OptiPlex 7070 Tower

Service Manual

Regulatory Model: D18M
Regulatory Type: D18M005
September 2021
Rev. A02

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.

Contents

1

Working on your computer

Topics:

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: 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

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: 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.

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

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

Before working inside your computer

1. Save and close all open files and exit all open applications.
2. Shut down your computer. Click **Start** > **Power** > **Shut down**.

   NOTE: If you are using a different operating system, see the documentation of your operating system for shut-down instructions.
3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.
5. Remove any media card and optical disc from your computer, if applicable.

6. After the computer is unplugged, press and hold the power button for 5 seconds to ground the system board.

   CAUTION: Place the computer on a flat, soft, and clean surface to avoid scratches on the display.

7. Place the computer face down.

Safety precautions

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

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

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

Standby power

Dell products with standby power must be unplugged before you open the case. Systems that incorporate standby power are essentially powered while turned off. The internal power enables the system to be remotely turned on (wake on LAN) and suspended into a sleep mode and has other advanced power management features.

Unplugging, pressing and holding the power button for 20 seconds should discharge residual power in the system board.

Bonding

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

Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

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

ESD field service kit

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

Components of an ESD field service kit

The components of an ESD field service kit are:

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

ESD protection summary

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

Transporting sensitive components

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

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

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

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

After working inside your computer

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.

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.

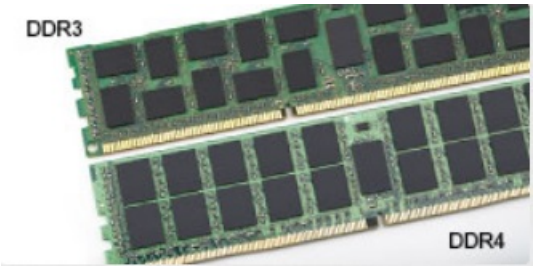


Figure 1. Notch difference

Increased thickness

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

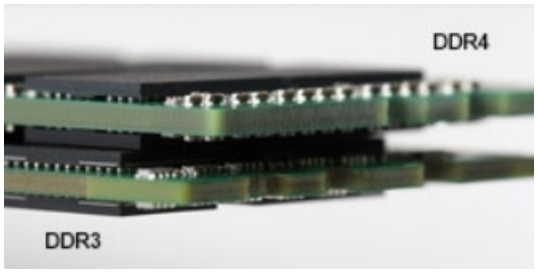


Figure 2. Thickness difference

Curved edge

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

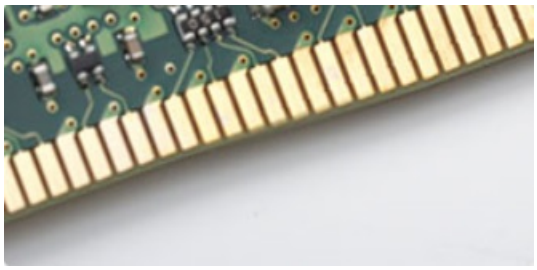


Figure 3. Curved edge

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.

NOTE: The DDR4 memory is imbedded in board and not a replaceable DIMM as shown and referred.

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.

Table 1. USB evolution

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

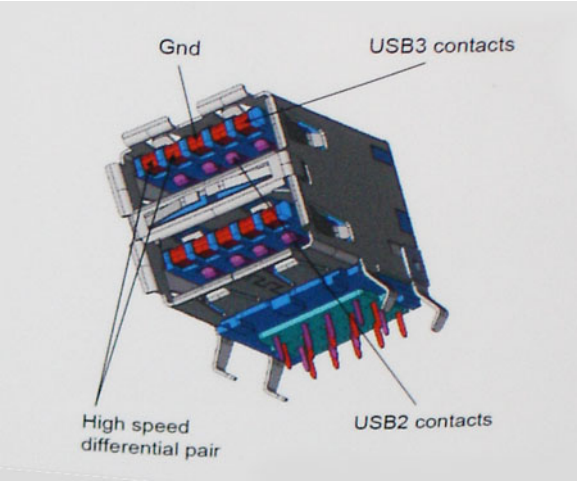
The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

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 4.8 Gbps. 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 480 Mbps and 12 Mbps 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 320 Mbps (40 MB/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.

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

Intel Optane memory

Intel Optane memory functions only as a storage accelerator. It neither replaces nor adds to the memory (RAM) installed on your computer.

NOTE: Intel Optane memory is supported on computers that meet the following requirements:

- 7th Generation or higher Intel Core i3/i5/i7 processor
- Windows 10 64-bit version 1607 or higher
- Intel Rapid Storage Technology driver version 15.9.1.1018 or higher

Table 2. Intel Optane memory specifications

Feature	Specifications
Interface	PCIe 3x2 NVMe 1.1
Connector	M.2 card slot (2230/2280)
Configurations supported	• 7th Generation or higher Intel Core i3/i5/i7 processor • Windows 10 64-bit version 1607 or higher • Intel Rapid Storage Technology driver version 15.9.1.1018 or higher
Capacity	32 GB

Enabling Intel Optane memory

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

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

Disabling Intel Optane memory

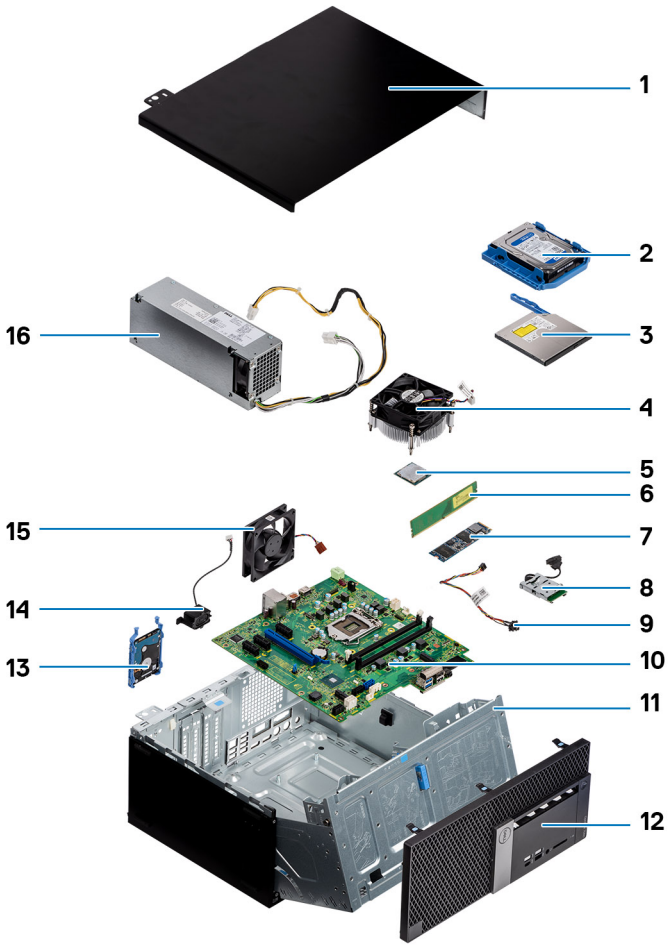
CAUTION: After disabling Intel Optane memory, do not uninstall the driver for Intel Rapid Storage Technology as it will result in a blue screen error. The Intel Rapid Storage Technology user interface can be removed without uninstalling the driver.

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

1. On the taskbar, click the search box, and then type **"Intel Rapid Storage Technology"**.
2. Click **Intel Rapid Storage Technology**. The **Intel Rapid Storage Technology** window is displayed.
3. On the **Intel Optane memory** tab, click **Disable** to disable the Intel Optane memory.
4. Click **Yes** if you accept the warning.
   The disabling progress is displayed.
5. Click **Reboot** to complete disabling Intel Optane memory and restart your computer.

3

Major components of your system



1. Side cover
2. 3.5-inch hard drive assembly
3. Optical drive
4. Heatsink assembly
5. Processor
6. Memory module
7. M.2 SSD
8. SD card reader
9. Power button
10. System board
11. Front panel door
12. Bezel
13. 2.5-inch hard drive assembly
14. Speaker
15. System fan
16. Power supply unit

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.

4

Removing and installing components

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

Topics:

Side cover

Removing side cover

1. Follow the procedure in Before working inside your computer.
2. To remove the cover:
   a. Slide the release latch to release the cover from the system [1].
   b. Slide the cover towards the back of the system and lift it from the system [2].

Installing side cover

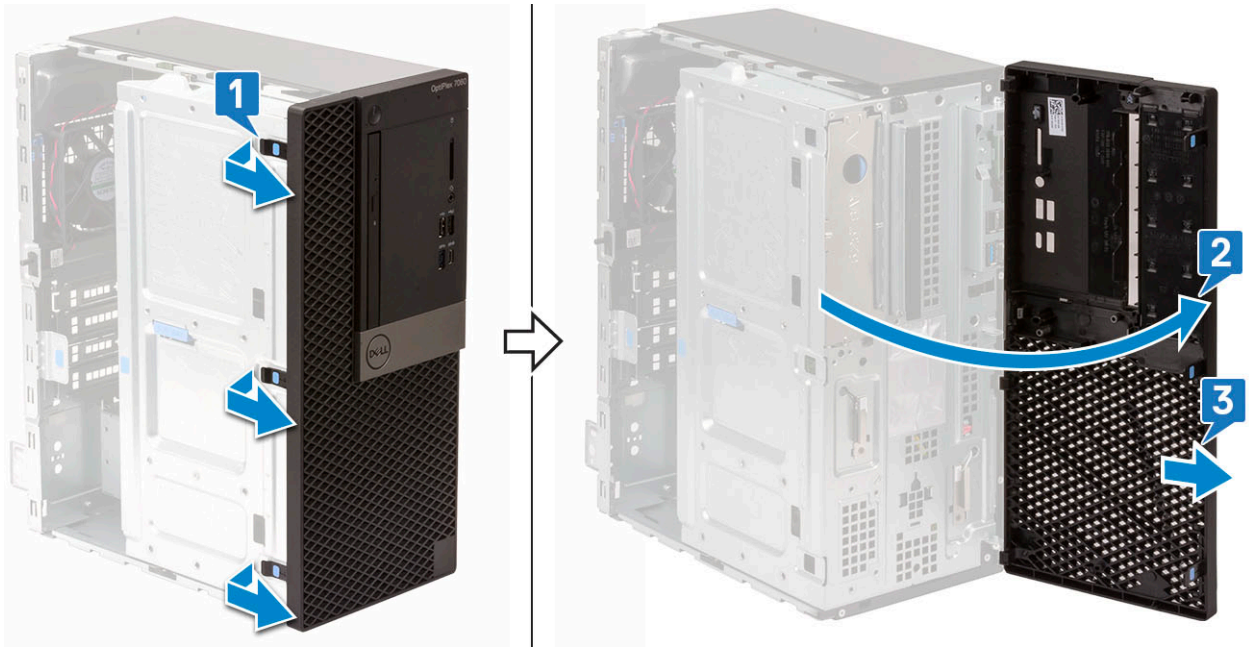
1. To install the side cover:
   a. The release latch automatically locks the side cover to the system [2].

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

Bezel

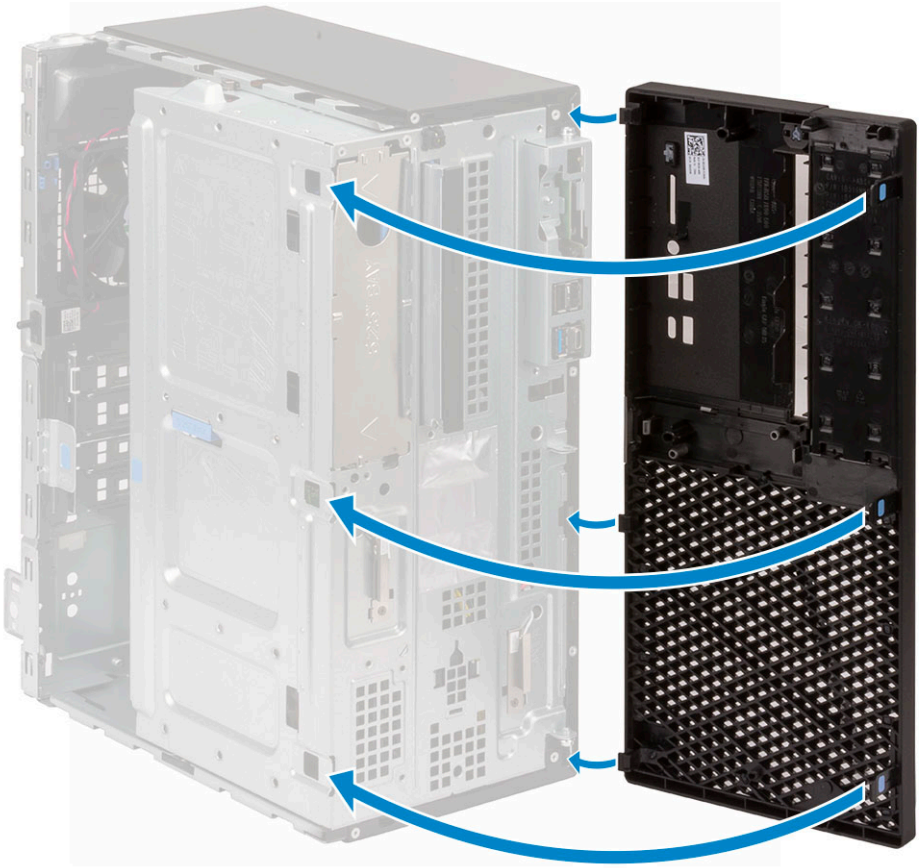
Removing front bezel

1. Follow the procedure in Before working inside your computer.
2. Remove the Side cover.
3. To remove the front bezel:
   a. Pry the retention tabs to release the front bezel from the system [1].
   b. Rotate the front bezel away from the computer [2] and pull to release the hooks on the front bezel from the front-panel slots [3].



Installing front bezel

1. To install the front bezel:
   a. Position the bezel to align the tab holders with the slots on the system chassis.
   b. Press the bezel until the tabs click into place.



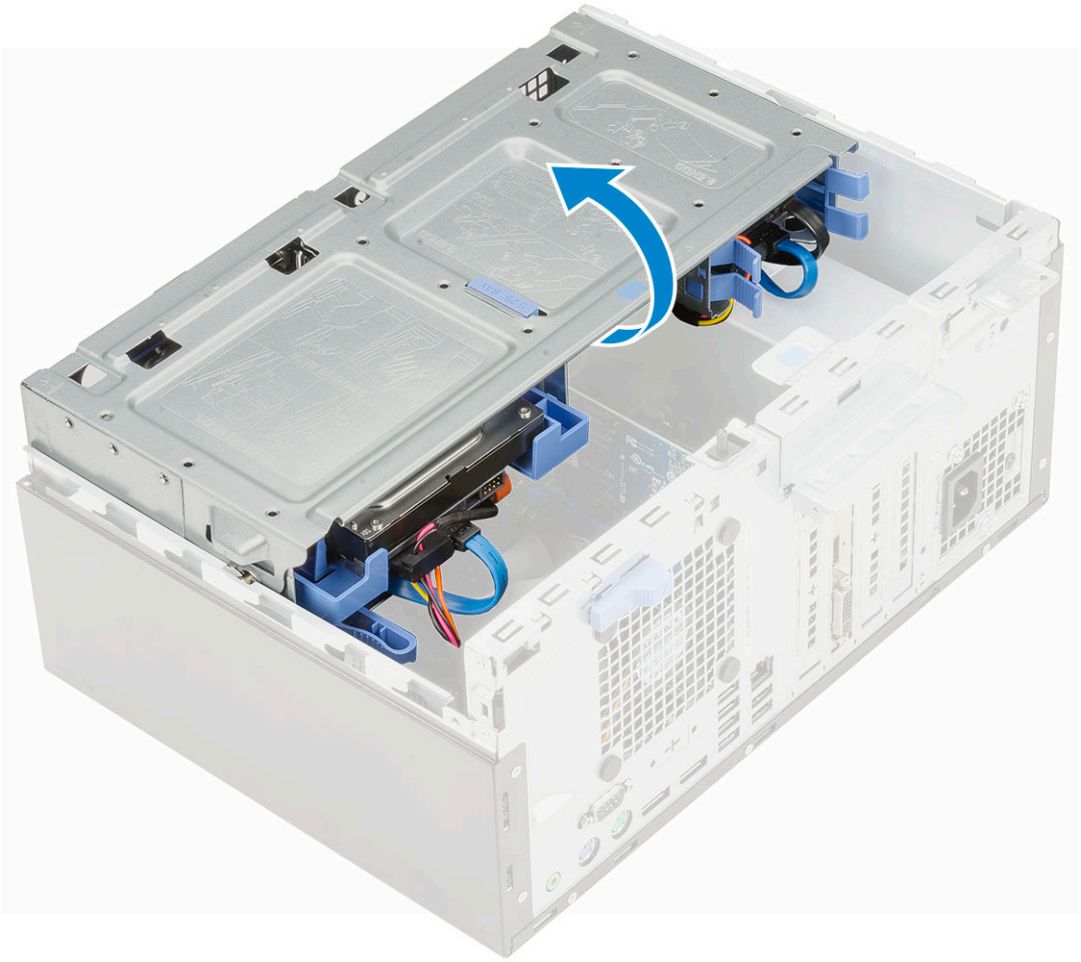
2. Install the Side cover.
3. Follow the procedure in After working inside your computer.

Front panel door

Opening front panel door

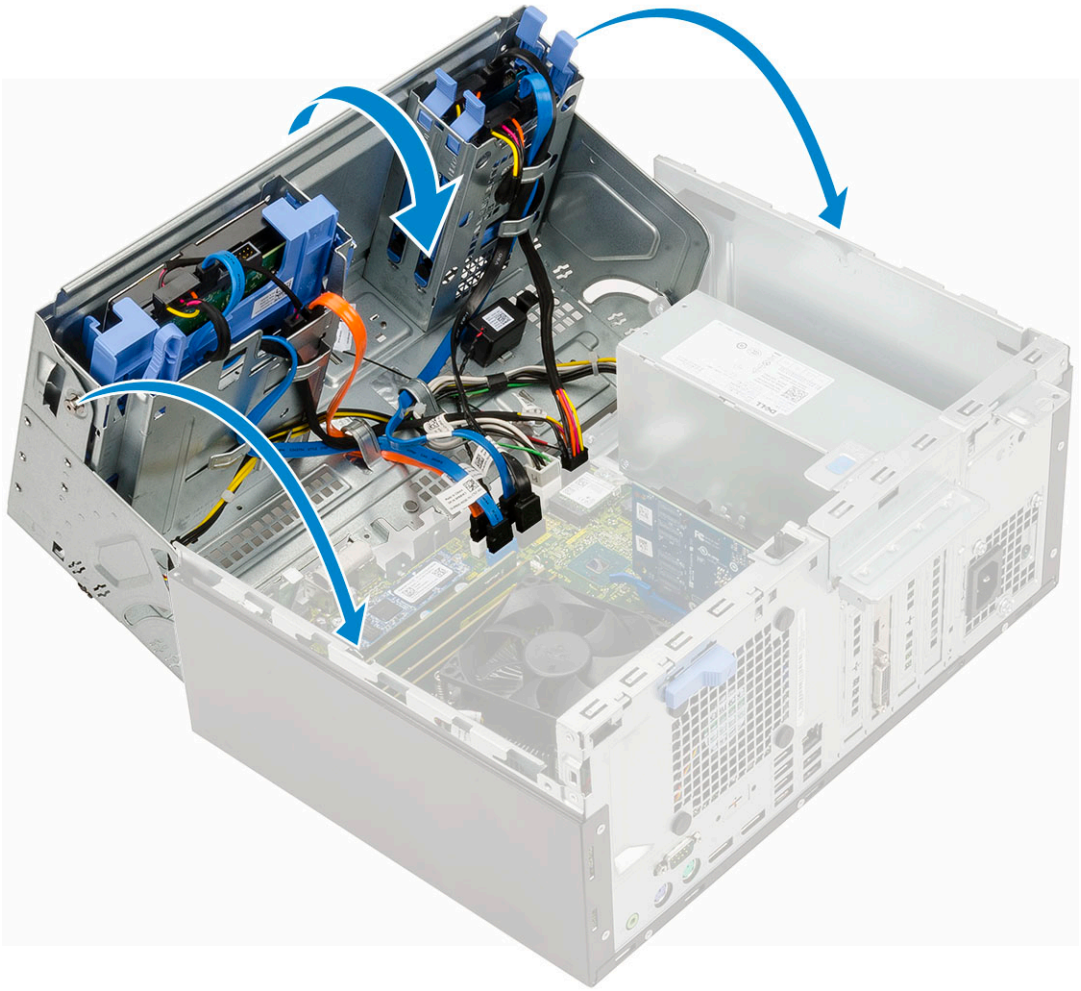
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Side cover
   b. Front bezel

   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. Turn the front panel door to close it.

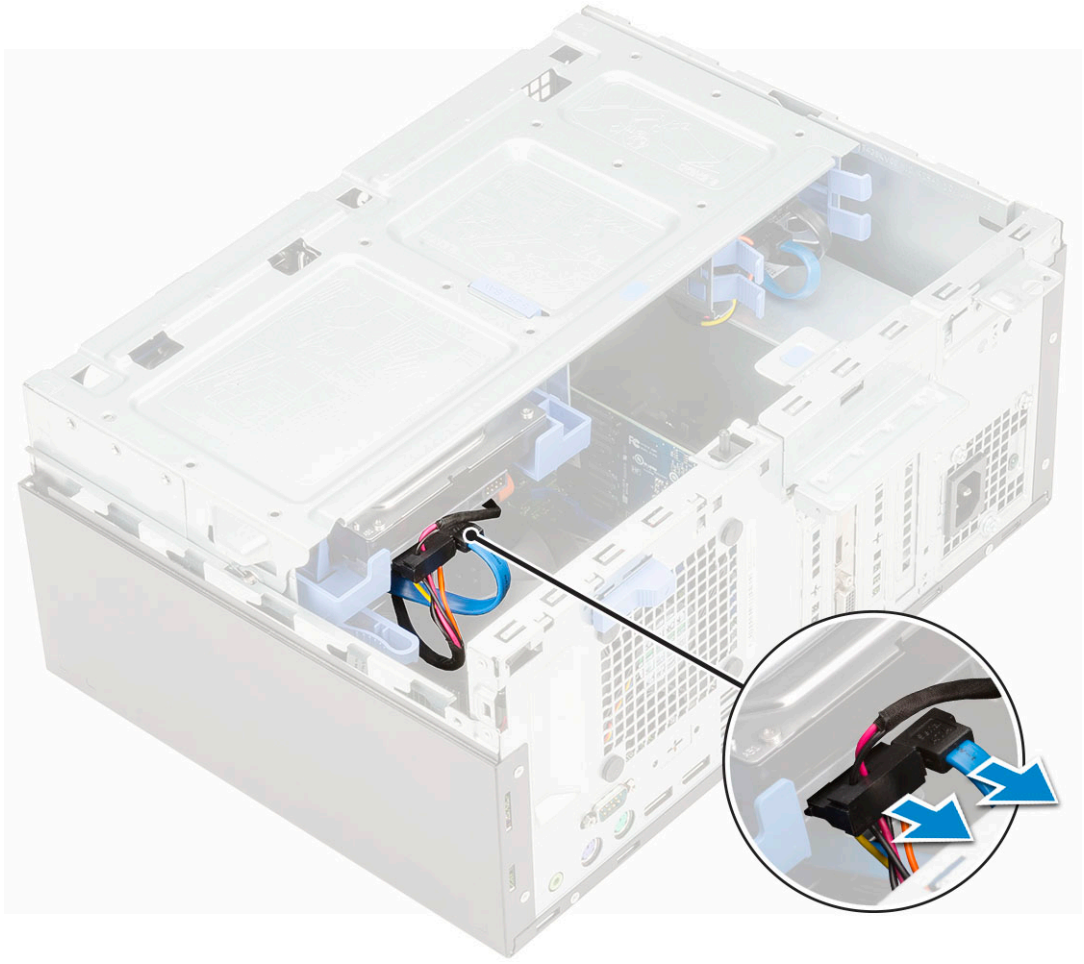


2. Install the:
   a. Front bezel
   b. Side cover
3. Follow the procedure in After working inside your computer.

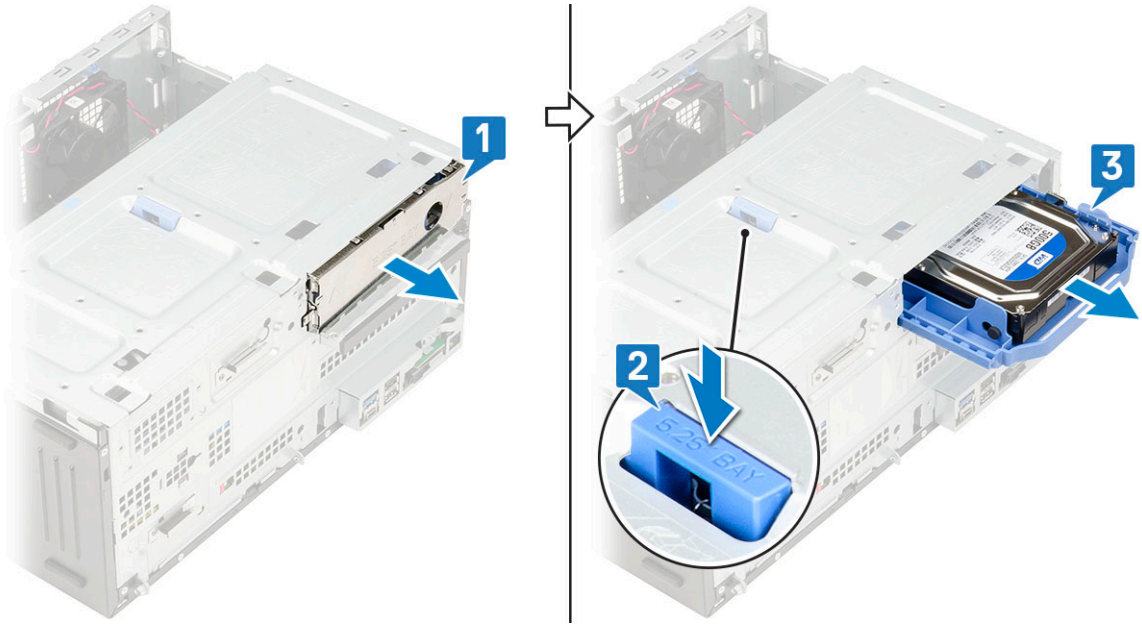
3.5-inch hard drive assembly

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 SATA cable and the power cable from the connectors on the hard drive.

