


Dell Precision 3240 Compact

Service Manual



Notes, cautions, and warnings

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

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

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

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Working on your computer


Safety instructions

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

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

Steps

1. Save and close all open files and exit all open applications.
2. Shut down your computer. Click **Start** >  **Power** > **Shut down**.
 -  **NOTE:** If you are using a different operating system, see the documentation of your operating system for shut-down instructions.
3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.

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

5. Remove any media card and optical disc from your computer, if applicable.

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.

After working inside your computer

About this task

 **CAUTION:** 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.

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.

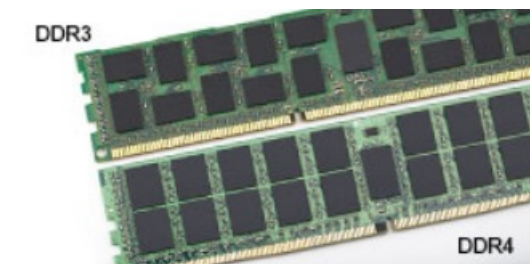


Figure 1. Notch difference

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.

Graphics options

Intel UHD graphics

Intel UHD graphics P630

Table 1. Intel UHD P630 graphics specifications

Description	Specifications
Bus type	Integrated
Memory type	DDR4
Memory interface	N/A, Unified Memory Architecture (UMA)
Graphics level	10 th Generation Intel Comet Lake Xeon W-series : GT2 (UHD P630)
Estimated Maximum Power Consumption (TDP)	45 W—included in the CPU power
Maximum color depth	24 (non-HDR), 30 (HDR) bit per pixel
Maximum vertical refresh rate	Up to 60 Hz depending on resolution

Intel UHD graphics 630

Table 2. Intel UHD 630 graphics specifications

Description	Specifications
Bus type	Integrated
Memory type	DDR4
Memory interface	N/A, Unified Memory Architecture (UMA)
Graphics level	10 th Generation Intel Core i processors : GT2 (UHD 630)
Estimated Maximum Power Consumption (TDP)	45 W—included in the CPU power
Maximum color depth	224 (non-HDR), 30 (HDR) bit per pixel
Maximum vertical refresh rate	Up to 60 Hz depending on resolution

NVIDIA Quadro P400

Table 3. NVIDIA Quadro P400 specifications

Description	Values
GPU Memory	2 GB GDDR5
Memory Interface	64-bit
Memory Bandwidth	Up to 32 GB/s
NVIDIA CUDA Cores	256
System Interface	PCI Express 3.0 x16
Max Power Consumption	30 W
Thermal Solution	Active
Form Factor	Height: 2.713 in./68.91 mm and Length: 5.7 in./144.78 mm, Single Slot, Low Profile
Display Connectors	3x mDP 1.4
Max Simultaneous Displays	3 displays
Display Resolution	<ul style="list-style-type: none"> • 3x 4096x2160 @ 120Hz • 1x 5120x2880 @ 60Hz
Graphics APIs	<ul style="list-style-type: none"> • Shader Model 5.1 • OpenGL 4.5 • DirectX 12.0 • Vulkan 1.0
Compute APIs	<ul style="list-style-type: none"> • CUDA, DirectCompute • OpenCL

NVIDIA Quadro P620

Table 4. NVIDIA Quadro P620 specifications

Description	Values
Graphics memory	2 GB GDDR5
Bus type	PCIe x16 Gen 3
Memory Interface	128-bit
Clock Speeds	1266 MHz graphics core (min. at P0) 4012 MHz memory
GPU base clock	1266 MHz (min. at P0)
Estimated Maximum Power	40 W
Display Support	4 x mini-DisplayPort
Maximum Color Depth	Up to 10 bit/color
Maximum Vertical Refresh Rate	<ul style="list-style-type: none"> • Up to 395 Hz at 1920 x 1080 • Up to 118 Hz at 3840 x 2160
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL 4.5

Table 4. NVIDIA Quadro P620 specifications (continued)

Description	Values
Supported Resolutions and Max Refresh Rates (Hz)	Max Digital : Single DisplayPort 1.4 - 5120 x 2880 (4k) @ 60 Hz
Numbers of displays supported	Up to four displays

NVIDIA Quadro P1000

Table 5. NVIDIA Quadro P1000 specifications

Description	Values
Graphics memory	4 GB GDDR5
Bus type	PCIe x16 Gen3
Memory Interface	128-bit
Clock Speeds	1088 MHz graphics core (min. at P0) 2430 MHz memory
GPU base clock	3504 MHz (min. at P0)
Maximum Power	47 W
Display Support	Four mDP 1.4
Maximum Color Depth	Up to 10bit/color
Maximum Vertical Refresh Rate	Up to 395 Hz at 1920 x 1080 Up to 118 Hz at 3840 x 2160
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL 4.5
Supported Resolutions and Max Refresh Rates (Hz)	<ul style="list-style-type: none"> Max Digital : Single DisplayPort 1.4 - 7680 x 4320 (8k) @ 30 Hz (mDP/Type-C to DP) Max Digital : Dual DisplayPort 1.4 - 7680 x 4320 (8k) @ 60 Hz (mDP/Type-C to DP)
Numbers of display supported	Up to four displays

System management features

Dell commercial systems come with a number of systems management options that are included by default for In-Band management with the Dell Client Command Suite. In-Band management is when the system has a functional operating system and the device is connected to a network so that it can be managed. The Dell Client Command Suite of tools can be leveraged individually or with a systems management console like SCCM, LANDESK, KACE, etc.

We also offer Out-of-Band management as an option. Out-of-band management is when the system does not have a functional operating system or is turned off and you still want to be able to manage the system in that state.

Systems management features

Systems Management—From On-Premises To The Cloud

Dell Client Command Suite—A free toolkit available for download, for all Precision Workstations at <https://dell.com/command>, automates and streamlines systems management tasks, saving time, money, and resources. It consists of the following modules that can be used independently, or with various systems management consoles such as SCCM.

- **Dell Command | Deploy**—Enables easy operating system deployment across all major Operating System (OS) deployment methodologies and provides numerous system-specific drivers that have been extracted and reduced to an Operating System-consumable state.
- **Dell Command | Configure**—A graphical user interface (GUI) admin tool for configuring and deploying hardware settings in a pre-Operating System or post-Operating System environment. It operates seamlessly with SCCM and Airwatch and can be self-integrated into LANDesk and KACE. Command | Configure allows you to remotely automate and configure over 150+ BIOS settings for a personalized user experience.
- **Dell Command | PowerShell Provider**—Can do the same things as Command | Configure, but with a different method. PowerShell is a scripting language that allows customers to create a customized and dynamic configuration process.
- **Dell Command | Monitor**—A Windows Management Instrumentation (WMI) agent that provides IT administrators with an extensive inventory of the hardware and health-state data. IT administrators can also configure hardware remotely by using command line and scripting.
- **Dell Command | Update (end-user tool)**—A factory-installed software and allows IT administrators to individually manage and automatically present, install Dell updates to the BIOS drivers, and software. Command Update eliminates the time-consuming process of update installation.
- **Dell Command | Update Catalog**—Provides searchable metadata that allows the management console to retrieve the latest system-specific updates (driver, firmware, BIOS). The updates are then delivered seamlessly to end-users using the customer's systems management infrastructure that is consuming the catalog (like SCCM).
- **Dell Command | vPro Out of Band console**—Extends hardware management to systems that are offline or have an unreachable Operating System (Dell exclusive features).
- **Dell Command | Integration Suite for System Center**—Integrates all the key components of the Client Command Suite into Microsoft System Center Configuration Manager 2012 and Current Branch versions.

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 6. 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.

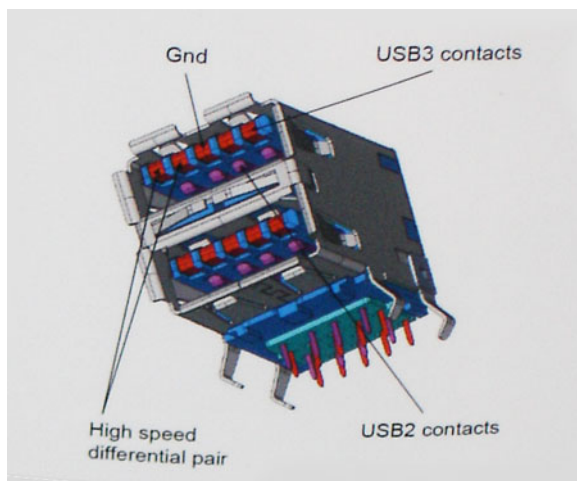


Speed

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.

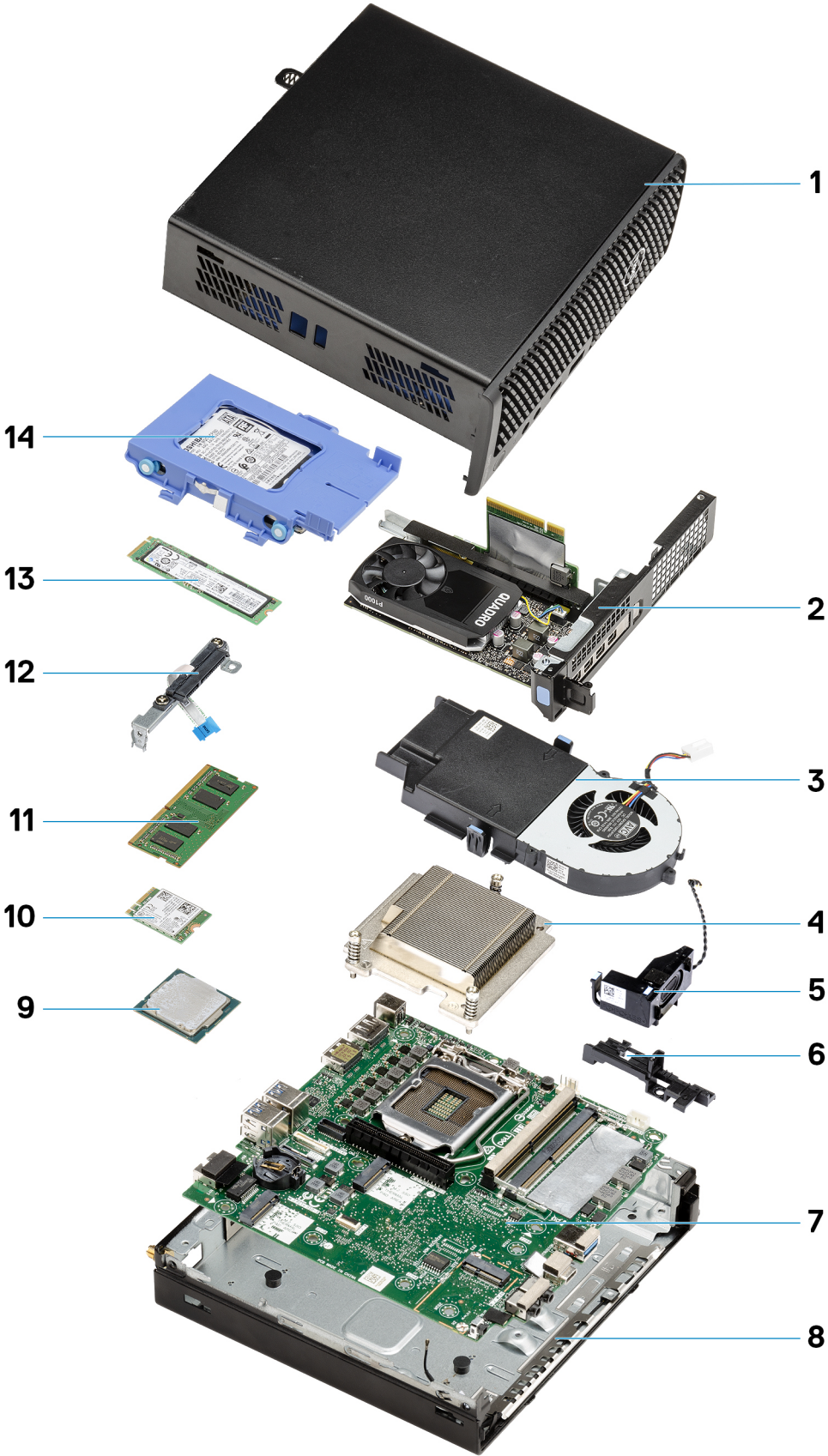
Listed below are some of the available SuperSpeed USB 3.2 Gen 1 products:

- 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.

Major components of your system



1. Top Cover
2. Riser card
3. Fan assembly
4. Heat sink
5. Speaker
6. 2.5 in. Hard drive support bracket
7. System board
8. Internal WLAN antenna
9. Processor
10. WLAN card
11. Memory modules
12. Interposer module
13. Solid-state drive
14. Hard-drive 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.

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 shows the screw list and the image of the screws.

Table 7. Screw list







Component	Screw type	Quantity	Image
Top cover	#6x32 (Thumbscrew)	1	
M.2 2230/2280 Solid-state drive	M2x3.5	1+1 (optional second solid-state drive)	
WLAN card	M2x3.5	1	
I/O module (optional)	M3x3	2	

Table 7. Screw list (continued)

Component	Screw type	Quantity	Image
System board	M3x4	3	
	#6-32	4	
Riser card	M3x5	2	

SMA antenna

Removing the SMA antenna

Prerequisites

1. Follow the procedure in [before working inside your computer](#).

About this task

The following image indicates the location of the SMA antenna and provides a visual representation of the removal procedure.





Steps

1. Turn the SMA antenna horizontal to its connector on the chassis.
2. Loosen the nut on the base of the SMA antenna to separate the SMA antenna from the system unit.
3. Remove the SMA antenna from the system unit.

Installing the SMA antenna

Prerequisites

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

About this task

The following image indicates the location of the SMA antenna and provides a visual representation of the installation procedure.



3



Steps

1. Align and place the antenna on the SMA connector of the system unit.
2. Tighten the nut at the bottom of SMA antenna to secure the antenna to the system unit.
3. Turn the antenna at a convenient angle as per the deployment infrastructure.


Next steps

1. Follow the procedure in [after working inside your computer](#).

Side cover

Removing the side cover

Prerequisites

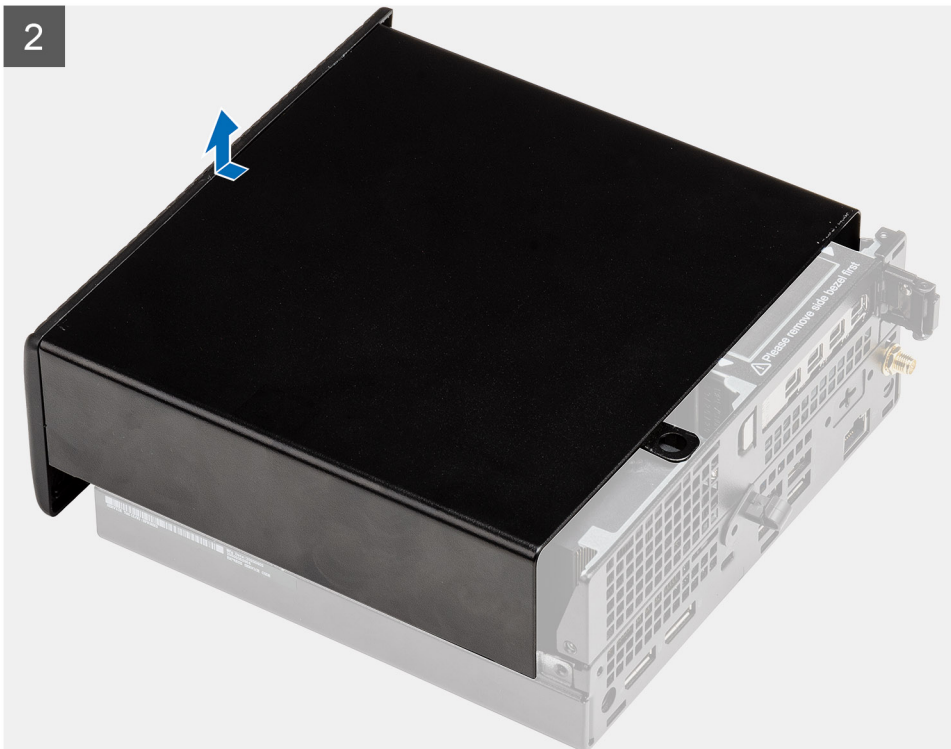
1. Follow the procedure in [before working inside your computer](#).
 -  **NOTE:** Ensure that you remove the security cable from the security-cable slot (if applicable).

About this task

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



1x
#6-32



Steps

1. Loosen the thumbscrew (#6x32) that secures the side cover to the system.

2. Slide the side cover towards the front of the system and lift the side cover from the system unit.

Installing the side cover

Prerequisites

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

About this task

The following image indicates the location of the side cover and provides a visual representation of the installation procedure.



1x
#6-32



2



Steps

1. Align the side cover with the grooves on the chassis.
2. Slide the side cover towards the back of the system to install it.
3. Tighten the thumbscrew (#6x32) to secure the side cover to the system.

Next steps

1. Follow the procedure in [after working inside your computer](#).

Top Cover (side bezel)

Removing the top cover (side bezel)

Prerequisites

1. Follow the procedure in [before working inside your computer](#).

NOTE: Turn the optional SMA antenna downwards or remove it for convenient sliding of the top cover (side bezel).

About this task

The following image indicates the location of the top cover (side bezel) and provides a visual representation of the removal procedure.



Steps

1. Slide the top cover (side bezel) towards the back of the system unit.
2. Lift the top cover (side bezel) away from the system unit.

Installing the top cover (side bezel)

Prerequisites

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

About this task

The following images indicate the location of the top cover (side bezel) and provide a visual representation of the installation procedure.




2



Steps

1. Align and place the top cover (side bezel) with the grooves on the chassis.
2. Slide the top cover (side bezel) towards to the front of the system unit to install it.

Next steps

 **NOTE:** Turn the optional SMA antenna to a convenient angle after safely sliding back the top cover (side bezel) on the chassis.

1. Follow the procedure in [after working inside your computer](#).

Front bezel

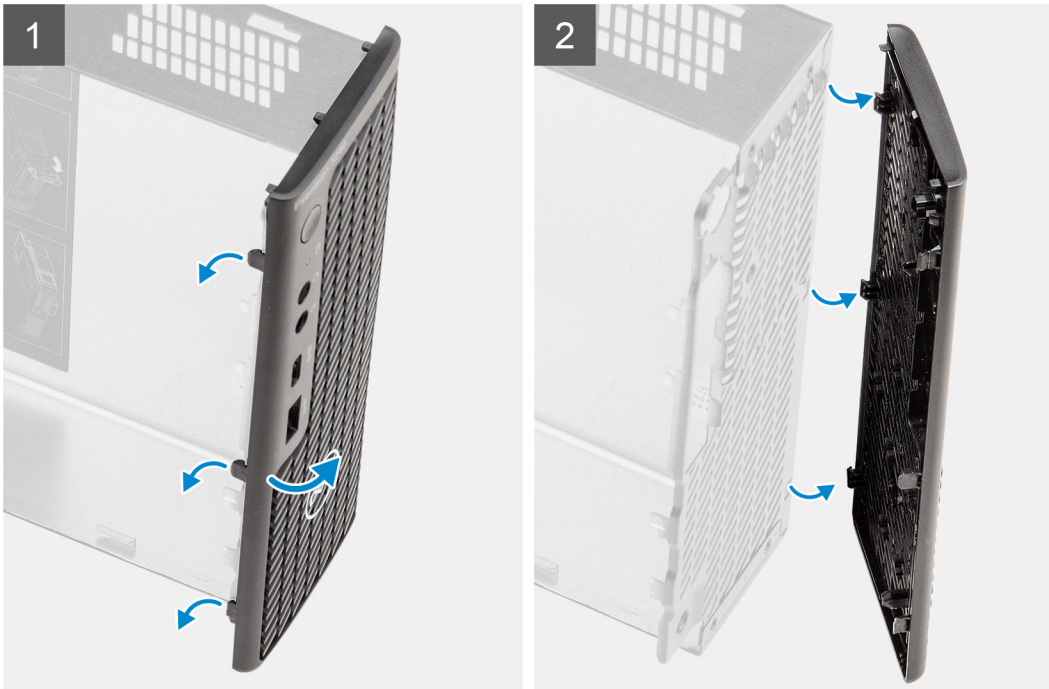
Removing the front bezel

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).

About this task

The following image indicates the location of the front bezel and provides a visual representation of the removal procedure.



Steps

1. Pry the retention tabs to release the front bezel from the system.
2. Remove the front bezel from the system.

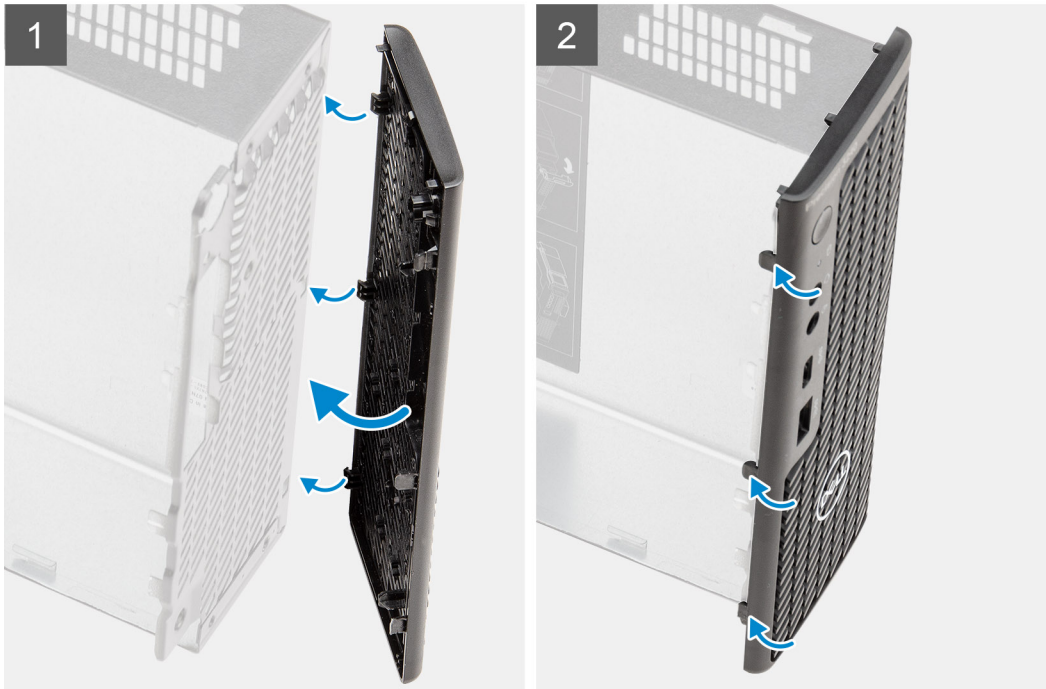
Installing the front bezel

Prerequisites

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

About this task

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



Steps

1. Position the bezel to align the tabs with the slots on the chassis.
2. Press the bezel until the release tabs click into place.

