

# OptiPlex 3090 Ultra

## Service Manual

## Notes, cautions, and warnings

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

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

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

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# Working on your computer

## Topics:

- Safety instructions

## Safety instructions

### Prerequisites

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

- You have read the safety information that shipped with your computer.
- A component can be replaced or, if purchased separately, installed by performing the removal procedure in reverse order.

### About this task

**⚠️ WARNING:** Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the [Regulatory Compliance Homepage](#)

**⚠️ CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

**⚠️ CAUTION:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

**⚠️ CAUTION:** Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

**⚠️ CAUTION:** When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

**ⓘ NOTE:** Disconnect 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 to the power source.

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

## Before working inside your device

### About this task

To avoid damaging your device, perform the following steps before you begin working inside the device:

### Steps

- Ensure that you follow the [Safety Instruction](#).
- Ensure that your work surface is flat and clean to prevent the device cover from being scratched.

3. Turn off your device.
4. Remove the device from the stand:

**Removing device from Fixed-height stand or Pro 1.0 Height-adjustable stand:**

- a. Slide the release latch on the stand until you hear a click to release the stand cover.
- b. Slide and lift the back cover to release it from the stand.
- c. Disconnect the keyboard, mouse, network, power, and display cable from the device.
- d. Pull the retention latch that secures the device to the stand chassis.
- e. Lift the device from the cover.

**Removing device from offset VESA mount:**

- a. Disconnect the keyboard, mouse, network, power, and display cable from the device.
- b. Push the quick release button on the VESA mount.
- c. Slide and remove the monitor arm from the offset VESA mount (U/P-series monitor).

**i** **NOTE:** For E-series monitor, remove the VESA cover.

- d. Remove the four screws that secure the offset VESA mount to the monitor.
- e. Remove the four holders on which the offset VESA mount is mounted.
- f. Lift the offset VESA mount from the monitor.
- g. Remove the four screws that secure the device to the offset VESA mount.
- h. Lift the device away from the offset VESA mount.

**Removing device from Pro 2.0 Height-adjustable stand:**

- a. Press the button on the side of the stand chassis, to release the stand cover.
- b. Slide and lift the back cover to release it from the stand.
- c. Disconnect the keyboard, mouse, network, power, and display cable from the device.
- d. Slide and release the inner bar on the lower edge of the stand cover that secures the device to the stand chassis.
- e. Slide and remove the device from the cover.
- f. Slide the inner bar back to the lower edge of the stand cover.

**Removing device on Wall Mount:**

- a. For full function wall mount:
  - i. Unlock the wall mount module.
  - ii. Open the wall mount cover.
  - iii. Disconnect the keyboard, mouse, network, power, and display cable from the device.
  - iv. Snap open the wall mount bracket module from the slots on the wall mount.
  - v. Remove the four screws that secure the device to the wall mount bracket.
  - vi. Lift the device away from the wall mount bracket.
- b. For simple function wall mount:
  - i. Unmount the wall mount bracket module from the wall.
  - ii. Disconnect the keyboard, mouse, network, power adapter, and display cable from the device.
  - iii. Remove the four screws that secure the device to the wall mount bracket.
  - iv. Lift the device away from the wall mount bracket.

5. Press and hold the power button while the device is unplugged to ground the system board.

**i** **NOTE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

## Safety precautions

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

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

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power.
- Disconnect all network cables, telephone, and telecommunications lines from the system.
- Use an ESD field service kit when working inside any tablet/desktop to avoid electrostatic discharge (ESD) damage.

- After removing any system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to reduce the chance of getting electrocuted.

## Standby power

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

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

## Bonding

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

## Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

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

## ESD field service kit

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

### Components of an ESD field service kit

The components of an ESD field service kit are:

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

### ESD protection summary

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

## Transporting sensitive components

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

# After working inside your device

## About this task

After you complete any replacement procedure, ensure that you connect any external devices, cards, and cables before turning on your computer.

## Steps

1. Install the device in the stand:

### **Installing the device on Fixed-height stand or Pro 1.0 Height-adjustable stand:**

- a. Unlock the latch on the lower chassis of the stand to remove the stand cover.
- b. Align and position the top side of the device to the upper chassis of the stand back cover.
- c. Align the power button on the device with the slot on the stand back cover chassis.
- d. Press the device until the retention latch clicks into place and secures it.
- e. Connect the keyboard, mouse, network, power, and display cable to the device.

 **CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the device.**

- f. Slide the back cover, along with the device, into the stand until it clicks into place.

- g. Lock the stand cover.

### **Installing the device on offset VESA mount:**

- a. Align the screw holes on the device to the screw holes on the offset VESA mount.
- b. Install the four screws to secure the device to the offset VESA mount.
- c. Align the screw holes in the offset VESA mount with the screw holes on the back cover of the monitor.
- d. Install the four screws to secure the offset VESA mount to the monitor.
- e. Align the tabs on the adapter that is attached to the stand, with the slots on the back of the monitor.
- f. Slide the tabs on the stand adapter into its slots on the monitor.
- g. Connect the keyboard, mouse, network, power, and display cable to the device.

 **CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the device.**

### **Installing the device on Pro 2.0 Height-adjustable stand:**

- a. Press the button on the side of the stand chassis, to release the stand cover.
- b. Slide and release the inner bar on the lower edge of the stand cover.
- c. Align the vents on the device with the vents on the stand cover and slide the device in the cover.
- d. Slide the inner bar back to the lower edge of the stand cover to lock the device to the cover.
- e. Connect the keyboard, mouse, network, power, and display cable to the device.

 **CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the device.**

- f. Slide the back cover, along with the device, into the stand until it clicks into place.
- g. Lock the stand cover.

### **Installing the device on Wall Mount:**

- a. For full function wall mount:
  - i. Align the screw holes on the device with the screw holes on the wall mount bracket.
  - ii. Install the four screws to secure the device to the wall mount bracket.
  - iii. Insert the hooks on the mounting bracket of the wall mount into the slots on the wall mount bracket module.
  - iv. Align and insert the hooks on the wall mount bracket module into the slots on the wall mount until it clicks into place.
  - v. Connect the keyboard, mouse, network, power, and display cable to the device.

 **CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the device.**

- vi. Close the stand cover.
- vii. Lock the device and the stand cover.

- b. For simple function wall mount:

- i. Align the screw holes on the device with the screw holes on the wall mount bracket.

- ii. Install the four screws to secure the device to the wall mount bracket.
- iii. Connect the keyboard, mouse, network, power, and display cable to the device.

 **CAUTION:** To connect a network cable, first plug the cable into the network device and then plug it into the device.

- iv. Align and mount the wall mount bracket module in the screws on the wall.

2. Turn on your device.
3. If required, verify that the device works correctly by running **ePSA diagnostics**.

# Removing and installing components

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

## Topics:

- Recommended tools
- Screw List
- Major components of your system
- Hard-drive assembly
- Hard-drive bracket
- Hard drive
- Cover
- Memory module
- WLAN card
- Internal solid-state drive
- eMMC Storage module
- System fan
- Power button
- Coin-cell battery
- System board
- Heat-sink
- Replacing the chassis

## Recommended tools

The procedures in this document require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe

## Screw List

The following table shows the screw list and the images for different components.

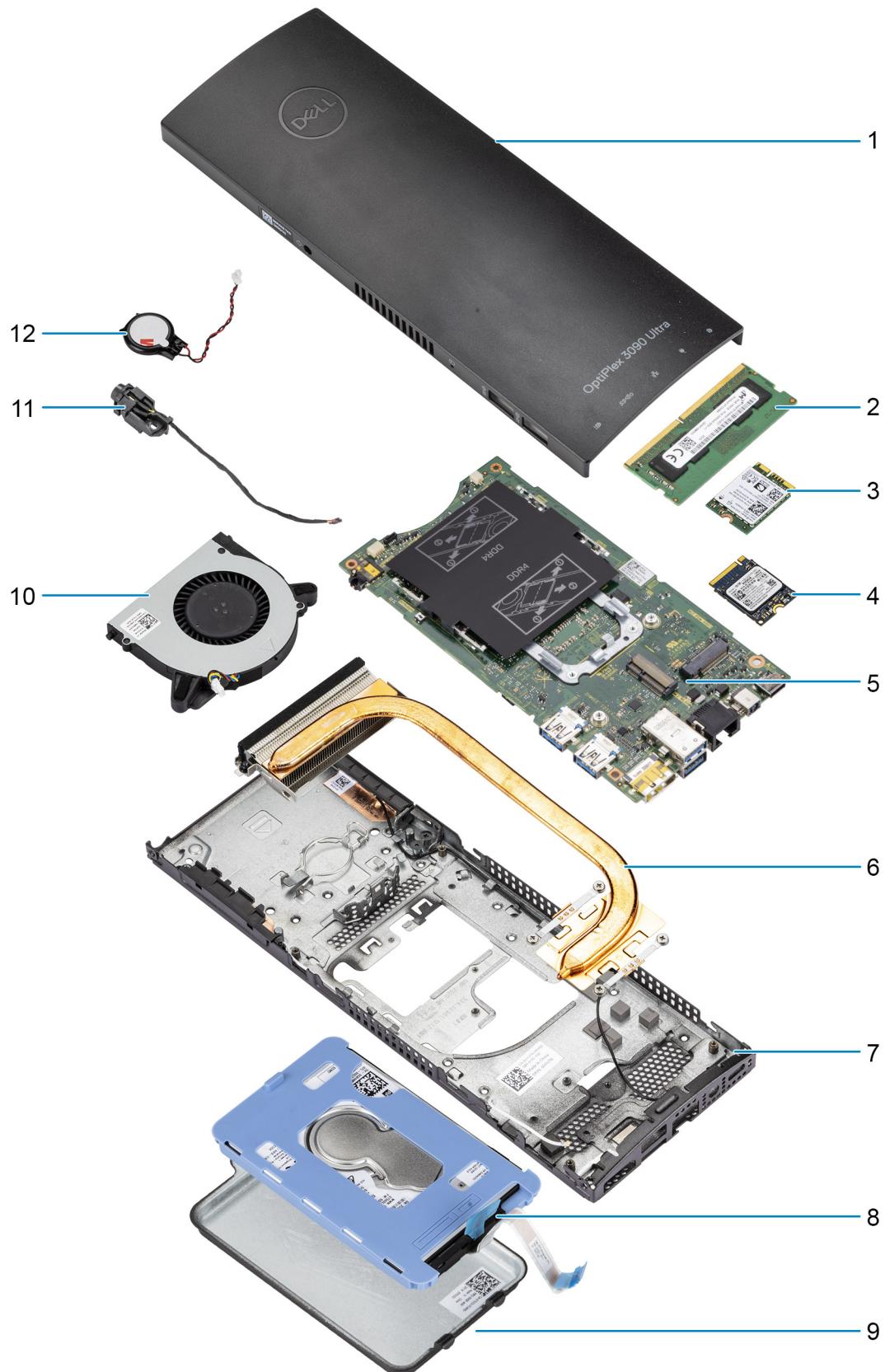
**Table 1. Screw Size List**

Component	Screw type	Quantity	Image
Power button	M2x3	1	
System board	M2x3	4	
	M2x3 (captive screw)	1	
Hard-drive assembly (or non Hard-drive assembly)	M2x3	1	

**Table 1. Screw Size List (continued)**

<b>Component</b>	<b>Screw type</b>	<b>Quantity</b>	<b>Image</b>
M.2 WLAN card	M2x3.5	1	
M.2 2230 Solid-state drive or EMMC)	M2x3.5	1	

# Major components of your system



1. Cover

2. Memory module
3. WLAN card
4. Solid-state drive
5. System board
6. Heat-sink
7. Chassis
8. Hard-drive assembly
9. Hard-drive cover
10. System fan
11. Power button
12. Coin-cell battery

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

## Hard-drive assembly

### Removing the hard-drive assembly

#### Prerequisites

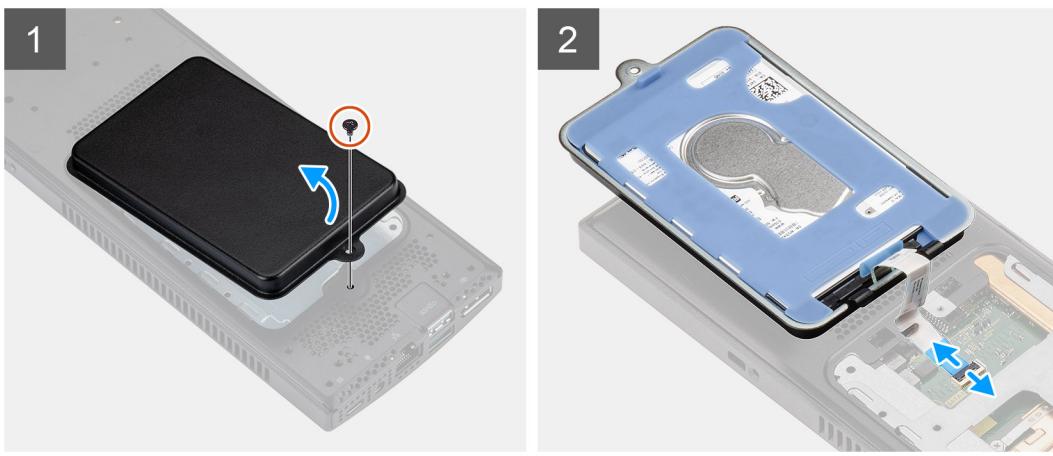
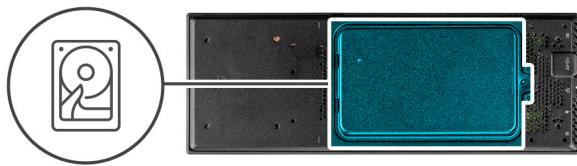
1. Follow the procedure in [before working inside your device](#).

#### About this task

The figure indicates the location of the hard-drive assembly module and provides a visual representation of the removal procedure.



1x  
M2x3



### Steps

1. Remove the (M2x3) screw that secures the hard-drive assembly to the chassis.
2. Turn the hard-drive assembly to access the hard-drive cable.
3. Open the latch and disconnect the hard-drive cable from the connector on the system board.
4. Carefully unroute the hard-drive cable from the routing guide on the chassis.

**i** **NOTE:** Observe the routing of the hard-drive cable inside the chassis as you remove them. Route the cable properly when you replace the component to prevent the cable from being pinched or crimped.