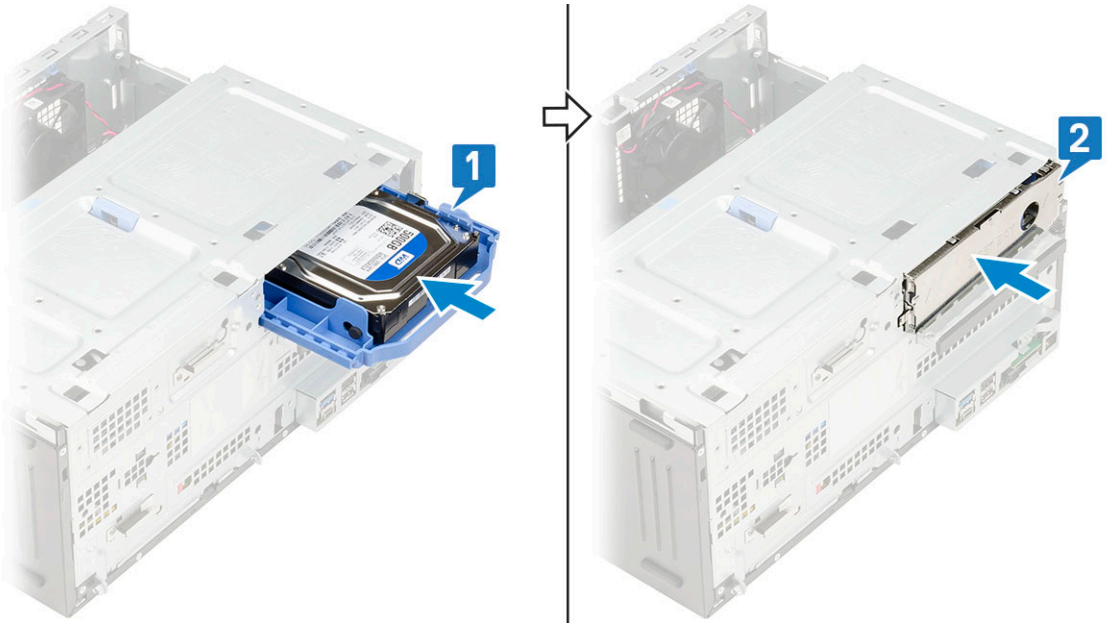


b. Remove the HDD filler bracket from the system [1].
c. Press the blue tab [2] and pull the hard drive assembly out of the system [3].

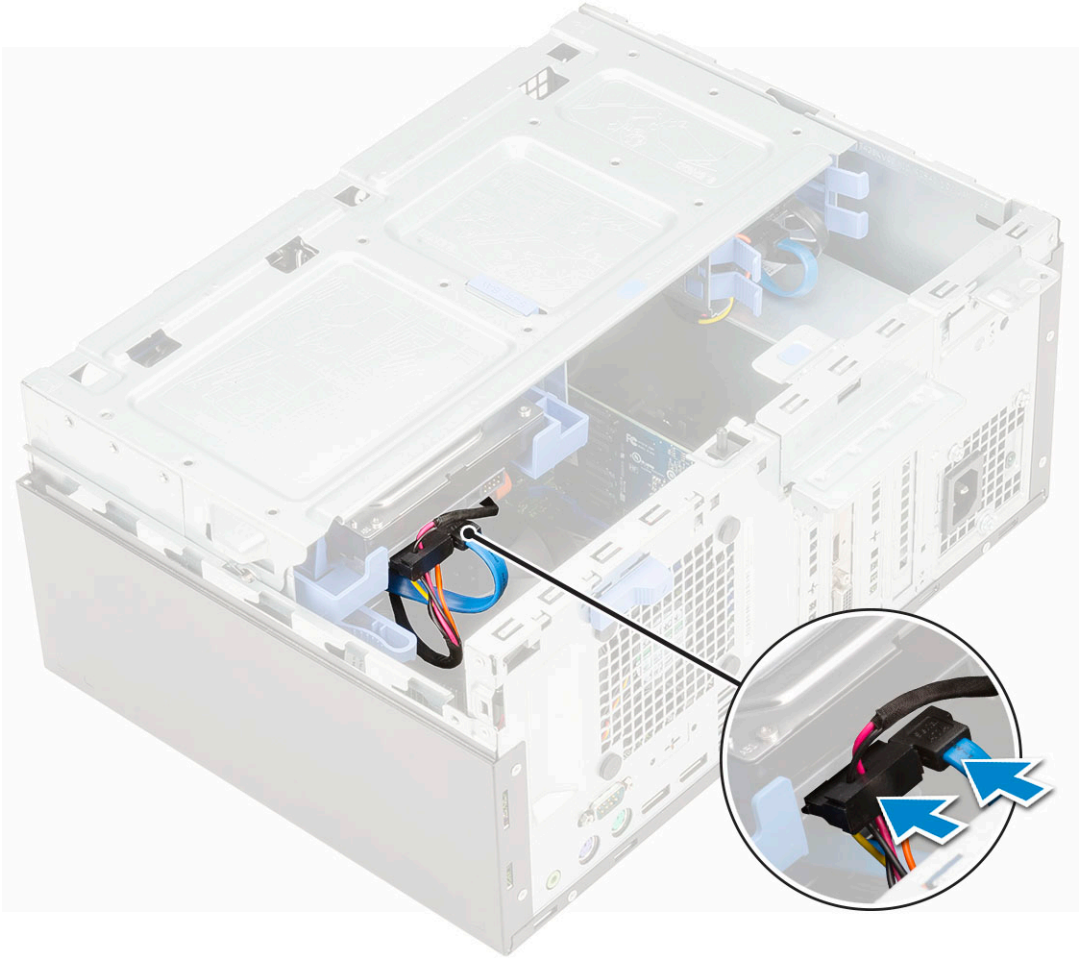


Installing 3.5–inch hard drive assembly

1. Insert the hard drive assembly into the slot on the system until it clicks into place [1].
2. Replace the HDD filler bracket [2].



3. Connect the SATA cable and the power cable to the connectors on the hard drive.

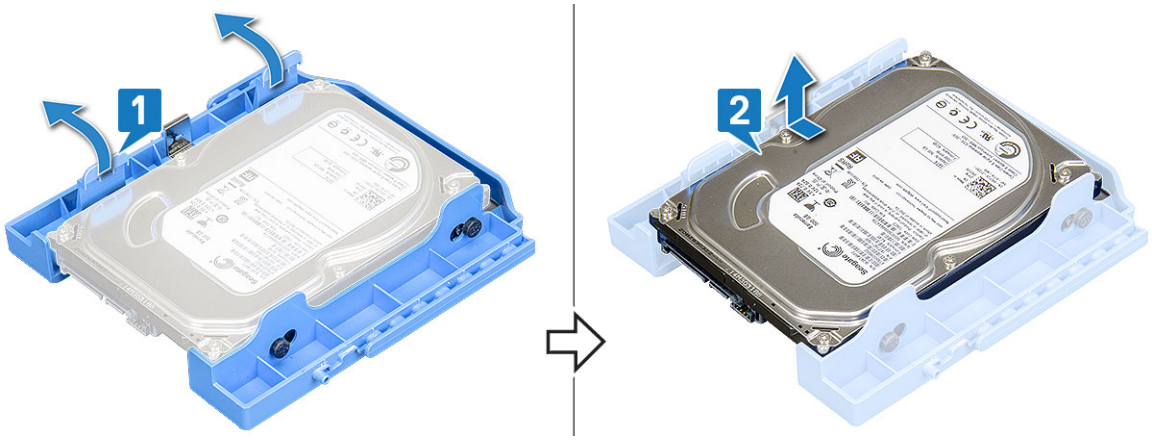


4. Install the:
   a. Front bezel
   b. Side cover
5. Follow the procedure in After working inside your computer.

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 HDD assembly
3. To remove the hard drive :
   a. Pull one side of the hard drive bracket to disengage the pins on the bracket from the slots on the hard drive [1].
   b. Lift the hard drive out of the hard drive bracket [2].



Installing the 3.5–inch hard drive into the hard drive bracket

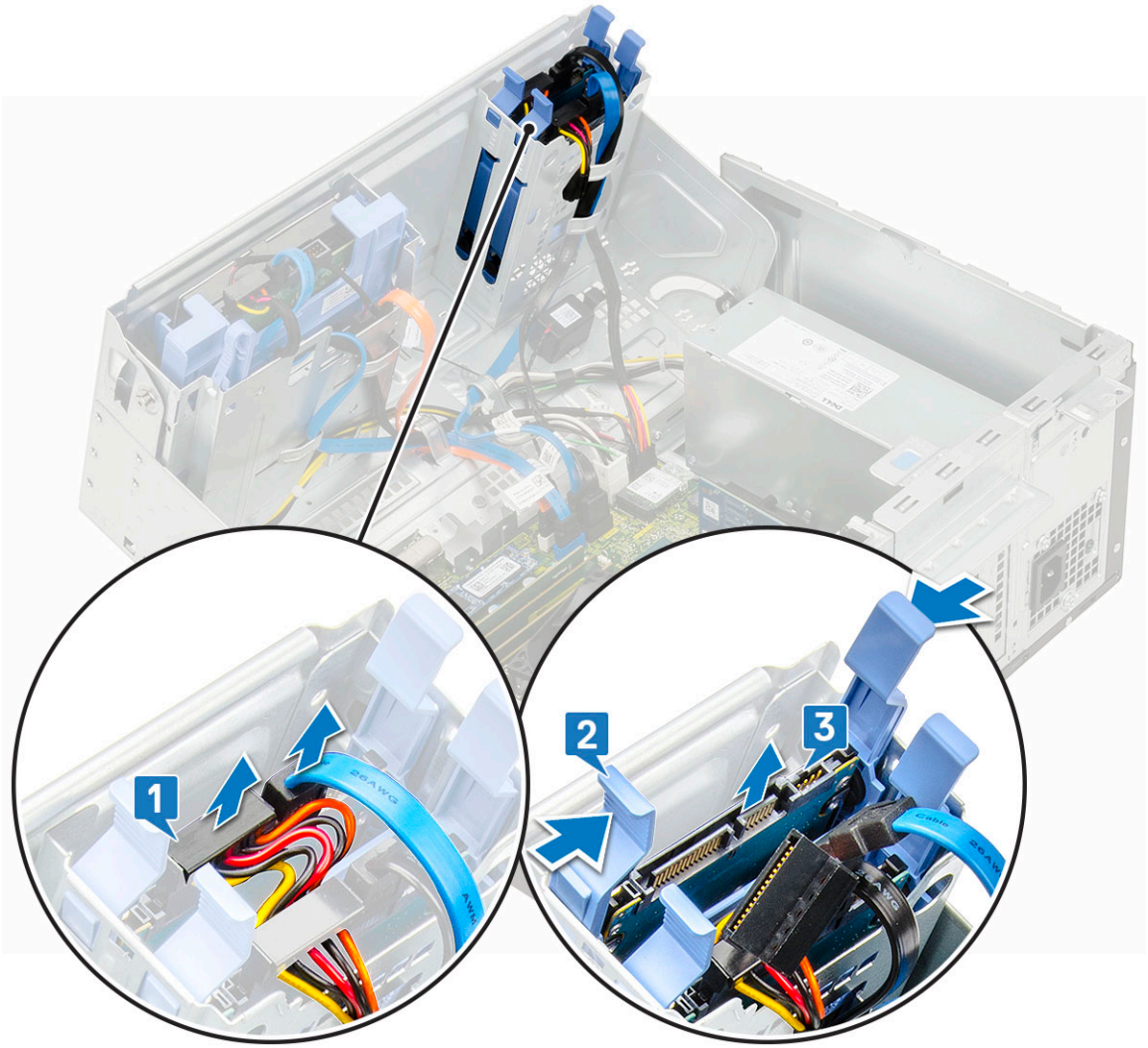
1. To install the hard drive:
   a. Align the hard drive to the side of the hard drive bracket, and pull the other end tabs to insert the pins on the bracket into the hard drive [1].
   b. Insert the hard drive into the hard drive bracket until it clicks into place [2].

2. Install the:
   a. 3.5-inch hard drive assembly
   b. Front bezel
   c. Side cover
3. Follow the procedure in After working inside your computer.

2.5-inch hard drive assembly

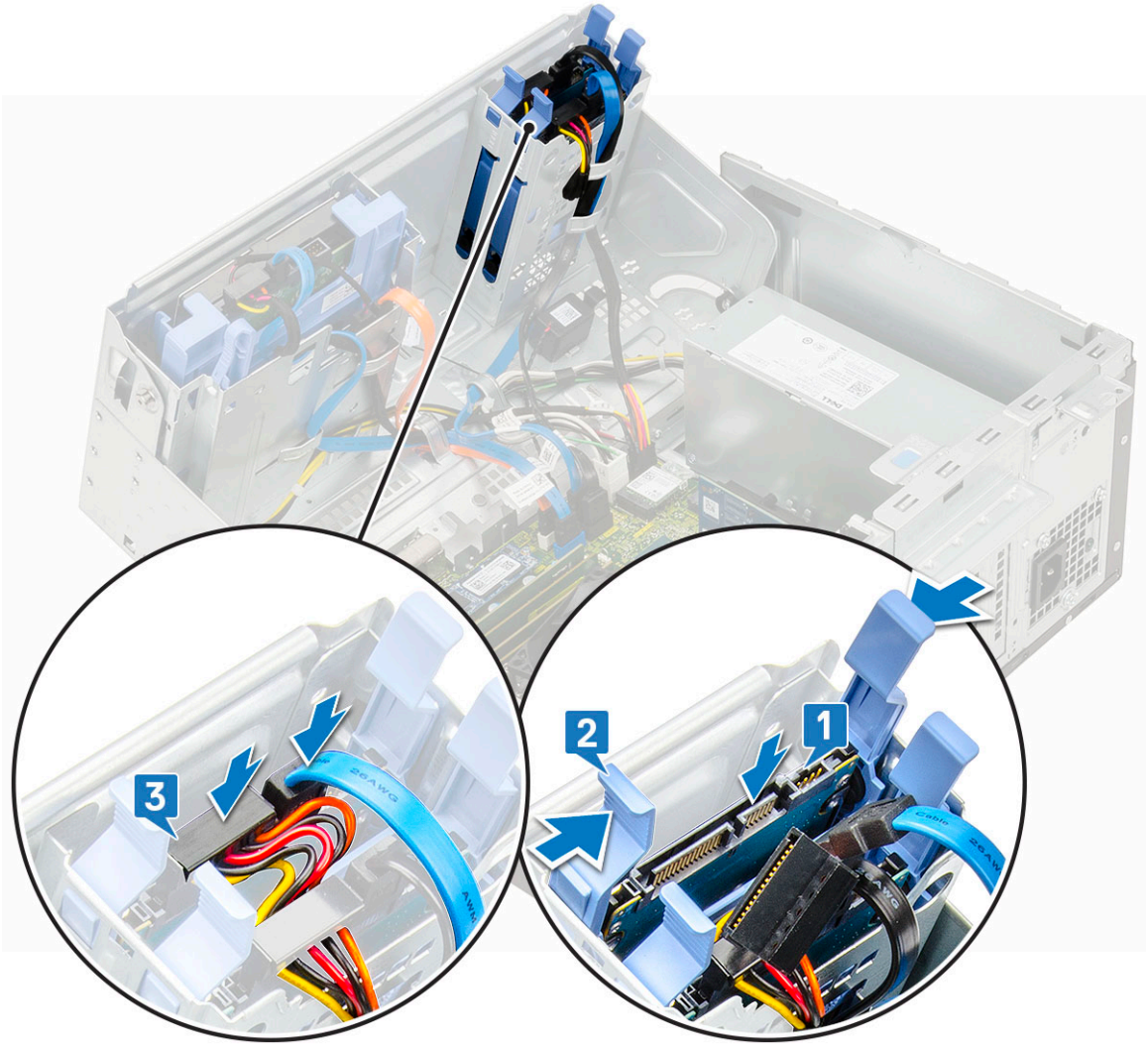
Removing the 2.5–inch hard drive assembly

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Side cover
   b. Front bezel
3. Open the front panel door.
4. To remove the hard drive assembly:
   a. Disconnect the hard drive data and power cables from the connectors on the 2.5-inch hard drive [1].
   b. Press the blue tabs of the assembly on both sides [2] and pull the hard drive assembly out of the system [3].



Installing the 2.5-inch drive assembly

1. To install the hard drive:
   a. Insert the hard drive assembly into the slot on the system until it clicks into place [1] [2].
   b. Connect the hard drive data and power cables to the connectors on the 2.5-inch hard drive [3].

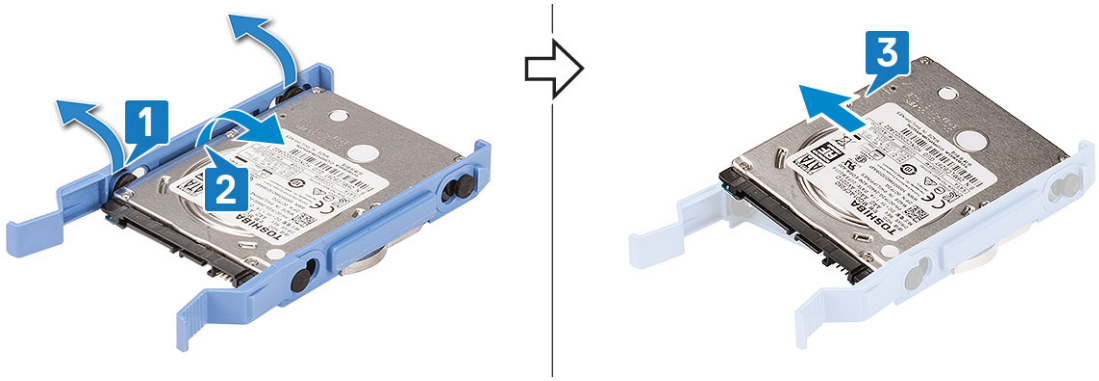


2. Close the front panel door.
3. Install the:
   a. Front bezel
   b. Side cover
4. Follow the procedure in After Working Inside Your Computer.

2.5-inch hard drive

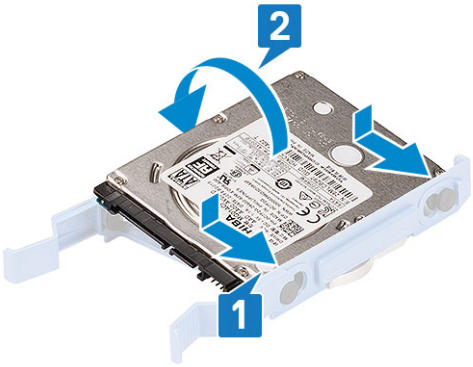
Removing the 2.5–inch drive from the drive bracket

1. Follow the procedure in Before Working Inside Your Computer.
2. Remove the:
   a. Side cover
   b. Front bezel
   c. 2.5-inch hard 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].
   c. Remove the drive from the bracket [3].



Installing the 2.5–inch hard drive into the hard drive bracket

1. To install the hard drive:
   a. 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.
   b. Insert the hard drive into the hard drive bracket until it clicks into place [1].
   c. Insert the hard drive into the hard drive bracket until it clicks into place [2].



2. Install the:
   a. 2.5-inch hard drive assembly
   b. Front bezel
   c. Side cover
3. Follow the procedure in After working inside your computer.

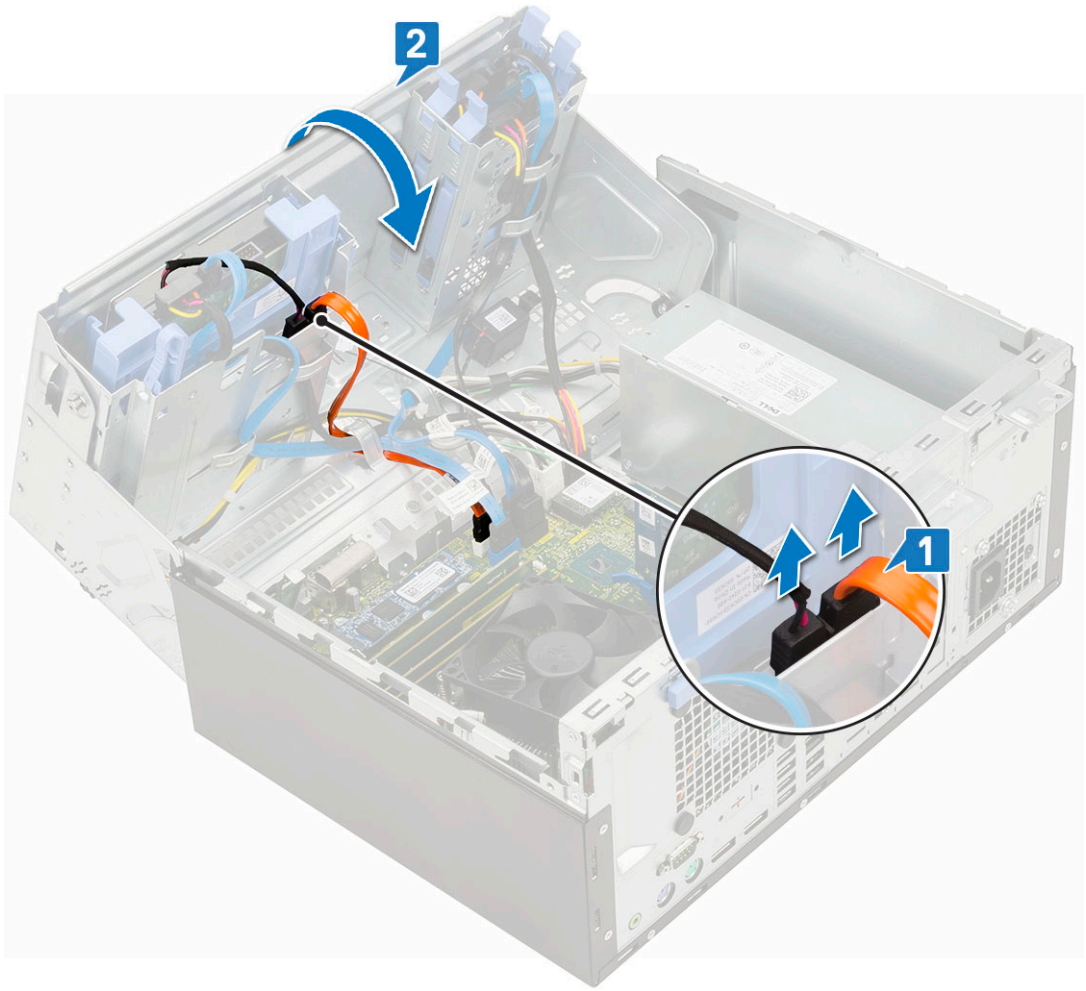
Optical drive

Removing optical drive

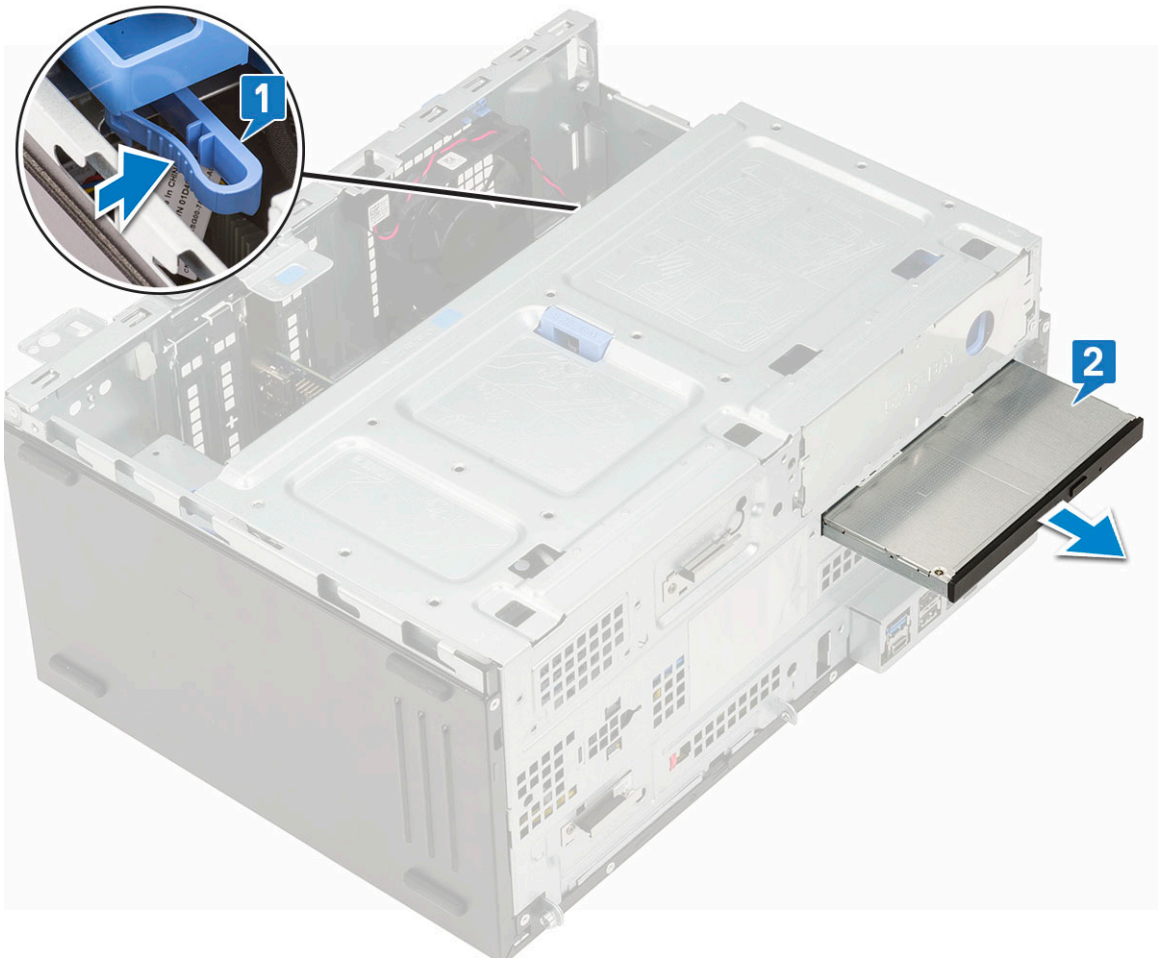
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Side cover
   b. Front bezel
3. Open the front panel door.
4. To remove the optical drive assembly:
   a. Disconnect the optical drive data cable and power cable from the connectors on the optical drive [1].

