Inspiron 3880

Service Manual

Regulatory Model: D29M
Regulatory Type: D29M002
November 2023
Rev. A03

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.

© 2020-2021 Dell Inc. or its subsidiaries. All rights reserved. Dell, EMC, and other trademarks are trademarks of Dell Inc. or its subsidiaries. Other trademarks may be trademarks of their respective owners.

Contents

Chapter 1: Working inside your computer 6
Before working inside your computer 6
Safety instructions 6
Electrostatic discharge—ESD protection 7
ESD field service kit 7
Transporting sensitive components 8
After working inside your computer 9

Chapter 2: Removing and installing components 10
Recommended tools 10
Screw list 10
System-board components 12
Left-side cover 13
Removing the left-side cover 13
Installing the left-side cover 14
Front cover 14
Removing the front cover 14
Installing the front cover 15
Memory modules 16
Removing the memory modules 16
Installing the memory modules 17
Solid-state drive/Intel Optane 18
Removing the solid-state drive/Intel Optane 18
Installing the solid-state drive/Intel Optane 19
Coin-cell battery 21
Removing the coin-cell battery 21
Installing the coin-cell battery 21
Power-button assembly 22
Removing the power-button assembly 22
Installing the system board 23
Wireless card 24
Removing the wireless card 24
Installing the wireless card 25
Antenna modules 27
Removing the antenna modules 27
Installing the antenna modules 28
Graphics card 29
Removing the graphics card 29
Installing the graphics card 30
Power-supply unit 31
Removing the power supply 31
Installing the power supply 32
Hard drive 34
Removing the hard drive 34

Installing the hard drive....35
Optical drive....36
Removing the optical drive....36
Installing the optical drive....38
Optical-drive bezel....39
Removing the optical-drive bezel....39
Installing the optical drive....39
Media-card reader....40
Removing the media-card reader....40
Installing the media-card reader....41
Fan shroud....42
Removing the fan shroud....42
Installing the fan shroud....43
Fan and heat-sink assembly....44
Removing the fan and heat-sink assembly....44
Installing the fan and heat-sink assembly....45
Processor....46
Removing the processor....46
Installing the processor....48
System board....49
Removing the system board....49
Installing the system board....53

Chapter 3: Drivers and downloads....56

Chapter 4: System setup....57
Entering BIOS setup program....57
Navigation keys....57
System setup options....57
System and setup password....62
Assigning a system setup password....62
Deleting or changing an existing system setup password....63
Clearing CMOS settings/RTC reset....63
Clearing BIOS (System Setup) and System passwords....63
Boot Sequence....64
Updating the BIOS....64
Updating the BIOS in Windows....64
Updating the BIOS using the USB drive in Windows....64
Updating the BIOS in Linux and Ubuntu....65
Updating the BIOS from the F12 One-Time boot menu....65
Updating BIOS on systems with BitLocker enabled....65

Chapter 5: Troubleshooting....66
System diagnostic lights....66
Diagnostic error messages....66
System error messages....69
Built-in self-test (BIST)....70
M-BIST....70
LCD Built-in Self Test (BIST)....70

Recovering the operating system..... 71
WiFi power cycle..... 71
Real-Time Clock (RTC Reset)..... 71

Chapter 6: Getting help and contacting Dell..... 73

1

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.

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.

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.

2

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:

- Philips screwdriver #1 and #2
- 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	6-32, hex head	2	
Solid-state drive	System board	M2x3.5	1	
Wireless card	System board	M2x3.5	1	
Antenna modules	Chassis	M3	2	
3.5-inch hard drive	Chassis	6-32, pan head	4	
VGA-connector board	Chassis	6-32, thumb	1	
Power-supply unit	Chassis	6-32, hex head	3	
Optical drive	Chassis	M2x2	2	

Table 1. Screw list (continued)

Component	Secured to	Screw type	Quantity	Screw image
Media-card reader	Chassis	6-32, pan head	1	
I/O-cover door	Chassis	6-32, pan head	1	
Fan and heat-sink assembly	System board	M3 (captive)	4	
System board	Chassis	6-32, hex head	8	
System board	Chassis	6-32, M.2 card mounting screw	1	

System-board components

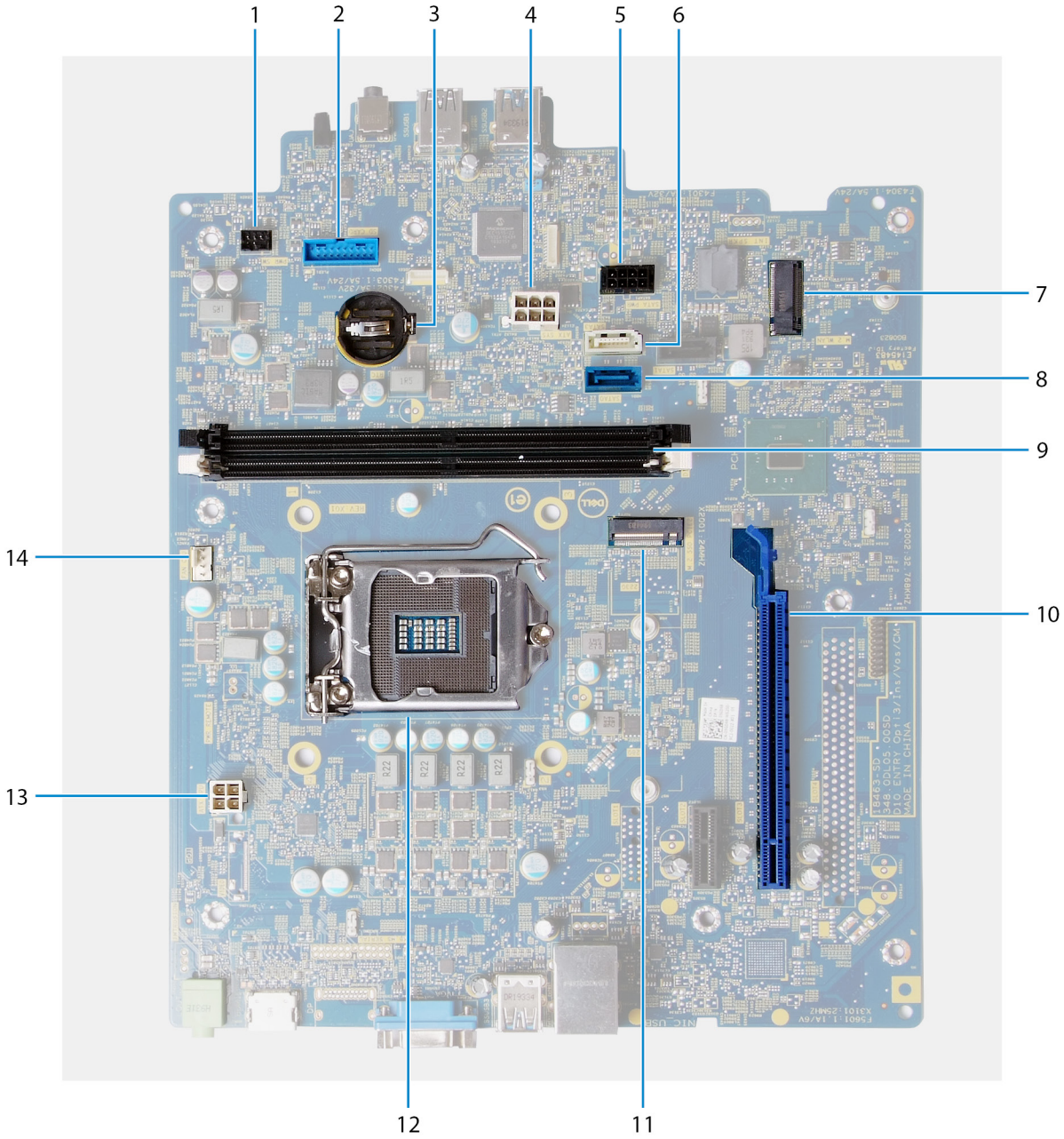


Figure 1. System-board components

1. power-button cable connector (PWR SW)
2. media-card reader board cable connector (SD CARD)
3. coin-cell battery slot
4. system-board power cable (ATX SYS)
5. hard-drive power cable connector (SATA PWR)
6. hard-drive data cable connector (SATA1)
7. M.2 2230 card slot for wireless card (M.2 WLAN)
8. hard-drive data cable connector (SATA0)
9. memory-module slots (2)
10. PCIe x16 slot for graphics card (SLOT3)
11. M.2 2230/2280 card slot for solid-state drive/Intel Optane (M.2 SSD PCIE2)

12. processor slot
13. processor-power cable connector (ATX CPU)
14. fan cable connector (FAN SYS)

Left-side cover

Removing the left-side cover

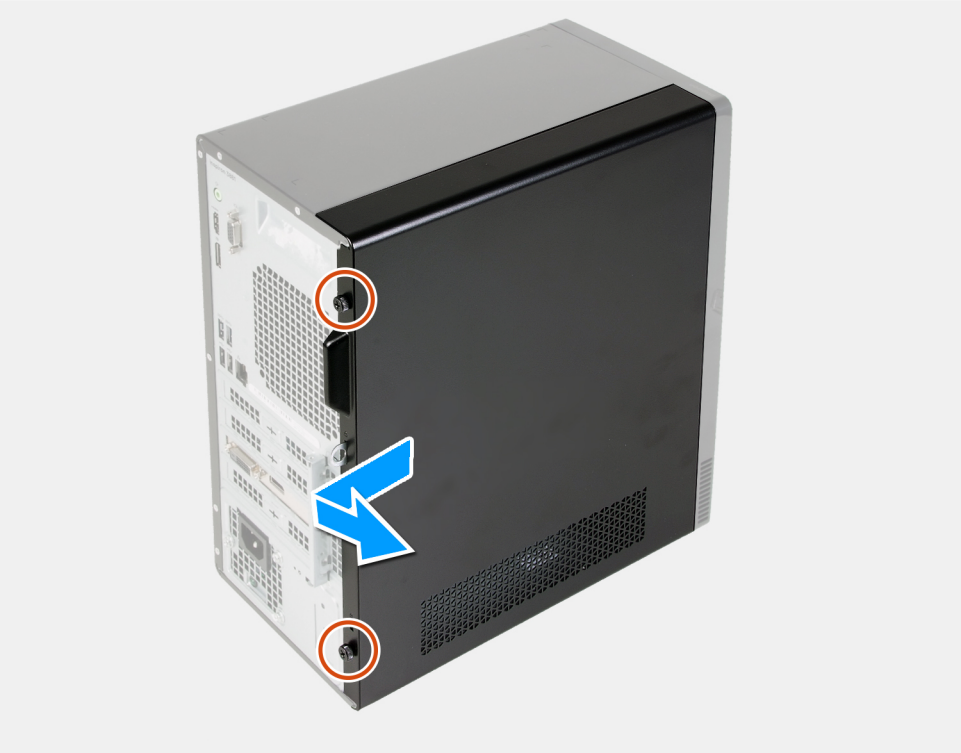
Prerequisites

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

About this task

The following image(s) indicate the location of the left-side cover and provides a visual representation of the removal procedure.





Steps

1. Remove the two thumb screws (6-22) that secure the left-side cover to the chassis.
2. Using the tab on the left-side cover, slide the cover towards the back of the computer and remove the left-side cover off the chassis.

Installing the left-side cover

Prerequisites

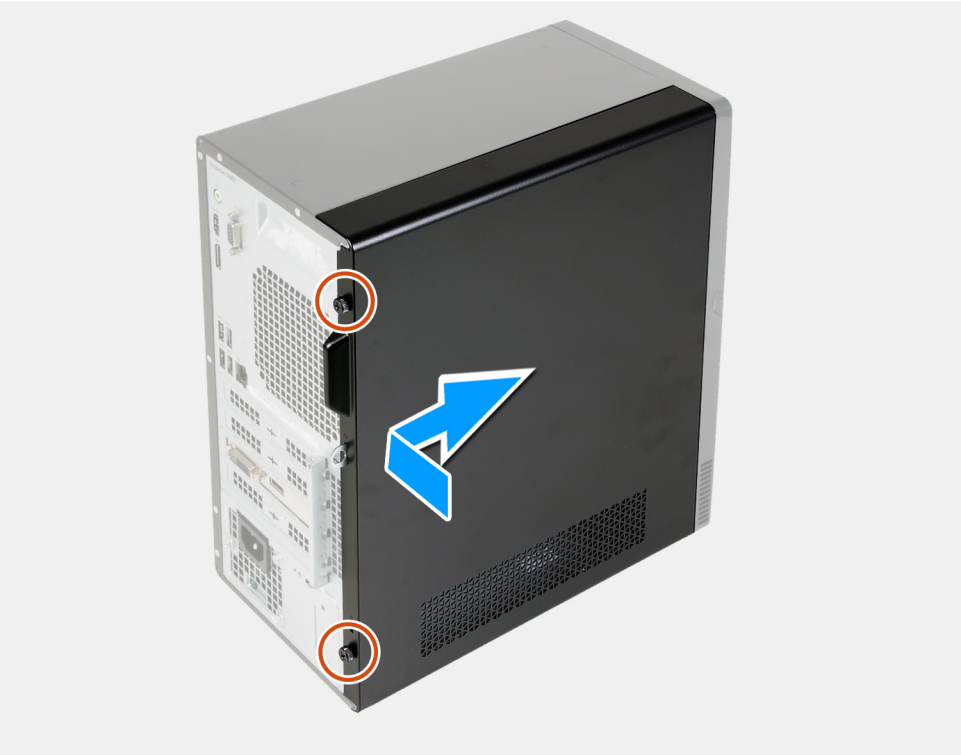
If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following image(s) indicate the location of the left-side cover and provides a visual representation of the installation procedure.



2x
6-32



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. Replace the two thumb screws (6-32) that secure the left-side cover to the chassis.

Next steps

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

Front cover

Removing the front cover

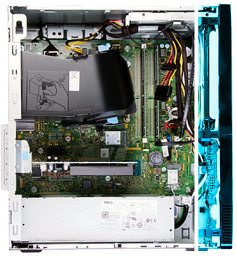
Prerequisites

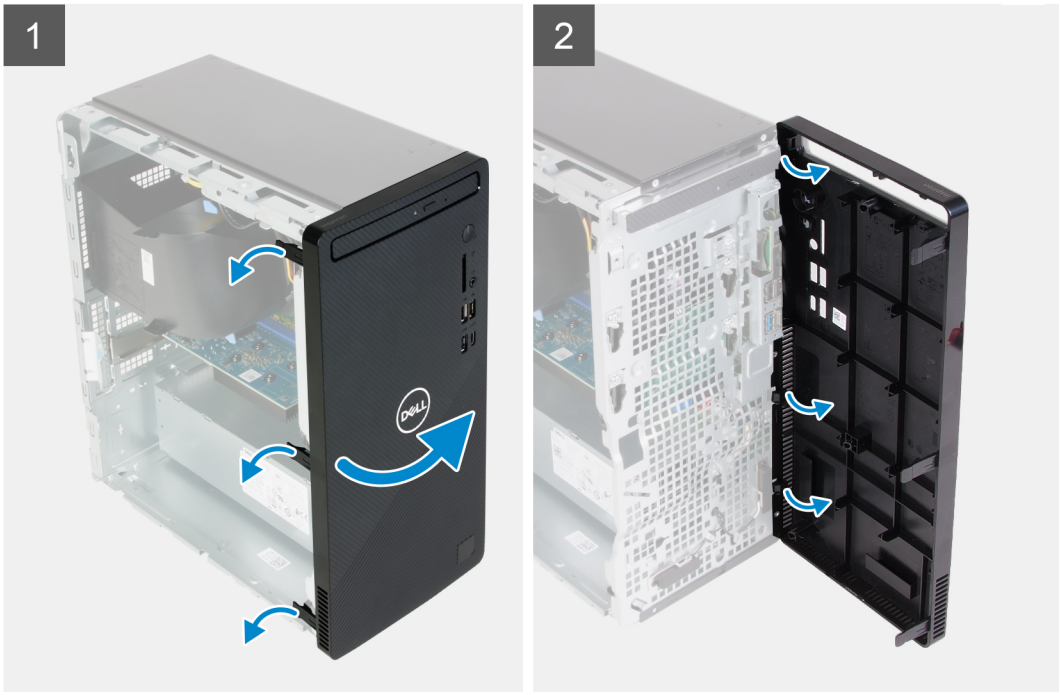
1. Follow the procedure in Before working inside your computer.

2. Remove the left-side cover.

About this task

The following image(s) indicate the location of the front cover and provides 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 sequentially from the top.
3. Rotate the front cover outward from the chassis.
4. Remove the front cover from the chassis.