5. Remove the hard-drive assembly.

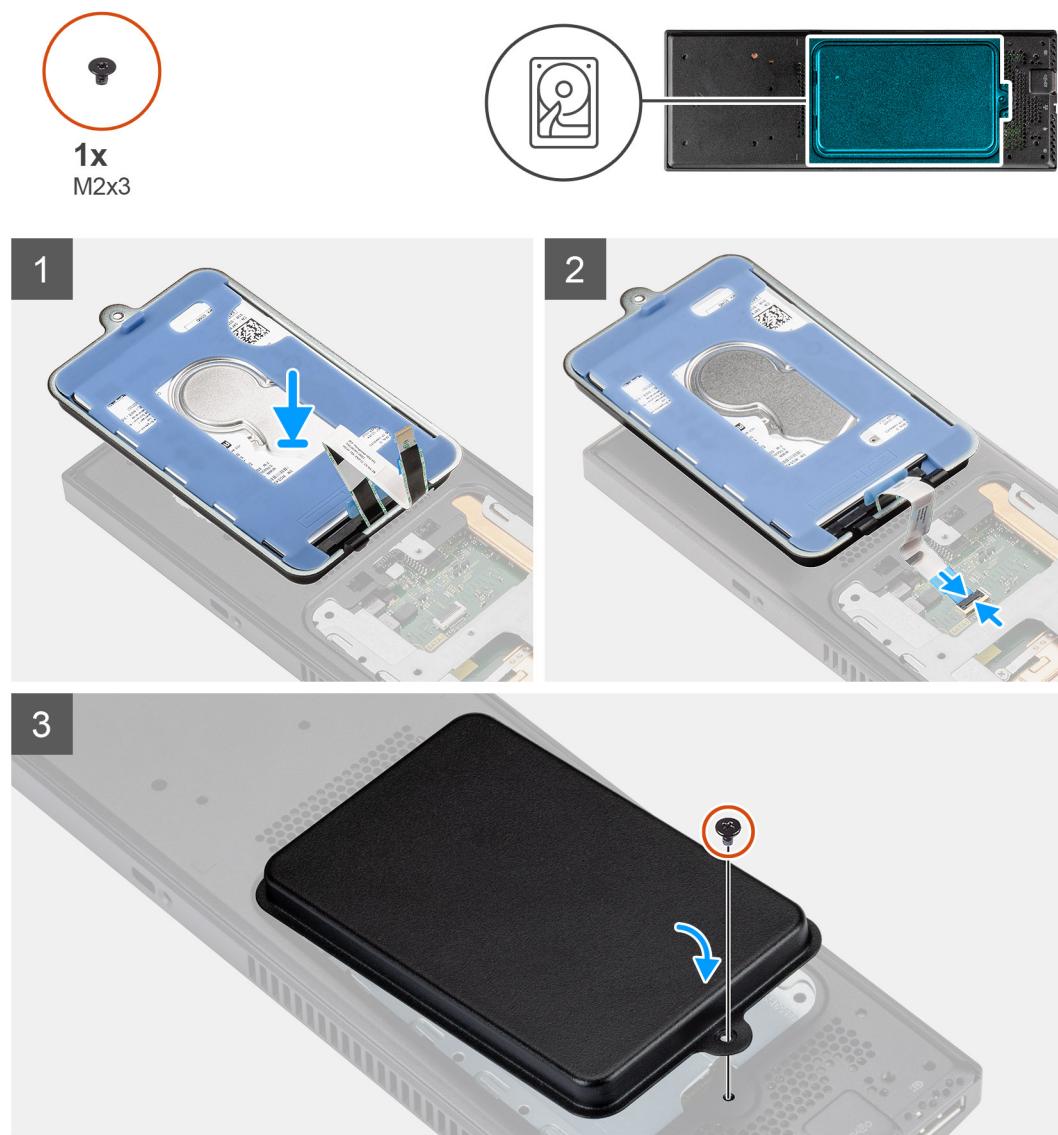
## Installing the hard-drive assembly

### Prerequisites

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

## About this task

The figure indicates the location of the hard-drive assembly module and provides a visual representation of the installation procedure.



## Steps

1. Place the hard-drive assembly on the cover.
2. Route the hard-drive cable through the routing guide on the chassis.
3. Connect the hard-drive cable to the connector on the system board and close the latch to secure the cable.
4. Turn the hard-drive assembly module and align the tabs on the hard-drive assembly with the slots on the chassis.
5. Align the screw hole on the hard-drive assembly with the screw hole on the chassis.
6. Replace the M2x3 screw to secure the hard-drive assembly to the chassis.

## Next steps

1. Follow the procedure in [after working on your device](#).

# Hard-drive bracket

## Removing the hard-drive bracket

### Prerequisites

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

### About this task



### Steps

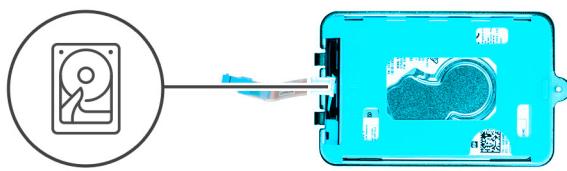
Pull the rubber tab on the protective sleeve and lift the hard-drive module out from the hard-drive bracket.

## Installing the hard-drive bracket

### Prerequisites

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

## About this task



## Steps

1. Align and place the hard drive on the bracket.
2. Gently push the hard-drive into the bracket.

## Next steps

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

# Hard drive

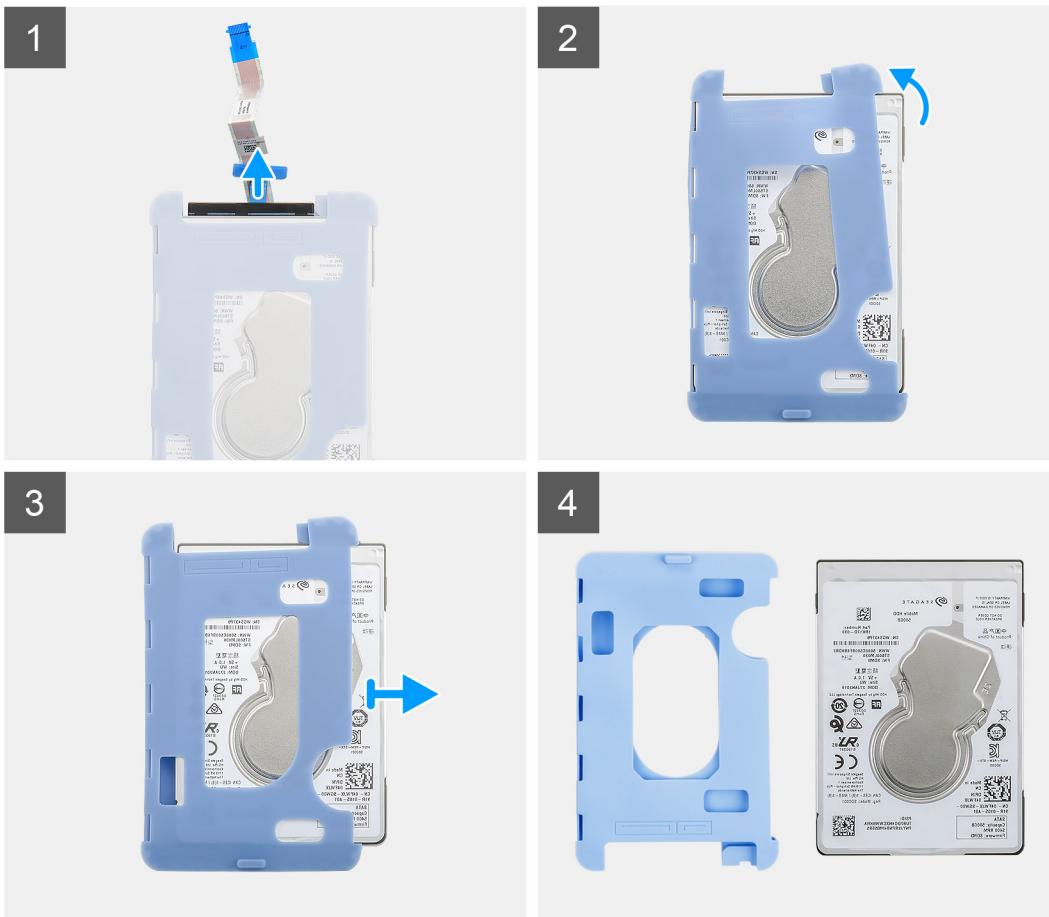
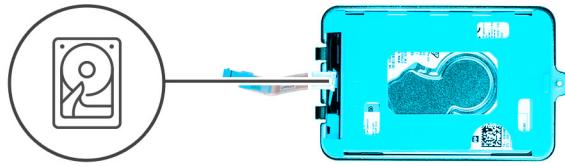
## Removing the hard drive

### Prerequisites

1. Follow the procedure in [before working inside your device](#).
2. Remove the [hard-drive assembly](#).
3. Remove the [hard-drive bracket](#).

### About this task

The figure indicates the location of the hard-drive module and provides a visual representation of the removal procedure.



## Steps

1. Disconnect the hard-drive cable from the connector on the hard drive.
2. Release the protective sleeve from the hard-drive.
3. Gently pull the hard-drive out of the protective sleeve.

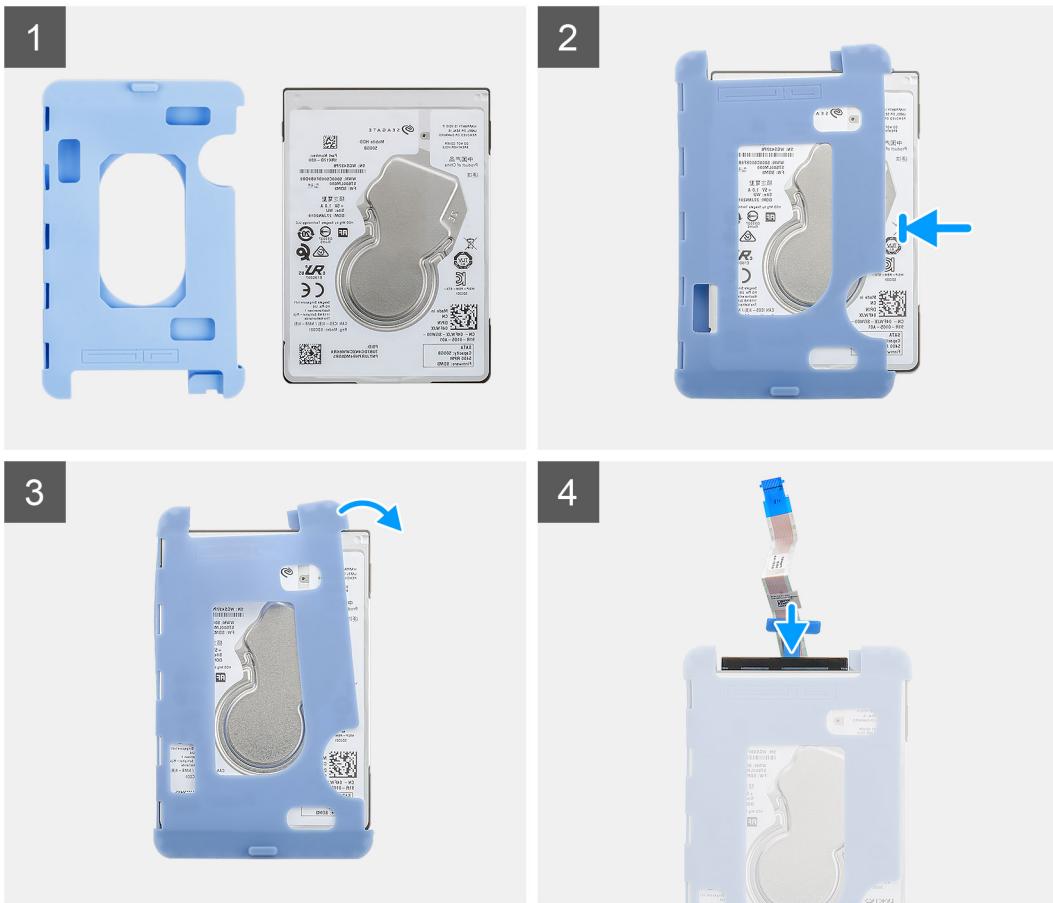
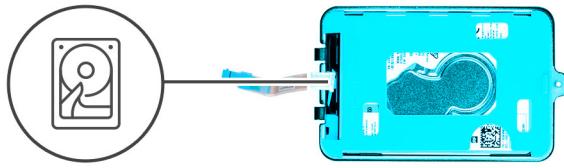
## Installing the hard drive

### Prerequisites

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

### About this task

The figure indicates the location of the hard-drive module and provides a visual representation of the installation procedure.



## Steps

1. Insert the hard drive into the protective sleeve.  
**i | NOTE:** Ensure to match the mark on the protective sleeve with the hard drive PIN and connector location.
2. Pull the protective sleeves along the hard-drive edges.
3. Connect the hard-drive cable to the connector on the hard drive.

## Next steps

1. Install the [hard-drive bracket](#).
2. Install the [hard-drive assembly](#).
3. Follow the procedure in [after working on your device](#).

# Cover

## Removing the cover

### Prerequisites

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

### About this task

The figure indicates the location of the cover and provides a visual representation of the removal procedure.



### Steps

Slide and lift the cover to release it from the chassis.

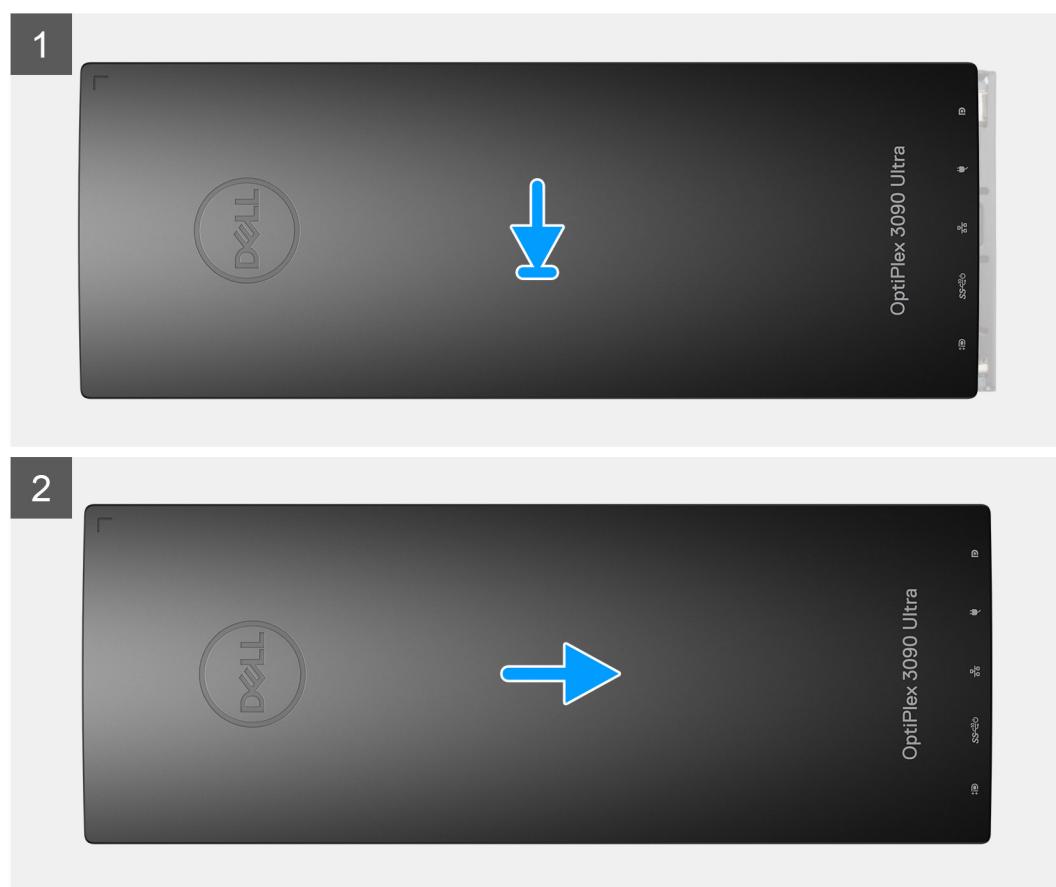
# Installing the cover

## Prerequisites

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

## About this task

The figure indicates the location of the cover and provides a visual representation of the installation procedure.