      NOTE: You may need 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].

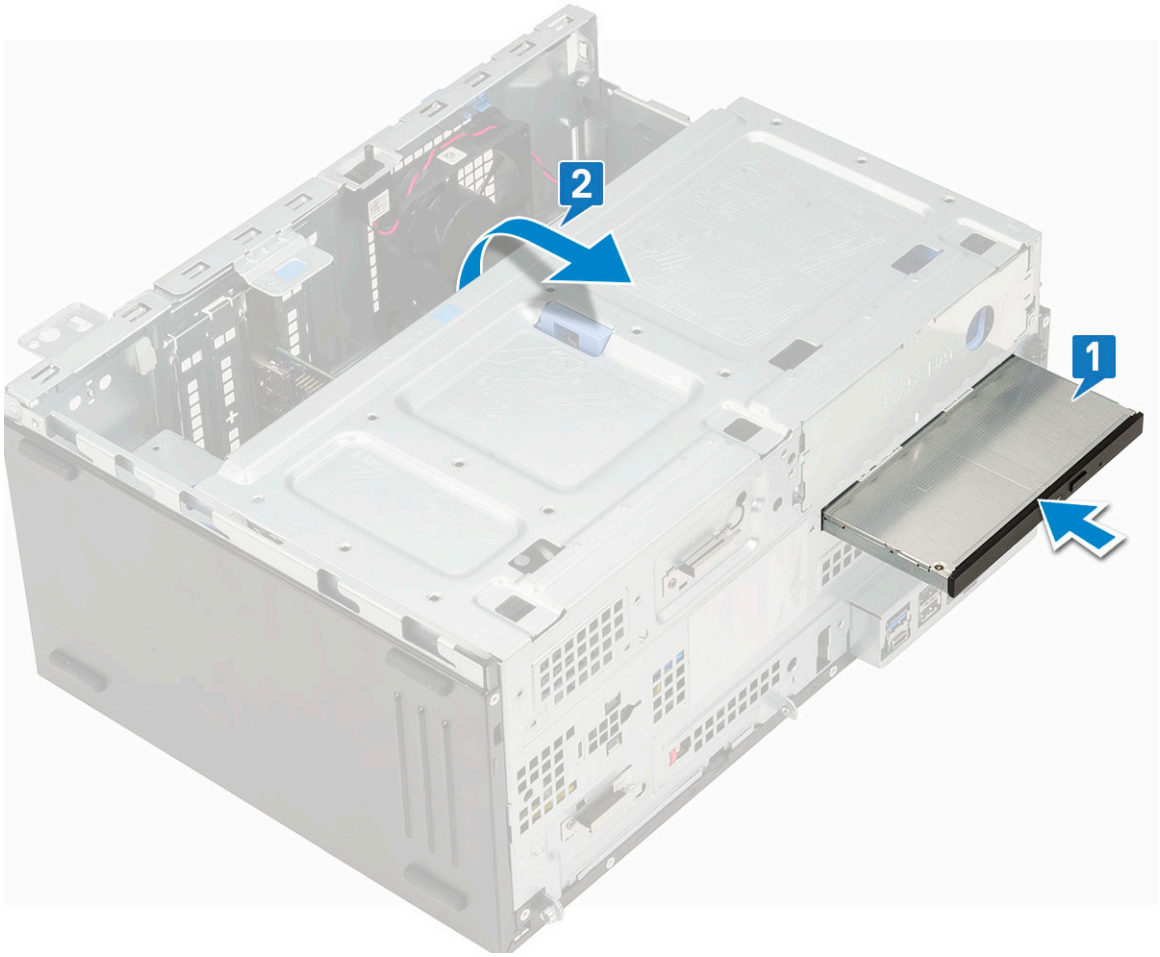


c. Press the blue release tab [1] and slide the optical drive out of the system [2].

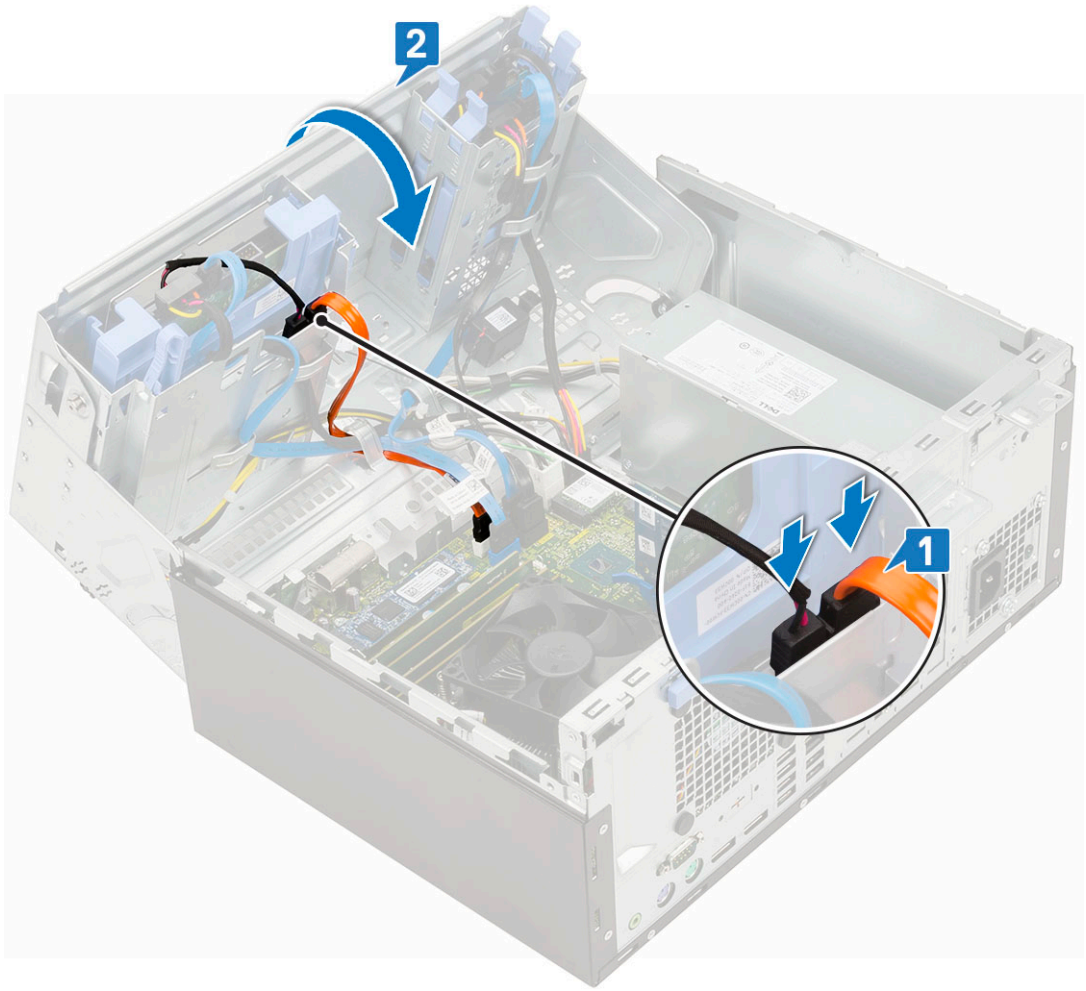


Installing optical drive

1. To install the optical drive:
   a. Insert the optical drive into the optical drive bay until it clicks into place [1].
   b. Open the front panel door [2].



c. Route the cables under the drive cage.
d. Connect the optical drive data cable and power cable to the connectors on the optical drive [1] .
e. Close the front panel door [2].

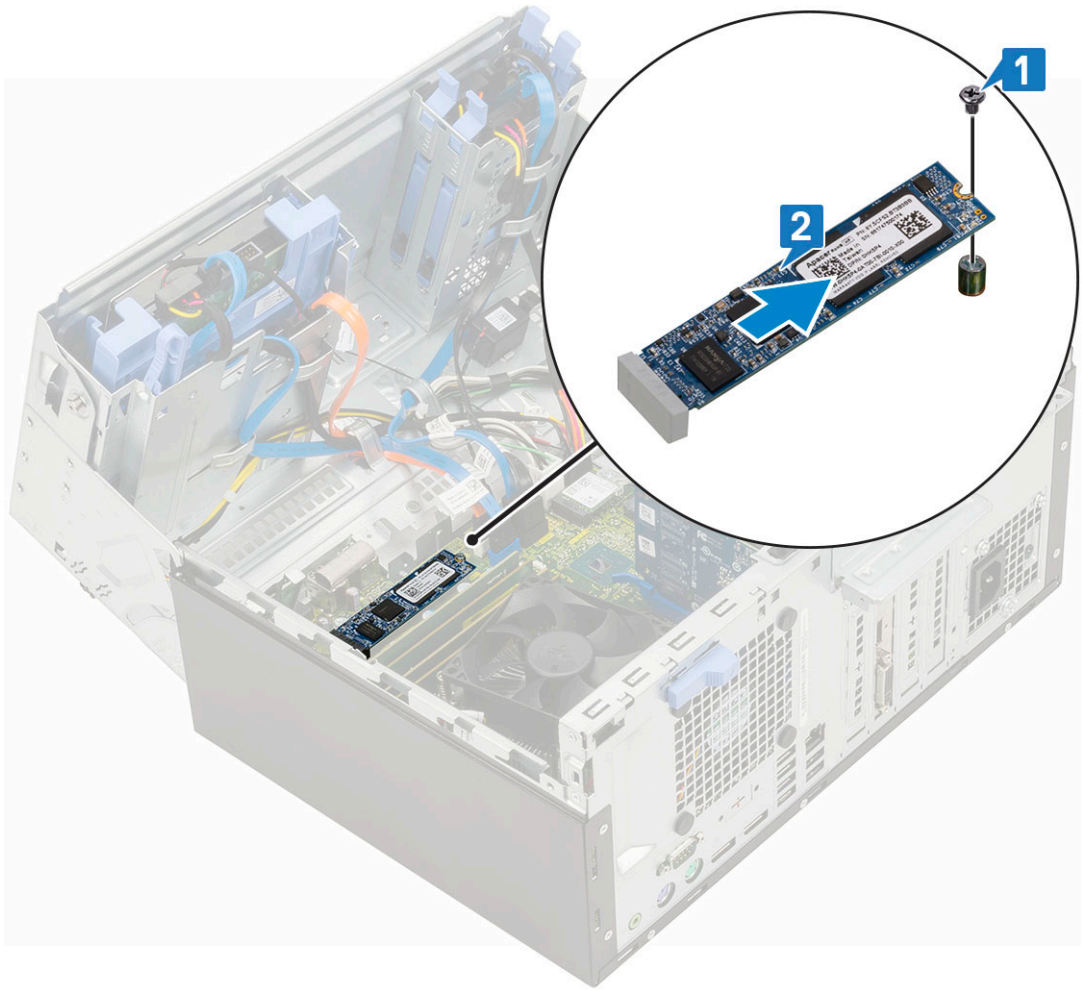


2. Install the:
   a. Front bezel
   b. Side cover
3. Follow the procedure in After working inside your computer.

M.2 SSD

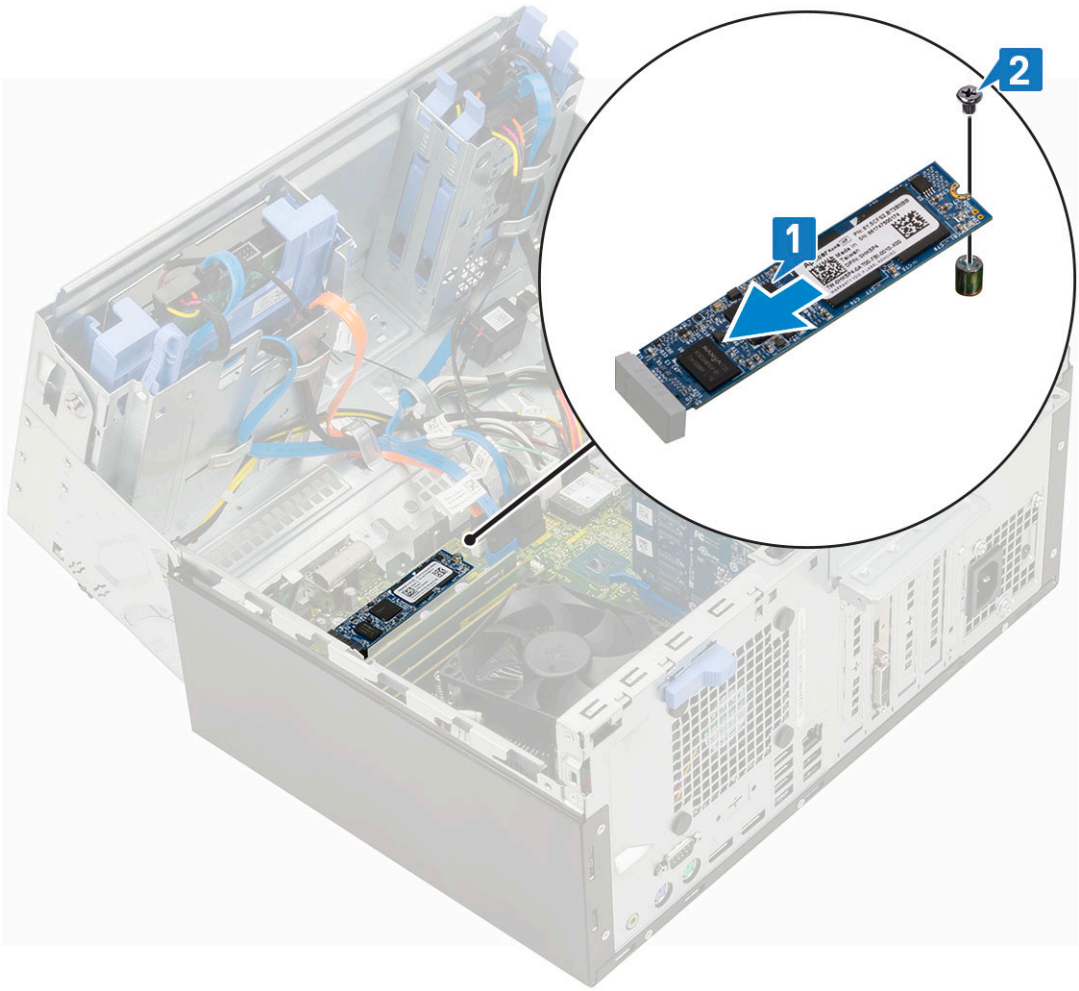
Removing M.2 SSD

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 SSD:
   a. Remove the single screw that secures the SSD to the system board [1].
   b. Slide the M.2 SSD from the connector on the system board [2].



Installing M.2 SSD

1. Insert the M.2 SSD to the connector on the system board [1].
2. Replace the single screw to secure the SSD to the system board [2].

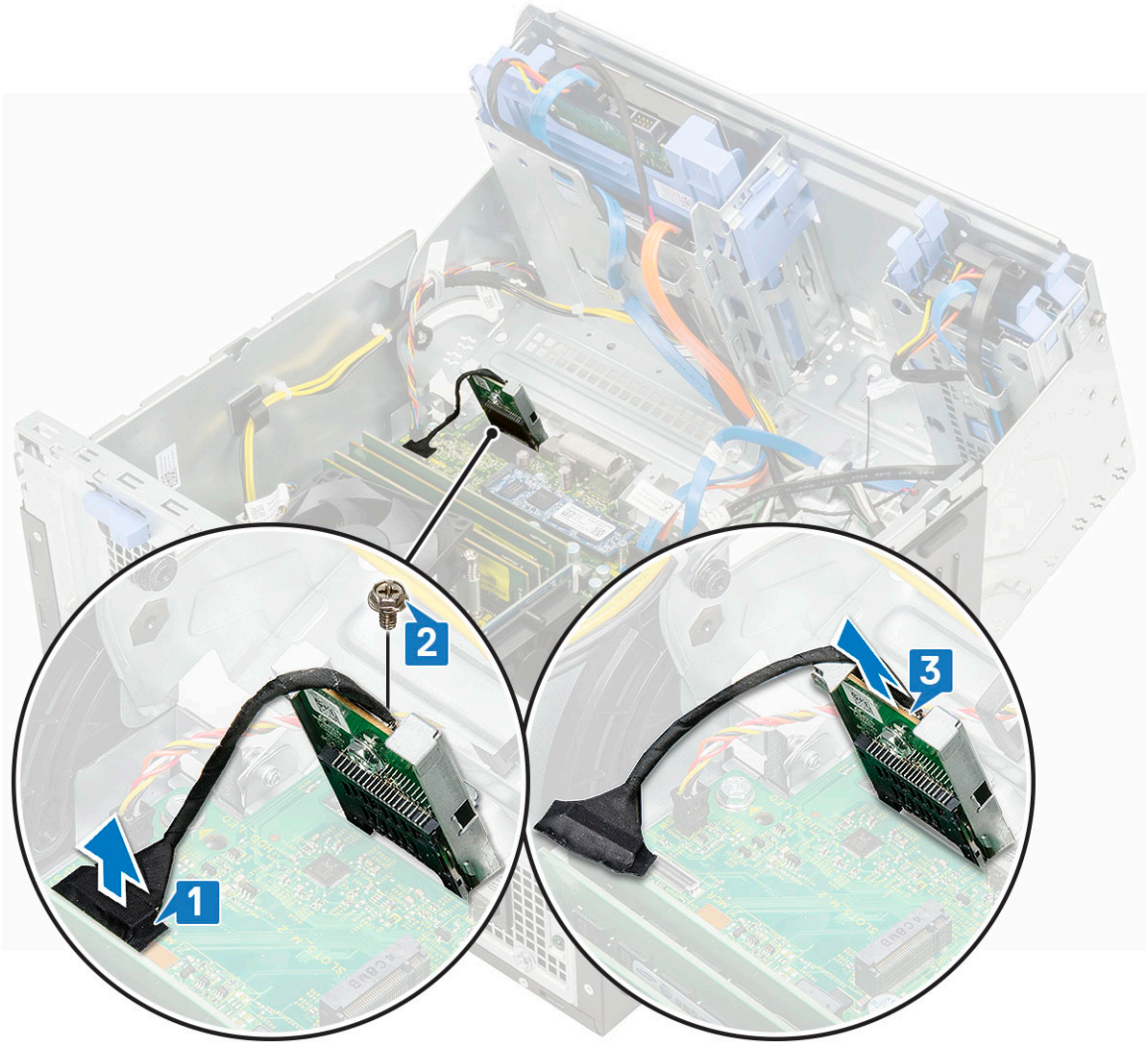


3. Close the front panel door.
4. Install the:
   a. Front bezel
   b. Side cover
5. Follow the procedure in After working inside your computer.

SD card reader

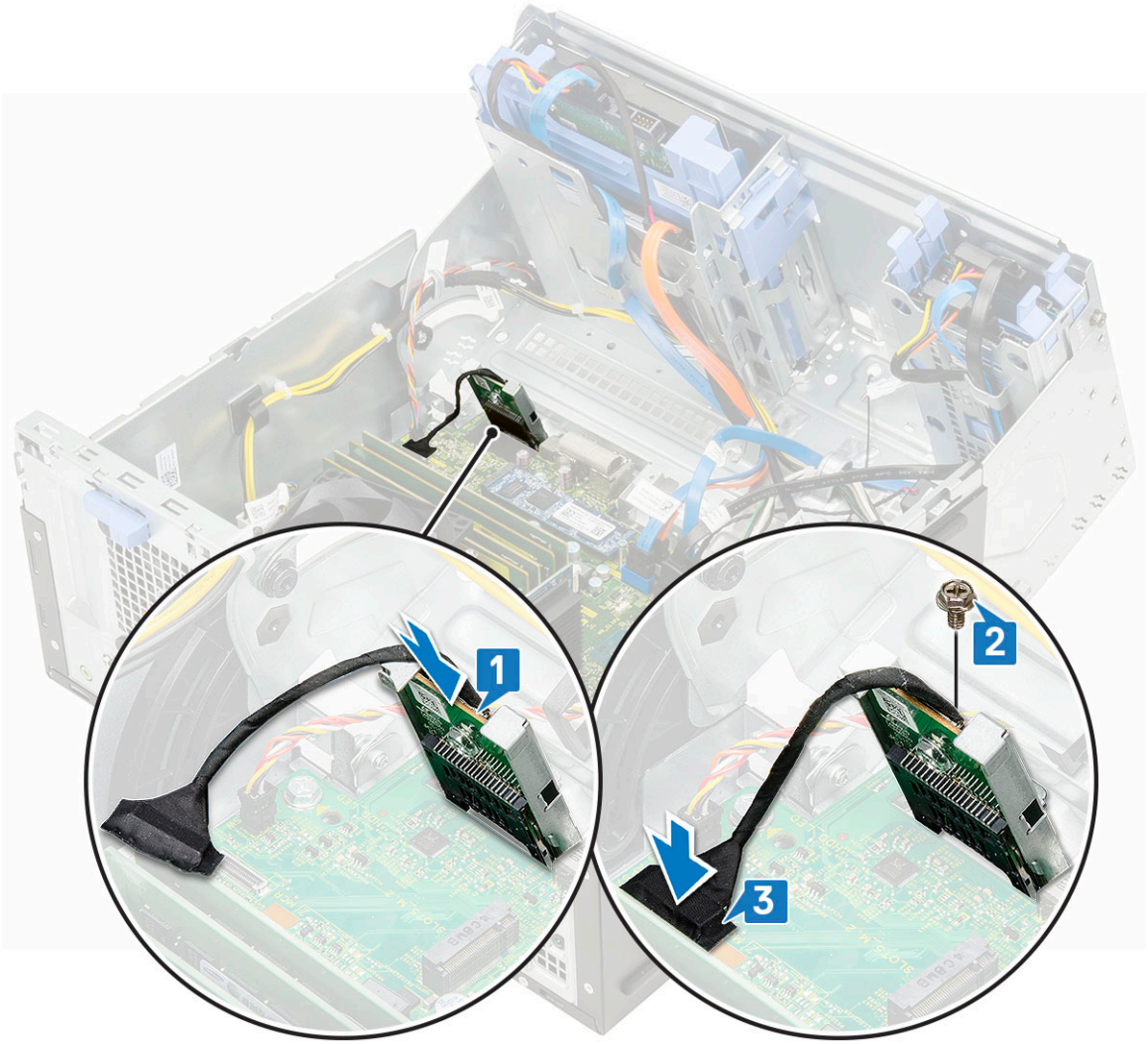
Removing SD card reader

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 system [3].



Installing SD card reader

1. To install the SD card reader:
   a. Insert the SD card reader into the slot on the front panel door [1].
   b. Replace the screw to secure the SD card reader to the front panel door [2].
   c. Connect the SD card reader cable to the connector on the system board [3].

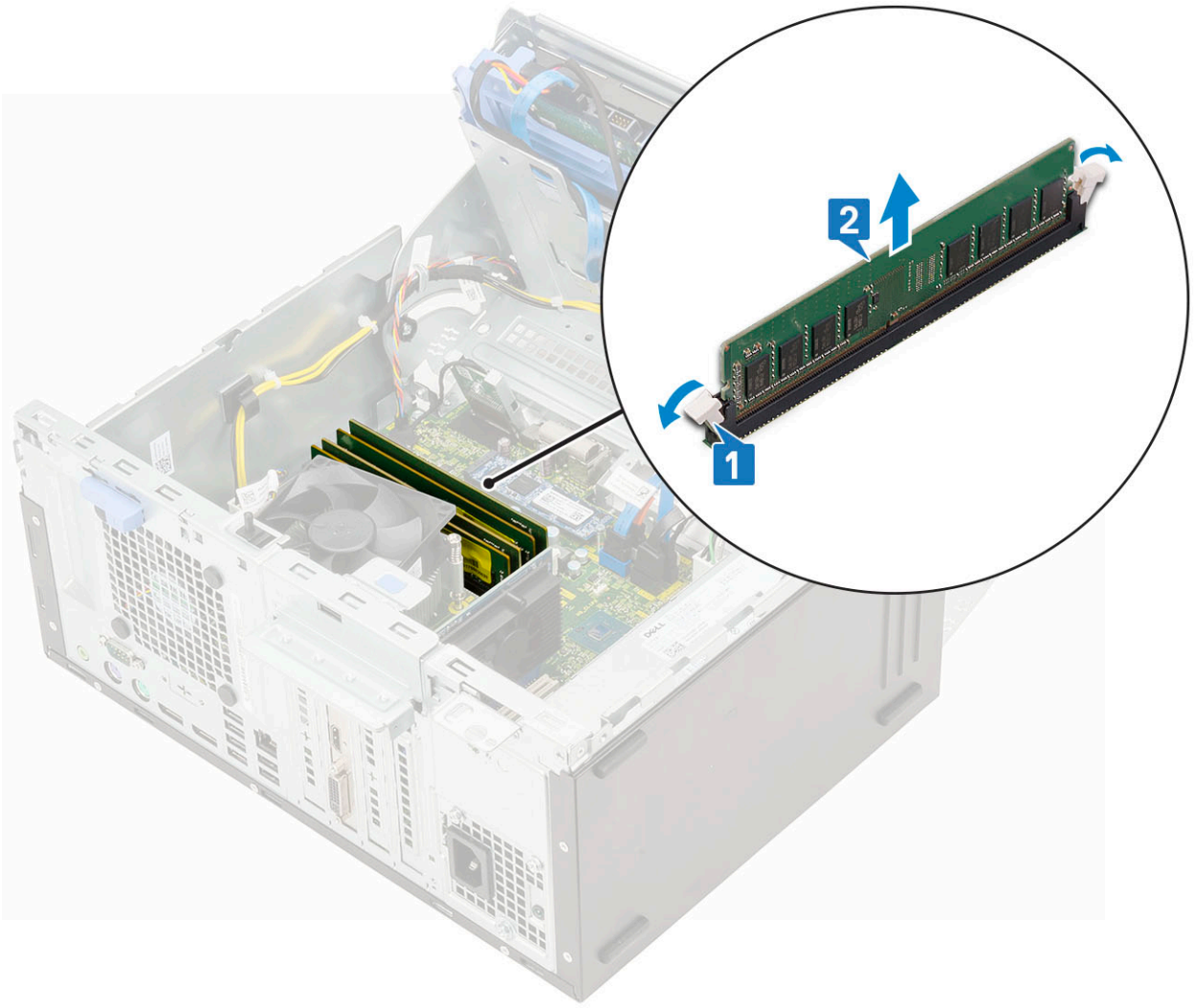


2. Close the front panel door.
3. Install the:
   a. Front bezel
   b. Side cover
4. Follow the procedure in After working inside your computer.

