

Dell Pro Precision 9 T6

PW9T6260

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
Bottom stand	M3x5	4	 Figure 1. M3x5
Left-side cover	Captive screw	1	Not applicable
Right-side cover	6-32	2	 Figure 2. 6-32
Front-I/O module	• M2x4 (captive screw) • 6-32	• 2 • 5	 Figure 3. 6-32
Optical-drive bracket	M2	1	 Figure 4. M2
M.2 2230 SSD	Captive screw	2	Not applicable
M.2 2280 SSD	Captive screw	1	Not applicable
M.2 2280 SSD and carrier	• M3x3.5 • M2x3.5	• 6 • 1	Not applicable

Table 1. Screw list (continued)

Component	Screw type	Quantity	Screw image
Expansion rear hard drive door	M3	2	 Figure 5. M3
Expansion hard drive bay	M3x5	4	 Figure 6. M3x5
Expansion NVMe bay	M3x5	4	 Figure 7. M3x5
WLAN bracket	M2x3.5	1	 Figure 8. M2x3.5
Intrusion switch	M3x5	4	 Figure 9. M3x5
Heat-sink assembly	Captive screw	4	Not applicable
Front system-fan assembly	M3	2	 Figure 10. M3
Rear system-fan assembly	M3	2	 Figure 11. M3
Expansion NVMe bay fan	6-32	1	 Figure 12. 6-32
Expansion hard drive bay fan	6-32	1	 Figure 13. 6-32
Expansion riser fan	M3	1	 Figure 14. M3

Table 1. Screw list (continued)

Component	Screw type	Quantity	Screw image
Graphics card end-holder	Captive screws	2	Not applicable
Graphics card	M3x5	1	 Figure 15. M3x5
Powered graphics card	M3x5	2	 Figure 16. M3x5
Air shroud hard drive fan	M3x5	3	 Figure 17. M3x5
Power-distribution board	6-32 - M3x5	3 4	 Figure 18. 6-32  Figure 19. M3x5
Front SATA/SAS hard drive module	6-32	4	 Figure 20. 6-32
HEPCB board	M3	4	 Figure 21. M3
EXPA board assembly	Captive screws	4	Not applicable
EXPA board	6-32	5	 Figure 22. 6-32
SD-card reader	Captive screw	1	Not applicable

Table 1. Screw list (continued)

Component	Screw type	Quantity	Screw image
Rear SATA/SAS module	6-32	2	 Figure 23. 6-32
System board	6-32	14	 Figure 24. 6-32
Bottom air-shroud	M3	7	 Figure 25. M3

Major components of Dell Pro Precision 9 T6 PW9T6260

The following image shows the major components of Dell Pro Precision 9 T6 PW9T6260.

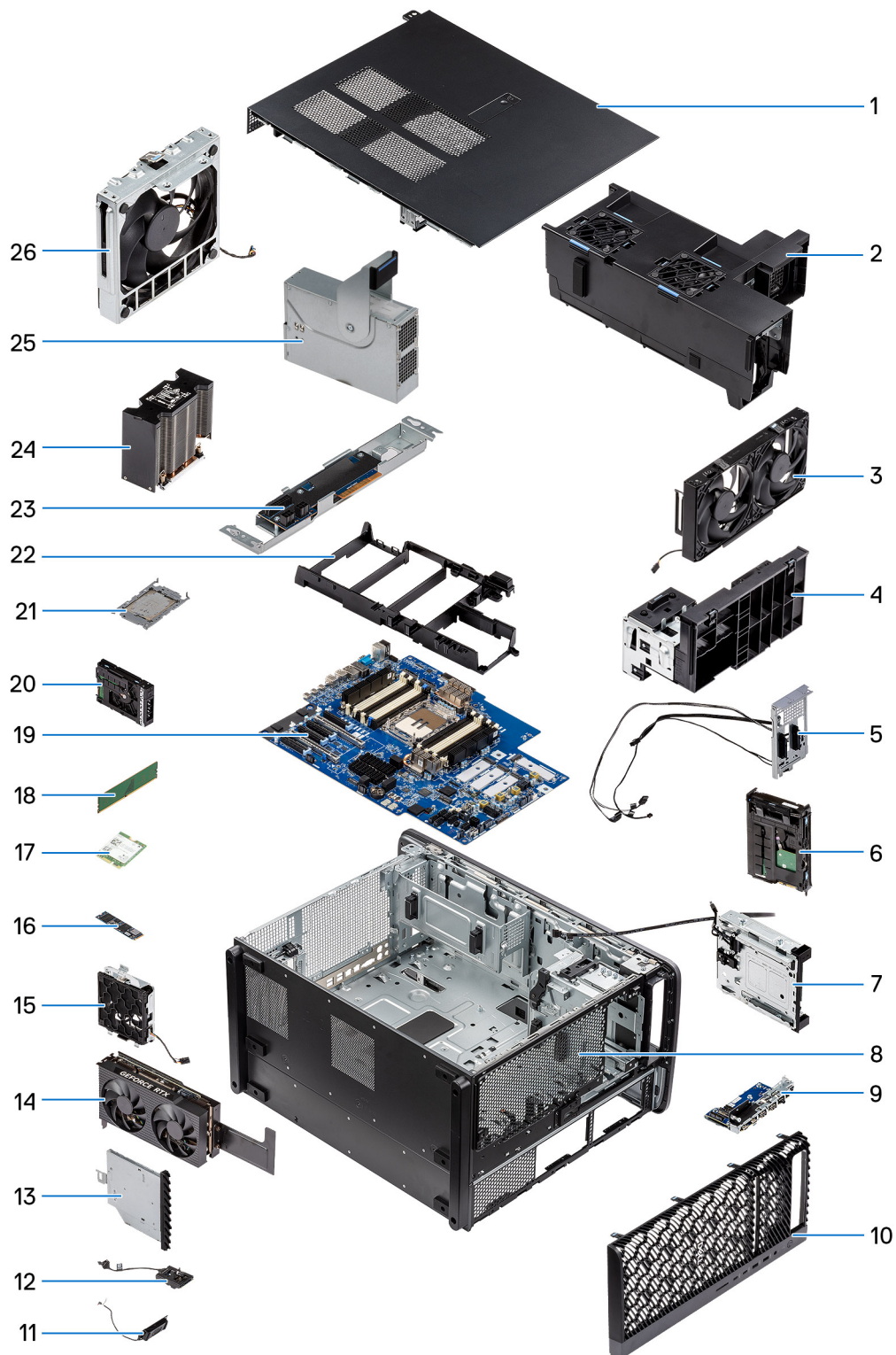


Figure 26. Major components of Dell Pro Precision 9 T6 PW9T6260 (Base side)

1. Left side cover
2. Top air shroud
3. Front system fan assembly
4. Graphics card end holder
5. Hard drive backplane assembly
6. Internal hard drive assembly
7. Hard drive bay

8. Computer chassis
9. Front I/O board
10. Main bezel
11. Internal speaker
12. SD-card reader
13. Optical drive
14. Graphics card
15. Bottom system fan
16. Solid state drive
17. Wireless card
18. Memory module
19. System board
20. External hard drive assembly
21. Processor
22. Bottom air shroud
23. Power-distribution board
24. Heat-sink assembly
25. Power supply unit
26. Rear system fan

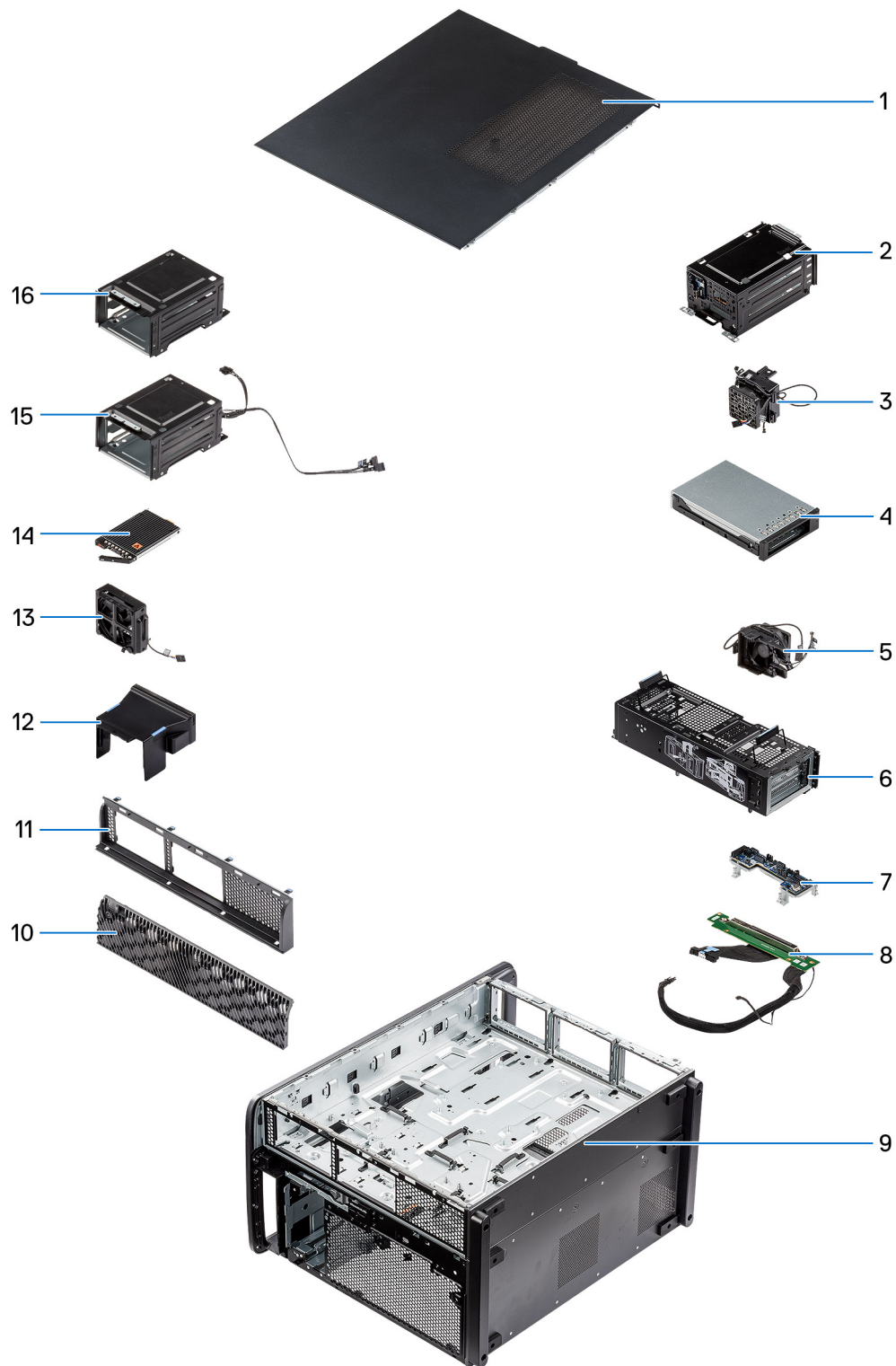


Figure 27. Major components of Dell Pro Precision 9 T6 PW9T6260 (Expansion side)

1. Right side cover
2. Rear NVMe console
3. NVMe fan and backplane module
4. NVMe module
5. Flexbay-fan module
6. Riser box
7. EXPA board assembly

8. HEPCB board
9. Computer chassis
10. Expansion bezel
11. Expansion bezel door
12. Riser air duct
13. Riser fan
14. M.2/E3.S SSD carrier
15. Hard drive mid console
16. Hard drive upper console

i 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

Table 2. CRU/FRU list

Dell Pro Precision 9 T6 PW9T6260	CRU component	FRU component
Left-side cover		
Right-side cover		
Front bezel		
Expansion main bezel		
Slim ODD, cable, and bezel		
Front 3.5-inch hard drive, carrier, cable, and bezel		
Front NVMe module		
Air shroud		
Internal 3.5-inch hard drive, carrier, and cable		
Onboard M.2 SSD 2230/2280		
Onboard M.2 SSD heat-sink		

Table 2. CRU/FRU list (continued)

Dell Pro Precision 9 T6 PW9T6260	CRU component	FRU component
Wireless card		
Wireless external puck antenna		
Memory modules		
Graphics card		
Graphics card middle-holder		
Graphics card power-cable		
PCIe Expansion cards		
Intrusion switch and cable		
Coin-cell battery		
Power-supply unit and cables		
Front upper and lower chassis fan		
Rear chassis fan		
Expansion air shroud		
Expansion riser fan		
Expansion rear hard drive door		
Expansion riser module		

Table 2. CRU/FRU list (continued)

Dell Pro Precision 9 T6 PW9T6260	CRU component	FRU component
Expansion hard drive bay fan		
Expansion NVMe bay fan		
HEPCB board		
EXPA board		
Internal speaker		
Front NVMe fan module		
Memory fan within air shroud		
Processor heat-sink		
Processor		
SD-card reader		
System board		

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.

Bottom stand

Removing the bottom stand

Prerequisites

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

About this task

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



4x
M3x5

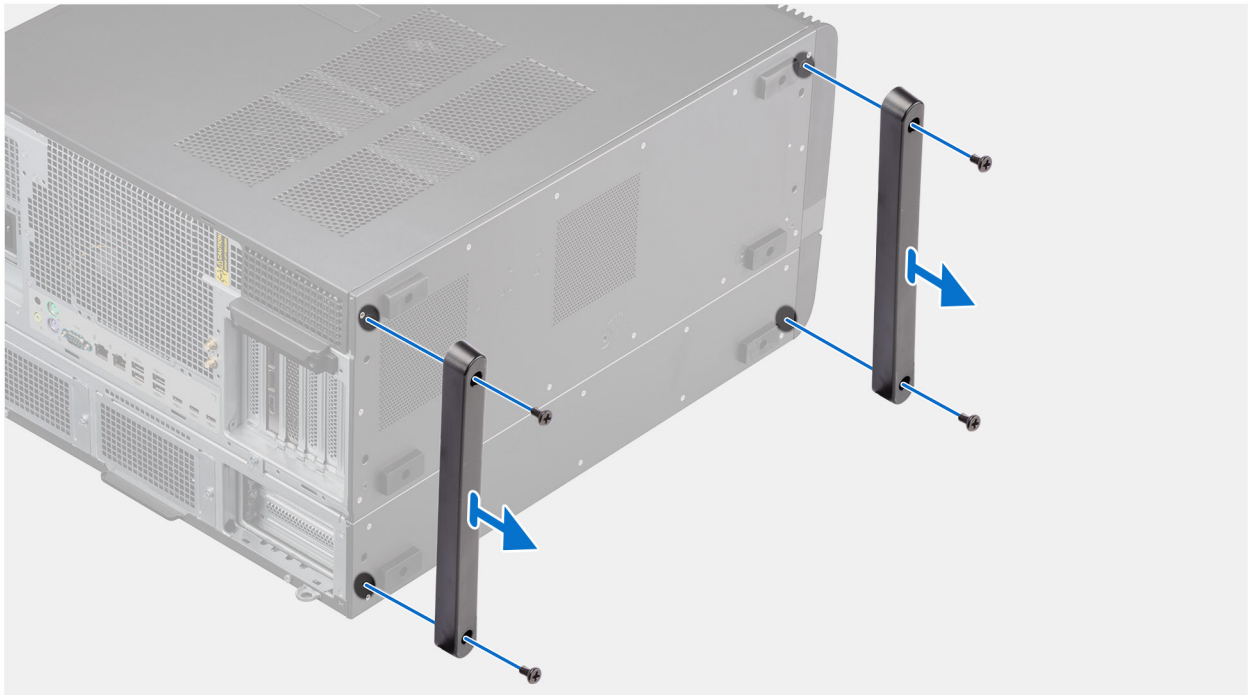


Figure 28. Removing the bottom stand

Steps

1. Remove the four screws (M3x5) that secure the bottom stand to the computer.
2. Remove the bottom stand from the computer.

Installing the bottom stand

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 bottom stand and provide a visual representation of the installation procedure.



4x
M3x5

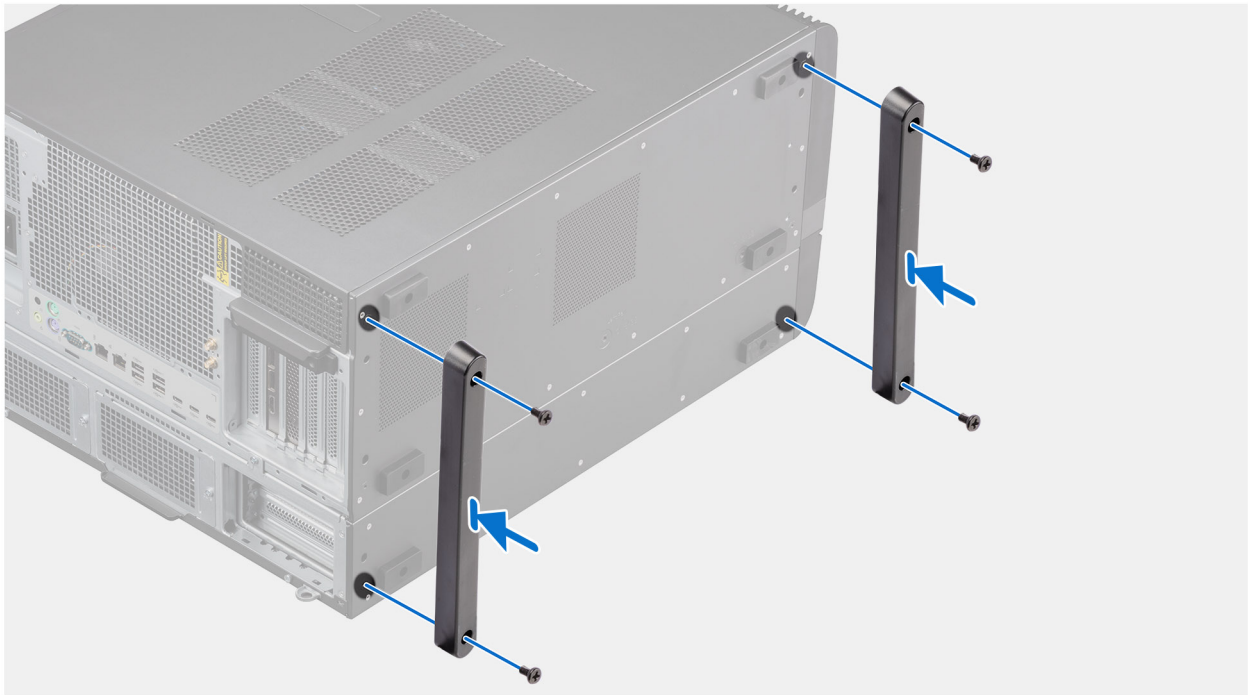


Figure 29. Installing the bottom stand

Steps

1. Align and place the bottom stand on the base of the computer.
2. Replace the four screws (M3x5) to secure the bottom stand to the computer.

Next steps

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

Side cover

Removing the left 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 left side cover and provide a visual representation of the removal procedure.



Figure 30. Removing the side cover

Steps

1. Unlock the left side cover latch using a Phillips screwdriver.
2. Press to open the latch of the left side cover.
3. Pull the release latch to release the left side cover from the computer.
4. Open the left side cover at an angle and lift the cover away from the chassis.

Installing the left 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 left side cover and provide a visual representation of the installation procedure.

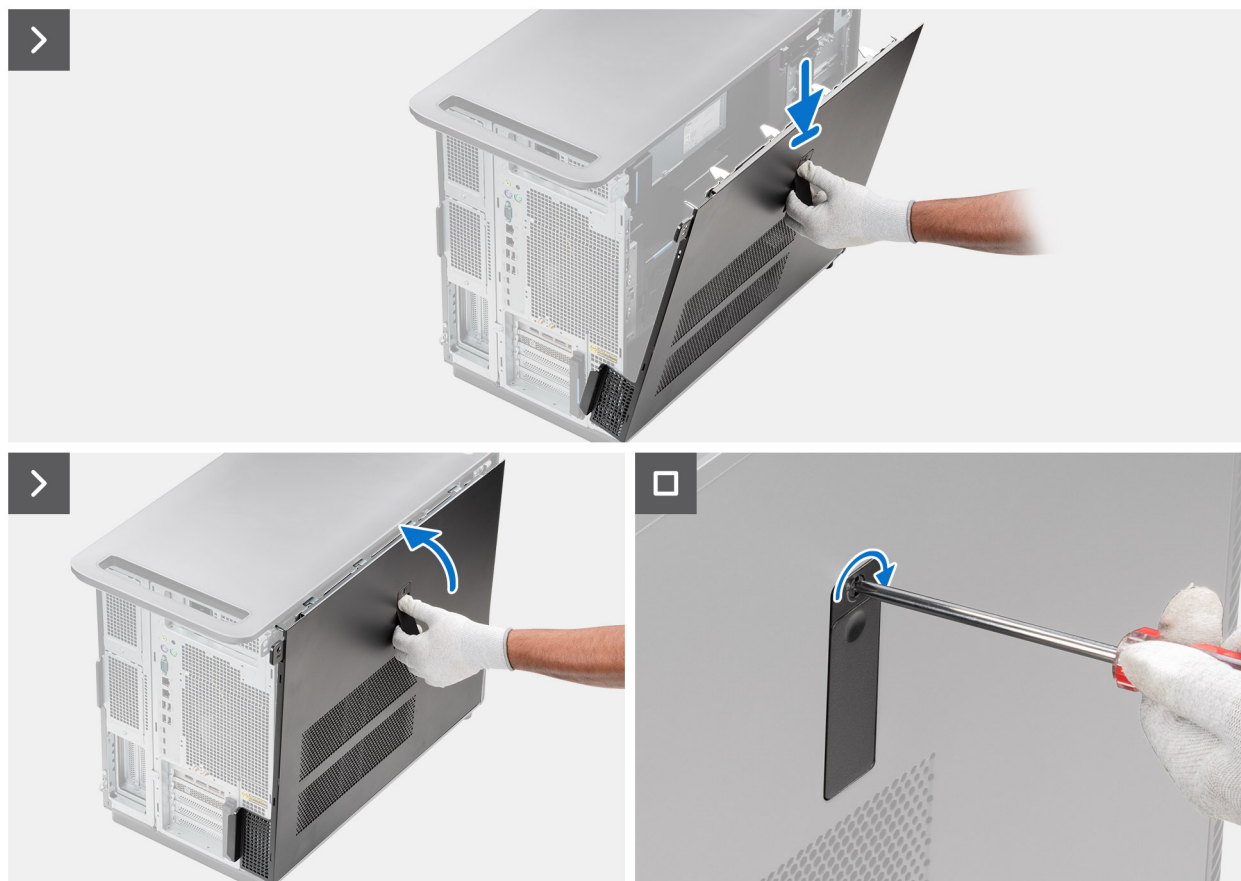


Figure 31. Installing the side cover

Steps

1. Holding the left side cover handle, align and place the tabs on the side cover with the slots on the chassis.
2. Press the left side cover into the side of the computer to install it.
3. To set the side-panel latch to the locked position, use a Phillips screwdriver to turn the left side cover latch to the locked position.

Next steps

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

Removing the right 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 right side cover and provide a visual representation of the removal procedure.



2x
#6-32

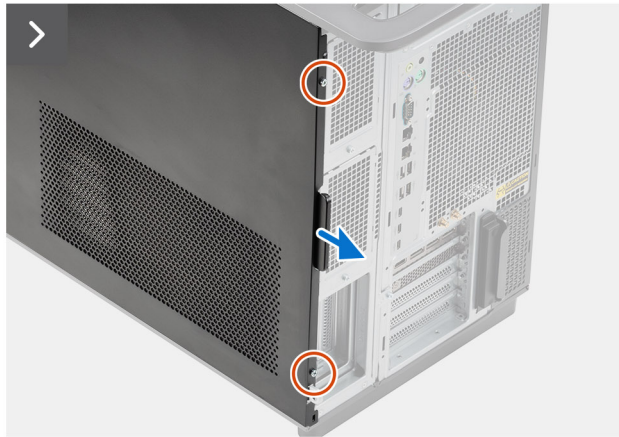


Figure 32. Removing the side cover

Steps

1. Remove the two screws (#6-32) that secure the right side cover to the chassis.
2. Slide and remove the right side cover from the computer.

Installing the right 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 right side cover and provide a visual representation of the installation procedure.



2x
#6-32

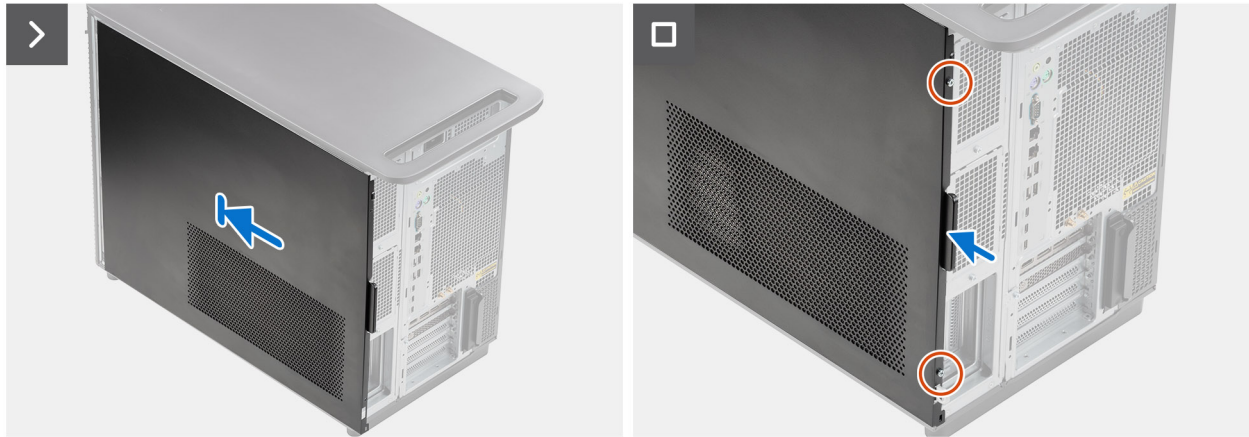


Figure 33. Installing the right side cover

Steps

1. Align and slide the right side cover into the chassis.
2. Press the right side cover into the side of the computer to install it.
3. Replace the two screws (#6-32) to secure the right side cover to the chassis.

Next steps

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

Expansion bezel

Removing the expansion bezel

Prerequisites

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

About this task

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

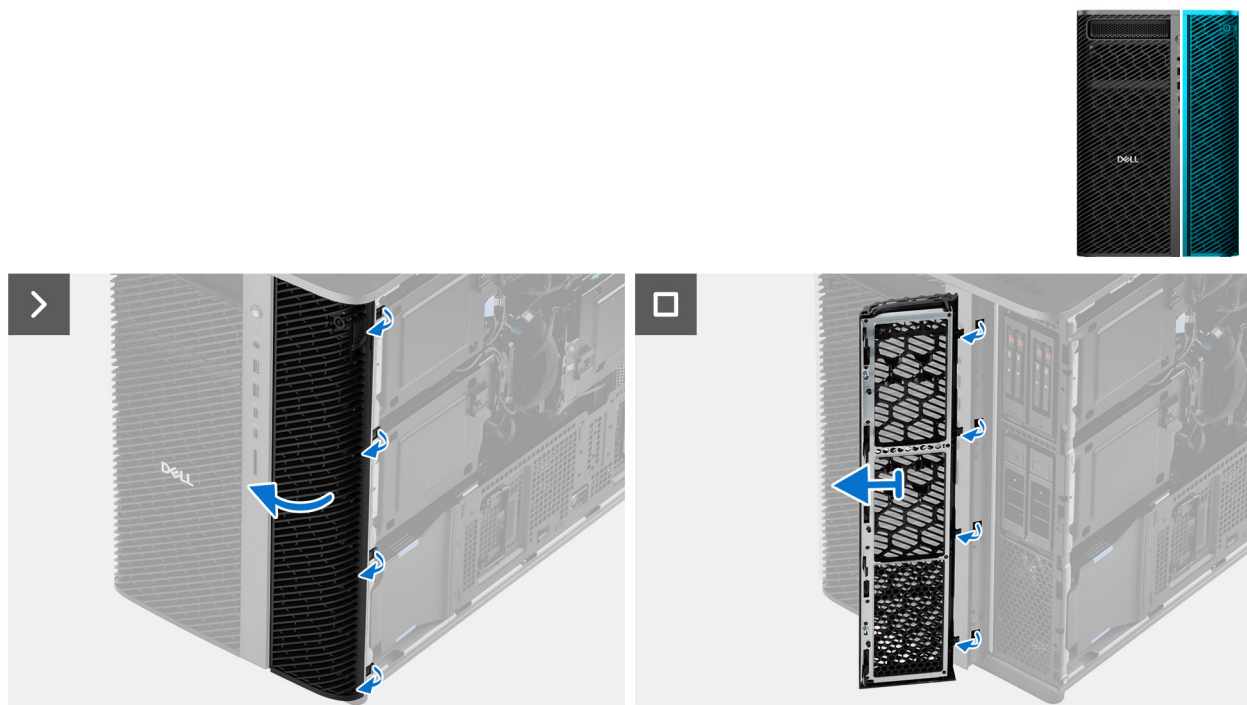


Figure 34. Removing the expansion bezel

Steps

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

Installing the expansion 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 expansion bezel and provide a visual representation of the installation procedure.

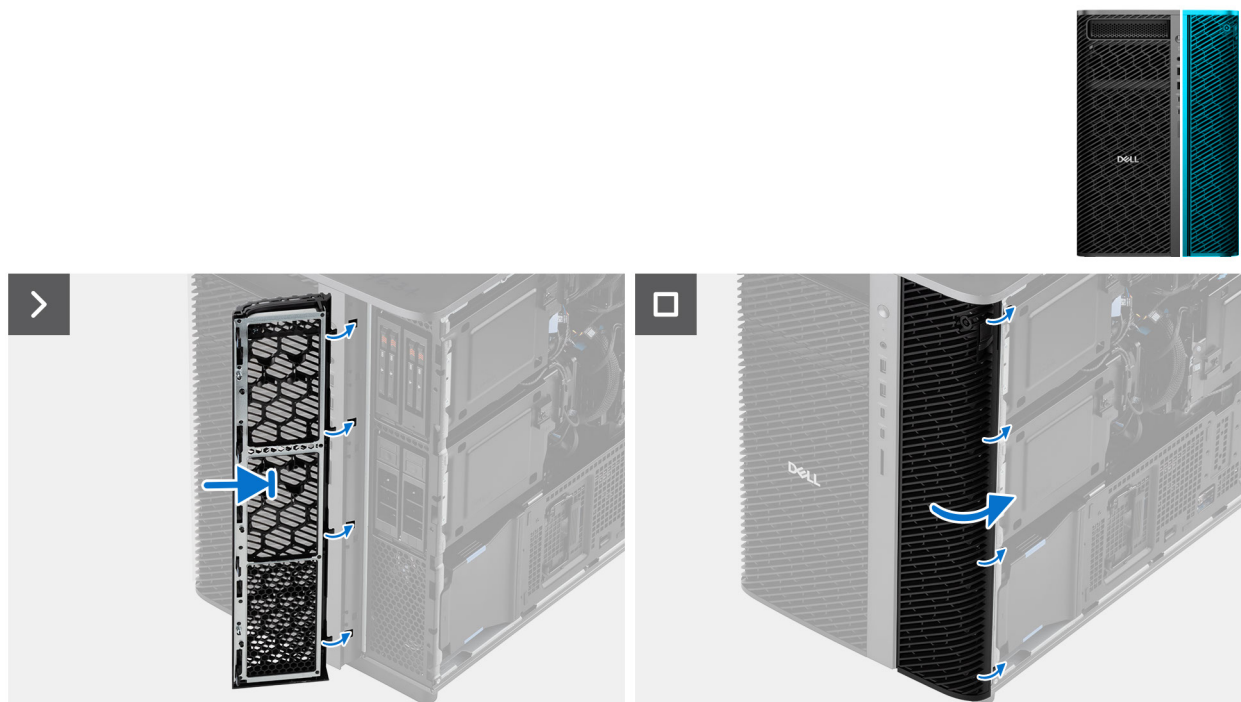


Figure 35. Installing the expansion bezel

Steps

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

Next steps

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

Main bezel

Removing the main bezel

Prerequisites

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

About this task

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

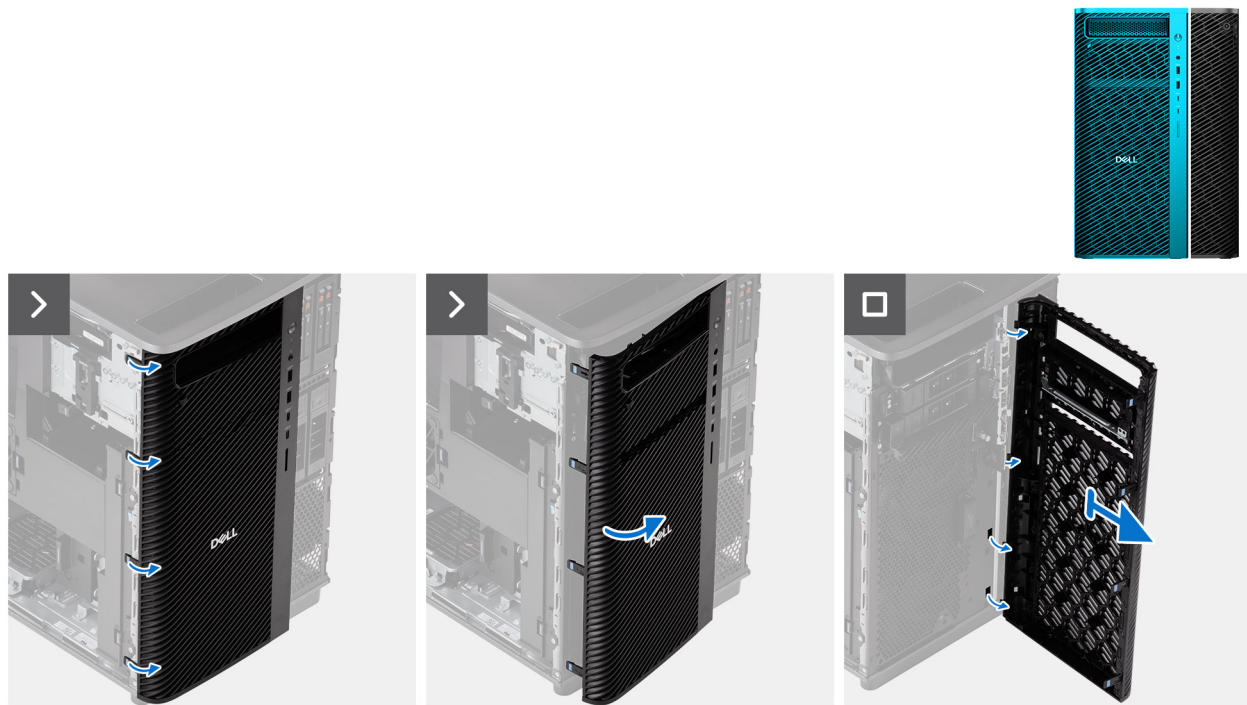


Figure 36. Removing the main bezel

Steps

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

Installing the main 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 main bezel and provide a visual representation of the installation procedure.

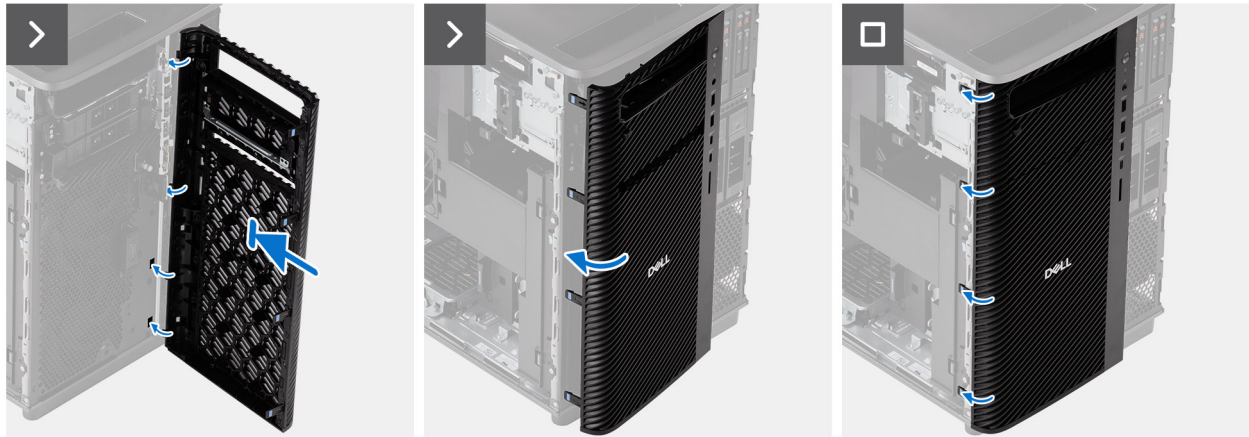


Figure 37. Installing the main bezel

Steps

1. Position the main 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 [expansion bezel](#).
2. Install the [right side cover](#).
3. Install the [left side cover](#).
4. 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 [left side cover](#).

About this task

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

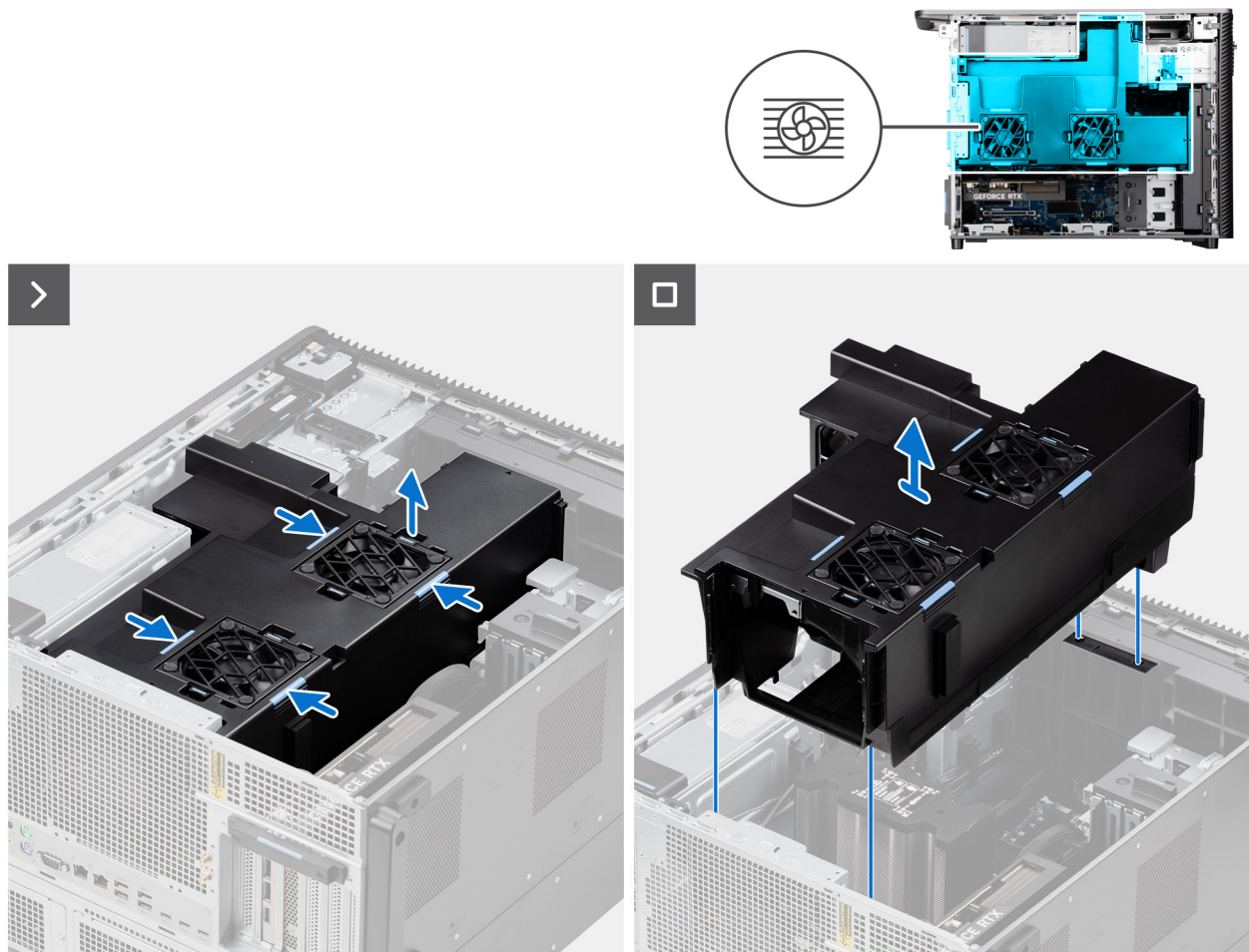


Figure 38. Removing the air shroud

Steps

1. Hold the air shroud on the gripping points.
2. Lift the air shroud 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.

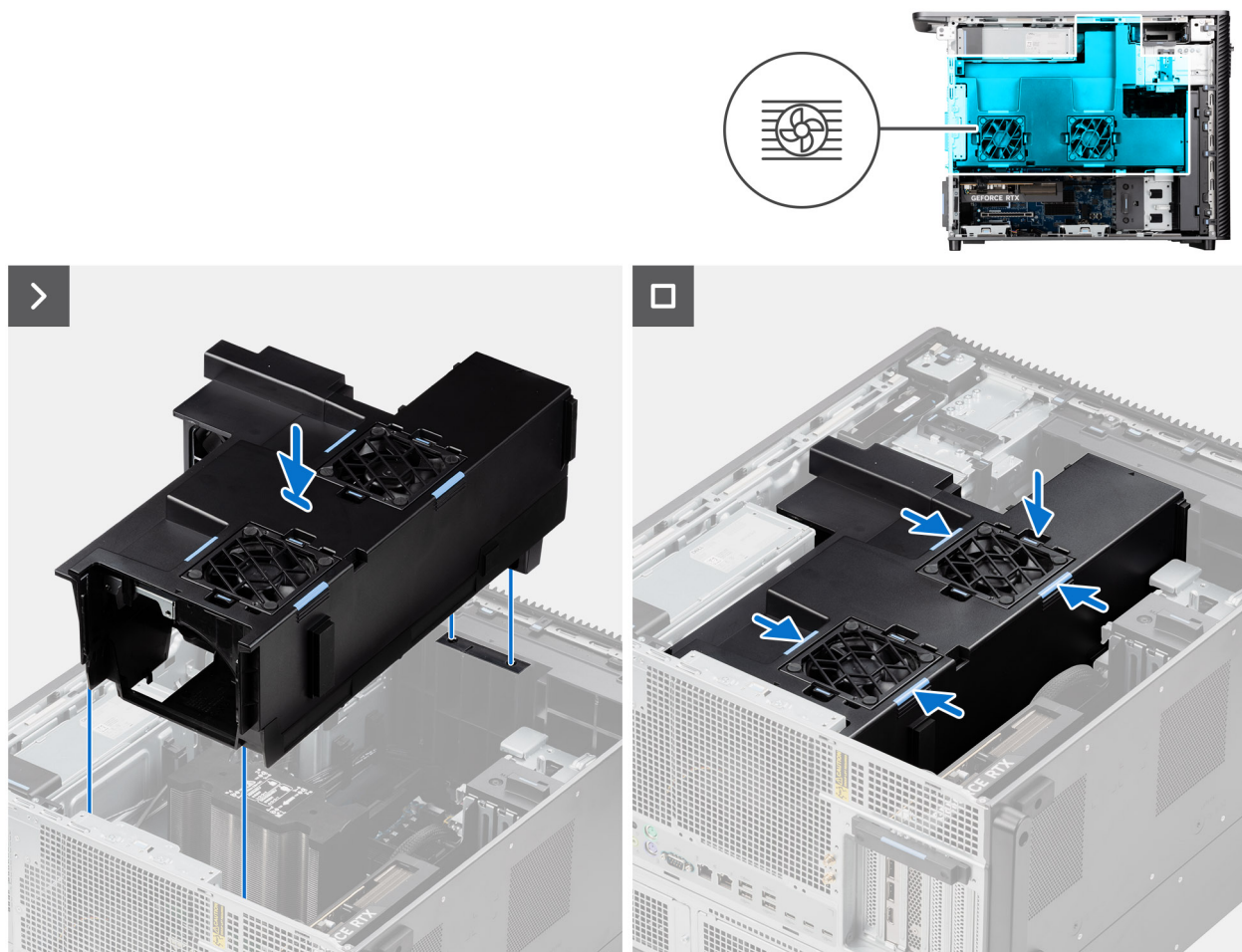


Figure 39. Installing the air shroud

Steps

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

Next steps

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

Removing the riser air shroud

Prerequisites

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

About this task

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

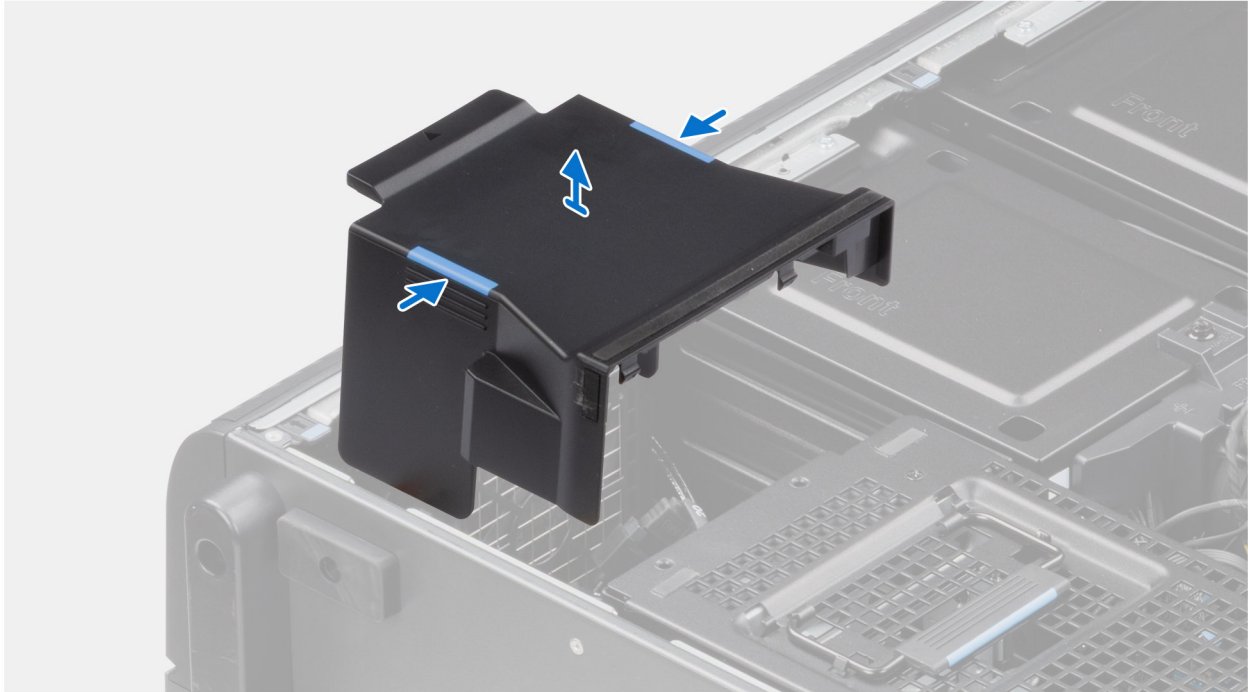
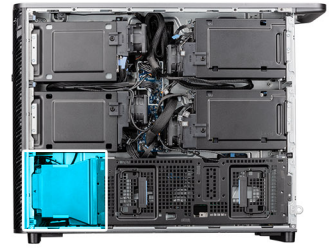


Figure 40. Removing the riser air shroud

Steps

1. Hold the air shroud on the gripping points.
2. Lift the air shroud out of the computer.

Installing the riser air shroud

Prerequisites

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

About this task

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

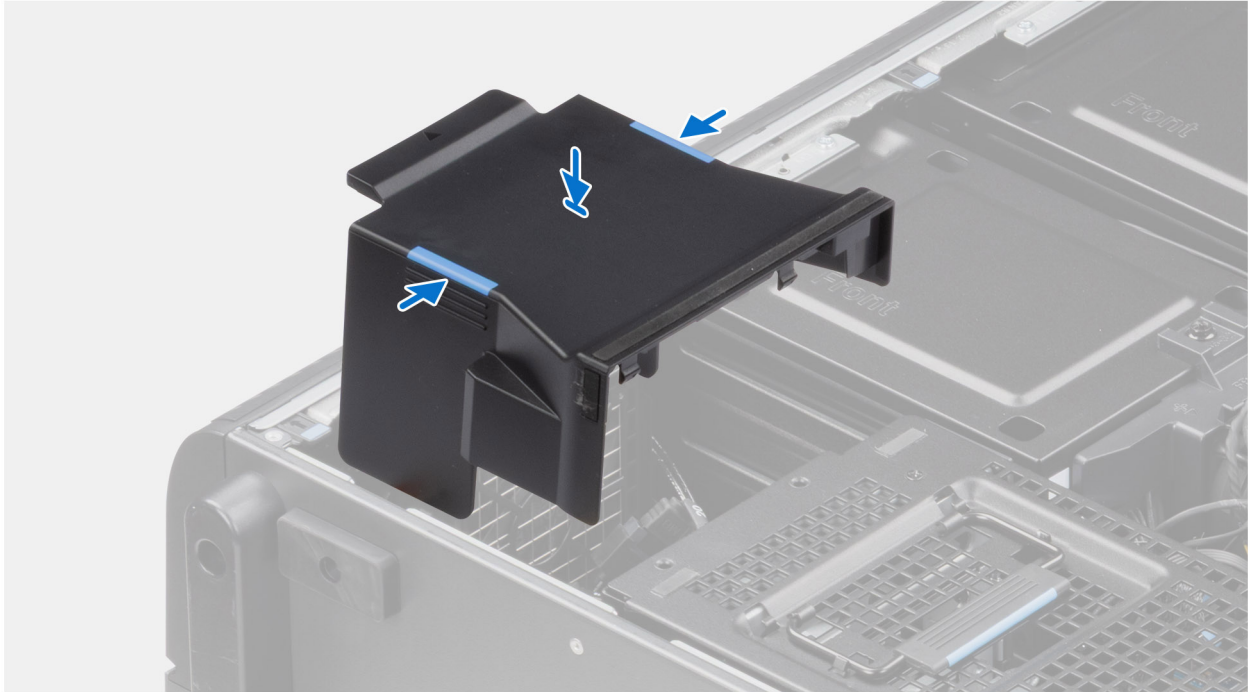
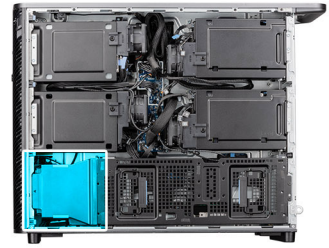


Figure 41. Installing the air shroud

Steps

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

Next steps

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

Air shroud fans

Removing the air shroud fans

Prerequisites

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

About this task

The following images indicate the location of the air shroud fans and provide a visual representation of the removal procedure.