## Steps

1. Align the tabs on the cover with the slots on the chassis.
2. Slide the cover until it clicks into place.

## Next steps

1. Follow the procedure in [after working on your device](#).

# Memory module

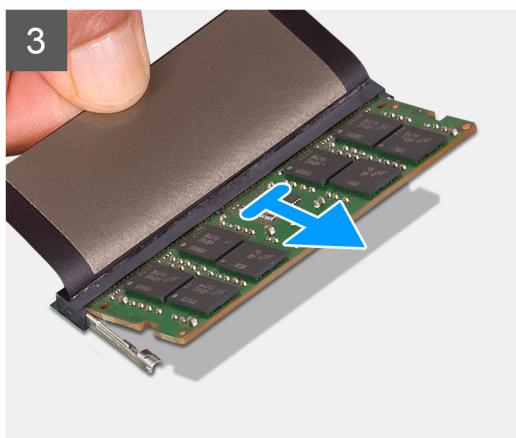
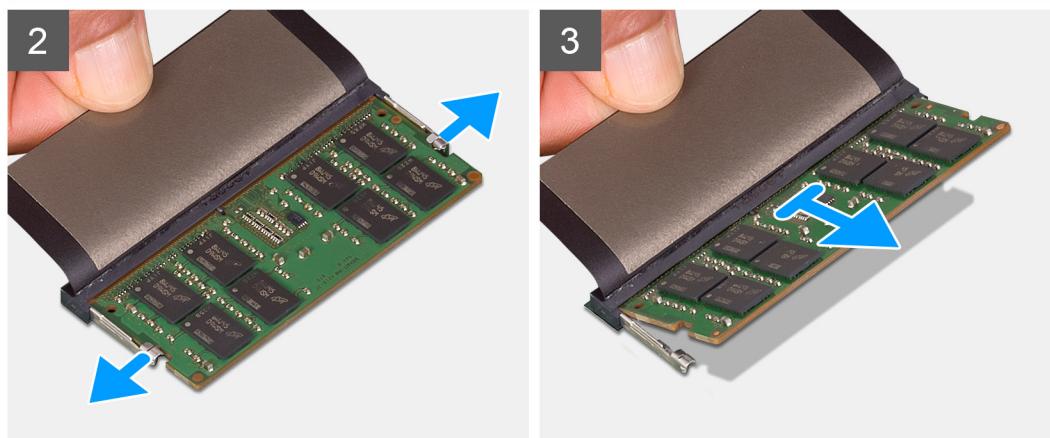
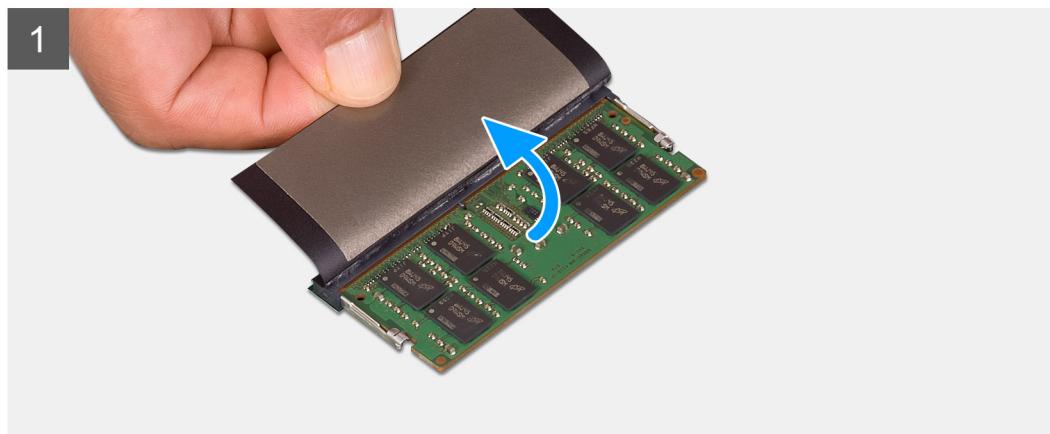
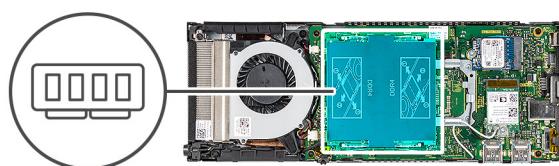
## Removing the memory module

### Prerequisites

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

### About this task

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



### Steps

1. Lift the absorber above the memory module.
2. Gently pry the retention clips away from the memory module until the memory module pops up.
3. Slide and remove the memory module from the memory-module slot on the system board.

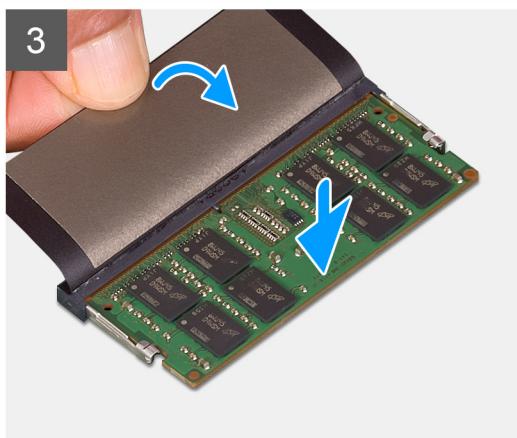
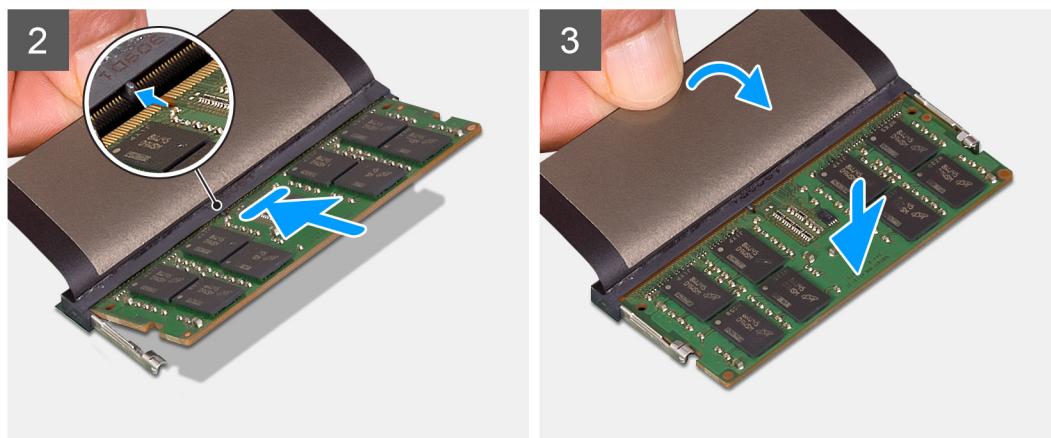
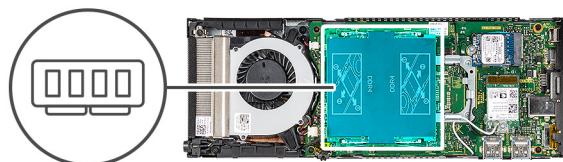
# Installing the memory module

## Prerequisites

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

## About this task

The figure indicates the location of the memory module and provides a visual representation of the installation procedure.



## Steps

1. Lift the absorber above the memory-module slot, and align the notch on the memory module with the tab on the memory-module slot.
2. Slide the memory module firmly into the slot at an angle.
3. Press the memory module down until it clicks into place.

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

4. Lower the absorber above the memory module.

## Next steps

1. Install the [cover](#).
2. Follow the procedure in [after working on your device](#).

# WLAN card

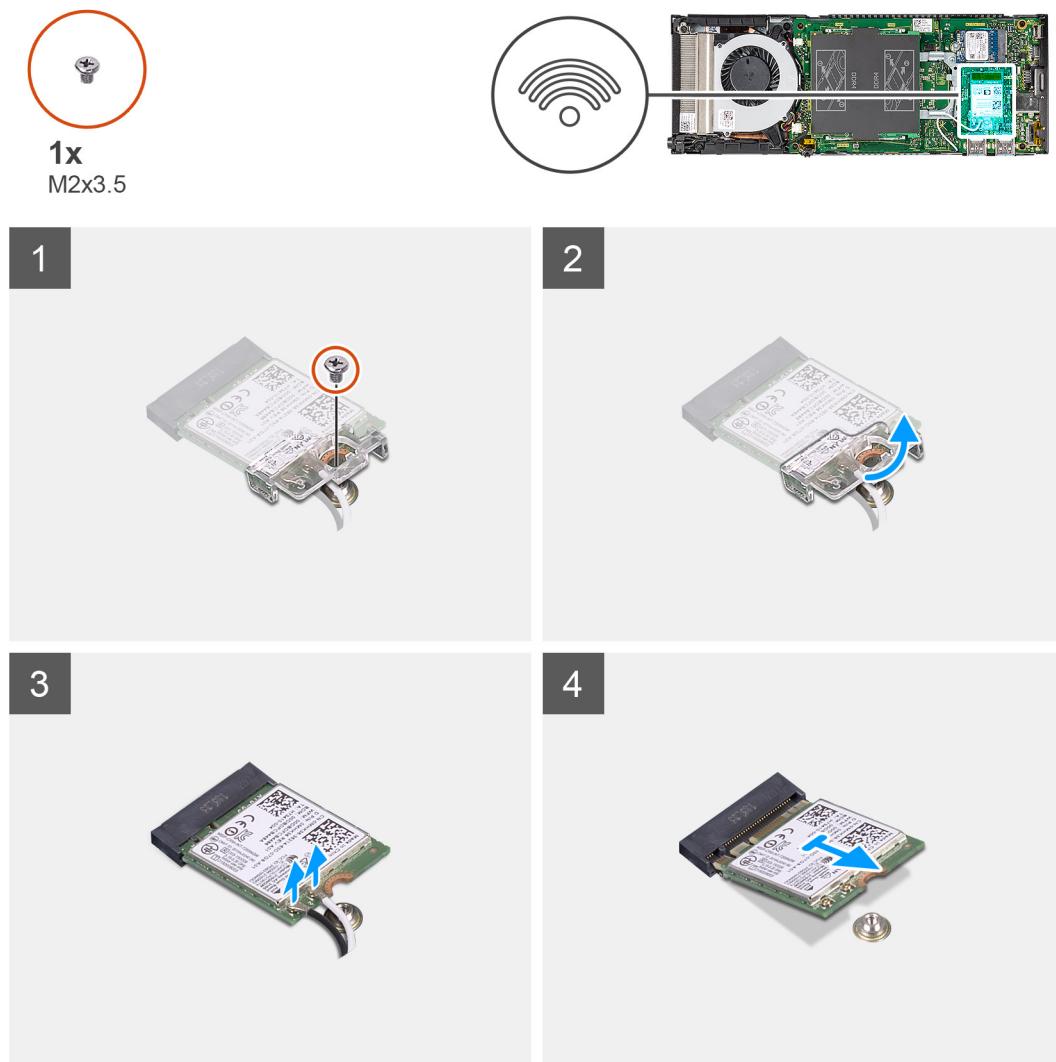
## Removing the WLAN card

### Prerequisites

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

### About this task

The figure indicates the location of the WLAN card and provides a visual representation of the removal procedure.



### Steps

1. Remove the (M2x3.5) screw that secures the WLAN bracket to the system board.
2. Slide and lift the WLAN bracket.

3. Disconnect the WLAN antenna cables from the WLAN card.
4. Slide and remove the WLAN card from the WLAN connector on the system board.

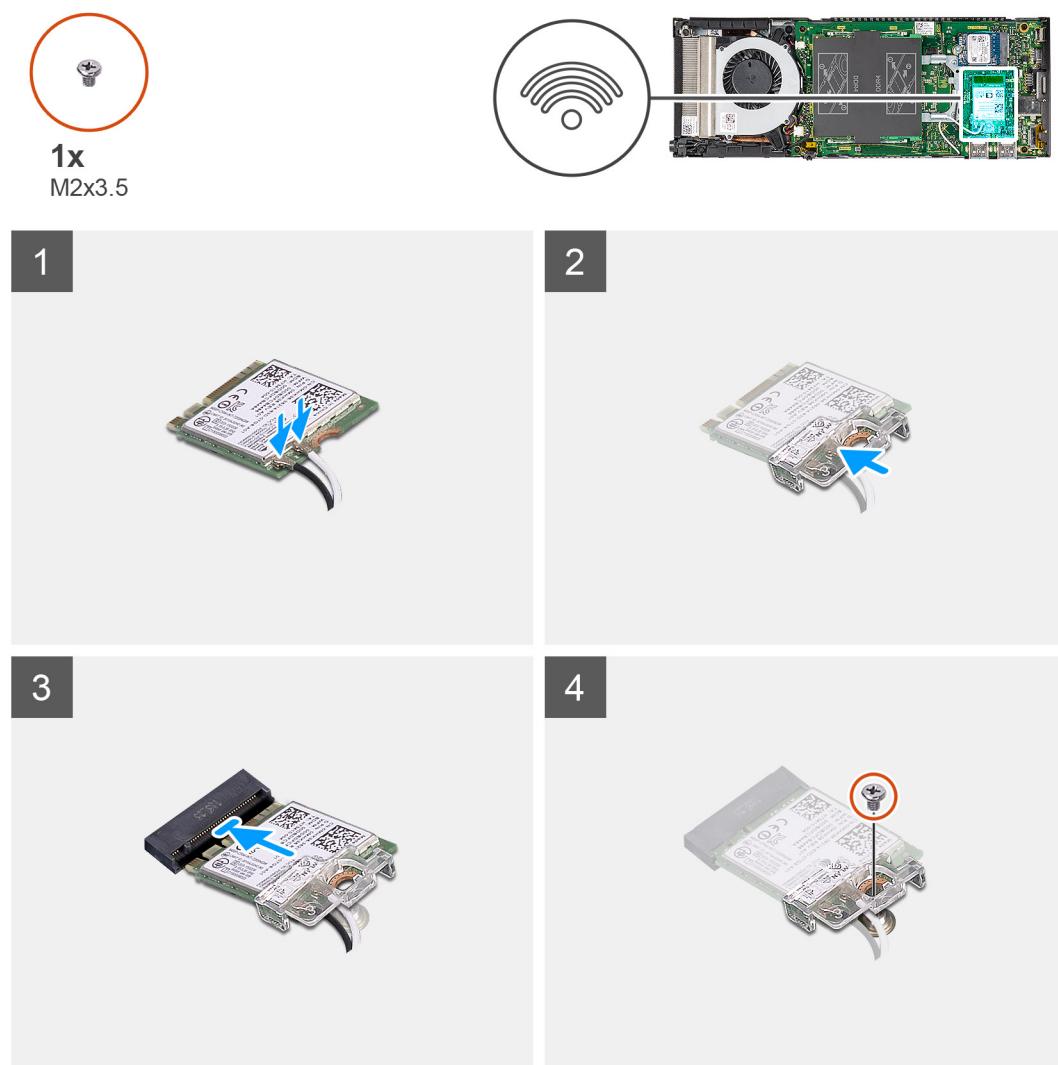
## Installing the WLAN card

### Prerequisites

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

### About this task

The figure indicates the location of the WLAN card and provides a visual representation of the installation procedure.



