OptiPlex XE3 Tower

Service Manual

Regulatory Model: D18M
Regulatory Type: D18M005

Notes, cautions, and warnings

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

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

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

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Contents

1

Working on your computer

Safety instructions

Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or, if purchased separately, installed by performing the removal procedure in reverse order.

WARNING: Disconnect 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 to the power source.

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.Dell.com/regulatory_compliance

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

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

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

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1 Ensure that you follow the Safety Instruction.

2 Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.

3 Turn off your computer.
4 Disconnect all network cables from the computer.

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

5 Disconnect your computer and all attached devices from their electrical outlets.
6 Press and hold the power button while the computer is unplugged to ground the system board.

> **NOTE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.**

After working inside your computer

After you complete any replacement procedure, ensure that you connect any external devices, cards, and cables before turning on your computer.

1 Connect any telephone or network cables to your computer.

> **CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.**

2 Connect your computer and all attached devices to their electrical outlets.
3 Turn on your computer.
4 If required, verify that the computer works correctly by running **ePSA diagnostics**.

2

Technology and components

This chapter details the technology and components available in the system.

Topics:

DDR4

DDR4 (double data rate fourth generation) memory is a higher-speed successor to the DDR2 and DDR3 technologies and allows up to 512 GB in capacity, compared to the DDR3's maximum of 128 GB per DIMM. DDR4 synchronous dynamic random-access memory is keyed differently from both SDRAM and DDR to prevent the user from installing the wrong type of memory into the system.

DDR4 needs 20 percent less or just 1.2 volts, compared to DDR3 which requires 1.5 volts of electrical power to operate. DDR4 also supports a new, deep power-down mode that allows the host device to go into standby without needing to refresh its memory. Deep power-down mode is expected to reduce standby power consumption by 40 to 50 percent.

DDR4 Details

There are subtle differences between DDR3 and DDR4 memory modules, as listed below.

Key notch difference

The key notch on a DDR4 module is in a different location from the key notch on a DDR3 module. Both notches are on the insertion edge but the notch location on the DDR4 is slightly different, to prevent the module from being installed into an incompatible board or platform.

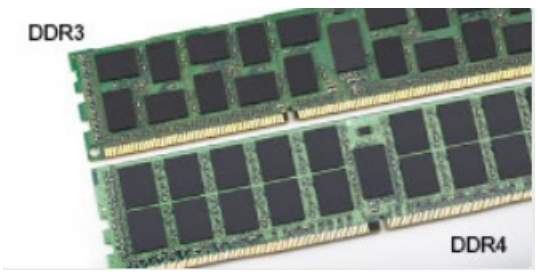


Figure 1. Notch difference

Increased thickness

DDR4 modules are slightly thicker than DDR3, to accommodate more signal layers.

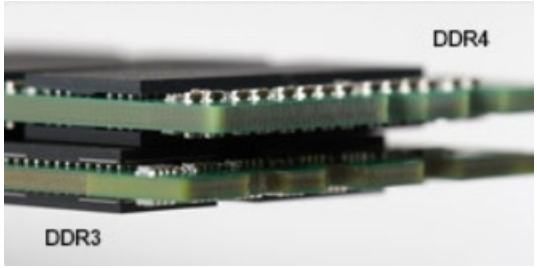


Figure 2. Thickness difference

Curved edge

DDR4 modules feature a curved edge to help with insertion and alleviate stress on the PCB during memory installation.

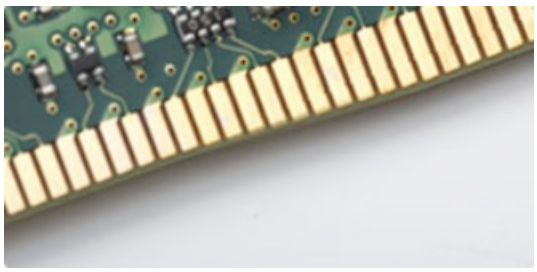


Figure 3. Curved edge

Memory Errors

Memory errors on the system display the new ON-FLASH-FLASH or ON-FLASH-ON failure code. If all memory fails, the LCD does not turn on. Troubleshoot for possible memory failure by trying known good memory modules in the memory connectors on the bottom of the system or under the keyboard, as in some portable systems.

USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drivers, and printers.

Let's take a quick look on the USB evolution referencing to the table below.

Table 1. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 3.0/USB 3.1 Gen 1	5 Gbps	Super Speed	2010
USB 2.0	480 Mbps	High Speed	2000
USB 3.1 Gen 2	10 Gbps	Super Speed	2013

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1

finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

- Higher transfer rates (up to 5 Gbps)
- Increased maximum bus power and increased device current draw to better accommodate power-hungry devices
- New power management features
- Full-duplex data transfers and support for new transfer types
- Backward USB 2.0 compatibility
- New connectors and cable

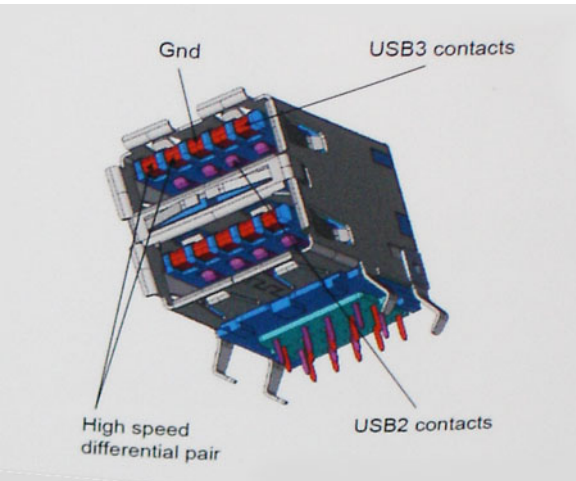
The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480Mbps and 12Mbps respectively and are kept to maintain backward compatibility.

USB 3.0/USB 3.1 Gen 1 achieves the much higher performance by the technical changes below:

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320Mbps (40MB/s) — the actual real-world maximum. Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

Listed below are some of the available SuperSpeed USB 3.0/USB 3.1 Gen 1 products:

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives
- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

The good news is that USB 3.0/USB 3.1 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.0/USB 3.1 Gen 1 specifies new physical connections and thus new cables to take advantage of the higher speed capability of the new protocol, the connector itself remains the same rectangular shape with the four USB 2.0 contacts in the exact same location as before. Five new connections to carry receive and transmitted data independently are present on USB 3.0/USB 3.1 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

Windows 8/10 will be bringing native support for USB 3.1 Gen 1 controllers. This is in contrast to previous versions of Windows, which continue to require separate drivers for USB 3.0/USB 3.1 Gen 1 controllers.

Microsoft announced that Windows 7 would have USB 3.1 Gen 1 support, perhaps not on its immediate release, but in a subsequent Service Pack or update. It is not out of the question to think that following a successful release of USB 3.0/USB 3.1 Gen 1 support in Windows 7, SuperSpeed support would trickle down to Vista. Microsoft has confirmed this by stating that most of their partners share the opinion that Vista should also support USB 3.0/USB 3.1 Gen 1.

USB Type-C

USB Type-C is a new, tiny physical connector. The connector itself can support various exciting new USB standards like USB 3.1 and USB power delivery (USB PD).

Alternate Mode

USB Type-C is a new connector standard that is very small. It is about a third the size of an old USB Type-A plug. This is a single connector standard that every device should be able to use. USB Type-C ports can support a variety of different protocols using “alternate modes,” which allows you to have adapters that can output HDMI, VGA, DisplayPort, or other types of connections from that single USB port

USB Power Delivery

The USB PD specification is also closely intertwined with USB Type-C. Currently, smartphones, tablets, and other mobile devices often use a USB connection to charge. A USB 2.0 connection provides up to 2.5 watts of power — that'll charge your phone, but that's about it. A laptop might require up to 60 watts, for example. The USB Power Delivery specification ups this power delivery to 100 watts. It's bi-directional, so a device can either send or receive power. And this power can be transferred at the same time the device is transmitting data across the connection.

This could spell the end of all those proprietary laptop charging cables, with everything charging via a standard USB connection. You could charge your laptop from one of those portable battery packs you charge your smartphones and other portable devices from today. You could plug your laptop into an external display connected to a power cable, and that external display would charge your laptop as you used it as an external display — all via the one little USB Type-C connection. To use this, the device and the cable have to support USB Power Delivery. Just having a USB Type-C connection doesn't necessarily mean they do.

USB Type-C and USB 3.1

USB 3.1 is a new USB standard. USB 3's theoretical bandwidth is 5 Gbps same as of USB 3.1 Gen 1, while USB 3.1 Gen 2's bandwidth is 10 Gbps. That's double the bandwidth, as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1. USB Type-C is just a connector shape, and the underlying technology could just be USB 2 or USB 3.0. In fact, Nokia's N1 Android tablet uses a USB Type-C connector, but underneath it's all USB 2.0 — not even USB 3.0. However, these technologies are closely related.

Advantages of Displayport over USB Type-C

- Full DisplayPort audio/video (A/V) performance (up to 4K at 60Hz)
- Reversible plug orientation and cable direction
- Backwards compatibility to VGA, DVI with adaptors
- SuperSpeed USB (USB 3.1) data
- Supports HDMI 2.0a and is backwards compatible with previous versions

HDMI 2.0

This topic explains the HDMI 2.0 and its features along with the advantages.

HDMI (High-Definition Multimedia Interface) is an industry-supported, uncompressed, all-digital audio/video interface. HDMI provides an interface between any compatible digital audio/video source, such as a DVD player, or A/V receiver and a compatible digital audio and/or video monitor, such as a digital TV (DTV). The intended applications for HDMI TVs, and DVD players. The primary advantage is cable reduction and content protection provisions. HDMI supports standard, enhanced, or high-definition video, plus multichannel digital audio on a single cable.

HDMI 2.0 Features

- **HDMI Ethernet Channel** - Adds high-speed networking to an HDMI link, allowing users to take full advantage of their IP-enabled devices without a separate Ethernet cable
- **Audio Return Channel** - Allows an HDMI-connected TV with a built-in tuner to send audio data "upstream" to a surround audio system, eliminating the need for a separate audio cable
- **3D** - Defines input/output protocols for major 3D video formats, paving the way for true 3D gaming and 3D home theater applications
- **Content Type** - Real-time signaling of content types between display and source devices, enabling a TV to optimize picture settings based on content type
- **Additional Color Spaces** - Adds support for additional color models used in digital photography and computer graphics
- **4K Support** - Enables video resolutions far beyond 1080p, supporting next-generation displays that will rival the Digital Cinema systems used in many commercial movie theaters

- **HDMI Micro Connector** - A new, smaller connector for phones and other portable devices, supporting video resolutions up to 1080p
- **Automotive Connection System** - New cables and connectors for automotive video systems, designed to meet the unique demands of the motoring environment while delivering true HD quality

Advantages of HDMI

- Quality HDMI transfers uncompressed digital audio and video for the highest, crispest image quality.
- Low -cost HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner
- Audio HDMI supports multiple audio formats from standard stereo to multichannel surround sound
- HDMI combines video and multichannel audio into a single cable, eliminating the cost, complexity, and confusion of multiple cables currently used in A/V systems
- HDMI supports communication between the video source (such as a DVD player) and the DTV, enabling new functionality

Disassembly and reassembly

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].

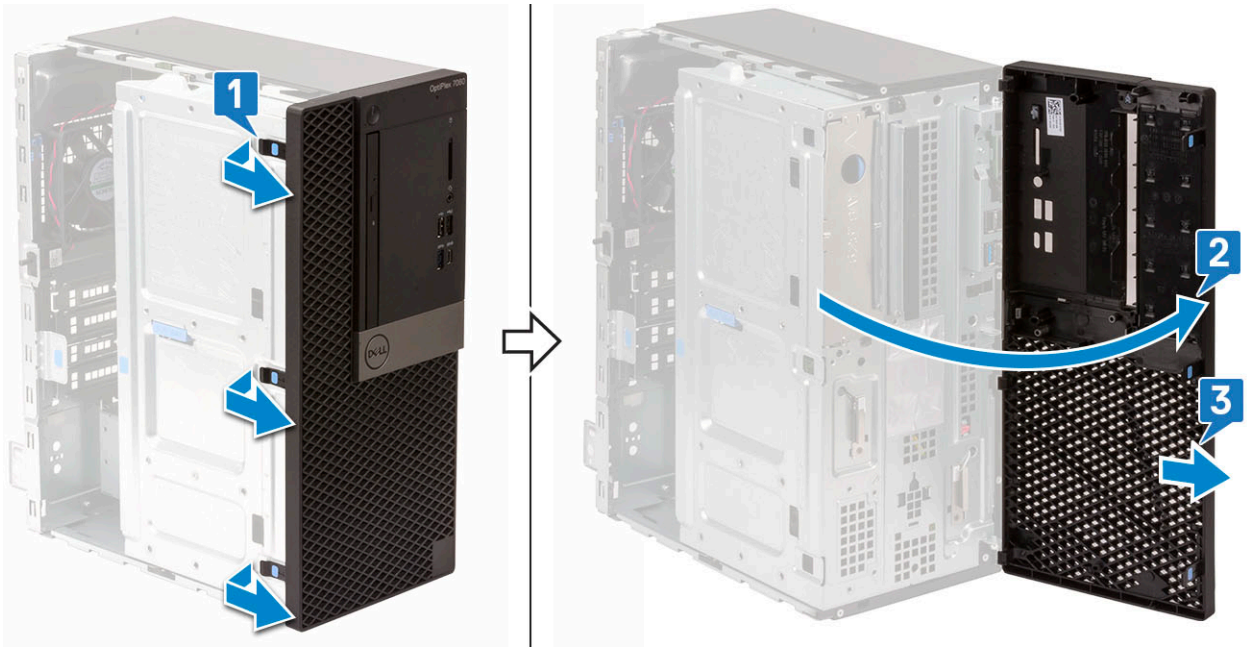
2 Slide the side cover until the click sound and the blue tab secures the side cover to the computer [2].

3 Follow the procedure in After working inside your computer.

Front Bezel

Removing front bezel

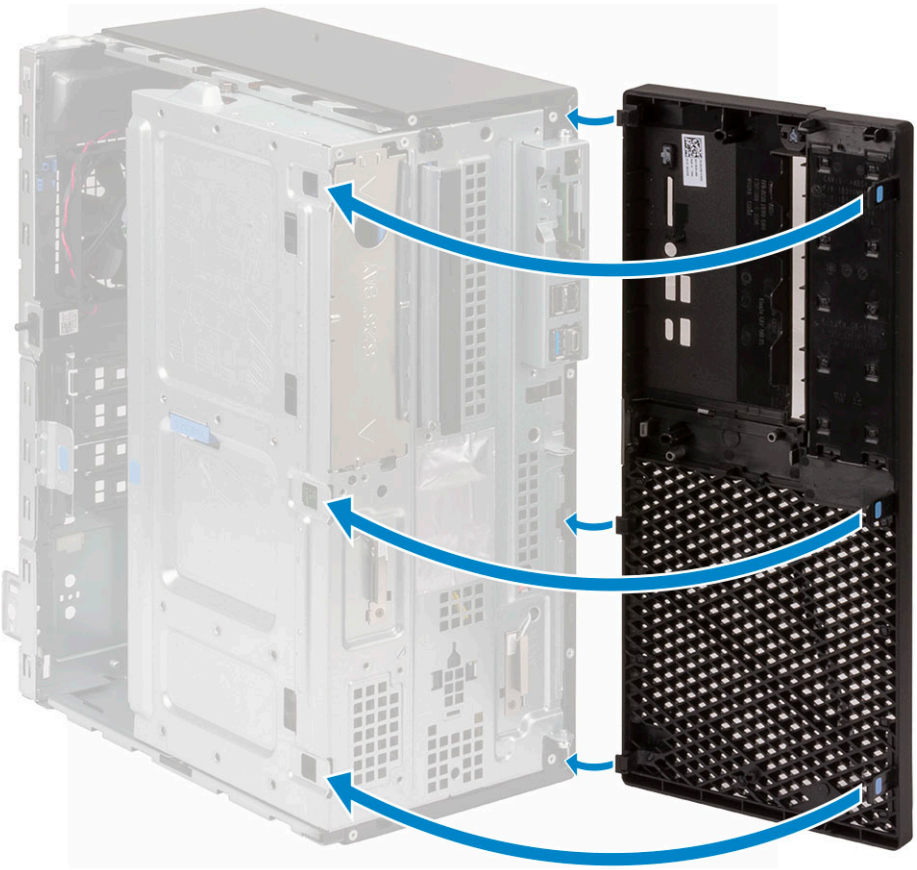
1 Follow the procedure in Before working inside your computer.
2 Remove the side cover.
3 To remove the front bezel:
   a Lift the tabs to release the front bezel from the chassis [1].
   b Push the front bezel away from the chassis [2] .
   c Pull the front bezel to release it from the chassis [3].



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.

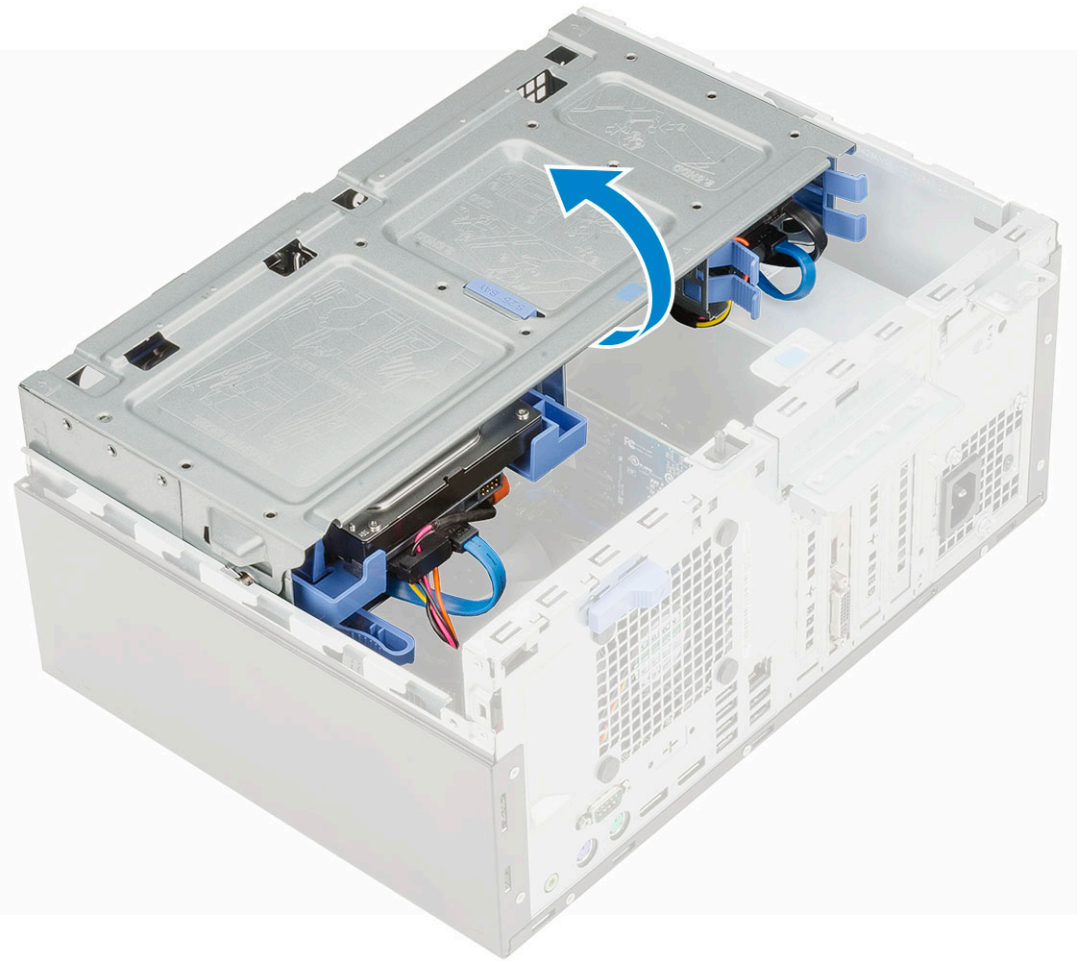
2 Remove the:

a side cover

b front bezel

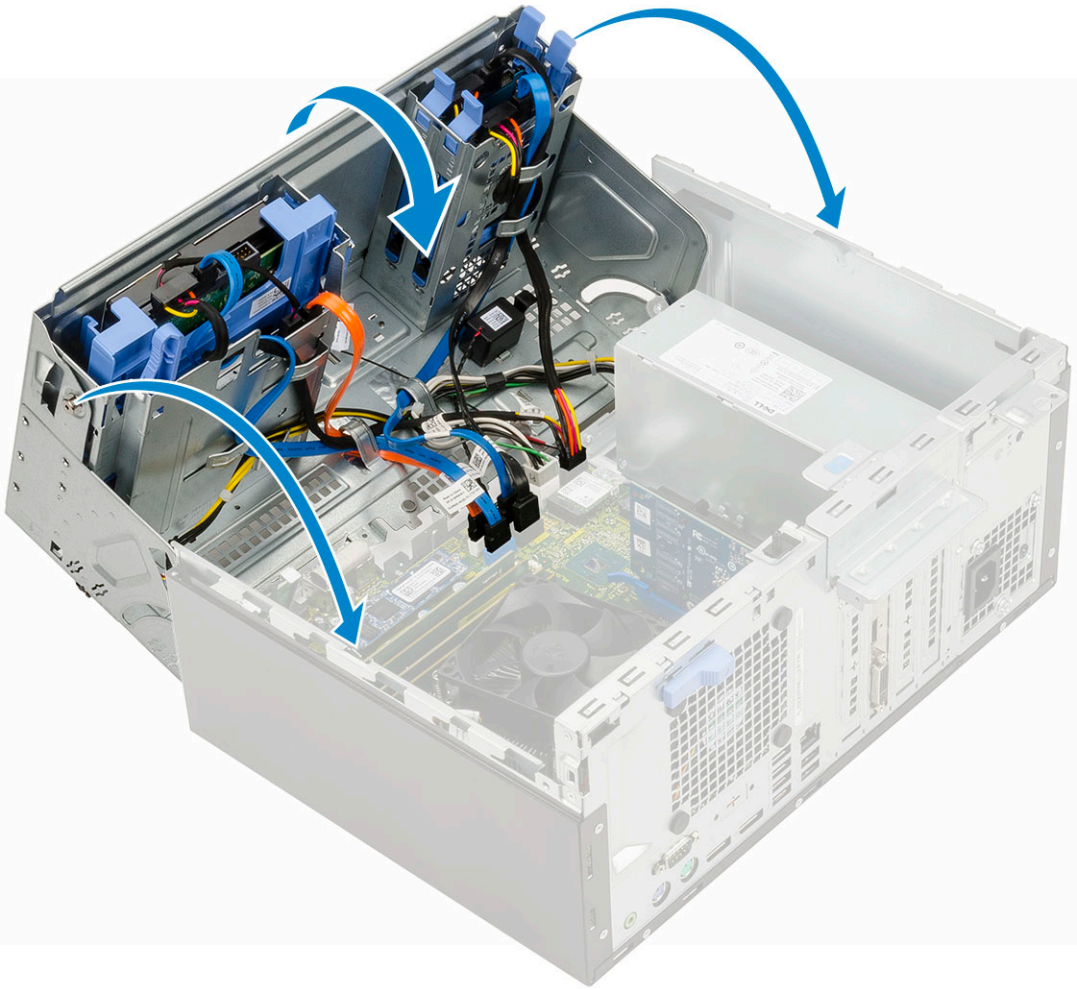
CAUTION: The front panel door opens only to a limited extent. See the printed image on the front panel door for the maximum permissible level.