Next steps

1. Install the [side cover](#).
2. Install the [top cover \(side bezel\)](#).
3. Follow the procedure in [after working inside your computer](#).

Hard-drive assembly

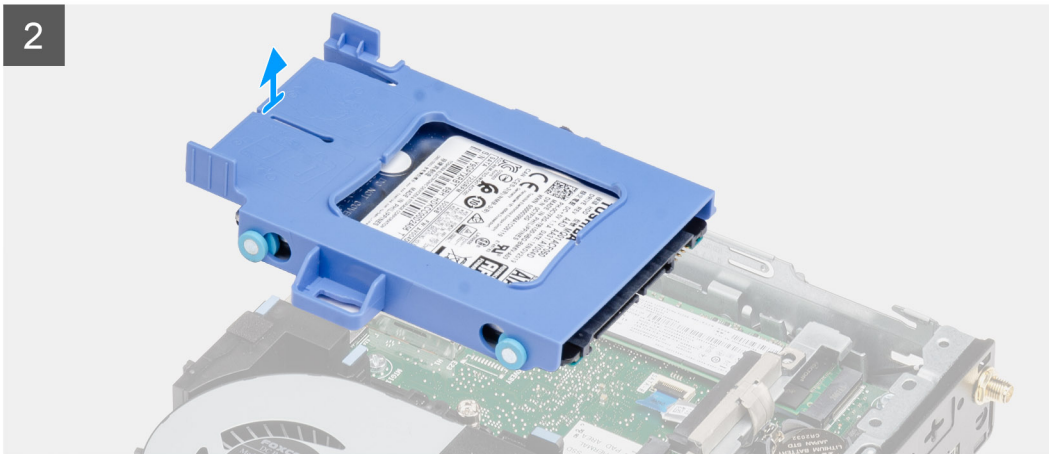
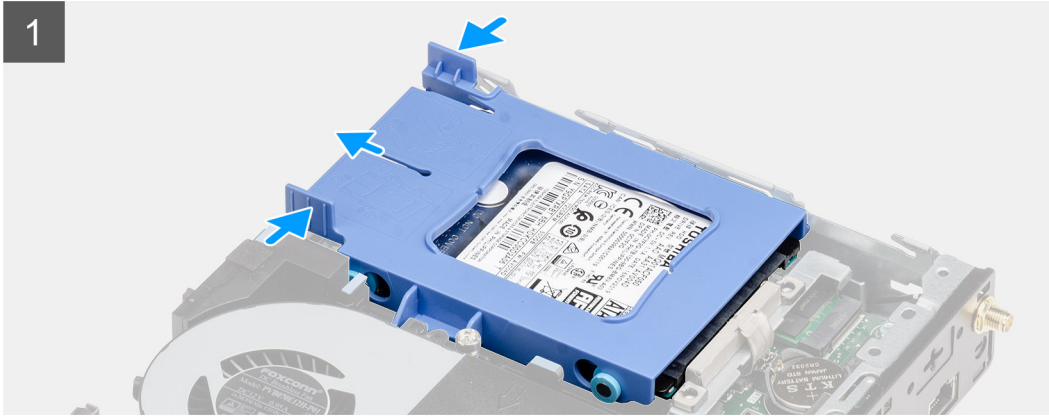
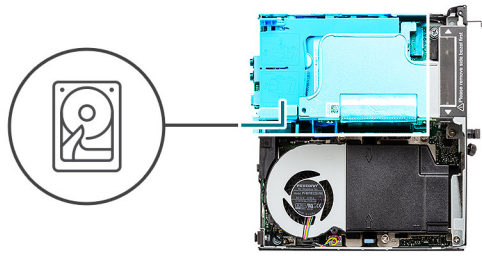
Removing the hard drive assembly

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).

About this task

The following images indicate the location of the hard drive assembly and provide a visual representation of the removal procedure.



Steps

1. Press the release tabs on the hard drive assembly and slide it towards the front of the system to disconnect it from the connector on the system board.
2. Lift the hard drive assembly from the system.

i **NOTE:** Note the orientation of the hard drive so that you can replace it correctly.

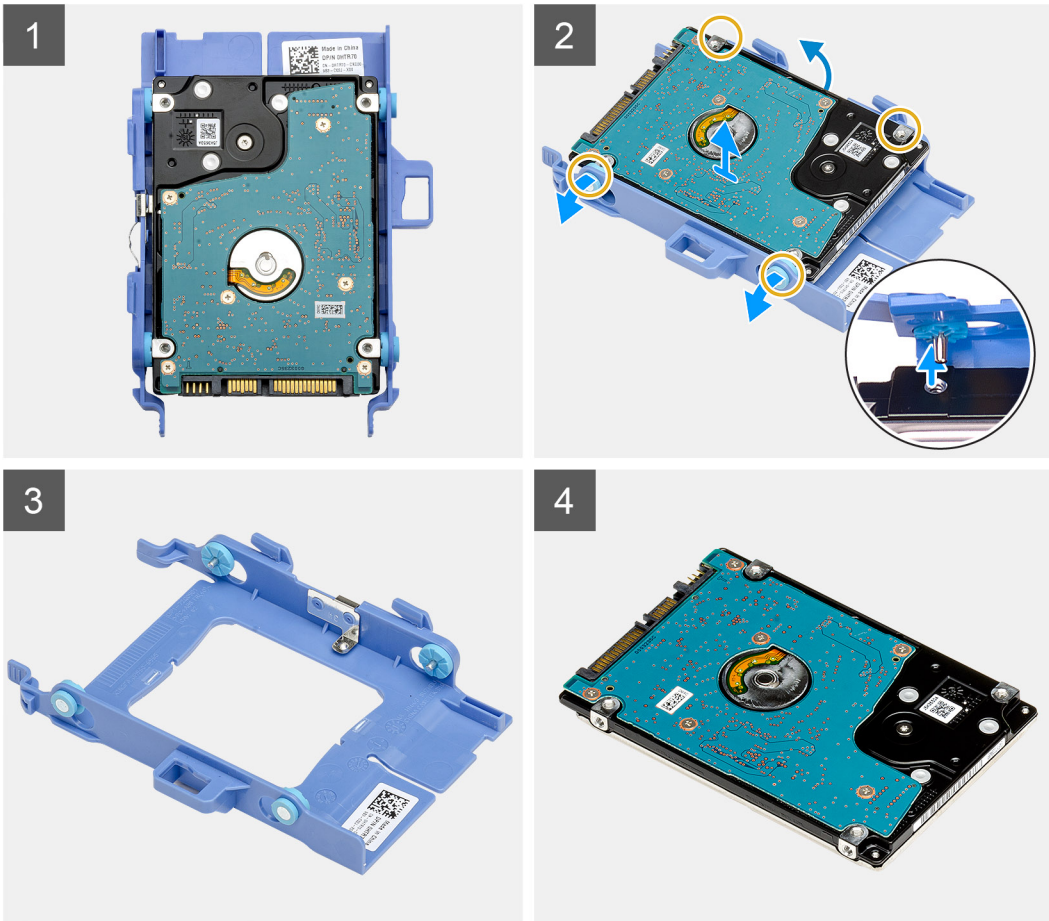
Removing the hard drive bracket

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#)
4. Remove the [front bezel](#).
5. Remove the [2.5 in. hard-drive assembly](#).

About this task

The following images indicate the location of the hard drive bracket and provide a visual representation of the removal procedure.



Steps

1. Pull one side of the hard drive bracket to disengage the pins on the bracket from the slots on the drive.
2. Lift the hard drive out of the bracket.

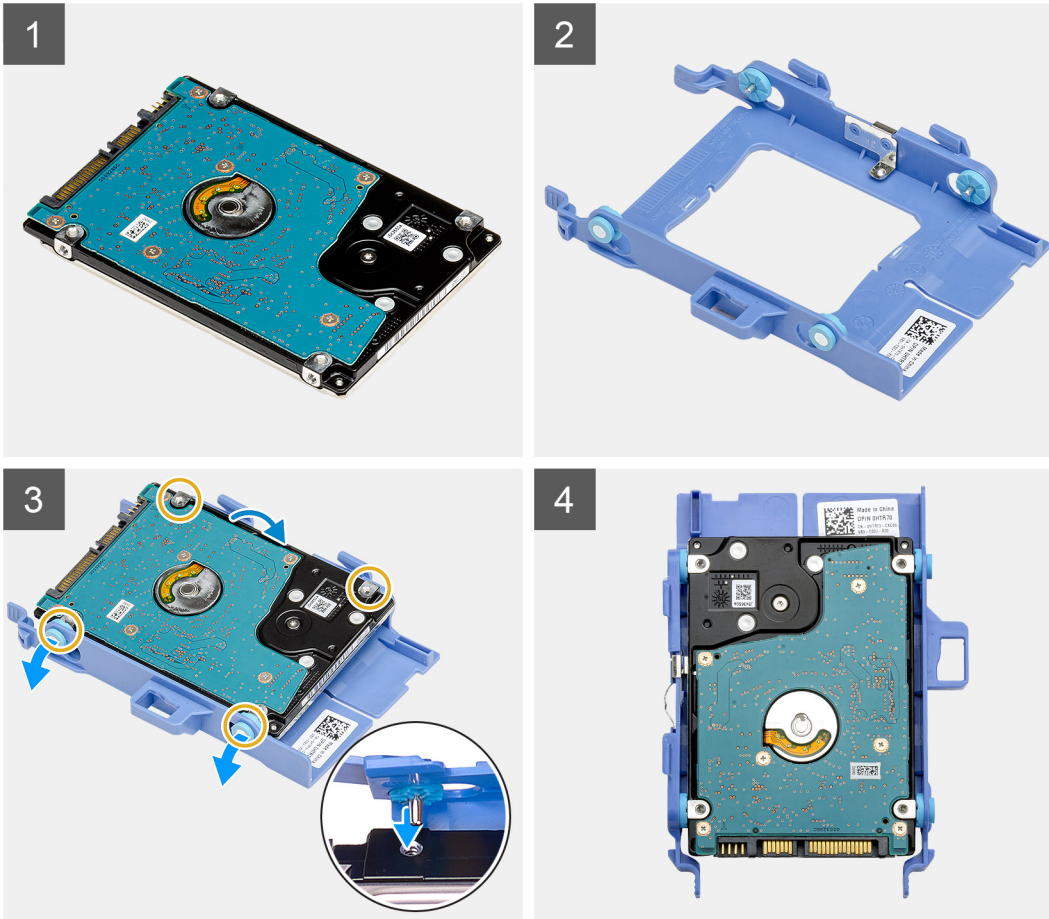
Installing the hard drive bracket

Prerequisites

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

About this task

The following image indicates the location of the hard drive bracket and provides a visual representation of the installation procedure.



Steps

1. Place the hard drive into the bracket.
 2. Align and insert the pins on the drive bracket with the slots on the drive.
- NOTE:** Note the orientation of the hard drive so that you can replace it correctly.

Next steps

1. Install the [2.5 in. hard-drive assembly](#).
2. Install the [front bezel](#).
3. Install the [top cover \(side bezel\)](#).
4. Install the [side cover](#).
5. Follow the procedure in [after working inside your computer](#).

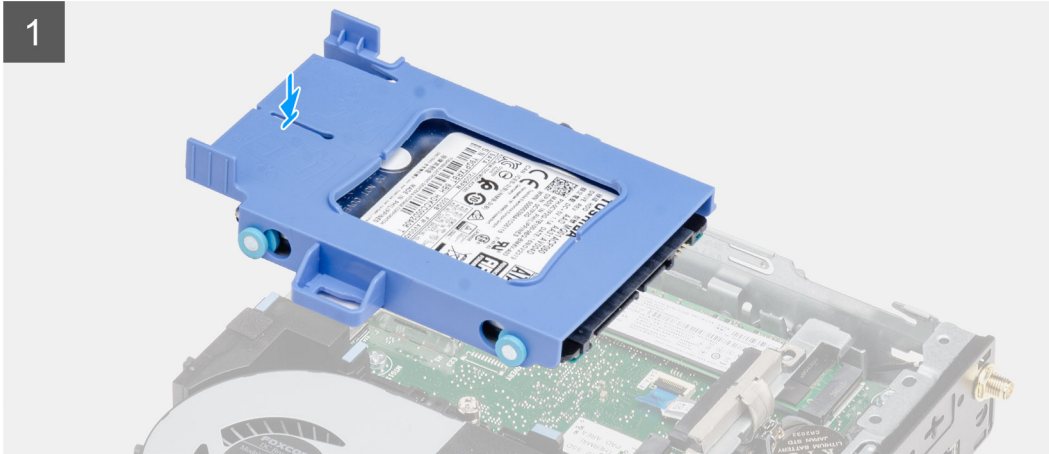
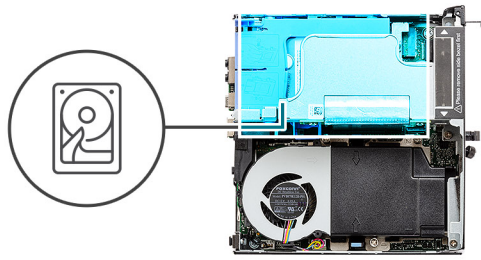
Installing the 2.5 in. hard drive assembly

Prerequisites

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

About this task

The following image indicates the location of the hard drive assembly and provides a visual representation of the installation procedure.



Steps

1. Insert the hard drive assembly into the slot on the system.
2. Slide the hard drive assembly towards the connector in the system board until the release tabs clicks into place.

Next steps

1. Install the [front bezel](#).
2. Install the [top cover \(side bezel\)](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

WLAN card

Removing the WLAN card

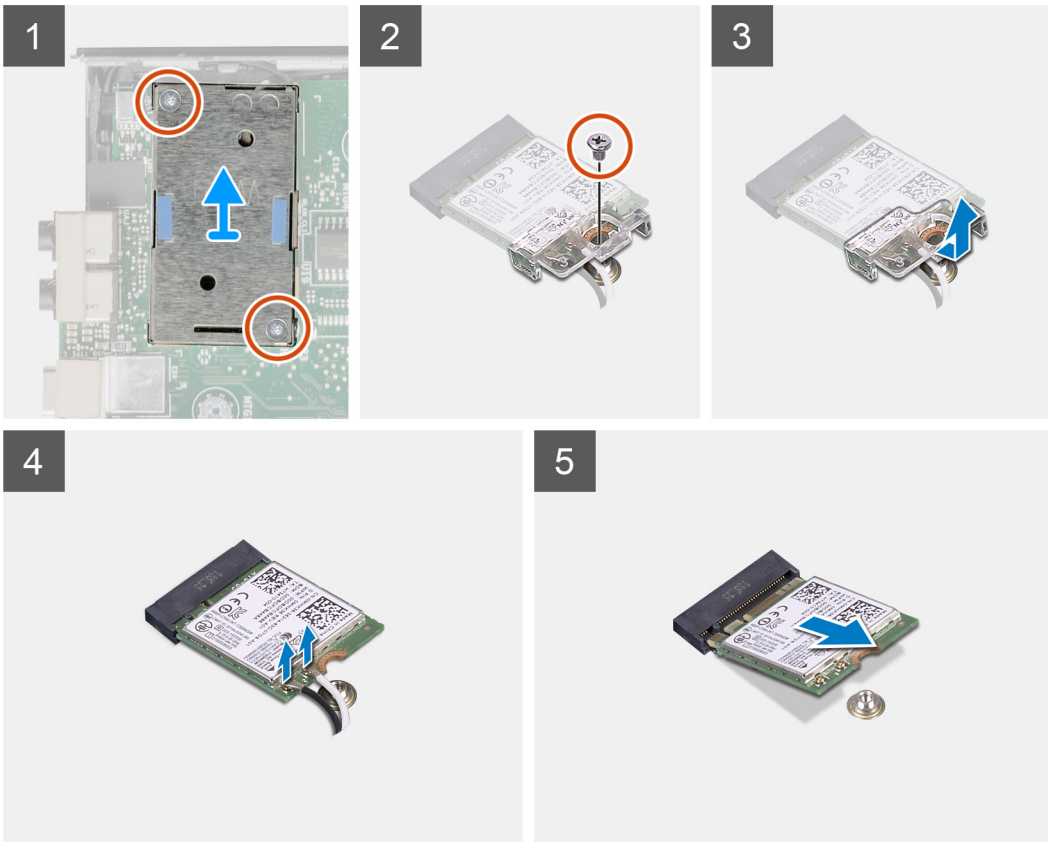
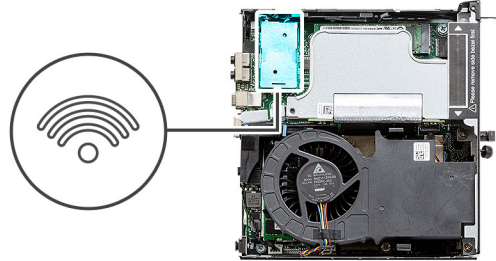
Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).

3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).
5. Remove the [hard-drive assembly](#).

About this task

The following images indicate the location of the wireless card and provide a visual representation of the removal procedure.



Steps

1. Remove the (M2x3.5) screw that secures the WLAN card bracket to the system board.
2. Slide and lift the WLAN card bracket away from the WLAN card.
3. Disconnect the antenna cables from the WLAN card.
4. Slide and remove the WLAN card from the connector on the system board.

Installing the WLAN card

Prerequisites

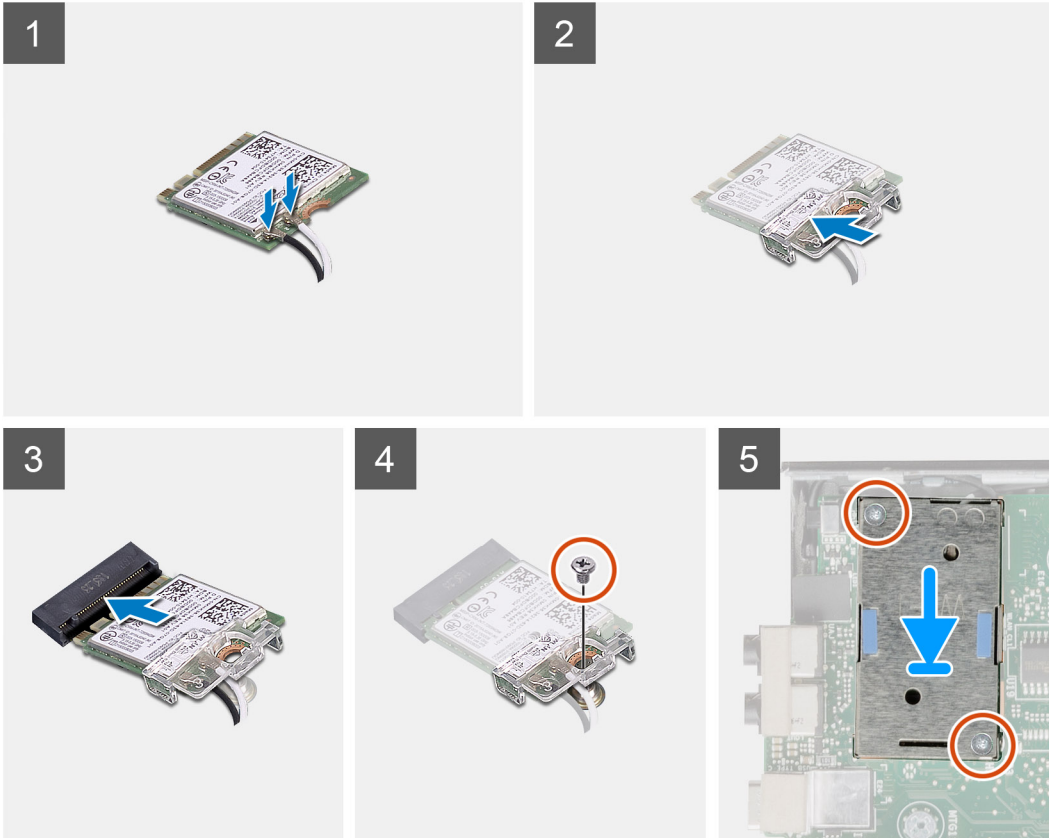
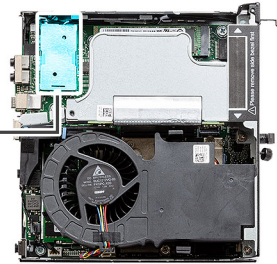
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the wireless card and provides a visual representation of the installation procedure.



3x
M2x3



Steps

1. Connect the antenna cables to the WLAN card.
The following table provides the antenna-cable color scheme for the WLAN card of your computer.

Table 8. Antenna-cable color scheme

Connectors on the wireless card	Antenna-cable color	Silkscreen marking	
Main	White	MAIN	△ (white triangle)
Auxiliary	Black	AUX	▲ (black triangle)

2. Place the WLAN card bracket to secure the antenna cables.
3. Align the notch on the WLAN card with the tab on the WLAN card slot. Insert the WLAN card into the connector on the system board.
4. Replace the (M2x3.5) screw to secure the WLAN card bracket to the WLAN card.

Next steps

1. Install the [hard-drive assembly](#).

2. Install the [front bezel](#).
3. Install the [top cover \(side bezel\)](#).
4. Install the [side cover](#).
5. Follow the procedure in [after working inside your computer](#).

