

# XPS 8940

## 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

## 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 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 Lithium-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.

## Electrostatic discharge—ESD protection

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

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 For this reason, some previously approved methods of handling parts are no longer applicable.

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

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

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

Perform the following steps to prevent ESD damage:

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

## ESD field service kit

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

### Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.

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

## ESD protection summary

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

## 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.

## Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

 **CAUTION: Do not lift greater than 50 pounds. Always obtain additional resources or use a mechanical lifting device.**

1. Get a firm balanced footing. Keep your feet apart for a stable base, and point your toes out.
2. Tighten stomach muscles. Abdominal muscles support your spine when you lift, offsetting the force of the load.
3. Lift with your legs, not your back.
4. Keep the load close. The closer it is to your spine, the less force it exerts on your back.
5. Keep your back upright, whether lifting or setting down the load. Do not add the weight of your body to the load. Avoid twisting your body and back.
6. Follow the same techniques in reverse to set the load down.

# 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.

# 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 screwdrivers #1/#2
- Optical drive opening tool
- 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**

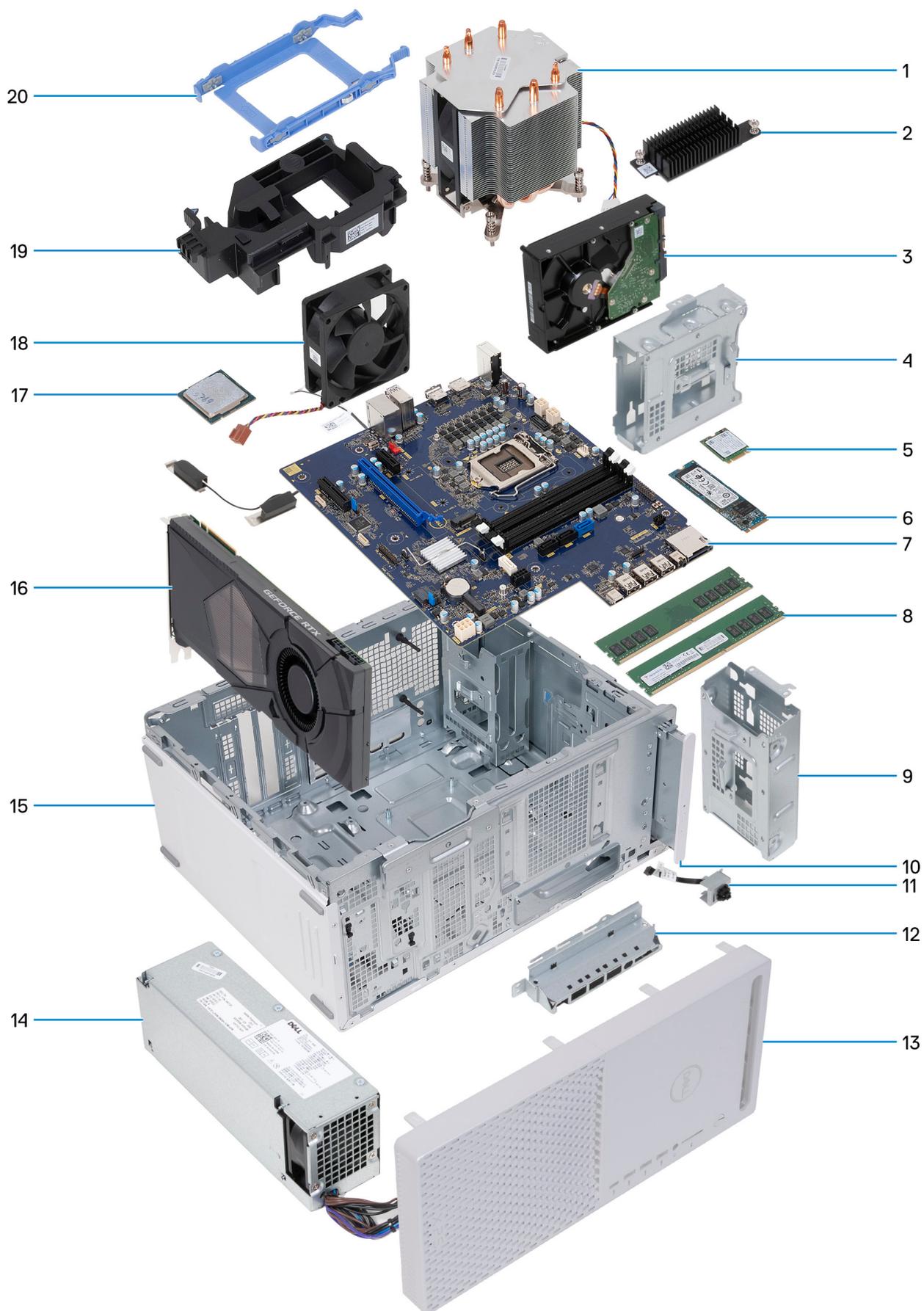
Component	Secured to	Screw type	Quantity	Screw image
Left-side cover	Chassis	Captive screw #6-33	2	
Optical-drive bracket	Optical drive	M2x3	1	
3.5-inch hard-drive assembly	Chassis	#6-32	1	
3.5-inch hard drive	Hard-drive cage	#6-32	4	
Wireless-card bracket	System board	M2x3	1	
Solid-state drive/Intel Optane memory module	System board	M2x3	1	
Power-supply unit	Chassis	#6-32	3	

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

<b>Component</b>	<b>Secured to</b>	<b>Screw type</b>	<b>Quantity</b>	<b>Screw image</b>
Processor fan and heat-sink assembly	Chassis	Captive screw M3	4	
Voltage regulator heat sink	Chassis	Captive screw M2.5	2	
Front I/O bracket	Chassis	#6-32	1	
System board	Chassis	#6-32	8	
System board	Chassis	#6-32x3.8	1	

## Major components of XPS 8940

The following image shows the major components of XPS 8940.



1. processor fan and heat-sink assembly
2. voltage regulator heat sink (optional)
3. hard drive
4. hard-drive cage
5. wireless card
6. solid-state drive
7. system board
8. memory modules
9. hard-drive cage
10. optical drive (optional)
11. power-button module
12. front I/O bracket
13. front cover
14. power-supply unit
15. chassis
16. graphics card
17. processor
18. chassis fan
19. graphics-card supporting bracket
20. hard-drive bracket

## Left-side cover

### Removing the left-side cover

#### Prerequisites

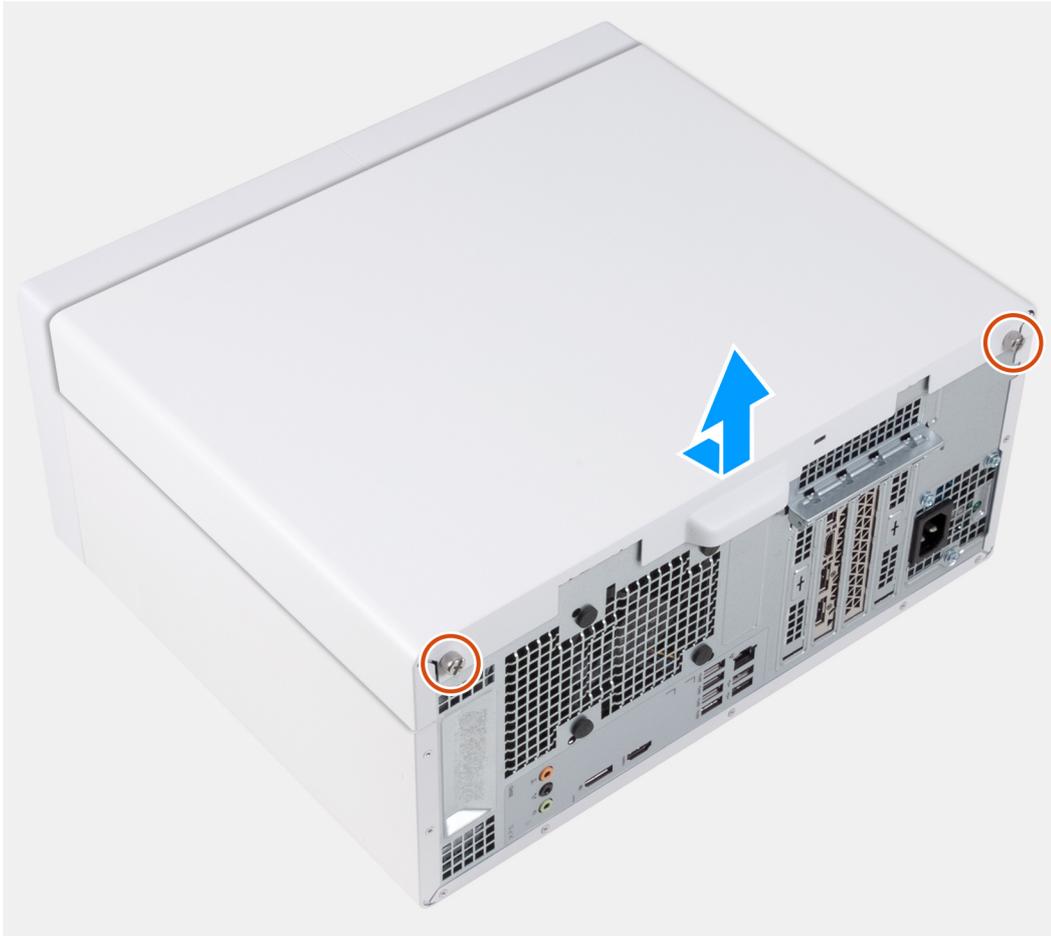
1. Follow the procedure in [Before working inside your computer](#).

#### About this task

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



2x



### Steps

1. Loosen the two captive screws that secure the left-side cover to the chassis.
2. Using the tab on the left-side cover, slide and lift the left-side cover off the chassis.

## Installing the left-side cover

### 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 left-side cover and provide a visual representation of the installation procedure.



2x



### Steps

1. Align the tabs on the left-side cover with the slots on the chassis, and slide it towards the front of the computer.
2. Tighten the two captive screws that secure the left-side cover to the chassis.

### Next steps

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

## Optical drive (optional)

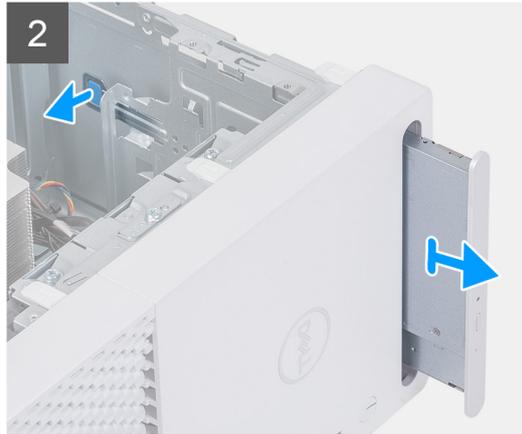
### Removing the optical drive

#### Prerequisites

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

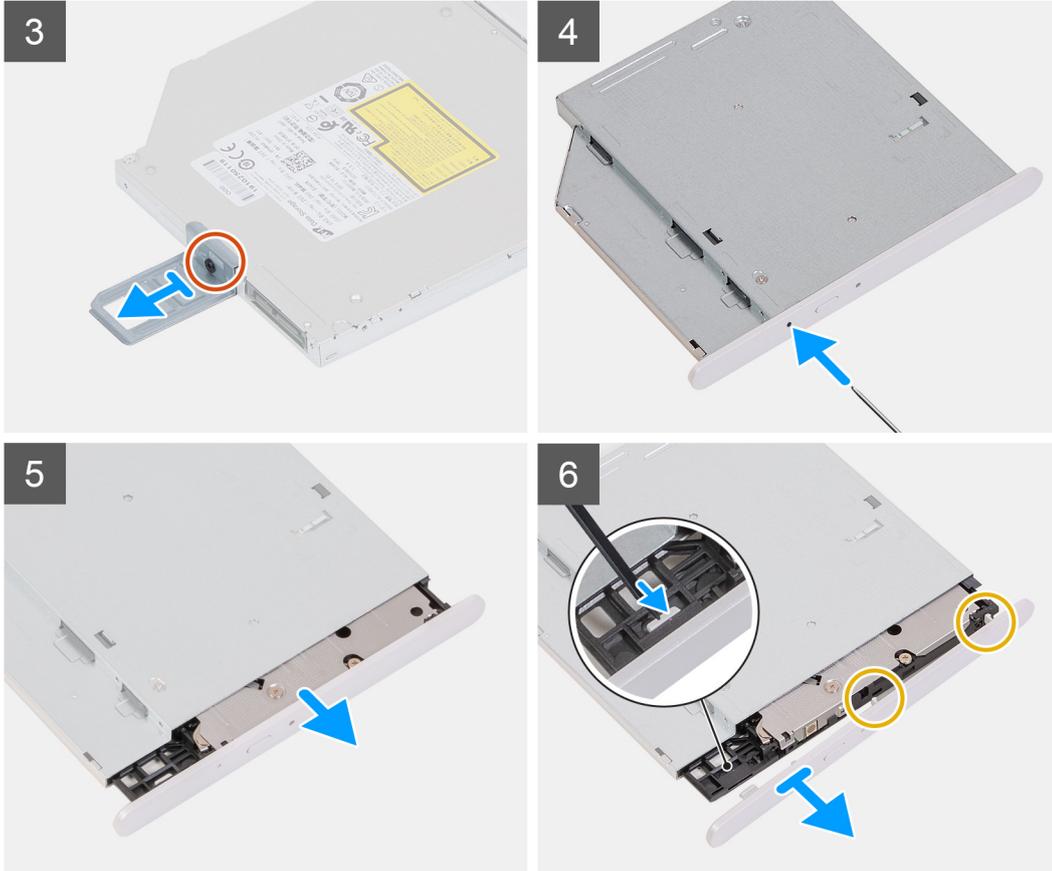
### About this task

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





1x  
M2x3



### Steps

1. Disconnect the power and data cables from the optical drive.
2. Pull the release tab on the optical-drive cage towards the bottom of the computer.
3. Pull to slide out the optical drive through the front of the computer.
4. Remove the screw (M2x3) that secures the optical-drive bracket to the optical drive.
5. Eject the optical drive by inserting an optical drive opening tool in the optical-drive eject hole.
6. Using a plastic scribe, gently push the optical-drive bezel away to remove the tabs from the slots on the optical drive.

## Installing the optical drive

### Prerequisites

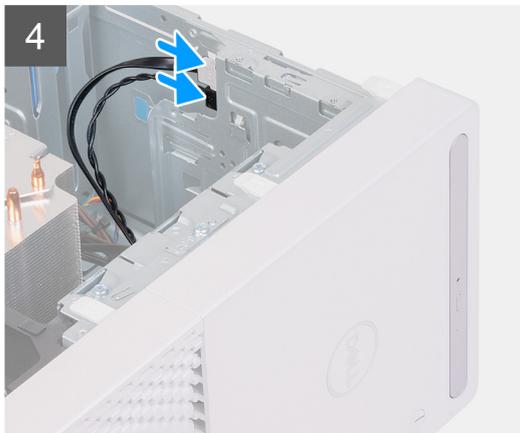
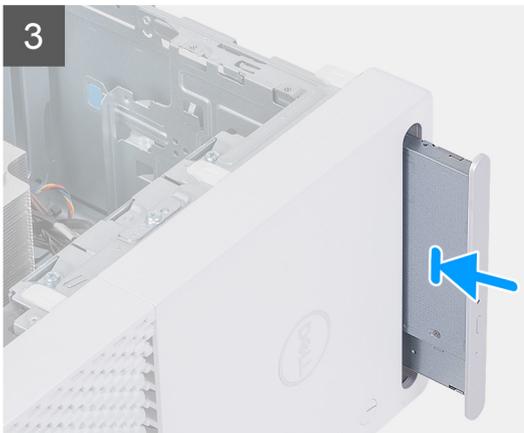
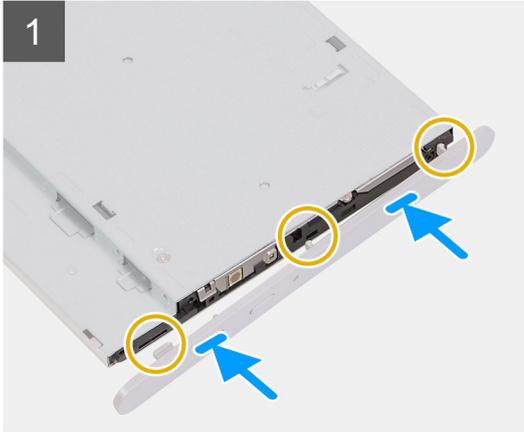
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



1x  
M2x3



### Steps

1. Align the tabs on the optical-drive bezel with slots on the optical drive and snap it in place.
2. Align the screw hole on the optical-drive bracket with the screw hole on the optical drive.
3. Replace the screw (M2x3) that secures the optical-drive bracket to the optical drive.
4. Slide the optical drive into the optical-drive cage through the front of the computer until it snaps into place.
5. Connect the power and data cables to the optical drive.

