

Dell Pro Precision 9 T2

PW9T2260

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 inside 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 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 [Dell Regulatory Compliance Home Page](#).

 **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:** You should only perform troubleshooting and repairs as authorized or directed by the Dell technical support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

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

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

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

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. For Windows operating system, 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. Turn off all the attached peripherals.

4. Disconnect your computer from the electrical outlet.

5. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.

 **CAUTION:** To disconnect a network cable, unplug the cable from your computer.

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

Safety precautions

This section details the primary steps to be followed before disassembling any device or component.

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

- Turn off the computer and all attached peripherals.
- Disconnect the computer from AC power.
- Disconnect all network cables and peripherals from the computer.
- Use an ESD field service kit when working inside your computer to avoid electrostatic discharge (ESD) damage.
- Place the removed component on an anti-static mat after removing it from the computer.
- Press and hold the power button for 15 seconds to discharge the 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 by using 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 nonmetal surface. Ensure that the wrist strap is secure and in full contact with your skin. Remove all jewelry, watches, bracelets, or rings before grounding 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 modules, and system boards. A slight charge 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.

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 module that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code that is 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 memory module receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms that are 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, and so on.

Intermittent failures that are also called latent or "walking wounded" are difficult to detect and troubleshoot.

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. Wireless anti-static straps 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, use the anti-static wrist strap to discharge the static electricity from your body.

NOTE: You can protect against ESD and discharge static electricity from your body by touching a metal-grounded object before you interact with anything electronic, for example, an unpainted metal surface on your computer's I/O panel. When connecting a peripheral (including handheld digital assistants) to your computer, you should always ground both yourself and the peripheral before connecting it to the computer. In addition, as you work inside the computer, periodically touch a metal-grounded object to remove any static charge that your body may have accumulated.

For more information about the wrist strap and ESD wrist strap tester, see [Components of an ESD Field Service Kit](#).

- 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.

 **CAUTION:** It is critical to keep ESD-sensitive devices away from internal parts that are insulated and often highly charged, such as plastic heat sink casings.

Working environment

Before the ESD Field Service kit is deployed, conduct an evaluation of the site to ensure proper setup and readiness. For example, deploying the kit for a server environment is different than for a desktop or laptop environment. Servers are typically installed in a rack within a data center; desktops or laptops 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 computer 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 component 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 anti-static mat, in the computer, or inside an ESD bag.

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 anti-static mat and to any bare metal on the computer being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the anti-static mat. ESD-sensitive items are safe in your hand, on the anti-static mat, in the computer, or inside an ESD bag.
- **Wrist Strap and Bonding Wire** – If an anti-static mat is not being used, the wrist strap and bonding wire should be connected directly between your wrist and an exposed metal part of the hardware. If you are using an anti-static mat, connect the wrist strap and bonding wire to the anti-static mat to ensure protection for any hardware placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the anti-static mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, anti-static mat, and bonding wire. Never use wireless wrist straps. Always be cautious 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 an ESD strap are prone to damage over time. When using an unmonitored ESD kit, it is recommended to test the wrist strap regularly—ideally before each service session, and at a minimum, once per week. The most reliable method for testing is with a wrist strap tester. To perform the test, connect the bonding wire of the wrist strap to the tester while wearing the strap. Press the test button to initiate the check. A green LED indicates a successful test, while a red LED and audible alarm signal a failure.

 **NOTE:** It is recommended to always use the traditional wired ESD grounding wrist strap and protective anti-static mat when servicing Dell products. In addition, it is critical to keep sensitive parts separate from all insulator parts while servicing the computer.

Transporting sensitive components

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

Lifting equipment

Adhere to the following guidelines when lifting heavy equipment:

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

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

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 components 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.

Information on repairability for Québec - From Dell Canada Inc. - to Quebec consumers

Dell does not guarantee the availability of replacement parts, repair services, or information necessary for maintenance or repair.

BitLocker

When updating the BIOS on a computer with BitLocker enabled, consider the following precautions.

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the BitLocker key is not recognized the next time you reboot the computer. You will then be prompted to enter the recovery key to proceed, and the computer displays a prompt for the recovery key on each reboot. Failure to provide the recovery key can result in data loss or an operating system reinstall. For more information, refer [Updating the BIOS on Dell systems with BitLocker enabled](#).

The installation of the following components triggers BitLocker:

- Hard disk drive or solid state drive
- System board

Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #1
- Phillips screwdriver #2
- Torx #6 (T6) screwdriver
- Torx #30 (T30) screwdriver
- 8 mm hex socket screwdriver

Screw list

- NOTE:** When removing screws from a component, it is recommended to note the screw type and the quantity of screws, and then place them in a screw storage box. This is to ensure that the correct number of screws and correct screw type is restored when the component is replaced.
- NOTE:** Some computers have magnetic surfaces. Ensure that the screws are not left attached to such surfaces when replacing a component.
- NOTE:** Screw color may vary depending on the configuration ordered.

Table 1. Screw list

Component	Screw type	Quantity	Screw image
Side cover	captive screw	1	-
Front I/O-bracket	#6-32	1	 Figure 1. #6-32
M.2 carrier cover	M3x3.5	4	 Figure 2. M3x3.5
M.2 2230/2280 SSD (in carrier)	M2x3.5	1	 Figure 3. M2x3.5
M.2 SSD heatsink	M2x8.5 (captive screw)	1	-
M.2 2230 SSD (onboard)	M2x6 (standoff nut)	1	-
Wireless-card bracket	M2x3.5	1	 Figure 4. M2x3.5
Front upper chassis fan	M3x5	1	 Figure 5. M3x5

Table 1. Screw list (continued)

Component	Screw type	Quantity	Screw image
Front lower chassis fan	M3x5	1	 Figure 6. M3x5
Rear chassis fan	M3x5	1	 Figure 7. M3x5
PCIe filler	M3x5	4	 Figure 8. M3x5
Graphics card end holder	Captive screws	2	-
Graphics card middle-holder base	Captive screws	2	-
Graphics card middle holder	#6-32	1	 Figure 9. #6-32
PSU cover	#6-32	1	 Figure 10. #6-32
PSU	#6-32	4	 Figure 11. #6-32
Heat-sink assembly	Captive screw	4	-
Optional serial module	M3	2	 Figure 12. M3
Cable box	#6-32	2	 Figure 13. #6-32

Table 1. Screw list (continued)

Component	Screw type	Quantity	Screw image
Processor fan	M3	6	 Figure 14. M3
System board	#6-32	10	 Figure 15. #6-32

Major components of Dell Pro Precision 9 T2 PW9T2260

The following image shows the major components of Dell Pro Precision 9 T2 PW9T2260.

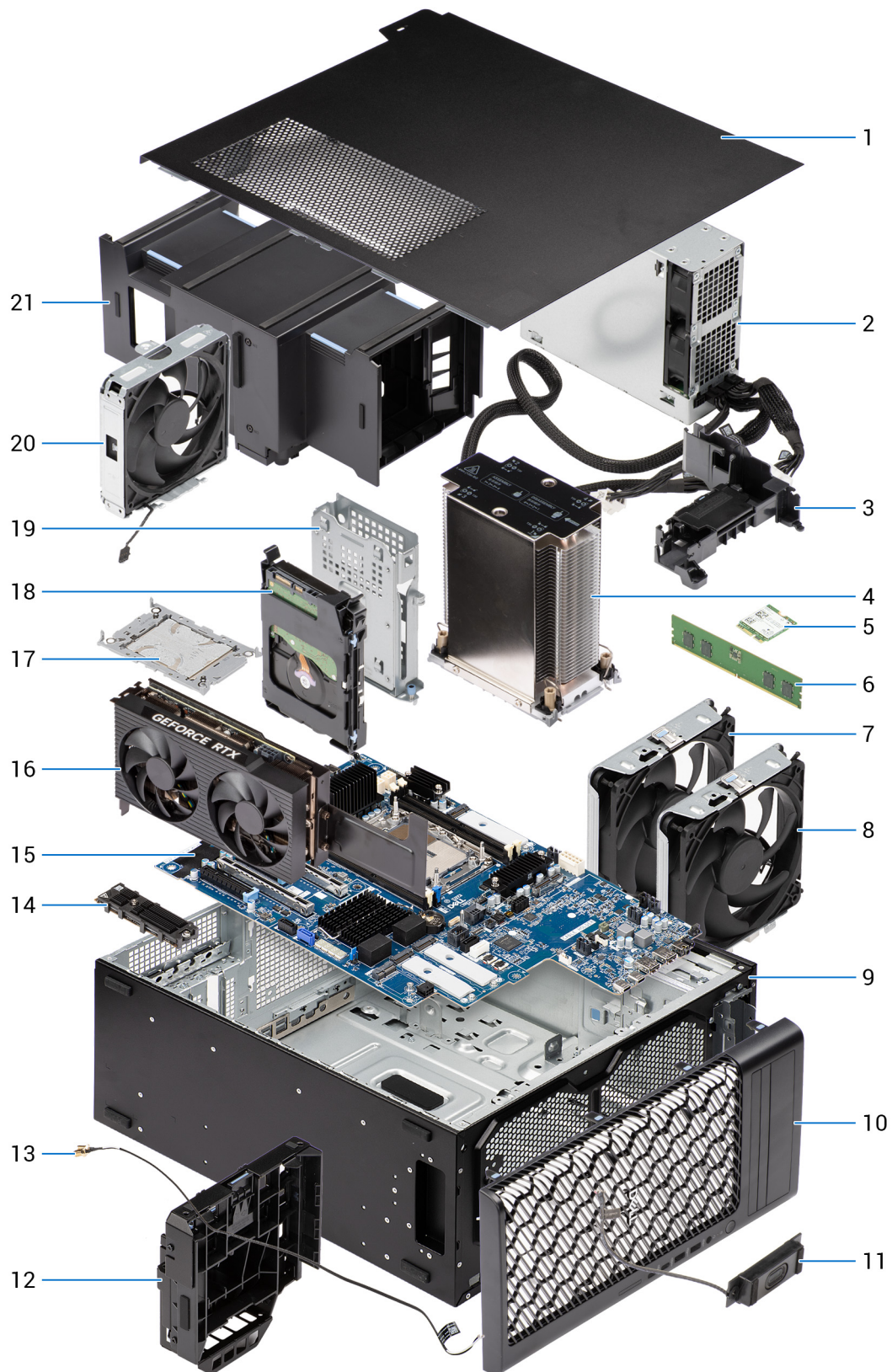


Figure 16. Major components of Dell Pro Precision 9 T2 PW9T2260

1. Side cover
2. Power-supply unit
3. Cable box

4. Heat-sink assembly
5. Wireless card
6. Memory module
7. Rear chassis fan
8. Front chassis fan
9. Computer chassis
10. Front bezel
11. Internal speaker
12. Graphics card end holder
13. Wireless internal SMA cable
14. M.2 SSD module with heatsink
15. System board
16. Graphics card
17. Processor
18. Hard-drive assembly
19. Hard drive bracket
20. Processor fan
21. Air shroud

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.

Customer Replaceable Units (CRUs) and Field Replaceable Units (FRUs) list

The replaceable components in Dell Pro Precision 9 T2 PW9T2260 are either Customer Replaceable Units (CRUs) or Field Replaceable Units (FRUs).

CAUTION: CRUs may be replaced by the customer, following the safety precautions and replacement procedures.

CAUTION: FRUs should be replaced by an authorized service technician, who is a trained technical repair specialist.

CAUTION: Replacement of FRUs by persons other than authorized service technicians may result in damage to the computer or data loss.

NOTE: Damages resulting from improper replacement or from failure to follow instructions are not covered by your warranty. Consider having a trained technical repair specialist perform replacements of FRU components.

Table 2. CRU and FRU list

Customer Replaceable Unit (CRU)	Field Replaceable Unit (FRU)
Side cover	Front NVMe module
Front bezel	Processor fan
Slim ODD, cable, and bezel	Wireless internal SMA cable (optional)
M.2 SSD carrier and M.2 SSD tray	Processor heat-sink assembly
Front 3.5-inch hard drive, carrier, cable, and bezel	Processor
Air shroud	External ports (optional modules)
Internal 3.5-inch hard drive, carrier, and cable	System board
Onboard M.2 SSD 2230/2280	
Onboard M.2 SSD heatsink	

Table 2. CRU and FRU list (continued)

Customer Replaceable Unit (CRU)	Field Replaceable Unit (FRU)
Wireless card	
Wireless external puck antenna (optional)	
Memory modules	
Graphics card	
Graphics card middle-holder	
Graphics card power-cable	
PCIe Expansion cards	
Intrusion switch and cable	
Internal speaker	
Coin-cell battery	
Power-supply unit and cables	
Front upper chassis fan (optional)	
Front lower chassis fan (optional)	
Rear chassis fan	
Processor-fan bracket	

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.



Figure 17. Removing the side cover

Steps

1. Loosen the single captive screw that secures the side cover release latch to the computer.

 **NOTE:** Ensure that the captive screw is fully loosened.

2. Pull the release latch away from the back of the chassis to release the cover from the computer.
3. Pull the side cover away from the chassis and remove the side cover.

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 images indicate the location of the side cover and provide a visual representation of the installation procedure.



Figure 18. Installing the side cover

Steps

1. Align the tabs on the side cover with the slots on the chassis.
2. Press the side cover towards the side of the computer to install it.
The release latch automatically locks the side cover to the computer.
3. Tighten the single captive screw to secure the side cover to the computer.

Next steps

1. 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 [side cover](#).
3. Remove the [air shroud](#).

About this task

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

 **CAUTION:** Removing the coin-cell battery clears the CMOS and resets BIOS settings.

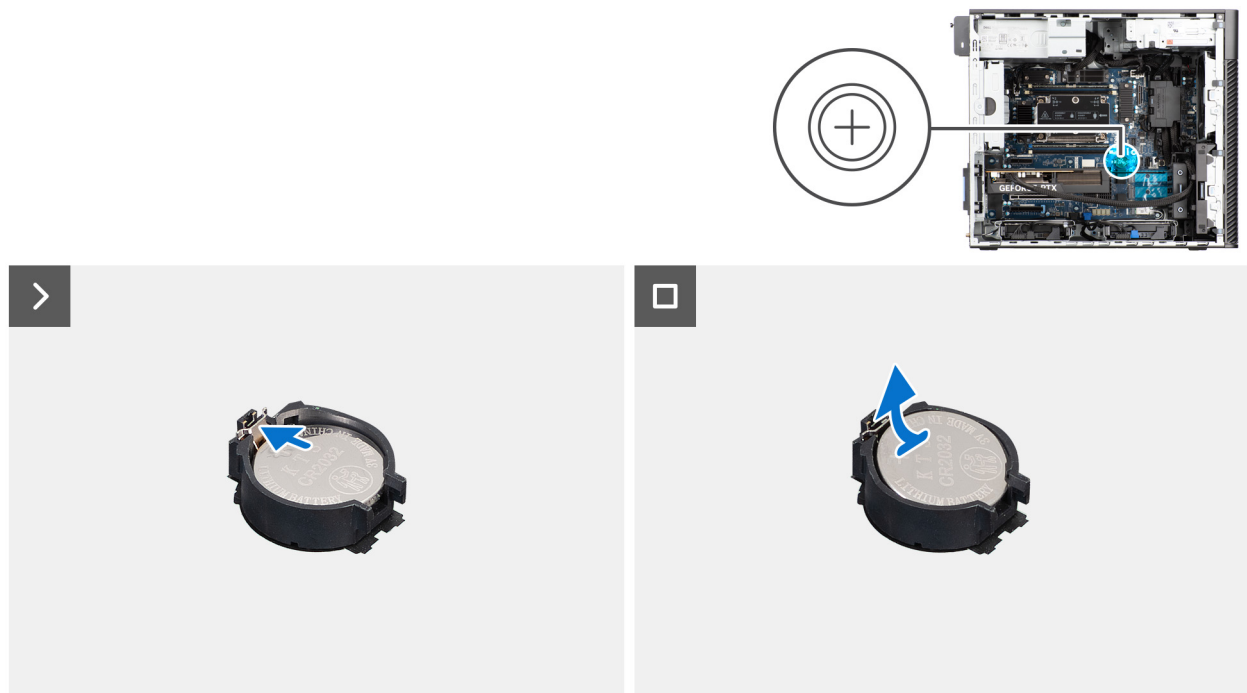


Figure 19. Removing the coin-cell battery

Steps

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

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

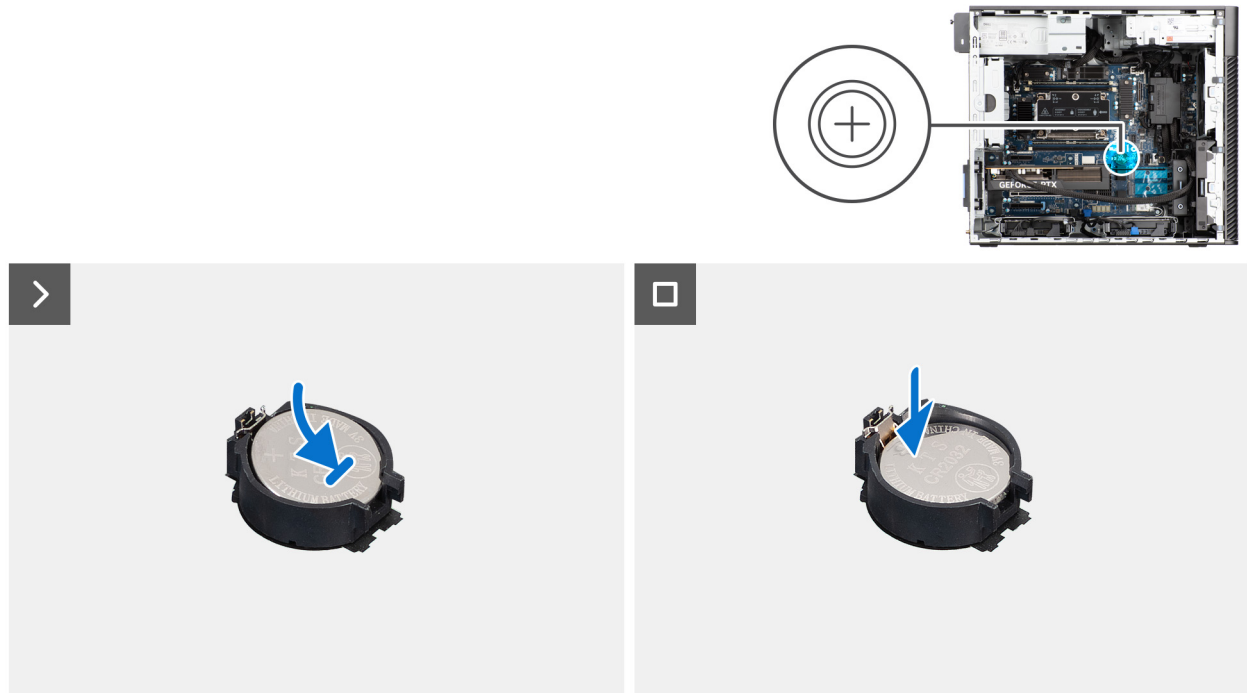


Figure 20. Installing the coin-cell battery

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 [air shroud](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

Removing and installing Customer Replaceable Units (CRUs)

The replaceable components in this chapter are Customer Replaceable Units (CRUs).

 **CAUTION:** CRUs may be replaced by the customer, following the safety precautions and replacement procedures.

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

Front bezel

Removing the front bezel

Prerequisites

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

About this task

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

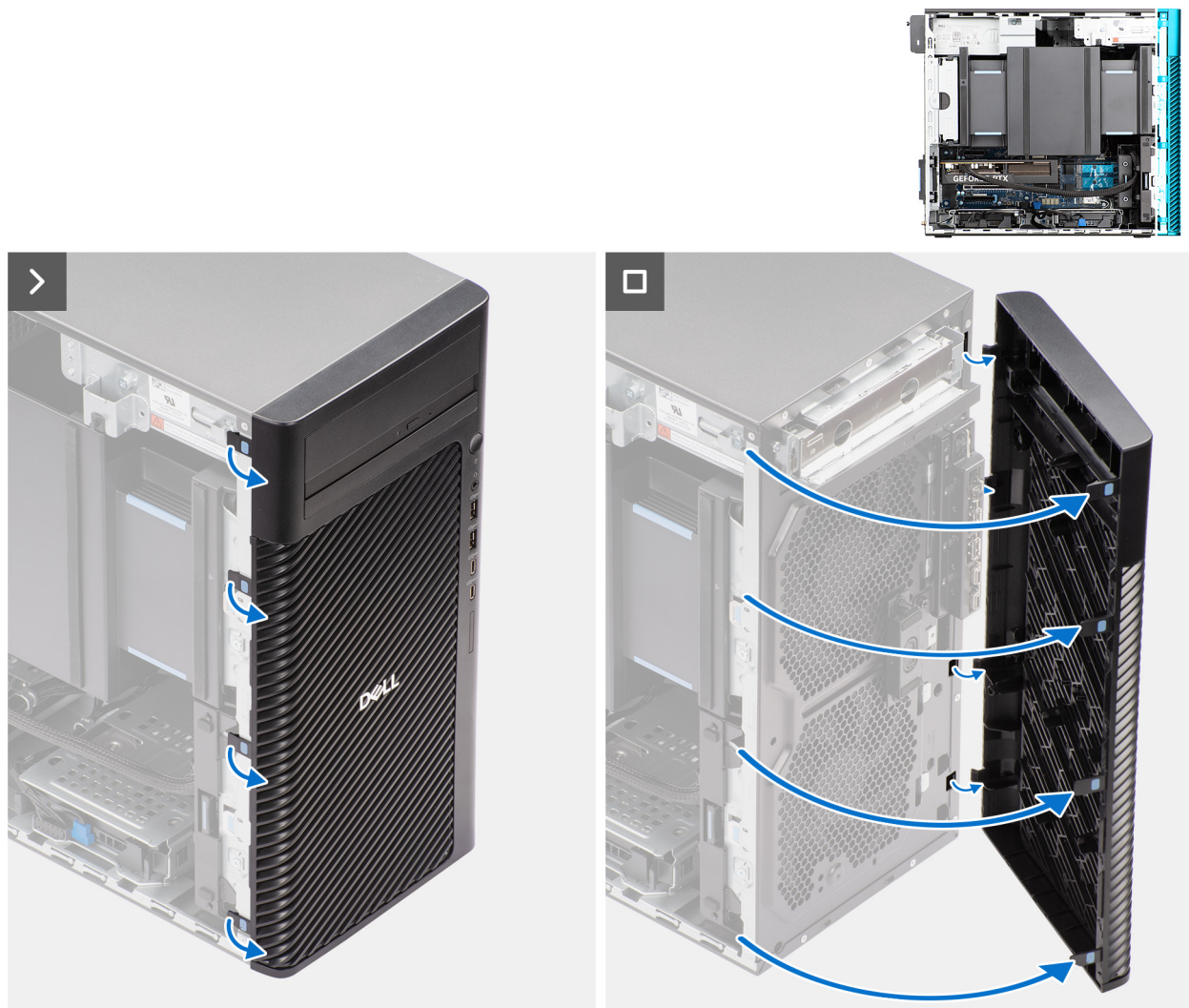


Figure 21. Removing the front bezel

Steps

1. Pry the retention tabs to release the front bezel from the computer.
2. Slightly pull the front bezel and gently rotate it to release the other tabs on the bezel from the slots in the chassis.
3. Remove the front bezel from the computer.

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 images indicate the location of the front bezel and provide a visual representation of the installation procedure.



Figure 22. Installing the front bezel

Steps

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

Next steps

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

Front I/O-bracket

Removing the front I/O-bracket

Prerequisites

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

About this task

The following images indicate the location of the front I/O-bracket and provide a visual representation of the removal procedure.

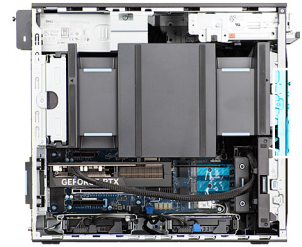


Figure 23. Removing the front I/O-bracket

Steps

1. Remove the screw (#6-32) that secures the front I/O-bracket to the chassis.
2. Slide and remove the front I/O-bracket out of the chassis.

Installing the front I/O-bracket

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 front I/O-bracket and provide a visual representation of the installation procedure.



1x
#6-32

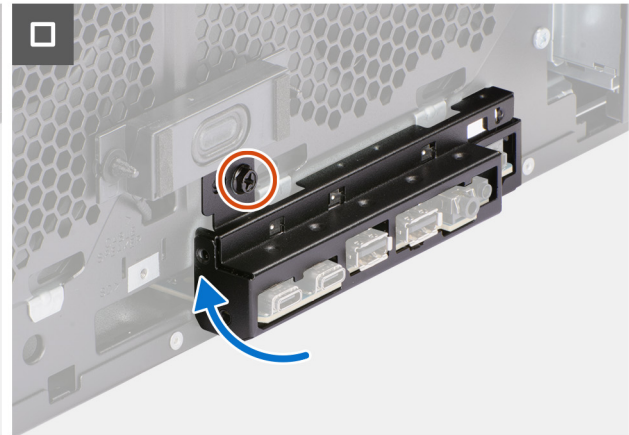
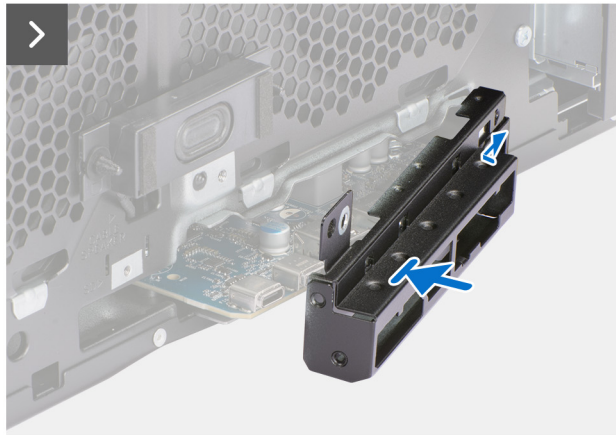
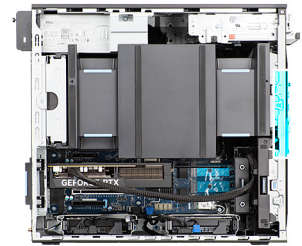


Figure 24. Installing the front I/O bracket

Steps

1. Align and slide the front I/O-bracket into its slot on the chassis.
2. Replace the screw (#6-32) to secure the front I/O-bracket to the chassis.

Next steps

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

Slim optical-drive

Removing the optical drive

Prerequisites

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

About this task

 **NOTE:** The optical drive is located within the disk bay.

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

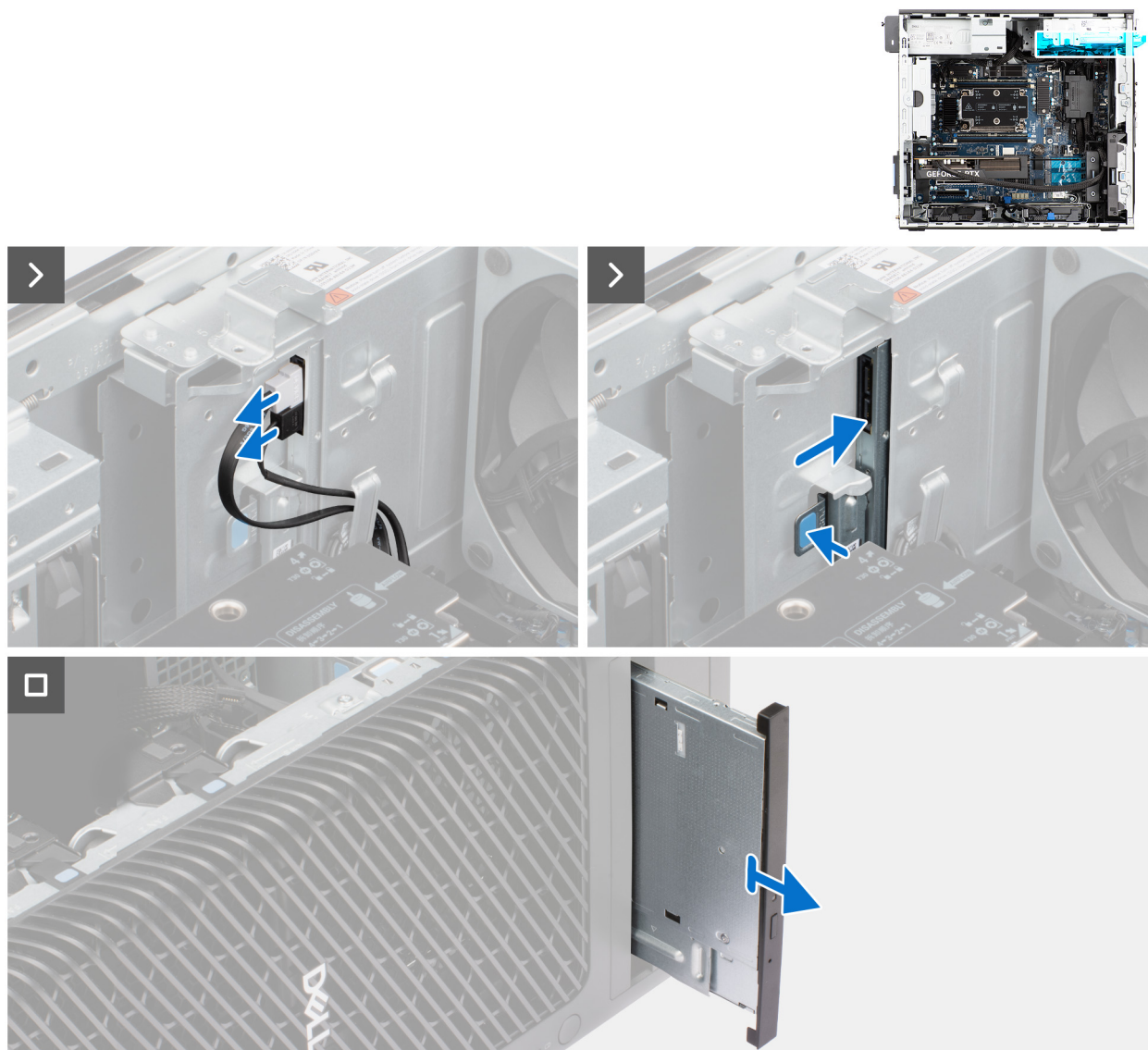


Figure 25. Removing the optical drive

Steps

1. Disconnect the data and power cable from the connectors on the optical drive.
2. Press down on the securing tab to release the optical drive from the drive bay.
3. Pull to slide the optical drive out of the drive bay.

Installing the optical drive

Prerequisites

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

About this task

NOTE: The optical drive is located within the drive bay. Follow the below-mentioned procedure **on the disk-drive cage** to remove or install the optical drive.

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

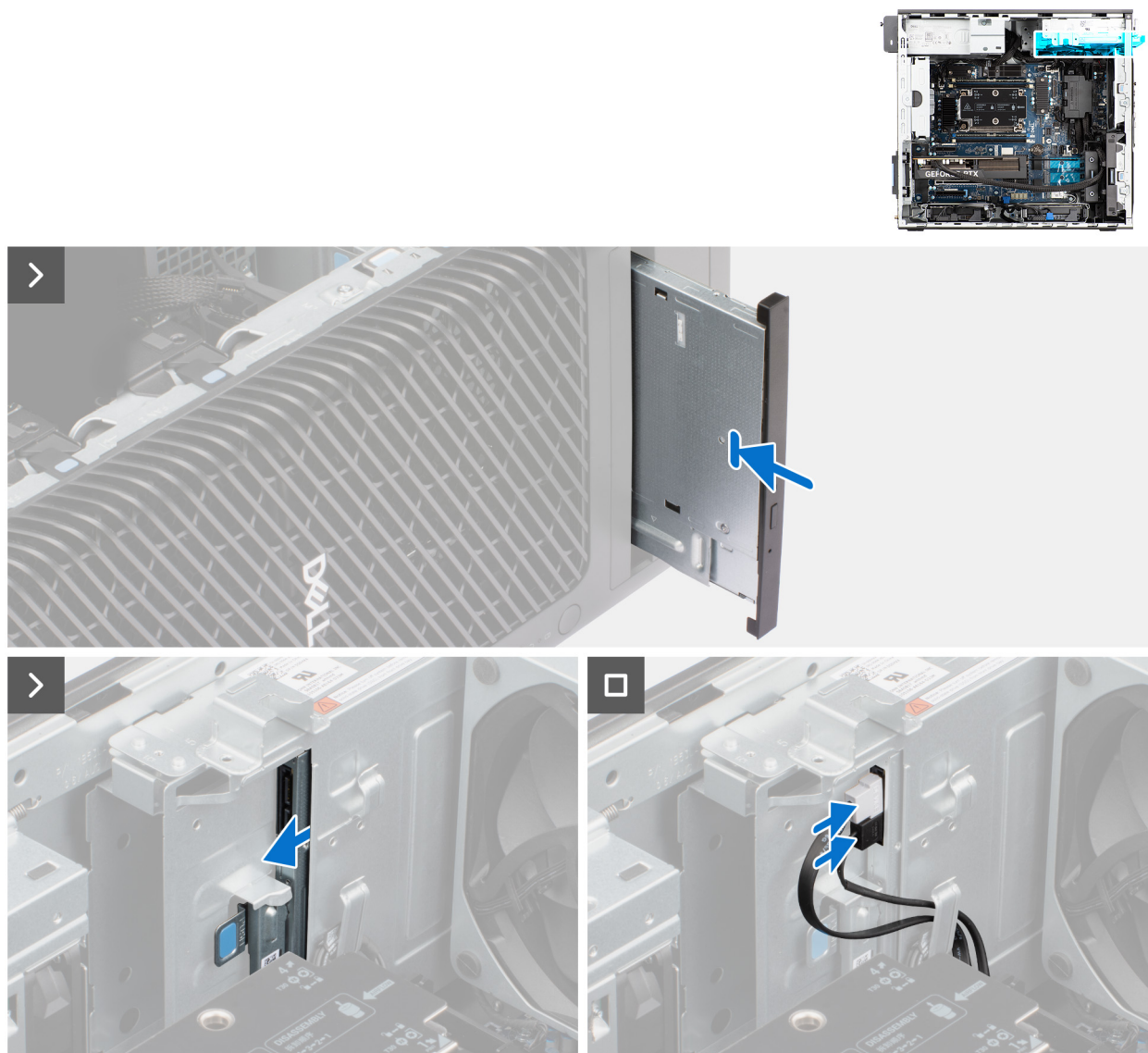


Figure 26. Installing the optical drive

Steps

1. Slide the optical drive into the drive bay until the optical drive clicks into place.
2. Connect the data and power cable to the connectors on the optical drive.

Next steps

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

Optical-drive bracket

Removing the optical-drive bracket

Prerequisites

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

2. Remove the [side cover](#).
3. Remove the [front bezel](#).
4. Remove the [optical drive](#).

About this task

The following images indicate the visual representation of the optical-drive bracket removal procedure.

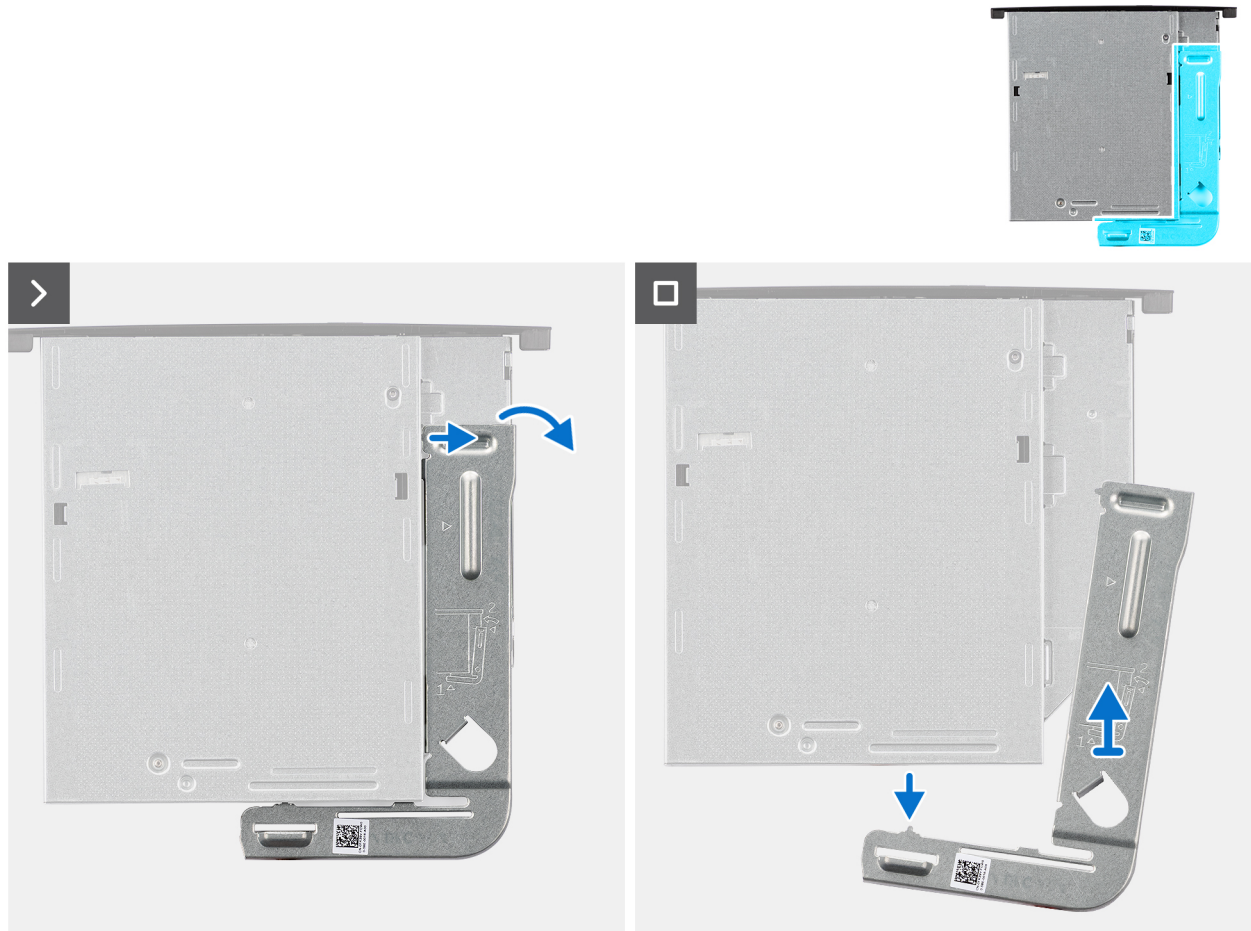


Figure 27. Removing the optical-drive bracket

Steps

1. Flip the optical drive over to reveal the securing tab.
2. Slide and remove the securing tabs to release the bracket from the optical drive.
3. Gently pull the bracket away from the optical drive.

Installing the optical-drive bracket

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 optical-drive bracket and provide a visual representation of the installation procedure.



Figure 28. Installing the optical-drive bracket

Steps

1. Insert the alignment post on the securing tabs into the slots on the optical drive.
2. Rotate the securing tabs inward until it clicks into place.

Next steps

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

Optical-drive bezel

Removing the optical-drive bezel

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [front bezel](#).
4. Remove the [optical drive](#).
5. Remove the [optical-drive bracket](#).

About this task

The following images indicate the visual representation of the optical-drive bezel removal procedure.

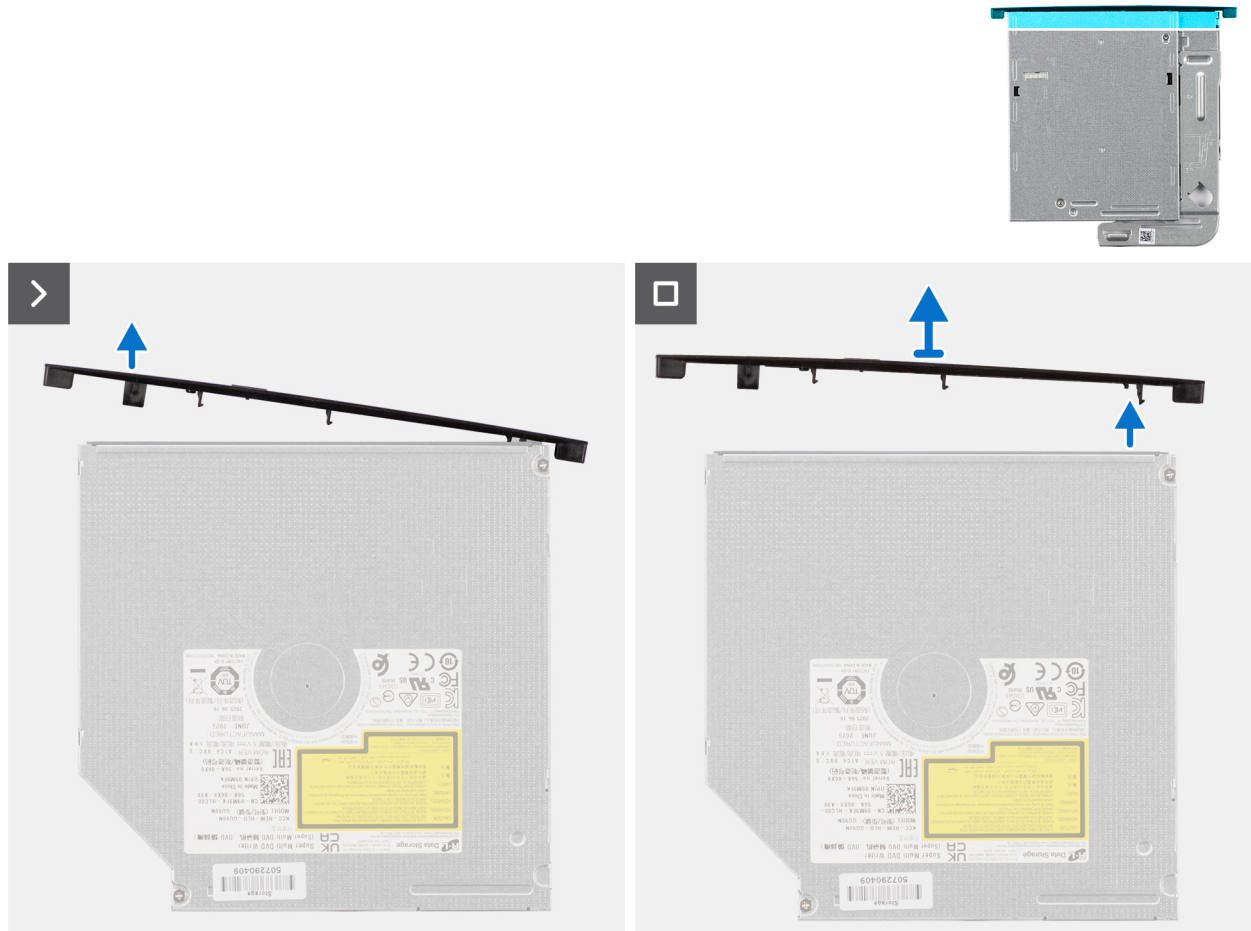


Figure 29. Removing the optical-drive bezel

Steps

1. Flip the optical drive over to reveal the securing tab.
2. Pry the securing tab on the bezel to release it from the optical drive.
3. Gently pull the bezel from the optical drive.

Installing the optical-drive 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 optical-drive bezel and provide a visual representation of the installation procedure.

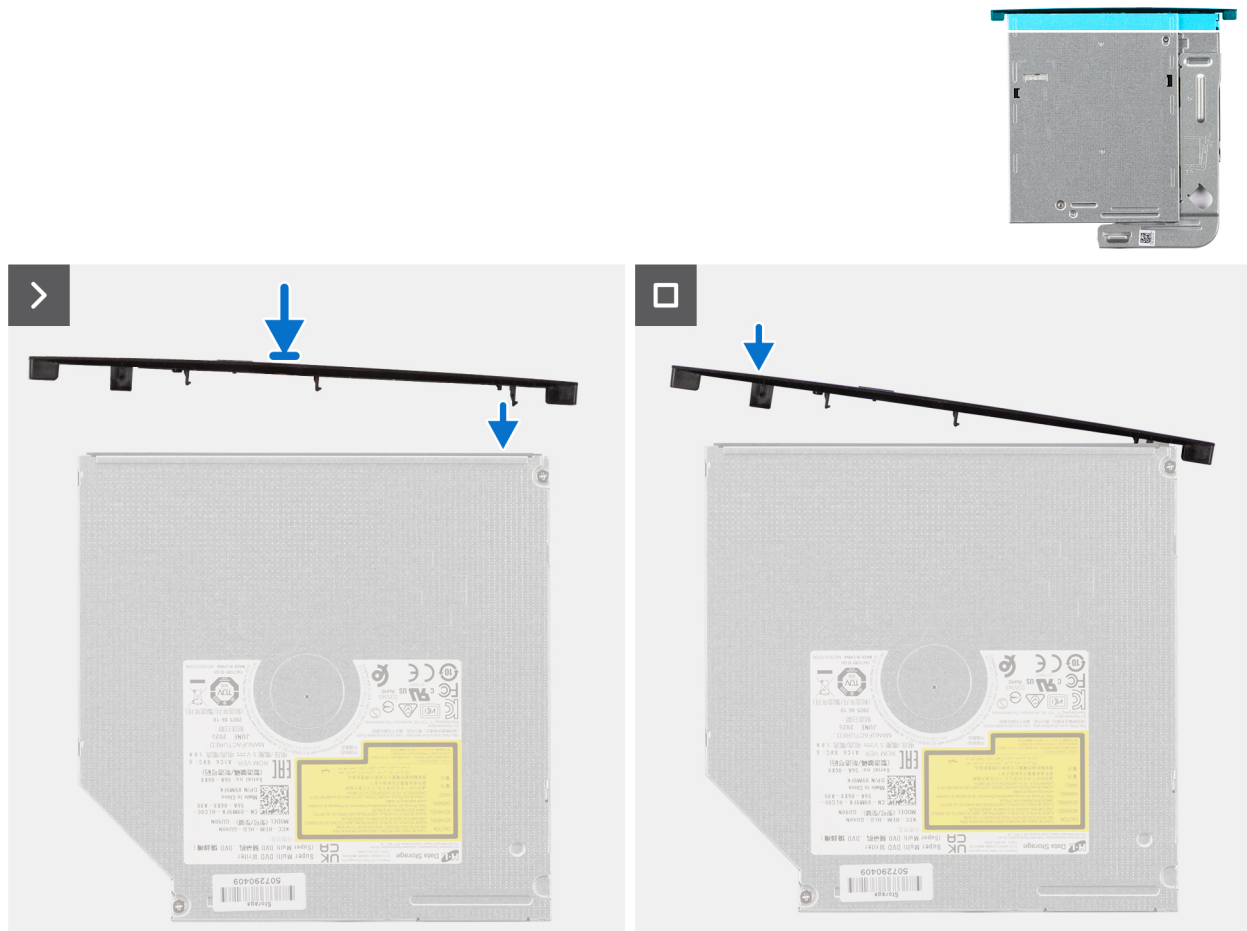


Figure 30. Installing the optical-drive bezel

Steps

1. Align the tabs on the bezel with the slots on the optical drive.
2. Press the bezel against the optical drive until the bezel clicks into place.