Memory module

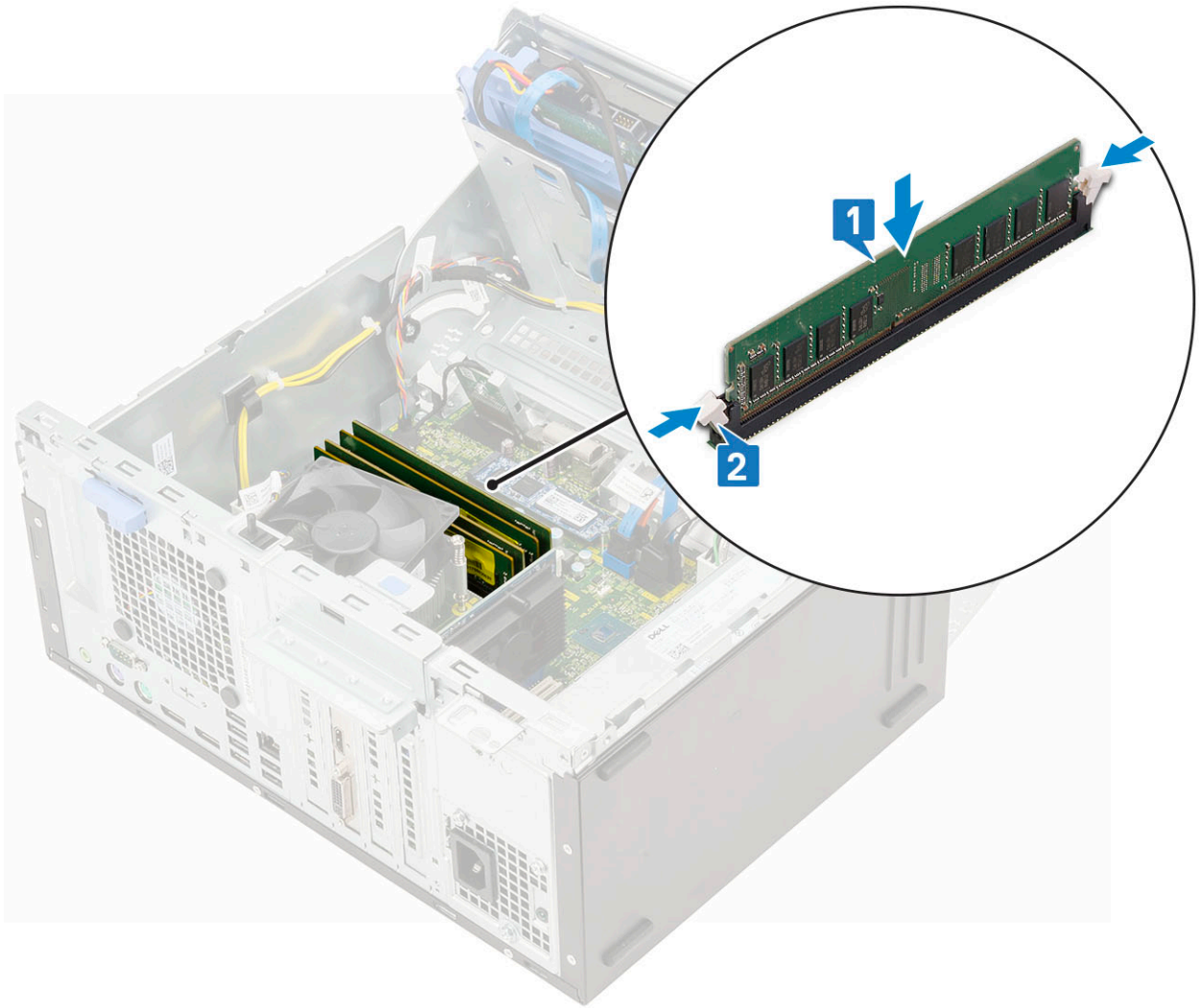
Removing memory module

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. Pull the clips securing the memory module until the memory module pops up [1].
   b. Remove the memory module from the system board [2].



Installing memory module

1. To install the memory module:
   a. Align the notch on the memory module with the tab on the memory module connector.
   b. Insert the memory module into the memory module socket [1].
   c. Press the memory module until the memory module retention tabs click into place [2].



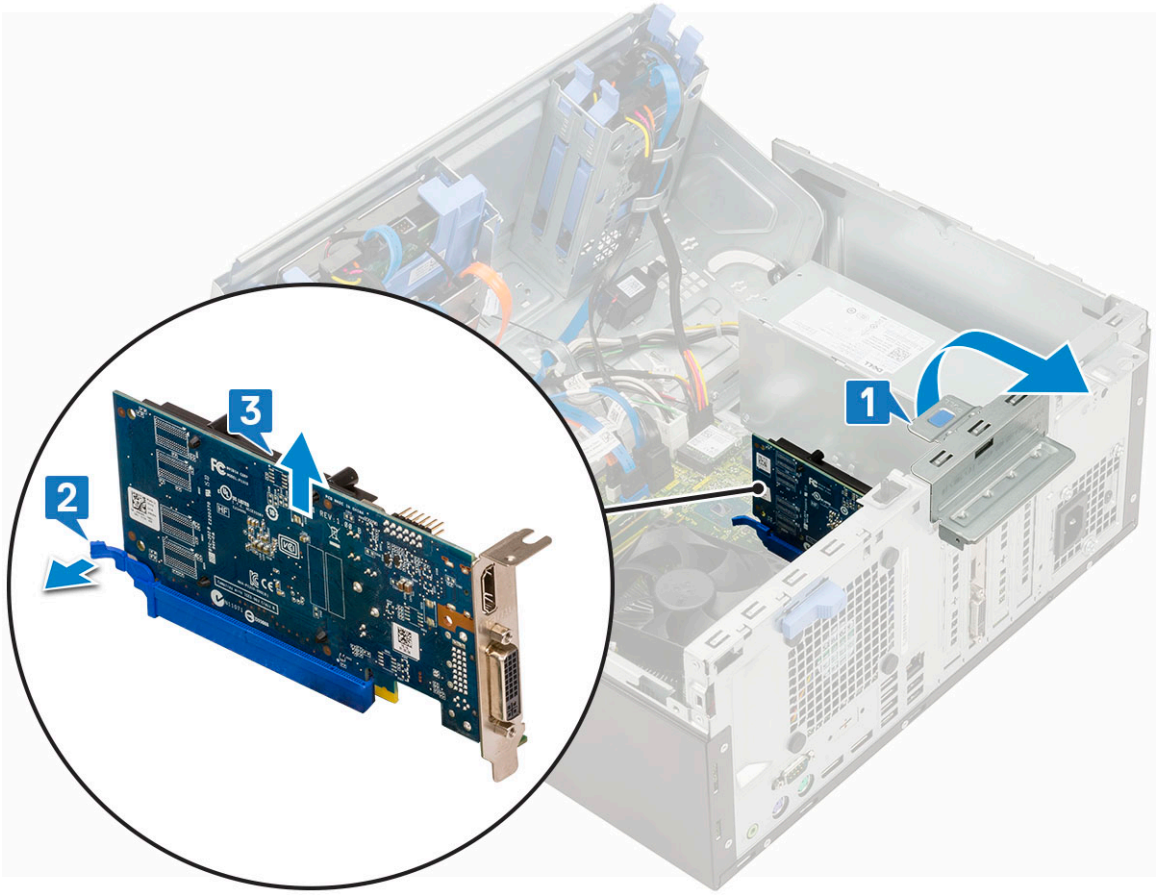
2. Close the front panel door.
3. Install the:
   a. Front bezel
   b. Side cover
4. Follow the procedure in After working inside your computer.

Expansion card

Removing PCIe expansion card

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 release latch to unlock the PCIe expansion card [1].
   b. Push the card retention latch [2], and lift the PCIe expansion card out of the computer [3].

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

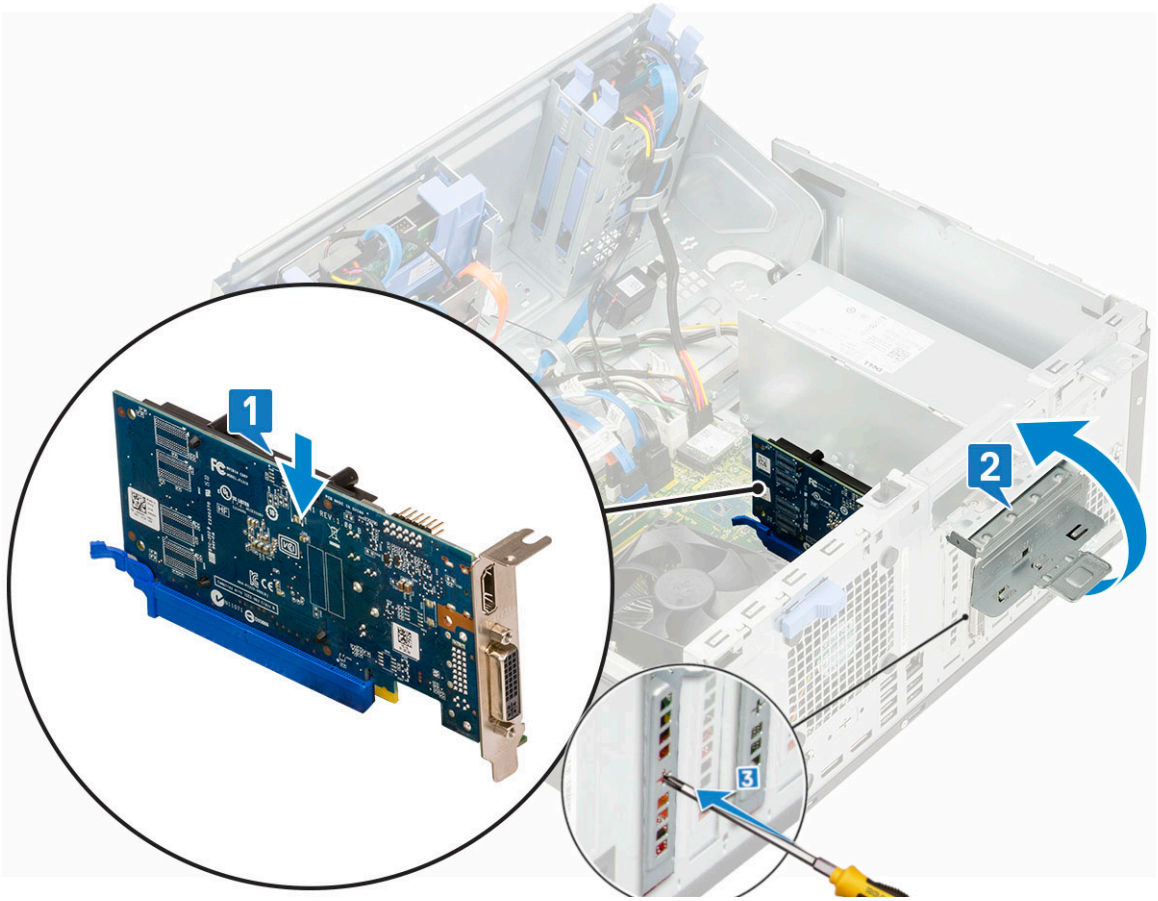


5. Repeat the steps to remove any additional PCIe expansion card.

Installing PCIe expansion card

1. To install the PCIe expansion card:
   a. **NOTE:** To remove the PCIe brackets (2 and 3), push the bracket upwards from the inside of your computer to release it and then lift the bracket away from your computer.

      Insert a screwdriver in the hole of a PCIe bracket and push hard to release the bracket [3], and then lift the bracket out from your computer.
   b. Insert the PCIe expansion card to the connector on the system board [1].
   c. Secure the PCIe expansion card by pushing the card retention latch until it clicks into place [2].
   d. Repeat the steps to install any additional PCIe expansion card.

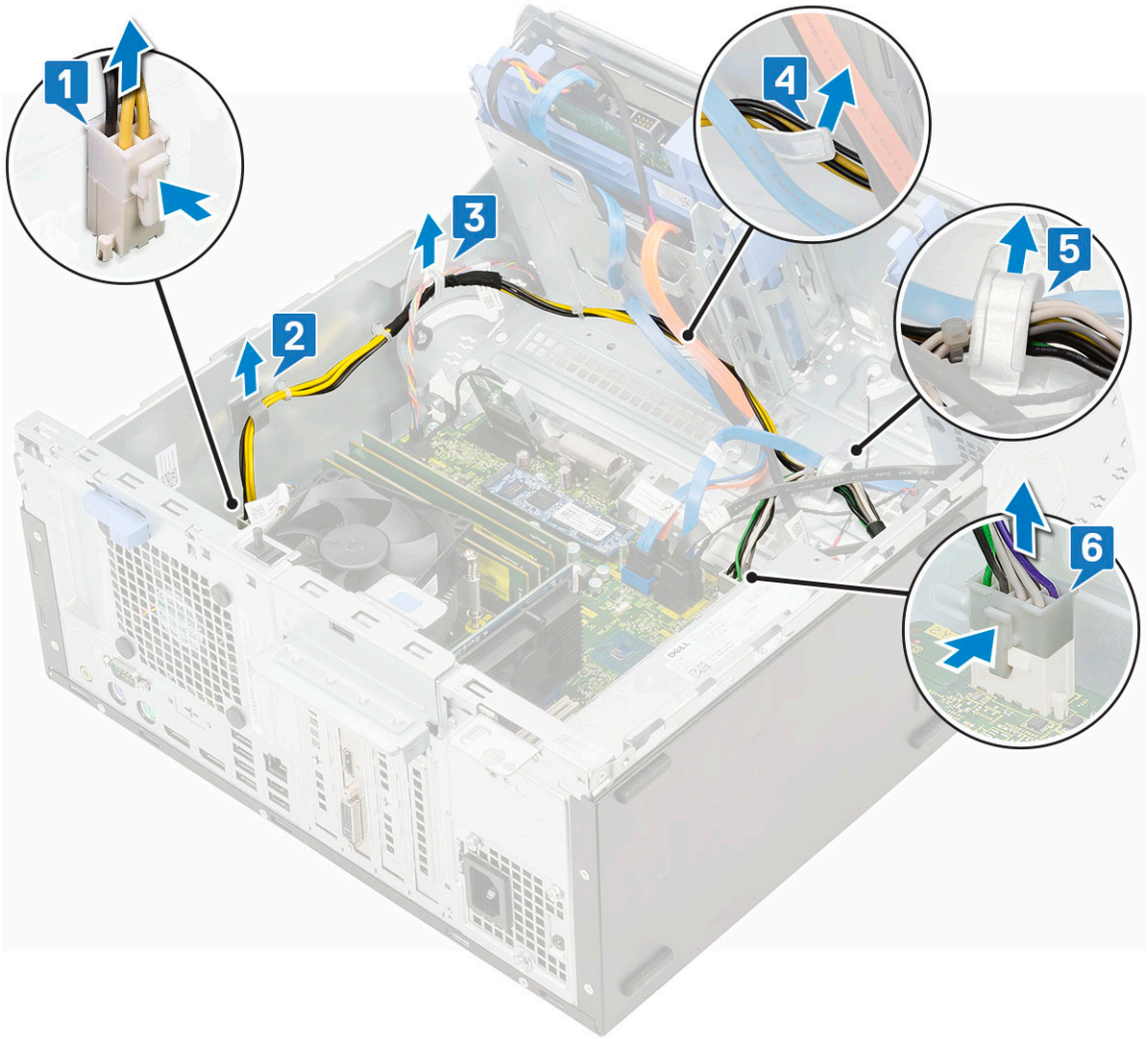


2. Close the front panel door.
3. Install the:
   a. Front bezel
   b. Side cover
4. Follow the procedure in After working inside your computer.

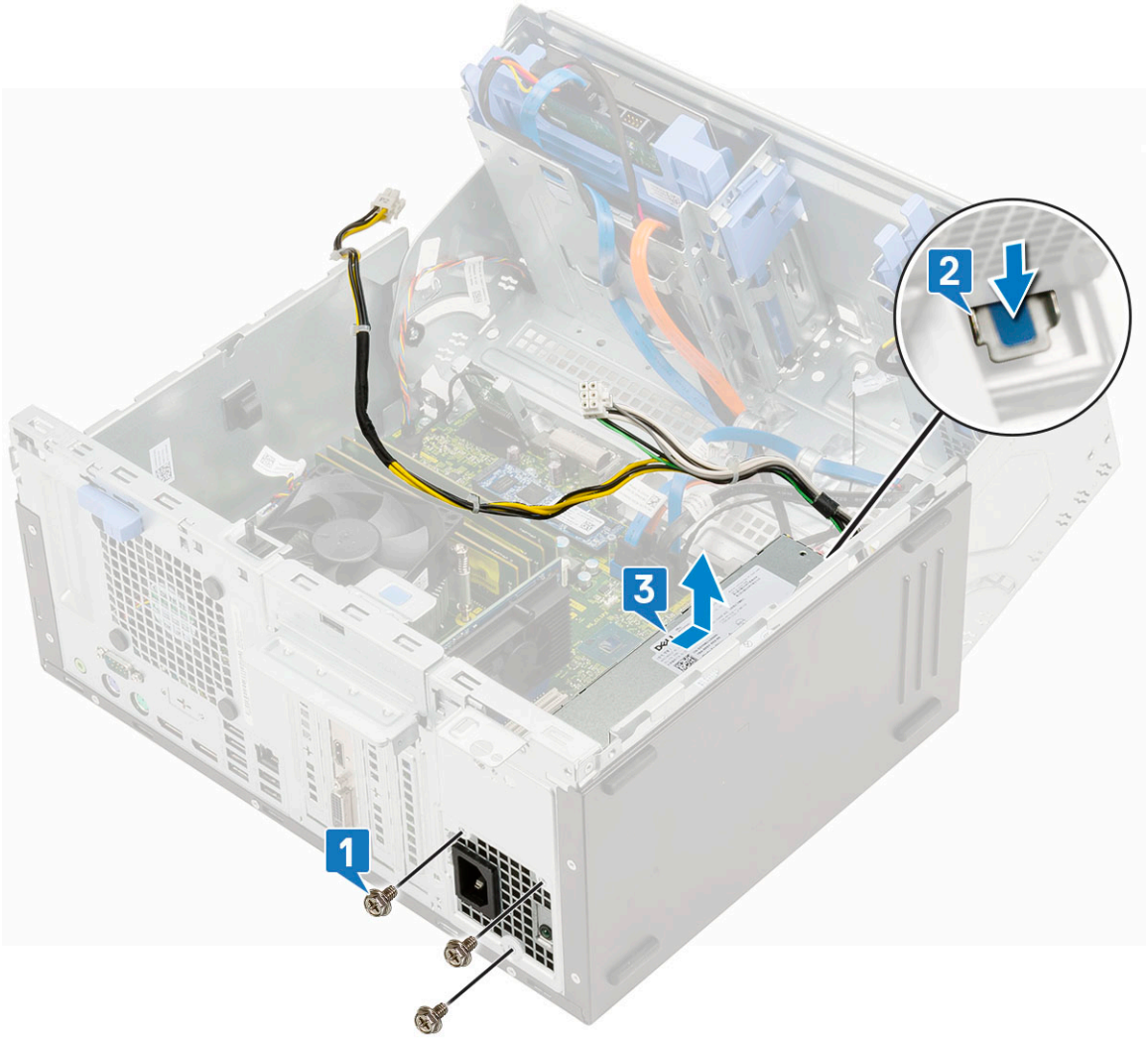
Power supply unit

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. Disconnect the PSU cables from the connectors on the system board [1].
   b. Unroute the PSU cables from the retention clips [2, 3, 4, 5].
   c. Disconnect the PSU cables from the connectors on the system board [6].

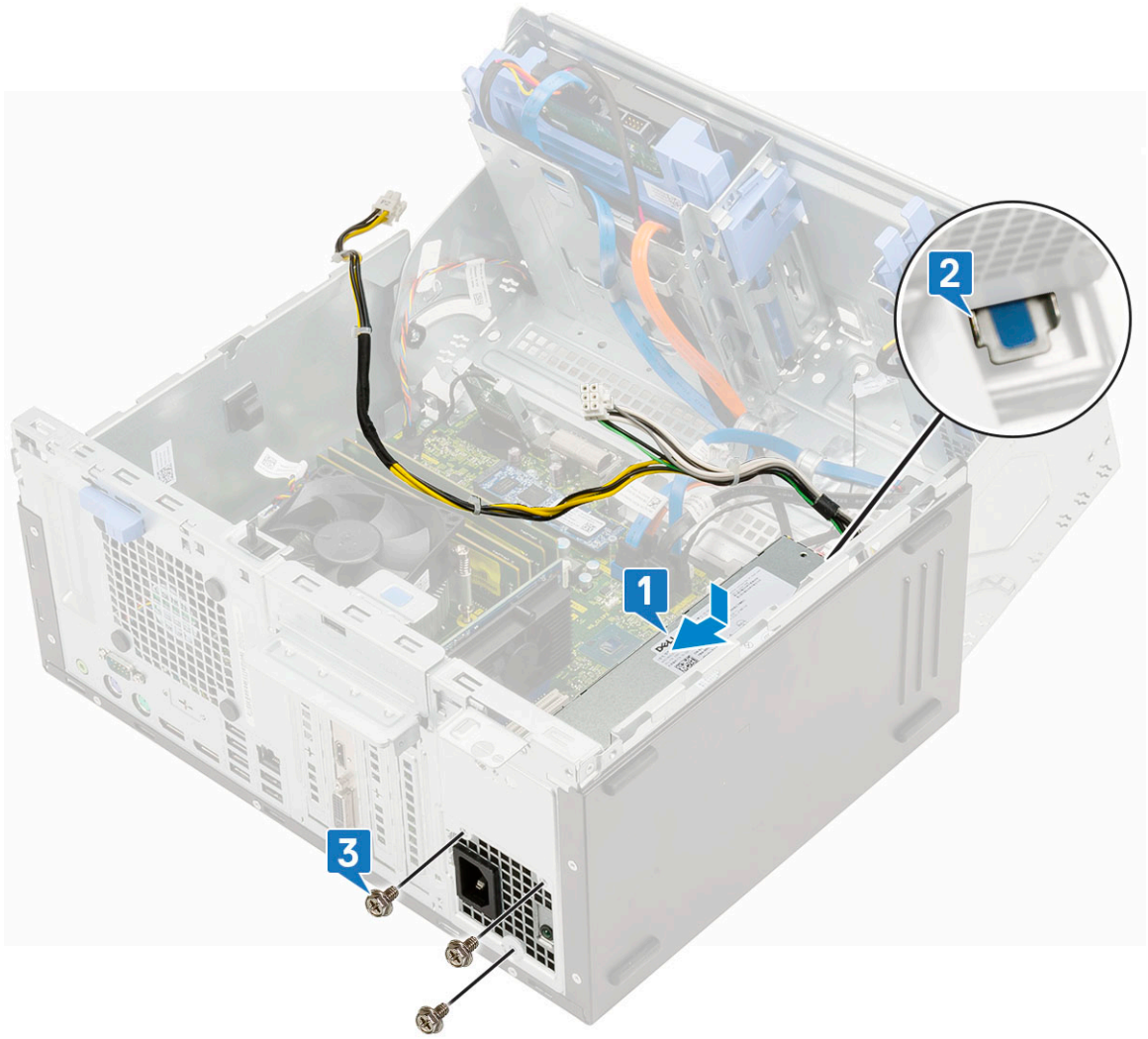


5. To remove the PSU:
   a. Remove the 3 screws that secure the PSU to the system [1].
   b. Press the release tab [2].
   c. Slide and lift the PSU away from the computer [3].

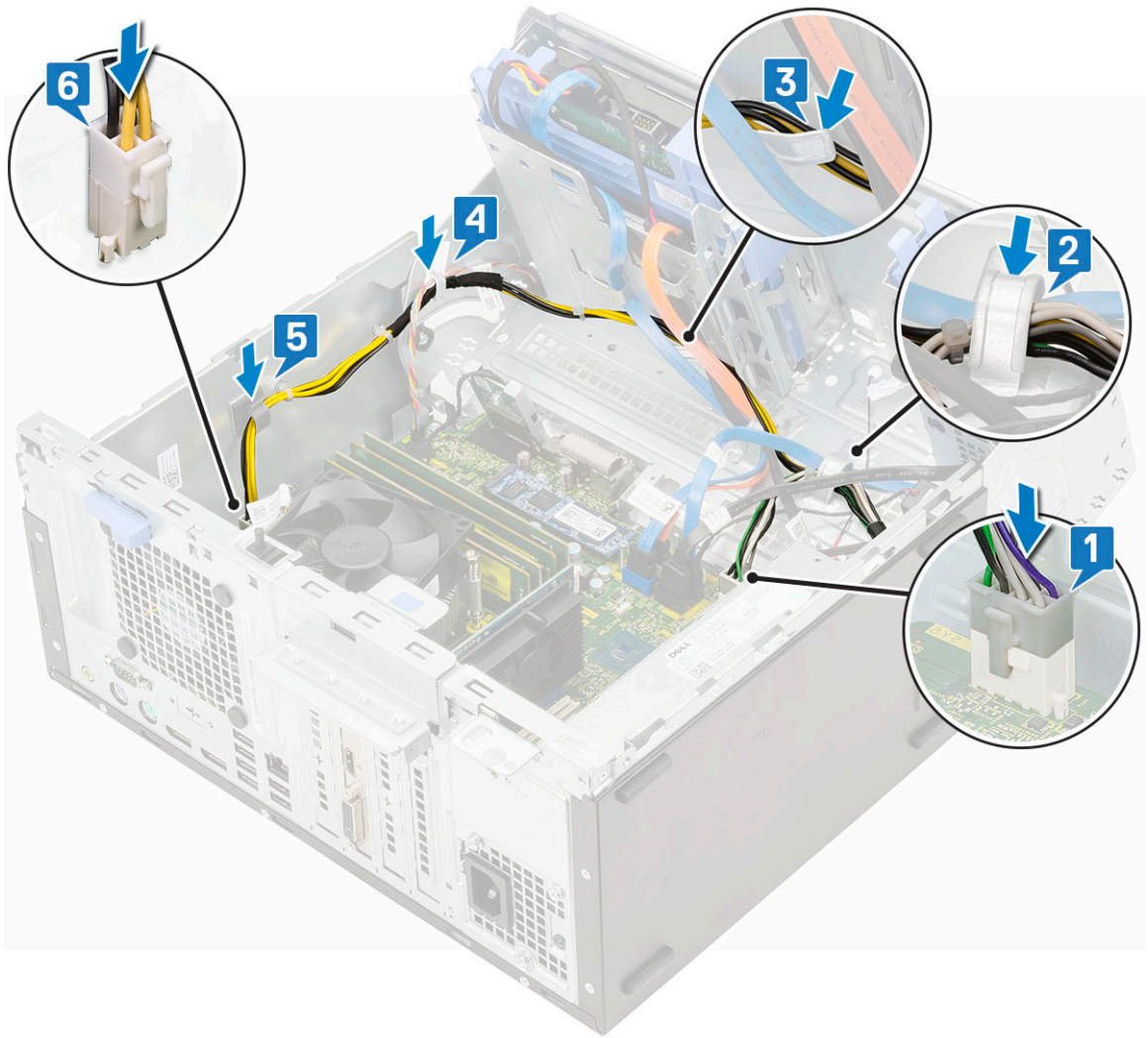


Installing power supply unit or PSU

1. To install the PSU:
   a. Insert the PSU into the PSU slot and slide it towards the back of the system until it clicks into place [1].
   b. Replace the three screws to secure the PSU to the computer [3].



c. Connect the PSU cables to the connectors on the system board [1].
d. Route the PSU cables through the retention clips [2, 3, 4, 5].
e. Connect the PSU cable to the connector on the system board [6].