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.



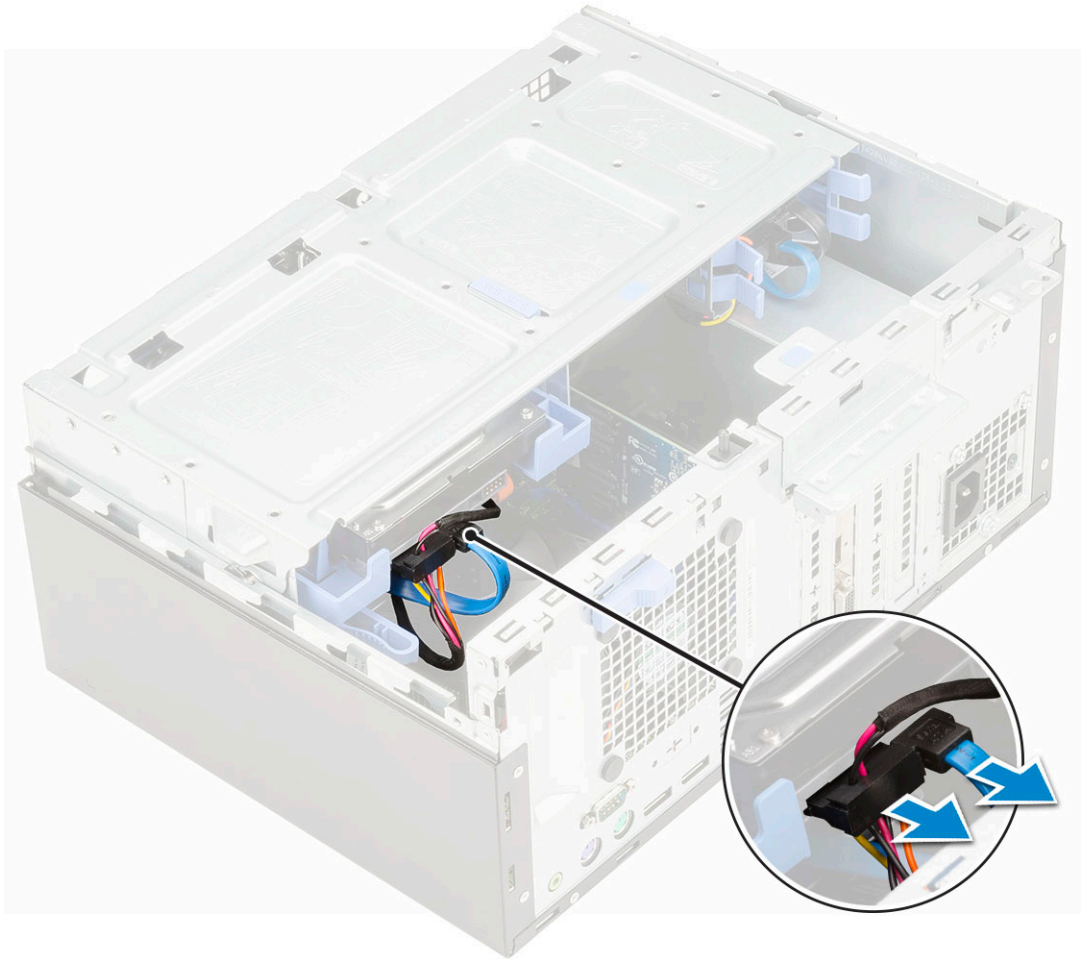
2 Install the
   a front bezel
   b side cover
3 Follow the procedure in After working inside your computer.

3.5-inch hard drive

Removing 3.5–inch hard drive assembly

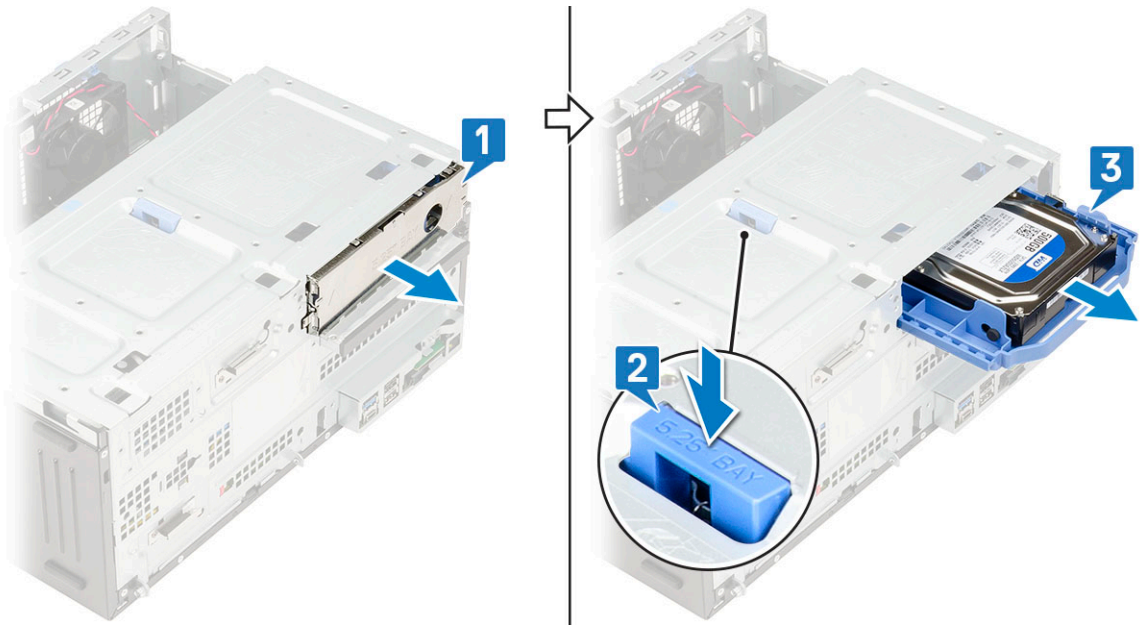
1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a side cover
   b front bezel
3 To remove the hard drive assembly:
   a Disconnect the hard drive assembly cables from the connectors on the hard drive.

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



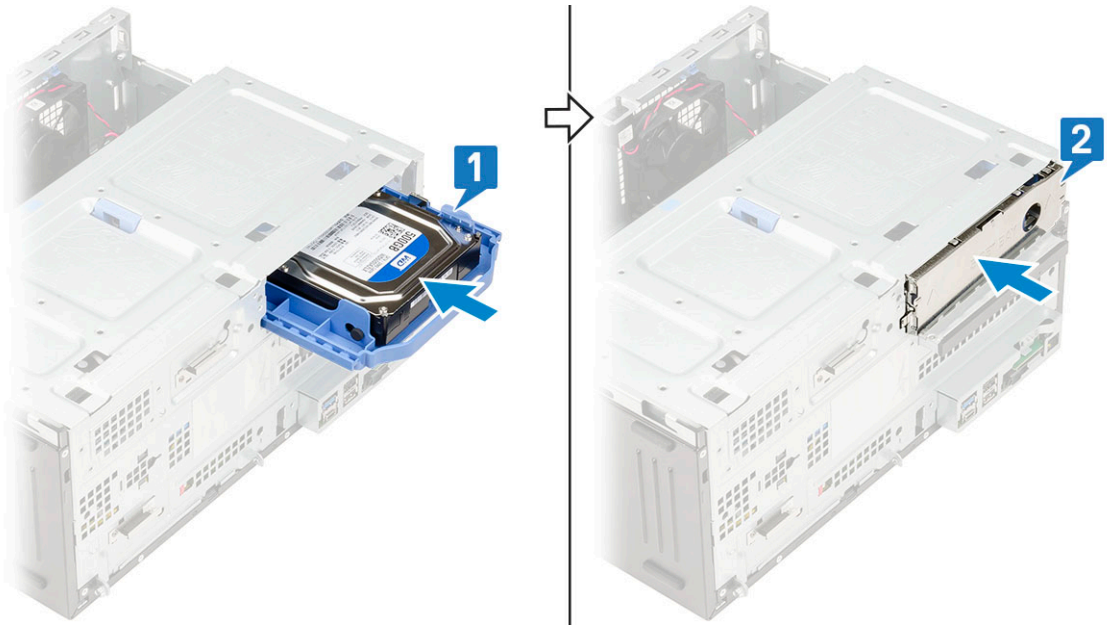
b Pull the metal bracket that shields the hard drive assembly [1].

c Press the blue tab [2] and pull the hard drive assembly out of the computer [3].



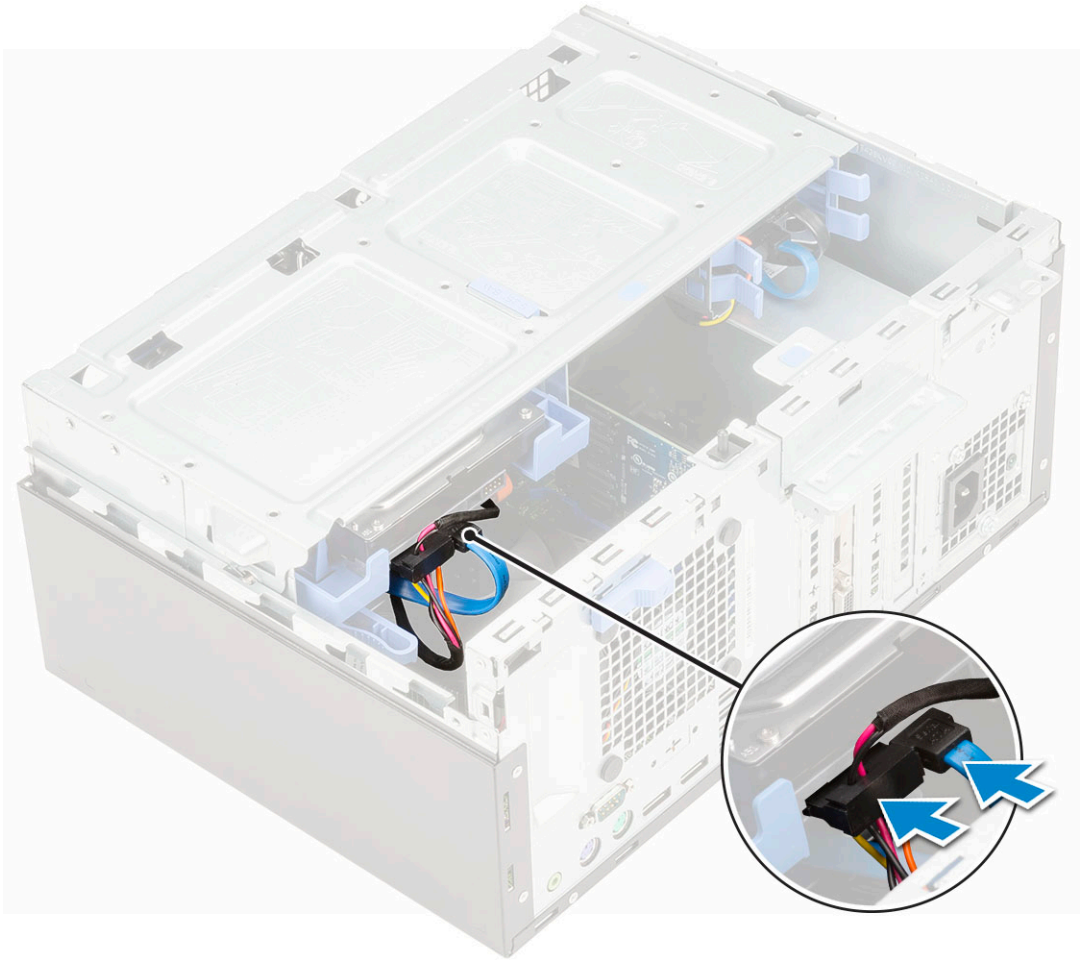
Installing 3.5–inch hard drive assembly

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.

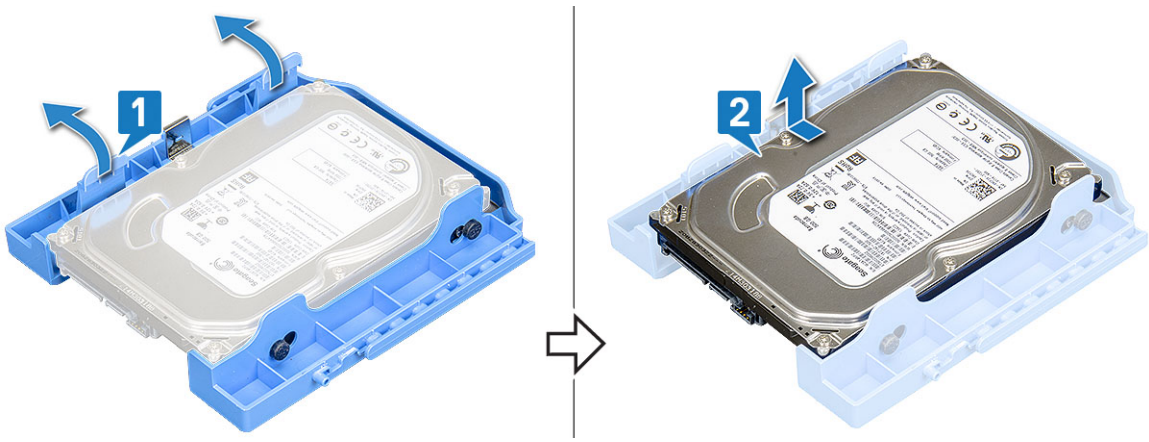
3.5-inch hard drive

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:

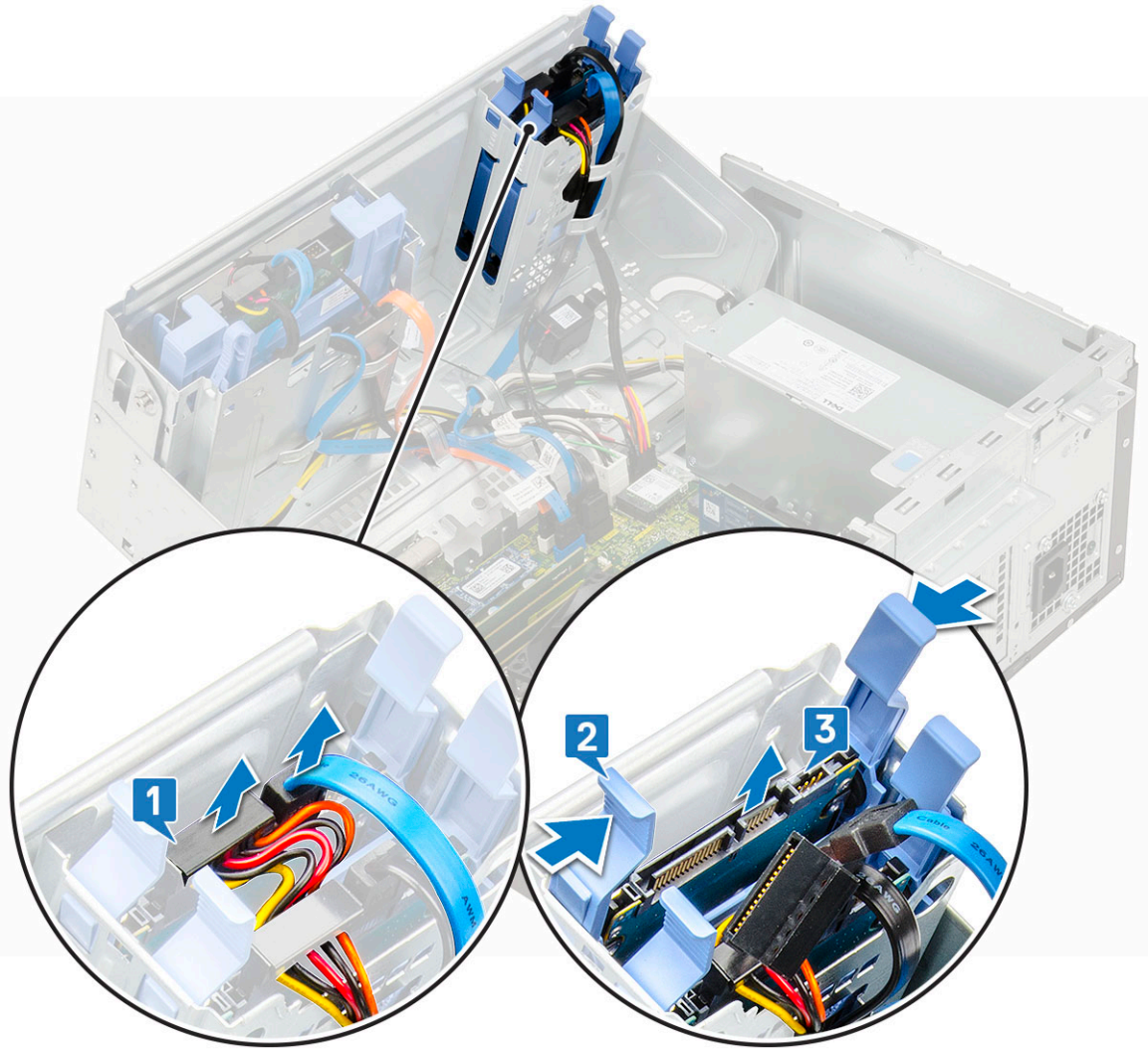
- a side cover
- b front bezel

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].

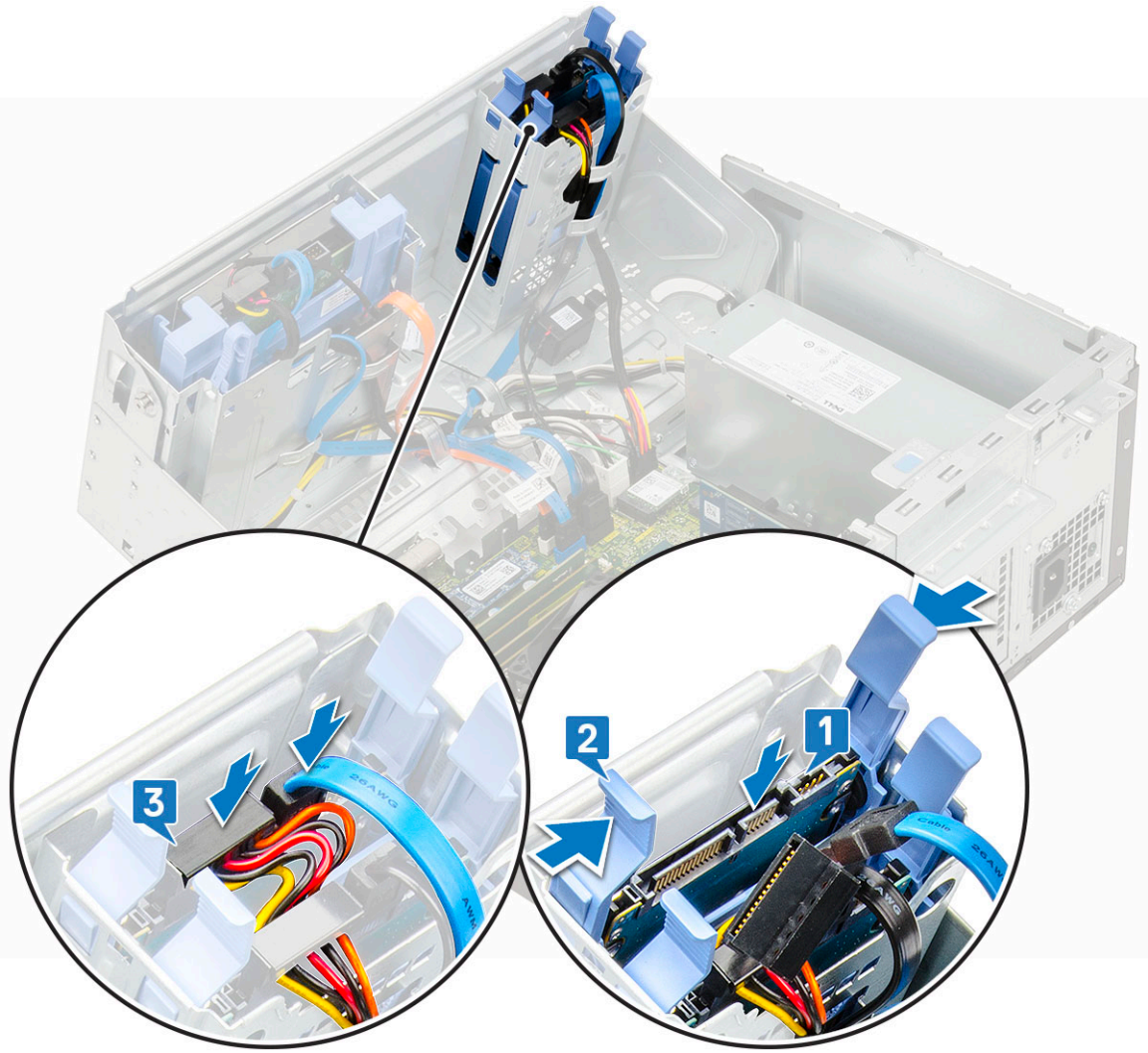
NOTE: Gently press the blue tabs to avoid damage to the plastic tabs.



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.

