

# OptiPlex XE3 Tower

## Service Manual

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## 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.

# Working on your computer

## Topics:

- [Safety instructions](#)
- [Turning off your computer — Windows 10](#)
- [Before working inside your computer](#)
- [After working inside your computer](#)

## Safety instructions

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

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

**⚠ WARNING:** Disconnect your computer from all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting your computer to an electrical outlet.

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

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

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

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

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

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


**⚠ CAUTION:** Exercise caution when handling Lithium-ion batteries in laptops. Swollen batteries should not be used and should be replaced and disposed properly.


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

## Before working inside your computer

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

1. Save and close all open files and exit all open applications.

2. Shut down your computer. For Windows operating system, click **Start** >  **Power** > **Shut down**.

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

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

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

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

## Safety precautions

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

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

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

## Bonding

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

## Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. The use of wireless anti-static straps is no longer allowed; they do not provide adequate protection. Touching the chassis before handling parts does not ensure adequate ESD protection on parts with increased sensitivity to ESD damage.
- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.

- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component. Before unwrapping the anti-static packaging, ensure that you discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

## ESD field service kit

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

### Components of an ESD field service kit

The components of an ESD field service kit are:

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

### ESD protection summary


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

## Transporting sensitive components

When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.


## 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


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

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.


## Turning off your computer — Windows 10

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


1. Click or tap .
2. Click or tap  and then click or tap **Shut down**.

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

## Before working inside your computer

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

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2. Shut down your computer. For Windows operating system, 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.

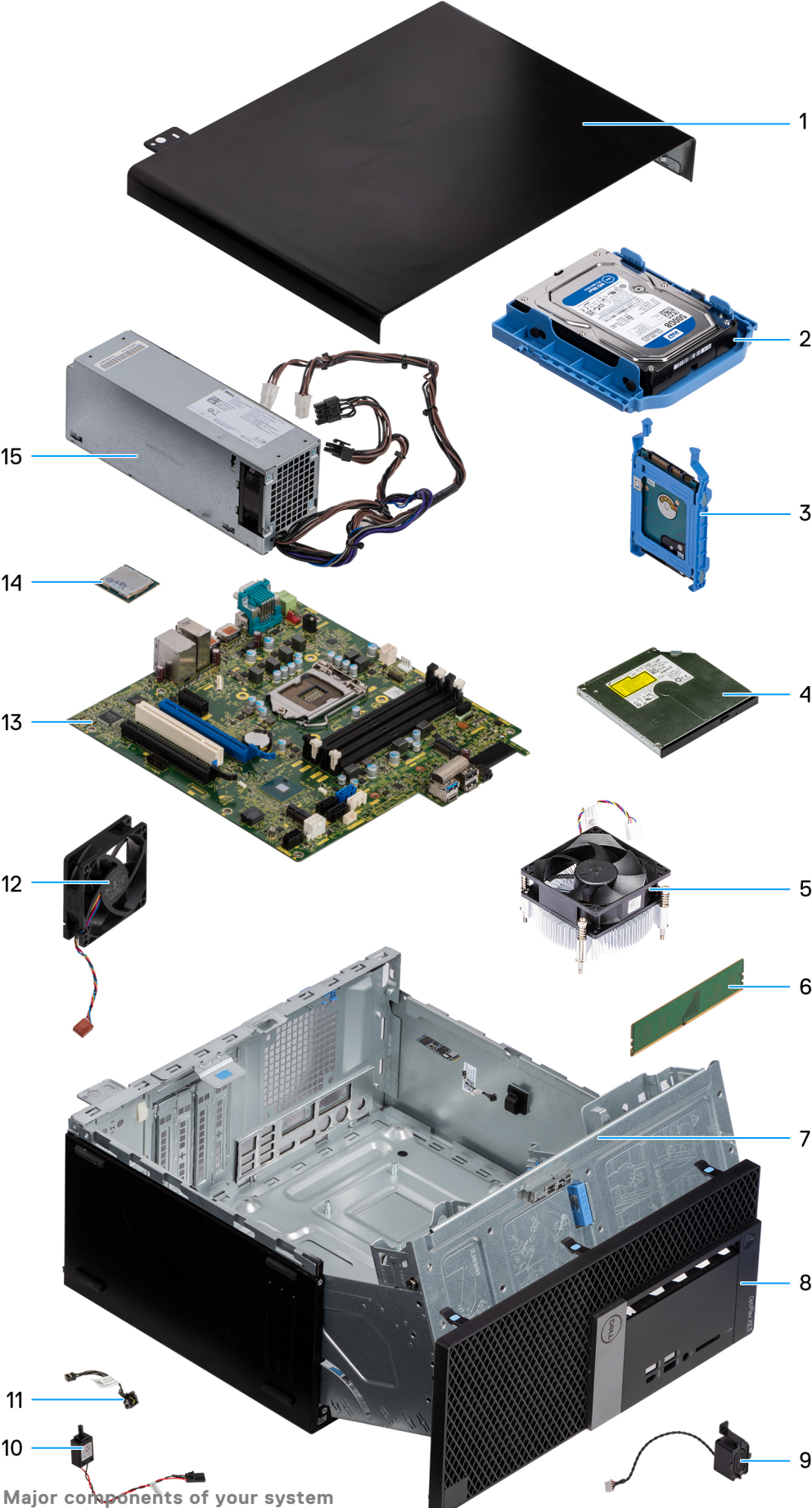
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# Major components of your system



1. Side cover
2. 3.5-inch hard drive assembly
3. 2.5-inch hard drive assembly
4. Optical Disk Drive
5. Heat sink fan
6. Memory module
7. Chassis
8. Front bezel
9. Speaker
10. Intrusion switch
11. Power button
12. System fan
13. System board
14. Processor
15. Power-Supply Unit (PSU)

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

# Disassembly and reassembly

## Topics:

- Side cover
- Bezel
- Front panel door
- 3.5-inch hard drive assembly
- 2.5-inch hard drive assembly
- Optical drive
- M.2 PCIe SSD
- SD card reader
- Memory module
- Expansion card
- Power supply unit
- Intrusion switch
- Speaker
- Power button
- Heat sink fan
- Coin cell battery
- Heat sink
- Processor
- System fan
- Optional VGA module
- System board

## Side cover

### Removing side cover

1. Follow the procedure in [Before working inside your computer](#).
2. To release the side cover:
  - a. Slide the blue tab to release the side cover from the computer [1].
  - b. Slide the side cover toward the back of the computer [2].
  - c. Lift the side cover to remove it from the computer.



## Installing side cover

1. Place the side cover on the computer and slide the side cover forward [1].
2. Slide the side cover until the click sound and the blue tab secures the side cover to the computer [2].

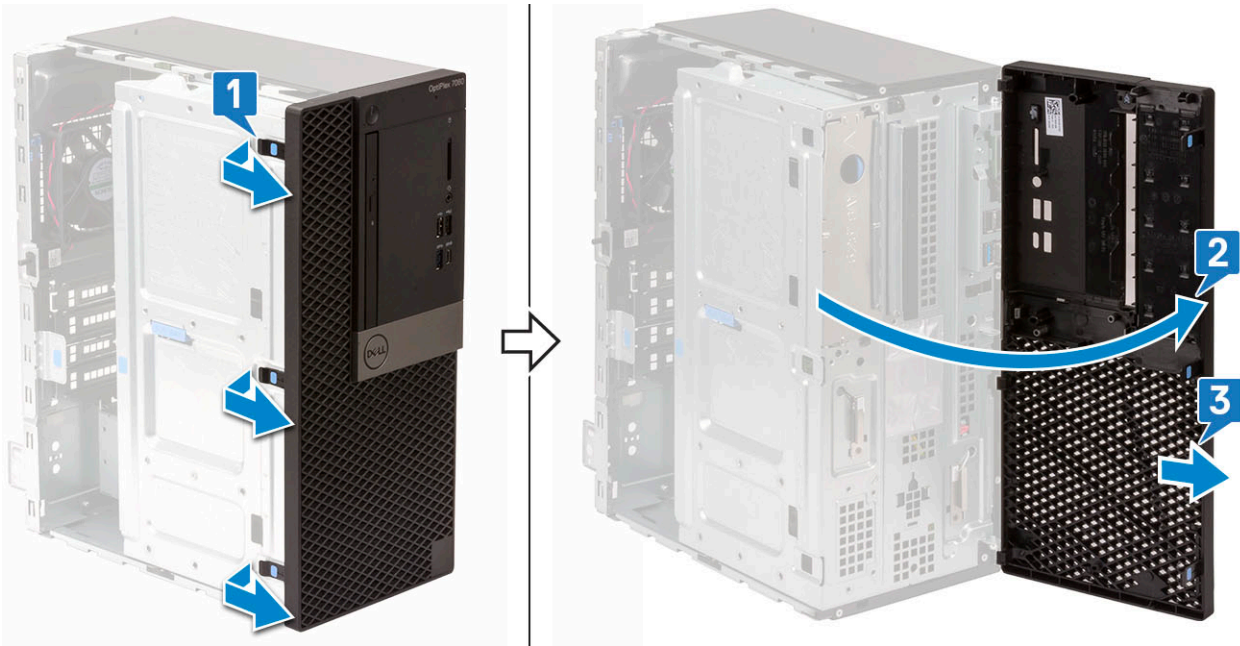


3. Follow the procedure in [After working inside your computer](#).

## Bezel

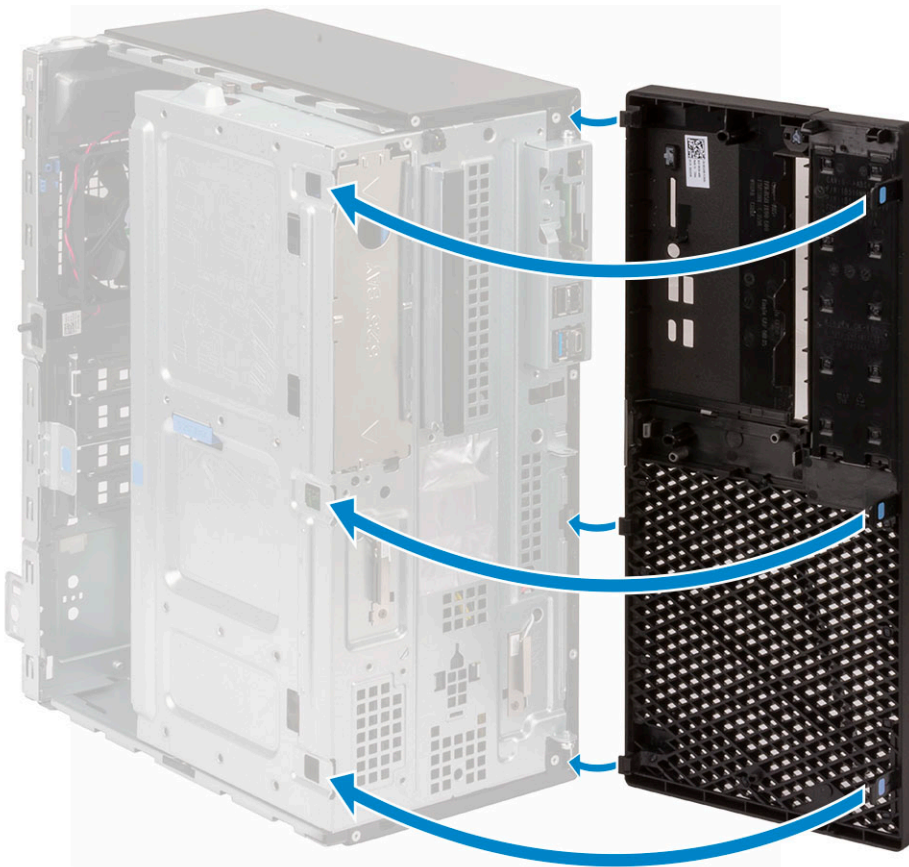
### Removing front bezel

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [side cover](#).
3. To remove the front bezel:
  - a. Lift the tabs to release the front bezel from the chassis [1].
  - b. Push the front bezel away from the chassis [2].
  - c. Pull the front bezel to release it from the chassis [3].



## Installing front bezel

1. Position the front bezel to align the tab holders on the chassis.
2. Slide and press the front bezel until the tabs click in place.



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

# Front panel door

## Opening the front panel door

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)

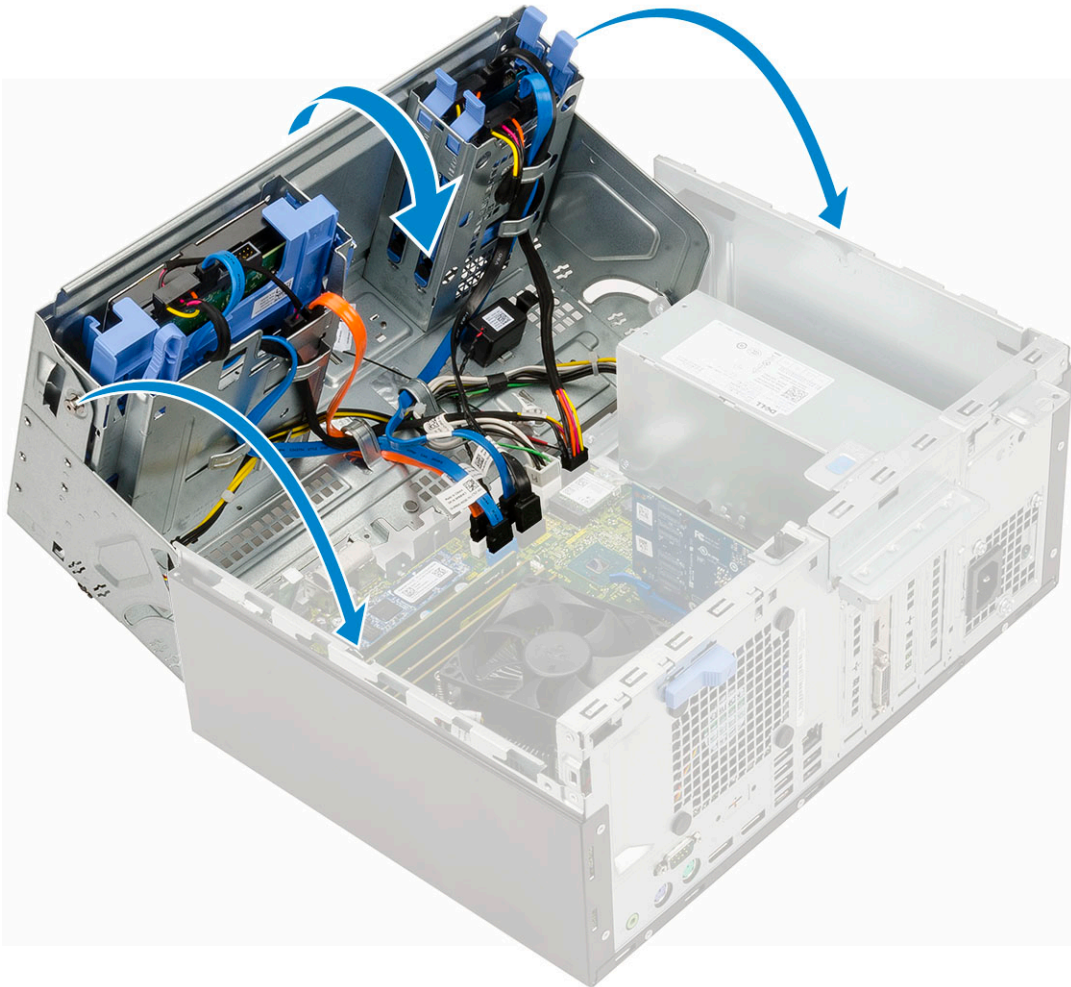
 **CAUTION:** The front panel door opens only to a limited extent. See the printed image on the front panel door for the maximum permissible level.

3. Pull the front panel door to open it.



## Closing front panel door

1. Push the front panel door on the computer and press the side cover forward until the panel door clicks into place.




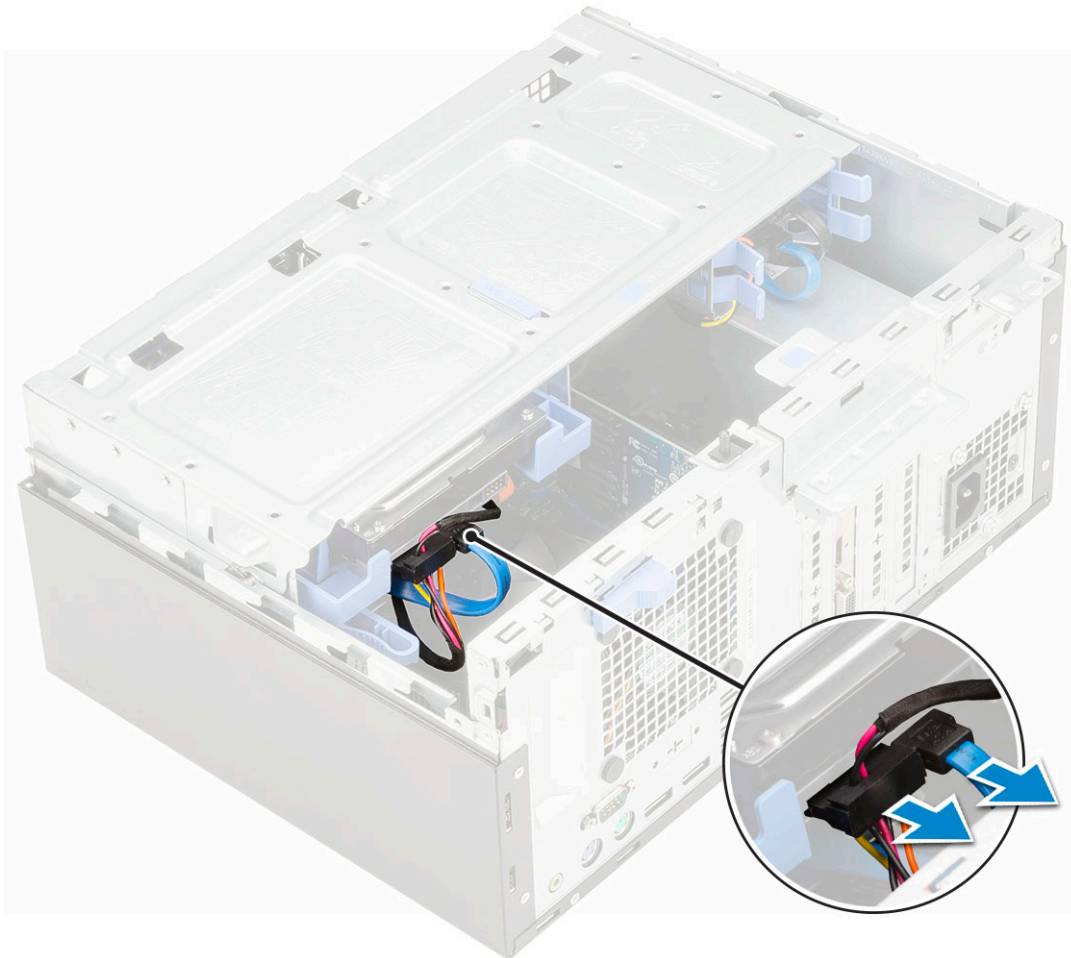
2. Install the
  - a. front bezel
  - b. side cover
3. Follow the procedure in [After working inside your computer](#).

## 3.5-inch hard drive assembly

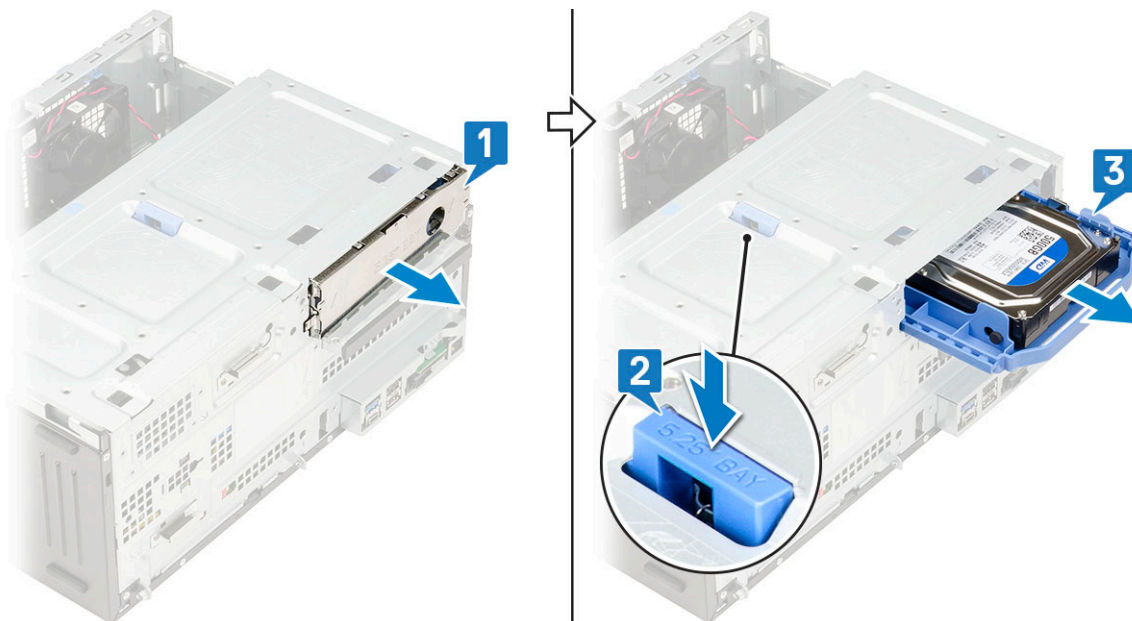
### Removing 3.5–inch hard drive assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. side cover
  - b. front bezel
3. To remove the hard drive assembly:
  - a. Disconnect the hard drive assembly cables from the connectors on the hard drive.

 **NOTE:** Ensure to remove the SATA blue cable first, to ease in removing the hard drive data cable.

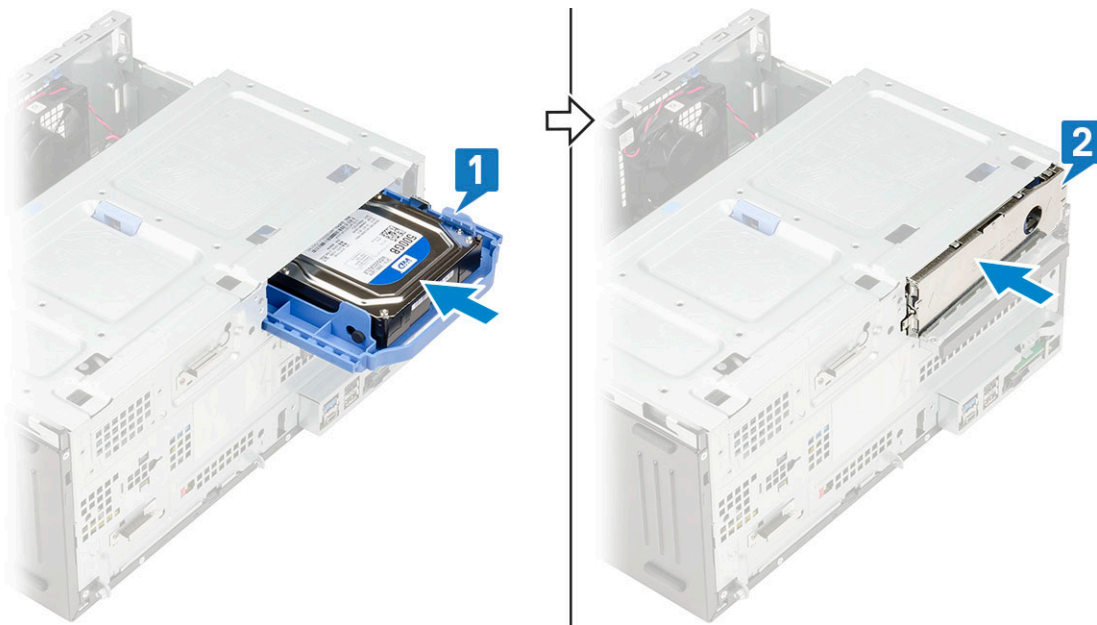


- b. Pull the metal bracket that shields the hard drive assembly [1].
- c. Press the blue tab [2] and pull the hard drive assembly out of the computer [3].

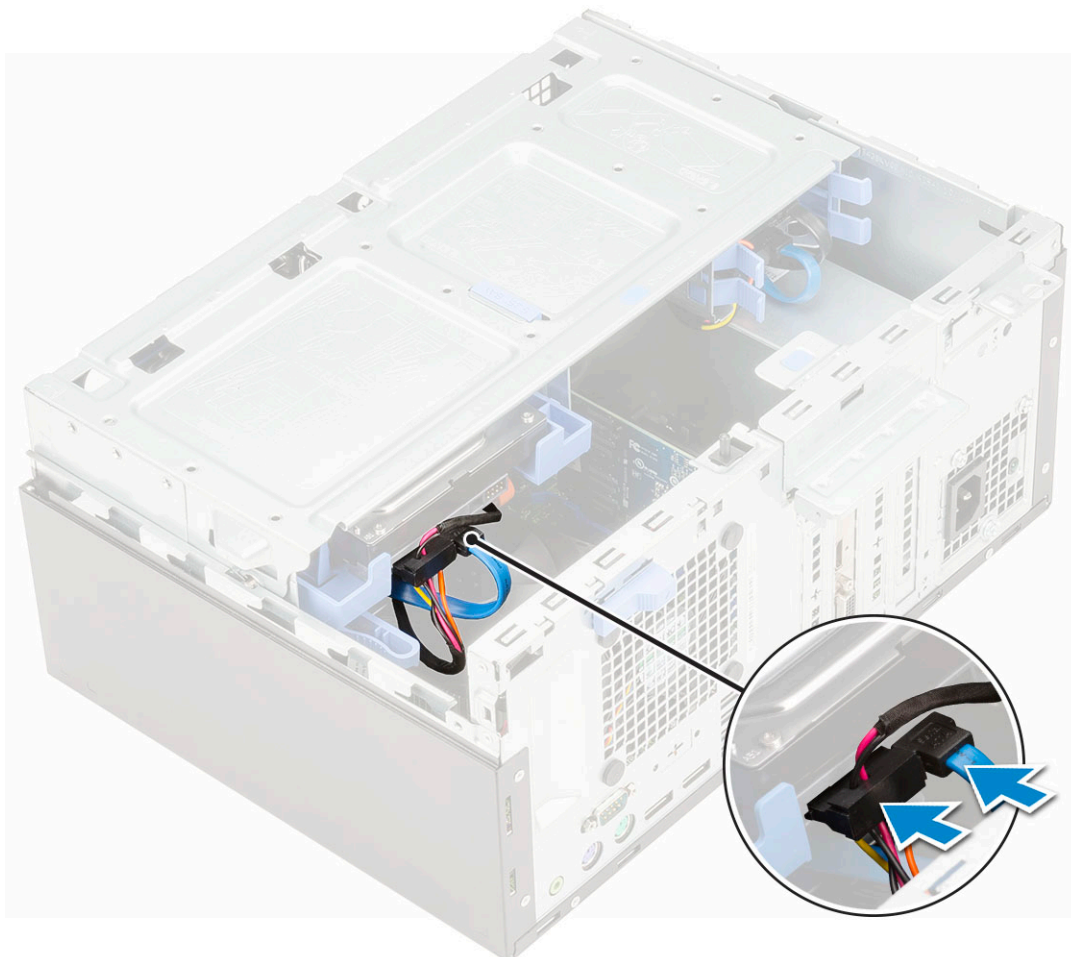


## Installing 3.5-inch hard drive assembly

- 1. Insert the hard drive assembly into the slot on the computer until it clicks into place [1].



