

# Alienware x15 R1

## Service Manual

Regulatory Model: P111F  
Regulatory Type: P111F001  
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A L I E N W A R E 

## Notes, cautions, and warnings

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

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

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

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# Working inside your computer

## Before working inside your computer

### About this task

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

### Steps

1. Save and close all open files and exit all open applications.
2. Shut down your computer. Click **Start** >  **Power** > **Shut down**.  
 **NOTE:** If you are using a different operating system, see the documentation of your operating system for shut-down instructions.
3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.  
 **CAUTION:** To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.
5. Remove any media card and optical disc from your computer, if applicable.

## Safety instructions

Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that you have read the safety information that shipped with your computer.

 **WARNING:** Before working inside your computer, read the safety information that is shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at [www.dell.com/regulatory\\_compliance](http://www.dell.com/regulatory_compliance).

 **WARNING:** Disconnect your computer from all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting your computer to an electrical outlet.

 **CAUTION:** To avoid damaging the computer, ensure that the work surface is flat, dry, and clean.

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

 **CAUTION:** You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. See the safety instructions that is shipped with the product or at [www.dell.com/regulatory\\_compliance](http://www.dell.com/regulatory_compliance).

 **CAUTION:** Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity which could harm internal components.

 **CAUTION:** When you disconnect a cable, pull it by its connector or its pull tab, not the cable itself. Some cables have connectors with locking tabs or 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 ports and the connectors are correctly oriented and aligned.

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

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

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

## 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.

## Lifting equipment

Adhere to the following guidelines when lifting heavy weight 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 techniques 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 parts that you removed before working on your computer.

- 4.** Connect your computer and all attached devices to their electrical outlets.
- 5.** Turn on your computer.

# Removing and installing components

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

## Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #0
- Plastic scribe

## Screw list

**(i) NOTE:** When removing screws from a component, it is recommended to note the screw type, 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.

**(i) NOTE:** Some computers have magnetic surfaces. Ensure that the screws are not left attached to such surfaces when replacing a component.

**(i) NOTE:** Screw color may vary with the configuration ordered.

**Table 1. Screw list**

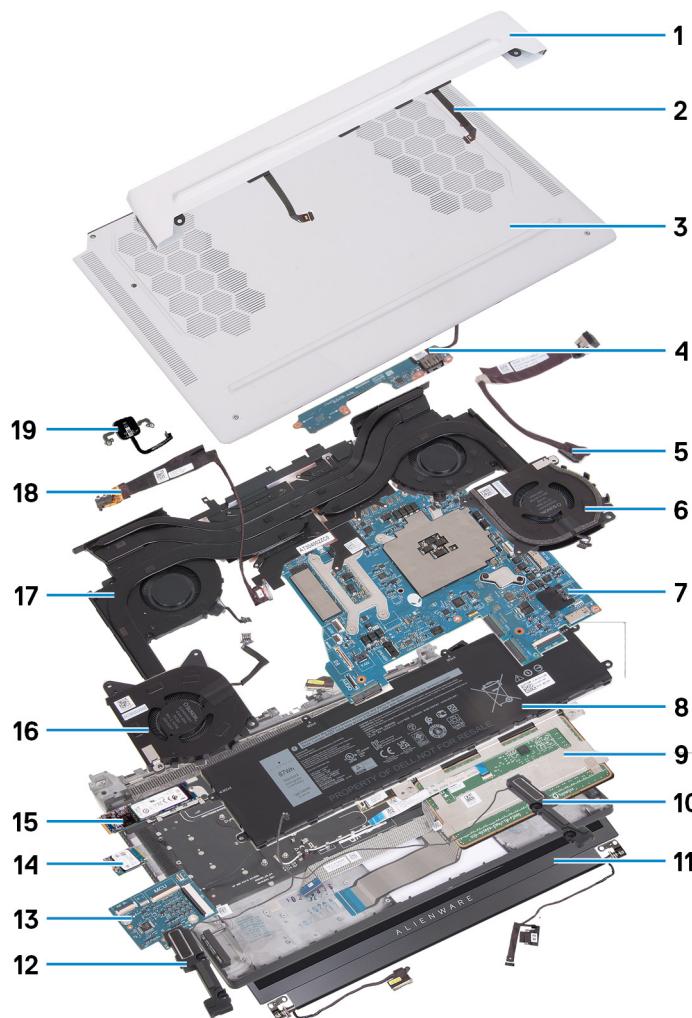
Component	Secured to	Screw type	Quantity	Screw image
Base cover	Palm-rest and keyboard assembly	M2.5x7	4	
Base cover	Palm-rest and keyboard assembly	M2.5x7 (Captive screw)	2	
Battery	Palm-rest and keyboard assembly	M2x4	4	
Wireless-card bracket	Wireless card and palm-rest and keyboard assembly	M2x3	1	
Solid-state drive thermal shield	Palm-rest and keyboard assembly	M2x3	1	
Solid-state drive bracket	Palm-rest and keyboard assembly	M2x4	1	
Fan	Palm-rest and keyboard assembly	M2x4	6	
Rear I/O cover	Palm-rest and keyboard assembly	M2.5x9	2	
Power-adapter port bracket	Palm-rest and keyboard assembly	M2.5x3.5	2	

**Table 1. Screw list (continued)**

Component	Secured to	Screw type	Quantity	Screw image
Display assembly	Palm-rest and keyboard assembly	M2.5x3.5	6	
Keyboard-controller board bracket	Palm-rest and keyboard assembly	M2x1.9	2	
Touchpad bracket	Palm-rest and keyboard assembly	M2x1.9	2	
Touchpad	Palm-rest and keyboard assembly	M2x1.9	2	
Touchpad	Palm-rest and keyboard assembly	M1.2x1.5	5	
Keyboard-controller board	Palm-rest and keyboard assembly	M1.6x1.6	2	
System board	Palm-rest and keyboard assembly	M2x4	5	
Fan and heat-sink assembly	System board	M2x3	9	
I/O-board	Palm-rest and keyboard assembly	M1.6x1.8	4	
Power-button bracket	Palm-rest and keyboard assembly	M1.2x1.5	2	
Power-button bracket	Palm-rest and keyboard assembly	M2x1.9	2	

## Major components of Alienware x15 R1

The following image shows the major components of Alienware x15 R1.



1. Rear I/O-cover
2. Tron-light cable
3. Base cover
4. I/O board
5. Power-adapter port
6. Right fan
7. System board
8. Battery
9. Touchpad
10. Right speaker
11. Display assembly
12. Left speaker
13. Keyboard-controller board
14. Wireless card
15. solid-state drive
16. Left fan
17. Fan and heat-sink assembly
18. Headset port
19. Power button

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

# Disassembly and reassembly

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

## Base cover

### Removing the base cover

#### Prerequisites

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

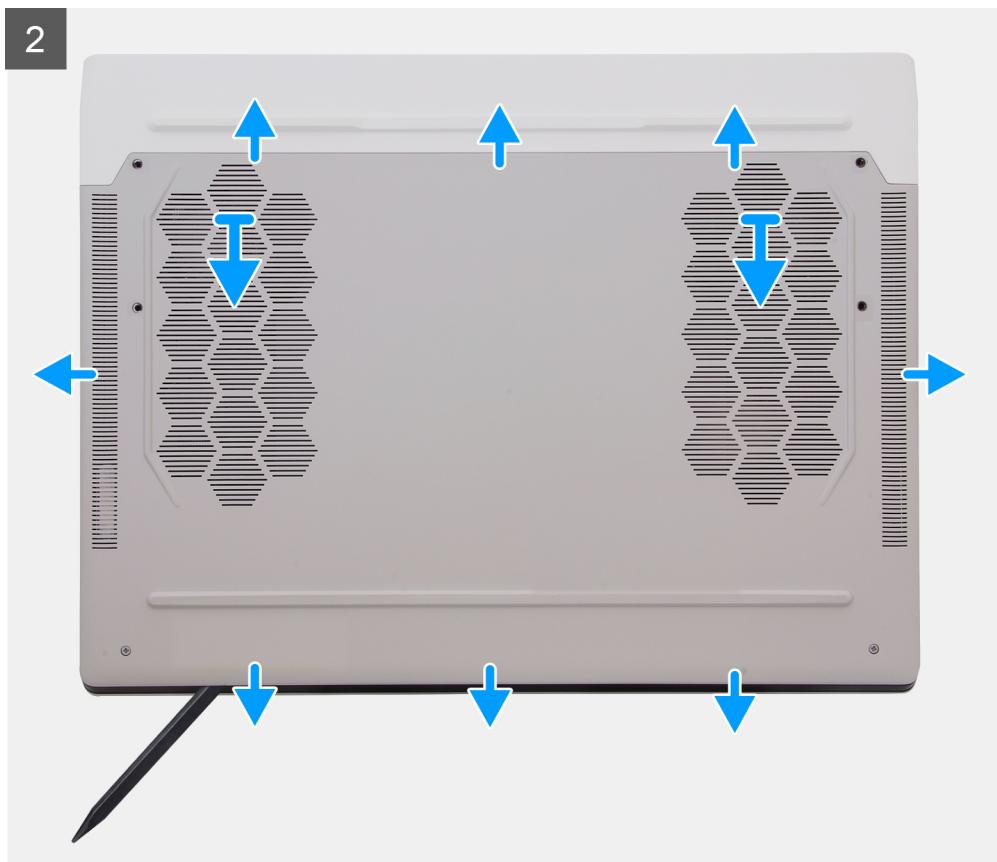
#### About this task

**(i) | NOTE:** Before removing the base cover, ensure that there is no micro-SD card that is installed in the micro-SD card slot on your computer.

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



2



3





### Steps

1. Remove the four screws (M2.5x7) that secure the base cover to the palm-rest and keyboard assembly.
2. Loosen the two captive screws (M2.5x7) that secure the base cover to the palm-rest and keyboard assembly.
3. Using a plastic scribe, pry the base cover from the gap created after loosening the captive screws in the bottom left or right and continue to work on the sides to open the base cover.
4. Lift and slide the base cover off the palm-rest and keyboard assembly.
5. Disconnect the battery cable from the system board.
6. Press and hold the power button for 20 seconds to ground the computer and drain the flea power.

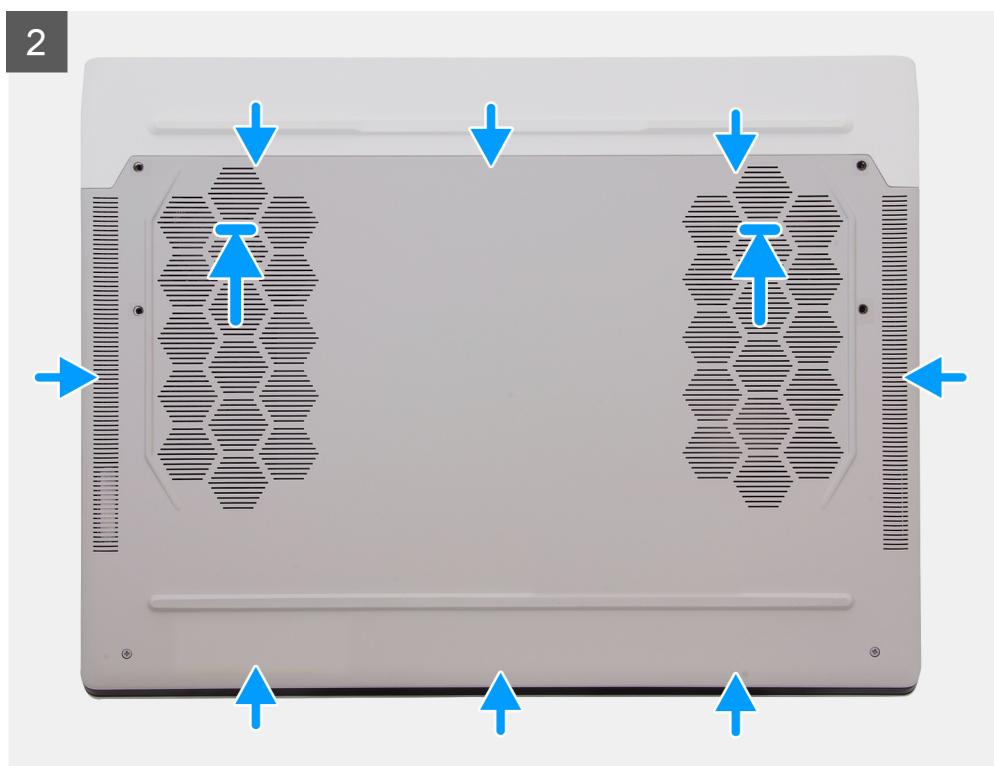
## Installing the base cover

### 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 base cover and provides a visual representation of the installation procedure.





### Steps

1. Connect the battery cable to the system board and route the cable through the routing guides on the fan.
2. Slide the tabs on the top of the base cover under the rear I/O-cover and snap the base cover to the palm-rest and keyboard assembly.
3. Tighten the two captive screws (M2.5x7) that secure the base cover to the palm-rest and keyboard assembly.
4. Replace the four screws (M2.5x7) that secure the base cover to the palm-rest and keyboard assembly.

### Next steps

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

## Battery

### Lithium-ion battery precautions



#### CAUTION:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any kind to pry on or against the battery.
- Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.

- If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See [www.dell.com/contactdell](http://www.dell.com/contactdell).
- Always purchase genuine batteries from [www.dell.com](http://www.dell.com) or authorized Dell partners and resellers.
- Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see [Handling swollen Lithium-ion batteries](#).

## Removing the battery

### Prerequisites

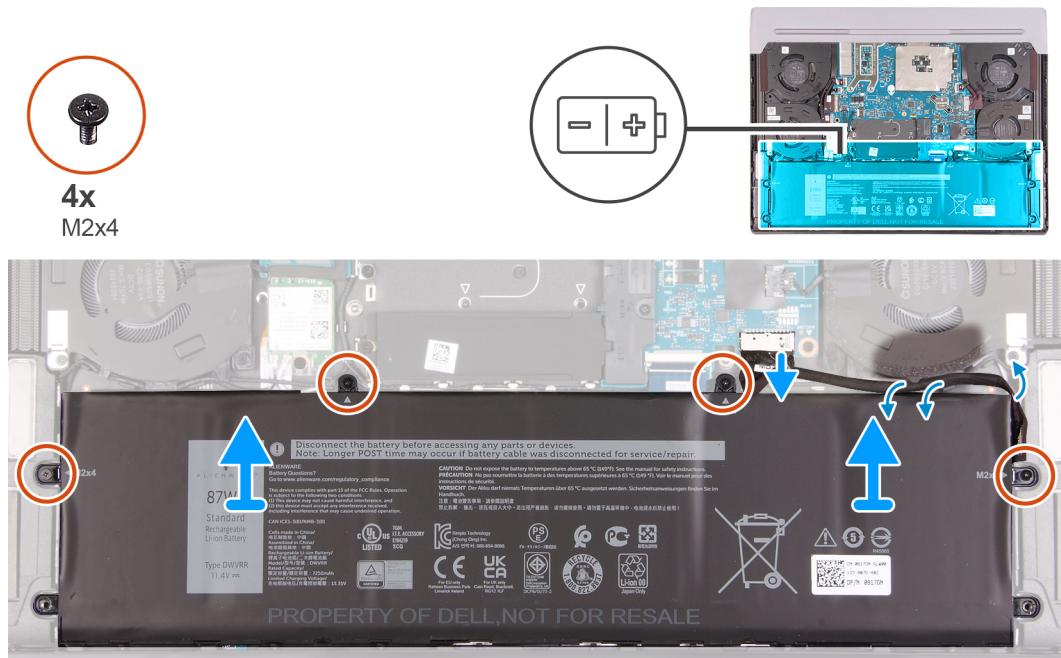
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

### About this task

**CAUTION:** This computer is designed without an RTC coin cell-battery. After a service incident where the computer battery is disconnected, when the battery is fully discharged, or when the computer is reassembled and turned on, an RTC reset cycle will occur. When an RTC Reset cycle occurs, the computer turns on and off three times. An "Invalid Configuration" error message is displayed prompting you to enter the BIOS and configure the date and time. The computer starts functioning normally after setting the date and time.

**CAUTION:** Removing the battery resets the BIOS setup program's settings to default. It is recommended that you note the BIOS setup program's settings before removing the battery.

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



### Steps

1. Disconnect the battery cable from the system board and remove the battery cable from the routing guides on the fan (applicable only if not disconnected earlier).
2. Remove the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
3. Lift the battery off the palm-rest and keyboard assembly.

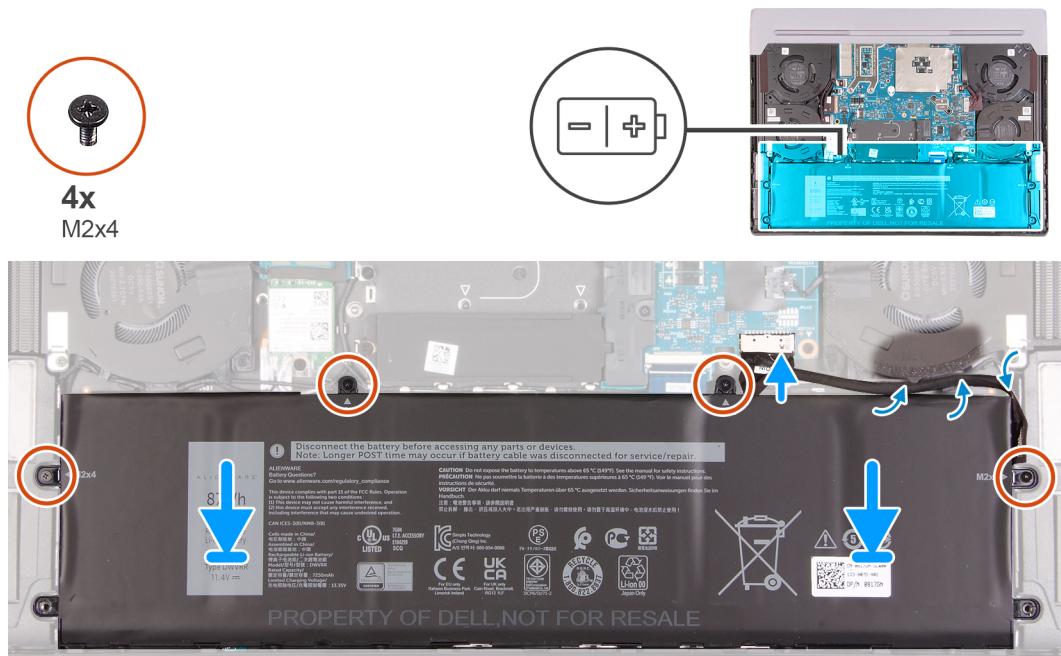
# Installing the battery

## 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 battery and provides a visual representation of the installation procedure.



## Steps

1. Using the alignment posts, place the battery on the palm-rest and keyboard assembly.
2. Align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.
3. Replace the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
4. Route the battery cable through the routing guides on the fan and connect the battery cable to the system board.

## Next steps

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

# Battery cable

## Lithium-ion battery precautions



### CAUTION:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.

- **Do not bend the battery.**
- **Do not use tools of any kind to pry on or against the battery.**
- **Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.**
- **If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See [www.dell.com/contactdell](http://www.dell.com/contactdell).**
- **Always purchase genuine batteries from [www.dell.com](http://www.dell.com) or authorized Dell partners and resellers.**
- **Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see [Handling swollen Lithium-ion batteries](#).**

## Removing the battery cable

### Prerequisites

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

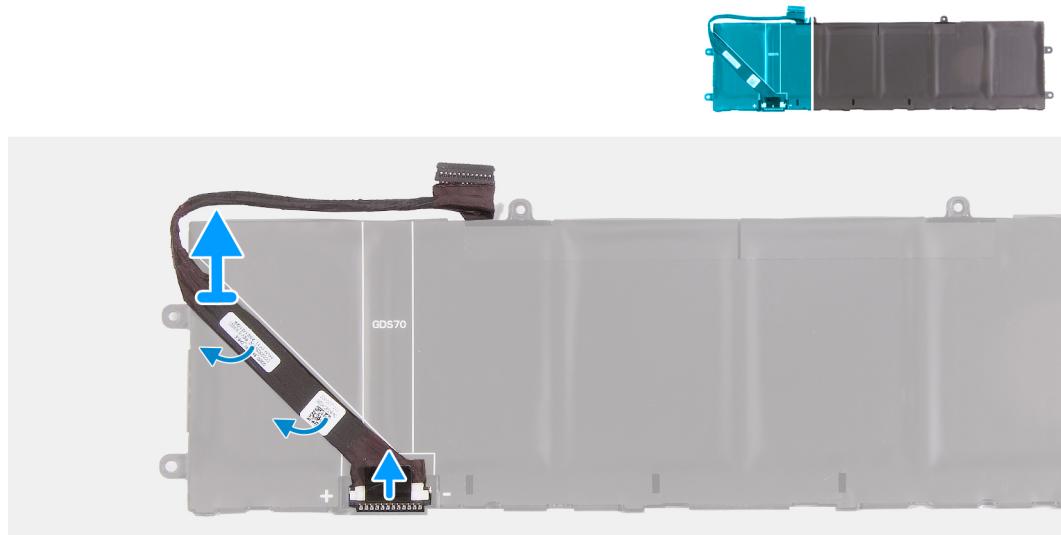
2. Remove the [base cover](#).

3. Remove the [battery](#).

**(i) NOTE:** If battery is disconnected from system board for service, then there is a delay during boot as the computer undergoes RTC battery reset.

### About this task

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



### Steps

1. Turn the battery over and peel the battery cable from the battery.
2. Disconnect the battery cable from the connector on the battery.
3. Lift the battery cable off the battery.