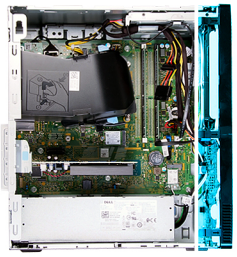
Installing the front cover

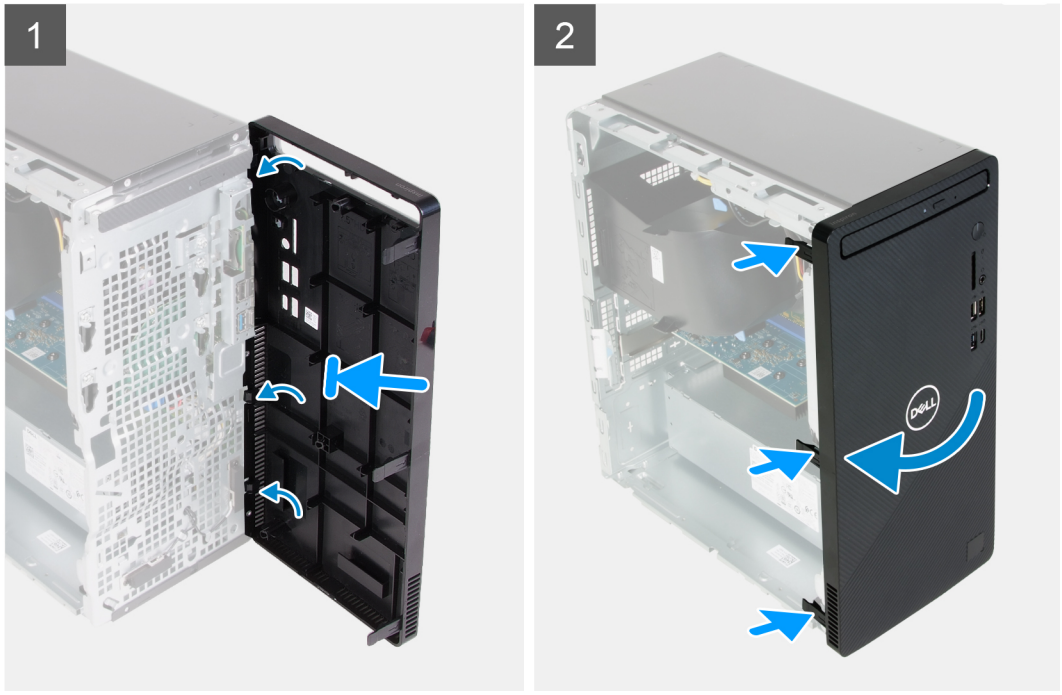
Prerequisites

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

About this task

The following image(s) indicate the location of the front cover and provides a visual representation of the installation procedure.





Steps

1. Place the computer in an upright position.
2. Align and insert the front-cover tabs with the slots on the chassis.
3. Rotate the front cover towards the chassis and snap it into place.

Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

Memory modules

Removing the memory modules

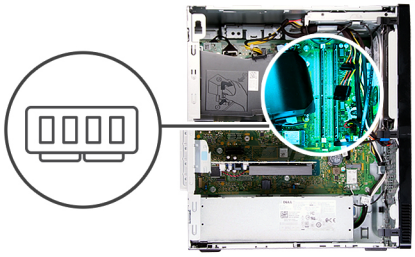
Prerequisites

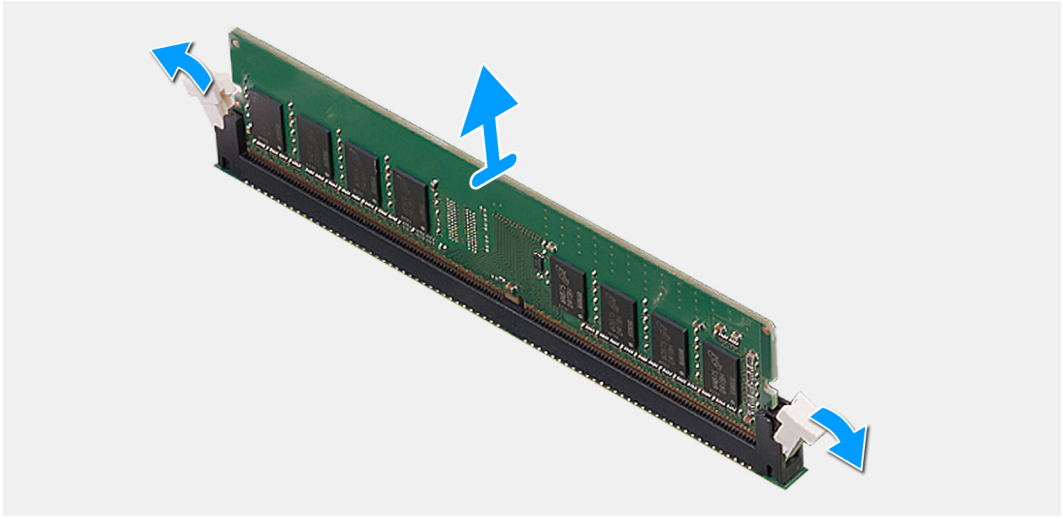
1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

About this task

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

The following image(s) indicate the location of the memory modules and provides a visual representation of the removal procedure.





Steps

1. Lay the computer with its right side facing down.
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.

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 install the replacement 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

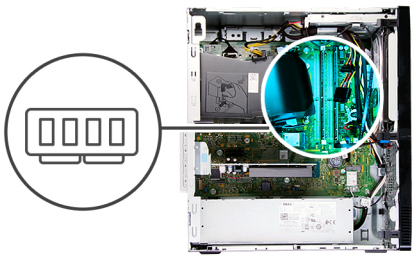
Prerequisites

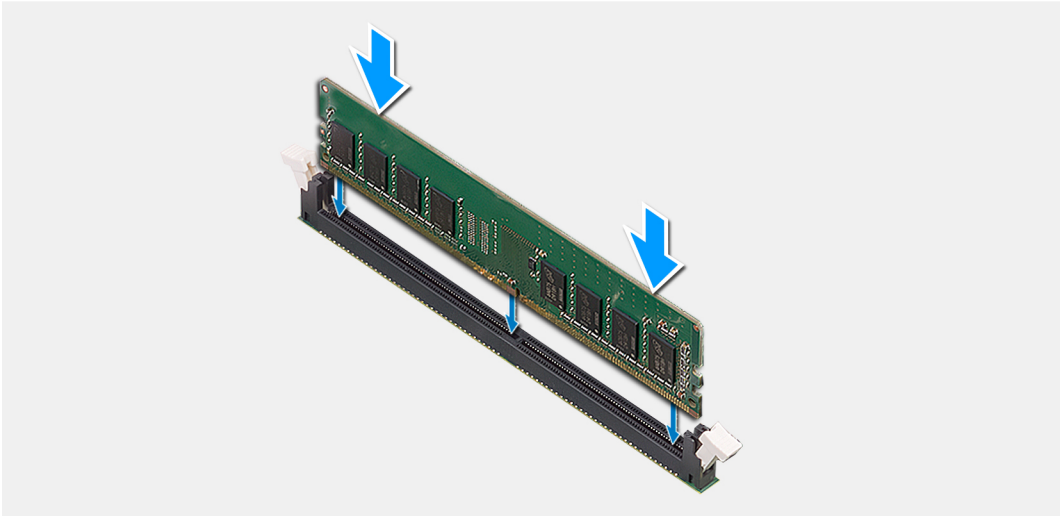
If you are replacing a component, remove the existing component before performing the installation process.

About this task

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

The following image(s) indicate the location of the memory modules and provides a visual representation of the installation procedure.





Steps

1. Ensure that the securing clips are in an open position.
2. Align the notch on the memory module with the tab on the memory-module slot.
3. Insert the memory module into the memory-module connector until the memory module snaps into position and the securing clip locks in place.

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

   NOTE: Repeat step 1 to step 3 when installing more than one memory module in your computer.

Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

Solid-state drive/Intel Optane

Removing the solid-state drive/Intel Optane

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

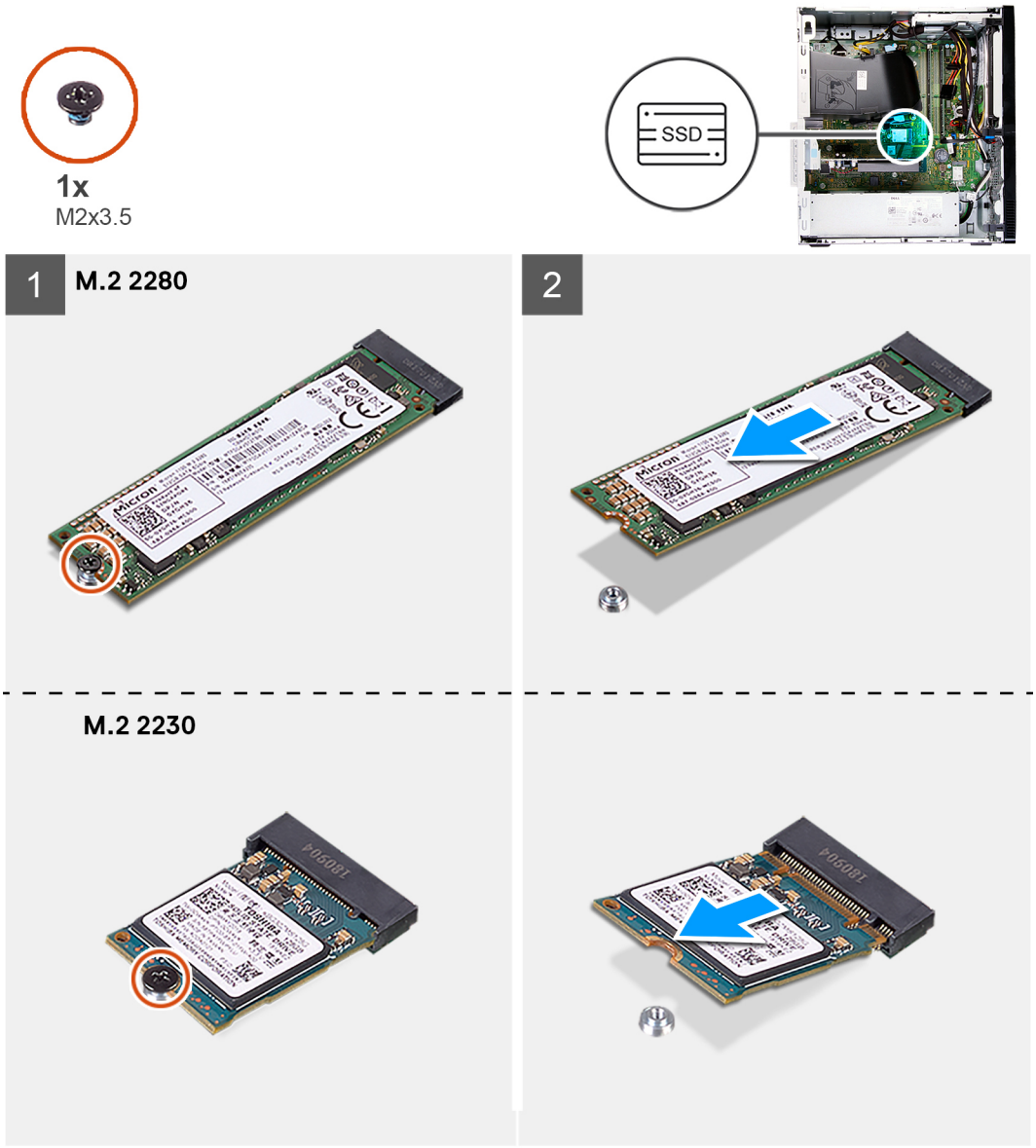
About this task

NOTE: Depending on the configuration ordered your computer may come with one of the following modules installed:

- M.2 2230 solid-state drive
- M.2 2280 solid-state drive

- M.2 2280 Intel Optane

The following image(s) indicate the location of the solid-state drive/Intel Optane and provides a visual representation of the removal procedure.



Steps

1. Lay the computer with its right side facing down.
2. Remove the screw (M2x3.5) that secures the solid-state drive/Intel Optane to the system board.
3. 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

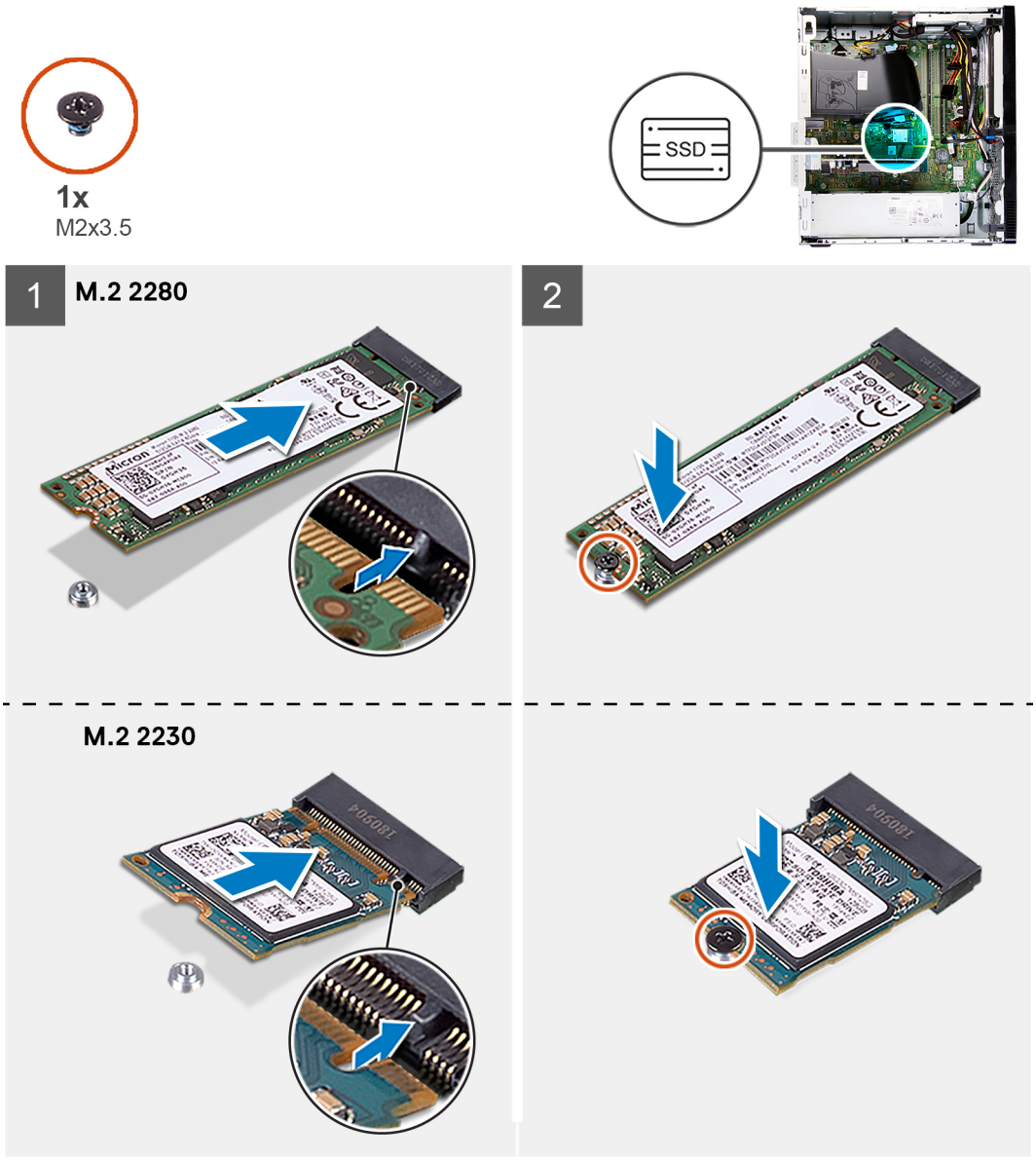
If you are replacing a component, remove the existing component before performing the installation process.

About this task

NOTE: You may install the following supported modules on your computer's M.2 card slot:

- M.2 2230 solid-state drive
- M.2 2280 solid-state drive
- M.2 2280 Intel Optane

The following image(s) indicate the location of the solid-state drive/Intel Optane and provides a visual representation of the installation procedure.



Steps

1. Locate the notch on the solid-state drive/Intel Optane.
2. Align the notch on the solid-state drive/Intel Optane with the tab on the M.2 card slot.
3. Slide the solid-state drive/Intel Optane into the M.2 card slot on the system board.
4. Replace the screw (M2x3.5) that secures the solid-state drive/Intel Optane to the system board.

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

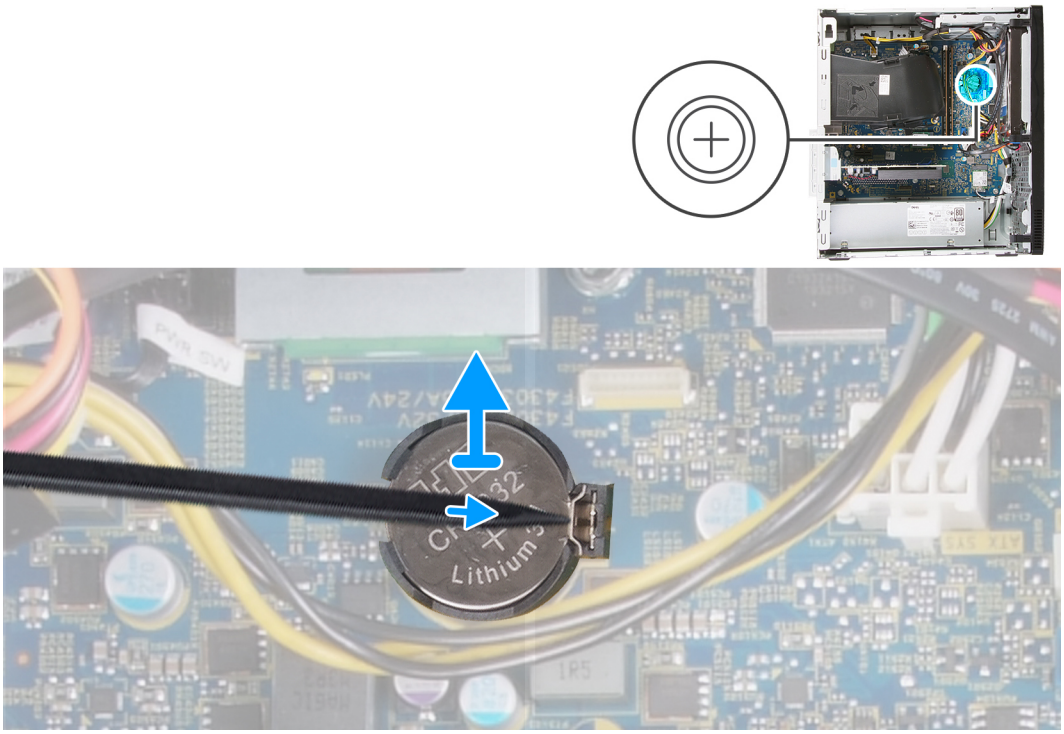
1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

About this task

NOTE: 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 battery.