2. Close the metal bracket that shields the hard drive assembly [2].
3. Connect the SATA cable and the power cable to the connectors on the hard drive .

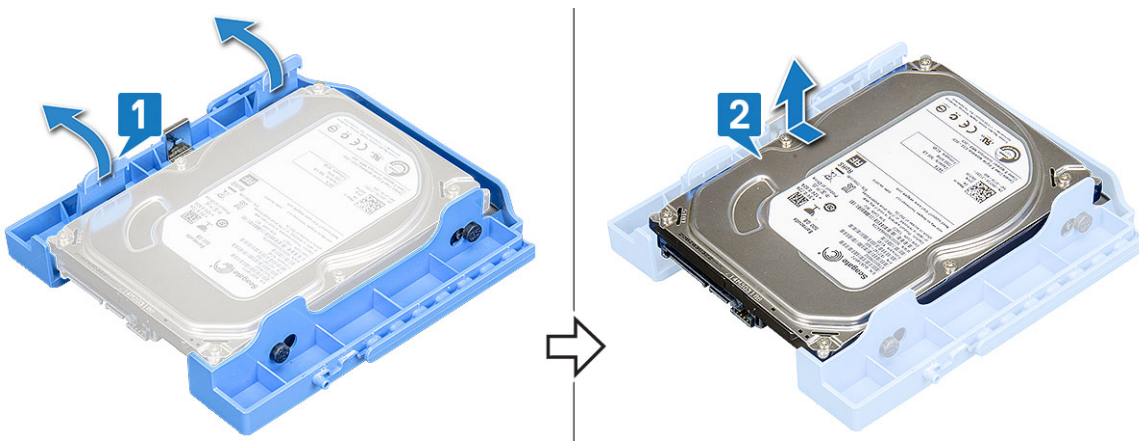


4. Install the:
  - a. front bezel
  - b. side cover
5. Follow the procedure in [After working inside your computer.](#)

## 3.5-inch hard drive

### Removing 3.5-inch hard drive from the hard drive bracket

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
  - c. [3.5-inch hard drive assembly](#)
3. To remove the hard drive bracket:
  - a. Pull one side of the hard drive bracket to disengage the pins on the bracket from the slots on the hard drive [1].  
**NOTE:** Do not pull plastic tab by more than 25° to avoid damage to the tabs.
  - b. Pull the hard drive out of the hard drive bracket.
  - c. Lift the hard drive out of the hard drive bracket [2].



### Installing the 3.5-inch hard drive into the hard drive bracket

1. Align the hard drive to the side of the hard drive bracket, and pull the other end tabs to insert the pins on the bracket into the hard drive [1].




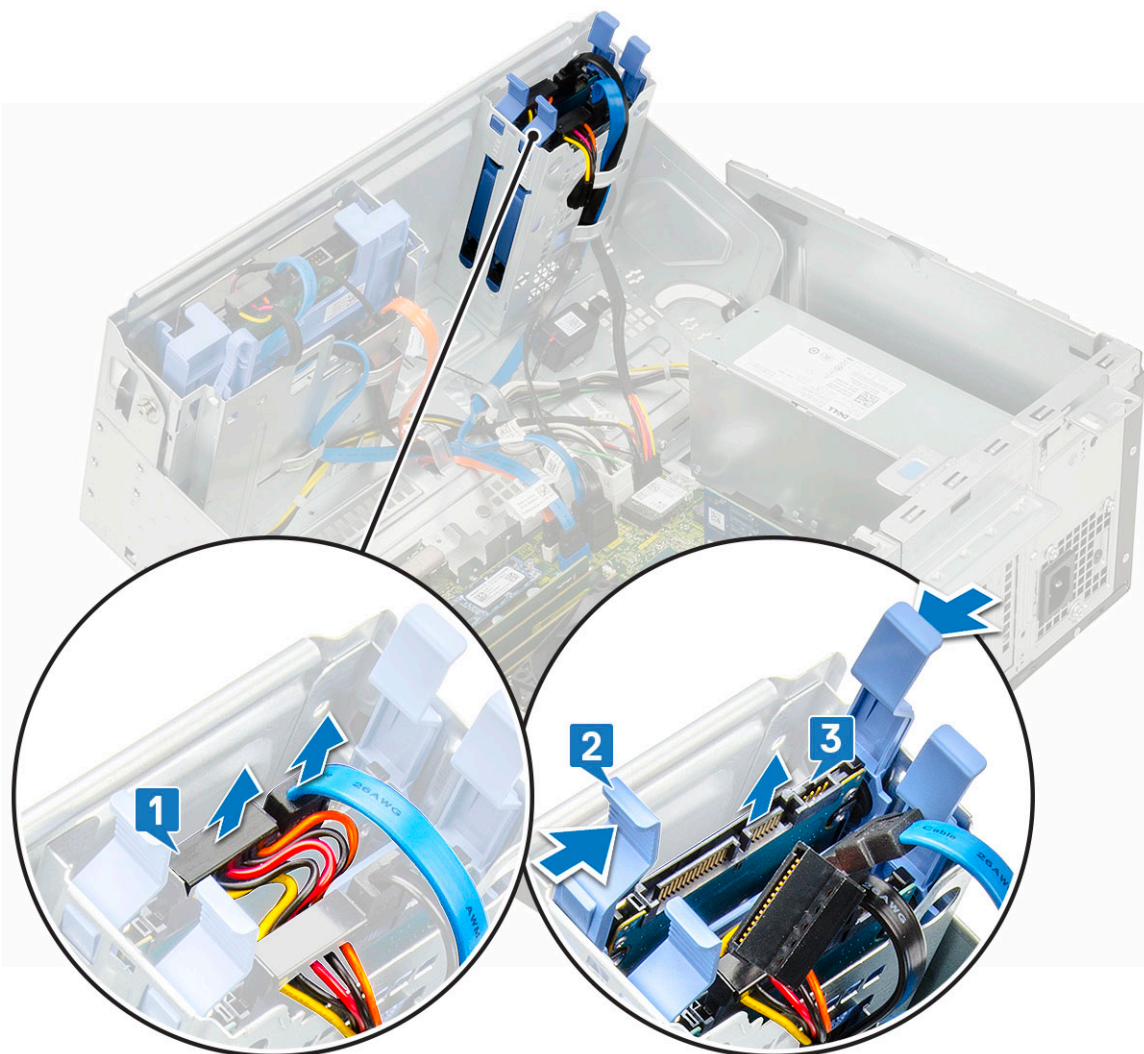
2. Insert the hard drive into the hard drive bracket and press until it clicks into place [2].
3. Install the:
  - a. [3.5-inch hard drive assembly](#)
  - b. [front bezel](#)
  - c. [side cover](#)
4. Follow the procedure in [After working inside your computer](#).

## 2.5-inch hard drive assembly

### Removing the 2.5-inch drive assembly

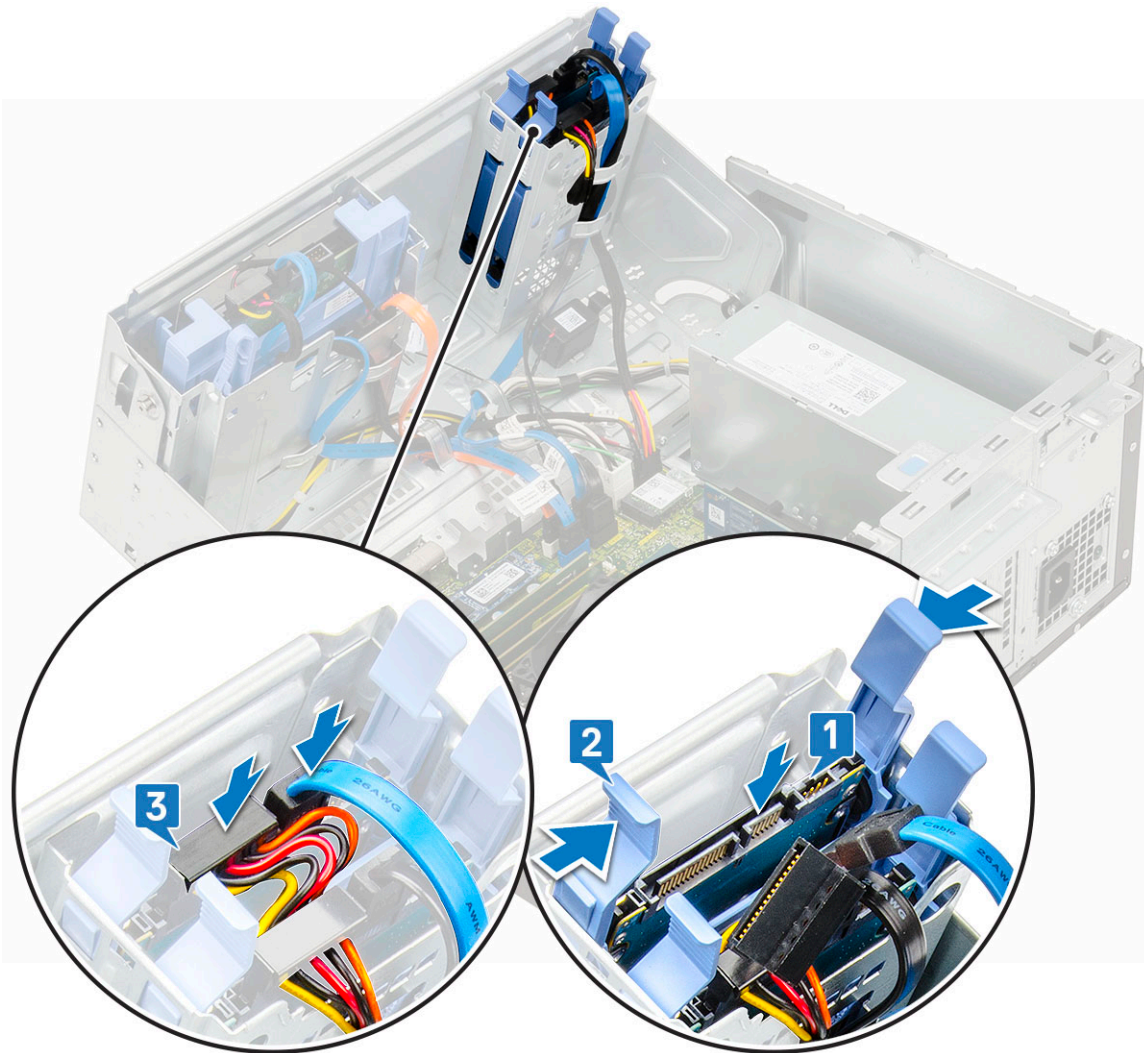
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the drive assembly:
  - a. Disconnect the drive assembly cables from the connectors on the drive [1].
  - b. Press the blue tabs on both sides [2] and pull the drive assembly out of the computer [3].

 **NOTE:** Gently press the blue tabs to avoid damage to the plastic tabs.



### Installing the 2.5-inch drive assembly

1. Insert the drive assembly into the slot on the computer and press until it clicks into place [1,2].
2. Connect the SATA cable and the power cable to the connectors on the drive [3].

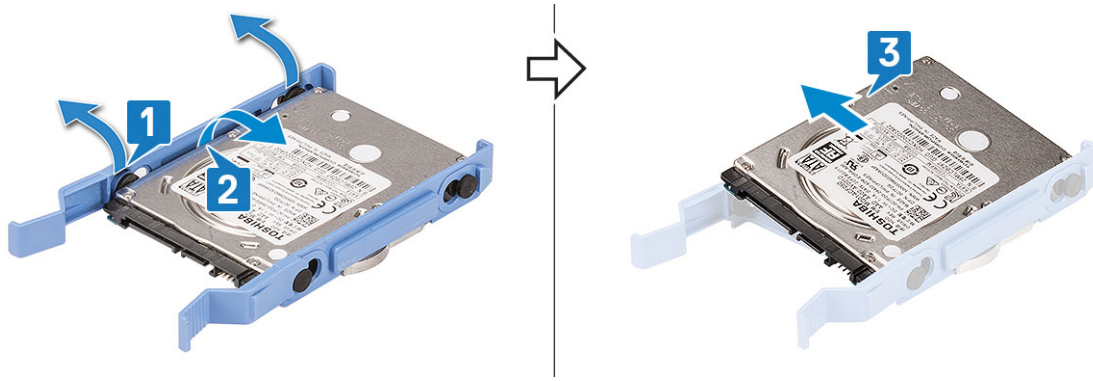


3. Close the [front panel door](#).
4. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
5. Follow the procedure in [After Working Inside Your Computer](#).

## 2.5-inch hard drive

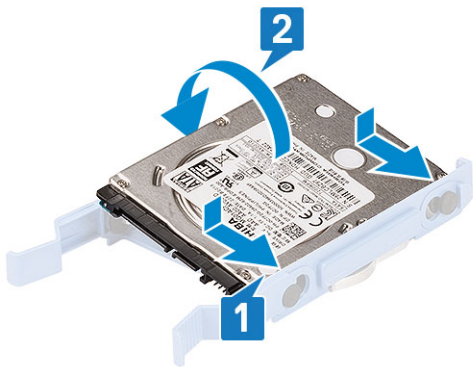
### Removing the 2.5–inch drive from the drive bracket

1. Follow the procedure in [Before Working Inside Your Computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
  - c. [2.5–inch drive assembly](#)
3. To remove the drive:
  - a. Pull one side of the drive bracket to disengage the pins on the bracket from the slots on the drive [1].
  - b. Lift the drive out of the drive bracket [2].



## Installing the 2.5-inch hard drive into the drive bracket

1. Align the hard drive to the side of the hard drive bracket, and pull the other end tabs to insert the pins on the bracket into the hard drive.



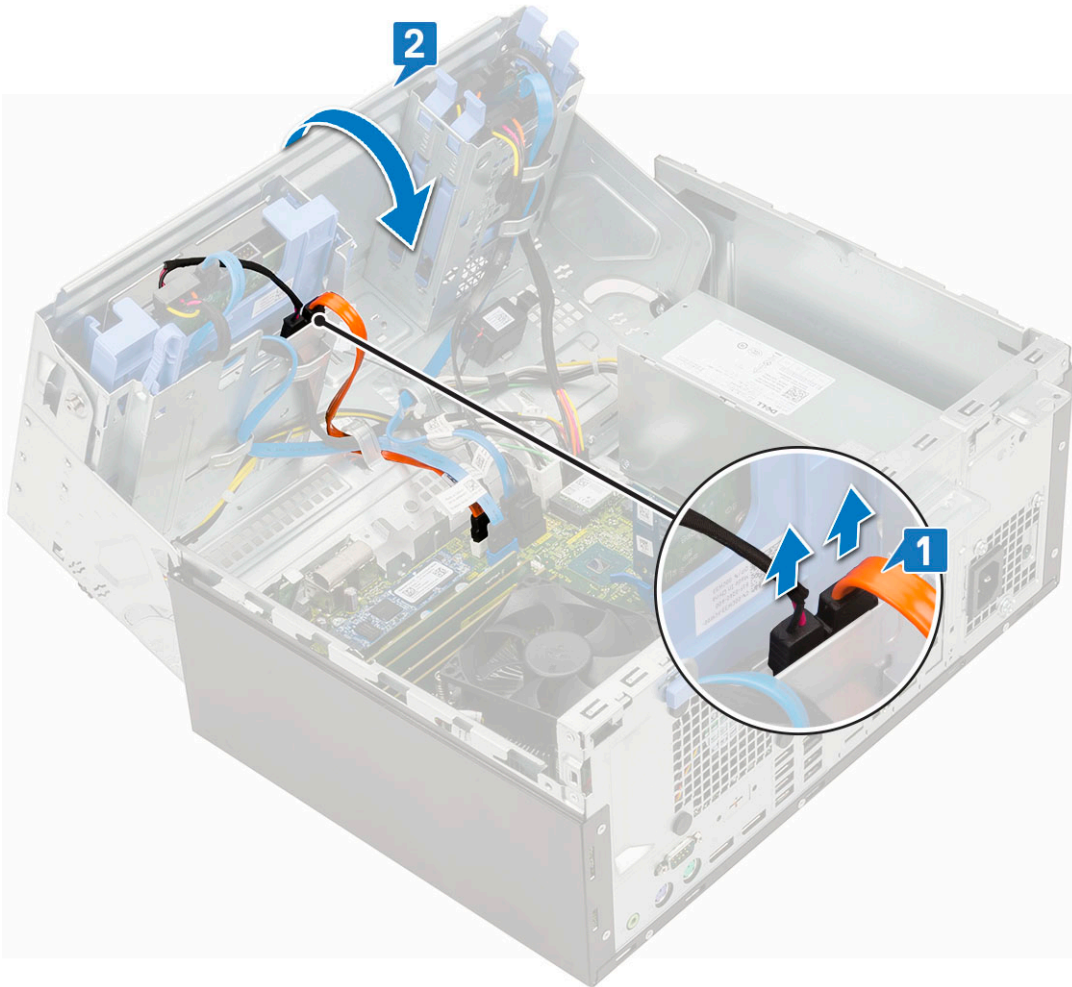
2. Insert the hard drive into the hard drive bracket and press the hard drive until it clicks into place.
3. Install the:
  - a. 2.5-inch drive assembly
  - b. front bezel
  - c. cover
4. Follow the procedure in [After working inside your computer](#).

## Optical drive

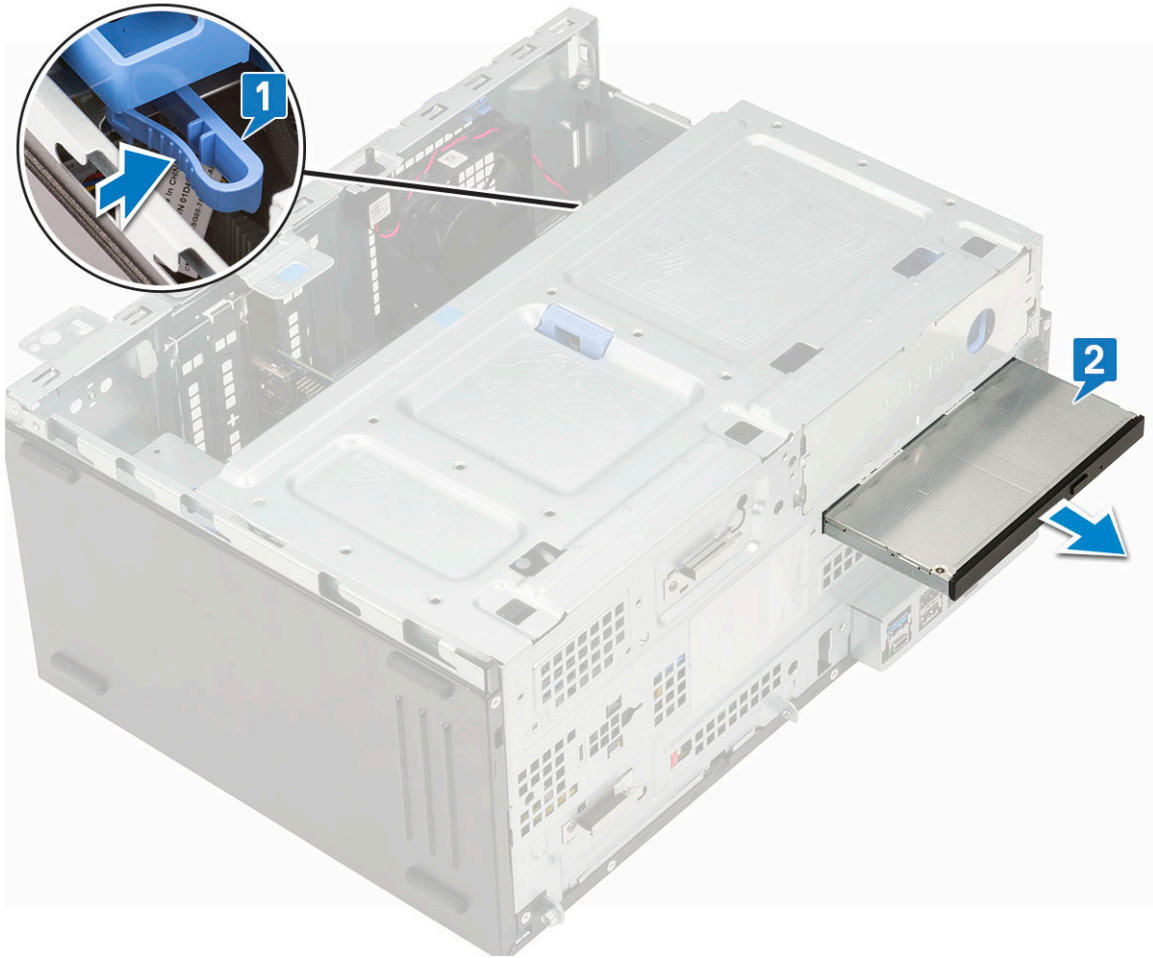
### Removing optical drive

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. side cover
  - b. front bezel
3. Open the [front panel door](#).
4. To remove the optical drive assembly:
  - a. Disconnect the data cable and power cable from the connectors on the optical drive [1].
 

**NOTE:** Ensure to unroute the cables from the tabs under the drive cage to allow you to disconnect the cables from the connectors.
  - b. Close the front panel door [2].

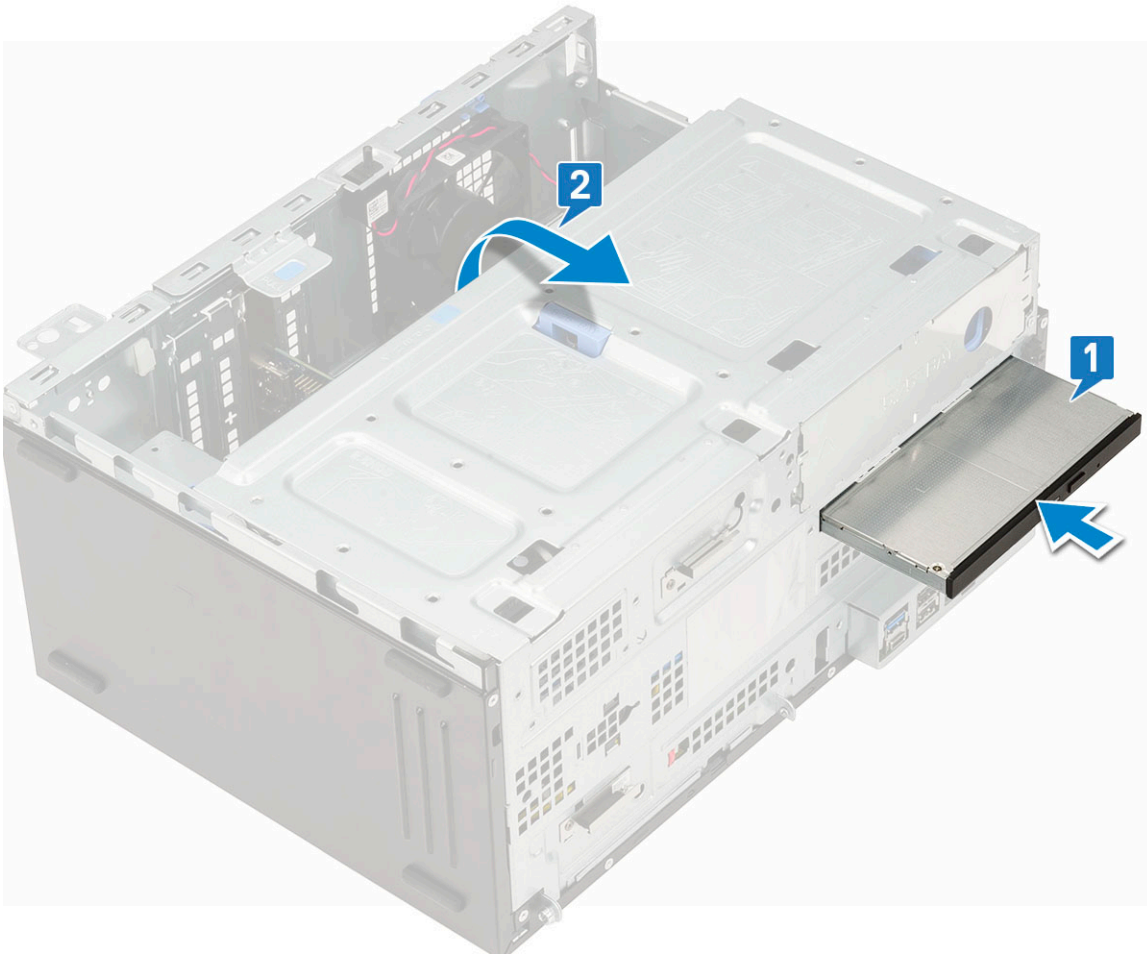


c. Press the blue release tab [1] and slide the optical drive out of the computer [2].