Next steps

1. Install the [optical-drive bracket](#).
2. Install the [optical drive](#).
3. Install the [front bezel](#).
4. Install the [side cover](#).
5. Follow the procedure in [after working inside your computer](#).

External storage flexbay (Hard drive)

Removing the external hard-drive assembly

Prerequisites

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

About this task

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

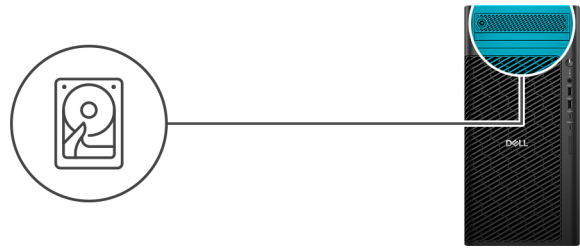


Figure 31. Removing the external hard-drive assembly

Steps

1. Push the release button on the hard-drive assembly to open the release latch.
2. Hold the release latch and slide the hard-drive assembly out of the external FlexBay slot.

Removing the external hard-drive carrier

Prerequisites

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the [hard-drive assembly](#)

About this task

The following images indicate the overview of the hard-drive carrier and provide a visual representation of the removal procedure.



Figure 32. Removing the external hard-drive carrier

Steps

1. Pry the sides of the carrier to release the pins on the carrier from the slots on the hard drive.
2. Lift and remove the hard drive off the external hard-drive carrier.

Installing the external hard-drive carrier

Prerequisites

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

About this task

The following images indicate the overview of the external hard-drive carrier and provide a visual representation of the installation procedure.



Figure 33. Installing the external hard-drive carrier

Steps

1. Place the hard drive into the external hard-drive bracket and align the pins on the bracket with the slots on the hard drive.
2. Snap the hard-drive into the external hard-drive bracket.

Next steps

1. Install the [external hard-drive assembly](#).
2. Follow the procedure in [after working inside your computer](#).

Installing the external hard-drive 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 external hard-drive assembly and provide a visual representation of the installation procedure.

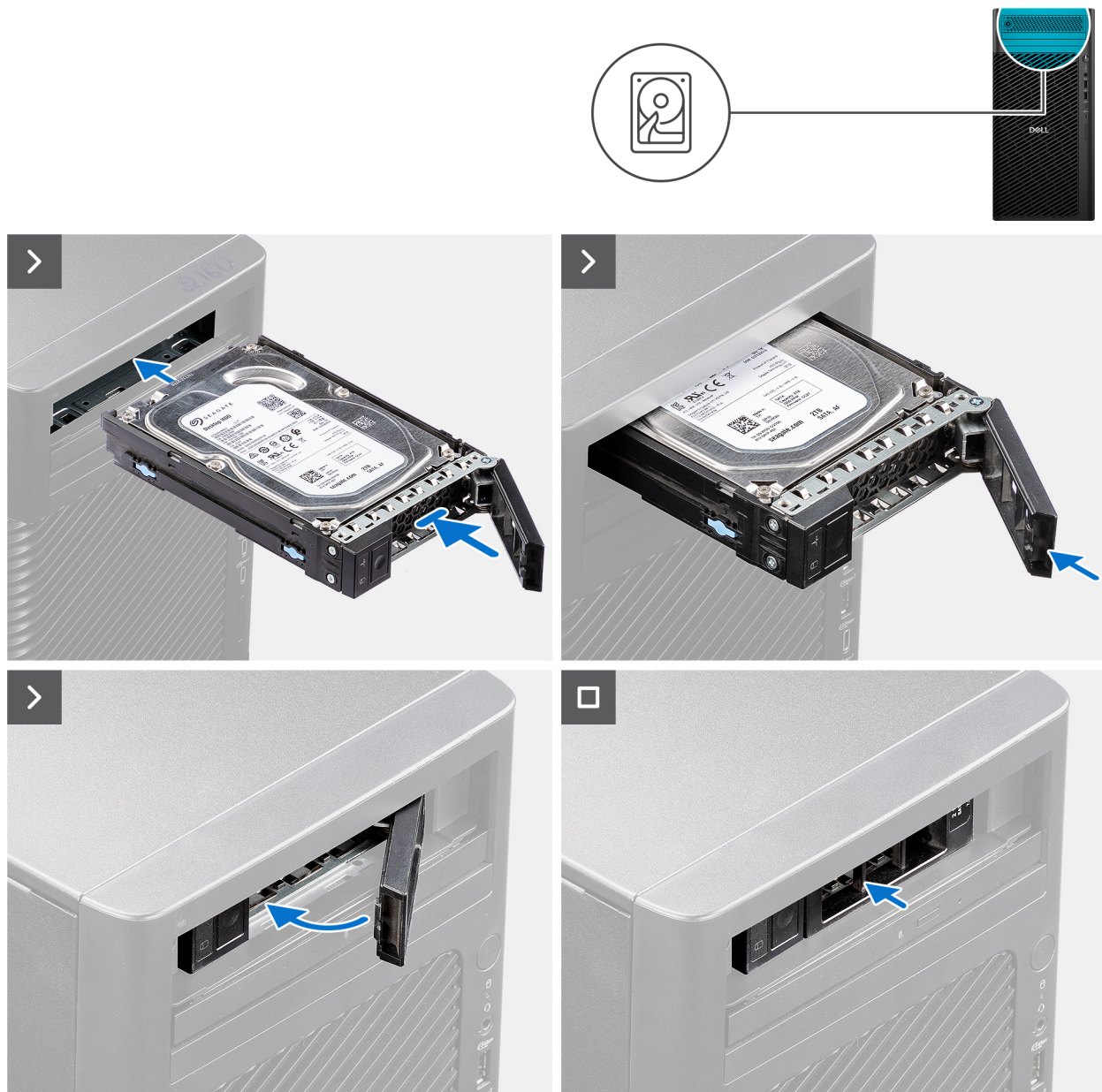


Figure 34. Installing the external hard-drive assembly

Steps

1. Slide and insert the hard-drive assembly into the external FlexBay slot.
2. Close the release latch to secure the hard-drive assembly in place.

Next steps

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

M.2 SSD carrier and M.2 SSD tray

Removing the M.2 SSD carrier

Prerequisites

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

About this task

The following images indicate the location of the M.2 SSD carrier and provide a visual representation of the removal procedure.

Steps

1. Push the latch on the M.2 SSD carrier to release the carrier from the front NVMe module.
2. Slide the M.2 SSD carrier out of the front NVMe module.

Removing the M.2 SSD from the carrier

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [M.2 SSD carrier](#).

About this task

The following images indicate the location of the M.2 SSD and provide a visual representation of the removal procedure.

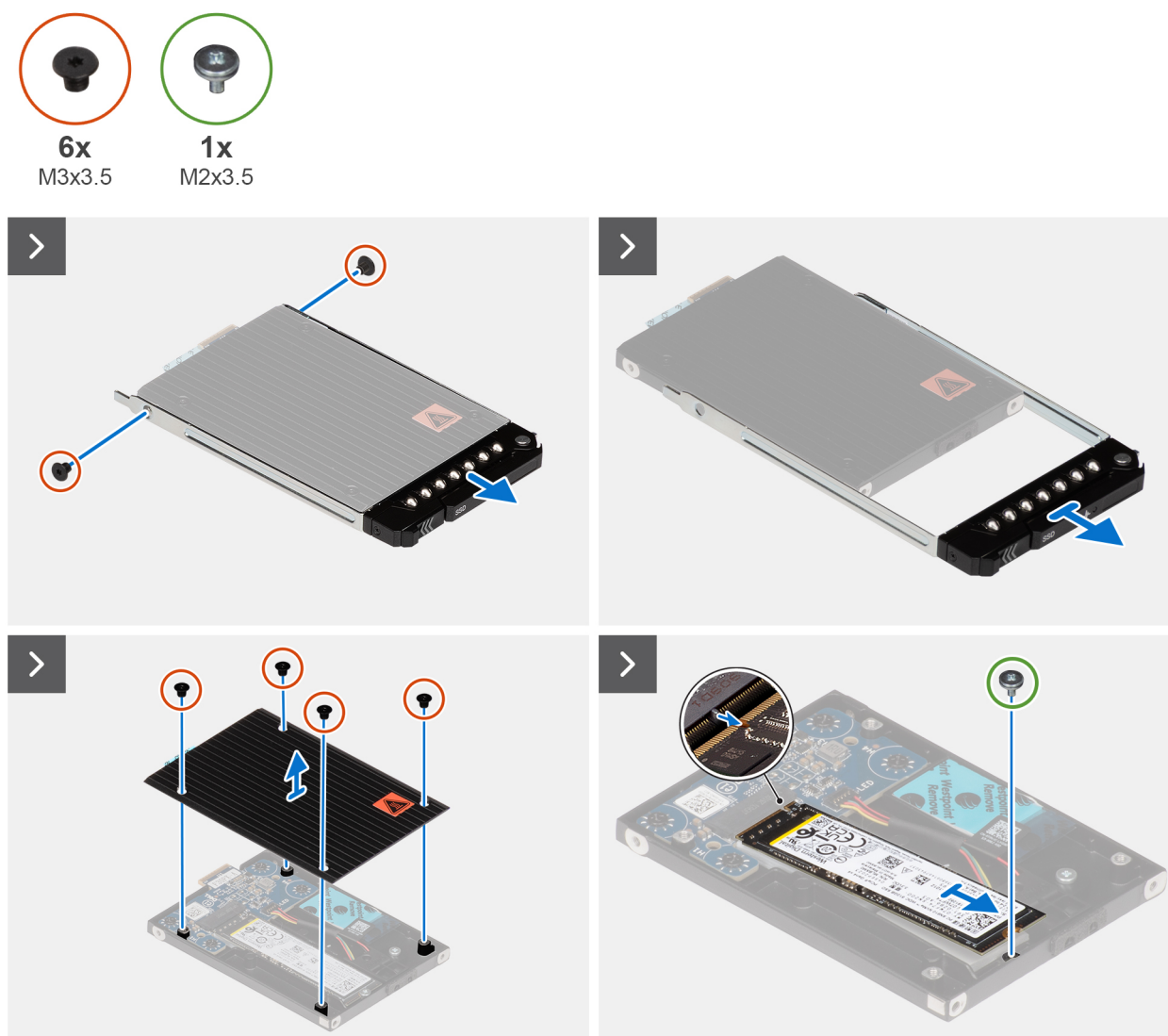


Figure 35. Removing the M.2 SSD from the carrier

Steps

1. Remove the two screws (M3x3.5) that secure the M.2 carrier handle to the carrier.
2. Slide the carrier handle away from the carrier.
3. Remove the four screws (M3x3.5) that secure the carrier cover to the carrier.
4. Lift the cover away from the carrier.
5. Remove the screw (M2x3.5) that secures the M.2 SSD to the carrier.
6. Slide and remove the M.2 SSD from the slot on the carrier.

Installing the M.2 SSD in the carrier

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 M.2 SSD and provide a visual representation of the installation procedure.

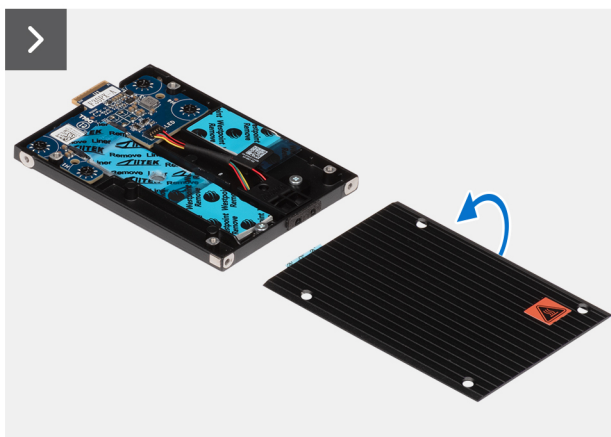
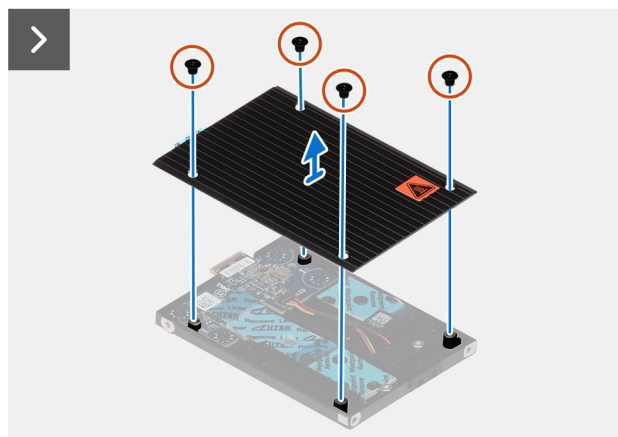
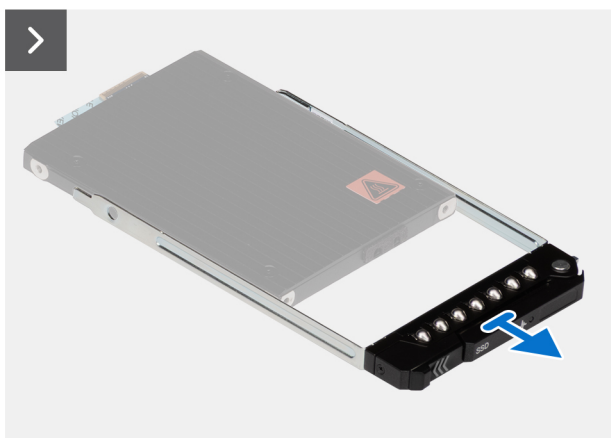
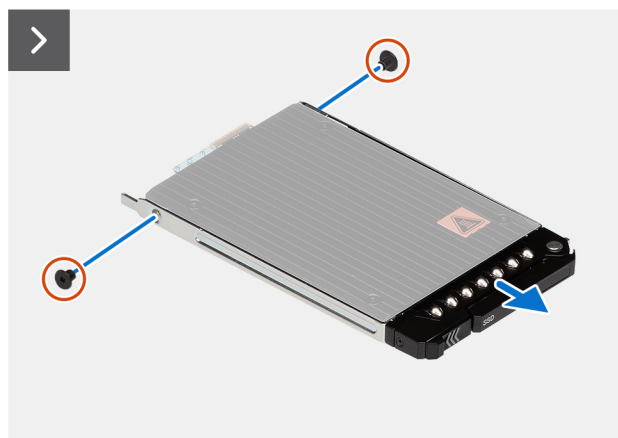
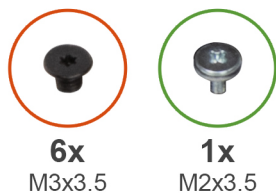


Figure 36. Installing the M.2 SSD in the carrier

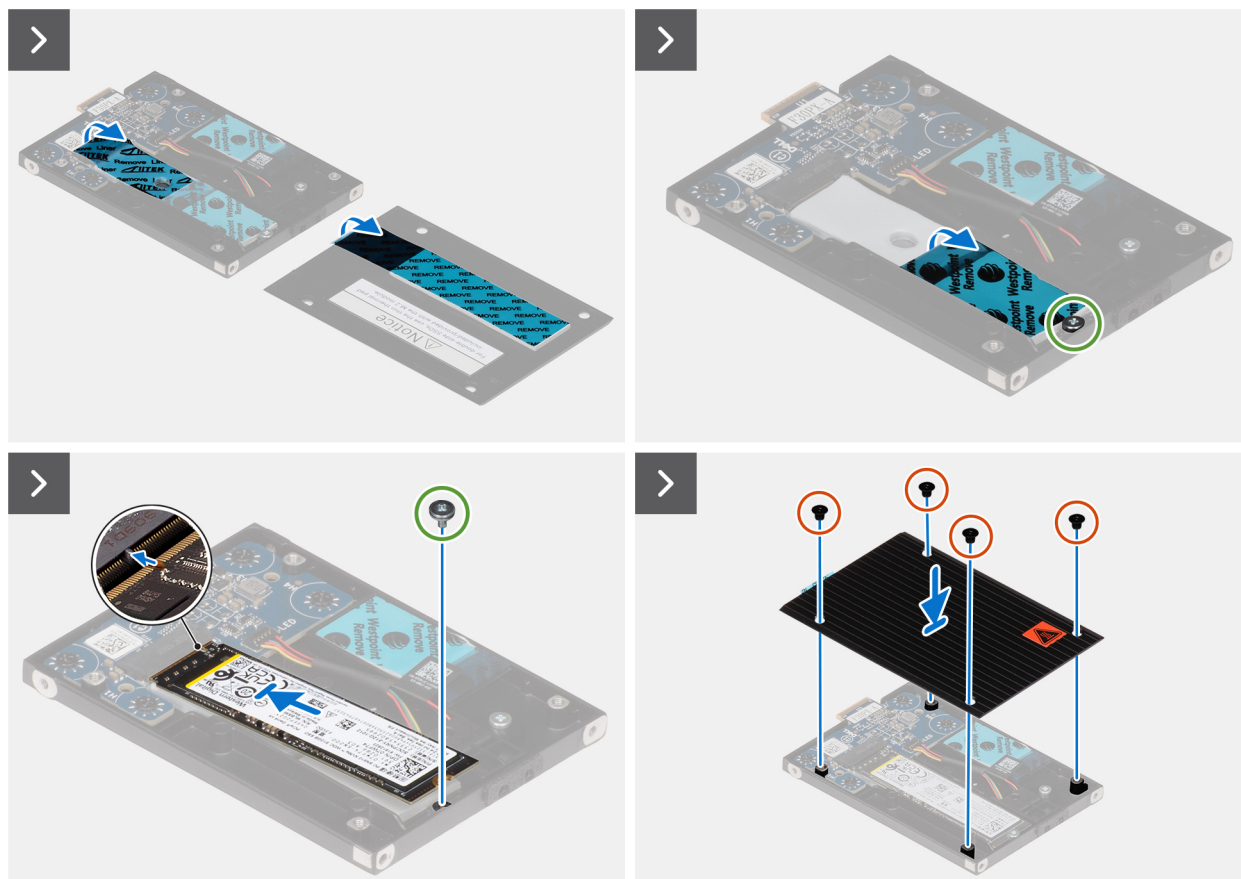


Figure 37. Installing the M.2 SSD in the carrier

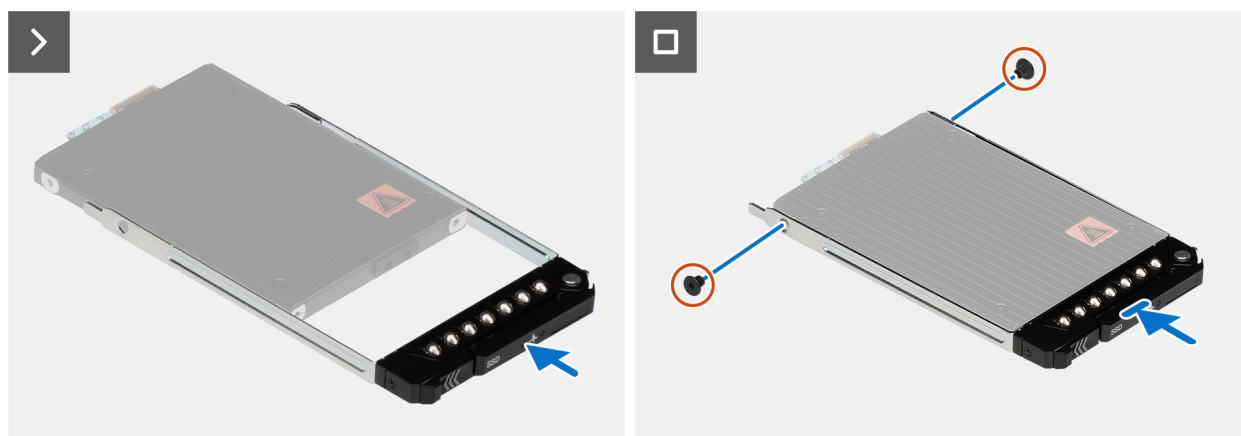


Figure 38. Installing the M.2 SSD in the carrier

Steps

1. Remove the two screws (M3x3.5) that secure the M.2 carrier handle to the carrier.
2. Slide the carrier handle away from the carrier.
3. Remove the four screws (M3x3.5) that secure the carrier cover to the carrier.
4. Lift the cover away from the carrier.
5. Remove the thermal pad protection film from the M.2 SSD slot on the carrier.
6. Flip the carrier cover and remove the thermal pad protection film from the carrier cover.
7. Remove the screw (M2x3.5) that is secured to the carrier.
8. Align the notch on the M.2 SSD with the tab on the carrier connector.

9. Insert the M.2 SSD at an angle into the slot on the carrier.
10. Install the screw (M2x3.5) to secure the M.2 SSD to the carrier.
11. Align the screw holes on the carrier cover with the screw holes on the carrier.
12. Install the four screws (M3x3.5) to secure the carrier cover to the carrier.
13. Slide the carrier handle back to the carrier.
14. Install the two screws (M3x3.5) to secure the M.2 carrier handle to the carrier.

Next steps

1. Install the [M.2 SSD carrier](#).
2. Follow the procedure in [after working inside your computer](#).

Installing the M.2 SSD carrier

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 M.2 SSD carrier and provide a visual representation of the installation procedure.

Steps

1. Align the M.2 SSD carrier with the slot on the front NVMe module.
2. Slide the carrier into the slot, until it clicks into place.
3. Push the carrier latch to lock the carrier in the front NVMe module.

Next steps

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

Air shroud

Removing the air shroud

Prerequisites

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

About this task

The following image indicates the location of the air shroud and provides a visual representation of the removal procedure.

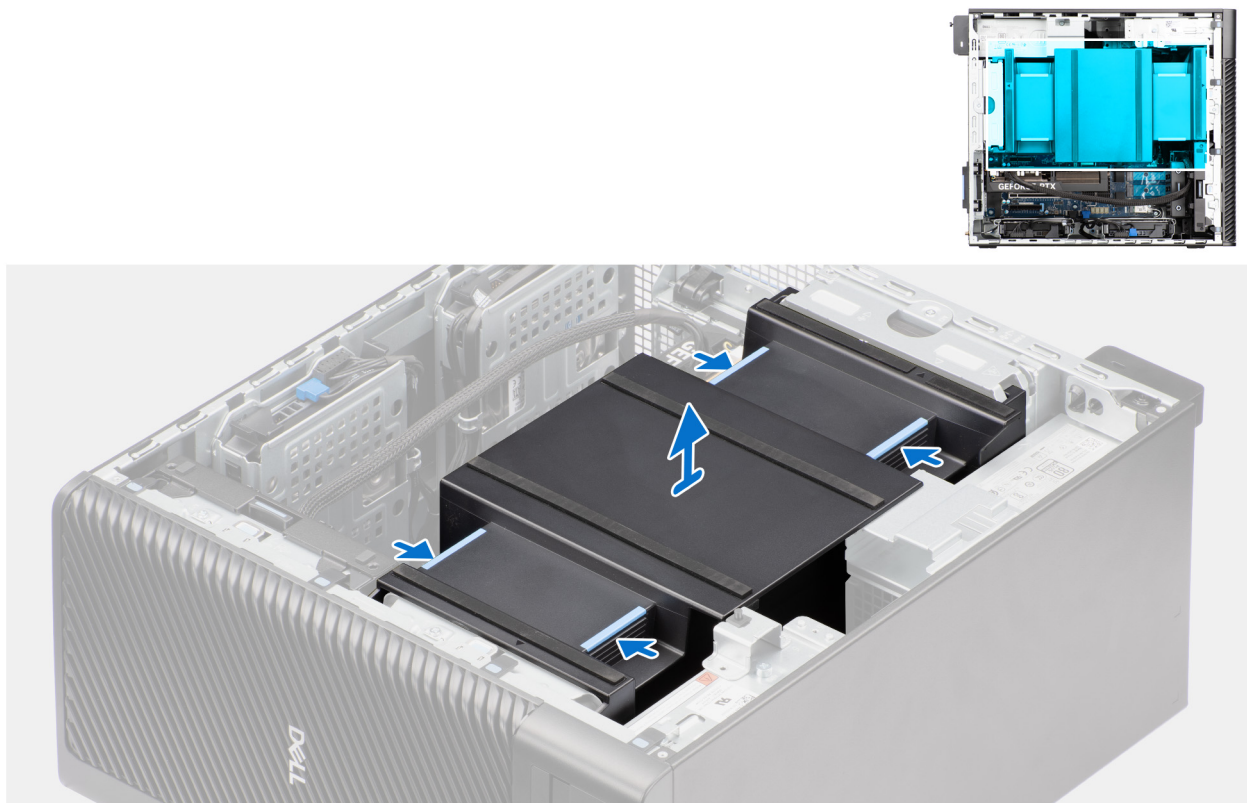


Figure 39. Removing the air shroud

Steps

1. Hold the air shroud at the gripping points.
2. Pull the air shroud upwards and out of the computer.

Installing the air shroud

Prerequisites

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

NOTE: Route all the power cables through the bottom air shroud cover to prevent the air shroud installation interference.

About this task

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

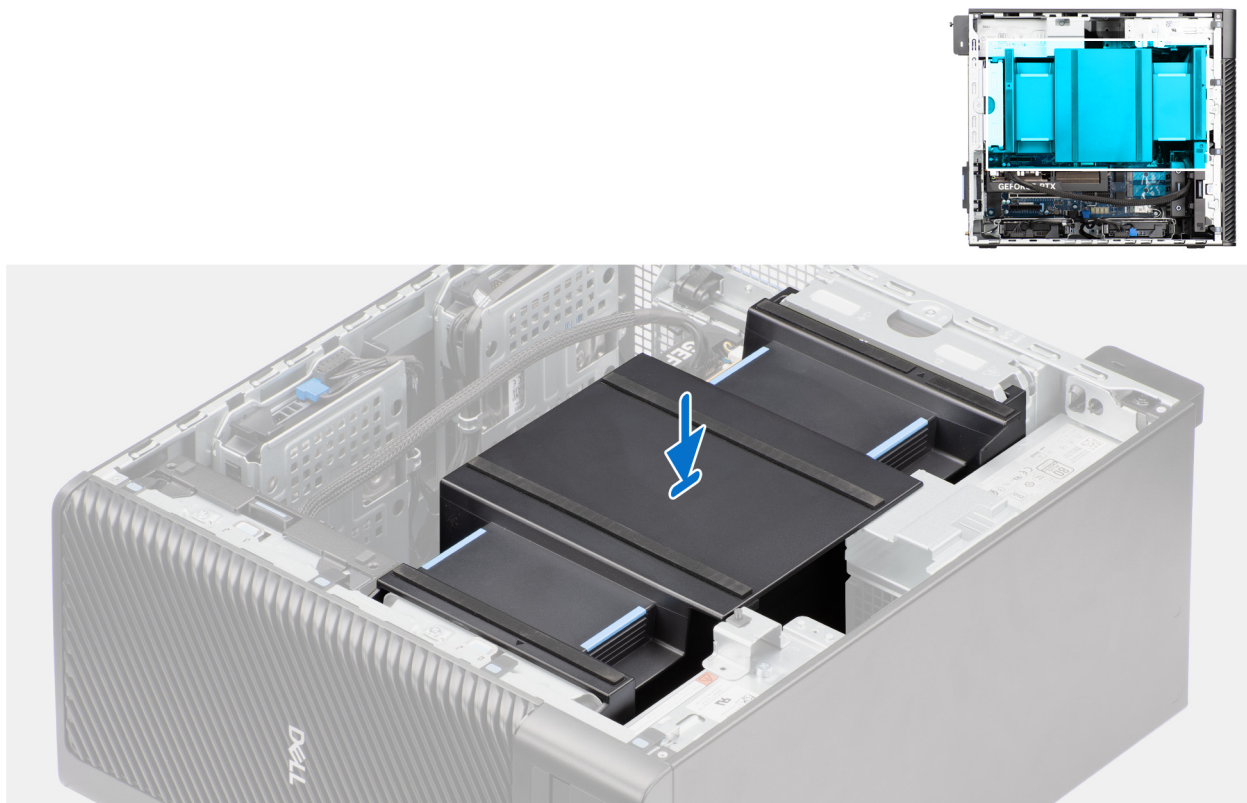


Figure 40. Installing the air shroud

Steps

1. Align the air shroud over the heat-sink and system board holding and place it in the slot.
2. Press the air shroud down until the tabs secure into place.

Next steps

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

Memory module

Removing the memory module

Prerequisites

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

About this task

The following image indicates the location of the memory module and provides a visual representation of the removal procedure.

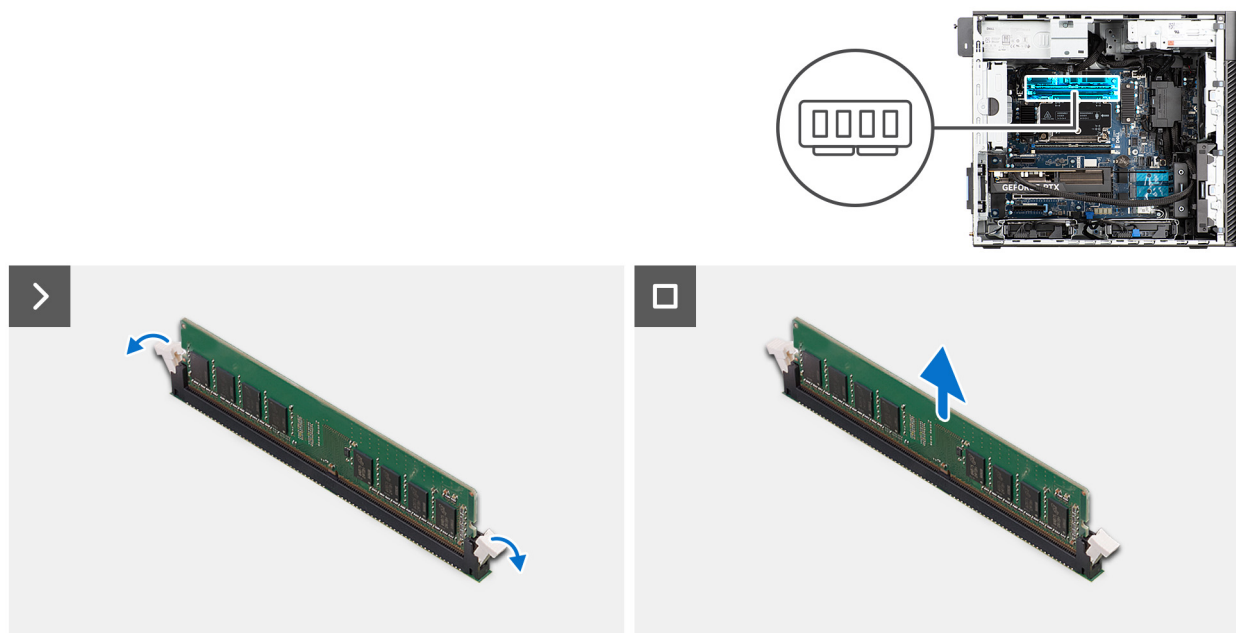


Figure 41. Removing the memory module

Steps

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

CAUTION: To prevent damage to the memory module, hold the memory module by the edges. Do not touch the components or metallic contacts on the memory module as electrostatic discharge(ESD) can inflict severe damage on the components. To read more about ESD protection, see [ESD protection](#).

Installing the memory 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 memory module and provides a visual representation of the installation procedure.

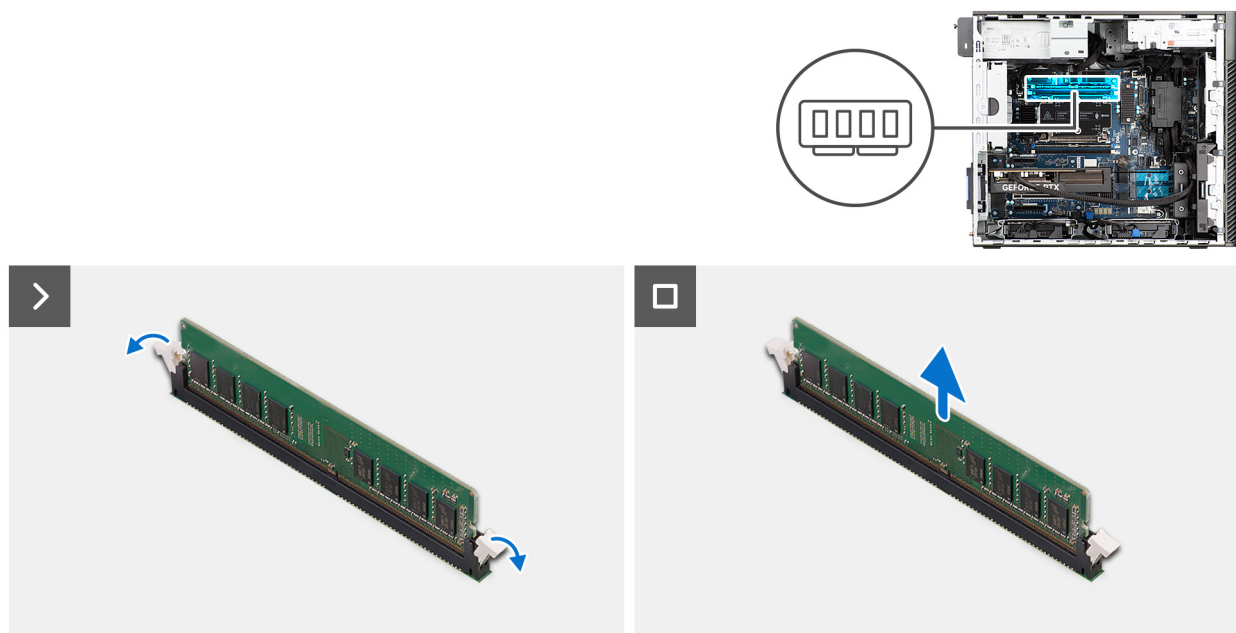


Figure 42. Installing the memory module

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 secures into place.

NOTE: If the memory module is not secure, then remove the memory module and reinstall it.

CAUTION: To prevent damage to the memory module, hold the memory module by the edges. Do not touch the components or metallic contacts on the memory module as electrostatic discharge(ESD) can inflict severe damage on the components. To read more about ESD protection, see [ESD protection](#).

Next steps

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

Hard drive

Removing the 3.5-inch hard drive assembly (bay1)

Prerequisites

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

About this task

The following images indicate the location of the 3.5-inch hard drive assembly (bay1) and provide a visual representation of the removal procedure.

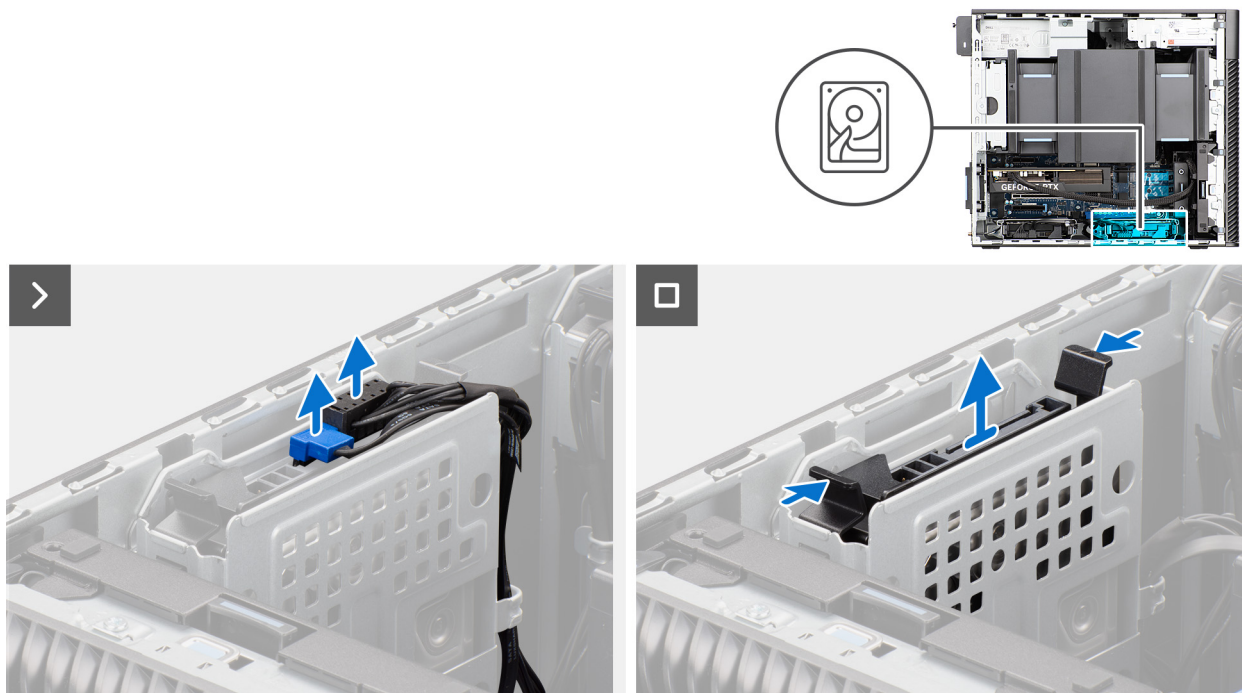


Figure 43. Removing the 3.5-inch hard drive assembly from bay1

Steps

1. Disconnect the data and power cables from the 3.5-inch hard drive module.
2. Press the securing tabs to release the hard drive assembly from the chassis.
3. Slide the hard drive assembly away from the bay1.

Removing the 3.5-inch hard drive assembly (bay2)

Prerequisites

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

About this task

The following images indicate the location of the 3.5-inch hard drive assembly (bay2) and provide a visual representation of the removal procedure.

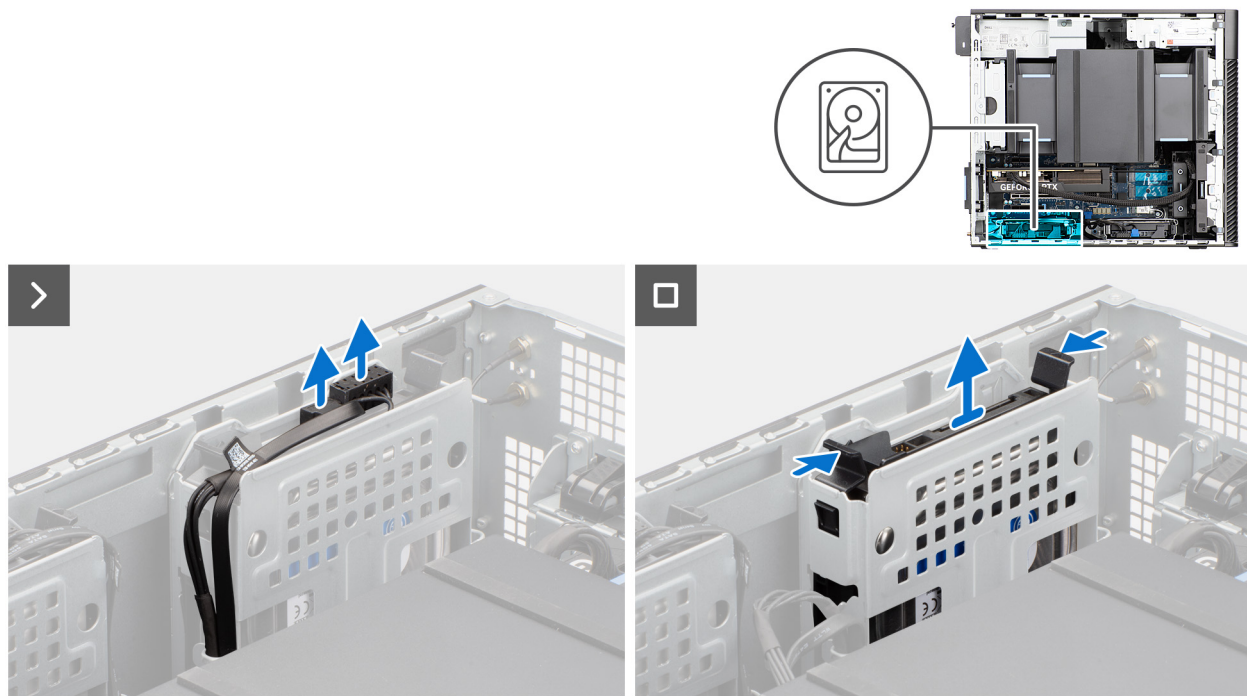


Figure 44. Removing the 3.5-inch hard drive assembly (bay2)

Steps

1. Disconnect the data and power cables from the 3.5-inch hard drive module.
2. Press the securing tabs to release the hard drive assembly from the chassis.
3. Slide the hard drive assembly away from the bay2.

Removing the 3.5-inch hard drive bracket

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [3.5-inch hard drive assembly \(bay1\)](#) or [3.5-inch hard drive assembly \(bay2\)](#).

About this task

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



Figure 45. Removing the 3.5-inch hard drive bracket

Steps

1. Pry both sides of the hard drive bracket edge to release the tabs on the bracket from the slots on the hard drive.
2. Lift and remove the hard drive off the hard drive bracket.

Installing the 3.5-inch hard drive bracket

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 3.5-inch hard drive bracket and provide a visual representation of the installation procedure.



Figure 46. Installing the 3.5-inch hard drive bracket

Steps

1. Place the hard drive into the hard drive bracket and align the tabs on the bracket with the slots on the hard drive.
2. Snap the hard drive into the hard drive bracket.

Next steps

1. Install the [3.5-inch hard drive assembly \(bay1\)](#) or [3.5-inch hard drive assembly \(bay2\)](#).
2. Install the [side cover](#).
3. Follow the procedure in [after working inside your computer](#).

Installing the 3.5-inch hard drive assembly (bay2)

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 3.5-inch hard drive assembly (bay2) and provide a visual representation of the installation procedure.

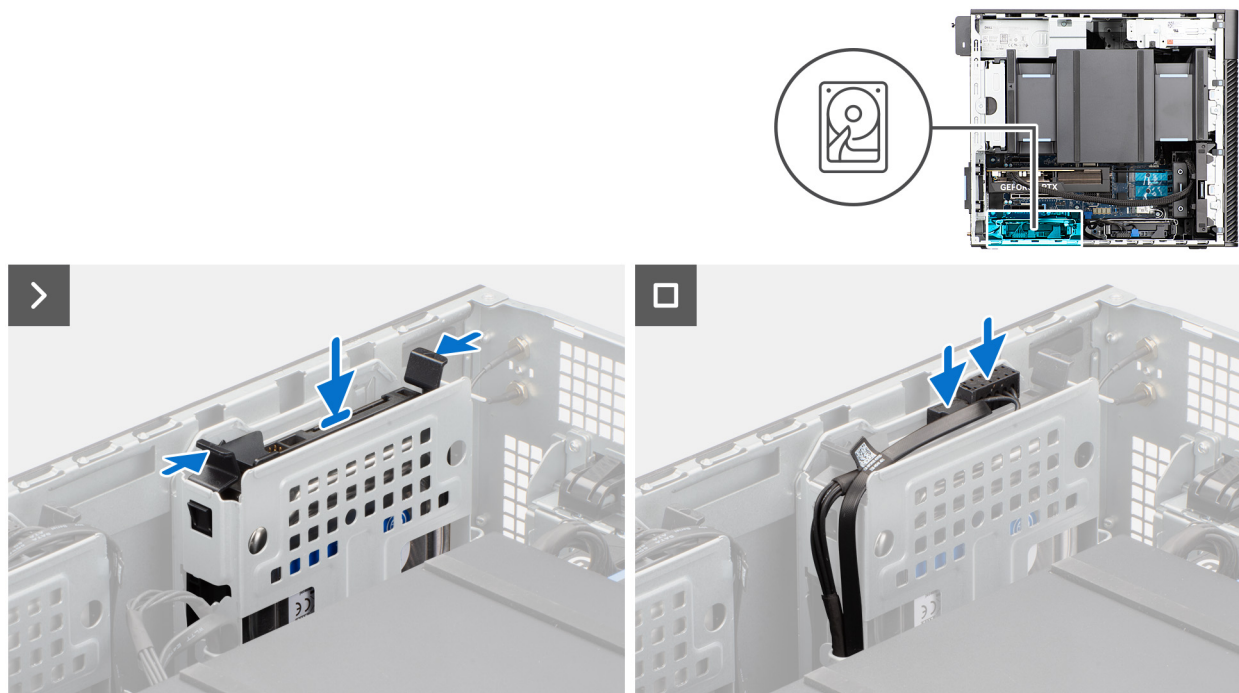


Figure 47. Installing the 3.5-inch hard drive assembly in bay2

Steps

1. Slide and insert the 3.5-inch hard drive assembly into the hard drive bracket.
2. Route the power and data cables through the routing guides on the hard drive assembly and connect the cables to the hard drive.

Next steps

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

Installing the 3.5-inch hard drive assembly (bay1)

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 3.5-inch hard drive assembly and provide a visual representation of the installation procedure.

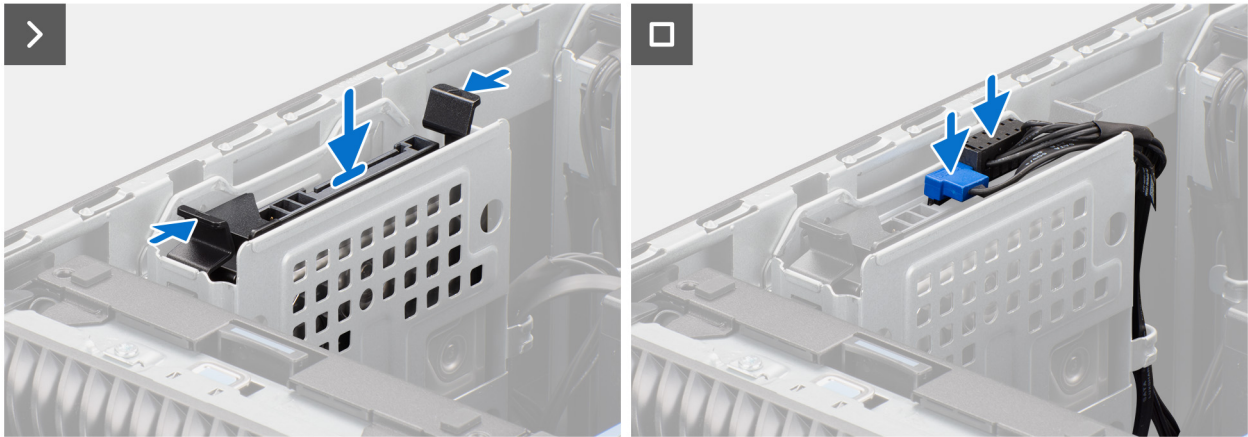
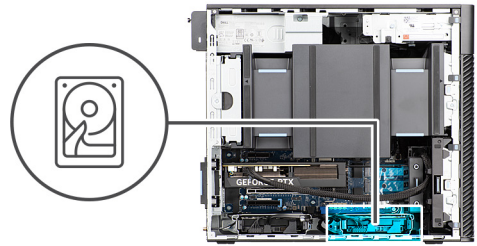


Figure 48. Installing the 3.5-inch hard drive assembly in bay1

Steps

1. Slide and insert the 3.5-inch hard drive assembly into the hard drive bracket.
2. Route the power and data cables through the routing guides on the hard drive assembly and connect the cables to the hard drive.

