

# Dell G7 15 7500

## Service Manual

## Notes, cautions, and warnings

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

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

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

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# Working inside your computer

## 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.

 **NOTE:** 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).

 **NOTE:** 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 thumb-screws 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.

 **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

## Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #0
- Phillips screwdriver #1
- 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 surface 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
2280 solid-state drive thermal bracket	Solid-state drive and system board	M2x4	2	
2230 solid-state drive thermal bracket	System board	M2x4	1	
2230 solid-state drive	System board	M2x4	1	
Base cover	Palm-rest and keyboard assembly	M2x5	6	
Battery	Palm-rest and keyboard assembly	M2x3	4	
Battery	Palm-rest and keyboard assembly	M2x4	4	
Processor fan	System board and palm-rest and keyboard assembly	M2x4	2	
Display-assembly cable holder	Palm-rest and keyboard assembly	M2x4	2	
Display hinges	Palm-rest and keyboard assembly	M2.5x2.5	8	

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

Component	Secured to	Screw type	Quantity	Screw image
I/O board	Palm-rest and keyboard assembly	M2x4	2	
Finger-print reader	Palm-rest and keyboard assembly	M2x2.5	1	
Graphics-card fan	System board and palm-rest and keyboard assembly	M2x4	2	
Graphics card-processor thermal shield cover	System board	M2x2	2	
G-key	System board	M2x2.5	3	
Keyboard bracket	Palm-rest and keyboard assembly	M1.2x2.5	41	
Power-adapter port	Palm-rest and keyboard assembly	M2x2.5	1	
Power-button board	Palm-rest and keyboard assembly	M2x2.5	2	
Rear-cover bracket	System board	M2x5	4	
Rear cover	System board	M2x4	3	
Rear cover	System board	M1.6x4	2	
Speakers	Palm-rest and keyboard assembly	M2x2	4	
System board	Palm-rest and keyboard assembly	M2x2.5	5	
Touchpad bracket	Palm-rest and keyboard assembly	M2x2.5	5	
Touchpad	Palm-rest and keyboard assembly	M2x2	2	
Type-C bracket	System board	M2.5x5	2	
Wireless-card bracket	Palm-rest and keyboard assembly	M2x4	1	

# Base cover

## Removing the base cover

### Prerequisites

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

### About this task

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



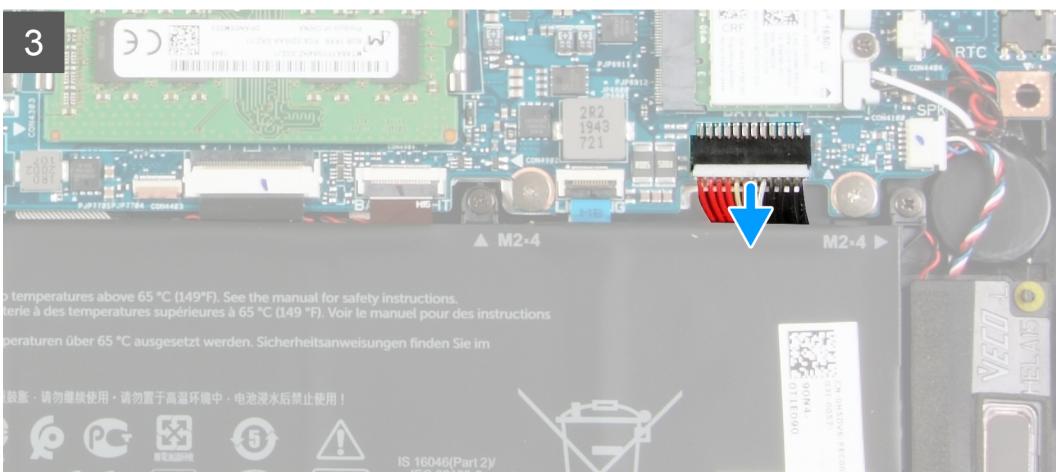
1



2



3



## Steps

1. Remove the six screws (M2x5) that secure the base cover to the palm-rest and keyboard assembly.
2. Loosen the two captive screws that secure the base cover to the palm-rest and keyboard assembly.

**CAUTION:** Do not pull on or pry the base cover at the side where the hinges are located; doing so may damage the base cover.

**NOTE:** Loosening the two captive screws on the base cover creates a gap which can be used to pry and lift the base cover off the palm-rest and keyboard assembly.

3. Starting from the top-right corner, use a plastic scribe to pry the base cover and to release the base cover from the tabs. Lift the base cover off the palm-rest and keyboard assembly.

***(i) NOTE: The following steps are applicable only if you want to further remove any other component from your computer.***

4. Disconnect the battery cable from the system board.
5. Turn your computer over and press the power button for 15 seconds to drain the flea power.

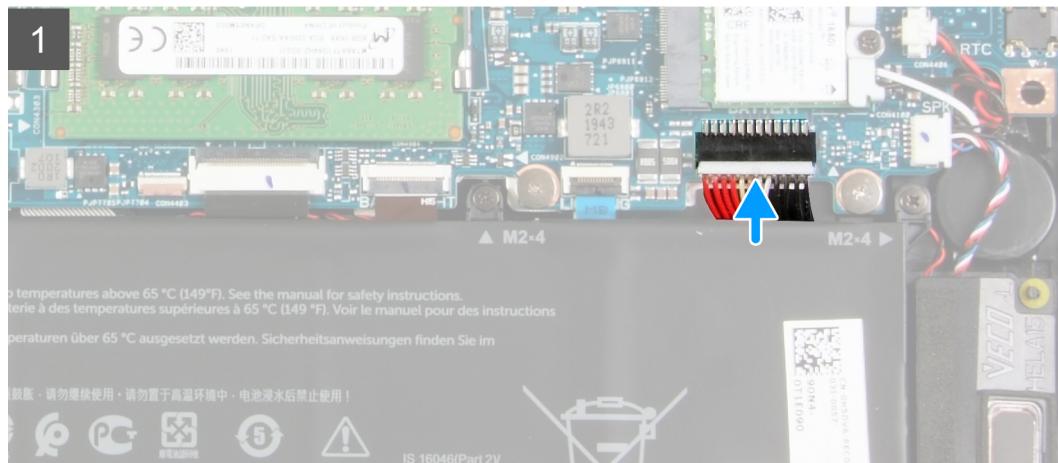
## Installing the base cover

### Prerequisites

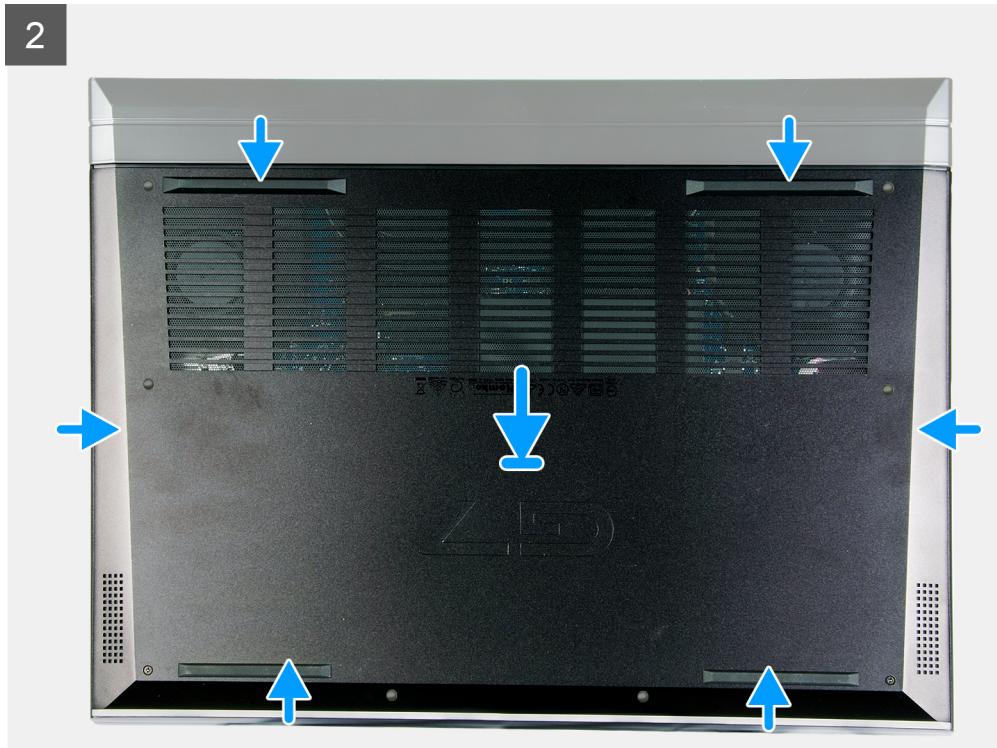
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



2



2x



6x  
M2x5

3



### Steps

1. Connect the battery cable to the system board, if the battery had been previously disconnected.

2. Align the screw holes on the base cover with the screw holes on the palm-rest and keyboard assembly, and then snap the base cover into place.
3. Tighten the two captive screws that secure the base cover to the palm-rest and keyboard assembly.
4. Replace the six screws (M2x5) 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.**

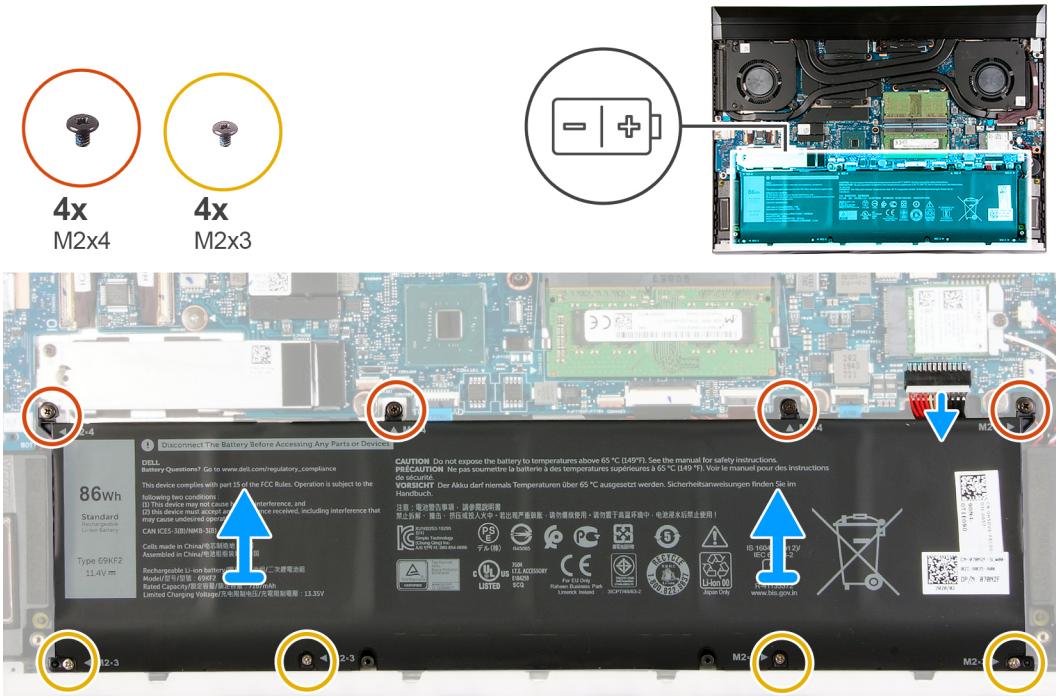
### Removing the battery

#### Prerequisites

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

#### About this task

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



## Steps

1. Disconnect the battery cable from the system board, if it is not previously disconnected.
2. Remove the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
3. Remove the four screws (M2x3) that secure the battery to the palm-rest and keyboard assembly.
4. Lift the battery off the palm-rest and keyboard assembly.

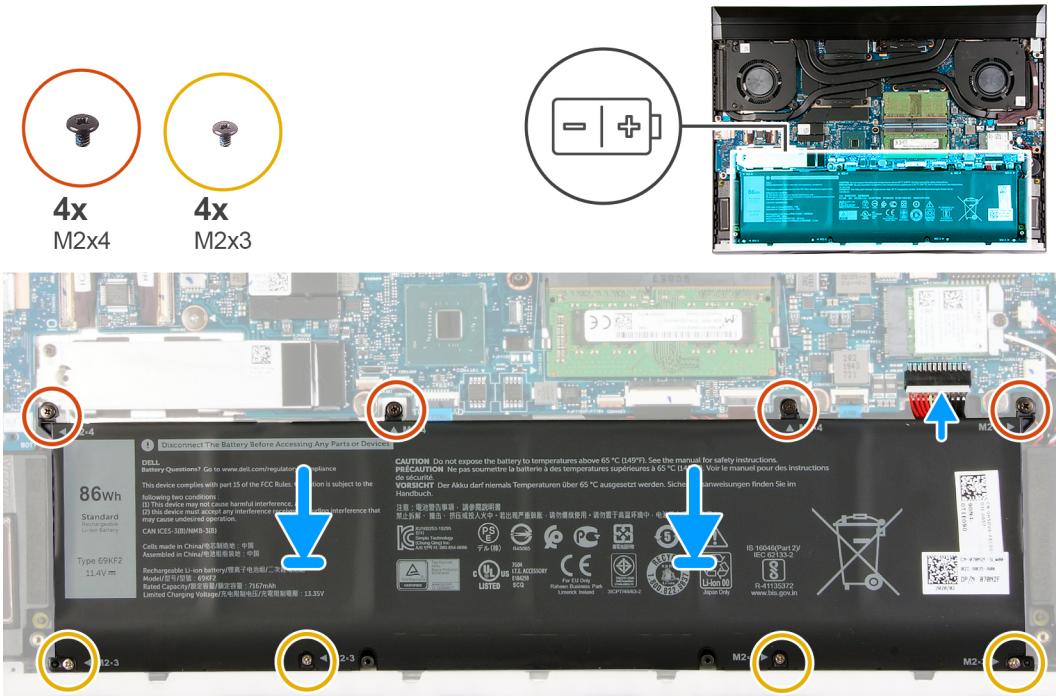
## Installing the battery

### Prerequisites

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

### About this task

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



## Steps

1. Align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.
2. Replace the four screws (M2x3) that secure the battery to the palm-rest and keyboard assembly.
3. Replace the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
4. 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](#).

## Coin-cell battery

## Removing the coin-cell battery

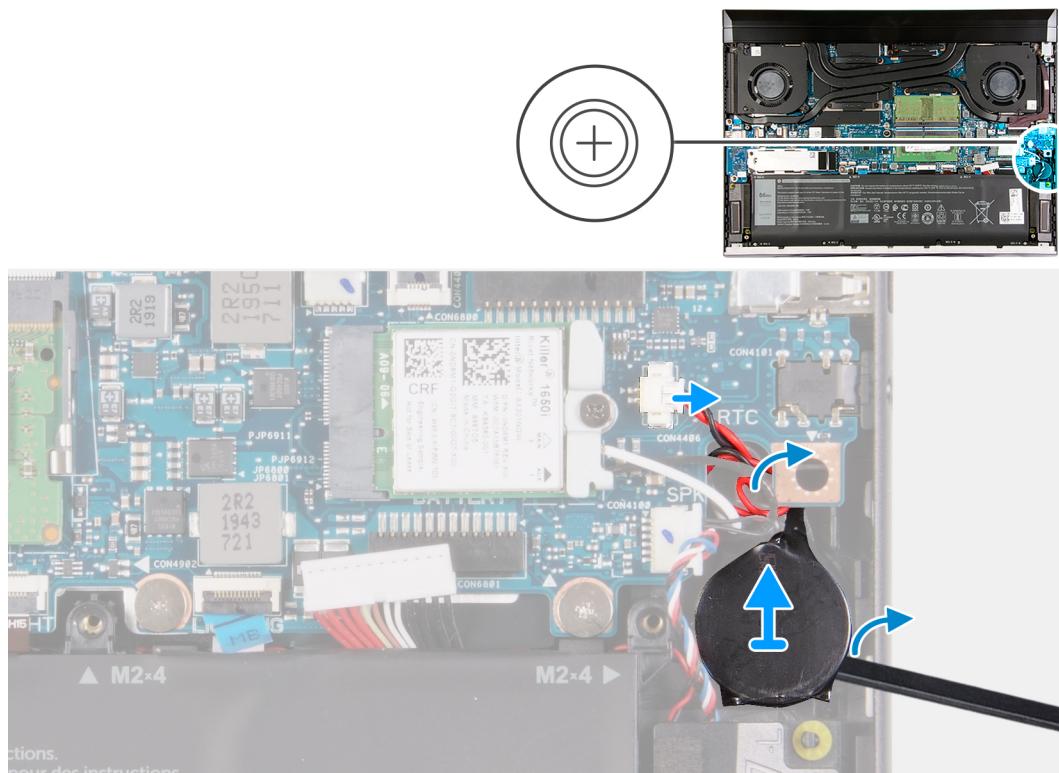
### Prerequisites

**⚠ CAUTION:** Removing the coin-cell 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 coin-cell battery.

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

### About this task

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



### Steps

1. Disconnect the coin-cell battery cable from the system board.
2. Remove the coin-cell battery cable from the routing guide and under the speaker cable.
3. Using a plastic scribe, peel the coin-cell battery off the palm-rest and keyboard assembly.

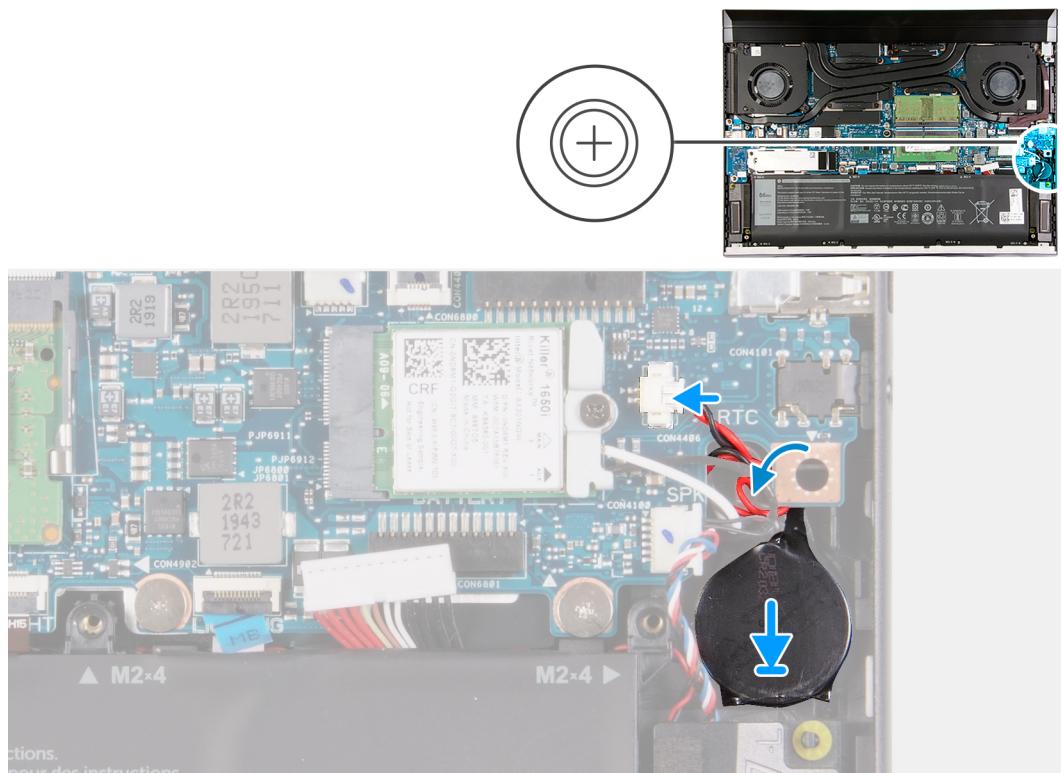
## Installing the coin-cell battery

### Prerequisites

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

### About this task

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



### Steps

1. Adhere the coin-cell battery to the palm-rest and keyboard assembly.
2. Route the coin-cell battery cable under the speaker cable and through the routing guides.
3. Connect the coin-cell battery cable to the system board.

### Next steps

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

## Rear cover

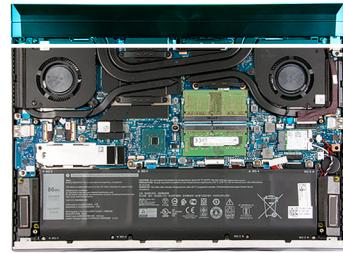
### Removing the rear cover

#### Prerequisites

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

#### About this task

The following image indicates the location of the rear cover and provides a visual representation of the removal procedure.



### Steps

1. Remove the three screws (M2x4) that secure the rear cover to the palm-rest and keyboard assembly.
2. Remove the two screws (M1.6x4) that secure the rear cover to the system board.
3. Push the rear cover away from the system board and lift it off the palm-rest and keyboard assembly.