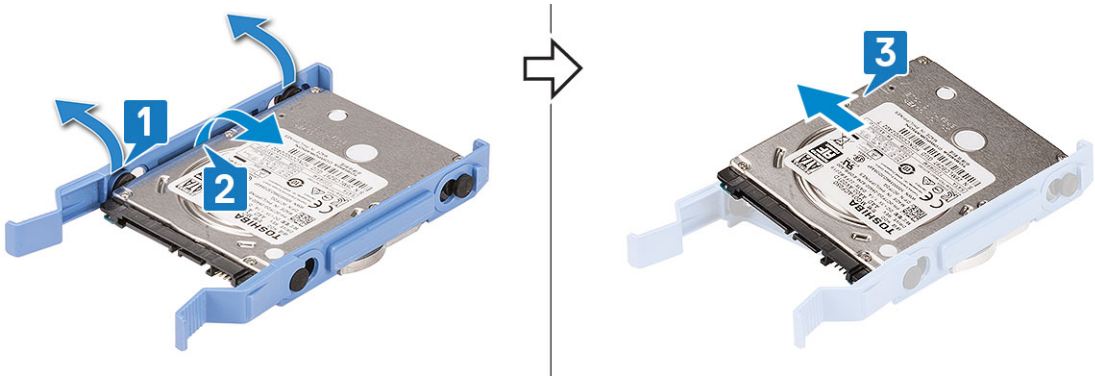
2.5-inch hard drive

Removing the 2.5–inch drive from the drive bracket

1 Follow the procedure in Before Working Inside Your Computer.

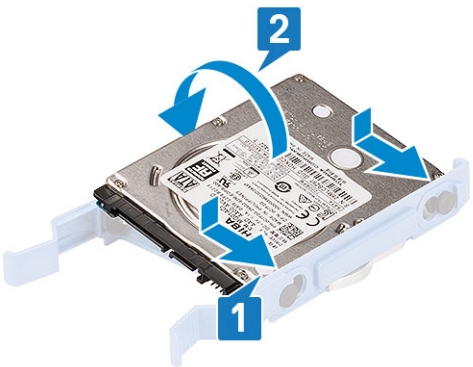
2 Remove the:
   a side cover
   b front bezel
   c 2.5–inch drive assembly

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

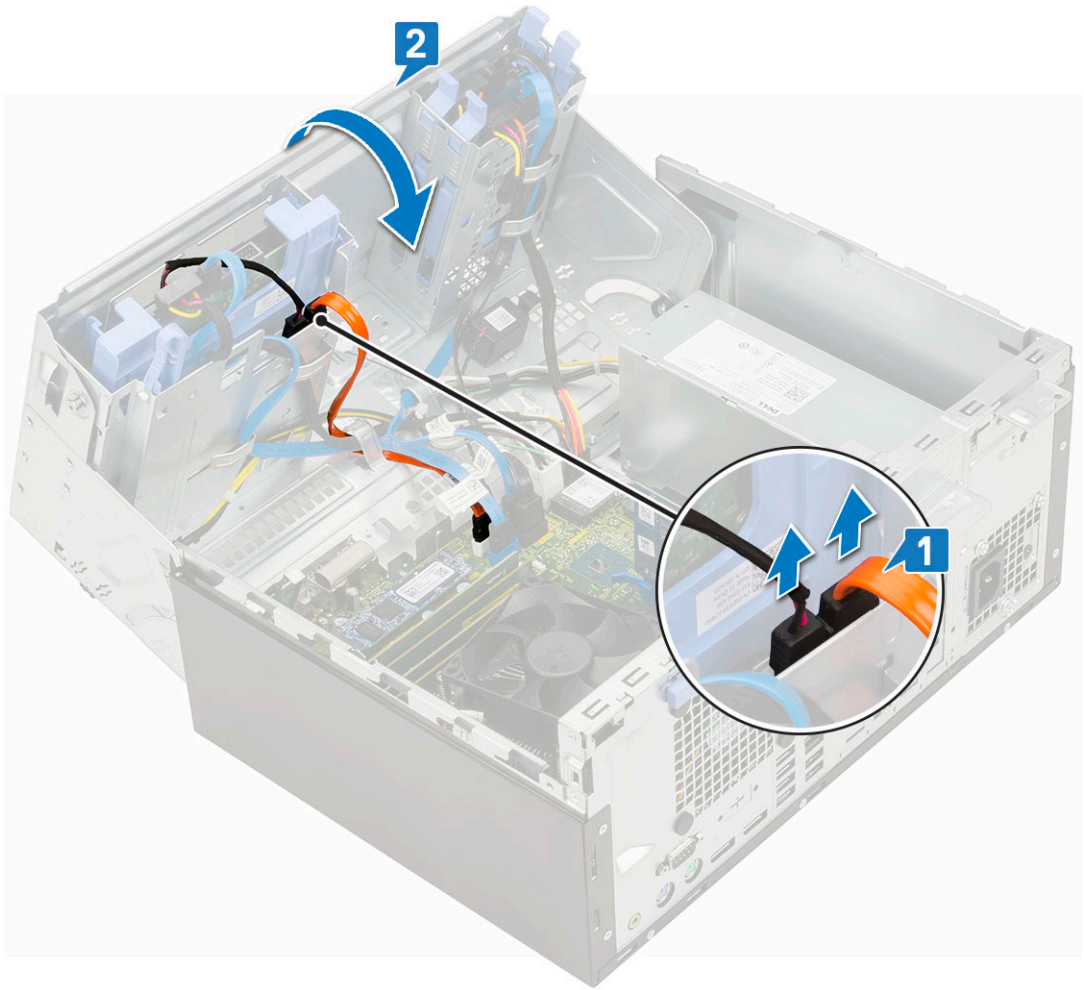
3 Open the front panel door.

4 To remove the optical drive assembly:

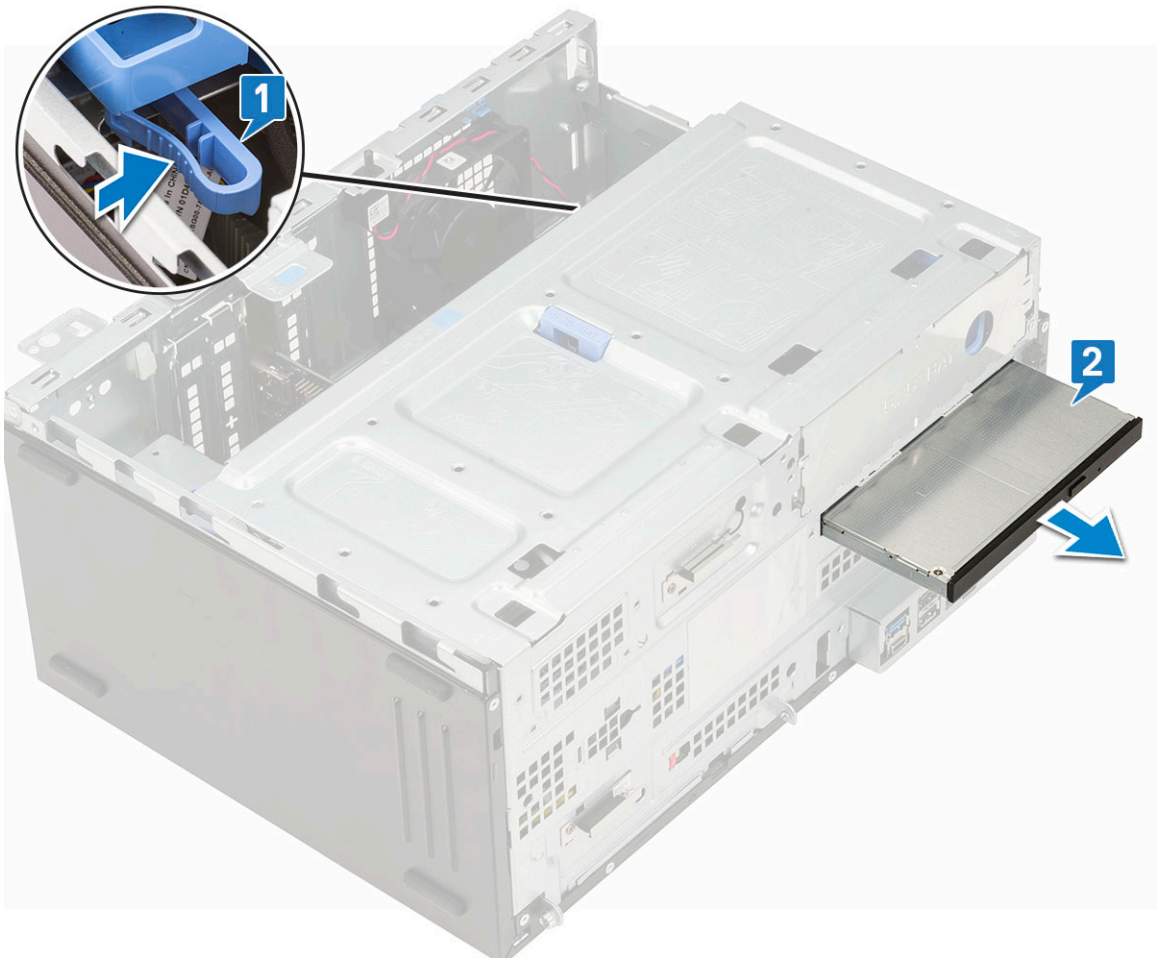
a Disconnect the data cable and power cable from the connectors on the optical drive [1].

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].

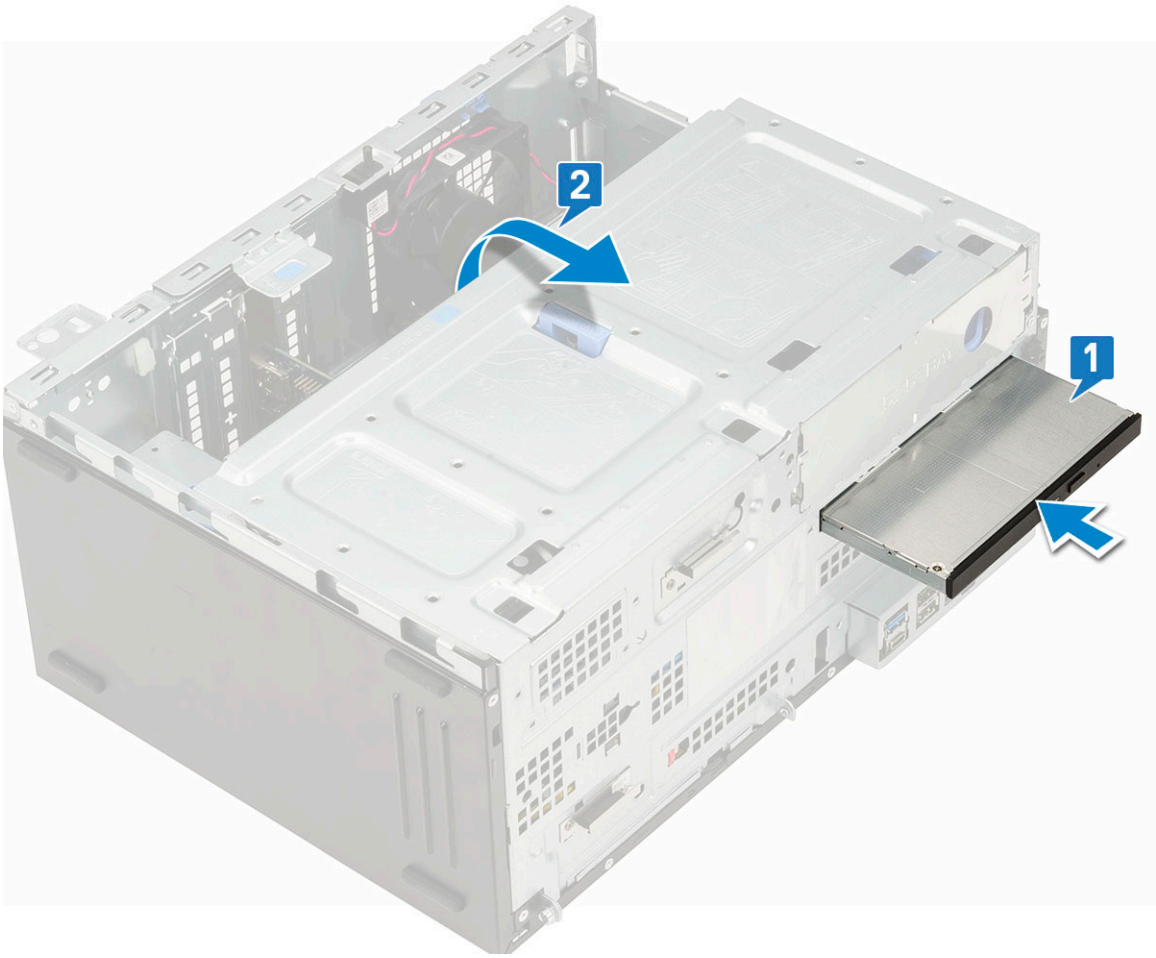


c Press the blue release tab [1] and slide the optical drive out of the computer [2].



Installing optical drive

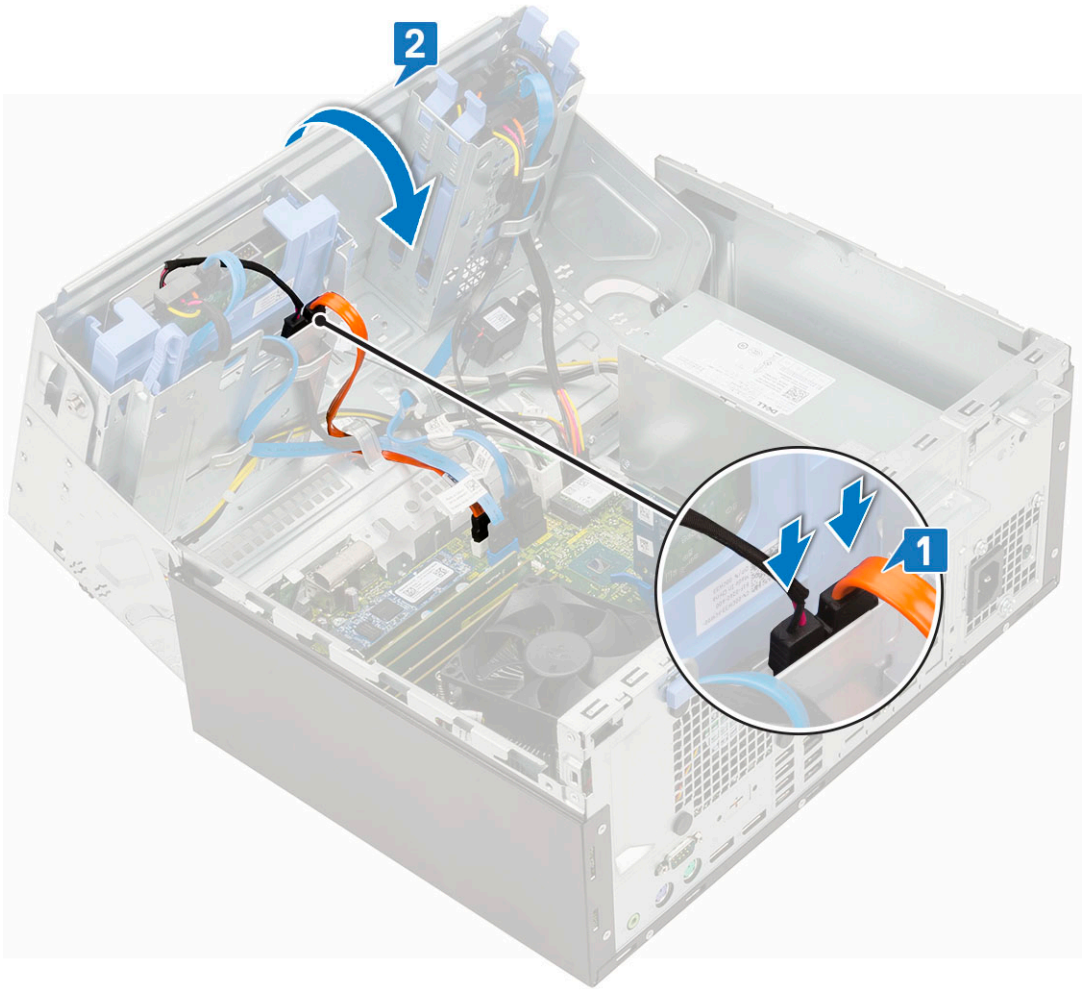
1 Insert the optical drive into the optical drive bay until the blue release tab clicks into place.



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].

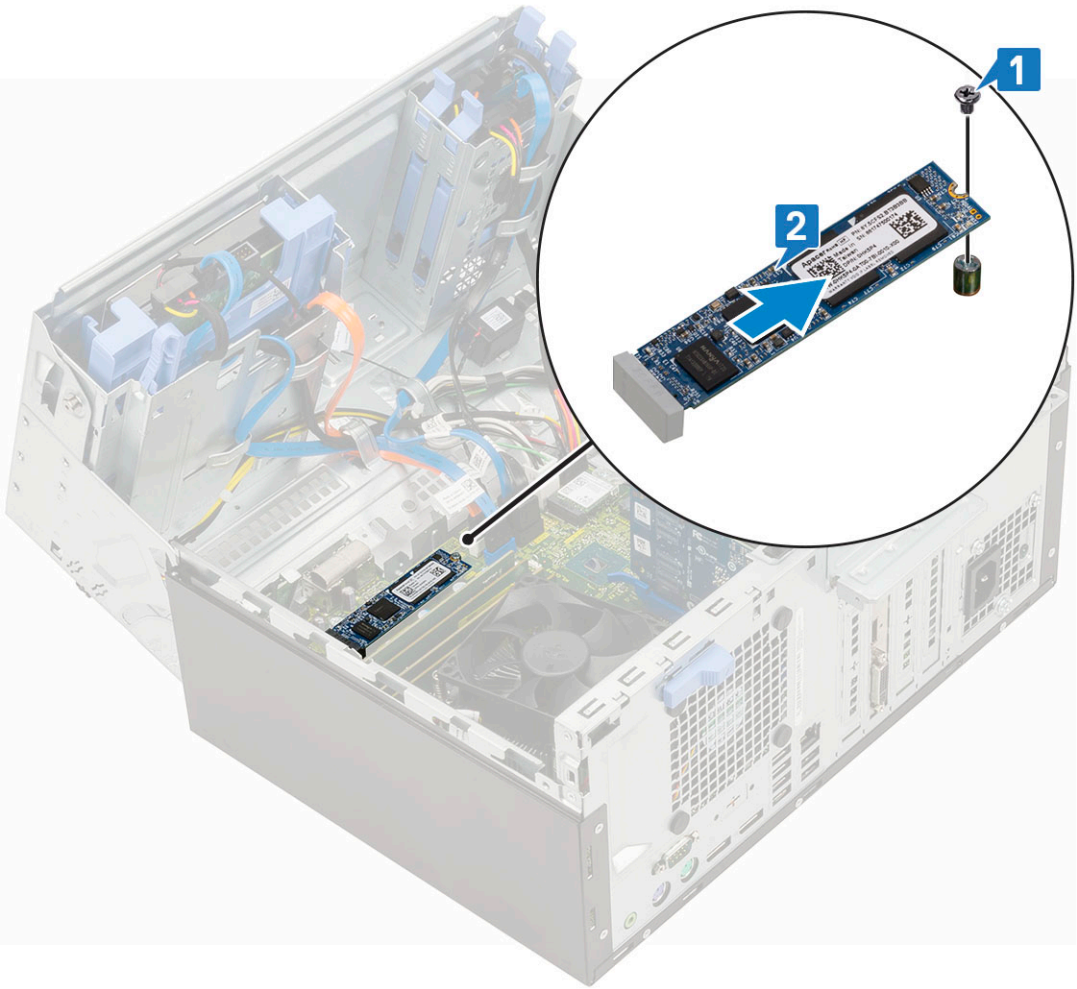


5 Close the front panel door.
6 Install the:
   a front bezel
   b side cover
7 Follow the procedure in After working inside your computer.

M.2 PCIe SSD

Removing M.2 PCIe SSD - optional

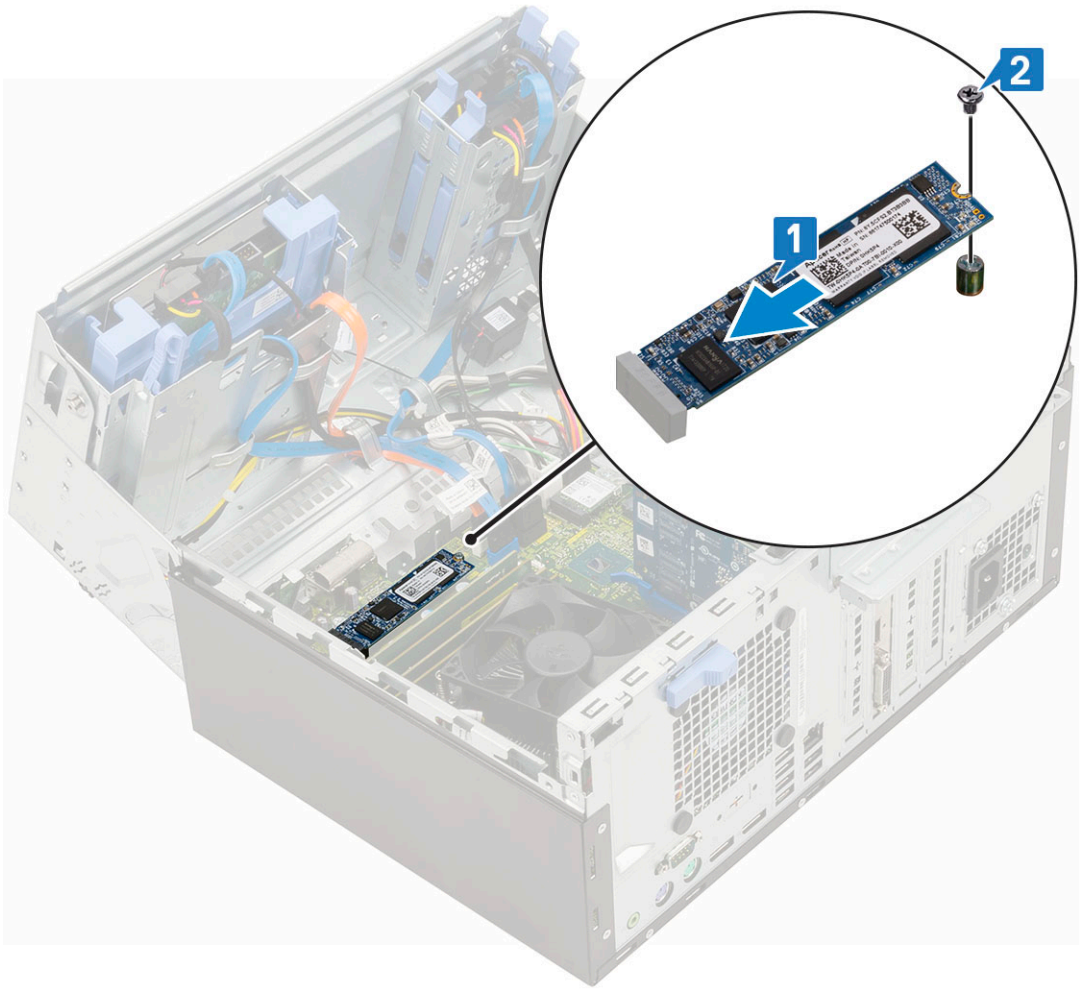
1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a side cover
   b front bezel
3 Open the front panel door.
4 To remove the M.2 PCIe SSD:
   a Remove the screw that secures the M.2 PCIe SSD to the system board [1].
   b Slide out the M.2 PCIe SSD from the connector on the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

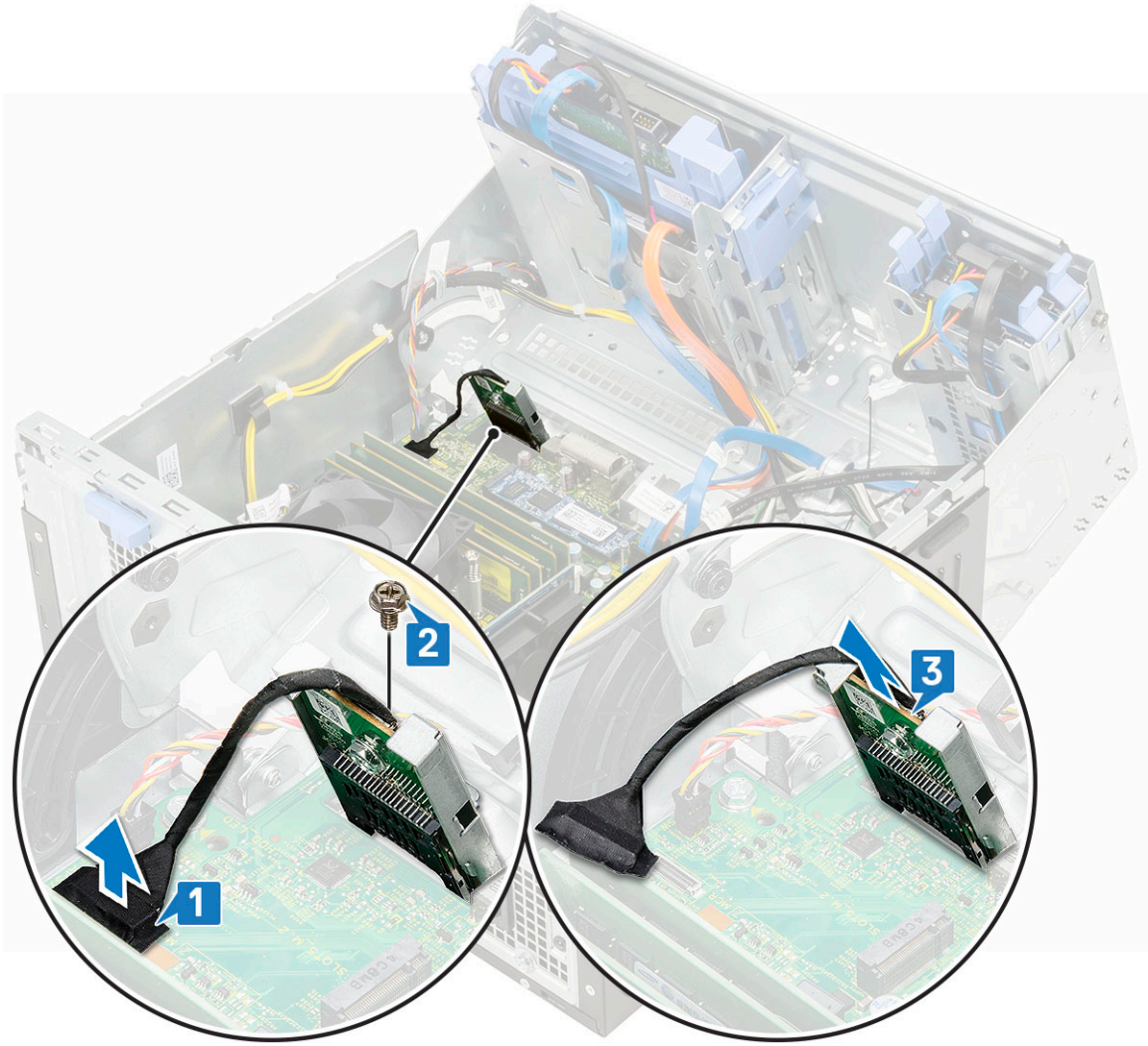


3 Close the front panel door.
4 Install the:
   a front bezel
   b side cover
5 Follow the procedure in After working inside your computer.