### Steps

1. Connect the WLAN antenna cables to the WLAN card.

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

**Table 2. Antenna-cable color scheme**

Connectors on the wireless card	Antenna-cable color
Main (white triangle)	White

**Table 2. Antenna-cable color scheme (continued)**

Connectors on the wireless card	Antenna-cable color
Auxiliary (black triangle)	Black

2. Align and place the WLAN card bracket to secure the WLAN antenna cables to the WLAN card.
3. Align the notch on the WLAN card with the WLAN connector and insert the WLAN card at an angle into the WLAN card slot.
4. Replace the (M2x3.5) screw to secure the WLAN card to the system board.

**Next steps**

1. Install the [cover](#).
2. Follow the procedure in [after working on your device](#).

## Internal solid-state drive

### Removing the solid-state drive

**Prerequisites**

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

**About this task**

The figure indicates the location of the M.2 2230 solid-state drive and provides a visual representation of the removal procedure.



1x  
M2x3.5



## Steps

1. Remove the (M2x3.5) screw that secures the solid-state drive module to the connector on the system board.
2. Slide the solid-state drive module out from the M.2 slot.
3. Peel the solid-state drive thermal pad from the system board.

## Installing the solid-state drive

### Prerequisites

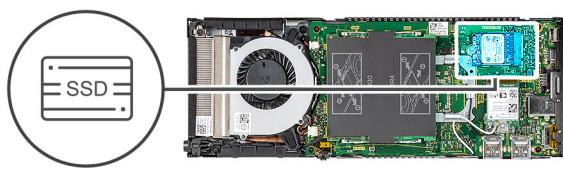
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The figure indicates the location of the M.2 2230 solid-state drive and provides a visual representation of the installation procedure.



1x  
M2x3.5



## Steps

1. Align and adhere the SSD thermal pad in the mark on the system board.  
**NOTE:** Check the adhesive direction before adhering it to the system board.
2. Align the notch on the solid-state drive module with the connector on the system board and slide the solid-state drive at an angle into the slot.
3. Replace the (M2x3.5) screw to secure the solid-state drive module to the system board.

## Next steps

1. Install the [cover](#).
2. Follow the procedure in [after working on your device](#).

# eMMC Storage module

For computers with eMMC module in M.2 2230 SSD slot.

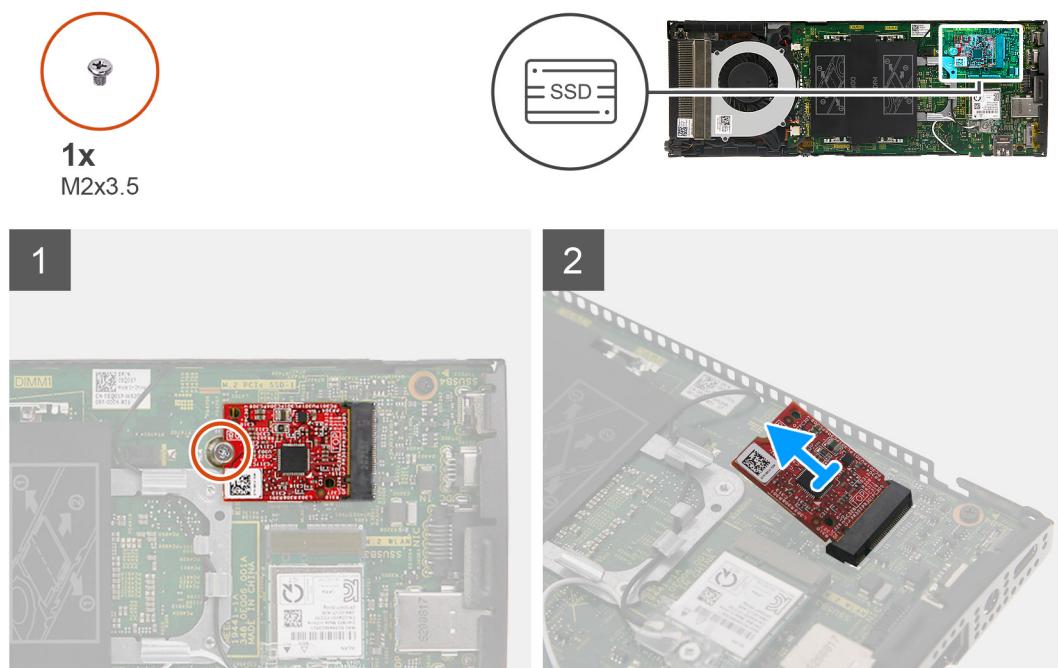
## Removing the eMMC storage module

### Prerequisites

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

### About this task

The figure indicates the location of the eMMC storage module and provides a visual representation of the removal procedure.



### Steps

1. Remove the (M2x3.5) screw that secures the eMMC storage module to the connector on the system board.
2. Slide the eMMC storage module at an angle out from the slot.

## Installing the eMMC storage module

### Prerequisites

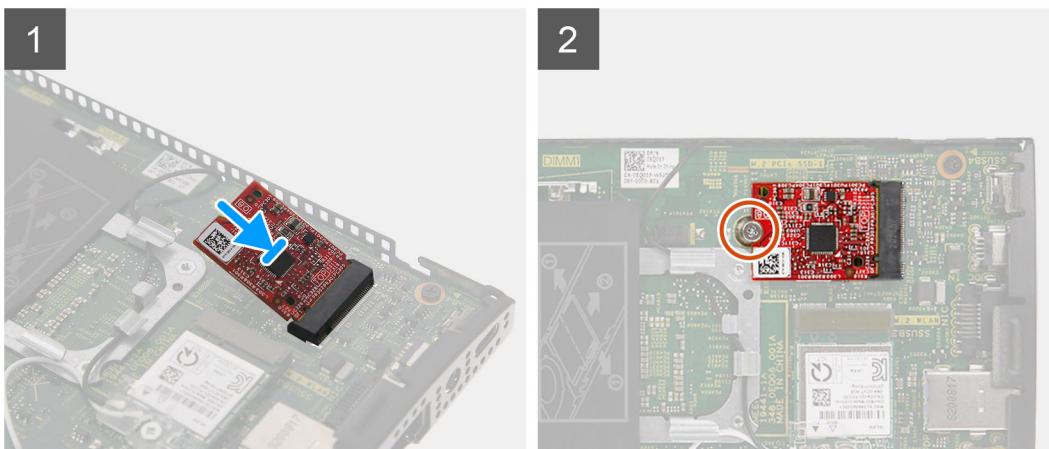
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The figure indicates the location of the eMMC storage module and provides a visual representation of the installation procedure.



1x  
M2x3.5



### Steps

1. Align the notch on the eMMC storage module with the connector on the system board and slide the eMMC storage module at an angle into the slot.
2. Replace the (M2x3.5) screw to secure the eMMC storage module to the system board.

### Next steps

1. Install the [cover](#).
2. Follow the procedure in [after working on your device](#).

## System fan

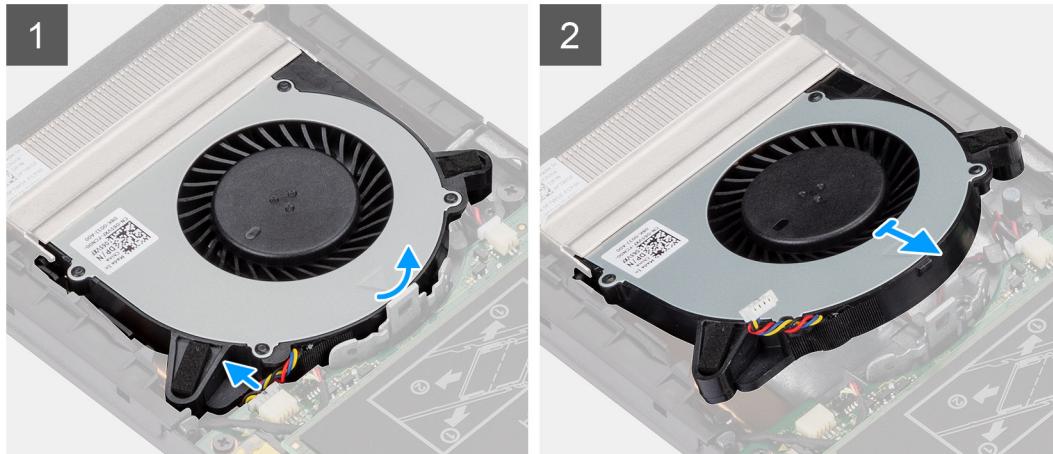
### Removing the system fan

#### Prerequisites

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

#### About this task

The figure indicates the location of the system fan and provides a visual representation of the removal procedure.



### Steps

1. Release the system fan from the retention tab on the fan tray.
2. Disconnect the system fan cable from the connector on the system board.
3. Slide the system fan out from the guiding rails on the heat-sink bracket.

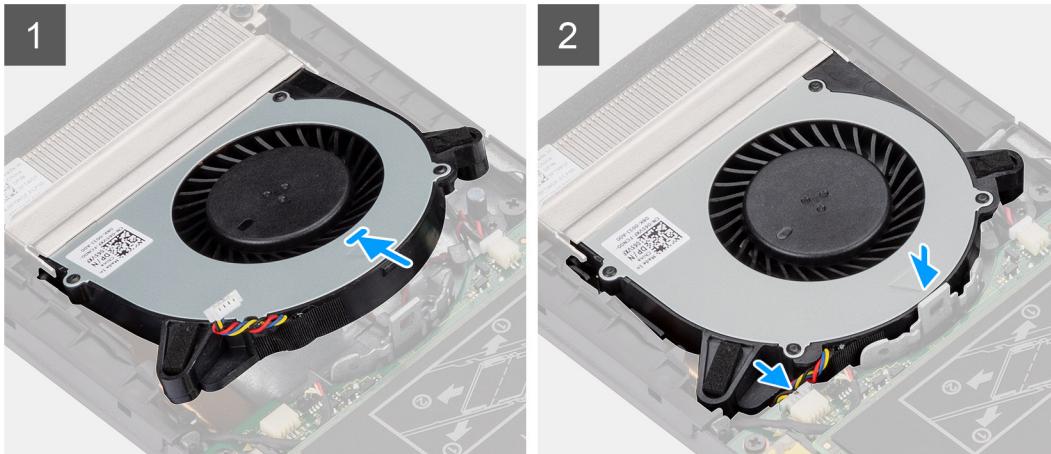
## Installing the system fan

### Prerequisites

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

### About this task

The figure indicates the location of the system fan and provides a visual representation of the installation procedure.



### Steps

1. Connect the system fan cable to the connector on the system board.
2. Align the tabs on the system fan with the guiding rails on the heat-sink bracket.
3. Press the system fan down into the fan tray until it clicks into place.

### Next steps

1. Install the [cover](#).
2. Follow the procedure in [after working on your device](#).

## Power button

### Removing the power button

#### Prerequisites

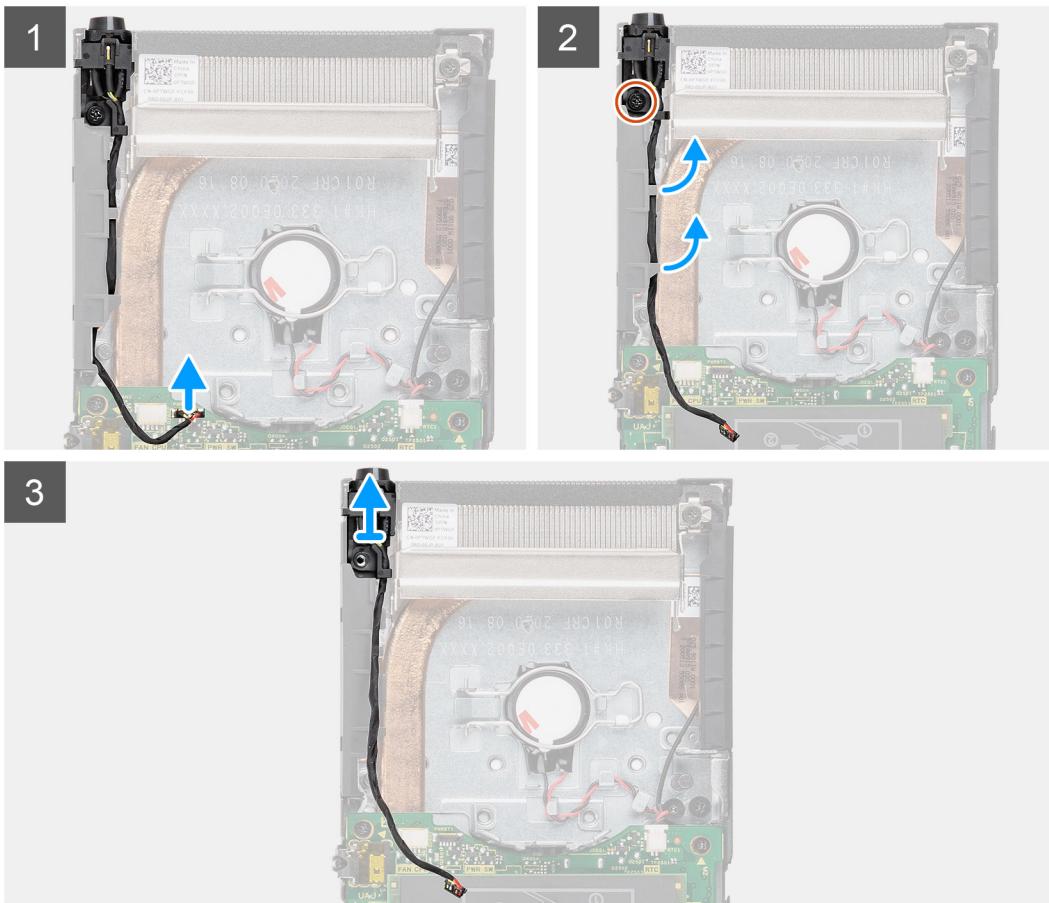
1. Follow the procedure in [before working inside your device](#).
2. Remove the [cover](#).
3. Remove the [system fan](#).

