OptiPlex 3050 Tower

Owner's Manual

Regulatory Model: D18M
Regulatory Type: D18M003

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.

2018 - 08

Rev. A02

Contents

1

Working on your computer

Safety instructions

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

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

WARNING: Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the power source.

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

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

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

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

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

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

Before working inside your computer

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

1 Ensure that you follow the Safety Instruction.
2 Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
3 Turn off your computer.
4 Disconnect all network cables from the computer.

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

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

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

Turning off your computer

Turning off your computer — Windows 10

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer.

1 Click or tap  .

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

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

Turning off your computer — Windows 7

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer.

1 Click **Start**.

2 Click **Shut Down**.

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

After working inside your computer

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

1 Connect any telephone or network cables to your computer.

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

2 Connect your computer and all attached devices to their electrical outlets.

3 Turn on your computer.

4 If required, verify that the computer works correctly by running **ePSA diagnostics**.

Disassembly and reassembly

Recommended tools

The procedures in this document require the following tools:

- Small flat blade screwdriver
- Phillips # 1 screwdriver
- Small plastic scribe

Back cover

Removing cover

1 Follow the procedure in Before working inside your computer.

2 To release the cover:
   a Loosen the captive screws securing the cover to the computer [1].
   b Slide the cover toward the back of the computer [2].

3 Lift the cover to remove it from the computer.

Installing cover

1 Place the cover on the computer and slide the cover forward until it clicks into place.
2 Tighten the captive screws to secure the cover to the computer.
3 Follow the procedure in After working inside your computer.

Bezel

Removing bezel

1 Follow the procedure in Before working inside your computer.
2 Remove the cover.
3 To remove the bezel:
   a Lift the tabs and rotate the bezel to release the bezel from the chassis [1,2].

b Pull the bezel to release the tab holders on the front bezel from the slots on the chassis.

Installing bezel

1 Position the bezel to align the tab holders on the chassis.
2 Press the bezel until the tabs click into place.
3 Install the cover.
4 Follow the procedure in After working inside your computer.

Opening the front panel door

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

NOTE: All pictures shown are for illustration purposes only. Actual product may vary depending on product model, configuration, features and/or product enhancements.

3 Pull the front panel door to open it.

Storage

Removing 3.5–inch hard drive

1 Follow the procedure in Before working inside your computer.

2 Remove the:

a cover

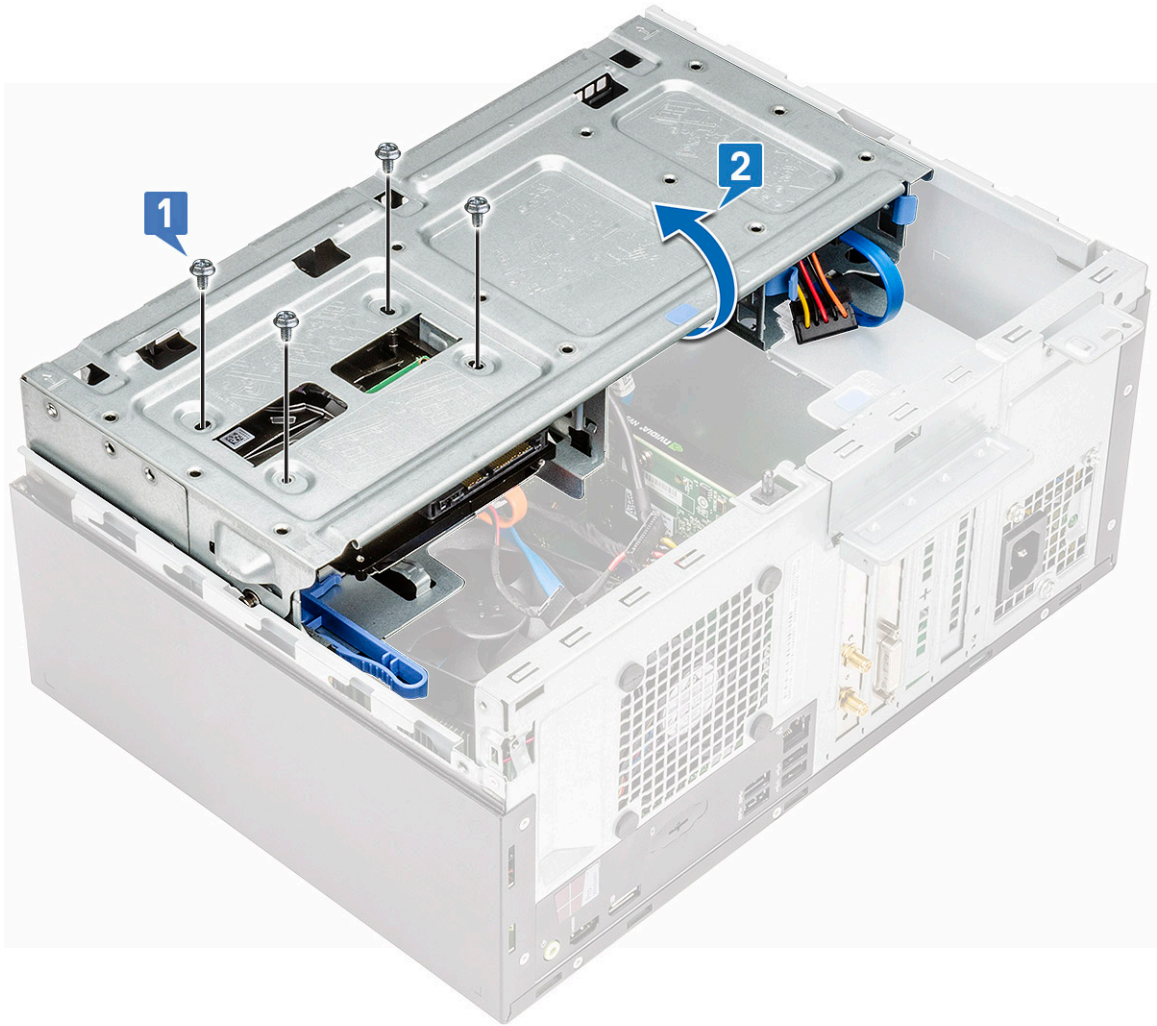
b bezel

3 **NOTE: All pictures shown are for illustration purposes only. Actual product may vary depending on product model, configuration, features and/or product enhancements.**

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 screws that secure the hard drive to the chassis [1] and open the front panel door [2].



c Slide the hard drive out from the chassis.

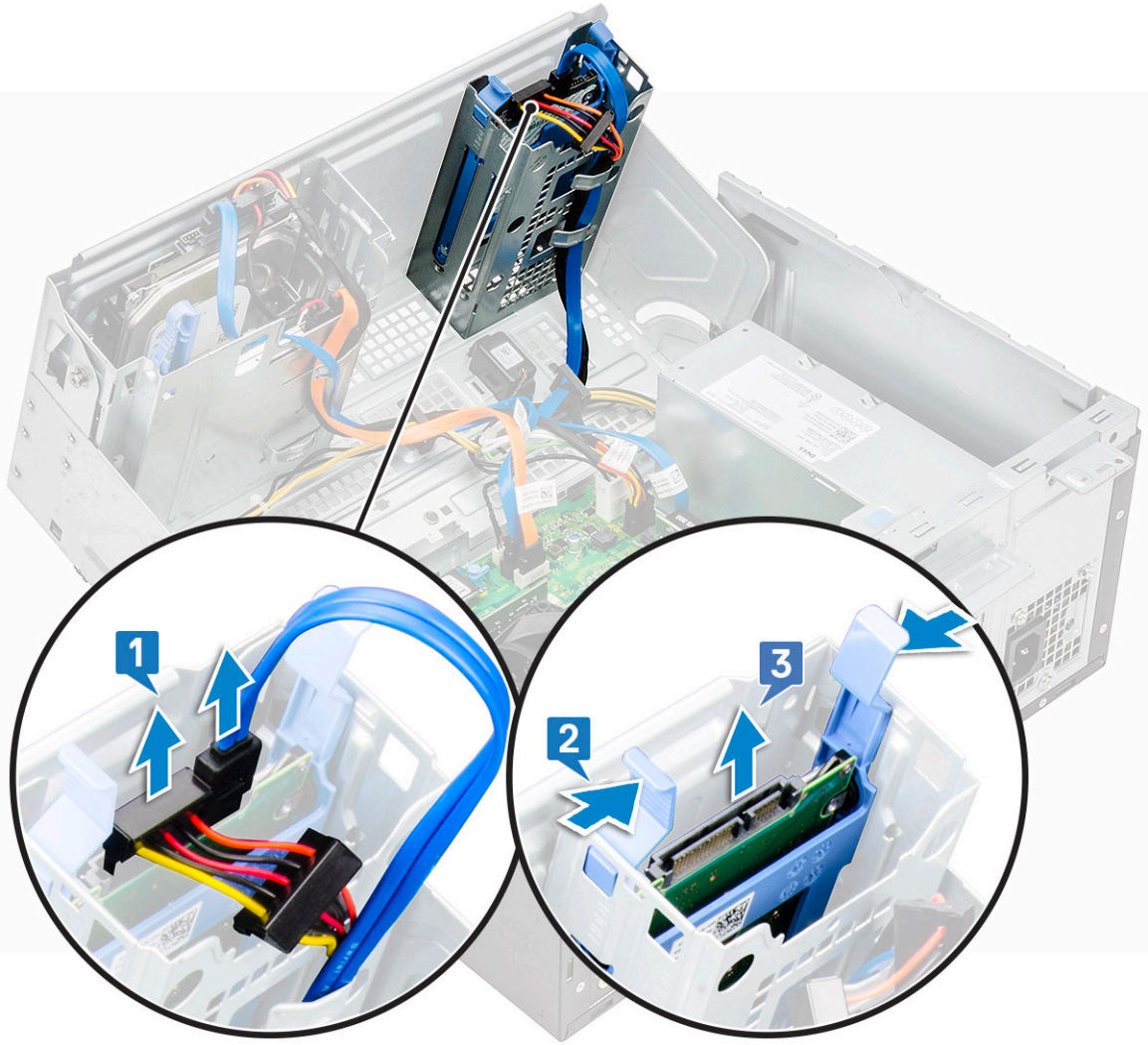
Installing 3.5–inch hard drive

1 Insert the hard drive into the slot on the chassis.
2 Tighten the screws to secure the hard drive to the chassis.
3 Close the front panel door.
4 Connect the SATA cable and the power cable to the connectors on the hard drive.
5 Install the:
   a bezel
   b cover
6 Follow the procedure in After working inside your computer.

Removing the 2.5–inch drive assembly

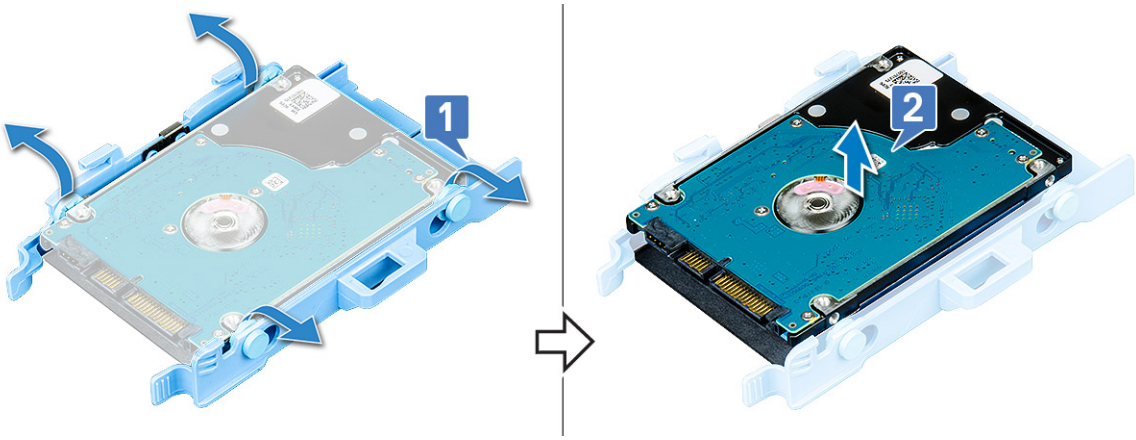
1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a cover
   b bezel
3 Open the front panel door.

4 To remove the drive assembly:
   a Disconnect the drive assembly cables from the connectors on the drive [1].
   b Press the blue tabs on both sides [2] and pull the drive assembly out of the computer [3].



Removing the 2.5–inch drive from the drive bracket

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



Installing the 2.5–inch hard drive into the drive bracket

1 To install the hard drive:
   a Insert pins on one side of the bracket into the slots on one side of the hard drive.
   b Pull the other side of the bracket to insert the pins into the slots on the other side of hard drive.
2 Install the:
   a 2.5-inch drive assembly
   b bezel
   c cover
3 Follow the procedure in After working inside your computer.

Installing the 2.5-inch drive assembly

1 Insert the drive assembly into the slot on the computer until it clicks into place.
2 Close the front panel door.
3 Connect the SATA cable and the power cable to the connectors on the drive.
4 Install the:
   a bezel
   b cover
5 Follow the procedure in After Working Inside Your Computer.

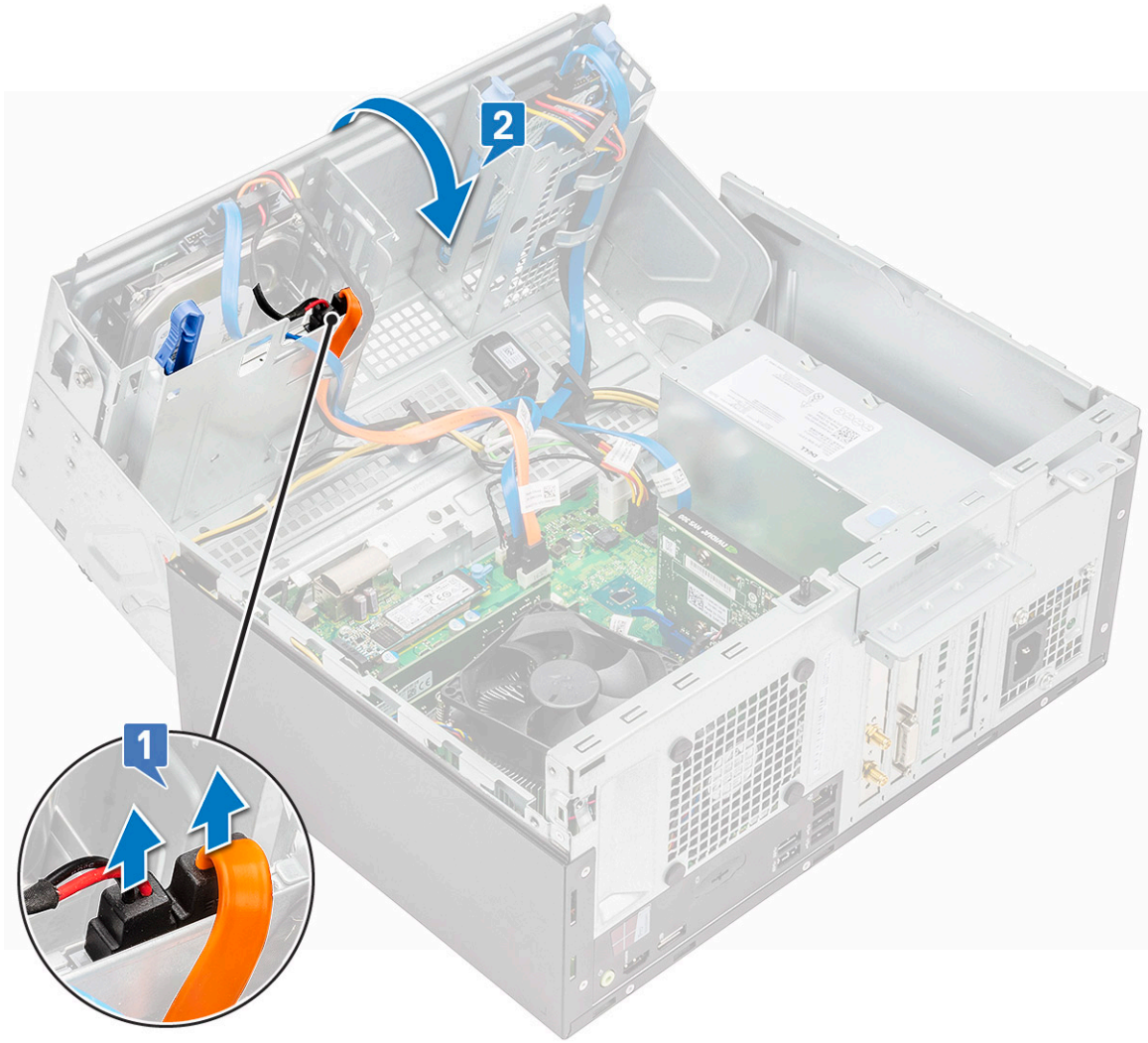
Optical drive

Removing optical drive

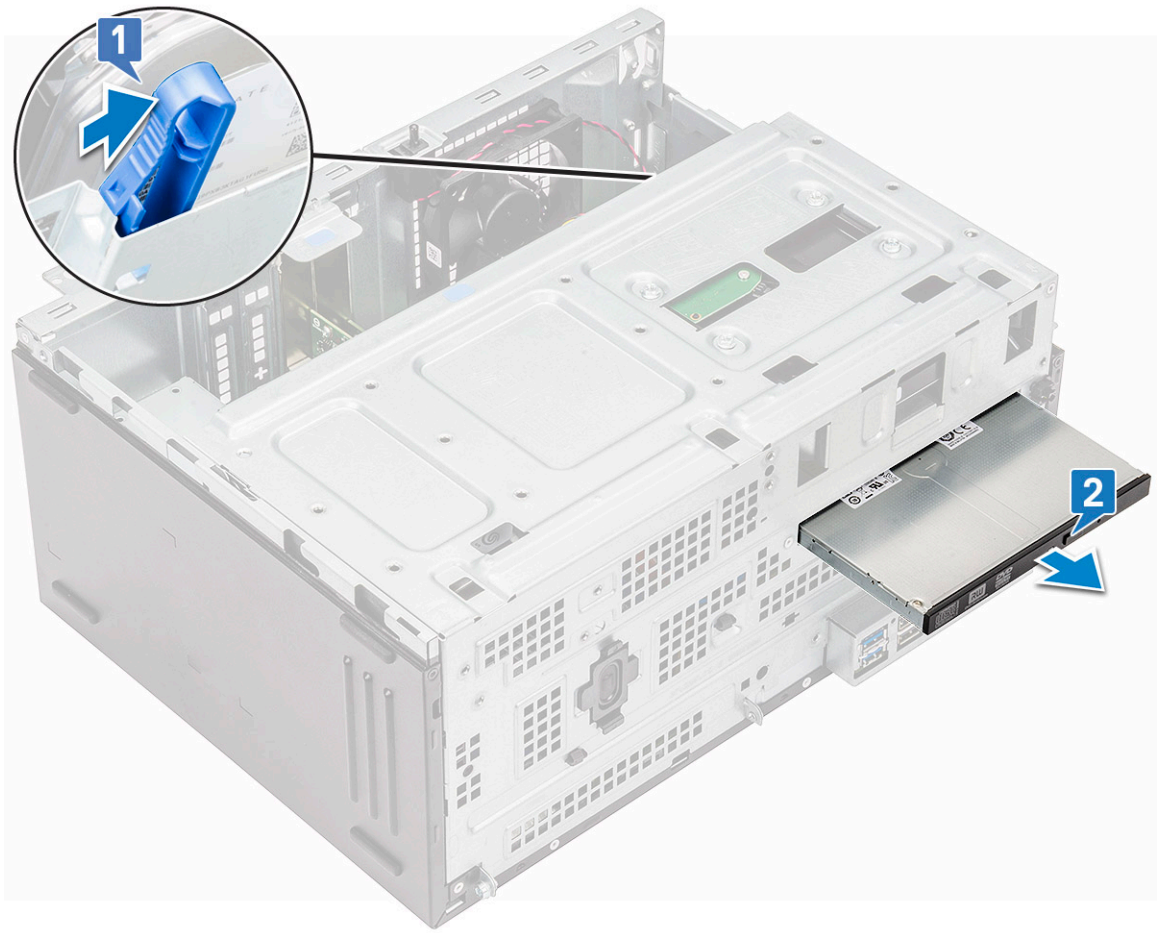
1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a cover
   b bezel
3 Open the front panel door.
4 To remove the optical drive assembly:
   a Disconnect the data cable and power cable from the connectors on the optical drive [1].

> **NOTE: 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 computer [2].



Installing optical drive

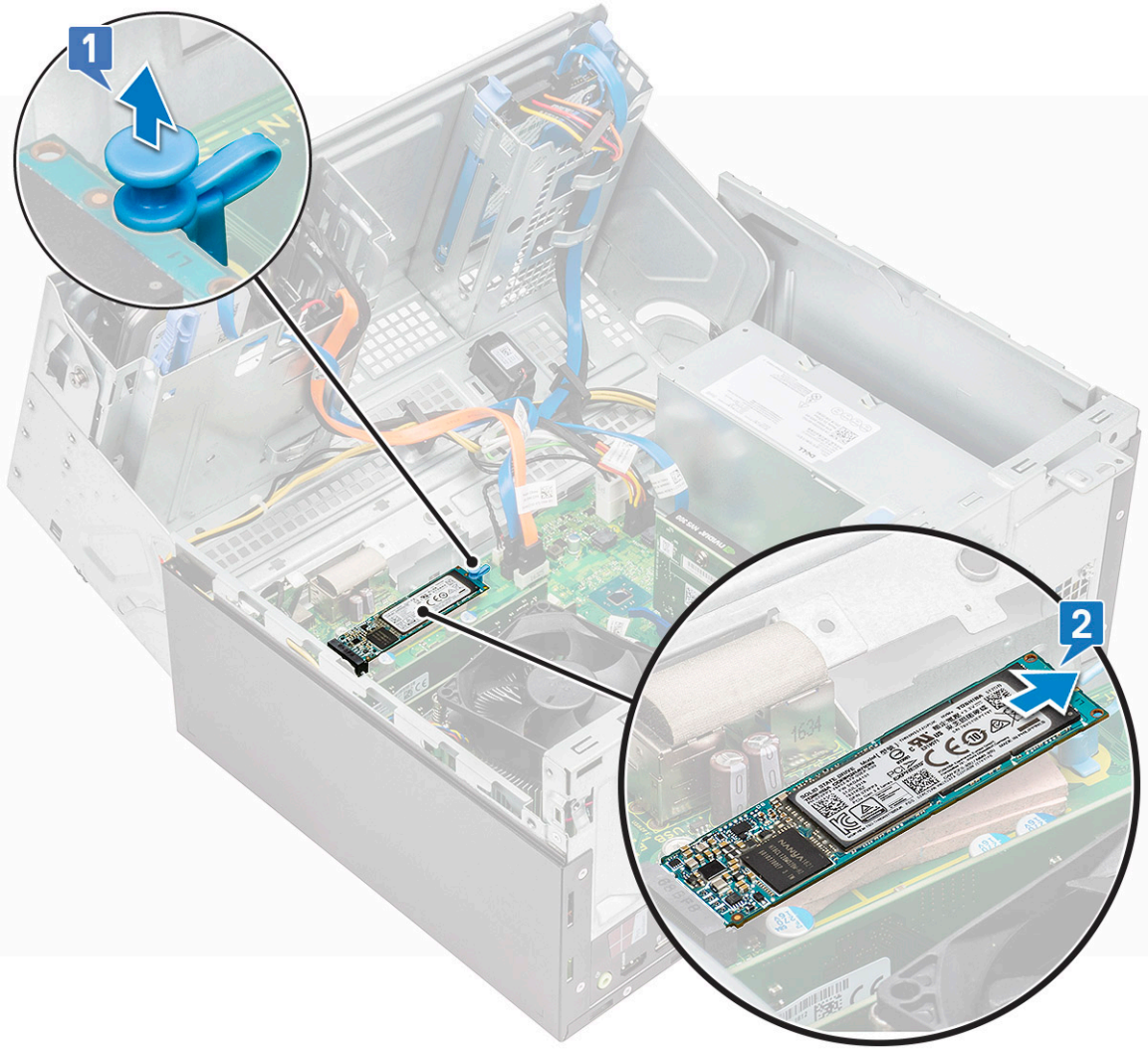
1 Insert the optical drive into the optical drive bay until it clicks into place.
2 Open the front panel door.
3 Route the data cable and power cable under the drive cage.
4 Connect the data cable and power cable to the connectors on the optical drive.
5 Close the front panel door.
6 Install the:
   a bezel
   b cover
7 Follow the procedure in After working inside your computer.