3x
M3x5

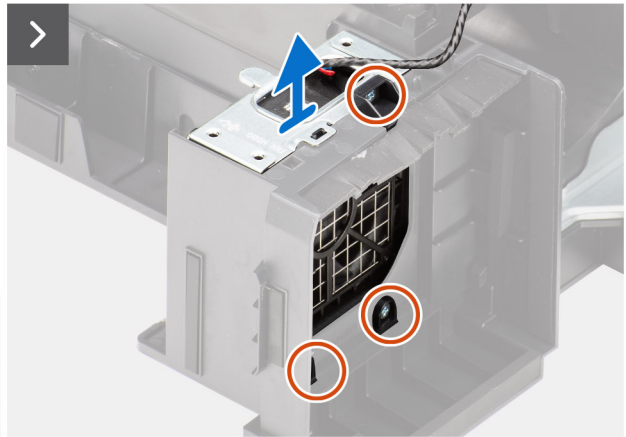
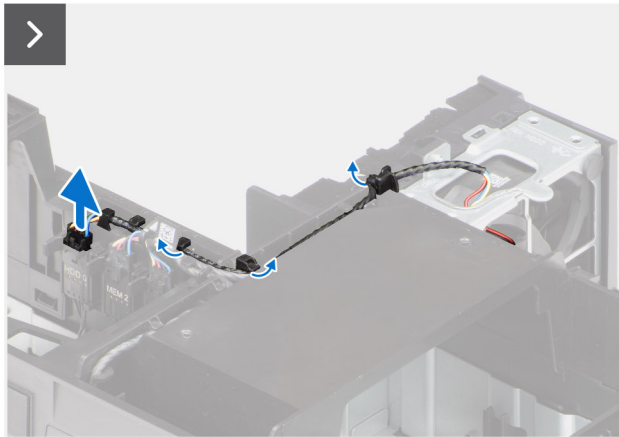
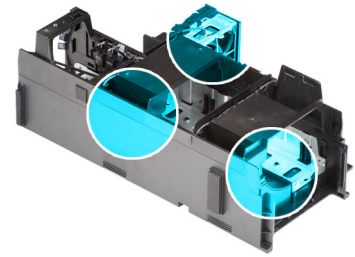


Figure 42. Removing the air shroud fans

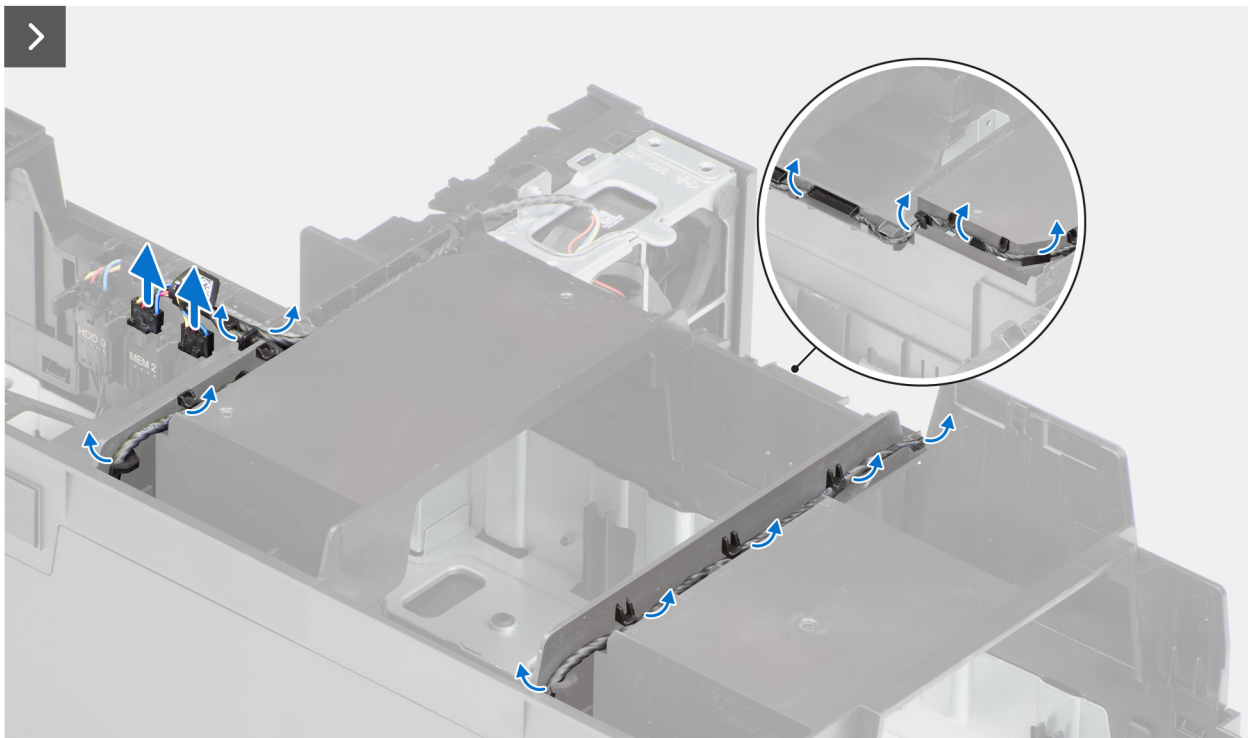


Figure 43. Removing the air shroud fans



Figure 44. Removing the air shroud fans

Steps

1. Disconnect the hard drive-fan cable from the connector on the air shroud.
2. Unroute the hard drive-fan cable from the routing guides on the air shroud.
3. Remove the three screws (M3x5) that secures the hard drive fan to the air shroud.
4. Lift the hard drive-fan out of the air shroud.
5. Disconnect the memory-fan cable from the connector on the air shroud.
6. Unroute the memory-fan cable from the routing guides on the air shroud.
7. Press and hold the releasing clip on both the sides of the fan modules to release the fans from the slots.
8. Lift the memory-fans out of the air shroud.

Installing the air shroud fans

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 air shroud fans and provide a visual representation of the installation procedure.



3x
M3x5

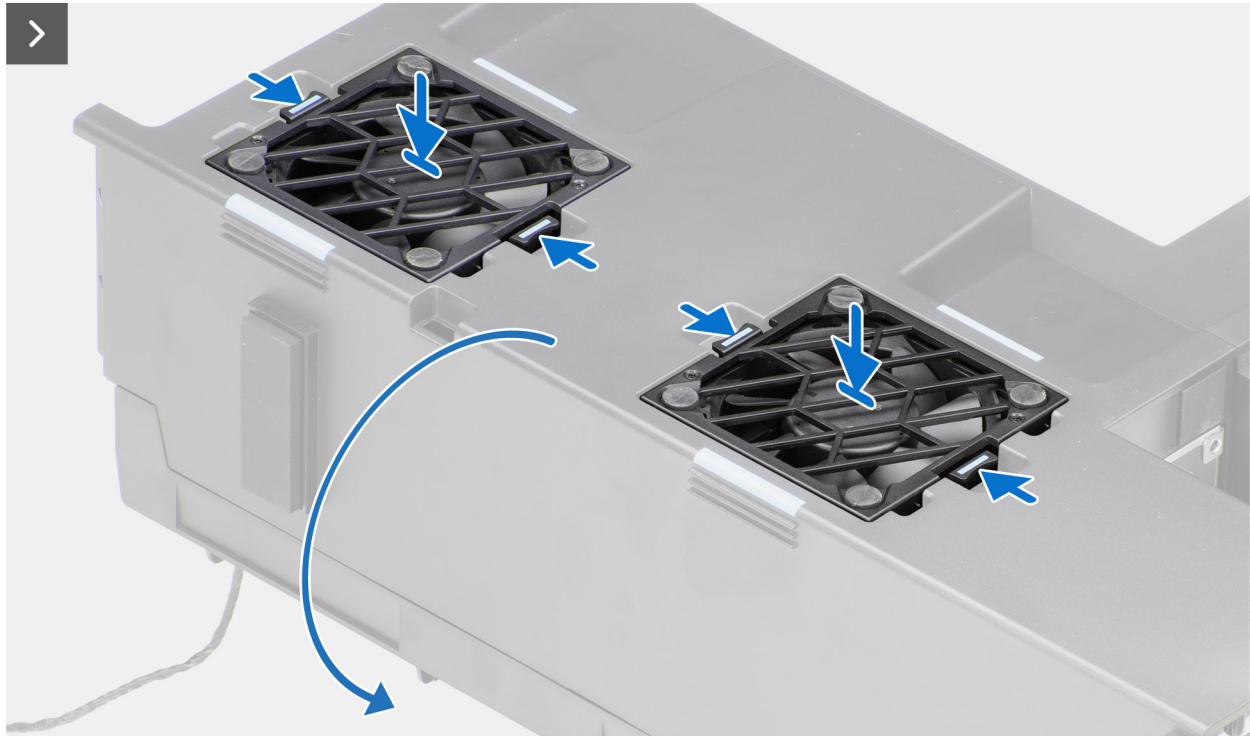
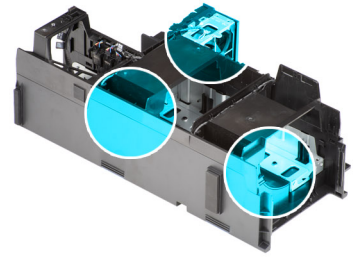


Figure 45. Removing the air shroud fans

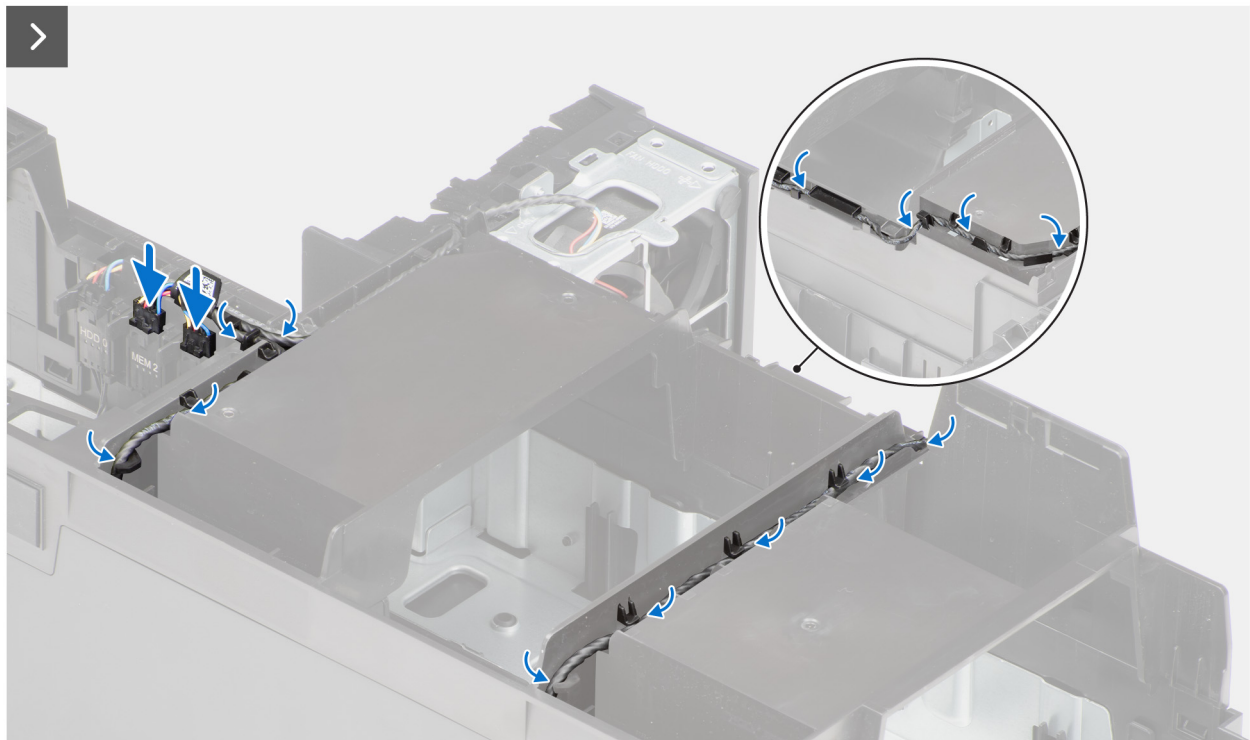


Figure 46. Removing the air shroud fans

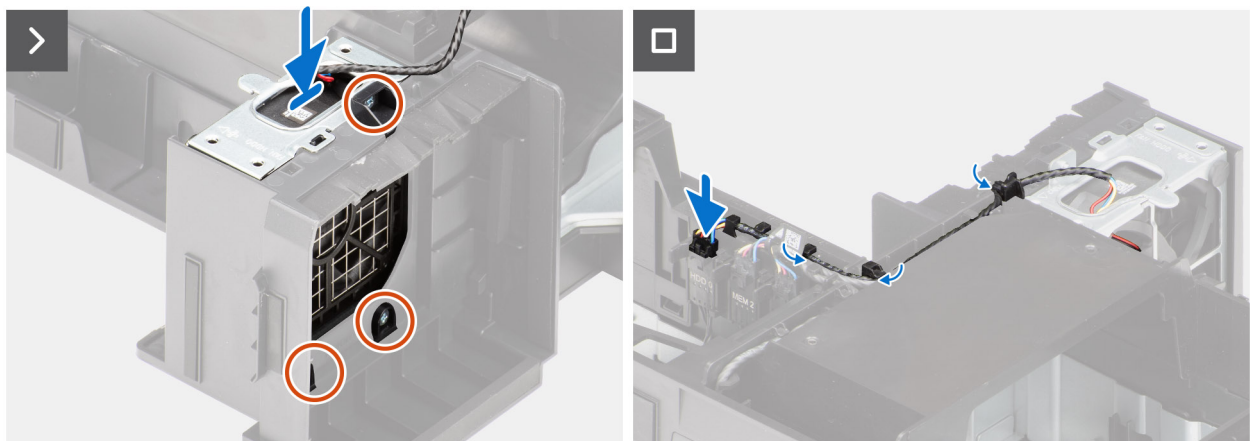


Figure 47. Removing the air shroud fans

Steps

1. Align and place the memory-fans in the slots on the air shroud.
2. Push the memory-fans down until it clicks into place.
3. Route the memory-fan cable through the routing guides on the air shroud.
4. Connect the memory-fan cable to the connectors on the air shroud.
5. Align and slide the hard drive-fan in its slot on the air shroud.
6. Replace the three screws (M3x5) that secures the hard drive-fan to the air shroud.
7. Route the hard drive-fan cables through the routing guides on the air shroud.
8. Connect the hard drive-fan cable to the connector on the air shroud.

Next steps

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

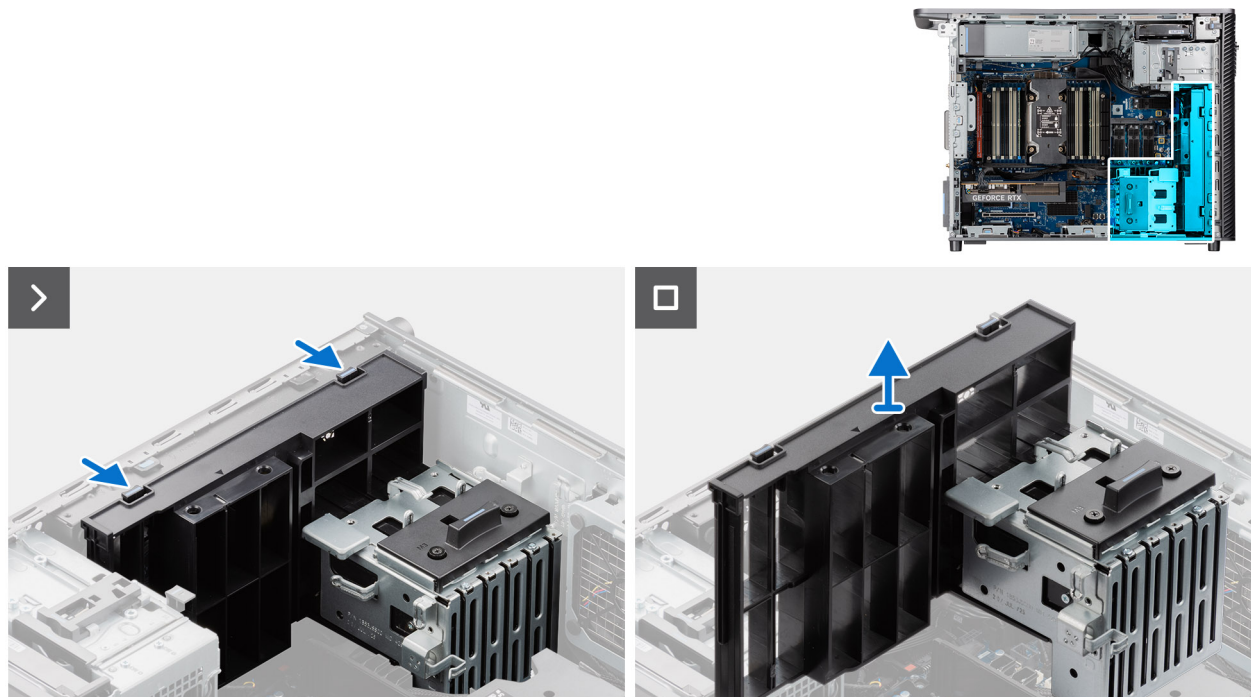


Figure 48. Removing the graphics-card end holder

Steps

1. Push the latch to unlock position on the graphics-card end holder.
2. Slide the graphics-card end holder and lift it out of 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.

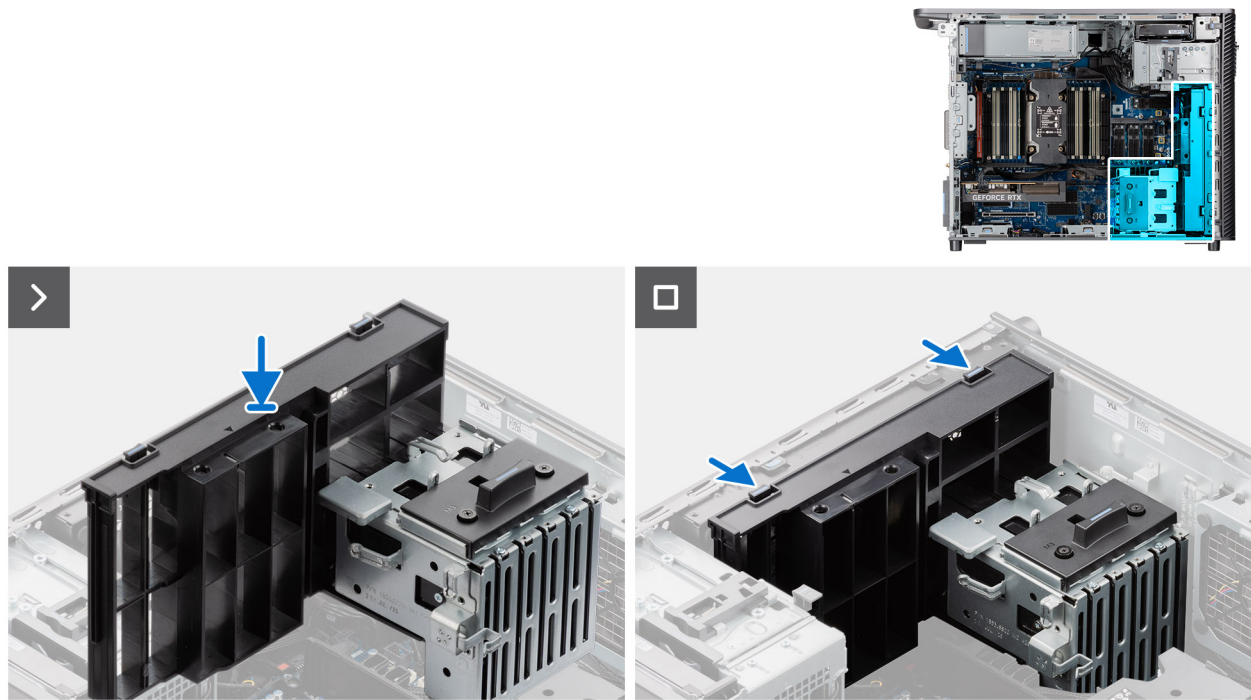


Figure 49. Installing the graphics-card end holder

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 clicks and is fully seated in the chassis.
3. Slide the latch to lock position on the graphics-card end holder.

Next steps

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

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.

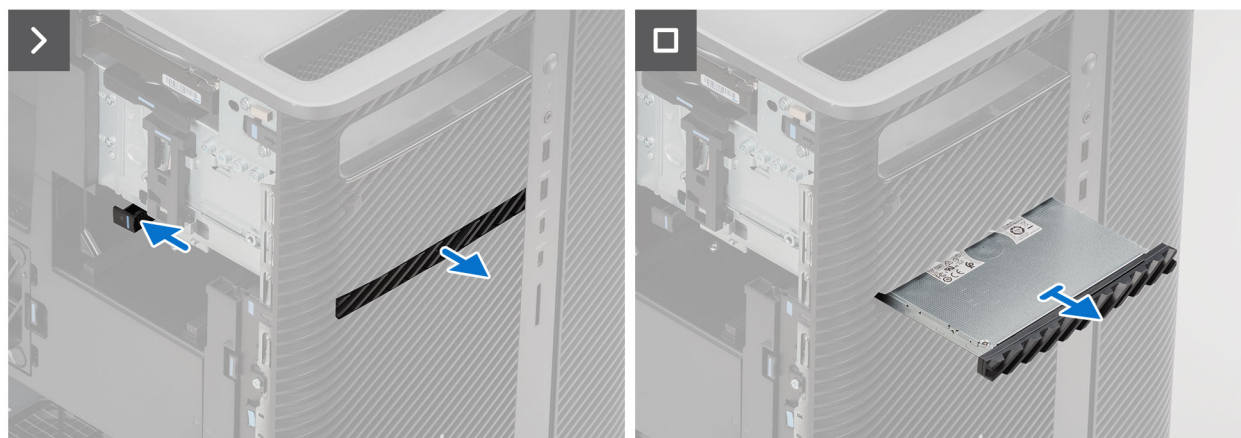
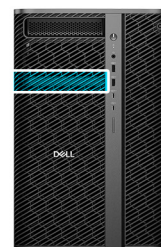


Figure 50. Removing the optical drive

Steps

1. Press the securing tab to release the optical drive from the drive bay.
2. 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.

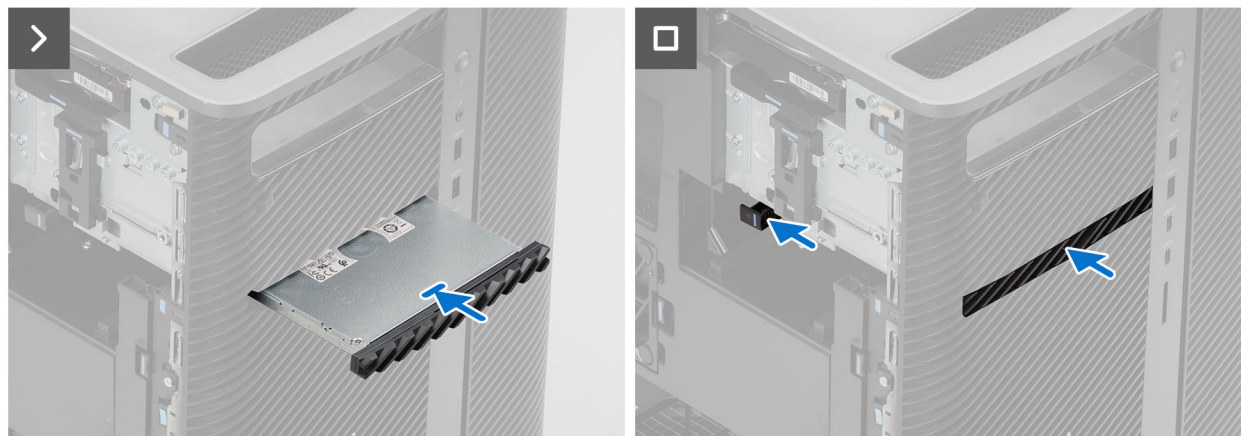
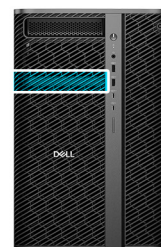


Figure 51. Installing the optical drive

Steps

Slide the optical drive into the drive bay until the optical drive clicks into place.

Next steps

1. Install the [left side cover](#).
2. 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 [left side cover](#).
3. Remove the [optical drive](#).

About this task

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



1x
M2



Figure 52. Removing the optical-drive bezel

Steps

1. Remove the screw (M2) that secures the optical-drive bracket to the optical drive.
2. Slide the optical-drive 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.



1x
M2

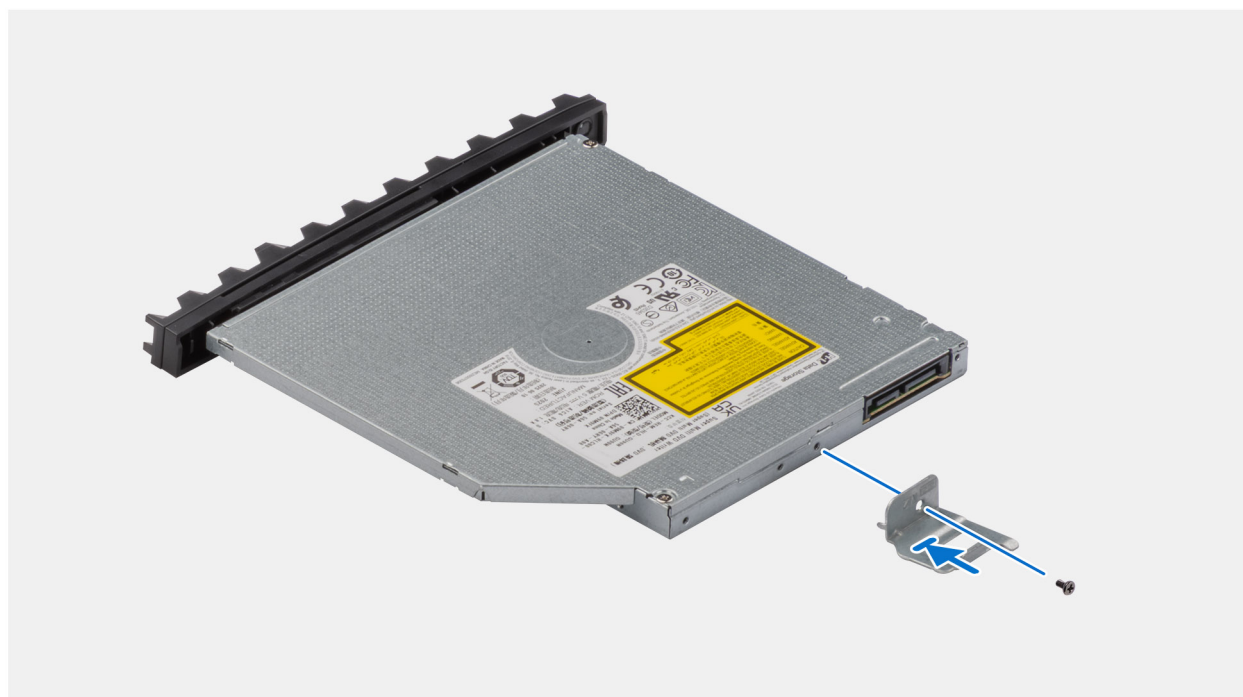


Figure 53. Installing the optical-drive bezel

Steps

1. Align and place the tabs on the bracket with the slots on the optical drive.
2. Replace the screw (M2) to secure the optical-drive bracket to the optical drive.

Next steps

1. Install the [optical drive](#).
2. Install the [left side cover](#).
3. 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 [left 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.

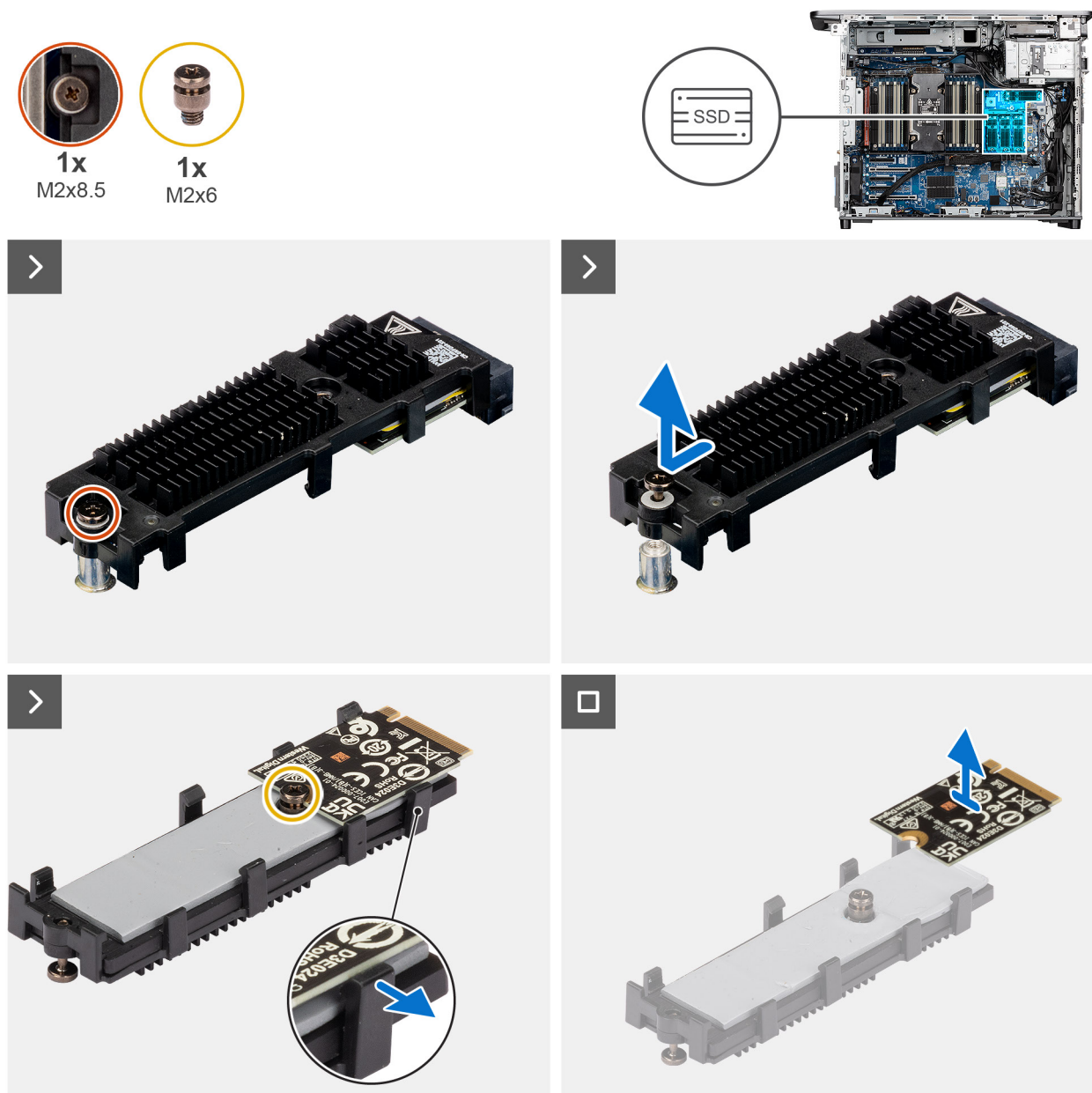


Figure 54. Removing the onboard M.2 2230 SSD

Steps

1. Loosen the captive 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-0, SSD-1, SSD-2, and SSD-3 slots.

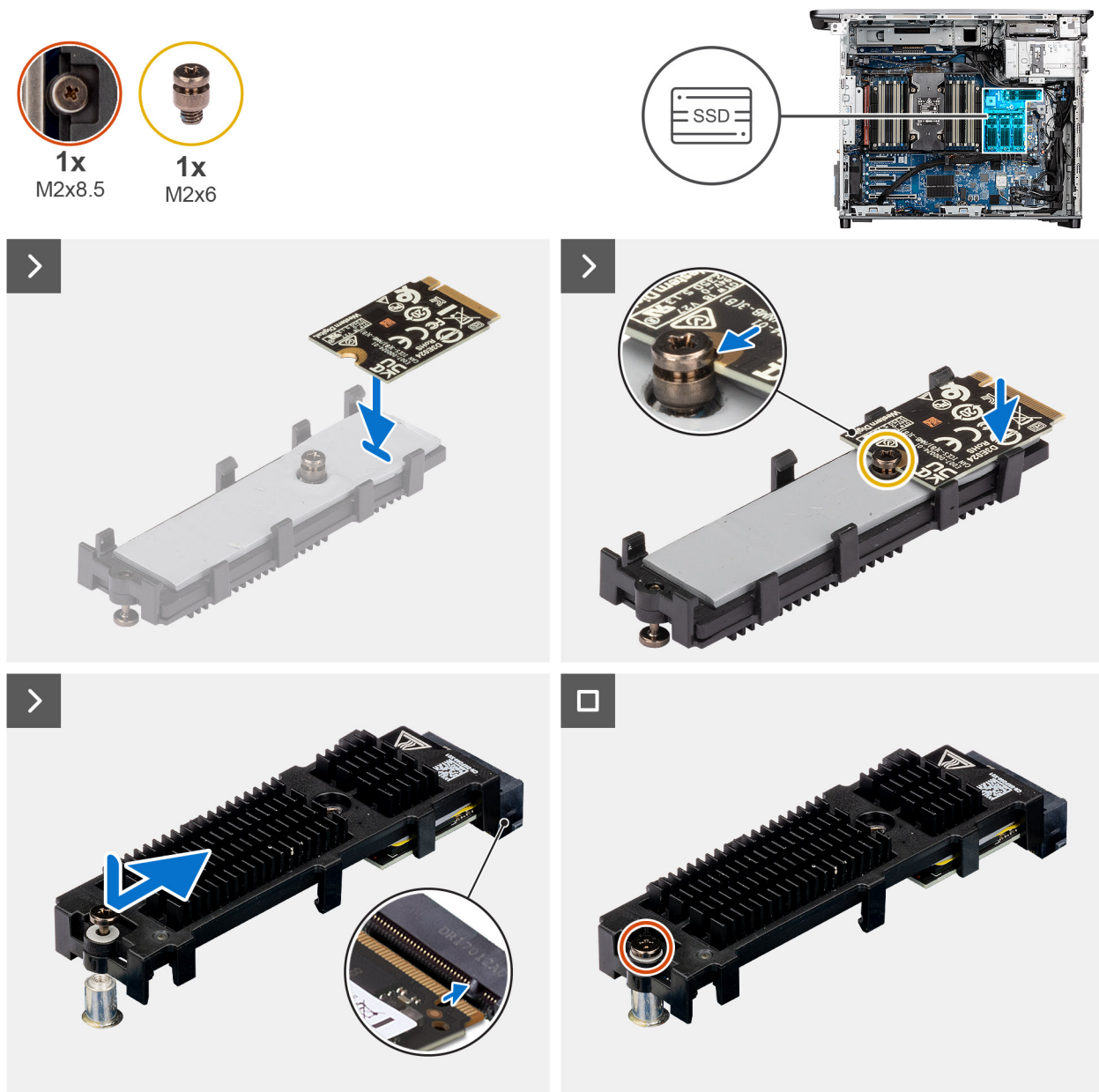


Figure 55. Installing the onboard M.2 2230 SSD

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 with a M.2 2230 SSD, ensure that the screw is fastened back to the heat sink.

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

Next steps

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

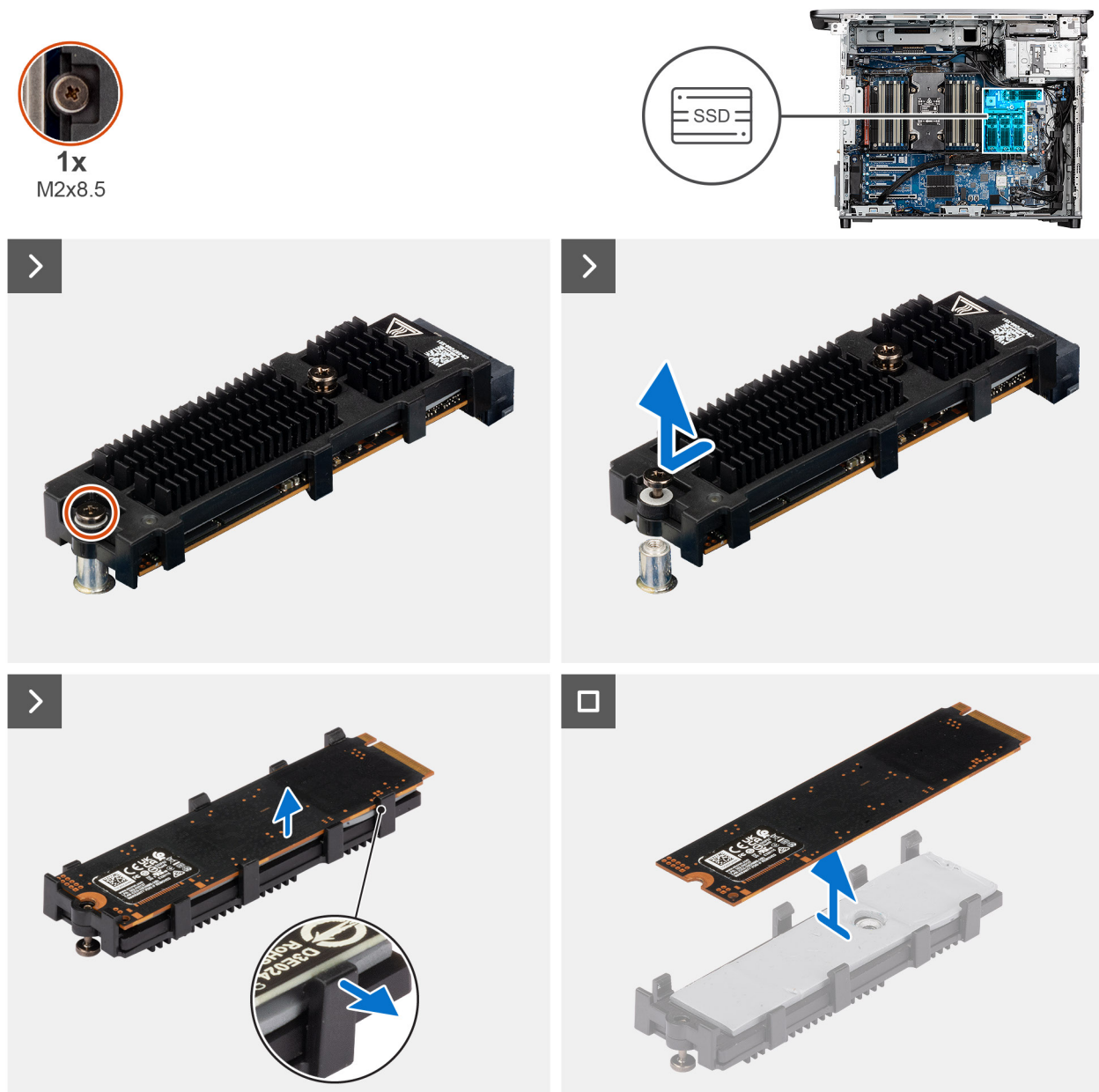


Figure 56. Removing the onboard M.2 2280 SSD

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

 **NOTE:** Follow the below procedures for installing SSD on SSD-0, SSD-1, SSD-2, and SSD-3 slots.

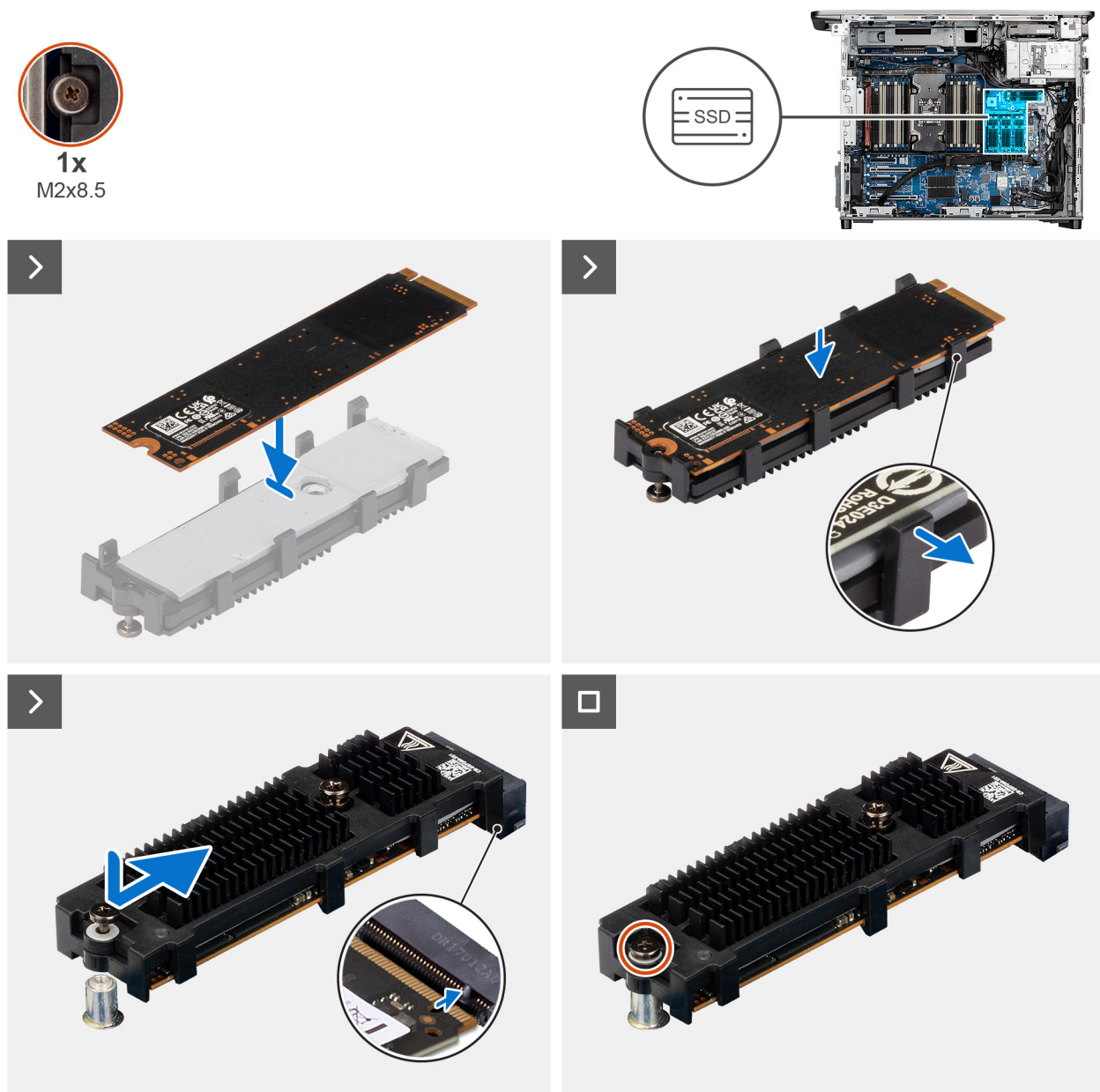


Figure 57. Installing the onboard M.2 2280 SSD

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

Hard drive

Removing the internal 3.5-inch hard drive assembly

Prerequisites

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

About this task

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

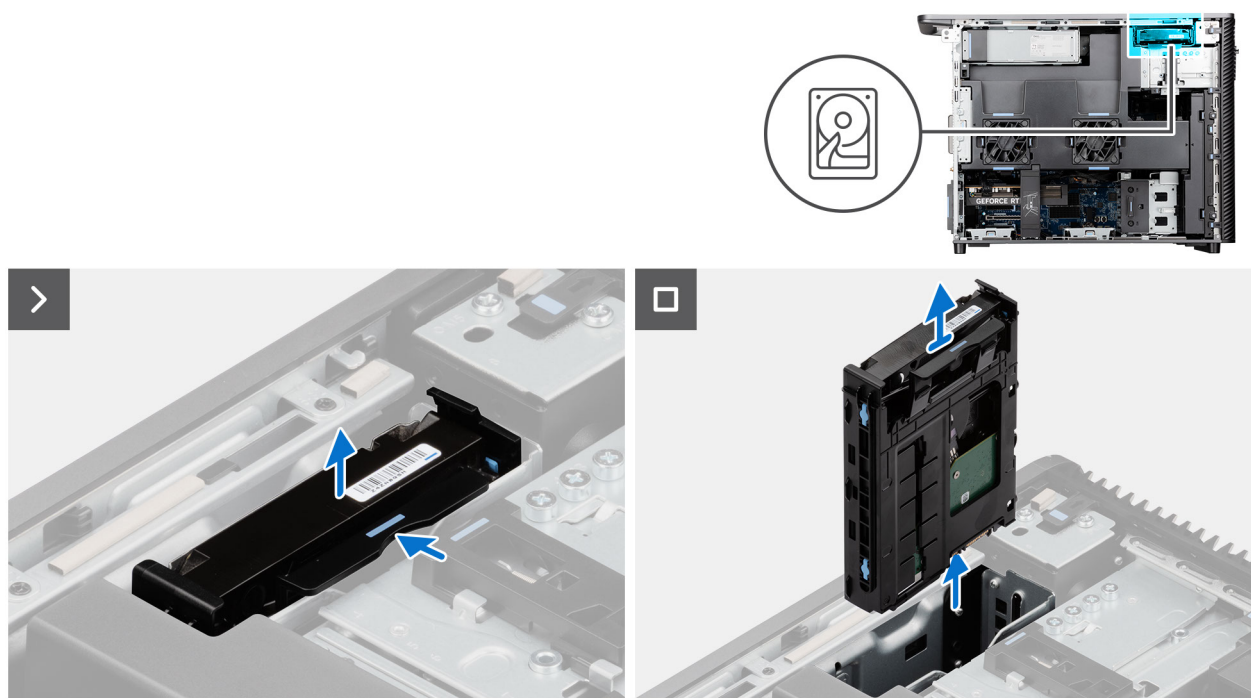


Figure 58. Removing the internal 3.5-inch hard drive assembly

Steps

1. Press the securing tabs to release the hard drive assembly from the chassis.
2. Slide the hard drive assembly away from the bay1.