NOTE: After a service incident where the system board is replaces, or when the coin-cell battery is replaced an RTC reset cycle will occur. When an RTC Reset cycle occurs, the computer turns on and off three times. An "Invalid Configuration" error message is displayed prompting you to enter the BIOS and configure the date and time. The computer starts functioning normally after setting the date and time.

The following image(s) indicate the location of the coin-cell battery and provides a visual representation of the removal procedure.



Steps

1. Lay the computer with its right side facing down.
2. Using a plastic scribe, push the coin-cell battery securing-clip on the coin-cell battery socket to release the coin-cell battery out of the slot on the system board.
3. Lift the coin-cell battery off its slot on the system board.

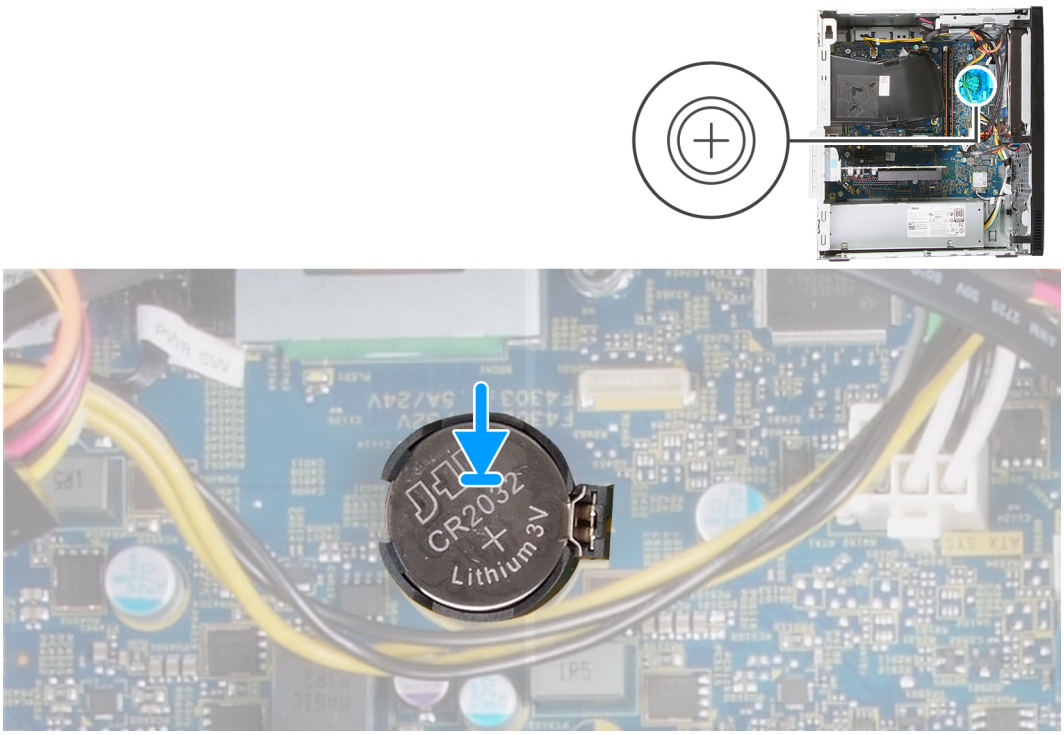
Installing the coin-cell battery

Prerequisites

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

About this task

The following image(s) indicate the location of the coin-cell battery and provides a visual representation of the installation procedure.



Steps

1. Insert the coin-cell battery into its slot on the system board with the positive side (+) label facing up.
2. Press down and and snap the coin-cell battery into the slot on the system board.

Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

Power-button assembly

Removing the power-button assembly

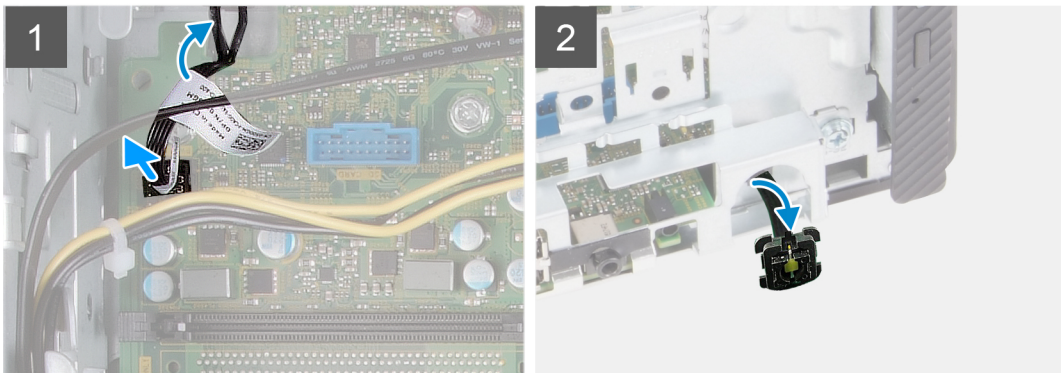
Prerequisites

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 image(s) indicate the location of the power-button assembly and provides a visual representation of the removal procedure.





Steps

1. Lay the computer with its right side facing down.
2. Disconnect the power-button cable from the system board.
3. Remove the power-button cable from the routing guide on the chassis.
4. Push the power-button assembly through its slot on the chassis.
5. Remove the power-button assembly from the chassis.

Installing the system board

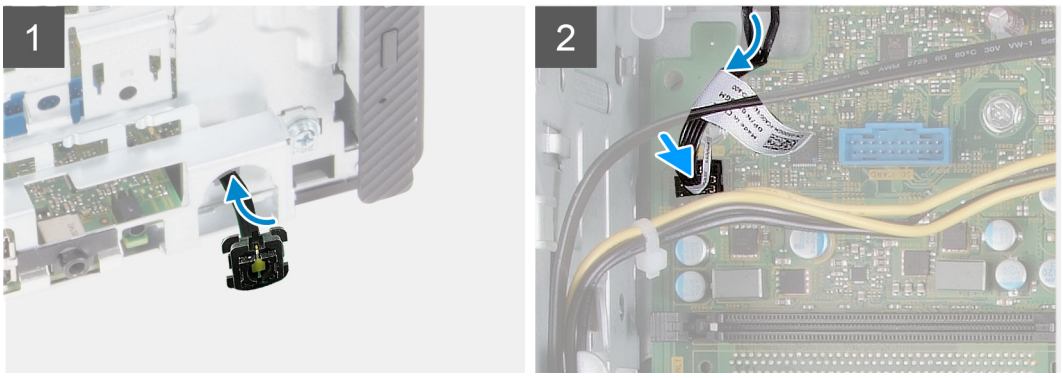
Prerequisites

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

About this task

The following image(s) indicate the location of the system board and provides a visual representation of the installation procedure.





Steps

1. Thread the power-button cable through the slot on the chassis and push the power-button assembly in place on its slot on the chassis.
2. Route the power-button cable through the routing guide on the chassis.
3. Connect the power-button cable to the system board.

Next steps

1. Install the front cover.
2. Install the left-side cover.
3. Follow the procedure in After working inside your computer.

Wireless card

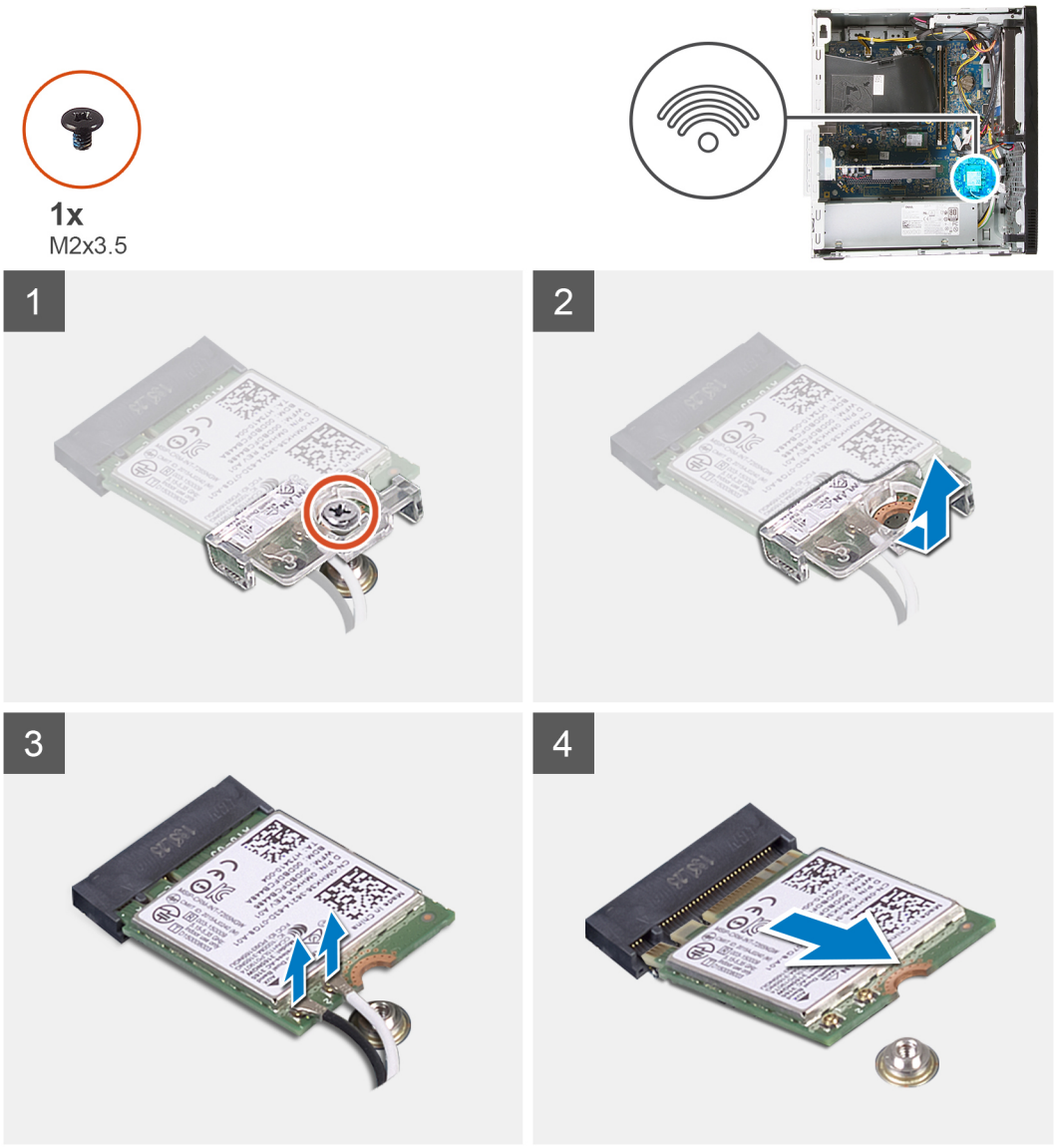
Removing the wireless card

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

About this task

The following image(s) indicate the location of the wireless card and provides a visual representation of the removal procedure.



Steps

1. Lay the computer with its right side facing down.
2. Remove the screw (M2x3.5) 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.

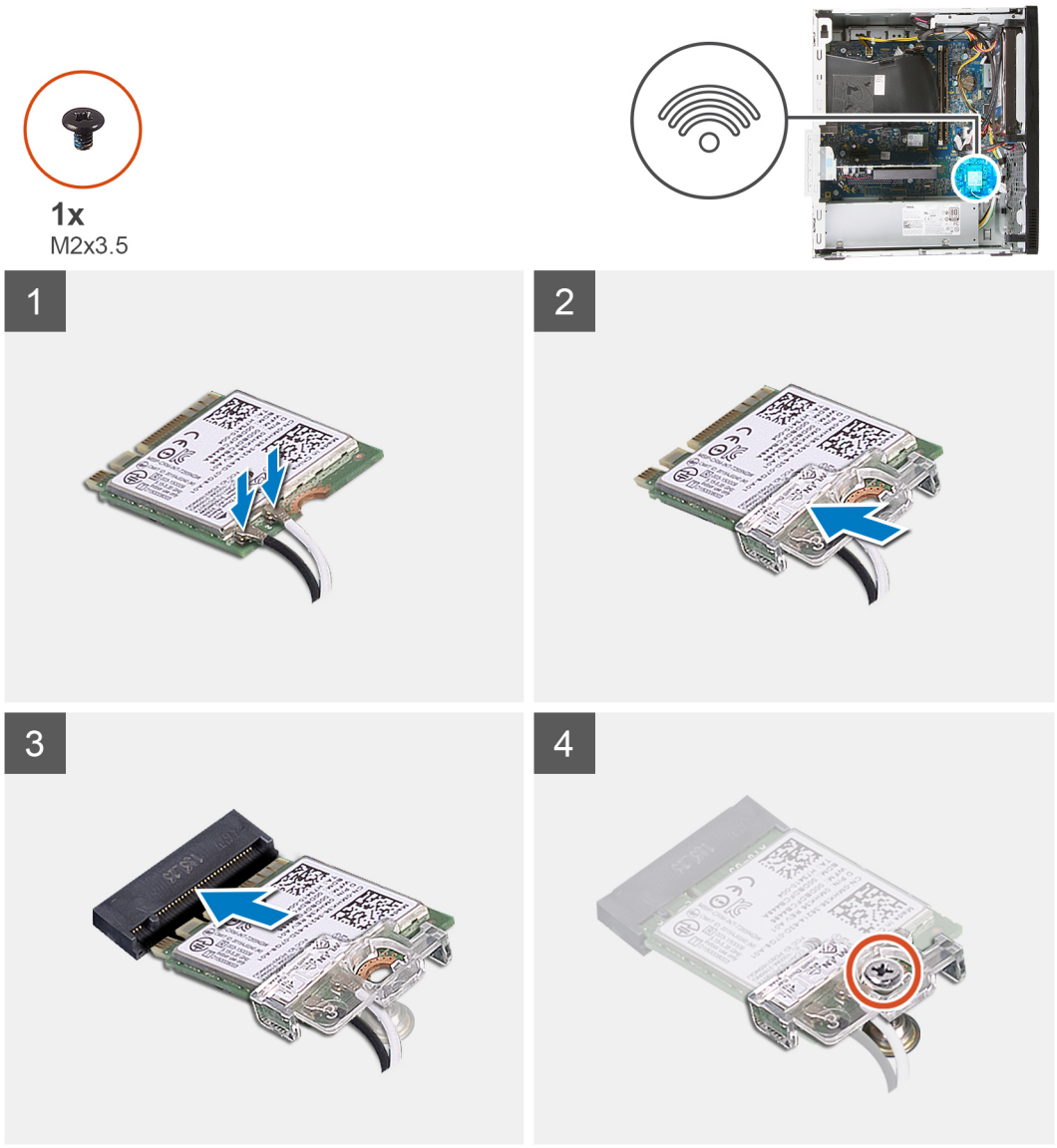
Installing the wireless card

Prerequisites

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

About this task

The following image(s) indicate the location of the wireless card and provides a visual representation of the installation procedure.



Steps

1. Connect the antenna cables to the wireless card.

   The following table provides the antenna-cable color scheme for the wireless card 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 (M2x3.5) that secures the wireless card to the system board.

Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

Antenna modules

Removing the antenna modules

Prerequisites

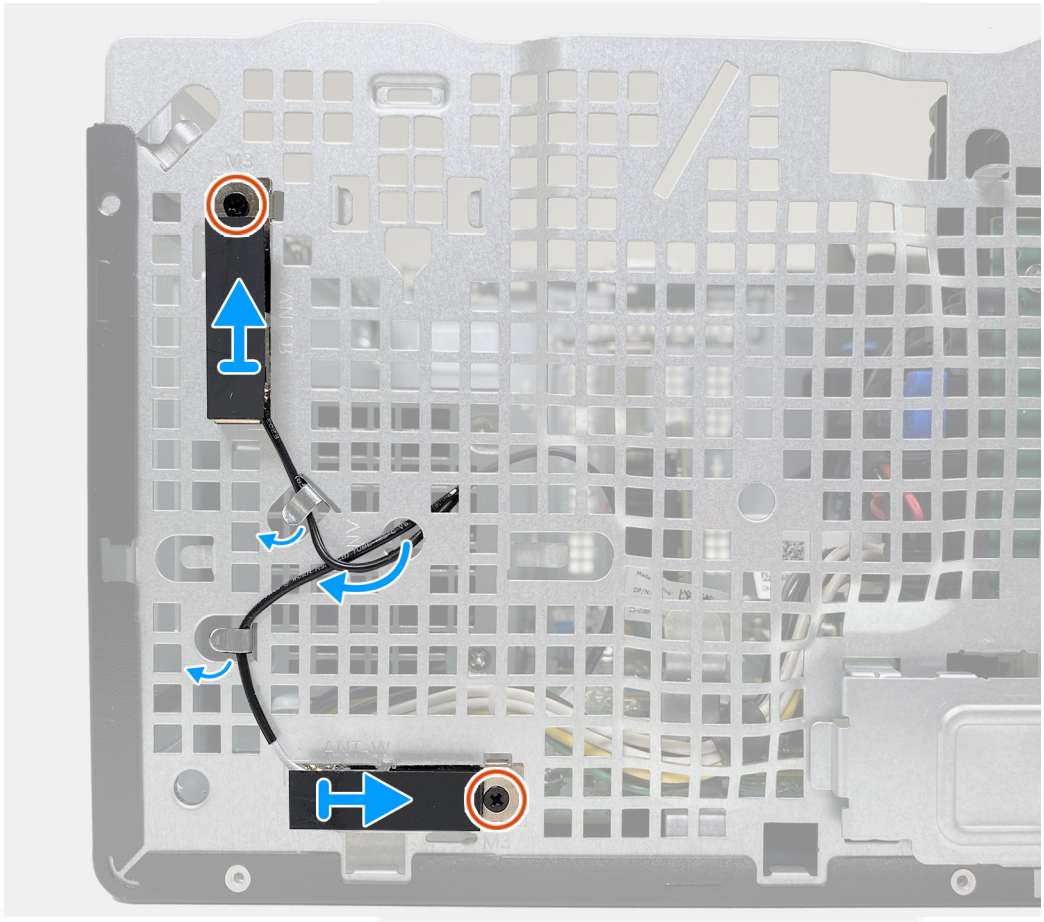
1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the front cover.
4. Remove the wireless card.

