

# OptiPlex 3090 Tower

## Service Manual

## Notes, cautions, and warnings

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

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

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

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# Working inside 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.


-  **WARNING:** 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](http://www.dell.com/regulatory_compliance).
-  **WARNING:** 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](http://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 thumbscrews 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.
-  **CAUTION:** Exercise caution when handling rechargeable Li-ion batteries in laptops. Swollen batteries should not be used and should be replaced and disposed properly.
-  **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

-  **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**.

 **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 to 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 to keep sensitive parts separate from all insulator parts while performing service and that they use anti-static bags for transporting sensitive components.

## 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.

## After working inside your computer

### About this task

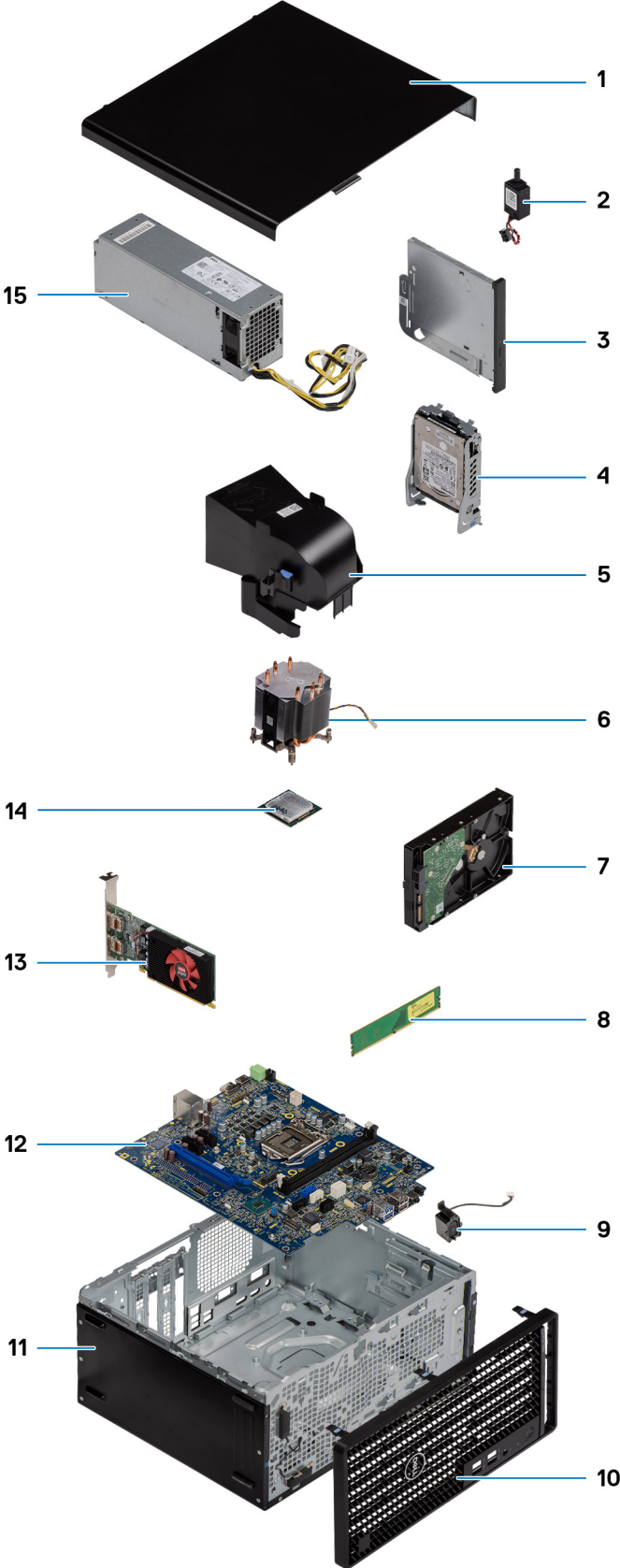
 **CAUTION: Leaving stray or loose screws inside your computer may severely damage your computer.**

### 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.



# Major components of your system



1. Side cover
2. Intrusion switch
3. Optical Disk Drive
4. 2.5-inch hard-disk drive assembly
5. Fan duct
6. Processor fan and heat-sink assembly
7. 3.5-inch hard-disk drive assembly
8. Memory module
9. Speaker
10. Front bezel
11. Chassis
12. System board
13. Powered Graphical processing unit
14. M.2 WLAN
15. PSU

 **NOTE:** Dell provides a list of components and their part numbers for the original system configuration purchased. These parts are available according to warranty coverages purchased by the customer. Contact your Dell sales representative for purchase options.

# Removing and installing components

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

## Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #0
- Phillips screwdriver #1
- Plastic scribe








## Screw list

**NOTE:** When removing screws from a component, it is recommended to note the screw type, the quantity of screws, and then place them in a screw storage box. This is to ensure that the correct number of screws and correct screw type is restored when the component is replaced.


**NOTE:** Some computers have magnetic surfaces. Ensure that the screws are not left attached to such surfaces when replacing a component.

**NOTE:** Screw color may vary with the configuration ordered.

**Table 1. Screw list**

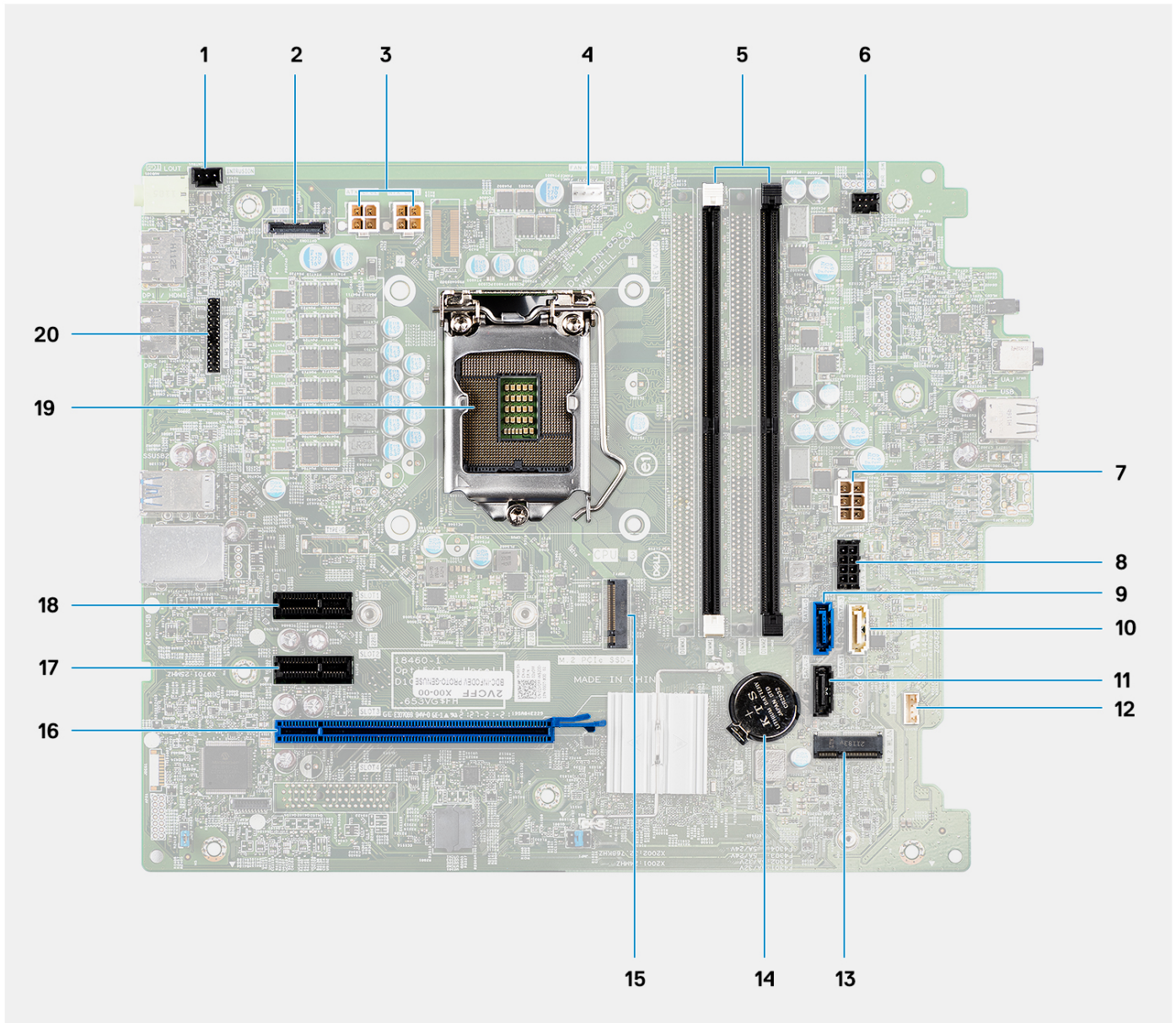
Component	Screw type	Quantity	Image
Side cover	#6-32	2	
Front I/O bracket	#6-32	2	
M.2 2230/2280 Solid-state drive	M2x3.5	1	
WLAN card	M2x3.5	1	
Power supply unit	#6-32	3	
2.5 in. hard-drive bracket	M3x3.5	4	
3.5 in. hard-drive	#6-32	4	

**Table 1. Screw list (continued)**

Component	Screw type	Quantity	Image
System board	#6-32	8	

## Major components of OptiPlex 3090 Tower

The following image shows the major components of OptiPlex 3090 Tower .



- |                                |                                |
|--------------------------------|--------------------------------|
| 1. Intrusion switch connector  | 2. Optional video connector    |
| 3. CPU power connector         | 4. CPU fan connector           |
| 5. Memory slots (DIMM1, DIMM2) | 6. Power switch connector      |
| 7. System power connector      | 8. SATA power cable connector  |
| 9. SATA 0 connector            | 10. SATA 2 connector           |
| 11. SATA 1 connector           | 12. Internal speaker connector |

- 13. M.2 WLAN connector
- 15. M.2 solid-state drive connector
- 17. PCIe x1 (Slot 2)
- 19. Processor socket (CPU)

- 14. Coin-cell battery
- 16. PCIe x16 (Slot 3)
- 18. PCIe x1 (Slot 1)
- 20. Serial port connector

**NOTE:** Dell provides a list of components and their part numbers for the original system configuration purchased. These parts are available according to warranty coverages purchased by the customer. Contact your Dell sales representative for purchase options.

## 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 provide a visual representation of the removal procedure.



2



### Steps

1. Loosen the thumbscrew (#6-32) that secures the side cover to the computer.
2. Slide the side cover towards the rear of the computer and lift the cover away from the computer.

## Installing the side cover

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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





### Steps

1. Locate the side cover slot on your computer.
2. Align the tabs on the side cover with the slots on the chassis.
3. Slide the side cover towards the front of the computer to install it.
4. Tighten the thumbscrew (#6-32) to secure the side cover to the computer.

### Next steps

1. Follow the procedure in [after working inside your computer](#).

# Front bezel

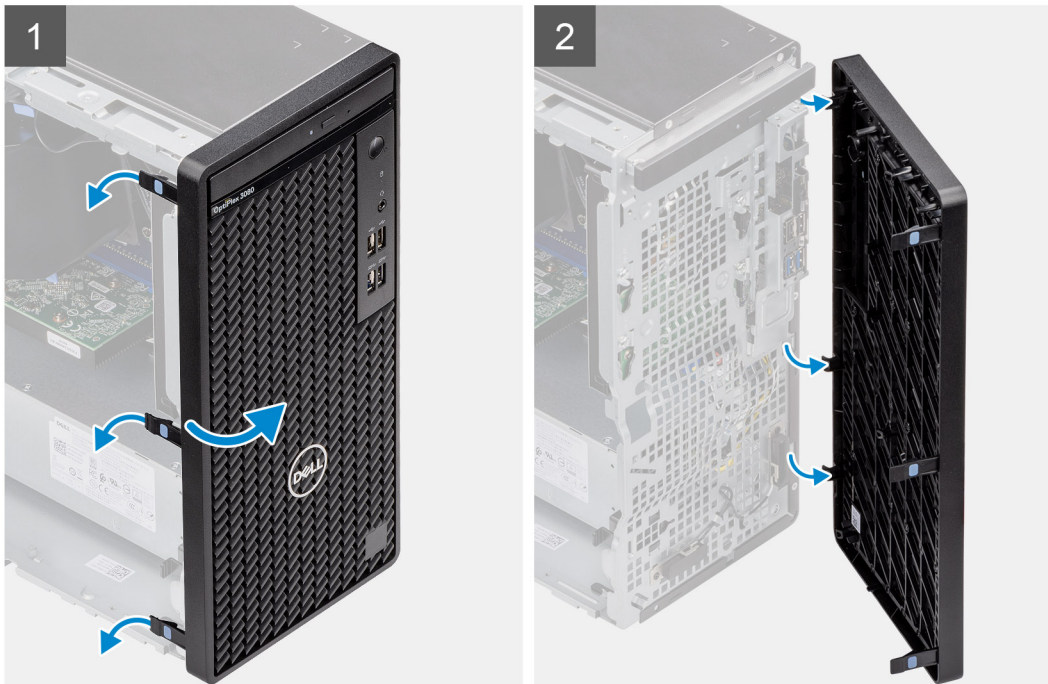
## Removing the front bezel

### 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 computer.
2. Slightly pull the front bezel and gently rotate to release the other tabs on the bezel from the slots in the computer chassis.
3. Remove the front bezel from the computer.

## Installing the front bezel

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



### Steps

1. Position the front bezel to align the tabs on the bezel with the slots on the chassis.
2. Press the bezel until the tabs clicks into place.

### Next steps

1. Install the [side cover](#).
2. Follow the procedure in [after working inside your computer](#).

## Fan duct

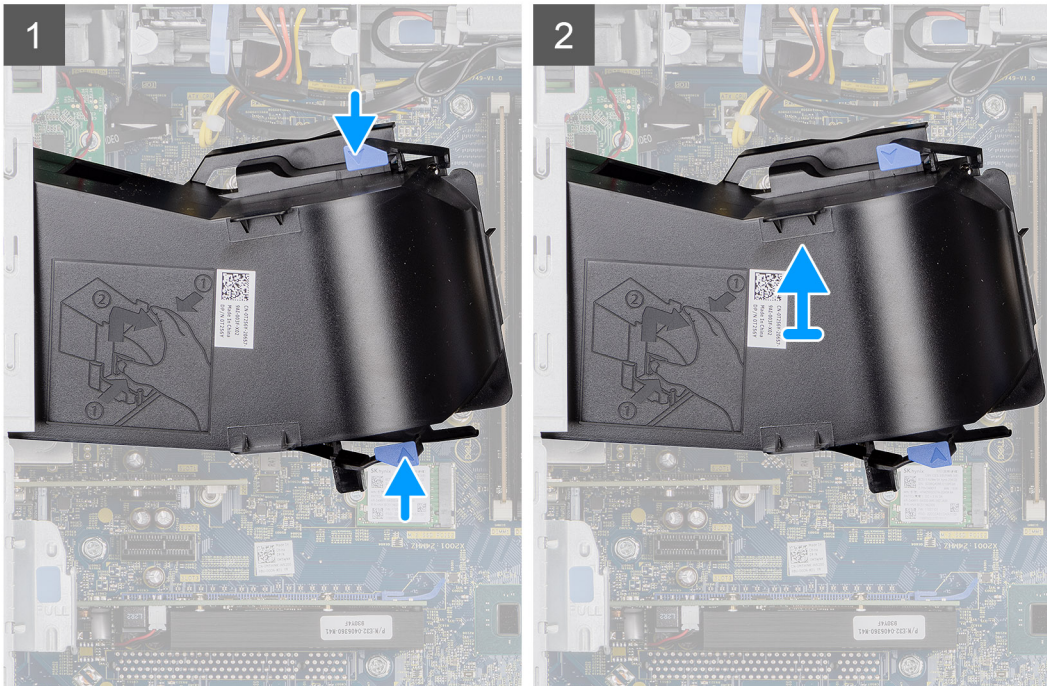
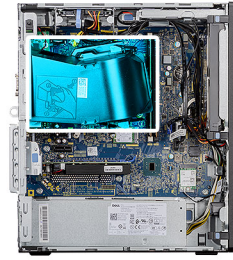
### Removing the fan duct

#### 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 fan duct and provide a visual representation of the removal procedure.



### Steps

1. Press the retention tabs on both sides of the fan duct to release it.
2. Pull and remove the fan duct from the computer.

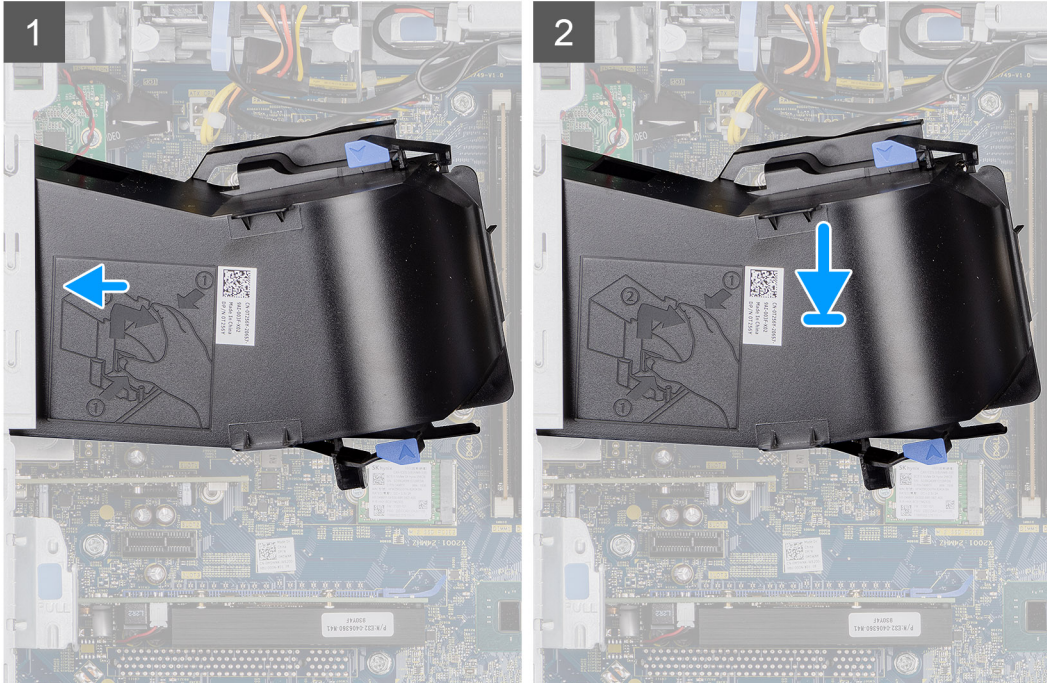
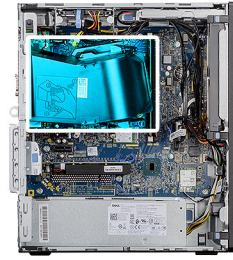
## Installing the fan duct

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following image indicates the location of the fan duct and provides a visual representation of the installation procedure.



### Steps

1. Position the fan duct to align it with the slots on the computer chassis.
2. Press the fan duct until it clicks into place.

