Precision 3640 Tower

Service Manual

0.0.0.0

Regulatory Model: D24M
Regulatory Type: D24M004
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Notes, cautions, and warnings

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

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

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

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 you have read the safety information that shipped with your computer.

WARNING: Before working inside your computer, read the safety information that is shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.

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

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

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

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

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

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

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

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

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

Before working inside your computer

About this task

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

Steps

1. Ensure that you follow the safety instructions.
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 the 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 the 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.

Safety precautions

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

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

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

Standby power

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

Unplugging, pressing and holding the power button for 15 seconds should discharge residual power in the system board.

Bonding

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

Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

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

ESD field service kit

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

Components of an ESD field service kit

The components of an ESD field service kit are:

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

ESD protection summary

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

Transporting sensitive components

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

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

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

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

After working inside your computer

About this task

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

Steps

1. Replace all screws and ensure that no stray screws remain inside your computer.
2. Connect any external devices, peripherals, or cables you removed before working on your computer.
3. Replace any media cards, discs, or any other parts that you removed before working on your computer.
4. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.

2

Technology and components

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

DDR4

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

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

DDR4 Details

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

Key notch difference

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

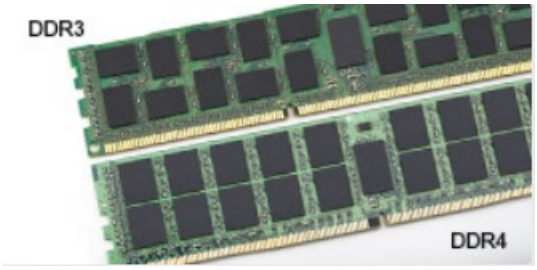


Figure 1. Notch difference

Increased thickness

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

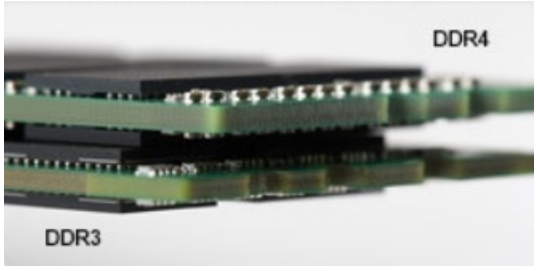


Figure 2. Thickness difference

Curved edge

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

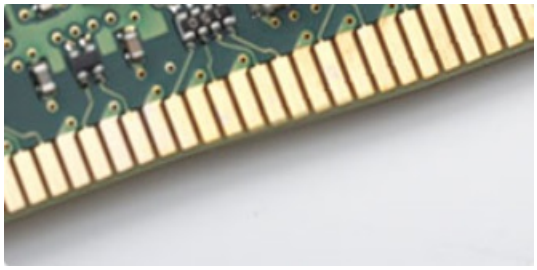


Figure 3. Curved edge

Memory Errors

Memory errors on the system display 2,3 failure code. If all memory fails, the LCD does not turn on. Troubleshoot for possible memory failure by trying known good memory modules in the memory connectors on the bottom of the system or under the keyboard, as in some portable systems.

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

Intel Rapid Storage Technology (Intel RST)

The following article provides an overview of the Intel Rapid Storage Technology application and its features:

Overview

Intel Rapid Storage Technology (IRST) is a hardware, firmware and, software-based RAID solution. IRST was previously known as Matrix RAID. IRST allows for creation of two RAID volumes on a single RAID array where both the volumes can be of the same or different type.

NOTE: Precision 3640 Tower does not support discreet RAID option.

IRST encapsulates newer level of protection with better performance, and low power consumption. IRST user interface simplifies creation and management of storage assets.

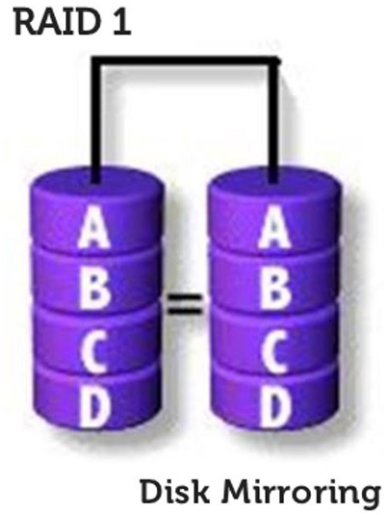
The fault tolerance is averted using one of the following RAID levels:

1. **RAID 0 (Striping):**

   Multiple storage devices are combined to what appears to be a single virtual drive. Data is arranged as blocks that are spread across multiple storage devices using process called striping. RAID 0 uses Read/ Write capabilities of two or more storage devices in parallel, enhancing performance. There is no redundancy, hence if any of the storage devices fails, the RAID has to be re-created.

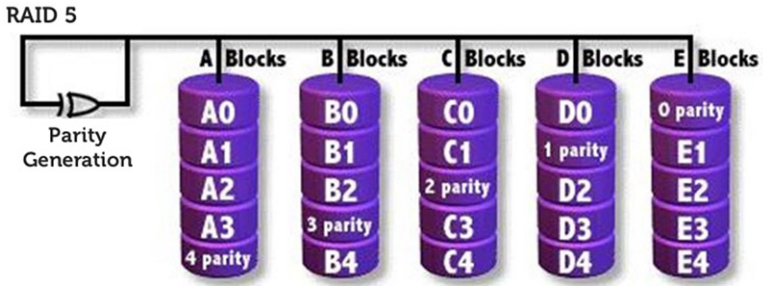
2. **RAID 1 (Mirroring):**

   Two storage devices are mirrored or duplicated to achieve redundancy and hence enhance reliability in an event of single drive failure. The performance is that of a single drive.



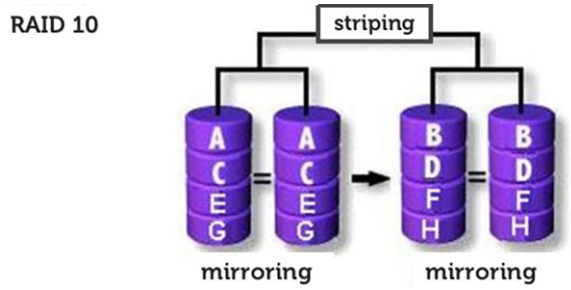
3. **RAID 5 (Striping with Parity):**

   In this RAID level, data is stripped into blocks and spread across three or more storage devices. Each block contains the data and a parity for fault tolerance. In an event of a drive failure, the parity helps build the lost piece of data. To further enhance the write performance, IRST uses Volume Write-Back Cache and Coalescer. The Volume Write-Back allows writes to be buffered, and Coalescer allows multiple write requests to be combined to reduce the overhead on parity calculation.



4. **RAID 10 (Striping and Mirroring)):**

   RAID 10 is created, mirroring (RAID 1) the stripped (RAID 0) array. This RAID level uses four or more storage devices. It has great reliability like a RAID 1 and performance like a RAID 0.



RAID-ready

A RAID-Ready configuration allows migration from one non-RAID SATA drive to a SATA RAID configuration.

NOTE: A reinstall of the operating system is not required for the migration.

A RAID-Ready computer must meet the following requirements:

- Supported Intel Chipsets
- One Serial ATA (SATA) hard drive
- RAID controller enabled in the computer setup
- BIOS that includes the IRST option ROM

- IRST software
- Hard drive partition with at least 5 MB of free space

Features of RAID-enabled computers:

- **Intel Rapid Recover Technology** - This technology provides full data redundancy by copying data from a designated source drive (active or main disk) to a designated destination drive (recovery disk). Data updates of recovery volumes can be continuous or on request.
- **Intel Rapid RAID :** - This technology allows creation of RAID 0, RAID 1, RAID 5, and RAID 10 volumes on desktop and mobile platforms. Data is distributed across two or more disks to provide data redundancy or to enhance data storage performance.
- **Intel Matrix RAID Technology** - This technology allows two independent RAID volumes to be created on a single array. The first volume occupies part of the array, leaving space for the second volume. The array may consist of two to six SATA disks depending on the volume types.
- **Native command queuing** - A feature that allows SATA disks to accept more than one command at a time. With multiple disks that support NCQ, storage performance is increased on random workloads by allowing the disk to internally optimize the order of commands.
- **Disk capacity greater than 2 TB (Option ROM support)** - This feature supports hard disks and solid-state drives with a capacity greater than 2 TB that are reported as pass-through devices (available) or used in a RAID configuration. Besides booting from a computer disk greater than 2 TB is allowed, if the version of the option ROM in your computer supports this feature.
- **Password-protected disks** - This feature provides high-level security and protection for the data on your disks with a password, denying access from any unauthorized user.

RAID Matrix

This section shows the different storage combination and the use of RAID level with those combinational array.

Storage Config Group Name	RAID config	M.2 Slot on MB 1st Boot	2nd M.2 Slot on MB	1st HDD 1st Boot	2nd HDD	3rd HDD	4th HDD	2.5" HDD slim line option (DP27) -	Zoom2 card UltraSpeed NVMe SSDs	ODD
				3.5"	3.5"	3.5"				
		PCIe NVMe	PCIe NVMe	2.5"	2.5"	2.5"	2.5"	2.5"	PCIe NVMe	
M.2 SSD Boot + Optional M.2 SSD	N	Y	Y (optional)	NA	NA	NA	NA	NA	Y (optional)	Y (optional)
M.2 SSD Boot + Optional M.2 SSD	Y	RAID 0/1	RAID 0/1	NA	NA	NA	NA	NA	NA	Y (optional)
M.2 SSD Boot + Optional M.2 SSD	Y	RAID 0/5	RAID 0/5	NA	NA	NA	NA	NA	RAID 0/5	Y (optional)
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	Y	Y (optional)	RAID 0/1	RAID 0/1	Y (optional)	Y (optional)	NA	Y (optional)	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	Y	Y (optional)	RAID 0/5	RAID 0/5	RAID 0/5	Y (optional)	NA	Y (optional)	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	Y	Y (optional)	RAID 0/1/5/10	RAID 0/1/5/10	RAID 0/1/5/10	RAID 0/1/5/10	NA	Y (optional)	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/5	RAID 0/5	Y	Y (optional)	Y (optional)	Y (optional)	NA	RAID 0/5	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/5	RAID 0/5	Y	Y (optional)	Y (optional)	NA	NA	RAID 0/5	Y (optional)
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/5	RAID 0/5	Y	Y (optional)	Y (optional)	NA	Y	RAID 0/5	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	N	Y	Y (optional)	Y	Y (optional)	Y (optional)	Y (optional)	NA	Y (optional)	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	N	Y	Y (optional)	Y	Y (optional)	Y (optional)	NA	Y	Y (optional)	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/1	RAID 0/1	Y	Y (optional)	Y (optional)	NA	NA	NA	Y (optional)
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/1	RAID 0/1	Y	Y (optional)	Y (optional)	Y (optional)	NA	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/1	RAID 0/1	Y	Y (optional)	Y (optional)	NA	Y	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	Y	Y (optional)	RAID 0/5	RAID 0/5	RAID 0/5	NA	NA	Y (optional)	Y (optional)
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/1	RAID 0/1	RAID 0/1	RAID 0/1	Y (optional)	Y (optional)	NA	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/1	RAID 0/1	RAID 0/5	RAID 0/5	RAID 0/5	NA	NA	NA	Y (optional)
M.2 SSD Boot + Optional M.2 SSD + 2.5" SATA	Y	RAID 0/1	RAID 0/1	RAID 0/1/5/10	RAID 0/1/5/10	RAID 0/1/5/10	RAID 0/1/5/10	NA	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	N	Y	Y (optional)	Y	Y (optional)	Y (optional)	NA	NA	NA	Y (optional)
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	N	Y	Y (optional)	Y	Y (optional)	NA	NA	Y	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	N	Y	Y (optional)	Y	Y (optional)	Y (optional)	NA	Y (optional)	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	Y	Y	Y (optional)	RAID 0/1	RAID 0/1	Y (optional)	NA	Y (optional)	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	Y	Y	Y (optional)	RAID 0/5	RAID 0/5	RAID 0/5	NA	Y (optional)	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	Y	RAID 0/1	RAID 0/1	Y	Y (optional)	Y (optional)	NA	Y (optional)	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	Y	RAID 0/5	RAID 0/5	Y	Y (optional)	Y (optional)	NA	Y (optional)	RAID 0/5	NA
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	Y	RAID 0/1	RAID 0/1	RAID 0/1	RAID 0/1	Y (optional)	NA	Y (optional)	NA	NA
M.2 SSD Boot + Optional M.2 SSD + 3.5" SATA	Y	RAID 0/5	RAID 0/5	RAID 0/1	RAID 0/1	Y (optional)	NA	Y (optional)	RAID 0/5	NA
2.5" SATA Boot + Optional 2.5" SATA	N	NA	NA	Y	Y (optional)	Y (optional)	Y (optional)	NA	NA	NA
2.5" SATA Boot + Optional 2.5" SATA	N	NA	NA	Y	Y (optional)	Y (optional)	NA	NA	NA	Y (optional)
2.5" SATA Boot + Optional 2.5" SATA	N	NA	NA	Y	Y (optional)	Y (optional)	NA	Y	NA	NA
2.5" SATA Boot + Optional 2.5" SATA	Y	NA	NA	RAID 0/1	RAID 0/1	NA	NA	NA	NA	Y (optional)
2.5" SATA Boot + Optional 2.5" SATA	Y	NA	NA	Y	RAID 0/1	RAID 0/1	NA	NA	NA	Y (optional)
2.5" SATA Boot + Optional 2.5" SATA	Y	NA	NA	RAID 0/5	RAID 0/5	RAID 0/5	NA	NA	NA	Y (optional)
2.5" SATA Boot + Optional 2.5" SATA	Y	NA	NA	RAID 0/1/5/10	RAID 0/1/5/10	RAID 0/1/5/10	RAID 0/1/5/10	NA	NA	NA
2.5" SATA Boot + Optional 2.5" SATA	Y	NA	NA	Y	RAID 0/1	RAID 0/1	NA	Y (optional)	NA	NA
2.5" SATA Boot + Optional 2.5" SATA	Y	NA	NA	Y	RAID 0/5	RAID 0/5	RAID 0/5	NA	NA	NA
2.5" SATA Boot + Optional 3.5" SATA	N	NA	NA	Y	Y (optional)	Y (optional)	NA	NA	NA	Y (optional)
2.5" SATA Boot + Optional 3.5" SATA	N	NA	NA	Y	Y (optional)	Y (optional)	NA	Y	NA	NA
2.5" SATA Boot + Optional 3.5" SATA	Y	NA	NA	Y	RAID 0/1	RAID 0/1	NA	NA	NA	Y (optional)
2.5" SATA Boot + Optional 3.5" SATA	Y	NA	NA	Y	RAID 0/1	RAID 0/1	NA	Y	NA	NA
2.5" SATA Boot + Optional M.2 SSD + 3.5" SATA	N	Y (optional)	Y (optional)	Y	Y (optional)	Y (optional)	NA	NA	NA	NA
3.5" SATA Boot + Optional 3.5" SATA	N	NA	NA	Y	Y (optional)	Y (optional)	NA	NA	NA	Y (optional)
3.5" SATA Boot + Optional 3.5" SATA	N	NA	NA	Y	Y (optional)	Y (optional)	NA	Y	NA	NA
3.5" SATA Boot + Optional 3.5" SATA	Y	NA	NA	RAID 0/1	RAID 0/1	NA	NA	NA	NA	Y (optional)
3.5" SATA Boot + Optional 3.5" SATA	Y	NA	NA	Y	RAID 0/1	RAID 0/1	NA	NA	NA	Y (optional)
3.5" SATA Boot + Optional 3.5" SATA	Y	NA	NA	RAID 0/5	RAID 0/5	RAID 0/5	NA	NA	NA	Y (optional)
3.5" SATA Boot + Optional 3.5" SATA	Y	NA	NA	Y	RAID 0/1	RAID 0/1	NA	NA	NA	Y (optional)
DP27 2.5" SATA Boot + Optional M.2 SSD or SATA	N	Y (optional)	Y (optional)	NA	NA	NA	NA	Y	Y (optional)	NA
DP27 2.5" SATA Boot + Optional M.2 SSD or SATA	N	Y (optional)	Y (optional)	Y	Y (optional)	Y (optional)	NA	Y	Y (optional)	NA
DP27 2.5" SATA Boot + Optional M.2 SSD or SATA	Y	Y (optional)	Y (optional)	RAID 0/1	RAID 0/1	NA	NA	Y	Y (optional)	NA
DP27 2.5" SATA Boot + Optional M.2 SSD or SATA	Y	Y (optional)	Y (optional)	RAID 0/5	RAID 0/5	RAID 0/5	NA	Y	Y (optional)	NA
DP27 2.5" SATA Boot + Optional M.2 SSD or SATA	N	Y (optional)	Y (optional)	Y	Y (optional)	Y (optional)	NA	Y	Y (optional)	NA
No HDD	N	NA	NA	NA	NA	NA	NA	NA	NA	NA

- Green: RAID across SSDs
- Yellow: RAID across Hard disk drives

HDMI 2.0

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

HDMI (High-Definition Multimedia Interface) is an industry-supported, uncompressed, all-digital audio/video interface. HDMI provides an interface between any compatible digital audio/video source, such as a DVD player, or A/V receiver and a compatible digital audio and/or video monitor, such as a digital TV (DTV). The intended applications for HDMI TVs, and DVD

players. The primary advantage is cable reduction and content protection provisions. HDMI supports standard, enhanced, or high-definition video, plus multichannel digital audio on a single cable.

HDMI 2.0 Features

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

Advantages of HDMI

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

USB features

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

Table 1. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 1.x	12 Mbps	Full Speed	1996
USB 2.0	480 Mbps	High Speed	2000
USB 3.0	5 Gbps	SuperSpeed	2010
USB 3.1	10 Gbps	SuperSpeed+	2010
USB 3.2	20 Gbps	SuperSpeed+	2017
USB4	40 Gbps	SuperSpeed+ and Thunderbolt 3	2019

USB 3.2 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 3.2 Gen 1 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.2 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 3.2 Gen 1.

USB 3.2 Gen 2 (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 3.2 Gen 2 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.2 Gen 2 features are as follows:

- Higher transfer rates (up to 10Gbps)
- 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

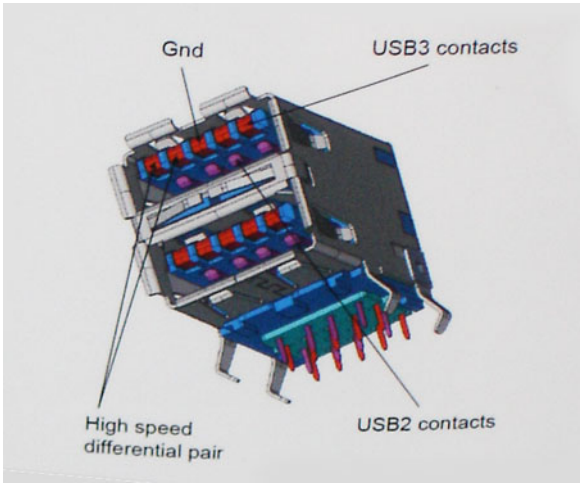
The topics below cover some of the most commonly asked questions regarding USB 3.2 Gen 1.

Speed

Currently, there are 3 speed modes defined by the latest USB 3.2 Gen 1/USB 3.2 Gen 1 and USB 3.2 Gen 2x2 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8 Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480 Mbps and 12 Mbps respectively and are kept to maintain backward compatibility.

USB 3.2 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 3.2 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



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

Applications

USB 3.2 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 2 Gbps 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 3.2 Gen 1 products:

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

Compatibility

The good news is that USB 3.2 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.2 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 3.2 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

PCIe add-in cards

Graphics card matrix

This section describes the Graphics card card connection configurations on the PCIe slots.

Precision 3640 Tower Slot Matrix		300w PSU up to 105w GPU 460w PSU up to 210w GPU 550w PSU up to 300W GPU														
GPU Cards		nVidia P400/DL	nVidia GT730 /DL	nVidia P620/DL	nVidia P1000/DL	AMD WX3200/DL	nVidia P2200/DL	AMD Radeon Pro W5500	nVidia RTX4000/ DL	nVidia RTX2060 Super	AMD Radeon Pro W5700	nVidia RTX2070 Super	Radeon Pro RX5700XT	nVidia RTX2080 Super	nVidia RTX5000	nVidia RTX 2080 TI
	Lane Width	x16	X16	x16	x16	x16	x16	x16	x16	x16	x16	x16	x16	x16	x16	x16
	Slot Size	SW	DW	SW	SW	SW	SW	DW	SW	DW	DW	DW	DW	DW	DW	DW
	Card Height	HH	HH	HH	HH	HH	FH	FH	FH	FH	FH	FH	FH	FH	FH	FH
	Gen	3	3	3	3	3	3	4	3	3	4	3	4	3	3	3
	Power	30w	30W	40w	47w	55W	75w	130W	160W	175W	180W	215W	225W	250W	265W	265W
	Dongle	N/A	N/A	N/A	N/A	N/A	N/A	6 pin	8 pin	8 pin	6 pin+8 pin	6 pin+8 pin	6 pin+8 pin	6 pin+8 pin	6 pin+8 pin	8 pin+8 pin
	Display Output	3x mDP	DP x2 (DP1.2)	4x mDP	4x mDP	4x mDP	4x DP	DP x4	DP x3 USB-C x1	DVI, HDMI, DP 1.4	mDP x5 TypeC x1	DL DVI x1 DP x(2 or 3) HDMI, TypeC	DP x3 HDMI x1	HDMI 3x DP 1.4	DP x4 USB-C x1	DP x3 HDMI, TypeC
Slot 1	x16 PCIe Primary GPU	X	X	X	X	X	X	X 460w greater	X 460w greater	X 460w greater	X 460w greater	X 550w greater	X 550w greater	X 550w greater	X 550w greater	X 550w greater
Slot 3	x4 PCIe (Open ended)	X Note 1	X Note 1	X Note 1	X Note 1	X 460w greater Note 1	X 460w greater Note 1	X 550w greater Note 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note 1: If more than 1 card that is designated for Slot 3 is ordered, the 1st card should be placed in Slot 1, the 2nd card should be placed in Slot 3

Note 6: Graphics cards always have priority for Slot#1, Non-Graphics cards should be placed in Slot#3 before Slot#1

Add-in Cards Matrix

This section describes the Add-in card connection configurations on the PCIe slots.

Table 2. Add-in card connection matrix

	Zoom2	USB Type-C	Parallel/ Serial	Serial	1 Gb NIC	2.5 Gb NIC	Intel Ethernet 10 Gb X550-t (Dual port)	Thunderbolt 3 PCIe Card
Lane width	x8	x1	x1	x1	x1	x1	x1	x4
Slot size	SW (Single width)							
Card height	HH (Half Height)							
Generation	3.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0
Power	25 W	18.3 W	7 W	-	7 W	-	-	60 W
PCIe x16 (SLOT1)	✗	✓¶	✓¶	✓¶	✓¶	✓¶	✓¶	✗
PCIe x4 (SLOT3) Open ended	✓†	✓	✓	✓	✓	✓	✓	✓‡

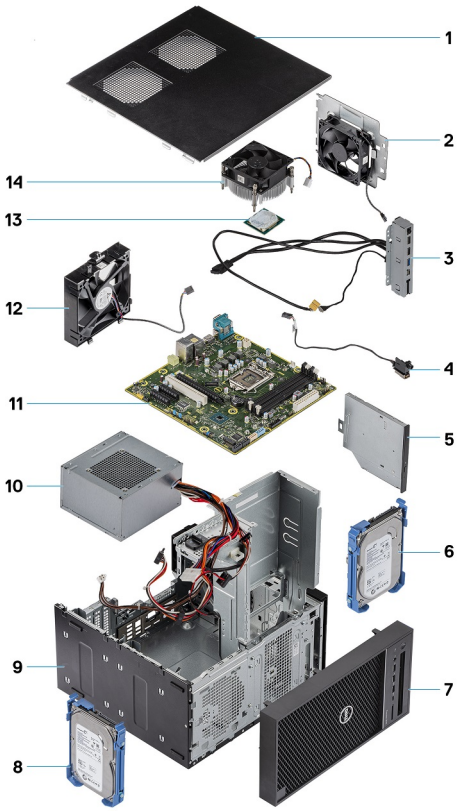
¶: Graphics cards have first priority and should always be placed on SLOT1. Non Graphics, other PCIe cards should be placed on SLOT3 before SLOT1 fitted with the Graphics Card.

†: Only one Zoom2 card can be fitted on PCIe x4 slot and this limits to have only 1x M.2 SSD installed in it.

‡: Thunderbolt 3 card can only be installed on SLOT3

3

Major components of your system



1. Cover
2. System fan
3. IO panel
4. Power button module
5. Optical drive
6. Hard drive
7. Bezel
8. Hard drive
9. Chasis
10. Power supply unit
11. System board
12. Front fan
13. Processor
14. Heatsink assembly

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

4

Disassembly and reassembly

Recommended tools

The procedures in this document require the following tools:

- Phillips # 1 screwdriver
- Small flat blade screwdriver

Screw list

The following table provides the list of screws that are used for securing different components to the computer.

Table 3. Screw list

Component	#6-32x1/4'' 	M2x2.5 	M3X3 	M2X3.5 
Power supply bracket	2			
Power supply unit	4			
Heat sink blower (95 W heat sink solution)	3			
System-fan bracket	1			
System board	8			
IO panel	1			
Security-lock metal bracket	2			
Solid-state drive (SSD) card		1		
Optical drive bracket		1		
Optional IO card			2	
WLAN card and SMA antenna module				1

Cover

Removing the cover

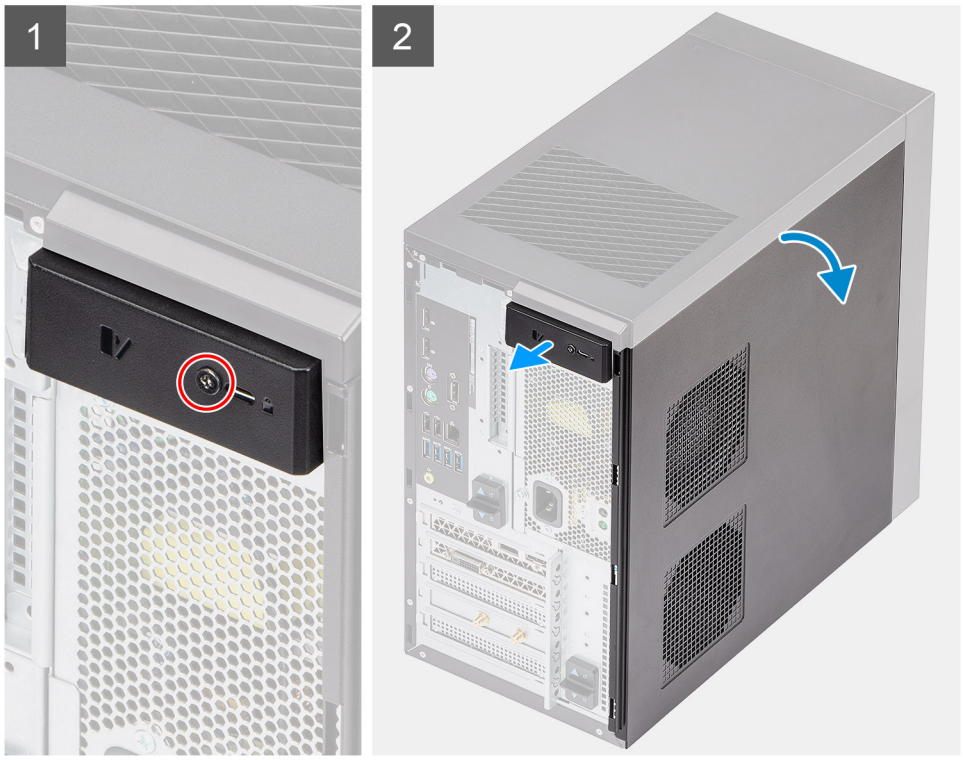
Prerequisites

1. Follow the procedure in before working inside your computer.

About this task

The following images indicate the location of the cover and provides a visual representation of the removal procedure.