About this task

The following image(s) indicate the location of the antenna modules and provides a visual representation of the removal procedure.







Steps

1. Remove the two screws (M3) that secure the antenna modules to the chassis.

2. Route the antenna cables through the routing guides on the chassis.
3. Lift the antenna modules off the chassis.

Installing the antenna modules

Prerequisites

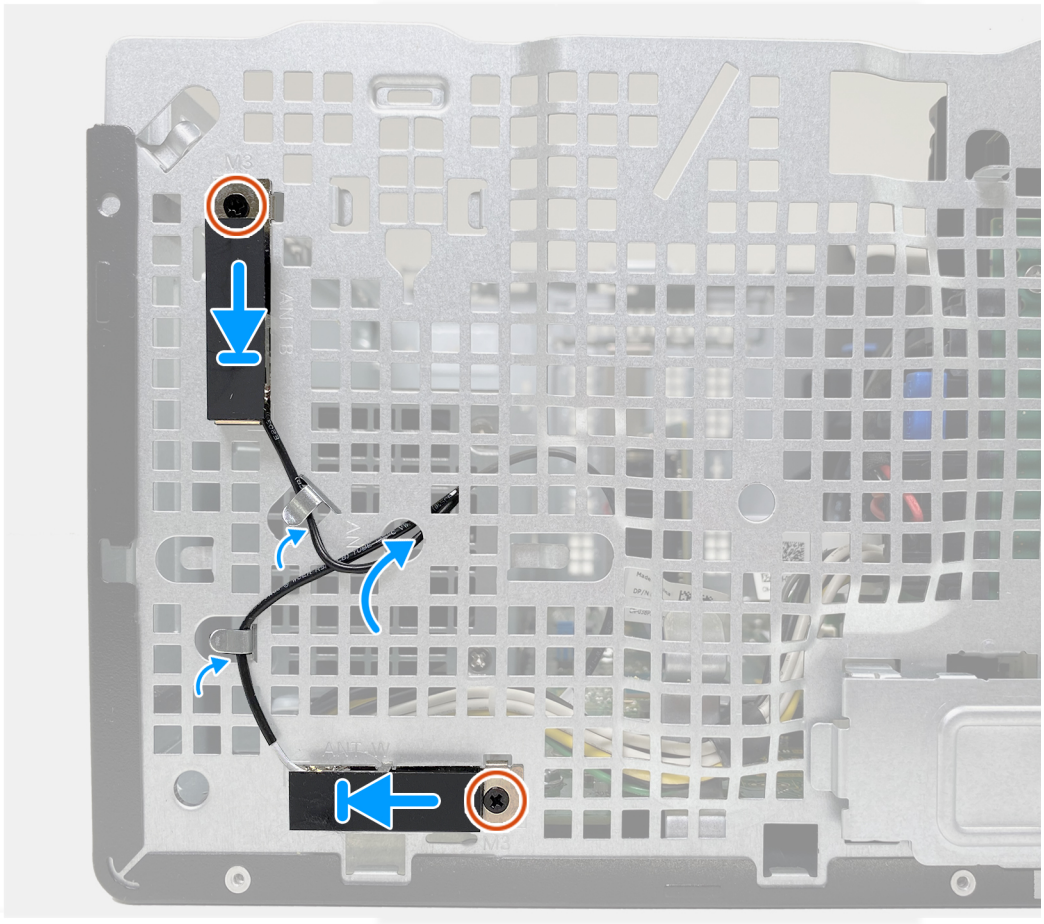
If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following image(s) indicate the location of the antenna modules and provides a visual representation of the installation procedure.







Steps

1. Place the antenna modules into the slots on the chassis.
2. Replace the two screws (M3) that secure the antenna modules to the chassis
3. Route the antenna cables through the routing guides on the chassis and thread the cables through the slot on the chassis.

Next steps

1. Install the wireless card.
2. Install the front cover.
3. Install the left-side cover.
4. Follow the procedure in After working inside your computer.

Graphics card

Removing the graphics card

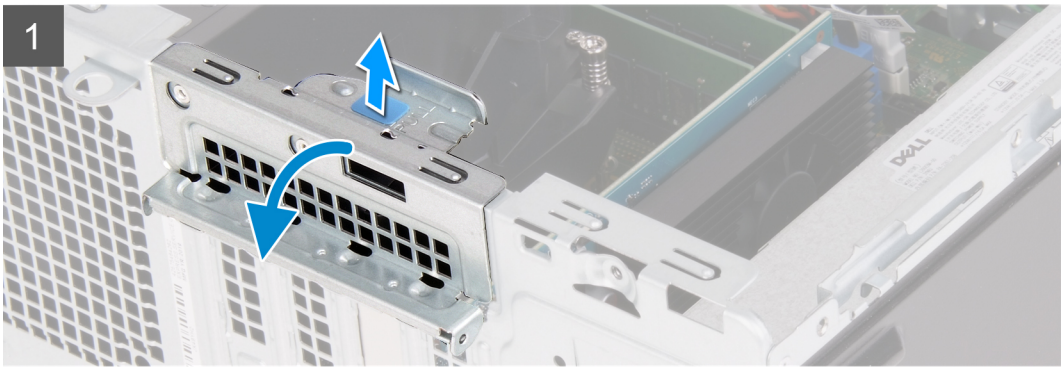
Prerequisites

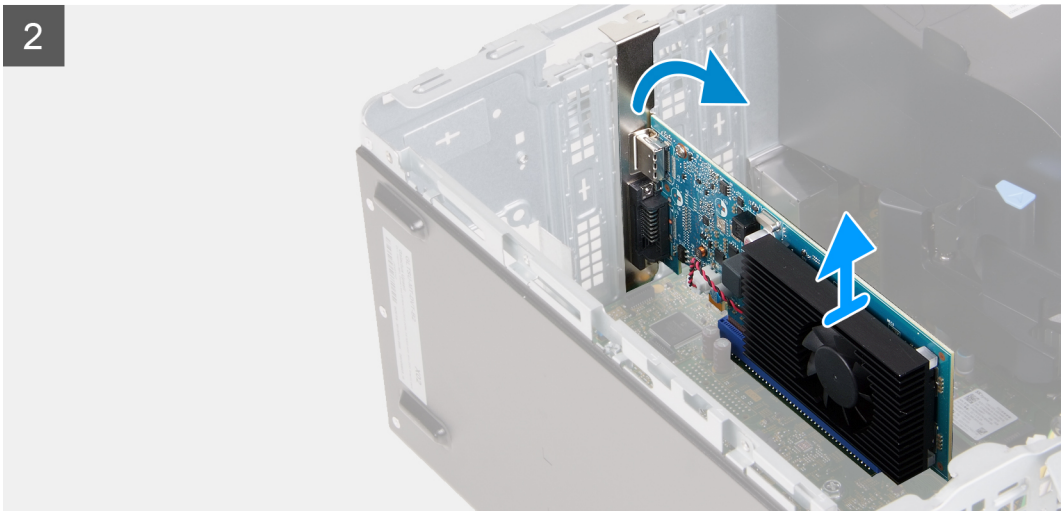
1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

About this task

The following image(s) indicate the location of the graphics card and provides a visual representation of the removal procedure.







Steps

1. Lay the computer with its right side facing down.
2. Locate the graphics card installed in the PCIe x16 card slot.
3. Lift the pull tab and open the expansion-card door.
4. Push and hold the securing tab on the graphics-card slot and lift the graphics card from the PCIe x16 card slot.

Installing the graphics card

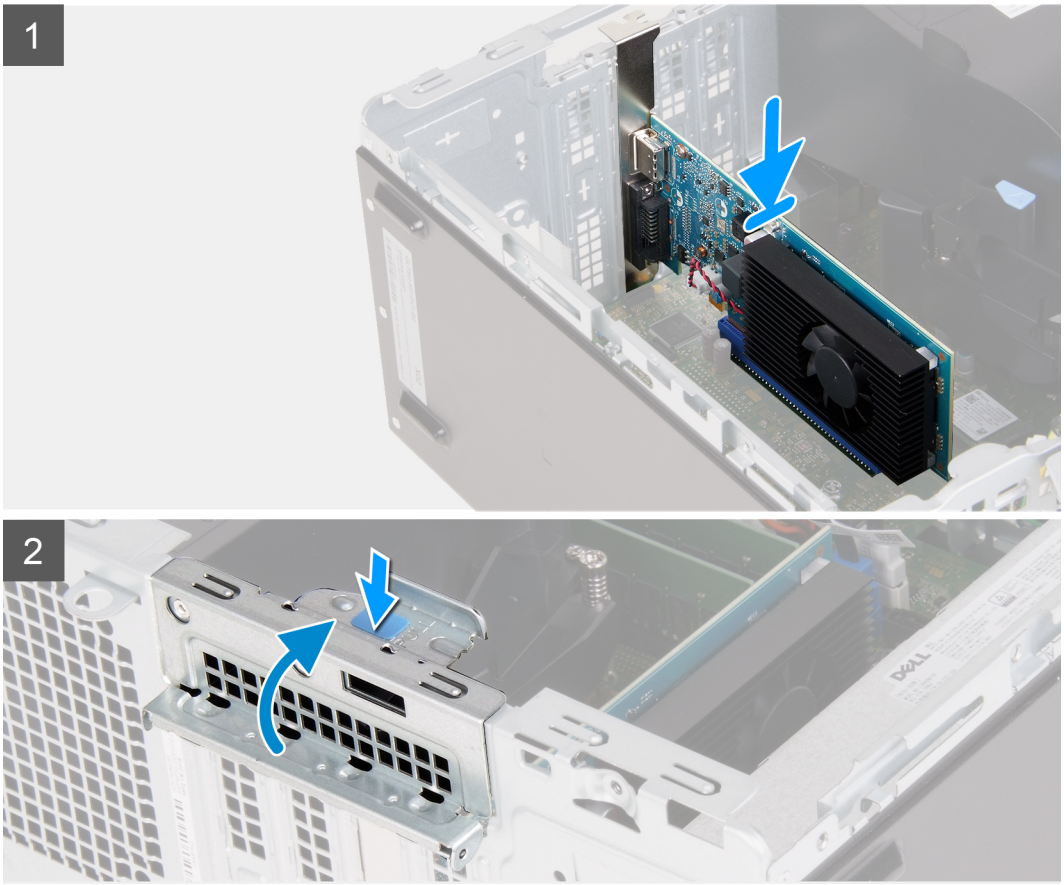
Prerequisites

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

About this task

The following image(s) indicate the location of the graphics card and provides a visual representation of the installation procedure.





Steps

1. Align the graphics card with the PCIe x16 card slot on the system board.
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 expansion-card door.

Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

Power-supply unit

Removing the power supply

Prerequisites

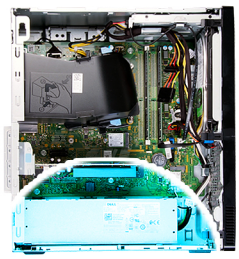
1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

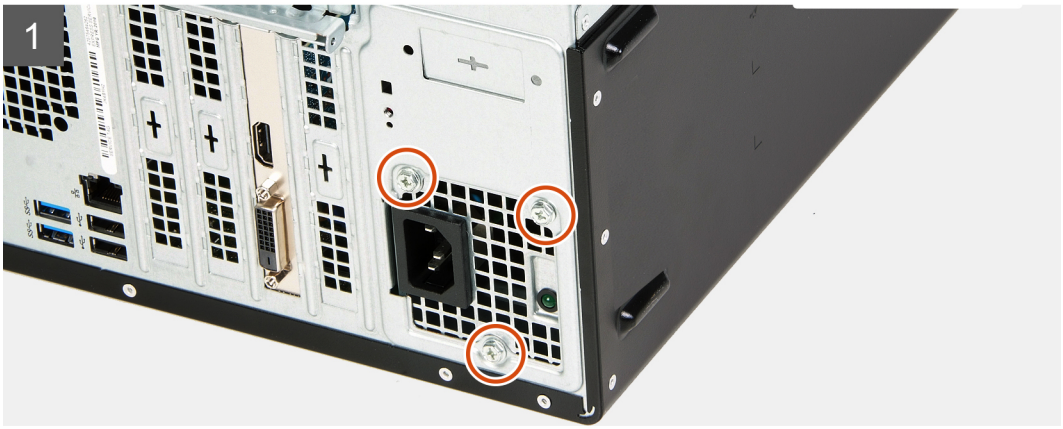
About this task

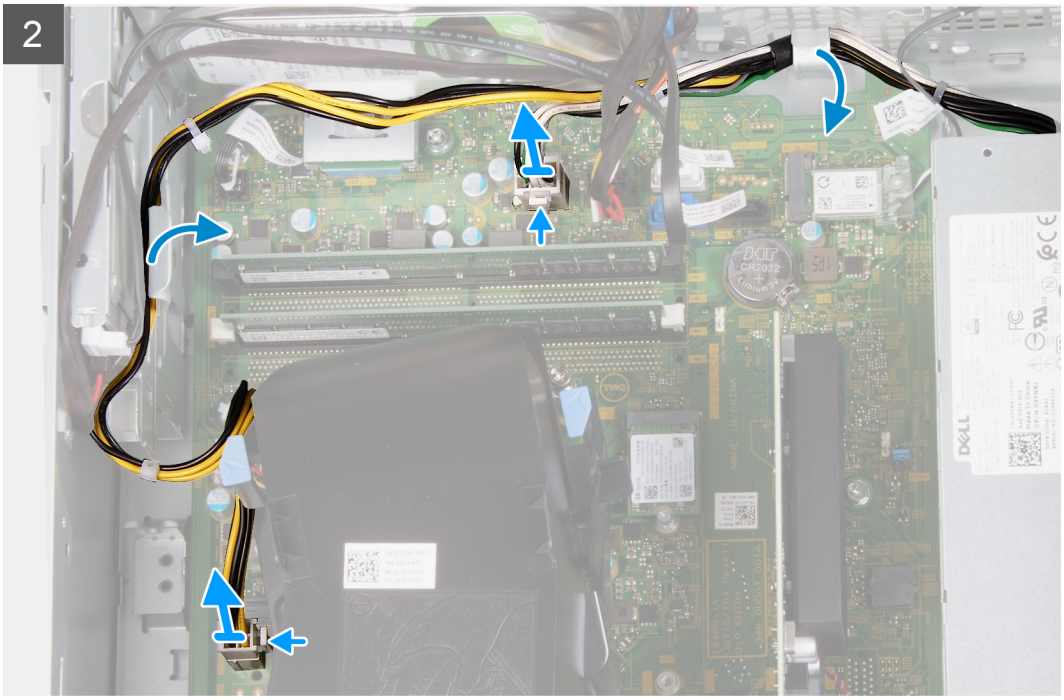
The following image(s) indicate the location of the power supply and provides a visual representation of the removal procedure.

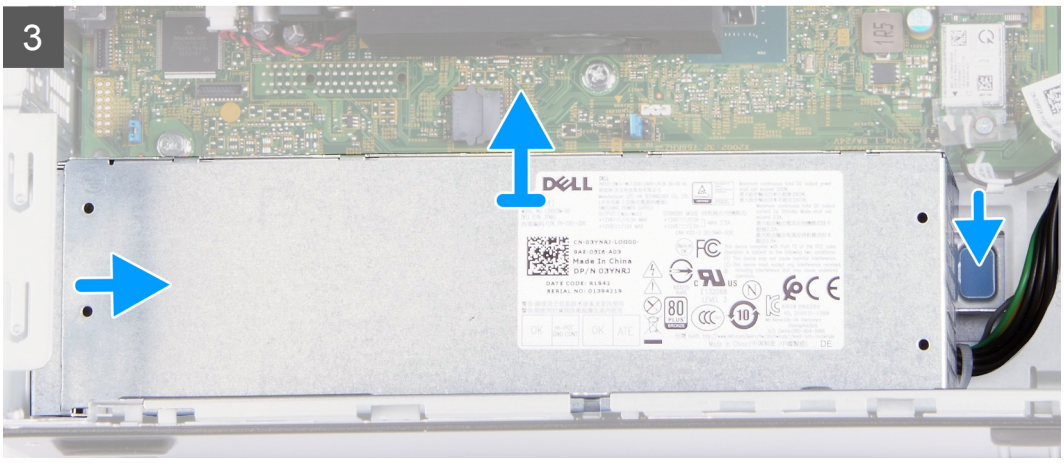


3x
6-32









Steps

1. Lay the computer with its right side facing down.
2. Remove the three screws (6-32) that secure the power supply to the chassis.
3. Disconnect the power-supply cables from the system board.

   NOTE: The power-supply cable is connected to the system board at two locations and supply power to the following components at the two location:

   - Processor
   - System board

4. Remove the power-supply cables from the routing guides on the chassis.
5. Press down on the securing clip to release the power supply from the chassis.
6. Slide and lift the power supply from its slot on the chassis.

