# Precision 3440 Small Form Factor

Service Manual

## Notes, cautions, and warnings

(i) **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.**

# Contents

# Working on your computer

## Safety instructions

Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that you have read the safety information that shipped with your computer.

> (i) **NOTE: Before working inside your computer, read the safety information that is shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

> (i) **NOTE: Disconnect your computer from 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 your computer to an electrical outlet.**

> ⚠ **CAUTION: To avoid damaging the computer, ensure that the work surface is flat, dry and clean.**

> ⚠ **CAUTION: To avoid damaging the components and cards, handle them by their edges, and avoid touching the pins and the contacts.**

> ⚠ **CAUTION: You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. See the safety instructions that is shipped with the product or at www.dell.com/regulatory_compliance.**

> ⚠ **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.**

> ⚠ **CAUTION: When you disconnect a cable, pull it by its connector or its pull tab, not the cable itself. Some cables have connectors with locking tabs or thumb-screws that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly-aligned to avoid bending the connector pins. When connecting cables, ensure that the ports and the connectors are correctly oriented and aligned.**

> ⚠ **CAUTION: Press and eject any installed card from the media-card reader.**

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

## Before working inside your computer

**About this task**

> (i) **NOTE: The images in this document may differ from your computer depending on the configuration you ordered.**

**Steps**

1. Save and close all open files and exit all open applications.
2. Shut down your computer. Click **Start** > ⏻ **Power** > **Shut down**.

   > (i) **NOTE: If you are using a different operating system, see the documentation of your operating system for shut-down instructions.**

3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.

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

5. Remove any media card and optical disc from your computer, if applicable.

# Safety precautions

The safety precautions chapter details the primary steps to be taken before performing any disassembly instructions.

Observe the following safety precautions before you perform any installation or break/fix procedures involving disassembly or reassembly:

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power.
- Disconnect all network cables, telephone, and telecommunications lines from the system.
- Use an ESD field service kit when working inside any desktop to avoid electrostatic discharge (ESD) damage.
- After removing any system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to reduce the chance of getting electrocuted.

## Standby power

Dell products with standby power must be unplugged before you open the case. Systems that incorporate standby power are essentially powered while turned off. The internal power enables the system to be remotely turned on (wake on LAN) and suspended into a sleep mode and has other advanced power management features.

Unplugging, pressing and holding the power button for 15 seconds should discharge residual power in the system board.

## Bonding

Bonding is a method for connecting two or more grounding conductors to the same electrical potential. This is done through the use of a field service electrostatic discharge (ESD) kit. When connecting a bonding wire, ensure that it is connected to bare metal and never to a painted or non-metal surface. The wrist strap should be secure and in full contact with your skin, and ensure that you remove all jewelry such as watches, bracelets, or rings prior to bonding yourself and the equipment.

# Electrostatic discharge—ESD protection

ESD is a major concern when you handle electronic components, especially sensitive components such as expansion cards, processors, memory DIMMs, and system boards. Very slight charges can damage circuits in ways that may not be obvious, such as intermittent problems or a shortened product life span. As the industry pushes for lower power requirements and increased density, ESD protection is an increasing concern.

Due to the increased density of semiconductors used in recent Dell products, the sensitivity to static damage is now higher than in previous Dell products. For this reason, some previously approved methods of handling parts are no longer applicable.

Two recognized types of ESD damage are catastrophic and intermittent failures.

- **Catastrophic** – Catastrophic failures represent approximately 20 percent of ESD-related failures. The damage causes an immediate and complete loss of device functionality. An example of catastrophic failure is a memory DIMM that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code emitted for missing or nonfunctional memory.
- **Intermittent** – Intermittent failures represent approximately 80 percent of ESD-related failures. The high rate of intermittent failures means that most of the time when damage occurs, it is not immediately recognizable. The DIMM receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms related to the damage. The weakened trace may take weeks or months to melt, and in the meantime may cause degradation of memory integrity, intermittent memory errors, etc.

The more difficult type of damage to recognize and troubleshoot is the intermittent (also called latent or "walking wounded") failure.

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. The use of wireless anti-static straps is no longer allowed; they do not provide adequate protection. Touching the chassis before handling parts does not ensure adequate ESD protection on parts with increased sensitivity to ESD damage.
- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.
- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component. Before unwrapping the anti-static packaging, ensure that you discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

# ESD field service kit

The unmonitored Field Service kit is the most commonly used service kit. Each Field Service kit includes three main components: anti-static mat, wrist strap, and bonding wire.

## Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.
- **Wrist Strap and Bonding Wire** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the ESD mat is not required, or connected to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the ESD mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, mat, and bonding wire. Never use wireless wrist straps. Always be aware that the internal wires of a wrist strap are prone to damage from normal wear and tear, and must be checked regularly with a wrist strap tester in order to avoid accidental ESD hardware damage. It is recommended to test the wrist strap and bonding wire at least once per week.
- **ESD Wrist Strap Tester** – The wires inside of an ESD strap are prone to damage over time. When using an unmonitored kit, it is a best practice to regularly test the strap prior to each service call, and at a minimum, test once per week. A wrist strap tester is the best method for doing this test. If you do not have your own wrist strap tester, check with your regional office to find out if they have one. To perform the test, plug the wrist-strap's bonding-wire into the tester while it is strapped to your wrist and push the button to test. A green LED is lit if the test is successful; a red LED is lit and an alarm sounds if the test fails.
- **Insulator Elements** – It is critical to keep ESD sensitive devices, such as plastic heat sink casings, away from internal parts that are insulators and often highly charged.
- **Working Environment** – Before deploying the ESD Field Service kit, assess the situation at the customer location. For example, deploying the kit for a server environment is different than for a desktop or portable environment. Servers are typically installed in a rack within a data center; desktops or portables are typically placed on office desks or cubicles. Always look for a large open flat work area that is free of clutter and large enough to deploy the ESD kit with additional space to accommodate the type of system that is being repaired. The workspace should also be free of insulators that can cause an ESD event. On the work area, insulators such as Styrofoam and other plastics should always be moved at least 12 inches or 30 centimeters away from sensitive parts before physically handling any hardware components
- **ESD Packaging** – All ESD-sensitive devices must be shipped and received in static-safe packaging. Metal, static-shielded bags are preferred. However, you should always return the damaged part using the same ESD bag and packaging that the new part arrived in. The ESD bag should be folded over and taped shut and all the same foam packing material should be used in the original box that the new part arrived in. ESD-sensitive devices should be removed from packaging only at an ESD-protected work surface, and parts should never be placed on top of the ESD bag because only the inside of the bag is shielded. Always place parts in your hand, on the ESD mat, in the system, or inside an anti-static bag.
- **Transporting Sensitive Components** – When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

## ESD protection summary

It is recommended that all field service technicians use the traditional wired ESD grounding wrist strap and protective anti-static mat at all times when servicing Dell products. In addition, it is critical that technicians keep sensitive parts separate from all insulator parts while performing service and that they use anti-static bags for transporting sensitive components.

# After working inside your computer

**About this task**

⚠ **CAUTION: Leaving stray or loose screws inside your computer may severely damage your computer.**

**Steps**

1. Replace all screws and ensure that no stray screws remain inside your computer.
2. Connect any external devices, peripherals, or cables you removed before working on your computer.
3. Replace any media cards, discs, or any other parts that you removed before working on your computer.
4. Connect your computer and all attached devices to their electrical outlets.

5. Turn on your computer.

# Disassembly and reassembly

## Recommended tools

The procedures in this document require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe-Recommended for field technician

## Screw List

The following table shows the screw list and the images for different components.

**Table 1. Screw list**

| Component | Screw type | Quantity | Image |
| --- | --- | --- | --- |
| M.2 2230/2280 Solid-state drive | M2x3 | 1 | |
| WLAN card | M2x3 | 1 | |
| SD card reader | M6x32 | 2 | |
| Support bracket | M6x32 | 2 | |
| Power supply unit | M6x32 | 2 | |
| System board | M2x4<br>6-32 | 1<br>5 | |

## Side cover

## Removing the side cover

**Prerequisites**

1. Follow the procedure in before working inside your computer.
   ⓘ **NOTE: Ensure that you remove the security cable from the security-cable slot (if applicable).**

## About this task

The following images indicate the location of the side cover and provides a visual representation of the removal procedure.
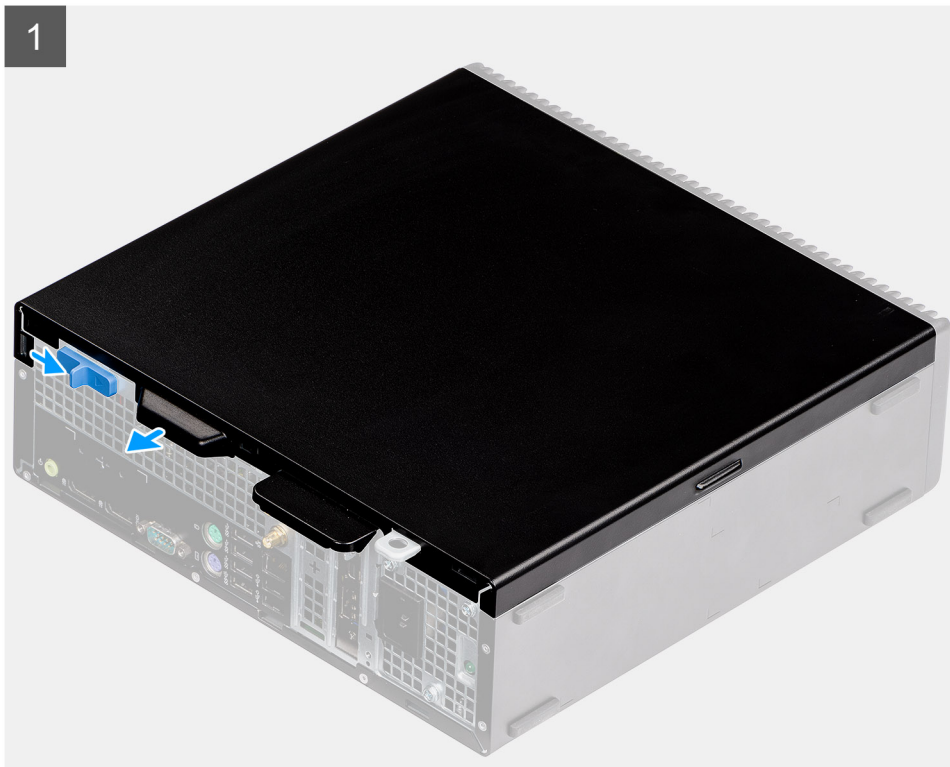




## Steps

1. Slide down on the release latch until your hear a click.
2. Slide the side cover towards the back of the system.
3. Lift the side cover from the system.

# Installing the side cover

**Prerequisites**

**About this task**

The following image indicates the location of the side panels and provides a visual representation of the installation procedure.

**Steps**

1. Place the side cover on your computer.
2. Slide the side cover towards the front of the system till you hear the release latch click.

**Next steps**

1. Follow the procedure in after working inside your computer.

# Intrusion switch

## Removing the intrusion switch

**Prerequisites**

1. Follow the procedure in Before working inside your computer.
2. Remove the Side cover

**About this task**

The following images indicate the location of the intrusion switch and provide a visual representation of the removal procedure.
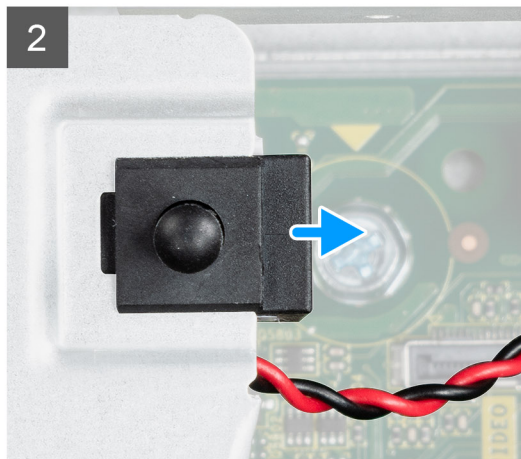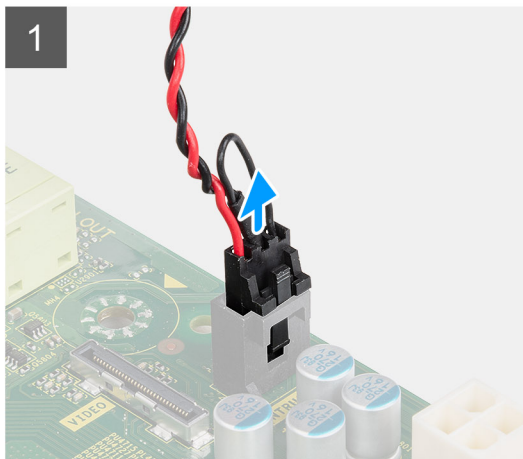


**Steps**

1. Disconnect the intrusion switch cable from the connector on the system board.
2. Slide the intrusion switch from the system .

## Installing the intrusion switch

**Prerequisites**

**About this task**

The following image indicates the location of the intrusion switch and provides a visual representation of the installation procedure.



**Steps**

1. Slide the intrusion switch into the slot on the chassis.
2. Connect the intrusion switch cable to the connector on the system board. .

**Next steps**

1. Install the Side cover
2. Follow the procedure in After working inside your computer.

# Front bezel

# Removing the front bezel

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.

**About this task**

The following images indicate the location of the front bezel and provide a visual representation of the removal procedure.
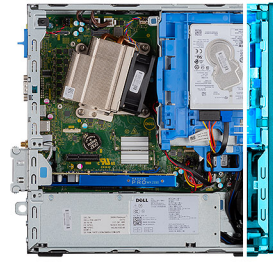
**Steps**

1. Pry the retention tabs to release the front bezel from the system.
2. Remove the front bezel from the system.

# Installing the front bezel

**Prerequisites**

**About this task**

The following image indicates the location of the front bezel and provides a visual representation of the installation procedure.
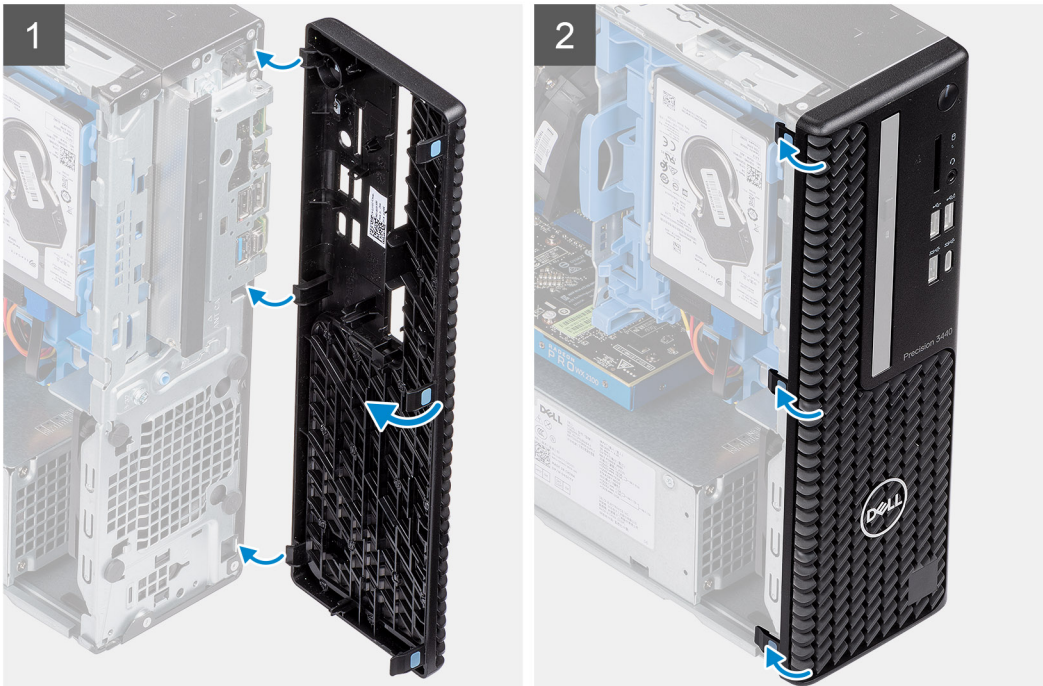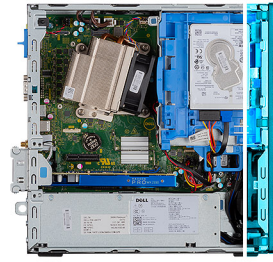
**Steps**

1. Align the bezel and insert the retention tabs on the bezel into the slots on the system.
2. Press the bezel until the retention tabs click into place.

**Next steps**

1. Install the side cover.
2. Follow the procedure in after working inside your computer.

# Hard-drive assembly

# Removing the 2.5 in. hard-disk drive assembly

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.

**About this task**

The following images indicate the location of the 2.5 in. hard-disk drive assembly and provide a visual representation of the removal procedure.
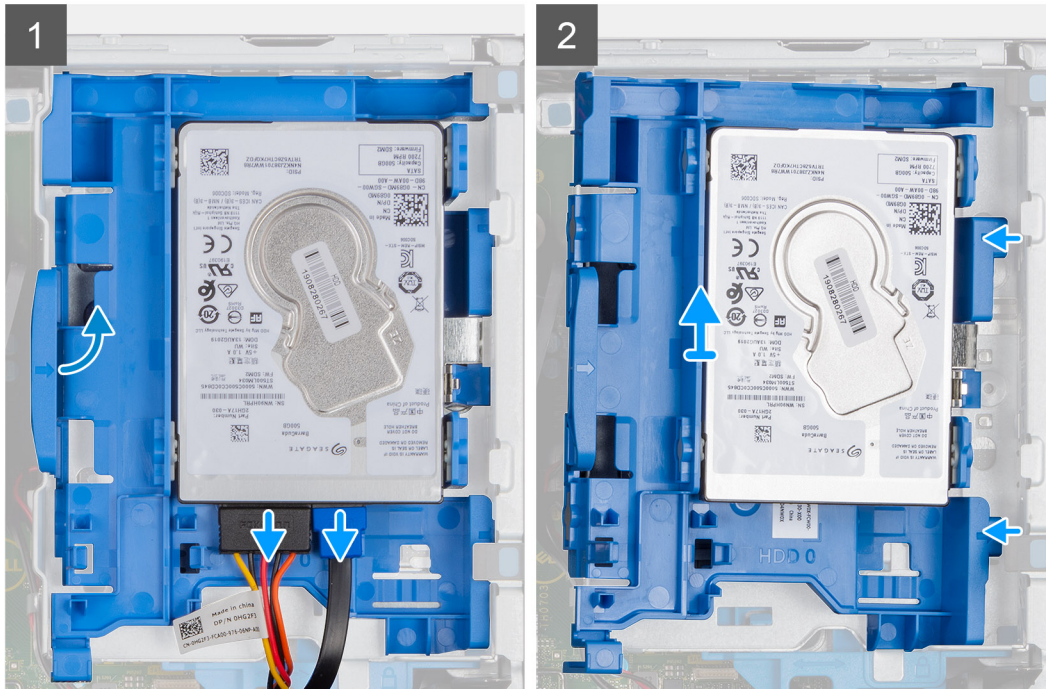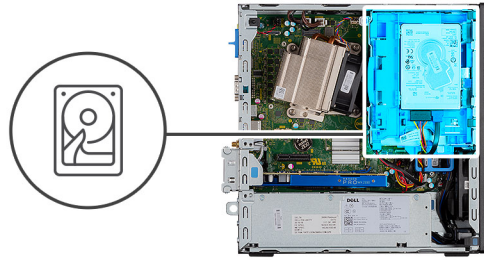
## Steps

1. Disconnect the hard-disk drive data cable and power cable from the connectors on the hard-disk drive.
2. Push the release tab and slightly lift the hard-disk drive assembly.
3. Release the hard-disk drive assembly from the notch and slide the hard-disk drive assembly out.

