

Dell Vostro 3670

Service Manual

Notes, cautions, and warnings

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

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

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

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Working on your computer

Safety instructions

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

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

i **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.

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

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

△ CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface that is grounded to ground yourself before you touch the computer to perform any disassembly tasks.

△ 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.

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

Turning off your computer — Windows 10

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

1. Click or tap .

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

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

Before working inside your computer

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

3. If the computer is connected to a docking device (docked), undock it.
 4. Disconnect all network cables from the computer (if available).
-  **CAUTION:** If your computer has an RJ45 port, disconnect the network cable by first unplugging the cable from your computer.
5. Disconnect your computer and all attached devices from their electrical outlets.
 6. Open the display.
 7. Press and hold the power button for few seconds, to ground the system board.
-  **CAUTION:** To guard against electrical shock unplug your computer from the electrical outlet before performing Step # 8.
-  **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.
8. Remove any installed ExpressCards or Smart Cards from the appropriate slots.

After working inside your computer

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

-  **CAUTION:** To avoid damage to the computer, use only the battery designed for this particular Dell computer. Do not use batteries designed for other Dell computers.
1. Connect any external devices, such as a port replicator or media base, and replace any cards, such as an ExpressCard.
 2. Connect any telephone or network cables to your computer.
-  **CAUTION:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
3. Connect your computer and all attached devices to their electrical outlets.
 4. Turn on your computer.

Technology and components

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

Topics:

- [HDMI 1.4](#)
- [USB features](#)

HDMI 1.4

This topic explains the HDMI 1.4 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.

 **NOTE:** The HDMI 1.4 will provide 5.1 channel audio support.

HDMI 1.4 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

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 drives, and printers.

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

Table 1. USB evolution

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

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

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

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

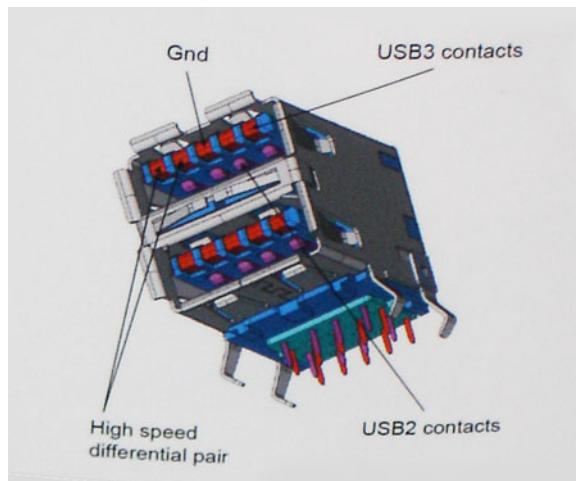


Speed

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

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

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



With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320Mbps (40MB/s) — the actual real-world maximum.

Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

Applications

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

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

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

Compatibility

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

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

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

Removing and installing components

Recommended tools

The procedures in this document require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe

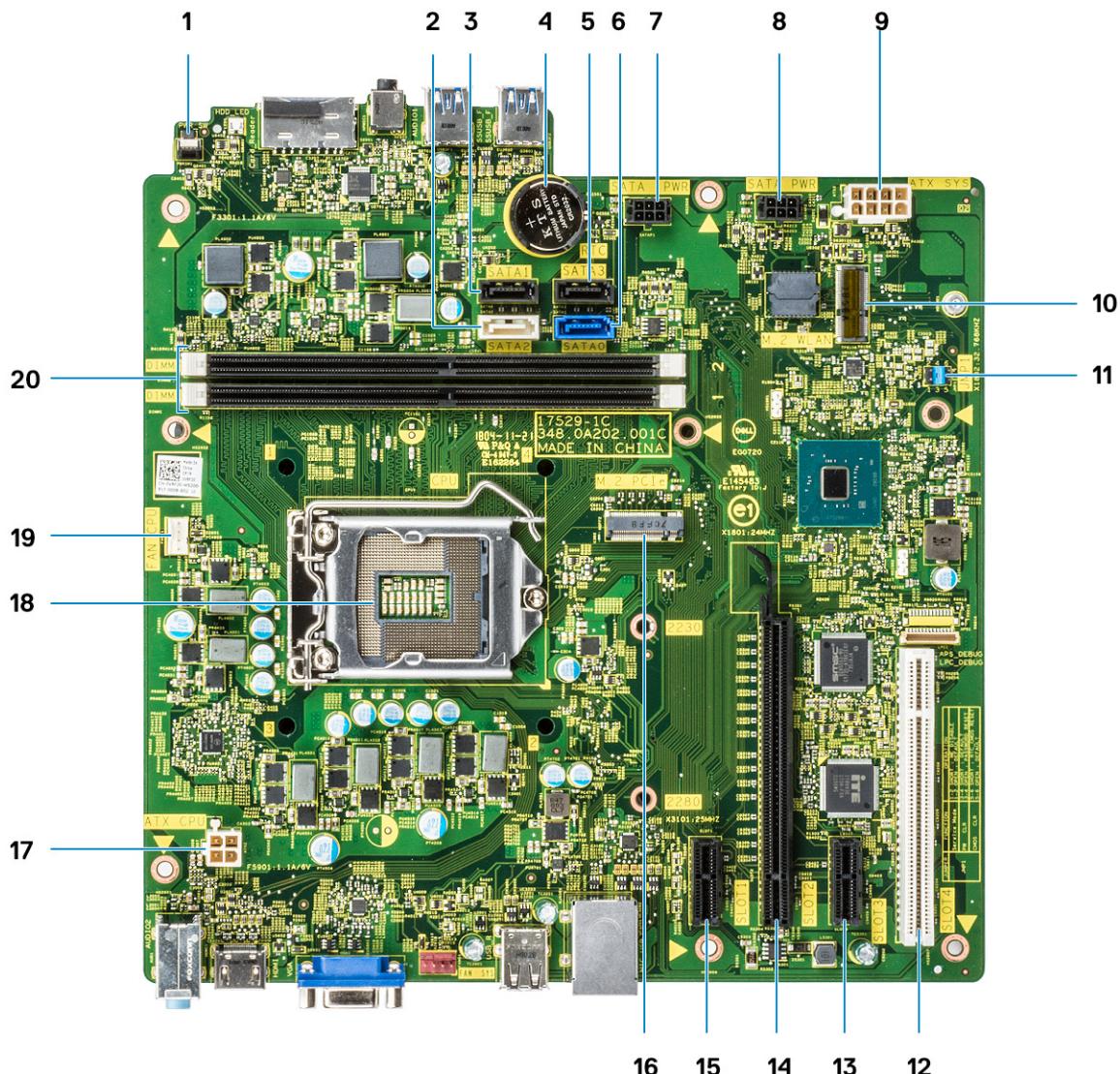
 **NOTE:** The #0 screw driver is for screws 0-1 and the #1 screw driver is for screws 2-4

Screw list and images

Table 2. Vostro 3670 screw size list

Component	Screw type	Quantity	Image	Color
PSU	#6.32xL6.35	4		Black
Side cover		2		
FIO bracket		1		
Motherboard		8		
PCI bracket		1		
3.5 HDD (Optional)	#6.32UNCx3.6	4		Silver
Slim ODD	M2x2	2		Black
M.2 SSD card	M2x3.5	1		Silver
NGFF card		1		
2.5 HDD (optional 1 pcs)	M3x3.5	2		Silver
2.5 HDD (optional 2 pcs)		4		

System board layout



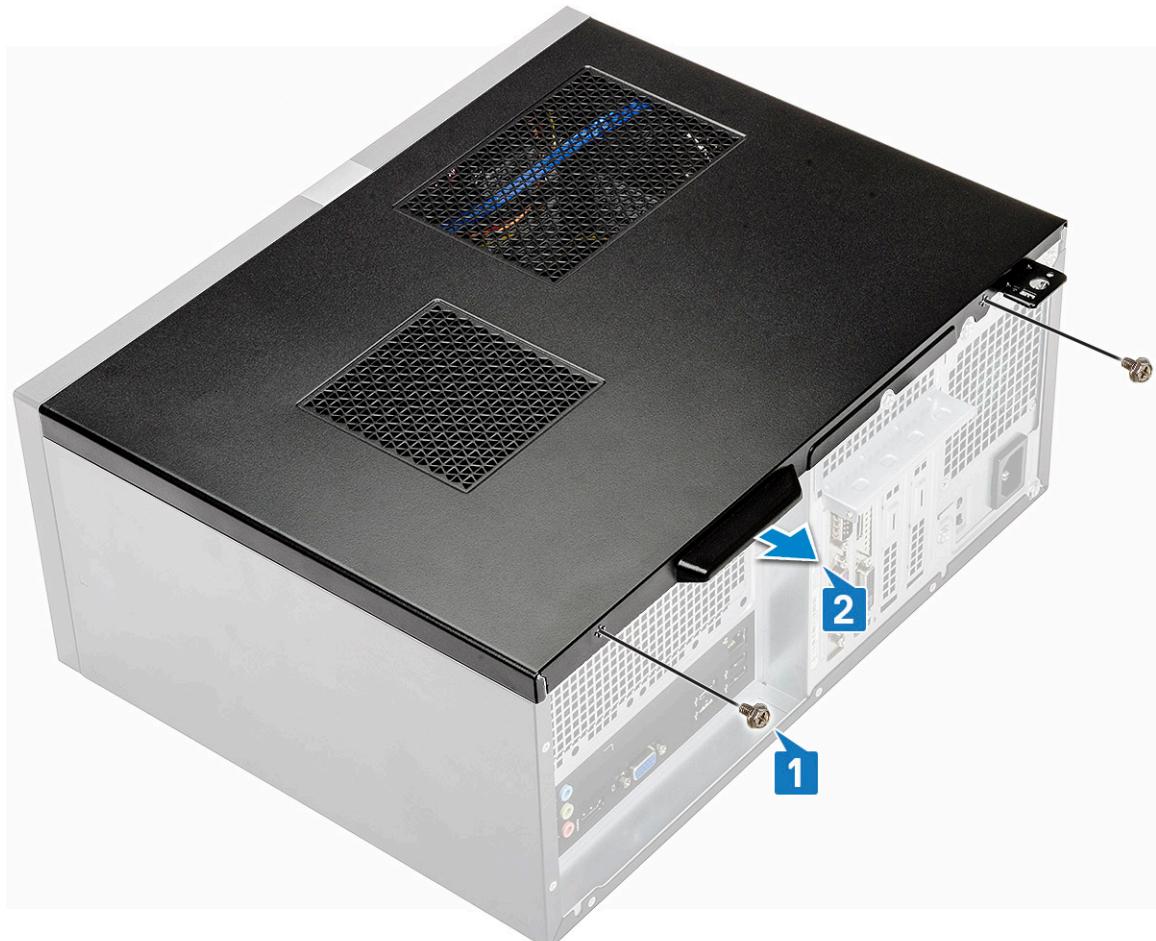
1. Power switch connector
2. SATA 2 Connector (white color)
3. SATA 1 Connector (black color)
4. Coin-cell battery Connector
5. SATA 3 Connector (black color)
6. SATA 0 Connector (Blue color)
7. HDD_ODD_PowerCable Connector (SATA_PWR)
8. HDD_ODD_PowerCable Connector (SATA_PWR)
9. ATX Power Connector (ATX_SYS)
10. M.2 WLAN Connector
11. Service mode/password clear/CMOS clear jumpers
12. PCI Connector (SLOT4)
13. PCI-e X1 Connector (SLOT3)
14. PCI-e X16 Connector (SLOT2)
15. PCI-e X1 Connector (SLOT1)
16. M.2 PCIe Connector
17. CPU Power Connector (ATX_CPU)
18. Processor Socket (CPU)

19. CPU Fan Connector (FAN_CPU)
20. Memory Connectors (DIMM1/DIMM2)

Cover

Removing the cover

1. Follow the procedure in [Before working inside your computer](#).
2. To remove the cover:
 - a) Remove the two (6-32x6.35) screws that secure the cover to the computer [1] and pull the cover away from the system [2].
 - b) Lift the cover.





Installing the cover

1. Place the cover on the computer and slide the cover forward until the latches snap-in.



2. Tighten the two (6-32x6.35) screws to secure the cover to the computer.

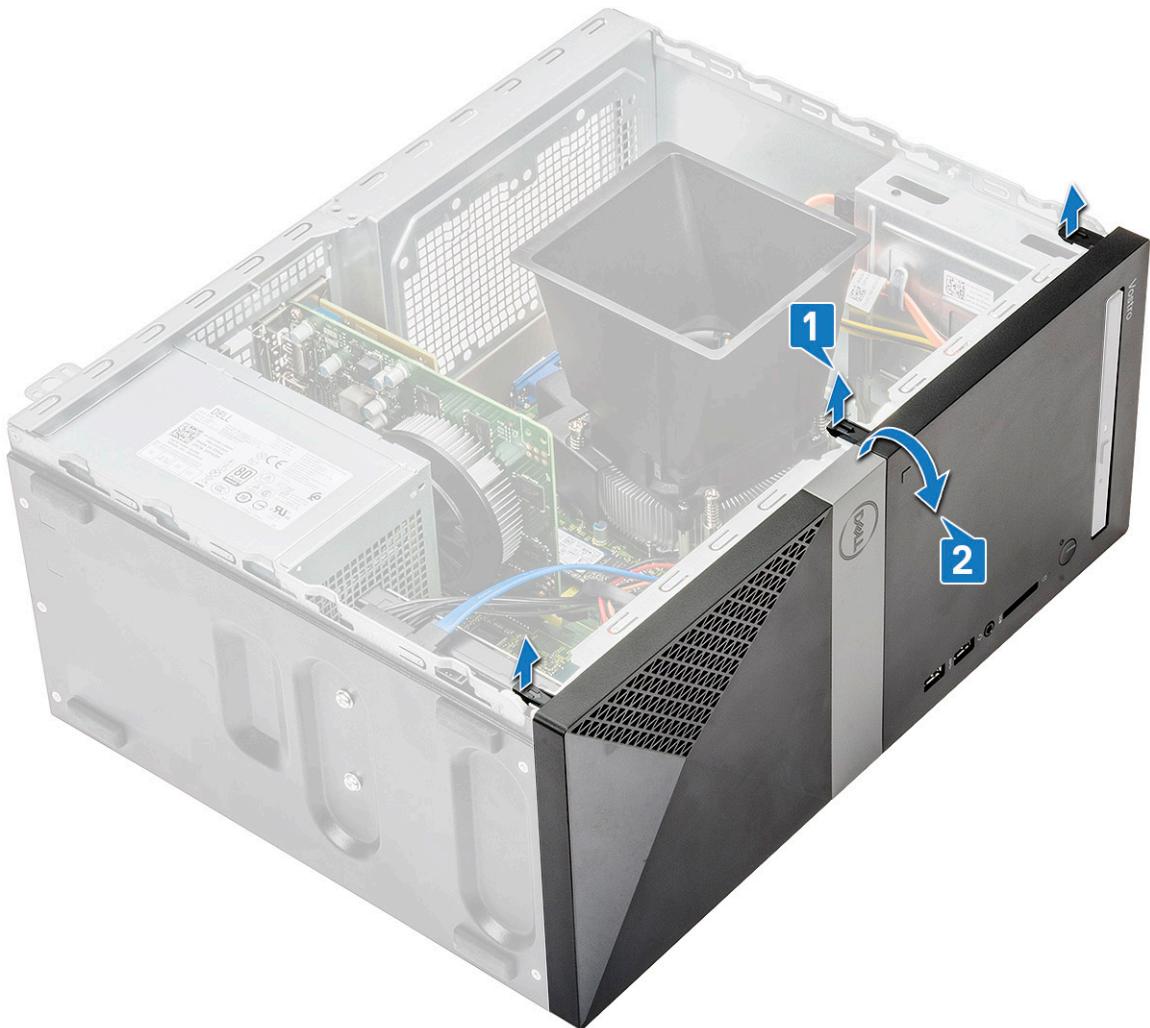


3. Follow the procedure in [After working inside your computer](#).

Front Bezel

Removing the front bezel

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [Cover](#).
3. To remove the bezel:
 - a) Lift the three latches to release the bezel from the chassis [1].
 - b) Lift the chassis, rotate and pull the front bezel away from the computer to release the tabs [2].