M.2 PCIe SSD

Removing optional M.2 PCIe SSD

1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a cover
   b bezel
3 Open the front panel door.

4 To remove the M.2 PCIe SSD:
   a Pull the blue tab that secures the M.2 PCIe SSD to the system board [1].
   b Slide out the M.2 PCIe SSD from the connector on the system board [2].



Installing optional M.2 PCIe SSD

1 Insert the M.2 PCIe SSD to the connector.
2 Press the blue tab to secure the M.2 PCIe SSD.
3 Close the front panel door.
4 Install the:
   a bezel
   b 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 cover

   b bezel

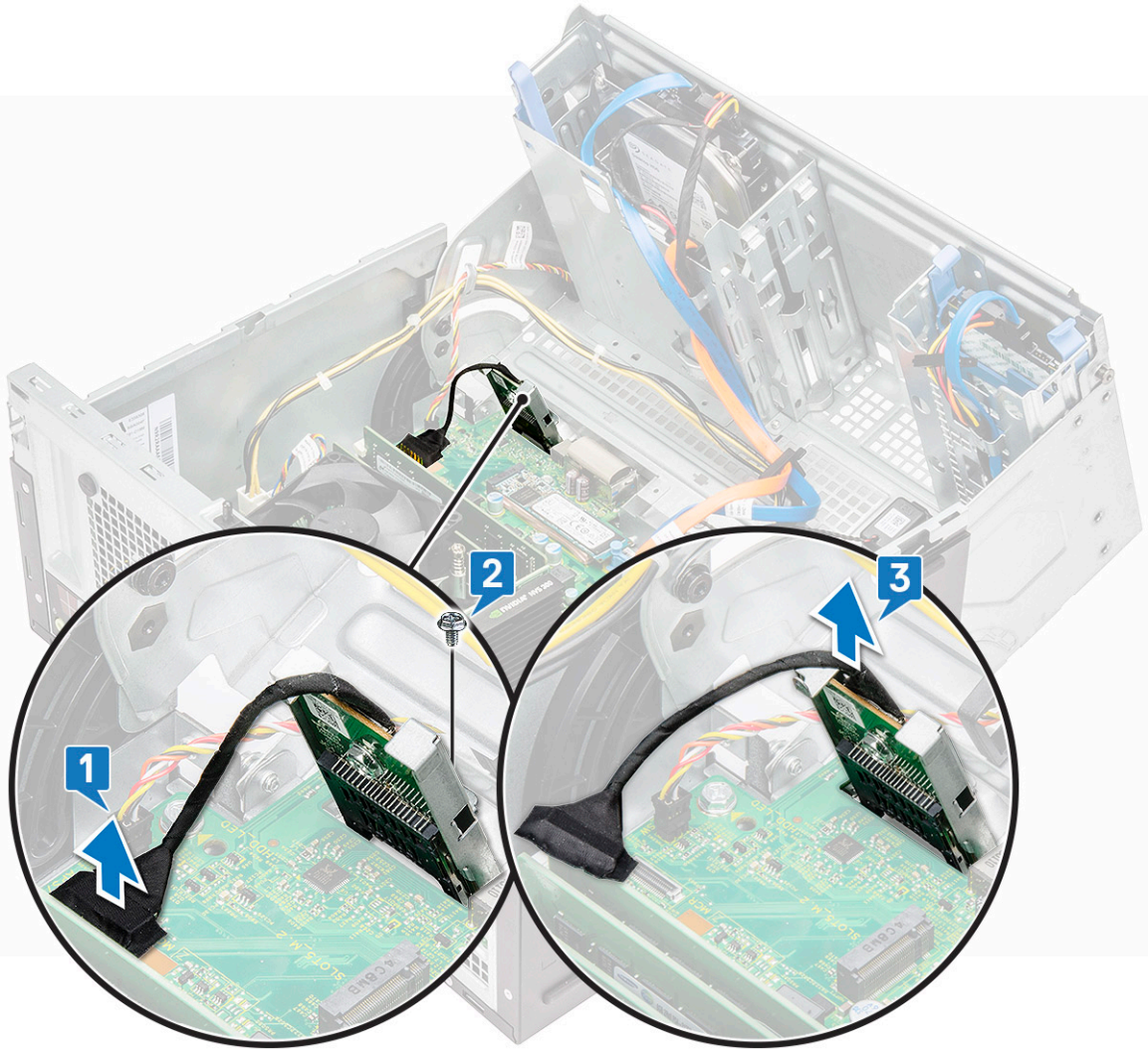
3 Open the front panel door.

4 To remove the SD card reader:

   a Disconnect the SD card reader cable from the connector on the system board [1].

   b Remove the screw that secures the SD card reader to the front panel door [2].

   c Lift the SD card reader out of the computer [3].



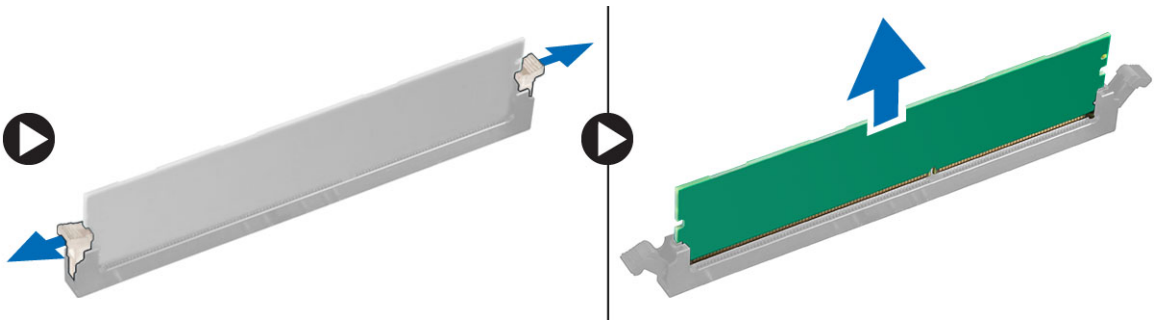
Installing SD card reader

1 Insert the SD card reader into the slot on the front panel door.
2 Tighten the screw to secure the SD card reader to the front panel door.
3 Connect the SD card reader cable to the connector on the system board.
4 Close the front panel door.
5 Install the:
   a bezel
   b cover
6 Follow the procedure in After working inside your computer.

Memory module

Removing memory module

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



Installing memory module

1 Align the notch on the memory module with the tab on the memory module connector.
2 Insert the memory module into the memory module socket.
3 Press the memory module until the memory module retention tabs click into place.
4 Close the front panel door.
5 Install the:
   a cover
   b bezel
6 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:

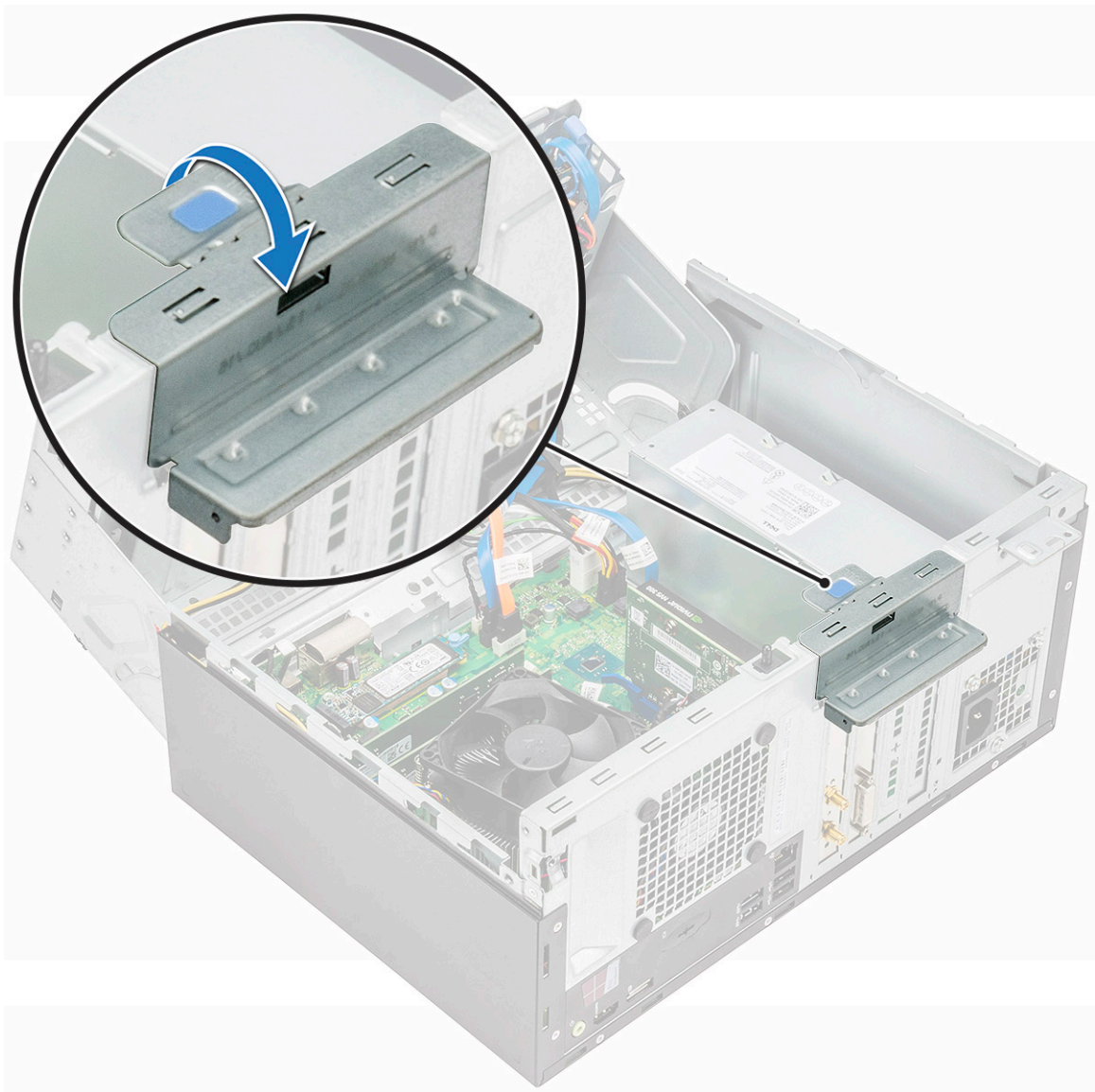
   a cover

   b bezel

3 Open the front panel door.

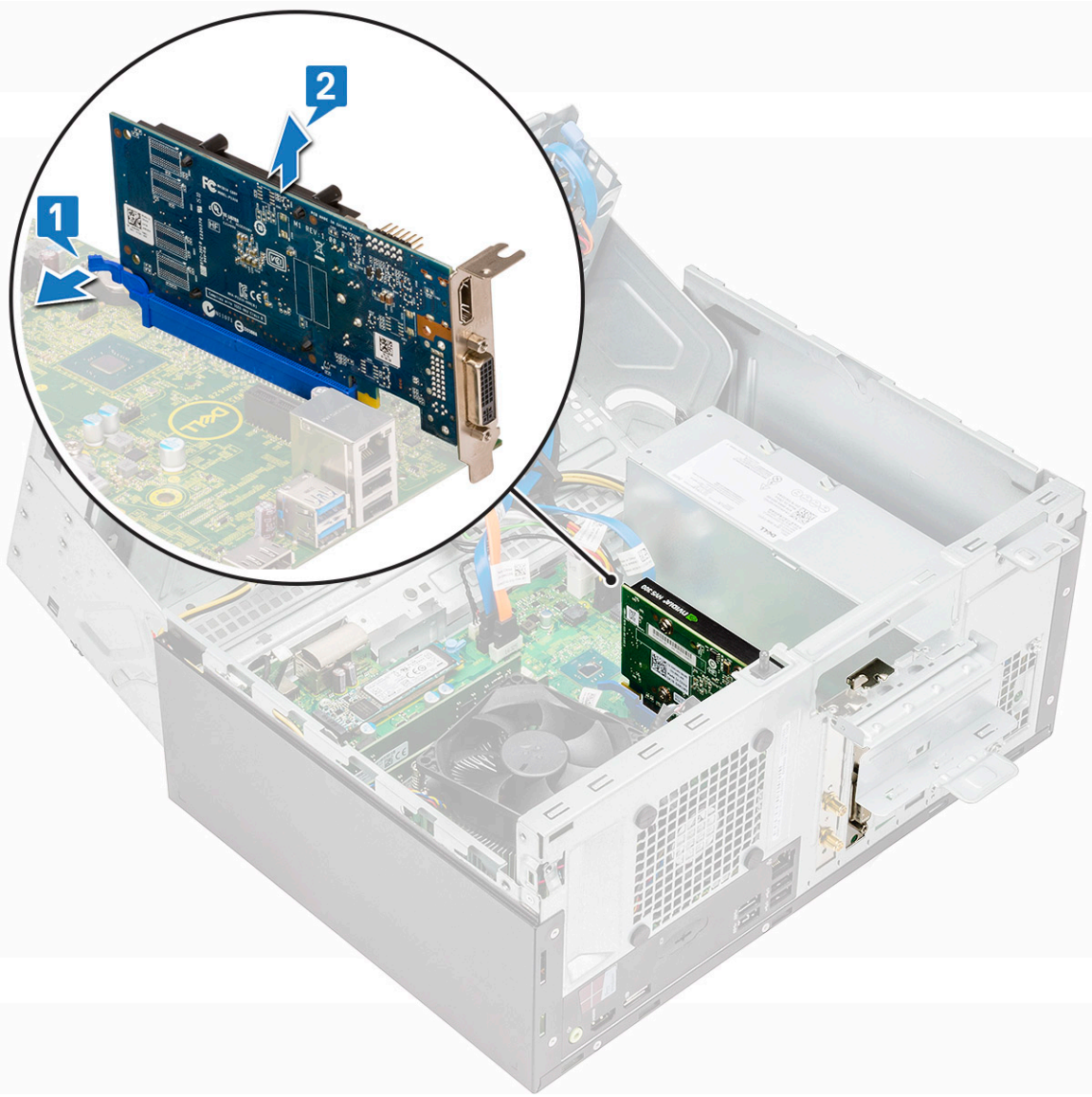
4 To remove the PCIe expansion card:

   a Pull the release latch to unlock the PCIe expansion card.



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

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



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

Installing PCIe expansion card

1 Pull the release latch backward to open [1].

2 To remove the PCIe brackets (1 and 3) as shown below, insert a screwdriver in the hole of a PCIe bracket and push hard to release the bracket [2], and then lift the bracket out from your computer.

> **NOTE: To remove the PCIe brackets (2 and 4), push the bracket upwards from the inside of your computer to release it and then lift the bracket away from your computer.**

3 Insert the PCIe expansion card to the connector on the system board.

4 Secure the PCIe expansion card by pushing the card retention latch until it clicks into place.

NOTE: This step is applicable only for the connector with card retention latch, otherwise, skip this step.

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

6 Close the release latch.

7 Close the front panel door.

8 Install the:

a bezel

b cover

9 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

   b bezel

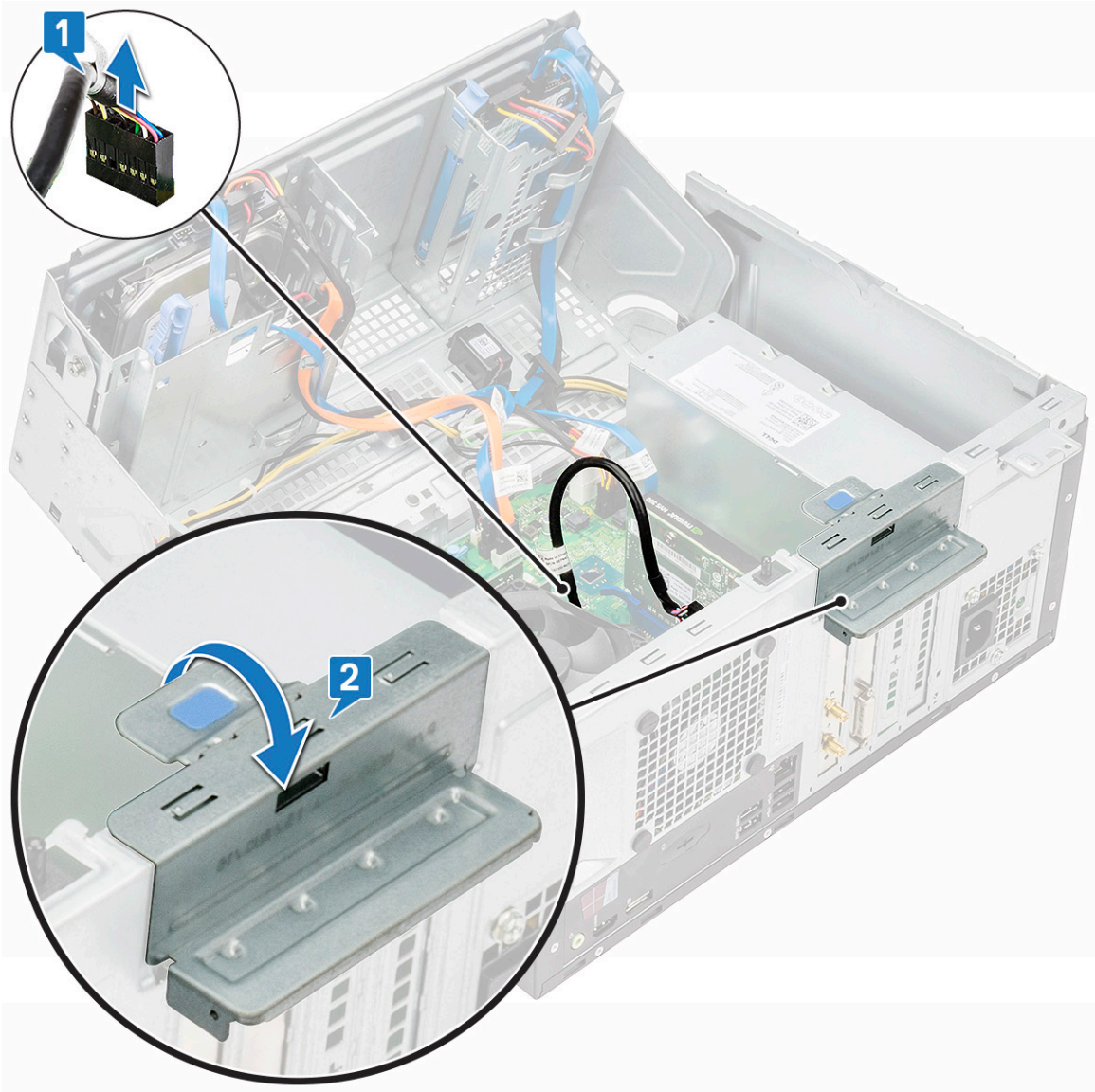
3 Open the front panel door.

4 To remove the WLAN module:

   a Loosen the antenna screw to remove the antenna from the computer.

   b Disconnect the WLAN module cable from the connector on the system board [1]

   c Pull the release latch to unlock the WLAN module [2].



d Lift the WLAN module out of the computer.

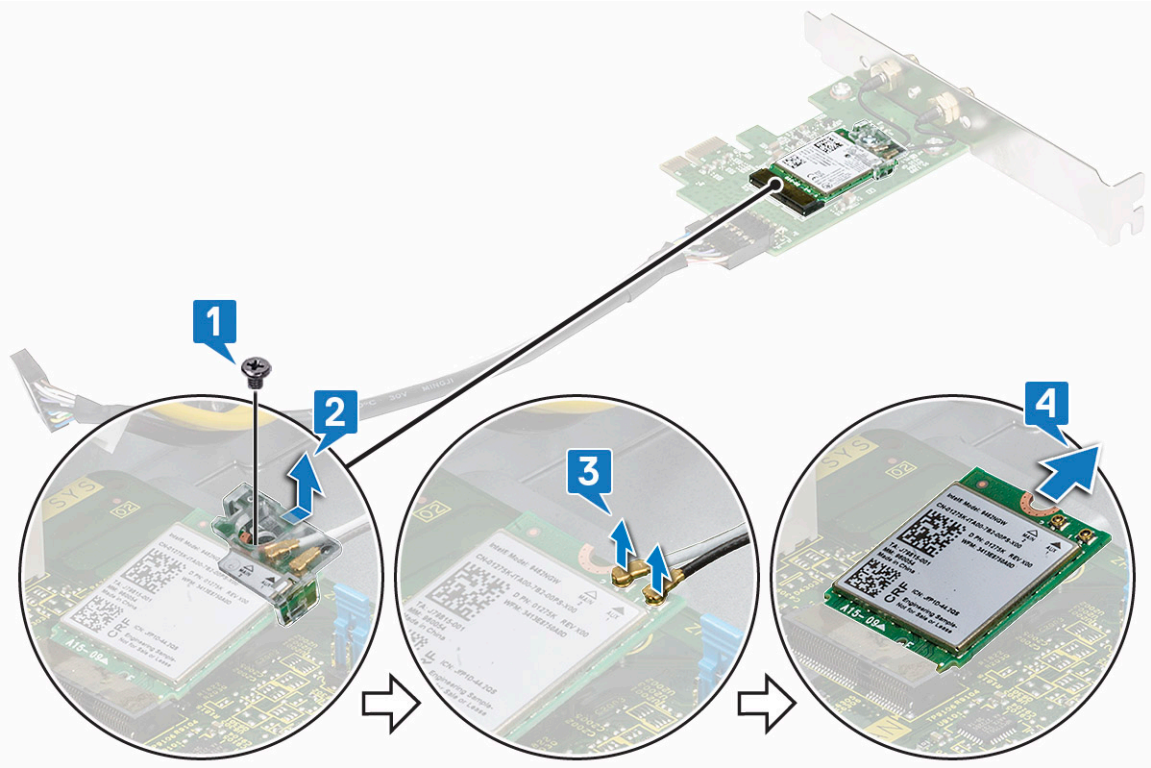
5 To remove the WLAN card:

a Remove the screw that secures the WLAN card to the WLAN module [1].

b Lift the WLAN card bracket [2].

c Disconnect the antenna cables from the connectors on the WLAN card [3]

d Pull the WLAN card from the slot [4].



Installing WLAN card

1 Insert the WLAN card into the connector on the WLAN module.

2 Connect the WLAN antenna cables to the connectors on the WLAN card.

3 Place the WLAN card bracket to secure the WLAN cables.

4 Tighten the screw to secure the WLAN card to the system.

5 Pull the release latch to open [1].

6 To remove the PCIe brackets (1 and 3) as shown below, insert a screwdriver in the hole of a bracket and push hard to release the bracket [2], and then lift the bracket out from your computer.

NOTE: To remove the PCIe brackets (2 and 4), push the bracket upwards from the inside of your computer to release it and then lift the bracket away from your computer.

7 Insert the WLAN module into the connector on the system board and press until it is secured.

NOTE: The WLAN module can be installed in PCIe slots 1 and 4 only.