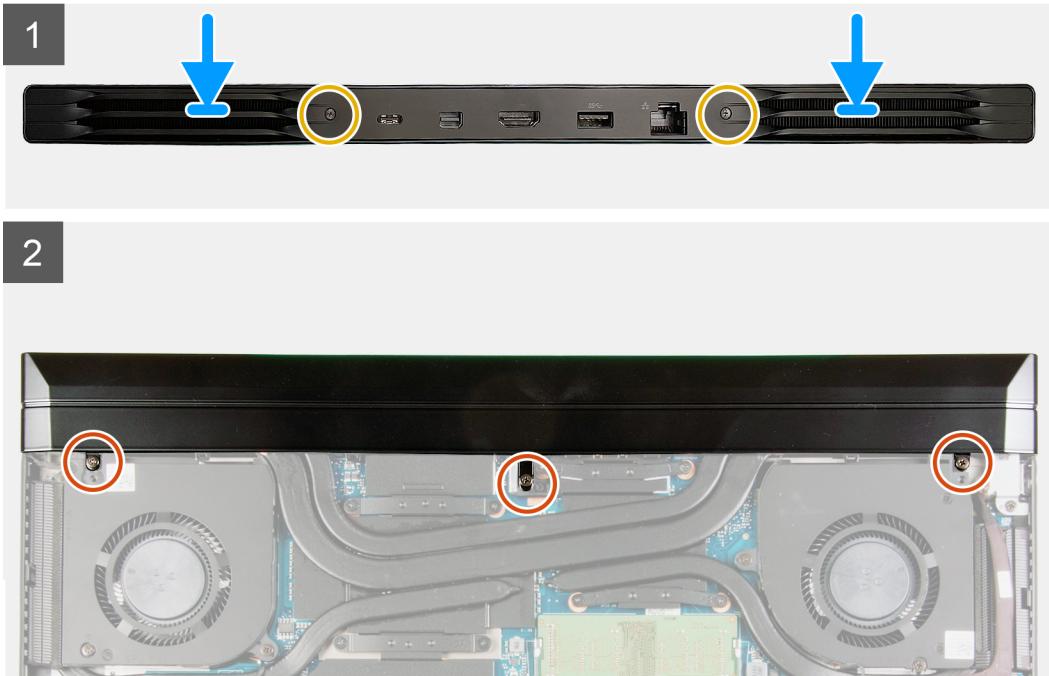
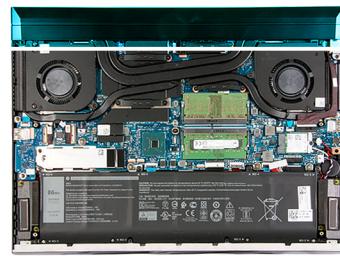
## Installing the rear cover

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



### Steps

1. Slide the rear cover toward the system board.
2. Align the screw holes on the rear cover with the screw holes on the palm-rest and keyboard assembly.
3. Replace the three screws (M2x4) that secure the rear cover to the palm-rest and keyboard assembly.
4. Replace two screws (M1.6x4) that secure the rear cover to the system board.

### Next steps

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

## Rear-cover bracket

### Removing the rear-cover bracket

#### Prerequisites

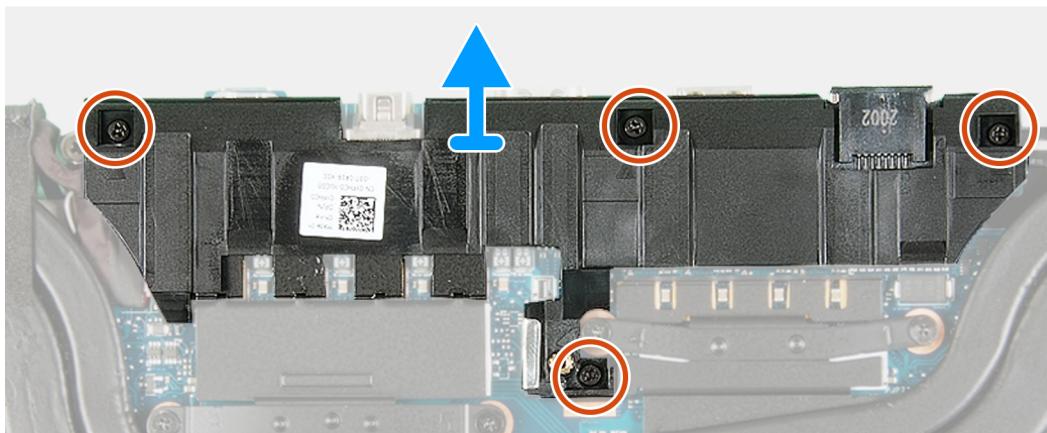
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear cover](#).

#### About this task

The following image indicates the location of the rear-cover bracket and provides a visual representation of the removal procedure.



4x  
M2x5



### Steps

1. Remove the four screws (M2x5) that secure the rear-cover bracket to the system board.
2. Lift the rear-cover bracket off the system board.

## Installing the rear-cover bracket

### Prerequisites

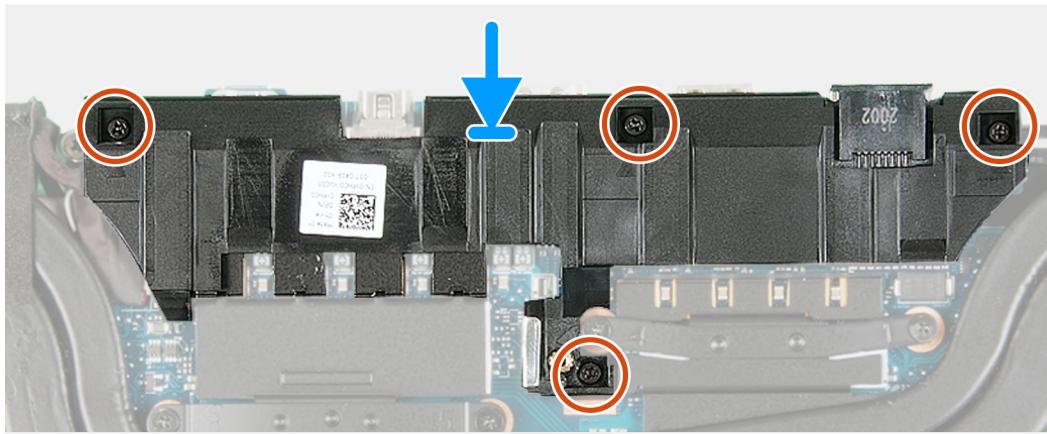
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following image indicates the location of the rear-cover bracket and provides a visual representation of the installation procedure.



4x  
M2x5



### Steps

1. Align the screw holes on the rear-cover bracket with the screw holes on the system board.
2. Replace the four screws (M2x5) that secure the rear-cover bracket to the system board.

### Next steps

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

## Display assembly

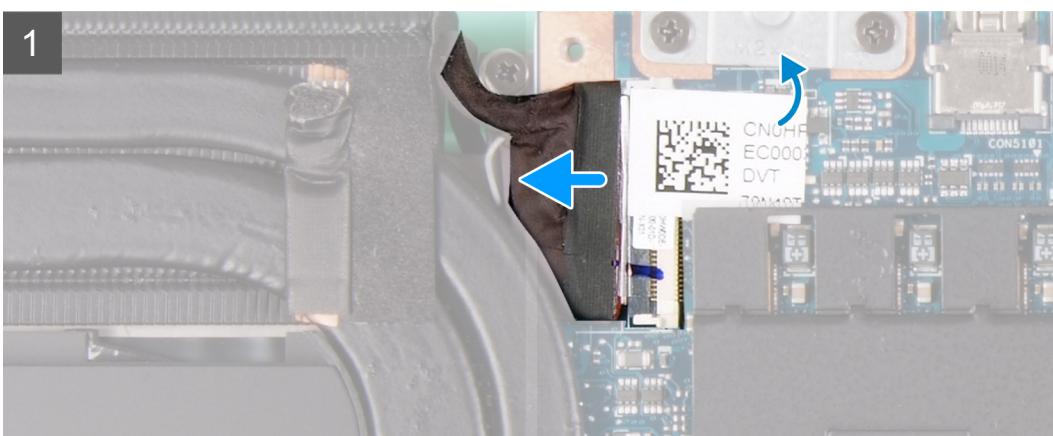
### Removing the display assembly

#### Prerequisites

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

#### About this task

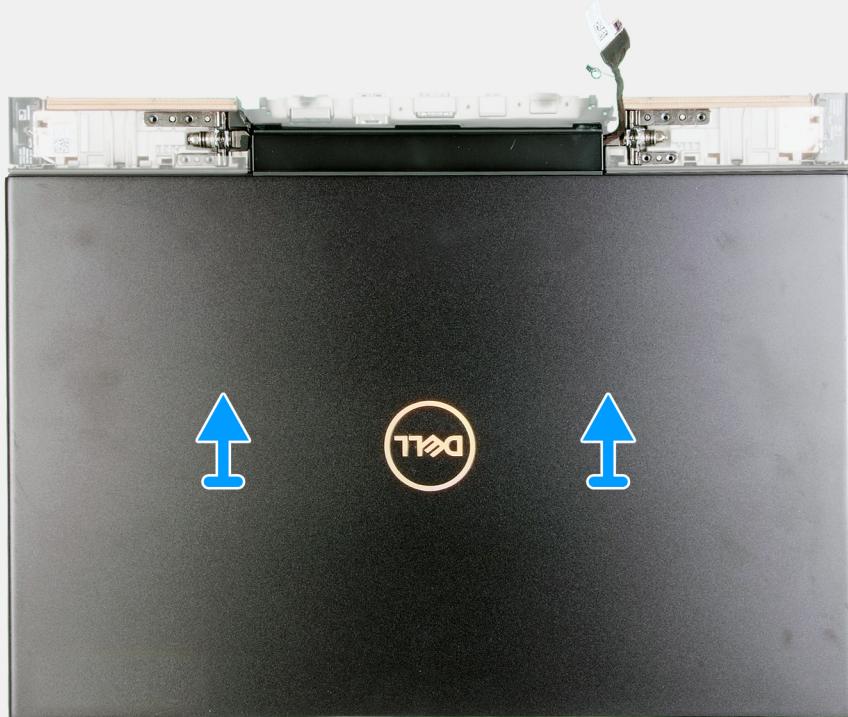
The following images indicate the location of the display assembly and provide a visual representation of the removal procedure.



3

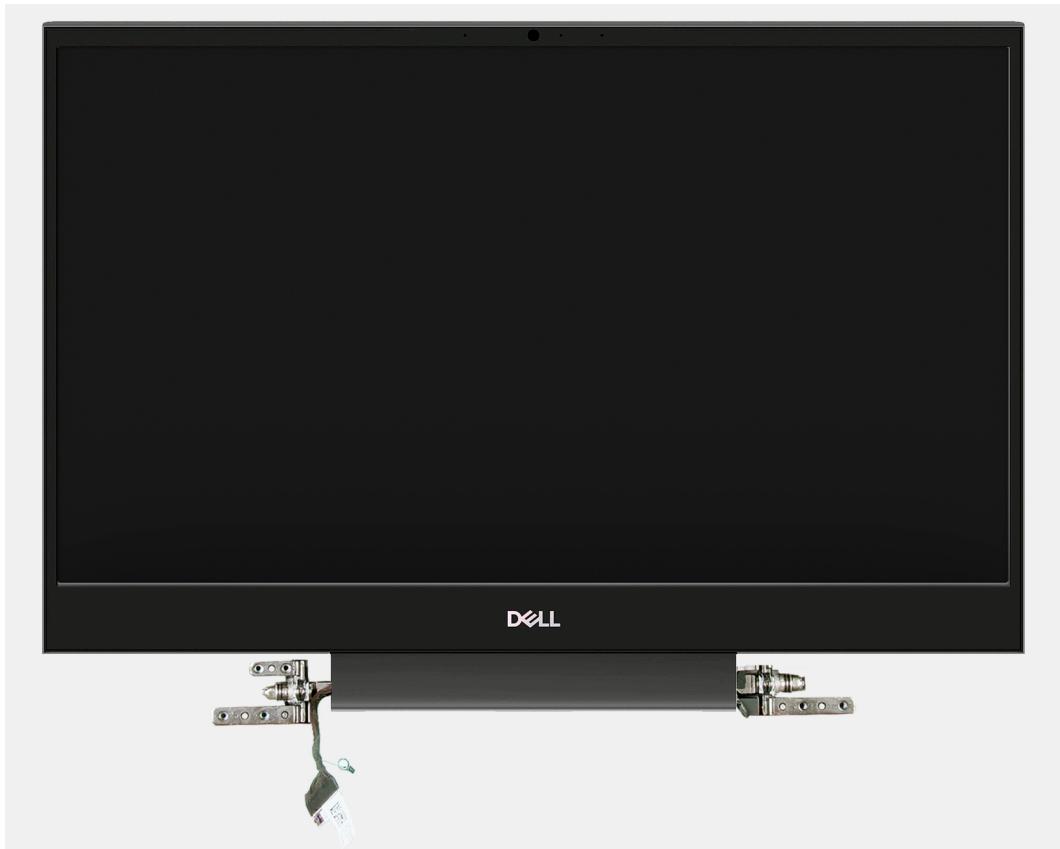


4



### Steps

1. Open the latch and disconnect the display cable from the system board.
2. Remove the screw (M2x4) that secures the display cable to the palm-rest and keyboard assembly.
3. Flip the computer over.
4. Remove the eight screws (M2.5x5) that secure the display-assembly hinges to the palm-rest and keyboard assembly.
5. Lift the hinges from the palm-rest and keyboard assembly.
6. Slide the display assembly from the palm-rest and keyboard assembly.
7. After performing all the above steps, 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 procedure.

### About this task

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

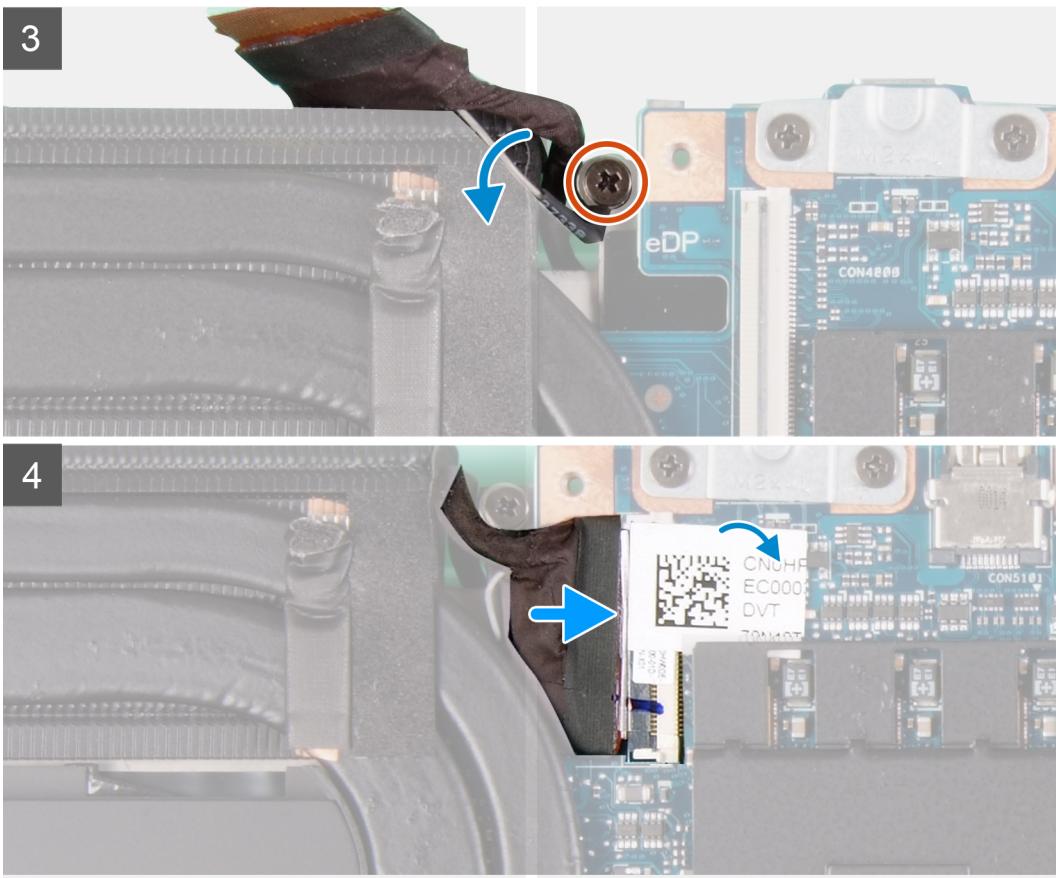


1



2





### Steps

1. Align the tabs on the hinges with the slots on the palm-rest and keyboard assembly and place the display assembly on the palm-rest and keyboard assembly.
2. Align the screw holes on the palm-rest and keyboard assembly with the screw holes on the right and the left display-assembly hinges.
3. Replace eight screws (M2.5x5) that secure the display-assembly hinges to the palm-rest and keyboard assembly.
4. Align the display assembly with the screw hole on the palm-rest and keyboard assembly.
5. Replace the screw (M2x4) that secures the display cable to the system board.
6. Connect the display cable to the connector on the system board and close the latch to secure the cable.

### Next steps

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

## Wireless card

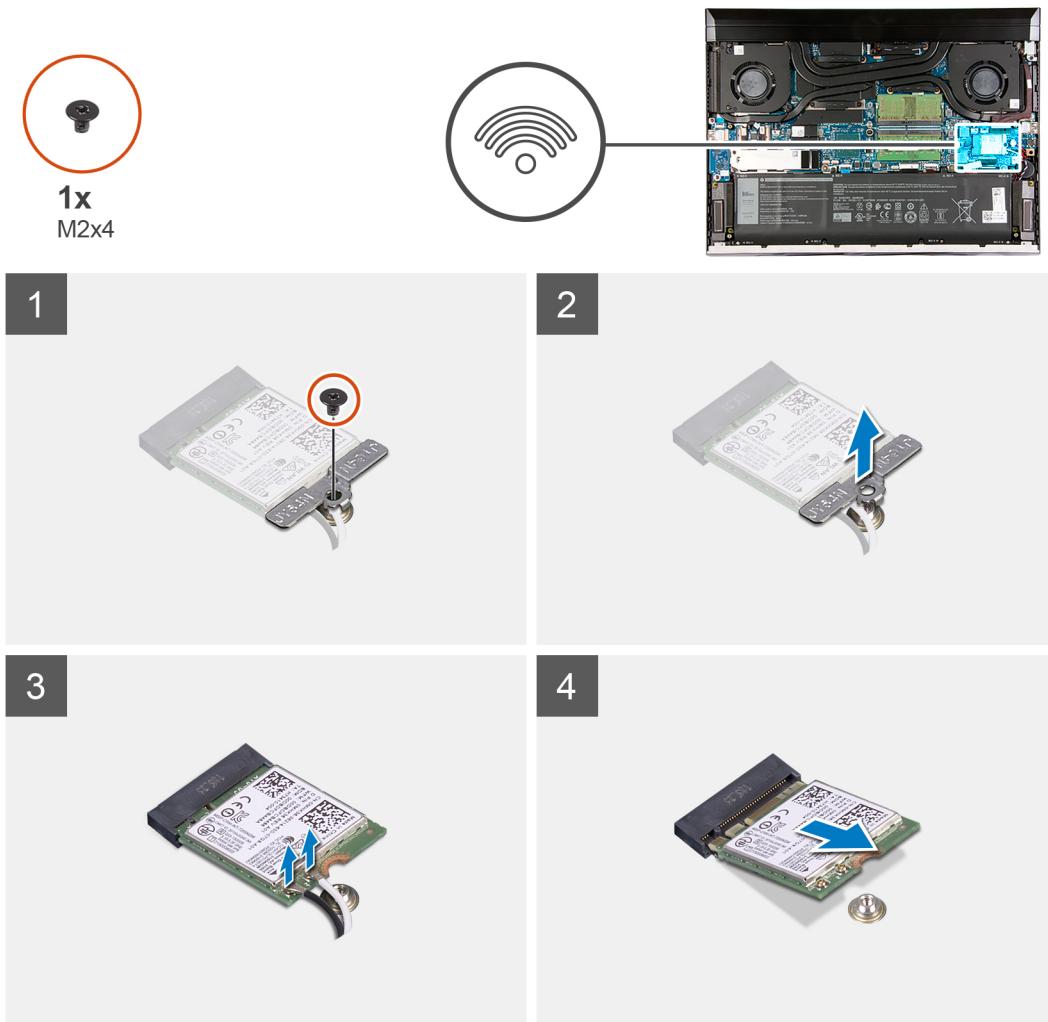
### Removing the wireless card

#### Prerequisites

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

#### About this task

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



### Steps

1. Remove the screw (M2x4) that secures the wireless-card bracket to the system board.
2. Lift the wireless-card bracket off the wireless card.
3. Disconnect the antenna cables from the wireless card.
4. Slide and remove the wireless card from the wireless-card slot.

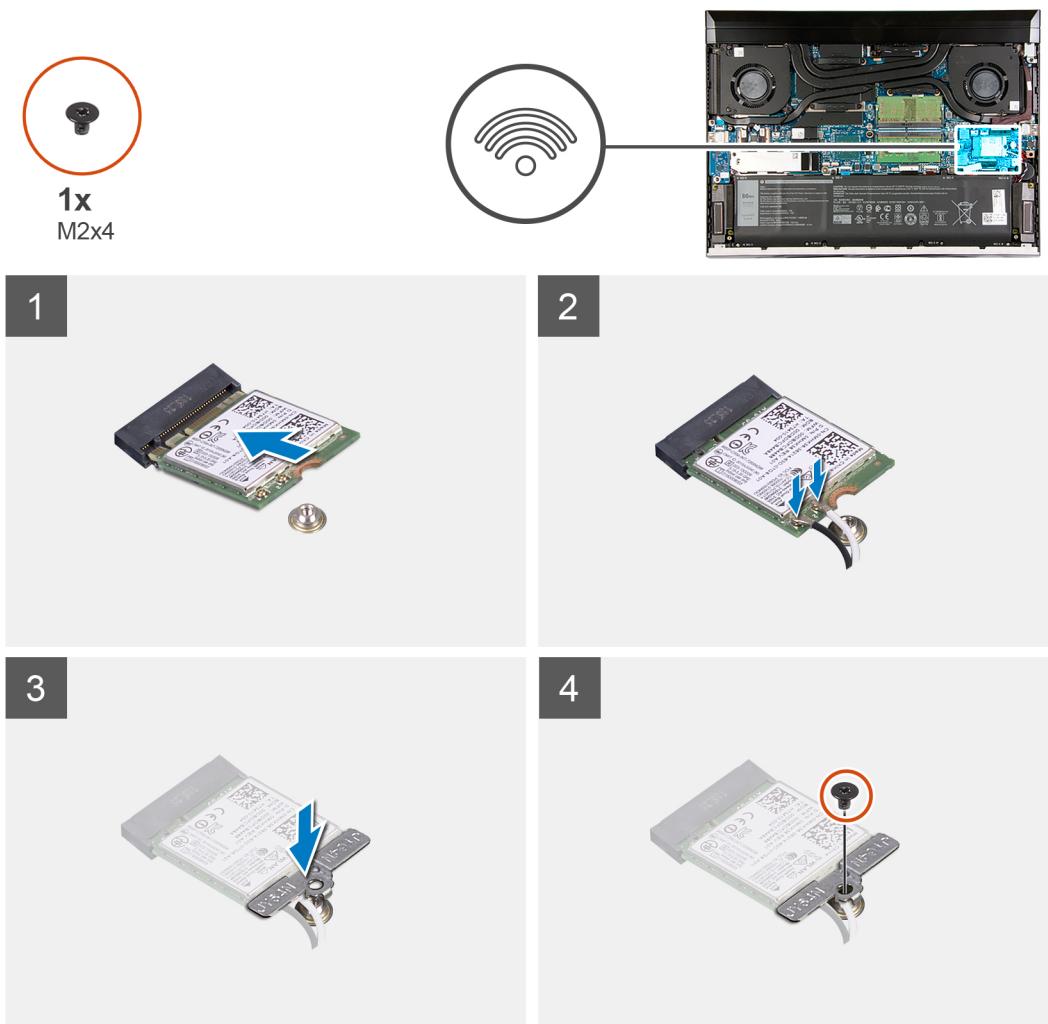
## Installing the wireless card

### 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 wireless card and provides a visual representation of the installation procedure.