1x
M6.32x12.7



Steps

1. Remove the security screw (M#6.32x12.7), secured to the cover latch.
2. Pull the release latch to release the cover.
3. Rotate the cover and lift the cover to remove it from the computer.

Installing the cover

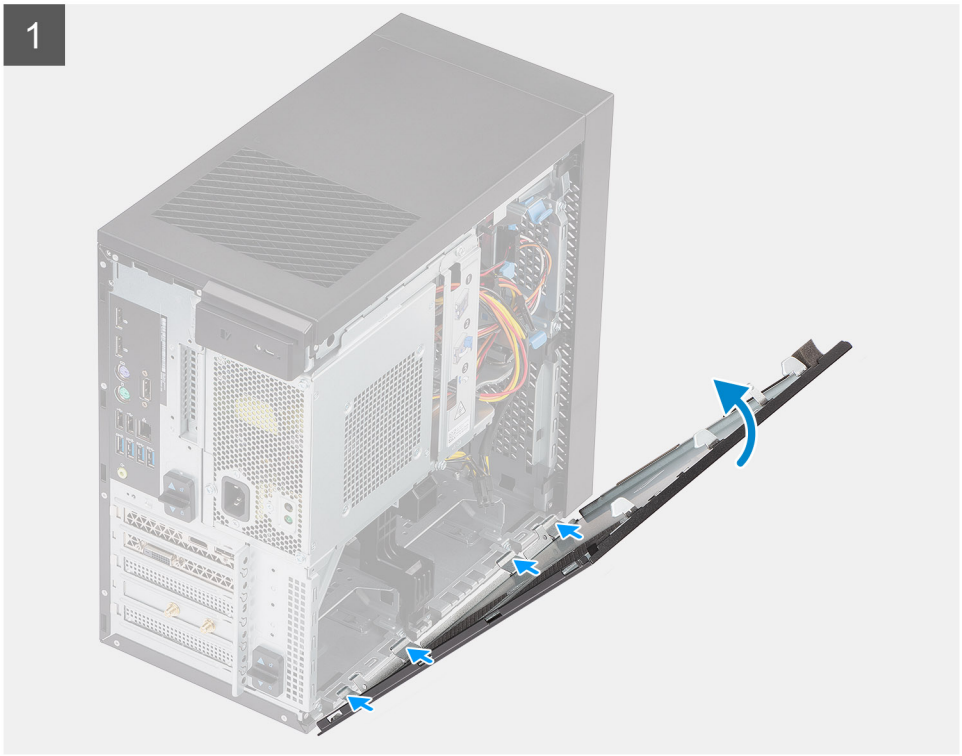
Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the cover and provides a visual representation of the installation procedure.

1x
M6.32x12.7



Steps

1. Align the hooks on the cover with the tabs on the chassis of the computer.

2. Rotate the cover until it clicks into place.
3. Replace the single (M#6.32x12.7) security screw to secure the latch to the chassis.

Next steps

1. Follow the procedure in after working inside your computer.

PSU hinge

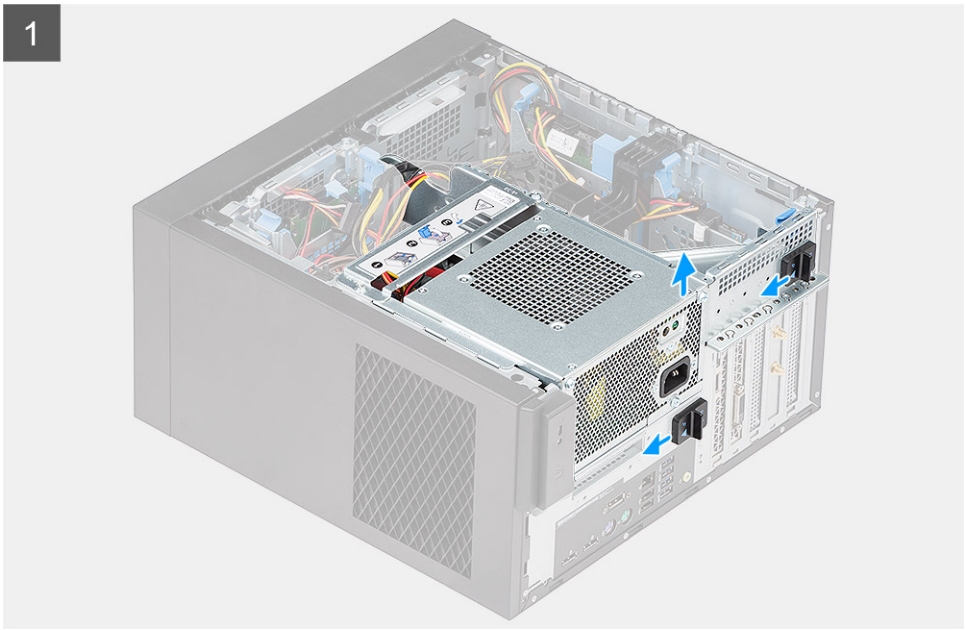
Opening the PSU hinge

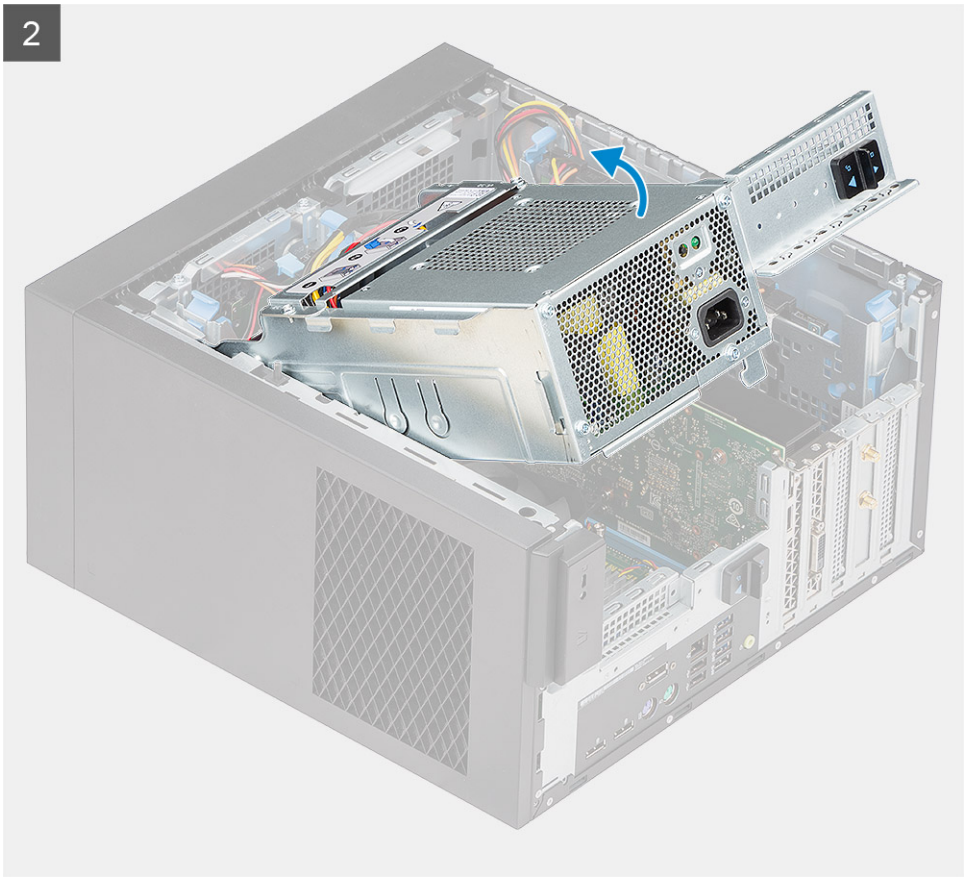
Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.

About this task

The following images indicate the location of the PSU hinge and provides a visual representation of the opening procedure.





Steps

1. Unlock the PSU by sliding the release latches to the 'Unlock' position.
2. Rotate the PSU hinge towards the front of the computer.

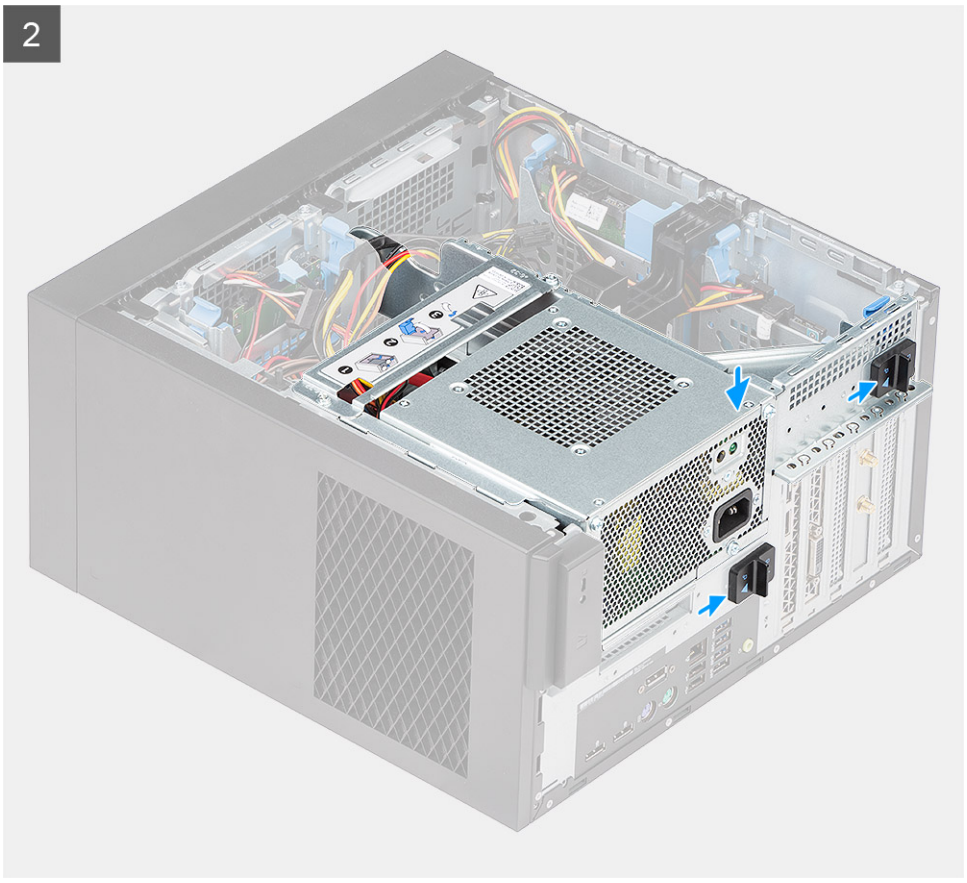
Closing the PSU hinge

Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the PSU hinge and provides a visual representation of the closing procedure.



Steps

1. Rotate the PSU hinge towards the base of the computer.

2. Slide the release latches to 'Lock' position to secure the PSU hinge to the computer.

Next steps

1. Install the cover.
2. Follow the procedure in after working inside your computer.

Bezel

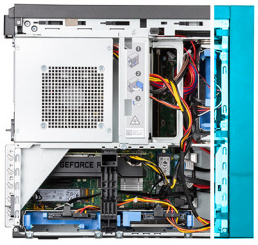
Removing the bezel

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.

About this task

The following images indicate the location of the bezel and provides a visual representation of the removal procedure.



Steps

1. Pry the retention tabs to release the front bezel.
2. Rotate and pull the front bezel to release the front bezel from the slots on the chassis.

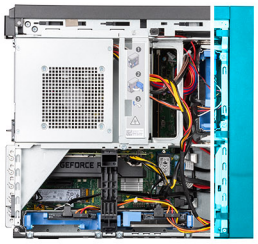
Installing the bezel

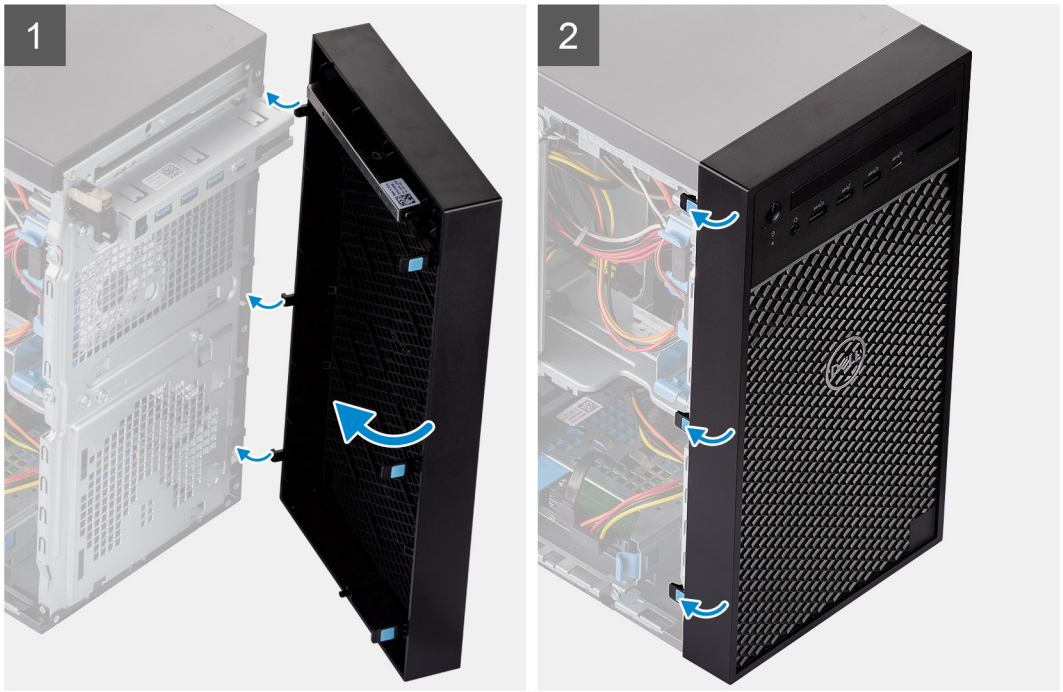
Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following image indicate the location of the bezel and provides a visual representation of the installation procedure.





Steps

1. Hold the bezel and ensure that the hooks on the bezel align with notches on the computer.
2. Rotate the front bezel toward the computer and press firmly until the tabs click into place.

Next steps

1. Install the cover.
2. Follow the procedure in after working inside your computer.

Memory module

Removing the memory module

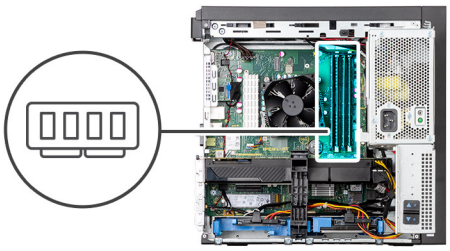
Prerequisites

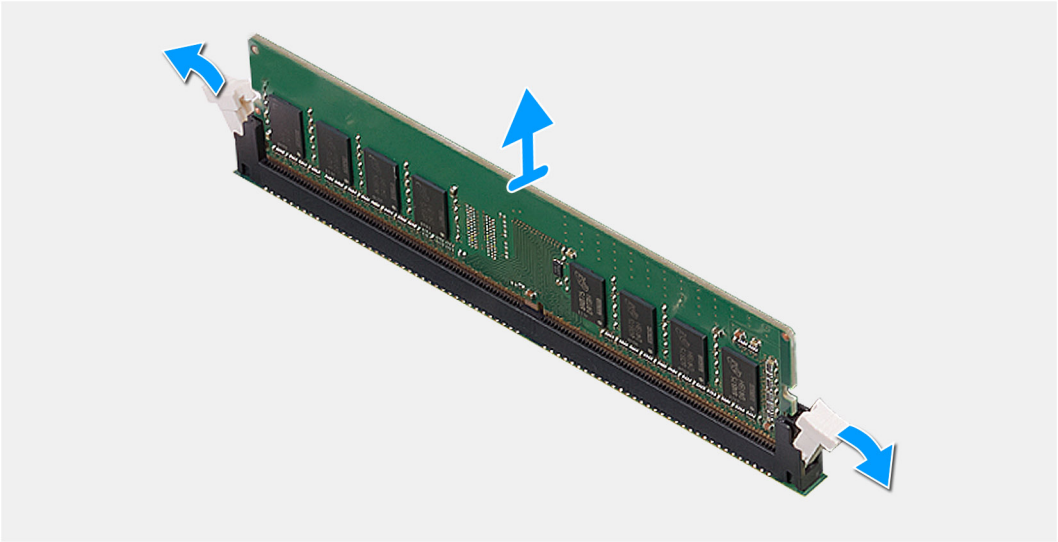
1. Follow the procedure in before working inside your computer.

2. Remove the cover.
3. Open the psu hinge.

About this task

The following images indicate the location of the memory module and provides a visual representation of the removal procedure.





Steps

1. Press the memory module retention tabs on each side of the memory module.
2. Lift the memory module out of the connectors on the system board.

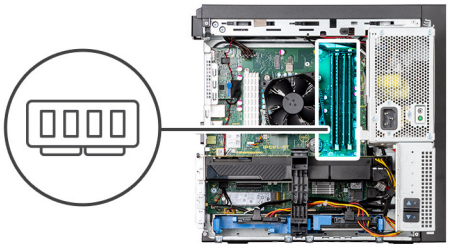
Installing the memory module

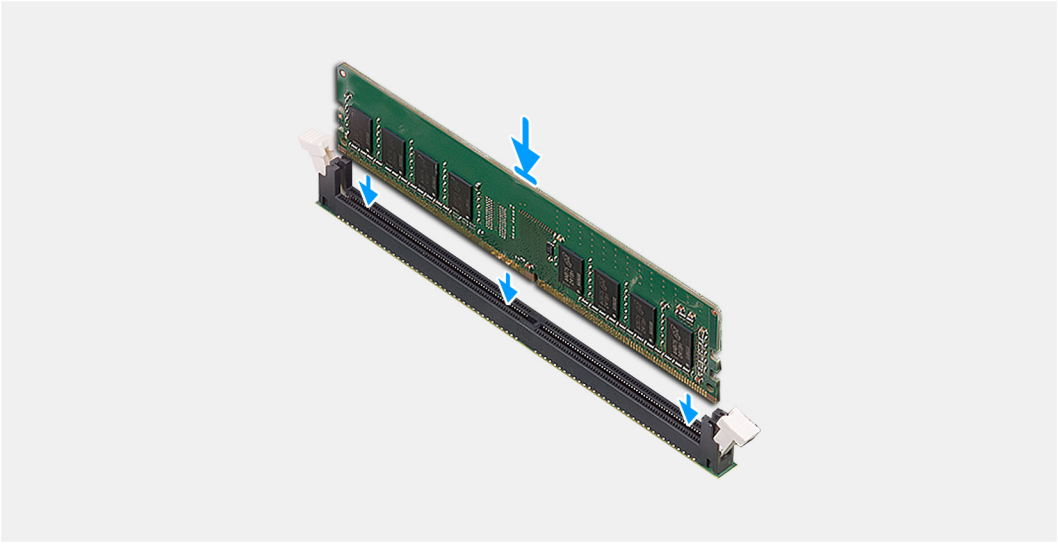
Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the memory module and provides a visual representation of the installation procedure.





Steps

1. Align the notch on the memory module with the tab on the memory module connector of the system board.
2. Press the memory module until the retention tabs clicks into place.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

Hard drive

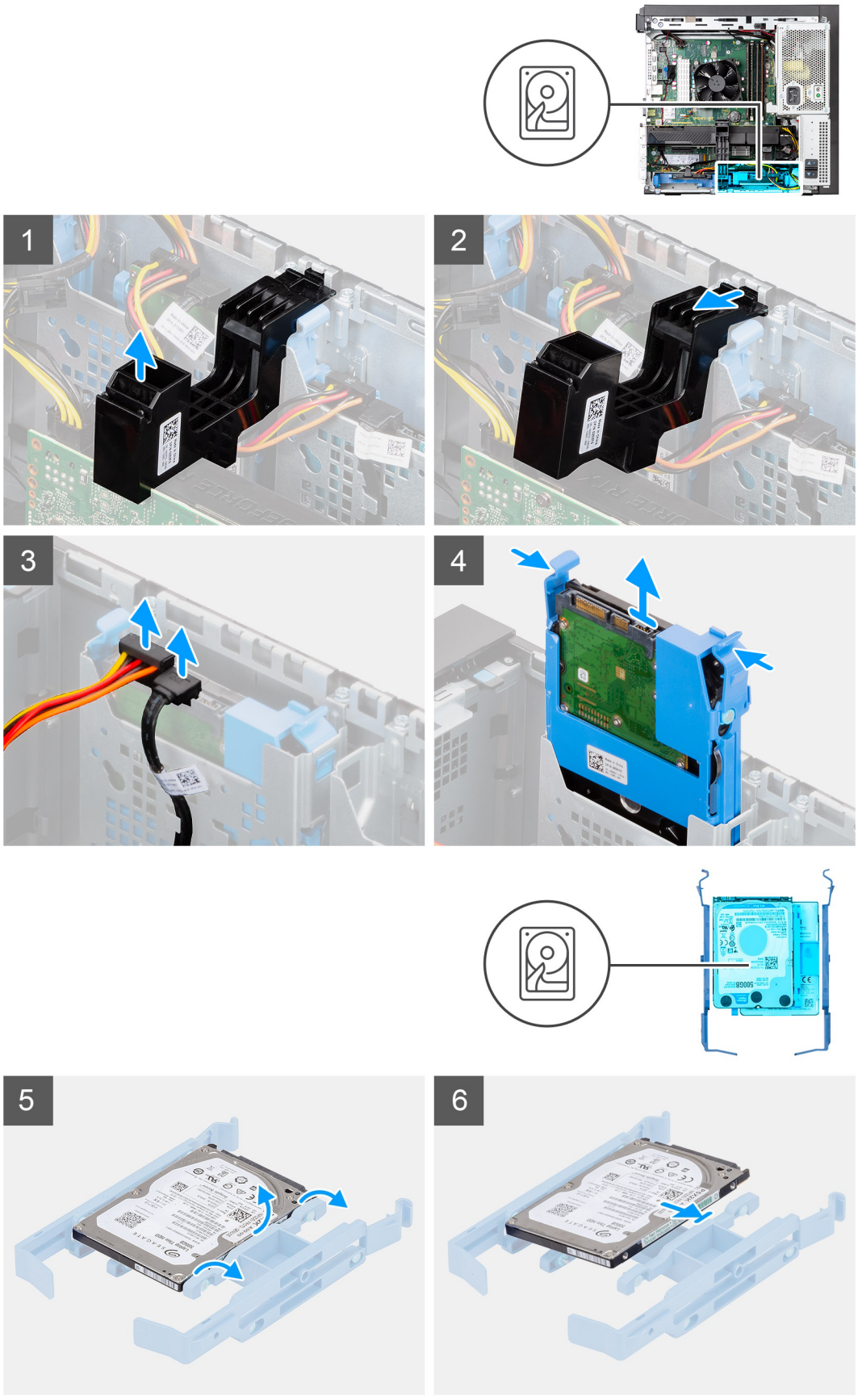
Removing the 3.5-inch hard drive

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

About this task

The following images indicate the location of the 3.5-inch hard drive and provides a visual representation of the removal procedure.



Steps

1. Lift the side of the PCIe holder to release it from the graphics card.

2. Slide the holder out from the slot in the chassis.
3. Disconnect the data and power SATA cables from the hard drive.
4. Press the blue securing bracket tabs and lift the hard drive assembly out of the hard drive bay.
5. Flex the hard drive bracket, to disengage the pins.
6. Slide the 3.5-inch hard disk drive out of the bracket.

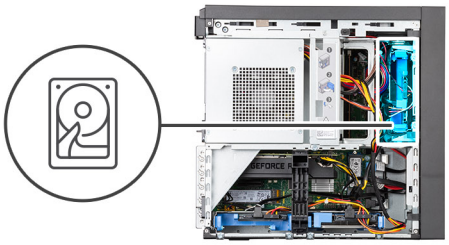
Removing the 2.5-inch hard drive

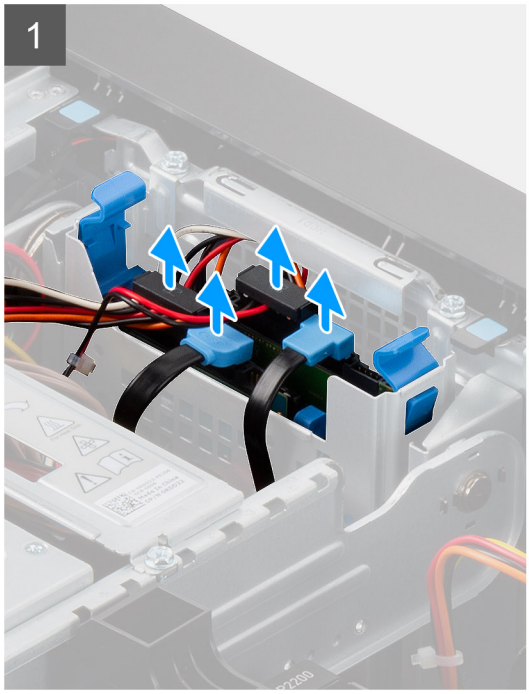
Prerequisites

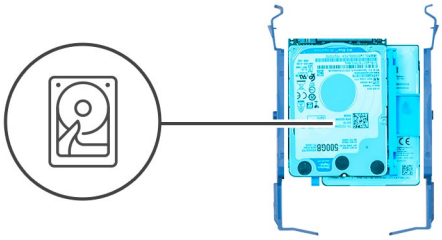
1. Follow the procedure in before working inside your computer.
2. Remove the cover.

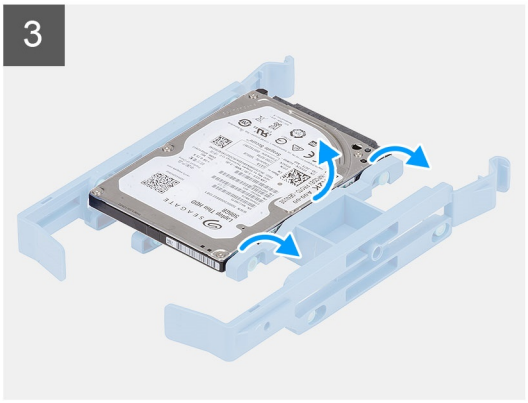
About this task

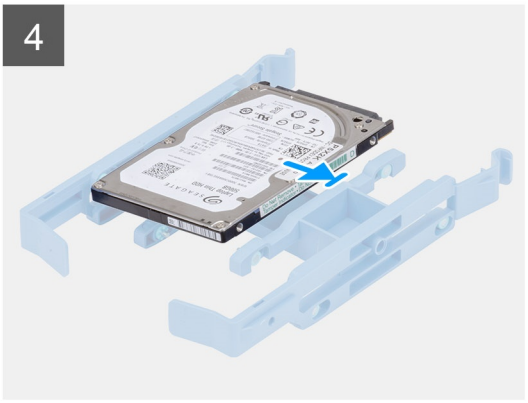
The following images indicate the location of the 2.5-inch hard drive and provides a visual representation of the removal procedure.











Steps

1. Disconnect the data cables and the power SATA cables from the hard drive.
2. Press the blue securing bracket tabs and lift the hard drive assembly out of the hard drive bay.
3. Flex the hard drive bracket, to disengage the pins.
4. Slide out from the 2.5-inch hard drive out of the bracket.