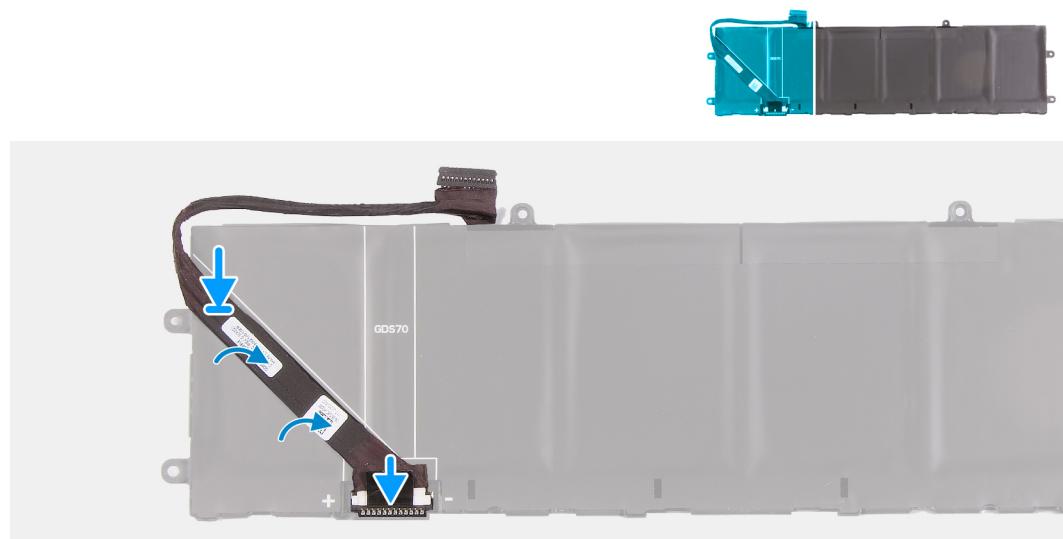
## Installing the battery cable

### Prerequisites

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

### About this task

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



### Steps

1. Align and adhere the battery cable to the battery.
2. Connect the battery cable to the connector on the battery.

### Next steps

1. Install the [battery](#).
2. Install the [base cover](#).
3. Follow the procedure in [After working on your computer](#).

## Wireless card

### Removing the wireless card

#### Prerequisites

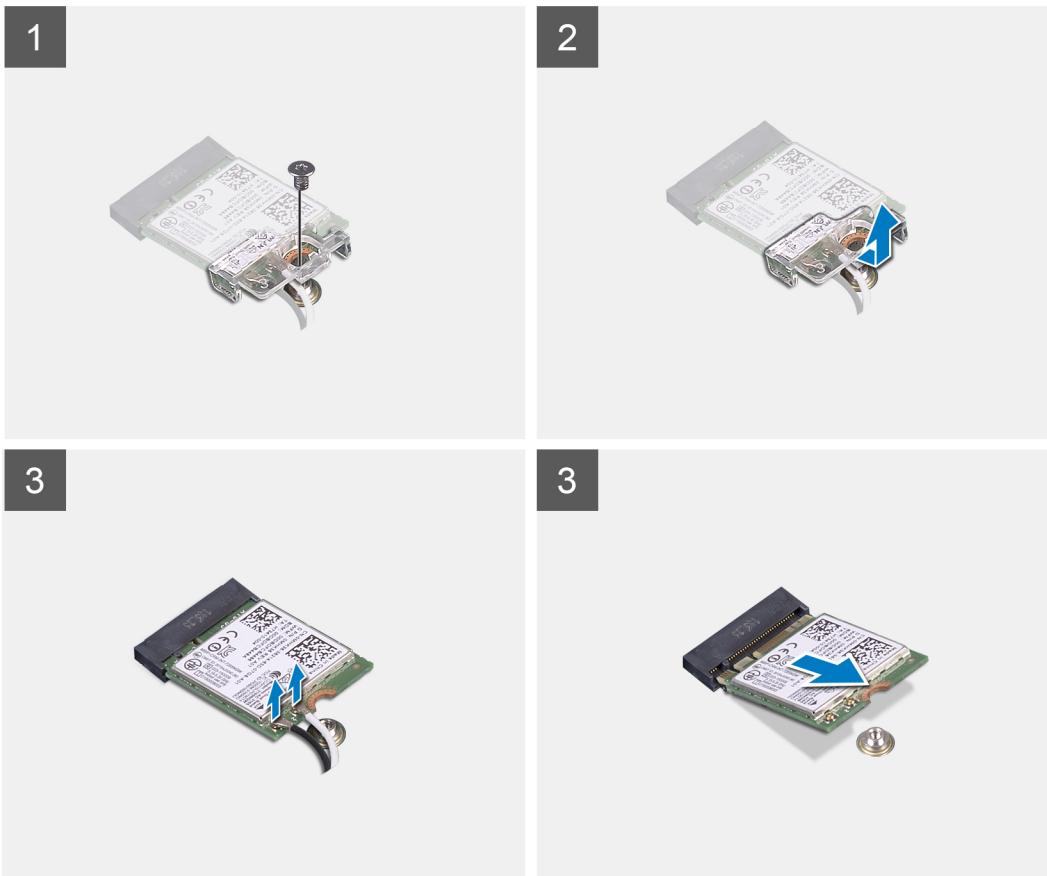
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

#### About this task

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



1x  
M2x3



### Steps

1. Remove the screw (M2x3) that secures the wireless-card bracket to the wireless card and palm-rest and keyboard assembly.
2. Slide and remove the wireless-card bracket off the wireless card.
3. Disconnect the antenna cables from the wireless card.
4. Slide and remove the wireless card from the wireless-card slot.

## Installing the wireless card

### Prerequisites

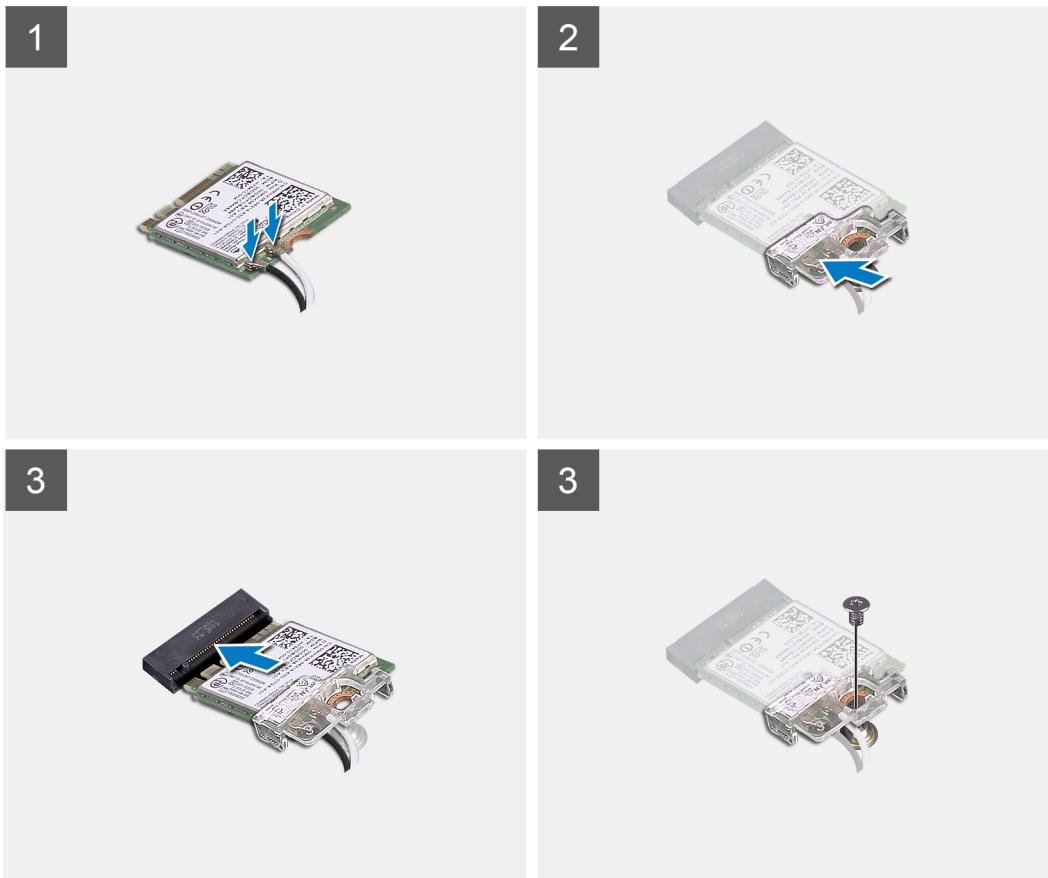
If you are replacing a component, remove the existing component before performing the installation process.

### About this task

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



1x  
M2x3



## Steps

1. Connect the antenna cables to the wireless card.

The following table provides the antenna-cable color scheme for the wireless card that is supported by your computer.

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

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

2. Align 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 and insert the wireless card at an angle into the wireless-card slot.
4. Align the screw hole on the wireless-card bracket with the screw hole on the wireless card and palm-rest and keyboard assembly.
5. Replace the screw (M2x3) that secures the wireless-card bracket to the wireless card and the palm-rest and keyboard assembly.

## Next steps

1. Install the [base cover](#).

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

## Solid-state drive

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

#### Prerequisites

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

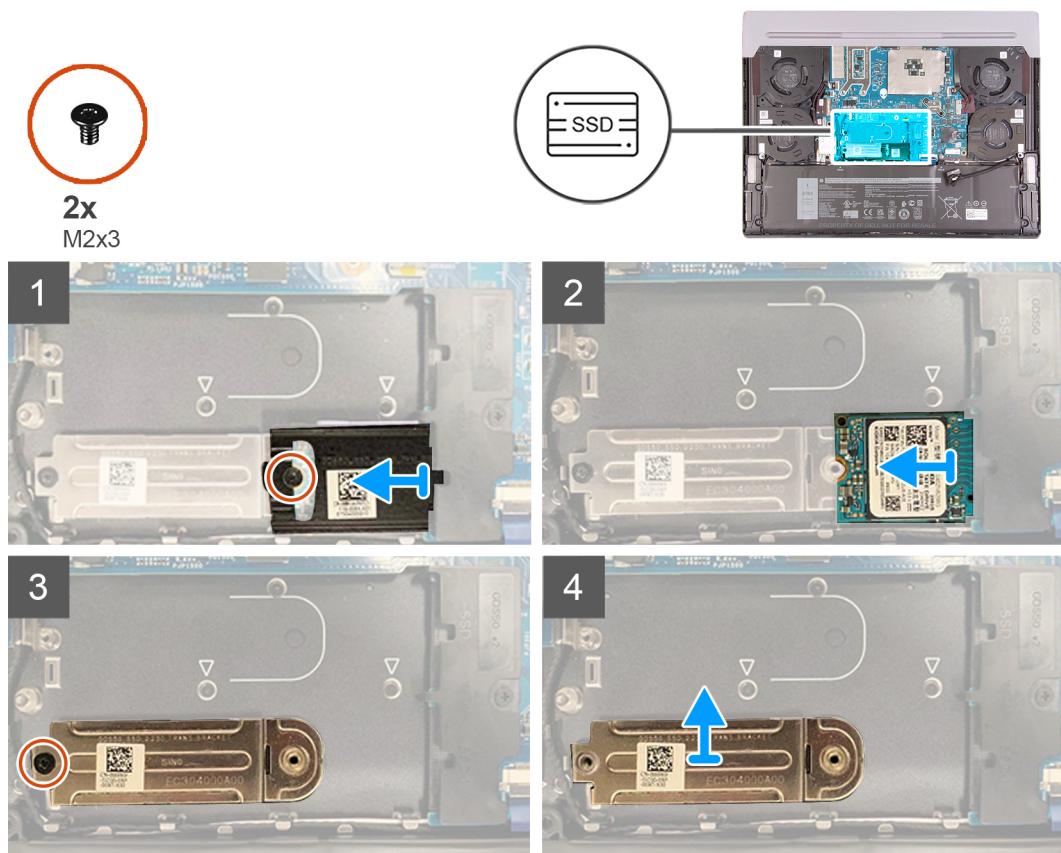
#### About this task

**i** **NOTE:** The following procedure applies only to computers shipped with an M.2 2230 solid-state drive.

**i** **NOTE:** The M.2 card installed on M.2 slot will depend on the configuration ordered. Supported card configurations:

- M.2 2230 solid-state drive + 2230 mounting bracket
- M.2 2280 solid-state drive

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



#### Steps

1. Remove the screw (M2x3) that secures the solid-state drive thermal shield to the solid-state drive and palm-rest and keyboard assembly.
2. Lift and remove the solid-state thermal shield off the solid-state drive.
3. Slide and remove the solid-state drive from the solid-state drive slot.
4. Remove the screw (M2x3) that secures the solid-state drive mounting bracket to the palm-rest and keyboard assembly.

5. Lift the solid-state drive mounting bracket off the palm-rest and keyboard assembly.

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

### Prerequisites

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

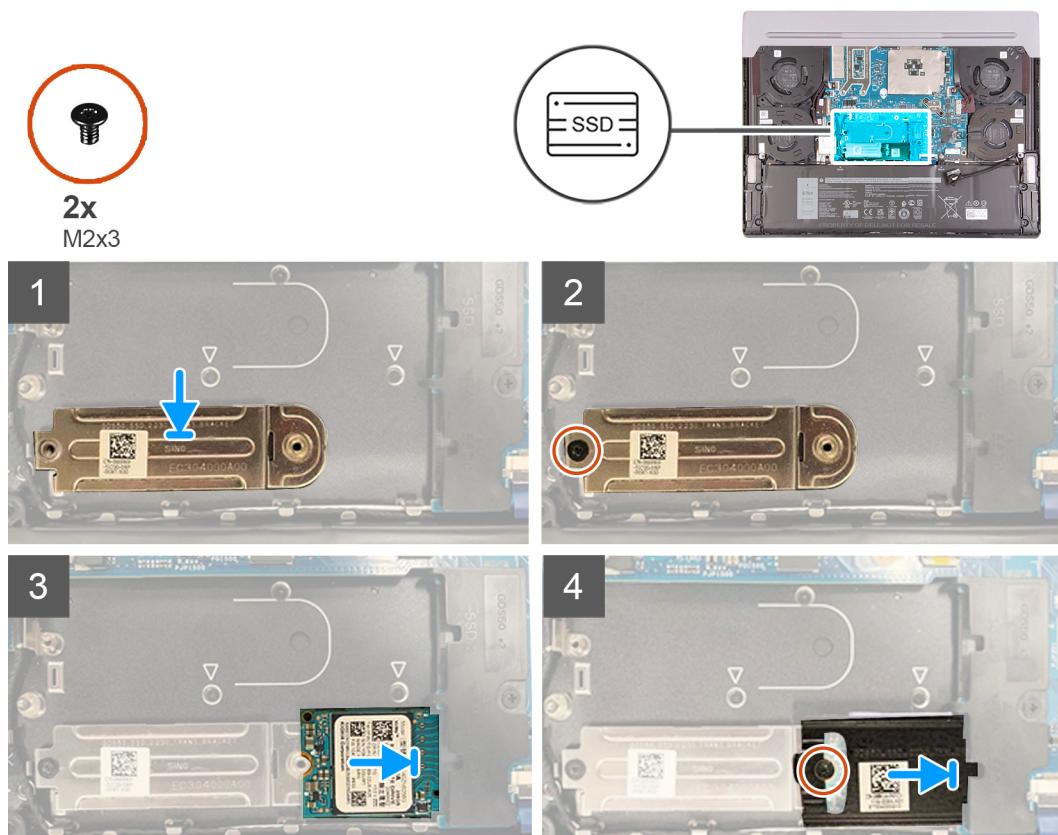
### About this task

**i** **NOTE:** The following procedure applies only to computers shipped with an M.2 2230 solid-state drive.

**i** **NOTE:** The M.2 card installed on M.2 slot will depend on the configuration ordered. Supported card configurations:

- M.2 2230 solid-state drive + 2230 mounting bracket
- M.2 2280 solid-state drive

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



### Steps

1. Align and place the solid-state drive mounting bracket on the palm-rest and keyboard assembly.
2. Replace the screw (M2x3) that secures the solid-state drive mounting bracket to the palm-rest and keyboard assembly.
3. Align the notch on the solid-state drive with the tab on the solid-state drive slot.
4. Slide the solid-state drive into the solid-state drive slot.
5. Slide the solid-state drive thermal shield into the solid-state drive slot.
6. Align the screw hole on the solid-state drive thermal shield with the screw hole on the solid-state drive and palm-rest and keyboard assembly.
7. Replace the screw (M2x3) that secures the M.2 2230 solid-state drive thermal shield to the solid-state drive and palm-rest and keyboard assembly.

## Next steps

1. Install the [base 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 [base cover](#).

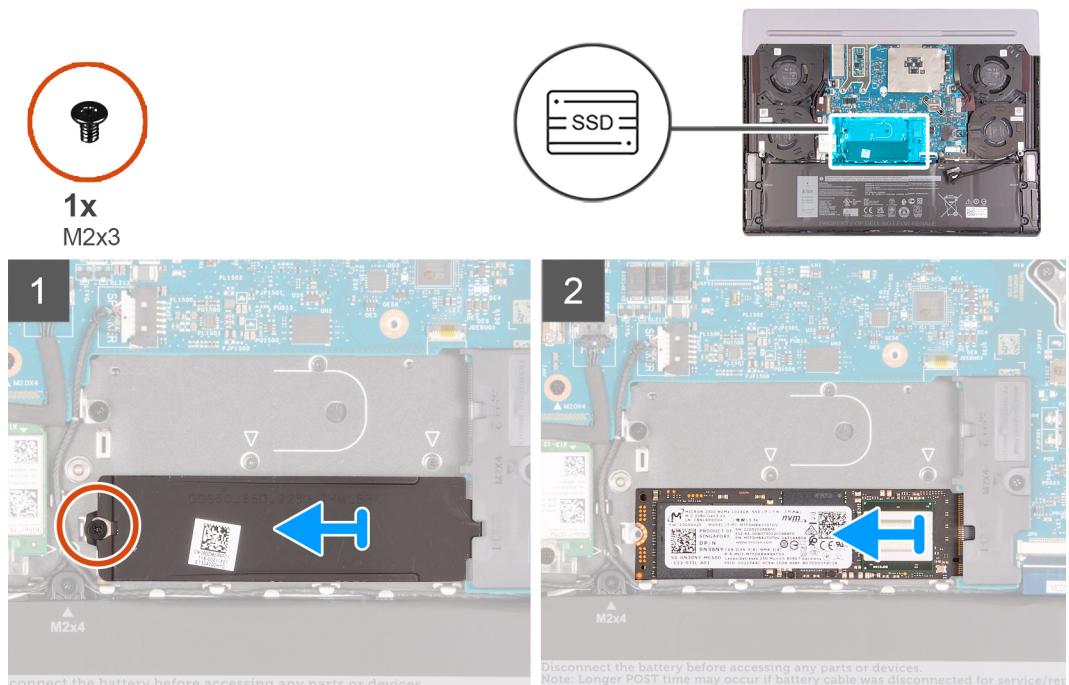
## About this task

**(i) NOTE:** The following procedure applies only to computers shipped with an M.2 2280 solid-state drive.

**(i) NOTE:** The M.2 card installed on M.2 slot will depend on the configuration ordered. Supported card configurations:

- M.2 2230 solid-state drive + 2230 mounting bracket
- M.2 2280 solid-state drive

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



## Steps

1. Remove the screw (M2x3) that secures the solid-state drive thermal shield to the solid-state drive and palm-rest and keyboard assembly.
2. Lift and remove the solid-state thermal shield off the solid-state drive.
3. Slide and remove the solid-state drive from the solid-state drive slot.

# Installing the M.2 2280 solid-state drive

## Prerequisites

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

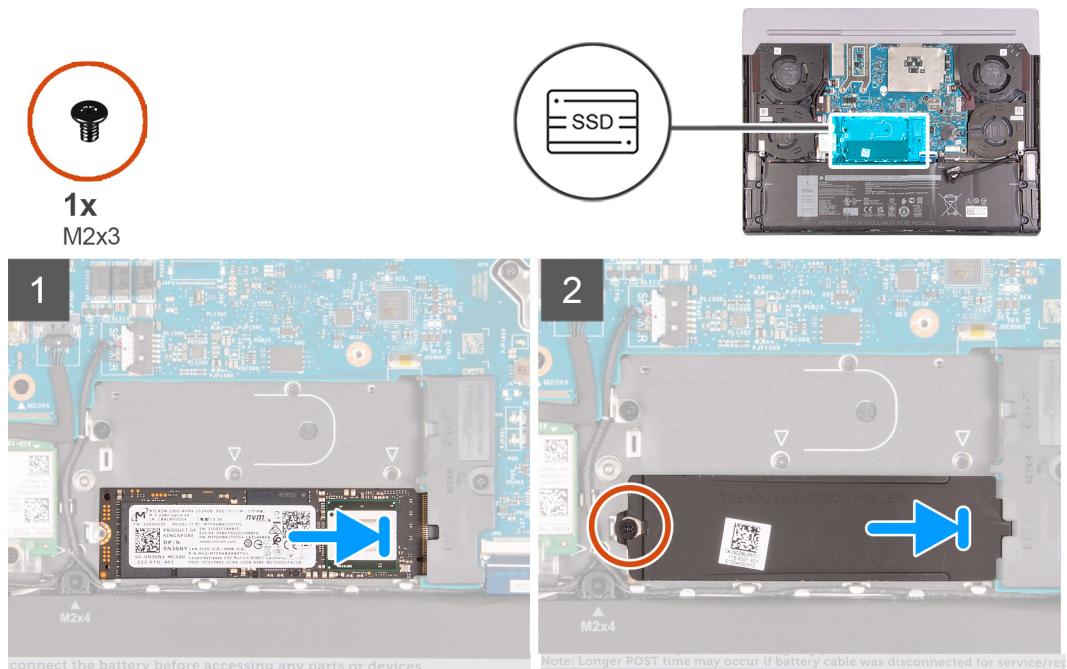
## About this task

**(i) NOTE:** The following procedure applies only to computers shipped with an M.2 2280 solid-state drive.

**(i) NOTE:** The M.2 card installed on M.2 slot will depend on the configuration ordered. Supported card configurations:

- M.2 2230 solid-state drive + 2230 mounting bracket
- M.2 2280 solid-state drive

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



## Steps

1. Align the notch on the solid-state drive with the tab on the solid-state drive slot.
2. Slide the solid-state drive into the solid-state drive slot.
3. Slide the solid-state drive thermal shield into the solid-state drive slot.
4. Align the screw hole on the solid-state drive thermal shield with the screw hole on the solid-state drive and palm-rest and keyboard assembly.
5. Replace the screw (M2x3) that secures the M.2 2280 solid-state drive thermal shield to the solid-state drive and palm-rest and keyboard assembly.