Speaker

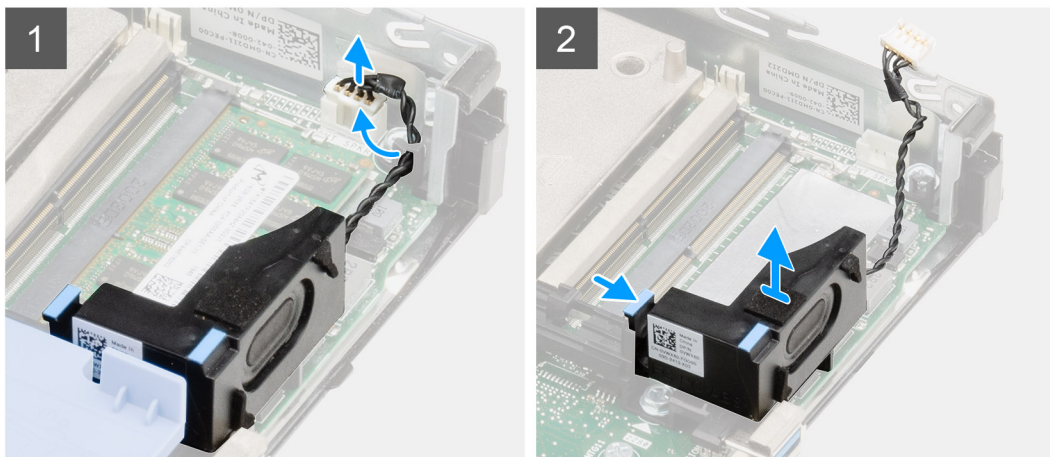
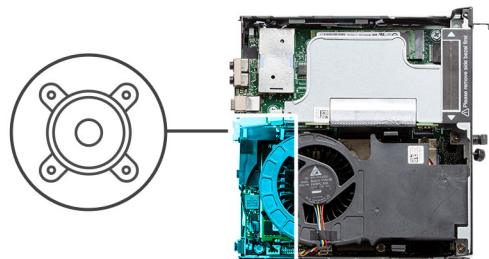
Removing the speaker

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).

About this task

The following images indicate the location of the speaker and provide a visual representation of the removal procedure.



Steps

1. Disconnect the speaker cable from the system board.
2. Press the release tab and lift the speaker along with the cable from the system board.

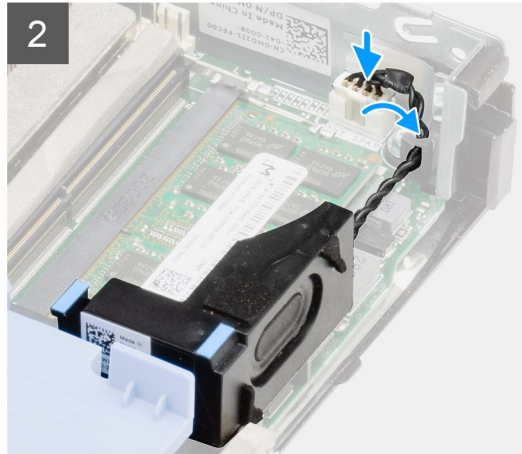
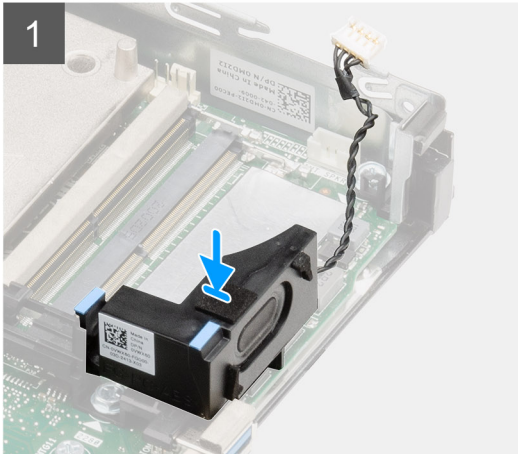
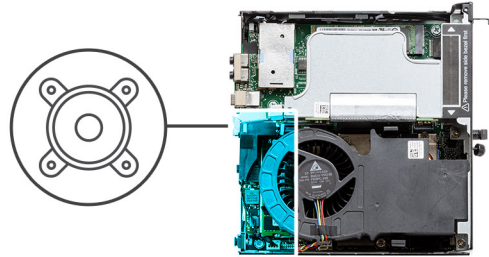
Installing the speaker

Prerequisites

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

About this task

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



Steps

1. Align and insert the speaker into the slot and press it until the release tab clicks.
2. Connect the speaker cable to the system board.

Next steps

1. Install the [front bezel](#).
2. Install the [top cover \(side bezel\)](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

Fan assembly

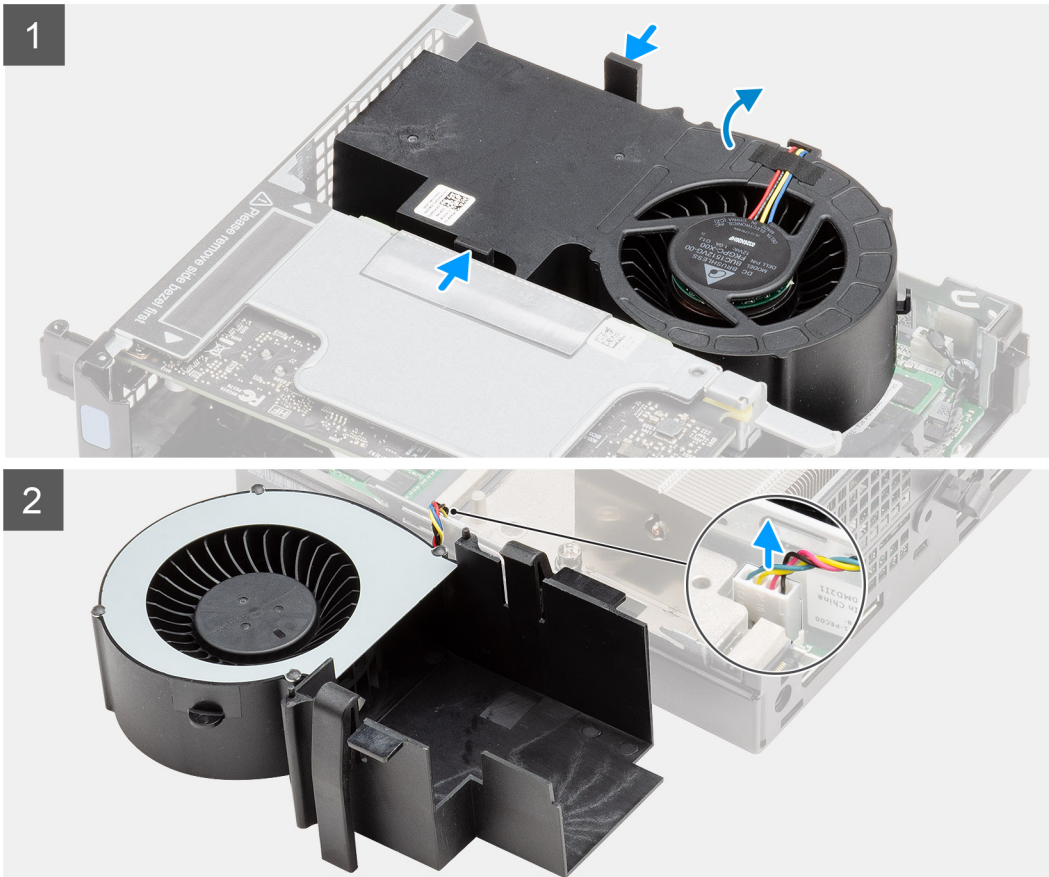
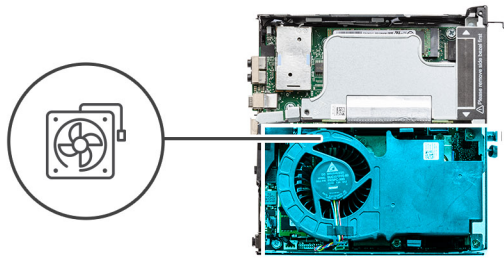
Removing the fan assembly

Prerequisites


1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).

About this task

The following images indicate the location of the fan assembly and provide a visual representation of the removal procedure.



Steps

1.  **NOTE:** Unroute the speaker cable from the routing guide on the fan assembly.

Press the blue tabs on both sides of the fan, and slide to lift the fan to release it from the system and turn it over.

2. Disconnect the fan cable from the connector on the system board. Lift the fan assembly out of the system.

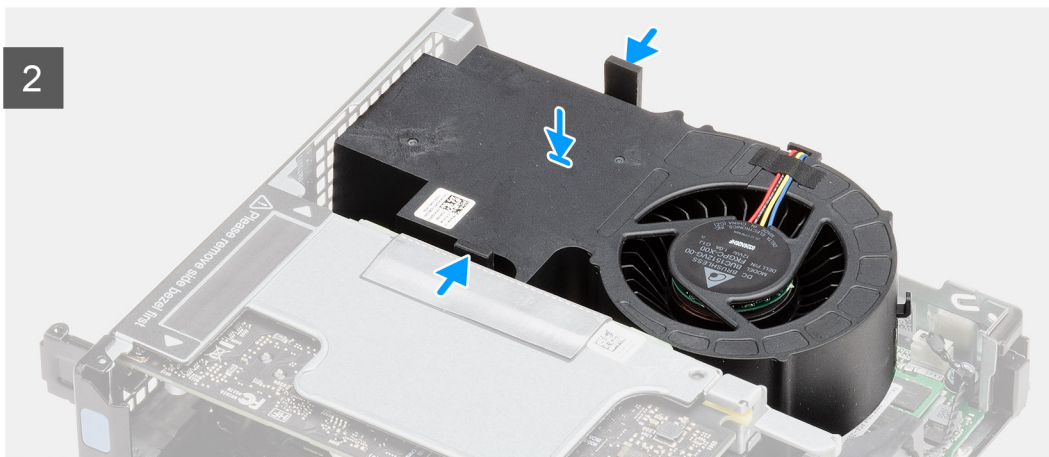
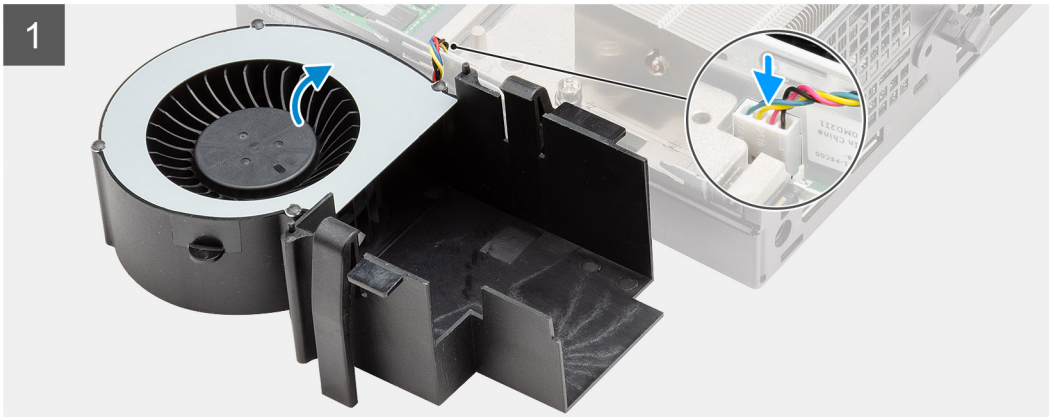
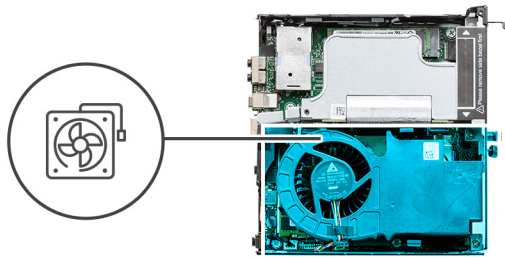
Installing the fan assembly

Prerequisites

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

About this task

The following images indicate the location of the fan assembly and provide a visual representation of the removal procedure.



Steps

1. Connect the fan cable to the connector on the system board.
2. Press the release tab on the fan assembly and place it on the system up-side down until it clicks into place.

NOTE: Route the speaker cable through the routing guides on the fan assembly.

Next steps

1. Install the [front bezel](#).
2. Install the [top cover \(side bezel\)](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

Memory modules

Removing the memory modules

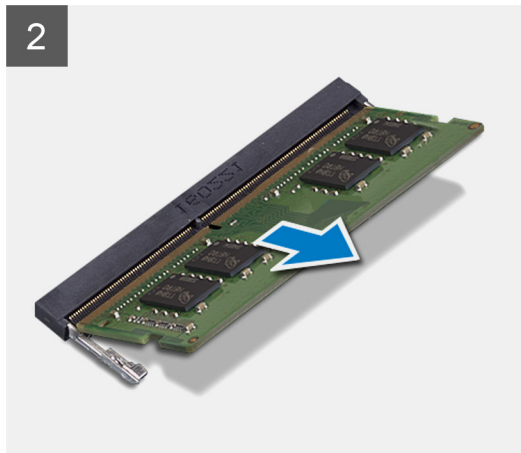
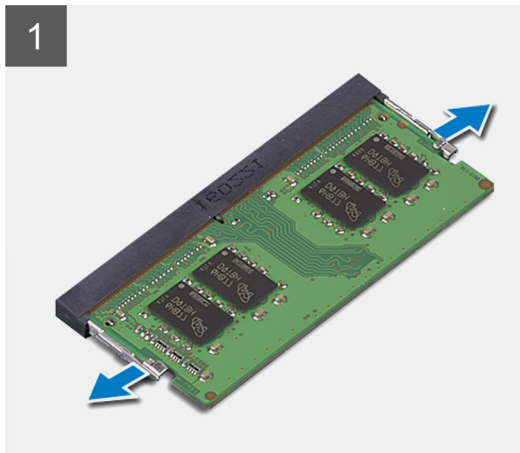
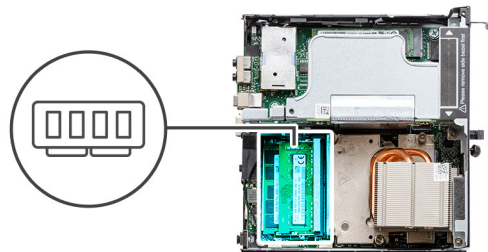
Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).
5. Remove the [fan assembly](#).

About this task

The following images indicate the location of the memory modules and provide a visual representation of the removal procedure.

CAUTION: To prevent damage to the memory module, hold the memory module by the edges. Do not touch the components on the memory module.



Steps

1. Pull the securing clips from the memory module until the memory module pops-up.
2. Slide and remove the memory module from the memory-module slot.

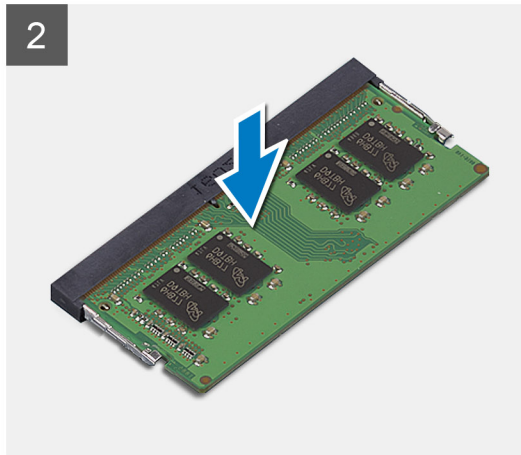
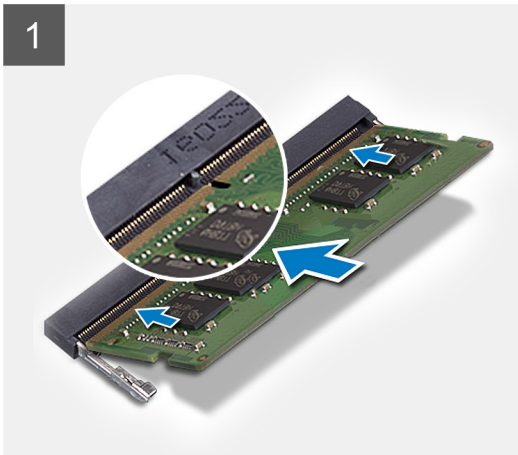
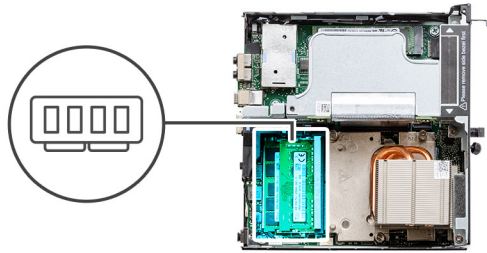
Installing the memory modules

Prerequisites

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

About this task

The following image indicates the location of the memory modules 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 slot.
2. Slide the memory module firmly into the slot at an angle and press the memory module down until it clicks into place.

NOTE: If you do not hear the click, remove the memory module and reinstall it.

Next steps

1. Install the [fan assembly](#).
2. Install the [front bezel](#).
3. Install the [top cover \(side bezel\)](#).
4. Install the [side cover](#).
5. Follow the procedure in [after working inside your computer](#).

Riser card

Removing the riser card

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#)
4. Remove the [front bezel](#).
5. Remove the [fan assembly](#).

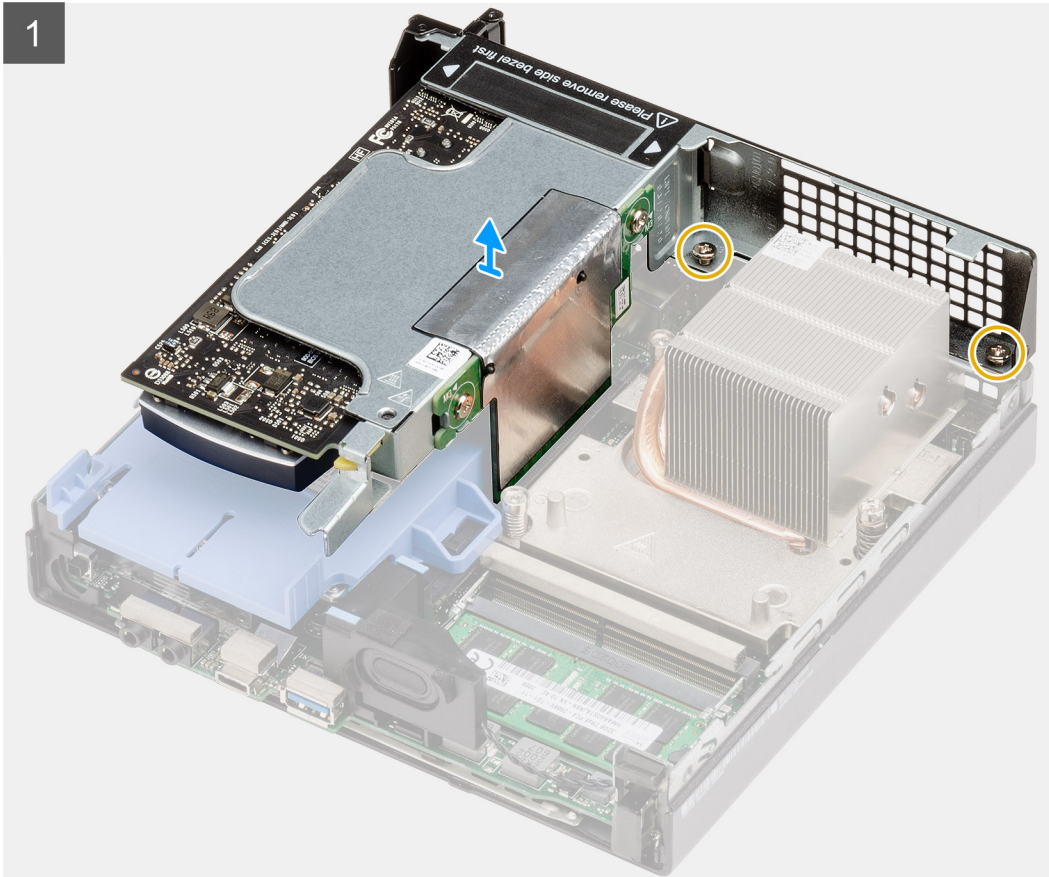
NOTE: This step is valid for system configuration that is shipped with 80 W CPU.

About this task

The following images indicate the location of the riser card and provide a visual representation of the removal procedure.



2x
M3x5



Steps

1. Loosen the two screws (M2x4) that secure the riser card to the system chassis.
2. Lift the riser card from the system board.

Installing the riser card

Prerequisites

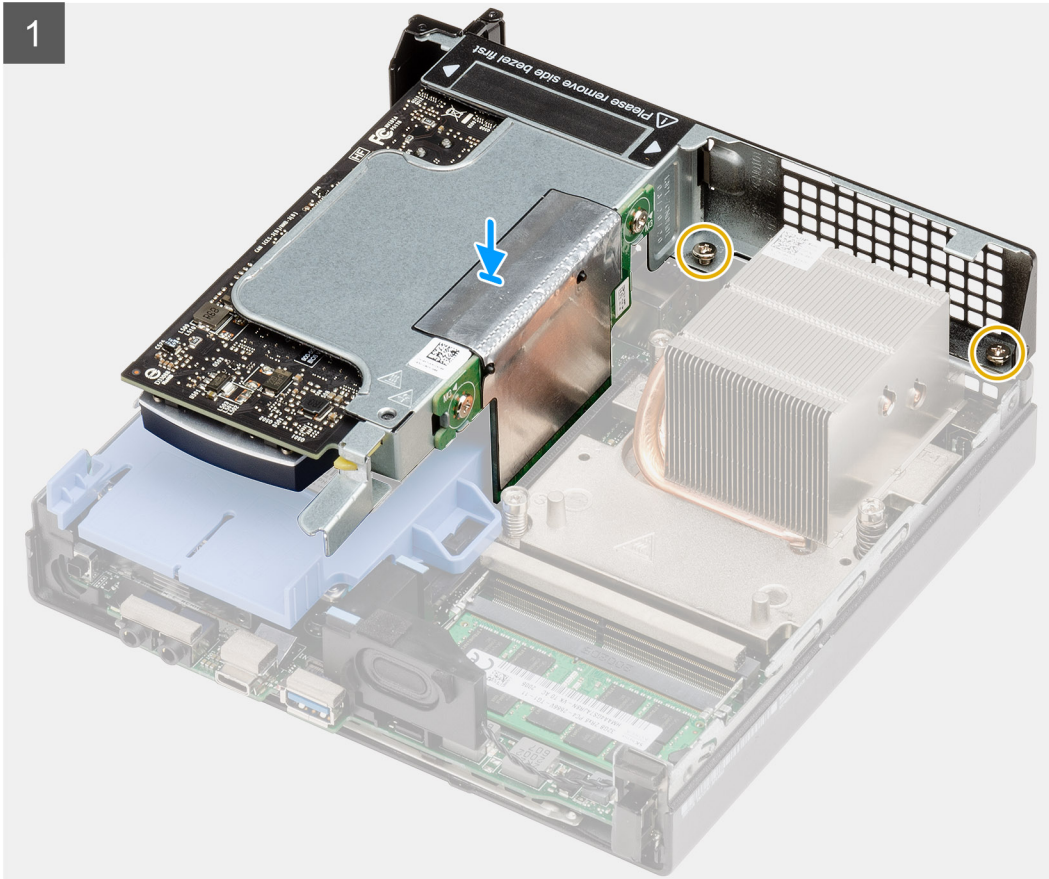
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the riser card and provides a visual representation of the installation procedure.