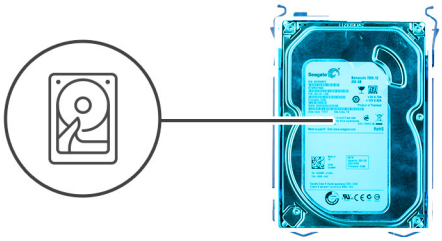
Installing the 3.5-inch hard drive

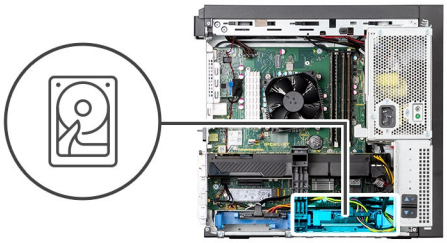
Prerequisites

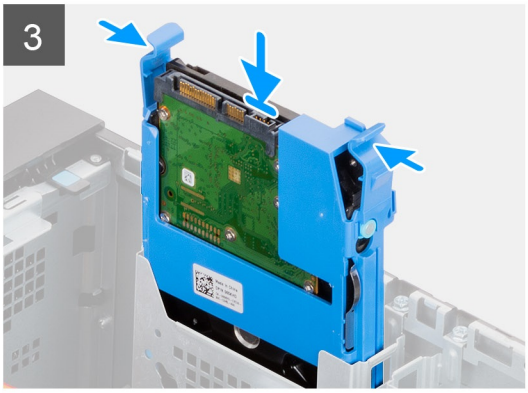
If you are replacing a component, remove the existing component before performing the installation process.

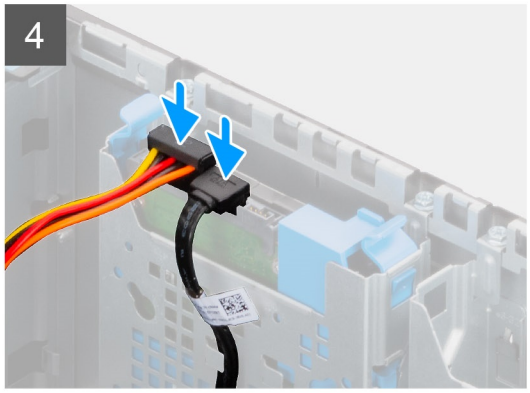
About this task

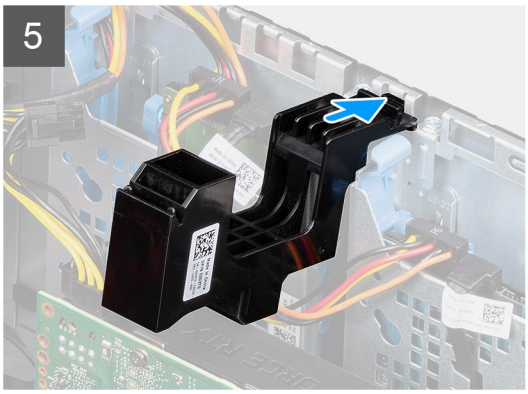
The following images indicate the location of the 3.5-inch hard drive and provides a visual representation of the installation procedure.

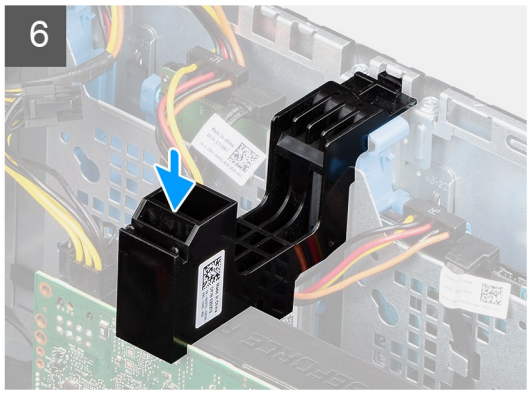












Steps

1. Align the pins on the hard drive bracket with the pits on one side of the hard disk drive.

2. Place the hard disk drive into the bracket.
3. Slide the hard drive assembly into the hard drive bay slot of the computer chassis.
4. Connect the data and power SATA cables to the hard disk drive.
5. Insert the PCIe card holder into the slot on the chassis.
6. Press the PCIe card holder firmly to secure the holder to the top of the graphics card.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

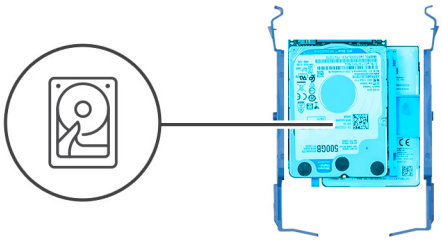
Installing the 2.5-inch hard drive

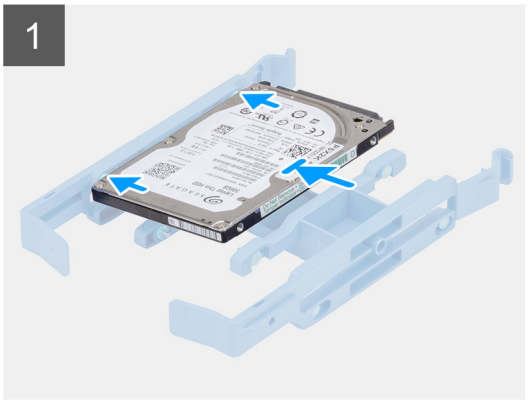
Prerequisites

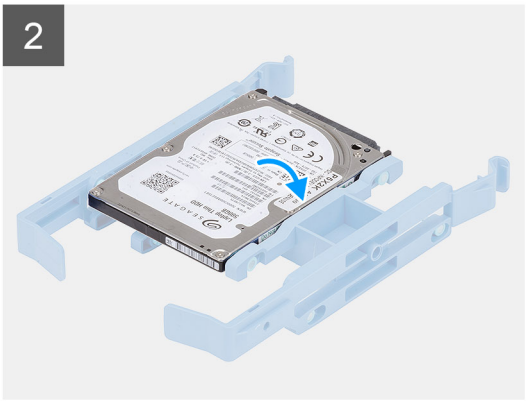
If you are replacing a component, remove the existing component before performing the installation process.

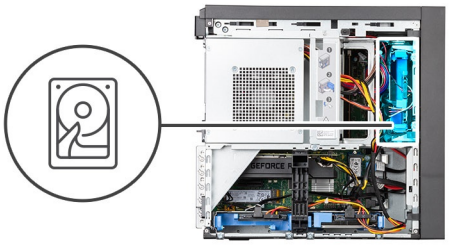
About this task

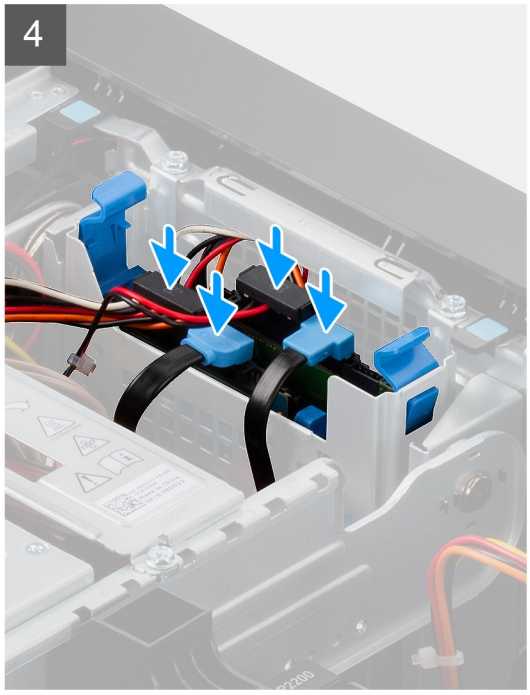
The following images indicate the location of the 2.5-inch hard drive and provides a visual representation of the installation procedure.











Steps

1. Align the securing pins in the hard drive bracket with the pits on the 2.5-inch hard drive.
2. Firmly press the 2.5-inch hard drive into the bracket until it clicks in place.
3. Replace the hard drive assembly into the hard drive bay and press it firmly into the slot.
4. Connect the power and data SATA cables to the 2.5-inch hard drive.

Next steps

1. Install the cover.
2. Follow the procedure in after working inside your computer.

Optical drive

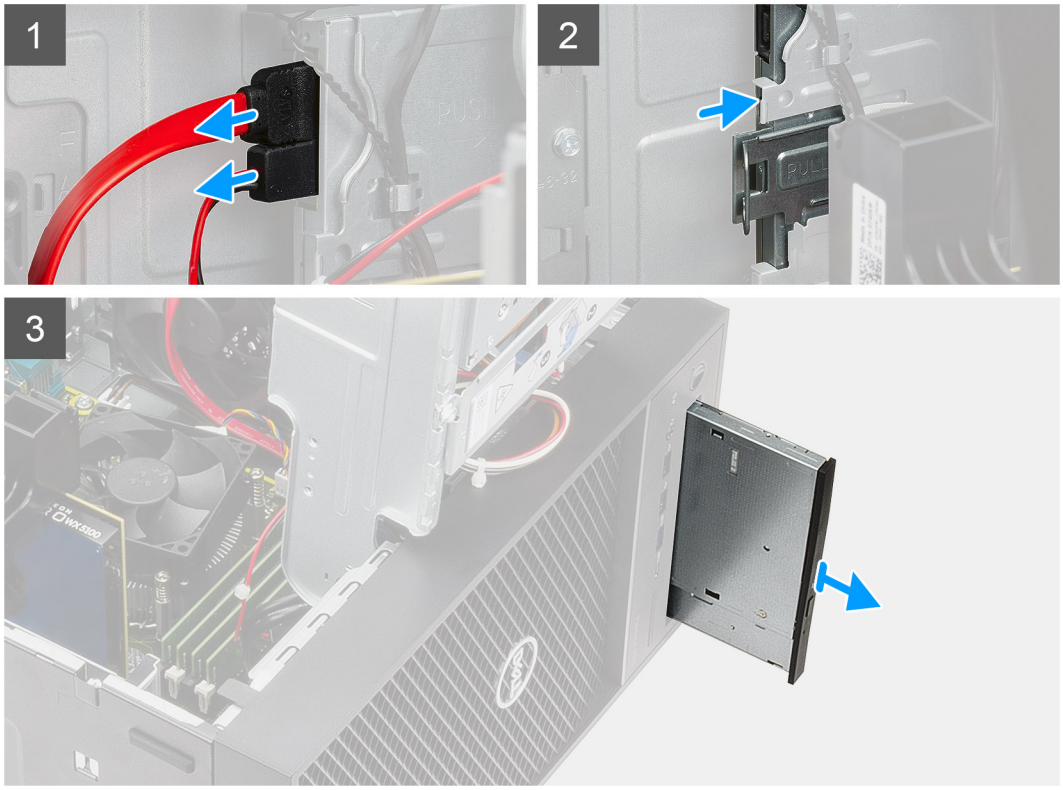
Removing the optical drive

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.
4. Remove the bezel.

About this task

The following images indicate the location of the optical drive and provides a visual representation of the removal procedure.



Steps

1. Disconnect the data cable and the power cable from the optical drive.
2. Push the optical drive out from the front of the computer.
3. Slide and remove the optical drive out of the computer.

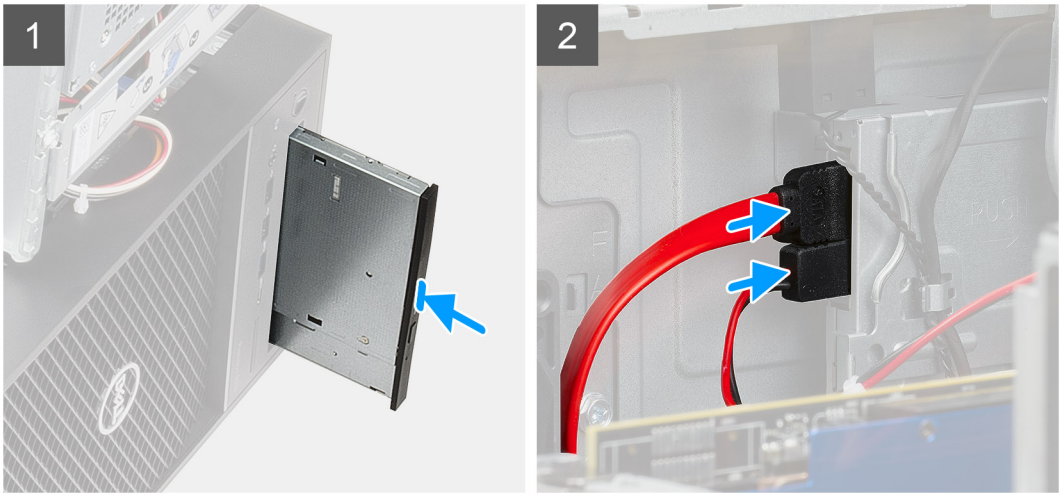
Installing the optical drive

Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the optical drive and provides a visual representation of the installation procedure.



Steps

1. Slide the optical drive into the drive bay from the front of the computer until it is secured.
2. Connect the data cable and power cable to the optical drive.

Next steps

1. Install the bezel.
2. Close the psu hinge.
3. Install the cover.
4. Follow the procedure in after working inside your computer.

Graphics card

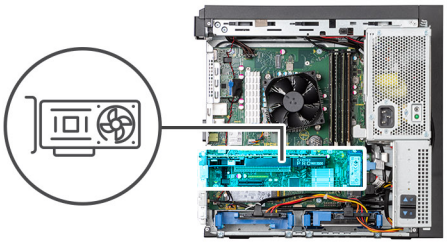
Removing the graphics card

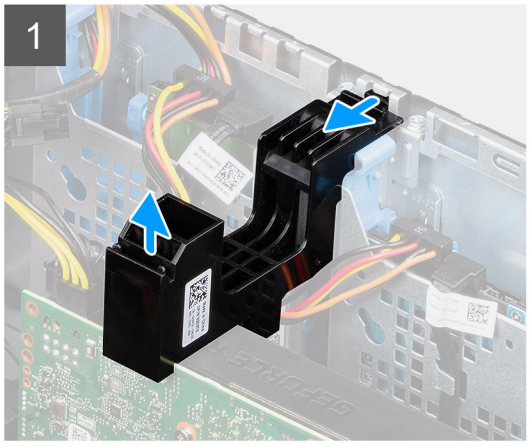
Prerequisites

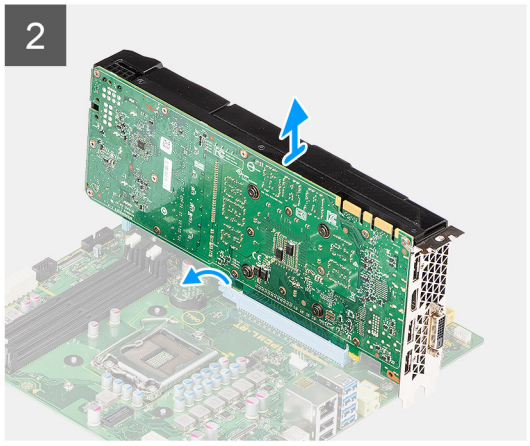
1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

About this task

The following image indicate the location of the graphics card and provides a visual representation of the removal procedure.







Steps

1. **NOTE:** A PCIe holder may not be required for computer that is shipped with NVIDIA Quadro P4000 or RTX4000 dual graphics cards configuration.

   Lift the side of the PCIe holder to release it from the graphics card and slide the holder out from the slot in the chassis.
2. Push the card retention latch away from the card and lift the graphics card out of the PCIe slot of the system board.

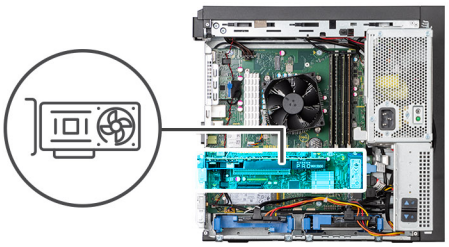
Installing the graphics card

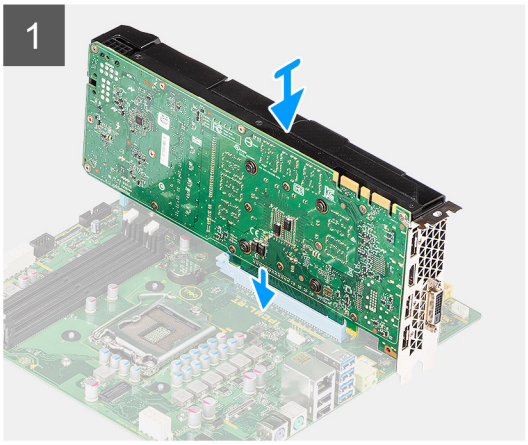
Prerequisites

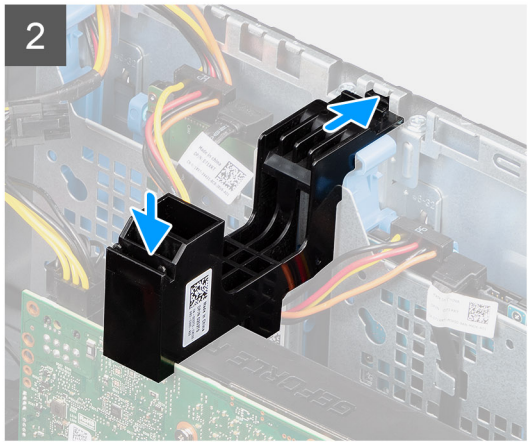
If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the graphics card and provides a visual representation of the installation procedure.







Steps

1. Insert the graphics card into the PCIe slot on the system board.

   NOTE: Connect the graphics-card power cable to the connector on the graphics card for a single graphics card configuration.

2. Insert the PCIe card holder into the slot on the chassis and press it firmly to secure the holder to the top of the graphics card.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

WLAN module and SMA antenna

Removing WLAN module and SMA antenna

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

About this task

The following images indicate the location of the WLAN module and SMA antenna and provides a visual representation of the removal procedure.

Steps

1. Remove the single (M2x3.5) screw that secures the WLAN card to the system board and undo the antenna cables from the rubber guides on the system board.
2. Slide and remove the external antenna connector from the PCIe slot on the chassis.
3. Remove the WLAN card from the system board.
4. Remove the plastic bracket from the top of the antenna connector.

5. Gently remove the antenna cables from the connectors on the WLAN card.
6. Separate the WLAN module and SMA antenna.

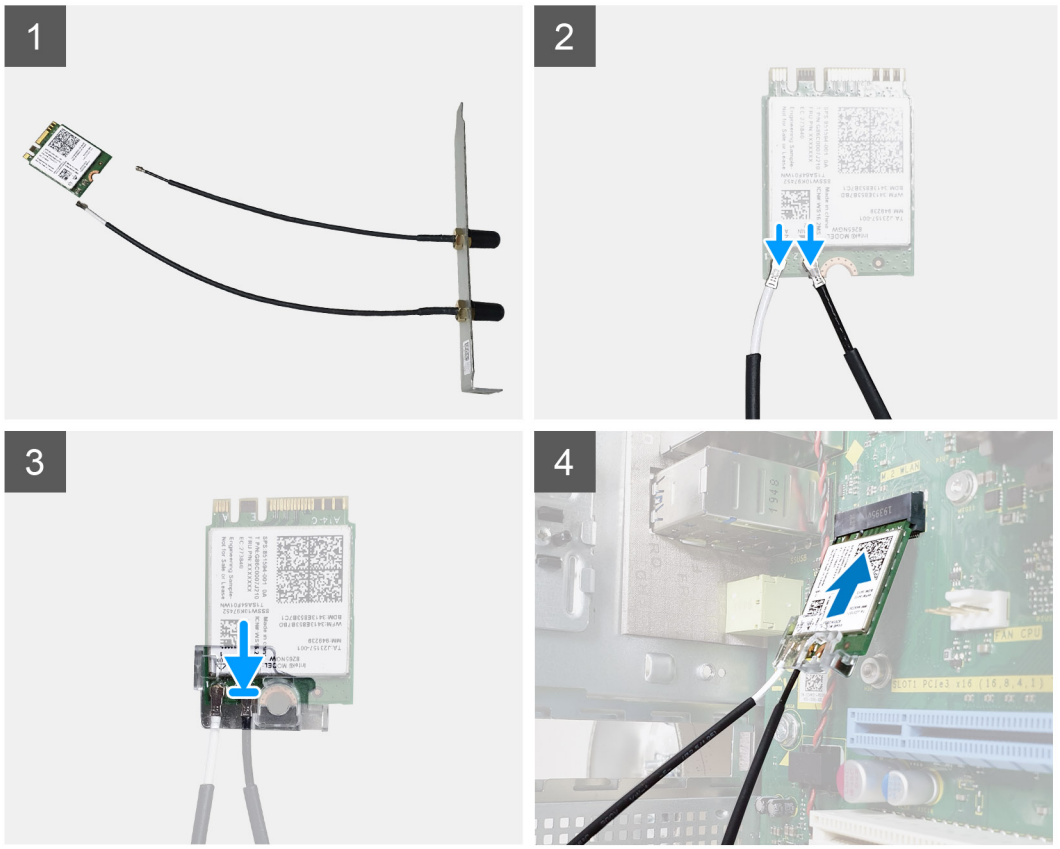
Installing WLAN module and SMA antenna

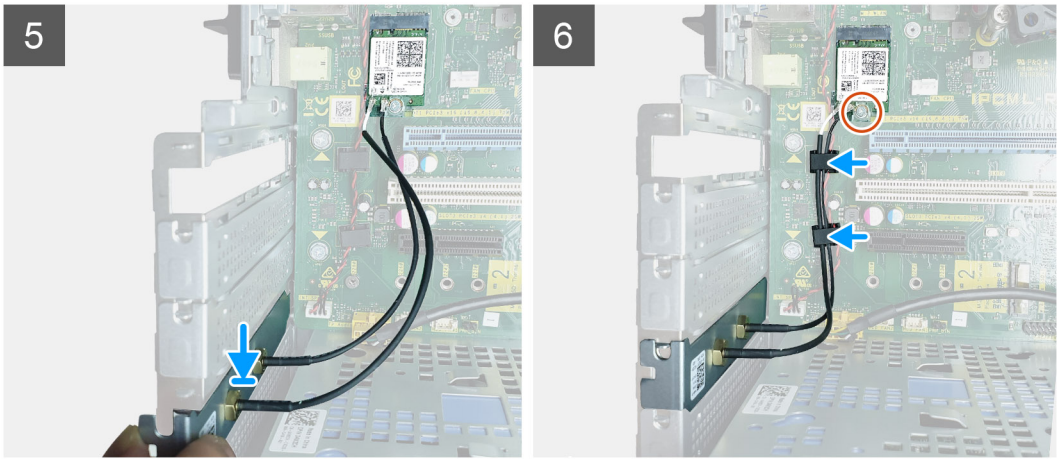
Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the WLAN module and SMA antenna and provides a visual representation of the installation procedure.





Steps

1. Assemble the WLAN module with the SMA antenna.
2. Connect the antenna cable to the WLAN module.
3. Replace the plastic bracket on the antenna connectors of the WLAN module.
4. Insert the WLAN module into the M.2 slot on the system board.
5. Replace PCIe bracket into its slot on the chassis.
6. Route the antenna cables along the rubber guides on the system board and replace the single (M2x3.5) screw securing the WLAN module to the system board.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

IO panel

Removing the IO panel

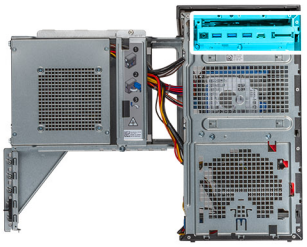
Prerequisites

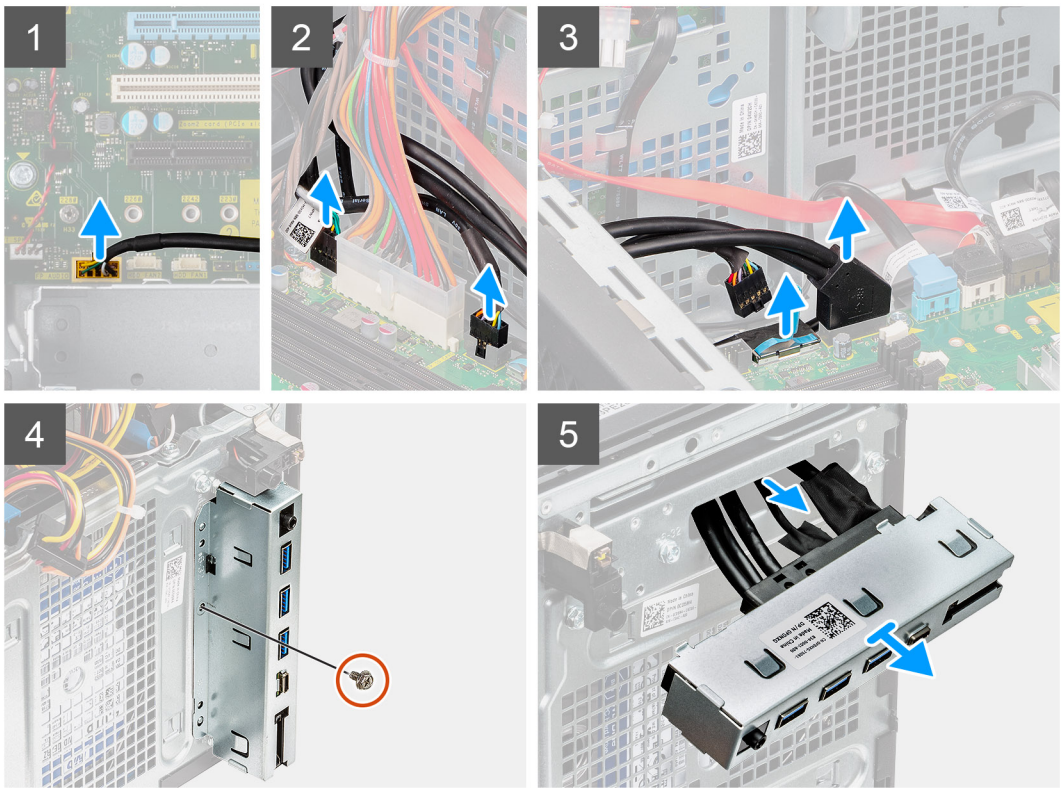
1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.
4. Remove the bezel.
5. Remove the optical drive.

About this task

The following images indicate the location of the IO panel and provides a visual representation of the removal procedure.

1x
6-32





Steps

1. Disconnect the IO audio cable from the connector on the system board and undo the cable from routing guides next to the system board on the chassis
2. Disconnect the following cables from their respective connectors on the system board:
   a. System board power connector cable
   b. SD card cable
   c. Type-C cable
   d. IO USB cable
3. Remove the single (#6-32x1/4) screw that secures the IO panel to the chassis.
4. Lift the IO panel to release the tabs on the IO panel from the slots on the chassis.
5. Pull the IO panel along with the cables to remove it from the IO panel slot in the chassis.

Installing the IO panel

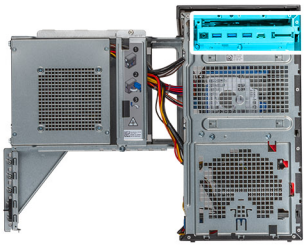
Prerequisites

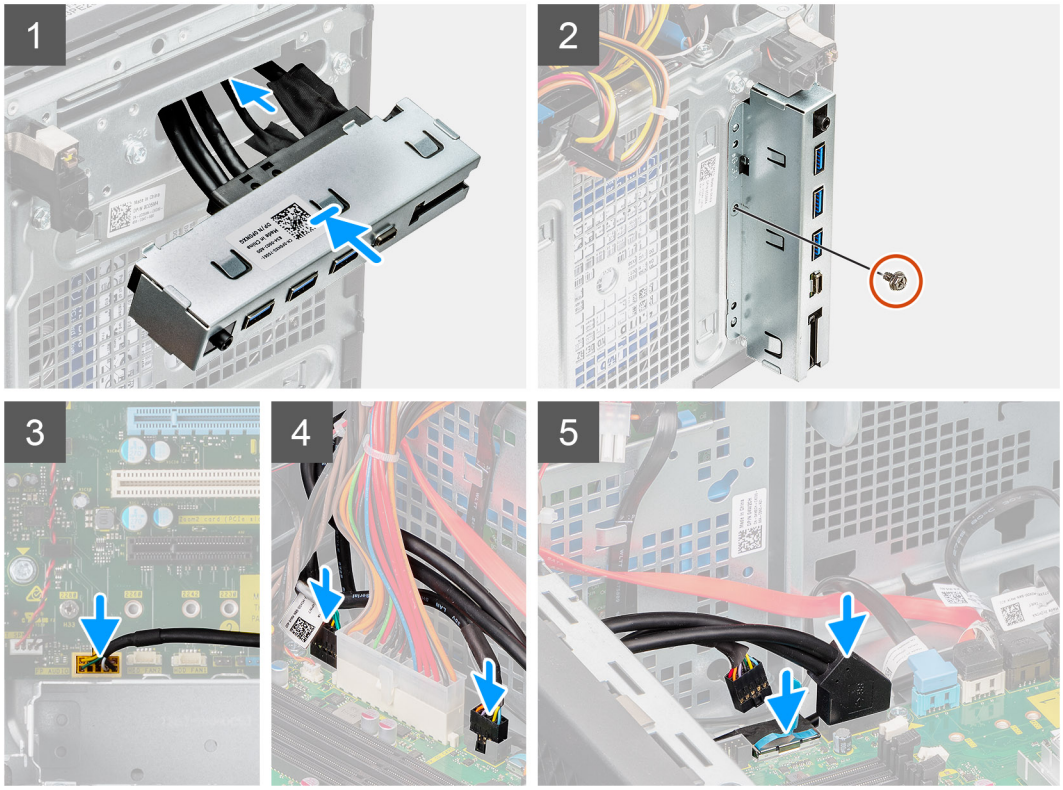
If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the IO panel and provides a visual representation of the installation procedure.