## Next steps

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

## Solid-state drive bracket

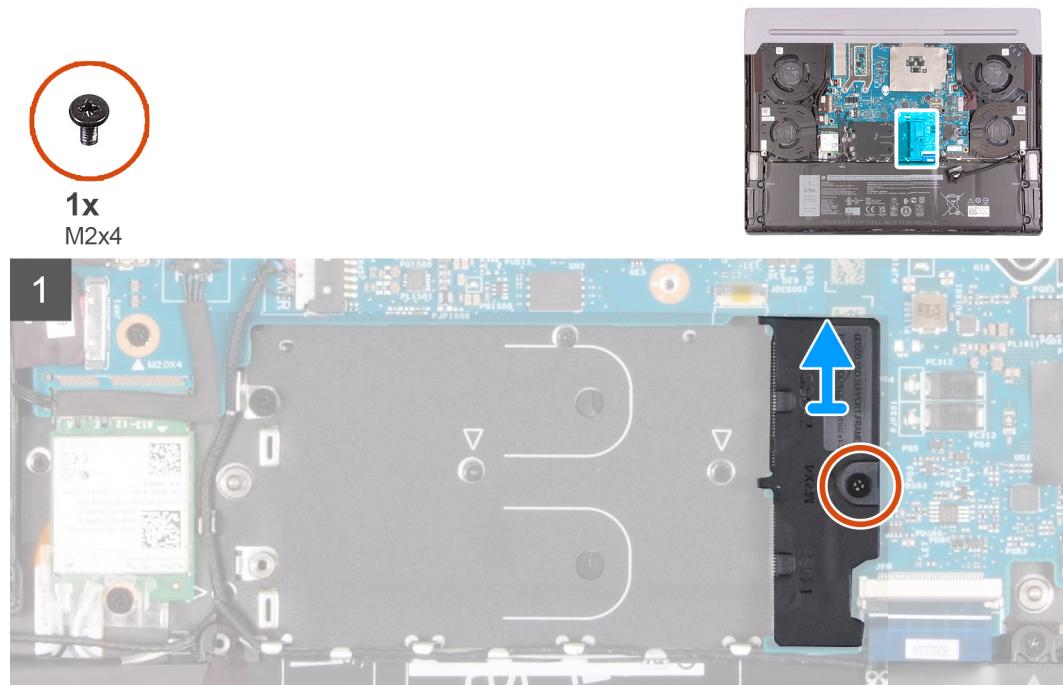
### Removing the solid-state drive bracket

#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.

## About this task

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



## Steps

1. Remove the screw (M2x4) that secures the solid-state drive bracket to the palm-rest and keyboard assembly.
2. Lift the solid-state drive bracket off the palm-rest and keyboard assembly.

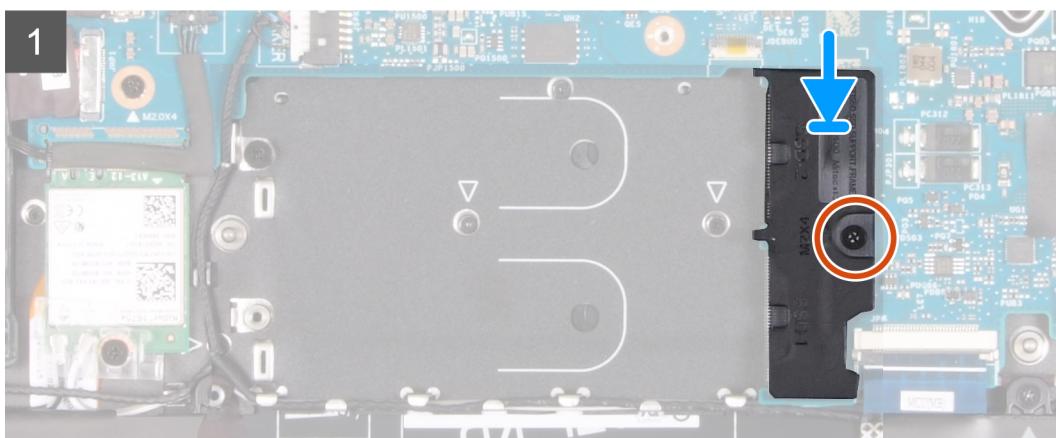
## Installing the solid-state drive bracket

### About this task

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



1x  
M2x4



## Steps

1. Align the screw hole on the solid-state drive bracket with the screw hole on the palm-rest and keyboard assembly.
2. Replace the screw (M2x4) that secures the solid-state drive bracket to the palm-rest and keyboard assembly.

## Next steps

1. Install the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
2. Install the [base cover](#).
3. Follow the procedure in [After working inside your computer](#).

## Fans

### Removing the fans

#### Prerequisites

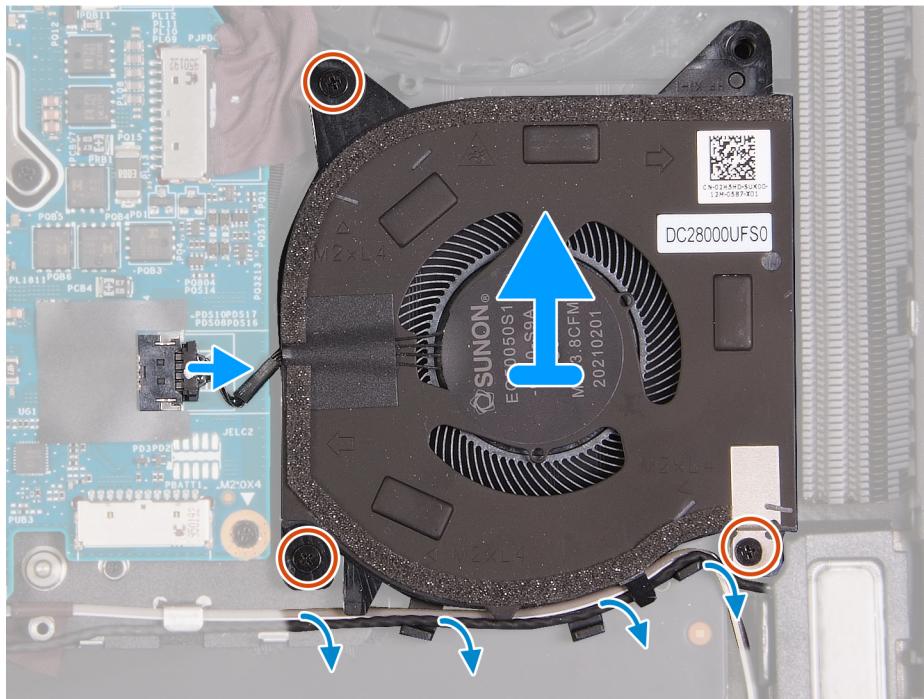
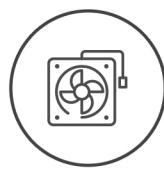
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

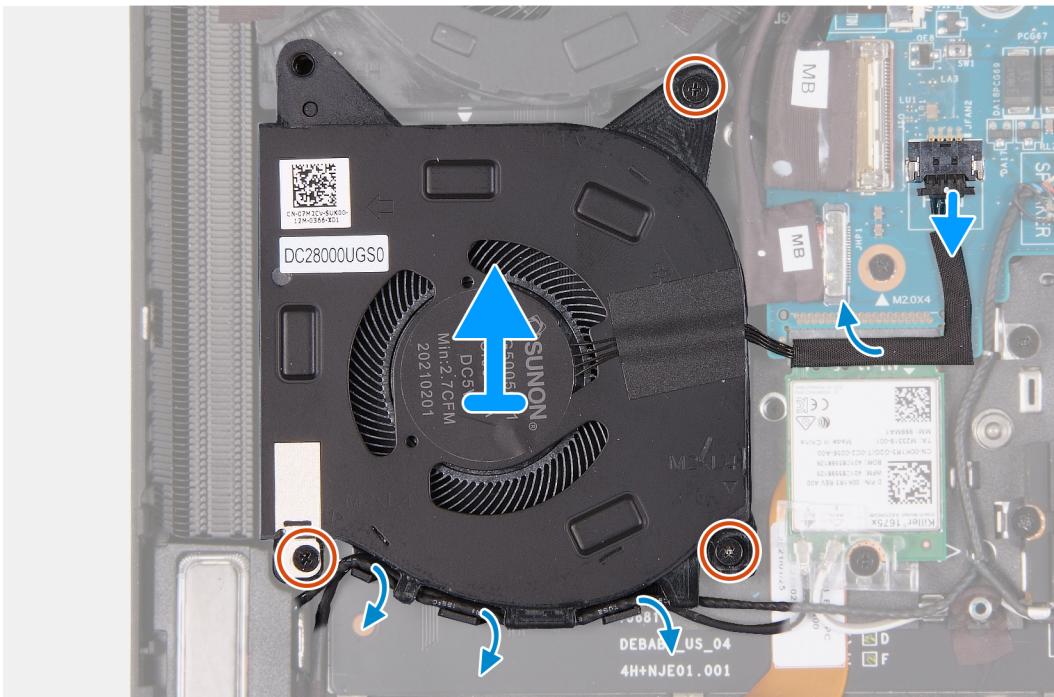
#### About this task

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



3x  
M2x4





## Steps

1. Remove the three screws (M2x4) that secure the right fan to the palm-rest and keyboard assembly.
2. Remove the speaker cable and antenna cable from the routing guides on the right fan.
3. Disconnect the right fan cable from the system board.
4. Lift the right fan off the palm-rest and keyboard assembly.
5. Remove the three screws (M2x4) that secure the left fan to the palm-rest and keyboard assembly.
6. Remove the speaker cable and the antenna cable from the routing guides on the left fan.
7. Disconnect the left fan cable from the system board.
8. Peel the left fan cable from the system board and lift the left fan off the palm-rest and keyboard assembly.

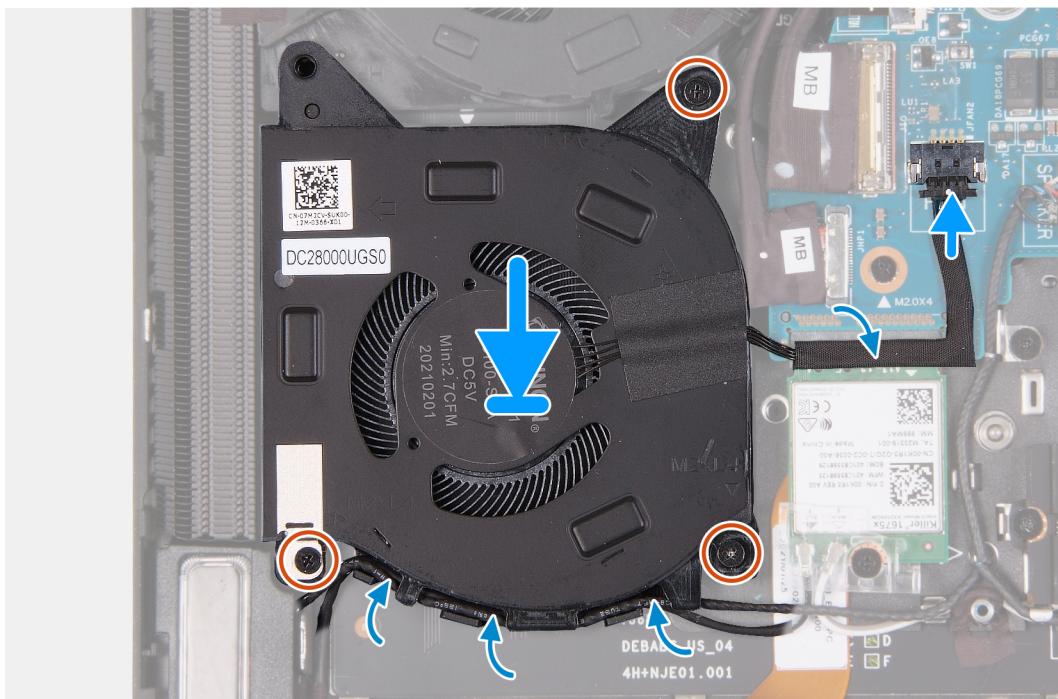
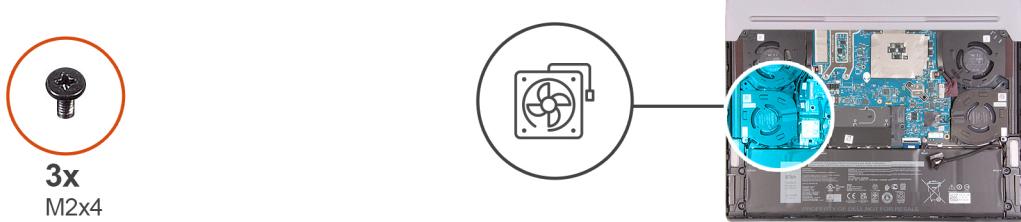
## Installing the fans

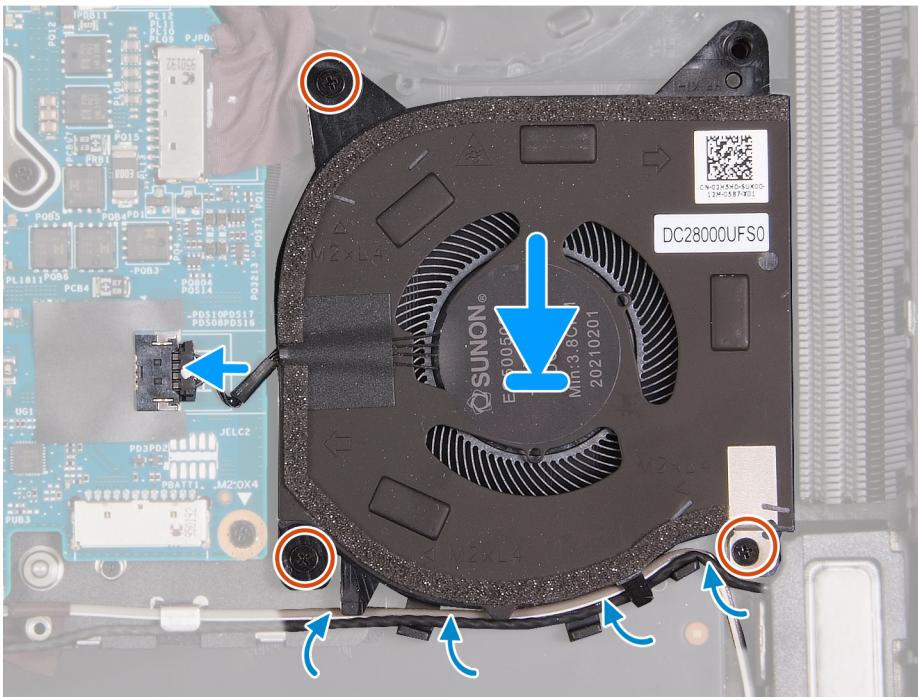
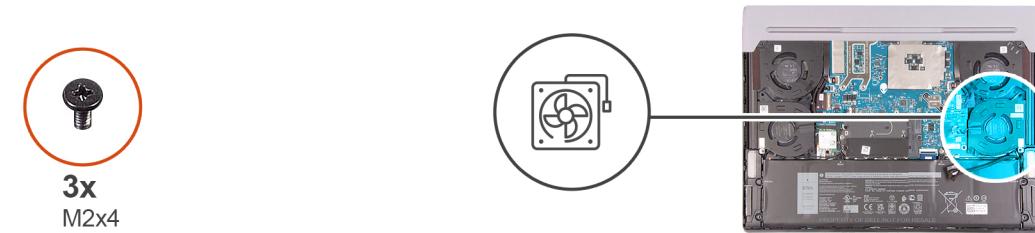
### Prerequisites

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 fans and provides a visual representation of the installation procedure.





## Steps

1. Align and place the left fan into the slot on the palm-rest and keyboard assembly.
2. Adhere the left fan cable to the system board and connect the left fan cable to the system board.
3. Replace the three screws (M2x4) that secure the left fan to the palm-rest and keyboard assembly.
4. Route the speaker cable and the antenna cable through the routing guides on the left fan.
5. Align and place the right fan into the slot on the palm-rest and keyboard assembly.
6. Connect the right fan cable to the system board.
7. Replace the three screws (M2x4) that secure the right fan to the palm-rest and keyboard assembly.
8. Route the speaker cable and antenna cable through the routing guides on the right fan.

## Next steps

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

## Rear-I/O cover

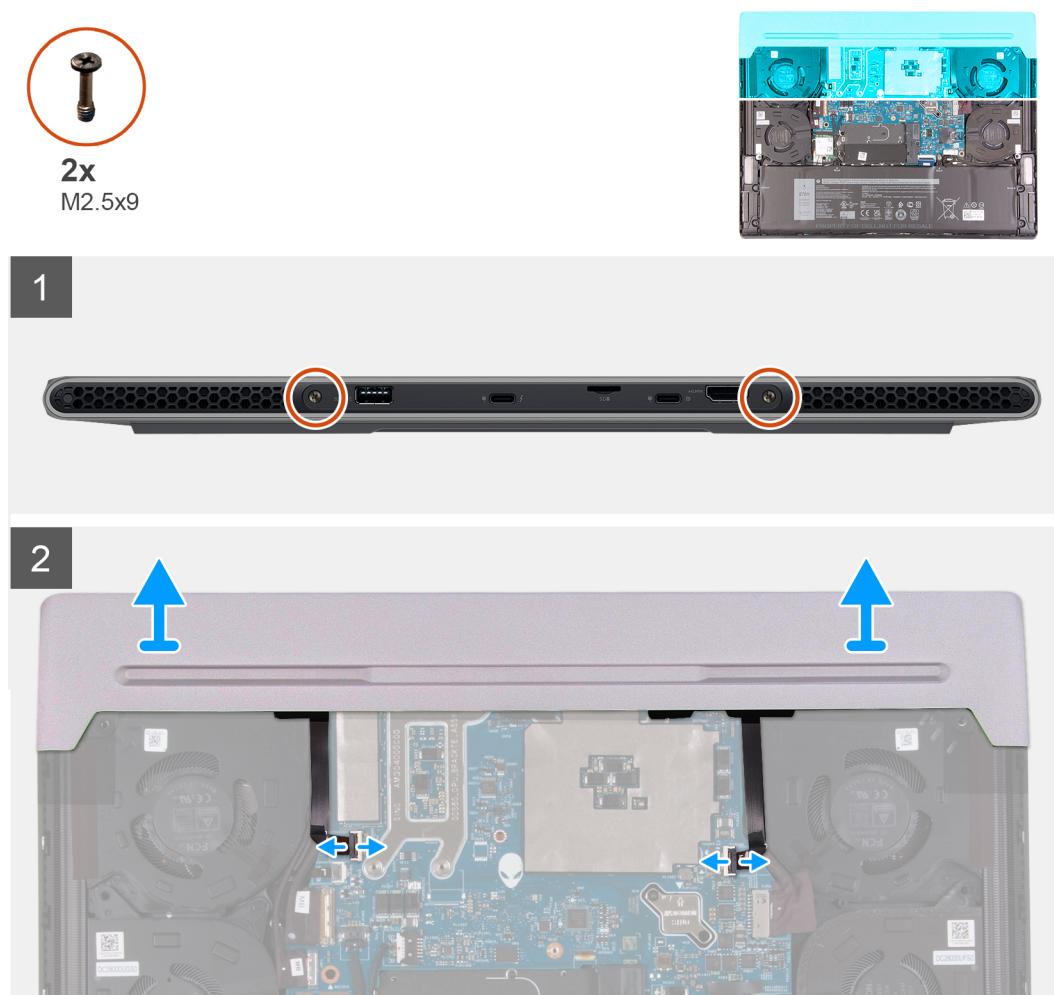
## Removing the rear I/O-cover

## Prerequisites

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

## About this task

The following image(s) indicate the location of the rear I/O-cover and provides a visual representation of the removal procedure.



## Steps

1. Remove the two screws (M2.5x9) that secure the rear I/O-cover to the palm-rest and keyboard assembly.
2. Open the latches and disconnect the left and right Tron-light cables from the system board.  
**NOTE:** To prevent damaging your computer, ensure that the Tron-light cable has been disconnected from the system board before removing the rear I/O-cover.
3. Firmly grasp the sides of your computer with both hands and push it outwards to remove the rear I/O-cover off the palm-rest and keyboard assembly.

## Installing the rear I/O-cover

### Prerequisites

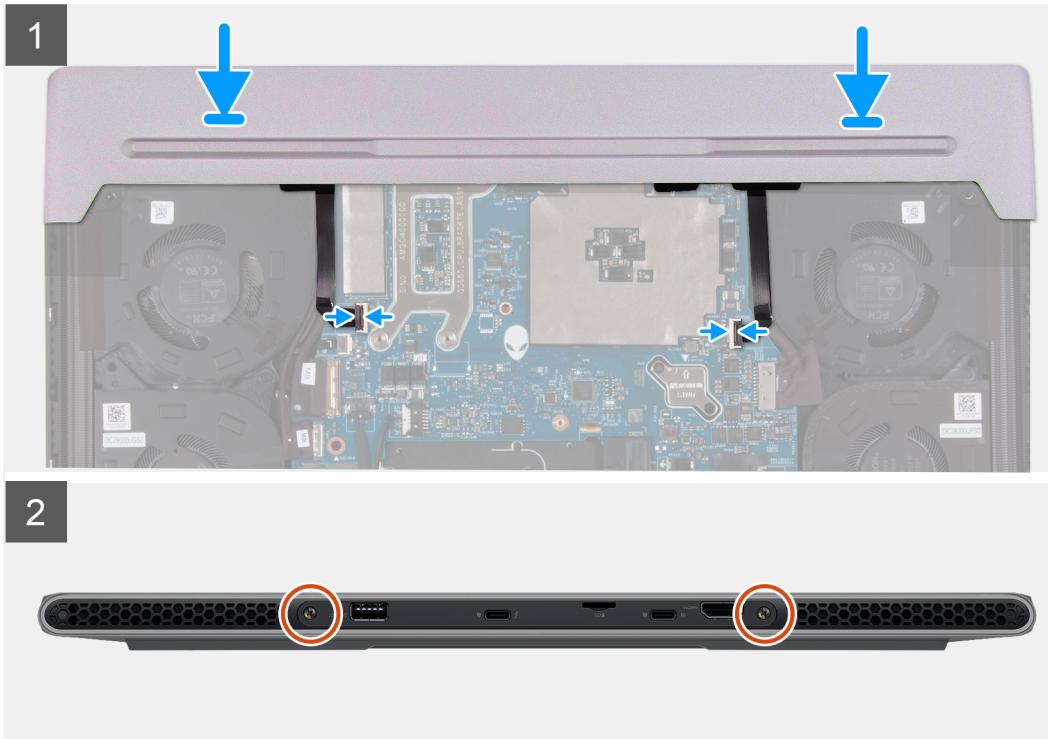
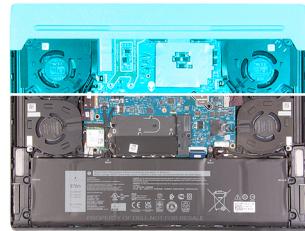
If you are replacing a component, remove the existing component before performing the installation process.