### Next steps

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

# Power button

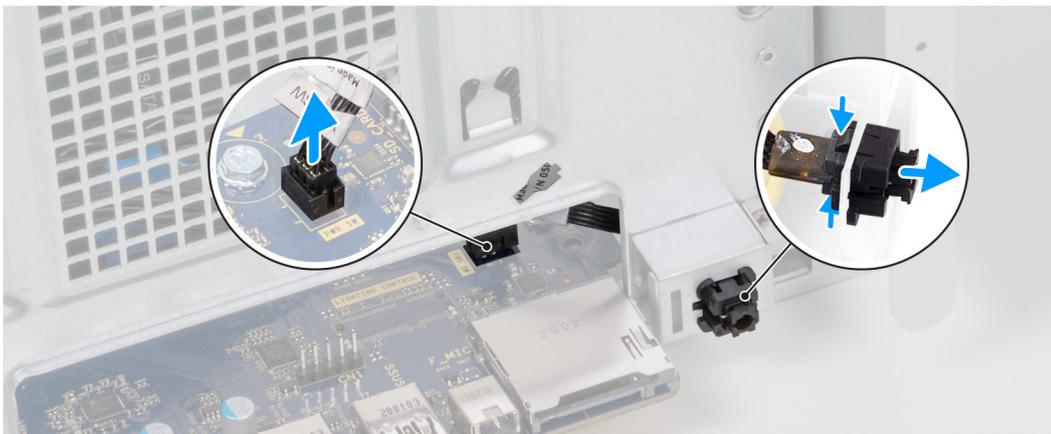
## Removing the power button

### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).
3. Remove the [front cover](#).

### About this task

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



### Steps

1. Lay the computer on the right side.
2. Disconnect the power-button cable from the system board.

 **NOTE:** The above image is provided for illustrative purposes only. You do not need to remove the front I/O cover to access the power-button cable.

3. Press the release tabs on the power-button module and push the power-button module out of the chassis.
4. Lift the power-button module, along with its cable, from the chassis.

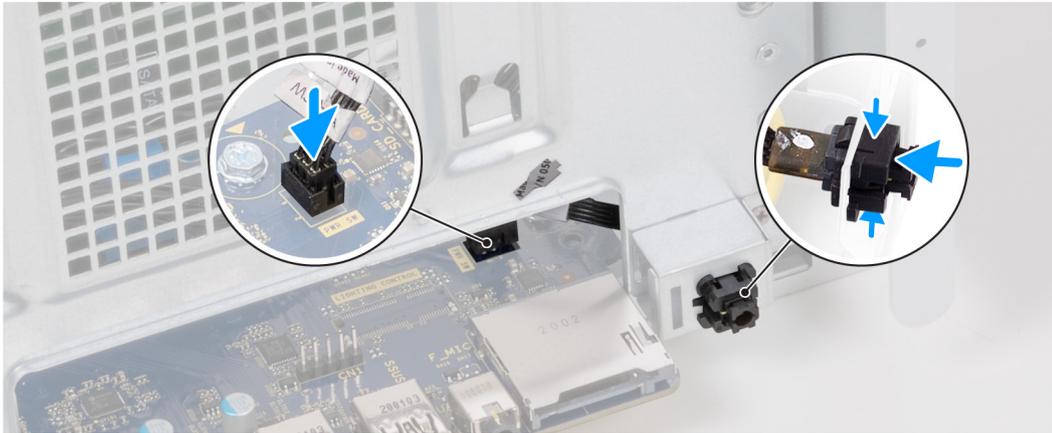
## Installing the power button

### 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 and provide a visual representation of the installation procedure.



### Steps

1. Slide the power-button module into the chassis until it snaps into place.
2. Connect the power-button cable to the system board.

**i** **NOTE:** The above image is provided for illustrative purposes only. You do not need to remove the front I/O cover to access the power-button cable.

### Next steps

1. Install the [front cover](#).
2. Install the [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).

## Front cover

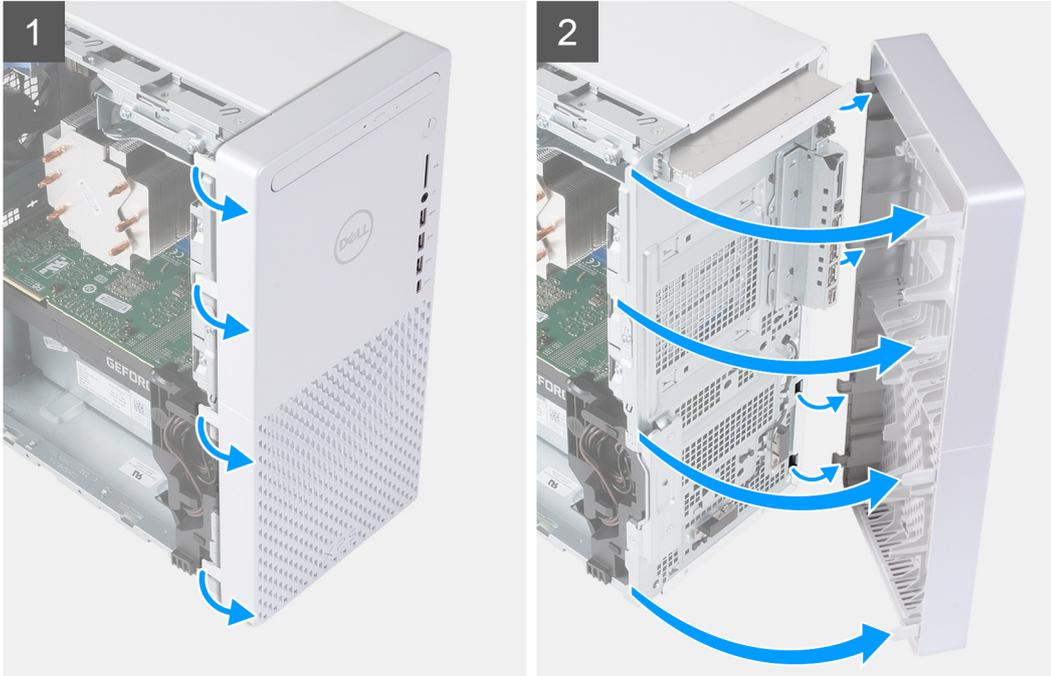
### Removing the front cover

#### Prerequisites

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

#### About this task

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



### Steps

1. Place the computer in an upright position.
2. Gently pry and release the front-cover tabs from the top-left, working down sequentially to the bottom-left tab.
3. Swing the front cover outwards, away from the chassis, and remove the cover.

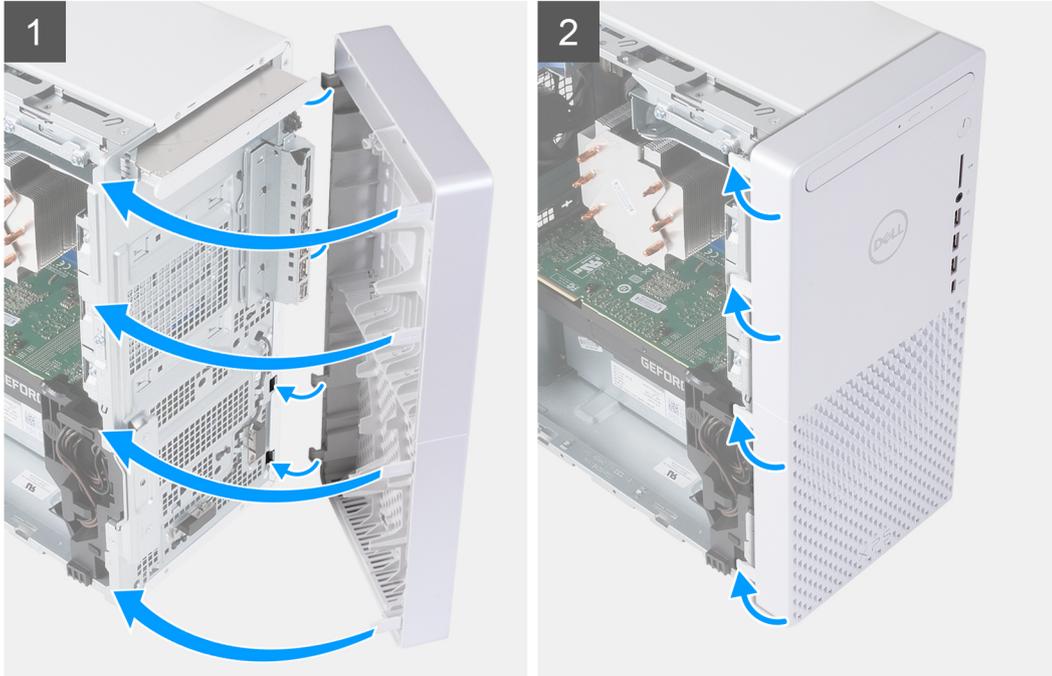
## Installing the front cover

### 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 front cover and provide a visual representation of the installation procedure.



### Steps

1. Place the computer in an upright position.
2. Insert the right-side front-cover tabs into the corresponding slots on the chassis.
3. Push the left-side of the front cover towards the chassis, snapping the slots into position.

### Next steps

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

## 2.5-inch hard drive

### Removing the 2.5-inch hard drive

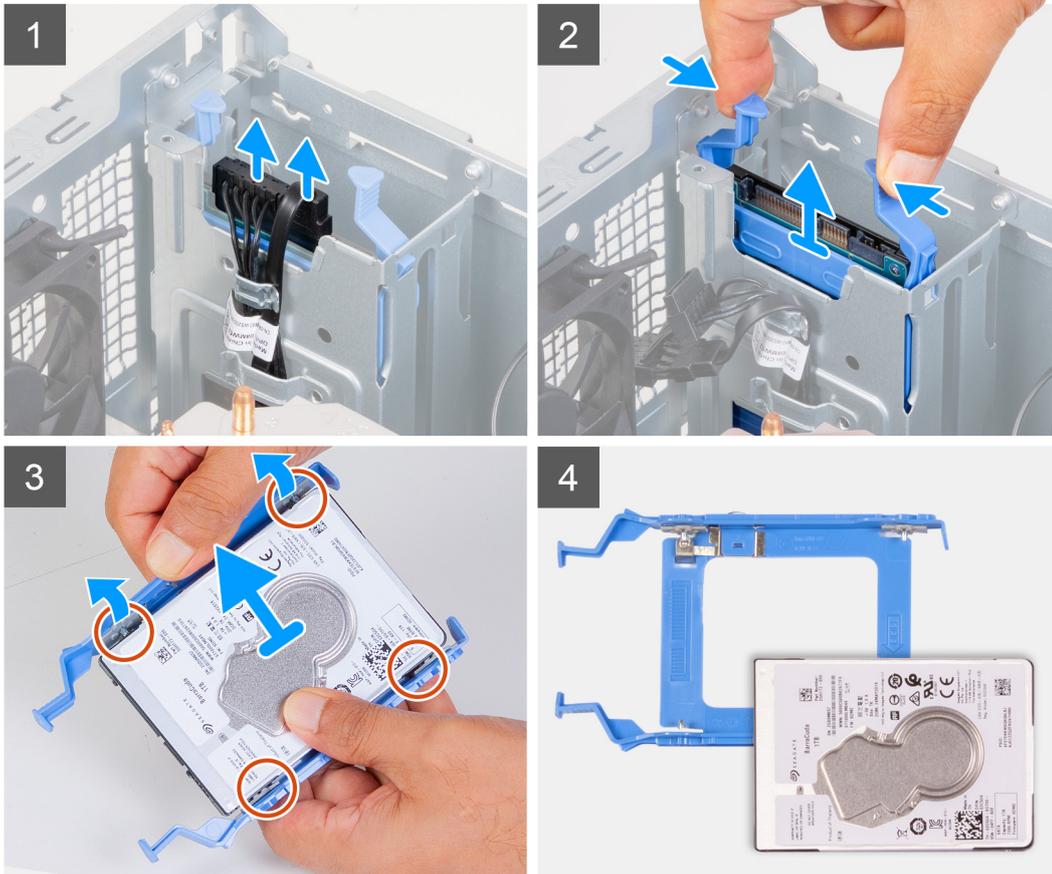
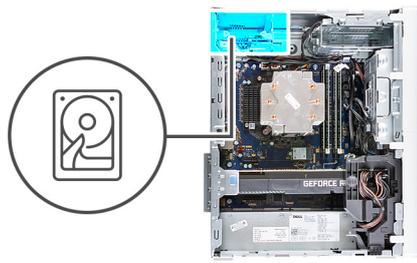
#### Prerequisites

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

#### About this task

 **NOTE:** The computer ships with two empty 2.5-inch hard-drive cages. A 2.5-inch hard drive (sold separately) is required to perform below procedures.

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. Lay the computer on the right side.
2. Disconnect the data and power cables from the hard drive.
3. Press the release tabs on the hard-drive carrier and slide the hard-drive carrier out of the hard-drive cage.
4. Pry the hard-drive carrier to release the tabs on the carrier from the slots on the hard drive.
5. Lift the hard drive off the hard-drive carrier.

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

## Installing the 2.5-inch hard drive

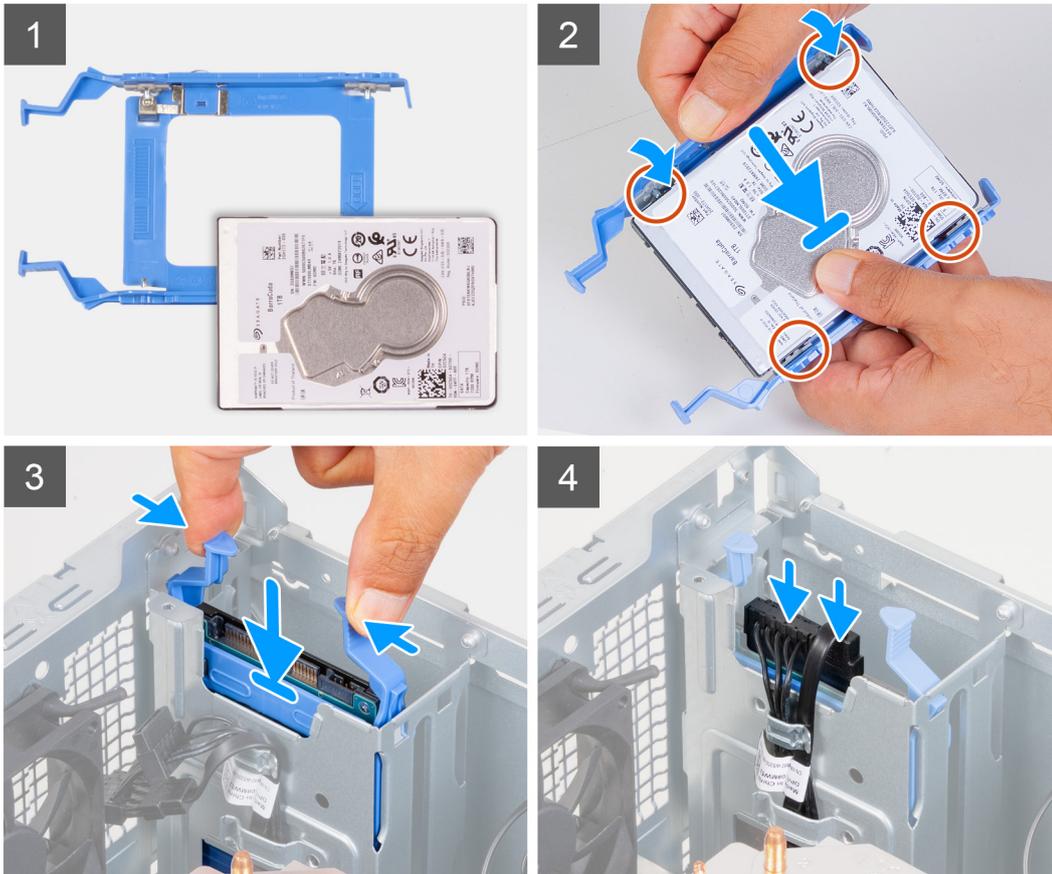
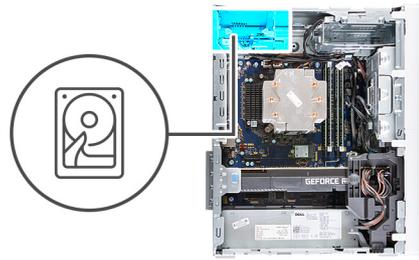
### Prerequisites

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

### About this task

**i** **NOTE:** The computer ships with two empty 2.5-inch hard-drive cages. A 2.5-inch hard drive (sold separately) is required to perform below procedures.

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



### Steps

1. Place the hard drive into the hard-drive carrier and align the tabs on the carrier with the slots on the hard drive.
2. Snap the hard-drive carrier into the hard drive.
3. Slide the hard-drive assembly into the hard-drive cage until it snaps into place.
4. Connect the data cable and power cable to the hard drive.