#### About this task

The figure indicates the location of the power button and provides a visual representation of the removal procedure.



1x  
M2x3



## Steps

1. Disconnect the power-button cable from the connector on the system board.

2. Unroute the power-button cable from the routing guide.

**NOTE:** Observe the routing of the power-button cable inside the chassis as you remove them. Route the cable properly when you replace the component to prevent the cable from being pinched or crimped.

3. Remove the (M2x3) screw that secures the power button to the chassis.

4. Lift the power button out of the chassis.

## Installing the power button

### Prerequisites

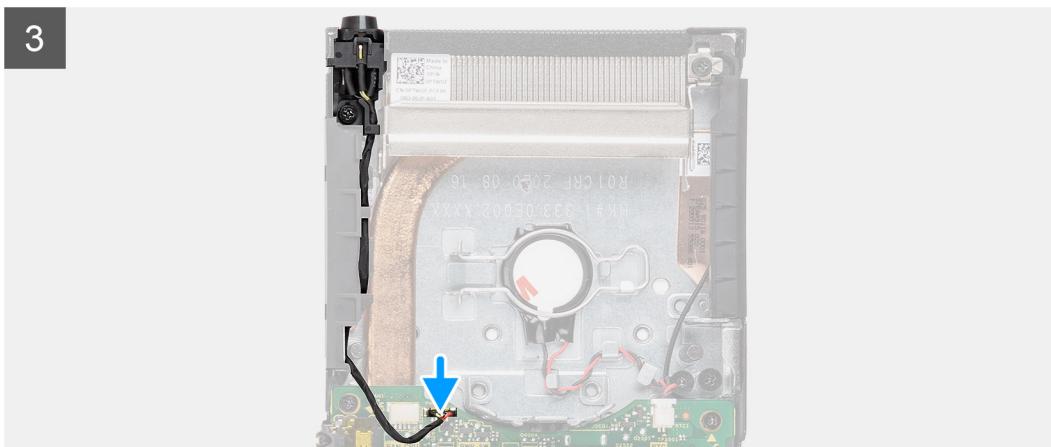
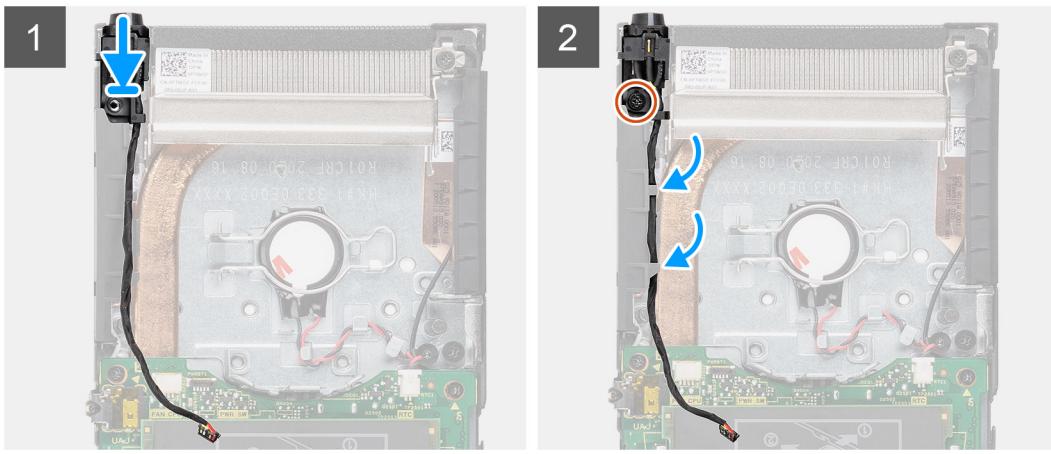
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The figure indicates the location of the power button and provides a visual representation of the installation procedure.



1x  
M2x3



## Steps

1. Place the power button into the slot on the chassis.
2. Replace the (M2x3) screw to secure the power button to the chassis.
3. Route the power button cable through the routing guides on the chassis.
4. Connect the power-button cable to the connector on the system board.

## Next steps

1. Install the [system fan](#).
2. Install the [cover](#).
3. Follow the procedure in [after working on your device](#).

# Coin-cell battery

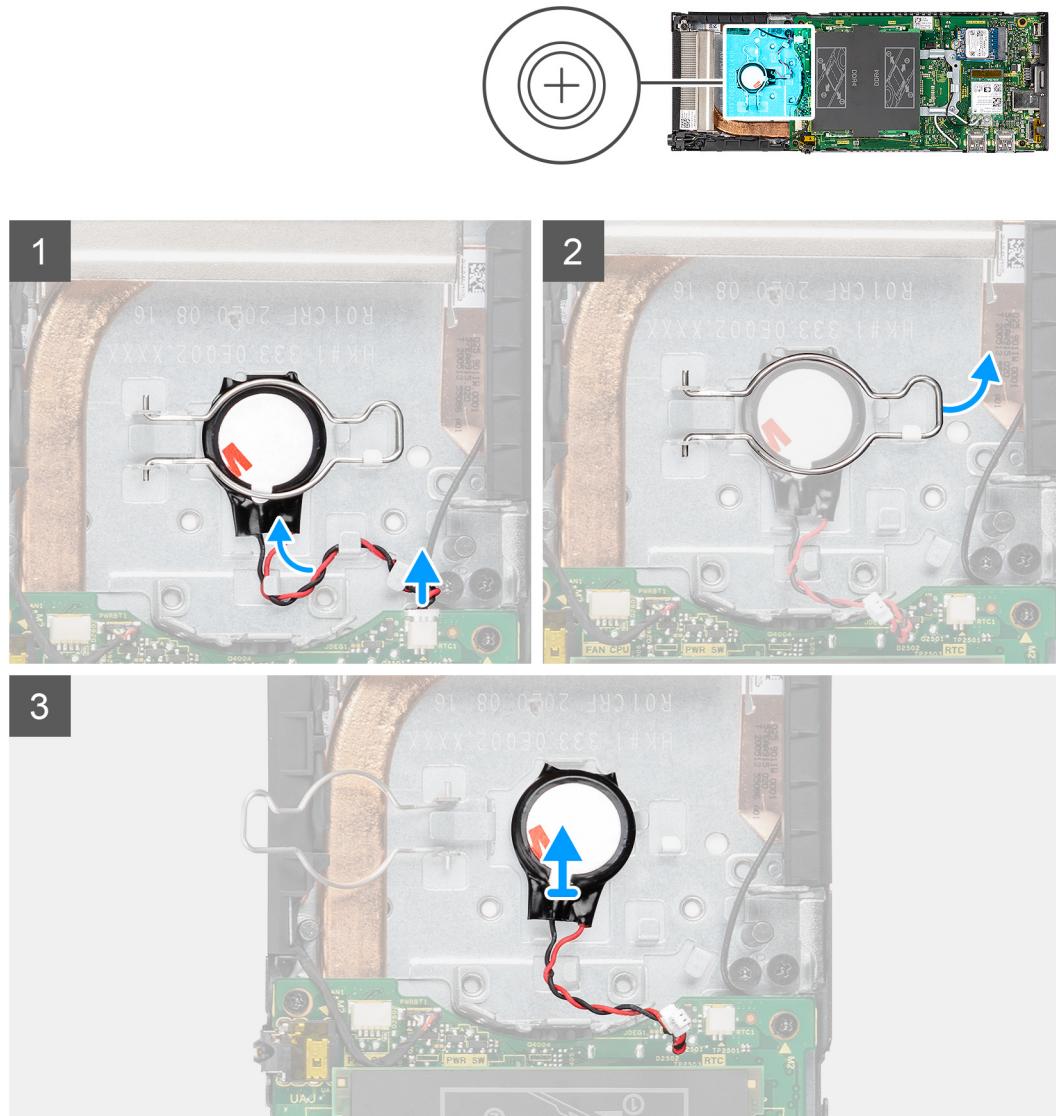
## Removing the coin-cell battery

### Prerequisites

1. Follow the procedure in [before working inside your device](#).
2. Remove the [cover](#).
3. Remove the [system fan](#).

### About this task

The figure indicates the location of the coin-cell battery and provides a visual representation of the removal procedure.



### Steps

1. Disconnect the coin-cell battery cable from the connector on the system board.
2. Unroute the coin-cell battery cable from the routing guide.

**NOTE:** Observe the routing of the coin-cell battery cable inside the chassis as you remove them. Route the cable properly when you replace the component to prevent the cable from being pinched or crimped.

3. Release the coin-cell retention clip from the securing hook and turn the clip to the other side to access the coin-cell battery.
4. Lift the coin-cell battery.

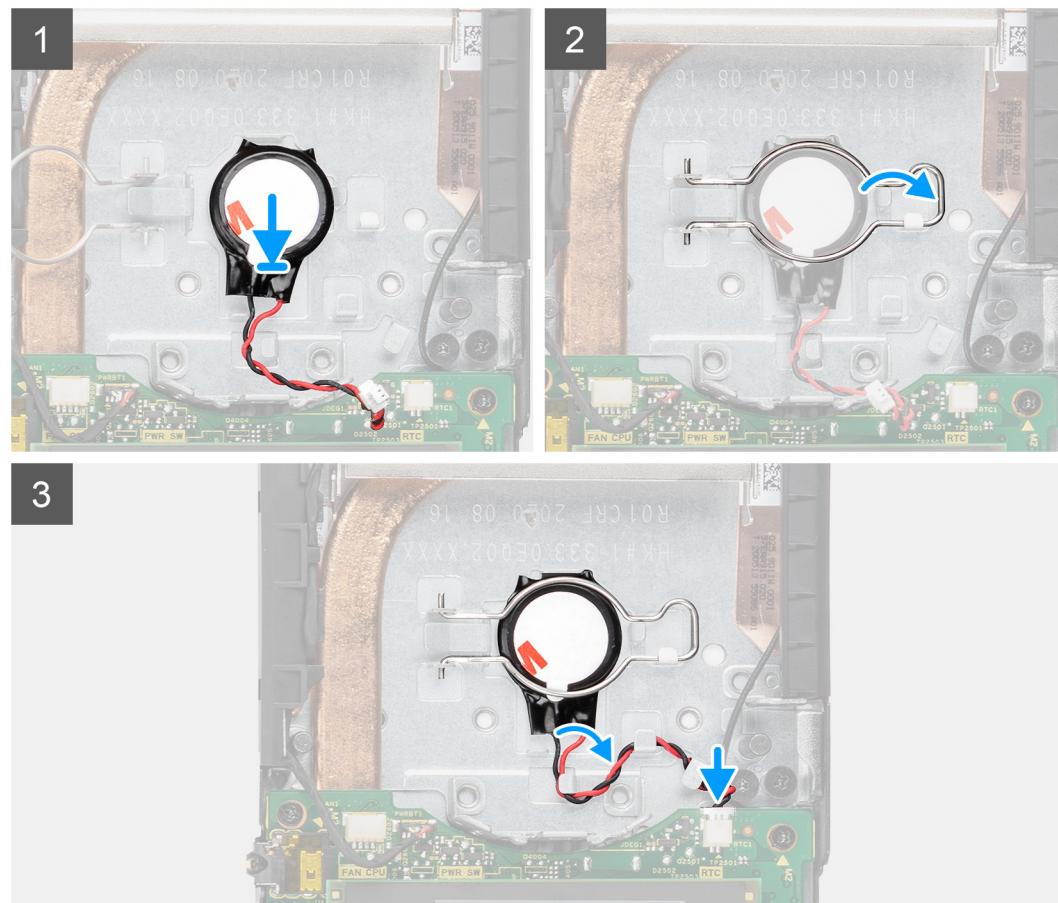
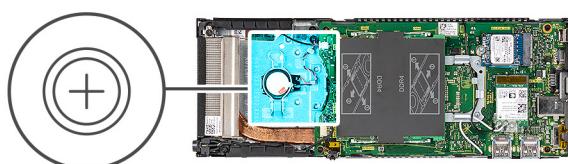
## Installing the coin-cell battery

### Prerequisites

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

### About this task

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



### Steps

1. Place the coin-cell battery in the slot on the chassis.
2. Close the coin-cell retention clip to secure the coin-cell battery.
3. Secure the coin-cell retention clip to the hook.

4. Route the coin-cell battery cable through the routing guide.
5. Connect the coin-cell battery cable to the connector on the system board.

#### Next steps

1. Install the [system fan](#).
2. Install the [cover](#).
3. Follow the procedure in [after working on your device](#).

## System board

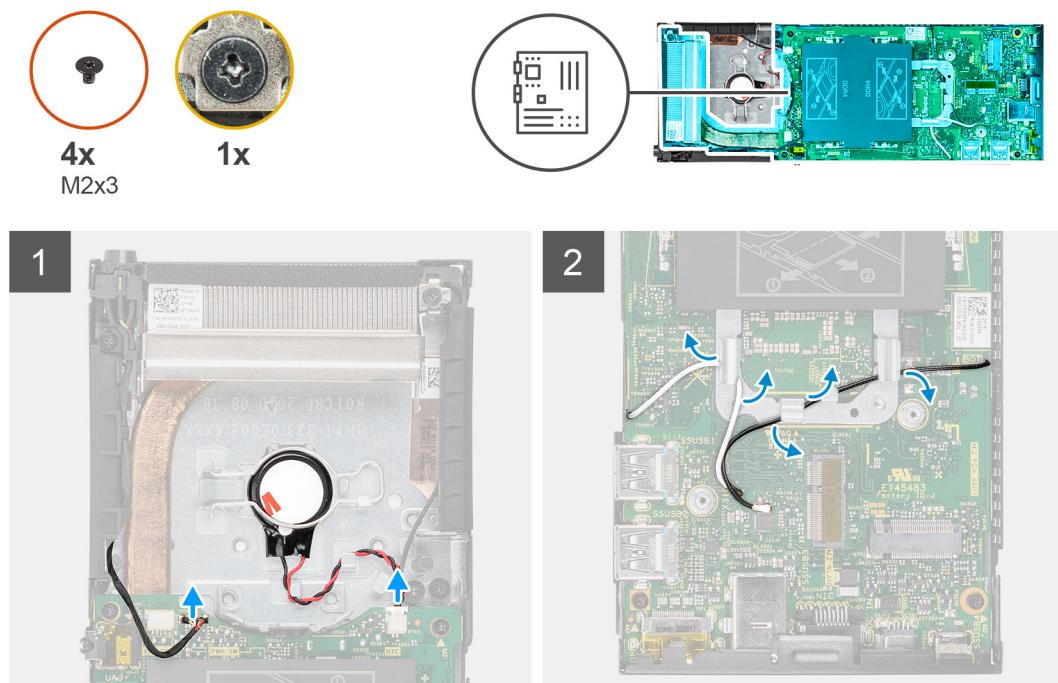
### Removing the system board

#### Prerequisites

1. Follow the procedure in [before working inside your device](#).
2. Remove the [hard-drive assembly](#).
3. Remove the [cover](#).
4. Remove the [system fan](#).
5. Remove the [WLAN card](#).
6. Remove the [solid-state drive](#).
7. Remove the [memory module](#).