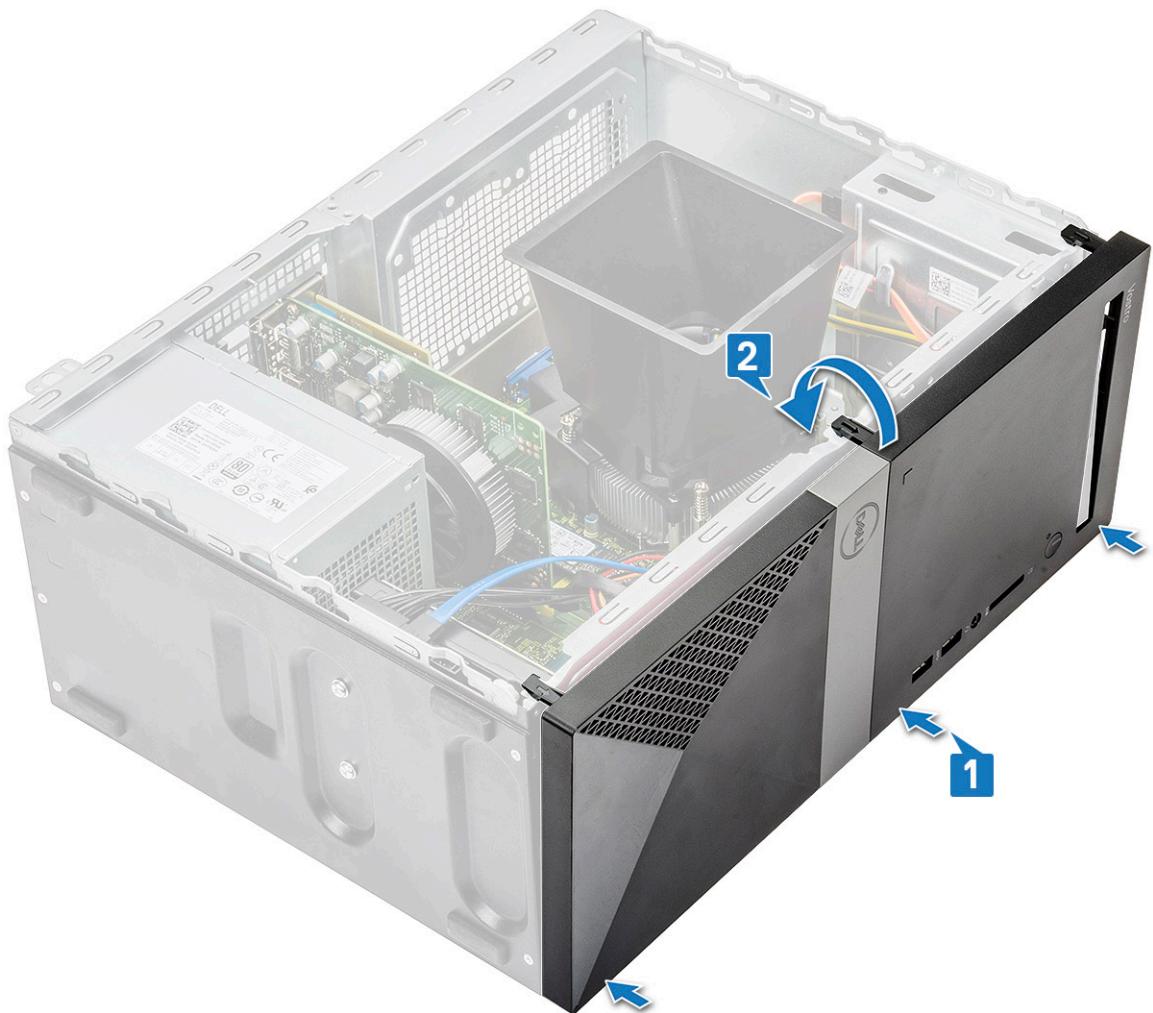


c) Lift the chassis and remove the front bezel from the chassis



Installing the front bezel

1. Position the bezel to align the tab holders on the chassis.



2. Rotate the bezel until the tabs clicks into place.

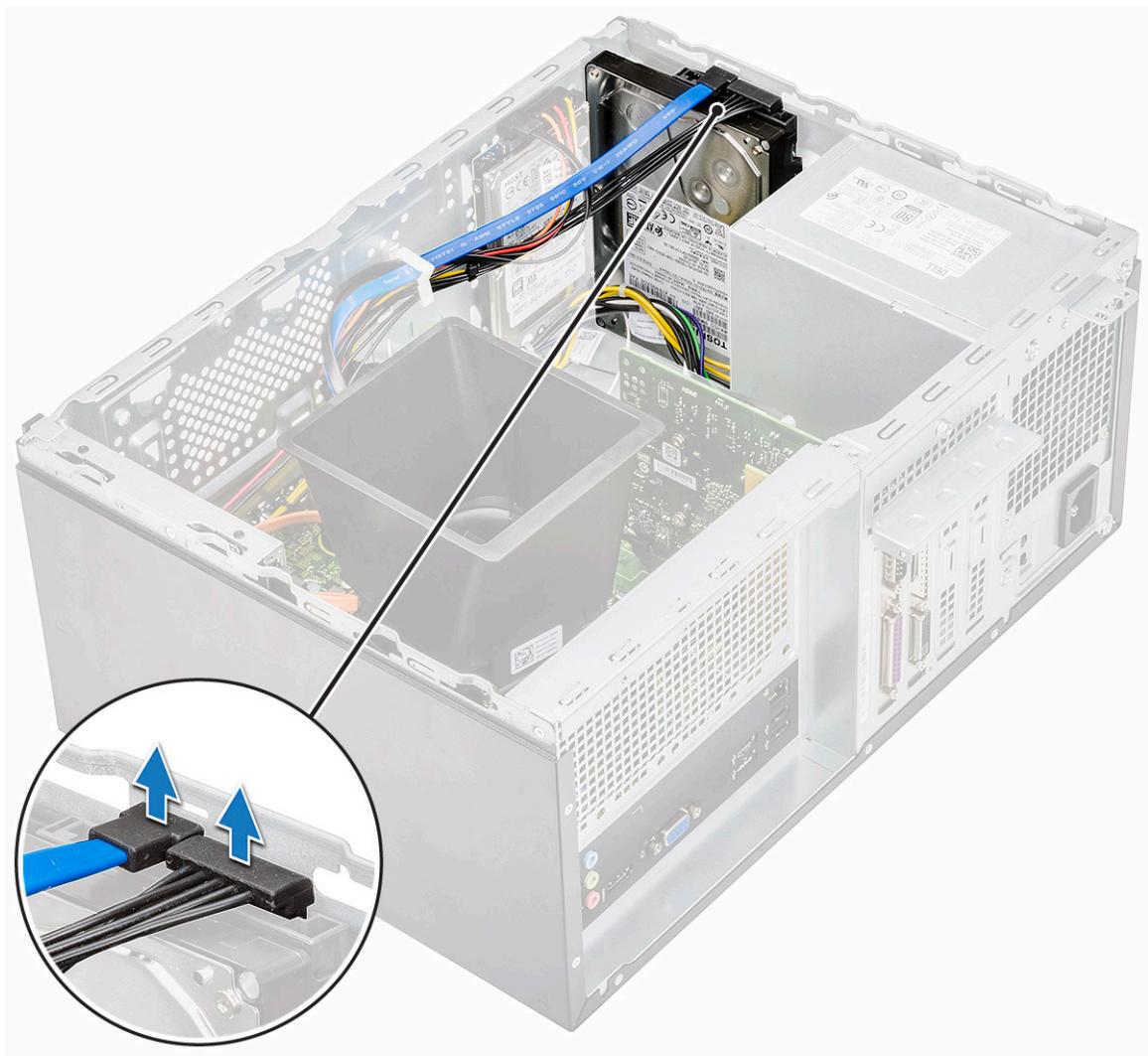


3. Install the [Cover](#).
4. Follow the procedure in [After working inside your computer](#).

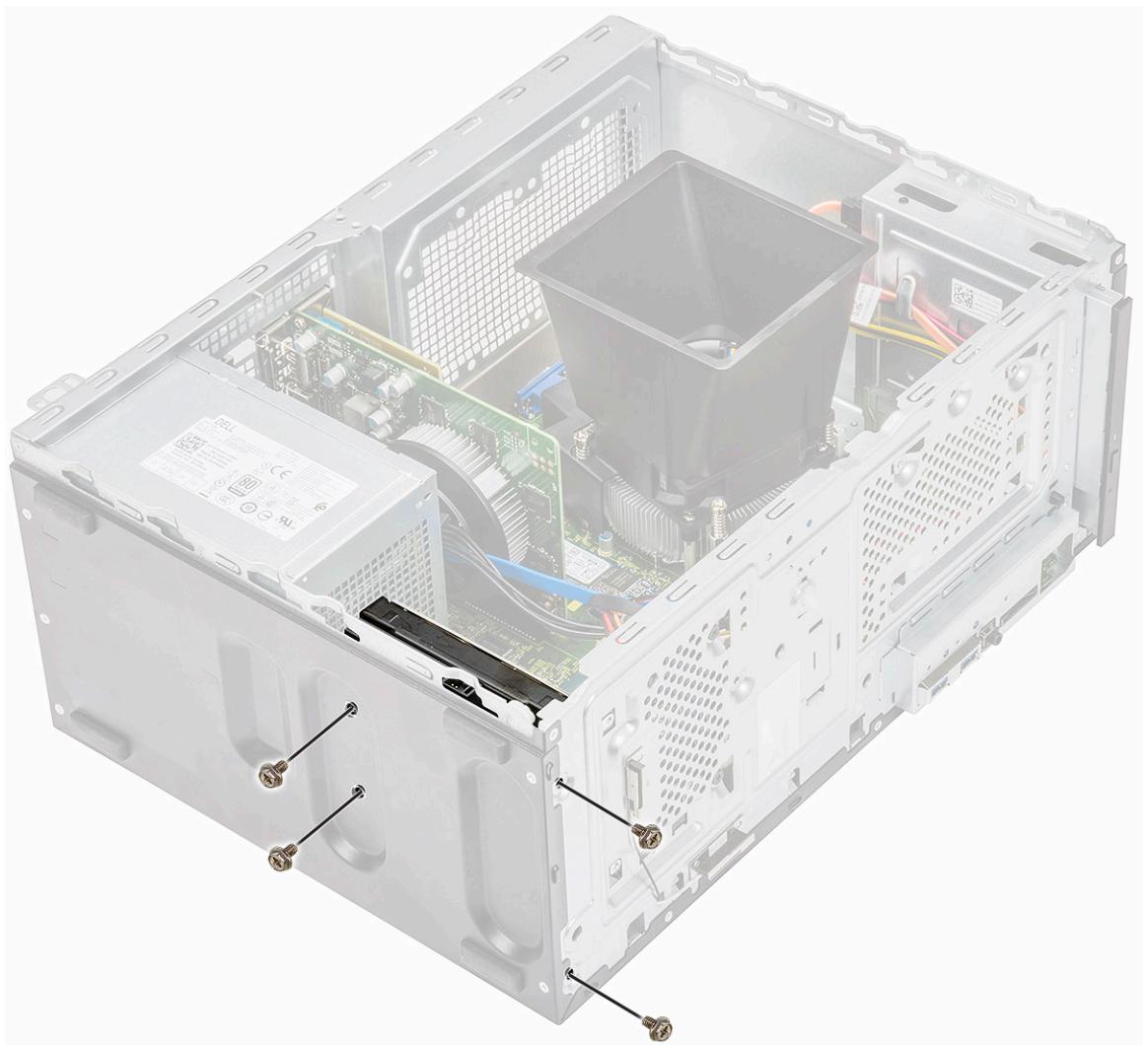
Hard drive

Removing 3.5 inches hard drive assembly - optional

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



- b) Remove the four (6-32x3.6) screws that secure the hard drive assembly to the base and front of the chassis.



c) Slide and lift the HDD away from the chassis

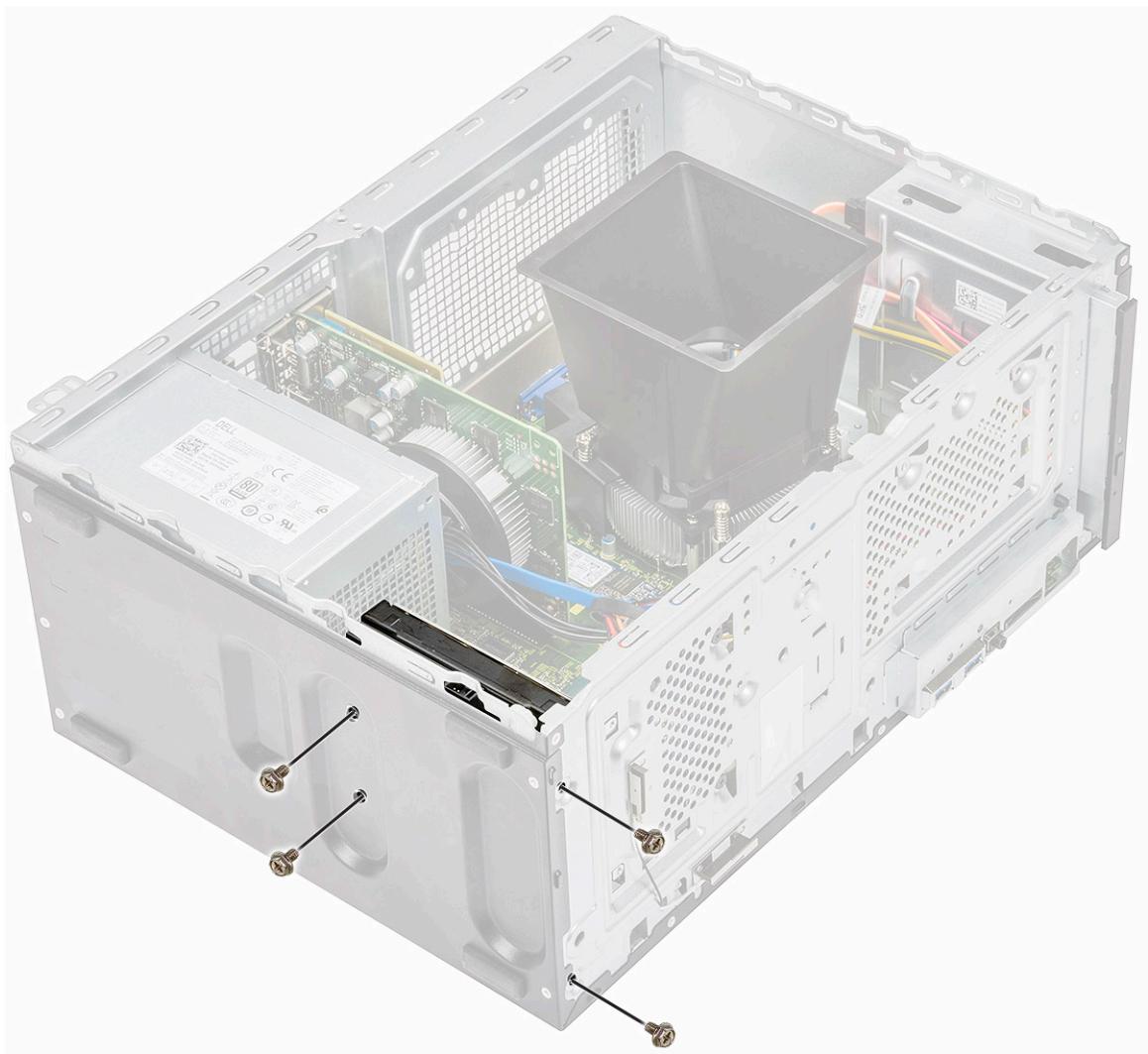


Installing 3.5 inches hard drive assembly - optional

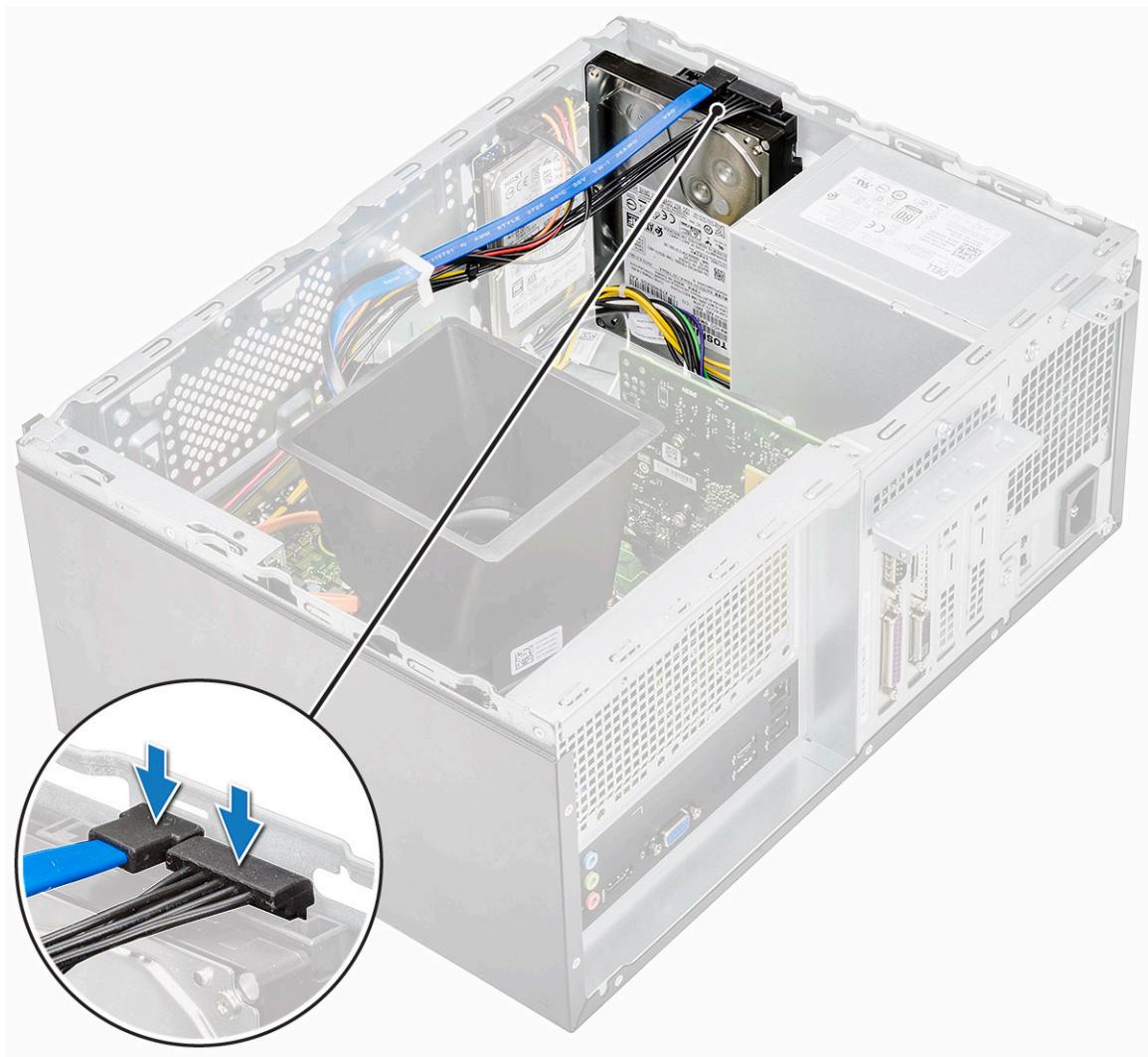
1. Insert the hard drive assembly into the slot on the computer until it clicks into place.



2. Install the four (6-32x3.6) screws that secure the hard drive assembly to the base and front of the chassis.



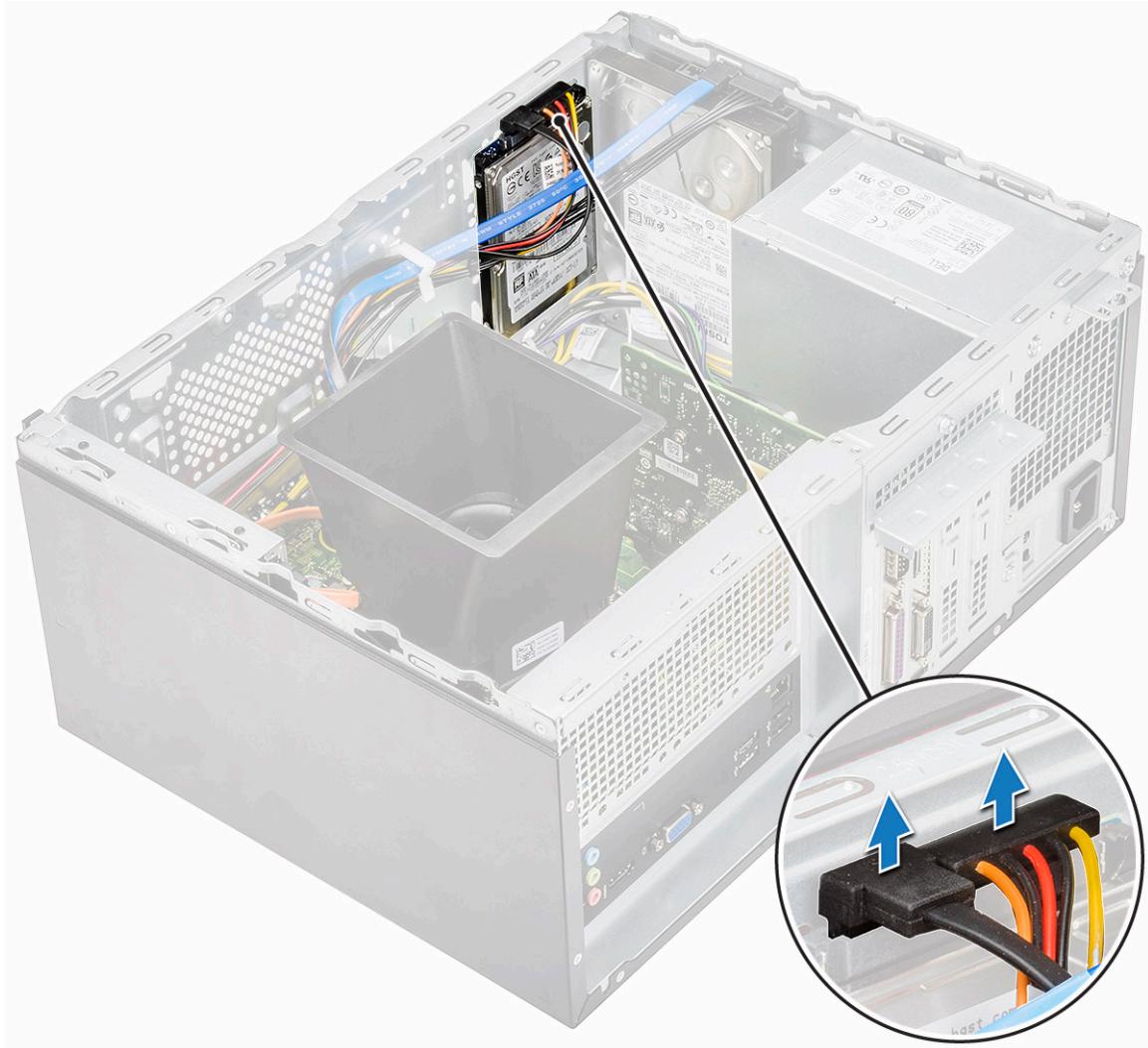
3. Connect the hard drive cable and the power cable to the connectors on the hard drive.



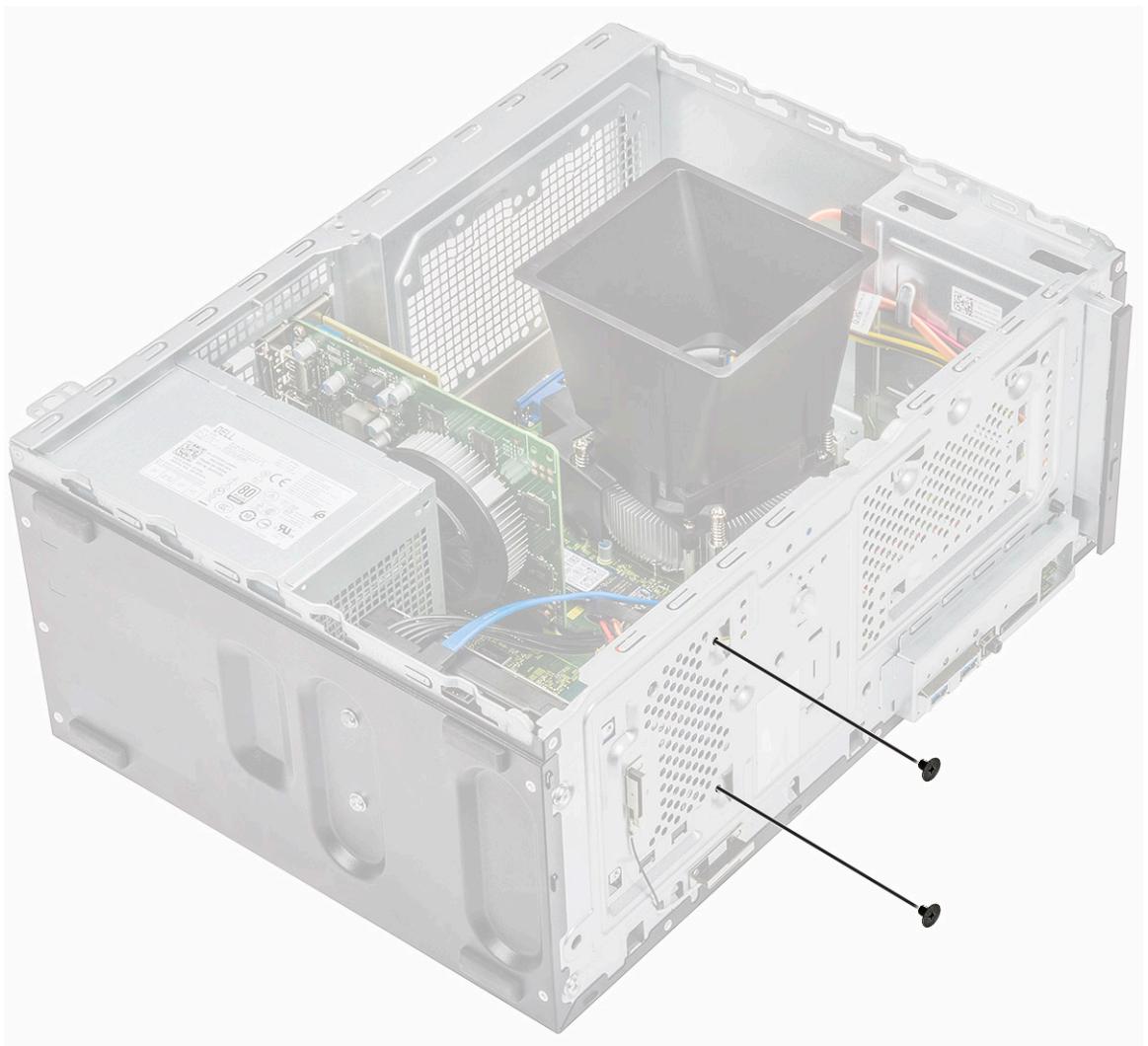
4. Install the:
 - a) [Front bezel](#)
 - b) [Cover](#)
5. Follow the procedure in [After working inside your computer](#).