2x
M3x5



Steps

1. Align the riser card and push it down on the PCIe connector of the system board.
2. Tighten the screws (M2x4) that secure the riser card to the system chassis.


Next steps

1. Install the [fan assembly](#).
NOTE: This step is valid for system configuration that is shipped with 80 W CPU.
2. Install the [front bezel](#).
3. Install the [top cover \(side bezel\)](#).
4. Install the [side cover](#).
5. Follow the procedure in [after working inside your computer](#).

Dell Ultra Speed Drive

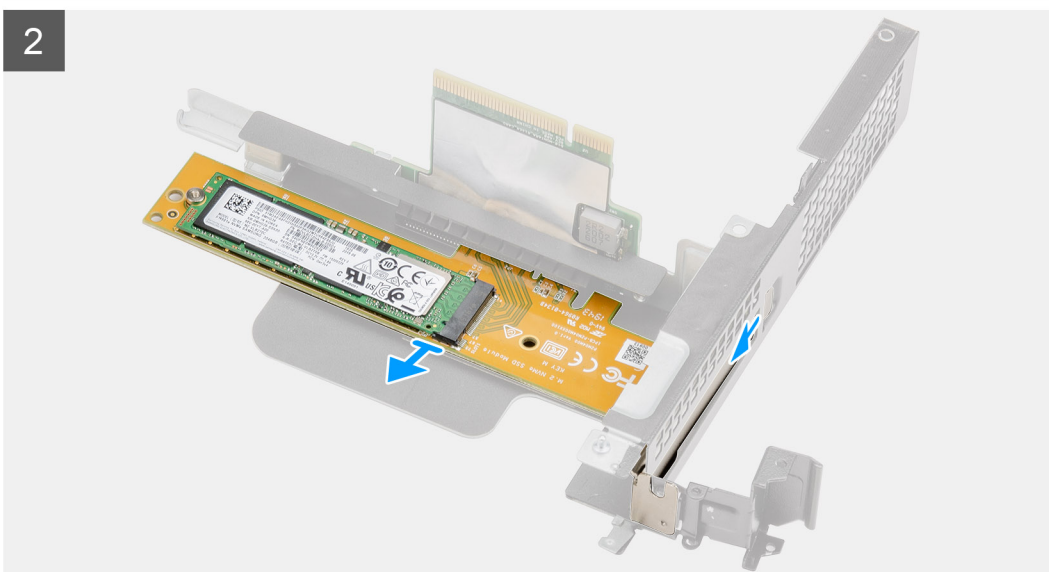
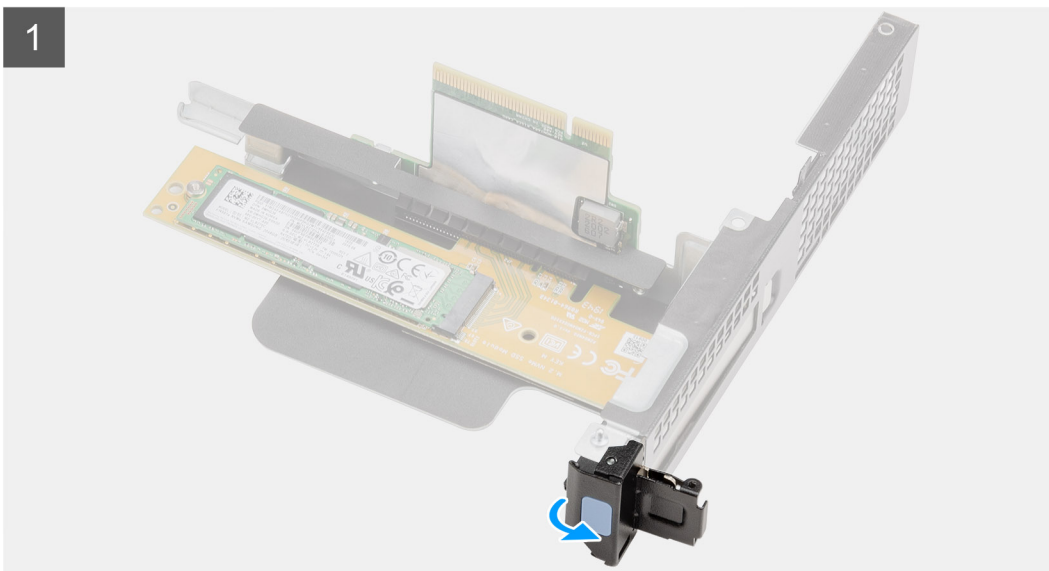
Removing the Dell Ultra Speed Drive

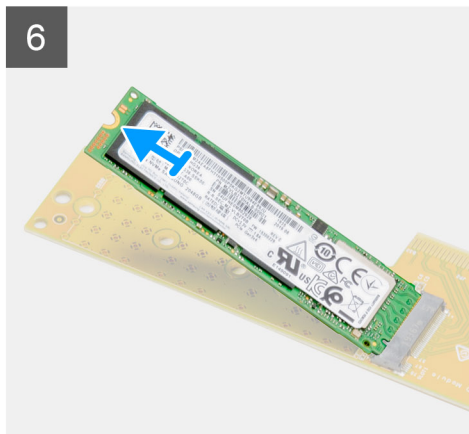
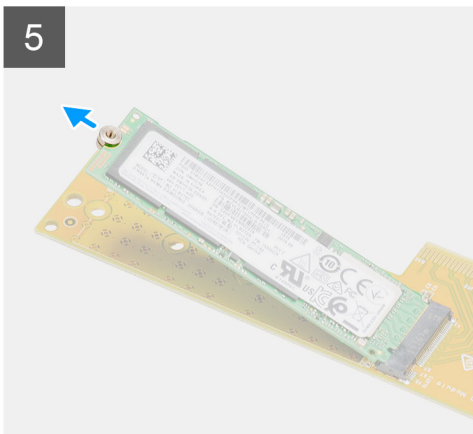
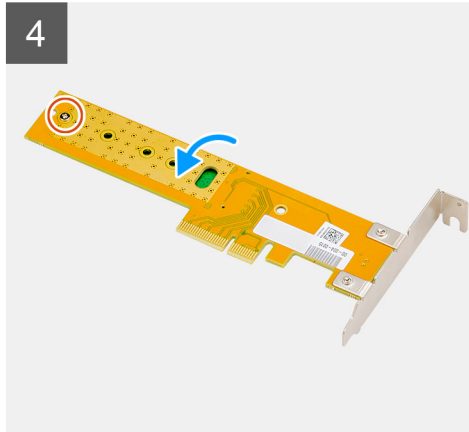
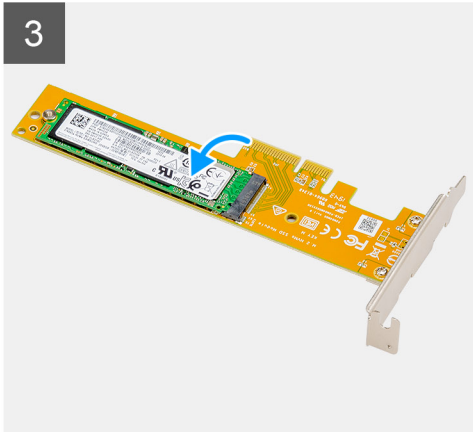
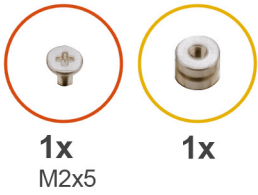
Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#)
4. Remove the [front bezel](#).
5. Remove the [fan assembly](#).
-  **NOTE:** This step is valid for system configuration that is shipped with 80 W CPU.
6. Remove the [riser card](#).

About this task

The following images indicate the location of the Dell Ultra Speed Drive and provide a visual representation of the removal procedure.





Steps

1. Pull the metal tab to open the expansion card latch.
2. Slide the Dell Ultra speed drive along the edges of the riser card to release it from the riser card.
3. Flip over the Dell Ultra Speed Drive with SSD facing down.
4. Loosen the single screw (M2x5) securing the standoff nut to the Dell Ultra Speed Drive.
5. Remove the standoff nut from the SSD.
6. Slide the SSD out of the M.2 slot on the Dell Ultra Speed Drive.

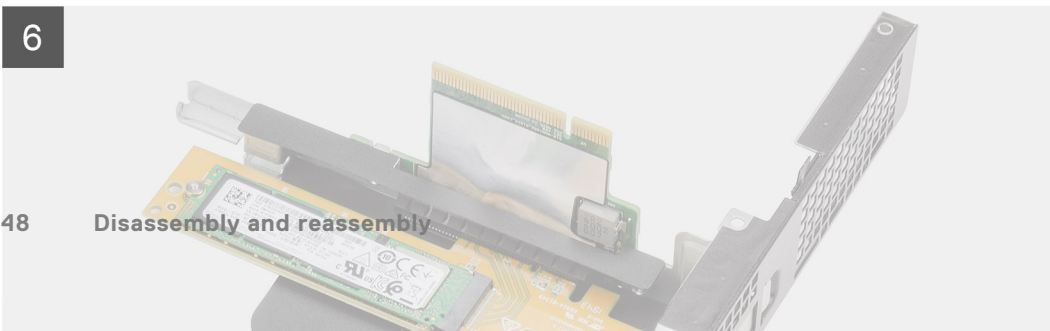
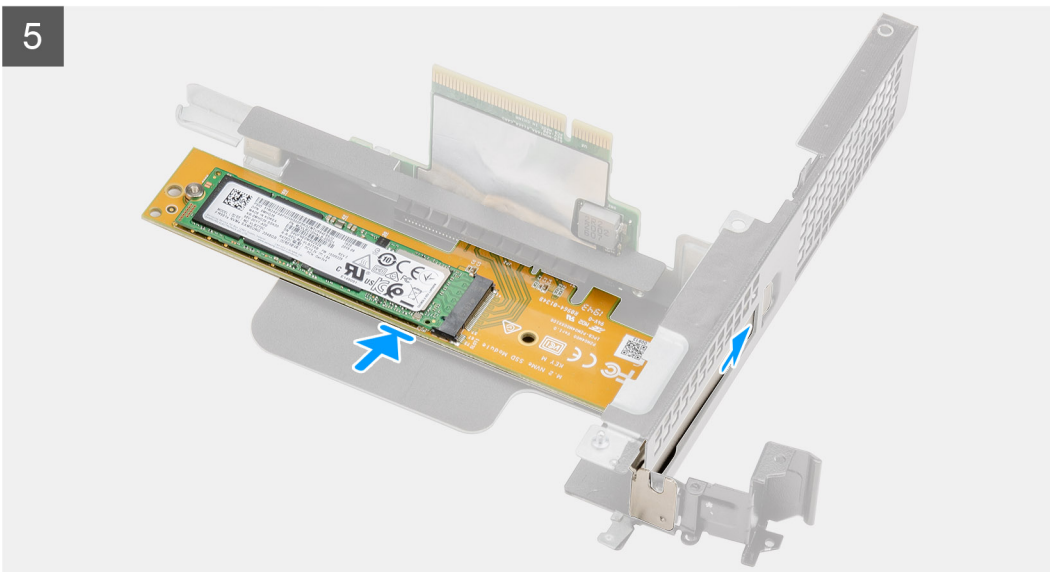
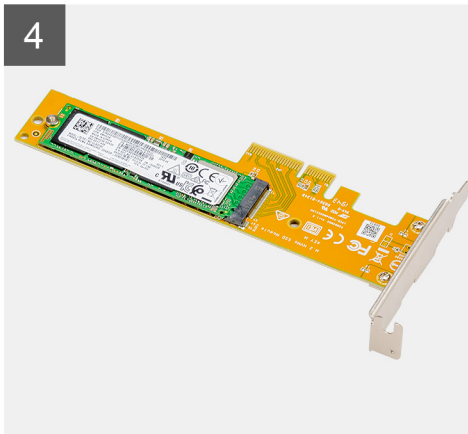
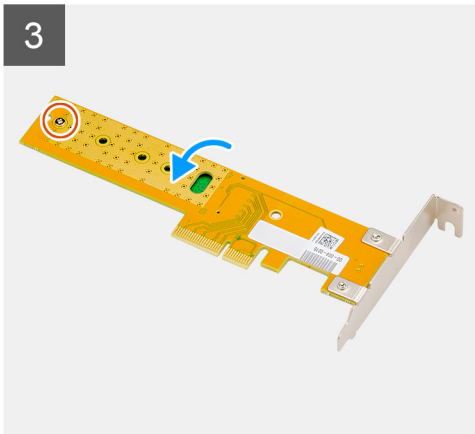
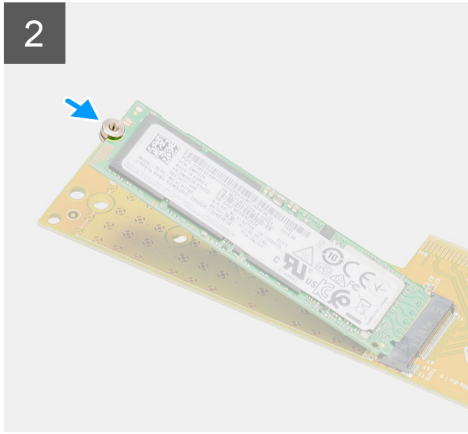
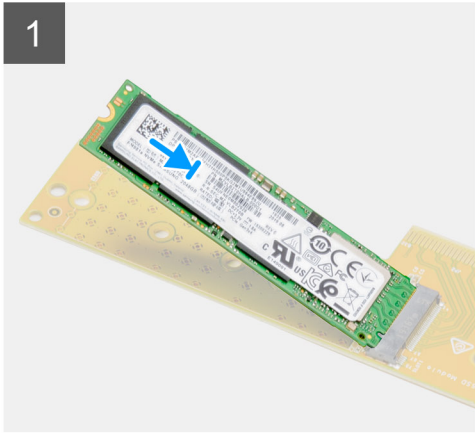
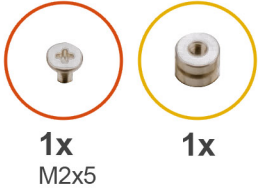
Installing the Dell Ultra Speed Drive

Prerequisites

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

About this task

The following image indicates the location of the Dell Ultra Speed Drive and provides a visual representation of the installation procedure.



Steps

1. Align the notch on the SSD with the tab on the solid-state drive connector on the Dell Ultra Speed Drive.
2. Install the standoff nut on the notch of the SSD.
3. Replace the single screw (M2x5) securing the standoff nut to the Dell Ultra Speed Drive.
4. Flip over the Dell Ultra Speed Drive with the SSD facing up.
5. Replace the Dell Ultra Speed Drive into the slot on the riser card until it clicks into place.
6. Close the expansion card latch and press it until it clicks into place.

Next steps

1. Install the [riser card](#).
2. Install the [fan assembly](#).
i **NOTE:** This step is valid for system configuration that is shipped with 80 W CPU.
3. Install the [front bezel](#).
4. Install the [top cover \(side bezel\)](#).
5. Install the [side cover](#).
6. Follow the procedure in [after working inside your computer](#).

Graphics card

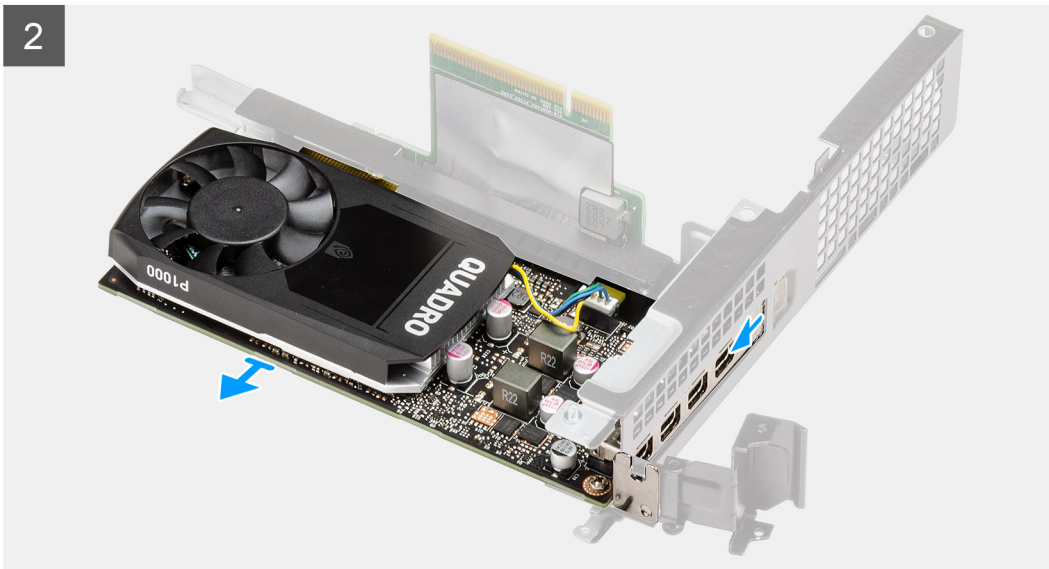
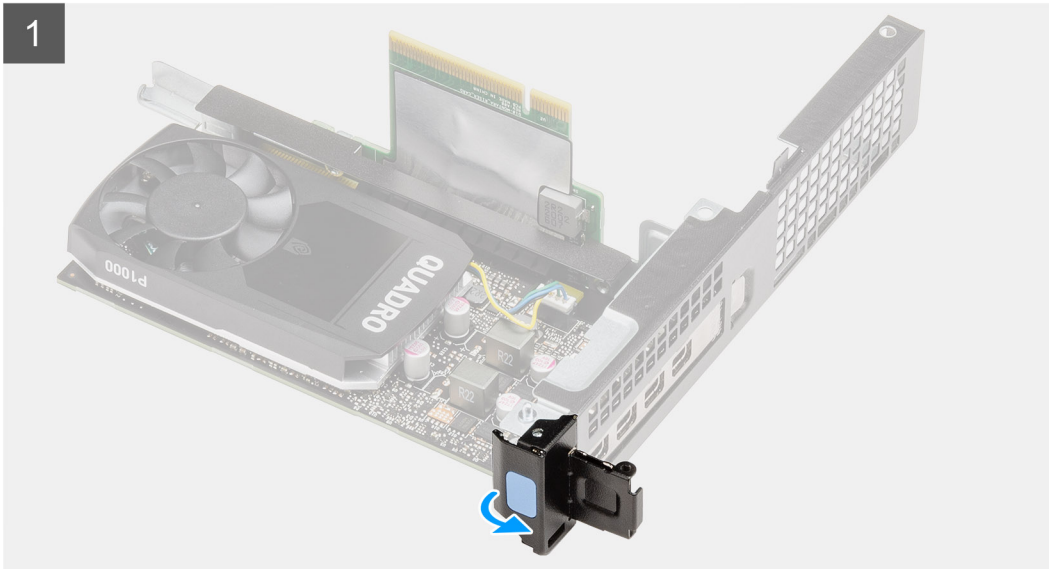
Removing the graphics card

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#)
4. Remove the [front bezel](#).
5. Remove the [fan assembly](#).
i **NOTE:** This step is valid for system configuration that is shipped with 80 W CPU.
6. Remove the [riser card](#).

About this task

The following images indicate the location of the graphics card and provide a visual representation of the removal procedure.



Steps

1. Pull the metal tab to open the expansion card latch.
2. Slide the graphics card along the edges of the riser card to release it from the riser card.

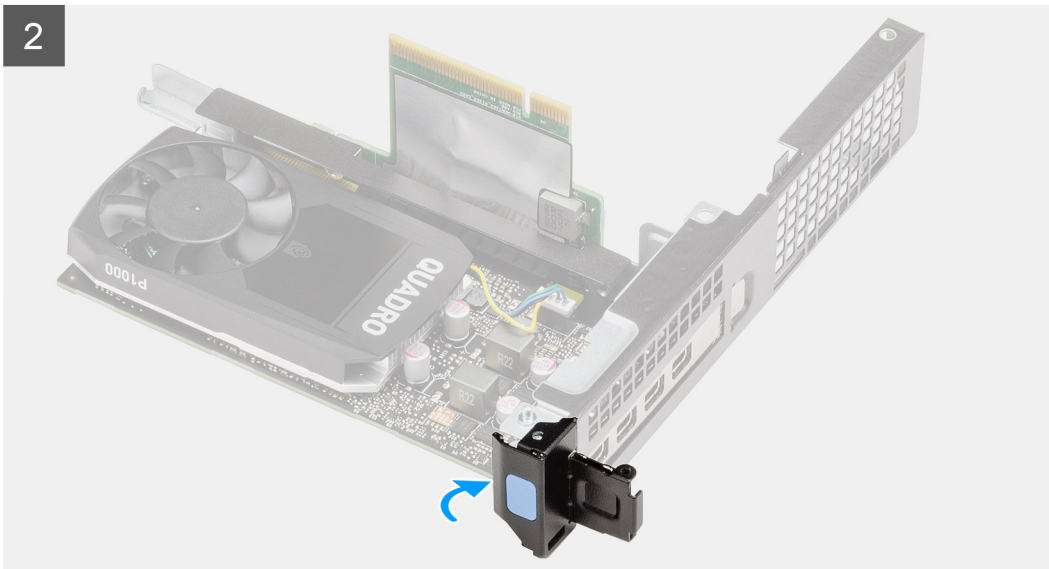
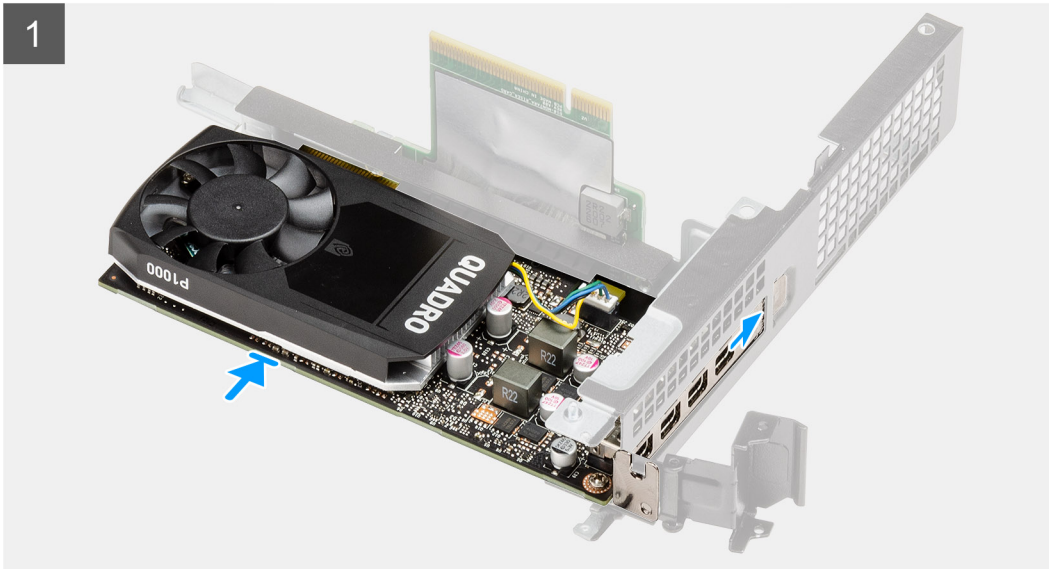
Installing the graphics card

Prerequisites

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

About this task

The following image indicates the location of the graphics card and provides a visual representation of the installation procedure.