## Steps

1. 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.
2. Connect the antenna cables to the wireless card.

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

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

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

3. Align the screw hole of the wireless-card bracket with the screw hole on the system board.
4. Replace the screw (M2x4) that secures the wireless-card bracket to the wireless card and the system board.

## 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

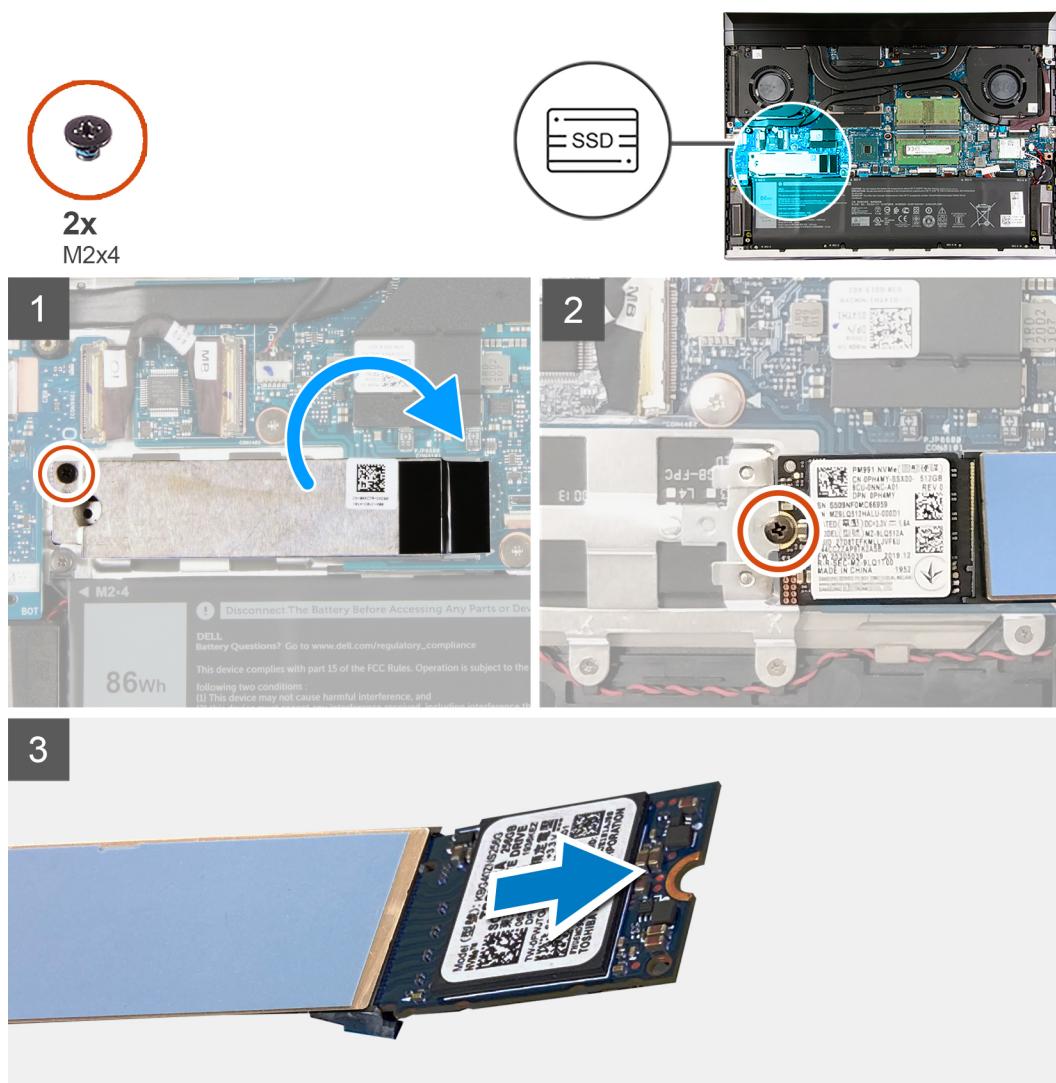
### Prerequisites

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

### About this task

**NOTE:** Depending on the configuration ordered, your computer may support an M.2 2230 solid-state drive or an M.2 2280 solid-state drive.

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



### Steps

1. Remove the screw (M2x4) that secures the solid-state drive thermal bracket to the system board.
2. Flip the solid-state drive thermal bracket to access the solid-state drive.

**NOTE:** If you want to replace the system board, do not leave the solid-state thermal bracket on the system board. Peel the adhesive tape off the system board and lift the solid-state thermal bracket.

3. Remove the screw (M2x4) that secures the solid-state drive to the system board.
4. Slide and lift the solid-state drive off the system board.

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

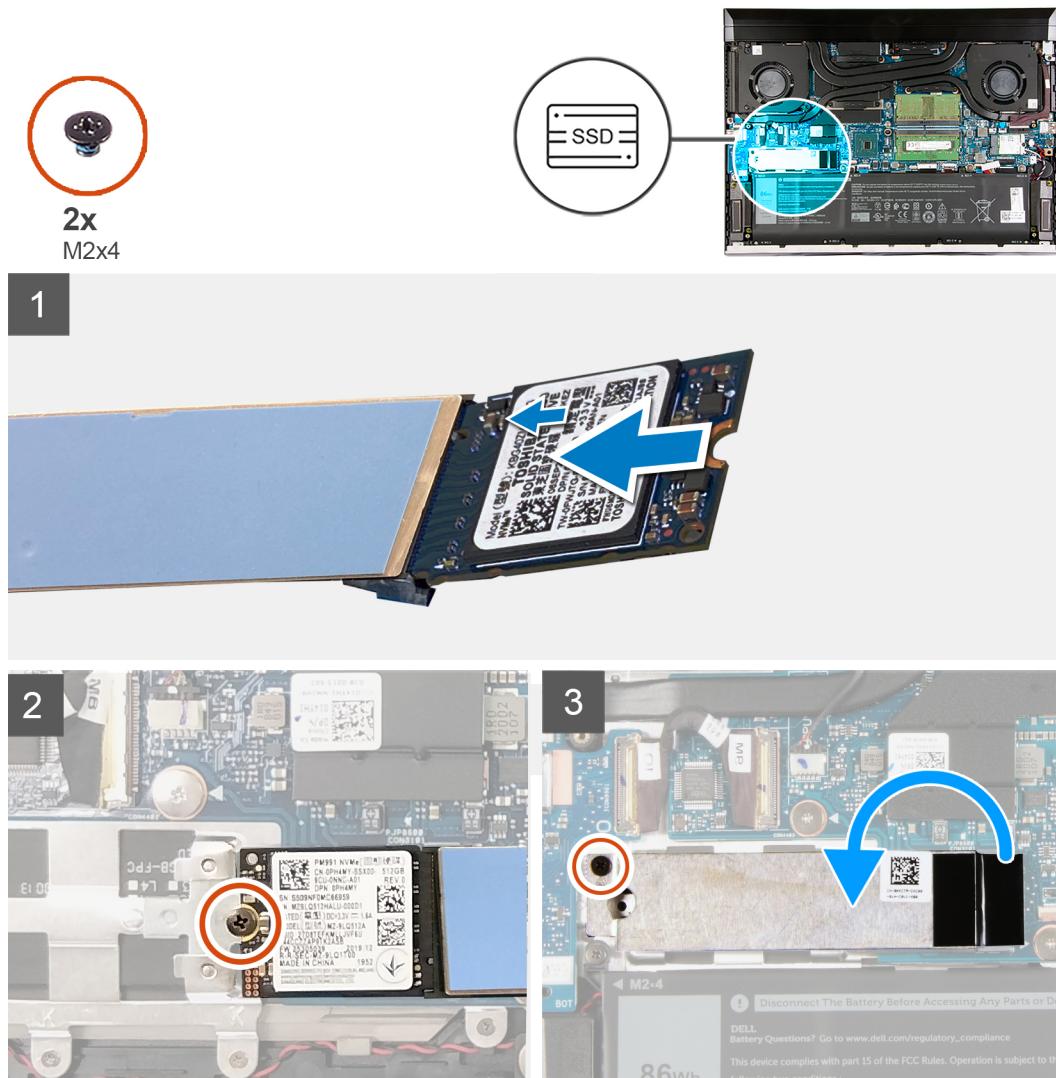
### Prerequisites

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

### About this task

***(i) NOTE: Depending on the configuration ordered, your computer may support an M.2 2230 solid-state drive or an M.2 2280 solid-state drive.***

The following image indicates the location of the M.2 2230 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. Replace the screw (M2x4) that secures the solid-state drive to the system board.
4. Using the alignment post, place the solid-state thermal bracket over the solid-state drive.
5. Replace the screw (M2x4) that secures the solid-state thermal bracket to the system board.

***(i) NOTE:*** Adhere the tape to secure the solid-state drive thermal bracket to the system board, if applicable.

## 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

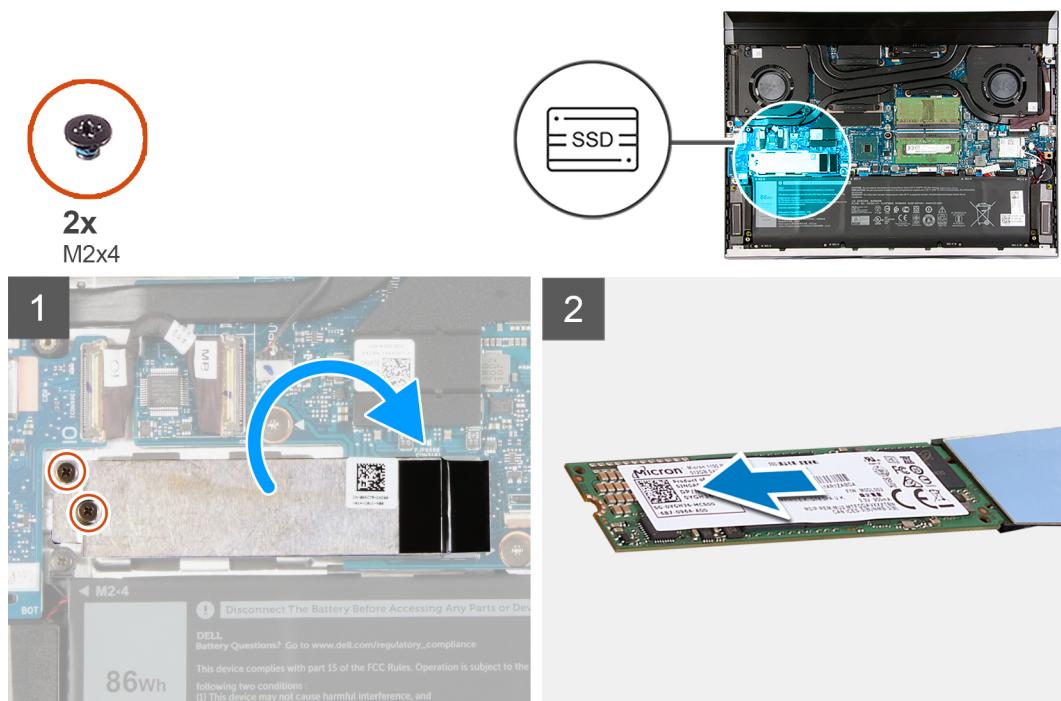
## Prerequisites

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

## About this task

***(i) NOTE:*** Depending on the configuration ordered, your computer may support an M.2 2230 solid-state drive or an M.2 2280 solid-state drive.

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



## Steps

1. Remove the two screws (M2x4) that secure the solid-state drive thermal bracket and the solid-state drive to the system board.
2. Flip the solid-state drive thermal bracket to access the solid-state drive.

***(i) NOTE:*** If you want to replace the system board, do not leave the solid-state thermal bracket on the system board. Peel the adhesive tape off the system board and lift the solid-state thermal bracket.
3. Slide and lift the solid-state drive off the system board.

# Installing the M.2 2280 solid-state drive

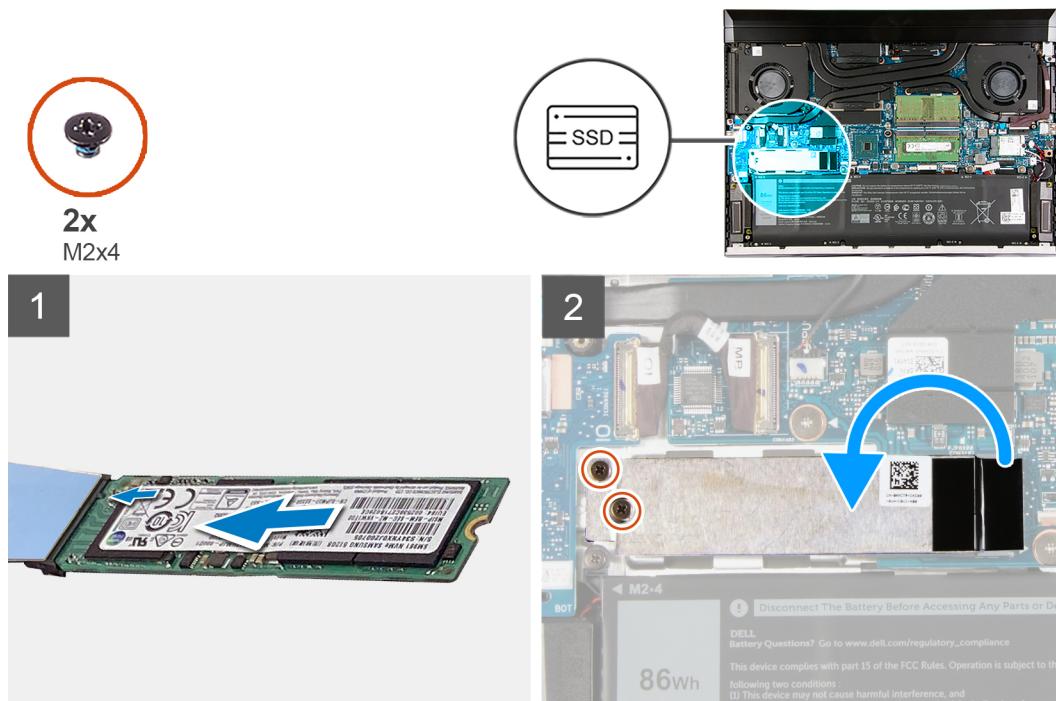
## Prerequisites

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

## About this task

***(i) NOTE: Depending on the configuration ordered, your computer may support an M.2 2230 solid-state drive or an M.2 2280 solid-state drive.***

The following image indicates the location of the M.2 2280 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. Using the alignment post, place the solid-state thermal bracket over the solid-state drive.
4. Replace the two screws (M2x4) that secure the solid-state thermal bracket and the solid-state drive to the system board.

***(i) NOTE: Adhere the tape to secure the solid-state drive thermal bracket to the system board, if applicable.***

## Next steps

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

# Memory modules

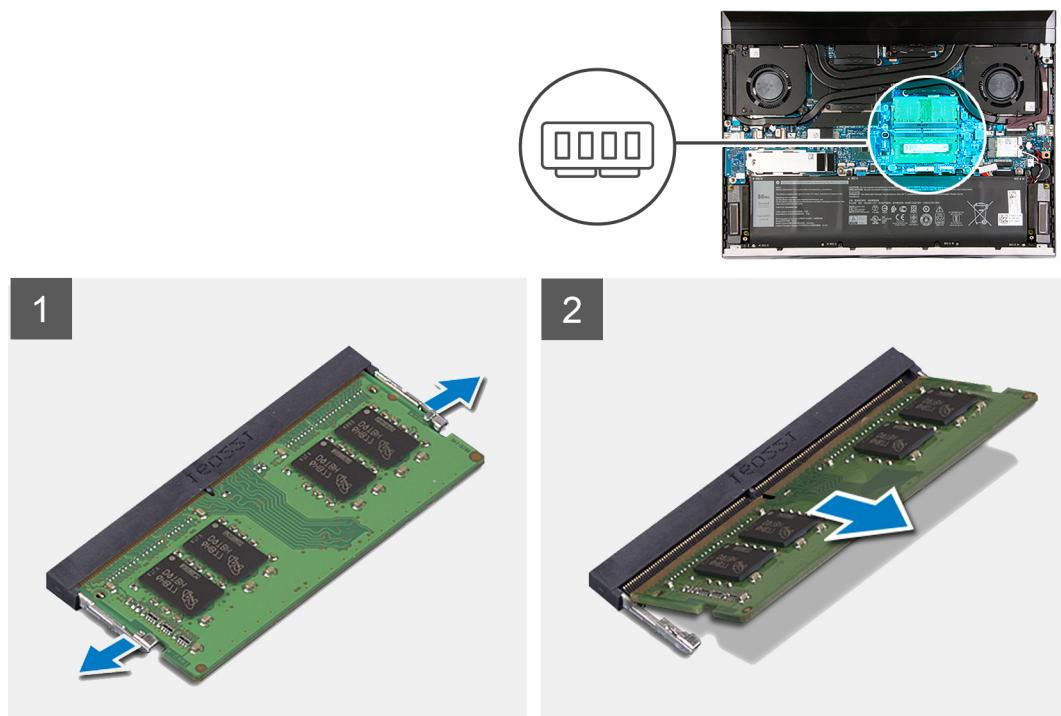
## Removing the memory modules

### Prerequisites

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

### About this task

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



### Steps

1. Use your fingertips to carefully spread apart the securing-clips on each end of the memory-module slot until the memory module pops up.
2. Slide and remove the memory module from the memory-module slot.

**NOTE:** Repeat step 1 and step 2 to remove the other memory module, if installed on your computer.

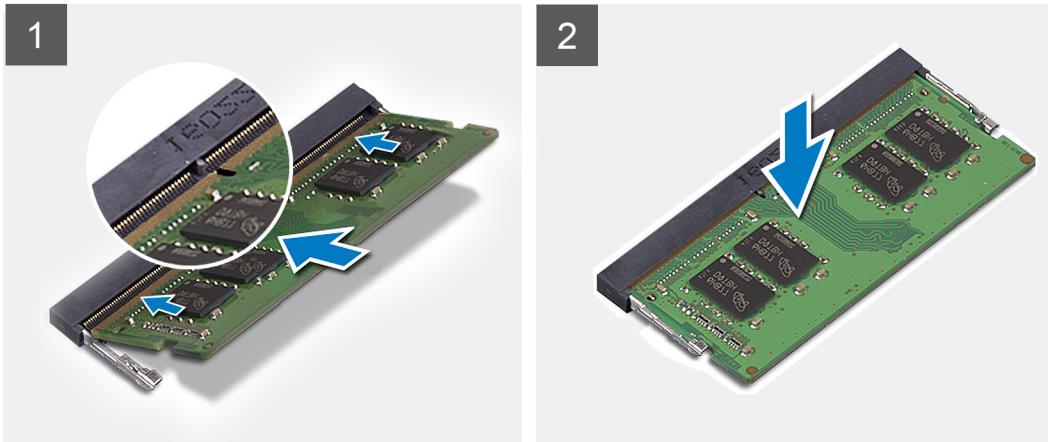
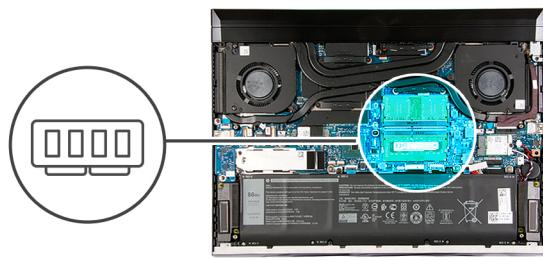
## Installing the memory modules

### Prerequisites

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

### About this task

The following image indicates the location of the memory modules and provides a visual representation of the installation procedure.



### Steps

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

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

***(i) NOTE:*** Repeat step 1 to step 3 to install the other memory module, if available on your computer.

### Next steps

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

## Processor fan

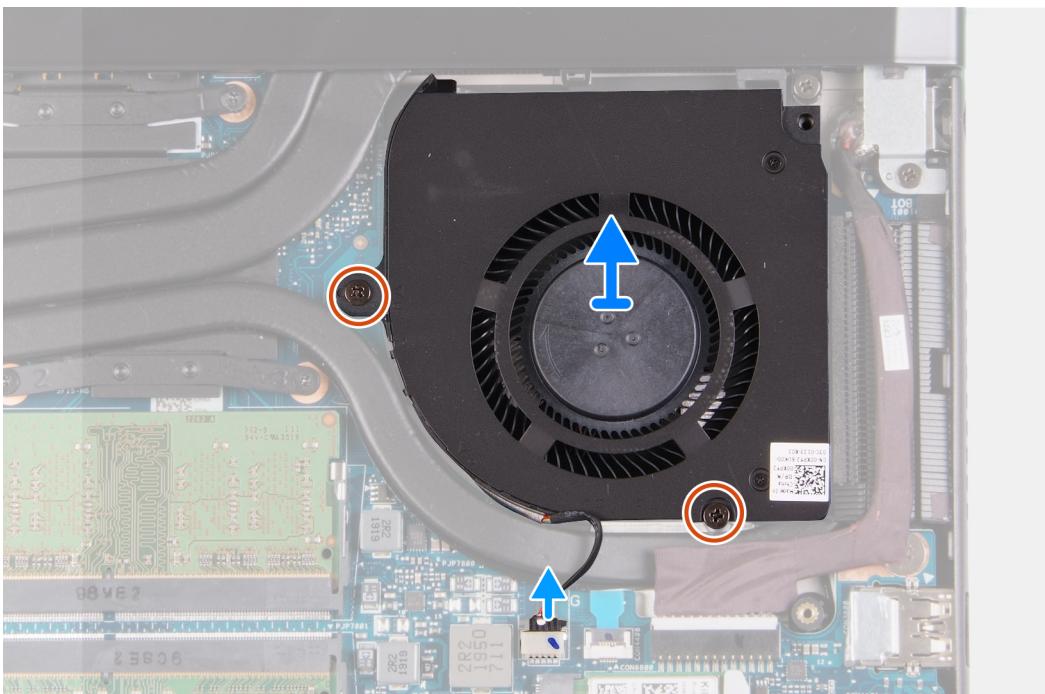
### Removing the processor fan

#### Prerequisites

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

#### About this task

The following image indicates the location of the processor fan and provides a visual representation of the removal procedure.