Removing the 2.5 inches hard drive assembly - optional

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



- b) Remove the two (M3x3.5) screws that secure the hard drive assembly to the front of the chassis.



c) Slide and lift the HDD away from the chassis

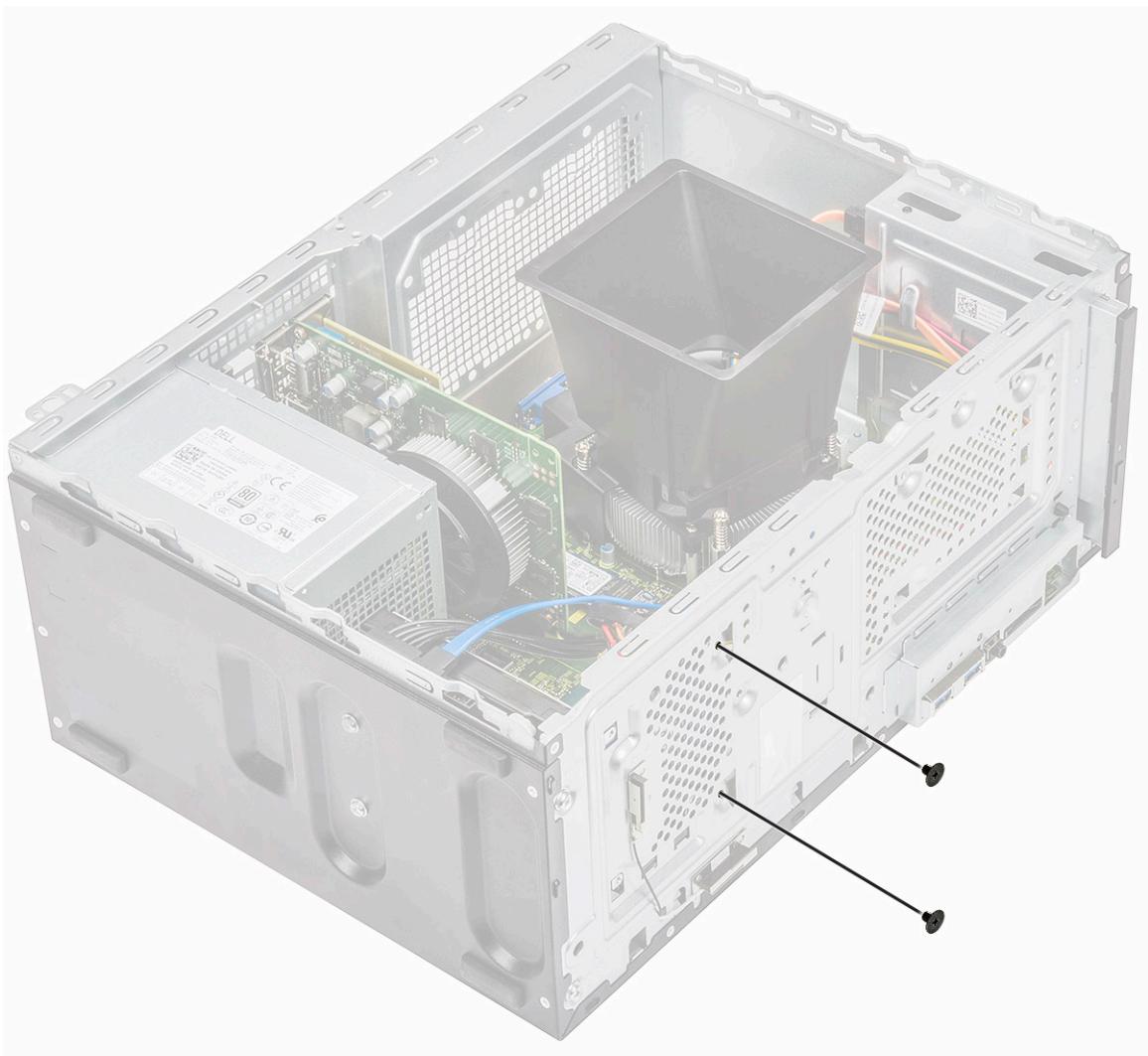


Installing 2.5 inches hard drive assembly - optional

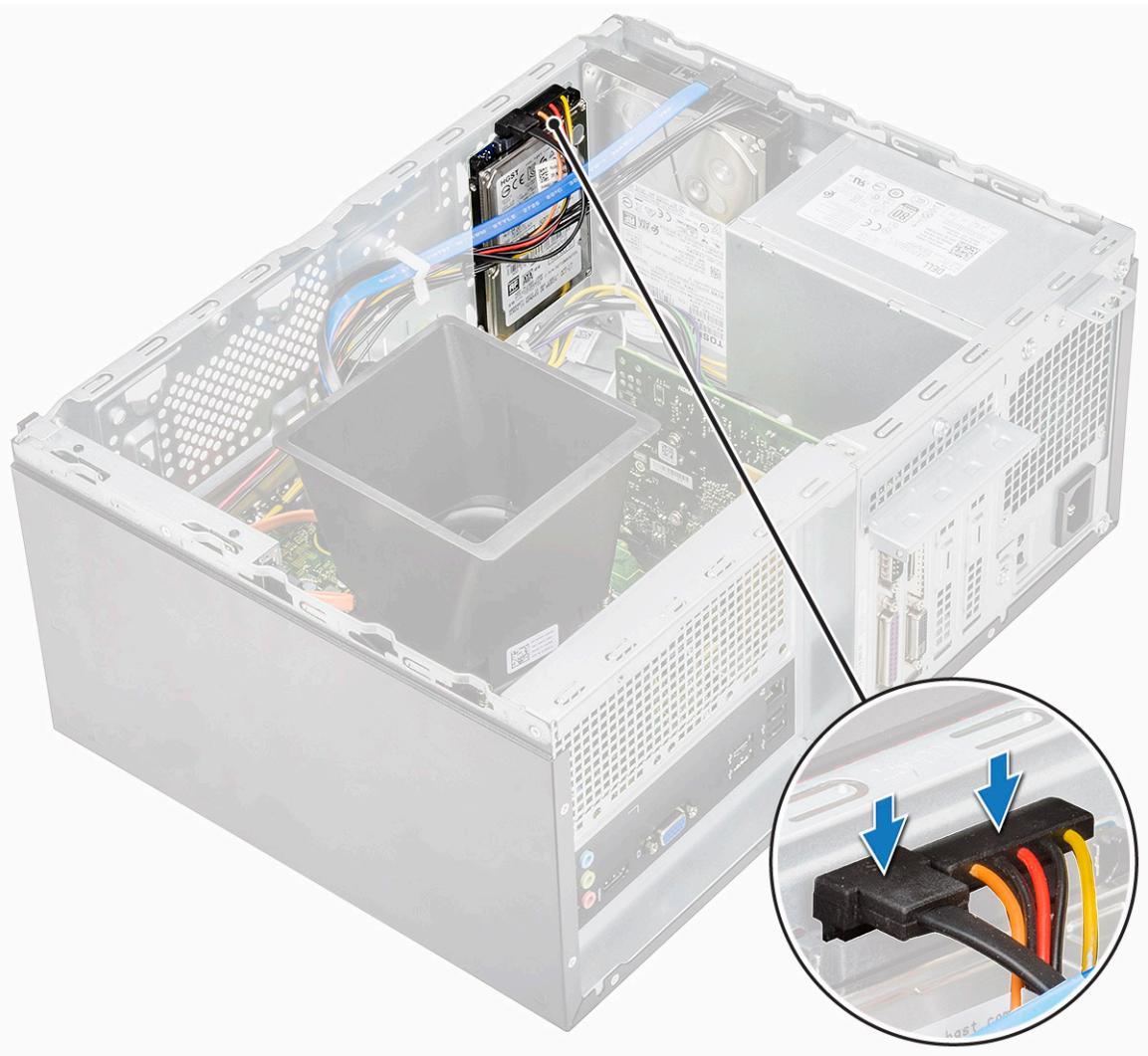
1. Place the hard drive assembly into the chassis.



2. Install the two (M3x3.5) screws that secure the hard drive assembly to the base and front of the chassis.



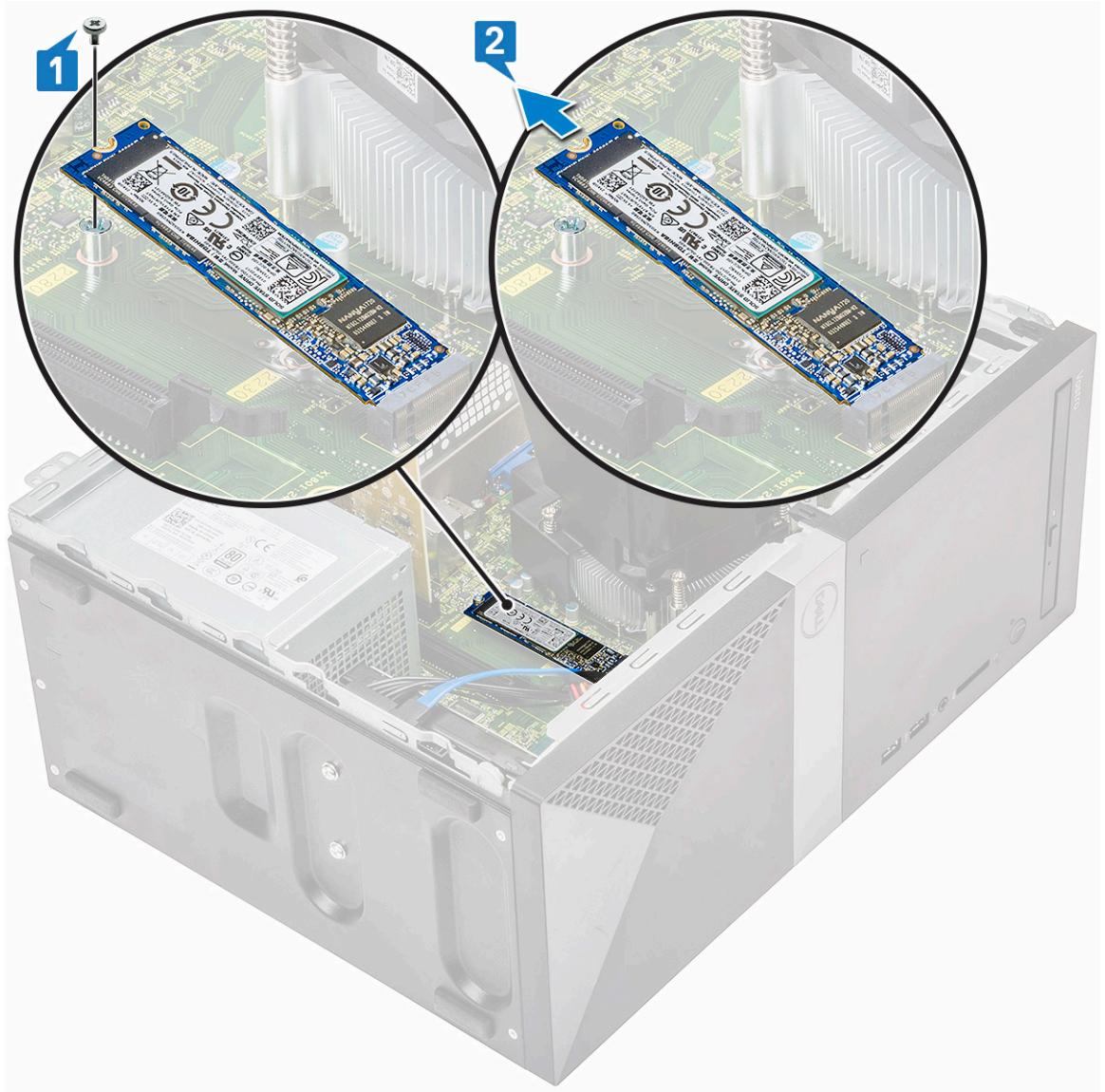
3. Connect the SATA cable and the power cable to the connectors on the hard drive.



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

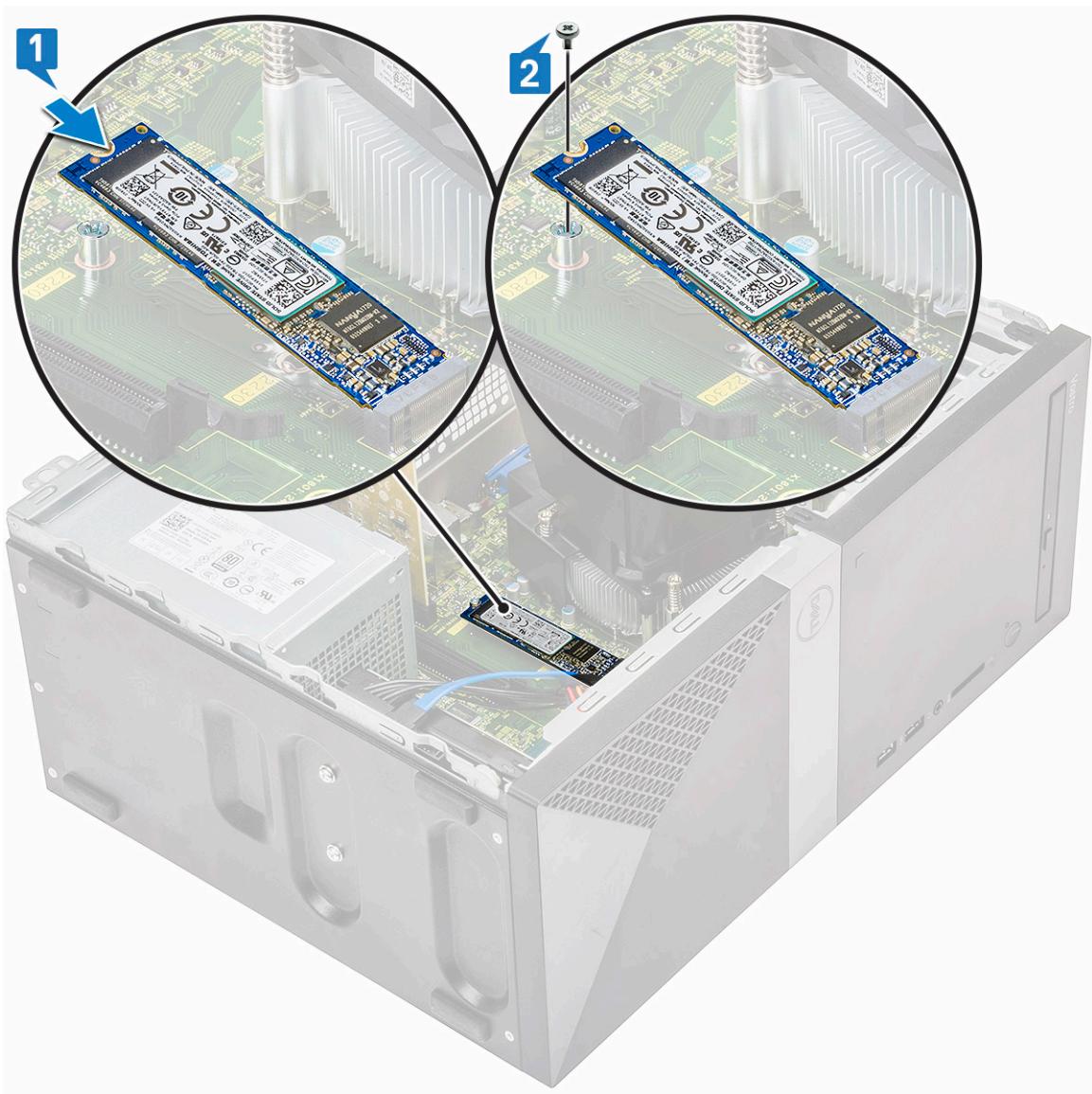
Removing the M.2 PCIe Solid State Drive - optional

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [Cover](#).
3. To remove the Solid State Drive (SSD):
 - a) Remove the one (M2x3.5) screw that secures the SSD to the system board [1]
 - b) Slide the SSD from the connector on the system board [2].



Installing the M.2 PCIe SSD - optional

1. Insert the SSD into the connector on the system board [1]
2. Replace the one (M2x3.5) screw that secures the SSD to the system board [2]

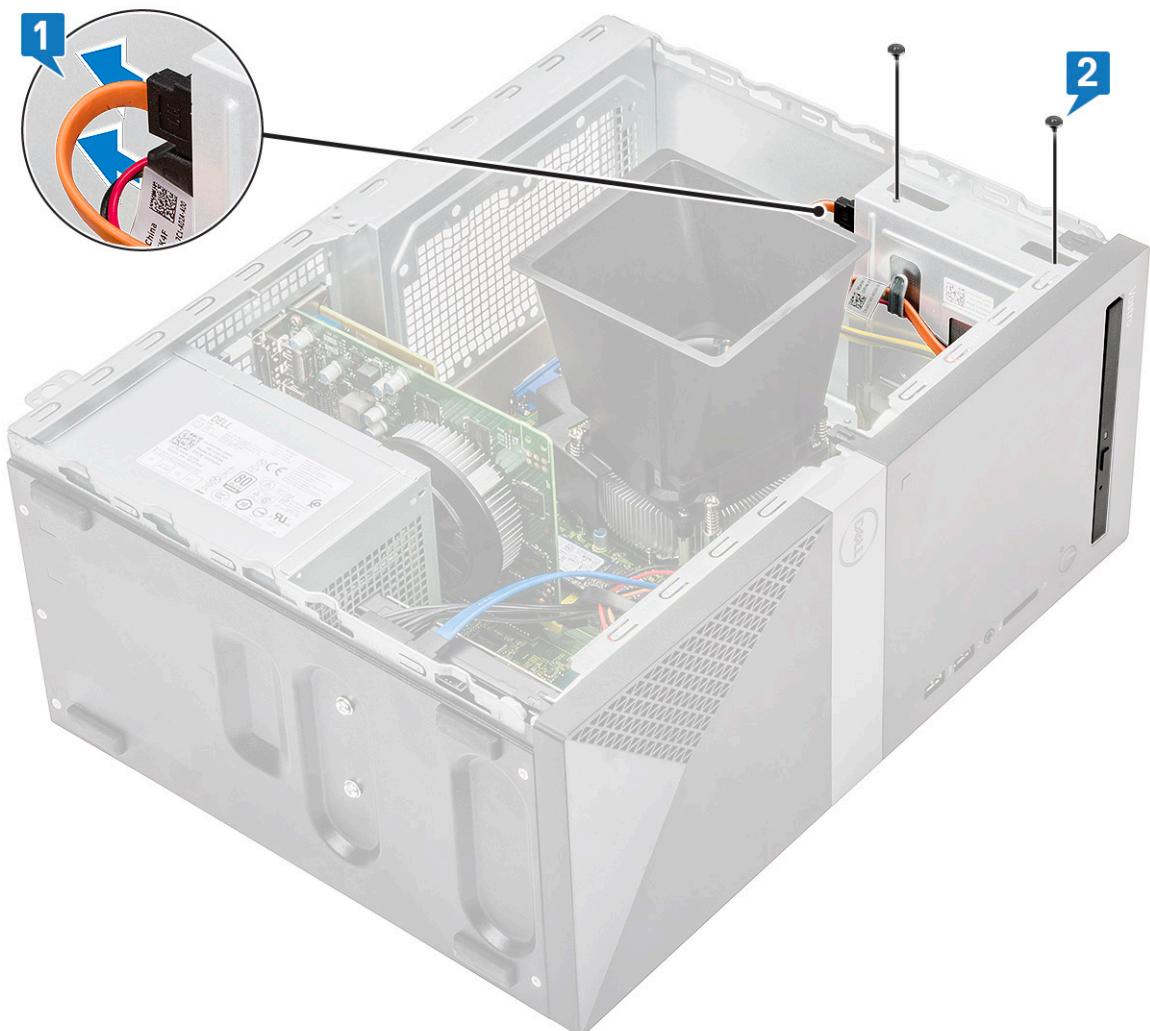


3. Install the [Cover](#).
4. Follow the procedure in [After working inside your computer](#).

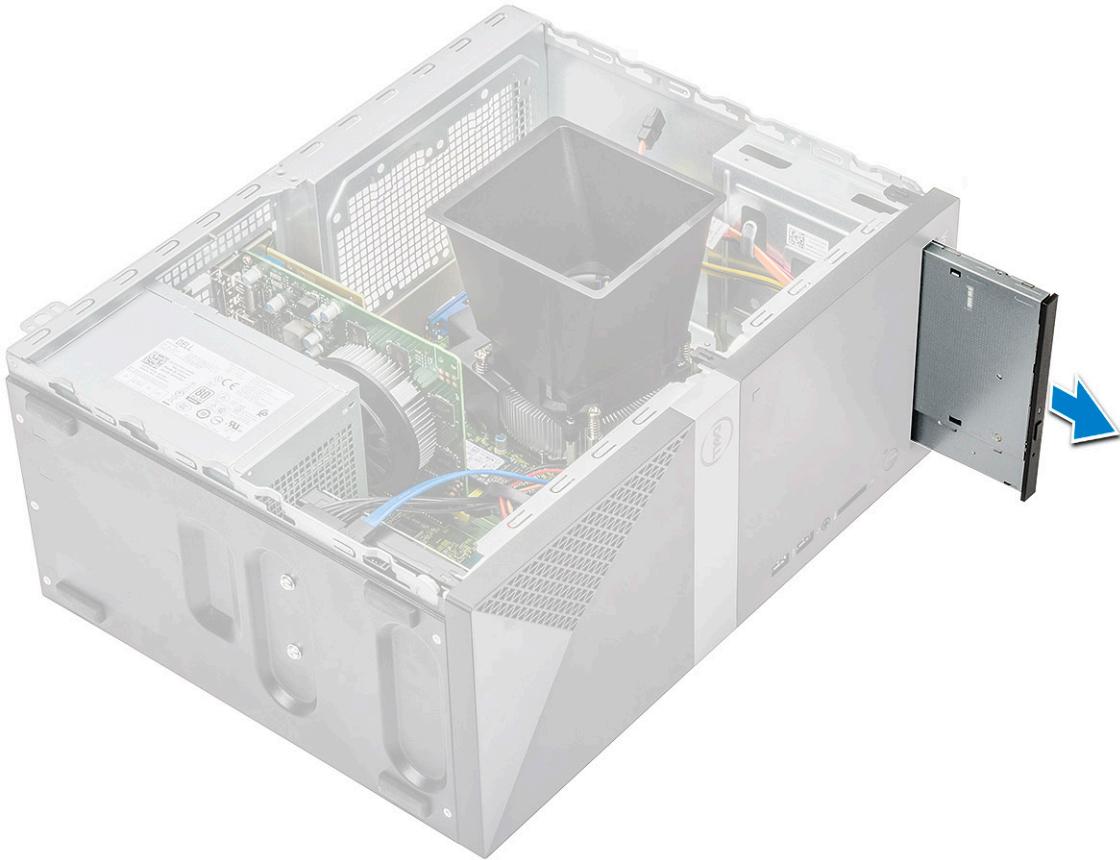
Optical drive

Removing optical drive assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
3. To remove the slim optical drive:
 - a) Disconnect the data cable and power cable from the connectors on the optical drive assembly [1].
(i) | NOTE: You must unroute the cables from the tabs under the drive cage to allow you to disconnect the cables from the connectors.
 - b) Remove the two (M2x2) screws that secure the optical drive assembly to the computer [2].