Next steps

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

Solid state drive

Removing the onboard M.2 2230 SSD

Prerequisites

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

About this task

The following images indicate the location of the M.2 2230 SSD and provide a visual representation of the removal procedure.

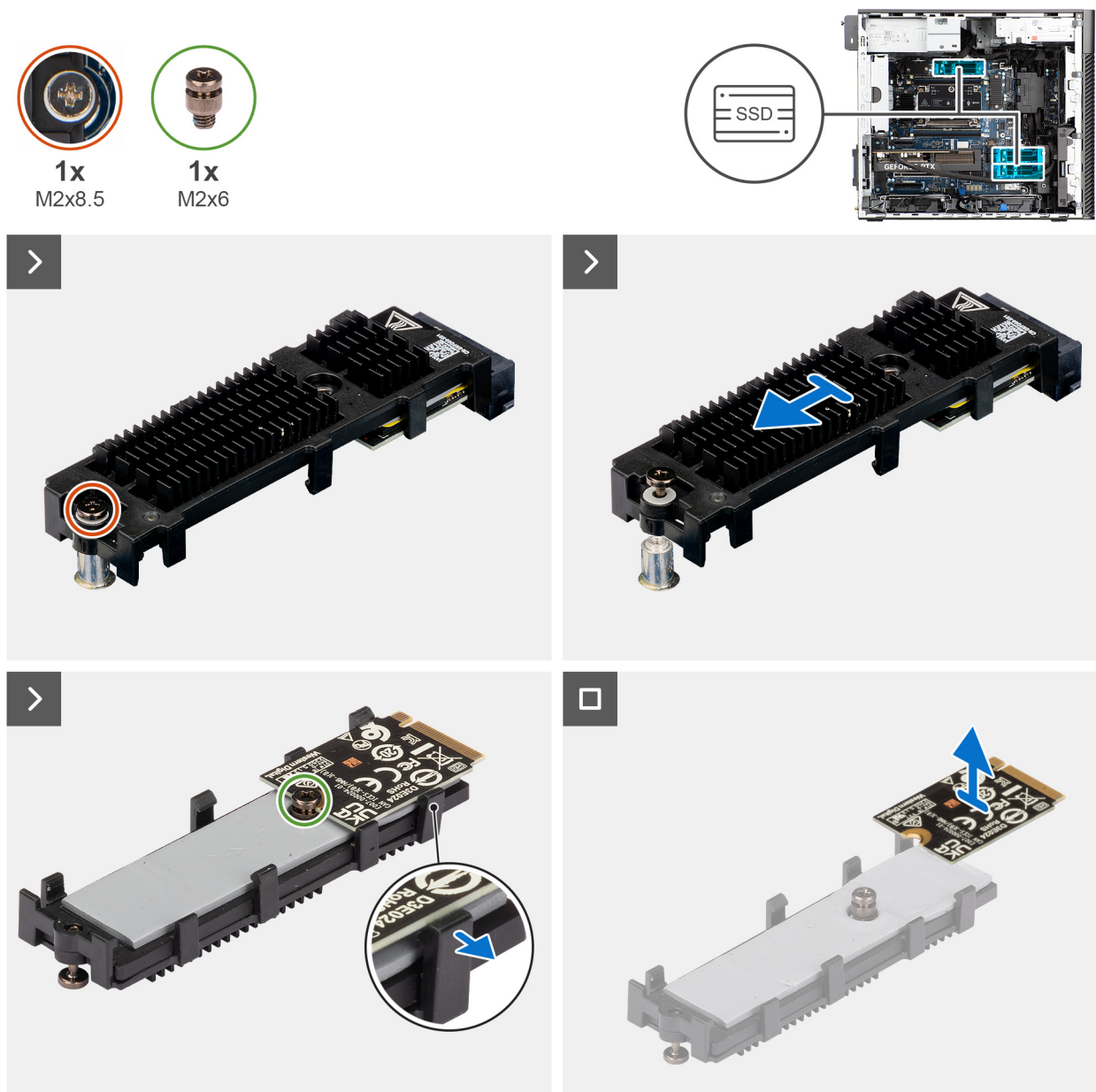


Figure 49. Removing the onboard M.2 2230 SSD

Steps

1. Remove the screw (M2x8.5) that secures the SSD heat-sink to the system board.
2. Slide and flip over the SSD heat-sink.
3. Remove the screw (M2x6) that secures the SSD to the heat-sink.
4. Slide and lift the SSD off the system board.

Installing the onboard M.2 2230 SSD

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 M.2 2230 SSD and provide a visual representation of the installation procedure.

NOTE: Follow the below procedures for installing SSD on SSD-1, SSD-2, and SSD-3 slots.

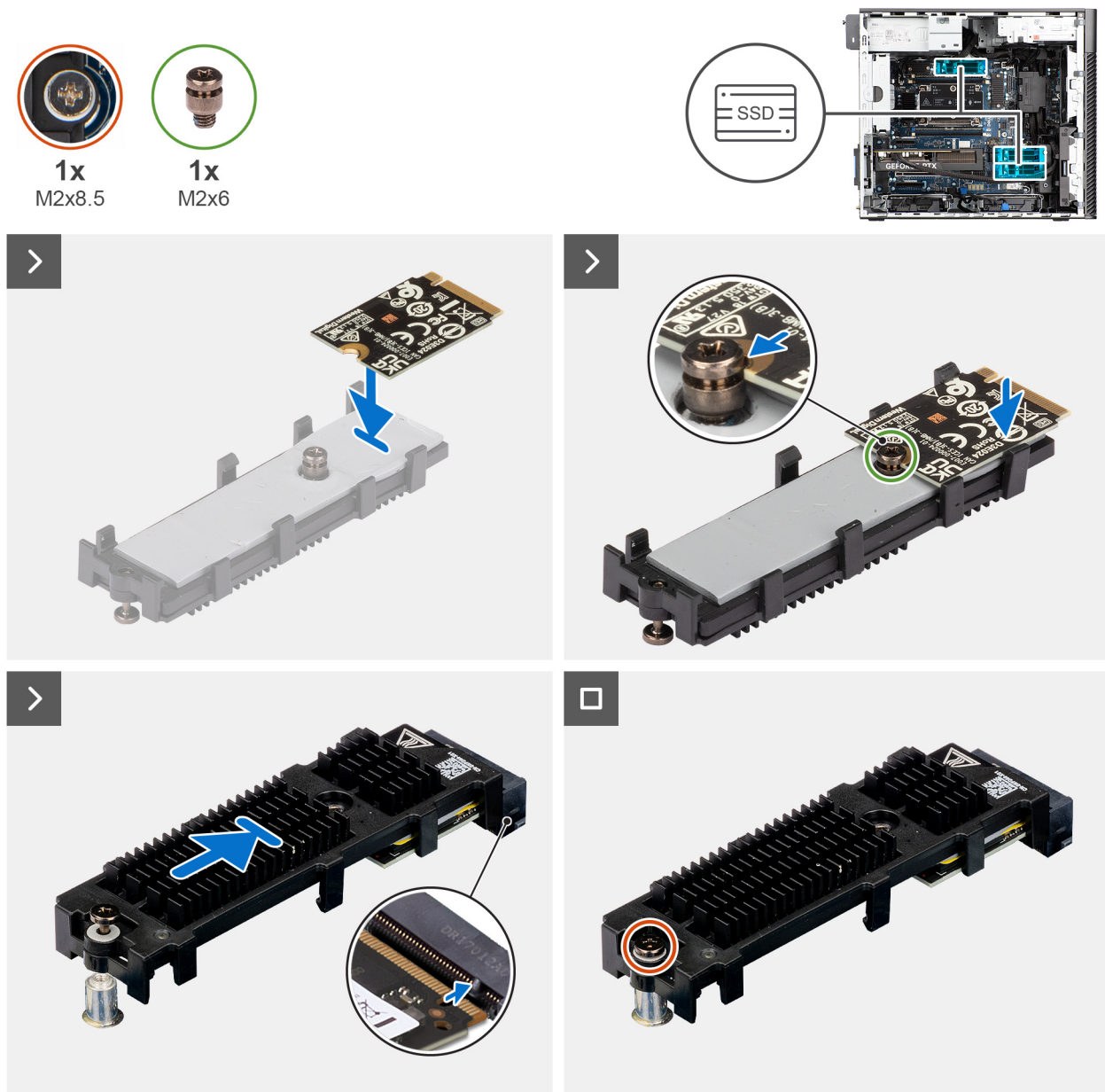


Figure 50. Installing the onboard M.2 2230 SSD

Steps

1. Align the screw hole on the SSD with the screw hole on the SSD heat-sink.
2. Install the screw (M2x6) to secure the SSD to the SSD heat-sink.
3. Align the notch on the SSD with the tab on the SSD connector.
4. Insert the SSD heat-sink assembly at an angle into the slot on the system board.

NOTE: When replacing a M.2 2280 SSD from a M.2 2230 SSD, ensure to move the standoff nut to the M.2 2230 SSD slot position.

5. Install the screw (M2x8.5) to secure the M.2 2230 SSD to the system board.

Next steps

1. Install the [air shroud](#).
2. Install the [side cover](#).

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

Removing the onboard M.2 2280 SSD

Prerequisites

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

About this task

The following images indicate the location of the onboard M.2 2280 SSD and provide a visual representation of the removal procedure.

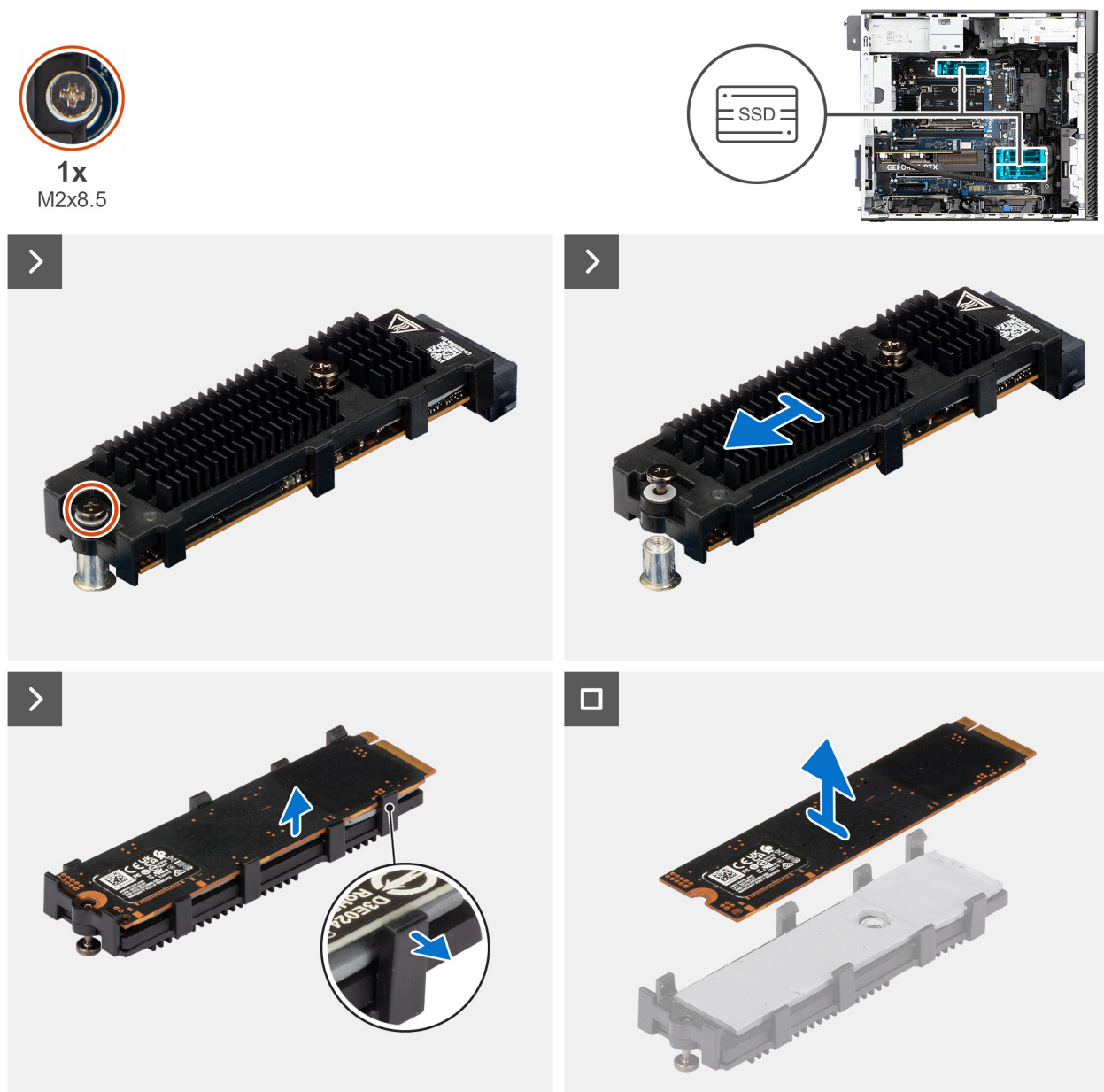


Figure 51. Removing the onboard M.2 2280 SSD

Steps

1. Remove the screw (M2x8.5) that secures the SSD heat-sink to the system board.

2. Slide and flip over the SSD heat-sink.
3. Pry the retention tabs on the SSD heat-sink and slide the SSD off the system board.

Installing the onboard M.2 2280 SSD

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 M.2 2280 SSD and provide a visual representation of the installation procedure.

 **NOTE:** Follow the below procedures for installing SSD on SSD-1, SSD-2, and SSD-3 slots.

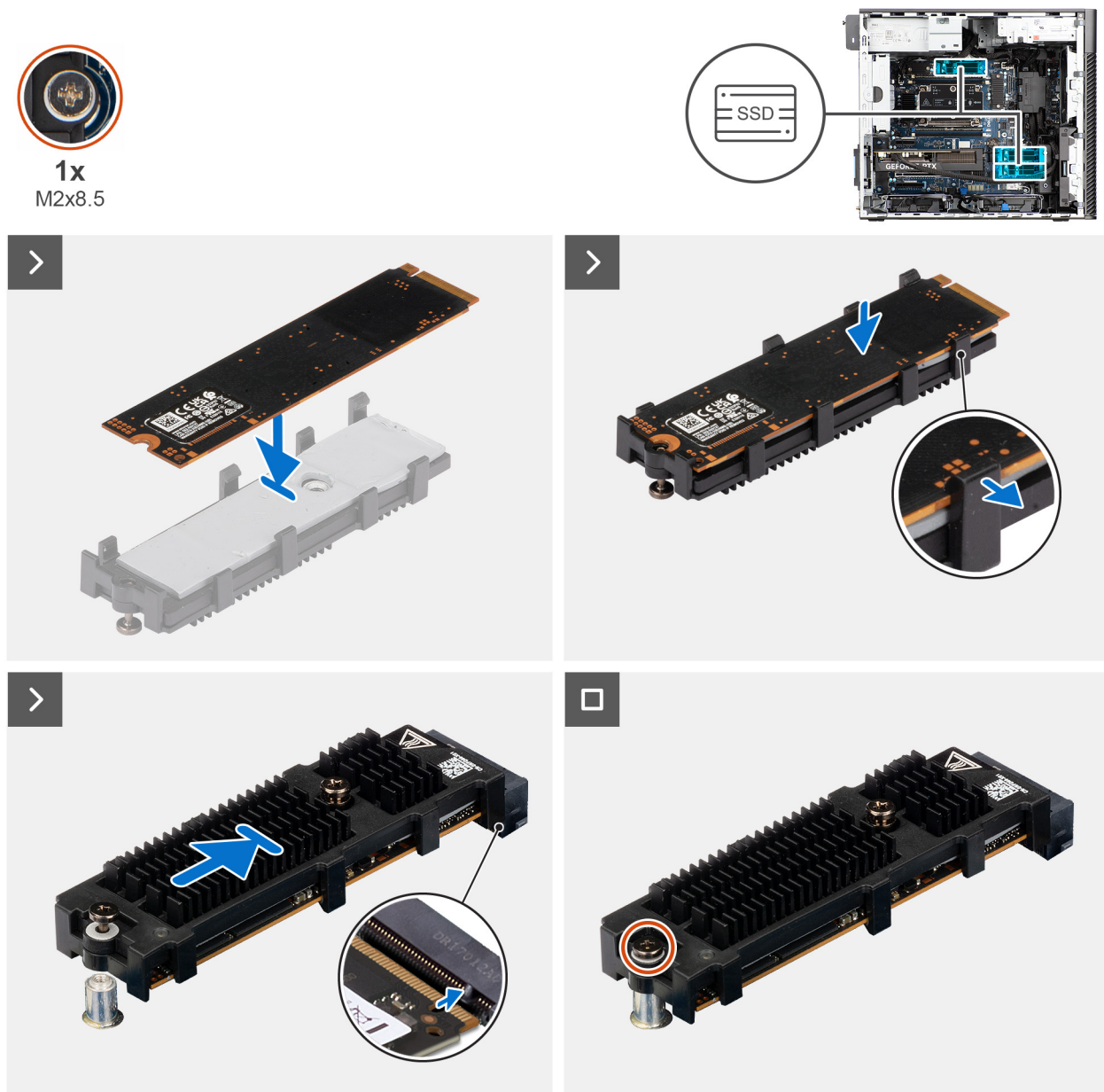


Figure 52. Installing the onboard M.2 2280 SSD

Steps

1. Align the screw hole on the SSD with the screw hole on the SSD heat-sink.
2. Pry the retention tabs on the heat sink and place the SSD on the heat sink.
3. Align the notch on the SSD with the tab on the SSD connector.
4. Insert the SSD heat-sink assembly at an angle into the slot on the system board.
5. Install the screw (M2x8.5) to secure the M.2 2280 SSD to the system board.

Next steps

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

Wireless card

Removing the wireless card

Prerequisites

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

About this task

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

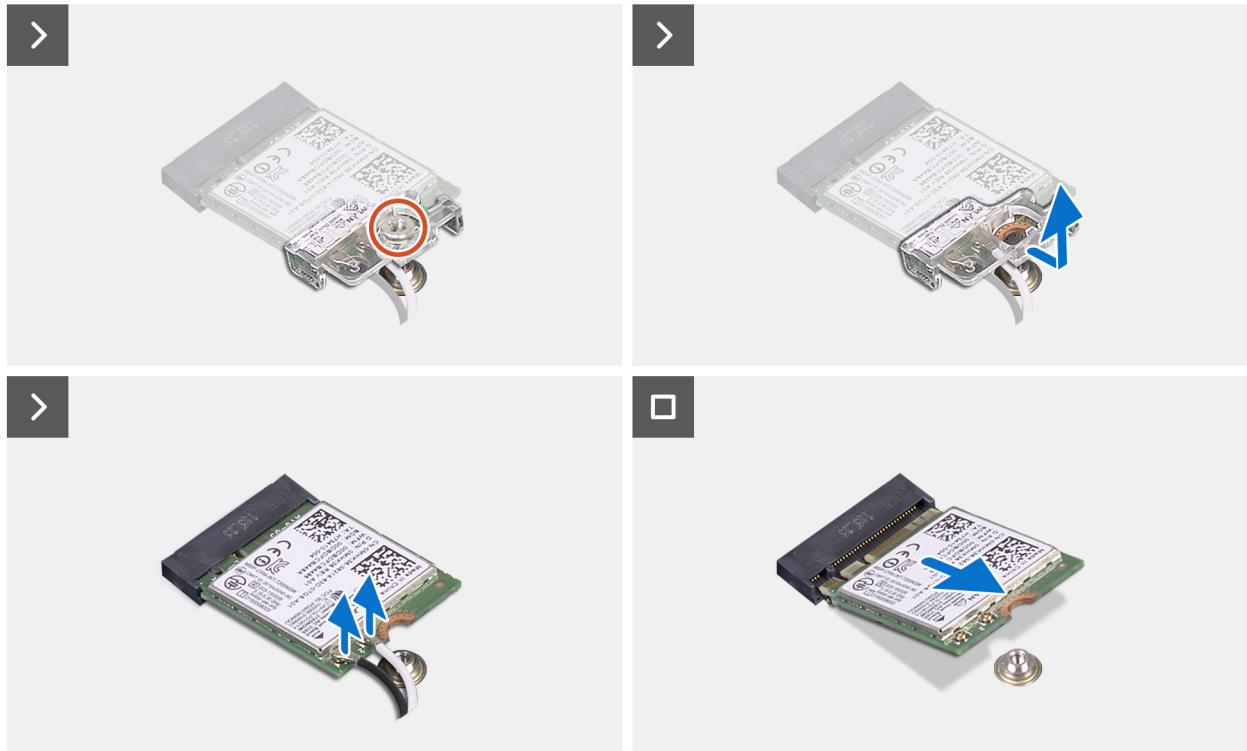
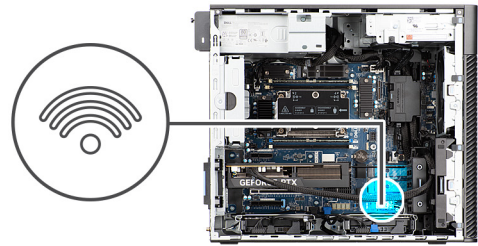


Figure 53. Removing the wireless card

Steps

1. Remove the screw (M2x3.5) that secures the wireless card to the system board.
2. Slide and lift the wireless-card bracket off the wireless card.
3. Disconnect the antenna cables from the wireless card.
4. Slide and remove the wireless card at an angle from the wireless-card slot (M.2 WLAN).

Installing the wireless card

Prerequisites

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

About this task

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

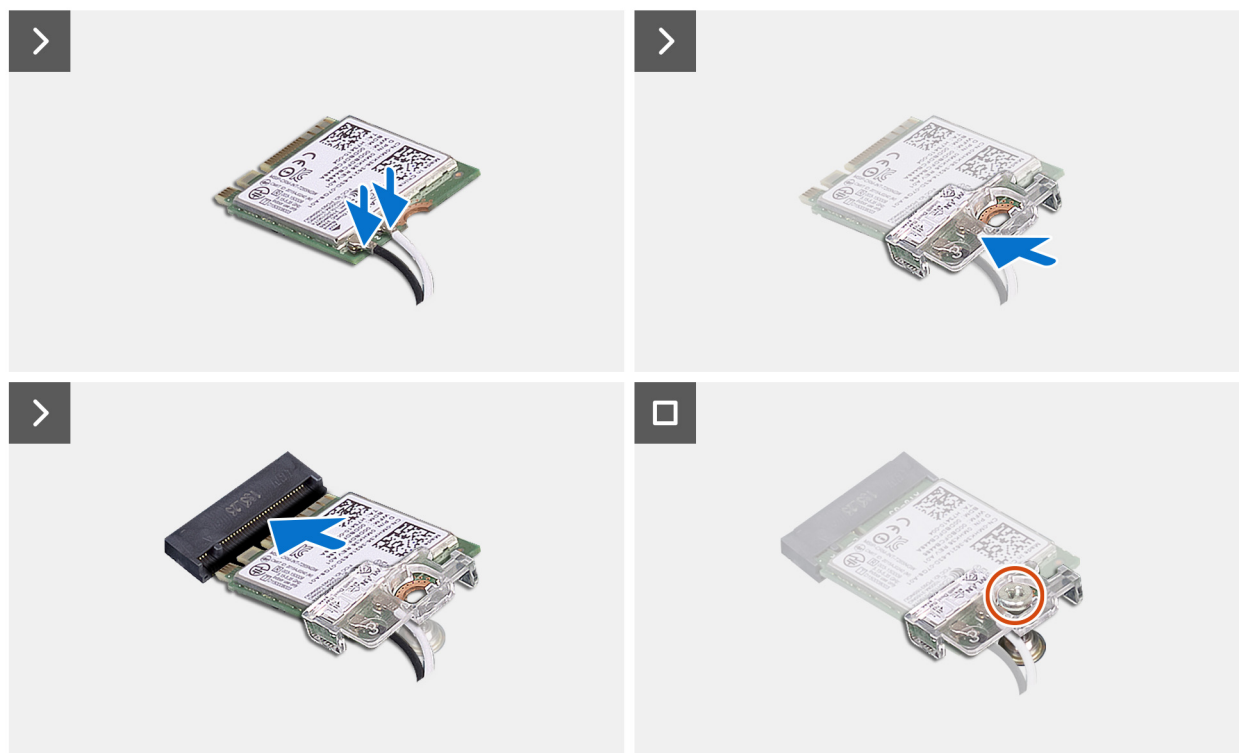
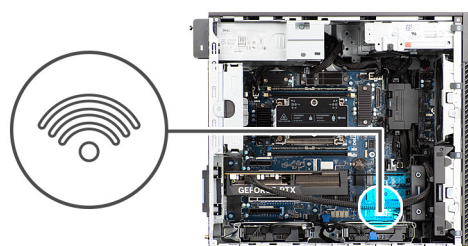


Figure 54. Installing the wireless card

Steps

1. Connect the antenna cables to the wireless card.

Table 3. Antenna-cable color scheme

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

2. Slide and place the wireless-card bracket on the wireless card.
3. Align the notch on the wireless card with the tab on the wireless-card slot (M.2 WLAN).
4. Slide the wireless card at an angle into the wireless-card slot.
5. Replace the screw (M2x3.5) that secures the wireless card to the system board.

Next steps

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

Intrusion switch

Removing the intrusion switch

Prerequisites

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

About this task

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

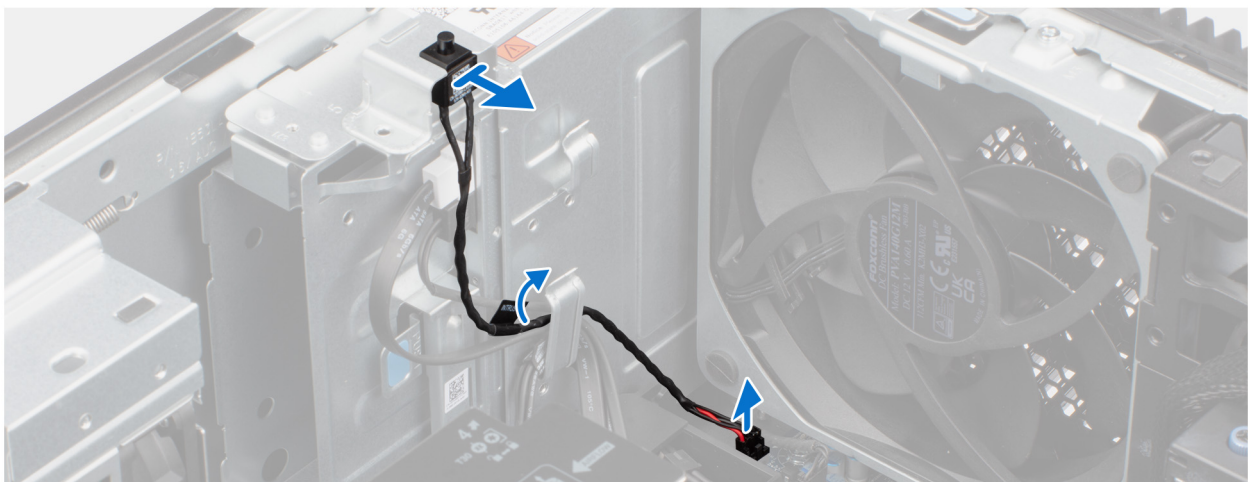
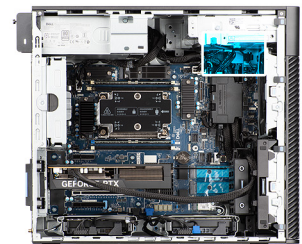


Figure 55. Removing the intrusion switch

Steps

1. Disconnect the intruder switch cable from the connector on the system board and unroute the cable from the routing guide.
2. Slide and remove the intrusion switch from the chassis.

Installing the intrusion switch

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 intrusion switch and provides a visual representation of the installation procedure.

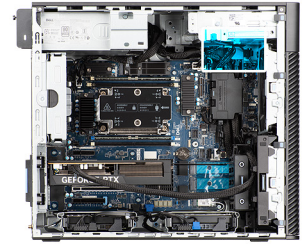


Figure 56. Installing the intrusion switch

Steps

1. Insert the intrusion switch into its slot and slide the switch to secure it into the slot.
2. Route the intruder switch cable through the routing guide and connect the intruder cable to the connector on the system board.

Next steps

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

Chassis fan

Removing the front upper chassis fan (optional)

Prerequisites

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

About this task

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



1x
M3x5

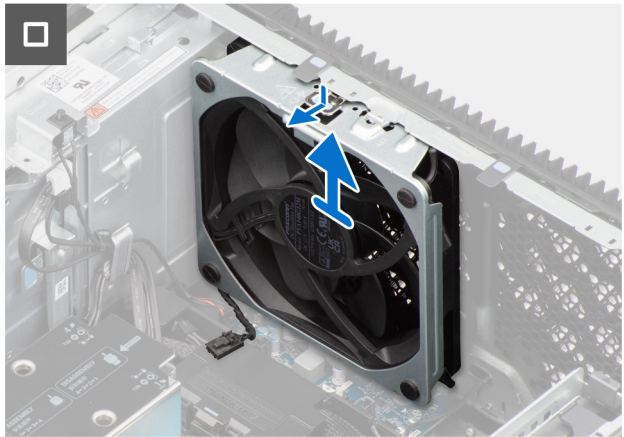
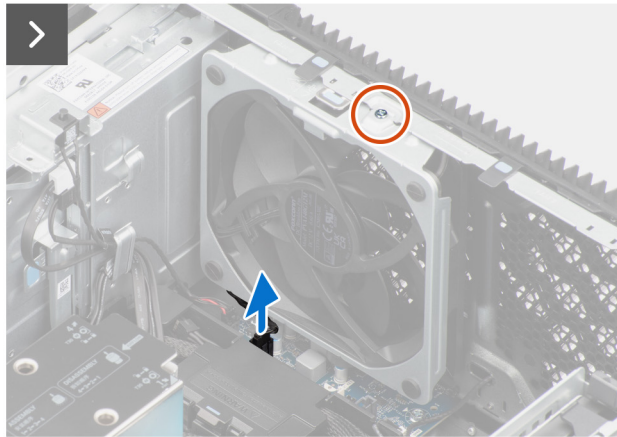
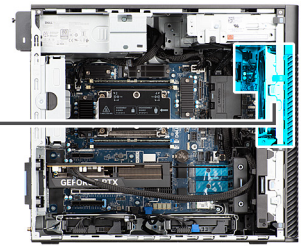
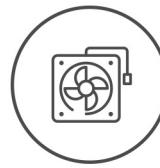


Figure 57. Removing the front upper chassis fan

Steps

1. Remove the screw (M3x5) that secures the front upper chassis fan to the chassis.
2. Disconnect the fan cable from the connector on the system board.
3. Press the tab to release the chassis fan from the slot.
4. At an angle, lift the chassis fan and remove it from the chassis.

Installing the front upper chassis fan (optional)

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 front upper chassis fan and provide a visual representation of the installation procedure.



1x
M3x5

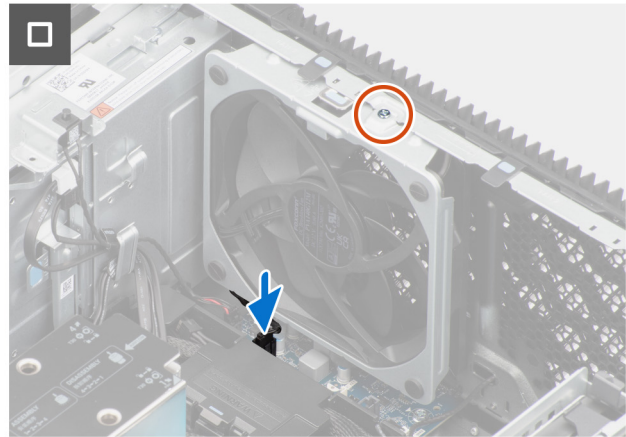
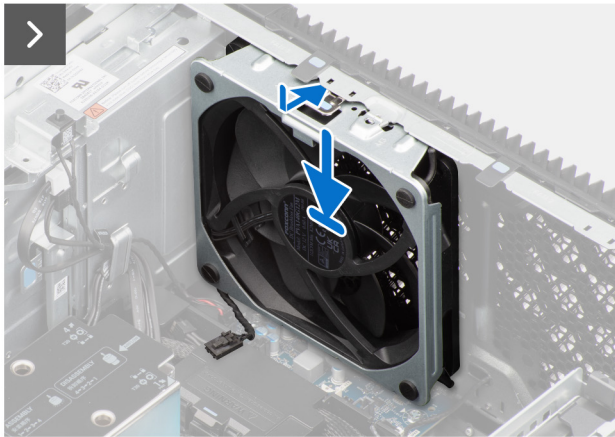
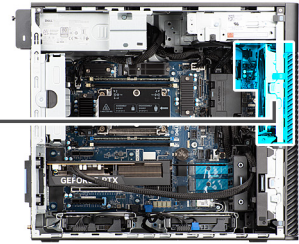
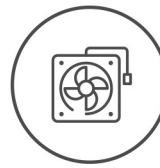


Figure 58. Installing the front upper chassis fan

Steps

1. Align the tabs on the fan with the slots on the chassis.
2. Insert the chassis fan at an angle into the slot in the chassis.
3. Press the chassis fan into the slot until the release tab locks into place.
4. Connect the fan cable to the connector on the system board.
5. Replace the screw (M3x5) to secure the front upper chassis fan to the chassis.

Next steps

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

Removing the front lower chassis fan (optional)

Prerequisites

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

About this task

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



1x
M3x5

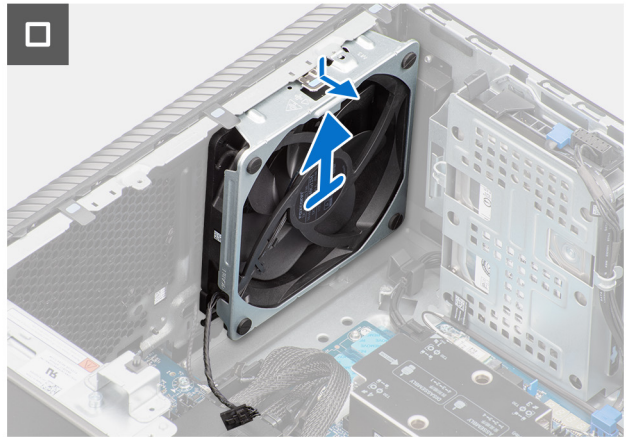
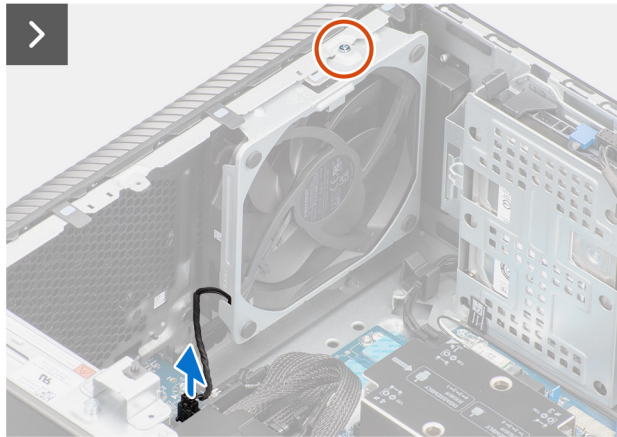
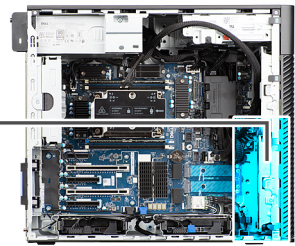
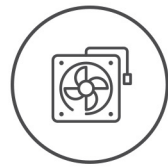


Figure 59. Installing the front lower chassis fan

Steps

1. Remove the screw (M3x5) that secures the front lower chassis fan to the chassis.
2. Disconnect the fan cable from the connector on the system board.
3. Press the tab to release the chassis fan from the slot.
4. At an angle, lift the chassis fan and remove it from the chassis.

Installing the front lower chassis fan (optional)

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 front lower chassis fan and provide a visual representation of the installation procedure.



1x
M3x5

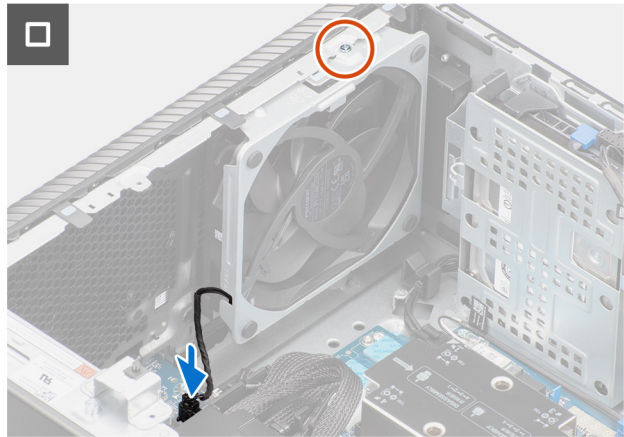
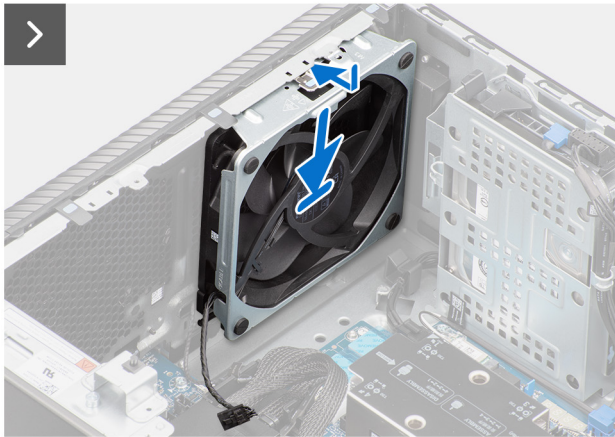
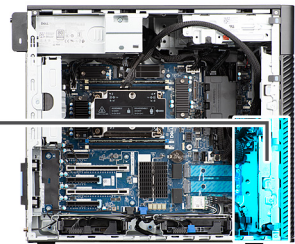
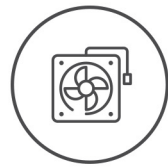


Figure 60. Installing the front lower chassis fan

Steps

1. Align the tabs on the fan with the slots on the chassis.
2. Insert the chassis fan at an angle into the slot in the chassis.
3. Press the chassis fan into the slot until the release tab locks into place.
4. Connect the fan cable to the connector on the system board.
5. Replace the screw (M3x5) to secure the front upper chassis fan to the chassis.

Next steps

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

Removing the rear chassis fan

Prerequisites

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

About this task

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



1x
M3x5

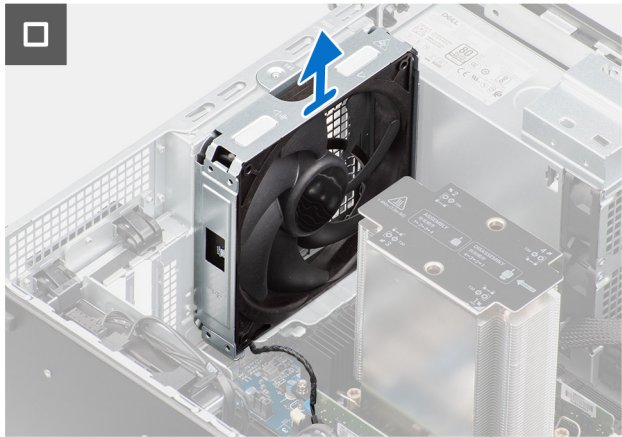
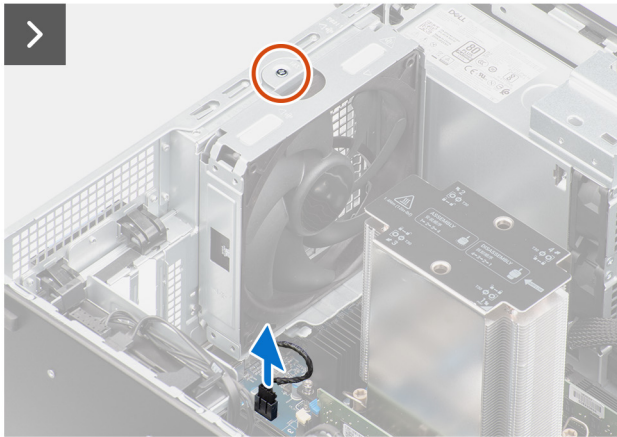
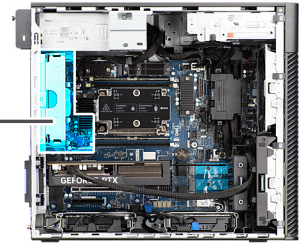
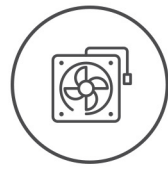


Figure 61. Removing the rear chassis fan

Steps

1. Disconnect the fan cable from the connector on the system board.
2. Remove the screw (M3x5) that secure the fan to the chassis.
3. Lift and remove the fan from the chassis.

Installing the rear chassis fan

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 rear chassis fan and provide a visual representation of the installation procedure.



1x
M3x5

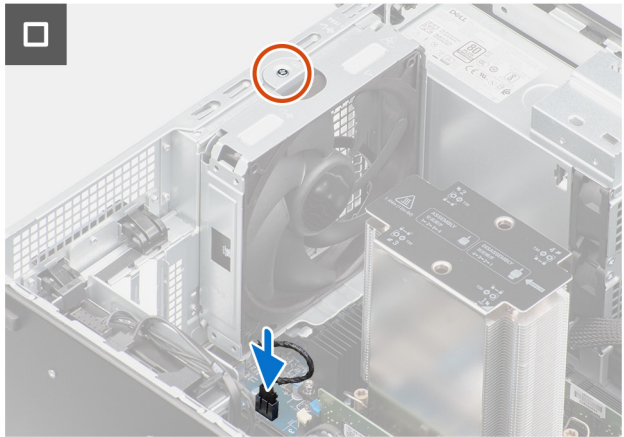
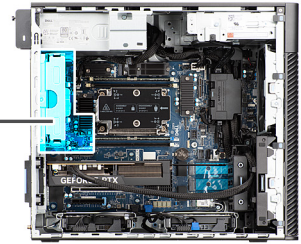
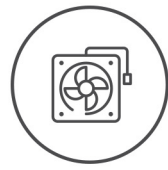


Figure 62. Installing the rear chassis fan

Steps

1. Align and place the rear fan on the chassis.
2. Install the screw (M3x5) to secure the fan to the chassis.
3. Connect the fan cable to the connector on the system board.

Next steps

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

Internal speaker

Removing the internal speaker

Prerequisites

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

About this task

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

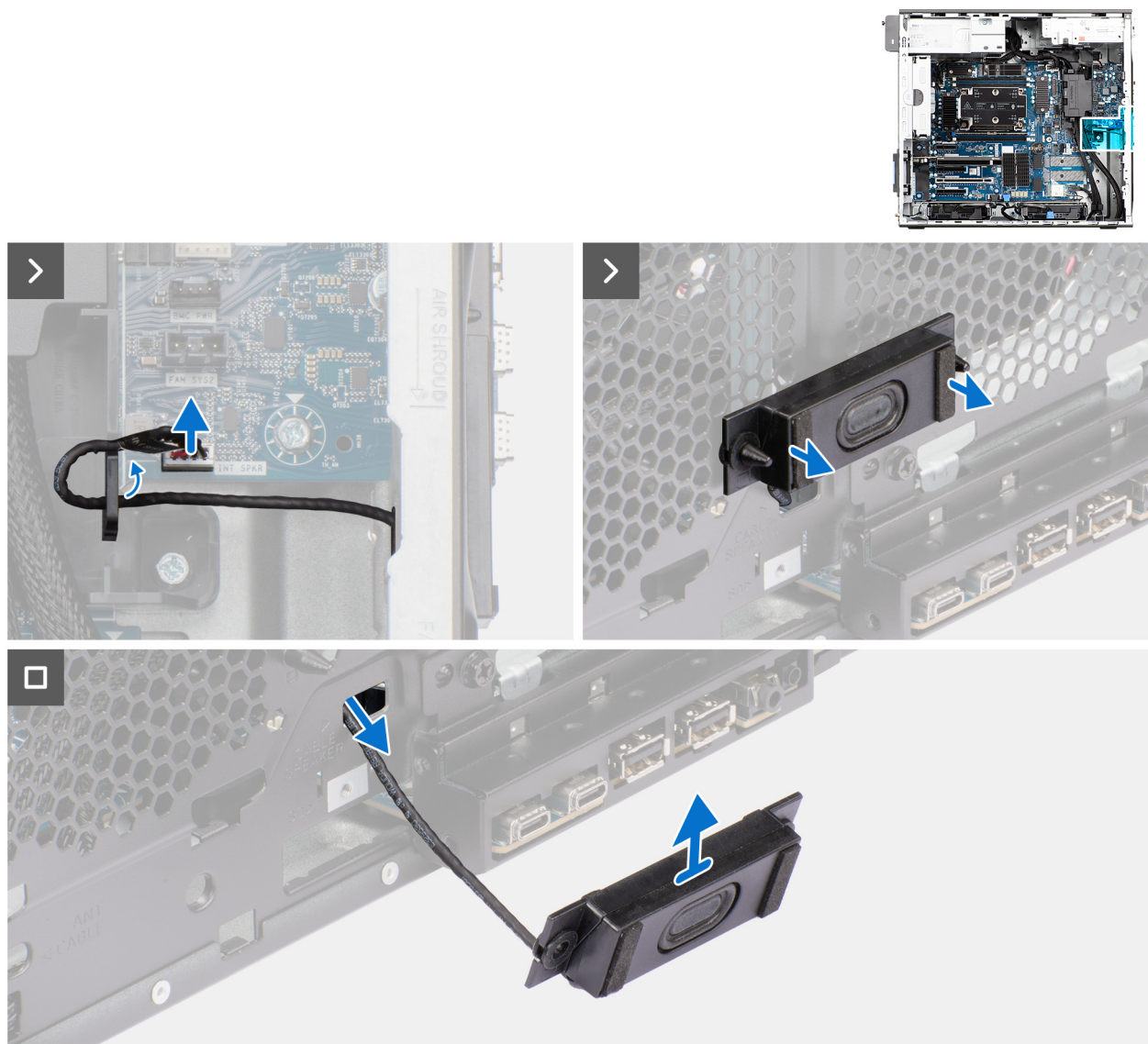


Figure 63. Removing the internal speaker

Steps

1. Disconnect the internal speaker cable from the connector on the system board.
2. Unroute the internal speaker cable through the recess on the chassis.
3. Slide and remove the internal speaker from the chassis.

Installing the internal speaker

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 internal speaker and provide a visual representation of the installation procedure.