SD card reader

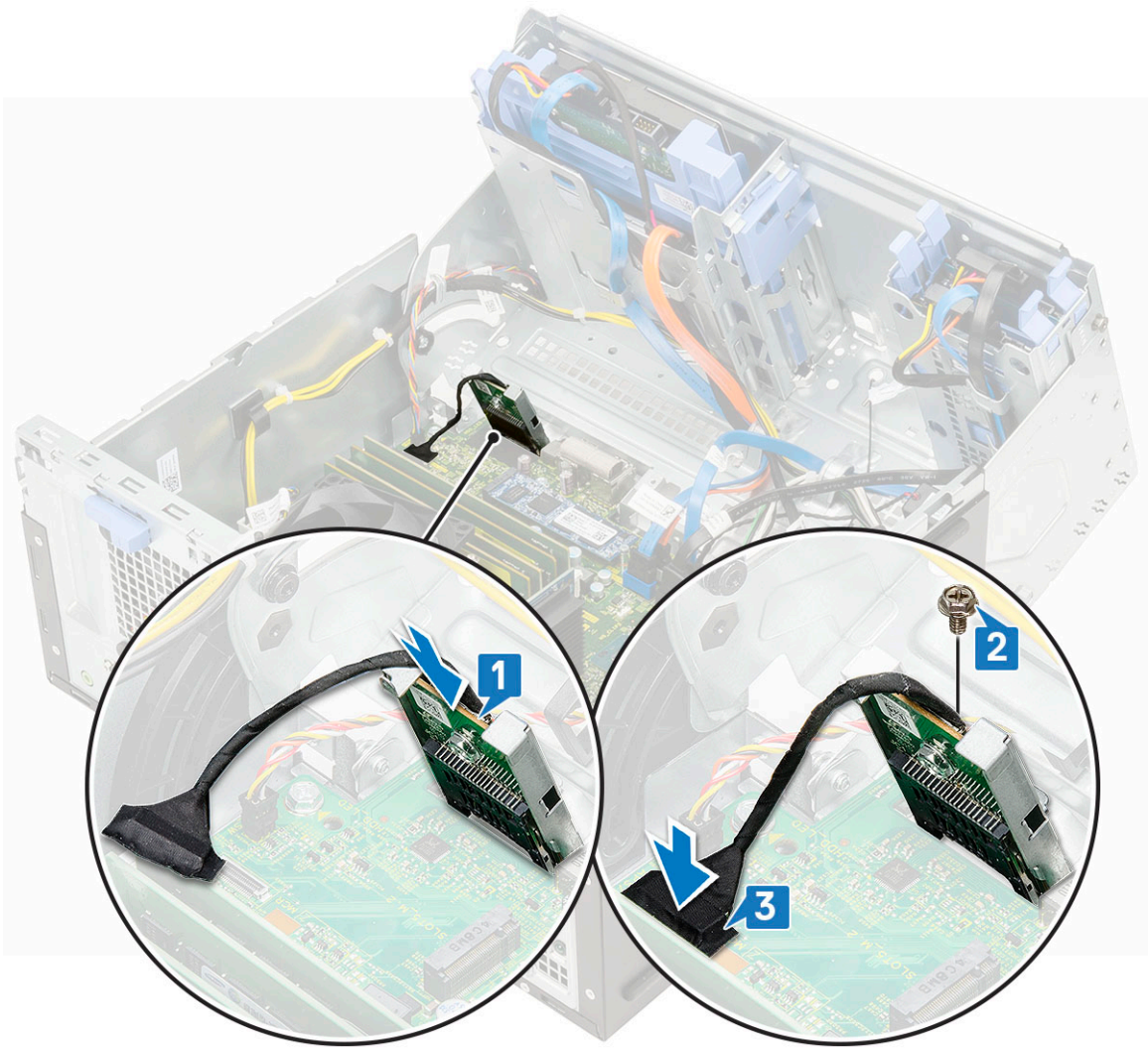
Removing SD card reader

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

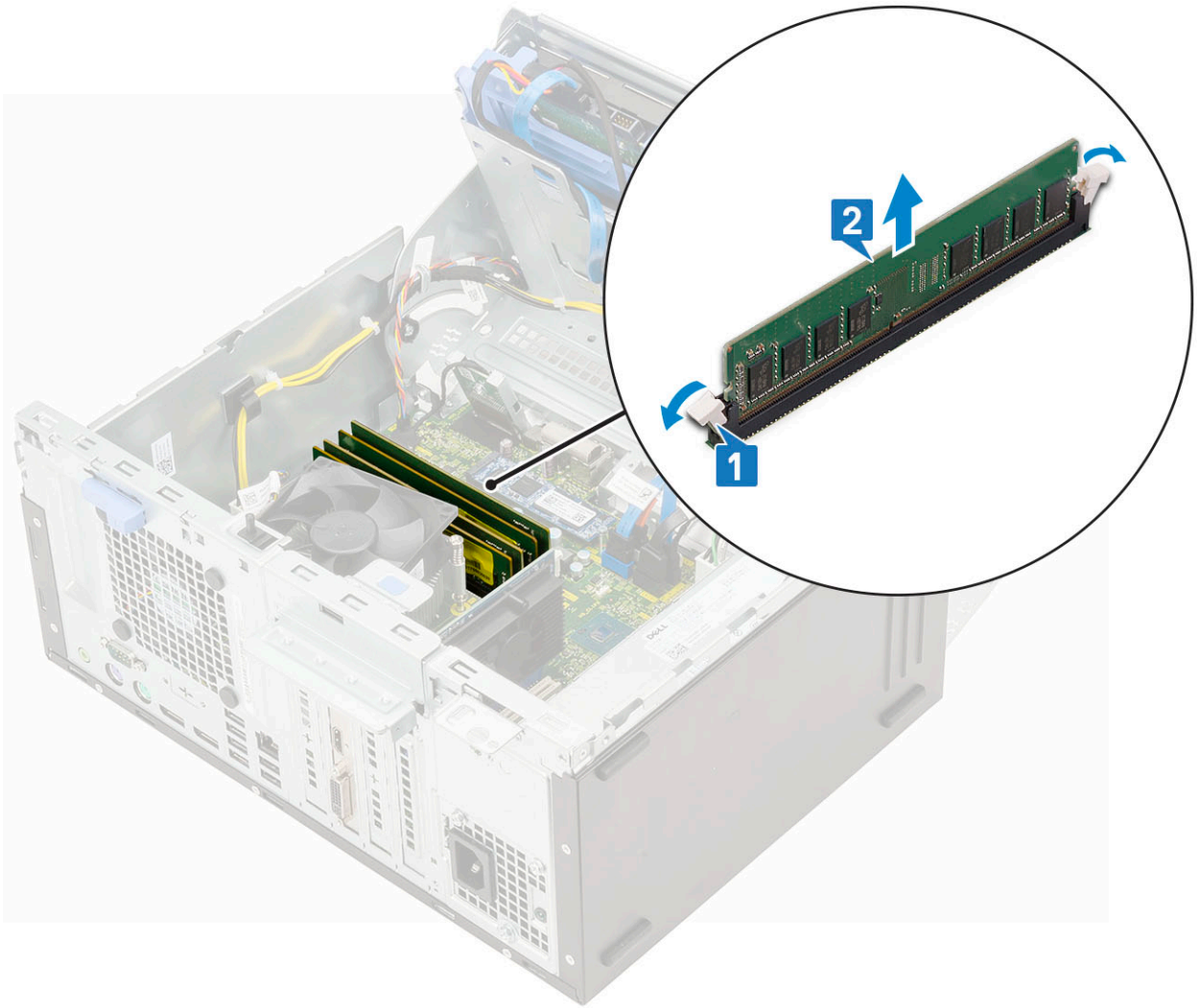
1 Follow the procedure in Before working inside your computer.

2 Remove the:
   a side cover
   b front bezel

3 Open the front panel door.

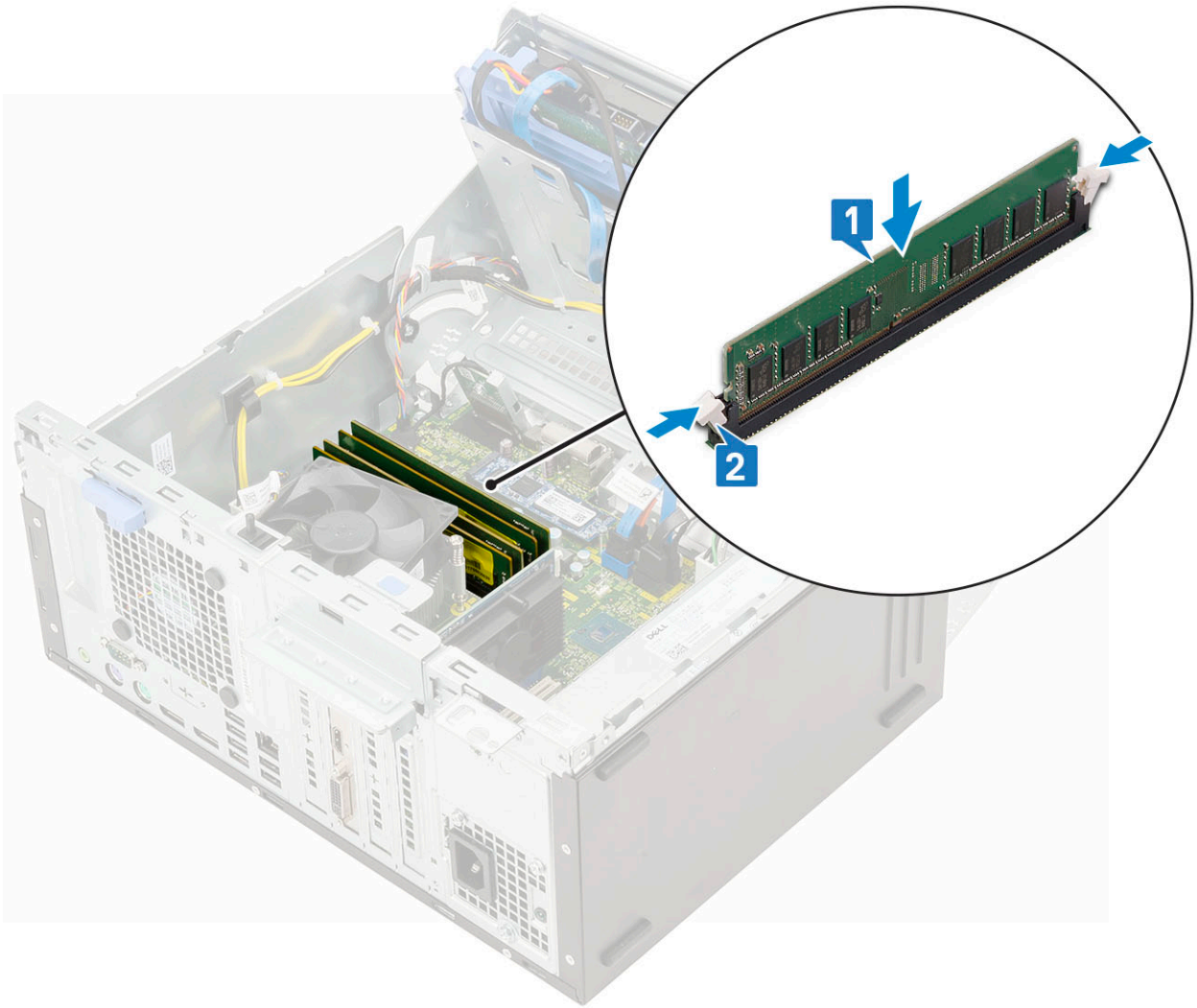
4 To remove the memory module:
   a Push the memory module retention tabs on both sides of the memory module [1].
   b Pull the memory module from the memory module connector on the system board [2].

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].



NOTE: Bison XE3 supports 4 memory module.

4 Close thefront 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

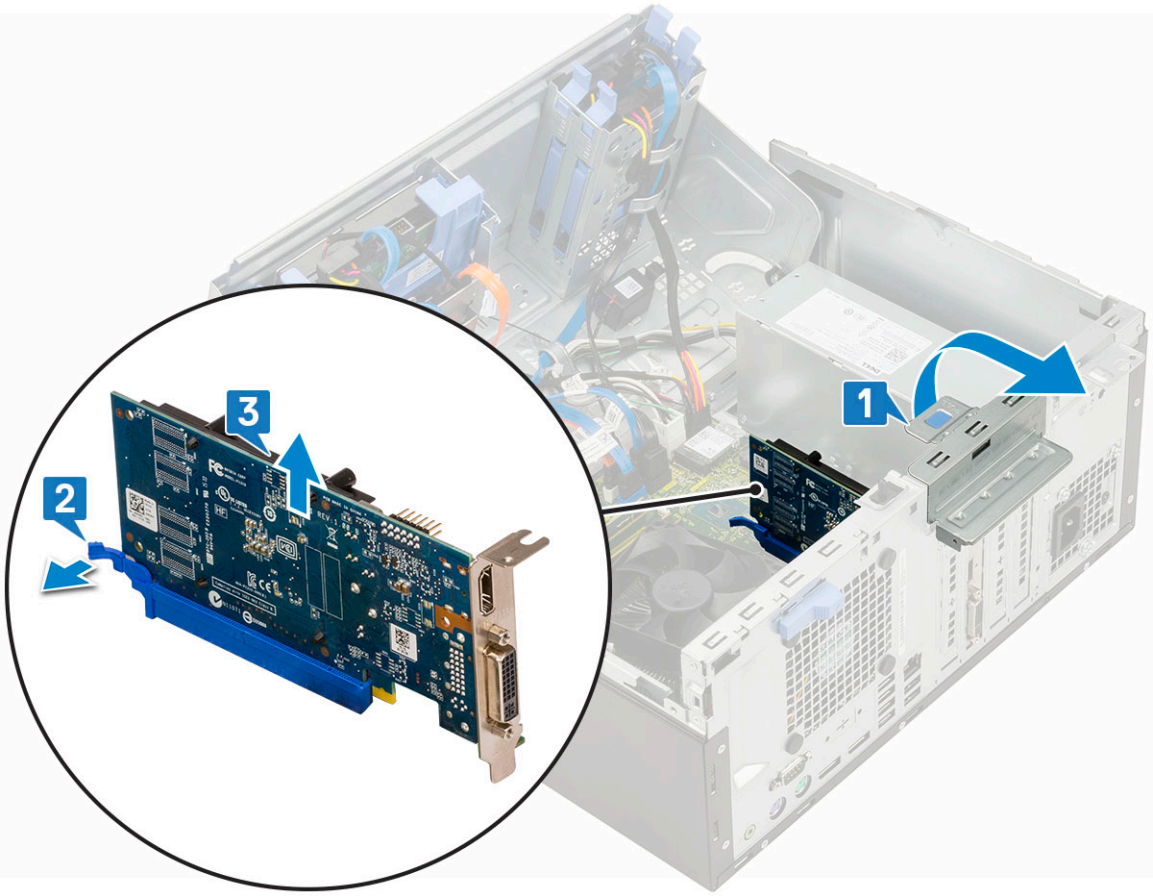
1 Follow the procedure in Before working inside your computer.

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.

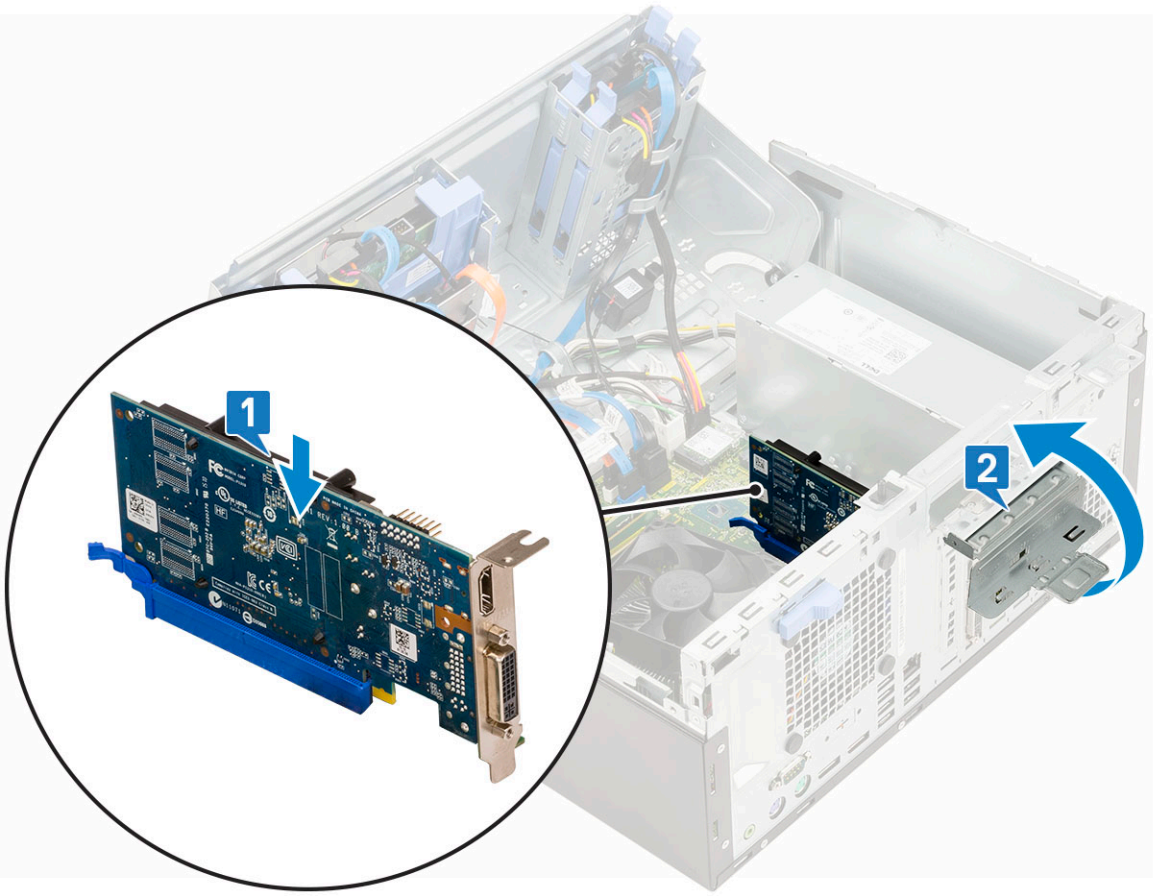


5 Repeat the steps to remove any additional PCIe expansion card

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

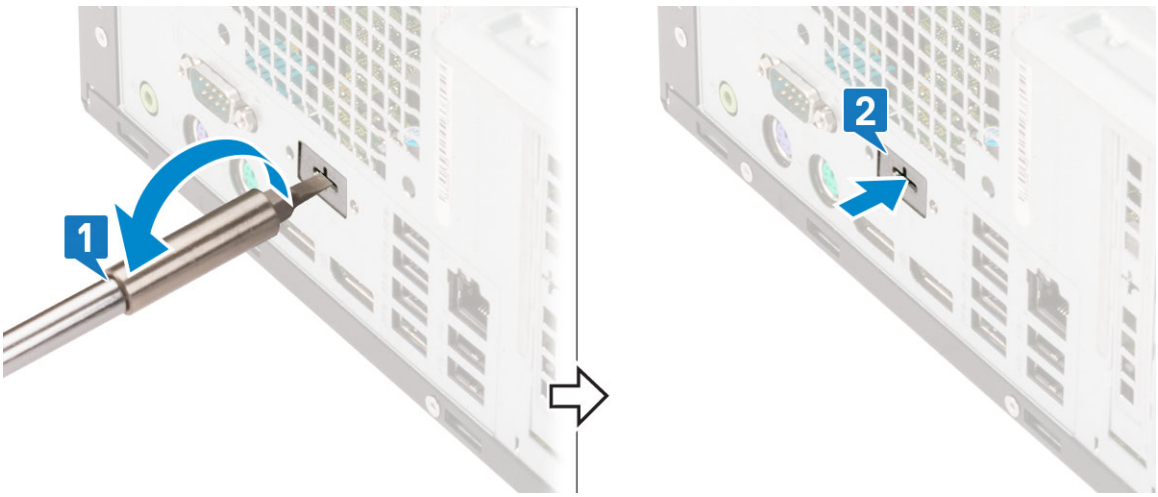
   b side cover

6 Follow the procedure in After working inside your computer.

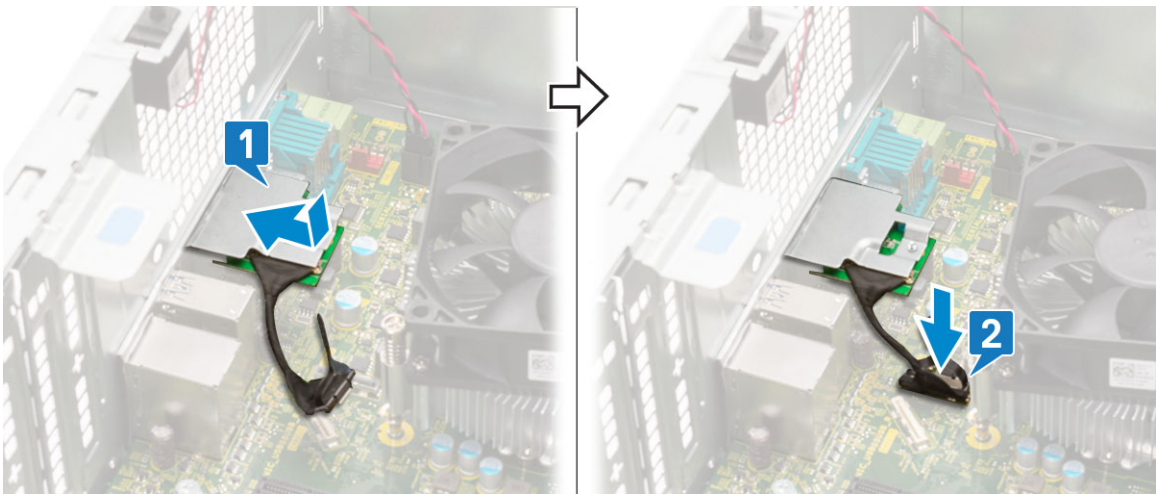
Optional VGA module

Installing optional VGA module

1 To remove the metal bracket as shown below, insert a flathead screwdriver in the hole of the bracket [1], push the bracket to release the bracket [2], and then lift the bracket out from the system.