### Steps

1. Remove the two screws (M2x4) that secure the processor fan to the system board and the palm-rest and keyboard assembly.
2. Disconnect the processor-fan cable from the system board.
3. Lift the processor fan off the palm-rest and keyboard assembly.

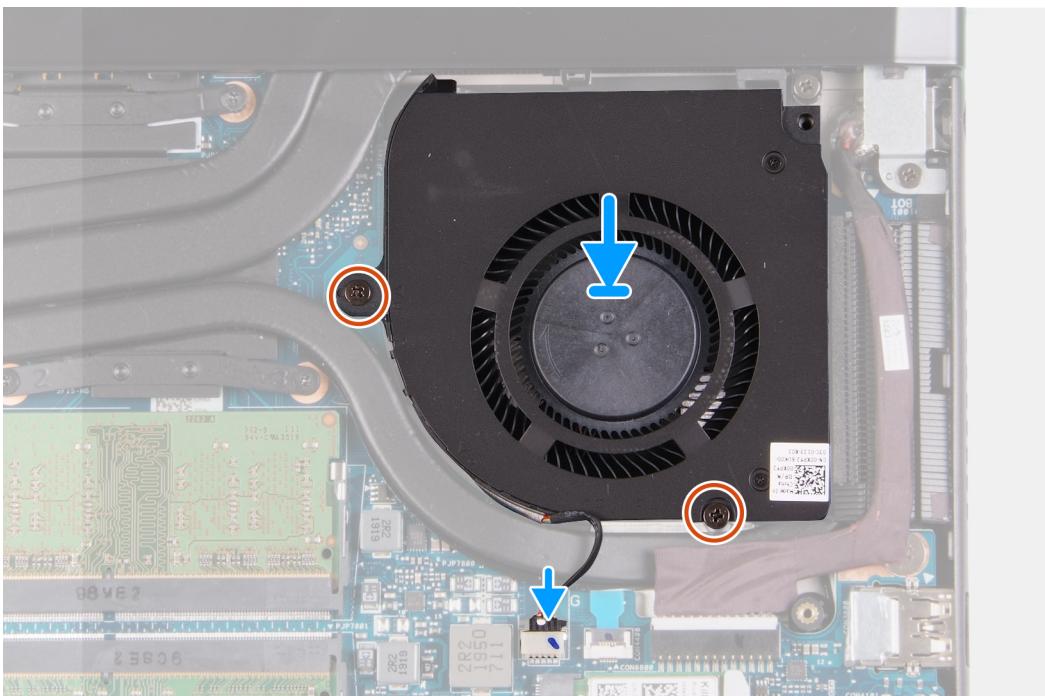
## Installing the processor fan

### Prerequisites

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

### About this task

The following image indicates the location of the processor fan and provides a visual representation of the installation procedure.



## Steps

1. Align the screw holes on the processor fan with the screw holes on the system board and the palm-rest and keyboard assembly.
2. Connect the processor-fan cable to the system board.
3. Replace the two screws (M2x4) that secure the processor fan to the system board and the palm-rest and keyboard assembly.

## Next steps

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

## Graphics-card fan

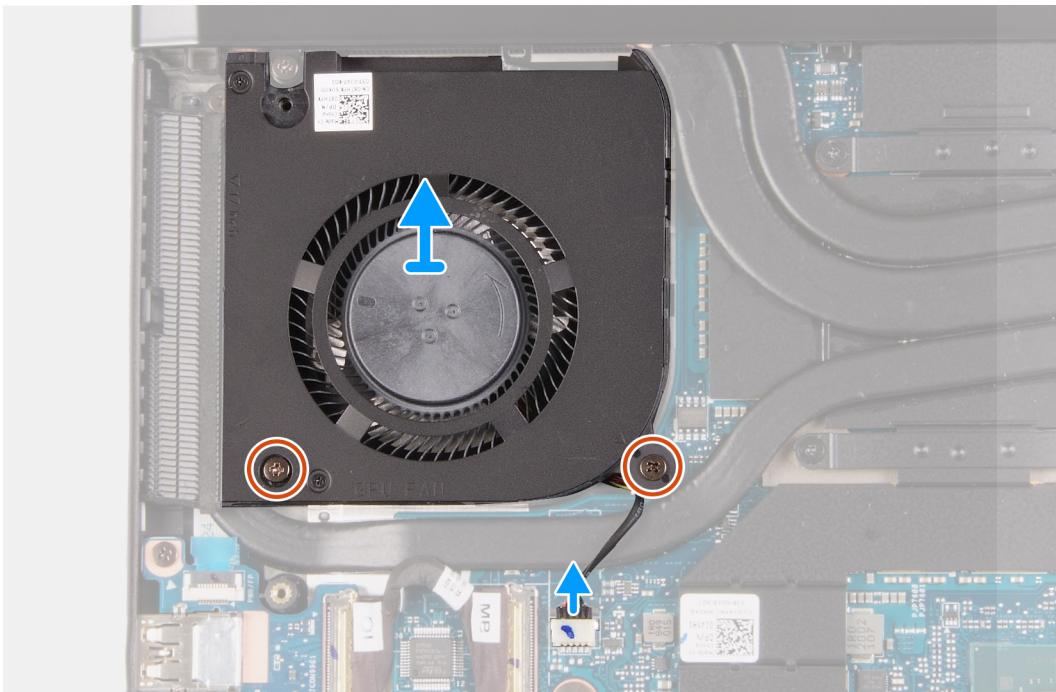
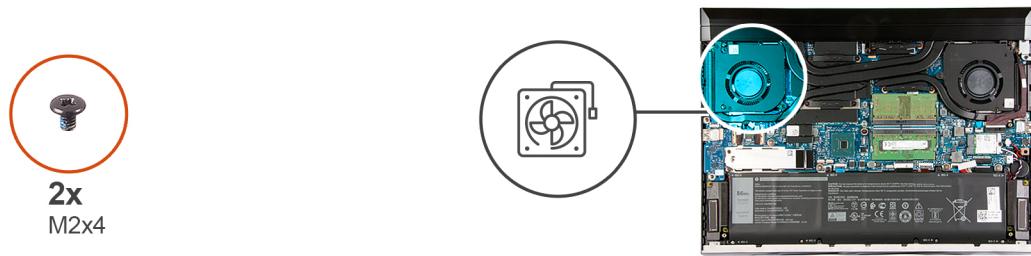
### Removing the graphics-card fan

#### Prerequisites

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

#### About this task

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



### Steps

1. Remove the two screws (M2x4) that secure the graphics-card fan to the system board and the palm-rest and keyboard assembly.
2. Disconnect the graphics-card fan cable from the system board.
3. Lift the graphics-card fan off the palm-rest and keyboard assembly.

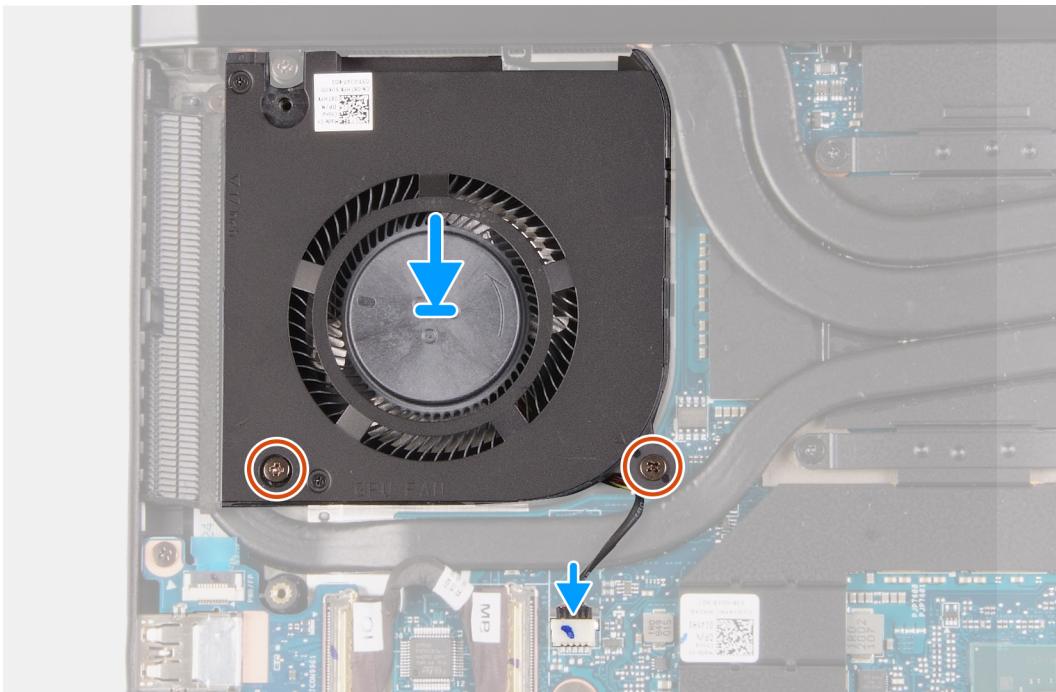
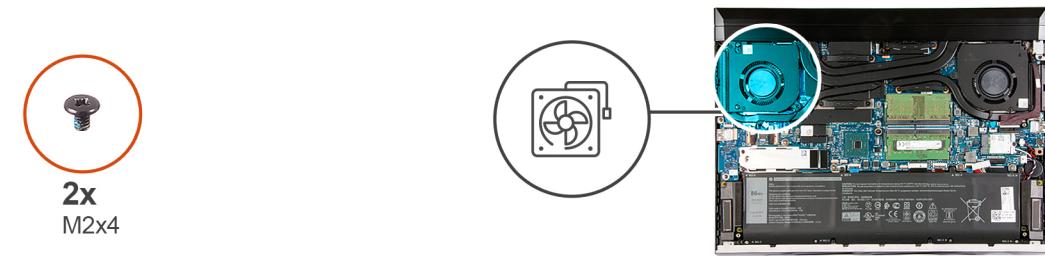
## Installing the graphics-card fan

### 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 graphics-card fan and provides a visual representation of the installation procedure.



### Steps

1. Align the screw holes on the graphics-card fan with the screw holes on the system board and the palm-rest and keyboard assembly.
2. Connect the graphics-card fan cable to the system board.
3. Replace the two screws (M2x4) that secure the graphics-card fan to the system board and 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

### Installing the power-adapter port

#### Prerequisites

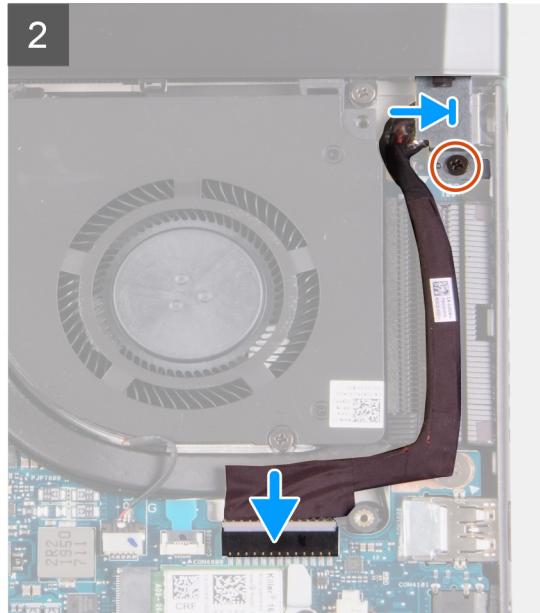
If you are replacing a component, remove the existing component before performing the installation procedure.

#### About this task

The following image indicates the location of the power-adapter port and provides a visual representation of the installation procedure.



1x  
M2x2.5



### Steps

1. Place the power-adapter port into the slot on the palm-rest and keyboard assembly.
2. Route the power-adapter port through the routing guides on the heat sink.
3. Connect the power-adapter port cable to the system board.
4. Align the screw hole on the power-adapter bracket with the screw hole on the palm-rest and keyboard assembly.
5. Replace the screw (M2X2.5) that secures the power-adapter port bracket to the palm-rest and keyboard assembly.

### Next steps

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

## Removing the power-adapter port

### Prerequisites

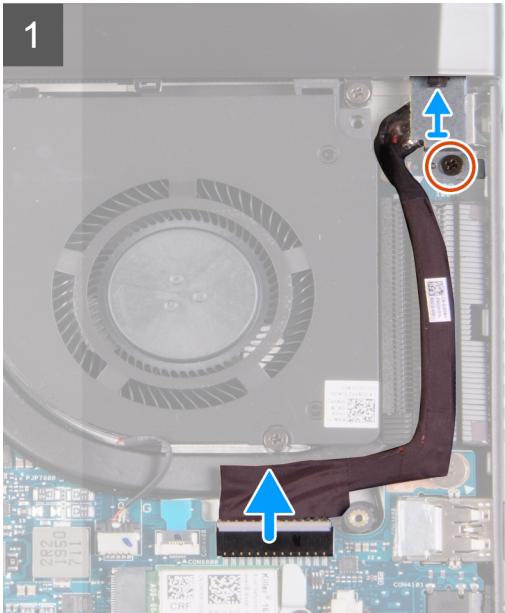
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

### About this task

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



1x  
M2x2.5



#### Steps

1. Remove the screw (M2X2.5) that secures 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.
4. Remove the power-adapter port cable from the routing guides on the heat sink.
5. Lift the power-adapter port, along with its cable, off the palm-rest and keyboard assembly.

## Power button with optional fingerprint reader

### Removing the power button with optional fingerprint reader

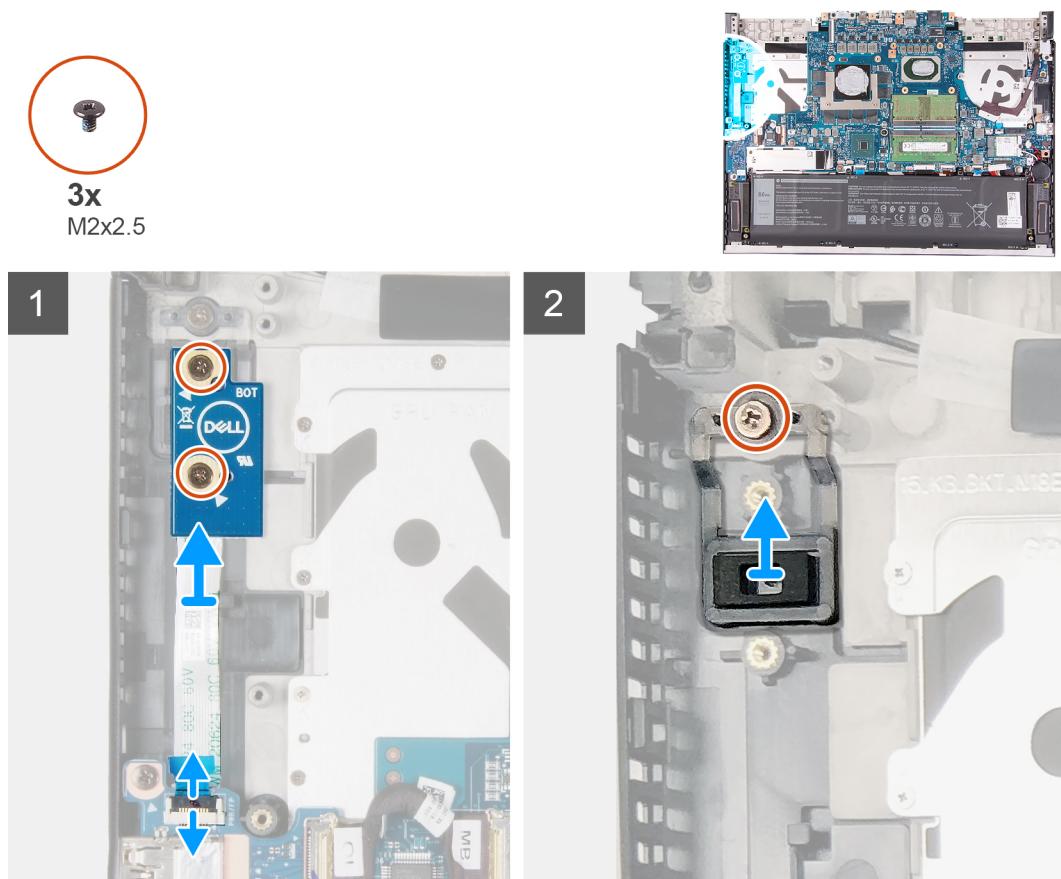
#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear cover](#).
4. Remove the [rear-cover bracket](#).
5. Remove the [graphics-card fan](#).
6. 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 prevents damage to the thermal bond between the system board and heat sink.***

## About this task

The following image indicates the location of the power button with optional fingerprint reader and provides a visual representation of the removal procedure.



## Steps

1. Open the latch and disconnect the power button with optional fingerprint reader cable from the connector on the I/O board.
2. Remove the two screws (M2x2.5) that secure the power button with optional fingerprint reader to the palm-rest and keyboard assembly.
3. Lift the power-button board off the palm-rest and keyboard assembly.
4. Remove the screw (M2x2.5) that secures the fingerprint reader to the palm-rest and keyboard assembly.
5. Lift the power button and fingerprint reader (optional) off the palm-rest and keyboard assembly.

## Installing the power-button board with optional fingerprint reader

### Prerequisites

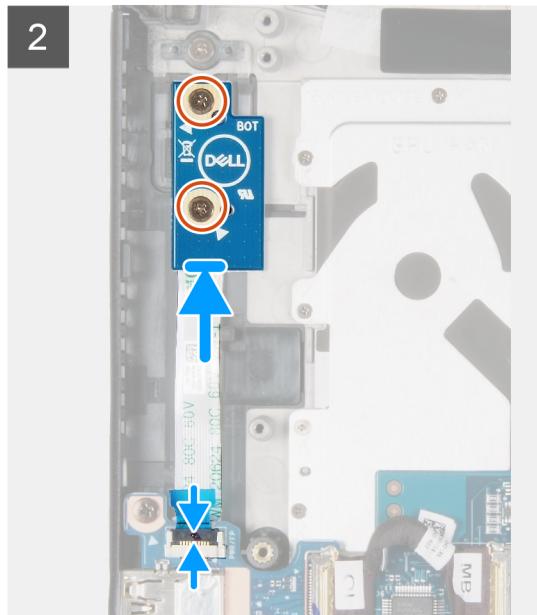
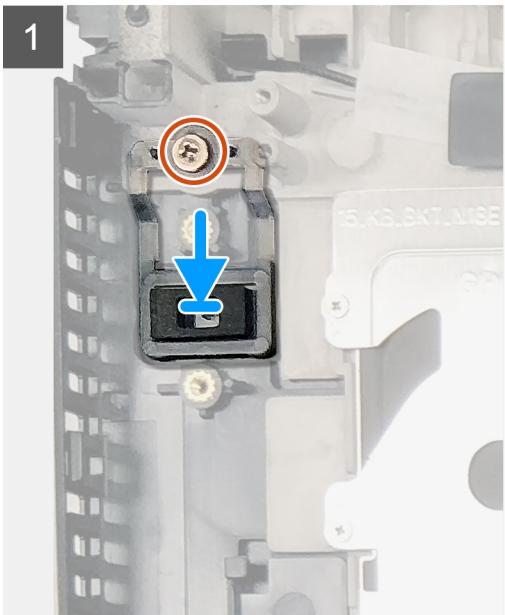
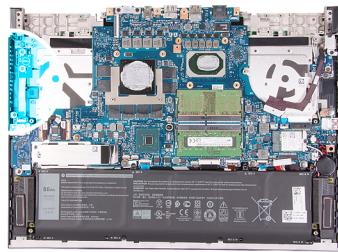
If you are replacing a component, remove the existing component before performing the installation procedure.

## About this task

The following image indicates the location of the power button with optional fingerprint reader and provides a visual representation of the installation procedure.



3x  
M2x2.5



## Steps

1. Align the screw holes on the optional finger-print reader with the screw holes on the palm-rest and keyboard assembly.
2. Replace the screw (M2x2.5) that secures the optional fingerprint reader to the palm-rest and keyboard assembly.

**i NOTE: Apply sufficient torque when tightening the screw (M2x2.5) to avoid damaging the screw thread.**

3. Align the screw hole on the power button with optional fingerprint reader with the screw hole on the palm-rest and keyboard assembly.
4. Replace the two screws (M2x2.5) that secure the power button with optional fingerprint reader to the palm-rest and keyboard assembly.
5. Connect the power button with optional fingerprint reader cable to the connector on the I/O board and close the latch to secure the cable.

## Next steps

1. Install the [system board](#).
2. Install the [graphics-card fan](#).
3. Install the [rear-cover bracket](#).
4. Install the [rear cover](#).
5. Install the [base cover](#).
6. Follow the procedure in [After working inside your computer](#).