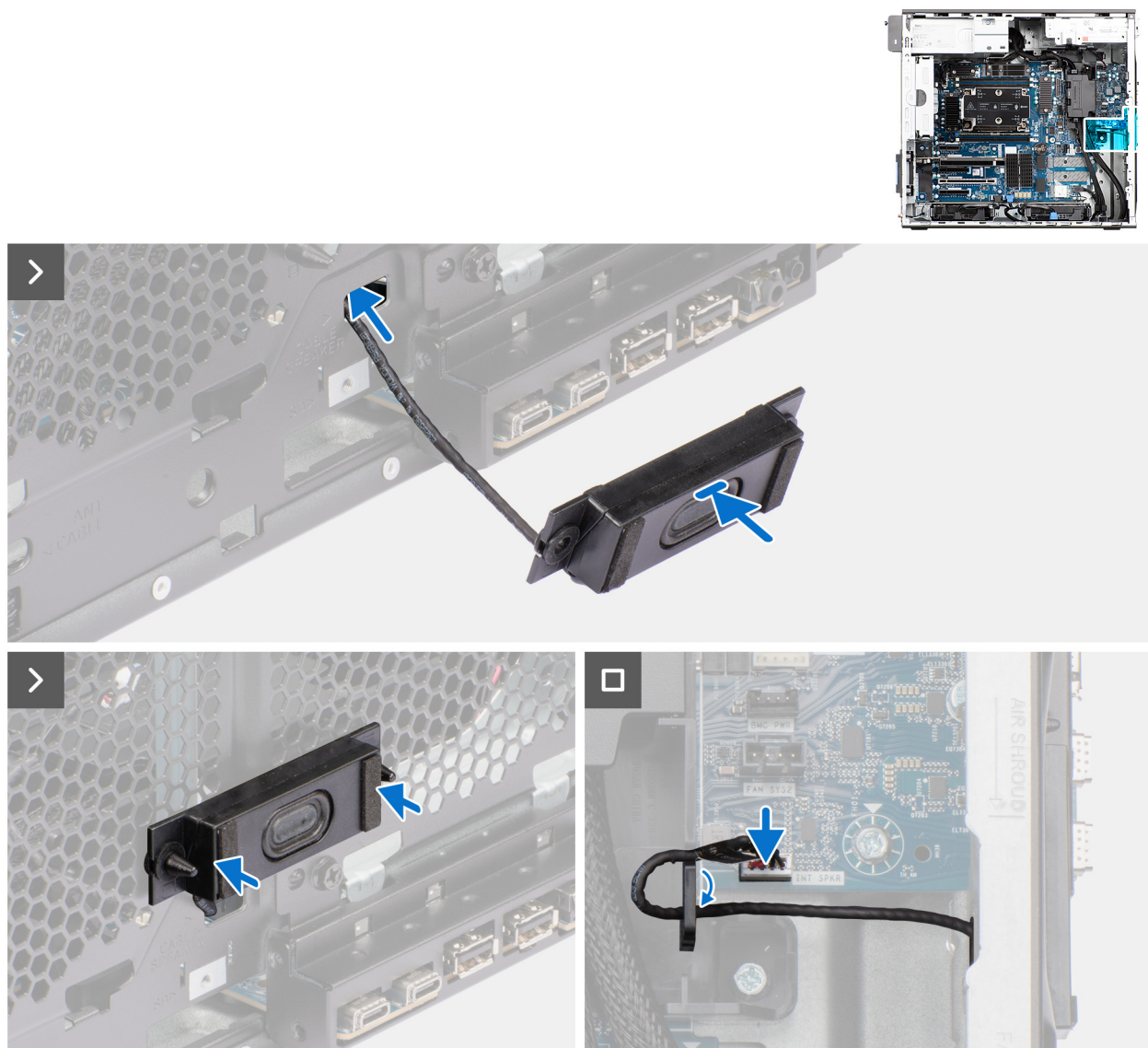


Figure 64. Installing the internal speaker

Steps

1. Align the holes on the internal speaker with the alignment post on the chassis.
2. Insert the internal speaker into its slot.
3. Route the internal speaker cable through the recess on the front of the chassis.
4. Connect the internal speaker cable to the connector on the system board.

Next steps

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

Graphics-card end holder

Removing the graphics-card end holder

Prerequisites

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

About this task

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

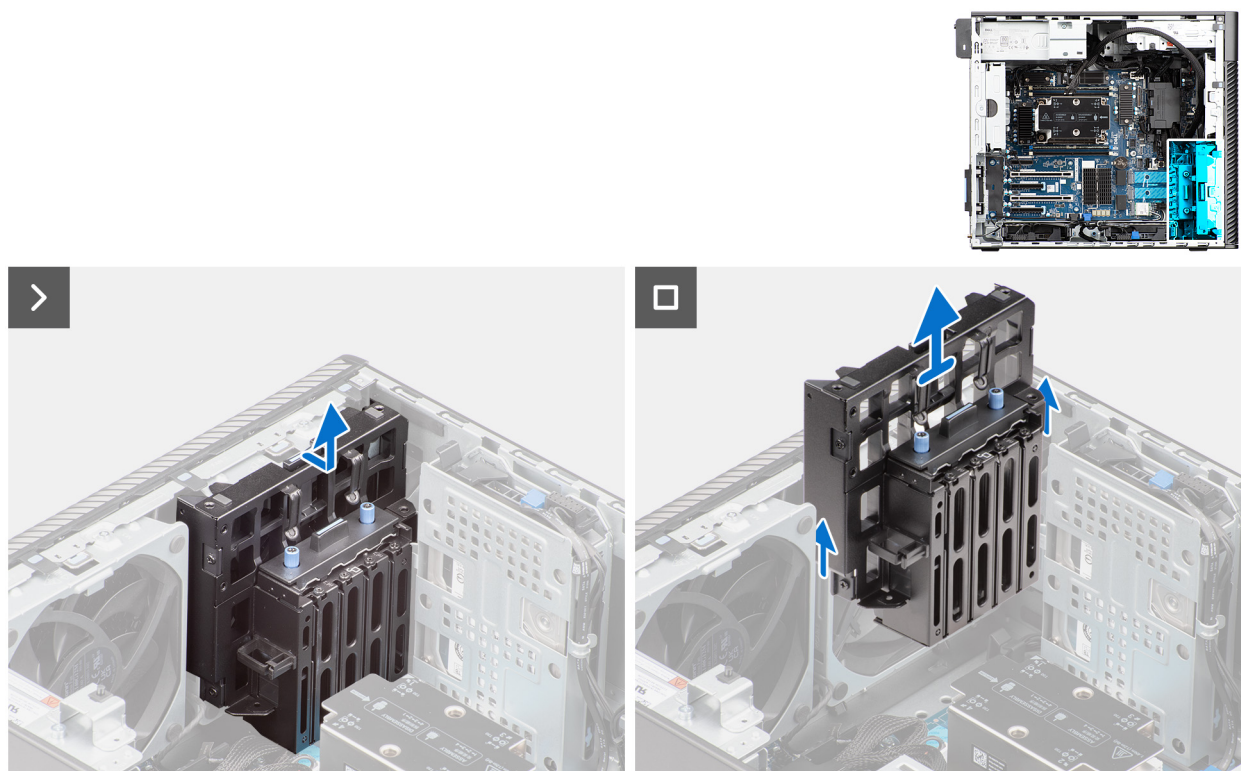


Figure 65. Removing the graphics-card end holder

Steps

1. Push the latch to unlock position on the graphics-card end holder.
2. Slide and remove the graphics-card end holder from the computer.

Installing the graphics-card end holder

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 graphics-card end holder and provide a visual representation of the installation procedure.

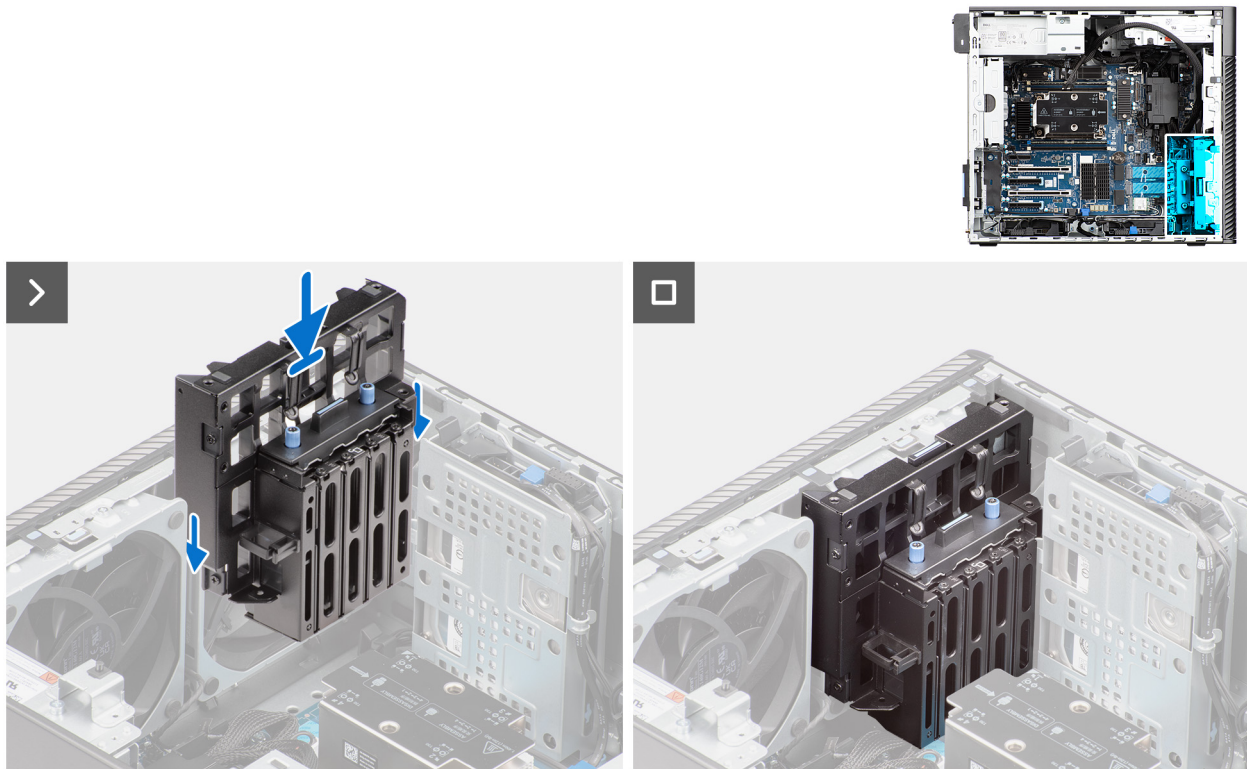


Figure 66. Installing the graphics-card end holder

Steps

1. Position the graphics-card end holder to align it with the slots on the computer chassis.
2. Press the graphics-card end holder down until it secures into place.
3. Slide the latch to lock position on the graphics-card end holder.

Next steps

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

Expansion card

Removing the nonpowered graphics card

Prerequisites

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

About this task

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



1x
M3x5

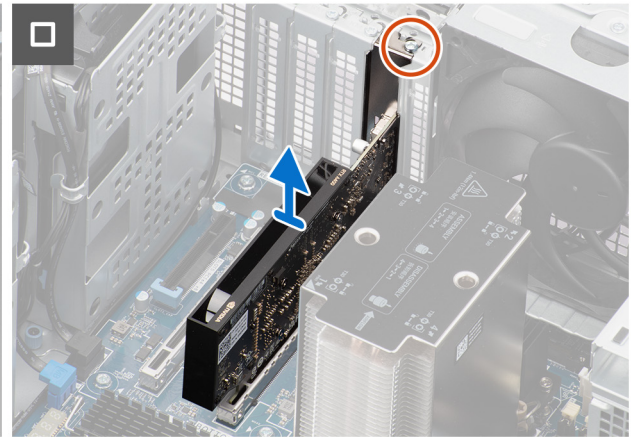
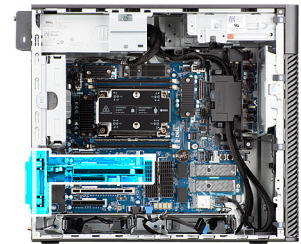


Figure 67. Removing the nonpowered graphics card

Steps

1. Press the pull tab down to open the PCIe door.
2. Remove the screw (M3x5) that secures the graphics card to the PCIe slot.
3. Lift the graphics card from the PCIe slot on the system board.
4. Lift the pull tab to close the PCIe door.

Installing the nonpowered graphics card

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 nonpowered graphics card and provide a visual representation of the installation procedure.



1x
M3x5

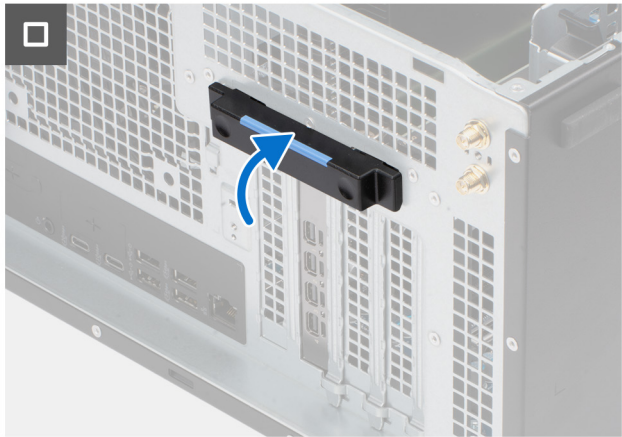
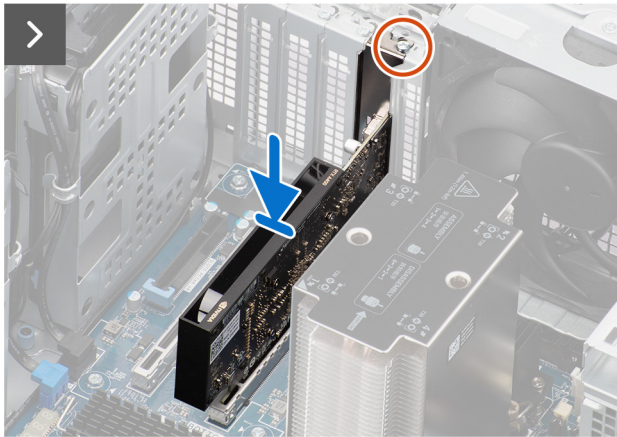
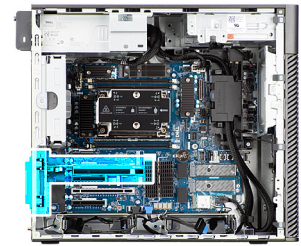


Figure 68. Installing the nonpowered graphics card

Steps

1. Press the pull tab down to open the PCIe door.
2. Remove the screw (M3x5) that secures the PCIe filler to the PCIe slot.
3. Slide and remove the PCIe filler away from the chassis.
4. Align the graphics card with the PCIe connector on the system board.
5. Using the alignment post, connect the graphics card to the connector and press down firmly.
6. Install the screw (M3x5) to secure the graphics card to the PCIe slot.
7. Lift the pull tab to close the PCIe door.

Next steps

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

Removing the powered graphics card

Prerequisites

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

About this task

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

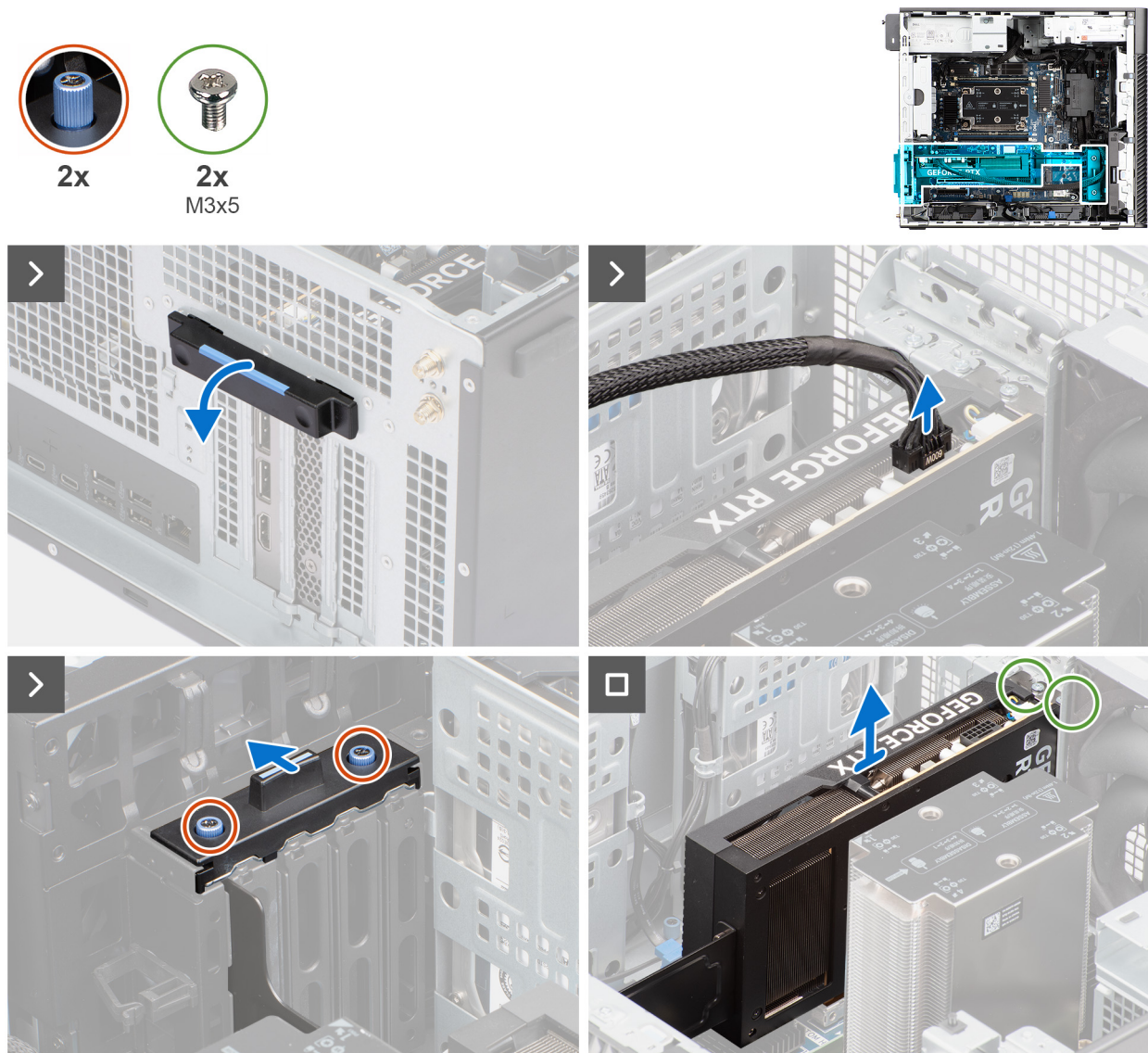


Figure 69. Removing the powered graphics card

Steps

1. Press the pull tab down to open the PCIe door.
2. Disconnect the power cable from the connector on the powered graphics card.
3. Loosen the two captive screws on the end holder and push the latch towards the chassis to unlock the graphics card from the end holder.
4. Remove the two screws (M3x5) that secure the graphics card to the PCIe slot.
5. Lift and remove the powered graphics card away from the PCIe slot.
6. Lift the pull tab to close the PCIe door.

Installing the powered graphics card

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 powered graphics card and provide a visual representation of the installation procedure.

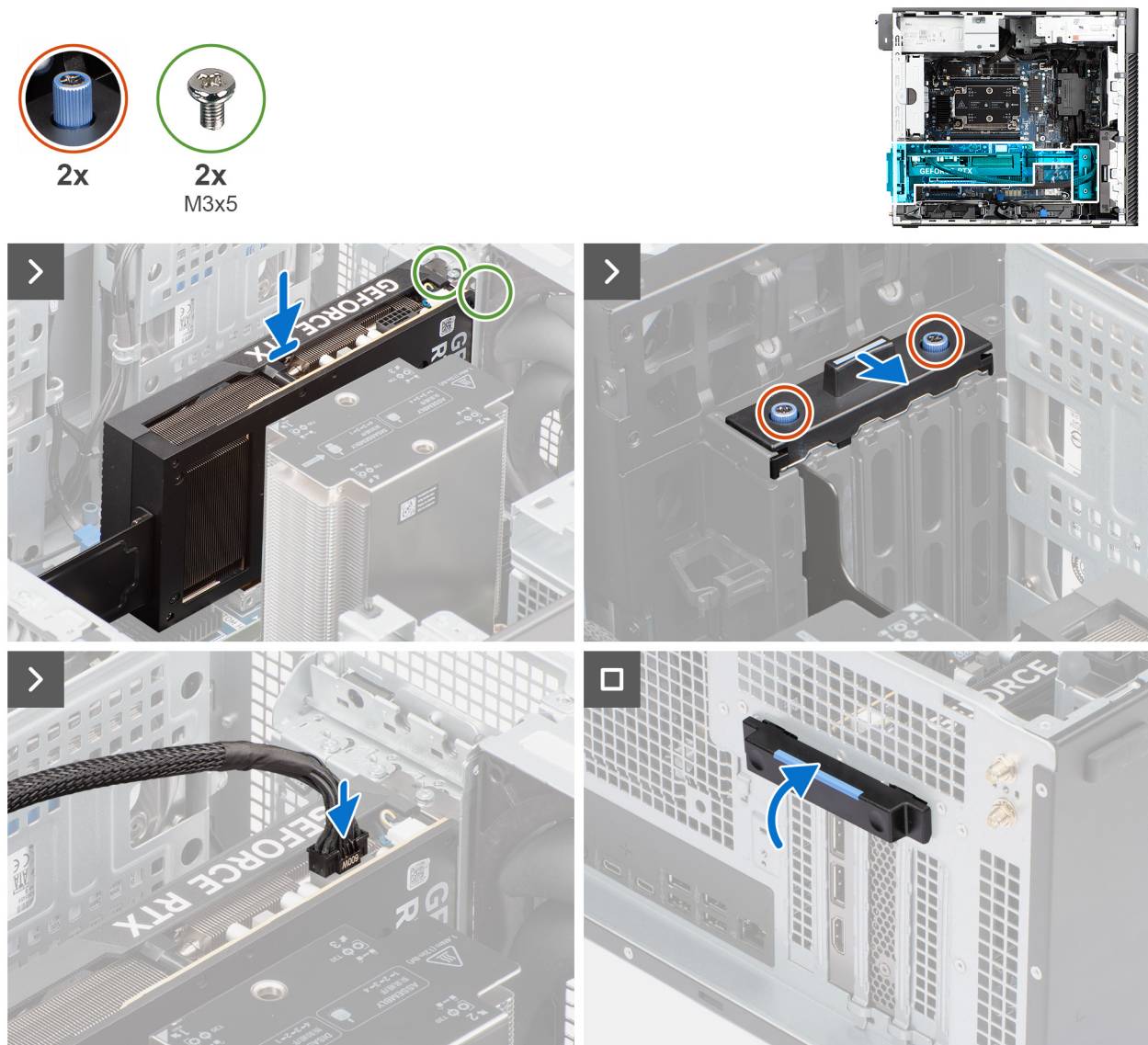


Figure 70. Installing the powered graphics card

Steps

1. Align the graphics card with the PCIe connector on the system board.
2. Using the alignment post, connect the graphics card to the connector and press down firmly.
3. Replace the two screws (M3x5) to secure the graphics card to the PCIe slot.
4. Push the latch on the end holder outwards to lock the graphics card to the end holder.
5. Tighten the two captive screws to secure the graphics card to the end holder.
6. Connect the power cable to the connector on the powered graphics card.
7. Lift the pull tab to close the PCIe door.

Next steps

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

Removing the Ultra-Speed Duo card

Prerequisites

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

About this task

The following images indicate the location of the Ultra-Speed Duo card and provide a visual representation of the removal procedure.

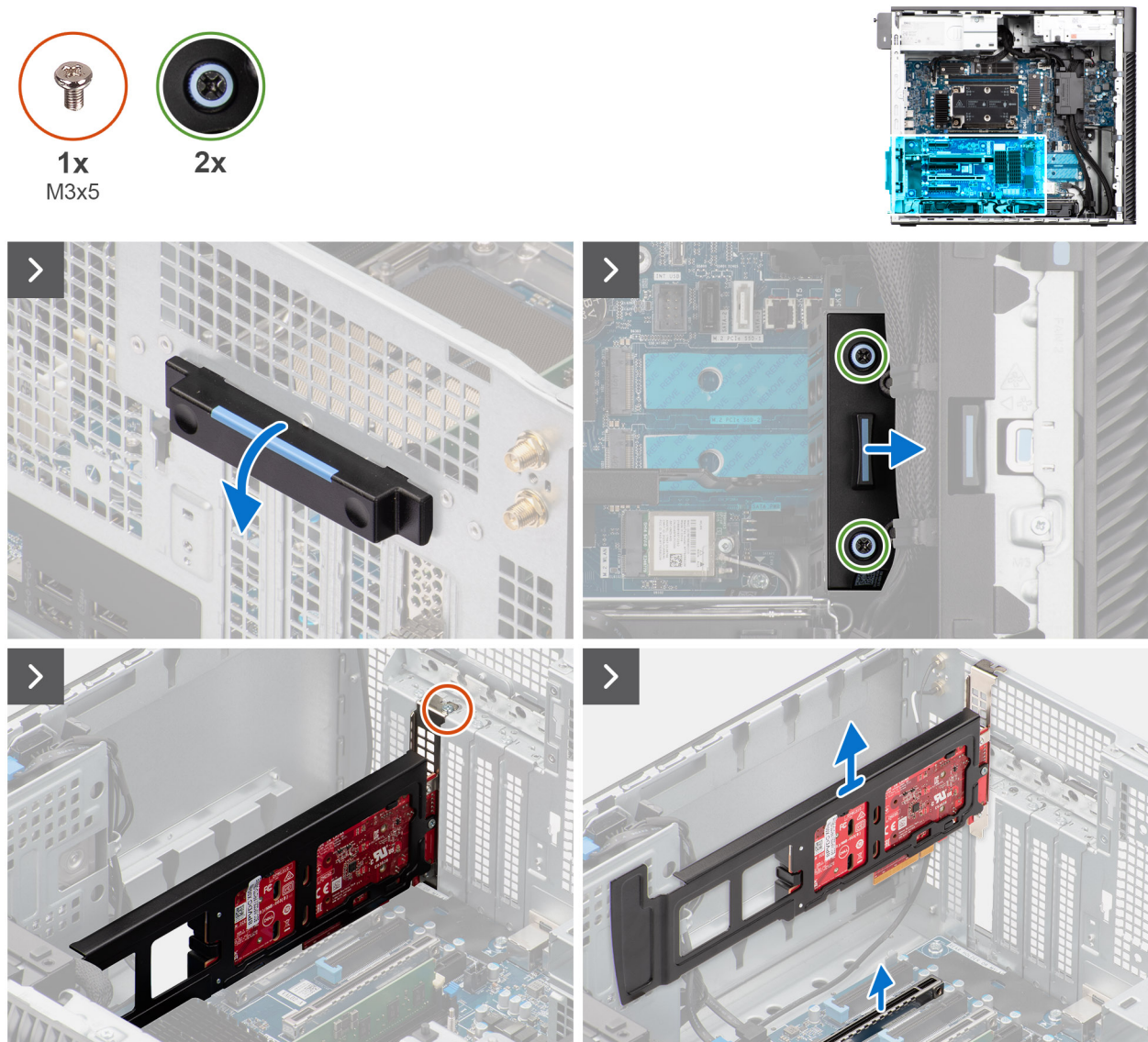


Figure 71. Removing the Ultra-Speed Duo card

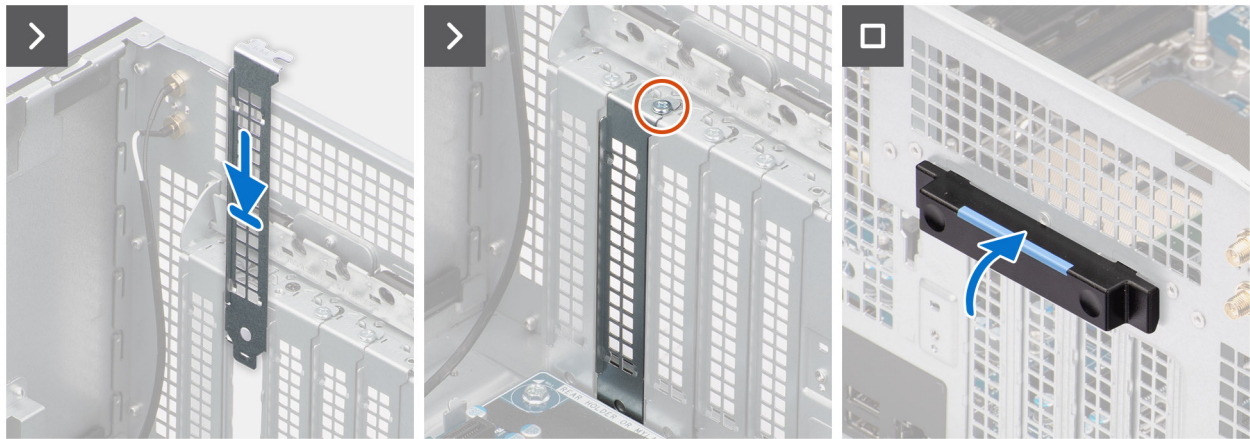


Figure 72. Removing the Ultra-Speed Duo card

Steps

1. Press the pull tab down to open the PCIe door.
2. Loosen the two captive screws on the end holder and push the latch towards the chassis to unlock the Ultra-Speed Duo card from the end holder.
3. Remove the screw (M3x5) that secures the Ultra-Speed Duo card to the PCIe slot.
4. Lift the Ultra-Speed Duo card from the PCIe slot on the system board.
5. Slide and place the PCIe filler in the PCIe slot on the chassis.
6. Replace the screw (M3x5) to secure the PCIe filler to the chassis.
7. Lift the pull tab to close the PCIe door.

Installing the Ultra-Speed Duo card

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 Ultra-Speed Duo card and provide a visual representation of the installation procedure.

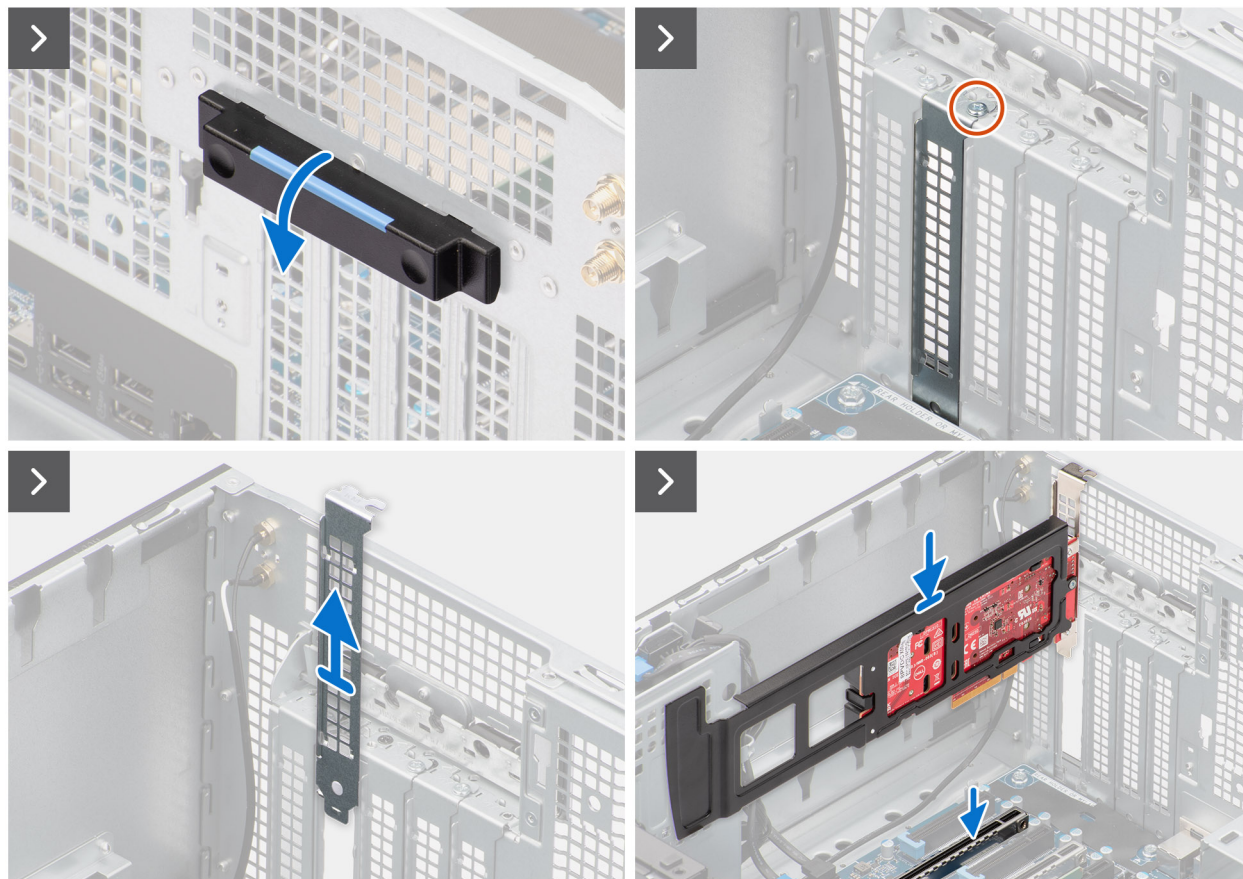
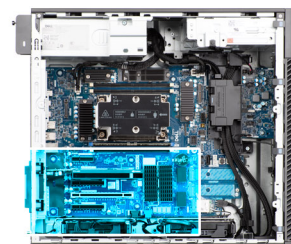
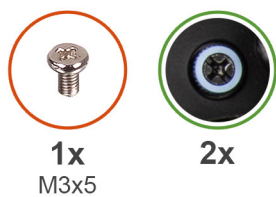


Figure 73. Installing the Ultra-Speed Duo card

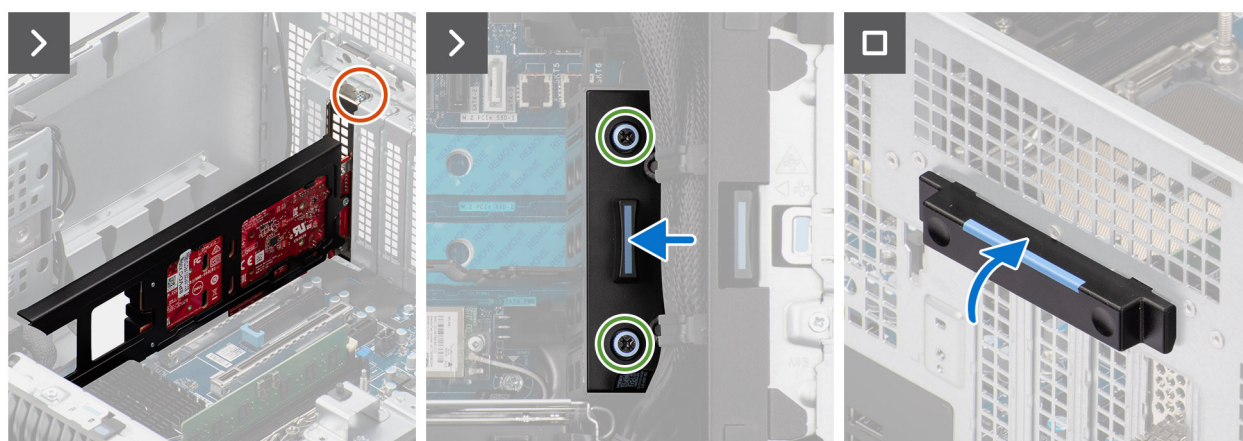


Figure 74. Installing the Ultra-Speed Duo card

Steps

1. Press the pull tab down to open the PCIe door.

2. Remove the screw (M3x5) that secures the PCIe filler to the PCIe slot.
3. Slide and remove the PCIe filler away from the chassis.
4. Align the Ultra-Speed Duo card with the PCIe connector on the system board.
5. Using the alignment post, connect the Ultra-Speed Duo card to the connector and press down firmly.
6. Install the screw (M3x5) to secure the Ultra-Speed Duo card to the PCIe slot.
7. Tighten the two captive screws to secure the Ultra-Speed Duo card to the end holder.
8. Lift the pull tab to close the PCIe door.

Next steps

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

Removing the Ultra-Speed Quad card

Prerequisites

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

About this task

The following images indicate the location of the Ultra-Speed Quad card and provide a visual representation of the removal procedure.

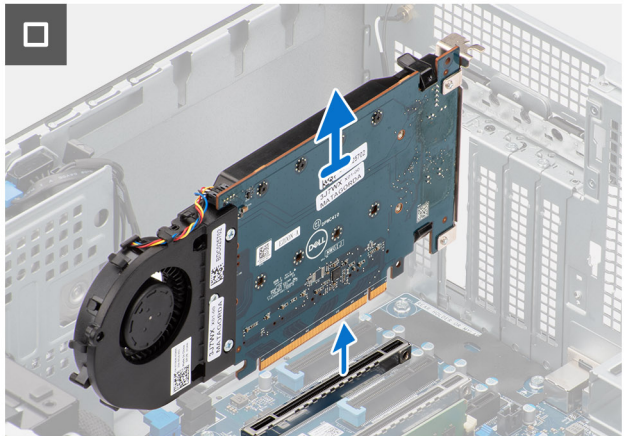
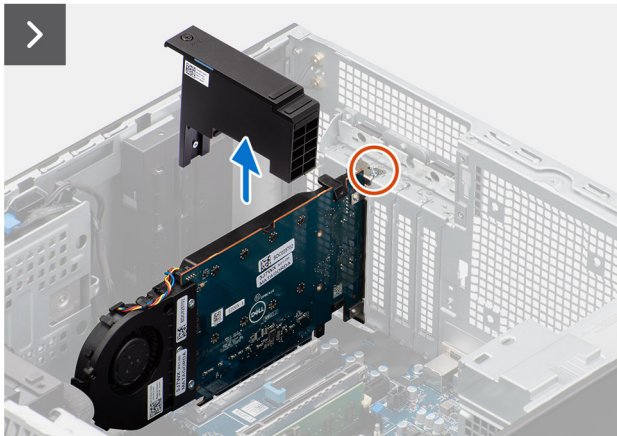
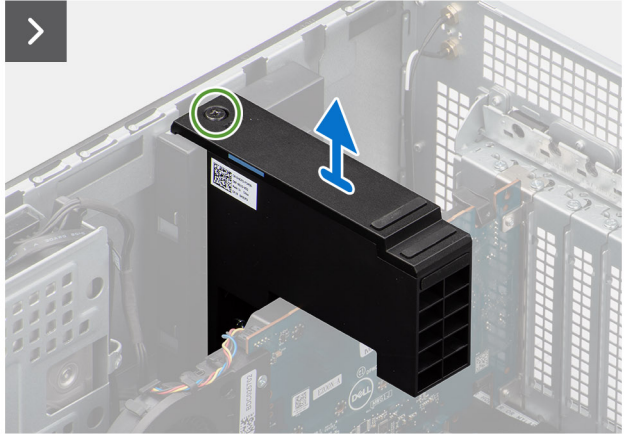
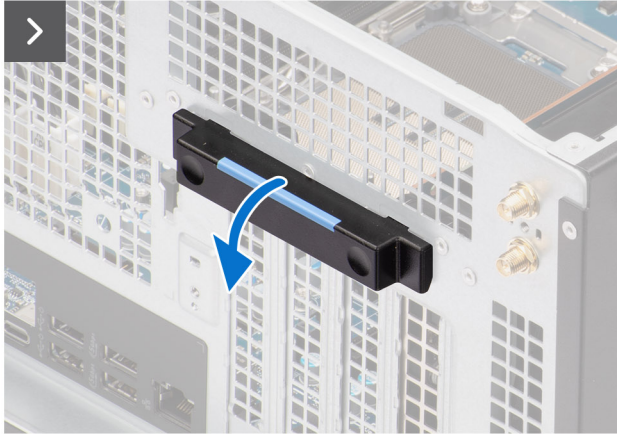
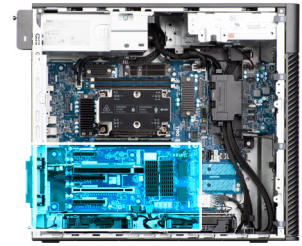
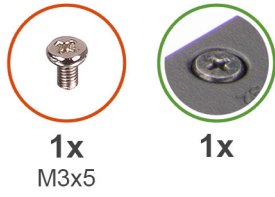


Figure 75. Removing the Ultra-Speed Quad card

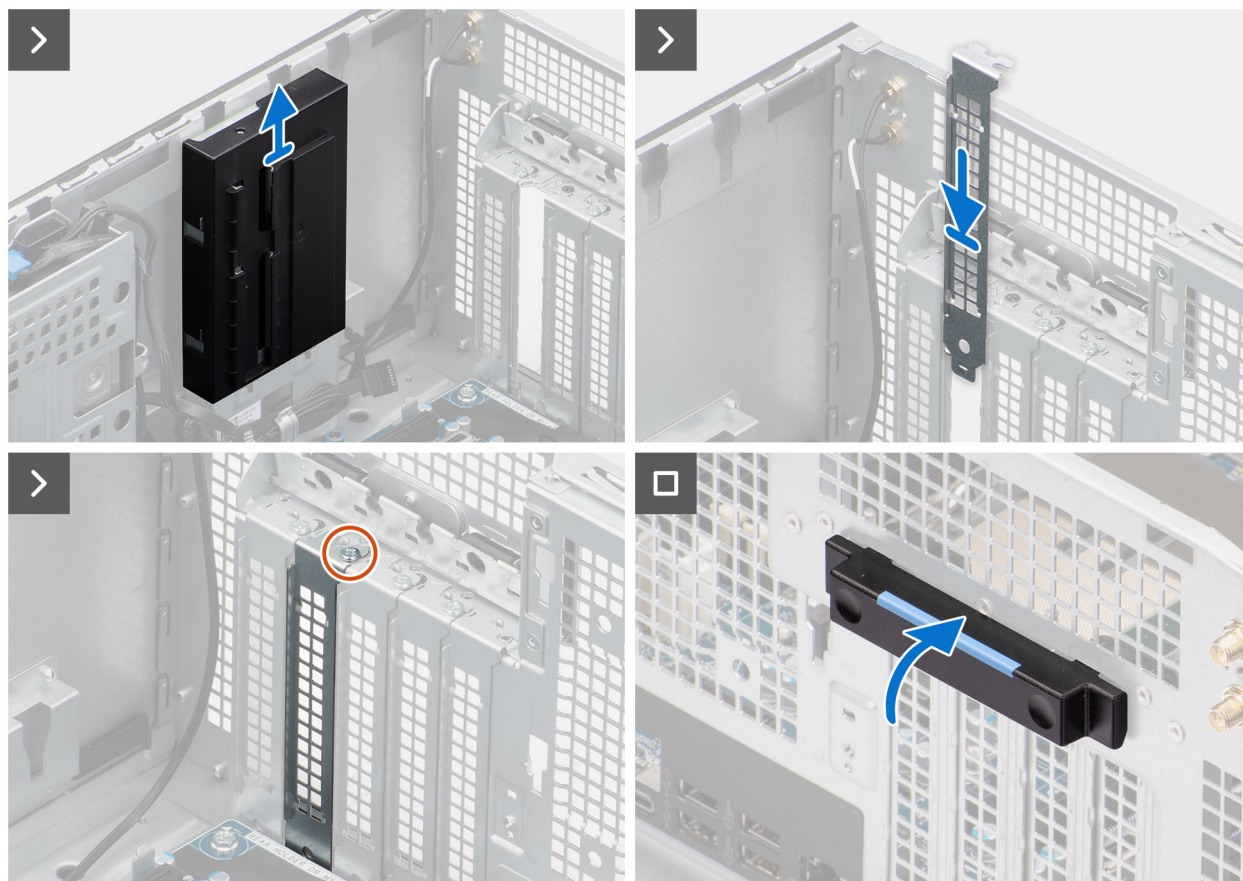


Figure 76. Removing the Ultra-Speed Quad card

Steps

1. Press the pull tab down to open the PCIe door.
2. Loosen the captive screw (#6-32) that secure the middle holder to the middle-holder base.
3. Slide and remove the middle holder from the rail on the middle-holder base.
4. Remove the screw (M3x5) that secures the Ultra-Speed Quad card to the PCIe slot.
5. Lift the Ultra-Speed Quad card from the PCIe slot on the system board.
6. Loosen the two captive screws on the middle-holder base and slide it out from the chassis.
7. Slide and place the PCIe filler in the PCIe slot on the chassis.
8. Replace the screw (M3x5) to secure the PCIe filler to the chassis.
9. Lift the pull tab to close the PCIe door.

Installing the Ultra-Speed Quad card

Prerequisites

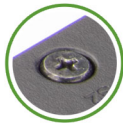
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following images indicate the location of the Ultra-Speed Quad card and provide a visual representation of the installation procedure.