2 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].



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

4 Install the system fan.

5 Close the front panel door.

6 Install the:

a Front bezel

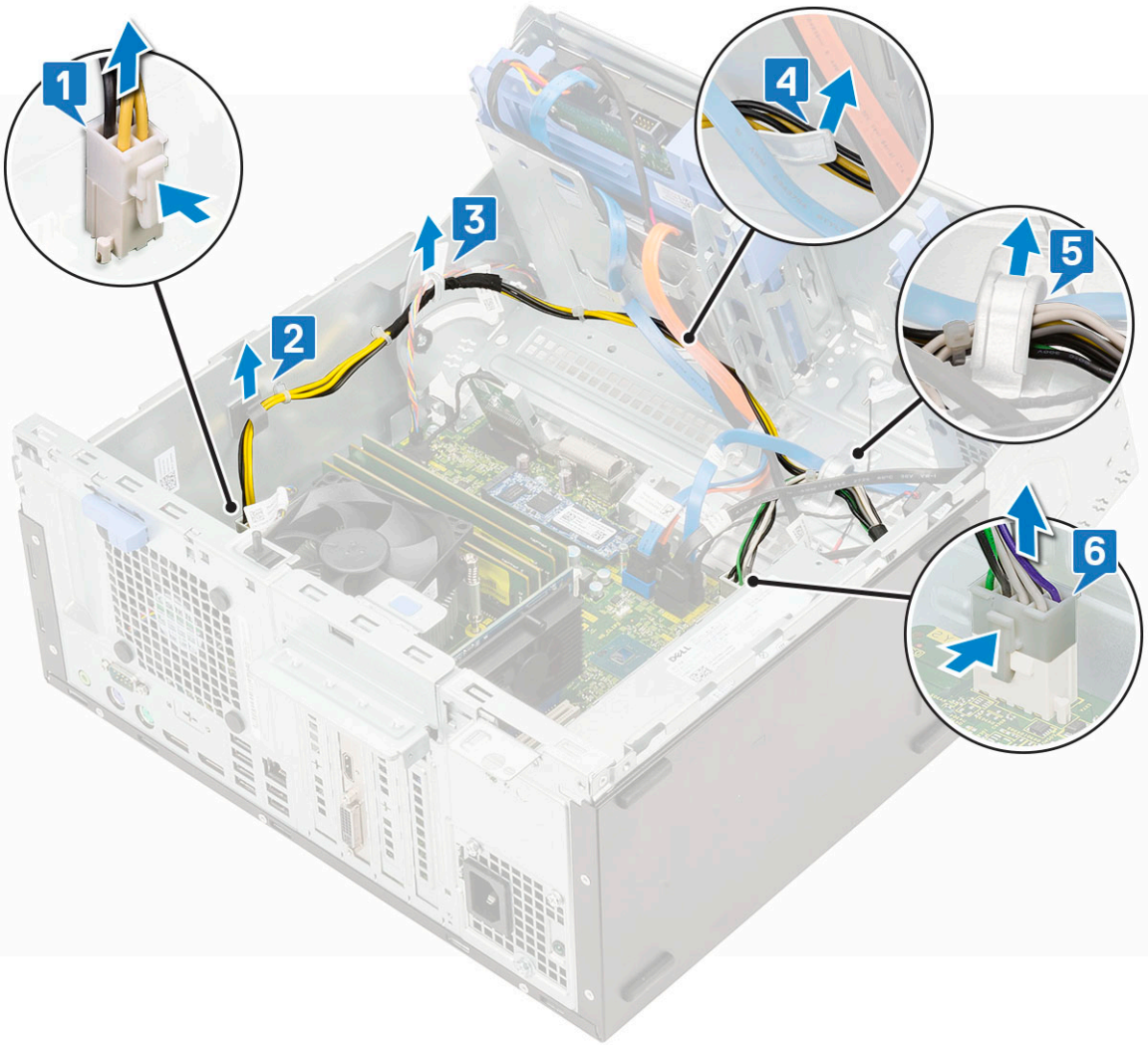
b Side cover

7 Follow the procedure in After working inside your computer.

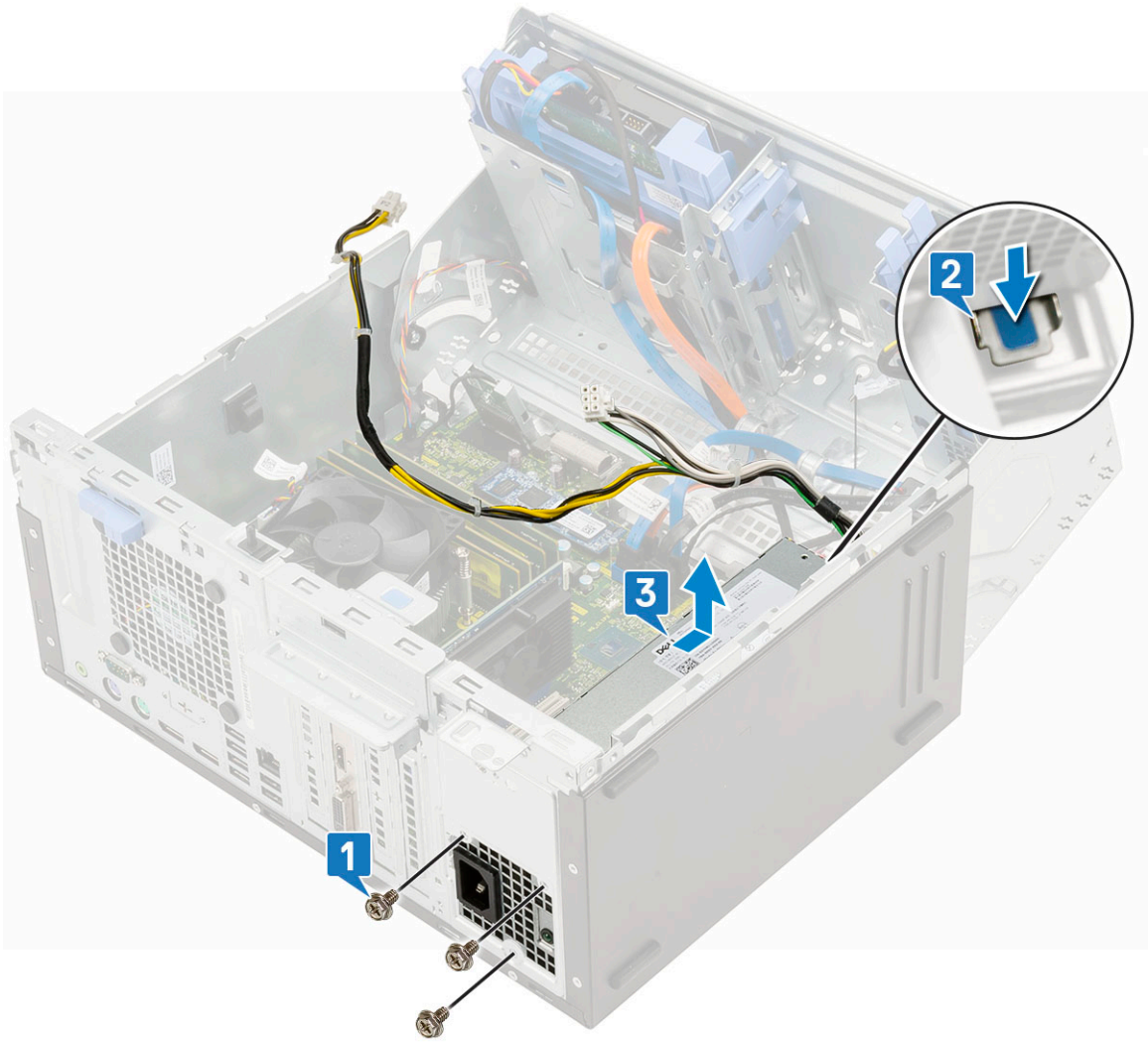
Power supply unit

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].

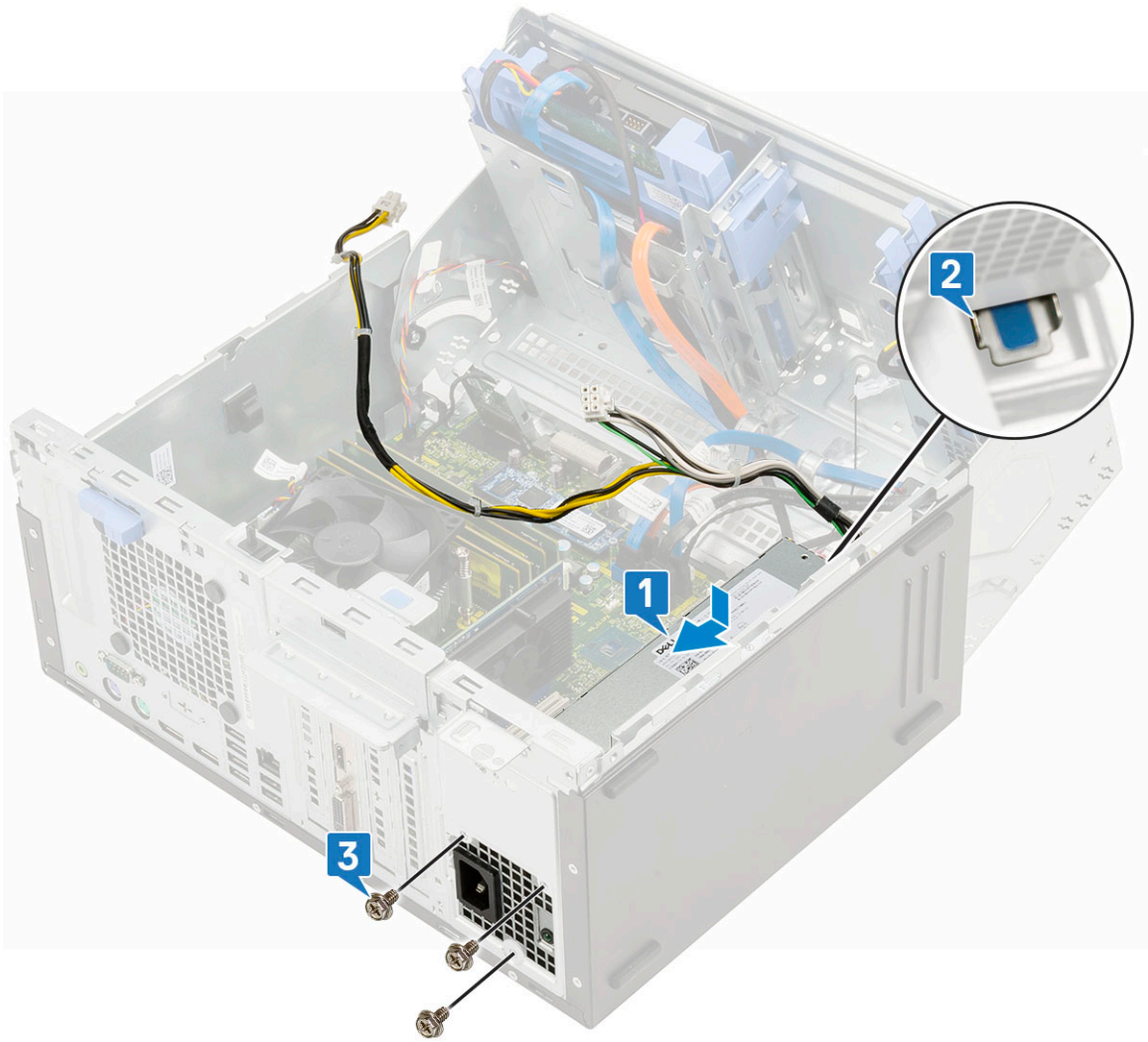


5 To remove the PSU:
   a Remove the screw (3) to release the PSU from the computer chassis [1].
   b Press the release tab [2].
   c Slide and lift the PSU away from the computer [3].



Installing power supply unit or PSU

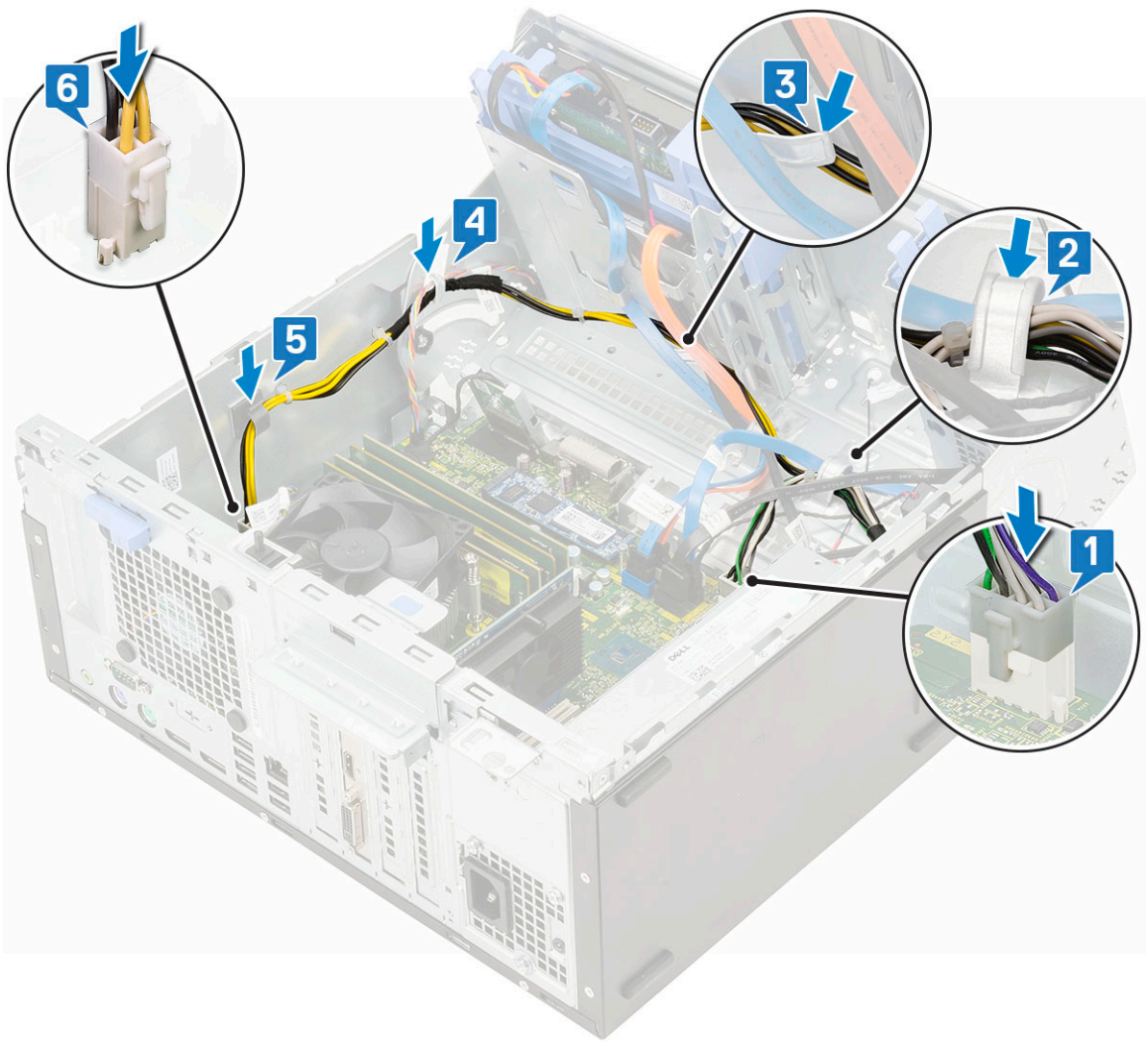
1 Insert the PSU into the PSU slot and slide it toward the back of the computer until it clicks into place{1,2]



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

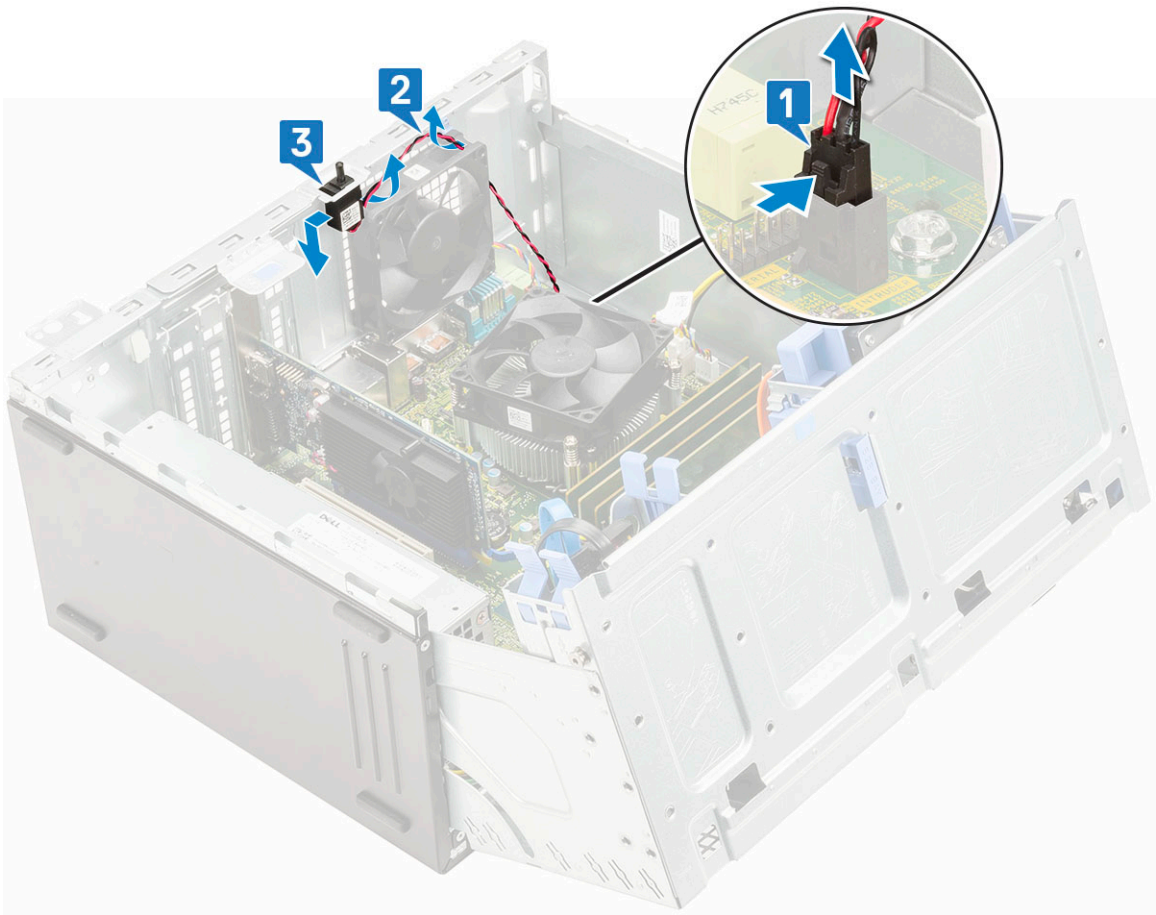
Removing intrusion switch

1 Follow the procedure in Before working inside your computer.

2 Remove the:
   a side cover
   b front bezel

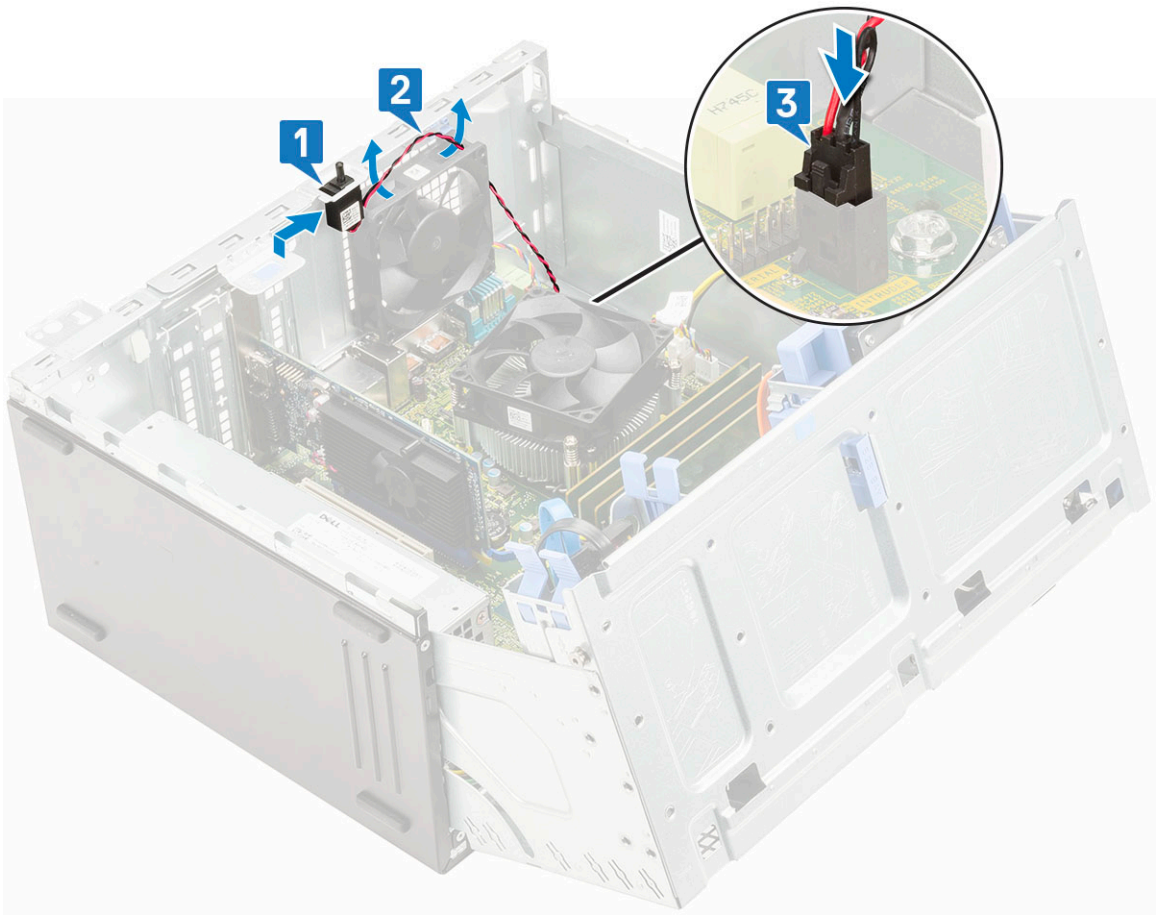
3 Open the front panel door.