### Next steps

1. Install the [side cover](#).
2. Follow the procedure in [after working inside your computer](#).

## 2.5-inch hard-drive assembly

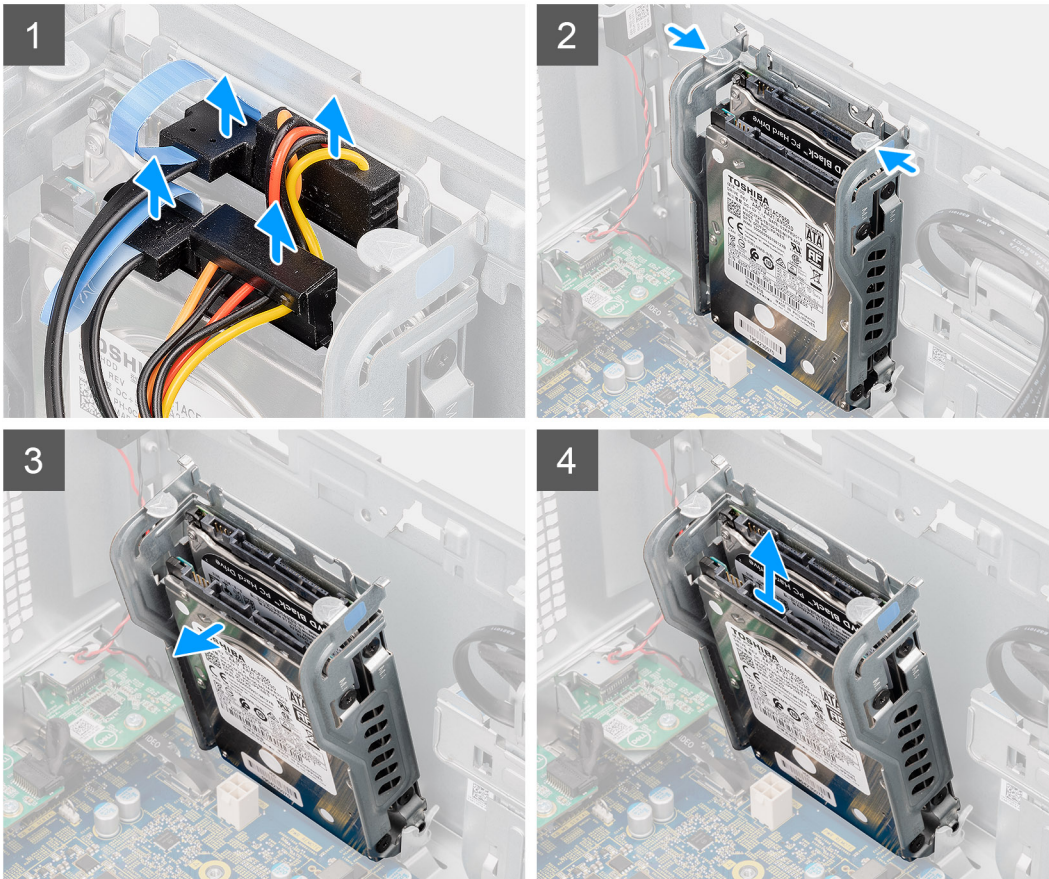
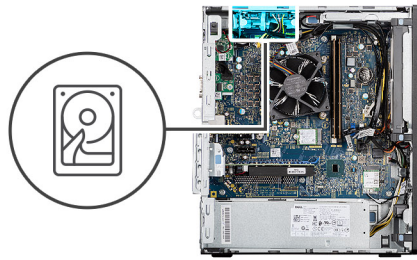
### Removing the 2.5-inch hard-drive assembly

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).

#### About this task

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



### Steps

1. Disconnect the hard-drive data and power cables from the connectors on the 2.5-inch hard-disk drive module.
2. Press the release tabs on both the sides of the hard-drive bracket to release it from the slots on the computer chassis.
3. Tilt the hard-drive assembly slightly at an angle.
4. Lift the hard-drive assembly from the computer.

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

## Removing the 2.5-inch hard-drive bracket

### Prerequisites

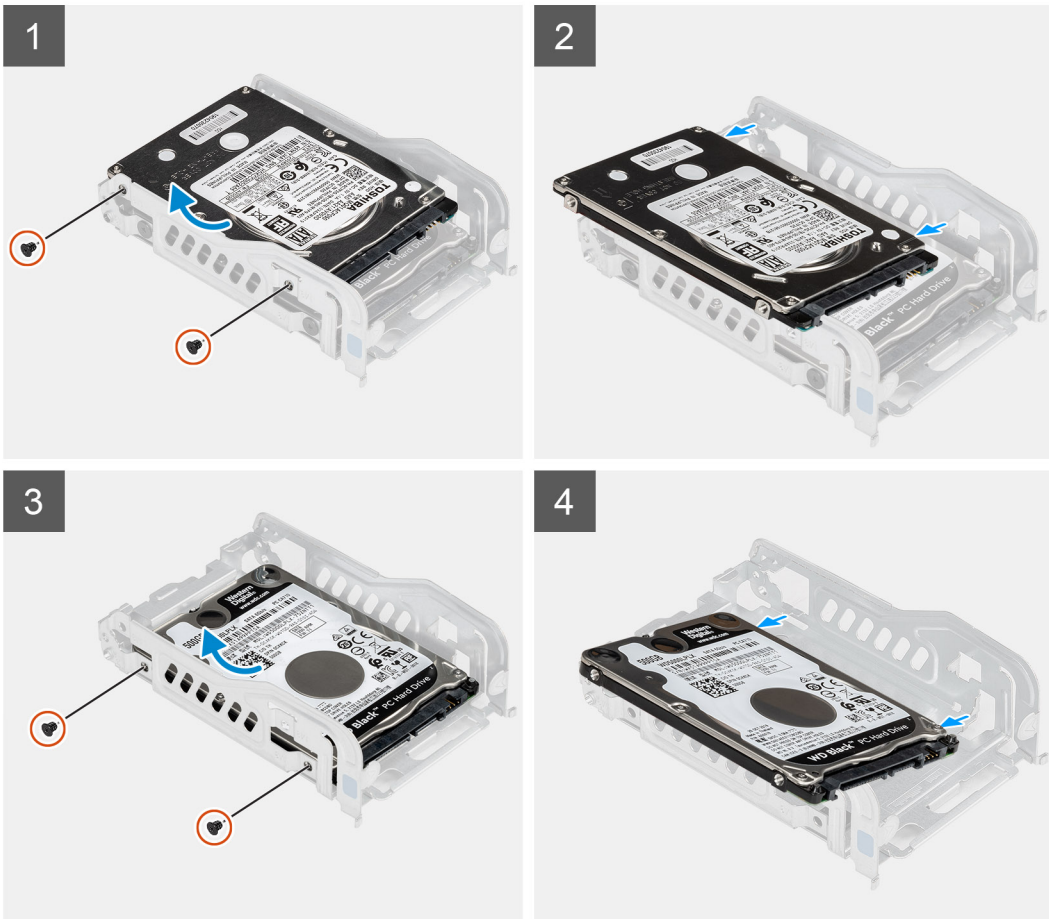
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).
4. Remove the [2.5 inch hard-drive assembly](#).

### About this task

The following images indicate the location of the 2.5-inch hard-drive bracket and provides a visual representation of the removal procedure.



4x  
M3x3.5



### Steps

1. Remove the two (M3x3.5) screws that secure the first hard drive to the hard-drive metal bracket.
2. Slide and lift the hard drive from the hard-drive metal bracket.
3. Remove the two (M3x3.5) screws that secure the second hard drive to the hard-drive metal bracket.
4. Slide and lift the second hard-disk drive from the hard-drive metal bracket.

## Installing the 2.5-inch hard-drive bracket

### Prerequisites

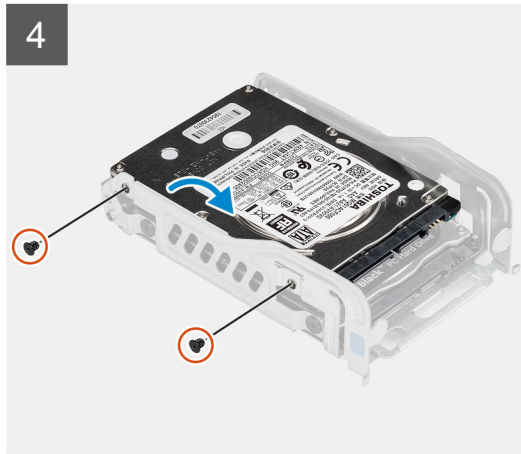
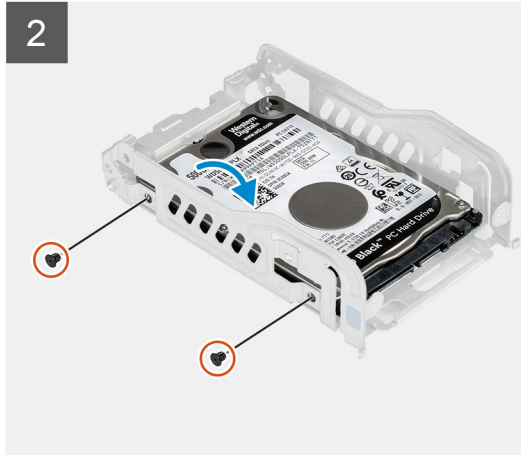
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following image indicates the location of the 2.5-inch hard-drive bracket and provides a visual representation of the installation procedure.



4x  
M3x3.5



### Steps

1. Place the first hard-drive into the hard-drive metal bracket and align the slots on the bracket with the slots on the hard drive.
2. Replace the two (M3x3.5) screws to secure the first hard drive to the hard-drive metal bracket.
3. Place the second hard drive into the hard-drive metal bracket and align the slots on the bracket with the slots on the hard drive.
4. Replace the two (M3x3.5) screws to secure the second hard drive to the hard-drive metal bracket.

### Next steps

1. Install the [2.5 inch hard-drive assembly](#).
2. Install the [fan duct](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

## Installing the 2.5-inch hard-drive assembly

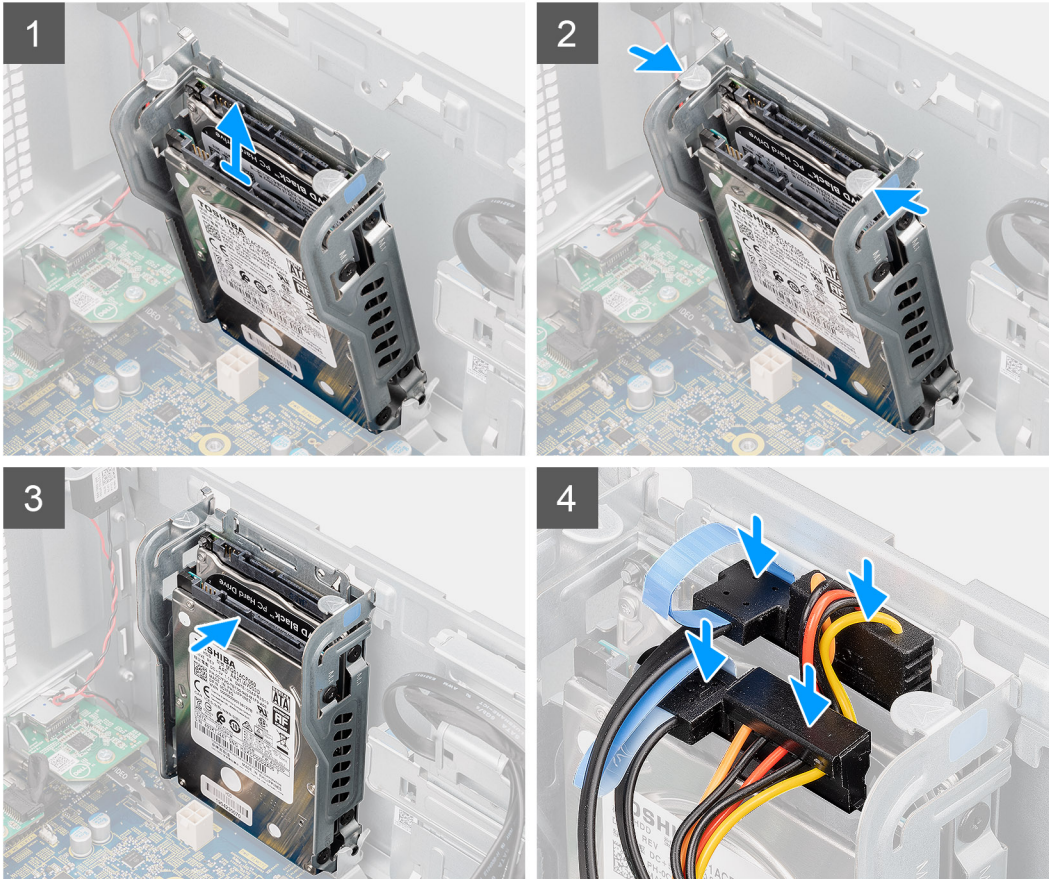
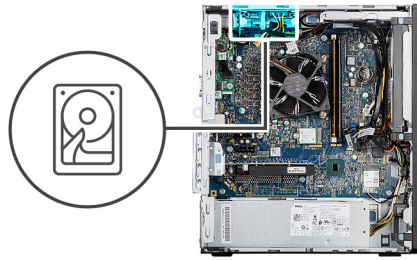
### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.



### About this task

The following image indicates the location of the 2.5-inch hard-drive assembly and provides a visual representation of the installation procedure.



### Steps

1. Align the hard-drive assembly at an angle to the slot on the computer.
2. Press the release tabs on the hard-drive bracket and slightly align back to insert the hard-drive assembly to the slot on the computer chassis.
3. Connect the hard-drive data and power cables to the connectors on the 2.5-inch hard-drive module.

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

# 3.5-inch hard drive

## Removing the 3.5-inch hard drive

### Prerequisites

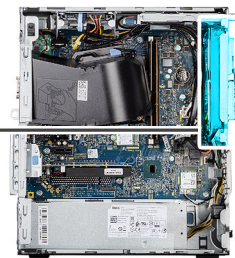
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).

### About this task

The following images indicate the location of the 3.5-inch hard-disk drive and provides a visual representation of the removal procedure.



4x  
#6-32



### Steps

1. Disconnect the data and power cables from the connectors on the 3.5-inch hard-drive module.
2. Remove the four (#6-32) screws that secure the 3.5-inch hard drive to the chassis.
3. Remove the 3.5-inch hard drive away from the chassis.

## Installing the 3.5-inch hard-disk drive

### Prerequisites

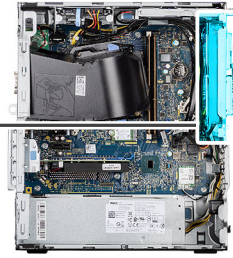
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the 3.5-inch hard-disk drive and provides a visual representation of the installation procedure.



4x  
#6-32



### Steps

1. Align and place the 3.5-inch hard drive in its slot on the chassis.
2. Replace the four (#6-32) screws that secure the 3.5-inch hard drive to the chassis.
3. Connect the power cable and data cable to the connectors on the hard-drive module.

### Next steps

1. Install the [side cover](#).
2. Follow the procedure in [after working inside your computer](#).

## Solid-state drive

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

#### Prerequisites

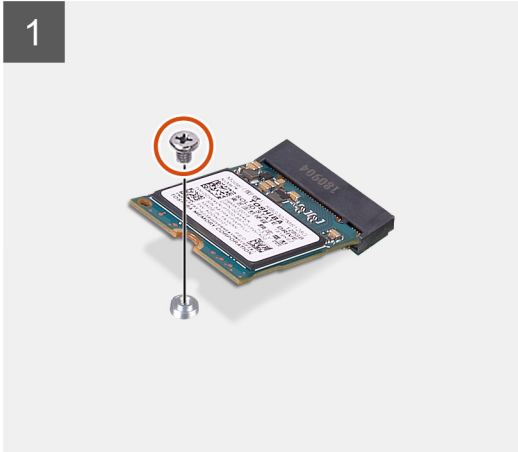
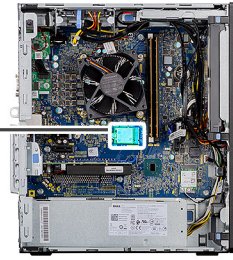
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).

#### About this task

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



1x  
M2x3.5



### Steps

1. Remove the screw (M2x3.5) 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

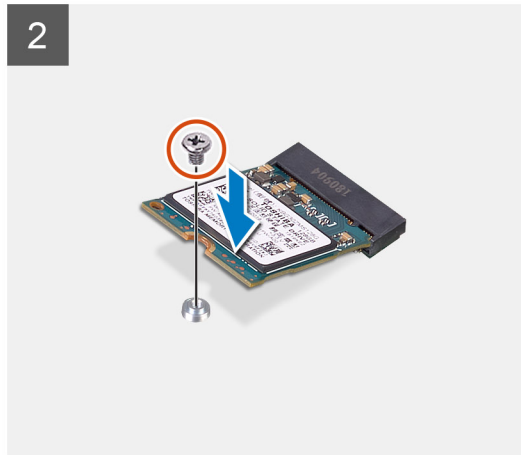
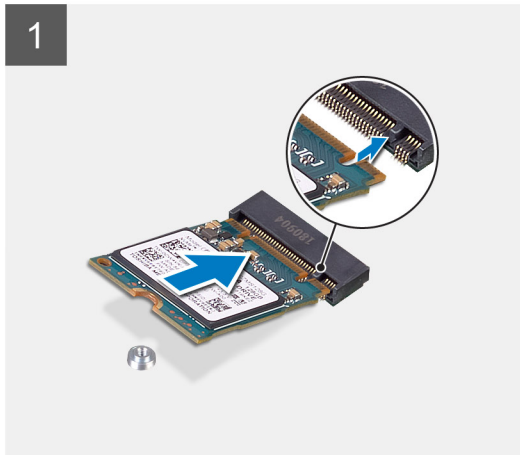
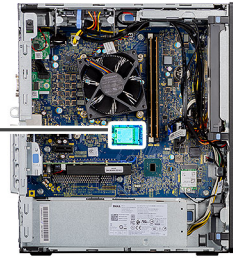
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



1x  
M2x3.5



### 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 slot on the system board.
3. Replace the screw (M2x3.5) to secure the M.2 2230 solid-state drive to the system board.

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

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

### Prerequisites

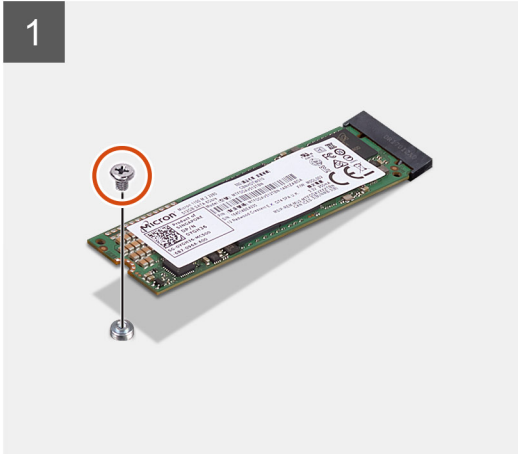
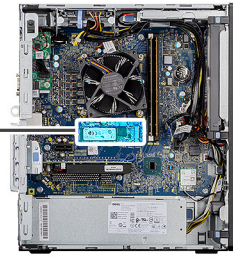
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).

### About this task

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



**1x**  
M2x3.5



### Steps

1. Remove the screw (M2x3.5) 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

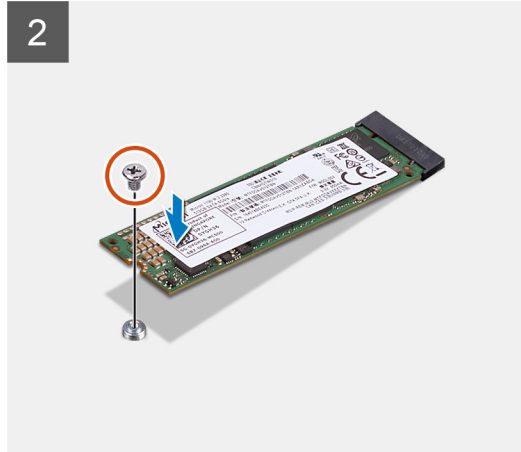
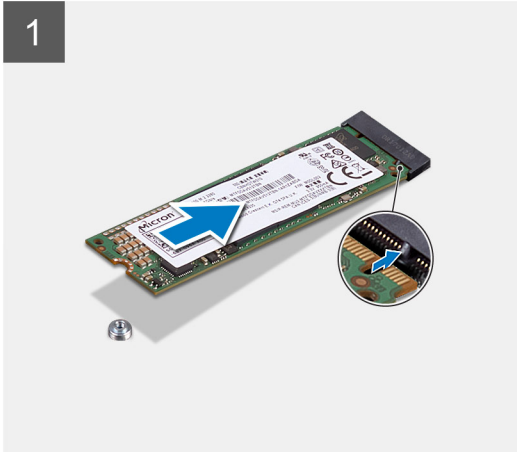
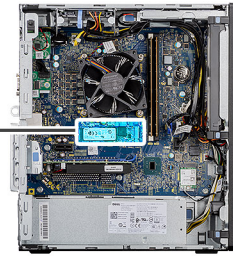
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



1x  
M2x3.5



### 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 slot on the system board.
3. Replace the screw (M2x3.5) to secure the M.2 2280 solid-state drive to the system board.