### Next steps

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

# 3.5-inch hard drive

## Removing the 3.5-inch hard drive

### Prerequisites

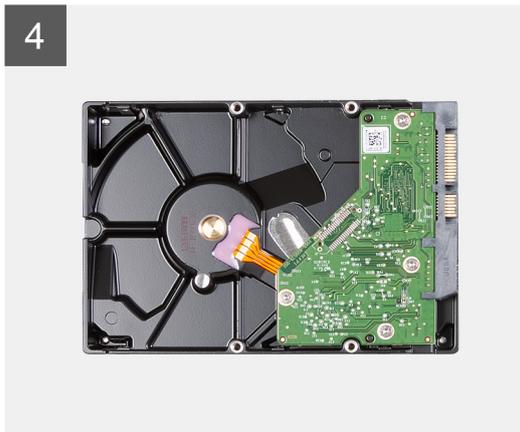
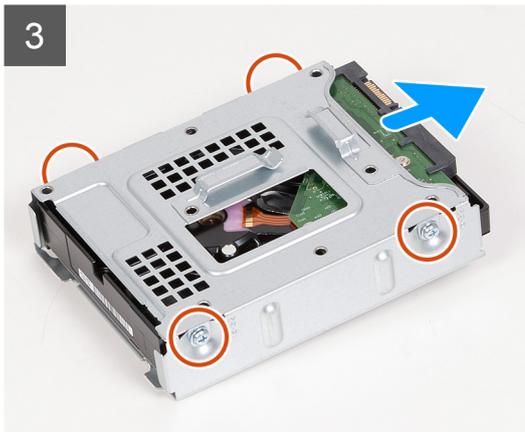
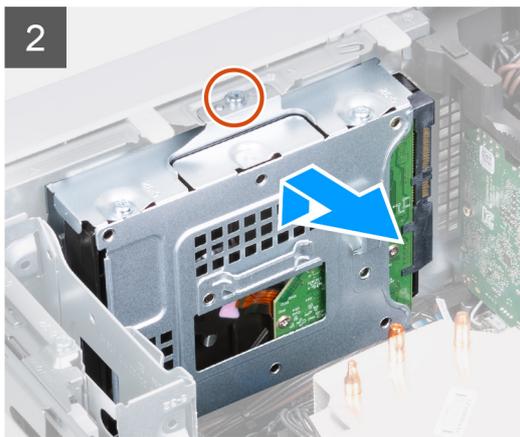
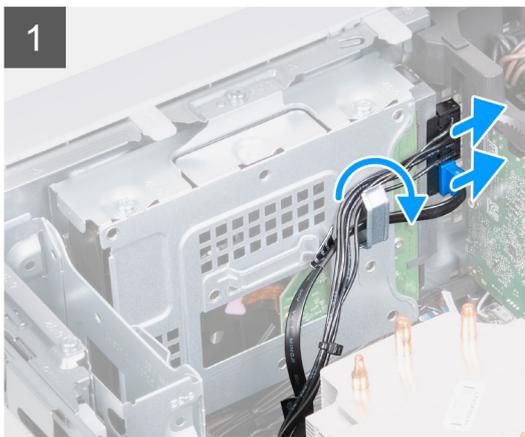
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).

### About this task

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



5x  
#6-32



### Steps

1. Lay the computer on the right side.
2. Disconnect the data and power cables from the hard drive.
3. Remove the cables from the routing guides on the hard-drive assembly.
4. Remove the screw (#6-32) that secures the 3.5-inch hard-drive assembly to the chassis.

5. Lift the hard-drive assembly away from the chassis.
6. Remove the four screws (#6-32) that secure the hard drive to the hard-drive cage.
7. Slide the hard drive from the hard-drive cage.

## Installing the 3.5-inch hard drive

### Prerequisites

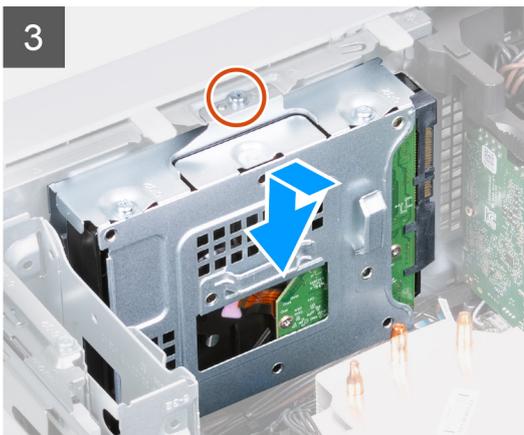
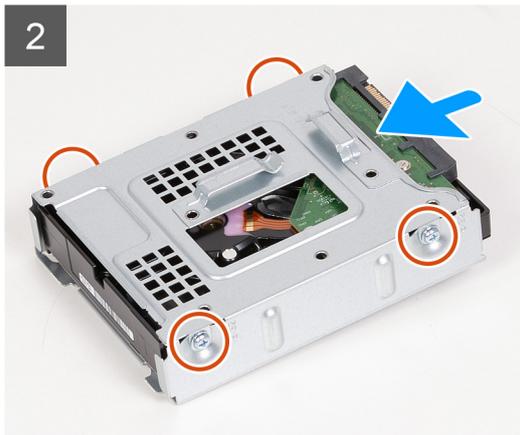
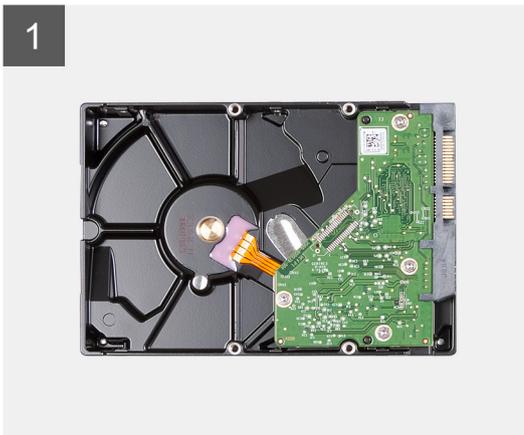
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



5x  
#6-32



### Steps

1. Slide the hard drive into the hard-drive cage.
2. Replace the four screws (#6-32) that secure the hard drive to the hard-drive cage.
3. Align the hard-drive assembly with the tabs on the chassis.
4. Using the alignment post, align the screw hole on the hard-drive assembly with the screw hole on the chassis.

5. Route the power cable and data cable through the routing guides on the hard-drive assembly and connect the cables to the hard drive.
6. Replace the screw (#6-32) that secures the hard-drive assembly to the chassis.

**Next steps**

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

## Chassis fan

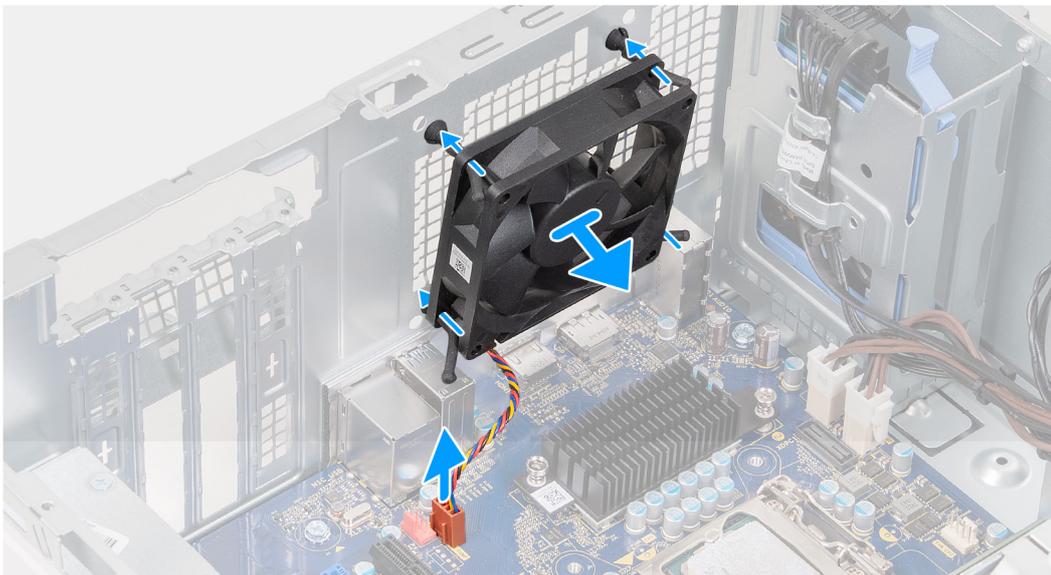
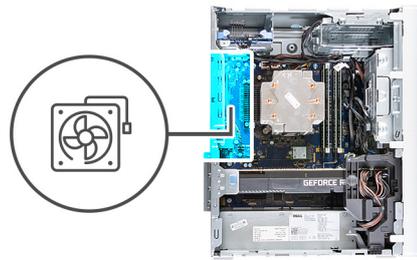
### Removing the chassis fan

**Prerequisites**

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

**About this task**

The following images indicate the location of the chassis fan and provide a visual representation of the removal procedure.



**Steps**

1. Lay the computer on the right side.
2. Disconnect the fan cable from the system board.
3. Gently pull the fan to release it from the rubber grommets.
4. Remove the fan off the chassis.

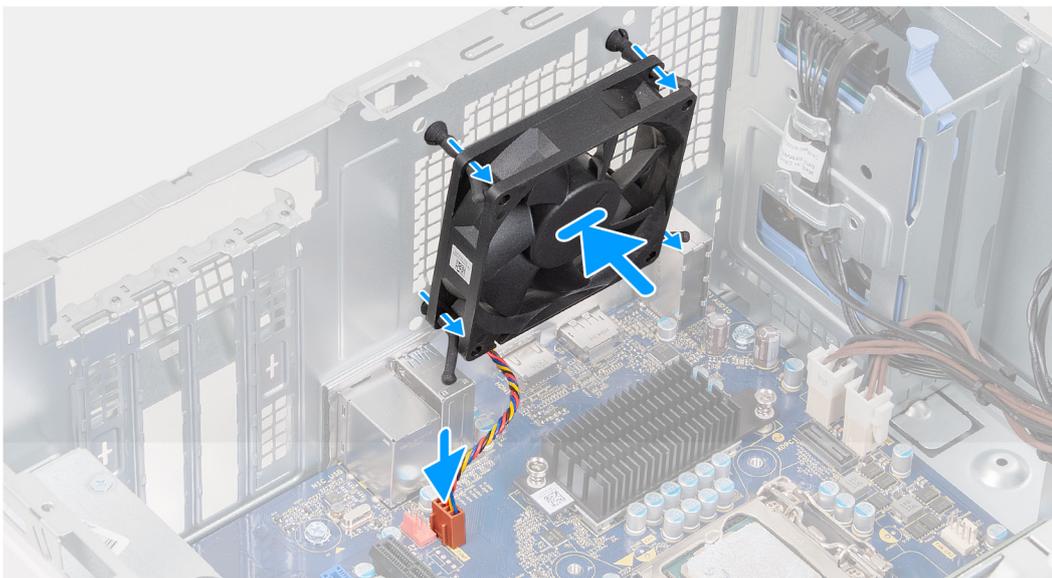
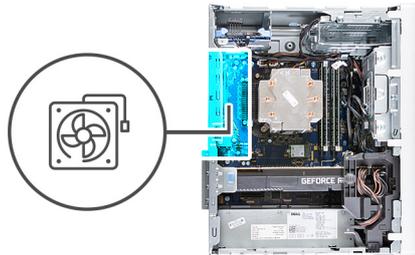
# Installing the chassis fan

## 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 chassis fan and provide a visual representation of the installation procedure.



## Steps

1. Align the slots on the fan with the rubber grommets on the chassis.

**i** **NOTE:** The replacement fan may have tabs that are inserted into the grommets slots. This is to prevent the incorrect installation of the fan.



2. Route the rubber grommets through the slots on fan and push the rubber grommets until the fan snaps into position.
3. Connect the fan cable to the system board.

#### Next steps

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

## Memory modules

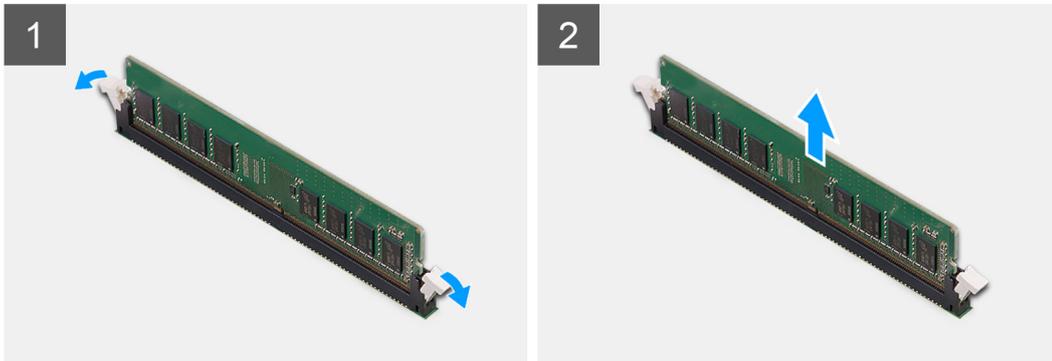
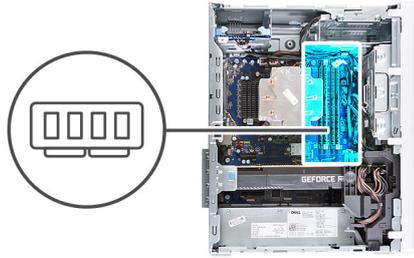
### Removing the memory modules

#### Prerequisites

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

#### About this task

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



### Steps

1. Lay the chassis on the right side.
2. Use your fingertips to carefully spread apart the securing-clips on each end of the memory-module slot.
3. Grasp the memory module near the securing clip, and then gently ease the memory module out of the memory-module slot.

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

**NOTE:** Repeat step 2 to step 3 to remove any other memory modules installed in your computer.

**NOTE:** Note the slot and the orientation of the memory module in order to replace it in the correct slot.

**NOTE:** If the memory module is difficult to remove, gently ease the memory module back and forth to remove it from the slot.

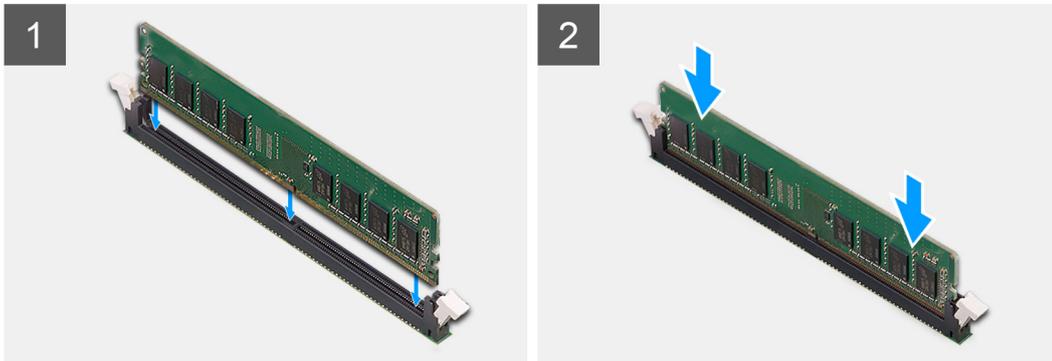
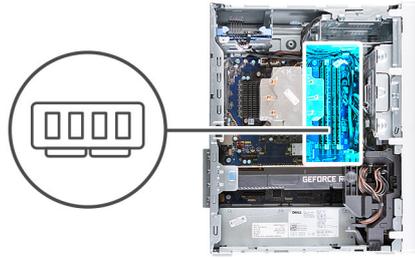
## Installing the memory modules

### Prerequisites

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

### About this task

The following images indicate the location of the memory modules and provide 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. Insert the memory module into the memory-module connector until the memory module snaps into position and the securing clip locks in place.

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

**NOTE:** The securing clips return to the locked position. If you do not hear the click, remove the memory module and reinstall it.

**NOTE:** If the memory module is difficult to remove, gently ease the memory module back and forth to remove it from the slot.

### Next steps

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

## Wireless card

### Removing the wireless card

#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).
3. Remove the [3.5-inch hard drive](#).

#### About this task

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



1x  
M2x3



### Steps

1. Lay the computer on the right side.
2. Remove the screw (M2x3) that secures the wireless card to the system board.
3. Slide and lift the wireless-card bracket off the wireless card.
4. Disconnect the antenna cables from the wireless card.
5. Slide and remove the wireless card at an angle from the wireless-card slot.

## Installing the wireless card

### Prerequisites

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

**NOTE:** To avoid damage to the wireless card, do not place any cables under it.

### About this task

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



1x  
M2x3



### Steps

1. Connect the antenna cables to the wireless card.

The following table provides the antenna-cable color scheme for the wireless card that is supported by 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. Slide and place the wireless-card bracket on the wireless card.
3. Align the notch on the wireless card with the tab on the wireless-card slot.
4. Slide the wireless card at an angle into the wireless-card slot.
5. Replace the screw (M2x3) that secures the wireless card to the system board.

### Next steps

1. Install the [3.5-inch hard drive](#).
2. Install the [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).

# Solid-state drive/Intel Optane

## Removing the solid-state drive/Intel Optane

### Prerequisites

**i** **NOTE:** You must disable the Intel Optane memory before removing Intel Optane from your computer. For more information about disabling the Intel Optane memory, see [Disabling Intel Optane](#).