#### About this task

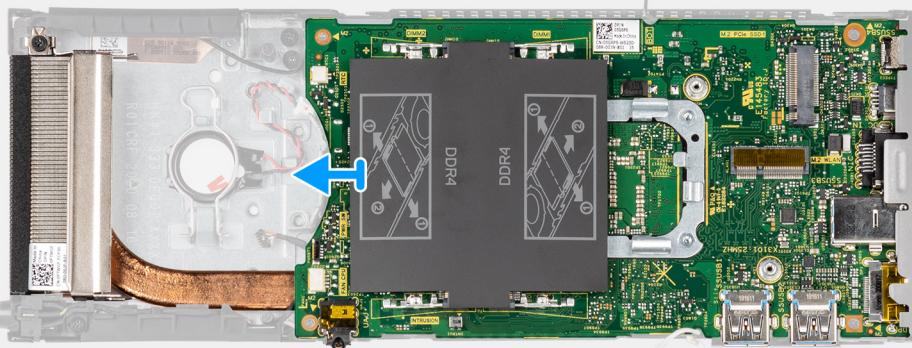
The figure indicates the location of the system board and provides a visual representation of the removal procedure.



3



4



### Steps

1. Disconnect the power-button cable and the coin-cell battery cable from the connectors on the system board.
2. Unroute the power-button cable and the coin-cell battery cable from the routing guides.
3. Unroute the WLAN antenna cables from the routing guides.

**i** **NOTE:** Observe the routing of the WLAN antenna cables inside the chassis as you remove them. Route these cables properly when you replace the component to prevent the cables from being pinched or crimped.

4. Loosen the (M2x3) captive screw and remove the four (M2x3) screws that secure the system board to the chassis.
5. Slightly lift and slide the system board out of the chassis.

**i** **NOTE:** The system board is removed along with the heat-sink connected to it.

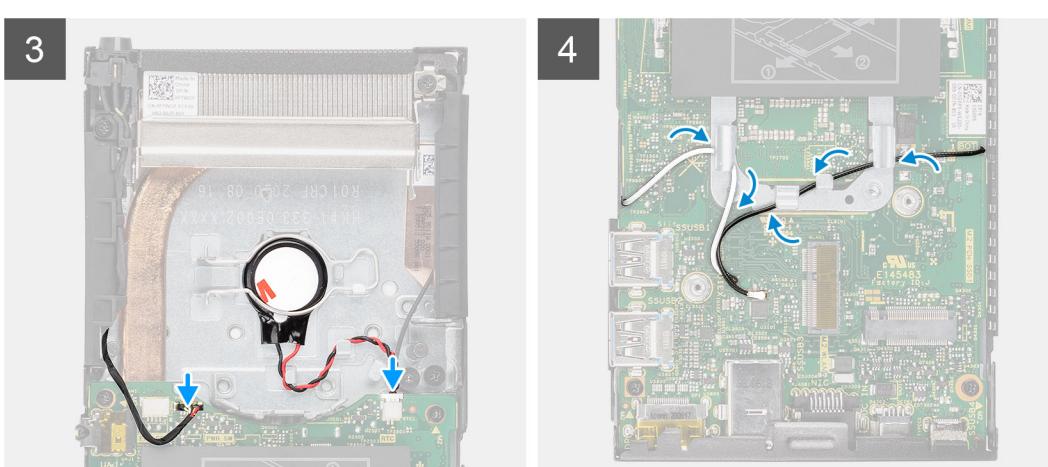
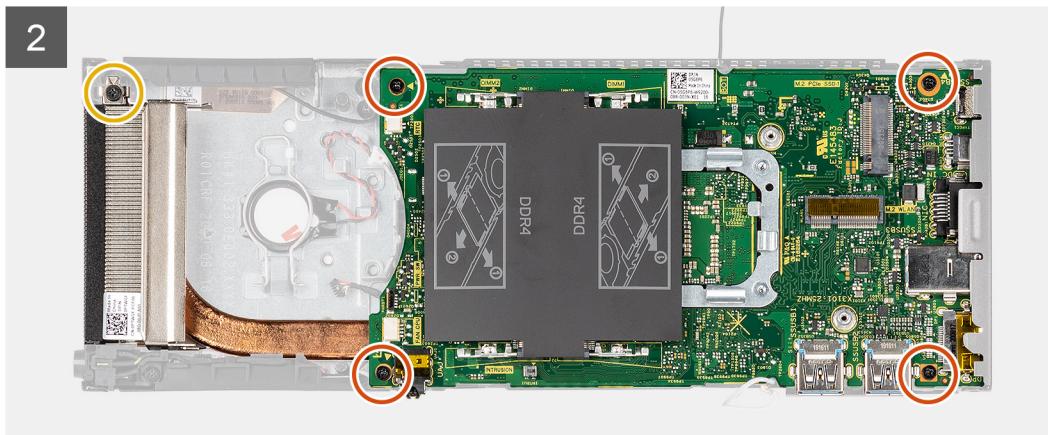
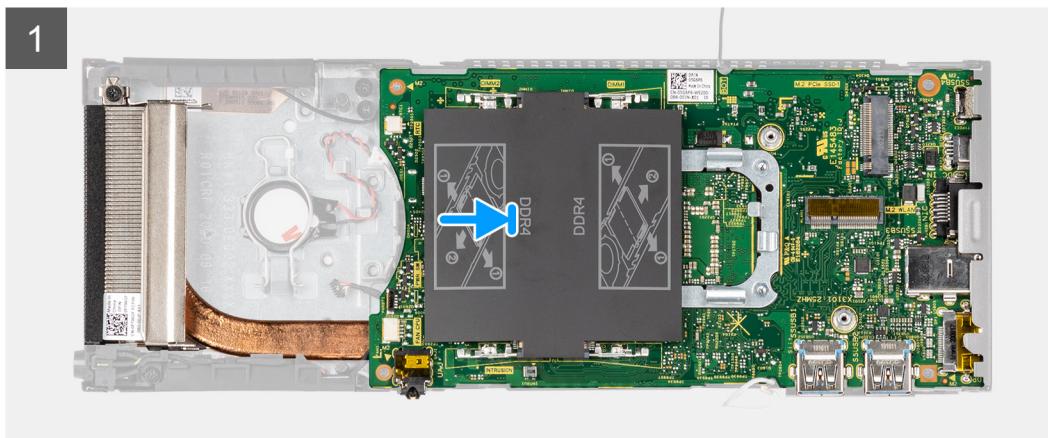
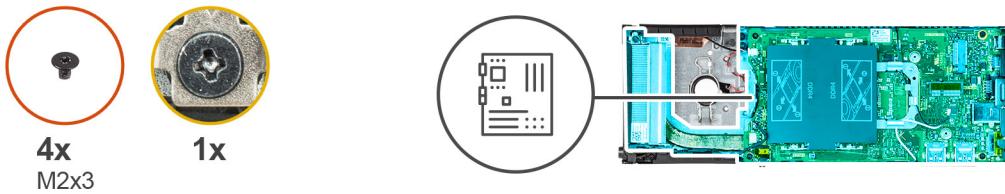
## Installing the system board

### Prerequisites

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

### About this task

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



### Steps

1. Align the connectors on the system board with the connector slots on the chassis.

**NOTE:** The system board is installed along with the heat-sink connected to it.

2. Gently slide the system board into the chassis.

3. Tighten the (M2x3) captive screw and replace the four (M2x3) screws to secure the system board to the chassis.
4. Route the power-button cable and the coin-cell battery cable through the routing guides.
5. Connect the power-button cable and the coin-cell battery cable to the connectors on the system board.
6. Route the WLAN antenna cables through the routing guides.

** NOTE:** The antennas should be aligned with the notches in the system board and the cable routing should not be over the system board QR code.

#### Next steps

1. Install the [solid-state drive](#).
2. Install the [memory module](#).
3. Install the [WLAN card](#).
4. Install the [system fan](#).
5. Install the [cover](#).
6. Install the [hard-drive assembly](#).
7. Follow the procedure in [after working on your device](#).

## Heat-sink

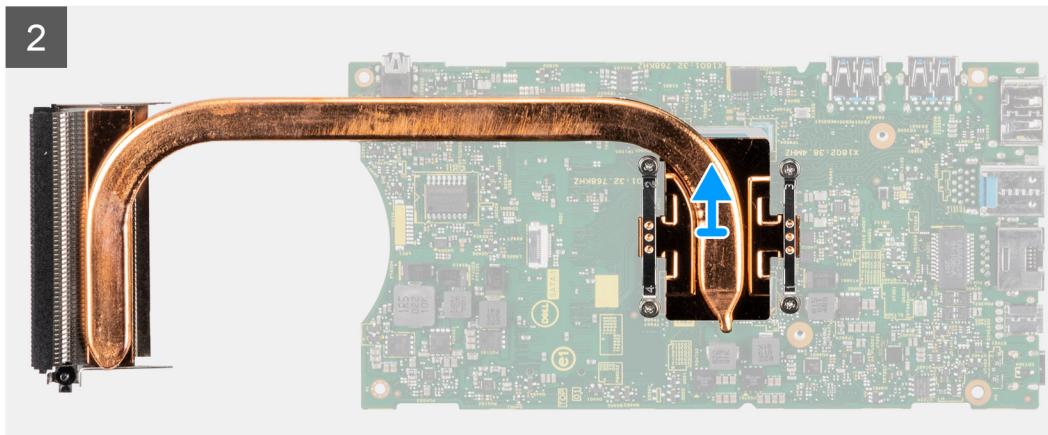
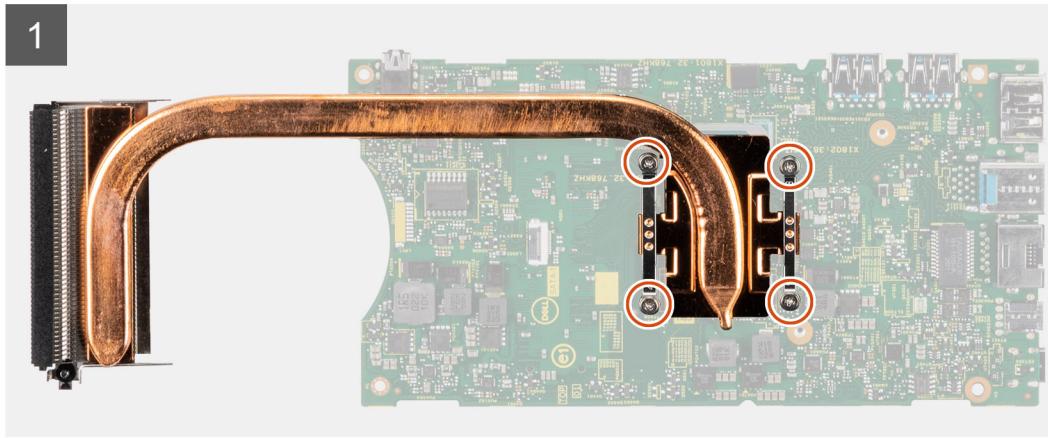
### Removing the heat-sink

#### Prerequisites

1. Follow the procedure in [before working inside your device](#).
2. Remove the [hard-drive assembly](#).
3. Remove the [cover](#).
4. Remove the [system fan](#).
5. Remove the [WLAN card](#).
6. Remove the [solid-state drive](#).
7. Remove the [memory module](#).
8. Remove the [system board](#).

#### About this task

The figure indicates the location of the heat-sink assembly and provides a visual representation of the removal procedure.



## Steps

1. In sequential order (as indicated on the heat sink), loosen the four captive screws that secure the heat sink to the system board.
2. Lift the heat-sink away from the system board.

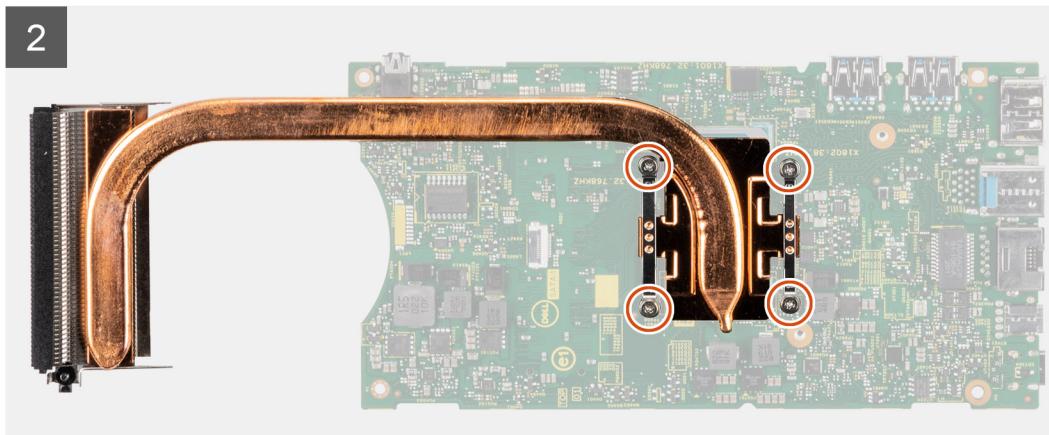
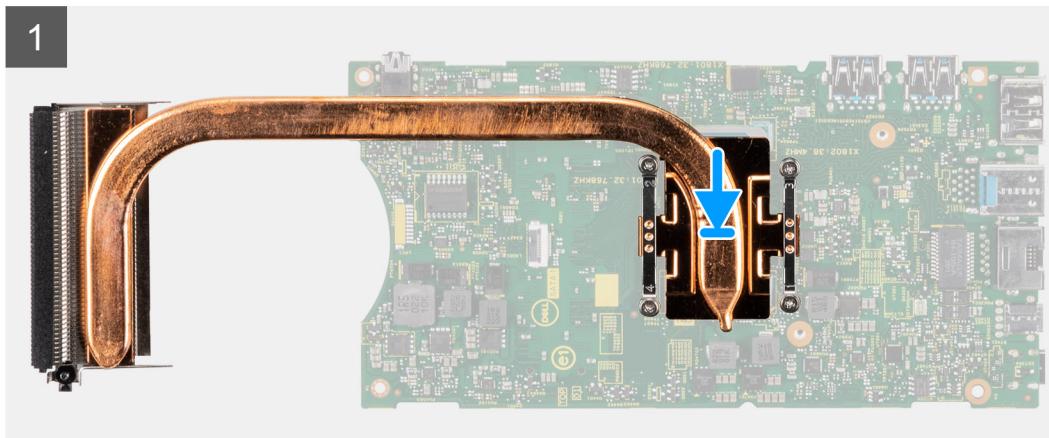
## Installing the heat-sink

### Prerequisites

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

### About this task

The figure indicates the location of the heat-sink and provides a visual representation of the installation procedure.



