# Dell Tower Plus EBT2250

## Owner's Manual

Regulatory Model: D30M
Regulatory Type: D30M006
January 2025
Rev. A01

## Notes, cautions, and warnings

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

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

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

# Contents

# 1

# Views of Dell Tower EBT2250

## Front

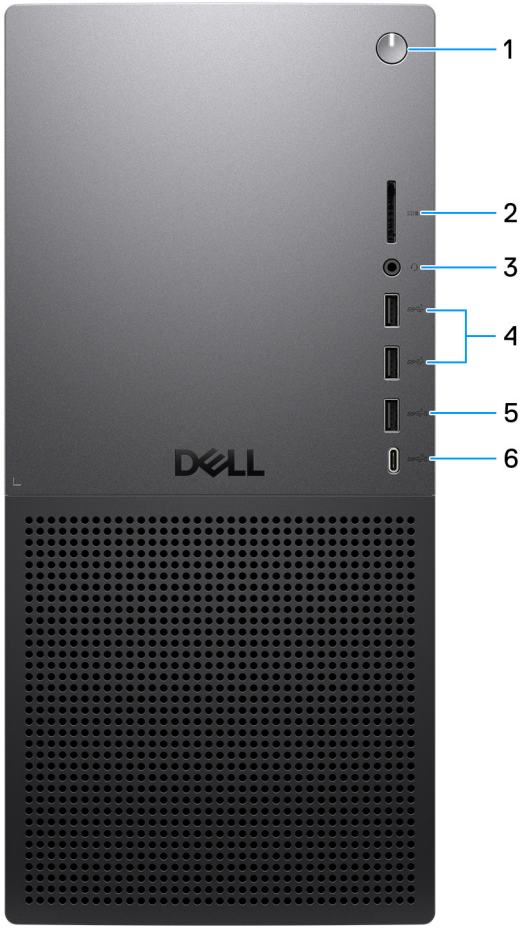


**Figure 1. Front view**

1. **Power button**

   Press to turn on the computer if it is turned off, in sleep state, or in hibernate state.

   When the computer is turned on, press the power button to put the computer into sleep state; press and hold the power button for 10 seconds to force shut-down the computer.

   **NOTE:** The power-button behavior can be customized in the operating system.

2. **SD-card slot**

   Insert an SD card to expand your storage and store photos, videos, and data from your computer. The computer supports the following card types:

   - Secure Digital (SD)
   - Secure Digital High Capacity (SDHC)
   - Secure Digital Extended Capacity (SDXC)

3. **Headset port**

   Connect headphones or a headset (headphone and microphone combo).

4. **USB 3.2 Gen 1 (5 Gbps) ports (2)**

   Connect devices such as external storage devices and printers. Supports data transfer speeds up to 5 Gbps.

5. **USB 3.2 Gen 1 (5 Gbps) port with PowerShare**

   Connect devices such as external storage devices and printers.

   Supports data transfer speeds up to 5 Gbps. PowerShare enables you to charge your USB devices even when your computer is turned off.

   **NOTE:** If your computer is turned off or in hibernate state, you must connect the power adapter to charge your devices using the PowerShare port. You must enable this feature in the BIOS setup program.

   **NOTE:** Certain USB devices may not charge when the computer is turned off or in sleep state. In such cases, turn on the computer to charge the device.

6. **USB 3.2 Gen 2 (10 Gbps) port with PowerShare**

   Connect devices such as external storage devices and printers.

   Provides data transfer speeds up to 10 Gbps. Supports Power Delivery that enables two-way power supply between devices. Provides up to 15 W power output.

   **NOTE:** PowerShare enables you to charge your USB devices even when your computer is turned off.

   **NOTE:** If a USB device is connected to the PowerShare port before the computer is turned off or put in hibernate state, you must disconnect and connect it again to enable charging.

# Back

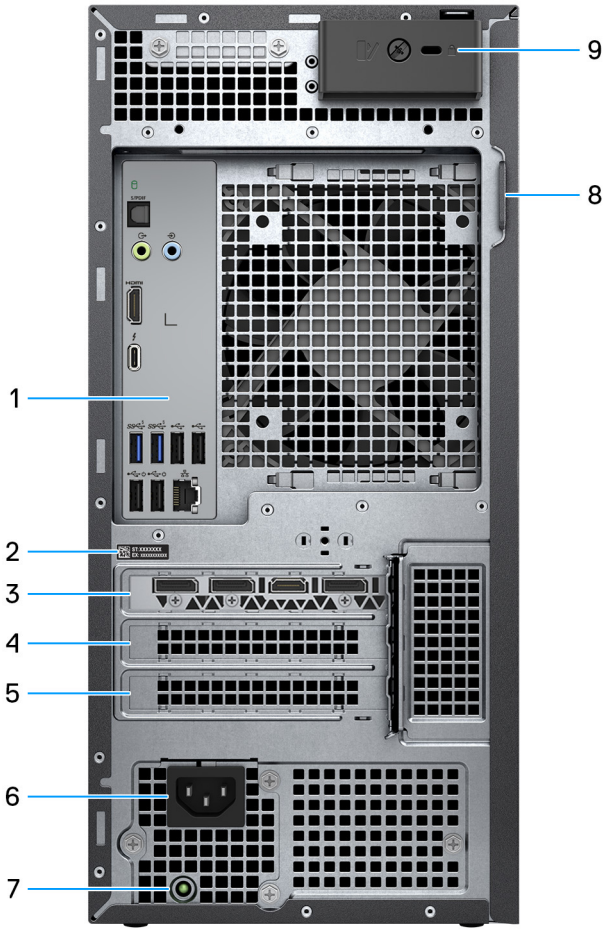


**Figure 2. Back view**

1. **Back panel**

   Connect USB, audio, video, and other devices.

2. **Service Tag label**

   The Service Tag is a unique alphanumeric identifier that enables Dell service technicians to identify the hardware components in your computer and access warranty information.

3. **PCI-Express X16 (graphics slot 1)**

   Connect a PCI-Express card such as graphics, audio, or network card to enhance the capabilities of your computer.

   For optimal graphics performance, use a PCI-Express X16 slot for connecting the graphics card.

   **NOTE:** The PCI-Express X16 slot works at X8 lanes only.

   **NOTE:** If you have two graphics cards, the card that is installed in PCI-Express X16 (graphics slot 1) is the primary graphics card.

4. **PCI-Express X4 slot**

   Connect a PCI-Express card such as graphics, audio, or network card to enhance the capabilities of your computer.

   **NOTE:** The PCI-Express X4 slot 3 works at X2 lanes only.

5. **PCI-Express X4 slot**

Connect a PCI-Express card such as graphics, audio, or network card to enhance the capabilities of your computer.

**NOTE:** The PCI-Express X4 slot 3 works at X2 lanes only.

6. **Power port**

   Connect a power cable to provide power to your computer.

7. **Power-supply diagnostics light**

   Indicates the power-supply state.

8. **Padlock rings**

   Attach a standard padlock to prevent unauthorized access to the interior of your computer.

9. **Security-cable slot (for Kensington locks)**

   Attach a security cable to prevent unauthorized movement of your computer.

# Back Panel

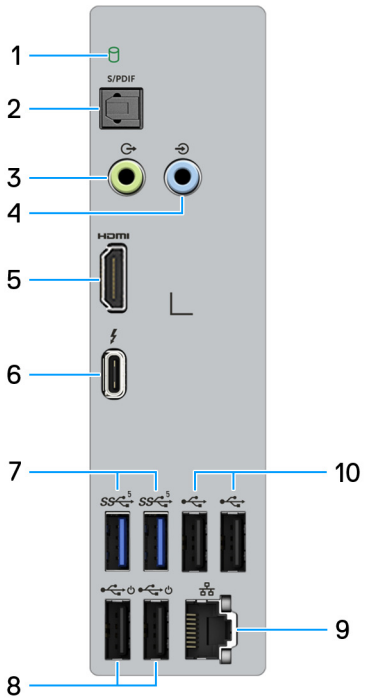


**Figure 3. Back Panel**

1. **Hard-drive activity light**

   The light turns on when the computer reads from or writes to the hard drive.

   **NOTE:** Hard-drive activity light is supported only on computers that are shipped with hard drive.

2. **Optical S/PDIF port**

   Connect an amplifier, speakers, or a TV for digital audio output through an optical cable.

3. **Front L/R surround line-out port**

   Connect audio-output devices such as speakers and amplifiers. In a 5.1 speaker channel setup, connect the front-left and front-right speakers.

4. **Line-in port**

Connect recording or playback devices such as a microphone or CD player.

5. **HDMI 2.0 port**

   Connect to a TV, external display, or another HDMI-in enabled device. Supports video and audio output.

6. **Thunderbolt 4.0 (40 Gbps) port with Power Delivery and DisplayPort**

   Supports USB4, DisplayPort 1.4, Thunderbolt 4 and also enables you to connect to an external display using a display adapter. Supports data transfer rates of up to 40 Gbps for USB4 and Thunderbolt 4.

   **NOTE:** You can connect a Dell Docking Station to the Thunderbolt 4 ports. For more information, search in the Knowledge Base Resource at Dell Support Site.

   **NOTE:** A USB Type-C to DisplayPort adapter (sold separately) is required to connect a DisplayPort device.

   **NOTE:** USB4 is backward compatible with USB 3.2, USB 2.0, and Thunderbolt 3.

   **NOTE:** Thunderbolt 4 supports two 4K displays or one 8K display.

7. **USB 3.2 Gen 1 (5 Gbps) ports (2)**

   Connect devices such as external storage devices and printers. Supports data transfer speeds up to 5 Gbps.

8. **USB 2.0 (480 Mbps) ports with Smart Power On (2)**

   Connect devices such as external storage devices and printers. Provides data transfer speeds up to 480 Mbps.

   **NOTE:** Deep Sleep is enabled by default. Disable Deep Sleep at the BIOS setup to enable Smart Power On feature on your computer.

   **NOTE:** Smart Power On is the ability to wake a computer from S4 and S5 sleep states with a move of a mouse or press of a key on the keyboard.

   **NOTE:** This port does not support video or audio streaming or power delivery.

9. **Network port (with lights)**

   Connect an Ethernet (RJ45) cable from a router or a broadband modem for network or Internet access.

   The two lights next to the connector indicate the connectivity status and network activity.

10. **USB 2.0 (480 Mbps) ports (2)**

    Connect devices such as external storage devices and printers. Supports data transfer speeds up to 480 Mbps.

# 2

# Set up your computer

### About this task

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

### Steps

1. Connect the wired keyboard and mouse to the available ports. To connect a wireless keyboard and mouse, see the instructions on how to connect in the documentation that ships with the wireless keyboard and mouse.

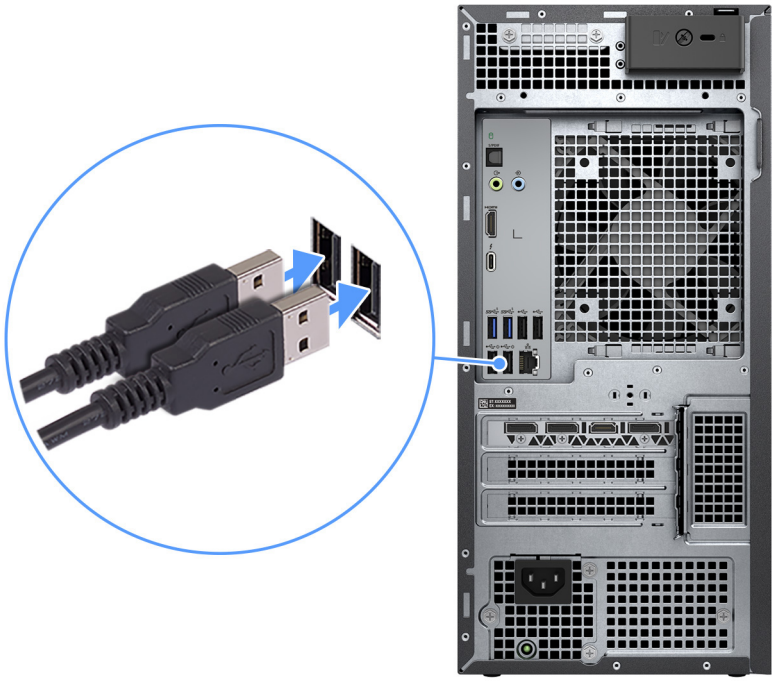

**Figure 4. Connecting the wired keyboard and mouse to your Dell Tower EBT2250**

2. Connect to your network using an Ethernet cable.

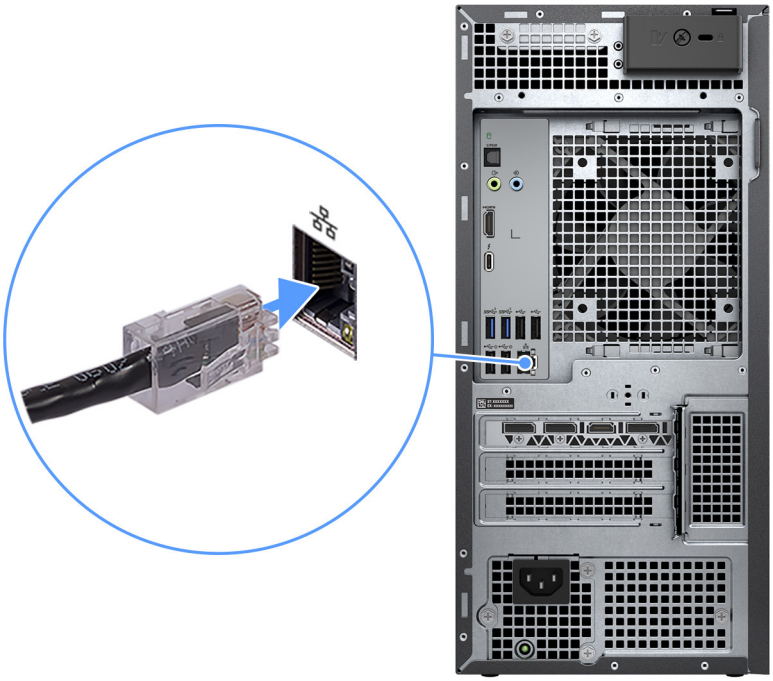

**Figure 5. Connecting the Ethernet cable**

3. Connect the display. For more information about setting up the display, see the documentation that is shipped with your display.

**Figure 6. Connect the display**

4. Connect the power cable to the computer and then connect it to the wall outlet.

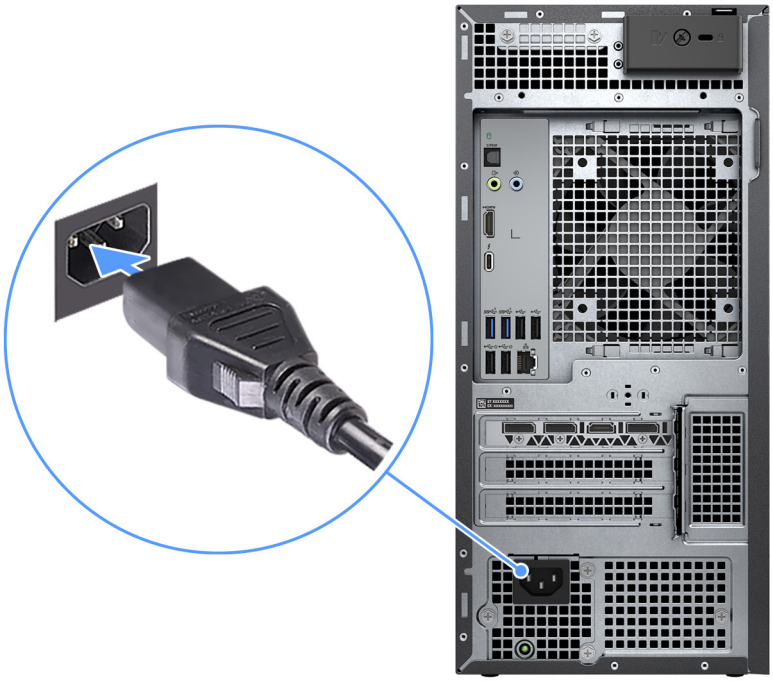

**Figure 7. Connect the power cable**

5. Press the power button at the front of the computer to turn on the computer.


**Figure 8. Press the power button**

6. Finish the Windows setup.

   Follow the on-screen instructions to complete the setup. When setting up, Dell Technologies recommends that you:

   - Connect to a network for Windows updates.

**NOTE:** If connecting to a secured wireless network, enter the password for the wireless network access when prompted.

- If connected to the Internet, sign-in with or create a Microsoft account. If not connected to the Internet, create an offline account.
- On the **Support and Protection** screen, enter your contact details.

7. Locate and use Dell apps from the Windows Start menu—Recommended.

**Table 1. Locate Dell apps**

| Resources | Description |
|---|---|
|  | **MyDell**<br>MyDell is a software application that offers you a single streamlined engagement platform including account access, device information, and hardware settings. This software delivers intelligent features that automatically fine-tune your computer for the best possible audio, power, and performance. Get the most out of your Dell device with intelligent, personalized technology from MyDell. The following options can be customized in MyDell:<br>• Application<br>• Audio<br>• Power<br>• Color and Display<br>• Presence detection<br>For more information about how to use MyDell, see product guides at Dell Support Site. |
|  | **SupportAssist**<br>SupportAssist proactively and predictively identifies hardware and software issues on your computer and automates the engagement process with Dell Technical support. It addresses performance and stabilization issues, prevents security threats, monitors, and detects hardware failures. For more information, see *SupportAssist for Home PCs User's Guide* at SupportAssist for Home PCs.<br>**NOTE:** In SupportAssist, click the warranty expiry date to renew or upgrade your warranty. |
|  | **Dell Digital Delivery**<br>Download software applications, which are purchased but not preinstalled on your computer. For more information about using Dell Digital Delivery, search in the Knowledge Base Resource at Dell Support Site. |

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# Specifications of Dell Tower EBT2250

## Dimensions and weight

The following table lists the height, width, depth, and weight of your Dell Tower EBT2250.

**Table 2. Dimensions and weight**

| Description | Values |
|---|---|
| Height | 372.90 mm (14.68 in.) |
| Width | 173 mm (6.81 in.) |
| Depth | 426.90 mm (16.81 in.) |
| Weight<br>**NOTE:** The weight of your computer depends on the configuration ordered and manufacturing variability. | 12.94 kg (28.53 lb) |

## Processor

The following table lists the details of the processors that are supported for your Dell Tower EBT2250.

### Table 3. Processor

| Description | Option one | Option two | Option three |
|---|---|---|---|
| Processor type | Intel Core Ultra 5 225 | Intel Core Ultra 7 265 | Intel Core Ultra 9 285 |
| Processor wattage | 65 W | 65 W | 65 W |
| Processor total core count | 10 | 20 | 24 |
| Performance-cores | 6 | 8 | 8 |
| Efficient-cores | 4 | 12 | 16 |
| Processor total thread counts<br>**NOTE:** Intel Hyper-Threading Technology is only available on Performance-cores. | 16 | 28 | 32 |
| Processor speed | Up to 4.9 GHz | Up to 5.3 GHz | Up to 5.6 GHz |
| Performance-cores frequency | | | |
| Processor base frequency | 3.3 GHz | 2.4 GHz | 2.5 GHz |
| Maximum turbo frequency | 4.9 GHz | 5.3 GHz | 5.6 GHz |
| Efficient-cores frequency | | | |
| Processor base frequency | 2.7 GHz | 1.8 GHz | 1.9 GHz |
| Maximum turbo frequency | 4.4 GHz | 4.6 GHz | 4.6 GHz |
| Processor cache | 20 MB | 30 MB | 36 MB |
| Integrated graphics | Intel Arc Graphics | Intel Arc Graphics | Intel Arc Graphics |

### Table 4. Processor

| Description | Option four | Option five |
|---|---|---|
| Processor type | Intel Core Ultra 7 265K | Intel Core Ultra 9 285K |
| Processor wattage | 125 W | 125 W |
| Processor total core count | 20 | 24 |
| Performance-cores | 8 | 8 |
| Efficient-cores | 12 | 16 |
| Processor total thread counts<br>**NOTE:** Intel Hyper-Threading Technology is only available on Performance-cores. | 28 | 32 |
| Processor speed | Up to 5.5 GHz | Up to 5.7 GHz |
| Performance-cores frequency | | |
| Processor base frequency | 3.9 GHz | 3.7 GHz |
| Maximum turbo frequency | 5.5 GHz | 5.7 GHz |
| Efficient-cores frequency | | |
| Processor base frequency | 3.3 GHz | 3.2 GHz |
| Maximum turbo frequency | 4.6 GHz | 4.6 GHz |
| Processor cache | 30 MB | 36 MB |
| Integrated graphics | Intel Arc Graphics | Intel Arc Graphics |

# Chipset

The following table lists the details of the chipset that is supported by your Dell Tower EBT2250.

### Table 5. Chipset

| Description | Values |
|---|---|
| Chipset | Z890 |
| Processor | • Intel Core Ultra 5/7/9<br>• Intel Core Ultra 7K/9K |
| DRAM bus width | 128-bit |
| Flash EPROM | 32 MB |
| PCIe bus | Up to Gen5 |

# Operating system

Your Dell Tower EBT2250 supports the following operating systems:

- Windows 11 Pro, 64-bit
- Windows 11 Home, 64-bit

# Memory

The following table lists the memory specifications that are supported by your Dell Tower EBT2250.

### Table 6. Memory specifications

| Description | Values |
|---|---|
| Memory slots | 2 |
| Memory type | DDR5 |
| Memory speed | 5200 MT/s |
| Maximum memory configuration | 64 GB |
| Minimum memory configuration | 8 GB |
| Memory size per slot | 8 GB, 16 GB, 32 GB |
| Memory configurations supported | • 8 GB, 1 x 8 GB, DDR5, 5200 MT/s<br>• 16 GB, 1 x 16 GB, DDR5, 5200 MT/s<br>• 16 GB, 2 x 8 GB, DDR5, 5200 MT/s, dual-channel<br>• 32 GB, 1 x 32 GB, DDR5, 5200 MT/s<br>• 32 GB, 2 x 16 GB, DDR5, 5200 MT/s, dual-channel<br>• 64 GB, 2 x 32 GB, DDR5, 5200 MT/s, dual-channel |

# Ports and connectors

The following table lists the external and internal ports available on your Dell Tower EBT2250.

### Table 7. Ports and connectors

| Description | Values |
|---|---|
| **External:** | |
| Network | One RJ45 port |
| USB | • Two USB 3.2 Gen 1 (5 Gbps) ports (front)<br>• One USB 3.2 Gen 1 (5 Gbps) port with PowerShare (front)<br>• One USB 3.2 Gen 2 (10 Gbps) Type-C port with PowerShare (front)<br>• Two USB 2.0 (480 Mbps) ports with Smart Power On (rear)<br>• Two USB 2.0 (480 Mbps) ports (rear)<br>• Two USB 3.2 Gen 1 (5 Gbps) ports (rear)<br>• One Thunderbolt 4 (40 Gbps) port with DisplayPort Alt Mode/USB Type-C/USB4/Power Delivery (rear) |
| Audio | • One front headset port<br>• One rear line-out port<br>• One rear line-in port<br>• One rear optical S/PDIF port |

### Table 7. Ports and connectors (continued)

| Description | Values |
|---|---|
| Video | One HDMI 2.0 port |
| Media-card reader | One SD-card slot |
| Power port | One AC power-supply port |
| Security | • One security-cable slot (for Kensington locks)<br>• One padlock slot |
| **Internal:** | |
| PCIe expansion card slots | • One PCIe x16 mechanical/x16 electrical Gen5 slot<br>• Two PCIe Gen3 x4 slots |
| mSATA | Not supported |
| SATA | Three SATA slots |
| M.2 | • One M.2 2230 slot for WiFi and Bluetooth combo card<br>• Two M.2 2230 or 2280 slots for solid-state drives<br>**NOTE:** To learn more about the features of different types of M.2 cards, search in the Knowledge Base Resource at Dell Support Site. |

# Ethernet

The following table lists the wired Ethernet Local Area Network (LAN) specifications of your Dell Tower EBT2250.

### Table 8. Ethernet specifications

| Description | Values |
|---|---|
| Model | Killer E3100G Ethernet controller integrated on the system board |
| Transfer rate | 10/100/1000/2500 Mbps |

# Wireless module

The following table lists the Wireless Local Area Network (WLAN) module that is supported on your Dell Tower EBT2250.

### Table 9. Wireless module specifications

| Description | Values |
|---|---|
| Model number | Intel BE200 |
| Transfer rate | Up to 5760 Mbps |
| Frequency bands supported | 2.4 GHz/5 GHz/6 GHz |
| Wireless standards | • WiFi 802.11a/b/g<br>• Wi-Fi 4 (WiFi 802.11n)<br>• Wi-Fi 5 (WiFi 802.11ac) |

### Table 9. Wireless module specifications (continued)

| Description | Values |
|---|---|
| | • Wi-Fi 6E (WiFi 802.11ax)<br>• Wi-Fi 7 (WiFi 802.11be) |
| Encryption | • 64-bit/128-bit WEP<br>• AES-CCMP<br>• TKIP |
| Bluetooth wireless card | Bluetooth 5.4 wireless card |

# Storage

This section lists the storage options on your Dell Tower EBT2250.

Your Dell Tower EBT2250 supports one of the following storage configurations:

- Up to two M.2 2230 or M.2 2280 PCIe NVMe solid-state drives
- Up to two M.2 2230 or M.2 2280 PCIe NVMe solid-state drives, and up to two 3.5-inch hard drives

The primary drive of your Dell Tower EBT2250 varies with the storage configuration. For computers:

- With a M.2 drive, the M.2 drive is the primary drive.
- With a M.2 drive and up to two hard-disk drives, the M.2 drive is the primary drive.

### Table 10. Storage specifications

| Storage type | Interface type | Capacity |
|---|---|---|
| One M.2 2230 solid-state drive | PCIe Gen4 x4 NVMe, up to 64 Gbps | Up to 512 GB |
| One M.2 2280 solid-state drive | PCIe Gen4 x4 NVMe, up to 64 Gbps | Up to 4 TB |
| Two 3.5-inch hard-disk drives | SATA AHCI, up to 6 Gbps | Up to 2 TB |
| Two 2.5-inch hard-disk drives | SATA AHCI, up to 6 Gbps | Up to 2 TB |

# GPU—Integrated

The following table lists the specifications of the integrated Graphics Processing Unit (GPU) supported by your Dell Tower EBT2250.

### Table 11. GPU—Integrated

| Controller | Memory size | Processor |
|---|---|---|
| Intel Arc Graphics | Shared system memory | Intel Core Ultra 5/7/9 |
| Intel Arc Graphics | Shared system memory | Intel Core Ultra 7K/9K |

# Video

### Table 12. Discrete graphics specifications

| Discrete graphics | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Controller** | **Number of cards** | **External display support** | **Memory size** | **Memory type** | **PCIe version** | **Power consumption** | **Recommended PSU** |
| NVIDIA GeForce RTX 3050 | 1 | Three DisplayPort 1.4 ports, one HDMI 2.1 port | 8 GB | GDDR6 | 4 | 120 W | >= 460 W |
| NVIDIA GeForce RTX 4060 | 1 | Three DisplayPort 1.4 ports, one HDMI 2.1 port | 8 GB | GDDR6 | 4 | 115 W | >= 460 W |
| NVIDIA GeForce RTX 4060 Ti | 1 | Three DisplayPort 1.4 ports, one HDMI 2.1 port | 8 GB | GDDR6 | 4 | 160 W | >= 460 W |
| NVIDIA GeForce RTX 4070 SUPER | 1 | Three DisplayPort 1.4 ports, one HDMI 2.1 port | 12 GB | GDDR6X | 4 | 220 W | >= 750 W |
| NVIDIA GeForce RTX 4070 Ti SUPER | 1 | Three DisplayPort 1.4 ports, one HDMI 2.1 port | 16 GB | GDDR6X | 4 | 285 W | >= 750 W |
| NVIDIA GeForce RTX 4080 SUPER | 1 | Three DisplayPort 1.4 ports, one HDMI 2.1 port | 16 GB | GDDR6X | 4 | 320 W | >= 750 W |
| NVIDIA GeForce RTX 4090 | 1 | Three DisplayPort 1.4 ports, one HDMI 2.1 port | 24 GB | GDDR6X | 4 | 450 W | >= 1000 W |

# Audio

The following table lists the audio specifications of your Dell Tower EBT2250.

### Table 13. Audio specifications

| Description | Values |
|---|---|
| Audio type | Integrated 7.1 channel audio |

### Table 13. Audio specifications (continued)

| Description | Values |
|---|---|
| Audio controller | Realtek ALC1220 |
| Internal audio interface | High definition audio interface |
| External audio interface | • Headset port - 3.5 mm Universal audio jack<br>• Front L/R surround line-out port - 3.5 mm Line-in port - 3.5 mm |

# Media-card reader

The following table provides the specification of media cards that are supported by your Dell Tower EBT2250.

### Table 14. Media-card reader specifications

| Description | Values |
|---|---|
| Media-card slot type | One SD card slot |
| Media-cards supported | • Secure Digital (SD)<br>• Secure Digital High Capacity (SDHC)<br>• Secure Digital Extended Capacity (SDXC) |
| **NOTE:** The maximum capacity that is supported by the media-card reader varies depending on the standard of the media card that is installed on your computer. | |

# Power ratings

The following table lists the power rating specifications of Dell Tower EBT2250.

### Table 15. Power ratings

| Description | Option one | Option two | Option three |
|---|---|---|---|
| Type | 460 W Bronze | 750 W Platinum | 1000 W Platinum |
| Input voltage | 90 VAC to 264 VAC | 90 VAC to 264 VAC | 90 VAC to 264 VAC |
| Input frequency | 47 Hz to 63 Hz | 47 Hz to 63 Hz | 47 Hz to 63 Hz |
| Input current (maximum) | 7 A | 10 A | 13.6 A |
| Output current (continuous) | Operating:<br>• 12 VA/18 A<br>• 12 VB/18 A<br>• 12 VC/18 A<br>Standby:<br>• 12 VA/1.5 A<br>• 12 VB /3.3 A<br>• 12 VC/0 A | Operating:<br>• 12 VA/36 A<br>• 12 VB/27 A<br>• 12 VC/36 A<br>Standby:<br>• 12 VA/1.5 A<br>• 12 VB /5 A | Operating:<br>• 12 VA/36 A<br>• 12 VB/27 A<br>• 12 VC/36 A<br>Standby:<br>• 12 VA/1.5 A<br>• 12 VB /5 A |
| Rated output voltage | • + 12 VA<br>• + 12 VB<br>• + 12 VC | • + 12 VA<br>• + 12 VB<br>• + 12 VC | • + 12 VA<br>• + 12 VB<br>• + 12 VC |

### Table 15. Power ratings (continued)

| Description | Option one | Option two | Option three |
|---|---|---|---|
| Temperature range: | | | |
| Operating | 5°C to 45°C (41°F to 113°F) | 5°C to 50°C (41°F to 122°F) | 5°C to 50°C (41°F to 122°F) |
| Storage | -40°C to 70°C (-40°F to 158°F) | -40°C to 70°C (-40°F to 158°F) | -40°C to 70°C (-40°F to 158°F) |

# Power supply connector

The following table lists the power-supply connectors of your computer.