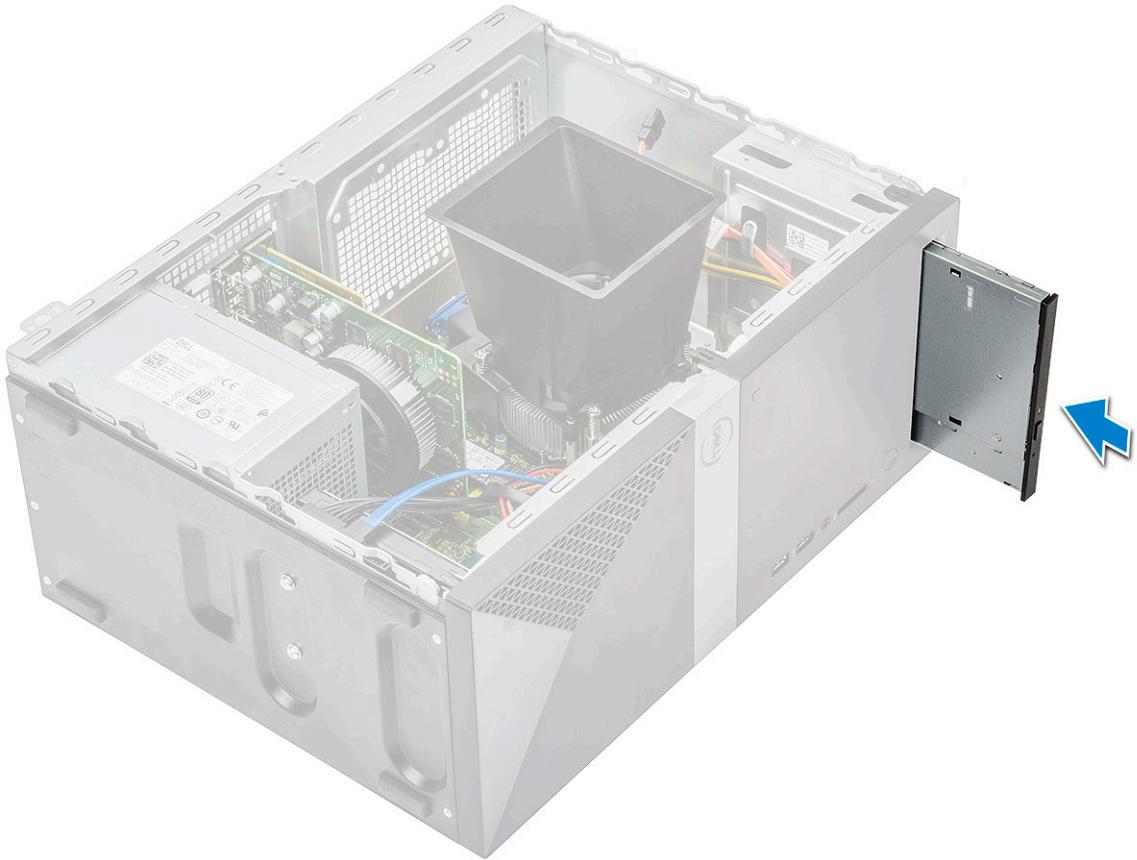


c) Slide the optical drive assembly out of the computer.

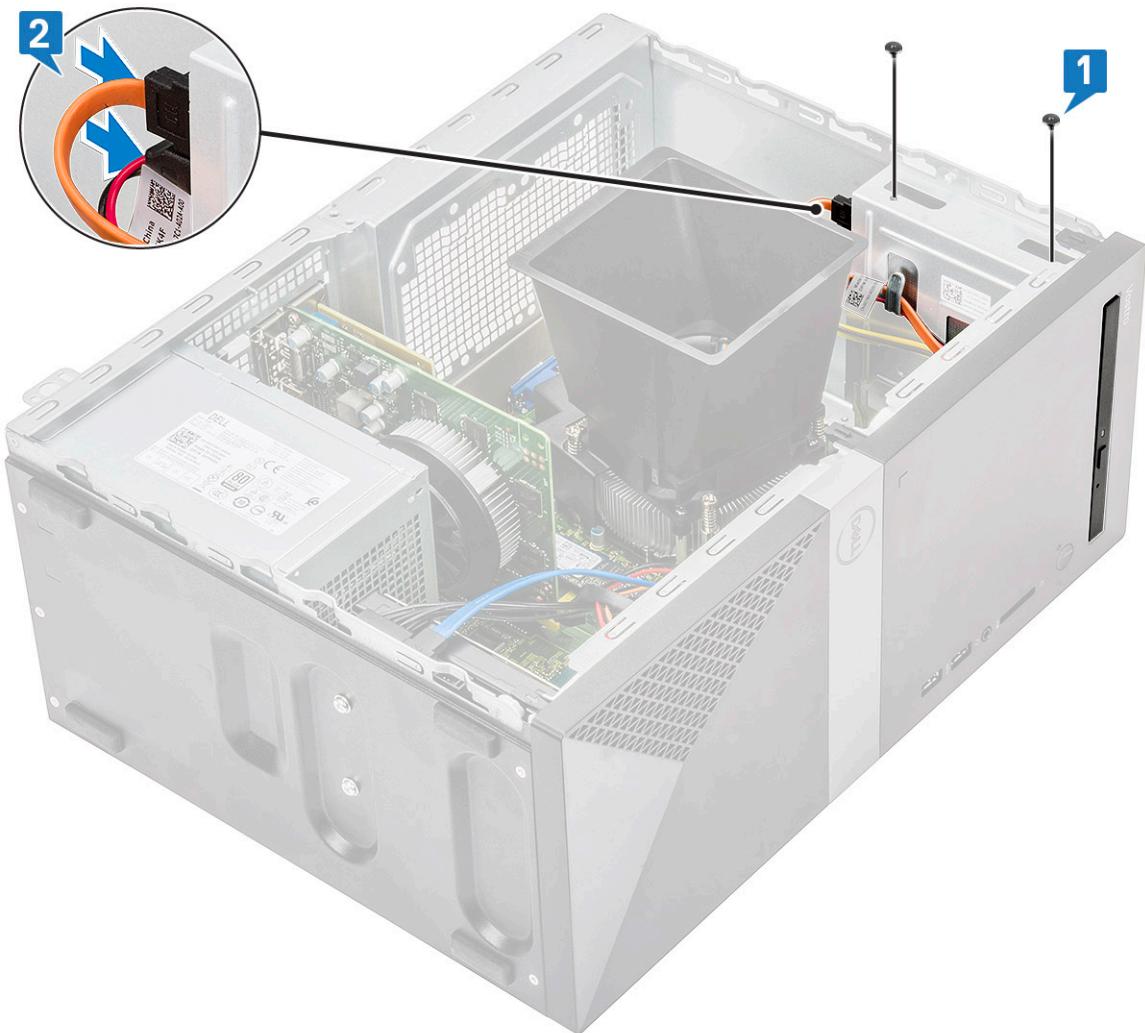


Installing optical drive assembly

1. Place the optical drive into the optical drive slot.



2. Tighten the two (M2x2) screws to secure the optical drive assembly to the computer [1].
3. Route the data cable and power cable under the drive cage.
4. Connect the data cable and power cable to the connectors on the optical drive assembly [2].

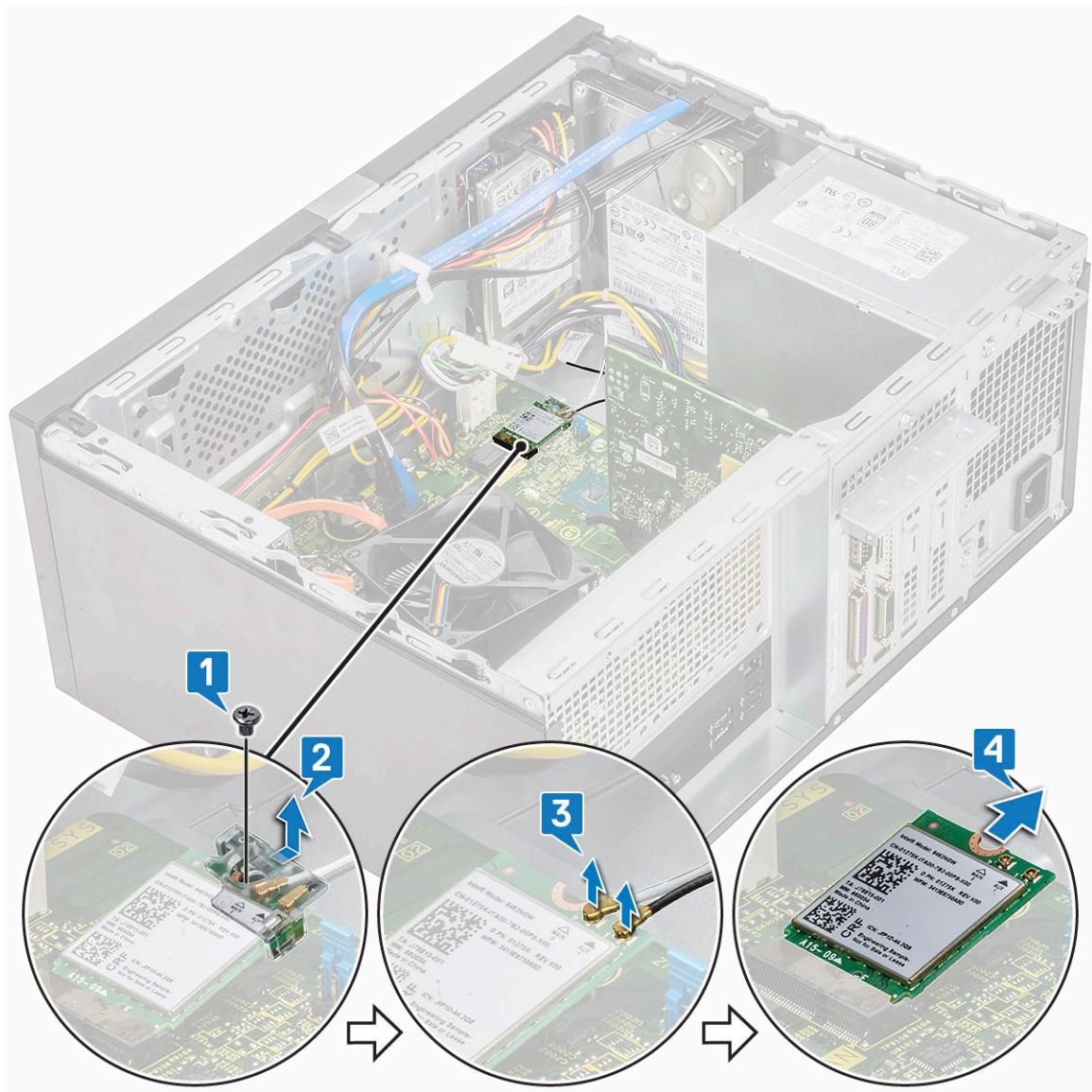


5. Install the:
 - a) [Cover](#)
6. Follow the procedure in [After working inside your computer](#).

WLAN card

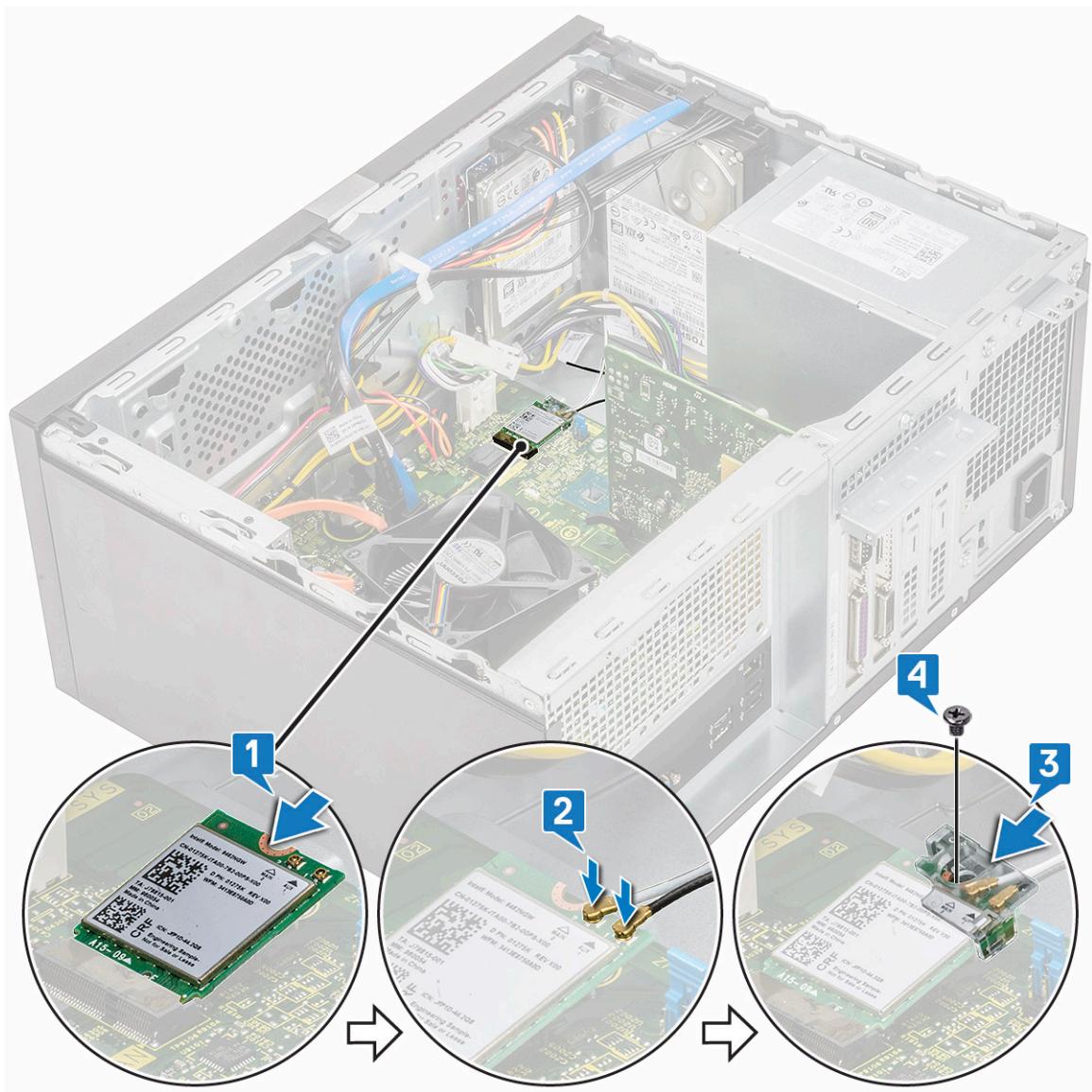
Removing WLAN card

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
3. To remove the WLAN card:
 - a) Loosen one (M2x3.5) screw to release the plastic tab that secures the WLAN card to the computer [1].
 - b) Remove the plastic tab to access the WLAN cables [2].
 - c) Disconnect the WLAN cables from the connectors on the WLAN card [3].
 - d) Lift the WLAN card from the connector on the system board [4].



Installing WLAN Card

1. Insert the WLAN card to the connector on the system board [1].
2. Connect the WLAN cables to the connectors on the WLAN card [2].
3. Place the plastic tab on the WLAN card [3] and tighten one (M2x3.5) screw to secure the WLAN card to the system board [4].

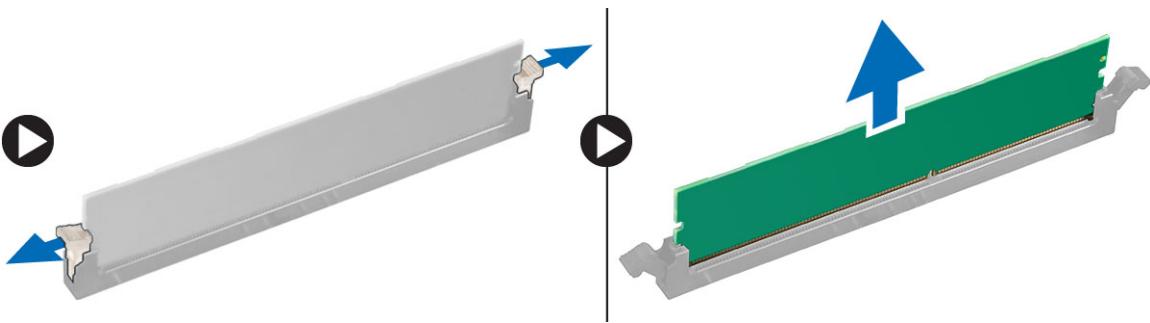


4. Install the:
 - a) [Cover](#)
5. Follow the procedure in [After working inside your computer](#).

Memory modules

Removing memory module

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
3. To remove the memory module:
 - a) Push the memory module retention tabs on both sides of the memory module.
 - b) Lift the memory module from the memory module connector on the system board.



Installing the memory module

1. Align the notch on the memory module with the tab on the memory module connector.
2. Press the memory module until the memory module retention tabs click into place.
3. Install the:
 - a) [Cover](#)
4. Follow the procedure in [After working inside your computer](#).

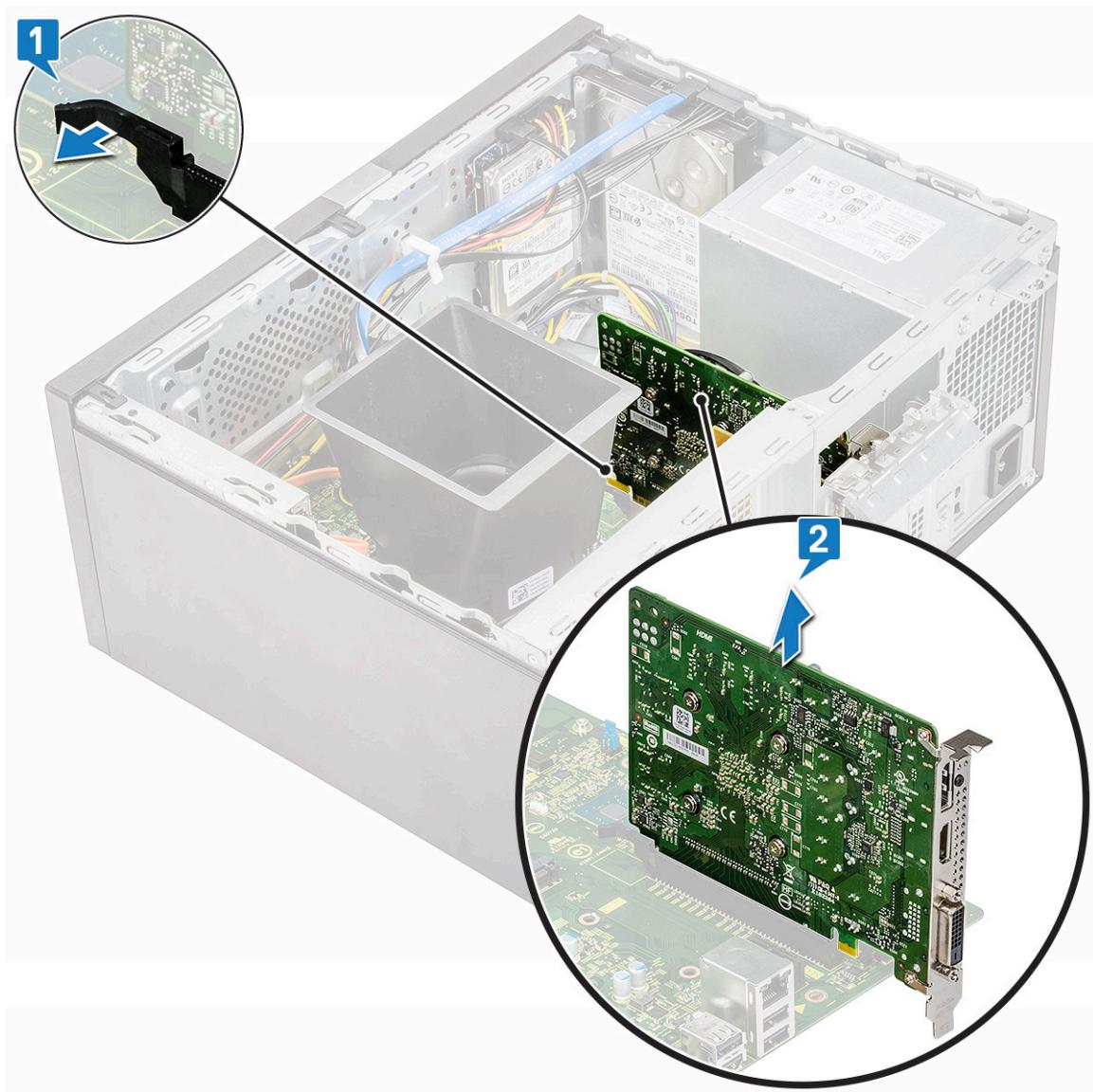
Expansion card

Removing the PCIe expansion card

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
3. To remove the PCIe expansion card:
 - a) Remove the one (6-32x6.35) screw to remove the PCIe bracket [1, 2].