## Steps

1. Align the screws on the heat-sink with the screw holes on the system board.
2. In sequential order (as indicated on the heat sink), tighten the four captive screws that secure the heat sink to the system board.

## Next steps

1. Install the [system board](#).
2. Install the [solid-state drive](#)
3. Install the [memory module](#).
4. Install the [WLAN card](#).
5. Install the [system fan](#).
6. Install the [cover](#).
7. Install the [hard-drive assembly](#).
8. Follow the procedure in [after working on your device](#).

# Replacing the chassis

## Prerequisites

1. Follow the procedure in [before working inside your device](#).
2. Remove the [hard-drive assembly](#).
3. Remove the [cover](#).
4. Remove the [system fan](#).
5. Remove the [WLAN card](#).
6. Remove the [solid-state drive](#).
7. Remove the [power button](#)
8. Remove the [memory module](#).
9. Remove the [coin-cell battery](#).
10. Remove the [system board](#).

## About this task

After removing the above components, we are left with the chassis.



## Software

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

### Topics:

- [Downloading Windows drivers](#)

## Downloading Windows drivers

### Steps

1. Turn on the .
2. Go to [Dell.com/support](#).
3. Click **Product Support**, enter the Service Tag of your , and then click **Submit**.

**(i) | NOTE:** If you do not have the Service Tag, use the auto detect feature or manually browse for your model.

4. Click **Drivers and Downloads**.
5. Select the operating system installed on your .
6. Scroll down the page and select the driver to install.
7. Click **Download File** to download the driver for your .
8. After the download is complete, navigate to the folder where you saved the driver file.
9. Double-click the driver file icon and follow the instructions on the screen.

# System setup

 **CAUTION:** Unless you are an expert computer user, do not change the settings in the BIOS Setup program. Certain changes can make your computer work incorrectly.

 **NOTE:** Before you change BIOS Setup program, it is recommended that you write down the BIOS Setup program screen information for future reference.

Use the BIOS Setup program for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the size of the hard drive.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, and enabling or disabling base devices.

## Topics:

- BIOS overview
- Entering BIOS setup program
- Navigation keys
- Boot Sequence
- System setup options
- Updating the BIOS in Windows
- System and setup password
- Clearing BIOS (System Setup) and System passwords

## BIOS overview

The BIOS manages data flow between the computer's operating system and attached devices such as hard disk, video adapter, keyboard, mouse, and printer.

## Entering BIOS setup program

### About this task

Turn on (or restart) your computer and press F2 immediately.

## Boot menu

Press <F12> when the Dell logo appears to initiate a one-time boot menu with a list of the valid boot devices for the system. Diagnostics and BIOS Setup options are also included in this menu. The devices listed on the boot menu depend on the bootable devices in the system. This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the system. Using the boot menu does not make any changes to the boot order stored in the BIOS.

The options are:

- UEFI Boot:
  - Windows Boot Manager
- Other Options:
  - BIOS Setup
  - BIOS Flash Update
  - Diagnostics
  - Change Boot Mode Settings

# Navigation keys

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

Keys	Navigation
<b>Up arrow</b>	Moves to the previous field.
<b>Down arrow</b>	Moves to the next field.
<b>Enter</b>	Selects a value in the selected field (if applicable) or follow the link in the field.
<b>Spacebar</b>	Expands or collapses a drop-down list, if applicable.
<b>Tab</b>	Moves to the next focus area.
<b>Esc</b>	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 restarts the system.

# Boot Sequence

Boot sequence enables you to bypass the System Setup-defined boot device order and boot directly to a specific device (for example: optical drive or hard drive). During the Power-on Self-Test (POST), when the Dell logo appears, you can:

- Access System Setup by pressing F2 key
- Bring up the one-time boot menu by pressing F12 key.

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot menu options are:

- Removable Drive (if available)
- STXXXX Drive

**i** **NOTE:** XXXX denotes the SATA drive number.

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

**i** **NOTE:** Choosing **Diagnostics**, displays the **SupportAssist** screen.

The boot sequence screen also displays the option to access the System Setup screen.

# System setup options

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

**Table 3. System setup options—System information menu**

Overview	
<b>OptiPlex 3090 Ultra</b>	
BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the system.
Asset Tag	Displays the Asset Tag of the system.
Manufacture Date	Displays the manufacture date of the system.
Ownership Date	Displays the ownership date of the system.
Express Service Code	Displays the express service code of the system.
Ownership Tag	Displays the Ownership Tag of the system.

**Table 3. System setup options—System information menu (continued)**

<b>Overview</b>	
Signed Firmware Update	Displays whether the Signed Firmware Update is enabled on your system.
<b>Processor Information</b>	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed.
Minimum Clock Speed	Displays the minimum processor clock speed.
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.
<b>Memory Information</b>	
Memory Installed	Displays the total system memory installed.
Memory Available	Displays the total system 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 SLOT1	Displays the memory in SLOT1
DIMM SLOT2	Displays the memory in SLOT2
<b>Devices Information</b>	
Video Controller	Displays the video controller type of the system.
Video Memory	Displays the video memory information of the system.
Wi-Fi Device	Displays the wireless device information of the system.
Native Resolution	Displays the native resolution of the system.
Video BIOS Version	Displays the video BIOS version of the system.
Audio Controller	Displays the audio controller information of the system.
Bluetooth Device	Displays the Bluetooth device information of the system.
LOM MAC Address	Displays the LAN On Motherboard (LOM) MAC address of the system.
Pass Through MAC Address	Displays the pass through MAC address of the system.
Cellular Device	Displays the M.2 PCIe SSD information of the system.

**Table 4. System setup options—Boot Configuration menu**

<b>Boot Configuration</b>	
<b>Boot Sequence</b>	
Boot mode	Displays the boot mode.
Boot Sequence	Displays the boot sequence.
<b>Secure Boot</b>	
Enable Secure Boot	Enable or disable the secure boot feature.

**Table 4. System setup options—Boot Configuration menu (continued)**

<b>Boot Configuration</b>	
Secure Boot Mode	By default, the option is not enabled. Enable or disable to change the secure boot mode options. By default, the <b>Deployed Mode</b> is enabled.
<b>Expert Key Management</b>	
Enable Custom Mode	Enable or disable custom mode. By default, the <b>custom mode</b> option is not enabled.
Custom Mode Key Management	Select the custom values for expert key management.

**Table 5. System setup options—Integrated Devices menu**

<b>Integrated Devices</b>	
<b>Date/Time</b>	Displays the current date in MM/DD/YYYY format and current time in HH:MM:SS AM/PM format.
<b>Audio</b>	
Enable Audio	Enable or disable the integrated audio controller. By default, the option is enabled.
<b>USB/Thunderbolt Configuration</b>	<ul style="list-style-type: none"><li>Enable or disable booting from USB mass storage devices that are connected to external USB ports. By default, the <b>Enable Rear USB Ports</b> and <b>Enable Side USB Ports</b> options are enabled.</li><li>Enable or disable booting from USB mass storage devices such as external hard drive, optical drive, and USB drive. By default, the <b>Enable USB Boot Support</b> option is enabled.</li></ul>
<b>Side USB Configuration</b>	Enable or disable the individual USB ports. By default, the <b>Side Port 1(Near DP</b> and <b>Side Port 2</b> options are selected. <b>i</b> <b>NOTE:</b> USB keyboard and mouse always work in the BIOS setup irrespective of this settings.
<b>Rear USB Configuration</b>	Enable or disable the individual USB ports. By default, all the options ( <b>Rear Port 1(UP)</b> , <b>Rear Port 2(Down)</b> and <b>Rear Port 3(Type C)</b> ) are selected. <b>i</b> <b>NOTE:</b> USB keyboard and mouse always work in the BIOS setup irrespective of this settings.

**Table 6. System setup options—Storage menu**

<b>Storage</b>	
<b>SATA/NVMe Operation</b>	
SATA/NVMe Operation	Set the operating mode of the integrated storage device controller. By default, the <b>RAID On</b> option is enabled.
<b>Storage interface</b>	
Port Enablement	This page allows you to enable the onboard drives. By default, all the options are enabled.
<b>SMART Reporting</b>	

**Table 6. System setup options—Storage menu (continued)**

<b>Storage</b>	
Enable SMART Reporting	Enable or disable Self-Monitoring, Analysis, and Reporting Technology (SMART) during system startup.  By default, the <b>Enable SMART Reporting</b> option is not enabled.
<b>Drive Information</b>	
<b>SATA-1</b>	
Type	Displays the SATA type information of the system.
Device	Displays the SATA device information of the system.
<b>M.2 PCIe SSD</b>	
Type	Displays the M.2 PCIe SSD type information of the system.
Device	Displays the M.2 PCIe SSD device information of the system.
<b>PCIe M.2 eMMC</b>	
Type	Displays the PCIe M.2 eMMC type information of the system.
Device	Displays the PCIe M.2 eMMC device information of the system.

**Table 7. System setup options—Display menu**

<b>Display</b>	
<b>Primary Display</b>	
Video Primary Display	
	This field determines which video controller will become the primary display when multiple controllers are available in the system.  By default, <b>Auto</b> option is enabled.
<b>Full Screen Logo</b>	
Enable or disable full screen logo.  By default, the option is not enabled.	

**Table 8. System setup options—Connection menu**

<b>Connection</b>	
<b>Network Controller Configuration</b>	
Integrated NIC	
	If enabled, UEFI networking protocols are installed and available, allowing pre-OS and early OS networking features to use any enabled NIC's. This may be used without PXE turned on.  By default, <b>Enabled with PXE</b> option is enabled.
<b>Wireless Device Enable</b>	
WLAN	
	Enable or disable the internal WLAN device  By default, the option enabled.
Bluetooth	
	Enable or disable the internal Bluetooth device  By default, the option enabled.
<b>Enable UEFI Network Stack</b>	
Enable or disable UEFI Network Stack and controls the on-board LAN Controller.  By default, the <b>Enable UEFI Network Stack</b> option is enabled.	
<b>HTTPs Boot Feature</b>	
HTTPs Boot	
	Enable or disable the HTTPs Boot feature.  By default, the <b>HTTPs Boot</b> option is enabled.

**Table 9. System setup options—Power menu**

Power	
<b>USB Wake Support</b>	Enable USB Wake Support When enabled, connecting Dell USB devices will wake the system from standby. By default, the option is enabled.
<b>AC Behaviour</b>	AC Recovery Allows to determine what happens when AC power is restored after an unexpected loss of AC power. By default, the <b>Power Off</b> option is enabled.
<b>Active State Power Management</b>	Aspm Enable the Active State Power Management (ASPM) level. By default, the <b>Auto</b> option is enabled.
<b>Block Sleep</b>	Enables to block entering sleep (S3) mode in the operating system. By default, the <b>Block Sleep</b> option is disabled.
<b>Deep Sleep Control</b>	Allows to conserve more power while in Shutdown (SS) or Hibernate (S4) mode. By default, the <b>Enabled in S4 and SS</b> option is enabled.
<b>Fan Control Override</b>	Determines the speed of the fan. By default, the option is disabled.
<b>Intel Speed Shift Technology</b>	Enable or disable the Intel speed shift technology support. By default, the <b>Intel Speed Shift Technology</b> option is enabled.

**Table 10. System setup options—Security menu**

Security	
<b>TPM 2.0 Security</b>	TPM 2.0 Security On Enable or disable TPM 2.0 security options. By default, the <b>TPM 2.0 Security On</b> option is enabled.
Attestation Enable	Enables to control whether the Trusted Platform Module (TPM) Endorsement Hierarchy is available to the operating system. By default, the <b>Attestation Enable</b> option is enabled.
Key Storage Enable	Enables to control whether the Trusted Platform Module (TPM) Storage Hierarchy is available to the operating system. By default, the <b>Key Storage Enable</b> option is enabled.
SHA-256	BIOS and the TPM will use the SHA-256 hash algorithm to extend measurements into the TPM PCRs during BIOS boot. By default, the <b>SHA-256</b> option is enabled.
Clear	Enables to clear the TPM owner information and returns the TPM to the default state. By default, the <b>Clear</b> option is disabled.
PPI ByPass for Clear Commands	Controls the TPM Physical Presence Interface (PPI). By default, the <b>PPI ByPass for clear Commands</b> option is disabled.
<b>Intel Total Memory Encryption</b>	

**Table 10. System setup options—Security menu (continued)**

<b>Security</b>	
Total Memory Encryption	Enable or disable you to protect memory from physical attacks including freeze spray, probing DDR to read the cycles, and others. By default, the <b>Total Memory Encryption</b> option is disabled.
<b>Chassis intrusion</b>	Controls the chassis intrusion feature. By default, the <b>Disabled</b> option is enabled.
Clear Intrusion	By default, the option is disabled.
<b>Chassis Intrusion Reset</b>	Resets the chassis intrusion. By default, the option is disabled.
<b>SMM Security Mitigation</b>	Enable or disable SMM Security Mitigation. By default, the option is enabled.
<b>Data Wipe on Next Boot</b>	
Start Data Wipe	Enable or disable the data wipe on next boot. By default, the option is disabled.
Absolute	Enable or disable or permanently disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute software. By default, the option is enabled.
UEFI Boot Path Security	Controls whether the system will prompt the user to enter the admin password (if set) when booting to a UEFI boot device from the F12 boot menu. By default, the <b>Always Except Internal HDD</b> option is enabled.