(i) **NOTE: Note the orientation of the hard-disk drive so that you can replace it correctly.**

# Removing the hard-disk drive bracket

## Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.
4. Remove the 2.5 in. hard-disk drive assembly.

## About this task

The following images indicate the location of the hard-disk drive bracket and provide a visual representation of the removal procedure.
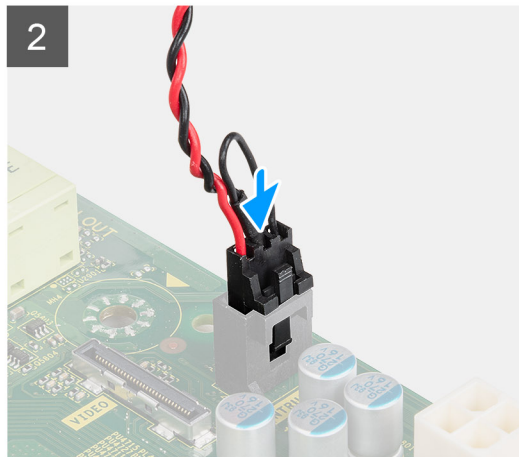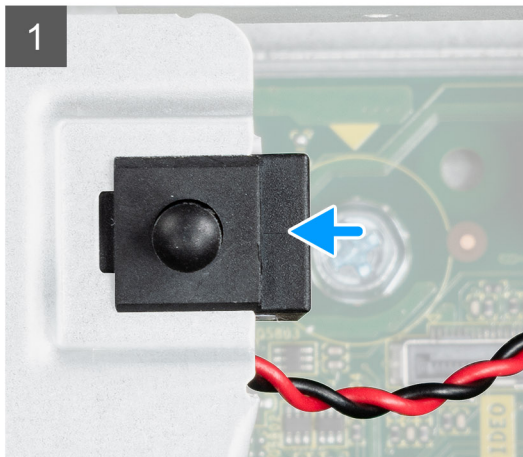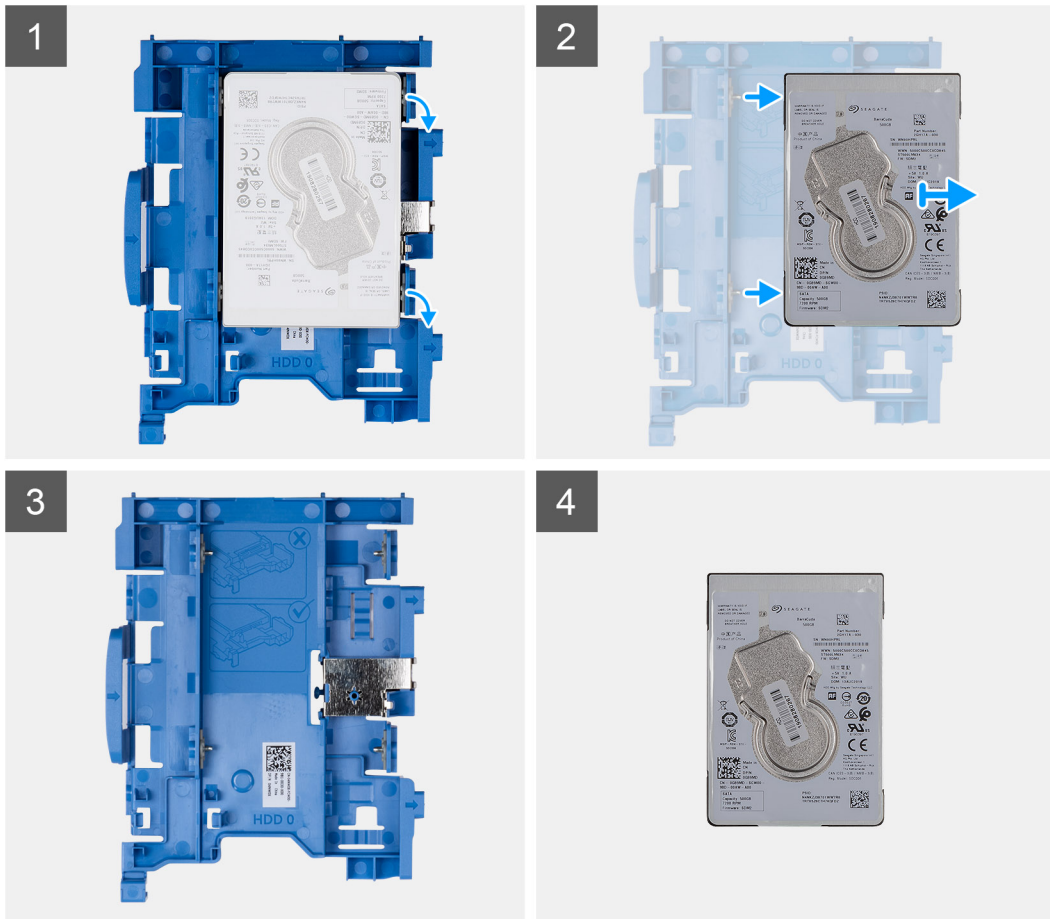
## Steps

1. Pull one side of the hard-disk drive bracket to disengage the pins on the bracket from the slots on the drive and lift the hard-disk drive.
2. Hard-disk drive bracket for the 2.5 in. hard-disk drive.
3. 2.5 in. hard-disk drive.

# Installing the hard-disk drive bracket

**Prerequisites**

**About this task**

The following image indicates the location of the hard-disk drive bracket and provides a visual representation of the installation procedure.
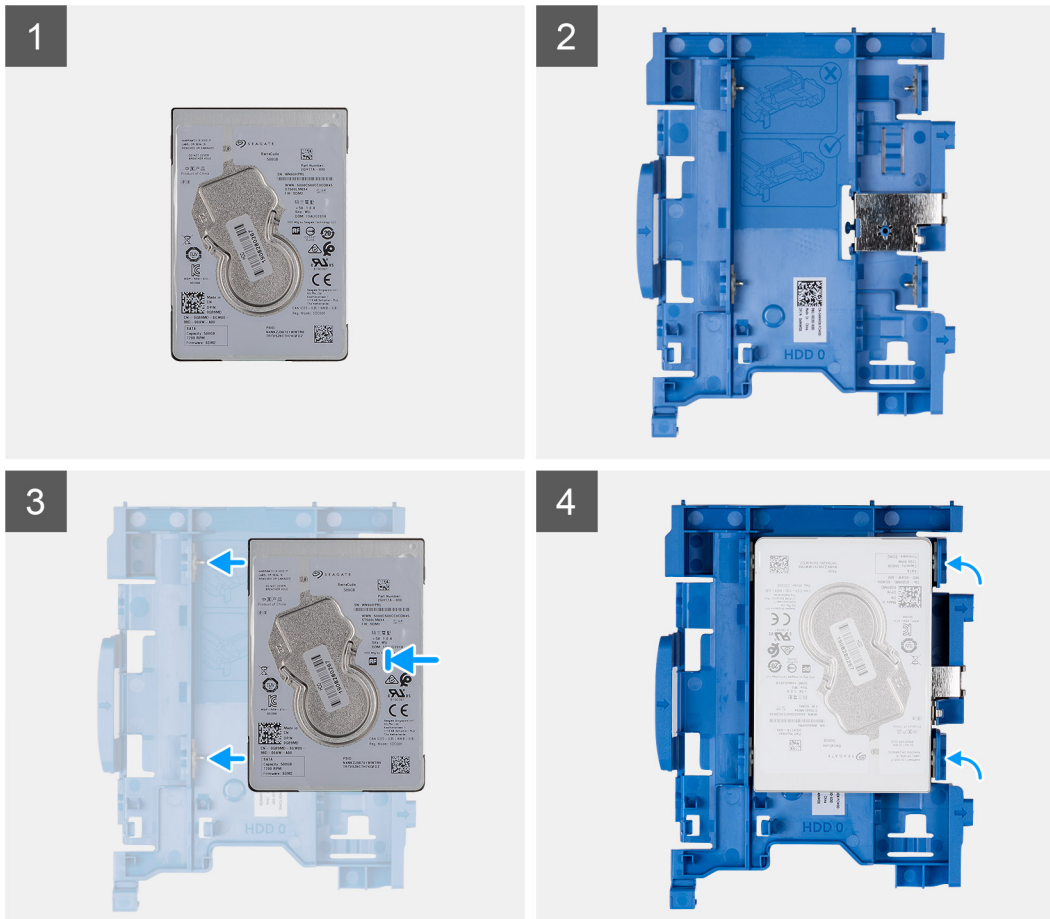
**Steps**

1. 2.5 in. hard-disk drive.
2. Hard-disk drive bracket for the 2.5 in. hard-disk drive.
3. Align and insert the pins on the drive bracket with the slots on the hard-disk drive.
4. 2.5 in. hard-disk drive assembly.

**Next steps**

1. Install the 2.5 in. hard-disk drive assembly.
2. Install the front bezel.
3. Install the side cover.
4. Follow the procedure in after working inside your computer.

# Installing the 2.5 in. hard-disk drive assembly

**Prerequisites**

**About this task**

The following image indicates the location of the 2.5 in. hard-disk drive and provides a visual representation of the installation procedure.
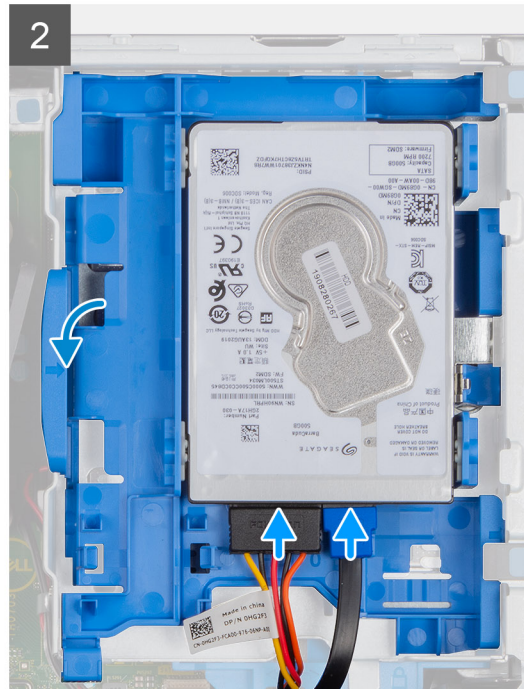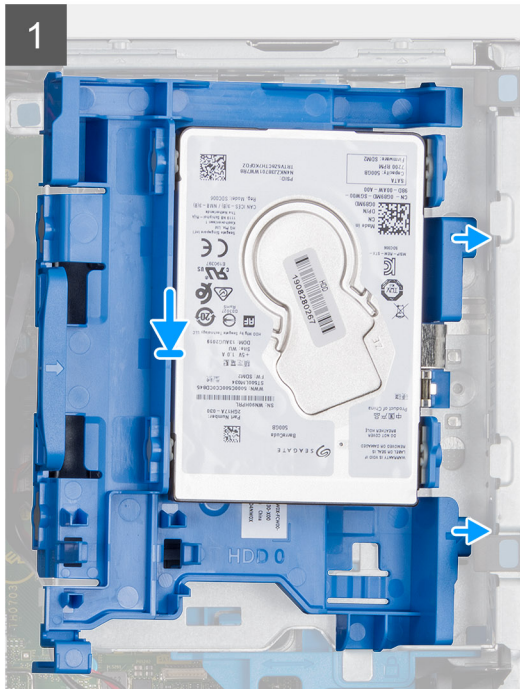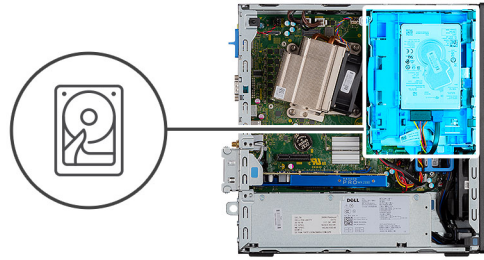
**Steps**

1. Insert the hard-disk drive assembly into the slot on the system and slide the hard-disk drive assembly down.
2. Press down the hard-disk drive assembly, until it clicks into place.
3. Connect the power cable and hard-disk drive cable to the connectors on the hard-disk drive.

**Next steps**

1. Install the front bezel.
2. Install the side cover.
3. Follow the procedure in after working inside your computer.

# Hard-drive and optical-drive module

# Removing the hard-disk drive and optical-disk drive module

**Prerequisites**

1. Follow the procedure in Before working inside your computer.
2. Remove the Side cover
3. Remove the Front bezel

**About this task**

The following images indicate the location of the hard-disk drive and optical-disk drive module and provide a visual representation of the removal procedure.
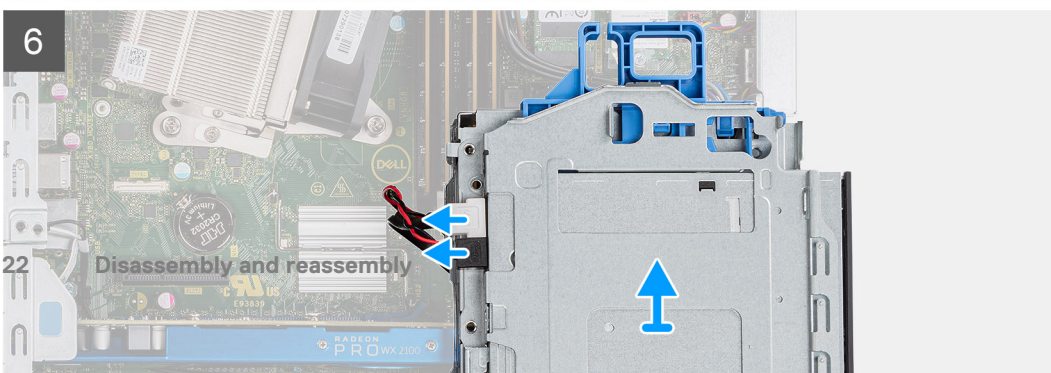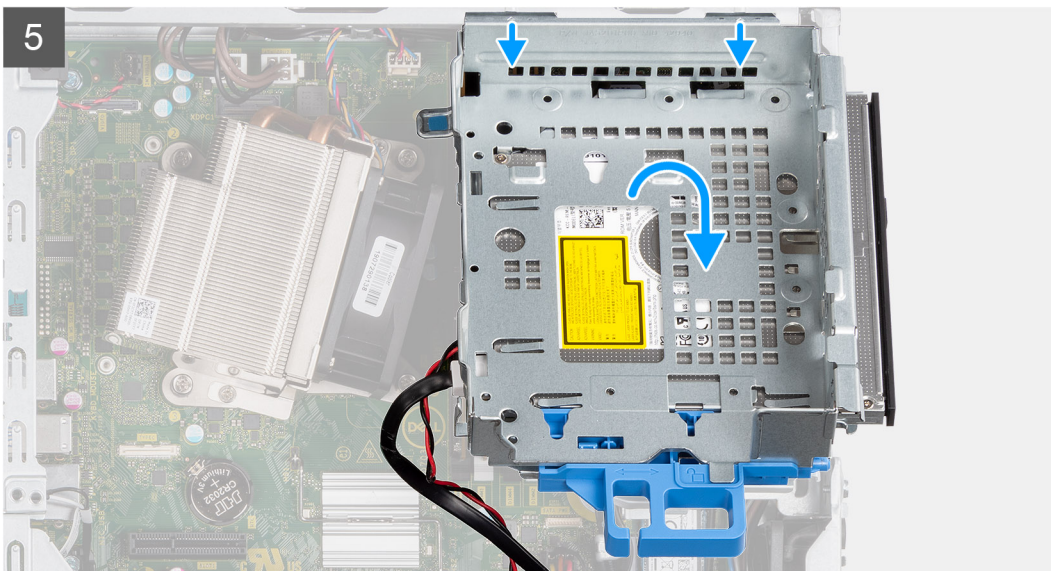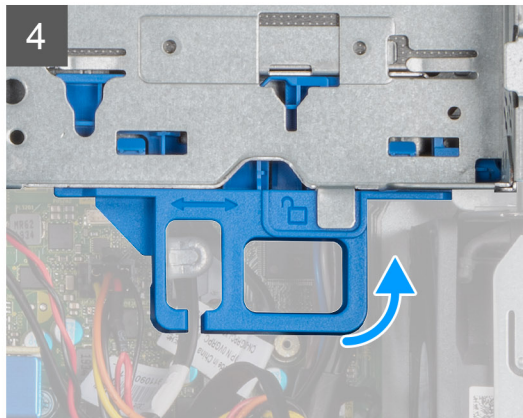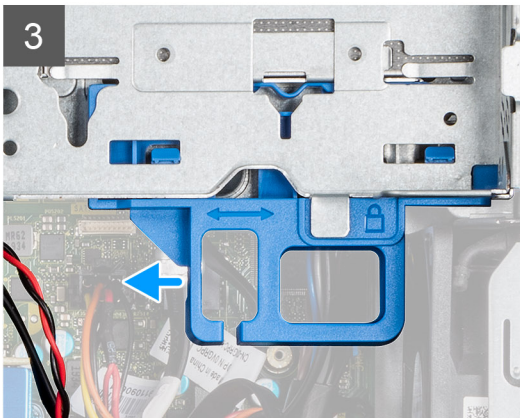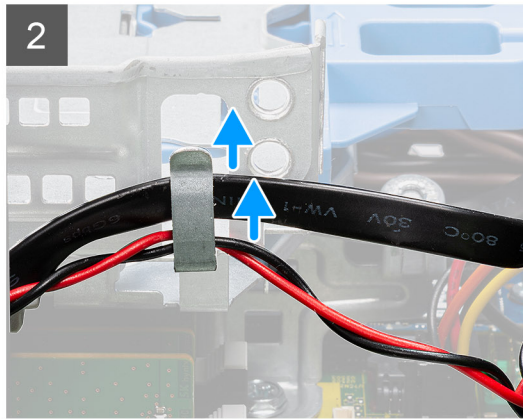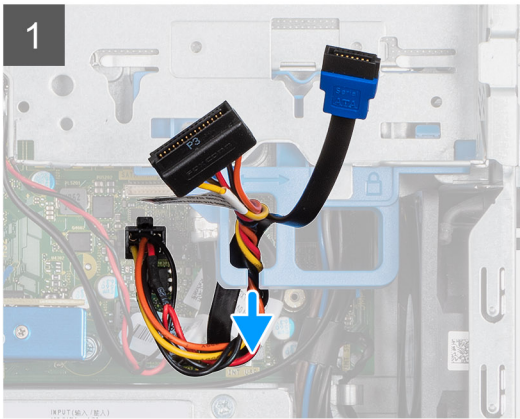
**Steps**

1. Remove the hard-disk drive power cable and the SATA cable through the recess in the release latch.
2. Unroute the optical-disk drive cable and the hard-disk drive cable from the retention clip on the hard-disk drive and optical-disk drive module.
3. Slide the release latch to unlock the hard-disk drive and optical-disk drive module.
4. Holding the release latch lift the hard-disk drive and optical-disk drive module.
5. Lift the hard-disk drive and optical-disk drive module and slide it out of the slot.
6. Flip the hard-disk drive and optical-disk drive module to disconnect the optical-disk drive data and power cables.