1x
6-32





Steps

1. Insert the cables through the IO panel slot on the chassis.
2. Insert the IO panel tabs into the slots on the computer chassis and replace the single (#6-32x1/4') screw to secure the IO panel to the computer.
3. Route the cables through the routing channel and connect the following cables to their respective connectors on the system board:
   a. IO USB cable
   b. Type-C cable
   c. SD card cable
   d. System board power connector cable

Next steps

1. Install the optical drive.
2. Install the bezel.
3. Close the psu hinge.
4. Install the cover.
5. Follow the procedure in after working inside your computer.

Power button module

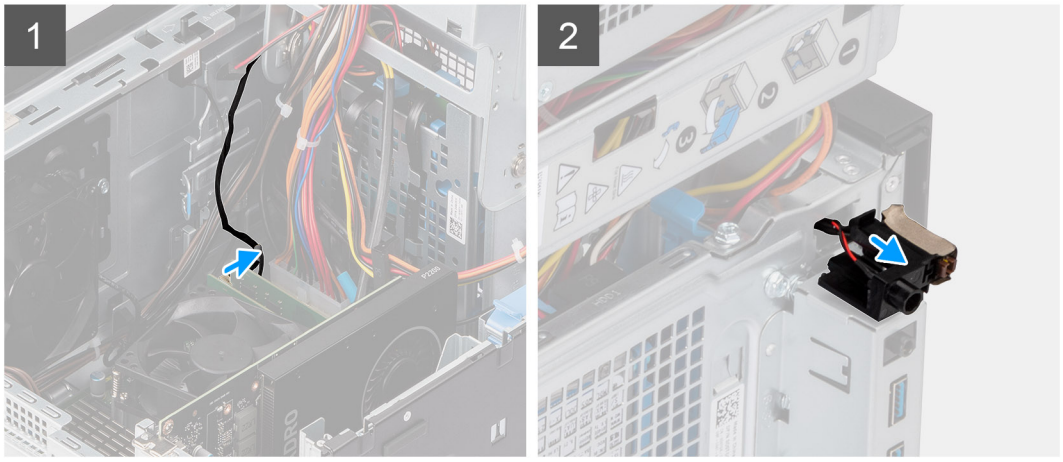
Removing the power button module

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.
4. Remove the bezel.
5. Remove the IO panel.

About this task

The following images indicate the location of the power button module and provides a visual representation of the removal procedure.



Steps

1. Disconnect the power button module cable from the connector on the system board.
2. Remove the button module cable from the routing guides next to the system board on the chassis.

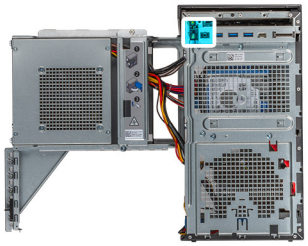
Installing the power button module

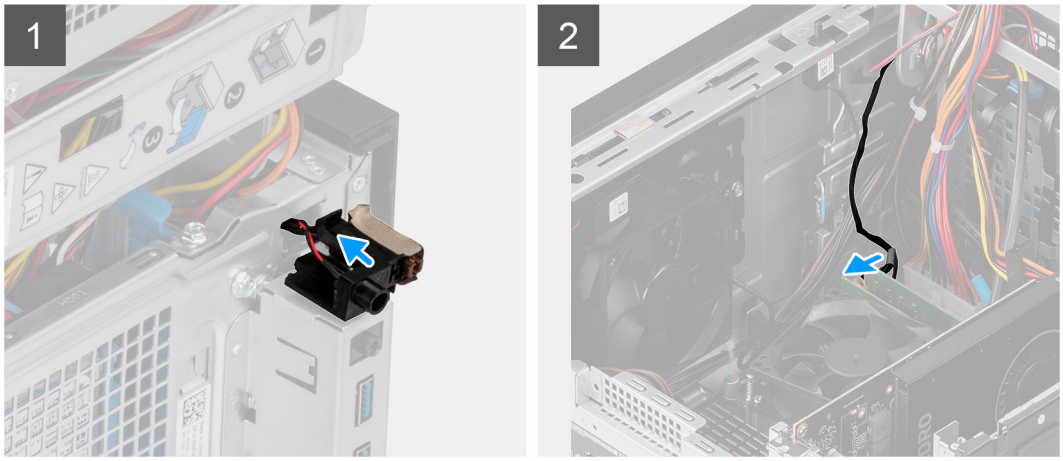
Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the power button module and provides a visual representation of the installation procedure.





Steps

1. Insert the power button module into its slot on the system and press the notches and secure it to the system.
2. Affix the adhesive tape to secure the power button module to the system.
3. Route the power button module cable through the routing clips on the system.
4. Connect the power button module cable to the connector on the system board.

Next steps

1. Install the IO panel.
2. Install the bezel.
3. Close the psu hinge.
4. Install the cover.
5. Follow the procedure in after working inside your computer.

Speaker

Removing the speaker

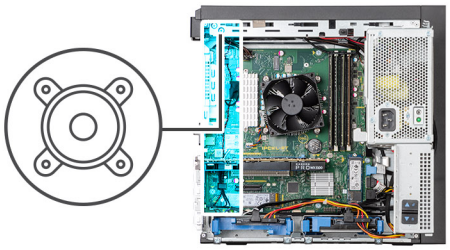
Prerequisites

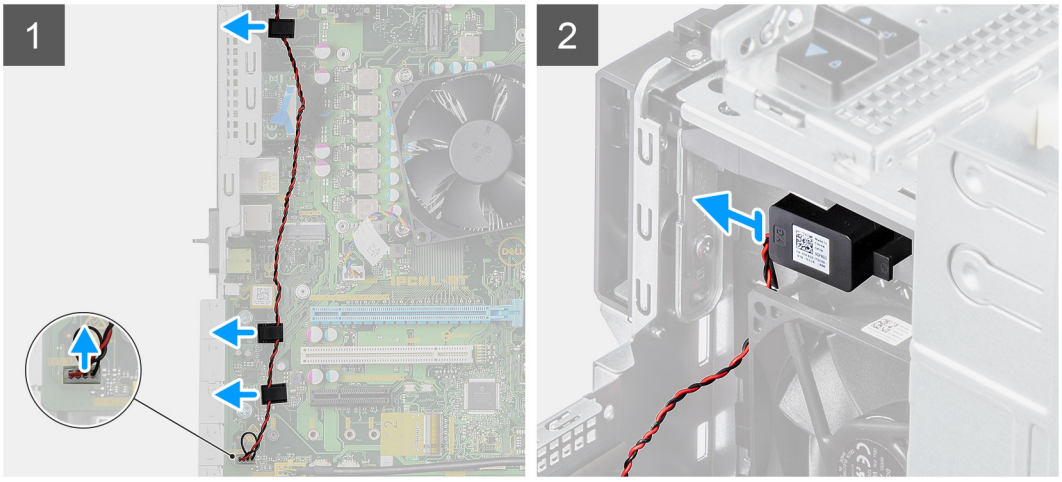
1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

About this task

The following image indicate the location of the speaker and provides a visual representation of the removal procedure.

NOTE: Speakers are for troubleshooting purposes only and cannot be used for audio output in the operating system environment.





Steps

1. Disconnect the speaker cable from the system board and undo the cable from the routing guides on the system board.
2. Press the release tab and pull the speaker out of the computer.

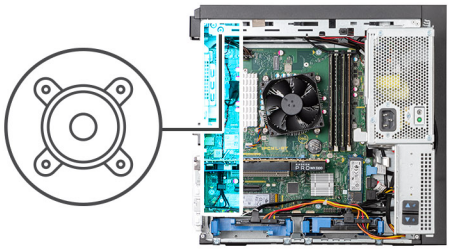
Installing the speaker

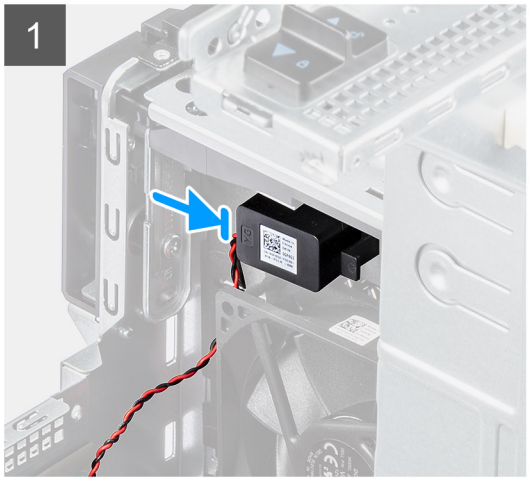
Prerequisites

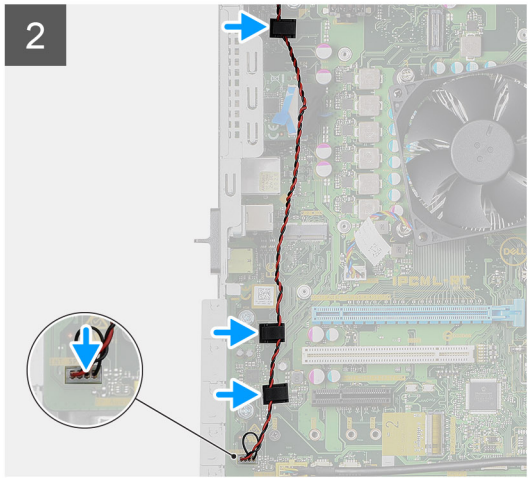
If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following image indicate the location of the speaker and provides a visual representation of the installation procedure.







Steps

1. Replace the speaker into its slot in the chassis and slide it until it clicks in place.
2. Tuck the cable along the routing guide on the system board and connect the speaker cable to the system board.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

Intrusion switch

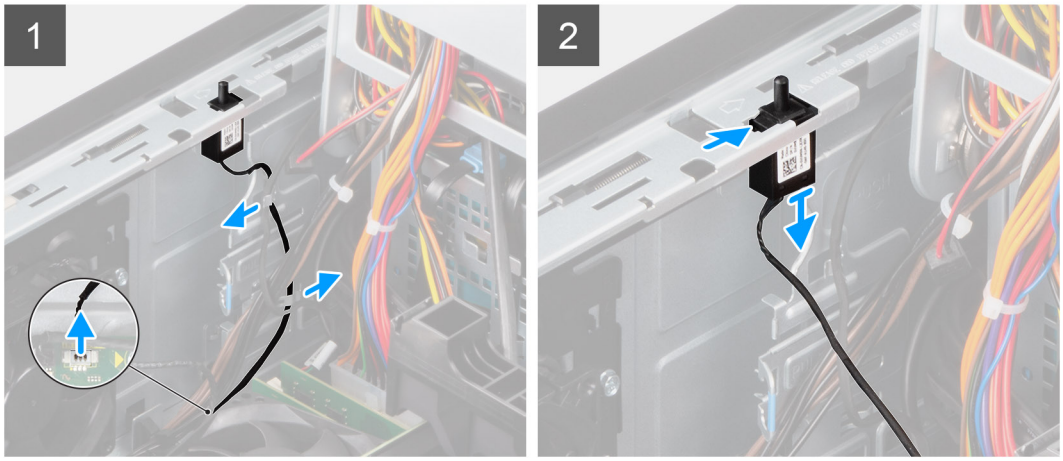
Removing the intrusion switch

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

About this task

The following images indicate the location of the intrusion switch and provides a visual representation of the removal procedure.



Steps

1. Disconnect the intrusion switch cable from the connector on the system board and undo the cable that is routed along the clips on the chassis.
2. Slide the intrusion switch and push it to remove it from its slot in the chassis.

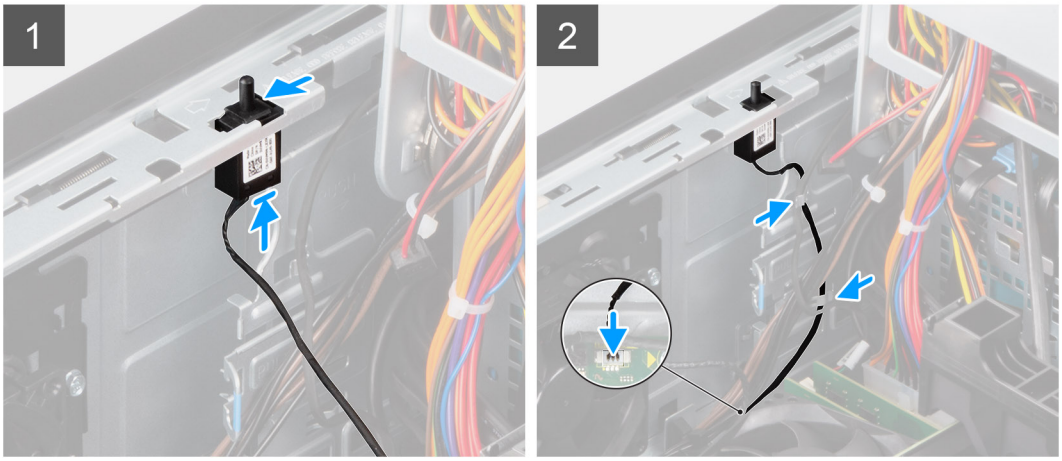
Installing the intrusion switch

Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the intrusion switch and provides a visual representation of the installation procedure.



Steps

1. Replace the intrusion switch into its slot in the chassis and slide it in to secure it to the chassis.
2. Route the intrusion switch cable through the routing clips on the chassis and connect the cable to the system board.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

Solid state drive

Removing the solid state drive

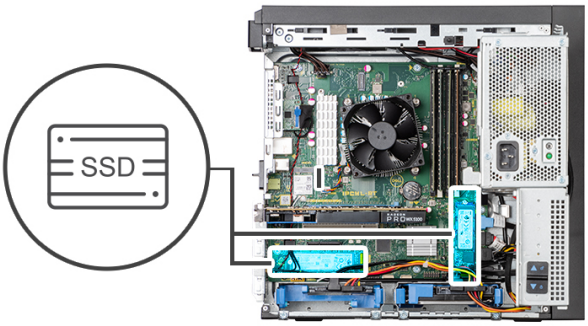
Prerequisites

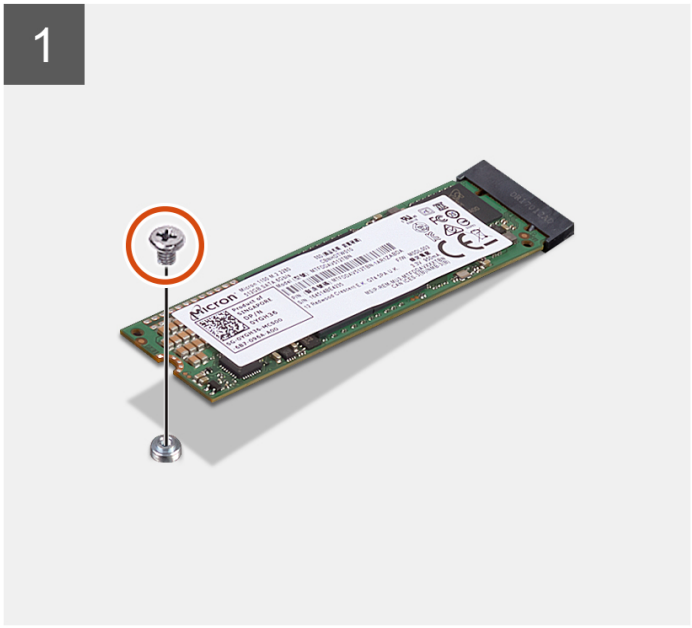
1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.
4. Remove the graphics card.

About this task

The following images indicate the location of the solid state drive and provides a visual representation of the removal procedure.

1x
M2x2.5





Steps

1. Remove the single (M2x2.5) screw that secures the solid state drive to the system board.
2. Slide the solid state drive and remove it from the system board.

Installing the solid state drive

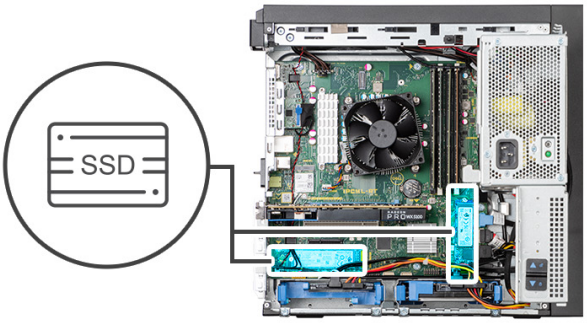
Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

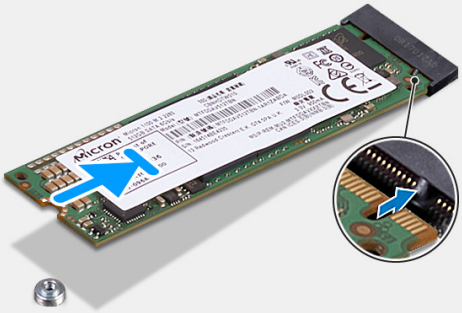
About this task

The following image indicate the location of the solid state drive and provides a visual representation of the installation procedure.

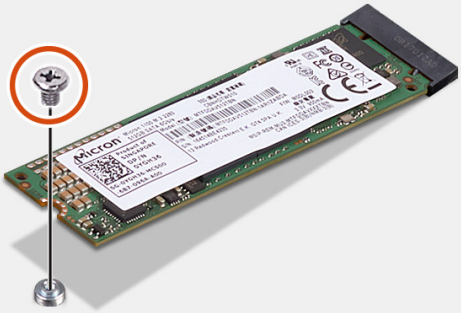
1x
M2x2.5



1



2



Steps

1. Align the notch on the M.2 slot on the system board with that on the solid state drive and slide the solid state drive into the system board.
2. Replace the single (M2x2.5) screw to secure the solid state drive to the system board.

Next steps

1. Install the graphics card.
2. Close the psu hinge.
3. Install the cover.
4. Follow the procedure in after working inside your computer.

Coin cell battery

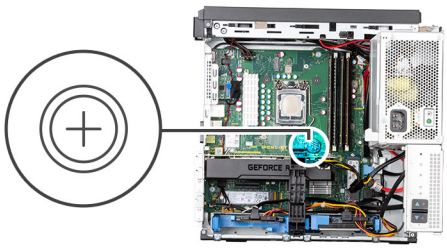
Removing the coin cell battery

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

About this task

The following image indicate the location of the coin cell battery and provides a visual representation of the removal procedure.



Steps

1. Use a scribe to press the release latch until the coin cell battery pops out of the system board.
2. Remove the coin cell battery from the connector on the system board.

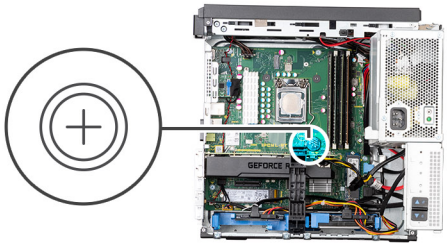
Installing the coin cell battery

Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following image indicate the location of the coin cell battery and provides a visual representation of the installation procedure.



Steps

1. Hold the coin cell battery with the **"+"** sign facing up and slide it under the securing tabs of the connector on the system board.
2. Press the battery into the connector until it locks into place.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

Power supply unit

Removing the power supply unit

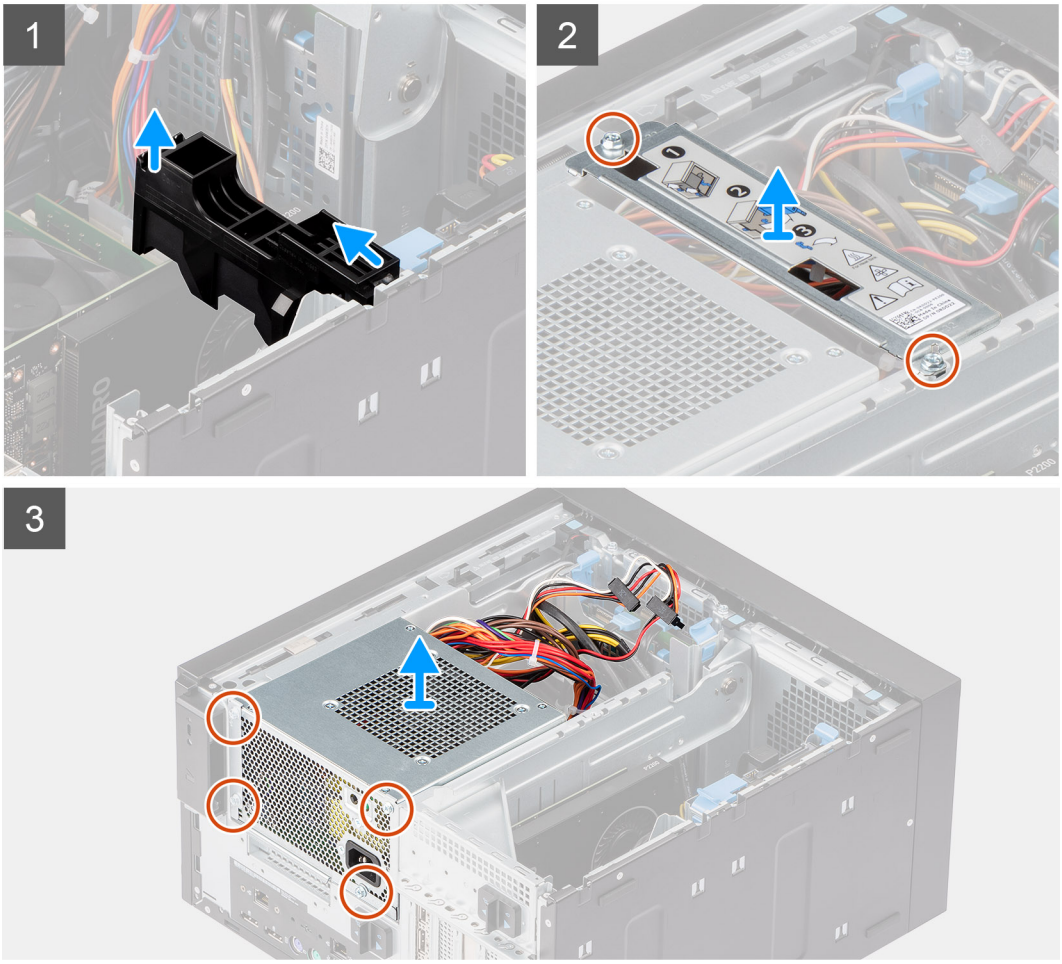
Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the PSU hinge.
4. Disconnect the power supply cables and close the PSU hinge.

About this task

The following images indicate the location of the power supply unit and provides a visual representation of the removal procedure.

6x
6-32



Steps

1. Lift the side of the PCIe holder to release it from the graphics card and slide the holder out from the slot in the chassis.
2. Remove the two #6-32x1/4 screws that secure the power-supply bracket to the chassis and lift the power-supply bracket from the system.
3. Remove the four #6-32x1/4 screws that secure the power-supply unit to the chassis and lift the PSU off the chassis.

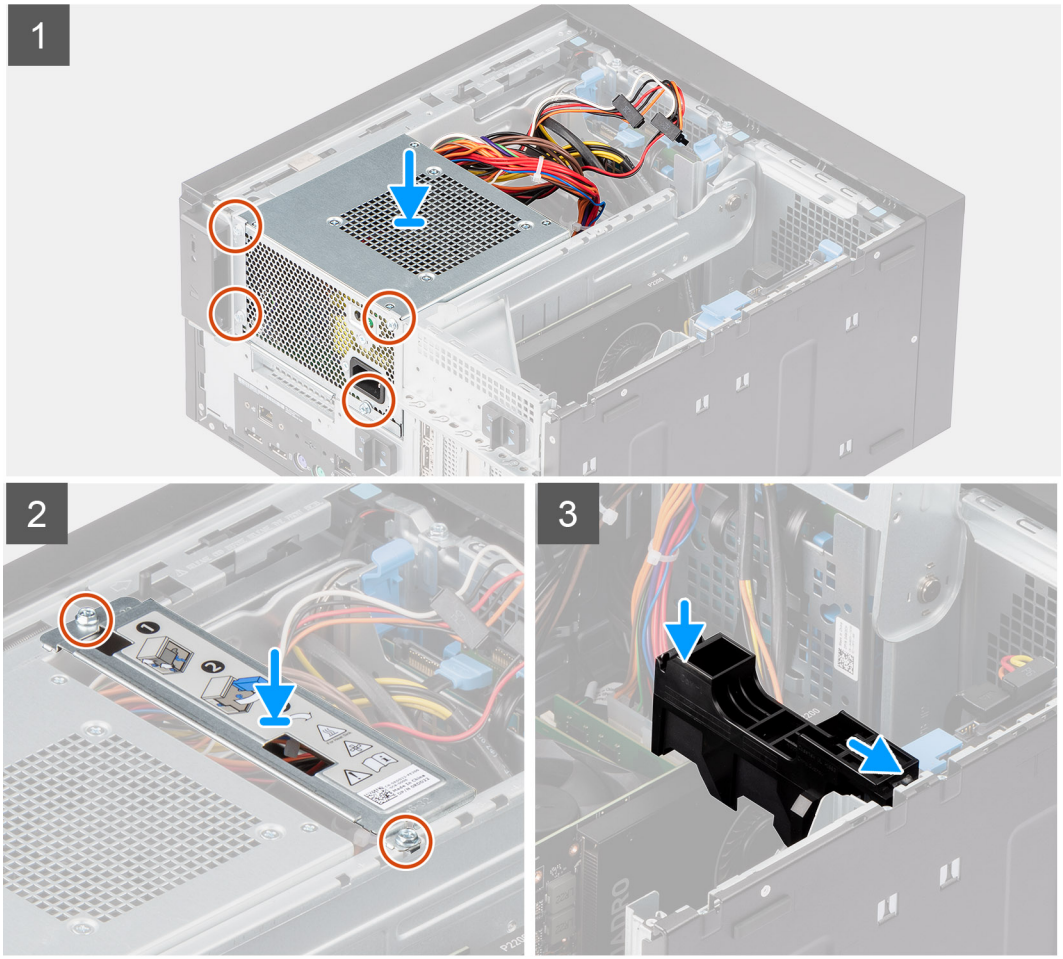
Installing the power supply unit

Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the power supply unit and provides a visual representation of the installation procedure.



Steps

1. Insert the PSU into the PSU slot and slide it towards the back of the computer until it clicks into place.
2. Replace the four #6-32x1/4 screws to secure the PSU to the computer.
3. Place the power supply bracket and tighten the two #6-32x1/4 screws to secure the PSU to the computer.
4. Insert the PCIe card holder into the slot on the chassis and press it firmly to secure the holder to the top of the graphics card.

Next steps

1. Open the PSU hinge.
2. Connect the power supply cables and close the PSU hinge.
3. Install the cover.
4. Follow the procedure in after working inside your computer.