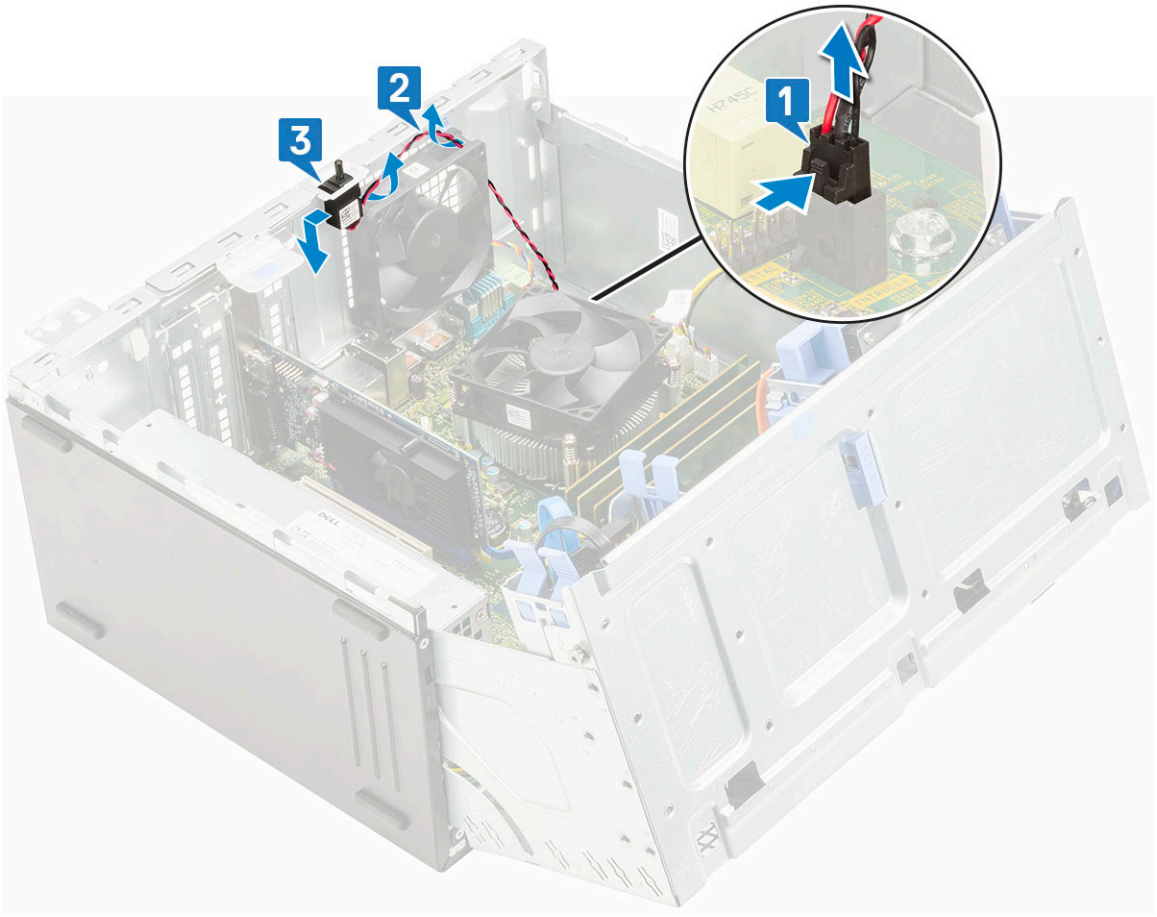


2. Close the front panel door.
3. Install the:
   a. Front bezel
   b. Side cover
4. Follow the procedure in After working inside your computer.

Intrusion switch

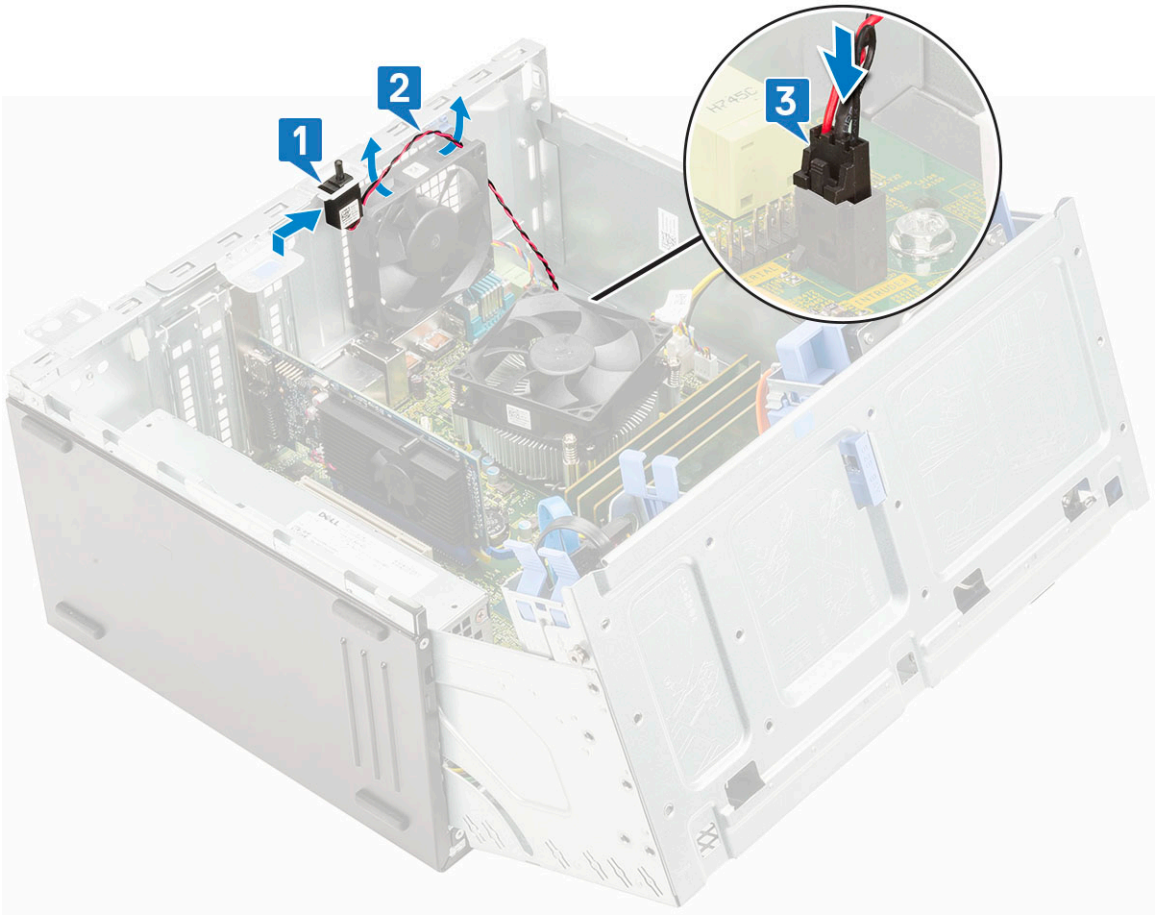
Removing intrusion switch

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. Disconnect the intrusion switch cable from the connector on the system board [1].
   b. Unroute the intrusion switch cable from the fan grommets [2].
   c. Slide the intrusion switch and push it to remove from the computer [3].



Installing intrusion switch

1. Insert the intrusion switch into the slot on the system [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].

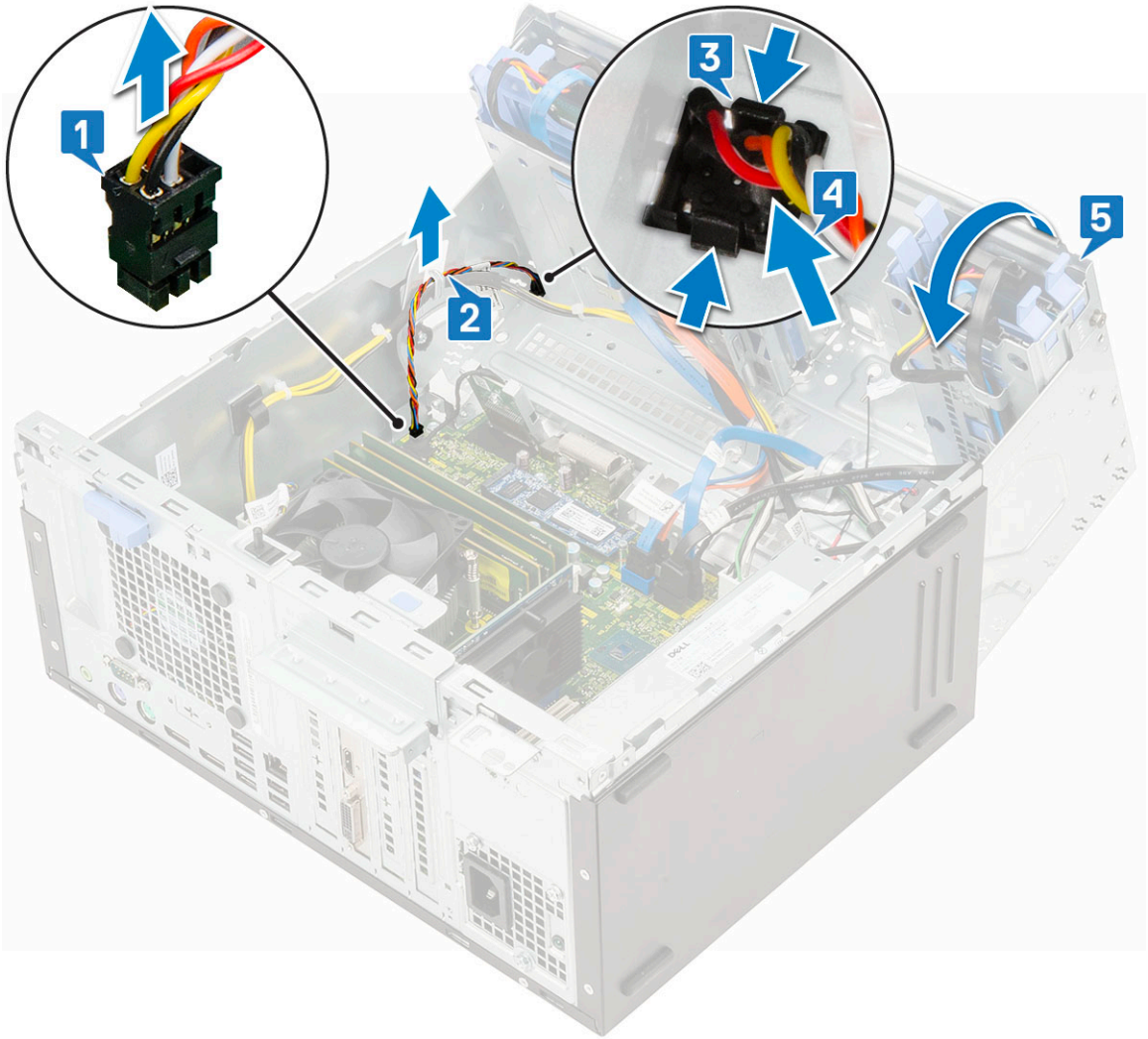


4. Close the front panel door.
5. Install the:
   a. Front bezel
   b. Side cover
6. Follow the procedure in After working inside your computer.

Power button

Removing power button

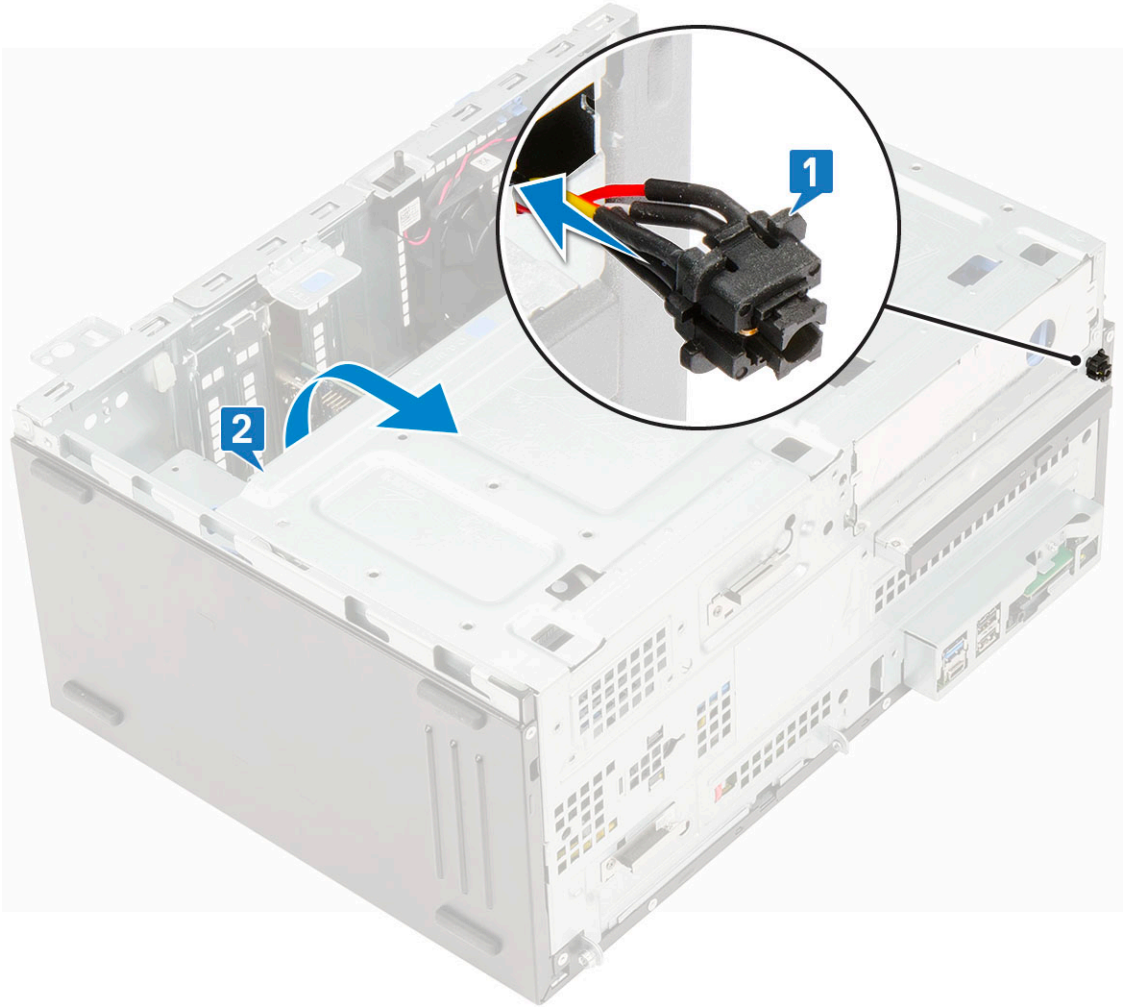
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Side cover
   b. Front bezel
3. Open the front panel door.
4. To release the power button:
   a. Disconnect the power button cable from the system board [1].
   b. Unroute the power button cable through the retention clip [2].
   c. Press the release tabs using a plastic scribe and slide the power button out from the front of the system [3].
   d. Close the front panel door [5].



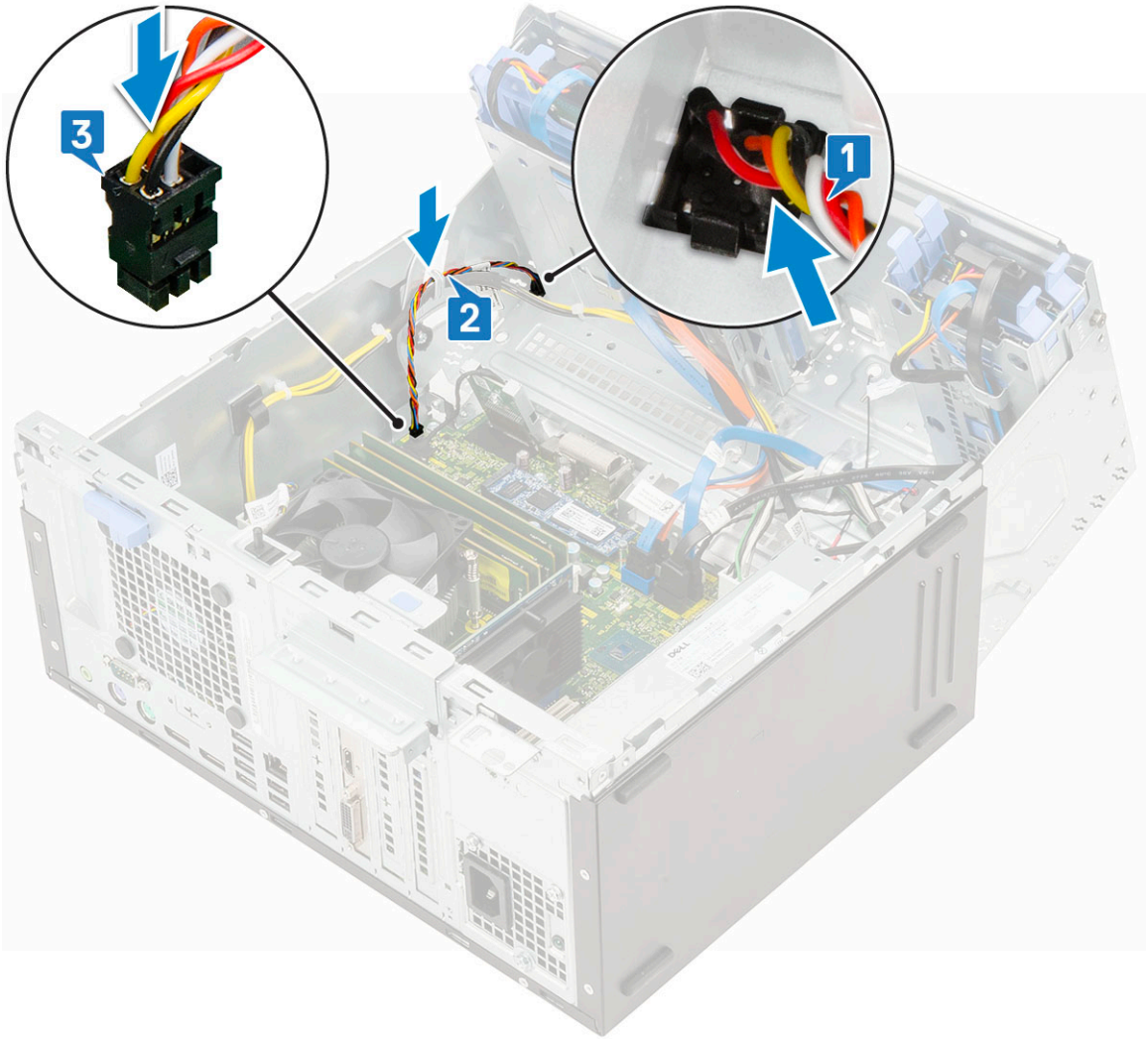
5. Pull the power button out from the computer.

Installing power button

1. Insert the power switch into the slot from the front of the computer and press it until it clicks into place [1].
2. Open the front panel door [2]



3. Route the power switch cable from the power button through the retention clip [2].
4. Align the cable with the pins on the connector and connect the power button cable [3].

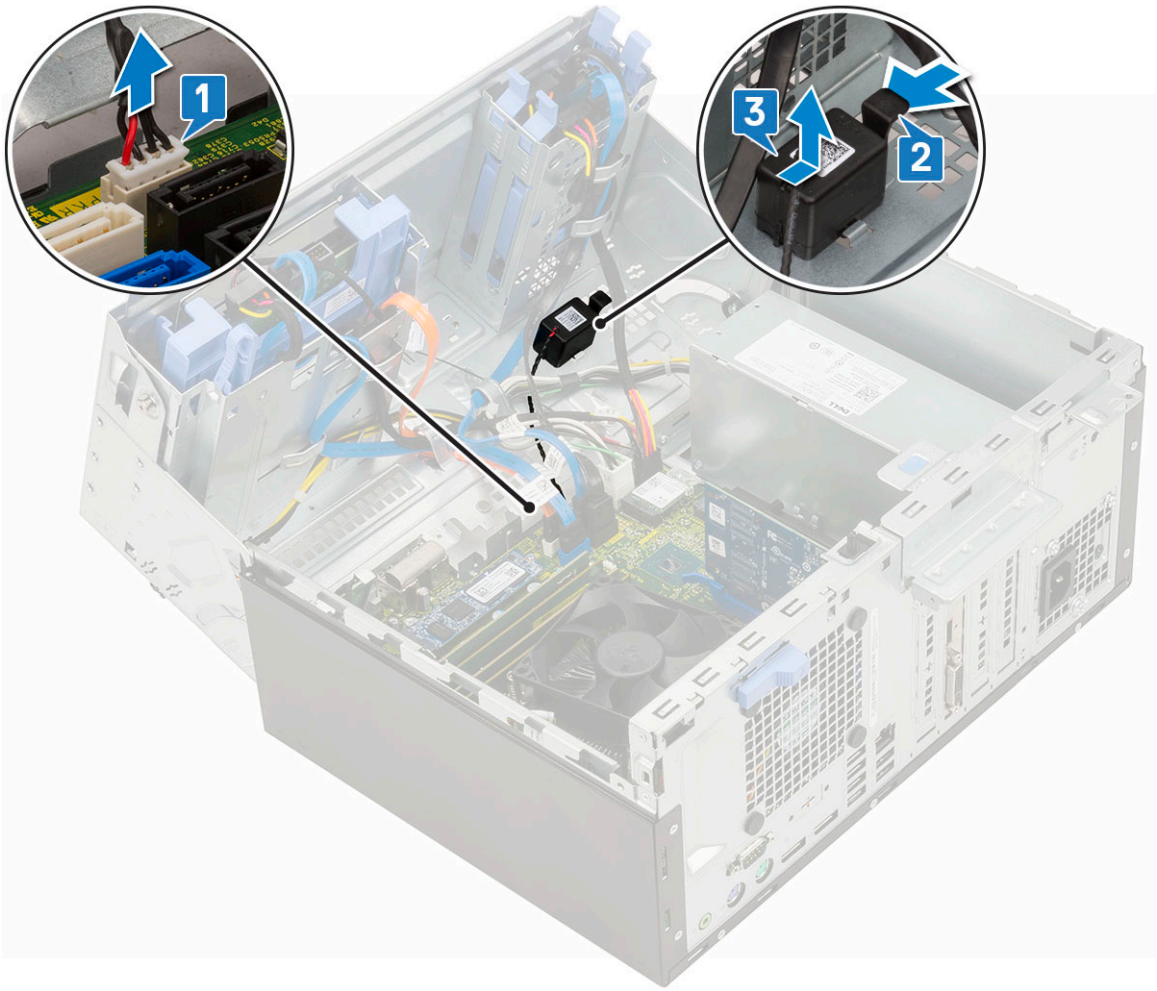


5. Close the front panel door.
6. Install the:
   a. Front bezel
   b. Side cover
7. Follow the procedure in After working inside your computer.