1x
M3x5



1x

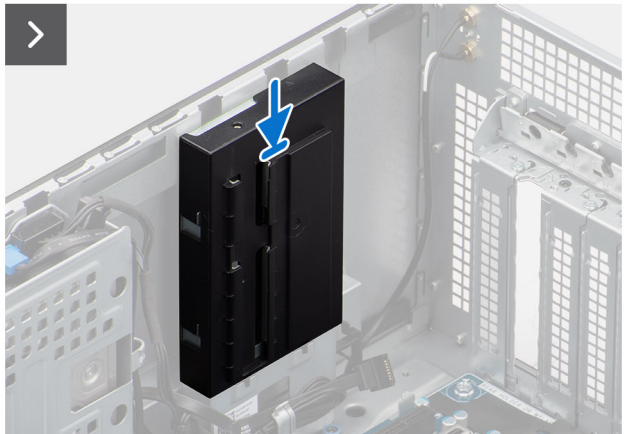
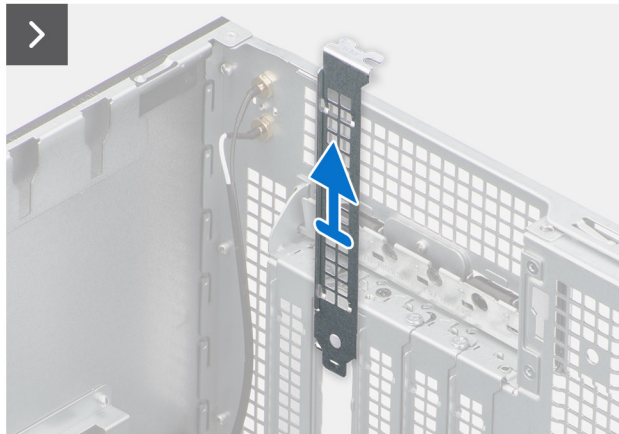
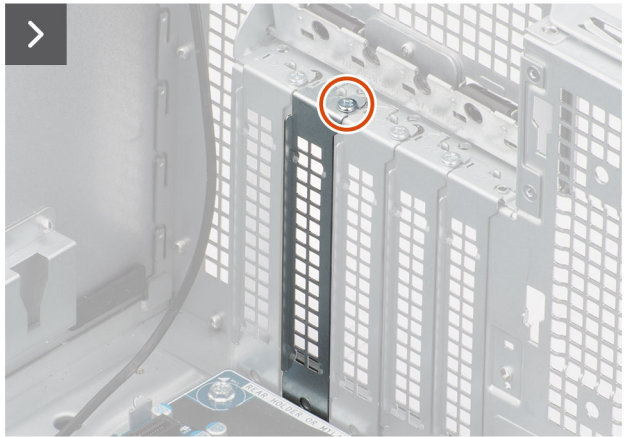
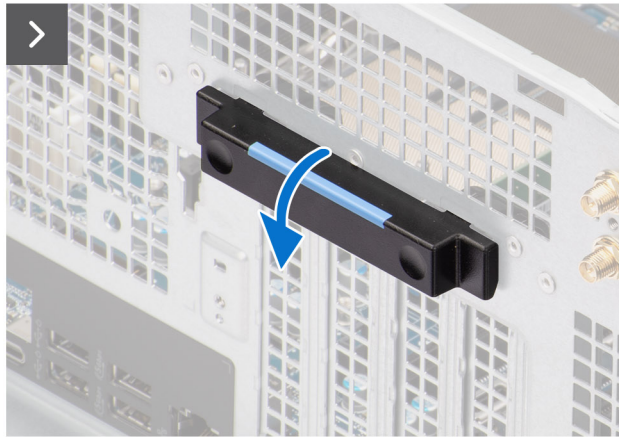


Figure 77. Installing the Ultra-Speed Quad card

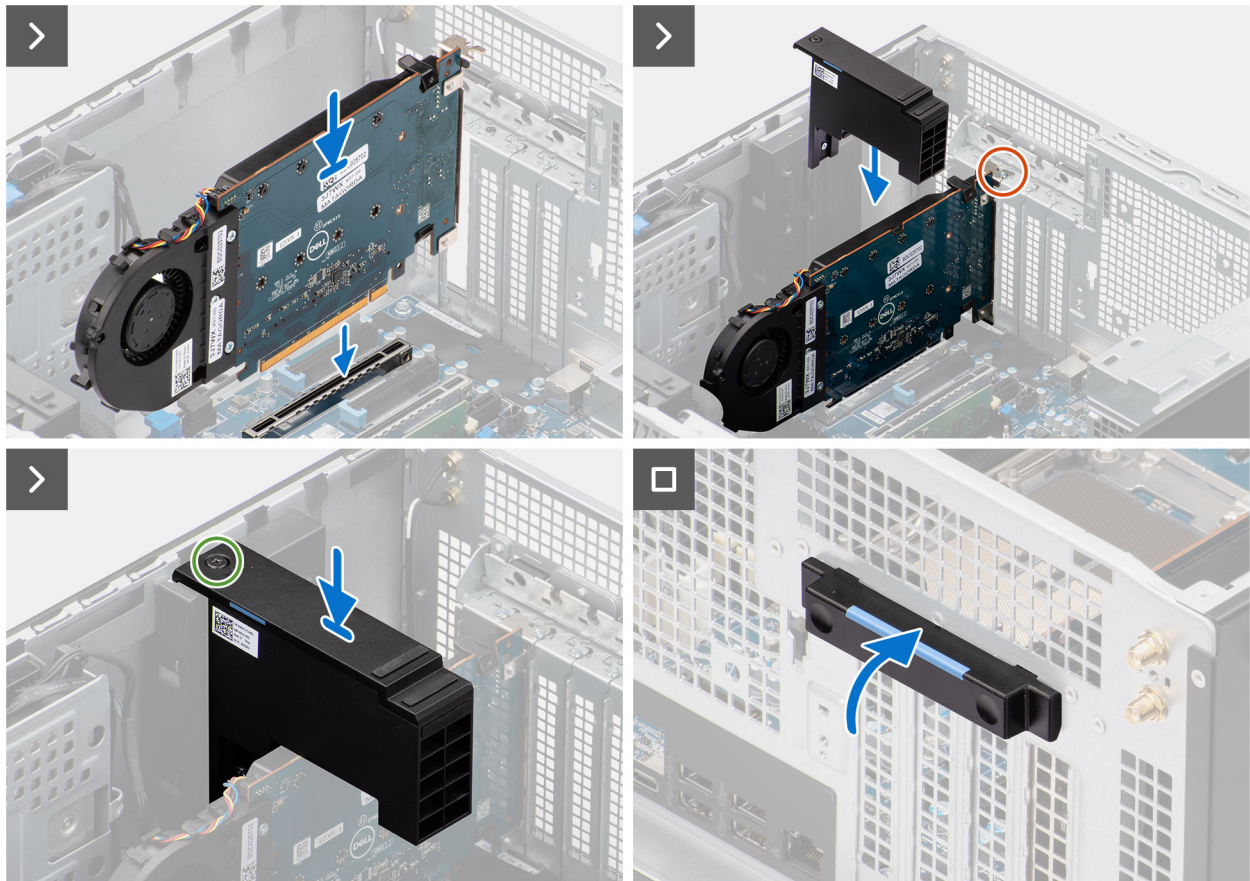


Figure 78. Installing the Ultra-Speed Quad card

Steps

1. Press the pull tab down to open the PCIe door.
2. Remove the screw (M3x5) that secures the PCIe filler to the PCIe slot.
3. Slide and remove the PCIe filler away from the chassis.
4. Slide the middle-holder base vertically downwards in the slot on the chassis.
5. Tighten the two captive screws to secure the middle-holder base to the chassis.
6. Align the Ultra-Speed Quad card with the PCIe connector on the system board.
7. Using the alignment post, connect the Ultra-Speed Quad card to the connector and press down firmly.
8. Install the screw (M3x5) to secure the Ultra-Speed Quad card to the PCIe slot.
9. Align and slide the middle holder in the rail on the middle-holder base.
10. Tighten the screw (#6-32) to secure the middle holder to the middle-holder base.
11. Lift the pull tab to close the PCIe door.

Next steps

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

Removing the Intel Ethernet Controller I226-V

Prerequisites

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

About this task

The following images indicate the location of the Intel Ethernet Controller I226-V and provide a visual representation of the removal procedure.

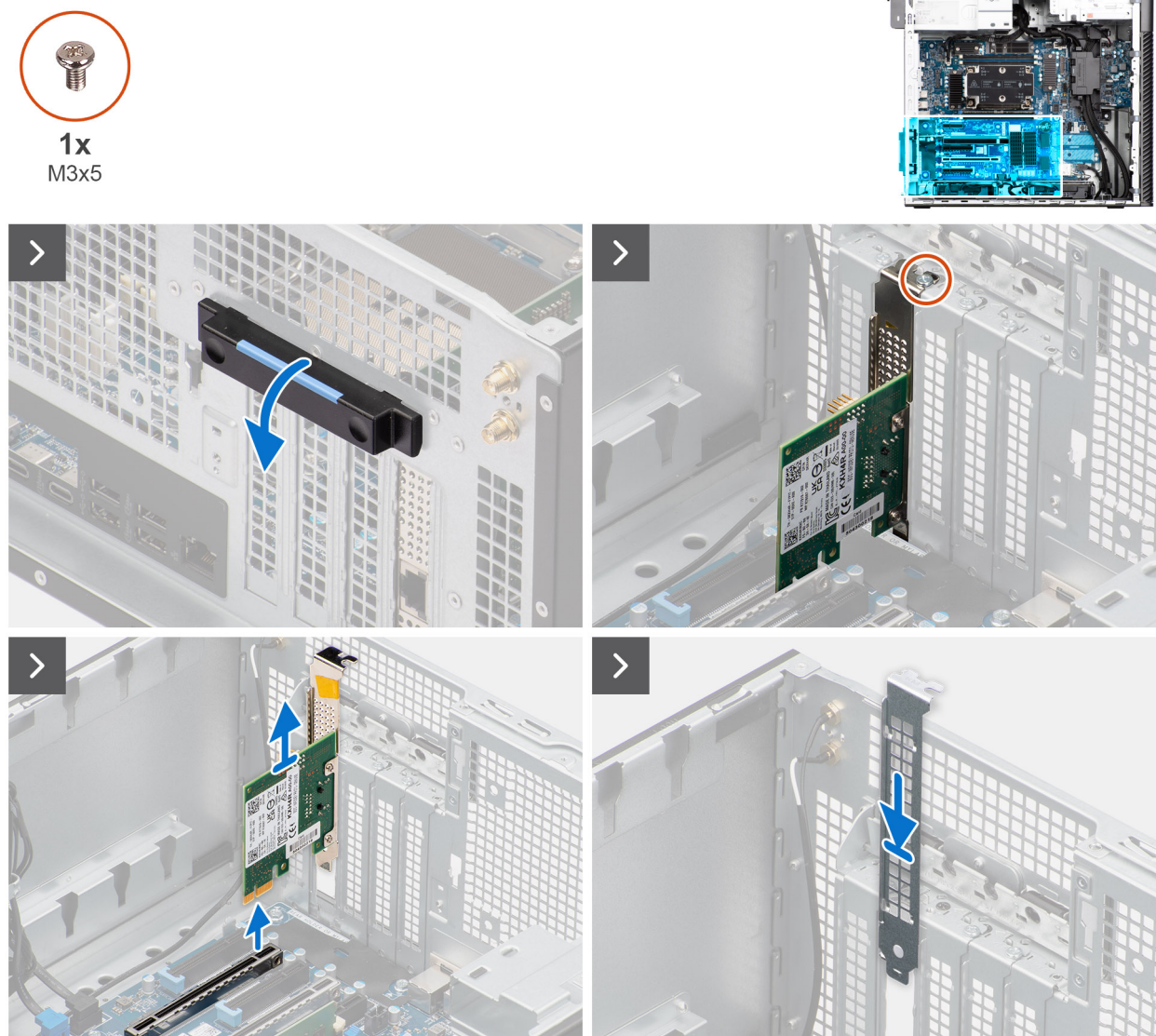


Figure 79. Removing the Intel Ethernet Controller I226-V

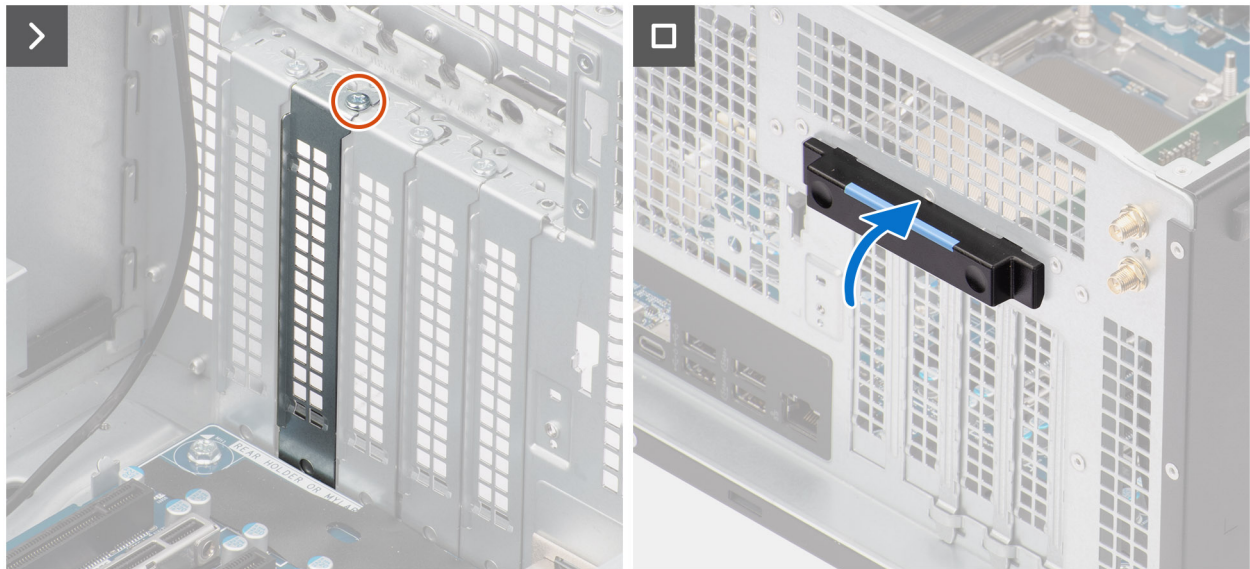


Figure 80. Removing the Intel Ethernet Controller I226-V

Steps

1. Press the pull tab down to open the PCIe door.
2. Remove the screw (M3x5) that secures the Ethernet card to the PCIe slot.
3. Lift the Ethernet card from the PCIe slot on the system board.
4. Slide and place the PCIe filler in the PCIe slot on the chassis.
5. Replace the screw (M3x5) to secure the PCIe filler to the chassis.
6. Lift the pull tab to close the PCIe door.

Installing the Intel Ethernet Controller I226-V

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 Intel Ethernet Controller I226-V and provide a visual representation of the installation procedure.



1x
M3x5

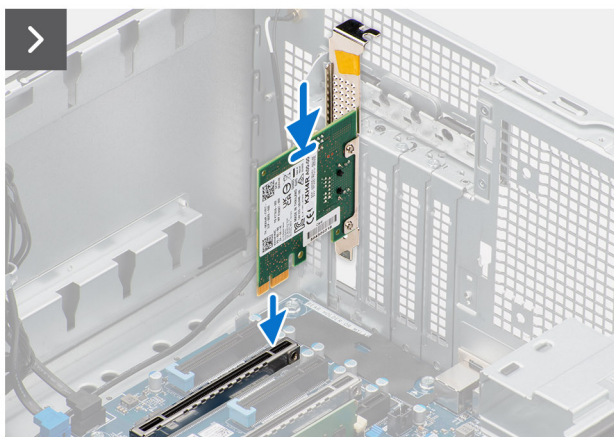
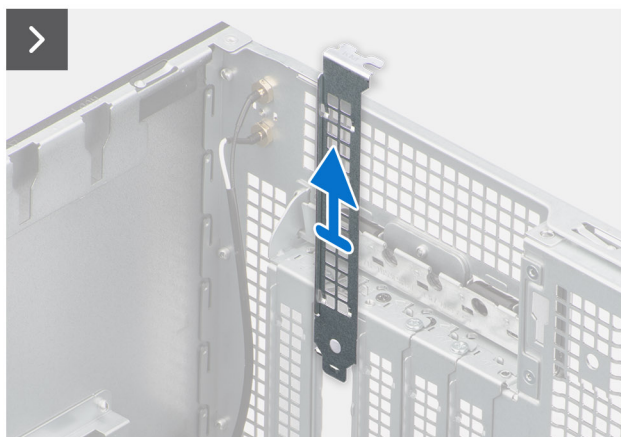
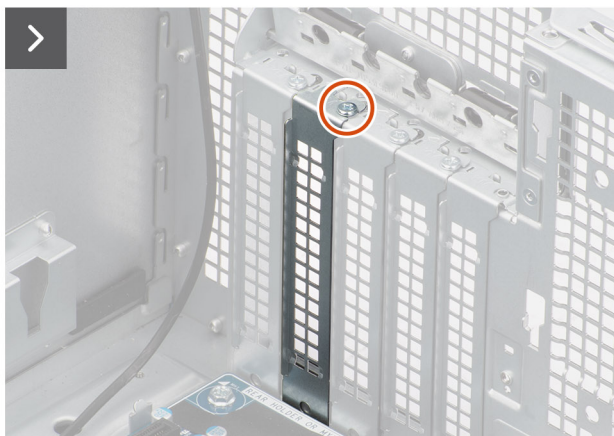
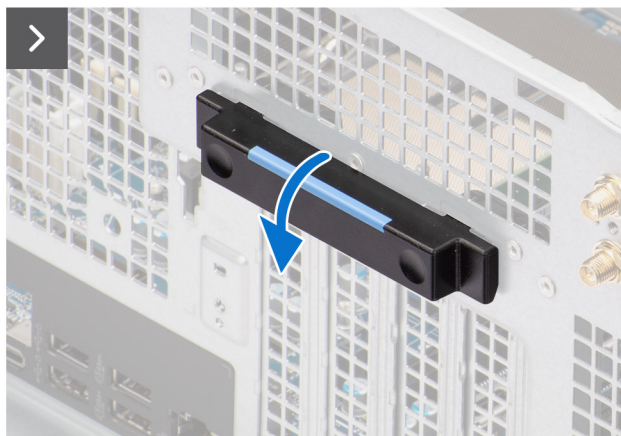
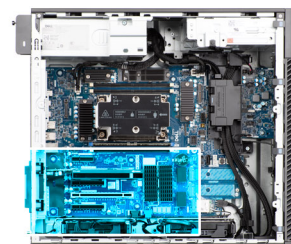


Figure 81. Installing the Intel Ethernet Controller I226-V

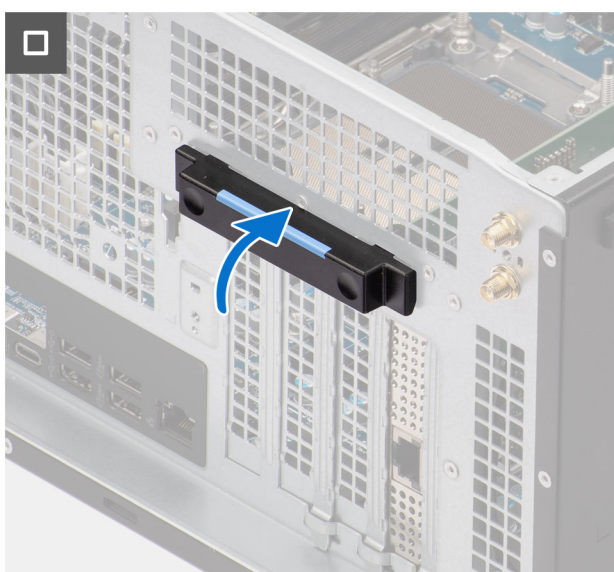


Figure 82. Installing the Intel Ethernet Controller I226-V

Steps

1. Press the pull tab down to open the PCIe door.
2. Remove the screw (M3x5) that secures the PCIe filler to the PCIe slot.
3. Slide and remove the PCIe filler away from the chassis.
4. Align the Ethernet card with the PCIe connector on the system board.
5. Using the alignment post, connect the Ethernet card to the connector and press down firmly.
6. Install the screw (M3x5) to secure the Ethernet card to the PCIe slot.
7. Lift the pull tab to close the PCIe door.

Next steps

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

Removing the Intel Ethernet Network Adapter E810-XXVDA2

Prerequisites

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

About this task

The following images indicate the location of the Intel Ethernet Network Adapter E810-XXVDA2 and provide a visual representation of the removal procedure.



1x
M3x5

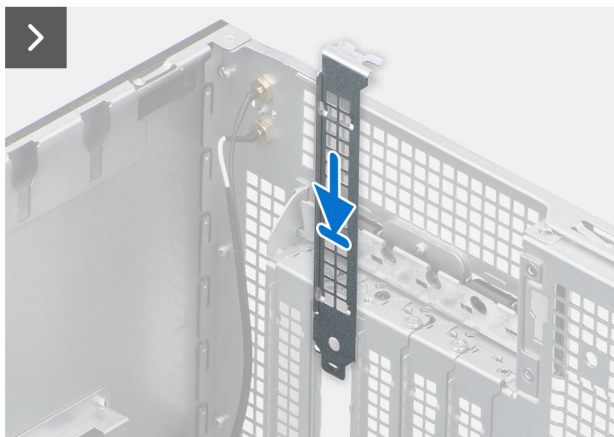
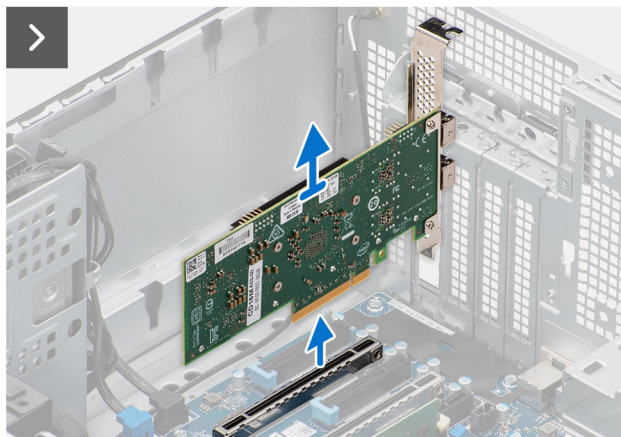
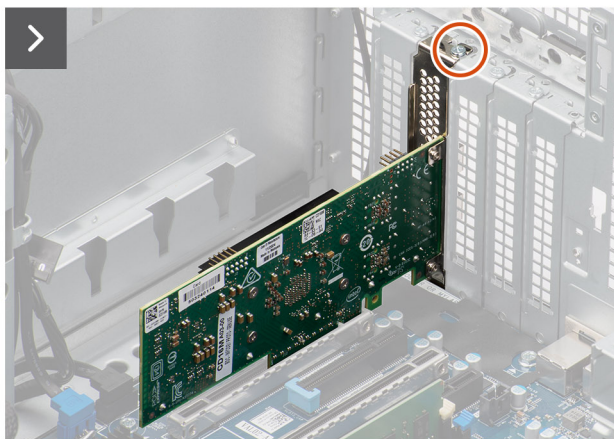
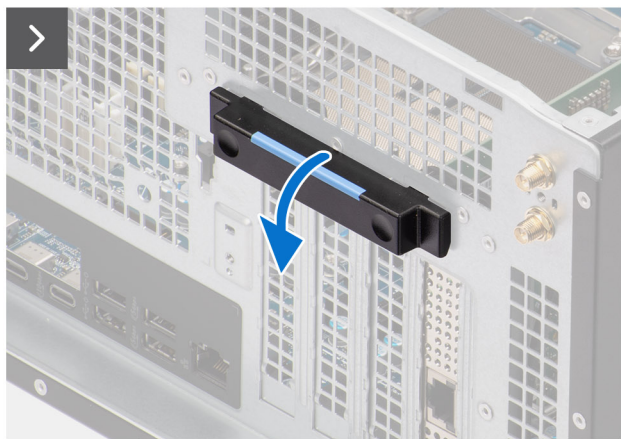
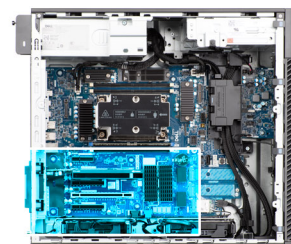


Figure 83. Removing the Intel Ethernet Network Adapter E810-XXVDA2

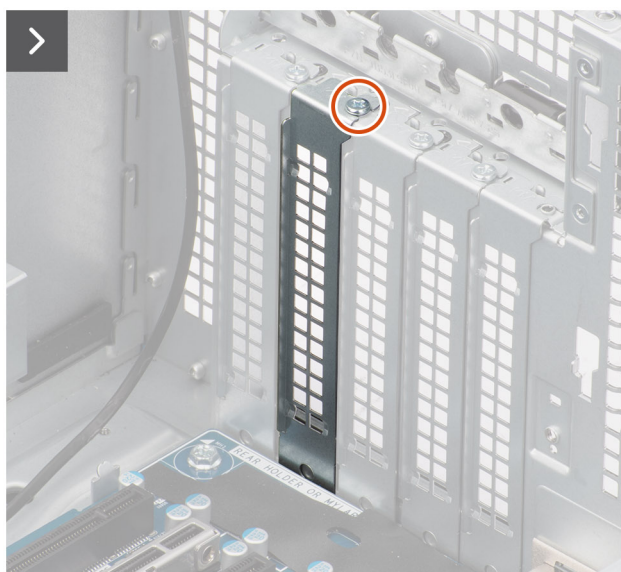


Figure 84. Removing the Intel Ethernet Network Adapter E810-XXVDA2

Steps

1. Press the pull tab down to open the PCIe door.
2. Remove the screw (M3x5) that secures the Ethernet adapter to the PCIe slot.
3. Lift the Ethernet adapter from the PCIe slot on the system board.
4. Slide and place the PCIe filler in the PCIe slot on the chassis.
5. Replace the screw (M3x5) to secure the PCIe filler to the chassis.
6. Lift the pull tab to close the PCIe door.

Installing the Intel Ethernet Network Adapter E810-XXVDA2

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 Intel Ethernet Network Adapter E810-XXVDA2 and provide a visual representation of the installation procedure.

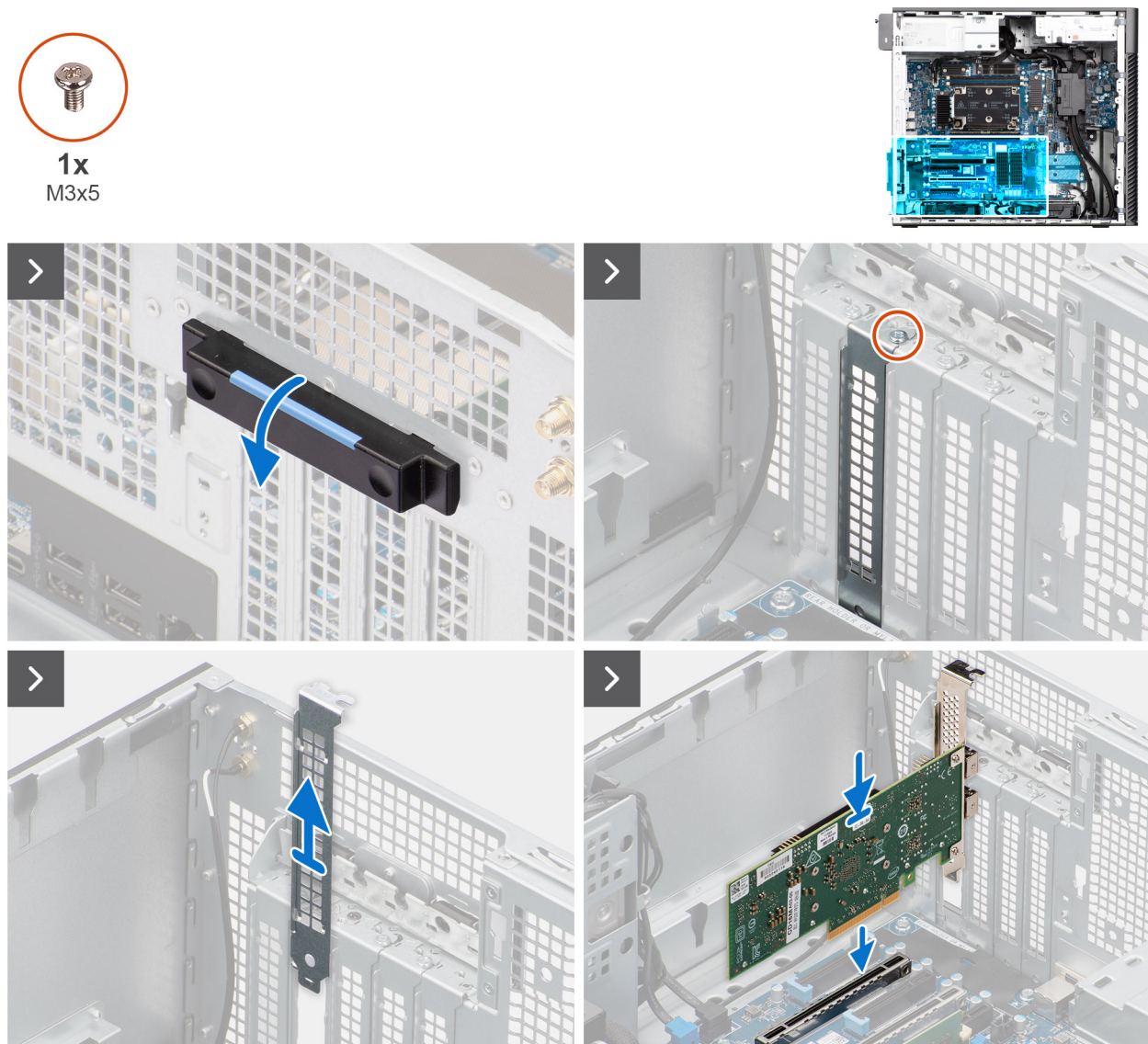


Figure 85. Installing the Intel Ethernet Network Adapter E810-XXVDA2

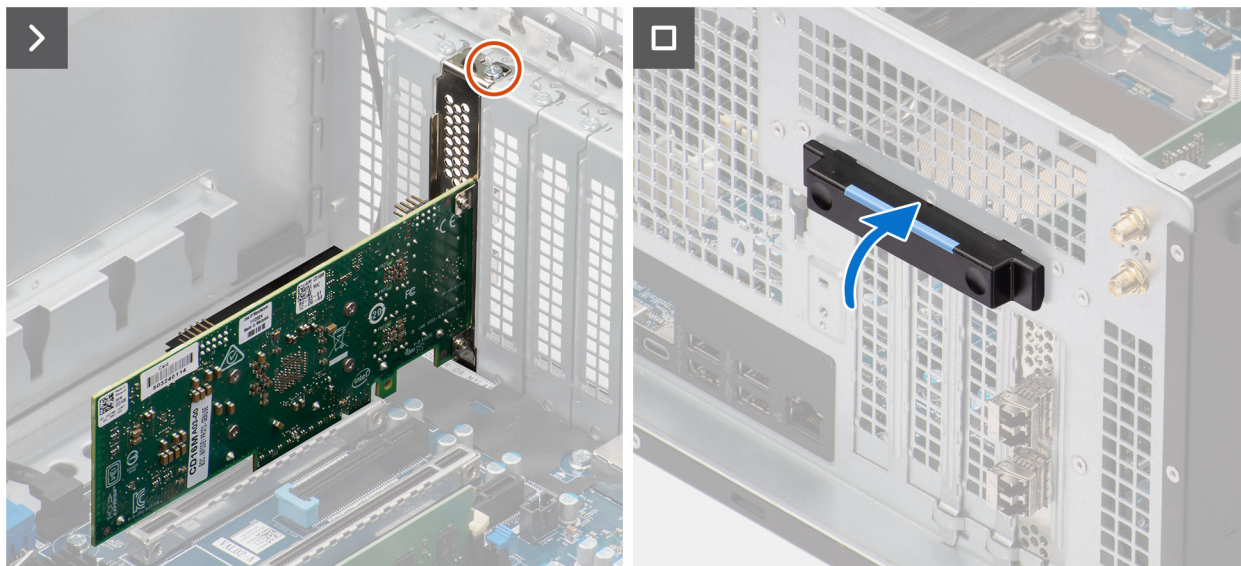


Figure 86. Installing the Intel Ethernet Network Adapter E810-XXVDA2

Steps

1. Press the pull tab down to open the PCIe door.
2. Remove the screw (M3x5) that secures the PCIe filler to the PCIe slot.
3. Slide and remove the PCIe filler away from the chassis.
4. Align the Ethernet adapter with the PCIe connector on the system board.
5. Using the alignment post, connect the Ethernet adapter to the connector and press down firmly.
6. Install the screw (M3x5) to secure the Ethernet adapter to the PCIe slot.
7. Lift the pull tab to close the PCIe door.

Next steps

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

Power-supply unit

Removing the power-supply unit (PSU)

Prerequisites

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

NOTE: Note the routing of all cables as you remove them so that you can route them correctly while you are replacing the PSU.

About this task

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



5x
#6-32

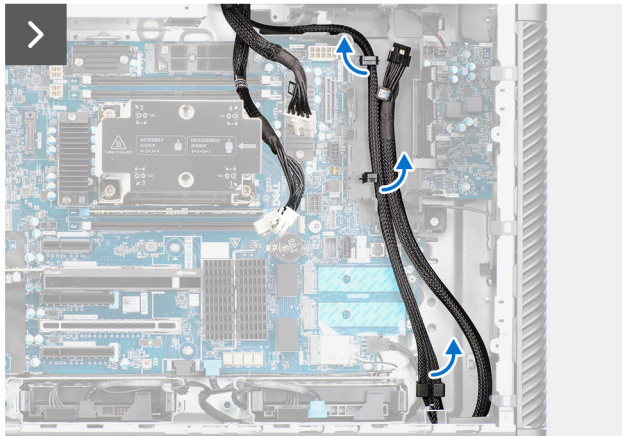
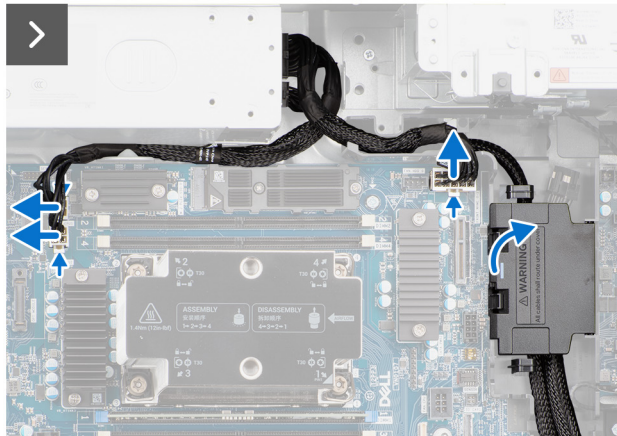
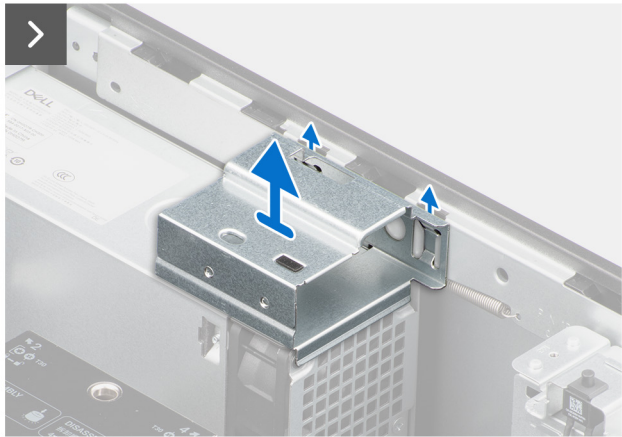
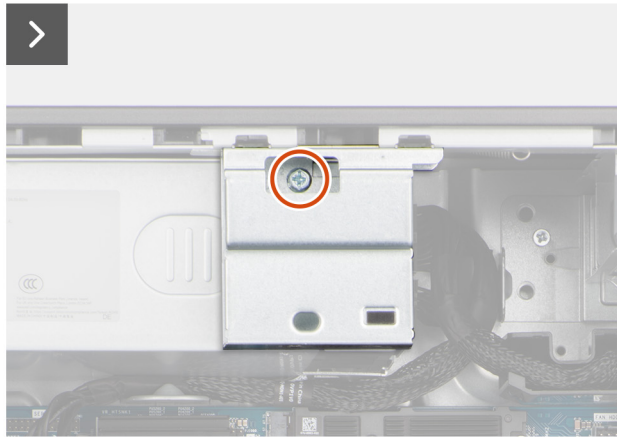
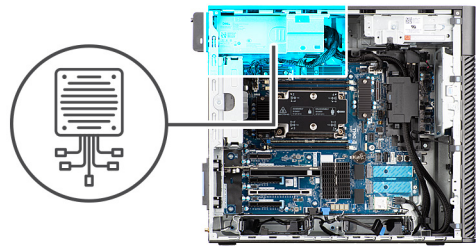


Figure 87. Removing the PSU

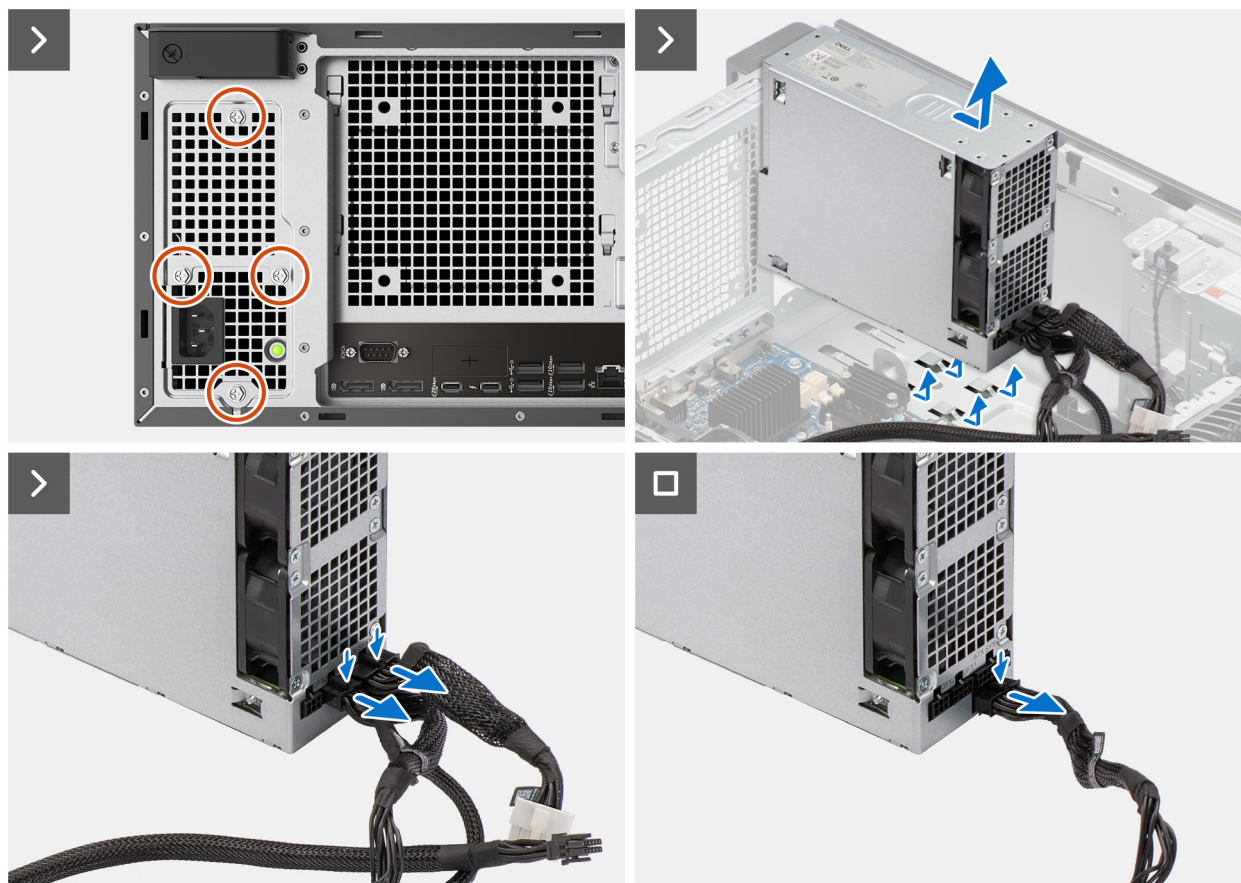


Figure 88. Removing the PSU

Steps

1. Remove the screw (#6-32) that secures the PSU cover to the PSU.
2. Remove the PSU cover from the slots on the chassis.
3. Disconnect the power cables from the connectors on the system board.
4. Open the cover of the cable box and carefully unroute the power cables from both the cable box and the routing guides on the chassis.
5. Remove the four screws (#6x32) that secure the PSU to the chassis.
6. Slide the PSU to release it from the slots on the chassis.
7. Lift and remove the PSU away from the chassis.
8. Disconnect the power cables from the connectors on the PSU.

Installing the power-supply unit (PSU)

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 PSU and provide a visual representation of the installation procedure.



5x
#6-32

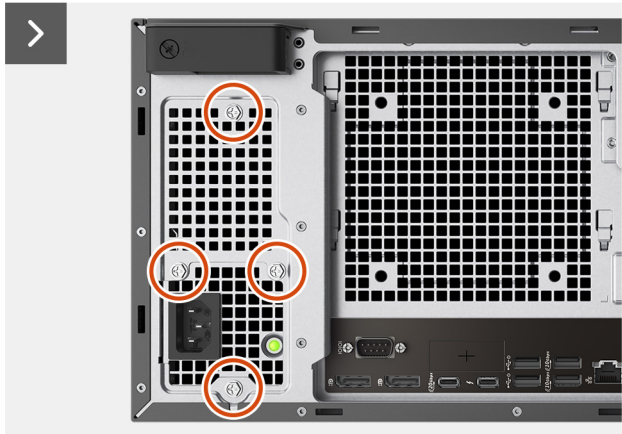
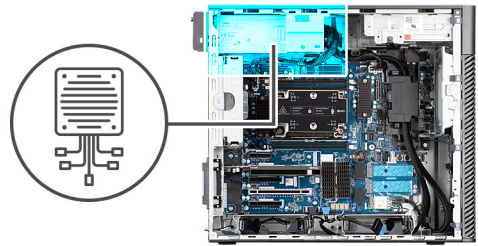


Figure 89. Installing the PSU

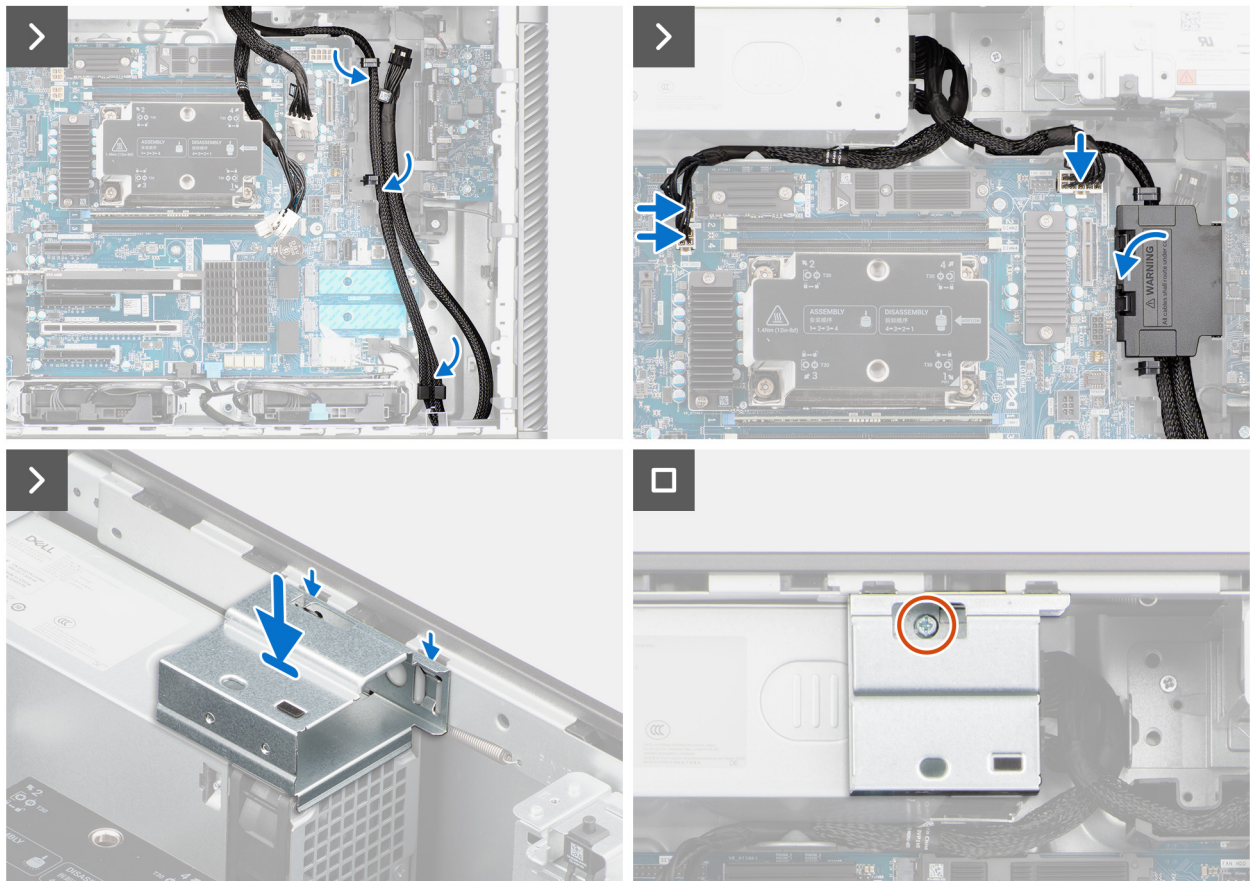


Figure 90. Installing the PSU

Steps

1. Connect the power cables to the connectors on the PSU.
2. Slide the power-supply unit into the chassis until the securing tab snaps into position.
3. Install the four screws (#6x32) to secure the PSU to the chassis.
4. Open the cable-box cover and route the power cable through the cable box and routing guides on the chassis.
5. Connect the power cables to the connectors on the system board and close the cable-box cover.
6. Align and place the PSU cover in the slots on the chassis.
7. Install the screw (#6-32) to secure the PSU cover to the chassis.

Next steps

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

Wireless external puck antenna (optional)

Removing the wireless external puck-antenna

Prerequisites

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

About this task

The following images indicate the location of the wireless external puck-antenna and provide a visual representation of the removal procedure.

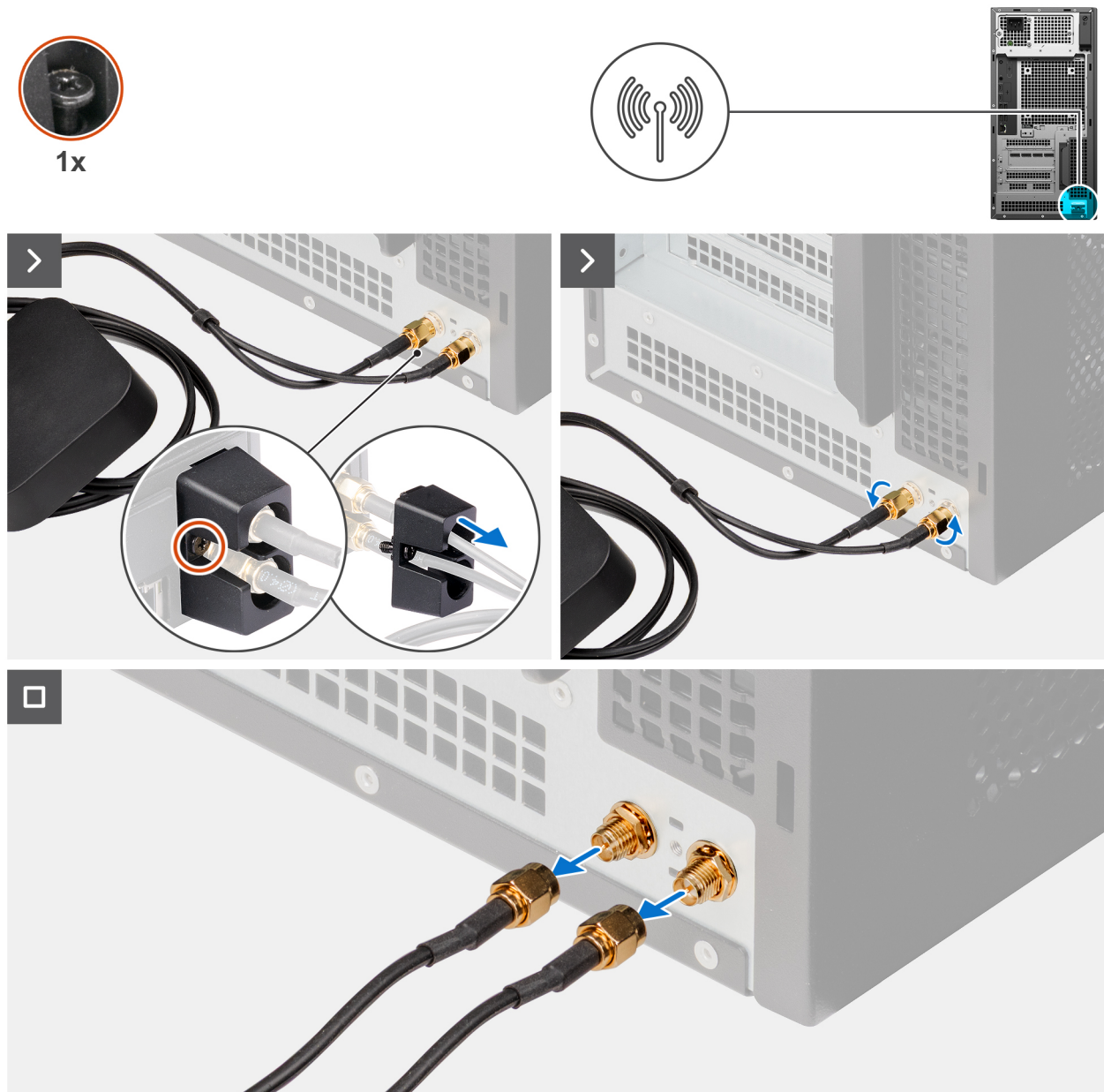


Figure 91. Removing the wireless external puck-antenna

Steps

1. Loosen the captive screw that secures the SMA cover to the computer chassis.
2. Slide the SMA cover over the antenna cables.
3. Loosen the bolts that secure the antenna cables to the SMA connectors on the chassis.
4. Remove the external puck antenna away from the chassis.