8 Connect the WLAN module cable to the connector on the system board.

9 Tighten the antenna screw to install the antenna.

10 Close the release latch.

11 Close the front panel door.

12 Install the:

a bezel

b cover

13 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 cover

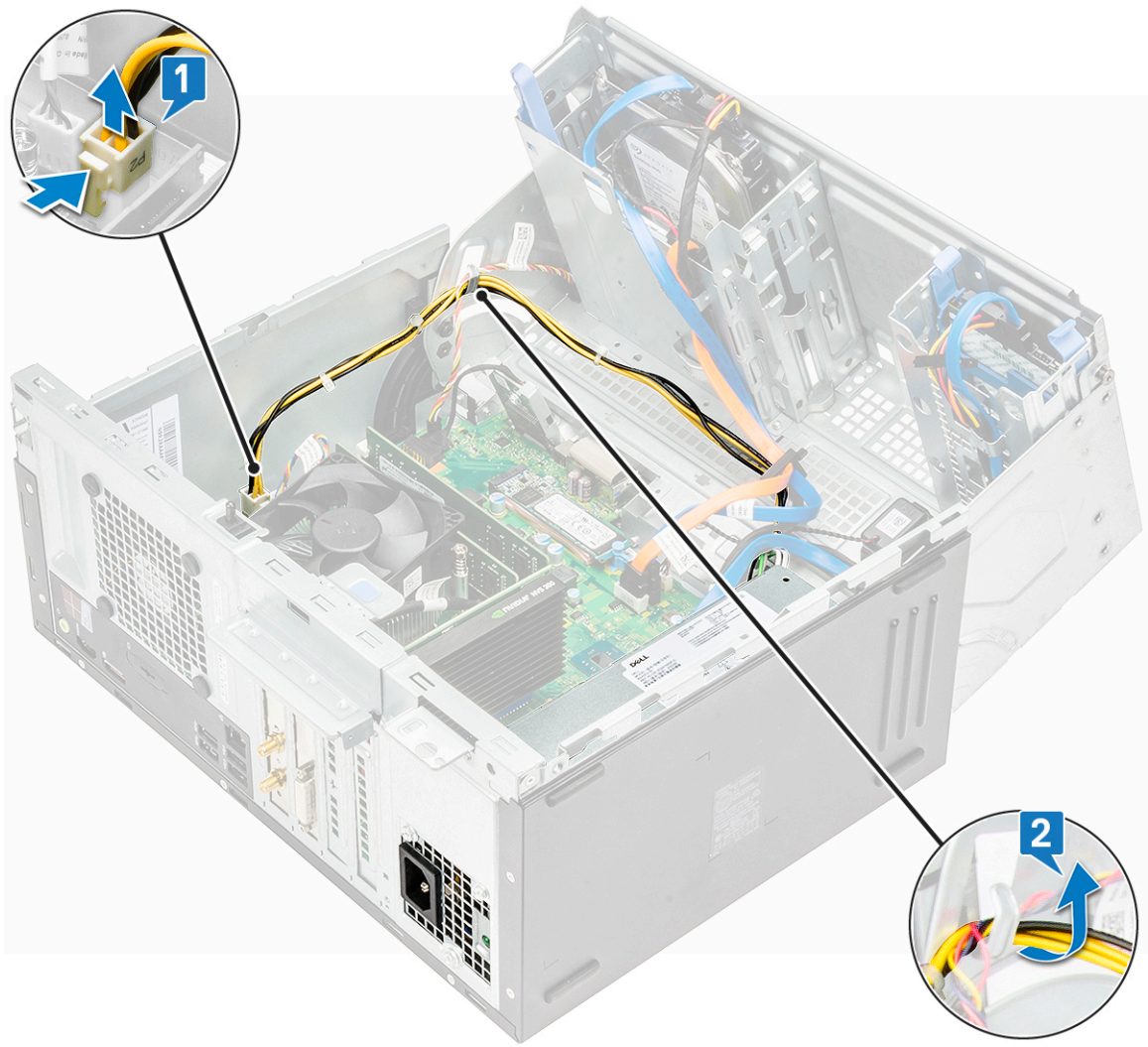
   b bezel

3 Open the front panel door.

4 To release the PSU:

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

   b Unroute the PSU cable from the release clip [2].

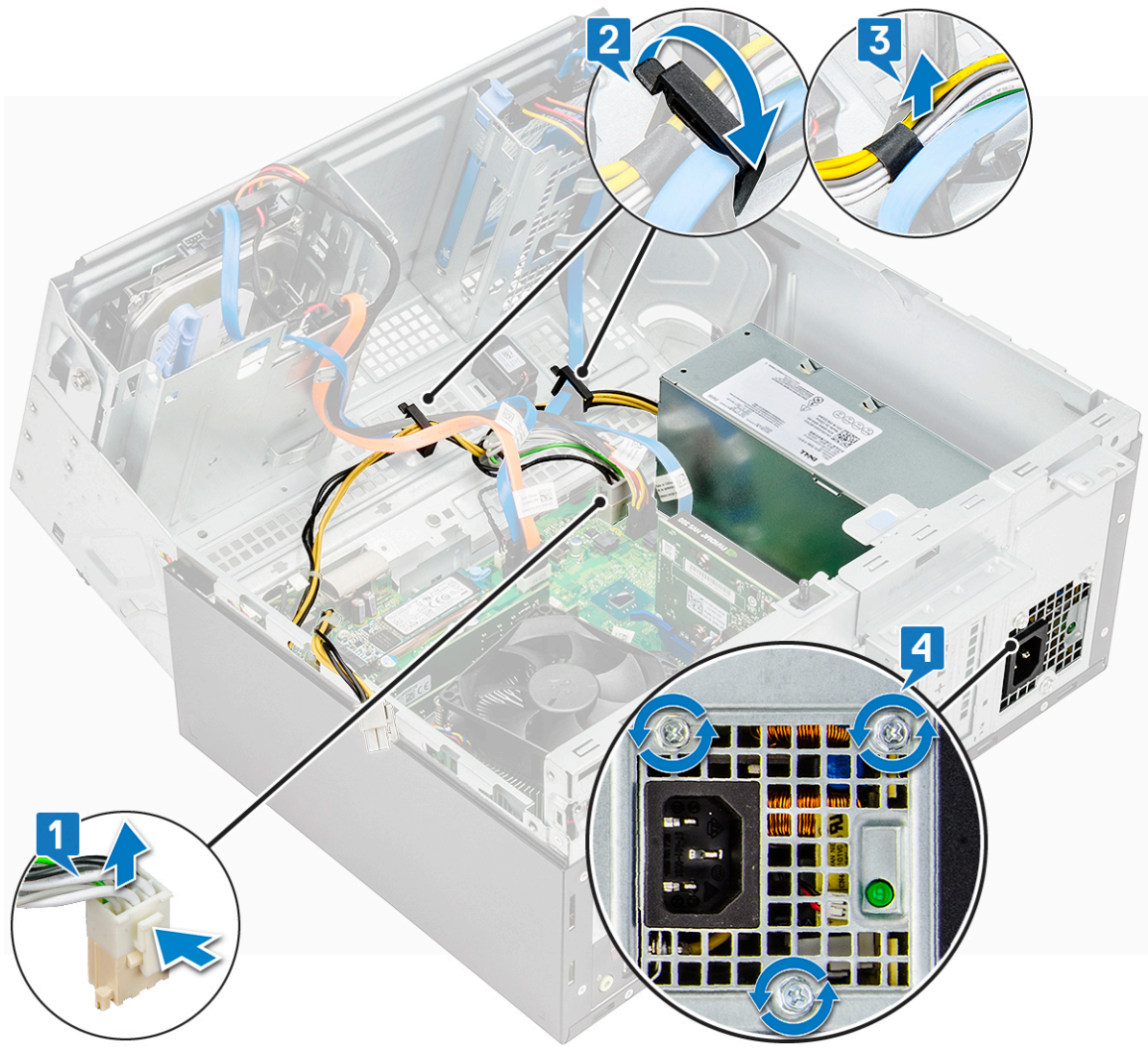


   c Disconnect the PSU cable from the connector on the system board [1].

   d Pull the release clip [2].

   e Unroute the PSU cables from the retention clip [3].

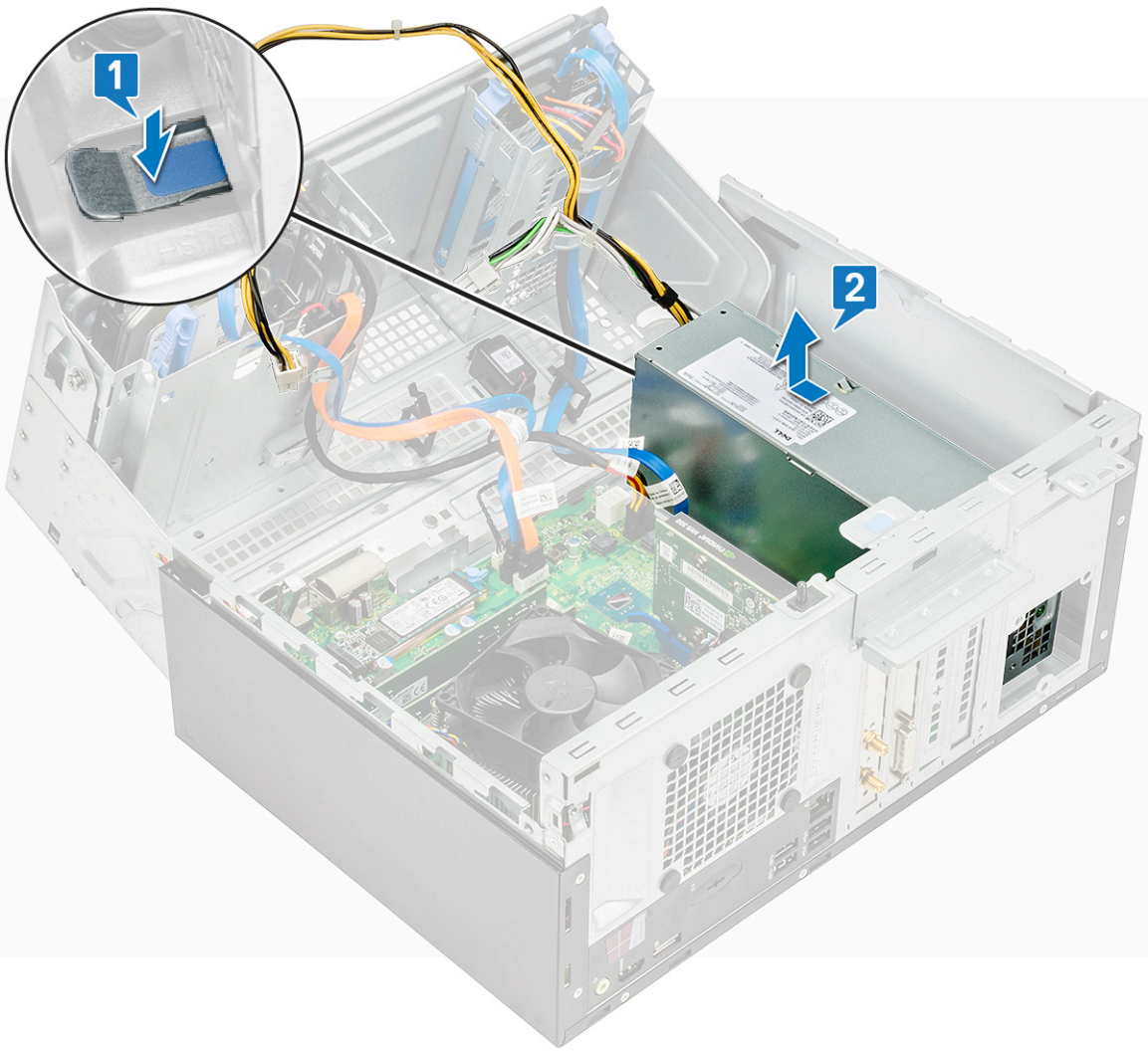
   f Remove the screws that secure the PSU to the computer [4].



5 To remove the PSU:

a Press the release tab [1].

b Slide and lift the PSU away from the computer [2].



Installing power supply unit or PSU

1 Insert the PSU into the PSU slot and slide it towards the back of the computer until it clicks into place.
2 Tighten the screws to secure the PSU to the computer.
3 Route the PSU cables through the retention clips and secure one of the cables with the release clips.
4 Connect the PSU cables to the connectors on the system board.
5 Close the front panel door.
6 Install the:
   a bezel
   b cover
7 Follow the procedure in After working inside your computer.

VGA daughter board

Removing VGA daughter board

1 Follow the procedure in Before working inside your computer.

2 Remove the:

   a cover

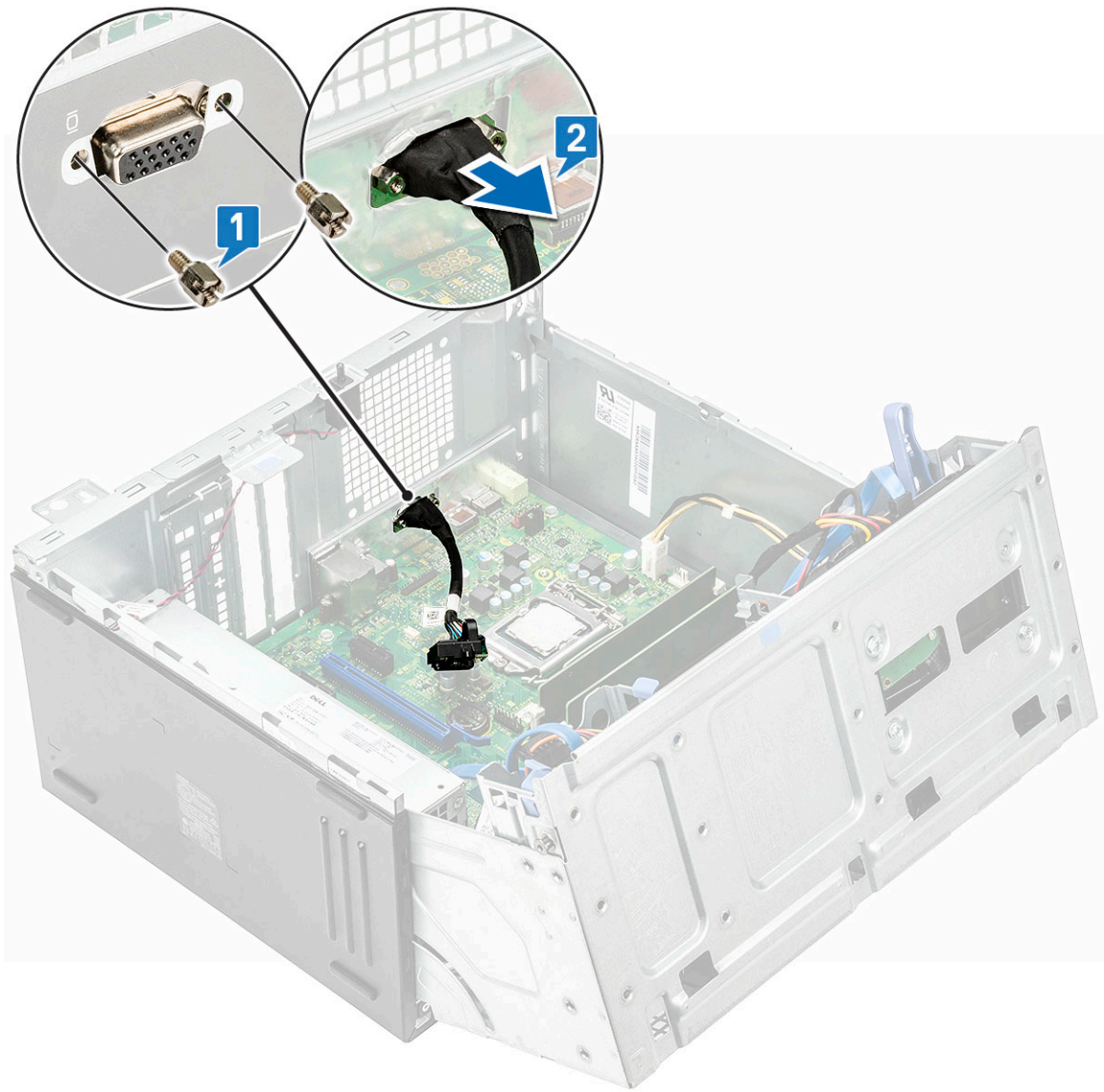
   b bezel

3 Open the front panel door

4 To remove the VGA daughter board:

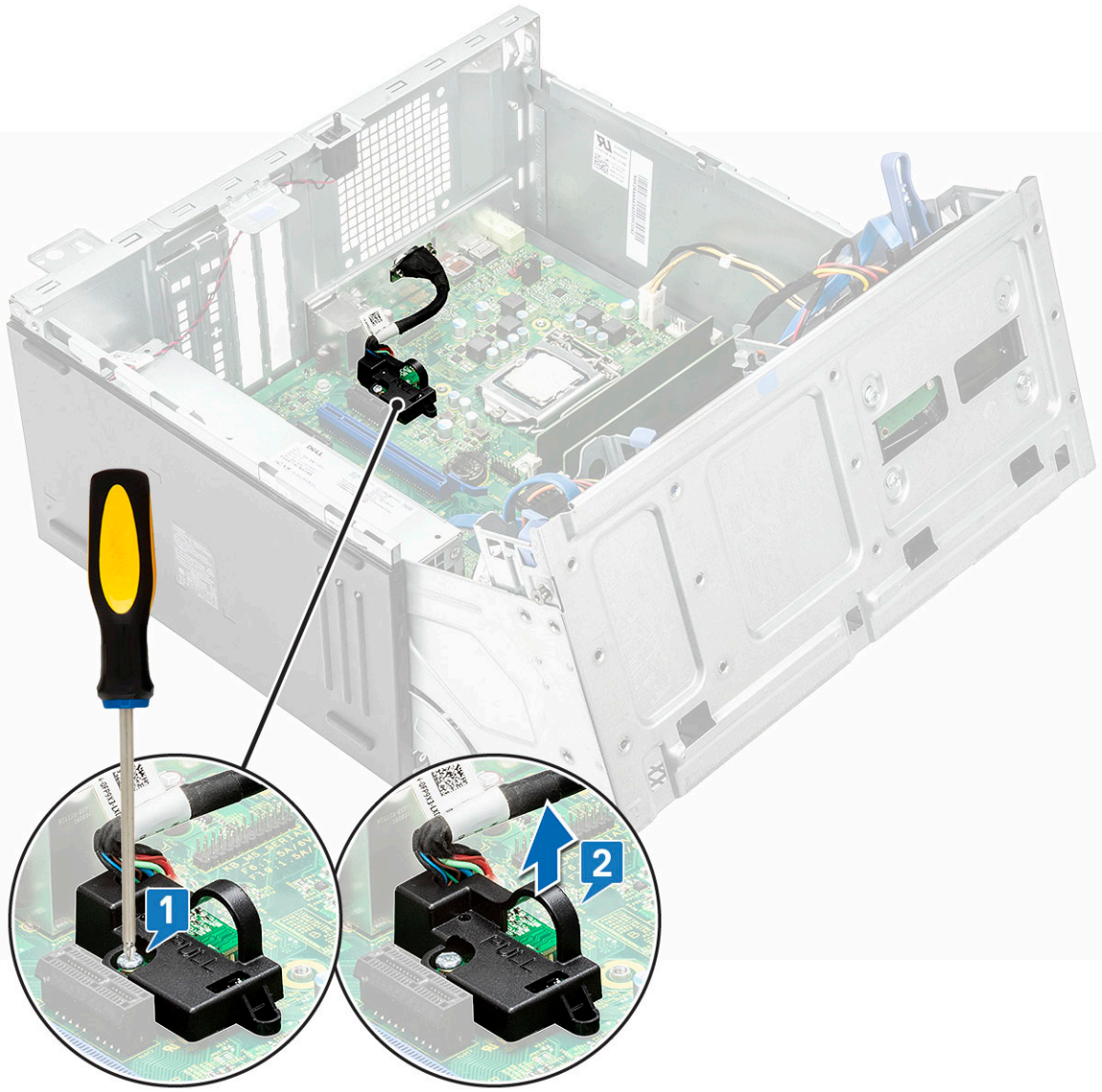
   a Remove the screws that secure the VGA connector to the computer [1].

   b Slide the VGA connector to release it from the computer [2].



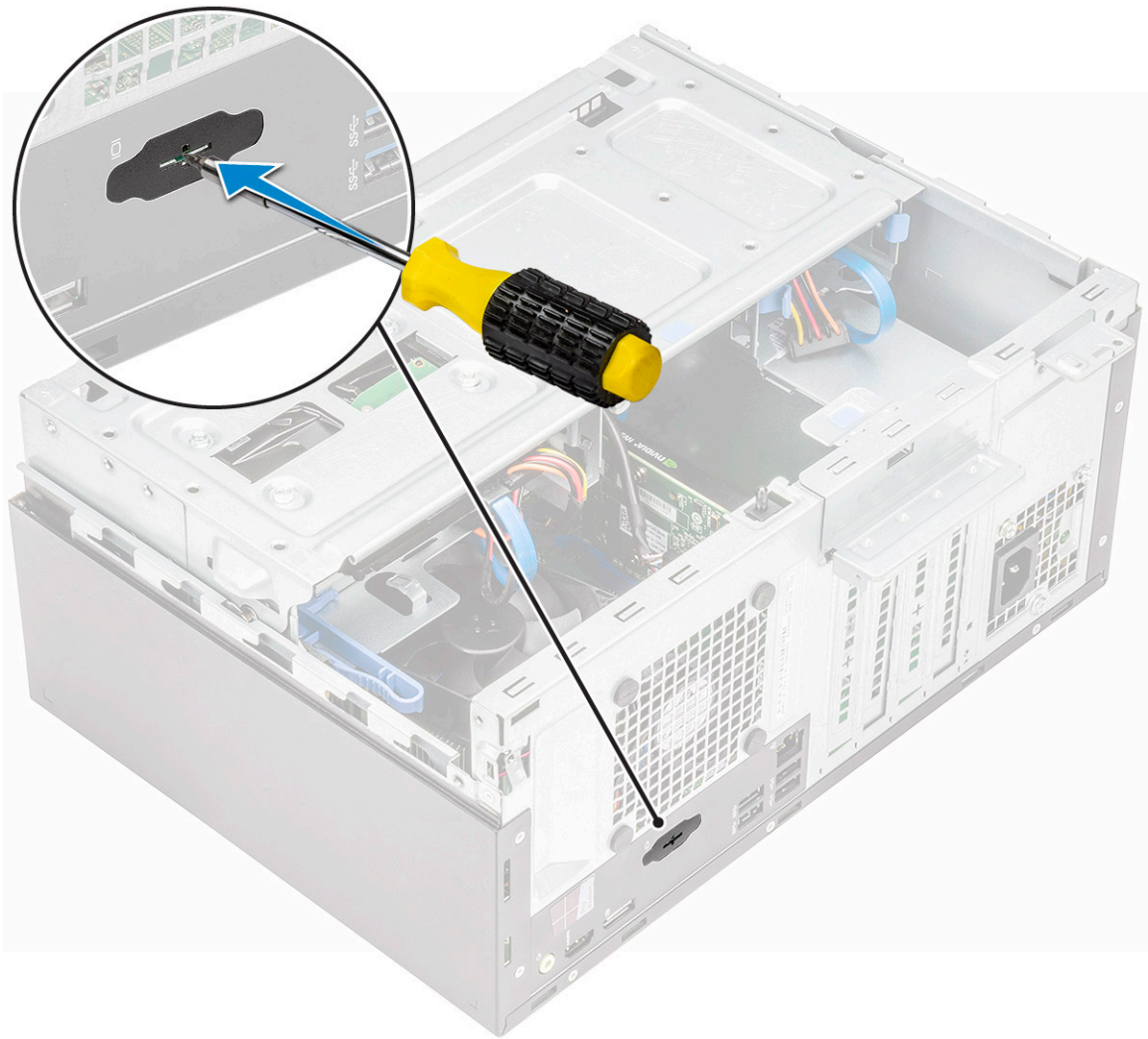
   c Remove the screw that secures the VGA daughter board to the computer [1].

   d Lift the VGA daughter board using the handle to remove it from the computer [2].