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

## Memory modules

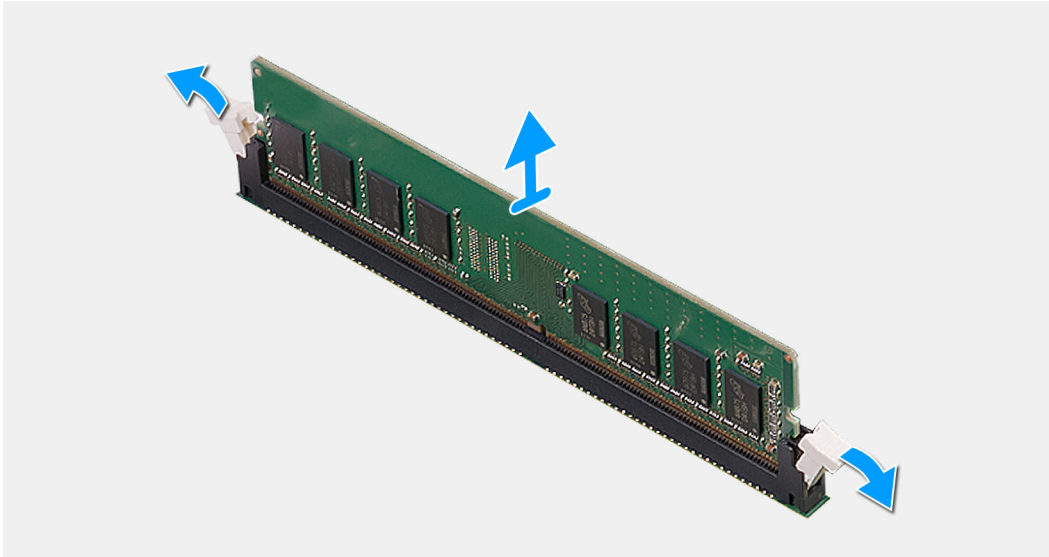
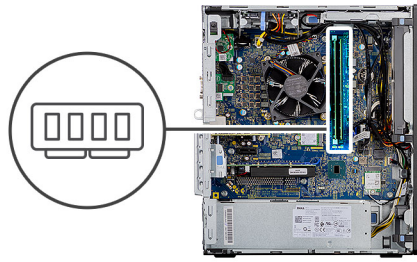
### Removing the memory modules

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).

#### 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 both side of the memory module until the memory module pops up.
2. Slide and remove the memory module from the memory-module slot.

## Installing the memory modules

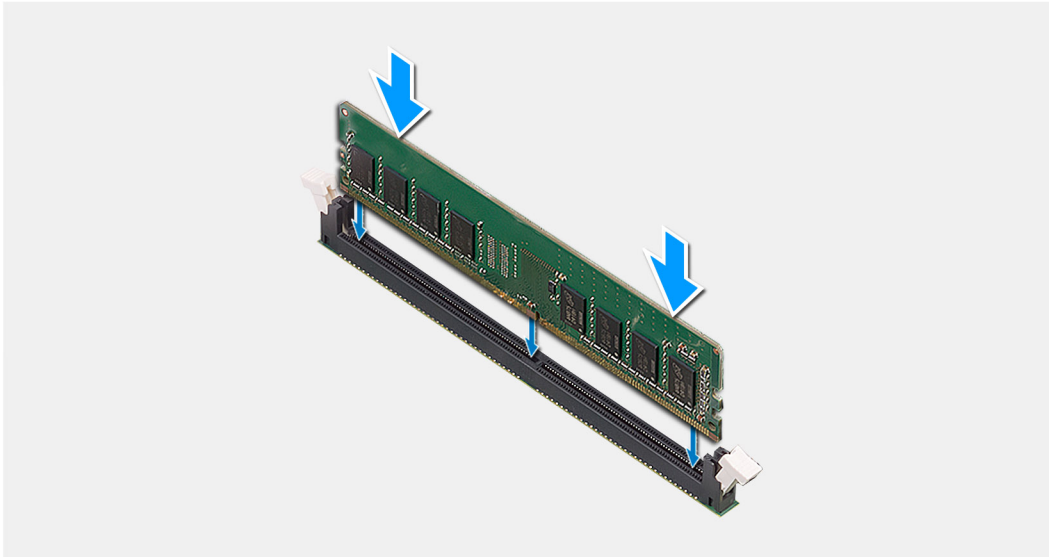
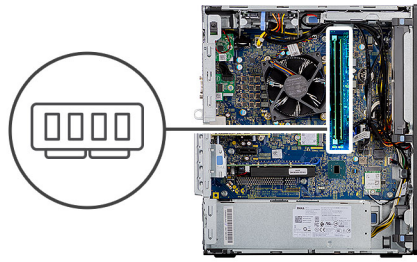
### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### 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.

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

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

## Processor fan and heat-sink assembly

### Removing the processor fan and heat-sink assembly

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).

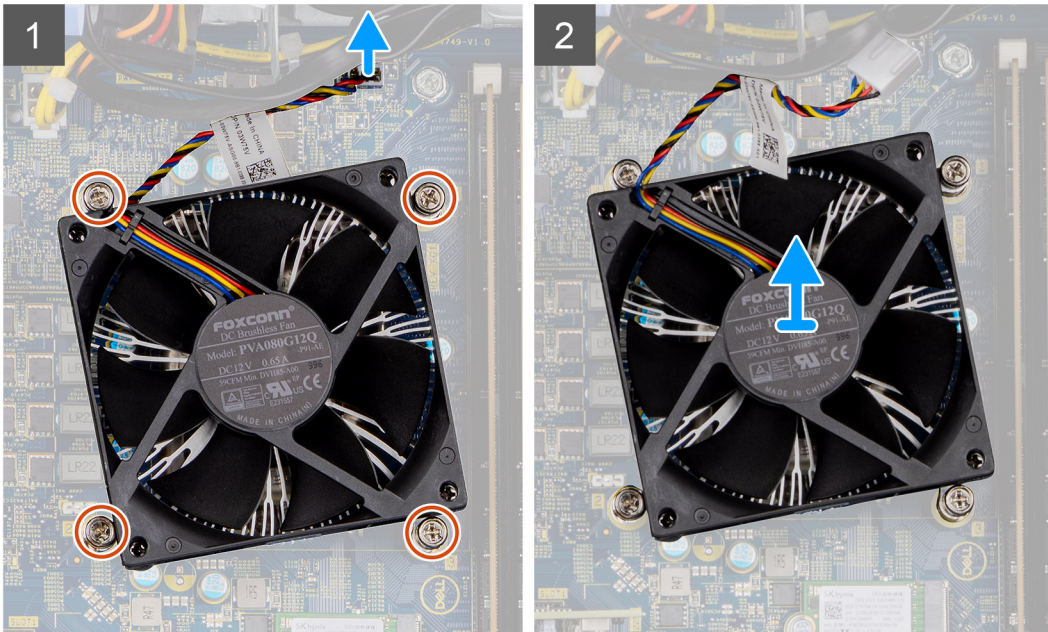
**WARNING:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.

**CAUTION:** For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.

2. Remove the [side cover](#).
3. Remove the [fan duct](#).

### About this task

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



### Steps

1. Disconnect the processor fan cable from the connector on the system board.
2. Loosen the four captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Lift the processor fan and heat-sink assembly off the system board.

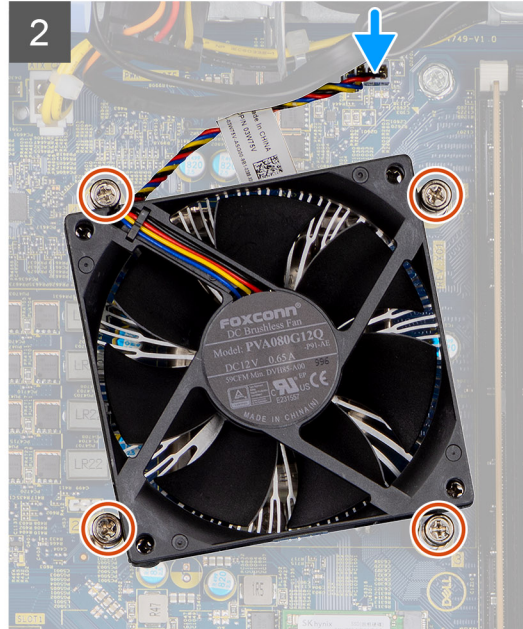
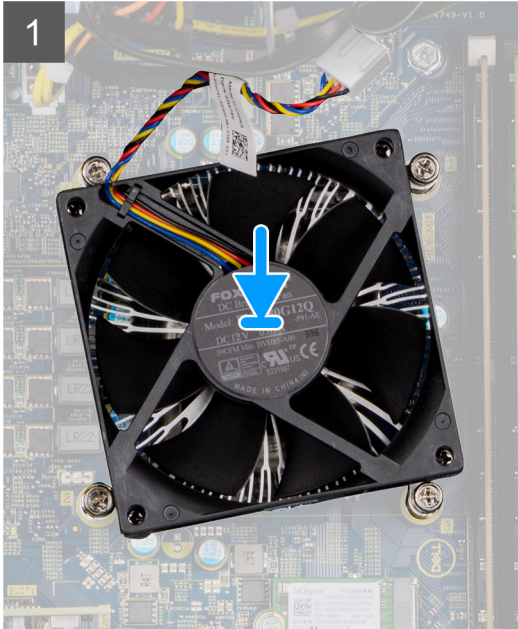
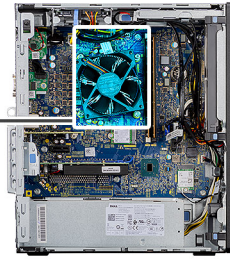
## Installing the processor fan and heat-sink assembly

### Prerequisites

**NOTE:** If either the processor or the heat sink is replaced, use the thermal grease provided in the kit to ensure that thermal conductivity is achieved.

### About this task

The following image indicates the location of the processor fan and heat-sink assembly and provides a visual representation of the installation procedure.



### Steps

1. Align the screw holes on the processor fan and heat-sink assembly with the screw holes on the system board.
2. Tighten the four captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Connect the processor-fan cable to the connector on the system board.

### Next steps


1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

## Processor

### Removing the processor

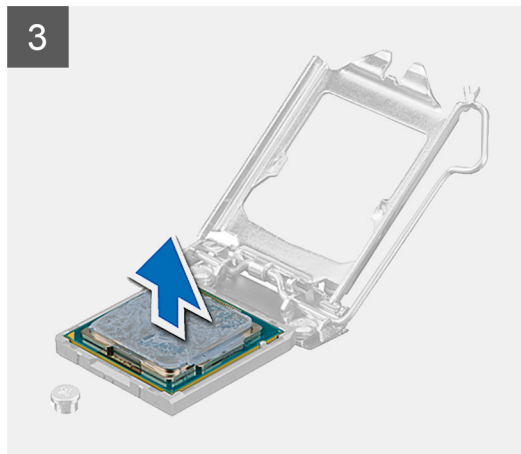
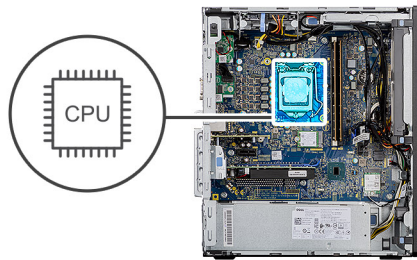
#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).
4. Remove the [processor fan and heat-sink assembly](#).

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

### About this task

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.

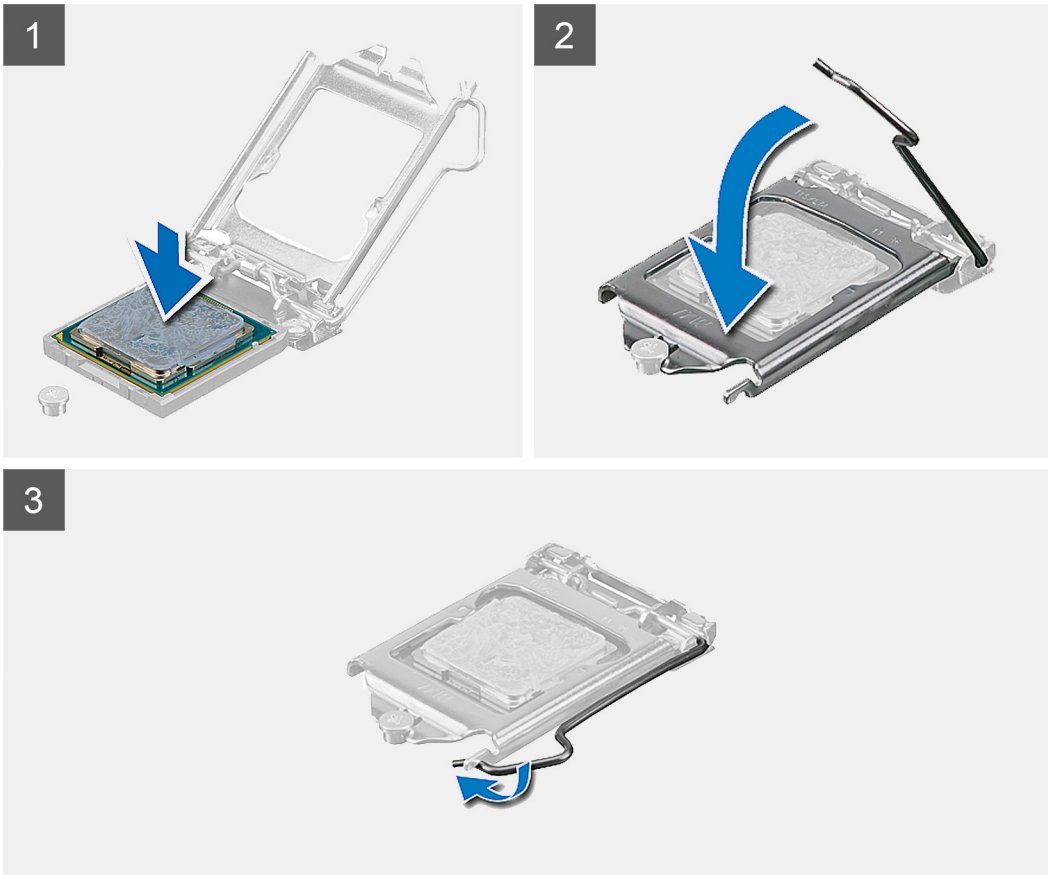
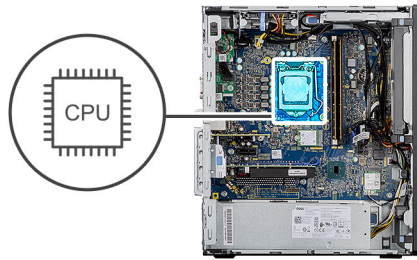
## Installing the processor

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



### Steps

1. Ensure that the release lever on the processor socket is fully extended in the open position.
2. Align the notches on the processor with the tabs on the processor socket and place the processor in the processor socket.  
**i** **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.
3. When the processor is fully seated in the socket, pivot the release-lever down and place it under the tab on the processor cover.

### Next steps

1. Install the [processor fan and heat-sink assembly](#).
2. Install the [fan duct](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

# Graphics card

## Removing the graphics card

### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).

### About this task

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

### Steps

1. Locate the graphics card (PCI-Express).
2. Lift the pull tab to open the PCIe door.
3. Push and hold the securing tab on the graphics-card slot and lift the graphics card from the graphics-card slot.

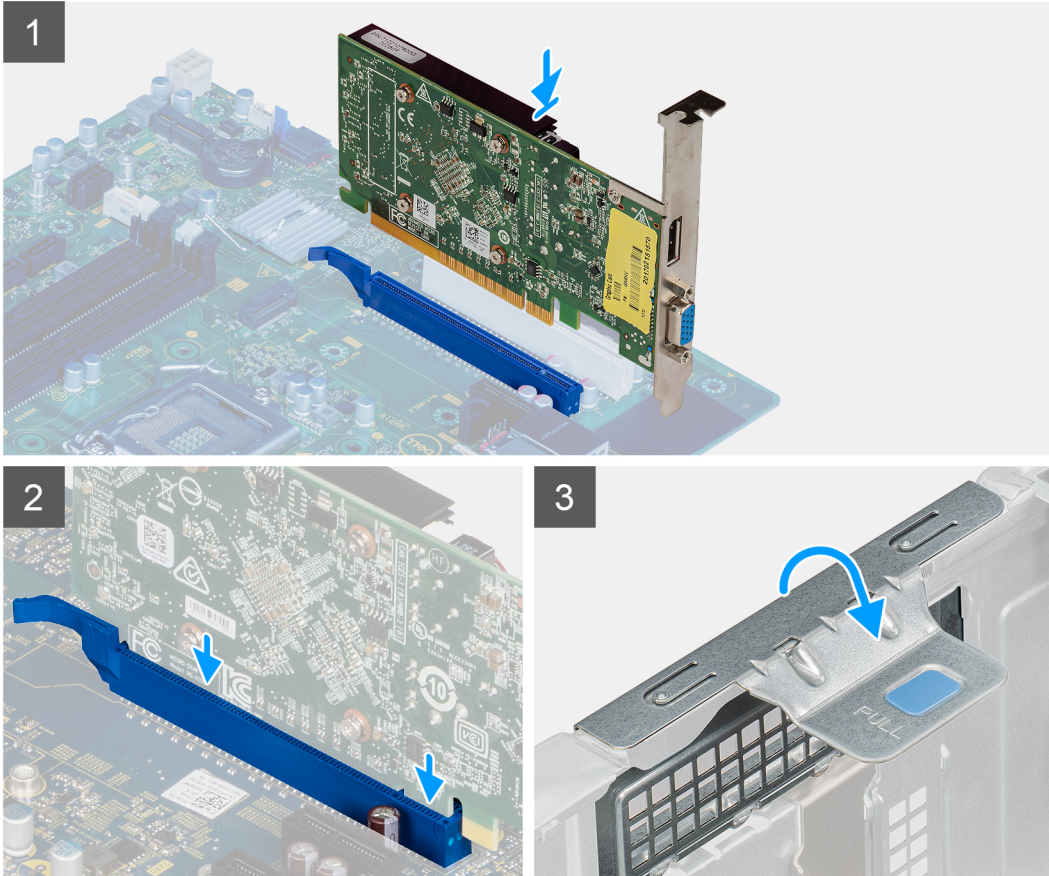
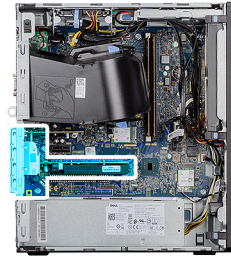
## Installing the graphics card

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the graphics card and provides a visual representation of the installation procedure.



### Steps

1. Align the graphics card with the PCI-Express card connector on the system board.
2. Using the alignment post, connect the graphics card in the connector and press down firmly. Ensure that the card is firmly seated.
3. Lift the pull tab to close the PCIe door.