# Light bar

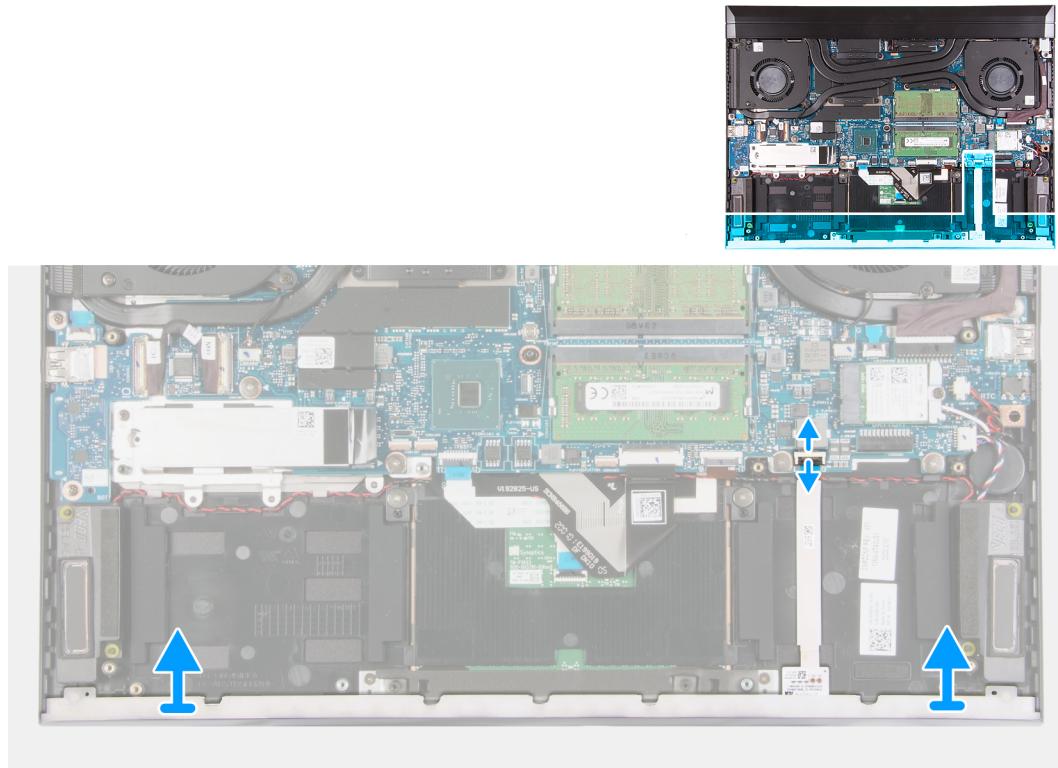
## Removing the light bar

### 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 indicates the location of the light bar and provides a visual representation of the removal procedure.



### Steps

1. Open the latch and disconnect the light-bar cable from the system board.
2. Lift the light bar, along with its cable, off the palm-rest and keyboard assembly.

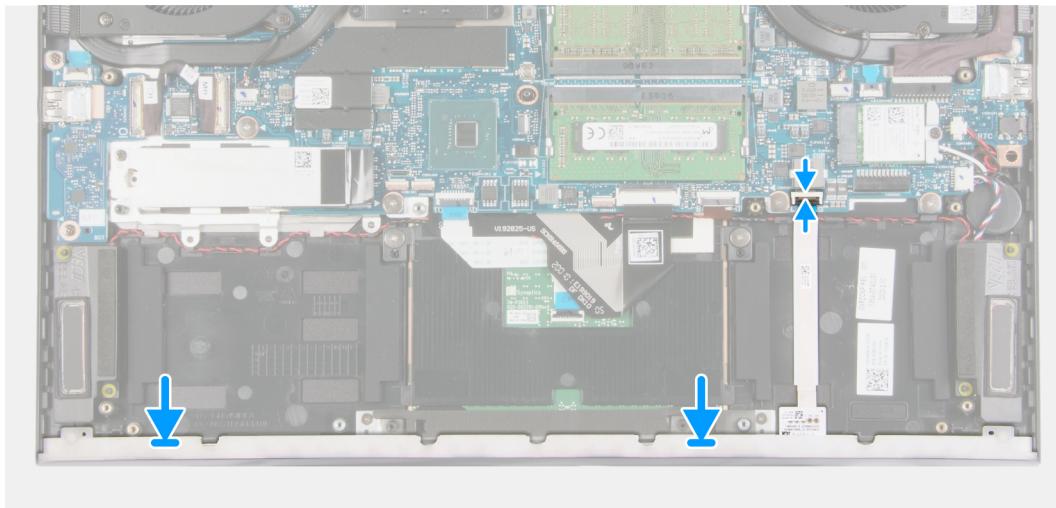
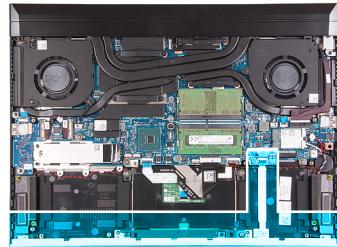
## Installing the light bar

### 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 light bar and provides a visual representation of the installation procedure.



## Steps

1. Align the light bar with the slots on the palm-rest and keyboard assembly.
2. Connect the light-bar cable to the system board and close the latch to secure the cable.

## Next steps

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

# I/O board

## Removing the I/O board

### Prerequisites

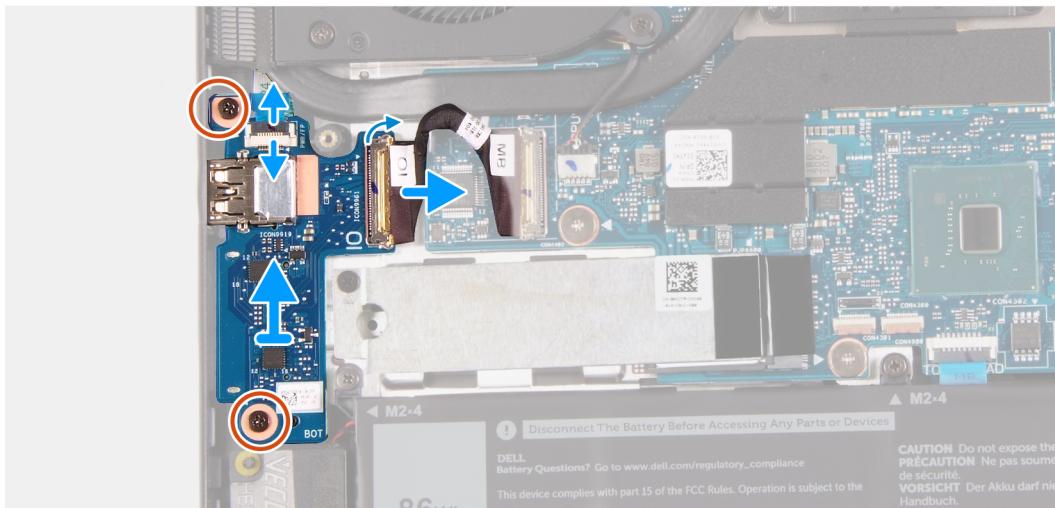
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

### About this task

The following image indicates the location of the I/O board and provides a visual representation of the removal procedure.



2x  
M2x4



## Steps

1. Open the latch and disconnect the fingerprint-reader cable from the I/O board.
2. Open the latch and disconnect the I/O cable from the I/O board.
3. Remove the two screws (M2x4) that secure the I/O board to the palm-rest and keyboard assembly.
4. Lift the I/O board off the palm-rest and keyboard assembly.

## Installing the I/O board

### Prerequisites

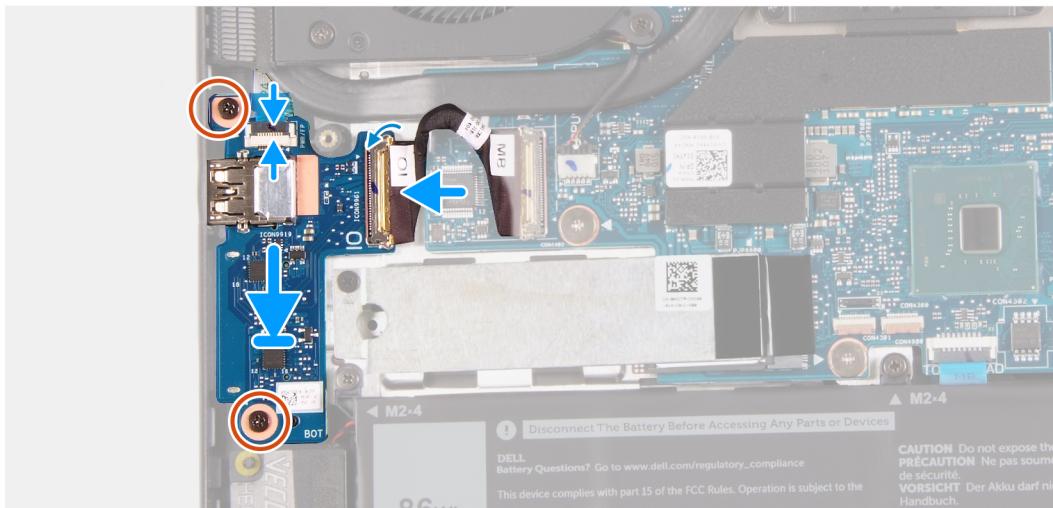
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following image indicates the location of the I/O board and provides a visual representation of the installation procedure.



2x  
M2x4



## Steps

1. Align the screw hole on the I/O board with the screw hole on the palm-rest and keyboard assembly.
2. Replace the two screws (M2x4) that secure the I/O board to the palm-rest and keyboard assembly.
3. Connect the I/O-board cable to the I/O board and close the latch to secure the cable.
4. Connect the fingerprint-reader cable to the I/O-board and close the latch to secure the cable.

## Next steps

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

# Heat sink

## Removing the heat sink

### Prerequisites

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

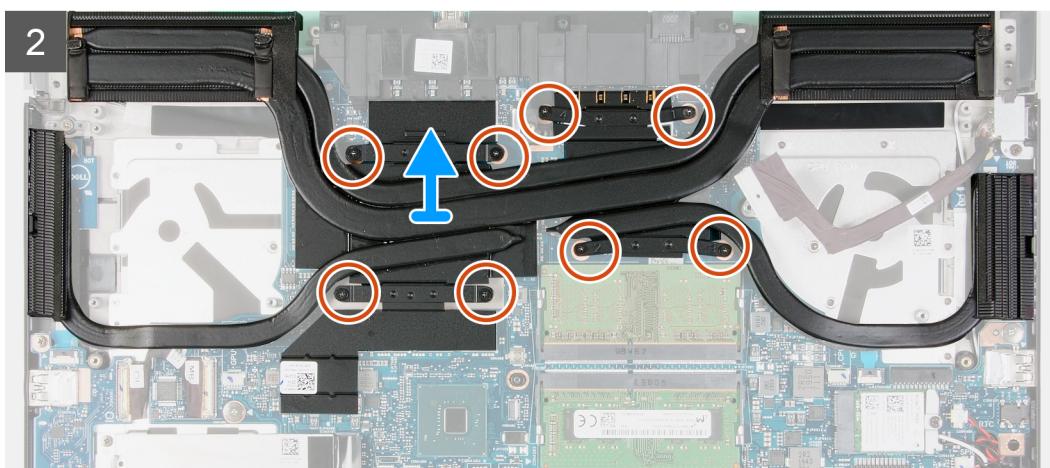
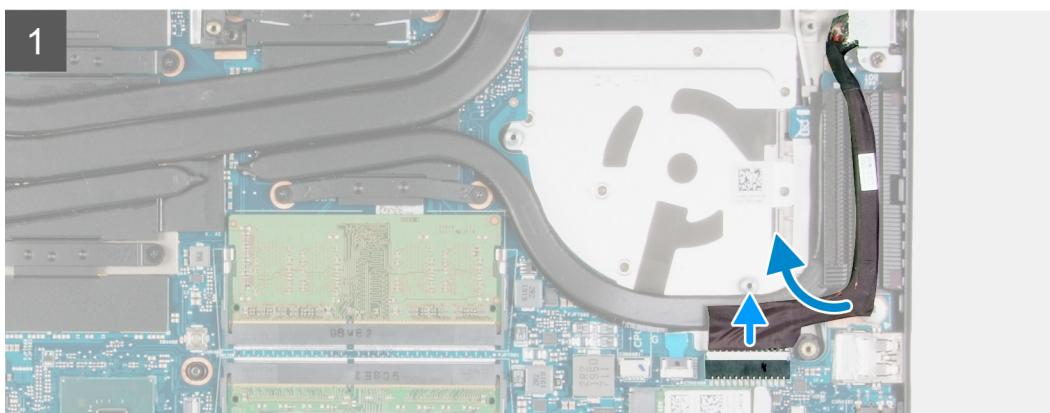
**⚠ CAUTION:** For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.

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

2. Remove the [base cover](#).
3. Remove the [rear cover](#).
4. Remove the [processor fan](#).
5. Remove the [graphics-card fan](#).

### About this task

The following image indicates the location of the heat sink and provides a visual representation of the removal procedure.



## Steps

1. Disconnect the power-adapter port cable from the system board and remove it from the routing guides on the heat sink.
2. In reverse sequential order (as indicated by the numbers on the heat sink), loosen the eight captive screws that secure the heat sink to the system board.
3. Lift the heat sink off the system board.

## Installing the heat sink

### Prerequisites

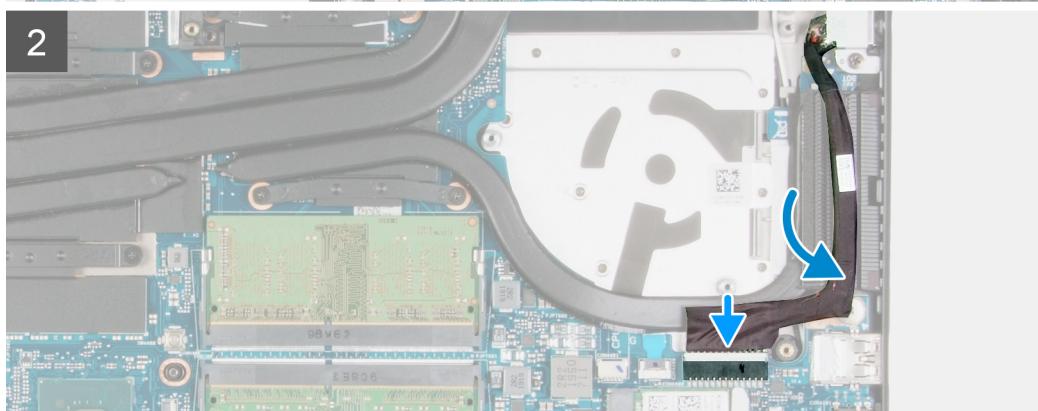
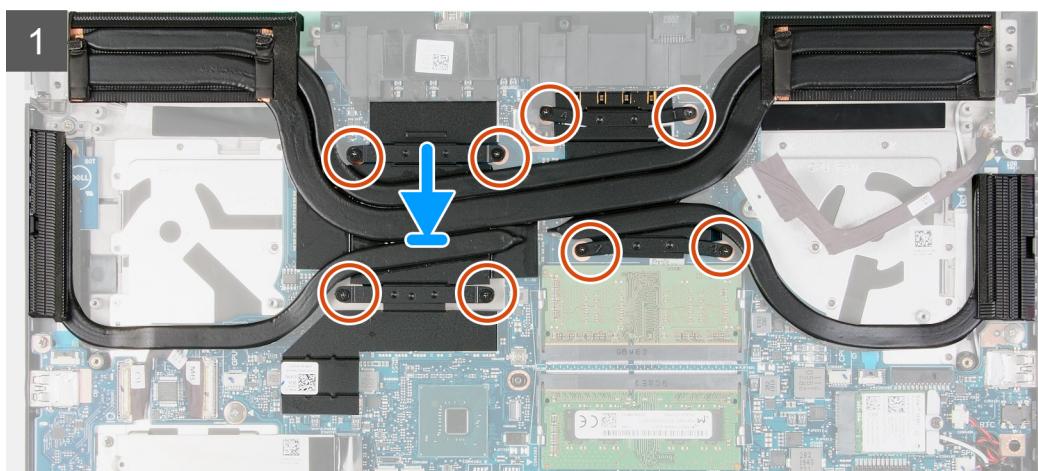
If you are replacing a component, remove the existing component before performing the installation procedure.

**CAUTION:** Incorrect alignment of the heat sink will damage the system board and the processor.

**NOTE:** If either the system board or the heat sink is replaced, use the thermal pad or thermal paste provided in the kit to ensure that there is thermal conductivity.

### About this task

The following image indicates the location of the heat sink and provides a visual representation of the installation procedure.



## Steps

1. Align the screw holes on the heat sink with the screw holes on the system board.
2. In sequential order (as indicated by the numbers on the heat sink), tighten the eight captive screws that secure the heat sink to the system board.
3. Route the power-adapter port cable through the routing guide on the heat sink and connect the power-adapter port cable to the system board.

## Next steps

1. Install the [graphics-card fan](#).
2. Install the [processor fan](#).
3. Install the [rear cover](#).
4. Install the [base cover](#).
5. Follow the procedure in [After working inside your computer](#).

# G key

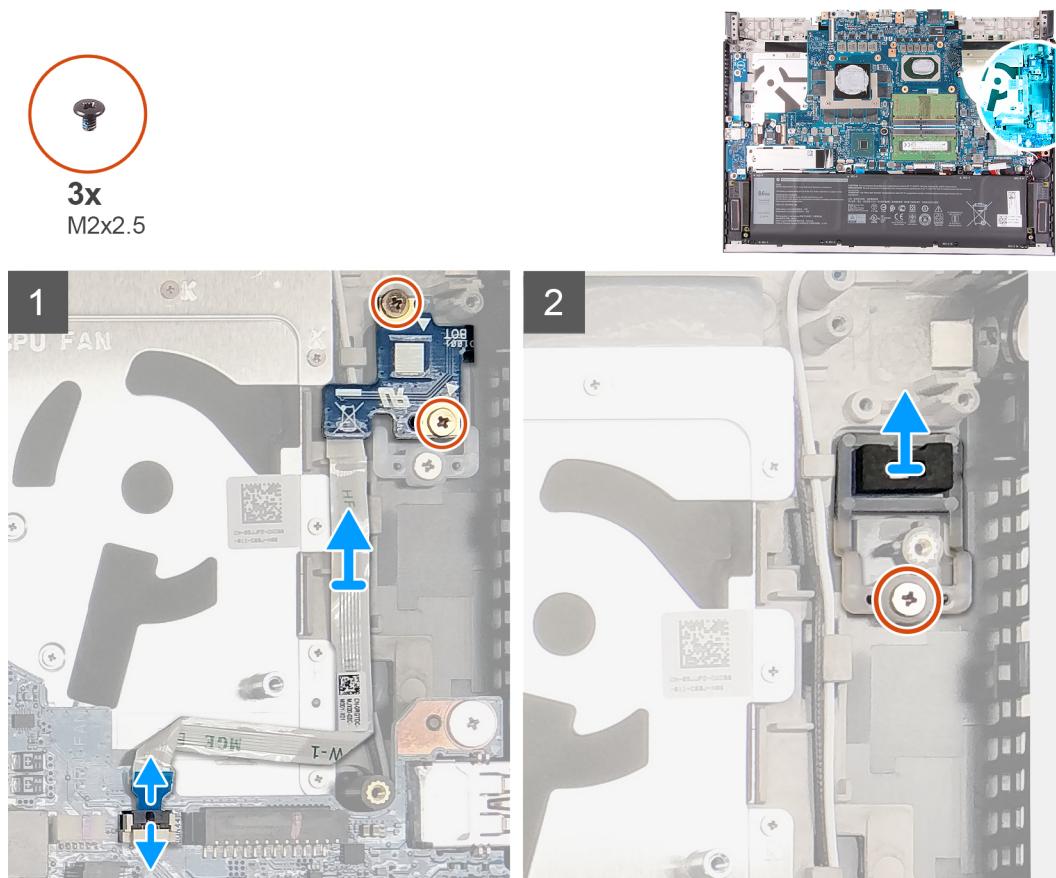
## Removing the G key

### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [rear cover](#).
4. Remove the [rear-cover bracket](#).
5. Remove the [processor fan](#).
6. Remove the [graphics-card fan](#).
7. Remove the [heat sink](#).
8. Remove the [power-adapter port](#).

### About this task

The following image indicates the location of the G key and provides a visual representation of the removal procedure.



### Steps

1. Remove the two screws (M2x2.5) that secure the G-key board to the palm-rest and keyboard assembly.
2. Open the latch and disconnect the G-key cable from the system board.
3. Lift the G-key board off the palm-rest and keyboard assembly.
4. Remove the screw (M2x2.5) that secures the G key to the palm-rest and keyboard assembly.
5. Lift the G key off the palm-rest and keyboard assembly.

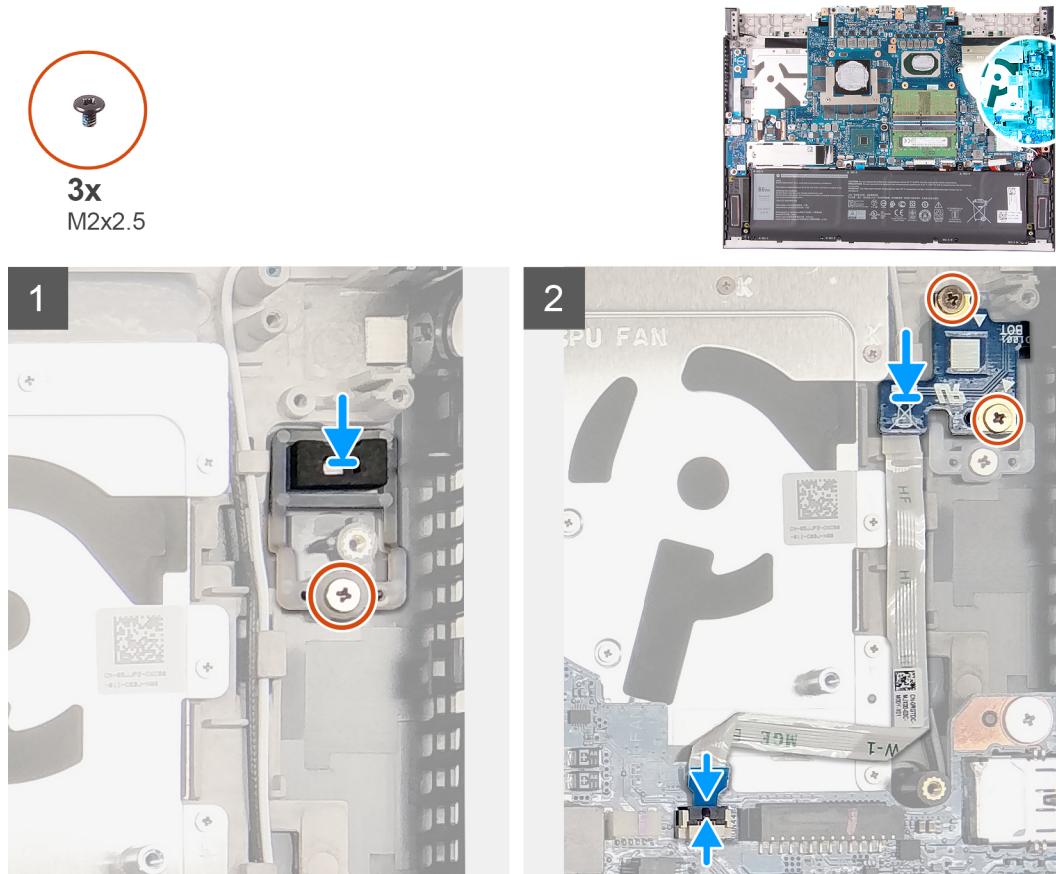
# Installing the G key

## 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 G key and provides a visual representation of the installation procedure.