## About this task

The following image(s) indicate the location of the rear I/O-cover and provides a visual representation of the installation procedure.



2x  
M2.5x9



**CAUTION:** To avoid damaging your computer, ensure that the Tron-light cable is not pinched when sliding the rear I/O-cover into palm-rest and keyboard assembly.

#### Steps

1. With the correct orientation, slide the rear I/O-cover into the palm-rest and keyboard assembly, and snap it into place.
2. Slide the left and right Tron-light cables into their respective connectors on the system board and close the latches to secure the cables.
3. Replace the two screws (M2.5x9) that secure the rear I/O-cover to the palm-rest and keyboard assembly.

#### Next steps

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

## Power-adapter port

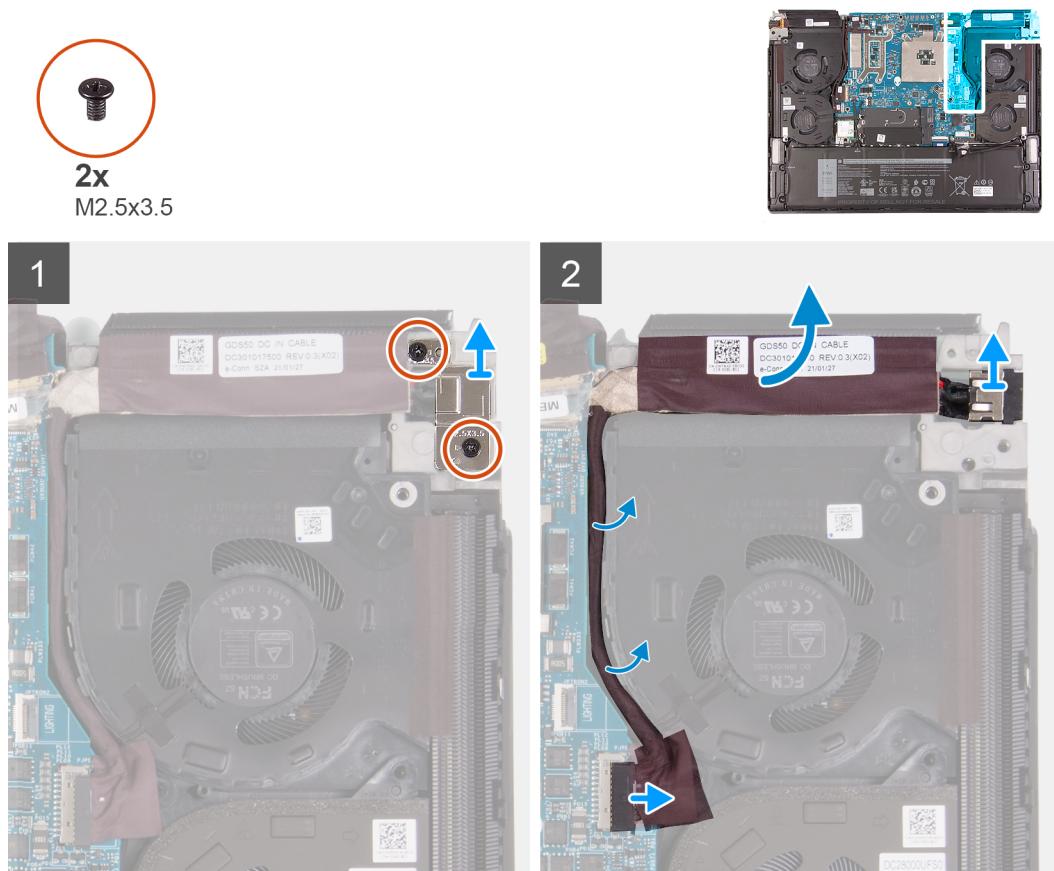
### Removing the power-adapter port

#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear I/O-cover](#).

## About this task

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



## Steps

1. Remove the two screws (M2.5x3.5) that secure the power-adapter port bracket to the palm-rest and keyboard assembly.
2. Lift the power-adapter port bracket off the palm-rest and keyboard assembly.
3. Disconnect the power-adapter port cable from the system board and then remove it from the routing guides on the fan and heat-sink assembly.
4. Peel off the power-adapter port cable from the fan and heat-sink assembly.
5. Lift the power-adapter port along with its cable off the palm-rest and keyboard assembly.

## Installing the power-adapter port

### Prerequisites

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

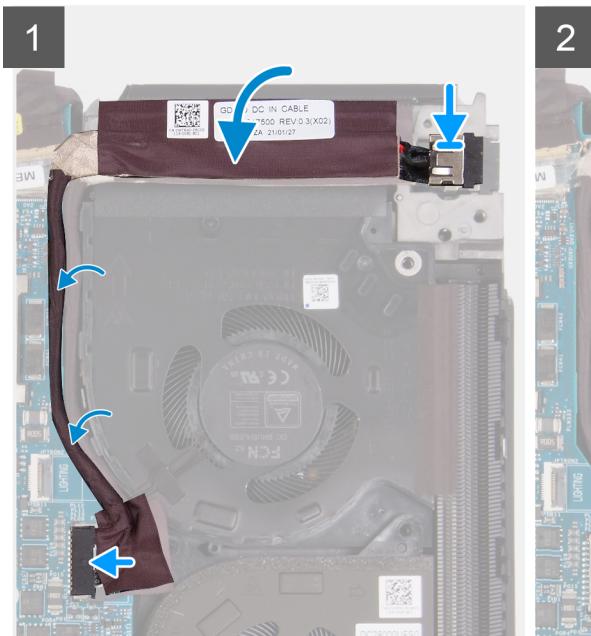
## About this task

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



2x

M2.5x3.5



## Steps

1. Align and place the power-adapter port into the slot on the palm-rest and keyboard assembly.
2. Adhere the power-adapter port cable to the fan and heat-sink assembly.
3. Connect the power-adapter port cable to the system board.
4. Route the power-adapter port cable through the routing guides on the fan and heat-sink assembly.
5. Place the power-adapter port bracket on the power-adapter port.
6. Align the screw holes on the power-adapter port bracket with the screw holes on the palm-rest and keyboard assembly.
7. Replace the two screws (M2.5x3.5) that secure the power-adapter port bracket to the palm-rest and keyboard assembly.

## Next steps

1. Install the [rear I/O-cover](#).
2. Install the [base cover](#).
3. Follow the procedure in [After working inside your computer](#).

## Headset port

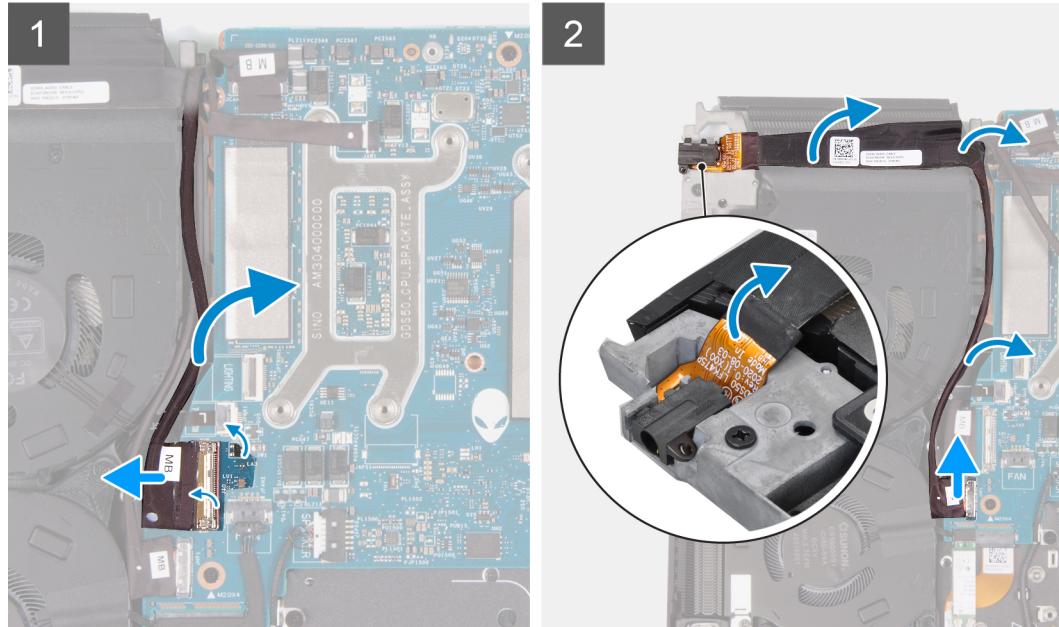
### Removing the headset port

#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear I/O-cover](#).

## About this task

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



## Steps

1. Peel the tape that secures the I/O-board cable to the system board.
2. Open the latch and disconnect the I/O-board cable from the system board.
3. Remove the I/O-board cable from the routing guides on the fan and heat-sink assembly.
4. Disconnect the headset-port cable from the system board.
5. Remove the headset-port cable from the routing guides on the fan and heat-sink assembly.
6. Peel off the headset-port cable from the fan and heat-sink assembly.
7. Lift the headset port along with its cable from the slot on the palm-rest and keyboard assembly.

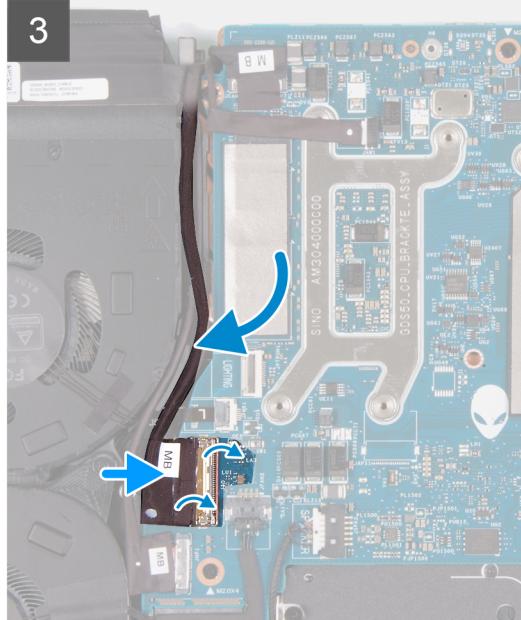
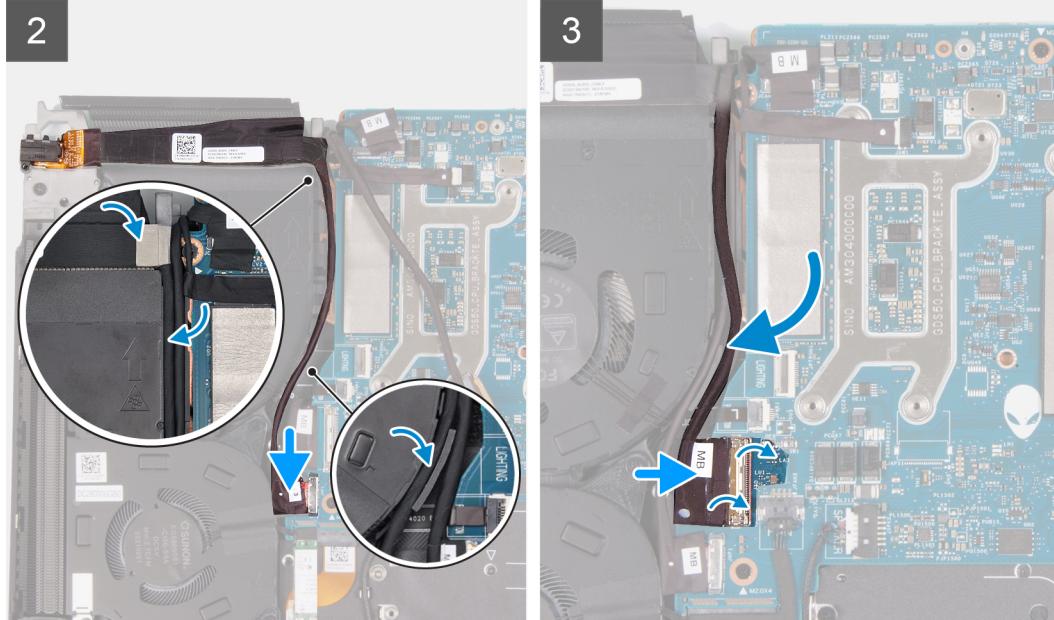
## Installing the headset port

### 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 headset port and provides a visual representation of the installation procedure.



## Steps

1. Slide the headset port into the slot on the palm-rest and keyboard assembly.
2. Align the headset port into the slot on the palm-rest and keyboard assembly.
3. Adhere the headset-port cable to the fan and heat-sink assembly.
4. Route the headset-port cable through the routing guides on the fan and heat-sink assembly.
5. Connect the headset-port cable to the system board.
6. Route the I/O-board cable through the routing guides on the fan and heat-sink assembly.
7. Slide the I/O-board cable into the connector on the system board and close the latch to secure the cable.
8. Adhere the tape that secures the I/O-board cable to the system board.

## Next steps

1. Install the [rear I/O-cover](#).
2. Install the [base cover](#).

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

## Display assembly

### Removing the display assembly

#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear I/O-cover](#).

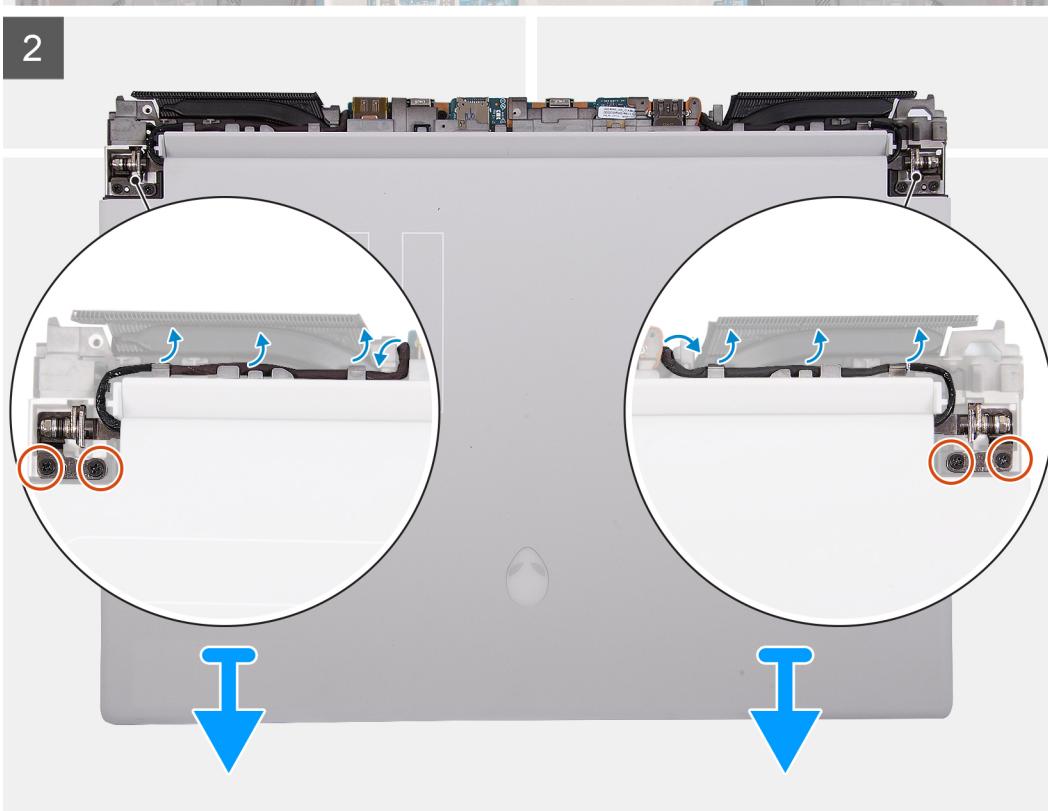
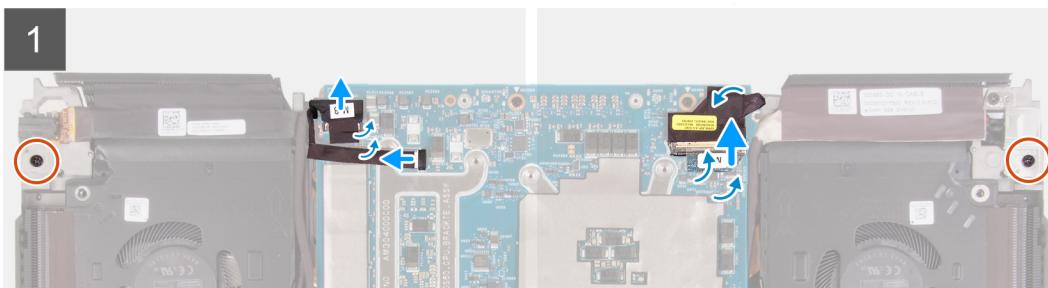
#### About this task

 **NOTE:** The display assembly is a Hinge-Up Display (HUD) and cannot be further disassembled.

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



**6x**  
M2.5x3.5



### Steps

1. Peel the tape that secures the camera cable to the system board and disconnect the camera cable from the system board.
2. Disconnect the Alien head LED cable from the system board and peel the Alien head LED cable from the system board.
3. Peel the tape that secures the display cable to the system board.
4. Open the latch and disconnect the display cable from the system board and peel the display cable off the system board.
5. Turn the computer over.
6. Remove the six screws (M2.5x3.5) that secure the display assembly to the palm-rest and keyboard assembly.
7. Remove the display cable from the slot on the palm-rest and keyboard assembly and remove it from the routing guides on the palm-rest and keyboard assembly.
8. Remove the camera cable and the Alien head LED cable from the slot on the palm-rest and keyboard assembly and remove it from the routing guides on the palm-rest and keyboard assembly.
9. Slide the display assembly off the palm-rest and keyboard assembly.
10. After performing the steps above, you are left with the display assembly.



## Installing the display assembly

### Prerequisites

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

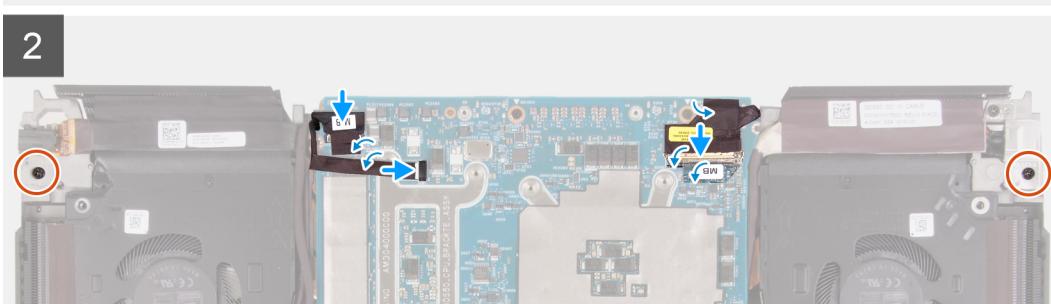
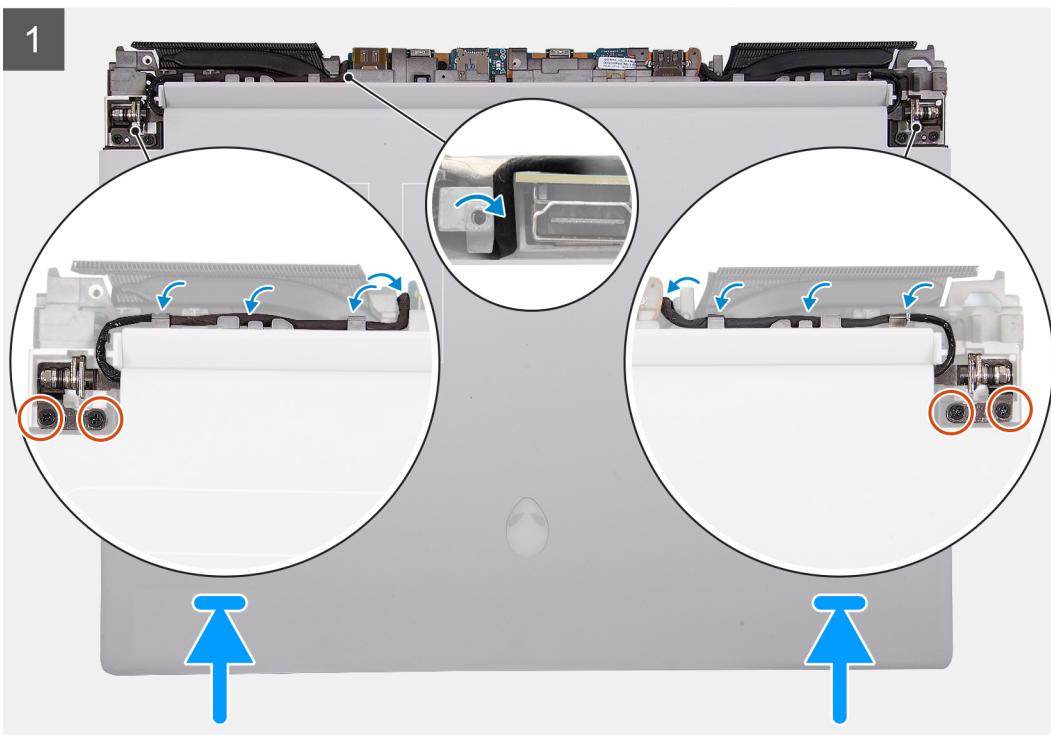
### About this task

 **CAUTION: Place the computer on a soft and clean surface to avoid scratching the display.**

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



6x  
M2.5x3.5



### Steps

1. Gently slide and place the display assembly on the palm-rest and keyboard assembly.
2. Align the screw holes on the display assembly with the screw holes on the palm-rest and keyboard assembly.
3. Replace the six screws (M2.5x3.5) that secure the display assembly to the palm-rest and keyboard assembly.
4. Route the camera cable and the Alien head LED cable through the routing guides on the palm-rest and keyboard assembly and route it through the slot on the palm-rest and keyboard assembly.
5. Route the display cable through the routing guides on the palm-rest and keyboard assembly and route it through the slot on the palm-rest and keyboard assembly.
6. Turn the computer over.
7. Adhere the display cable to the system board.
8. Connect the display cable to the connector on the system board and close the latch to secure the cable.
9. Adhere the tape that secures the display cable to the system board.
10. Adhere the Alien head LED cable to the system board and connect the Alien head LED cable to the system board.
11. Connect the camera cable to the system board and adhere the tape that secures the camera cable to the system board.