Removing the internal hard drive carrier

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [internal 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 59. Removing the 3.5-inch hard drive bracket

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 internal hard drive carrier.

Installing the internal 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 internal hard drive carrier and provide a visual representation of the installation procedure.



Figure 60. Installing the 3.5-inch hard drive bracket

Steps

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

Next steps

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

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

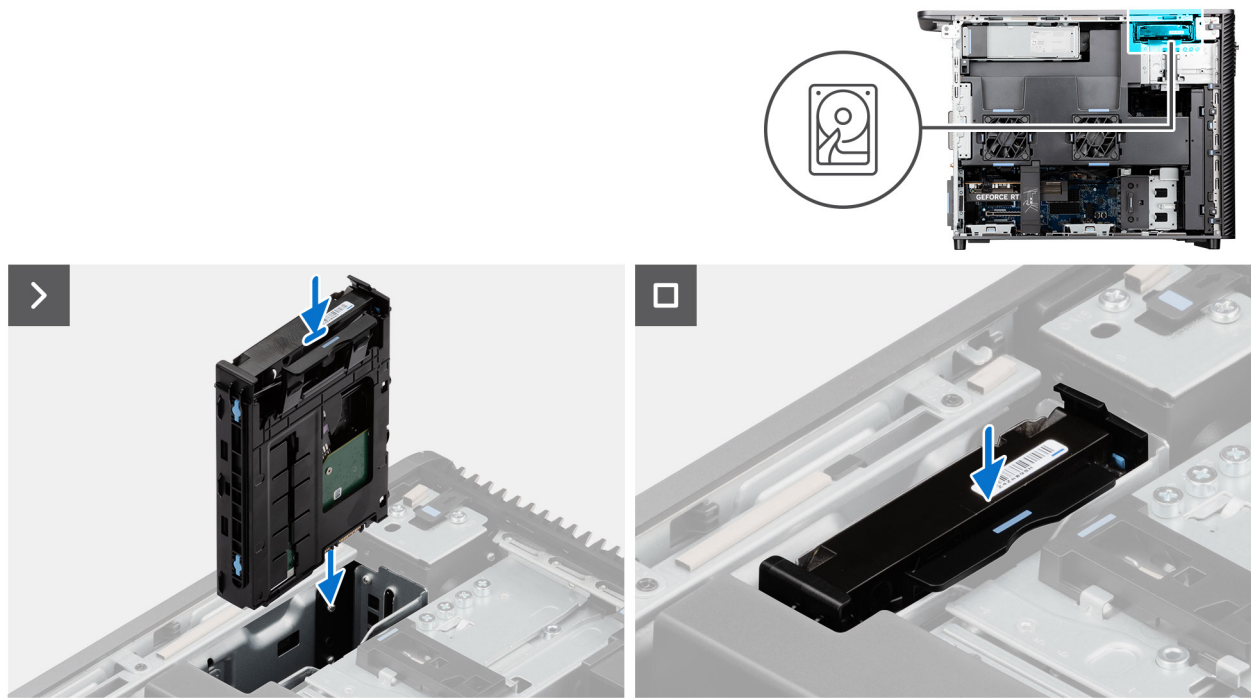


Figure 61. Installing the internal 3.5-inch hard drive assembly

Steps

1. Slide and insert the internal 3.5-inch hard drive assembly into the hard drive bracket.
2. Push the internal 3.5-inch hard drive assembly down to secure it in the slot.

Next steps

1. Install the [left side cover](#).
2. 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 62. Removing the external hard drive assembly

Steps

1. Slide the button down to unlock the hard drive cover, rotate the cover outward, and remove it.
2. Push the release button on the hard drive assembly to open the release latch.
3. 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 63. 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 64. 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 65. 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.
3. Align and place the hard drive cover on its slot, push the cover until it snaps in place.

Next steps

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

Front-NVMe module

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.

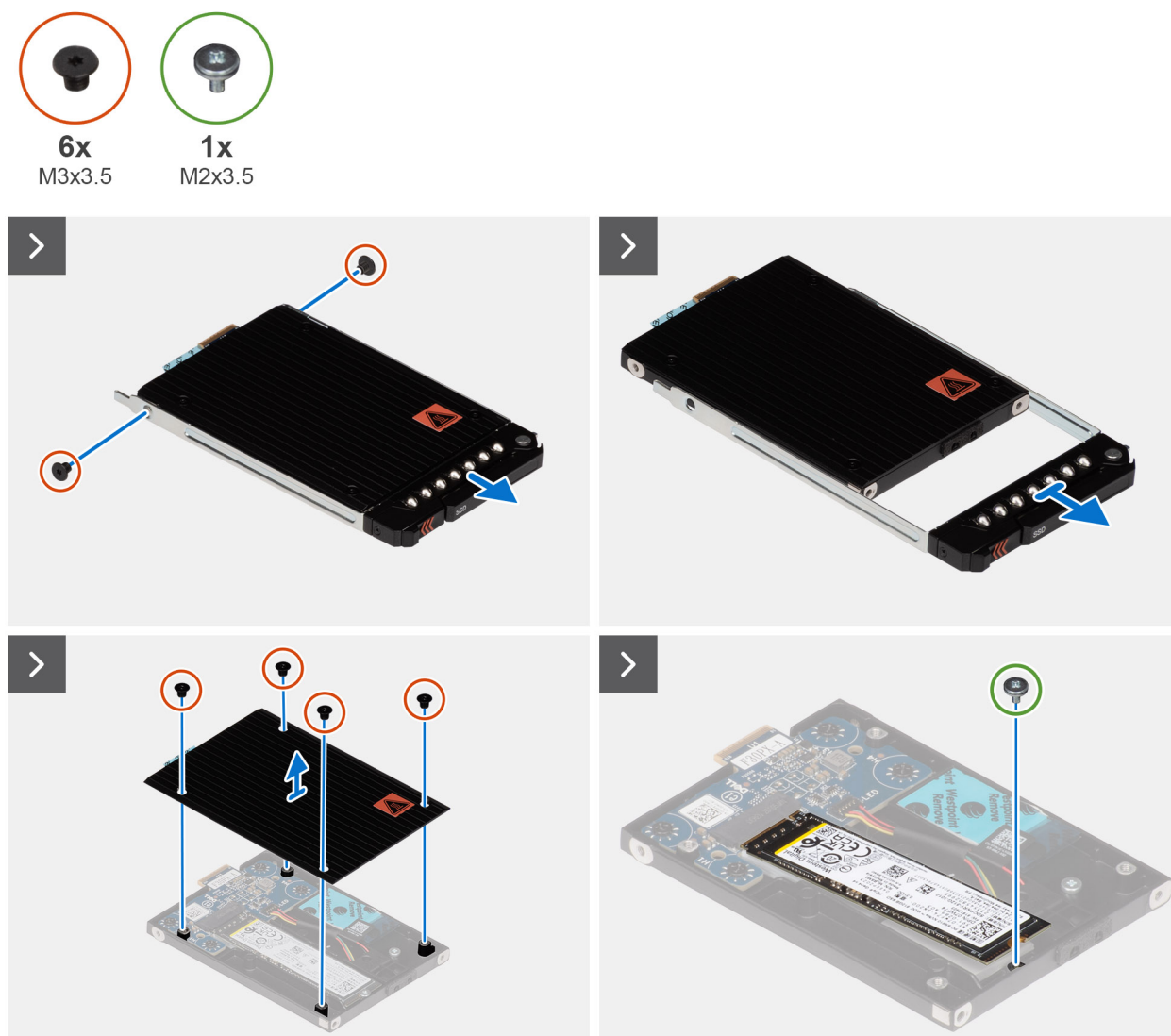


Figure 66. Removing the M.2 SSD from the carrier

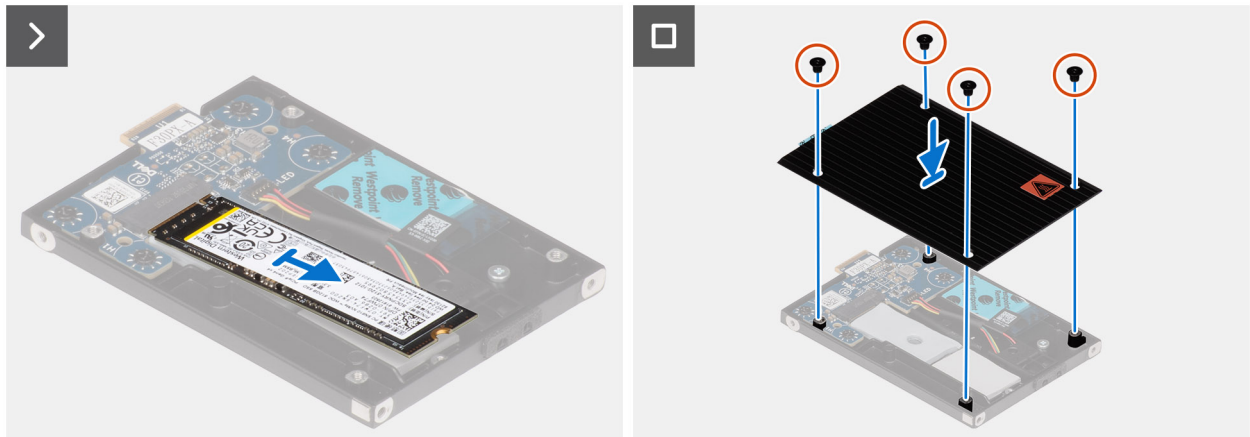


Figure 67. Removing the M.2 SSD from the carrier

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.
7. Align the screw holes on the carrier cover with the screw holes on the carrier.
8. Install the four screws (M3x3.5) to secure the carrier cover to 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.

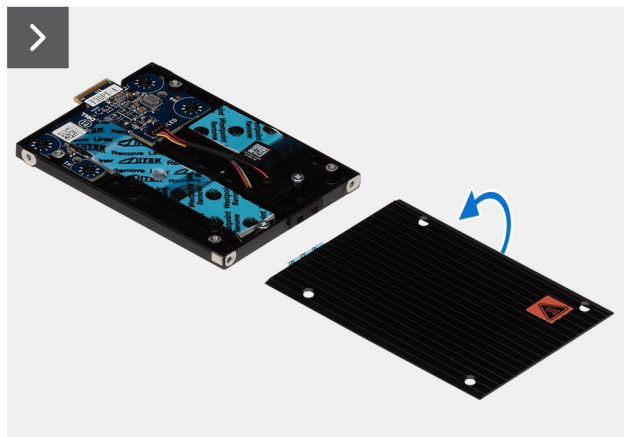
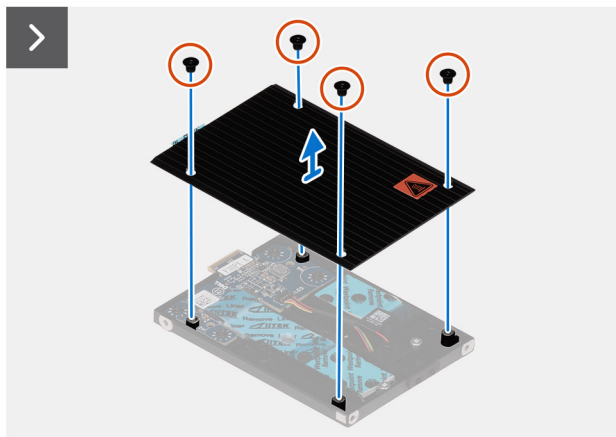
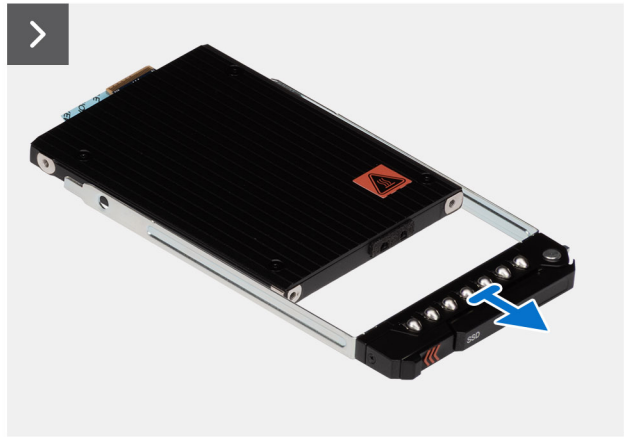
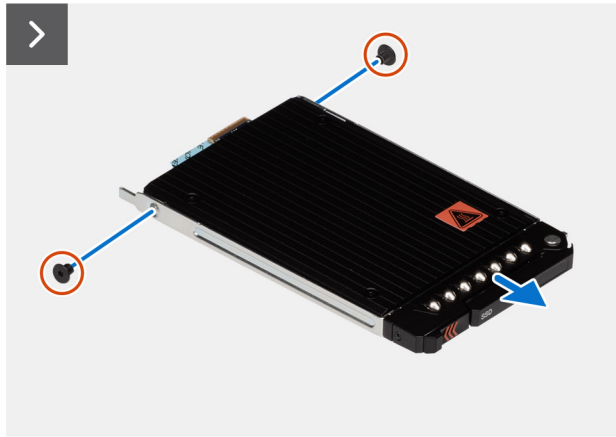


Figure 68. Installing the M.2 SSD in the carrier

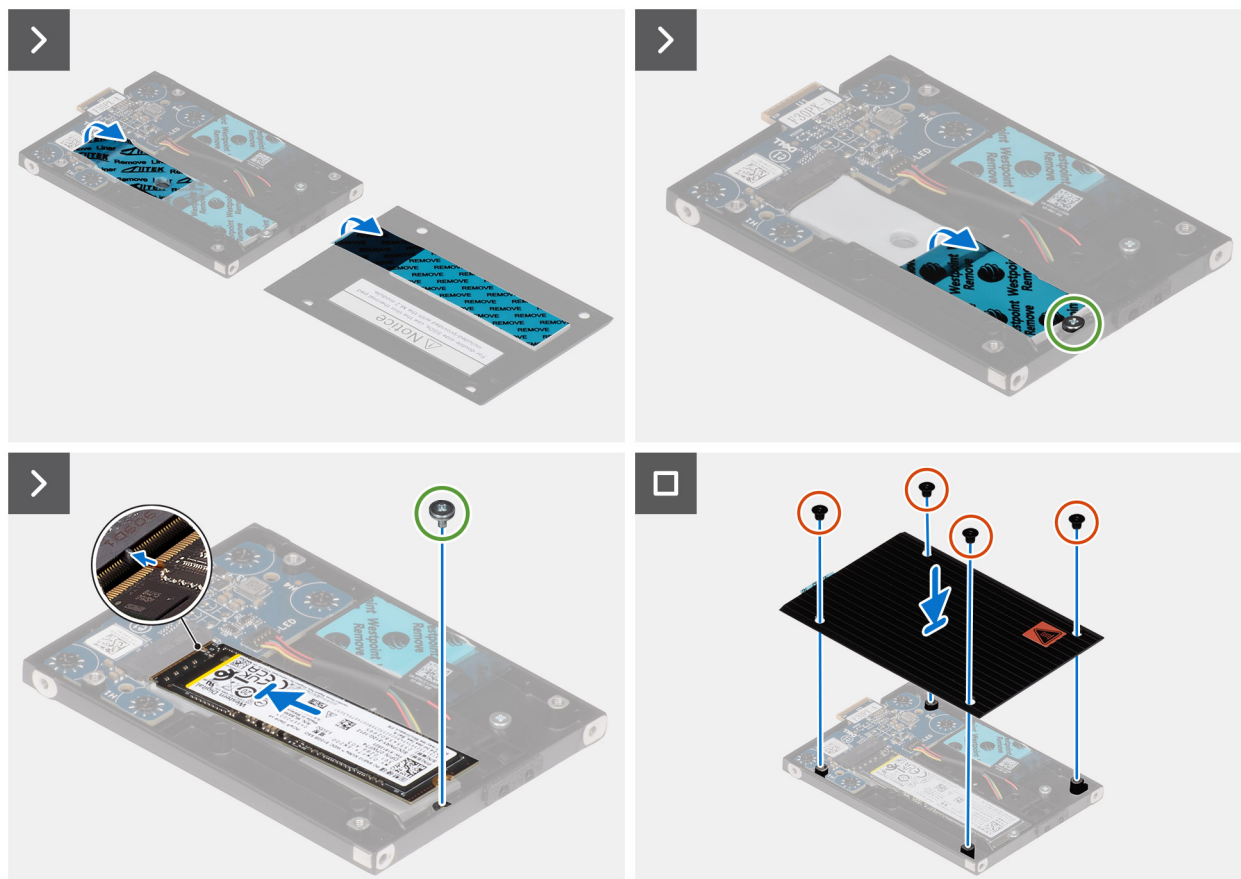


Figure 69. Installing the M.2 SSD in the carrier

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.

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](#).

External storage expansion (Hard drive)

Removing the expansion rear hard drive door

Prerequisites

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

About this task

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

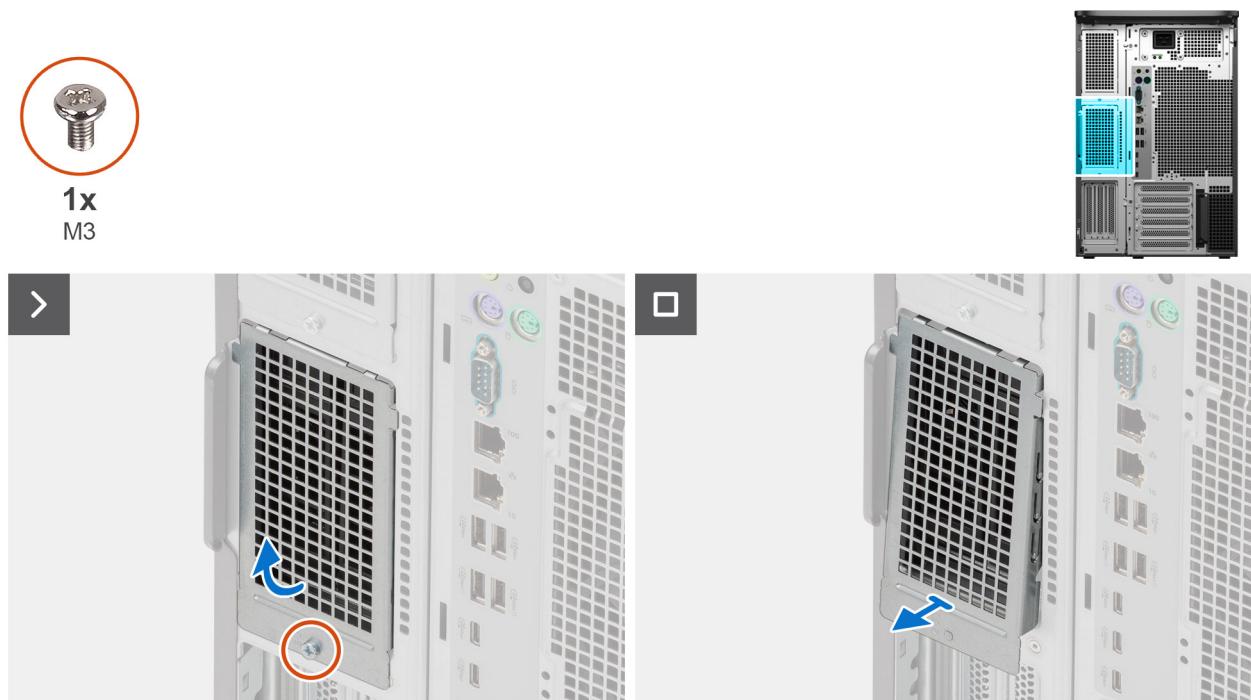


Figure 70. Removing the expansion rear hard drive door

Steps

1. Remove the screw (M3) that secures the rear hard drive door..
2. Lift the hard drive door out of the computer.

Removing the external rear 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 rear hard drive assembly and provide a visual representation of the removal procedure.

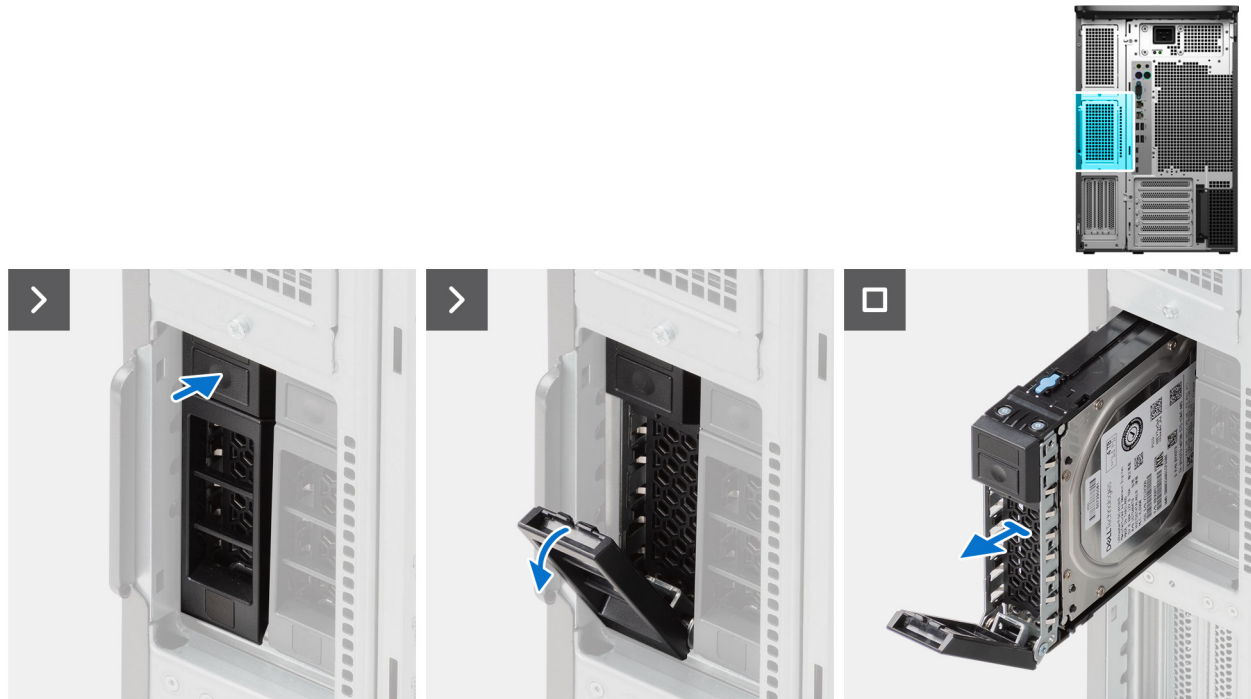


Figure 71. Removing the external rear hard drive assembly

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 rear hard drive slot.

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



Figure 72. Installing the external rear hard drive assembly

Steps

1. Slide and insert the hard drive assembly into the external rear hard drive 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](#).

Installing the expansion rear hard drive door

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 expansion rear hard drive door and provide a visual representation of the installation procedure.



1x
M3

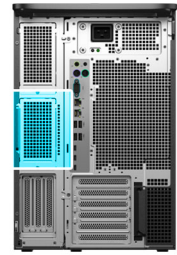


Figure 73. Installing the expansion rear hard drive door

Steps

1. Align and place the rear hard drive door into the slot.
2. Replace the screw (M3) to secure the rear hard drive door to the computer.

Next steps

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

Expansion-NVMe module

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.

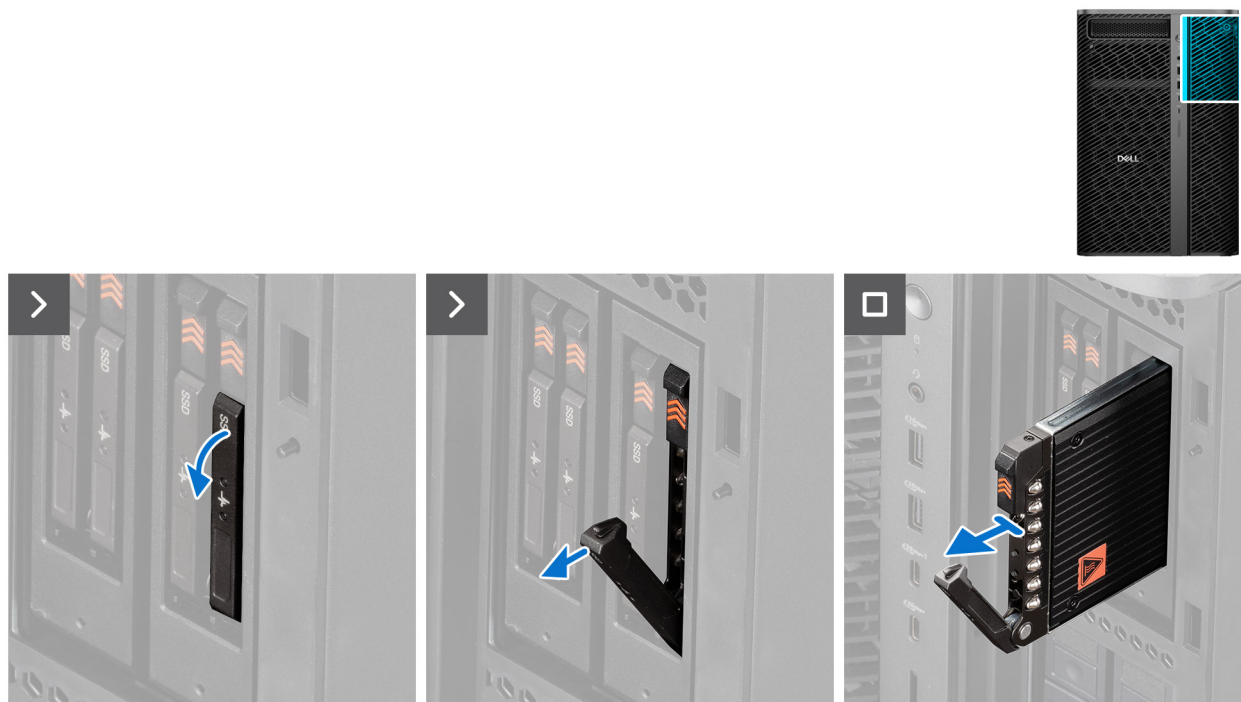


Figure 74. Removing the expansion M.2 SSD carrier

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.

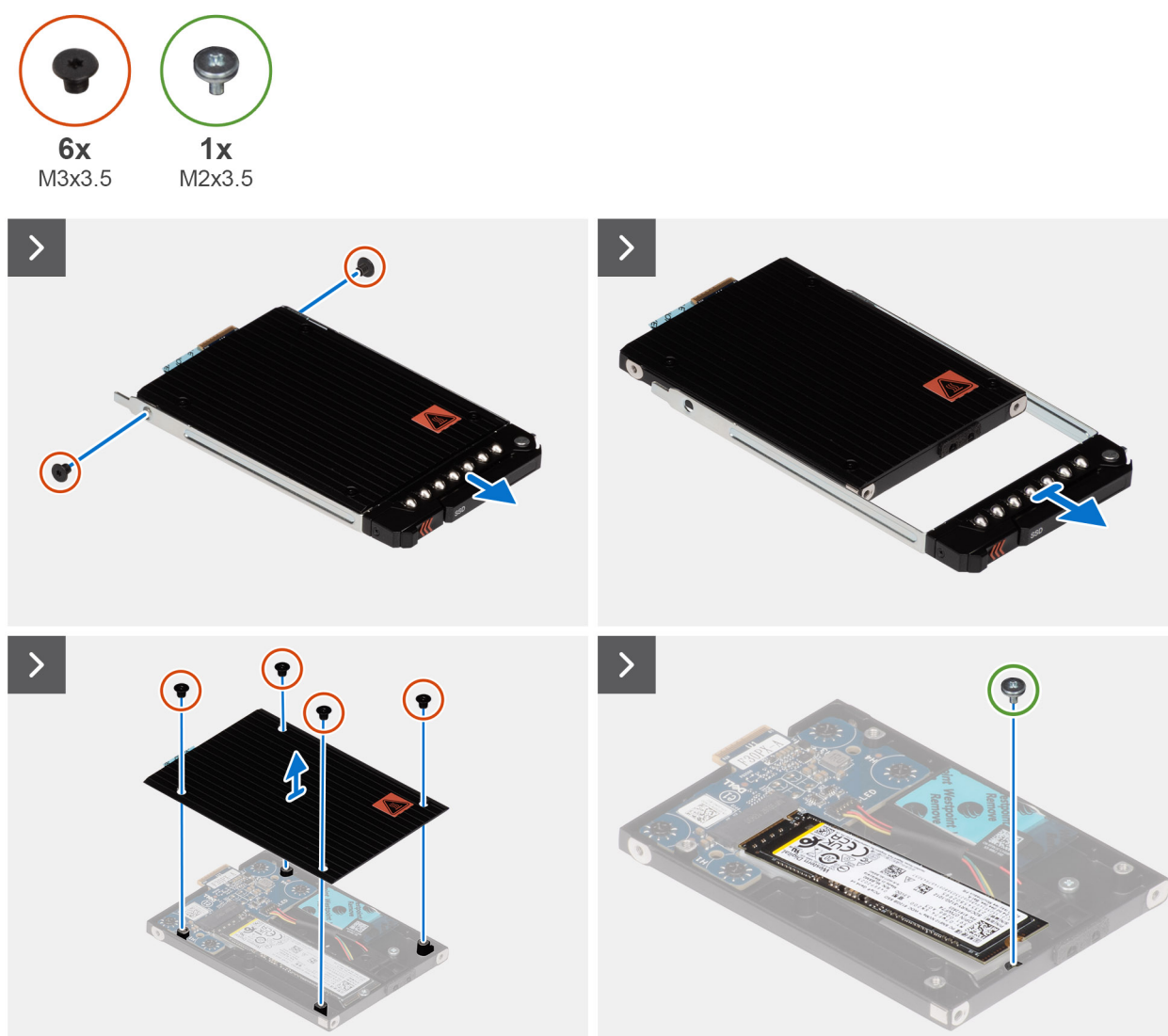


Figure 75. Removing the M.2 SSD from the carrier

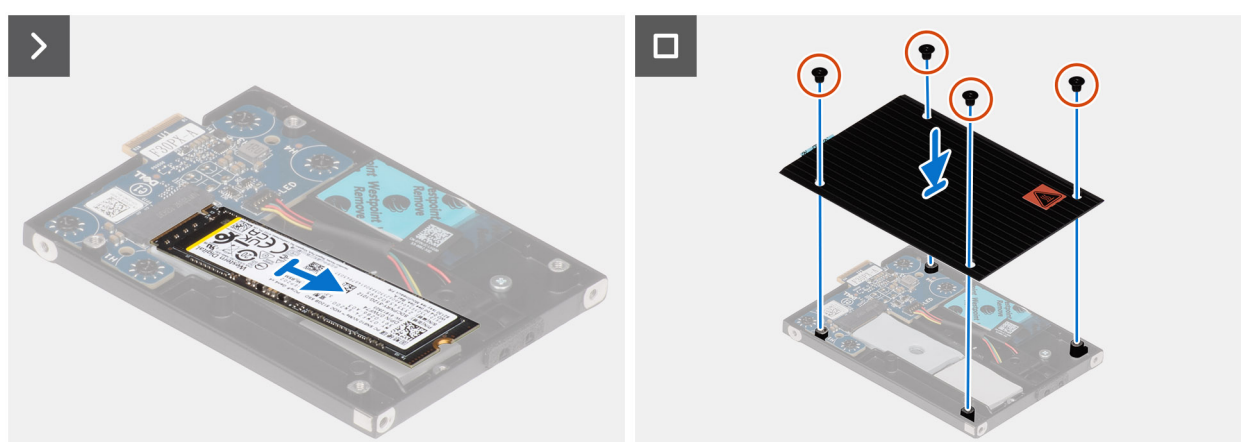


Figure 76. Removing the M.2 SSD from the carrier

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.
7. Align the screw holes on the carrier cover with the screw holes on the carrier.
8. Install the four screws (M3x3.5) to secure the carrier cover to 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.

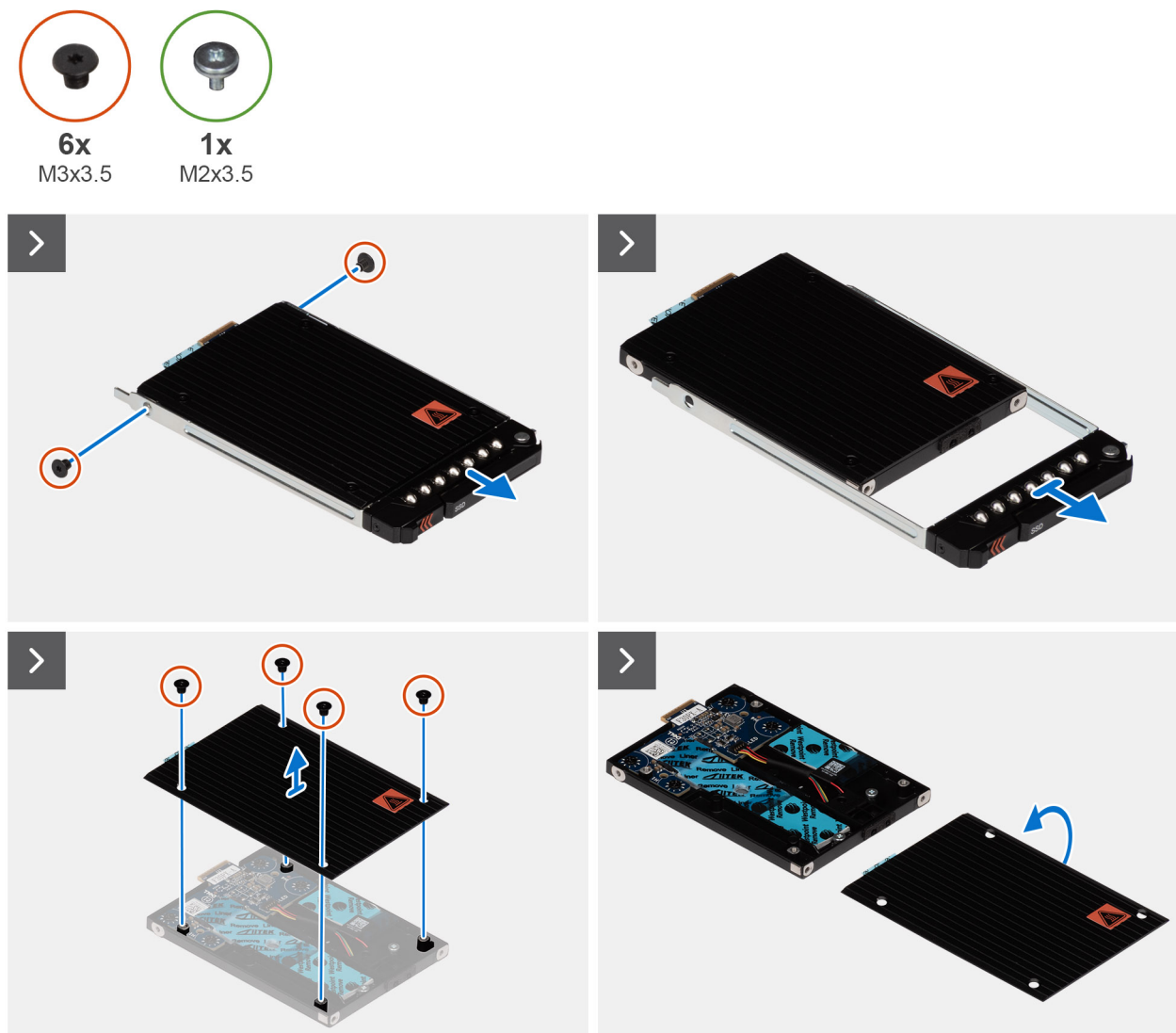


Figure 77. Installing the M.2 SSD in the carrier

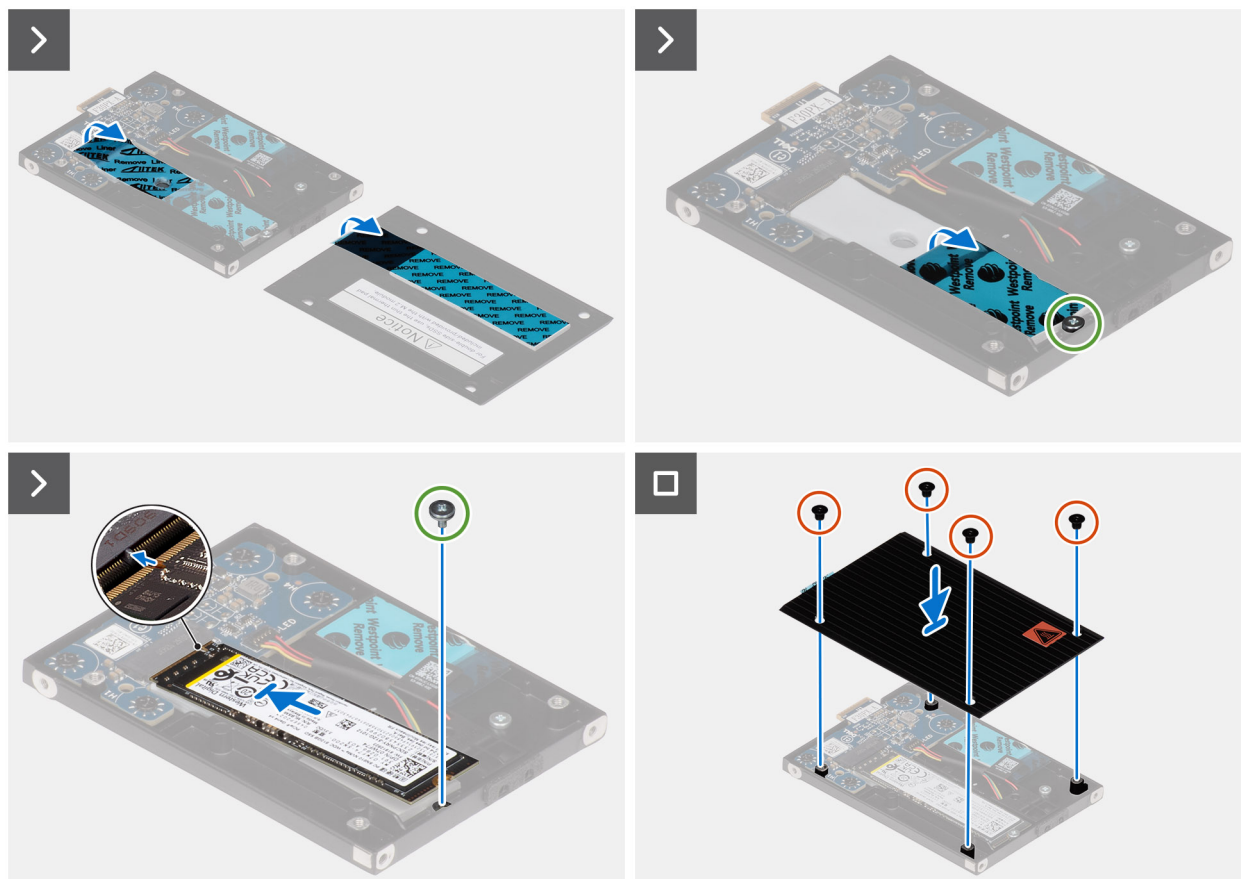


Figure 78. Installing the M.2 SSD in the carrier

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.

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.

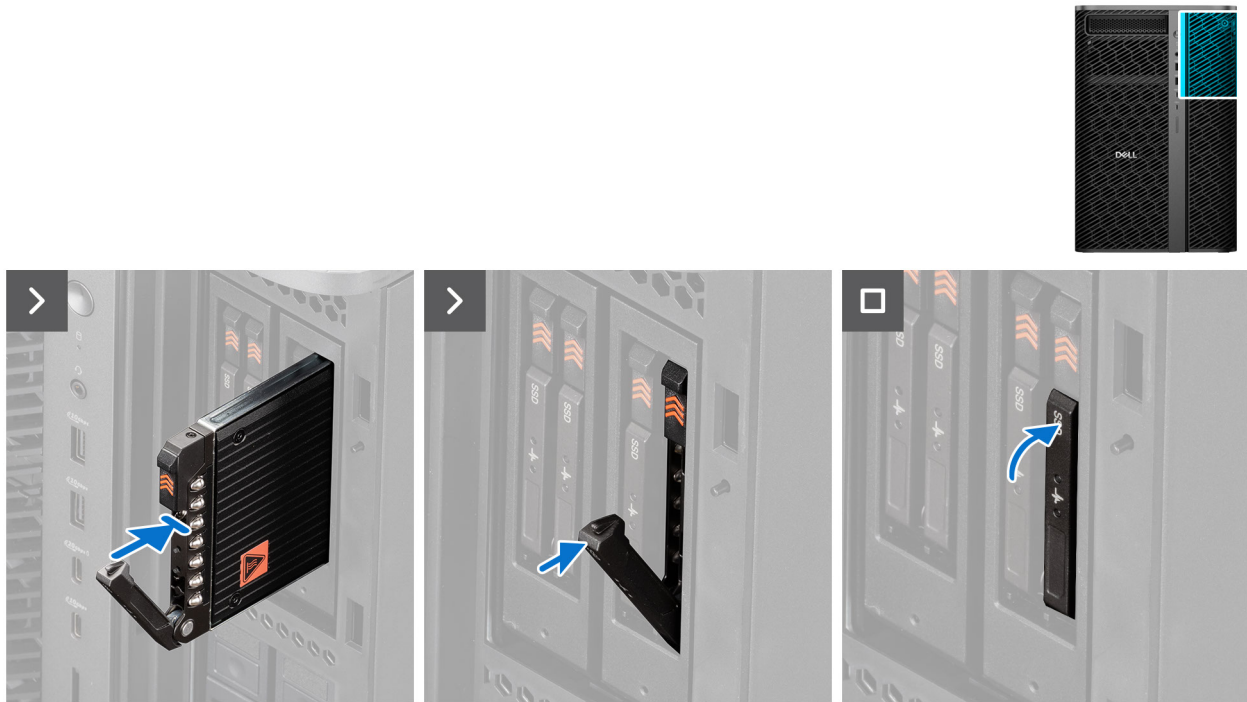


Figure 79. Installing the expansion M.2 SSD carrier

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](#).

Expansion storage bay

Removing the expansion mid hard drive bay

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [right side cover](#).
3. Remove the [hard-drive bay fan](#).

About this task

The following images indicate the visual representation of the expansion mid hard drive bay removal procedure.



4x
M3x5

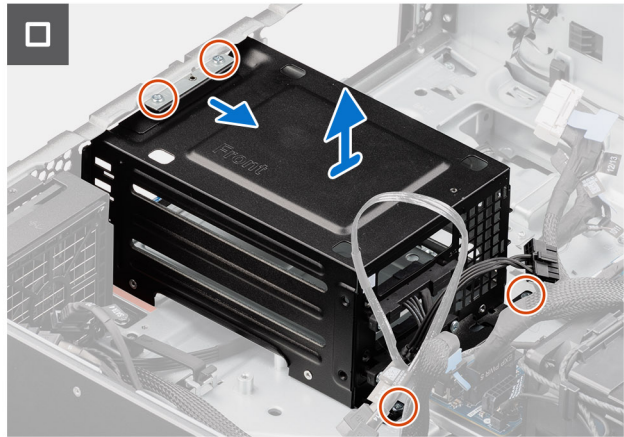
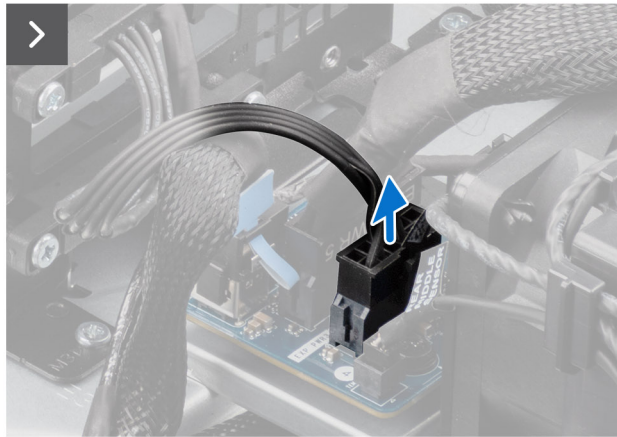
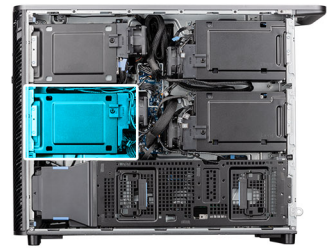


Figure 80. Removing the expansion mid hard drive bay

Steps

1. Disconnect the hard drive bay cable from the connector on the system board.
2. Remove the four screws (M3x5) that secure the hard drive bay to the chassis.
3. Slide and lift the expansion mid hard drive bay out of the computer.

Installing the expansion mid hard drive bay

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 expansion hard drive bay and provide a visual representation of the installation procedure.



4x
M3x5

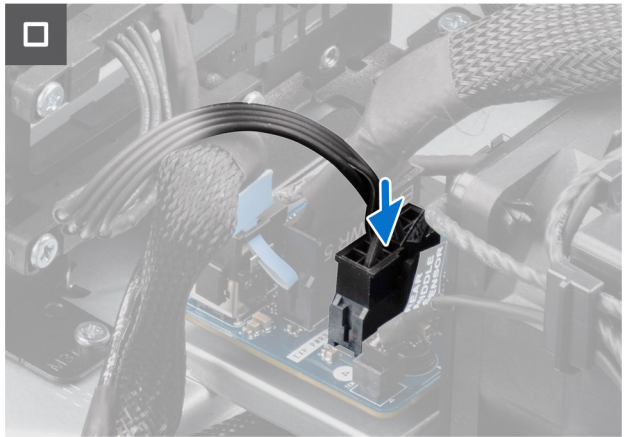
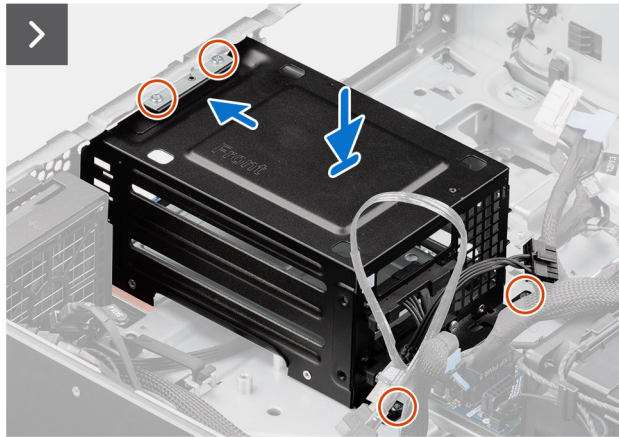
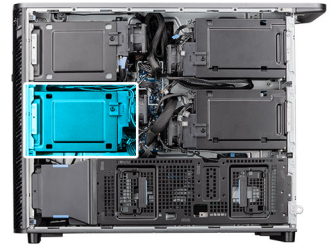


Figure 81. Installing the expansion mid hard drive bay

Steps

1. At an angle, align and slide the hard drive bay into the slot.
2. Replace the four screws (M3x5) to secure the hard drive bay to the chassis.
3. Connect the hard drive bay cable to the connector on the system board.