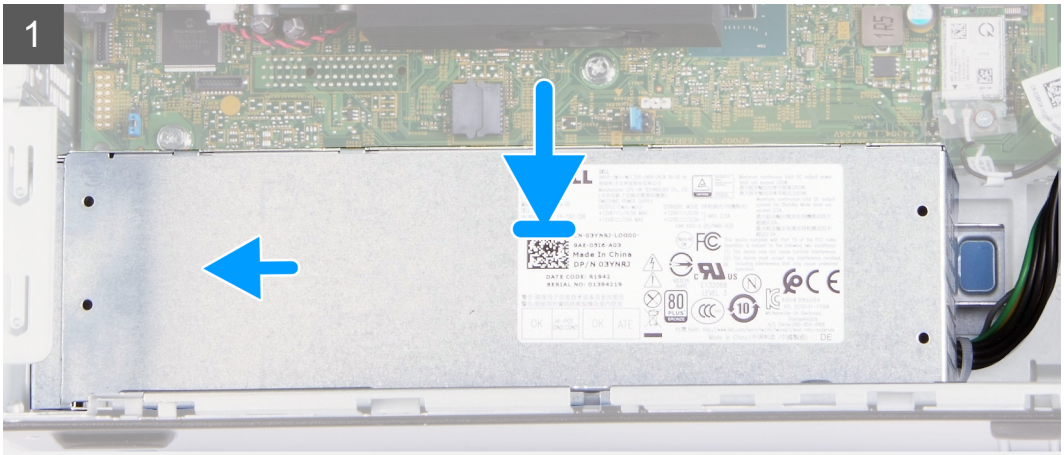
Installing the power supply

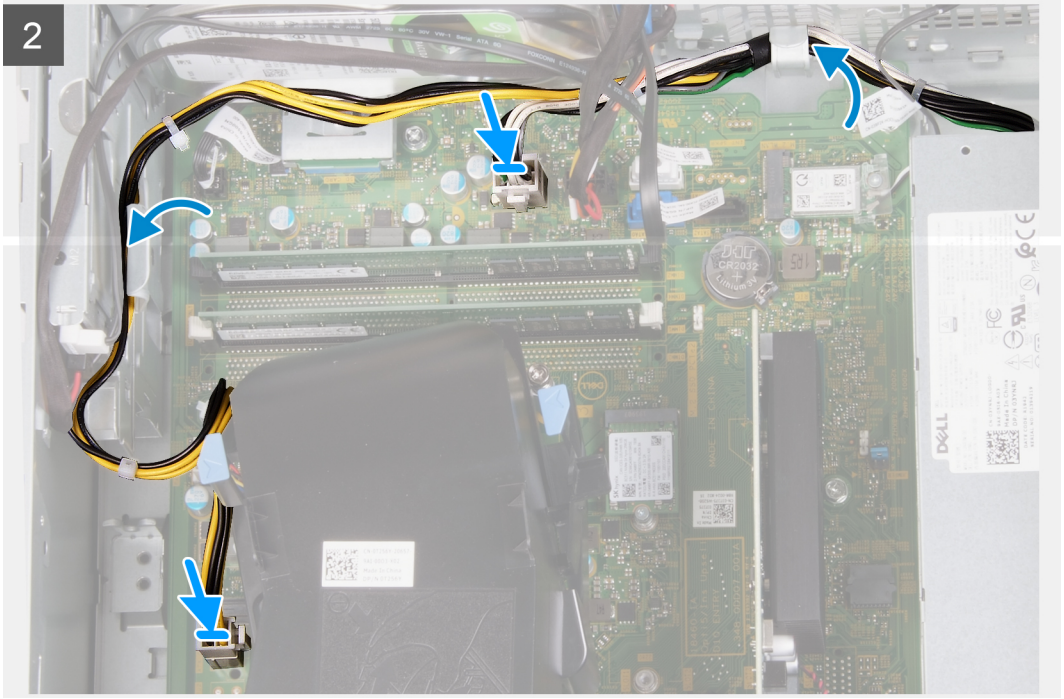
Prerequisites

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

About this task

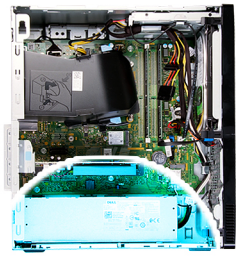
The following image(s) indicate the location of the power supply and provides a visual representation of the installation procedure.

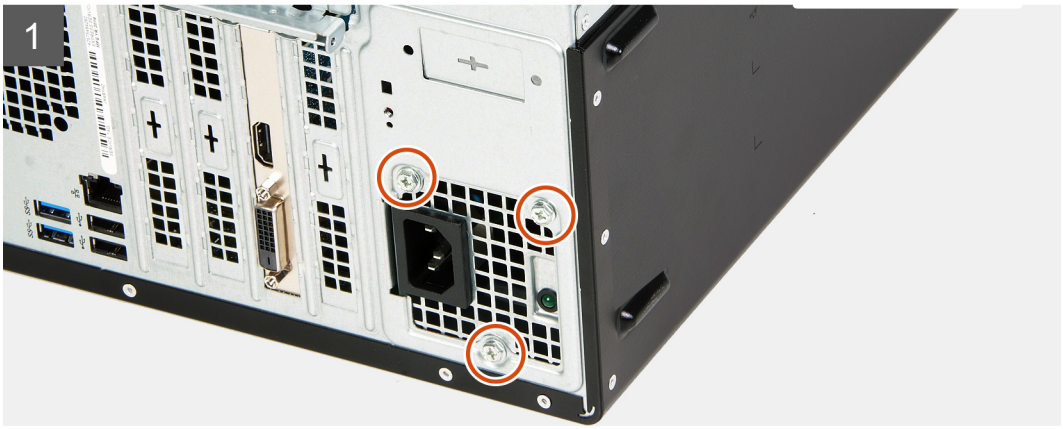






3x
6-32





Steps

1. Place and slide the power supply into its slot on the chassis.
2. Route the power-supply cables into the routing guides on the chassis.
3. Connect the power-supply cables to the two connectors on the system board.

   NOTE: The power-supply cable is connected to the system board at two locations and supply power to the following components at the two location:

   - Processor
   - System board

4. Replace the three screws (6-32) that secure the power supply to the chassis.

Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

Hard drive

Removing the hard drive

Prerequisites

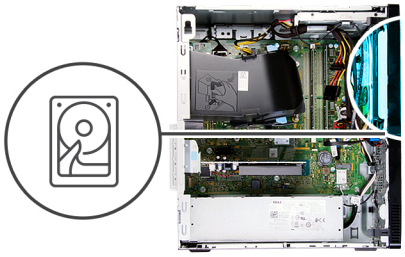
1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the front cover.

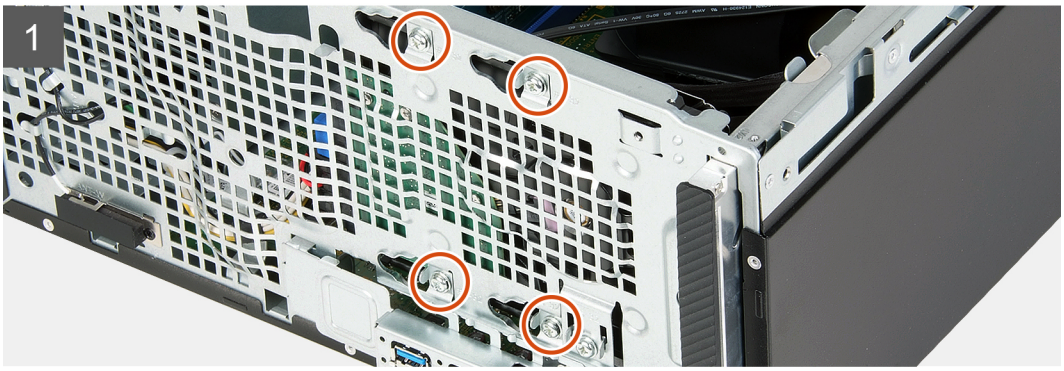
About this task

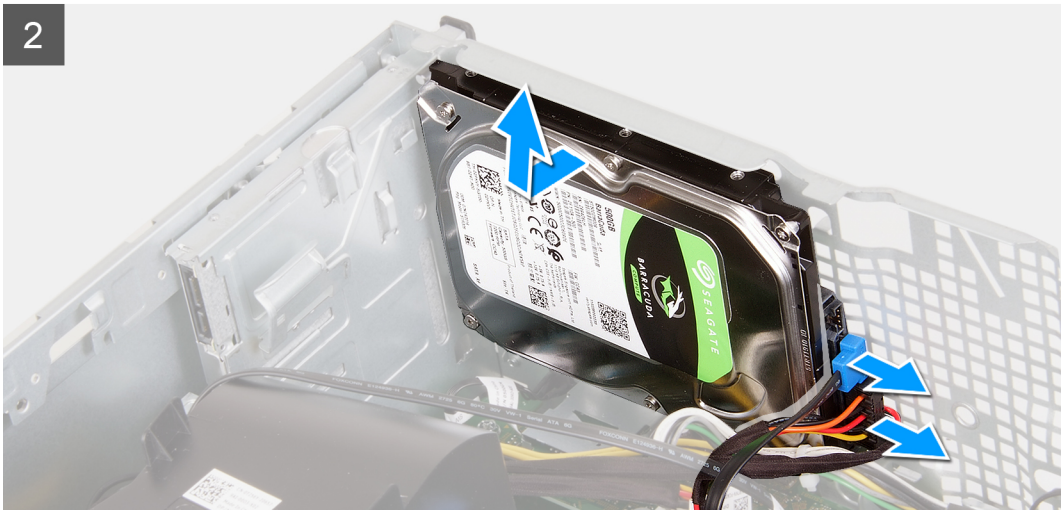
The following image(s) indicate the location of the hard drive and provides a visual representation of the removal procedure.



4x
6-32







Steps

1. Lay the computer with its right side facing down.

   CAUTION: Hold the hard drive In place when removing the screws that secure the hard drive to the chassis to prevent the hard drive from falling from place and damaging your computer.

2. Disconnect the hard-drive power cable and hard-drive data cable.
3. Remove the four screws (6-32) that secure the hard drive to the chassis.
4. Lift the hard drive off the chassis.

Installing the hard drive

Prerequisites

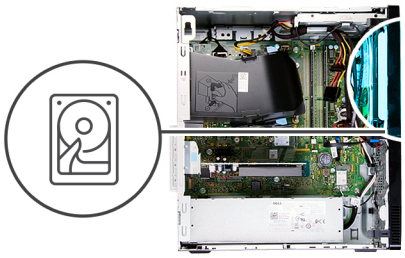
If you are replacing a component, remove the existing component before performing the installation process.

About this task

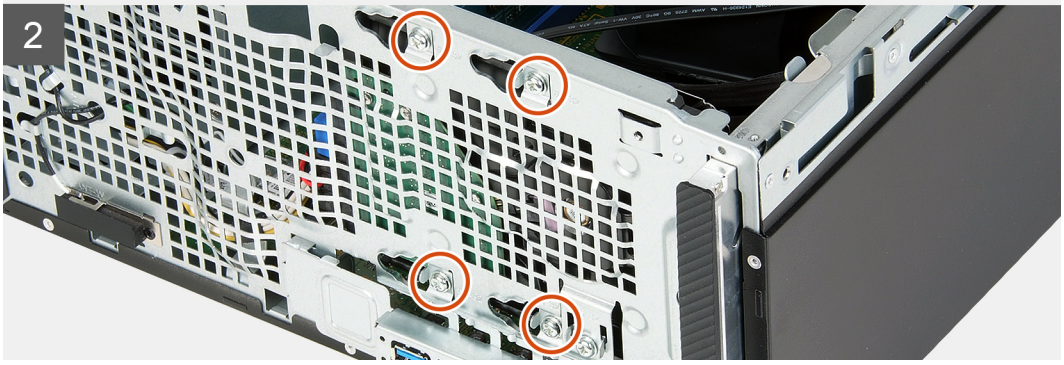
The following image(s) indicate the location of the hard drive and provides a visual representation of the installation procedure.



4x
6-32







Steps

1. Hold the hard drive into place on the chassis and align the screw holes on the hard drive with the screw holes on the chassis.
2. Connect the hard-drive power cable and hard-drive data cable to the hard drive.
3. Replace the four screws (6-32) that secure the hard drive to the chassis.

Next steps

1. Install the front cover.
2. Install the left-side cover.
3. Follow the procedure in After working inside your computer.

Optical drive

Removing the optical drive

Prerequisites

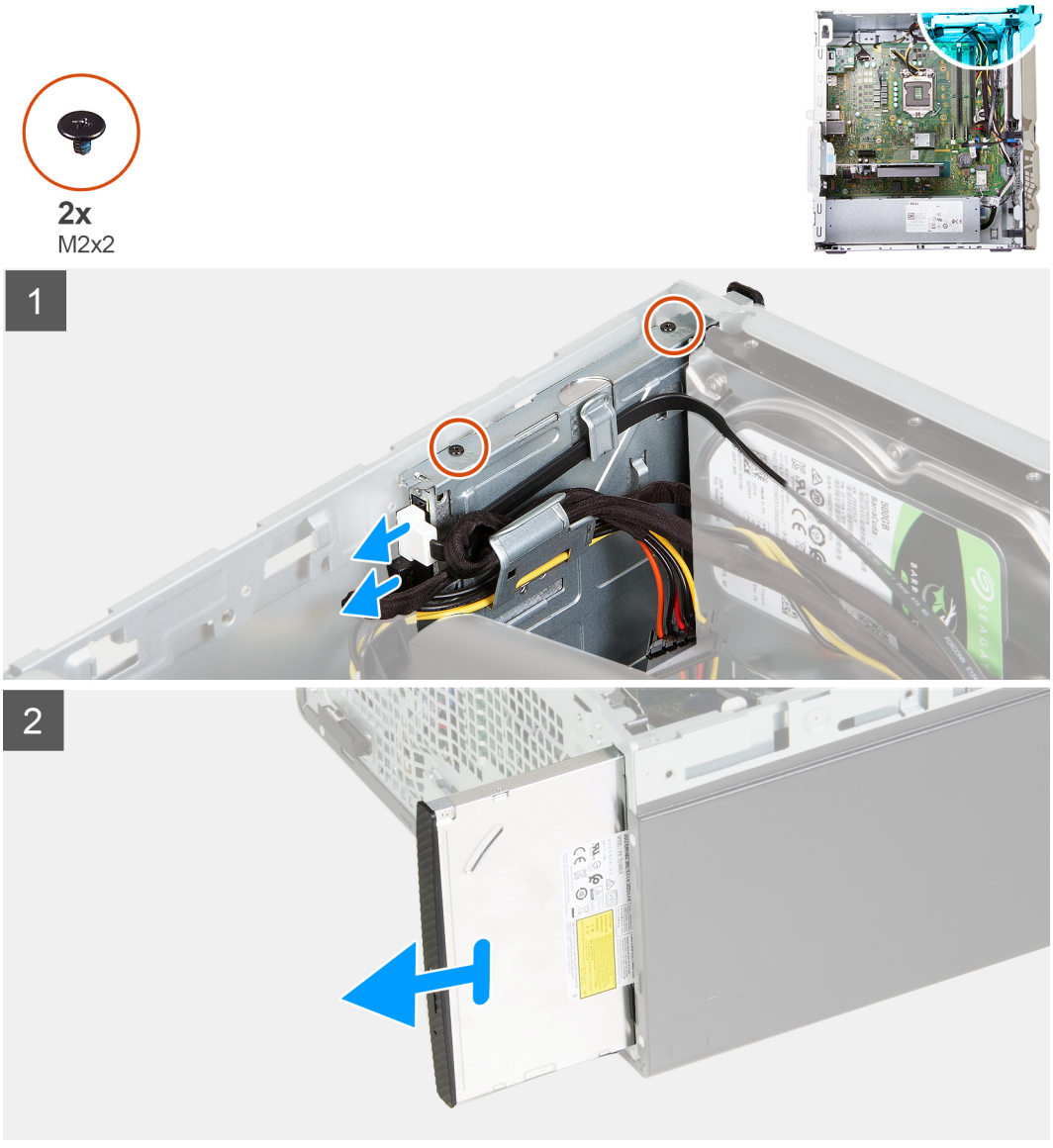
1. Follow the procedure in Before working inside your computer.

2. Remove the front cover.
3. Remove the left-side cover.

About this task

NOTE: These steps are only applicable for computers shipped with the optional optical drive.

The following image(s) indicate the location of the optical drive and provides a visual representation of the removal procedure.



Steps

1. Lay the computer with its right side facing down.
2. Disconnect the optical-drive power cable from the optical drive.
3. Disconnect the optical-drive data cable from the optical drive.
4. Remove the two screws (M2x2) that secure the optical drive to the chassis.
5. Slide and lift the optical drive from its slot on the chassis.

Installing the optical drive

Prerequisites

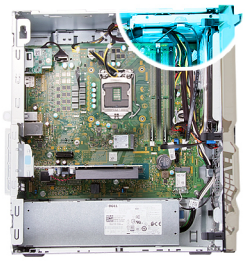
If you are replacing a component, remove the existing component before performing the installation process.