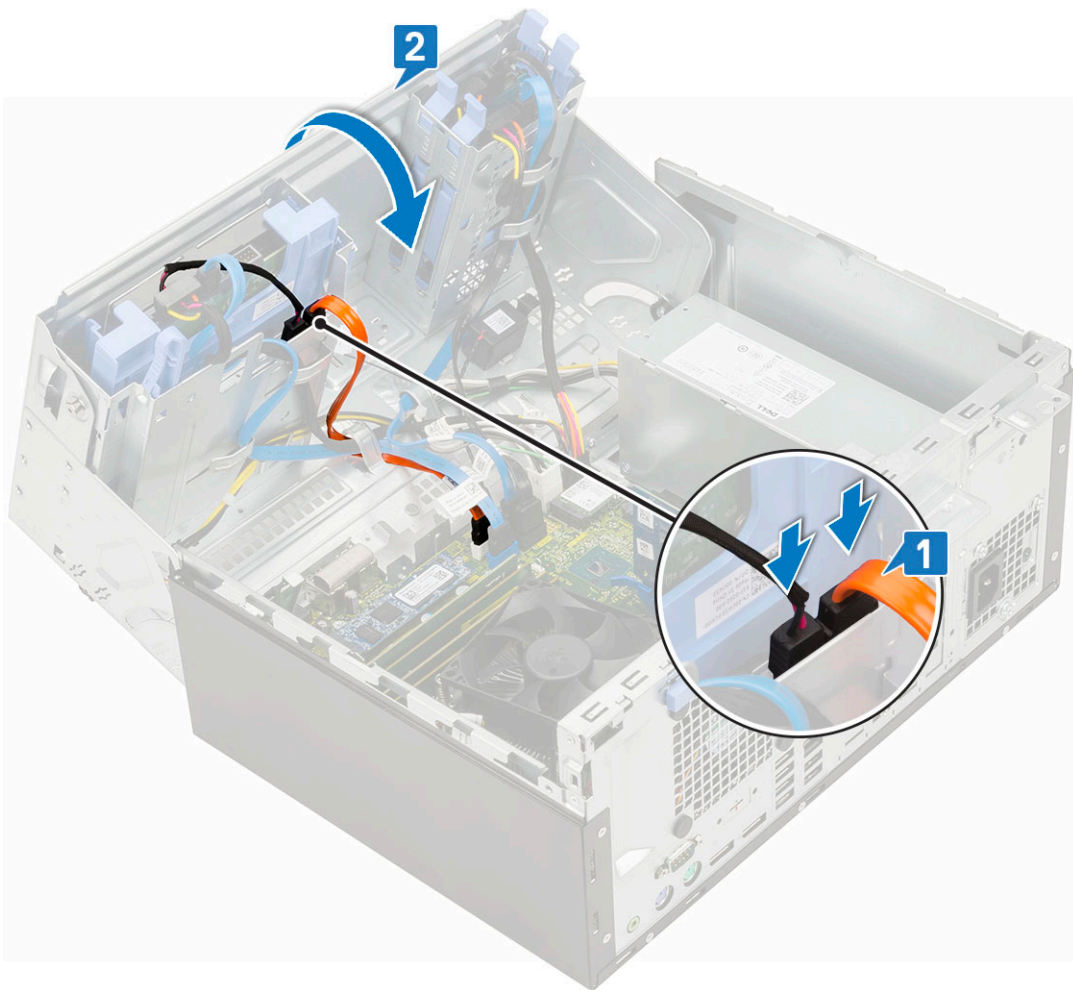


## Installing optical drive

1. Insert the optical drive into the optical drive bay until the blue release tab clicks into place.



2. Open the [front panel door](#) [2].
3. Route the data cable and power cable under the drive cage.
4. Connect the data cable and power cable to the connectors on the optical drive [3].

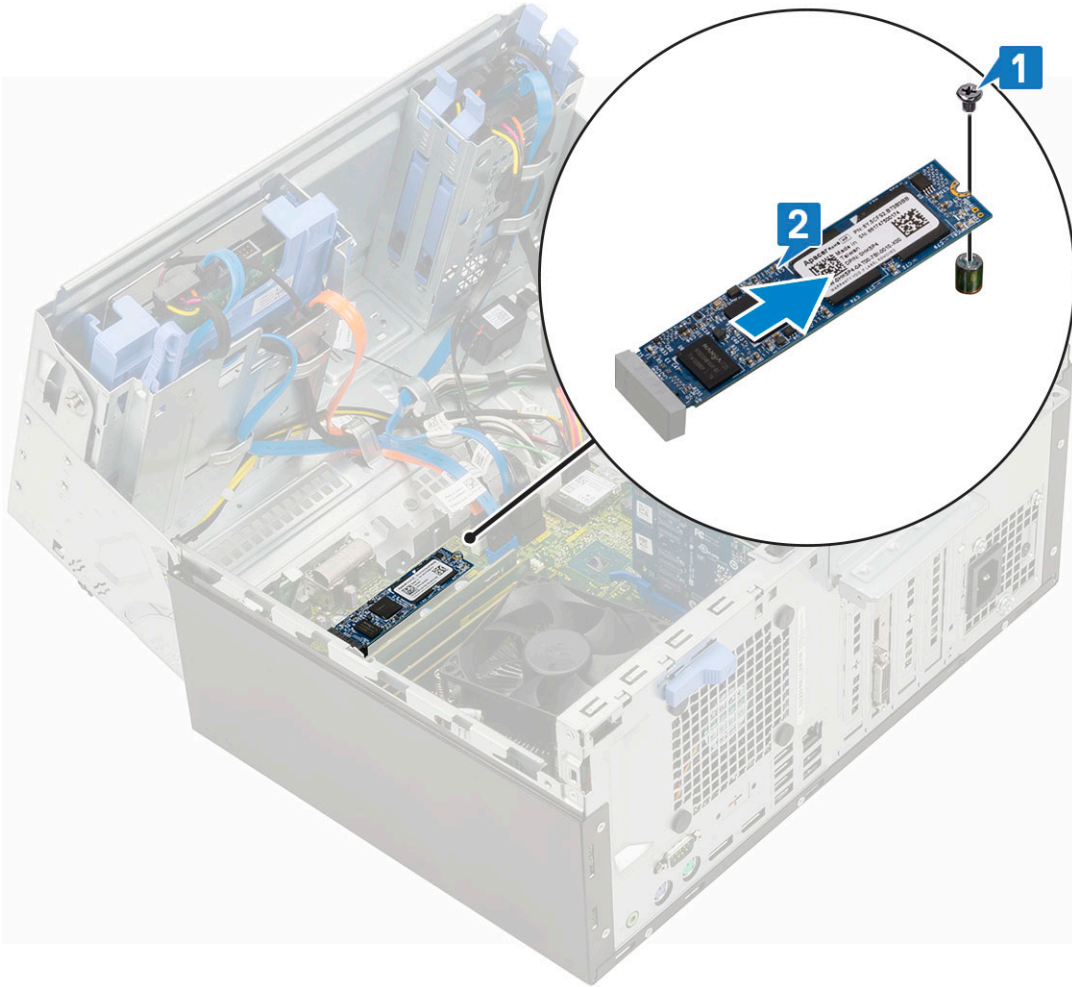


5. Close the front panel door.
6. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
7. Follow the procedure in [After working inside your computer](#).

## M.2 PCIe SSD

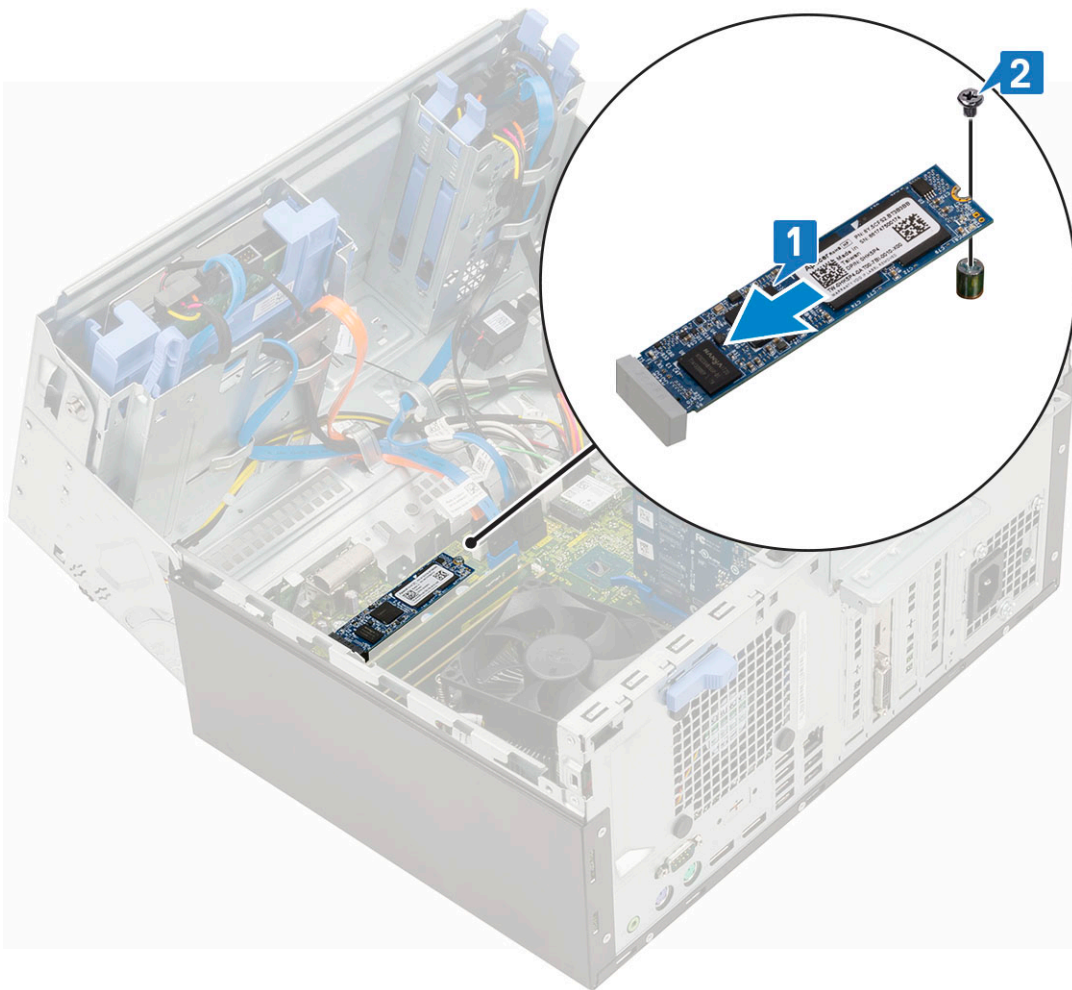
### Removing M.2 PCIe SSD - optional

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the M.2 PCIe SSD:
  - a. Remove the screw that secures the M.2 PCIe SSD to the system board [1].
  - b. Slide out the M.2 PCIe SSD from the connector on the system board [2].



## Installing M.2 PCIe SSD

1. Slide out the M.2 PCIe SSD from the connector on the system board [1].
2. Replace the screw that secures the M.2 PCIe SSD to the system board [2].

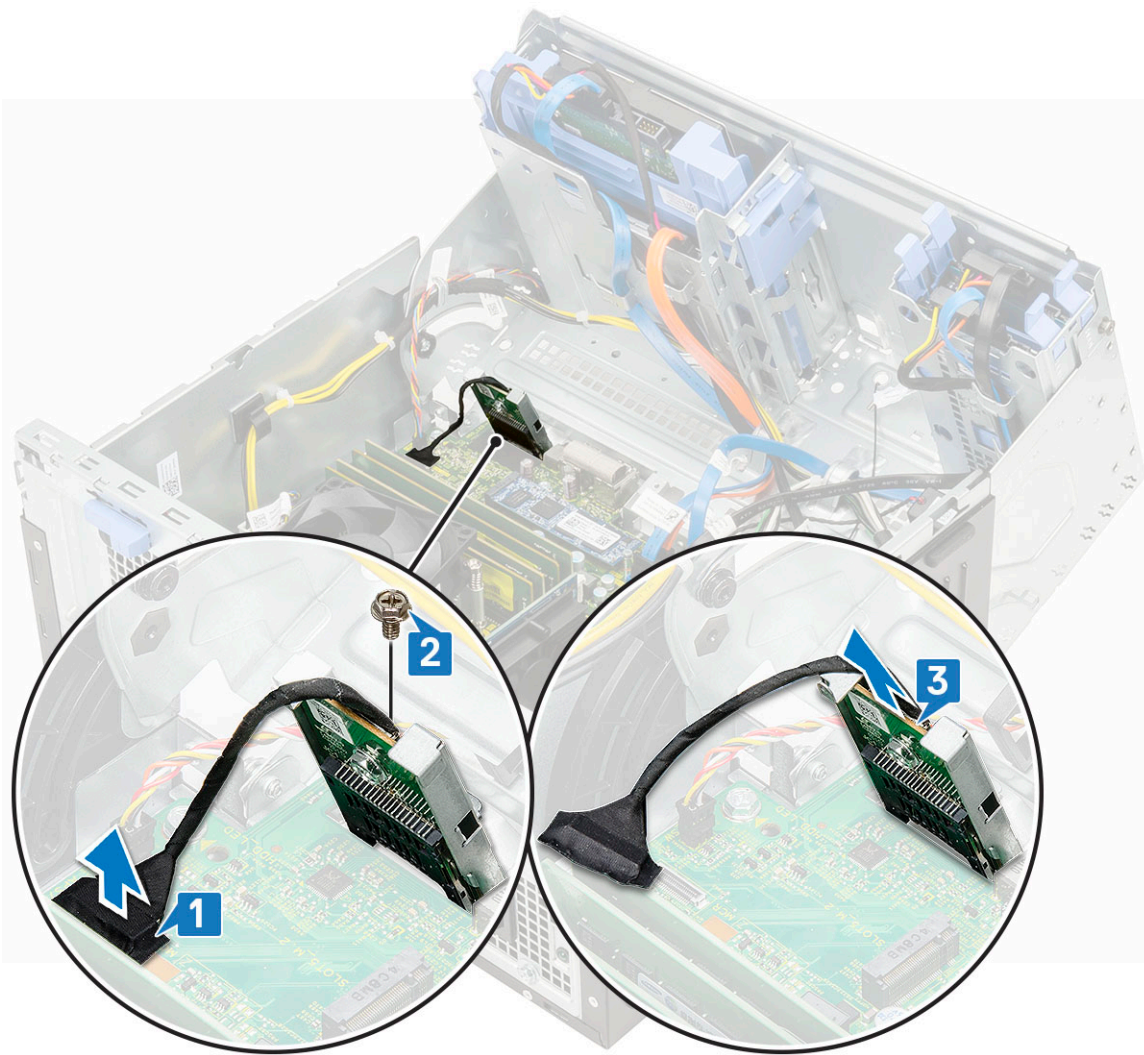


3. Close the [front panel door](#).
4. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
5. Follow the procedure in [After working inside your computer](#).

## SD card reader

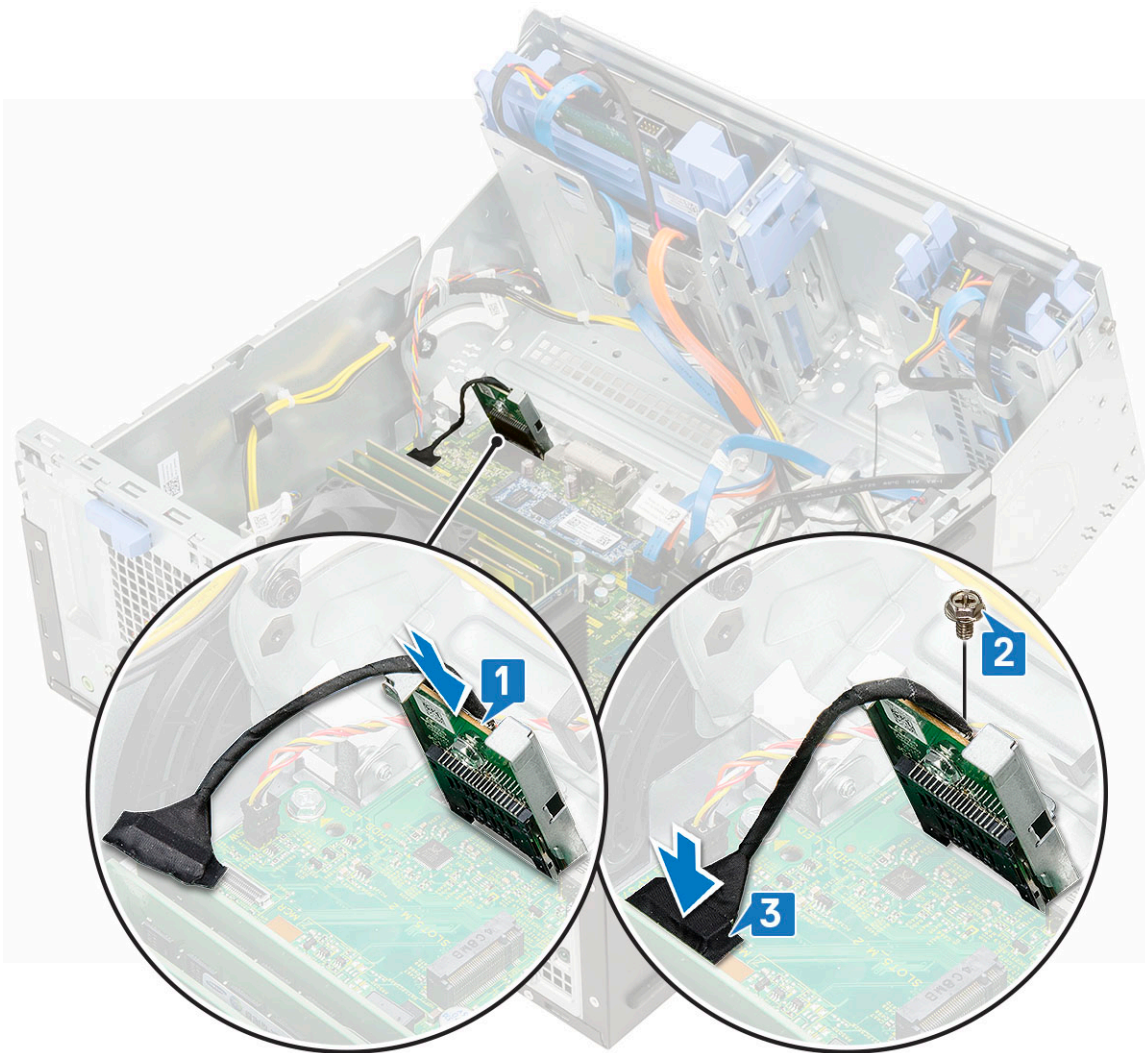
### Removing SD card reader

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the SD card reader:
  - a. Disconnect the SD card reader cable from the connector on the system board [1].
  - b. Remove the screw that secures the SD card reader to the front panel door [2].
  - c. Lift the SD card reader out of the computer chassis [3].



## Installing SD card reader

1. Insert the SD card reader into the slot on the front panel door [1].
2. Tighten the screw to secure the SD card reader to the front panel door [2].
3. Connect the SD card reader cable to the connector on the system board [3].



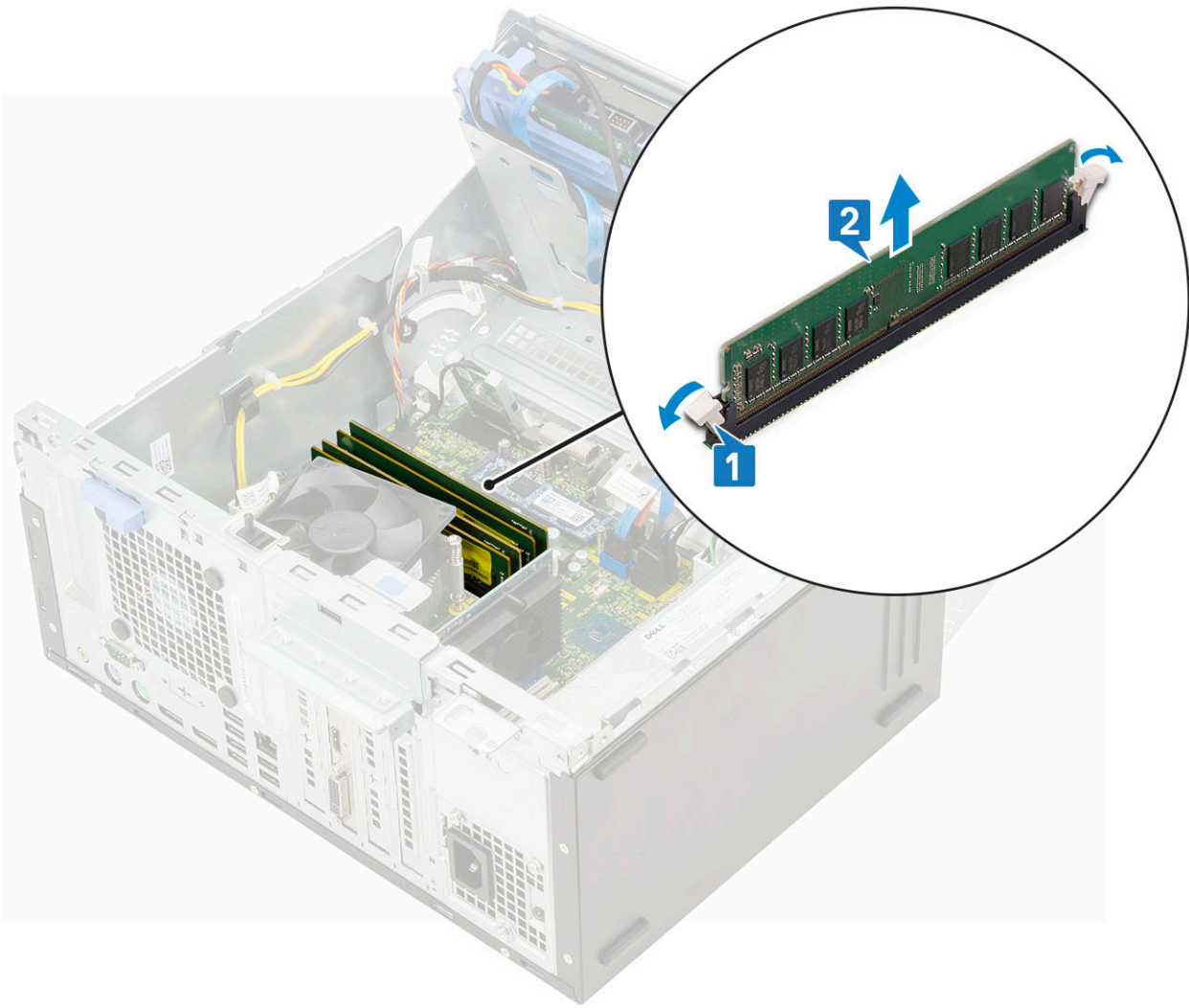
4. Close the [front panel door](#).
5. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
6. Follow the procedure in [After working inside your computer](#).

## Memory module

### Removing memory module

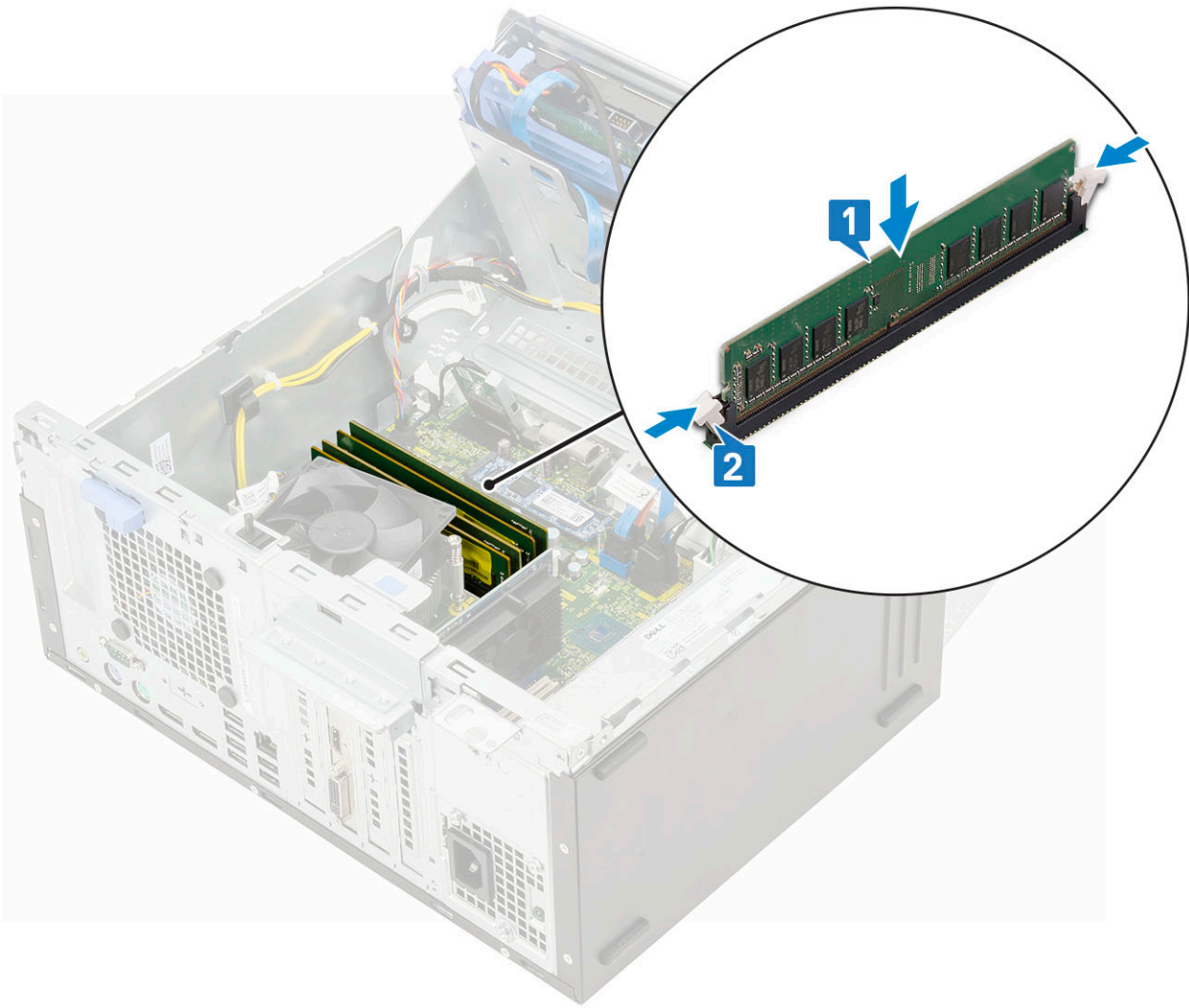
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the memory module:
  - a. Push the memory module retention tabs on both sides of the memory module [1].
  - b. Pull the memory module from the memory module connector on the system board [2].

**i** **NOTE:** Follow the step 4a., 4b to remove the other memory modules.



## Installing memory module

1. Align the notch on the memory module with the tab on the memory module connector.
2. Insert the memory module into the memory module socket [1].
3. Press the memory module until the memory module retention tabs click into place [2].