# Installing the hard-disk drive and optical-disk drive module

**Prerequisites**

**About this task**

The following image indicates the location of the hard-disk drive and optical-disk drive module and provides a visual representation of the installation procedure.
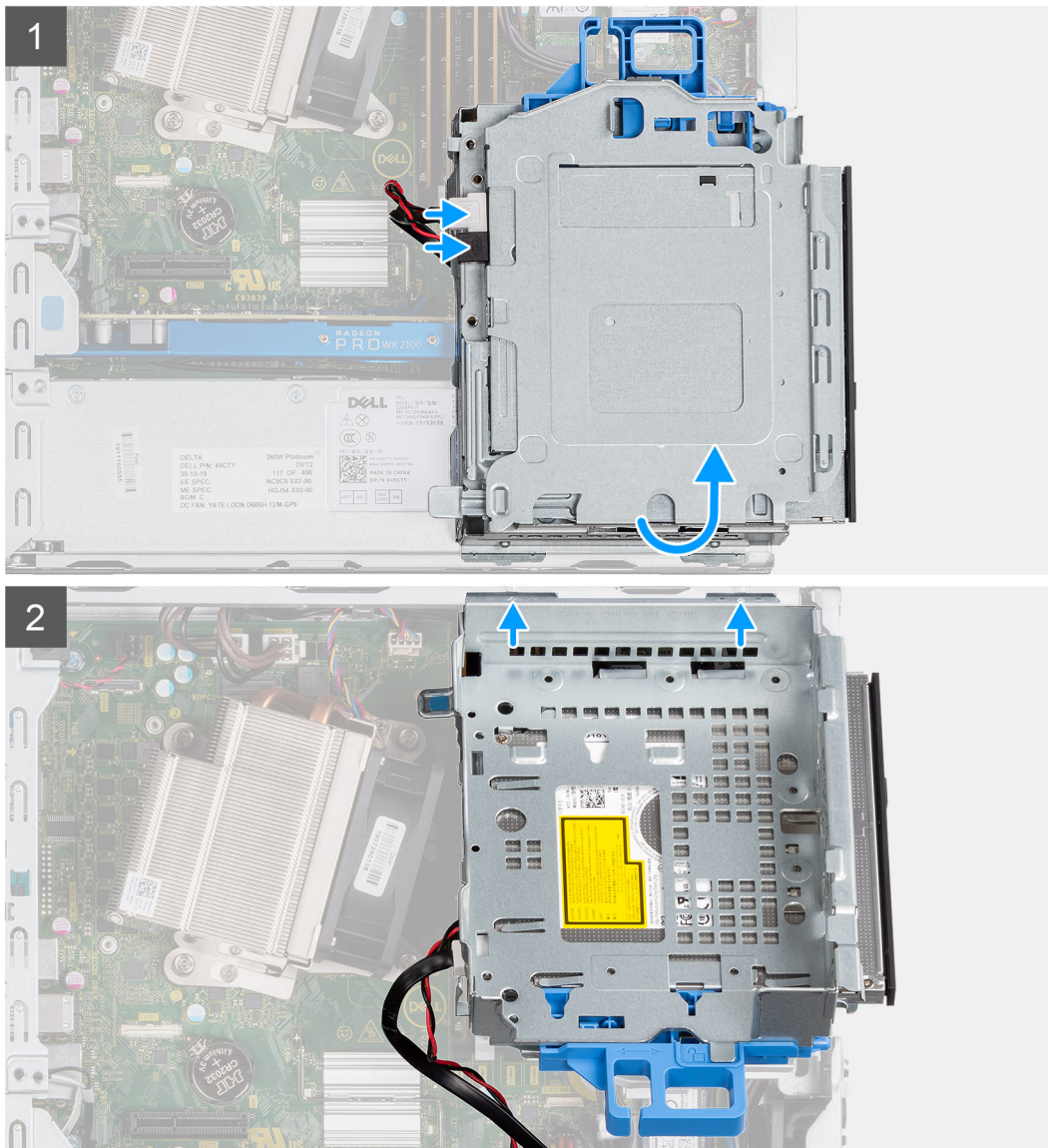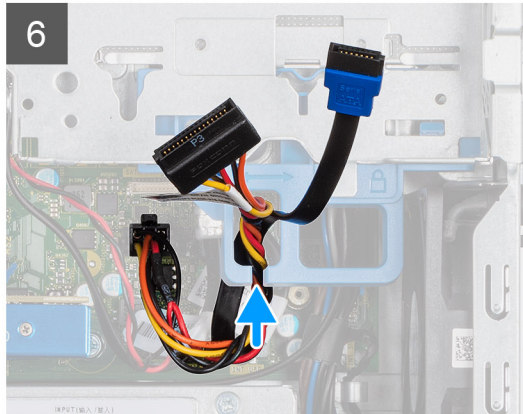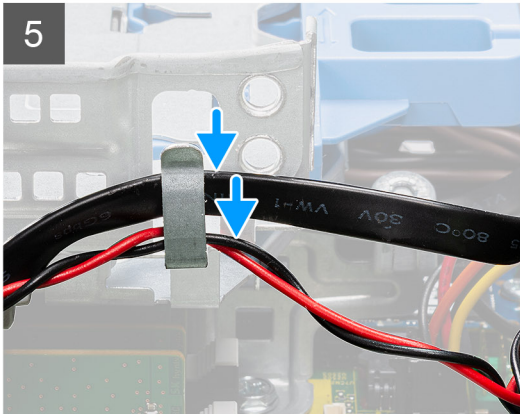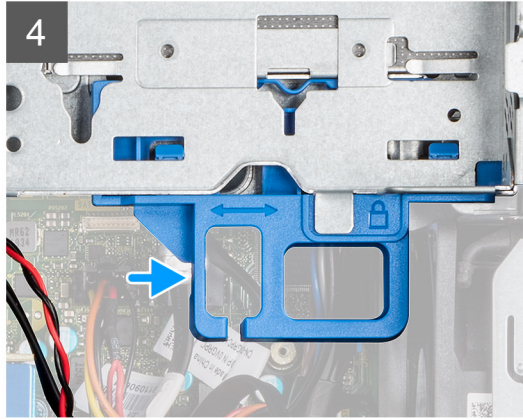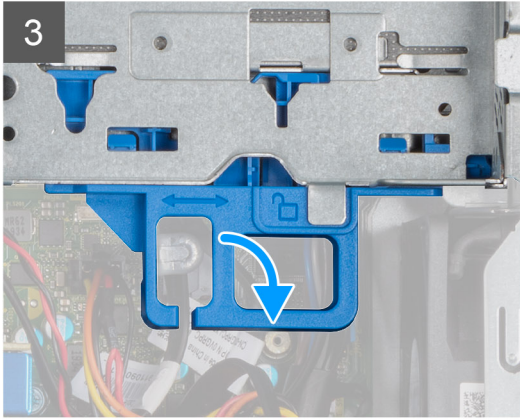
**Steps**

1. Connect the optical-drive data and power cable to the connectors on the optical-drive and flip the hard-disk drive and optical-disk drive module.
2. Insert the tabs on the hard-disk drive and optical-disk drive module into the slot on the system at an angle.
3. Lower the hard-disk drive and optical-disk drive module into the slot.
4. Slide the release latch to lock the hard-disk drive and optical-disk drive module.
5. Reroute the hard-disk drive power cable and SATA cable through the retention clips on the hard-disk drive and optical-disk drive module.
6. Reroute the hard-disk drive power cable and the SATA cable through the recess on the release tab.

**Next steps**

1. Install the Front bezel
2. Install the Side cover
3. Follow the procedure in After working inside your computer.

# Optical drive

## Removing the slim optical-drive

**Prerequisites**

1. Follow the procedure in Before working inside your computer.
2. Remove the Side cover
3. Remove the Front bezel

**About this task**

The following images indicate the location of the slim optical-drive and provide a visual representation of the removal procedure.
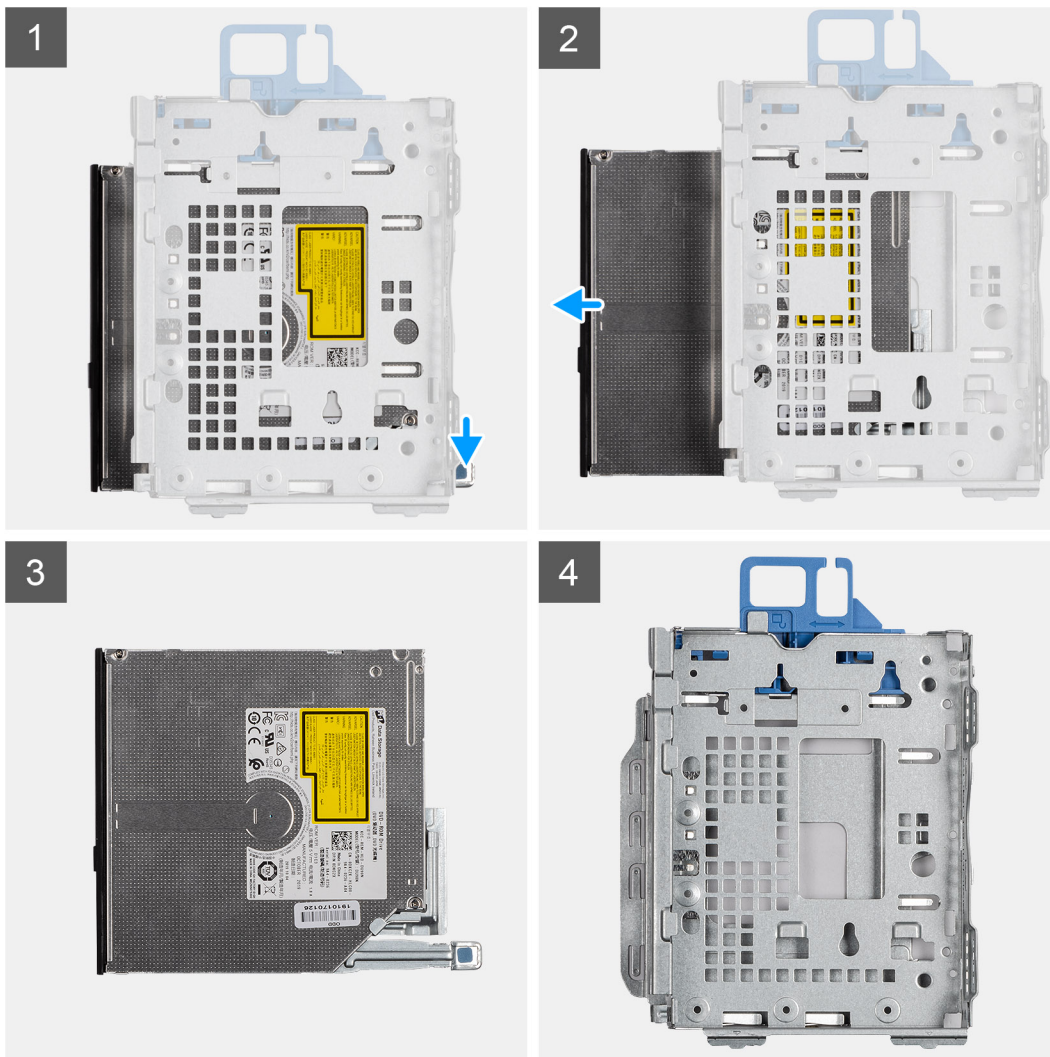


**Steps**

1. Press the release tab on the optical-drive/ hard-drive module.
2. Slide the optical-drive out of the optical-drive/ hard-drive module.
3. Optical-drive unit.
4. Optical-drive/ hard-drive module.

# Installing the slim optical-drive

**Prerequisites**

**About this task**

The following image indicates the location of the slim optical-drive and provides a visual representation of the installation procedure.



**Steps**

1. Optical drive/ hard drive module.
2. Optical drive unit.
3. Insert the optical drive into the optical drive/ hard drive module.
4. Press the Optical drive unit until it clicks in place.

**Next steps**

1. Install the Side cover
2. Install the Front bezel
3. Follow the procedure in After working inside your computer.

# Solid-state drive

## Removing the M.2 2230 PCIe solid-state drive

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.
4. Remove the 2.5 in. hard drive assembly.

**About this task**

The following images indicate the location of the solid-state drive and provide a visual representation of the removal procedure.



**Steps**

1. Remove the screw (M2x3) that secures the solid-state drive to the system board.
2. Slide and lift the solid-state drive off the system board.

## Installing the M.2 2230 PCIe solid-state drive

**Prerequisites**

**About this task**

The following image indicates the location of the solid-state drive and provides a visual representation of the installation procedure.

## Steps

1. Align the notch on the solid-state drive with the tab on the solid-state drive connector.
2. Insert the solid-state drive at a 45-degree angle into the connector on the system board.
3. Replace the screw (M2x3) that secures the M.2 2230 PCIe solid-state drive to the system board.

## Next steps

1. Install the 2.5 in. hard drive assembly.
2. Install the front bezel.
3. Install the side cover.
4. Follow the procedure in after working inside your computer.

# Removing the M.2 2280 PCIe solid-state drive

## Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.
4. Remove the 2.5 in. hard drive assembly.

## About this task

The following images indicate the location of the solid-state drive and provide a visual representation of the removal procedure.

**1x**
M2x3
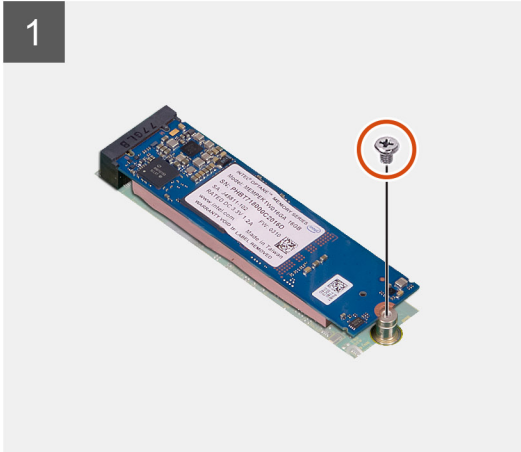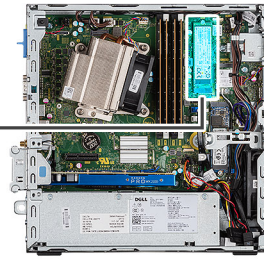
**Steps**

1. Remove the screw (M2x3) that secures the solid-state drive to the system board.
2. Slide and lift the solid-state drive off the system board.

# Installing the M.2 2280 PCIe solid-state drive

**Prerequisites**

**About this task**

The following image indicates the location of the solid-state drive and provides a visual representation of the installation procedure.

**Steps**

1. Align the notch on the solid-state drive with the tab on the solid-state drive connector.
2. Insert the solid-state drive at a 45-degree angle into the connector on the system board.
3. Replace the screw (M2x3) that secures the M.2 2280 PCIe solid-state drive to the system board.

**Next steps**

1. Install the 2.5 in. hard drive assembly.
2. Install the front bezel.
3. Install the side cover.
4. Follow the procedure in after working inside your computer.

# WLAN card

## Removing the WLAN card

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.
4. Remove the 2.5 in. hard drive assembly.

**About this task**

The following images indicate the location of the wireless card and provide a visual representation of the removal procedure.
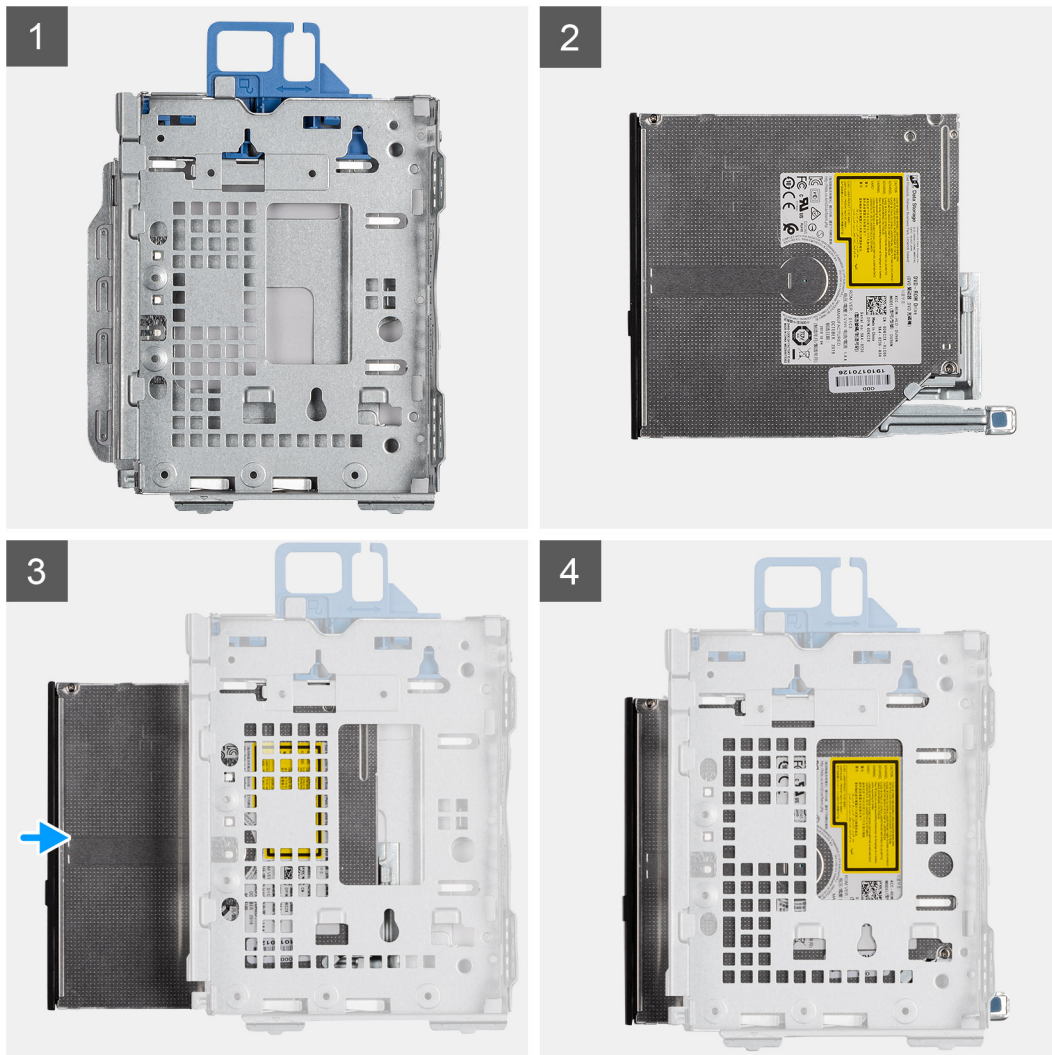
**Steps**

1. Remove the (M2x3) screw that secures the WLAN bracket and WLAN card to the system board.
2. Slide and lift the WLAN card bracket away from the WLAN card.
3. Disconnect the antenna cables from the WLAN card.
4. Slide and remove the WLAN card from the connector on the system board.

# Installing the WLAN card

**Prerequisites**

**About this task**

The following image indicates the location of the wireless card and provides a visual representation of the installation procedure.