Steps

1. Replace the graphics card into the slot on the riser card until it clicks into place.
2. Close the expansion card latch and press it until it clicks into place.

Next steps

1. Install the [riser card](#).
2. Install the [fan assembly](#).
 - NOTE:** This step is valid for system configuration that is shipped with 80 W CPU.
3. Install the [front bezel](#).
4. Install the [top cover \(side bezel\)](#).
5. Install the [side cover](#).
6. Follow the procedure in [after working inside your computer](#).

Solid-state drive

Removing the M.2 2280 PCIe solid-state drive

Prerequisites

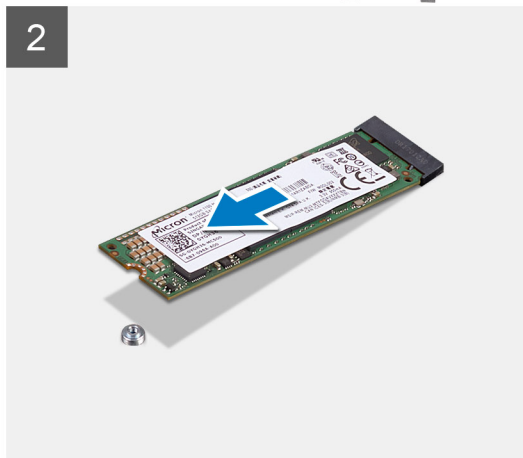
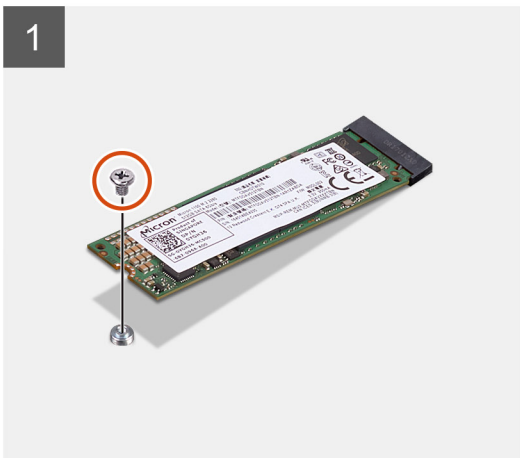
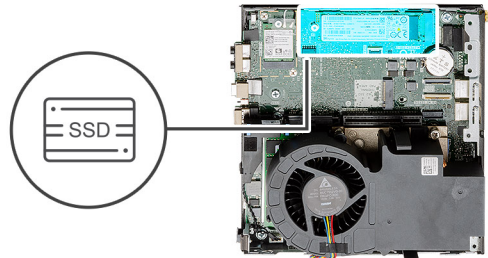
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).
5. Remove the [fan assembly](#).
- i** **NOTE:** This step is valid for system configuration that is shipped with 80 W CPU.
6. Remove the [riser card](#).
7. Remove the [hard-drive assembly](#).

About this task

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



1x
M2x3.5



Steps

1. Remove the screw (M2x3.5) that secures the solid-state drive to the system board.
2. Slide and lift the solid-state drive off the system board.

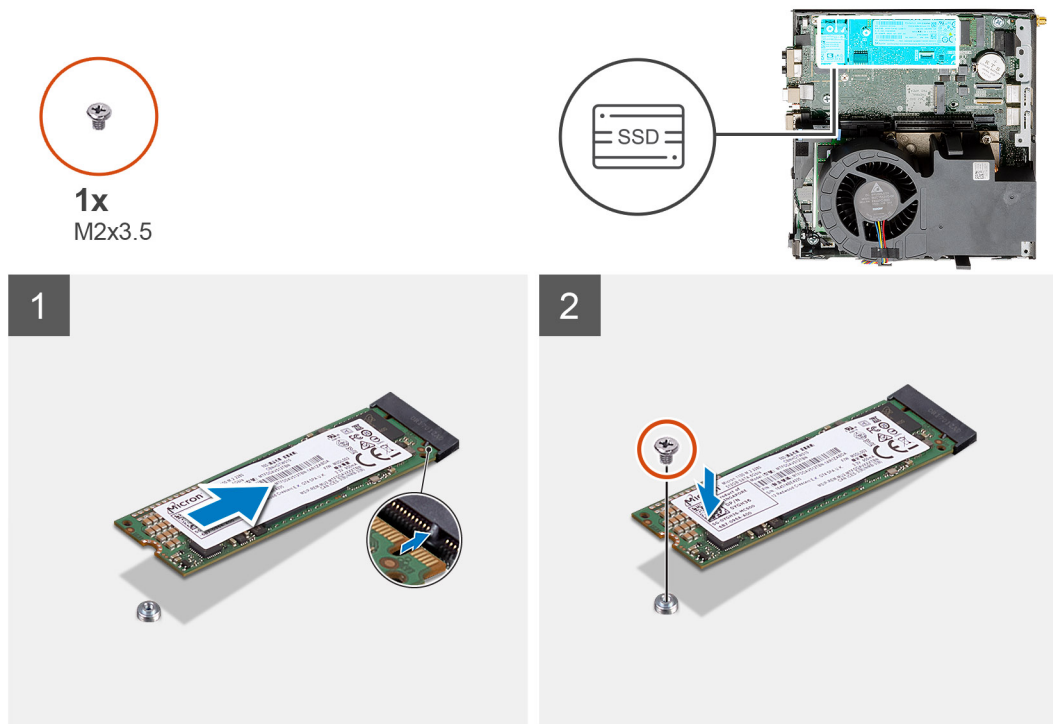
Installing the M.2 2280 PCIe solid-state drive

Prerequisites

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

About this task

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



Steps

1. Align the notch on the solid-state drive with the tab on the solid-state drive connector on the system board.
2. Insert the solid-state drive at a 45-degree angle into the solid-state drive connector.
3. Replace the screw (M2x3.5) that secures the M.2 2280 PCIe solid-state drive to the system board.

Next steps

1. Install the [hard-drive assembly](#).
 2. Install the [riser card](#).
 3. Install the [fan assembly](#).
- i** **NOTE:** This step is valid for system configuration that is shipped with 80 W CPU.
4. Install the [front bezel](#).
 5. Install the [top cover \(side bezel\)](#).
 6. Install the [side cover](#).
 7. Follow the procedure in [after working inside your computer](#).

Optional IO card

Removing the optional I/O card

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).
5. Remove the [hard drive assembly](#).

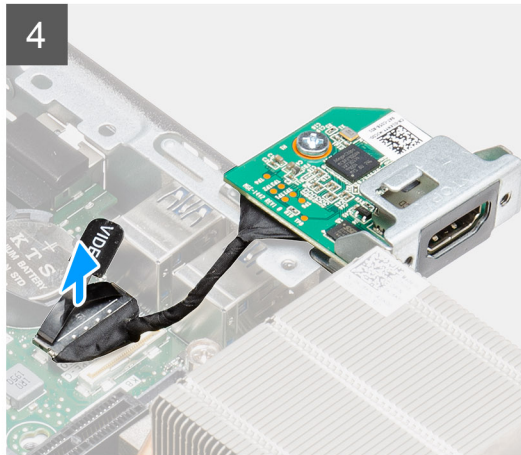
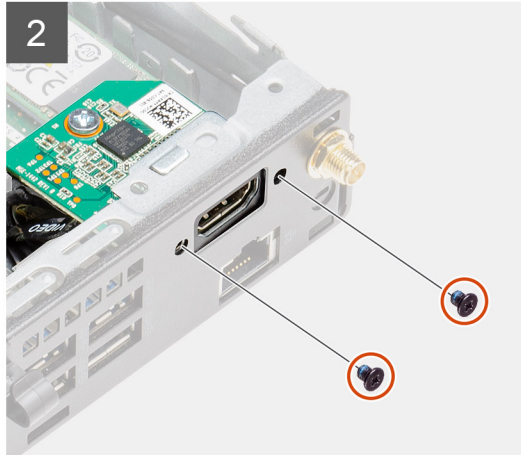
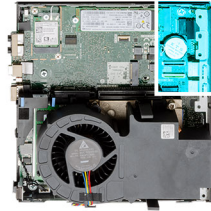
6. Remove the [solid-state drive](#).
7. Remove the [riser card](#).

About this task

The following images indicate the location of the optional I/O card and provide a visual representation of the removal procedure.



2x
M3x3



Steps

1. Remove the two (M3x3) screws that secure the optional I/O module to the system chassis.
 - NOTE:** The screw type differs with the kind of I/O module used.
2. Slide and remove the optional I/O card from its slot in the chassis.
3. Disconnect the cable that connects the optional I/O card to the system board.
4. Remove the I/O card from the system unit.

Installing the optional I/O card

Prerequisites

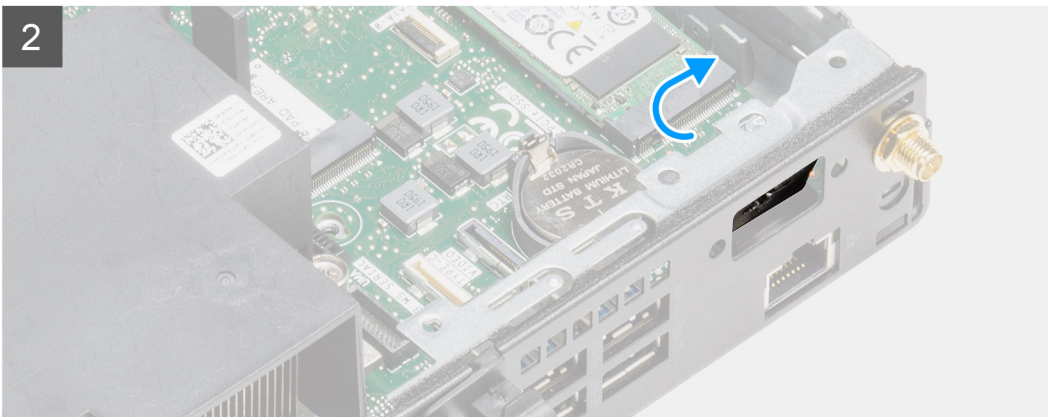
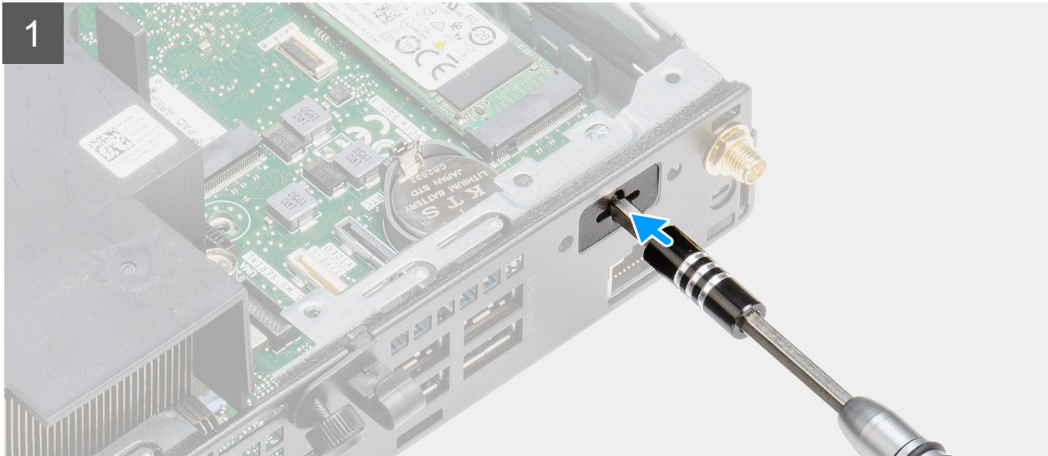
If you are replacing a component, remove the existing component before performing the installation procedure.

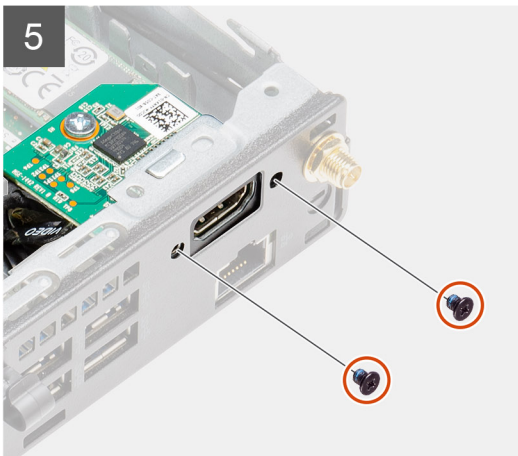
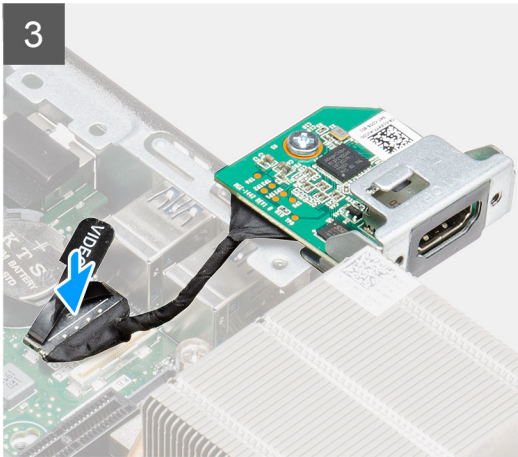
About this task

The following image indicates the location of the optional I/O card and provides a visual representation of the installation procedure.



2x
M3x3





Steps

1. Insert a flat-head screwdriver in the hole of the bracket for optional I/O module.
2. Push the bracket to release the bracket from the system chassis.
3. Connect the I/O card cable to the connector on the system board.
4. Insert the I/O card into its slot from the inside your system.
5. Use the two (M3x3) screws to secure the optional I/O card to the chassis.

NOTE: The screw type differs with the kind of I/O module used.

Next steps

1. Install the [riser card](#).
2. Install the [hard drive assembly](#).
3. Install the [front bezel](#).
4. Install the [top cover \(side bezel\)](#).
5. Install the [side cover](#).
6. Follow the procedure in [after working inside your computer](#).

Coin-cell battery

Removing the coin-cell battery

Prerequisites

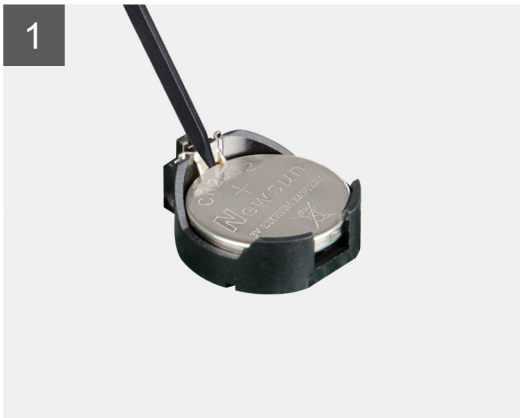
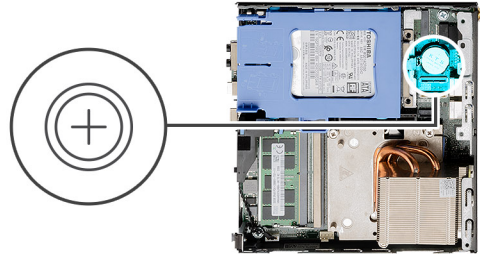
1. Follow the procedure in [before working inside your computer](#).

2. Remove the [top cover](#).
3. Remove the [front bezel](#).
4. Remove the [fan assembly](#).

i **NOTE:** Removing the coin-cell battery resets the BIOS setup program settings to default. It is recommended that you note the BIOS setup program settings before removing the coin-cell battery.

About this task

The following images indicate the location of the coin-cell battery and provide a visual representation of the removal procedure.



Steps

1. Using a plastic scribe, gently pry the coin-cell battery out of the battery socket on the system board.
2. Remove the coin-cell battery out of the system.

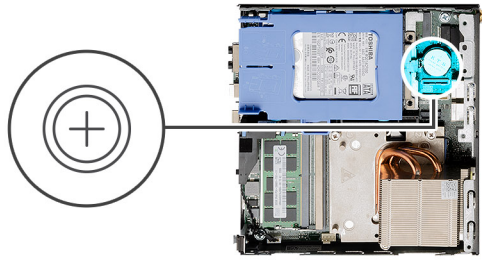
Installing the coin-cell battery

Prerequisites

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

About this task

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



Steps

1. Insert the coin cell battery with the "+" sign facing up and slide it under the securing tabs at the positive side of the connector.
2. Press the battery into the connector until it locks into place.

Next steps

1. Install the [fan assembly](#).
2. Install the [front bezel](#).
3. Install the [top cover](#).
4. Follow the procedure in [after working inside your computer](#).

Heat sink

Removing the heat sink

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).
5. Remove the [fan assembly](#).