Front fan

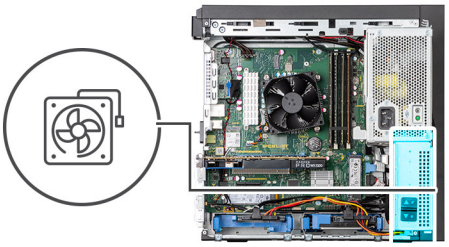
Removing the front fan

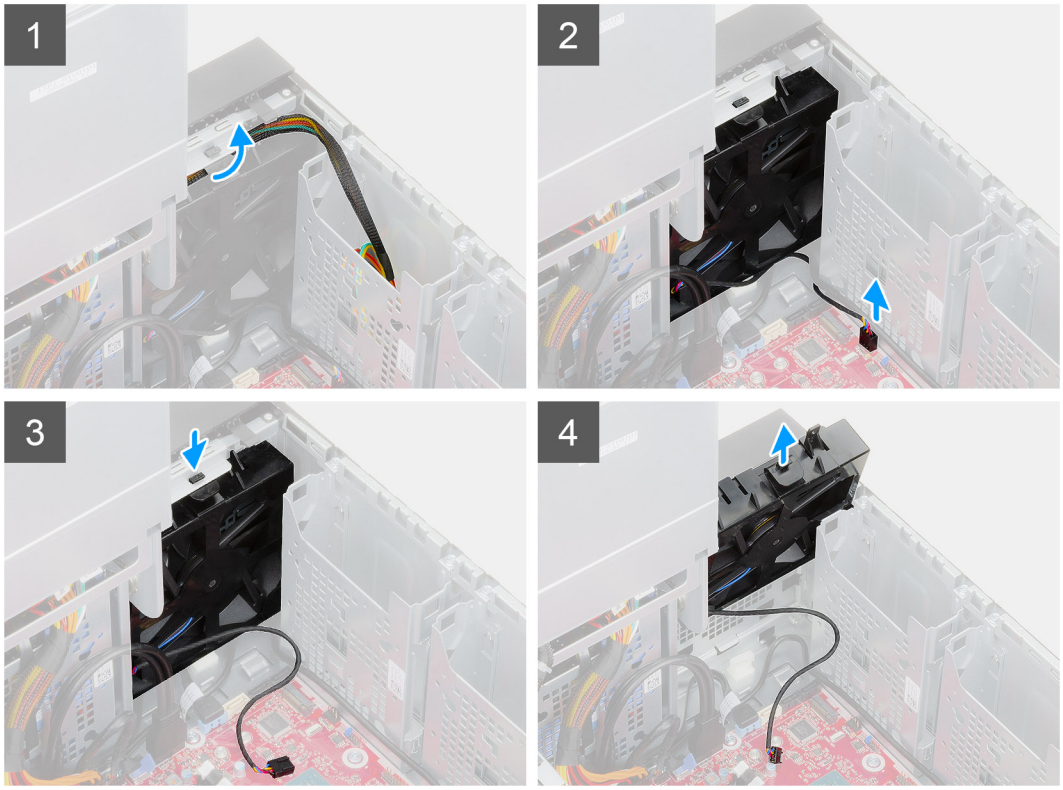
Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

About this task

The following images indicate the location of the front fan and provides a visual representation of the removal procedure.





Steps

1. Unthread the hard drive cables from the routing guides on the front fan.
2. Disconnect the fan cable from the system board.
3. Press the notch to release the fan from the chassis.
4. Slide and remove the fan from the chassis.

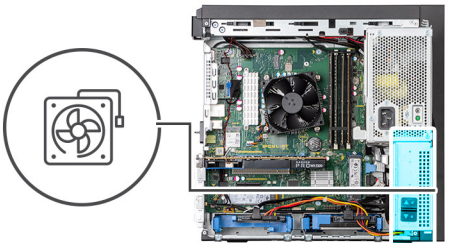
Installing the front fan

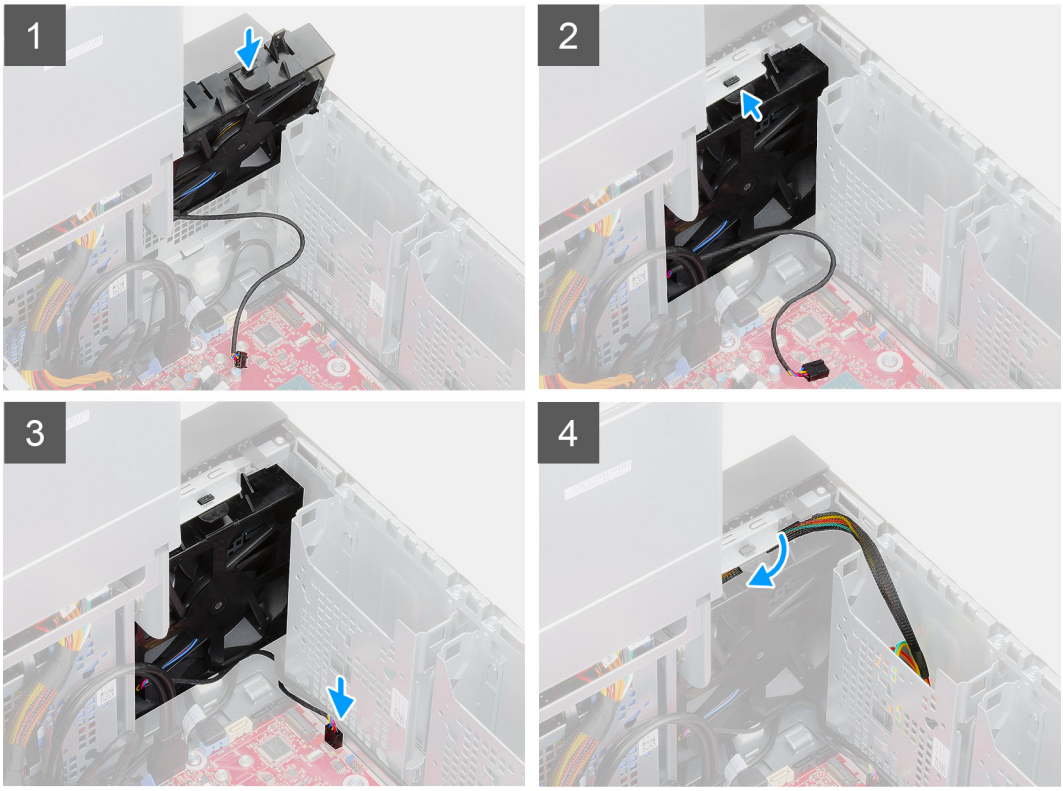
Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the front fan and provides a visual representation of the installation procedure.





Steps

1. Align the notches in the fan with the hooks on the chassis and replace the fan into its slot in the chassis.
2. Firmly press the fan so it is locked in its position.
3. Connect the fan cable to the system board.
4. The Hard drive cable can be routed along the guides on the front fan.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

Top fan

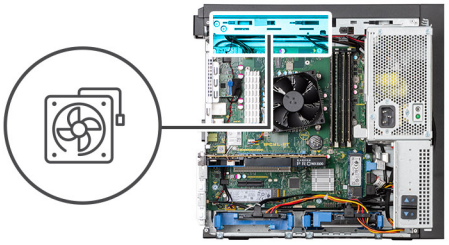
Removing the top fan

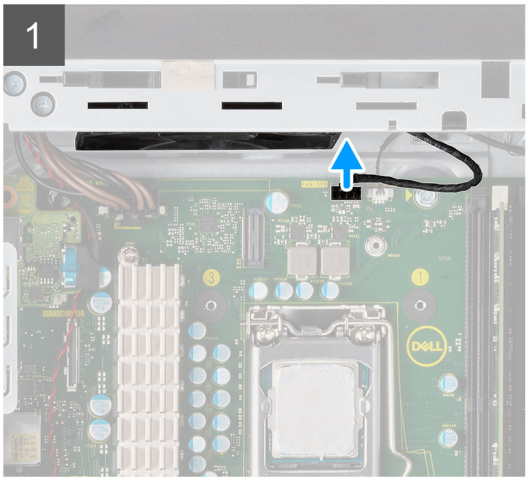
Prerequisites

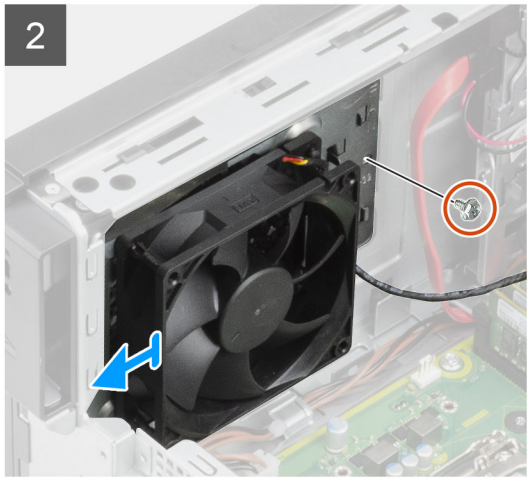
1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

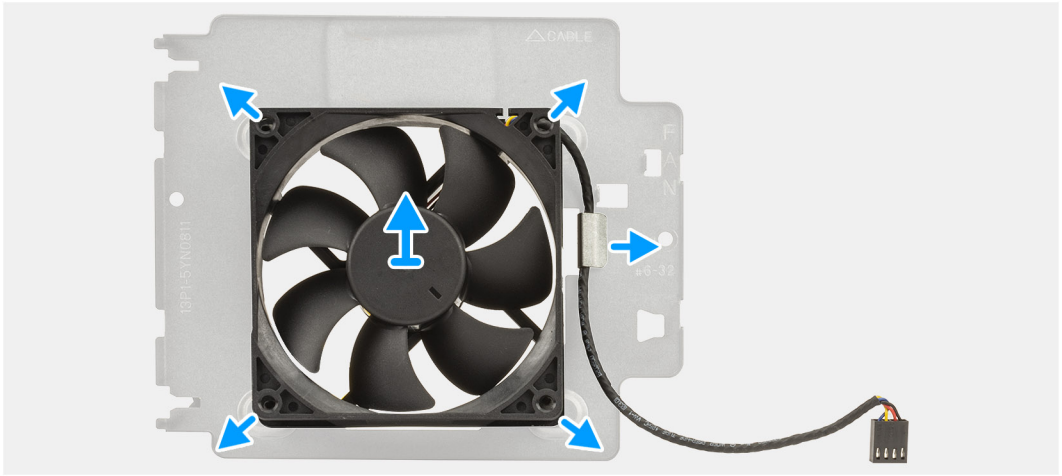
About this task

The following images indicate the location of the top fan and provides a visual representation of the removal procedure.









Steps

1. Disconnect the fan cable from the system board:
2. Remove the single screw (#6-32) that secure the fan bracket to the chassis.

3. Slide and remove the fan along with the bracket from the chassis.
4. Pry and separate the fan from the fan bracket.

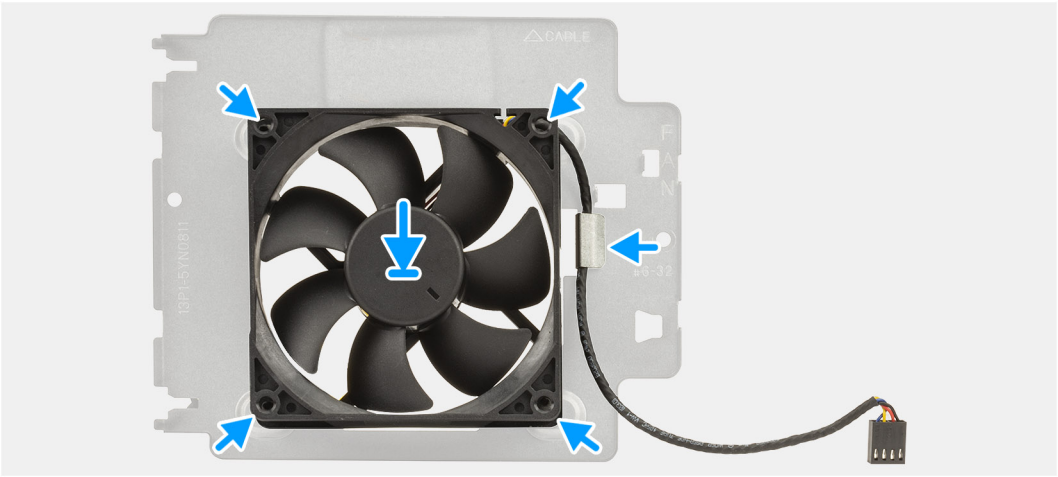
Installing the top fan

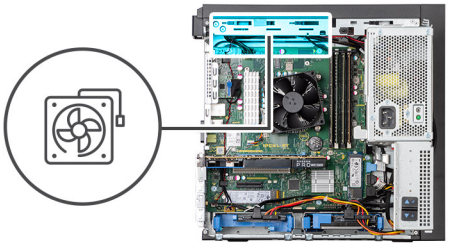
Prerequisites

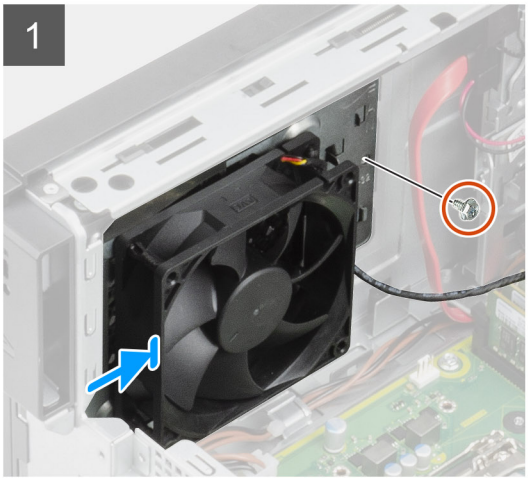
If you are replacing a component, remove the existing component before performing the installation process.

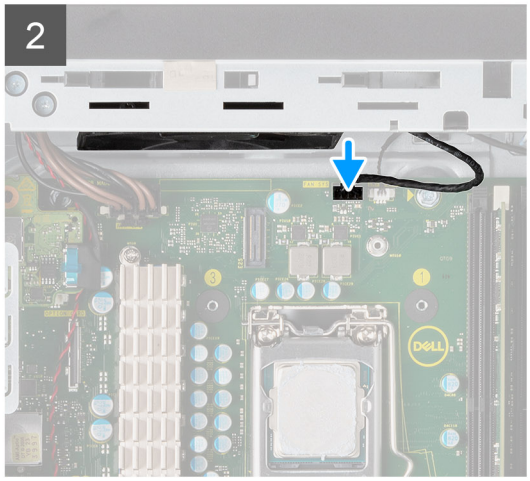
About this task

The following images indicate the location of the top fan and provides a visual representation of the installation procedure.









Steps

1. Align the holes in the fan case with the rubber guides on the fan bracket.
2. Slide and replace the fan along with the bracket into its slot in the chassis.
3. Replace the single screw (#6-32) to secure the fan bracket to the chassis.
4. Connect the fan cable to the system board.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

Heatsink assembly

Removing the heatsink assembly

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.

About this task

The following images indicate the location of the heatsink assembly and provides a visual representation of the removal procedure.

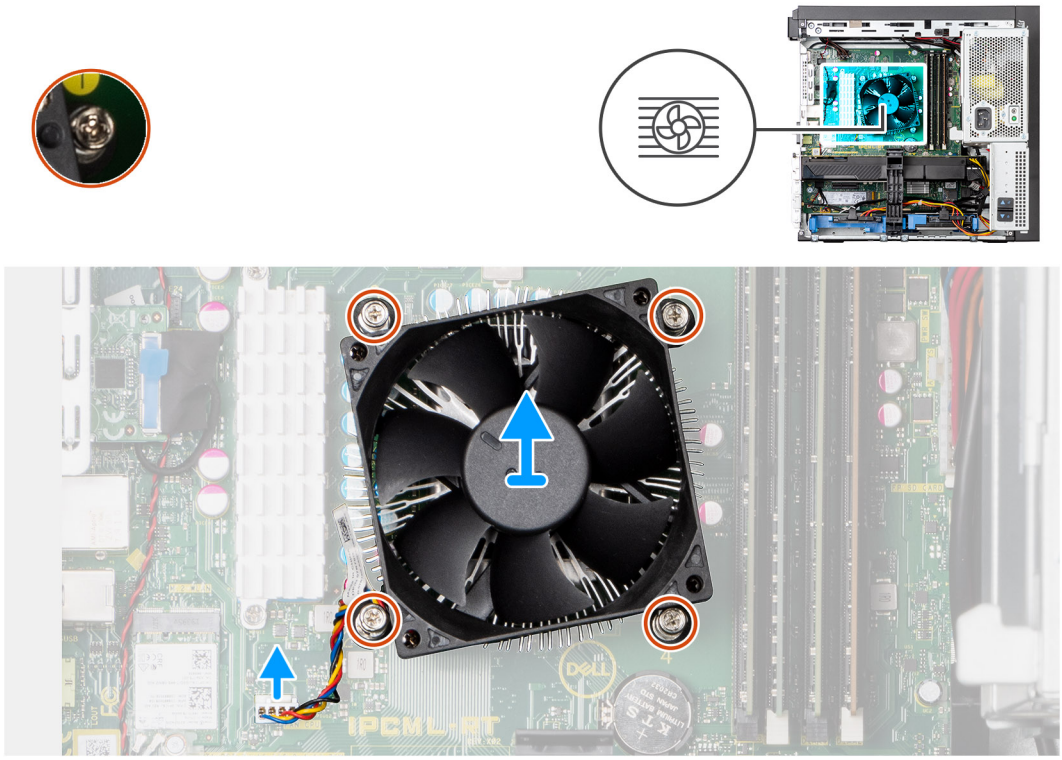
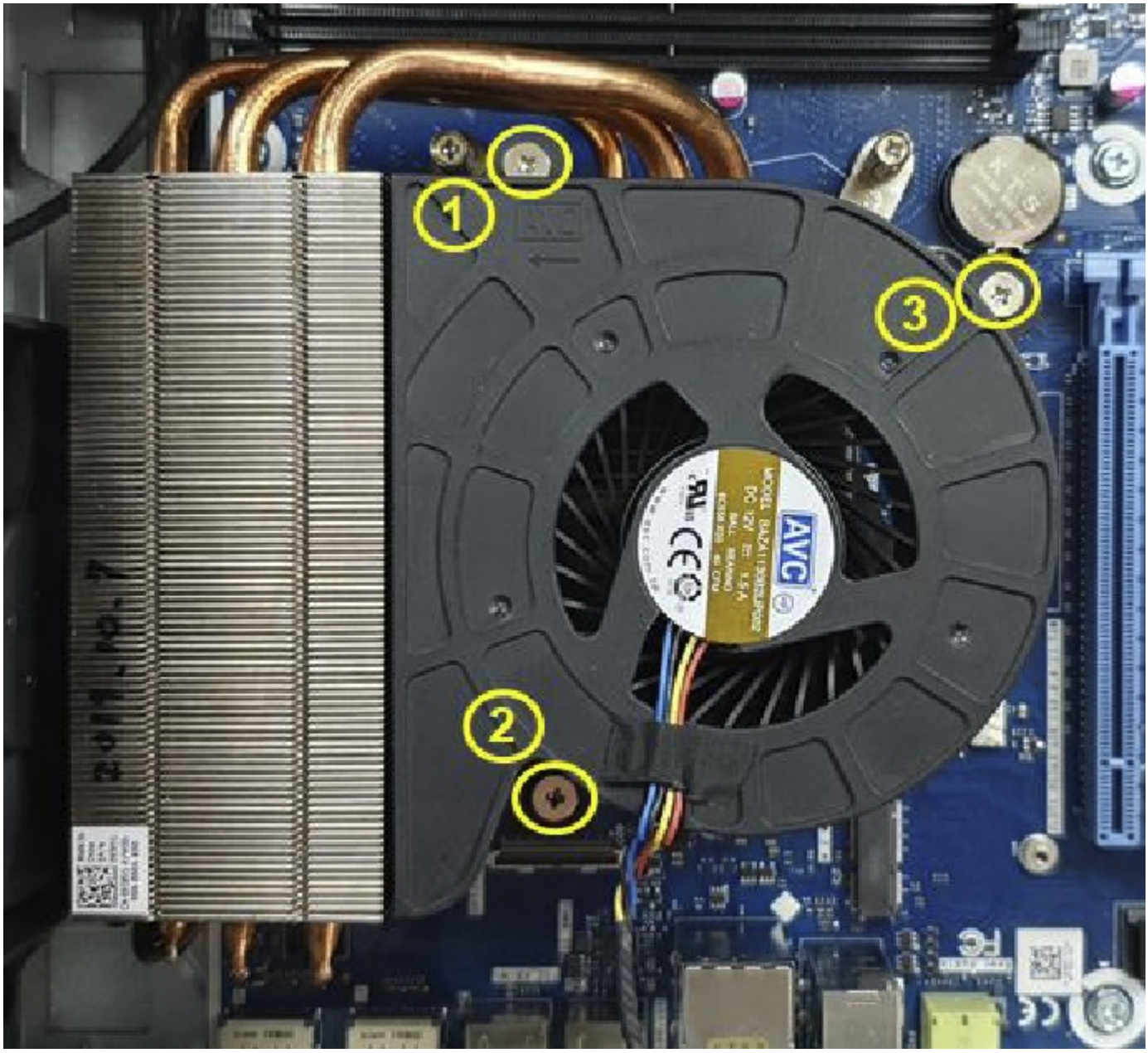


Figure 4. Heatsink assembly - 65 W or 80 W CPU



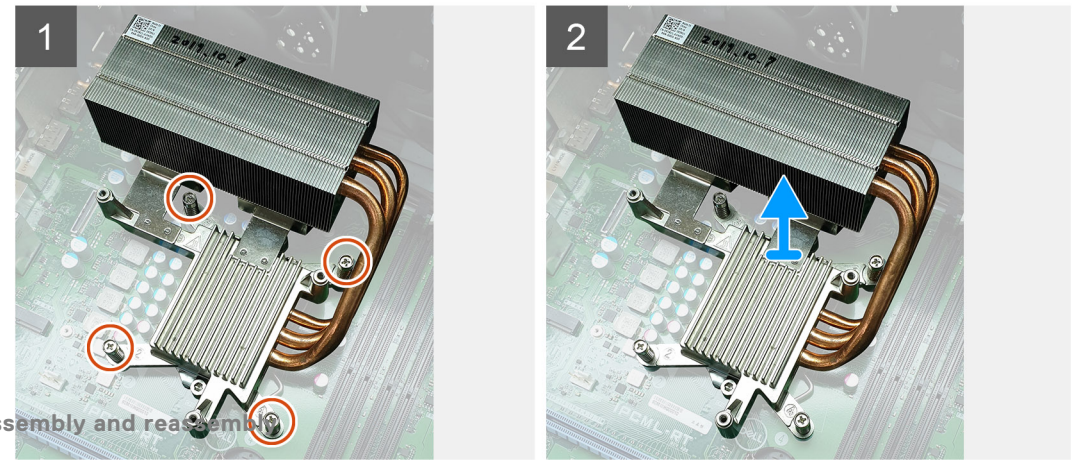


Figure 5. Heatsink assembly - 125 W CPU

Steps

1. Disconnect the heatsink fan cable from the connector on the system board.
2. **NOTE:** Loosen the screws in a sequential order (1,2,3,4) as mentioned on the system board.

   Loosen the four captive screws that secure the heatsink assembly and lift it from the system board.

Installing the heatsink assembly

Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the heatsink assembly and provides a visual representation of the installation procedure.

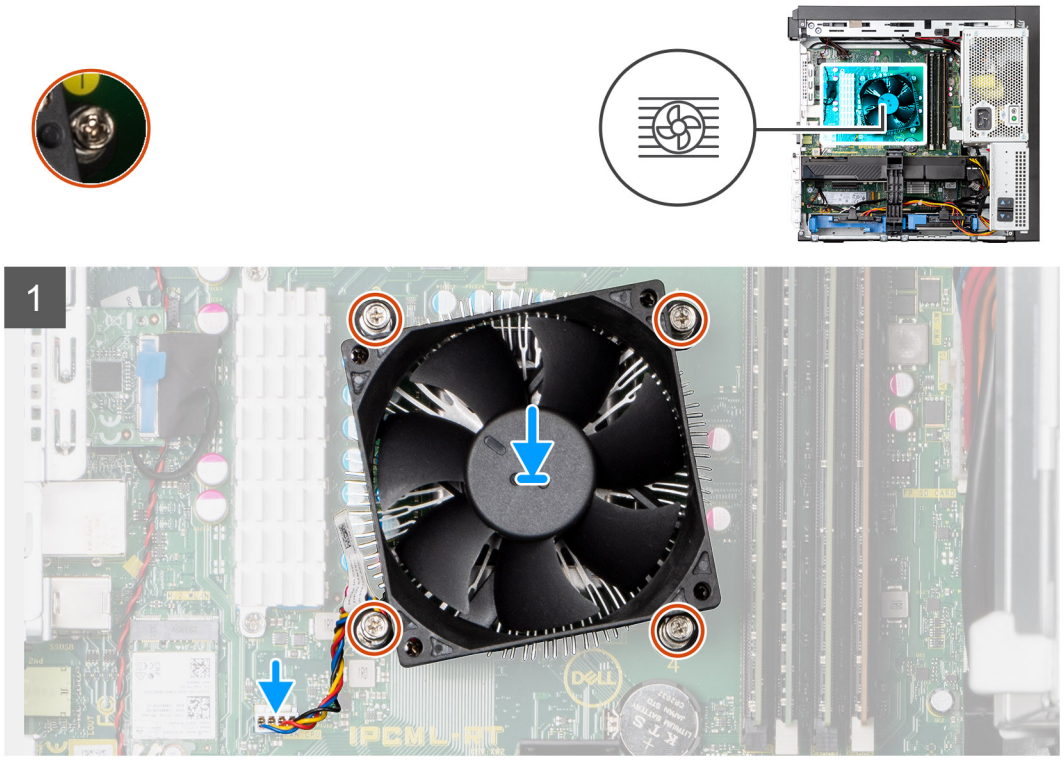


Figure 6. Heatsink assembly - 65 W or 80 W CPU

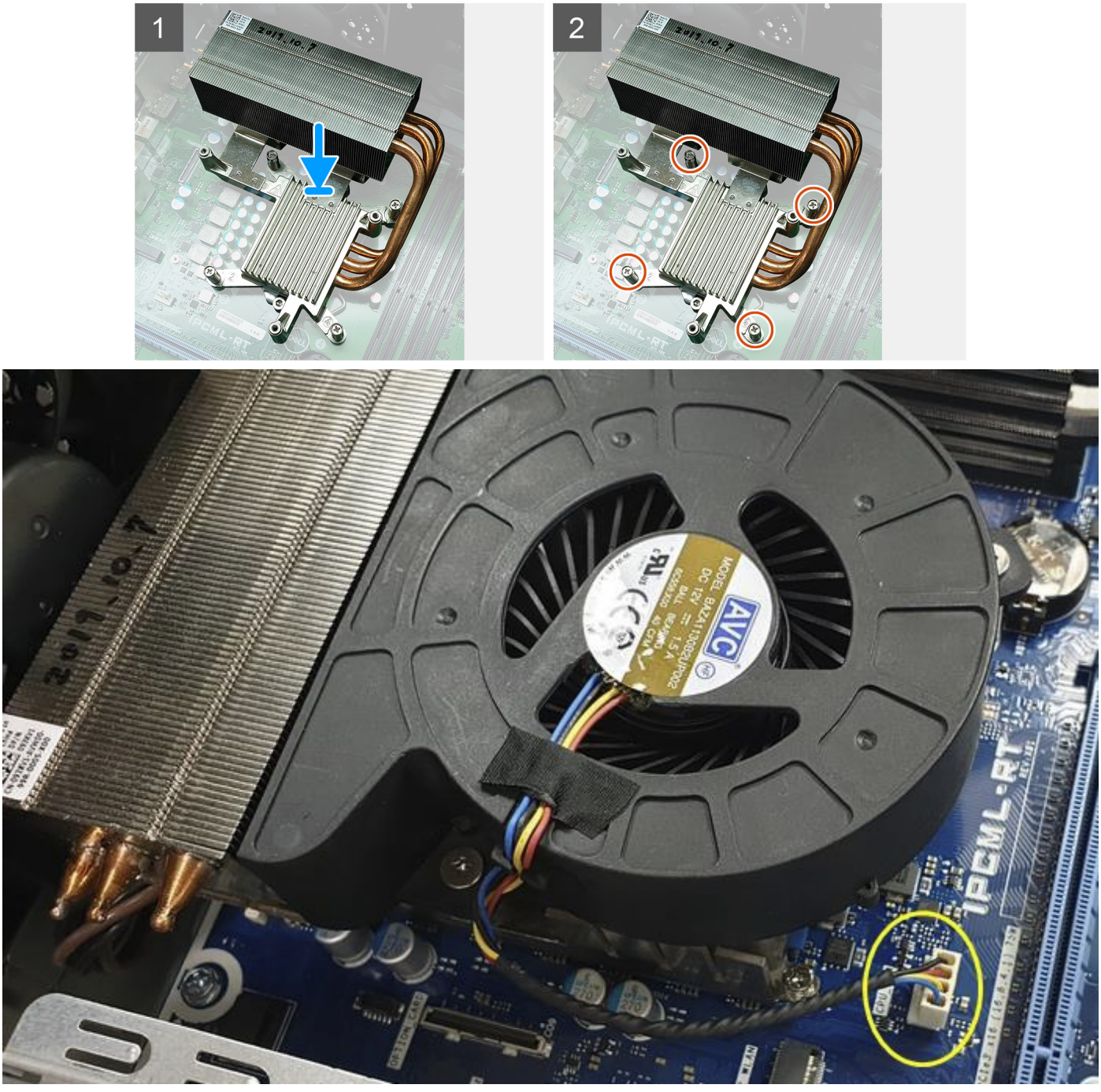


Figure 7. Heatsink assembly - 125 W CPU

Steps

1. Replace the heatsink assembly on the top of processor preassembled with thermal gel.
2. **NOTE:** Tighten the screws in a sequential order (1,2,3,4) as mentioned on the system board.