**1x**
M2x3
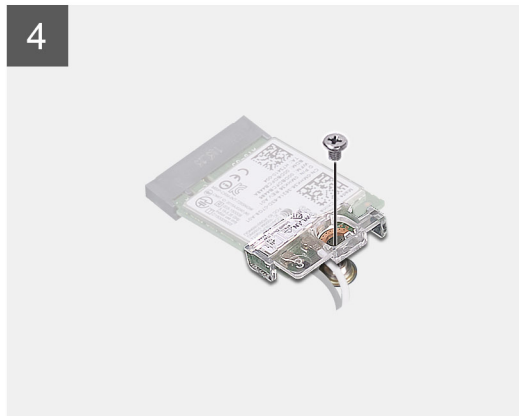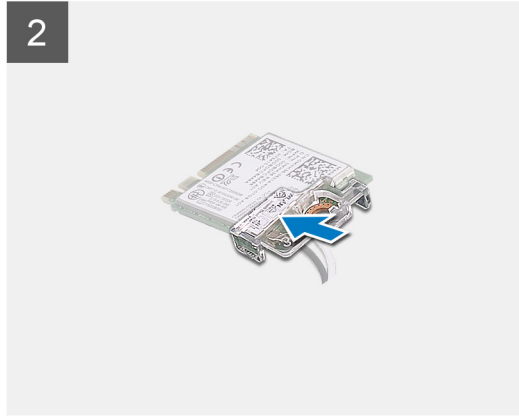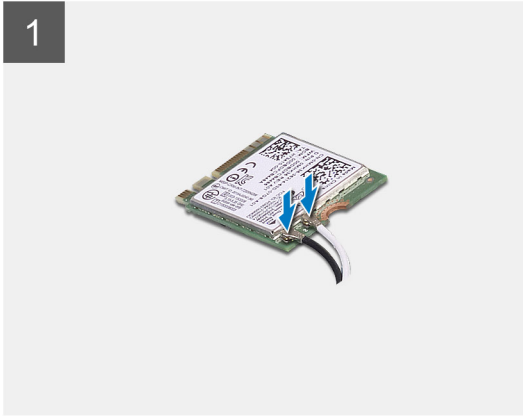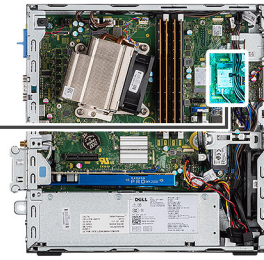
**Steps**

1. Connect the antenna cables to the WLAN card.

   The following table provides the antenna-cable color scheme for the WLAN card of your computer.

   **Table 2. Antenna-cable color scheme**

   | Connectors on the wireless card | Antenna-cable color |
   |---|---|
   | Main (white triangle) | White |
   | Auxiliary (black triangle) | Black |

2. Place the WLAN card bracket to secure the antenna cables.
3. Align the notch on the WLAN card with the tab on the WLAN-card slot and insert it into the connector on the system board.
4. Replace the (M2x3) screw to secure the WLAN card bracket and WLAN card to the system board.

**Next steps**

1. Install the 2.5 in. hard drive assembly.
2. Install the front bezel.
3. Install the side cover.
4. Follow the procedure in after working inside your computer.

# SD card reader - optional

## Removing the SD card reader

**Prerequisites**

1. Follow the procedure in Before working inside your computer.
2. Remove the Side cover

**About this task**

The following images indicate the location of the graphics card and provide a visual representation of the removal procedure.



**Steps**

1. Unroute the power supply cables from the retention clip on the SD card reader.
2. Remove the two screws (M6X32) and lift the SD card reader from the chassis.

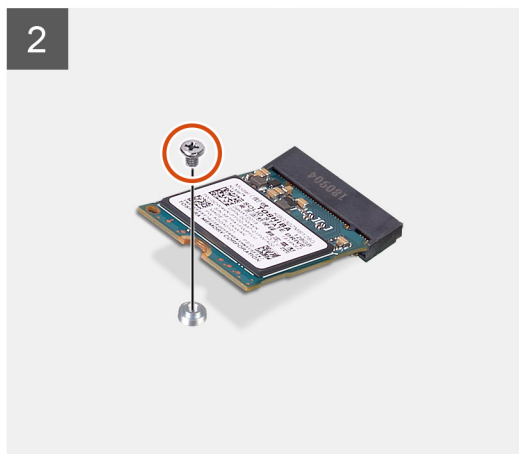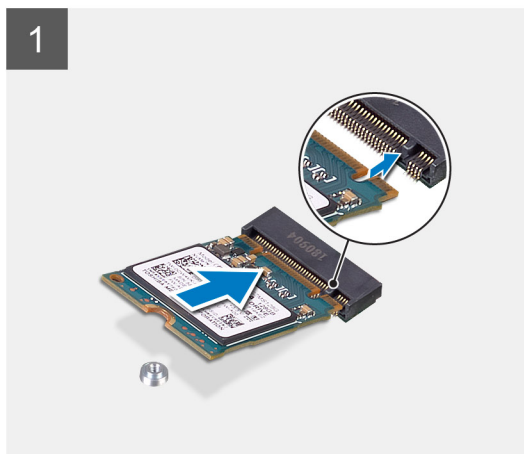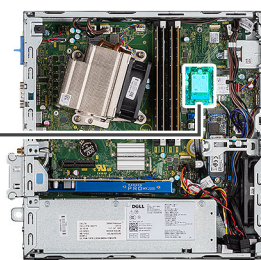## Installing the SD card reader

**Prerequisites**

**About this task**

The following image indicates the location of the SD card reader and provides a visual representation of the installation procedure.
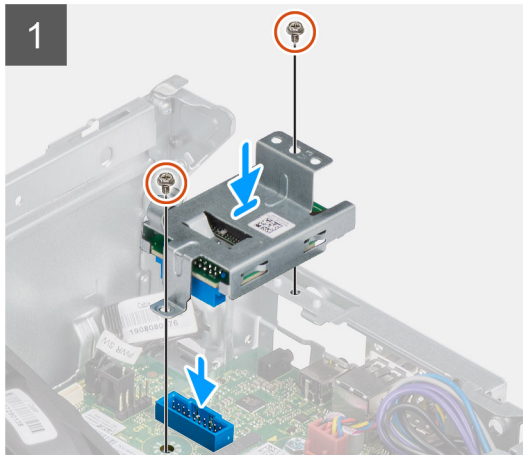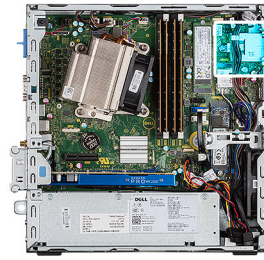
**Steps**

1. Align the SD card reader with the screw holes on the system board and replace the two screws (M6X32).
2. Route the power supply cables through the retention clip on the SD card reader.

**Next steps**

1. Install the Side cover
2. Follow the procedure in After working inside your computer.

# Expansion card

## Removing the expansion card

**Prerequisites**

1. Follow the procedure in Before working inside your computer.
2. Remove the Side cover

**About this task**

The following images indicate the location of the expansion card and provide a visual representation of the removal procedure.
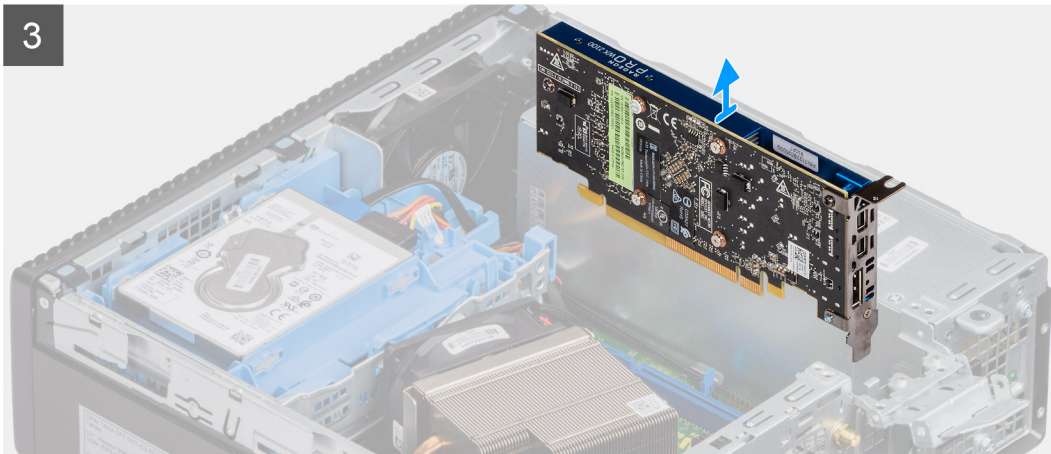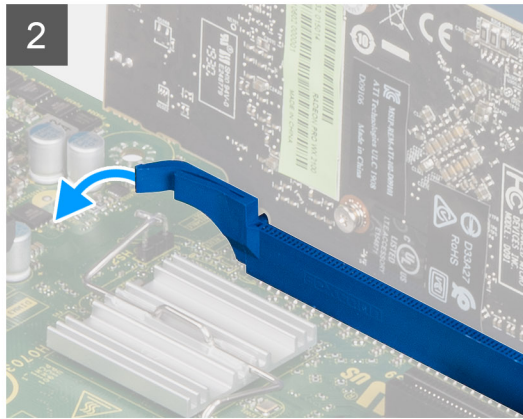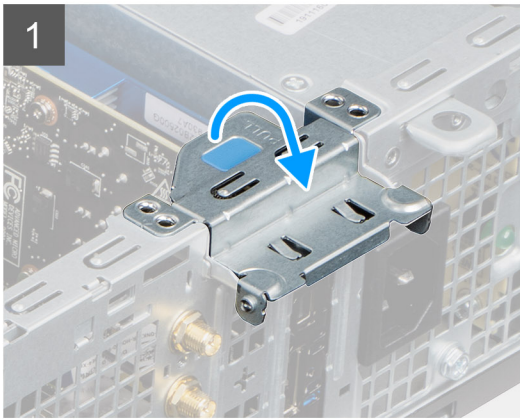
## Steps

1. Pull the metal tab to open the expansion card latch.
2. Pull the release tab at the base of the expansion card.
3. Lift the expansion card away from the connector on the system board.
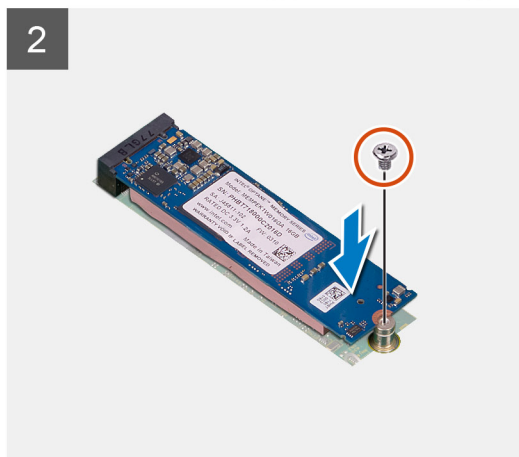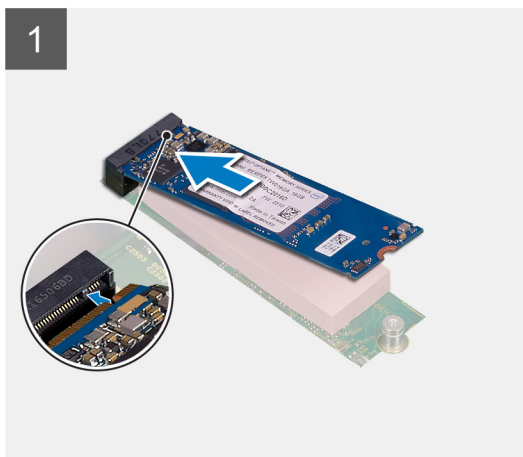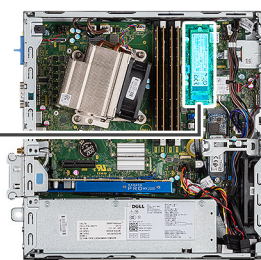
# Installing the expansion card

**Prerequisites**

**About this task**

The following image indicates the location of the expansion card and provides a visual representation of the installation procedure.

**Steps**

1. Align the notch on the expansion card with the connector on the system board.
2. Place the card in the connector and press down firmly. Ensure that the card is firmly seated.
3. Close the expansion card latch and press it until it clicks into place.

**Next steps**

1. Install the Side cover
2. Follow the procedure in After working inside your computer.
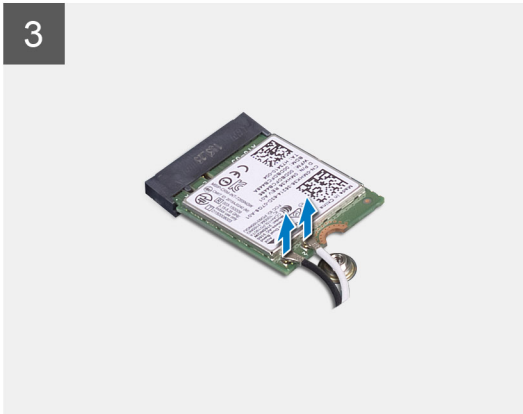
# Memory modules

## Removing the memory modules

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.

4. Remove the 2.5 in. hard drive assembly.

⚠ **CAUTION: To prevent damage to the memory module, hold the memory module by the edges. Do not touch the components on the memory module**

**About this task**

The following images indicate the location of the memory modules and provide a visual representation of the removal procedure.
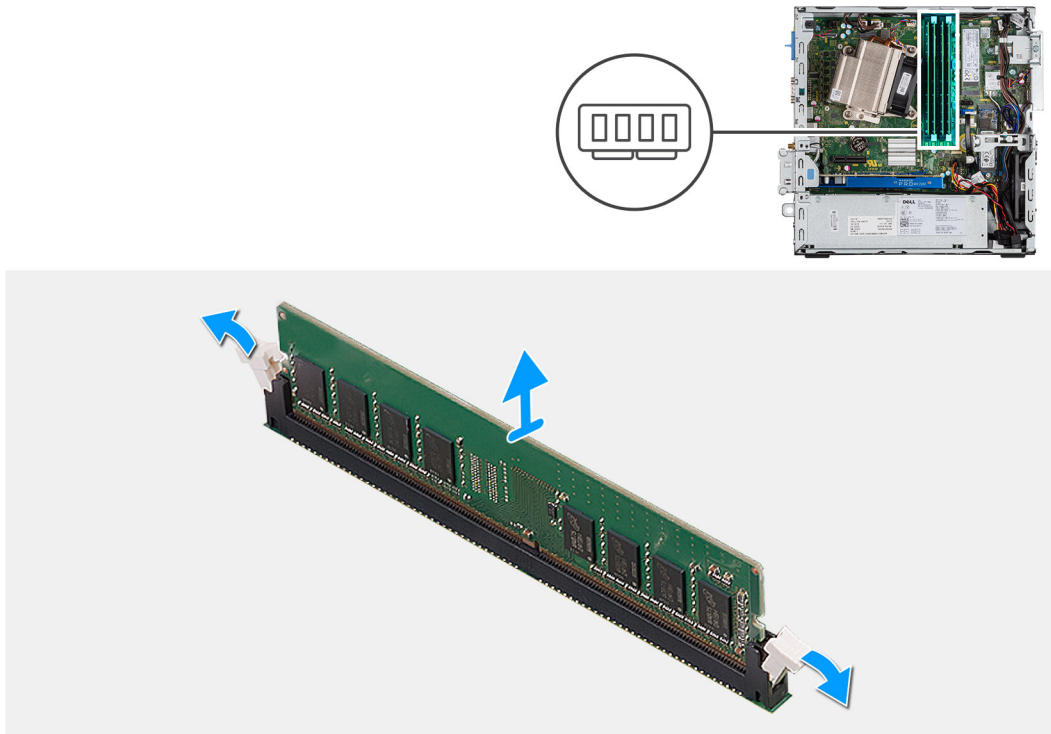


**Steps**

1. Pull the securing clips from the memory module until the memory module pops up.
2. Remove the memory module from the memory-module slot.

# Installing the memory modules

**Prerequisites**

**About this task**

The following image indicates the location of the memory modules and provides a visual representation of the installation procedure.

## Steps

1. Align the notch on the memory module with the tab on the memory-module slot.
2. Slide the memory module firmly into the slot at an angle and press the memory module down until it clicks into place.

> (i) **NOTE: If you do not hear the click, remove the memory module and reinstall it.**

## Next steps

1. Install the 2.5 in. hard drive assembly.
2. Install the front bezel.
3. Install the side cover.
4. Follow the procedure in after working inside your computer.
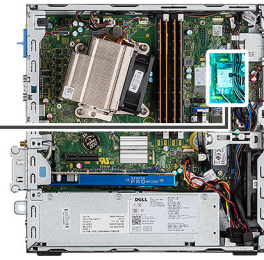
# Heat sink

## Removing the heat-sink

### Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.

### About this task

The following images indicate the location of the heat-sink and provide a visual representation of the removal procedure.
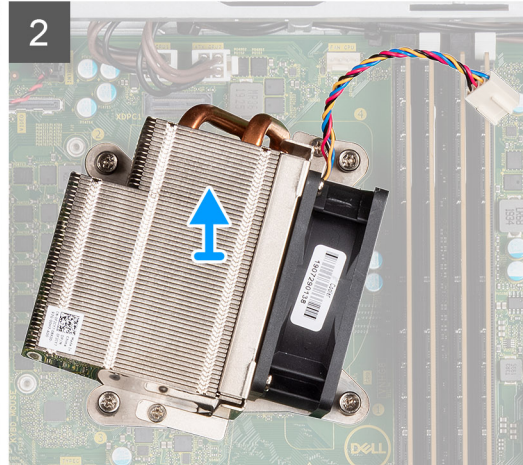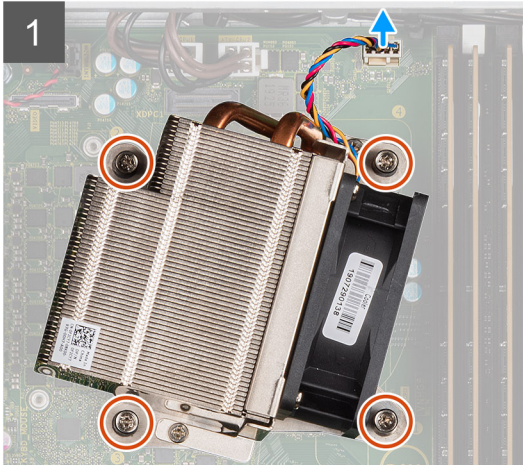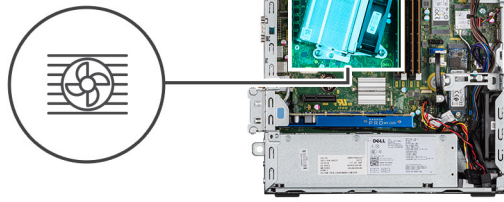
## Steps

1. Disconnect the fan cable from the connector on the system board.
2. Loosen the four captive screws that secure the heat sink to the system.