About this task

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

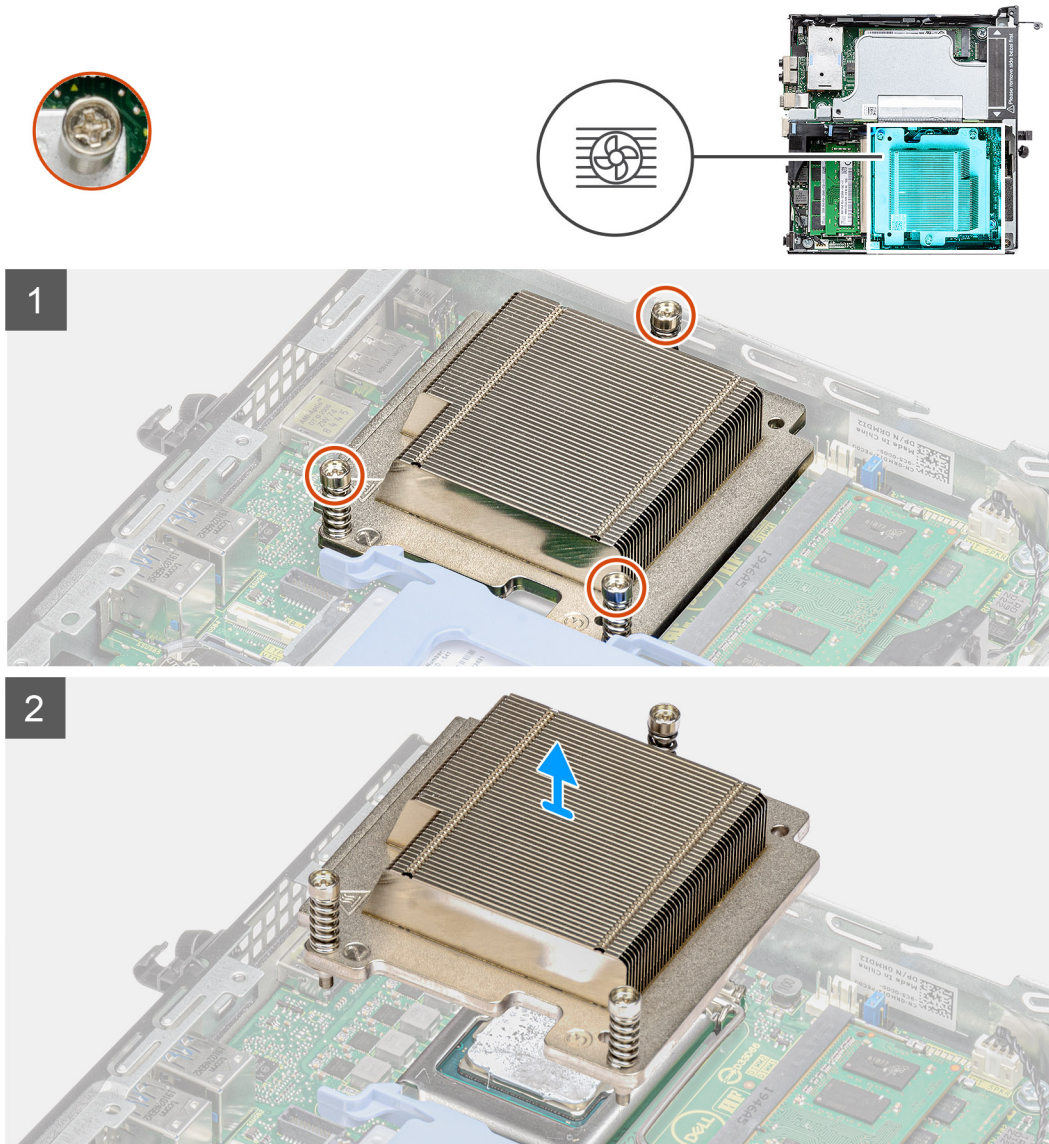


Figure 4. Heat sink shipped with system configuration shipped with 65 W CPU

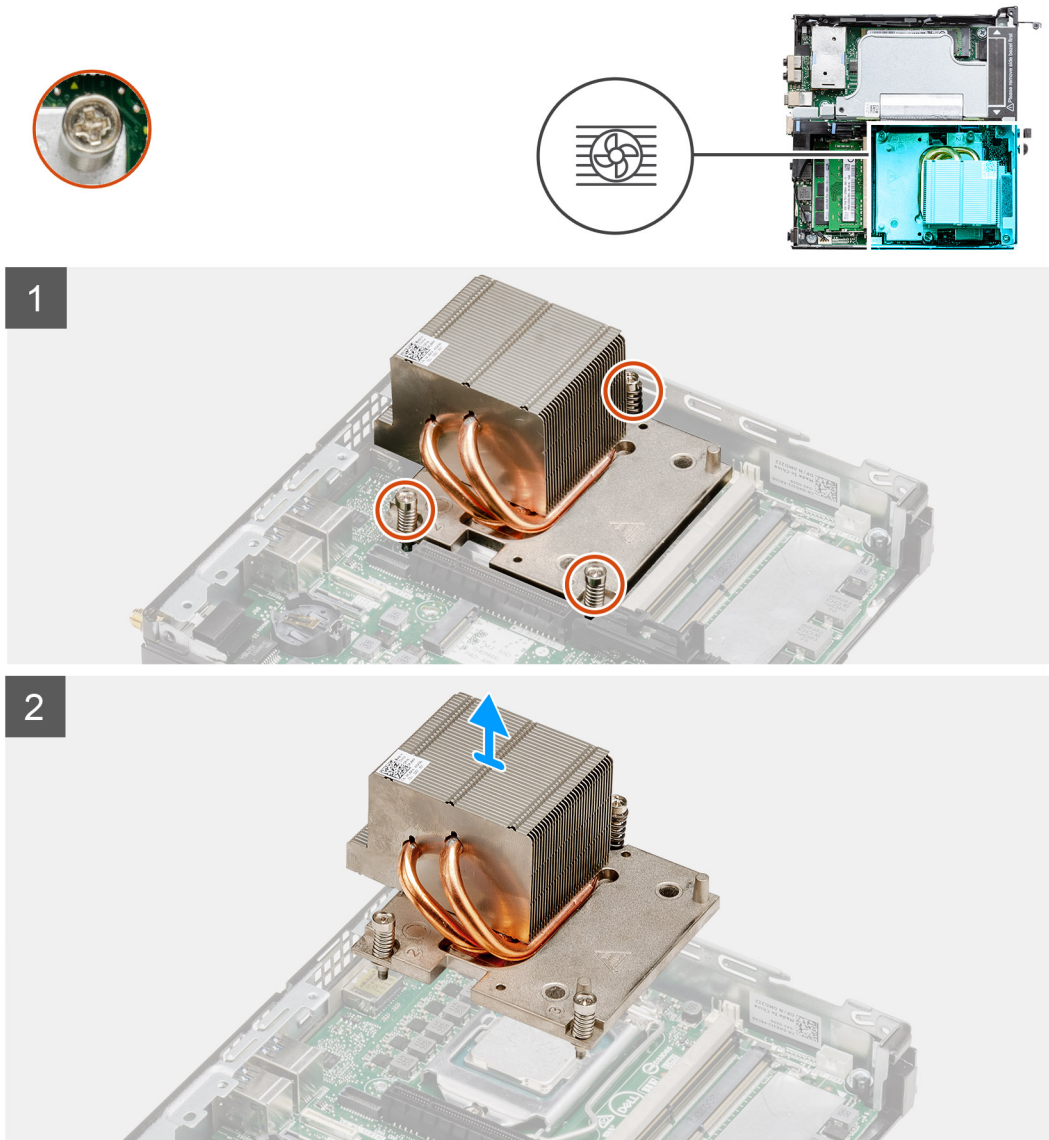


Figure 5. Heat sink shipped with system configuration shipped with 80 W CPU

Steps

1. Loosen the three captive screws that secure the heat sink to the system.
 - i** **NOTE:** Loosen the screw in the sequential order (3,2,1) as printed on the heat sink.
2. Lift the heat-sink from the system board.

Installing the heat sink

Prerequisites

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

About this task

The following image indicates the location of the heat sink and provides a visual representation of the installation procedure.

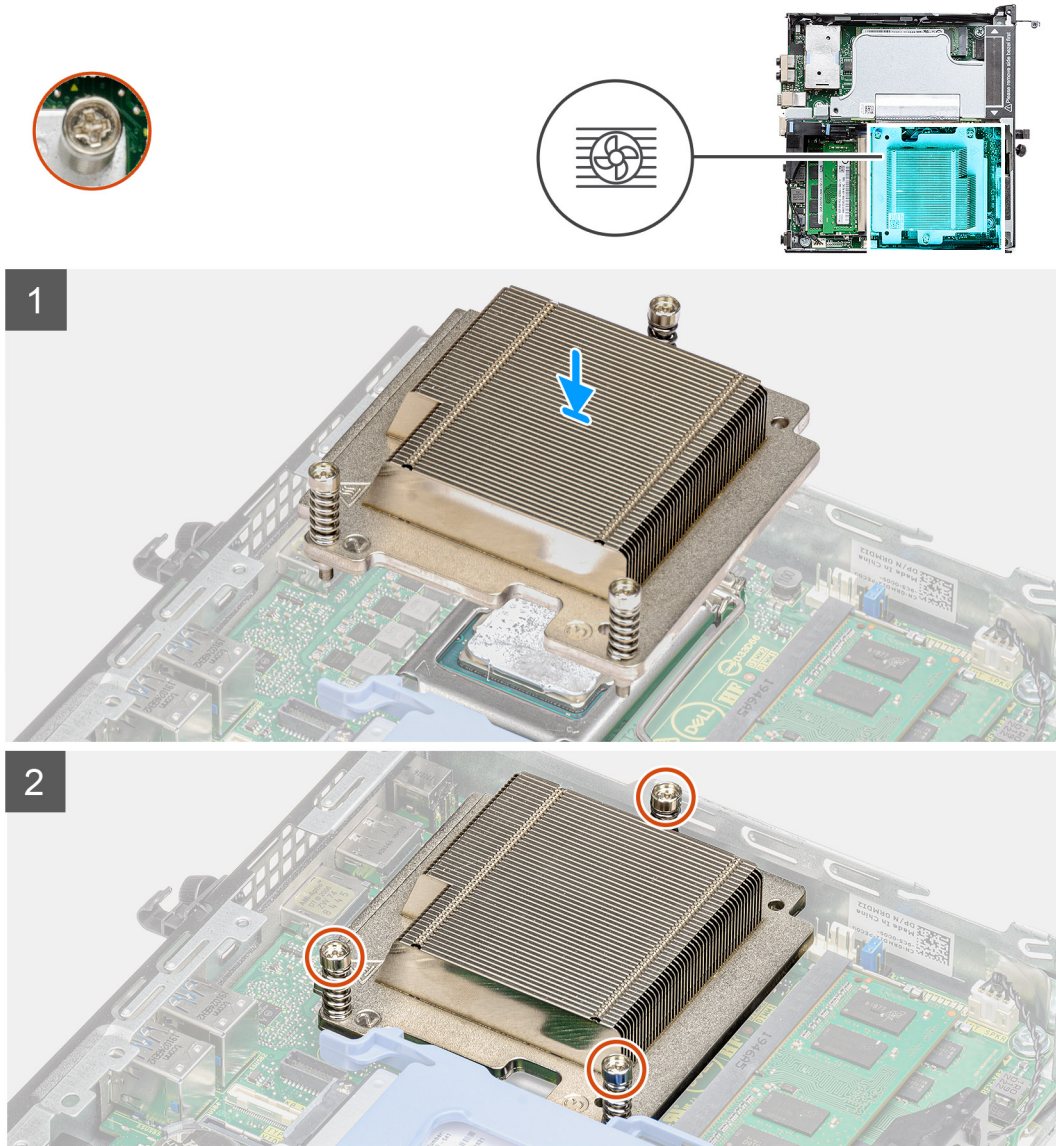


Figure 6. Heat sink shipped with system configuration shipped with 65 W CPU

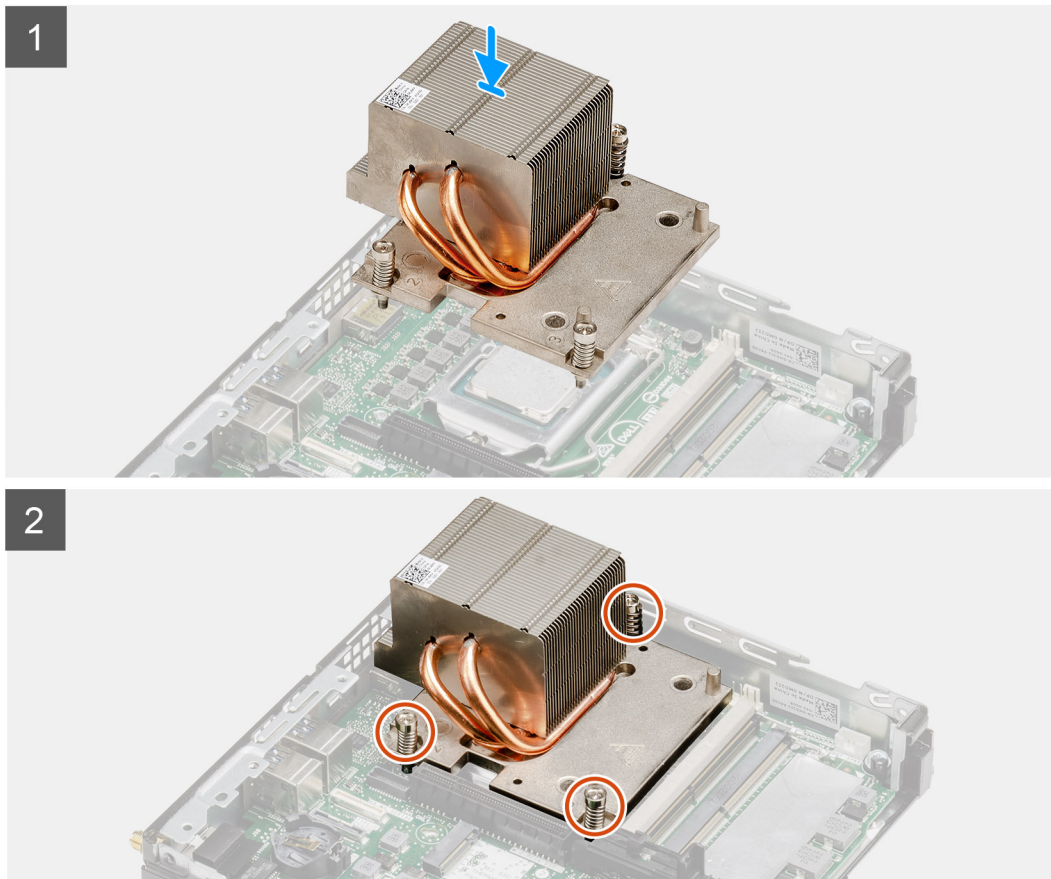
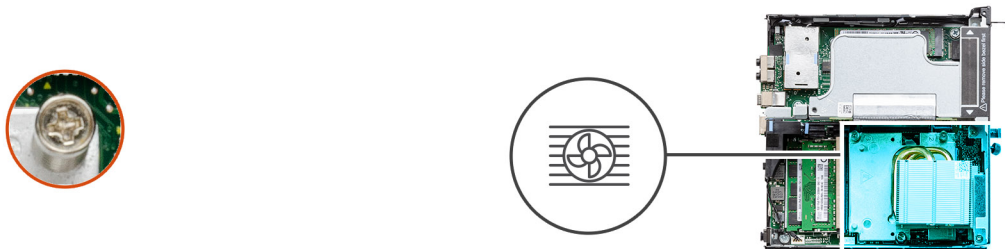


Figure 7. Heat sink shipped with system configuration shipped with 80 W CPU

Steps

1. Align the screws of the heat sink with the holders on the system board and place the heat sink on the processor.
2. Tighten the captive screws that secure the heat sink to the system board.

i **NOTE:** Tighten the screws in a sequential order (1,2,3) as printed on the heat sink.

Next steps

1. Install the [fan assembly](#).
2. Install the [front bezel](#).
3. Install the [top cover \(side bezel\)](#).
4. Install the [side cover](#).
5. Follow the procedure in [after working inside your computer](#).

Interposer module

Removing the interposer module

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#)
4. Remove the [front bezel](#).
5. Remove the [fan assembly](#).

i **NOTE:** This step is valid for system configuration that is shipped with 80 W CPU.

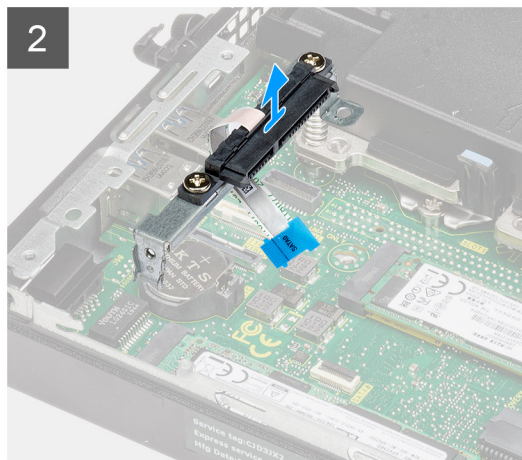
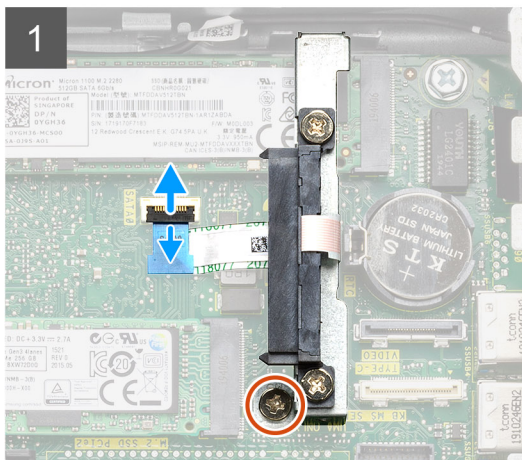
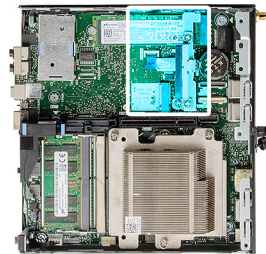
6. Remove the [riser card](#).

About this task

The following images indicate the location of the interposer module and provide a visual representation of the removal procedure.



1x
M3x5



Steps

1. Flip open the actuator and disconnect the SATA FPC cable from the system board.
2. Loosen and remove the single screw (M3x5) securing the interposer module to the system board.

Installing the interposer module

Prerequisites

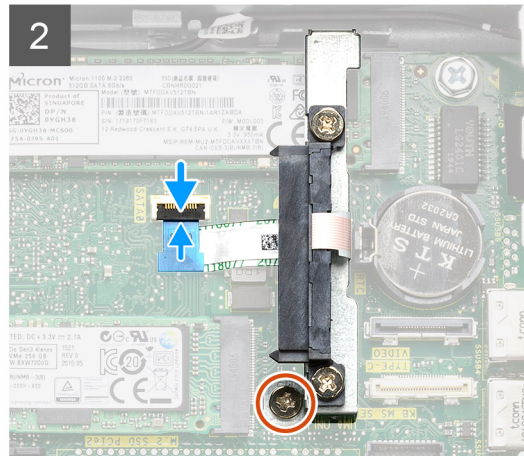
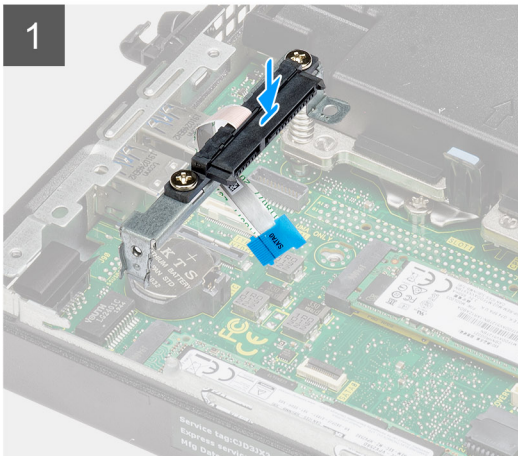
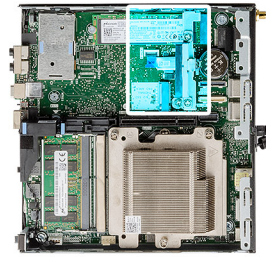
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the interposer module and provides a visual representation of the installation procedure.



1x
M3x5



Steps

1. Align and replace the interposer module on the system board.
2. Replace the single screw (M3x5) and connect the SATA cable to the connector on the system board and close the actuator.

Next steps

1. Install the [riser card](#).
2. Install the [fan assembly](#).
i **NOTE:** This step is valid for system configuration that is shipped with 80 W CPU.
3. Install the [front bezel](#).
4. Install the [top cover \(side bezel\)](#).
5. Install the [side cover](#).
6. Follow the procedure in [after working inside your computer](#).

Processor

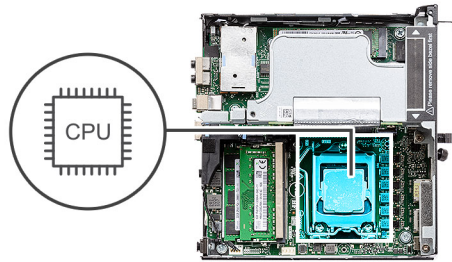
Removing the processor

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover \(side bezel\)](#).
4. Remove the [front bezel](#).
5. Remove the [fan assembly](#).
6. Remove the [heat sink](#).

About this task

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



Steps

1. Press down and push the release lever away from the processor to release it from the securing tab.
2. Lift the lever upward to lift the processor cover.

CAUTION: When removing the processor, do not touch any of the pins inside the socket or allow any objects to fall on the pins in the socket.

3. Gently lift the processor from the processor socket.

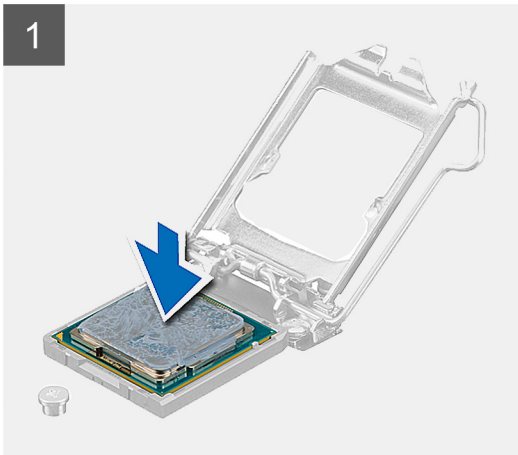
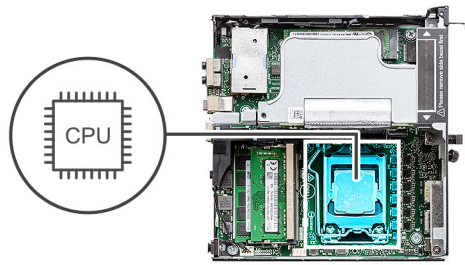
Installing the processor

Prerequisites

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

About this task

The following image indicates the location of the processor and provides a visual representation of the installation procedure.



Steps

1. Align the pin-1 corner of the processor with the pin 1 corner of the processor socket, and then place the processor in the processor socket.
i **NOTE:** The pin-1 corner of the processor has a triangle that aligns with the triangle on the pin-1 corner on the processor socket. When the processor is properly seated, all four corners are aligned at the same height. If one or more corners of the processor are higher than the others, the processor is not seated properly.
2. When the processor is fully seated in the socket, close the processor cover.
3. Press down and push the release lever under the securing tab to lock it.

Next steps

1. Install the [heat sink](#).
2. Install the [fan assembly](#).
3. Install the [front bezel](#).
4. Install the [top cover \(side bezel\)](#).
5. Install the [side cover](#).
6. 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 [side cover](#).
3. Remove the [top cover](#).
4. Remove the [SMA antenna](#)
5. Remove the [front bezel](#).
6. Remove the [hard drive assembly](#).
7. Remove the [solid-state drive](#).
8. Remove the [WLAN card](#).
9. Remove the [speaker](#).
10. Remove the [fan assembly](#).
11. Remove the [memory modules](#).
12. Remove the [riser card](#).
13. Remove the [heat sink](#).
14. Remove the [interposer module](#).