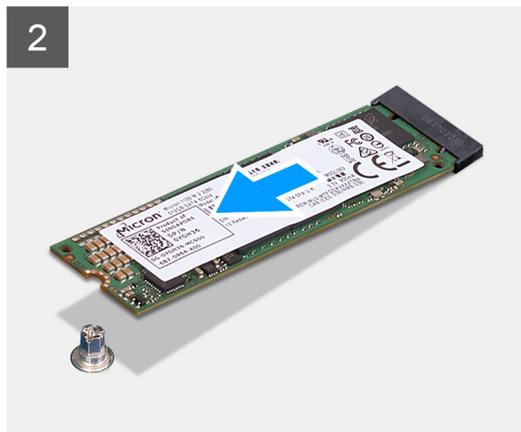
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).
3. Remove the [graphics card](#).

### About this task

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



1x  
M2x3



### Steps

1. Remove the screw (M2x2.5) that secures the solid-state drive/Intel Optane to the system board.
2. Slide and lift the solid-state drive/Intel Optane from the M.2 card slot on the system board.

## Installing the solid-state drive/Intel Optane

### Prerequisites

**Δ** **CAUTION:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.

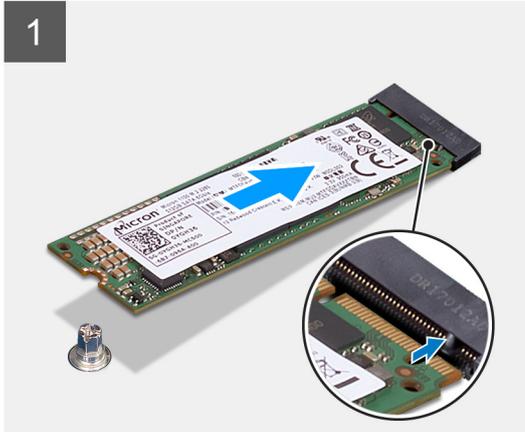
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the solid-state drive/Intel Optane and provide a visual representation of the installation procedure.



1x  
M2x3



### Steps

1. Align the notch on the solid-state drive/Intel Optane with the tab on the M.2 card slot.
2. Slide the solid-state drive/Intel Optane into the M.2 card slot on the system board.
3. Replace the screw (M2x3) that secures the solid-state drive/Intel Optane to the system board.

### Next steps

1. Install the [graphics card](#).
2. Install the [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).

**i** **NOTE:** Enable the Intel Optane memory after you replace the Intel Optane memory module. For more information about enabling the Intel Optane memory, see [Enabling Intel Optane](#).

## Graphics card

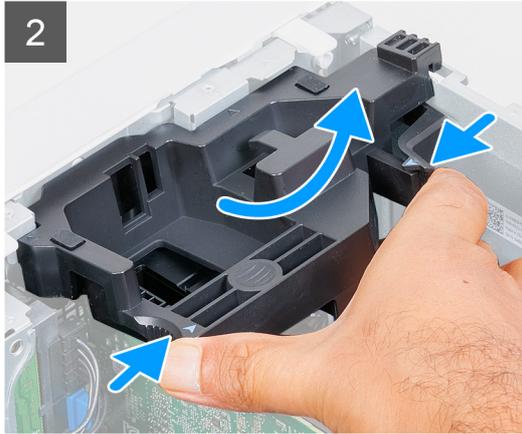
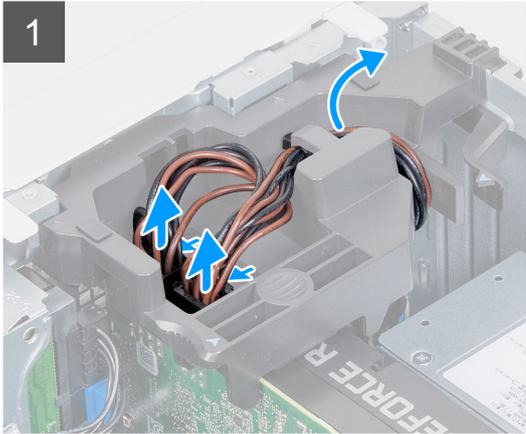
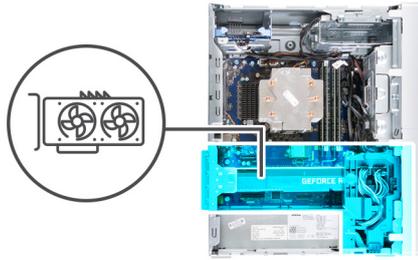
### Removing the graphics card

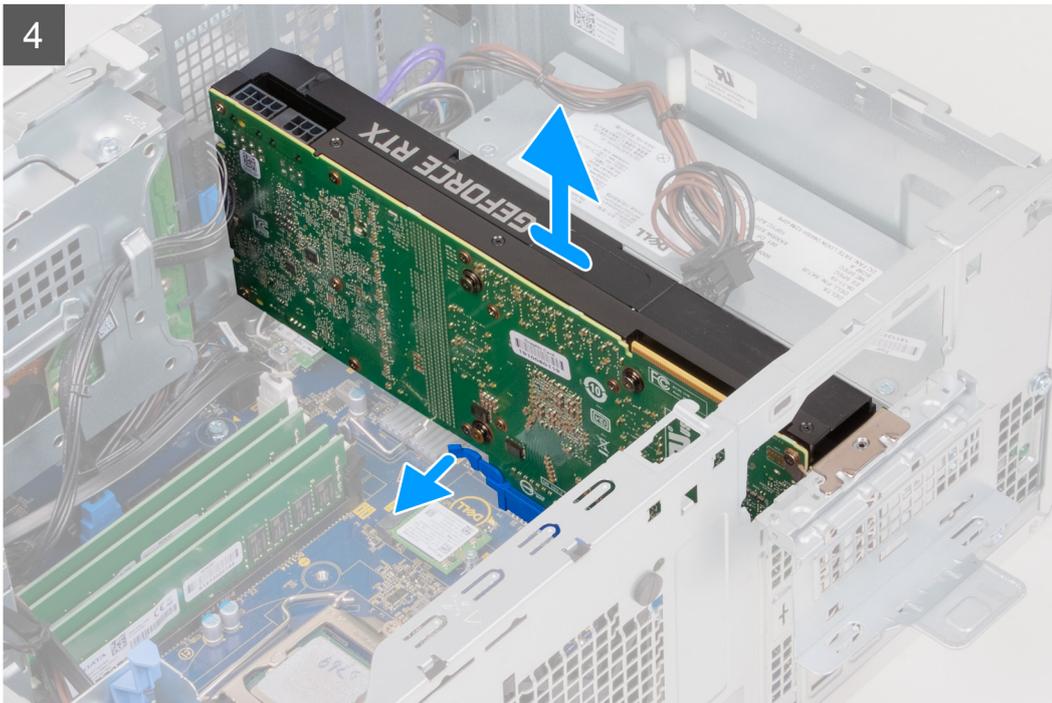
#### Prerequisites

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

#### About this task

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





### Steps

1. Lay the computer on the right side.
2. Disconnect the power cables from the graphics card and remove them from the routing guides on the graphics -card support bracket.

**i** **NOTE:** This step is applicable only for computers that are shipped with a graphics-card support bracket.

3. Pull together the securing tabs on the graphics-card support bracket and rotate to remove it off the chassis.
4. Lift the pull tab to open the PCIe door.
5. Push and hold the securing tab on the graphics-card slot and lift the graphics card from the graphics-card slot.

**i** **NOTE:** To remove the NVIDIA GeForce RTX 2080 graphics card, lift and rotate the graphics card.

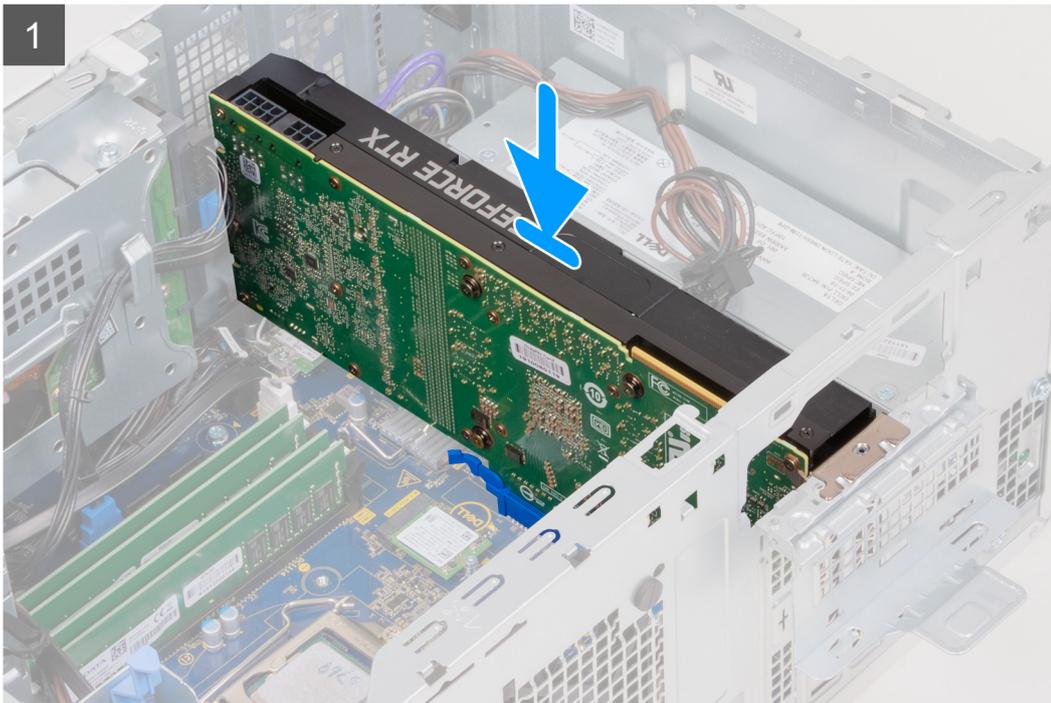
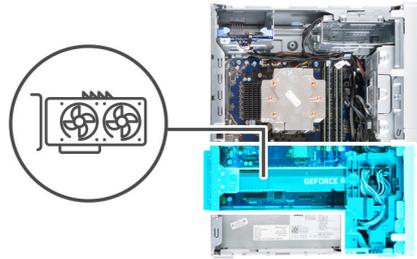
## Installing the graphics card

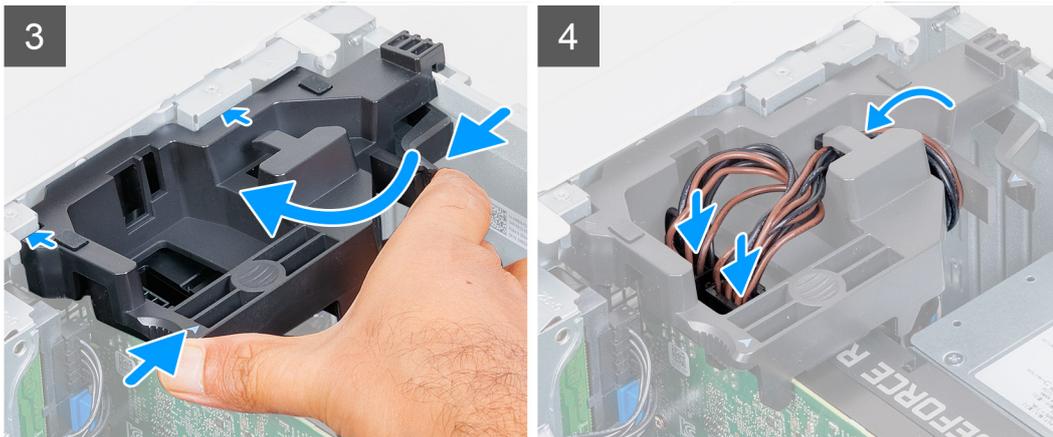
### Prerequisites

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 provide a visual representation of the installation procedure.





### Steps

1. Align the graphics card with the PCI-Express card connector on the system board.  
 ⓘ **NOTE:** To install the NVIDIA GeForce RTX 2080 graphics card, rotate and install the graphics card.
2. Using the alignment post, connect the card in the connector and press down firmly. Ensure that the card is firmly seated.
3. Close the PCIE door.
4. Replace the graphics-card support bracket that connects the graphics card.  
 ⓘ **NOTE:** This step is applicable only for computers that are shipped with a graphics-card support bracket.
5. Route the cables through the routing guide on the graphics-card support bracket and connect the power cables to the graphics card.

### Next steps

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

## Coin-cell battery

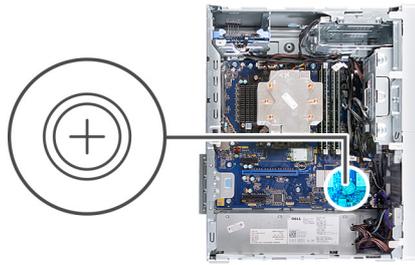
### Removing the coin-cell battery

#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).  
 ⚠ **CAUTION:** Removing the coin-cell battery resets the BIOS setup program's settings to default. It is recommended that you note the BIOS setup program's settings before removing the coin-cell battery.
2. Remove the [left-side cover](#).
3. Remove the [graphics card](#).

#### 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. Lay the computer on the right side.
2. Using your finger, push the coin-cell battery-release lever on the coin-cell battery socket to release the coin-cell battery out of the socket.
3. Remove the coin-cell battery.

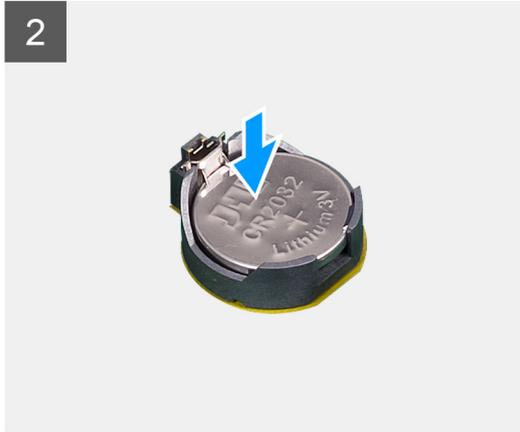
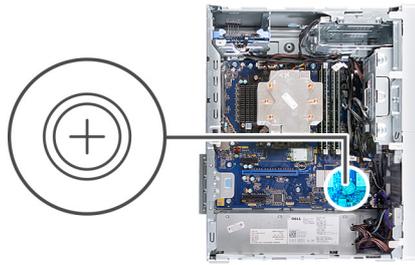
## Installing the coin-cell battery

### Prerequisites

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

### About this task

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



Insert the coin-cell battery into the socket with the positive side (+) label facing up and snap the battery in the socket.

#### Next steps

1. Install the [graphics card](#).
2. Install the [left-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 [left-side cover](#).
3. Remove the [graphics card](#).

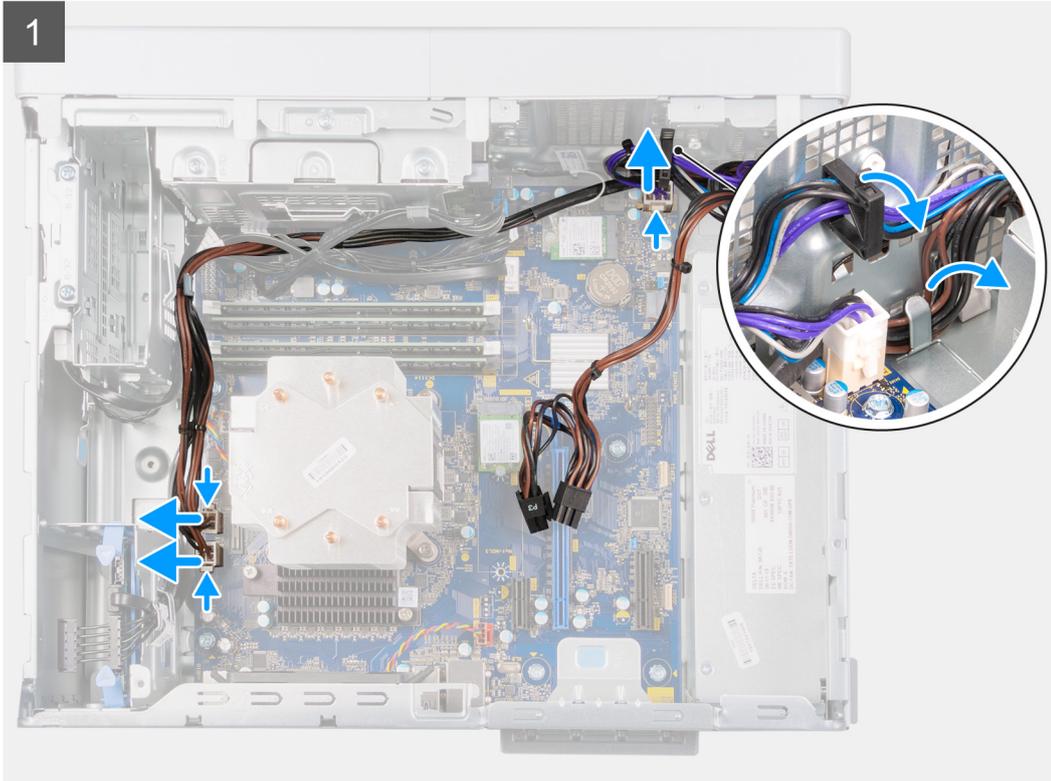
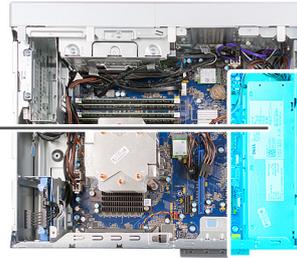
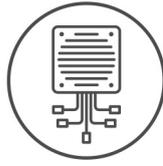
 **NOTE:** Note the routing of all cables as you remove them so that you can route them correctly while you are replacing the power-supply unit.