Installing the wireless external puck-antenna

Prerequisites

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

About this task

The following images indicate the location of the wireless external puck-antenna and provide a visual representation of the installation procedure.

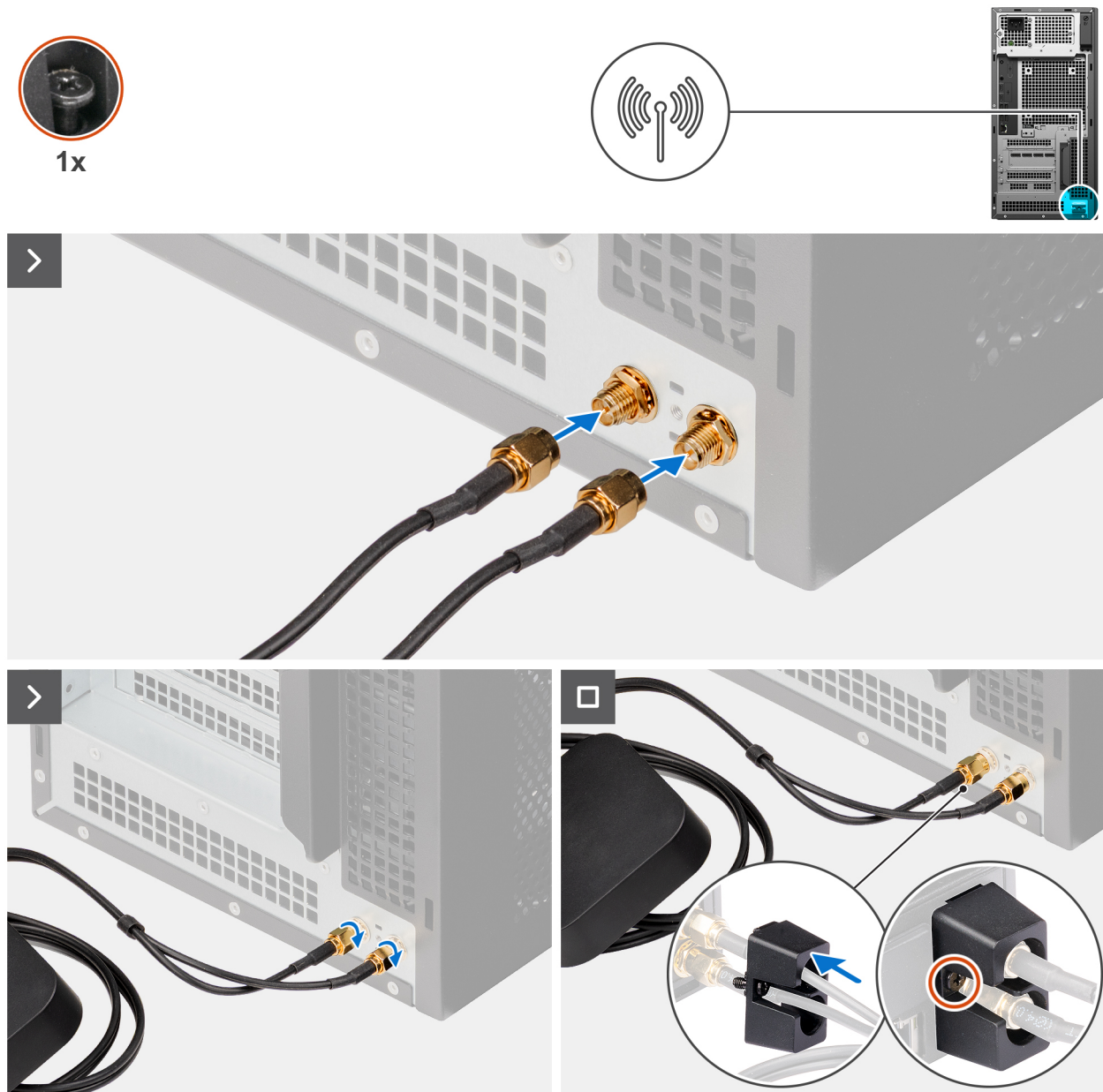


Figure 92. Installing the puck-antenna expansion card

Steps

1. Align and connect the antenna cables to the SMA connectors on the chassis.
2. Tighten the bolts to secure the antenna cables to the SMA connectors on the chassis.
3. Slide the SMA cover over the antenna cables.
4. Tighten the captive screw to secure the SMA cover to the computer chassis.

Next steps

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

Removing and installing Field Replaceable Units (FRUs)

The replaceable components in this chapter are Field Replaceable Units (FRUs).

 **CAUTION:** FRUs should be replaced by an authorized service technician, who is a trained technical repair specialist.

 **NOTE:** Damages resulting from improper replacement or from failure to follow instructions are not covered by your warranty. Consider having a trained technical repair specialist perform replacements of FRU components.

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

Front NVMe module

Removing the front NVMe module

Prerequisites

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

About this task

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

Steps

1. Loosen the two screws that secure the fan module to the front M.2 SSD module.
2. Disconnect the fan power cable from the connector on the system board.
3. Unroute it from the cable box and the clips on the hard drive cage.
4. Slide and lift the fan module out of the computer.
5. Disconnect the M.2 power and sensor cables from the connectors on the system board.
6. Disconnect the HSBP signal cable from the connector on the system board.
7. Disconnect the signal and power cable from the connectors of the front NVMe module.
8. Insert a pin into the release hole on the NVMe module and press inward to release it from the slot on the chassis.
9. Slide the front NVMe module out of the computer.

Installing the front NVMe module

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 front NVMe module and provide a visual representation of the installation procedure.

Steps

1. Slide the front NVMe module into the slot on the chassis till it clicks in place.
2. Connect the HSBP cable to the connector on the system board.
3. Connect the M.2 power and sensor cables to the connectors and on the system board.
4. Connect the signal and the power cable to the connector on the front NVMe module.
5. Slide the NVMe fan module into its slot.
6. Tighten the two captive screws to secure the fan module to the chassis.
7. Connect the fan power cable to the connector on the system board.

Next steps

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

Processor fan

Removing the processor fan

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [air shroud](#).

About this task

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

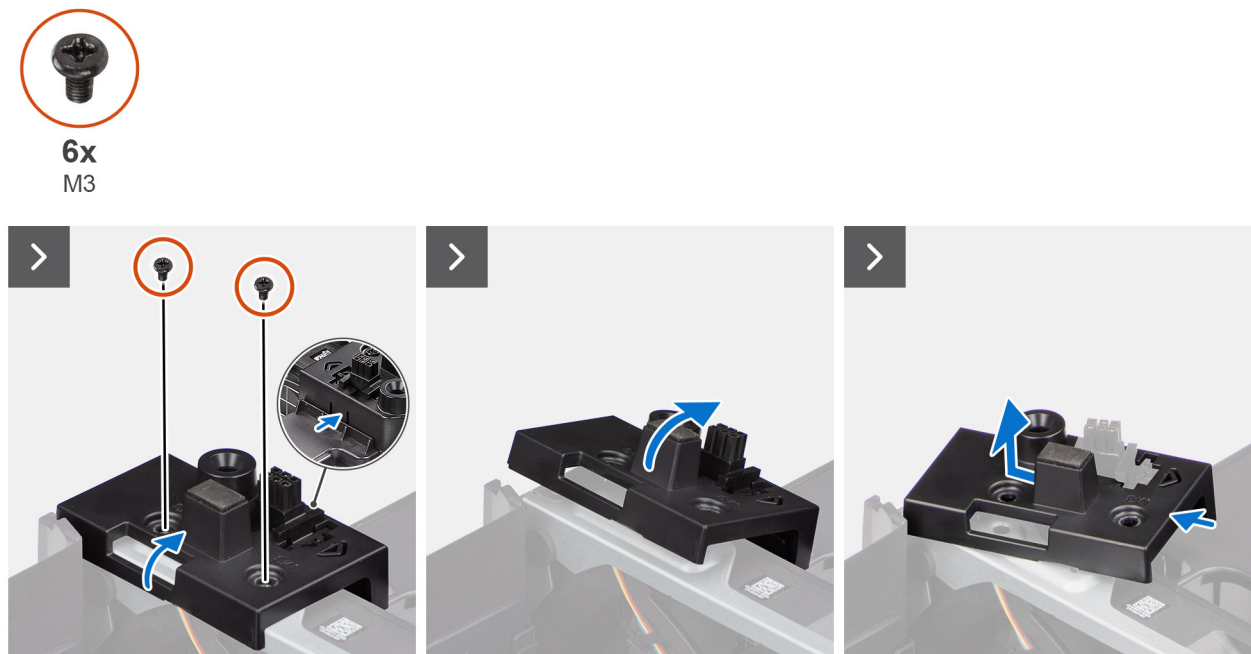


Figure 93. Removing the processor fan

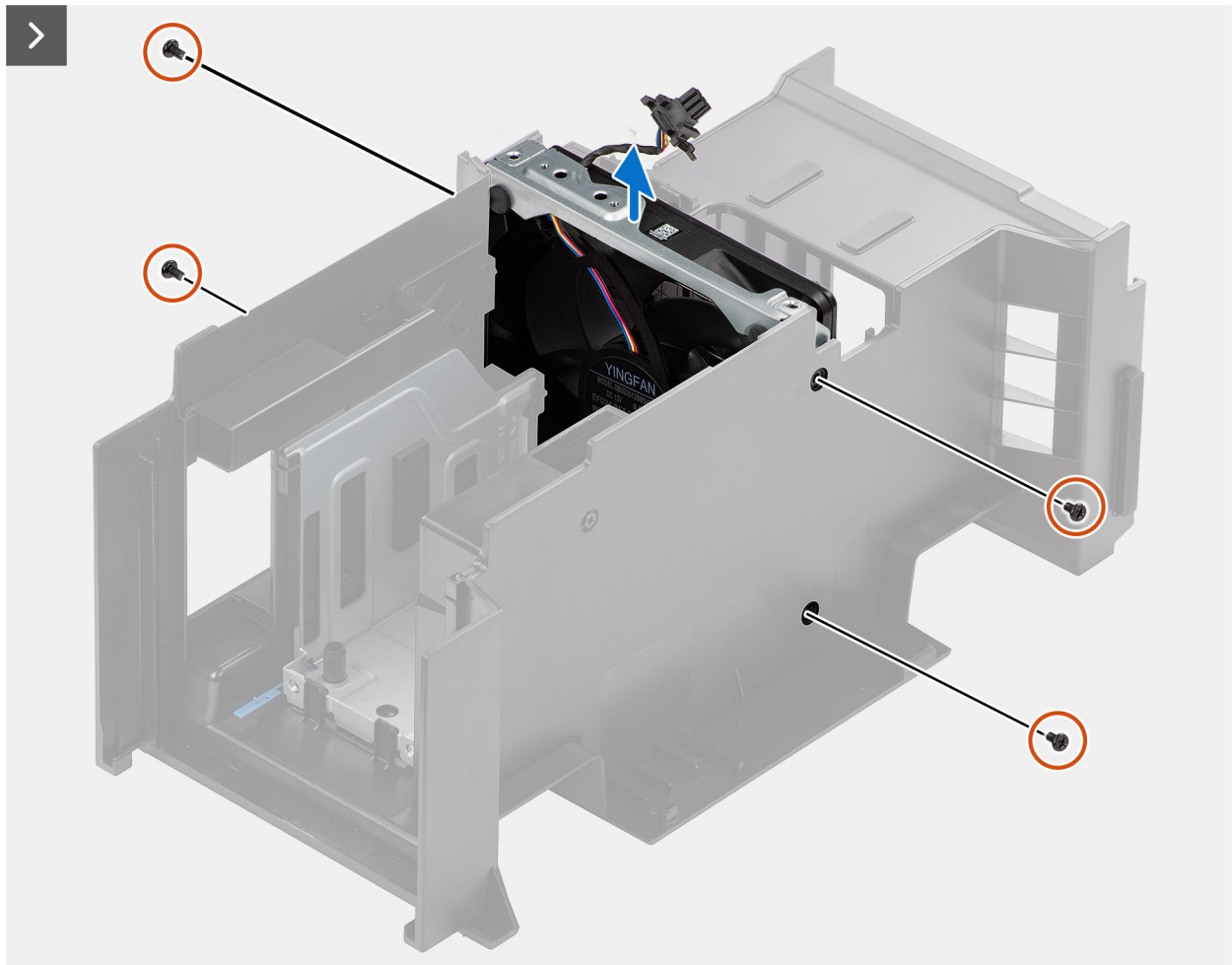


Figure 94. Removing the processor fan

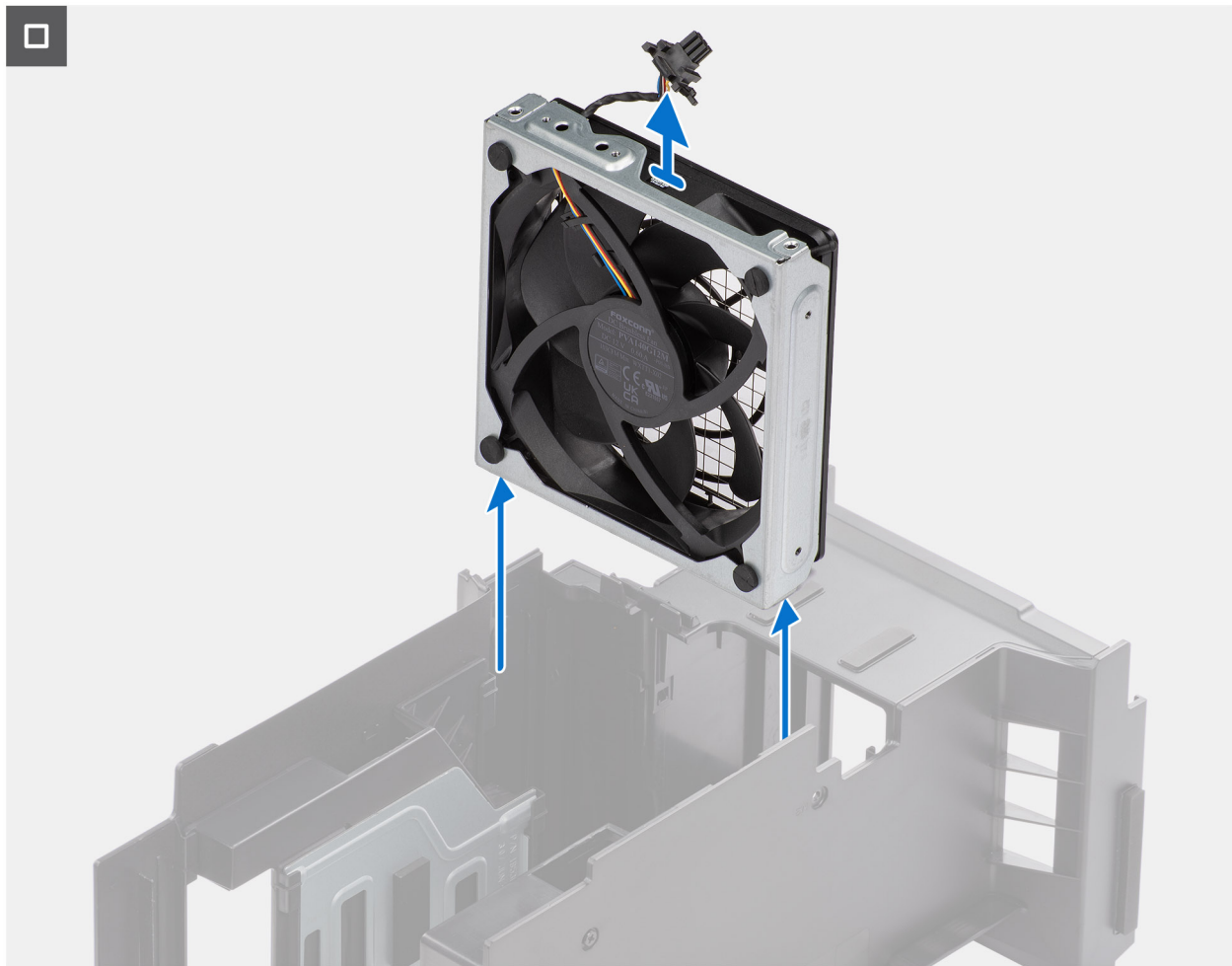


Figure 95. Removing the processor fan

Steps

1. Remove the two screws (M3) that secure the connector bracket to the processor fan.
2. Press and hold the releasing clip on the processor fan to release the bracket from the slot.
3. Slide and remove the bracket away from the air shroud.
4. Remove the four screws (M3) that secure the processor fan to the air shroud.
5. Slide and lift the processor fan away from the air shroud.

Removing processor fan bracket

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [air shroud](#).
4. Remove the [processor fan](#).

About this task

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

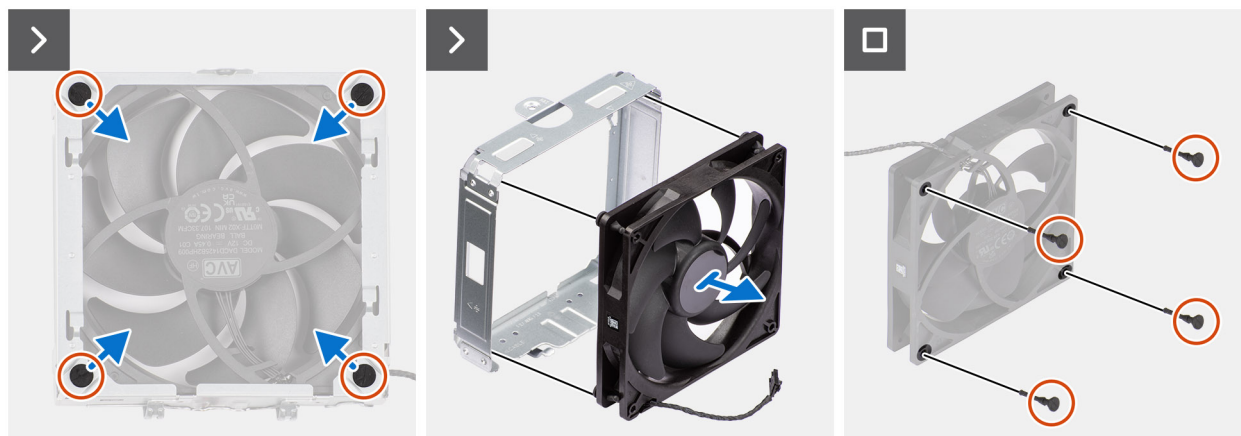


Figure 96. Removing processor fan bracket

Steps

1. Locate the position of rubber grommets.
2. Gently pull the rubber grommets down to release it from the slots on the fan bracket.
3. Remove the fan away from the fan bracket.
4. Remove the rubber grommets out of the fan.

Installing the processor fan bracket

Prerequisites

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

About this task

The following images indicate the processor fan bracket and provide a visual representation of the installation procedure.

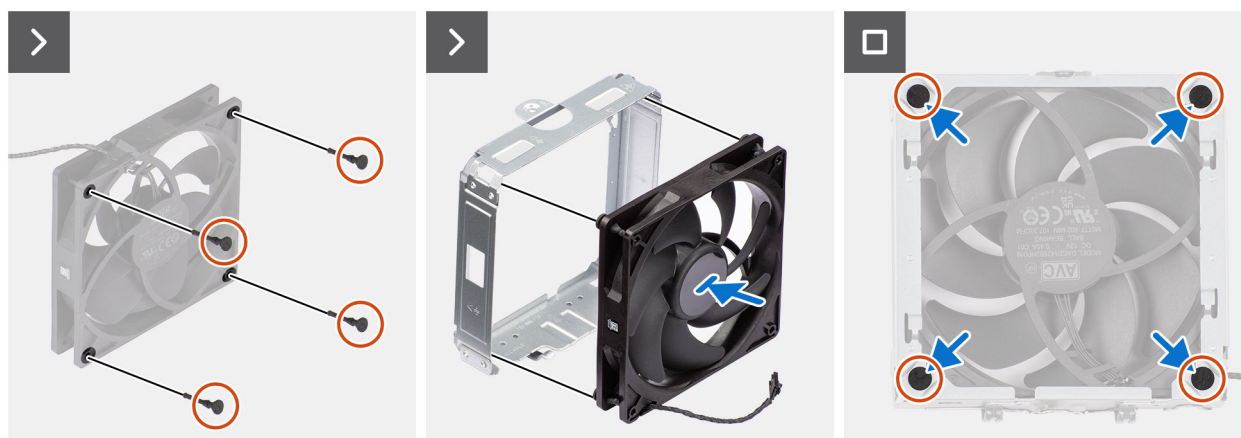


Figure 97. Installing the processor fan bracket

Steps

1. Insert the rubber grommets in the slots on the fan.
2. Align the slots on the fan with the rubber grommets on the bracket.
3. Route the rubber grommets through the slots on the fan and pull the rubber grommets until the fan snaps into position.

Next steps

1. Install the [processor fan](#).
2. Install the [air shroud](#).

3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

Installing the processor fan

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 processor fan and provide a visual representation of the installation procedure.

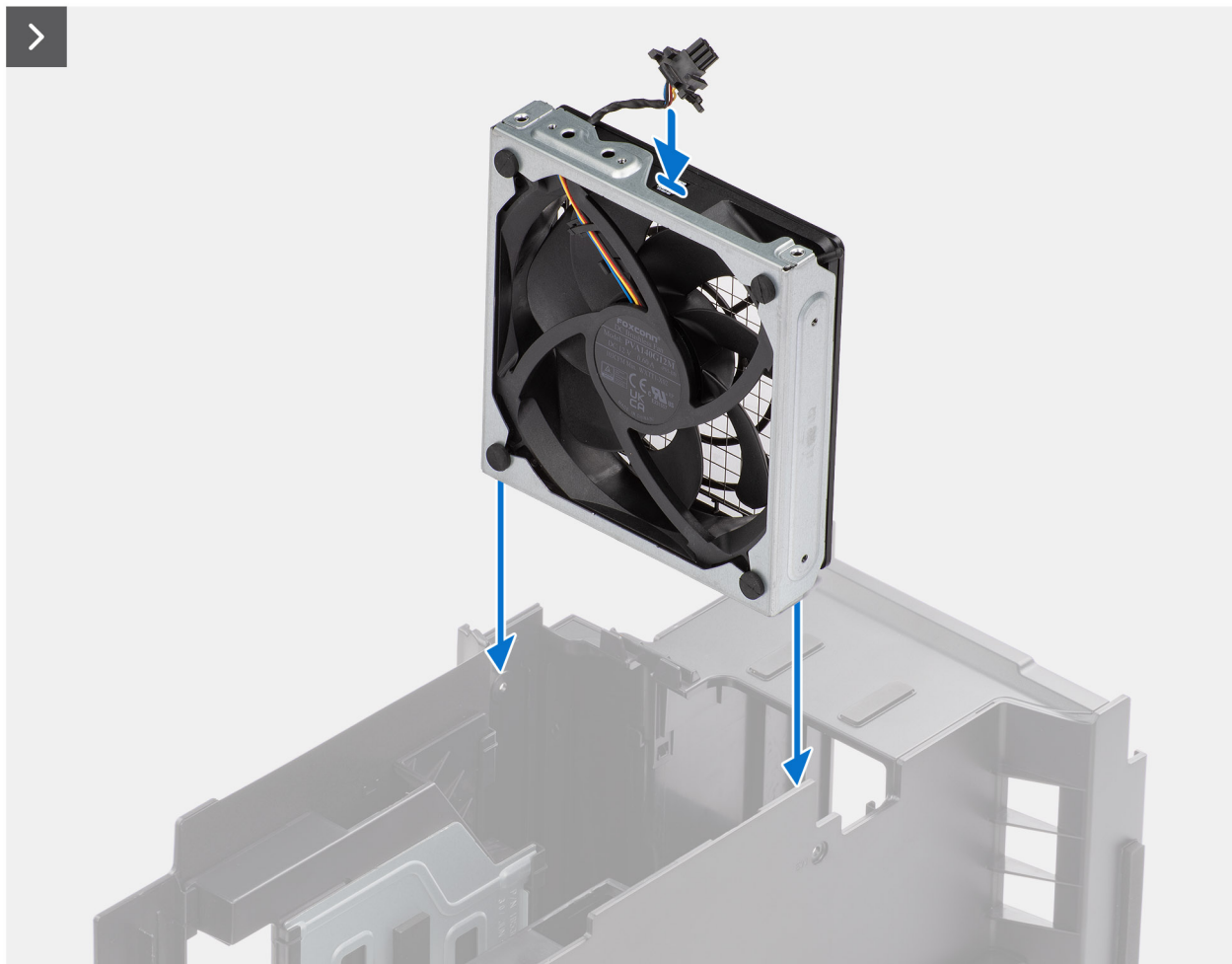


Figure 98. Installing the processor fan

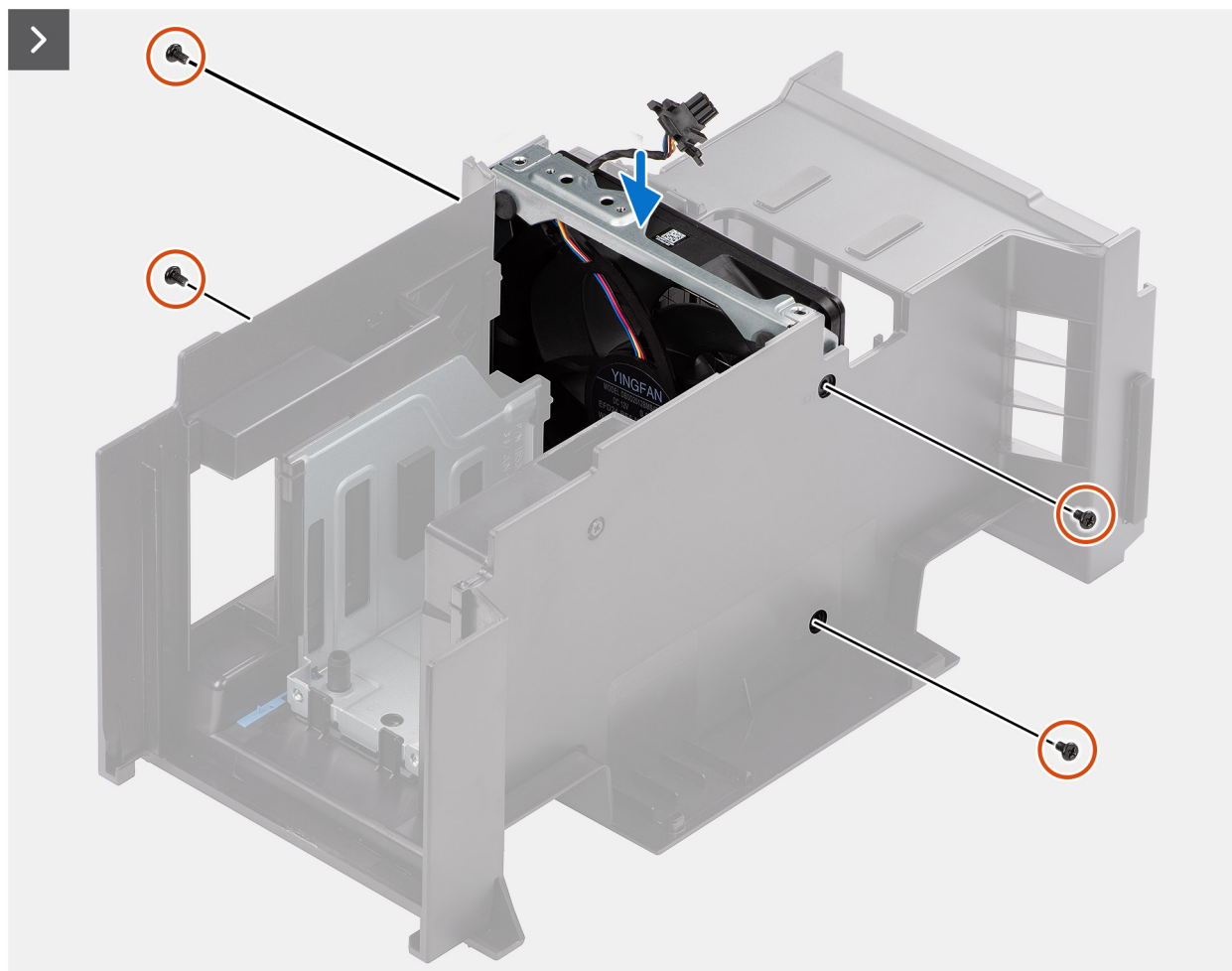


Figure 99. Installing the processor fan

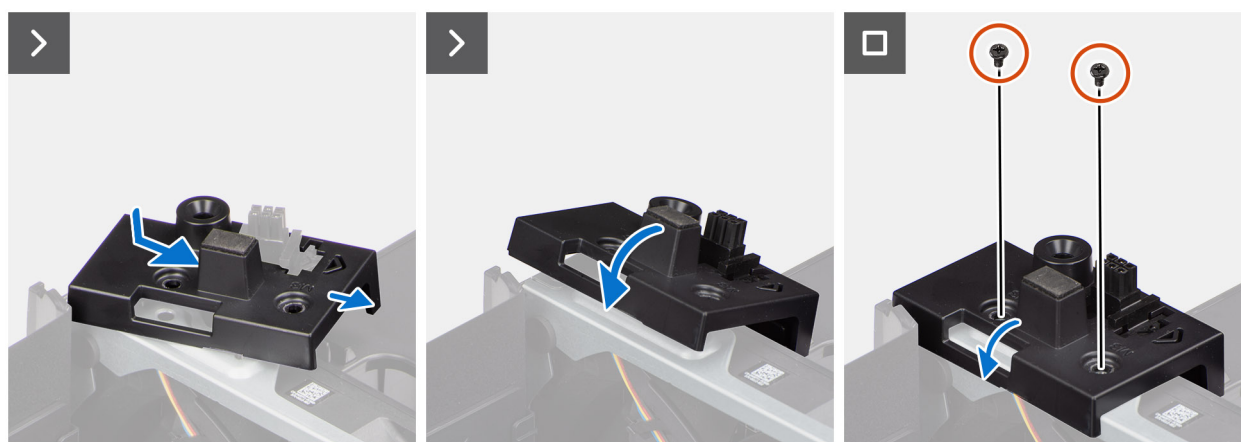


Figure 100. Installing the processor fan

Steps

1. Align the processor fan into the slot on the air shroud.
2. Slide it down to securely place the processor fan into the air shroud.
3. Replace the four screws (M3) to secure the processor fan to the air shroud.
4. Press and hold the releasing clip on the processor fan to place the bracket on the slot.
5. Align the screw holes on the connector bracket with the screw holes on the processor fan.
6. Replace the two screws (M3) to secure the bracket to the processor fan.

Next steps

1. Install the [air shroud](#).
2. Install the [side cover](#).
3. Follow the procedure in [After working inside your computer](#).

Wireless internal SMA cable (optional)

Removing the wireless internal SMA cable

Prerequisites

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

About this task

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

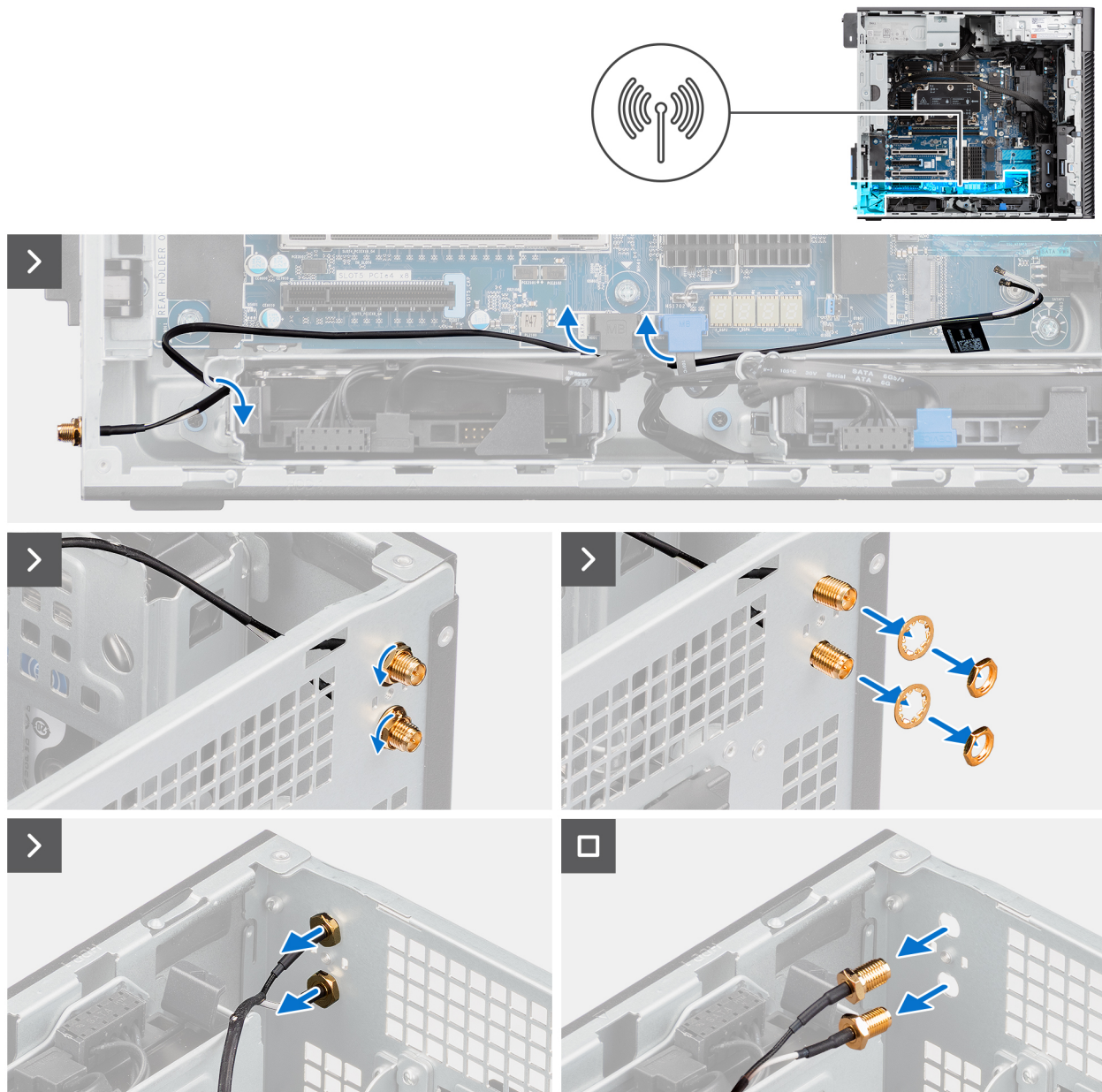


Figure 101. Removing the wireless internal SMA cable

Steps

1. Unroute the internal SMA cable from the routing guides on the chassis and underneath the hard drive data and power cables.
2. Using the 8 mm hex socket screwdriver, remove the nuts that secure the internal SMA cable to the chassis.
3. Remove the internal SMA cable away from the chassis,

Installing the wireless internal SMA cable

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 wireless internal SMA cable and provide a visual representation of the installation procedure.

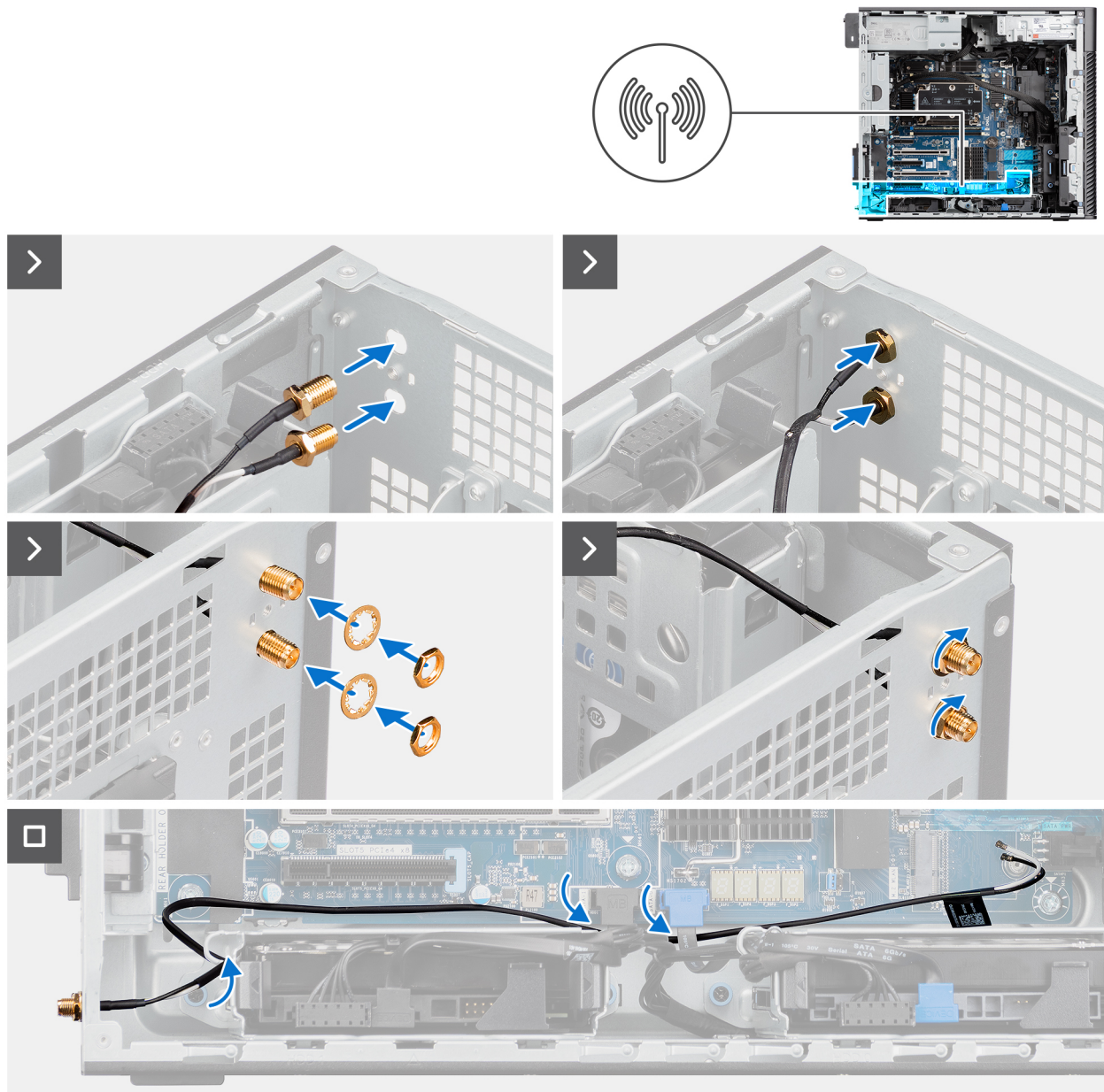


Figure 102. Installing the wireless internal SMA cable

Steps

1. Align and place an internal SMA cable in the slots on the chassis.
2. Using the 8 mm hex socket screwdriver, install the nuts to secure the internal SMA cable to the chassis.
3. Route the internal SMA cable through the routing guides on the chassis and underneath the hard drive data and power cables.

Next steps

1. Install the [wireless card](#).
2. Install the [air shroud](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

Processor heat-sink assembly

Removing the processor heat-sink assembly

Prerequisites

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

WARNING: The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.

CAUTION: For maximum cooling of the processor, do not touch the heat-transfer areas on the heat sink. The oils in your skin can reduce the heat-transfer capability of the thermal grease.

2. Remove the [side cover](#).
3. Remove the [air shroud](#).

About this task

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

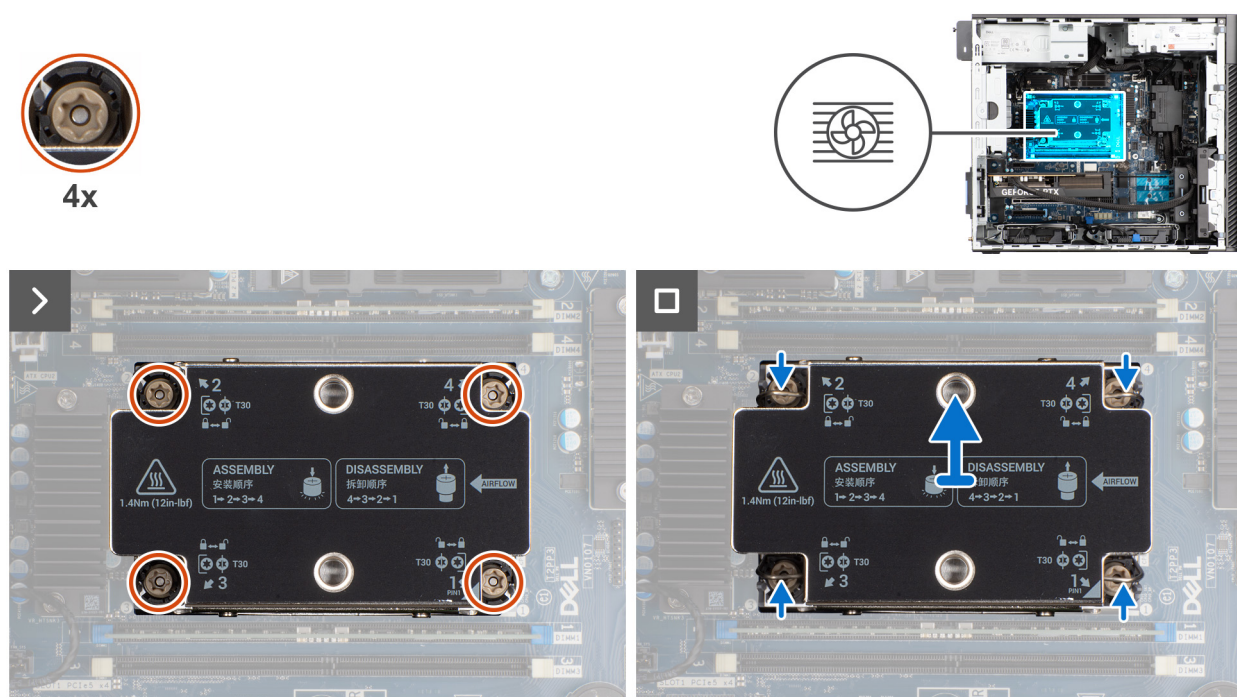


Figure 103. Removing the processor heat-sink assembly

Steps

1. Using a Torx T30 screwdriver, in reverse sequential order (4->3->2->1), loosen the four captive (PEEK) nuts that secure the heat-sink assembly to the system board.
2. Move the four heat-sink clips to the unlocked position.
3. Lift the heat-sink assembly from the system board.

NOTE: The processor is part of the heat-sink assembly. If the heat-sink must be replaced, ensure that the processor is carefully transferred to the replacement heat-sink before reinstallation.

Installing the processor heat-sink assembly

Prerequisites

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

NOTE: If either the processor or the heat sink is replaced, use the thermal grease that is provided in the kit to ensure that thermal conductivity is achieved.

About this task

The following images indicate the location of the processor heat-sink assembly and provide a visual representation of the installation procedure.

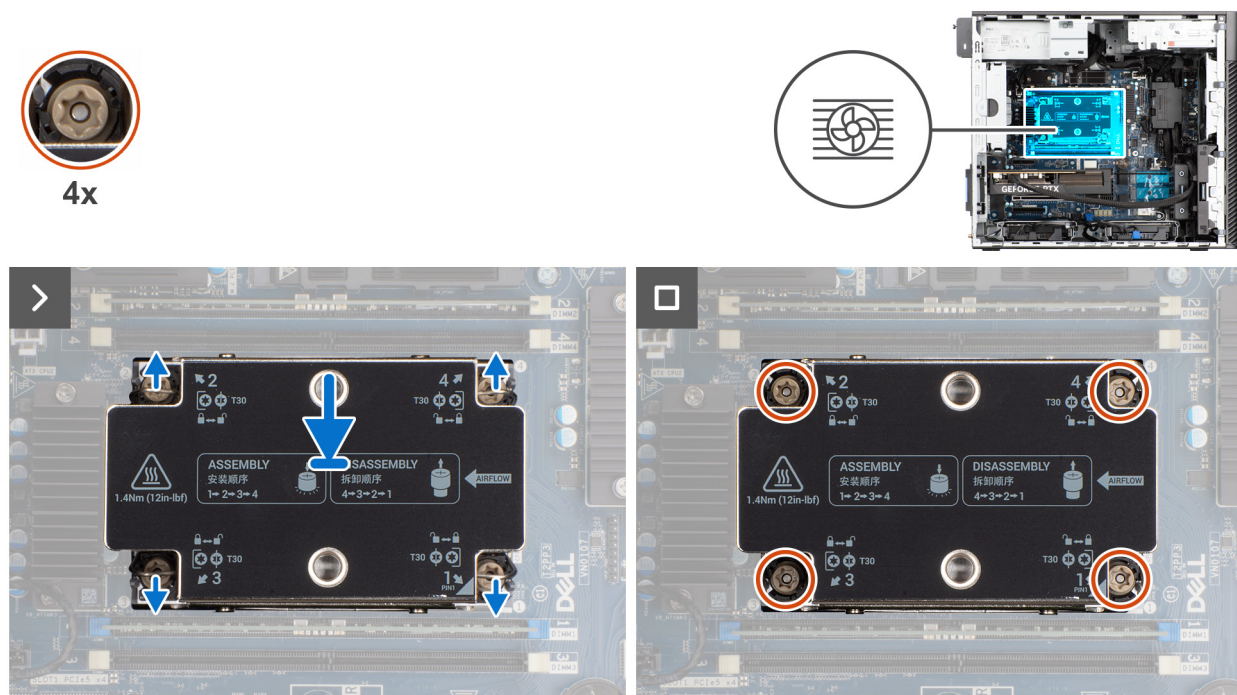


Figure 104. Installing the processor heat-sink assembly

Steps

1. **NOTE:** Ensure that the four heat-sink clips are in the unlocked position.