Speaker

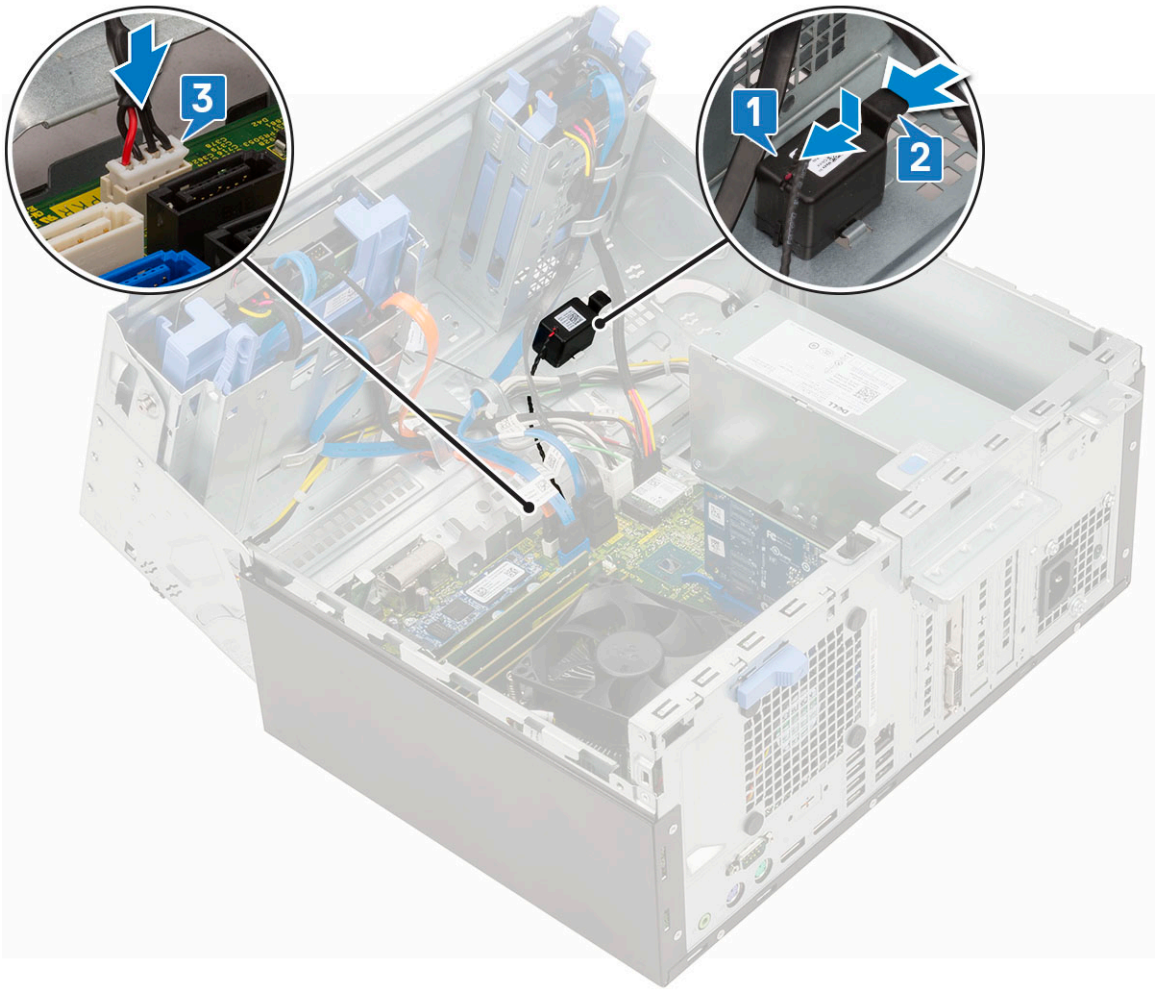
Removing speaker

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. Lift the tab [2], and slide the speaker out of the slot [3].



Installing speaker

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

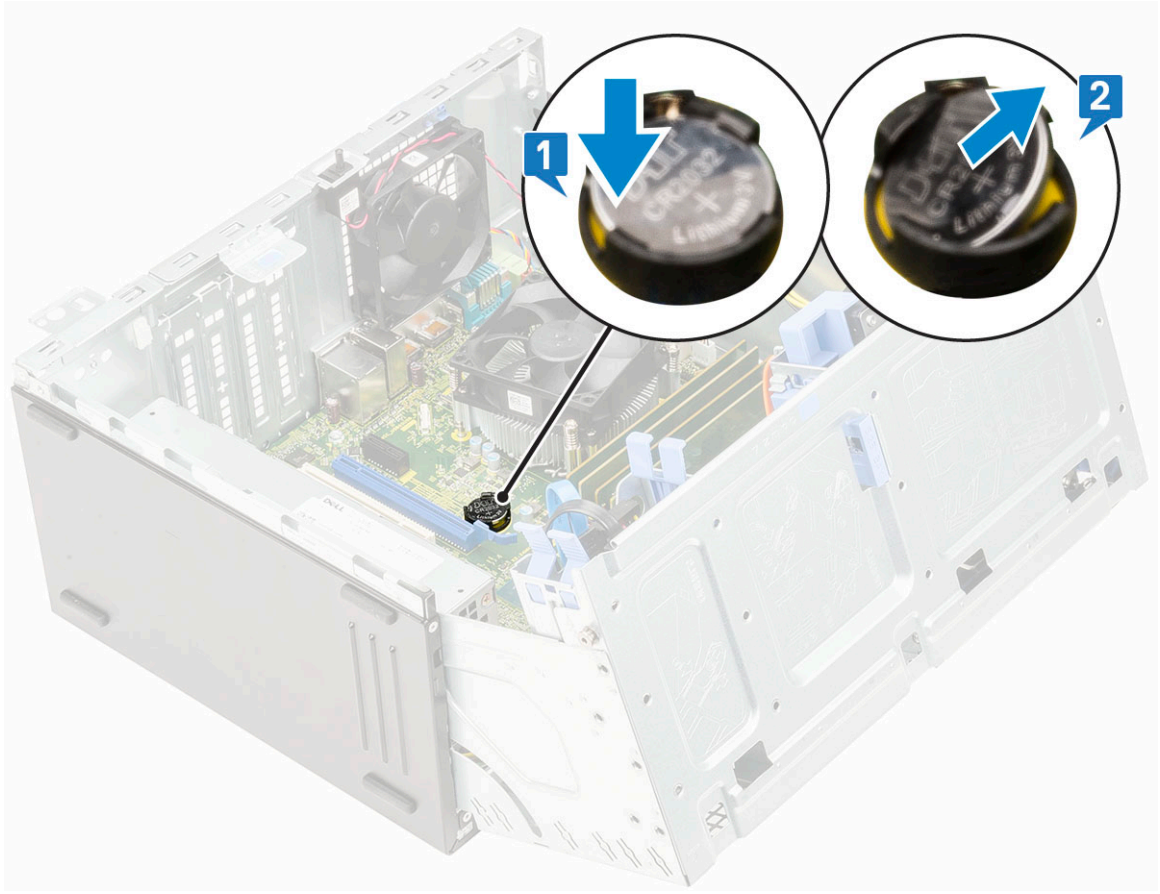


3. Close the front panel door.
4. Install the:
   a. Front bezel
   b. Side cover
5. Follow the procedure in After working inside your computer.

Coin cell battery

Removing coin cell battery

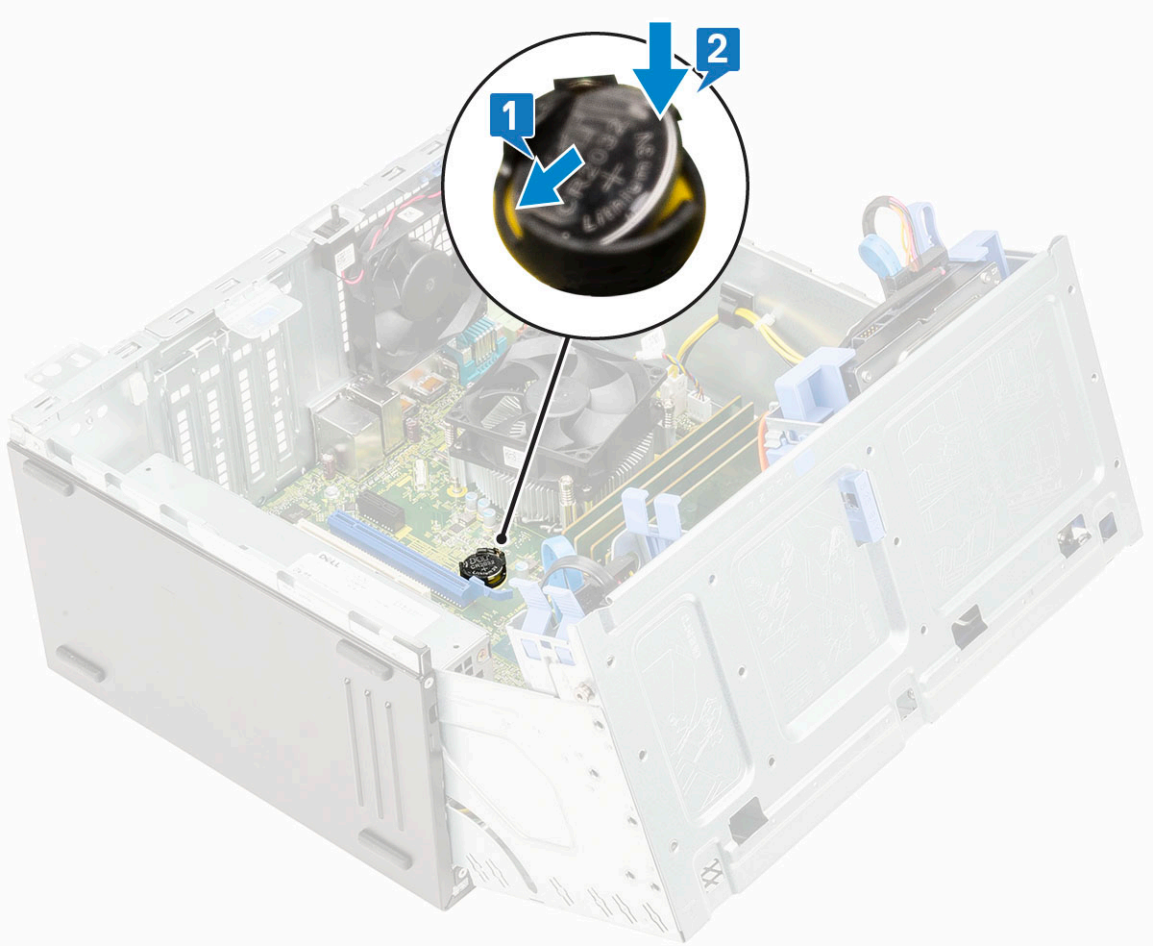
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Side cover
   b. Front bezel
3. Open the front panel door.
4. To remove the coin cell battery:
   a. Press the release latch until the coin cell battery pops out [1].
   b. Remove the coin cell battery from the connector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



NOTE: Removing the coin cell battery may reset the system board BIOS/Settings

Installing the 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.

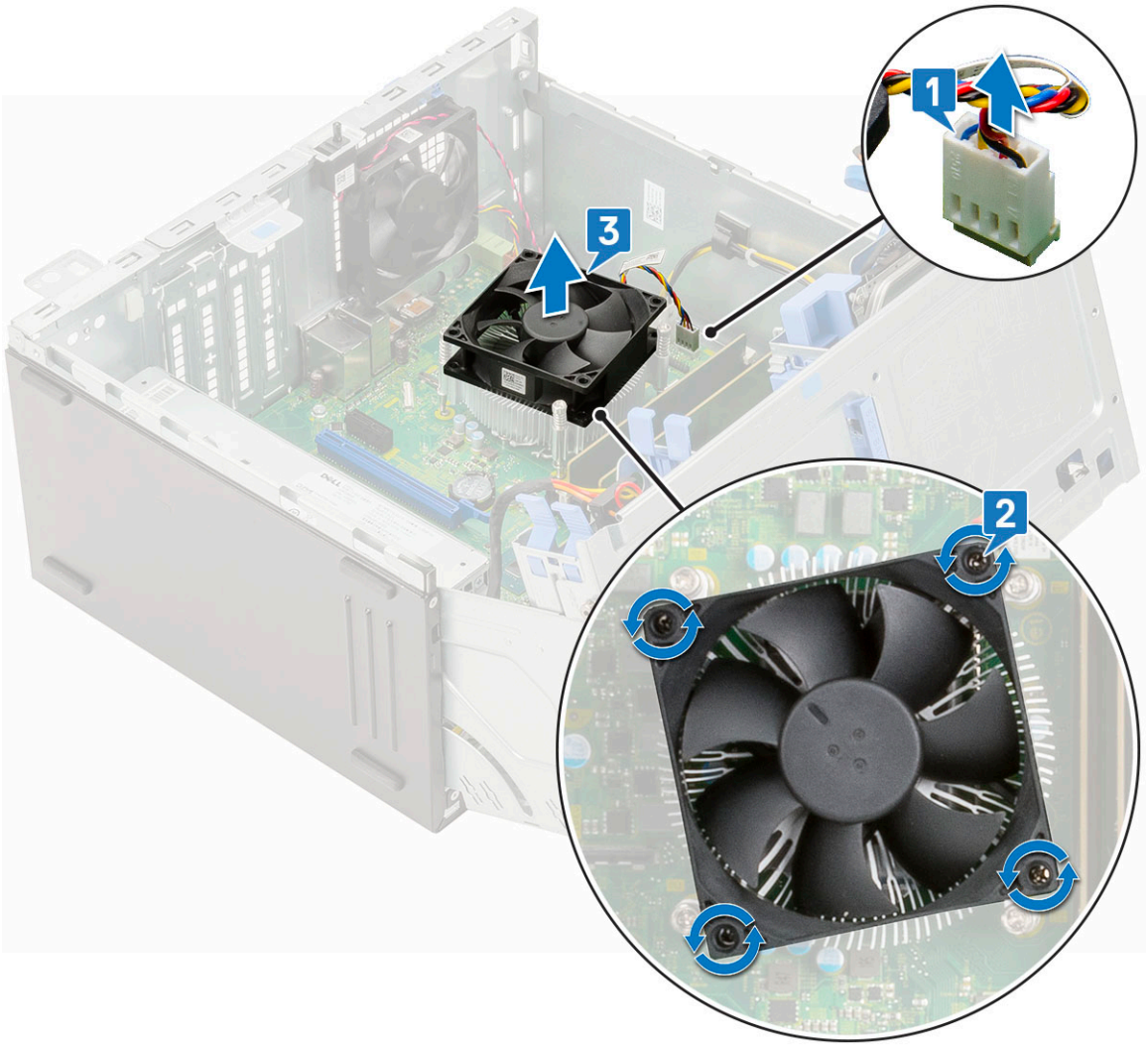
Heat sink fan

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].

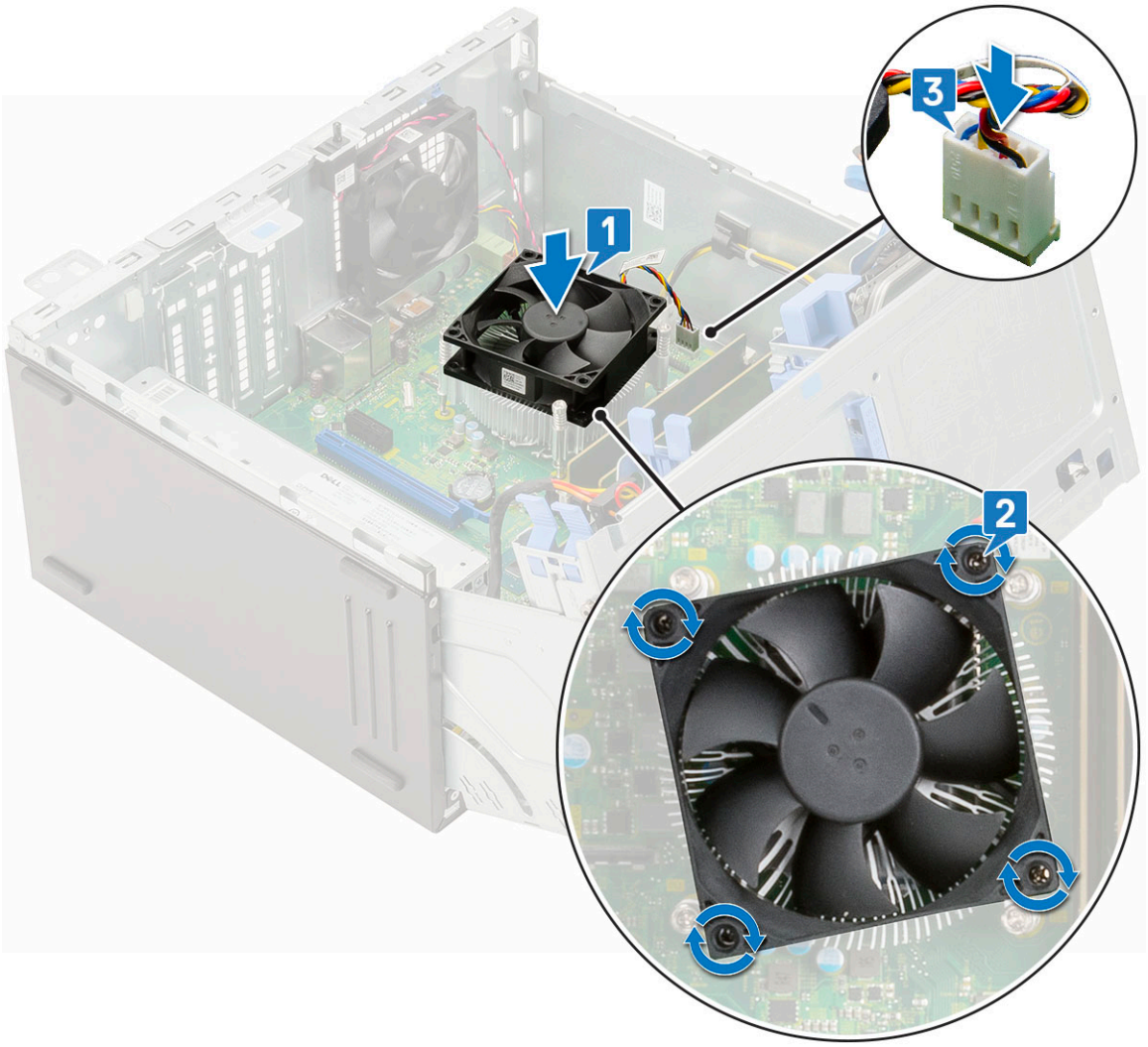
      NOTE: Ensure to insert the Torx screw driver from top screw hole to remove the screws.

   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.

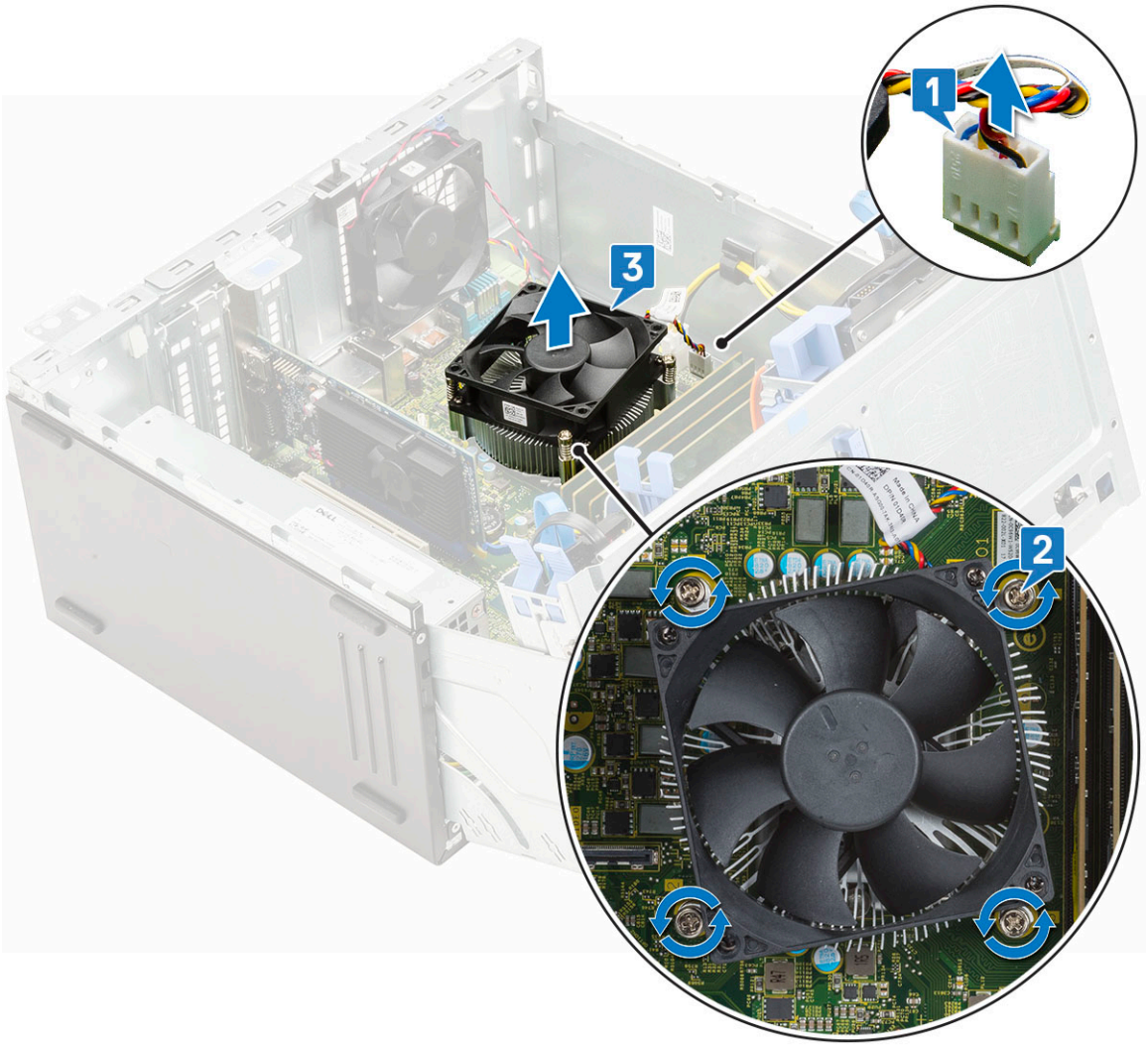
Heatsink assembly

Removing heatsink 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 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].

      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].

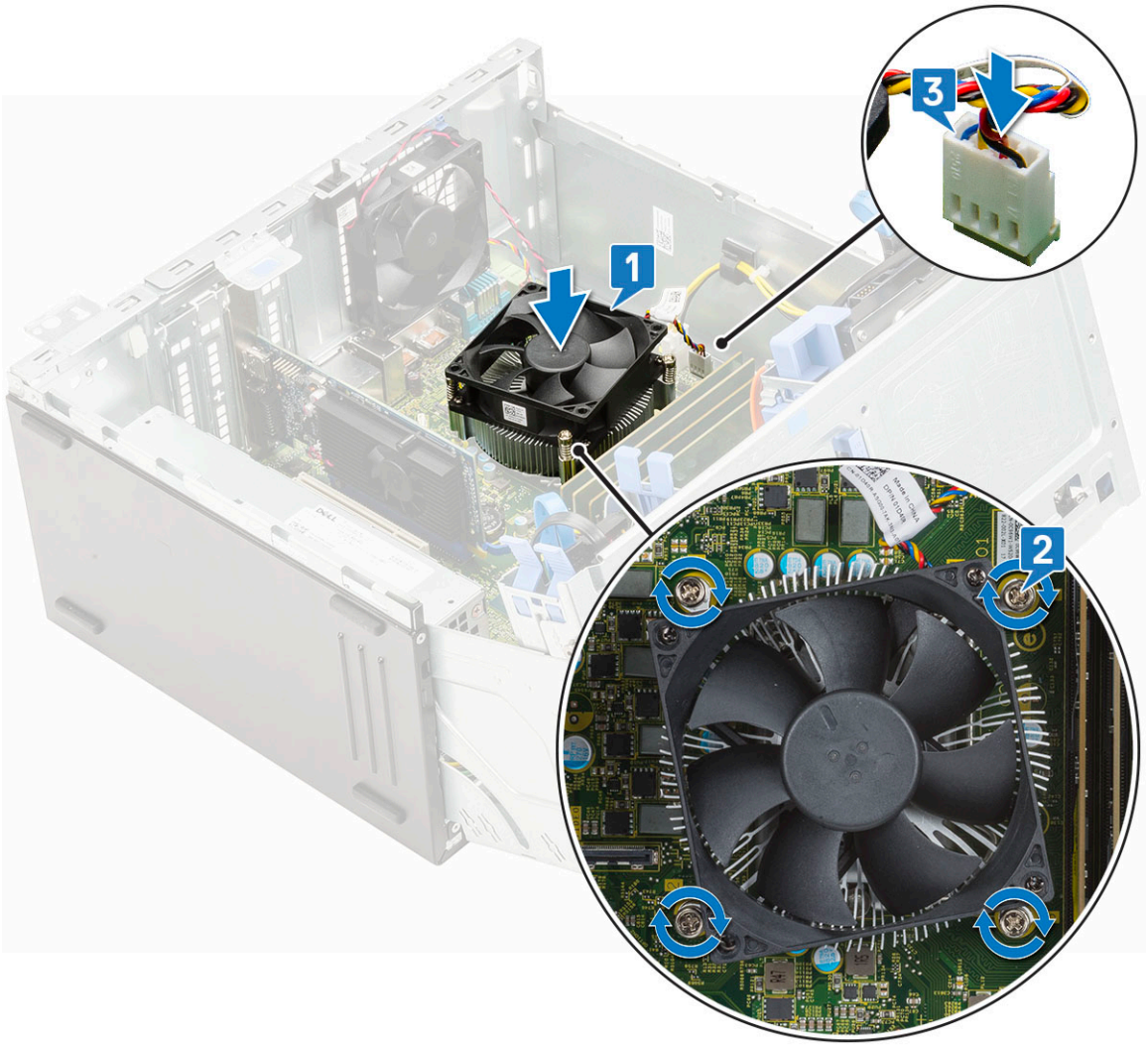


Installing heatsink assembly

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].

   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].