## Next steps

1. Install the [rear I/O-cover](#).
2. Install the [base cover](#).
3. Follow the procedure in [After working inside your computer](#).

# Speakers

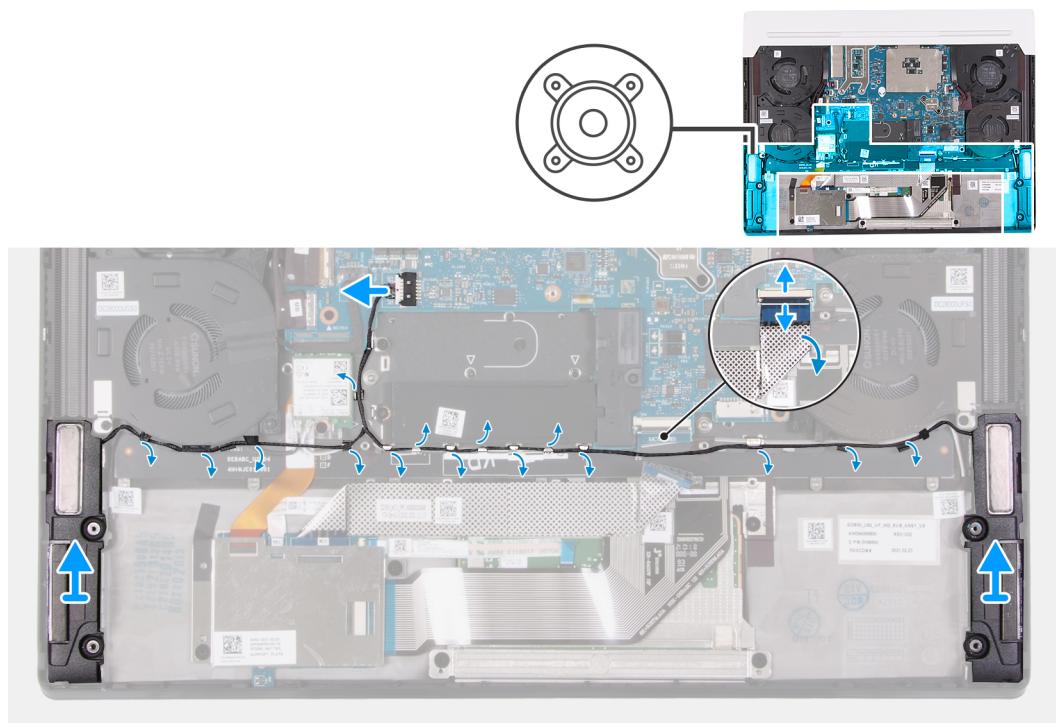
## Removing the speakers

### Prerequisites

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

### About this task

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



### Steps

1. Disconnect the speaker cable from the system board.
2. Open the latch and disconnect the keyboard-controller board cable from the system board.
3. Peel the tape that secures the speaker cable to the palm-rest and keyboard assembly.
4. Remove the speaker cables from the routing guides on the palm-rest and keyboard assembly.
5. Lift the right and left speaker, along with its cable, off the palm-rest and keyboard assembly.

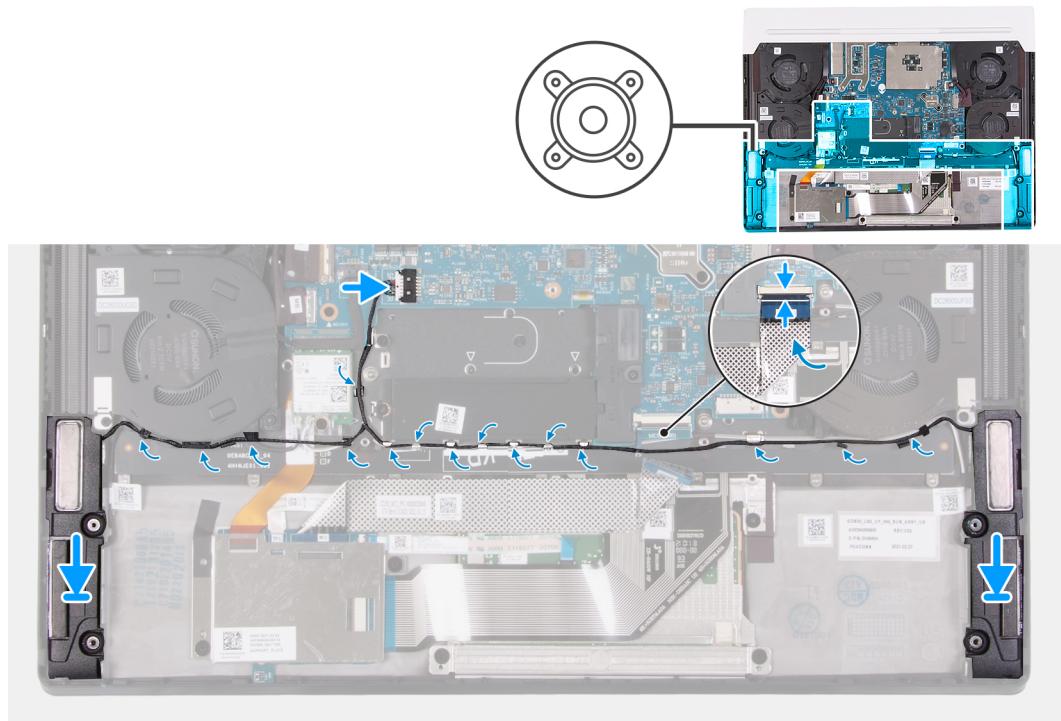
## Installing the speakers

### 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 speakers and provides a visual representation of the installation procedure.



**(i) NOTE:** If the rubber grommets are pushed out of the speakers when removing the speakers, push them back in place before replacing the speakers.

## Steps

1. Using the alignment posts, place the left and right speakers into their slots on the palm-rest and keyboard assembly.
2. Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.
3. Adhere the tape that secures the speaker cable to the palm-rest and keyboard assembly.
4. Connect the keyboard-controller board cable to the system board and close the latch to secure the cable.
5. Connect the speaker cable to the system board.

## Next steps

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

## Touchpad

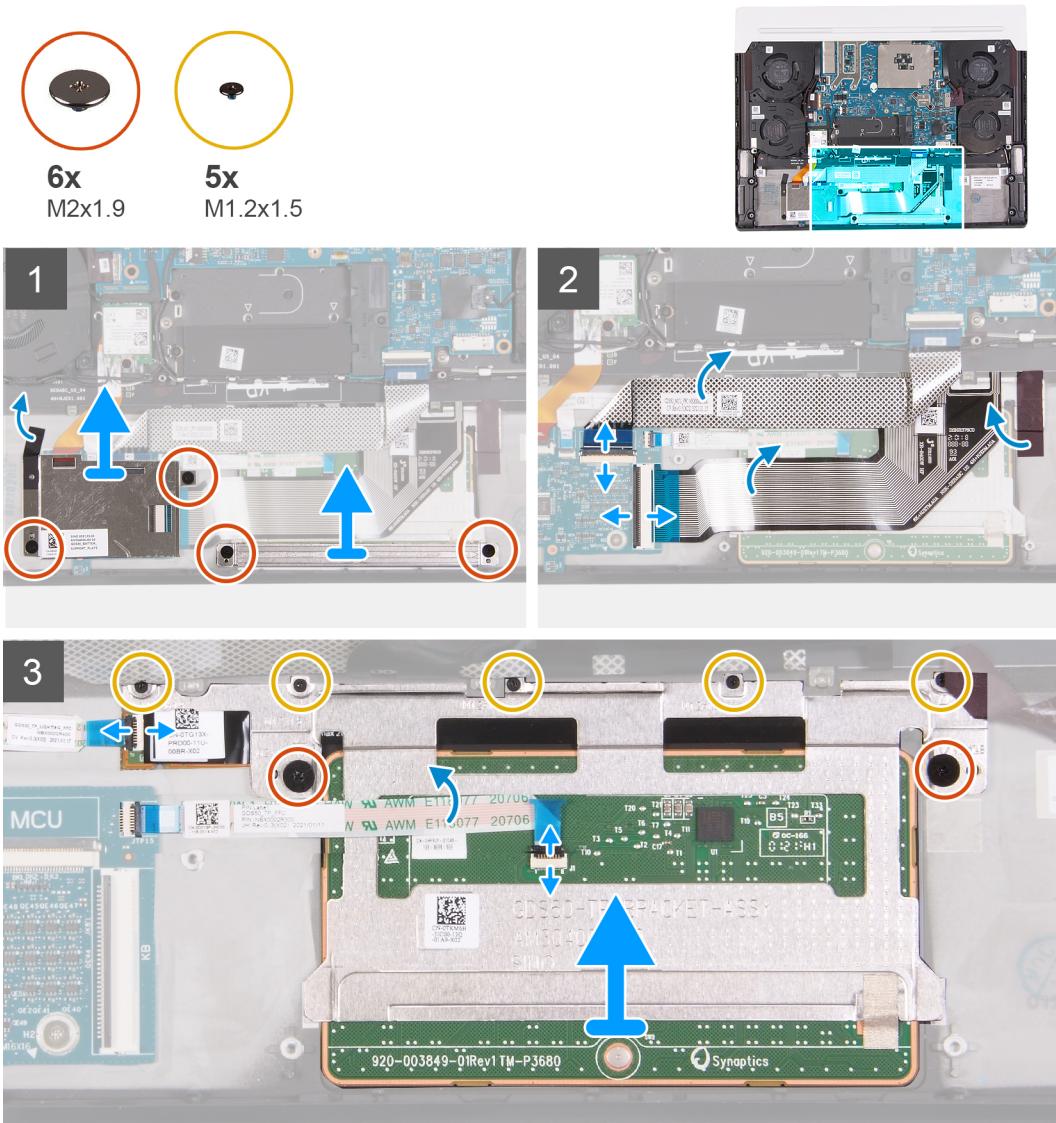
### Removing the touchpad

#### Prerequisites

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

#### About this task

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



## Steps

1. Remove the two screws (M2x1.9) that secure the keyboard-controller board bracket to the palm-rest and keyboard assembly.
2. Peel the tape that secures the keyboard-controller board bracket to the palm-rest and keyboard assembly.
3. Lift the keyboard-controller board bracket off the palm-rest and keyboard assembly.
4. Remove the two screws (M2x1.9) that secure the touchpad bracket to the palm-rest and keyboard assembly.
5. Lift the touchpad bracket off the palm-rest and keyboard assembly.
6. Open the latch and disconnect the keyboard-controller board cable from keyboard-controller board.
7. Fold up the keyboard-controller board cable.
8. Open the latch and disconnect the keyboard cable from the keyboard-controller board.
9. Fold up the keyboard cable.
10. Peel the tape that secures the touchpad to the palm-rest and keyboard assembly.
11. Open the latch and disconnect the touchpad-light cable from the touchpad.
12. Open the latch and disconnect the touchpad cable from the touchpad.
13. Fold up the touchpad cable.
14. Remove the two screws (M2x1.9) that secure the touchpad to the palm-rest and keyboard assembly.
15. Remove the five screws (M1.2x1.5) that secure the touchpad to the palm-rest and keyboard assembly.

**(i) | NOTE:** Your computer may be shipped with an touchpad-light cable depending on the configuration you have ordered.

**16.** Lift the touchpad off the palm-rest and keyboard assembly.

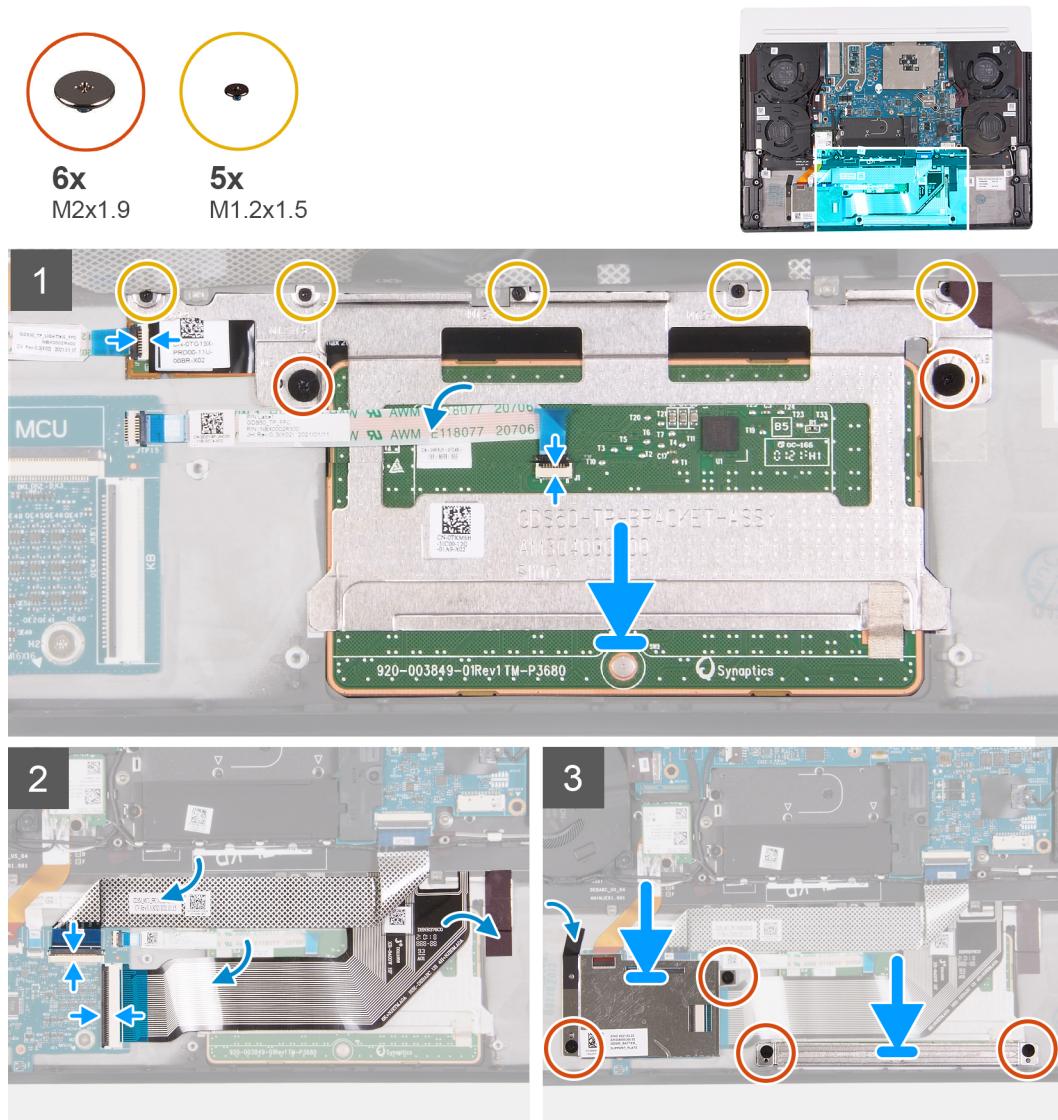
## Installing the touchpad

### Prerequisites

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

### About this task

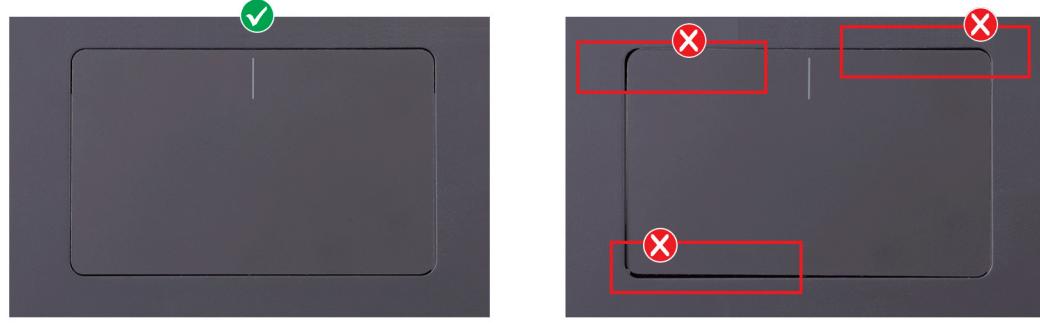
The following image(s) indicate the location of the touchpad and provides a visual representation of the installation procedure.



### Steps

1. Align and place the touchpad into the slot on the palm-rest and keyboard assembly.

**NOTE:** Turn the computer over and open the display. Ensure that the touchpad is equally aligned along all four sides.



2. Replace the two screws (M2x1.9) that secure the touchpad to the palm-rest and keyboard assembly.
3. Replace the five screws (M1.2x1.5) that secure the touchpad to the palm-rest and keyboard assembly.
4. Fold down the touchpad cable.
5. Slide the touchpad cable into its connector on the touchpad and close the latch to secure the cable.
6. Slide the touchpad-light cable into its connector on the touchpad and close the latch to secure the cable.
- NOTE:** Your computer may be shipped with an touchpad-light cable depending on the configuration you have ordered.
7. Fold down the keyboard cable.
8. Slide the keyboard cable into the connector on the keyboard-controller board and close the latch to secure the cable.
9. Fold down the keyboard-controller board cable.
10. Slide the keyboard-controller board cable into the connector on the keyboard-controller board and close the latch to secure the cable.
11. Adhere the tape that secures the touchpad to the palm-rest and keyboard assembly.
12. Align the screw holes on the touchpad bracket to the screw holes on the palm-rest and keyboard assembly.
13. Replace the two screws (M2x1.9) that secure the touchpad bracket to the palm-rest and keyboard assembly.
14. Align the screw holes on the keyboard-controller board bracket to the screw holes on the palm-rest and keyboard assembly.
15. Replace the two screws (M2x1.9) that secure the keyboard-controller board bracket to the palm-rest and keyboard assembly.
16. Adhere the tape that secures the keyboard-controller board bracket to the palm-rest and keyboard assembly.

#### Next steps

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

## Keyboard-controller board

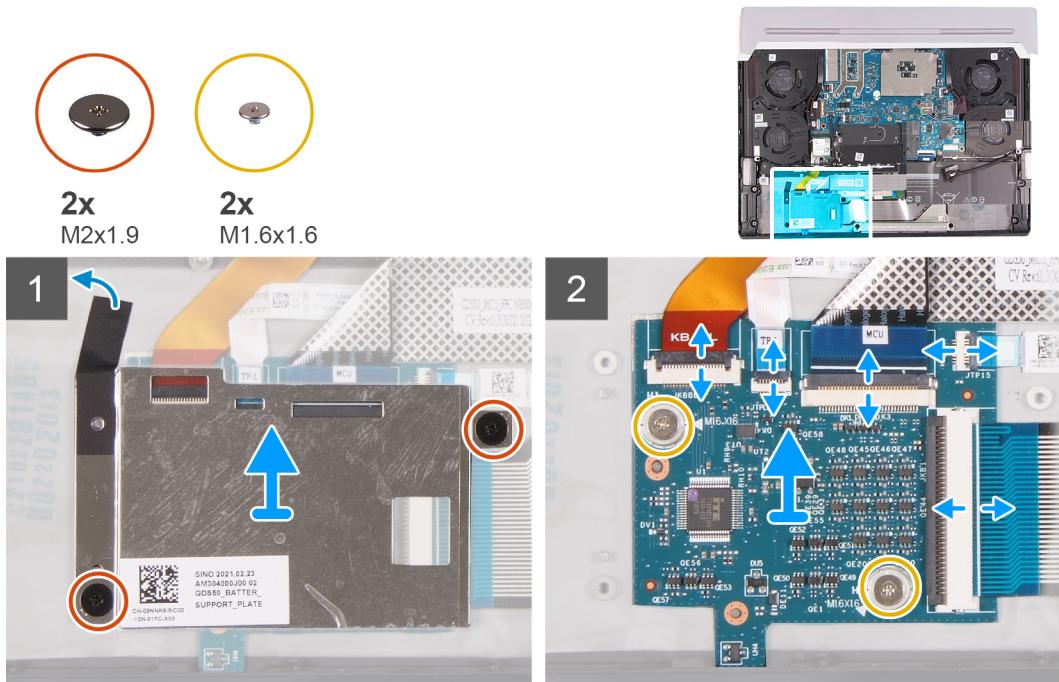
### Removing the keyboard-controller board

#### Prerequisites

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

#### About this task

The following image(s) indicate the location of the keyboard-controller board and provides a visual representation of the removal procedure.



## Steps

1. Remove the two screws (M2x1.9) that secure the keyboard-controller board bracket to the palm-rest and keyboard assembly.
2. Peel the tape that secures the keyboard-controller board bracket to the palm-rest and keyboard assembly.
3. Lift the keyboard-controller board bracket off the keyboard-controller board.
4. Open the latch and disconnect the keyboard-backlight cable from the keyboard-controller board.
5. Open the latch and disconnect the touchpad-light cable from the keyboard-controller board.

**(i) NOTE:** Your computer may be shipped with an touchpad-light cable depending on the configuration you have ordered.

6. Open the latch and disconnect the keyboard-controller board cable from the keyboard-controller board.
7. Open the latch and disconnect the touchpad cable from the keyboard-controller board.
8. Open the latch and disconnect the keyboard cable from the keyboard-controller board.
9. Remove the two screws (M1.6x1.6) that secure the keyboard-controller board to the palm-rest and keyboard assembly.
10. Lift the keyboard-controller board off the palm-rest and keyboard assembly.