   ⓘ **NOTE: Loosen the screws in a sequential order (1,2,3,4) as mentioned on the system board.**

3. Lift the heat-sink from the system board.

# Installing the heat-sink

**Prerequisites**

**About this task**

The following image indicates the location of the VR heat sink and provides a visual representation of the installation procedure.
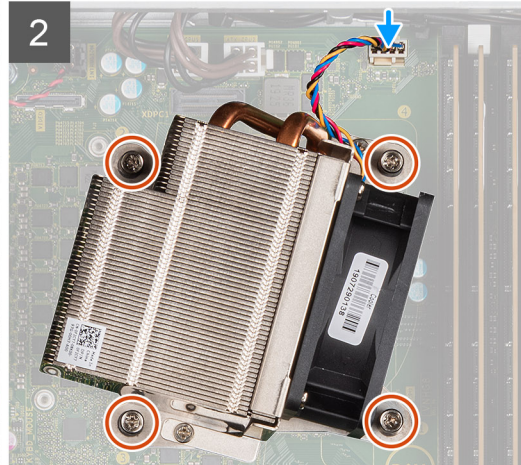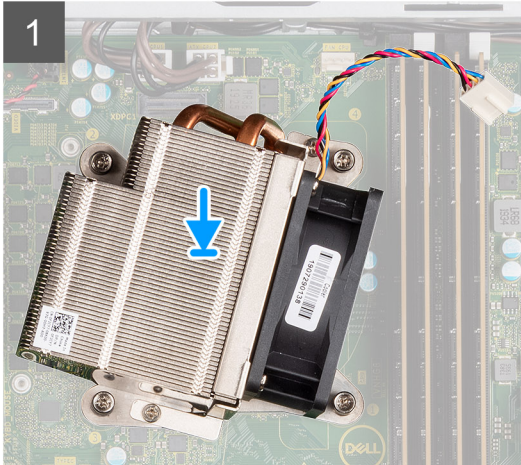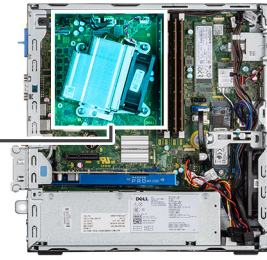
## Steps

1. Place the heat sink on the processor.
2. Tighten the four captive screws that secure the heat-sink to the system board, as per the callout on the system board.

   ⓘ **NOTE: Tighten the screws in a sequential order (1,2,3,4) as mentioned on the system board.**

3. Connect the heat sink fan cable to the system board.

## Next steps

1. Install the front bezel.
2. Install the side cover.
3. Follow the procedure in after working inside your computer.

# Coin-cell battery

## Removing the coin-cell battery

### Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.

### About this task

The following images indicate the location of the coin-cell battery and provide a visual representation of the removal procedure.
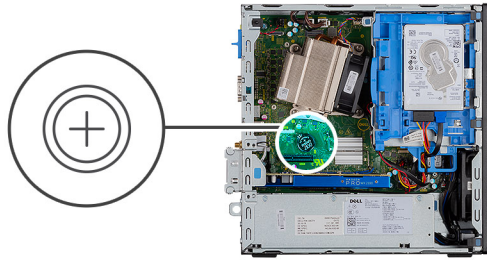
**Steps**

1. Using a plastic scribe, gently pry the coin-cell battery out of the battery socket.
2. Remove the coin-cell battery out of the system.

# Installing the coin-cell battery

**Prerequisites**

**About this task**

The following image indicates the location of the coin-cell battery and provides a visual representation of the installation procedure.
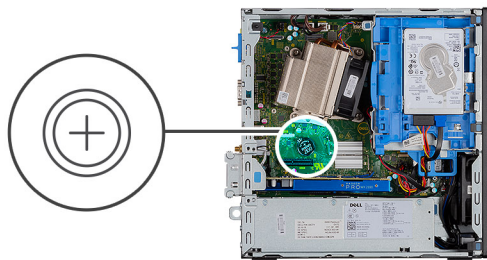
**Steps**

1. Insert the coin cell battery with the "+" sign facing up and slide it into the battery socket at an angle.
2. Press the battery into the connector until it clicks into place.

**Next steps**

1. Install the front bezel.
2. Install the side cover.
3. Follow the procedure in after working inside your computer.

# Processor

## Removing the processor

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.
4. Remove the heat-sink.

**About this task**

ⓘ **NOTE: The processor might still be hot after the computer is shut down. Allow the processor to cool down before removing it.**

The following images indicate the location of the processor and provide a visual representation of the removal procedure.
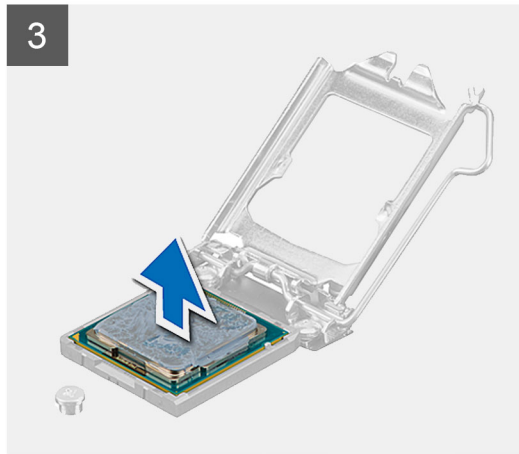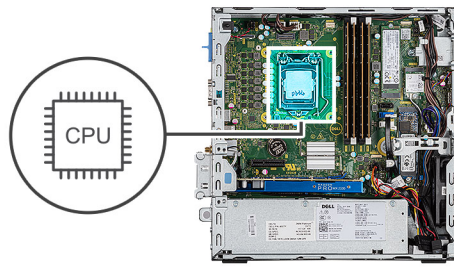
**Steps**

1. Press down and push the release lever away from the processor to release it from the securing tab.
2. Lift the lever upward to lift the processor cover.

   ⚠️ **CAUTION: When removing the processor, do not touch any of the pins inside the socket or allow any objects to fall on the pins in the socket.**

3. Gently lift the processor from the processor socket.

# Installing the processor

**Prerequisites**

**About this task**

The following image indicates the location of the processor and provides a visual representation of the installation procedure.
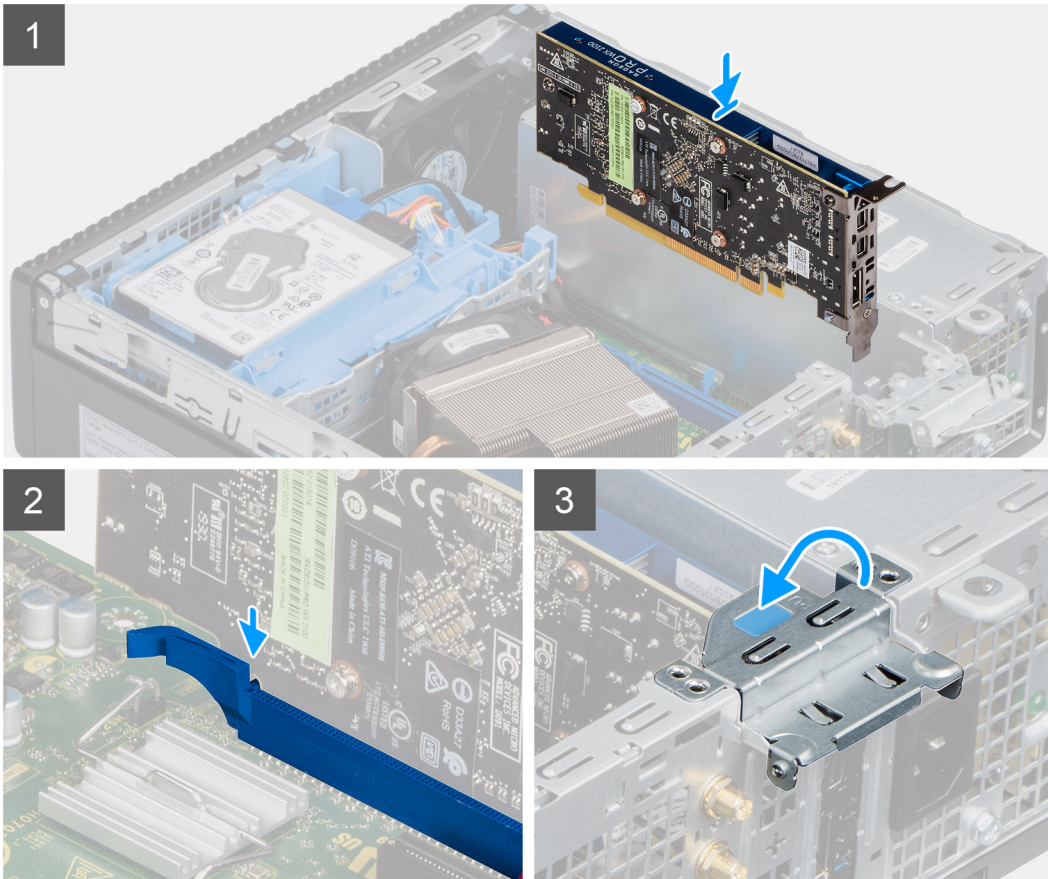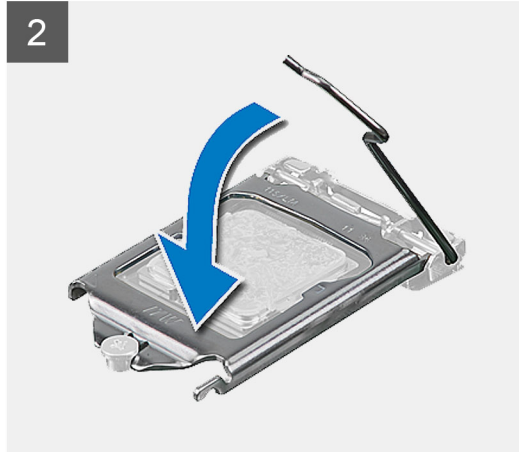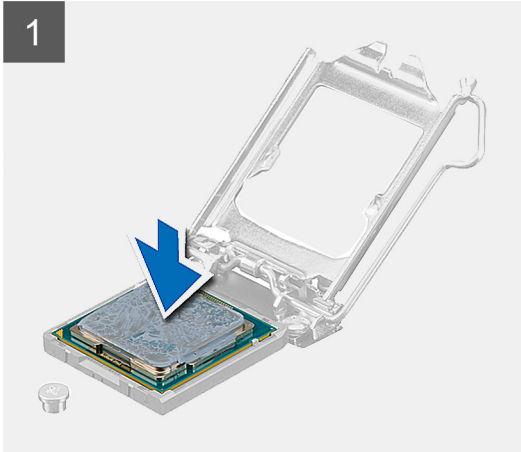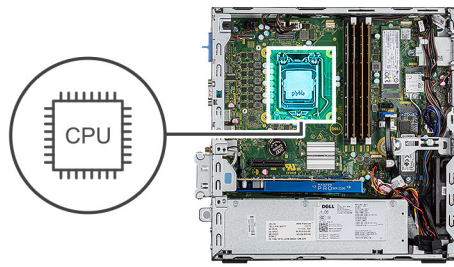
## Steps

1. Align the pin-1 corner of the processor with the pin 1 corner of the processor socket, and then place the processor in the processor socket.

   ⓘ **NOTE: The pin-1 corner of the processor has a triangle that aligns with the triangle on the pin-1 corner on the processor socket. When the processor is properly seated, all four corners are aligned at the same height. If one or more corners of the processor are higher than the others, the processor is not seated properly.**

2. When the processor is fully seated in the socket, close the processor cover.
3. Press down and push the release lever under the securing tab to lock it.

## Next steps

1. Install the heat-sink.
2. Install the front bezel.
3. Install the side cover.
4. Follow the procedure in after working inside your computer.

# Power switch

## Removing the power switch

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.
4. Remove the Hard drive and optical drive module

**About this task**

The following images indicate the location of the heat-sink and provide a visual representation of the removal procedure.
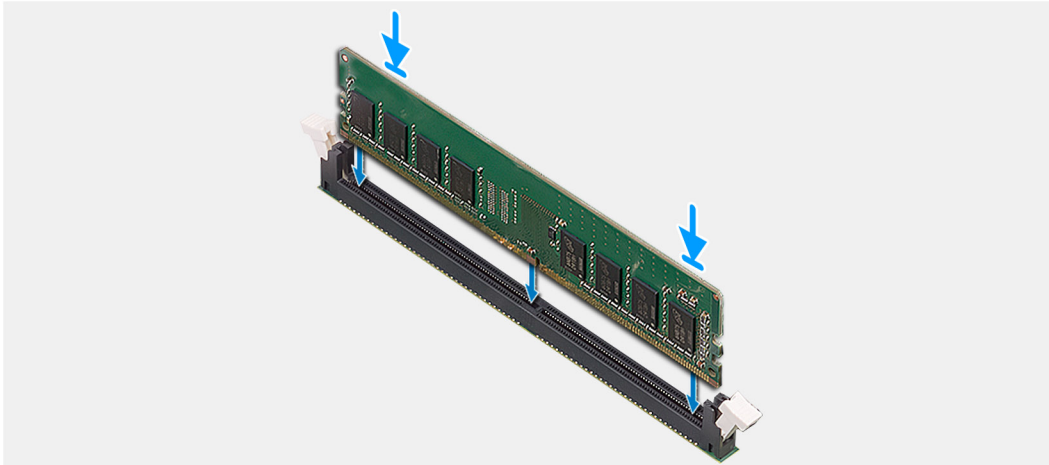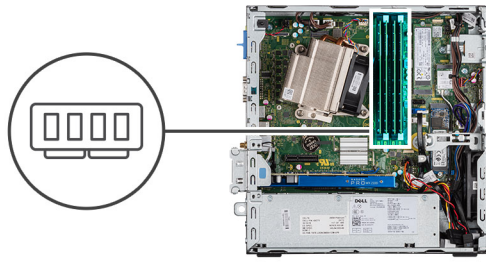
**Steps**

1. Disconnect the power switch cable from the system board.
2. Press the power switch retention tabs and pull the power switch out from the system.

## Installing the power switch

**Prerequisites**

**About this task**

The following image indicates the location of the VR heat sink and provides a visual representation of the installation procedure.

**Steps**

1. Slide the power switch module into the slot on the chassis until it clicks into place.
2. Connect the power switch cable to the connector on the system board.

**Next steps**

1. Install the Hard drive and optical drive module
2. Install the front bezel.
3. Install the side cover.
4. Follow the procedure in after working inside your computer.

# Power-supply unit

## Removing the power-supply unit

**Prerequisites**

1. Follow the procedure in Before working inside your computer.
2. Remove the Side cover
3. Remove the Front bezel
4. Remove the Hard drive and optical drive module

**About this task**

The following images indicate the location of the power-supply unit and provide a visual representation of the removal procedure.

**5x**
6x32
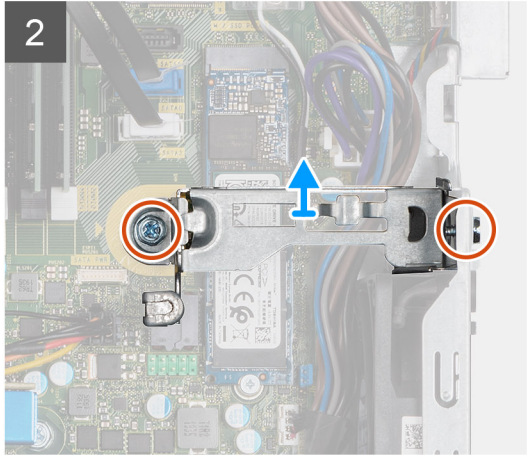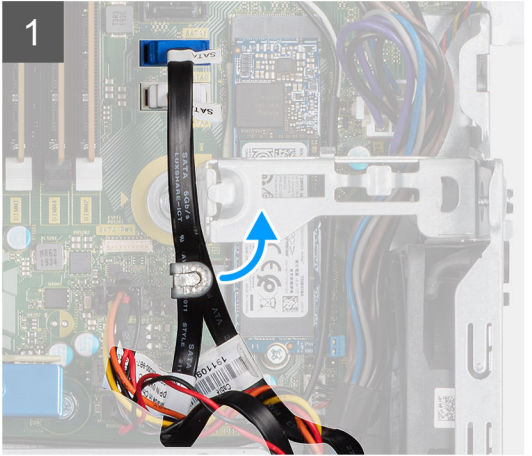
**Steps**

1. Remove the SATA cables from the retention clip on the support bracket.
2. Remove the two screws (M6x32) and slide the support bracket out from the slot.
3. Remove the power-supply cable from the retention clip on the chassis.
4. Remove the three screws (M6x32) that secure the power-supply unit to the back of the chassis.
5. Press the power-supply unit release latch and slide the unit into the chassis.
6. Remove the power-supply unit out of the chassis.

# Installing the power-supply unit

**Prerequisites**

**About this task**

The following image indicates the location of the power-supply unit and provides a visual representation of the installation procedure.
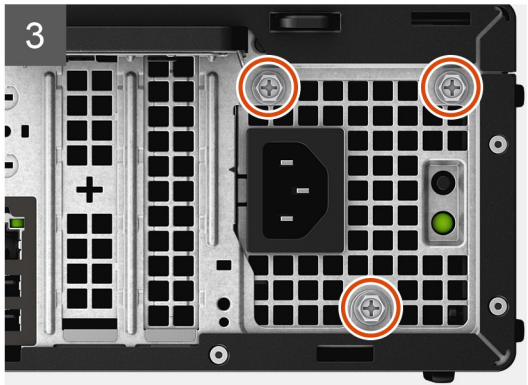
**5x**
6x32
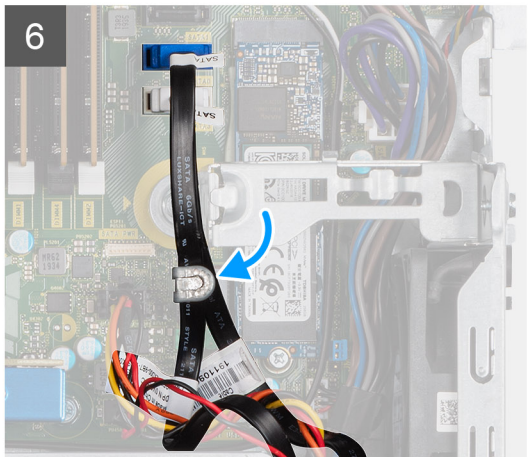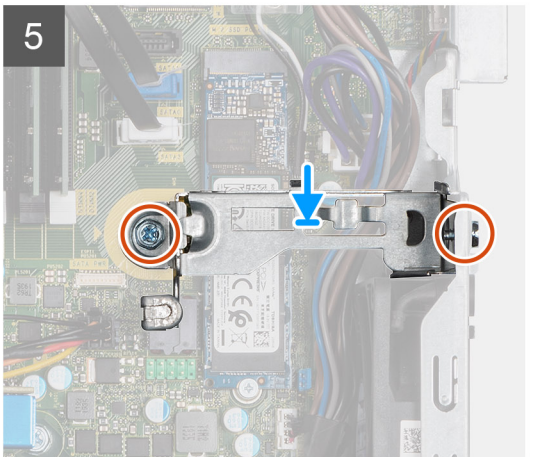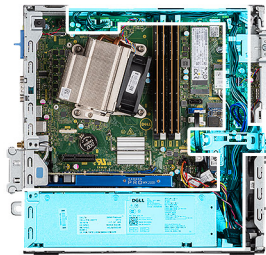
**Steps**

1. Align and place the power-supply unit into the slot on the chassis.
2. Slide the power-supply unit into the slot until it clicks in place.
3. Replace the three screws (M6x32) to secure the power-supply unit to the chassis.
4. Insert the power-supply cables through retention clips and connect it to the connectors on the system board.
5. Place the support bracket into the slot and secure it with the two screws (M6x32).
6. Insert the SATA cables through the retention clip on the support bracket.

**Next steps**

1. Install the Hard drive and optical drive module
2. Install the Front bezel
3. Install theSide cover
4. Follow the procedure in After working inside your computer.