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

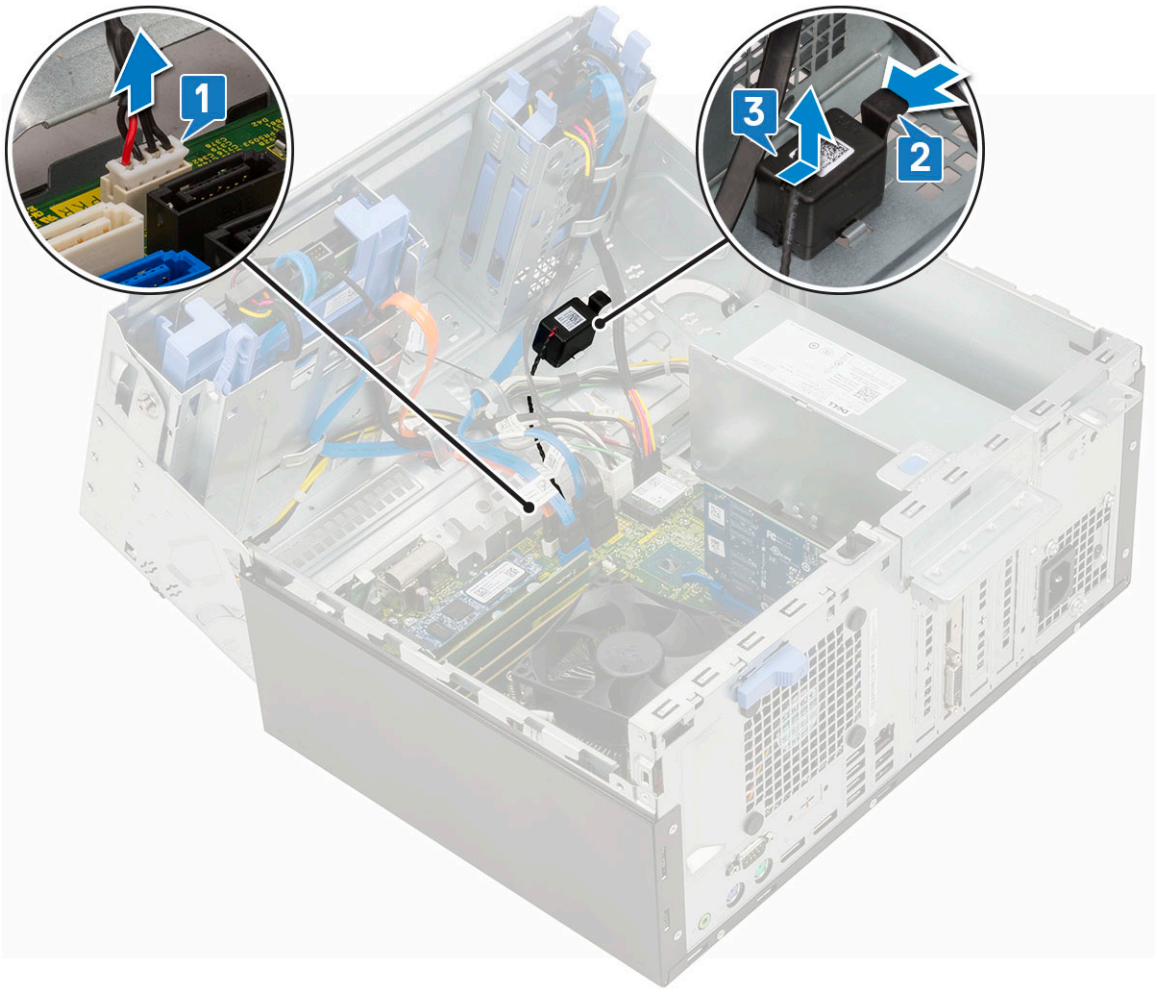
Removing speaker

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.

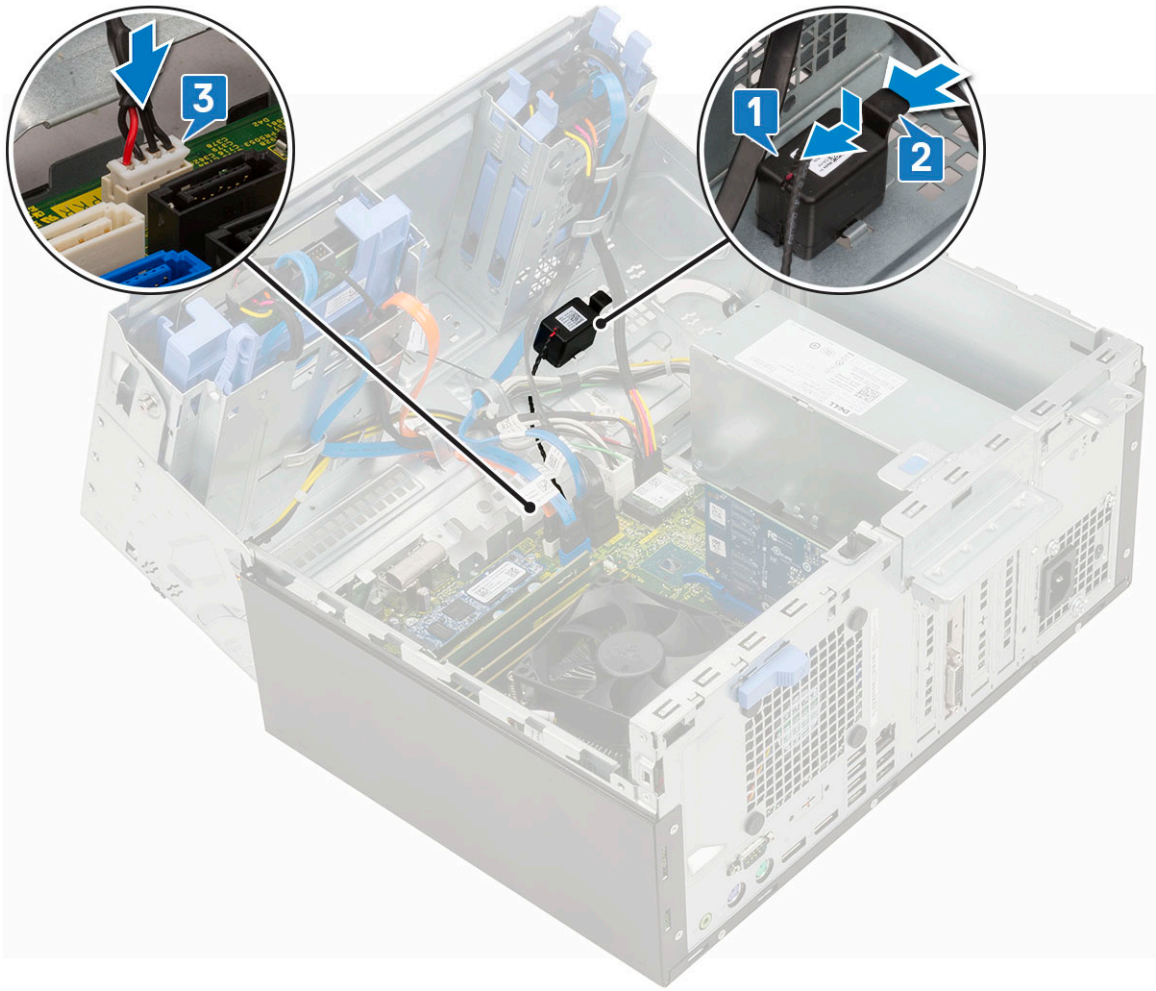
4 To remove the speaker:
   a Disconnect the speaker cable from the connector on the system board [1].
   b Press the release tabs [2], and slide the speaker out of the slot [3].



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].

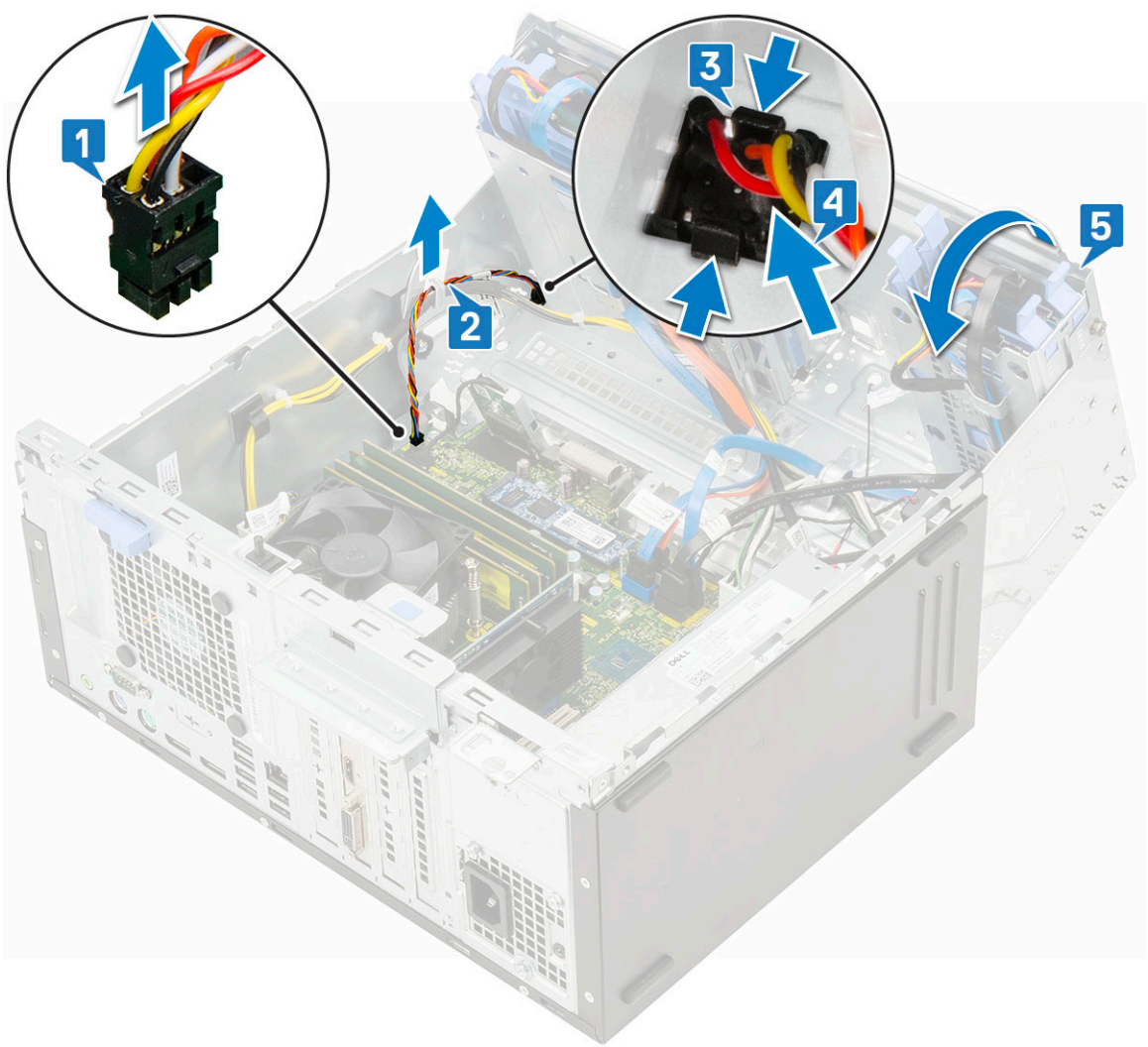


3 Close the front panel door.
4 Install the:
   a front bezel
   b side cover
5 Follow the procedure in After working inside your computer.

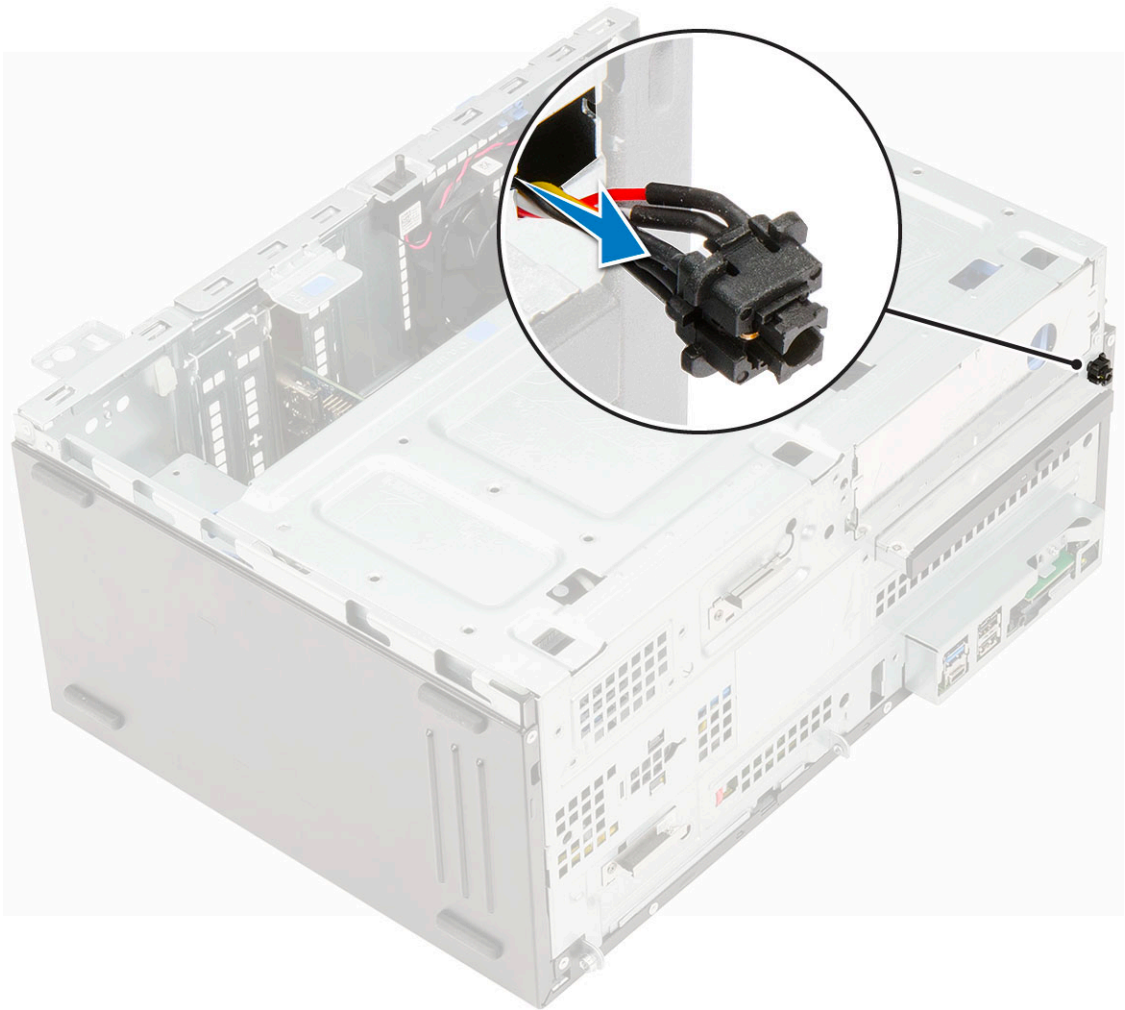
Power button

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].

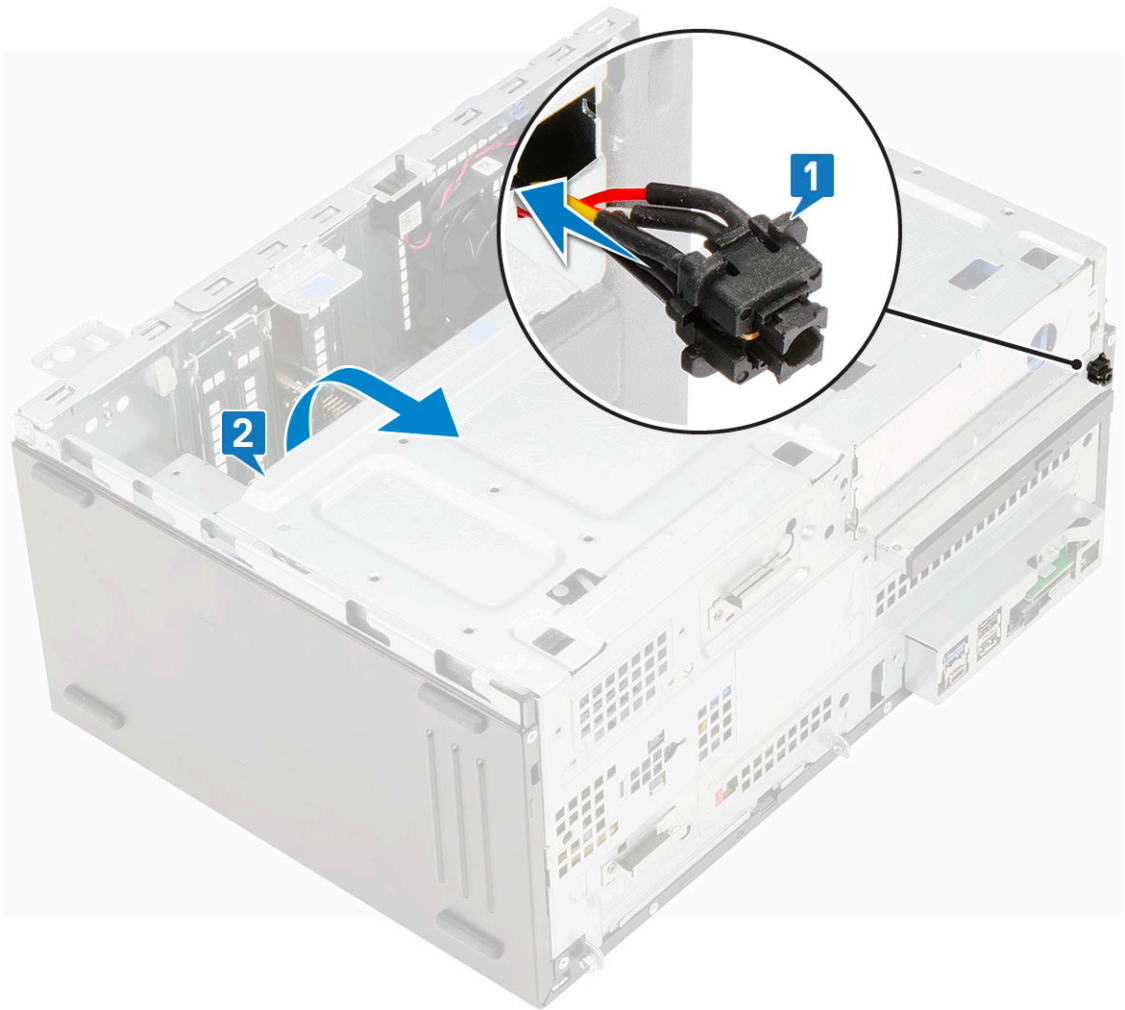


5 Pull the power switch out from the computer.



Installing power button

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

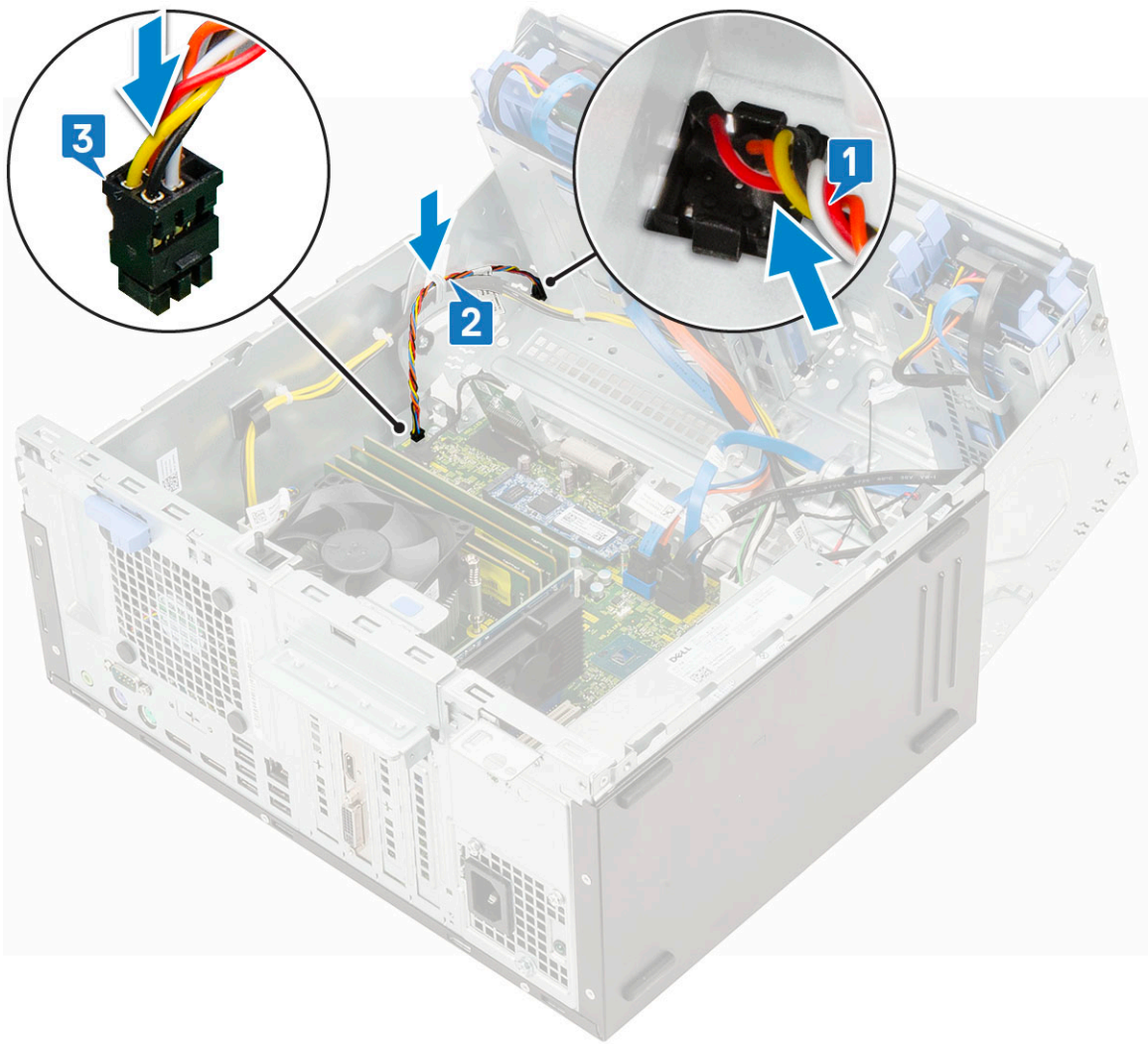


2 Open the front panel [1].

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.