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

## Graphical processing unit

### Removing the powered GPU

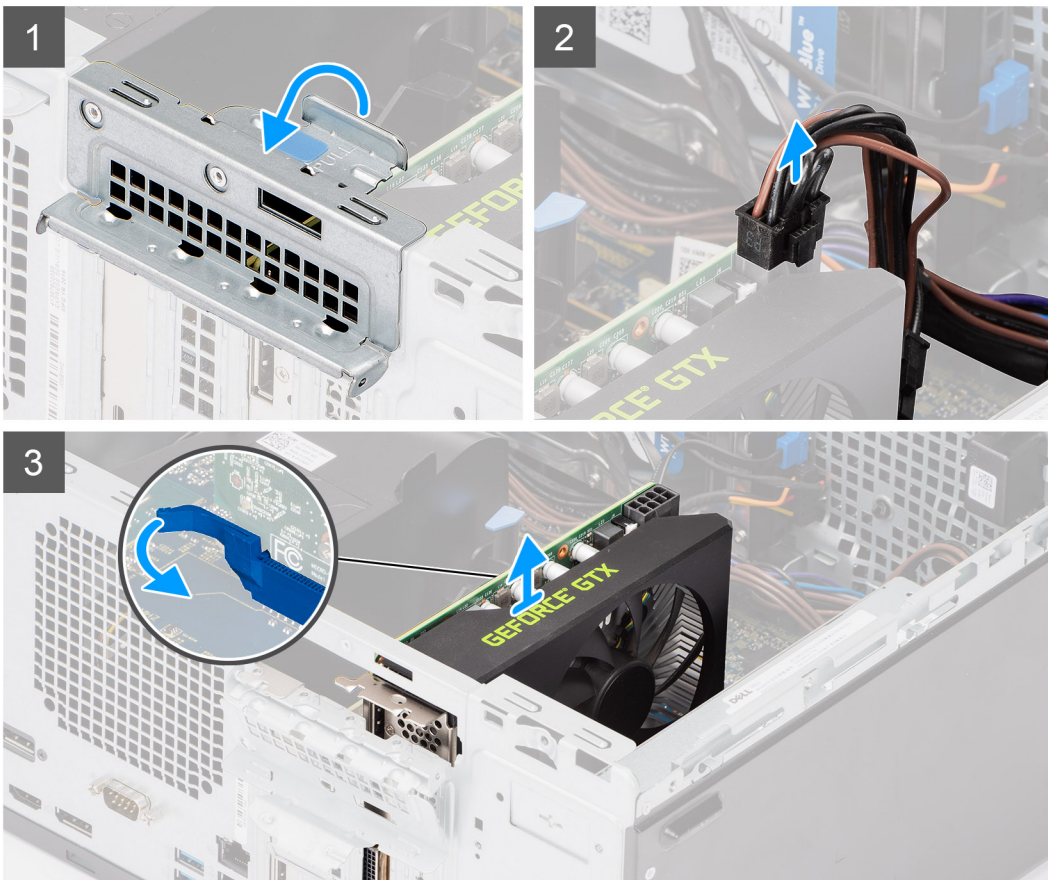
#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).

2. Remove the [side cover](#).
3. Remove the [fan duct](#).

### About this task

The following images indicate the location of the powered graphical processing unit and provides a visual representation of the removal procedure.



### Steps

1. Lift the pull tab to open the PCIe door.
2. Disconnect the power cable from the connector on the powered GPU.
3. Push and hold the securing tab on the graphics-card slot and lift the powered GPU away from the graphics-card slot.

## Installing the powered GPU

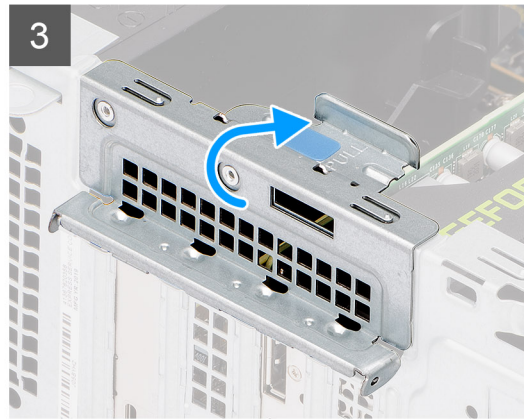
### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.



### About this task

The following images indicate the location of the powered graphical processing unit and provides a visual representation of the installation procedure.



### Steps

1. Align the powered GPU with the PCI-Express card connector on the system board.
2. Using the alignment post, connect the powered GPU in the connector and press down firmly. Ensure that the powered GPU is firmly seated.
3. Connect the power cable to the connector on the powered GPU.
4. Lift the pull tab to close the PCIe door.

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

# Coin-cell battery

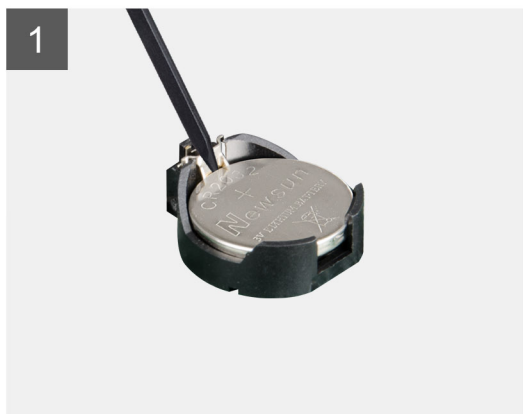
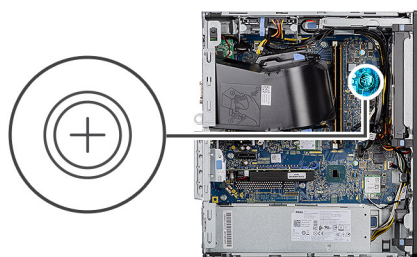
## Removing the coin-cell battery

### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).

### 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 slot on the system board.
2. Remove the coin-cell battery away from the computer.

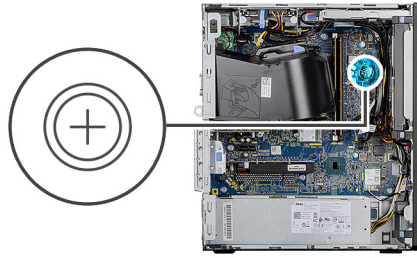
## Installing the coin-cell battery

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### 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 under the securing tabs at the positive side of the connector.
2. Press the battery into the connector until it locks into place.

### Next steps

1. Install the [side cover](#).
2. 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 [powered GPU](#) (optional).

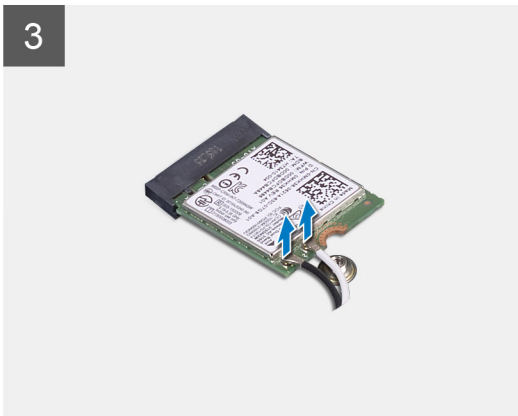
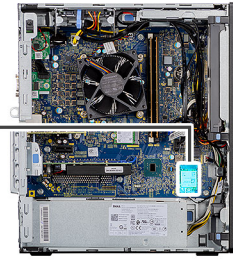
**NOTE:** This step is required only if the system is configured with powered GPU.

#### About this task

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



1x  
M2x3.5



### Steps

1. Remove the (M2x3.5) screw that secures the WLAN card to the system board.
2. 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

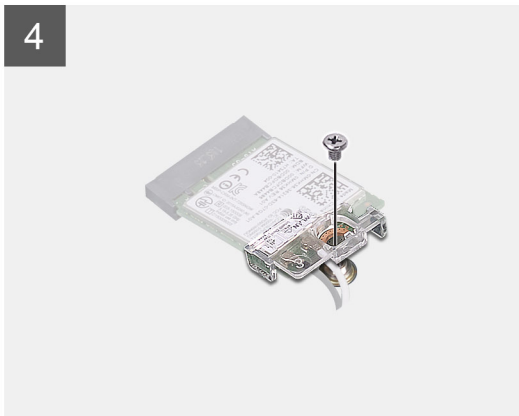
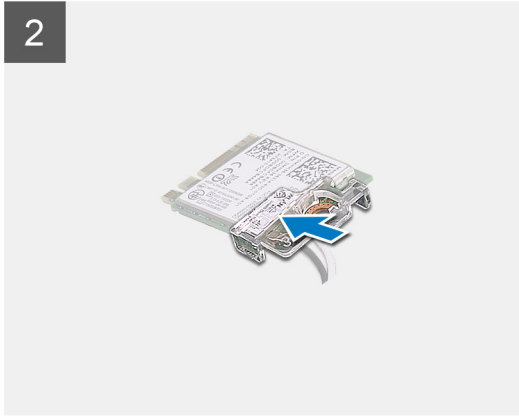
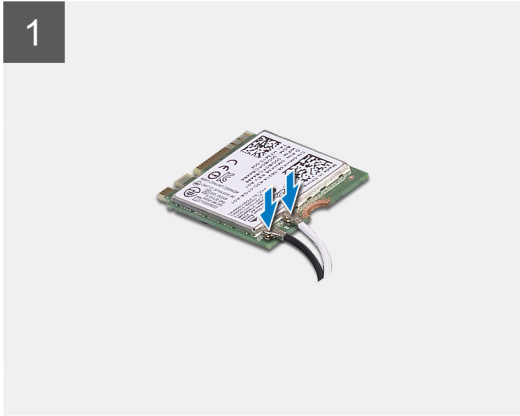
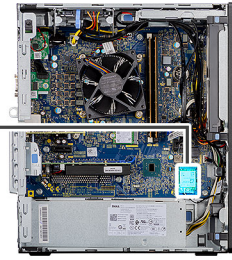
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



1x  
M2x3.5



### 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 WLAN antenna cables.
3. Insert the WLAN card into the connector on the system board.
4. Replace the (M2x3.5) screw to secure the plastic tab to the WLAN card.

### Next steps

1. Install the [powered GPU](#) (optional).  
**i** **NOTE:** This step is required only if the system is configured with powered GPU.
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

# Slim optical-drive

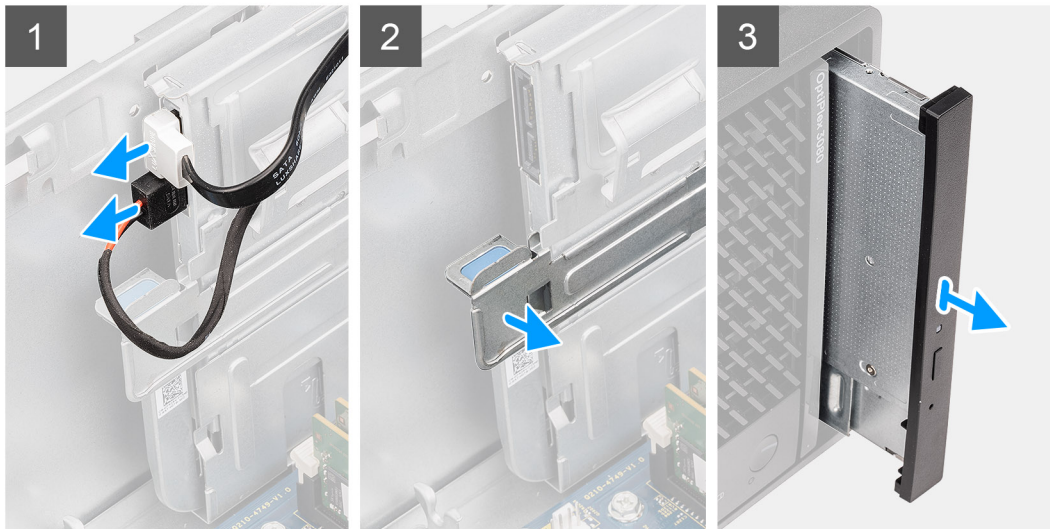
## Removing the Slim-Optical Disk Drive

### 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 slim ODD and provides a visual representation of the removal procedure.



### Steps

1. Disconnect the data and power cables from the slim ODD.
2. Pull the securing tab to release the slim ODD from the chassis.
3. Slide and remove the slim ODD from the ODD slot.

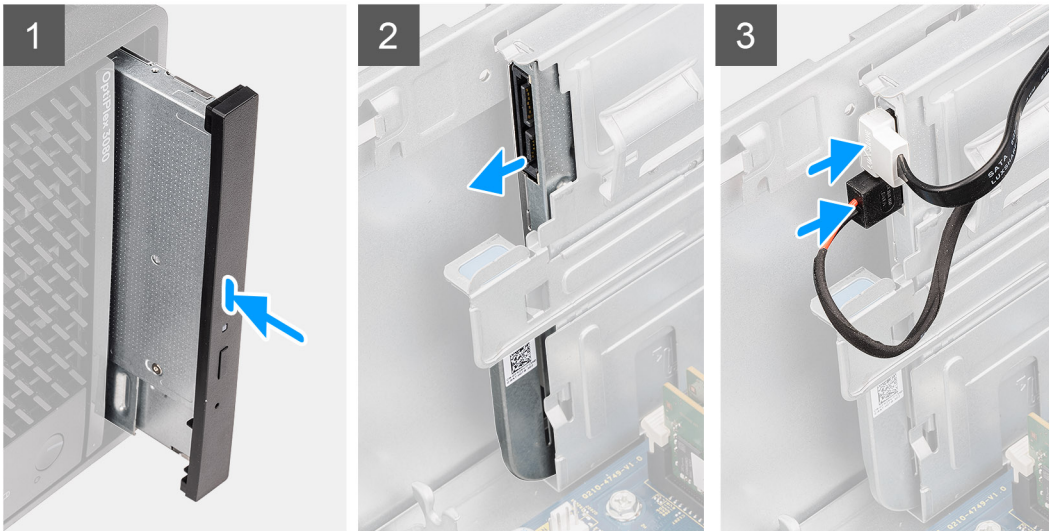
## Installing the Slim-Optical Disk Drive

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the slim ODD and provide a visual representation of the installation procedure.



### Steps

1. Insert the slim ODD assembly into the ODD slot.
2. Slide the slim ODD assembly until it snaps into place.
3. Route the power cable and data cable through the routing guides and connect the cables to the slim ODD.

### Next steps

1. Install the [side cover](#).
2. Follow the procedure in [after working inside your computer](#).

## Slim optical-drive bracket

### Removing the slim-ODD bracket

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [slim Optical Disk Drive](#).

#### About this task

The following images indicate the location of the slim-ODD bracket and provides a visual representation of the removal procedure.



### Steps

1. Pry the slim-ODD bracket to release it from the slot on the ODD.
2. Remove the slim-ODD bracket off the ODD.

## Installing the slim-ODD bracket

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the slim-ODD bracket and provides a visual representation of the installation procedure.



### Steps

1. Align and place the slim-ODD bracket on the ODD slots.
2. Snap the slim-ODD bracket into the slim ODD.

### Next steps

1. Install the [slim Optical Disk Drive](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).



# Speaker

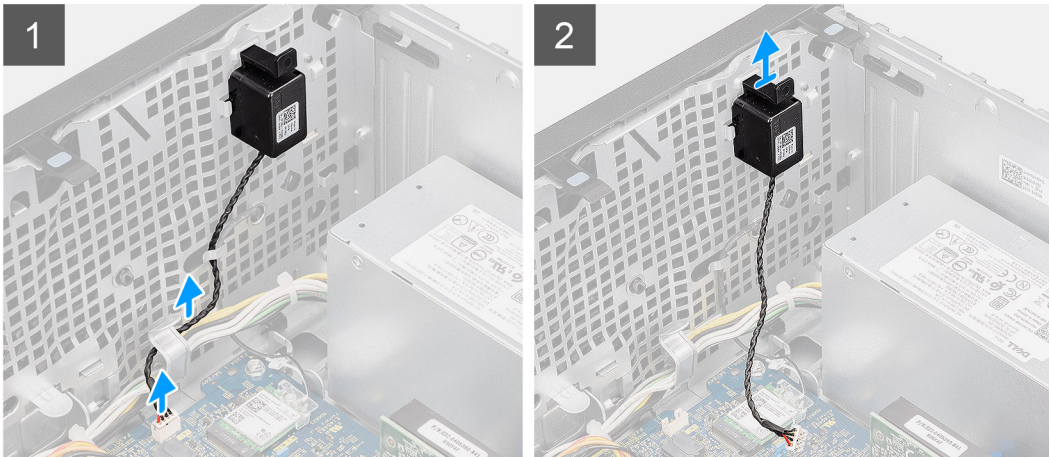
## Removing the speaker

### 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 speakers and provide a visual representation of the removal procedure.



### Steps

1. Disconnect the speaker cable from the connector on the system board.
2. Unroute the speaker cable from the routing guides on the chassis.
3. Press the tab and slide the speaker along with the cable from the slot on the chassis.

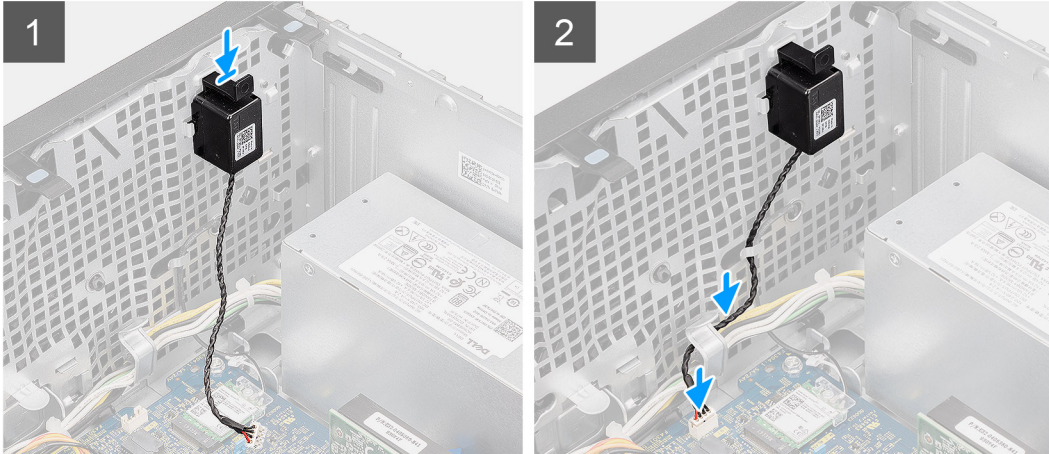
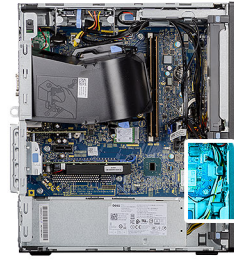
## Installing the speaker

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



### Steps

1. Press and slide the speaker in the slot on the chassis until it snaps into place.
2. Route the speaker cable through the routing guide on the chassis.
3. Connect the speaker 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](#).