Next steps

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

Removing the expansion upper rear hard drive bay

Prerequisites

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

About this task

The following images indicate the visual representation of the expansion upper rear hard drive bay removal procedure.



2x
M3x5

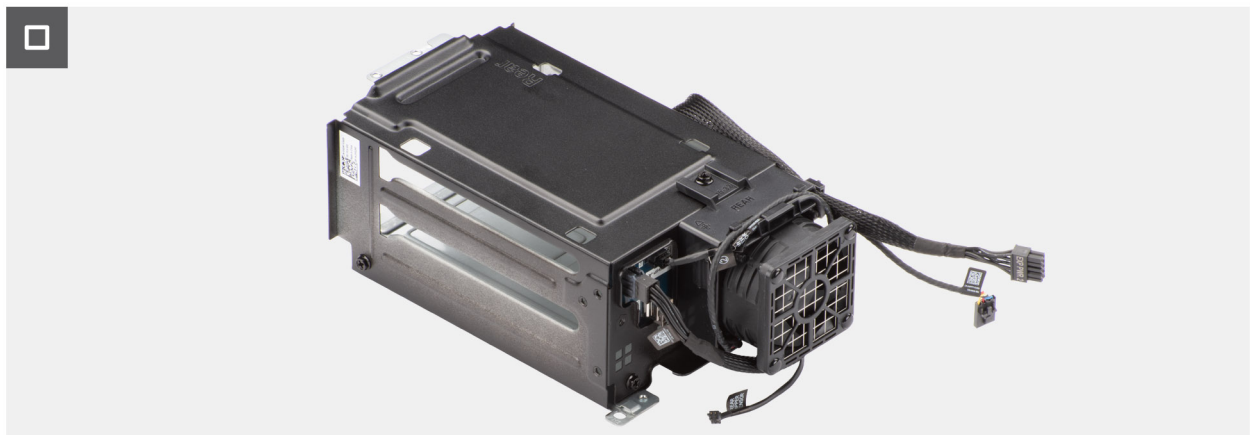
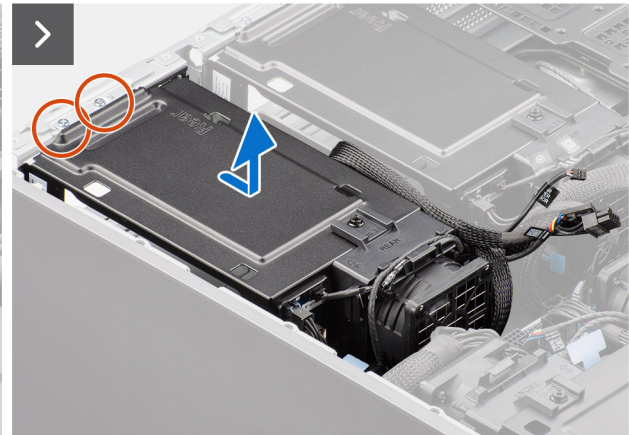
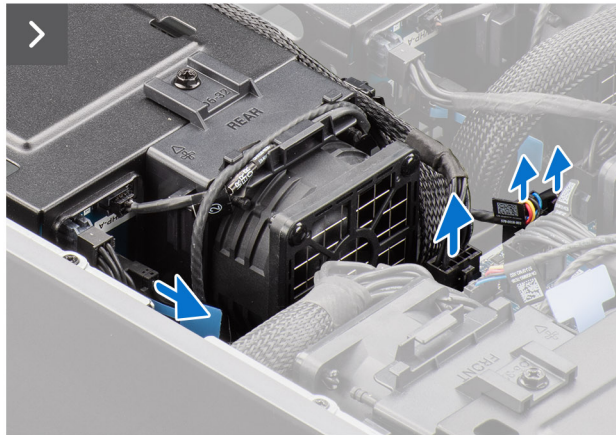
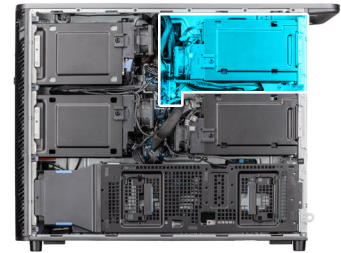


Figure 82. Removing the expansion upper rear hard drive bay

Steps

1. Disconnect the hard drive bay cables from the connectors on the expa board.
2. Remove the two screws (M3x5) that secure the hard drive bay to the chassis.
3. Side and lift the expansion upper rear hard drive bay out of the computer.

Installing the expansion upper rear hard drive bay

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 expansion upper rear hard drive bay and provide a visual representation of the installation procedure.



2x
M3x5

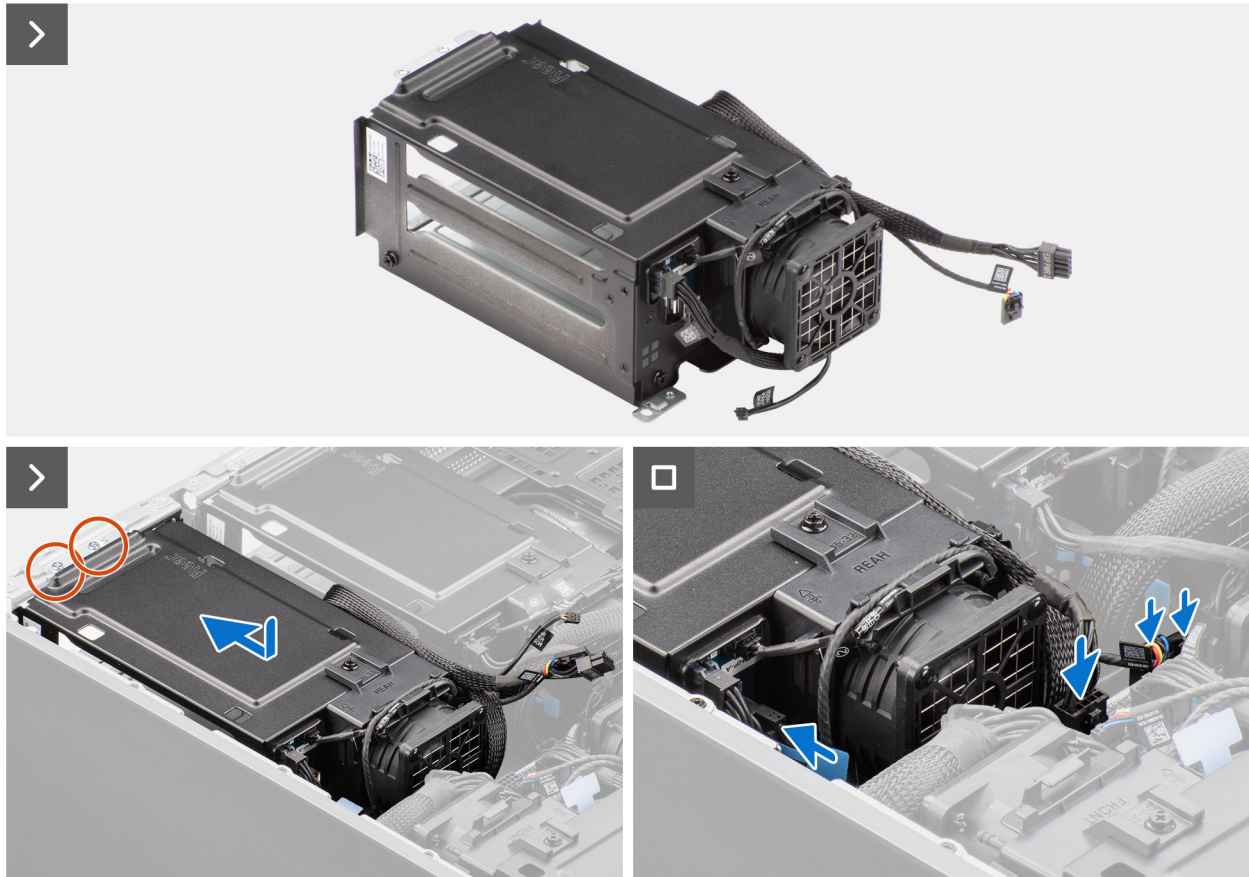
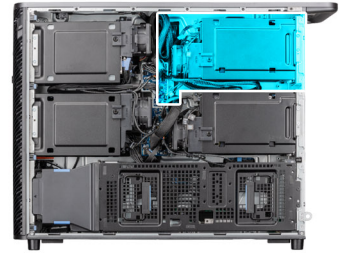


Figure 83. Installing the expansion upper rear hard drive bay

Steps

1. At an angle, align and slide the hard drive bay into the slot.
2. Replace the four screws (M3x5) to secure the hard drive bay to the chassis.
3. Connect the hard drive bay cables to the connectors on the expa board.

Next steps

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

Removing the expansion upper front NVMe bay

Prerequisites

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

About this task

The following images indicate the visual representation of the expansion upper front NVMe bay removal procedure.

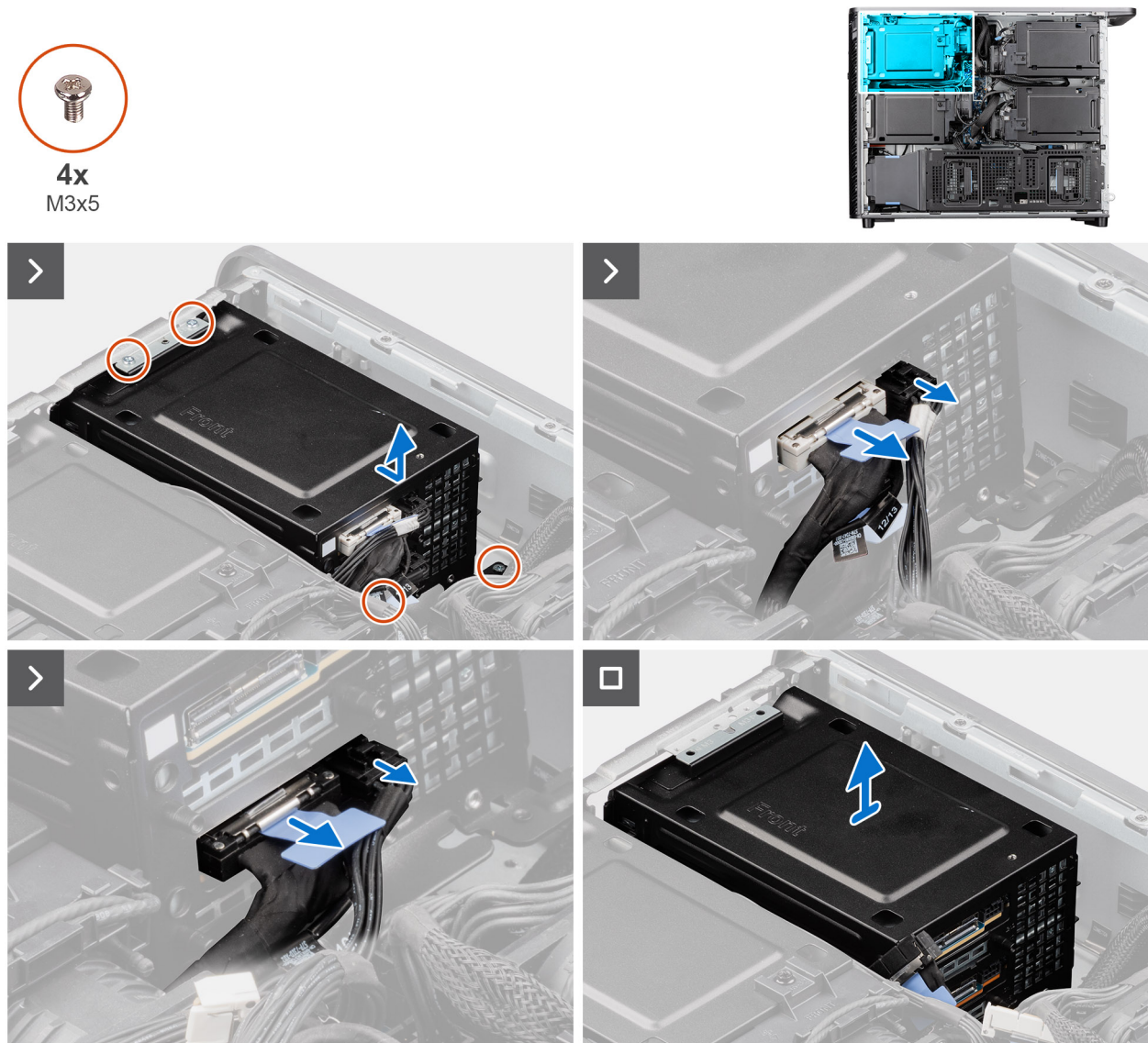


Figure 84. Removing the expansion upper front NVMe bay

Steps

1. Remove the four screws (M3x5) that secure the NVMe bay to the chassis.
2. Disconnect the upper front NVMe bay cables from its connectors.
3. Slide and lift the upper front NVMe bay out of the computer.

Installing the expansion upper front NVMe bay

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 expansion upper front NVMe bay and provide a visual representation of the installation procedure.



4x
M3x5

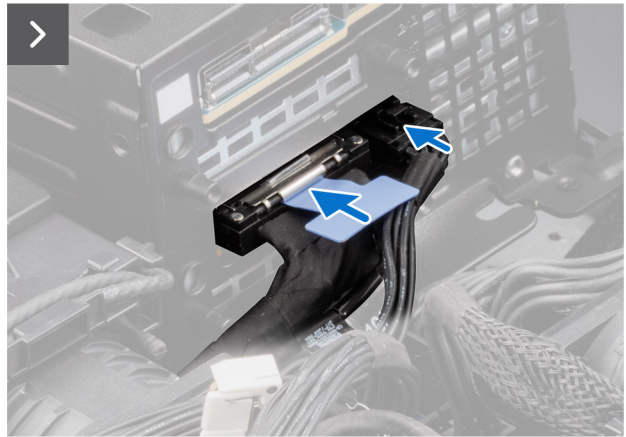
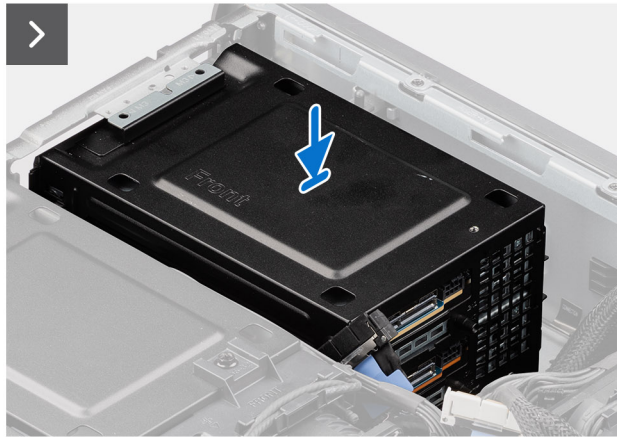


Figure 85. Installing the expansion upper front NVMe bay

Steps

1. At an angle, align and slide the upper NVMe bay into the slot.
2. Replace the four screws (M3x5) to secure the NVMe bay to the chassis.
3. Connect the NVMe bay cables to its connectors.

Next steps

1. Install the [NVMe bay fan](#).
2. Install the [right side cover](#).
3. 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 [left 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.

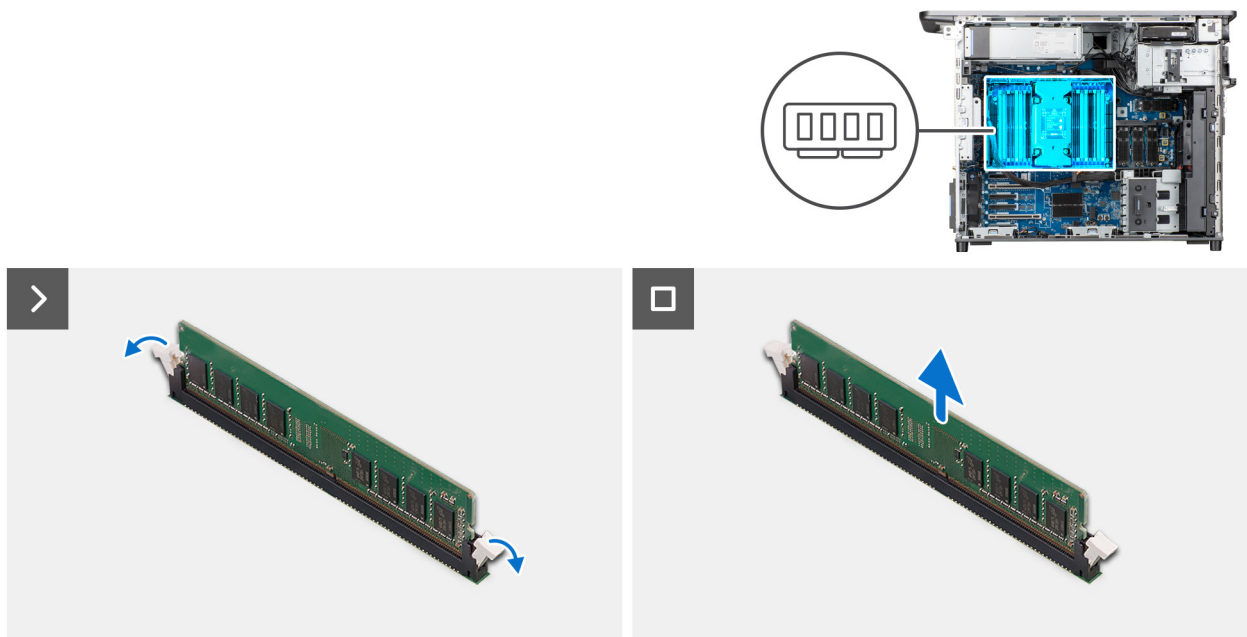


Figure 86. Removing the memory module

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.

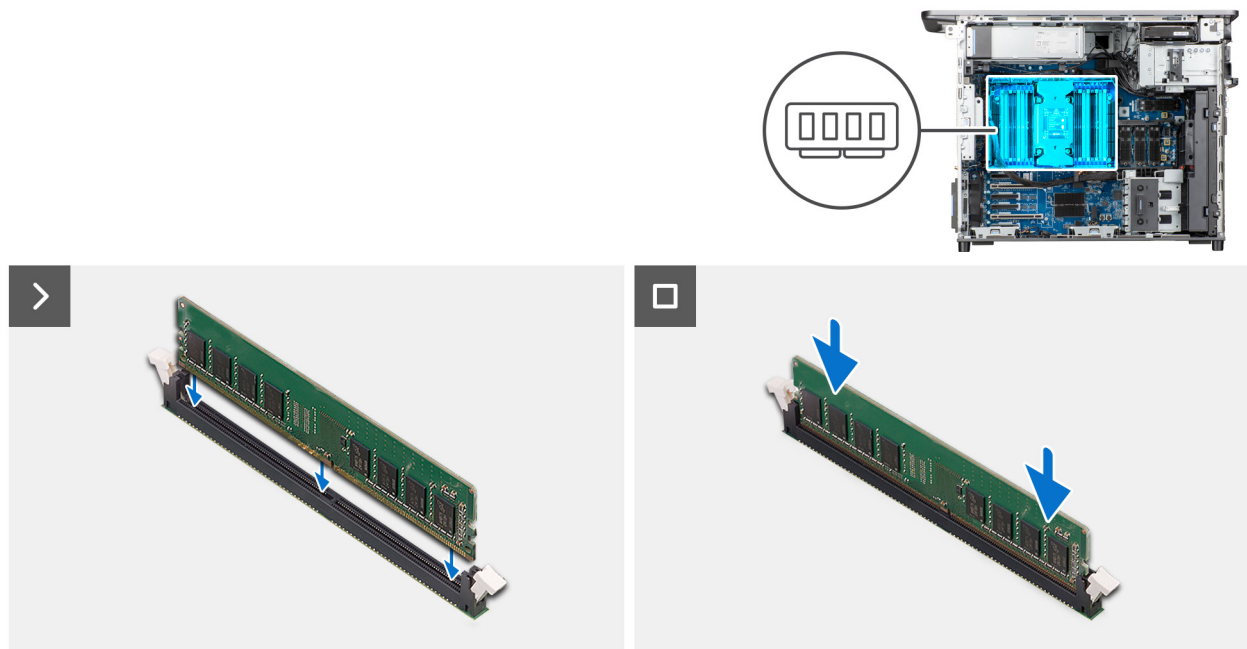


Figure 87. Installing the memory module

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 [left 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 [left side cover](#).
3. Remove the [air shroud](#).
4. Remove the [graphics card end holder](#).

About this task

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



1x
M2x3.5

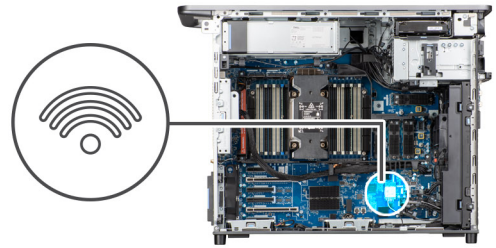


Figure 88. Removing the wireless card

Steps

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

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.

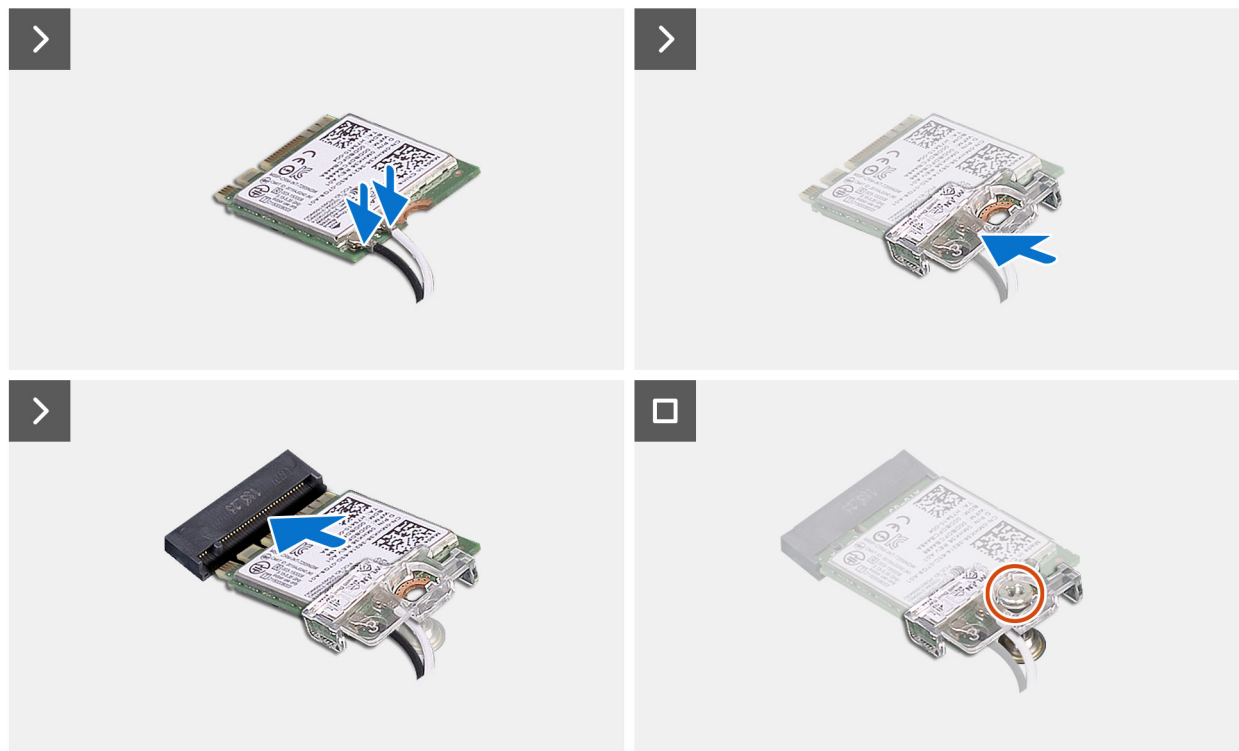
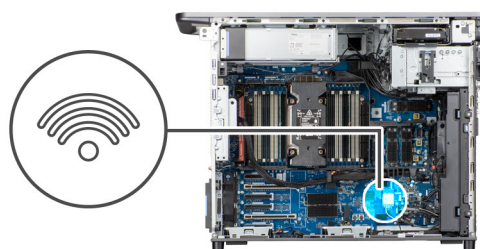


Figure 89. Installing the wireless card

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

Coin-cell battery

Removing the coin-cell battery

Prerequisites

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

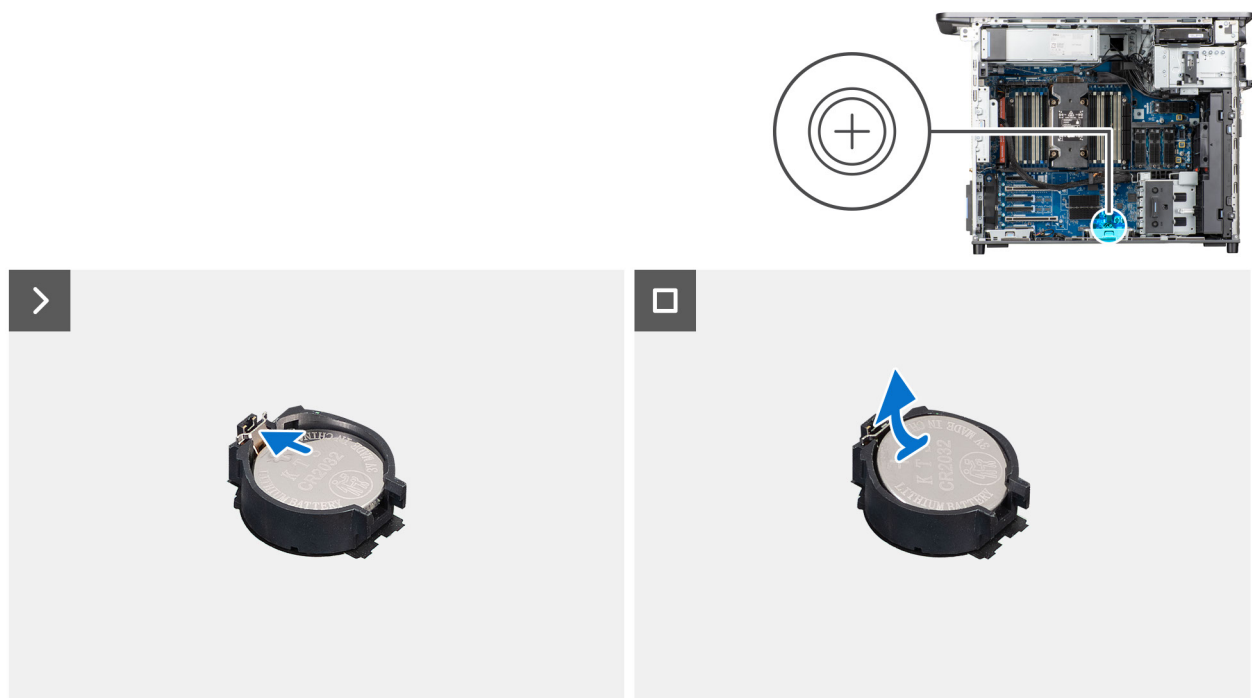


Figure 90. Removing the coin-cell battery

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.

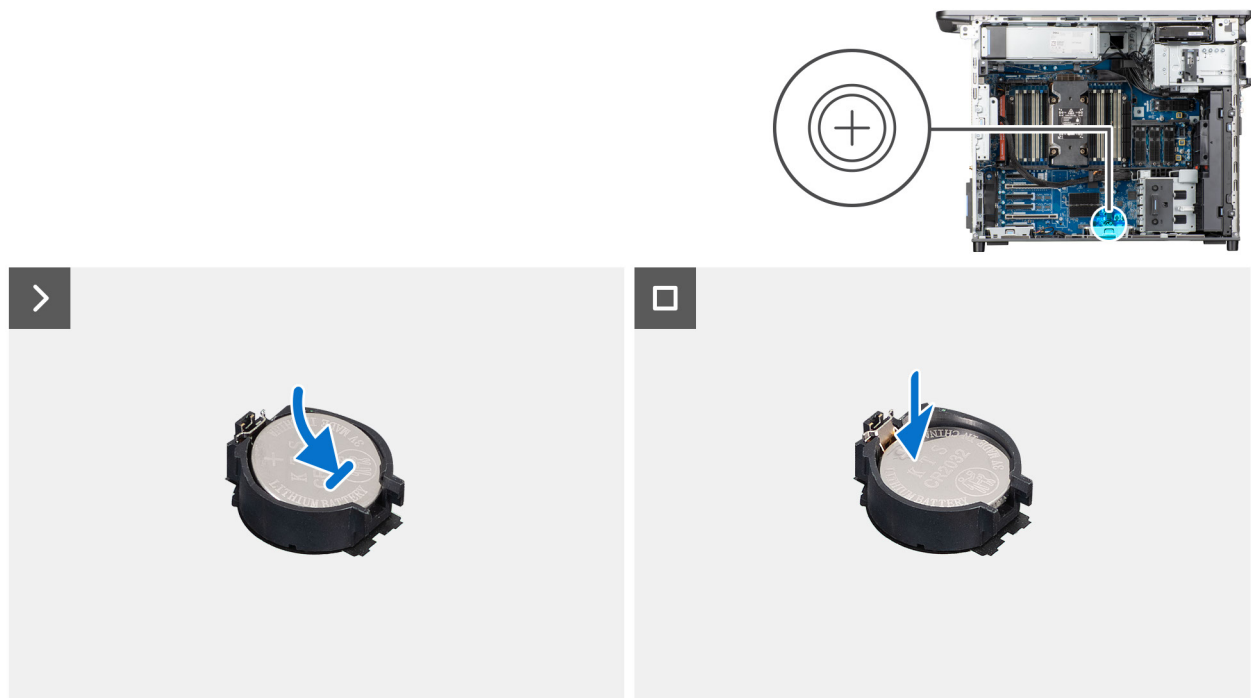


Figure 91. Installing the coin-cell battery

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

Intrusion switch

Removing the base intrusion switch

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [left side cover](#).
3. Remove the [right side cover](#).
4. Remove the [air shroud](#).
5. Remove the [graphics card end holder](#).

About this task

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



1x
M3x5

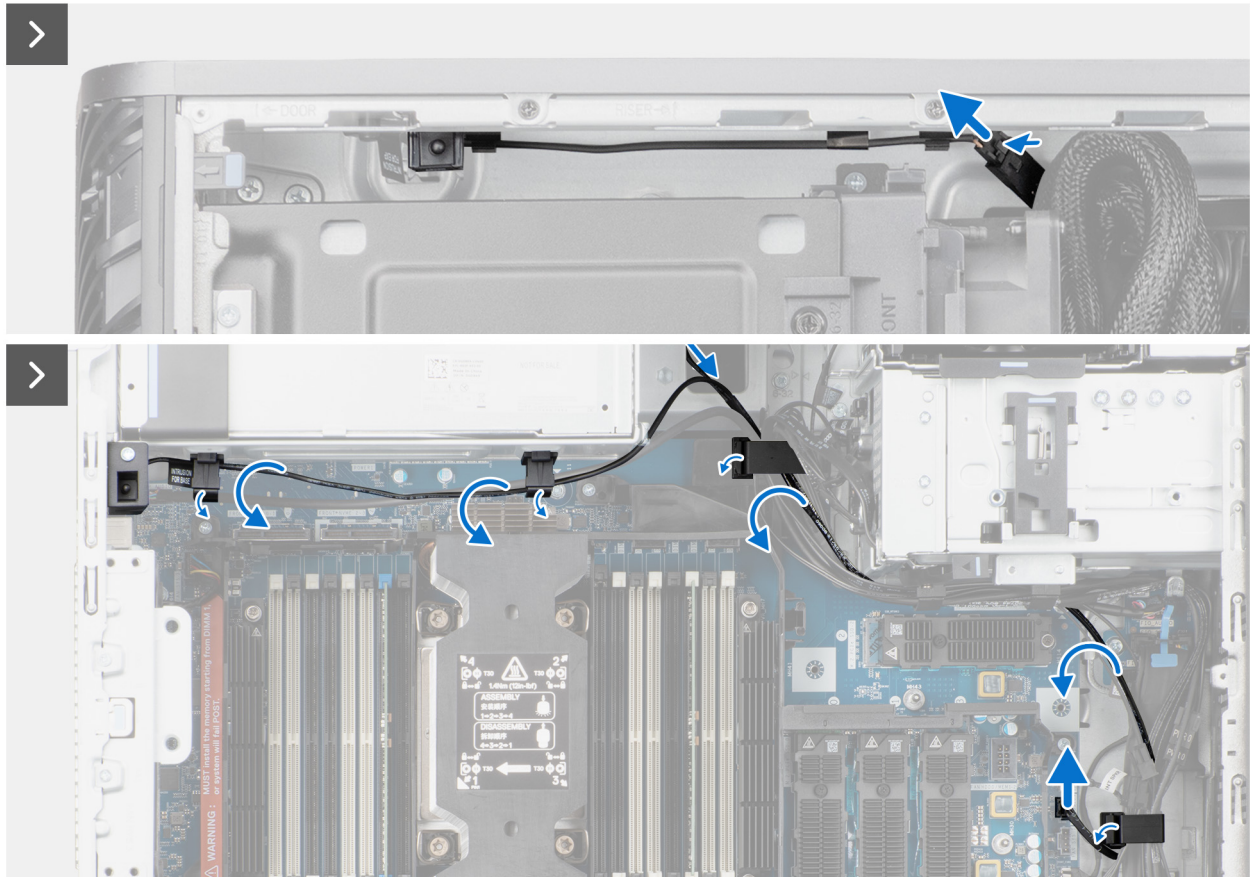
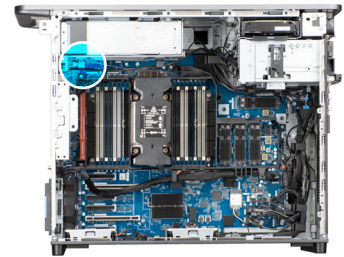


Figure 92. Removing the intrusion switch



Figure 93. Removing the base intrusion switch

Steps

1. Disconnect the right-side intruder switch cable from the connector of the base intruder switch cable.

2. Guide the connector out through the recess on the chassis.
3. Disconnect the intruder switch cable from the connector on the system board.
4. Open the cable clips and unroute the cable from the routing guides.
5. Remove the screw (M3x5) that secures the intrusion switch to the chassis.
6. Slide and remove the intrusion switch from the chassis.

Installing the base 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.

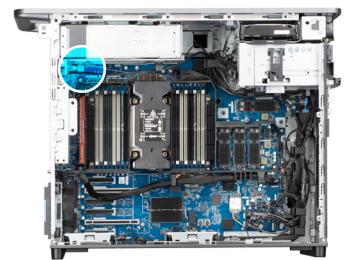


Figure 94. Installing the base intrusion switch

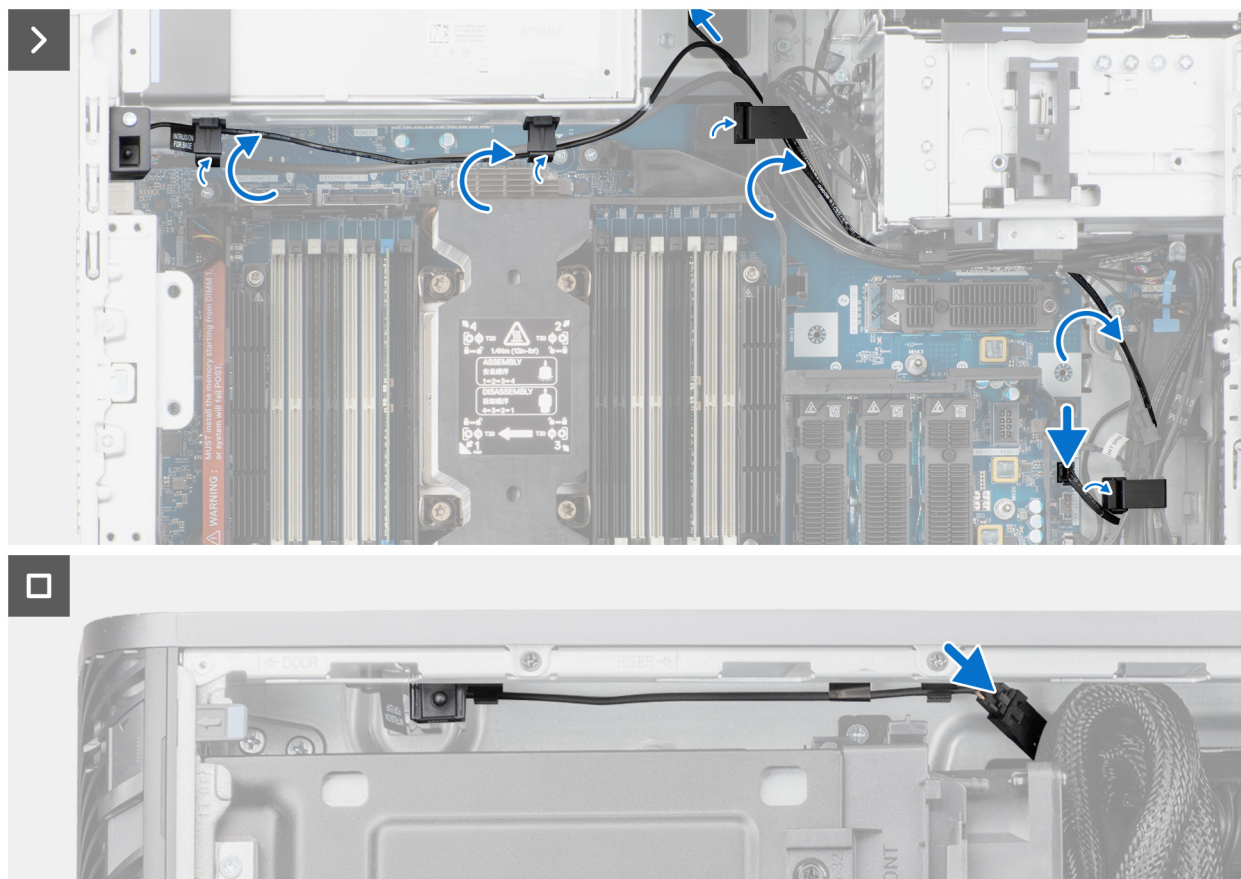


Figure 95. Installing the base intrusion switch

Steps

1. Insert the intrusion switch into its slot.
2. Replace the screw (M3x5) to secure it to the chassis.
3. Route the intruder switch cable through the routing guide and cable clips on the chassis.
4. Connect the intruder cable to the connector on the system board.
5. Thread the expansion intruder cable through the recess in the chassis and connect it to the expansion intrusion switch.

Next steps

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

Removing the expansion intrusion switch

Prerequisites

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

About this task

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



Figure 96. Removing the expansion intrusion switch

Steps

1. Disconnect the expansion intruder switch cable from the connector of the main-intruder switch cable.
2. Unroute the cable from the routing guides.
3. Slide and remove the intrusion switch from the chassis.

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



Figure 97. Installing the expansion intrusion switch

Steps

1. Insert the intrusion switch into its slot and slide it to secure it to the chassis.
2. Route the intruder switch cable through the routing guides on the chassis.
3. Connect the intruder cable to the connector of the main-intruder switch.

Next steps

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

Fan

Removing the front chassis fan assembly

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [left side cover](#).
3. Remove the [air shroud](#).
4. Remove the [graphics card end holder](#).

About this task

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

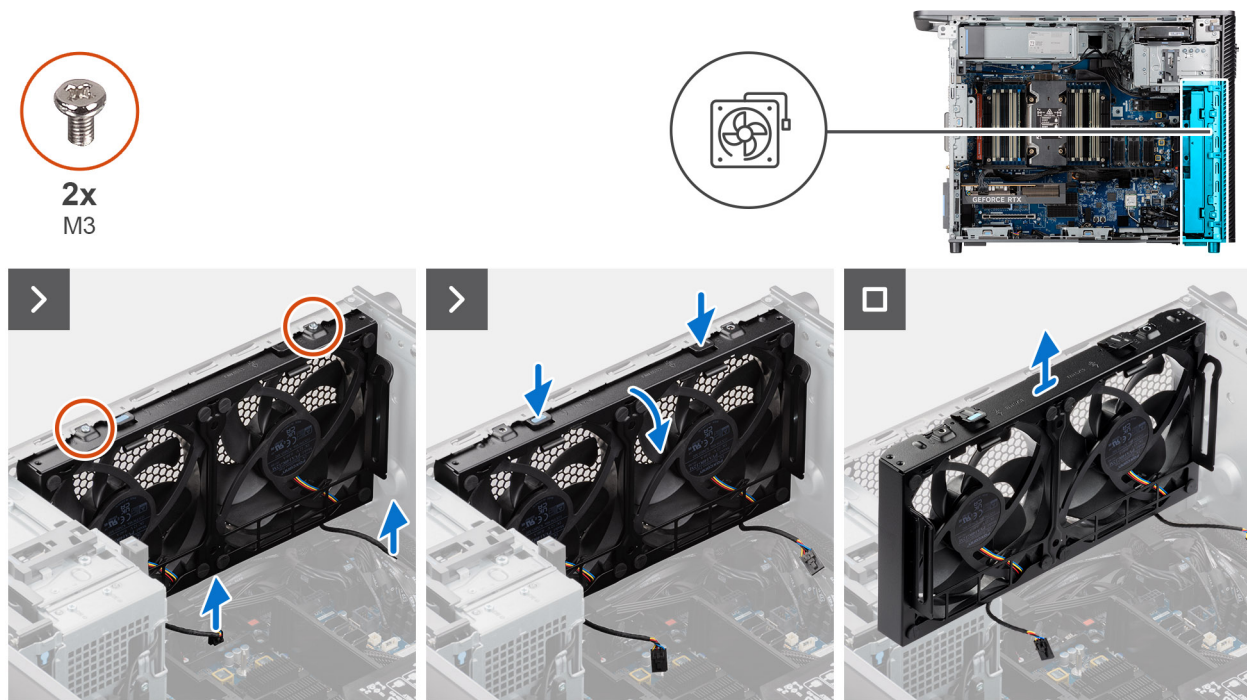


Figure 98. Removing the front chassis fan assembly

Steps

1. Remove the two screws (M3) that secure the front chassis fan assembly to the chassis.
2. Disconnect the fan cables from the connectors (FAN_SYS1 and FAN_SYS2) on the system board.
3. Press the tabs 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 chassis fan assembly

Prerequisites

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

About this task

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

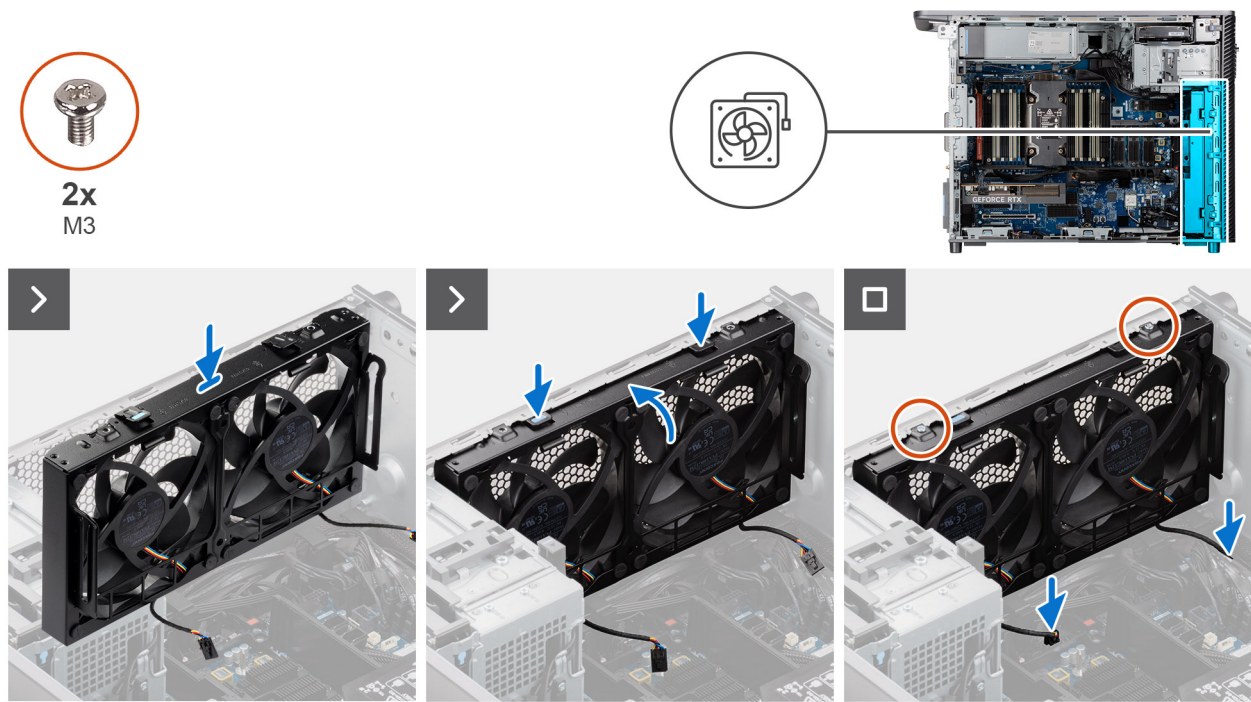


Figure 99. Installing the front chassis fan assembly

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 cables to the connectors (FAN_SYS1 and FAN_SYS2) on the system board.
5. Replace the two screws (M3) that secure the front chassis fan assembly to the chassis.

Next steps

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

Removing the bottom chassis fan 4

Prerequisites

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

About this task

The following images indicate the location of the bottom chassis fan 4 and provide a visual representation of the removal procedure.

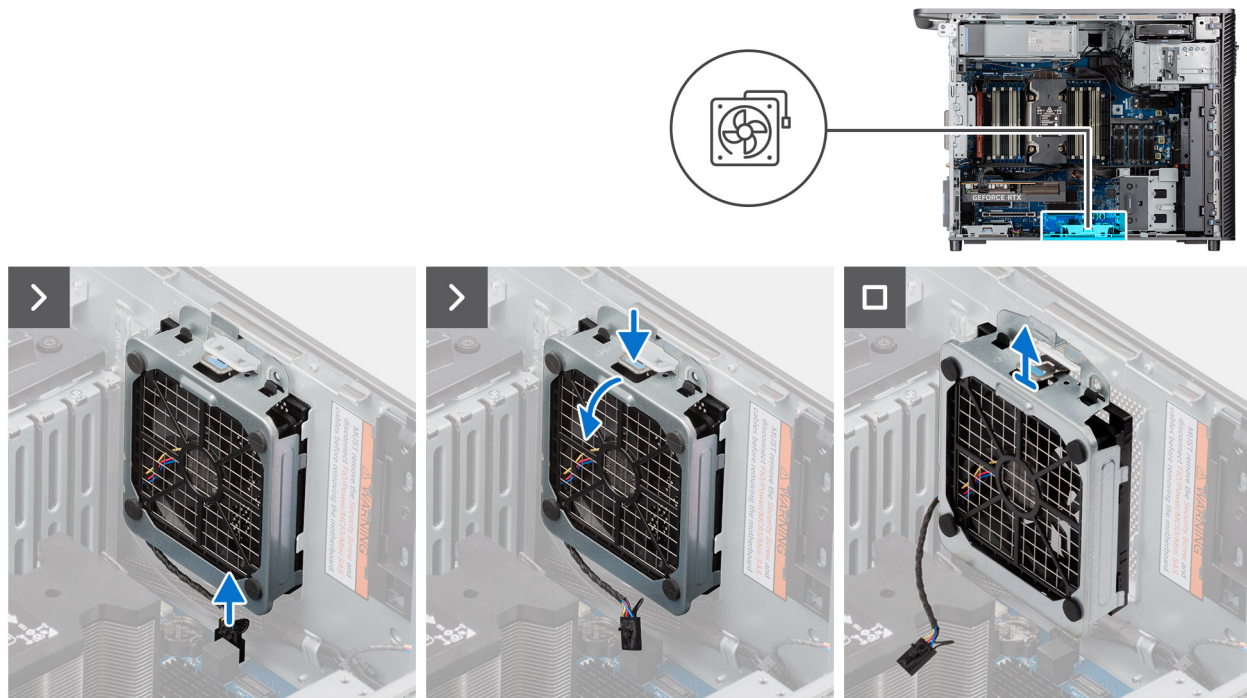


Figure 100. Removing the bottom chassis fan 4

Steps

1. Disconnect the fan cable from the connector on the system board.
2. Press the tab to release the chassis fan from the slot.
3. At an angle, lift the chassis fan and remove it from the chassis.