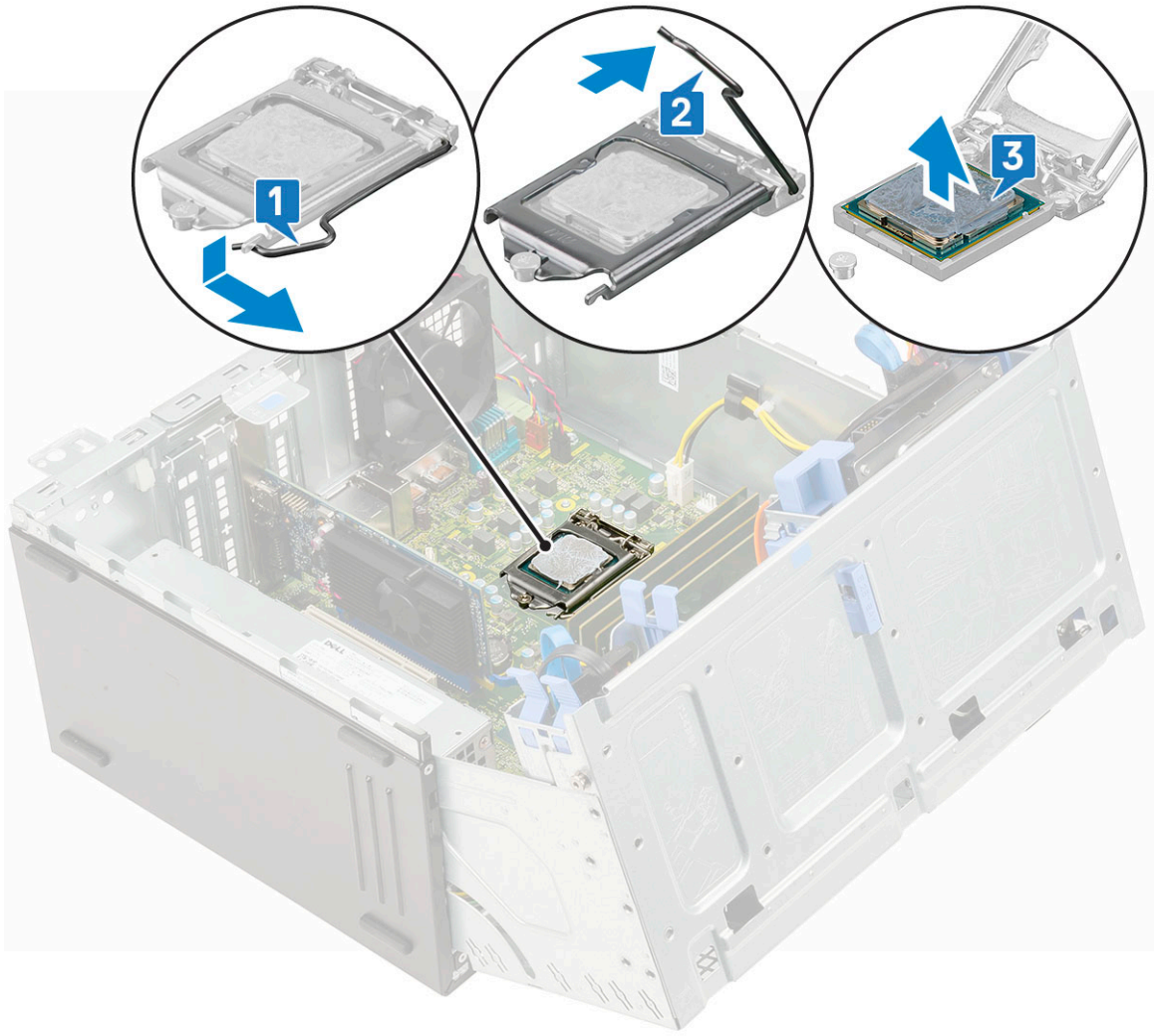
4. Close the front panel door.
5. Install the:
   a. Front bezel
   b. Side cover
6. Follow the procedure in After working inside your computer.

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 heatsink assembly.
5. 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 and lift 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.

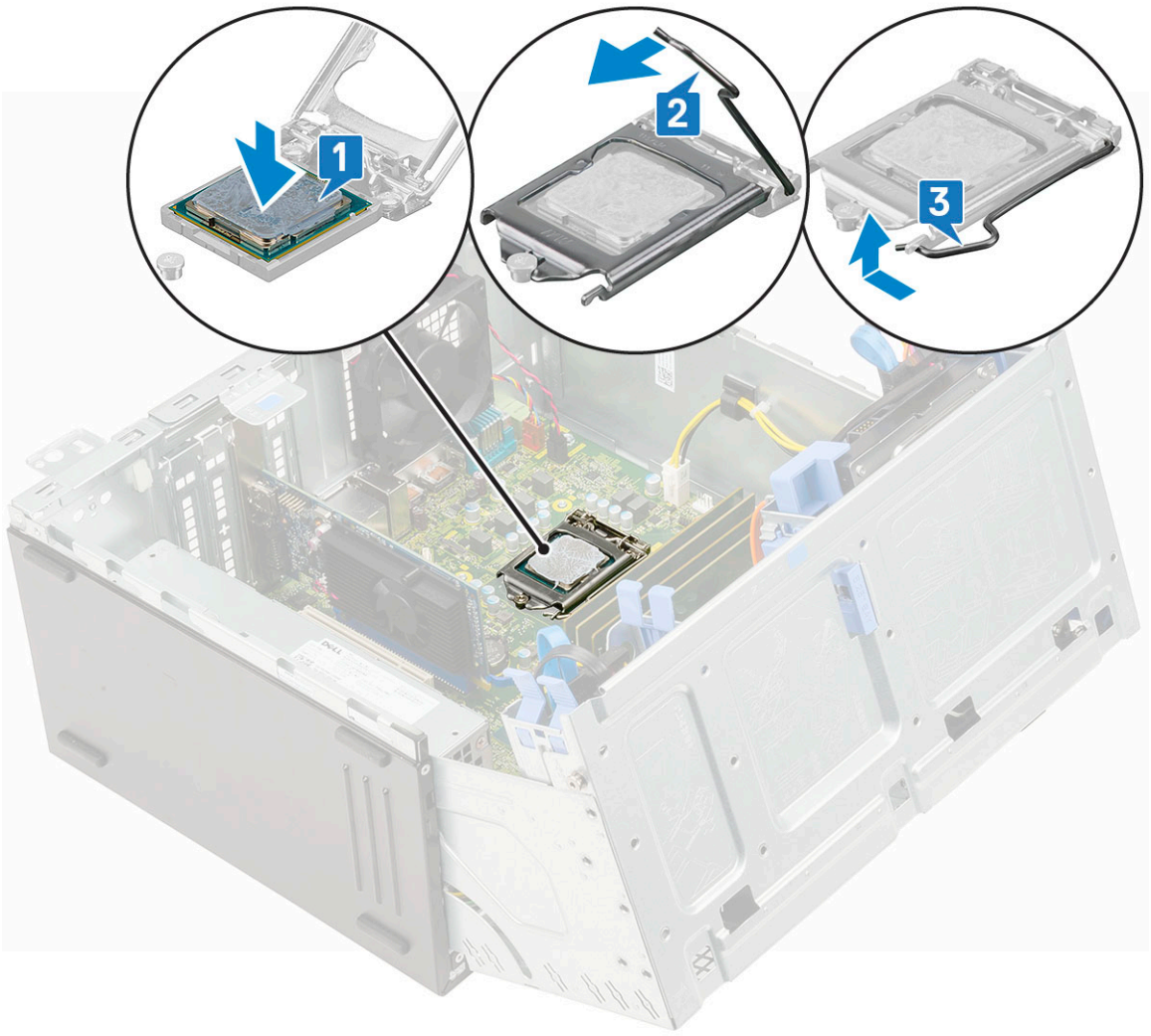


Installing processor

1. Place 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 it [3].

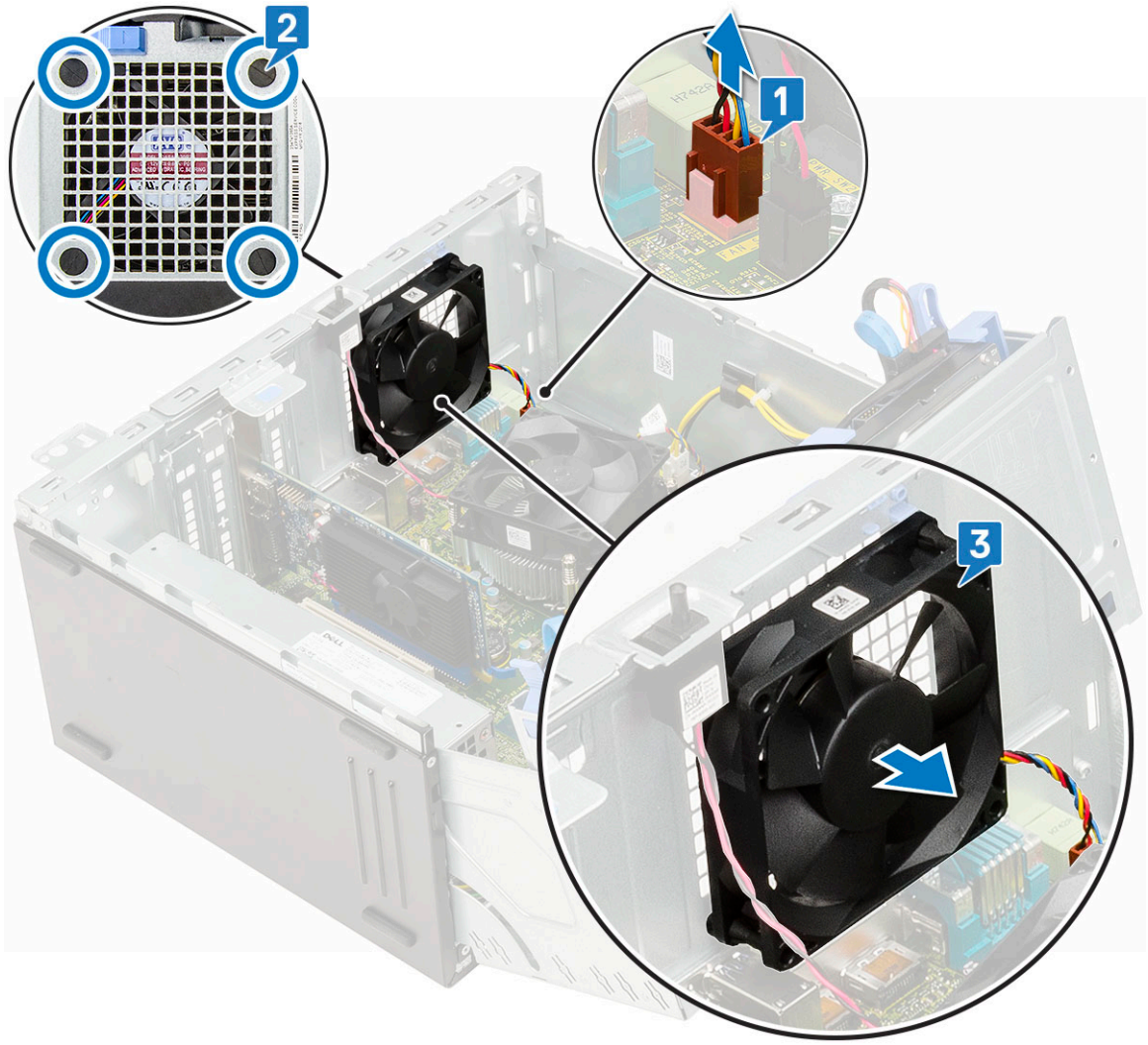


4. Install the heatsink assembly.
5. Close the front panel door.
6. Install the:
   a. Front bezel
   b. Side cover
7. Follow the procedure in After working inside your computer.

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. To remove the system fan:
   a. Disconnect the system fan cable from the connector on the system board [1].
   b. Stretch the grommets to remove the grommets securing the fan to the computer[2].
   c. Slide the system fan out of the computer [3].

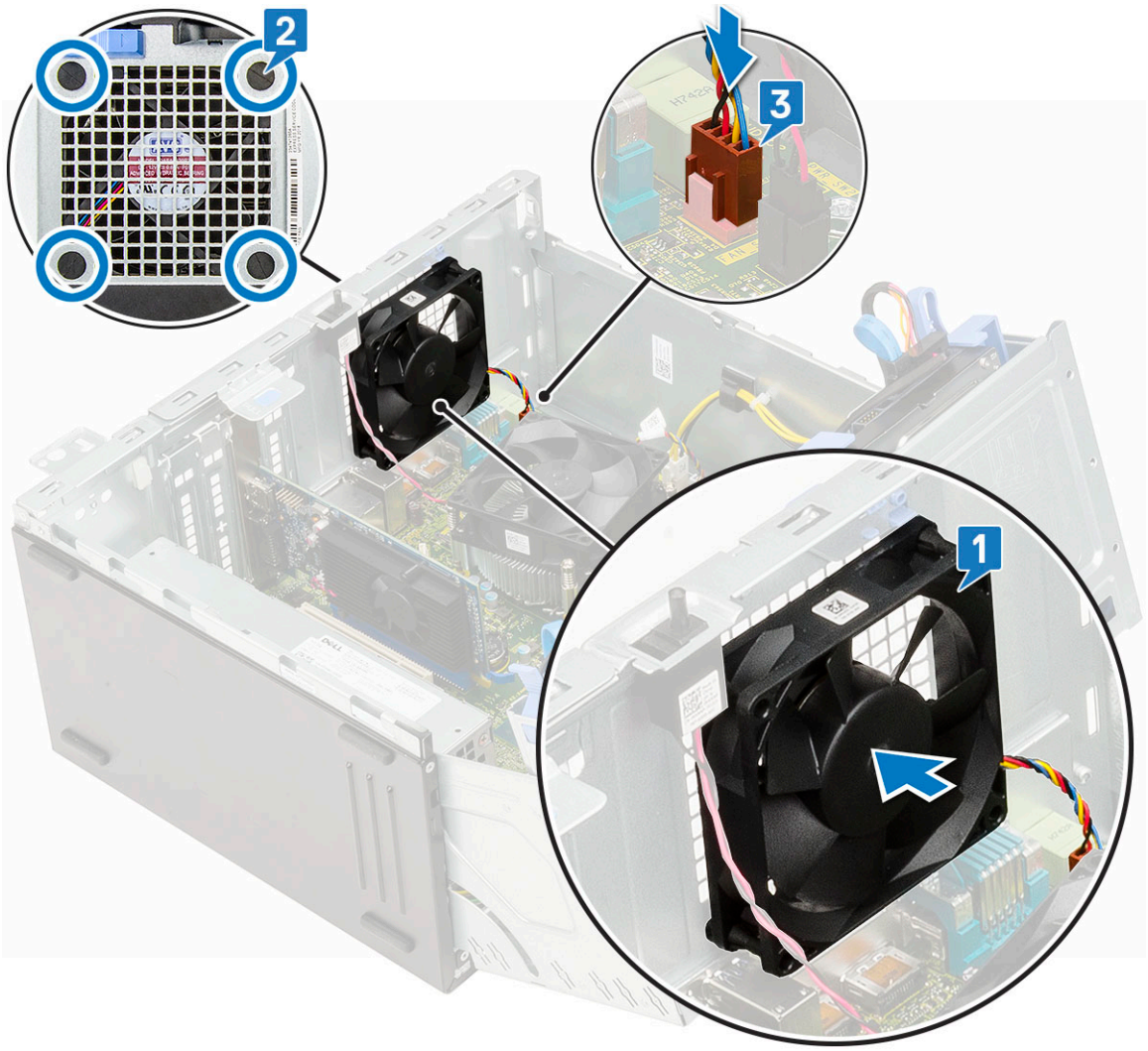


Installing system fan

1. Insert the grommets into the slots from the back of the computer.

   NOTE: Install the lower two grommets first.

2. Hold the system fan with the cable facing the bottom of the computer.
3. Align the grooves of the system fan with the grommets on the chassis wall.
4. Pass the grommets through the corresponding grooves on the system fan [1].
5. Stretch the grommets and slide the system fan toward the computer until it locks into place [2].
6. Connect the system fan cable to the connector on the system board [3].



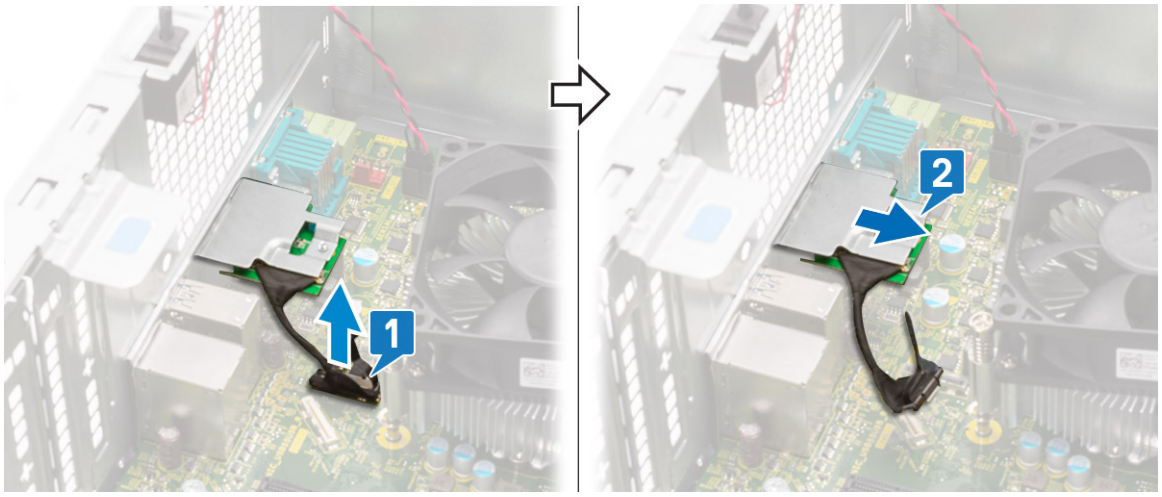
7. Close the front panel door.
8. Install the:
   a. Intrusion switch
   b. Front bezel
   c. Side cover
9. Follow the procedure in After working inside your computer.

Optional VGA module

Removing optional VGA module

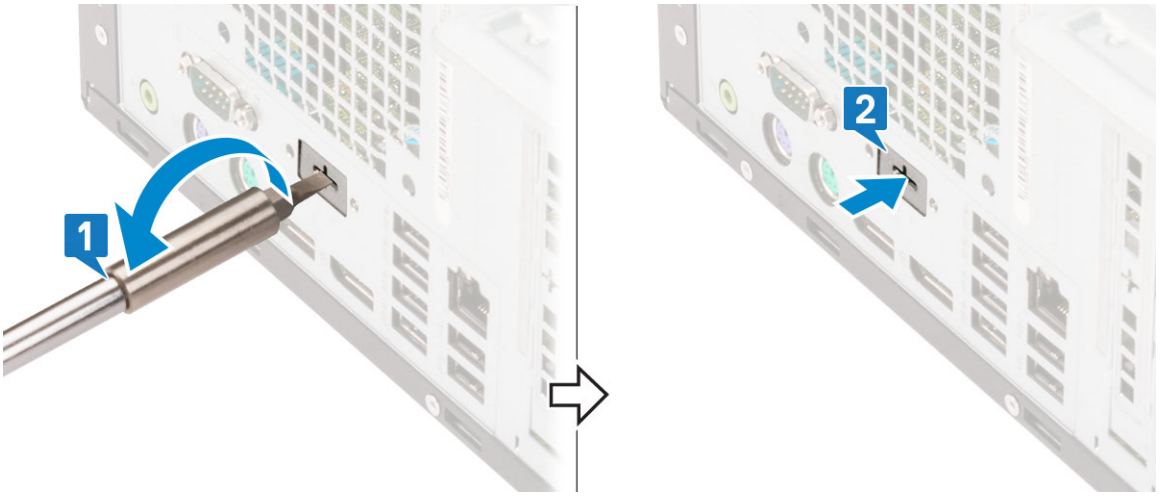
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. Side cover
   b. Front bezel
3. Open the front panel door.
4. Remove the system fan.
5. To remove the optional VGA module:
   a. Remove the two (M3X3) screws that secure the optional VGA module to the system.

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

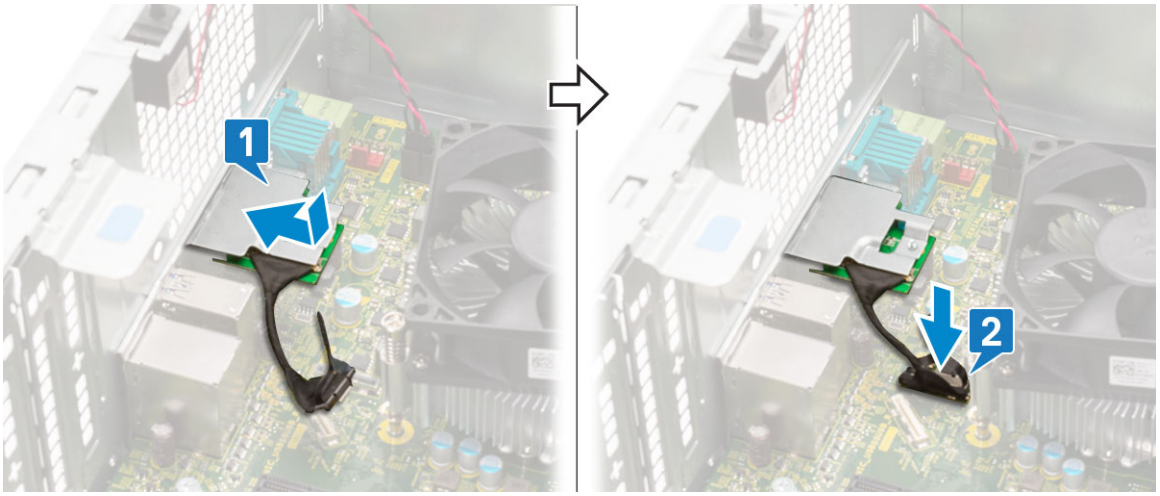


Installing optional VGA module

1. 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.

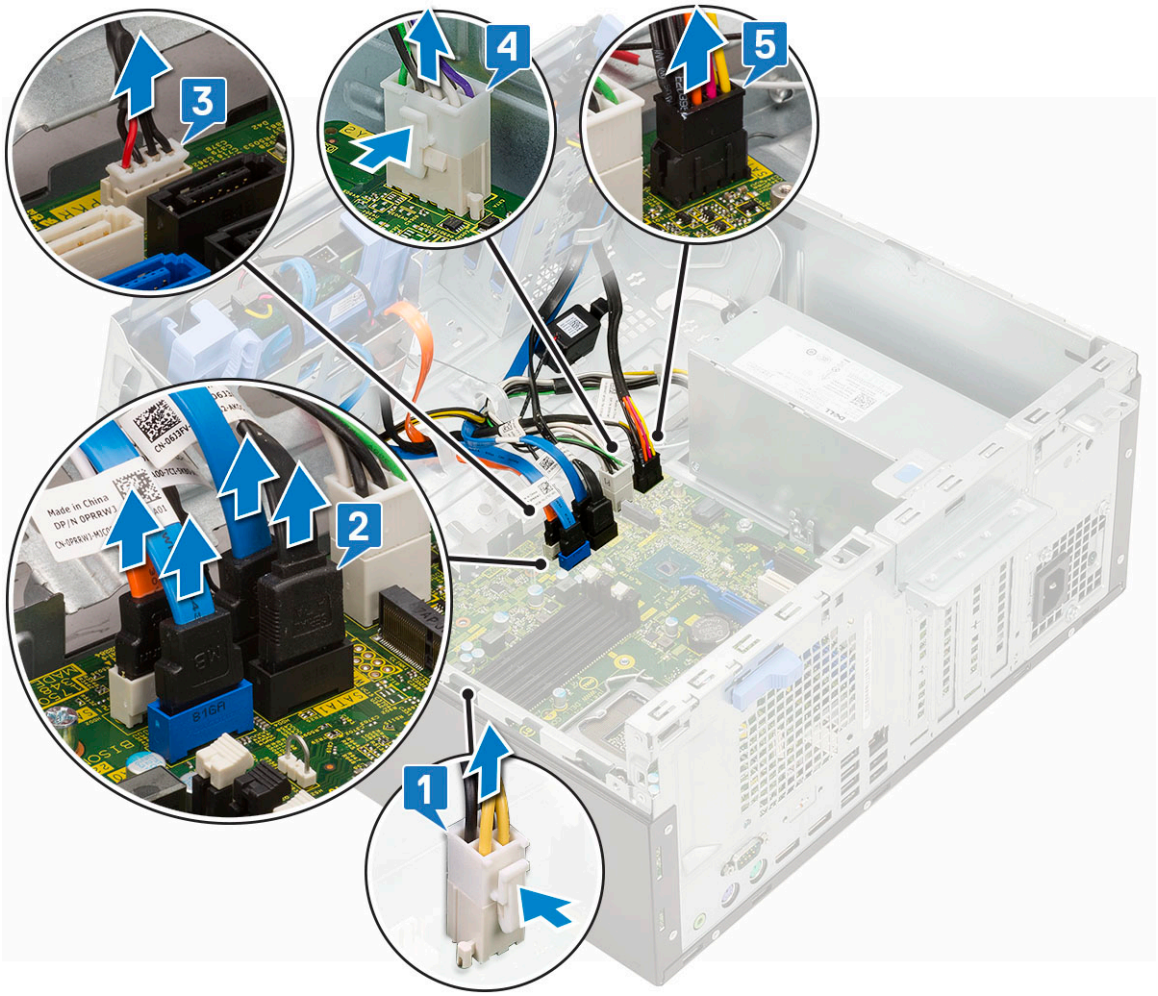
System board

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. Heatsink assembly
   b. Processor
   c. Expansion card
   d. M.2 SSD
   e. SD card reader

f. Memory module
g. Heatsink fan

5. Disconnect the following cables:
   a. Intrusion switch
   b. Power switch
6. Disconnect the following cables from the system board:
   a. CPU power [1]
   b. Hard drive data and optical drive data [2]
   c. Speaker [3]
   d. System power [4]
   e. SATA [5]