**i** **NOTE:** Bison XE3 supports 4 memory module.

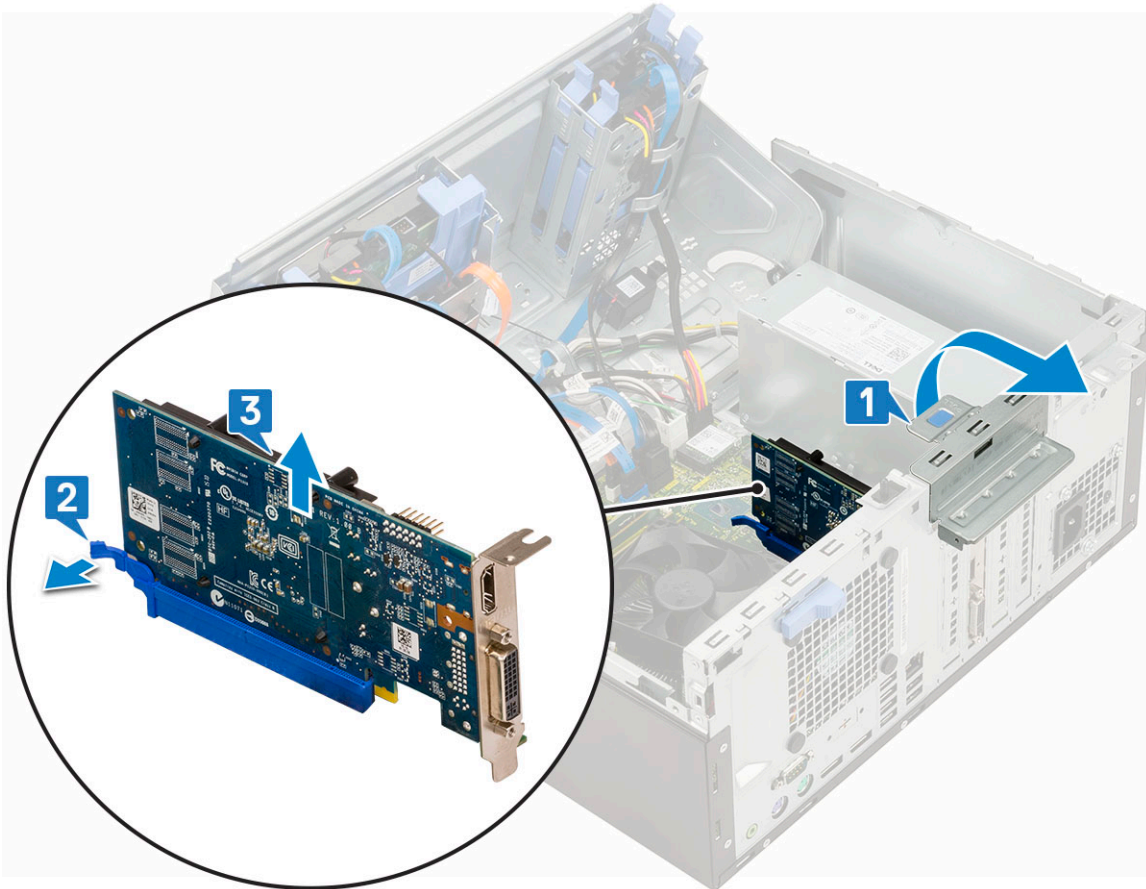
4. Close the [front panel door](#).
5. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
6. Follow the procedure in [After working inside your computer](#).

## Expansion card

### Removing PCIe expansion card - optional

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the PCIe expansion card:
  - a. Pull the blue release tab that secures the PCIe expansion card to the system board [1].
  - b. Pull the card retention latch, and lift the PCIe expansion card from the connector on the system board [2,3].

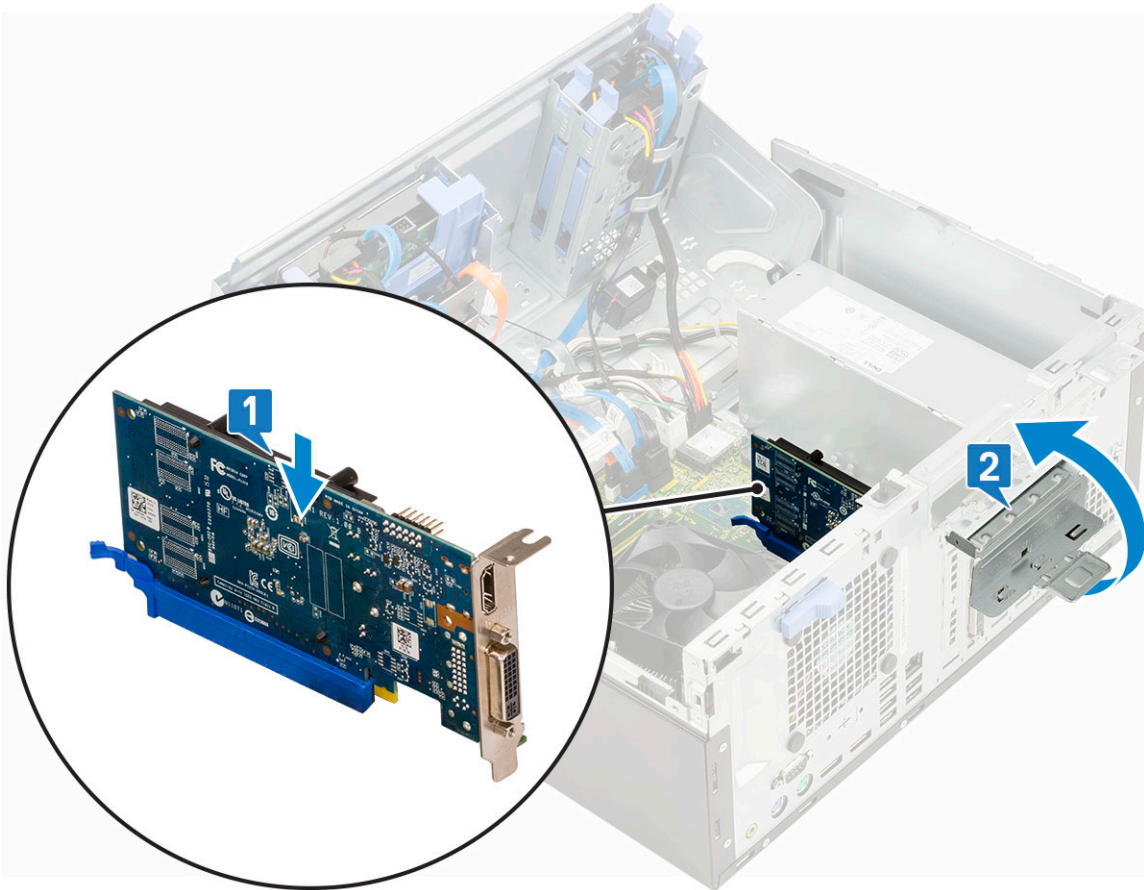
**NOTE:** The step is applicable only for the connector with card retention latch, otherwise, lift the PCIe expansion card out of the computer.



5. Repeat the steps to remove any additional PCIe expansion card

## Installing PCIe expansion card

1. Insert the M.2 PCIe Card to the connector and push the PCIe Card to secure the card with the connector [1].
2. Release the card retention latch to secure the PCIe expansion card [2].

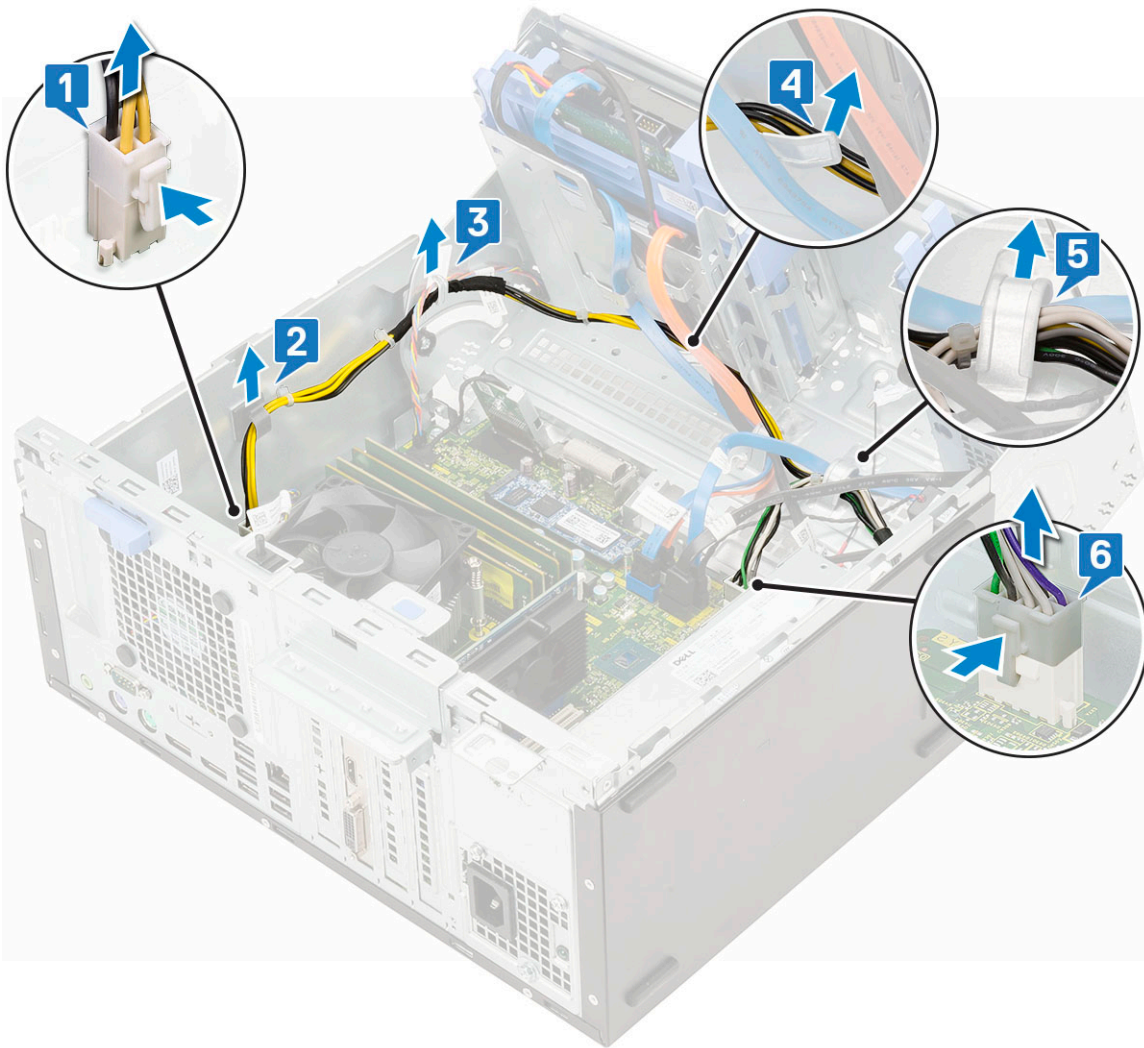


3. Repeat the step 1 to install additional PCIe expansion card.
4. Close the [front panel door](#).
5. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
6. Follow the procedure in [After working inside your computer](#).

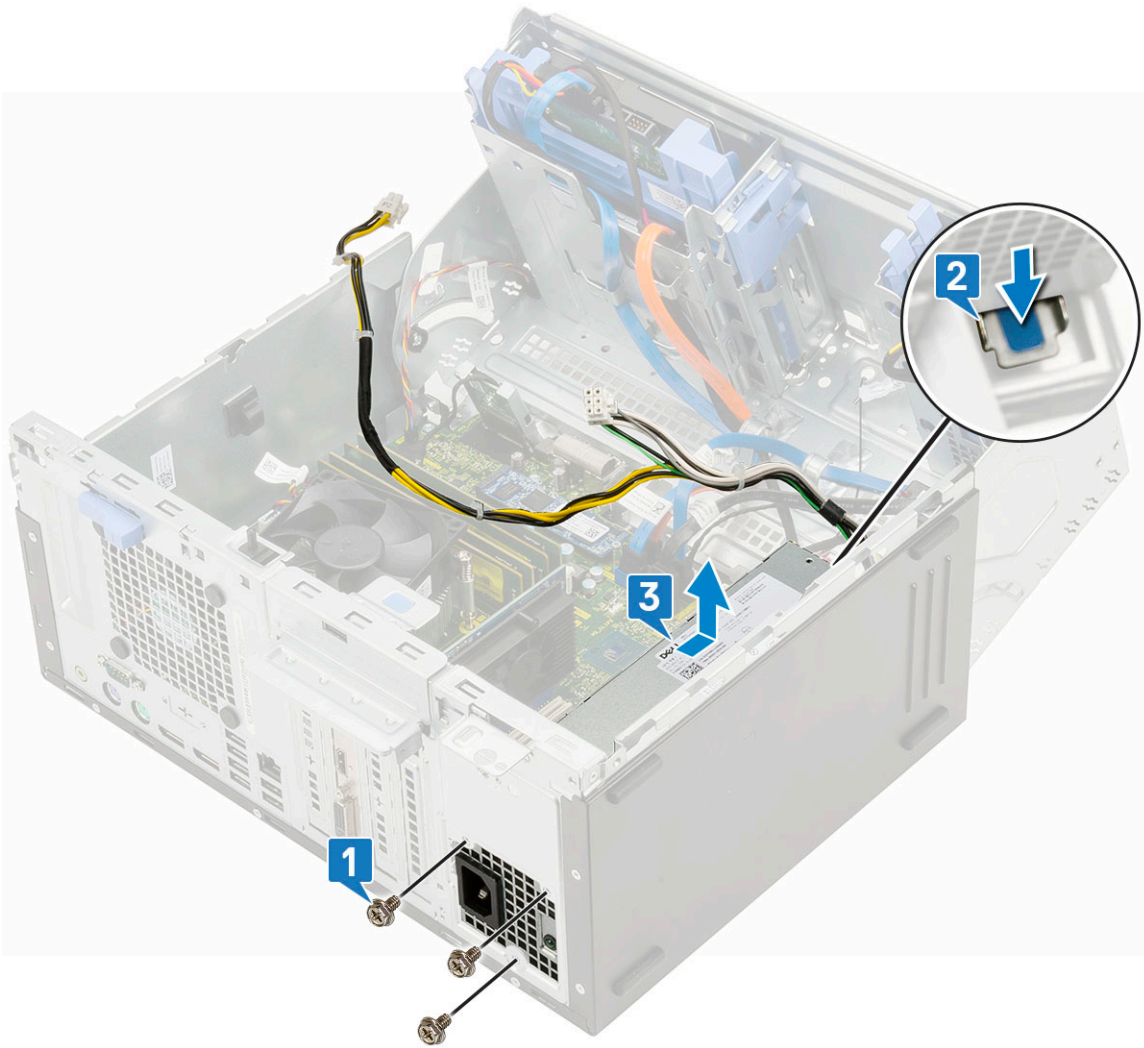
## Power supply unit

### Removing power supply unit or PSU

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To release the PSU:
  - a. Press the latch and disconnect the PSU cables from the connectors on the system board [1].
  - b. Unroute the PSU cable from the retention clip to release the cable [2,3,4,5].
  - c. Press the latch and disconnect the cables from the connector on the system board [6].

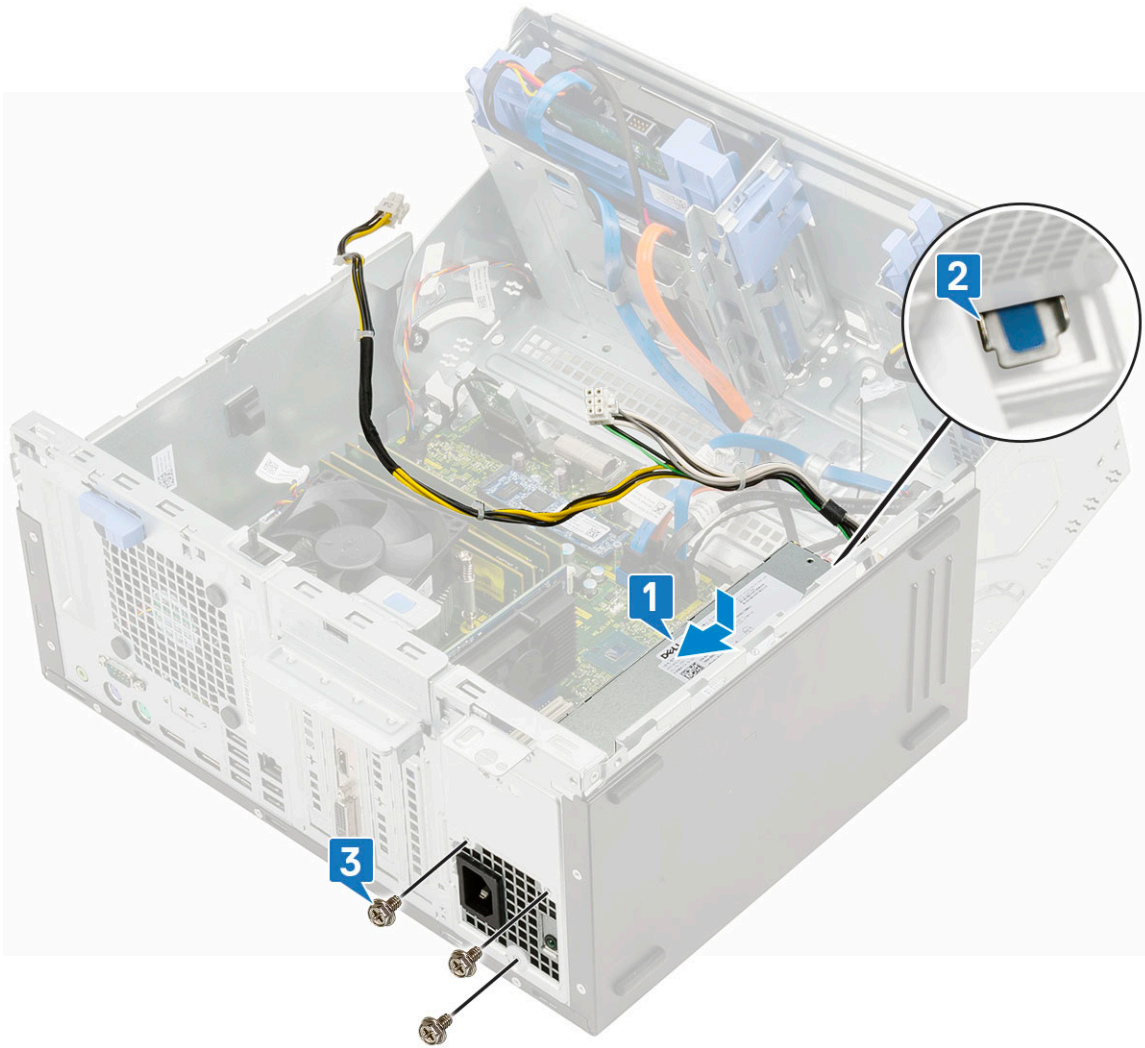


5. To remove the PSU:
- a. Remove the screw (3) to release the PSU from the computer chassis [1].
  - b. Press the release tab [2].
  - c. Slide and lift the PSU away from the computer [3].

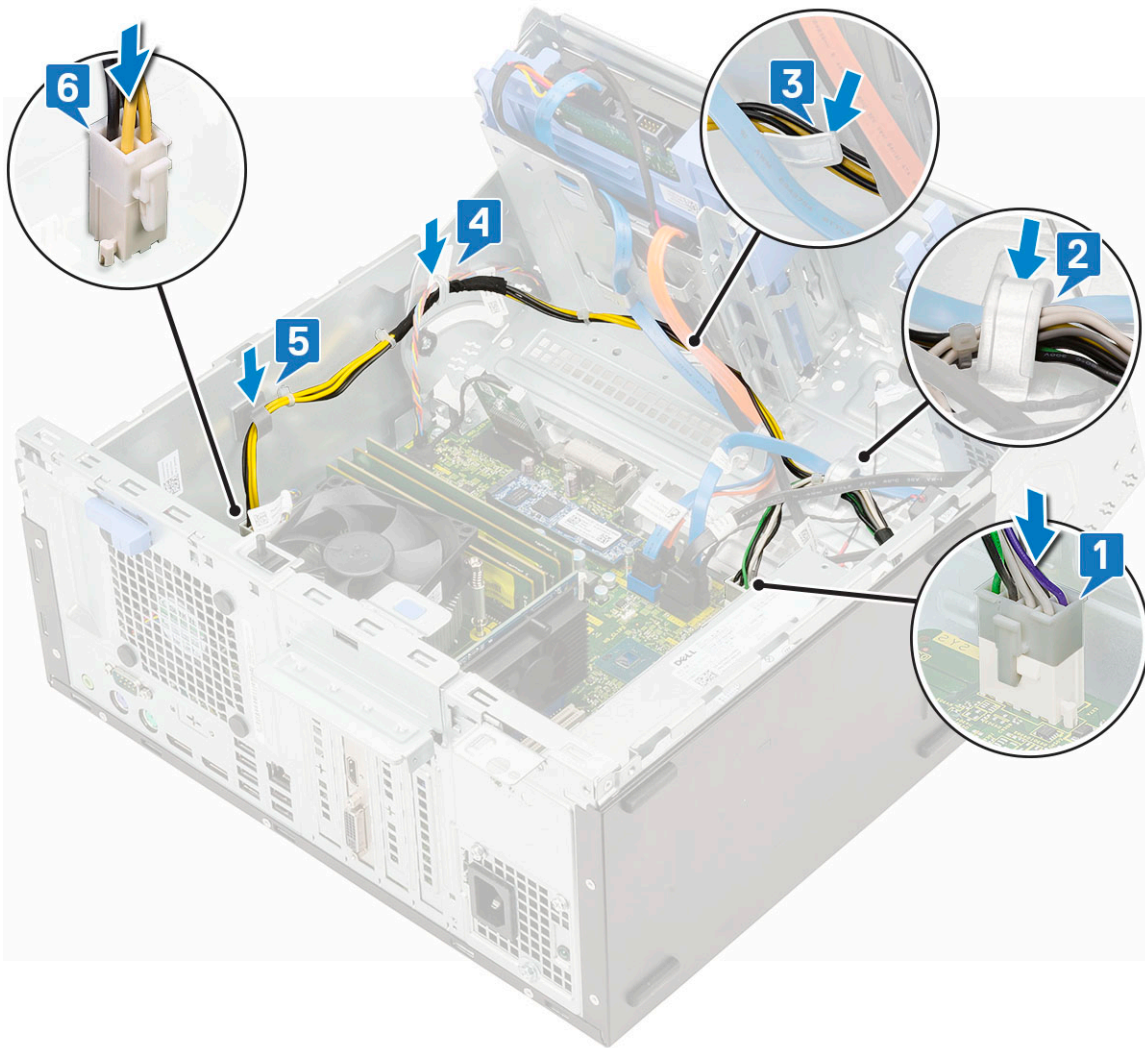


## Installing power supply unit or PSU

1. Insert the PSU into the PSU slot and slide it toward the back of the computer until it clicks into place{1,2}



2. Tighten the screws (3) to secure the PSU to the computer chassis [3].
3. Route the PSU cables through the retention clips [2,3,4,5].
4. Connect the PSU cables to the connectors on the system board [1,6].



5. Close the [front panel door](#).
6. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
7. Follow the procedure in [After working inside your computer](#).

## Intrusion switch

### Removing intrusion switch

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the intrusion switch:
  - a. Press the latch and disconnect the intrusion switch cable from the connector on the system board and pull the cable [1].
  - b. Unroute the intrusion switch cable from the fan grommet [2].
  - c. Slide the intrusion switch and push it to remove from the computer [3].



## Installing intrusion switch

1. Insert the intrusion switch and slide the switch into the slot on the computer chassis [1].
2. Route the intrusion switch cable through the fan grommet [2].
3. Connect the intrusion switch cable to the connector on the system board [3].

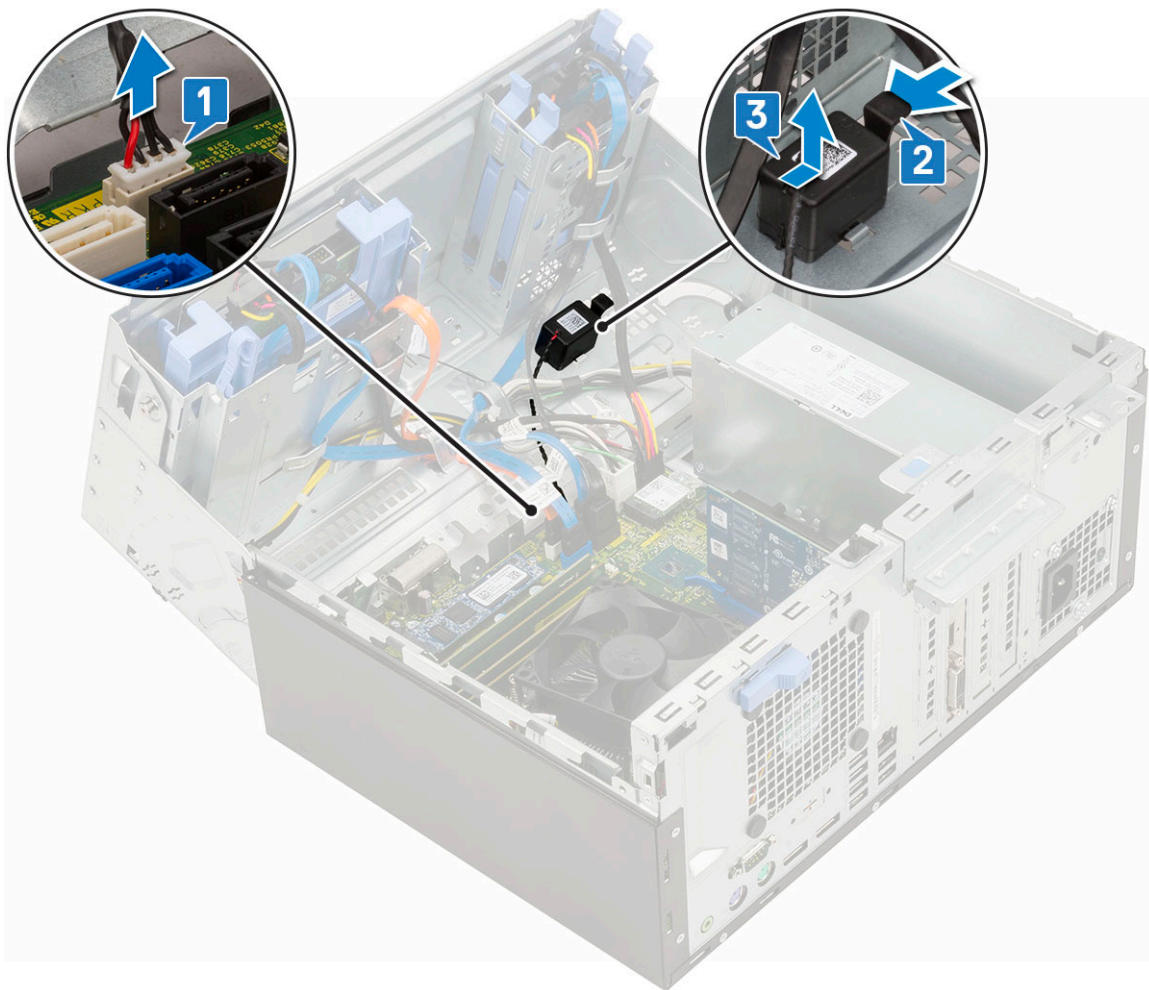


4. Close the [front panel door](#).
5. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
6. Follow the procedure in [After working inside your computer](#).