**NOTE:** Your computer may be shipped with an touchpad-light cable depending on the configuration you have ordered.

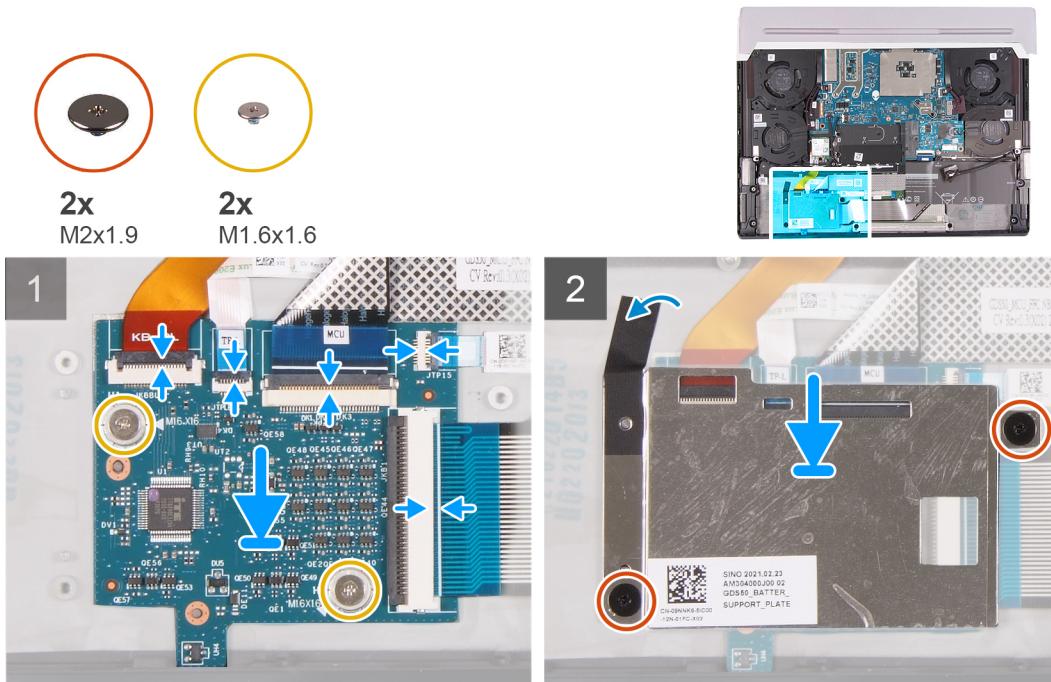
## Installing the keyboard-controller board

## 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 keyboard-controller board and provides a visual representation of the installation procedure.



## Steps

1. Using the alignment posts, place the keyboard-controller board into the slot on the palm-rest and keyboard assembly.
2. Replace the two screws (M1.6x1.6) that secure the keyboard-controller board to the palm-rest and keyboard assembly.
3. Slide the keyboard cable into the connector on the keyboard-controller board and close the latch to secure the cable.
4. Slide the touchpad cable into the connector on the keyboard-controller board and close the latch to secure the cable.
5. Slide the keyboard-controller board cable into the connector on the keyboard-controller board and close the latch to secure the cable.
6. Slide the touchpad-light cable into the connector on the keyboard-controller board and close the latch to secure the cable.
- NOTE:** Your computer may be shipped with an touchpad-light cable depending on the configuration you have ordered.
7. Slide the keyboard-backlight cable into the connector on the keyboard-controller board and close the latch to secure the cable.
8. Align the screw holes on the keyboard-controller board bracket with the screw holes on the keyboard-controller board and palm-rest and keyboard assembly.
9. Replace the two screws (M2x1.9) that secures the keyboard-controller board bracket to the keyboard-controller board and palm-rest and keyboard assembly.
10. Adhere the tape that secures the keyboard-controller board bracket to the palm-rest and keyboard assembly.

## Next steps

1. Install the [battery](#).
2. Install the [base 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 [base cover](#).
3. Remove the [battery](#).

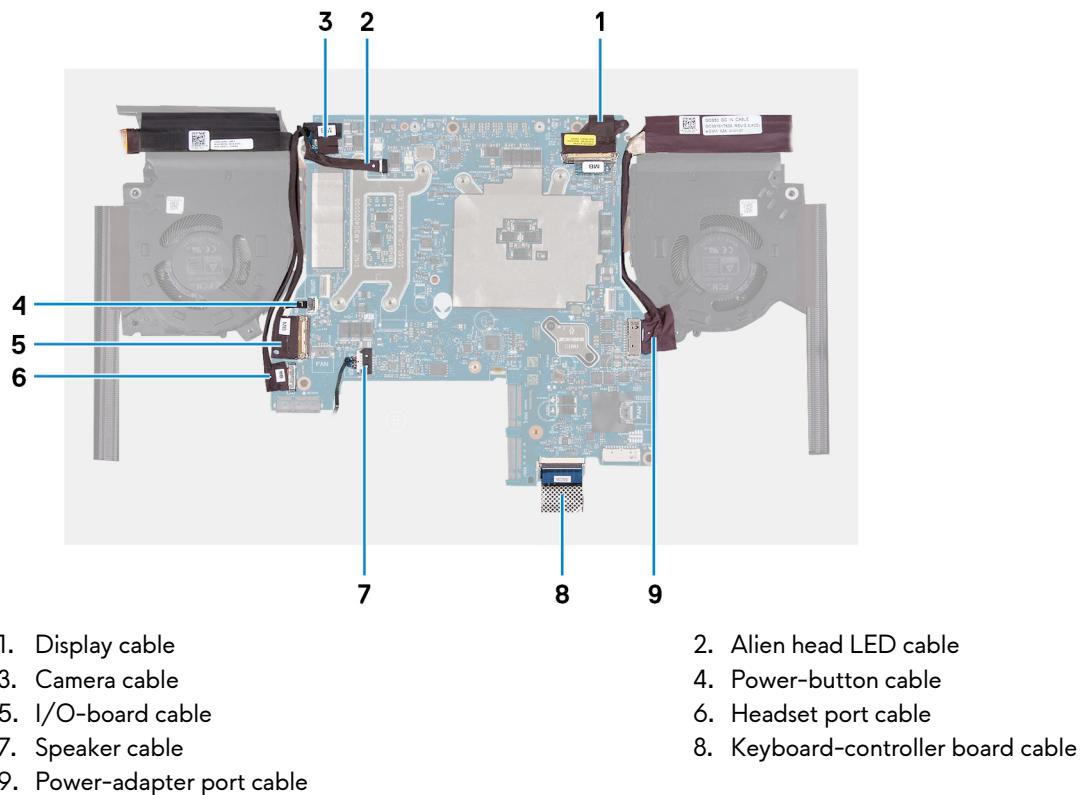
4. Remove the [wireless card](#).
5. Remove the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
6. Remove the [fans](#).
7. Remove the [rear I/O-cover](#).
8. Remove the [solid-state drive bracket](#).

#### About this task

**(i) NOTE:** When installing this component, please refer to the techsheet bundled with the service kit for computers with the following Graphics Processing Unit (GPU) configurations:

- NVIDIA GeForce RTX 3070
- NVIDIA GeForce RTX 3080

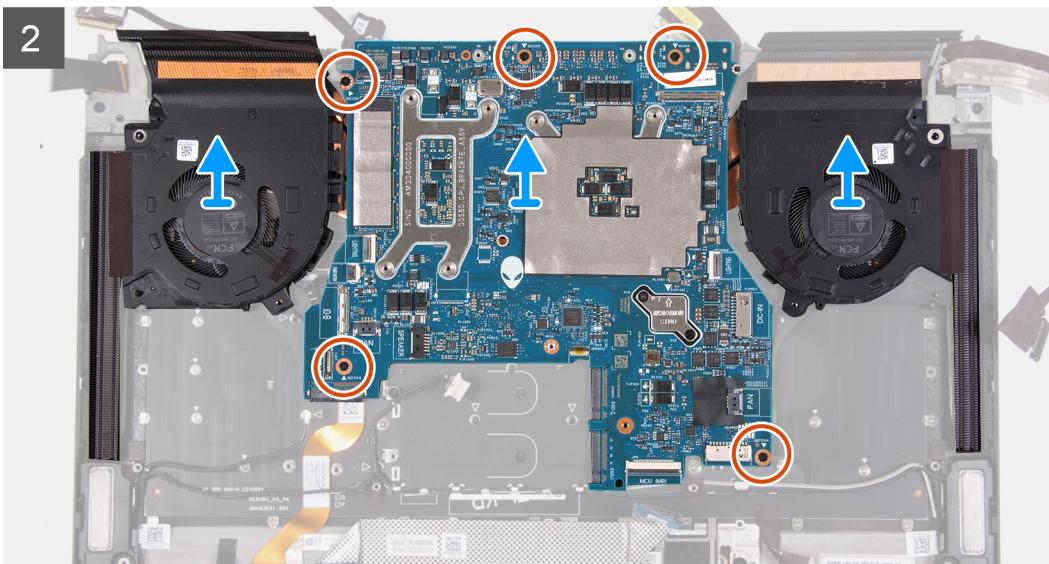
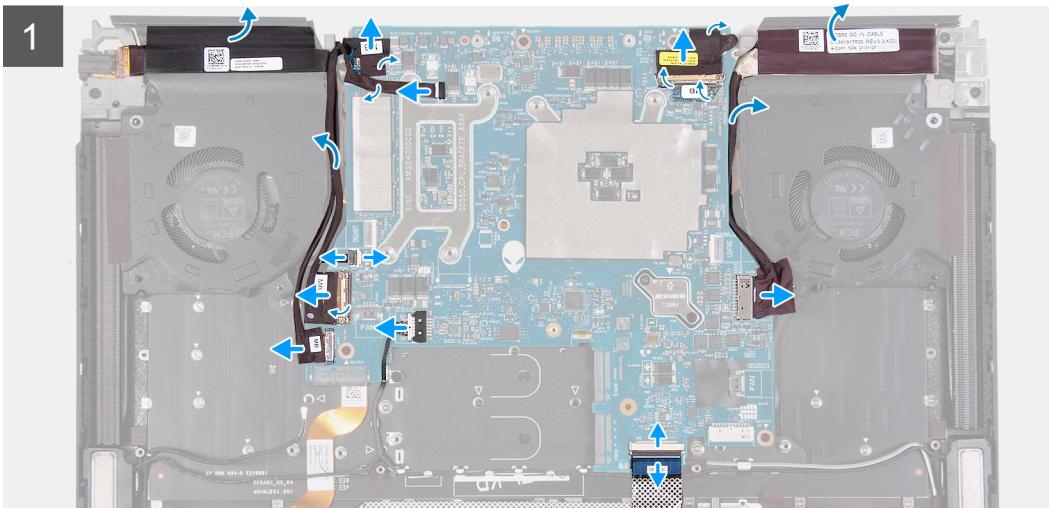
The following image indicates the connectors on your system board.



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



5x  
M2x4



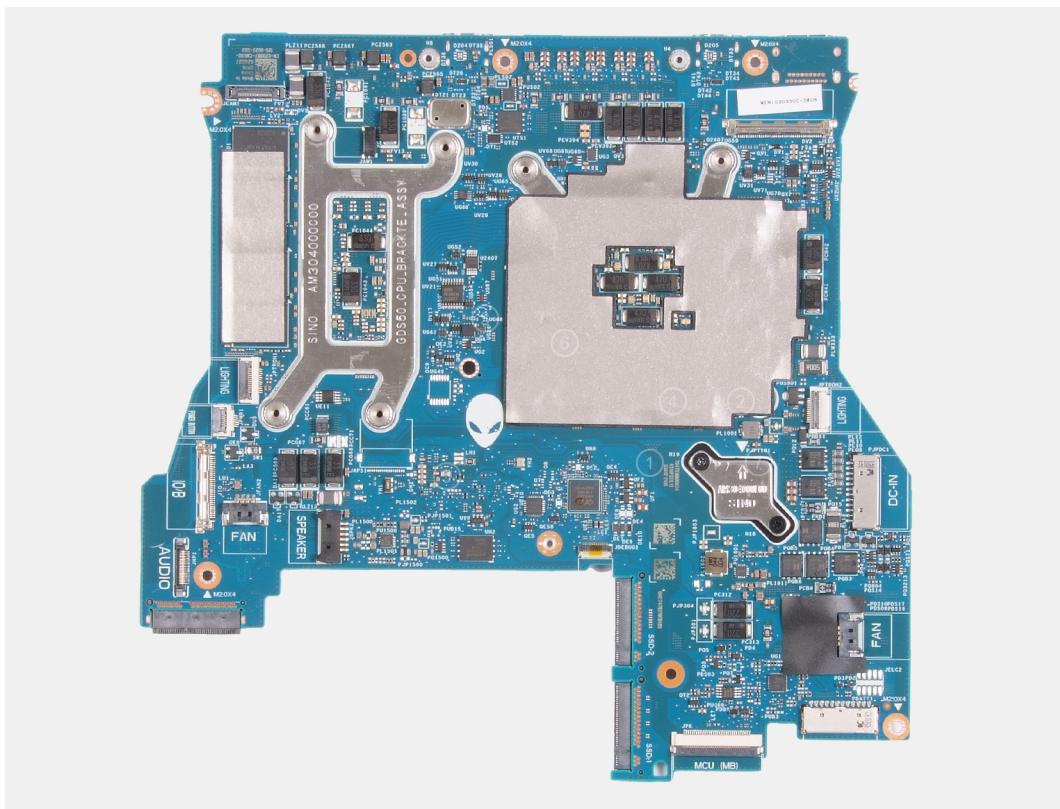
## Steps

1. Peel the headset port cable from the fan and heat-sink assembly.
2. Disconnect the camera cable from the system board and peel the tape that secures the camera cable to the system board.
3. Disconnect the Alien head LED cable from the system board and peel the cable from the system board.
4. Open the latch and disconnect the power-button cable from the system board.
5. Peel the tape that secures the I/O-board cable to the system board.
6. Open the latch and disconnect the I/O-board cable from the system board and remove it from the routing guides on the fan and heat-sink assembly.
7. Disconnect the headset-port cable from the system board and remove it from the routing guides on the fan and heat-sink assembly.
8. Disconnect the speaker cable from the system board.
9. Open the latch and disconnect the keyboard-controller board cable from the system board.
10. Disconnect the power-adapter port cable from the system board.

11. Remove the power-adapter port cable from the palm-rest and keyboard assembly and peel the power-adapter port cable off the fan and heat-sink assembly.
12. Peel the tape that secures the display cable to the system board.
13. Open the latch and disconnect the display cable from the system board and peel the display cable off the system board.
14. Remove the five screws (M2x4) that secure the system-board assembly to the palm-rest and keyboard assembly.
15. Grab the system-board assembly from the top left and right sides of the heat sink and lift the system-board assembly off the palm-rest and keyboard assembly.
16. Place the system-board assembly on a clean and flat surface.
17. Turn the system-board assembly over.
18. Remove the [fan and heat-sink assembly](#).
19. Turn the system-board assembly over.
20. After performing all the above steps, you are left with the system board.

**CAUTION: Do not use alcohol wipes to clean the Element 31 thermal grease from the processor chip which is surrounded by the processor barrier sheet. The alcohol solution from the wipes will dissolve the Element 31 thermal grease into conductive metal particles. If these conductive metal particles come into contact with the surface of the system board, it will cause the an electrical short when the computer is powered on.**

**i** **NOTE:** Before returning the faulty system board. Adhere the processor (CPU) sticker over the processor (CPU) chip and ensure that it covers the entire surface of it.



## Installing the system board

### Prerequisites

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

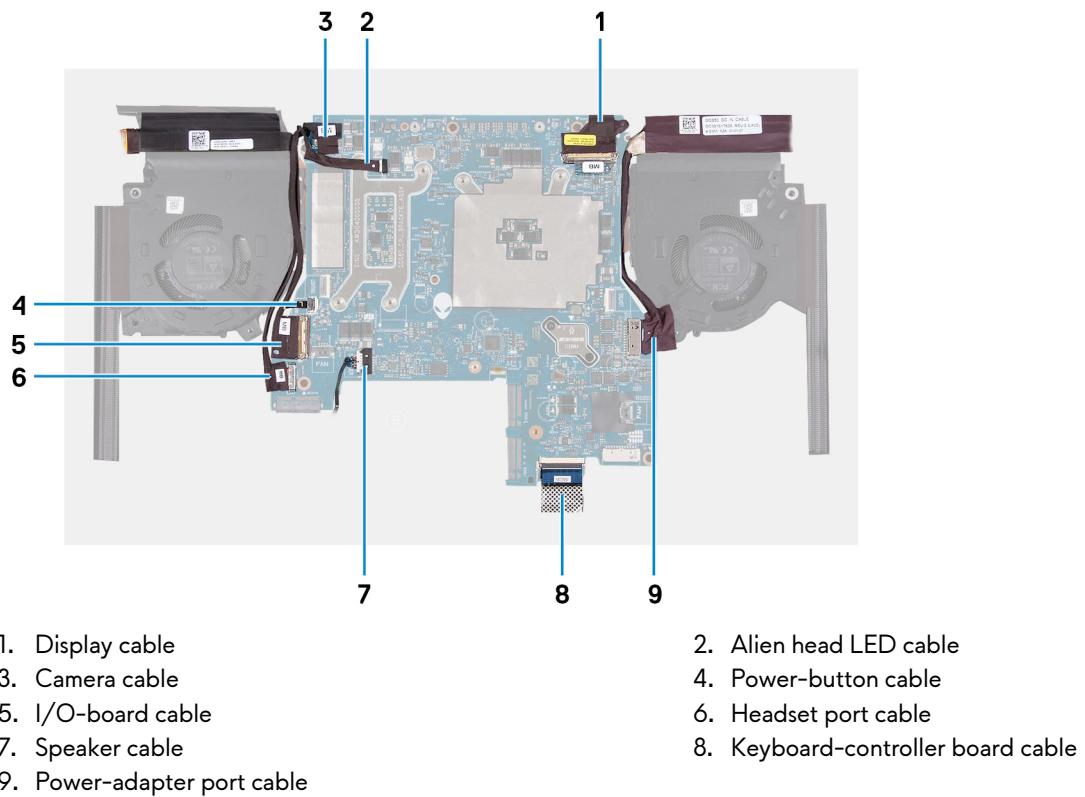
### About this task

**i** **NOTE:** When installing this component, please refer to the techsheet bundled with the service kit for computers with the following Graphics Processing Unit (GPU) configurations:

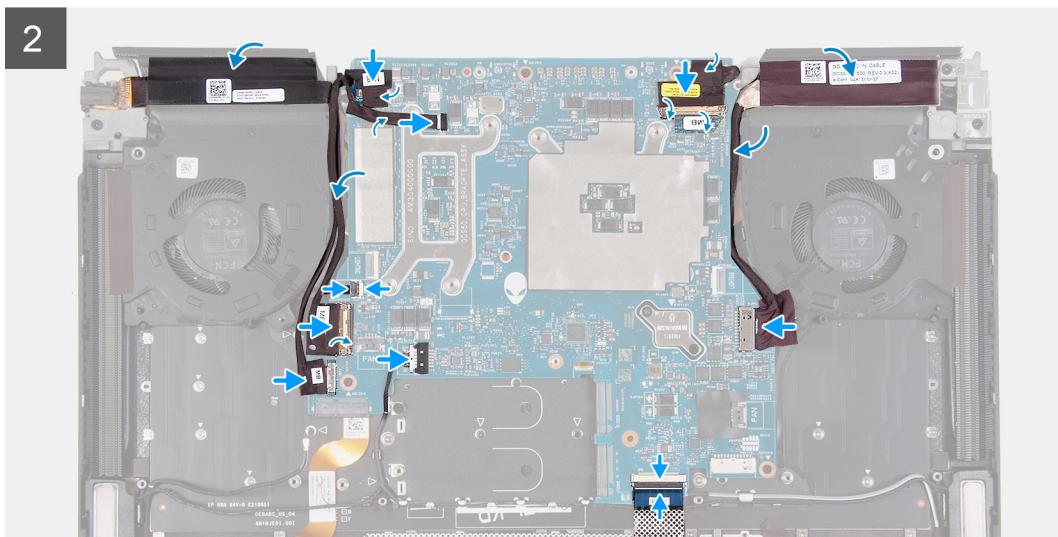
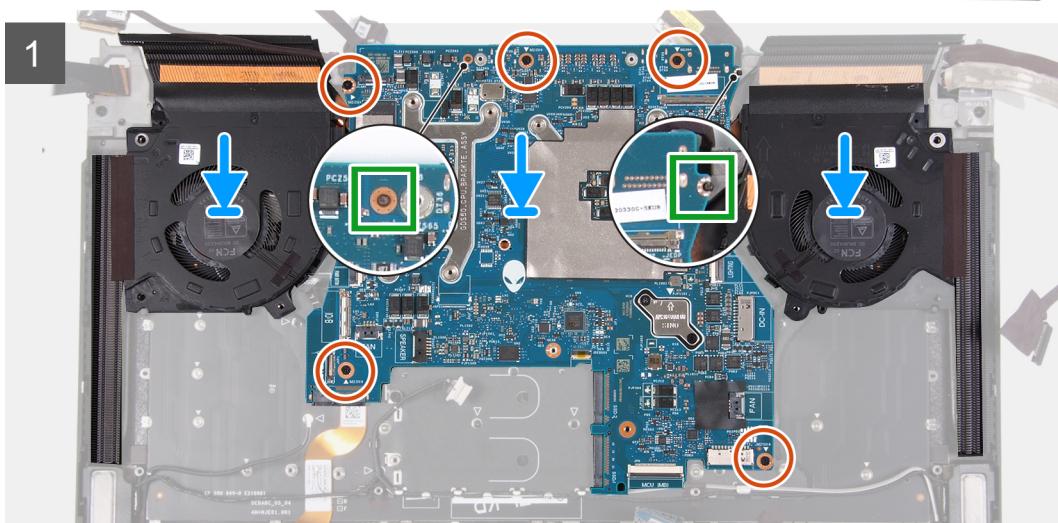
- NVIDIA GeForce RTX 3070

• NVIDIA GeForce RTX 3080

The following image indicates the connectors on your system board.