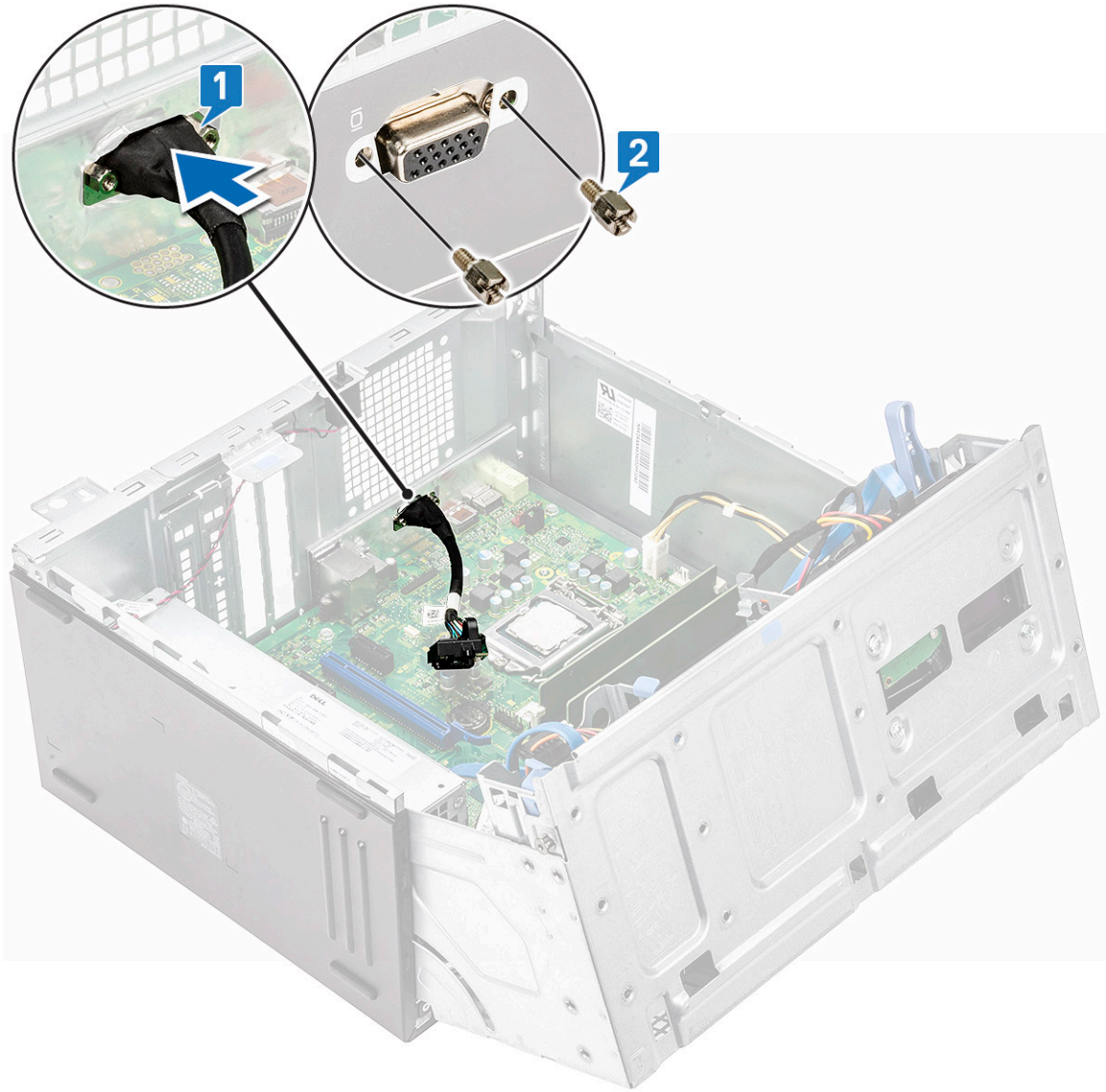
Installing VGA daughter board

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



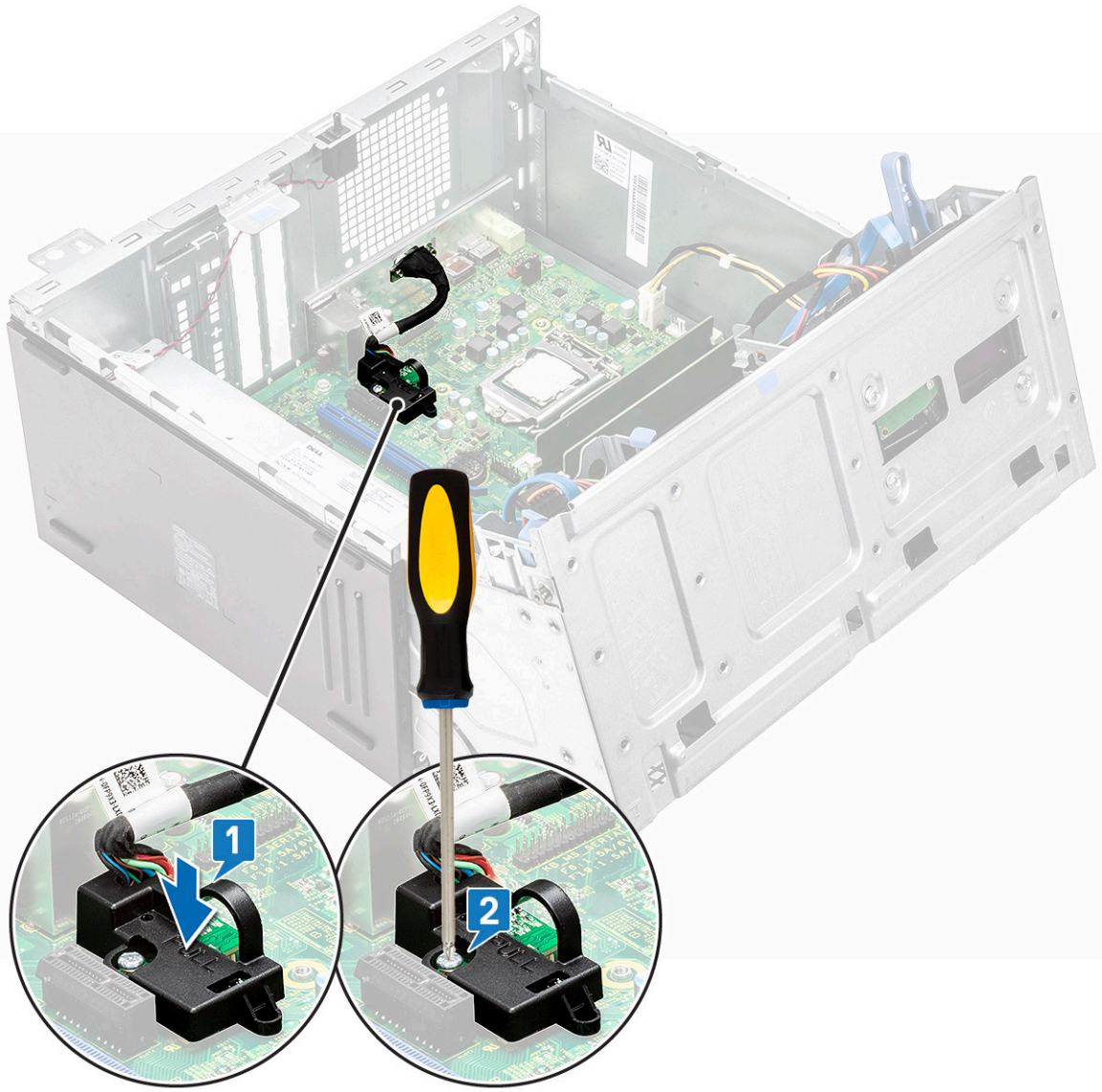
2 Insert the VGA connector into the slot from inside of the computer [1].

3 Tighten the screws to secure the VGA connector to the computer [2].



4 Align the VGA daughter board with the screw holder on the system board [1].

5 Tighten the screw to secure the VGA daughter board to the system board [2].



6 Close the front panel door.

7 Install the:
   a bezel
   b cover

8 Follow the procedure in After working inside your computer.

Intrusion switch

Removing intrusion switch

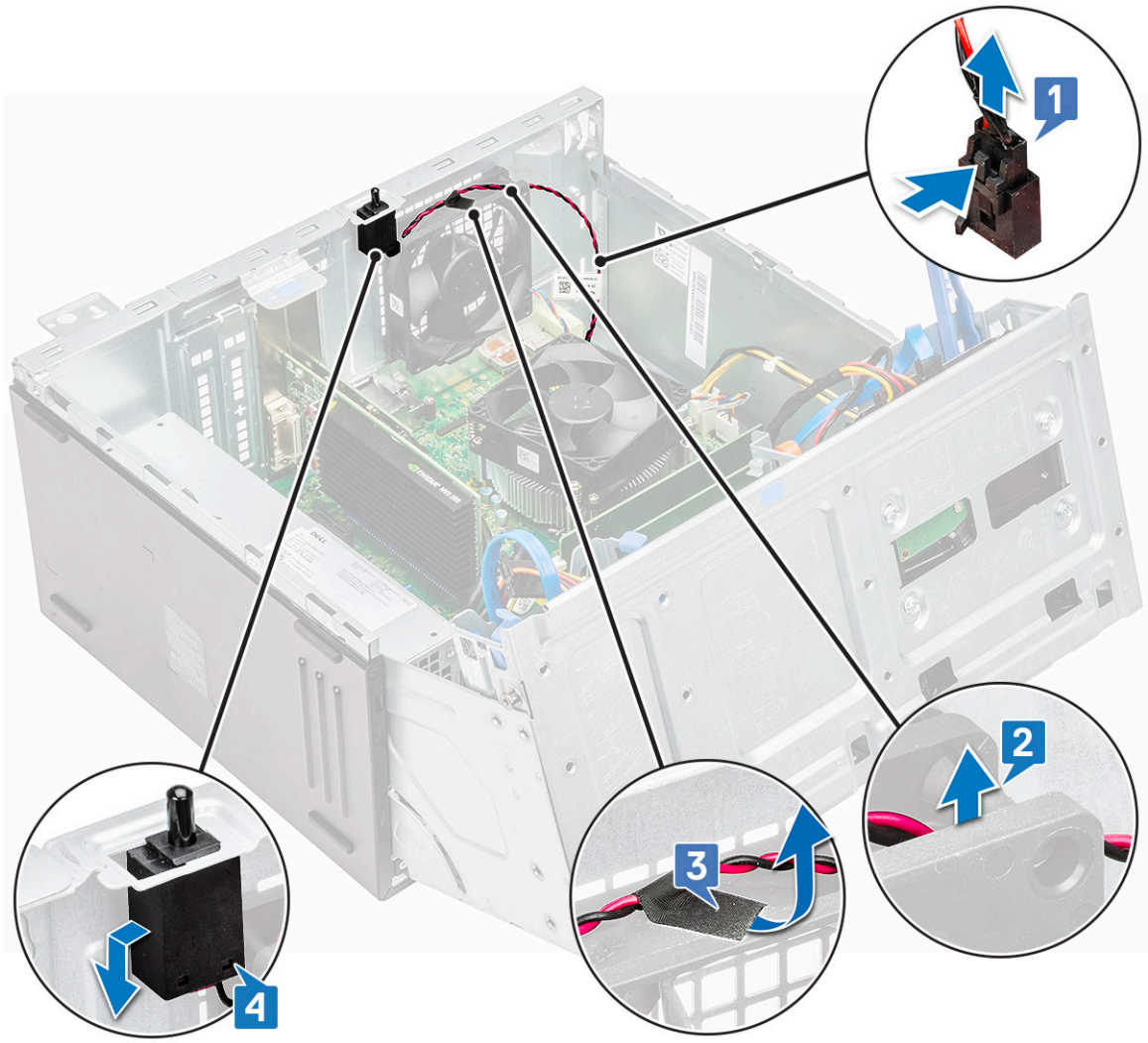
1 Follow the procedure in Before working inside your computer.

2 Remove the:
   a cover
   b 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 grommet [2].
c Remove the adhesive tape that holds the intrusion switch cable on the system fan [3].
d Slide the intrusion switch and push it to remove from the computer [4].



Installing intrusion switch

1 Insert the intrusion switch into the slot on the computer.
2 Affix the adhesive tape that holds the intrusion switch cable on the system fan.
3 Route the intrusion switch cable through the fan grommet.
4 Connect the intrusion switch cable to the connector on the system board.
5 Close the front panel door.
6 Install the:
  a bezel
  b cover
7 Follow the procedure in After working inside your computer.

Power switch

Removing power switch

1 Follow the procedure in Before working inside your computer.

2 Remove the:

   a cover

   b bezel

3 Open the front panel door.

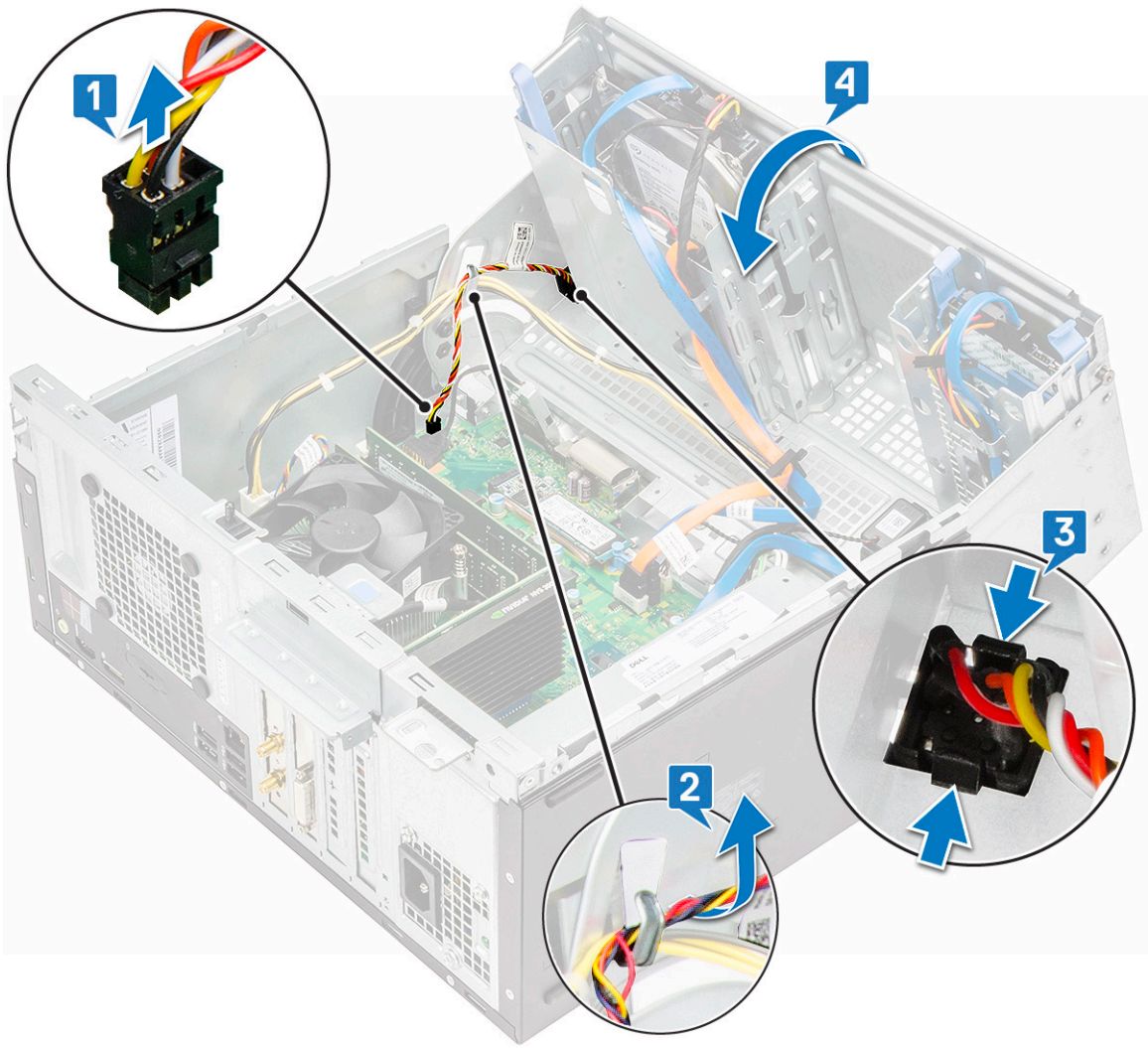
4 To release the power switch:

   a Disconnect the power switch cable from the system board [1].

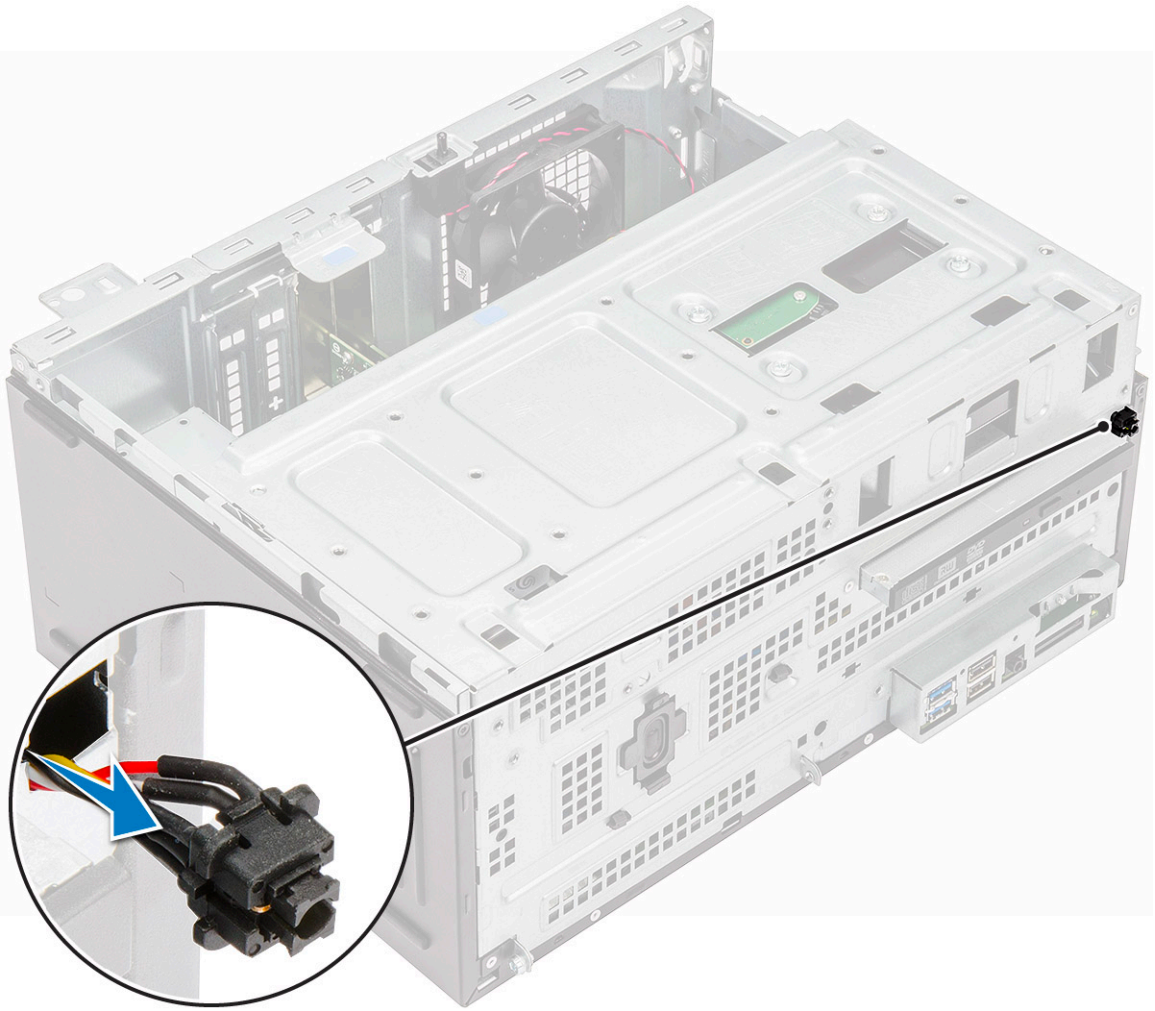
   b Unroute the power switch cable through the retention clip [2].

   c Press the release tabs using a plastic scribe and slide the power switch out from the front of the computer [3].

   d Close the front panel door [4].



5 Pull the power switch out from the computer.



Installing power switch

1 Insert the power switch into the slot from the front of the computer and press it until it clicks into place.
2 Route the power switch cable through the retention clip.
3 Align the cable with the pins on the connector and connect the cable.
4 Close the front panel door.
5 Install the:
   a bezel
   b cover
6 Follow the procedure in After working inside your computer.