About this task

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



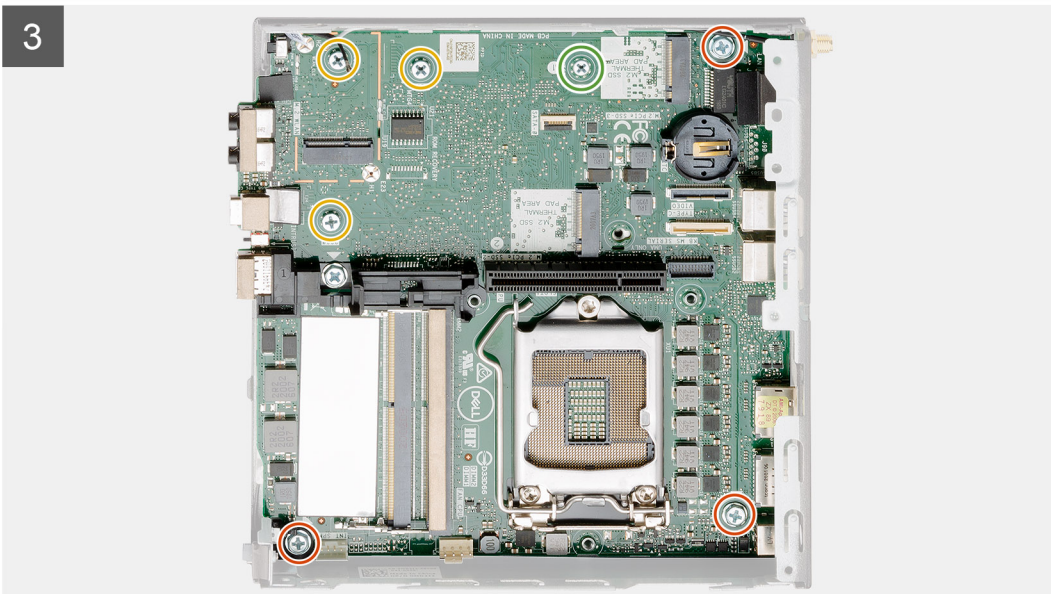
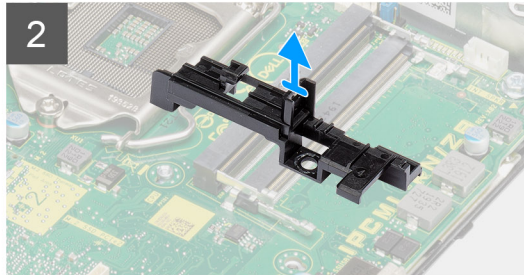
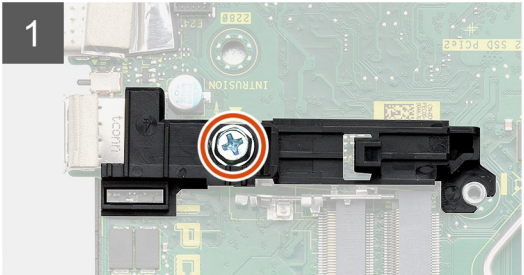
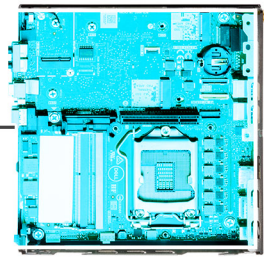
4x
6-32



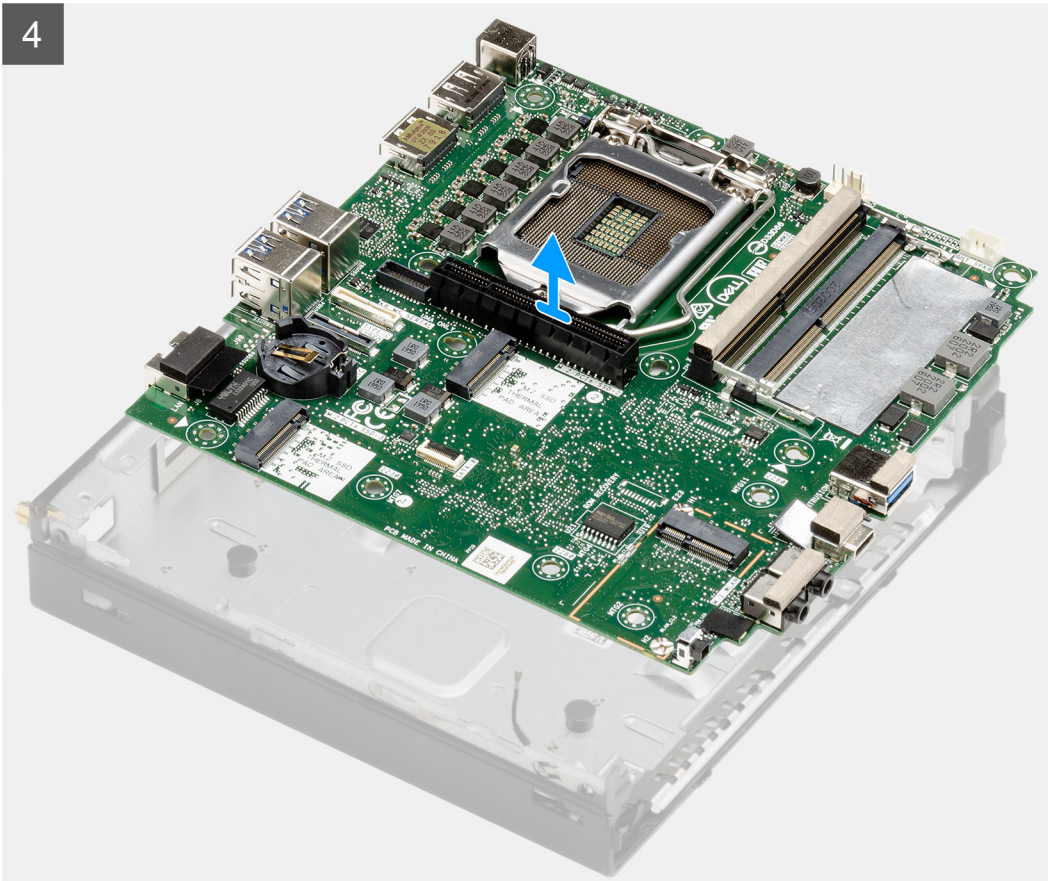
3x
M2x4



1x
M6x32



4



Steps

1. Remove the single (6-32) screw that secures the hard drive caddy support to the system board.
2. Lift the hard drive caddy support away from the system board.
3. Remove the three (M3x4) screws and three (6-32) screws that secure the system board to the chassis.
4. Lift the system board away from the chassis.

Installing the system board

Prerequisites

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

About this task

The following image indicates the location of the system board and provides a visual representation of the installation procedure.



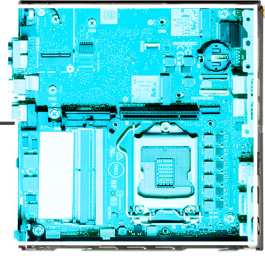
4x
6-32



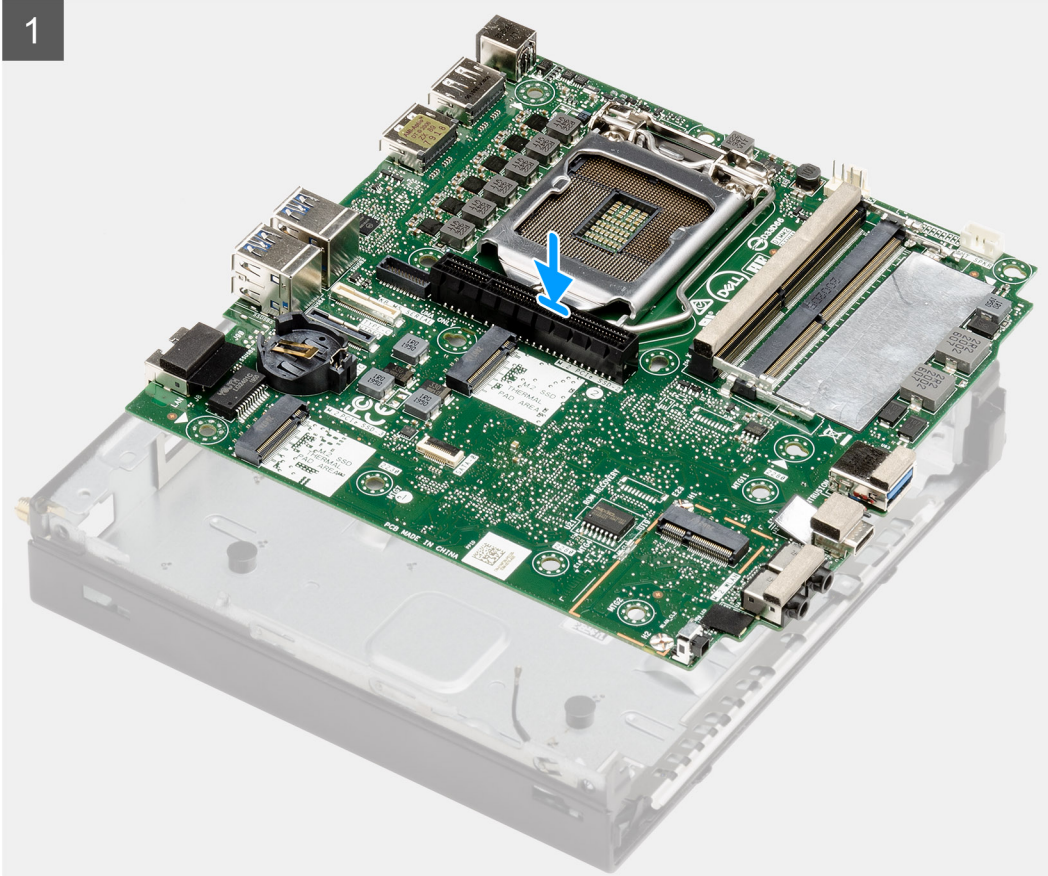
3x
M2x4

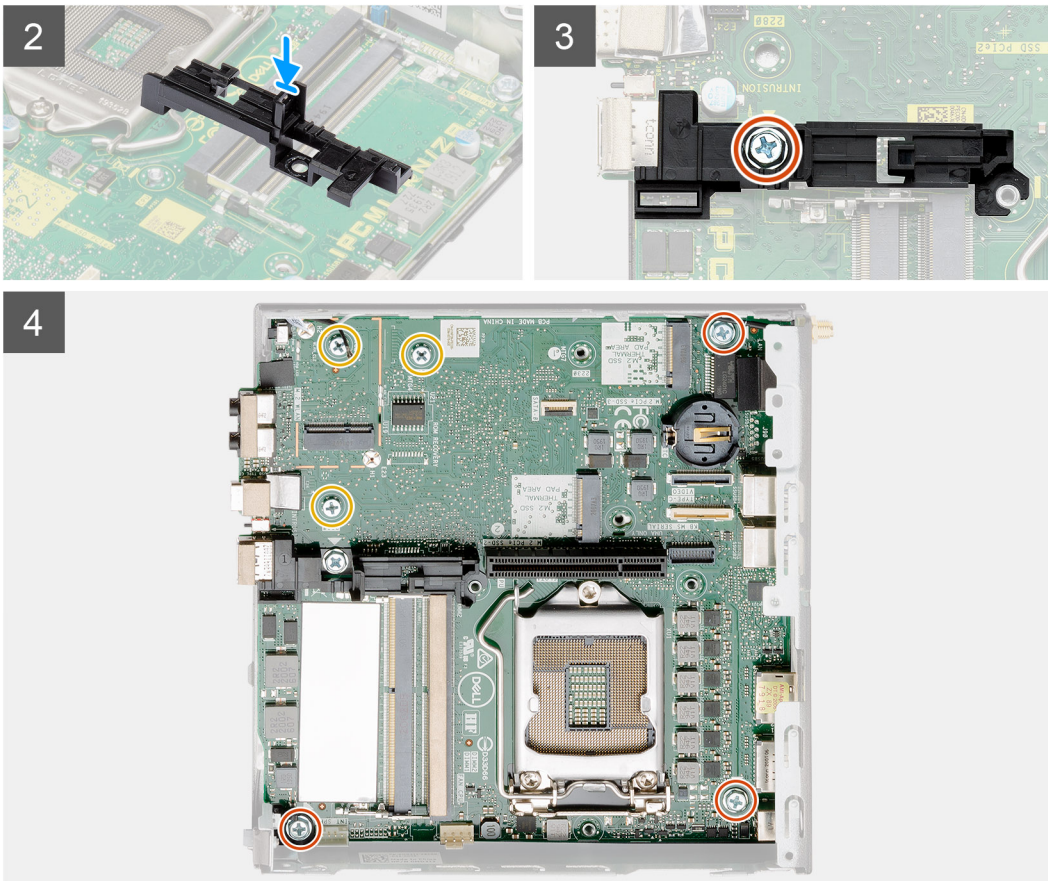


1x
M6x32



1





Steps

1. Align and lower the system board into the system until the connectors at the back of the system board align with the slots on the chassis, and the screw holes on the system board align with the standoffs on the system.
2. Align the slot on the hard drive caddy support with system board and place the hard drive caddy on the system board.
3. Replace the screw (6-32) to secure the hard drive caddy support to the system board.
4. Replace the three (M3x4) screws and three (6-32) screws to secure the system board to the chassis.

Next steps

1. Install the [interposer card](#).
2. Install the [heat sink](#).
3. Install the [riser card](#).
4. Install the [memory modules](#).
5. Install the [speaker](#).
6. Install the [fan assembly](#).
7. Install the [WLAN card](#).
8. Install the [solid-state drive](#).
9. Install the [hard drive assembly](#).
10. Install the [front bezel](#).
11. Install the [SMA antenna](#).
12. Install the [top cover](#).
13. Install the [side cover](#).
14. Follow the procedure in [after working inside your computer](#).

Internal antenna

Removing the Internal antenna

Prerequisites

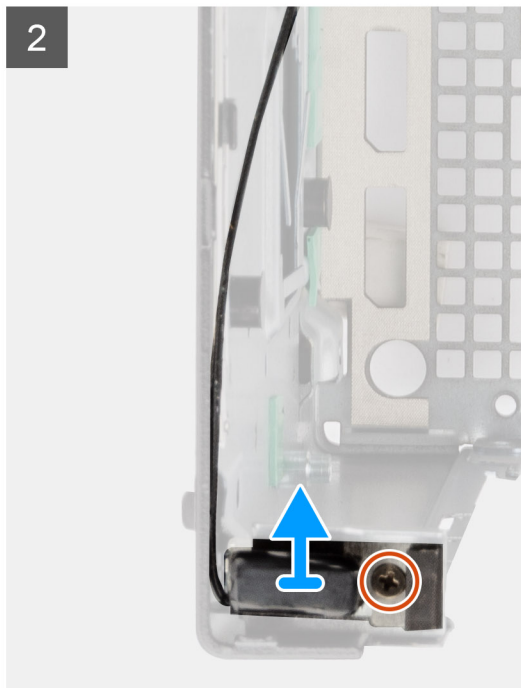
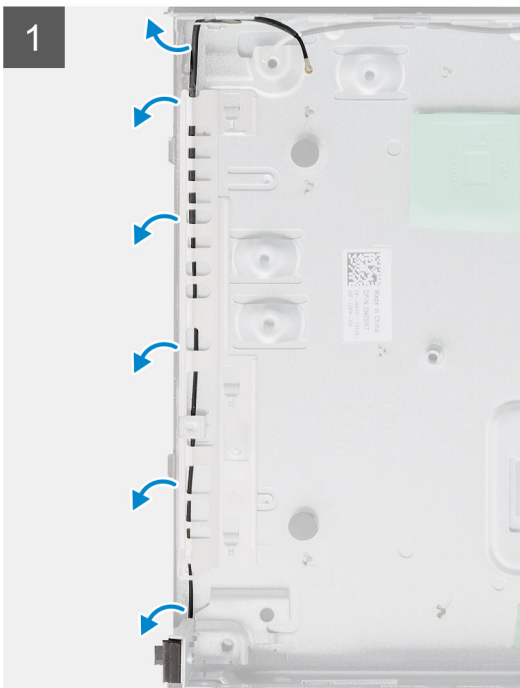
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover](#).
4. Remove the [SMA antenna](#)
5. Remove the [front bezel](#).
6. Remove the [hard drive assembly](#).
7. Remove the [solid-state drive](#).
8. Remove the [WLAN card](#).
9. Remove the [speaker](#).
10. Remove the [fan assembly](#).
11. Remove the [memory modules](#).
12. Remove the [riser card](#).
13. Remove the [heat sink](#).
14. Remove the [interposer module](#).
15. Remove the [system board](#).

About this task

The following images indicate the location of the internal antenna and provide a visual representation of the removal procedure.



1x
3x3



Steps

1. Pry the metallic routing tabs and unroute the antenna cables from the chassis.
2. Loosen and remove the single screw (M3x3) securing the internal antenna to the chassis.

Installing the Internal antenna

Prerequisites

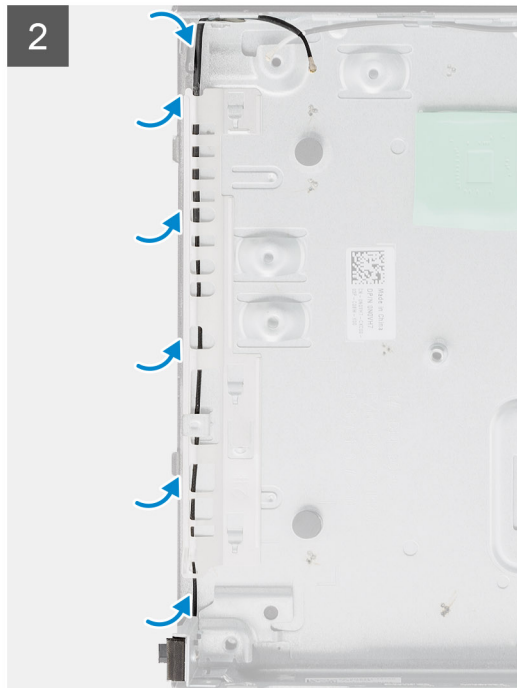
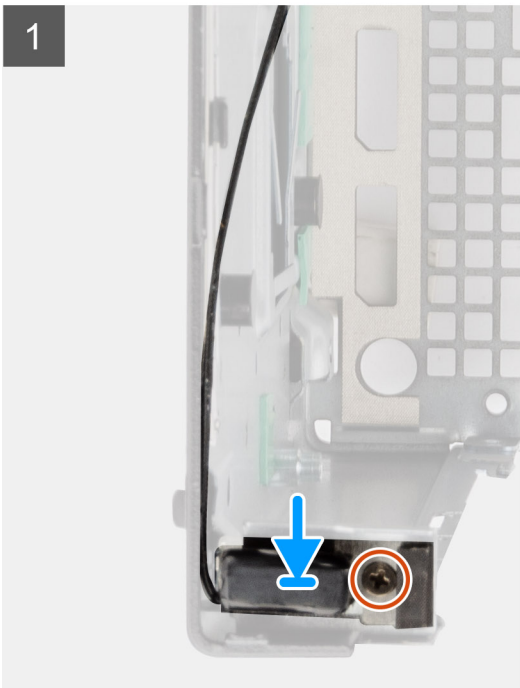
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the Internal antenna and provides a visual representation of the installation procedure.



1x
3x3



Steps

1. Align and replace the SMA antenna connector on the rear of the chassis and secure it using the single M3x3 screw to the chassis.
2. Route the antenna cable along the metallic guide path on the chassis.

Next steps

1. Install the [system board](#).
2. Install the [interposer card](#).
3. Install the [heat sink](#).
4. Install the [riser card](#).
5. Install the [memory modules](#).

6. Install the [speaker](#).
7. Install the [fan assembly](#).
8. Install the [WLAN card](#).
9. Install the [solid-state drive](#).
10. Install the [hard drive assembly](#).
11. Install the [front bezel](#).
12. Install the [SMA antenna](#).
13. Install the [top cover](#).
14. Install the [side cover](#).
15. 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 [side cover](#).
3. Remove the [top cover](#).
4. Remove the [SMA antenna](#).
5. Remove the [front bezel](#).
6. Remove the [hard drive assembly](#).
7. Remove the [solid-state drive](#).
8. Remove the [WLAN card](#).
9. Remove the [speaker](#).
10. Remove the [fan assembly](#).
11. Remove the [memory modules](#).
12. Remove the [riser card](#).
13. Remove the [heat sink](#).
14. Remove the [interposer module](#).

About this task

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



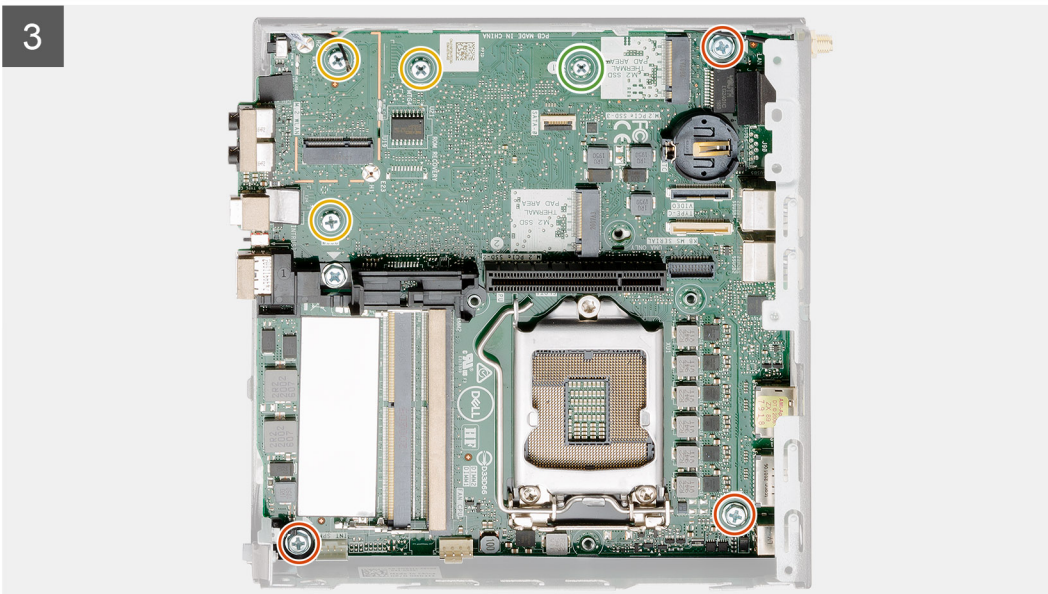
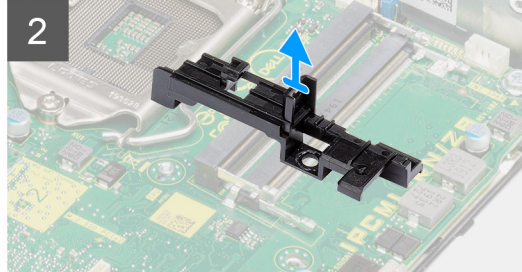
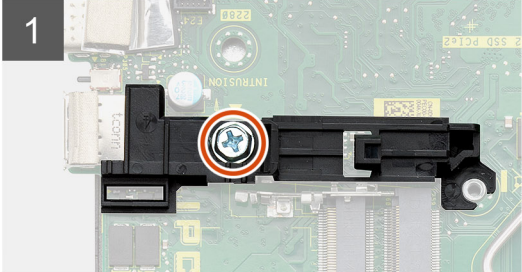
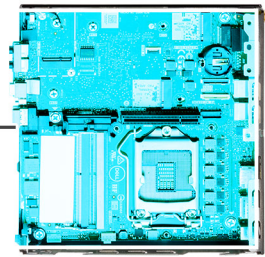
4x
6-32



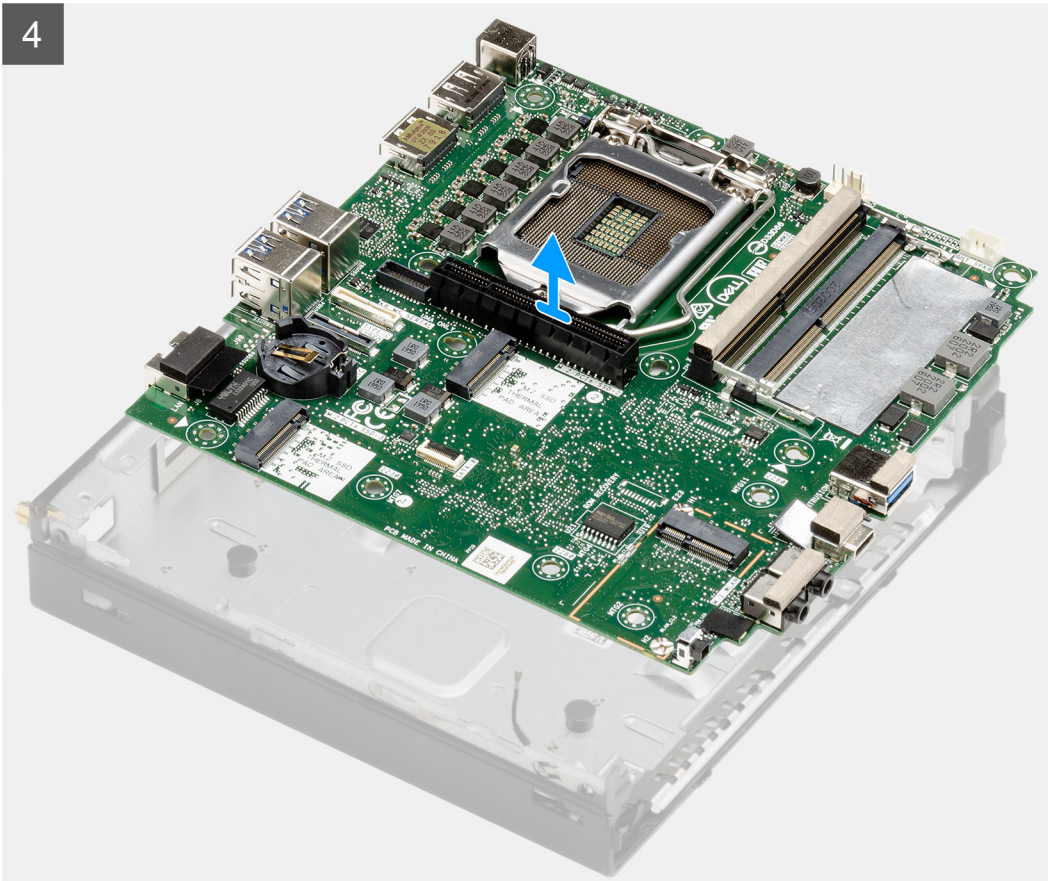
3x
M2x4



1x
M6x32



4



Steps

1. Remove the single (6-32) screw that secures the hard drive caddy support to the system board.
2. Lift the hard drive caddy support away from the system board.
3. Remove the three (M3x4) screws and three (6-32) screws that secure the system board to the chassis.
4. Lift the system board away from the chassis.