### Table 16. Power supply connector

| Power-supply unit | Power-supply unit connecters |
|---|---|
| 460 W Bronze | • Two four-pin connectors for the processor<br>• One eight-pin connector for the system board<br>• One six-pin and one (6+2) pin connector for graphics card |
| 750 W Platinum | • Two four-pin connectors for the processor<br>• One 10-pin connector for the system board<br>• Two six-pin and one (6+2) pin connector for graphics card |
| 1000 W Platinum | • Two four-pin connectors for the processor<br>• One 10-pin connector for the system board<br>• Two six-pin and one (6+2) pin connector for graphics card |

# Operating and storage environment

This table lists the operating and storage specifications of your Dell Tower EBT2250.

**Airborne contaminant level:** G1 as defined by ISA-S71.04-1985

### Table 17. Computer environment

| Description | Operating | Storage |
|---|---|---|
| Temperature range | 10°C to 35°C (50°F to 95°F) | -40°C to 65°C (-40°F to 149°F) |
| Relative humidity (maximum) | 20% to 80% (non-condensing) | 5% to 95% (non-condensing) |
| Vibration (maximum)* | 0.26 GRMS | 1.37 GRMS |
| Shock (maximum) | 40 G† | 105 G† |
| Altitude range | -15.20 m to 3048 m (-49.87 ft to 10000 ft) | -15.20 m to 10668 m (-49.87 ft to 35000 ft) |
| **CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.** | | |

* Measured using a random vibration spectrum that simulates the user environment.

† Measured using a 2 ms half-sine pulse.

# 4

# 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. See the safety instructions that are shipped with the product or at Dell Regulatory Compliance Home Page.**

**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.**

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

## 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 and all attached devices from their electrical outlets.

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 performing any disassembly instructions.

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

- Turn off the 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 any to avoid electrostatic discharge (ESD) damage.
- Place the removed component on an anti-static mat after removing it from the computer.
- Wear shoes with nonconductive rubber soles to reduce the chance of getting electrocuted.
- Unplugging, pressing, and holding the power button for 15 seconds should discharge residual power in the system board.

## Standby power

Dell products with standby power must be unplugged before you open the back cover. Systems that are equipped with standby power are powered while turned off. The internal power enables the computer to be remotely turned on (Wake-on-LAN) and suspended into a sleep mode and has other advanced power management features.

## 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. 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 deploying the ESD Field Service kit, assess the situation at the customer location. For example, deploying the kit for a server environment is different than for a desktop or 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** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the anti-static mat is not required, or connect to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the 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 kit, it is a best practice to regularly test the strap prior to each service, and at a minimum, test once per week. A wrist strap tester is the best method for doing this test. To perform the test, plug the bonding-wire of the wrist-strap into the tester while it is strapped to your wrist and push the button to test. A green LED is lit if the test is successful; a red LED is lit and an alarm sounds if the test fails.

**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.

# BitLocker

**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 progress, and the system displays a prompt for the recovery key on each reboot. If the recovery key is not known, this can result in data loss or an operating system reinstall. For more information, see Knowledge Article: 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 #2
- Phillips screwdriver #1
- Plastic scribe

# 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 18. Screw list

| Component | Screw type | Quantity | Image |
|---|---|---|---|
| Side cover | #6-32 (Captive screw) | 1 |  |
| Power button | #6-32 | 1 |  |
| Rear-chassis fan | M3x5 | 1 |  |
| Front-chassis fan | M3x5 | 1 |  |
| M.2 2230 solid-state drive | M2x3.5 | 1 |  |
| M.2 2280 solid-state drive | M2x3.5 | 1 |  |
| Wireless card | M2x3.5 | 1 |  |
| Power-supply unit | #6-32 | 6 |  |
| System board | #6-32 | 10 |  |

# Major components of Dell Tower EBT2250

The following image shows the major components of Dell Tower EBT2250.

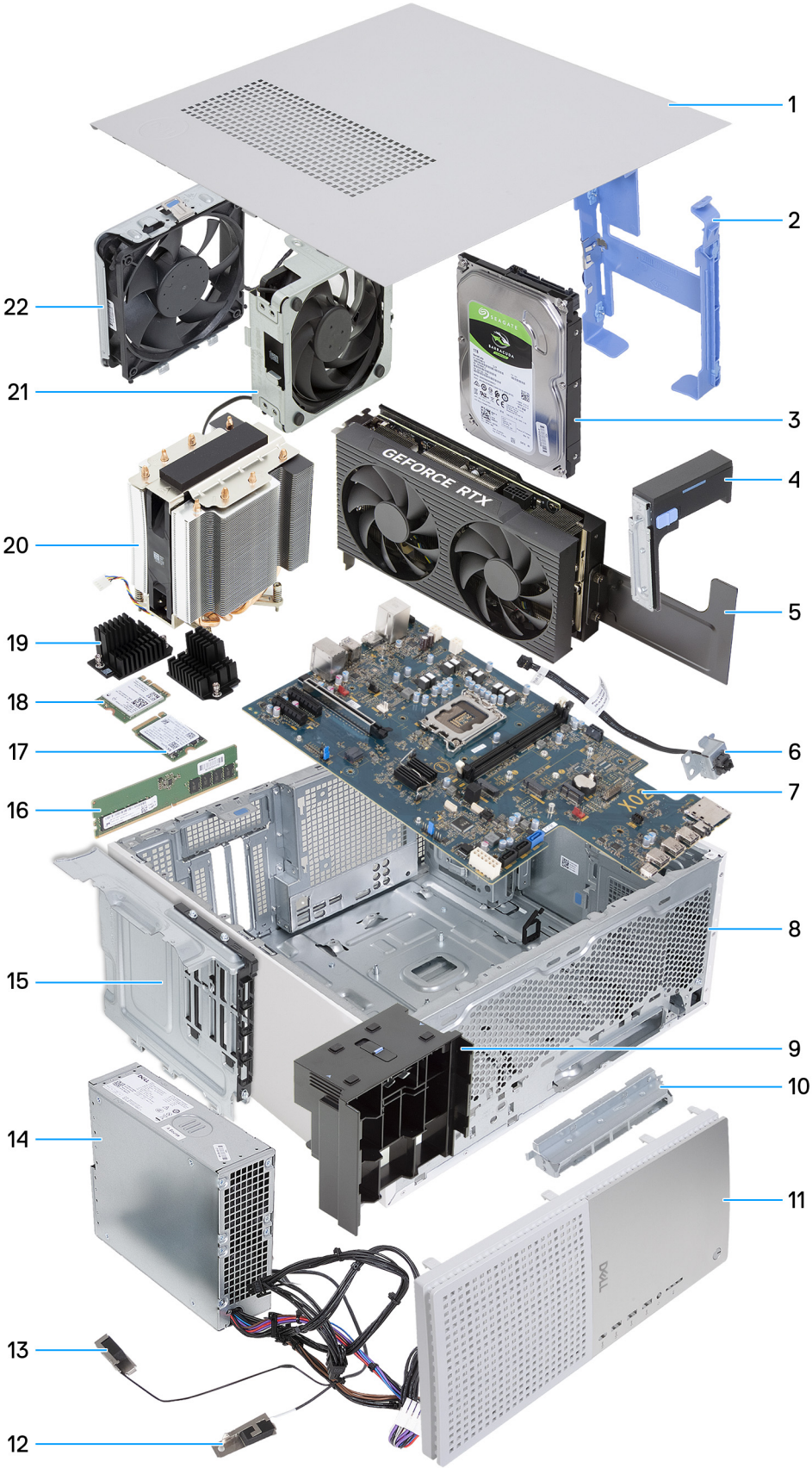



**Figure 9. Major components of Dell Tower EBT2250**

1. Left-side cover

2. Hard-drive carrier
3. Hard drive
4. Graphics-card middle holder
5. Graphics card
6. Power button and power-button bracket
7. System board
8. Chassis
9. Graphics-card end holder
10. Front I/O-bracket
11. Front cover
12. Antenna module (1)
13. Antenna module (2)
14. Power-supply unit
15. Power-supply cage
16. Memory module
17. M.2 2230 solid-state drive
18. Wireless card
19. Voltage-regulator heat sink
20. Fan and heat-sink assembly
21. Rear-chassis fan
22. Front-chassis fan

**NOTE:** Dell Technologies 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.

5

# Removing and installing Customer Replaceable Units (CRUs)

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

**CAUTION: Customers can replace only the Customer Replaceable Units (CRUs) following the safety precautions and replacement procedures.**

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

# Left-side cover

## Removing the left-side cover

### Prerequisites

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

### About this task

The following image(s) indicate the location of the left-side cover and provides a visual representation of the removal procedure.


**Figure 10. Removing the left-side cover**

### Steps

1. Using a flat head or Phillips-head screwdriver, loosen the captive screw that secures the left-side cover latch to the chassis.
2. Pull on the left-side cover latch to release the left-side cover from the chassis.
3. Holding the left-side cover firmly on both sides, remove and lift the left-side cover from the chassis.

## Installing the left-side cover

### Prerequisites

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

### About this task

The following image(s) indicate the location of the left-side cover and provides a visual representation of the installation procedure.


**Figure 11. Installing the left-side cover**

### Steps

1. Hold the left-side cover firmly on both sides, slide the bottom edge of the left-side cover into the chassis.
2. Holding the left-side cover latch, push the left-side cover into position.
3. Using a flat head or Phillips-head screwdriver, tighten the captive screw that secures the left-side cover latch to the chassis.

### Next steps

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

# Front cover

## Removing the front cover

### Prerequisites

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

2. Remove the left-side cover.

### About this task

The following image(s) indicate the location of the front cover and provides a visual representation of the removal procedure.

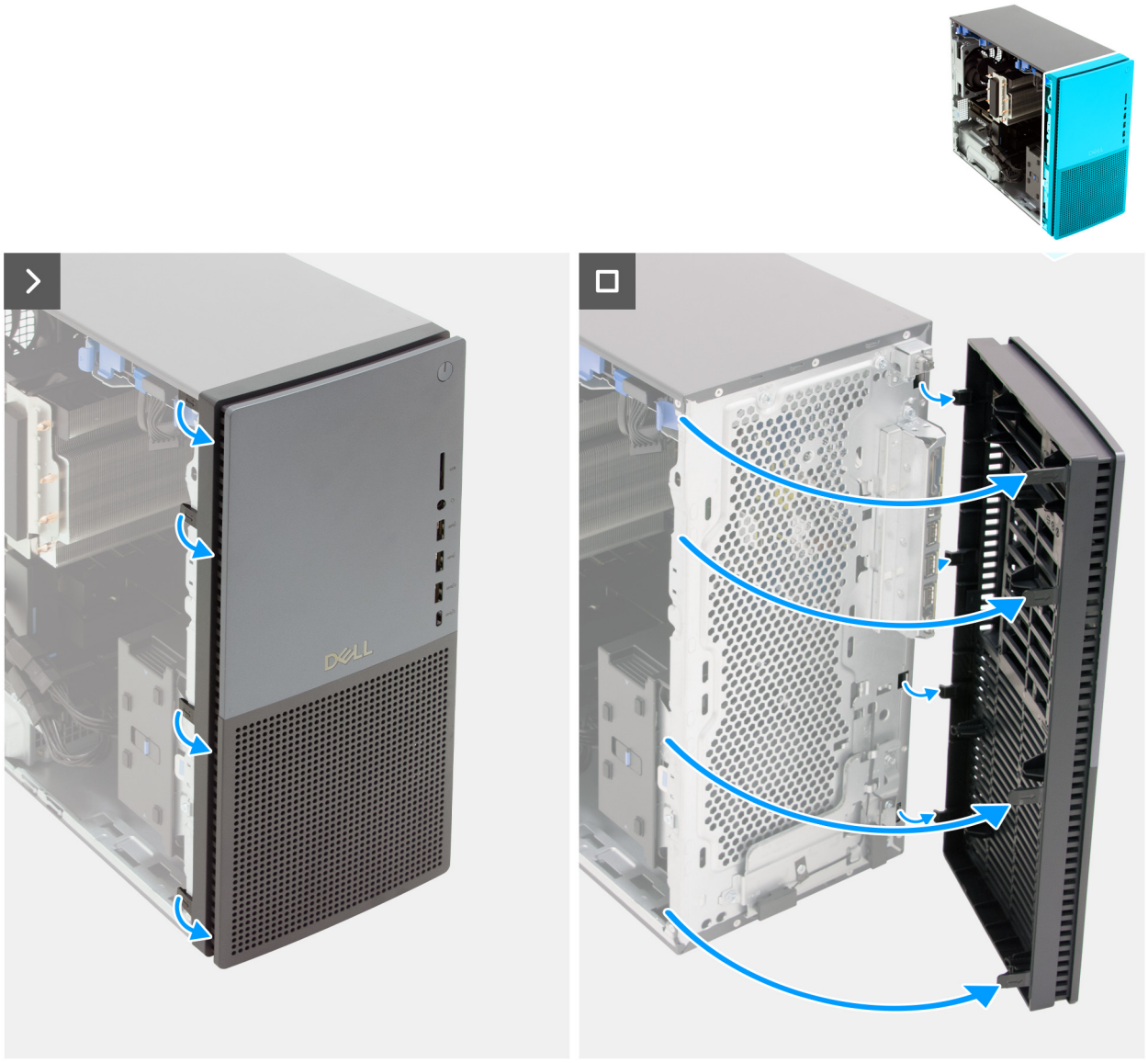


**Figure 12. Removing the front cover**

### Steps

1. Gently pry and release the front-cover tabs from the top, working down sequentially to the bottom-left tab.
2. Swing the front cover outwards, away from the chassis, and remove the cover.

# Installing the front cover

### Prerequisites

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

### About this task

The following image(s) indicate the location of the front cover and provides a visual representation of the installation procedure.

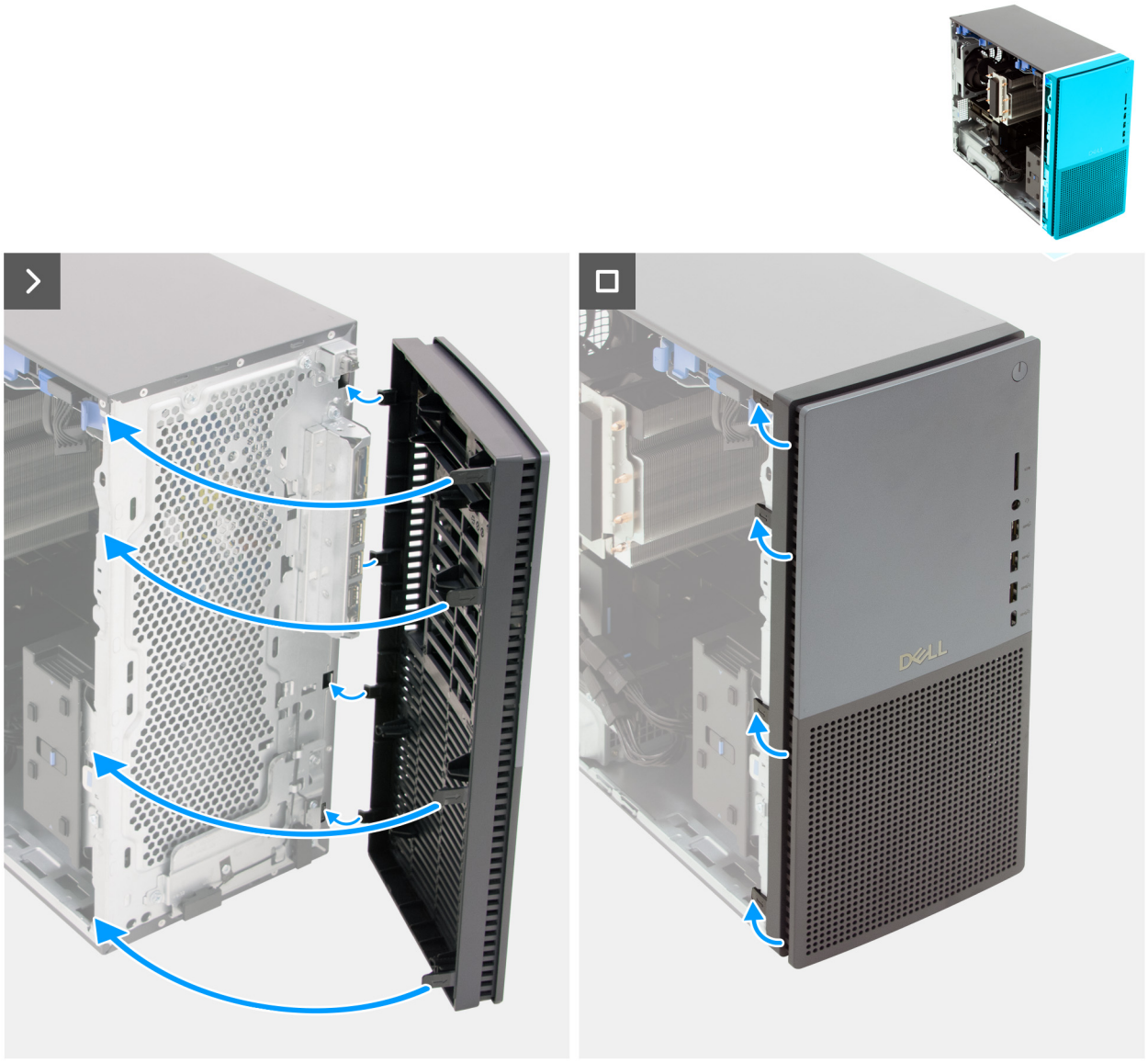


Figure 13. Installing the front cover

### Steps

1. Insert the right-side front-cover tabs into the corresponding slots on the chassis.
2. Push the left-side of the front cover towards the chassis, snapping the tabs into position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# Power button

## Removing the power button

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

3. Remove the front cover.

### About this task

The following image(s) indicate the location of the power button and provides a visual representation of the removal procedure.

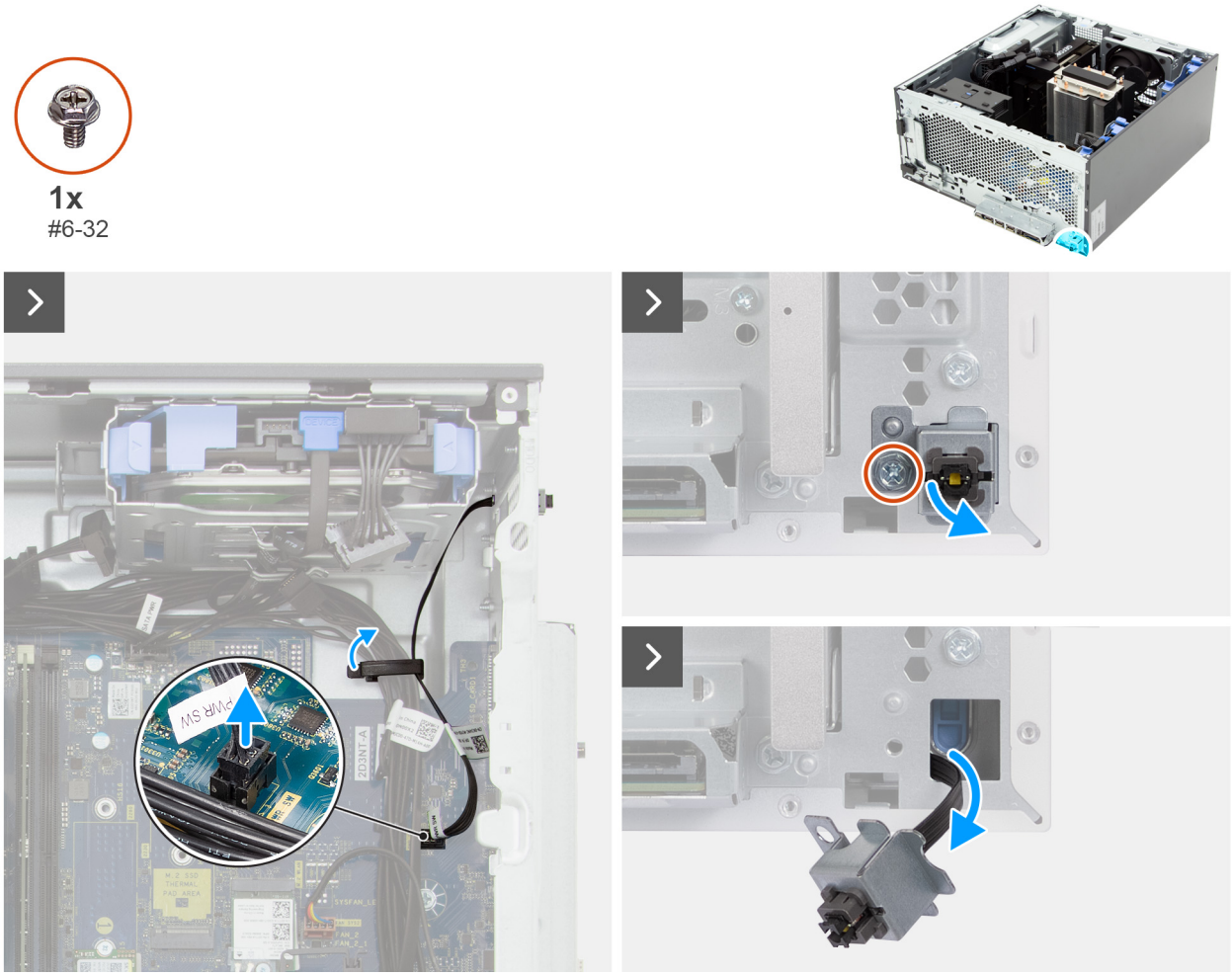



Figure 14. Removing the power button

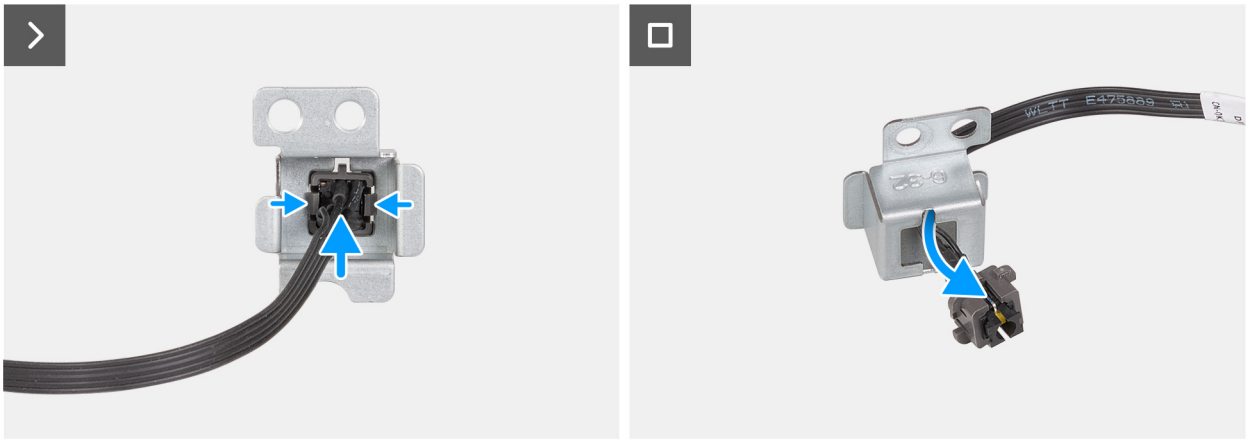


Figure 15. Removing the power button

### Steps

1. Place the computer on its side with the left side facing up.

2. Disconnect the power-button cable from its connector (PWR SW1) on the system board.
3. Remove the screw (#6-32) that secures the power-button bracket to the chassis.
4. Remove the power button and its bracket from the slot on the chassis and thread the power-button cable through the slot on the chassis.
5. Press the release tabs on the sides of the power button to release it from the power-button bracket. If necessary, use the flat-side of a scribe to lever the power button off the bracket.
6. Thread the power-button cable through the slot on the power-button bracket.

# Installing the power button

### Prerequisites

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

### About this task

The following image(s) indicate the location of the power button and provides a visual representation of the installation procedure.

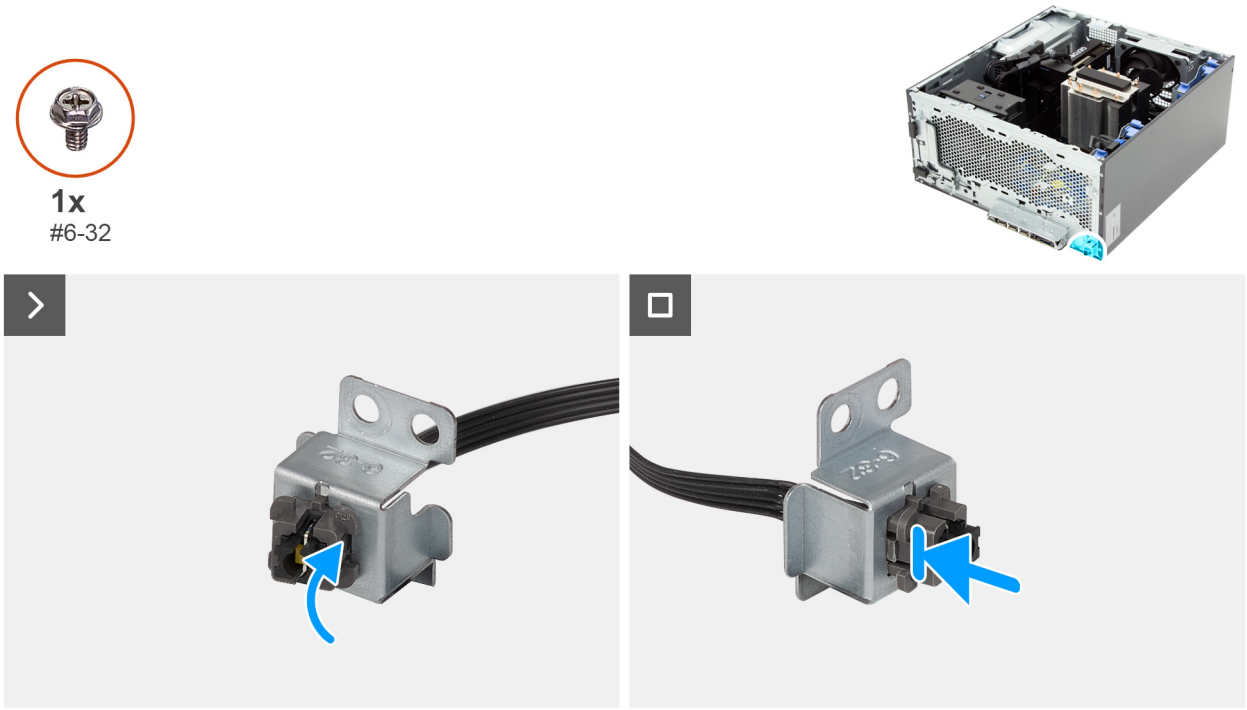



**Figure 16. Installing the power button**

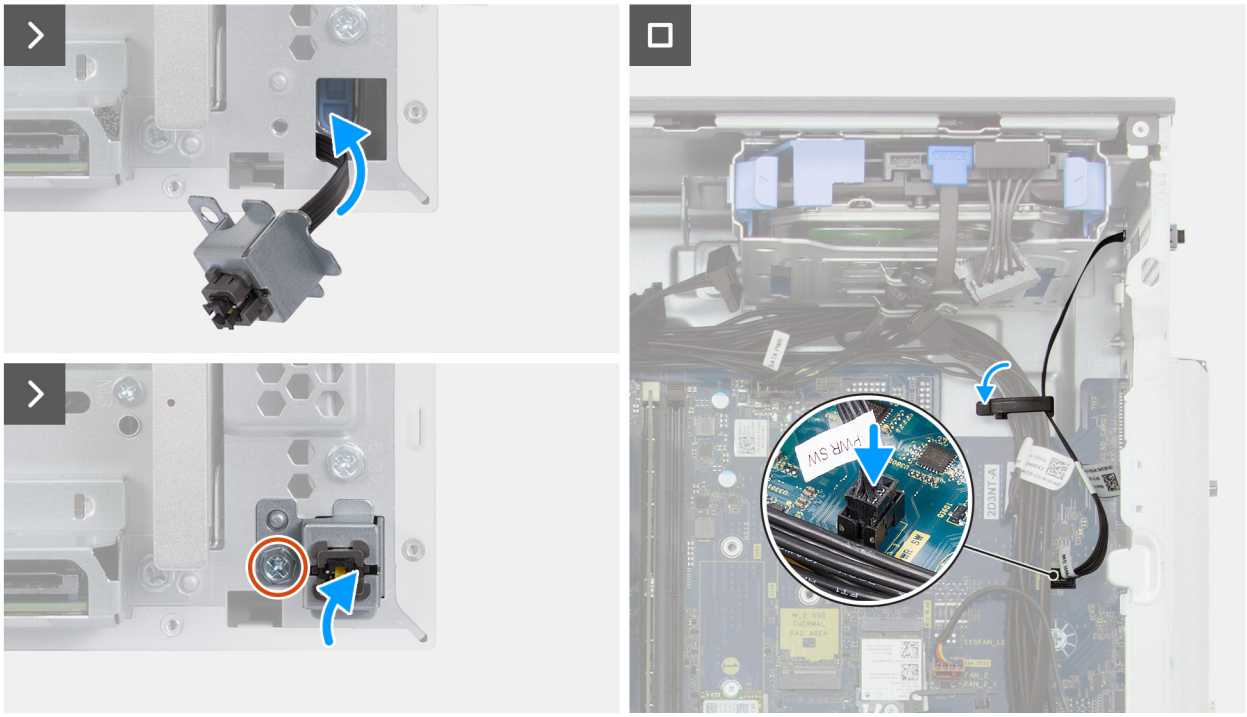



**Figure 17. Installing the power button**

### Steps

1. Thread the power-button cable through the slot on the power-button bracket.
2. Press down on the securing tabs to push the power button into the slot on the power-button bracket.
3. Thread the power-button cable through the slot on the chassis.
4. Insert the top tabs on the power-button bracket into the slot in the chassis, then align the screw hole on the bracket with the screw hole on the chassis.
5. Replace the screw (#6-32) that secures the power-button bracket to the chassis.
6. Connect the power-button cable to its connector (PWR SW1) on the system board.
7. Place the computer in an upright position.