## Speaker

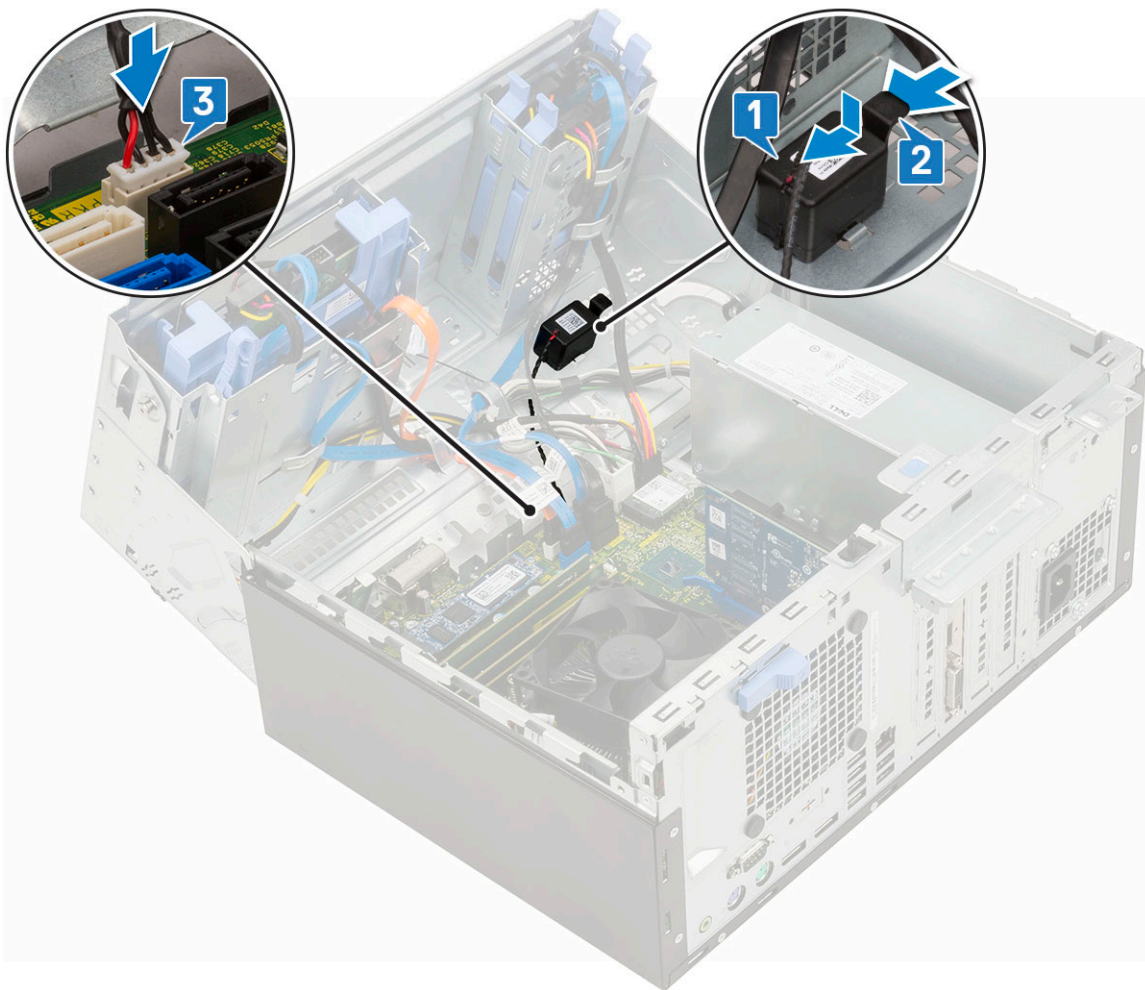
### Removing speaker

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the speaker:
  - a. Disconnect the speaker cable from the connector on the system board [1].
  - b. Press the release tabs [2], and slide the speaker out of the slot [3].



## Installing speaker

1. Insert the speaker into the slot [1] and slide it until it clicks into place [2].
2. Connect the speaker cable to the connector on the system board [3].

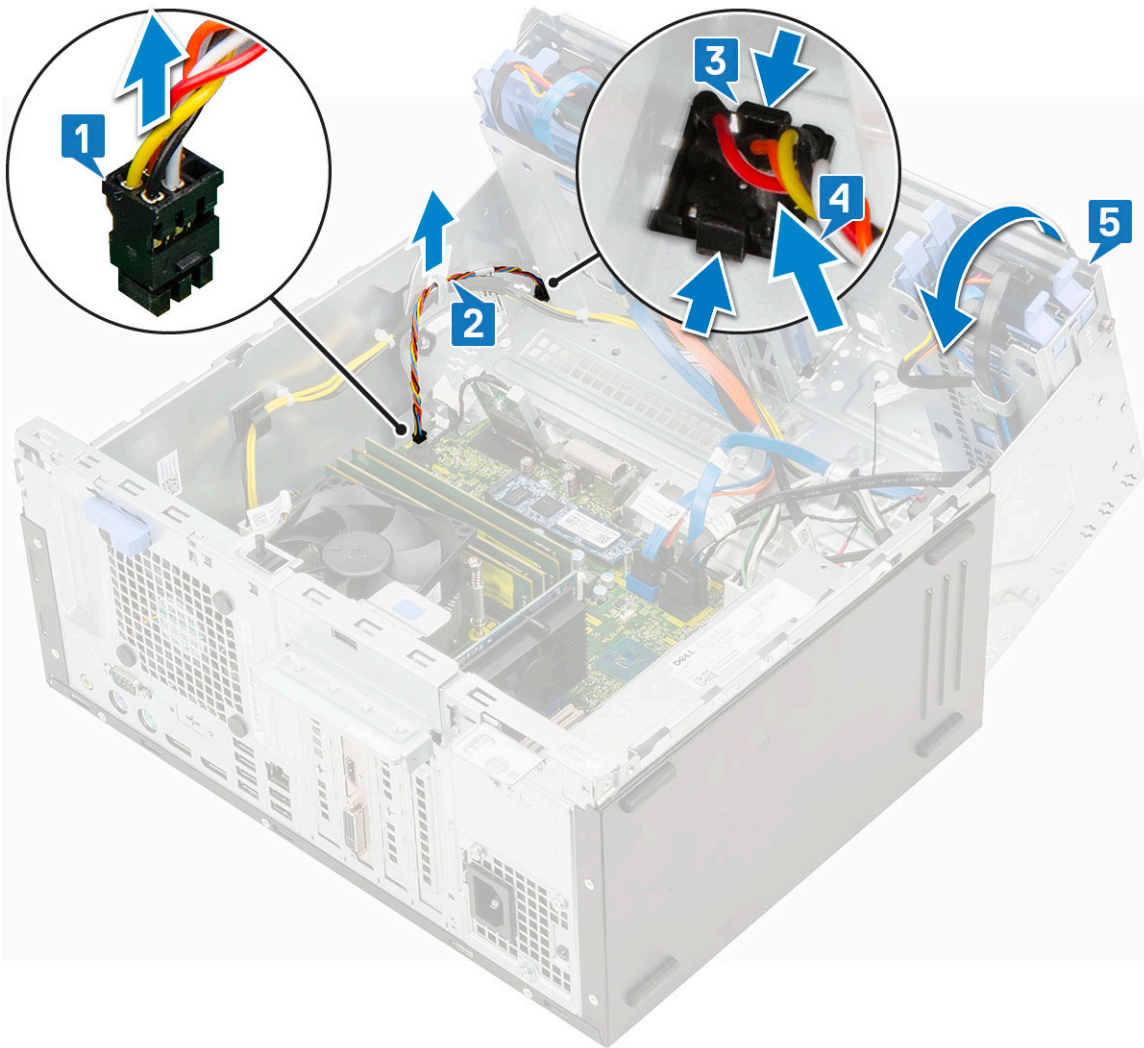


3. Close the [front panel door](#).
4. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
5. Follow the procedure in [After working inside your computer](#).

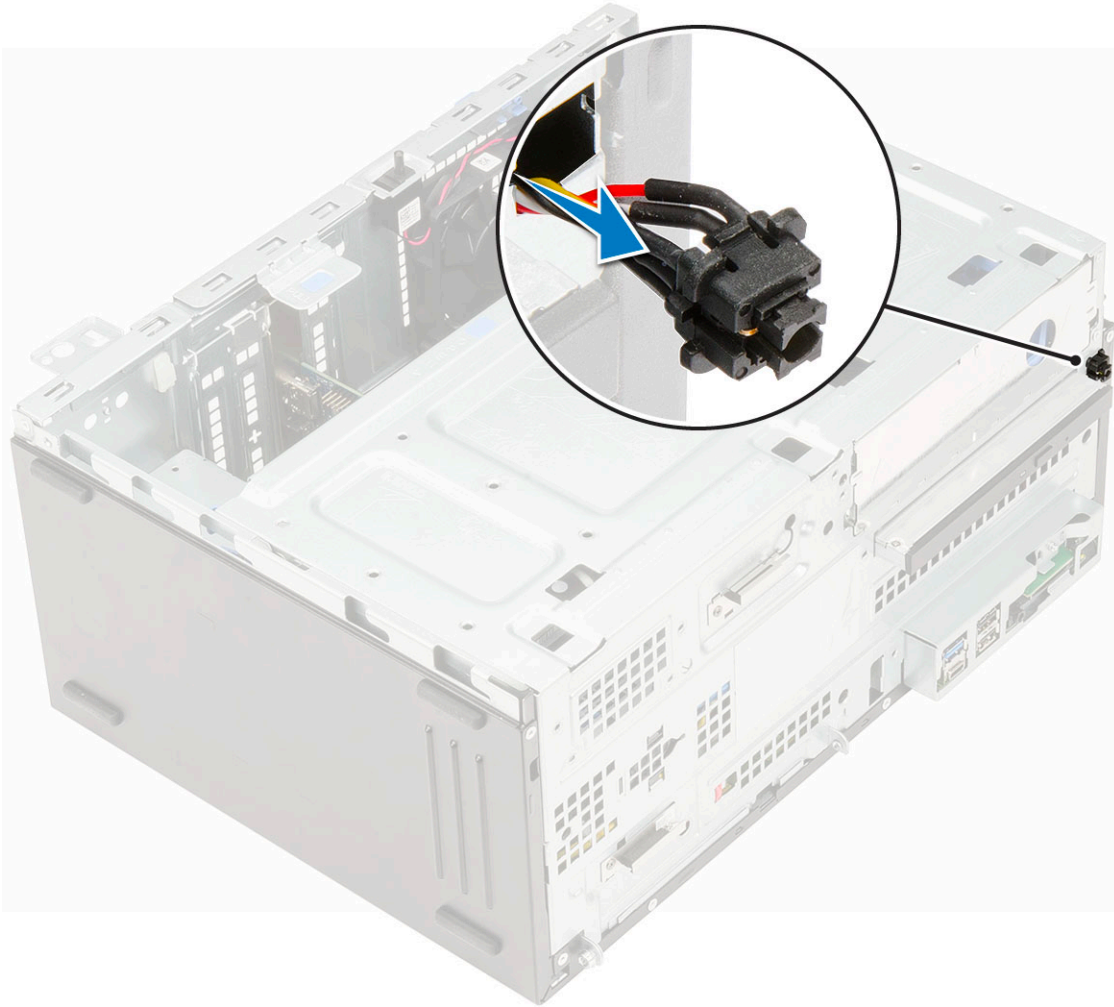
## Power button

### Removing power button

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To release the power switch:
  - a. Pull the socket to disconnect the power switch cable from the system board [1].
  - b. Unroute the power switch cable through the retention clip [2].
  - c. Press the release tabs using a plastic scribe and slide the power switch out from the front of the computer [3].
  - d. Close the front panel door [4].

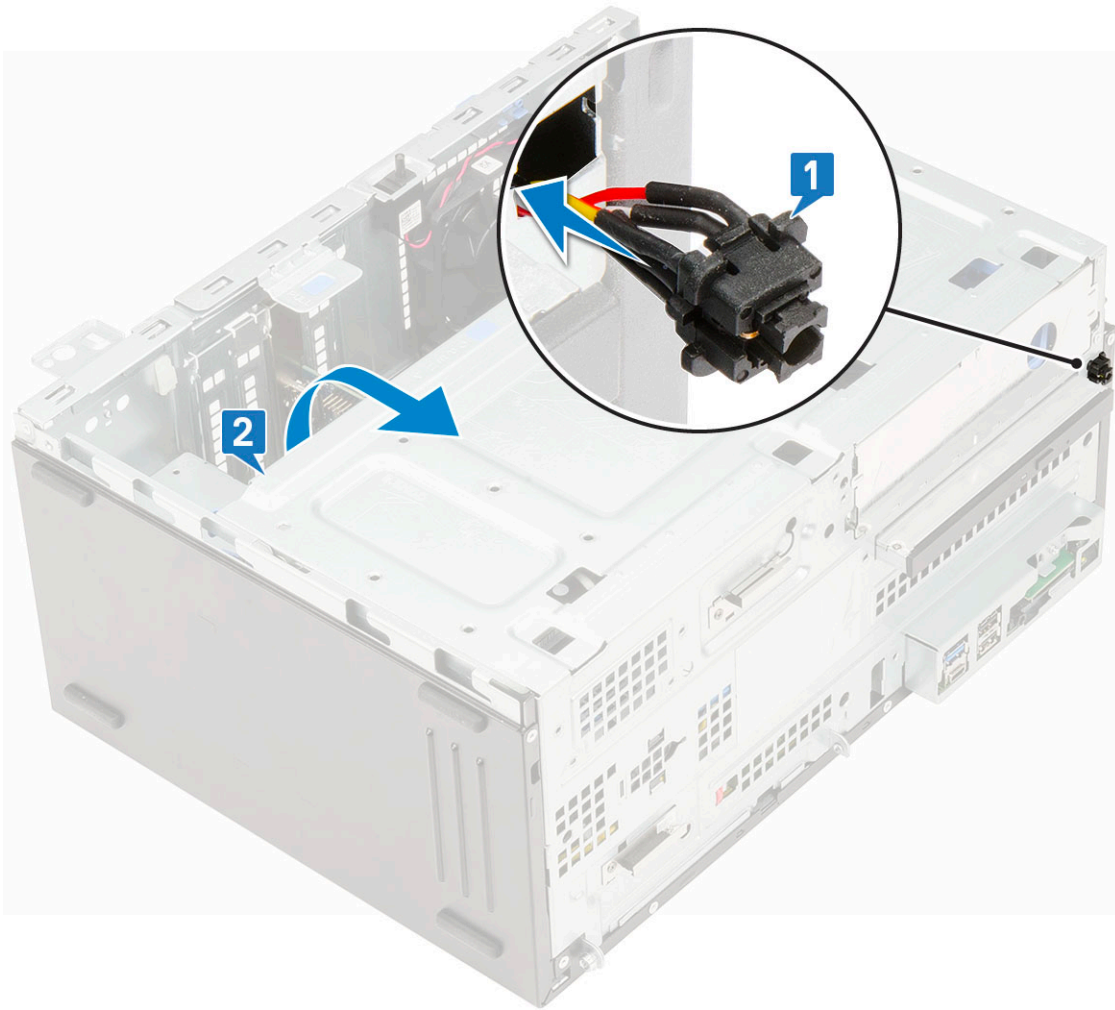


5. Pull the power switch out from the computer.

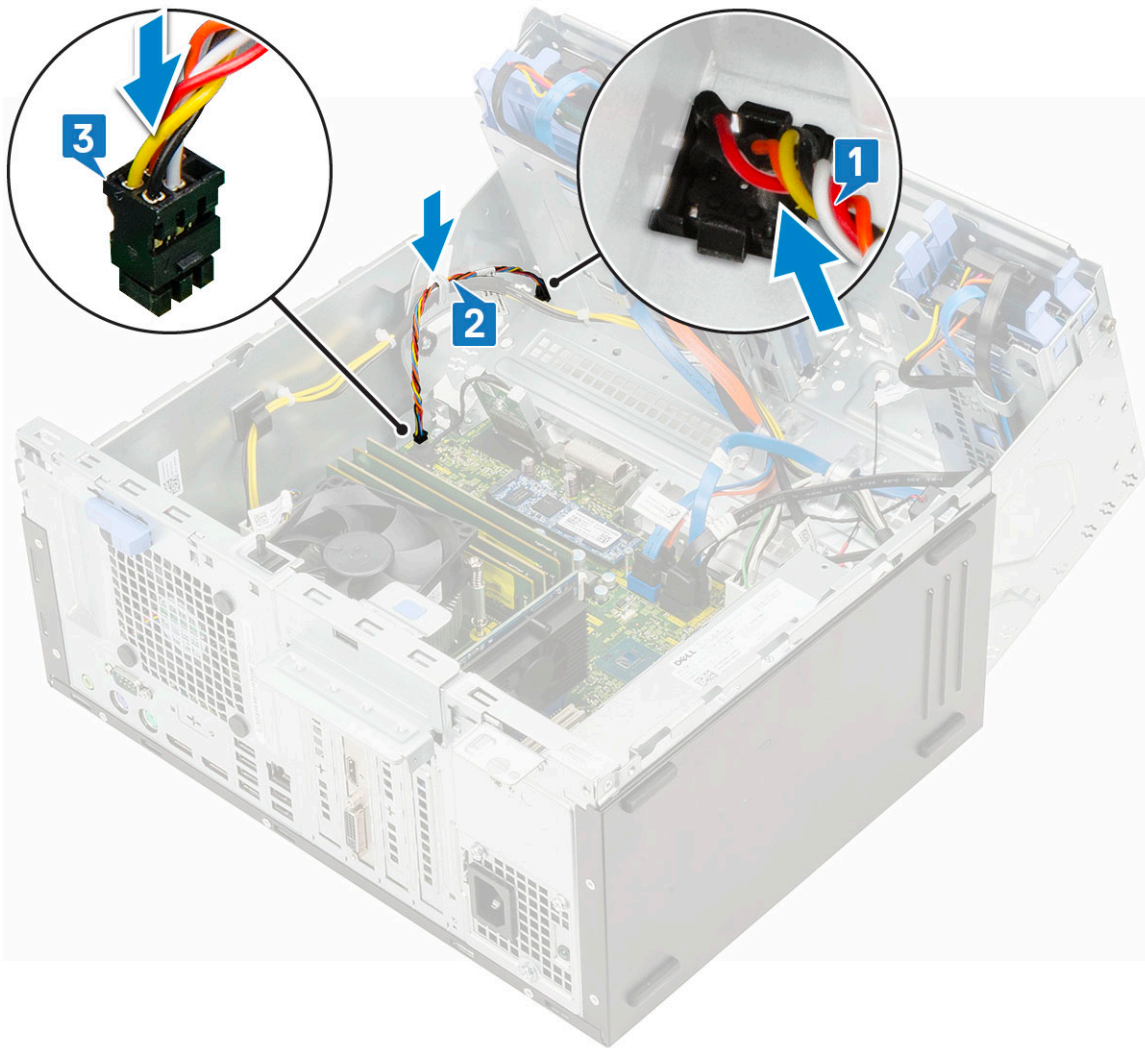


## Installing power button

1. Insert the power switch into the slot from the front of the computer.



2. Open the front panel [1].
3. Press the power switch to the slot on the computer chassis [2].
4. Route the power switch cable through the retention clip [3].
5. Align the cable with the pins on the connector and push to connect the cable.



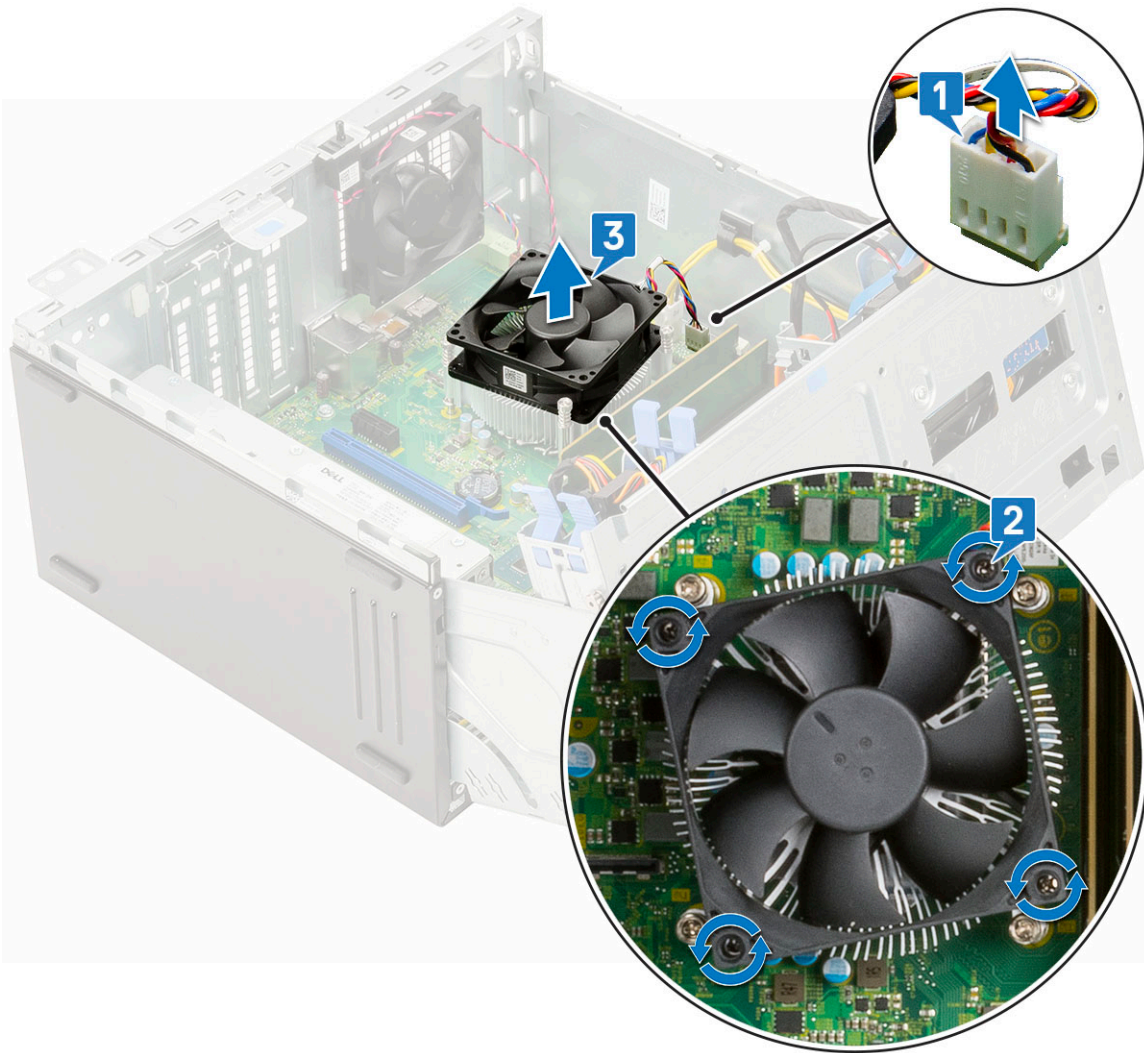
6. Close the [front panel door](#).
7. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
8. Follow the procedure in [After working inside your computer](#).

## Heat sink fan

### Removing heat sink fan

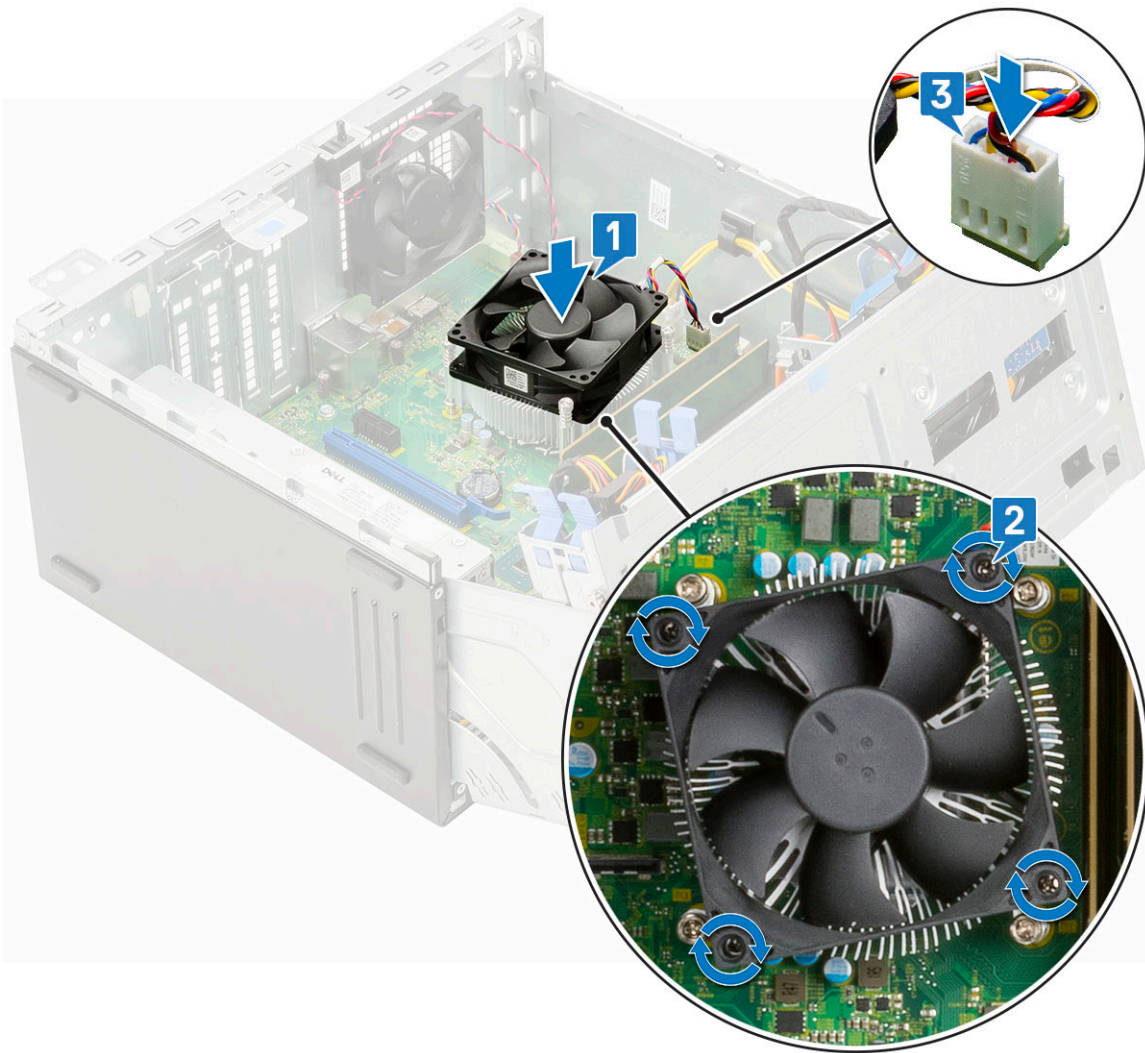
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the heatsink fan assembly:
  - a. Disconnect the heatsink fan assembly cable from the connector on the system board [1].
  - b. Remove the screws that secure the fan to the heat sink [2].