# System fan

## Removing the system fan

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.
4. Remove the Hard drive and optical drive module

**About this task**

The following images indicate the location of the heat-sink and provide a visual representation of the removal procedure.

**Steps**

1. Disconnect the fan cable from the connector on the system board.
2. Slide the fan grommets towards the slot on the back of the fan chassis.
3. Lift the system fan from the system.

## Installing the system fan

**Prerequisites**

**About this task**

The following image indicates the location of the VR heat sink and provides a visual representation of the installation procedure.

**Steps**

1. Align and place the system fan in the system chassis.
2. Pass the grommets through the chassis and slide outward along the groove to secure it in place.
3. Connect the system fan cable to the system board.

**Next steps**

1. Install the Hard drive and optical drive module
2. Install the front bezel.
3. Install the side cover.
4. Follow the procedure in after working inside your computer.

# System board

## Removing the system board

**Prerequisites**

1. Follow the procedure in before working inside your computer.
2. Remove the side cover.
3. Remove the front bezel.
4. Remove the hard drive assembly.
5. Remove the solid-state drive.
6. Remove the WLAN card.
7. Remove the heat-sink.
8. Remove the memory modules.
9. Remove the processor.

**About this task**

The following images indicate the location of the system board and provide a visual representation of the removal procedure.
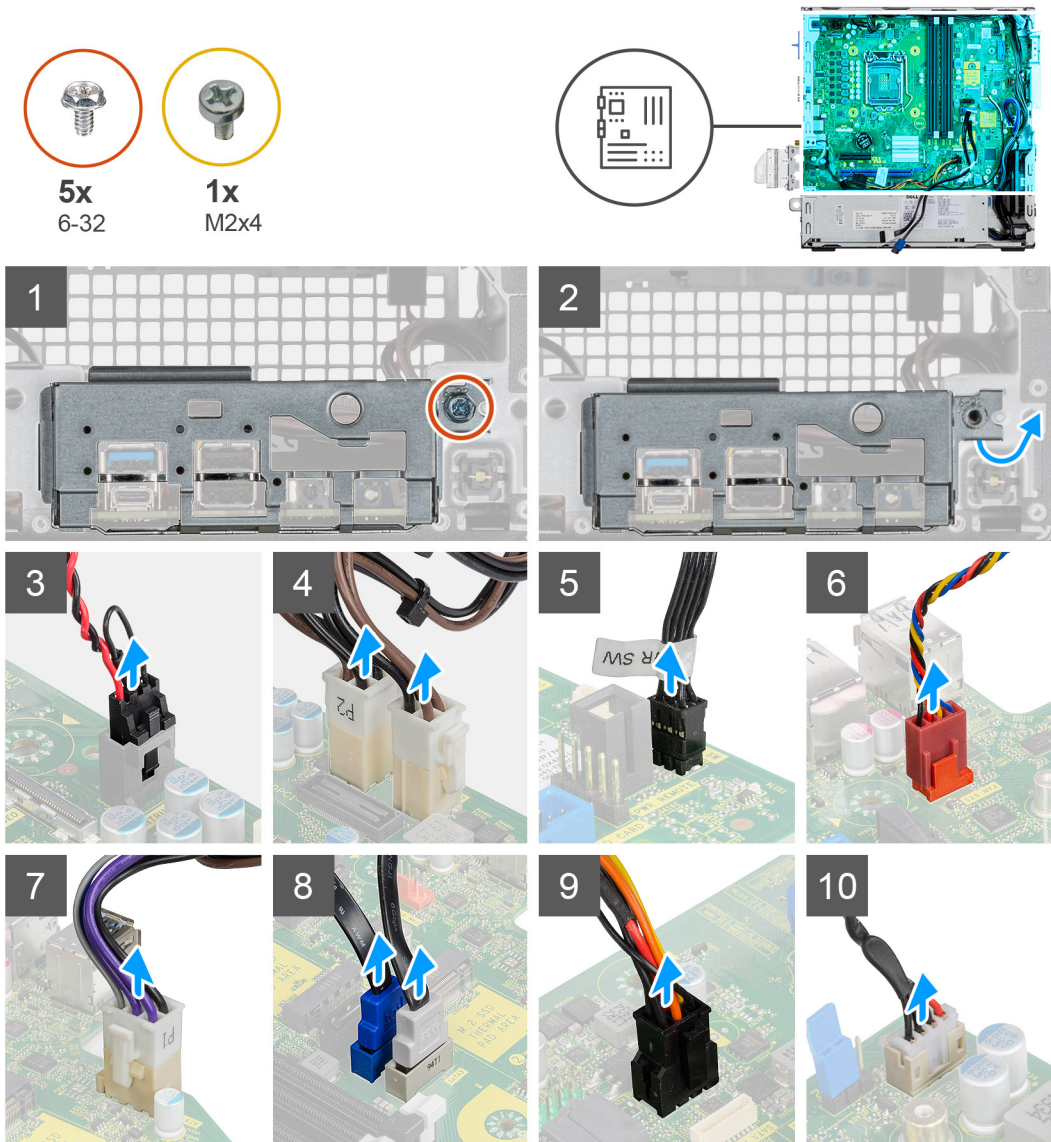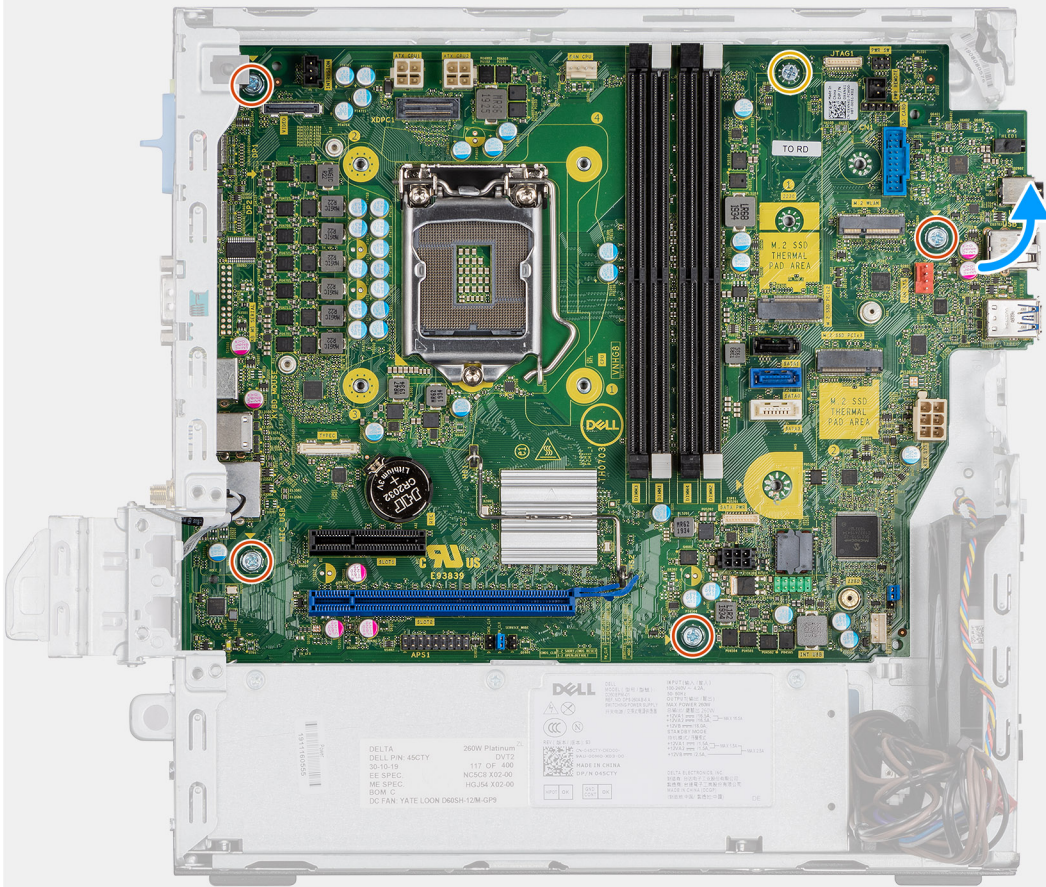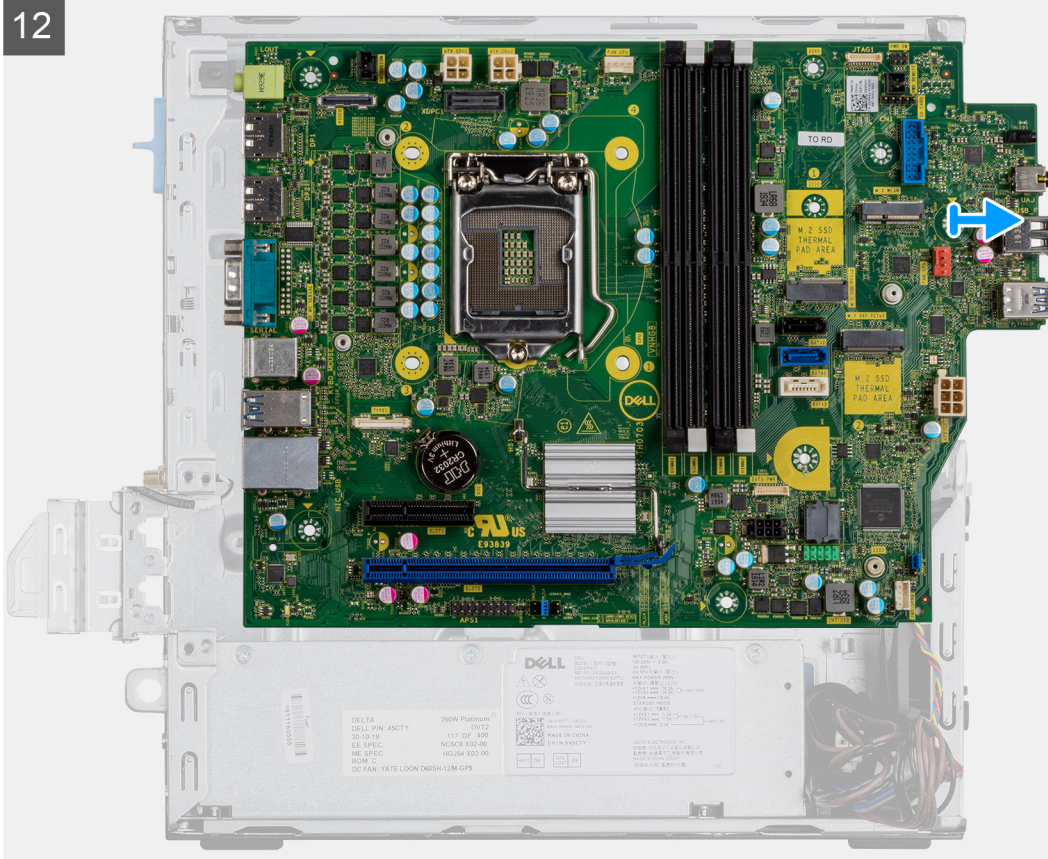
**Steps**

1. Remove the screw (6-32) that secures the I/O panel to the system chassis.
2. Lift the I/O panel away from the system chassis.
3. Disconnect the intrusion switch cable from the connector on the system board.
4. Disconnect the system board power supply cables.
5. Disconnect the power button switch cable from the connector on the system board.
6. Disconnect the system fan cable to the connector on the system board.
7. Disconnect the processor power supply cable from the connector on the system board.
8. Disconnect the SATA cables from the connector on the system board.
9. Disconnect the SATA power cable from the connector on the system board.
10. Disconnect the internal speaker cable from the connector on the system board.
11. Remove the four Screws (6-32) and the single standoff screw (M2X4) that secure the system board.
12. Lift the system board at an angle and slide it out of the system chassis.

# Installing the system board

**Prerequisites**

**About this task**

The following image indicates the location of the system board and provides a visual representation of the installation procedure.
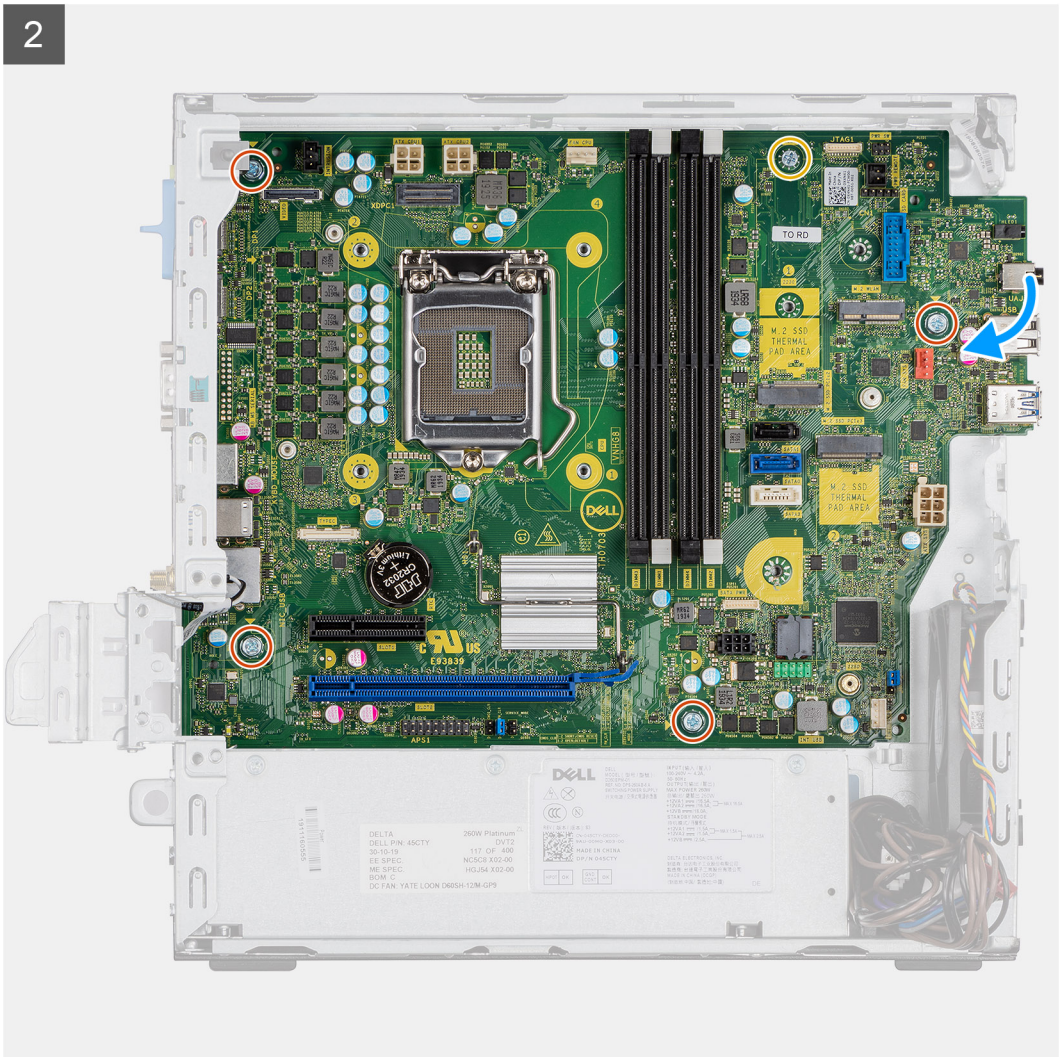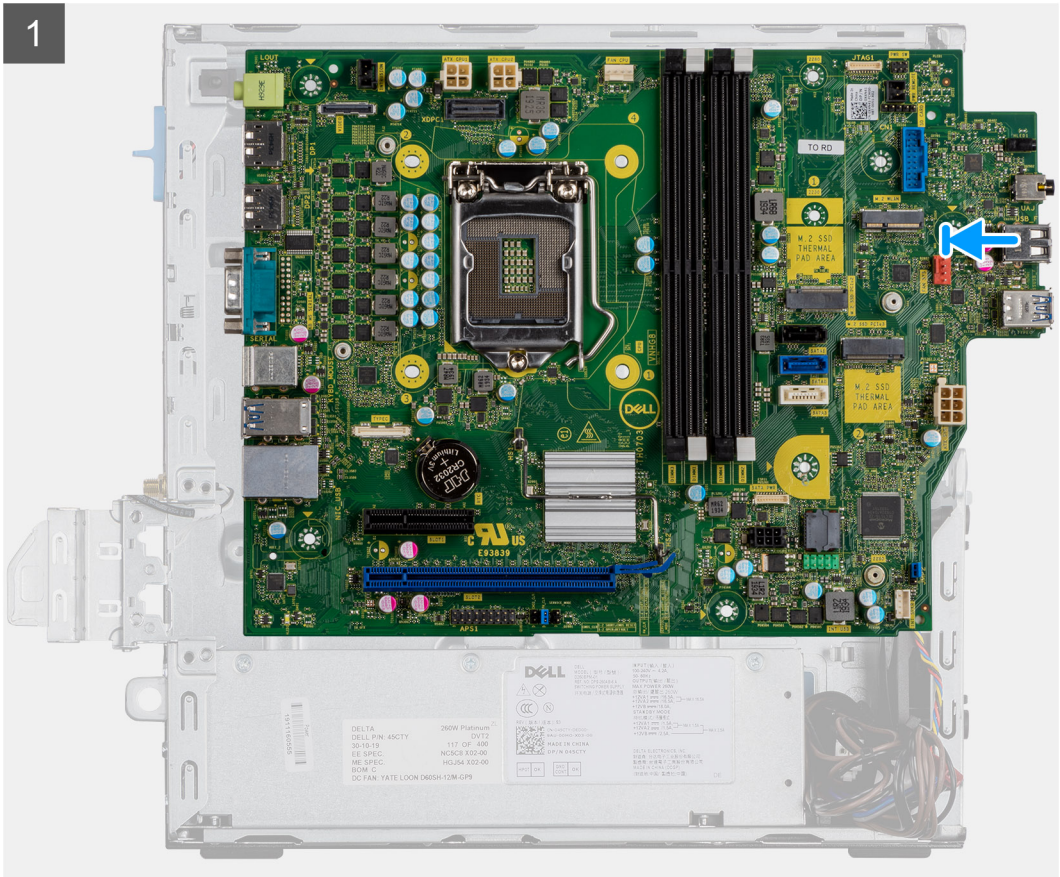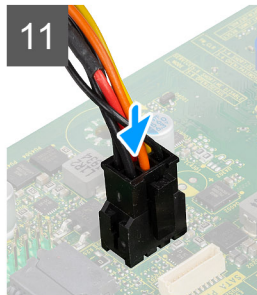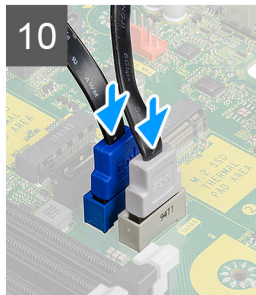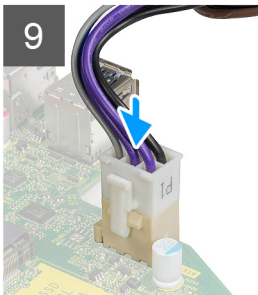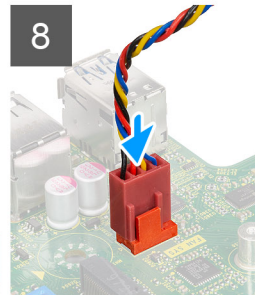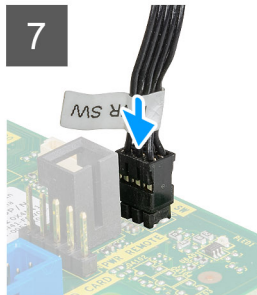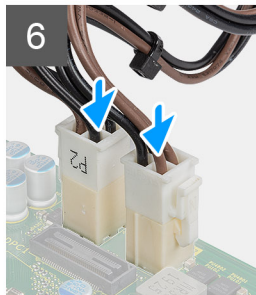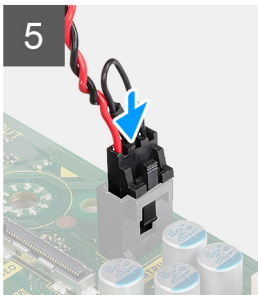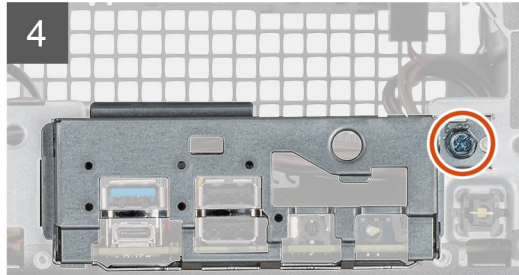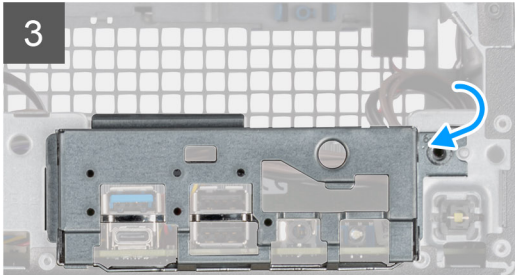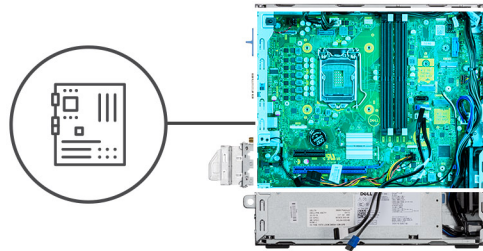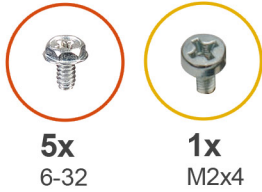
**Steps**