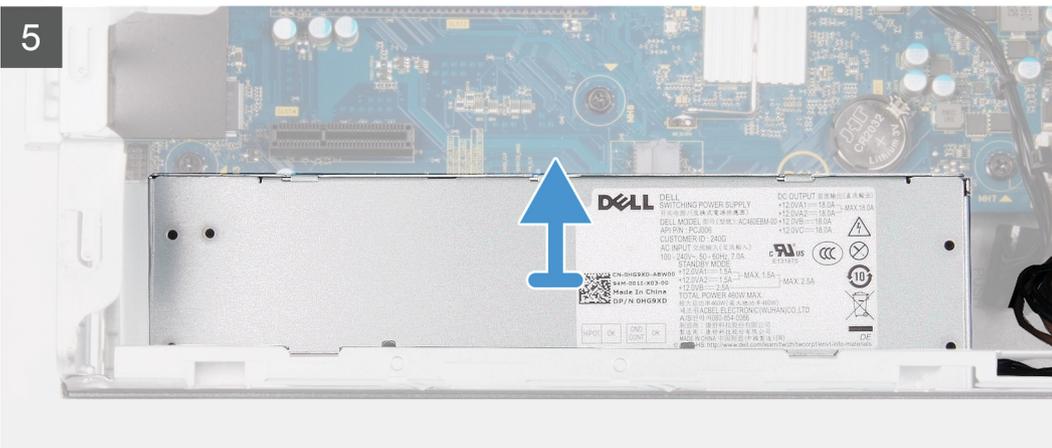
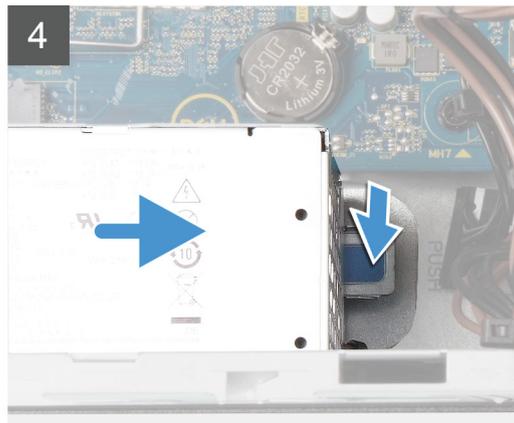
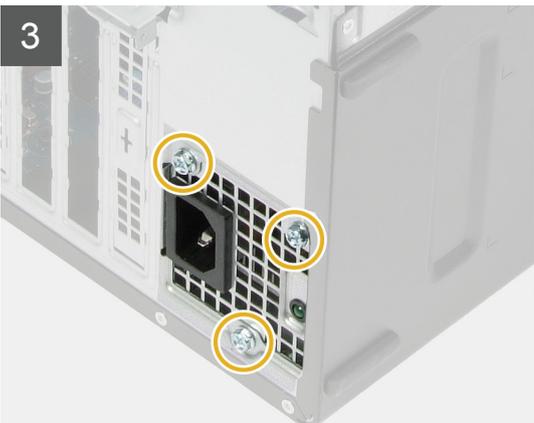
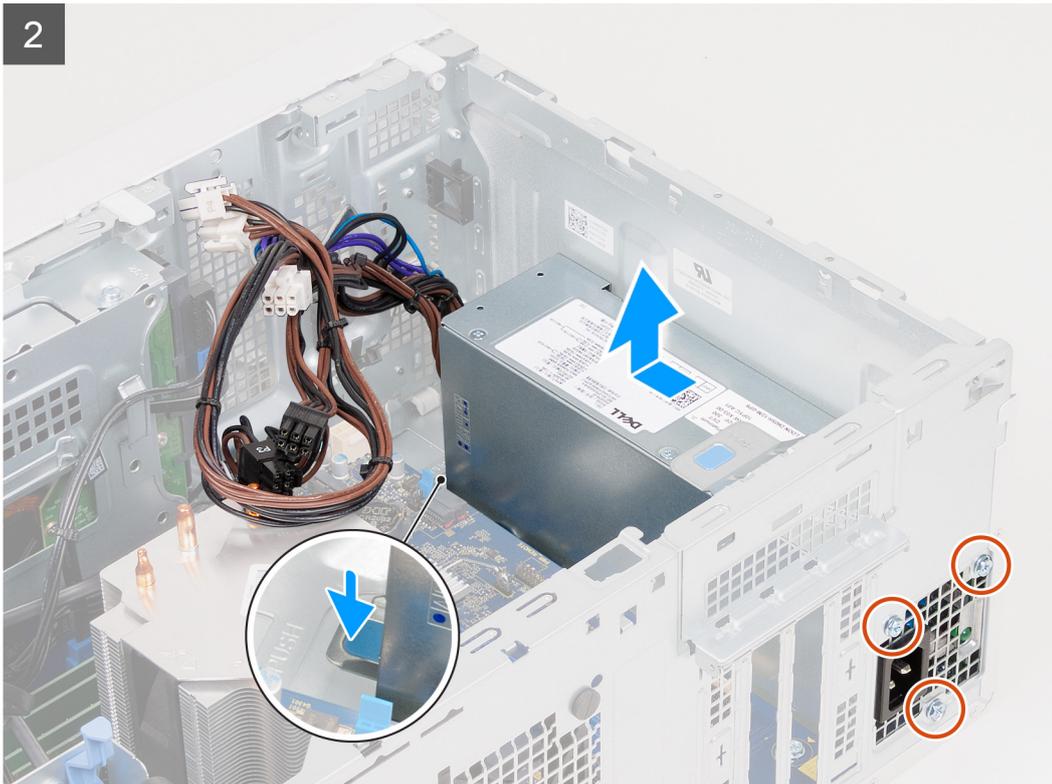
#### About this task

The following images indicate the location of the power-supply unit and provide 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 remove them from the routing guides on the chassis.

3. Remove the three screws (#6-32) 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.

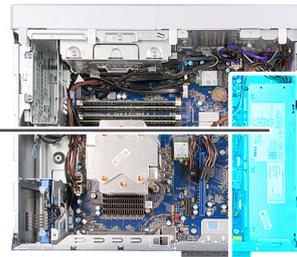
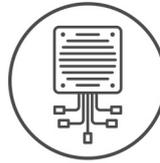
**NOTE:** The cables and ports on the back of the power-supply unit are color-coded to indicate the different power wattage. Ensure that you plug in the cable to the correct port. Failure to do so may result in damaging the power-supply unit and/or computer components.

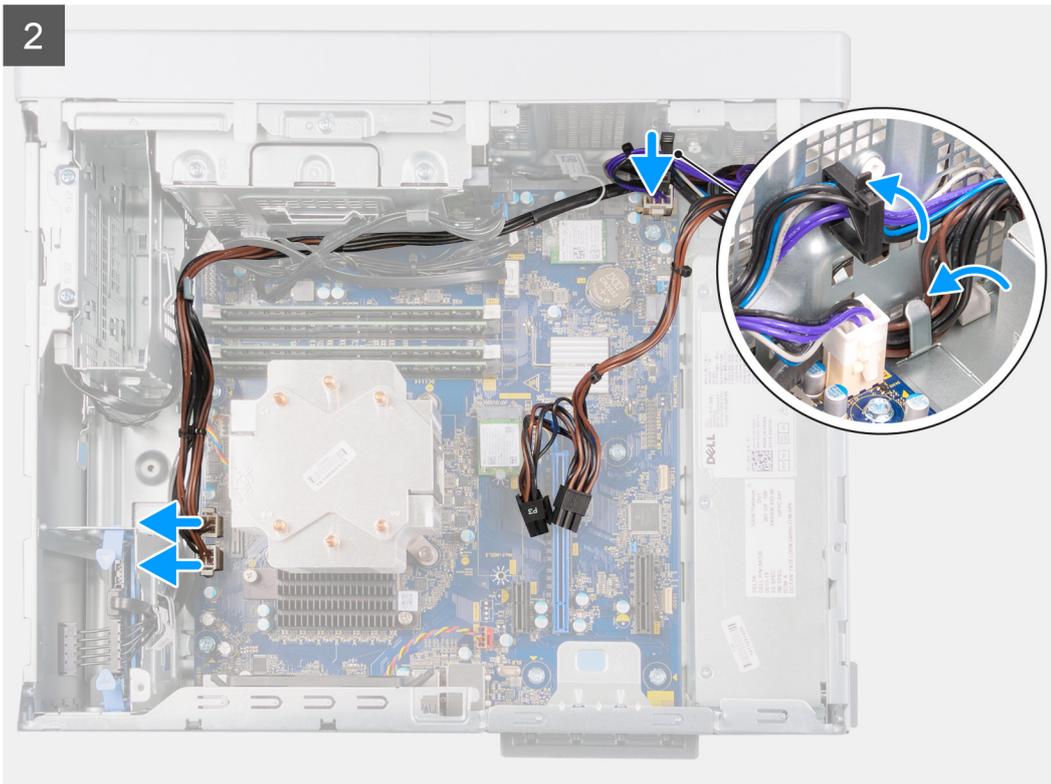
### About this task

The following images indicate the location of the power-supply unit and provide 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 screws (#6-32) that 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 [graphics card](#).
2. Install the [left-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 (65 W)

#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).  
 **NOTE:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.
2. Remove the [left-side cover](#).

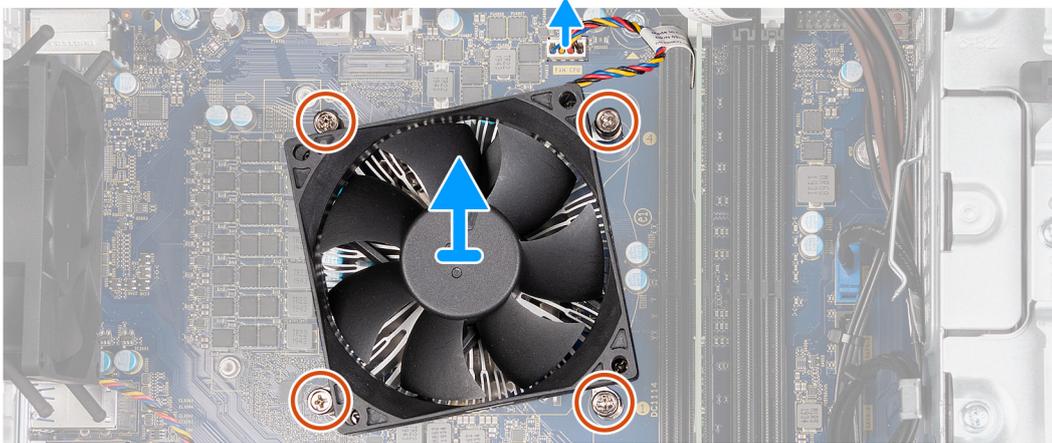
#### About this task

 **NOTE:** The following procedure only applies to computers shipped with a 65 W processor.

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



4x



### Steps

1. Disconnect the processor-fan cable from the system board.
2. In the reverse sequential order (4->3->2->1), loosen the 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 (65 W processor)

### Prerequisites

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

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

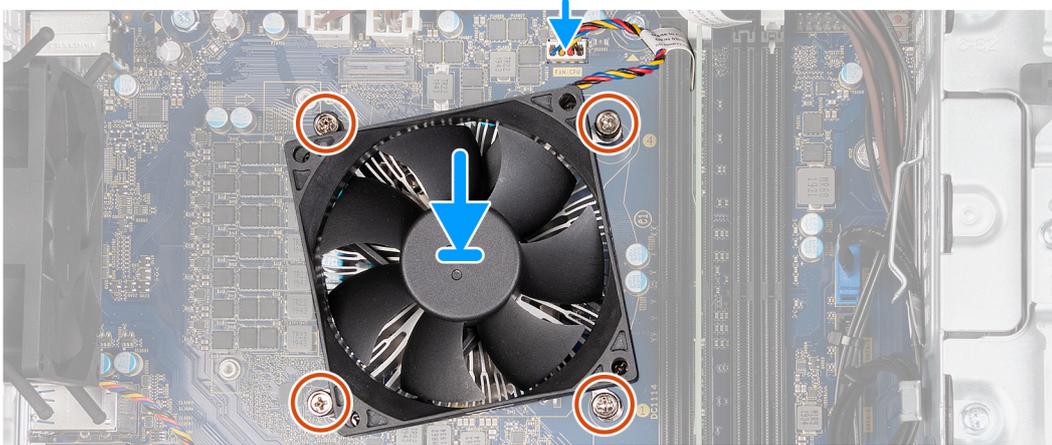
### About this task

**NOTE:** The following procedure only applies to computers shipped with a 65 W processor.

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



4x



### Steps

1. Align the numbering on the processor fan and heat-sink assembly with the numbering on the system board.
2. In the sequential order (1->2->3->4), tighten the captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Connect the processor-fan cable to the system board.

### Next steps

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

## Removing the processor fan and heat-sink assembly (125 W processor)

### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).  
**NOTE:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.
2. Remove the [left-side cover](#).

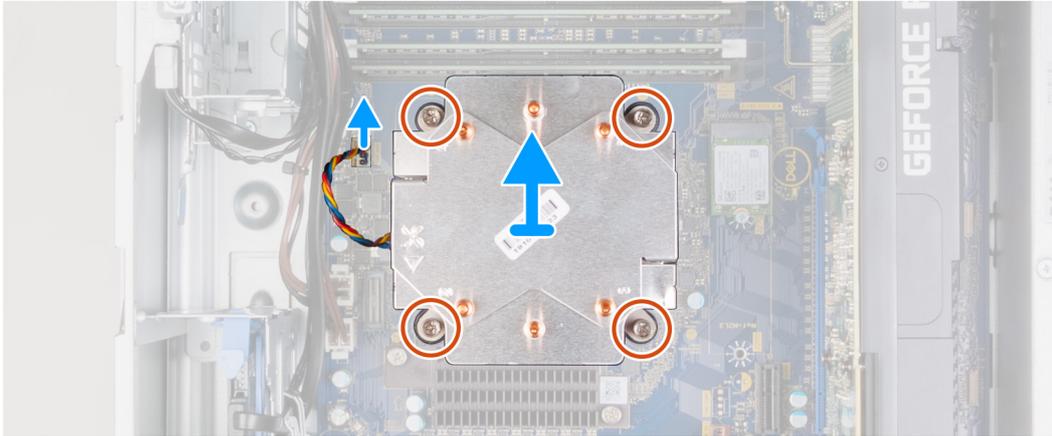
### About this task

**NOTE:** The following procedure only applies to computers shipped with a 125 W processor.

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



4x



### Steps

1. Disconnect the processor-fan cable from the system board.
2. In the reverse sequential order (4->3->2->1), loosen the 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 (125 W)

### Prerequisites

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

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

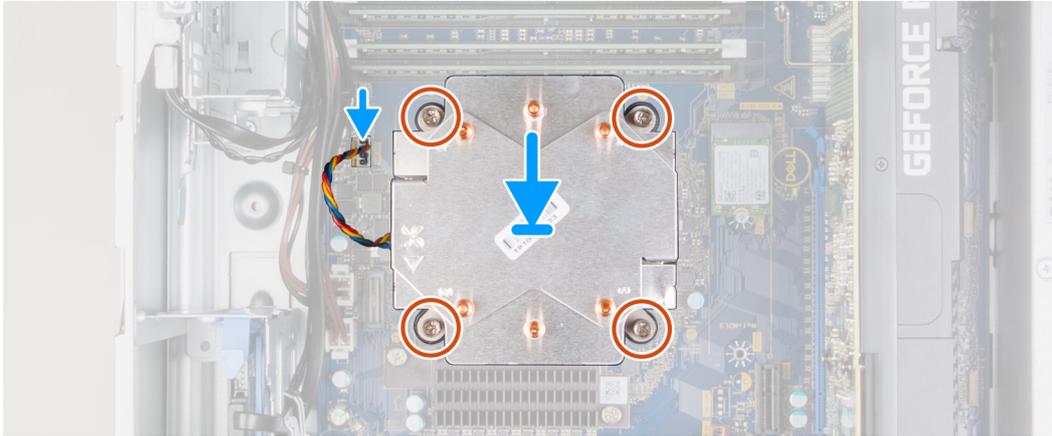
### About this task

**NOTE:** The following procedure only applies to computers shipped with a 125 W processor.

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



4x



### Steps

1. Align the numbering on the processor fan and heat-sink assembly with the numbering on the system board.
2. In the sequential order (1->2->3->4), tighten the captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Connect the processor-fan cable to the system board.