**i** **NOTE:** Ensure to insert the Torx screw driver from top screw hole to remove the screws.
  - c. Lift the heatsink fan away from the computer [3].



## Installing heatsink fan

1. Place the fan on the heatsink assembly [1].
2. Tighten the screws (4) to secure the fan to the heatsink assembly [2].
3. Connect the heatsink fan assembly cable to the connector on the system board [3].

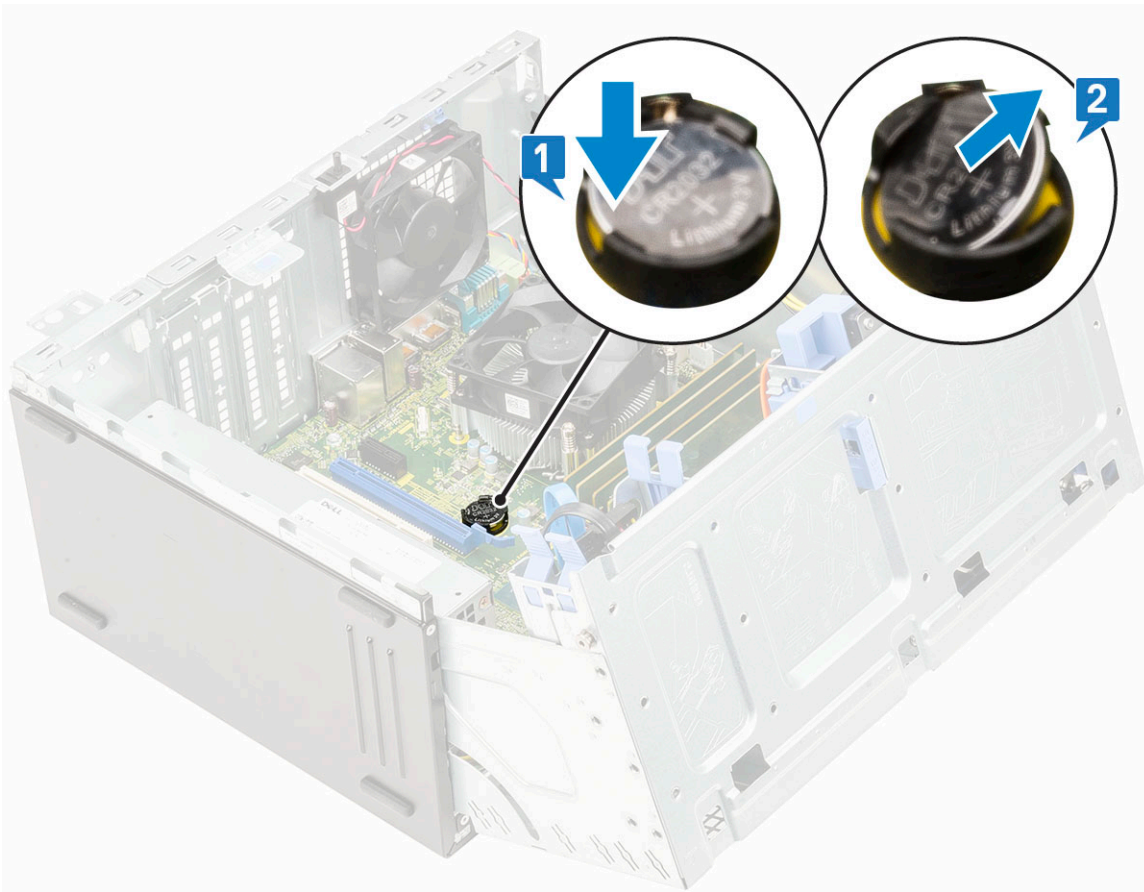


4. Close the [front panel door](#).
5. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
6. Follow the procedure in [After working inside your computer](#).

## Coin cell battery

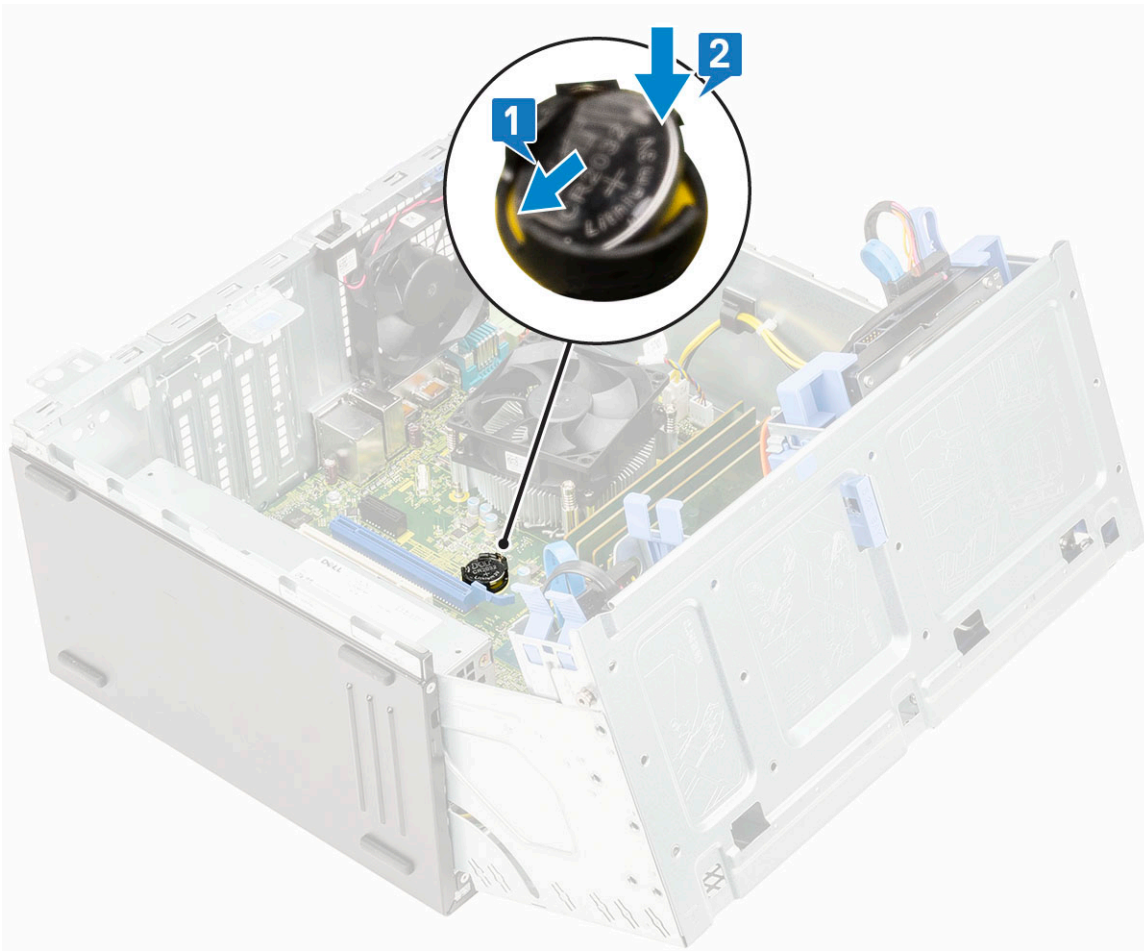
### Removing coin cell battery

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. To remove the coin cell battery:
  - a. Press the release latch until the coin cell battery pops out [1].
  - b. Lift the coin cell battery from the connector on the system board [2].



## Installing coin cell battery

1. Hold the coin cell battery with the "+" sign facing up and slide it under the securing tabs at the positive side of the connector [1].
2. Press the battery into the connector until it locks into place [2].

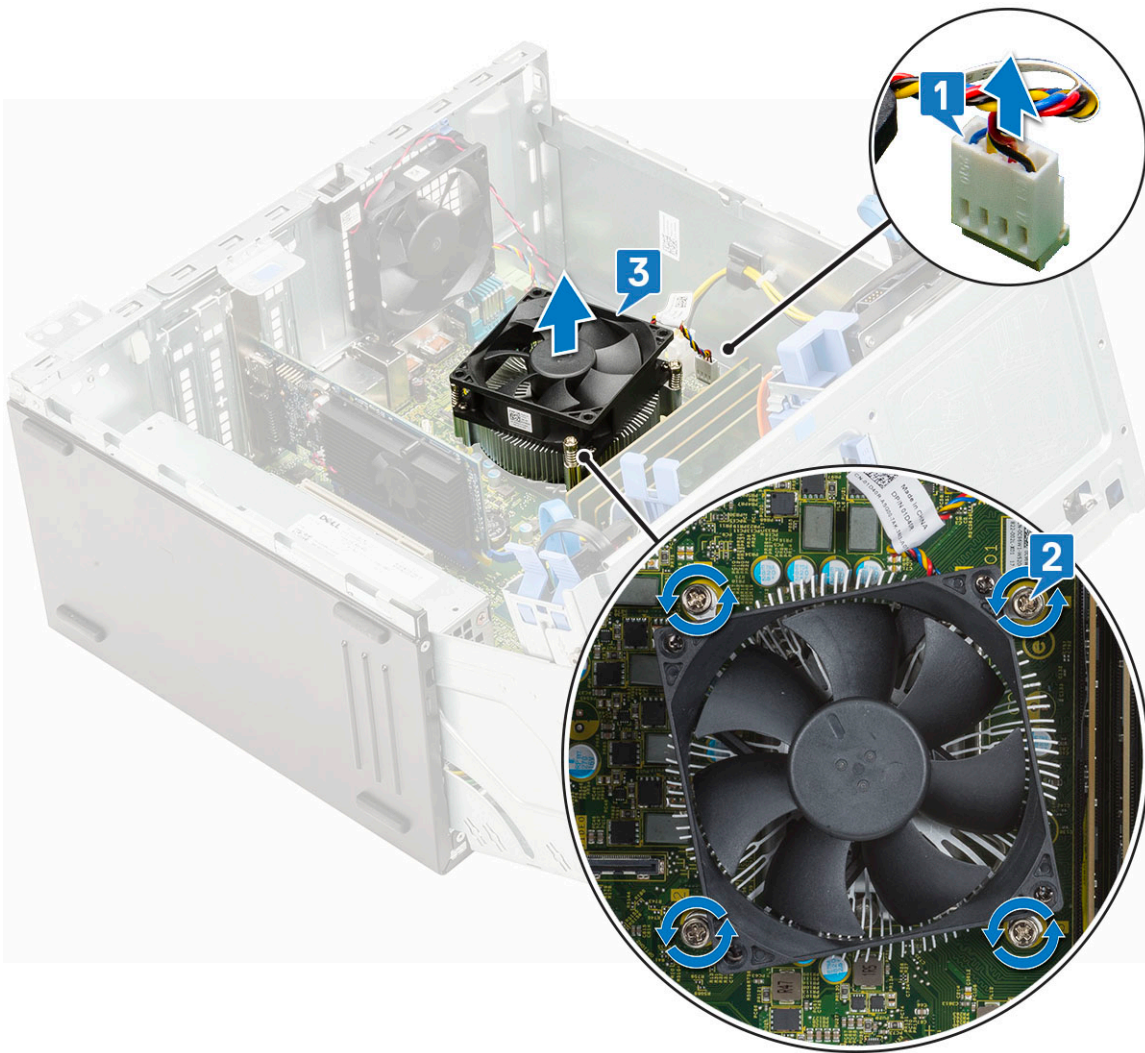


3. Close the [front panel door](#).
4. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
5. Follow the procedure in [After working inside your computer](#).

## Heat sink

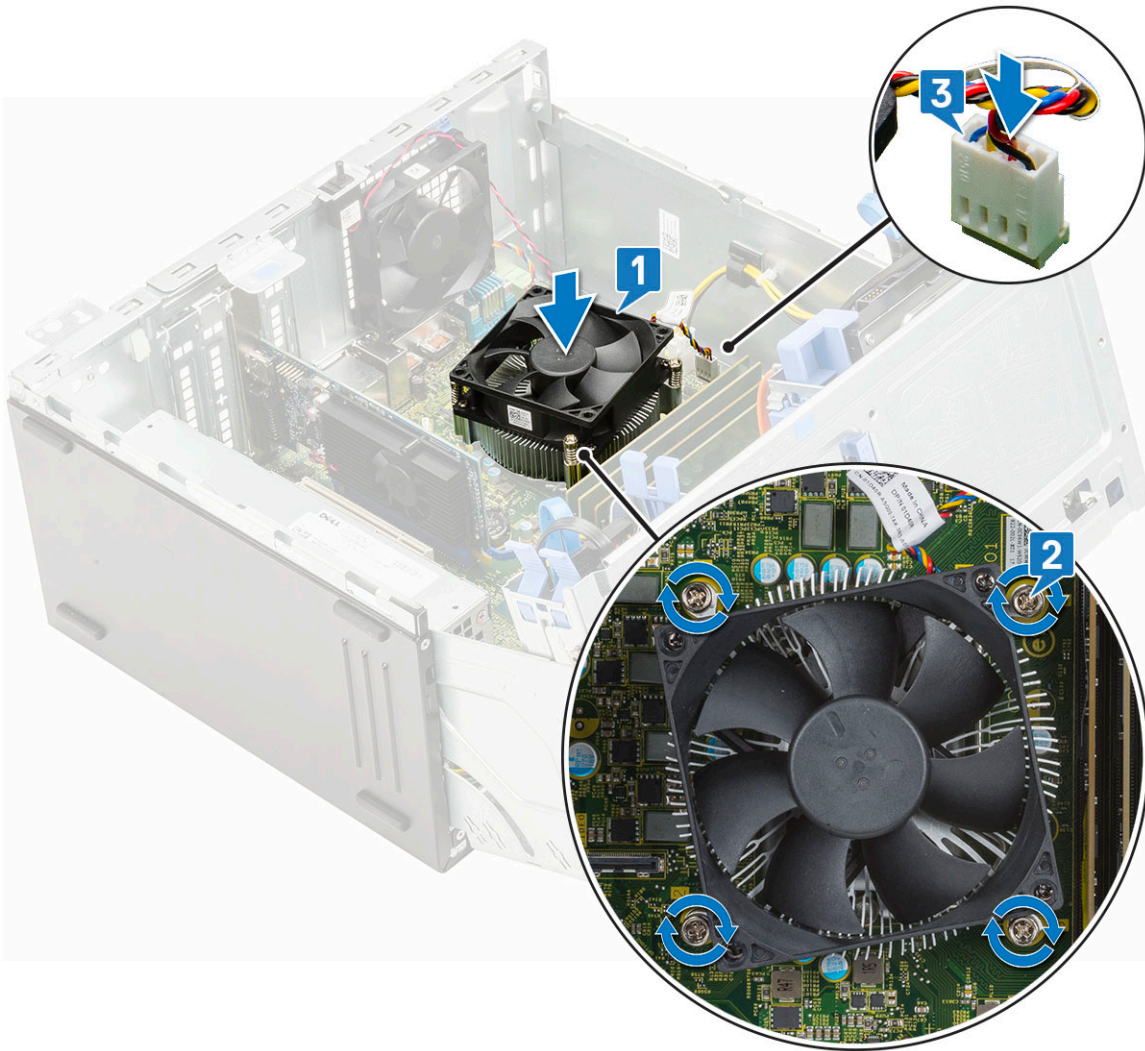
### Removing heatsink assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [bezel](#)
3. Open the [front panel door](#).
4. To remove the heatsink assembly:
  - a. Disconnect the heatsink fan assembly cable from the connector on the system board [1].
  - b. Loosen the captive screws (4) that secure the heatsink assembly to the system board [2].  
**i** **NOTE:** Remove the screw in the sequential order (1,2,3,4) as printed on the system board.
  - c. Lift the heatsink assembly away from the computer [3].



## Installing heatsink assembly

1. Align the screws of the heatsink assembly with the holders on the system board and place the heatsink assembly on the processor [1].
2. Tighten the captive screws to secure the heatsink assembly to the system board [2].  
**i** **NOTE:** Tighten the screws in a sequential order (1,2,3,4) as printed on the system board.
3. Connect the heatsink fan assembly cable from the connector on the system board [3].



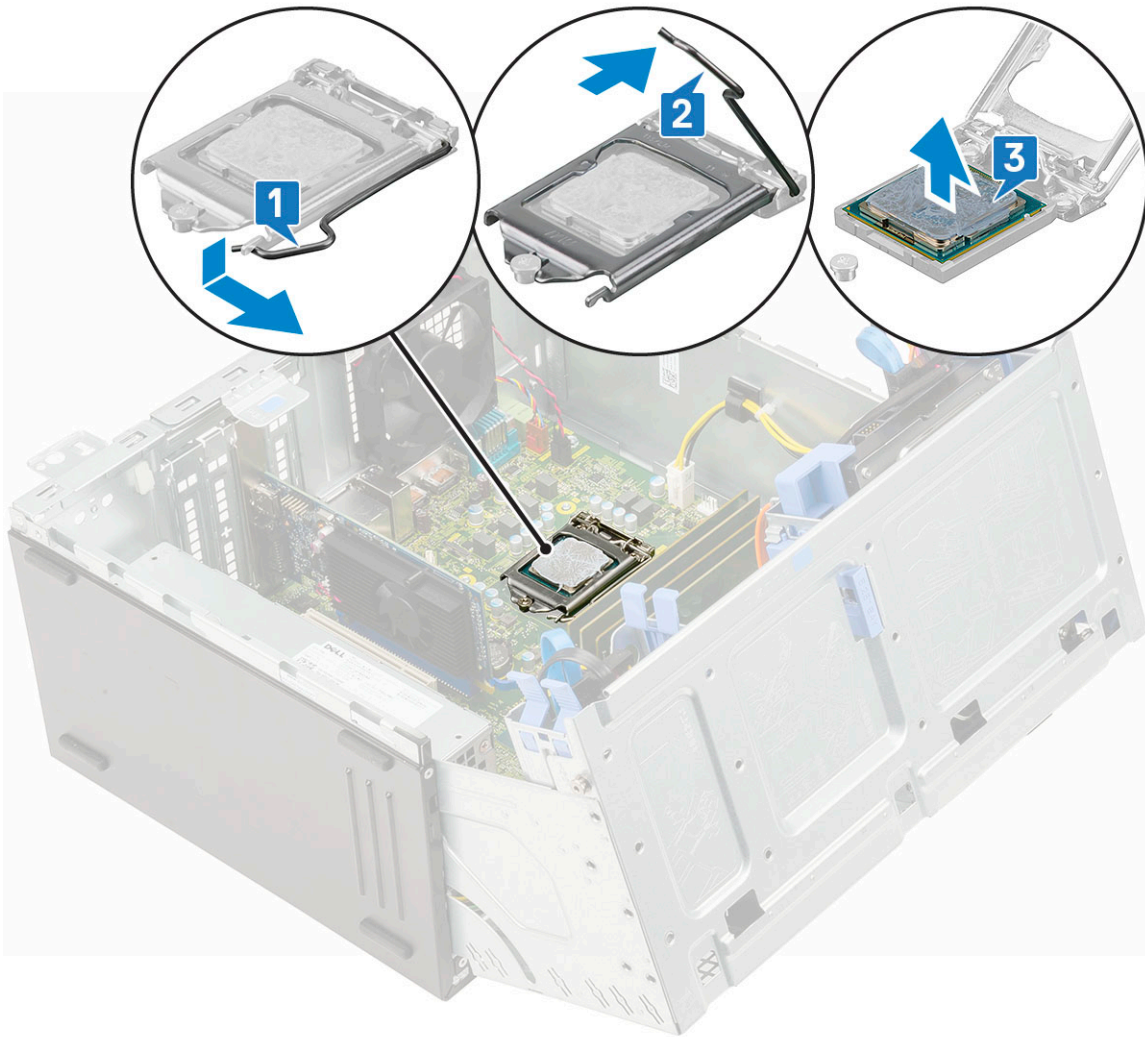
4. Close the [front panel door](#).
5. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
6. Follow the procedure in [After working inside your computer](#).

## Processor

### Removing processor

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. Remove the [heat sink fan](#)
5. Remove the [heat sink](#).
6. To remove the processor:
  - a. Release the socket lever by pushing the lever down and out from under the tab on the processor shield [1].
  - b. Lift the lever upward until the lever pops out of the processor shield [2].
  - c. Lift the processor out of the socket [3].

**CAUTION:** Do not touch the processor socket pins, they are fragile and can be permanently damaged. Be careful not to bend the pins in the processor socket when removing the processor out of the socket.

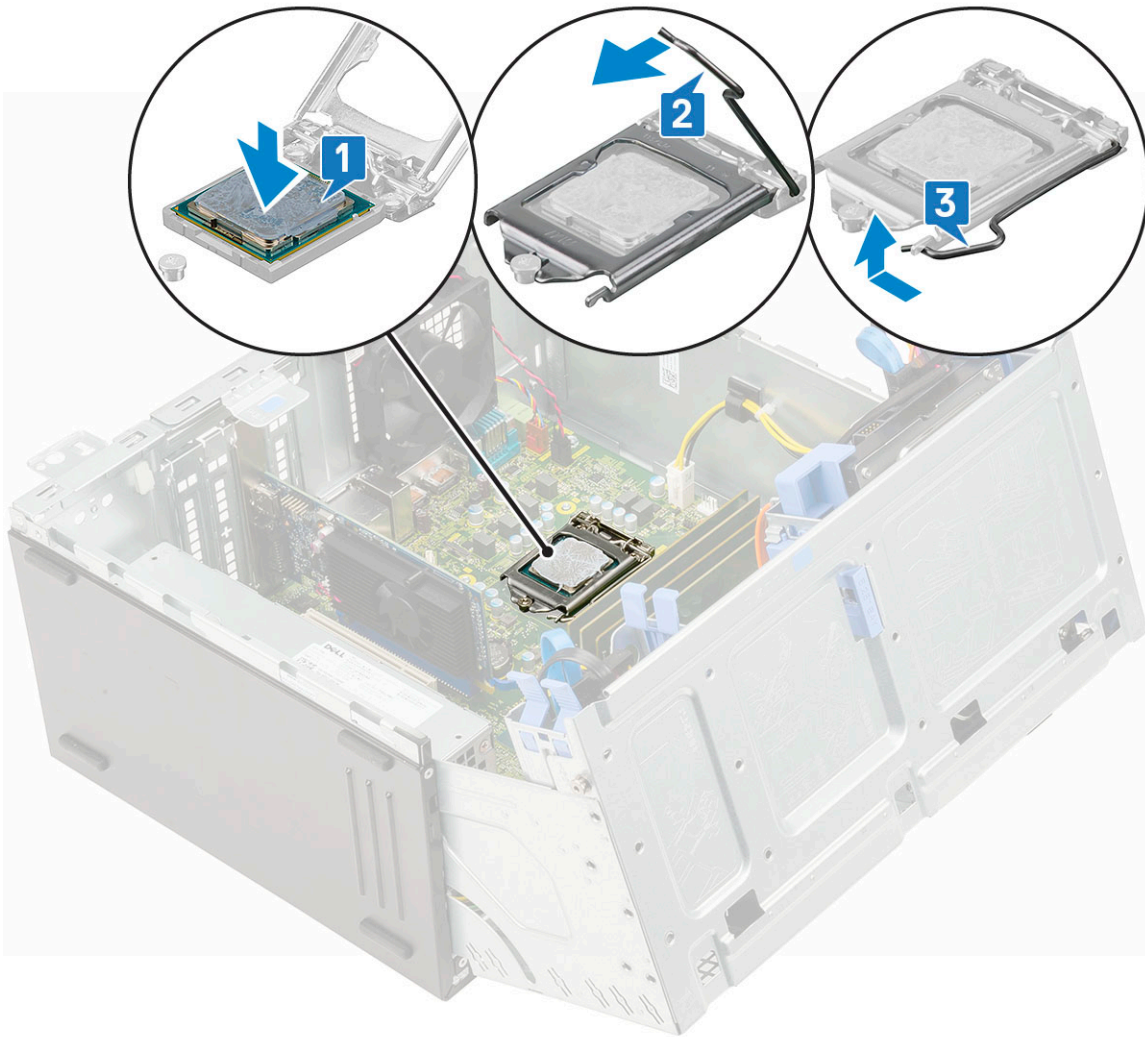


## Installing processor

1. Place and align the processor on the socket such that the slots on the processor align with the socket keys [1].

**CAUTION:** Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.


2. Close the processor shield by sliding it under the retention screw [2].
3. Lower the socket lever and push it under the tab to lock and secure the processor [3].



4. Install the [heat sink](#).
5. Install the [heat sink fan](#)
6. Close the [front panel door](#)
7. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
8. Follow the procedure in [After working inside your computer](#).