1. Align and lower the system board into the system until the connectors at the back of the system board align with the slots on the chassis, and the screw holes on the system board align with the standoffs on the system.
2. Replace the four screws (6-32) and the single standoff screw (M2x4) screw to secure the system board to the chassis.
3. Align and lower the I/O panel into the slot on the system chassis.
4. Replace the screws (6-32) to secure the I/O panel to the system chassis.
5. Reconnect the intrusion switch cable to the connector on the system board.
6. Reconnect the system board power supply cables to the connector on the system board.
7. Reconnect the power button switch cable to the connector on the system board.
8. Reconnect the system fan cable to the connector on the system board.
9. Reconnect the processor power supply cable to the connector on the system board.
10. Reconnect the SATA cables to the connectors on the system board.
11. Reconnect the SATA power cable to the connector on the system board.
12. Reconnect the internal speaker cables to the connector on the system board.

**Next steps**

1. Install the processor.
2. Install the memory modules.
3. Install the heat-sink.
4. Install the WLAN card.

5. Install the solid-state drive.
6. Install the hard drive assembly.
7. Install the front bezel.
8. Install the side cover.
9. Follow the procedure in after working inside your computer.

# System setup

System setup enables you to manage your desktop hardware and specify BIOS level options. From the System setup, 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 your computer security

**Topics:**

## Accessing System Setup

**Steps**

1. Turn on (or restart) your computer.
2. After the white Dell logo appears, press F2 immediately.

   The System Setup page is displayed.

   (i) **NOTE: If you wait too long and the operating system logo appears, wait until you see the desktop. Then, shut down or restart your computer and try again.**

   (i) **NOTE: After the Dell logo appears, you can also press F12 and then select BIOS setup.**

## Navigation Keys

The following table displays the system setup navigation keys.

(i) **NOTE: For most of the system setup options, changes that you make are recorded but do not take effect until you restart the system.**

**Table 3. 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.<br>ⓘ **NOTE: 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. |

# General screen options

This section lists the primary hardware features of your computer.

| Option | Description |
|--------|-------------|
| **System Information** | • System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date, and the Express Service Code.<br>• Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channels Mode, Memory Technology, DIMM A1 Size, DIMM B 2Size.<br>• Processor Information: Displays Processor Type, Core Count, Processor ID, Current Clock Speed, Minimum Clock Speed, Maximum Clock Speed, Processor L2 Cache, Processor L3 Cache, HT Capable, and 64-Bit technology.<br>• Device Information: Displays Primary Hard Drive, SATA-0SATA-0, SATA-1, SATA-2, SATA-3, LOM MAC Address, Video Controller, Audio Controller. WiFi Device, M.2PCIe SSD-0, Bluetooth Device. |
| **Boot Sequence** | **Boot Sequence** — Allows you to change the order in which the computer attempts to find an operating system. The options are:<br>   • Windows Boot Manager<br>   • Onboard NIC(IPV4)<br>   • Oboard NIC(IPV6)<br>By default, all the options are checked. You can also deselect any option or change the boot order. |
| **UEFI Boot Path Security** | This options control whether or not the system will prompt the user to enter the Admin password (if set) when booting a UEFI boot path from the F12 Boot Menu<br>• **Always Except Internal HDD** (default)<br>• Always<br>• Never |
| **Date/Time** | Allows you to change the date and time. |

# System Configuration screen options

| Option | Description |
|--------|-------------|
| **Integrated NIC** | Allows you to configure the integrated network controller. The options are:<br>• Disabled<br>• Enabled<br>• Enabled w/PXE: This option is enabled by default. |

| Option | Description |
|---|---|
| **SATA Operation** | Allows you to configure the internal SATA hard-drive controller. The options are: <br>• Disabled<br>• **AHCI**<br>• **RAID On**(default) |
| **Drives** | Allows you to configure the SATA drives on board. All drives are enabled by default. The options are:<br>• SATA-0<br>• SATA-1<br>• SATA-2<br>• SATA-3<br>• M.2 PCIe SSD-2 |
| **SMART Reporting** | This field controls whether hard drive errors for integrated drives are reported during system startup. This technology is part of the SMART (Self-Monitoring Analysis and Reporting Technology) specification. This option is disabled by default.<br>• Enable SMART Reporting |
| **USB Configuration** | This field configures the integrated USB controller. If Boot Support is enabled, the system is allowed to boot any type of USB Mass Storage Devices (HDD, memory key, floppy).<br><br>If USB port is enabled, device attached to this port is enabled and available for OS.<br><br>If USB port is disabled, the OS cannot see any device attached to this port.<br>• **Enable USB Boot Support** (default)<br>• **Enable Front USB Ports**(default)<br>• **Enable Rear USB Ports** (default)<br><br>ⓘ NOTE: **USB keyboard and mouse always work in the BIOS setup irrespective of these settings.** |
| **Front USB Configuration** | This field enables or disables the front USB configuration<br>• Front Port 1 (Bottom Right)*: This option is enabled by default.<br>• Front Port 2 (Bottom Left)*: This option is enabled by default.<br>• Front Port 1 with Power Share (Top Right)<br>• Front Port 2 (Top Left)<br><br>* denotes a USB 3.0-capable port |
| **Rear USB Configuration** | This field enables or disables the rear USB configuration<br>• Rear Port 1 (Bottom Right)<br>• Rear Port 2 (Bottom Left)<br>• Rear Port 3 (Top Left)<br>• Rear Port 4 (Top Right)<br><br>* denotes a USB 3.0-capable port |
| **Audio** | This field enables or disables the integrated audio controller. By default, the **Enable Audio** option is selected. The options are:<br>• Enable Microphone: This option is enabled by default. |
| **Miscellaneous Devices** | Allows you to enable or disable the following devices:<br>• Enable PCI Slot<br>• Enabled Secure Digital (SD) Card (default)<br><br>ⓘ NOTE: **All devices are enabled by default.** |

# Security screen options

| Option | Description |
|---|---|
| Admin Password | Allows you to set, change, or delete the administrator (admin) password.<br><br>ⓘ **NOTE: You must set the admin password before you set the system or hard drive password. Deleting the admin password automatically deletes the system password and the hard drive password.**<br><br>ⓘ **NOTE: Successful password changes take effect immediately.**<br><br>Default setting: Not set |
| System Password | Allows you to set, change, or delete the system password.<br><br>ⓘ **NOTE: Successful password changes take effect immediately.**<br><br>Default setting: Not set |
| Internal HDD-0 Password | Allows you to set, change, or delete the password on the system's internal hard-disk drive.<br><br>ⓘ **NOTE: Successful password changes take effect immediately.**<br><br>Default Setting: Not set |
| Internal HDD-1 Password | Allows you to set, change, or delete the password on the system's internal hard-disk drive.<br><br>ⓘ **NOTE: Successful password changes take effect immediately.**<br><br>Default Setting: Not set |
| Internal HDD-3 Password | Allows you to set, change, or delete the password on the system's internal hard-disk drive.<br><br>ⓘ **NOTE: Successful password changes take effect immediately.**<br><br>Default Setting: Not set |
| Password Change | Allows you to enable the disable permission to the System and Hard Drive passwords when the admin password is set.<br><br>Default setting: **Allow Non-Admin Password Changes** is selected. |
| UEFI Capsule Firmware Update | This option controls whether the system allows the BIOS updates through UEFI capsule update packages. This option is enabled by default. |
| TPM 2.0 Security | Allows you to enable the Trusted Platform Module (TPM) during POST. The options are:<br><br>· **TPM On** (enabled by default)<br>· Clear<br>· PPI Bypass for Enabled Commands<br>· PPI Bypass for Disabled Commands<br>· PPI Bypass for Clear Command<br>· **Attestation Enable** (enabled by default)<br>· **Key Storage Enable** (enabled by default)<br>· **SHA-256** (enabled by default)<br>· Disabled<br>· Enabled (enabled by default) |
| PTT Security | Allows you to enable the Platform Trust Technology feature (PTT). The option is:<br><br>· PTT On (not enabled) |
| Absolute(R) | Allows you to activate or disable the optional Computrace software The options are:<br><br>· Deactivate<br>· Disable<br>· Permanently Disabled |

| Option | Description |
|---|---|
| | ⓘ **NOTE: The Activate and Disable options will permanently activate or disable the feature and no further changes are allowed** |
| | Default setting: Deactivate |
| **Master Password Lockout** | The option Enable Master Password Lockout is not selected by default. |
| **SMM Security Mitigation** | Allows you to enable or disable the additional UEFI SMM Security Mitigation protections.<br><br>Default Setting: SMM Security Mitigation is not selected. |

# Video screen options

| Option | Description |
|---|---|
| **Multi-Display** | This option enables or disables Multi-Display. It should be enables for Windows 7 or later. This feature is not applicable to other operating systems.<br><br>• Enable Multi-Display: This option is enabled by default. |
| **Primary Display** | This option determines which video controller becomes the primary display when multiple controllers are available in the system<br><br>• Auto: This option is enabled by default.<br>• Intel HD Graphics<br>• NVIDIA HD Graphics |

# Secure Boot screen options

| Option | Description |
|---|---|
| **Secure Boot Enable** | This option enables or disables the **Secure Boot** feature.<br><br>Default setting: Not selected |
| **Secure Boot Mode** | • **Deployed Mode** (default)<br>• Audit Mode |
| **Expert Key Management** | Allows you to manipulate the security key databases only if the system is in Custom Mode. The **Enable Custom Mode** option is disabled by default. The options are:<br><br>• **PK** (default)<br>• KEK<br>• db<br>• dbx<br><br>If you enable the **Custom Mode**, the relevant options for **PK, KEK, db, and dbx** appear. The options are:<br><br>• **Save to File**—Saves the key to a user-selected file.<br>• **Replace from File**—Replaces the current key with a key from a user-selected file.<br>• **Append from File**—Adds a key to the current database from a user-selected file<br>• **Delete**—Deletes the selected key<br>• **Reset All Keys**—Resets to default setting<br>• **Delete All Keys**—Deletes all the keys<br><br>ⓘ **NOTE: If you disable the Custom Mode, all the changes made are erased and the keys restore to default settings.** |

# Intel Software Guard Extensions screen options

| Option | Description |
| --- | --- |
| Intel SGX Enable | This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS. The options are:<br>• Disabled<br>• Enabled<br>• **Software Controlled** (default) |
| Enclave Memory Size | This option sets **SGX Enclave Reserve Memory Size**. The options are:<br>• 32 MB<br>• 64 MB<br>• 128 MB |

# Performance screen options

| Option | Description |
| --- | --- |
| Multi Core Support | This field specifies whether the process has one or all cores enabled. The performance of some applications improve with the additional cores. This option is enabled by default. Allows you to enable or disable multi-core support for the processor. The installed processor supports two cores. If you enable Multi Core Support, two cores are enabled. If you disable Multi Core Support, one core is enabled.<br>• All (enabled by default)<br>• 1<br>• 2<br>• 3 |
| Intel SpeedStep | Allows you to enable or disable the Intel SpeedStep feature.<br>Enable Intel SpeedStep<br>Default setting: The option is enabled. |
| C-States Control | Allows you to enable or disable the additional processor sleep states.<br>C states<br>Default setting: The option is enabled. |
| Intel TurboBoost | Allows you to enable or disable the Intel TurboBoost mode of the processor.<br>Enable Intel TurboBoost (default) |

# Power Management screen options

| Option | Description |
| --- | --- |
| AC Recovery | Allows you to enable or disable the computer from turning on automatically when an AC adapter is restored.<br>• Power Off (default)<br>• Power On<br>• Last Power State |
| Enable Intel Speed Shift Technology | This option is used to enable or disable the Intel speed shift technology support. The option is enabled by default. |
| Auto On Time | Allows you to set the time at which the computer must turn on automatically. The options are:<br>• Disabled<br>• Every Day |

| Option | Description |
|---|---|
| | • Weekdays<br>• Select Days<br><br>Default setting: Disabled |
| **Deep Sleep Control** | Allows you to aggressive the system is at conserving power while Shut down (S5) or in Hybernate (S4) mode.<br><br>• Disabled<br>• Enabled in S5 only<br>• Enabled in S4 and S5 (default) |
| **USB Wake Support** | Allows you to enable USB devices to wake the system from Standby.<br><br>• Enable USB Wake Support<br><br>Default setting: The option is enabled.. |
| **Wake on LAN/ WLAN** | Allows you to enable or disable the feature that powers on the computer from the Off state when triggered by a LAN signal.<br><br>• **Disabled**: This option is enabled by default.<br>• LAN Only<br>• WLAN Only<br>• LAN or WLAN<br>• LAN with PXE Boot |
| **Block Sleep** | This option lets you block entering to sleep (S3 state) in operating system environment.<br><br>Block Sleep (S3 state)<br><br>Default setting: This option is disabled |

# POST Behavior screen options

| Option | Description |
|---|---|
| **Numlock LED** | This option specifies whether the NumLock LED should be on when the system boots.<br><br>• Enable Numlock LED: The option is enabled. |
| **Keyboard Errors** | This option option specifies whether the keyboard related errors are reported when it boots.<br><br>• Enables Keyboard Error Detection: The option is enabled by default. |
| **Fastboot** | Allows you to speed up the boot process by bypassing some of the compatibility steps. The options are:<br><br>• Minimal<br>• **Thorough** (default)<br>• Auto |
| **Extend BIOS POST Time** | This option created an additional pre-boot delay.<br><br>• **0 seconds (default)**<br>• 5 seconds<br>• 10 seconds |
| **Full Screen Logo** | . This option displays full screen logo if your image match screen resolution. The option Enable Full Screen Logo is not selected by default. |
| **Warnings and Errors** | • **Prompt on Warnings and Errors** (default)<br>• Continue on Warnings<br>• Continue on Warnings and Errors |

# Virtualization support screen options

| Option | Description |
|---|---|
| Virtualization | Allows you to enable or disable the Intel Virtualization Technology. |
| | Enable Intel Virtualization Technology (default). |
| VT for Direct I/O | Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel® Virtualization technology for direct I/O. |
| | Enable VT for Direct I/O - enabled by default. |

# Wireless screen options

| Option | Description |
|---|---|
| Wireless Device Enable | Allows you to enable or disable internal wireless devices. |
| | • **WLAN/WiGig** (default) |
| | • **Bluetooth** (default) |

# Advanced configuration options

| Option | Description |
|---|---|
| ASPM | Allows you to set the ASPM level. |
| | • **Auto** (default) |
| | • Disabled |
| | • L1 Only |

# Maintenance screen options

| Option | Description |
|---|---|
| Service Tag | Displays the Service Tag of your computer. |
| Asset Tag | Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default. |
| SERR Messages | This field controls the SERR message mechanism. Some graphic card required the SERR message. |
| | • Enable SERR Messages (default) |
| BIOS Downgrade | This field controls flashing of the system firmware to pervious revisions. |
| | Allows BIOS Downgrade (Enabled by default) |
| Data Wipe | This field enables user to erase data from all internal storage device. |
| BIOS Recovery | Allows you to recover from certain corrupted BIOS conditions from a recover file on the user primary hard drive. Enabled by default. |

# System Log screen options

| Option | Description |
|---|---|
| BIOS Events | Allows you to view and clear the System Setup (BIOS) POST events. |

# SupportAssist System Resolution

| Option | Description |
| --- | --- |
| **Auto OS Recovery Threshold** | Allows you to control the automatic boot flow for SupportAssist System. Options are:<br>• Off<br>• 1<br>• 2 (Enabled by default)<br>• 3 |
| **SupportAssist OS Recovery** | Allows you to recover the SupportAssist OS Recovery (Disabled by default) |

# Updating the BIOS in Windows

**Prerequisites**

It is recommended to update your BIOS (System Setup) when you replace the system board or if an update is available.

**About this task**

ⓘ **NOTE: If BitLocker is enabled, it must be suspended prior to updating the system BIOS, and then re enabled after the BIOS update is completed.**

**Steps**

1. Restart the computer.
2. Go to **Dell.com/support**.
   - Enter the **Service Tag** or **Express Service Code** and click **Submit**.
   - Click **Detect Product** and follow the instructions on screen.
3. If you are unable to detect or find the Service Tag, click **Choose from all products**.
4. Choose the **Products** category from the list.

   ⓘ **NOTE: Choose the appropriate category to reach the product page.**

5. Select your computer model and the **Product Support** page of your computer appears.
6. Click **Get drivers** and click **Drivers and Downloads**.
   The Drivers and Downloads section opens.
7. Click **Find it myself**.
8. Click **BIOS** to view the BIOS versions.
9. Identify the latest BIOS file and click **Download**.
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.

# Updating your system BIOS using a USB flash drive

**About this task**

If the system cannot load into Windows, but there is still a need to update the BIOS, download the BIOS file using another system and save it to a bootable USB Flash Drive.