## Power button

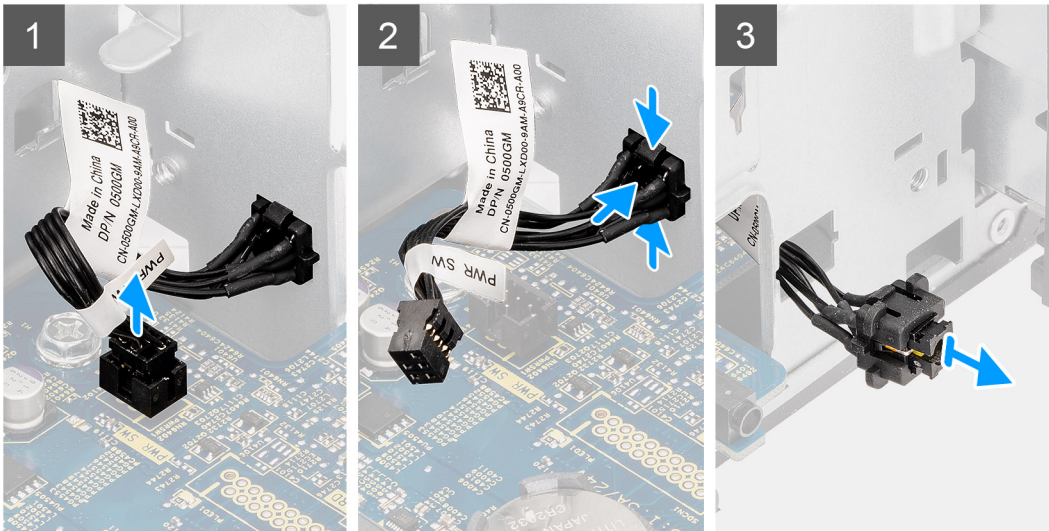
### Removing the power button

#### 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 power button and provides a visual representation of the removal procedure.



### Steps

1. Disconnect the power-button cable from the connector on the system board.
2. Press the release tabs on the power-button head and slide the power-button cable out from the front-side chassis of the computer.
3. Pull the power-button cable out from the computer.

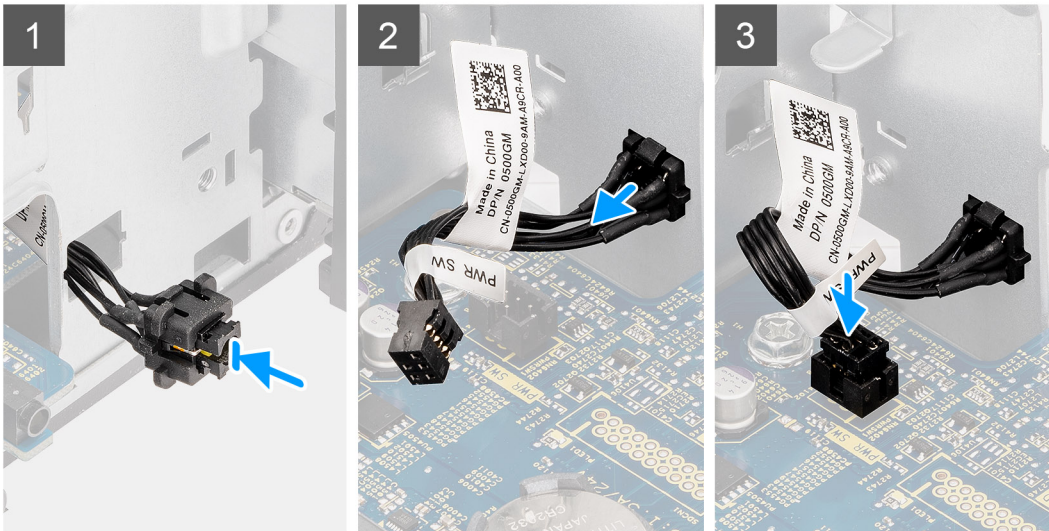
## Installing the power button

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the power button switch and provides a visual representation of the installation procedure.



### Steps

1. Insert the power-button cable into the slot from the front-side of the computer, and press the power-button head until it clicks into the place in the chassis.
2. Align and connect the power-button cable to the connector on 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](#).

## 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 [fan duct](#).

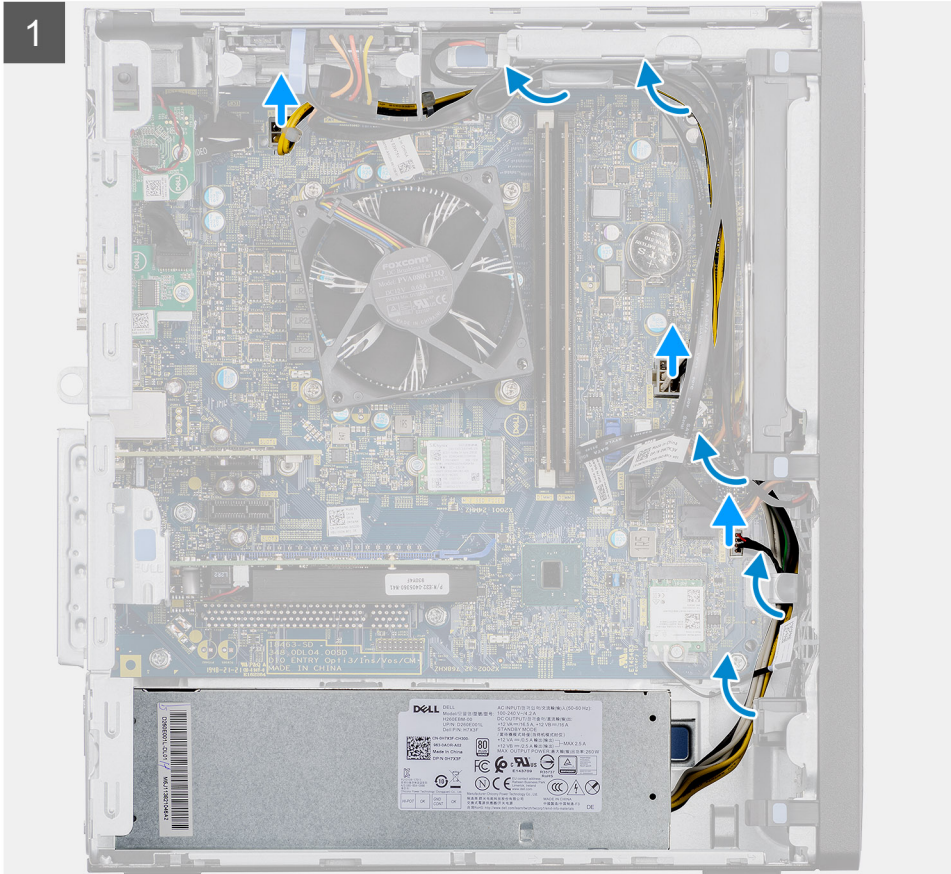
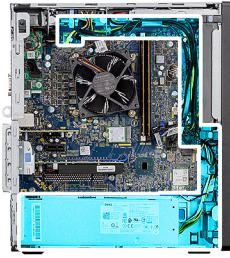
 **NOTE:** Note the routing of all cables as you remove them so that you can route them correctly while you are replacing the power-supply unit.

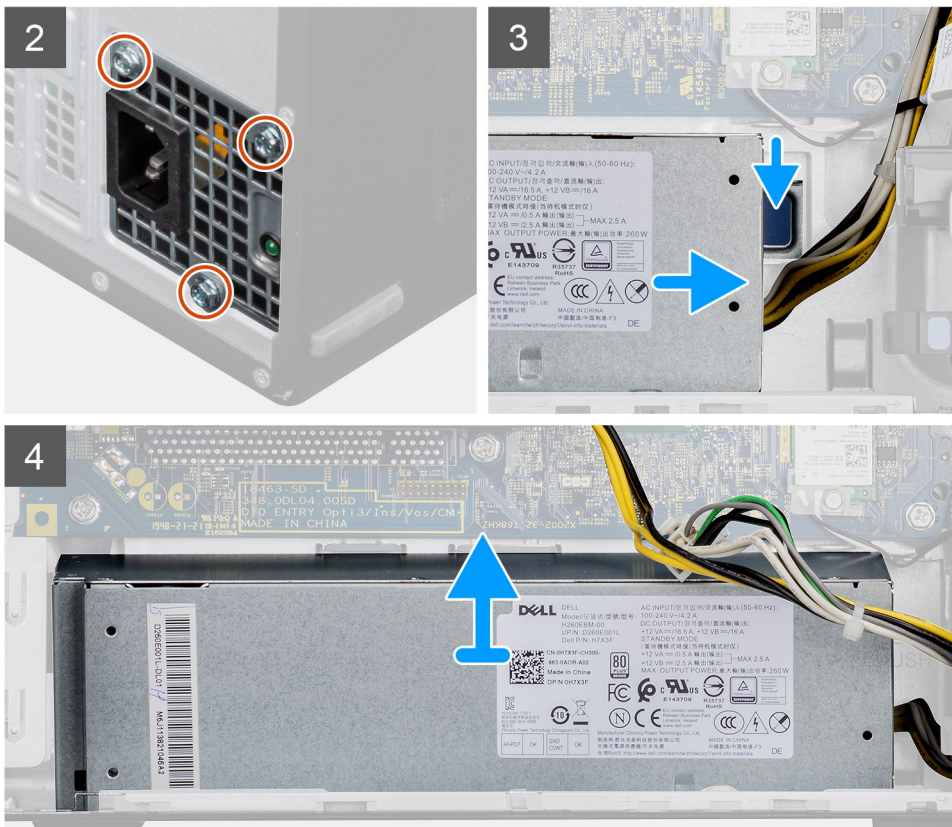
#### About this task

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



**3x**  
#6-32





## Steps

1. Lay the computer on the right side.
2. Disconnect the power cables from the system board and unroute them from the routing guides on the chassis.
3. Remove the three (#6-32) screws that secure the power-supply unit to the chassis.
4. Press the securing clip and slide the power-supply unit away from the back of the chassis.
5. Lift the power-supply unit off the chassis.

## Installing the power-supply unit

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

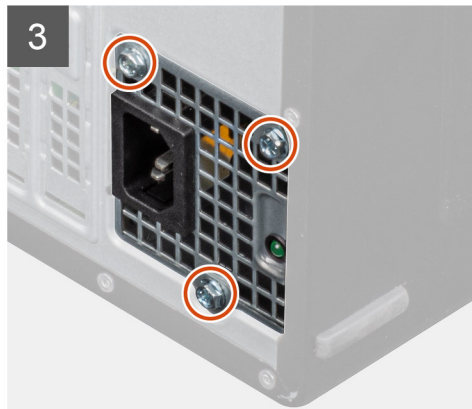
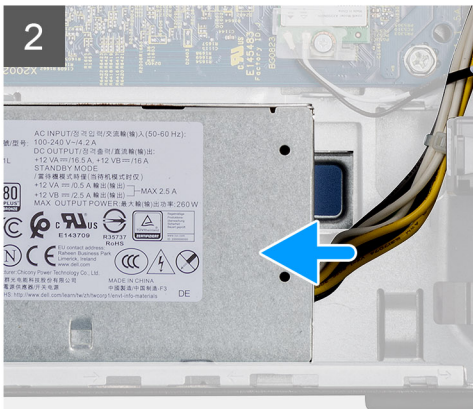
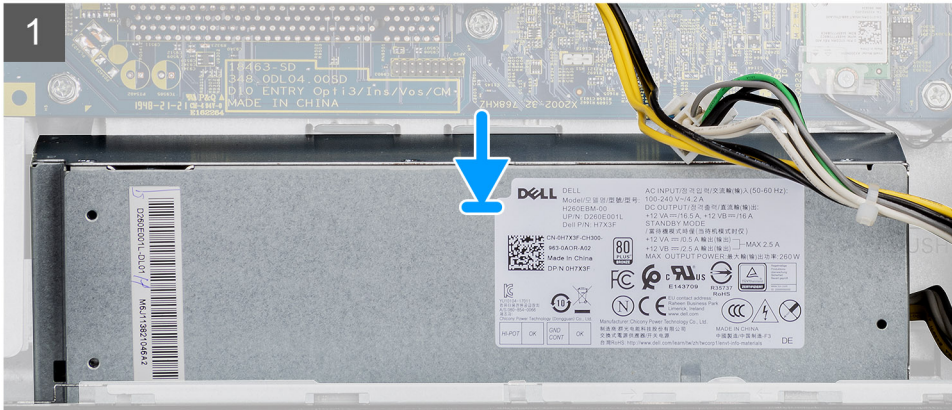
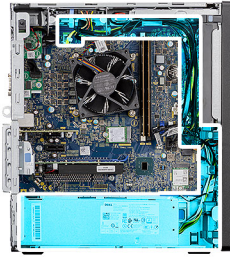
**⚠ WARNING:** The cables and ports on the back of the power-supply unit are color-coded to indicate the different power wattage. Ensure that you plug in the cable to the correct port. Failure to do so may result in damaging the power-supply unit and/or system components.

### About this task

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



3x  
#6-32





### Steps

1. Slide the power-supply unit into the chassis until the securing tab snaps into position.
2. Replace the three (#6-32) screws to secure the power-supply unit to the chassis.
3. Route the power cable through the routing guides on the chassis and connect the power cables to their respective connectors on the system board.

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

## Intrusion switch

### Removing the intrusion switch

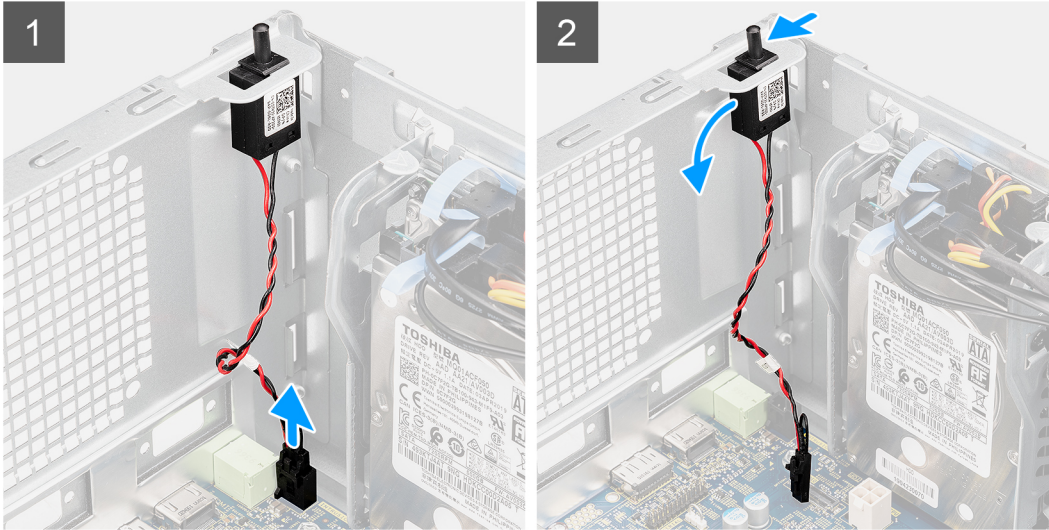
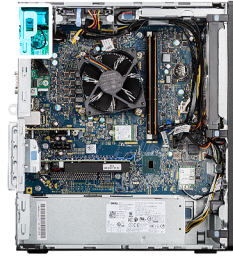
#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).

#### About this task

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





### Steps

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

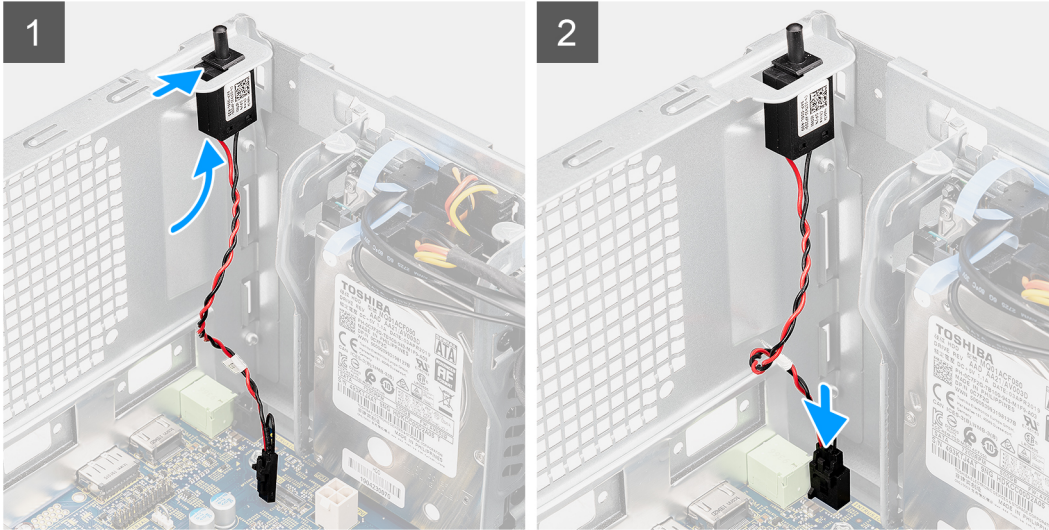
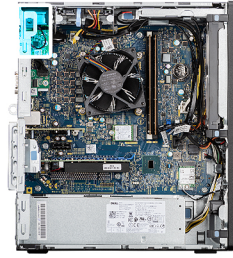
## Installing the intrusion switch

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the intrusion switch and provides a visual representation of the installation procedure.



### Steps

1. Insert the intrusion switch into its slot and slide the switch to secure it into the slot.
2. Connect the intrusion switch cable to the connector on the system board.

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

## Optional I/O modules (HDMI/VGA/DP/Serial)

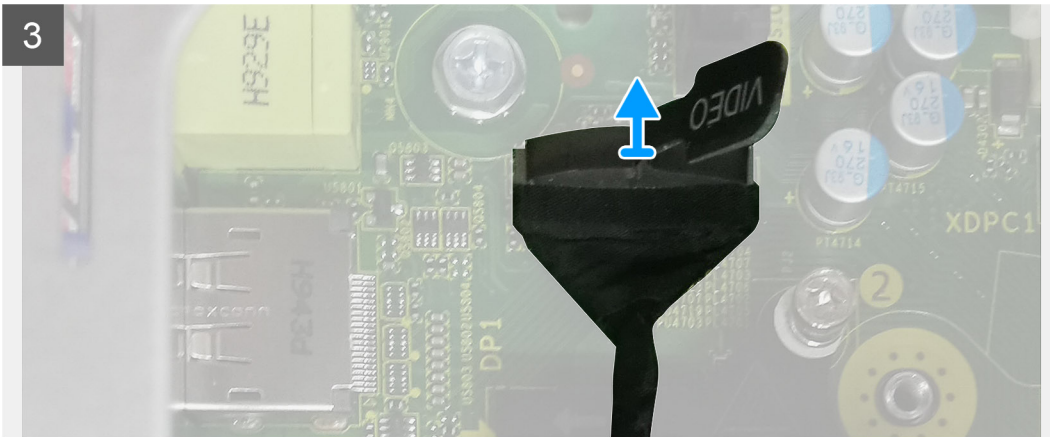
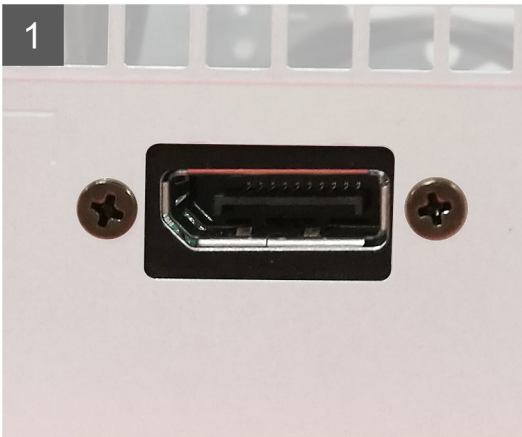
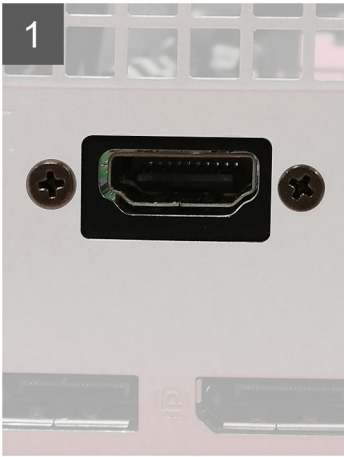
### Removing optional I/O modules (HDMI/VGA/DP/Serial)