## Steps

1. Place the G key into the slot on the palm-rest and keyboard assembly.
2. Align the screw holes on the G key with the screw holes on the palm-rest and keyboard assembly.
3. Replace the screw (M2x2.5) that secures the G key to the palm-rest and keyboard assembly.
4. Align the screw hole on the G-key board with the screw hole on the palm-rest and keyboard assembly.
5. Replace the two screws (M2x2.5) that secure the G-key board to the palm-rest and keyboard assembly.
6. Connect the G-key board cable to the system board and close the latch to secure the cable.

## Next steps

1. Install the [power-adapter port](#).
2. Install the [heat sink](#).
3. Install the [graphics-card fan](#).
4. Install the [processor fan](#).
5. Install the [rear-cover bracket](#).
6. Install the [rear cover](#).
7. Install the [base cover](#).
8. 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](#).

**NOTE:** The Service Tag of your computer is stored in the system board. Enter the Service Tag in the BIOS setup program after you replace the system board.

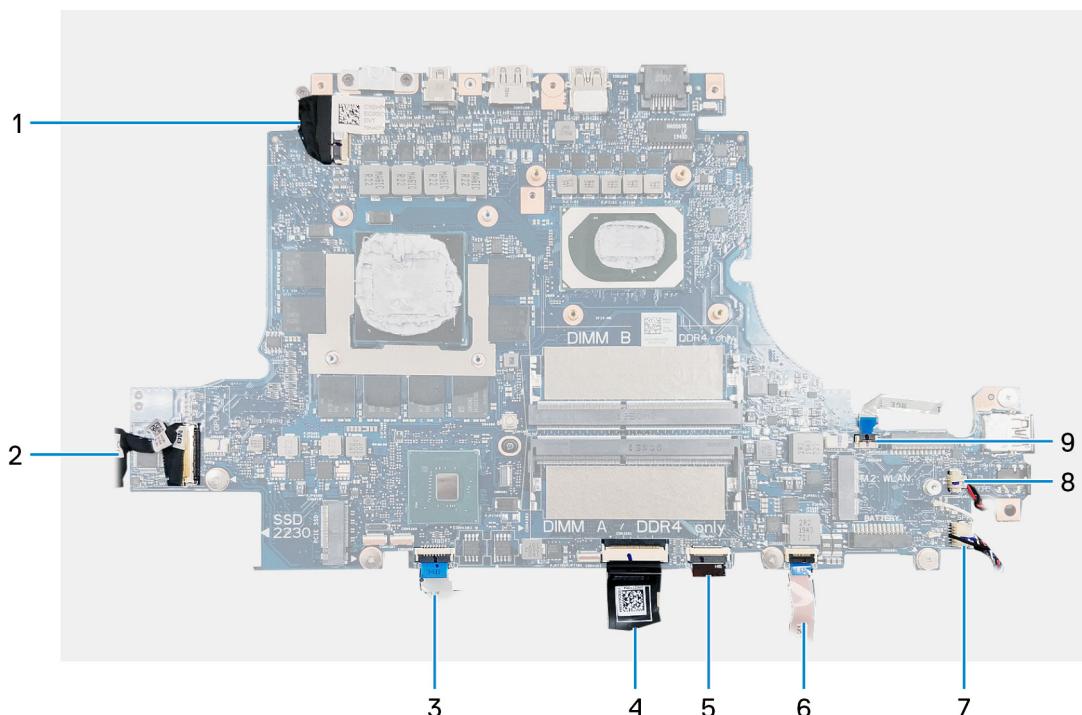
**NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. Make the appropriate changes again after you replace the system board.

**NOTE:** Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.

2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [coin-cell battery](#).
5. Remove the [rear cover](#).
6. Remove the [rear-cover bracket](#).
7. Remove the [wireless card](#).
8. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
9. Remove the [memory modules](#).
10. Remove the [processor fan](#).
11. Remove the [graphics-card fan](#).
12. Remove the [heat sink](#).

### About this task

The following image indicates the cables on your system board.

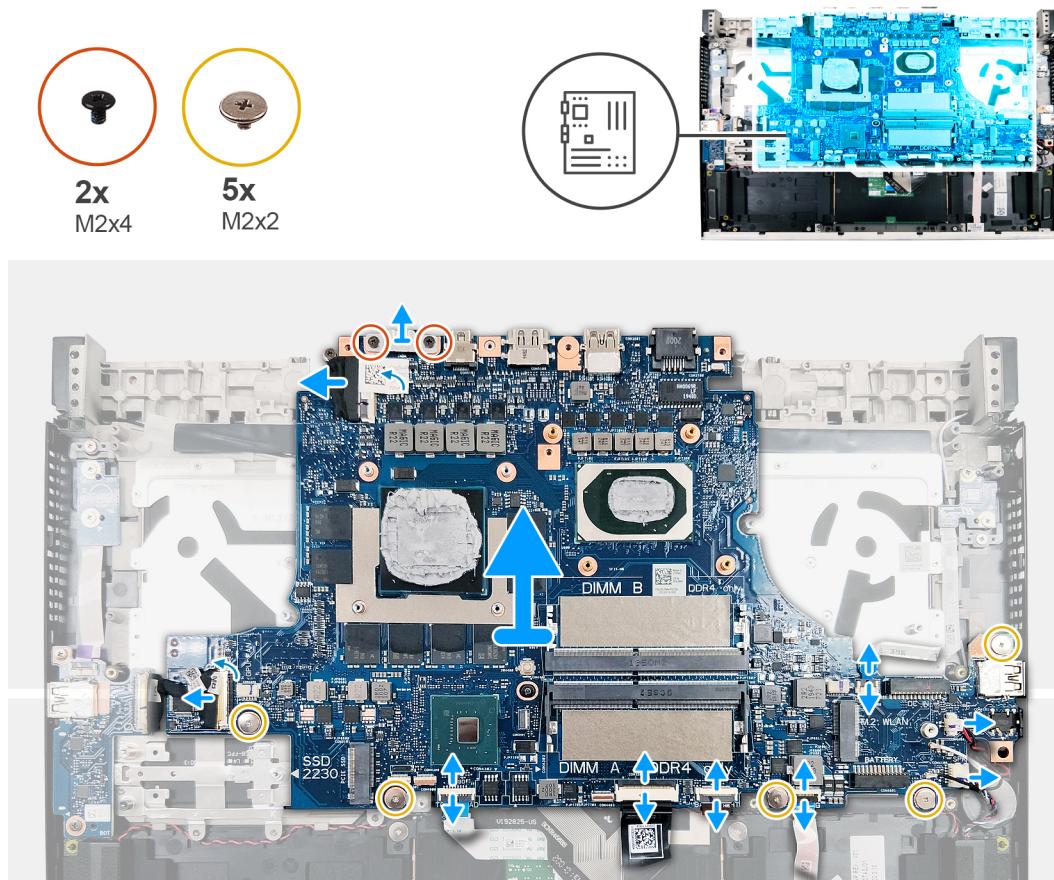


**Figure 1. System-board cables**

1. Display cable	2. I/O-board cable
3. Touchpad cable	4. Keyboard cable

- 5. Keyboard-backlight cable
- 6. Light-bar cable
- 7. Speaker cable
- 8. Coin-cell battery cable
- 9. G-key cable

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



### Steps

1. Remove the two screws (M2x4) that secure the USB Type-C bracket to the system board.
2. Lift the USB Type-C bracket off the system board.
3. Open the latch and disconnect the display cable from the system board.
4. Open the latch and disconnect the I/O-board cable from the system board.
5. Open the latch and disconnect the touchpad cable from the system board.
6. Open the latch and disconnect the keyboard cable from the system board.
7. Open the latch and disconnect the keyboard-backlight cable from the system board.
8. Open the latch and disconnect the light-bar cable from the system board.
9. Disconnect the speaker cable from the system board.
10. Disconnect the coin-cell battery cable from the system board.
11. Open the latch and disconnect the G-key cable from the system board.
12. Remove the five screws (M2x2) that secure the system board to the palm-rest and keyboard assembly.
13. Lift the system board off the palm-rest and keyboard assembly.

## Installing the system board

### Prerequisites

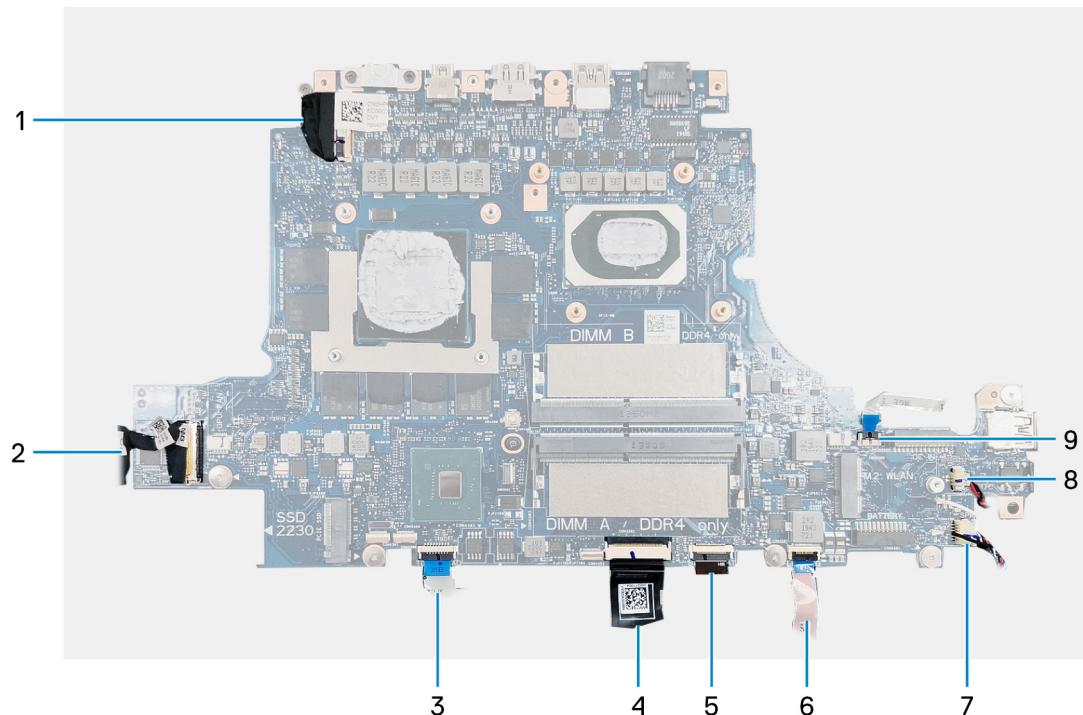
If you are replacing a component, remove the existing component before performing the installation procedure.

**(i) NOTE:** The Service Tag of your computer is stored in the system board. Enter the Service Tag in the BIOS setup program after you replace the system board.

**(i) NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. Make the appropriate changes again after you replace the system board.

#### About this task

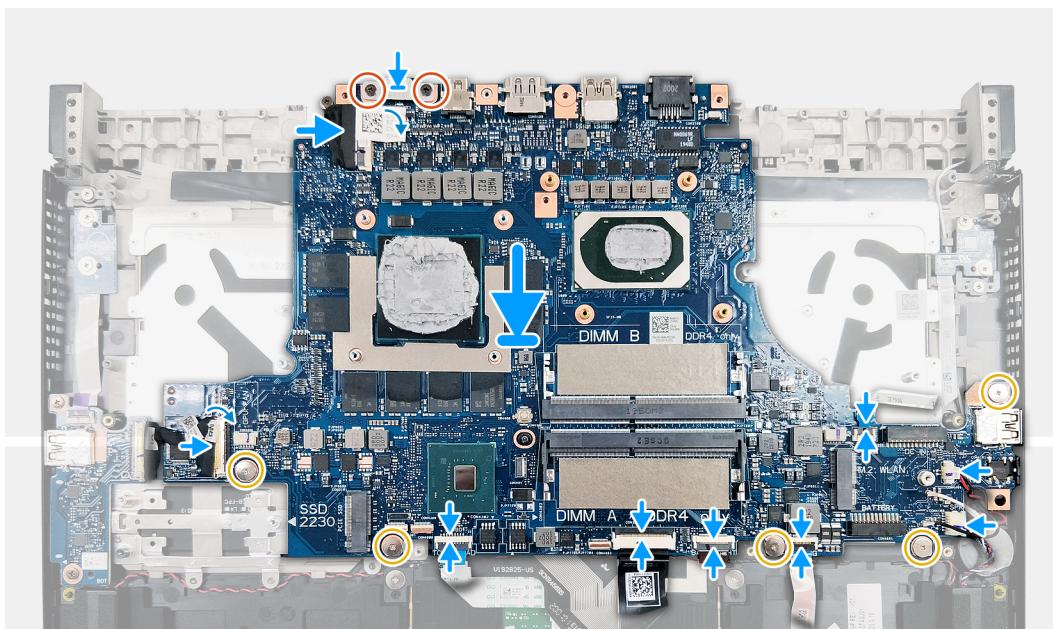
The following image indicates the cables on your system board.



**Figure 2. System-board cables**

1. Display cable	2. I/O-board cable
3. Touchpad cable	4. Keyboard cable
5. Keyboard-backlight cable	6. Light-bar cable
7. Speaker cable	8. Coin-cell battery cable
9. G-key cable	

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



## Steps

1. Align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.
2. Replace the five screws (M2x2) that secure the system board to the palm-rest and keyboard assembly.
3. Connect the G-key cable to the system board and close the latch.
4. Connect the coin-cell battery cable to the system board.
5. Connect the speaker cable to the system board.
6. Connect the light-bar cable to the system board and close the latch.
7. Connect the keyboard-back light cable to the system board and close the latch.
8. Connect the keyboard cable to the system board and close the latch.
9. Connect the touchpad cable to the system board and close the latch.
10. Connect the I/O-board cable to the system board and close the latch.
11. Connect the display cable to the system board and close the latch.
12. Align the screw holes on the USB Type-C bracket with the screw holes on the system board.
13. Replace the two screws (M2x4) that secure the USB Type-C bracket to the system board.

## Next steps

1. Install the [heat sink](#).
2. Install the [graphics-card fan](#).
3. Install the [processor fan](#).
4. Install the [memory modules](#).
5. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
6. Install the [wireless card](#).
7. Install the [rear-cover bracket](#).
8. Install the [rear cover](#).
9. Install the [coin-cell battery](#).
10. Install the [battery](#).
11. Install the [base cover](#).

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

# Speakers

## Removing the speakers

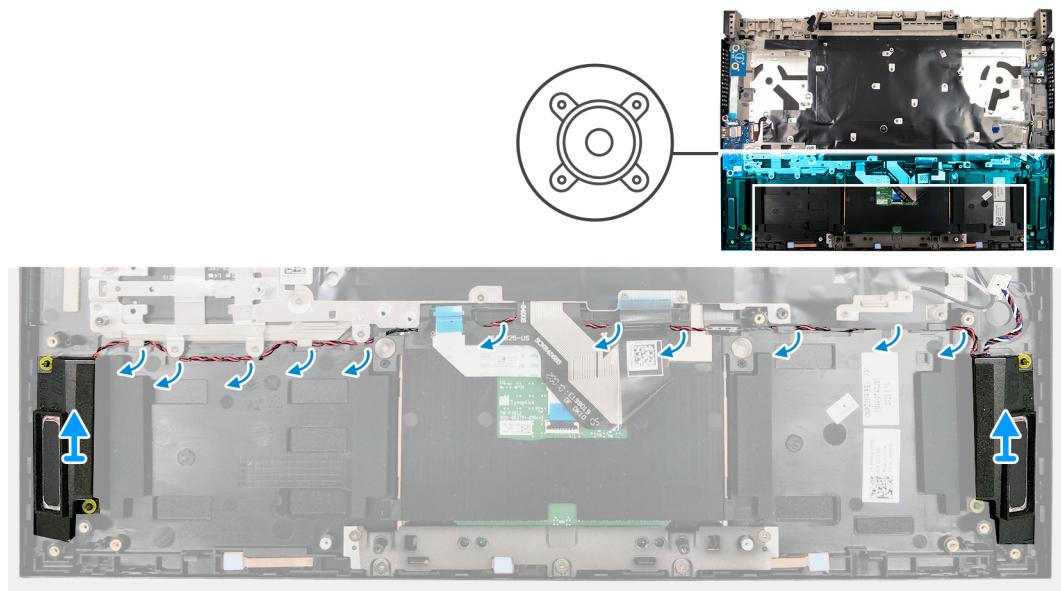
### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [coin-cell battery](#).
5. Remove the [rear cover](#).
6. Remove the [rear-cover bracket](#).
7. Remove the [wireless card](#).
8. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
9. Remove the [memory modules](#).
10. Remove the [processor fan](#).
11. Remove the [graphics-card fan](#).
12. Remove the [light bar](#).
13. 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 prevents damage to the thermal bond between the system board and heat sink.

### About this task

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



### Steps

1. Note the speaker-cable routing, and remove the speaker cable from the routing guides on the palm-rest and keyboard assembly.
2. Lift the speakers, along with the cables, off the palm-rest and keyboard assembly.

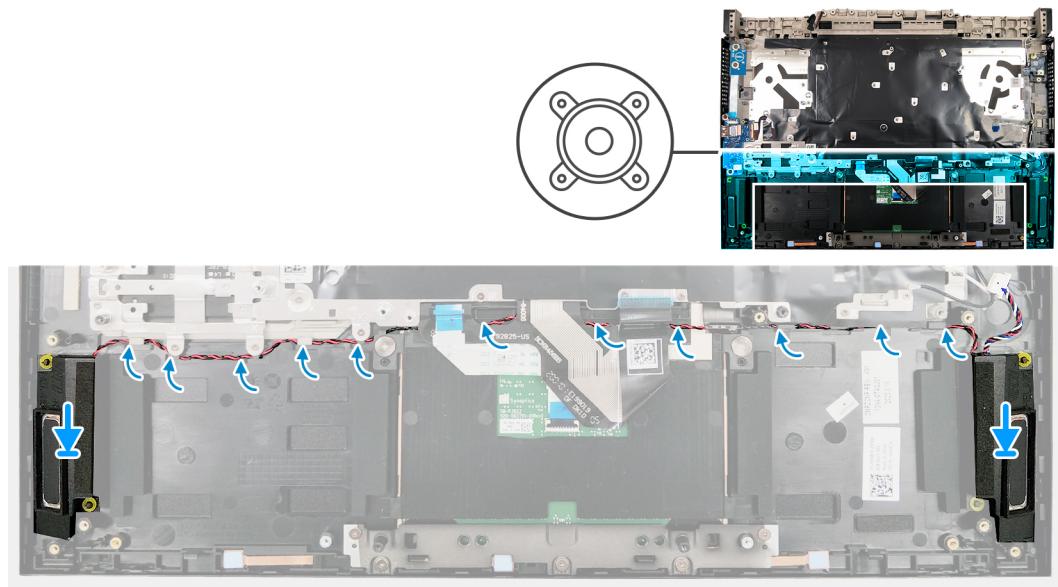
# Installing the speakers

## Prerequisites

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

## About this task

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



## Steps

1. Using the alignment posts and rubber grommets, place the speakers on the slots on the palm-rest and keyboard assembly.
2. Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.

## Next steps

1. Install the [system board](#).
2. Install the [light bar](#).
3. Install the [graphics-card fan](#).
4. Install the [processor fan](#).
5. Install the [memory modules](#).
6. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
7. Install the [wireless card](#).
8. Install the [rear-cover bracket](#).
9. Install the [rear cover](#).
10. Install the [coin-cell battery](#).
11. Install the [battery](#).
12. Install the [base cover](#).
13. Follow the procedure in [After working inside your computer](#).

# Touchpad

## Removing the touchpad

## Prerequisites

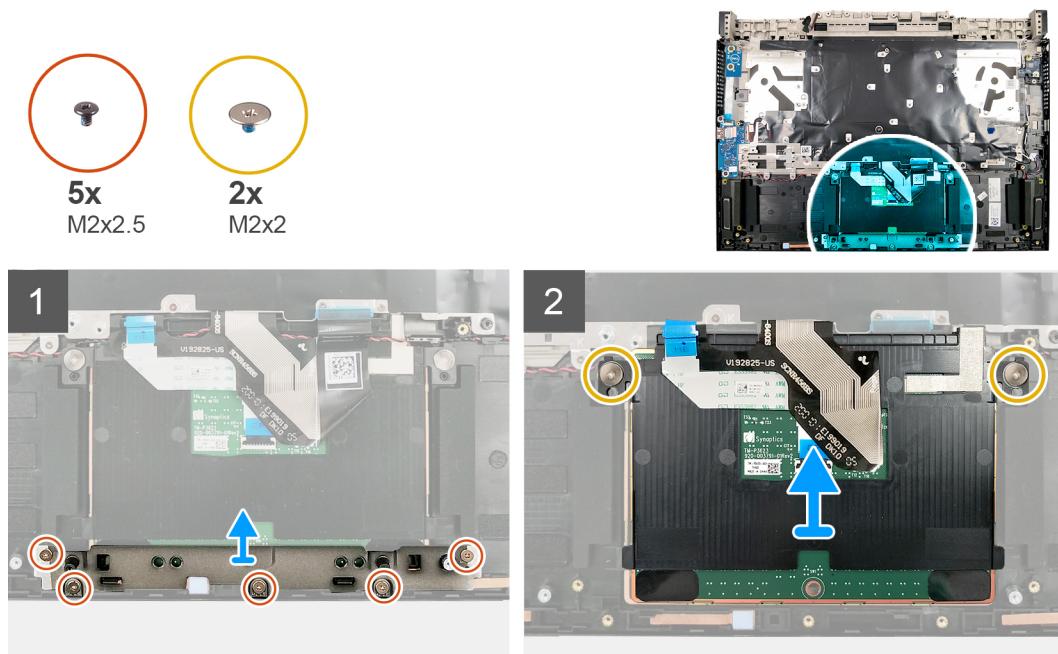
1. Follow the procedure in [Before working inside your computer](#).