### Next steps

1. Install the front cover.
2. Install the left-side cover.
3. Follow the procedure in After working inside your computer.

# 3.5-inch hard drive

## Removing the 3.5-inch hard drive

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

### About this task

**NOTE:** This computer may have up to two 3.5-inch hard drives installed in the two hard-drive cages (HDD0 and HDD1) on the chassis.

The following image(s) indicate the location of the 3.5-inch hard drive in the HDD0 hard-drive cage and provides a visual representation of the removal procedure.

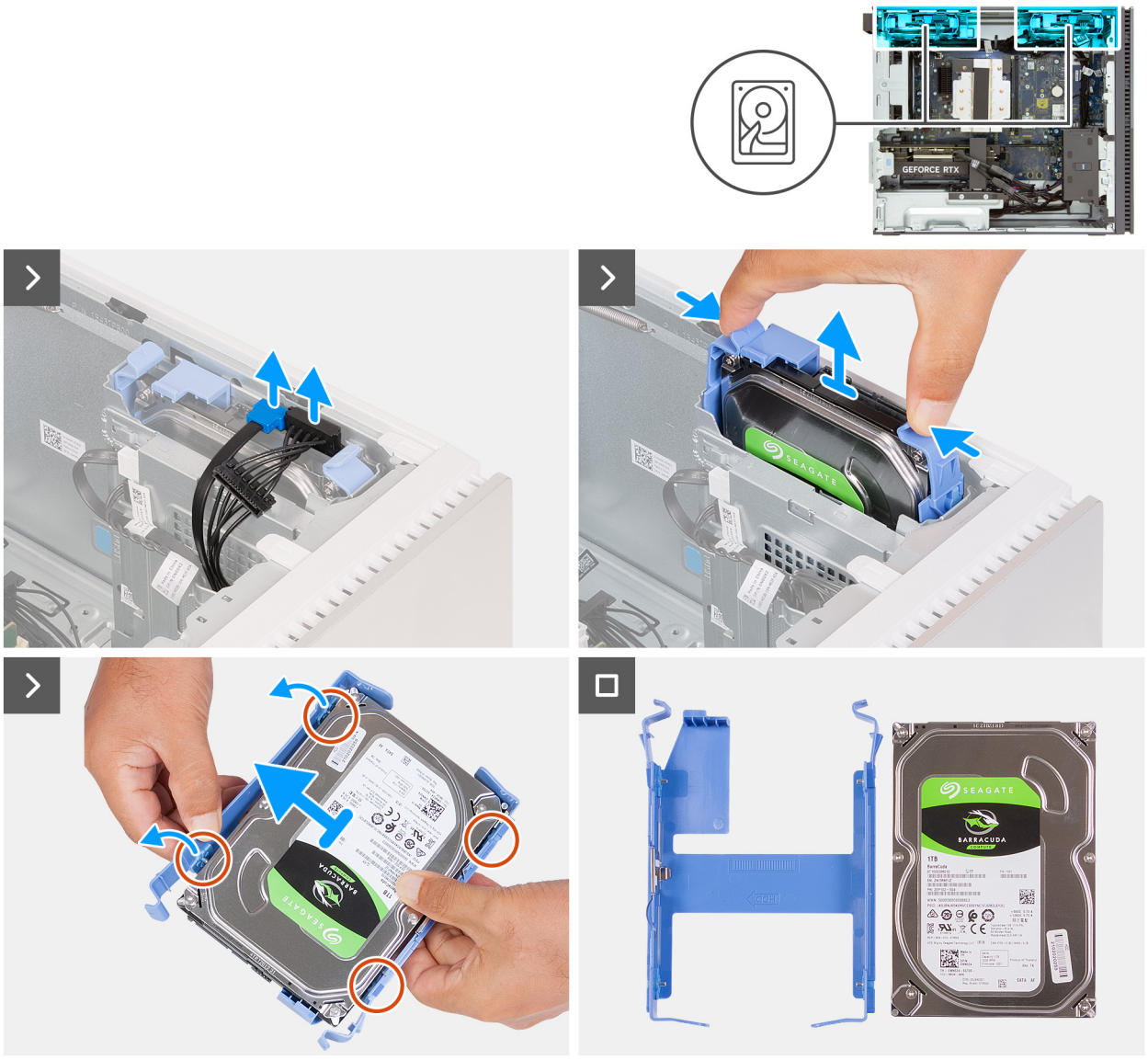



**Figure 18. Removing the 3.5-inch hard drive**

### Steps

1. Place the computer on its side with the left side facing up.
2. Disconnect the hard-drive data and power cables from the 3.5-inch hard drive.
3. Press the release tabs on the hard-drive carrier and slide the hard-drive carrier out of the hard-drive cage.
4. Pry the hard-drive carrier to release the tabs on the carrier from the slots on the 3.5-inch hard drive.
5. Lift the 3.5-inch hard drive off the hard-drive carrier.

**NOTE:** Repeat step 2 to step 5 to remove the 3.5-inch hard drive from the HDD1 hard-drive cage.

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

# Installing the 3.5-inch hard drive

### Prerequisites

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

### About this task

**NOTE:** You may install two 3.5-inch hard drives into your computer, one into each hard-drive cage (HDD0 and HDD1) on the chassis.

**NOTE:** Be sure to use the correct size hard-drive carrier for the hard-drive to be installed. For example, use a 3.5-inch hard-drive carrier to install a 3.5-inch hard drive. If you do not have the correct size hard-drive carrier, order one from Dell.

The following image(s) indicate the location of the 3.5-inch hard drive in the HDD0 hard-drive cage and provides a visual representation of the installation procedure.

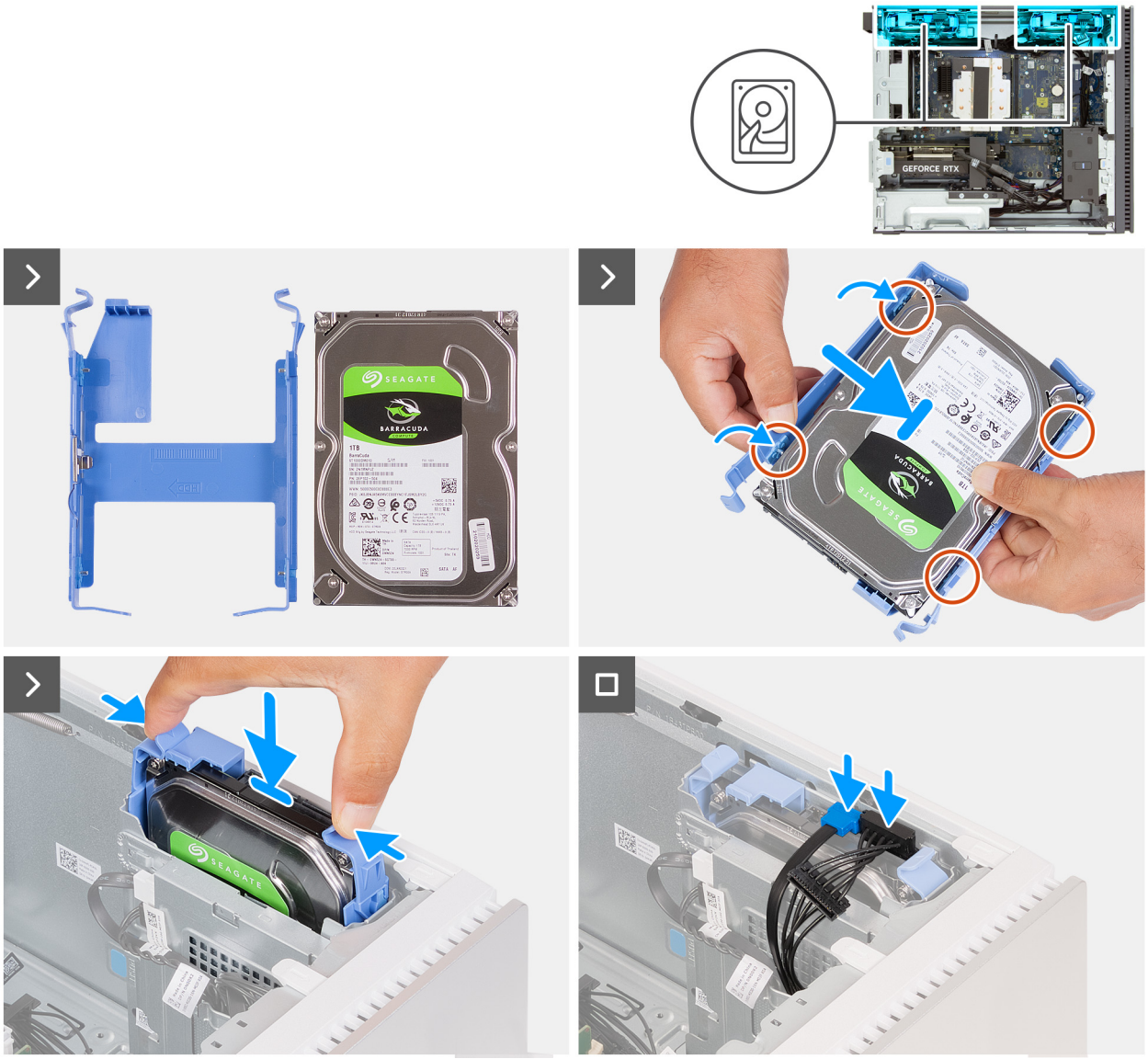



**Figure 19. Installing the 3.5-inch hard drive**

### Steps

1. Noting the orientation of the hard drive and carrier in the image, place the 3.5-inch hard drive into the hard-drive carrier.
2. Flex the carrier on the sides to ensure the pins on the carrier fit snugly into the screw holes on the sides of the hard drive.

3. Holding the hard-drive assembly securely, flip it around so that the top of the hard drive faces the bottom of the hard-drive cage as illustrated. Push the hard-drive assembly into the hard-drive cage until it locks into place.
4. Connect the hard-drive data cable and power cable to the 3.5-inch hard drive.

   **NOTE:** Repeat step 1 to step 4 to install the 3.5-inch hard drive in the HDD1 hard-drive cage.

5. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.
3. Verify if the storage device is installed correctly (optional). You can verify by following the steps in Identifying storage device in device manager or Identifying your storage device in system setup (BIOS).

**NOTE:** To install the operating system on to your storage device, see **Reinstall Windows to the Dell factory image using recovery media** in the Knowledge Base Resource at Dell Support Site.

## Identifying the storage device in Device Manager

### Steps

1. On the taskbar, click the search box, and then type `Device Manager`.
2. Click **Device Manager**.
   The **Device Manager** window is displayed.
3. Expand **Disk drives**.

## Identifying the storage device in system setup (BIOS)

### Steps

1. Turn on or restart your computer.
2. Press F2 when the Dell logo is displayed on the screen to enter the BIOS setup program.
   A list of hard drives are displayed under the **System Information** in the **General** group.

# 2.5-inch hard drive

## Removing the 2.5-inch hard drive

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

### About this task

**NOTE:** This computer may have up to two 2.5-inch hard drives installed in the two hard-drive cages (HDD0 and HDD1) on the chassis.

The following images indicate the location of the 2.5-inch hard drive in the HDD0 hard-drive cage and provide a visual representation of the removal procedure.

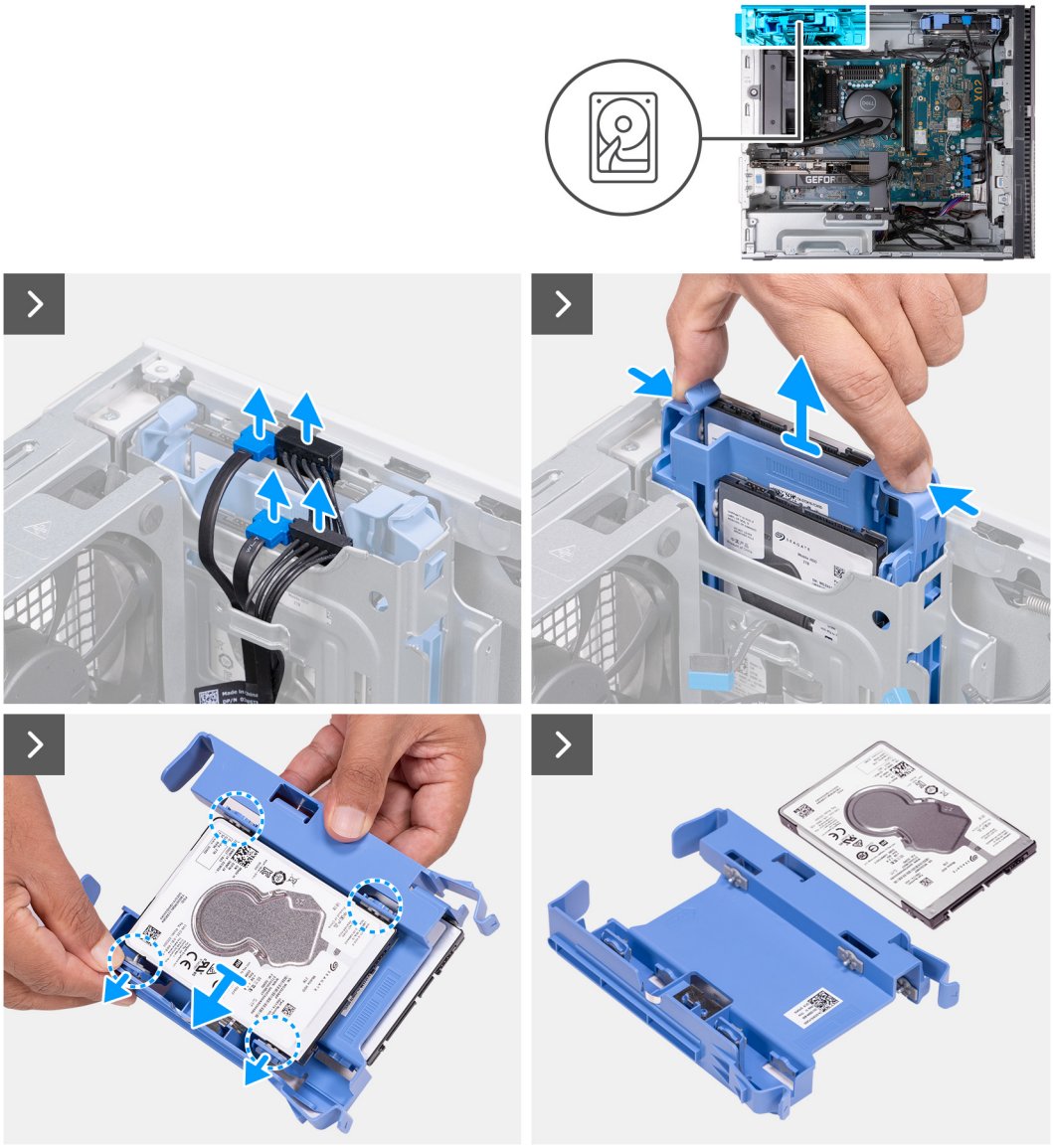


Figure 20. Removing the 2.5-inch hard drive

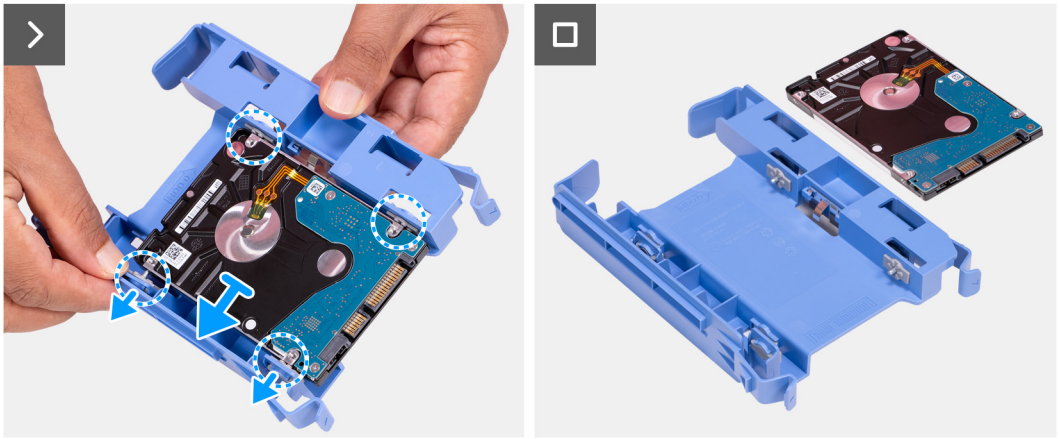


Figure 21. Hard drive and hard-drive carrier drive

### Steps

1. Disconnect the data and power cables from the hard drive.

2. Press the release tabs on the hard-drive carrier and slide the hard-drive carrier out of the hard-drive cage.
3. Pry the sides of the hard-drive carrier to release the tabs on the carrier from the slots on the hard drive.
4. Lift the hard drive out of the hard-drive carrier.

**NOTE:** Repeat step 1 to step 4 to remove the 2.5-inch hard drive from the HDD1 hard-drive cage.

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

# Installing the 2.5-inch hard drive

### Prerequisites

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

### About this task

**NOTE:** Be sure to use the correct size hard-drive carrier for the hard-drive to be installed. For example, use a 2.5-inch hard-drive carrier to install a 2.5-inch hard drive. If you do not have the correct size hard-drive carrier, order one from Dell.

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

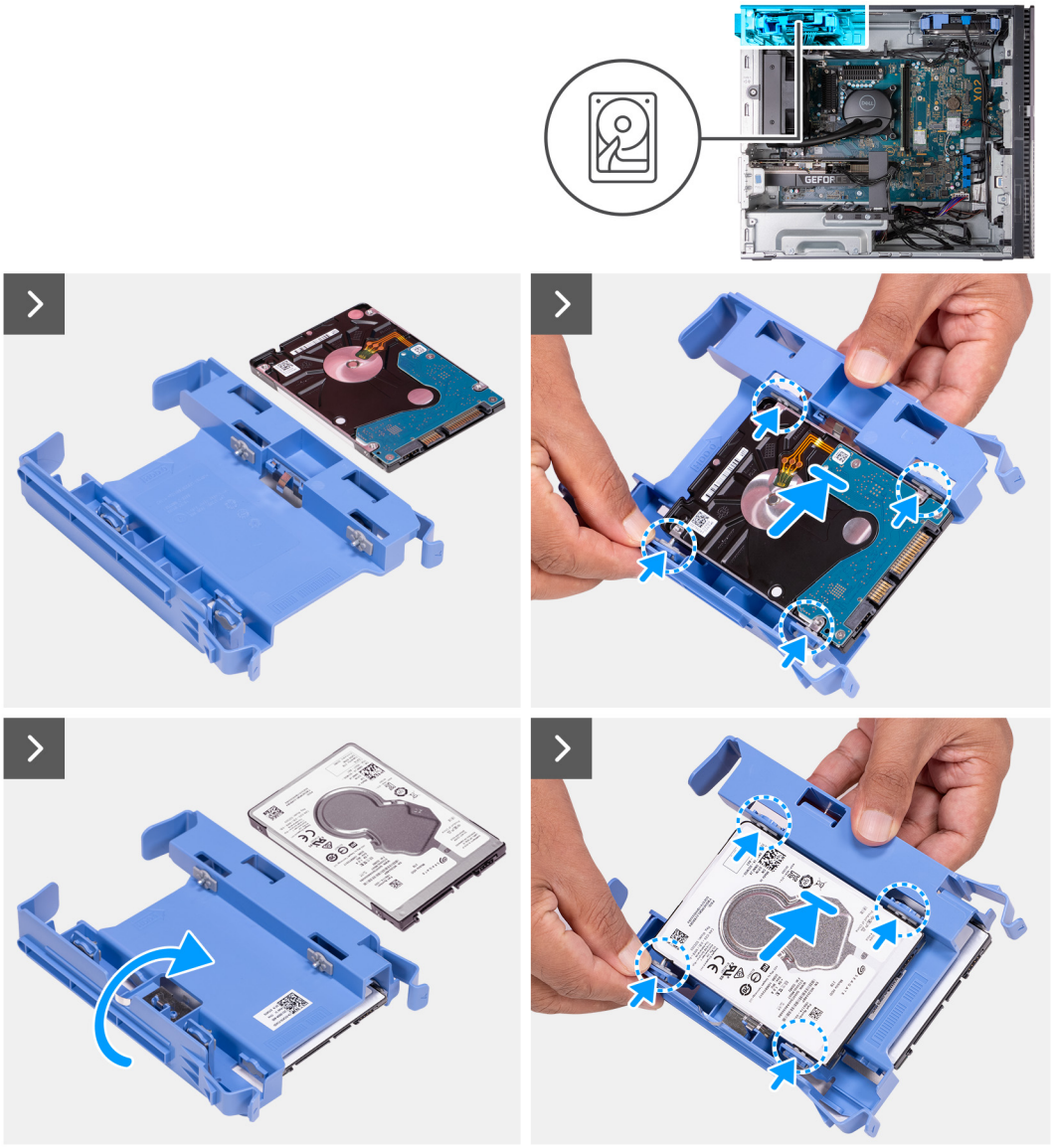


Figure 22. Installing the 2.5-inch hard drive

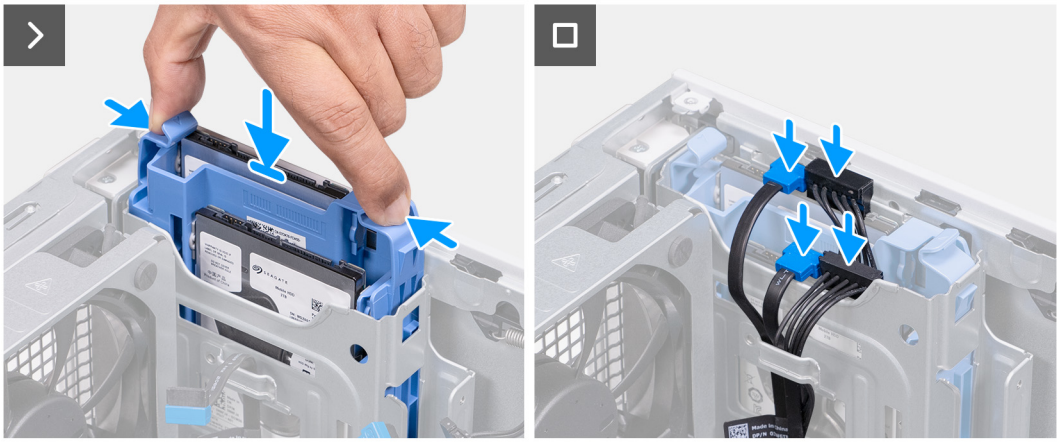


Figure 23. Installing the 2.5-inch hard drive

**NOTE:** Note the orientation on the hard-drive carrier to replace it correctly.

### Steps

1. Align the hard drive with the pins on the hard-drive carrier.
2. Using the tabs on the opposite side, flex open the carrier to insert the pins on the other side.
3. Slide the hard-drive assembly into the hard-drive cage until it snaps into place.
4. Connect the data and power cables to the hard drive.

**NOTE:** Repeat step 1 to step 4 to install the 2.5-inch hard drive in the HDD1 hard-drive cage.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.
3. Verify if the storage device is installed correctly (optional). You can verify by following the steps in Identifying storage device in device manager or Identifying your storage device in system setup (BIOS).

**NOTE:** To install the operating system on to your storage device, see **Reinstall Windows to the Dell factory image using recovery media** in the Knowledge Base Resource at Dell Support Site.

# Coin-cell battery

## Removing the coin-cell battery

### Prerequisites

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

**WARNING: This computer contains a coin-cell battery and requires trained technicians for handling guidance.**

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

2. Remove the left-side cover.

### About this task

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

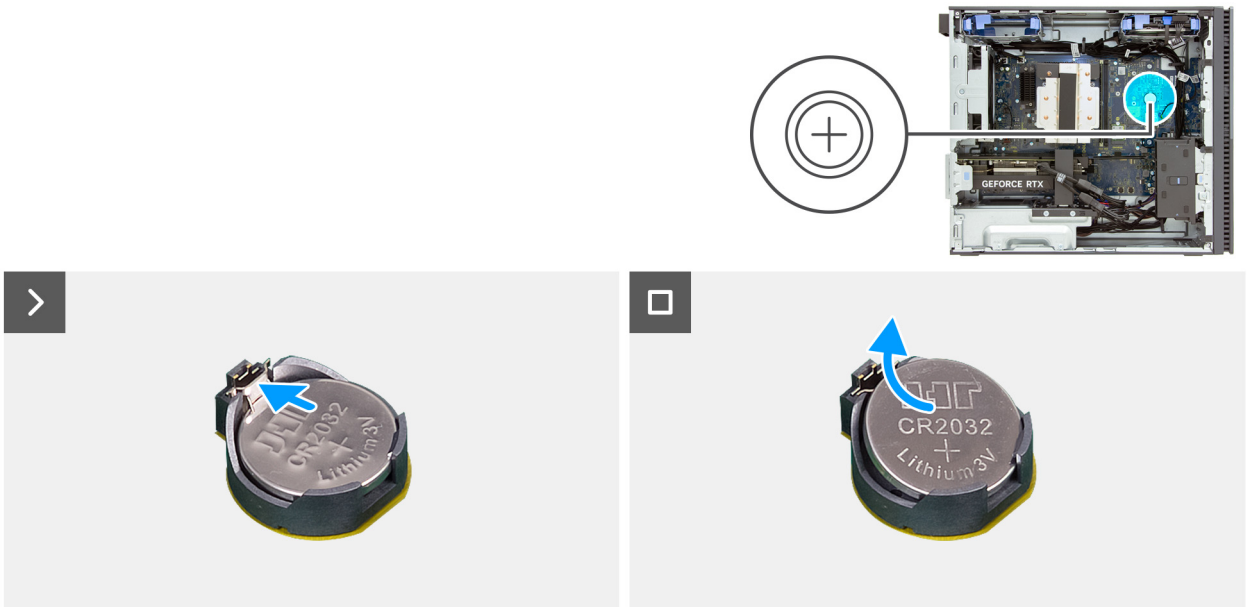



**Figure 24. Removing the coin-cell battery**

### Steps

1. Place the computer on its side with the left side facing up.
2. Push the coin-cell battery-release lever on the coin-cell battery socket (BT1) to release the coin-cell battery out of the socket.
3. Remove the coin-cell battery.