ⓘ **NOTE: You will need to use a bootable USB flash drive. Please refer to the following article for further details How to Create a Bootable USB Flash Drive using Dell Diagnostic Deployment Package (DDDP)**

**Steps**

1. Download the BIOS update .EXE file to another system.
2. Copy the file e.g. O9010A12.EXE onto the bootable USB flash drive.
3. Insert the USB flash drive into the system that requires the BIOS update.
4. Restart the system and press F12 when the Dell splash logo appears to display the One Time Boot Menu.
5. Using arrow keys, select **USB Storage Device** and click **Enter**.
6. The system will boot to a Diag C:\> prompt.
7. Run the file by typing the full filename, for example, O9010A12.exe and press **Enter**.
8. The BIOS Update Utility will load. Follow the instructions on screen.

```
════════════════ BIOS Update Utility ════════════════

    This utility will update the system BIOS and firmware.  During the
    update procedure, your system will restart.  Do not interrupt this
    procedure once it begins.  Do not disconnect the AC power source (if you
    are updating a mobile computer, connect the AC power adapter).
    Interruption of the BIOS/firmware update procedure will likely render
    your system unusable.

    Do you wish to continue (y/n)? y




    ════════ Copyright 2009-2011 Dell Inc.  All Rights Reserved. ════════
```

**Figure 1. DOS BIOS Update Screen**

# System and setup password

**Table 4. System and setup password**

| Password type | Description |
|---|---|
| System password | Password that you must enter to log on to your system. |
| Setup password | Password that you must enter to access and make changes to the BIOS settings of your computer. |

You can create a system password and a setup password to secure 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: System and setup password feature is disabled.**

# Assigning a system setup password

**Prerequisites**

You can assign a new **System or Admin Password** only when the status is in **Not Set**.

**About this task**

To enter the system setup, press F2 immediately after a power-on or reboot.

**Steps**

1. In the **System BIOS** or **System Setup** screen, select **Security** and press **Enter**.
   The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.

   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, ("), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press **Esc** and a message prompts you to save the changes.
5. Press **Y** to save the changes.
   The computer reboots.

# Deleting or changing an existing system setup password

**Prerequisites**

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

**About this task**

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

**Steps**

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**.

   (i) **NOTE: If you change the System and/or Setup password, re enter the new password when prompted. If you delete the System and 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 System Setup.
   The computer restarts.

# Troubleshooting

## System diagnostic lights

**Power-supply diagnostics light**

Indicates the power-supply state.

**Hard-drive activity light**

Turns on when the computer reads from or writes to the hard drive.

**Table 5. LED codes**

| Diagnostic light codes | Problem description |
|---|---|
| 1,2 | Unrecoverable SPI flash failure |
| 2,1 | CPU failure |
| 2,2 | System board failure, corrupt BIOS, ROM error |
| 2,3 | No memory/RAM detected |
| 2,4 | Memory/RAM failure |
| 2,5 | Invalid Memory installed |
| 2,6 | System board error, chipset error, clock failure, gate A20 failure, super I/O failure, keyboard controller failure |
| 3,1 | CMOS battery failure |
| 3,2 | PCIe or video card/chip failure |
| 3,3 | Recovery Image not found |
| 3,4 | Recovery Image found but invalid |
| 3,5 | Power Rail Failure |
| 3,6 | Paid SPI volume error |
| 3,7 | Intel ME (Management Engine) error |
| 4,2 | CPU power cable connection issue |

## Diagnostic error messages

**Table 6. Diagnostic error messages**

| Error messages | Description |
|---|---|
| AUXILIARY DEVICE FAILURE | The touchpad or external mouse may be faulty. For an external mouse, check the cable connection. Enable the **Pointing Device** option in the System Setup program. |
| BAD COMMAND OR FILE NAME | Ensure that you have spelled the command correctly, put spaces in the proper place, and used the correct path name. |
| CACHE DISABLED DUE TO FAILURE | The primary cache internal to the microprocessor has failed. **Contact Dell** |

**Table 6. Diagnostic error messages(continued)**

| Error messages | Description |
|---|---|
| CD DRIVE CONTROLLER FAILURE | The optical drive does not respond to commands from the computer. |
| DATA ERROR | The hard drive cannot read the data. |
| DECREASING AVAILABLE MEMORY | One or more memory modules may be faulty or improperly seated. Reinstall the memory modules or, if necessary, replace them. |
| DISK C: FAILED INITIALIZATION | The hard drive failed initialization. Run the hard drive tests in **Dell Diagnostics**. |
| DRIVE NOT READY | The operation requires a hard drive in the bay before it can continue. Install a hard drive in the hard drive bay. |
| ERROR READING PCMCIA CARD | The computer cannot identify the ExpressCard. Reinsert the card or try another card. |
| EXTENDED MEMORY SIZE HAS CHANGED | The amount of memory recorded in non-volatile memory (NVRAM) does not match the memory module installed in the computer. Restart the computer. If the error appears again, **Contact Dell** |
| THE FILE BEING COPIED IS TOO LARGE FOR THE DESTINATION DRIVE | The file that you are trying to copy is too large to fit on the disk, or the disk is full. Try copying the file to a different disk or use a larger capacity disk. |
| A FILENAME CANNOT CONTAIN ANY OF THE FOLLOWING CHARACTERS: \ / : * ? " < > \| - | Do not use these characters in filenames. |
| GATE A20 FAILURE | A memory module may be loose. Reinstall the memory module or, if necessary, replace it. |
| GENERAL FAILURE | The operating system is unable to carry out the command. The message is usually followed by specific information. For example, Printer out of paper. Take the appropriate action. |
| HARD-DISK DRIVE CONFIGURATION ERROR | The computer cannot identify the drive type. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. Run the **Hard Disk Drive** tests in **Dell Diagnostics**. |
| HARD-DISK DRIVE CONTROLLER FAILURE 0 | The hard drive does not respond to commands from the computer. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the **Hard Disk Drive** tests in **Dell Diagnostics**. |
| HARD-DISK DRIVE FAILURE | The hard drive does not respond to commands from the computer. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the **Hard Disk Drive** tests in **Dell Diagnostics**. |
| HARD-DISK DRIVE READ FAILURE | The hard drive may be defective. Shut down the computer, remove the hard drive, and boot the computer from an optical. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the **Hard Disk Drive** tests in **Dell Diagnostics**. |
| INSERT BOOTABLE MEDIA | The operating system is trying to boot to non-bootable media, such as an optical drive. Insert bootable media. |

**Table 6. Diagnostic error messages(continued)**

| Error messages | Description |
|---|---|
| INVALID CONFIGURATION INFORMATION-PLEASE RUN SYSTEM SETUP PROGRAM | The system configuration information does not match the hardware configuration. The message is most likely to occur after a memory module is installed. Correct the appropriate options in the system setup program. |
| KEYBOARD CLOCK LINE FAILURE | For external keyboards, check the cable connection. Run the **Keyboard Controller** test in **Dell Diagnostics**. |
| KEYBOARD CONTROLLER FAILURE | For external keyboards, check the cable connection. Restart the computer, and avoid touching the keyboard or the mouse during the boot routine. Run the **Keyboard Controller** test in **Dell Diagnostics**. |
| KEYBOARD DATA LINE FAILURE | For external keyboards, check the cable connection. Run the **Keyboard Controller** test in **Dell Diagnostics**. |
| KEYBOARD STUCK KEY FAILURE | For external keyboards or keypads, check the cable connection. Restart the computer, and avoid touching the keyboard or keys during the boot routine. Run the **Stuck Key** test in **Dell Diagnostics**. |
| LICENSED CONTENT IS NOT ACCESSIBLE IN MEDIADIRECT | Dell MediaDirect cannot verify the Digital Rights Management (DRM) restrictions on the file, so the file cannot be played. |
| MEMORY ADDRESS LINE FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE | A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it. |
| MEMORY ALLOCATION ERROR | The software you are attempting to run is conflicting with the operating system, another program, or a utility. Shut down the computer, wait for 30 seconds, and then restart it. Run the program again. If the error message still appears, see the software documentation. |
| MEMORY DOUBLE WORD LOGIC FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE | A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it. |
| MEMORY ODD/EVEN LOGIC FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE | A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it. |
| MEMORY WRITE/READ FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE | A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it. |
| NO BOOT DEVICE AVAILABLE | The computer cannot find the hard drive. If the hard drive is your boot device, ensure that the drive is installed, properly seated, and partitioned as a boot device. |
| NO BOOT SECTOR ON HARD DRIVE | The operating system may be corrupted, **Contact Dell**. |
| NO TIMER TICK INTERRUPT | A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**. |
| NOT ENOUGH MEMORY OR RESOURCES. EXIT SOME PROGRAMS AND TRY AGAIN | You have too many programs open. Close all windows and open the program that you want to use. |
| OPERATING SYSTEM NOT FOUND | Reinstall the operating system. If the problem persists, **Contact Dell**. |
| OPTIONAL ROM BAD CHECKSUM | The optional ROM has failed. **Contact Dell**. |
| SECTOR NOT FOUND | The operating system cannot locate a sector on the hard drive. You may have a defective sector or corrupted File Allocation Table (FAT) on the hard drive. Run the Windows error-checking utility to check the file structure on the hard drive. See **Windows Help and Support** for instructions (click **Start** > **Help and Support**). If a large number of sectors are defective, back up the data (if possible), and then format the hard drive. |

**Table 6. Diagnostic error messages(continued)**

| Error messages | Description |
|---|---|
| SEEK ERROR | The operating system cannot find a specific track on the hard drive. |
| SHUTDOWN FAILURE | A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**. If the message reappears, **Contact Dell**. |
| TIME-OF-DAY CLOCK LOST POWER | System configuration settings are corrupted. Connect your computer to an electrical outlet to charge the battery. If the problem persists, try to restore the data by entering the System Setup program, then immediately exit the program. If the message reappears, **Contact Dell**. |
| TIME-OF-DAY CLOCK STOPPED | The reserve battery that supports the system configuration settings may require recharging. Connect your computer to an electrical outlet to charge the battery. If the problem persists, **Contact Dell**. |
| TIME-OF-DAY NOT SET-PLEASE RUN THE SYSTEM SETUP PROGRAM | The time or date stored in the system setup program does not match the system clock. Correct the settings for the **Date and Time** options. |
| TIMER CHIP COUNTER 2 FAILED | A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**. |
| UNEXPECTED INTERRUPT IN PROTECTED MODE | The keyboard controller may be malfunctioning, or a memory module may be loose. Run the **System Memory** tests and the **Keyboard Controller** test in **Dell Diagnostics** or **Contact Dell**. |
| X:\ IS NOT ACCESSIBLE. THE DEVICE IS NOT READY | Insert a disk into the drive and try again. |

# Diagnostic error messages

**Table 7. Diagnostic error messages**

| Error messages | Description |
|---|---|
| AUXILIARY DEVICE FAILURE | The touchpad or external mouse may be faulty. For an external mouse, check the cable connection. Enable the **Pointing Device** option in the System Setup program. |
| BAD COMMAND OR FILE NAME | Ensure that you have spelled the command correctly, put spaces in the proper place, and used the correct path name. |
| CACHE DISABLED DUE TO FAILURE | The primary cache internal to the microprocessor has failed. Contact Dell |
| CD DRIVE CONTROLLER FAILURE | The optical drive does not respond to commands from the computer. |
| DATA ERROR | The hard drive cannot read the data. |
| DECREASING AVAILABLE MEMORY | One or more memory modules may be faulty or improperly seated. Reinstall the memory modules or, if necessary, replace them. |
| DISK C: FAILED INITIALIZATION | The hard drive failed initialization. Run the hard drive tests in **Dell Diagnostics**. |
| DRIVE NOT READY | The operation requires a hard drive in the bay before it can continue. Install a hard drive in the hard drive bay. |
| ERROR READING PCMCIA CARD | The computer cannot identify the ExpressCard. Reinsert the card or try another card. |

**Table 7. Diagnostic error messages(continued)**

| Error messages | Description |
|---|---|
| EXTENDED MEMORY SIZE HAS CHANGED | The amount of memory recorded in non-volatile memory (NVRAM) does not match the memory module installed in the computer. Restart the computer. If the error appears again, Contact Dell |
| THE FILE BEING COPIED IS TOO LARGE FOR THE DESTINATION DRIVE | The file that you are trying to copy is too large to fit on the disk, or the disk is full. Try copying the file to a different disk or use a larger capacity disk. |
| A FILENAME CANNOT CONTAIN ANY OF THE FOLLOWING CHARACTERS: \ / : * ? " < > \| - | Do not use these characters in filenames. |
| GATE A20 FAILURE | A memory module may be loose. Reinstall the memory module or, if necessary, replace it. |
| GENERAL FAILURE | The operating system is unable to carry out the command. The message is usually followed by specific information. For example, Printer out of paper. Take the appropriate action. |
| HARD-DISK DRIVE CONFIGURATION ERROR | The computer cannot identify the drive type. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. Run the **Hard Disk Drive** tests in **Dell Diagnostics**. |
| HARD-DISK DRIVE CONTROLLER FAILURE 0 | The hard drive does not respond to commands from the computer. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the **Hard Disk Drive** tests in **Dell Diagnostics**. |
| HARD-DISK DRIVE FAILURE | The hard drive does not respond to commands from the computer. Shut down the computer, remove the hard drive, and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the **Hard Disk Drive** tests in **Dell Diagnostics**. |
| HARD-DISK DRIVE READ FAILURE | The hard drive may be defective. Shut down the computer, remove the hard drive, and boot the computer from an optical. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the **Hard Disk Drive** tests in **Dell Diagnostics**. |
| INSERT BOOTABLE MEDIA | The operating system is trying to boot to non-bootable media, such as an optical drive. Insert bootable media. |
| INVALID CONFIGURATION INFORMATION-PLEASE RUN SYSTEM SETUP PROGRAM | The system configuration information does not match the hardware configuration. The message is most likely to occur after a memory module is installed. Correct the appropriate options in the system setup program. |
| KEYBOARD CLOCK LINE FAILURE | For external keyboards, check the cable connection. Run the **Keyboard Controller** test in **Dell Diagnostics**. |
| KEYBOARD CONTROLLER FAILURE | For external keyboards, check the cable connection. Restart the computer, and avoid touching the keyboard or the mouse during the boot routine. Run the **Keyboard Controller** test in **Dell Diagnostics**. |
| KEYBOARD DATA LINE FAILURE | For external keyboards, check the cable connection. Run the **Keyboard Controller** test in **Dell Diagnostics**. |

**Table 7. Diagnostic error messages(continued)**

| Error messages | Description |
|---|---|
| KEYBOARD STUCK KEY FAILURE | For external keyboards or keypads, check the cable connection. Restart the computer, and avoid touching the keyboard or keys during the boot routine. Run the **Stuck Key** test in **Dell Diagnostics**. |
| LICENSED CONTENT IS NOT ACCESSIBLE IN MEDIADIRECT | Dell MediaDirect cannot verify the Digital Rights Management (DRM) restrictions on the file, so the file cannot be played. |
| MEMORY ADDRESS LINE FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE | A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it. |
| MEMORY ALLOCATION ERROR | The software you are attempting to run is conflicting with the operating system, another program, or a utility. Shut down the computer, wait for 30 seconds, and then restart it. Run the program again. If the error message still appears, see the software documentation. |
| MEMORY DOUBLE WORD LOGIC FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE | A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it. |
| MEMORY ODD/EVEN LOGIC FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE | A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it. |
| MEMORY WRITE/READ FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE | A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it. |
| NO BOOT DEVICE AVAILABLE | The computer cannot find the hard drive. If the hard drive is your boot device, ensure that the drive is installed, properly seated, and partitioned as a boot device. |
| NO BOOT SECTOR ON HARD DRIVE | The operating system may be corrupted, Contact Dell. |
| NO TIMER TICK INTERRUPT | A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**. |
| NOT ENOUGH MEMORY OR RESOURCES. EXIT SOME PROGRAMS AND TRY AGAIN | You have too many programs open. Close all windows and open the program that you want to use. |
| OPERATING SYSTEM NOT FOUND | Reinstall the operating system. If the problem persists, Contact Dell. |
| OPTIONAL ROM BAD CHECKSUM | The optional ROM has failed. Contact Dell. |
| SECTOR NOT FOUND | The operating system cannot locate a sector on the hard drive. You may have a defective sector or corrupted File Allocation Table (FAT) on the hard drive. Run the Windows error-checking utility to check the file structure on the hard drive. See **Windows Help and Support** for instructions (click **Start** > **Help and Support**). If a large number of sectors are defective, back up the data (if possible), and then format the hard drive. |
| SEEK ERROR | The operating system cannot find a specific track on the hard drive. |
| SHUTDOWN FAILURE | A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**. If the message reappears, Contact Dell. |
| TIME-OF-DAY CLOCK LOST POWER | System configuration settings are corrupted. Connect your computer to an electrical outlet to charge the battery. If the problem persists, try to restore the data by entering the System Setup program, then immediately exit the program. If the message reappears, Contact Dell. |
| TIME-OF-DAY CLOCK STOPPED | The reserve battery that supports the system configuration settings may require recharging. Connect your computer to an |

**Table 7. Diagnostic error messages(continued)**

| Error messages | Description |
|---|---|
|  | electrical outlet to charge the battery. If the problem persists, Contact Dell. |
| TIME-OF-DAY NOT SET-PLEASE RUN THE SYSTEM SETUP PROGRAM | The time or date stored in the system setup program does not match the system clock. Correct the settings for the **Date and Time** options. |
| TIMER CHIP COUNTER 2 FAILED | A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**. |
| UNEXPECTED INTERRUPT IN PROTECTED MODE | The keyboard controller may be malfunctioning, or a memory module may be loose. Run the **System Memory** tests and the **Keyboard Controller** test in **Dell Diagnostics** or Contact Dell. |
| X:\ IS NOT ACCESSIBLE. THE DEVICE IS NOT READY | Insert a disk into the drive and try again. |

# System error messages

**Table 8. System error messages**

| System message | Description |
|---|---|
| Alert! Previous attempts at booting this system have failed at checkpoint [nnnn]. For help in resolving this problem, please note this checkpoint and contact Dell Technical Support | The computer failed to complete the boot routine three consecutive times for the same error. |
| CMOS checksum error | RTC is reset, **BIOS Setup** default has been loaded. |
| CPU fan failure | CPU fan has failed. |
| System fan failure | System fan has failed. |
| Hard-disk drive failure | Possible hard disk drive failure during POST. |
| Keyboard failure | Keyboard failure or loose cable. If reseating the cable does not solve the problem, replace the keyboard. |
| No boot device available | No bootable partition on hard disk drive, the hard disk drive cable is loose, or no bootable device exists.<br>• If the hard drive is your boot device, ensure that the cables are connected and that the drive is installed properly and partitioned as a boot device.<br>• Enter system setup and ensure that the boot sequence information is correct. |
| No timer tick interrupt | A chip on the system board might be malfunctioning or motherboard failure. |
| NOTICE - Hard Drive SELF MONITORING SYSTEM has reported that a parameter has exceeded its normal operating range. Dell recommends that you back up your data regularly. A parameter out of range may or may not indicate a potential hard drive problem | S.M.A.R.T error, possible hard disk drive failure. |

# WiFi power cycle

**About this task**

If your computer is unable to access the internet due to WiFi connectivity issues a WiFi power cycle procedure may be performed. The following procedure provides the instructions on how to conduct a WiFi power cycle:

ⓘ **NOTE: Some ISPs (Internet Service Providers) provide a modem/router combo device.**

**Steps**

1. Turn off your computer.
2. Turn off the modem.
3. Turn off the wireless router.
4. Wait for 30 seconds.
5. Turn on the wireless router.
6. Turn on the modem.
7. Turn on your computer.

**5**

# Getting help

**Topics:**

# Contacting Dell

**Prerequisites**

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

**About this task**

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:

**Steps**

1. Go to **Dell.com/support.**
2. Select your support category.
3. Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4. Select the appropriate service or support link based on your need.