Installing the bottom chassis fan 4

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 bottom chassis fan 4 and provide a visual representation of the installation procedure.

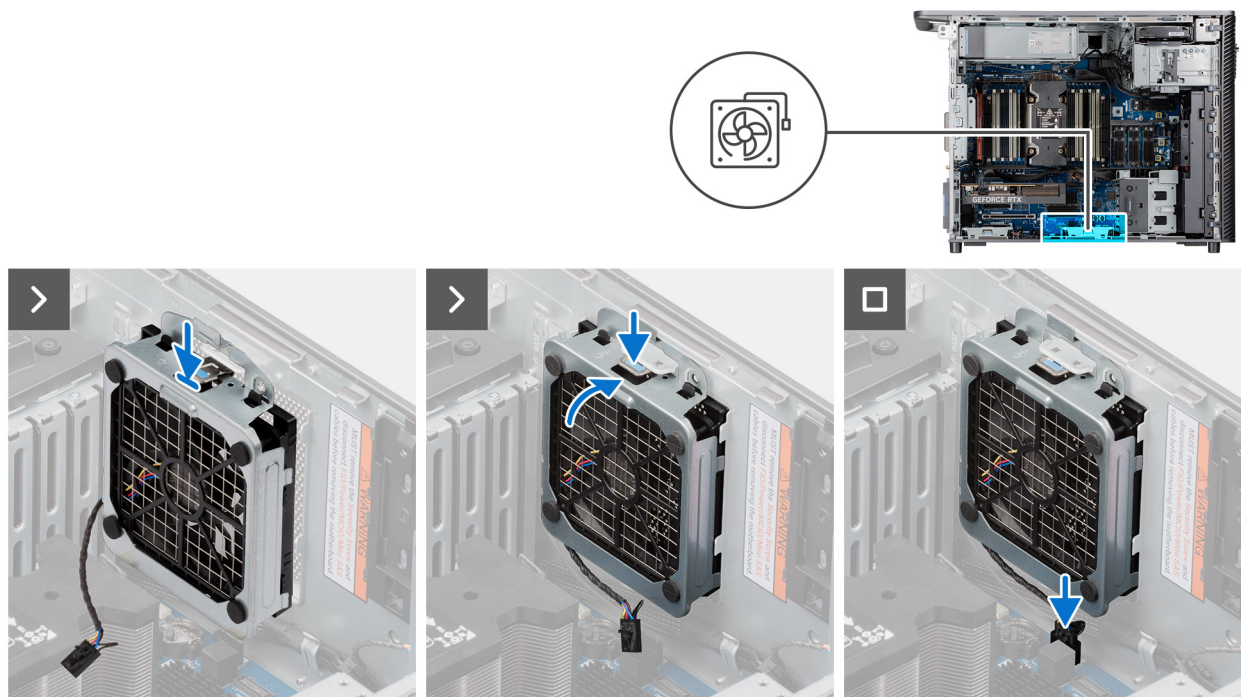


Figure 101. Installing the bottom chassis fan 4

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.

Next steps

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

Removing the bottom chassis fan 5

Prerequisites

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

About this task

The following images indicate the location of the bottom chassis fan 5 and provide a visual representation of the removal procedure.

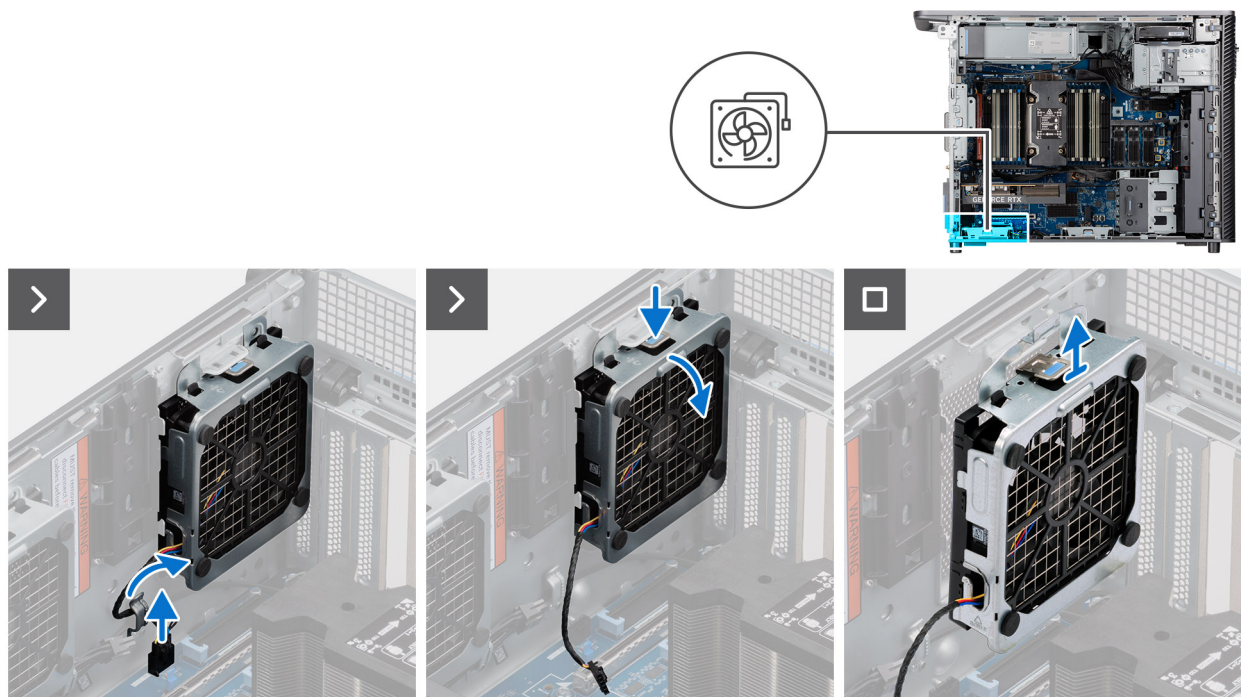


Figure 102. Removing the bottom chassis fan 5

Steps

1. Disconnect the fan cable from the connector on the system board.
2. Press the tab to release the chassis fan from the slot.
3. At an angle, lift the chassis fan and remove it from the chassis.

Installing the bottom chassis fan 5

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 bottom chassis fan 5 and provide a visual representation of the installation procedure.

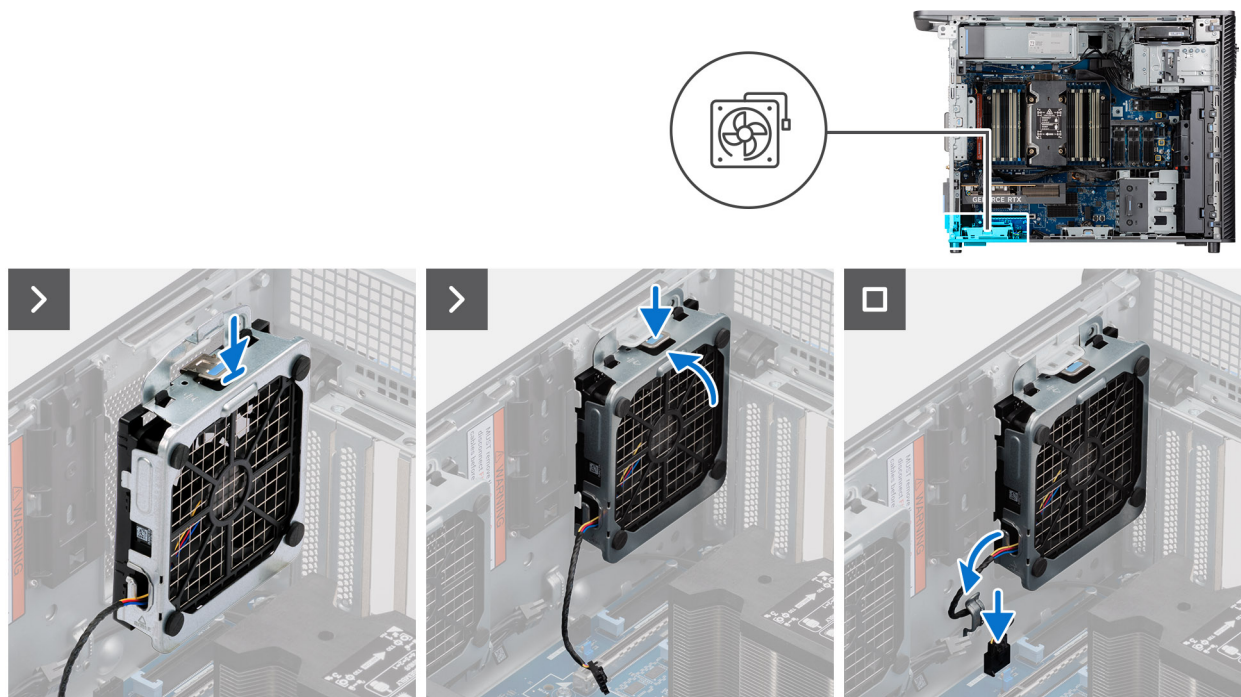


Figure 103. Installing the bottom chassis fan 5

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.

Next steps

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

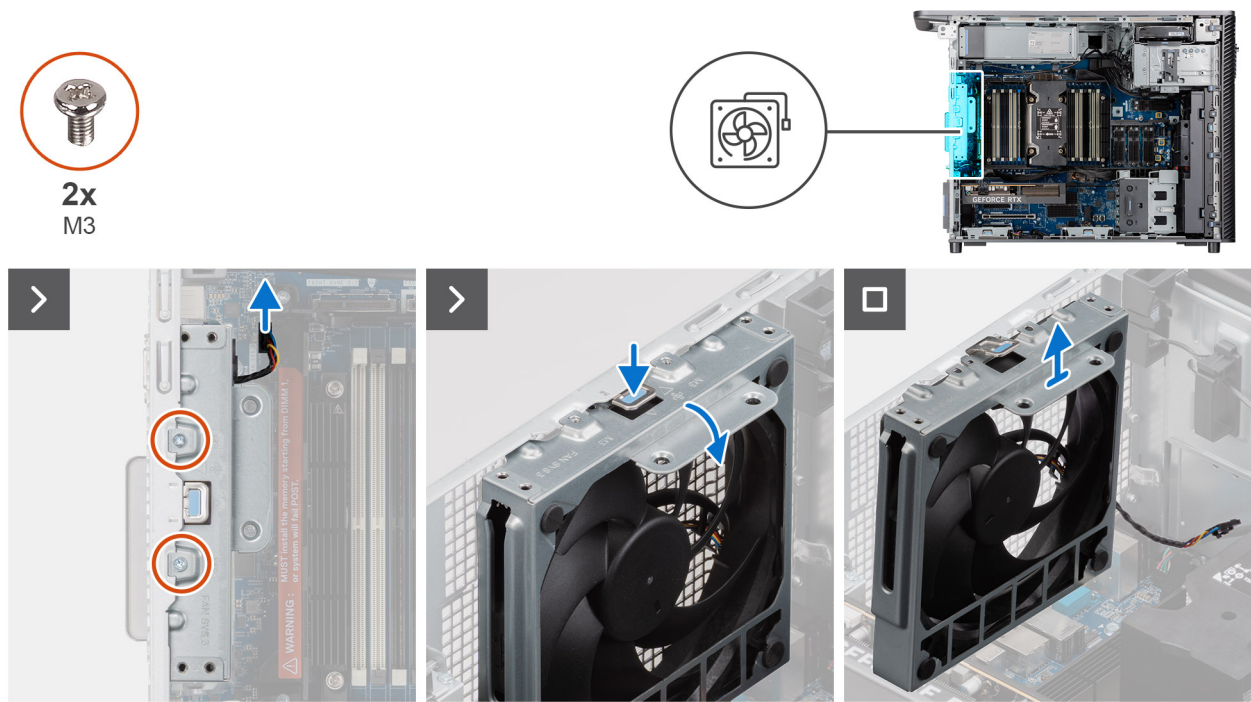


Figure 104. Removing the rear chassis fan

Steps

1. Disconnect the fan cable from the connector on the system board.
2. Remove the two screws (M3) that secure the fan to the chassis.
3. Press the tab to release the rear fan from the slot.
4. 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.

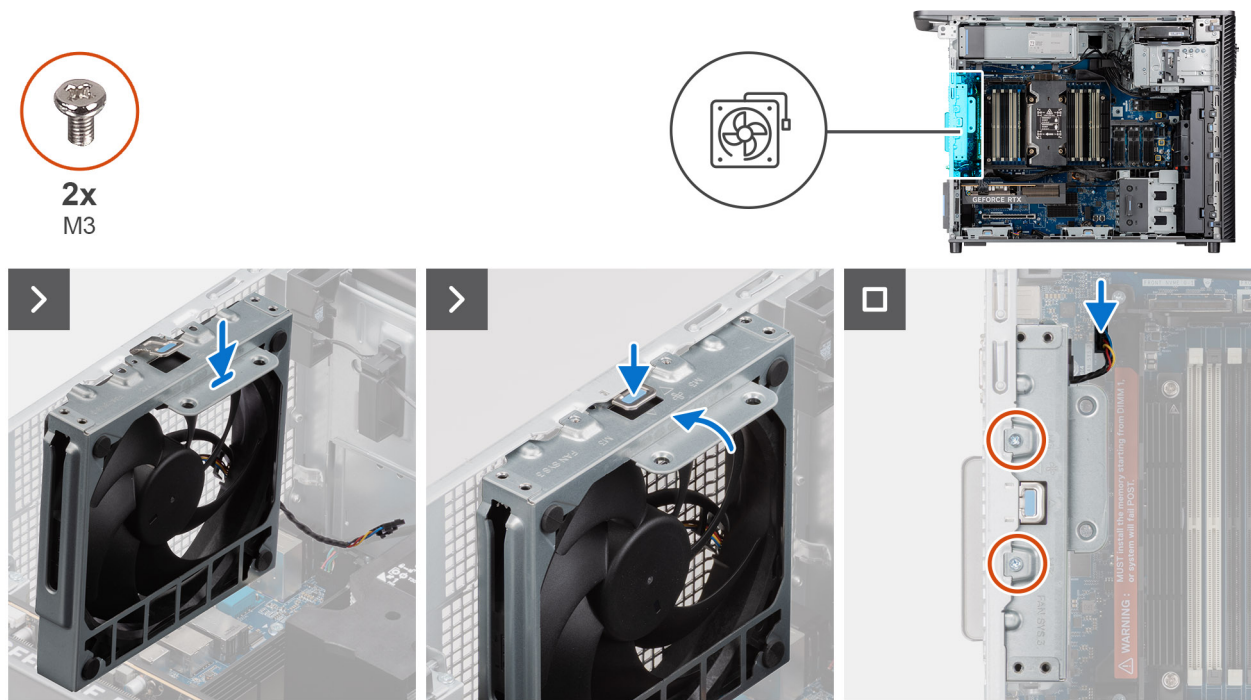


Figure 105. Installing the rear chassis fan

Steps

1. Align and place the rear fan on the chassis.
2. Insert the rear chassis fan at an angle into the slot in the chassis.
3. Install the two screws (M3) to secure the fan to the chassis.
4. Connect the fan cable to the connector on the system board.

Next steps

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

Expansion riser box

Removing the expansion riser box

Prerequisites

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

About this task

The following images indicate the visual representation of the expansion riser box removal procedure.

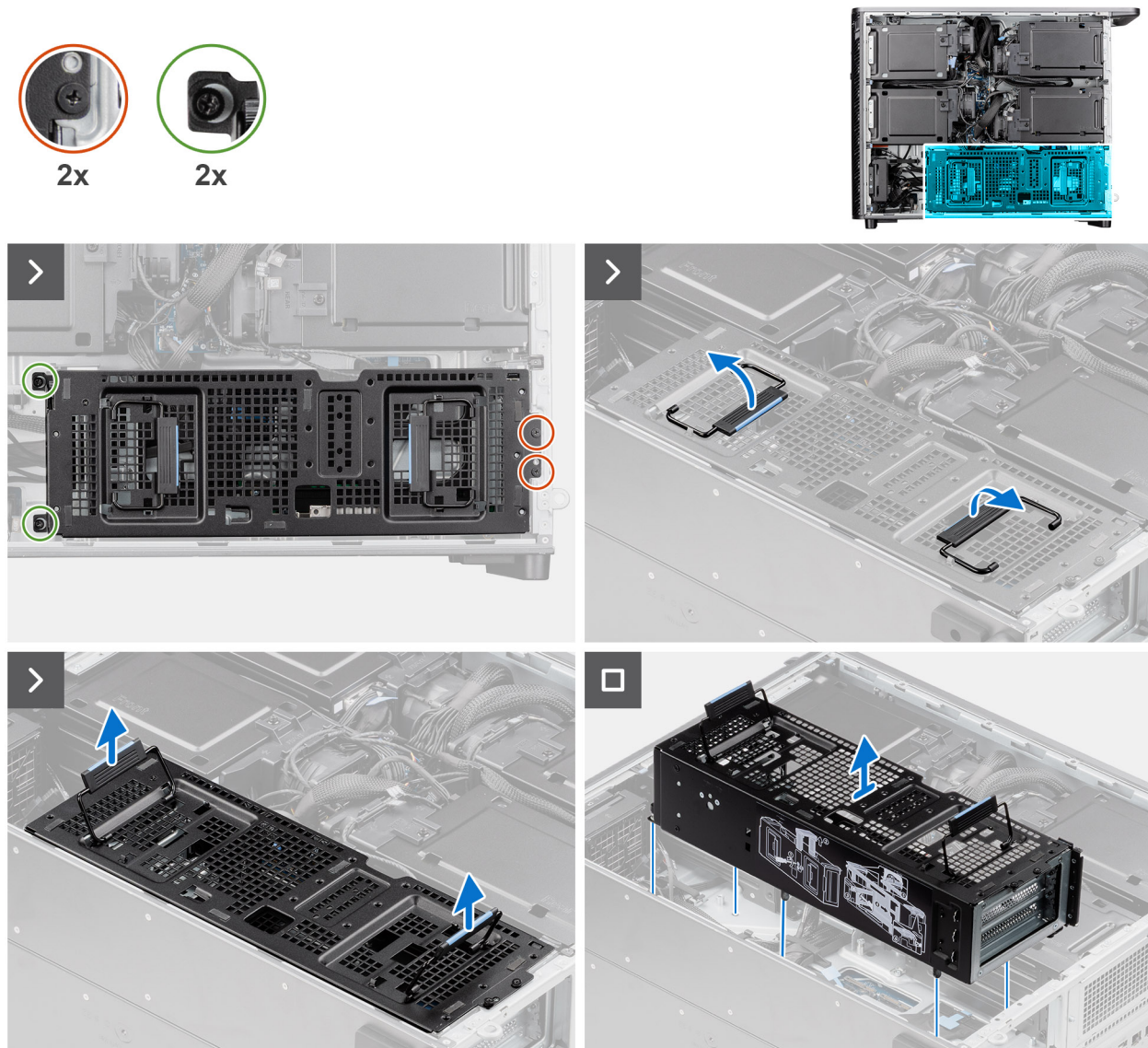


Figure 106. Removing the expansion riser box

Steps

1. Loosen the four captive screws that secure the riser box to the chassis.
2. Lift to open the riser handles.
3. Holding the riser handles, lift the expansion riser box out of the computer.

Removing the expansion riser box board

Prerequisites

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

About this task

The following images indicate the visual representation of the expansion riser box board removal procedure.

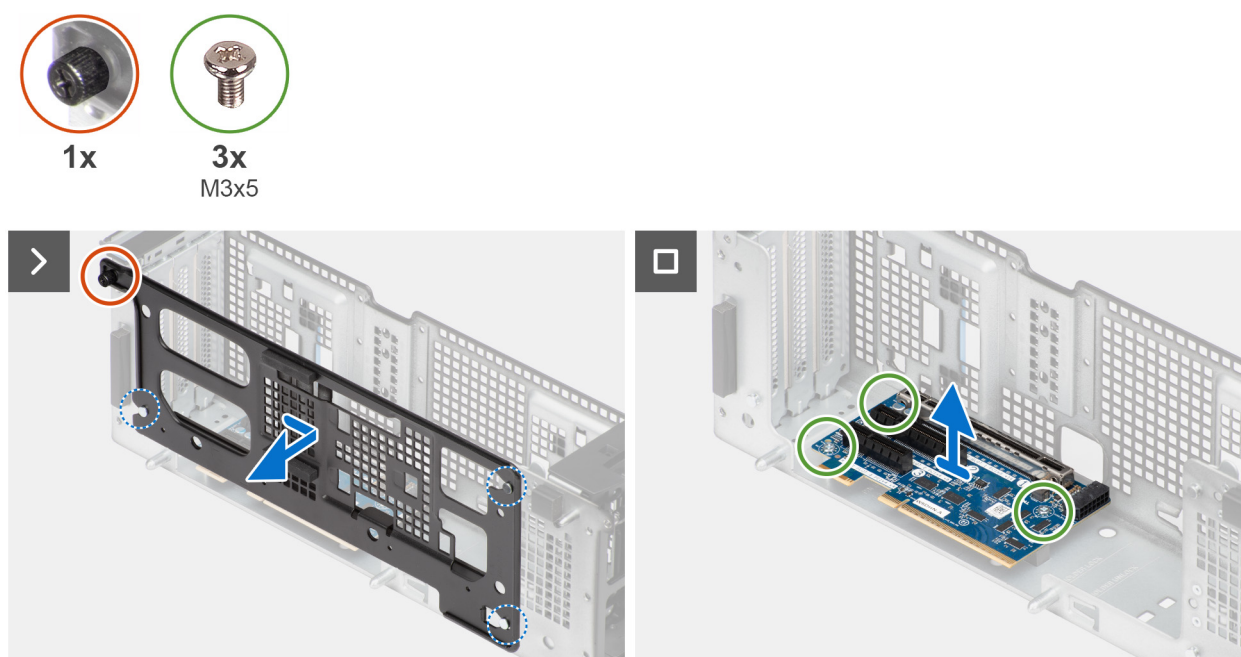


Figure 107. Removing the expansion riser box board

Steps

1. Loosen the captive screw that secures the riser box cover to the box.
2. Slide the riser box cover to disengage it from the box and remove it.
3. Remove the three screws (M3x5) that secure the board to the riser box.
4. Lift the riser box board out of the riser box.

Installing the expansion riser box board

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 expansion riser box board and provide a visual representation of the installation procedure.

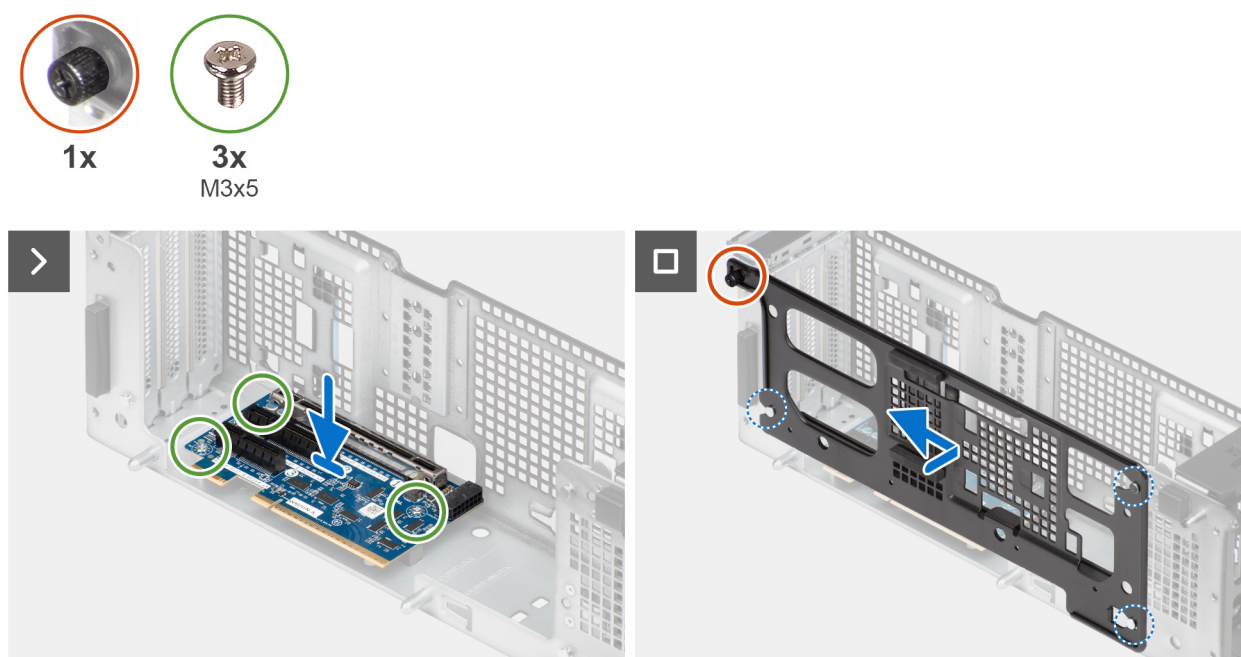


Figure 108. Installing the expansion riser box board

Steps

1. Align the screw holes on the riser board with the holes on the riser box.
2. Replace the three screws (M3x5) to secure the riser board to the box.
3. Align the standoff posts on the riser box with the slots on the riser box cover.
4. Slide to lock the riser box cover and tighten the screw to secure the cover to the box.

Next steps

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

Installing the expansion riser box

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 expansion riser box and provide a visual representation of the installation procedure.

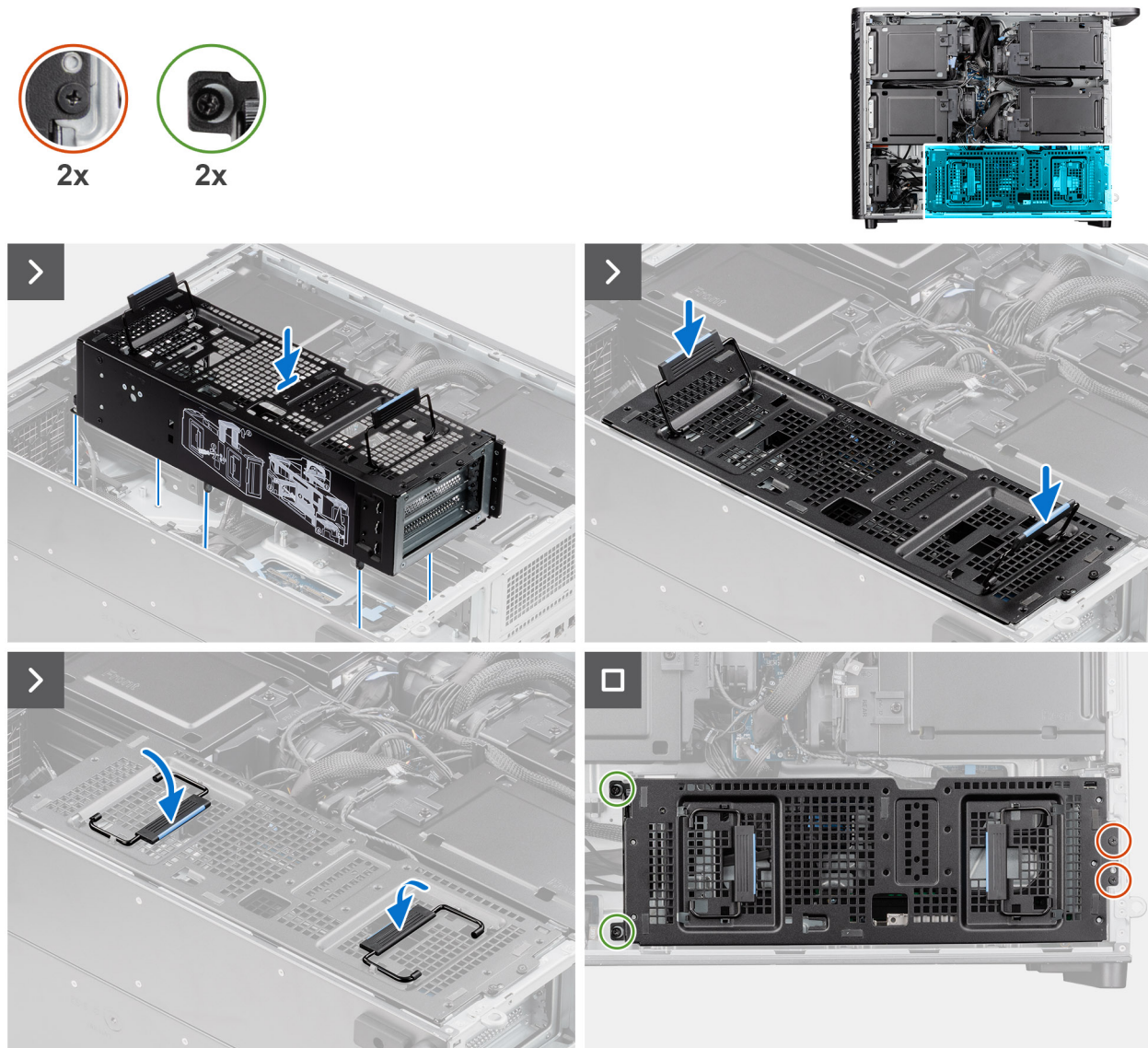


Figure 109. Installing the expansion riser box

Steps

1. Align the standoff posts on the riser box with the slots on the chassis.
2. Insert the riser box into the slot and close the riser handles.
3. Tighten the four captive screws to secure the riser box to the chassis.

Next steps

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

Expansion bay fan module

Removing the expansion NVMe-bay fan module

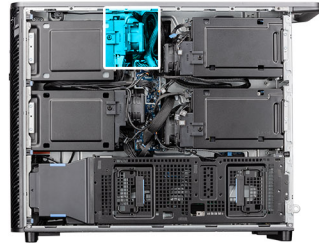
Prerequisites

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

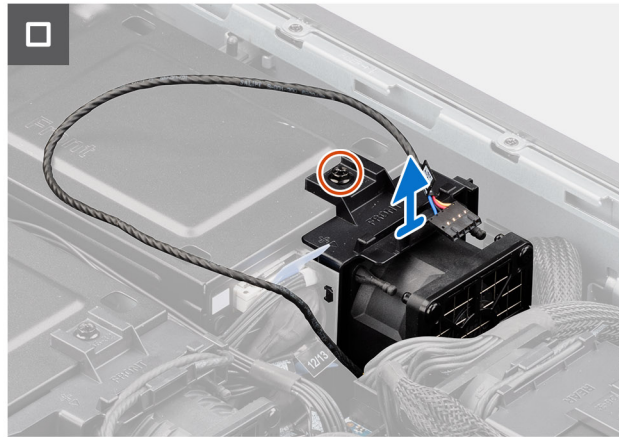
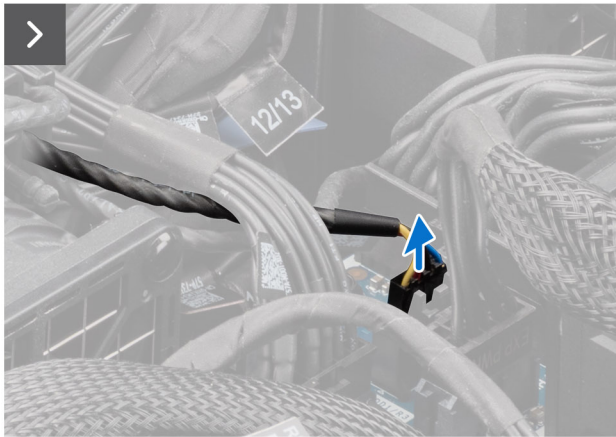
2. Remove the [right side cover](#).

About this task

The following images indicate the location of the expansion NVMe-bay fan module and provide a visual representation of the removal procedure.



1x
6-32



Steps

1. Disconnect the fan-controller cable from the connector on the expa board.
2. Remove the screw (6-32) that secure the fan module to the bay.
3. Lift and remove the fan module away from the computer.

Installing the expansion NVMe-bay fan module

Prerequisites

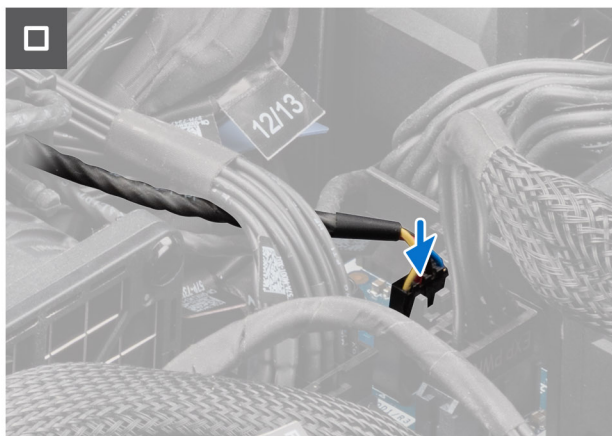
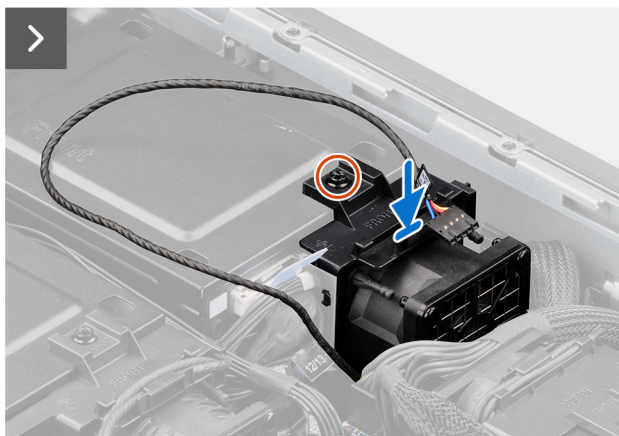
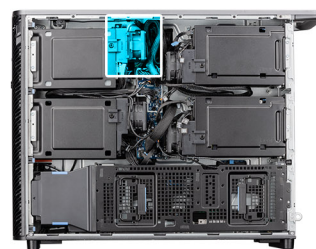
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following images indicate the location of the expansion NVMe-bay fan module and provide a visual representation of the installation procedure.



1x
6-32



Steps

1. Align the screw hole on the expansion NVMe-bay fan module with the screw hole on the flex12.
2. Install the screw (6-32) to secure the fan module to the bay.
3. Connect the fan-controller cable to the connector on the expa board.

Next steps

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

Removing the expansion hdd-bay fan module

Prerequisites

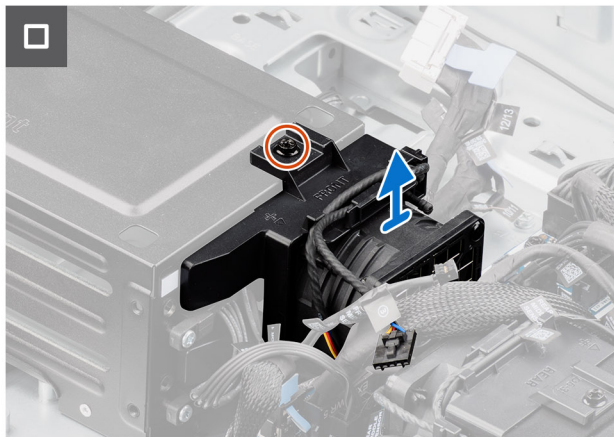
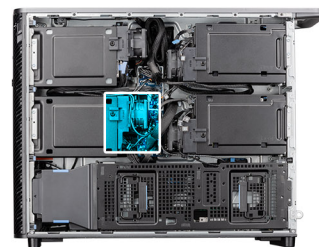
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [right side cover](#).

About this task

The following images indicate the location of the expansion hdd-bay fan module and provide a visual representation of the removal procedure.



1x
6-32



Steps

1. Disconnect the fan-controller cable from the connector on the expa board.
2. Remove the screw (6-32) that secures the fan module to the bay.
3. Lift and remove the expansion hdd-bay fan module away from the computer.

Installing the expansion hdd fan module

Prerequisites

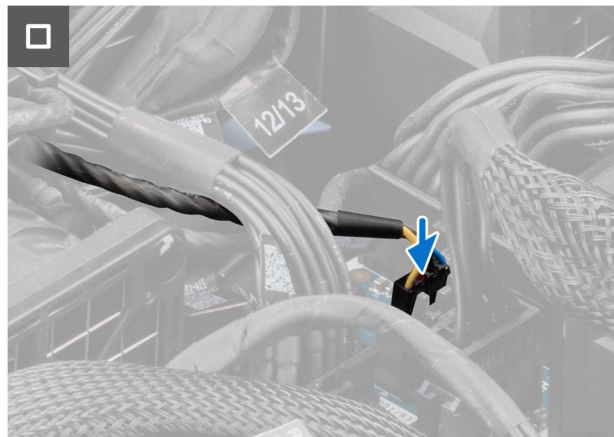
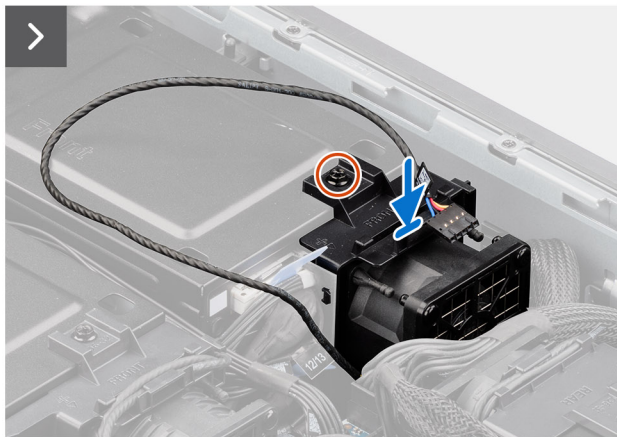
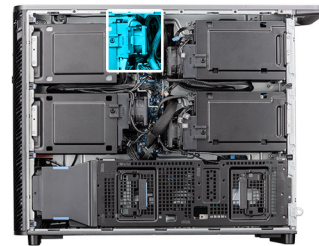
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following images indicate the location of the expansion hdd fan module and provide a visual representation of the installation procedure.



1x
6-32



Steps

1. Align the screw hole on the expansion hdd-bay fan module with the screw hole on the bay.
2. Install the screw (6-32) to secure the fan module to the bay.
3. Connect the fan-controller cable to the connector on the expa board.

Next steps

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

Removing the expansion riser fan module

Prerequisites

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

About this task

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

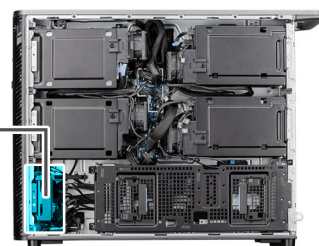
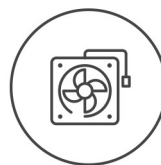


Figure 110. Removing the expansion riser fan module

Steps

1. Disconnect the riser fan-controller cable from the connector.
2. Remove the screw (Mx3) that secures the fan module to the bay.
3. Tilt and lift the fan module away from the computer.

Installing the expansion riser fan 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 expansion riser fan module and provide a visual representation of the installation procedure.

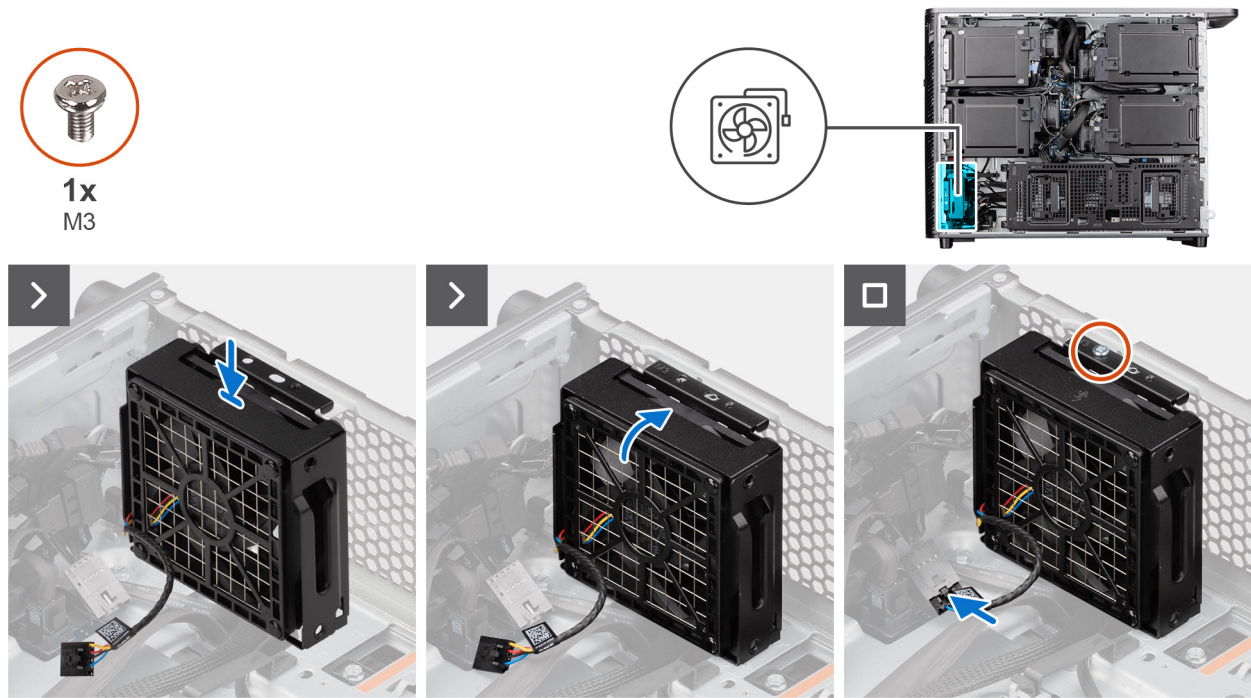


Figure 111. Installing the expansion riser fan module

Steps

1. Align the screw hole on the riser fan module with the screw hole on the chassis.
2. Install the screw (Mx3) to secure the fan module to the chassis.
3. Connect the fan-controller cable to its connector.

Next steps

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

Graphics midholder

Removing the midholder

Prerequisites

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

About this task

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

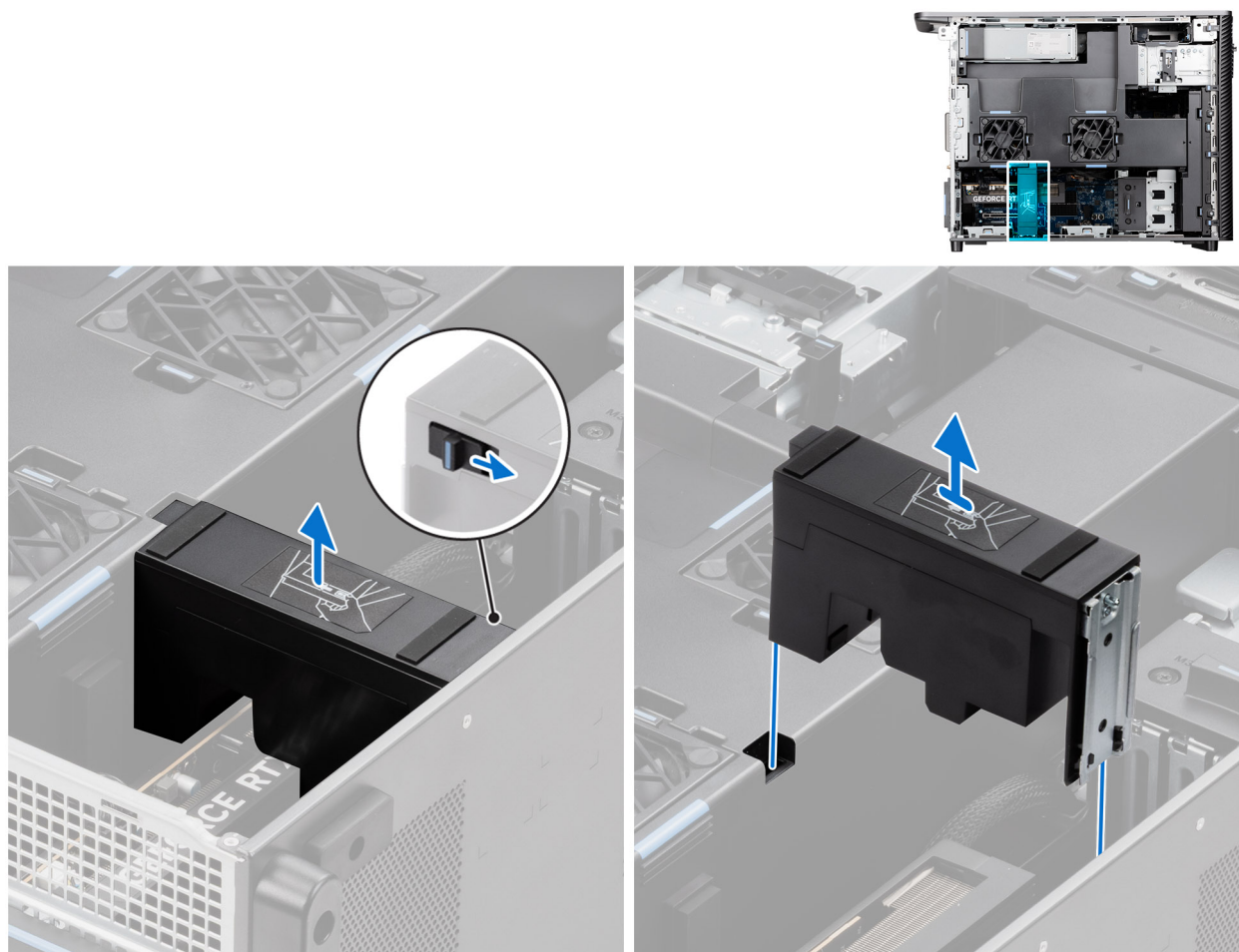


Figure 112. Removing the midholder

Steps

1. Slide the lock on the midholder to unlock position.
2. Lift the midholder from the computer.

Installing the midholder

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 midholder and provide a visual representation of the installation procedure.