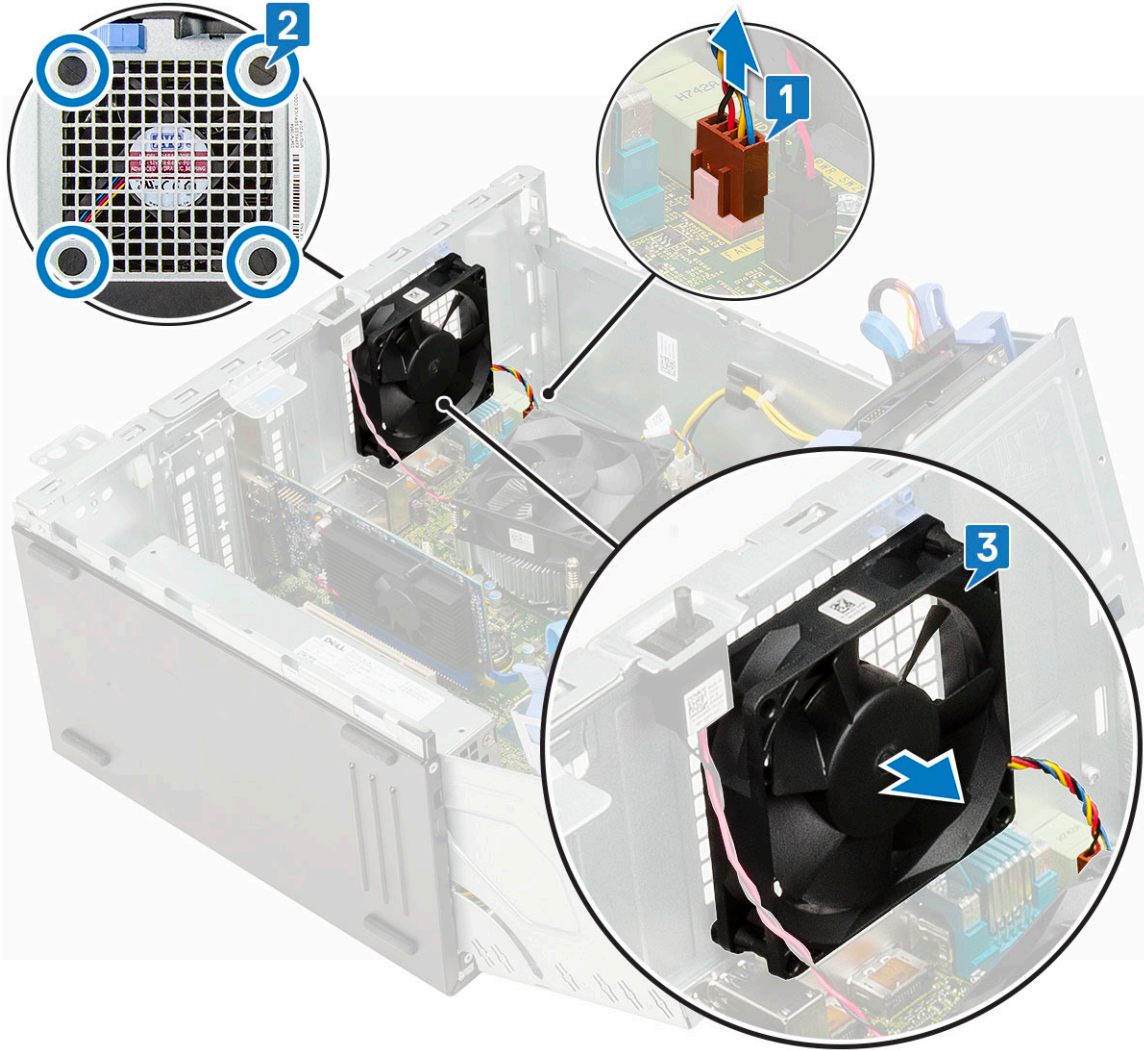
## System fan

### Removing system fan

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
  - c. [intrusion switch](#)
3. Open the [front panel door](#).
4. To remove the system fan:
  - a.  **NOTE:** Ensure to remove the intrusion switch before uninstalling the system fan.

Disconnect the system fan cable from the connector on the system board [1].

- b. Stretch the grommets (4) securing the fan to the computer to ease the removal of the system fan [2].
- c. Lift the system fan out of the computer [3].

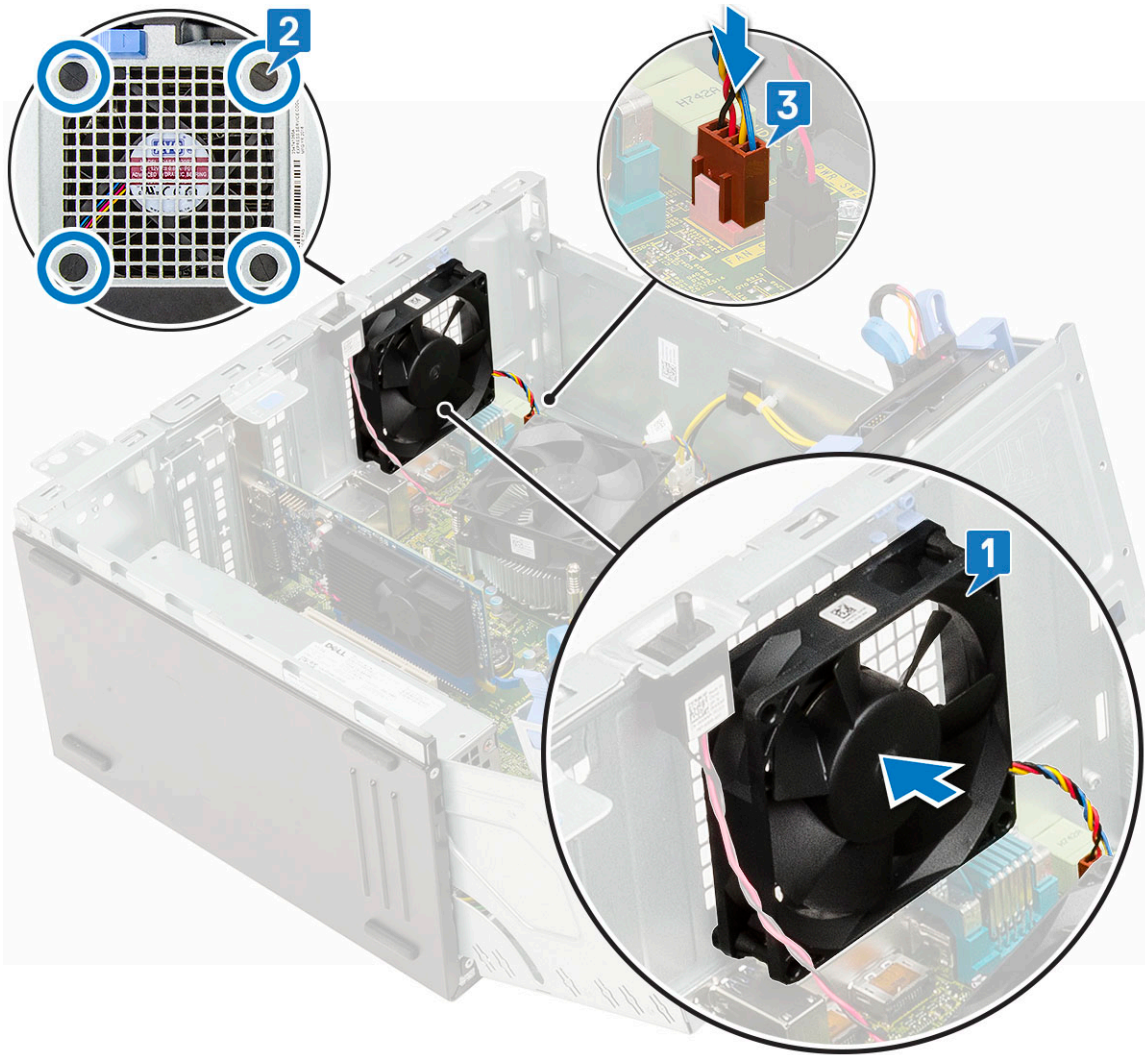


## Installing system fan

1. Align the grooves of the system fan with the grommets on the chassis wall [1].
2. Pass the grommets through the corresponding grooves on the system fan.
3. Stretch the grommets and slide the system fan toward the computer until it locks into place [2].

**NOTE:** Install the lower two grommets first.

4. Connect the system fan cable to the connector on the system board [3].

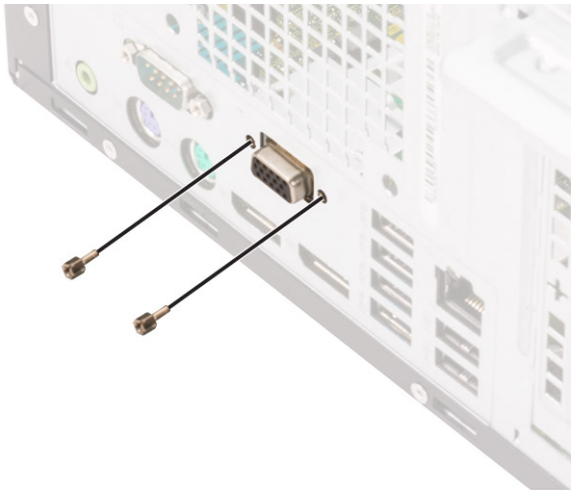


5. Close the [front panel door](#).
6. Install the:
  - a. [intrusion switch](#)
  - b. [front bezel](#)
  - c. [side cover](#)
7. Follow the procedure in [After working inside your computer](#).

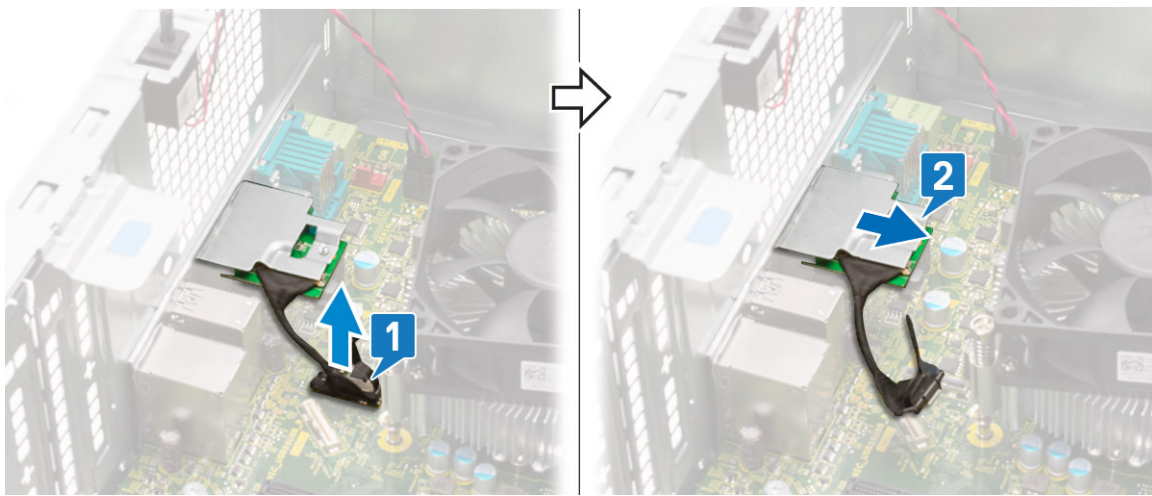
## Optional VGA module

### Removing optional VGA module

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [Side cover](#)
  - b. [Front bezel](#)
3. Open the [front panel door](#)
4. Remove the [system fan](#).
5. To remove the optional VGA module:
  - a. Remove the two (M3X3) screws that secure the optional VGA module to the system.

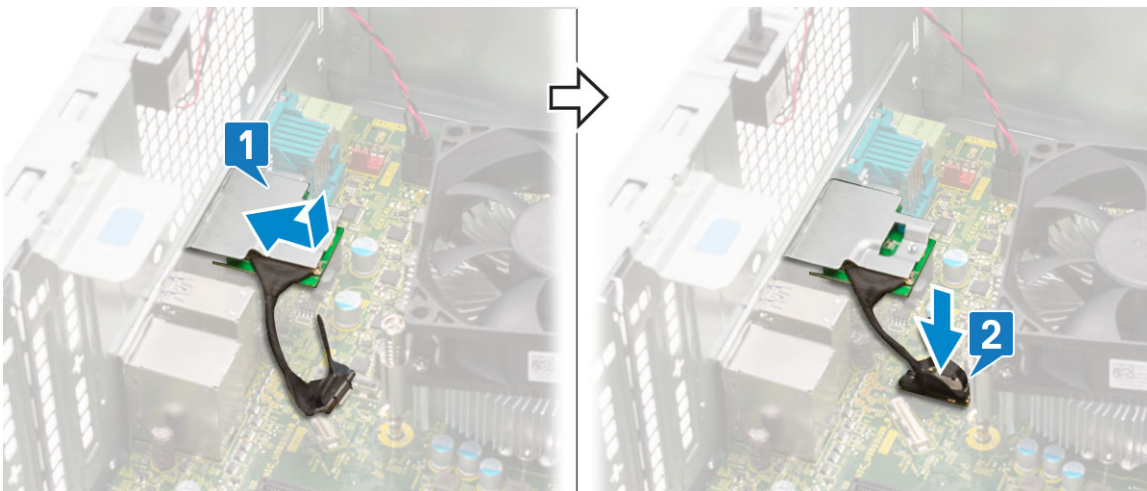


- b. Disconnect the VGA cable from the connector on the system board [1].
- c. Remove the VGA module from the system [2].

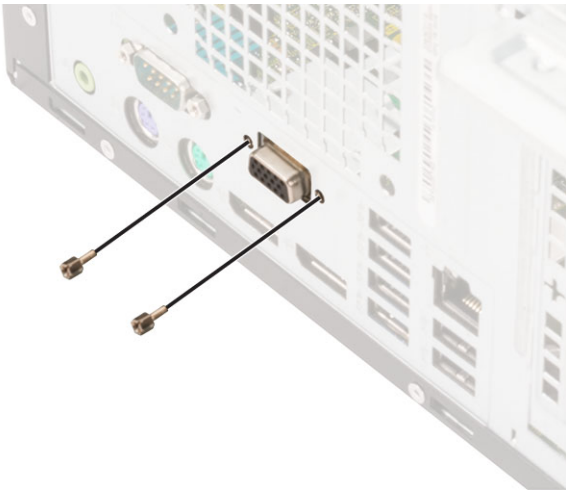


## Installing optional VGA module

- 1. Insert the VGA module into its slot from the inside of your computer [1] and connect the VGA cable to the connector on the system board [2].



- 2. Replace the two (M3X3) screws to secure the optional VGA module to the system.

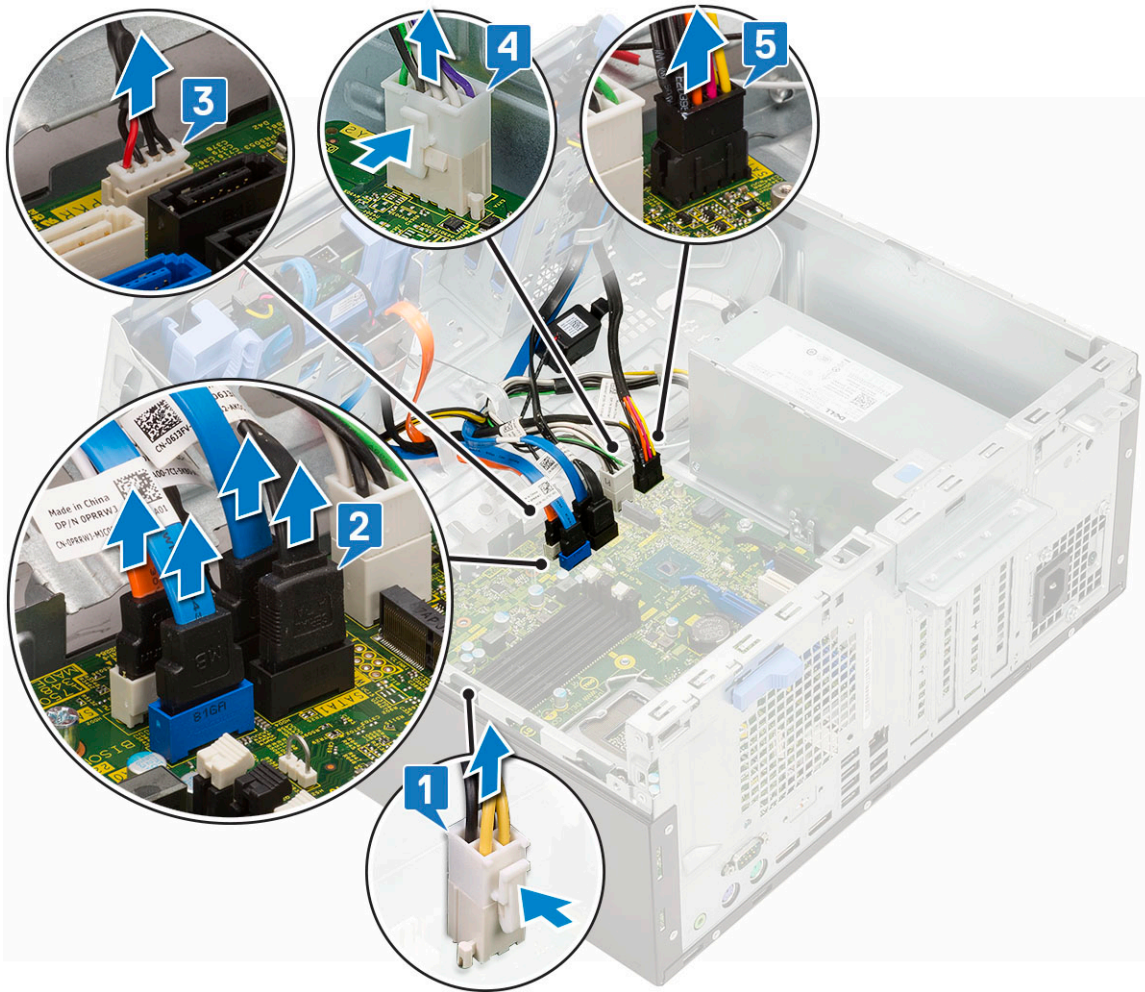


3. Install the [system fan](#).
4. Close the [front panel door](#).
5. Install the:
  - a. [Front bezel](#)
  - b. [Side cover](#)
6. Follow the procedure in [After working inside your computer](#).

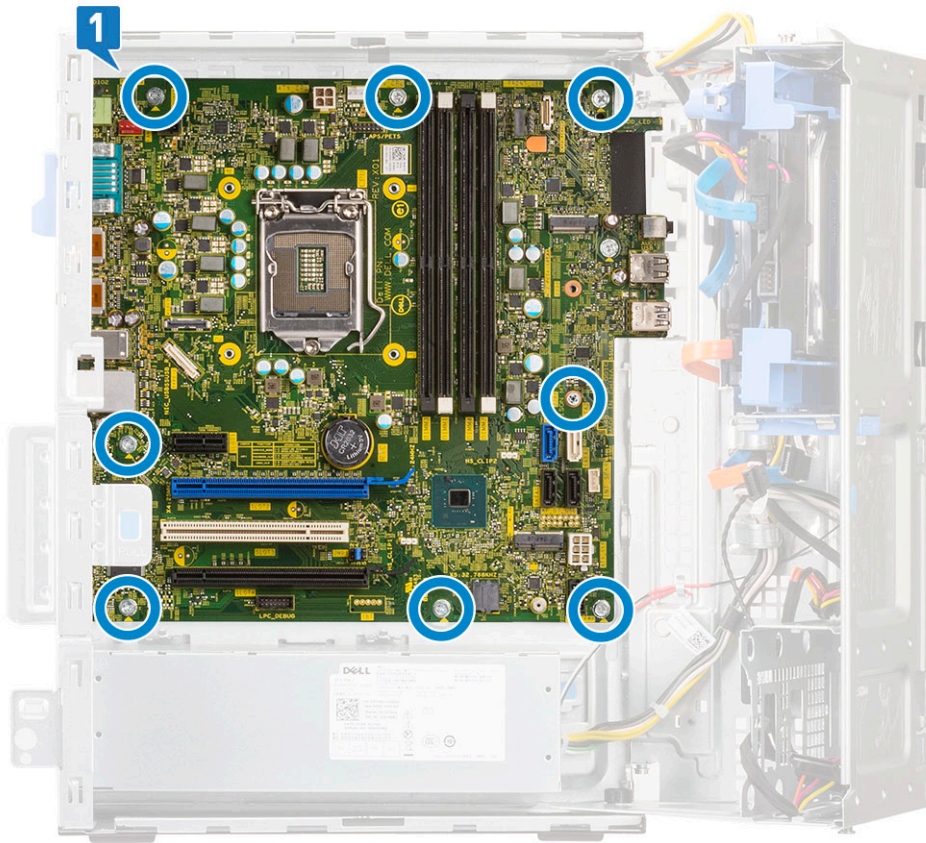
## System board

### Removing system board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [side cover](#)
  - b. [front bezel](#)
3. Open the [front panel door](#).
4. Remove the:
  - a. [heat sink fan](#)
  - b. [heat sink](#)
  - c. [processor](#)
  - d. [expansion card](#)
  - e. [M.2 PCIe SSD](#)
  - f. [SD card reader](#)
  - g. [memory module](#)
5. Disconnect the following cables from the system board:
  - a. PSU [1]
  - b. power cable and SATA cable [2]
  - c. speaker [3]
  - d. PSU [4]
  - e. power distribution for optical drive and hard drive [5]



6. To remove the system board:
  - a. Remove the screws (8) that secure the system board to the computer chassis.

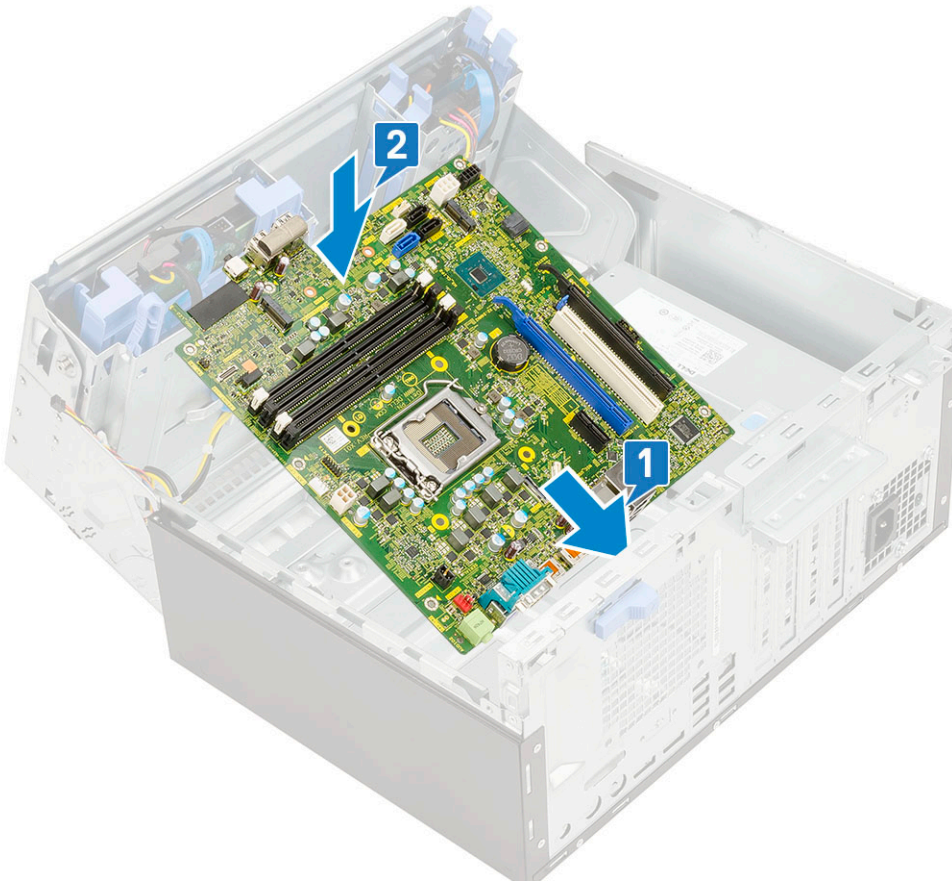


b. Slide and lift the system board away from the computer [1, 2].

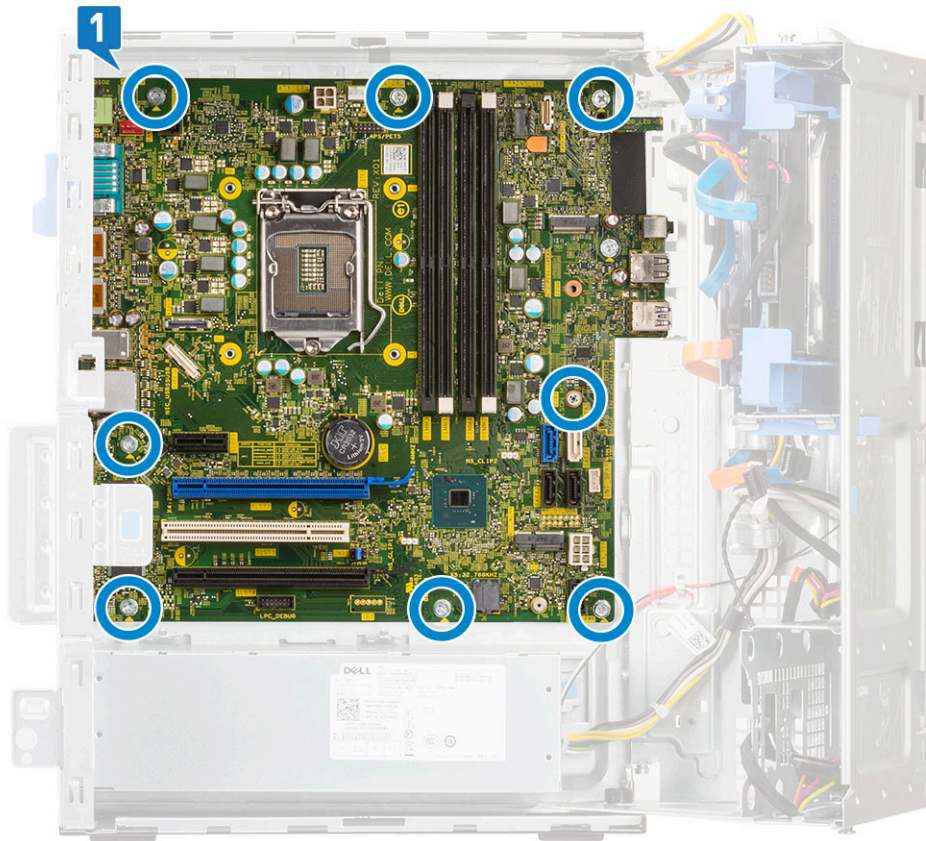


## Installing the system board

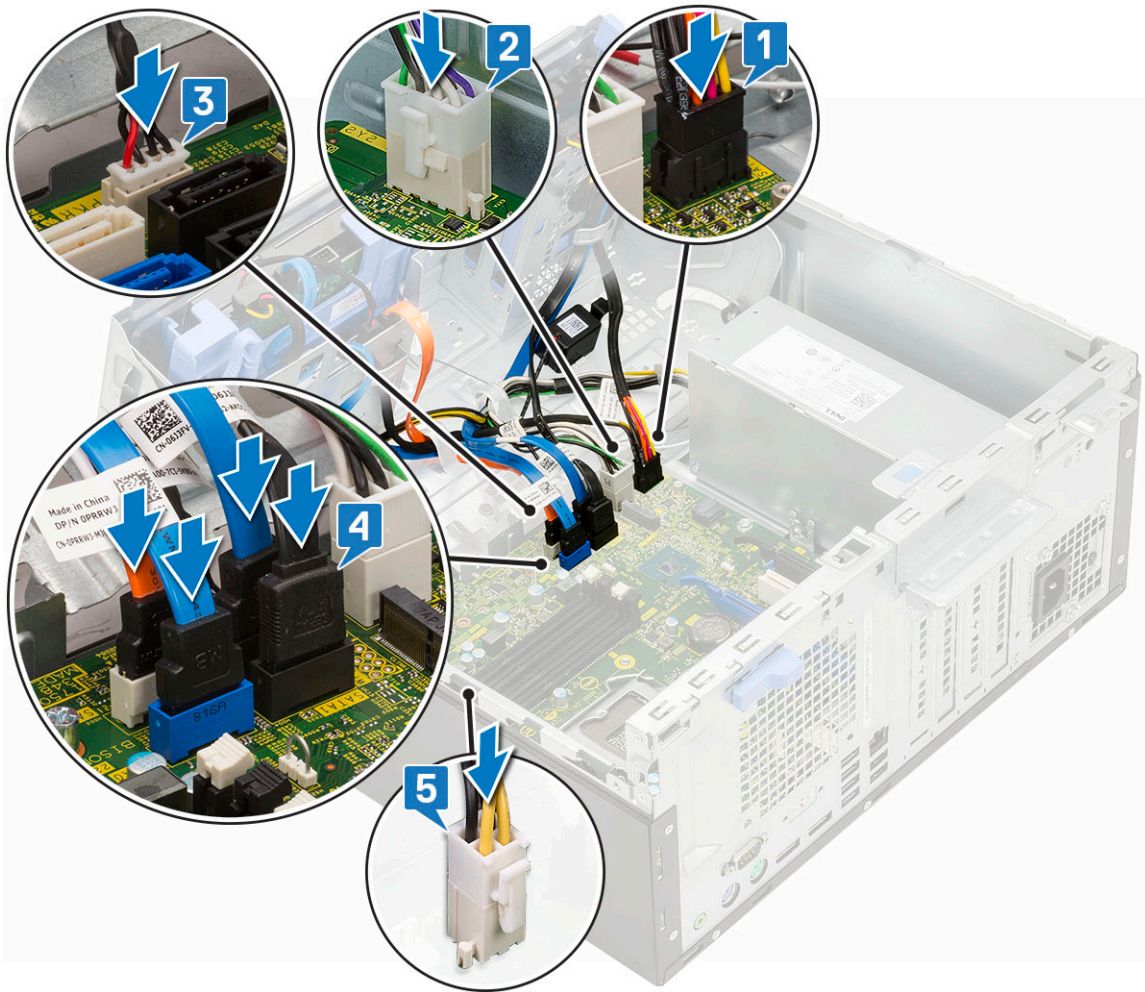
1. Hold the system board by its edges and align it toward the back of the computer [1,2].