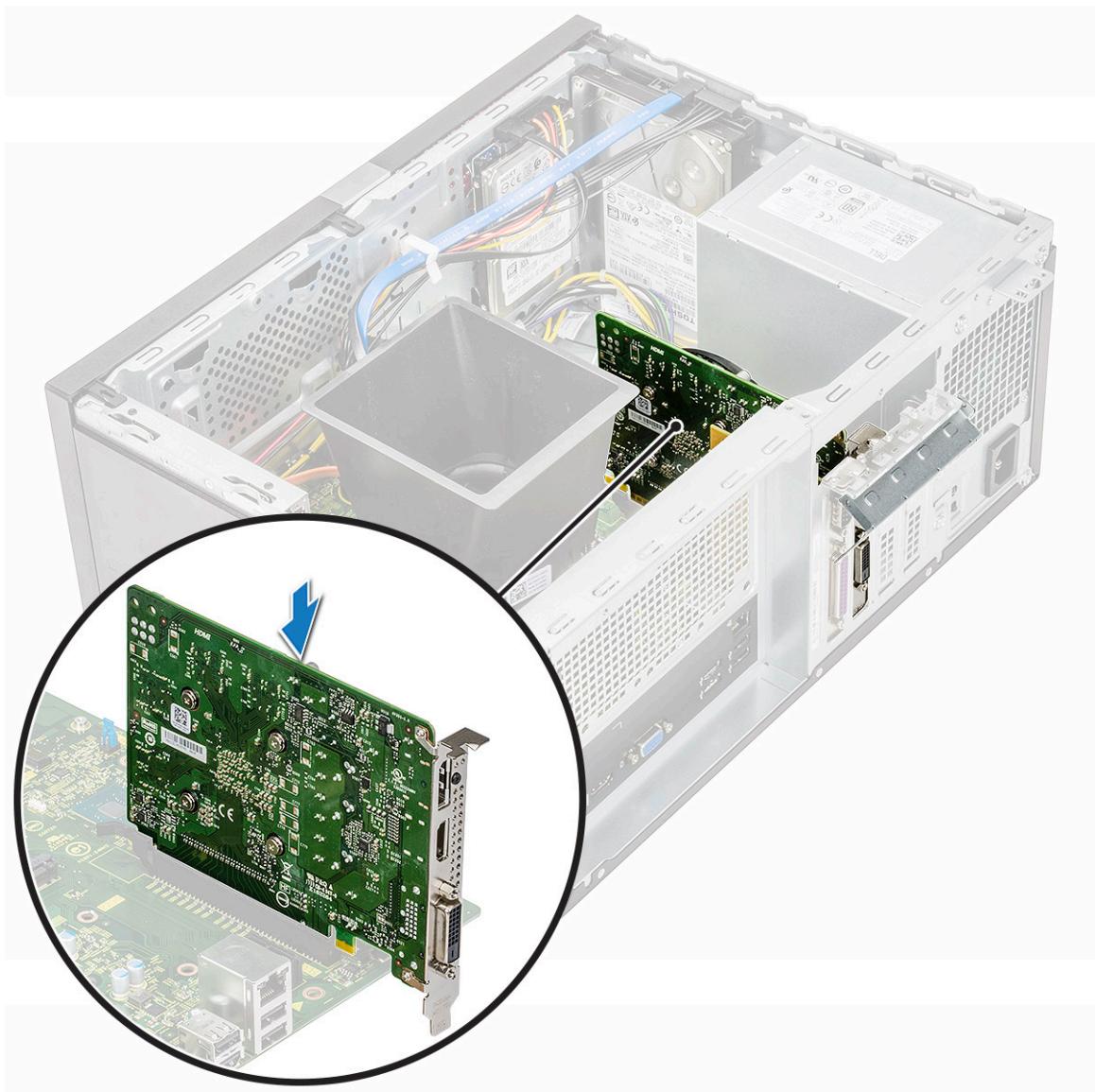


- b) Push the release tab [1] and lift the PCIe expansion card out of the computer [2].

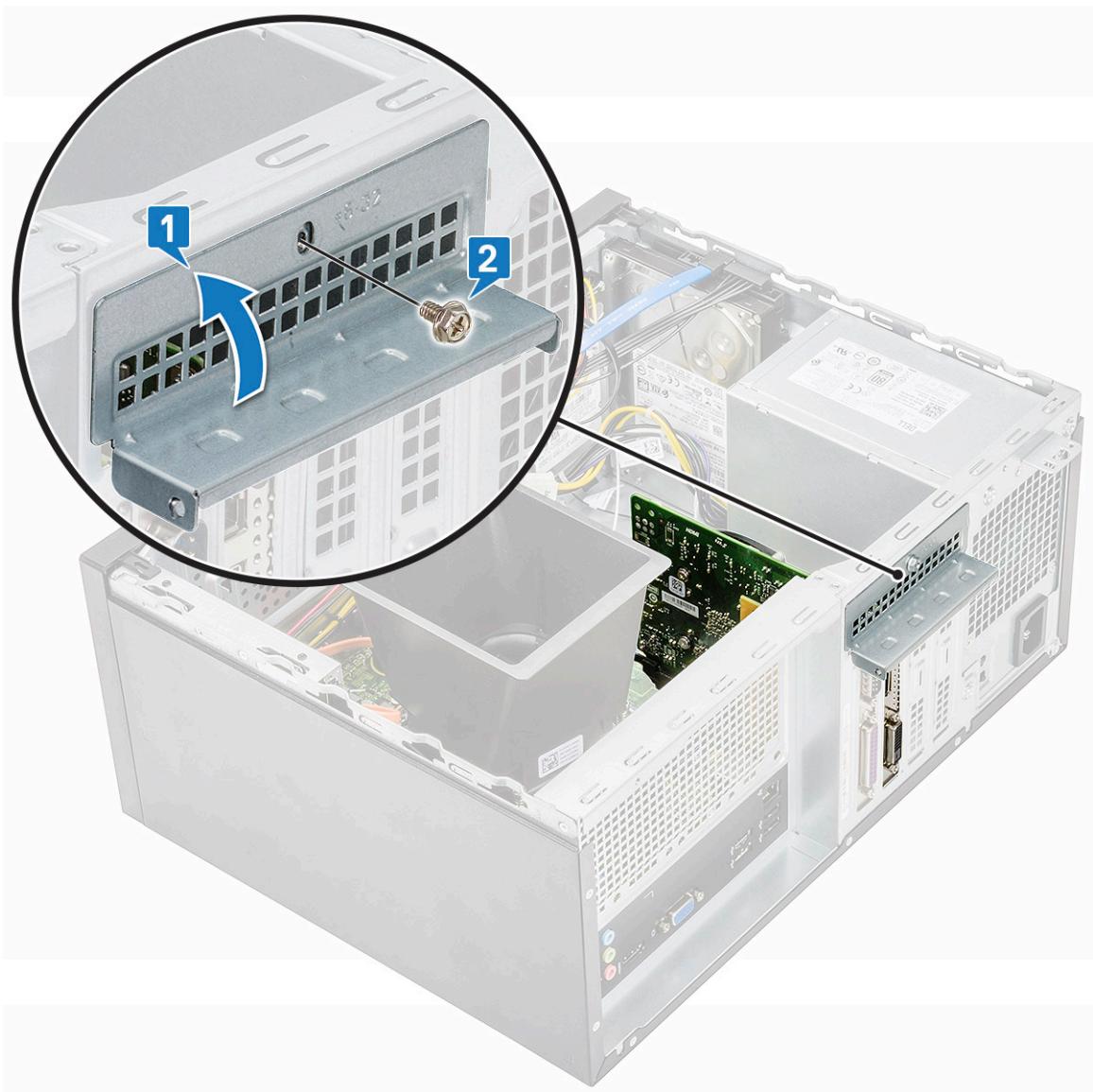


Installing the PCIe expansion card

1. Pull the release latch backward to open.
2. Insert the PCIe expansion card to the connector on the system board.



3. Secure the PCIe expansion card by pushing the card retention latch until it clicks into place.
4. Close the PCIe bracket.
5. Replace the one (6-32x6.35) screw to fix the PCIe bracket

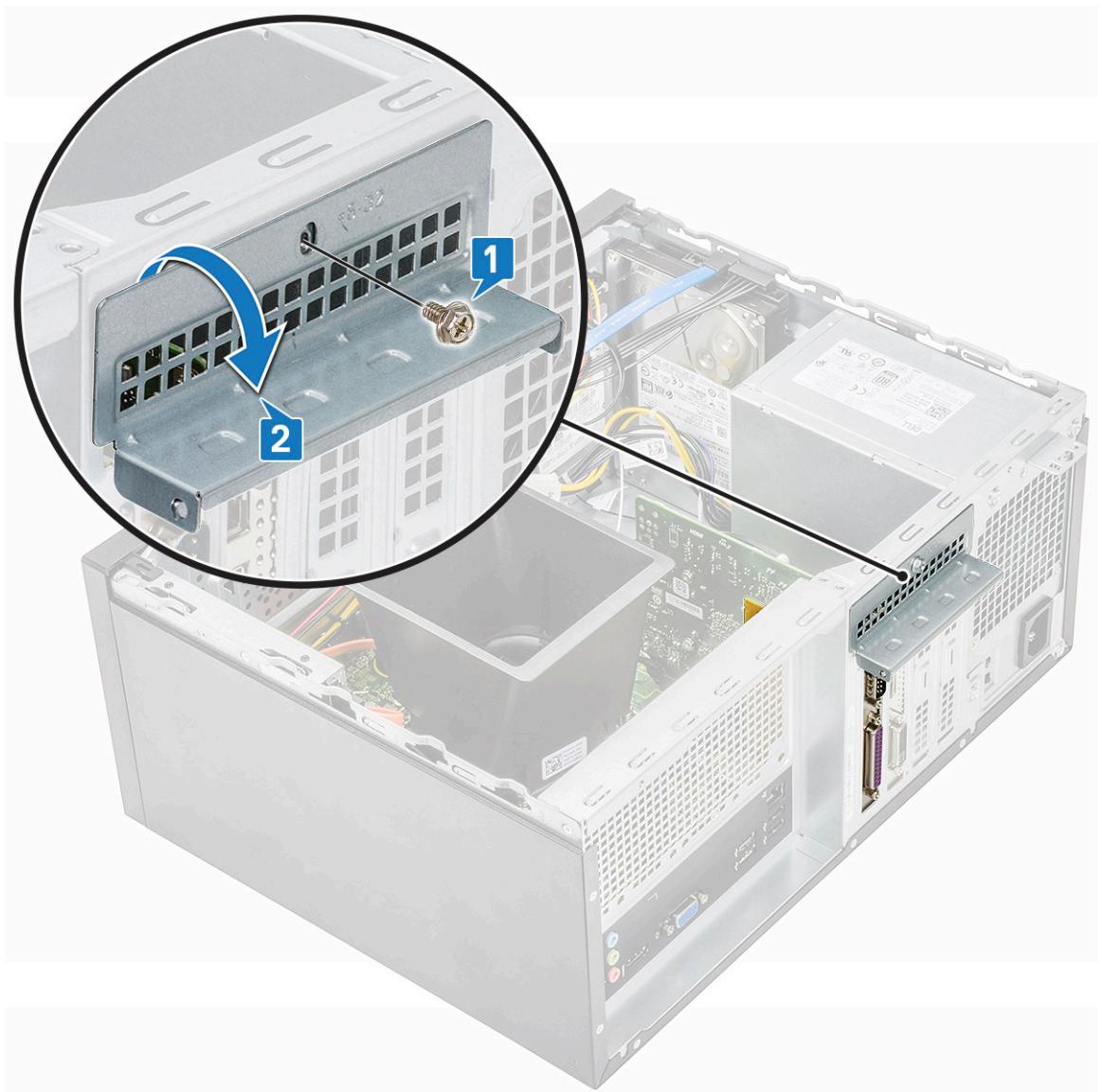


6. Install the:
 - a) [Cover](#)
7. Follow the procedure in [After working inside your computer](#).

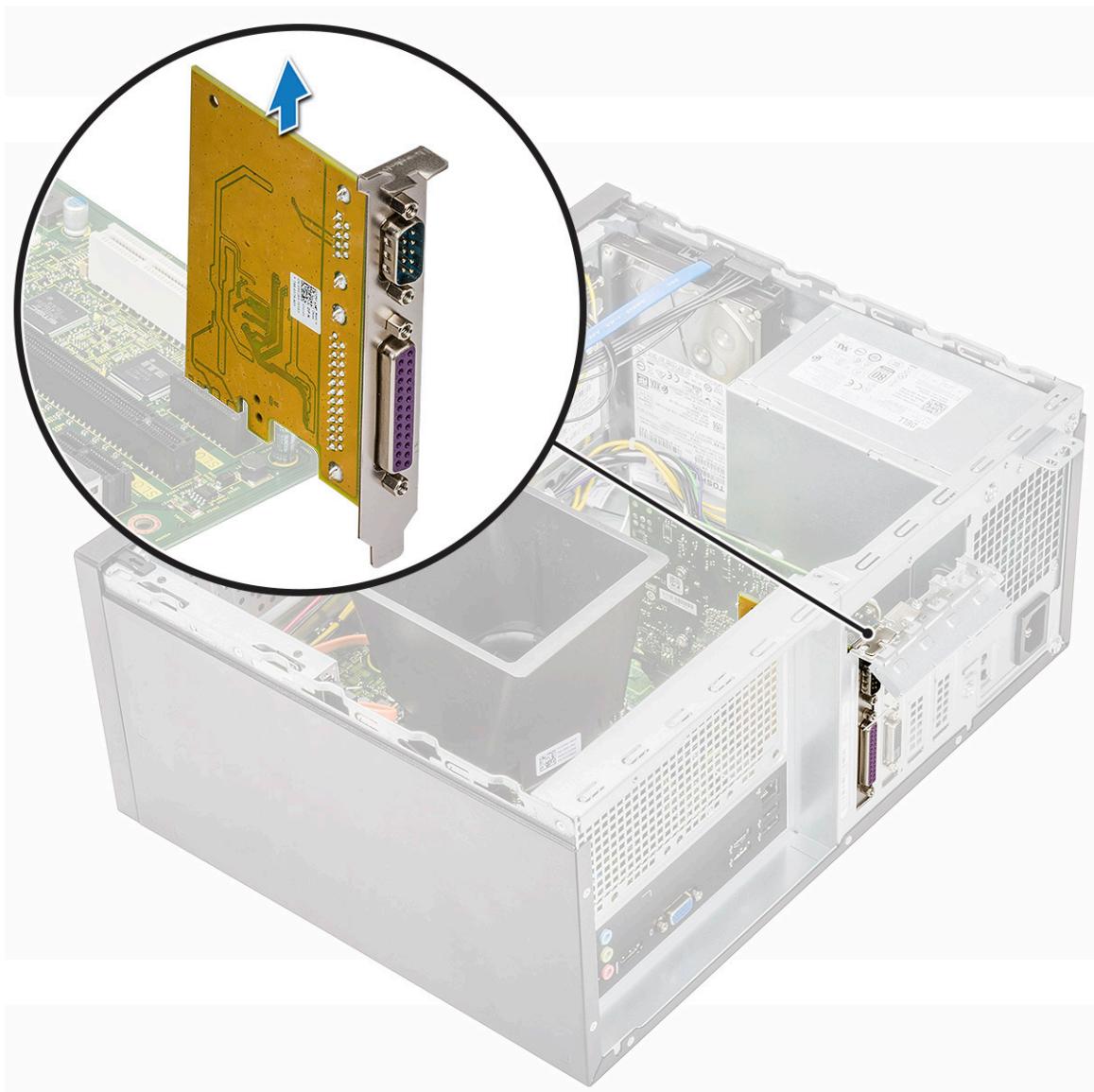
Optional card

Removing the optional card

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
3. To remove the optional card:
 - a) Remove the one (6-32x6.35) screw to remove the PCIe bracket [1, 2].

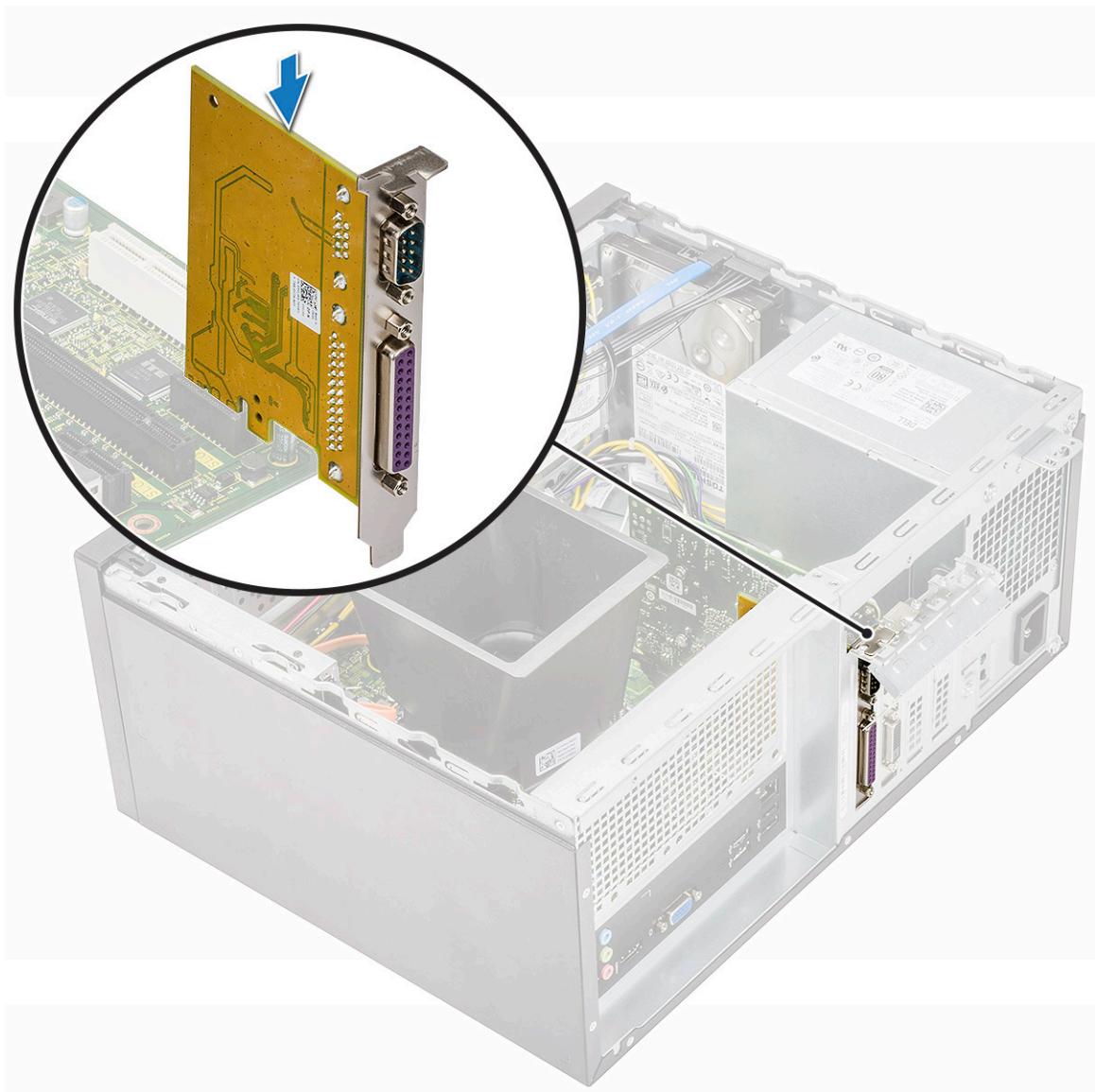


- b) Lift the optional card out of the computer.