**Table 11. System setup options—Passwords menu**

<b>Passwords</b>	
<b>Admin Password</b>	Set, change, or delete the administrator password.
<b>System Password</b>	Set, change, or delete the system password.
<b>Internal HDD-1 Password</b>	Set, change, or delete the Internal HDD-1 password
<b>NVMe SSD0</b>	Set, change, or delete the NVMe SSD0 password.
<b>Password Configuration</b>	
Upper Case Letter	Reinforces password must have at least one upper case letter. By default, the option is enabled.
Lower Case Letter	Reinforces password must have at least one lower case letter. By default, the option is enabled.
Digit	Reinforces password must have at least one digit. By default, the option is enabled.
Special Character	Reinforces password must have at least one special character. By default, the option is enabled.
Minimum Characters	Set the minimum characters allowed for password.
Password Bypass	When enabled, this always prompts for system and internal hard drive passwords when powered on from the off state. By default, the <b>Disabled</b> option is selected.
<b>Password Changes</b>	

**Table 11. System setup options—Passwords menu (continued)**

<b>Passwords</b>	
Enable Non-Admin Password Changes	Enable or disable to change system and hard drive password without the need for admin password.  By default, the option is disabled.
<b>Admin Setup Lockout</b>	
Enable Admin Setup Lockout	Enables administrators control over how their users can or cannot access BIOS setup.  By default, the option is disabled.
<b>Master Password Lockout</b>	
Enable Master Password Lockout	When enabled, this disables the master password support.  By default, the option is disabled.
<b>Allow Non-Admin PSID Revert</b>	
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.  By default, the option is disabled.

**Table 12. System setup options—Update, Recovery menu**

<b>Update, Recovery</b>	
<b>UEFI Capsule Firmware Updates</b>	Enable or disable BIOS updates through UEFI capsule update packages.  By default, the option is enabled.
<b>BIOS Recovery from Hard Drive</b>	Enables the user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key.  By default, the option is enabled.
<b>BIOS Downgrade</b>	Enable or disable the flashing of the system firmware to previous revision is blocked.  By default, the option is enabled.
<b>SupportAssist OS Recovery</b>	Enable or disable the boot flow for SupportAssist OS Recovery tool in the event of certain system errors.  By default, the option is enabled.
BIOSConnect	Enable or disable 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.  By default, the option is enabled.
Dell Auto operating system Recovery Threshold	Controls the automatic boot flow for SupportAssist System Resolution Console and for Dell operating system Recovery Tool.  By default, the threshold value is set to 2.

**Table 13. System setup options—System Management menu**

<b>System Management</b>	
<b>Service Tag</b>	Display the Service Tag of the system.
<b>Asset Tag</b>	Create a system Asset Tag.
<b>Enable Watchdog Timer</b>	

**Table 13. System setup options—System Management menu (continued)**

<b>System Management</b>	
Watchdog Timer Support	Enable or disable the Watchdog Timer Feature. By default, the option is disabled.
<b>Wake on LAN</b>	
Wake on LAN	Enable or disable the system to power on by special LAN signals when it receives a wakeup signal from the WLAN. By default, the <b>Disabled</b> option is selected.
Auto on Time	Enable to set the system to turn on automatically every day or on a preselected date and time. This option can be configured only if the Auto On Time is set to Everyday, Weekdays, or Selected Days. By default, the option is disabled.
<b>Intel AMT Capability</b>	
Enable Intel AMT Capability	By default <b>Restrict MEBx Access</b> option is enabled.
<b>MEBx Hotkey</b>	
Enable MEBx Hotkey	When enabled, this allows the use of Ctrl+P hotkey to access MEBx. By default <b>OFF</b> option is disabled.
<b>USB Provision</b>	
Enable USB Provision	Intel AMT can be provisioned using the local provisioning file using a USB storage device. By default <b>OFF</b> option is disabled.

**Table 14. System setup options—Keyboard menu**

<b>Keyboard</b>	
<b>Keyboard Errors</b>	
Enable Keyboard Error Detection	Allows keyboard related errors to be reported when the system boots. By default, the option is enabled.
<b>Device Configuration Hotkey Access</b>	
	Manages whether you can access device configuration screens through hotkeys during system startup. By default, the option is enabled.

**Table 15. System setup options—Pre-boot Behavior menu**

<b>Pre-boot Behavior</b>	
<b>Adapter Warnings</b>	
Enable Adapter Warnings	Enable or disable the warning messages during boot when the adapters with less power capacity are detected. By default, the option is enabled.
<b>Warning and Errors</b>	
	Enable or disable the action to be done when a warning or error is encountered. By default, the <b>Prompt on Warnings and Errors</b> option is enabled.
<b>USB-C Warnings</b>	
Enable Dock Warning Messages	By default, the option is enabled.
<b>Fastboot</b>	
	Enable to set the speed of the boot process. By default, the <b>Minimal</b> option is enabled.

**Table 15. System setup options—Pre-boot Behavior menu (continued)**

Pre-boot Behavior	
<b>Extend BIOS POST Time</b>	Set the BIOS POST time. By default, the <b>0 seconds</b> option is enabled.
<b>MAC Address Pass-Through</b>	Replaces the external NIC MAC address with the selected MAC address from the system. By default, the <b>System Unique MAC Address</b> option is enabled.

**Table 16. System setup options—Virtualization menu**

Virtualization	
<b>Intel Virtualization Technology</b>	Specify whether a Virtual Machine Monitor (VMM) can use the additional hardware capabilities that are provided by Intel Virtualization Technology. By default, the option is enabled.
<b>VT for Direct I/O</b>	Specify whether a Virtual Machine Monitor (VMM) can use the additional hardware capabilities that are provided by Intel Virtualization Technology for Direct I/O. By default, the option is enabled.

**Table 17. System setup options—Performance menu**

Performance	
<b>Multi Core Support</b>	Enables to change the number of CPU cores available to the operating system. By default, the <b>All Cores</b> option is enabled.
<b>Intel SpeedStep</b>	Enables the system to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production. By default, the option is enabled.
<b>C-States Control</b>	Enable or disable additional processor sleep states. By default, the option is enabled.
<b>Intel Turbo Boost Technology</b>	Enable or disable Intel TurboBoost mode of the processor. By default, the option is enabled.
<b>Intel Hyper-Threading Technology</b>	Enable or disable Hyper-Threading in the processor. By default, the option is enabled.
<b>Dynamic Tuning:Machine Learning</b>	Enables the operating system capability to enhance dynamic power tuning capabilities based on detected workloads. By default, the option is disabled.

**Table 18. System setup options—System Logs menu**

System Logs	
<b>BIOS Event Log</b>	
Clear Bios Event Log	Display BIOS events. By default, the <b>Keep</b> option is enabled.

## Updating the BIOS in Windows

### Prerequisites

It is recommended to update your BIOS (System Setup) when you replace the system board or if an update is available.

### About this task

 **NOTE:** If BitLocker is enabled, it must be suspended prior to updating the system BIOS, and then re enabled after the BIOS update is completed.

### Steps

1. Restart the computer.
2. Go to **Dell.com/support**.
  - Enter the **Service Tag** or **Express Service Code** and click **Submit**.
  - Click **Detect Product** and follow the instructions on screen.
3. If you are unable to detect or find the Service Tag, click **Choose from all products**.
4. Choose the **Products** category from the list.

 **NOTE:** Choose the appropriate category to reach the product page.

5. Select your computer model and the **Product Support** page of your computer appears.
6. Click **Get drivers** and click **Drivers and Downloads**.  
The Drivers and Downloads section opens.
7. Click **Find it myself**.
8. Click **BIOS** to view the BIOS versions.
9. Identify the latest BIOS file and click **Download**.
10. Select your preferred download method in the **Please select your download method below** window, click **Download File**.  
The **File Download** window appears.
11. Click **Save** to save the file on your computer.
12. Click **Run** to install the updated BIOS settings on your computer.  
Follow the instructions on the screen.

## Updating BIOS on systems with BitLocker enabled

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <https://www.dell.com/support/article/sln153694>

# Updating your system BIOS using a USB flash drive

## About this task

If the computer cannot load into Windows but there is still a need to update the BIOS, download the BIOS file using another computer and save it to a bootable USB flash drive.

**i** **NOTE:** You must use a bootable USB flash drive. For more information, see the knowledge base article [SLN143196](#).

## Steps

1. Download the BIOS update .exe file to another computer.
2. Copy the .exe file onto the bootable USB flash drive.
3. Insert the USB flash drive into the computer that requires the BIOS update.
4. Restart the computer and press F12 when the Dell logo appears to display the One Time Boot Menu.
5. Using arrow keys, select **USB Storage Device** and press Enter.
6. The computer restarts to a Diag C:\> prompt.
7. Run the file by typing the complete filename and press Enter.
8. The BIOS Update Utility is displayed. Follow the on-screen instructions.

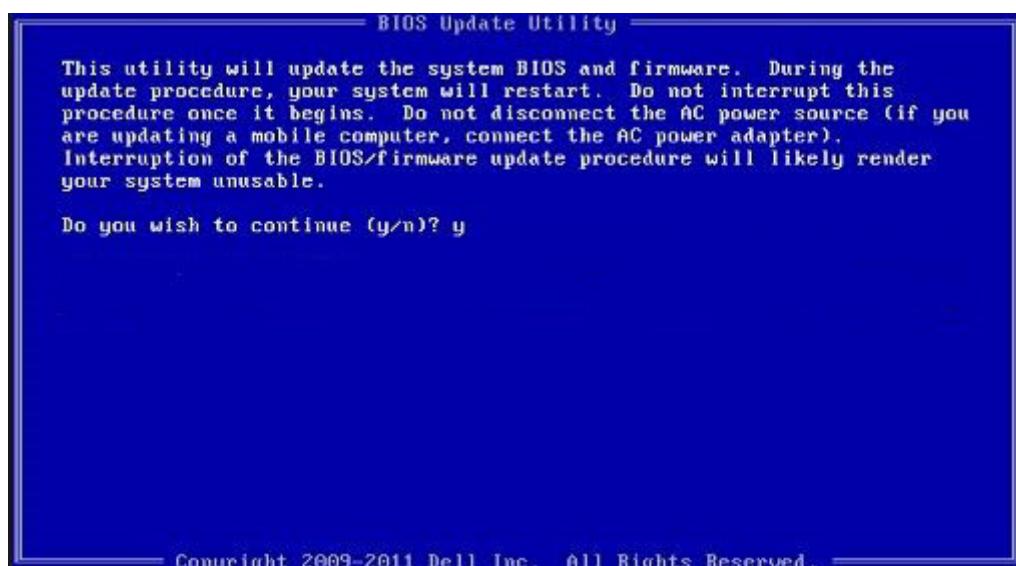


Figure 1. DOS BIOS Update Screen

# System and setup password

Table 19. System and setup password

Password type	Description
System password	Password that you must enter to log on to your system.
Setup password	Password that you must enter to access and make changes to the BIOS settings of your computer.

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

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

**⚠ CAUTION:** Anyone can access the data stored on your computer if it is not locked and left unattended.

 **NOTE:** System and setup password feature is disabled.

## Assigning a system setup password

### Prerequisites

You can assign a new **System or Admin Password** only when the status is in **Not Set**.

### About this task

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 **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 assign the system password:
  - A password can have up to 32 characters.
  - The password can contain the numbers 0 through 9.
  - Only lower case letters are valid, upper case letters are not allowed.
  - Only the following special characters are allowed: space, ("), (+), (.), (-), (.), (/), (,), ([), (\), (]), (`).
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press **Esc** and a message prompts you to save the changes.
5. Press **Y** to save the changes.  
The computer reboots.

## Deleting or changing an existing system setup password

### Prerequisites

Ensure that the **Password Status** is **Unlocked** (in the System Setup) before attempting to delete or change the existing System and Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is **Locked**.

### About this task

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 **Password Status** is **Unlocked**.
3. Select **System Password**, alter or delete the existing system password and press **Enter** or **Tab**.
4. Select **Setup Password**, alter or delete the existing setup password and press **Enter** or **Tab**.

 **NOTE:** If you change the System and/or Setup password, re enter the new password when prompted. If you delete the System and Setup password, confirm the deletion when prompted.

5. Press **Esc** and a message prompts you to save the changes.
6. Press **Y** to save the changes and exit from System Setup.  
The computer restarts.

# Clearing BIOS (System Setup) and System passwords

## About this task

 **NOTE:** To conduct a BIOS and System password reset, you must call the Dell Tech Support number in your region.

## Steps

1. Key in your computer's service tag number into the locked BIOS/system setup screen.
2. Convey the code generated to the Dell Tech Support agent.
3. The Dell Tech Support agent will provide a 32 character Master System Password that can be used to access the locked BIO/system setup.

# Troubleshooting

## Topics:

- Dell SupportAssist Pre-boot System Performance Check diagnostics
- WiFi power cycle
- Diagnostic LED

## 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 with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

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

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

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

## Running the SupportAssist Pre-Boot System Performance Check

### Steps

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

# WiFi power cycle

## About this task

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

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

## Steps

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

# Diagnostic LED

Instead of beep codes, errors are indicated by the bicolor Battery Charge/Status LED. A specific blink pattern is followed by flashing a pattern of flashes in amber, followed by white. The pattern then repeats.

**i NOTE:** The diagnostic pattern consists of a two-digit number being represented by a first group of LED blinks (1 through 9) in amber, followed by a 1.5 s pause with the LED off, and then a second group of LED blinks (1 through 9) in white. This is then followed by a three second pause, with the LED off, before repeating over again. Each LED blink takes 1.5 s.

The system will not shut down when displaying the Diagnostic Error Codes.

Diagnostic Error Codes will always supersede any other use of the LED.

**Table 20. Diagnostic LED/Beep codes**

Blinking Patterns		Problem description	Faults
Amber	White		
2	1	Faulty system board	Faulty system board
2	2	Faulty system board, power supply, unit (PSU), or cabling	Faulty system board, power supply, unit (PSU), or cabling
2	3	Faulty system board, CPU, or DIMMS	Faulty system board, power supply, unit (PSU), or DIMMS
2	4	Faulty coin cell battery	Faulty coin cell battery
2	5	BIOS Recovery	Auto-Recovery trigger, recovery image is not found or is invalid.
2	7	Memory	Memory SPD failure
3	3	Memory	No memory detected
3	5	Memory	Modules incompatible or invalid configuration
3	6	BIOS Recovery	On-demand trigger, recovery image is not found.
3	7	BIOS Recovery	On-demand trigger, recovery image is invalid.

 **NOTE:** For diagnostics pattern 2-amber, 8-white connects an external monitor to isolate between system board or graphics controller failure.

# Getting help

## Topics:

- [Contacting Dell](#)

## Contacting Dell

### Prerequisites

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

### About this task

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

### Steps

1. Go to [Dell.com/support](#).
2. Select your support category.
3. Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4. Select the appropriate service or support link based on your need.