Align the screws on the processor heat-sink assembly with the screw holders on the system board, and place the heat-sink assembly (with the processor) onto the system board.

NOTE: The processor is part of the heat-sink assembly. If the heat-sink is being replaced with a replacement heat-sink, see [Installing the processor](#).

NOTE: Ensure that the triangle mark is directed towards the rear side of the computer.

2. Move the four heat-sink clips to the lock position.
3. In the sequential order (1->2->3->4), tighten the four captive (PEEK) nuts to secure the heat-sink assembly to the system board.

NOTE: Tighten the screws in a sequential order (1,2,3,4) as printed on the system board.

Next steps

1. Install the [air shroud](#).
2. Install the [side cover](#).

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

Processor

Removing the processor

 **CAUTION:** The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [air shroud](#).
4. Remove the [processor heat-sink assembly](#).

 **NOTE:** The processor might still be hot after the computer is shut down. Allow the processor to cool down before removing it.

About this task

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

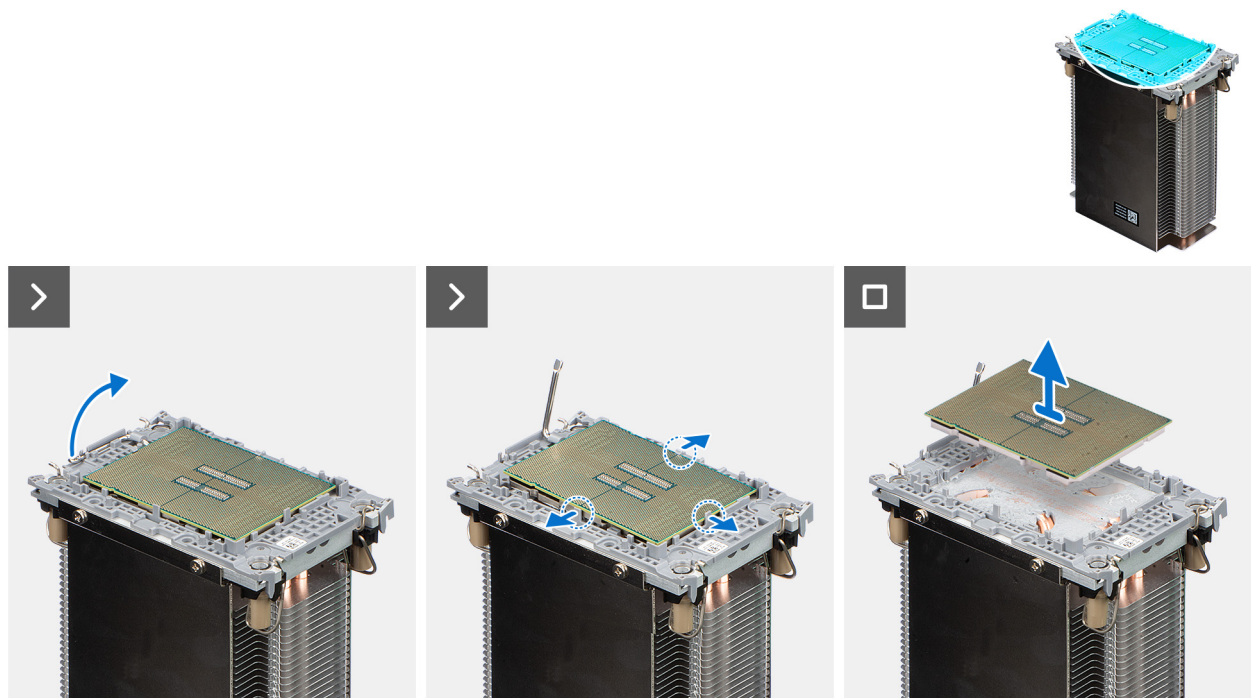


Figure 105. Removing the processor

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 images indicate the location of the processor and provide a visual representation of the installation procedure.

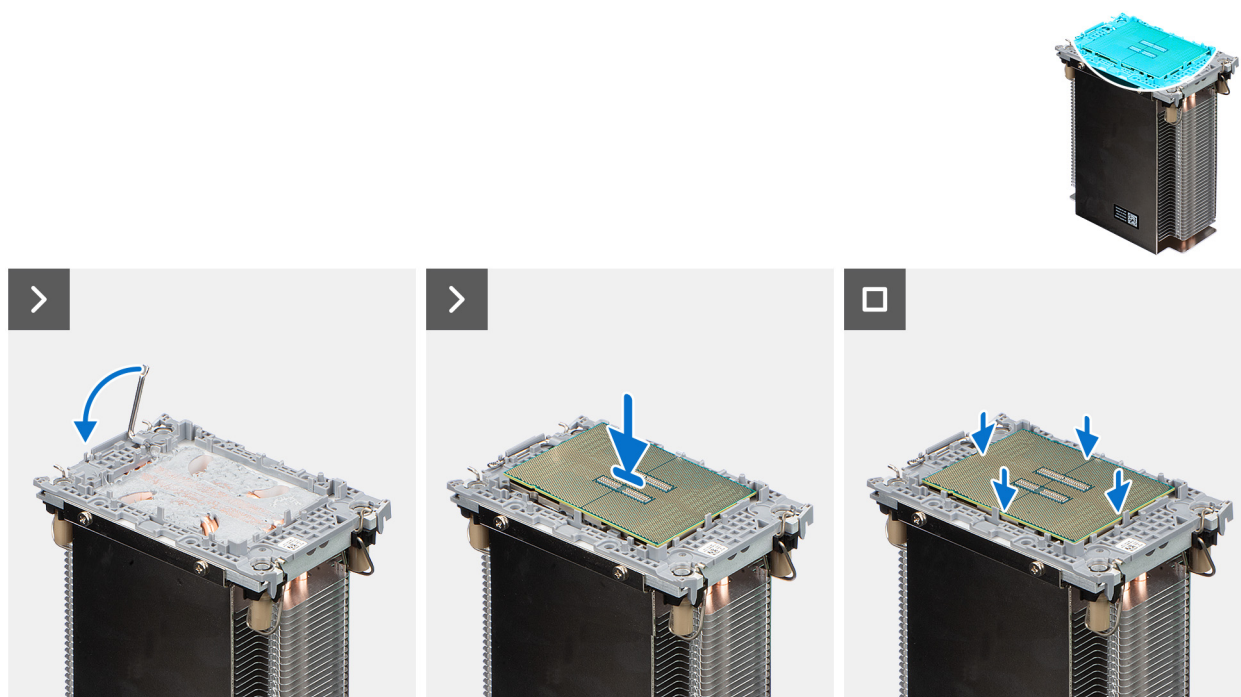


Figure 106. Installing the processor

Steps

1. Ensure that the release lever on the processor socket is fully extended in the open position.
2. Align the notches on the processor with the tabs on the processor socket, and place the processor in the processor socket.
NOTE: The pin 1 corner of the processor has a triangle that aligns with the triangle on the pin 1 corner of 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 secured properly.
3. When the processor is secured in the socket, pivot the release-lever down and place it under the tab on the processor cover.

Next steps

1. Install the [processor heat-sink assembly](#).
2. Install the [air shroud](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

External port (optional module)

NOTE: For more information about the ports supported by the external port (optional module slot), see the Specifications chapter.

Installing the optional 5GbE network adapter module

Prerequisites

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

About this task

NOTE: The optional-port modules are mutually exclusive; only a single module can be installed at a time.

The following images indicate the location of the optional 5GbE network adapter module and provide a visual representation of the installation procedure.

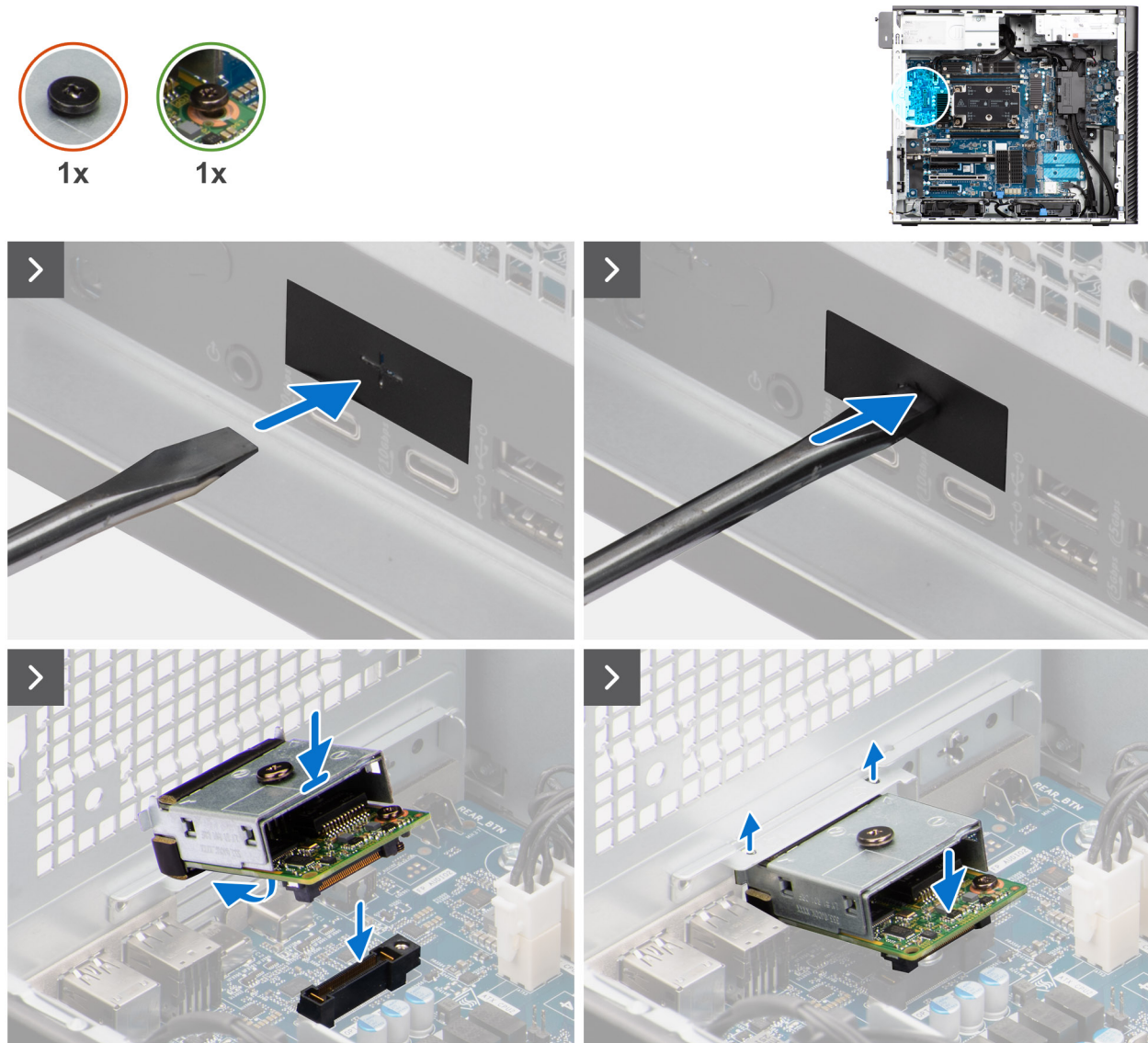


Figure 107. Installing the optional 5GbE network adapter module

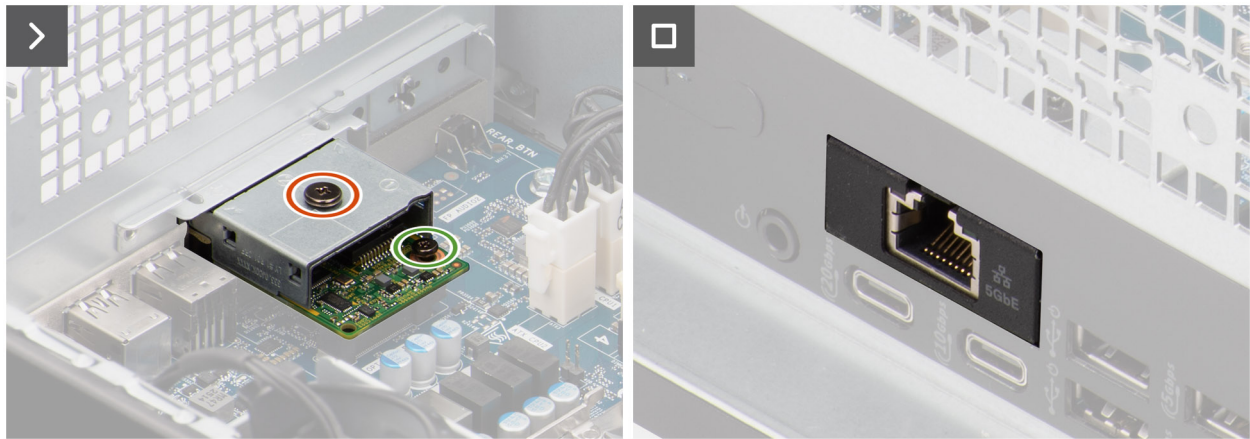


Figure 108. Installing the optional 5GbE network adapter module

Steps

1. Using a screw driver, push against the optional-port cover until it comes off.

NOTE: This step is only applicable if you are installing the optional-port module on a computer that did not previously have it installed.

2. Place the 5GbE network adapter module at an angle and align the tabs on the module to the slots on the chassis.
3. Align the 5GbE network adapter module to the slot on the chassis and connect the module to the connector on the system board.
4. Replace the screw to secure the 5GbE network adapter module to the system board.
5. Align the screw on the 5GbE network adapter module cover to the screw hole on the module.
6. Replace the screw to secure the 5GbE network adapter module cover to the 5GbE network adapter module.

Next steps

1. Install the [rear chassis fan](#).
2. Install the [air shroud](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

Removing the optional 5GbE network adapter module

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [air shroud](#).
4. Remove the [rear chassis fan](#).

About this task

The following image indicates the location of the optional 5GbE network adapter module and provides a visual representation of the removal procedure.

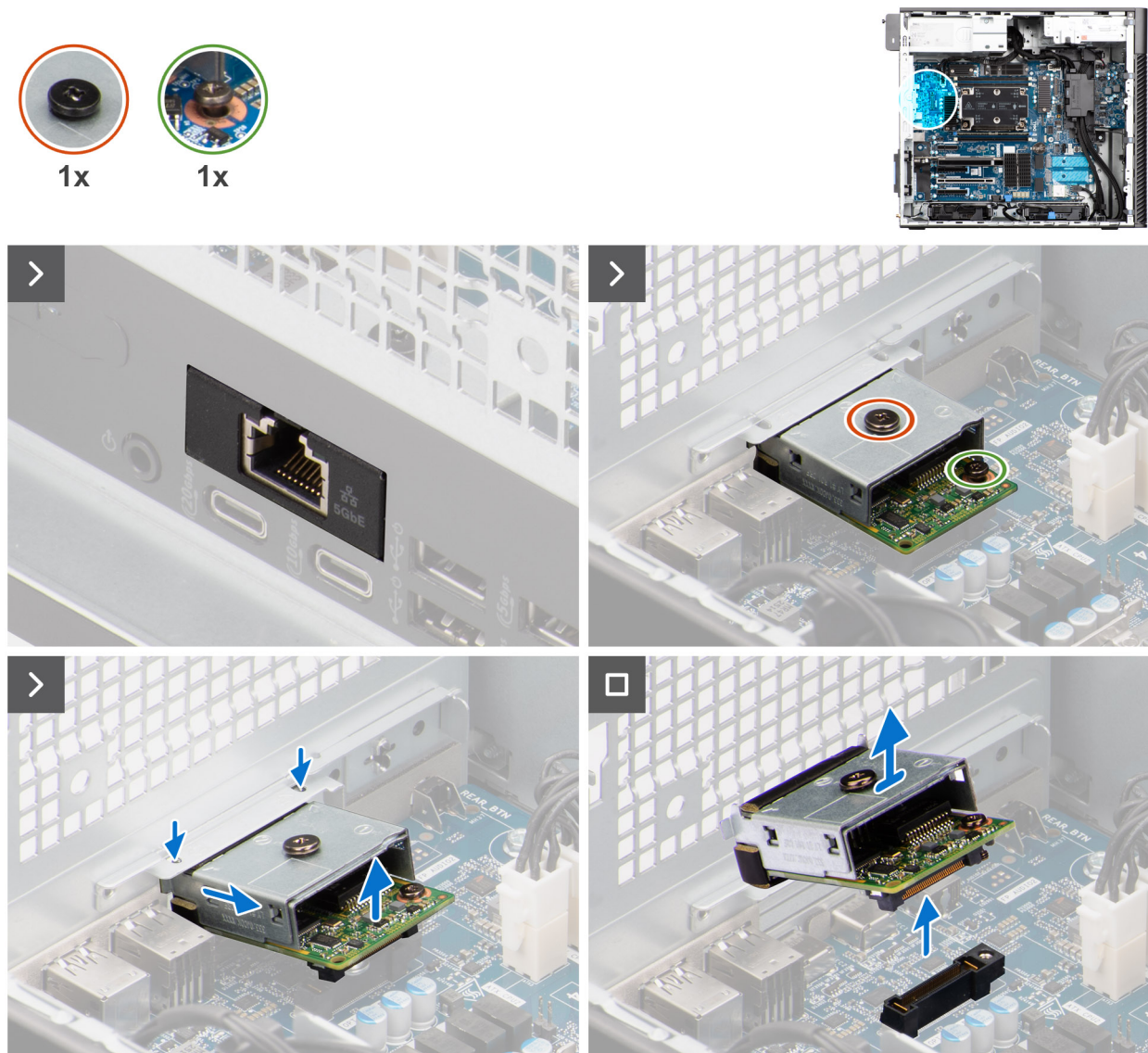


Figure 109. Removing the optional 5GbE network adapter module

Steps

1. Remove the screw that secures the 5GbE network adapter module cover to the 5GbE network adapter module.
2. Remove the screw that secures the 5GbE network adapter module to the system board.
3. Lift the 5GbE network adapter module at an angle and remove the tabs on the module from the slots on the chassis.
4. Remove the 5GbE network adapter module from the connector on the system board and list it away from the system board.

Installing the optional dual-USB 3.2 module

Prerequisites

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

About this task

NOTE: The optional-port modules are mutually exclusive; only a single module can be installed at a time.

The following images indicate the location of the optional dual-USB 3.2 module and provide a visual representation of the installation procedure.

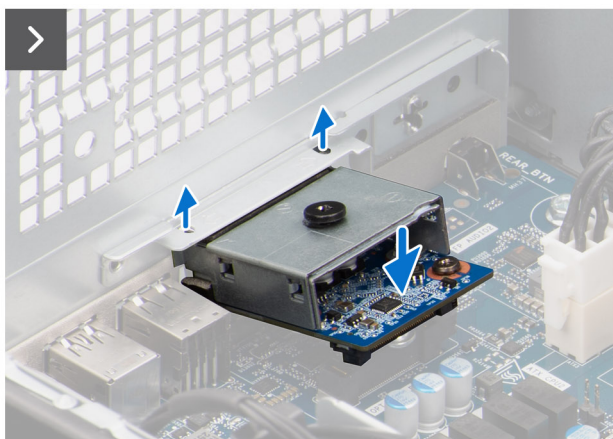
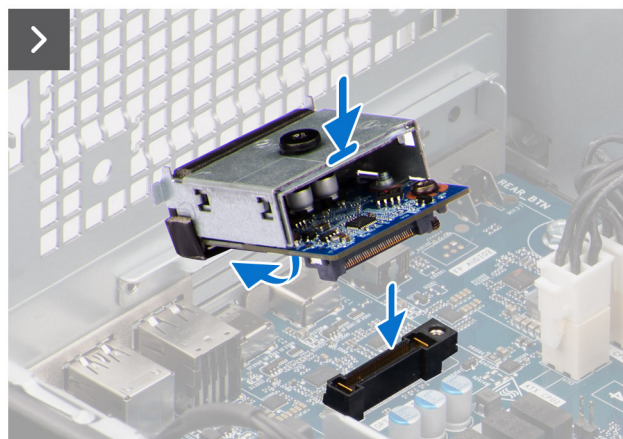
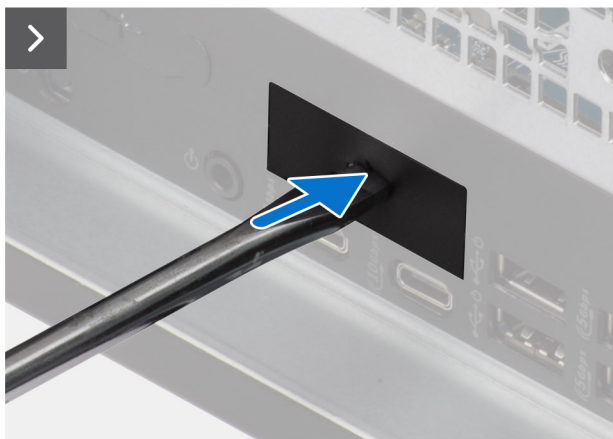
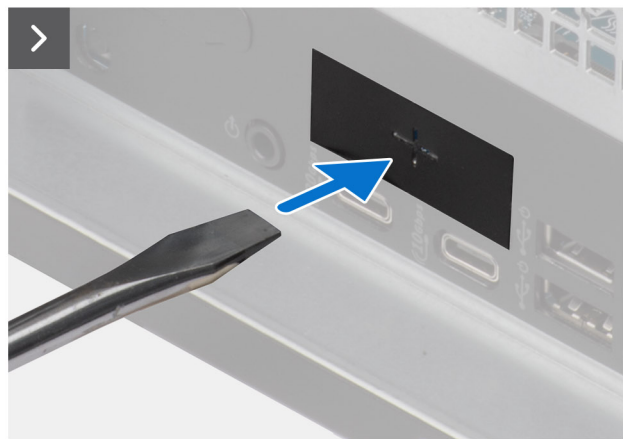
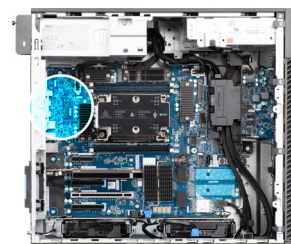
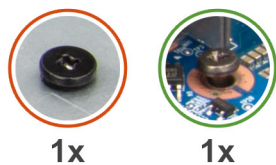


Figure 110. Installing the optional dual-USB 3.2 module



Figure 111. Installing the optional dual-USB 3.2 module

Steps

1. Using a screw driver, push against the optional-port cover until it comes off.



NOTE: This step is only applicable if you are installing the optional-port module on a computer that did not previously have it installed.

2. Place the optional USB module at an angle and align the tabs on the module to the slots on the chassis.
3. Align the optional USB module to the slot on the chassis and connect the module to the connector on the system board.
4. Replace the screw that secures the optional USB module to the system board.
5. Align the screw on the optional USB module cover to the screw hole on the optional USB module.
6. Replace the screw that secures the optional USB module cover to the optional USB module.

Next steps

1. Install the [rear chassis fan](#).
2. Install the [air shroud](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

Removing the optional dual-USB 3.2 module

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [air shroud](#).
4. Remove the [rear chassis fan](#).

About this task

The following image indicates the location of the optional dual-USB 3.2 module and provides a visual representation of the removal procedure.

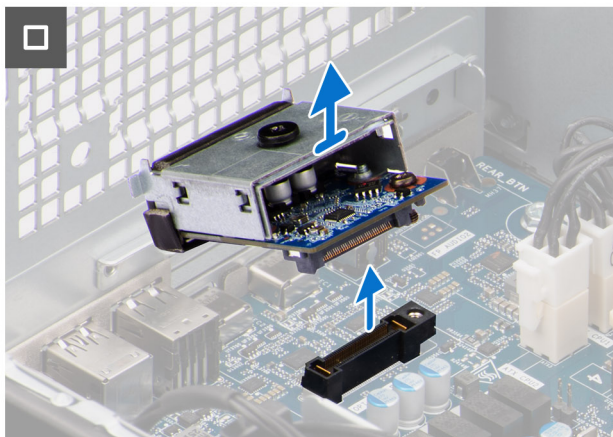
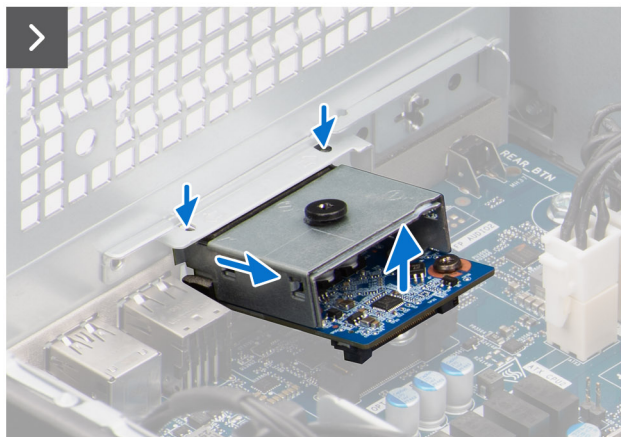
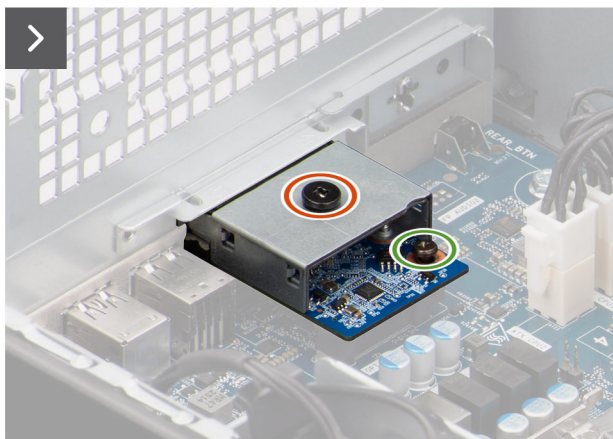
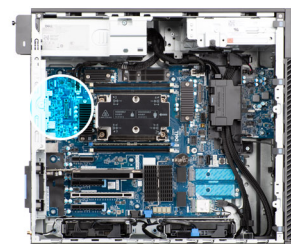
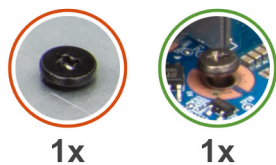


Figure 112. Removing the optional dual-USB 3.2 module

Steps

1. Remove the screw that secures the optional USB module cover to the optional USB module.
2. Remove the screw that secures the optional USB module to the system board.
3. Lift the optional USB module at an angle and remove the tabs on the optional USB module from the slots on the chassis.
4. Remove the optional USB module from the connector on the system board and lift it away from the system board.

Installing the serial-port module

Prerequisites

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

About this task

The following images indicate the location of the serial-port module and provide a visual representation of the installation procedure.

Steps

1. Using a screw driver, push against the serial-port cover until it comes off.
2. Remove the two screws (M3) on the serial-port module.
 **NOTE:** Steps 1 and 2 are only applicable if you are installing the serial-port module on a computer that did not previously have it installed.
3. Unroute the CPU power cable from the hook on the PSU.
4. Suspend the serial-port module over the system board.
5. Connect the serial-port module cable to its connector on the system board.
6. Insert the serial-port module into its slot on the chassis.
7. Replace the two screws (M3) to secure the serial-port module to the chassis.

Next steps

1. Install the [rear chassis fan](#).
2. Install the [air shroud](#).
3. Install the [side cover](#).
4. Follow the procedure in [after working inside your computer](#).

Removing the serial-port module

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [side cover](#).
3. Remove the [air shroud](#).
4. Remove the [rear chassis fan](#).

About this task

The serial-port module is an optional component and may not be installed in your computer.

The following image indicates the location of the serial-port module and provides a visual representation of the removal procedure.

Steps

1. Remove the two screws (M3) that secure the optional serial module to the chassis.
2. Push the serial-port module through its slot on the chassis.
3. Disconnect the serial-port module cable from the connector on the system board.
4. Lift the serial-port module off the system board.

System board

System-board callouts

This topics provides detailed call outs for the connectors on the system board:

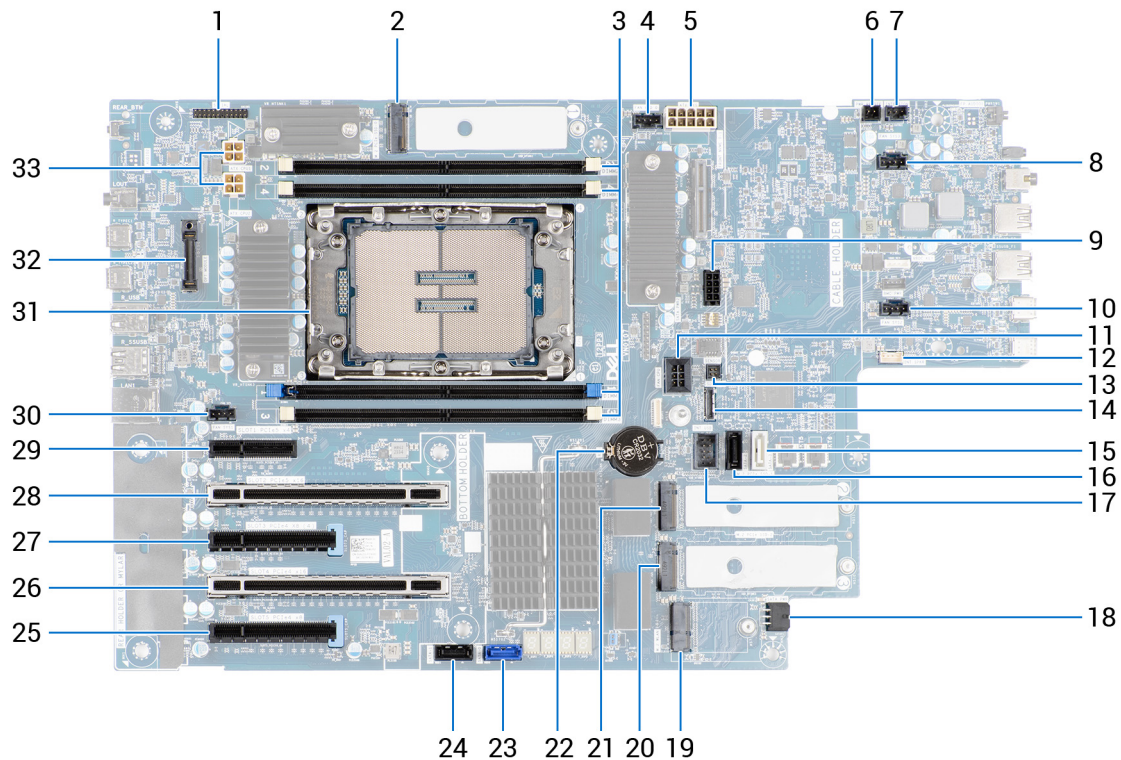


Figure 113. System-board callouts

Table 4. Dell Pro Precision 9 T2 PW9T2260 system-board callouts

No	Connector	Description
1	SERIAL	Serial port connector
2	M.2 PCIe SSD-0	SSD slot-0
3	DIMM1/DIMM2/DIMM3/DIMM4	Memory module connectors
4	FAN HDD 0	Hard drive fan connector
5	ATX SYS	System power connector
6	PWR REMOTE	Power remote connector
7	INTRUSION	Intrusion switch connector
8	FAN SYS3	System fan connector
9	SATA PWR2	SATA hard drive power-cable connector
10	FAN SYS2	System fan connector
11	FAN CPU	CPU fan connector
12	INT SPKR	Internal speaker
13	FAN HDD THRM	Sensor cable connector

Table 4. Dell Pro Precision 9 T2 PW9T2260 system-board callouts (continued)

No	Connector	Description
14	SD CARD	SD card connector
15	SATA-3	SATA hard drive data-cable connector
16	SATA-2	SATA hard drive data-cable connector
17	INT USB TBD	Internal USB Thunderbolt connector
18	SATA PWR	SATA hard drive power-cable connector
19	M.2 WLAN	Wireless card connector
20	M.2 PCIe SSD-3	SSD slot -3
21	M.2 PCIe SSD-2	SSD slot-2
22	RTC	Coin-cell battery
23	SATA-0	SATA hard drive data-cable connector
24	SATA-1	SATA hard drive data-cable connector
25	SLOT5	Full-height Gen4 PCIe x8 (open-ended)
26	SLOT4	Full-height Gen4 PCIe x16
27	SLOT3	Full-height Gen4 PCIe x8 (x4 electrical) open-ended
28	SLOT2	Full-height Gen5 PCIe x16
29	SLOT1	Full-height Gen5 PCIe x4 (closed-end)
30	FAN SYS1	System fan connector
31	CPU	Processor socket
32	OPT MODULE	Optional module connector
33	ATX CPU1 and ATX CPU2	CPU power connector

Removing the system board

 **CAUTION:** The information in this removal section is intended for authorized service technicians only.

Prerequisites

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

 **NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

 **NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

 **NOTE:** Before disconnecting cables from the system board, note the connector locations to ensure correct reconnection after replacing the board.

2. Remove the [side cover](#).
3. Remove the [front bezel](#).
4. Remove the [air shroud](#).
5. Remove the [3.5-inch HDD](#).
6. Remove the [M.2 2230 SSD](#) or the [M.2 2280 SSD](#).
7. Remove the [wireless card](#).

8. Remove the [memory module](#).
9. Remove the [nonpowered graphics card](#).
10. Remove the [powered graphics card](#).

i **NOTE:** This step is required only if the computer is configured with a powered GPU.

11. Remove the [heat-sink assembly](#).
12. Remove the [processor](#).
13. Remove the [front chassis fan](#) and the [rear chassis fan](#).
14. Remove the [intrusion switch](#).
15. Remove the [internal speaker](#).
16. Remove the [front I/O-bracket](#).

About this task

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

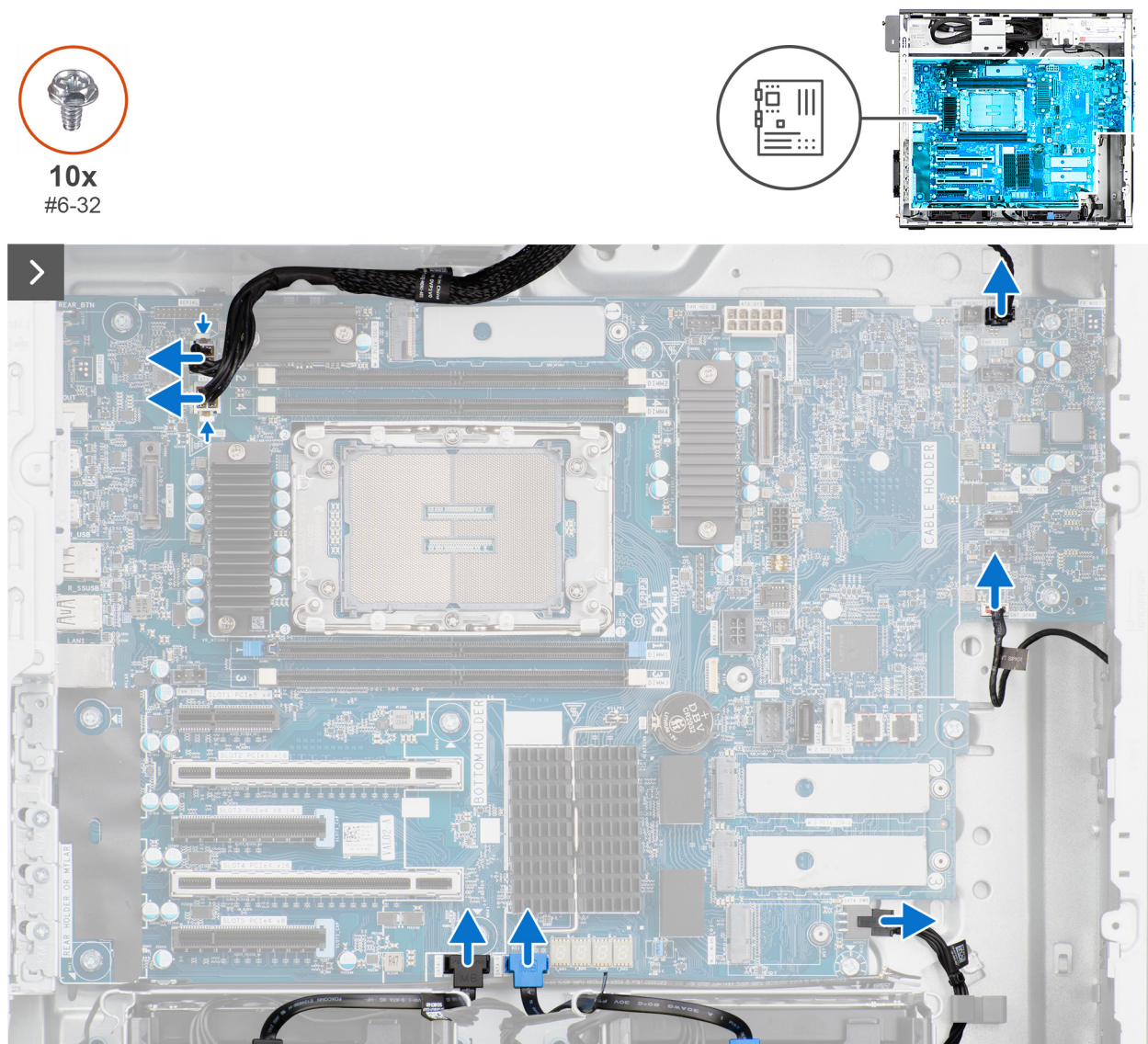


Figure 114. Removing the system board

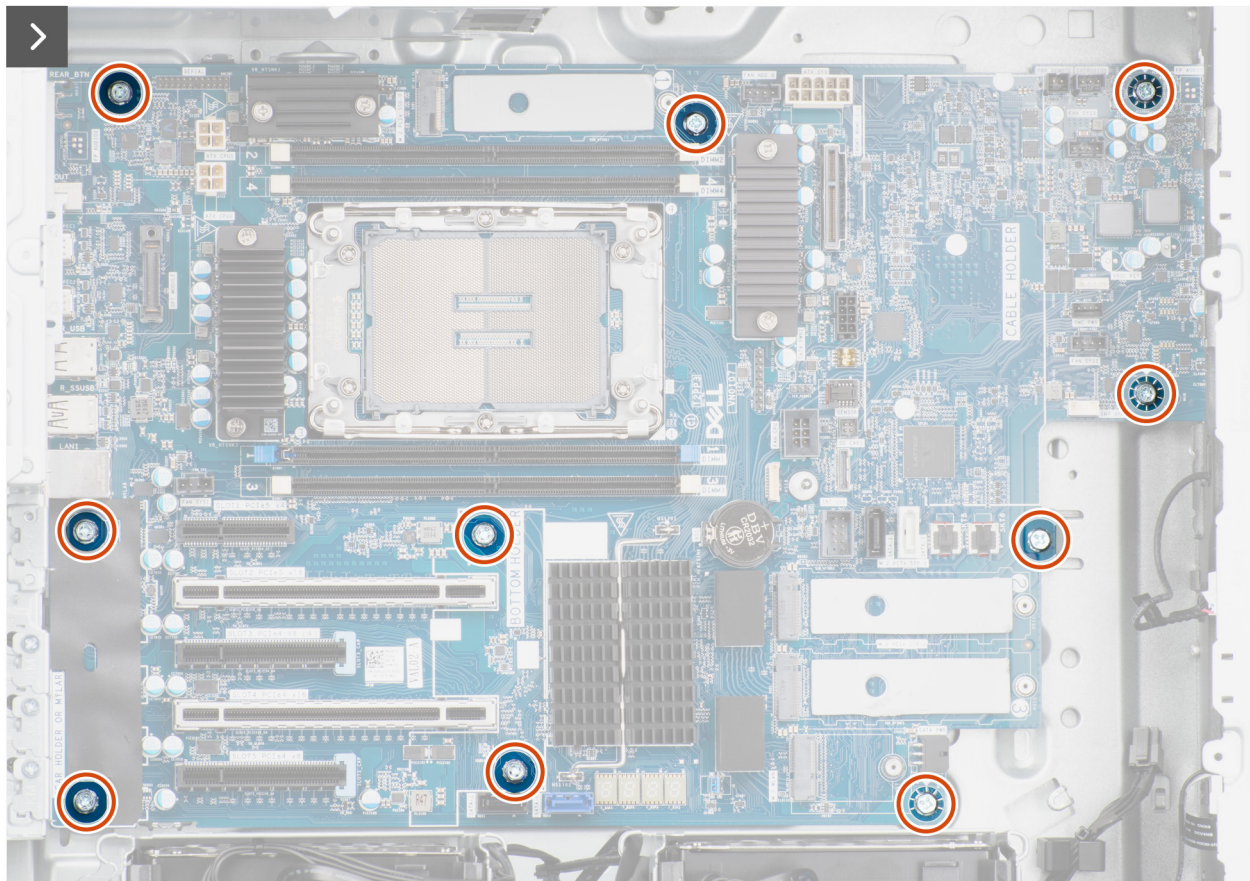


Figure 115. Removing the system board

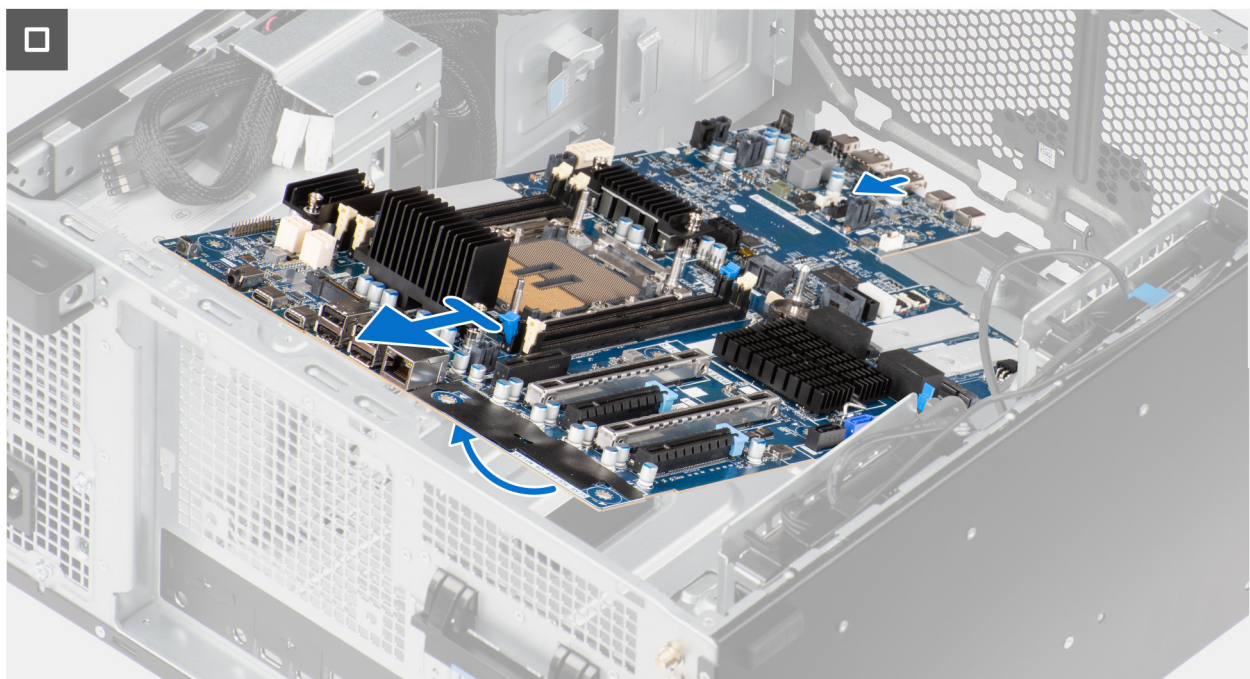


Figure 116. Removing the system board

Steps

1. Disconnect the power and hard drive cables that are connected to the system board.
2. Open the cable-box cover and unroute the cables from the cable box.

3. Remove the two screws (#6-32) that secure the cable box to the chassis.
4. Lift the cable box out of the chassis.
5. Remove the ten screws (#6-32) that secure the system board to the chassis.
6. Lift the system board at an angle and remove the system board from the chassis.

Installing the system board

 **CAUTION:** The information in this installation section is intended for authorized service technicians only.

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 system board and provide a visual representation of the installation procedure.