## Installing the coin-cell battery

**WARNING: This computer contains a coin-cell battery and requires trained technicians for handling guidance.**

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

### Prerequisites

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

### About this task

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

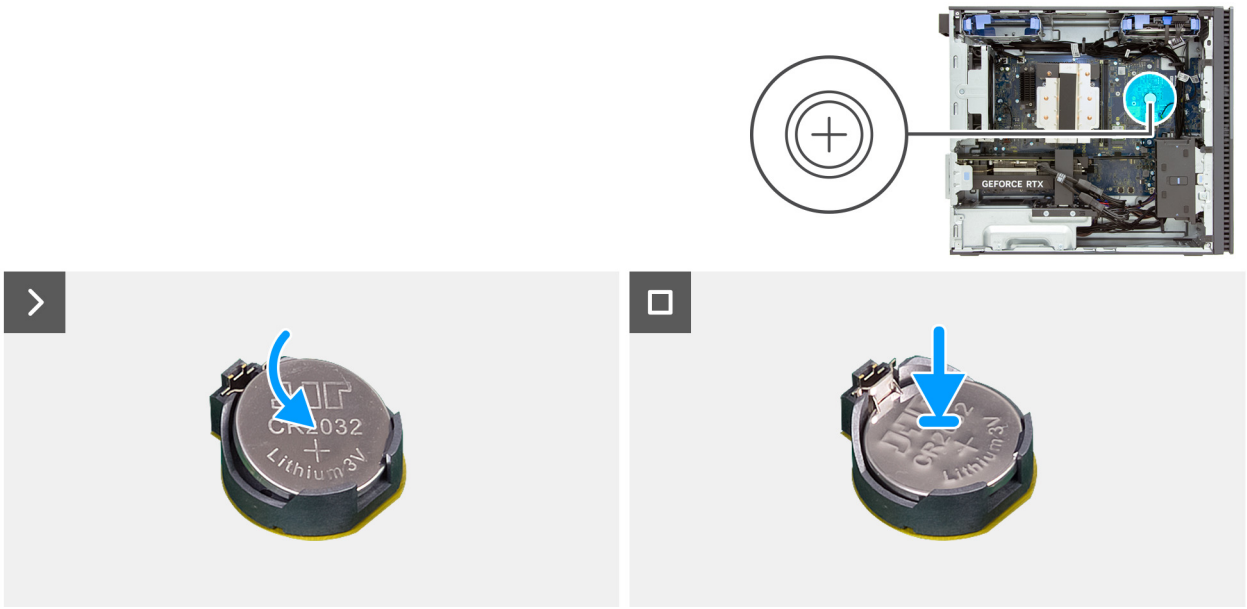



**Figure 25. Installing the coin-cell battery**

### Steps

1. Insert the coin-cell battery into the socket (BT1) with the positive side (+) label facing up and snap the battery in the socket.
2. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# Graphics card

## Removing the graphics card

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

### About this task

**NOTE:** Depending on the configuration ordered, your computer may not have a discrete graphics card installed.

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

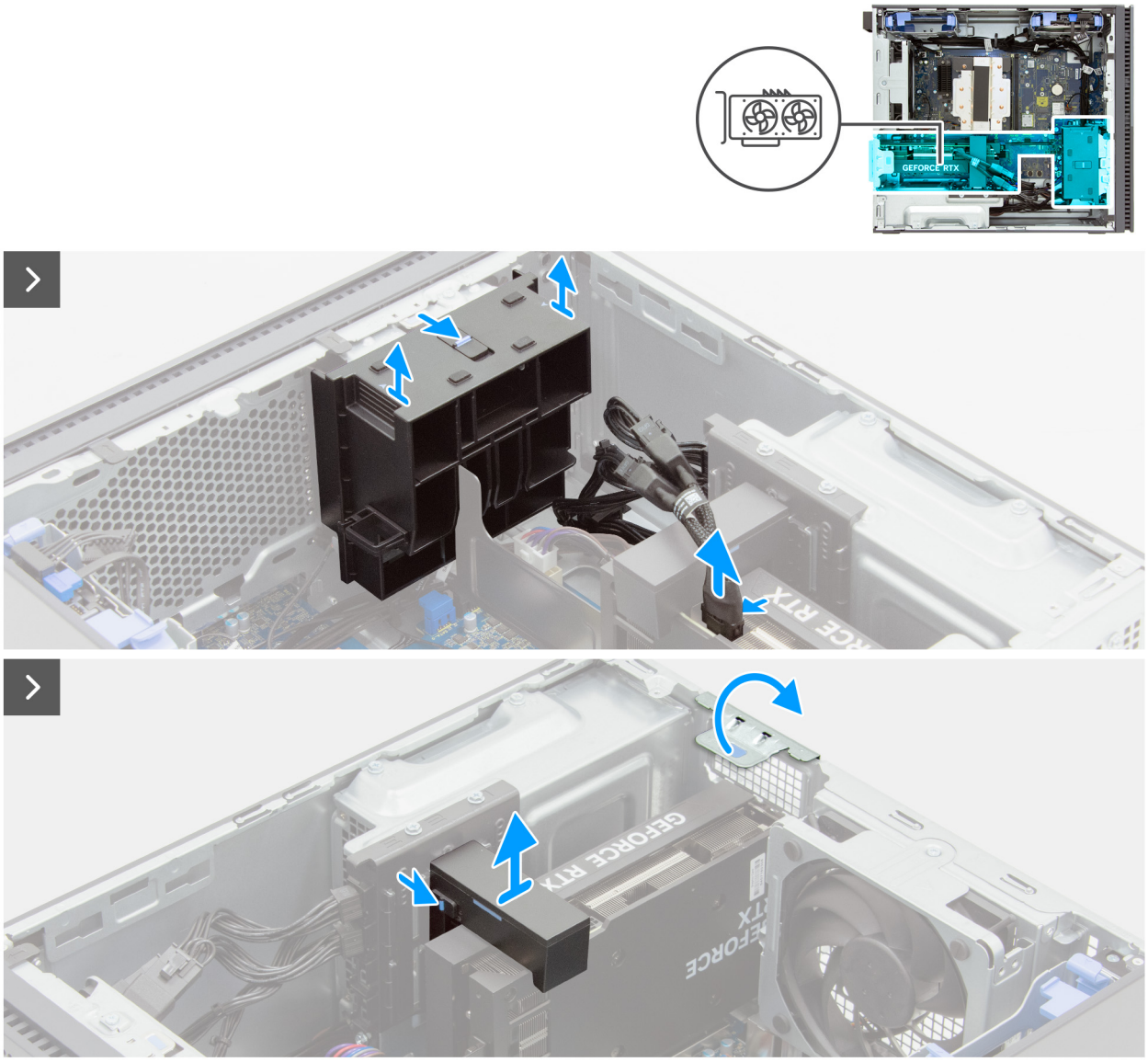


Figure 26. Removing the graphics card

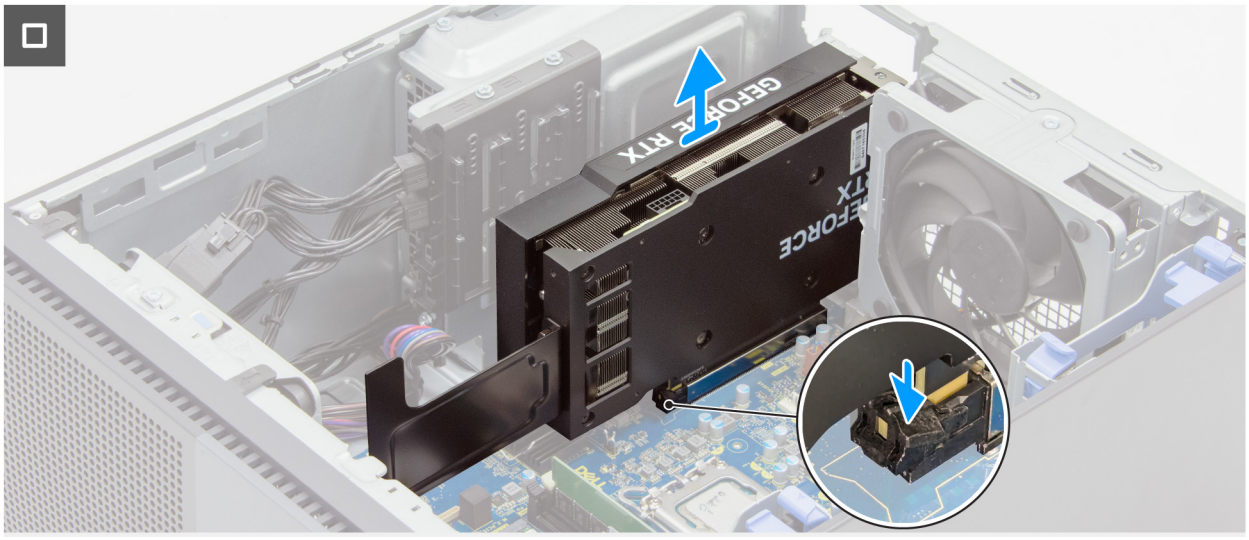


Figure 27. Removing the graphics card

### Steps

1. Place the computer on its side with the left side facing up.
2. Slide the release latch to its unlock position and lift the graphics-card end holder away from the front-chassis fan.

   **NOTE:** Skip this step if your graphics card does not ship with a graphics-card end holder.

3. Press and hold the securing clip on the graphics-card power cable, then pull the connector off the graphics card.
4. Slide and hold the locking mechanism on the graphics-card support bracket, then pull the bracket off the retaining rails on the power-supply cage.

   **NOTE:** The size and location of the graphic-card support bracket may vary depending on the graphics card configuration on your computer.

   **NOTE:** Skip this step if your graphics card does not ship with a graphics-card support bracket.

5. Lift the pull tab and open the expansion-card door.
6. Push the securing tab on the PCIe slot away from the graphics card, grasp the card by its top corner, and ease it out of the slot.

## Installing the graphics card

### Prerequisites

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

### About this task

The following image(s) indicate the location of the graphics card and provides a visual representation of the installation procedure.

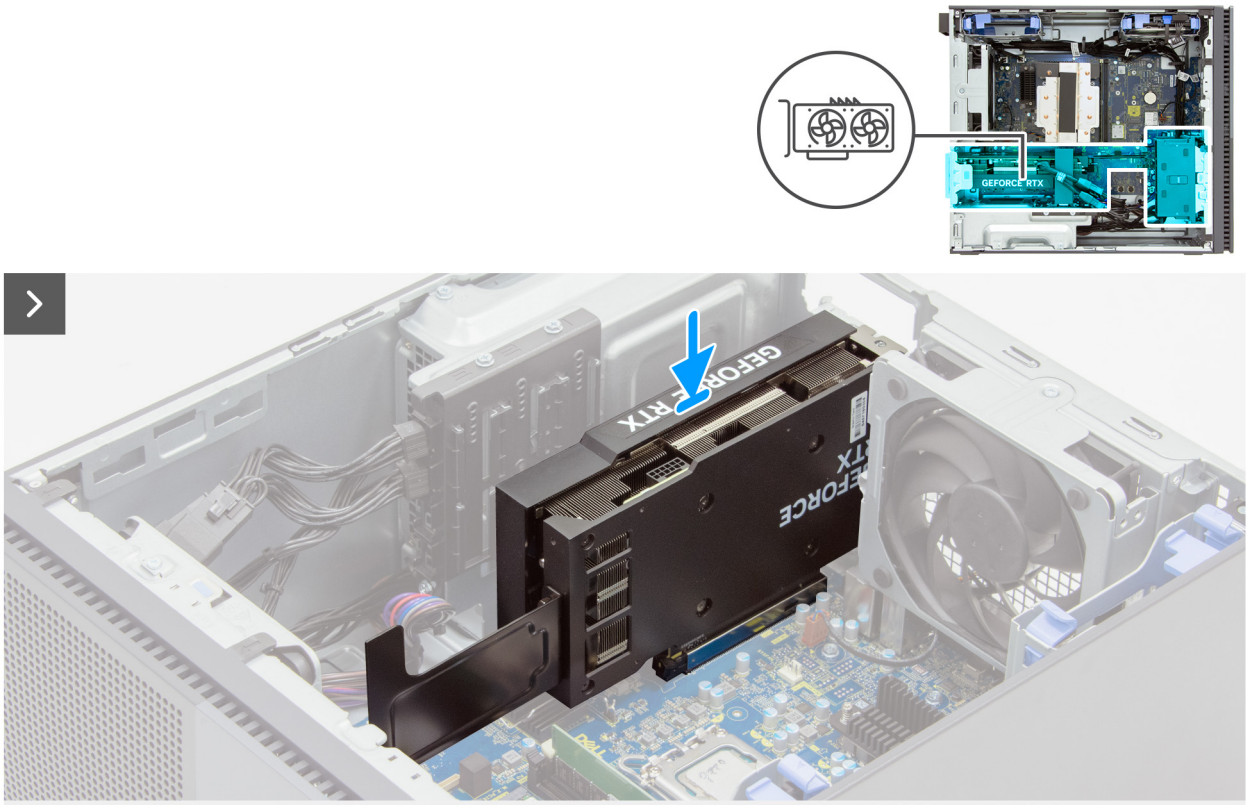



**Figure 28. Installing the graphics card**

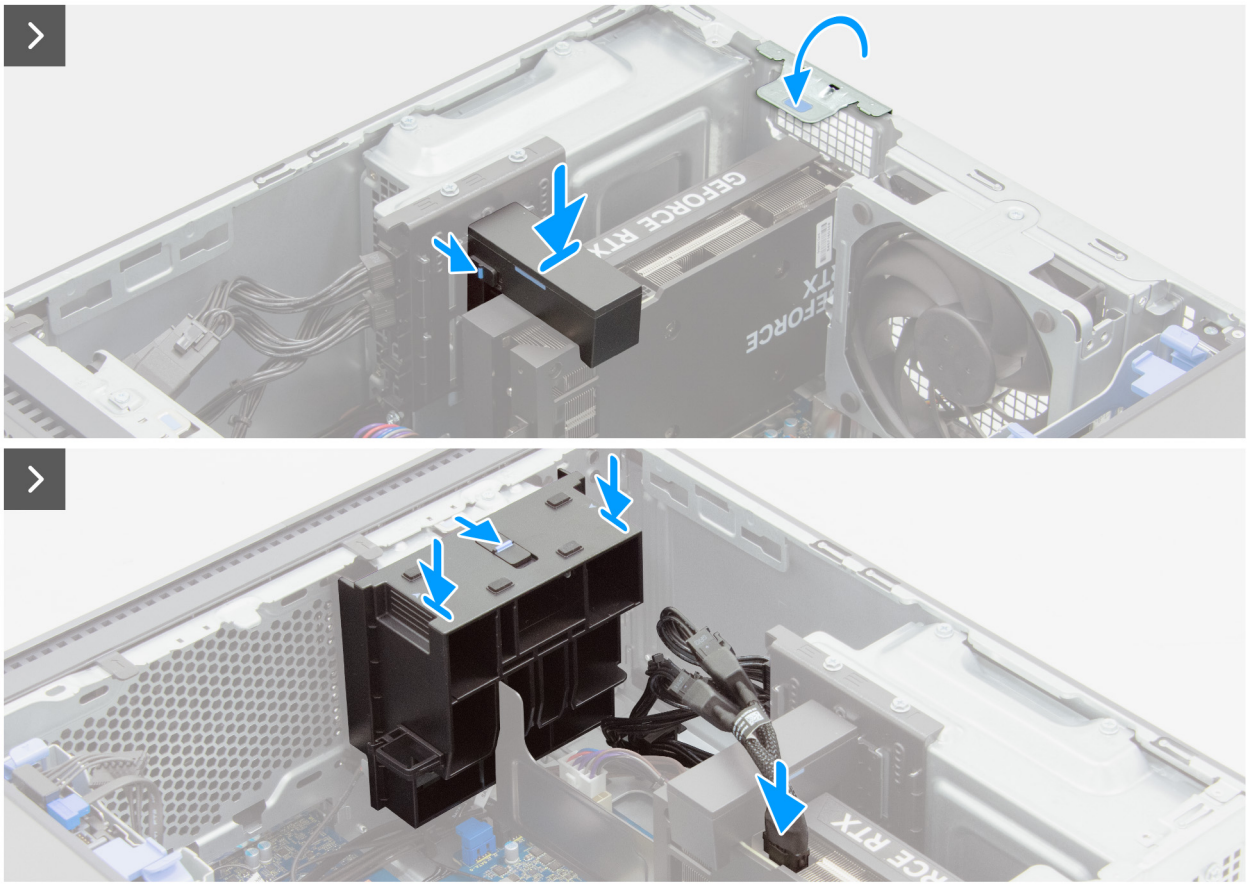


**Figure 29. Installing the graphics card**

### Steps

1. Place the card into the PCIe slot and press down firmly until the graphics card snaps into place.
2. Close the expansion-card door and snap the latch back into position.
3. Insert the graphics-card support bracket onto the retaining rails and slide the latch to its lock position.

   **NOTE:** Skip this step if your graphics card does not ship with a graphics-card end holder.

   **NOTE:** The size and location of the graphic-card support bracket may vary depending on the graphics card configuration on your computer.

4. Connect the graphics-card power cable to the graphics card.
5. Align and place the graphics-card end holder on the chassis and slide the latch to its lock position.

   **NOTE:** Skip this step if your graphics card does not ship with a graphics-card end holder.

6. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# Memory module

## Removing the memory modules

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

### About this task

**NOTE:** This computer may have up to two memory modules installed in the memory-module slots (DIMM1 and DIMM2).

The following image(s) indicate the location of the memory and provides a visual representation of the removal procedure.

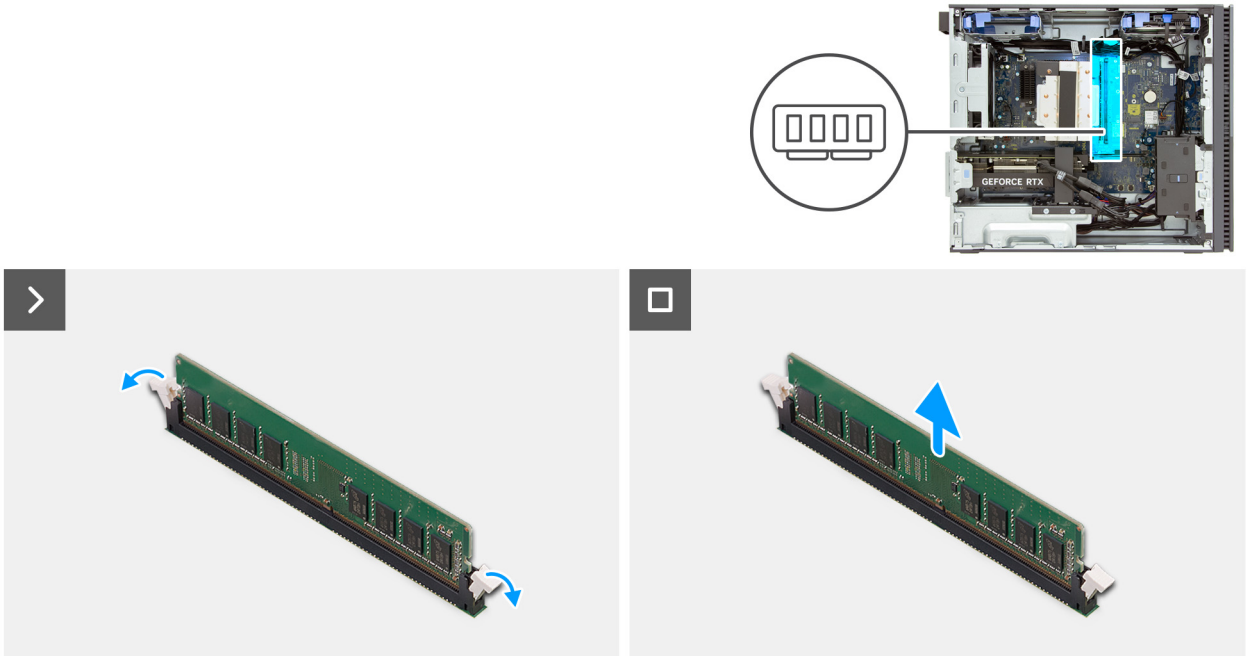



Figure 30. Removing the memory

### Steps

1. **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 ESD can inflict severe damage on the components. To read more about ESD protection, see ESD protection.**

   Place the computer on its side with the left side facing up.
2. Carefully spread apart the securing-clips on each end of the memory-module slot (DIMM1).
3. Grasp the memory module near the securing clip, and then gently ease the memory module out of the memory-module slot.

   **NOTE:** Note the slot and the orientation of the memory module in order to replace it in the correct slot.

   **NOTE:** If the memory module is difficult to remove, gently ease the memory module back and forth to remove it from the slot.

   **NOTE:** Repeat step 2 to step 3 to remove any other memory module installed in the other memory-module slot (DIMM2).

# Installing the memory modules

### Prerequisites

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

### About this task

**NOTE:** Up to two memory modules may be installed into this computer.

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

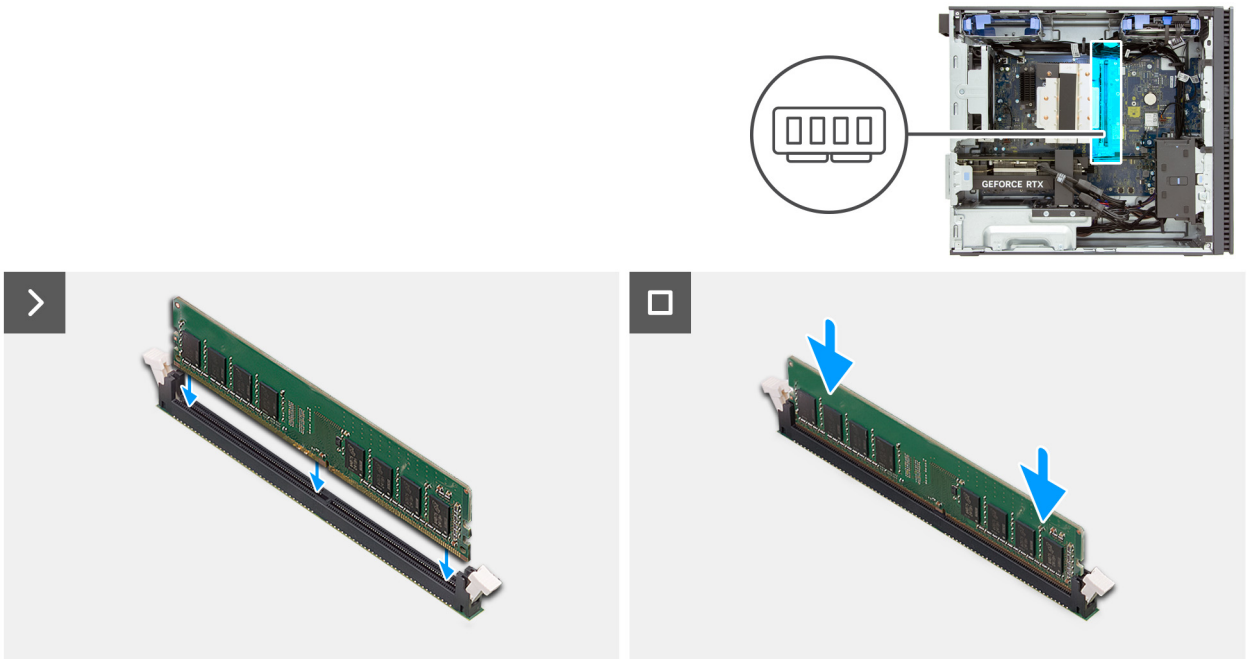



Figure 31. Installing the memory

### Steps

1. **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 ESD can inflict severe damage on the components. To read more about ESD protection, see ESD protection.**

   Align the notch on the memory module with the tab on the memory-module slot (DIMM1).
2. Insert the memory module into the memory-module slot (DIMM1).
3. Press down on the memory module until the memory module snaps into position and the securing clip locks in place.

   **NOTE:** The securing clips return to the locked position. If you do not hear the click, remove the memory module and reinstall it.

   **NOTE:** If the memory module is difficult to remove, gently ease the memory module back and forth to remove it from the slot.

   **NOTE:** Repeat step 1 to step 3 for any other memory module to be installed in the other memory-module slot (DIMM2).

   **NOTE:** To enable dual-channel memory support when installing two identical memory modules, insert one module into the DIMM1 slot and the other module into the DIMM2 slot.
4. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.

2. Follow the procedure in After working inside your computer.

# Rear-chassis fan

## Removing the rear-chassis fan

### 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 rear-chassis fan and provide a visual representation of the removal procedure.

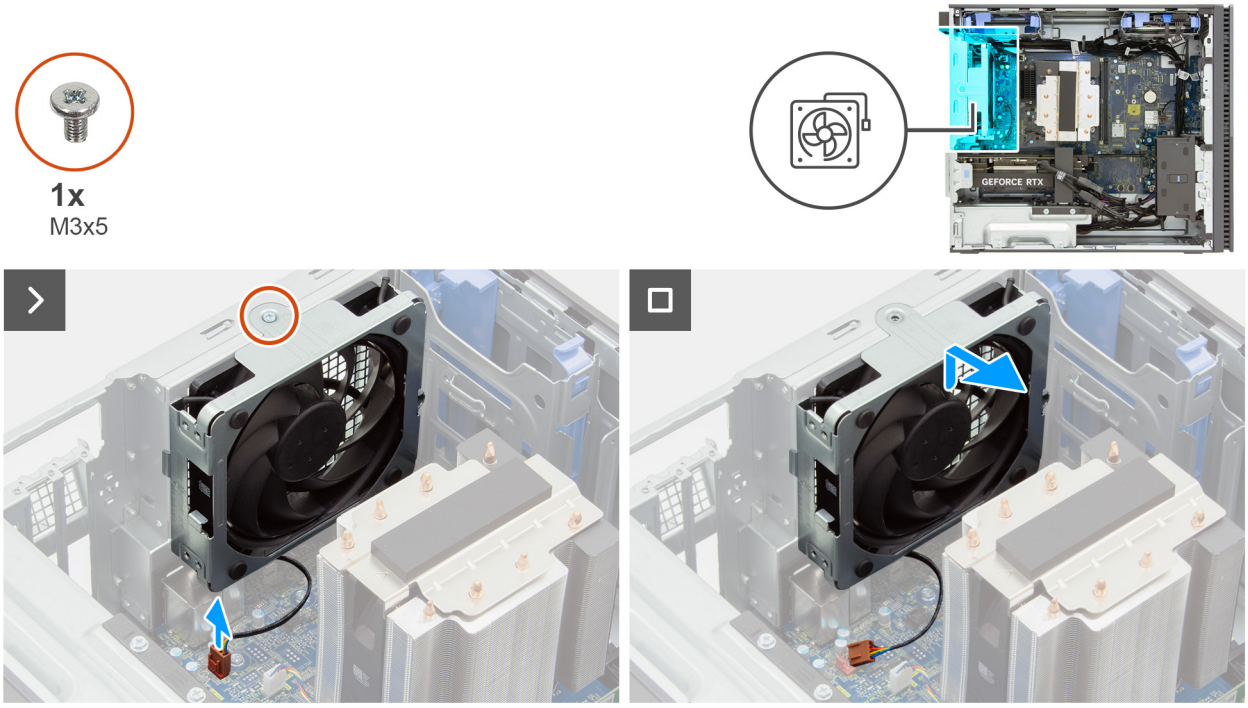



Figure 32. Removing the rear-chassis fan

### Steps

1. Place the computer on its side with the left side facing up.
2. Disconnect the rear-chassis fan cable from its connector (FAN SYS1) on the system board.
3. Remove the screw (M3x5) that secures the rear-chassis fan to the chassis.
4. Slide and lift the rear-chassis fan off 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.

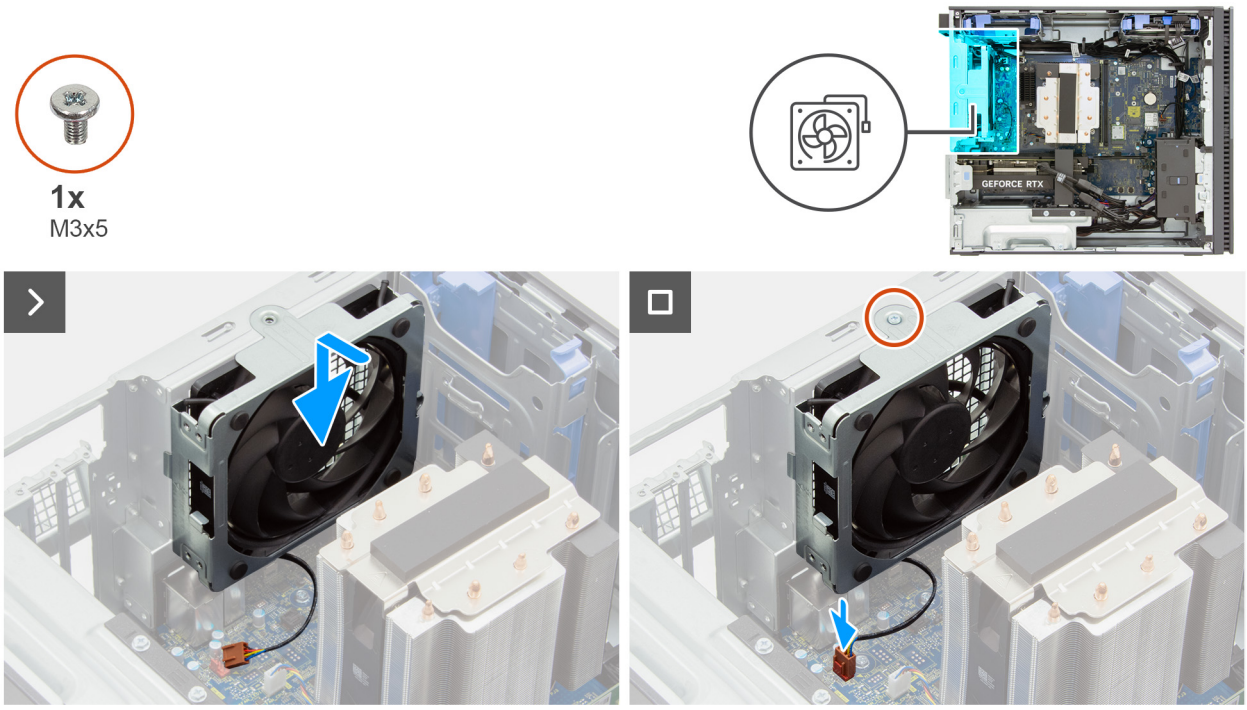



**Figure 33. Installing the rear-chassis fan**

### Steps

1. Place the computer on its side with the left side facing up.
2. Align the rear-chassis fan with the slot on the chassis.
3. Replace the screw (M3x5) that secures the rear-chassis fan to the chassis.
4. Connect the rear-chassis fan cable to its connector (FAN SYS1) on the system board.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# Front-chassis fan

## Removing the front-chassis fan

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

### About this task

The following image(s) indicate the location of the front-chassis fan and provides a visual representation of the removal procedure.

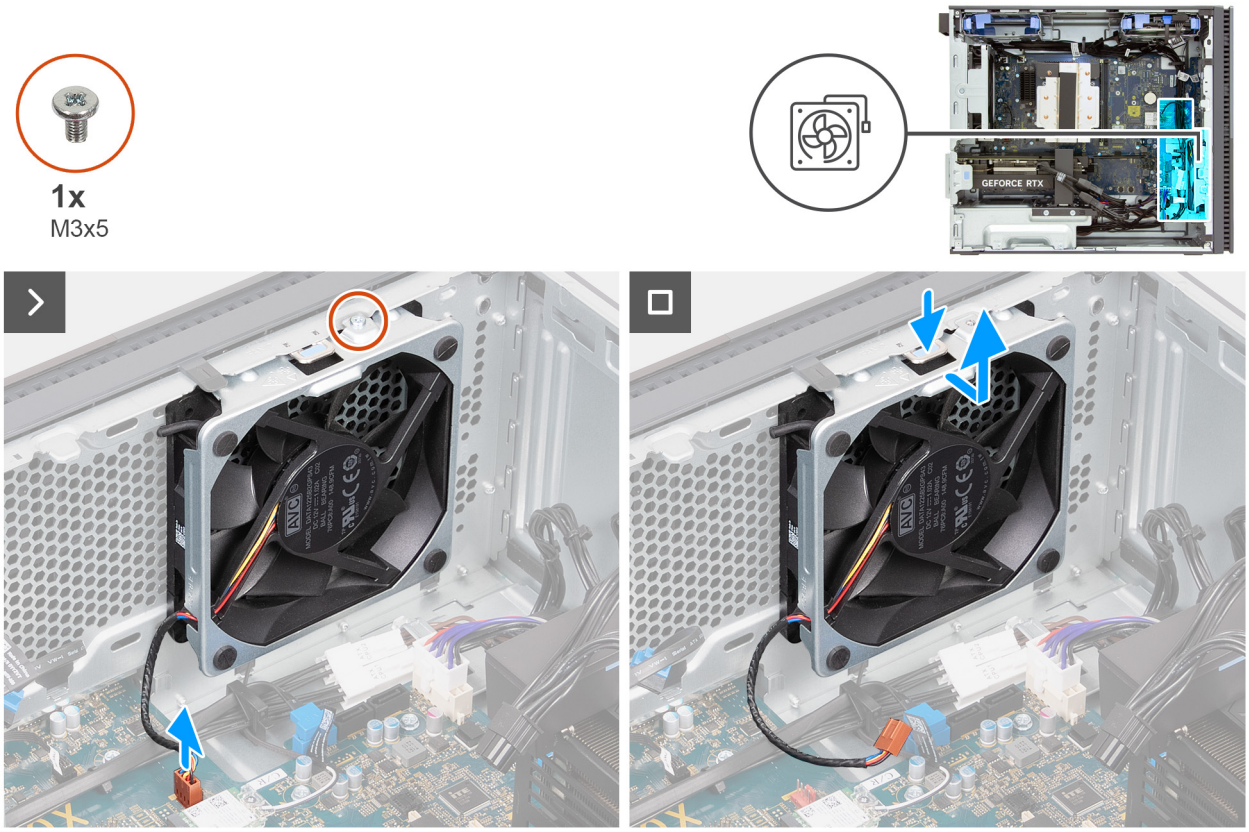



**Figure 34. Removing the chassis fan**

### Steps

1. Place the computer on its side with the left side facing up.
2. Slide the release latch to its unlock position and lift the graphics-card end holder away from the front-chassis fan.

   **NOTE:** Skip this step if your graphics card does not ship with a graphics-card end holder.

3. Remove the screw (M3x5) that secures the front-chassis fan to the chassis.
4. Disconnect the front-chassis fan cable from its connector (FAN SYS2) on the system board.
5. Press down on the securing tab to release the front-chassis fan from the chassis.
6. Lift the front-chassis fan off the chassis.