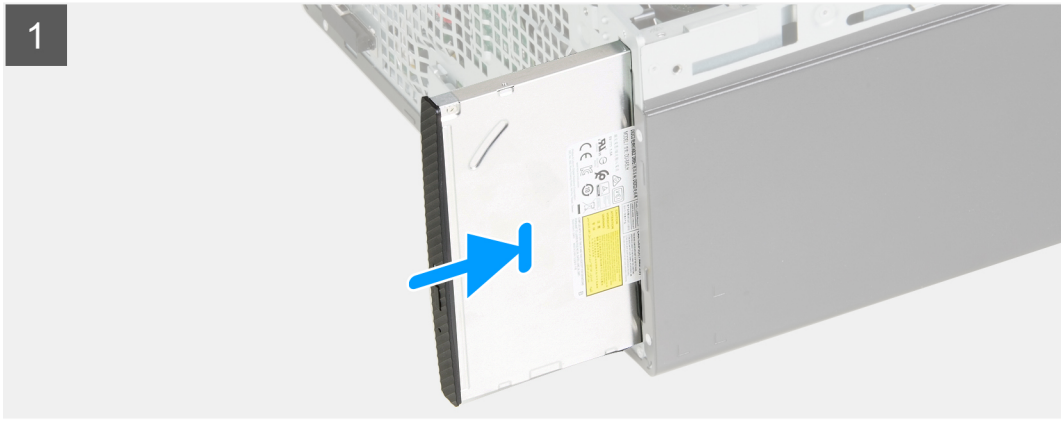
About this task

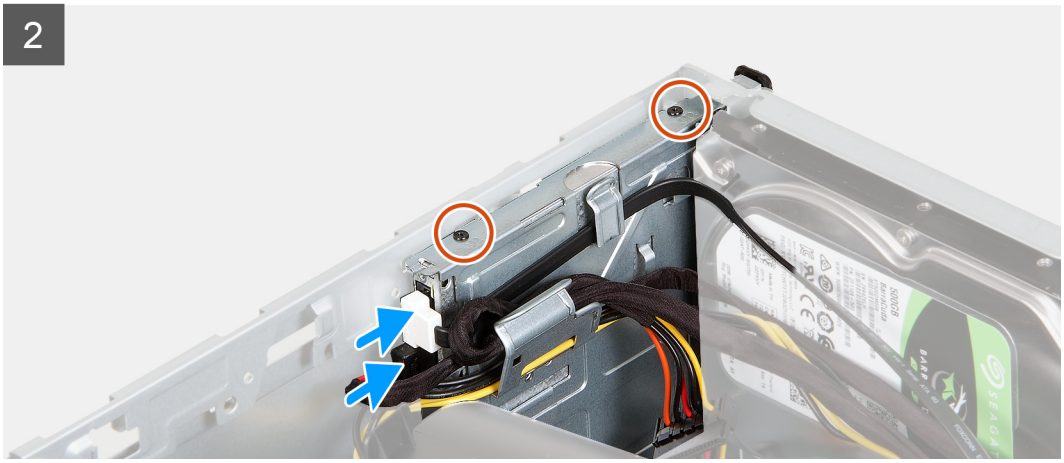
NOTE: When installing the optional optical drive, ensure that the front cover of your computer has the slot for it.

The following image(s) indicate the location of the optical drive and provides a visual representation of the installation procedure.









Steps

1. Slide and replace the optical drive into its slot on the chassis.
2. Align the screw holes on the optical drive with the screw holes on the chassis.
3. Replace the two screws (M2x2) that secure the optical drive to the chassis.
4. Connect the optical-drive power cable to the connector on the optical drive.
5. Connect the optical-drive data cable to the connector on the optical drive.

Next steps

1. Install the left-side cover.
2. Install the front cover.
3. Follow the procedure in After working inside your computer.

Optical-drive bezel

Removing the optical-drive bezel

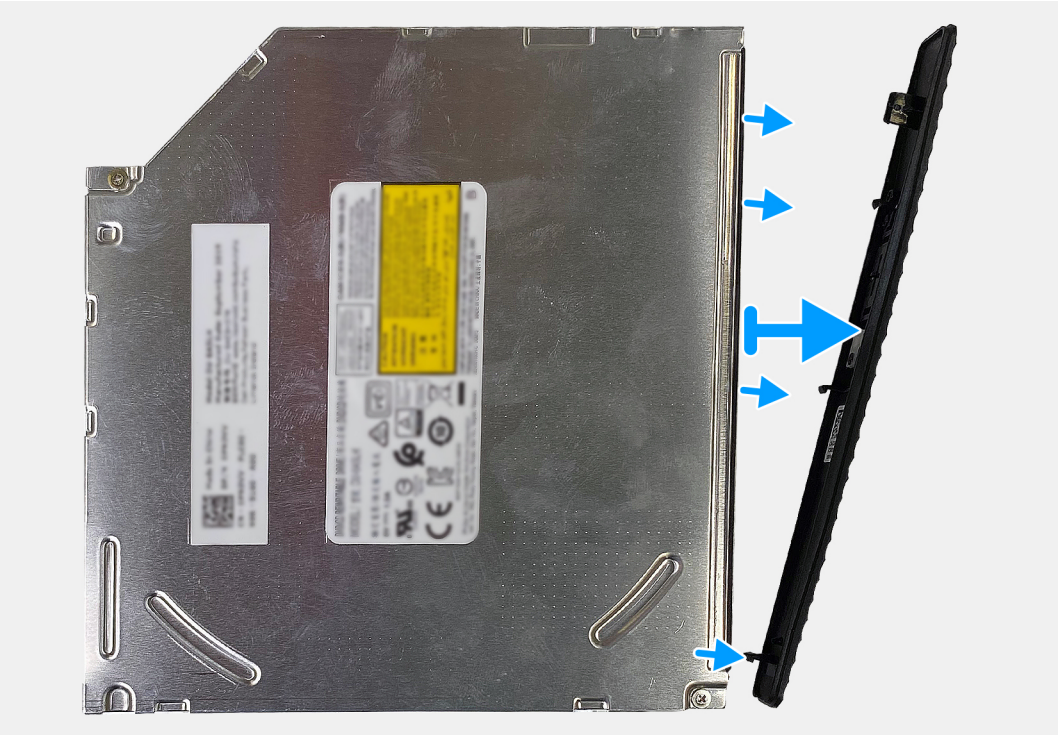
Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the front cover.
4. Remove the optical drive.

About this task

NOTE: These steps are only applicable for computers shipped with the optional optical drive.

The following image(s) indicate the location of the optical-drive bezel and provides a visual representation of the removal procedure.



Steps

Pry and lift the optical-drive bezel from the optical drive.

Installing the optical drive

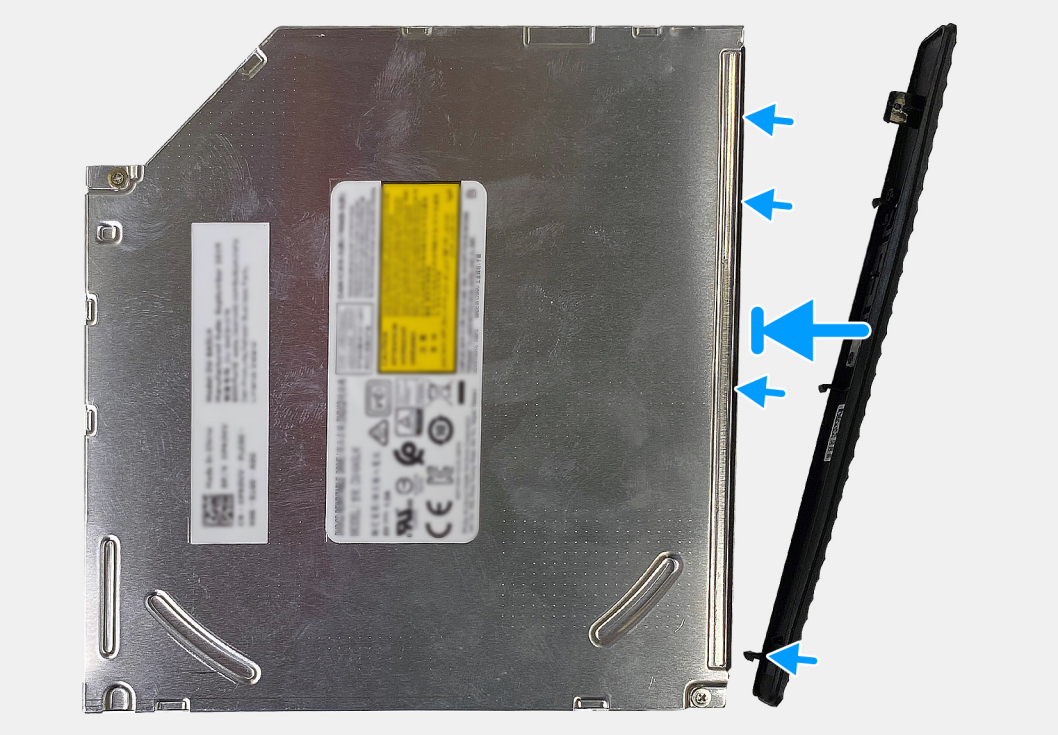
Prerequisites

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

About this task

NOTE: When installing the optional optical drive, ensure that the front cover of your computer has the slot for it.

The following image(s) indicate the location of the optical-drive bezel and provides a visual representation of the installation procedure.



Steps

1. Place the optical-drive bezel on the optical drive, aligning the hooks on the optical-drive bezel with the slots on the optical drive.
2. Press down on the optical-drive bezel to secure it into place on the optical drive.

Next steps

1. Install the optical drive.
2. Install the front cover.
3. Install the left-side cover.
4. Follow the procedure in After working inside your computer.

Media-card reader

Removing the media-card reader

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the front cover.

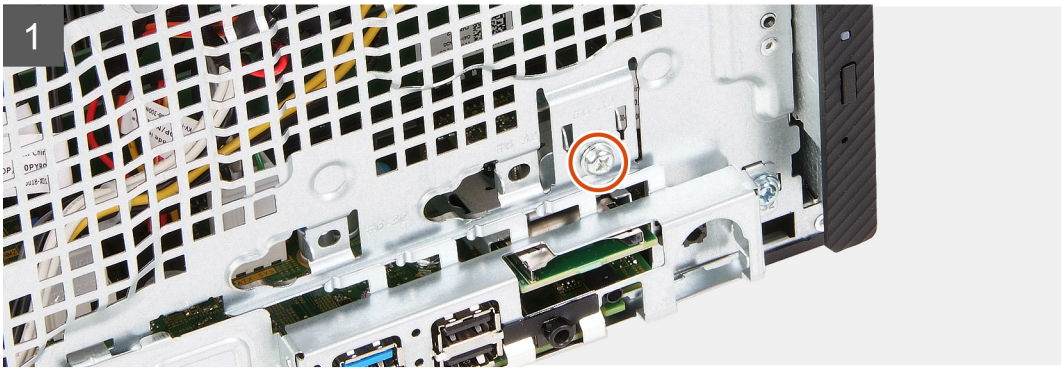
About this task

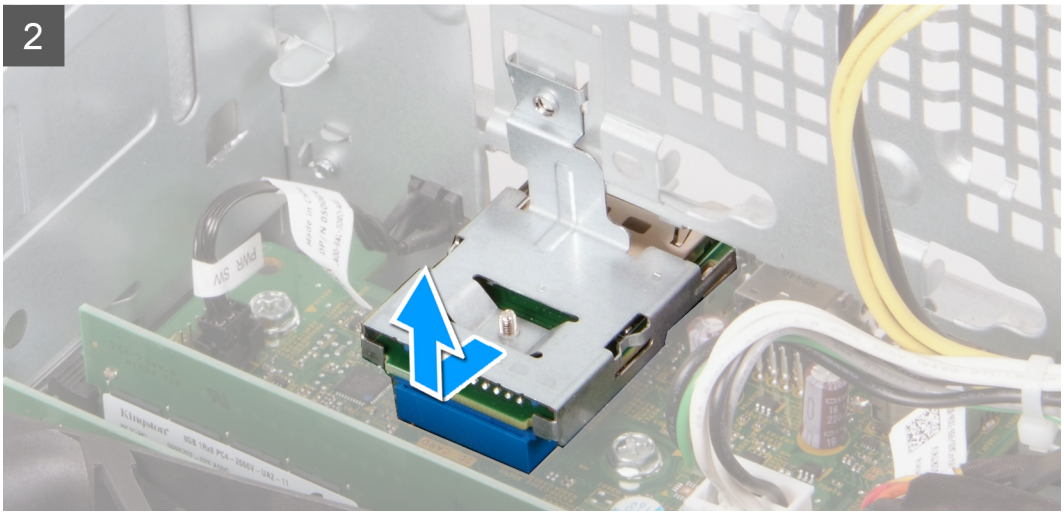
The following image(s) indicate the location of the media-card reader and provides a visual representation of the removal procedure.



1x
6-32







Steps

1. Lay the computer with its right side facing down.
2. Remove the screw (6-32) that secures the media-card reader to the chassis.
3. Using the tip of a Phillips-head screw driver, push on the screw hole location to release the media-card reader.
4. Slide and lift the media-card reader from the slot on the chassis.

Installing the media-card reader

Prerequisites

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

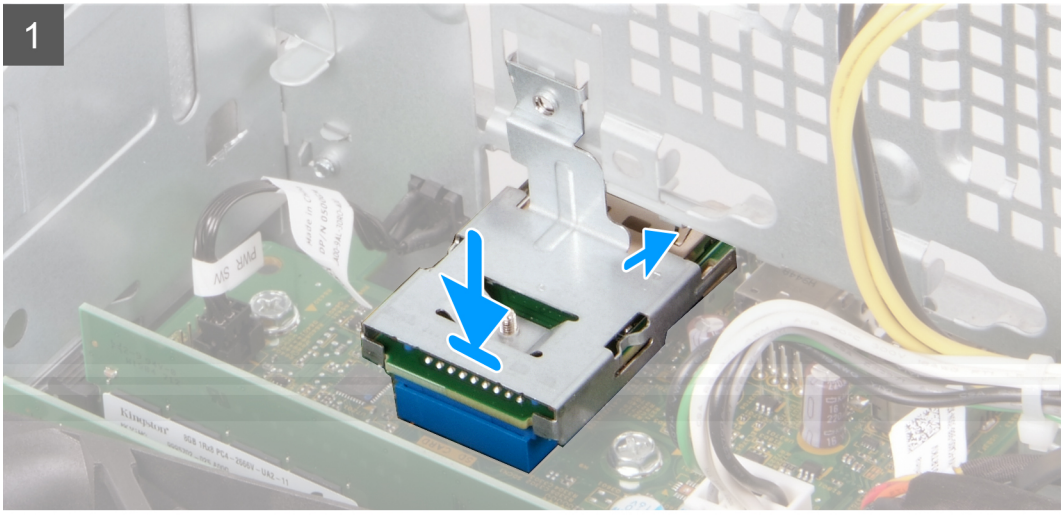
About this task

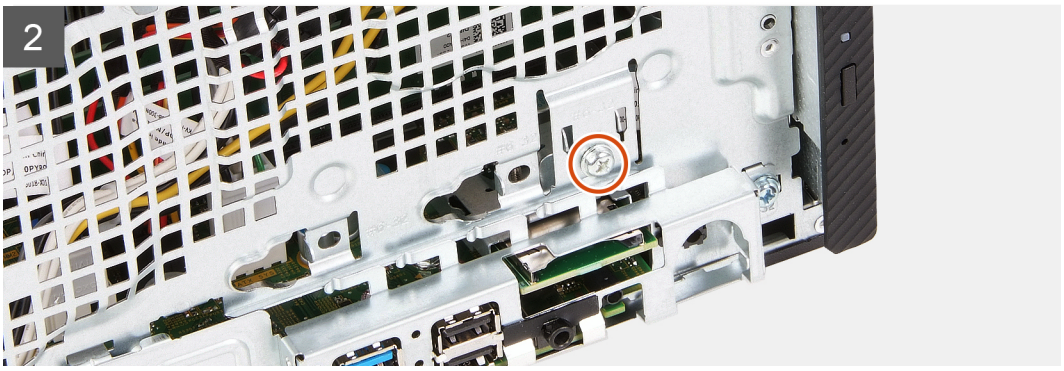
The following image(s) indicate the location of the media-card reader and provides a visual representation of the installation procedure.



1x
6-32







Steps

1. Connect the media-card reader into its slot on the chassis.
2. Replace the screw (6-32) that secures the media-card reader to the chassis.

Next steps

1. Install the front cover.
2. Install the left-side cover.
3. Follow the procedure in After working inside your computer.

Fan shroud

Removing the fan shroud

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

About this task

The following image(s) indicate the location of the fan shroud and provides a visual representation of the removal procedure.





Steps

1. Lay the computer with its right side facing down.
2. Press on both securing clips to release the fan shroud from the fan and heat-sink assembly.
3. Slide and lift the fan shroud off the system board.

Installing the fan shroud

Prerequisites

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

About this task

The following image(s) indicate the location of the fan shroud and provides a visual representation of the installation procedure.





Steps

Place the fan shroud into place on the fan and heat-sink assembly and snap it into place.

Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

Fan and heat-sink assembly

Removing the fan and heat-sink assembly

Prerequisites

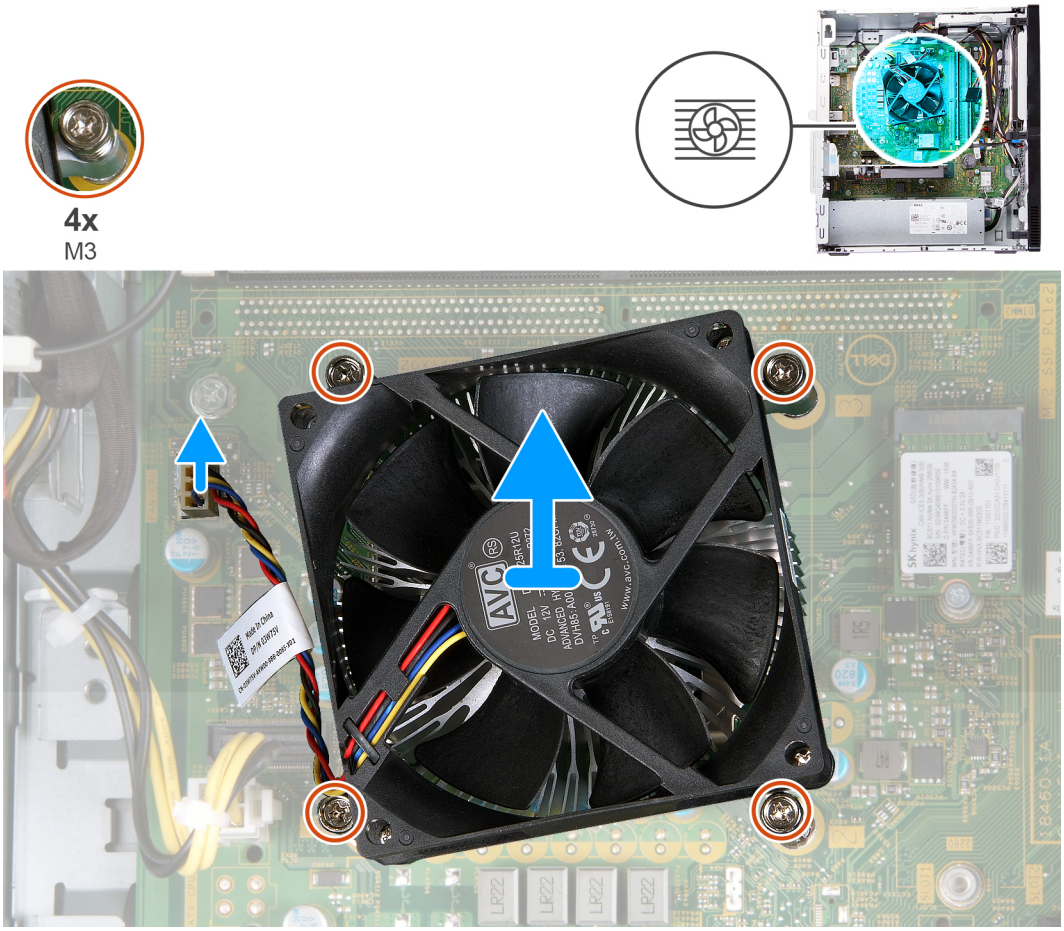
1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the fan shroud.

About this task

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

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

The following image(s) indicate the location of the fan and heat-sink assembly and provides a visual representation of the removal procedure.



Steps

1. Lay the computer with its right side facing down.
2. Disconnect the fan cable from the system board.
3. In a reverse sequential order (4>3>2>1) loosen the four captive screws that secure the fan and heat-sink assembly to the system board.
4. Lift the fan and heat-sink assembly off the system board.

Installing the fan and heat-sink assembly

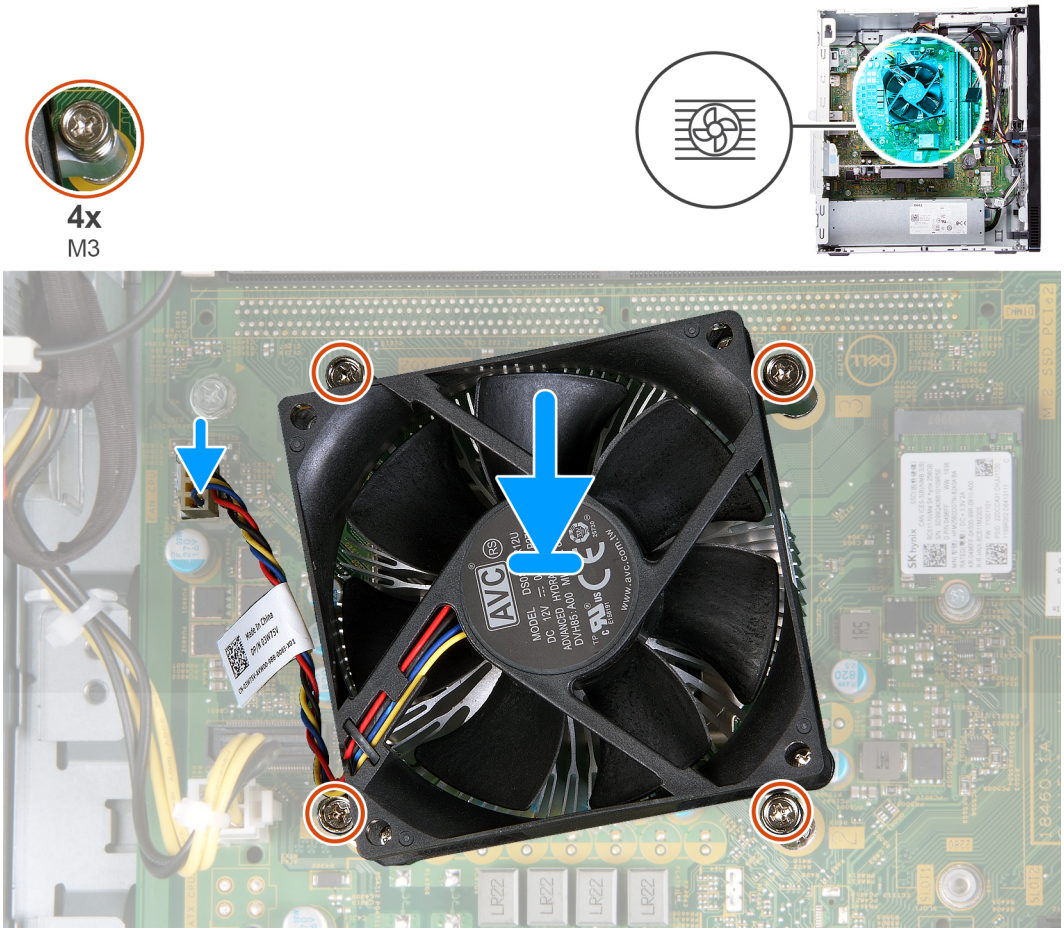
Prerequisites

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

About this task

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

The following image(s) indicate the location of the fan and heat-sink assembly and provides a visual representation of the installation procedure.



Steps

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

Next steps

1. Install the fan shroud.
2. Install the left-side cover.
3. Follow the procedure in After working inside your computer.

Processor

Removing the processor

Prerequisites

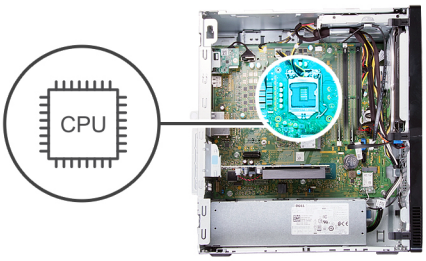
1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the fan shroud.
4. Remove the fan and heat-sink assembly.

About this task

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

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

The following image(s) indicate the location of the processor and provides a visual representation of the removal procedure.





Steps

1. Lay the computer with its right side facing down.
2. Press the release lever down and then push it away from the processor to release it from the securing tab.

   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. Extend the release lever completely and open the processor cover.
4. Gently lift the processor from the processor socket on the system board.

Installing the processor

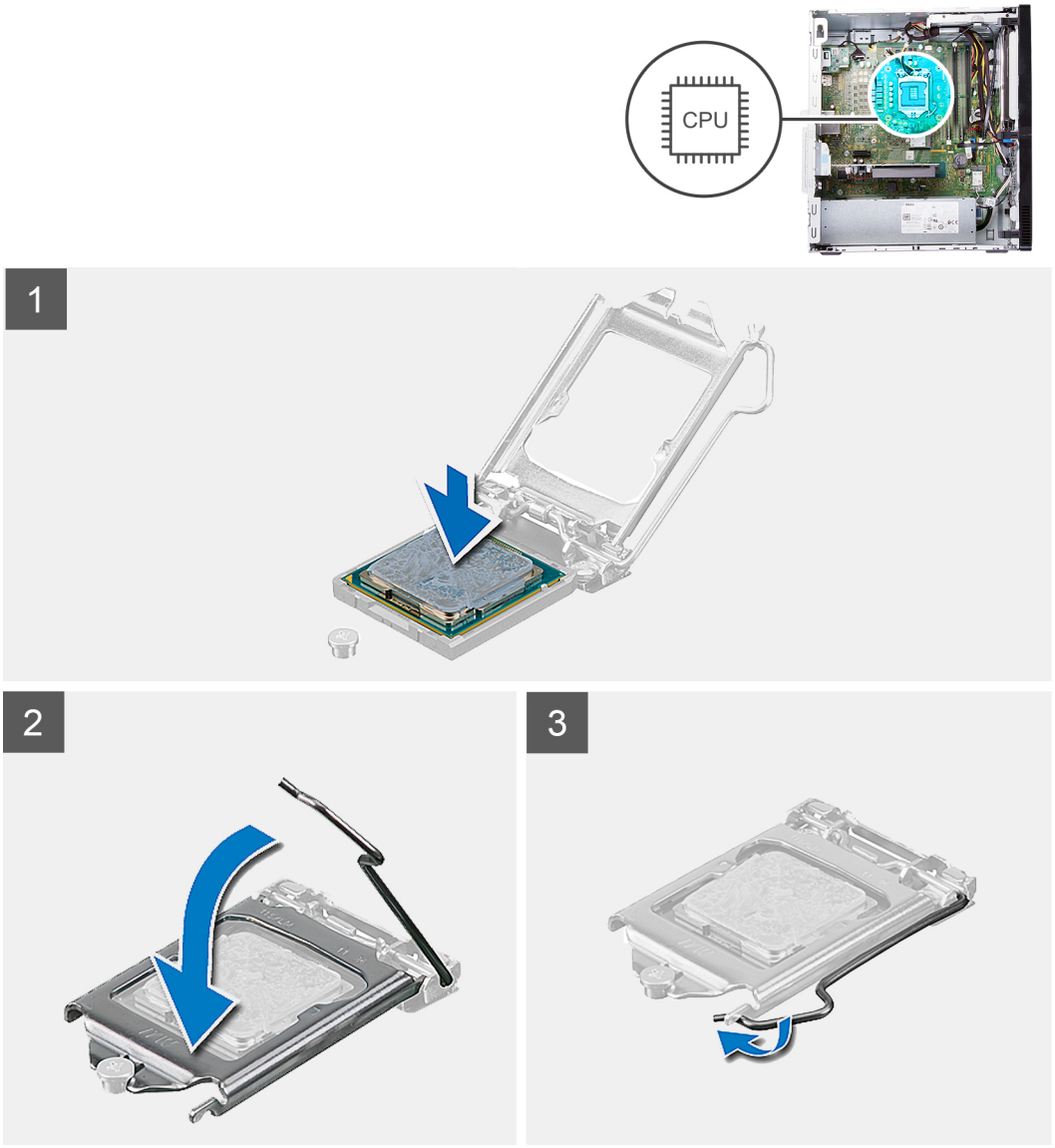
Prerequisites

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

About this task

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

The following image(s) indicate the location of the processor and provides a visual representation of the installation procedure.



Steps

1. Ensure that the release lever on the processor socket is fully extended in the open position.

   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 on the system board.

NOTE: 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 fan and heat-sink assembly.
2. Install the fan shroud.
3. Install the left-side cover.
4. Follow the procedure in After working inside your computer.

System board

Removing the system board

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the front cover.
4. Remove the fan shroud.
5. Remove the solid-state drive/Intel Optane.
6. Remove the coin-cell battery.
7. Remove the wireless card.
8. Remove the hard drive.
9. Remove the graphics card.
10. Remove the media-card reader.
11. Remove the fan and heat-sink assembly.
12. Remove the processor.

About this task

NOTE: For computers shipped with 10th Generation Intel Core i5-10400F and 10th Generation Intel Core i7-10700F processors a VGA-connector cover is installed over the VGA connector and needs to be removed when the VGA-connector board is removed.

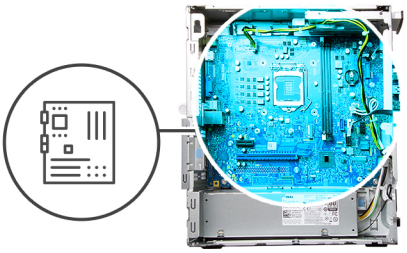
NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

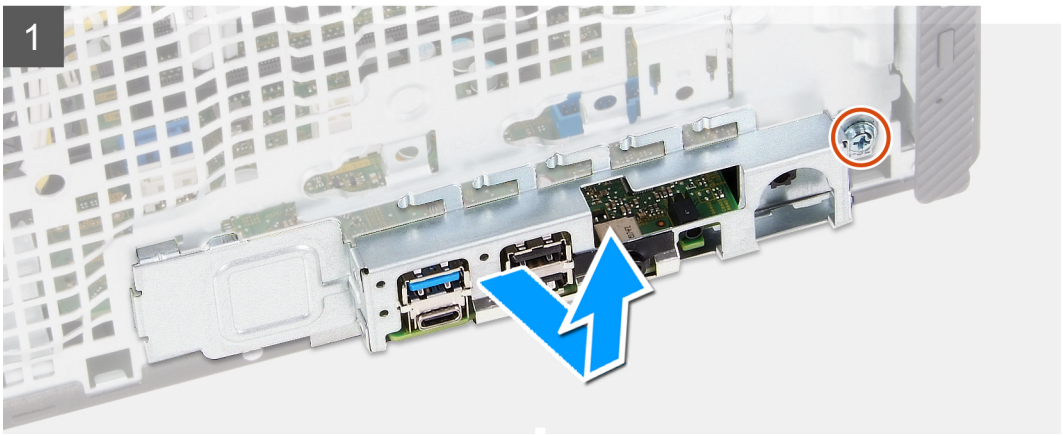
NOTE: Replacing the system board removes any changes you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

NOTE: Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.

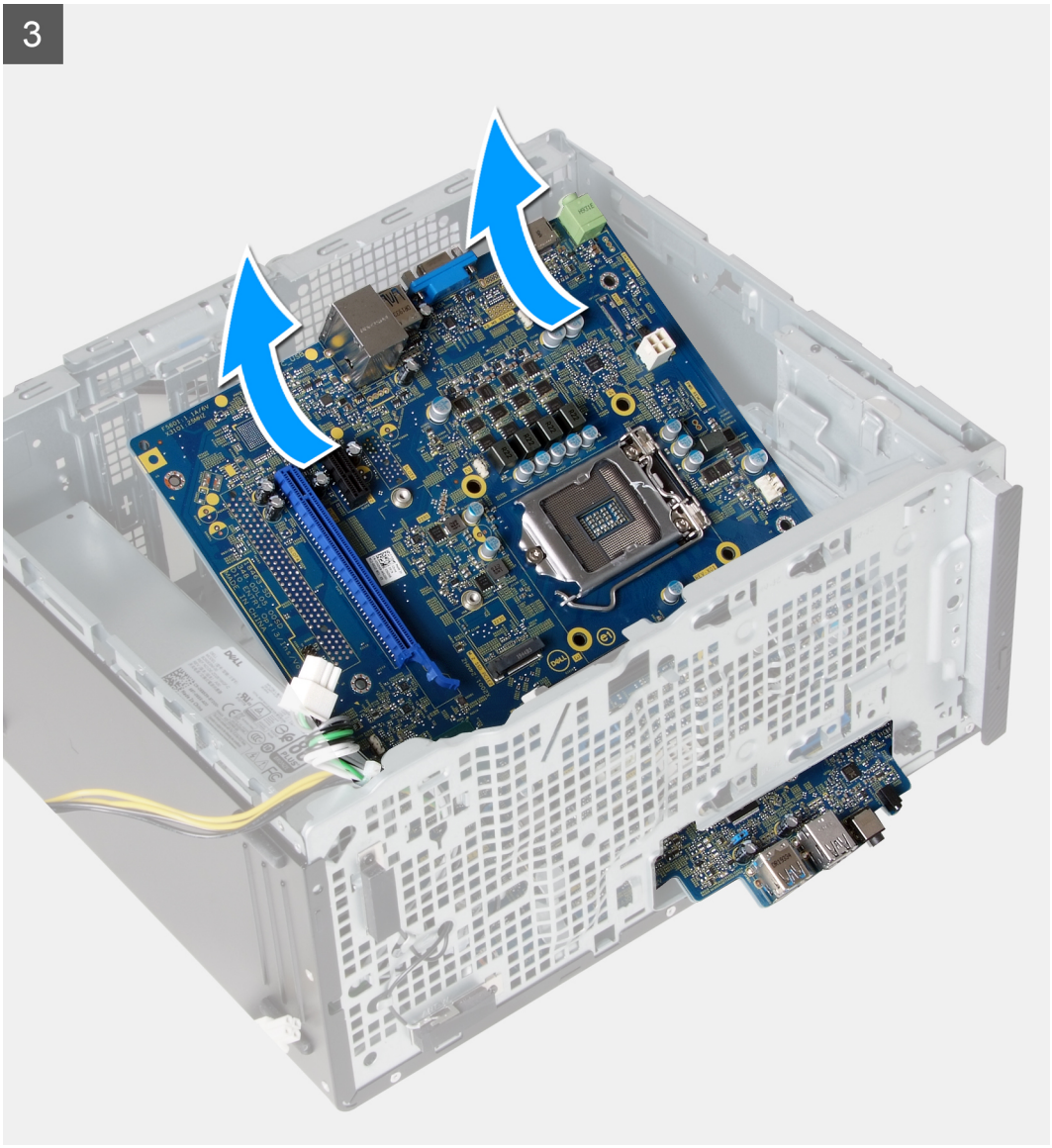
The following image(s) indicate the location of the system board and provides a visual representation of the removal procedure.