Speaker

Removing speaker

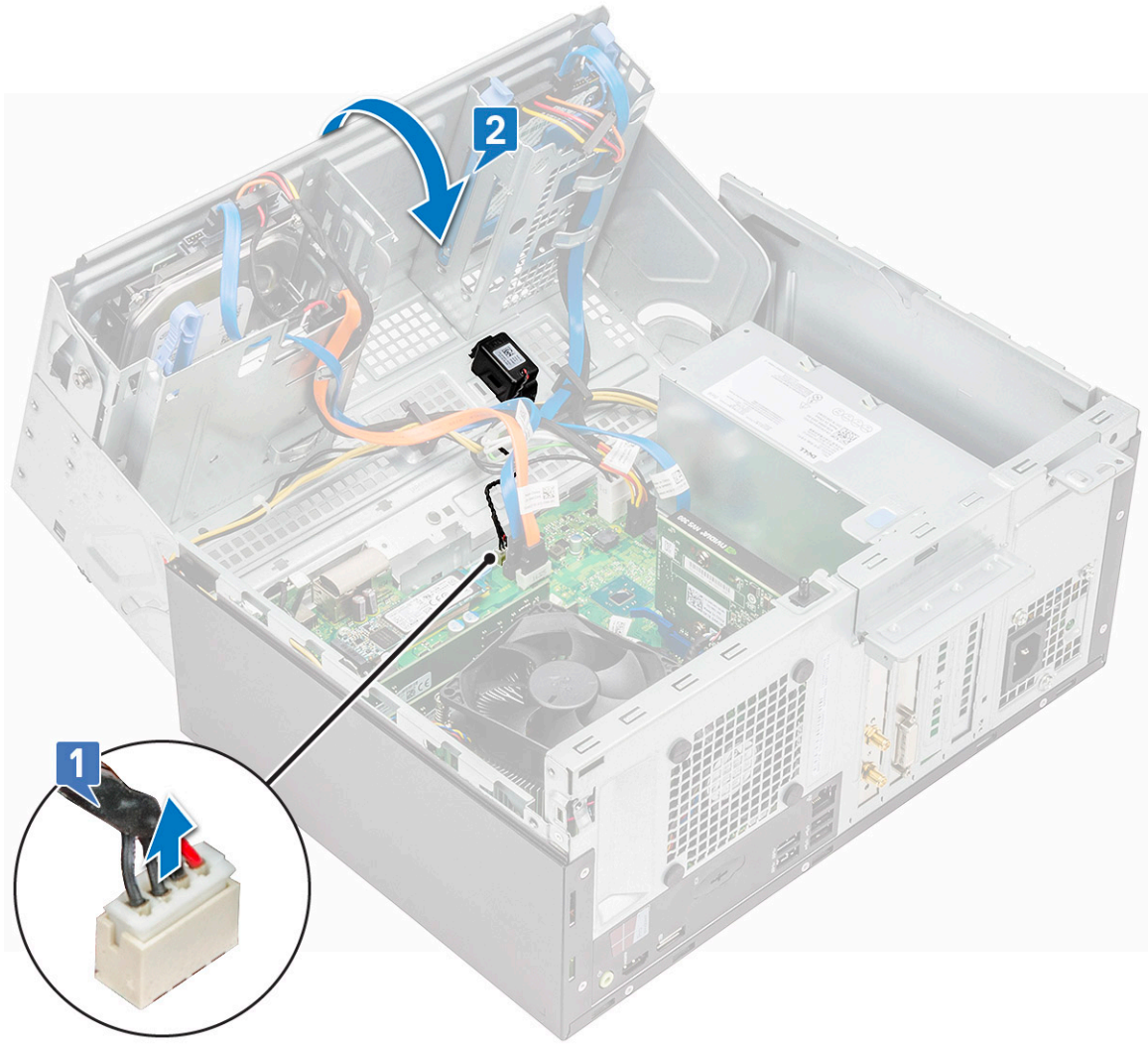
1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a cover
   b bezel

3 Open the front panel door.

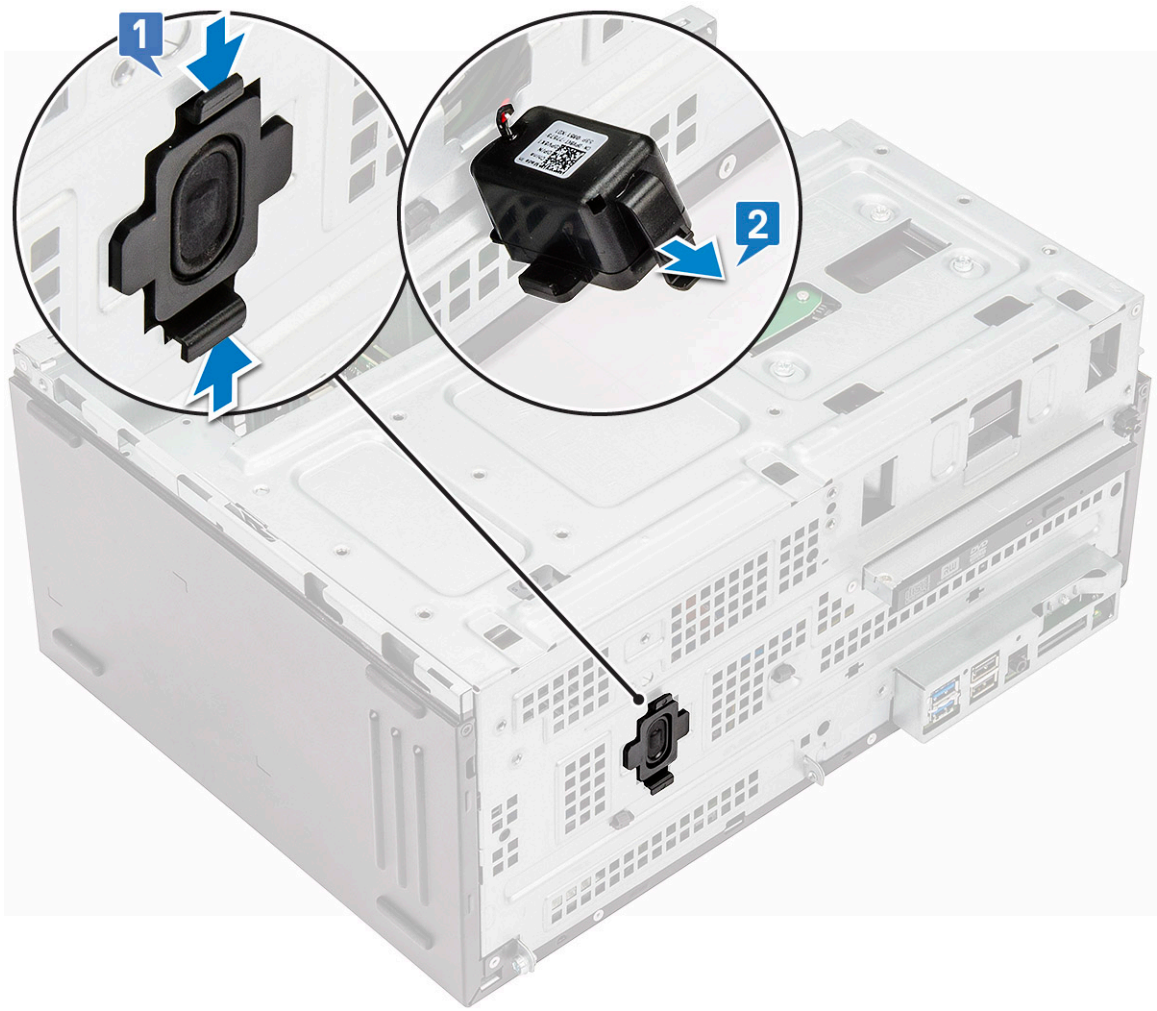
4 To remove the speaker:

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

b Close the front panel door [2].



c Press the release tabs [1], and slide the speaker [2] out of the slot.



Installing speaker

1 Insert the speaker into the slot and press it until it clicks into place.
2 Connect the speaker cable to the connector on the system board.
3 Close the front panel door.
4 Install the:
   a bezel
   b 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 cover
   b bezel
3 Open the front panel door.

4 To remove the coin cell battery:
   a Using a plastic scribe, pry the coin cell battery until it pops up [1].
   b Remove the coin cell battery from the connector on the system board [2].

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.
2 Press the battery into the connector until it locks into place.
3 Close the front panel door.
4 Install the:
   a bezel
   b cover
5 Follow the procedure in After working inside your computer.

Heat sink

Removing heat sink assembly

1 Follow the procedure in Before working inside your computer.

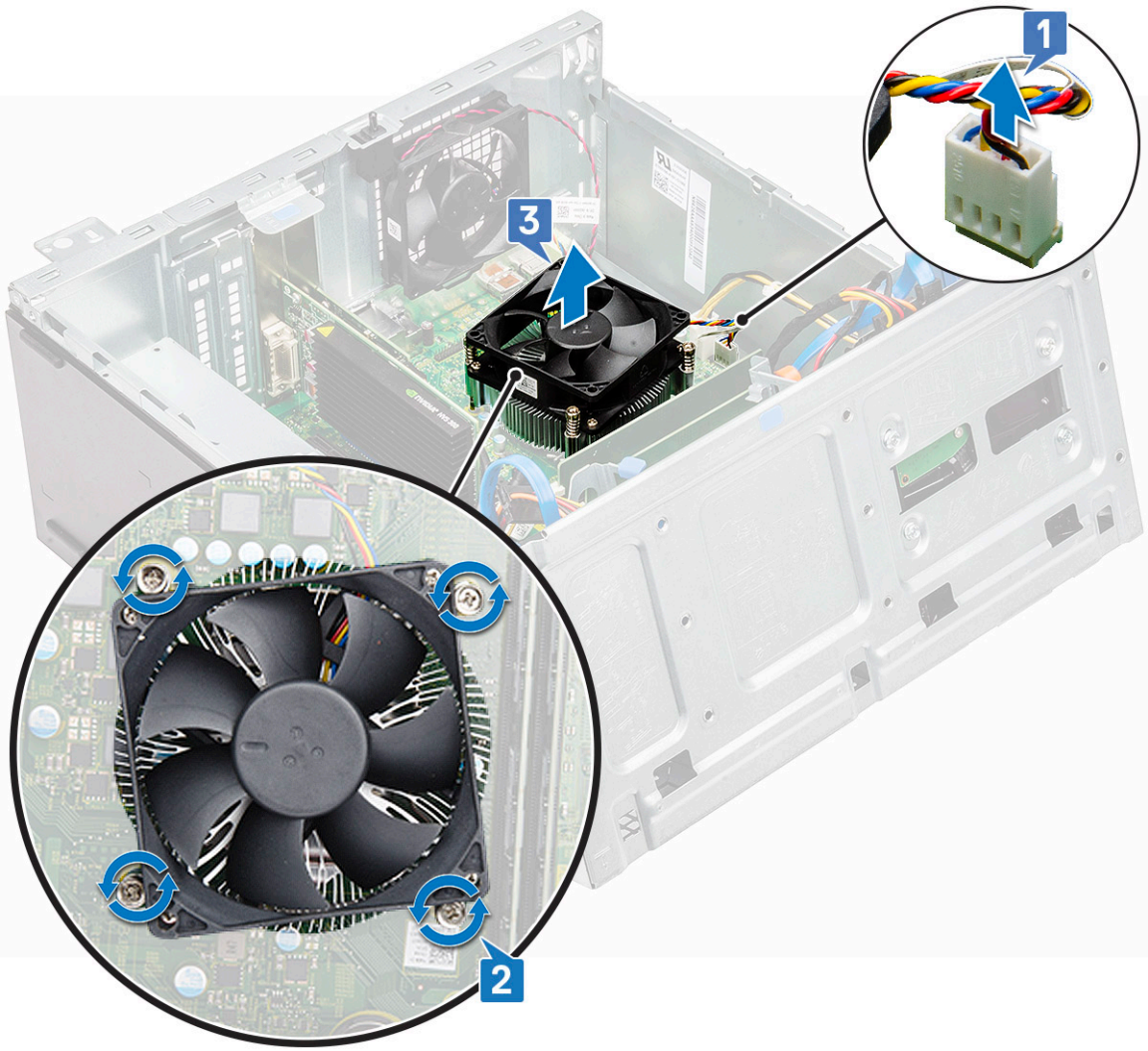
2 Remove the:

- a cover
- b bezel

3 Open the front panel door.

4 To remove the heat sink assembly:

- a Disconnect the heat sink assembly cable from the connector on the system board [1].
- b Loosen the captive screws that secure the heat sink assembly to the system board [2].
- c Lift the heat sink assembly away from the computer [3].



Installing heat sink assembly

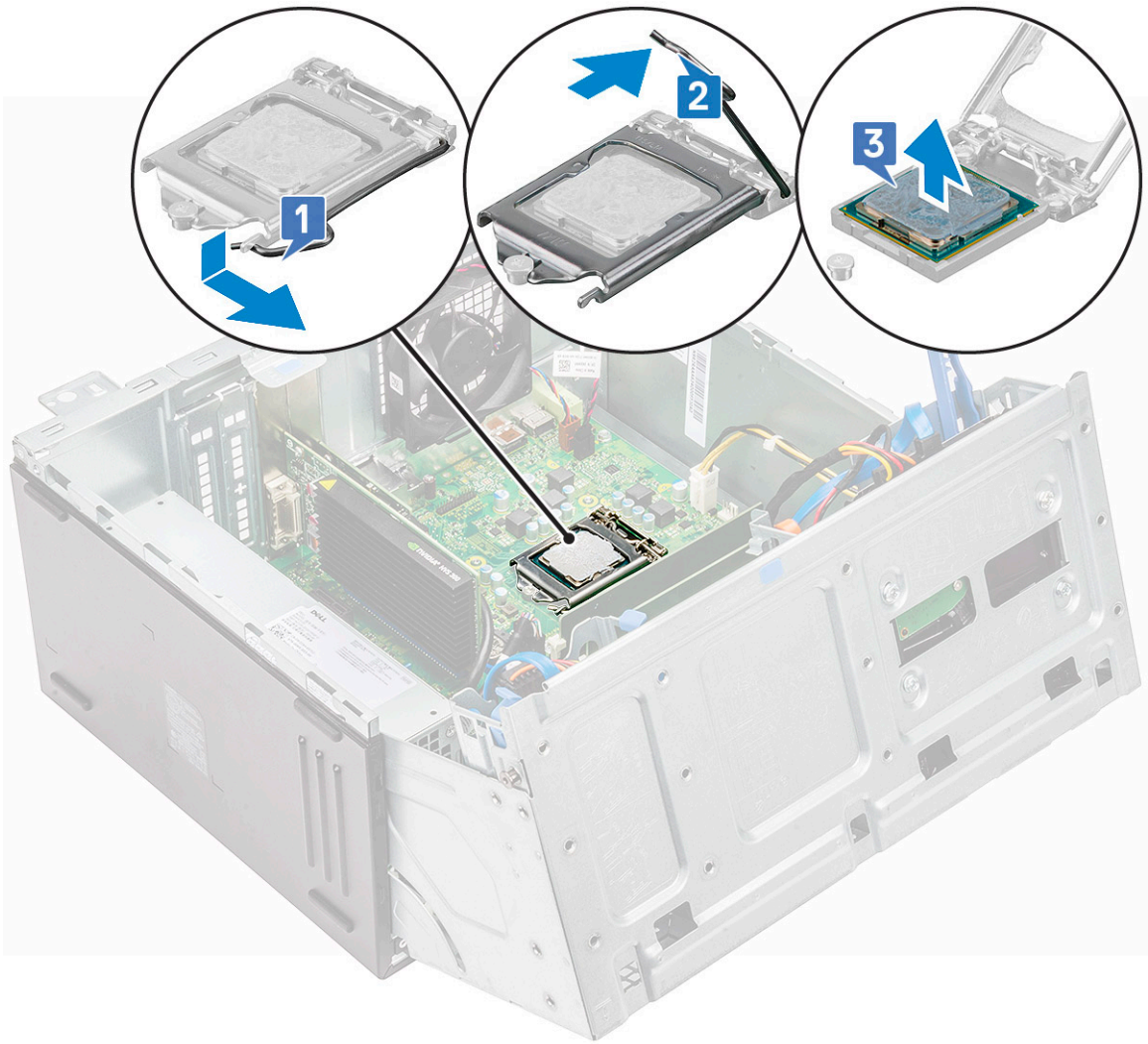
1 Align the screws of the heat sink assembly with the holders on the system board.
2 Place the heat sink assembly on the processor.
3 Tighten the captive screws to secure the heat sink assembly to the system board.
4 Connect the heat sink assembly cable to the connector on the system board.
5 Close the front panel door.
6 Install the:
   a bezel
   b cover
7 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 cover
   b bezel
3 Open the front panel door.
4 Remove the heat sink 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 Align the processor with the socket keys.

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

2 Align the pin-1 indicator of the processor with the triangle on the socket.

3 Place the processor on the socket such that the slots on the processor align with the socket keys.

4 Close the processor shield by sliding it under the retention screw.

5 Lower the socket lever and push it under the tab to lock it.

6 Install the heat sink assembly.

7 Close the front panel door.

8 Install the:

   a bezel

   b cover

9 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 cover

   b bezel

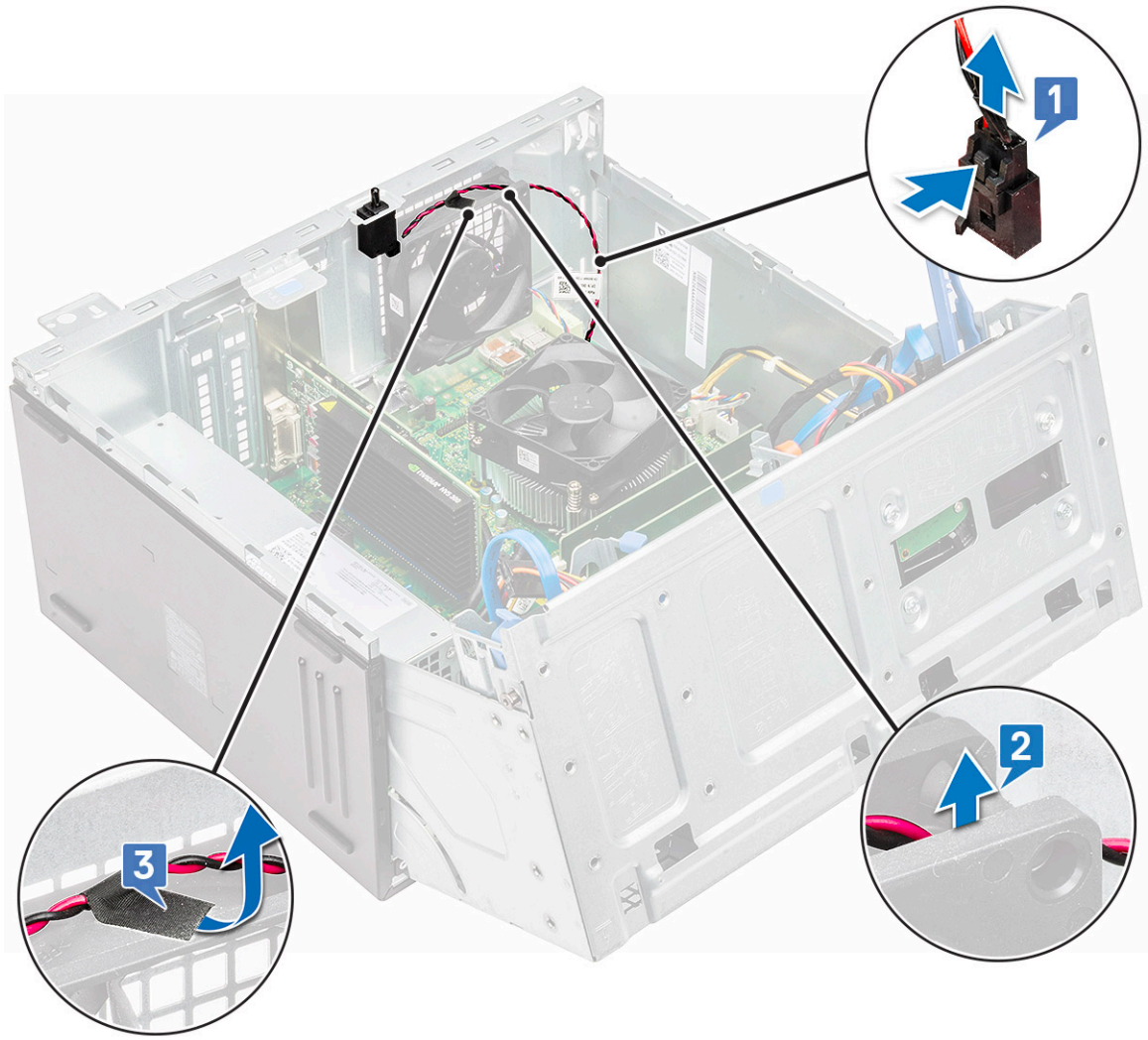
3 Open the front panel door.

4 To remove the system fan:

   a Press the notch and disconnect the intrusion switch cable from the connector on the system board [1].

   b Unroute the intrusion switch cable from the fan grommet as shown in the image [2].

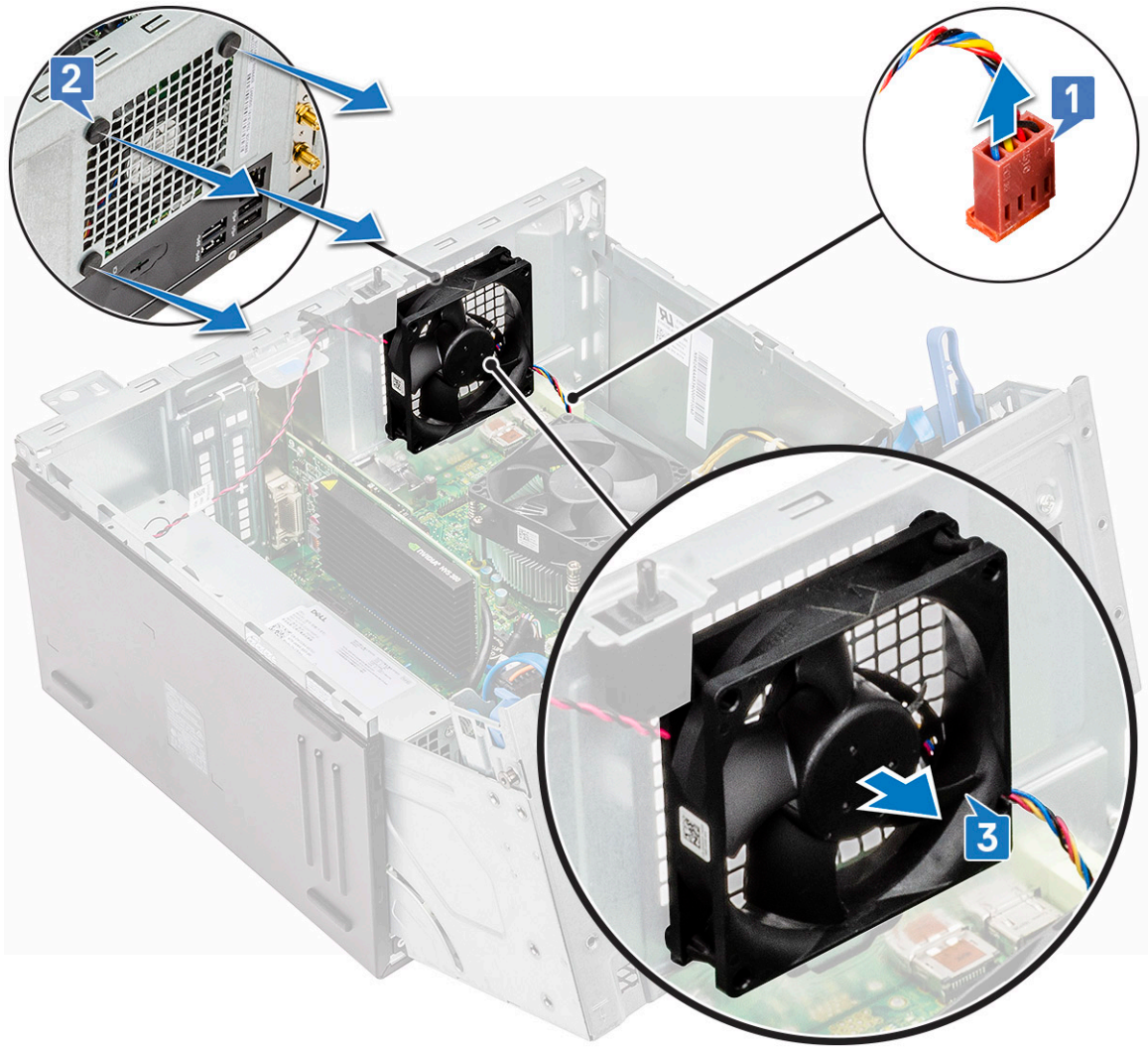
   c Remove the tape that holds the intrusion switch cable on the system fan and move the cable away [3].



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

   e Pull the grommets securing the fan to remove the grommets from the system [2].

   f Slide the system fan out of the computer [3].



Installing system fan

1 Insert the grommets into the slots on the back of the computer.
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.
5 Stretch the grommets and slide the system fan toward the computer until it locks into place.