Installing the system board

Prerequisites

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

About this task

The following image indicates the location of the system board and provides a visual representation of the installation procedure.



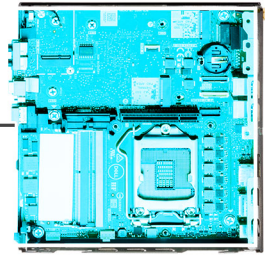
4x
6-32



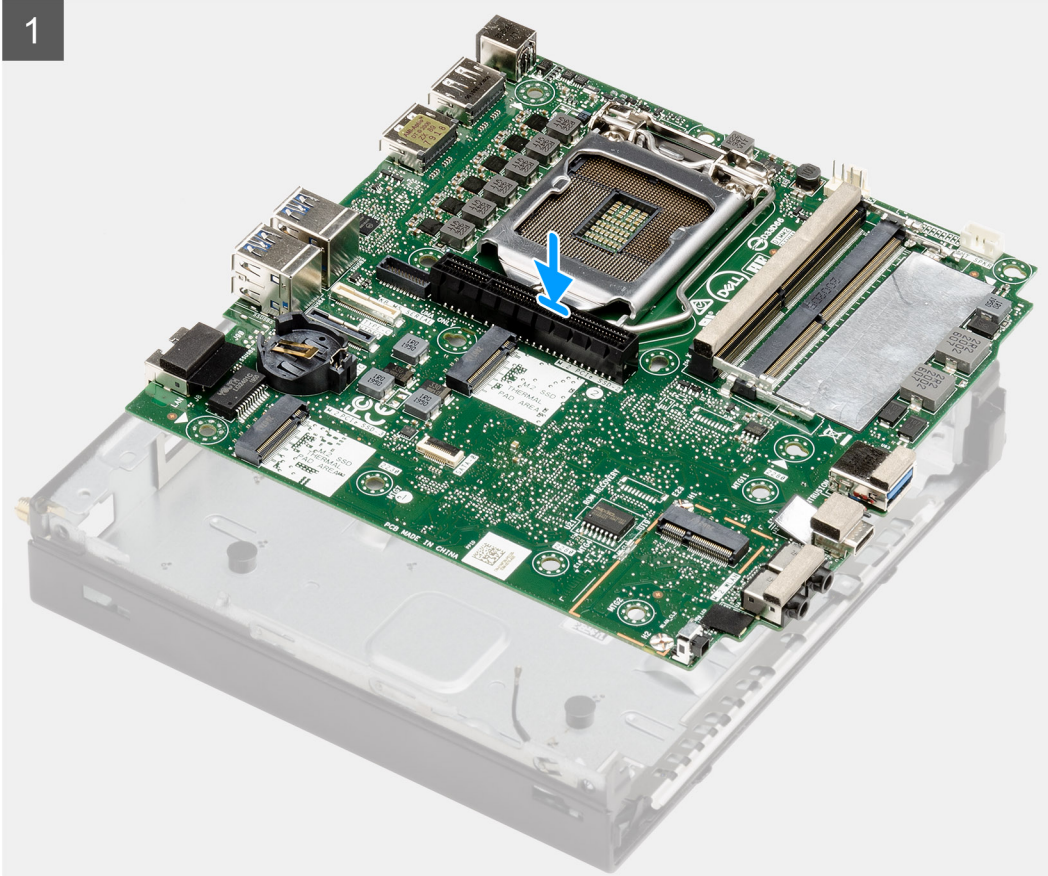
3x
M2x4

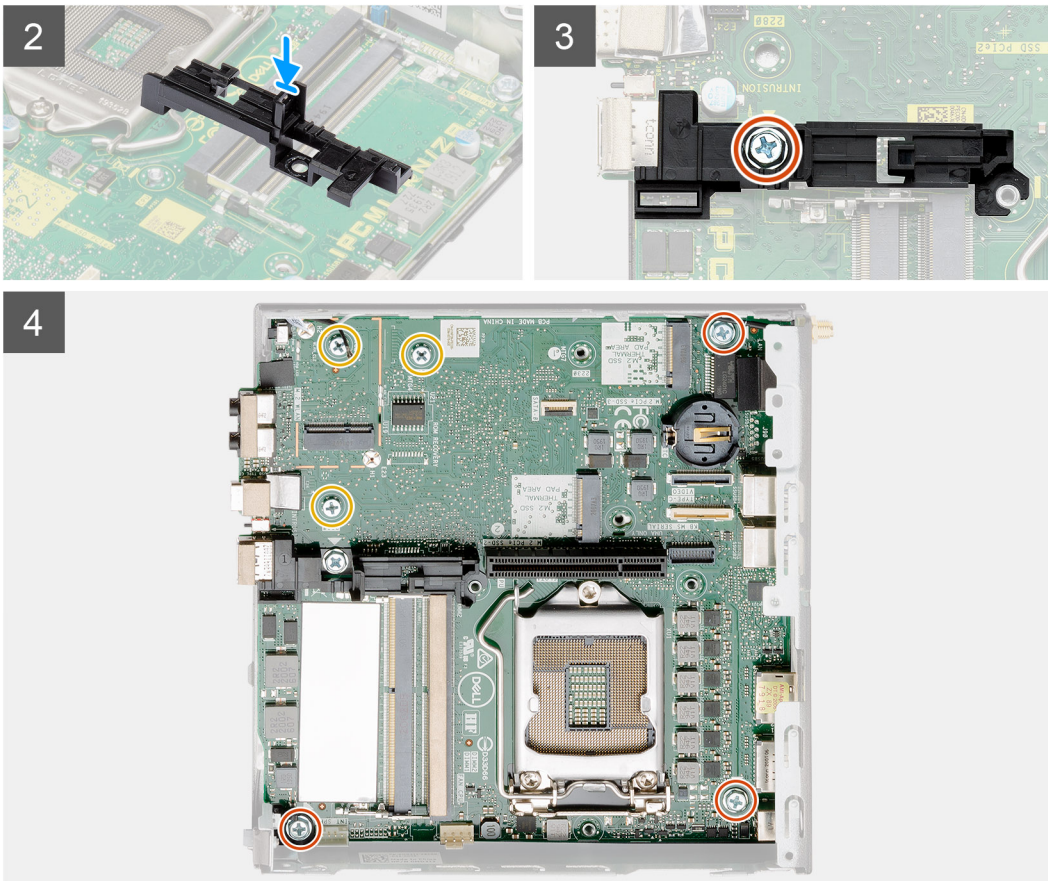


1x
M6x32



1





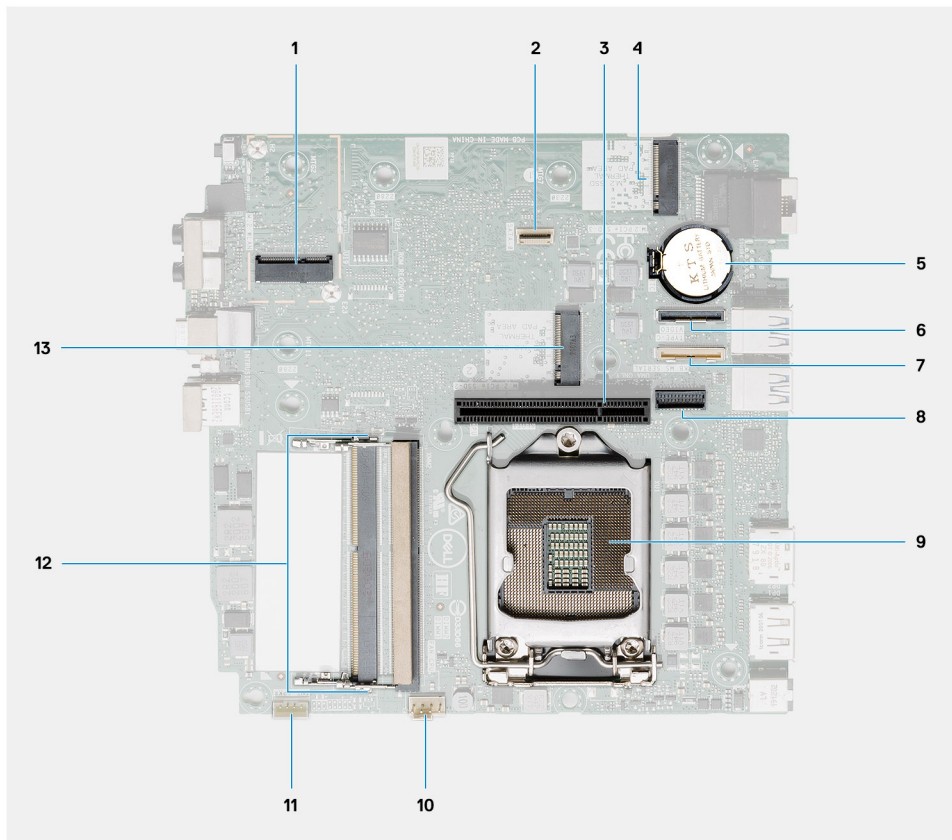
Steps

1. Align and lower the system board into the system until the connectors at the back of the system board align with the slots on the chassis, and the screw holes on the system board align with the standoffs on the system.
2. Align the slot on the hard drive caddy support with system board and place the hard drive caddy on the system board.
3. Replace the screw (6-32) to secure the hard drive caddy support to the system board.
4. Replace the three (M3x4) screws and three (6-32) screws to secure the system board to the chassis.

Next steps

1. Install the [interposer card](#).
2. Install the [heat sink](#).
3. Install the [riser card](#).
4. Install the [memory modules](#).
5. Install the [speaker](#).
6. Install the [fan assembly](#).
7. Install the [WLAN card](#).
8. Install the [solid-state drive](#).
9. Install the [hard drive assembly](#).
10. Install the [front bezel](#).
11. Install the [SMA antenna](#).
12. Install the [top cover](#).
13. Install the [side cover](#).
14. Follow the procedure in [after working inside your computer](#).

System board Layout



1. M.2 2230 WLAN connector
2. SATA FFC connector
3. PCIe x8 slot Gen3 slot
4. M.2 2230/2280 SSD PCIe x4 connector
5. Coin-cell battery
6. Optional I/O board connector (USB 3.2 Gen 2 Type-C Port)
7. Keyboard and mouse serial port connector
8. Optional video connector (VGA Port/DisplayPort 1.4 Port/HDMI 2.0b Port/USB 3.2Gen 2 Type-C Port with Alt-mode)
9. Processor socket
10. CPU Fan connector
11. Internal speaker connector
12. Two SODIMM DDR4 memory slots
13. M.2 2230/2280 SSD PCIe x4 connector

Internal antenna

Removing the Internal antenna

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [top cover](#).
4. Remove the [SMA antenna](#)
5. Remove the [front bezel](#).
6. Remove the [hard drive assembly](#).

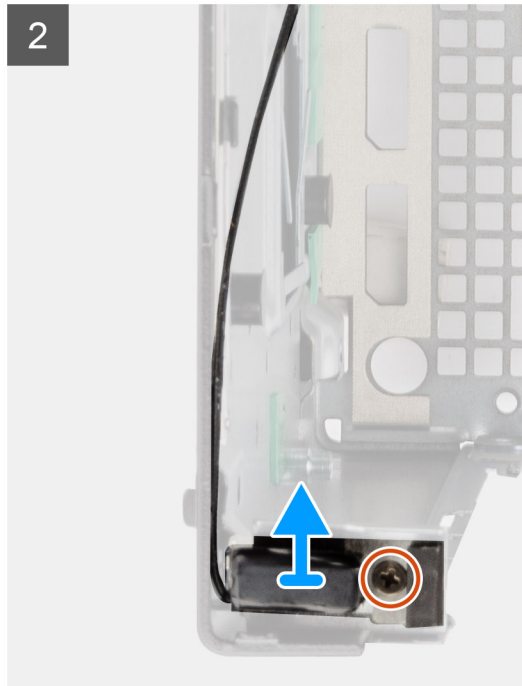
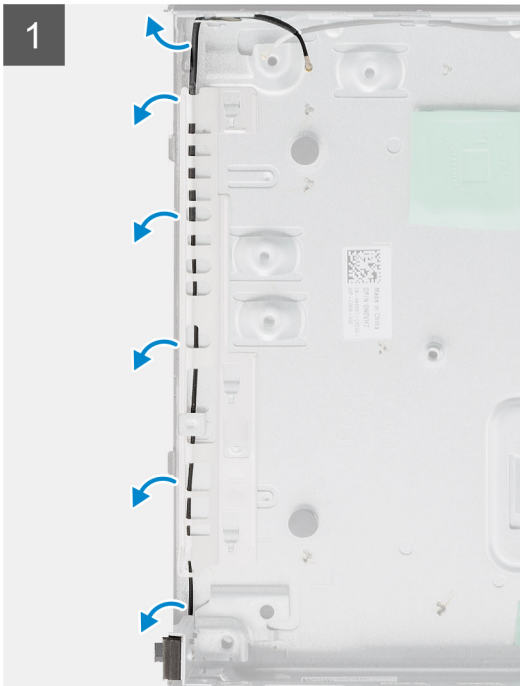
7. Remove the [solid-state drive](#).
8. Remove the [WLAN card](#).
9. Remove the [speaker](#).
10. Remove the [fan assembly](#).
11. Remove the [memory modules](#).
12. Remove the [riser card](#).
13. Remove the [heat sink](#).
14. Remove the [interposer module](#).
15. Remove the [system board](#).

About this task

The following images indicate the location of the internal antenna and provide a visual representation of the removal procedure.



1x
3x3



Steps

1. Pry the metallic routing tabs and unroute the antenna cables from the chassis.
2. Loosen and remove the single screw (M3x3) securing the internal antenna to the chassis.

Installing the Internal antenna

Prerequisites

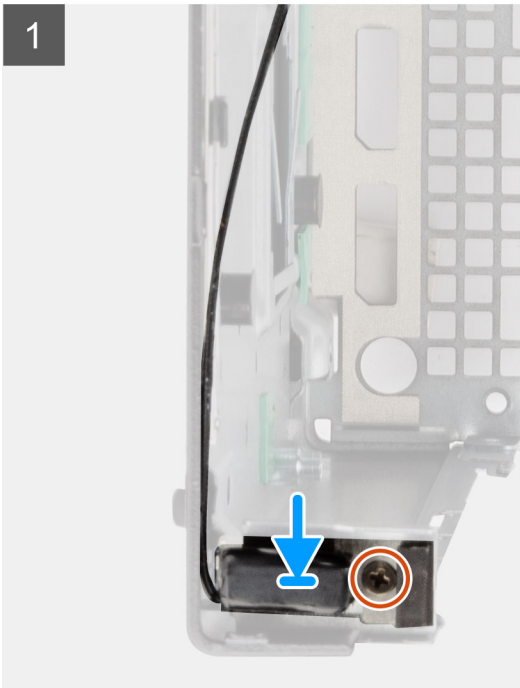
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the Internal antenna and provides a visual representation of the installation procedure.



1x
3x3



Steps

1. Align and replace the SMA antenna connector on the rear of the chassis and secure it using the single M3x3 screw to the chassis.
2. Route the antenna cable along the metallic guide path on the chassis.

Next steps

1. Install the [system board](#).
2. Install the [interposer card](#).
3. Install the [heat sink](#).
4. Install the [riser card](#).
5. Install the [memory modules](#).
6. Install the [speaker](#).
7. Install the [fan assembly](#).
8. Install the [WLAN card](#).
9. Install the [solid-state drive](#).
10. Install the [hard drive assembly](#).
11. Install the [front bezel](#).
12. Install the [SMA antenna](#).
13. Install the [top cover](#).
14. Install the [side cover](#).
15. Follow the procedure in [after working inside your computer](#).

Troubleshooting

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 10 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/support.

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.

Dell SupportAssist Pre-boot System Performance Check diagnostics

About this task

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

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

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

For more information, see [Resolve Hardware Issues With Built-in and Online Diagnostics \(SupportAssist ePSA, ePSA or PSA Error Codes\)](#).

Running the SupportAssist Pre-Boot System Performance Check

Steps

1. Turn on your computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.
4. Click the arrow at the bottom left corner.
Diagnostics front page is displayed.
5. Click the arrow in the lower-right corner to go to the page listing.
The items detected are listed.
6. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
7. Select the device from the left pane and click **Run Tests**.
8. If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.

Diagnostic LED behavior

Table 9. Diagnostic LED behavior

Blinking pattern		Problem description	Suggested resolution
Amber	White		
1	2	Unrecoverable SPI Flash Failure	
2	1	CPU failure	<ul style="list-style-type: none"> • Run the Intel CPU diagnostics tools. • If problem persists, replace the system board.
2	2	System board failure (included BIOS corruption or ROM error)	<ul style="list-style-type: none"> • Flash latest BIOS version • If problem persists, replace the system board.
2	3	No memory/RAM detected	<ul style="list-style-type: none"> • Confirm that the memory module is installed properly. • If problem persists, replace the memory module.
2	4	Memory/RAM failure	<ul style="list-style-type: none"> • Reset the memory module. • If problem persists, replace the memory module.
2	5	Invalid memory installed	<ul style="list-style-type: none"> • Reset the memory module. • If problem persists, replace the memory module.
2	6	System board / Chipset Error / Clock failure / Gate A20 failure / Super I/O failure / Keyboard controller failure	<ul style="list-style-type: none"> • Flash latest BIOS version • If problem persists, replace the system board.

Table 9. Diagnostic LED behavior (continued)

Blinking pattern		Problem description	Suggested resolution
Amber	White		
3	1	CMOS battery failure	<ul style="list-style-type: none"> Reset the CMOS battery connection. If problem persists, replace the RTS battery.
3	2	PCI or Video card/chip failure	Replace the system board.
3	3	BIOS Recovery image not found	<ul style="list-style-type: none"> Flash latest BIOS version If problem persists, replace the system board.
3	4	BIOS Recovery image found but invalid	<ul style="list-style-type: none"> Flash latest BIOS version If problem persists, replace the system board.
3	5	Power rail failure	<ul style="list-style-type: none"> EC ran into power sequencing failure. If problem persists, replace the system board.
3	6	SBIOS Flash corruption	<ul style="list-style-type: none"> Flash corruption detected by SBIOS If problem persists, replace the system board.
3	7	Intel ME (Management Engine) Error	<ul style="list-style-type: none"> Timeout waiting on ME to reply to HECI message If problem persists, replace the system board.
4	2	CPU Power Cable Connection Issue	

Diagnostic error messages

Table 10. 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.

Table 10. Diagnostic error messages (continued)

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

Table 10. Diagnostic error messages (continued)

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


Table 10. Diagnostic error messages (continued)

Error messages	Description
TIME-OF-DAY CLOCK LOST POWER	System configuration settings are corrupted. Connect your computer to an electrical outlet to charge the battery. If the problem persists, try to restore the data by entering the System Setup program, then immediately exit the program. If the message reappears, Contact Dell.
TIME-OF-DAY CLOCK STOPPED	The reserve battery that supports the system configuration settings may require recharging. Connect your computer to an electrical outlet to charge the battery. If the problem persists, Contact Dell.
TIME-OF-DAY NOT SET-PLEASE RUN THE SYSTEM SETUP PROGRAM	The time or date stored in the system setup program does not match the system clock. Correct the settings for the Date and Time options.
TIMER CHIP COUNTER 2 FAILED	A chip on the system board may be malfunctioning. Run the System Set tests in Dell Diagnostics.
UNEXPECTED INTERRUPT IN PROTECTED MODE	The keyboard controller may be malfunctioning, or a memory module may be loose. Run the System Memory tests and the Keyboard Controller test in Dell Diagnostics or Contact Dell.
X:\ IS NOT ACCESSIBLE. THE DEVICE IS NOT READY	Insert a disk into the drive and try again.

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.

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 11. 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	<ul style="list-style-type: none"> 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:	<ol style="list-style-type: none"> Go to https://www.dell.com/support/home/?app=knowledgebase. Type the subject or keyword in the Search box. Click Search to retrieve the related articles.
Learn and get more information about your product: <ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> 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.