1x
6-32
8x
6-32
1x
6-32




1


2



Steps

1. Lay the computer with its right side facing down.
2. Loosen the two captive screws that secure the VGA-connector cover to the VGA connector. (if applicable)
3. Remove the VGA-connector cover from the VGA connector. (if applicable)
4. Remove the screw (6-32) that secures the I/O-cover door to the chassis.
5. Lift the pull tab and open the I/O-cover door.
6. Disconnect the following cables from the system board.
   - power-supply cables
   - hard-drive cable
   - power-button cable
7. Remove the M.2 card-mounting screw (6-32) that secures the system board to the chassis.

   NOTE: The location of the M.2 card mounting screw will differ than what is shown in the image depending on the type of M.2 card installed in the slot on the system board.
8. Remove the eight screws (6-32) that secure the system board to the chassis.
9. Lift the system board at an angle and remove it from the chassis.

Installing the system board

Prerequisites

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

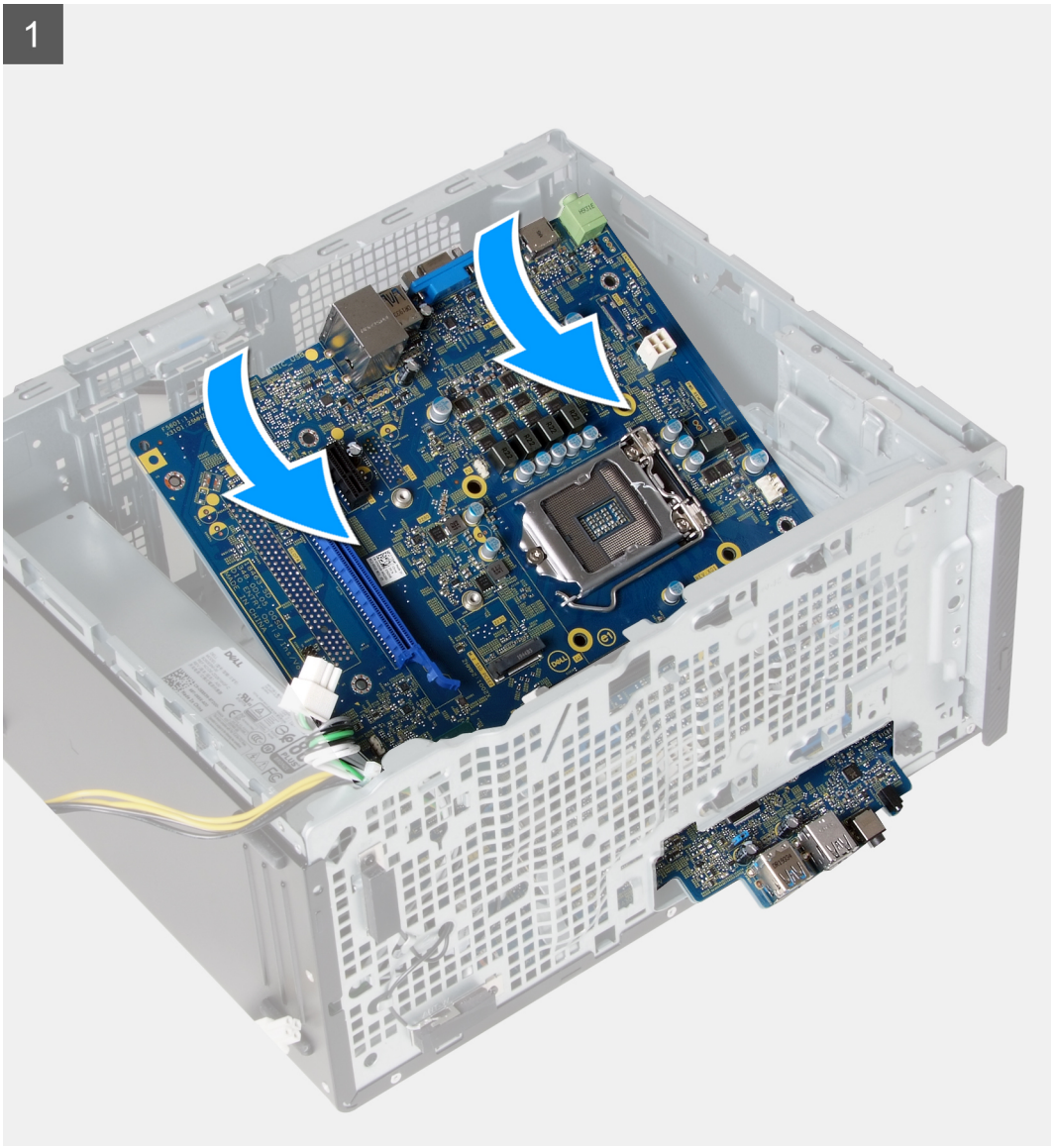
About this task

NOTE: For computers shipped with 10th Generation Intel Core i5-10400F and 10th Generation Intel Core i7-10700F processors a VGA-connector cover is installed over the VGA connector and must be installed after the VGA-connector board has been installed.

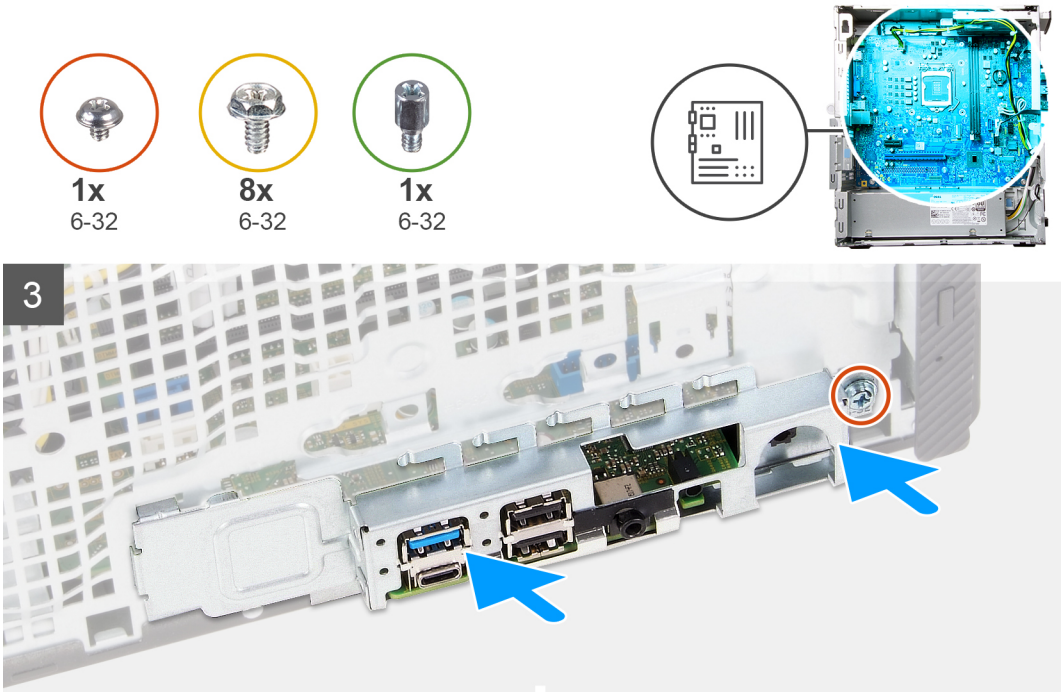
NOTE: If either the processor or the fan and heat-sink assembly is replaced, use the thermal grease provided in the kit to ensure that thermal conductivity is achieved.

The following image(s) indicate the location of the system board and provides a visual representation of the installation procedure.

1




2



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 M.2 card-mounting screw (6-32) that secures the system board to the chassis.

   NOTE: Depending on the M.2 card you install in your computer, the location where you replace the M.2 card-mounting screw will differ.

3. Replace the eight screws (6-32) that secure the system board to the chassis.
4. Connect the following cables to the system board.
   - power-supply cables
   - hard-drive cable
   - power-button cable
5. Close the I/O-cover door.
6. Replace the screw (6-32) that secures the I/O-cover door to the chassis.
7. Place the VGA-connector cover over the VGA connector. (if applicable)
8. Tighten the two captive screws that secure the VGA-connector cover to the VGA connector. (if applicable)

Next steps

1. Install the processor.
2. Install the fan and heat-sink assembly.
3. Install the media-card reader.
4. Install the graphics card.
5. Install the hard drive.
6. Install the wireless card.
7. Install the solid-state drive/Intel Optane.
8. Install the fan shroud.
9. Install the front cover.
10. Install the left-side cover.
11. Follow the procedure in After working inside your computer.

3

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.

4

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

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

Use the BIOS Setup program for the following purposes:

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

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
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
Enter	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

System setup options

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	
System Information	
BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.

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

General-System Information	
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.
Memory Information	
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.
PCI Information	
SLOT2	Displays the PCI information of the computer.
SLOT3	Displays the PCI information of the computer.
SLOT5_M.2	Displays the PCI information of the computer.
Processor Information	
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.
Device Information	
SATA-0	Displays the SATA device information of the computer.
SATA-1	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.
Boot Sequence	
Boot Sequence	Displays the boot sequence.

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

General-System Information	
Boot List Option	Displays the available boot options.
UEFI Boot Path Security	
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
Date/Time	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

System Configuration	
Integrated NIC	Controls the on-board LAN controller.
Enable UEFI Network Stack	Enable or disable UEFI Network Stack.
SATA Operation	Configure operating mode of the integrated SATA hard drive controller.
Drives	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.
M.2 PCIe SSD-2	Displays the M.2 PCIe SSD information of the computer.
SMART Reporting	Enable or disable SMART Reporting during system startup.
USB Configuration	
Enable USB Boot Support	Enable or disable booting from USB mass storage devices such as external hard drive, optical drive, and USB drive.
Enable front USB Port	Enable or disable the front USB ports.
Enable rear USB Port	Enable or disable the rear USB ports.
Front USB Configuration	Enable or disable the front USB ports.
Rear USB Configuration	Enable or disable the rear USB ports.
Audio	Enable or disable the integrated audio controller.
Miscellaneous Devices	Enable or disable various onboard devices.

Table 5. System setup options—Video menu

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

Table 6. System setup options—Security menu

Security	
Admin Password	Set, change, or delete the administrator password.
System Password	Set, change, or delete the system password.
Internal HDD-0 Password	Set, change, or delete the internal hard-disk drive password.
Password Configuration	Control the minimum and maximum number of characters allowed for Admin and System passwords.

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

Security	
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.
PTT Security	
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.
Admin Setup Lockout	Enable to prevent users from entering Setup when an Admin Password is set.
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

Secure Boot	
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. • Deployed Mode-Default: Enabled • Audit Mode-Default: Disabled
Deployed Mode	Enable or disable the deployed mode.
Audit Mode	Enable or disable the audit mode.
Expert Key Management	
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

Intel Software Guard Extensions	
Intel SGX Enable	Enable or disable Intel Software Guard Extensions.
Enclave Memory Size	Set the Intel Software Guard Extensions Enclave Reserve Memory Size.
Performance	
Multi Core Support	Enable multiple cores. Default: Enabled.
Intel SpeedStep	Enable or disable Intel Speedstep Technology. Default: Enabled. **NOTE:** 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.

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

Intel Software Guard Extensions	
	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.
Power Management	
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.
USB Wake Support	Enable the USB devices to wake the computer from Standby.
Deep Sleep Control	Enables you to control the Deep Sleep mode support.
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.
POST Behavior	
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

Virtualization Support	
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

Wireless	
Wireless Device Enable	Enable or disable internal wireless devices.

Table 11. System setup options—Maintenance menu

Maintenance	
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.

Table 11. System setup options—Maintenance menu (continued)

Maintenance	
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.

Table 12. System setup options—System Logs menu

System Logs	
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.

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 F12 immediately after a power-on or reboot.

Steps

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
   The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
   Use the following guidelines to assign the system password:
   - A password can have up to 32 characters.
   - The password can contain the numbers 0 through 9.
   - Only lower case letters are valid, upper case letters are not valid.
   - Only the following special characters are valid: Space, (”), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

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

Deleting or changing an existing system setup password

Prerequisites

Ensure that the **Password Status** is Unlocked (in the System Setup) before attempting to delete or change the existing System and 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.

Clearing CMOS settings/RTC reset

About this task

CAUTION: Clearing CMOS settings will reset the BIOS settings on your computer as well as reset the Real-Time Clock on your BIOS.

Steps

1. Press and hold the power button for 30 seconds.
2. Release the power button and allow the system to boot.

Clearing BIOS (System Setup) and System passwords

About this task

NOTE: To conduct a BIOS and System password reset, you must call the Dell Tech Support number in your region.

Steps

1. Key in your computer's service tag number into the locked BIOS/system setup screen.
2. Convey the code generated to the Dell Tech Support agent.
3. The Dell Tech Support agent will provide a 32 character Master System Password that can be used to access the locked BIO/system setup.

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)

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

  NOTE: Choosing **Diagnostics**, will display the **diagnostics** screen.

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

Updating the BIOS

Updating the BIOS in Windows

Steps

1. Go to 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 at 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 at 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 in Linux and Ubuntu

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

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.

Updating BIOS on systems with BitLocker enabled

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Dell Knowledge Base article: 000134415

5

Troubleshooting

System diagnostic lights

Power-supply diagnostics light

Indicates the power-supply state.

Hard-drive activity light

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

Table 15. Diagnostic-light codes

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

Diagnostic error messages

Table 16. Diagnostic error messages

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

Table 16. Diagnostic error messages (continued)

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

Table 16. Diagnostic error messages (continued)

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

Table 16. Diagnostic error messages (continued)

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

System error messages

Table 17. System error messages

System message	Description
Alert! Previous attempts at booting this system have failed at checkpoint [nnnn]. For help in resolving this problem, please note this checkpoint and contact Dell Technical Support	The computer failed to complete the boot routine three consecutive times for the same error.
CMOS checksum error	RTC is reset, **BIOS Setup** default has been loaded.
CPU fan failure	CPU fan has failed.
System fan failure	System fan has failed.
Hard-disk drive failure	Possible hard disk drive failure during POST.
Keyboard failure	Keyboard failure or loose cable. If reseating the cable does not solve the problem, replace the keyboard.
No boot device available	No bootable partition on hard disk drive, the hard disk drive cable is loose, or no bootable device exists.

Table 17. System error messages (continued)

System message	Description
	• If the hard drive is your boot device, ensure that the cables are connected and that the drive is installed properly and partitioned as a boot device. • Enter system setup and ensure that the boot sequence information is correct.
`No timer tick interrupt`	A chip on the system board might be malfunctioning or motherboard failure.
`NOTICE - Hard Drive SELF MONITORING SYSTEM has reported that a parameter has exceeded its normal operating range. Dell recommends that you back up your data regularly. A parameter out of range may or may not indicate a potential hard drive problem`	S.M.A.R.T error, possible hard disk drive failure.

Built-in self-test (BIST)

M-BIST

M-BIST (Built In Self-Test) is the system board's built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures.

NOTE: M-BIST can be manually initiated before POST (Power On Self Test).

How to run M-BIST

NOTE: M-BIST must be initiated on the system from a power-off state either connected to AC power or with battery only.

1. Press and hold both the **M** key on the keyboard and the **power button** to initiate M-BIST.
2. With both the **M** key and the **power button** held down, the battery indicator LED may exhibit two states:
   a. OFF: No fault detected with the system board
   b. AMBER: Indicates a problem with the system board
3. If there is a failure with the system board, the battery status LED will flash one of the following error codes for 30 seconds:

Table 18. LED error codes

Blinking Pattern		Possible Problem
Amber	**White**	
2	1	CPU Failure
2	8	LCD Power Rail Failure
1	1	TPM Detection Failure
2	4	Unrecoverable SPI Failure

4. If there is no failure with the system board, the LCD will cycle through the solid color screens described in the LCD-BIST section for 30 seconds and then power off.

LCD Built-in Self Test (BIST)

Dell laptops have a built-in diagnostic tool that helps you determine if the screen abnormality you are experiencing is an inherent problem with the LCD (screen) of the Dell laptop or with the video card (GPU) and PC settings.

When you notice screen abnormalities like flickering, distortion, clarity issues, fuzzy or blurry image, horizontal or vertical lines, color fade etc., it is always a good practice to isolate the LCD (screen) by running the Built-In Self Test (BIST).

How to invoke LCD BIST Test

1. Power off the Dell laptop.
2. Disconnect any peripherals that are connected to the laptop. Connect only the AC adapter (charger) to the laptop.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold **D** key and **Power on** the laptop to enter LCD built-in self test (BIST) mode. Continue to hold the D key, until the system boots up.
5. The screen will display solid colors and change colors on the entire screen to white, black, red, green, and blue twice.
6. Then it will display the colors white, black and red.
7. Carefully inspect the screen for abnormalities (any lines, fuzzy color or distortion on the screen).
8. At the end of the last solid color (red), the system will shut down.

NOTE: Dell SupportAssist Pre-boot diagnostics upon launch, initiates an LCD BIST first, expecting a user intervention confirm functionality of the LCD.

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. 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.

Real-Time Clock (RTC Reset)

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

Start the RTC reset with the system powered off and connected to AC power. Press and hold the power button for thirty (30) seconds. The system RTC Reset occurs after you release the power button.

6

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 19. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
My Dell app	
Tips	
Contact Support	In Windows search, type `Contact Support`, and press Enter.
Online help for operating system	www.dell.com/support/windows www.dell.com/support/linux
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 www.dell.com/support. For more information on how to find the Service Tag for your computer, see Locate the Service Tag on your computer.
Dell knowledge base articles for a variety of computer concerns	1. Go to www.dell.com/support. 2. On the menu bar at the top of the Support page, select **Support** > **Knowledge Base**. 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.

Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see 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.