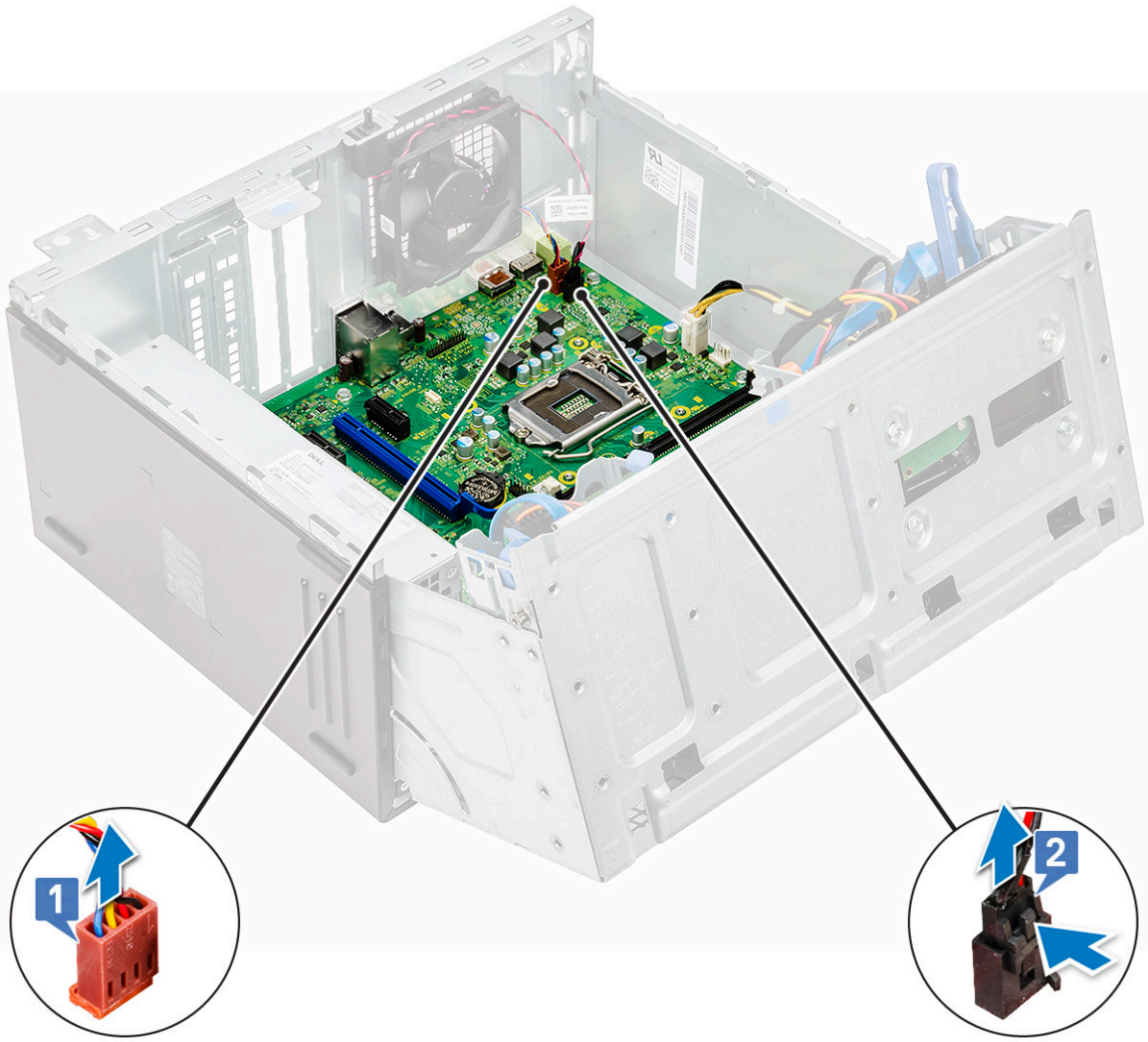
NOTE: Install the lower two grommets first.

6 Connect the system fan cable to the connector on the system board.
7 Secure the intrusion switch cable to the system fan with an adhesive tape.
8 Route the intrusion cable through the system fan grommet.
9 Connect the intrusion switch cable to the connector on the system board.
10 Close the front panel door.
11 Install the:
   a bezel
   b cover
12 Follow the procedure in After working inside your computer.

System board

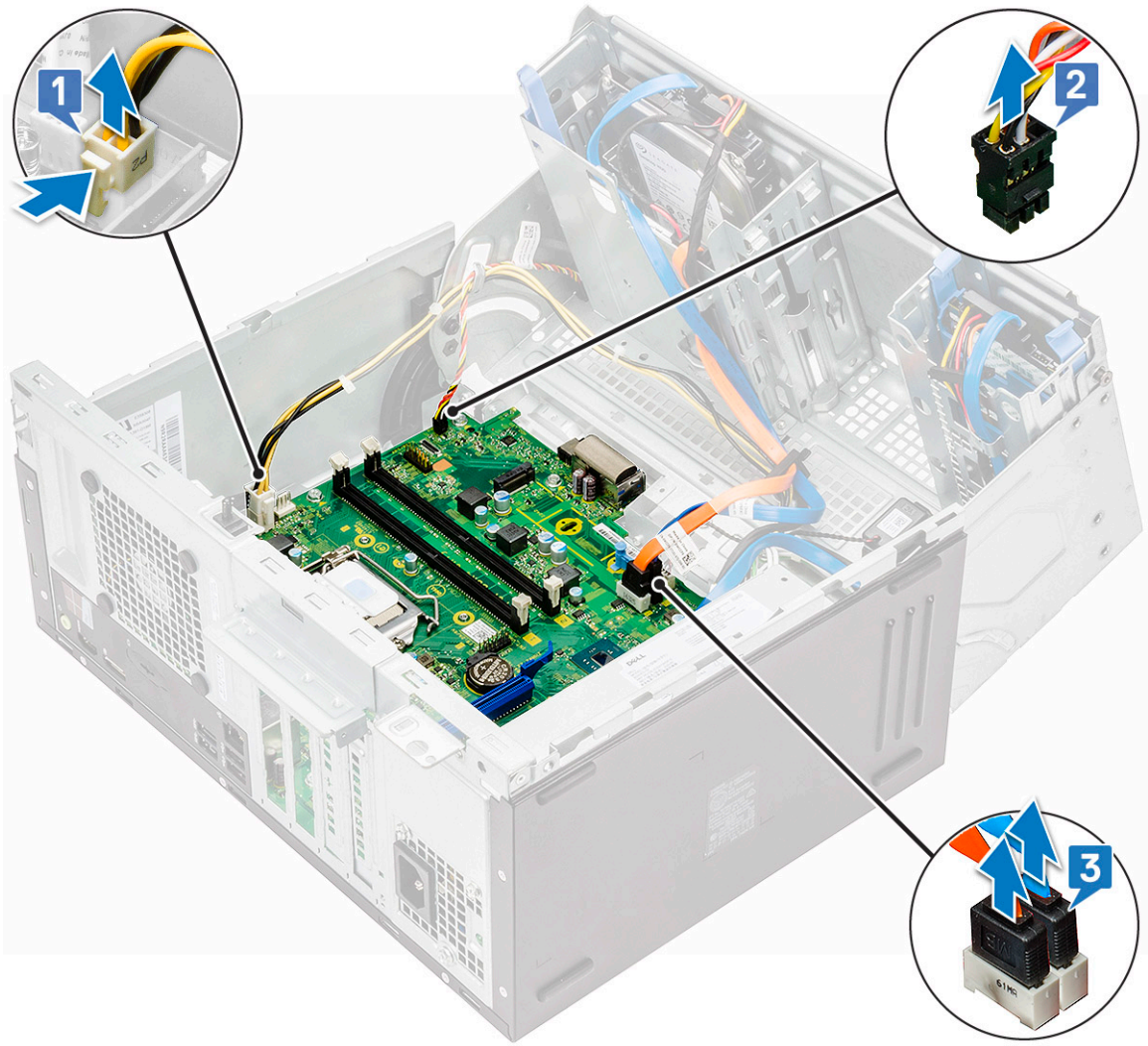
Removing system board

1 Follow the procedure in Before working inside your computer.
2 Remove the:
   a cover
   b bezel
3 Open the front panel door.
4 Remove the:
   a heat sink assembly
   b processor
   c expansion card
   d optional M.2 PCIe SSD
   e SD card reader
   f memory module
   g VGA daughter board
5 Disconnect the following cables:
   a system fan [1]
   b intrusion switch [2]



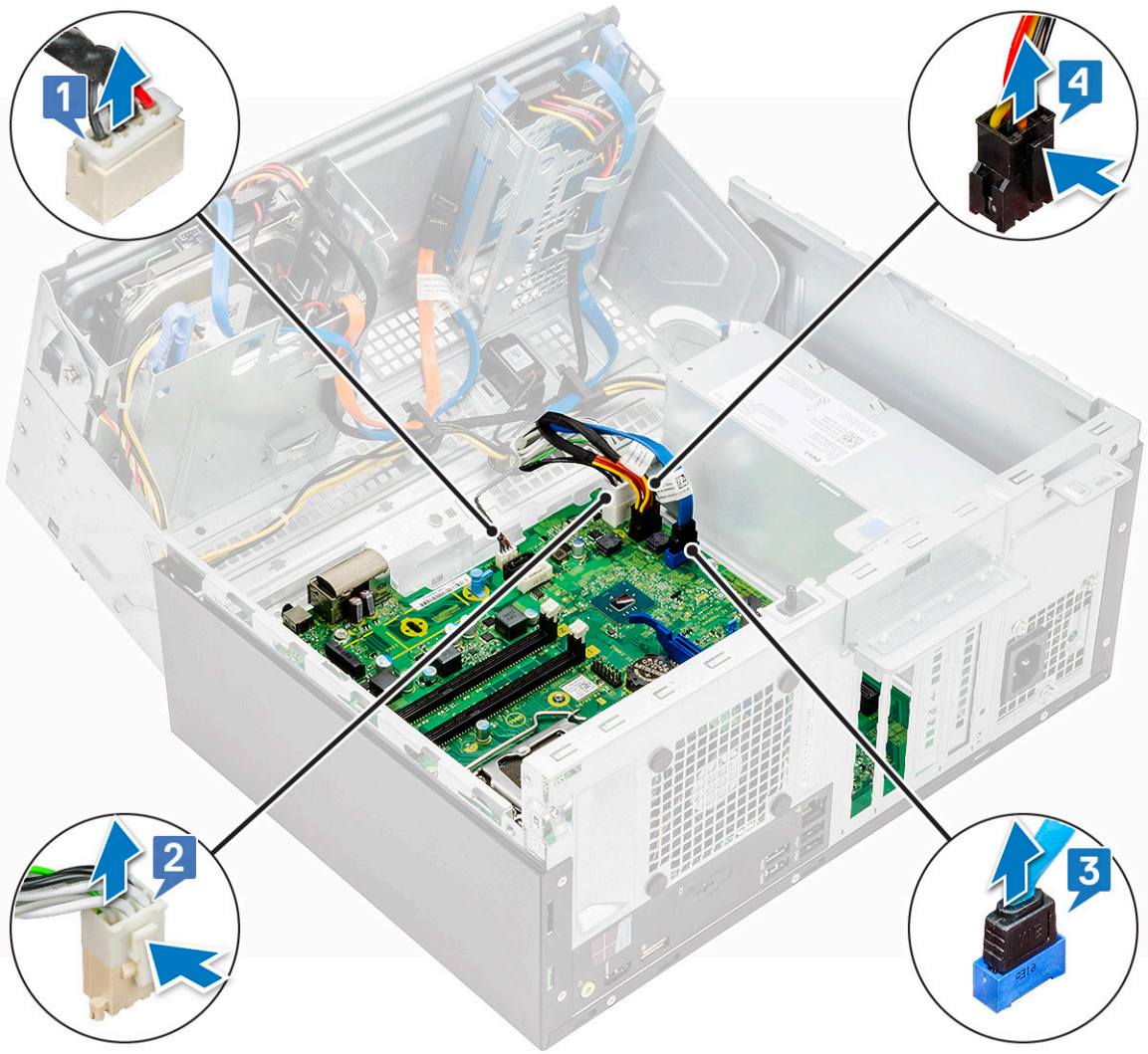
6 Disconnect the following cables:

a PSU [1]
b power switch [2]
c optical drive and hard drive [3]

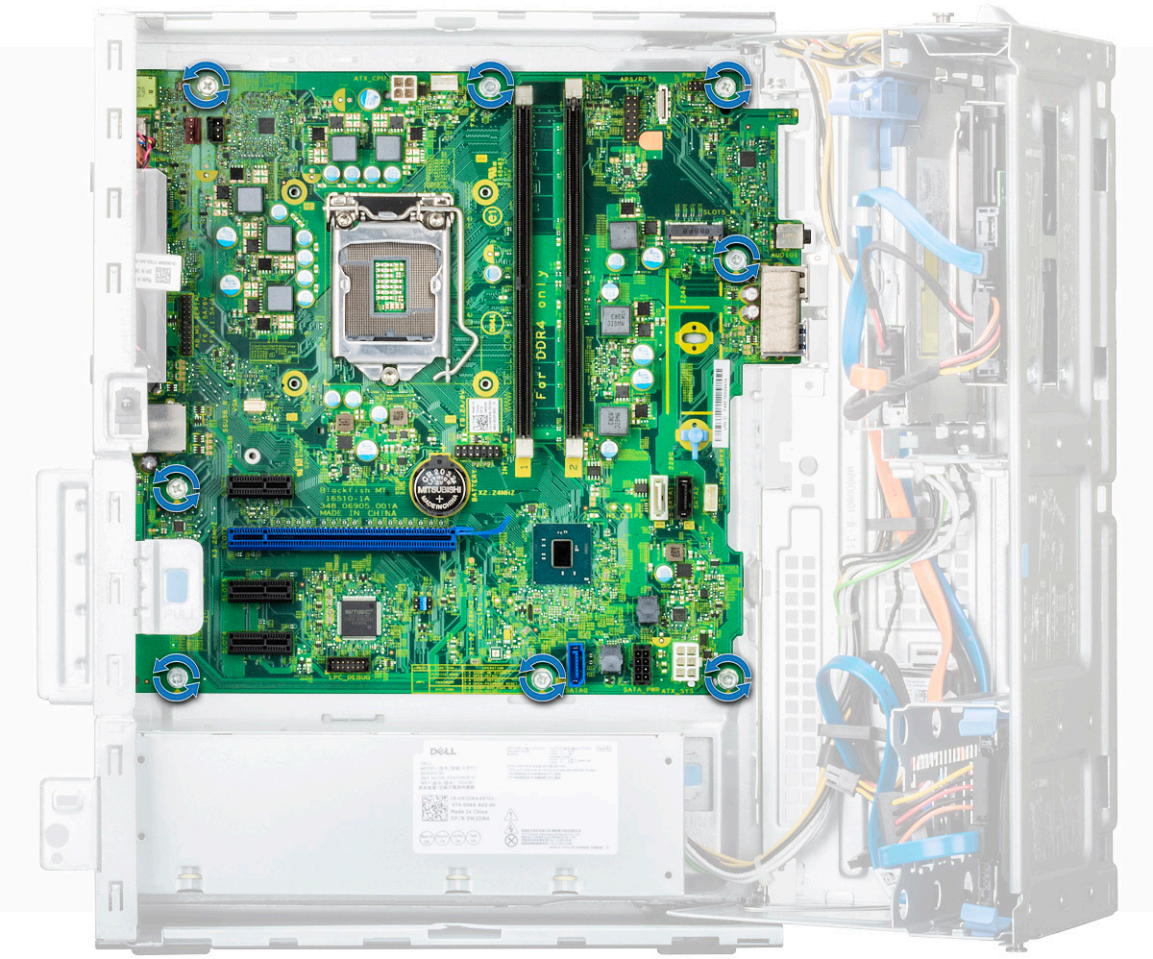


7 Disconnect the following cables:

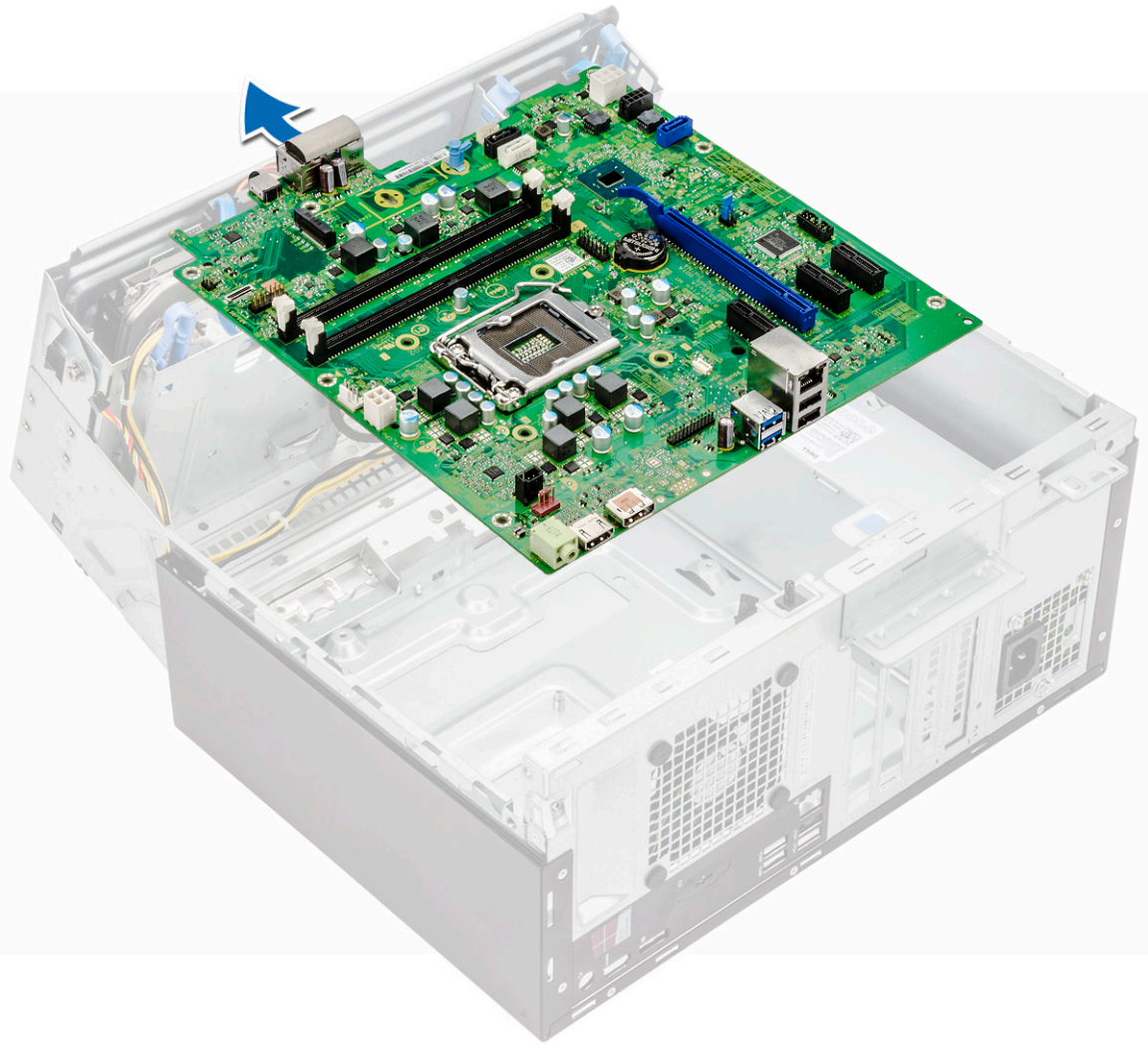
a speaker [1]
b PSU [2]
c hard drive [3]
d power distribution for optical drive and hard drive [4]



8 Remove the screws that secure the system board to the computer.



9 Slide and lift the system board away from the computer.



Installing the system board

1 Hold the system board by its edges and align it toward 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.

3 Tighten the screws to secure the system board to the computer.

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 intrusion switch
   b system fan
   c power distribution for optical drive and hard drive
   d PSU (2 cables)
   e optical dive and hard drive cables (4 cables)
   f speaker
   g power switch

6 Install the:

   a VGA daughter board
   b memory module
   c SD card reader

d optional M.2 PCIe SSD
e expansion card
f processor
g heat sink assembly

7 Close the front panel door.

8 Install the:
a bezel
b cover

9 Follow the procedure in After working inside your computer.

M.2 Intel Optane Memory Module 16 GB

Overview

This document describes the specifications and capabilities of the Intel® Optane™ memory module. The Intel® Optane™ memory is a system acceleration solution developed for 7th Generation Intel® Core™ processor-based platforms. The Intel® Optane™ memory module is architected with the high performance controller interface Non-Volatile Memory Express (NVMe*)- delivering outstanding performance, low latency and quality of service. NVMe uses a standardized interface that enables higher performance and lower latency than pervious interfaces. Intel® Optane™ memory module offers capacities of 16 GB and 32 GB in small M.2 form factors.

The Intel® Optane™memory module offers a system acceleration solution using the latest Intel® Rapid Storage Technology (Intel® RST) 15.5X.

The Intel® Optane™ memory module includes these key features:

- PCIe 3.0x2 with NVMe interface
- Uses Intel's revolutionary new storage technology, 3D Xpoint™ memory media
- Ultra-low latency; exceptional responsiveness
- Performance saturation at queue depth of 4 and lower
- Very high endurance capabilities

Intel®Optane™ Memory Module Driver Requirements

The following table describes the driver requirements for the Intel® Optane™ memory system acceleration us a component of Intel® Rapid Storgae Technology 15.5 or later and requires 7th generation Intel® Core ™ processor-based platforms to function.

Table 1. Driver Support

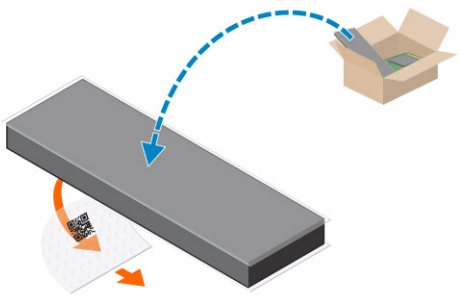
Support Level	Operating System Description
Intel® Optane™ Memory with System Acceleration Configuration Using Rapid Storage Technology Driver[1]	Windows 10*64 bit

NOTES:

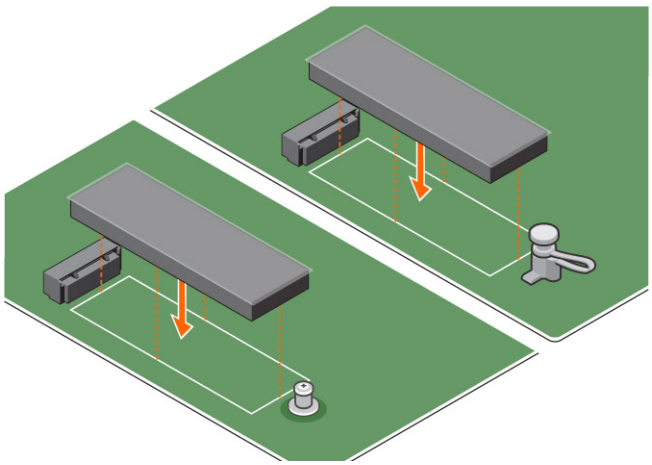
1 Intel® RST driver requires device to be attached to RST enabled PCIe lanes on 7th generation Intel® Core™.

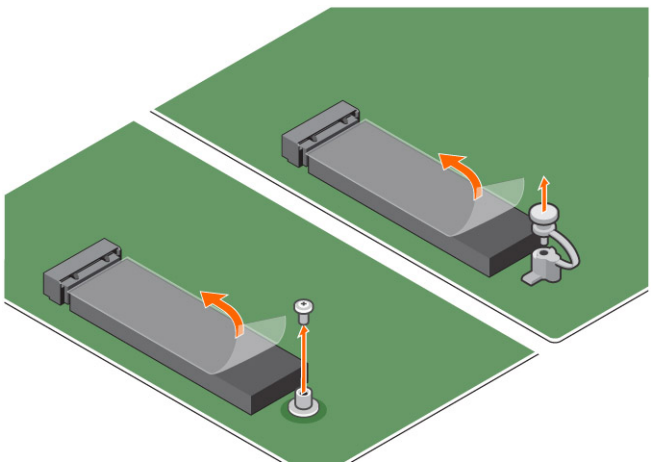
M.2 Intel Optane Memory Module 16 GB

1 Follow the procedure in Before working inside your computer.
2 Remove the cover.
3 To remove M.2 Intel optane memory module:
   a Remove the thermal pad and white adhesive tape from the box.

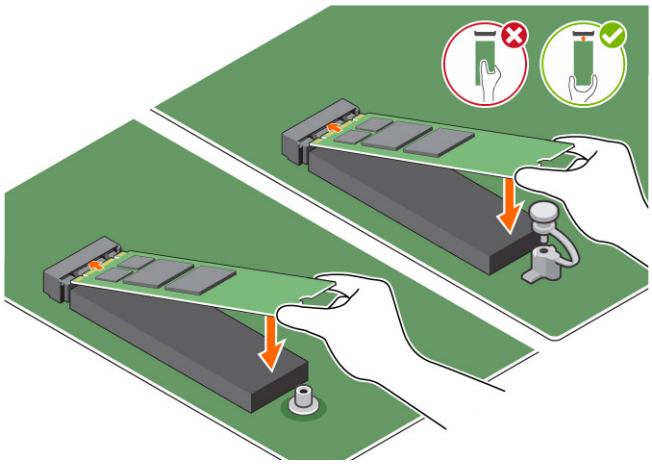


b Place the thermal pad on the SSD slot and remove the white adhesive tape.