### Next steps

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

## Processor

### Removing the processor

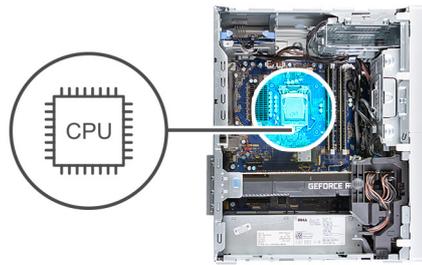
#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left-side cover](#).
3. 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 the release lever down and then push it away from the processor to release it from the securing tab.
2. Extend the release lever completely and open 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.

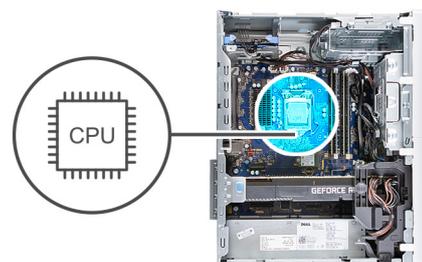
## Installing the processor

### Prerequisites

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

### About this task

The following images indicate the location of the processor and provide 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.

**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.

2. Align the notches on the processor with the tabs on the processor socket and place the processor in the processor socket.

**△** **CAUTION:** Ensure that the processor-cover notch is positioned underneath the alignment post.

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 [left-side cover](#).
3. Follow the procedure in [After working inside your computer](#).

# Voltage regulator heat sink (optional)

## Removing the voltage regulator heat sink

### Prerequisites

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

**△** **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.

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

**i** **NOTE:** The voltage regulator heat sink is shipped as a separate unit and it does not ship along with the system board. A voltage regulator is required for computers that are shipped with the following processors:

- 10<sup>th</sup> Generation Intel Core i5-10600K
- 10<sup>th</sup> Generation Intel Core i5-10600KF
- 10<sup>th</sup> Generation Intel Core i7-10700K
- 10<sup>th</sup> Generation Intel Core i7-10700KF
- 10<sup>th</sup> Generation Intel Core i9-10900K
- 10<sup>th</sup> Generation Intel Core i9-10900KF
- 11<sup>th</sup> Generation Intel Core i5-11600K
- 11<sup>th</sup> Generation Intel Core i5-11600KF
- 11<sup>th</sup> Generation Intel Core i7-11700K
- 11<sup>th</sup> Generation Intel Core i7-11700KF
- 11<sup>th</sup> Generation Intel Core i9-11900K
- 11<sup>th</sup> Generation Intel Core i9-11900KF

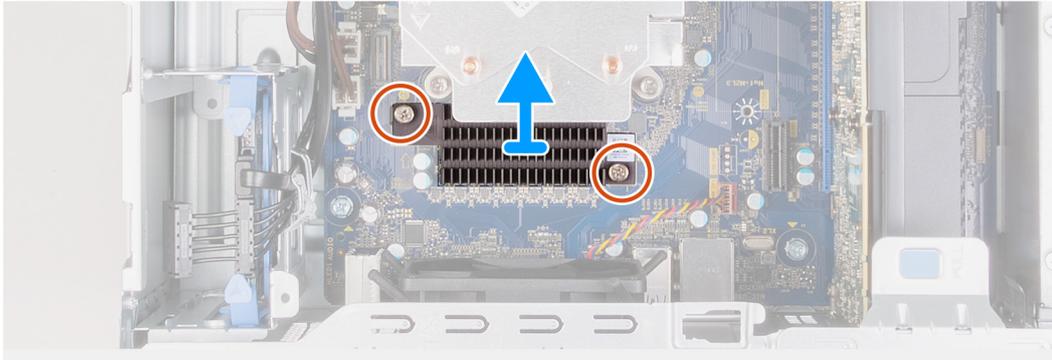
2. Remove the [left-side cover](#).

### About this task

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



2x



### Steps

1. Loosen the captive screws that secure the voltage regulator heat sink to the system board.
2. Lift the voltage regulator heat sink off the system board.

## Installing the voltage regulator heat sink

### Prerequisites

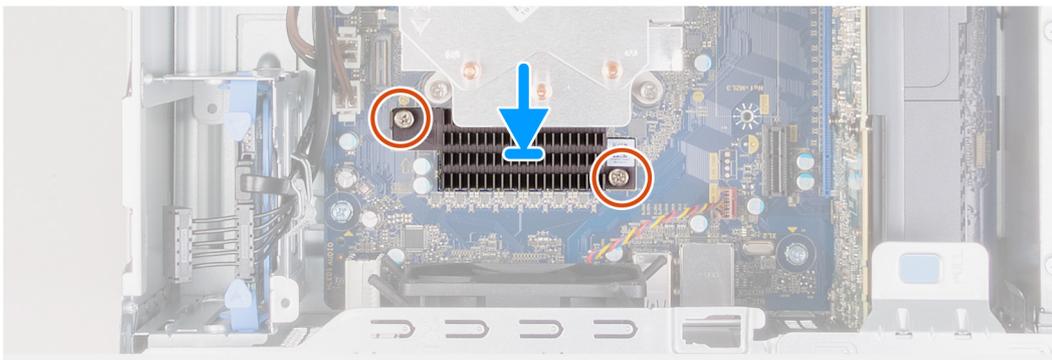
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following images indicate the location of the voltage regulator heat sink and provide a visual representation of the installation procedure.



2x



## Steps

1. Align and place the voltage regulator heat sink on the system board.
2. Tighten the captive screws that secure the voltage regulator heat sink to the system board.

## Next steps

1. Install the [left-side cover](#).
2. 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](#).

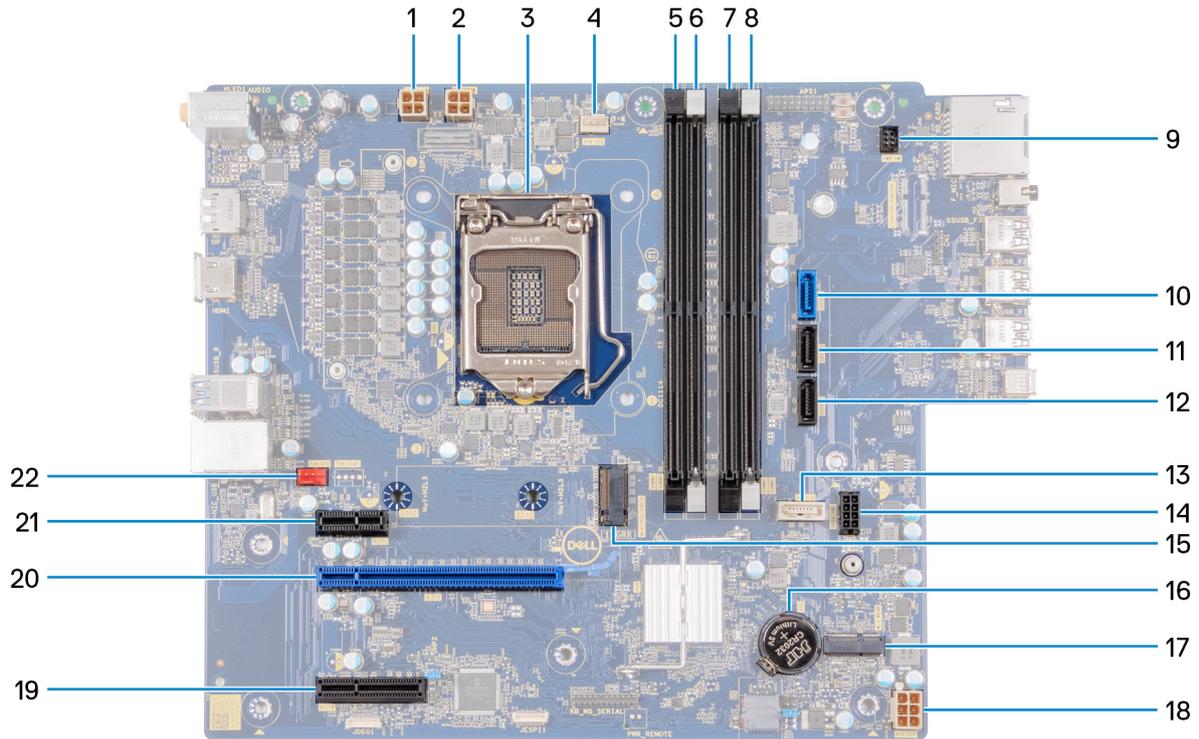
**i** **NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

**i** **NOTE:** 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.

**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.

2. Remove the [left-side cover](#).
3. Remove the [front cover](#).
4. Remove the [3.5-inch hard drive](#), if applicable.
5. Remove the [memory modules](#).
6. Remove the [wireless card](#).
7. Remove the [solid-state drive/Intel Optane](#).
8. Remove the [graphics card](#).
9. Remove the [coin-cell battery](#).
10. Remove the [processor fan and heat-sink assembly](#).
11. Remove the [processor](#).

## About this task



**Figure 1. System-board components**

1. processor power-cable connector (ATX CPU1)
2. processor power-cable connector (ATX CPU)
3. processor
4. processor-fan cable connector (FAN CPU)
5. memory-module slot (DIMM3)
6. memory-module slot (DIMM1)
7. memory-module slot (DIMM4)
8. memory-module slot (DIMM2)
9. power-button cable
10. hard-drive data-cable connector (SATA0)
11. hard-drive data-cable connector (SATA1)
12. hard-drive data-cable connector (SATA2)
13. optical-drive data-cable connector (SATA3)
14. hard-drive power cable connector (SATA PWR)
15. solid-state drive connector (m.2 PCIe SSD)
16. coin-cell battery
17. wireless-card slot
18. system-board power-cable connector (ATX SYS)
19. PCIe x4 slot
20. PCIe x16 slot
21. PCIe x1 slot
22. chassis-fan cable connector (FAN SYS)

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



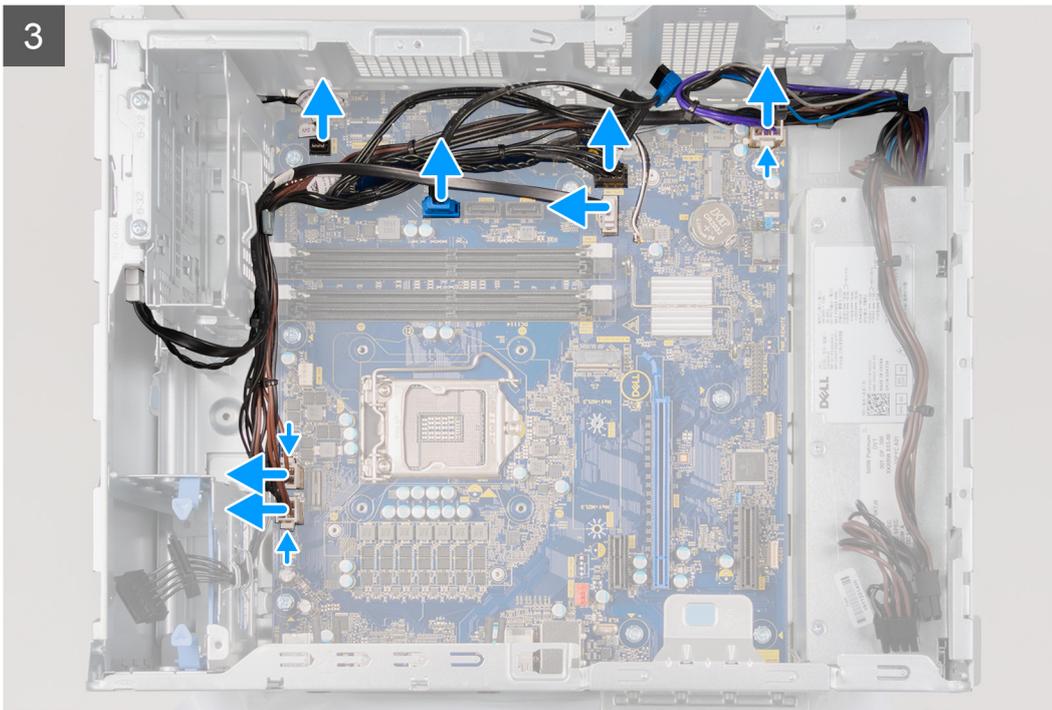
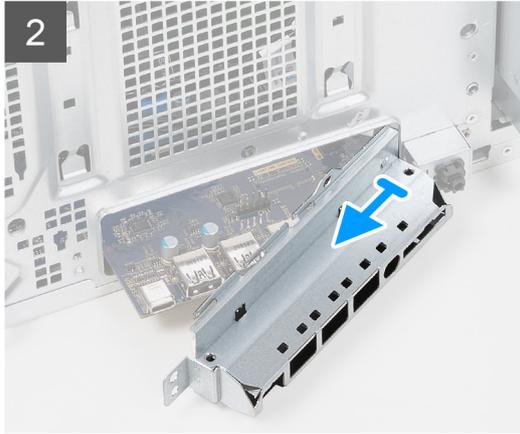
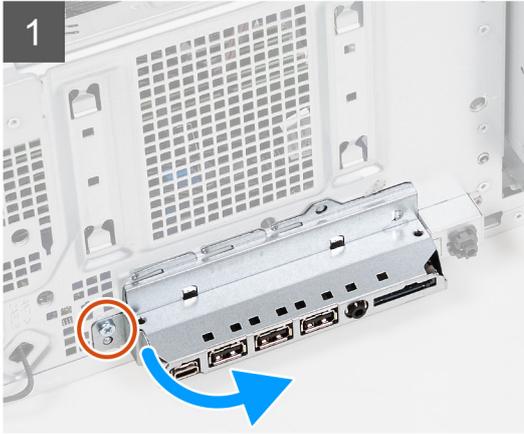
1x  
#6-32

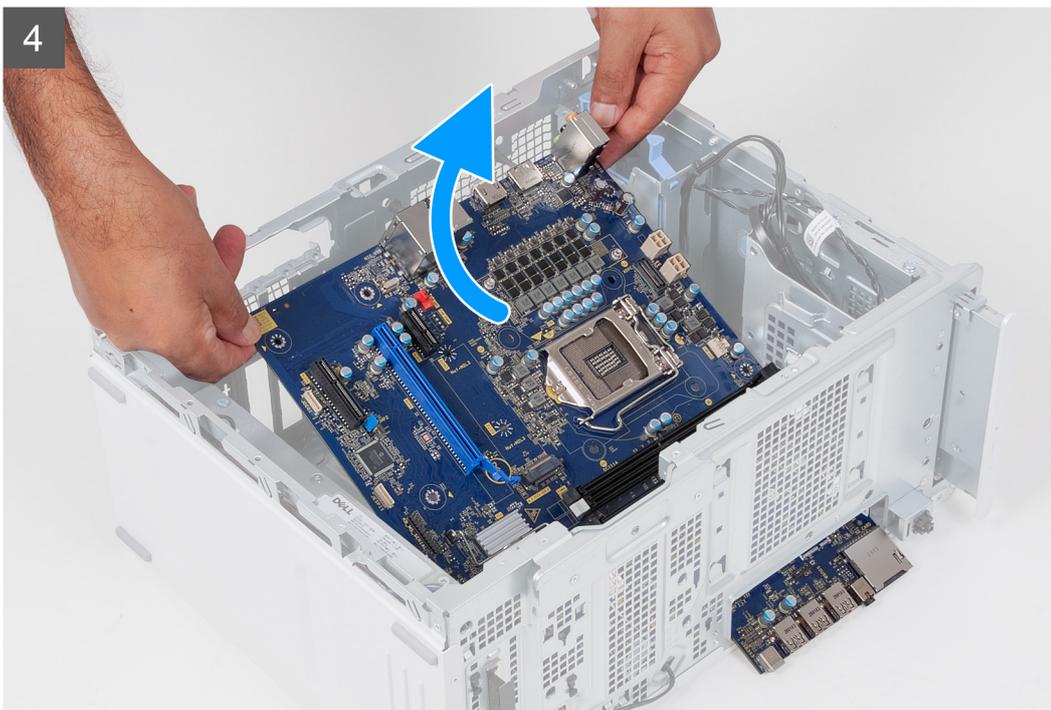
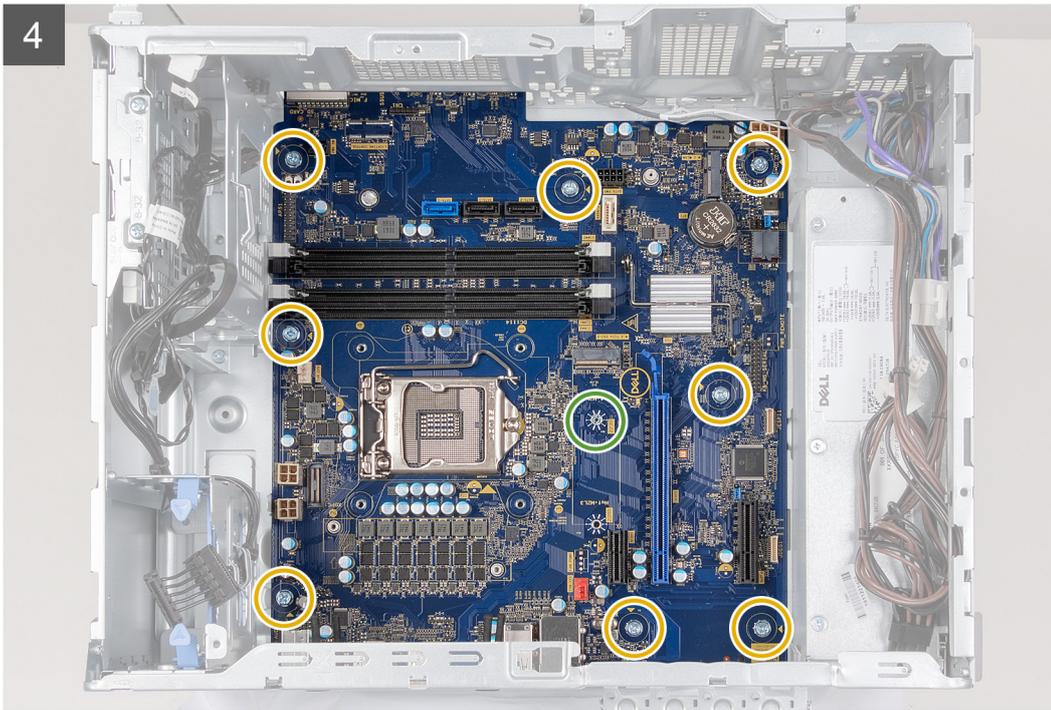


8x  
#6-32



1x  
#6-32x3.8





### Steps

1. Lay the computer on the right side.
2. Remove the screw (#6-32) that secures the front I/O-bracket to the chassis.
3. Rotate and remove the front I/O-bracket from the chassis.
4. Disconnect all the cables that are connected to the system board.
5. Remove the eight screws (#6-32) that secure the system board to the chassis.
6. Remove the [voltage regulator heat sink](#).