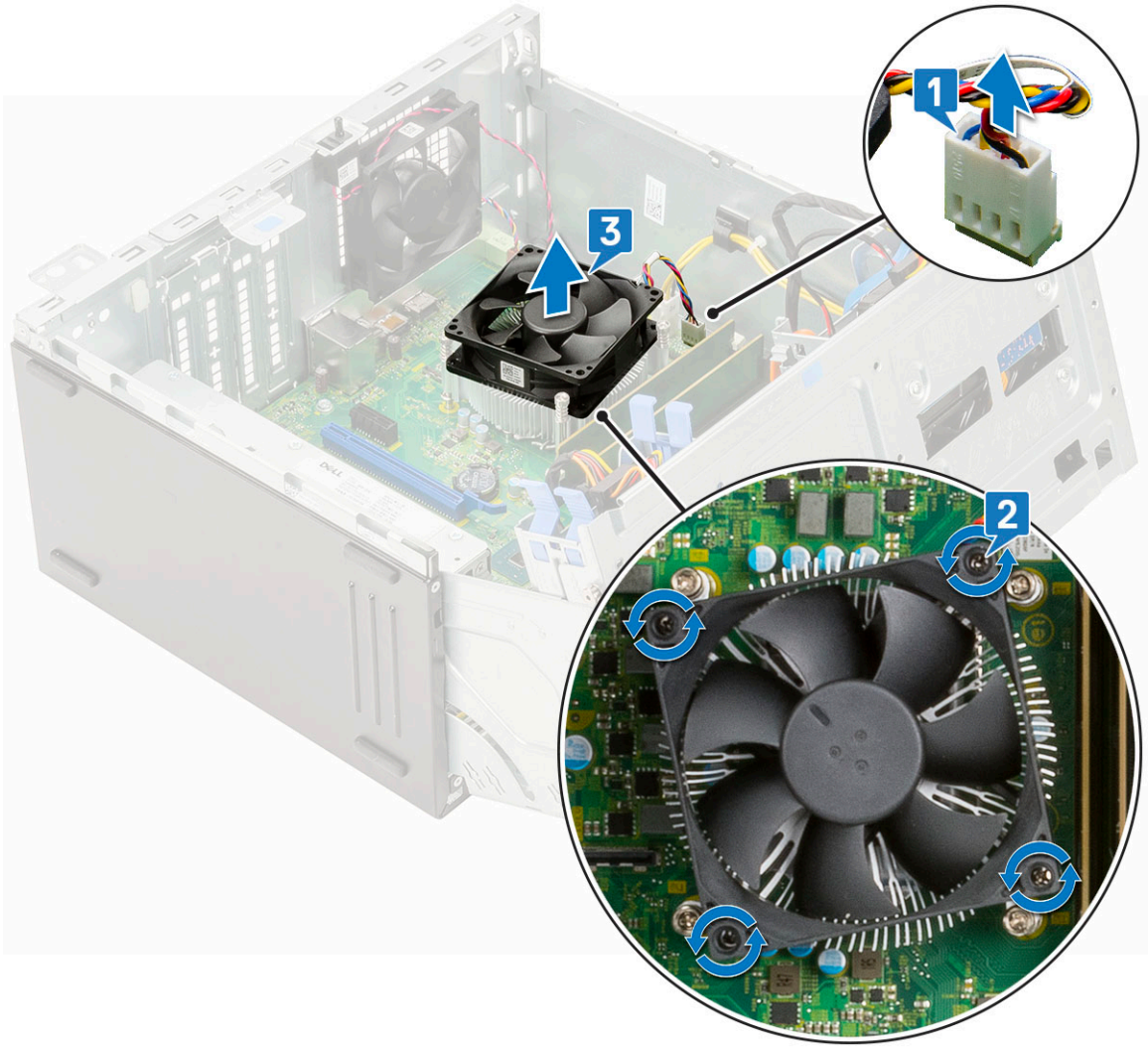
Heat sink fan

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 heat sink fan:
   a Disconnect the heat sink assembly cable from the connector on the system board [1].
   b Remove the screws that secure the fan to the heat sink [2].

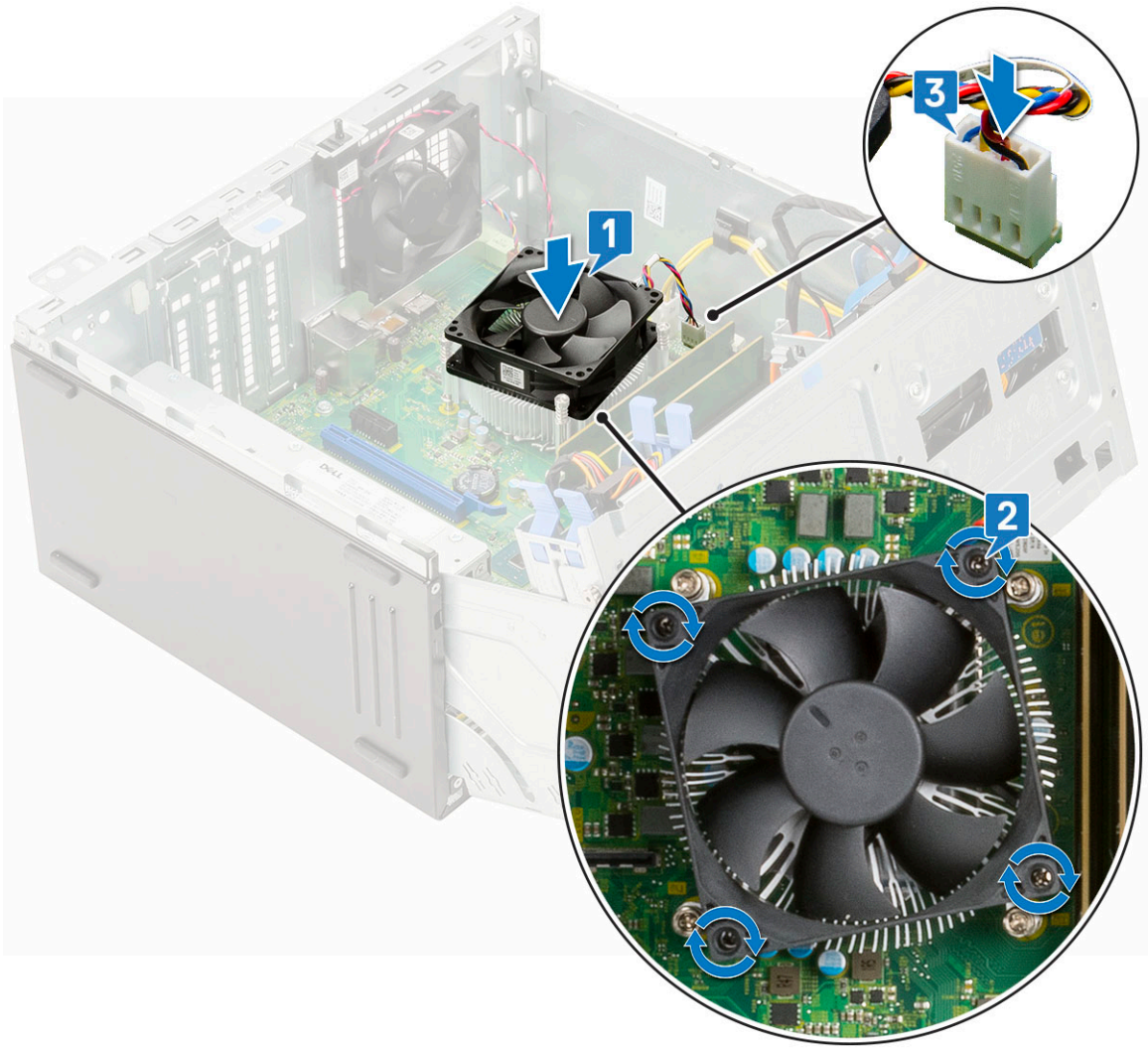
NOTE: Ensure to insert the Torx screw driver from top screw hole to remove the screws.

c Lift the heat sink fan away from the computer [3].



Installing heat sink fan

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

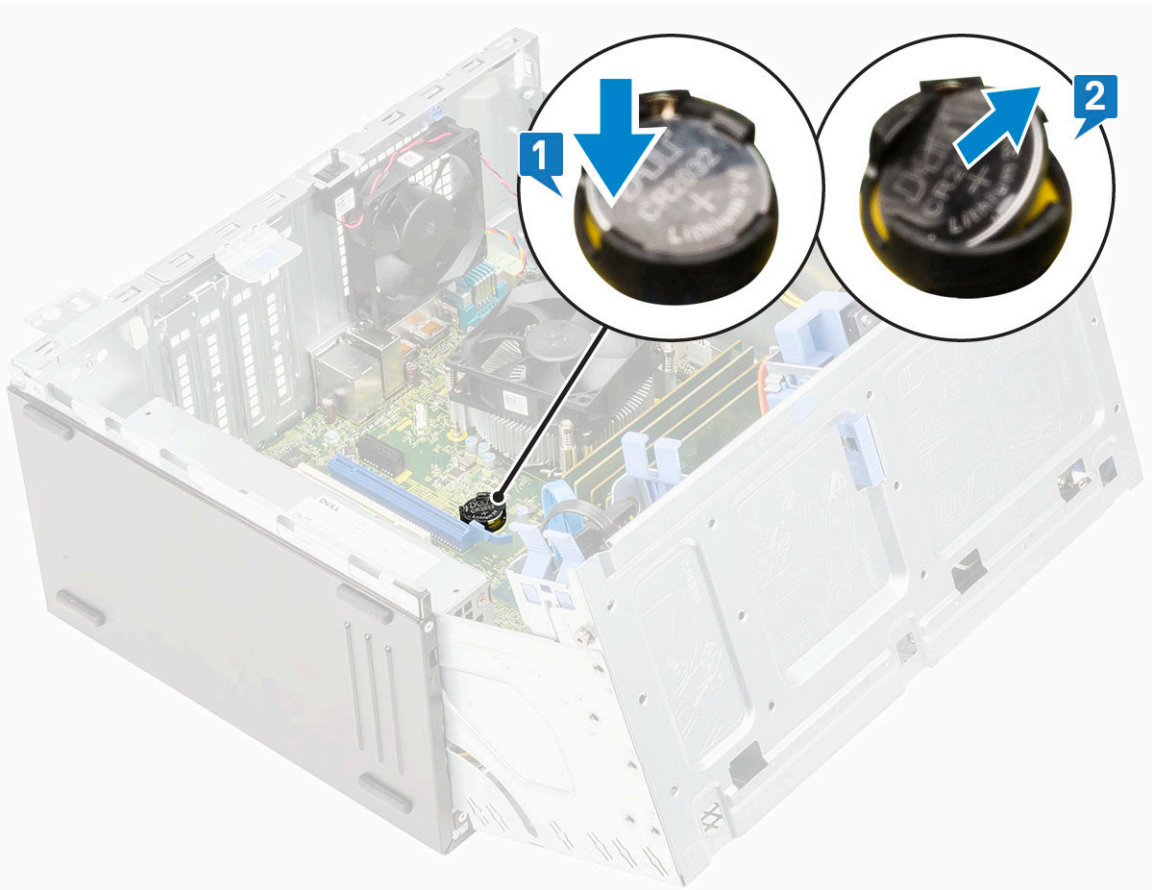


4 Close the front panel door.
5 Install the:
   a front bezel
   b side cover
6 Follow the procedure in After working inside your computer.

Coin cell battery

Removing coin cell battery

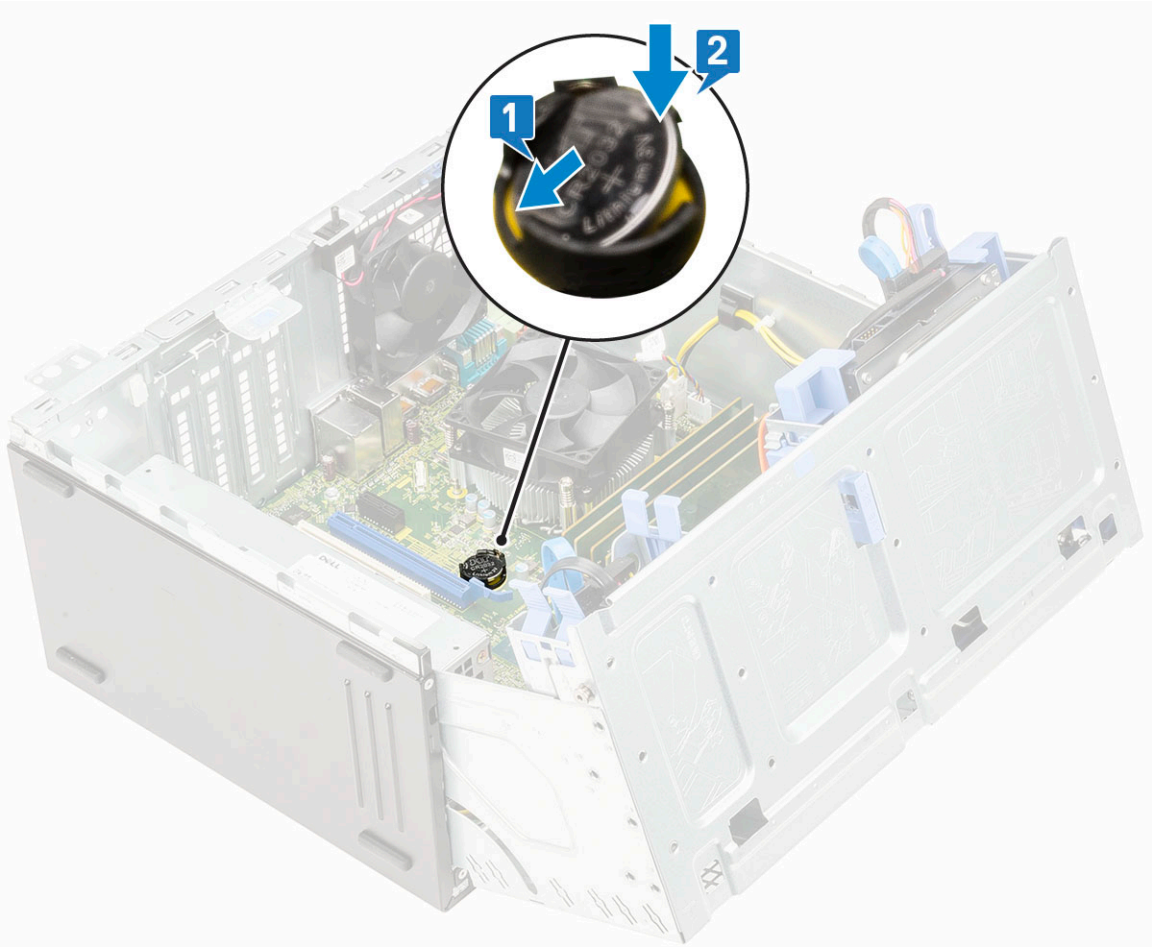
1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a side cover
   b front bezel
3 Open the front panel door.
4 To remove the coin cell battery:
   a Press the release latch until the coin cell battery pops out [1].
   b Lift the coin cell battery from the connector on the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

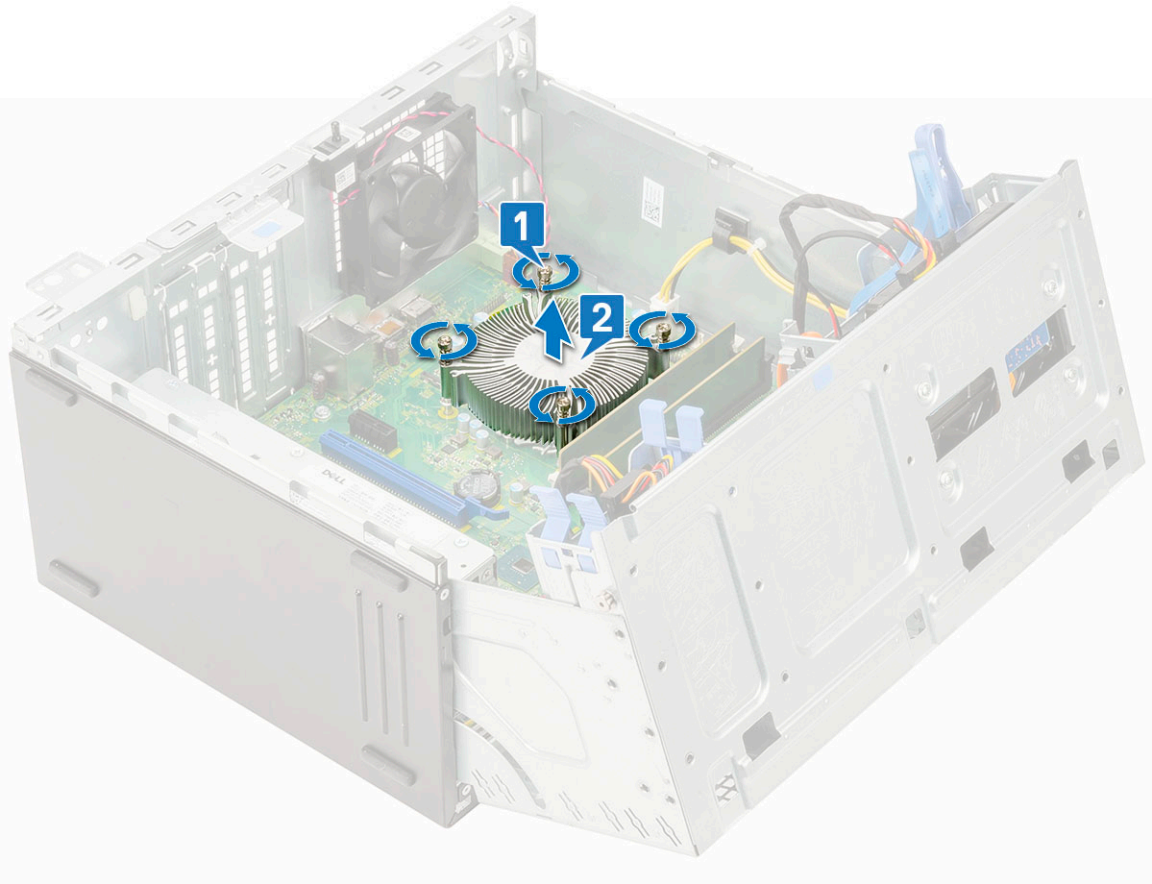
Heat sink

Removing heat sink

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 Remove the heatsink fan.
5 To remove the heat sink:
   a Loosen the captive screws (4) that secure the heat sink to the system board [1].

   NOTE: Remove the screw in the sequential order (1,2,3,4) as printed on the system board.

   b Lift the heat sink away from the computer [2].



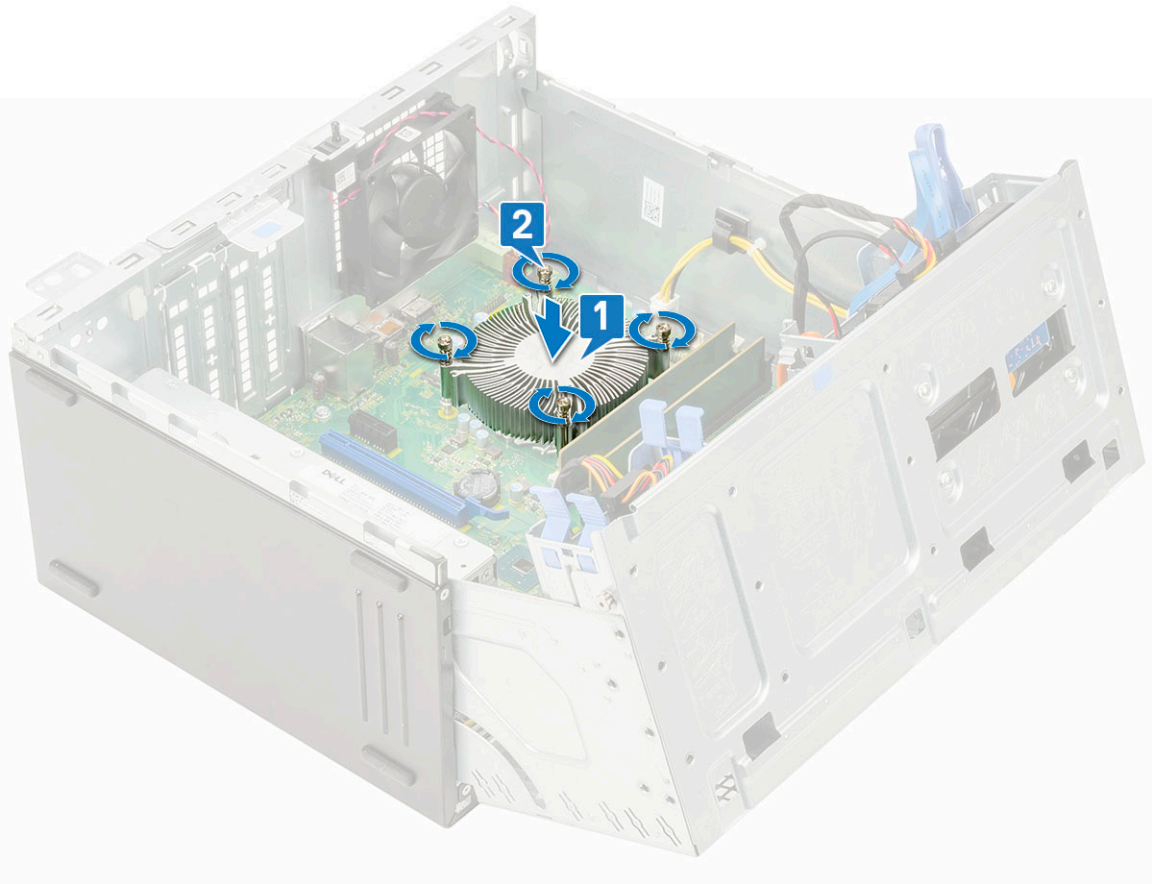
Installing heat sink

1 Align the screws of the heat sink with the holders on the system board and place the heat sink on the processor [1].

2 Tighten the captive screws to secure the heat sink assembly to the system board [2].

NOTE:

Tighten the screws in a sequential order (1,2,3,4) as printed on the system board.



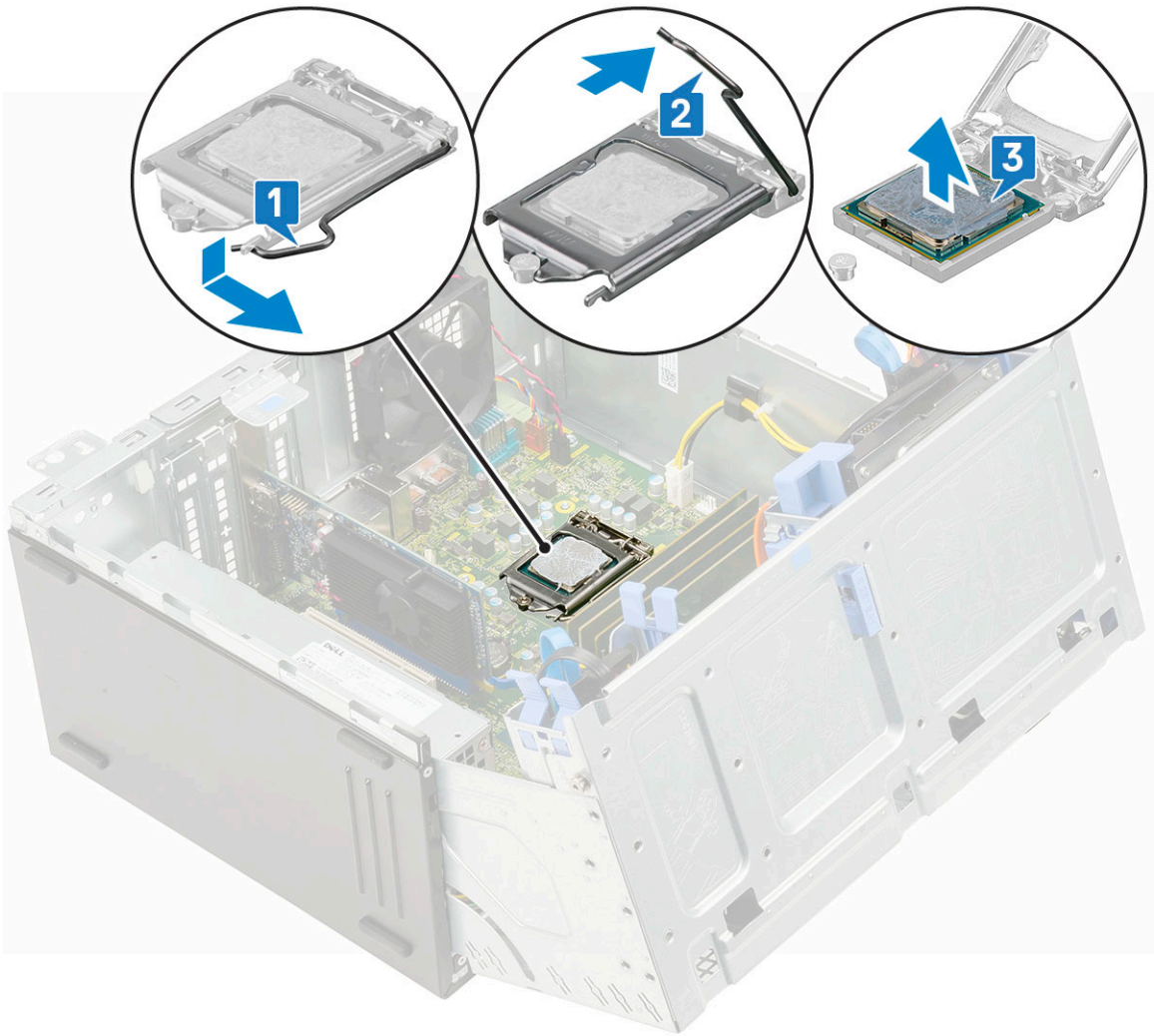
3 Replace the heat sink fan.
4 Close the front panel door.
5 Install the:
   a front bezel
   b side cover
6 Follow the procedure in After working inside your computer.