2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [rear cover](#).
5. Remove the [rear-cover bracket](#).
6. Remove the [wireless card](#).
7. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
8. Remove the [memory modules](#).
9. Remove the [processor fan](#).
10. Remove the [graphics-card fan](#).
11. 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 prevents damage to the thermal bond between the system board and heat sink.

#### About this task

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



#### Steps

1. Remove the five screws (M2x2.5) that secure the touchpad bracket to the palm-rest and keyboard assembly.
2. Lift the touchpad bracket off the palm-rest and keyboard assembly.
3. Open the latch and disconnect the touchpad cable from the system board.
4. Open the latch and disconnect the touchpad cable from the touchpad.
5. Remove the two screws (M2x2) that secure the touchpad to the palm-rest and keyboard assembly.
6. Slide and lift the touchpad at an angle, off the palm-rest and keyboard assembly.

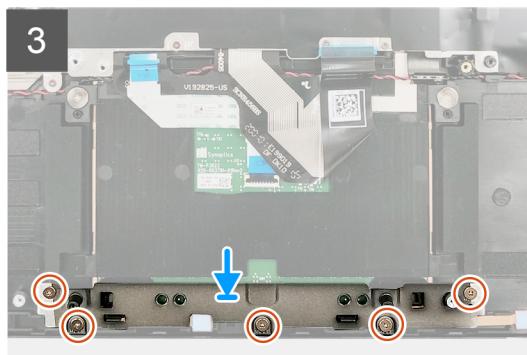
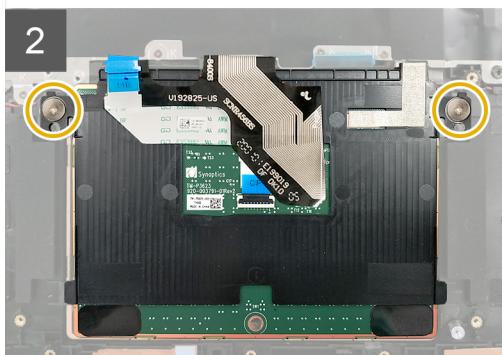
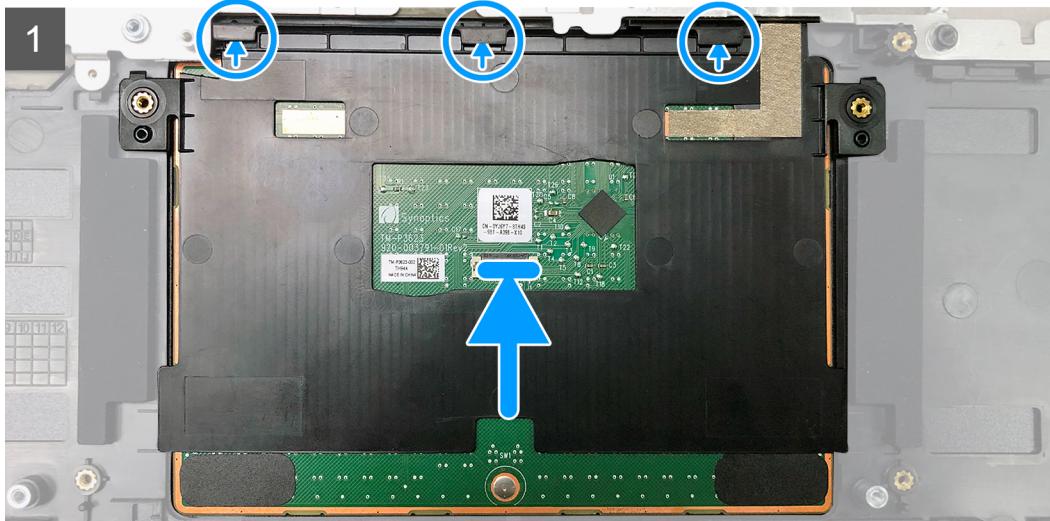
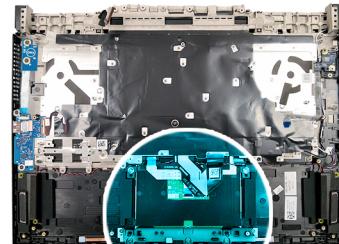
## Installing the touchpad

#### Prerequisites

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

#### About this task

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



## Steps

1. Slide and insert the touchpad into the slot on the palm-rest and keyboard assembly.
2. Align the screw holes on the touchpad with the screw holes on the palm-rest and keyboard assembly.
3. Replace the two screws (M2x2) that secure the touchpad to the palm-rest and keyboard assembly.
4. Connect the touchpad cable to the system board and close the latch to secure the touchpad cable.
5. Connect the touchpad cable to the touchpad board and close the latch to secure the cable.
6. Align the screw holes on the touchpad bracket with the screw holes on the palm-rest and keyboard assembly.
7. Replace the five screws (M2x2.5) that secure the touchpad and the touchpad bracket to the palm-rest and keyboard assembly.

## Next steps

1. Install the [system board](#).
2. Install the [graphics-card fan](#).
3. Install the [processor fan](#).
4. Install the [memory modules](#).
5. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
6. Install the [wireless card](#).
7. Install the [rear-cover bracket](#).

8. Install the [rear cover](#).
9. Install the [battery](#).
10. Install the [base cover](#).
11. Follow the procedure in [After working inside your computer](#).

## Keyboard

### Removing the keyboard

#### Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [coin-cell battery](#).
5. Remove the [rear cover](#).
6. Remove the [rear-cover bracket](#).
7. Remove the [display assembly](#).
8. Remove the [wireless card](#).
9. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
10. Remove the [memory modules](#).
11. Remove the [processor fan](#).
12. Remove the [graphics-card fan](#).
13. Remove the [power-adapter port](#).
14. Remove the [power button with optional fingerprint reader](#).
15. Remove the [light bar](#).
16. Remove the [I/O board](#).
17. 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 prevents damage to the thermal bond between the system board and heat sink.**

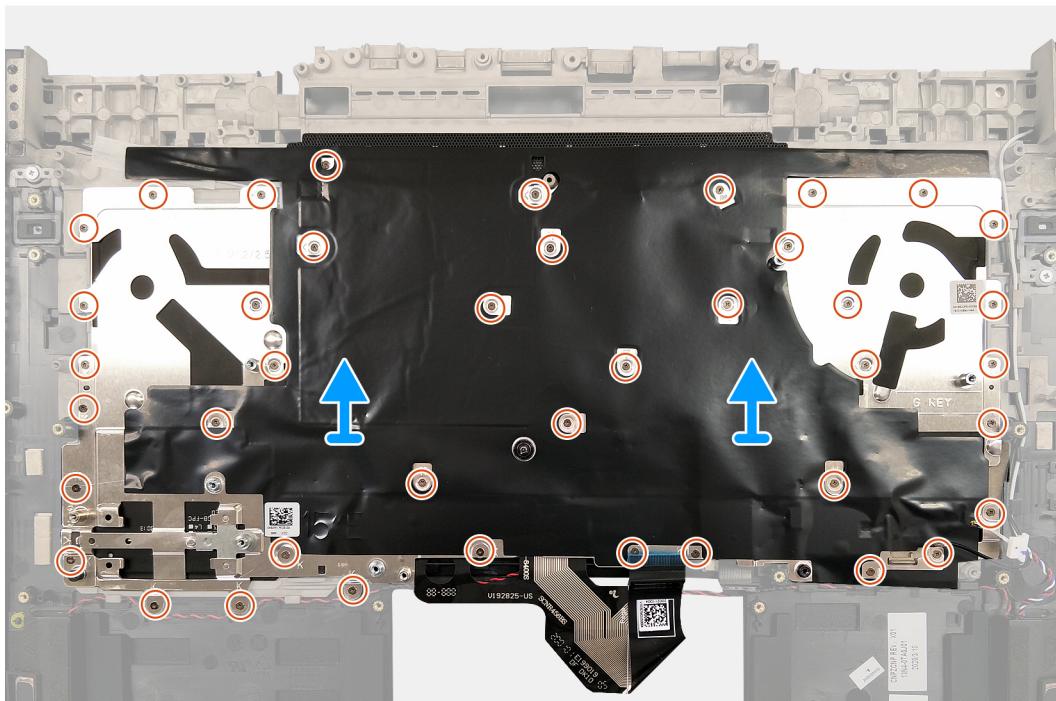
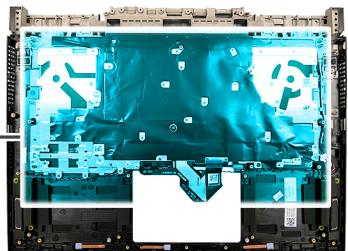
18. Remove the [G key](#).
19. Remove the [touchpad](#).

#### About this task

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



41x  
M1.2x2.5



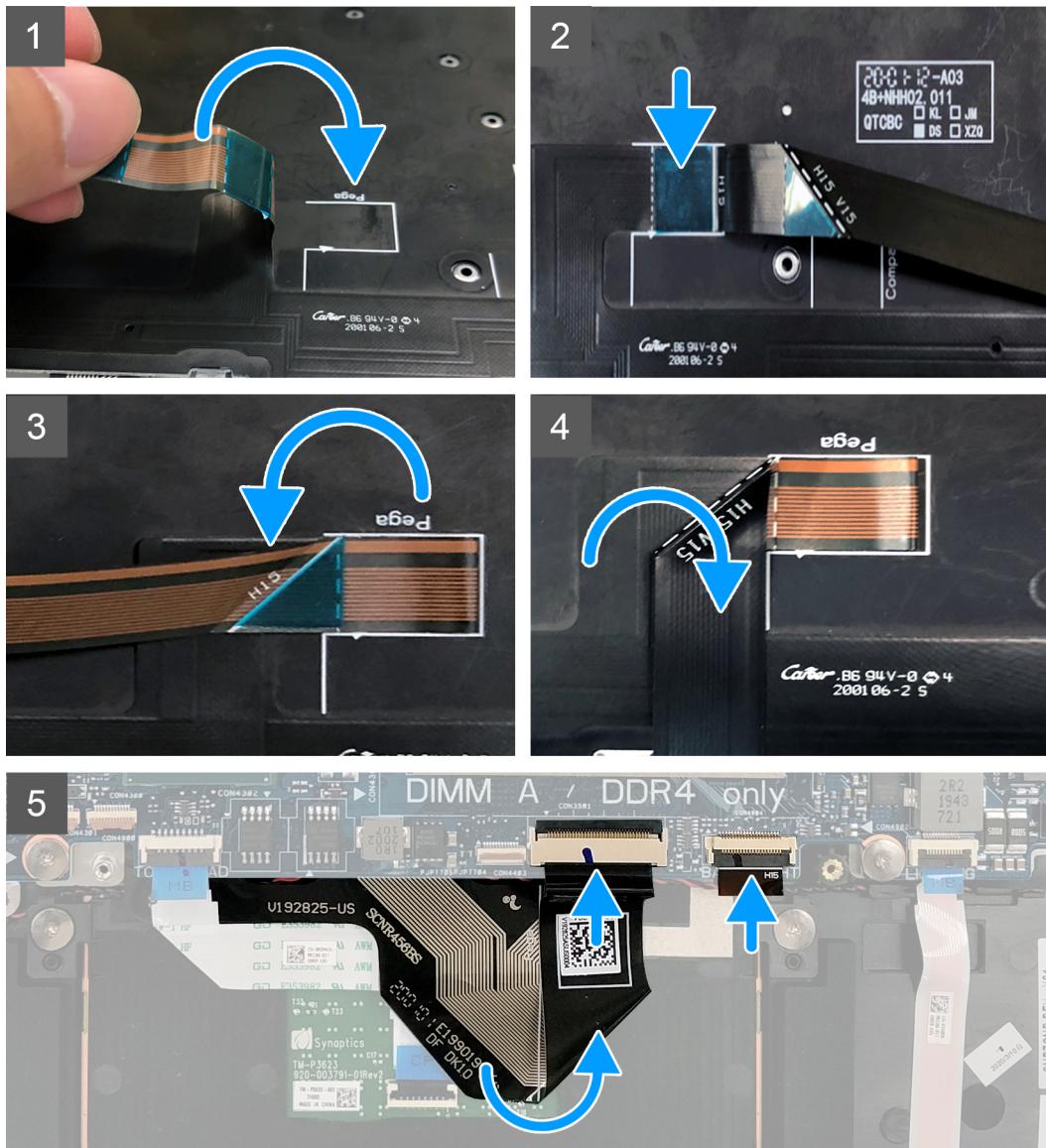
## Steps

1. Remove the 41 screws (M1.2x2.5) that secure the keyboard bracket to the palm-rest and keyboard assembly.
2. Lift the keyboard bracket and keyboard off the palm-rest and keyboard assembly.

## Folding the keyboard cable

### About this task

The following image provides a visual representation of folding the keyboard cable.



### Steps

1. Place the keyboard on a flat and clean surface.
2. Using the alignment lines on keyboard bracket and keyboard cable, fold the keyboard cable as shown in the images.

***(i) NOTE: Ensure that the QR code on the keyboard cable is facing up before connecting it to the system board.***

3. Install the [keyboard](#).

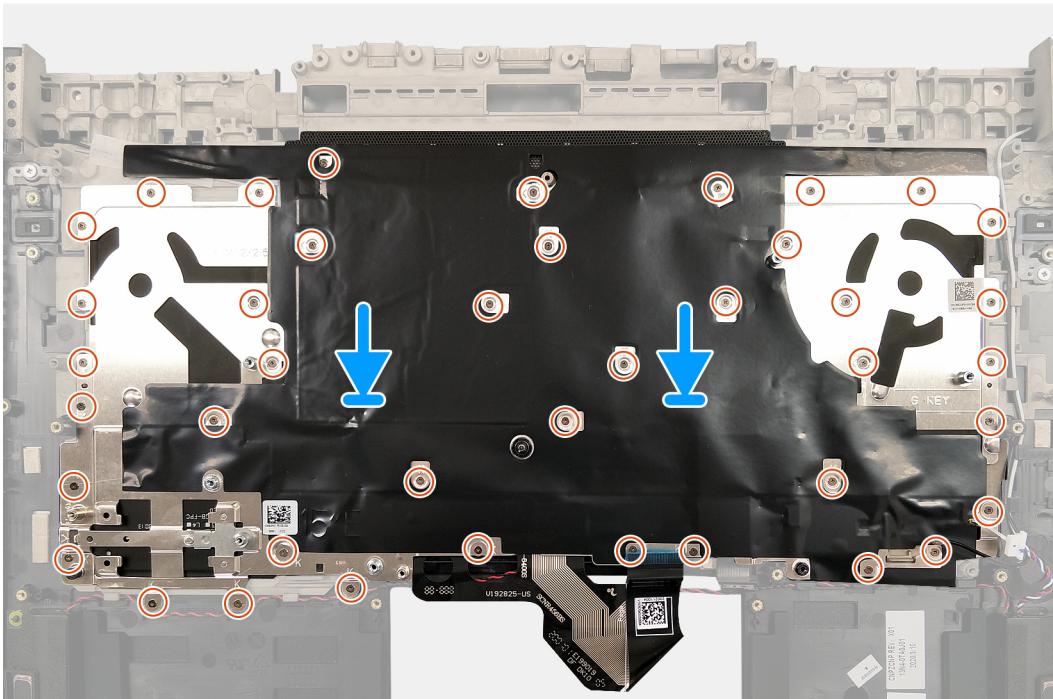
## Installing the keyboard

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



## Steps

1. [Fold the keyboard cable](#).
2. Align the screw holes on the keyboard and keyboard bracket with the screw holes on the palm-rest and keyboard assembly.
3. Replace the 41 screws (M1.2x2.5) that secure the keyboard bracket to the palm-rest and keyboard assembly.

## Next steps

1. Install the [touchpad](#).
2. Install the [G key](#).
3. Install the [system board](#).
4. Install the [I/O board](#).
5. Install the [light bar](#).
6. Install the [power button with optional fingerprint reader](#).
7. Install the [power-adapter port](#).
8. Install the [graphics-card fan](#).
9. Install the [processor fan](#).
10. Install the [memory modules](#).
11. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
12. Install the [wireless card](#).
13. Install the [display assembly](#).
14. Install the [rear-cover bracket](#).
15. Install the [rear cover](#).
16. Install the [coin-cell battery](#).
17. Install the [battery](#).
18. Install the [base cover](#).
19. Follow the procedure in [After working inside your computer](#).

# Palmrest

## Removing the palmrest

### Prerequisites

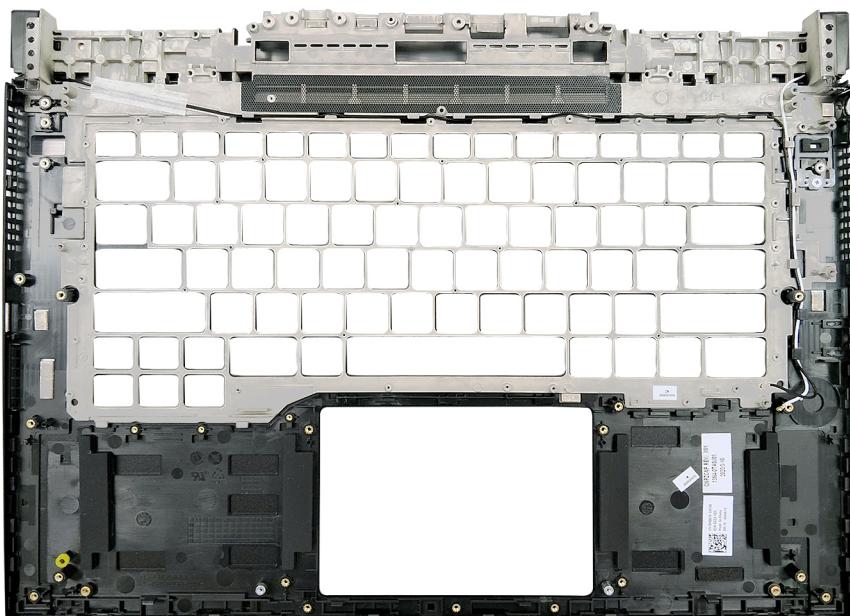
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [coin-cell battery](#).
5. Remove the [rear cover](#).
6. Remove the [rear-cover bracket](#).
7. Remove the [display assembly](#).
8. Remove the [wireless card](#).
9. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
10. Remove the [processor fan](#).
11. Remove the [graphics-card fan](#).
12. Remove the [power-adapter port](#).
13. Remove the [power button with optional fingerprint reader](#).
14. Remove the [light bar](#).
15. Remove the [I/O board](#).
16. Remove the [G key](#).
17. 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 prevents damage to the thermal bond between the system board and heat sink.***

18. Remove the [speakers](#).
19. Remove the [touchpad](#).
20. Remove the [keyboard](#).

### About this task

After performing the steps in the pre-requisites, you are left with the palmrest.



# Installing the palmrest

## Prerequisites

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

## About this task

The following image indicates the palmrest and provides a visual representation of the installation procedure.



## Steps

Place the palmrest on a clean and flat surface.

## Next steps

1. Install the [keyboard](#).
2. Install the [touchpad](#).
3. Install the [speakers](#).
4. Install the [system board](#).  
**i NOTE: The system board can be removed or installed together with the heat sink attached.**
5. Install the [G key](#)
6. Install the [I/O board](#).
7. Install the [light bar](#).
8. Install the [power button with optional fingerprint reader](#).
9. Install the [power-adapter port](#).
10. Install the [graphics-card fan](#).
11. Install the [processor fan](#).
12. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#).
13. Install the [wireless card](#).
14. Install the [display assembly](#).
15. Install the [rear-cover bracket](#).
16. Install the [rear cover](#).
17. Install the [coin-cell battery](#).
18. Install the [battery](#).
19. Install the [base cover](#).

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

## Device drivers

### Intel Chipset Software Installation Utility

In the Device Manager, check if the chipset driver is installed.

Install the Intel chipset updates from [www.dell.com/support](http://www.dell.com/support).

### Video drivers

In the Device Manager, check if the video driver is installed.

Install the video driver update from [www.dell.com/support](http://www.dell.com/support).

### Intel Serial IO driver

In the Device Manager, check if the Intel Serial IO driver is installed.

Install the driver updates from [www.dell.com/support](http://www.dell.com/support).

### Intel Trusted Execution Engine Interface

In the Device Manager, check if the Intel Trusted Execution Engine Interface driver is installed.

Install the driver update from [www.dell.com/support](http://www.dell.com/support).

### Intel Virtual Button driver

In the Device Manager, check if the Intel Virtual Button driver is installed.

Install the driver updates from [www.dell.com/support](http://www.dell.com/support).

### Wireless and Bluetooth drivers

In the Device Manager, check if the network card driver is installed.

Install the driver updates from [www.dell.com/support](http://www.dell.com/support).

In the Device Manager, check if the Bluetooth driver is installed.

Install the driver updates from [www.dell.com/support](http://www.dell.com/support).