2. Lower the system board into the computer until the connectors at the back of the system board align with the slots on the chassis, and the screw holes on the system board align with the standoffs on the computer.
3. Tighten the screws (8) to secure the system board to the computer [1].



4. Align the cables with the pins on connectors on the system board and connect the following cables to the system board:
5. Route all the cables through the routing clips.
  - a. power distribution for optical drive and hard drives [1]
  - b. PSU [2]
  - c. speaker cable [3]
  - d. SATA data cable for optical drive and hard drive cables (4 cables) [4]
  - e. PSU cable [5]



6. Install the:
  - a. [memory module](#)
  - b. [M.2 PCIe SSD](#)
  - c. [expansion card](#)
  - d. [SD card reader](#)
  - e. [processor](#)
  - f. [heat sink](#)
  - g. [heat sink fan](#)
7. Close the [front panel door](#).
8. Install the:
  - a. [front bezel](#)
  - b. [side cover](#)
9. Follow the procedure in [After working inside your computer](#).

## Drivers and downloads

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

# System setup

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

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

Use the BIOS Setup program for the following purposes:

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

## Topics:

- [Boot Sequence](#)
- [Navigation keys](#)
- [Boot Sequence](#)
- [System Setup options](#)
- [Updating the BIOS](#)
- [System and setup password](#)
- [Enabling smart power on](#)

## Boot Sequence

Boot sequence enables 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

**NOTE:** XXXX denotes the SATA drive number.

- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

**NOTE:** Choosing **Diagnostics**, displays the **SupportAssist** screen.

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

## 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

Up arrow

### Navigation

Moves to the previous field.

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

## Boot Sequence

Boot sequence enables 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
  - **NOTE:** XXXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics
  - **NOTE:** Choosing **Diagnostics**, displays the **SupportAssist** screen.

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

## System Setup options

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

**Table 1. General**

Option	Description
System Information	Displays the following information: <ul style="list-style-type: none"> <li>• System Information: Displays <b>BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date,</b> and the <b>Express Service Code.</b></li> <li>• Memory Information: Displays <b>Memory Installed, Memory Available, Memory Speed, Memory Channel Mode, Memory Technology, DIMM 1 Size, and DIMM 2 Size, DIMM 3 Size, and DIMM 4 Size.</b></li> <li>• PCI Information: Displays SLO1, SLO2, SLO3, SLO4, and SLO5_M.2</li> <li>• Processor Information: Displays <b>Processor Type, Core Count, Processor ID, Current Clock Speed, Minimum Clock Speed, Maximum Clock Speed, Processor L2 Cache, Processor L3 Cache, HT Capable, and 64-Bit Technology.</b></li> <li>• Device Information: Displays <b>SATA-0, SATA-1, SATA-2, SATA-3, SATA-4, M.2 PCIe SSD-0, LOM MAC Address, Video Controller, and Audio Controller. .</b></li> </ul>

**Table 1. General (continued)**

Option	Description
Boot Sequence	Allows you to specify the order in which the computer attempts to find an operating system from the devices specified in this list. <ul style="list-style-type: none"> <li>• Legacy</li> <li>• UEFI (selected by default)</li> </ul>
Advanced Boot Options	Allows you to select the Enable Legacy Option ROMs option, when in UEFI boot mode. By default, this option is selected.
Date/Time	Allows you to set the date and time settings. Changes to the system date and time take effect immediately.


**Table 2. System Configuration**

Option	Description
Integrated NIC	Allows you to control the on-board LAN controller. The option 'Enable UEFI Network Stack' is not selected by default. The options are: <ul style="list-style-type: none"> <li>• Disabled</li> <li>• Enabled</li> <li>• Enabled w/PXE (default)</li> </ul> <p><b>i</b> <b>NOTE:</b> Depending on the computer and its installed devices, the items listed in this section may or may not appear.</p>
SATA Operation	Allows you to configure the operating mode of the integrated hard drive controller. <ul style="list-style-type: none"> <li>• Disabled = The SATA controllers are hidden</li> <li>• RAID ON = SATA is configured to support RAID mode (selected by default)</li> <li>• AHCI= SATA is configured for AHCI mode</li> </ul>
Serial Port	Allows you to determine how the built-in serial port to operate. The options are: <ul style="list-style-type: none"> <li>• Disabled</li> <li>• COM 1 – Default setting</li> <li>• COM 2</li> <li>• COM 3</li> <li>• COM 4</li> </ul>
Drives	Allows you to enable or disable the various drives on-board: <ul style="list-style-type: none"> <li>• SATA-0</li> <li>• SATA-1</li> <li>• SATA-2</li> <li>• SATA-3</li> <li>• SATA-4</li> </ul>
Smart Reporting	This field controls whether hard drive errors for integrated drives are reported during system startup. The <b>Enable Smart Reporting option</b> is disabled by default.
USB Configuration	Allows you to enable or disable the integrated USB controller for: <ul style="list-style-type: none"> <li>• Enable Boot Support</li> <li>• Enable Front USB Ports</li> <li>• Enable Rear USB Ports</li> </ul> <p>All the options are enabled by default.</p>


**Table 2. System Configuration (continued)**

Option	Description
Front USB Configuration	Allows you to enable or disable the front USB ports. All the ports are enabled by default.
Rear USB Configuration	Allows you to enable or disable the back USB ports. All the ports are enabled by default.
USB PowerShare	This option allows you to charge the external devices, such as mobile phones, music player. This option is disabled by default.
Audio	Allows you to enable or disable the integrated audio controller. The option <b>Enable Audio</b> is selected by default. <ul style="list-style-type: none"> <li>• Enable Microphone</li> <li>• Enable Internal Speaker</li> </ul> Both the options are selected by default.
Miscellaneous	Allows you to enable or disable the various on-board devices. <ul style="list-style-type: none"> <li>• Enable PCI Slot (default option)</li> <li>• Enable Media Card (default option)</li> <li>• Disable Media Card</li> </ul>


**Table 3. Video**

Option	Description
Primary Display	Allows you to select the primary display when multiple controllers are available in the system. <ul style="list-style-type: none"> <li>• Auto (default)</li> <li>• Intel HD Graphics</li> </ul>  <b>NOTE:</b> If you do not select Auto, the on-board graphics device will be present and enabled.

**Table 4. Security**

Option	Description
Admin Password	Allows you to set, change, and delete the admin password.
System Password	Allows you to set, change, and delete the system password.
Internal HDD-0 Password	Allows you to set, change, and delete the computer's internal HDD.
Internal HDD-3 Password	Allows you to set, change, and delete the computer's internal HDD.  <b>NOTE:</b> HDD passwords are not available for PCI-e hard drives.
Strong Password	This option lets you enable or disable strong passwords for the system.
Password Configuration	Allows you to control the minimum and maximum number of characters allowed for an administrative password and the system password. The range of characters is between 4 and 32.
Password Bypass	This option lets you bypass the System (Boot) Password and the internal HDD password prompts during a system restart. <ul style="list-style-type: none"> <li>• Disabled — Always prompt for the system and internal HDD password when they are set. This option is selected by default.</li> <li>• Reboot Bypass — Bypass the password prompts on Restarts (warm boots).</li> </ul>


**Table 4. Security (continued)**

Option	Description
	<p> <b>NOTE:</b> The system will always prompt for the system and internal HDD passwords when powered on from the off state (a cold boot). Also, the system will always prompt for passwords on any module bay HDDs that may be present.</p>
Password Change	<p>This option lets you determine whether changes to the System and Hard Disk passwords are permitted when an administrator password is set.</p> <p><b>Allow Non-Admin Password Changes</b> - This option is enabled by default.</p>
UEFI Capsule Firmware Updates	<p>This option controls whether this system allows BIOS updates via UEFI capsule update packages. This option is selected by default. Disabling this option will block BIOS updates from services such as Microsoft Windows Update and Linux Vendor Firmware Service (LVFS)</p>
TPM 2.0 Security	<p>Allows you to control whether the Trusted Platform Module (TPM) is visible to the operating system.</p> <ul style="list-style-type: none"> <li>● TPM On (default)</li> <li>● Clear</li> <li>● PPI Bypass for Enable Commands</li> <li>● PPI Bypass for Disable Commands</li> <li>● Attestation Enable (default)</li> <li>● Key Storage Enable(default)</li> <li>● SHA-256(default)</li> <li>● Disabled</li> <li>● Enabled (default)</li> </ul>
Computrace	<p>This field lets you Activate or Disable the BIOS module interface of the optional Computrace Service from Absolute Software. Enables or disables the optional Computrace service designed for asset management.</p> <ul style="list-style-type: none"> <li>● <b>Deactivate</b> - This option is selected by default.</li> <li>● Disable</li> <li>● Activate</li> </ul>
Chassis Intrusion	<p>Allows you to control the chassis intrusion feature. You can set this option to:</p> <ul style="list-style-type: none"> <li>● Enabled</li> <li>● Disabled (default)</li> <li>● On-Silent</li> </ul>
CPU XD Support	<p>Allows you to enable or disable the Execute Disable mode of the processor. This option is enabled by default.</p>
OROM Keyboard Access	<p>This option determines whether users are able to enter Option ROM Configuration screens via hotkeys during boot. Specifically, these settings are capable of preventing access to Intel RAID (CTRL+I) or Intel Management Engine BIOS Extension (CTRL+P/F12).</p> <ul style="list-style-type: none"> <li>● Enable (selected by default)— User may enter OROM configuration screens via the hotkey.</li> <li>● One-Time Enable — User may enter OROM configuration screens via the hotkeys on next boot only. After next boot, the setting will revert to disabled.</li> <li>● Disable — User may not enter OROM configuration screens via the hotkey.</li> </ul>

**Table 4. Security (continued)**

Option	Description
Admin Setup Lockout	Allows you to enable or disable the option to enter Setup when an Administrative password is set. This option is not set by default.

**Table 5. Secure Boot**

Option	Description
Secure Boot Enable	Allows you to enable or disable Secure Boot feature <ul style="list-style-type: none"> <li>● Disable (selected by default)</li> <li>● Enable</li> </ul>
Expert key Management	Allows you to manipulate the security key databases only if the system is in Custom Mode. The <b>Enable Custom Mode</b> option is disabled by default. The options are: <ul style="list-style-type: none"> <li>● PK (default)</li> <li>● KEK</li> <li>● db</li> <li>● dbx</li> </ul> <p>If you enable the <b>Custom Mode</b>, the relevant options for <b>PK, KEK, db, and dbx</b> appear. The options are:</p> <ul style="list-style-type: none"> <li>● <b>Save to File</b>- Saves the key to a user-selected file</li> <li>● <b>Replace from File</b>- Replaces the current key with a key from a user-selected file</li> <li>● <b>Append from File</b>- Adds a key to the current database from a user-selected file</li> <li>● <b>Delete</b>- Deletes the selected key</li> <li>● <b>Reset All Keys</b>- Resets to default setting</li> <li>● <b>Delete All Keys</b>- Deletes all the keys</li> </ul> <p> <b>NOTE:</b> If you disable the Custom Mode, all the changes made will be erased and the keys will restore to default settings.</p>

**Table 6. Intel Software Guard Extensions**

Option	Description
Intel SGX Enable	Allows you to enable or disable the Intel Software Guard Extensions to provide a secured environment for running code/storing sensitive information in the context of the main operating system. <ul style="list-style-type: none"> <li>● Disabled (default)</li> <li>● Enabled</li> </ul>
Enclave Memory Size	Allows you to set the Intel SGX Enclave Reserve Memory Size. <ul style="list-style-type: none"> <li>● 32 MB</li> <li>● 64 MB (Disabled by default)</li> <li>● 128 MB (Disabled by default)</li> </ul>


**Table 7. Performance**

Option	Description
Multi Core Support	This field specifies whether the process will have one or all cores enabled. This option is enabled by default. <p>options:</p> <ul style="list-style-type: none"> <li>● All (selected by default)</li> </ul>

**Table 7. Performance (continued)**

Option	Description
	<ul style="list-style-type: none"> <li>• 1</li> <li>• 2</li> <li>• 3</li> </ul>
Intel SpeedStep	Allows you to enable or disable the Intel SpeedStep mode of the processor. This option is enabled by default.
C States Control	Allows you to enable or disable additional processor sleep states. This option is enabled by default.
Limited CPUID Value	Allows you to limit the maximum value of the processor standard CPUID function. This option is disabled by default.
Intel TurboBoost	Allows you to enable or disable the Intel TurboBoost mode of the processor. This option is enabled by default.

**Table 8. Power Management**

Option	Description
AC Recovery	<p>Determines how the system responds when AC power is re-applied after a power loss. You can set the AC Recovery to:</p> <ul style="list-style-type: none"> <li>• Power Off</li> <li>• Power On</li> <li>• Last Power State</li> </ul> <p>This option is Power Off by default.</p>
Auto On Time	<p>Sets time to automatically turn on the computer. Time is kept in standard 12-hour format (hour:minutes:seconds). Change the startup time by typing the values in the time and AM/PM fields.</p> <p> <b>NOTE:</b> This feature does not work if you turn off your computer using the switch on a power strip or surge protector or if <b>Auto Power is set to disabled</b>.</p>
Deep Sleep Control	<p>Allows you to define the controls when Deep Sleep is enabled.</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• Enabled in S5 only</li> <li>• Enabled in S4 and S5</li> </ul> <p>This option is <b>Enabled in S4 and S5</b> by default.</p>
Fan Control Override	Allows you to determine the speed of the system fan. When this option is enabled, the system fan runs at the maximum speed. This option is disabled by default.
USB Wake Support	Allows you to enable the USB devices to wake the computer from standby (S1 / S3), Hibernate (S4), and Power Off (S5) modes. The option "Enable USB Wake Support" is selected by default
Wake on LAN/WWAN	<p>This option allows the computer to power up from the off state when triggered by a special LAN signal. This feature only works when the computer is connected to AC power supply.</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b> - Does not allow the system to power on by special LAN signals when it receives a wake-up signal from the LAN or wireless LAN.</li> <li>• <b>LAN or WLAN</b> - Allows the system to be powered on by special LAN or wireless LAN signals.</li> <li>• <b>LAN Only</b> - Allows the system to be powered on by special LAN signals.</li> </ul>

**Table 8. Power Management (continued)**

Option	Description
	<ul style="list-style-type: none"> <li>• <b>LAN with PXE Boot</b> - A wakeup packet sent to the system in either the S4 or S5 state, that will cause the system to wake-up and immediately boot to PXE.</li> <li>• <b>WLAN Only</b> - Allows the system to be powered on by special WLAN signals. This option is Disabled by default.</li> </ul>
Block Sleep	Allows you to block entering to sleep (S3 state) in OS environment. This option is disabled by default.
Intel Ready Mode	Allows you to enable the capability of Intel Ready Mode Technology. This option is disabled by default.

**Table 9. POST Behavior**

Option	Description
Numlock LED	Allows you to enable or disable the Numlock feature when your computer starts. This option is enabled by default.
Keyboard Errors	Allows you to enable or disable the keyboard error reporting when the computer starts. This option is disabled by default.
Fast Boot	<p>This option can speed up the boot process by bypassing some compatibility steps:</p> <ul style="list-style-type: none"> <li>• Minimal — The system boots quickly, unless the BIOS has been updated, memory changed, or the previous POST did not complete.</li> <li>• Thorough — The system does not skip any steps in the boot process.</li> <li>• Auto — This allows the operating system to control this setting (this works only when the operating system supports Simple Boot Flag).</li> </ul> <p>This option is set to <b>Minimal</b> by default.</p>

**Table 10. Manageability**

Option	Description
USB provision	This option is not selected by default.
MEBx Hotkey	This option is selected by default.

**Table 11. Virtualization Support**

Option	Description
Virtualization	This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel® Virtualization Technology. <b>Enable Intel Virtualization Technology</b> - This option is enabled by default.
VT for Direct I/O	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel® Virtualization technology for direct I/O. <b>Enable VT for Direct I/O</b> - This option is enabled by default.

**Table 12. Maintenance**

Option	Description
Service Tag	Displays the Service Tag of your computer.

**Table 12. Maintenance (continued)**

Option	Description
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set. This option is set by default.
SERR Messages	Controls the SERR message mechanism. This option is set by default. Some graphics cards require that the SERR message mechanism be disabled.
BIOS Downgrade	Allows you to control flashing of the system firmware to the previous versions. This option is enabled by default. <b>NOTE:</b> If this option is not selected, the flashing of the system firmware to the previous versions is blocked.
Data Wipe	Allows you to securely erase the data from all the available internal storages, such as HDD, SSD, mSATA, and eMMC. The option Wipe on Next Boot is disabled by default.
BIOS recovery	Allows you to recover the corrupted BIOS conditions from the recovery files on the primary hard drive. The option <b>BIOS Recovery from Hard Drive</b> is selected by default

**Table 13. System Logs**

Option	Description
BIOS Events	Displays the system event log and allows you to: <ul style="list-style-type: none"> <li>• Clear Log</li> <li>• Mark all Entries</li> </ul>

**Table 14. Advanced configurations**

Option	Description
ASPM	Allows you to activate the state power management. <ul style="list-style-type: none"> <li>• Auto (Default)</li> <li>• Disabled</li> <li>• L1 Only</li> </ul>

## Updating the BIOS

### Updating the BIOS in Windows

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

1. Go to [www.dell.com/support](http://www.dell.com/support).
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.  
**NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.

7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.  
For more information, search in the Knowledge Base Resource at [www.dell.com/support](http://www.dell.com/support).

## Updating the BIOS in Linux and Ubuntu

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

## Updating the BIOS using the USB drive in Windows

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

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

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

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

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

### BIOS Update

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

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

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

### Updating from the One-Time boot menu

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

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

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

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

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

## System and setup password

Table 15. 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

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

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


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

## Deleting or changing an existing system setup password

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.

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

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

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

## Enabling smart power on

To enable Smart Power On and the ability to wake a system from S3, S4, and S5 sleep states with a move of a mouse or press of a key on the keyboard, perform these steps:

1. Make sure the following BIOS settings under **Power Management** setup option are set as mentioned here:
  - **USB Wake Support** as Enabled.
  - **Deep Sleep Control** as Disabled.
2. Connect a keyboard, mouse, or wireless USB dongle to the Smart Power On USB port(s) on the back of your system.
3. Disable **Fast Startup** in the Operating System:
  - a. Search and open **Power options** in the Start Menu.
  - b. Click **Choose what the power buttons do** on the left side of the window.
  - c. Under **Shutdown settings**, make sure **Turn on fast startup** is disabled.
4. Reboot your system so the changes can take effect. The next time when your system goes to sleep or is shut down, any use of the mouse or keyboard will wake it up.

# Troubleshooting

## Topics:


- [Enhanced Pre-Boot System Assessment — ePSA diagnostics](#)
- [Diagnostics](#)
- [Backup media and recovery options](#)
- [Recovering the operating system](#)
- [Battery status lights](#)

## Enhanced Pre-Boot System Assessment — ePSA diagnostics

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

The ePSA diagnostics can be initiated by the FN+PWR buttons while powering on the computer.


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

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

## Running the ePSA Diagnostics

Invoke diagnostics boot by either of the methods that are suggested below:

1. Power on the computer.
2. As the computer boots, press the F12 key when the Dell logo is displayed.
3. In the boot menu screen, use Up/Down arrow key to select the **Diagnostics** option and then press **Enter**.

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

4. Press the arrow in the lower-right corner to go to the page listing. The detected items are listed and tested.
5. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
6. Select the device from the left pane and click **Run Tests**.
7. If there are any issues, error codes are displayed. Note the error code and contact Dell.

## Diagnostics

The computer POST (Power On Self Test) ensures that it meets the basic computer requirements and the hardware is working appropriately before the boot process begins. If the computer passes the POST, the computer continues to start in a normal

mode. However, if the computer fails the POST, the computer emits a series of LED codes during the start-up. The system LED is integrated on the Power button.

The following table shows different light patterns and what they indicate.

**Table 16. Power LED summary**

Amber LED state	White LED state	System state	Notes
Off	Off	S4, S5	<ul style="list-style-type: none"> <li>• Hibernate or Suspend to Disk (S4)</li> <li>• Power is off (S5)</li> </ul>
Off	Blinking	S1, S3	System is in a low power state, either S1 or S3. This does not indicate a fault condition.
Previous State	Previous State	S3, no PWRGD_PS	This entry provides for the possibility of a delay from SLP_S3# active to PWRGD_PS inactive.
Blinking	Off	S0, no PWRGD_PS	Boot Failure - The computer is receiving electrical power, and power supplied by the power supply is normal. A device might be malfunctioning or incorrectly installed. Refer to the table below for Amber Blinking Pattern diagnostics suggestion and possible failures.
Steady	Off	S0, no PWRGD_PS, Code fetch = 0	Boot Failure - This is a system fault error condition, including the power supply. Only the +5VSB rail on the power supply is working correctly.
Off	Steady	S0, no PWRGD_PS, Code fetch = 1	This indicates that the host BIOS has started to execute and the LED register is now writable.

**Table 17. Amber LED blinking failures**

Amber LED state	White LED state	System state	Notes
2	1	Bad MBD	Bad MBD - Rows A, G, H, and J from table 12.4 of SIO Spec - Pre-Post indicators [40]
2	2	Bad MB, PSU or cabling	Bad MBD, PSU or PSU cabling - Rows B, C and D of table 12.4 SIO spec [40]
2	3	Bad MBD, DIMMS, or CPU	Bad MBD, DIMMS or CPU - Rows F and K from table 12.4 of SIO spec [40]
2	4	Bad coin cell	Bad coin cell - Row M of table 12.4 in SIO spec [40]

**Table 18. States Under Host BIOS Control**

Amber LED state	White LED state	System state	Notes
2	5	BIOS state 1	BIOS Post code (Old LED pattern 0001) Corrupt BIOS.
2	6	BIOS state 2	BIOS Post code (Old LED pattern 0010) CPU config or CPU failure.
2	7	BIOS state 3	BIOS Post code (Old LED pattern 0011) MEM config in process. Appropriate mem modules detected but failure has occurred.
3	1	BIOS state 4	BIOS Post code (Old LED pattern 0100) Combine PCI device config or failure with video sub sytem config or failure. BIOS to eliminate 0101 video code.
3	2	BIOS state 5	BIOS Post code (Old LED pattern 0110) Combine storage and USB config or failure. BIOS to eliminate 0111 USB code.
3	3	BIOS state 6	BIOS Post code (Old LED pattern 1000) MEM config, no memory detected.
3	4	BIOS state 7	BIOS Post code (Old LED pattern 1001) Fatal Motherboard error.
3	5	BIOS state 8	BIOS Post code (Old LED pattern 1010) Mem config, modules incompatible or invalid config.
3	6	BIOS state 9	BIOS Post code (Old LED pattern 1011) combine "Other pre-video activity and resource configuration codes. BIOS to eliminate 1100 code.
3	7	BIOS state 10	BIOS Post code (Old LED pattern 1110) Other pre-post activity, routine subsequent to video init.

## Backup media and recovery options

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

## Recovering the operating system

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

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

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

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

## Battery status lights

If the computer is connected to an electrical outlet, the battery light operates as follows:



<b>Alternately blinking amber light and white light</b>	An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop. Re-plug battery connector, replace battery if the issue reoccurs.
<b>Alternately blinking amber light with steady white light</b>	Temporary battery failure with AC adapter present. Re-plug battery connector, replace battery if the issue reoccurs.
<b>Constantly blinking amber light</b>	Fatal battery failure with AC adapter present. Fatal battery, replace the battery.
<b>Light off</b>	Battery in full charge mode with AC adapter present.
<b>White light on</b>	Battery in charge mode with AC adapter present.

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

## Contacting Dell

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

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

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