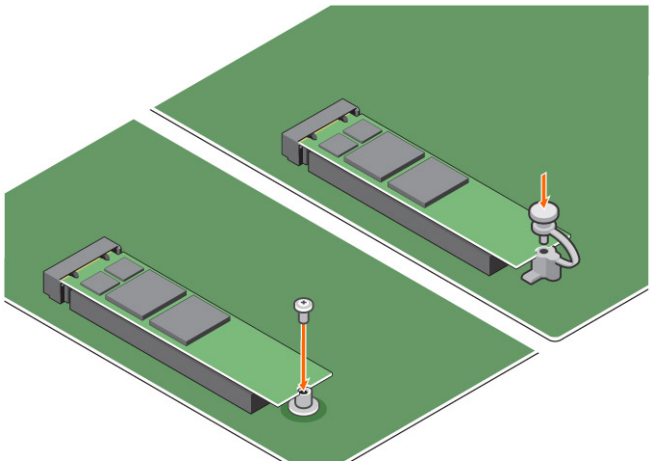




c Place the M.2 Intel optane memory module into the slot on the thermal pad.



d If the system is shipped with screw tighten that secures the M.2 Intel optane memory module on the computer. If the system is shipped with self locking spacer press to lock the M.2 Intel optane to secure on the computer.



Product specifications

Table 2. Product specifications

Features	Specification
Capacities	16 GB, 32 GB
Expansion cards	PCIe 3.0 x 2
M.2 form factors (all densities)	2280–S3–B-M
Performace	• Seq R/W: Up to 1350/290 MS/s • QD4 4HB Random Read: 240K + IOPs • QD4 4HB Random Write: 240K + IOPs
Latency (average sequential)	• Read 8.25 µ • Write: 30 µ
Components	• Intel 3D XPoint Memory Media • Intel Controller and Firmware • PCIe 3.0x2 with NVMe Interface • Intel Rapid Storage Technology 15.2 or later

Operating System Support	Windows 10 64 bit
Supported Platforms	7th generation or newer Intel Core processor based platforms
Power	• 3.3V Supply Rail • Active: 3.5 W • Drive Idel :900mW to 1.2W
Compliance	• NVMe Express 1.1 • PCI Express Base specifiation rev 3.0 • PCI M.2 HS Spec
Certification and Declarationsµ	UL, CE, C-Tick, BSMI, KCC, Microsoft WHQL, Microsoft WHCK, VCCI
Endurance Rating	• 100 GB Writes per day • Upto 182.3 TBW (Terabytes written)
Temperature Specification	• Operating: 0 to 70º C • Non-Opearting: 10 to 85º C • Temperature monitoring
Shock	1500 G/0.5msec
Vibration	• Operating: 2.17 G_{RMs}(5–800Hz) • Non-Operating: 3.13 G_{RMS} (5–800Hz)
Altitude (Simulated)	• Operating: –1,000 ft to 10,000 ft • Non-Operating: –1,000 ft to 40,000 ft
Product Ecological Compliance	RoHS
Reliability	• Uncorrectable Bit Error Rate (UBER): 1 sector per 10^{15} bits read • Mean Time Between Failure (MTBF): 1.6 million hours

Environmental Conditions

Table 3. Temperature, Shock, Vibration

Temperature	M.2 2280 form factor
Operating[1]	0–70º C
Non-operating [2]	-10–85º C
Temperature Gradient[3]	
Operating	30º C/hr (Typical)
Non-operating	30º C/hr (Typical)
Humidity	
Operating	5–95%
Non-operating	5–95%
Shock and Vibration	Range

Shock [4]	
Operating	1500 G / 0.5 ms
Non-operating	230 G / 3 msec
Vibration[5]	
Operating	2.17 G_{RMS} (5–800Hz) Max
Non-operating	3.13 G_{RMS} (5–800Hz) Max

NOTES:

1 Operating temperature is targeted for 70º C.

2 Please contact your Intel representative for details on the non-operating temperature range.

3 Temperature gradient measured without condensation.

4 Shock specification assume the device is mounted securely with the input vibration applied to the drive-mounting screws. Stimulus may be applied in the X,Y, or Z axis and shock specification is measured using Root Mean Squared (RMS) value.

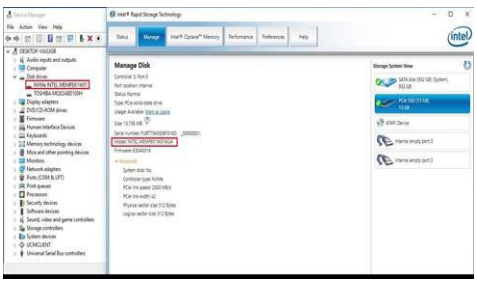
5 Vibration specifications assume the device is mounted securely with the input vibration applied to the drive-mounting screws. Stimulus may be applied in the X, Y, or Z axis. Vibration specificities is measured using RMS value.

Troubleshooting

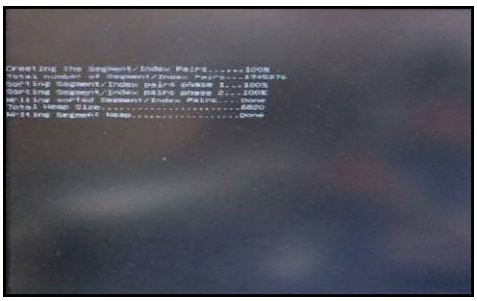
1 The Intel Optane Memory model name "NVME INTEL MEMPEK1W01" in Device Manager does not match in the Intel Rapid Storage Technology user interface; it only shows a part of the serial number information. This is a known issue and does not impede the functionality of the Intel Optane Memory.

Device Manager: NVME INTEL MEMPEK1W01

IRST UI: INTEL MEMPEK1W016GA



2 During the first-time boot up, the system will scan the pairing status as below screen shot after shutdown. It's working as designed and the message will not appear again in following boot ups.



4

Technology and components

Skylake – 6th Generation Intel Core processors

Intel Skylake is the successor to the Intel Broadwell processor. It is a micro architecture redesign using an existing process technology and it is branded as Intel 6th Gen Core. Like Broadwell, Skylake is available in four variants with suffixes SKL-Y, SKL-H, SKL-U, and SKL-S.

SKL-Y, SKL-H, SKL-U, and SKL-S are Intel's line of low-power mobile processors based on the Skylake micro architecture serving as successors to Broadwell Y, Broadwell H, Broadwell U, and Broadwell S processors respectively. Skylake processors are fabricated on Intel's 14nm process and provide a large set of improvements over comparable Broadwell models.

The Skylake also includes Core i7, i5, i3, Pentium, and the Celeron processors.

Skylake specifications

Table 4. Skylake specifications

Processor number	Clock Speed	Cache	Power	Memory type	Graphics
Intel Core i5-6500	3.20 GHz	6 MB	65 W	DDR4-2133	Intel HD graphics 530
Intel Core i3-6100	3.70 GHz	3 MB	65 W	DDR4-2133	Intel HD graphics 530
Intel Pentium G4400	3.30 GHz	3 MB	65 W	DDR4-2133	Intel HD graphics 510
Intel Celeron G3900	2.80 GHz	2 MB	65 W	DDR4-2133	Intel HD graphics 510

Kaby Lake — 7th Generation Intel Core processors

The 7th Gen Intel Core processor (Kaby Lake) family is the successor of 6th generation processors (Sky Lake). It's main features include:

- Intel 14nm Manufacturing Process Technology
- Intel Turbo Boost Technology
- Intel Hyper Threading Technology
- Intel Built-in Visuals
  - Intel HD graphics - exceptional videos, editing smallest details in the videos
  - Intel Quick Sync Video - excellent video conferencing capability, quick video editing and authoring
  - Intel Clear Video HD - visual quality and color fidelity enhancements for HD playback and immersing web browsing
- Integrated memory controller
- Intel Smart Cache
- Optional Intel vPro technology (on i5/i7) with Active Management Technology 11.6
- Intel Rapid Storage Technology

Kaby lake Specifications

Table 5. Kaby lake specifications

Processor number	Clock Speed	Cache	No. of cores/No. of threads	Power	Memory type	Graphics
Intel Core i3-7100U (3M Cache, up to 2.4 GHz), Dual Core	2.4 GHz	3 MB	2/4	15 W	DDR4-2133	Intel HD graphics 620
Intel Core i5-7200U (3M Cache, up to 3.1 GHz), Dual Core	2.5 GHz	3 MB	2/4	15 W	DDR4-2133	Intel HD graphics 620
Intel Core i5-7300U (3M Cache, up to 3.5 GHz),vPro, Dual Core	2.6 GHz	3 MB	2/4	15 W	DDR4-2133	Intel HD graphics 620
Intel Core i7-7600U (4M Cache, up to 3.9 GHz), vPro, Dual Core	2.8 GHz	4 MB	2/4	15 W	DDR4-2133	Intel HD graphics 620
Intel Core i5-7300HQ (6M Cache, up to 3.5GHz), Quad Core, 35W CTDP	2.5 GHz	6 MB	4/4	35 W	DDR4-2133; DDR4-2400	Intel HD Graphics 630
Intel Core i5-7440HQ (6M Cache, up to 3.8GHz), Quad Core, 35W CTDP	2.8 GHz	6 MB	4/4	35 W	DDR4-2133; DDR4-2400	Intel HD Graphics 630
Intel Core i7-7820HQ (8M Cache up to 3.9GHz), Quad Core, 35W CTDP	2.9 GHz	8 MB	4/8	35 W	DDR4-2133; DDR4-2400	Intel HD Graphics 630

USB features

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

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

Table 6. 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	Super Speed	2010
USB 3.1 Gen 2	10 Gbps	Super Speed	2013

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

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

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

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

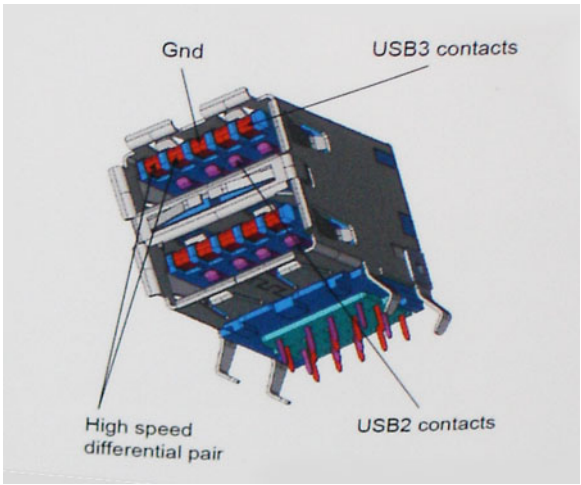
The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

Speed

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

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

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



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

Applications

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

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

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

Compatibility

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

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

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

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

5

System setup

System setup enables you to manage your desktop hardware and specify BIOS level options. From the System setup, you can:

- Change the NVRAM settings after you add or remove hardware
- View the system hardware configuration
- Enable or disable integrated devices
- Set performance and power management thresholds
- Manage your computer security

Topics:

Boot Sequence

Boot Sequence allows you to bypass the System Setup–defined boot device order and boot directly to a specific device (for example: optical drive or hard drive). During the Power-on Self Test (POST), when the Dell logo appears, you can:

- Access System Setup by pressing F2 key
- Bring up the one-time boot menu by pressing F12 key

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot menu options are:

- Removable Drive (if available)
- STXXXX Drive

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

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

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

Navigation Keys

The following table displays the system setup navigation keys.

NOTE: For most of the system setup options, changes that you make are recorded but do not take effect until you re-start the system.

Table 7. Navigation Keys

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
<Enter>	Allows you to select 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 till 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.
<F1>	Displays the System Setup help file.

System and setup password

Table 8. System and setup password

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

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

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

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

NOTE: System and setup password feature is disabled.

Assigning a system setup password

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

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

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

Deleting or changing an existing system setup password

Ensure that the **Password Status** is Unlocked (in the System Setup) before attempting to delete or change the existing System and/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 F2 immediately after a power-on or reboot.

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

> **NOTE: If you change the System and/or Setup password, re-enter the new password when promoted. If you delete the System and/or Setup password, confirm the deletion when promoted.**

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 reboot.

System Setup options

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

Table 9. 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**, and **DIMM 2 Size**, **DIMM 3 Size**, and **DIMM 4 Size**. • PCI Information: Displays SLOT1, SLOT2, SLOT3, SLOT4, and SLOT5_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-1, SATA-2, SATA-3, SATA-4, M.2 PCIe SSD-0, LOM MAC Address, Video Controller, and Audio Controller.** .
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. • Legacy • UEFI (selected by default)
Advanced Boot Options	Allows you to select the Enable Legacy Option ROMs option, when in UEFI boot mode. By default, this option is selected.
Date/Time	Allows you to set the date and time settings. Changes to the system date and time take effect immediately.

Table 10. 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.**
SATA Operation	Allows you to configure the operating mode of the integrated hard drive controller. • Disabled = The SATA controllers are hidden • RAID ON = SATA is configured to support RAID mode (selected by default) • AHCI= SATA is configured for AHCI mode
Serial Port	Allows you to determine how the built-in serial port to operate. The options are: • Disabled • COM 1 – Default setting • COM 2 • COM 3 • COM 4
Drives	Allows you to enable or disable the various drives on-board: • SATA-0 • SATA-1 • SATA-2 • SATA-3 • SATA-4
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 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 back USB ports. All the ports are enabled by default.
USB PowerShare	This option allows you to charge the external devices, such as mobile phones, music player. This option is disabled by default.
Audio	Allows you to enable or disable the integrated audio controller. The option **Enable Audio** is selected by default. • Enable Microphone • Enable Internal Speaker Both the options are selected by default.
Miscellaneous	Allows you to enable or disable the various on-board devices.

Option	Description
	• Enable PCI Slot (default option) • Enable Media Card (default option) • Disable Media Card

Table 11. 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.**

Table 12. Security

Option	Description
Admin Password	Allows you to set, change, and delete the admin password.
System Password	Allows you to set, change, and delete the system password.
Internal HDD-0 Password	Allows you to set, change, and delete the computer's internal HDD.
Internal HDD-3 Password	Allows you to set, change, and delete the computer's internal HDD. **NOTE: HDD passwords are not available for PCI-e hard drives.**
Strong Password	This option lets you enable or disable strong passwords for the system.
Password Configuration	Allows you to control the minimum and maximum number of characters allowed for 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 selected 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 • Attestation Enable (default) • Key Storage Enable(default)

Option	Description
	• SHA-256(default) • Disabled • Enabled (default)
Computrace	This field lets you Activate or Disable the BIOS module interface of the optional Computrace Service from Absolute Software. Enables or disables the optional Computrace service designed for asset management. • **Deactivate** - This option is selected by default. • Disable • Activate
Chassis Intrusion	Allows you to control the chassis intrusion feature. You can set this option to: • Enabled • Disabled (default) • On-Silent
CPU XD Support	Allows you to enable or disable the Execute Disable mode of the processor. This option is enabled by default.
OROM Keyboard Access	This option determines whether users are able to enter Option ROM Configuration screens via hotkeys during boot. Specifically, these settings are capable of preventing access to Intel RAID (CTRL +I) or Intel Management Engine BIOS Extension (CTRL+P/F12). • Enable (selected by default)— User may enter OROM configuration screens via the hotkey. • One-Time Enable — User may enter OROM configuration screens via the hotkeys on next boot only. After next boot, the setting will revert to disabled. • Disable — User may not enter OROM configuration screens via the hotkey.
Admin Setup Lockout	Allows you to enable or disable the option to enter Setup when an Administrative password is set. This option is not set by default.

Table 13. Secure Boot

Option	Description
Secure Boot Enable	Allows you to enable or disable Secure Boot feature • Disable (selected by default) • Enable
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

Option	Description
	NOTE: If you disable the Custom Mode, all the changes made will be erased and the keys will restore to default settings.

Table 14. Intel Software Guard Extensions

Option	Description
Intel SGX Enable	Allows you to enable or disable the Intel Software Guard Extensions to provide a secured environment for running code/storing sensitive information in the context of the main operating system. • Disabled (default) • Enabled
Enclave Memory Size	Allows you to set the Intel SGX Enclave Reserve Memory Size. • 32 MB • 64 MB (Disabled by default) • 128 MB (Disabled by default)

Table 15. Performance

Option	Description
Multi Core Support	This field specifies whether the process will have one or all cores enabled. This option is enabled by default. options: • All (selected by default) • 1 • 2 • 3
Intel SpeedStep	Allows you to enable or disable the Intel SpeedStep mode of the processor. This option is enabled by default.
C States Control	Allows you to enable or disable additional processor sleep states. This option is enabled by default.
Limited CPUID Value	Allows you to limit the maximum value of the processor standard CPUID function. This option is disabled by default.
Intel TurboBoost	Allows you to enable or disable the Intel TurboBoost mode of the processor. This option is enabled by default.

Table 16. 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

Option	Description
	This option is Power Off by default.
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 • Enabled in S5 only • Enabled in S4 and S5 This option is **Enabled in S4 and S5** by default.
Fan Control Override	Allows you to determine the speed of the system fan. When this option is enabled, the system fan runs at the maximum speed. This option is disabled by default.
USB Wake Support	Allows you to enable the USB devices to wake the computer from standby (S1 / S3), Hibernate (S4), and Power Off (S5) modes. The option "Enable USB Wake Support" is selected by default
Wake on LAN/WWAN	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 Disabled by default.
Block Sleep	Allows you to block entering to sleep (S3 state) in OS environment. This option is disabled by default.
Intel Ready Mode	Allows you to enable the capability of Intel Ready Mode Technology. This option is disabled by default.

Table 17. POST Behavior

Option	Description
Numlock LED	Allows you to enable or disable the Numlock feature when your computer starts. This option is enabled by default.
Keyboard Errors	Allows you to enable or disable the keyboard error reporting when the computer starts. This option is disabled by default.
Fast Boot	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 **Minimal** by default.

Table 18. Manageability

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

Table 19. Virtualization Support

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

Table 20. 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. This option is set by default.
SERR Messages	Controls the SERR message mechanism. This option is set by default. Some graphics cards require that the SERR message mechanism be disabled.
BIOS Downgrade	Allows you to control flashing of the system firmware to the previous versions. This option is enabled by default. **NOTE: If this option is not selected, the flashing of the system firmware to the previous versions is blocked.**
Data Wipe	Allows you to securely erase the data from all the available internal storages, such as HDD, SSD, mSATA, and eMMC. The option Wipe on Next Boot is disabled by default.
BIOS recovery	Allows you to recover the corrupted BIOS conditions from the recovery files on the primary hard drive. The option **BIOS Recovery from Hard Drive** is selected by default

Table 21. System Logs

Option	Description
BIOS Events	Displays the system event log and allows you to: • Clear Log • Mark all Entries

Table 22. Advanced configurations

Option	Description
ASPM	Allows you to activate the state power management. • Auto (Default) • Disabled • L1 Only

Updating the BIOS in Windows

It is recommended to update your BIOS (System Setup), when you replace the system board or if an update is available.

NOTE: If BitLocker is enabled, it must be suspended prior to updating the system BIOS, and then re-enabled after the BIOS update is completed.

1 Restart the computer.
2 Go to **Dell.com/support**.
   - Enter the **Service Tag** or **Express Service Code** and click **Submit**.
   - Click **Detect Product** and follow the instructions on screen.
3 If you are unable to detect or find the Service Tag, click **Choose from all products**.
4 Choose the **Products** category from the list.

   NOTE: Choose the appropriate category to reach the product page
5 Select your computer model and the **Product Support** page of your computer appears.
6 Click **Get drivers** and click **Drivers and Downloads**.
   The Drivers and Downloads section opens.
7 Click **Find it myself**.
8 Click **BIOS** to view the BIOS versions.
9 Identify the latest BIOS file and click **Download**.
10 Select your preferred download method in the **Please select your download method below** window, click **Download File**.
   The **File Download** window appears.
11 Click **Save** to save the file on your computer.
12 Click **Run** to install the updated BIOS settings on your computer.
   Follow the instructions on the screen.

Updating your system BIOS using a USB flash drive

If the system cannot load into Windows but there is still a need to update the BIOS, download the BIOS file using another system and save it to a bootable USB Flash Drive.

NOTE: You will need to use a bootable USB Flash drive. Please refer to the following article for further details: http://www.dell.com/support/article/sln143196

1 Download the BIOS update .EXE file to another system.
2 Copy the file e.g. O9010A12.EXE onto the bootable USB Flash drive.
3 Insert the USB Flash drive into the system that requires the BIOS update.
4 Restart the system and press F12 when the Dell Splash logo appears to display the One Time Boot Menu.
5 Using arrow keys, select **USB Storage Device** and click Return.
6 The system will boot to a Diag C:\> prompt.
7 Run the file by typing the full filename e.g. O9010A12.exe and press Return.
8 The BIOS Update Utility will load, follow the instructions on screen.

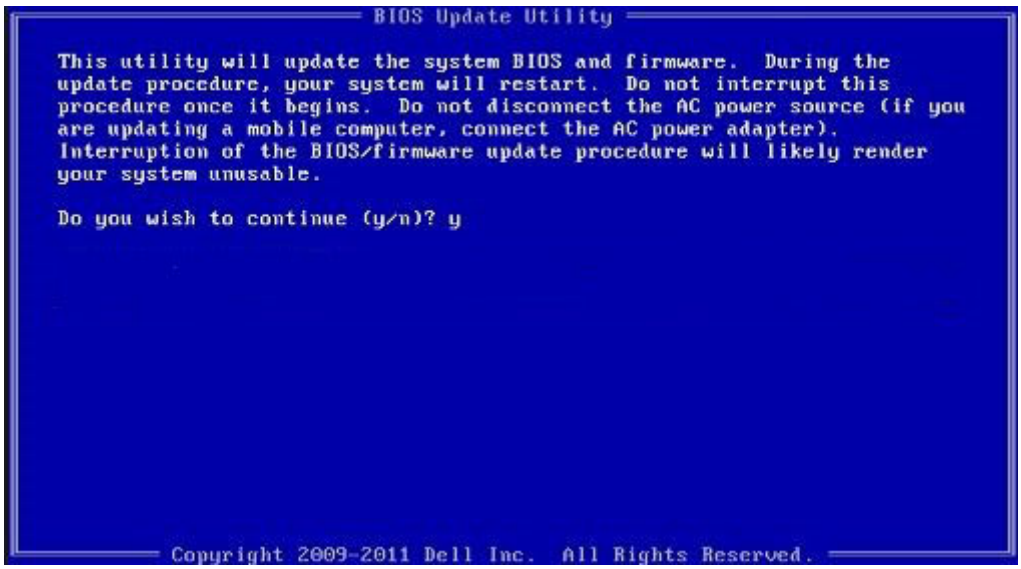


Figure 1. DOS BIOS Update Screen

Enabling smart power on

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

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

6

Software

Supported operating systems

The following list shows supported operating systems:

Table 23. Supported operating system

Supported operating systems	Operating System Description
Microsoft Windows	• Microsoft Windows 10 Home (64-bit) • Microsoft Windows 10 (64-bit) Professional • Microsoft Windows 7 (32/64 bit) Professional **NOTE: Microsoft Windows 7 is not supported with the Intel 7th Generation processors.**
Other	• Ubuntu 16.04 LTS • Neokylin V6.0
OS Media Support	• Optional RDVD drive

Downloading drivers

1 Turn on the computer.
2 Go to **Dell.com/support**.
3 Click **Product Support**, enter the Service Tag of your computer, and then click **Submit**.

NOTE: If you do not have the Service Tag, use the auto detect feature or manually browse for your computer model.