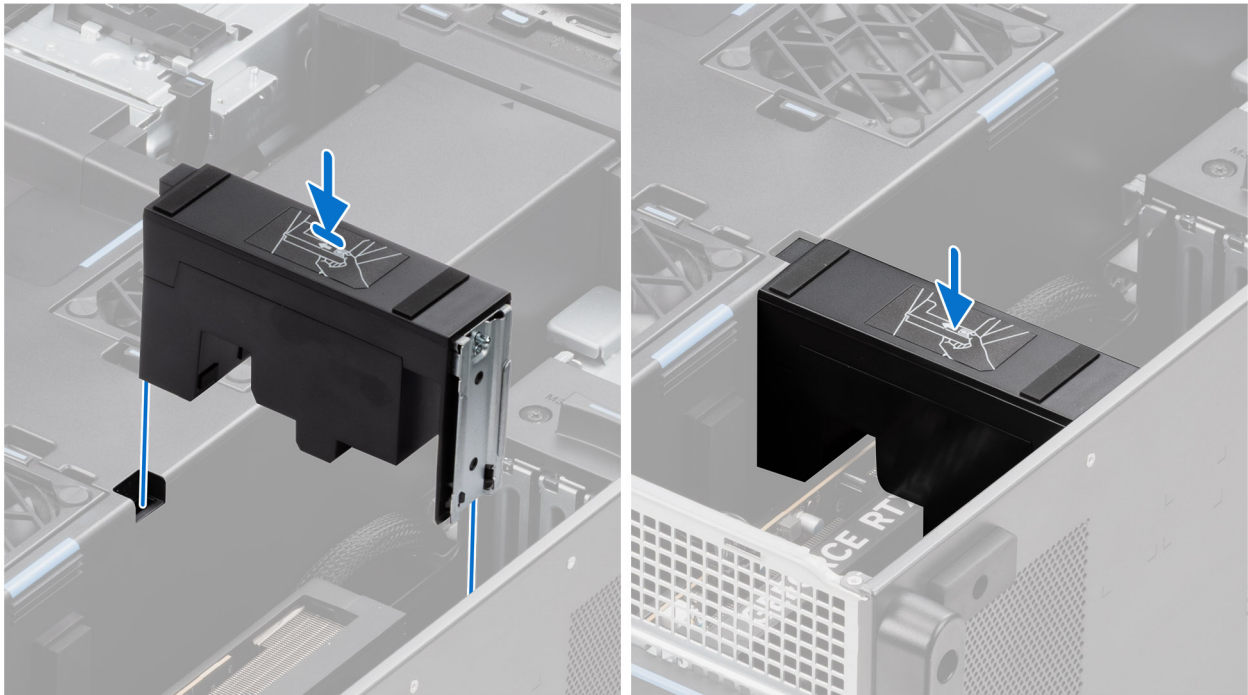
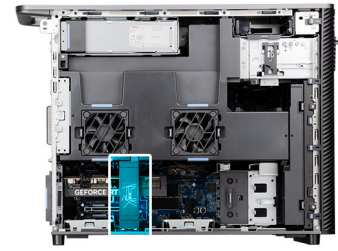


Figure 113. Installing the midholder

Steps

1. Align the rail on the midholder with the slots on the chassis.
2. Slide the midholder down into its slot.
3. Slide the lock on the midholder to lock position to secure it to the chassis.

Next steps

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

Graphics card

Removing the non-powered graphics card

Prerequisites

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

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

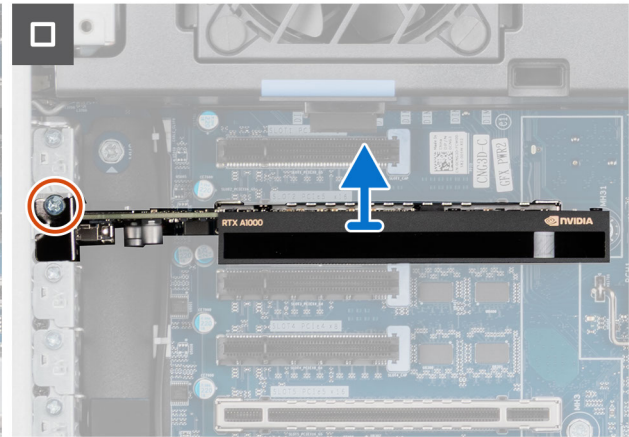
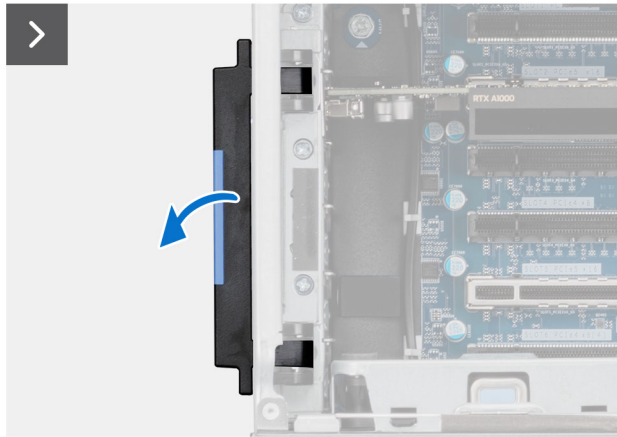
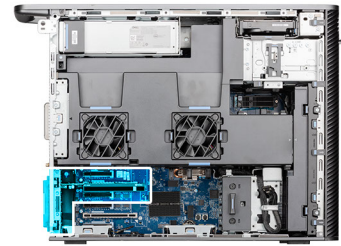


Figure 114. Removing the nonpowered graphics card

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

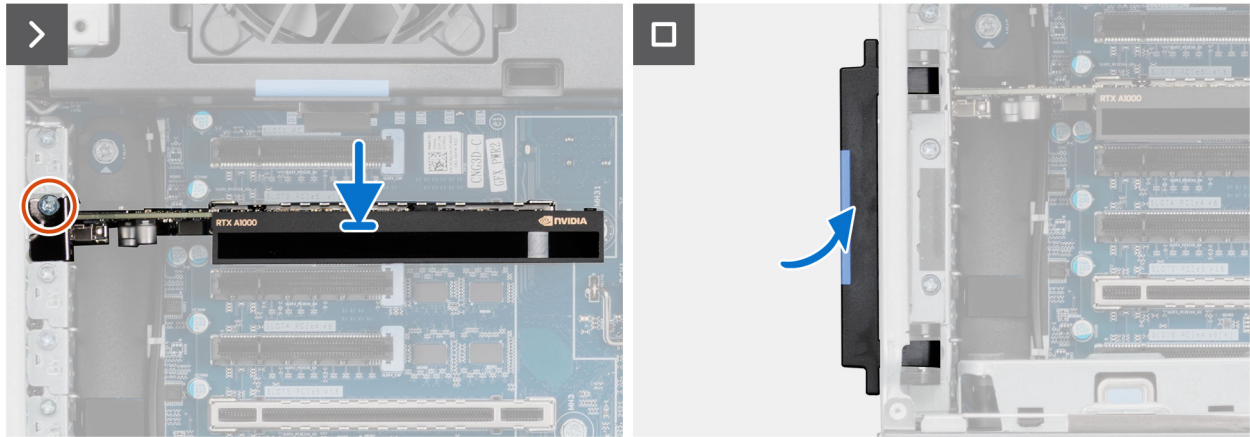
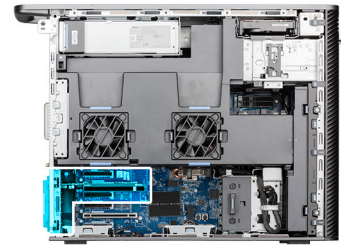


Figure 115. Installing the nonpowered graphics card

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 [left side cover](#).
2. 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 [left side cover](#).

About this task

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

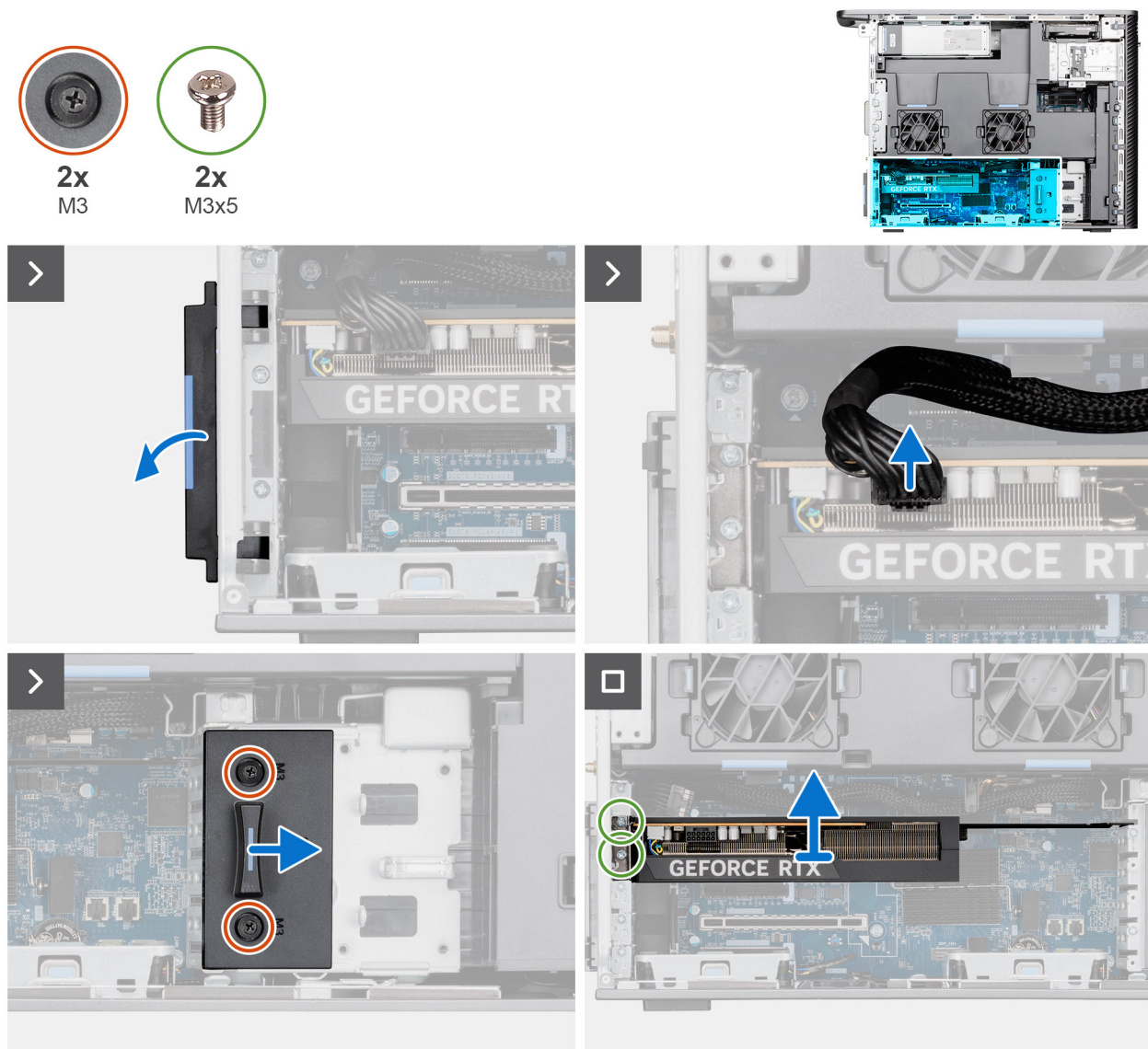


Figure 116. Removing the powered graphics card

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.

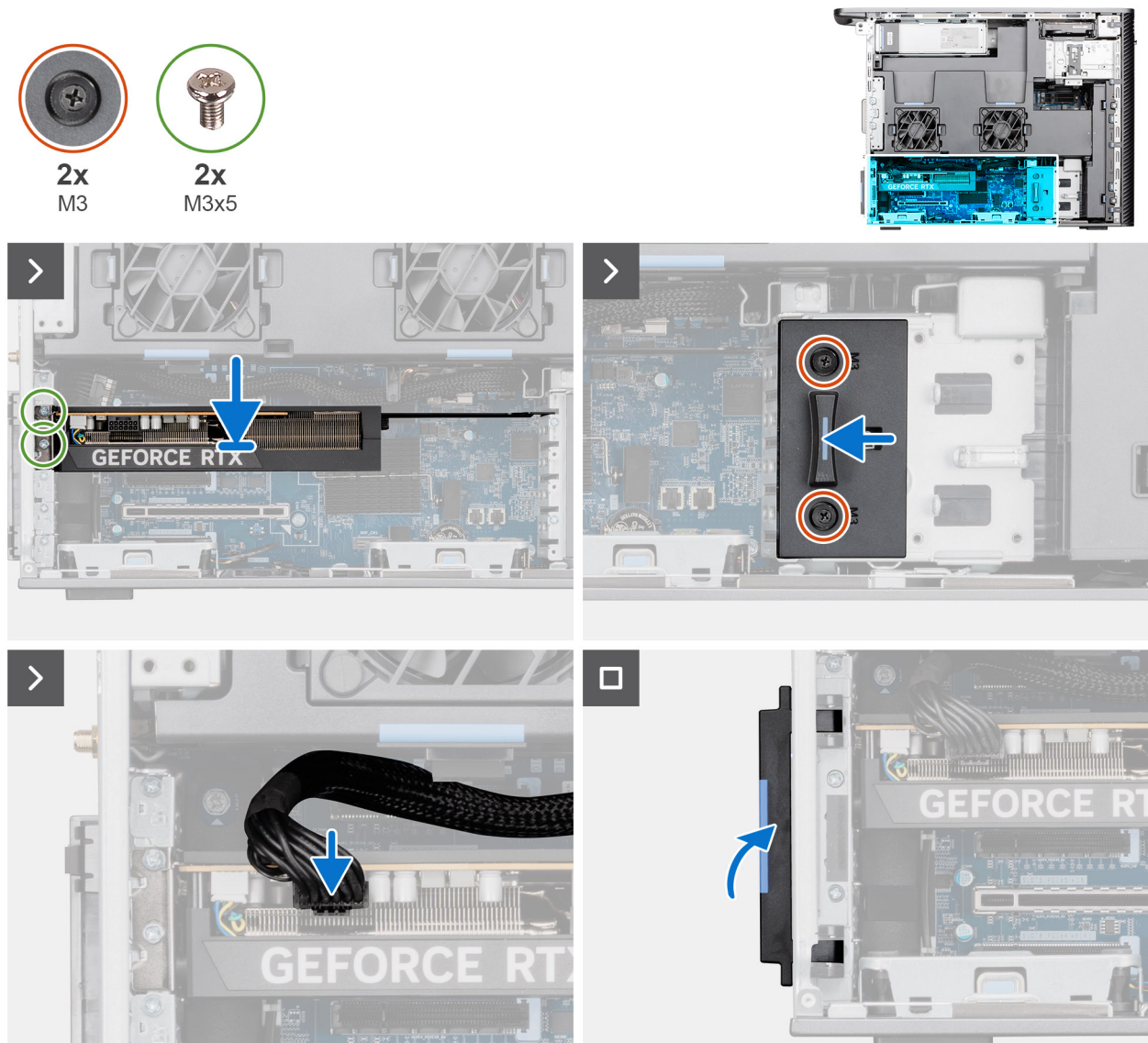


Figure 117. Installing the powered graphics card

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 [left side cover](#).
2. 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 [left side cover](#).

 **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.

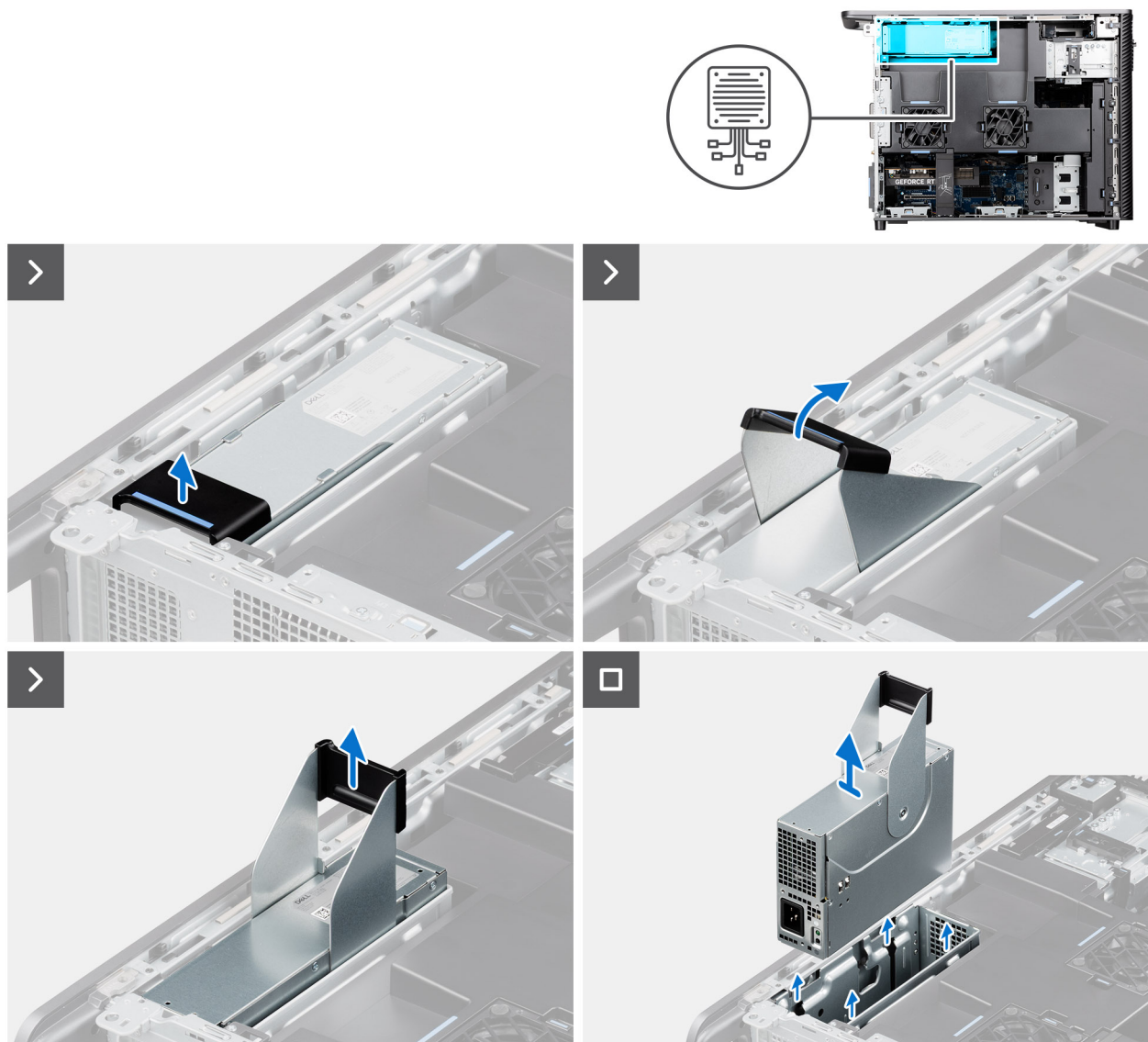


Figure 118. Removing the PSU

Steps

1. Hold the PSU handle on the gripping point.
2. Rotate the PSU handle to release it from the slot.

3. Lift and the slide the PSU out of the computer.

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.

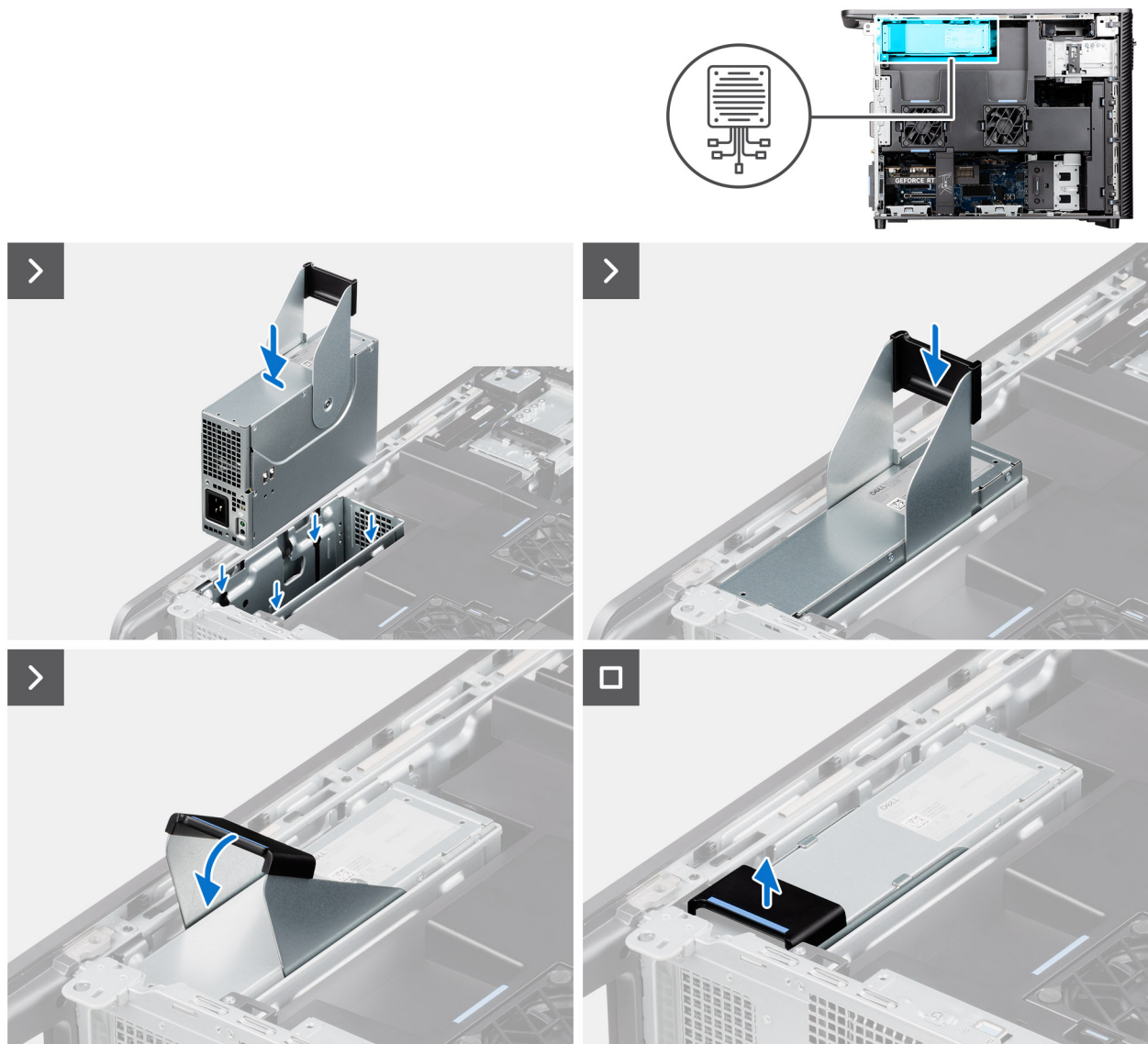


Figure 119. Installing the PSU

Steps

1. Slide the power-supply unit into the slot on the computer.
2. Ensure that the PSU is seated firmly in the slot.
3. Rotate the PSU handle to secure the PSU in the slot.

Next steps

1. Install the [left side cover](#).

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

Wireless external puck antenna (optional)

Removing the wireless internal SMA cable

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [left side cover](#).
3. Remove the [air shroud](#).
4. Remove the [wireless card](#).
5. Remove the [graphics card end holder](#).

About this task

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

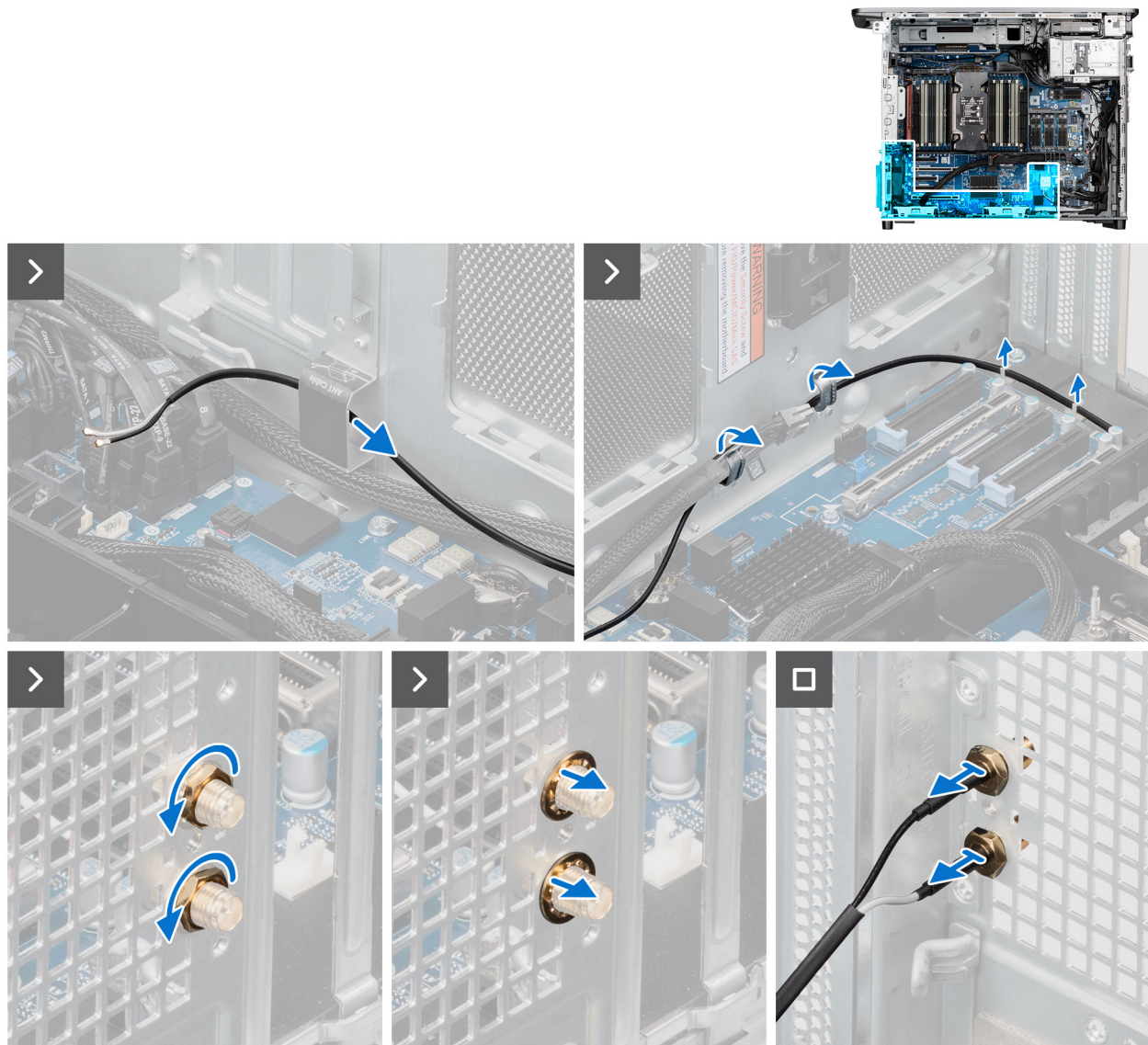


Figure 120. Removing the wireless internal SMA cable

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.

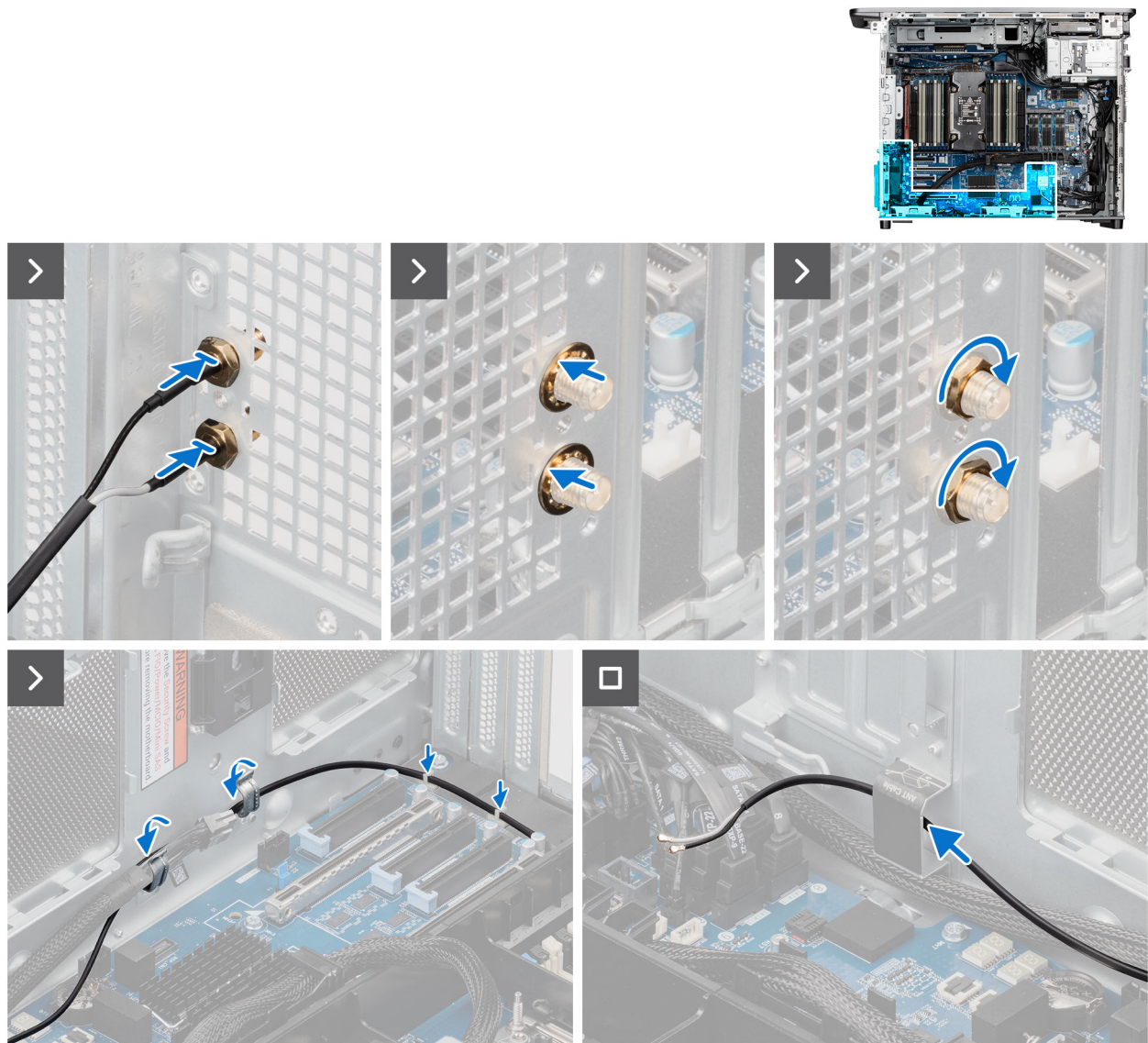


Figure 121. Installing the wireless internal SMA cable

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 [graphics card end holder](#).
2. Install the [wireless card](#).
3. Install the [air shroud](#).
4. Install the [left side cover](#).
5. 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.

Internal speaker

Removing the internal speaker

 **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 [left side cover](#).
3. Remove the [right side cover](#).
4. Remove the [air shroud](#).
5. Remove the [main bezel](#).
6. Remove the [expansion bezel](#).
7. Remove the [graphics card end holder](#).
8. Remove the [front chassis fan assembly](#).

About this task

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

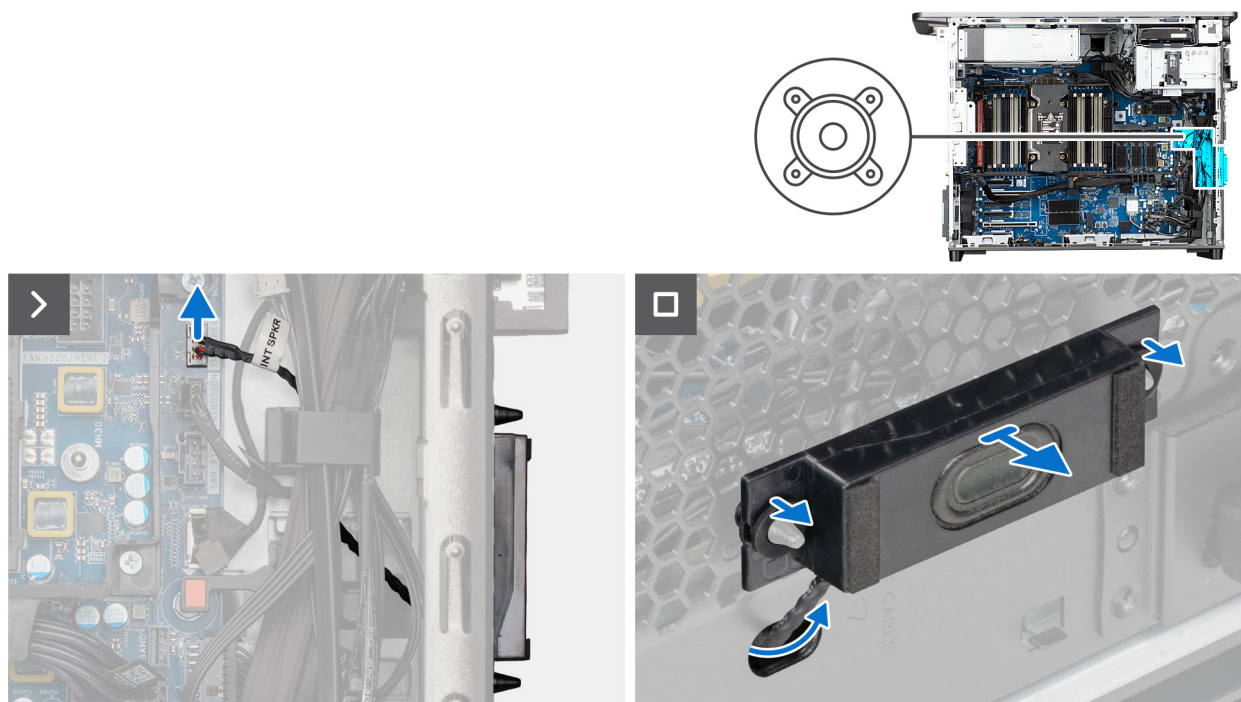


Figure 122. Removing the internal speaker

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

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

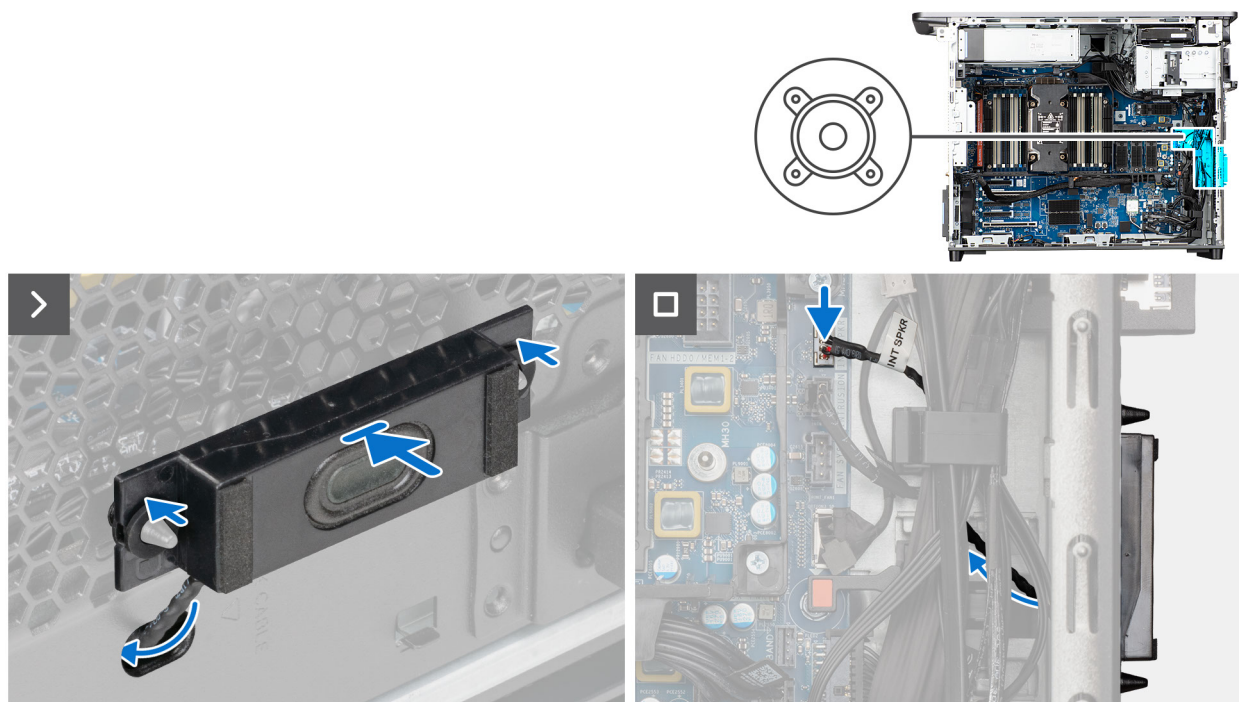


Figure 123. Installing the internal speaker

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 [front chassis fan assembly](#).
2. Install the [graphics card end holder](#).
3. Install the [expansion bezel](#).
4. Install the [main bezel](#).
5. Install the [air shroud](#).
6. Install the [right side cover](#).
7. Install the [left side cover](#).
8. Follow the procedure in [after working inside your computer](#).

Front I/O-board

Removing the front I/O-module

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [left side cover](#).
3. Remove the [right side cover](#).
4. Remove the [expansion bezel](#).
5. Remove the [main bezel](#).
6. Remove the [graphics card end holder](#).
7. Remove the [front chassis fan assembly](#).

About this task

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

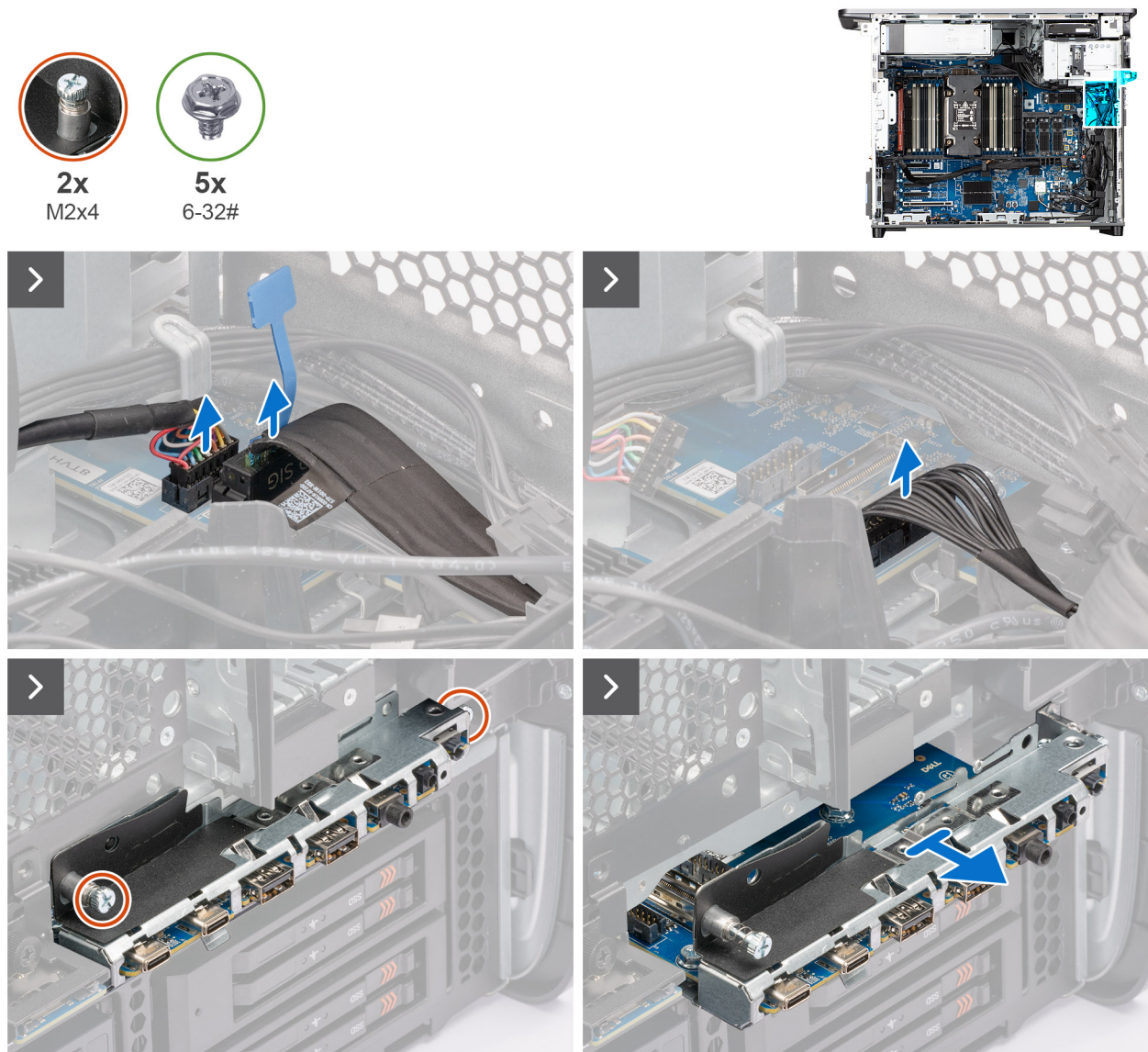


Figure 124. Removing the front I/O-module

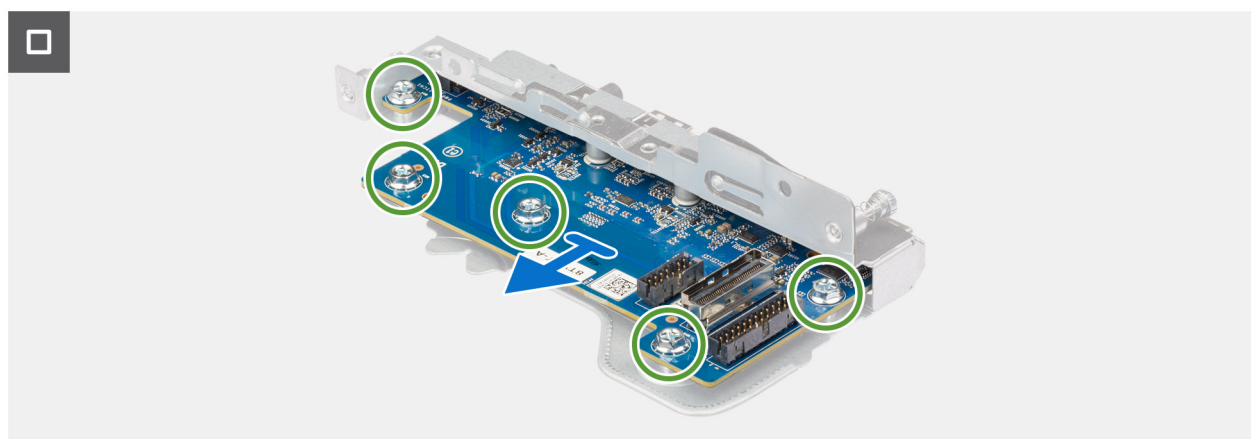


Figure 125. Removing the front I/O-bracket

Steps

1. Disconnect the audio, signal, and power cables from the connectors on the I/O board.
2. Using the blue pull tag, disconnect the power cable from the connector on the I/O board.
3. Loosen the two captive screws that secure the front I/O-module to the chassis.
4. Slide and remove the front I/O-module out of the chassis.
5. Remove the five screws (#6-32) that secure the front I/O board to the front I/O bracket.
6. Slide the front I/O board out of the front I/O bracket.

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

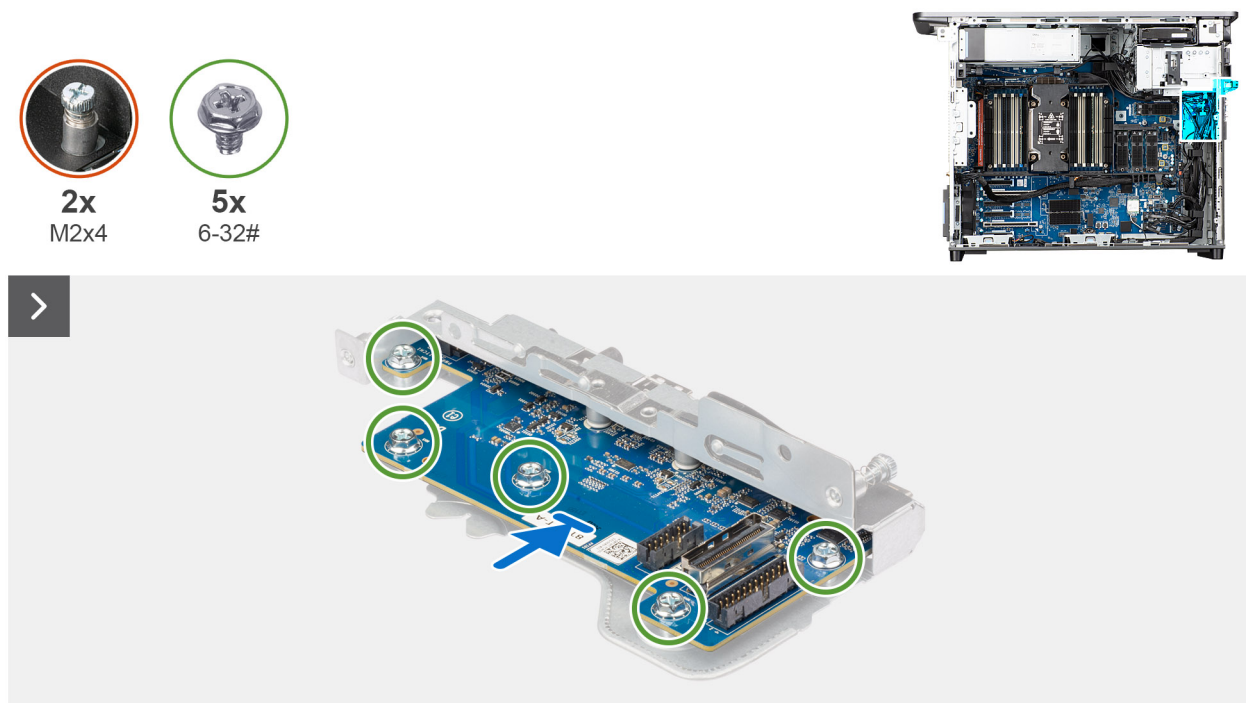


Figure 126. Installing the front I/O bracket

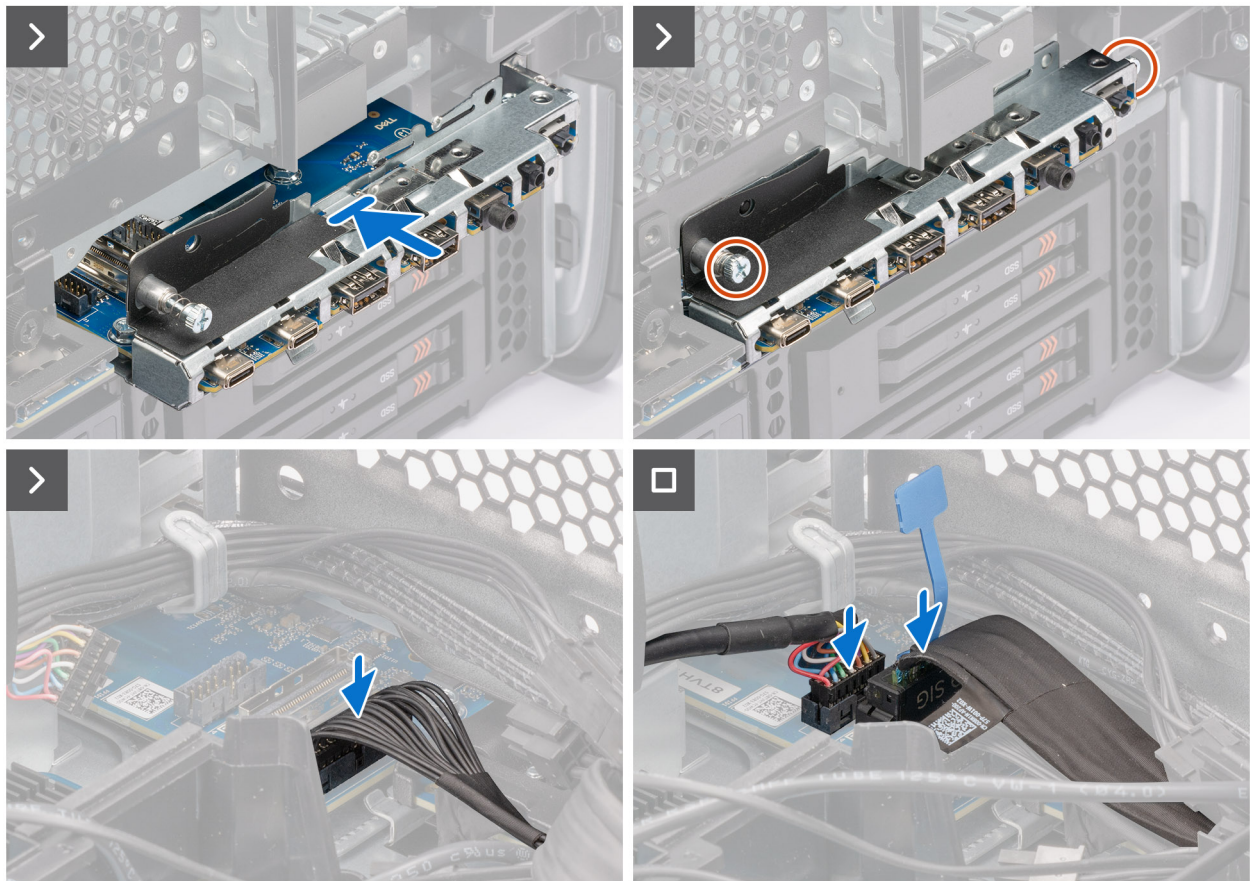


Figure 127. Installing the front I/O module

Steps

1. Align and slide the front I/O board into the front I/O bracket.
2. Replace the five screws (#6-32) to secure the front I/O board to the front I/O bracket.
3. Slide the front I/O module into the slot of the chassis.
4. Tighten the two captive screws to secure the front I/O module to the chassis.
5. Connect the front I/O power cable to the connector on the front I/O board.
6. Connect the front I/O audio, signal, and power cables to the connectors on the front I/O board.