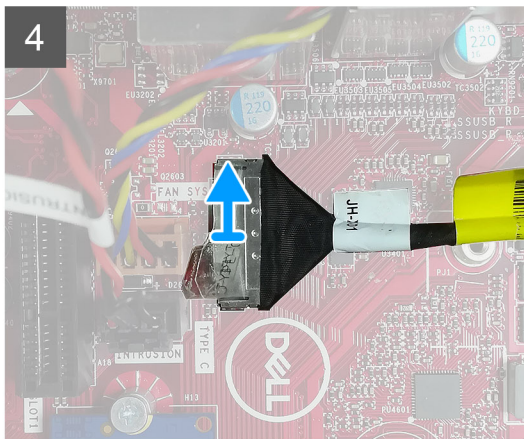
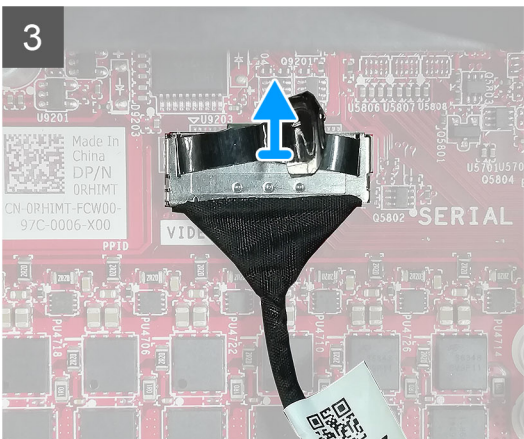
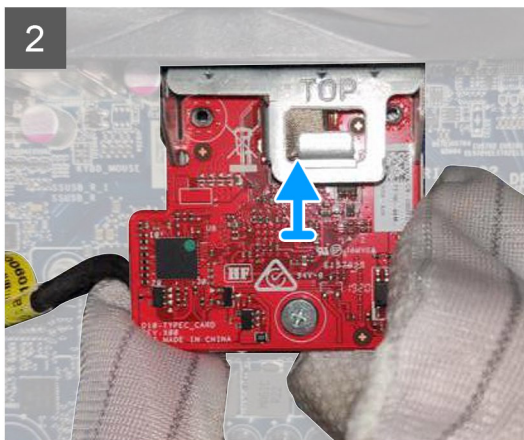
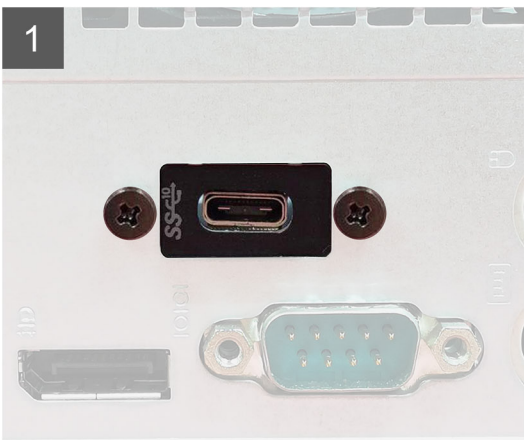
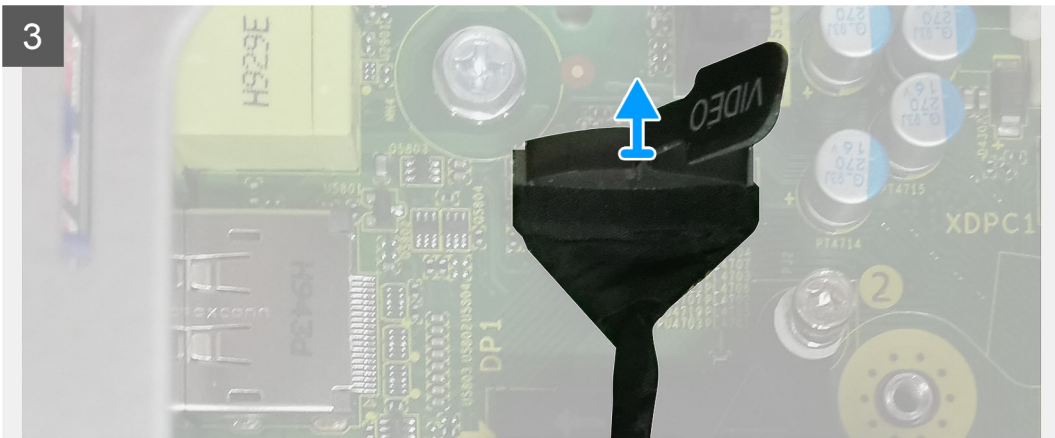
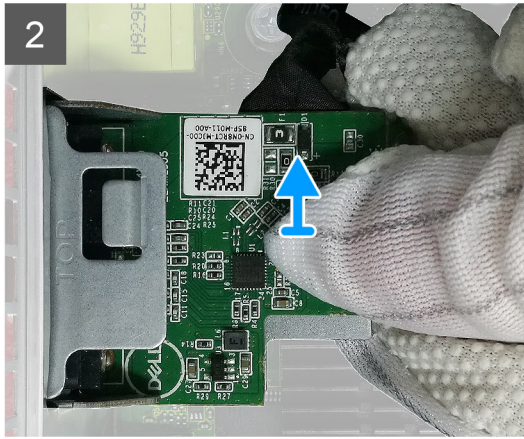
#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [fan duct](#).

#### About this task

The following images indicate the location of the optional I/O Modules and provides a visual representation of the removal procedure.





## Steps

1. Remove the two (M3X3) screws that secure the optional I/O module to the computer chassis.
2. Disconnect the I/O-module cable from the connector on the system board.
3. Remove the I/O module from the computer.

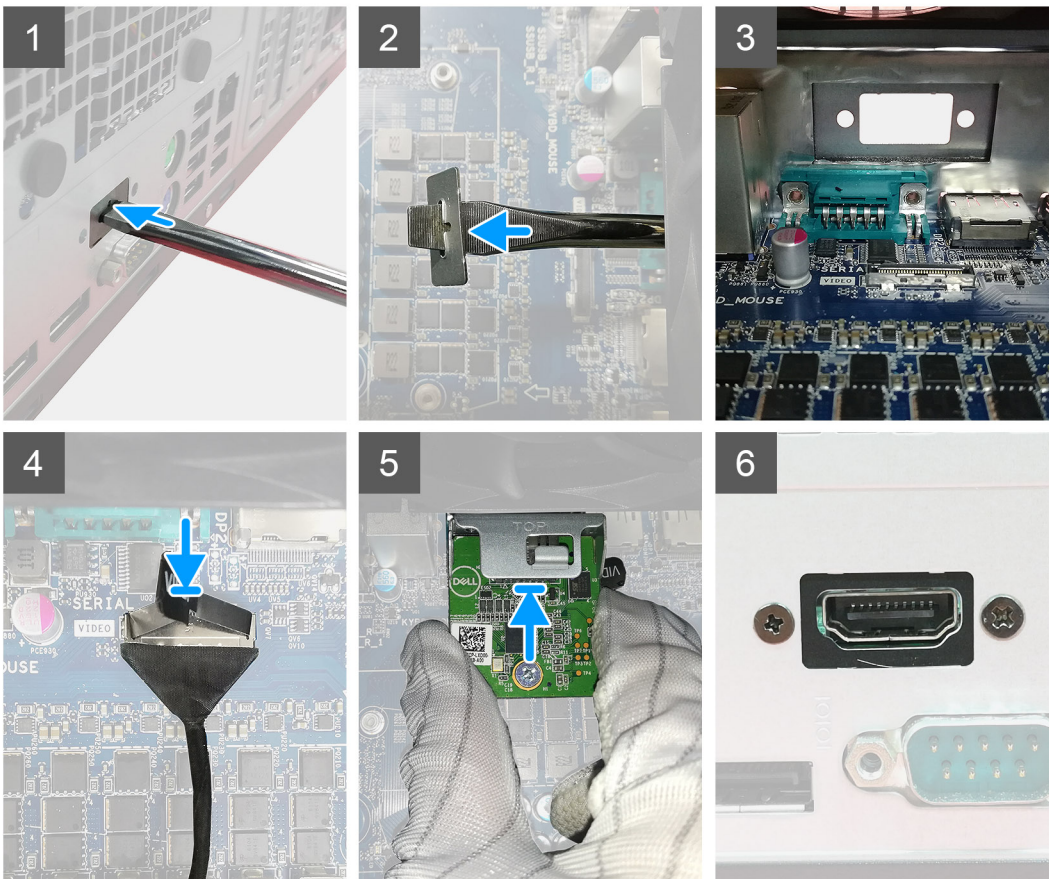
## Installing optional I/O modules (HDMI/VGA/DP/Serial)

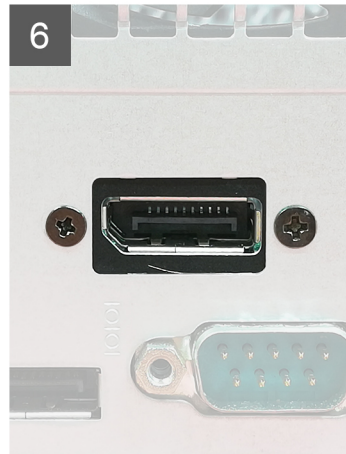
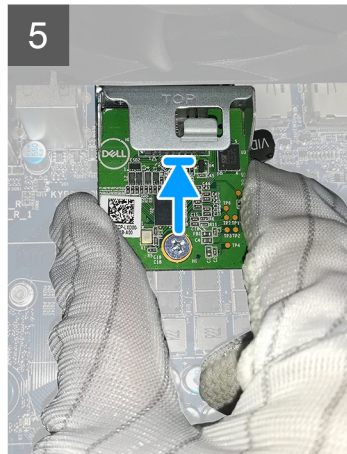
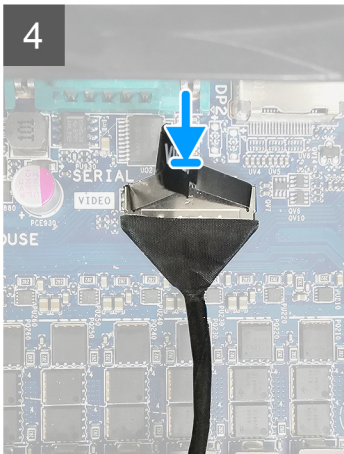
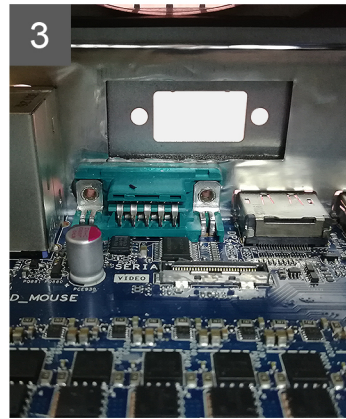
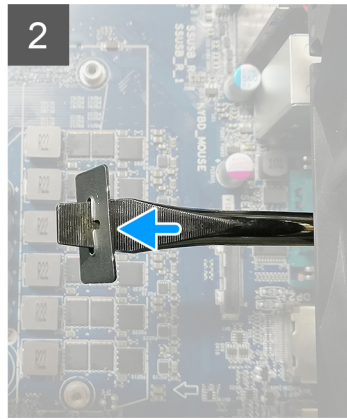
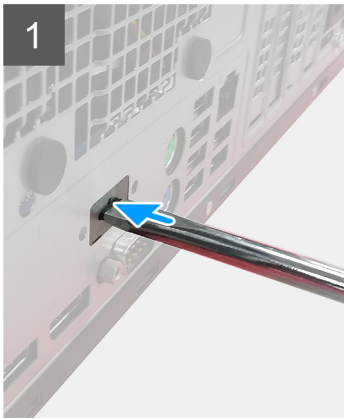
### Prerequisites

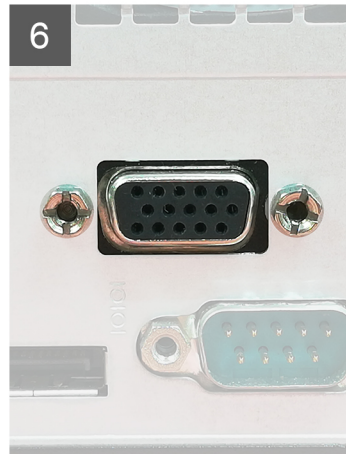
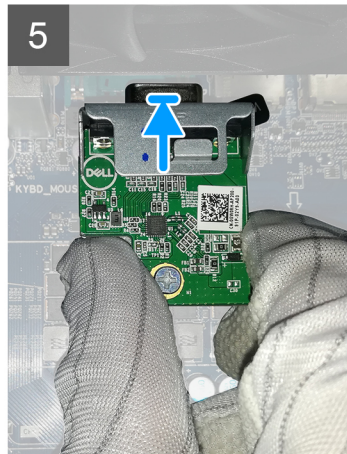
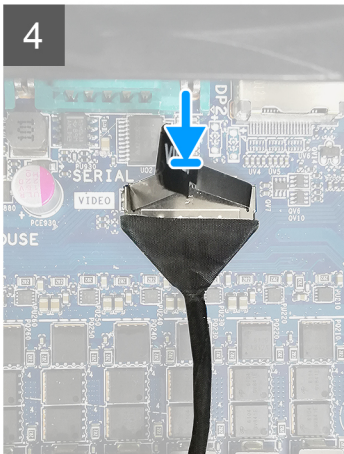
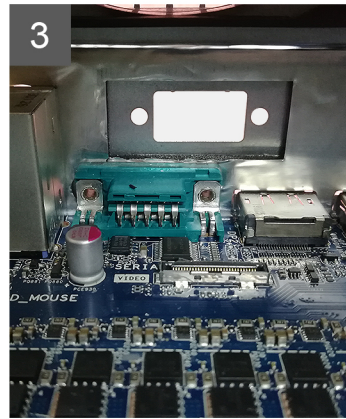
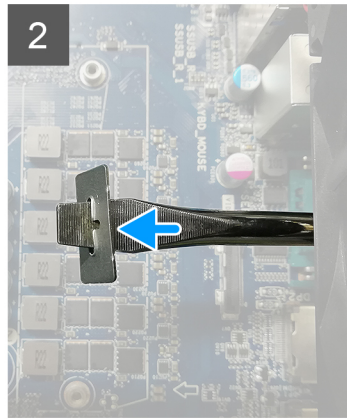
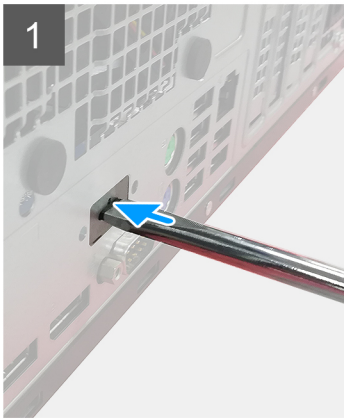
If you are replacing a component, remove the existing component before performing the installation procedure.

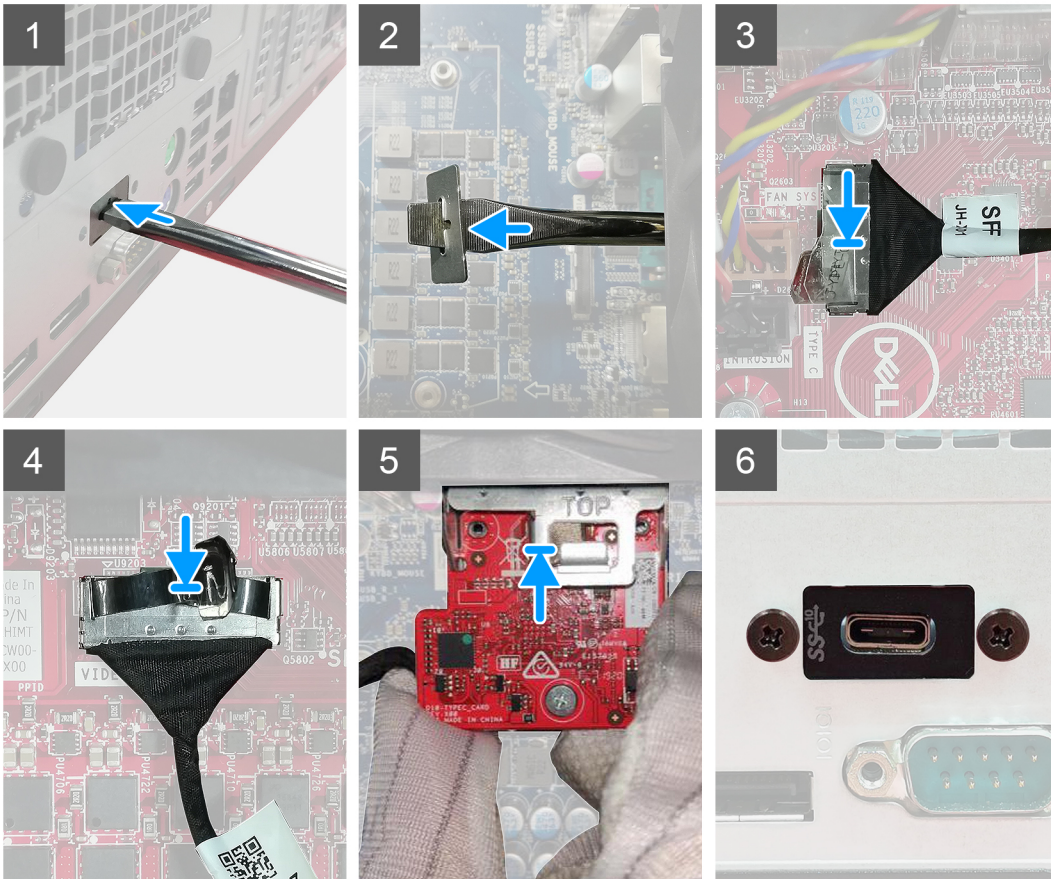
### About this task

The following images indicate the location of the system board and provides a visual representation of the installation procedure.









### Steps

1. To remove the dummy metal bracket, insert a flathead screwdriver in the hole of the bracket, push the bracket to release the bracket, and then lift the bracket out from the system.

**NOTE:** This step is applicable only if upgrading a system that previously had no optional I/O port.

2. Insert the optional I/O module (Type-C/HDMI/VGA/DP/Serial) into its slot from the inside of your computer.
3. Connect the I/O cable to the connector on the system board .
4. Replace the two (M3X3) screws to secure the optional I/O module to the system.