4 Click **Drivers and Downloads**.
5 Select the operating system installed on your computer.
6 Scroll down the page and select the driver to install.
7 Click **Download File** to download the driver for your computer.
8 Navigate to the folder where you saved the driver file, after the download is complete.
9 Double-click the driver file icon and follow the instructions on the screen.

Downloading the chipset driver

1 Turn on the computer.
2 Go to **Dell.com/support**.
3 Click **Product Support**, enter the Service Tag of your computer, and then click **Submit**.

NOTE: If you do not have the Service Tag, use the autodetect feature or manually browse for your computer model.

4 Click **Drivers and Downloads**.
5 Select the operating system installed in your computer.
6 Scroll down the page, expand **Chipset**, and select your chipset driver.

7 Click **Download File** to download the latest version of the chipset driver for your computer.
8 After the download is complete, navigate to the folder where you saved the driver file.
9 Double-click the chipset driver file icon and follow the instructions on the screen.

Intel chipset drivers

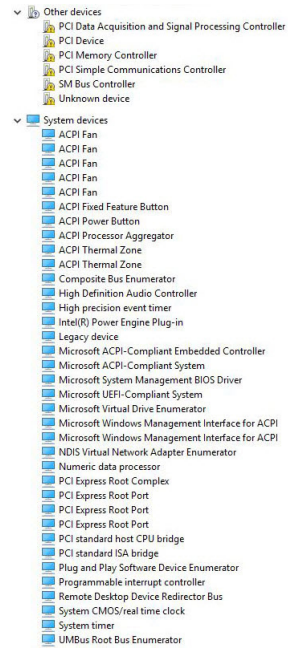
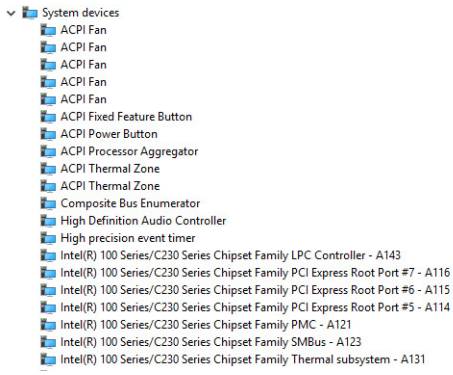
Verify if the Intel chipset drivers are already installed in the computer.

NOTE: Click Start > Control Panel > Device Manager

or

In Search the web and Windows, type **Device Manager**

Table 24. Intel chipset drivers

Before installation	After installation
	

Downloading graphic drivers

1 Turn on the computer.
2 Go to **Dell.com/support**.
3 Click **Product Support**, enter the Service Tag of your computer, and then click **Submit**.

NOTE: If you do not have the Service Tag, use the auto detect feature or manually browse for your computer model.

4 Click **Drivers and Downloads**.
5 Click **Find it myself** tab.
6 Select the operating system installed on your computer.
7 Scroll down the page and select the graphic driver to install.
8 Click **Download File** to download the graphic driver for your computer.
9 After the download is complete, navigate to the folder where you saved the graphic driver file.
10 Double-click the graphic driver file icon and follow the instructions on the screen.

Intel HD Graphics drivers

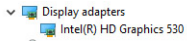
Verify if the Intel HD Graphics drivers are already installed in the computer.

NOTE: Click Start > Control Panel > Device Manager.

or

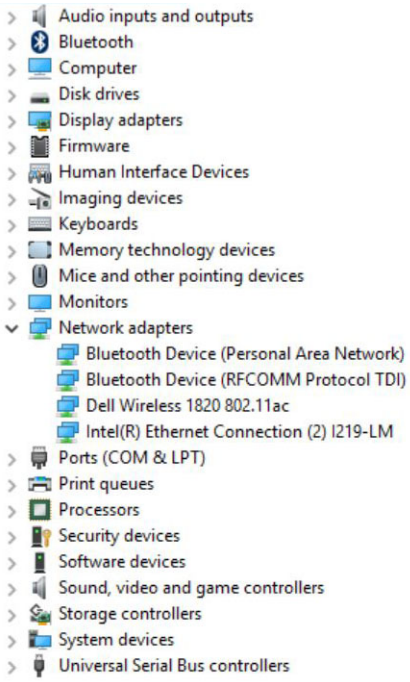
Tap Search the web and Windows and type **Device Manager**

Table 25. Intel HD Graphics drivers

Before installation	After installation
	

Intel Wi-Fi and Bluetooth drivers

In the Device Manager, check if the network card driver is installed. Install the driver updates from **dell.com/support**.



In the Device Manager, check if the Bluetooth driver is installed. Install the driver updates from **dell.com/support**.

Downloading the Wi-Fi driver

1 Turn on your computer.
2 Go to **dell.com/support**.
3 Click **Product Support**, enter the Service Tag of your computer and click **Submit**.

NOTE: **If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.**

4 Click **Drivers & downloads** > **Find it myself**.

5 Scroll down the page and expand **Network**.

6 Click **Download** to download the Wi-Fi driver for your computer.

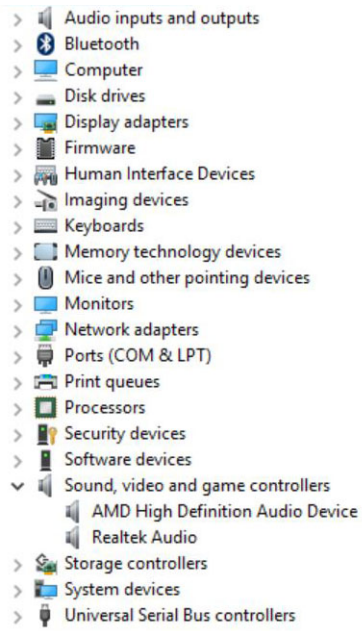
7 After the download is complete, navigate to the folder where you saved the Wi-Fi driver file.

8 Double-click the driver file icon and follow the instructions on the screen.

Realtek HD audio drivers

Verify if the Realtek audio drivers are already installed in the computer.

Table 26. Realtek HD audio drivers



Downloading the audio driver

1 Turn on your computer.

2 Go to **dell.com/support**.

3 Click **Product support**, enter the Service Tag of your computer, and then click **Submit**.

NOTE: **If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.**

4 Click **Drivers & downloads** > **Find it myself**.

5 Scroll down the page and expand **Audio**.

6 Click **Download** to download the audio driver.

7 Save the file, and after the download is complete, navigate to the folder where you saved the audio driver file.

8 Double-click the audio driver file icon and follow the instructions on the screen to install the driver.

7

Troubleshooting your computer

You can troubleshoot your computer using indicators like diagnostic lights, and error messages during the operation of the computer.

Diagnostic and Power LED codes

Table 27. Power LED states

Power LED light status	Possible cause	Troubleshooting steps
Off	The computer is either turned off or is not receiving power or in Hibernation mode.	• Re-seat the power cable in the power connector on the back of the computer and the electrical outlet. • If the computer is plugged into a power strip, ensure that the power strip is plugged into an electrical outlet and is turned on. Also, bypass power protection devices, power strips, and power extension cables to verify that the computer turns on properly. • Ensure the electrical outlet is working by testing it with another device, such as a lamp.
Steady/blinking amber	Computer fails to complete POST or processor failure.	• Remove and reinstall any cards. • Remove and reinstall the graphics card, if applicable. • Ensure the power cable is connected to the system board and processor.
Blinking white light	Computer is in sleep mode.	• Press the power button to bring the computer out of the sleep mode. • Ensure all power cables are securely connected to the system board. • Ensure the main power cable and front panel cable are connected to the system board.
Steady white	The computer is fully functional and in the On state.	If the computer is not responding, do the following: • Ensure the display is connected and turned on.

Power LED light status	Possible cause	Troubleshooting steps
		• If the display is connected and turned on, listen for a beep code.

NOTE: Amber LED blinking pattern : The pattern is 2 or 3 blinks followed by a short pause then X number of blinks up to 7. The repeated pattern has a long pause inserted in the middle. Example 2,3 = 2 amber blinks, short pause, 3 amber blinks followed by long pause then repeats.

Table 28. Diagnostic power LED codes

State	State Name	Blinking Amber Pattern	Problem Description	Suggested Resolution
-	-	2 blinks > short pause > 1 blink > long pause > repeats	Bad Motherboard	Replace the motherboard
-	-	2 blinks > short pause > 2 blinks > long pause > repeats	Bad Motherboard, Power Supply or Power Supply cabling	If customer can assist to troubleshoot, narrow down the issue with PSU BIST Test, reseat cable. If nothing works, replace the motherboard, power supply or cabling
-	-	2 blinks > short pause > 3 blinks > long pause > repeats	Bad Motherboard, Memory or Processor	If customer can assist to troubleshoot, narrow down the issue by reseating memory and swapping an available known good memory. If nothing works, replace the motherboard, memory or processor
-	-	2 blinks > short pause > 4 blinks > long pause > repeats	Bad coin cell battery	If customer can assist to troubleshoot, narrow down the issue by swapping a known good coin cell battery if available. If nothing works, replace the coin cell battery
S1	RCM	2 blinks > short pause > 5 blinks > long pause > repeats	BIOS Checksum Failure	System is in Recovery Mode. Flash latest BIOS version. If problem persists, replace the motherboard
S2	CPU	2 blinks > short pause > 6 blinks > long pause > repeats	Bad Processor	CPU configuration activity is in progress or a CPU failure was detected. Replace the processor

State	State Name	Blinking Amber Pattern	Problem Description	Suggested Resolution
S3	MEM	2 blinks > short pause > 7 blinks > long pause > repeats	Memory failures	Memory subsystem configuration activity is in progress. Appropriate memory modules were detected but a memory failure has occurred. If customer can assist to troubleshoot, narrow down the issue with reseating memory and swapping a known good memory if available. If nothing works, replace the memory.
S4	PCI	3 blinks > short pause > 1 blinks > long pause > repeats	PCIe Device or Video subsystem failures	PCIe device configuration activity is in progress or PCIe device failure was detected. If customer can assist to troubleshoot, narrow down the issue by reseating PCIe card and removing one by one to determine which card failed. If identified the PCIe card failed, replace the PCIe Card. If none of the PCIe Cards failed, replace the motherboard.
S5	VID	3 blinks > short pause > 2 blinks > long pause > repeats	Video Subsystem failure	Video subsystem configuration activity in progress or video subsystem failure. If customer can assist to troubleshoot, narrow down the issue by removing one by one to determine which card failed. If identified the card failed, replace the card. If none of the card failed, replace the motherboard.
S6	STO	3 blinks > short pause > 3 blinks > long pause > repeats	No Memory detected	If customer can assist to troubleshoot, narrow down the issue by removing one by one memory to determine which one failed and swapping to a known

State	State Name	Blinking Amber Pattern	Problem Description	Suggested Resolution
				good memory if available to confirm. If identified the memory failed, replace the memory. If none of the memory failed, replace the motherboard.
S7	USB	3 blinks > short pause > 4 blinks > long pause > repeats	Storage Subsystem failure	Possible storage device configuration in progress or storage subsystem failure. If customer can assist to troubleshoot, narrow down the issue by removing one by one storages on motherboard to determine which one failed. If identified the storage failed, replace the storage. If identified the storage failed, replace the storage.
S8	MEM	3 blinks > short pause > 5 blinks > long pause > repeats	Memory configuration or incompatible error	Memory subsystem configuration activity is in progress. No memory modules were detected. If customer can assist to troubleshoot, narrow down the issue by removing one by one the memory on motherboard to determine which one failed. Also, combining the configuration to validate appropriate combination. If identified the component failed, replace the component. If none of the component failed, replace the motherboard.
S9	MBF	3 blinks > short pause > 6 blinks > long pause > repeats	System board failure	Fatal system board failure detected. If customer can assist to troubleshoot, narrow down the issue by removing one by one the

State	State Name	Blinking Amber Pattern	Problem Description	Suggested Resolution
				component on motherboard to determine which one failed. If identified any of the component failed, replace the component. If none of the component failed, replace the motherboard.
S10	MEM	3 blinks > short pause > 7 blinks > long pause > repeats	Possible memory failure	Memory subsystem configuration activity is in progress. Memory modules have been detected but appear to be incompatible or in an invalid configuration. If customer can assist to troubleshoot, narrow down the issue by removing one by one the memory on motherboard to determine which one failed. If identified the memory failed, replace the memory. If else, replace the motherboard.

WARNING: The power LED only serve as an indicator of the progress through the POST process. These LEDs do not indicate the problem that caused the POST routine to stop

Power LED issue

Power LED is not flashing amber on ChengMing 3977 and Optiplex D8 and OptiPlex D8 AIO platforms.

ChengMing 3977 and OptiPlex D8 and D8 AIO platforms without processor installed or when processor power cable is not connected; it may not have the power LED flashing amber as the diagnostic indicator. The BIOS behavior specification defines that:

1 If no processor is installed in the system, the power LED should flash amber in pattern of 2-3
2 If no processor cable is connected in the system, the power LED should flash amber in pattern of 2-2

Do not replace any hardware, it works as per the design. With the Boot guard (BtG) feature of Intel ME11.6, when processor power or processor is missing, then the system will shut down.

Affected Platforms:

- ChengMing 3977
- OptiPlex 3050/5050/7050
- OptiPlex 3050 AIO/5250 AIO/7450 AIO

Dell Enhanced Pre-Boot System Assessment — ePSA Diagnostic 3.0

You can invoke the ePSA diagnostics by either of the following ways :

- Press the F12 key when the system posts and choose **ePSA or Diagnostics** option on One Time Boot Menu.
- Press and hold Fn(Function key on keyboard) and **Power On** (PWR) the system.

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.
or
8 Shut down the computer.
9 Press and hold the Fn key, while pressing the power button, and then release both.
10 Repeat steps 3–7 above.

Diagnostic error messages

Table 29. 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.

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

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

Error messages	Description
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 30. 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. • 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.

System message	Description
`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.

Power Supply Unit (PSU) Built-in Self Test (BIST)

This system supports a new Power Supply Unit (PSU) Built-in Self Test (BIST). BIST can now be performed by simply connecting the AC power cord to the PSU.

Troubleshooting with BIST

1 Turn off the system.

2 Disconnect the power cord from the PSU, and wait for 15 seconds.

3 After 15 seconds, connect the power cord back to the PSU.

- If the LED stays on for 3 seconds and turns off, it indicates that the PSU is functional. Continue with troubleshooting steps for other devices.
- If the LED does not turns on, it indicates a hardware failure. The failed component can be PSU, system board, or any other device.

Steps to confirm that PSU is defective

1 Disconnect the power cord from the PSU.

> **CAUTION: Ensure that you take adequate safety precautions before accessing the internal components of your system. See the disassembly instructions in the Service Manual for procedure to access the PSU and its cables.**

2 Disconnect the PSU cables from the system board.

3 Connect the power cord to the PSU.

- If the LED stays on for 3 seconds and turns off, it indicates that the PSU is functional. Continue with troubleshooting steps for other devices.
- If the LED does not turns on, it indicates a PSU failure. Dispatch PSU only.

8

Technical specifications

NOTE: Offerings may vary by region. For more information regarding the configuration of your computer in:

- Windows 10, click or tap **Start** > **Settings** > **System** > **About**.

Topics:

Processor specifications

OptiPlex 3050 systems are shipped with Intel 6th generation and 7th generation core processor technology.

NOTE: The clock speed and performance varies depending on the workload and other variables. Total cache up to 8 MB cache depending on processor type.

Feature	Specification
Processor type	• Intel Core i3-6100 (DC/3MB/4T/3.7GHz/65W) • Intel Core i5-6400 (QC/6MB/4T/2.7GHz/65W) • Intel Core i5-6500 (QC/6MB/4T/3.2GHz/65W) • Intel Pentium G4400 (DC/3MB/2T/3.3GHz/65W) • Intel Pentium G4500 (DC/3MB/2T/3.35GHz/51W) • Intel Celeron G3900 (DC/2MB/2T/2.8GHz/65W) • Intel Core i3-7100 (DC/3MB/4T/3.9GHz/65W) • Intel Core i3-7300 (DC/4MB/4T/4.0GHz/51W) • Intel Core i5-7400 (QC/6MB/4T/3.0GHz/65W) • Intel Core i5-7500 (QC/6MB/4T/3.4GHz/65W) • Intel Pentium G4560 (DC/3MB/2T/3.5GHz/65W) • Intel Celeron G3930 (DC/2MB/2T/2.9GHz/65W)

Memory specifications

Feature	Specification
Type	2133 MHz / 2400 MHz **NOTE: 2133 MHz is applicable only for 6th Generation processors.**
Connectors	Two DDR4 UDIMM slots
Memory capacity per slot	2 GB, 4 GB, 8 GB, and 16 GB
Minimum Memory	2 GB
Maximum Memory	32 GB

Video specifications

Feature	Specification
Video Controller - Integrated	For Intel 7th generation processors: • Intel HD 630 Graphics [with 7th Generation Core i3/i5/i7 CPU-GPU combo] • Intel HD 610 Graphics [with 7th Generation Celeron, Pentium CPU-GPU combo] For Intel 6th generation processors: • Intel HD 530 [with 6th Generation Core i3/i5/i7 CPU-GPU combo] • Intel HD 510 Graphics [with 6th Generation Celeron, Pentium CPU-GPU combo]
Video Controller - Discrete	• 1 GB AMD Radeon R5 430 (optional) • 2 GB AMD Radeon R5 430 (optional) • 4 GB AMD Radeon R7 450 (optional)

Audio specifications

Feature	Specification
Controller	Realtek ALC3234 High Definition Audio Codec (integrated, supports multiple streaming)
Internal speaker amplifier	Integrated

Communication specifications

- Realtek RTL8111HSD-CG Gigabit Ethernet LAN 10/100/1000 controller combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, PCI Express bus controller, and embedded memory.
- Intel Dual-Band Wireless-AC 8265 Wi-Fi + BT 4.2 Wireless Card (2x2), MU-MIMO-optional
- Intel Dual-Band Wireless-AC 3165 Wi-Fi + BT 4.2 Wireless Card (1x1)-optional
- Qualcomm QCA61x4A (DW1820)-for Brazil only

Storage specifications

Feature	Specification
Drive	Up to two 2.5-inch HDD/SSD
SSD	one M.2 PCIe SSD
Optical drive	one slim drive
SD card	one
RAID	The system does not support RAID 0 or RAID 1 capability.

Ports and connectors specifications

Table 31. Ports and connectors

Feature		Specification
Front I/O ports	Universal audio jack	One
	USB 3.1 Gen 1	Two
	USB 2.0	Two
Rear I/O ports	USB 3.1 Gen 1	Two
	USB 2.0	Two
	Line out	One
	HDMI Port	One
	DisplayPort	One
	Network port RJ-45	One
	Power connector port	One
	VGA port	One (optional)
	PS/2	Two (optional)
	Serial/Parallel	One (optional)

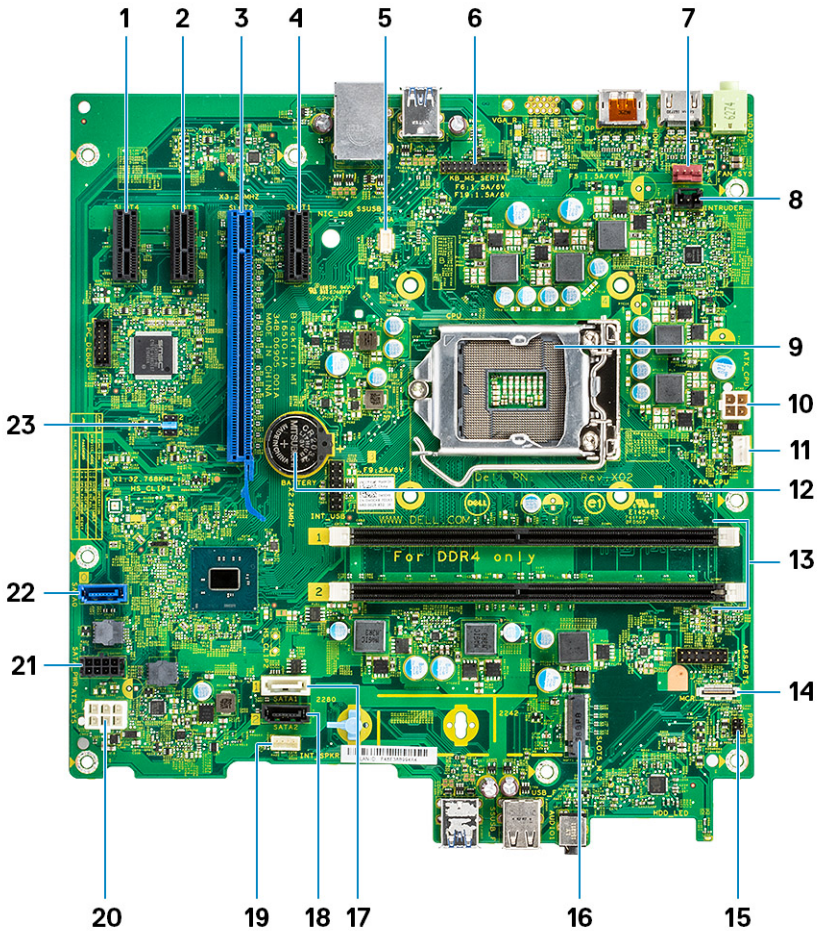
Power supply specifications

Feature	Specification
Type	240 W
Frequency	47 Hz - 63 Hz
Voltage	90 VAC - 264 VAC
Input current	4 A / 2 A
Coin cell battery	3 V CR2032 lithium coin cell

Physical dimension specifications

Feature	Specification
Height	350.52 mm (13.8 inches)
Width	154. mm (6.1 inches)
Depth	274.32 mm (10.8 inches)
Weight	7.93 kg (17.49 lb)

System board layout



NOTE: All pictures shown are for illustration purposes only. Actual product may vary depending on product model, configuration, features and/or product enhancements

1	PCIe X1 connector (slot4)	2	PCIe X1 connector (slot3)
3	PCIe X16 connector (slot2)	4	PCI-eX1 connector (slot 1)
5	VGA Daughter Board connector (VGA)	6	PS/2 Serial port connector
7	System fan connector	8	Intrusion switch connector
9	Processor	10	CPU power connector
11	CPU fan connector	12	Coin cell battery

13	Memory module connectors	14	Card reader connector
15	Power switch connector	16	M.2 SSD connector
17	SATA 1 connector	18	SATA 2 connector
19	Speaker connector	20	ATX power connector
21	HDD and ODD power connector	22	SATA 0 connector
23	CMOS_CLR/Password/Service_Mode Jumper		

Controls and lights specifications

Feature	Specification
Power button light	White light — Solid white light indicates power-on state; blinking white light indicates sleep state of the computer.
Hard Drive activity light	White light — Blinking white light indicates that the computer is reading data from or writing data to the hard drive.
Back panel:	
Link integrity light on integrated network adapter :	Green — a good 10 Mbps or 100 Mbps connection exists between the network and the computer. Orange — a good 1000 Mbps connection exists between the network and the computer. Off (no light) — the computer is not detecting a physical connection to the network.
Network activity light on integrated network adapter	Yellow light — A blinking yellow light indicates that network activity is present.
Power supply diagnostic light	Green light — The power supply is turned on and is functional. The power cable must be connected to the power connector (at the back of the computer) and the electrical outlet.

Environmental specifications

Temperature	Specifications
Operating	0°C to 35°C (32°F to 95°F)
Storage	–40°C to 65°C (–40°F to 149°F)
Relative humidity (maximum)	**Specifications**
Operating	10 % to 90 % (non condensing)
Storage	5 % to 95 % (non condensing)
Maximum vibration:	**Specifications**
Operating	0.66 GRMS
Storage	1.30 GRMS
Maximum shock:	**Specifications**
Operating	110 G
Storage	160 G

Altitude (maximum)	Specifications
Operating	–15.2 m to 3048 m (–50 to 10,000 ft)
Storage	–15.20 m to 10,668 m (–50 ft to 35,000 ft)
Airborne contaminant level	G2 or lower as defined by ANSI/ISA-S71.04-1985

9

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.