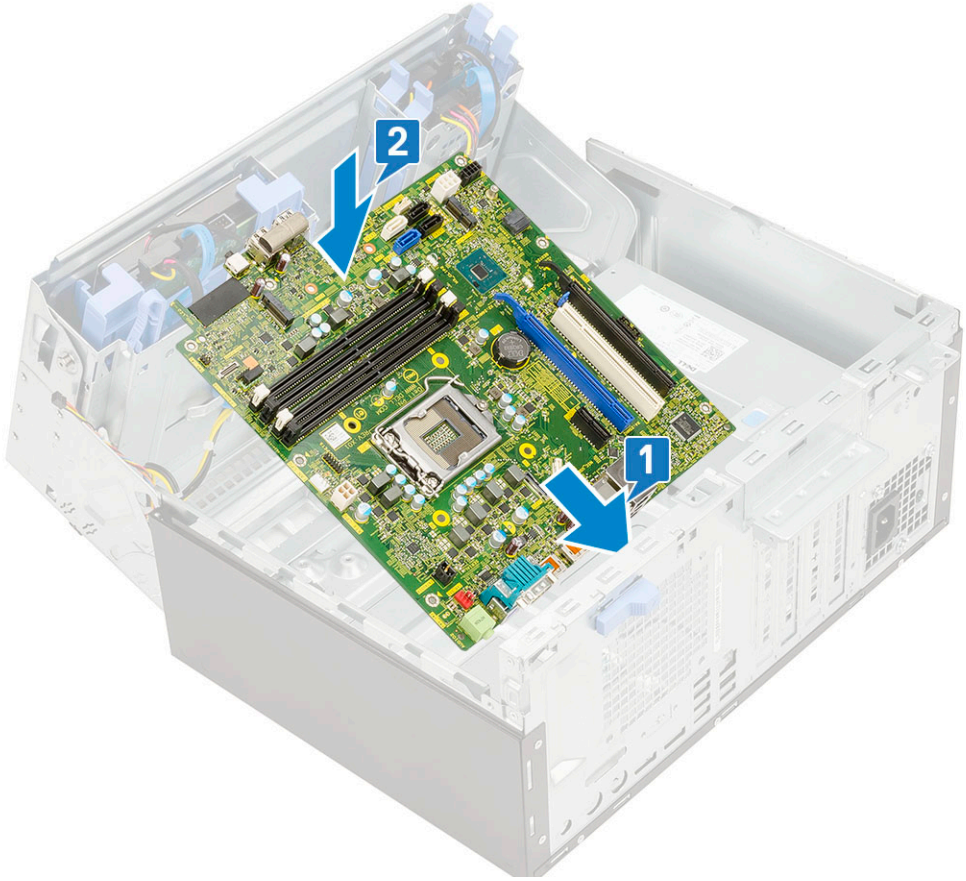


7. To remove the system board:
   a. Remove the screws that secure the system board to the computer [1].

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

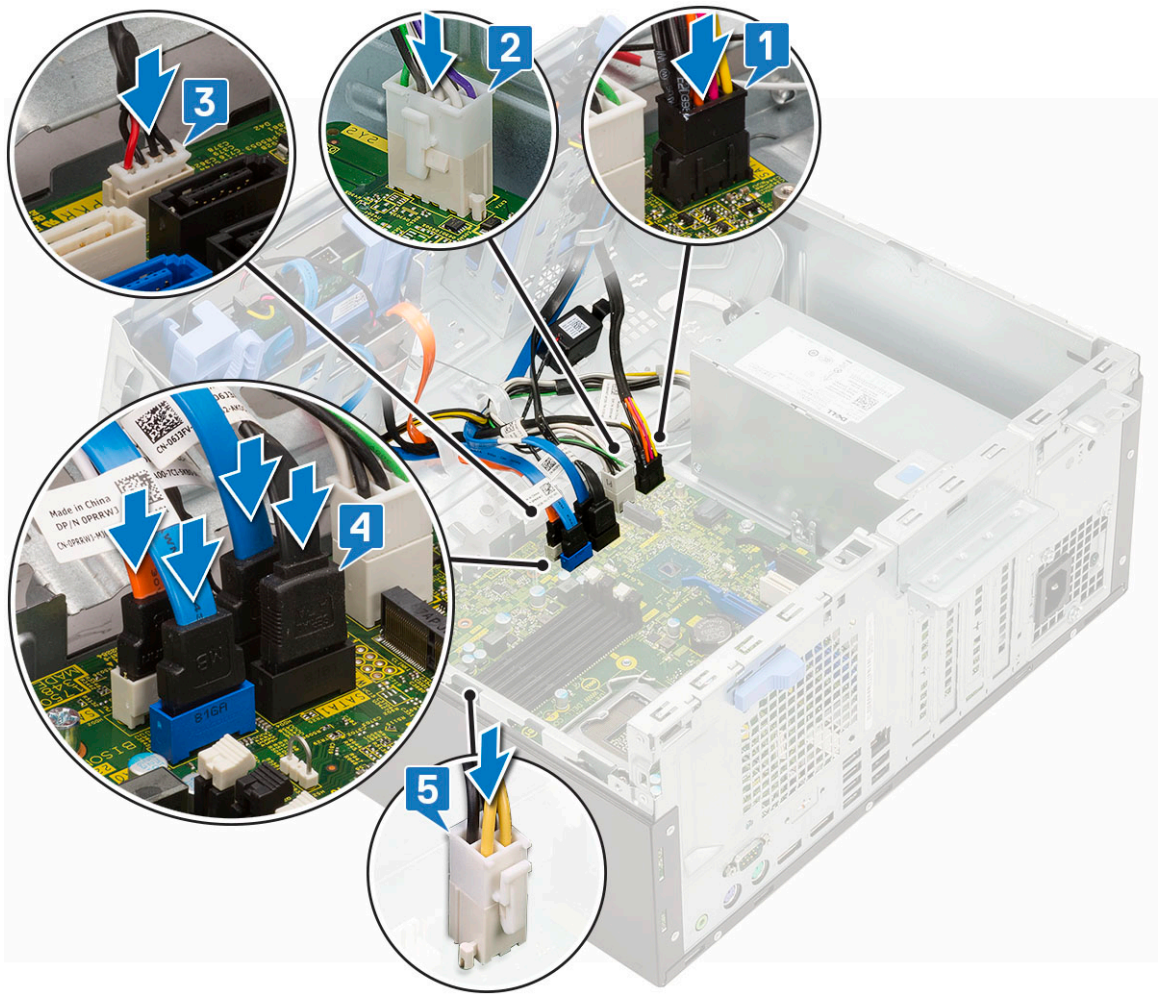
Installing the system board

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



3. Replace the screws to secure the system board to the computer [1].

4. Route all the cables through the routing clips.
5. Align the cables with the pins on connectors on the system board and connect the following cables to the system board:
   a. SATA [1]
   b. System power [2]
   c. Speaker [3]
   d. Hard drive data and optical drive data [4]
   e. CPU power [5]



6. Install the:
   a. Memory module
   b. M.2 SSD
   c. Expansion cards
   d. SD card reader
   e. Processor
   f. Heatsink assembly
7. Connect the following cables:
   a. Power switch
   b. Intrusion switch
8. Close the front panel door
9. Install the:
   a. Front bezel
   b. Side cover
10. Follow the procedure in After working inside your computer.

5

BIOS setup

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

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

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

Use the BIOS Setup program for the following purposes:

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

Topics:

BIOS overview

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

Entering BIOS setup program

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

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

Navigation keys

NOTE: For most of the System Setup options, changes that you make are recorded but do not take effect until you restart the system.

Table 3. Navigation keys

Keys	Navigation
Up arrow	Moves to the previous field.

Table 3. Navigation keys (continued)

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

Boot menu

Press <F12> when the Dell logo appears to initiate a one-time boot menu with a list of the valid boot devices for the system. Diagnostics and BIOS Setup options are also included in this menu. The devices listed on the boot menu depend on the bootable devices in the system. This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the system. Using the boot menu does not make any changes to the boot order stored in the BIOS.

The options are:

- UEFI Boot:
  - Windows Boot Manager
- Other Options:
  - BIOS Setup
  - BIOS Flash Update
  - Diagnostics
  - Change Boot Mode Settings

System setup options

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

General options

Table 4. General

Option	Description
System Information	Displays the following information: • System Information: Displays **BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date,** and the **Express Service Code**. • Memory Information: Displays **Memory Installed, Memory Available, Memory Speed, Memory Channel Mode, Memory Technology, DIMM 1 Size, DIMM 2 Size, DIMM 3 Size, and DIMM 4 Size**. • PCI Information: Displays SLOT1, SLOT 2, SLOT 3, SLOT 4, SLOT5_M.2, SLOT6_M.2 • Processor Information: Displays **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.** • Device Information: Displays **SATA-0, SATA 4, M.2 PCIe SSD-0, LOM MAC Address, Video Controller, Audio Controller, Wi-Fi Device, and Bluetooth Device.**

Table 4. 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. ● **Windows Boot Manager** ● **ONboard NIC (IPV4)** ● **Onboard NIC (IPV6)**
Advanced Boot Options	Allows you to select the Enable Legacy Option ROMs option, when in UEFI boot mode. By default, this option is selected. ● **Enable Legacy Option ROMs**—Default ● Enable Attempt Legacy Boot
UEFI Boot Path Security	This option controls whether or not the system will prompt the user to enter the Admin password when booting a UEFI boot path from the F12 Boot Menu. ● **Always, Except Internal HDD**—Default ● Always, Except Internal HDD and PXE ● Always ● Never
Date/Time	Allows you to set the date and time settings. Changes to the system date and time take effect immediately.

.

System information

Table 5. System Configuration

Option	Description
Integrated NIC	Allows you to control the on-board LAN controller. The option 'Enable UEFI Network Stack' is not selected by default. The options are: ● Disabled ● Enabled ● **Enabled w/PXE** (default) **NOTE:** Depending on the computer and its installed devices, the items listed in this section may or may not appear.
Serial Port	Determines how the built-in serial port operates. Choose any one option: ● Disabled ● **COM1** (default) ● COM2 ● COM3 ● COM4
SATA Operation	Allows you to configure the operating mode of the integrated hard drive controller. ● Disabled = The SATA controllers are hidden ● AHCI = SATA is configured for AHCI mode ● **RAID ON** = SATA is configured to support RAID mode (selected by default)
Drives	Allows you to enable or disable the various drives on-board: ● **SATA-0** ● **SATA-1** ● **SATA-2** ● **SATA**-3 ● **SATA-4** ● **M.2 PCIe SSD-0**

Table 5. System Configuration (continued)

Option	Description
Smart Reporting	This field controls whether hard drive errors for integrated drives are reported during system startup. The **Enable Smart Reporting option** is disabled by default.
USB Configuration	Allows you to enable or disable the integrated USB controller for: ● Enable USB Boot Support ● Enable Front USB Ports ● Enable Rear USB Ports All the options are enabled by default.
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 rear 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 enabled by default.
Audio	Allows you to enable or disable the integrated audio controller. The option **Enable Audio** is selected by default. ● **Enable Microphone** ● **Enable Internal Speaker** Both the options are selected by default.
Dust Filter Maintenance	Allows you to enable or disable BIOS messages for maintaining the optional dust filter installed in your computer. BIOS will generate a pre-boot reminder to clean or replace the dust filter based on the interval set. ● **Disabled** (default) ● 15 days ● 30 days ● 60 days ● 90 days ● 120 days ● 150 days ● 180 days
Miscellaneous Devices	● **Enable Secure Digital SD Card (default)** ● **Enable PCI Slot (default)** ● Secure Digital SD Card ● Secure Digital SD Card Read-Only Mode

Video screen options

Table 6. Video

Option	Description
Primary Display	Allows you to select the primary display when multiple controllers are available in the system. ● **Auto** (default) ● Intel HD Graphics **NOTE:** If you do not select Auto, the on-board graphics device will be present and enabled.

Security

Table 7. Security

Option	Description
Strong Password	This option lets you enable or disable strong passwords for the system. The option is disabled by default.
Password Configuration	Allows you to control the minimum and maximum number of characters allowed for a 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. ● **Disabled** — Always prompt for the system and internal HDD password when they are set. This option is enabled by default. ● Reboot Bypass — Bypass the password prompts on Restarts (warm boots). **NOTE:** 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.
Password Change	This option lets you determine whether changes to the System and Hard Disk passwords are permitted when an administrator password is set. **Allow Non-Admin Password Changes** - This option is enabled by default.
UEFI Capsule Firmware Updates	This option controls whether this system allows BIOS updates via UEFI capsule update packages. This option is selected by default. Disabling this option will block BIOS updates from services such as Microsoft Windows Update and Linux Vendor Firmware Service (LVFS)
TPM 2.0 Security	Allows you to control whether the Trusted Platform Module (TPM) is visible to the operating system. ● TPM On (default) ● Clear ● PPI Bypass for Enable Commands ● PPI Bypass for Disable Commands ● PPI Bypass for Clear Commands ● Attestation Enable (default) ● Key Storage Enable (default) ● SHA-256 (default) Choose any one option: ● Disabled ● Enabled (default)
Absolute	This field lets you Enable, Disable or Permanently Disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute Software. ● **Enabled** (default) ● Disabled ● Permanently Disabled
Chassis Intrusion	This field controls the chassis intrusion feature. Choose any one of the option: ● **Disabled** (default) ● Enabled ● On-Silent
OROM Keyboard Access	● Disabled ● **Enabled** (default) ● One Time Enable

Table 7. Security (continued)

Option	Description
Admin Setup Lockout	Allows you to prevent users from entering Setup when Admin password is set. This option is not set by default.
SMM Security Mitigation	Allows you to enable or disable additional UEFI SMM Security Mitigation protections. This option is not set by default.

Secure boot options

Table 8. Secure Boot

Option	Description
Secure Boot Enable	Allows you to enable or disable Secure Boot feature ● Secure Boot Enable This option is not selected by default.
Secure Boot Mode	Allows you to modify the behavior of Secure Boot to allow evaluation or enforcement of UEFI driver signatures. ● **Deployed Mode** (default) ● Audit Mode
Expert key Management	Allows you to manipulate the security key databases only if the system is in Custom Mode. The **Enable Custom Mode** option is disabled by default. The options are: ● **PK** (default) ● KEK ● db ● dbx If you enable the **Custom Mode**, the relevant options for **PK, KEK, db, and dbx** appear. The options are: ● **Save to File**- Saves the key to a user-selected file ● **Replace from File**- Replaces the current key with a key from a user-selected file ● **Append from File**- Adds a key to the current database from a user-selected file ● **Delete**- Deletes the selected key ● **Reset All Keys**- Resets to default setting ● **Delete All Key**s- Deletes all the keys **NOTE:** If you disable the Custom Mode, all the changes made will be erased and the keys will restore to default settings.

Intel Software Guard Extensions options

Table 9. Intel Software Guard Extensions

Option	Description
Intel SGX Enable	This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS. Click one of the following options: ● Disabled ● Enabled ● **Software controlled**—Default
Enclave Memory Size	This option sets **SGX Enclave Reserve Memory Size** Click one of the following options:

Table 9. Intel Software Guard Extensions (continued)

Option	Description
	• **32 MB** • **64 MB** • **128 MB**—Default

Performance

Table 10. Performance

Option	Description
Multi Core Support	This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores. • **All**—Default • **1** • **2** • **3**
Intel SpeedStep	Allows you to enable or disable the Intel SpeedStep mode of processor. • **Enable Intel SpeedStep** This option is set by default.
C-States Control	Allows you to enable or disable the additional processor sleep states. • **C states** This option is set by default.
Intel TurboBoost	Allows you to enable or disable the Intel TurboBoost mode of the processor. • **Enable Intel TurboBoost** This option is set by default.
Hyper-Thread Control	Allows you to enable or disable the HyperThreading in the processor. • Disabled • **Enabled**—Default

Power management

Table 11. Power Management

Option	Description
AC Recovery	Determines how the system responds when AC power is re-applied after a power loss. You can set the AC Recovery to: • Power Off • Power On • Last Power State This option is set to **Power Off** by default.
Enable Intel Speed Shift Technology	Allows you to enable or disable Intel Speed Shift Technology support. The option **Enable Intel Speed Shift Technology** is set by default.

Table 11. Power Management (continued)

Option	Description
Auto On Time	Sets time to automatically turn on the computer. Time is kept in standard 12-hour format (hour:minutes:seconds). Change the startup time by typing the values in the time and AM/PM fields. **NOTE:** This feature does not work if you turn off your computer using the switch on a power strip or surge protector or if **Auto Power is set to disabled**.
Deep Sleep Control	Allows you to define the controls when Deep Sleep is enabled. • **Disabled (default)** • Enabled in S5 only • Enabled in S4 and S5
Fan Control Override	The option is not set by default
USB Wake Support	Allows you to enable the USB devices to wake the computer from standby mode. The option "**Enable USB Wake Support**" is selected by default
Wake on LAN/WWAN	This option allows the computer to power up from the off state when triggered by a special LAN signal. This feature only works when the computer is connected to AC power supply. • **Disabled** - Does not allows the system to power on by special LAN signals when it receives a wake-up signal from the LAN or wireless LAN. • **LAN** or **WLAN** - Allows the system to be powered on by special LAN or wireless LAN signals. • **LAN Only** - Allows the system to be powered on by special LAN signals. • **LAN with PXE Boot** - 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. • **WLAN Only** - Allows the system to be powered on by special WLAN signals. This option is set to **Disabled** by default.
Block Sleep	Allows you to block entering to sleep (S3 state) in OS environment. This option is disabled by default.

Post behavior

Table 12. POST Behavior

Option	Description
Numlock LED	Allows you to enable or disable the Numlock feature when your computer starts. This option is enabled by default.
Keyboard Errors	Allows you to enable or disable the keyboard error reporting when the computer starts. The option **Enable Keyboard Error Detection** is enabled by default.
Fast Boot	This option can speed up the boot process by bypassing some compatibility steps: • Minimal — The system boots quickly, unless the BIOS has been updated, memory changed, or the previous POST did not complete. • Thorough — The system does not skip any steps in the boot process. • Auto — This allows the operating system to control this setting (this works only when the operating system supports Simple Boot Flag). This option is set to **Thorough** by default.
Extend BIOS POST Time	This option creates an additional pre-boot delay. • **0 seconds** (default) • 5 seconds • 10 seconds
Full Screen Logo	This option will display full screen logo if your image match screen resolution. The option Enable Full Screen Logo is not set by default.
Warnings and Errors	This option causes the boot process to only pause when warning or errors are detected. Choose any one of the option:

Table 12. POST Behavior (continued)

Option	Description
	• **Prompt on Warnings and Errors** (default) • Continue on Warnings • Continue on Warnings and Errors

Manageability

Table 13. Manageability

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

Virtualization support

Table 14. Virtualization Support

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

Wireless options

Table 15. Wireless

Option	Description
Wireless Device Enable	Allows you to enable or disable the internal wireless devices. The options are: • **WLAN/WiGig** • **Bluetooth** All the options are enabled by default.

Maintenance

Table 16. Maintenance

Option	Description
Service Tag	Displays the service tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set.

Table 16. Maintenance (continued)

Option	Description
	This option is not set by default.
SERR Messages	Controls the SERR message mechanism. This option is set by default. Some graphics cards require that the SERR message mechanism be disabled.
BIOS Downgrade	Allows you to flash previous revisions of the system firmware. • **Allow BIOS Downgrade** This option is set by default.
Bios Recovery	**BIOS Recovery from Hard Drive**—This option is set by default. Allows you to recover the corrupted BIOS from a recovery file on the HDD or an external USB key. **BIOS Auto-Recovery**— Allows you to recover the BIOS automatically.
First Power On Date	Allows you the set Ownership date. The option **Set Ownership Date** is not set by default.

System logs

Table 17. System Logs

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

Advanced configuration

Table 18. Advanced configuration

Option	Description
ASPM	Allows you to set the ASPM level. • Auto (default) - There is handshaking between the device and PCI Express hub to determine the best ASPM mode supported by the device • Disabled - ASPM power management is turned off at all time • L1 Only - ASPM power management is set to use L1

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, see Knowledge Article: https://www.dell.com/support/article/sln153694

1. Go to www.dell.com/support.
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.

   NOTE: If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.

5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.
   For more information, see knowledge base article 000124211 at www.dell.com/support.

Updating the BIOS in Linux and Ubuntu

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

Updating the BIOS 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, see Knowledge Article: https://www.dell.com/support/article/sln153694

1. Follow the procedure from step 1 to step 6 in Updating the BIOS in Windows to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article 000145519 at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12** .
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
   The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS 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, see Knowledge Article: https://www.dell.com/support/article/sln153694

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 19. System and setup password

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

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

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

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

NOTE: System and setup password feature is disabled.

Assigning a system setup password

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

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

Deleting or changing an existing system setup password

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

To enter the System Setup, press F12 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**, update, or delete the existing system password, and press Enter or Tab.
4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.

   NOTE: If you change the System and/or Setup password, reenter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.

5. Press Esc and a message prompts you to save the changes.
6. Press Y to save the changes and exit from System Setup.
   The computer restarts.

Clearing CMOS settings

CAUTION: Clearing CMOS settings will reset the BIOS settings on your computer.

1. Remove the front bezel.
2. Open the front panel door.
3. Remove the coin-cell battery.
4. Wait for one minute.
5. Replace the coin-cell battery.
6. Close the front panel door.
7. Replace the front bezel.

Clearing BIOS (System Setup) and System passwords

To clear the system or BIOS passwords, contact Dell technical support as described at www.dell.com/contactdell.

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

6

Troubleshooting

Topics:

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.

Power-Supply Unit Built-in Self-Test

Built-in Self-Test (BIST) helps determine if the power-supply unit is working. To run self-test diagnostics on the power-supply unit of a desktop or all-in-one computer, see the knowledge base article 000125179 at www.dell.com/support.

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 20. Power LED summary

Amber LED state	White LED state	System state	Notes
Off	Off	S4, S5	• Hibernate or Suspend to Disk (S4) • Power is off (S5)
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 21. 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]

Table 21. Amber LED blinking failures (continued)

Amber LED state	White LED state	System state	Notes
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 22. 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.

Diagnostic error messages

Table 23. Diagnostic error messages

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

Table 23. Diagnostic error messages (continued)

Error messages	Description
	and boot the computer from an optical drive. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the **Hard Disk Drive** tests in **Dell Diagnostics**.
HARD-DISK DRIVE READ FAILURE	The hard drive may be defective. Shut down the computer, remove the hard drive, and boot the computer from an optical. Then, shut down the computer, reinstall the hard drive, and restart the computer. If the problem persists, try another drive. Run the **Hard Disk Drive** tests in **Dell Diagnostics**.
INSERT BOOTABLE MEDIA	The operating system is trying to boot to non-bootable media, such as an optical drive. Insert bootable media.
INVALID CONFIGURATION INFORMATION-PLEASE RUN SYSTEM SETUP PROGRAM	The system configuration information does not match the hardware configuration. The message is most likely to occur after a memory module is installed. Correct the appropriate options in the system setup program.
KEYBOARD CLOCK LINE FAILURE	For external keyboards, check the cable connection. Run the **Keyboard Controller** test in **Dell Diagnostics**.
KEYBOARD CONTROLLER FAILURE	For external keyboards, check the cable connection. Restart the computer, and avoid touching the keyboard or the mouse during the boot routine. Run the **Keyboard Controller** test in **Dell Diagnostics**.
KEYBOARD DATA LINE FAILURE	For external keyboards, check the cable connection. Run the **Keyboard Controller** test in **Dell Diagnostics**.
KEYBOARD STUCK KEY FAILURE	For external keyboards or keypads, check the cable connection. Restart the computer, and avoid touching the keyboard or keys during the boot routine. Run the **Stuck Key** test in **Dell Diagnostics**.
LICENSED CONTENT IS NOT ACCESSIBLE IN MEDIADIRECT	Dell MediaDirect cannot verify the Digital Rights Management (DRM) restrictions on the file, so the file cannot be played.
MEMORY ADDRESS LINE FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE	A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it.
MEMORY ALLOCATION ERROR	The software you are attempting to run is conflicting with the operating system, another program, or a utility. Shut down the computer, wait for 30 seconds, and then restart it. Run the program again. If the error message still appears, see the software documentation.
MEMORY DOUBLE WORD LOGIC FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE	A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it.
MEMORY ODD/EVEN LOGIC FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE	A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it.
MEMORY WRITE/READ FAILURE AT ADDRESS, READ VALUE EXPECTING VALUE	A memory module may be faulty or improperly seated. Reinstall the memory module or, if necessary, replace it.
NO BOOT DEVICE AVAILABLE	The computer cannot find the hard drive. If the hard drive is your boot device, ensure that the drive is installed, properly seated, and partitioned as a boot device.
NO BOOT SECTOR ON HARD DRIVE	The operating system may be corrupted, **Contact Dell**.
NO TIMER TICK INTERRUPT	A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**.

Table 23. Diagnostic error messages (continued)

Error messages	Description
NOT ENOUGH MEMORY OR RESOURCES. EXIT SOME PROGRAMS AND TRY AGAIN	You have too many programs open. Close all windows and open the program that you want to use.
OPERATING SYSTEM NOT FOUND	Reinstall the operating system. If the problem persists, **Contact Dell**.
OPTIONAL ROM BAD CHECKSUM	The optional ROM has failed. **Contact Dell**.
SECTOR NOT FOUND	The operating system cannot locate a sector on the hard drive. You may have a defective sector or corrupted File Allocation Table (FAT) on the hard drive. Run the Windows error-checking utility to check the file structure on the hard drive. See **Windows Help and Support** for instructions (click **Start** > **Help and Support**). If a large number of sectors are defective, back up the data (if possible), and then format the hard drive.
SEEK ERROR	The operating system cannot find a specific track on the hard drive.
SHUTDOWN FAILURE	A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**. If the message reappears, **Contact Dell**.
TIME-OF-DAY CLOCK LOST POWER	System configuration settings are corrupted. Connect your computer to an electrical outlet to charge the battery. If the problem persists, try to restore the data by entering the System Setup program, then immediately exit the program. If the message reappears, **Contact Dell**.
TIME-OF-DAY CLOCK STOPPED	The reserve battery that supports the system configuration settings may require recharging. Connect your computer to an electrical outlet to charge the battery. If the problem persists, **Contact Dell**.
TIME-OF-DAY NOT SET-PLEASE RUN THE SYSTEM SETUP PROGRAM	The time or date stored in the system setup program does not match the system clock. Correct the settings for the **Date and Time** options.
TIMER CHIP COUNTER 2 FAILED	A chip on the system board may be malfunctioning. Run the **System Set** tests in **Dell Diagnostics**.
UNEXPECTED INTERRUPT IN PROTECTED MODE	The keyboard controller may be malfunctioning, or a memory module may be loose. Run the **System Memory** tests and the **Keyboard Controller** test in **Dell Diagnostics** or **Contact Dell**.
X:\ IS NOT ACCESSIBLE. THE DEVICE IS NOT READY	Insert a disk into the drive and try again.

System error messages

Table 24. System error messages

System message	Description
Alert! Previous attempts at booting this system have failed at checkpoint [nnnn]. For help in resolving this problem, please note this checkpoint and contact Dell Technical Support	The computer failed to complete the boot routine three consecutive times for the same error.
CMOS checksum error	RTC is reset, **BIOS Setup** default has been loaded.

Table 24. System error messages (continued)

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

Recovering the operating system

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

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

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

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

Real-Time Clock (RTC Reset)

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

Start the RTC reset with the system powered off and connected to AC power. Press and hold the power button for 20 seconds. The system RTC Reset occurs after you release the power button.

Backup media and recovery options

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

WiFi power cycle

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

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

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

7

Getting help

Topics:

- Contacting Dell

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.