Next steps

1. Install the [front chassis fan](#).
2. Install the [graphics card end holder](#).
3. Install the [main bezel](#).
4. Install the [expansion bezel](#).
5. Install the [right side cover](#).
6. Install the [left side cover](#).
7. Follow the procedure in [after working inside your computer](#).

Heat sink

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

About this task

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

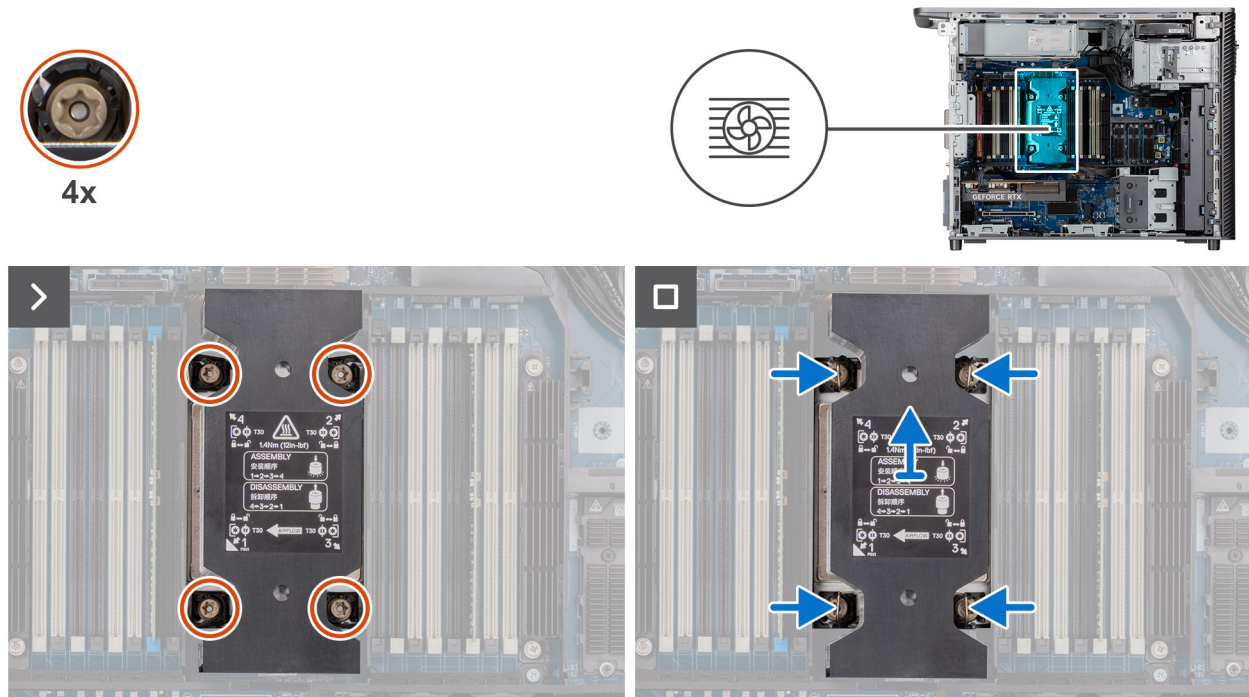


Figure 128. Removing the heat-sink assembly

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 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 heat-sink assembly and provide a visual representation of the installation procedure.

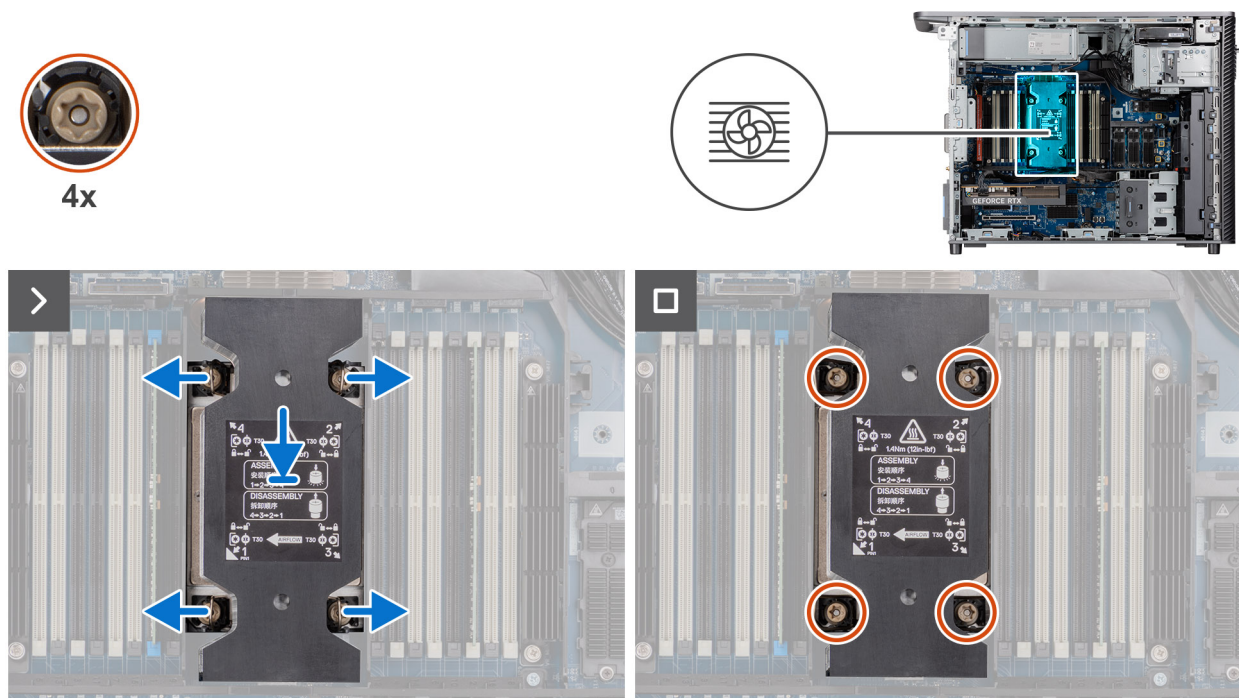


Figure 129. Installing the heat-sink assembly

Steps

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

Align the screws on the 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 [left 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 [left side cover](#).
3. Remove the [air shroud](#).
4. Remove the [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.

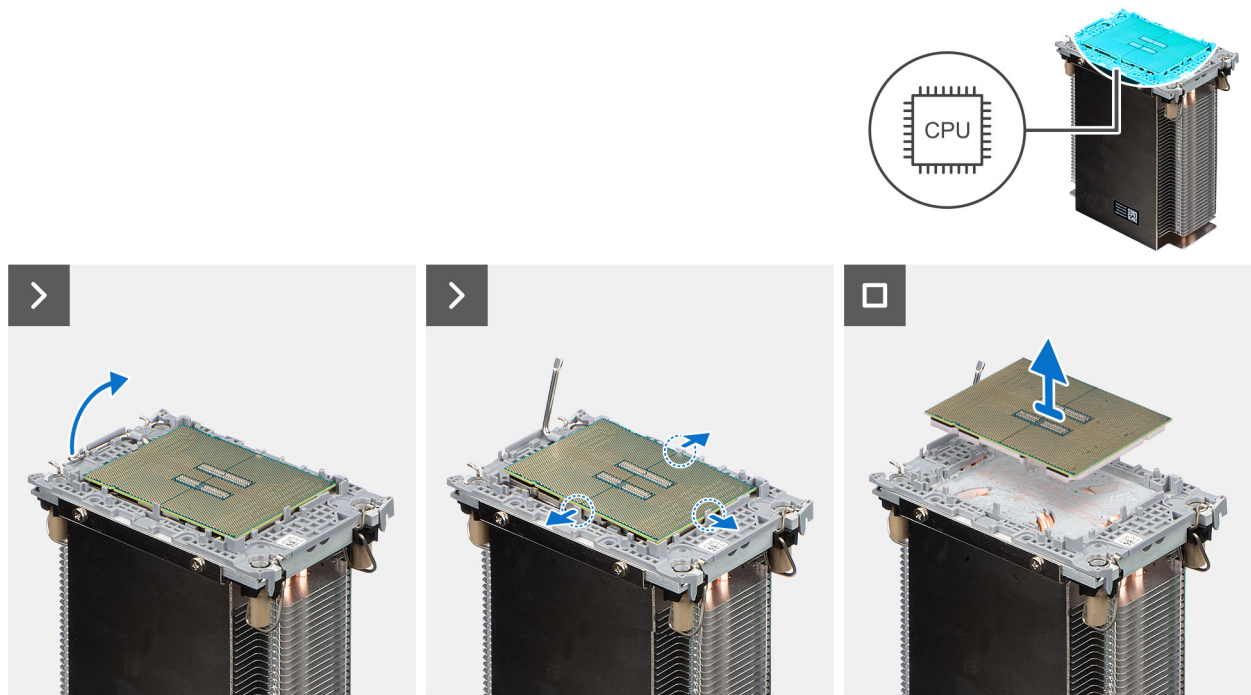


Figure 130. Removing the processor

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.

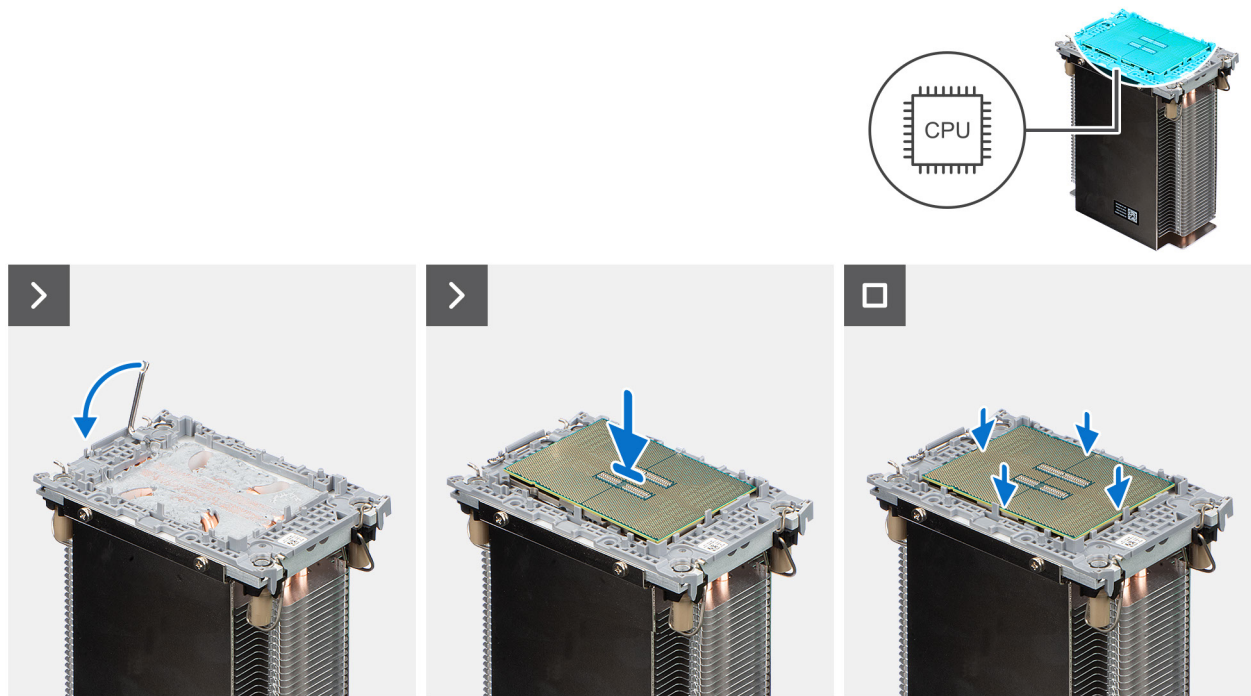


Figure 131. Installing the processor

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

Power-distribution board

Removing the power-distribution bracket and board

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [left side cover](#).
3. Remove the [right side cover](#).
4. Remove the [air shroud](#).
5. Remove the [power-supply unit](#).

About this task

The following images indicate the location of the power-distribution bracket and board and provide a visual representation of the removal procedure.

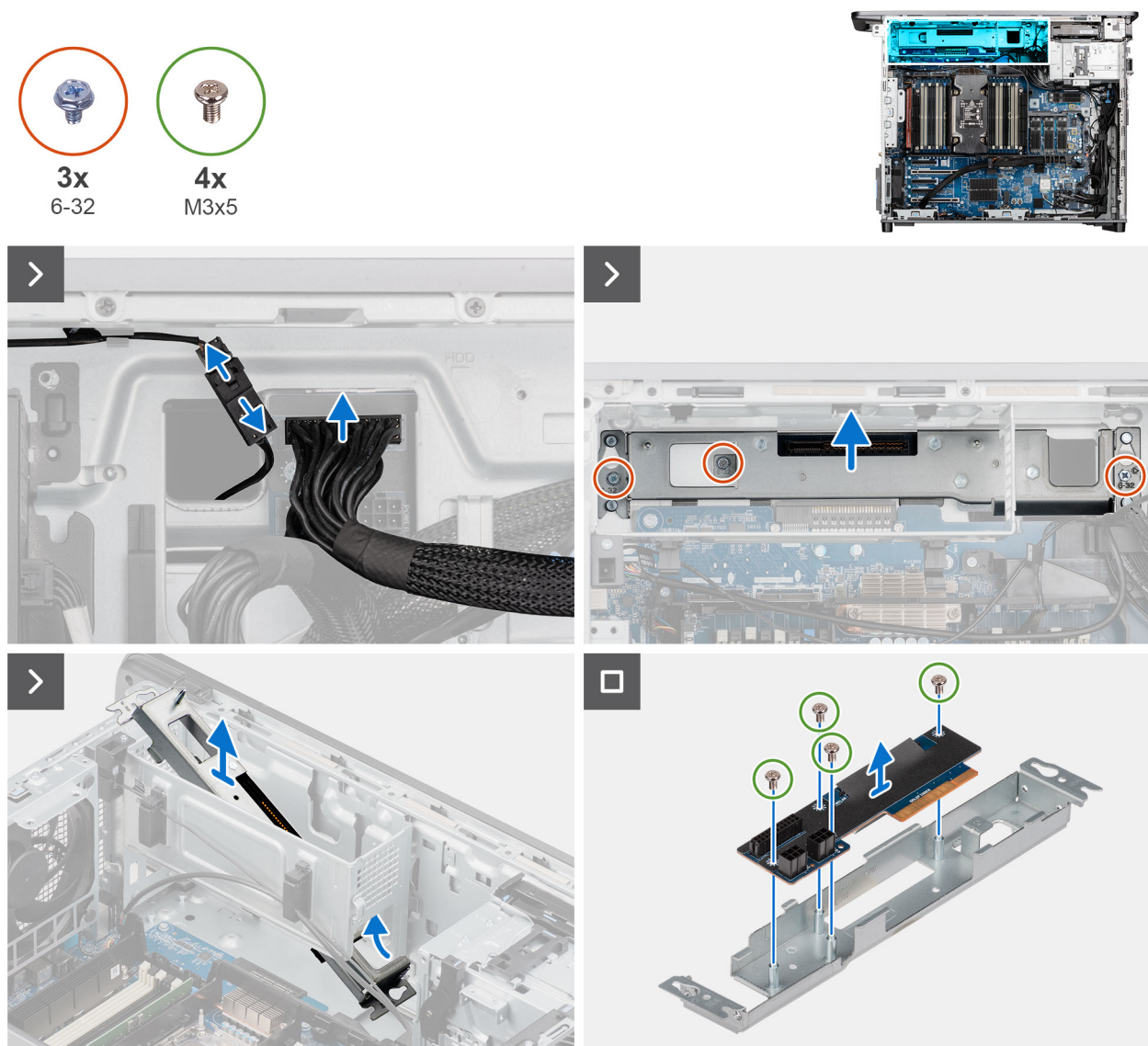


Figure 132. Removing the power-distribution bracket and board

Steps

1. Disconnect the intruder and power cable from their connectors.
2. Remove the three screws (6-32) that secure the power-distribution bracket to the chassis.
3. Slide the power-distribution bracket at an angle and lift it off the chassis.
4. Remove the five screws (M3x5) that secure the power-distribution board to the power-distribution bracket.
5. Lift the power-distribution board off the bracket.

Installing the power-distribution board and 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 power-distribution board and bracket and provide a visual representation of the installation procedure.

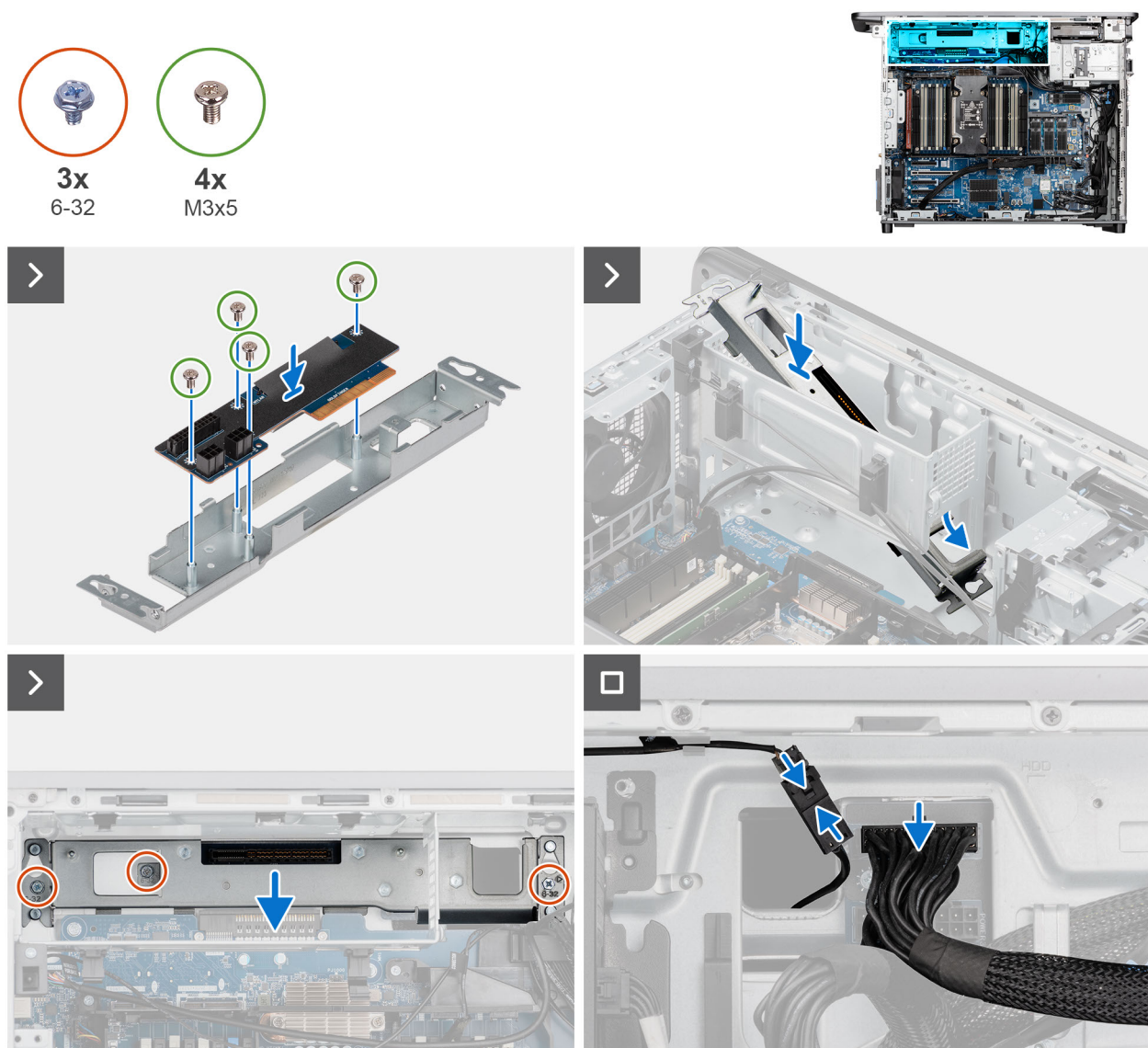


Figure 133. Installing the power-distribution board and bracket

Steps

1. Align and place the power-distribution board on the bracket.
2. Replace the four (M3x5) screws to secure the power-distribution board to the bracket.
3. Slide the power-distribution bracket at an angle and align it with the chassis.
4. Replace the three (6-32) screws to secure the power-distribution bracket to the chassis.
5. Connect the intruder and power cable to their connectors.

Next steps

1. Install the [power-supply unit](#).
2. Install the [air shroud](#).
3. Install the [right side cover](#).
4. Install the [left side cover](#).
5. Follow the procedure in [after working inside your computer](#).

HEPCB board

Removing the HEPCB board

Prerequisites

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

About this task

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



4x
M3

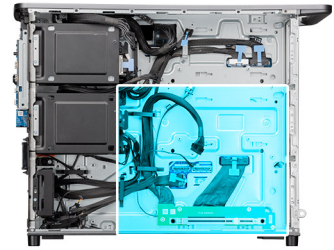


Figure 134. Removing the HEPCB board

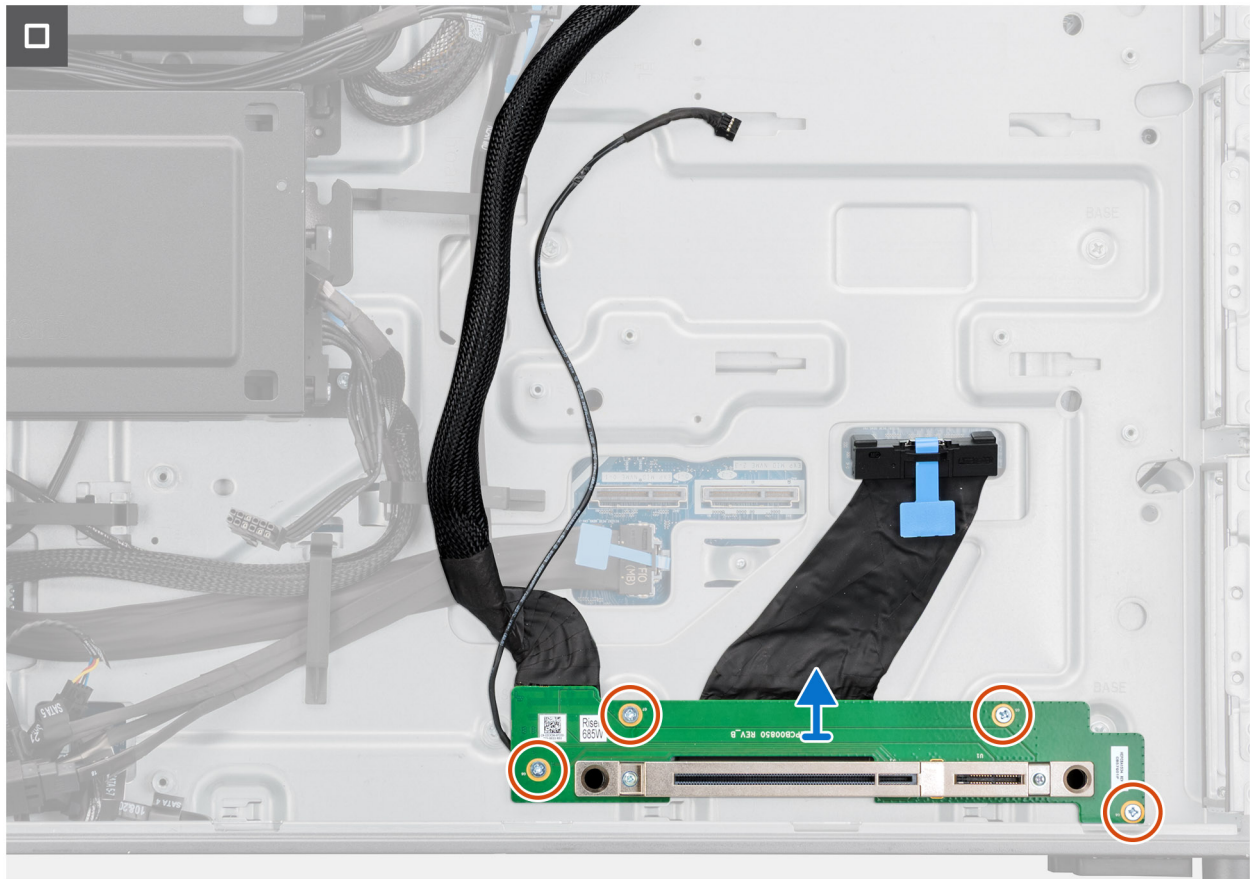


Figure 135. Removing the HEPCB board

Steps

1. Disconnect the HEPCB board cable from the connectors on the system board.
2. Remove the data and sensor cables from the routing clips.
3. Remove the four screws (M3) that secure the HEPCB board to the chassis.
4. Lift the HEPCB board out of the computer.

Installing the HEPCB board

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



4x
M3

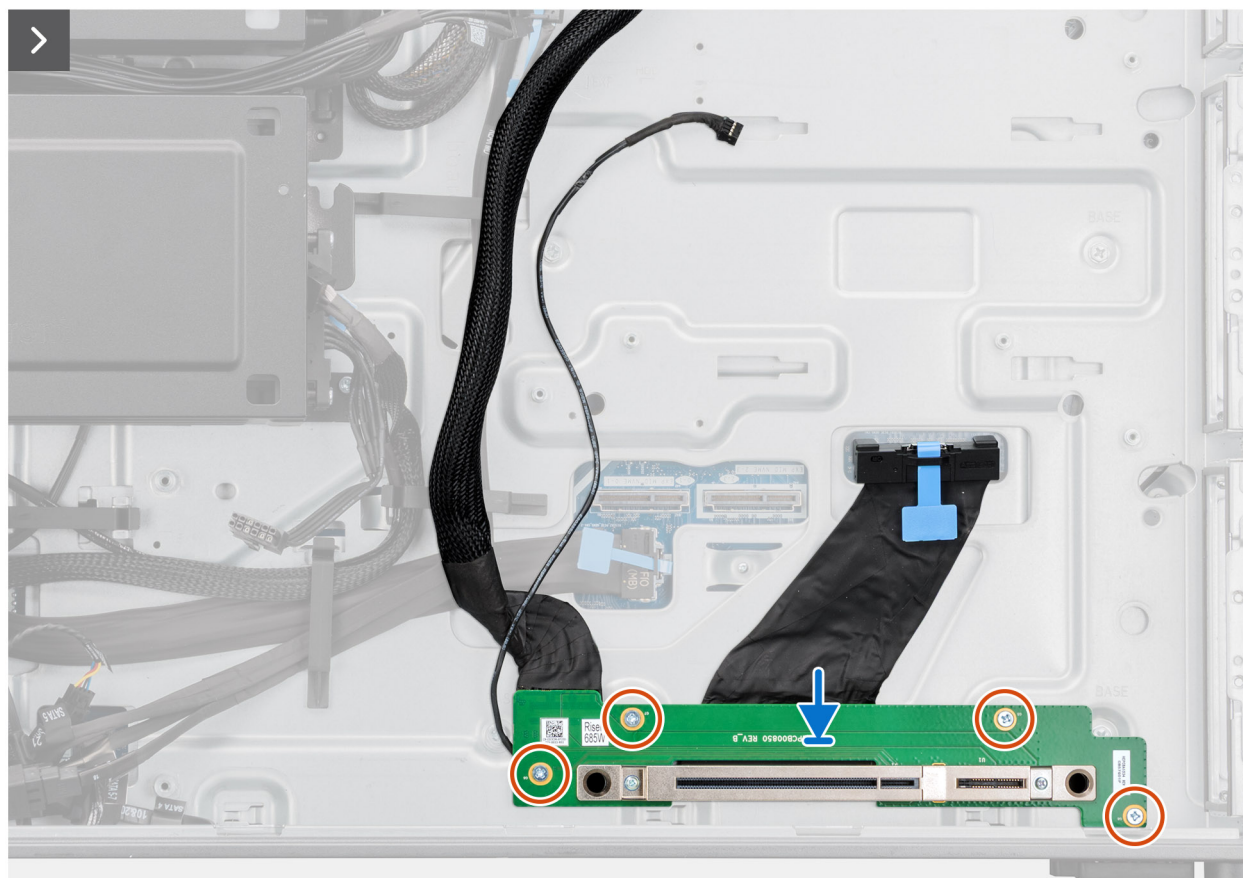
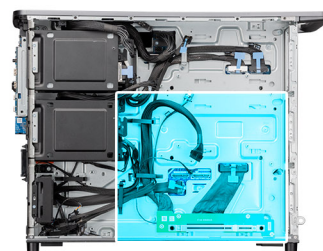


Figure 136. Installing the HEPCB board



Figure 137. Installing the HEPCB board

Steps

1. Align and place the HEPCB board in its slot on the chassis .
2. Replace the four screws (M3) to secure the HEPCB board to the chassis.
3. Route the data and sensor cables through the routing clips.
4. Connect the HEPCB board cable to the connector on the system board.

Next steps

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

EXPA board assembly

Removing the EXPA board assembly

Prerequisites

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

About this task

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

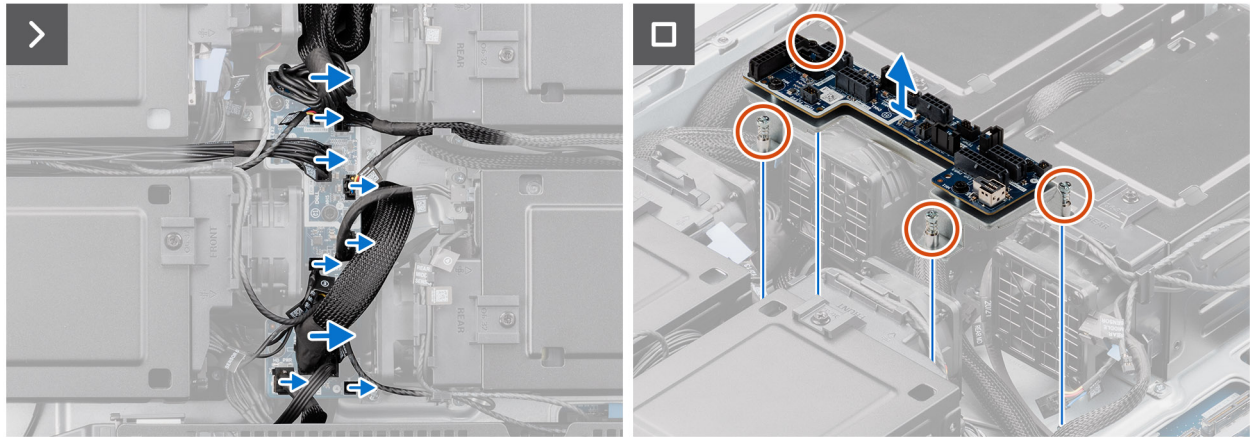
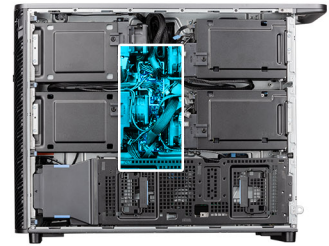


Figure 138. Removing the EXPA board assembly

Steps

1. Disconnect the power, thermal, and fan cables from the connectors on the EXPA board.
2. Loosen the four captive screws that secure the EXPA board assembly to the chassis.
3. Lift the EXPA board assembly out of the computer.

Installing the EXPA board 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 EXPA board assembly and provide a visual representation of the installation procedure.

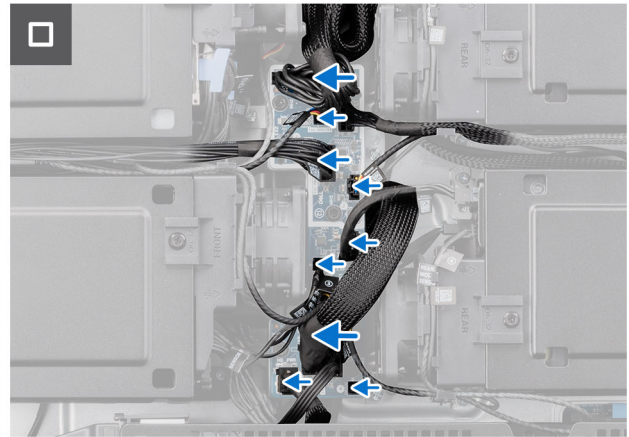
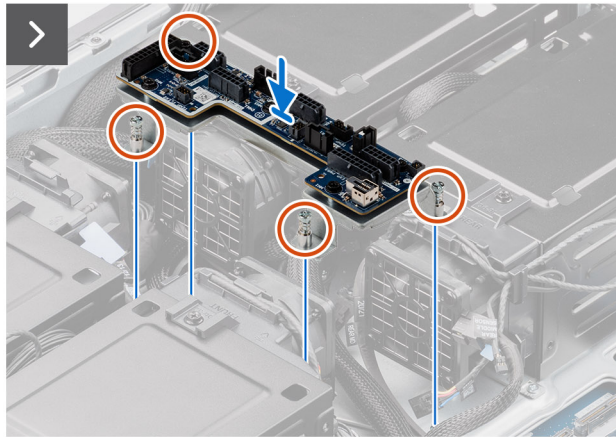
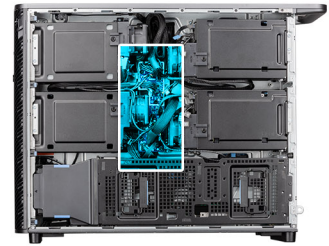


Figure 139. Installing the EXPA board assembly

Steps

1. Align and place the EXPA board assembly in its slot on the chassis .
2. Tighten the four captive screws to secure the EXPA board assembly to the chassis.
3. Connect the power, thermal, and fan cables to the connectors on the EXPA board.

Next steps

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

EXPA board

Removing the EXPA board

Prerequisites

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

About this task

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



5x
6-32

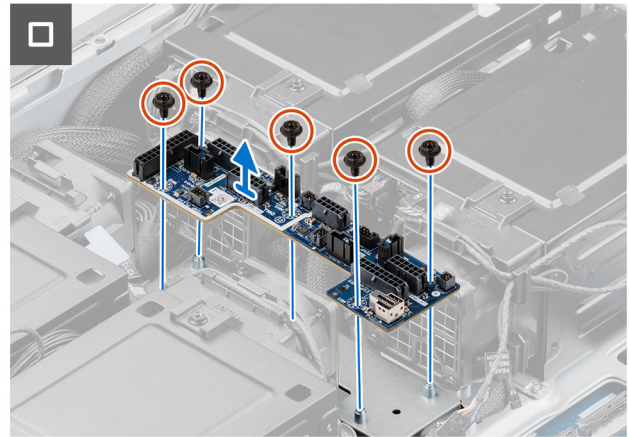
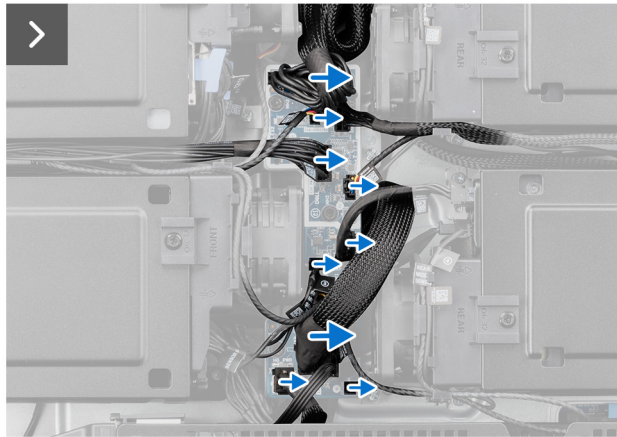
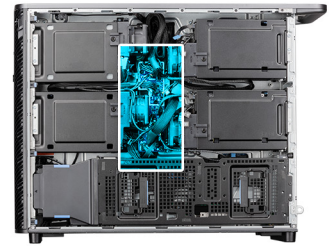


Figure 140. Removing the EXPA board

Steps

1. Disconnect the power, thermal, and fan cables from the connectors on the EXPA board.
2. Remove the five screws (6-32) that secure the EXPA board to the chassis.
3. Lift the power distribution board out of the computer.

Installing the EXPA board

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



5x
6-32

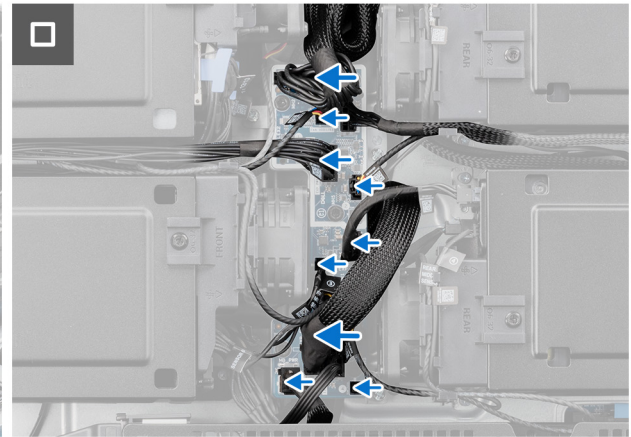
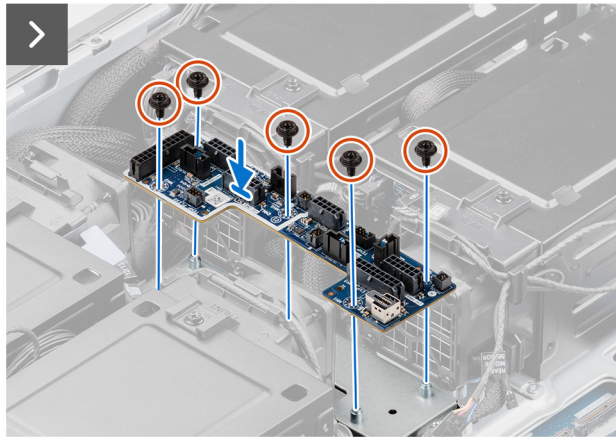
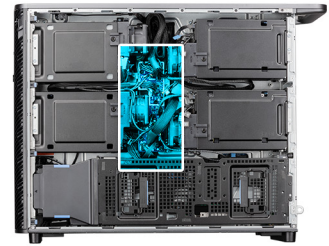


Figure 141. Installing the EXPA board

Steps

1. Align and place the EXPA board on the EXPA assembly.
2. Replace the five screws (6-32) to secure the EXPA board to the EXPA assembly.
3. Connect the power, thermal, and fan cables to the connectors on the EXPA board.

Next steps

1. Install the [right side cover](#).
2. 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 Specifications.

Removing the optional SD card module

Prerequisites

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

About this task

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



1x

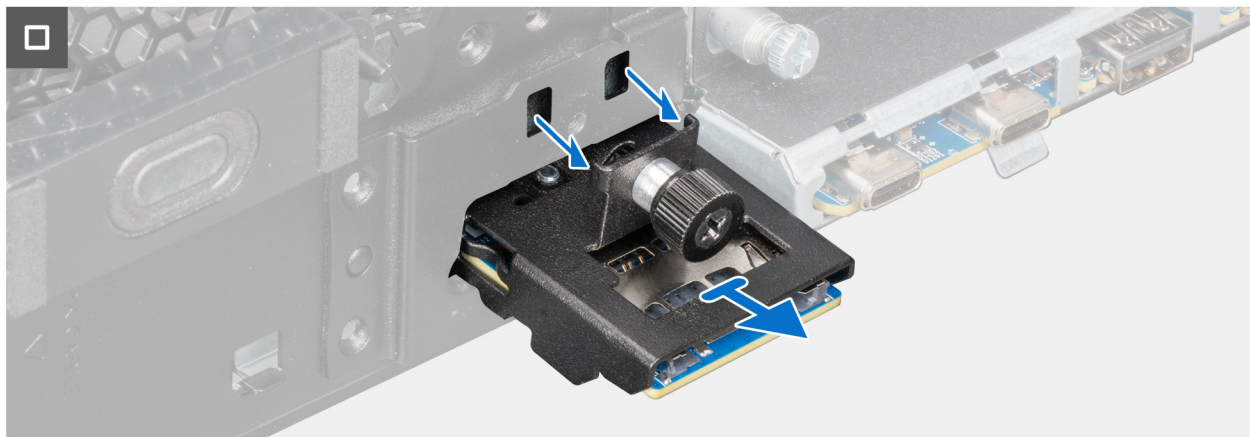
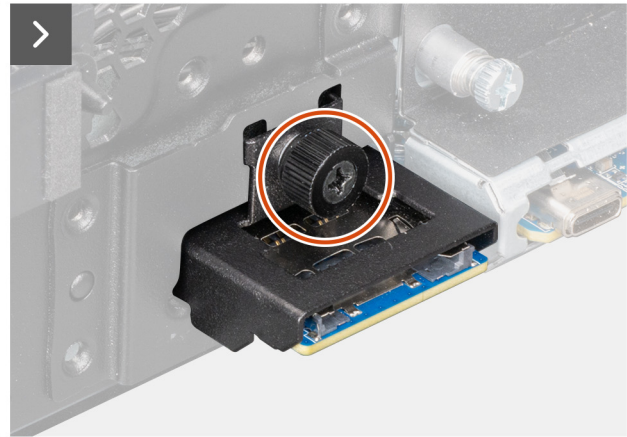
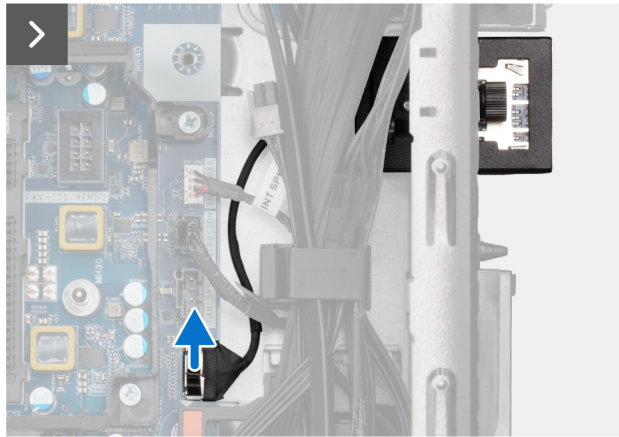
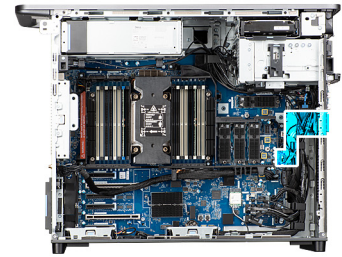


Figure 142. Removing the optional SD card module

Steps

1. Disconnect the SD card connector from the connector on the system board.
2. Loosen the thumbscrew and slide the SD card module out of the chassis.

Installing the optional SD card module

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 optional SD card module and provides a visual representation of the installation procedure.



1x

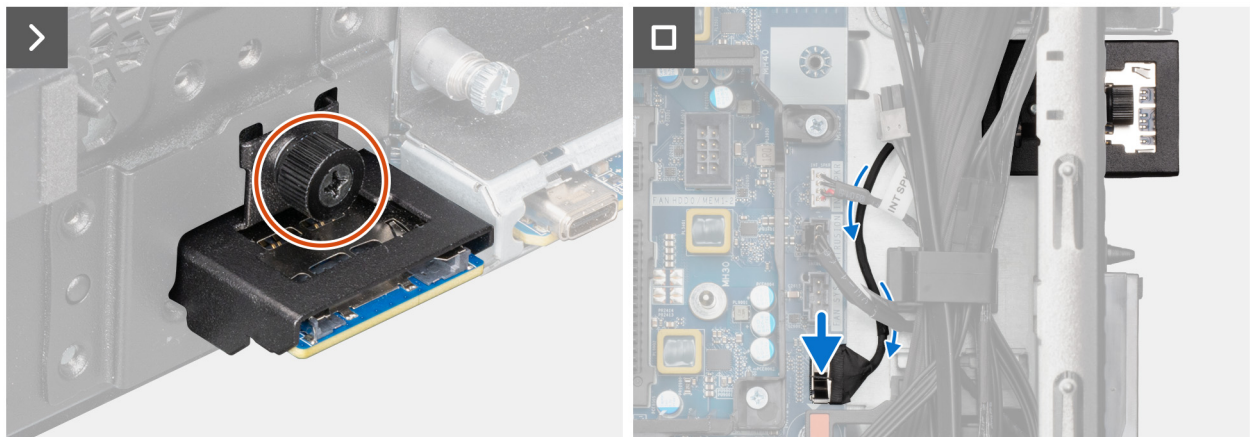
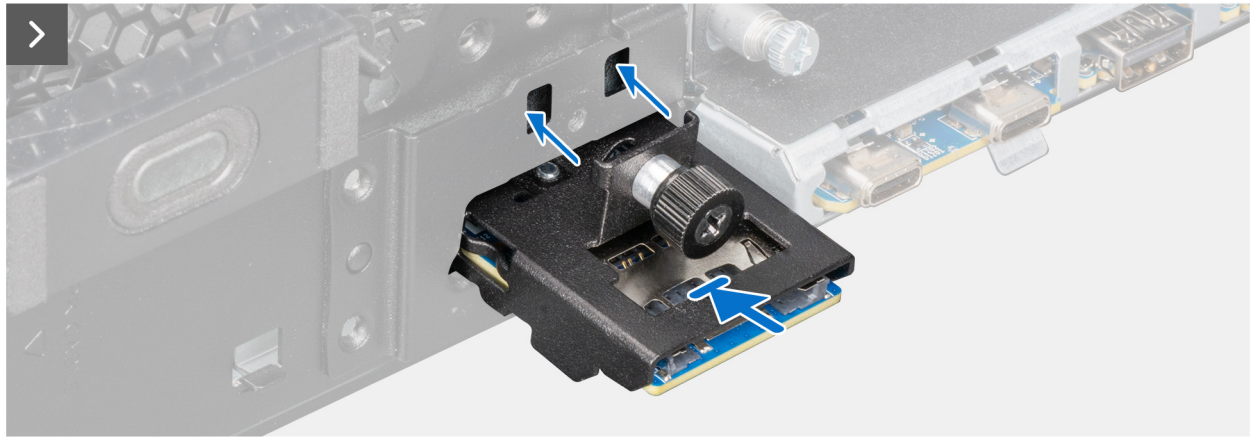
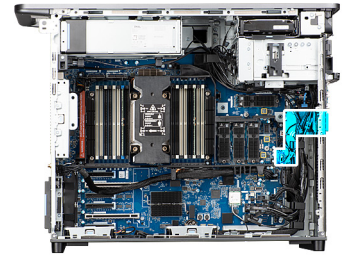


Figure 143. Installing the optional SD card module

Steps

1. Align the SD card module with the holes on the chassis and slide it in to secure it in place.
2. Fasten the thumbscrew to secure the SD card module.
3. Connect the SD card cable to the connector on the system board.