# Installing the front-chassis fan

### Prerequisites

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

### About this task

The following image(s) indicate the location of the front-chassis fan and provides a visual representation of the installation procedure.

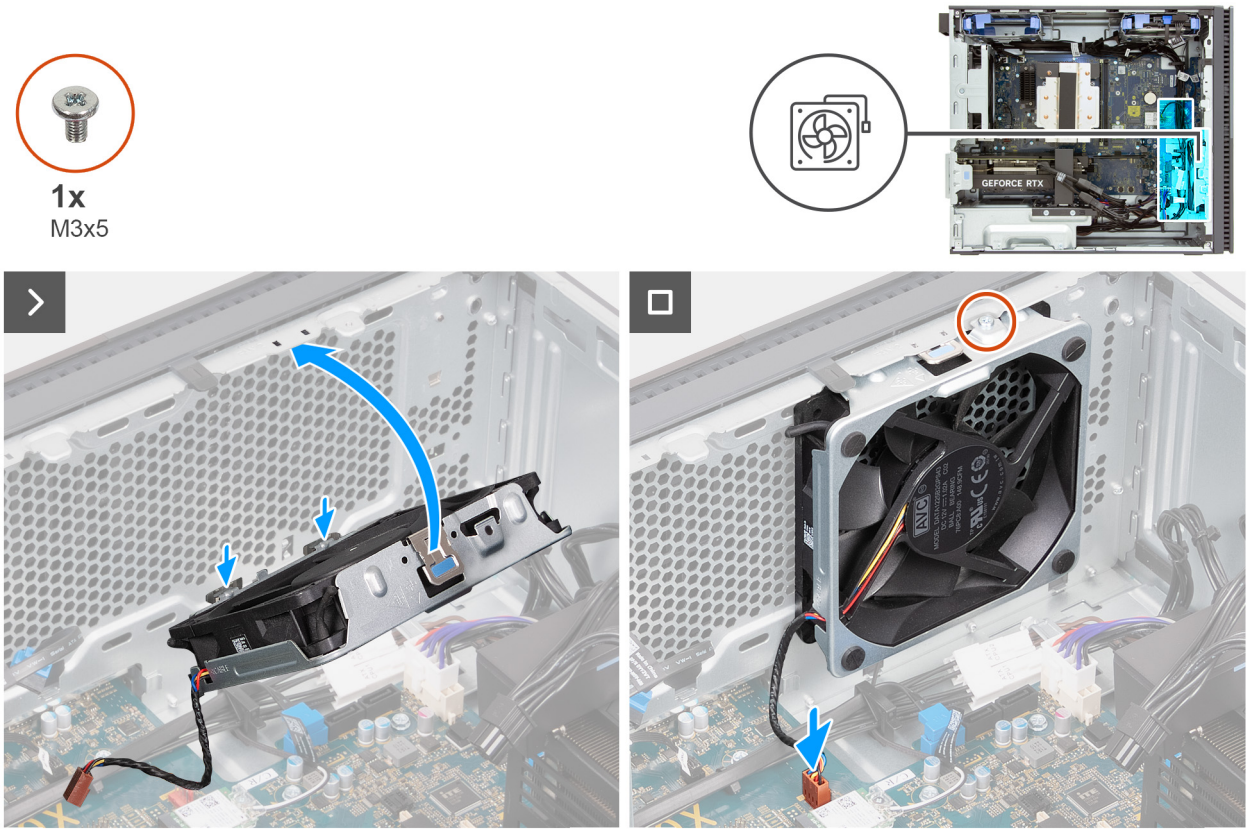



**Figure 35. Installing the chassis fan**

### Steps

1. Slide the tabs on the front-chassis fan into the slots on the chassis and rotate the rear-chassis fan inwards.
2. Press the front-chassis fan against the chassis to snap the chassis fan into place.
3. Connect the front-chassis fan cable to its connector (FAN SYS2) on the system board.
4. Replace the screw (M3x5) that secures the front-chassis fan to the chassis.
5. Align and place the graphics-card end holder on the chassis and slide the latch to its lock position.

   **NOTE:** Skip this step if your computer does not ship with a graphics-card end holder.

6. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# Solid state drive (SSD)

## Removing the M.2 2230 solid-state drive

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

### About this task

**NOTE:** Depending on the configuration ordered, your computer may have up to two M.2 2230 or 2280 solid-state drives installed in the two M.2 solid-state drive slots on the system board (M.2 PCIe SSD 0 and M.2 PCIe SSD 1).

The following image(s) indicate the location of the M.2 2230 solid-state drive and provides a visual representation of the removal procedure.

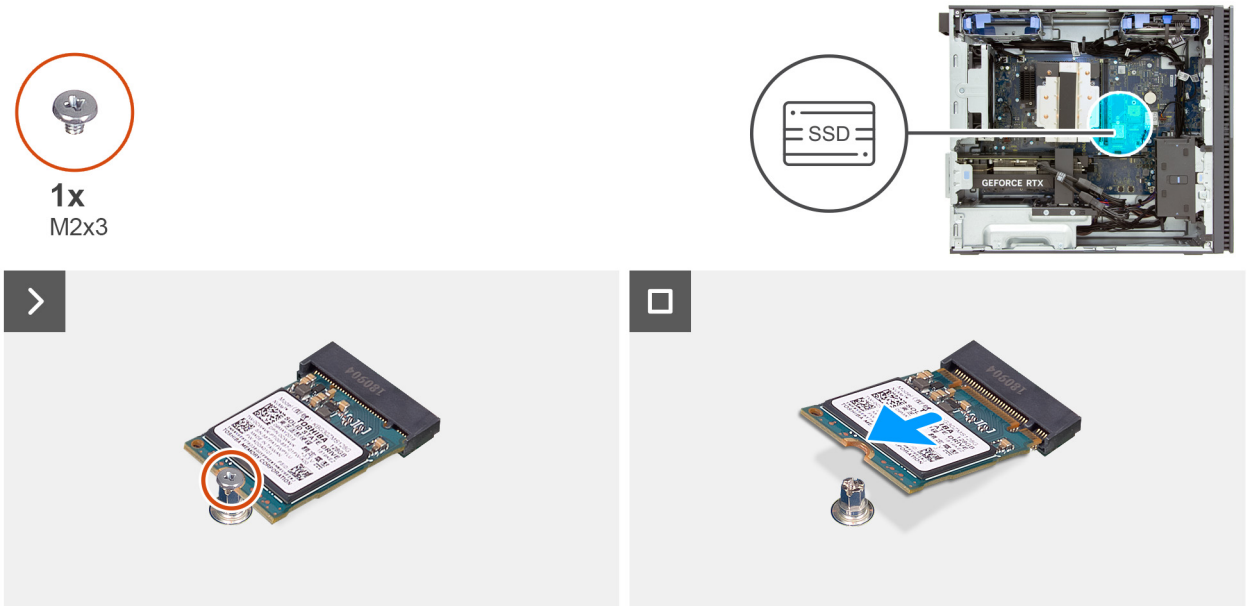



**Figure 36. Removing the M.2 2230 solid-state drive**

### Steps

1. Place the computer on its side with the left side facing up.
2. Remove the screw (M2x3) that secures the M.2 2230 solid-state drive to the system board.
3. Slide and lift the M.2 2230 solid-state drive from the M.2 card slot on the system board.

## Installing the M.2 2230 solid-state drive

### Prerequisites

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

### About this task

**NOTE:** You may install up to two M.2 2230 or 2280 solid-state drives into the two M.2 solid-state drive slots on the system board (M.2 PCIe SSD 0 and M.2 PCIe SSD 1).

The following image(s) indicate the location of the M.2 2230 solid-state drive and provides a visual representation of the installation procedure.

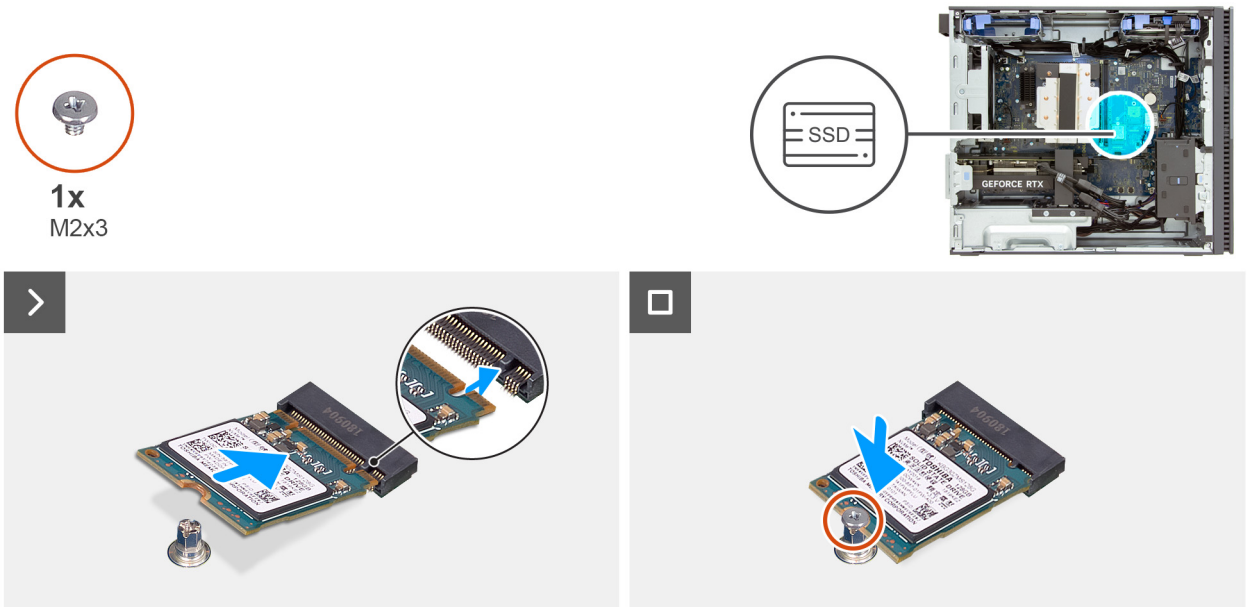



**Figure 37. Installing the M.2 2230 solid-state drive**

### Steps

1. Align the notch on the M.2 2230 solid-state drive with the tab on the M.2 card slot on the system board.
2. Slide the M.2 2230 solid-state drive into the M.2 card slot on the system board.
3. Replace the screw (M2x3) that secures the M.2 2230 solid-state drive to the system board.
4. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

## Removing the M.2 2280 solid-state drive

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

### About this task

**NOTE:** Depending on the configuration ordered, your computer may have up to two M.2 2230 or 2280 solid-state drives installed in the two M.2 solid-state drive slots on the system board (M.2 PCIe SSD 0 and M.2 PCIe SSD 1).

The following image(s) indicate the location of the M.2 2280 solid-state drive and provides a visual representation of the removal procedure.

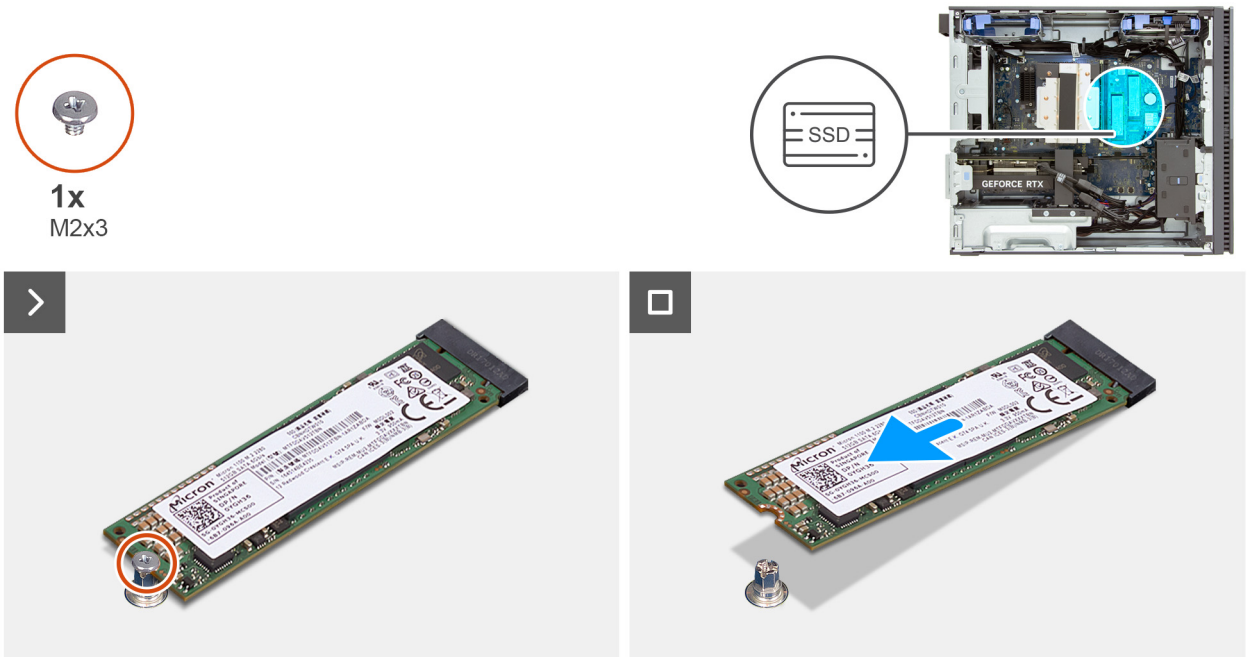



**Figure 38. Removing the M.2 2280 solid-state drive**

### Steps

1. Place the computer on its side with the left side facing up.
2. Remove the screw (M2x3) that secures the M.2 2280 solid-state drive to the system board.
3. Slide and lift the M.2 2280 solid-state drive from the M.2 card slot on the system board.

# Installing the M.2 2280 solid-state drive

### Prerequisites

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

### About this task

**NOTE:** You may install up to two M.2 2230 or 2280 solid-state drives into the two M.2 solid-state drive slots on the system board (M.2 PCIe SSD 0 and M.2 PCIe SSD 1).

The following image(s) indicate the location of the M.2 2280 solid-state drive and provides a visual representation of the installation procedure.

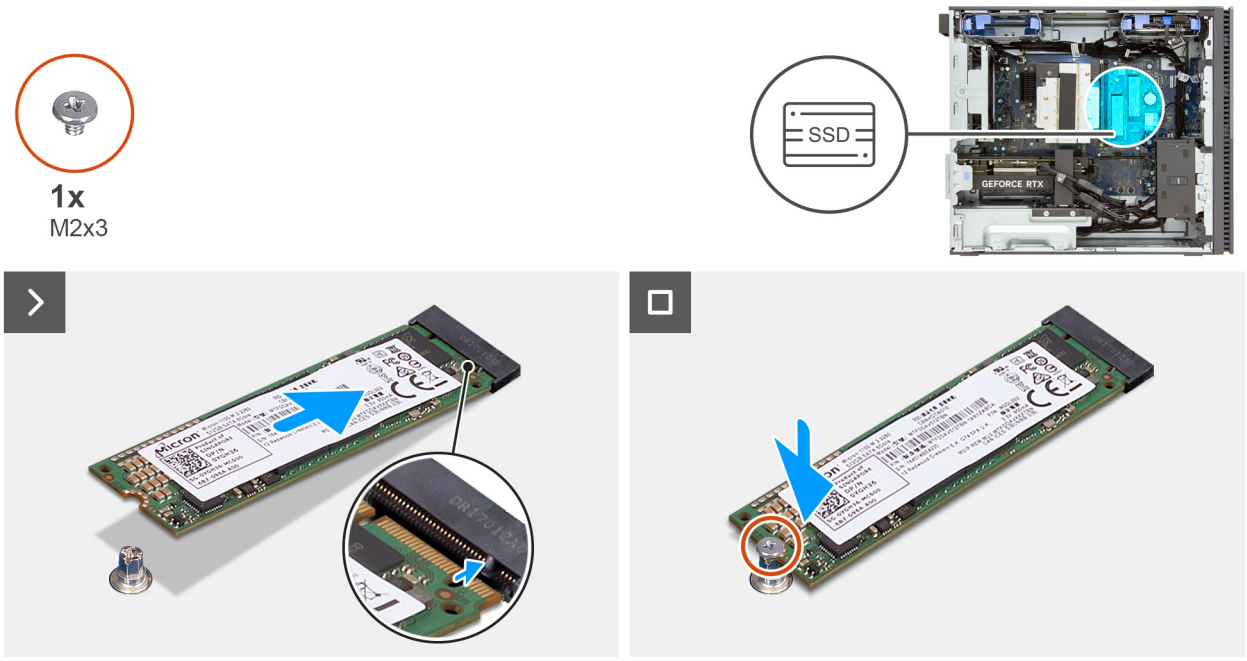



**Figure 39. Installing the M.2 2280 solid-state drive**

### Steps

1. Align the notch on the M.2 2280 solid-state drive with the tab on the M.2 card slot on the system board.
2. Slide the M.2 2280 solid-state drive into the M.2 card slot on the system board.
3. Replace the screw (M2x3) that secures the M.2 2280 solid-state drive to the system board.
4. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. 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.

### About this task

The following image(s) indicate the location of the wireless card and provides a visual representation of the removal procedure.

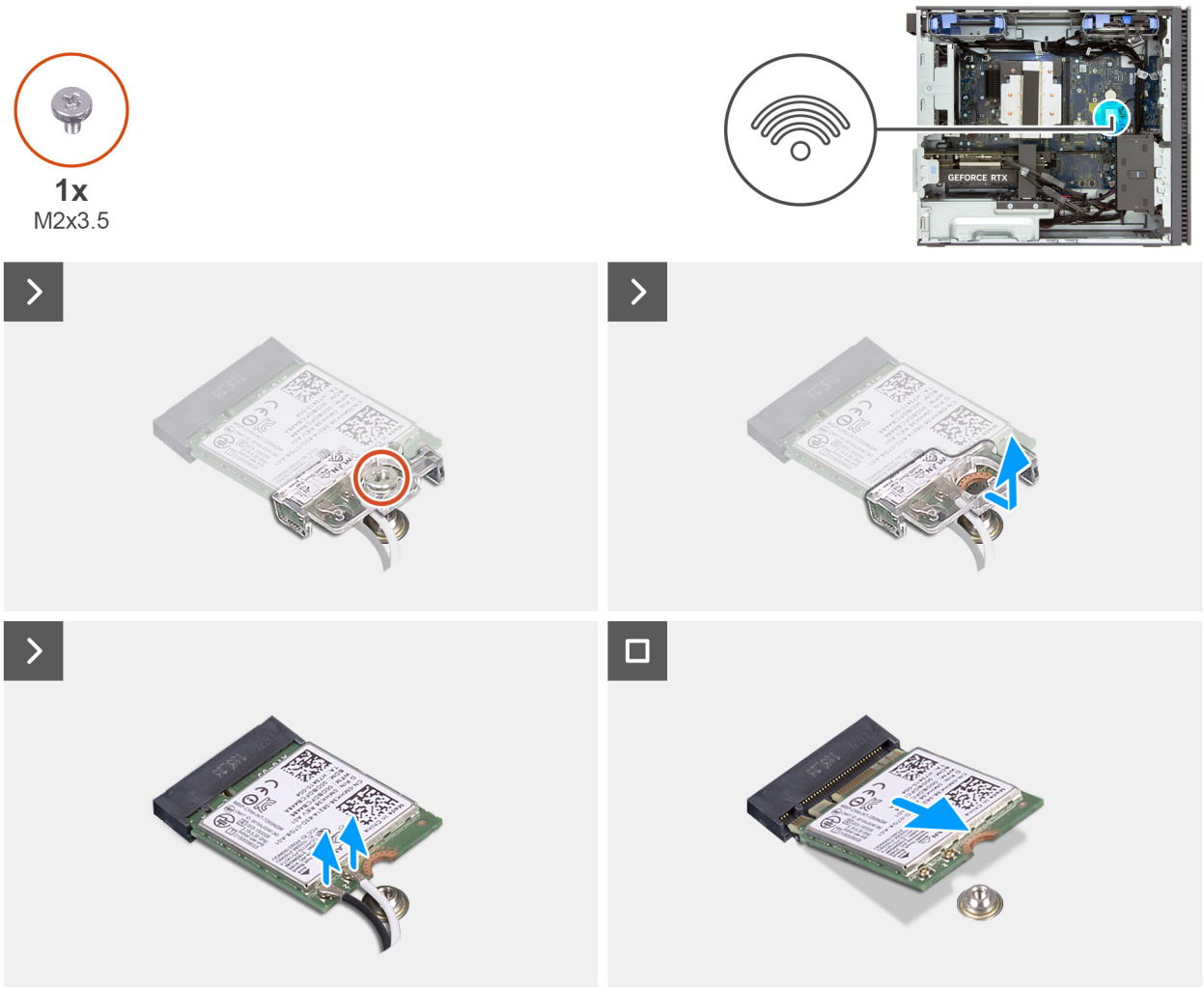



**Figure 40. Removing the wireless card**

### Steps

1. Place the computer on its side with the left side facing up.
2. Remove the screw (M2x3.5) that secures the wireless card to the system board.
3. Slide and lift the wireless-card bracket off the wireless card.
4. Disconnect the antenna cables from the wireless card.
5. Slide and remove the wireless card at an angle from the wireless-card slot (NGFF4).

# 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(s) indicate the location of the wireless card and provides a visual representation of the installation procedure.

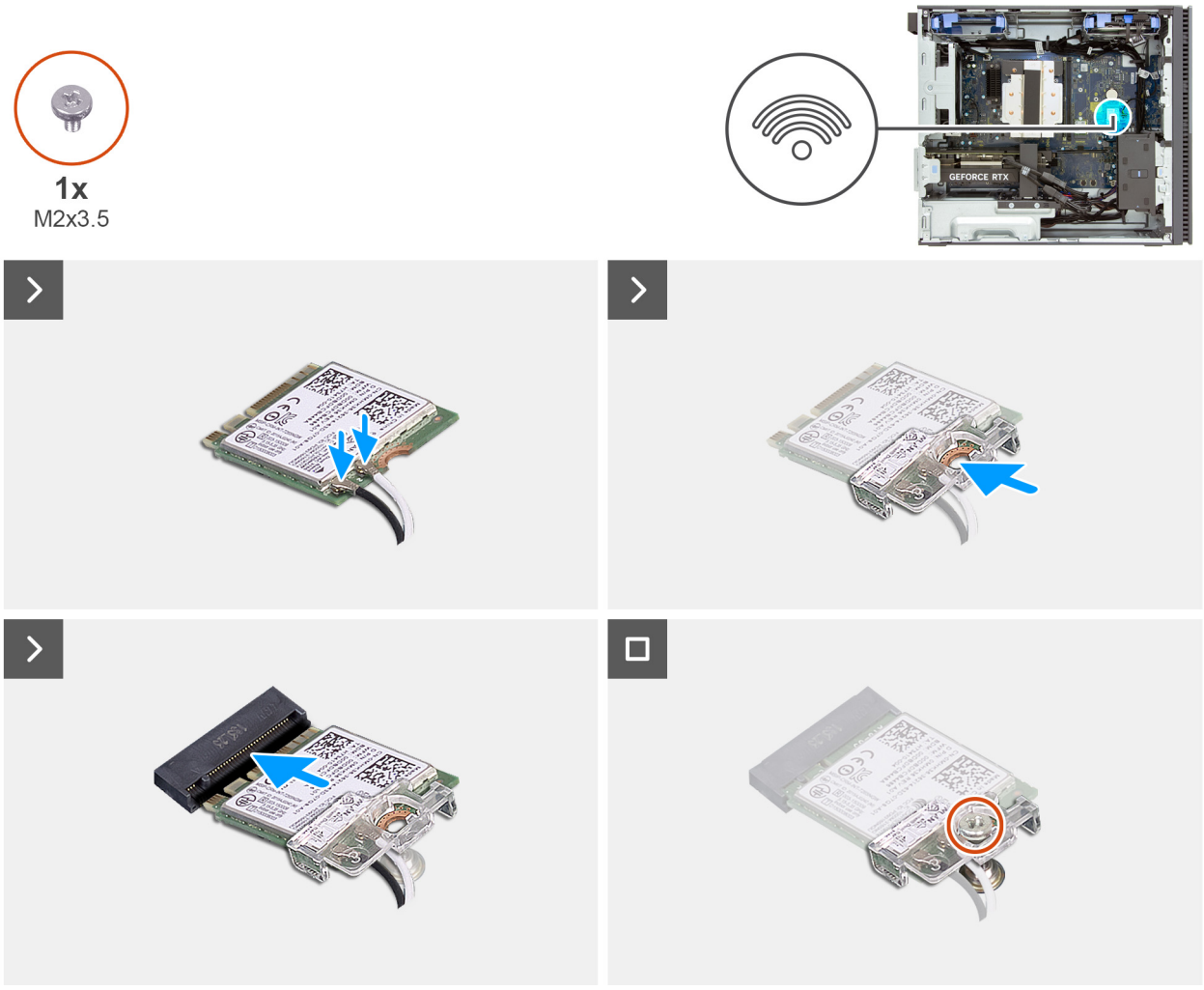



**Figure 41. Installing the wireless card**

### Steps

1. Connect the antenna cables to the wireless card.

#### Table 19. 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.
4. Slide the wireless card at an angle into the wireless-card slot (NGFF4).
5. Replace the screw (M2x3.5) that secures the wireless card to the system board.
6. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# 6

# Removing and installing Field Replaceable Units (FRUs)

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

**CAUTION: The information in this removing and installing FRUs section is intended for authorized service technicians only.**

**CAUTION: To avoid any potential damage to the component or loss of data, ensure that an authorized service technician replaces the Field Replaceable Units (FRUs).**

**CAUTION: Dell Technologies recommends that this set of repairs, if needed, to be conducted by trained technical repair specialists.**

**CAUTION: As a reminder, your warranty does not cover damages that may occur during FRU repairs that are not authorized by Dell Technologies.**

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

# Power-supply unit

## Removing the power-supply unit

### 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 power-supply unit and provide a visual representation of the removal procedure.

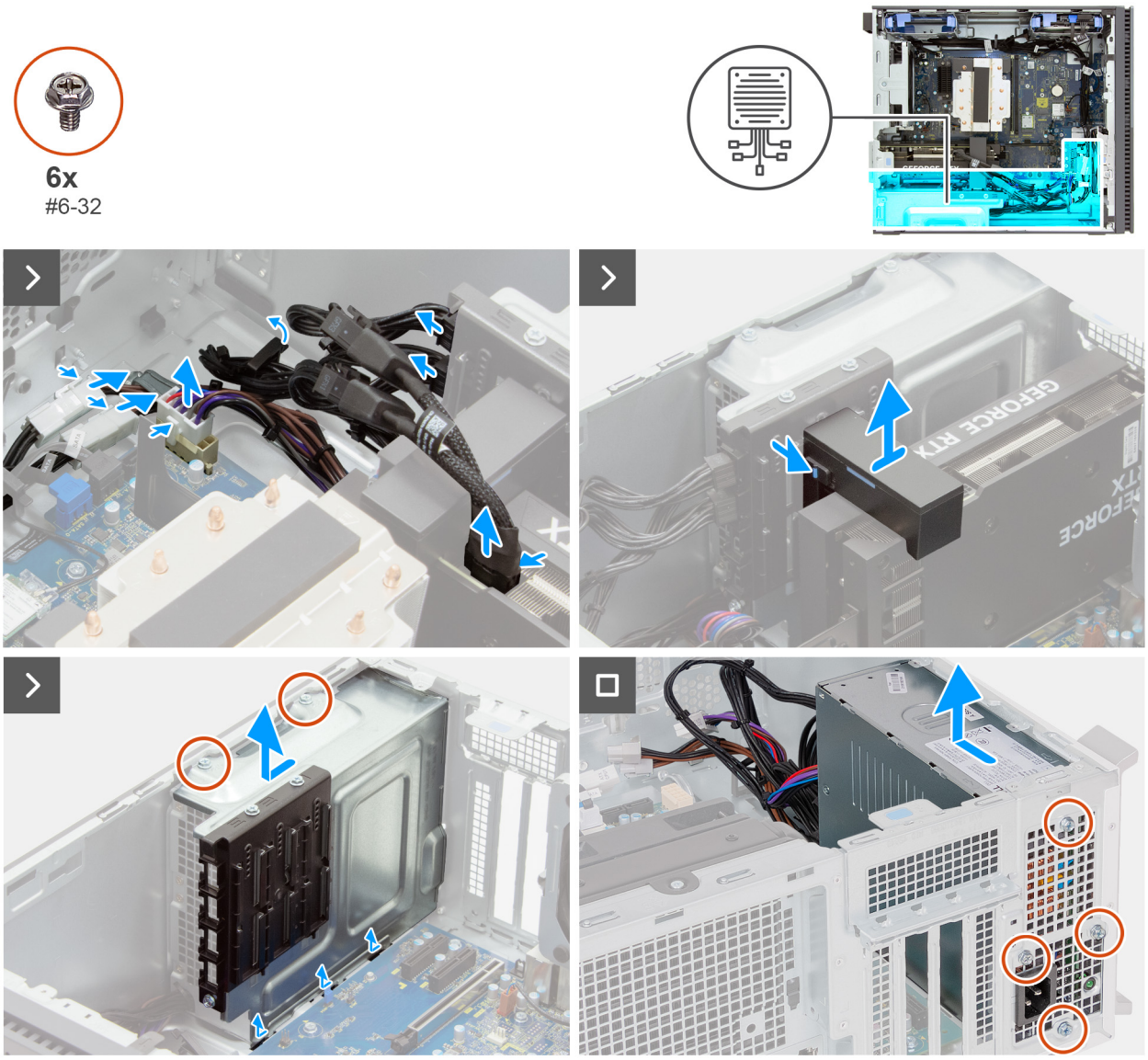



**Figure 42. Removing the power-supply unit**

### Steps

1. Place the computer on its side with the left side facing up.
2. Press down on the securing clip to disconnect the graphics-card power cables from the graphics card.
3. Disconnect the graphics-card power cables from the power-supply unit.
4. Press the release clips and disconnect the power-supply unit cables from the power-supply unit extension cables.
5. Remove the power-supply cables from the routing guides on the chassis.
6. Slide and hold the locking mechanism on the graphics card support bracket, then pull it off the retaining rails on the power-supply cage.

   **NOTE:** The size and location of the graphic-card middle holder may vary depending on the graphics card configuration on your computer.

7. Remove the two screws (#6-32) that secure the power-supply cage to the chassis.
8. Slide and lift the power-supply cage off the chassis.
9. Remove the four screws (#6-32) that secure the power-supply unit to the chassis.