**i** **NOTE:** The voltage regulator heat sink is shipped as a separate unit and it does not ship along with the system board. If reusing the voltage regulator heat sink, remove it from the old system board and transfer it to the new system board.

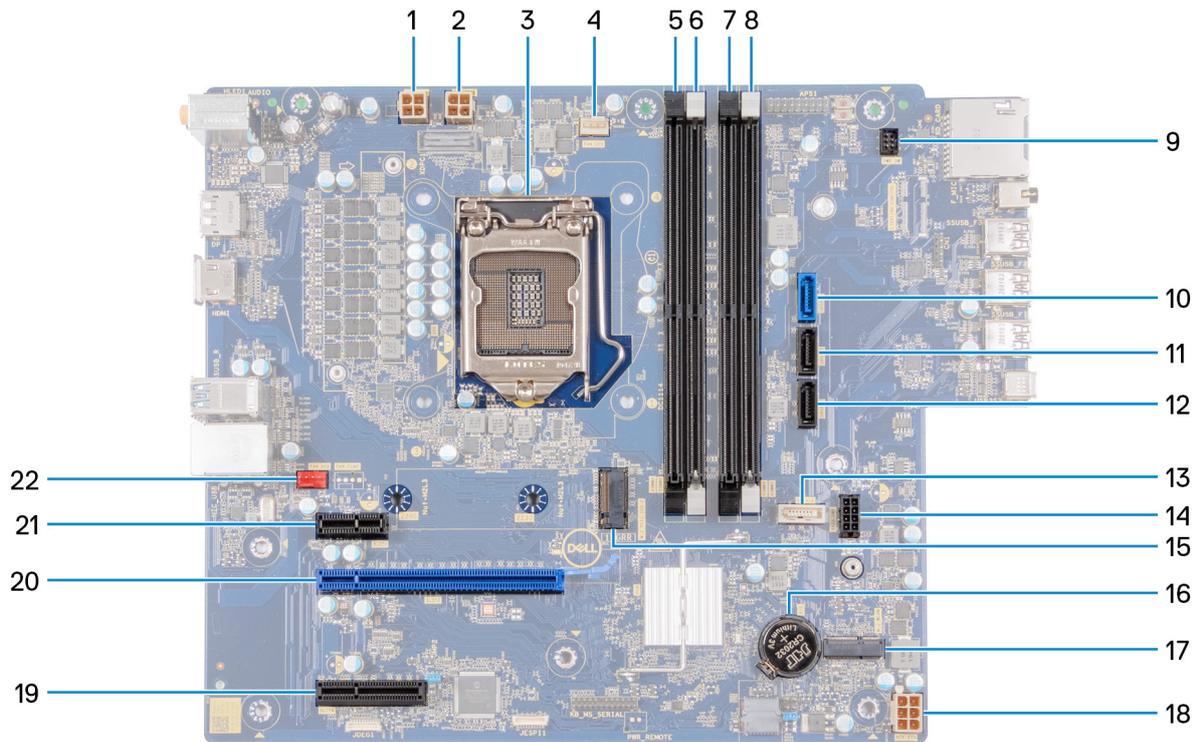
7. Remove the screw (#6-32x3.8) and that secures the system board to the chassis.
8. Lift the system board at an angle and remove it off the chassis.

## Installing the system board

### Prerequisites

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

### About this task



**Figure 2. System-board components**

1. processor power-cable connector (ATX CPU1)
2. processor power-cable connector (ATX CPU)
3. processor
4. processor-fan cable connector (FAN CPU)
5. memory-module slot (DIMM3)
6. memory-module slot (DIMM1)
7. memory-module slot (DIMM4)
8. memory-module slot (DIMM2)
9. power-button cable
10. hard-drive data-cable connector (SATA0)
11. hard-drive data-cable connector (SATA1)
12. hard-drive data-cable connector (SATA2)
13. optical-drive data-cable connector (SATA3)
14. hard-drive power cable connector (SATA PWR)
15. solid-state drive connector (m.2 PCIe SSD)
16. coin-cell battery
17. wireless-card slot
18. system-board power-cable connector (ATX SYS)
19. PCIe x4 slot
20. PCIe x16 slot

21. PCIe x1 slot

22. chassis-fan cable connector (FAN SYS)

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



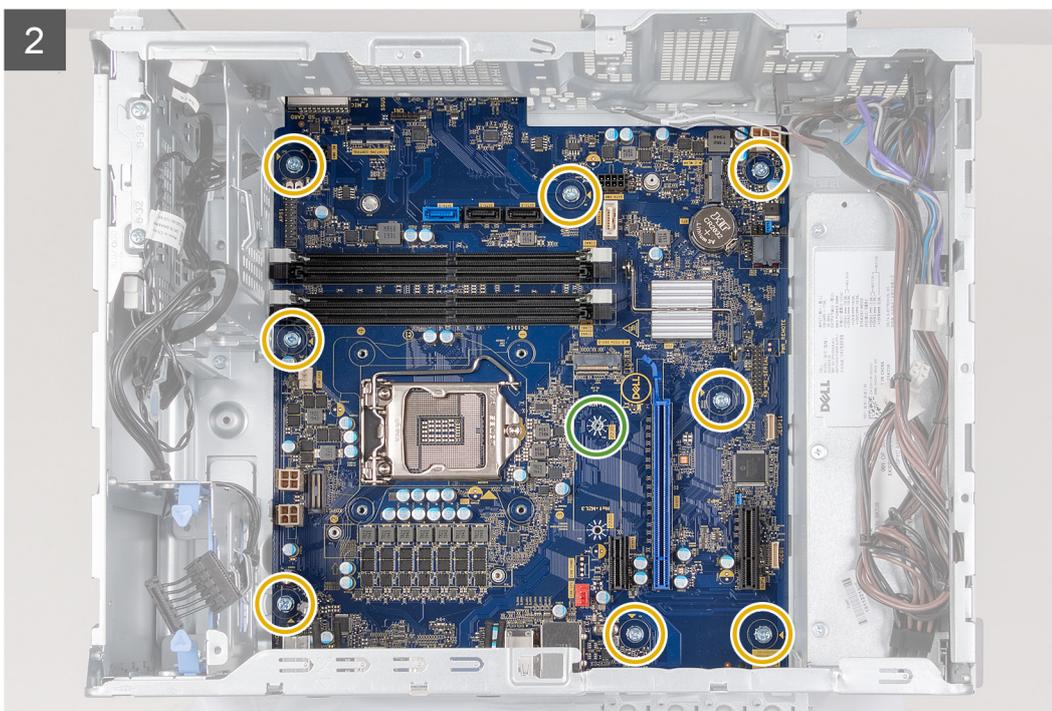
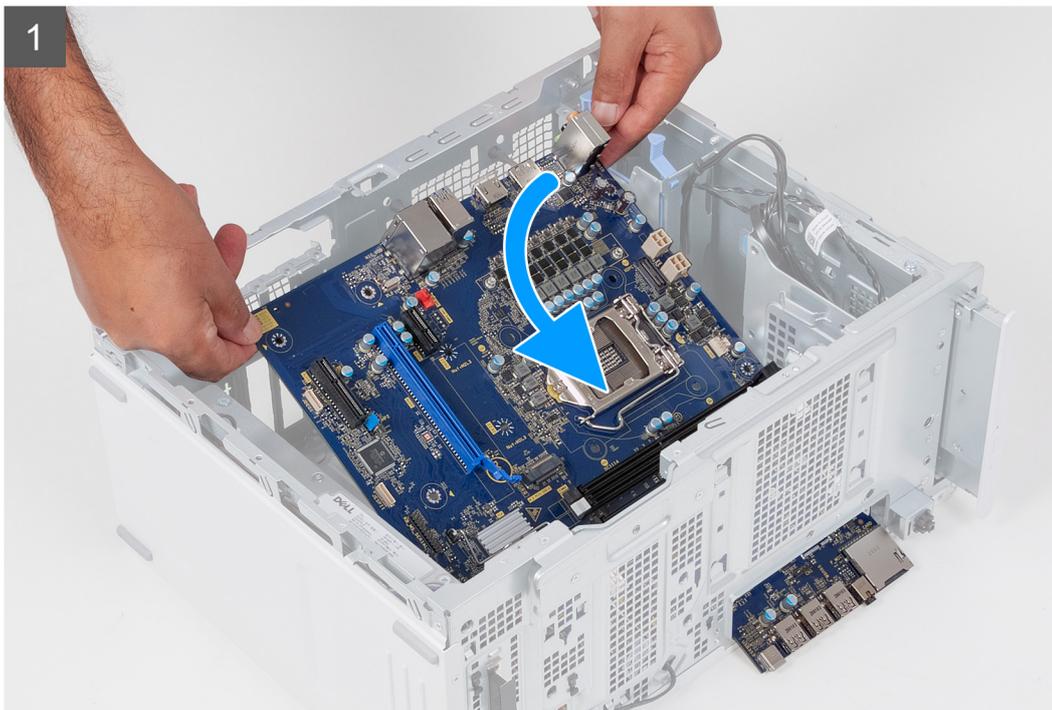
**1x**  
#6-32

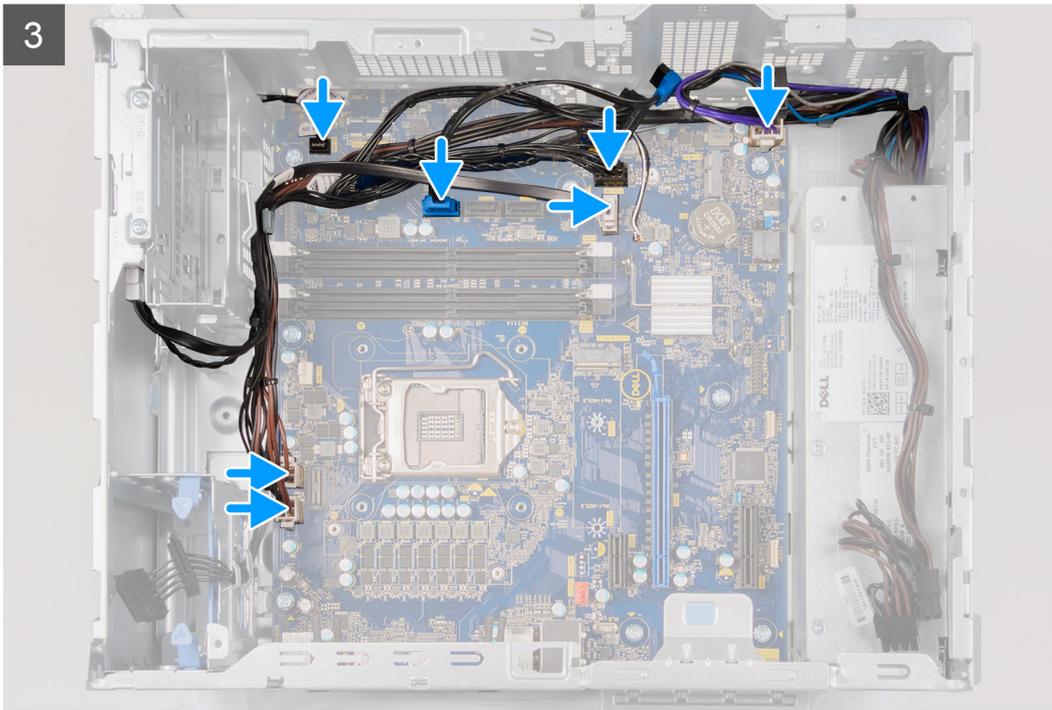


**8x**  
#6-32



**1x**  
#6-32x3.8





### Steps

1. Slide the back 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 screw (#6-32x3.8) that secures the system board to the chassis.
3. Install the [voltage regulator heat sink](#).
  - i **NOTE:** The voltage regulator heat sink is shipped as a separate unit and it does not ship along with the system board. If reusing the voltage regulator heat sink, remove it from the old system board and transfer it to the new system board.
4. Replace the eight screws (#6-32) that secure the system board to the chassis.
5. Route and connect all the cables that you disconnected from the system board.

6. Align the front I/O-bracket with the slots on the chassis.
7. Replace the screw (#6-32) that secures 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](#).
  5. Install the [solid-state drive/Intel Optane](#).
  6. Install the [wireless card](#).
  7. Install the [memory modules](#).
  8. Install the [3.5-inch hard drive](#), if applicable.
  9. Install the [front cover](#).
  10. Install the [left-side cover](#).
  11. Follow the procedure in [After 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.

## Drivers and downloads

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

# System setup

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

## System 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:** 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

### About this task

Turn on (or restart) your computer and press F2 immediately.

## 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.

Keys	Navigation
<b>Up arrow</b>	Moves to the previous field.
<b>Down arrow</b>	Moves to the next field.
<b>Enter</b>	Selects a value in the selected field (if applicable) or follow the link in the field.
<b>Spacebar</b>	Expands or collapses a drop-down list, if applicable.
<b>Tab</b>	Moves to the next focus area.
<b>Esc</b>	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.

# Boot Sequence

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

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

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

- 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 this computer and its installed devices, the items listed in this section may or may not appear.

**Table 3. System setup options—System information menu**

General-System Information	
<b>System Information</b>	
BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Displays the Asset Tag of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Manufacture Date	Displays the manufacture date of the computer.
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the express service code of the computer.
<b>Memory Information</b>	
Memory Installed	Displays the total computer memory installed.
Memory Available	Displays the total computer memory available.
Memory Speed	Displays the memory speed.
Memory Channel Mode	Displays single or dual channel mode.
Memory Technology	Displays the technology used for the memory.
DIMM 1 Size	Displays the DIMM 1 memory size.
DIMM 2 Size	Displays the DIMM 2 memory size.
DIMM 3 Size	Displays the DIMM 3 memory size.
DIMM 4 Size	Displays the DIMM 4 memory size.
<b>PCI Information</b>	
SLOT1	Displays the PCI information of the computer.
SLOT2	Displays the PCI information of the computer.
SLOT4	Displays the PCI information of the computer.

**Table 3. System setup options—System information menu (continued)**

<b>General-System Information</b>	
SLOT5_M.2	Displays the PCI information of the computer.
SLOT6_M.2	Displays the PCI information of the computer.
<b>Processor Information</b>	
Processor Type	Displays the processor type.
Core Count	Displays the number of cores on the processor.
Processor ID	Displays the processor identification code.
Current Clock Speed	Displays the current processor clock speed.
Minimum Clock Speed	Displays the minimum processor clock speed.
Maximum Clock Speed	Displays the maximum processor clock speed.
Processor L2 Cache	Displays the Processor L2 Cache size.
Processor L3 Cache	Displays the Processor L2 Cache size.
HT Capable	Displays whether the processor is HyperThreading (HT) capable.
64-Bit Technology	Displays whether 64-bit technology is used.
<b>Device Information</b>	
SATA-0	Displays the SATA device information of the computer.
SATA-1	Displays the SATA device information of the computer.
SATA-2	Displays the SATA device information of the computer.
SATA-3	Displays the SATA device information of the computer.
M.2 PCIe SSD-2	Displays the M.2 PCIe SSD information of the computer.
LOM MAC Address	Displays the LOM MAC address of the computer.
Video Controller	Displays the video controller type of the computer.
Audio Controller	Displays the audio controller information of the computer.
Wi-Fi Device	Displays the wireless device information of the computer.
Bluetooth Device	Displays the bluetooth device information of the computer.
<b>Boot Sequence</b>	
Boot Sequence	Displays the boot sequence.
Boot List Option	Displays the available boot options.
<b>UEFI Boot Path Security</b>	
Always,Except Internal HDD	Enable or disable the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu. Default: Enabled
Always	Enable or disable the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu. Default: Disabled
Never	Enable or disable the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu. Default: Disabled
<b>Date/Time</b>	Displays the current date in MM/DD/YY format and current time in HH:MM:SS AM/PM format.