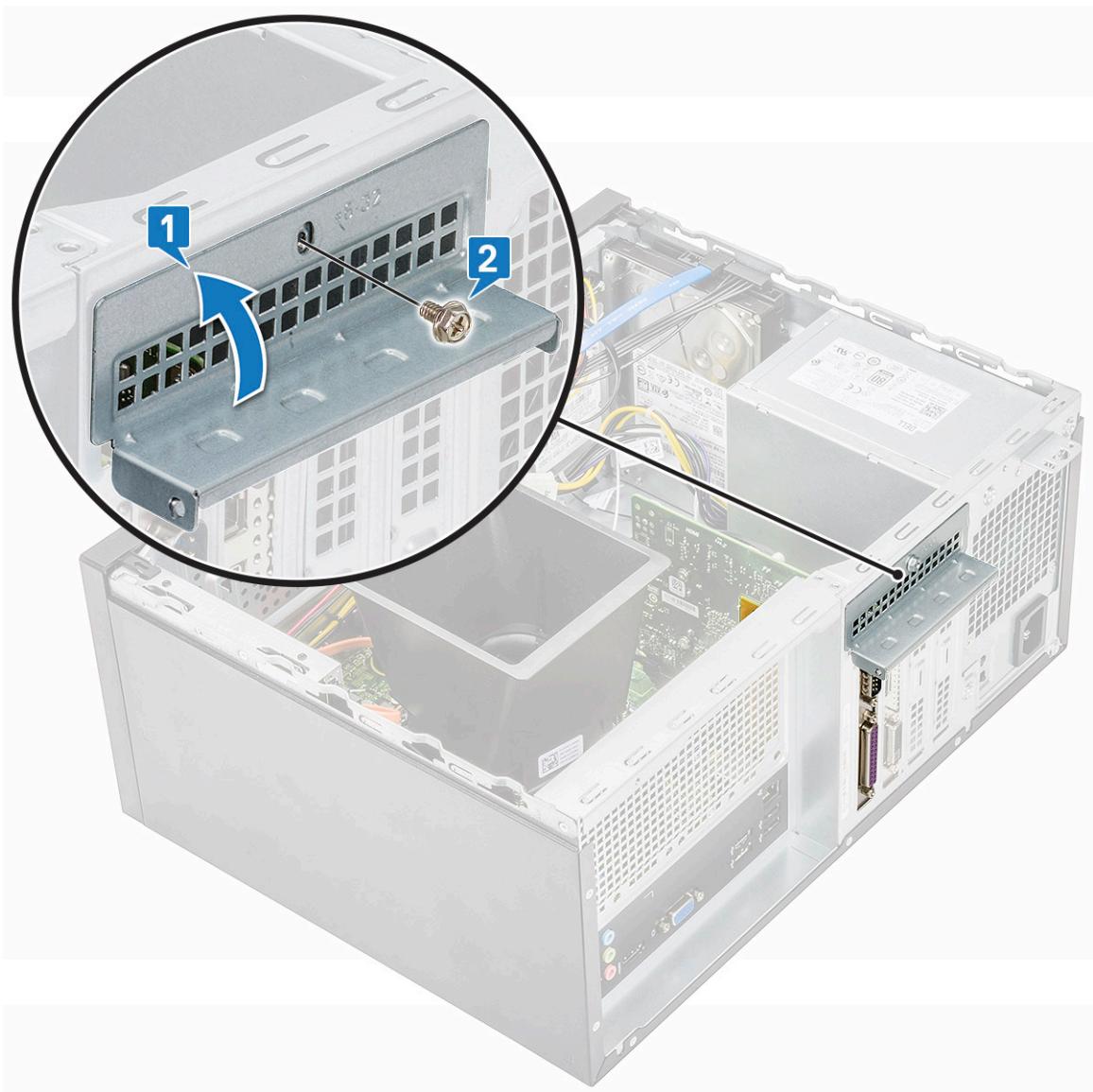


Installing the optional card

1. Insert the optional card to the connector on the system board.



2. Close the PCIe bracket.
3. Replace the one (6-32x6.35) screw to fix the PCIe bracket



4. Install the:
 - a) [Cover](#)
5. Follow the procedure in [After working inside your computer](#).

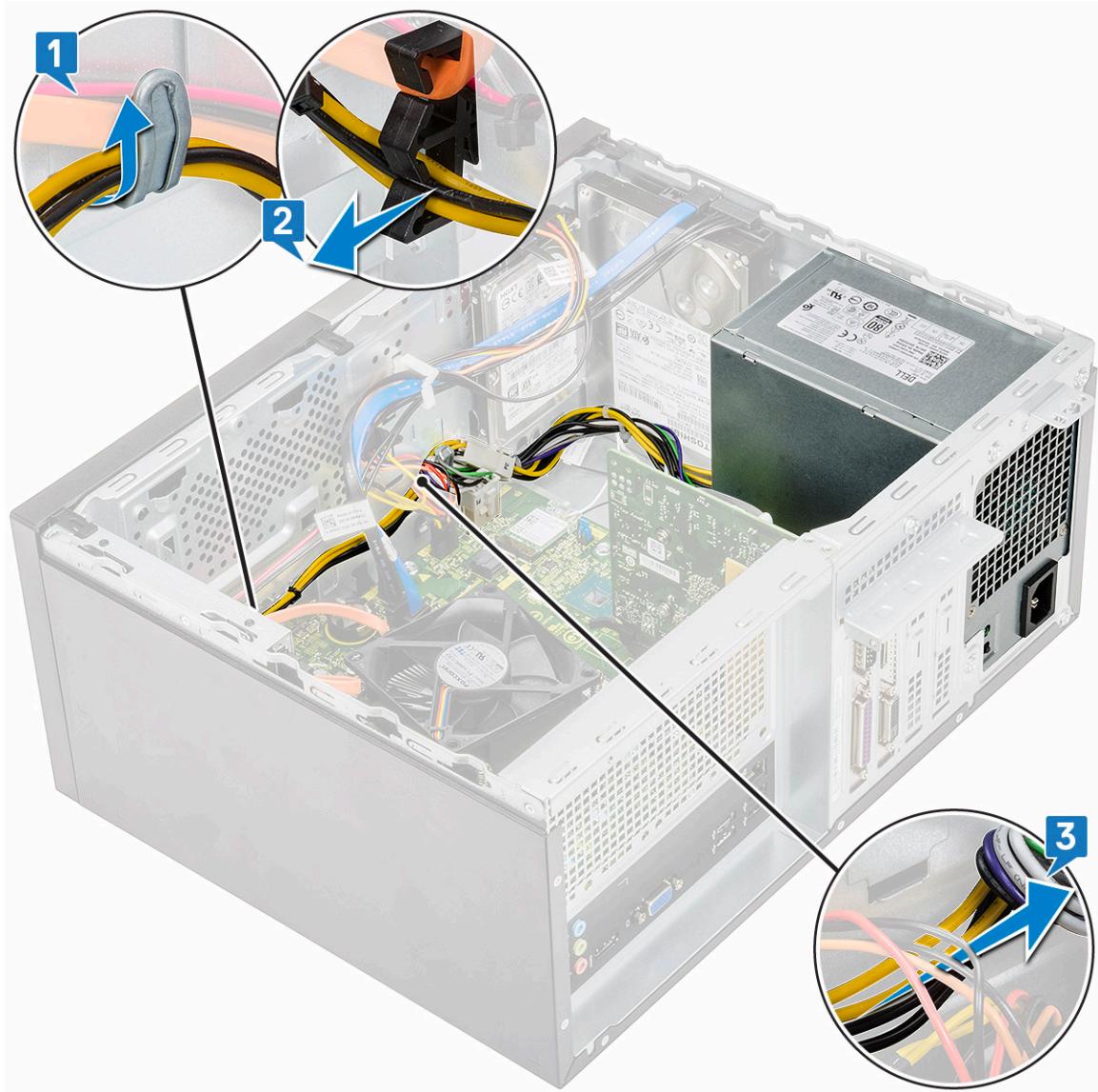
Power supply unit

Removing power supply unit

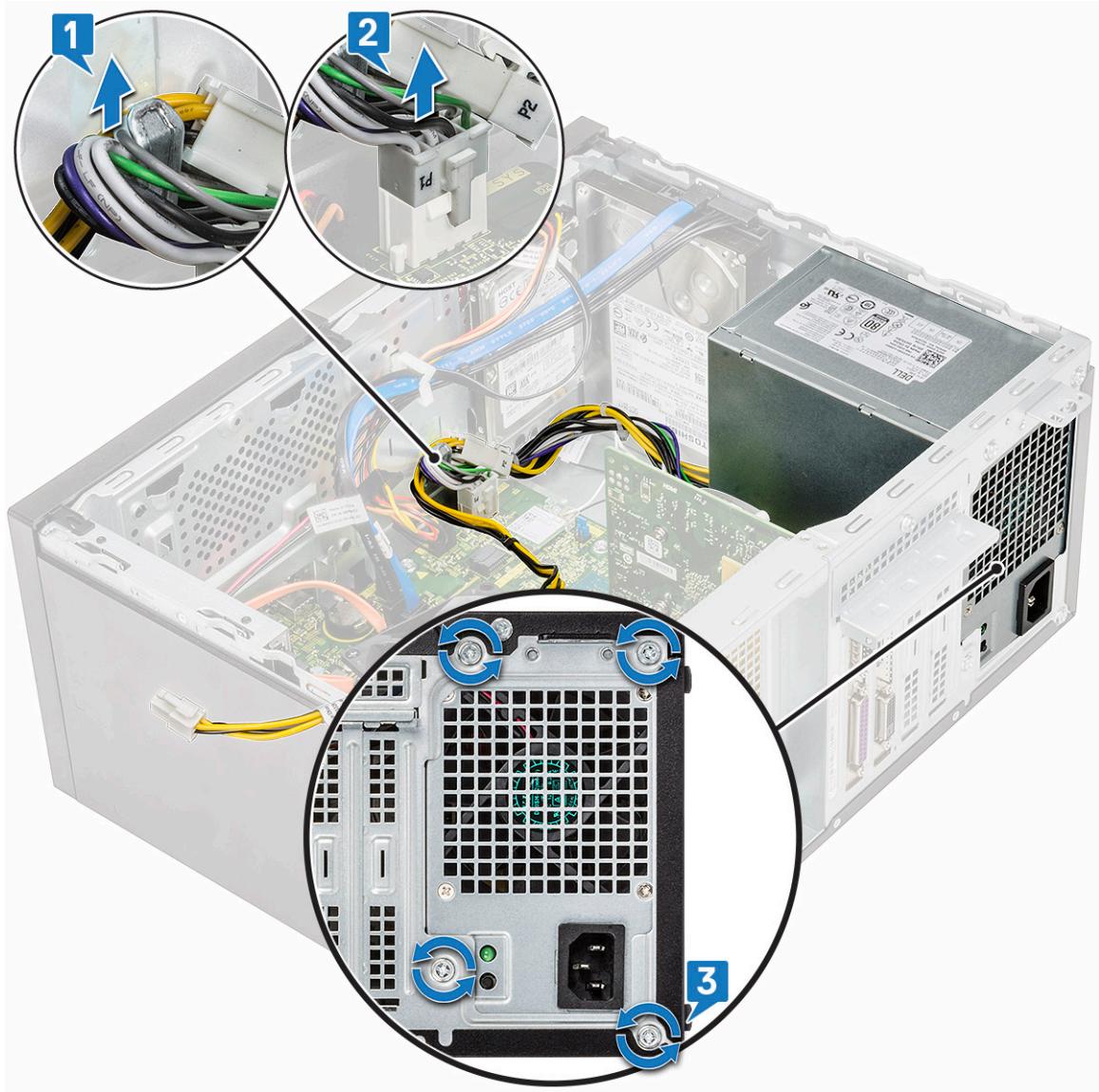
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
 - b) [Cooling shroud](#)
3. Removing the Power supply unit (PSU):
 - a) Disconnect the PSU cables from the connectors on the system board.



- b) Unroute the PSU cables from the retention clips.



- c) Unroute the PSU cable from the metal clip [1], press the tab of the 8-pin power cables and disconnect it from the system board [2], and then remove 4 (6-32x6.35) screws to release the PSU [3].



- d) Press the metal release tab, slide the PSU toward the back and lift it out of the computer.

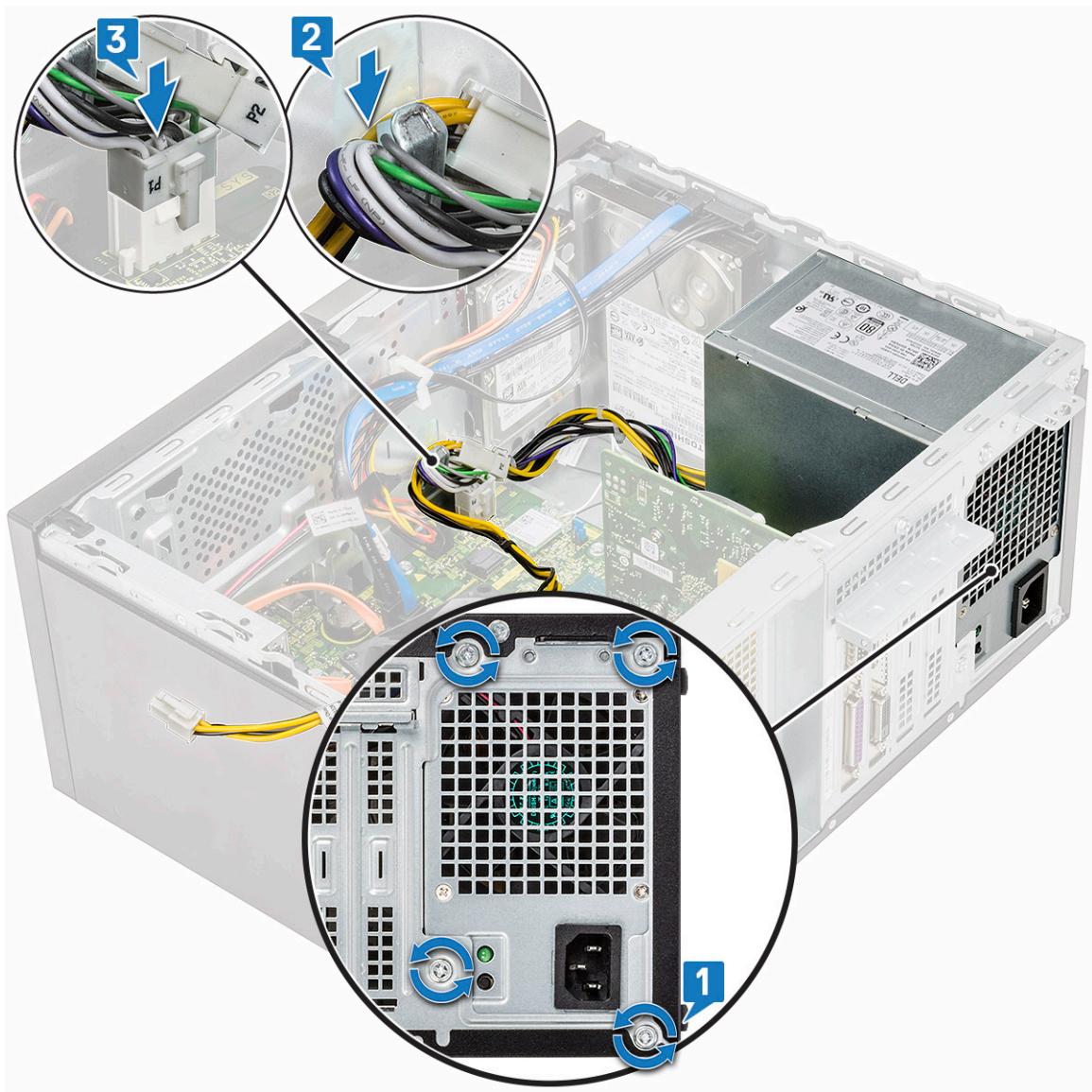


Installing power supply unit

1. Insert the power supply unit (PSU) into the PSU slot and slide it toward the back of the computer until it clicks into place.



2. Tighten the four (6-32x6.35) screws to secure the PSU to the computer [1], route the PSU cable from the metal clip [2] and insert the 8-pin power cables [3].



3. Route the PSU cables through the retention tabs.



4. Connect the PSU cables to the connectors on the system board.

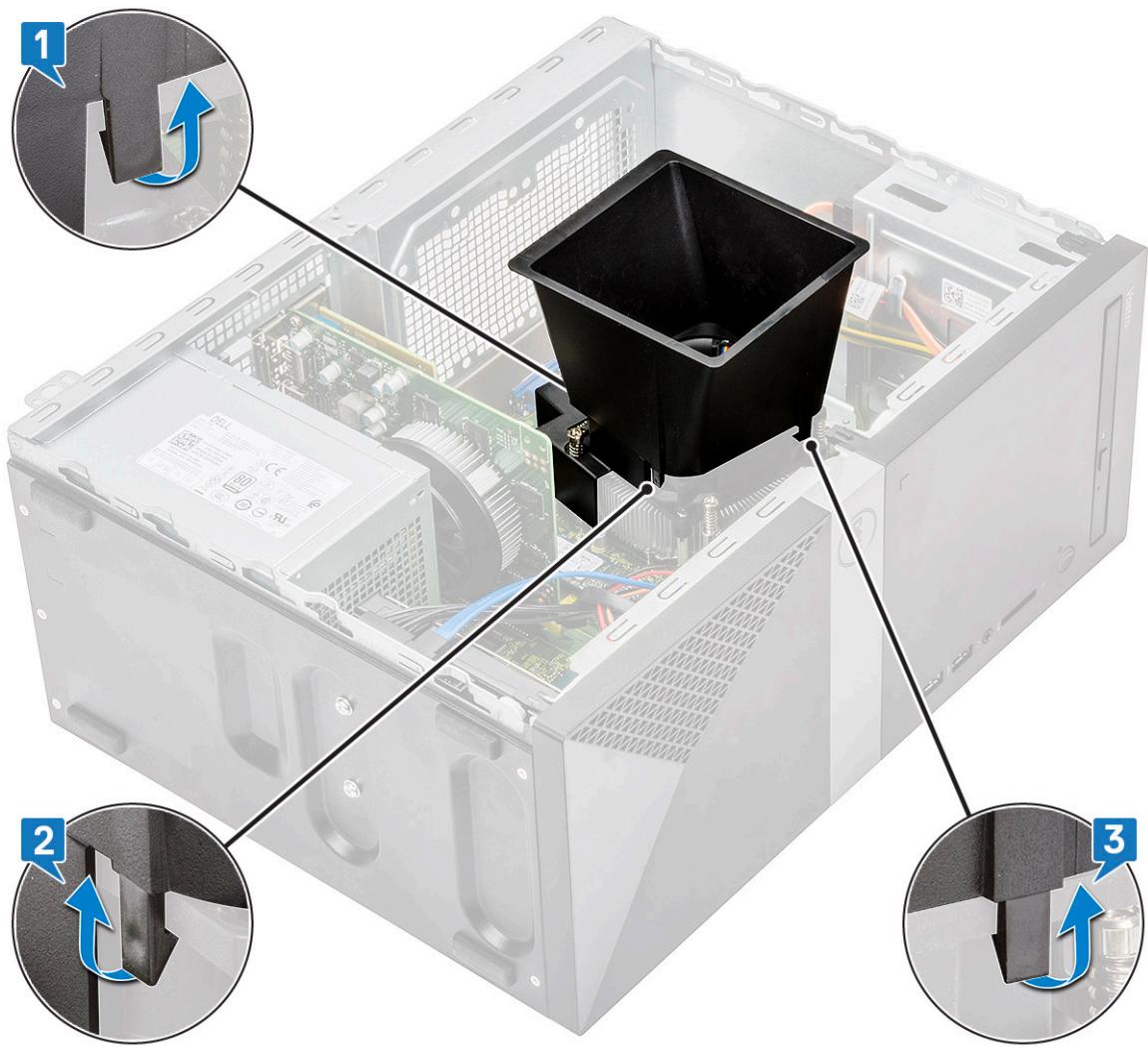


5. Install the:
 - a) [Cooling shroud](#)
 - b) [Cover](#)
6. Follow the procedure in [After working inside your computer](#).

Cooling shroud

Removing the cooling shroud

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
3. To remove the cooling shroud:
 - a) Pry and release the tabs that secure the cooling shroud to the process fan [1, 2, 3].



- b) Lift the cooling shroud away from the computer.



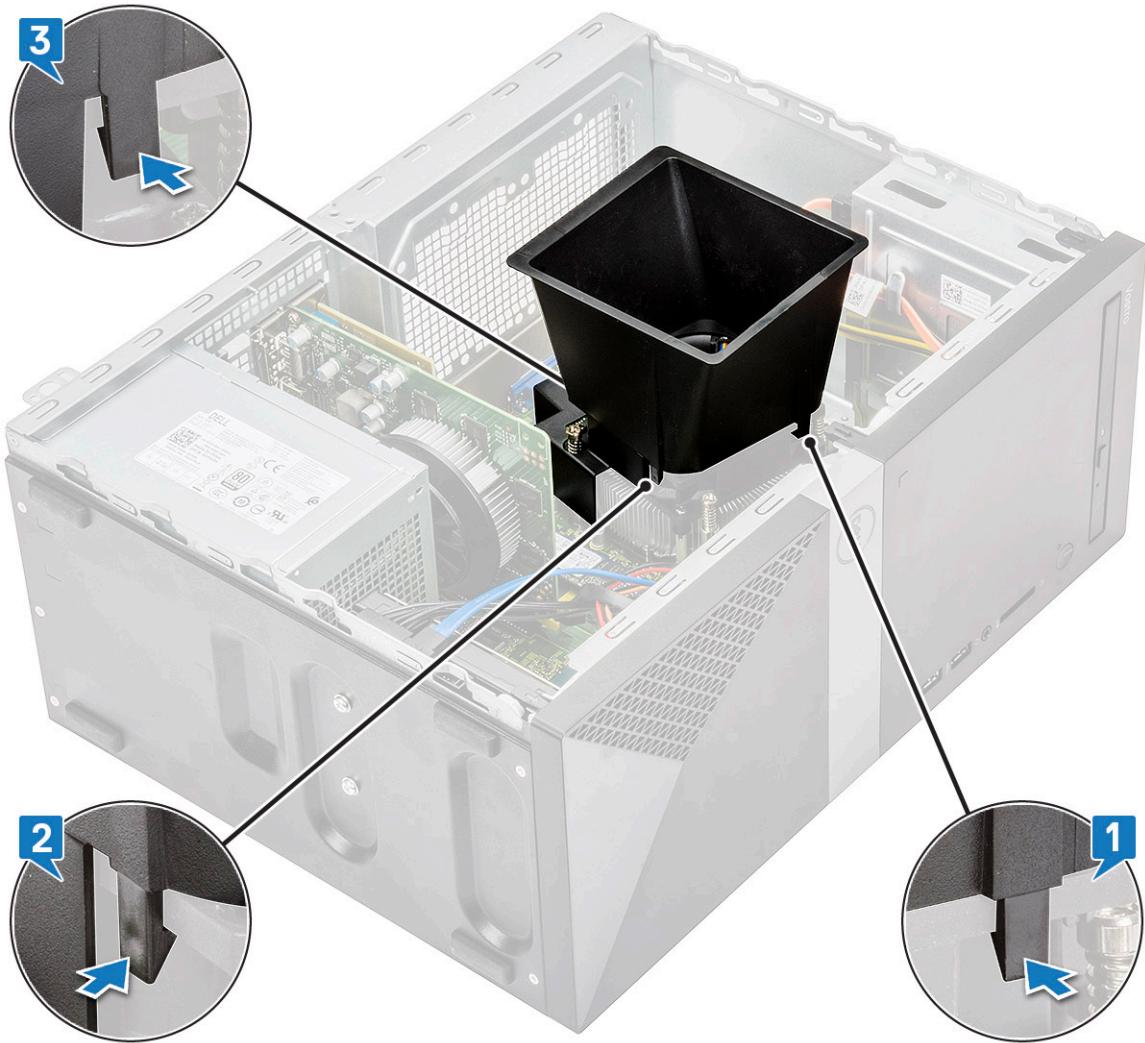
Installing the cooling shroud

1. Align the tabs on the cooling shroud with the securing slots on the computer.

(i) NOTE: Make sure the cooling shroud is placed such that the 'REAR' mark on the cooling shroud is towards the rear side of the system.



2. Lower the cooling shroud into the chassis and press down on the shroud until it snaps into place.



3. Install the:
 - a) [Cover](#)
4. Follow the procedure in [After working inside your computer](#).

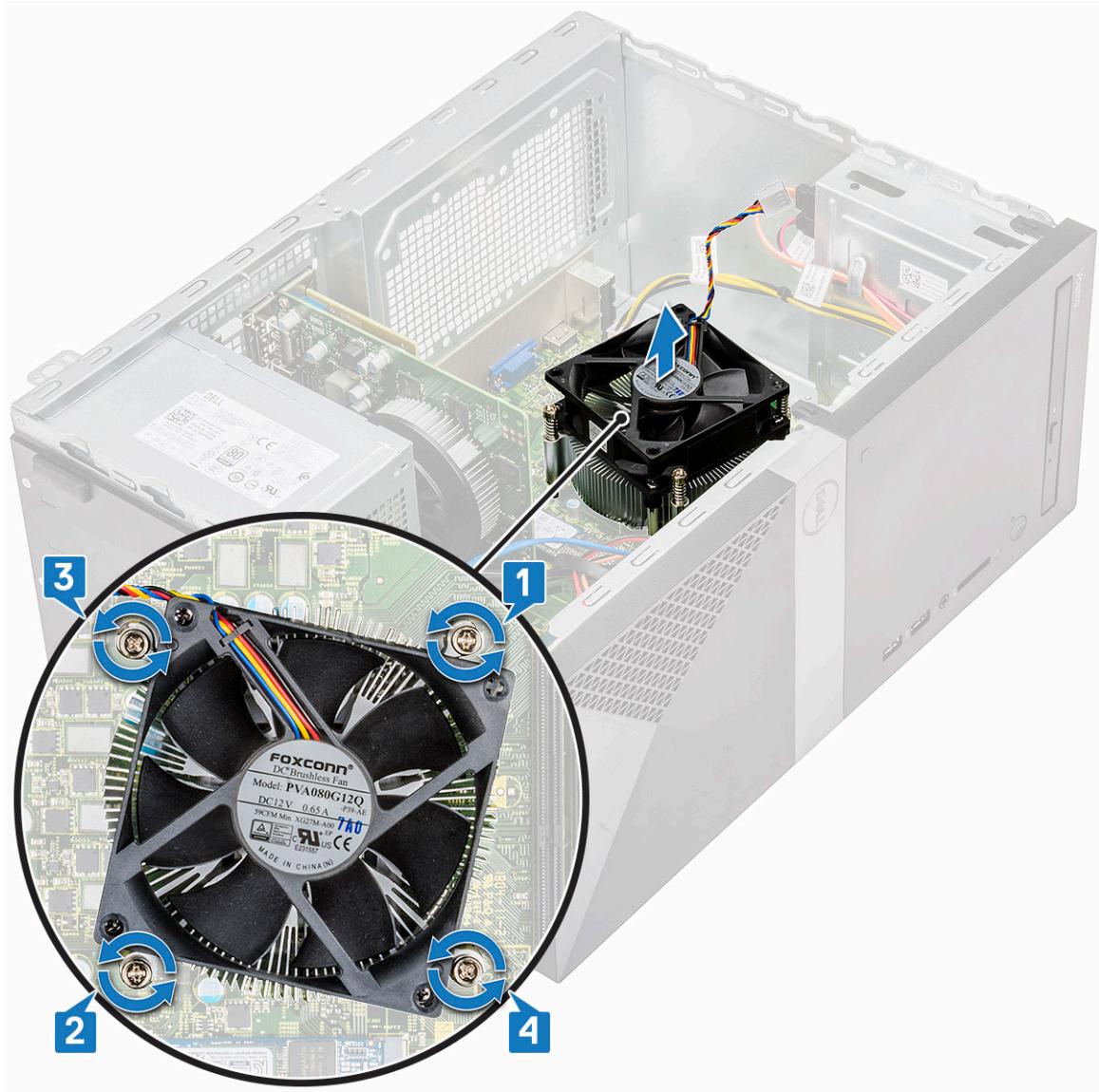
Heat sink assembly

Removing the heat sink assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
 - b) [Cooling shroud](#)
3. To remove the heat sink assembly:
 - a) Disconnect the fan cable from the connector on the system board.