Tighten the four captive screws that secure the heat sink assembly and lift it from the computer.

3. Replace the system fan on top of the heat sink assembly and tighten the four captive screws and connect the fan cable to the system board.

Next steps

1. Close the psu hinge.
2. Install the cover.
3. Follow the procedure in after working inside your computer.

Voltage regulator heat sink

Removing the voltage regulator heat sink

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.
4. Remove the graphics card.
5. Remove the solid state drive.
6. Remove the heat sink assembly.

About this task

The following images indicate the location of the voltage regulator heat sink and provides a visual representation of the removal procedure.

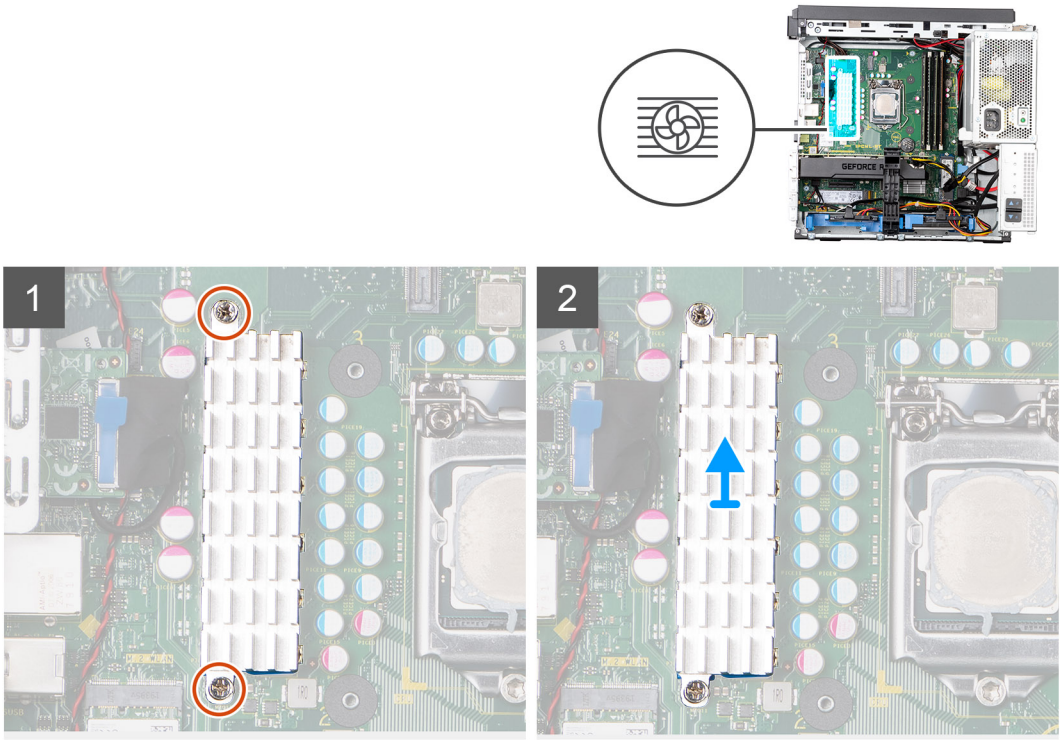


Figure 8. VR heatsink assembly for systems shipped with 65 W or 80 W CPU

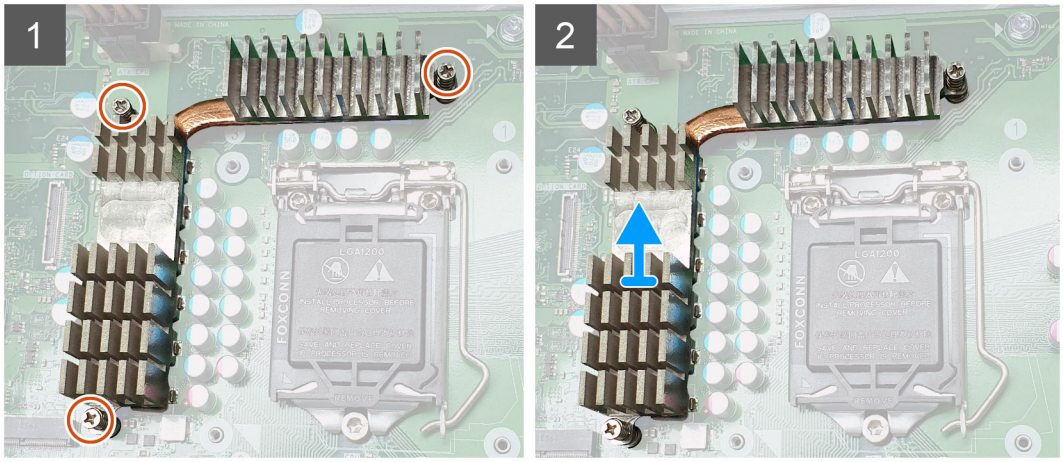


Figure 9. VR heatsink assembly for systems shipped with 125 W CPU

Steps

1. Loosen the captive screws that secure the VR heatsink to the system board.
2. Lift the VR heatsink from the system board.

Installing the voltage regulator heat sink

Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the voltage regulator heat sink and provides a visual representation of the installation procedure.

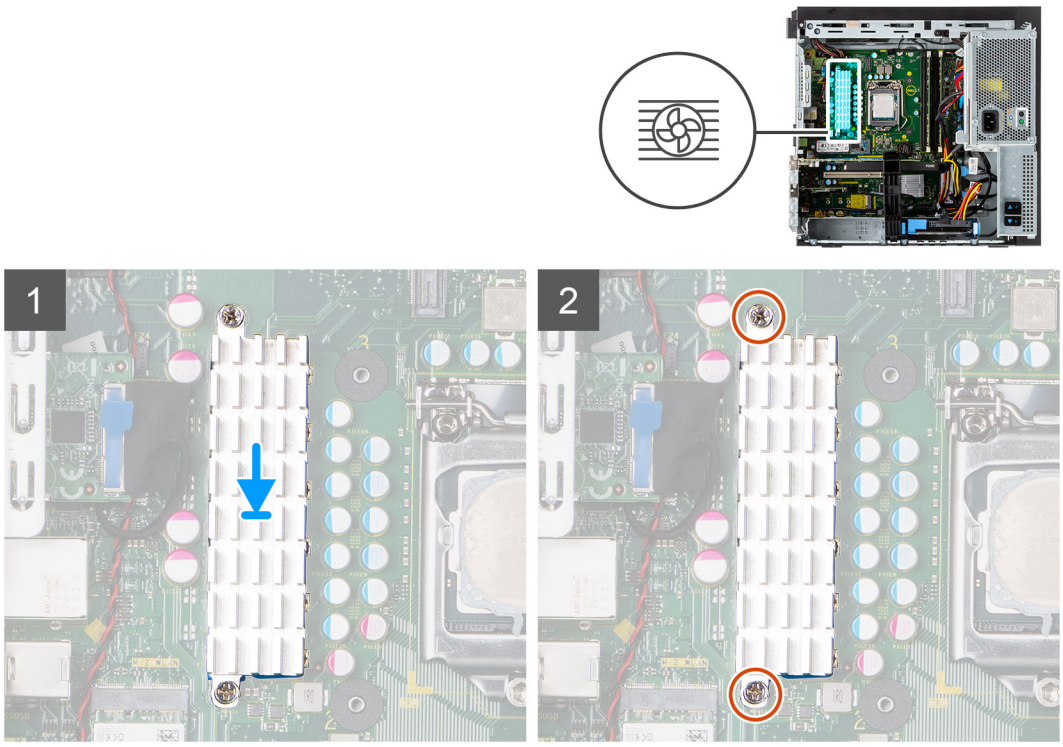


Figure 10. VR heatsink assembly for systems shipped with 65 W or 80 W CPU

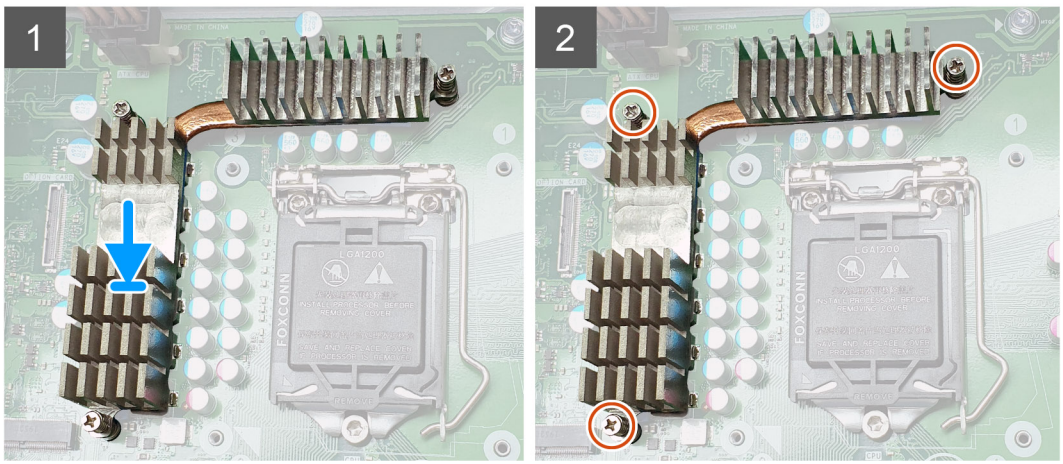


Figure 11. VR heatsink assembly for systems shipped with 125 W CPU

Steps

1. Align and replace the VR heatsink on the system board.
2. Tighten the captive screws that secure the VR heatsink to the system board.

Next steps

1. Install the heat sink assembly.
2. Install the solid state drive.
3. Install the graphics card.
4. Close the psu hinge.
5. Install the cover.
6. Follow the procedure in after working inside your computer.

Processor

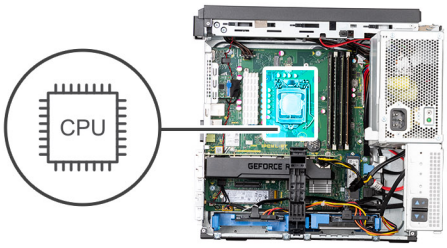
Removing the processor

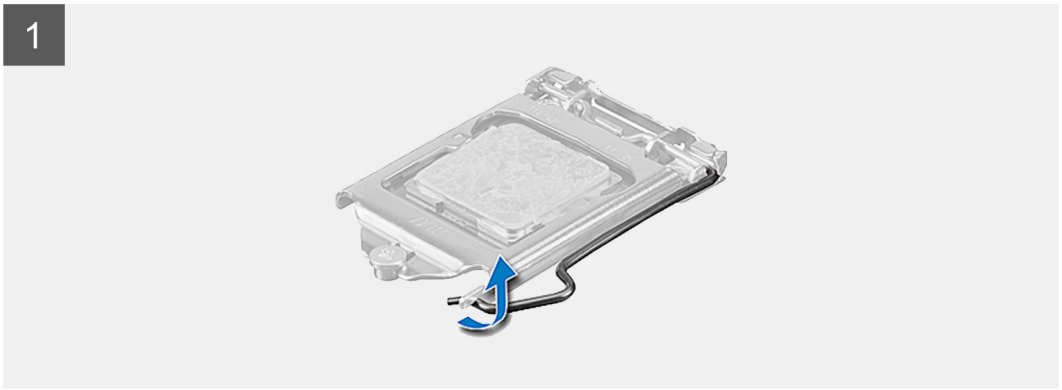
Prerequisites

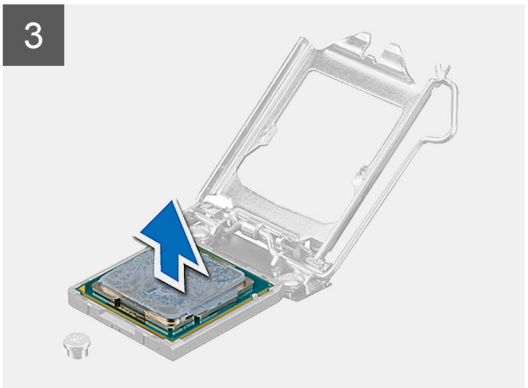
1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.
4. Remove the heat sink assembly.

About this task

The following images indicate the location of the processor and provides a visual representation of the removal procedure.







Steps

1. Gently press the CPU lever and release it from the latch mechanism.
2. Open the lever clockwise to lift the processor shield.
3. Carefully lift the processor out of the slot on the system board.

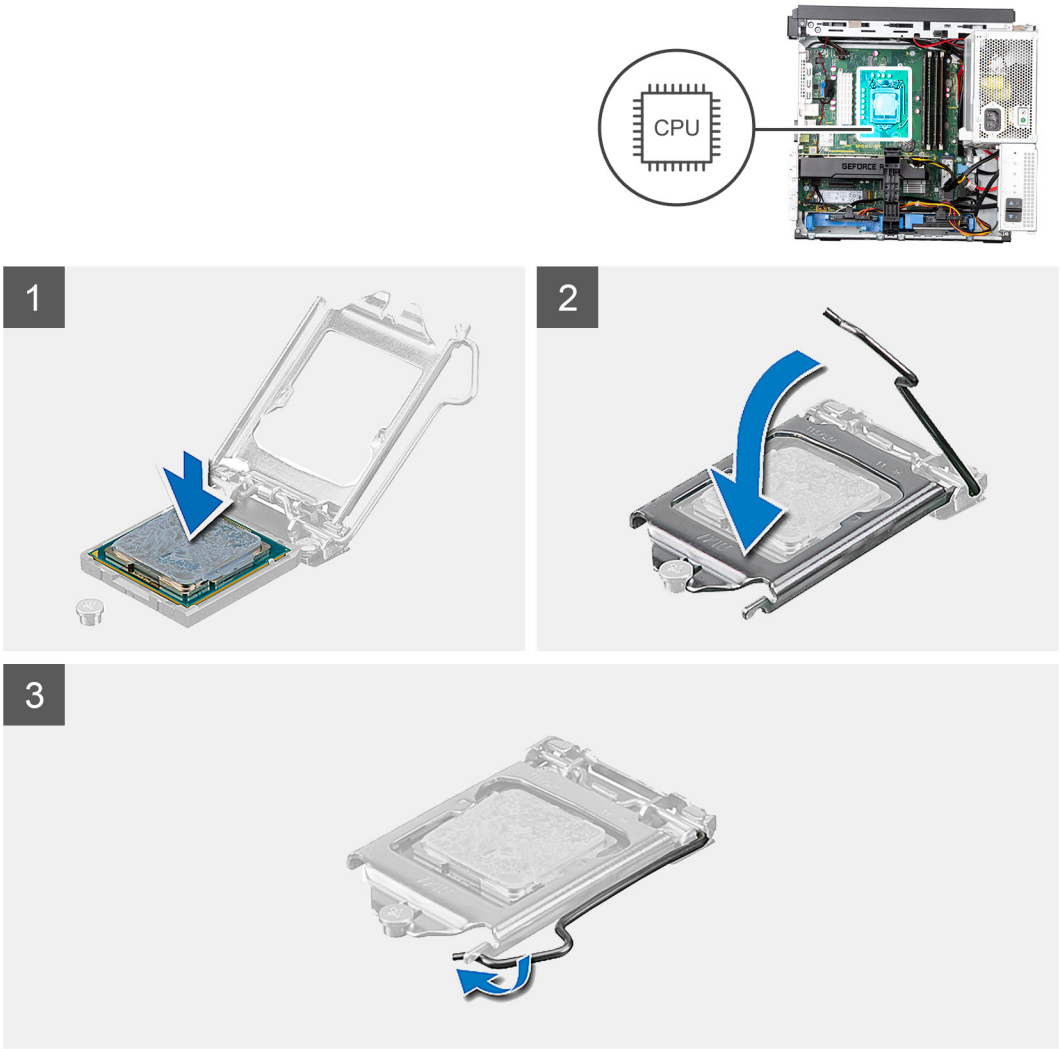
Installing the processor

Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following images indicate the location of the processor and provides a visual representation of the installation procedure.



Steps

1. Align the pin-1 indicator of the processor with the triangle on the socket and place the processor on the socket such that the slots on the processor align with the socket keys.
2. Close the processor shield by sliding it under the retention screw.
3. Lower the socket lever and push it under the latch to lock it.

Next steps

1. Install the heat sink assembly.

2. Close the psu hinge.
3. Install the cover.
4. Follow the procedure in after working inside your computer.

System board

Removing the system board

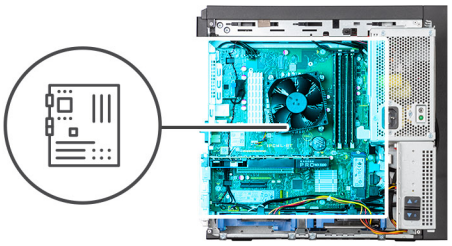
Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the cover.
3. Open the psu hinge.
4. Remove the memory module.
5. Remove the graphics card.
6. Remove the solid state drive.
7. Remove the WLAN module and SMA antenna.
8. Remove the heat sink assembly.
9. Remove the Voltage regulator heat sink.
10. Remove the processor.

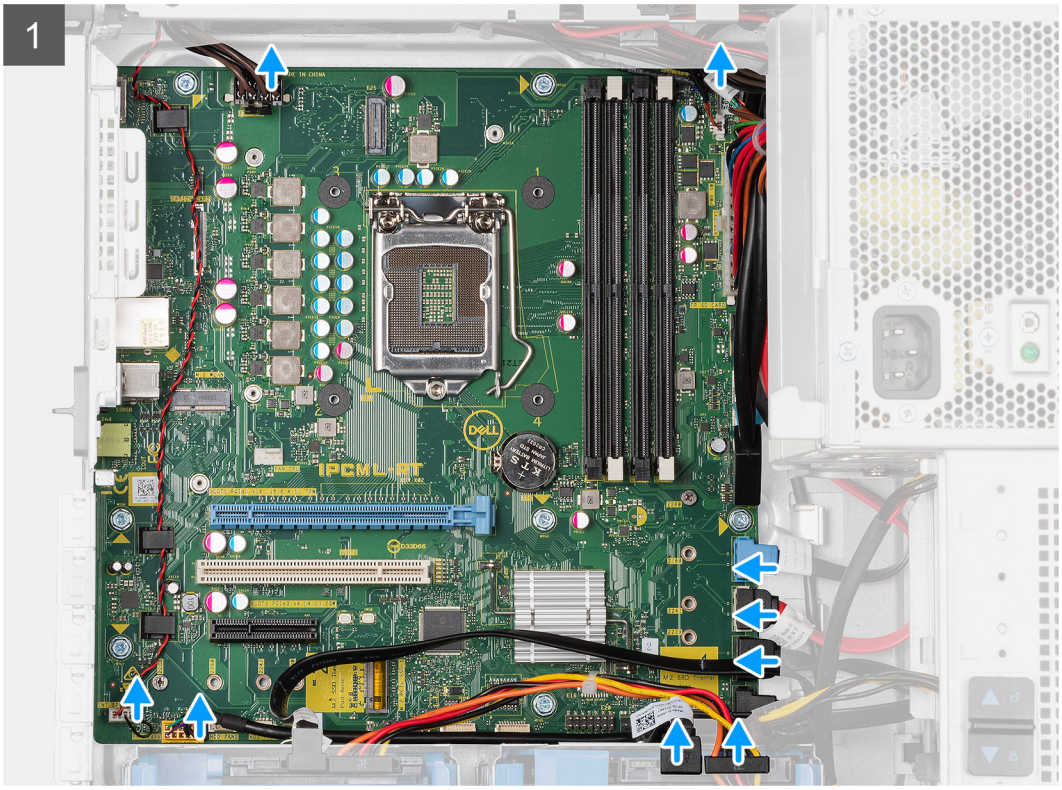
About this task

The following images indicate the location of the system board and provides a visual representation of the removal procedure.

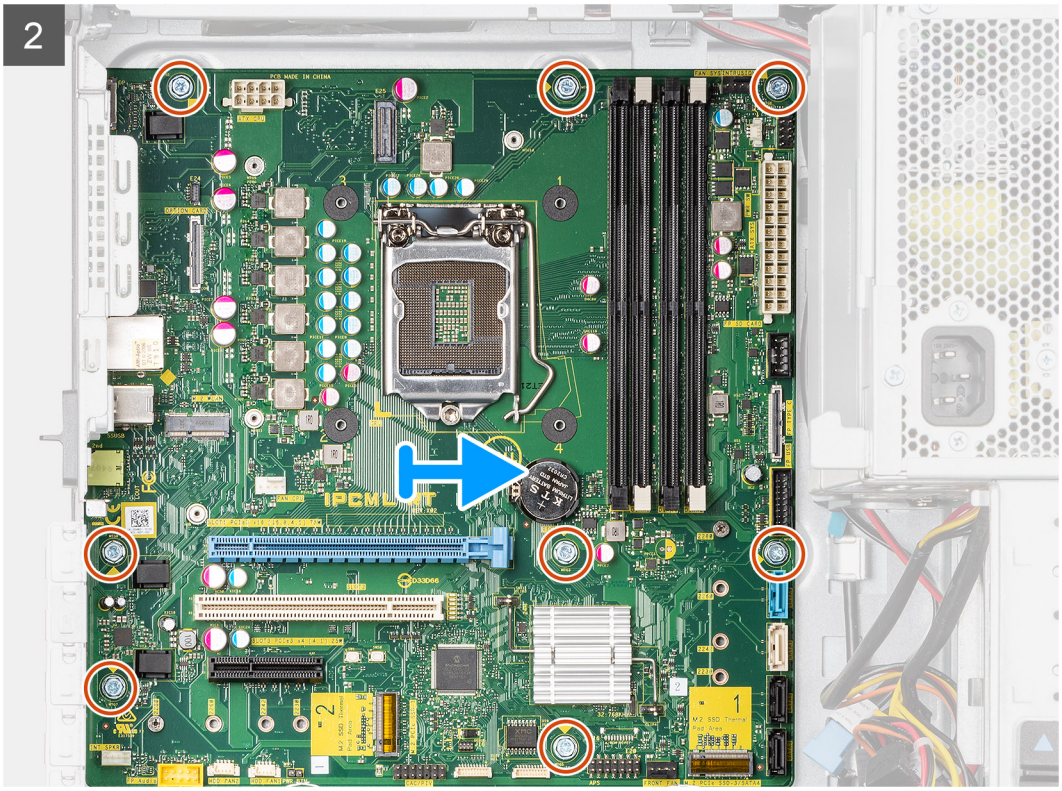
8x
6-32



1



2



Steps

1. Disconnect and remove the following cables from the system board:
   a. System fan cable
   b. Intrusion cable
   c. I/O panel cable
   d. CPU power cable
   e. System board power connector cable
   f. SD card cable
   g. Type-C cable
   h. I/O USB cable
   i. Primary hard drive SATA cable
   j. ODD SATA cable
   k. Speaker cable
   l. I/O audio cable
2. Remove the eight screws (#6-32) that secure the system board to the chassis.
3. Slide the system board out of the chassis.

Installing the system board

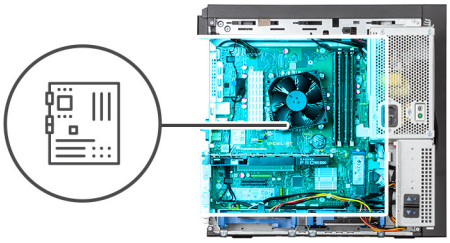
Prerequisites

If you are replacing a component, remove the existing component before performing the installation process.

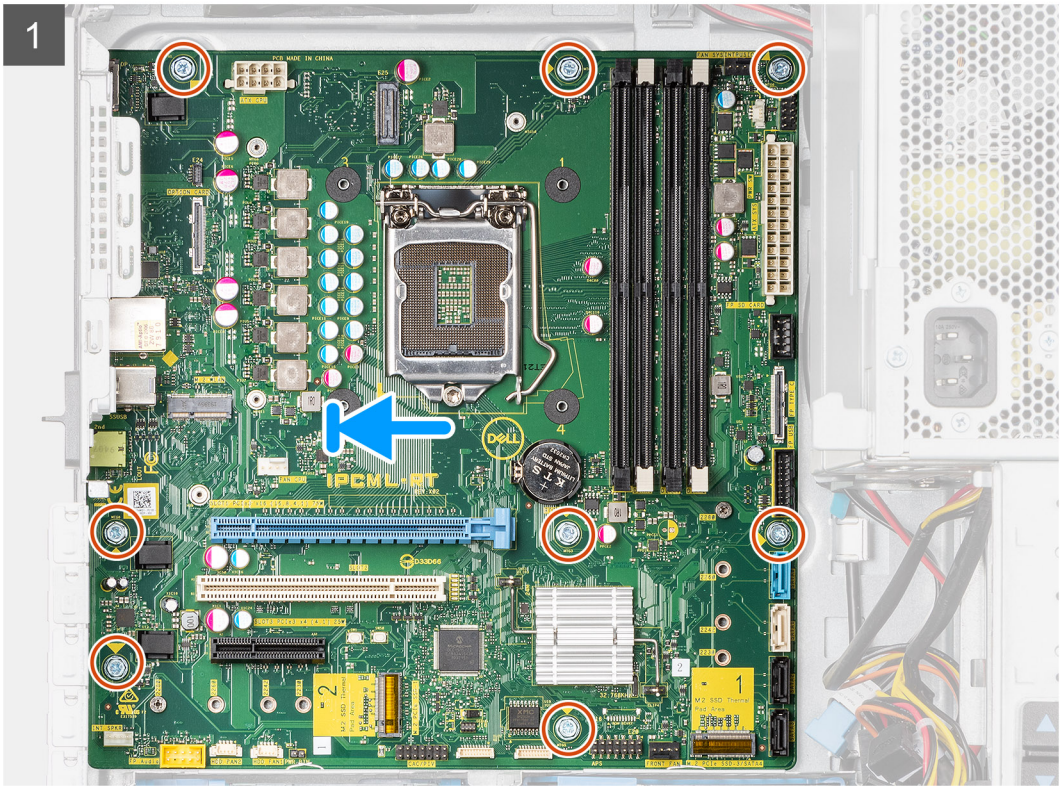
About this task

The following images indicate the location of the system board and provides a visual representation of the installation procedure.