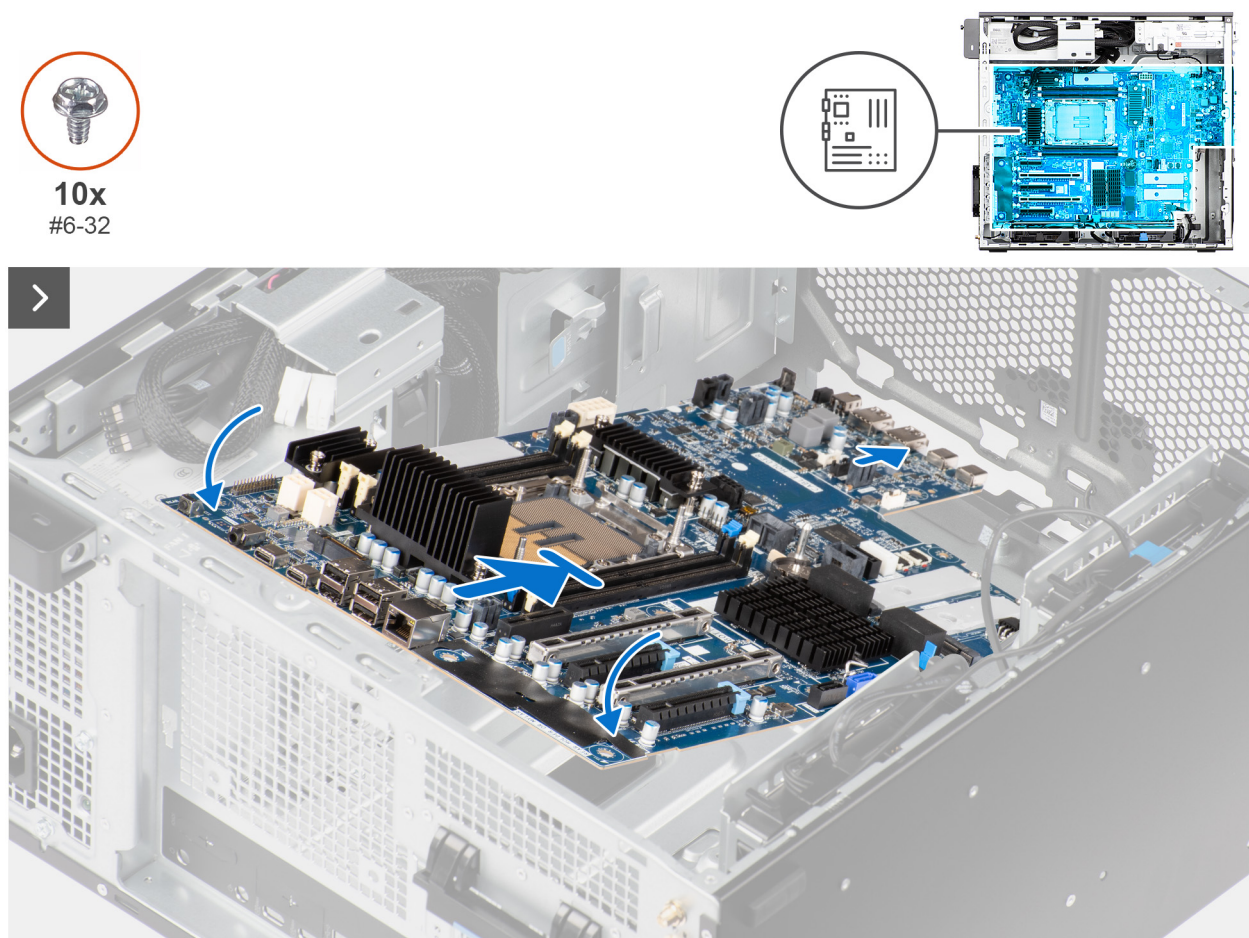


Figure 117. Installing the system board-1

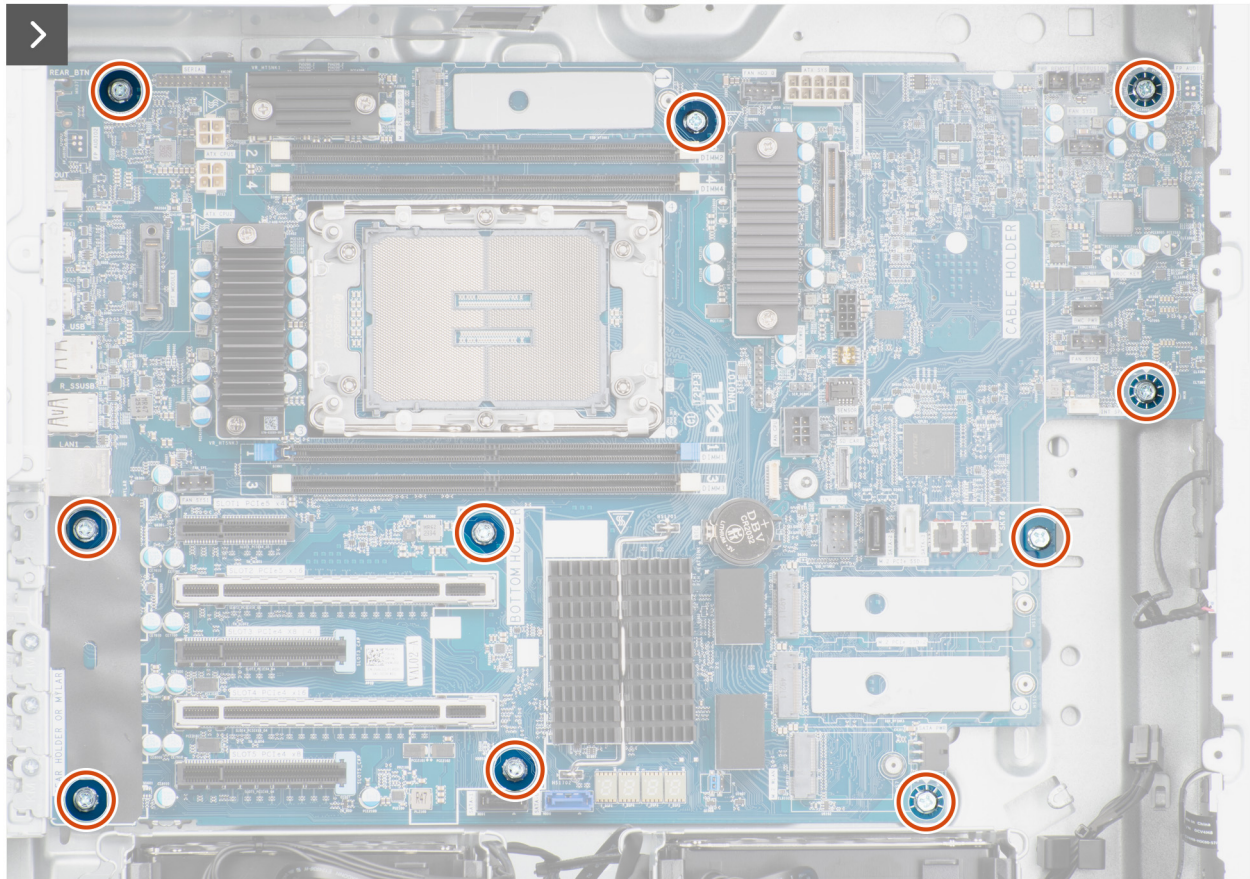


Figure 118. Installing the system board-2

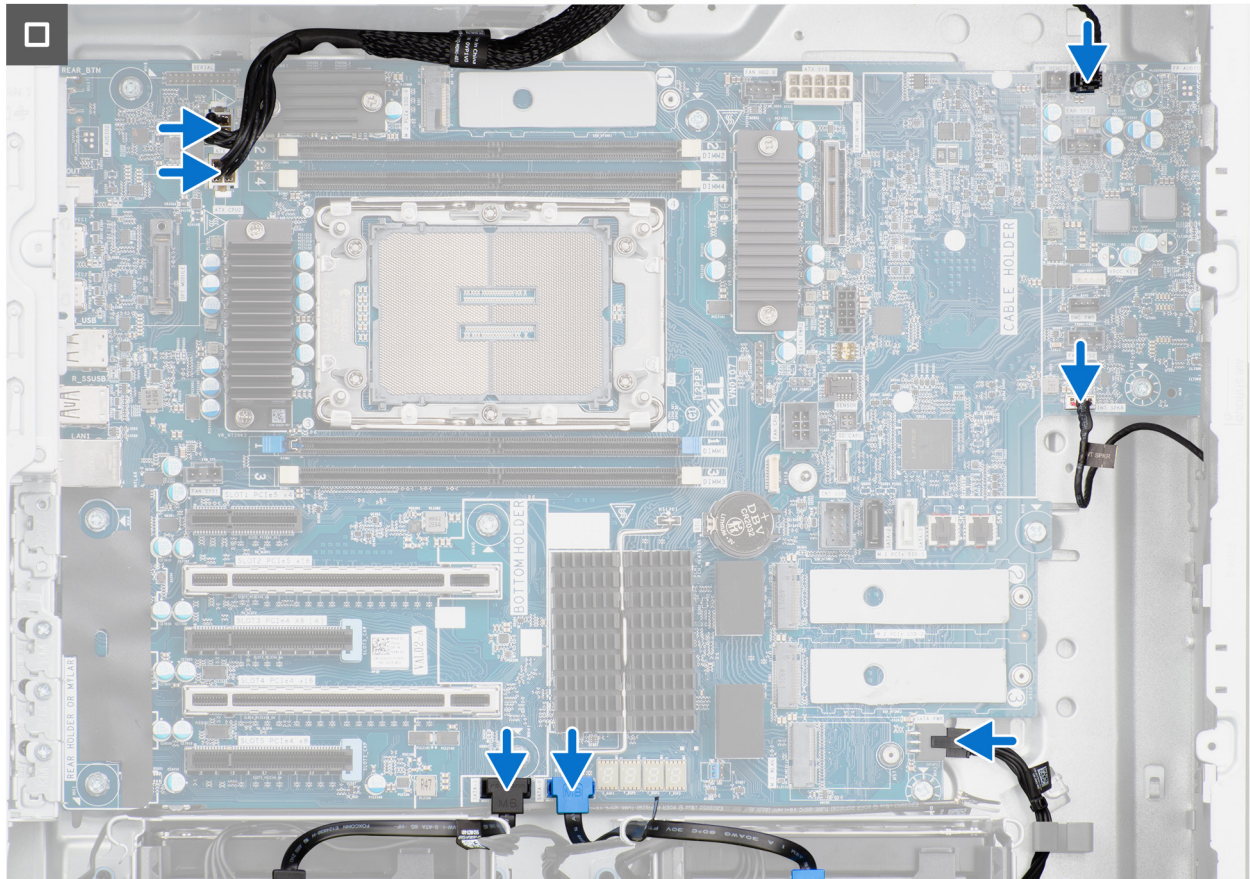


Figure 119. Installing the system board-3

Steps

1. Align and slide the front I/O-ports on the system board into the front I/O-slot on the chassis.
2. Align the screw holes on the system board with screw holes on the chassis.
3. Replace the ten screws (#6-32) that secure the system board to the chassis.
4. Align and place the cable box in its slot on the chassis.
5. Replace the two screws (#6-32) that secure the cable box to the chassis.
6. Route the cables through the cable box and close the cable-box cover.

i NOTE: Fold the excess cabling and insert it into the cable box.

7. Connect the power and hard drive cables to their respective connectors on the system board.

Next steps

1. Install the [front I/O-bracket](#).
2. Install the [internal speaker](#).
3. Install the [intrusion switch](#).
4. Install the [front chassis fan](#) and the [rear chassis fan](#).
5. Install the [processor](#).
6. Install the [heat-sink assembly](#).
7. Install the [powered graphics card](#).

i NOTE: This step is required only if the computer is configured with a powered GPU.

8. Install the [nonpowered graphics card](#).
9. Install the [memory module](#).
10. Install the [wireless card](#).
11. Install the [M.2 2230 SSD](#) or the [M.2 2280 SSD](#).

12. Install the [3.5-inch HDD](#).
13. Install the [air shroud](#).
14. Install the [front bezel](#).
15. Install the [side cover](#).
16. Follow the procedure in [after working inside your computer](#).

 **NOTE:** Your computers Service Tag is stored on the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

 **NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

Software

This chapter details the supported operating systems along with instructions on how to install the drivers.

Operating system

Your Dell Pro Precision 9 T2 PW9T2260 supports the following operating systems:

- Windows 11 Pro
- Ubuntu Linux 24.04 LTS
- Windows 11 IoT Enterprise 2024 LTSC (available through Dell Custom Solutions)

Drivers and downloads

When troubleshooting, downloading, or installing drivers, it is recommended that you read the Dell Knowledge Base article [Drivers and Downloads FAQs](#).

BIOS Setup

 **CAUTION:** Certain changes can make your computer work incorrectly. Before you change the settings in BIOS Setup, it is recommended that you note down the original settings for future reference.

 **NOTE:** Depending on the computer and the installed devices, the options that are listed in below may differ.

Use BIOS Setup for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the capacity of the storage device.
- Change the system configuration information.
- Set or change user-selectable options such as the user password, enabling or disabling base devices, and configuring hard drive settings.

Entering BIOS Setup program

Turn on or restart your computer and press F2 immediately.

Navigation keys

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

Table 5. Navigation keys

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
Enter	Selects a value in the selected field (if applicable) or follows the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restart the computer.

F12 One Time Boot menu

To enter the One Time Boot menu, turn on or restart your computer, and then press F12 immediately.

 **NOTE:** If you are unable to enter the One Time Boot menu, repeat the above action.

The One Time Boot menu displays the devices that you can boot from and also display the options to start diagnostics. The boot menu options are:

- Removable Drive (if available)
- STXXXX Drive (if available)

 **NOTE:** XXX denotes the SATA drive number.

- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

The One Time Boot menu screen also displays the option to access BIOS Setup.

View Advanced Setup options

About this task

Some BIOS Setup options are only visible by enabling **Advanced Setup** mode, which is disabled by default.

 **NOTE:** BIOS Setup options, including **Advanced Setup** options, are described in the **System setup options** option.

To enable Advanced Setup:

Steps

1. Enter BIOS Setup.
The Overview menu appears.
2. Click the **Advanced Setup** option to move it to the **ON** mode.
Advanced BIOS Setup options are displayed.

BIOS Setup options

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

Table 6. BIOS Setup options—Overview menu

Dell Pro Precision 9 T2 PW9T2260	
Overview	Description
BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Displays the Asset Tag of the computer.
Manufacture Date	Displays the manufacture date of the computer.
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the Express Service Code of the computer.
Ownership Tag	Displays the Ownership Tag of the computer.
System UUID	Displays the UUID of the computer.
Processor Information	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed.
Core Count	Displays the number of cores on the processor.
Processor ID	Displays the processor identification code.
Processor L2 Cache	Displays the processor L2 cache size.
Processor L3 Cache	Displays the processor L3 cache size.
Microcode Version	Displays the microcode version.

Table 6. BIOS Setup options—Overview menu (continued)

Dell Pro Precision 9 T2 PW9T2260	
Overview	Description
Intel Hyper-Threading Capable	Displays whether the processor is Hyper-Threading (HT) capable.
Intel vPro Technology	Displays whether the Intel vPro technology is used.
Memory Information	
Memory Installed	Displays the total memory that is installed on the computer.
Memory Available	Displays the total memory available on the computer.
Memory Speed	Displays the memory speed.
Memory Technology	Displays the technology that is used for the memory.
DIMM 1 Size	Displays the DIMM 1 memory size.
DIMM 2 Size	Displays the DIMM 2 memory size.
DIMM 3 Size	Displays the DIMM 3 memory size.
DIMM 4 Size	Displays the DIMM 4 memory size.
Devices Information	
Wi-Fi Device	Displays the wireless device information of the computer.
Native Resolution	Displays the native resolution of the computer.
Audio Controller	Displays the audio controller information of the computer.
Bluetooth Device	Displays the Bluetooth device information of the computer.
LOM MAC Address	Displays the LOM MAC address of the integrated Ethernet (network) controller.
dGPU Video Controller	Displays the dGPU video controller information of the computer.
Slot 1	Displays the PCIe slot information of the system.
Slot 2	Displays the PCIe slot information of the system.
Slot 3	Displays the PCIe slot information of the system.
Slot 4	Displays the PCIe slot information of the system.
Slot 5	Displays the PCIe slot information of the system.

Table 7. BIOS Setup options—Boot Configuration menu

Boot Configuration	Description
Boot Sequence	Displays the boot sequence.
Enable PXE Boot Priority	Enable or disable the PXE Boot priority. By default, the Enable PXE Boot Priority option is disabled. When enabled and if a PXE boot option is detected, it is added to the top of the boot sequence.
UEFI Network Boot Order	Allows you to select the IPv4 and IPv6 boot order. By default, the IPv4 option is enabled.
Extended IPV4 PXE Boot Timeout	Allows you to enter the Extended IPV4 PXE Boot timeout value only if the IPV4 PXE boot fails with standard timeouts. By default, the timeout is set to 0.
Secure Digital (SD) Card Boot	Enables or disable the SD card boot.

Table 7. BIOS Setup options—Boot Configuration menu (continued)

Boot Configuration	Description
	By default, the option is disabled.
Secure Boot	
Enable Secure Boot	Enables the computer to boot using only validated boot software. By default, the Enable Secure Boot option is enabled. For additional security, Dell Technologies recommends keeping the Secure Boot option enabled to ensure that the UEFI firmware validates the operating system during the boot process.  NOTE: For Secure Boot to be enabled, the computer must be in UEFI boot mode and the Enable Legacy Option ROMs option must be turned off.
Secure Boot Mode	Enables or disables the Secure Boot operation mode. By default, the Deployed Mode is selected.  NOTE: Deployed Mode should be selected for normal operation of Secure Boot.
Expert Key Management	
Enable Custom Mode	Enables or disables the ability to modify the keys in the PK, KEK, db, and dbx security key databases to be modified. By default, the Enable Custom Mode option is disabled.
Custom Mode Key Management	Selects the custom values for expert key management. By default, the PK option is selected.

Table 8. BIOS Setup options—Integrated Devices menu

Integrated Devices	Description
Date/Time	
Date	Sets the computer date in MM/DD/YYYY format. Changes to the date format take effect immediately.
Time	Sets the computer time in HH/MM/SS 24-hour format. You can select between a 12-hour and 24-hour clock. Changes to the time format take effect immediately.
HDD Fans	
HDD0 Fan Enable	Enables or disable the hard drive fans. By default, the option is enabled.
Limit system memory to less than 1 TB	Enables or disables the system memory limit to less than 1 TB. By default, the option is disabled.
Audio	
Enable Audio	Enables all integrated audio controller. By default, all the options are enabled.
Rear Audio Jack	Enables the rear audio jack. By default, the Line Out option is enabled.
USB/Thunderbolt Configuration	Enable or disable booting from USB mass storage devices through the boot sequence or boot menu. By default, all the options are enabled.

Table 8. BIOS Setup options—Integrated Devices menu (continued)

Integrated Devices	Description
Front USB Configuration	Enable or disable the individual front USB ports. By default, all the options are enabled.
Dust Filter Maintenance	Enables or disables the BIOS messages for maintaining the optional dust filter. By default, the option is disabled.
PCIe Bifurcation	Enable or disable the configuration settings of the CPU's PCIe port bifurcation feature. By default, the Auto option is enabled.
PCIe Bus Allocation	Displays the PCIe bus allocation information of the system. By default, the Default option is enabled.

Table 9. BIOS Setup options—Storage menu

Storage	Description
SATA/NVMe Operation	
SATA/NVMe Operation	Sets the operating mode of the integrated SATA hard drive controller. By default, the RAID On option is selected. The storage device is configured to support RAID functions with VMD Controller.
Storage Interface	
Port Enablement	Displays the information of various onboard drives. By default, all the options are enabled.
SMART Reporting	
Enable SMART Reporting	Enable or disable Self-Monitoring, Analysis, and Reporting Technology (SMART) during system startup. By default, the Enable SMART Reporting option is not enabled.
Drive Information	Displays the information of onboard drives.
Enable MediaCard	
Secure Digital (SD) Card	Enables or disables the SD card. By default, the Secure Digital (SD) Card option is enabled.
Secure Digital (SD) Card Read-Only Mode	Enables or disables the SD card read-only mode. By default, the Secure Digital (SD) Card Read-Only Mode option is disabled.

Table 10. BIOS Setup options—Display menu

Display	Description
Primary Video Slot	Enable to determine which video controller becomes the primary display when multiple controllers are available in the system. By default, the Auto option is enabled.
Full Screen Logo	Enables or disables the computer to display a full-screen logo, if the image matches screen resolution.

Table 10. BIOS Setup options—Display menu (continued)

Display	Description
	By default, the Full Screen Logo option is disabled.

Table 11. BIOS Setup options—Connection menu

Connection	Description
Network Controller Configuration	
Integrated NIC 1	Enable or disable the onboard LAN controller. By default, the Enabled with PXE option is enabled.
Wireless Device Enable	
WLAN	Enables or disables the internal WLAN device. By default, the WLAN option enabled.
Bluetooth	Enables or disables the internal Bluetooth device. By default, the Bluetooth option enabled.
Enable UEFI Network Stack	Enables or disables the UEFI Network Stack and controls the onboard LAN Controller. By default, the Auto Enabled option is enabled.
IPv4 PXE Boot	Enable or disable the IPv4 PXE Boot option. By default, the option is enabled.
IPv6 PXE Boot	Enable or disable the IPv6 PXE Boot option. By default, the option is enabled.
HTTP(s) Boot Feature	
HTTP(s) Boot	Enable or disable the HTTPs Boot feature. By default, the option is enabled.
HTTP(s) Boot Modes	By default, the Auto Mode option is enabled.

Table 12. BIOS Setup options—Power menu

Power	Description
USB PowerShare	
Enable USB PowerShare	Enable or disable the USB PowerShare feature. By default, the option is enabled.
Thermal Management	Allows you to manage the fan settings to regulate processor temperature and control computer performance, noise, and thermal levels. By default, the Optimized option is selected.
Lower PCIe Slot Zone	Allows you to increase the target fan speed on the Lower PCIe slot zone using this control.
CPU/Memory Zone	Allows you to increase the target fan speed on the CPU/Memory Zone using this control.
Storage Zone	Allows you to increase the target fan speed on the storage zone using this control.
Riser Zone	Allows you to increase the target fan speed on the riser zone using this control.
USB Wake Support	

Table 12. BIOS Setup options—Power menu (continued)

Power	Description
Enable USB Wake Support	When enabled, the USB devices like a mouse or keyboard can be used to wake the system from Standby, Hibernate, and Power Off. i NOTE: This feature requires Deep Sleep Control to be disabled. By default, the Enable USB Wake Support option is disabled.
AC Behavior	
AC Recovery	Enables the system to turn on automatically when AC is inserted. By default, the Power Off option is enabled.
Active State Power Management	
Enable ASPM	Allows you to set the active state power management level. By default, the Auto option is enabled.
Block Sleep	Enabled to block entering sleep (S3) mode in the operating system. By default, the Block Sleep option is disabled. i NOTE: When enabled, the computer does not go to Sleep, Intel Rapid Start is disabled automatically, and the operating system power option is blank if it was set to Sleep.
Deep Sleep Control	The deep Sleep Control option is disabled in order to enable the Wake from USB keyboard and mouse feature to work in the shutdown (S5) and Hibernate (S4) states. By default, the Enabled in S4 and S5 option is enabled.

Table 13. BIOS Setup options—Security menu

Security	Description
TPM 2.0 Security	
TPM 2.0 Security On	Allows you to enable or disable TPM visibility to the operating system. By default, the TPM 2.0 Security On option is enabled.
Attestation Enable	The Attestation Enable option controls the endorsement hierarchy of the TPM. Disabling the Attestation Enable option prevents TPM from being used to digitally sign certificates. By default, the Attestation Enable option is enabled. For additional security, Dell Technologies recommends keeping the Attestation Enable option enabled. i NOTE: When disabled, this feature may cause compatibility issues or loss of functionality in some operating systems.
Key Storage Enable	The Key Storage Enable option controls the storage hierarchy of TPM, which is used to store digital keys. Disabling the Key Storage Enable option restricts the ability of TPM to store owner's data. By default, the Key Storage Enable option is enabled. For additional security, Dell Technologies recommends keeping the Key Storage Enable option enabled. i NOTE: When disabled, this feature may cause compatibility issues or loss of functionality in some operating systems.

Table 13. BIOS Setup options—Security menu (continued)

Security	Description
PPI Bypass for Clear Commands	The PPI Bypass for Clear Commands option allows the operating system to manage certain aspects of PTT. When enabled, you are not prompted to confirm changes to the PTT configuration. By default, the PPI Bypass for Clear Commands option is disabled. For additional security, Dell Technologies recommends keeping the PPI Bypass for Clear Commands option disabled.
Intel Total Memory Encryption	
Multi-Key Total Memory Encryption (Up to 16 keys)	Enable or disable to protect memory from physical attacks including freeze spray, probing DDR to read the cycles, and others. Up to 16 different encryption keys are supported for use by OS/VMM. By default, the option is disabled.
Data Wipe on Next Boot	
Start Data Wipe	Data Wipe is a secure wipe operation that deletes information from a storage device.  CAUTION: The secure Data Wipe operation deletes information in a way that it cannot be reconstructed. Commands such as delete and format in the operating system may remove files from showing up in the file system. However, they can be reconstructed through forensic means as they are still represented on the physical media. Data Wipe prevents this reconstruction, and the data can no longer be recovered. When enabled, the data wipe option provides prompts to wipe any storage devices that are connected to the computer on the next boot. By default, the Start Data Wipe option is disabled.
HDD Security	
SED Block SID Authentication	Enables or disables the SED block SID authentication to control the mechanism that is used by the BIOS to block the entries from taking ownership of the Self-Encrypting Drive (SED) when the drive does not have a password set. By default, the option is enabled.
PPI Bypass for SED Block SID Command	Enables or disables you to control the SED block SID PPI. By default, the option is disabled.
Absolute	Absolute Software provides various cyber security solutions, some requiring software preloaded on Dell computers and integrated into the BIOS. To use these features, you must enable the Absolute BIOS setting and contact Absolute for configuration and activation. By default, the Absolute option is enabled. For additional security, Dell Technologies recommends keeping the Absolute option enabled.  NOTE: When the Absolute features are activated, the Absolute integration cannot be disabled from the BIOS setup screen.
UEFI Boot Path Security	Enables or disables the computer to prompt the user to enter the Administrator password (if set) when booting to a UEFI boot path device from the F12 boot menu. By default, the Always Except Internal HDD option is enabled.
Authenticated BIOS Interface	
Enable Authenticated BIOS Interface	Enable or disable the authenticated BIOS interface.

Table 13. BIOS Setup options—Security menu (continued)

Security	Description
	By default, the option is disabled.
Legacy Manageability Interface Access	Allows the administrator to control the access to BIOS configuration through the Legacy Manageability Interface option. When enabled, this prevents the BIOS Administrator password-based manageability tools from running, prevents some Dell software applications from reading configuration settings, and/or prevents changes to the BIOS configuration settings. When enabled, this option only supports the Authenticated BIOS Manageability Interface (ABI) for managing the BIOS configuration changes. To support this feature, ABI must be enabled and provisioned. When set to Enabled, the Legacy Manageability Interface can be used to read and change BIOS configuration settings. When set to Read-Only, BIOS configuration settings can be read, but cannot be changed through the Legacy Manageability Interface. When set to Disabled, the Legacy Manageability Interface is disabled. BIOS configuration reads and writes are blocked.
Firmware Device Tamper Detection	Allows you to control the firmware device tamper detection feature. This feature notifies the user when the firmware device is tampered. When enabled, a screen warning messages are displayed on the computer and a tamper detection event is logged in the BIOS Events log. The computer fails to reboot until the event is cleared. By default, the Silent option is enabled. For additional security, Dell Technologies recommends keeping the Silent option enabled.
Clear Firmware Device Tamper Detection	Enable or disable the Clear Firmware Device Tamper Detection. By default, the Clear Firmware Device Tamper Detection option is disabled.
Bypass BIOS Administrator Password for Platform Firmware Updates	Enable or disable the Bypass BIOS administrator platform firmware updates. By default, the option is disabled.

Table 14. BIOS Setup options—Passwords menu

Passwords	Description
Admin Password	The Administrator Password prevents unauthorized access to the BIOS Setup options. Once the administrator password is set, the BIOS setup options can only be modified after providing the correct password. The following rules and dependencies apply to the Administrator Password - • The administrator password cannot be set if computer and/or internal storage device passwords are already set. • The administrator password can be used in place of the computer and/or internal storage passwords. • When set, the administrator password must be provided during a firmware update. • Clearing the administrator password also clears the computer password (if set). Dell Technologies recommends using an administrator password to prevent unauthorized changes to BIOS setup options.
System Password	The System Password prevents the computer from booting to an operating system without entering the correct password. The following rules and dependencies apply when the System Password is used:

Table 14. BIOS Setup options—Passwords menu (continued)

Passwords	Description
	- The computer shuts down when idle for approximately 10 minutes at the computer password prompt. - The computer shuts down after three incorrect attempts to enter the computer password. - The computer shuts down when the Esc key is pressed at the System Password prompt. - The computer password is not prompted when the computer resumes from standby mode. Dell Technologies recommends using the computer password in situations where it is likely that a computer may be lost or stolen.
M.2 PCIe SSD-1	Set, change, or delete the M.2 PCIe SSD-1 password.
M.2 PCIe SSD-2	Set, change, or delete the M.2 PCIe SSD-2 password.
Password Configuration	The Password configuration page includes several options for changing the requirements of BIOS passwords. You can modify the minimum and maximum length of the passwords and require passwords to contain certain character classes (upper case, lower case, digit, special character). Dell Technologies recommends setting the minimum password length to at least eight characters.
Password Bypass	The Password Bypass option allows the computer to reboot from the operating system without entering the computer or hard drive password. If the computer has already booted to the operating system, it is presumed that the user has already entered the correct computer or hard drive password. NOTE: This option does not remove the requirement to enter the password after shutting down. By default, the option is disabled.
Password Changes	
Allow Non-Admin Password Changes	The Allow Non-Admin Password Changes option in BIOS setup allows an end user to set or change the computer or hard drive passwords without entering the administrator password. This gives an administrator control over the BIOS settings but enables an end user to provide their own password. By default, the Allow Non-Admin Password Changes option is enabled. For additional security, Dell Technologies recommends keeping the Allow Non-Admin Password Changes option disabled.
Admin Setup Lockout	
Enable Admin Setup Lockout	The Admin Setup Lockout option prevents an end user from even viewing the BIOS setup configuration without first entering the administrator password (if set). By default, the Admin Setup Lockout option is disabled. For additional security, Dell Technologies recommends keeping the Admin Setup Lockout option disabled.
Master Password Lockout	
Enable Master Password Lockout	The Master Password Lockout setting allows you to disable the Recovery Password feature. If the computer, administrator, or hard drive password is forgotten, the computer becomes unusable. NOTE: When the owner password is set, the Master Password Lockout option is not available. NOTE: When an internal hard drive password is set, it must first be cleared before Master Password Lockout can be changed.

Table 14. BIOS Setup options—Passwords menu (continued)

Passwords	Description
	By default, the Enable Master Password Lockout option is disabled. Dell does not recommend enabling the Master Password Lockout unless you have implemented your own password recovery computer.
Allow Non-Admin PSID Revert	
Enable Allow Non-Admin PSID Revert	Enables or disables the access to the Physical Security ID (PSID) revert of NVMe hard-drives from the Dell Security Manager prompt. By default, the option is disabled.

Table 15. BIOS Setup options—Update, Recovery menu

Update, Recovery	Description
BIOS Recovery from Hard Drive	
BIOS Recovery from Hard Drive	Enables or disables the user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key. By default, the BIOS Recovery from Hard Drive option is enabled.  NOTE: BIOS Recovery from Hard Drive is not available for self-encrypting drives (SED).  NOTE: BIOS recovery is designed to fix the main BIOS block and cannot work if the Boot Block is damaged. In addition, this feature cannot work in the event of EC corruption, ME corruption, or a hardware issue. The recovery image must exist on an unencrypted partition on the drive.
BIOS Downgrade	
Allow BIOS Downgrade	Controls flashing of the computer firmware to previous revisions. By default, the Allow BIOS Downgrade option is enabled.
SupportAssist OS Recovery	Enables or disables the boot flow for SupportAssist OS Recovery tool in the event of certain computer errors. By default, the SupportAssist OS Recovery option is enabled.
BIOSConnect	Enables or disables cloud Service operating system recovery if the main operating system fails to boot with the number of failures equal to or greater than the value specified by the Auto OS Recovery Threshold setup option and the local Service operating system does not boot or is not installed. By default, the BIOSConnect option is enabled.
Dell Auto OS Recovery Threshold	Allows you to control the automatic boot flow for SupportAssist System Resolution Console and for Dell OS Recovery Tool. By default, the Dell Auto OS Recovery Threshold value is set to 2.
Connected Service Delivery	Enables or disables the connected service delivery. By default, the option is enabled.

Table 16. BIOS Setup options—System Management menu

System Management	Description
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Creates a computer Asset Tag that can be used by an IT administrator to uniquely identify a particular computer.  NOTE: Once set in the BIOS, the Asset Tag cannot be changed.

Table 16. BIOS Setup options—System Management menu (continued)

System Management	Description
Wake on LAN/WLAN	Enables or disables the computer to turn on by a special LAN signal. By default, the Wake on LAN/WLAN option is disabled.
Auto On Time	Enable to set the computer to turn on automatically every day or on a preselected date and time. This option can be configured only if the Auto On Time is set to Everyday, Weekdays, or Selected Days. By default, the Auto On Time option is disabled.
Intel AMT Capability	
Enable Intel AMT Capability	Enable or disable the Intel AMT capability. By default, the Restrict Preboot Access option is enabled.
SERR Messages	
Enable SERR Messages	Enable or disable the SERR message mechanism. By default, the option is enabled.
First Power On Date	
Set Ownership Date	Allows to set the ownership date. By default, the option is disabled.
Diagnostics	
OS Agent Requests	Enable or disable the OS agent requests. By default, the option is enabled.
Power-on-Self-Test Automatic Recovery	Enable or disable the Power-on-Self-Test Automatic Recovery option. By default, the option is enabled.

Table 17. BIOS Setup options—Keyboard menu

Keyboard	Description
Numlock LED	
Enable Numlock LED	Enables or disables the Num lock option. By default, the option is enabled.
Device Configuration HotKey Access	Allows you to control whether you can access device configuration screens through hotkeys during computer startup. By default, the Device Configuration HotKey Access option is enabled. i NOTE: This setting controls only the Intel RAID (CTRL+I), MEBX (CTRL+P), and LSI RAID (CTRL+C) Option ROMs. Other preboot Option ROMs, which support entry using a key sequence, are not affected by this setting.

Table 18. BIOS Setup options—Pre-boot Behavior menu

Preboot Behavior	Description
Warnings and Errors	Enables or disables the action to be taken when a warning or error is encountered. By default, the Prompt on Warnings and Errors option is selected. i NOTE: Errors deemed critical to the operation of the computer hardware stop the functioning of the computer.
Extend BIOS POST Time	Sets the BIOS POST (Power-On Self-Test) load time.

Table 18. BIOS Setup options—Pre-boot Behavior menu (continued)

Preboot Behavior	Description
	By default, the 0 seconds option is selected.
Show Ownership Tag with Logo	Enables or disables the display of the computer ownership tag in addition to the BIOS Boot logo. By default, the option is enabled.

Table 19. BIOS Setup options—Virtualization menu

Virtualization Support	Description
Intel Trusted Execution Technology (TXT)	
Enable Intel Trusted Execution Technology (TXT)	Intel Trusted Execution Technology (TXT) is hardware extensions to Intel processors and chipsets. It provides a hardware-based root of trust to ensure that a platform boots with a known good configuration of firmware, BIOS, virtual machine monitor, and operating system. By default, the Intel Trusted Execution Technology (TXT) option is disabled. For additional security, Dell Technologies recommends keeping the Intel Trusted Execution Technology (TXT) option enabled.
DMA Protection	
Enable Pre-Boot DMA Support	Allows you to control the Pre-Boot DMA protection for both internal and external ports. This option does not directly enable DMA protection in the operating system. i NOTE: This option is not available when the virtualization setting for IOMMU is disabled (VT-d/AMD Vi). By default, the Enable Pre-Boot DMA Support option is enabled. For additional security, Dell Technologies recommends keeping the Enable Pre-Boot DMA Support option enabled. i NOTE: This option is provided only for compatibility purposes, since some older hardware is not DMA capable.
Enable OS Kernel DMA Support	Allows you to control the Kernel DMA protection for both internal and external ports. This option does not directly enable DMA protection in the operating system. For operating systems that support DMA protection, this setting indicates to the operating system that the BIOS supports the feature. i NOTE: This option is not available when the virtualization setting for IOMMU is disabled (VT-d/AMD Vi). By default, the Enable OS Kernel DMA Support option is enabled. i NOTE: This option is provided only for compatibility purposes, since some older hardware is not DMA capable.
Internal Port DMA Compatibility Mode	Enables or disables the notification to the operating system that the internal ports are not DMA capable. By default, the option is disabled.

Table 20. BIOS Setup options—Performance menu

Performance	Description
Enable Dell RMT	Enable or disable Dell Reliable Memory Technology (RMT) to identify and isolate memory errors in the system RAM. By default, the option is enabled.
Clear Dell RMT Log	By default, the option is disabled.

Table 20. BIOS Setup options—Performance menu (continued)

Performance	Description
Intel SpeedStep	
Enable Intel SpeedStep Technology	Enables the computer to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production. By default, the Enable Intel SpeedStep Technology option is enabled.
Intel Turbo Boost maximum Technology 3.0	
Enable Intel Turbo Boost Maximum Technology 3.0	Enables or disables the Intel TurboBoost mode of the processor. When enabled, the Intel TurboBoost driver increases the performance of the CPU or graphics processor. By default, the Enable Intel Turbo Boost Technology 3.0 option is enabled.
Intel Hyper-Threading Technology	
Enable Intel Hyper-Threading Technology	Enables or disables the Intel Hyper-Threading mode of the processor. When enabled, the Intel Hyper-Threading increases the efficiency of the processor resources when multiple threads run on each core. By default, the Intel Hyper-Threading Technology option is enabled.
Cache Prefetch	
	Enables or disables the hardware prefetcher to turn on the MLC streamer prefetcher. By default the Hardware Prefetcher is enabled. Enables or disables the Adjacent Cache Line prefetcher to turn on the MLC spatial prefetcher. By default the Adjacent Cache Prefetcher is enabled.
Pcie Link Speed	
	Allows you to select the maximum PCIe link speed attainable by devices within the system. By default, the Auto option is enabled.
PCIe Resizable Base Address Register (BAR)	
	Enable or disable the PCIe resizable BAR support. By default, the option is disabled.
RAS Support	
Memory RAS	Enable or disable RAS on memory modules to report errors and help minimize system downtime caused by memory failures. By default, the option is disabled.
PCIE RAS	Enable or disable RAS on PCIe modules to log errors caused by PCIe failures. By default, the option is disabled.
CPU RAS	Enable or disable RAS on CPU to log errors caused by CPU failures. By default, the option is disabled.
PCIe Data Link Feature Exchange	Enables or disables the PCIe Data Link Feature Exchange. By default, the option is disabled.

Table 21. BIOS Setup options—System Logs menu

System Logs	Description
BIOS Event Log	
Clear BIOS Event Log	Allows you to select option to keep or clear BIOS events logs. By default, the Keep Log option is selected.
Power Event Log	
Clear Power Event Log	Allows you to select option to keep or clear power events logs.

Table 21. BIOS Setup options—System Logs menu (continued)

System Logs	Description
	By default, the Keep Log option is selected.
Dell Reliable Memory Technology Events	Displays the Dell Reliable Memory Technology events.

Updating the BIOS

Updating the BIOS in Windows

About this task

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the BitLocker key is not recognized the next time you reboot the computer. You will then be prompted to enter the recovery key to proceed, and the computer displays a prompt for the recovery key on each reboot. Failure to provide the recovery key can result in data loss or an operating system reinstall. For more information, refer [Updating the BIOS on Dell systems with BitLocker enabled](#).

 **CAUTION:** Do not turn off the computer during the BIOS flash update process. The computer may not boot if you turn off your computer.

Steps

1. Go to [Dell Support Site](#).
2. Go to **Identify your product or ask support**. In the box, enter the product identifier, model, service request or describe what you are looking for, and then click **Search**.

 **NOTE:** If you do not have the Service Tag, click **Detect This PC**. The site automatically detects your device, and you can then click **Explore Product Support** to go to the support page for your device. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, navigate to the folder where the BIOS update file has been saved.
8. Double-click the BIOS update file and follow the on-screen instructions.

For more information, search [Dell Support Site](#).

Updating the BIOS using the USB drive in Windows

About this task

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the BitLocker key is not recognized the next time you reboot the computer. You will then be prompted to enter the recovery key to proceed, and the computer displays a prompt for the recovery key on each reboot. Failure to provide the recovery key can result in data loss or an operating system reinstall. For more information, refer [Updating the BIOS on Dell systems with BitLocker enabled](#).

 **CAUTION:** Do not turn off the computer during the BIOS flash update process. The computer may not boot if you turn off your computer.

Steps

1. Go to [Dell Support Site](#).
2. Go to **Identify your product or ask support**. In the box, enter the product identifier, model, service request or describe what you are looking for, and then click **Search**.
 **NOTE:** If you do not have the Service Tag, click **Detect This PC**. The site automatically detects your device, and you can then click **Explore Product Support** to go to the support page for your device. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. Create a bootable USB drive. For more information, search [Dell Support Site](#).
8. Copy the BIOS setup program file to the bootable USB drive.
9. Connect the bootable USB drive to the computer that needs the BIOS update.
10. Restart the computer and press **F12**.
11. Select the USB drive from the **One Time Boot Menu**.
12. Type the BIOS setup program filename and press **Enter**.
The **BIOS Update Utility** appears.
13. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS from the One-Time boot menu

To update the BIOS from the One-Time boot menu, see [Updating the BIOS from the One Time Boot Menu](#) at [Dell Support Site](#).

Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see [How to Update the Dell BIOS in the Ubuntu or Linux Environment](#) at [Dell Support Site](#).

System and setup password

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

 **CAUTION:** Ensure that your computer is locked when it is not in use. Anyone can access the data that is stored on your computer, when left unattended.

Table 22. System and setup password

Password type	Description
System password	Password that you must enter to boot to your operating system.
Setup password	Password that you must enter to access and change the BIOS settings of your computer.

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

 **NOTE:** The System and setup password feature is disabled by default.

Assigning a System Setup password

Prerequisites

You can assign a new System or Admin Password only when the status is set to **Not Set**. To enter BIOS System Setup, press F2 immediately after a power-on or reboot.

Steps

1. To enter the **System Setup**, press **F2** immediately after a power-on or reboot.
2. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
The **Security** screen is displayed.
3. Select **System/Admin Password** and create a password in the **Enter the new password** field.
Use the following guidelines to create the system password:
 - Password can be up to 32 characters.
 - Password must contain at least one special character: "(! " # \$ % & ' * + , - . / : ; < = > ? @ [\] ^ _ ` { | })")"
 - The password can contain numbers from 0 to 9.
 - The password can contain alphabets A to Z and a to z.
4. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
5. Press Y to save the changes.
The computer restarts.

Deleting or changing an existing system password or setup password

Prerequisites

Ensure that the **Password Status** is Unlocked in the System Setup before attempting to delete or change the existing system password and/or setup password. You cannot delete or change an existing system password or setup password if the **Password Status** is Locked. To enter the System Setup, press F2 immediately after a power-on or reboot.

Steps

1. To enter the **System Setup**, press **F2** immediately after a power-on or reboot.
2. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
The **System Security** screen is displayed.
3. In the **System Security** screen, verify that the **Password Status** is Unlocked.
4. Select **System Password**. Update or delete the existing system password, and press Enter or Tab.
5. Select **Setup Password**. Update or delete the existing setup password, and press Enter or Tab.
 **NOTE:** If you change the system password and/or setup password, reenter the new password when prompted. If you delete the system password and/or setup password, confirm the deletion when prompted.
6. Press Esc. A message prompts you to save the changes.
7. Press Y to save the changes and exit from **System Setup**.
The computer restarts.

Clearing system and setup passwords

About this task

To clear the system or setup passwords, contact Dell technical support as described at [Contact Support](#).

-  **NOTE:** For information about how to reset Windows or application passwords, see the documentation accompanying Windows or your application.

Clearing CMOS settings

About this task

 **CAUTION:** Clearing CMOS settings resets the BIOS settings on your computer.

Steps

1. Remove the left-side cover.
2. Remove the air shroud.
3. Remove the coin-cell battery.
4. Wait for one minute.
5. Replace the coin-cell battery.
6. Replace the air shroud.
7. Replace the left-side cover.

Troubleshooting

Dell SupportAssist Pre-boot System Performance Check diagnostics

About this task

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 within the BIOS and launched by the BIOS internally. The embedded system diagnostics provides options for particular devices or device groups allowing you to:

- Run tests automatically or in an interactive mode.
- Repeat the tests.
- Display or save test results.
- Run thorough tests to add more options and obtain details about any failed devices.
- View status messages that inform you when the 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 when the diagnostic tests are performed.

For more information, see [How to Run Dell Preboot Diagnostics and Hardware Tests on Your Dell Computer](#).

Running the SupportAssist Pre-Boot System Performance Check

Steps

1. Turn on your computer.
2. As the computer boots, press the F12 key.
3. On the boot menu screen, select **Diagnostics**.
The quick diagnostic test begins.

 **NOTE:** For more information about running the SupportAssist Pre-Boot System Performance Check on a specific device, see [Dell Support Site](#).

4. If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.

Power-Supply Unit Built-in Self-Test

Built-in Self-Test (BIST) helps determine if the power-supply unit is working. To run self-test diagnostics on the power-supply unit of a desktop or all-in-one computer, search in the Knowledge Base Resource at [Dell Support Site](#).

System-diagnostic lights

This section lists the system-diagnostic lights of your Dell Pro Precision 9 T2 PW9T2260.

The following table shows different Service LED blinking patterns and associated problems. The diagnostic light codes consist of a two-digit number, and the digits are separated by a comma. The number stands for a blinking pattern; the first digit shows the number of blinks in amber color, and the second digit shows the number of blinks in white color. The Service LED blinks in the following manner:

- The Service LED blinks the number of times equal to the value of the first digit and turns off with a short pause.

- After that, the Service LED blinks the number of times equal to the value of the second digit.
- The Service LED turns off again with a longer pause.
- After the second pause, the blinking pattern will be repeated.

Table 23. Diagnostic light codes

Diagnostic light codes (Amber, White)	Problem description
1,1	TPM Detection Failure
1,2	Unrecoverable SPI Flash Failure
1,5	EC unable to program i-Fuse
1,6	Generic catch-all for ungraceful EC code flow errors
1,7	Non-RPMC Flash on Boot Guard fused system
1,8	Chipset "Catastrophic Error" signal has tripped
2,1	CPU configuration or CPU failure
2,2	System board: BIOS or Read-Only Memory (ROM) failure
2,3	No memory, or Random-Access Memory (RAM) detected
2,4	Memory, or Random-Access Memory (RAM) failure
2,5	Invalid memory module
2,6	System board/Chipset Error
2,7	LCD failure SBIOS message
2,8	Display power-rail failure on the system board
3,1	CMOS battery failure
3,2	PCI of Video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	EC power-rail error
3,6	Flash corruption detected by SBIOS
3,7	Timeout waiting on ME to reply to HECI message
4,1	Memory DIMM power rail failure
4,2	CPU Power cable connection issue

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 on Dell computers running the Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, and 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 the 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 [Serviceability Tools at the Dell Support Site](#). Click **SupportAssist** and then click **SupportAssist OS Recovery**.

 **NOTE:** Windows 11 IoT Enterprise LTSC 2024 and Dell ThinOS 10 do not support Dell SupportAssist. For more information about recovering ThinOS 10, see [Recovery mode using R-Key](#).

Real-Time Clock (RTC Reset)

The Real-Time Clock (RTC) reset function enables you or the service technician to recover Dell computers from No POST/No Power/No Boot situations.

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

Backup media and recovery options

It is recommended to create a recovery drive to troubleshoot and fix problems that may occur with Windows. Dell provides multiple options for recovering the Windows operating system on your Dell computer. For more information, see [Dell Windows Backup Media and Recovery Options](#).

Network power cycle

About this task

If your computer is unable to access the Internet due to network connectivity issues, reset your network devices by performing the following steps:

Steps

1. Turn off the computer.
2. Turn off the modem.
 **NOTE:** Some Internet service providers (ISPs) provide a modem and router combo device.
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 the 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 24. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	Dell Site
Contact Support	In Windows search, type <code>Contact Support</code> , and press Enter.
Online help for operating system	Windows Support Site Linux Support Site
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals, and documents.	Your Dell computer is uniquely identified using a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at Dell Support Site . For more information about how to find the Service Tag for your computer, see Locate the Service Tag on your computer .
Dell knowledge base articles	1. Go to Dell Support Site. 2. On the menu bar at the top of the Support page, select Support > Support Library. 3. In the Search field on the Support Library page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.

Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see [Contact Support at Dell Support Site](#).

 **NOTE:** Availability of the services may vary depending on the country or region, and product.

 **NOTE:** If you do not have an active Internet connection, you can find contact information in your purchase invoice, packing slip, bill, or Dell product catalog.

Revision history

Tracks all updates that are made to the document. It typically includes the date of change, version number, and a brief description of the modification. This log helps maintain transparency, accountability, and a clear timeline of progress.

Table 25. Revision history

Revision	Date	Description
A01	August 2026	Added support for a 500 W PSU.
A00	May 2026	Original publish date.