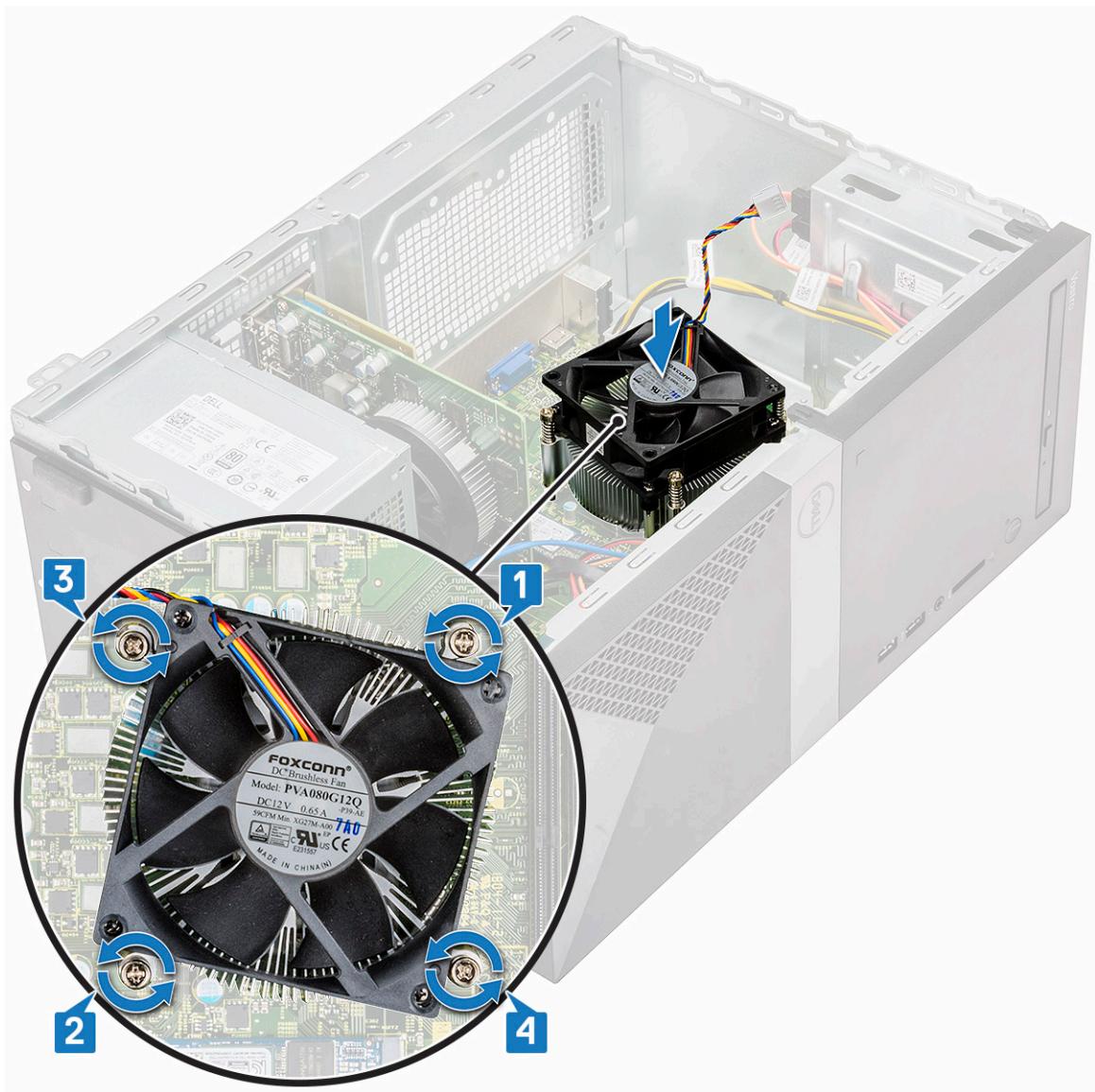
- b) Loosen the 4 M3 screws in reverse order marked on the system board
- i NOTE: Remove the screws that secure the heat sink to the system board in the order of the callouts shown [1, 2, 3, 4].**
- c) Lift the heat sink assembly away from the computer.



Installing the heat sink assembly

1. Align the heat sink assembly with screw holders on the system board.
2. Tighten the four M3 screws to secure the heat sink assembly to the computer and system board.

(i) | NOTE: Tighten the screws on the system board in the order of the callout numbers [1, 2, 3, 4].



3. Connect the fan cable to the connector on the system board.

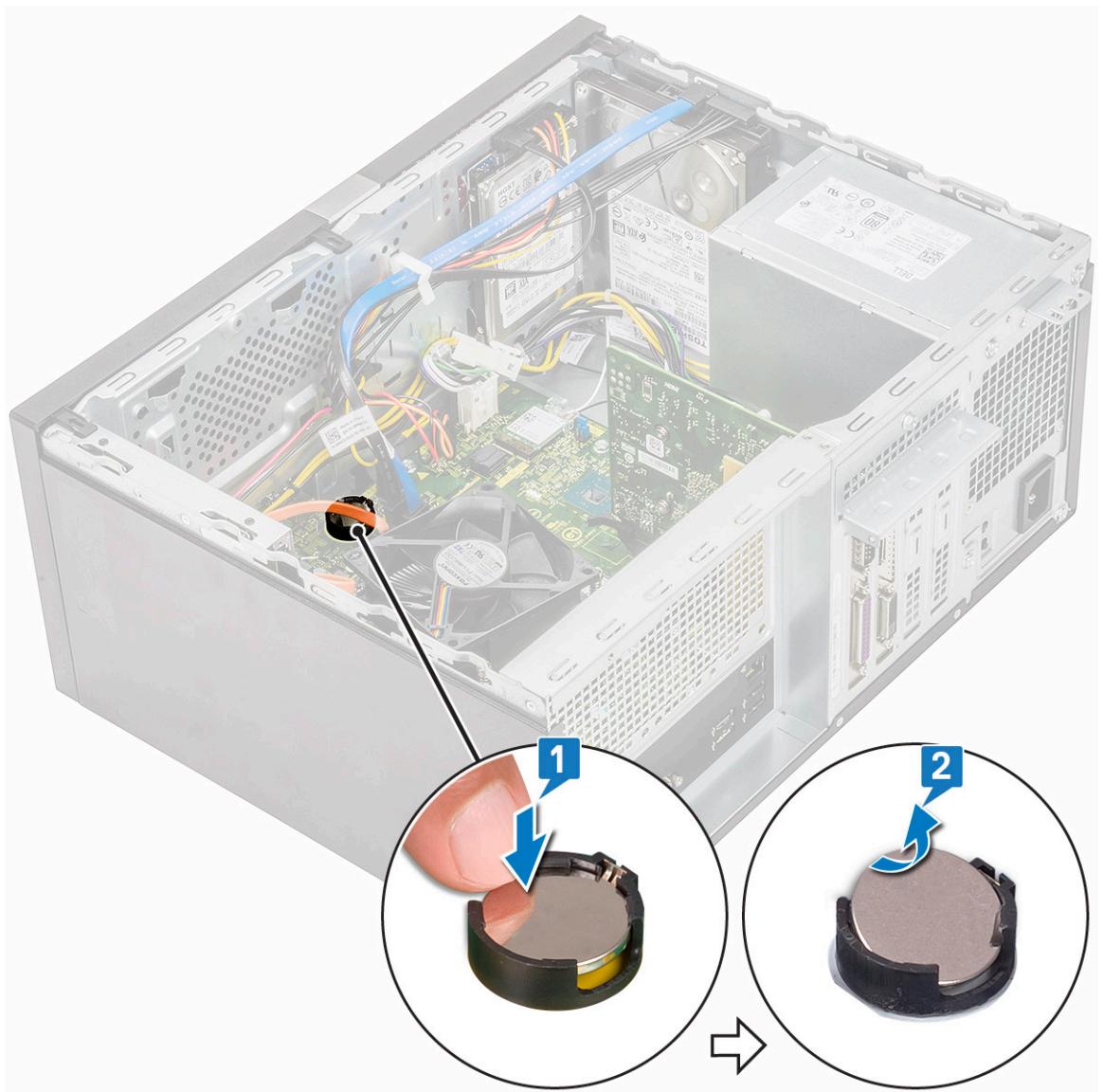


4. Install the:
 - a) [Cooling shroud](#)
 - b) [Cover](#)
5. Follow the procedure in [After working inside your computer](#).

Coin cell battery

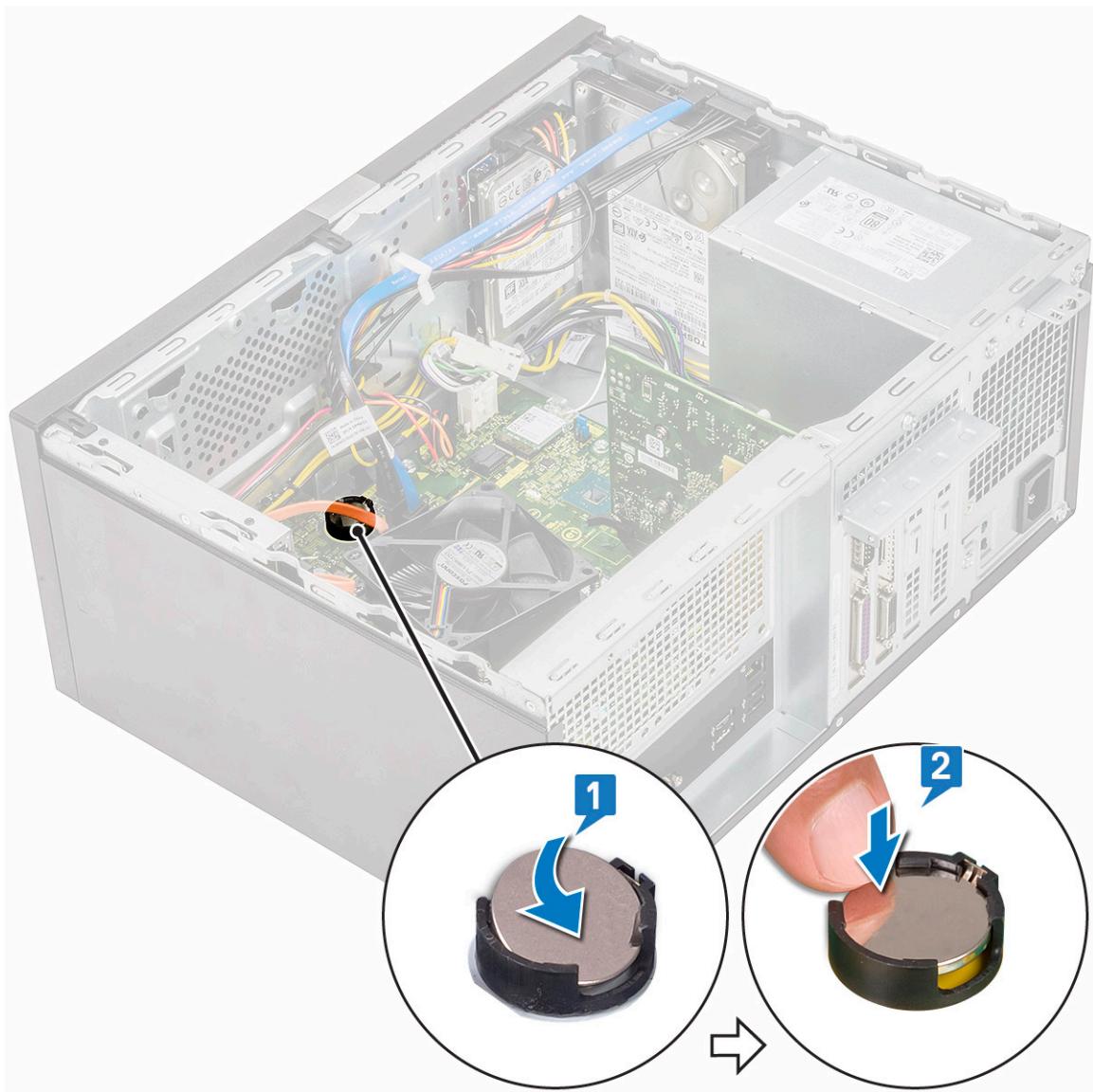
Removing the coin cell battery

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [Cover](#).
3. To remove the coin cell battery:
 - a) Press the side of the battery, that allows the battery to pop-up from the socket [1].
 - b) Lift the coin-cell battery out of the computer [2].



Installing the coin cell battery

1. Place the coin cell battery in its slot on the system board.
2. Press the battery until it snaps back into place.

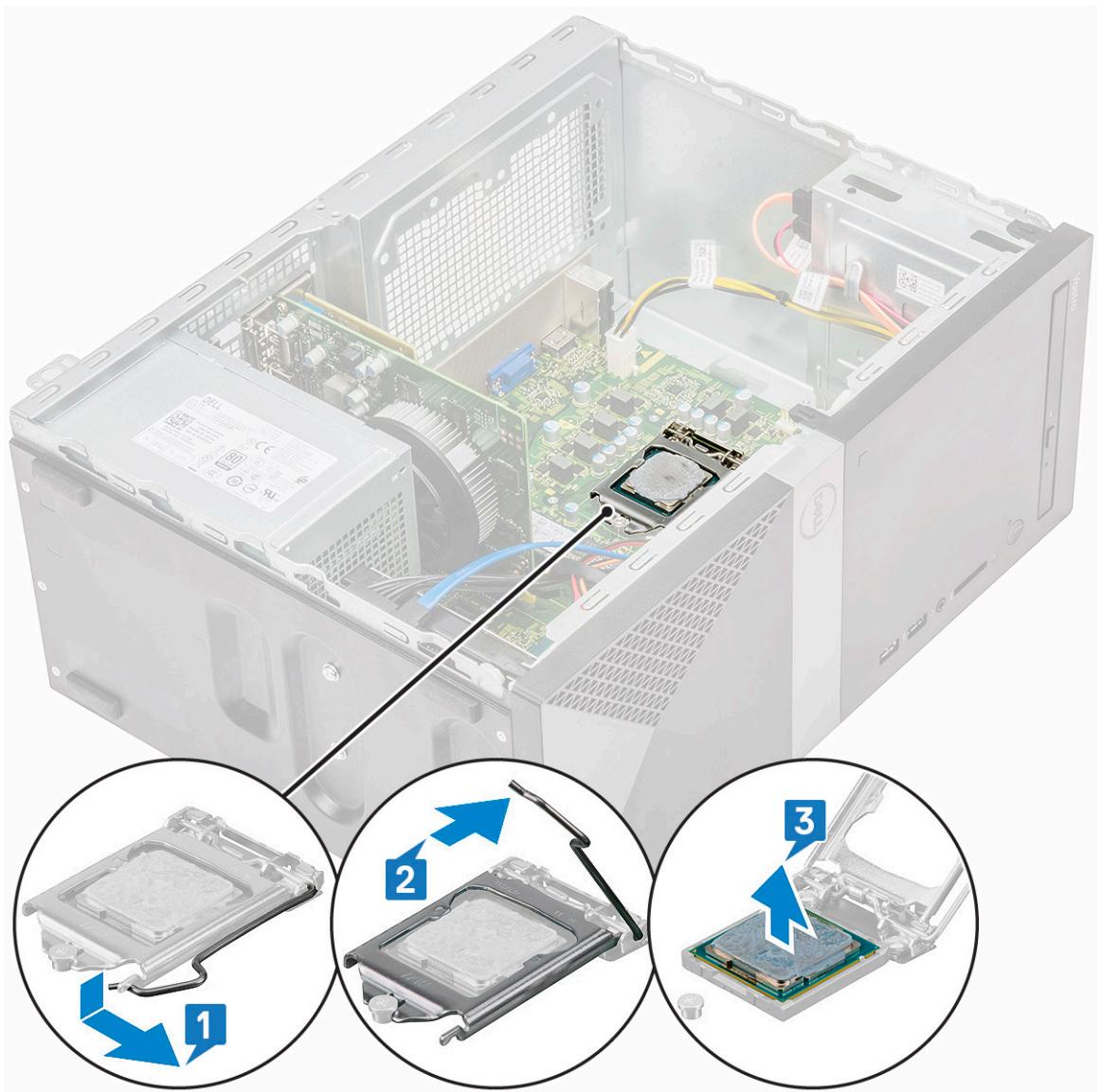


3. Install the [Cover](#).
4. Follow the procedure in [After working inside your computer](#).

Processor

Removing the processor

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) [Cover](#)
 - b) [Cooling shroud](#)
 - c) [Heat sink assembly](#)
3. To remove the processor:
 - a) Press the release lever down and then move it outward to release it from the retention hook [1].
⚠ CAUTION: The processor socket pins 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.
 - b) Lift the processor cover and remove the processor from the socket [2, 3].



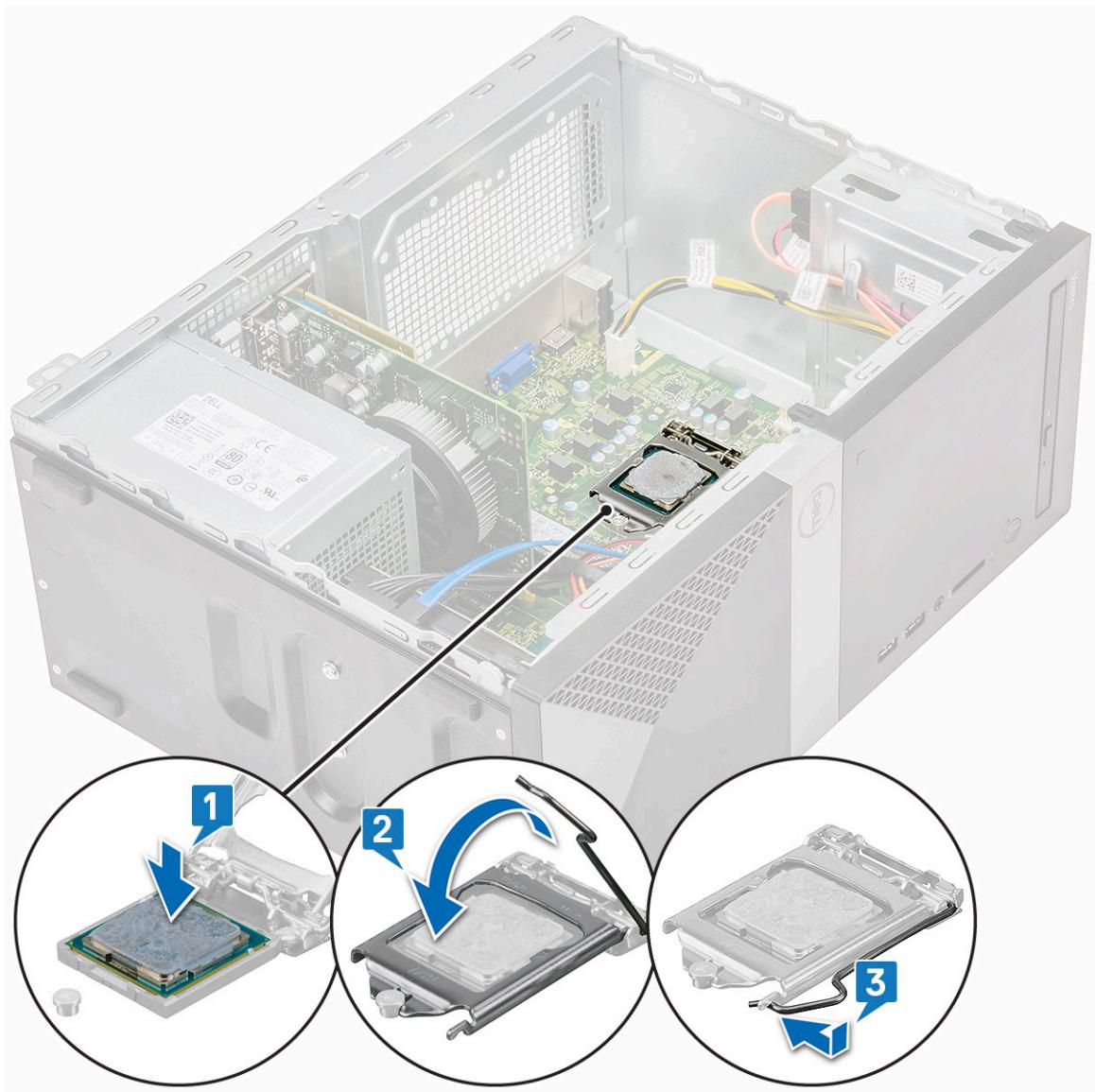
Installing the processor

1. Insert the processor in the processor socket. Ensure the processor is properly seated.

i | NOTE: Align pin 1 on the cpu with pin 1 on the motherboard

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

2. Lower the processor cover.
3. Press the release lever down and then move it inward to secure it with the retention hook.