**Table 4. System setup options—System Configuration menu**

<b>System Configuration</b>	
<b>Integrated NIC</b>	
Enable UEFI Network Stack	Controls the on-board LAN controller.
Enable UEFI Network Stack	Enable or disable UEFI Network Stack.

**Table 4. System setup options—System Configuration menu (continued)**

<b>System Configuration</b>	
<b>SATA Operation</b>	Configure operating mode of the integrated SATA hard drive controller.
<b>Drives</b>	Enable or disable various drives on board.
SATA-0	Displays the SATA device information of the computer.
SATA-1	Displays the SATA device information of the computer.
SATA-2	Displays the SATA device information of the computer.
SATA-3	Displays the SATA device information of the computer.
M.2 PCIe SSD-2	Displays the M.2 PCIe SSD information of the computer.
<b>SMART Reporting</b>	Enable or disable SMART Reporting during system startup.
<b>USB Configuration</b>	
Enable Boot Support	Enable or disable booting from USB mass storage devices such as external hard drive, optical drive, and USB drive.
Enable Front USB Ports	Enable or disable the front USB ports.
Enable Rear USB Ports	Enable or disable the rear USB ports.
<b>Front USB Configuration</b>	Enable or disable the front USB ports.
<b>Rear USB Configuration</b>	Enable or disable the rear USB ports.
<b>Audio</b>	Enable or disable the integrated audio controller.

**Table 5. System setup options—Video menu**

<b>Video</b>	
Multi-Display	Enable or disable multiple displays.
Primary Display	Set or change the primary display.

**Table 6. System setup options—Security menu**

<b>Security</b>	
Internal HDD-2 Password	Set, change, or delete the internal hard-disk drive password.
Internal HDD-3 Password	Set, change, or delete the internal hard-disk drive password.
M.2 SATA SSD Password	Set, change, or delete the M.2 solid-state drive password.
Strong Password	Enable or disable strong passwords.
Password Configuration	Control the minimum and maximum number of characters allowed for Admin and System passwords.
Password Change	Enable or disable changes to the System and Hard Disk passwords when an administrator password is set.
UEFI Capsule Firmware Updates	Enable or disable BIOS updates through UEFI capsule update packages.
<b>PTT Security</b>	
PTT On	Enable or disable Platform Trust Technology (PTT) visibility to the operating system.
Clear	Default: Disabled
PPI ByPass for Clear Command	Enable or disable the TPM Physical Presence Interface (PPI). When enabled, this setting will allow the OS to skip BIOS PPI user prompts when issuing the Clear command. Changes to this setting take effect immediately. Default: Disabled
Absolute(R)	Enable or disable the BIOS module interface of the optional Computrace(R) Service from Absolute Software.

**Table 6. System setup options—Security menu (continued)**

<b>Security</b>	
Master Password Lockout	Disables the master password support. Hard Disk passwords need to be cleared before changing the setting.
SMM Security Mitigation	Enable or disable SMM Security Mitigation

**Table 7. System setup options—Secure Boot menu**

<b>Secure Boot</b>	
Secure Boot Enable	Enable or disable the secure boot feature.
Secure Boot Mode	Modifies the behavior of Secure Boot to allow evaluation or enforcement of UEFI driver signatures. <ul style="list-style-type: none"> <li>• Deployed Mode-Default: Enabled</li> <li>• Audit Mode-Default: Disabled</li> </ul>
Deployed Mode	Enable or disable the deployed mode.
Audit Mode	Enable or disable the audit mode.
<b>Expert Key Management</b>	
Expert Key Management	Enable or disable Expert Key Management.
Custom Mode Key Management	Select the custom values for expert key management.

**Table 8. System setup options—Intel Software Guard Extensions menu**

<b>Intel Software Guard Extensions</b>	
Intel SGX Enable	Enable or disable Intel Software Guard Extensions.
Enclave Memory Size	Set the Intel Software Guard Extensions Enclave Reserve Memory Size.
<b>Performance</b>	
Multi Core Support	Enable multiple cores. Default: Enabled.
Intel SpeedStep	Enable or disable Intel Speedstep Technology. Default: Enabled. <b>i NOTE:</b> If enabled, the processor clock speed and core voltage are adjusted dynamically based on the processor load.
C-States Control	Enable or disable additional processor sleep states. Default: Enabled.
Intel TurboBoost	Enable or disable Intel TurboBoost mode of the processor. Default: Enabled.
HyperThread control	Enable or disable HyperThreading in the processor. Default: Enabled.
<b>Power Management</b>	
AC Recovery	Sets what action the computer takes when power is restored.
Enable Intel Speed Shift Technology	Enable or disable Intel Speed Shift Technology.
Auto On Time	Enable to set the computer to turn on automatically every day or on a preselected date and time. This option can be configured only if the Auto On Time is set to Everyday, Weekdays or Selected Days. Default: Disabled.

**Table 8. System setup options—Intel Software Guard Extensions menu (continued)**

<b>Intel Software Guard Extensions</b>	
Deep Sleep Control	Deep Sleep Control enables you to control the Deep Sleep mode support.
USB Wake Support	USB Wake Support enables the USB devices to wake the computer from Standby.
Fan Control Override	Enable or disable Fan control Override.
Wake on LAN/WLAN	Enables the computer to be powered on by special LAN signals.
Block sleep	Enables you to block entering to sleep mode in OS environment.
<b>POST Behavior</b>	
Numlock LED	Enables the NumLock function when computer boots.
Keyboard Errors	Enables the keyboard error detection.
Fastboot	Enable to set the speed of the boot process. Default: Thorough.
Extend BIOS POST Time	Configure additional pre-boot delay.
Full Screen Logo	Enable or disable to display full screen logo.
Warnings and Errors	Sets the boot process to pause when Warnings or Errors are detected.

**Table 9. System setup options—Virtualization Support menu**

<b>Virtualization Support</b>	
Virtualization	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology.
VT for Direct I/O	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology for Direct I/O.

**Table 10. System setup options—Wireless menu**

<b>Wireless</b>	
Wireless Device Enable	Enable or disable internal wireless devices.

**Table 11. System setup options—Maintenance menu**

<b>Maintenance</b>	
Service Tag	Display the system's Service Tag.
Asset Tag	Create a system Asset Tag.
SERR Messages	Enable or disable SERR messages.
BIOS Downgrade	Control flashing of the system firmware to previous revisions.
Data Wipe	Enable to securely erase data from all internal storage devices.
BIOS Recovery	Enable the user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key.
First Power On Date	Enable the user to set the Ownership date.

**Table 12. System setup options—System Logs menu**

<b>System Logs</b>	
BIOS Events	Display BIOS events.

**Table 13. System setup options—SupportAssist System Resolution menu**

SupportAssist System Resolution	
Auto OS Recovery Threshold	Control the automatic boot flow for SupportAssist System Resolution Console and for Dell OS Recovery tool.
SupportAssist OS Recovery	Enable or disable the boot flow for SupportAssist OS Recovery tool in the event of certain system errors
BIOSConnect	BIOSConnect enable or disable cloud Service OS upon absence of Local OS Recovery.

## System and setup password

**Table 14. System and setup password**

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

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

 **CAUTION:** The password features provide a basic level of security for the data on your computer.

 **CAUTION:** Anyone can access the data stored on your computer if it is not locked and left unattended.

 **NOTE:** System and setup password feature is disabled.

## Assigning a system setup password

### Prerequisites

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

### About this task

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

### Steps

- In the **System BIOS** or **System Setup** screen, select **Security** and press **Enter**.  
The **Security** screen is displayed.
- Select **System/Admin Password** and create a password in the **Enter the new password** field.  
Use the following guidelines to assign the system password:
  - A password can have up to 32 characters.
  - The password can contain the numbers 0 through 9.
  - Only lower case letters are valid, upper case letters are not allowed.
  - Only the following special characters are allowed: space, ("), (+), (.), (-), (.), (/), (:), ([), (\), (]), (`).
- Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
- Press **Esc** and a message prompts you to save the changes.
- Press **Y** to save the changes.  
The computer reboots.

# Deleting or changing an existing system setup password

## Prerequisites

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

## About this task

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

## Steps

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press **Enter**.  
The **System Security** screen is displayed.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
3. Select **System Password**, alter or delete the existing system password and press **Enter** or **Tab**.
4. Select **Setup Password**, alter or delete the existing setup password and press **Enter** or **Tab**.  
 **NOTE:** If you change the System and/or Setup password, re enter the new password when prompted. If you delete the System and Setup password, confirm the deletion when prompted.
5. Press **Esc** and a message prompts you to save the changes.
6. Press **Y** to save the changes and exit from System Setup.  
The computer restarts.

# Real Time Clock (RTC) reset

The Real Time Clock (RTC) reset function allows you or the service technician to recover the recently launched model Dell computers from **No POST/No Boot/No Power** situations. You can initiate the RTC reset on the computer from a power-off state only if it is connected to AC power. Press and hold the power button for 30 seconds. The computer RTC reset occurs after you release the power button.

 **NOTE:** The RTC reset is aborted if the power button is held for less than 25 seconds or more than 40 seconds.

The RTC reset restores the BIOS to defaults and resets the computer's date and time. The computer restarts several times during the reset process. Depending on how the computer is configured, you may see LED indications during the period the power button is held and after it is released. Once the reset is complete, the computer restarts and the Dell logo appears indicates reset success.

 **CAUTION:** Once RTC reset is complete, the computer may remain in a no-boot status until the time, date, and other BIOS settings are correctly set to boot in Windows. Failing to boot immediately after a reset does not mean that the reset has failed. You must restore the previous BIOS settings, such as the SATA Operation mode (ex. RAID On AHCI) for the computer to reboot normally.

The following items are unaffected by the RTC reset:

- TPM (remains on and enabled if it was in that state prior to RTC reset)
- Service Tag
- Asset Tag
- Ownership Tag
- Admin Password
- System Password
- Hard drive Password
- Key Databases
- System Logs

The following items may or may not reset based on your custom BIOS setting selections:

- Boot List
- Secure Boot Enable
- Allow BIOS Downgrade

- Password clear

The Master System Password is used to clear the admin and computer password.

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.

## 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.

## Updating the BIOS

### Updating the BIOS in Windows

#### 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, see knowledge base article [000124211](http://www.dell.com/support) at [www.dell.com/support](http://www.dell.com/support).

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

#### 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, see the knowledge base article [000145519](http://www.dell.com/support) 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

### 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.

# Troubleshooting

## Locate the Service Tag or Express Service Code of your Dell computer

Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, we recommend entering the Service Tag or Express Service Code at [www.dell.com/support](http://www.dell.com/support).

For more information on how to find the Service Tag for your computer, see [Locate the Service Tag for your Dell Laptop](#).

## SupportAssist diagnostics

### About this task

The SupportAssist diagnostics (previously known as ePSA diagnostics) performs a complete check of your hardware. The SupportAssist diagnostics is embedded in the BIOS and is launched by it internally. The SupportAssist diagnostics provides a set of options for particular devices or device groups. It allows 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 and provide extra information about the failed device(s)
- View status messages that indicate if the tests are completed successfully
- View error messages that indicate if problems were encountered during the test

**i** **NOTE:** Some tests are meant for specific devices and require user interaction. Ensure that you are present in front of the computer when the diagnostic tests are performed.

For more information, see [SupportAssist Pre-Boot System Performance Check](#).

## System-diagnostic lights

The power-status light indicates the power status of the computer. These are the power states:

**Solid white**—Computer is in S0 state. This is the normal power state of the computer.

**Blinking white**—Computer is in a low-power state, S3. This does not indicate a fault.

**Solid amber**—Computer is experiencing a boot failure, including the power-supply unit.

**Blinking amber**—Computer is experiencing a boot failure but the power-supply unit is functioning correctly.

**Off**—Computer is in sleep state, hibernation mode, or turned off.

The power-status light may also blink amber or white according to predefined "beep codes" indicating various failures.

For example, the power and battery-status light blinks amber two times followed by a pause, and then blinks white three times followed by a pause. This 2,3 pattern continues until the computer is turned off, indicating no memory or RAM is detected.

The following table shows different power and battery-status light patterns and associated problems.

**i** **NOTE:** The following diagnostic light codes and recommended solutions are intended for Dell service technicians to troubleshoot problems. You should only perform troubleshooting and repairs as authorized or directed by the Dell technical support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

**Table 15. Diagnostic light codes**

<b>Diagnostic light codes (Amber, White)</b>	<b>Problem description</b>
<b>1,2</b>	Unrecoverable SPI Flash Failure
<b>2,1</b>	CPU configuration or CPU failure
<b>2,2</b>	System board: BIOS or Read-Only Memory (ROM) failure
<b>2,3</b>	No memory or Random-Access Memory (RAM) detected
<b>2,4</b>	Memory or Random-Access Memory (RAM) failure
<b>2,5</b>	Invalid memory installed
<b>2,6</b>	System board/Chipset Error/Clock failure/ Gate A20 failure/Super I/O failure/Keyboard controller failure
<b>3,1</b>	CMOS battery failure
<b>3,2</b>	PCI or Video card/chip failure
<b>3,3</b>	BIOS Recovery 1: BIOS recovery image not found
<b>3,4</b>	BIOS Recovery 2: Recovery image found but invalid
<b>3,5</b>	Power Rail Failure: EC ran into power sequencing failure
<b>3,6</b>	Paired SPI Volume Error
<b>3,7</b>	Management Engine (ME) error. Timeout waiting on ME to reply to HECI message.
<b>4,2</b>	CPU Power cable connection issue

## Diagnostic error messages

**Table 16. Diagnostic error messages**

<b>Error messages</b>	<b>Description</b>
AUXILIARY DEVICE FAILURE	The touchpad or external mouse may be faulty. For an external mouse, check the cable connection. Enable the <b>Pointing Device</b> option in the System Setup program.
BAD COMMAND OR FILE NAME	Ensure that you have spelled the command correctly, put spaces in the proper place, and used the correct path name.
CACHE DISABLED DUE TO FAILURE	The primary cache internal to the microprocessor has failed. <b>Contact Dell</b>
CD DRIVE CONTROLLER FAILURE	The optical drive does not respond to commands from the computer.
DATA ERROR	The hard drive cannot read the data.
DECREASING AVAILABLE MEMORY	One or more memory modules may be faulty or improperly seated. Reinstall the memory modules or, if necessary, replace them.
DISK C: FAILED INITIALIZATION	The hard drive failed initialization. Run the hard drive tests in <b>Dell Diagnostics</b> .

**Table 16. Diagnostic error messages (continued)**

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

**Table 16. Diagnostic error messages (continued)**

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

**Table 16. Diagnostic error messages (continued)**

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

## Enabling Intel Optane memory

### Steps

1. On the taskbar, click the search box, and then type **Intel Rapid Storage Technology**.
2. Click **Intel Rapid Storage Technology**.  
The **Intel Rapid Storage Technology** window is displayed.
3. On the **Status** tab, click **Enable** to enable the Intel Optane memory.
4. On the warning screen, select a compatible fast drive, and then click **Yes** to continue enabling Intel Optane memory.
5. Click **Intel Optane memory** > **Reboot** to complete enabling your Intel Optane memory.

 **NOTE:** Applications may take up to three subsequent launches after enablement to see the full performance benefits.

## Disabling Intel Optane memory

### About this task

 **CAUTION:** After disabling Intel Optane memory, do not uninstall the driver for Intel Rapid Storage Technology as it will result in a blue screen error. The Intel Rapid Storage Technology user interface can be removed without uninstalling the driver.

 **NOTE:** Disabling Intel Optane memory is required before removing the SATA storage device accelerated by the Intel Optane memory module from the computer.

### Steps

1. On the taskbar, click the search box, and then type **Intel Rapid Storage Technology**.
2. Click **Intel Rapid Storage Technology**.  
The **Intel Rapid Storage Technology** window is displayed.
3. On the **Intel Optane memory** tab, click **Disable** to disable the Intel Optane memory.

 **NOTE:** For computers in which Intel Optane memory acts as a primary storage, do not disable the Intel Optane memory. The **Disable** option will be grayed out.

4. Click **Yes** if you accept the warning.  
The disabling progress is displayed.
5. Click **Reboot** to complete disabling your Intel Optane memory and restart your computer.

## 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**.

## WiFi power cycle

### About this task

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

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

### Steps

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

## Flea power release

### About this task

Flea power is the residual static electricity that remains on the computer even after it has been powered off and the battery has been removed. The following procedure provides the instructions on how to conduct flea power release:

### Steps

1. Turn off your computer.
2. Disconnect the power adapter from your computer.
3. Press and hold the power button for 15 seconds to drain the flea power.
4. Connect the power adapter to your computer.
5. 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 17. 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>
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.