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



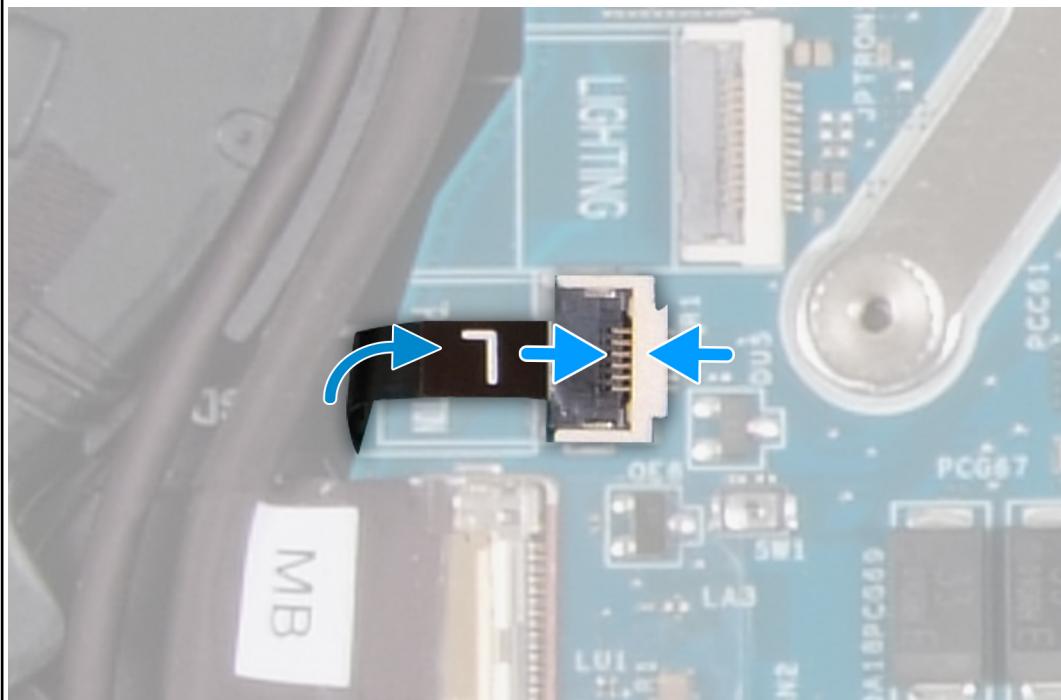
## Steps

1. Turn the system board over.
2. Install the [fan and heat-sink assembly](#).
3. Turn the system-board assembly over and place the system-board assembly on the palm-rest and keyboard assembly.
 

**(i) NOTE:** When installing the system-board assembly, align the system-board assembly to the positioning pins on the palm-rest and keyboard assembly and the extensions of the heat sink to the top edge of the palm-rest and keyboard assembly.
4. Align the screw holes on the system-board assembly with the screw holes on the palm-rest and keyboard assembly.
5. Replace the five screws (M2x4) that secure the system-board assembly to the palm-rest and keyboard assembly.
6. Adhere the display cable to the system board.
7. Slide the display cable into the connector on the system board and close the latch to secure the cable.
8. Adhere the tape that secures the display cable to the system board.
9. Align and place the power-adapter port cable and adhere the power-adapter port cable onto the fan and heat-sink assembly.
10. Connect the power-adapter port cable to the system board.

11. Slide the keyboard-controller board cable into the connector on the system board and close the latch to secure the cable.
12. Connect the speaker cable to the system board.
13. Connect the headset port cable to the system board and route it through the routing guides on the fan and heat-sink assembly.
14. Slide the I/O-board cable into the connector on the system board and close the latch to secure the cable.
15. Route the I/O-board cable through the routing guides on the fan and heat-sink assembly.
16. Adhere the tape that secures the I/O-board cable to the system board.
17. Slide the power-button board cable into the connector on the system board and close the latch to secure the cable.

**NOTE:** When installing the system-board assembly, ensure that the power-button board cable is placed on top of the system board. Overlooking the power-button board cable connection to the system board will result in no-power failure after service.



18. Adhere the Alien head LED cable to the system board and connect the Alien head LED cable to the system board.
19. Connect the camera cable to the system board and adhere the tape that secures the camera cable to the system board.
20. Adhere the headset-port cable to the palm-rest and keyboard assembly.

#### Next steps

1. Install the [solid-state drive bracket](#).
2. Install the [rear I/O-cover](#).
3. Install the [fans](#).
4. Install the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
5. Install the [wireless card](#).
6. Install the [battery](#).
7. Install the [base cover](#).
8. Follow the procedure in [After working inside your computer](#).

## Fan and heat-sink assembly

### Removing the fan and heat-sink assembly

#### Prerequisites

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

2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [wireless card](#).
5. Remove the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
6. Remove the [fans](#).
7. Remove the [rear I/O-cover](#).
8. Remove the [solid-state drive bracket](#).
9. Follow the procedure from step 1 to step 16 in [Removing the system board](#).

#### About this task

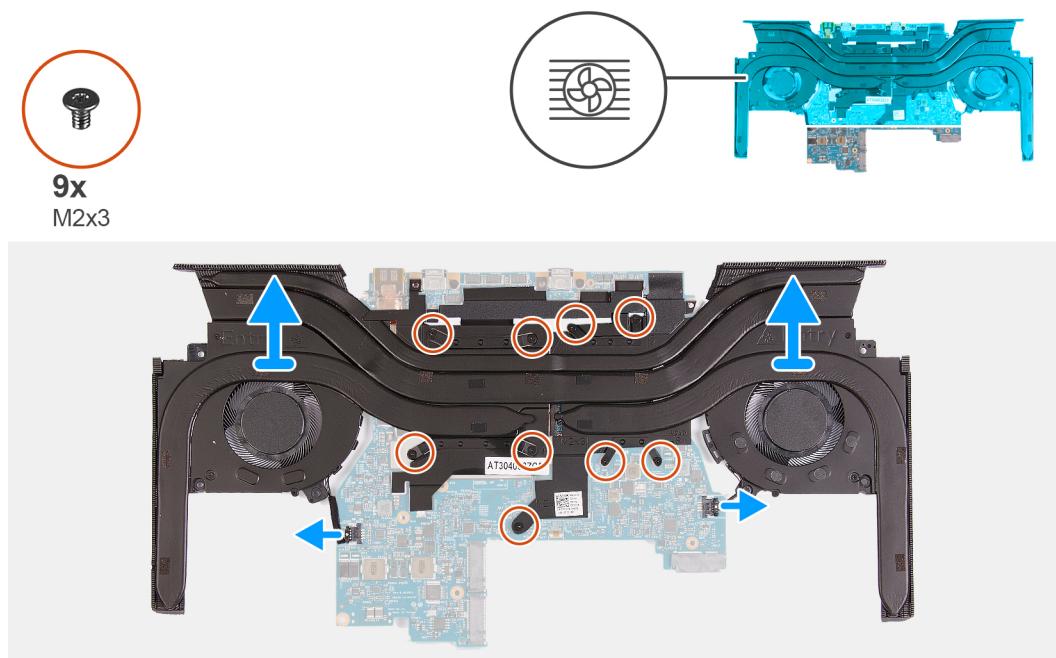
**NOTE:** When removing this component, please refer to the techsheet bundled with the service kit. This is only applicable for computers with the following Graphics Processing Unit (GPU) configurations that have Element 31 grease is applied to the CPU.

- NVIDIA GeForce RTX 3070
- NVIDIA GeForce RTX 3080

**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 image(s) indicate the location of the fan and heat-sink assembly and provides a visual representation of the removal procedure.



#### Steps

1. Turn the system-board assembly over.
2. Disconnect the left and right fan cables from the system board.
3. In the reverse sequential order (9>8>7>6>5>4>3>2>1), remove the nine screws (M2x3) that secure the fan and heat-sink assembly to the system board.
4. Lift the fan and heat-sink assembly off the system board.

**CAUTION:** Do not use an alcohol wipe to clean the Element 31 thermal grease off the surface of the processor, the alcohol solution from the wipes will dissolve the Element 31 grease into conductive metal particles. If these conductive metal particles come into contact with the surface of the system board, it will cause an electrical short when your computer is powered on.

# Installing the fan and heat-sink assembly

## Prerequisites

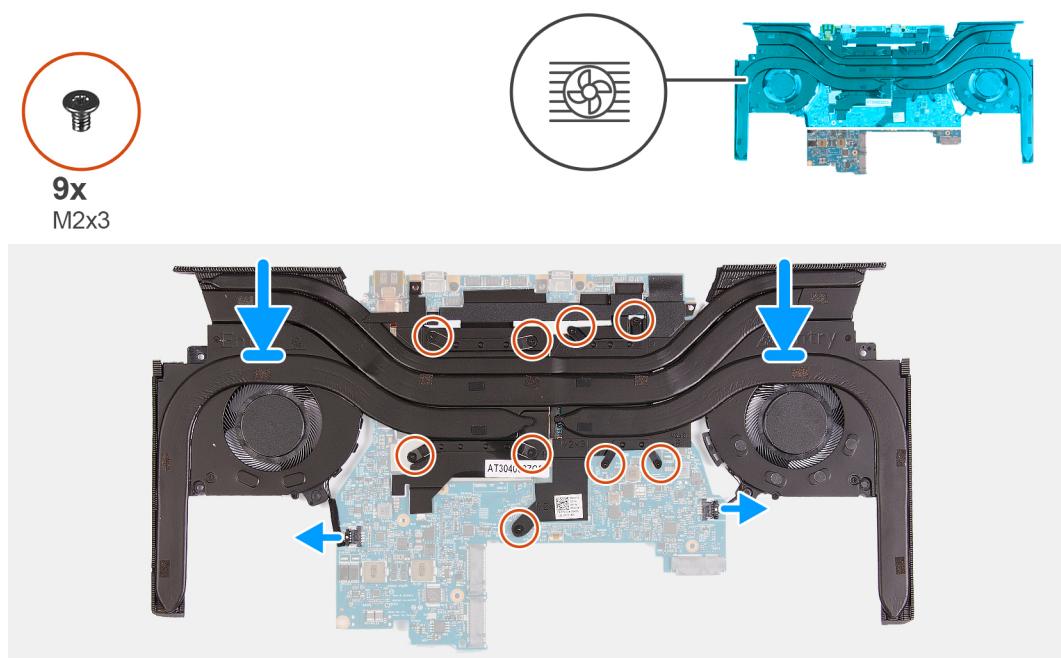
If you are replacing a component, remove the existing component before performing the installation process.

## About this task

**NOTE:** When installing this component, please refer to the techsheet bundled with the service kit. This is only applicable for computers with the following Graphics Processing Unit (GPU) configurations that have Element 31 grease is applied to the CPU.

- NVIDIA GeForce RTX 3070
- NVIDIA GeForce RTX 3080

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



## Steps

1. Align and place the fan and heat-sink assembly on the system board.
2. Align the screw holes on the fan and heat-sink assembly to the screw holes on the system board.
3. In the sequential order (1>2>3>4>5>6>7>8>9), replace the nine screws (M2x3) that secure the fan and heat-sink assembly to the system board.
4. Connect the left and right fan cables to the system board.

## Next steps

1. Follow the procedure from step 3 to step 20 in [Installing the system board](#).
2. Install the [solid-state drive bracket](#).
3. Install the [rear I/O-cover](#).
4. Install the [fans](#).
5. Install the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
6. Install the [wireless card](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Follow the procedure in [After working inside your computer](#).

# I/O board

## Removing the I/O board

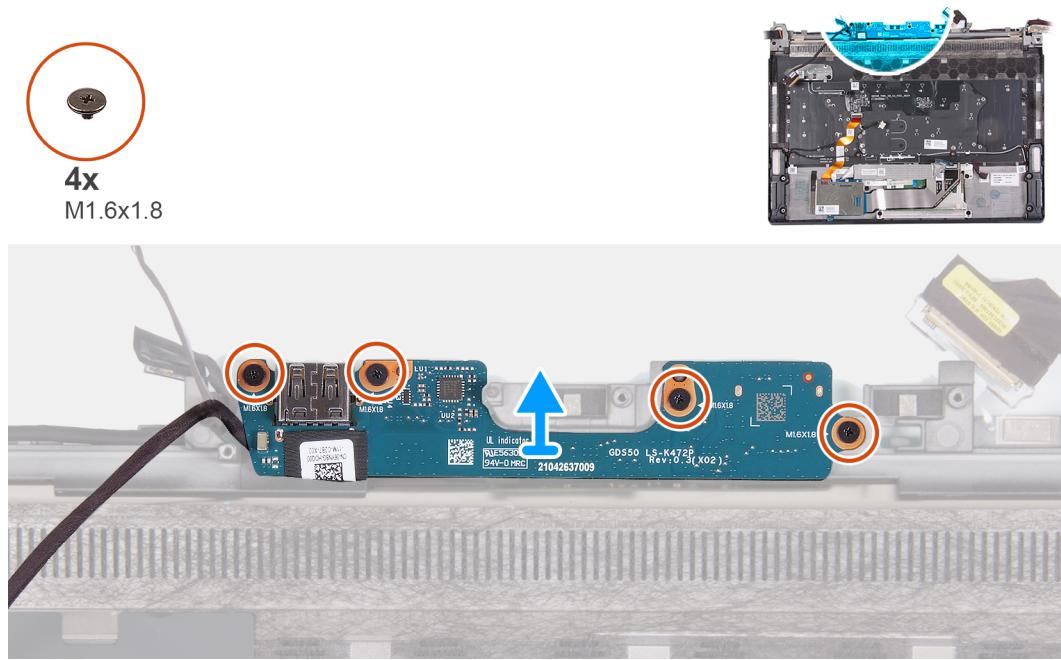
### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [wireless card](#).
5. Remove the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
6. Remove the [fans](#).
7. Remove the [rear I/O-cover](#).
8. Remove the [solid-state drive bracket](#).
9. Follow the procedure from step 1 to step 16 in [Removing the system board](#).

**(i) | NOTE:** The system board can be removed and installed along with the heat sink. This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board and heat sink.

### About this task

The following image(s) indicate the location of the I/O board and provides a visual representation of the removal procedure.



### Steps

1. Remove the four screws (M1.6x1.8) that secure the I/O board to the palm-rest and keyboard assembly.
2. Lift the I/O board off the palm-rest and keyboard assembly.

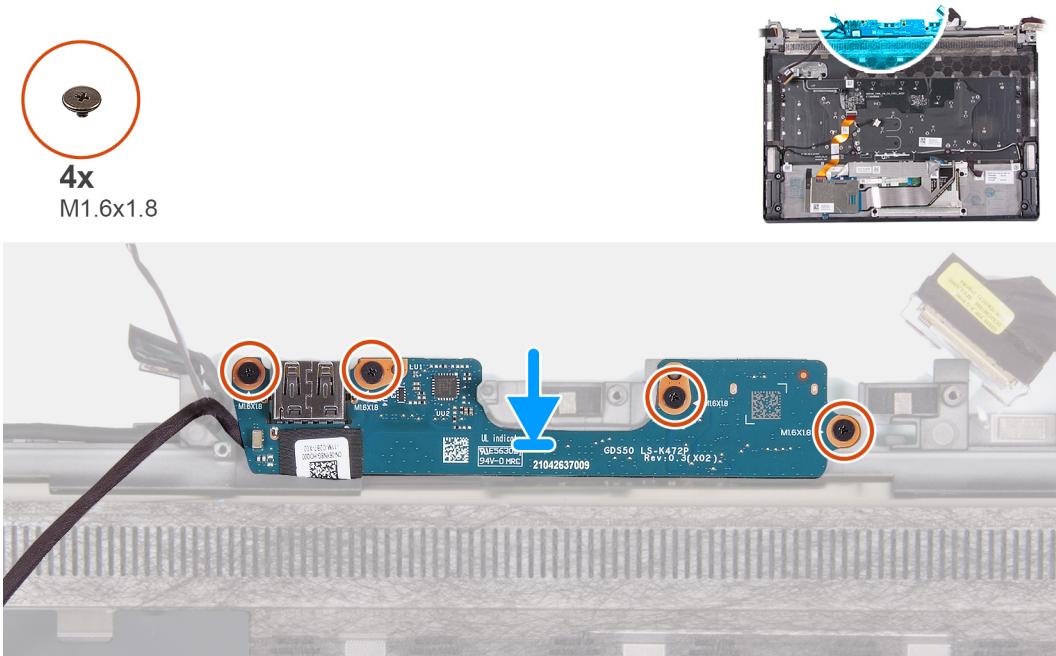
## Installing the I/O board

### 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 I/O board and provides a visual representation of the installation procedure.



## Steps

1. Align the screw holes on the I/O board with the screw holes on the palm-rest and keyboard assembly.
2. Replace the four screws (M1.6x1.8) that secure the I/O board to the palm-rest and keyboard assembly.

## Next steps

1. Follow the procedure from step 3 to step 20 in [Installing the system board](#).
2. **NOTE:** The system board can be removed and installed along with the heat sink. This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board and heat sink.
3. Install the [solid-state drive bracket](#).
4. Install the [rear I/O-cover](#).
5. Install the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
6. Install the [wireless card](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Follow the procedure in [After working inside your computer](#).

## Power button

### Removing the power button

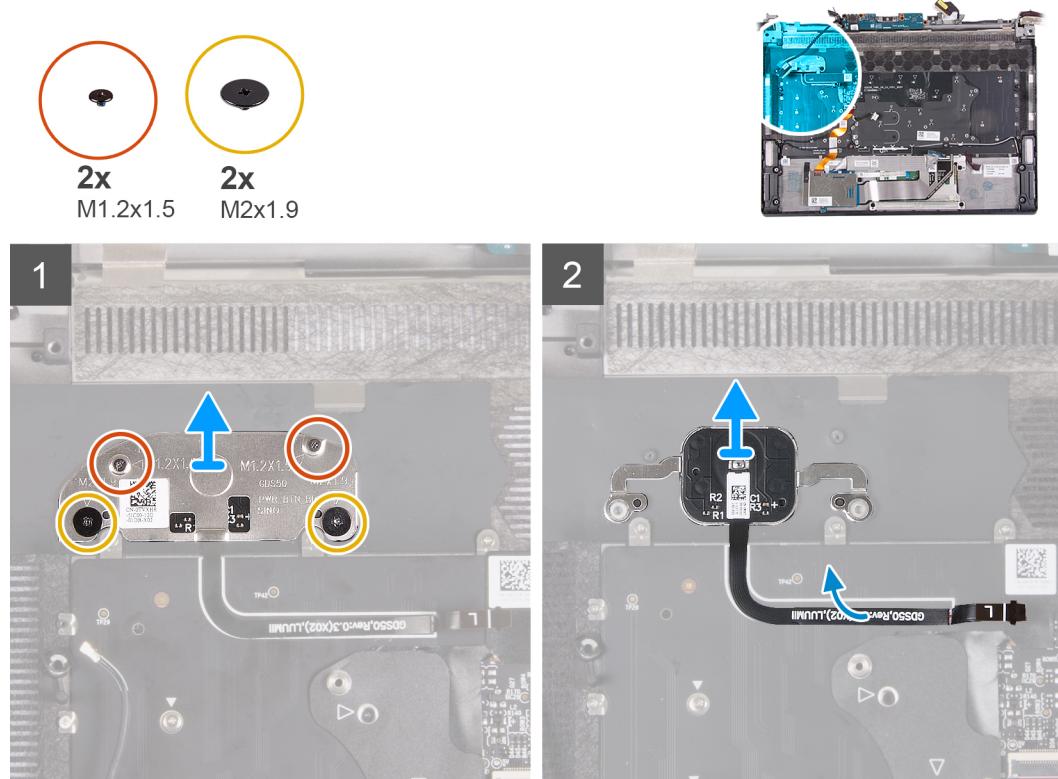
#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [wireless card](#).
5. Remove the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
6. Remove the [fans](#).
7. Remove the [rear I/O-cover](#).
8. Remove the [solid-state drive bracket](#).
9. Follow the procedure from step 1 to step 16 in [Removing the system board](#).

**NOTE:** The system board can be removed and installed along with the heat sink. This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board and heat sink.

#### About this task

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



#### Steps

1. Remove the two (M2x1.9) screws that secure the power-button bracket to the palm-rest and keyboard assembly.
2. Remove the two (M1.2x1.5) screws that secure the power-button bracket to the palm-rest and keyboard assembly.
3. Lift the power-button bracket off the power button.
4. Lift the power button, along with its cable, off the palm-rest and keyboard assembly.

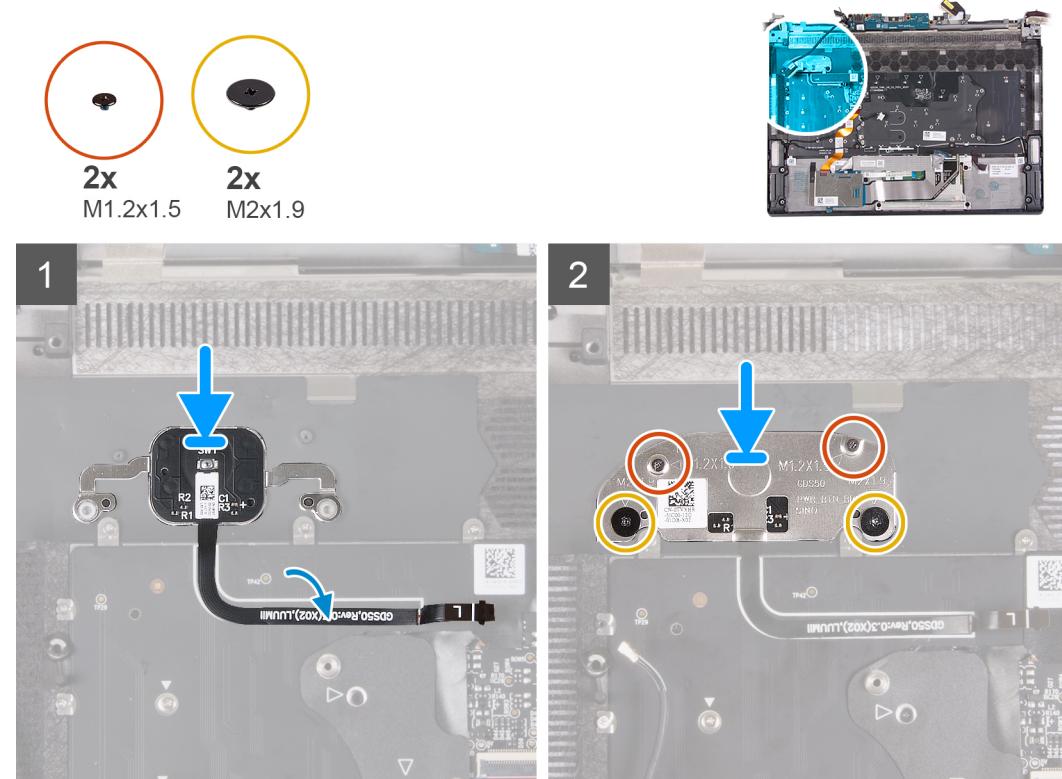
## Installing the power button

#### 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.



### Steps

1. Align and place the power button, along with its cable, into the slot on the palm-rest and keyboard assembly.
2. Align the screw holes on the power-button bracket to the screw holes on the palm-rest and keyboard assembly.
3. Replace the two screws (M2x1.9) that secure the power-button bracket to the palm-rest and keyboard assembly.
4. Replace the two screws (M1.2x1.5) that secure the power-button bracket to the palm-rest and keyboard assembly.