4. Install the:
 - a) Heat sink assembly
 - b) Cooling shroud
 - c) Cover
5. Follow the procedure in [After working inside your computer](#).

System board

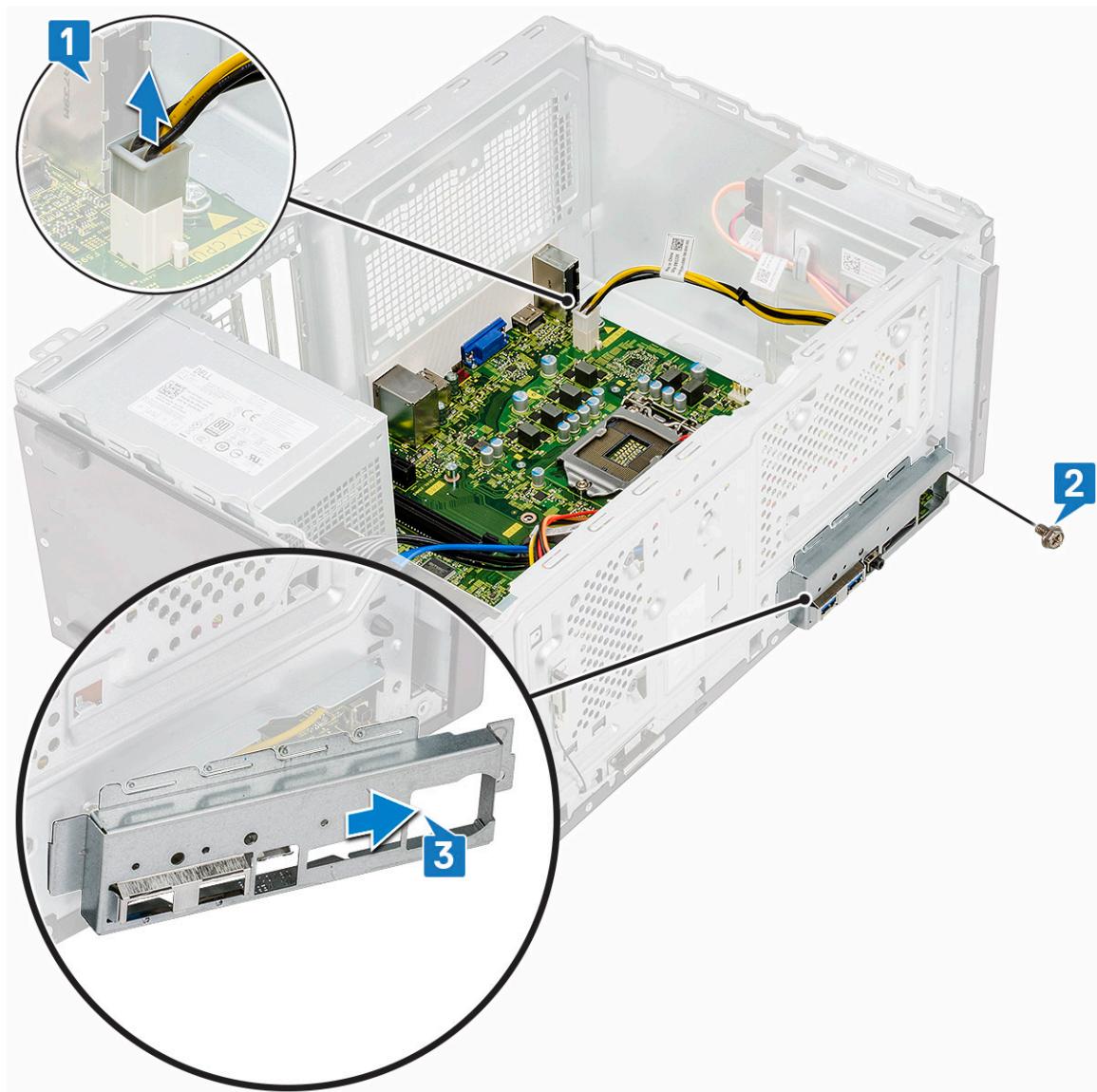
Removing the system board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a) Cover
 - b) Front bezel
 - c) SSD
 - d) WLAN
 - e) Memory module
 - f) Expansion card
 - g) Cooling shroud

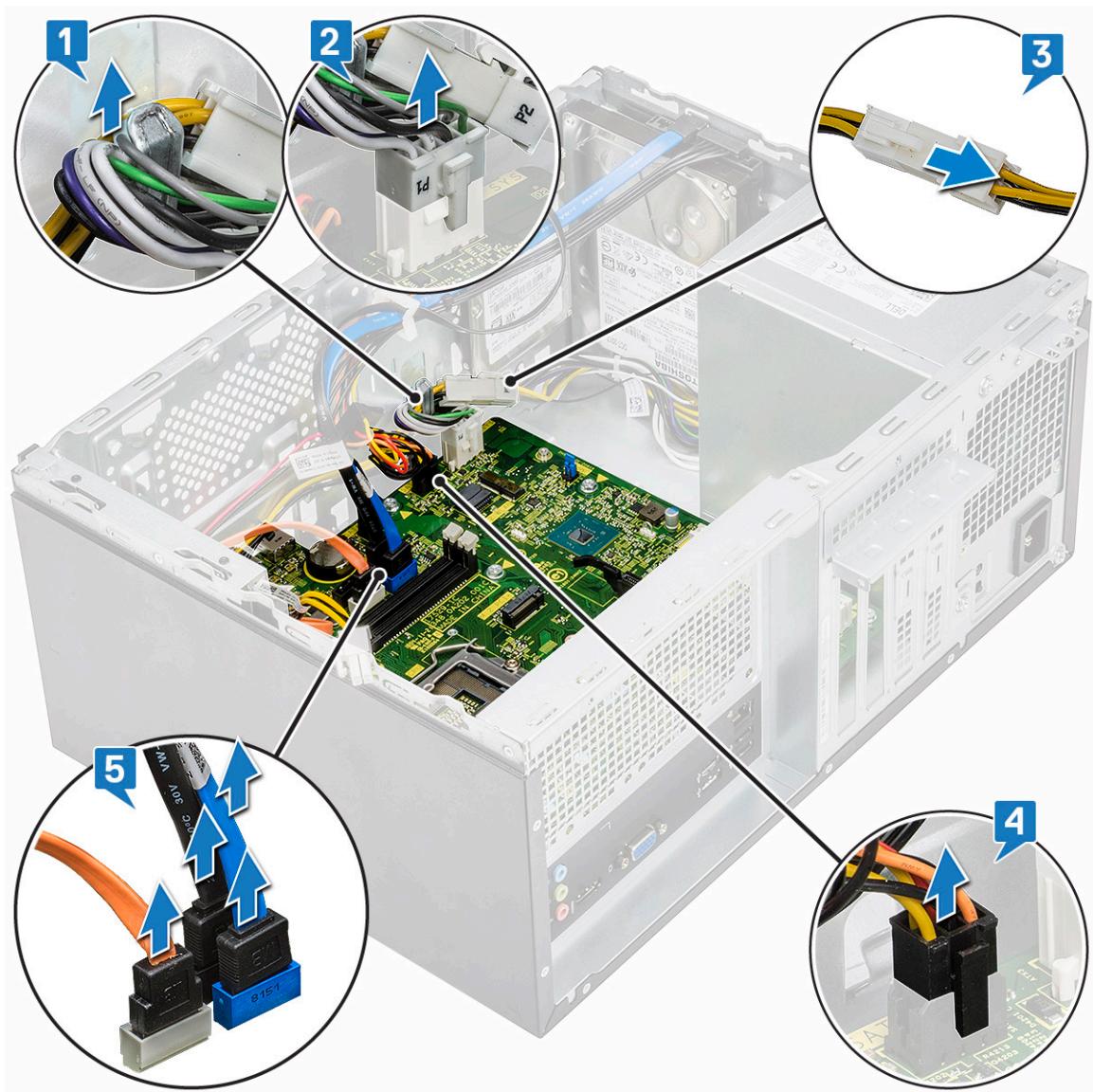
h) Heat sink assembly
i) Processor

3. To remove I/O panel cover:

- a) Disconnect the cable from the system board [1]
- b) Remove the one (6-32x6.35) screw that secures the I/O panel cover to the computer [2].
- c) Slide the I/O panel cover [3].



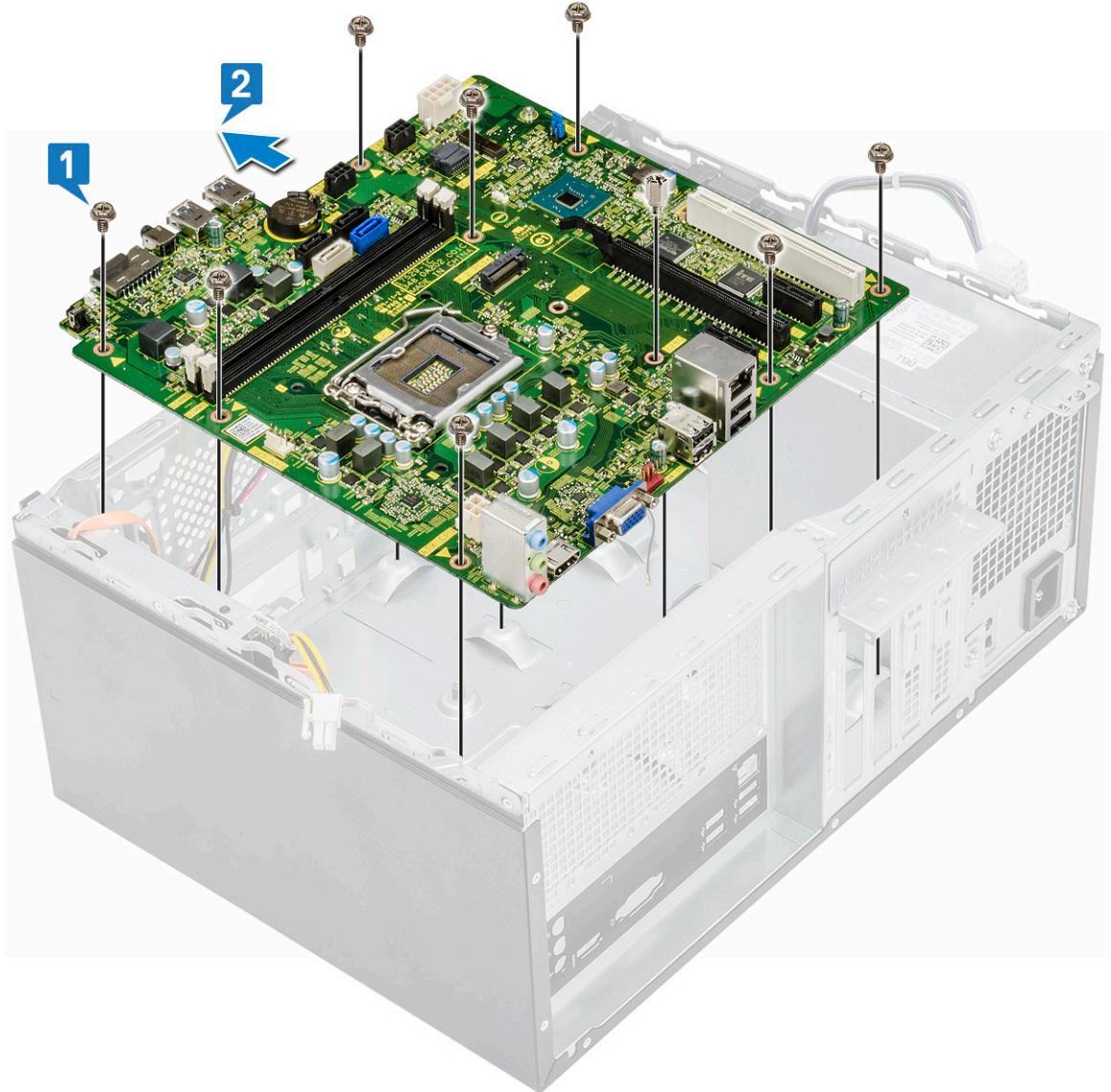
4. Unroute and disconnect the hard drive power cable, hard drive data cable, optical drive power cable, power supply unit cable [1, 2, 3, 4, 5].



5. To remove the system board:

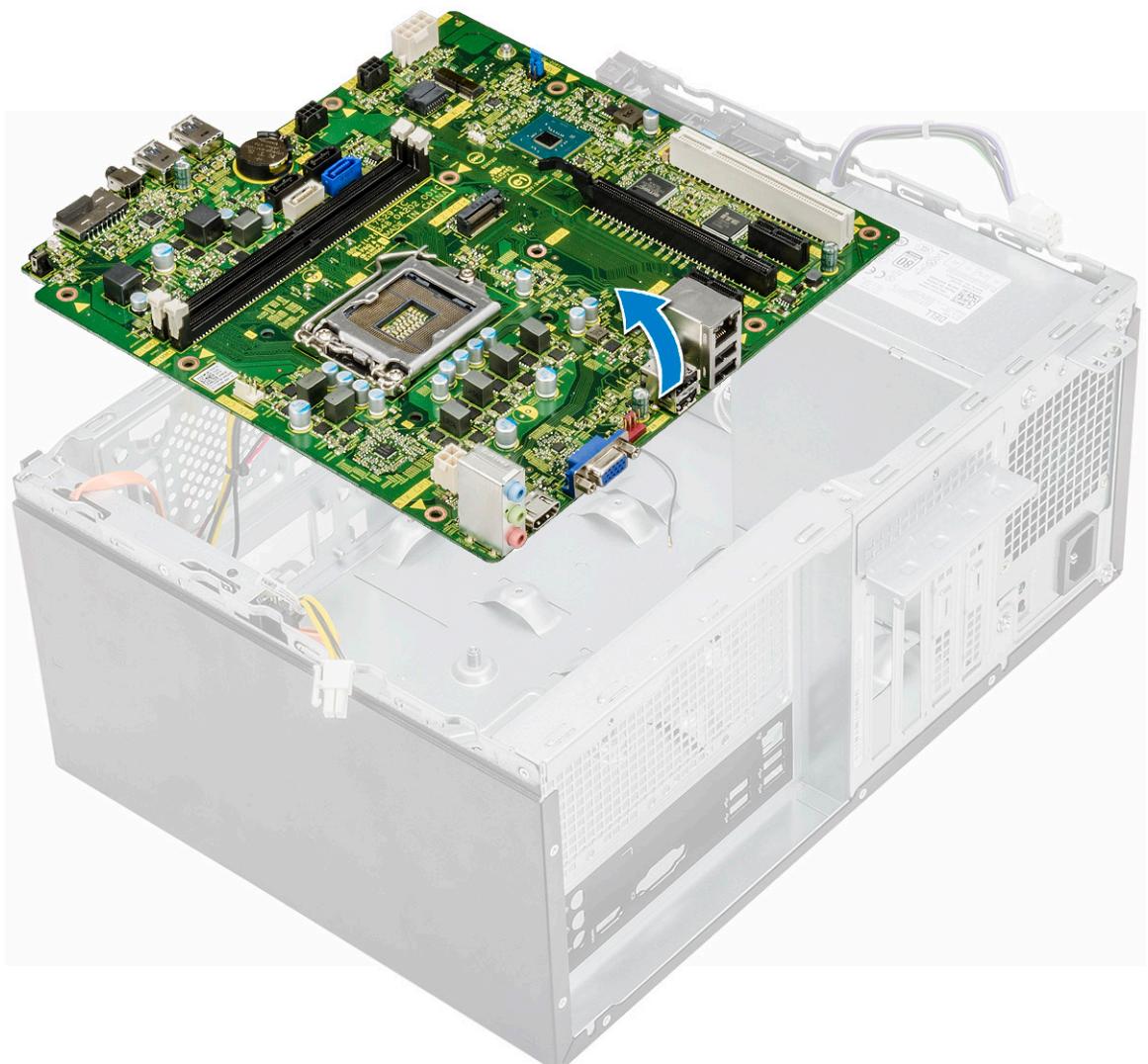
- Remove the eight (6-32x6.35) screws and one (6-32x4.8) screw for M2.SSD that secure the system board to the computer [1, 2].





- b) Tilt the system board at 45–degrees, and then lift the system board out of the computer.





Installing the system board

1. Align the system board to the port connectors on the rear of the chassis and place the system board in the chassis.



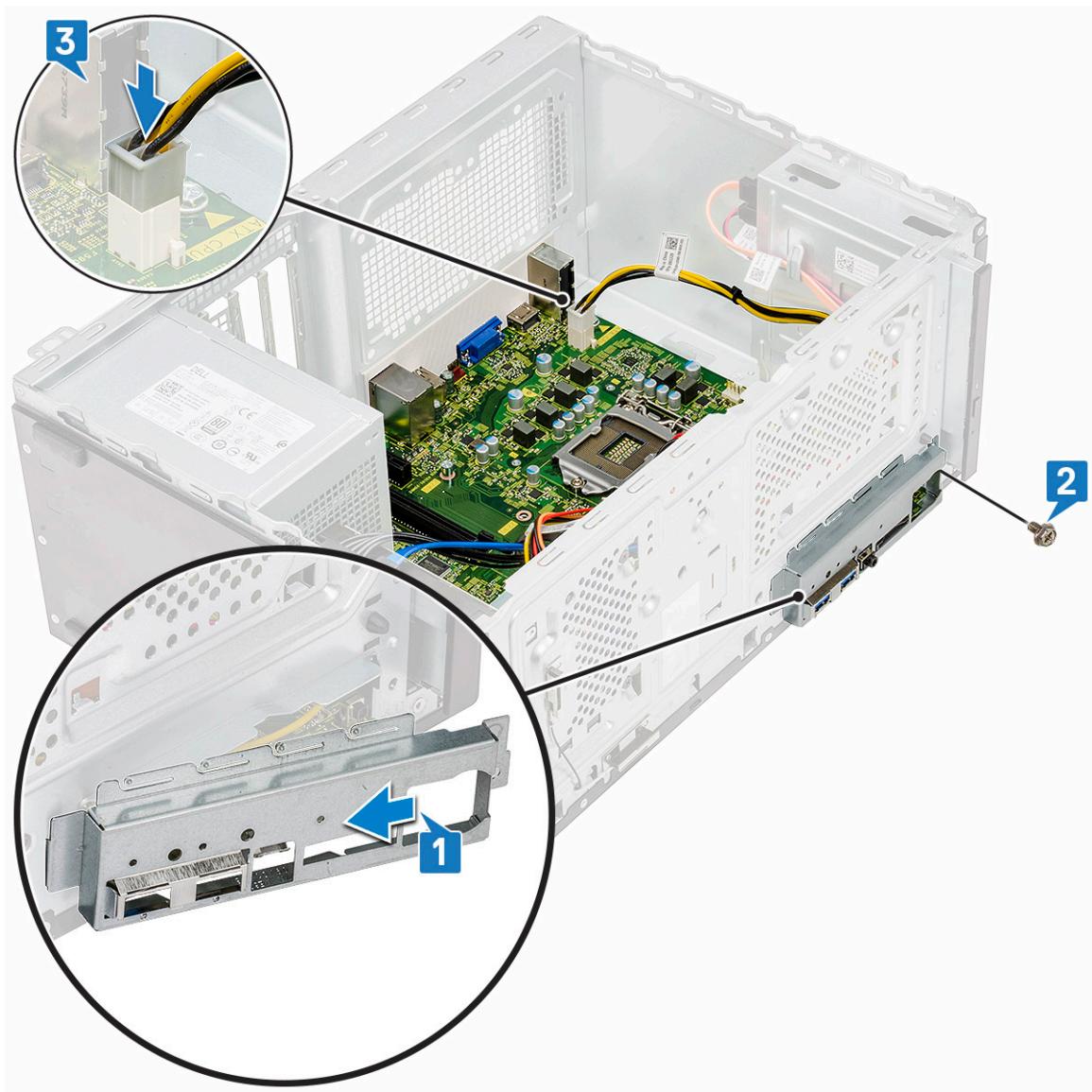
2. Tighten the eight (6-32x6.35) screws and one (6-32x4.8) screw for M2.SSD that secures the system board to the chassis.



3. Connect the hard drive, optical drive, power supply unit cable and speaker cables to the system board.



4. Place the I/O port bracket [1] and tighten the screw (6-32x6.35) [2] and connect the cable to the system board [3].



5. Install the:
 - a) Processor
 - b) Heat sink assembly
 - c) Cooling shroud
 - d) Expansion card
 - e) Memory module
 - f) WLAN
 - g) SSD
 - h) Front bezel
 - i) Cover
6. Follow the procedure in [After working inside your computer](#).

Troubleshooting

Enhanced Pre-Boot System Assessment — ePSA diagnostics

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

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

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

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

Running the ePSA Diagnostics

1. Invoke diagnostics boot by either of the methods suggested above
 2. Once on one time boot menu use up/down arrow key to navigate to ePSA or diagnostics and press <return> key to launch Fn+PWR will flash diagnostics boot selected on screen and launch ePSA/diagnostics directly.
 3. On the boot menu screen, select the **Diagnostics** option.
 4. Press the arrow in the lower-right corner to go to the page listing.
The items detected are listed and will be tested
 5. If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.
- To run a diagnostic test on a specific device
6. Press Esc and click **Yes** to stop the diagnostic test.
 7. Select the device from the left pane and click **Run Tests**.
 8. Repeat Step 4 and Step 8

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 3. Diagnostics

Number of LED flashes	Problem description
2 amber, 1 amber	Motherboard failure
2 amber, 2 amber	Motherboard, PSU or PSU Cabling failure

Number of LED flashes	Problem description
2 amber, 3 amber	Motherboard, Memory or CPU failure
2 amber, 4 amber	CMOS battery failure

Diagnostic error messages

Table 4. 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 .

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

Error messages	Description
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 5. System error messages

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

System message	Description
No timer tick interrupt	<ul style="list-style-type: none">• 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.
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	A chip on the system board might be malfunctioning or motherboard failure.
	S.M.A.R.T error, possible hard disk drive failure.

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.