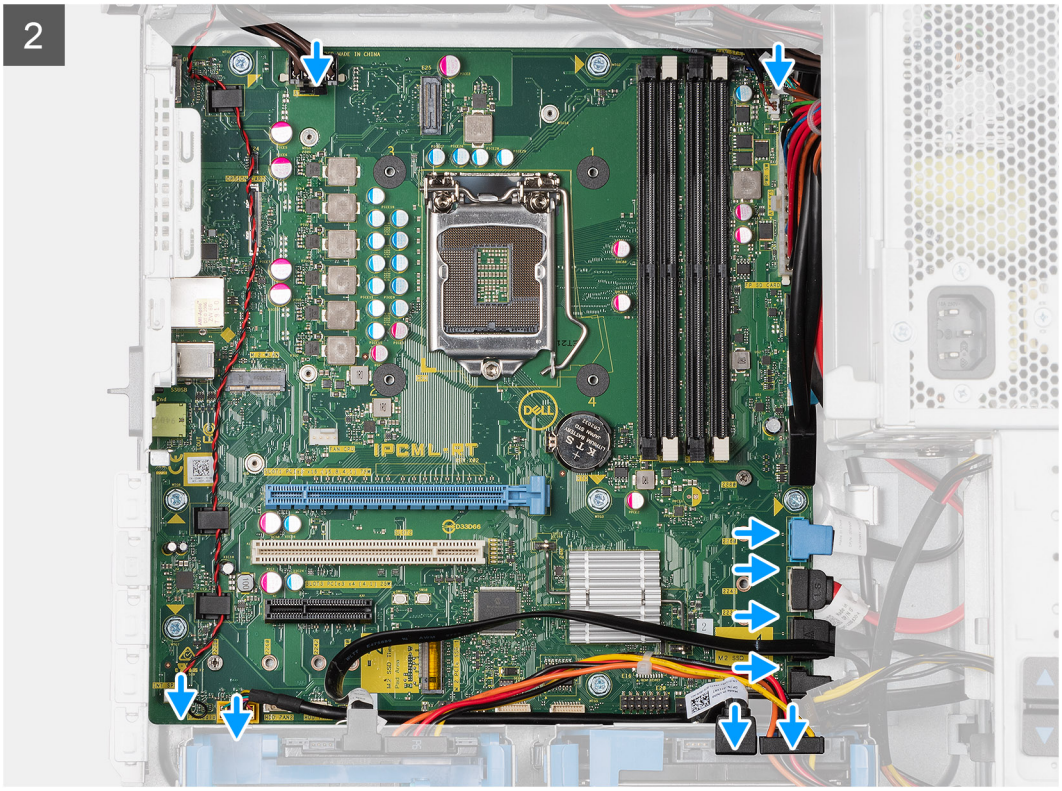
8x
6-32



1



2



Steps

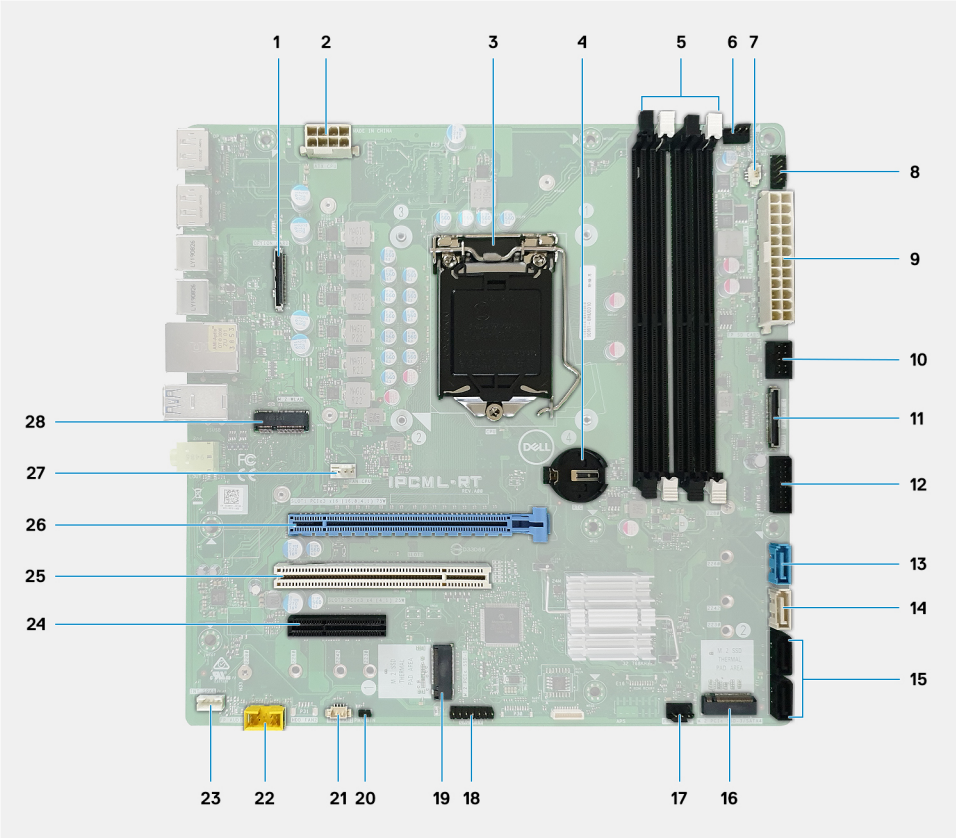
1. Slide the I/O ports on the system board into the slots on the chassis placing the system board in the chassis and replace the eight (#6-32) screws to secure the system board to the chassis.
2. Connect the following cables to the system board connectors:
   a. System fan cable
   b. Intrusion cable
   c. I/O panel cable
   d. CPU power cable
   e. System board power connector cable
   f. SD card cable
   g. Type-C cable
   h. I/O USB cable
   i. Primary hard drive SATA cable
   j. ODD SATA cable
   k. Speaker cable
   l. I/O audio cable

Next steps

1. Install the processor.
2. Install the Voltage regulator heat sink.
3. Install the heat sink assembly.
4. Install the WLAN module and SMA antenna.
5. Install the solid state drive.
6. Install the graphics card.
7. Install the memory module.
8. Close the psu hinge.
9. Install the cover.
10. Follow the procedure in after working inside your computer.

System board layout

This topic illustrates the system board layout and calls out the ports and connectors on the system board.



1. Optional I/O card connector
2. ATX PSU power connector : ATX CPU
3. CPU socket
4. Coin-cell battery
5. Memory module connector
6. Top-fan connector
7. Intrusion switch connector
8. Power button module connector: PWR SW
9. ATX PSU power connector : ATX SYS
10. SD Card reader connector
11. Front panel USB Type-C connector
12. Front panel USB Type-A connector
13. SATA 3.0 data connector : SATA0
14. SATA 3.0 data connector : SATA1
15. SATA 3.0 data connector : SATA2 and 3
16. M.2 2280 PCIe x4, keyed M for solid-state drive
17. Front fan connector
18. CAC_PIV/BT connector
19. M.2 2280 PCIe x4/SATA, keyed M for solid-state drive
20. PWR_BTN
21. System fan connector: HDD FAN
22. Front panel audio connector
23. Internal Speaker
24. Full Height PCIe x4 slot (open-ended)
25. PCI-32 slot
26. Full Height PCIe x16 slot
27. CPU Fan connector

28. M.2 2230 PCIe x1 slot, keyed E for WiFi and Bluetooth card

5

Troubleshooting

Real-Time Clock (RTC Reset)

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

Start the RTC reset with the system powered off and connected to AC power. Press and hold the power button for thirty (30) seconds. The system RTC Reset occurs after you release the power button.

System diagnostic lights

Power-supply diagnostics light

Indicates the status of the power-supply in either of the two sates:

- Off: No Power
- On: Power is supplied.

Power button light

Table 4. Power button LED status

Power button LED state	System state	Description
Off	• S4 • S5	There is in Hibernate or Off state.
Solid White	S0	Working state
Solid Amber		Various sleep states or No POST
Blinking Amber/White		Failure to POST

This platform relies on the Power button LED light blinking in an amber/white pattern to determine a failure as listed in the following table:

NOTE:

The blinking patterns consists of two numbers (representing First Group: Amber blinks, Second Group: White blinks).

- **First Group**: The Power button LED light blinks Amber, 1 to 9 times followed by a short pause with LED off for a couple of seconds.
- **Second Group**: The Power button LED light then blinks White, 1 to 9 times, followed by a longer pause before the next cycle starts again after a short interval.

.

Example: No Memory detected (2,3). Power button LED blinks 2-times in Amber followed by a pause, and then blinks 3-times in White. The Power button LED will pause for few seconds before the next cycle repeats itself again.

Table 5. Diagnostics LED codes

Diagnostic light codes	Problem description
1,2	Unrecoverable SPI flash failure
2,1	CPU failure
2,2	System board failure, corrupt BIOS, ROM error

Table 5. Diagnostics LED codes (continued)

Diagnostic light codes	Problem description
2,3	No memory/RAM detected
2,4	Memory/RAM failure
2,5	Invalid Memory installed
2,6	System board error, chipset error, clock failure, gate A20 failure, super I/O failure, keyboard controller failure
3,1	CMOS battery failure
3,2	PCIe or video card/chip failure
3,3	Recovery Image not found
3,4	Recovery Image found but invalid
3,5	Power Rail Failure
3,6	Paid SPI volume error
3,7	Intel (ME) Management Engine error
4,2	CPU power cable connection issue

Diagnostic error messages

Table 6. Diagnostic error messages

Error messages	Description
AUXILIARY DEVICE FAILURE	The touchpad or external mouse may be faulty. For an external mouse, check the cable connection. Enable the **Pointing Device** option in the System Setup program.
BAD COMMAND OR FILE NAME	Ensure that you have spelled the command correctly, put spaces in the proper place, and used the correct path name.
CACHE DISABLED DUE TO FAILURE	The primary cache internal to the microprocessor has failed. **Contact Dell**
CD DRIVE CONTROLLER FAILURE	The optical drive does not respond to commands from the computer.
DATA ERROR	The hard drive cannot read the data.
DECREASING AVAILABLE MEMORY	One or more memory modules may be faulty or improperly seated. Reinstall the memory modules or, if necessary, replace them.
DISK C: FAILED INITIALIZATION	The hard drive failed initialization. Run the hard drive tests in **Dell Diagnostics**.
DRIVE NOT READY	The operation requires a hard drive in the bay before it can continue. Install a hard drive in the hard drive bay.
ERROR READING PCMCIA CARD	The computer cannot identify the ExpressCard. Reinsert the card or try another card.
EXTENDED MEMORY SIZE HAS CHANGED	The amount of memory recorded in non-volatile memory (NVRAM) does not match the memory module installed in the computer. Restart the computer. If the error appears again, **Contact Dell**
THE FILE BEING COPIED IS TOO LARGE FOR THE DESTINATION DRIVE	The file that you are trying to copy is too large to fit on the disk, or the disk is full. Try copying the file to a different disk or use a larger capacity disk.

Table 6. Diagnostic error messages (continued)

Error messages	Description
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.
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.

Table 6. Diagnostic error messages (continued)

Error messages	Description
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.
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.

Table 6. Diagnostic error messages (continued)

Error messages	Description
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 7. 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.
NOTICE - Hard Drive SELF MONITORING SYSTEM has reported that a parameter has exceeded its normal operating range. Dell recommends that you back up your data regularly. A parameter out of range may or may not indicate a potential hard drive problem	S.M.A.R.T error, possible hard disk drive failure.

Recovering the operating system

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

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

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

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

WiFi power cycle

About this task

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

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

Steps

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

6

Getting help and contacting Dell

Self-help resources

You can get information and help on Dell products and services using these self-help resources:

Table 8. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	https://www.dell.com/
Dell Support	
Tips	
Contact Support	In Windows search, type `Contact Support`, and press Enter.
Online help for operating system	• Windows: https://www.dell.com/support/windows • Linux: https://www.dell.com/support/linux
Troubleshooting information, user manuals, set up instructions, product specifications, technical help blogs, drivers, software updates, and so on.	https://www.dell.com/support/home/
Dell knowledge base articles for various of system concerns:	1. Go to https://www.dell.com/support/home/?app=knowledgebase. 2. Type the subject or keyword in the **Search** box. 3. Click **Search** to retrieve the related articles.
Learn and get more information about your product: • Product specifications • Operating system • Setting up and using your product • Data backup • Troubleshooting and diagnostics • Factory and system restore • BIOS information	Dell provides several online and telephone-based support and service options. If you do not have an active Internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog. • Select **Detect Product**. • Locate your product through the drop-down menu under **View Products**. • Enter the **Service Tag number** or **Product ID** in the search bar. • Once on product support page, scroll down to Manuals and Documents section to preview all the Manuals, documents, and other information for your product.

Contacting Dell

Dell provides several online and telephone-based support and service options. If you do not have an active Internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog. Availability varies by country/region 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 https://www.dell.com/support/.
2. Select your country/region from the drop-down menu on the lower right corner of the page.
3. For **customized support:**
   a. Enter your system Service Tag in the **Enter your Service Tag** field.
   b. Click **submit**.
      - The support page that lists the various support categories is displayed.
4. For **general support:**
   a. Select your product category.
   b. Select your product segment.
   c. Select your product.
      - The support page that lists the various support categories is displayed.
5. For contact details of Dell Global Technical Support, see https://www.dell.com/contactdell.

   NOTE: The Contact Technical Support page is displayed with details to call, chat, or email the Dell Global Technical Support team.

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

A

Optional IO card

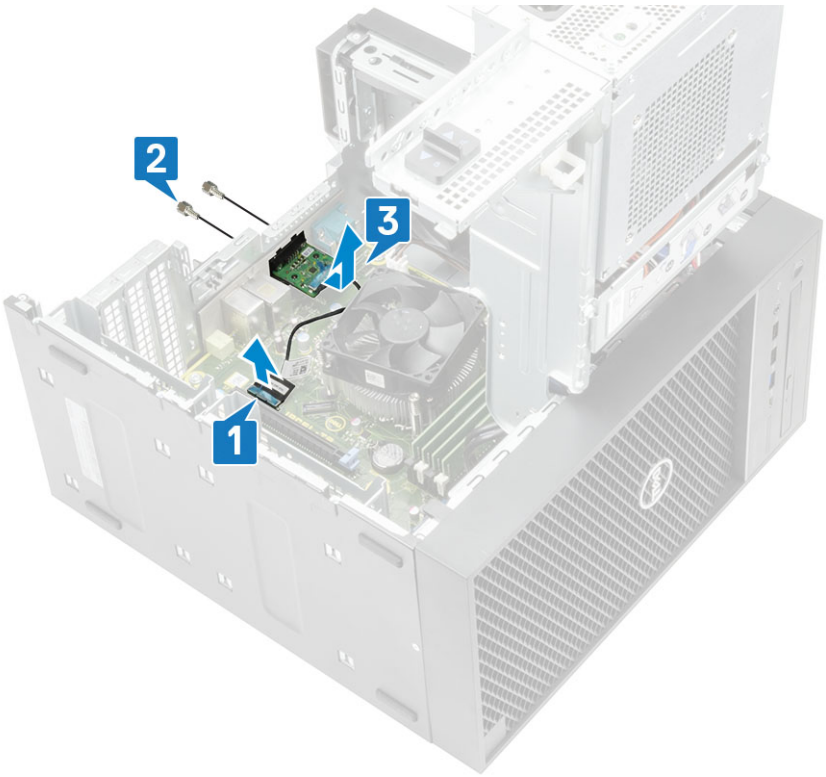
Removing optional IO card

About this task

NOTE: You may see one of these cards-HDMI/DisplayPort/VGA/Type-C based on the additional component you may have ordered with the system.

Steps

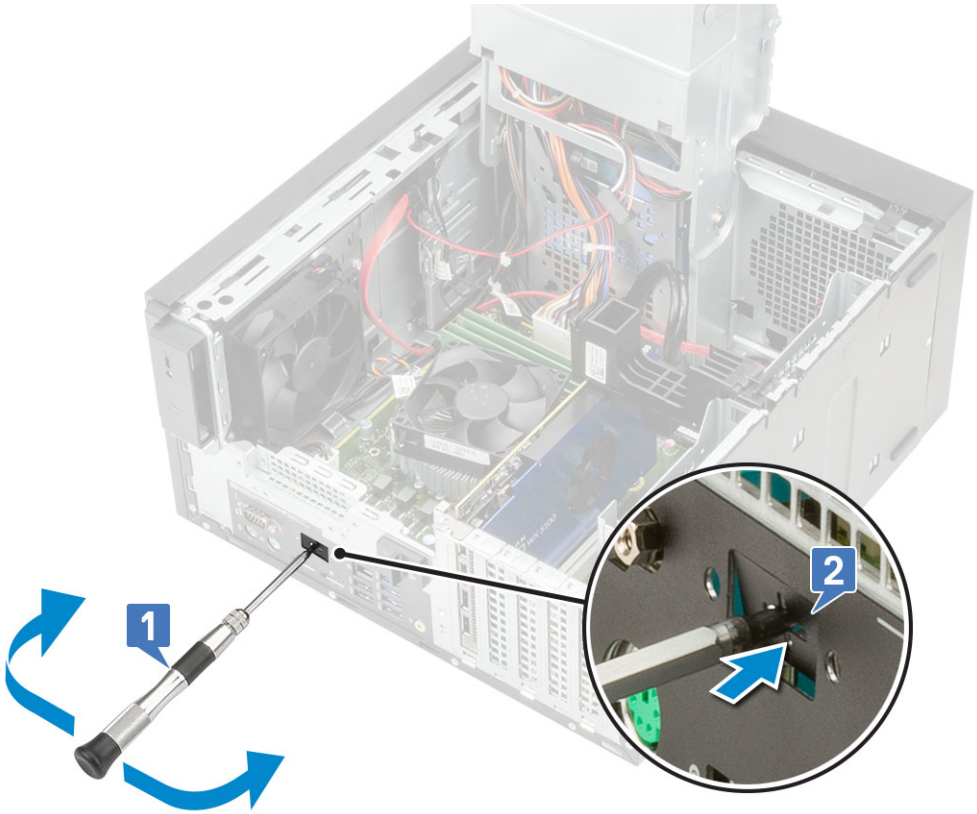
1. Follow the procedure in Before working inside your computer.
2. Remove the Cover on page 20.
3. Open the PSU hinge on page 23.
4. To remove the optional IO card:
   a. Disconnect the IO card cable from the connector on the system board [1].
   b. Remove the two M3X3 screws that secure the IO card to the system [2].
   c. Remove the IO card from the system [3].



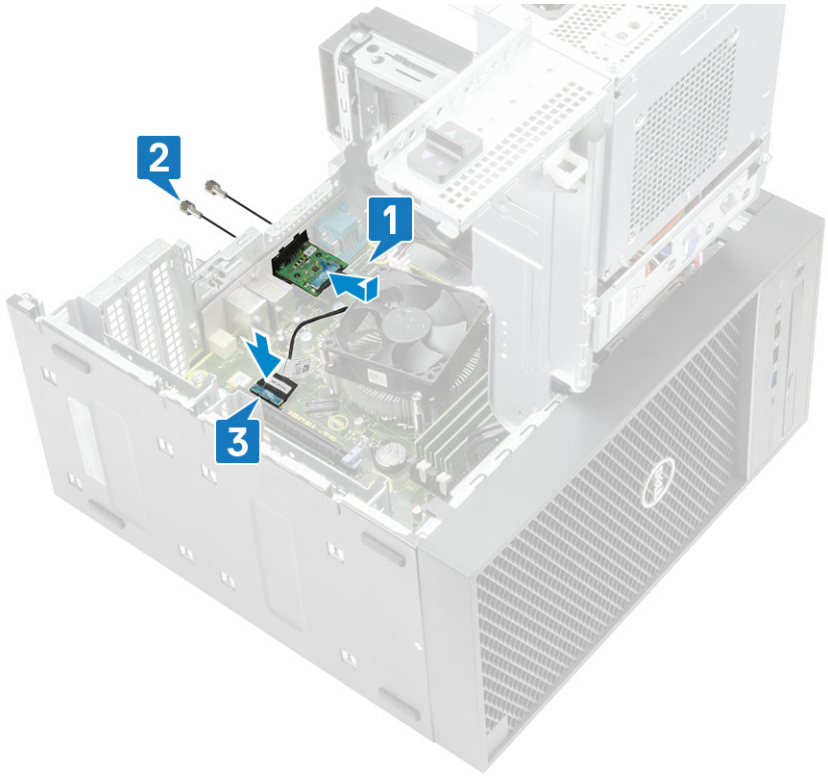
Installing the optional IO card

Steps

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



2. Insert the IO card into its slot from the inside of your computer [1] and replace the two M3X3 screws to secure the IO card to the system [2].
3. Connect the IO card cable to the connector on the system board [3].



4. Close the PSU hinge on page 23.
5. Install the Cover on page 20.

B

Cable cover

The cable cover for Precision Tower 3640 helps protect ports and cables connected to the system.

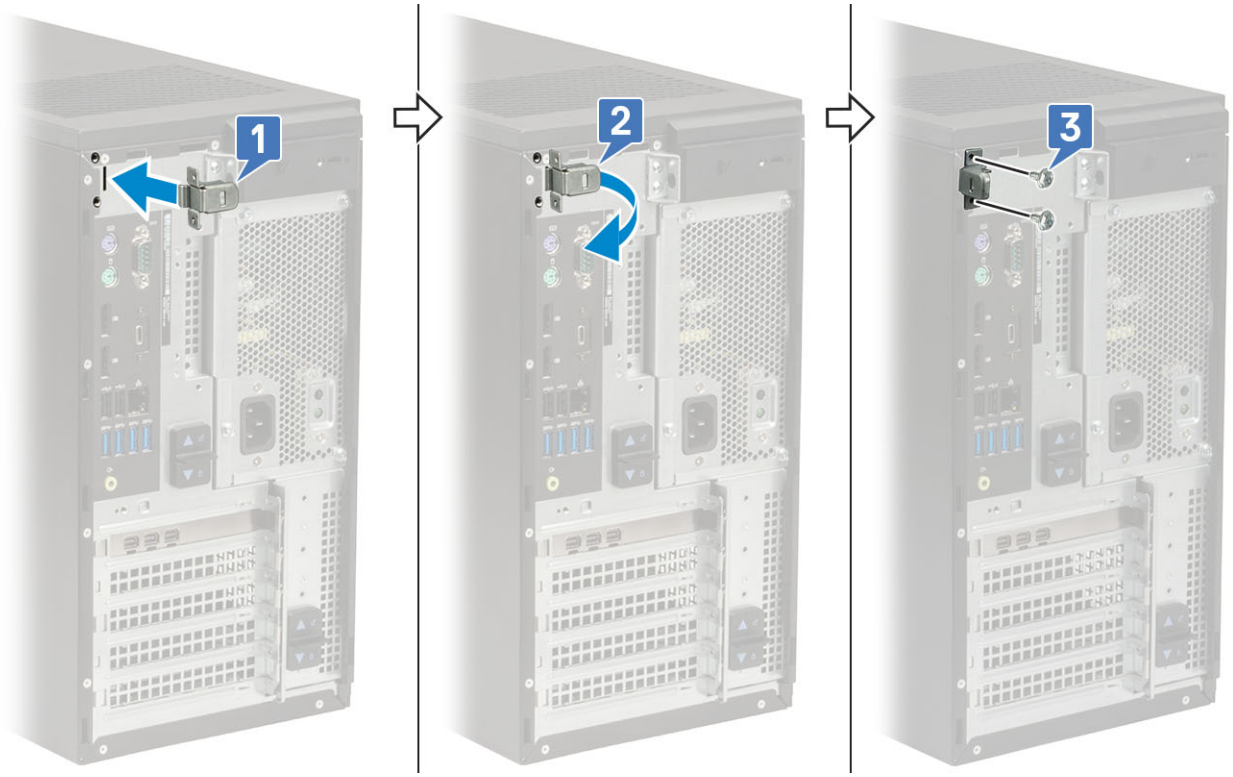
About this task

Follow these steps to install the cable cover on the system chassis.

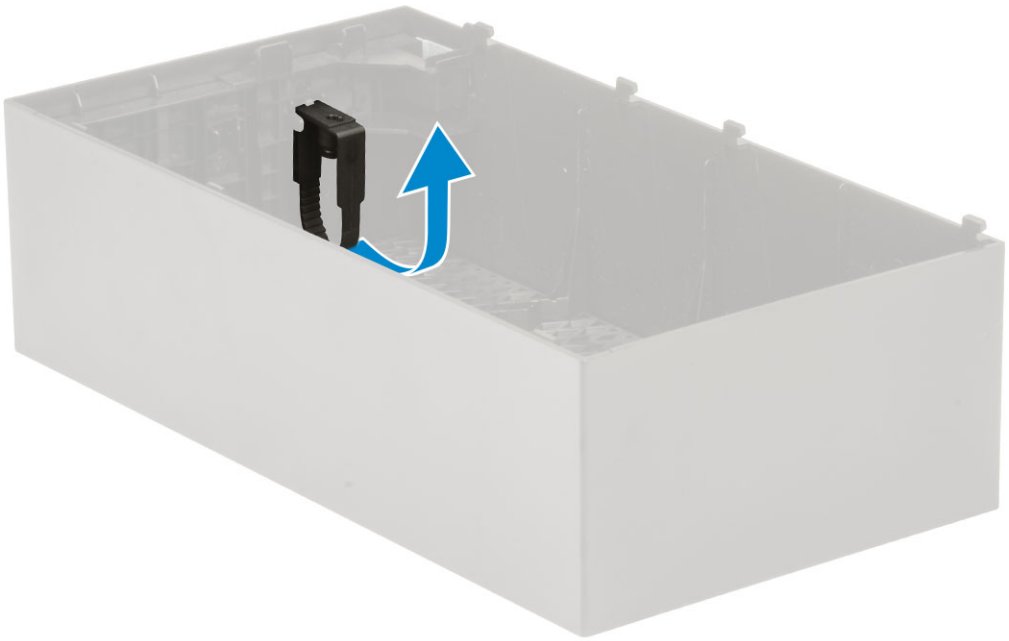
NOTE: Images shown below are for representation only and may vary depending on the system's configuration.

Steps

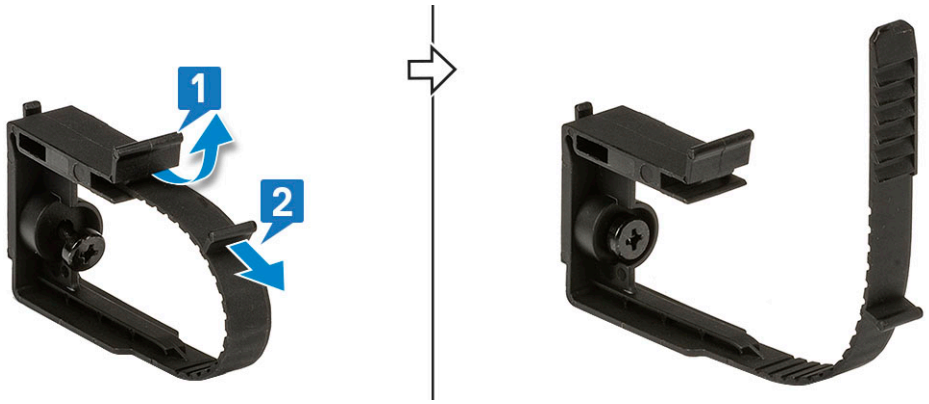
1. Insert the tab on the security-lock metal bracket into the slot on the rear side of the system [1] and rotate to align the holes on the metal bracket with screw holders on the chassis [2]
2. Fasten the two #6-32x1/4'' screws to secure the security metal bracket to the chassis [3].