### Next steps

1. Follow the procedure from step 3 to step 20 in [Installing the system board](#).
 

**NOTE:** The system board can be removed and installed along with the heat sink. This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board and heat sink.
2. Install the [solid-state drive bracket](#).
3. Install the [rear I/O-cover](#).
4. Install the [fans](#).
5. Install the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
6. Install the [wireless card](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Follow the procedure in [After working inside your computer](#).

## Palm-rest and antenna assembly

### Removing the palm-rest and keyboard assembly

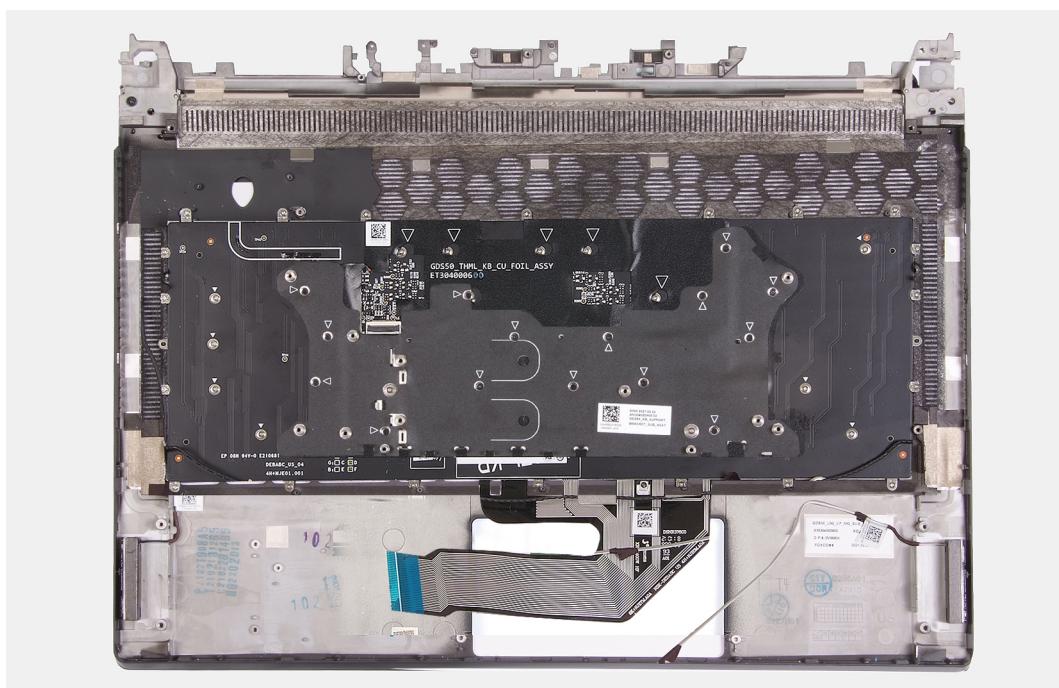
#### Prerequisites

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

4. Remove the [wireless card](#).
5. Remove the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.
6. Remove the [solid-state drive bracket](#).
7. Remove the [fans](#).
8. Remove the [rear I/O-cover](#).
9. Remove the [power-adapter port](#).
10. Remove the [headset port](#).
11. Remove the [display assembly](#).
12. Remove the [speakers](#).
13. Remove the [touchpad](#).
14. Remove the [keyboard-controller board](#).
15. Remove the [system board](#).  
**i** **NOTE:** The system board can be removed and installed along with the heat sink. This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board and heat sink.
16. Remove the [I/O-board](#).
17. Remove the [power button](#).

#### About this task

The following image(s) indicate the location of the palm-rest and keyboard assembly and provides a visual representation of the removal procedure.



#### Steps

After performing the pre-requisites, you are left with the palm-rest and keyboard assembly.

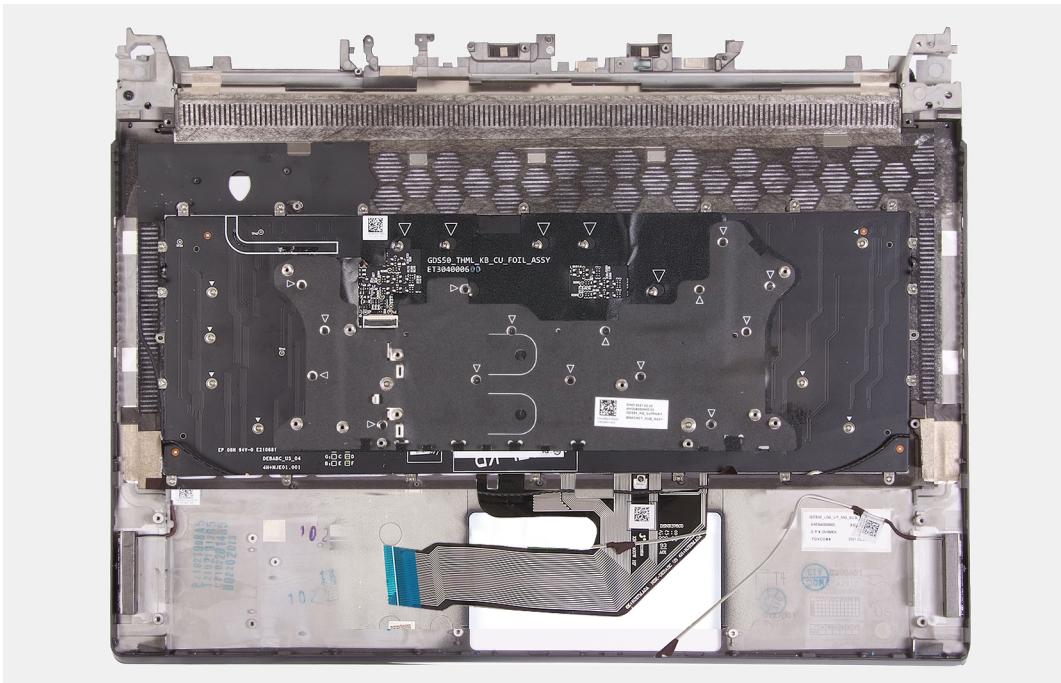
## Installing the palm-rest and keyboard assembly

#### 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 palm-rest and keyboard assembly and provides a visual representation of the installation procedure.



## Steps

To install the palm-rest and keyboard assembly, perform the postrequisites.

## Next steps

1. Install the [power button](#).

2. Install the [I/O-board](#).

3. Install the [system board](#).

**NOTE:** The system board can be removed and installed along with the heat sink. This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board and heat sink.

4. Install the [keyboard-controller board](#).

5. Install the [touchpad](#).

6. Install the [speakers](#).

7. Install the [display assembly](#).

8. Install the [headset port](#).

9. Install the [power-adapter port](#).

10. Install the [rear I/O-cover](#).

11. Install the [fans](#).

12. Install the [solid-state drive bracket](#).

13. Install the [M.2 2230 solid-state drive](#) or [M.2 2280 solid-state drive](#), as applicable.

14. Install the [wireless card](#).

15. Install the [battery](#).

16. Install the [base cover](#).

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

# Drivers and downloads

When troubleshooting, downloading or installing drivers it is recommended that you read the Dell Knowledge Based article, Drivers and Downloads FAQ [000123347](#).

# 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.

## Entering BIOS setup program

### About this task

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

## Navigation keys

 **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 allows 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 (if available)

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

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

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

# System setup options

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

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

<b>Main</b>	
System Time	Displays the current time in hh:mm:ss format.
System Date	Displays the current date in mm/dd/yyyy format.
BIOS Version	Displays the BIOS version.
Product Name	Displays the model number of your computer.
Service Tag	Displays the service tag of your computer.
Asset Tag	Displays the asset tag of your computer.
CPU Type	Displays the processor type.
CPU Speed	Displays the processor speed.
CPU ID	Displays the processor identification code.
<b>CPU Cache</b>	
L1 Cache	Displays the processor L1 cache size.
L2 Cache	Displays the processor L2 cache size.
L3 Cache	Displays the processor L3 cache size.
M.2 PCIe SSD-1	Display the M.2 PCIe SSD device information of the computer.
M.2 PCIe SSD-2	Display the M.2 PCIe SSD device information of the computer.
AC Adapter Type	Displays the type of AC adapter.
System Memory	Displays the size of memory installed.
Memory Speed	Displays the speed of memory.
Keyboard Type	Displays the type of keyboard installed on the computer.

**Table 4. System setup options—Advance menu**

<b>Advance</b>	
Integrated NIC	Enables or disables the Integrated NIC. Default: Enabled
USB Emulation	Enables or disables the USB emulation feature. This feature defines how the BIOS, in the absence of a USB-aware operating system, handles USB devices. USB emulation is always enabled during POST. <b>i</b> <b>NOTE:</b> You cannot boot any type of USB device (floppy, hard drive, or memory key) when this option is off. Default: Enabled
USB PowerShare	Enables or disables USB PowerShare. Default: Enabled
USB Wake Support	Enables or disables the USB Wake Support. Default: Enabled
SATA Operation	Allows you to configure the operating mode of the integrated SATA hard drive controller.

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

<b>Advance</b>	
Adapter Warnings	Default: AHCI  Allows you to choose if the computer should display warning messages when you use AC adapters that are not supported by your computer.
Function Key Behavior	Default: Enabled  Allows you to set function key or multimedia key as the default function key behavior.
Keyboard Backlight with AC	Default: Multimedia key  Selects the timeout value for the keyboard backlight when an AC adapter is plugged into the computer.
Keyboard Backlight with Battery	Default: 1 minute  Selects the timeout value for the keyboard backlight when the computer is running on battery power.
Battery Health	Default: 1 minute  Displays the battery health.
Battery Charge Configuration	Set the battery charge settings with a preselected custom charge start and stop.
Advance Battery Charge Configuration	Default: Adaptive  Set the battery charge settings with a preselected custom charge start and stop.
Power on LID open	Default: Adaptive  Selects the power-on option when the display is open.
<b>Maintenance</b>	
Data Wipe on next boot	Default: Disabled  Enables or disables data wipe on the next boot.
BIOS Recovery from Hard Drive	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.
BIOS Auto-Recovery	Enables BIOS to automatically recover BIOS without user actions.
Default: Disabled	
<b>SupportAssist System Resolution</b>	
Auto OS Recovery Threshold	Controls the automatic boot flow for SupportAssist System Resolution Console and for the Dell operating system Recovery tool.
SupportAssist OS Recovery	Default: 2  Enables or disables the boot flow for the SupportAssist OS Recovery tool in the even of certain system errors.
Default: Disabled	

**Table 5. System setup options—Security menu**

<b>Security</b>	
Admin Password	Displays if the administrator password is clear or set.
System Password	Displays if the system password is clear or set.
	Default: Not Set
Admin Password	Allows you to set the administrator password. The administrator password controls access to the system setup utility.
System Password	Allows you to set the system password. The system password controls access to the computer at boot.
Password Change	Allows you to permit or deny system password or HDD password changes.
	Default: Permitted
Absolute®	Enables or disables the BIOS module interface of the optional Computrace Service from Absolute Software.
	Default: Deactivate
Absolute® Status	Enables or disables SED Block SID Authentication.
	Default: Disabled
Windows SMM Security Mitigations Table (WSMT)	Enables or disables the Windows SMM Security Mitigations Table. It allows the system firmware to confirm to the OS that certain security best practices have been implemented in the System Management Mode (SMM) software.
	Default: Disabled
Firmware TPM	Enable or disable the firmware TPM.
	Default: Enabled
PPI Bypass for Clear Command	Allows you to control the TPM Physical Presence Interface (PPI). When enabled, this setting will allow the OS to skip BIOS PPI user prompts when issuing the Clear command. Changes to this setting take effect immediately.
	Default: Disabled
UEFI Firmware Capsule Updates	Enables or disables BIOS updates through UEFI capsule update packages.
	Default: Enabled
Secure Boot	Enables or disables configuration of platform features on Dell Client Systems with WSMT-enabled BIOS.
	Default: Enabled

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

<b>Boot</b>	
Boot List Option	Displays the boot options.
	Default: UEFI
File Browser Add Boot Option	Allows you to add the boot options.
<b>Windows Boot Manager</b>	Display boot options in Windows
UEFI Boot	Enables or disables UEFI boot.
	Default: Disabled

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

Exit	
Exit Saving Changes	Allows you to exit system setup and save your changes.
Save Change Without Exit	Allows you to save your changes without exiting the BIOS setup.
Exit Discarding Changes	Allows you to exit the BIOS setup without saving the changes.
Load Optimal Defaults	Allows you to restore default values for all system setup options.
Discard Changes	Allows you to load previous values for all system setup options.

## System and setup password

**Table 8. 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 F12 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.
  - At least one special character: ! " # \$ % & ' ( ) \* + , - . / : ; < = > ? @ [ \ ] ^ \_ ` { | }
  - Numbers 0 through 9.
  - Upper case letters from A to Z.
  - 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 Esc and save the changes as prompted by the pop-up message.
5. Press Y to save the changes. The computer restarts.

# 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/or 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 F12 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**, 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 and/or Setup password, reenter the new password when prompted. If you delete the System and/or 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 CMOS settings

## About this task

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

## Steps

1. Remove the [base cover](#).
2. Wait for one minute.
3. Replace the [base cover](#).

# Clearing BIOS (System Setup) and System passwords

## About this task

To clear the system or BIOS passwords, contact Dell technical support as described at [www.dell.com/contactdell](http://www.dell.com/contactdell).

 **NOTE:** For information on how to reset Windows or application passwords, refer to the documentation accompanying Windows or your application.

# Updating the BIOS

## Updating the BIOS in Windows

## Steps

1. Go to [www.dell.com/support](http://www.dell.com/support).
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.

**(i) | NOTE:** If you do not have the Service Tag, use the SupportAssist feature 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, see knowledge base article [000124211](https://www.dell.com/support/article/000124211) at [www.dell.com/support](https://www.dell.com/support).

## Updating the BIOS using the USB drive in Windows

### Steps

1. Follow the procedure from step 1 to step 6 in [Updating the BIOS in Windows](#) to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article [000145519](https://www.dell.com/support/article/000145519) at [www.dell.com/support](https://www.dell.com/support).
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12**.
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.  
The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

# Troubleshooting

## Handling swollen Lithium-ion batteries

Like most laptops, Dell laptops use lithium-ion batteries. One type of lithium-ion battery is the lithium-ion polymer battery. Lithium-ion polymer batteries have increased in popularity in recent years and have become standard in the electronics industry due to customer preferences for a slim form factor (especially with newer ultra-thin laptops) and long battery life. Inherent to lithium-ion polymer battery technology is the potential for swelling of the battery cells.

Swollen battery may impact the performance of the laptop. To prevent possible further damage to the device enclosure or internal components leading to malfunction, discontinue the use of the laptop and discharge it by disconnecting the AC adapter and letting the battery drain.

Swollen batteries should not be used and should be replaced and disposed of properly. We recommend contacting Dell product support for options to replace a swollen battery under the terms of the applicable warranty or service contract, including options for replacement by a Dell authorized service technician.

The guidelines for handling and replacing Lithium-ion batteries are as follows:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery before removing it from the system. To discharge the battery, unplug the AC adapter from the system and operate the system only on battery power. When the system will no longer power on when the power button is pressed, the battery is fully discharged.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any type to pry on or against the battery.
- If a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a battery can be dangerous.
- Do not attempt to reassemble a damaged or swollen battery into a laptop.
- Swollen batteries that are covered under warranty should be returned to Dell in an approved shipping container (provided by Dell)—this is to comply with transportation regulations. Swollen batteries that are not covered under warranty should be disposed of at an approved recycling center. Contact Dell product support at <https://www.dell.com/support> for assistance and further instructions.
- Using a non-Dell or incompatible battery may increase the risk of fire or explosion. Replace the battery only with a compatible battery purchased from Dell that is designed to work with your Dell computer. Do not use a battery from other computers with your computer. Always purchase genuine batteries from <https://www.dell.com> or otherwise directly from Dell.

Lithium-ion batteries can swell for various reasons such as age, number of charge cycles, or exposure to high heat. For more information on how to improve the performance and lifespan of the laptop battery and to minimize the possibility of occurrence of the issue, see [Dell Laptop Battery - Frequently Asked Questions](#).

## Locate the Service Tag or Express Service Code of your Dell computer

Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, we recommend entering the Service Tag or Express Service Code at [www.dell.com/support](https://www.dell.com/support).

For more information on how to find the Service Tag for your computer, see [Locate the Service Tag for your Dell Laptop](#).

## System-diagnostic lights

### Power and battery-status light

The power and battery status light indicates the power and battery status of the computer. These are the power states:

**Solid white:** Power adapter is connected and the battery has more than 5% charge.

**Amber:** Computer is running on battery and the battery has less than 5% charge.

**Off:**

- Power adapter is connected, and the battery is fully charged.
- Computer is running on battery, and the battery has more than 5% charge.
- Computer is in sleep state, hibernation, or turned off.

The power and battery-status light may also blink red or blue according to pre-defined "beep codes" indicating various failures.

For example, the power and battery-status light blinks red two times followed by a pause, and then blinks blue 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 and battery-status light patterns and associated problems.

**(i) 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 assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

**Table 9. Diagnostic-light LED codes**

Diagnostic light codes (Red, Blue)	Problem description
------------------------------------	---------------------

2,1	Processor failure
2,2	System board: BIOS or ROM (Read-Only Memory) failure
2,3	No memory or RAM (Random-Access Memory) detected
2,4	Memory or RAM (Random-Access Memory) failure
2,5	Invalid memory installed
2,6	System-board or chipset error
2,7	Display failure - SBIOS message
3,1	Coin-cell battery failure
3,2	PCI, video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete
3,7	Management Engine (ME) error

## SupportAssist diagnostics

**About this task**

The SupportAssist diagnostics (previously known as ePSA diagnostics) performs a complete check of your hardware. The SupportAssist diagnostics is embedded in the BIOS and is launched by it internally. The SupportAssist diagnostics provides a set of options for particular devices or device groups. It allows 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 and provide extra information about the failed device(s)
- View status messages that indicate if the tests are completed successfully
- View error messages that indicate if problems were encountered during the test

**(i) NOTE:** Some tests are meant for specific devices and require user interaction. Ensure that you are present in front of the computer when the diagnostic tests are performed.

For more information, see [SupportAssist Pre-Boot System Performance Check](#).

# Recovering the operating system

When your computer is unable to boot to the operating system even after repeated attempts, it automatically starts Dell SupportAssist OS Recovery.

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

You can also download it from the Dell Support website to troubleshoot and fix your computer when it fails to boot into their primary operating system due to software or hardware failures.

For more information about the Dell SupportAssist OS Recovery, see *Dell SupportAssist OS Recovery User's Guide* at [www.dell.com/serviceabilitytools](http://www.dell.com/serviceabilitytools). Click **SupportAssist** and then, click **SupportAssist OS Recovery**.

## WiFi power cycle

### About this task

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

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

### Steps

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

## Drain residual flea power (perform hard reset)

### About this task

Flea power is the residual static electricity that remains in the computer even after it has been powered off and the battery is removed.

For your safety, and to protect the sensitive electronic components in your computer, you are requested to drain residual flea power before removing or replacing any components in your computer.

Draining residual flea power, also known as a performing a "hard reset", is also a common troubleshooting step if your computer does not power on or boot into the operating system.

### To drain residual flea power (perform a hard reset)

### Steps

1. Turn off your computer.
2. Disconnect the power adapter from your computer.
3. Remove the base cover.
4. Remove the battery.
5. Press and hold the power button for 20 seconds to drain the flea power.
6. Install the battery.
7. Install the base cover.
8. Connect the power adapter to your computer.
9. Turn on your computer.

① **NOTE:** For more information about performing a hard reset, see the knowledge base article [000130881](http://www.dell.com/support) at [www.dell.com/support](http://www.dell.com/support).

# Getting help and contacting Alienware

## Self-help resources

You can get information and help on Alienware products and services using these online self-help resources:

**Table 10. Alienware products and online self-help resources**

Self-help resources	Resource location
Information about Alienware products and services	<a href="http://www.alienware.com">www.alienware.com</a>
My Dell app	
Tips	
Contact Support	In Windows search, type <b>Contact Support</b> , and press <b>Enter</b> .
Online help for operating system	<a href="http://www.dell.com/support/windows">www.dell.com/support/windows</a>
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents.	Your Alienware computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at <a href="http://www.dell.com/support">www.dell.com/support</a> . For more information on how to find the Service Tag for your computer, see <a href="#">Locate the Service Tag on your computer</a> .
VR Support	<a href="http://www.dell.com/VRsupport">www.dell.com/VRsupport</a>
Videos providing step-by-step instructions to service your computer	<a href="http://www.youtube.com/alienwareservices">www.youtube.com/alienwareservices</a>

## Contacting Alienware

To contact Alienware for sales, technical support, or customer service issues, see [www.alienware.com](http://www.alienware.com).

**(i) | NOTE:** Availability varies by country/region and product, and some services may not be available in your country/region.

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