### Next steps

1. Install the [fan duct](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).



# System board

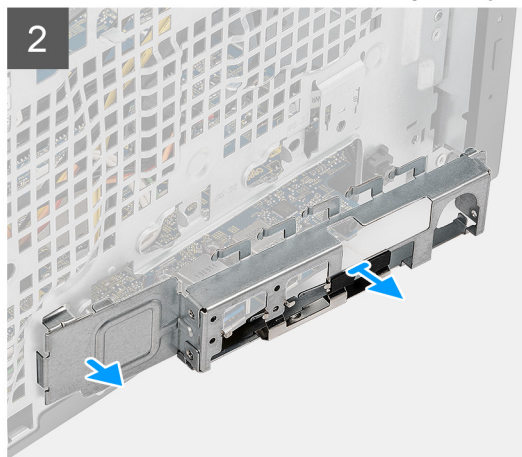
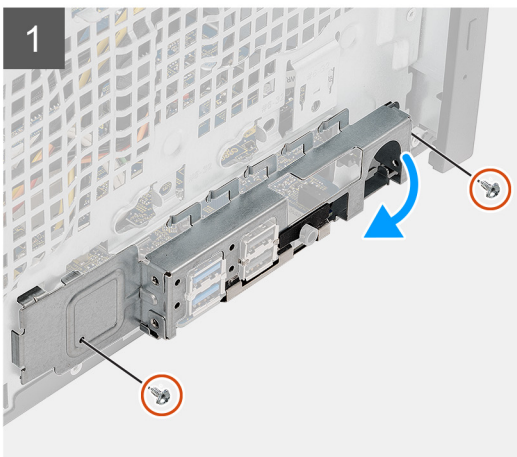
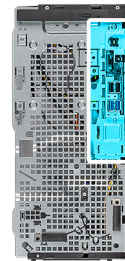
## Removing the system board

### Prerequisites

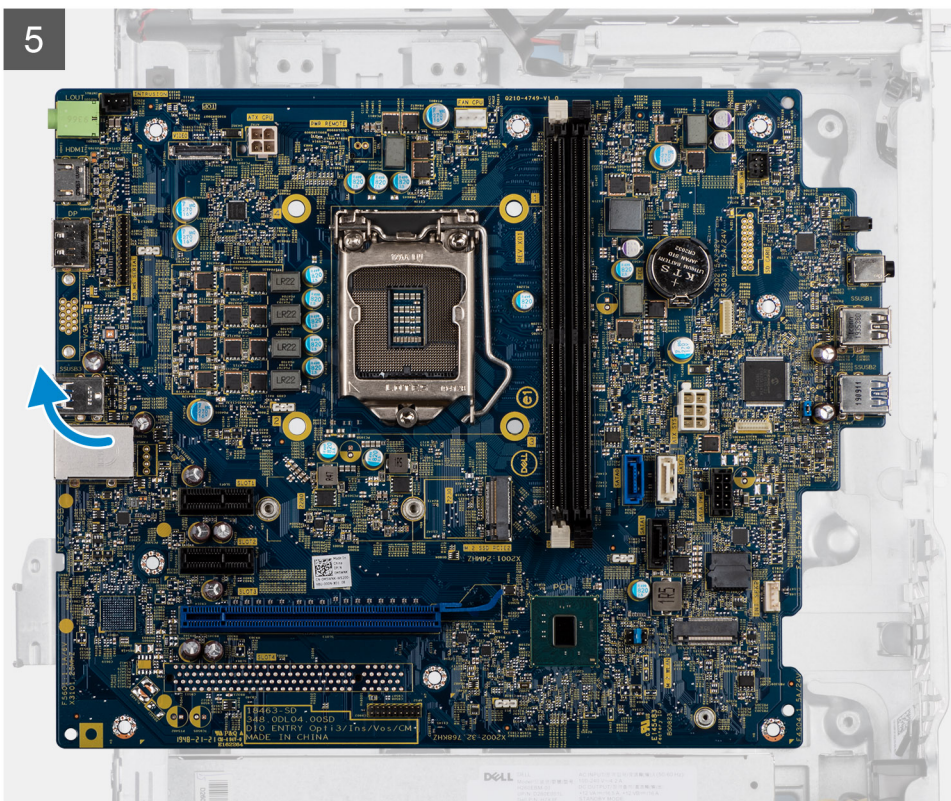
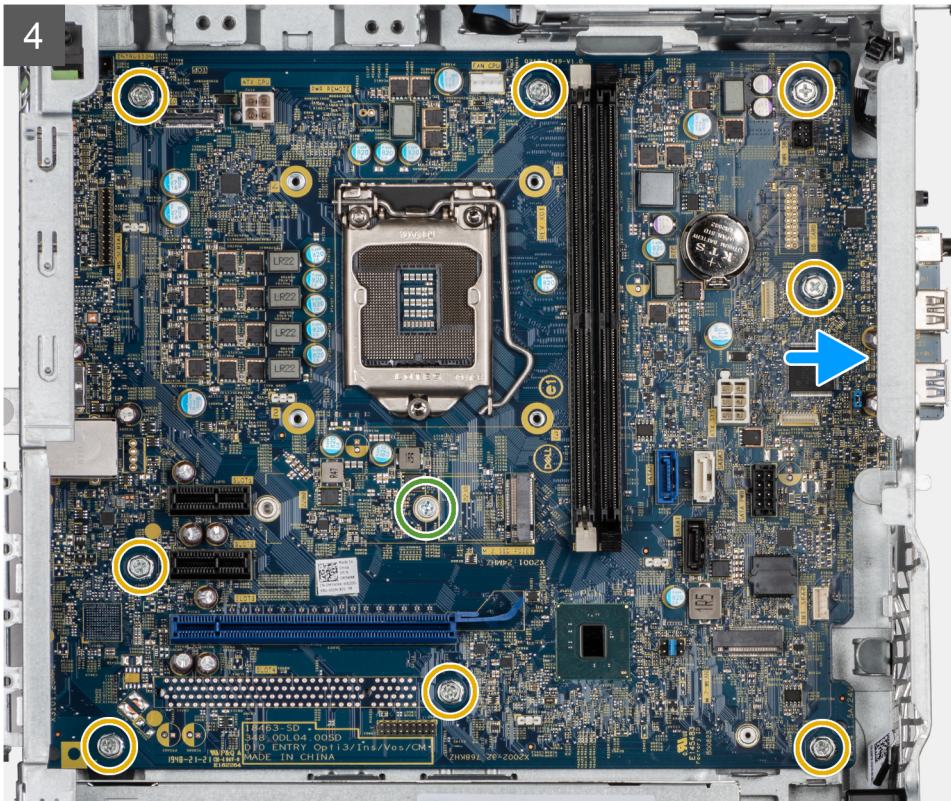
1. Follow the procedure in [before working inside your computer](#).
  - NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.
  - NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.
  - NOTE:** Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.
2. Remove the [side cover](#).
3. Remove the [front bezel](#).
4. Remove the [fan duct](#).
5. Remove the [memory module](#).
6. Remove the [wireless](#).
7. Remove the [M.2 2230 SSD/M.2 2280 SSD](#).
8. Remove the [coin-cell battery](#).
9. Remove the [graphics card/ powered graphical processing unit](#).
10. Remove the [processor fan and heat-sink assembly](#).
11. Remove the [processor](#).

### About this task

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







### Steps

1. Remove the two (#6-32) screws that secure the front I/O-bracket to the chassis.
2. Slide and remove the front I/O-bracket from the chassis.
3. Disconnect all the cables that are connected to the system board.
4. Remove the M.2 card standoff (#6-32) screw and eight (#6-32) screws that secure the system board to the chassis.

5. Lift the system board at an angle and remove the system board off the chassis.

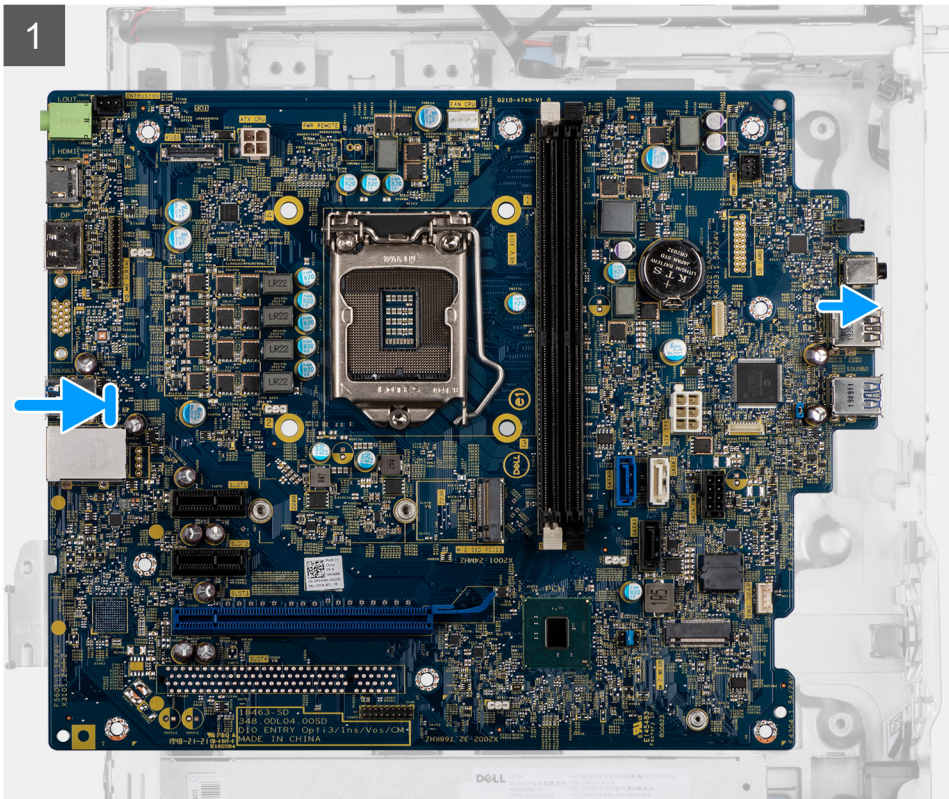
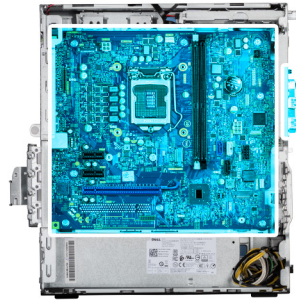
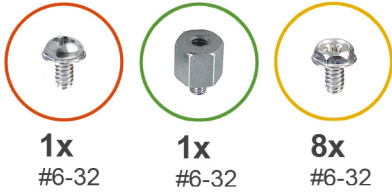
## Installing the system board

### Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the system board and provides a visual representation of the installation procedure.

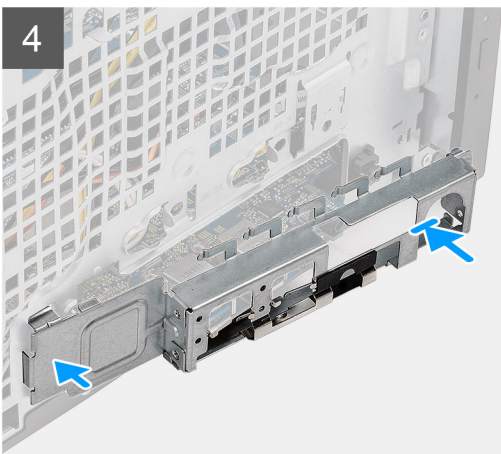




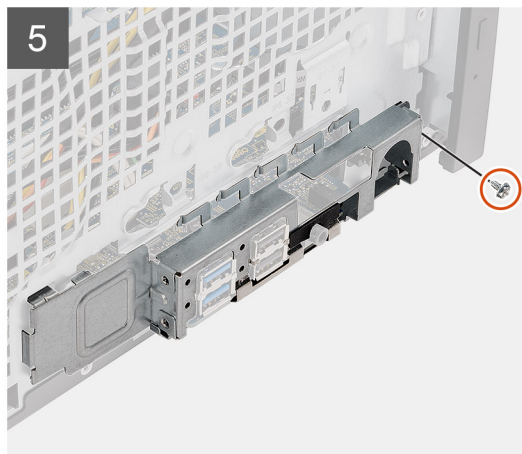
3



4



5



### Steps

1. Slide the front I/O-ports on the system board into the front I/O-slots on the chassis and align the screw holes on the system board with the screw holes on the chassis.
2. Replace the M.2 card standoff (#6-32) screw and eight (#6-32) screws that secure the system board to the chassis.
3. Route and connect all the cables to the connectors on the system board.

4. Align the front I/O-bracket with the slots on the chassis.
5. Replace the two (#6-32) screws to secure the front I/O-bracket to the chassis.

### Next steps

1. Install the [processor](#).
2. Install the [processor fan and heat-sink assembly](#).
3. Install the [coin-cell battery](#).
4. Install the [graphics card/powered GPU](#).
5. Install the [M.2 2230 SSD/M.2 2280 SSD](#).
6. Install the [wireless](#).
7. Install the [memory module](#).
8. Install the [fan duct](#)
9. Install the [front bezel](#).
10. Install the [side cover](#).
11. Follow the procedure in [after working inside your computer](#).
  - i** **NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.
  - i** **NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

## Drivers and downloads

When troubleshooting, downloading or installing drivers it is recommended that you read the Dell Knowledge Base article, Drivers and Downloads FAQs [000123347](#).



# BIOS setup

**CAUTION:** Unless you are an expert computer user, do not change the settings in the BIOS Setup program. Certain changes can make your computer work incorrectly.

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

**NOTE:** Before you change BIOS Setup program, it is recommended that you write down the BIOS Setup program screen information for future reference.

Use the BIOS Setup program for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the size of the hard drive.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, and enabling or disabling base devices.

## BIOS overview

The BIOS manages data flow between the computer's operating system and attached devices such as hard disk, video adapter, keyboard, mouse, and printer.

## Entering BIOS setup program

### Steps

1. Turn on your computer.
2. Press F2 immediately to enter the BIOS setup program.

**NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Then, turn off your computer and try again.

## Navigation keys

**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	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area. <b>NOTE:</b> For the standard graphics browser only.

**Table 3. Navigation keys (continued)**

Keys	Navigation
Esc	Moves to the previous page until 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.

## One Time Boot menu

To enter **One Time Boot menu**, turn on your computer, and then press F12 immediately.

**i** **NOTE:** It is recommended to shutdown the computer if it is on.

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

- Removable Drive (if available)
- STXXXX Drive (if available)
  - i** **NOTE:** XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

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

## System setup options

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

### General options

**Table 4. General**

Option	Description
System Information	Displays the following information: <ul style="list-style-type: none"> <li>• System Information: Displays <b>BIOS Version, Service Tag, Asset Tag, Ownership Tag, Manufacture Date, Ownership Date,</b> and the <b>Express Service Code.</b></li> <li>• Memory Information: Displays <b>Memory Installed, Memory Available, Memory Speed, Memory Channel Mode, Memory Technology, DIMM 1 Size,</b> and <b>DIMM 2 Size.</b></li> <li>• PCI Information: Displays Slot1_M.2, Slot2_M.2</li> <li>• Processor Information: Displays <b>Processor Type, Core Count, Processor ID, Current Clock Speed, Minimum Clock Speed, Maximum Clock Speed, Processor L2 Cache, Processor L3 Cache, HT Capable,</b> and <b>64-Bit Technology.</b></li> <li>• Device Information: Displays <b>SATA-0, M.2 PCIe SSD-2, LOM MAC Address, Video Controller, Audio Controller, Wi-Fi Device, and Bluetooth Device.</b></li> </ul>
Boot Sequence	Allows you to specify the order in which the computer attempts to find an operating system from the devices specified in this list.
UEFI Boot Path Security	This option controls whether or not the system prompts the user to enter the Admin password when booting a UEFI boot path from the F12 Boot Menu.
Date/Time	Allows you to set the date and time settings. Changes to the system date and time take effect immediately.

# System information

**Table 5. System Configuration**

Option	Description
Integrated NIC	<p>Allows you to control the onboard LAN controller. The option 'Enable UEFI Network Stack' is not selected by default. The options are:</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• Enabled</li> <li>• Enabled w/PXE (default)</li> </ul> <p><b>i</b> <b>NOTE:</b> Depending on the computer and its installed devices, the items that are listed in this section may or may not appear.</p>
SATA Operation	<p>Allows you to configure the operating mode of the integrated hard drive controller.</p> <ul style="list-style-type: none"> <li>• Disabled = The SATA controllers are hidden</li> <li>• AHCI = SATA is configured for AHCI mode</li> <li>• RAID ON = SATA is configured to support RAID mode (selected by default)</li> </ul>
Drives	<p>Allows you to enable or disable the various drives onboard:</p> <ul style="list-style-type: none"> <li>• SATA-0 (enabled by default)</li> <li>• M.2 PCIe SSD-0 (enabled by default)</li> </ul>
Smart Reporting	<p>This field controls whether hard-drive errors for integrated drives are reported during system startup. The <b>Enable Smart Reporting option</b> is disabled by default.</p>
USB Configuration	<p>Allows you to enable or disable the integrated USB controller for:</p> <ul style="list-style-type: none"> <li>• Enable USB Boot Support</li> <li>• Enable Front USB Ports</li> <li>• Enable Rear USB Ports</li> </ul> <p>All the options are enabled by default.</p>
Front USB Configuration	<p>Allows you to enable or disable the front USB ports. All the ports are enabled by default.</p>
Rear USB Configuration	<p>Allows you to enable or disable the back USB ports. All the ports are enabled by default.</p>
Audio	<p>Allows you to enable or disable the integrated audio controller. The option <b>Enable Audio</b> is selected by default.</p> <ul style="list-style-type: none"> <li>• Enable Microphone</li> <li>• Enable Internal Speaker</li> </ul> <p>Both the options are selected by default.</p>
Dust Filter Maintenance	<p>Allows you to enable or disable BIOS messages for maintaining the optional dust filter that is installed in your computer. BIOS will generate a pre-boot reminder to clean or replace the dust filter based on the interval set. The option <b>Disabled</b> is selected by default.</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• 15 days</li> <li>• 30 days</li> <li>• 60 days</li> <li>• 90 days</li> <li>• 120 days</li> <li>• 150 days</li> <li>• 180 days</li> </ul>

# Video screen options

**Table 6. Video**

Option	Description
Primary Display	<p>Allows you to select the primary display when multiple controllers are available in the system.</p>

**Table 6. Video**

Option	Description
	<ul style="list-style-type: none"> <li>• Auto (default)</li> <li>• Intel HD Graphics</li> </ul> <p><b>i</b> <b>NOTE:</b> If you do not select Auto, the on-board graphics device will be present and enabled.</p>

## Security

**Table 7. Security**


Option	Description
Admin Password	Allows you to set, change, and delete the admin password.
System Password	Allows you to set, change, and delete the system password.
Internal HDD-0 Password	Allows you to set, change, and delete the computer's internal hard drive password.
Password Configuration	Allows you to control the minimum and maximum number of characters that are allowed for an administrative password and the system password. The range of characters is between 4 and 32.
Password Bypass	<p>This option lets you bypass the System (Boot) Password and the internal hard drive password prompts during a system restart.</p> <ul style="list-style-type: none"> <li>• Disabled — Always prompt for the system and internal HDD password when they are set. This option is disabled by default.</li> <li>• Reboot Bypass — Bypass the password prompts on Restarts (warm boots).</li> </ul> <p><b>i</b> <b>NOTE:</b> The system will always prompt for the system and internal HDD passwords when powered on from the off state (a cold boot). Also, the system will always prompt for passwords on any module bay HDDs that may be present.</p>
Password Change	<p>This option lets you determine whether changes to the System and Hard Disk passwords are permitted when an administrator password is set.</p> <p><b>Allow Non-Admin Password Changes</b> - This option is enabled by default.</p>
UEFI Capsule Firmware Updates	This option controls whether this system allows BIOS updates via UEFI capsule update packages. This option is selected by default. Disabling this option will block BIOS updates from services such as Microsoft Windows Update and Linux Vendor Firmware Service (LVFS).
TPM 2.0 Security	<p>Allows you to control whether the Trusted Platform Module (TPM) is visible to the operating system.</p> <ul style="list-style-type: none"> <li>• TPM On (default)</li> <li>• Clear</li> <li>• PPI Bypass for Enable Commands</li> <li>• PPI Bypass for Disable Commands</li> <li>• PPI Bypass for Clear Commands</li> <li>• Attestation Enable (default)</li> <li>• Key Storage Enable (default)</li> <li>• SHA-256 (default)</li> </ul> <p>Choose any one option:</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• Enabled (default)</li> </ul>
Absolute	<p>This field lets you Enable, Disable or permanently Disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute Software.</p> <ul style="list-style-type: none"> <li>• Enabled - This option is selected by default.</li> <li>• Disable</li> </ul>

**Table 7. Security (continued)**

Option	Description
	<ul style="list-style-type: none"> <li>● Permanently Disabled</li> </ul>
Chassis Intrusion	<p>This field controls the chassis intrusion feature.</p> <p>Choose any one of the options:</p> <ul style="list-style-type: none"> <li>● Disabled (default)</li> <li>● Enabled</li> <li>● On-Silent</li> </ul>
Admin Setup Lockout	Allows you to prevent users from entering Setup when Admin password is set. This option is not set by default.
Master Password Lockout	Allows you to disable master password support. Hard Disk passwords need to be cleared before the settings can be changed. This option is not set by default.
SMM Security Mitigation	Allows you to enable or disable additional UEFI SMM Security Mitigation protections. This option is not set by default.