   **NOTE:** The number of screws in the power-supply unit depends on the configuration ordered.

10. Slide and lift the power-supply unit off the chassis.

# Installing the power-supply unit

### Prerequisites

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

### About this task

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

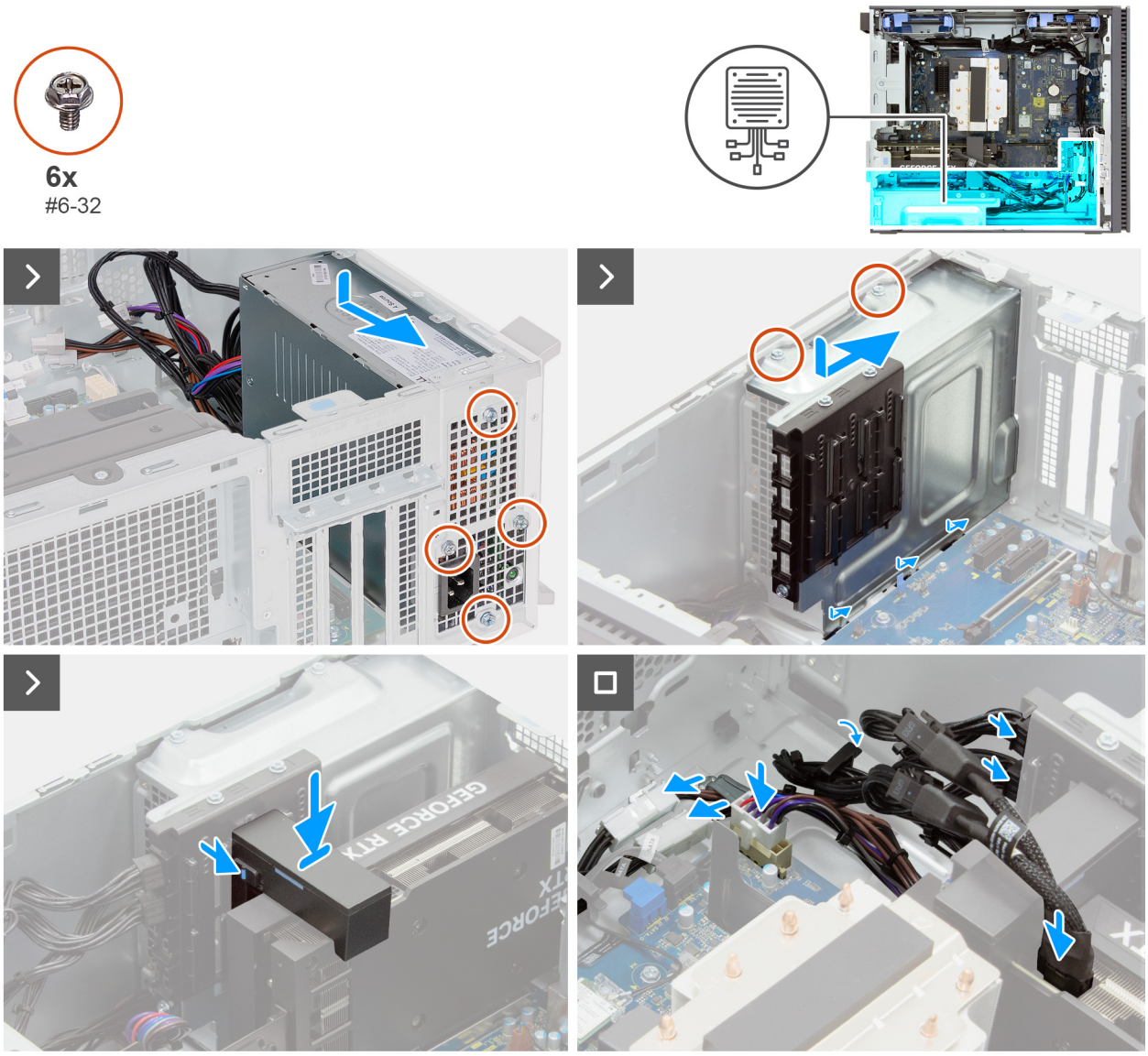



**Figure 43. Installing the power-supply unit**

### Steps

1. Place and align the screw holes on the power-supply unit to the screw holes on the chassis.
2. Replace the four screws (#6-32) that secure the power-supply unit to the chassis.

   **NOTE:** The number of screws in the power-supply unit depends on the configuration ordered.

3. Place and align the screw holes on the power-supply cage to the screw holes on the chassis.
4. Replace the two screws (#6-32) that secure the power-supply cage to the chassis.
5. Insert the graphics-card support bracket onto the retaining rails.

**NOTE:** The size and location of the graphic-card middle holder may vary depending on the graphics card configuration on your computer.

6. Push the graphics-card supporting bracket down until it locks into position.
7. Connect the system-board power cable to the system board.
8. Connect the power-supply cables to the processor-power cables.
9. Route the power-supply cables through the routing guides on the chassis.
10. Connect the graphics-card power cables to the power-supply unit.
11. Connect the graphics-card power cables to the graphics card.
12. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# Processor fan and heat-sink assembly

## Removing the processor fan and heat-sink assembly (65 W, air cooling)

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

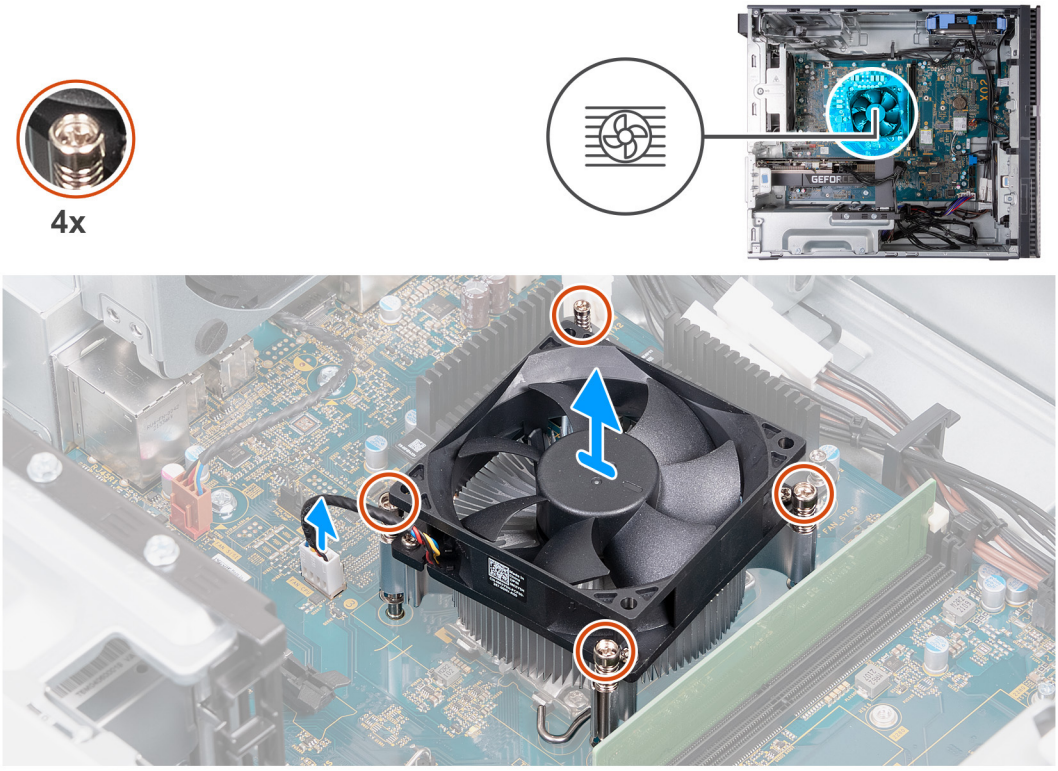
### About this task

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

**NOTE:** 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.

**NOTE:** This procedure only applies for computers that are shipped with a 65 W processor.

The following images indicate the location of the processor fan and heat-sink assembly (65 W, air cooling) and provide a visual representation of the removal procedure.




### Steps

1. Place the computer on its side with the left side facing up.
2. In sequential order (1>2>3>4), loosen the four captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Disconnect the processor-fan cable from its connector (FAN CPU) on the system board.
4. Lift the processor fan and heat-sink assembly from the system board.

## Installing the processor fan and heat-sink assembly (65 W, air cooling)

### Prerequisites

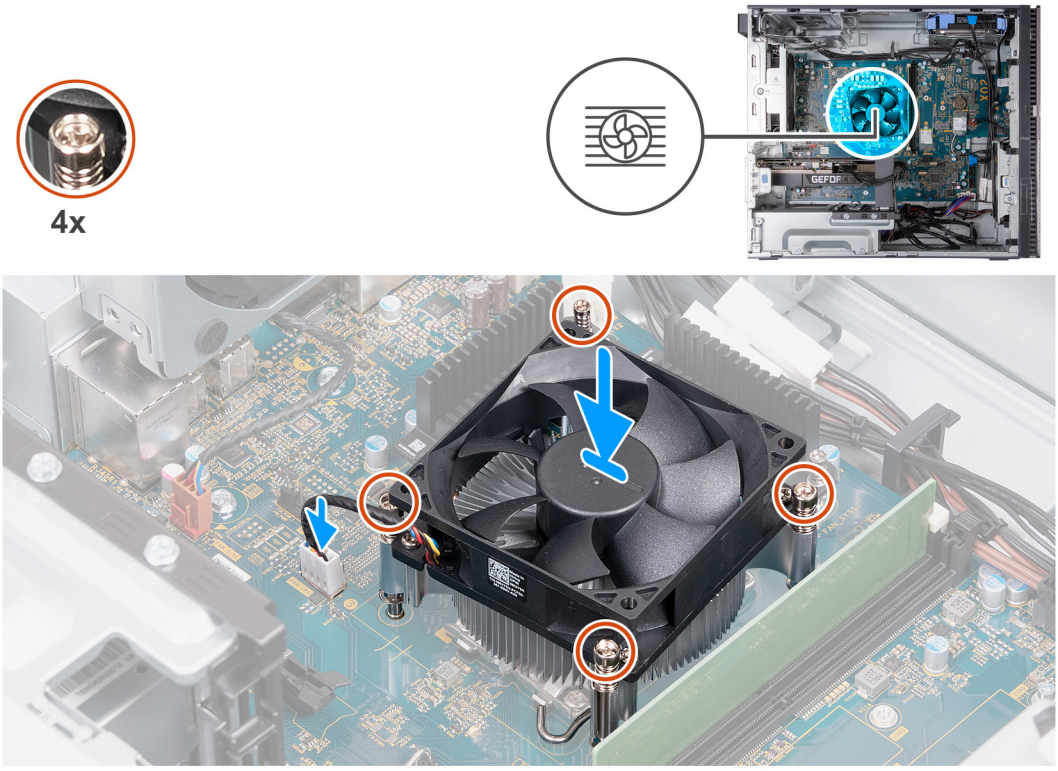
If you are replacing a component, remove the existing component before performing the installation process.

### About this task

**NOTE:** If the processor or the fan and heat-sink assembly is replaced, use the thermal grease that is provided in the kit to ensure that thermal conductivity is achieved.

**NOTE:** This procedure only applies for computers that are shipped with a 65 W processor.

The following images indicate the location of the processor fan and heat-sink assembly (65 W, air cooling) and provide a visual representation of the installation procedure.




### Steps

1. Place the processor fan and heat-sink assembly on the system board and align the captive screws to the screw holes on the system board.
2. In reverse sequential order (4>3>2>1), tighten the four captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Connect the processor-fan cable to its connector (FAN CPU) on the system board.
4. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# Removing the processor fan and heat-sink assembly (125 W, air cooling)

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.

### About this task

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

**NOTE:** 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.

**NOTE:** This procedure only applies for computers that are shipped with a 125 W processor.

The following images indicate the location of the processor fan and heat-sink assembly (125 W, air-cooling) and provide a visual representation of the removal procedure.

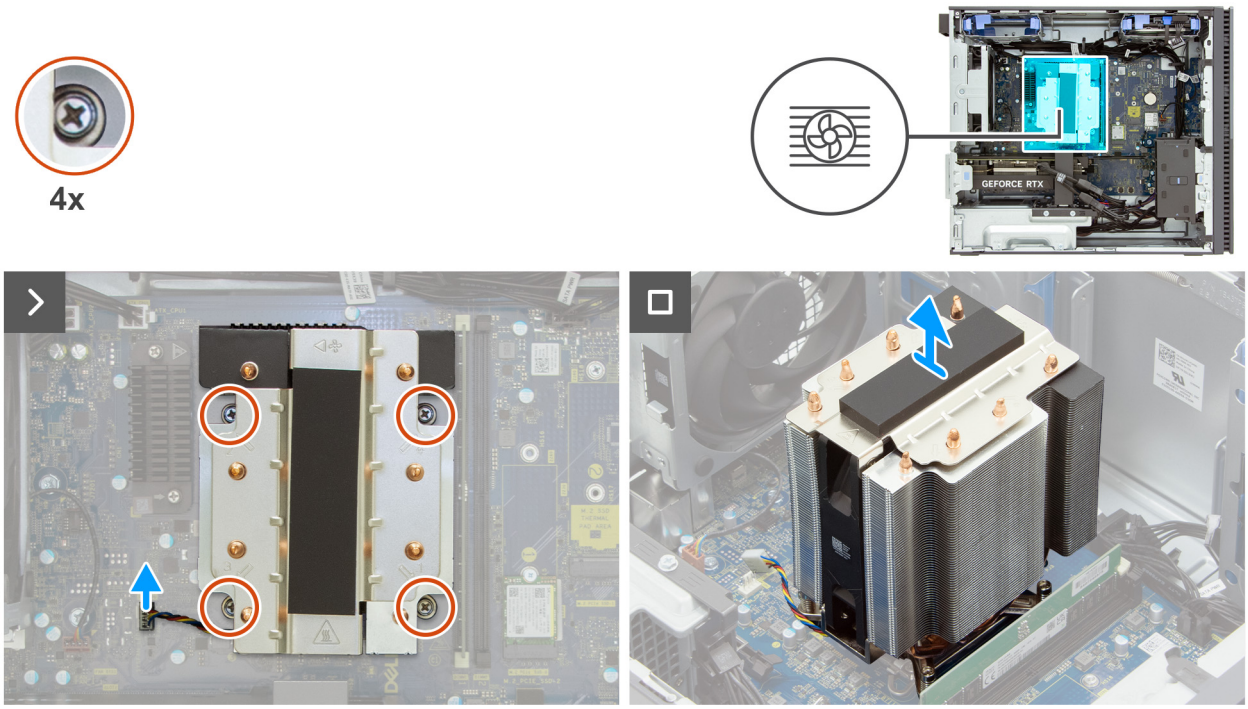



**Figure 44. Removing the processor fan and heat-sink assembly (125 W, air cooling)**

### Steps

1. Place the computer on its side with the left side facing up.
2. Disconnect the processor fan and heat-sink assembly fan cable from its connector (FAN CPU) on the system board.
3. In sequential order(1>2>3>4), loosen the four captive screws that secure the processor fan and heat-sink assembly to the system board.
4. Lift the processor fan and heat-sink assembly from the system board.

# Installing the processor fan and heat-sink assembly (125 W, air cooling)

### Prerequisites

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

### About this task

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

**NOTE:** This procedure only applies for computers that are shipped with a 125 W processor.

The following images indicate the location of the processor fan and heat-sink assembly (125 W, air cooling) and provide a visual representation of the installation procedure.

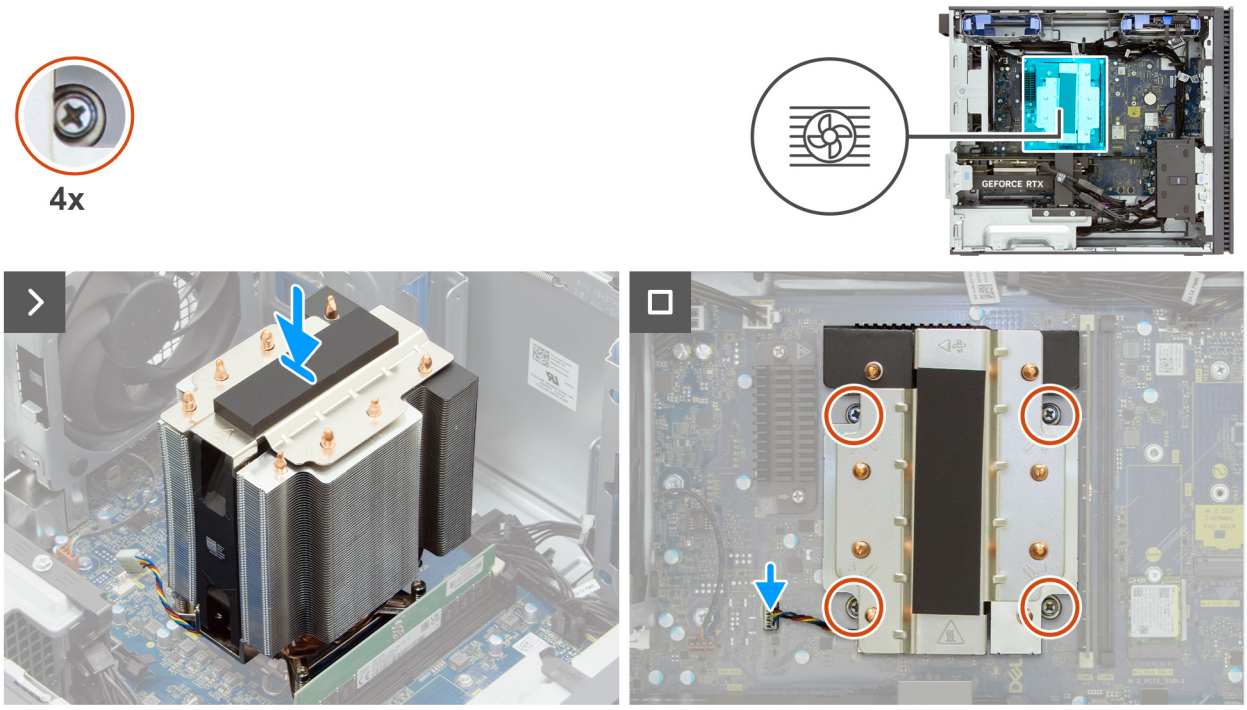



**Figure 45. Installing the processor fan and heat-sink assembly (125 W, air cooling)**

### Steps

1. Place the heat sink on the system board and align the captive screws to the screw holes on the system board.
2. In reverse sequential order (4>3>2>1), tighten the four captive screws that secure the processor fan and heat-sink assembly to the system board.
3. Connect the processor fan and heat-sink assembly fan cable to its connector (FAN CPU) on the system board.
4. Place the computer in an upright position.

### Next steps

1. Install the left-side cover.
2. Follow the procedure in After working inside your computer.

# Processor

## Removing the processor

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the fan and heat-sink assembly (65 W) or the fan and heat-sink assembly (125 W, air cooling), whichever is applicable.

### About this task

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

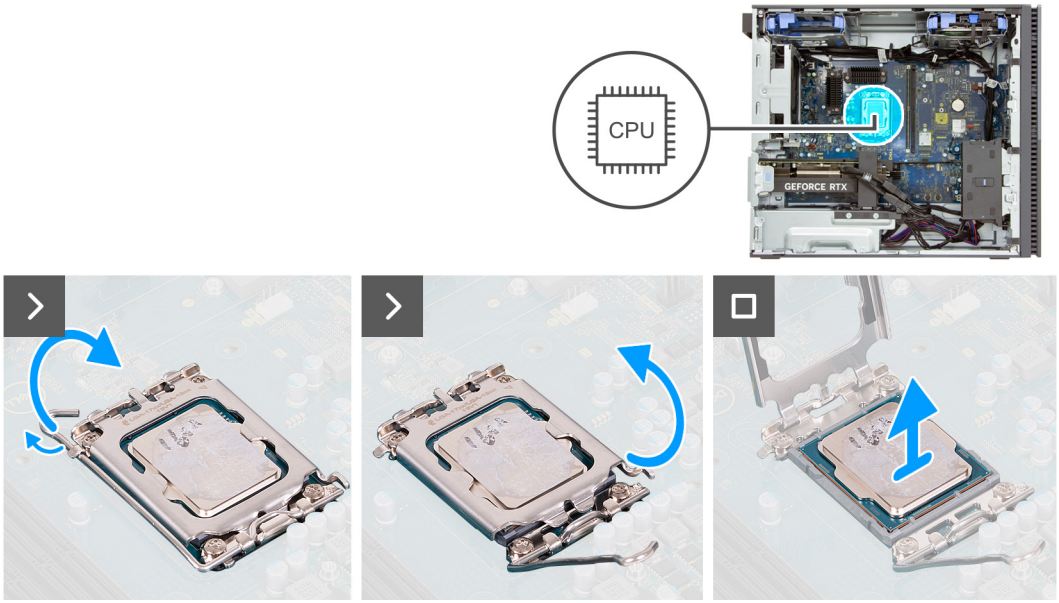



**Figure 46. Removing the processor**

### Steps

1. Press the release lever down and then push it away from the processor to release it from the securing tab.
2. Extend the release lever completely and open 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 process.

### About this task

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

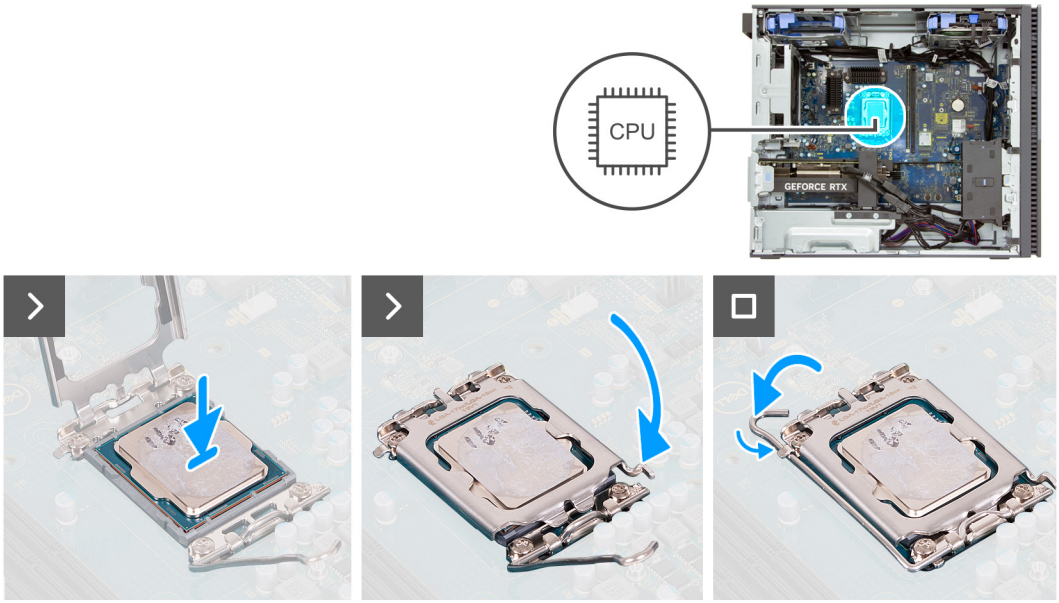



**Figure 47. Installing the processor**

### Steps

1. Ensure that the release lever on the processor socket is fully extended in the open position.

   **NOTE:** The pin-1 corner of the processor has a triangle that aligns with the triangle on the pin-1 corner on the processor socket. When the processor is properly seated, all four corners are aligned at the same height. If one or more corners of the processor are higher than the others, the processor is not seated properly.

2. Align the notches on the processor with the tabs on the processor socket and place the processor in the processor socket.

   **CAUTION: Ensure that the processor-cover notch is positioned underneath the alignment post.**

3. When the processor is fully seated in the socket, pivot the release-lever down and place it under the tab on the processor cover.

### Next steps

1. Install the fan and heat-sink assembly (65 W) or the fan and heat-sink assembly (125 W, air cooling), whichever is applicable.
2. Install the left-side cover.
3. Follow the procedure in After working inside your computer.

# Voltage-regulator heat sink

## Removing the voltage-regulator heat sink

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the processor fan and heat-sink assembly (65 W, air cooling) or the processor fan and heat-sink assembly (125 W, air cooling), whichever is applicable.

### About this task

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

**NOTE:** 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.

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

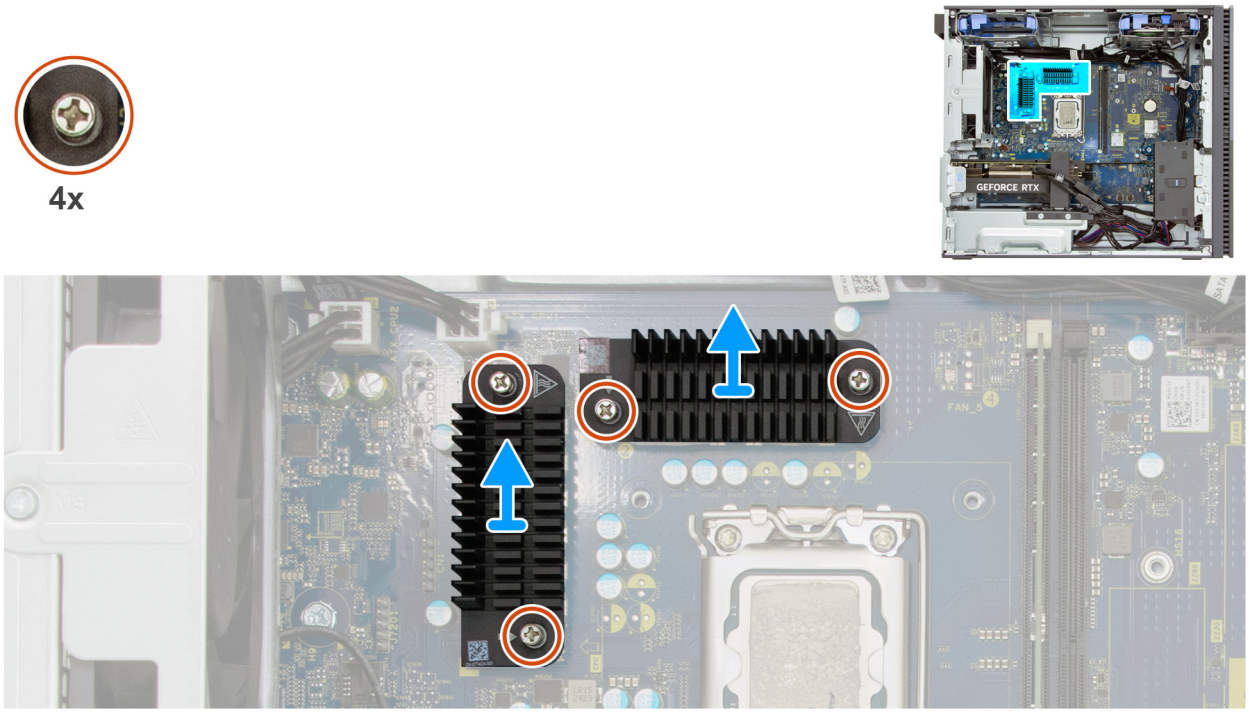



**Figure 48. Removing the voltage-regulator heat sink**

### Steps

1. Place the computer on its side with the left side facing up.
2. Remove the four captive screws that secure the voltage-regulator heat sink to the system board.
3. Lift the voltage-regulator heat sink off the system board.

## Installing the voltage-regulator heat sink

### Prerequisites

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

### About this task

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

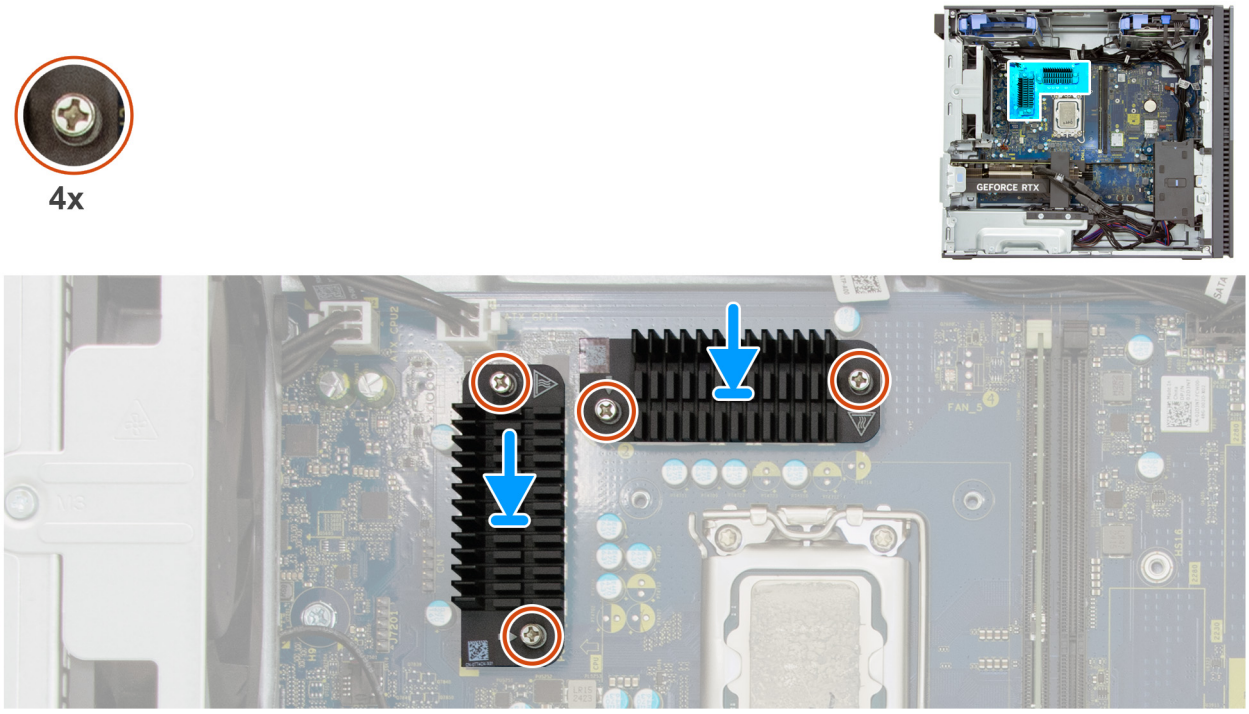



**Figure 49. Installing the voltage-regulator heat sink**

### Steps

1. Place the voltage-regulator heat sink on the system board.
2. Align the captive screws on the voltage-regulator heat sink to the screw holes on the system board.
3. Tighten the four captive screws that secure the voltage-regulator heat stink to the system board.
4. Place the computer in an upright position.