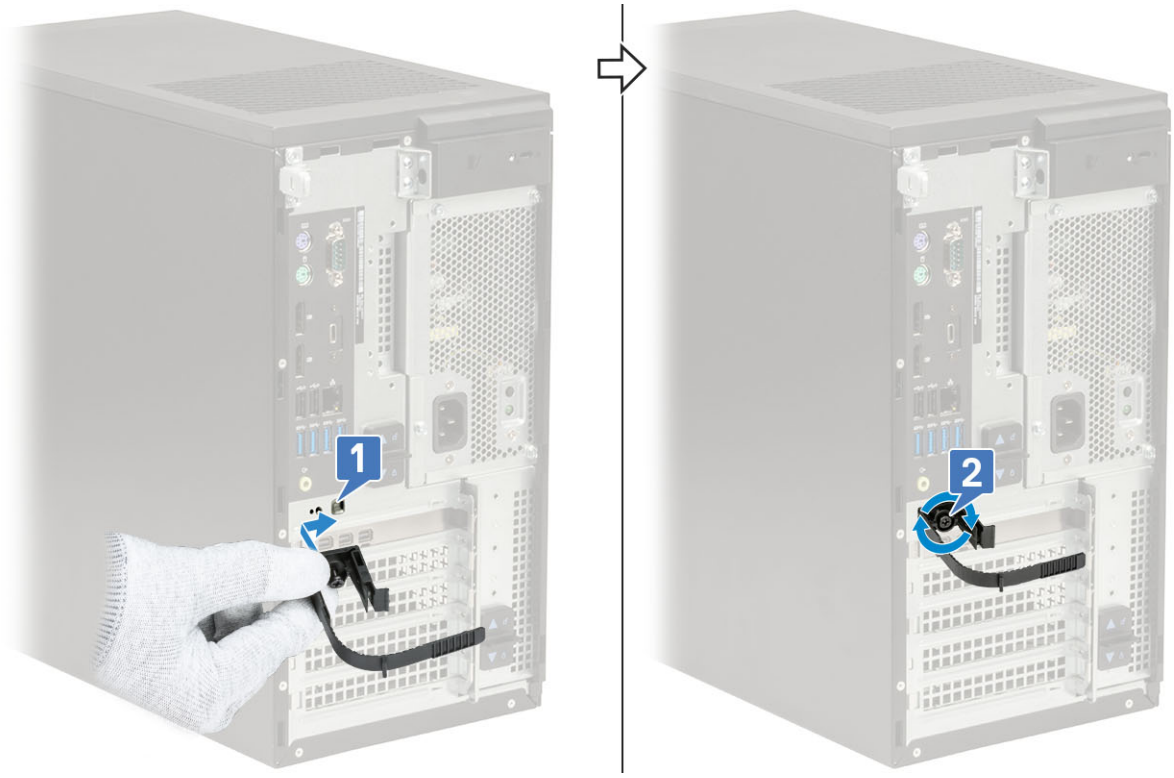
3. Pull the cable release latch and lift the latch away from the cable cover.



4. Lift the tab [1] to release and pull the cable tie from the slot on the cable release latch [2].

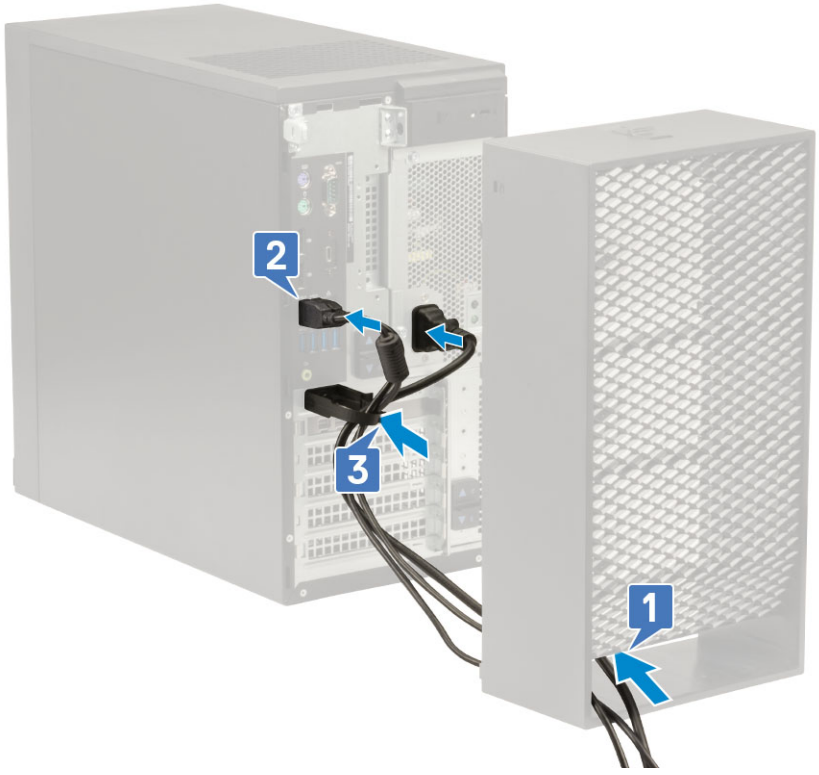


5. Align the cable release latch on the system chassis slot [1]. Tighten the screw to secure the cable release latch to the system chassis [2].

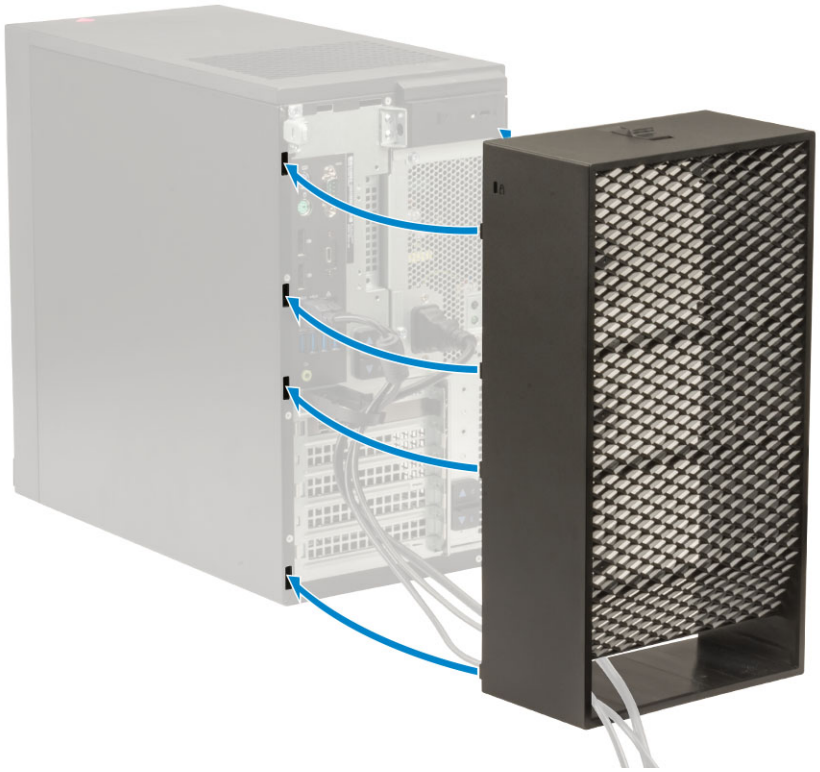


6. Route the cables through the slot of the cable cover [1], and connect them to their respective ports on the system [2]. Secure the cable with the cable tie and lock the tab in place [3].

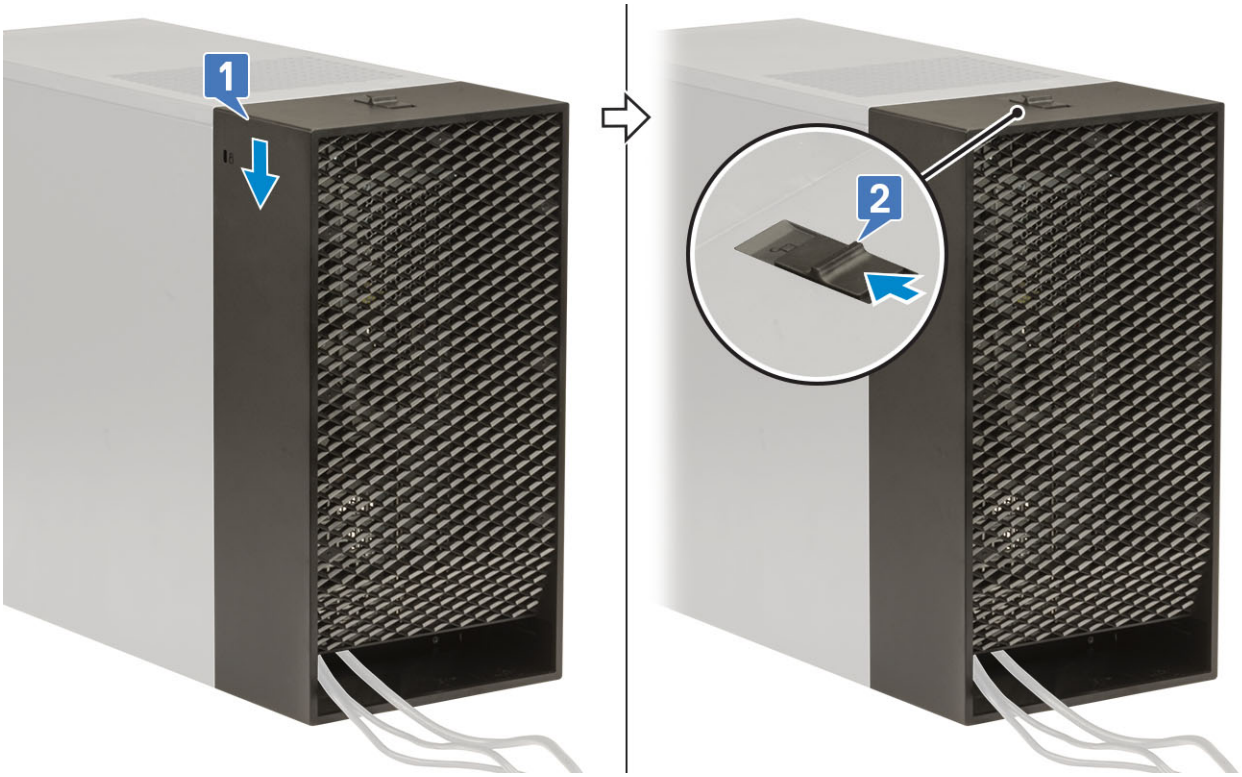
CAUTION: Take care not to break or bend the delicate plastic hooks.



7. Align the plastic hooks of the cable cover to the slots on the system .

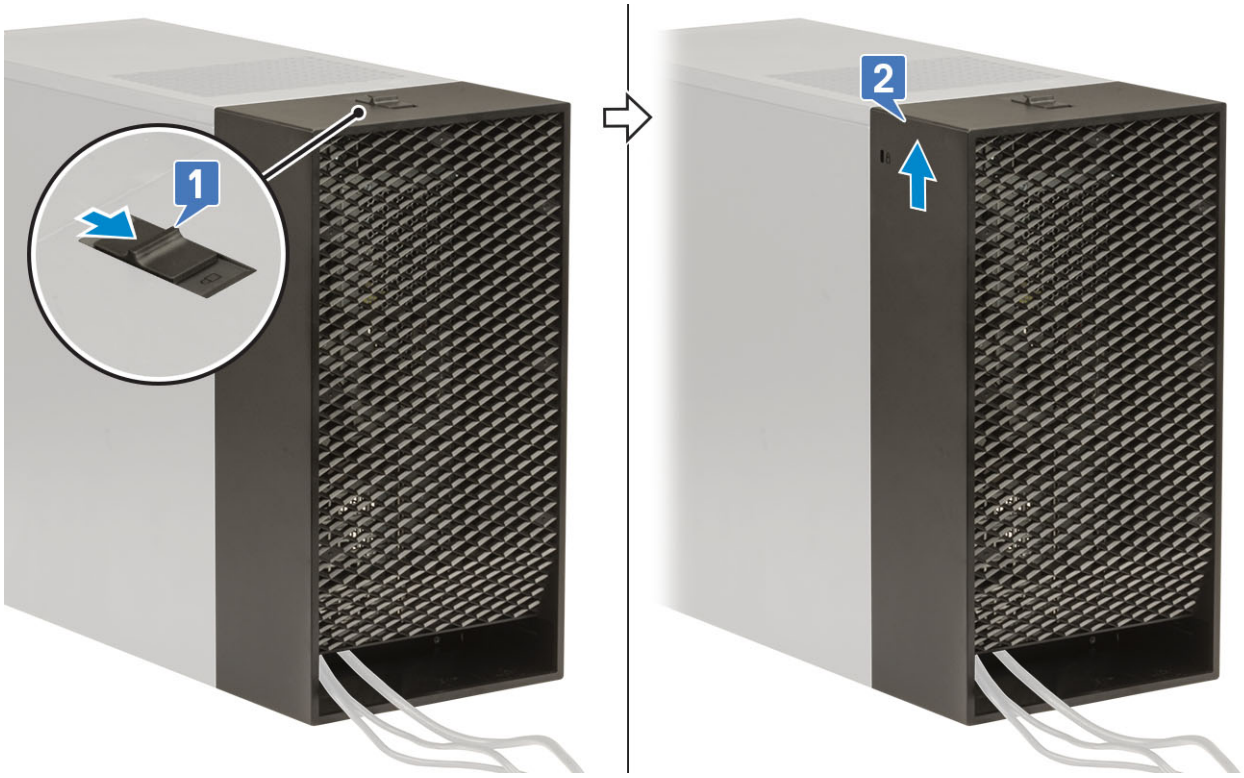


8. Gently press down on the cable cover until it clicks into place [1]. Slide the latch towards the chassis [2] to lock the cable cover in place.

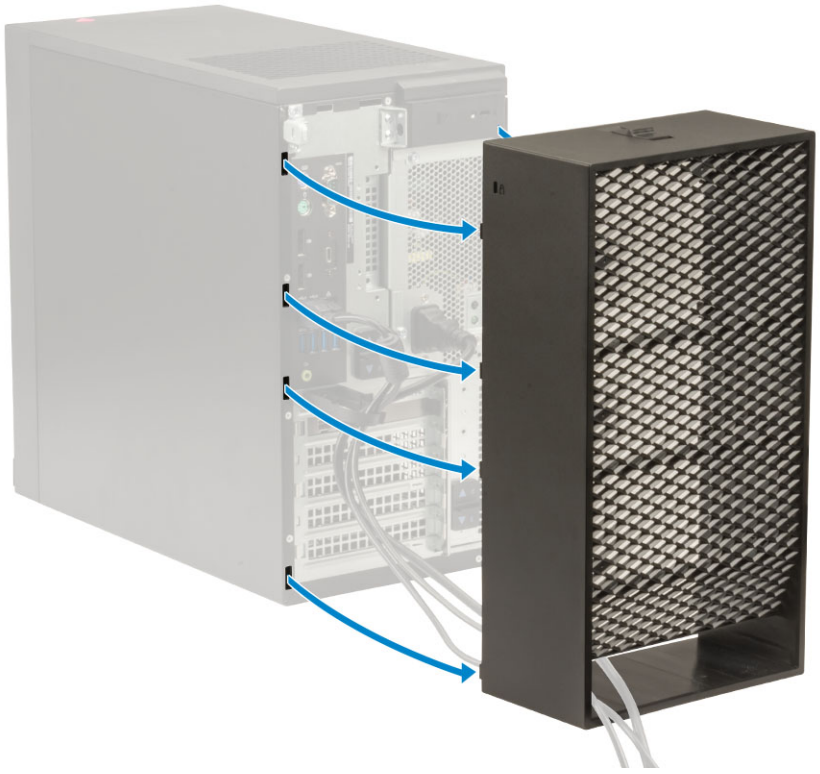


NOTE: For added security, use the Padlock ring to secure the system.

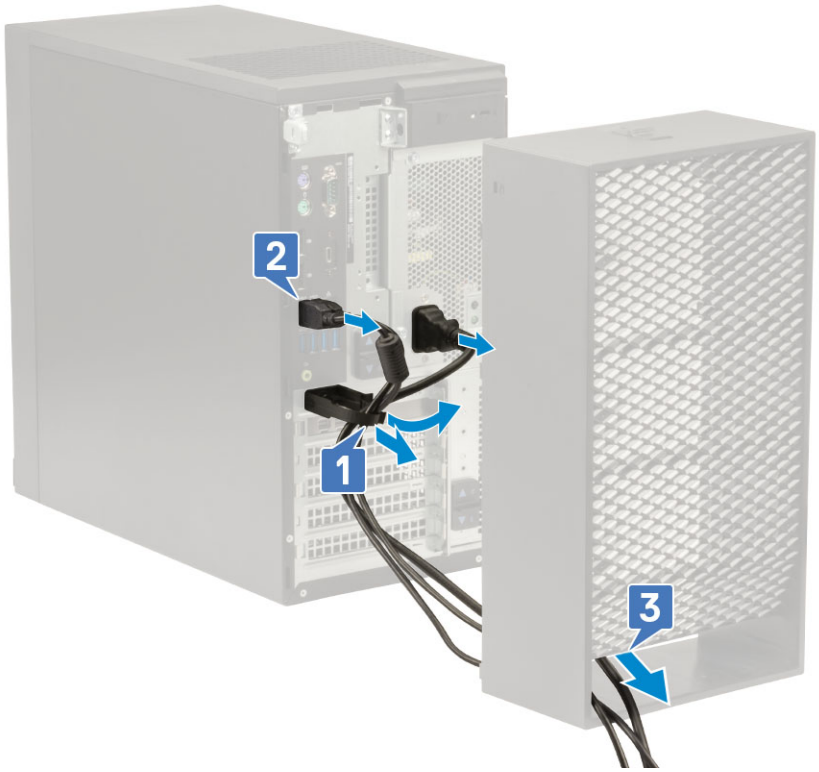
9. To remove the cable cover:
   a. Slide the latch away from the chassis to unlock the cable cover [1].
   b. Lift the cable cover away from the system chassis [2].



10. Pull the cable cover to release it from the chassis.



11. Open the tab and unroute the cables from cable tie [1], disconnect the cables from the ports on the system [2]. Remove the cables from the slot of the cable cover [3].


2
1
3

C

Dust filter

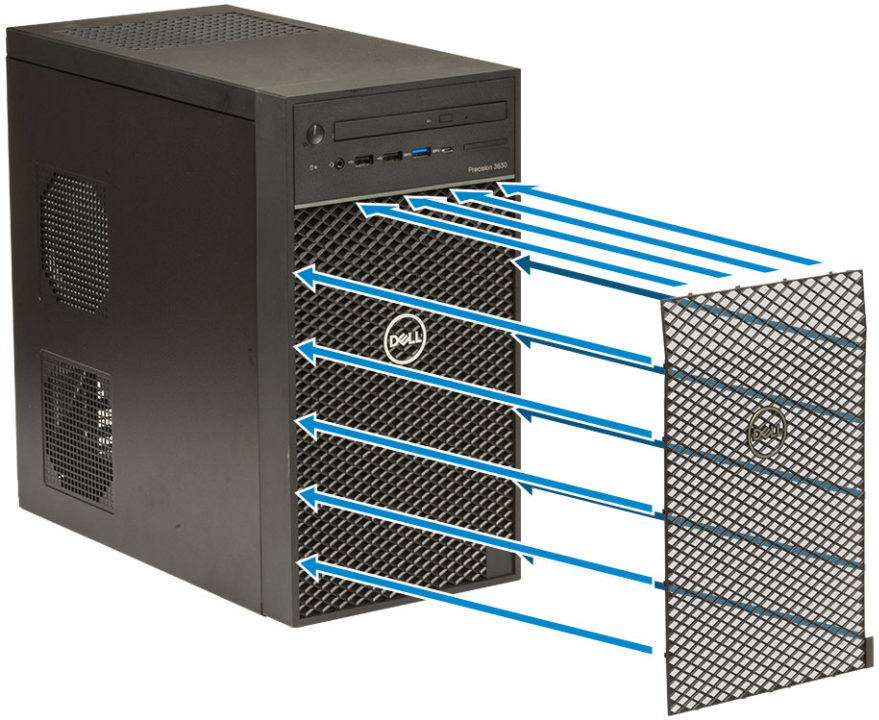
The dust filter for the Precision Tower 3640 helps protect the system from fine dust particles. After installation of the dust filter, the BIOS can be enabled to generate a preboot reminder to clean or replace the dust filter based on the time interval set.

About this task

Follow these steps to install the dust filter:

Steps

1. Align the plastic tabs of the dust filter to the slots on the system chassis and gently press to ensure that the dust filter fits firmly onto the system.



2. To remove the dust filter:
   a. With the help of a plastic scribe, gently pry the edge from the bottom to loosen the dust filter [1].
   b. Remove the dust filter from the system chassis [2].

3. Restart the system and press **F2** to enter the BIOS Setup menu.
4. In the BIOS Setup menu, navigate to **System Configuration** > **Dust Filter Maintenance** and select from any of the following intervals: 15, 30, 60, 90, 120, 150, or 180 days.

   NOTE: Default setting: Disabled.

   NOTE: Alerts are generated only during a system reboot and not during normal OS operation.

Next steps

To clean the dust filter, brush or gently vacuum and then wipe down the external surfaces with a moist cloth.

D

Chassis rubber feet

Removing the chassis rubber feet

Steps

1. Follow the procedure in *Before Working Inside Your Computer*.
2. Pull one end of rubber feet out of the slot [1] and slide the rubber feet to remove it from the system [2].

Figure 12. Front rubber feet removal

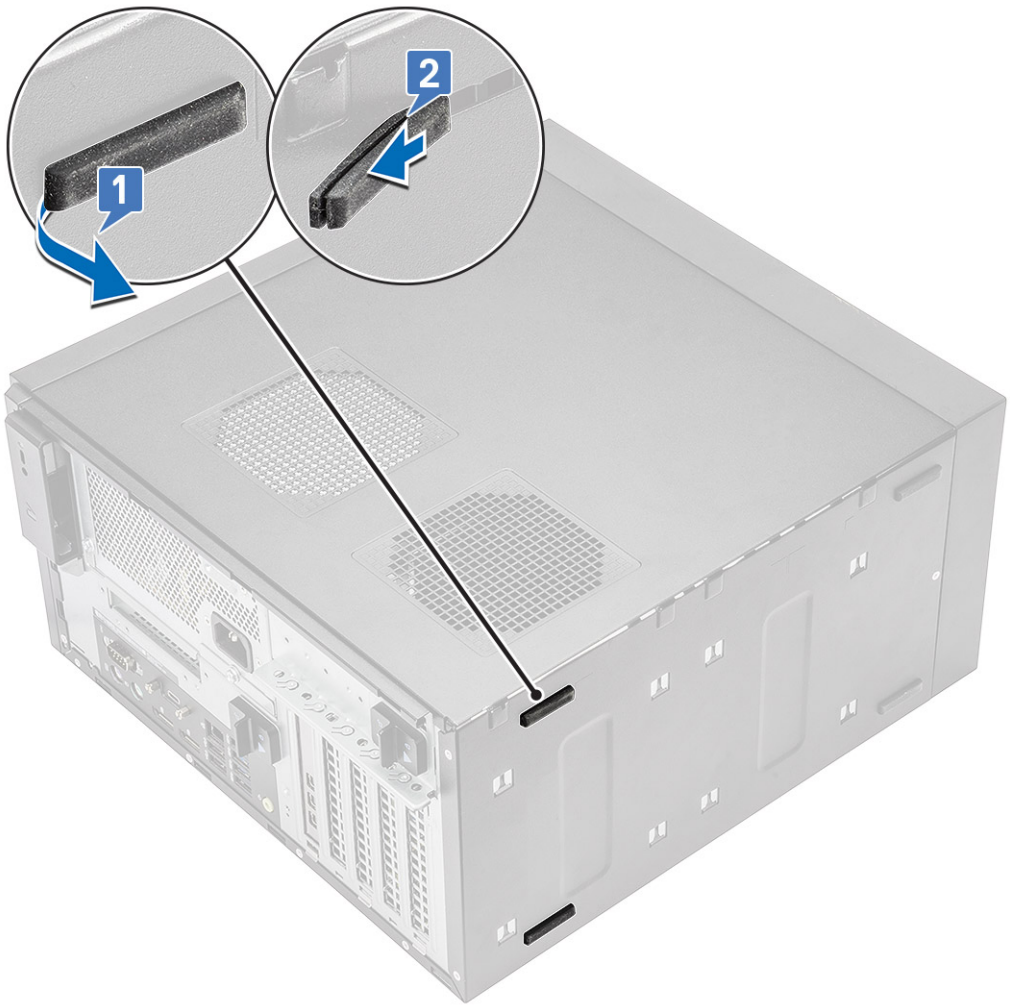


Figure 13. Rear rubber feet removal

Installing the chassis rubber feet

Steps

1. Insert one end of the rubber feet into the slot [1] and slide it to secure it to the system [2] and press the other end to secure it to the system [3].

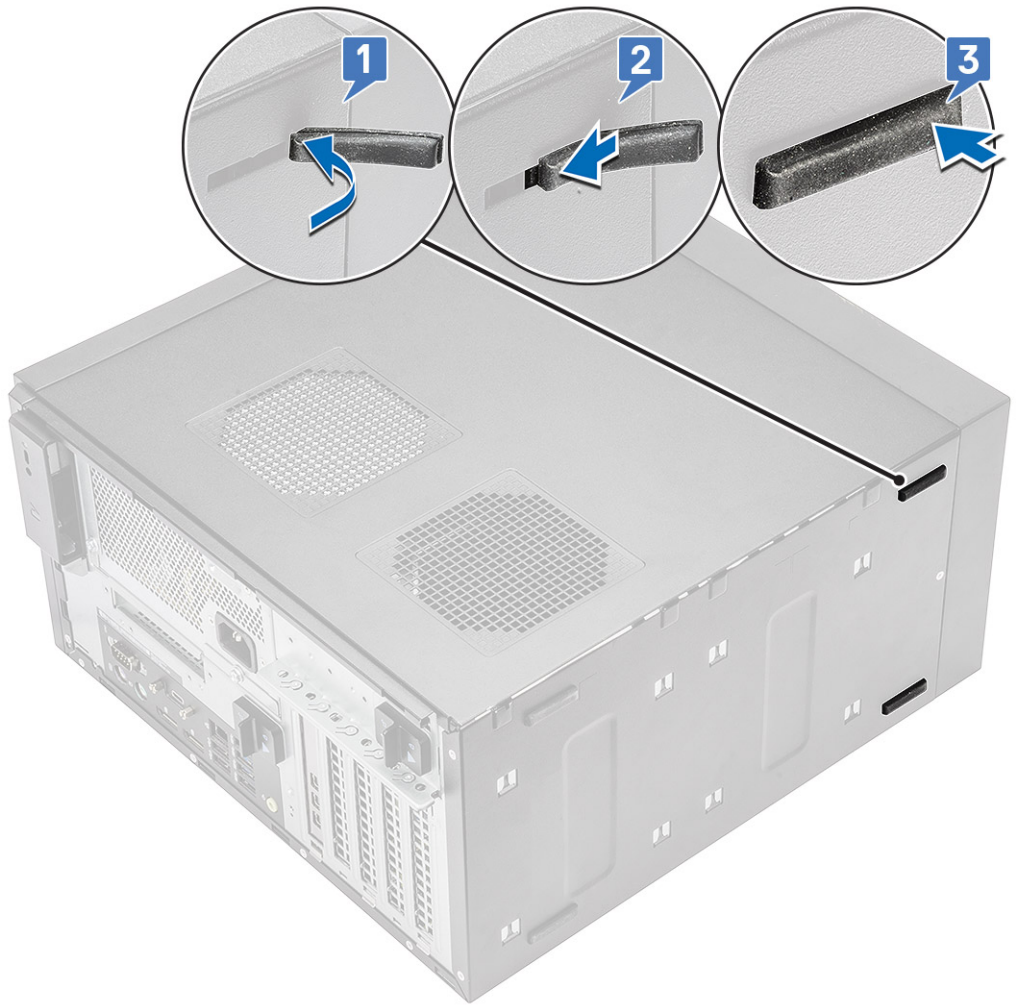


Figure 14. Front rubber feet installation

Figure 15. Rear rubber feet installation

2. Follow the procedure in *After Working Inside Your Computer*.