Next steps

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

System board

System-board call outs

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

System-board call outs (front side)

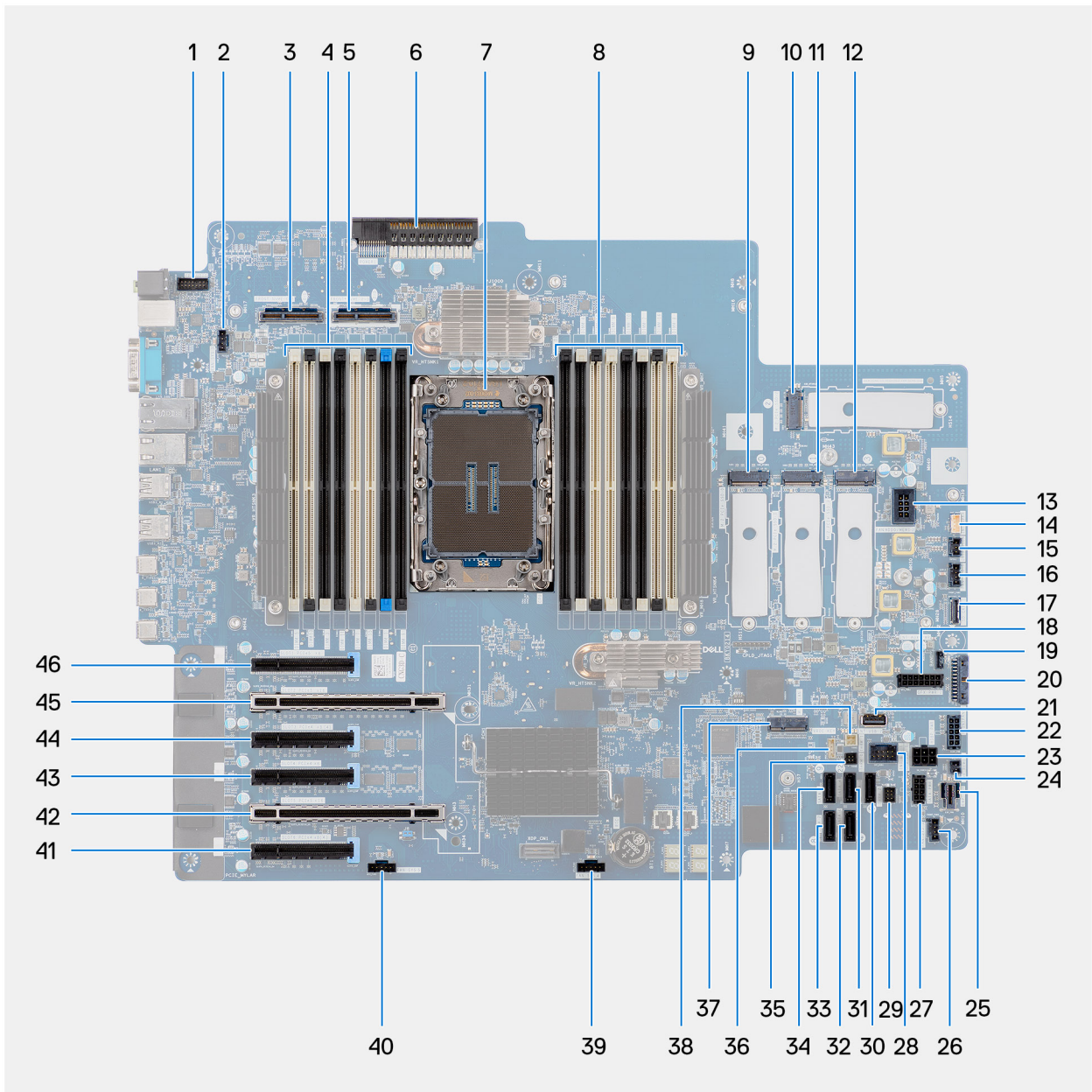


Table 4. Dell Pro Precision 9 Tower system board callouts (front side)

No	Connector	Description
1	FP AUDIO	Front panel audio-cable connector
2	FAN SYS3	System fan connector 3

Table 4. Dell Pro Precision 9 Tower system board callouts (front side) (continued)

No	Connector	Description
3	Front NVME 0-1	Front NVMe connector for externally facing M.2 flexbay drive
4	DIMMx 8 (DIMM5/13/3/11/7/15/1/9)	Memory module connectors
5	Front NVME 2-3	Front NVMe connector for externally facing M.2 flexbay drive
6	POWER1	Power supply unit board connector
7	CPU	Processor socket
8	DIMMx 8 (DIMM12/4/14/6/10/2/16/8)	Memory module connectors
9	M.2 PCIe SSD-0	SSD slot-0 connector
10	M.2 PCIe SSD-2	SSD slot-2 connector
11	M.2 PCIe SSD-1	SSD slot-1 connector
12	M.2 PCIe SSD-3	SSD slot-3 connector
13	FAN HDD0/MEM1-2	Air shroud fan connector
14	INT SPKR	Internal-speaker connector
15	INTRUSION	Intrusion switch connector
16	FAN SYS1	System fan connector
17	SD Card	SD-card reader connector
18	GFX PWR 2	Graphics card power connector 2
19	BMC PWR	BMC Power
20	FRONTPANEL	Front I/O-daughter board connector
21	INT USB2	Internal USB 2.0
22	HSBP PWR	HSBP board power connector
23	GFX PWR 1	Graphics card power connector 1
24	PWR REMOTE	Power remote connector
25	EXP PWR	Expansion power connector
26	FAN SYS2	System fan connector
27	SATA PWR	SATA power connector
28	INT USB1	Internal USB 1 connector
29	THRM 2	Thermal sensor 2 connector
30	SATA 1	SATA 1 connector
31	SATA 4	SATA 4 connector
32	SATA 0	SATA 0 connector
33	SATA 2	SATA 2 connector
34	SATA 3	SATA 3 connector
35	THRM 0	Thermal sensor 0 connector
36	VROC KEY	VROC key connector
37	M.2 WLAN	WLAN card connector
38	THRM 1	Thermal sensor 1 connector

Table 4. Dell Pro Precision 9 Tower system board callouts (front side) (continued)

No	Connector	Description
39	FAN SYS4	System fan connector 4
40	FAN SYS5	System fan connector 5
41	SLOT6	PCI Express Gen 4 x8 slot wired as x4 electrically
42	SLOT5	PCI Express Gen 5 x16 slot
43	SLOT4	PCI Express Gen 4 x8 slot
44	SLOT3	PCI Express Gen 4 x8 slot wired as x4 electrically
45	SLOT2	PCI Express Gen 5 x16 slot
46	SLOT1	PCI Express Gen 5 x8 slot

System-board call outs (rear side)

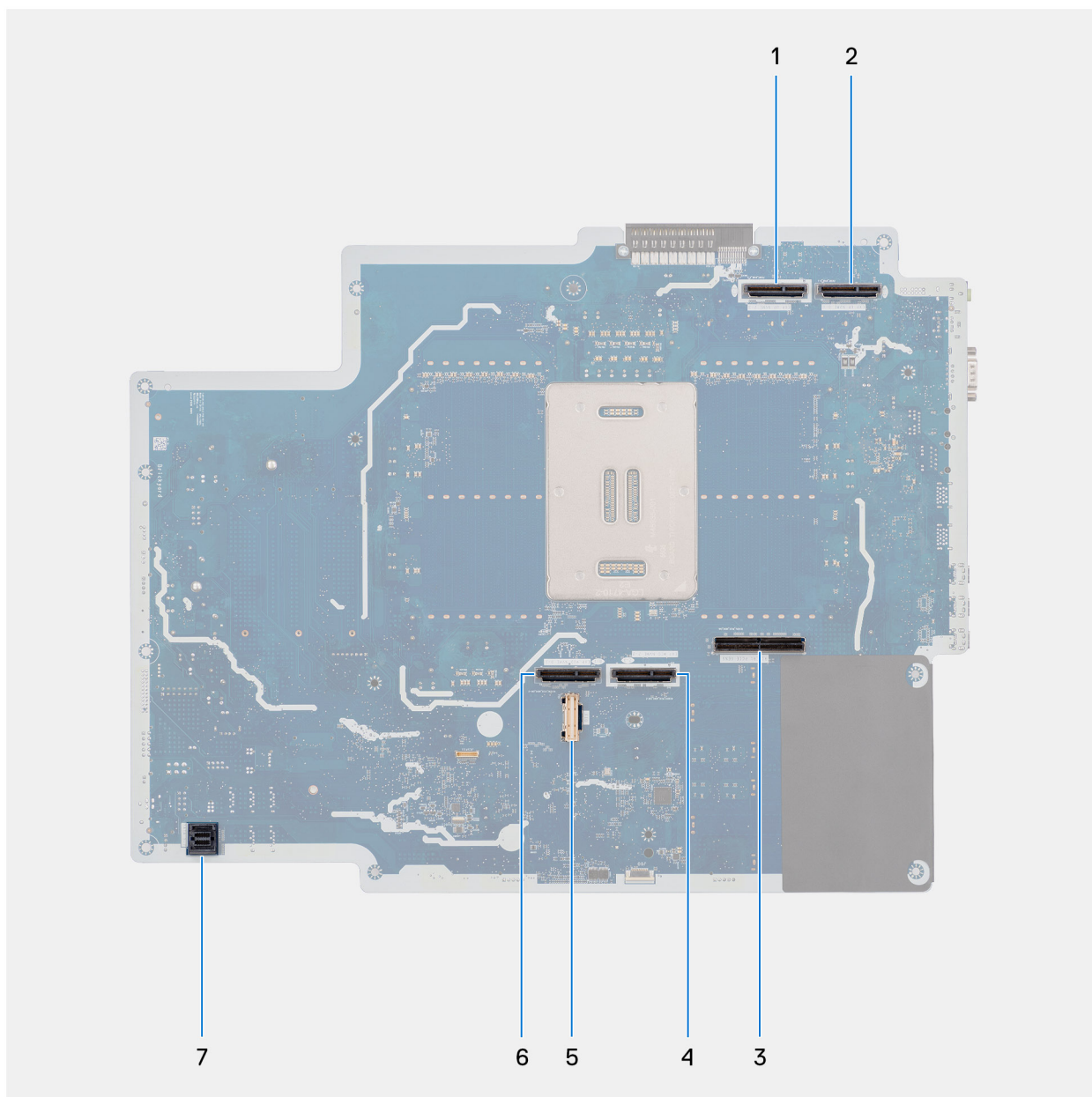


Table 5. Dell Pro Precision 9 Tower system board callouts (rear side)

No	Connector	Description
1	EXP UP NVME 2-3	Front NVMe connector for externally facing M.2 flexbay drive
2	EXP UP NVME 0-1	Front NVMe connector for externally facing M.2 flexbay drive
3	RISER1 PCIE GEN 5	Riser 1 connector
4	EXP MID NVME 2-3	Front NVMe connector for externally facing M.2 flexbay drive
5	FIO	Front I/O-board connector
6	EXP UP NVME 0-1	Front NVMe connector for externally facing M.2 flexbay drive

Table 5. Dell Pro Precision 9 Tower system board callouts (rear side) (continued)

No	Connector	Description
7	SATA 5-7	SATA 5-7 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 [left side cover](#).
3. Remove the [right side cover](#).
4. Remove the [expansion main bezel](#).
5. Remove the [main bezel](#).
6. Remove the [expansion bezel](#).
7. Remove the [air shroud](#).
8. Remove the [M.2 2230 SSD](#) or the [M.2 2280 SSD](#).
9. Remove the [memory module](#).
10. Remove the [non-powered graphics card](#).
11. Remove the [powered graphics card](#).

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

12. Remove the [graphics card end holder](#).
13. Remove the [wireless card](#).
14. Remove the [heat-sink assembly](#).
15. Remove the [processor](#).
16. Remove the [front chassis fan assembly](#) and the [rear chassis fan](#).
17. Remove the [main-intrusion switch](#) and the [expansion-intrusion switch](#).
18. Remove the [internal speaker](#).
19. Remove the [front I/O-bracket](#).
20. Remove the [power supply unit](#).
21. Remove the [power-distribution bracket and board](#).
22. Remove the [wireless internal SMA cable](#).
23. Remove the [HEPCB board](#).
24. Remove the [EXPA board assembly](#).

About this task

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



14x
6-32#

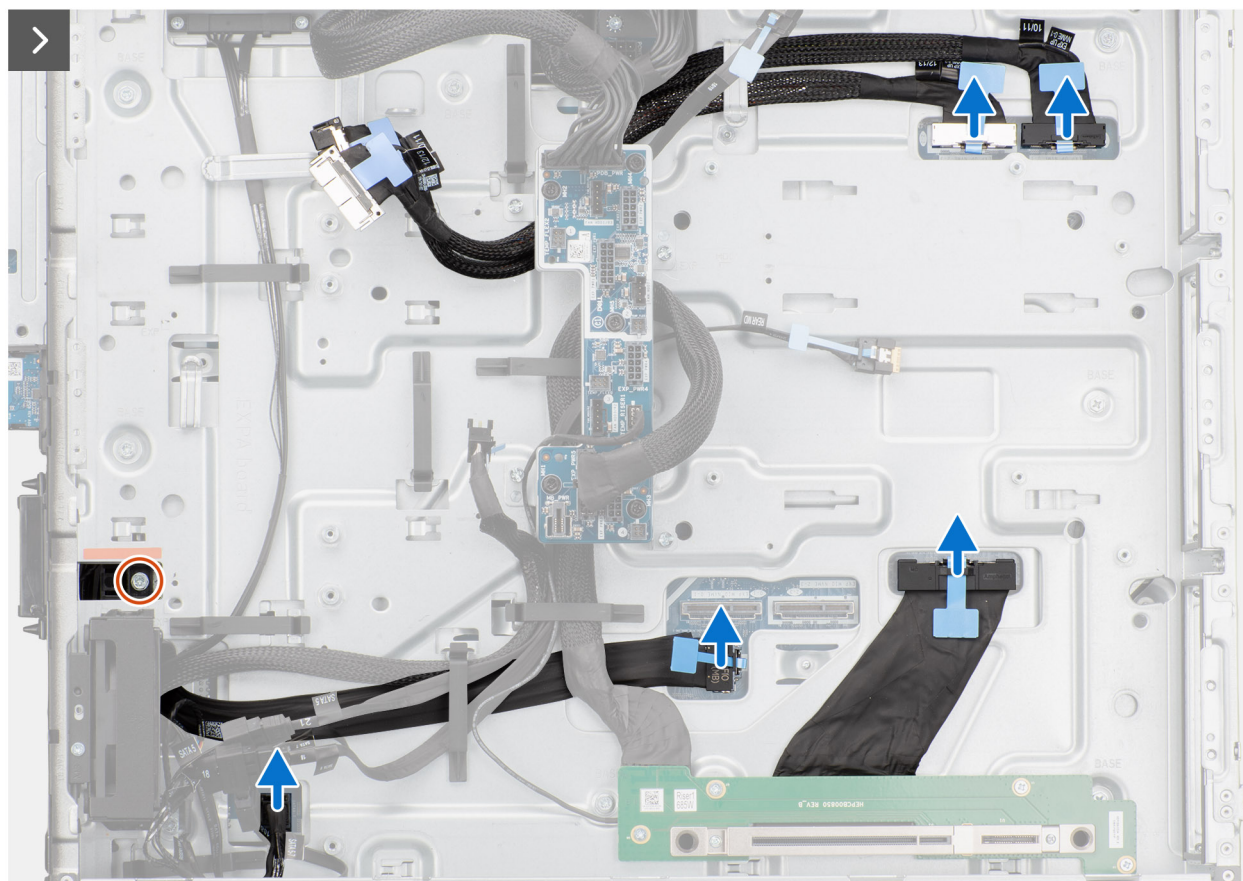
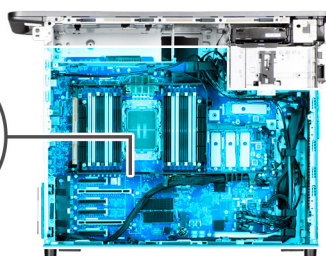


Figure 144. Removing the system board



Figure 145. Removing the system board

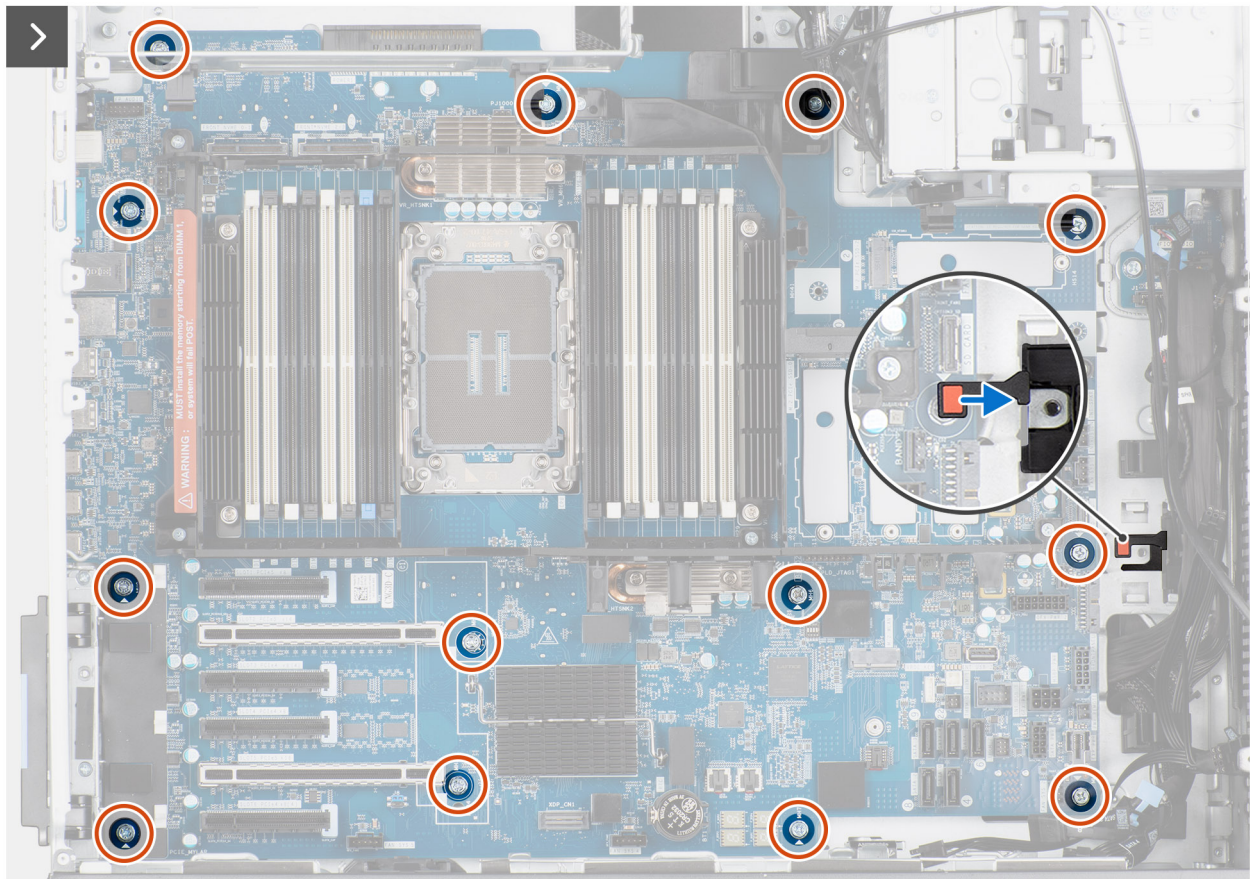


Figure 146. Removing the system board

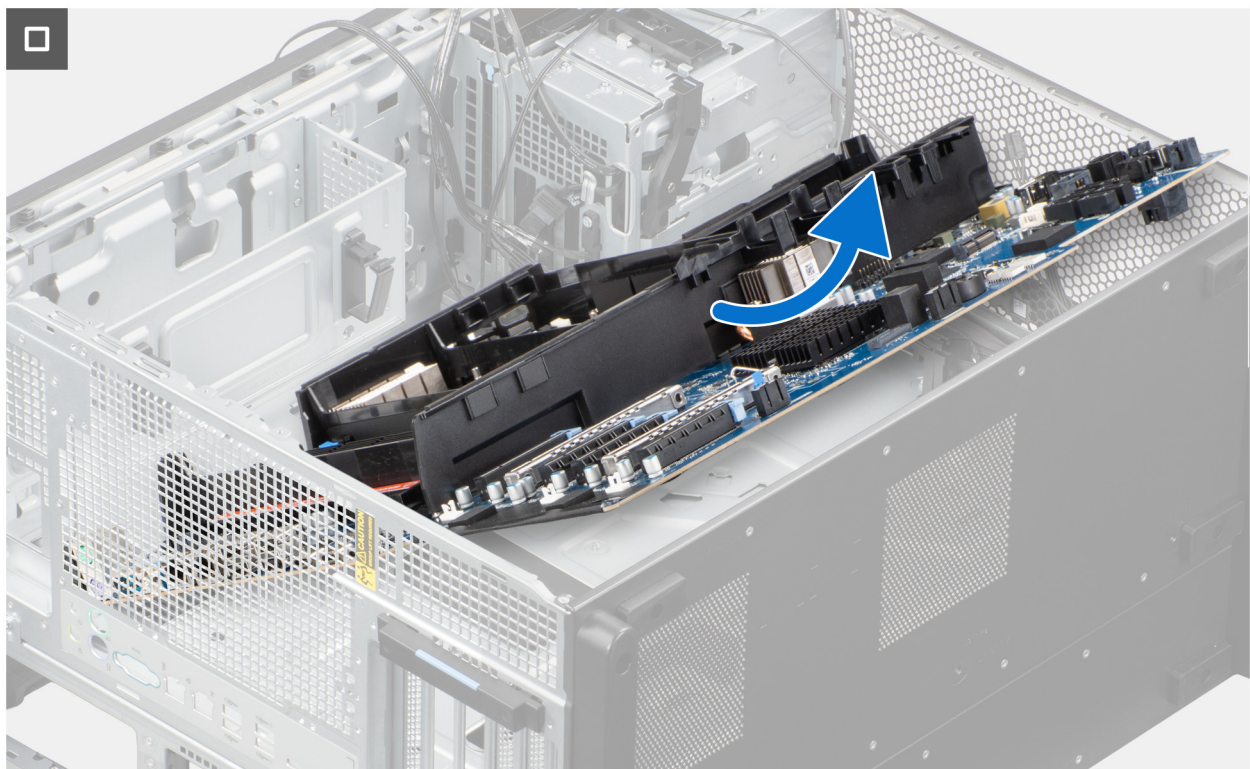


Figure 147. Removing the system board

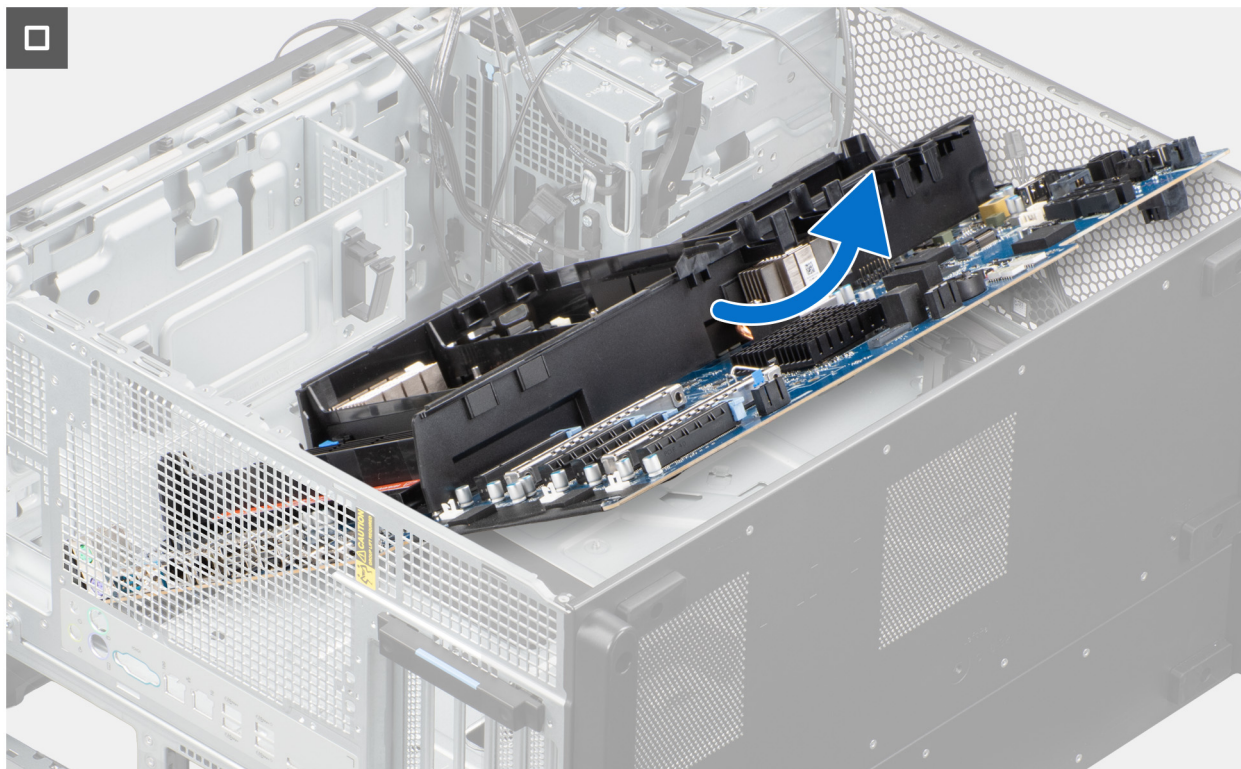


Figure 148. Removing the system board

Steps

1. Remove the screw (#6-32) that secure the system board to the chassis on the right side of the computer.
NOTE: The security screw location is identified by an orange marking on the chassis.
2. Disconnect all required cables from their respective connectors on the expansion side of the system board.
3. Disconnect all required cables from their respective connectors on the top side and bottom side of the system board.
4. Flip the system over so that the system board side is facing up.
5. Remove the thirteen screws (#6-32) that secure the system board to the chassis.
6. Release the security latch that secures the system board to the chassis.
NOTE: The orange marking indicates the location of the security latch.
7. 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.



14x
6-32#

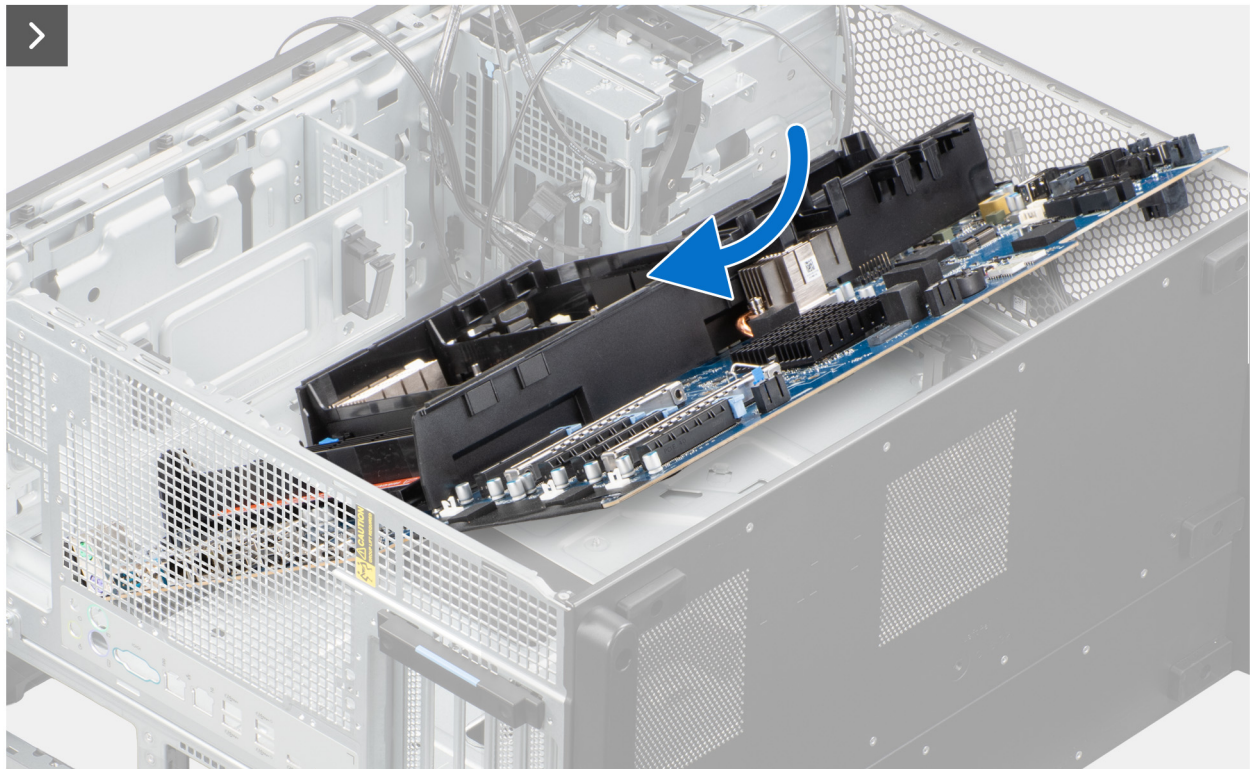
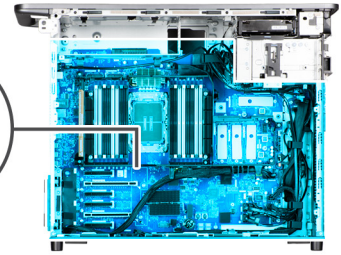


Figure 149. Installing the system board

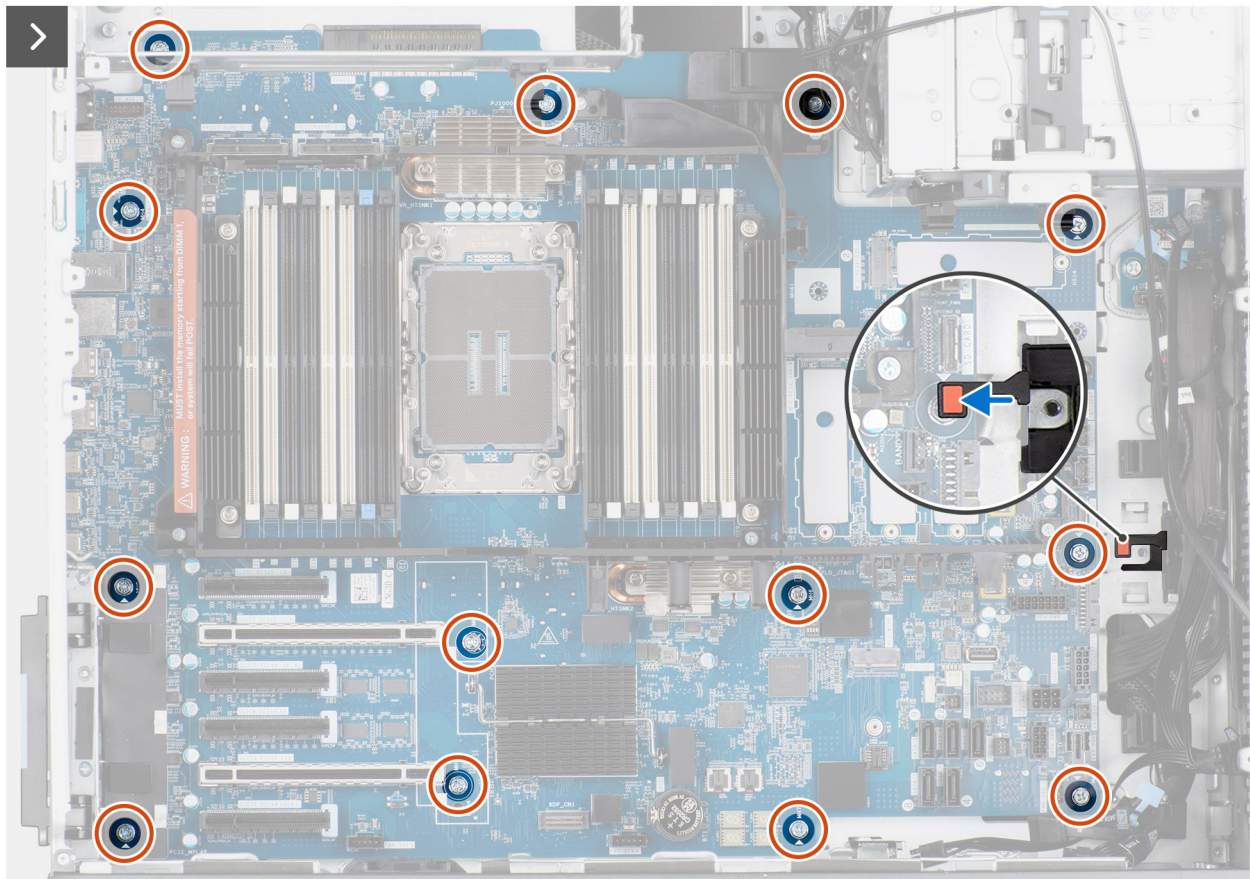


Figure 150. Installing the system board



Figure 151. Installing the system board

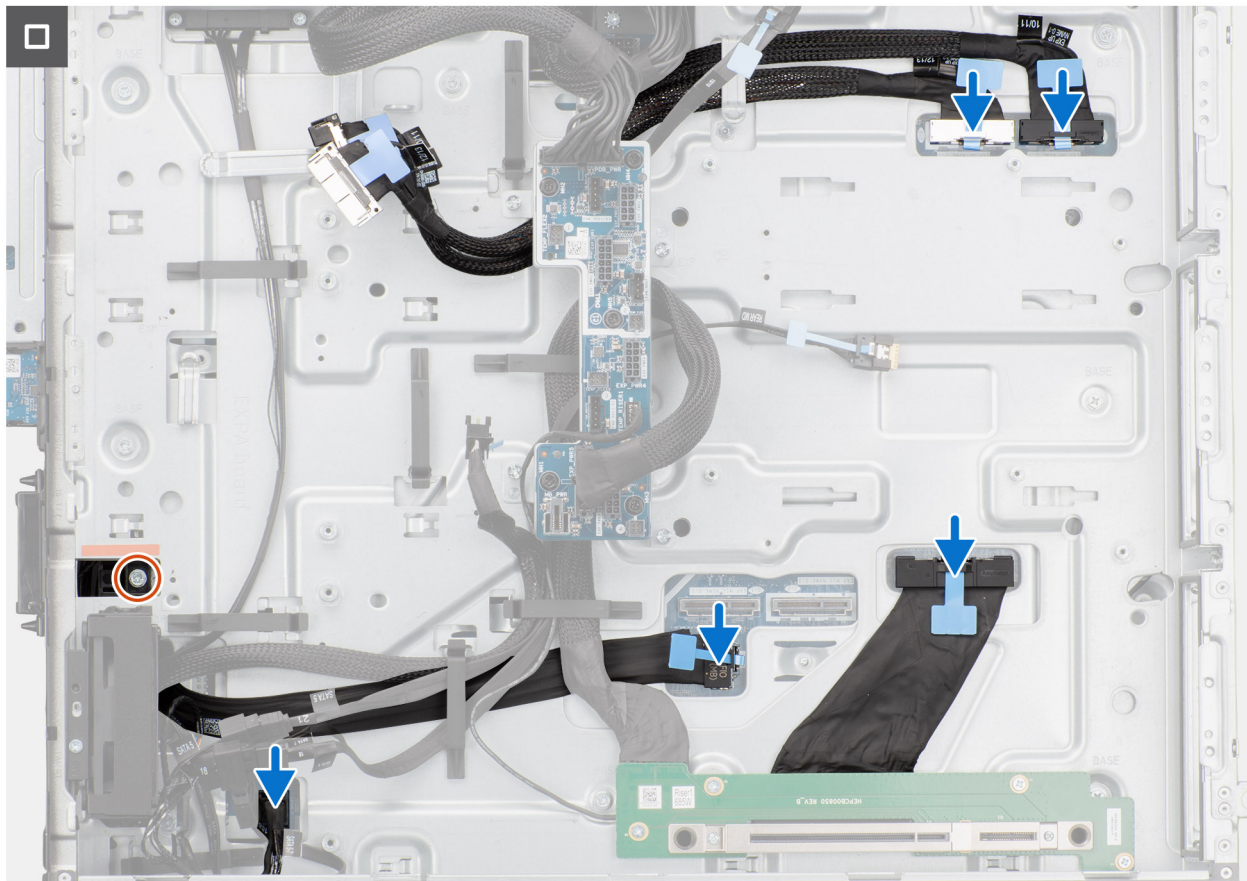


Figure 152. Installing the system board

Steps

NOTE: Press the security latch and ensure that no cables are routed in the latch area before installing the system board.

1. Lower the system board into the chassis at an angle.
2. Align the screw holes on the system board with screw holes on the chassis.
3. Replace the thirteen screws (#6-32) that secure the system board to the chassis.
4. Connect all the cables to their respective connectors on the system board base side.
5. Connect all the cables to their respective connectors on the system board expansion side.
6. Replace the screw (#6-32) that secure the system board to the right side of the computer.

Next steps

1. Install the [wireless internal SMA cable](#).
2. Install the [power-distribution bracket and board](#).
3. Install the [power supply unit](#).
4. Install the [front I/O-bracket](#).
5. Install the [internal speaker](#).
6. Install the [main-intrusion switch](#) and the [expansion-intrusion switch](#).
7. Install the [front chassis fan assembly](#) and the [rear chassis fan](#).
8. Install the [processor](#).
9. Install the [heat-sink assembly](#).
10. Install the [wireless card](#).
11. Install the [graphics card end holder](#).
12. Install the [powered graphics card](#).

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

13. Install the [non-powered graphics card](#).
14. Install the [memory module](#).
15. Install the [M.2 2230 SSD](#) or the [M.2 2280 SSD](#).
16. Install the [air shroud](#).
17. Install the [main bezel](#).
18. Install the [expansion bezel](#).
19. Install the [right side cover](#).
20. Install the [left side cover](#).
21. Follow the procedure in [after working inside your computer](#).

 **NOTE:** Your computer's 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.

Bottom air shroud

Removing the bottom air shroud

Prerequisites

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

About this task

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

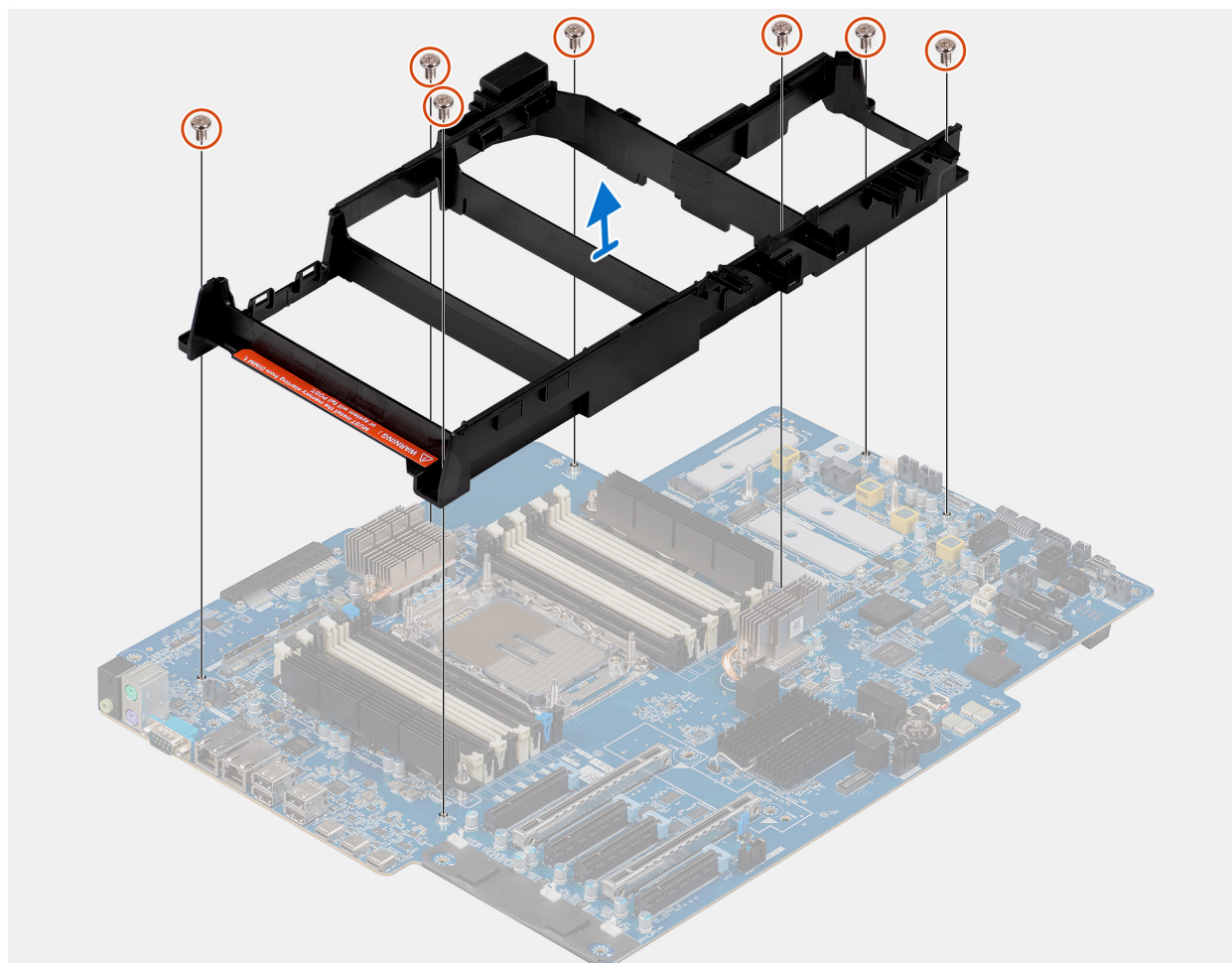


Figure 153. Removing the bottom air shroud

Steps

1. Remove the seven screws (M3) that secure the bottom air shroud to the system board.
2. Lift the bottom air shroud away from the system board.

Installing the bottom air shroud

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 bottom air shroud and provides a visual representation of the installation procedure.

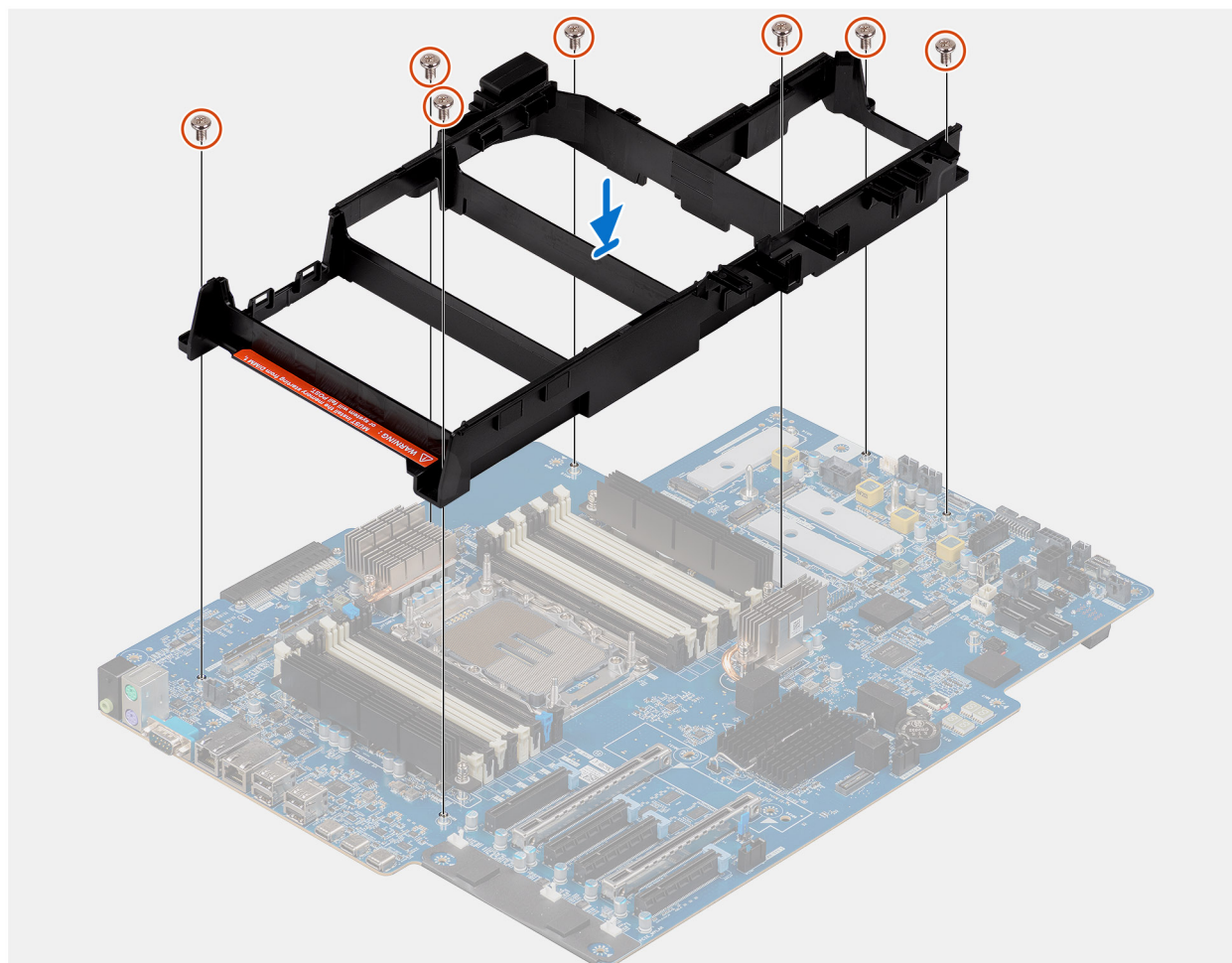


Figure 154. Installing the bottom air shroud

Steps

1. Align the bottom air shroud with the holes on the system board.
2. Replace the seven screws (M3) that secure the bottom air shroud to the system board.

Next steps

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

Software

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

Operating system

Your Dell Pro Precision 9 T6 PW9T6260 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 6. 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 7. BIOS Setup options—Overview menu

Overview	Description
Dell Pro Precision 9 T6 PW9T6260	
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 7. BIOS Setup options—Overview menu (continued)

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 built-in 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 8. 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. By default, the option is disabled.
Secure Boot	

Table 8. BIOS Setup options—Boot Configuration menu (continued)

Boot Configuration	Description
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 9. 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.
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.

Table 9. BIOS Setup options—Integrated Devices menu (continued)

Integrated Devices	Description
	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 10. 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 11. 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. By default, the Full Screen Logo option is disabled.

Table 12. BIOS Setup options—Connection menu

Connection	Description
Network Controller Configuration	
Integrated NIC 1	Enable or disable the onboard LAN controller.

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

Connection	Description
	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 13. 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	
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.  NOTE: This feature requires Deep Sleep Control to be disabled. By default, the Enable USB Wake Support option is disabled.
AC Behavior	

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

Power	Description
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. 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 14. 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. 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. NOTE: When disabled, this feature may cause compatibility issues or loss of functionality in some operating systems.
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	

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

Security	Description
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. 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.

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

Security	Description
	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 15. 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: • 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.

Table 15. BIOS Setup options—Passwords menu (continued)

Passwords	Description
	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. 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.

Table 15. BIOS Setup options—Passwords menu (continued)

Passwords	Description
	By default, the option is disabled.

Table 16. 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 17. 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.
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.

Table 17. BIOS Setup options—System Management menu (continued)

System Management	Description
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 or disable the SERR message mechanism. By default, the option is enabled.
Enable SERR Messages	
First Power On Date	
Set Ownership Date	Allows to set the ownership date. By default, the option is disabled.
Diagnostics	
	Enable or disable the Power-on-Self-Test Automatic Recovery option.
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 18. 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 19. 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. 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 20. 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. 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. 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. 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. 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 21. 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.
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.

Table 21. BIOS Setup options—Performance menu (continued)

Performance	Description
	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 22. 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. 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 23. 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 T6 PW9T6260.

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 24. 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 25. 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 26. Revision history

Revision	Date	Description
A00	May 2026	Original publish date.