### Next steps

1. Install the processor fan and heat-sink assembly (65 W, air cooling) or the processor fan and heat-sink assembly (125 W, air cooling), whichever is applicable.
2. Install the left-side cover.
3. Follow the procedure in After working inside your computer.

# System board

## Removing the system board

### Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the left-side cover.
3. Remove the front cover.
4. Remove the memory modules.
5. Remove the M.2 2230 solid-state drive or the M.2 2280 solid-state drive, whichever is applicable.
6. Remove the graphics card, if applicable.
7. Remove the wireless card.
8. Remove the coin-cell battery.
9. Remove the fan and heat-sink assembly (65 W) or the fan and heat-sink assembly (125 W, air cooling), whichever is applicable.
10. Remove the processor.
11. Remove the voltage-regulator heat sink, if applicable.

### About this task

The following image indicates the slots and connectors on your system board.

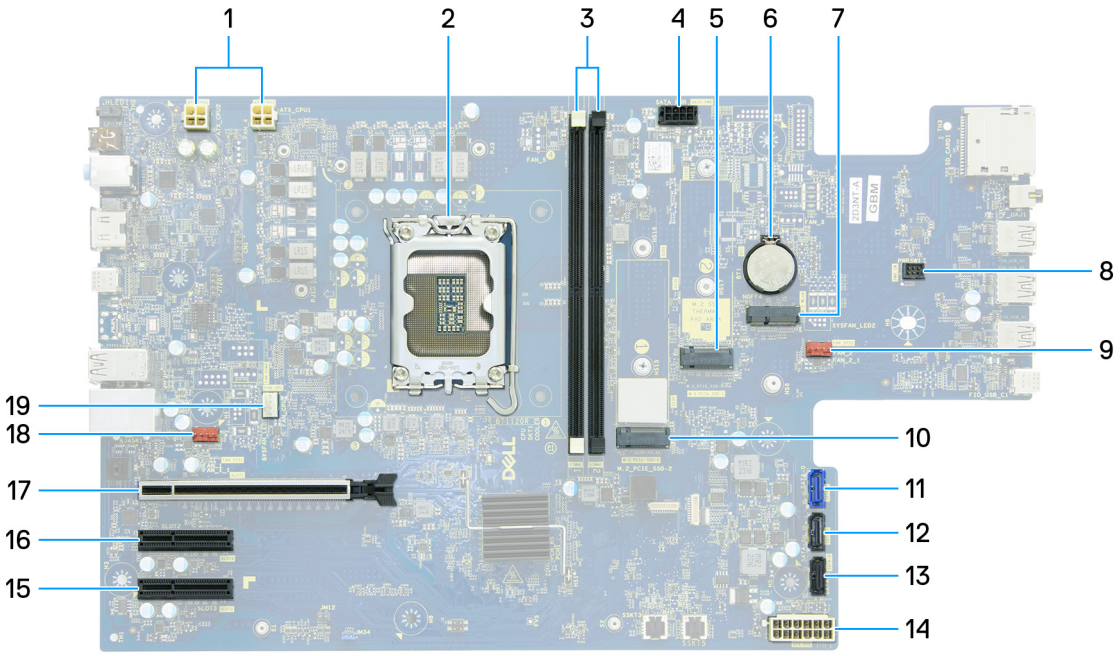



**Figure 50. System-board connectors**

1. Processor-power connectors (ATX CPU2 and ATX CPU1)
2. CPU socket (CPU)
3. Memory-module slots (DIMM1 and DIMM2)
4. SATA-power connector (SATA PWR)
5. M.2 2230 or M.2 2280 solid-state drive slot (M.2 PCIe SSD 1)
6. Coin-cell battery socket (RTC)
7. M.2 2230 wireless-card slot (M.2 WLAN)
8. Power-button connector (PWR SW)
9. Front-chassis fan connector (FAN SYS2)
10. M.2 2230 or M.2 2280 solid-state drive slot (M.2 PCIe SSD 0)
11. SATA 6 Gbps drive connector (SATA-0)
12. SATA 6 Gbps drive connector (SATA-1)
13. SATA 6 Gbps drive connector (SATA-2)
14. Power-supply connector (ATX SYS)
15. PCIe x4 slot (SLOT 3)
16. PCIe x4 slot (SLOT 2)
17. PCIe x16 slot (SLOT 1)
18. Rear chassis-fan cable connector (FAN SYS1)
19. Processor-fan cable connector (FAN CPU)

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

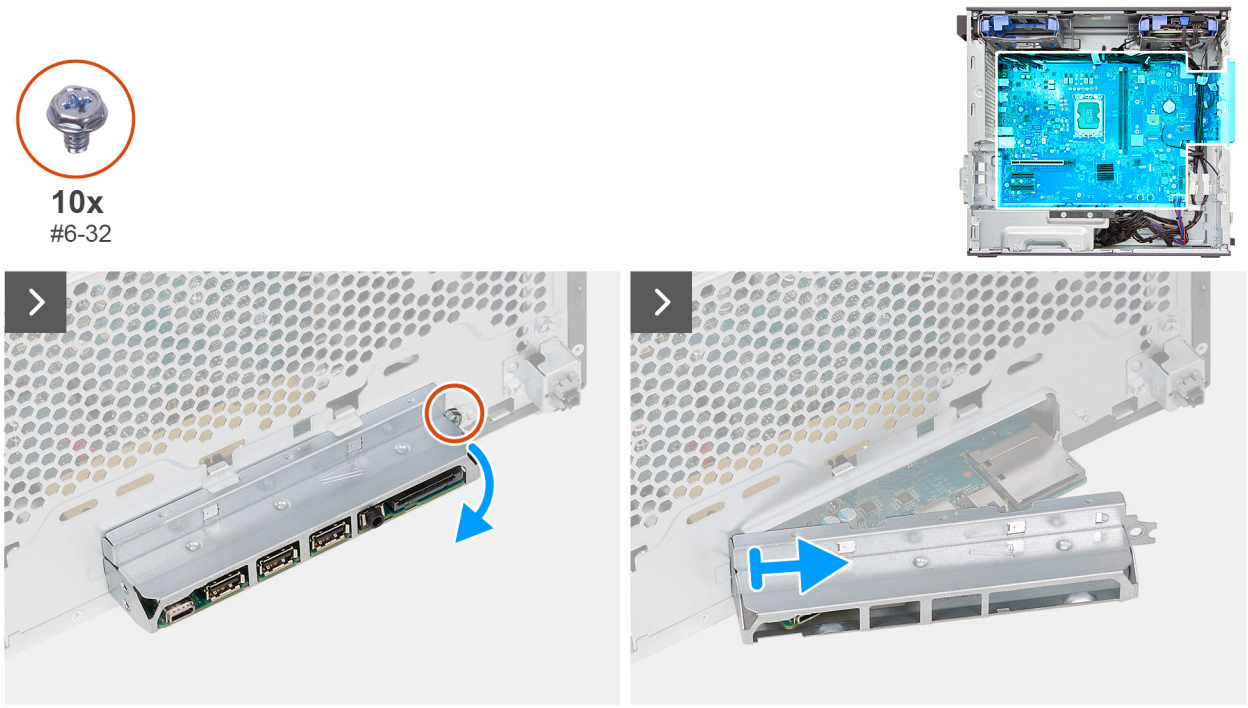



Figure 51. Removing the system board

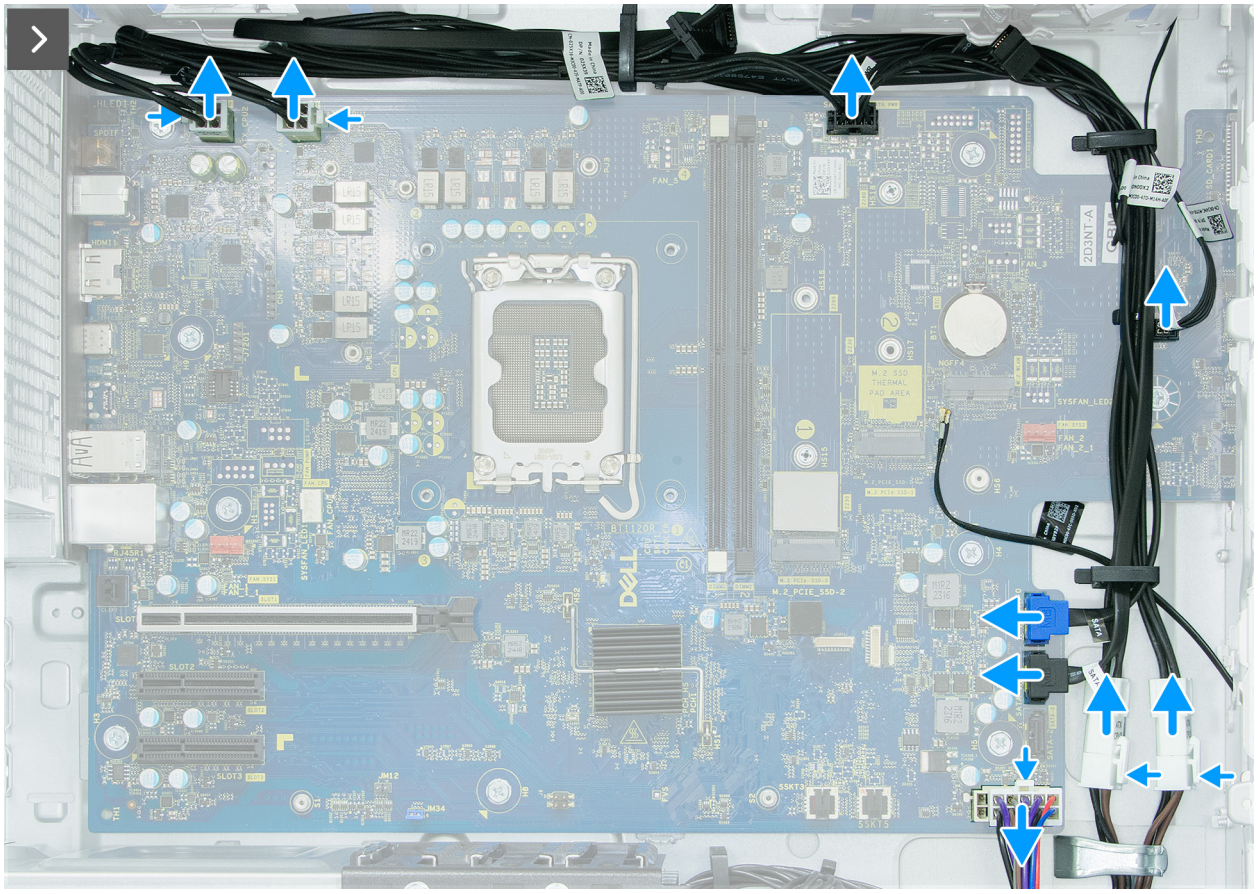


Figure 52. Removing the system board

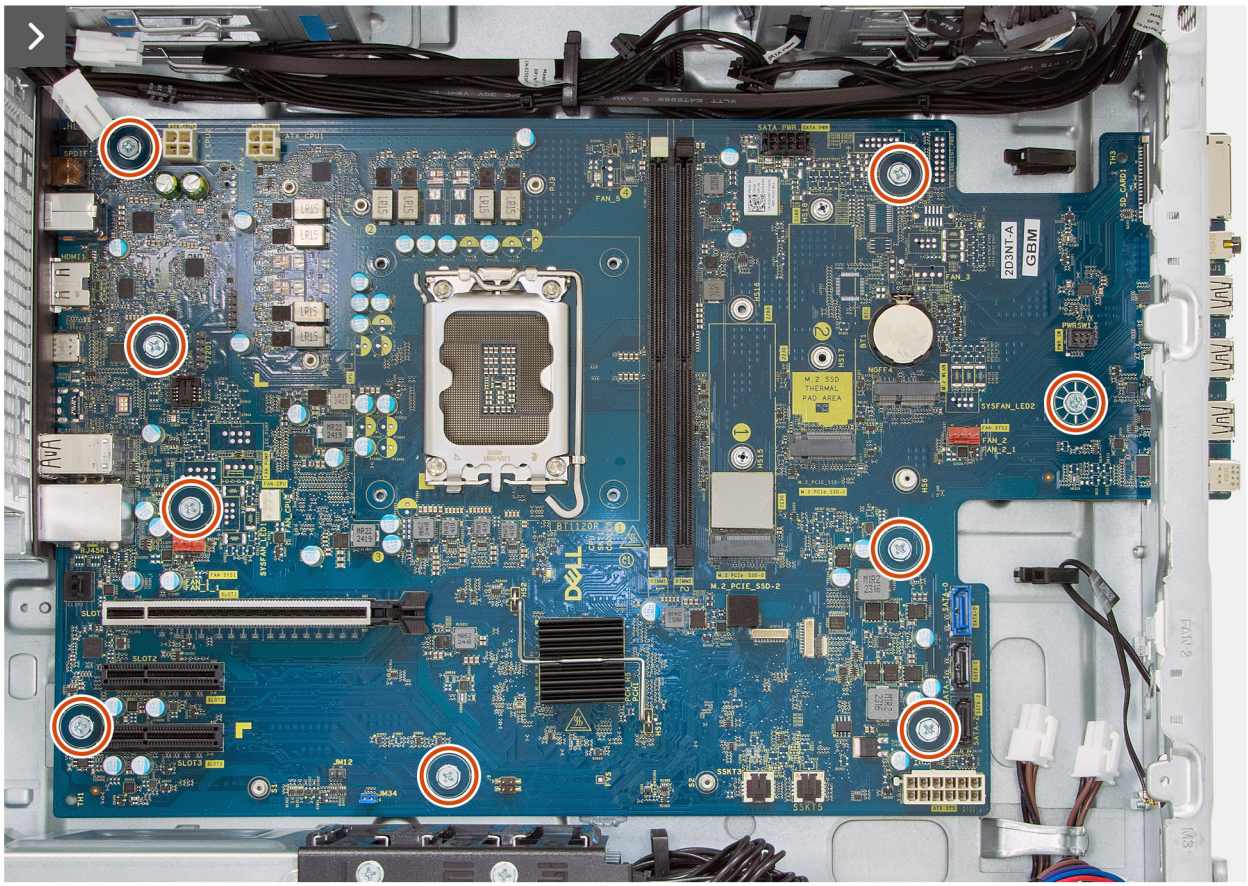


Figure 53. Removing the system board

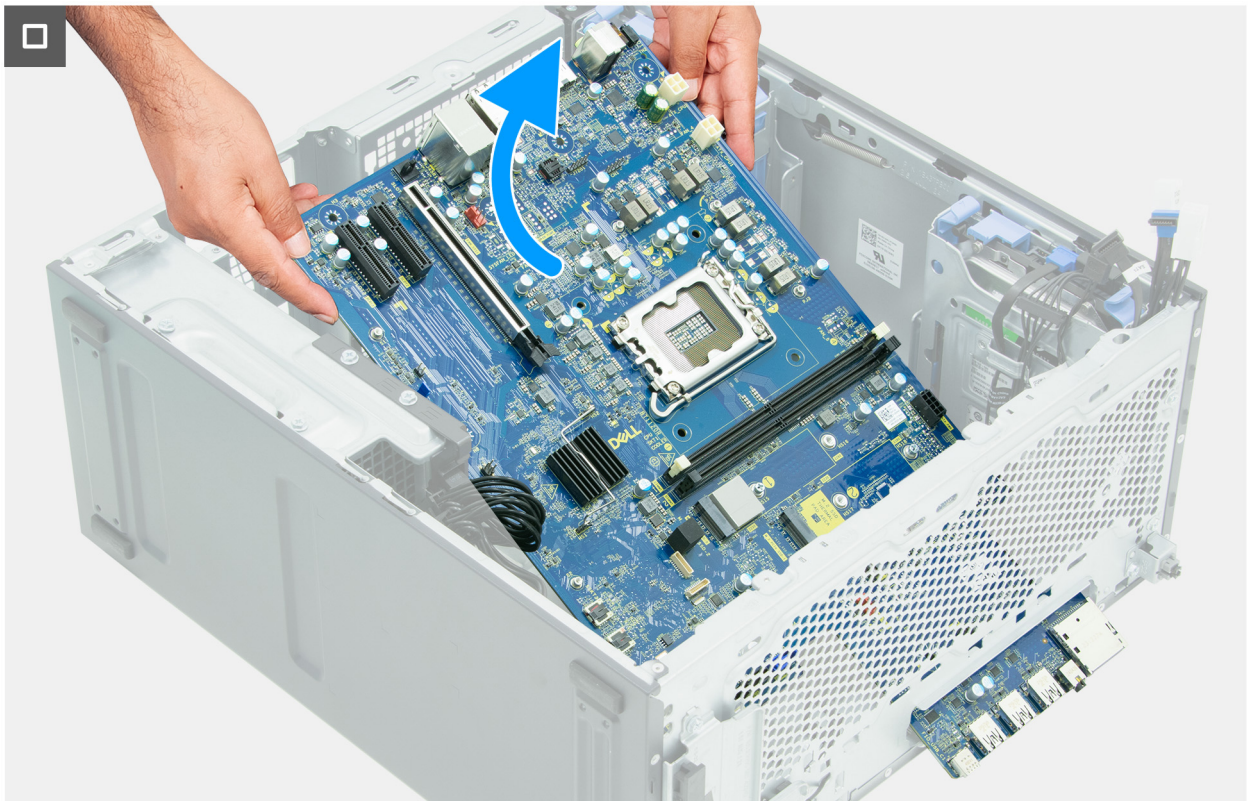


Figure 54. Removing the system board

### Steps

1. Remove the screw (#6-32) that secures the front I/O-bracket to the chassis.
2. Rotate and remove the front I/O-bracket from the chassis.
3. Disconnect the power-supply cable from its connector (ATX SYS) on the system board.

   **NOTE:** Note the routing of all cables as you remove them so that you can route them correctly after you replace the system board. For information about system-board connectors, see "System-board connectors".

   **NOTE:** Note the routing of all cables as you remove them so that you can route them correctly after you replace the system board.

4. Press the release clips and disconnect the power-supply unit cables from the power-supply unit extension cables.
5. Disconnect the SATA drive cable from its connector (SATA-0) on the system board.

   Repeat this step to disconnect the rest of SATA drive cables from their connectors (SATA-1 and SATA-2), if applicable.
6. Disconnect the power-button cable from its connector (PWR SW) on the system board.
7. Disconnect the SATA power cable from its connector (SATA PWR) on the system board.
8. Disconnect the processor-power cables from their connectors on the system board (ATX CPU1 and ATX CPU2).
9. Release the power-supply unit extension cables from their black plastic clips and lift the section of the cables away from the system board.
10. Remove the nine screws (#6-32) that secure the system board to the chassis.
11. Lift the system board at an angle and remove it from the chassis.

# Installing the system board

### Prerequisites

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

### About this task

The following image indicates the slots and connectors on your system board.

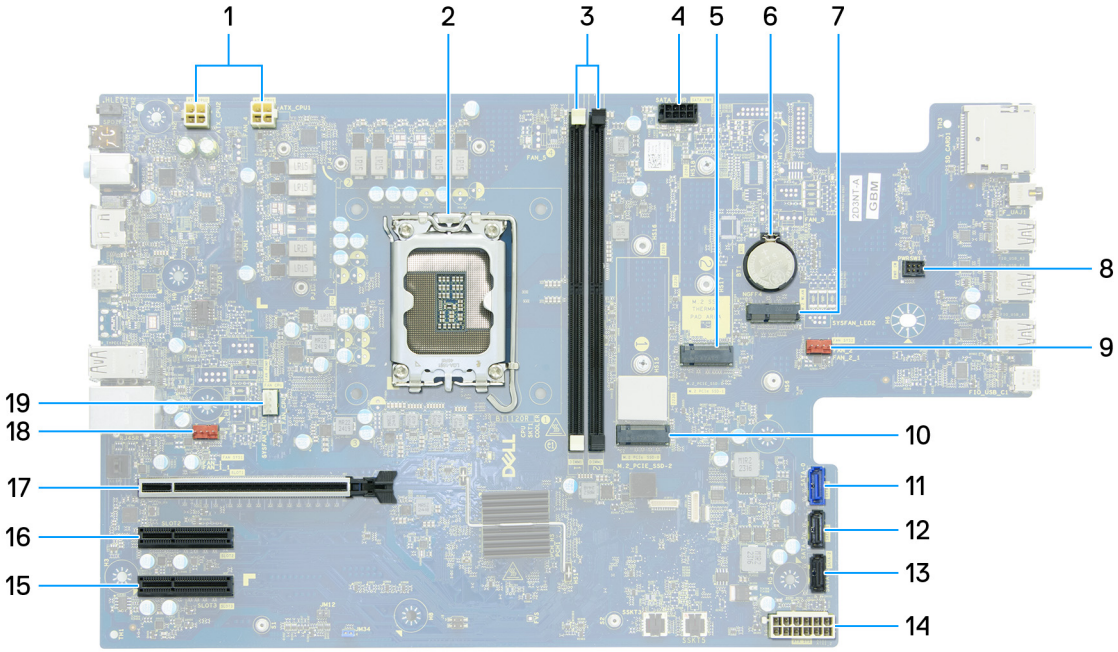



**Figure 55. System board connectors**

1. Processor-power connectors (ATX CPU2 and ATX CPU1)

2. CPU socket (CPU)
3. Memory-module slots (DIMM1 and DIMM2)
4. SATA-power connector (SATA PWR)
5. M.2 2230 or M.2 2280 solid-state drive slot (M.2 PCIe SSD 1)
6. Coin-cell battery socket (RTC)
7. M.2 2230 wireless-card slot (M.2 WLAN)
8. Power-button connector (PWR SW)
9. Front-chassis fan connector (FAN SYS2)
10. M.2 2230 or M.2 2280 solid-state drive slot (M.2 PCIe SSD 0)
11. SATA 6 Gbps drive connector (SATA-0)
12. SATA 6 Gbps drive connector (SATA-1)
13. SATA 6 Gbps drive connector (SATA-2)
14. Power-supply connector (ATX SYS)
15. PCIe x4 slot (SLOT 3)
16. PCIe x4 slot (SLOT 2)
17. PCIe x16 slot (SLOT 1)
18. Rear chassis-fan cable connector (FAN SYS1)
19. Processor-fan cable connector (FAN CPU)

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


**Figure 56. Installing the system board**

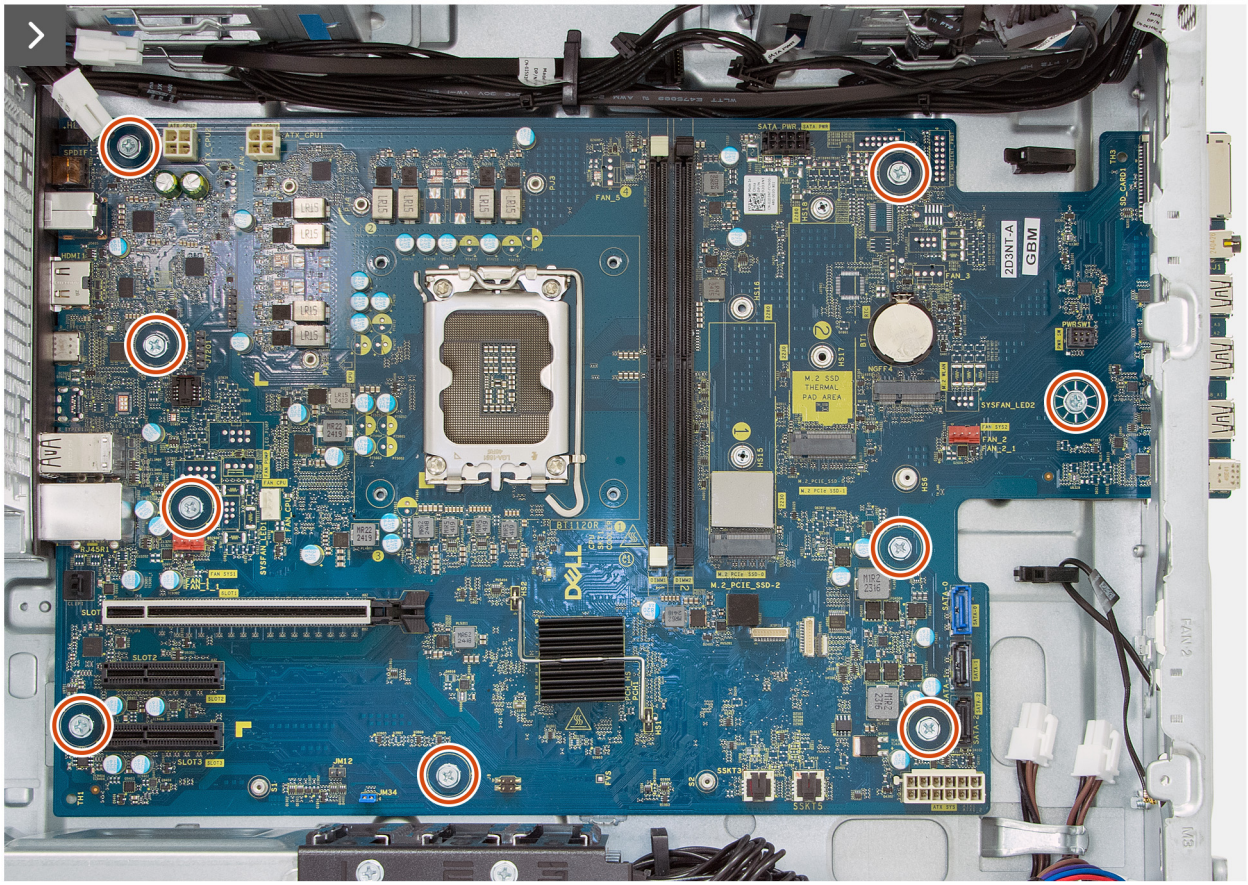


Figure 57. Installing the system board

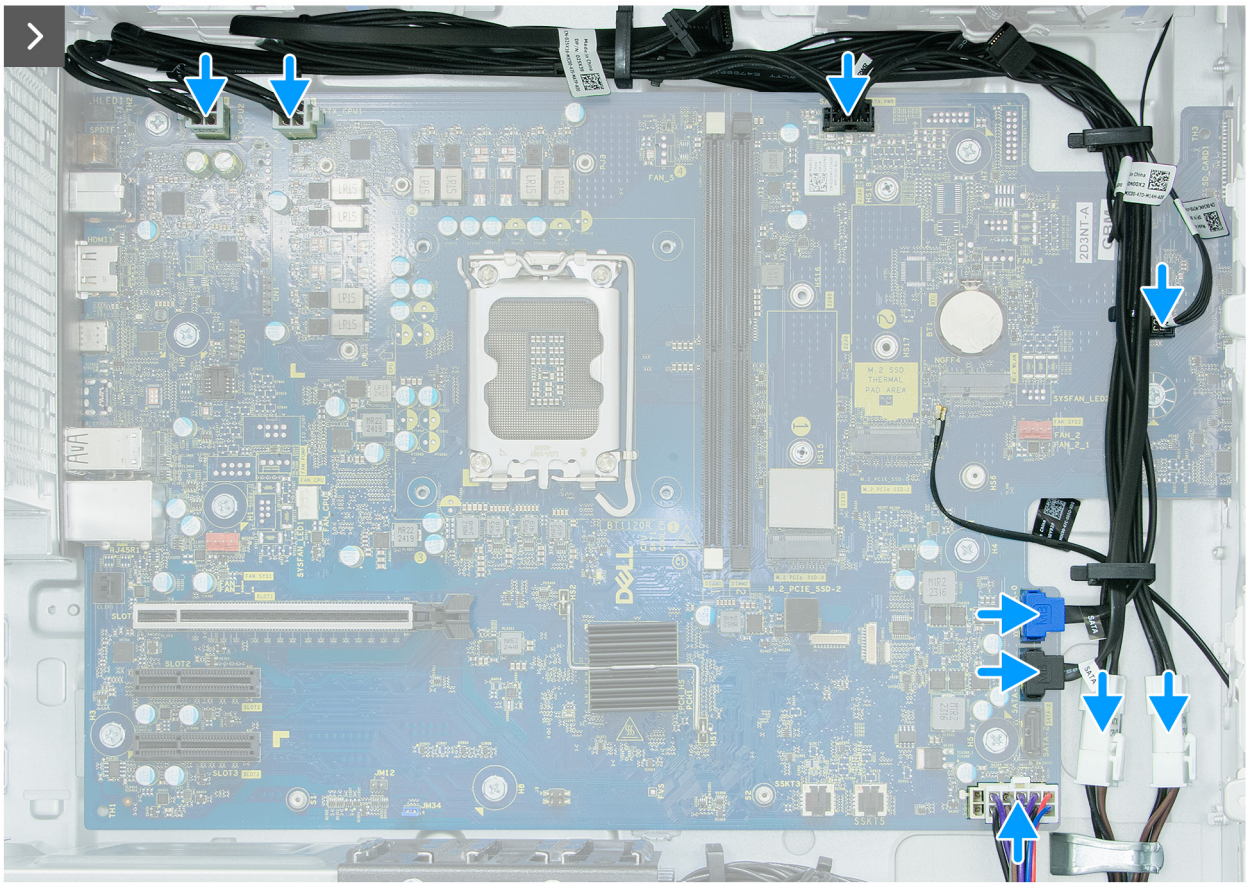


Figure 58. Installing the system board

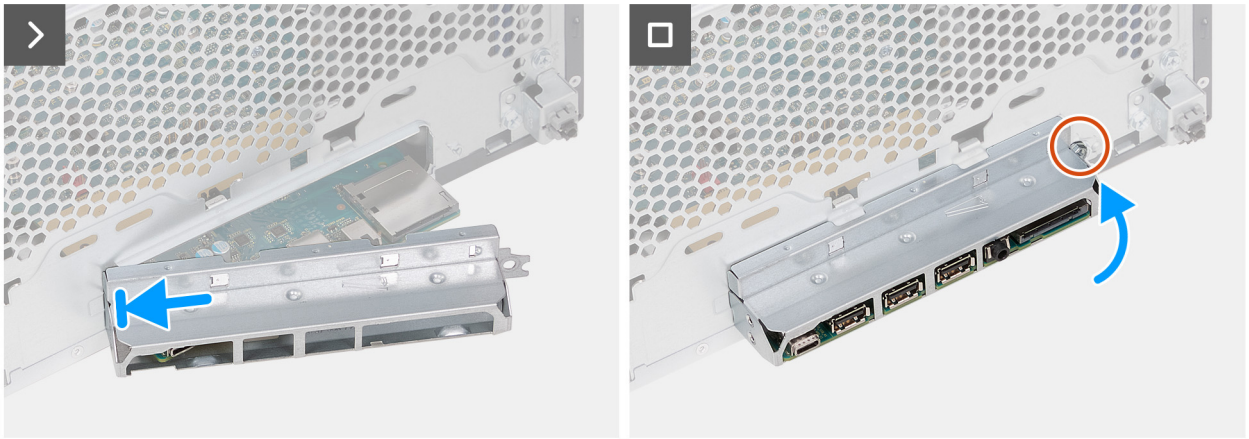


Figure 59. Installing the system board

### Steps

1. Slide the back I/O-ports on the system board into the front I/O-slots on the chassis. Align the screw holes on the system board with the screw holes on the chassis.
2. Replace the nine screws (#6-32) that secure the system board to the chassis.
3. Place the section of the the power-supply unit extension cables over the system board and secure the cables with their black plastic clips.
4. Connect the processor-power cables to their connectors on the system board (ATX CPU1 and ATX CPU2).
5. Connect the SATA power cable to its connector (SATA PWR) on the system board.
6. Connect the power-button cable to its connector (PWR SW) on the system board.
7. Connect the SATA drive cable to its connector (SATA-0) on the system board.