## Secure boot options

**Table 8. Secure Boot**

Option	Description
Secure Boot Enable	<p>Allows you to enable or disable Secure Boot feature</p> <ul style="list-style-type: none"> <li>● Secure Boot Enable</li> </ul> <p>This option is not selected by default.</p>
Secure Boot Mode	<p>Allows you to modify the behavior of Secure Boot to allow evaluation or enforcement of UEFI driver signatures.</p> <ul style="list-style-type: none"> <li>● Deployed Mode (default)</li> <li>● Audit Mode</li> </ul>
Expert key Management	<p>Allows you to manipulate the security key databases only if the system is in Custom Mode. The <b>Enable Custom Mode</b> option is disabled by default. The options are:</p> <ul style="list-style-type: none"> <li>● PK (default)</li> <li>● KEK</li> <li>● db</li> <li>● dbx</li> </ul> <p>If you enable the <b>Custom Mode</b>, the relevant options for <b>PK, KEK, db, and dbx</b> appear. The options are:</p> <ul style="list-style-type: none"> <li>● <b>Save to File</b>- Saves the key to a user-selected file</li> <li>● <b>Replace from File</b>- Replaces the current key with a key from a user-selected file</li> <li>● <b>Append from File</b>- Adds a key to the current database from a user-selected file</li> <li>● <b>Delete</b>- Deletes the selected key</li> <li>● <b>Reset All Keys</b>- Resets to default setting</li> <li>● <b>Delete All Keys</b>- Deletes all the keys</li> </ul> <p> <b>NOTE:</b> If you disable the Custom Mode, all the changes made will be erased and the keys will restore to default settings.</p>

# Intel Software Guard Extensions options

Table 9. Intel Software Guard Extensions

Option	Description
<b>Intel SGX Enable</b>	<p>This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> <li>● <b>Disabled</b></li> <li>● <b>Enabled</b></li> <li>● <b>Software controlled</b>—Default</li> </ul>
<b>Enclave Memory Size</b>	<p>This option sets <b>SGX Enclave Reserve Memory Size</b></p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> <li>● <b>32 MB</b></li> <li>● <b>64 MB</b></li> <li>● <b>128 MB</b>—Default</li> </ul>

## Performance

Table 10. Performance

Option	Description
<b>Multi Core Support</b>	<p>This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores.</p> <ul style="list-style-type: none"> <li>● <b>All</b>—Default</li> <li>● <b>1</b></li> <li>● <b>2</b></li> <li>● <b>3</b></li> </ul>
<b>Intel SpeedStep</b>	<p>Allows you to enable or disable the Intel SpeedStep mode of processor.</p> <ul style="list-style-type: none"> <li>● <b>Enable Intel SpeedStep</b></li> </ul> <p>This option is set by default.</p>
<b>C-States Control</b>	<p>Allows you to enable or disable the additional processor sleep states.</p> <ul style="list-style-type: none"> <li>● <b>C states</b></li> </ul> <p>This option is set by default.</p>
<b>Intel TurboBoost</b>	<p>Allows you to enable or disable the Intel TurboBoost mode of the processor.</p> <ul style="list-style-type: none"> <li>● <b>Enable Intel TurboBoost</b></li> </ul> <p>This option is set by default.</p>
<b>Hyper-Thread Control</b>	<p>Allows you to enable or disable the HyperThreading in the processor.</p> <ul style="list-style-type: none"> <li>● <b>Disabled</b></li> <li>● <b>Enabled</b>—Default</li> </ul>

## Power management

Table 11. Power Management

Option	Description
AC Recovery	Determines how the system responds when AC power is re-applied after a power loss. You can set the AC Recovery to: <ul style="list-style-type: none"> <li>• Power Off</li> <li>• Power On</li> <li>• Last Power State</li> </ul> This option is Power Off by default.
Enable Intel Speed Shift Technology	Allows you to enable or disable Intel Speed Shift Technology support. The option <b>Enable Intel Speed Shift Technology</b> is set by default.
Auto On Time	Sets time to automatically turn on the computer. Time is kept in standard 12-hour format (hour:minutes:seconds). Change the startup time by typing the values in the time and AM/PM fields. <p><b>NOTE:</b> This feature does not work if you turn off your computer using the switch on a power strip or surge protector or if <b>Auto Power is set to disabled</b>.</p>
Deep Sleep Control	Allows you to define the controls when Deep Sleep is enabled. <ul style="list-style-type: none"> <li>• Disabled</li> <li>• Enabled in S5 only</li> <li>• Enabled in S4 and S5</li> </ul>
USB Wake Support	Allows you to enable the USB devices to wake the computer from standby mode. The option "Enable USB Wake Support" is selected by default
Wake on LAN/WWAN	This option allows the computer to power up from the off state when triggered by a special LAN signal. This feature only works when the computer is connected to AC power supply. <ul style="list-style-type: none"> <li>• <b>Disabled</b> - Does not allow the system to power on by special LAN signals when it receives a wake-up signal from the LAN or wireless LAN.</li> <li>• <b>LAN or WLAN</b> - Allows the system to be powered on by special LAN or wireless LAN signals.</li> <li>• <b>LAN Only</b> - Allows the system to be powered on by special LAN signals.</li> <li>• <b>LAN with PXE Boot</b> - A wakeup packet sent to the system in either the S4 or S5 state, that will cause the system to wake-up and immediately boot to PXE.</li> <li>• <b>WLAN Only</b> - Allows the system to be powered on by special WLAN signals.</li> </ul> This option is Disabled by default.
Block Sleep	Allows you to block entering to sleep (S3 state) in OS environment. This option is disabled by default.

## Post behavior

Table 12. POST Behavior

Option	Description
Adapter Warnings	This option lets you choose whether the system displays warning messages when you use certain power adapters. This option is enabled by default.
Numlock LED	Allows you to enable or disable the Numlock feature when your computer starts. This option is enabled by default.
Keyboard Errors	Allows you to enable or disable the keyboard error reporting when the computer starts. The option <b>Enable Keyboard Error Detection</b> is enabled by default.
Fast Boot	This option can speed up the boot process by bypassing some compatibility steps:

**Table 12. POST Behavior (continued)**

Option	Description
	<ul style="list-style-type: none"> <li>Minimal — The system boots quickly, unless the BIOS has been updated, memory changed, or the previous POST did not complete.</li> <li>Thorough — The system does not skip any steps in the boot process.</li> <li>Auto — This allows the operating system to control this setting (this works only when the operating system supports Simple Boot Flag).</li> </ul> <p>This option is set to <b>Thorough</b> by default.</p>
Extend BIOS POST Time	<p>This option creates an additional pre-boot delay.</p> <ul style="list-style-type: none"> <li>0 seconds (default)</li> <li>5 seconds</li> <li>10 seconds</li> </ul>
Full Screen Logo	<p>This option will display full screen logo if your image match screen resolution. The option <b>Enable Full Screen Logo</b> is not set by default.</p>
Warnings and Errors	<p>This option causes the boot process to only pause when warning or errors are detected. Choose any one of the option:</p> <ul style="list-style-type: none"> <li>Prompt on Warnings and Errors - default</li> <li>Continue on Warnings</li> <li>Continue on Warnings and Errors</li> </ul>

## Virtualization support

**Table 13. Virtualization Support**

Option	Description
Virtualization	<p>This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by the Intel Virtualization technology.</p> <ul style="list-style-type: none"> <li><b>Enable Intel Virtualization Technology</b></li> </ul> <p>This option is set by default.</p>
VT for Direct I/O	<p>Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by the Intel Virtualization technology for direct I/O.</p> <ul style="list-style-type: none"> <li><b>Enable VT for Direct I/O</b></li> </ul> <p>This option is set by default.</p>

## Wireless options


**Table 14. Wireless**

Option	Description
Wireless Device Enable	<p>Allows you to enable or disable the internal wireless devices.</p> <p>The options are:</p> <ul style="list-style-type: none"> <li><b>WLAN/WiGig</b></li> <li><b>Bluetooth</b></li> </ul> <p>All the options are enabled by default.</p>



## Maintenance

Table 15. Maintenance

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	Controls the SERR message mechanism. This option is set by default. Some graphics cards require that the SERR message mechanism be disabled.
BIOS Downgrade	Allows you to flash previous revisions of the system firmware. <ul style="list-style-type: none"><li>● <b>Allow BIOS Downgrade</b></li></ul> This option is set by default.
Data Wipe	Allows you to securely erase data from all internal storage devices. <ul style="list-style-type: none"><li>● <b>Wipe on Next Boot</b></li></ul> This option is not set by default.
BIOS Recovery	<b>BIOS Recovery from Hard Drive</b> —This option is set by default. Allows you to recover the corrupted BIOS from a recovery file on the HDD or an external USB key.  <b>NOTE: BIOS Recovery from Hard Drive</b> field must be enabled. <b>Always Perform Integrity Check</b> —Performs integrity check on every boot.
First Power On Date	Allows you the set Ownership date. The option <b>Set Ownership Date</b> is not set by default.

## System logs

Table 16. System Logs

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

## Advanced configuration

Table 17. Advanced configuration

Option	Description
ASPM	Allows you to set the ASPM level. <ul style="list-style-type: none"><li>● Auto (default) - There is handshaking between the device and PCI Express hub to determine the best ASPM mode supported by the device</li><li>● Disabled - ASPM power management is turned off at all time</li><li>● L1 Only - ASPM power management is set to use L1</li></ul>


# SupportAssist System Resolution

Option	Description
<b>Auto OS Recovery Threshold</b>	Allows you to control the automatic boot flow for SupportAssist System. Options are: <ul style="list-style-type: none"><li>• Off</li><li>• 1</li><li>• 2 (Enabled by default)</li><li>• 3</li></ul>
<b>SupportAssist OS Recovery</b>	Allows you to recover the SupportAssist OS Recovery (Enabled by default).
<b>BIOSConnect</b>	BIOSConnect enable or disable cloud Service OS upon absence of Local OS Recovery (Enabled by default).


## Updating the BIOS

### Updating the BIOS in Windows

#### About this task

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, search in the Knowledge Base Resource at [www.dell.com/support](http://www.dell.com/support).

#### Steps


1. Go to [www.dell.com/support](http://www.dell.com/support).
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.  
 **NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.  
For more information, search in the Knowledge Base Resource at [www.dell.com/support](http://www.dell.com/support).

### Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see the knowledge base article [000131486](https://www.dell.com/support) at [www.dell.com/support](http://www.dell.com/support).

### Updating the BIOS using the USB drive in Windows

#### About this task

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the

**system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, search in the Knowledge Base Resource at [www.dell.com/support](http://www.dell.com/support).**

### Steps

1. Follow the procedure from step 1 to step 6 in [Updating the BIOS in Windows](#) to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, search in the Knowledge Base Resource at [www.dell.com/support](http://www.dell.com/support).
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12**.
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.  
The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

## Updating the BIOS from the F12 One-Time boot menu

Update your computer BIOS using the BIOS update.exe file that is copied to a FAT32 USB drive and booting from the F12 One-Time boot menu.

### About this task

**CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, search in the Knowledge Base Resource at [www.dell.com/support](http://www.dell.com/support).

### BIOS Update

You can run the BIOS update file from Windows using a bootable USB drive or you can also update the BIOS from the F12 One-Time boot menu on the computer.

Most of the Dell computers built after 2012 have this capability, and you can confirm by booting your computer to the F12 One-Time Boot Menu to see if BIOS FLASH UPDATE is listed as a boot option for your computer. If the option is listed, then the BIOS supports this BIOS update option.

**NOTE:** Only computers with BIOS Flash Update option in the F12 One-Time boot menu can use this function.

### Updating from the One-Time boot menu

To update your BIOS from the F12 One-Time boot menu, you need the following:

- USB drive formatted to the FAT32 file system (key does not have to be bootable)
- BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive
- AC power adapter that is connected to the computer
- Functional computer battery to flash the BIOS

Perform the following steps to perform the BIOS update flash process from the F12 menu:

**CAUTION:** Do not turn off the computer during the BIOS update process. The computer may not boot if you turn off your computer.

### Steps

1. From a turn off state, insert the USB drive where you copied the flash into a USB port of the computer.
2. Turn on the computer and press F12 to access the One-Time Boot Menu, select BIOS Update using the mouse or arrow keys then press Enter.  
The flash BIOS menu is displayed.
3. Click **Flash from file**.
4. Select external USB device.

5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS update is completed.

## System and setup password

**Table 18. System and setup password**

Password type	Description
System password	Password that you must enter to log in 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 that is 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 F12 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.
  - At least one special character: ! " # \$ % & ' ( ) \* + , - . / : ; < = > ? @ [ \ ] ^ \_ ` { | }
  - Numbers 0 through 9.
  - Upper case letters from A to Z.
  - Lower case letters from a to z.
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press Esc and save the changes as prompted by the pop-up message.
5. Press Y to save the changes.  
The computer restarts.

## 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/or 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 F12 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**, update, or delete the existing system password, and press Enter or Tab.
4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.  
 **NOTE:** If you change the System and/or Setup password, reenter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.
5. Press Esc and a message prompts you to save the changes.
6. Press Y to save the changes and exit from System Setup.  
The computer restarts.

## Clearing BIOS (System Setup) and System passwords

### About this task

To clear the system or BIOS passwords, contact Dell technical support as described at [www.dell.com/contactdell](http://www.dell.com/contactdell).

-  **NOTE:** For information on how to reset Windows or application passwords, refer to the documentation accompanying Windows or your application.

# Troubleshooting

## Dell SupportAssist Pre-boot System Performance Check diagnostics

### About this task

SupportAssist diagnostics (also known as system diagnostics) performs a complete check of your hardware. The Dell SupportAssist Pre-boot System Performance Check diagnostics is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

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

For more information, see <https://www.dell.com/support/kbdoc/000180971>.

## Running the SupportAssist Pre-Boot System Performance Check

### Steps

1. Turn on your computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.
4. Click the arrow at the bottom left corner.  
Diagnostics front page is displayed.
5. Click the arrow in the lower-right corner to go to the page listing.  
The items detected are listed.
6. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
7. Select the device from the left pane and click **Run Tests**.
8. If there are any issues, error codes are displayed.  
Note the error code and validation number and contact Dell.

## Diagnostic LED behavior

Table 19. Diagnostic LED behavior

Blinking pattern		Problem description	Suggested resolution
Amber	White		
1	2	Unrecoverable SPI Flash Failure	Run the Dell Support Assist/Dell Diagnostics tool.

**Table 19. Diagnostic LED behavior (continued)**

Blinking pattern		Problem description	Suggested resolution
Amber	White		
2	1	CPU failure	<ul style="list-style-type: none"> <li>• Run the Dell Support Assist/Dell Diagnostics tool.</li> <li>• If problem persists, replace the system board.</li> </ul>
2	2	System board failure (included BIOS corruption or ROM error)	<ul style="list-style-type: none"> <li>• Flash latest BIOS version</li> <li>• If problem persists, replace the system board.</li> </ul>
2	3	No memory/RAM detected	<ul style="list-style-type: none"> <li>• Confirm that the memory module is installed properly.</li> <li>• If problem persists, replace the memory module.</li> </ul>
2	4	Memory/RAM failure	<ul style="list-style-type: none"> <li>• Reset the memory module.</li> <li>• If problem persists, replace the memory module.</li> </ul>
2	5	Invalid memory installed	<ul style="list-style-type: none"> <li>• Reset the memory module.</li> <li>• If problem persists, replace the memory module.</li> </ul>
2	6	System board / Chipset Error / Clock failure / Gate A20 failure / Super I/O failure / Keyboard controller failure	<ul style="list-style-type: none"> <li>• Flash latest BIOS version</li> <li>• If problem persists, replace the system board.</li> </ul>
3	1	CMOS battery failure	<ul style="list-style-type: none"> <li>• Reset the CMOS battery connection.</li> <li>• If problem persists, replace the RTS battery.</li> </ul>
3	2	PCI or Video card/chip failure	Replace the system board.
3	3	BIOS Recovery image not found	<ul style="list-style-type: none"> <li>• Flash latest BIOS version</li> <li>• If problem persists, replace the system board.</li> </ul>
3	4	BIOS Recovery image found but invalid	<ul style="list-style-type: none"> <li>• Flash latest BIOS version</li> <li>• If problem persists, replace the system board.</li> </ul>
3	5	Power rail failure	<ul style="list-style-type: none"> <li>• EC ran into power sequencing failure.</li> <li>• If problem persists, replace the system board.</li> </ul>
3	6	SBIOS Flash corruption	<ul style="list-style-type: none"> <li>• Flash corruption detected by SBIOS</li> <li>• If problem persists, replace the system board.</li> </ul>
3	7	Intel ME (Management Engine) Error	<ul style="list-style-type: none"> <li>• Timeout waiting on ME to reply to HECI message</li> <li>• If problem persists, replace the system board.</li> </ul>

**Table 19. Diagnostic LED behavior (continued)**

Blinking pattern		Problem description	Suggested resolution
Amber	White		
4	2	CPU Power Cable Connection Issue	<ul style="list-style-type: none"> <li>• Run the PSU BIST</li> <li>• If the BIST passes, but the problem persists, run the Dell Support Assist/ Dell Diagnostics tool.</li> </ul>

## Recovering the operating system

When your computer is unable to boot to the operating system even after repeated attempts, it automatically starts Dell SupportAssist OS Recovery.

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

You can also download it from the Dell Support website to troubleshoot and fix your computer when it fails to boot into their primary operating system due to software or hardware failures.

For more information about the Dell SupportAssist OS Recovery, see *Dell SupportAssist OS Recovery User's Guide* at [www.dell.com/serviceabilitytools](http://www.dell.com/serviceabilitytools). Click **SupportAssist** and then, click **SupportAssist OS Recovery**.

## Real-Time Clock (RTC Reset)

The Real Time Clock (RTC) reset function allows you or the service technician to recover Dell systems from No POST/No Power/No Boot situations. The legacy jumper enabled RTC reset has been retired on these models.

Start the RTC reset with the system powered off and connected to AC power. Press and hold the power button for thirty (30) seconds

. The system RTC Reset occurs after you release the power button.


## Backup media and recovery options

It is recommended to create a recovery drive to troubleshoot and fix problems that may occur with Windows. Dell proposes multiple options for recovering Windows operating system on your Dell PC. For more information, see [Dell Windows Backup Media and Recovery Options](#).

## Wi-Fi power cycle

### About this task

If your computer is unable to access the Internet due to Wi-Fi connectivity issues a Wi-Fi power cycle procedure may be performed. The following procedure provides the instructions on how to conduct a Wi-Fi 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.

# Getting help and contacting Dell

## Self-help resources


You can get information and help on Dell products and services using these self-help resources:


**Table 20. Self-help resources**

Self-help resources	Resource location
Information about Dell products and services	<a href="http://www.dell.com">www.dell.com</a>
My Dell app	
Tips	
Contact Support	In Windows search, type <code>Contact Support</code> , and press Enter.
Online help for operating system	<a href="http://www.dell.com/support/windows">www.dell.com/support/windows</a> <a href="http://www.dell.com/support/linux">www.dell.com/support/linux</a>
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents.	Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at <a href="http://www.dell.com/support">www.dell.com/support</a> .  For more information on how to find the Service Tag for your computer, see <a href="#">Locate the Service Tag on your computer</a> .
Dell knowledge base articles for a variety of computer concerns	<ol style="list-style-type: none"> <li>1. Go to <a href="http://www.dell.com/support">www.dell.com/support</a>.</li> <li>2. On the menu bar at the top of the Support page, select <b>Support &gt; Knowledge Base</b>.</li> <li>3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.</li> </ol>

## Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see [www.dell.com/contactdell](http://www.dell.com/contactdell).

 **NOTE:** Availability varies by country/region and product, and some services may not be available in your country/region.

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