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.



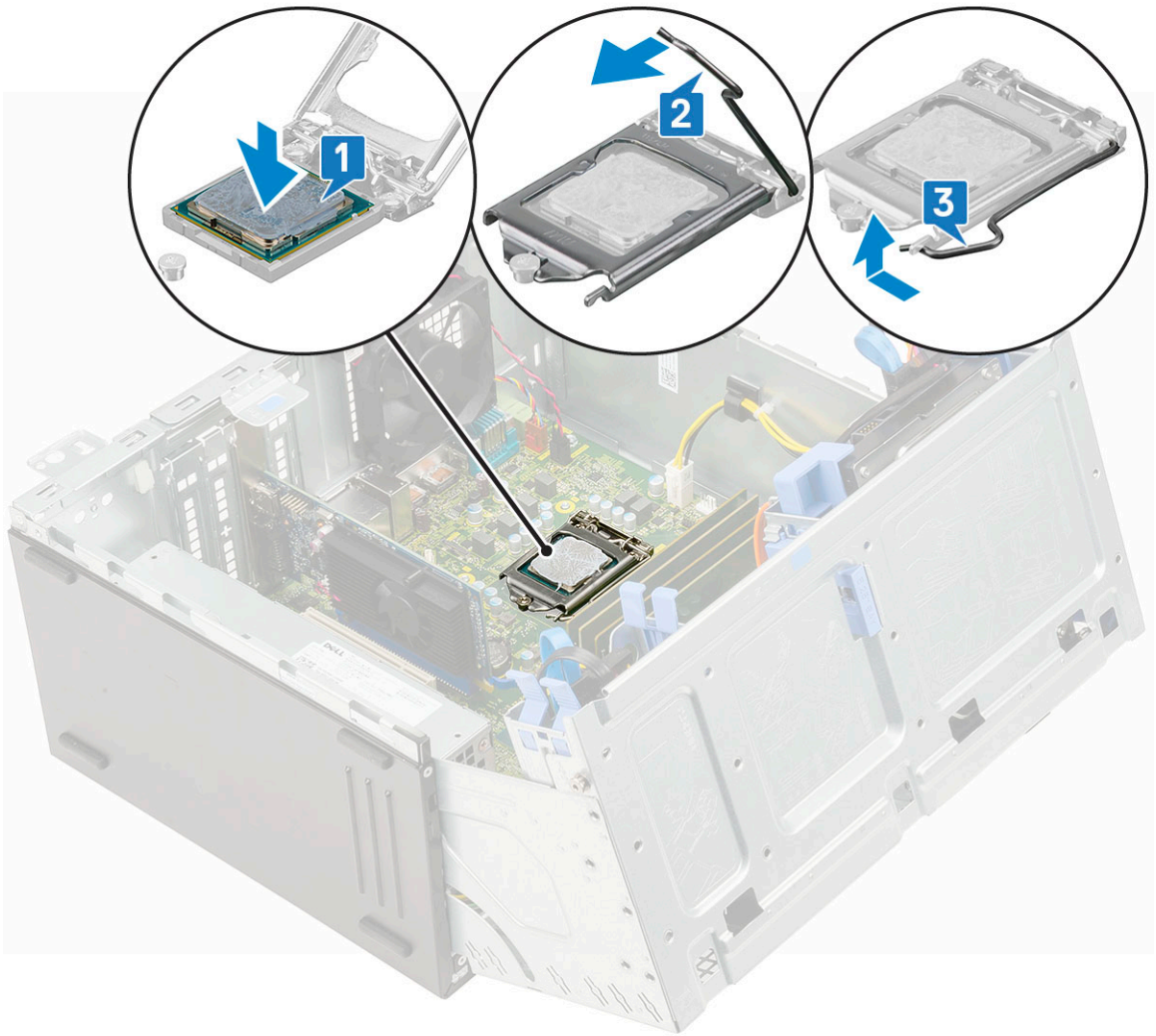
Installing processor

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

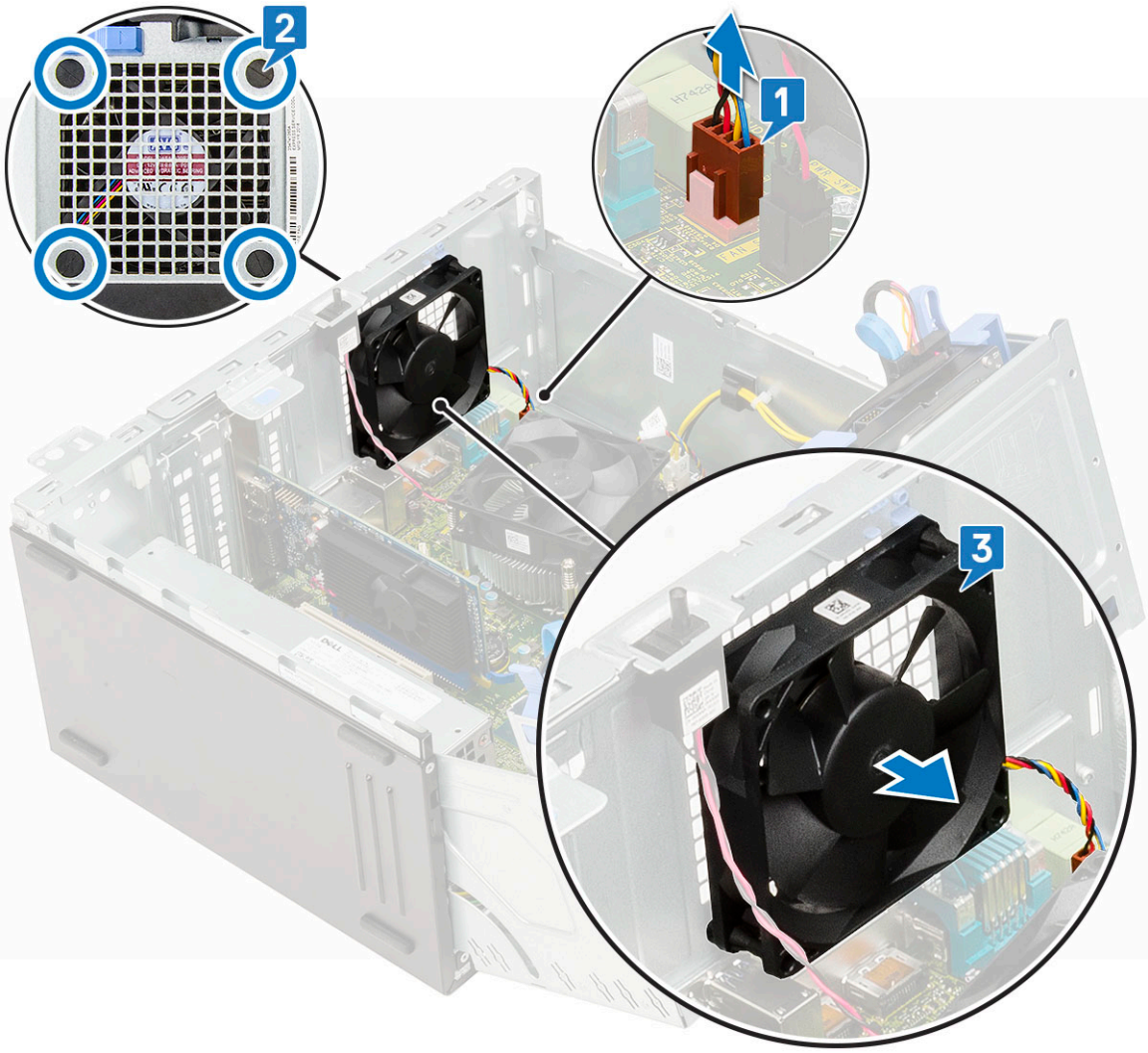
1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a side cover
   b front bezel
   c intrusion switch
3 Open the front panel door.
4 To remove the system fan:

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

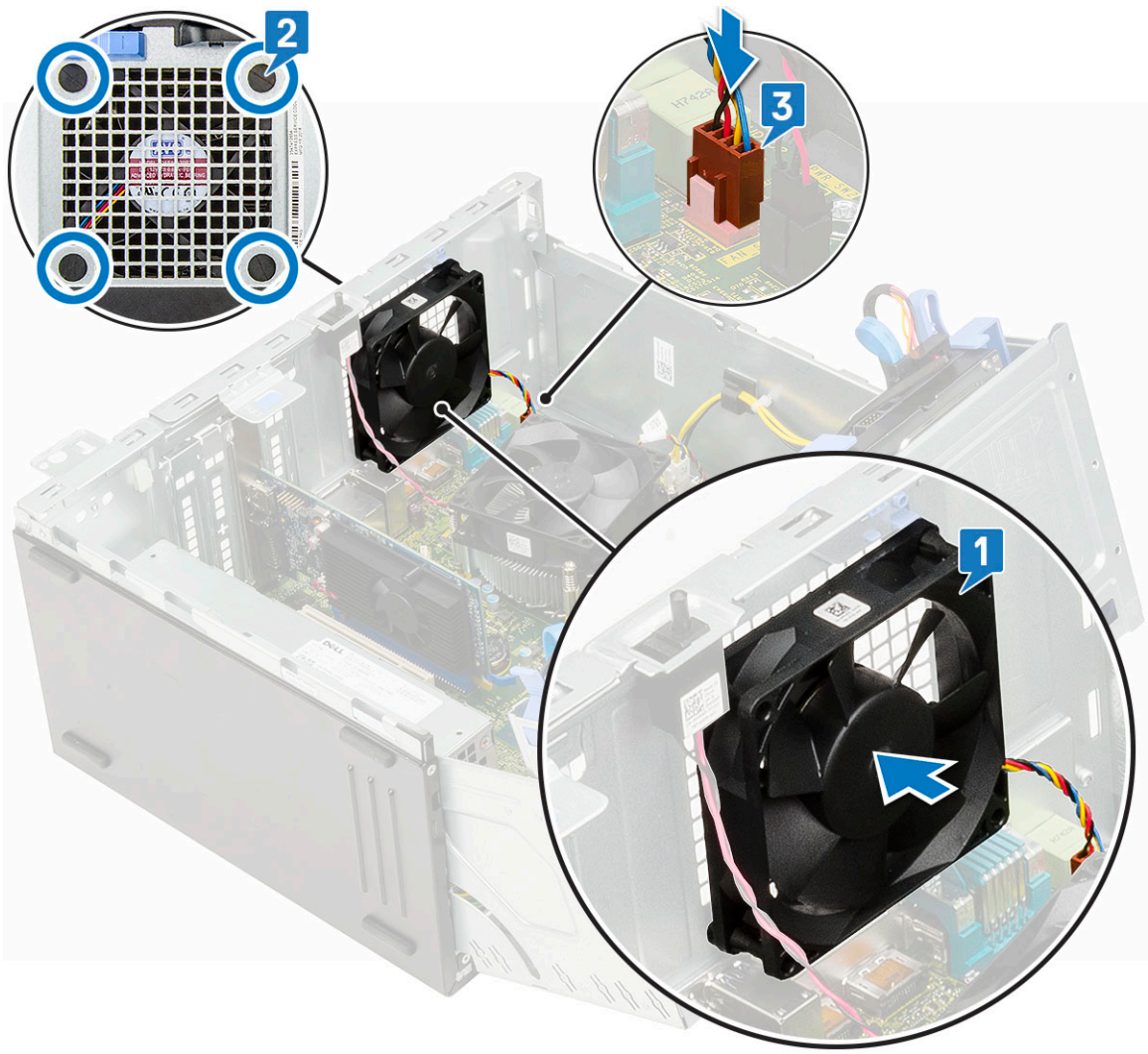
1 Align the grooves of the system fan with the grommets on the chassis wall [1].

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.

System board

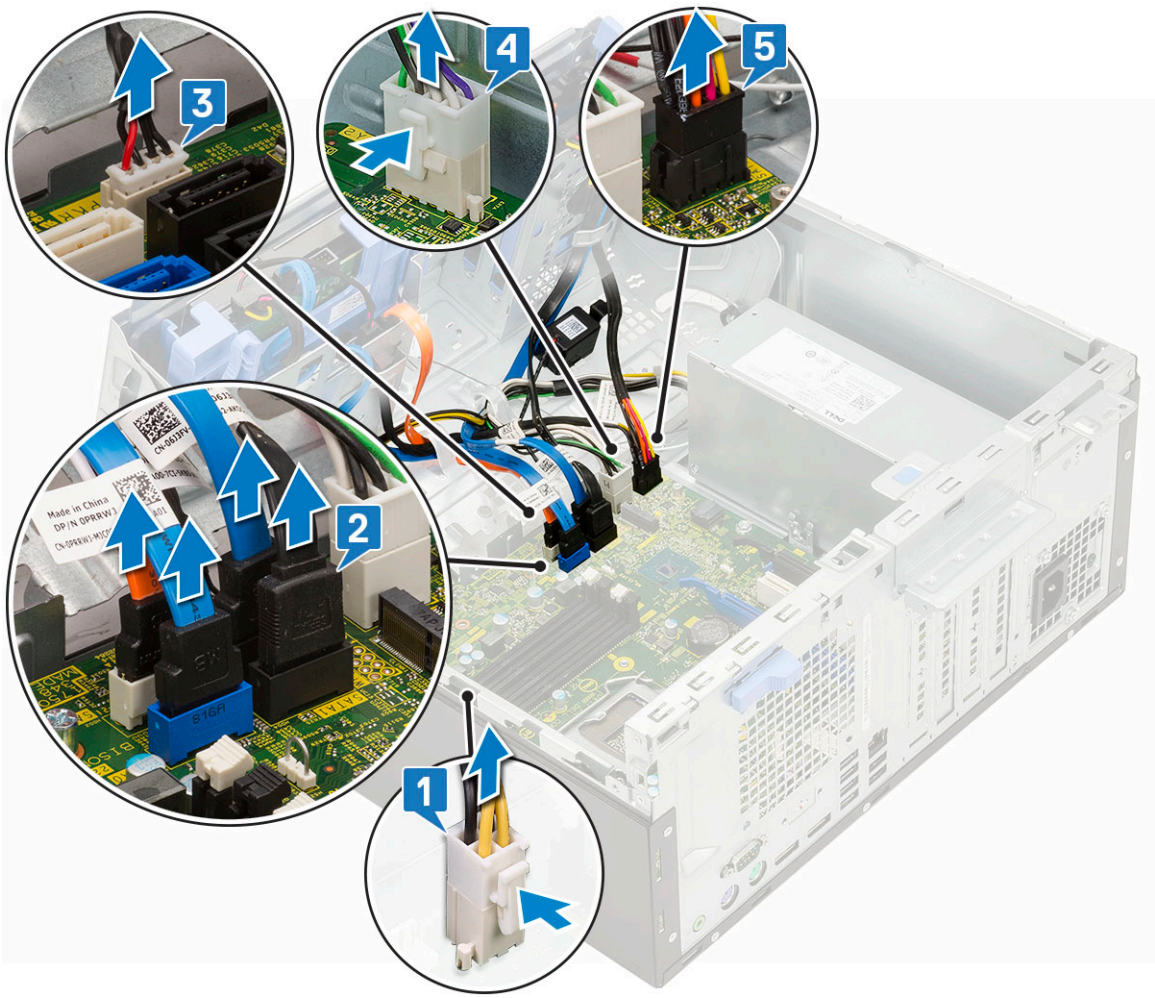
Removing system board

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]



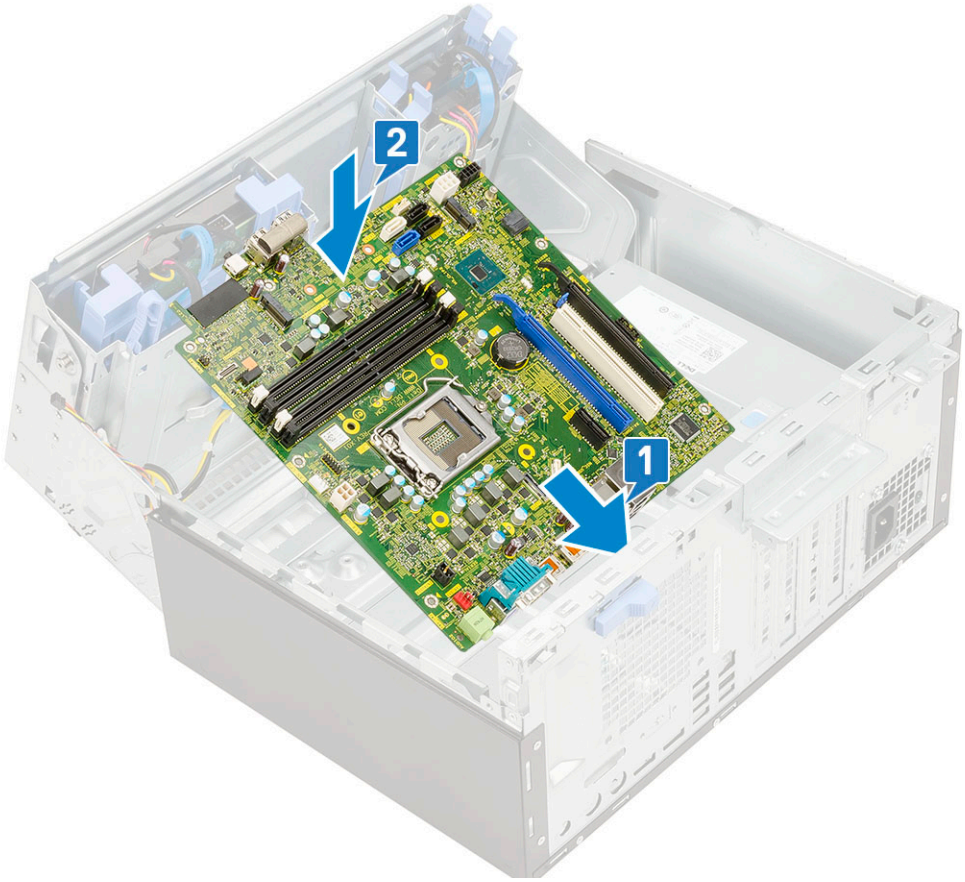
6 To remove the system board:

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.

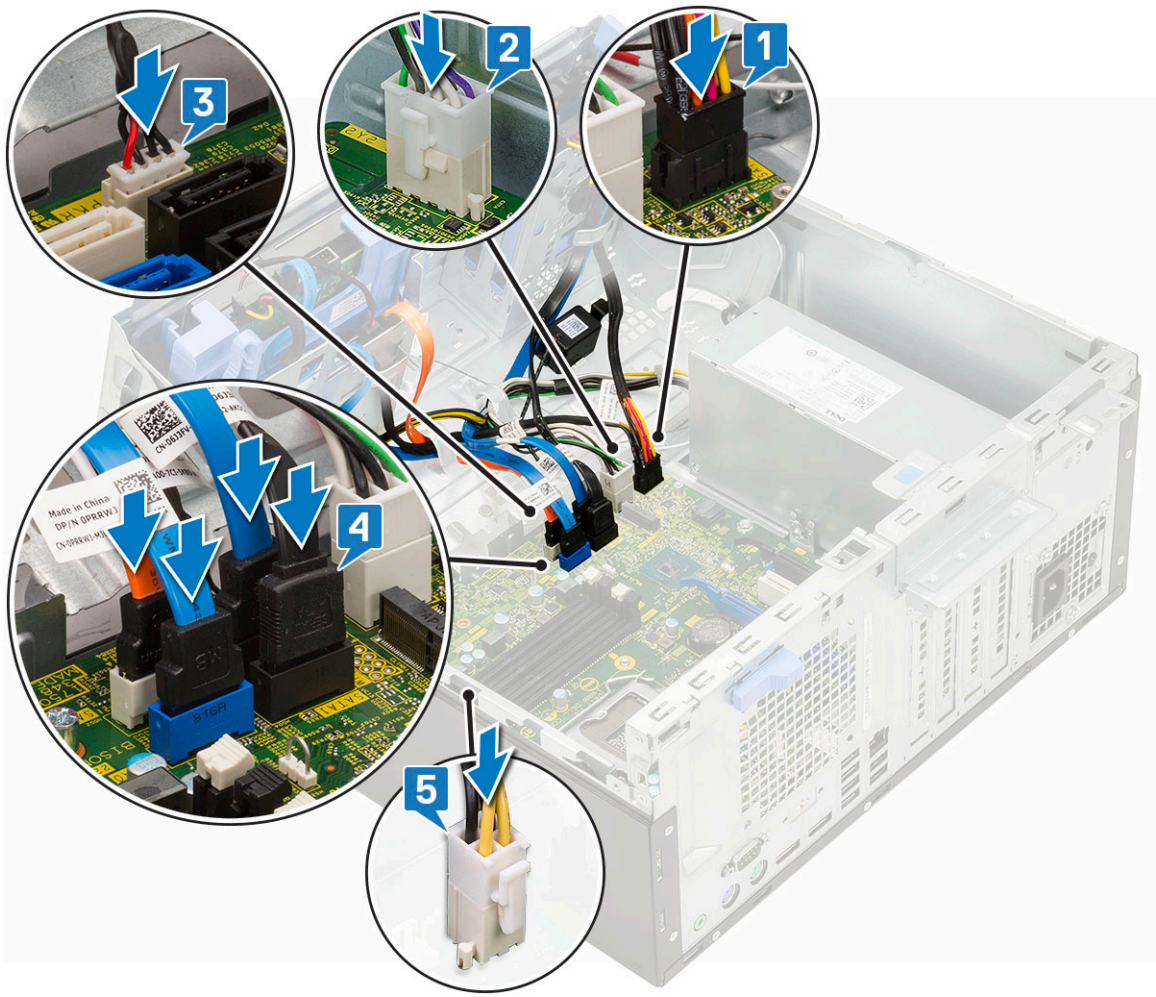
a power distribution for optical drive and hard drives [1]

b PSU [2]

c speaker cable [3]

d SATA data cable for optical dive 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.

4

Troubleshooting

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:

- 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

CAUTION: Use the system diagnostics to test only your computer. Using this program with other computers may cause invalid results or error messages.

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

1 Invoke diagnostics boot by either of the methods suggested above

2 Once on one time boot menu use up/down arrow key to navigate to ePSA or diagnostics and press <return> key to launch
Fn+PWR will flash diagnostics boot selected on screen and launch ePSA/diagnostics directly.

3 On the boot menu screen, select the **Diagnostics** option.

4 Press the arrow in the lower-right corner to go to the page listing.
The items detected are listed and will be tested

5 If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.

To run a diagnostic test on a specific device

1 Press Esc and click **Yes** to stop the diagnostic test.

2 Select the device from the left pane and click **Run Tests**.

3 If there are any issues, error codes are displayed.
Note the error code and validation number 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 2. Power LED summary

Amber LED state	White LED state	System state	Notes
Off	Off	S5	
Off	Blinking	S3, no PWRGD_PS	
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	
Steady	Off	S0, no PWRGD_PS, Code fetch = 0	
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 3. 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 4. 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

Amber LED state	White LED state	System state	Notes
			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.

Battery status lights

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

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

5

Getting help

Contacting Dell

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

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

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