Repeat this step to connect the rest of SATA drive cables to their connectors (SATA-1 and SATA-2), if applicable.

8. Connect the power-supply unit cables to the power-supply unit extension cables.
9. Connect the power-supply cable to its connector (ATX SYS) on the system board.
10. Place and align the front I/O-bracket with the I/O slot on the chassis.
11. Replace the screw (#6-32) that secures the front I/O-bracket to the chassis.

### Next steps

1. Install the voltage-regulator heat sink, if applicable.
2. Install the processor.
3. Install the fan and heat-sink assembly (65 W) or the fan and heat-sink assembly (125 W, air cooling), whichever is applicable.
4. Install the coin-cell battery.
5. Install the wireless card.
6. Install the graphics card, if applicable.
7. Install the M .2 2230 solid-state drive or the M .2 2280 solid-state drive, whichever is applicable.
8. Install the memory modules.
9. Install the front cover.
10. Install the left-side cover.
11. Follow the procedure in After working inside your computer.

# 7

# Software

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

## Operating system

Your Dell Tower EBT2250 supports the following operating systems:

- Windows 11 Pro, 64-bit
- Windows 11 Home, 64-bit

## Drivers and downloads

When troubleshooting, downloading, or installing drivers, it is recommended that you read the Dell Knowledge Base article Drivers and Downloads FAQs 000123347.

# 8

# BIOS Setup

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

**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.**

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 a user-selectable option, such as the user password, type of storage device installed, and enable or disable base devices.

## Entering BIOS Setup program

**About this task**

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 20. 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. |

## One time boot menu

To access the **one time boot menu**, turn on your computer, and then press F2 immediately.

**NOTE:** If your computer fails to enter the boot menu, restart the computer and press F2 immediately.

The one-time boot menu displays the devices that you can boot from, and also displays the option 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

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

The **one time boot menu** also displays the option to access the System Setup screen.

# 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.

# System setup options

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

**Table 21. System setup options—Overview**

| **Overview** | |
|---|---|
| **Dell Tower EBT2250** | |
| 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. |
| Signed Firmware Update | Displays whether the Signed Firmware Update is enabled on your computer.<br>By default, the **Signed Firmware Update** option is enabled. |
| **PROCESSOR** | |
| Processor Type | Displays the processor type. |
| Maximum Clock Speed | Displays the maximum processor clock speed. |
| Minimum Clock Speed | Displays the minimum processor clock speed. |

### Table 21. System setup options—Overview (continued)

| Overview | |
|---|---|
| Current Clock Speed | Displays the current 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. |
| Intel® Hyper-Threading Capable | Displays whether the processor is Hyper-Threading (HT) capable. |
| 64-Bit Technology | Displays whether 64-bit technology is used. |
| Intel vPro Technology® | Display whether the Intel vPro feature is supported. |
| **MEMORY** | |
| Memory Installed | Displays the total computer memory installed. |
| Memory Available | Displays the total computer memory available. |
| Memory Speed | Displays the memory speed. |
| Memory Channel Mode | Displays single or dual channel mode. |
| 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. |
| **DEVICES** | |
| Video Controller | Displays the video controller type of the computer. |
| Video Memory | Displays the video memory information of the computer. |
| Wi-Fi Device | Displays the wireless device information of the computer. |
| Native Resolution | Displays the native resolution of the computer. |
| Video BIOS Version | Displays the video BIOS version 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 LAN On Motherboard (LOM) MAC address of the computer. |
| Slot 1 | Displays the graphics or expansion card that is installed in Slot 1. |
| Slot 2 | Displays the expansion card that is installed in Slot 2. |
| Slot 3 | Displays the expansion card that is installed in Slot 3. |

### Table 22. System setup options—Boot Configuration menu

| Boot Configuration | |
|---|---|
| **Boot Sequence** | |
| Boot Mode: UEFI only | Displays the boot mode. |
| Boot Sequence | Displays the boot sequence. |
| Enable PXE Boot Priority | Enables or disables the option to add a new PXE boot to the top of the Boot Sequence.<br>By default, the **OFF** option is disabled. |
| Force PXE On Next Boot | Enables or disables the Force PXE feature on the next boot.<br>By default, the **Force PXE On Next Boot** option is disabled. |

### Table 22. System setup options—Boot Configuration menu (continued)

| Boot Configuration | |
|---|---|
| **Secure Boot** | |
| Enable Secure Boot | Enable or disable the secure boot feature.<br>By default, the **OFF** option is disabled. |
| Enable Microsoft UEFI CA | Enable or disable Microsoft UEFI Certificate Authority.<br>By default, the **ON** option is enabled.<br>**CAUTION: Disabling Microsoft UEFI CA could render your system being unable to boot. System graphics may not function, some devices may not function properly. The system could become unrecoverable.** |
| Secure Boot Mode | Change the secure boot mode options.<br>By default, the **Deployed Mode** option is enabled. |
| **Expert Key Management** | |
| Enable Custom Mode | Enable or disable custom mode.<br>By default, the **OFF** option is disabled. |
| Custom Mode Key Management | Select the custom values for expert key management. |

### Table 23. System setup options—Integrated Devices menu

| Integrated Devices | |
|---|---|
| **Date/Time** | Set the current date in MM/DD/YYYY format. |
| **Time** | Set the current time in HH:MM:SS AM/PM format. |
| **Enable Audio** | Enable or disable the integrated audio controller.<br>By default, all the options are enabled. |
| **USB/Thunderbolt Configuration** | |
| Enable Thunderbolt™ Support | Enable or disable the Thunderbolt™ Technology feature, ports and adapters.<br>By default, the **ON** option is enabled.<br>**NOTE:** Enabling the "Enable Thunderbolt™ Adapter Boot Support" or "Enable Thunderbolt™ Adapter Pre-boot Modules" options may allow devices connected to the Thunderbolt'" adapter during pre-boot to function in the operating system regardless of the Security Level selected in BIOS Setup. |
| Enable Thunderbolt™ Boot Support | Enable or disable the Thunderbolt™ Boot support.<br>By default, the **OFF** option is disabled. |

### Table 24. System setup options—Storage menu

| Storage | |
|---|---|
| **SATA/NVMe Operation** | Enable or disable the operating mode of the integrated SATA hard drive controller.<br>By default, the **RAID On** option is enabled. |
| **Storage Interface** | |
| Port Enablement | Enable or disable the onboard drives.<br>By default, all the onboard drives are enabled. |
| **SATA-0** | Enable or disable the SATA-0 drive. |

### Table 24. System setup options—Storage menu (continued)

| Storage | |
|---|---|
| | By default, the **ON** option is enabled. |
| **SATA-1** | Enable or disable the SATA-1 drive. |
| | By default, the **ON** option is enabled. |
| **SATA-2** | Enable or disable the SATA-2 drive. |
| | By default, the **ON** option is enabled. |
| **M.2 PCIe SSD-0** | Enable or disable the M.2 PCIe SSD-0 solid-state drive. |
| | By default, the **ON** option is enabled. |
| **M.2 PCIe SSD-1** | Enable or disable the M.2 PCIe SSD-1 solid-state drive. |
| | By default, the **ON** option is enabled. |
| **SMART Reporting** | |
| Enable SMART Reporting | Enable or disable Self-Monitoring, Analysis, and Reporting Technology (SMART) during computer startup. |
| | By default, the **OFF** option is disabled. |
| **Drive Information** | |
| **SATA-0** | |
| Type | Displays the SATA-0 type information of the computer. |
| Dervice | Displays the SATA-0 device information of the computer. |
| **SATA-1** | |
| Type | Displays the SATA-1 type information of the computer. |
| Dervice | Displays the SATA-1 device information of the computer. |
| **SATA-2** | |
| Type | Displays the SATA-2 type information of the computer. |
| Dervice | Displays the SATA-2 device information of the computer. |
| **M.2 PCIe SSD-0** | |
| Type | Displays the M.2 PCIe SSD-0 type information of the computer. |
| Device | Displays the M.2 PCIe SSD-0 device information of the computer. |
| **M.2 PCIe SSD-1** | |
| Type | Displays the M.2 PCIe SSD-1 type information of the computer. |
| Device | Displays the M.2 PCIe SSD-1 device information of the computer. |
| **Enable MediaCard** | |
| | Enable or disable all media cards. |
| | By default, the **Secure Digital (SD)** option is selected. |

### Table 25. System setup options—Display menu

| Display | |
|---|---|
| **Primary Display** | Determines the primary display when multiple controllers are available on the computer. |
| | By default, the **Auto** option is enabled. |
| **Full Screen Logo** | Enable or disable full screen logo. |

### Table 25. System setup options—Display menu (continued)

| Display | |
|---|---|
| | By default, the **OFF** option is disabled. |

### Table 26. System setup options—Connection menu

| Connection | |
|---|---|
| **Network Controller Configuration** | |
| Integrated NIC | Controls the on-board LAN controller.<br>By default, the **Enabled with PXE** option is selected. |
| **Wireless Device Enable** | |
| WLAN/WGig | Enable or disable the internal WLAN device.<br>By default, the **WLAN/WGig** option is selected. |
| Bluetooth® | Enable or disable the internal Bluetooth device.<br>By default, the **Bluetooth®** option is selected. |
| **Enable UEFI Network Stack** | Enable or disable UEFI Network Stack and controls the on-board LAN Controller.<br>By default, the **Auto Enabled** option is selected. |
| **HTTP(s) Boot Feature** | |
| **HTTP(s) Boot** | Enable or disable the HTTP(s) Boot feature.<br>By default, the **ON** option is enabled. |
| **HTTP(s) Boot Mode** | With Auto Mode, the HTTP(s) Boot extracts Boot URL from the DHCP. With Manual Mode, the HTTP(s) Boot reads Boot URL from the user-provided data.<br>By default, the **Auto Mode** option is selected. |

### Table 27. System setup options—Power menu

| Power | |
|---|---|
| **USB PowerShare** | |
| **Enable USB PowerShare** | When enabled, USB devices connected to the designated USB PowerShare port on the computer are powered or charged using the stored system battery.<br>By default, the **OFF** option is disabled. |
| **Thermal Management** | Select the heat management settings for the cooling fan and the processor, with respect to system performance, noise, and temperature.<br>By default, the **Optimized** option is selected. |
| **USB Wake Support** | |
| **Enable USB Wake Support** | When enabled, you can use the USB devices like a mouse or keyboard to wake your computer from standby.<br>By default, the **ON** option is enabled. |
| **AC Behavior** | |
| **AC Recovery** | Allows you to determine what happens when AC power is restored after an unexpected loss of AC power.<br>By default, the **Power Off** option is selected. |
| **Block Sleep** | Enables or disables the computer from entering Sleep (S3) mode in the operating system. |

### Table 27. System setup options—Power menu (continued)

| Power | |
|---|---|
| | By default, the **OFF** option is disabled.<br>**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** | Enable or disable the Deep Sleep mode support.<br>By default, the **Enabled in S4 and S5** option is selected. |
| **Intel Speed Shift Technology** | Enable or disable the Intel Speed Shift Technology support.<br>By default, the **ON** option is enabled. |

### Table 28. System setup options—Security menu

| Security | |
|---|---|
| **TPM 2.0 Security** | |
| **TPM 2.0 Security On** | Enable or disable TPM 2.0 security options.<br>By default, the **ON** option is enabled. |
| **Attestation Enable** | Enables to control whether the Trusted Platform Module (TPM) Endorsement Hierarchy is available to the operating system.<br>By default, the **ON** option is enabled. |
| **Key Storage Enable** | Enables to control whether the Trusted Platform Module (TPM) Storage Hierarchy is available to the operating system.<br>By default, the **ON** option is enabled. |
| **Clear** | Enables to clear the TPM owner information and returns the TPM to the default state.<br>By default, the **OFF** option is enabled. |
| **PPI ByPass for Clear Commands** | Controls the TPM Physical Presence Interface (PPI).<br>By default, the **OFF** option is enabled. |
| **SMM Security Mitigation** | Enables or disables additional UEFI SMM Security Mitigation protections. This option uses the Windows SMM Security Mitigations Table (WSMT) to confirm to the operating system that security best practices have been implemented by the UEFI firmware.<br>By default, the **ON** option is enabled.<br>For additional security, Dell Technologies recommends keeping the **SMM Security Mitigation** option enabled unless you have a specific application which is not compatible.<br>**NOTE:** This feature may cause compatibility issues or loss of functionality with some legacy tools and applications. |
| **Data Wipe on Next Boot** | |
| **Start Data Wipe** | Data Wipe is a secure wipe operation that deletes information from a storage device.<br>**WARNING: The secure Data Wipe operation deletes information in a way that it cannot be reconstructed.**<br>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 is not recoverable. |

### Table 28. System setup options—Security menu (continued)

| Security | |
|---|---|
| | When enabled, the data wipe option will prompt to wipe any storage devices that are connected to the computer on the next boot.<br>By default, the **OFF** option is disabled. |
| **HDD Security** | |
| **SED Block SID Authentication** | The SEO Block SID Authentication setting controls a mechanism used by the BIDS to block entities from taking ownership of the Self-Encrypting Drive (SED) when the drive does not have a password set.<br>By default, the **ON** option is enabled. |
| **PPI BYpass for SED Block SID Command** | This setting controls the SEO Block SID Physical Presence Interlace (PPI). When external SEO management software sends a request to BIOS to leave the drive in an unlocked state, this setting controls whether the user must acknowledge and approve the request.<br>By default, the **OFF** option is disabled. |
| **Absolute®** | |
| **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.<br>By default, the **Enable Absolute** option is enabled.<br>For additional security, Dell Technologies recommends keeping the **Absolute** option enabled.<br>**NOTE:** When the Absolute features are activated, the Absolute integration cannot be disabled from the BIOS setup screen. |
| **UEFI Boot Path Security** | |
| • 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.<br>By default, the **Always Except Internal HDD** option is selected. |

### Table 29. System setup options—Passwords menu

| Passwords | |
|---|---|
| **Admin Password** | Set, change, or delete the administrator password. |
| **System Password** | Set, change, or delete the computer password. |
| **M.2 PCIe SSD-0** | Set, change, or delete the M.2 PCIe SSD-0 password. |
| **M.2 PCIe SSD-1** | Set, change, or delete the M.2 PCIe SSD-1 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).<br>Dell Technologies recommends setting the minimum password length to at least eight characters. |
| **Upper Case Letter** | Reinforces password must have at least one upper case letter.<br>By default, the **OFF** option is enabled. |
| **Lower Case Letter** | Reinforces password must have at least one lower case letter.<br>By default, the **OFF** option is enabled. |

### Table 29. System setup options—Passwords menu (continued)

| Passwords | |
|---|---|
| **Digit** | Reinforces password must have at least one digit.<br>By default, the **OFF** option is enabled. |
| **Special Character** | Reinforces password must have at least one special character.<br>By default, the **OFF** option is enabled. |
| **Minimum Characters** | Set the minimum characters allowed for password.<br>By default, the **Minimum Characters** valuie is set to 4. |
| **Password Bypass** | |
| **Password Bypass** | When enabled, this always prompts for computer and internal hard drive passwords when powered on from the off state.<br>By default, the **Disabled** option is enabled. |
| **Password Changes** | |
| **Allow Non-Admin Password Changes** | The **Enable 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.<br>By default, the **ON** option is enabled.<br>For additional security, Dell Technologies recommends keeping the **Enable Non-Admin Password Changes** option disabled. |
| **Admin Setup Lockout** | |
| **Enable Admin Setup Lockout** | The **Enable Admin Setup Lockout** option prevents an end user from even viewing the BIOS setup configuration without first entering the administrator password (if set).<br>By default, the **OFF** option is disabled.<br>For additional security, Dell Technologies recommends keeping the **Enable 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.<br>**NOTE:** When the owner password is set, the Master Password Lockout option is not available.<br>**NOTE:** When an internal hard drive password is set, it must first be cleared before Master Password Lockout can be changed.<br>By default, the **OFF** option is disabled.<br>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** | Controls access to the Physical Security ID (PSID) revert of NVMe hard-drives from the Dell Security Manager prompt.<br>By default, the **OFF** option is disabled. |

### Table 30. System setup options—Update, Recovery menu

| Update, Recovery | |
|---|---|
| **UEFI Capsule Firmware Updates** | |

### Table 30. System setup options—Update, Recovery menu (continued)

| Update, Recovery | |
|---|---|
| **Enable UEFI Capsule Firmware Updates** | Enables or disables BIOS updates through UEFI capsule update packages.<br>**NOTE:** Disabling this option blocks the BIOS updates from services such as Microsoft Windows Update and Linux Vendor Firmware Service (LVFS).<br>By default, the **ON** option is enabled. |
| **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.<br>By default, the **ON** option is enabled.<br>**NOTE:** BIOS Recovery from Hard Drive is not available for self-encrypting drives (SED).<br>**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.<br>By default, the **ON** option is enabled. |
| **SupportAssist OS Recovery** | |
| **SupportAssist OS Recovery** | Enables or disables the boot flow for SupportAssist OS Recovery tool in the event of certain computer errors.<br>By default, the **ON** option is enabled. |
| **BIOSConnect** | |
| **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 operating system Recovery Threshold setup option and local Service operating system does not boot or is not installed.<br>By default, the **ON** option is enabled. |
| **Dell Auto OS Recovery Threshold** | |
| **Dell Auto OS Recovery Threshold** | Allows you to control the automatic boot flow for SupportAssist System Resolution Console and for Dell operating system Recovery Tool.<br>By default, the value of **2** option is selected. |

### Table 31. System setup options—System Management menu

| System Management | |
|---|---|
| **Service Tag** | |
| Service Tag | |
| **Asset Tag** | |
| **Asset Tag** | Creates a computer Asset Tag that can be used by an IT administrator to uniquely identify a particular computer.<br>**NOTE:** Once set in BIOS, the Asset Tag cannot be changed. |
| **Wake on LAN/WLAN** | |
| **Wake on LAN/WLAN** | Enables or disables the computer to turn on by special LAN signals.<br>By default, the **Disabled** option is selected. |
| **Auto On Time** | |

### Table 31. System setup options—System Management menu (continued)

| System Management | |
|---|---|
| **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.<br>By default, the **Disabled** option is selected. |
| **SERR Messages** | |
| **Enable SERR Messages** | Enable or disable SERR (system error) messages.<br>By default, the **ON** option is enabled. |
| **First Power On Date** | |
| **Set Ownership Date** | Set the ownership date.<br>By default, the **OFF** option is enabled. |
| **Diagnostics** | |
| **OS Agent Requests** | Enables OS agent request to schedule onboard diagnostics.<br>By default, the **ON** option is enabled. |
| **Power-On-Self-Test Automatic Recovery** | |
| **Power-On-Self-Test Automatic Recovery** | Enables automatic recovery when the computer becomes unresponsive when performing a BIOS Power-On-Self-Test (POST). If the computer becomes unresponsive before POST is completed, the BIOS will automatically attempt to recover the computer. In some cases, this may include resetting the BIOS Setup configuration settings to BIOS default values, and unprovisioning the Intel AMT vPro feature, if applicable.<br>By default, the **ON** option is enabled. |

### Table 32. System setup options—Keyboard menu

| Keyboard | |
|---|---|
| **Keyboard Errors** | |
| **Enable Keyboard Error Detectio** | Enable or disable the keyboard error detection feature.<br>By default, the **ON** option is enabled. |
| **Numlock LED** | |
| **Enable Numlock LED** | Enable or disable Numlock LED.<br>By default, the **ON** option is enabled. |

### Table 33. System setup options—Pre-boot Behavior menu

| Pre-boot Behavior | |
|---|---|
| **Warning and Errors** | |
| **Warning and Errors** | Enables or disables the action to be taken when a warning or error is encountered.<br>By default, the **Prompt on Warnings and Errors** option is selected. Stop, prompt, and wait for user input when warnings or errors are detected.<br>**NOTE:** Errors deemed critical to the operation of the computer hardware stop the functioning of the computer. |
| **Extend BIOS POST Time** | |
| **Extend BIOS POST Time** | Sets the BIOS POST (Power-On Self-Test) load time. |

### Table 33. System setup options—Pre-boot Behavior menu (continued)

| Pre-boot Behavior | |
|---|---|
| | By default, the **0 seconds** option is selected. |

### Table 34. System setup options—Virtualization menu

| Virtualization | |
|---|---|
| **Intel® Virtualization Technology** | |
| **Enable Intel® Virtualization Technology (VT)** | When enabled, the computer can run a Virtual Machine Monitor (VMM).<br>By default, the **ON** option is enabled. |
| **VT for Direct I/O** | |
| **Enable Intel® VT for Direct I/O** | When enabled, the computer can perform Virtualization Technology for Direct I/O (VT-d). VT-d is an Intel method that provides virtualization for memory map I/O.<br>By default, the **ON** option is enabled. |
| **Intel® Trusted Execution Technology (TXT)** | Intel Trusted Execution Technology (TXT) is a set of 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. The following must be enabled in order to enable Intel TXT -<br>● Intel Virtualization Technology - X<br>● Intel Virtualization Technology - Direct |
| **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.<br>**NOTE:** This option is not available when the virtualization setting for IOMMU is disabled (VT-d/AMD Vi).<br>By default, the **ON** option is enabled.<br>For additional security, Dell Technologies recommends keeping the **Enable Pre-Boot DMA Support** option enabled.<br>**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.<br>**NOTE:** This option is not available when the virtualization setting for IOMMU is disabled (VT-d/AMD Vi).<br>By default, the **ON** option is enabled.<br>**NOTE:** This option is provided only for compatibility purposes, since some older hardware is not DMA capable. |
| **Internal Port DMA Compatability Mode** | When enabled, BIOS will notify the OS that the internal ports are not OMA capable.<br>This is intended to help with devices that have OS OMA compatibility issues. This setting does not affect external port OMA or Pre-boot OMA support.<br>By default, the **OFF** option is disabled. |

### Table 35. System setup options—Performance menu

| Performance | |
|---|---|
| **Multi-Core Support** | |
| **Active Multiple Performance Cores (P-Cores) Select** | Change the number of CPU cores available to the operating system. The default value is set to the maximum number of cores.<br>By default, the **All Active** option is selected. |
| **Active Multiple Efficient Cores (P-Cores) Select** | Change the number of CPU E-cores available to the operating system. The default value is set to the maximum number of cores.<br>By default, the **All Active** option is selected. |
| **Intel® SpeedStep** | |
| **Enable Intel® SpeedStep Technology** | Enables the computer to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production.<br>By default, the **ON** option is enabled. |
| **C-States Control** | |
| **Enable C-State Control** | Enables or disables the ability of the CPU to enter and exit low-power state. When disabled, it disables all C-states. When enabled, it enables all C-states that the chipset or platform allows.<br>By default, the **ON** option is enabled. |
| **Intel® Turbo Boost Technology** | |
| **Enable Intel® Turbo Boost Technology** | Enables the Intel® TurboBoost™ mode of the processor. When enabled, the Intel TurboBoost driver increases the performance of the CPU or graphics processor.<br>By default, the **ON** option is enabled. |
| **Intel® Hyper-Threading Technology** | |
| **PCIe Resizable Base Address Register (BAR)** | |
| **Enable PCIe Resizable Base Address Register (BAR) support** | Enable or disable PCIe Resizable BAR support.<br>By default, the **OFF** option is disabled. |

### Table 36. System setup options—System Logs menu

| System Logs | |
|---|---|
| **BIOS Event Log** | |
| **Clear Bios Event Log** | Allows you to select option to keep or clear BIOS events logs.<br>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.<br>By default, the **Keep Log** option is selected. |

# Updating the BIOS

## Updating the BIOS in Windows

**Steps**

1. Go to Dell Support Site.

2. Go to **Identify your product or search 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, use the SupportAssist to automatically identify your computer. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**. Expand **Find drivers**.
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, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.

   For more information about how to update the system BIOS, search in the Knowledge Base Resource at Dell Support Site.

# Updating the BIOS using the USB drive in Windows

**Steps**

1. Go to Dell Support Site.
2. Go to **Identify your product or search 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, use the SupportAssist to automatically identify your computer. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**. Expand **Find drivers**.
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 the Knowledge Base Resource at 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

You can run the BIOS flash update file from Windows using a bootable USB drive or you can also update the BIOS from the One-Time boot menu on the computer. To update your computers BIOS, copy the BIOS XXXX.exe file onto a USB drive formatted with the FAT32 file system. Then, restart your computer and boot from the USB drive using the One-Time Boot Menu.

**About this task**

**BIOS Update**

To confirm if the BIOS Flash Update is listed as a boot option you can boot your computer to the **One Time Boot** Menu. If the option is listed, then the BIOS can be updated using this method.

To update your BIOS from the One-Time boot menu, you need the following:

- USB drive formatted to the FAT32 file system (the drive does not have to be bootable)
- BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive
- AC power adapter must be connected to the computer
- A functional computer battery to flash the BIOS

Perform the following steps to update the BIOS from the One-Time boot menu:

**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. Turn off the computer, insert the USB drive that contains the BIOS flash update file.
2. Turn on the computer and press **F12** to access the **One Time Boot** Menu. Select **BIOS Update** using the mouse or arrow keys then press Enter.
   The flash BIOS menu is displayed.
3. Click **Flash from file**.
4. Select the external USB device.
5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS flash update is completed.

# 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 37. 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. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
   The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
   Use the following guidelines to create the system password:
   - A password can have up to 32 characters.
   - A password can at least have one special character: "( ! " # $ % & ' * + , - . / : ; < = > ? @ [ \ ] ^ _ ` { | } )"
   - A password can have numbers 0 to 9.
   - A password can have an upper case letters from A to Z.
   - A password can have a lower case letters from a to z.
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. 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. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
   The **System Security** screen is displayed.
2. In the **System Security** screen, verify that the **Password Status** is Unlocked.
3. Select **System Password**. Update or delete the existing system password, and press Enter or Tab.
4. 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.

5. Press Esc. A message prompts you to save the changes.
6. 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.

# 9

# 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 the knowledge base article 000181163.

### 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 diagnostic quick 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

The power-button LED indicates the power status of the computer. These are the power states:

**Solid white**—Computer is in S0 state. This is the normal power state of the computer.

**Blinking white**—Computer is in a low-power state, S3. This does not indicate a fault.

**Pulsing white**—Computer is in the memory-training state, wait for the computer to boot up.

**Solid amber**—Computer is experiencing a boot failure, including the power-supply unit.

**Blinking amber**—Computer is experiencing a boot failure but the power-supply unit is functioning correctly.

**Off**—Computer is in sleep state, hibernation mode, or turned off.

The power-button LED may also blink amber or white according to predefined "beep codes" indicating various failures.

For example, the power-button LED blinks amber two times followed by a pause, and then blinks white three times followed by a pause. This 2,3 pattern continues until the computer is turned off, indicating no memory or RAM is detected.

The following table shows different power-button LED light patterns and associated problems.

**NOTE:** The following diagnostic light codes and recommended solutions are intended for Dell service technicians to troubleshoot problems. 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.

### Table 38. Diagnostic light codes

| Diagnostic light codes (Amber, White) | Problem description |
|---|---|
| **1,2** | Unrecoverable SPI Flash Failure |
| **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 installed |
| **2,6** | System board/Chipset Error/Clock failure/Gate A20 failure/Super I/O failure/Keyboard controller failure |
| **3,1** | CMOS battery failure |
| **3,2** | PCI of Video card/chip failure |
| **3,3** | BIOS Recovery 1: BIOS recovery image not found |
| **3,4** | BIOS Recovery 2: Recovery image found but invalid |
| **3,5** | Power Rail Failure: EC ran into power sequencing failure |
| **3,6** | Paid SPI Volume Error |
| **3,7** | Management Engine (ME) error. Timeout waiting on ME to reply to HECI message. |
| **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 stand-alone tool that is preinstalled in 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**.

# Real Time Clock—RTC reset

The Real Time Clock (RTC) reset function allows you or the service technician to recover the recently launched model Dell Latitude and Precision systems from **No POST/No Boot/No Power** situations. You can initiate the RTC reset on the system

from a power-off state only if it is connected to AC power. Press and hold the power button for 25 seconds. The system RTC reset occurs after you release the power button.

**NOTE:** If AC power is disconnected from the system during the process or the power button is held longer than 40 seconds, the RTC reset process gets aborted.

The RTC reset will reset the BIOS to Defaults, un-provision Intel vPro and reset the system date and time. The following items are unaffected by the RTC reset:

- Service Tag
- Asset Tag
- Ownership Tag
- Admin Password
- System Password
- HDD Password
- Key Databases
- System Logs

**NOTE:** The IT administrator's vPro account and password on the system will be un-provisioned. The system needs to go through the setup and configuration process again to reconnect it to the vPro server.

The below items may or may not reset based on your custom BIOS setting selections:

- Boot List
- Enable Legacy Option ROMs
- Secure Boot Enable
- Allow BIOS Downgrade

# 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.

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# Getting help and contacting Dell Technologies

## Self-help resources

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

**Table 39. Self-help resources**

| Self-help resources | Resource location |
|---|---|
| Information about Dell Technologies products and services | Dell Site |
| MyDell app | |
| Tips | |
| Contact Support | In Windows search, type `Contact Support`, and press Enter. |
| Online help for operating system | Windows Support Site |
| Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals, and documents. | Your Dell Technologies computer is uniquely identified using a Service Tag or Express Service Code. To view relevant support resources for your Dell Technologies computer, enter the Service Tag or Express Service Code at Dell Support Site.<br>For more information about how to find the Service Tag for your computer, see Instructions on how to find your Service Tag or Serial Number. |
| Dell Technologies knowledge base articles | 1. Go to Dell Support Site.<br>2. On the menu bar at the top of the Support page, select **Support** > **Support Library**.<br>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 Technologies

To contact Dell Technologies 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 about your purchase invoice, packing slip, bill, or Dell Technologies product catalog.