# 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.

## BIOS overview

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

## Entering BIOS setup program

### About this task

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

## 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.

## One time boot menu

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

 **NOTE:** It is recommended to shutdown the computer if it is on.

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

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

**Table 3. System setup options**

Overview	
<b>Dell G7 7500</b>	
BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Displays the Asset Tag of the computer.
Manufacture Date	Displays the manufacture date of the computer.
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the express service code of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Signed Firmware Update	Displays whether the signed firmware update is enabled. Default: Enabled
<b>BATTERY</b>	
Battery Type	Displays the battery type.
Battery Level	Displays the battery level.
Battery State	Displays the battery state.
Health	Displays the battery health.
AC Adapter	Displays whether an AC adapter is connected. If connected, the AC adapter type.
<b>PROCESSOR</b>	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed.

**Table 3. System setup options (continued)**

<b>Overview</b>	
Minimum Clock Speed	Displays the minimum processor clock speed.
Current Clock Speed	Displays the current processor clock speed.
Core Count	Displays the number of cores on the processor.
Processor ID	Displays the processor identification code.
Processor L2 Cache	Displays the processor L2 Cache size.
Processor L3 Cache	Displays the processor L3 Cache size.
Microcode Version	Displays the microcode version.
Intel Hyper-Threading Capable	Displays whether the processor is Hyper-Threading (HT) capable.
64-Bit Technology	Displays whether 64-bit technology is used.
<b>MEMORY</b>	
Memory Installed	Displays the total computer memory installed.
Memory Available	Displays the total computer memory available.
Memory Speed	Displays the memory speed.
Memory Channel Mode	Displays single or dual channel mode.
Memory Technology	Displays the technology that is used for the memory.
DIMM A Size	Displays the memory size in DIMM Slot A.
DIMM B Size	Displays the memory size in DIMM Slot B.
<b>DEVICES</b>	
Panel Type	Displays the panel type of the computer.
Video Controller	Displays the integrate graphics information of the computer.
Video Memory	Displays the video memory information of the computer.
Wi-Fi Device	Displays the Wi-Fi device installed in the computer.
Native Resolution	Displays the native resolution of the computer.
Video BIOS Version	Displays the video BIOS version of the computer.
Audio Controller	Displays the audio controller information of the computer.
Bluetooth Device	Displays whether a Bluetooth device is installed in the computer.
Primary Hard Drive	Displays the primary hard drive in the computer.
LOM MAC Address	Displays the MAC address.
Pass Through MAC Address	Displays the MAC address of the video pass-through.
Cellular Device	Displays the cellular device information.
Slot	Displays the information of the device installed.

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

<b>Boot Configuration</b>	
<b>Boot Mode</b>	
Boot Mode: UEFI only	Displays the boot mode of this computer.
Boot Sequence	Displays the boot sequence.
<b>Advanced Boot Options</b>	
Enable UEFI Network Stack	Enables or disables UEFI Network Stack. Default: ON

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

<b>Boot Configuration</b>	
<b>UEFI Boot Path Security</b>	Enables or disables the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu.  Default: Always Except Internal HDD
<b>Expert Key Management</b>	
Enable Custom Mode	Enables or disables the PK, KEK, db, and dbx security key databases to be manipulated.  Default: OFF
Custom Mode Key Management	Selects the security key database.  By default, PK is selected.

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

<b>Integrated Devices</b>	
<b>Date/Time</b>	
Date	Sets the computer date in MM/DD/YYYY format. Changes to the date take effect immediately.
Time	
	Sets the computer time in HH/MM/SS 24-hour format. You can switch between 12-hour and 24-hour clock. Changes to the time take effect immediately.
<b>Thunderbolt Adapter Configuration</b>	
Enable Thunderbolt Technology Support	Enables or disables Thunderbolt Technology Support.  Default: ON
Enable Thunderbolt Boot Support	Enables or disables Thunderbolt Boot Support.  Default: OFF
Enable Thunderbolt (and PCIe behind TBT) pre-boot modules	Enables or disables to allow or disallow PCIe devices to be connected through a Thunderbolt adapter during pre-boot.  Default: OFF
<b>Camera</b>	
	Enables or disables the camera.  By default, Enable Camera is selected.
<b>Audio</b>	
	Enables or disables all integrated audio controller.  Default: ON

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

<b>Storage</b>	
<b>SATA Operation</b>	Configures operating mode of the integrated SATA hard drive controller.  Default: RAID On. SATA is configured to support RAID (Intel Rapid Restore Technology).
<b>Enable SMART Reporting</b>	Enables or disables Self-Monitoring, Analysis, and Reporting Technology (SMART).  Default: OFF
<b>Drive Information</b>	Displays the information of various onboard drives.
<b>Enable MediaCard</b>	Enables to switch all media cards On/Off or set the media card to read-only state.  By default, Enable Secure Digital (SD) Card is selected.

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

Display	
<b>Display Brightness</b>	
Brightness on battery power	Sets the screen brightness when the computer is running on battery power. Default: 50
Brightness on AC power	Sets the screen brightness when the computer is running on AC power. Default: 0
<b>Touch Screen</b>	Enables or disables the touch screen for the OS. <b><i>(i) NOTE: The touch screen will always work in the BIOS setup irrespective of this setting.</i></b>
<b>Full Screen Logo</b>	Enabled or disabled the computer to display full screen logo if the image match screen resolution. Default: OFF

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

Connection	
<b>Network Controller Configuration</b>	Enables or disables the network controller. By default, Integrated NIC is selected.
<b>Wireless Device Enable</b>	Enable or disable internal WLAN/Bluetooth devices. By default, WLAN is selected. By default, Bluetooth is selected.
<b>Enable UEFI Network Stack</b>	When enabled, UEFI networking protocols are installed and available, allowing pre-OS and early OS networking features to use any enabled NICs. This may be used without PXE turned on. Default: ON
<b>Wireless Radio Control</b>	Enables to sense the connection of the computer to a wired network and subsequently disable the selected wireless radios (WLAN and/or WWAN). Upon disconnection from the wired network, the selected wireless radios are re-enabled. Default: OFF

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

Power	
<b>Battery Configuration</b>	Enables the computer to run on battery during power usage hours. Use the below options to prevent AC power usage between certain times of each day. By default Adaptive is selected.
<b>Advanced Configuration</b>	Enables Advanced Battery Charge Configuration from the beginning of the day to a specified work period. Advanced Battery Charged maximizes battery health while still supporting heavy use during the work day. Default: OFF
<b>Peak Shift</b>	Enables the computer to run on battery during peak power usage hours. Default: OFF

**Table 9. System setup options—Power menu (continued)**

<b>Power</b>	
<b>Thermal Management</b>	Sets cooling fan and processor heat management to adjust system performance, noise, and temperature.  By default, Optimized is selected.
<b>USB Wake Support</b>	Enables connecting a Dell USB-C Dock to wake the computer from Standby.  Default: ON
<b>Block Sleep</b>	Blocks the computer from entering Sleep (S3) mode in the operating system.  Default: OFF
	<b><i>(i) NOTE: If enabled, the computer will not go to sleep, Intel Rapid Start will be disabled automatically, and the operating system power option will be blank if it was set to Sleep.</i></b>
<b>Lid Switch</b>	Enables or disables the lid switch.  Default: ON
Enable Lid Switch	
Power On Lid Open	Enables the computer to power up from the off state whenever the lid is opened.  Default: ON
<b>Intel Speed Shift Technology</b>	Enables or disables the Intel Speed Shift Technology support. Setting this option to enable allows the operating system to select the appropriate processor performance automatically.  Default: ON

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

<b>Security</b>	
<b>TPM 2.0 Security On</b>	Select whether or not the Trusted Platform Model (TPM) is visible to the OS.  Default: ON
PPI Bypass for Enable Commands	Enables or disables the OS to skip BIOS Physical Presence Interface (PPI) user prompts when issuing TPM PPI enabled and activate commands.  Default: OFF
PPI Bypass for Disable Commands	Enables or disables The OS to skip BIOS PPI user prompts when issuing TPM PPI Disable and Deactivate commands.  Default: OFF
PPI Bypass for Clear Commands	Enables or disables the operating system to skip BIOS Physical Presence Interface (PPI) user prompts when issuing the Clear command.  Default: OFF
Attestation Enable	Enables to control whether the TPM Endorsement Hierarchy is available to the OS. Disabling this setting restricts the ability to use the TPM for signature operations.  Default: ON
Key Storage Enable	Enables to control whether the TPM Endorsement Hierarchy is available to the OS. Disabling this setting restricts the ability to use the TPM for storing owner data.  Default: ON
SHA-256	Enables or disables the BIOS and the TPM to use the SHA-256 hash algorithm to extend measurements into the TPM PCRs during BIOS boot.

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

<b>Security</b>	
Clear	Default: ON  Enables or disables the computer to clear the PTT owner information, and returns the PTT to the default state.
TPM State	Default: OFF  Enables or disables the TPM. This is the normal operating state for the TPM when you want to use its complete array of capabilities.
	Default: Enabled
<b>Intel Software Guard Extensions</b>	
Intel SGX	Enables or disables the Intel Software Guard Extensions (SGX) to provide a secured environment for running code/storing sensitive information.  By default, Software Control is selected.
<b>SMM Security Mitigation</b>	
SMM Security Mitigation	Enables or disables additional UEFI SMM Security Mitigation protections.  Default: OFF
<b>①  NOTE: This feature may cause compatibility issues or loss of functionality with some legacy tools and applications.</b>	
<b>Data Wipe on Next Boot</b>	
Start Data Wipe	When enabled, the BIOS will queue up a data wipe cycle for storage device(s) connected to the motherboard on the next reboot.  Default: OFF
<b>Absolute</b>	
Absolute	Enables, disables or permanently disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute Software.  By default, Enable Absolute is selected.
<b>UEFI Boot Path Security</b>	
UEFI Boot Path Security	Controls whether the system will prompt the user to enter the admin password (if set) when booting to a UEFI boot path device from the F12 boot menu.  By default, Always Except Internal HDD is selected.

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

<b>Passwords</b>	
<b>Admin Password</b>	Sets, changes, or deletes the administrator password (sometimes called the "setup password"). The administrator password enables several security features.
<b>Password Configuration</b>	
Upper Case Letter	When enabled, password must contain at least one upper case letter.  Default: OFF
Upper Case Letter	When enabled, password must contain at least one lower case letter.  Default: OFF
Digit	When enabled, password must contain at least one digit number.  Default: OFF
Special Character	When enabled, password must contain at least one special character.

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

<b>Passwords</b>	
	Default: OFF
Minimum Characters	Sets the minimum number of characters allowed for passwords. Default: 04
<b>Password Bypass</b>	
Password Bypass	When enabled, the system and the hard drive passwords are prompted when the computer is powered on from the Off state. By default, Disabled is selected.
<b>Password Changes</b>	
Enable Non-Admin Password Changes	When On, users can change the system and the hard drive password without the need for administrator password. Default: ON
<b>Admin Setup Lockout</b>	
Enable Admin Setup Lockout	Enables or disables the user from entering BIOS Setup when an administrator password is set. Default: OFF
<b>Master Password Lockout</b>	
Enable Master Password Lockout	Enables or disables the master password support. Default: OFF

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

<b>Update Recovery</b>	
	<b>UEFI Capsule Firmware Updates</b>
Enable UEFI Capsule Firmware Updates	Controls whether this computer allows BIOS updates via EUFI capsule update packages. Default: ON
<b>BIOS Recovery from Hard Drive</b>	
BIOS Recovery from Hard Drive	Enables the computer to recover from a bad BIOS image, as long as the Boot Block portion is intact and functioning. Default: ON
	<b>NOTE:</b> BIOS recovery is designed to fix the main BIOS block and cannot work if the Boot Block is damaged. In addition, this feature cannot work in the event of EC corruption, ME corruption, or a hardware issue. The recovery image must exist on an unencrypted partition on the drive.
<b>BIOS Downgrade</b>	
Allow BIOS Downgrade	Controls flashing of the system firmware to previous revisions. Default: ON
<b>SupportAssist OS Recovery</b>	
SupportAssist OS Recovery	Enables or disables the boot flow for SupportAssist OS Recovery tool in the event of certain system errors. Default: ON
<b>BIOSConnect</b>	

**Table 12. System setup options—Update Recovery menu (continued)**

<b>Update Recovery</b>	
BIOSConnect	Enables or disables cloud Service OS recover if the main operating system fails to boot with the number of failures equal to or greater than the value specified by the Auto OS Recovery Threshold setup option.  Default: ON
<b>Dell Auto OS Recovery Threshold</b>	Controls the automatic boot flow for SupportAssist System Resolution Console and for Dell operating system Recovery tool.  By default, 2 is selected.

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

<b>System Management</b>	
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Creates a system Asset Tag that can be used by an IT administrator to uniquely identify a particular system. Once set in BIOS, the Asset Tag cannot be changed.
<b>AC Behavior</b>	
Wake on AC	Enables the computer to turn on and go to boot when AC power is supplied to the computer.  Default: OFF
<b>Wake on LAN/WLAN</b>	
Wake on LAN/WLAN	Enables or disables the computer to turn on by a special LAN/WLAN signal.  By default, Disabled is selected.

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

<b>Keyboard</b>	
<b>Numlock Enable</b>	
Enable Numlock	Enables or disables Numlock when the computer boots.  Default: ON
<b>Fn Lock Options</b>	
Fn Lock Options	Enables or disables the Fn lock option.  Default: ON
Lock Mode	Default: Lock Mode Secondary. Lock Mode Secondary = If this option is selected, the F1-F12 keys scan the code for their secondary functions.
<b>Keyboard Illumination</b>	
Keyboard Illumination	Configures the operating mode of the keyboard illumination feature.  By default, Bright is selected.
<b>Keyboard Backlight Timeout on AC</b>	
Keyboard Backlight Timeout on AC	Configures the timeout value for the keyboard when an AC adapter is connected to the computer. The keyboard backlight timeout value is only effect when the backlight is enabled.  By default, 1 minute is selected.
<b>Keyboard Backlight Timeout on Battery</b>	
Keyboard Backlight Timeout on Battery	Configures the timeout value for the keyboard when the computer is running on battery. The keyboard backlight timeout value is only effect when the backlight is enabled.

**Table 14. System setup options—Keyboard menu (continued)**

Keyboard	
	By default, 1 minute is selected.
<b>OROM Keyboard Access</b>	Enables or disables the option to enter Option ROM configuration screens via hotkeys during boot.
OROM Keyboard Access	By default, Enabled is selected.

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

Pre-Boot Behavior	
<b>Adapter Warnings</b>	
Enable Adapter Warnings	Enables or disables the computer to display adapter warning messages when adapters with too little power capacity are detected. Default: ON
<b>Warnings and Errors</b>	
Warnings and Errors	Selects an action on encountering a warning or error during boot. By default, Prompt on Warnings and Errors is selected. <b><i>(i) NOTE: Errors deemed critical to the operation of the computer hardware will always halt the computer.</i></b>
<b>USB-C Warnings</b>	
Enable Dock Warning Messages	Enables or disables dock warning messages. Default: ON
<b>Fastboot</b>	
Fastboot	Configures the speed of the UEFI boot process. By default, Thorough is selected.
<b>Extend BIOS POST Time</b>	
Extend BIOS POST Time	Configures the BIOS POST (Power-On Self-Test) load time. By default, 0 seconds is selected.
<b>MAC Address Pass-Through</b>	
MAC Address Pass-Through	Replaces the external NIC MAC address (in a supported dock or dongle) with the selected MAC address from the computer. By default, System Unique MAC Address is selected.
<b>Sign of Life</b>	
Early Logo Display	Displays Logo Sign of Life. Default: ON

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

Virtualization	
<b>Intel Virtualization Technology</b>	
Intel Virtualization Technology	Enables or disables the computer to run a virtual machine monitor (VMM). Default: ON
<b>VT for Direct I/O</b>	

**Table 16. System setup options—Virtualization menu (continued)**

<b>Virtualization</b>	
Enable Intel VT for Direct I/O	Enables or disables the computer to perform Virtualization Technology for Direct I/O (VT-d). VT-d is an Intel method that provides virtualization for memory map I/O.  Default: ON

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

<b>Performance</b>	
<b>Multi-Core Support</b>	
Active Cores	Changes the number of CPU cores available to the operating system. The default value is set to the maximum number of cores.  By default, All Cores is selected.
<b>Intel SpeedStep</b>	
Enable Intel SpeedStep Technology	Enables or disables the Intel SpeedStep Technology to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production.  Default: ON
<b>C-States Control</b>	
Enable C-State Control	Enables or disables the CPU's ability to enter and exit low-power states.  Default: ON
Enable Adaptive C-States for Discrete Graphics	Allows the computer to dynamically detect high usage of a discrete graphics and adjust the computer parameters for higher performance during that time period.  Default: ON
<b>Intel Turbo Boost Technology</b>	
Enable Intel Turbo Boost Technology	Enabled or disabled the Intel TurboBoost mode of the processor. If enabled, the Intel TurboBoost driver increases the performance of the CPU or graphics processor.  Default: ON
<b>Intel Hyper-Threading Technology</b>	
Enable Intel Hyper-Threading Technology	Enabled or disabled the Intel Hyper-Threading mode of the processor. If enabled, the Intel Hyper-Threading increases the efficiency of the processor resources when multiple threads run on each core.  Default: ON
<b>Dynamic Tuning:Machine Learning</b>	
Enable Dynamic Tuning:Machine Learning	Enables or disables OS capability to enhance dynamic power tuning capabilities based on detected workloads.  Default: OFF

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

<b>System Logs</b>	
<b>BIOS Event Log</b>	
Clear Bios Event Log	Select keep or clear BIOS events.  By default, Keep is selected.
<b>Thermal Event Log</b>	
Clear Thermal Event Log	Select keep or clear Thermal events.

**Table 18. System setup options—System Logs menu (continued)**

System Logs		
	By default, Keep is selected.	
<b>Power Event Log</b>		
Clear POWER Event Log	Select keep or clear Power events.	By default, Keep is selected.

## System and setup password

**Table 19. System and setup password**

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

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

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

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

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

## Assigning a system setup password

### Prerequisites

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

### About this task

To enter the system setup, press F2 immediately after a power-on or reboot.

### Steps

1. In the **System BIOS** or **System Setup** screen, select **Security** and press **Enter**.  
The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.  
Use the following guidelines to assign the system password:
  - A password can have up to 32 characters.
  - The password can contain the numbers 0 through 9.
  - Only lower case letters are valid, upper case letters are not allowed.
  - Only the following special characters are allowed: space, ("), (+), (.), (-), (.), (/), (,), ([), (\), (]), (`).
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press **Esc** and a message prompts you to save the changes.
5. Press **Y** to save the changes.  
The computer reboots.

# Deleting or changing an existing system setup password

## Prerequisites

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

## About this task

To enter the System Setup, press **F2** immediately after a power-on or reboot.

## Steps

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press **Enter**.  
The **System Security** screen is displayed.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
3. Select **System Password**, alter or delete the existing system password and press **Enter** or **Tab**.
4. Select **Setup Password**, alter or delete the existing setup password and press **Enter** or **Tab**.

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

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

# Clearing CMOS settings

## About this task

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

## Steps

1. Turn off your computer.
2. Remove the [base cover](#).

**i** **NOTE:** The battery must be disconnected from the system board (see Step 4 in [Removing the base cover](#)).

3. Press and hold the power button for 15 seconds to drain the flea power.
4. Before you turn on your computer, follow the steps in [Installing the base cover](#).
5. Turn on your computer.

# 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).

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

# Troubleshooting

## 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.***

## System diagnostic lights

### Battery-status light

Indicates the power and battery-charge status.

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

**Amber** — Computer is running on battery and the battery has less than 5 percent charge.

### Off

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

The power and battery-status light blinks amber along with beep codes indicating failures.

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

The following table shows different power and battery-status light patterns and associated problems.

**Table 20. LED codes**

Diagnostic light codes	Problem description
<b>1,1</b>	TPM detection failure
<b>1,2</b>	Unrecoverable SPI flash failure
<b>1,5</b>	i-Fuse failure
<b>1,6</b>	EC internal failure
<b>2,1</b>	Processor failure
<b>2,2</b>	System board: BIOS or ROM (Read-Only Memory) failure
<b>2,3</b>	No memory or RAM (Random-Access Memory) detected

**Table 20. LED codes (continued)**

Diagnostic light codes	Problem description
<b>2,4</b>	Memory or RAM (Random-Access Memory) failure
<b>2,5</b>	Invalid memory installed
<b>2,6</b>	System-board or chipset error
<b>2,7</b>	Display failure
<b>2,8</b>	LCD power rail failure.
<b>3,1</b>	Coin-cell battery failure
<b>3,2</b>	PCI, video card/chip failure
<b>3,3</b>	Recovery image not found
<b>3,4</b>	Recovery image found but invalid
<b>3,5</b>	Power-rail failure
<b>3,6</b>	System BIOS Flash incomplete
<b>3,7</b>	Management Engine (ME) error

**Camera status light:** Indicates whether the camera is in use.

- Solid white — Camera is in use.
- Off — Camera is not in use.

**Caps Lock status light:** Indicates whether Caps Lock is enabled or disabled.

- Solid white — Caps Lock enabled.
- Off — Caps Lock disabled.

## Built-in self-test (BIST)

### About this task

There are three different types of BIST to check the performance of display, power rail, and system board. These tests are important to evaluate if an LCD or system board needs a replacement.

1. **M-BIST:** M-BIST is the system board built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures. M-BIST must be manually initiated before POST and can also run on a dead system .
2. **L-BIST:** L-BIST is an enhancement to the single LED error code diagnostics and is automatically initiated during POST.
3. **LCD-BIST:** LCD BIST is an enhanced diagnostic test that is introduced through Preboot System Assessment (PSA) on legacy systems.

**Table 21. Functions**

	<b>M-BIST</b>	<b>L-BIST</b>
<b>Purpose</b>	Evaluates the health condition of the system board.	Checks if the system board is supplying power to the LCD by performing an LCD Power Rail test.
<b>Trigger</b>	Press the <M> key and the power button.	Integrated into the single LED error code diagnostics. Automatically initiated during POST.
<b>Indicator of fault</b>	Battery LED light with <b>Solid Amber</b>	Battery LED error code of [2,8] blinks Amber x2, then pause, then blinks White x8.
<b>Repair instruction</b>	Indicates a problem with the system board.	Indicates a problem with the system board.

## System board built-in self-test (M-BIST)

### About this task



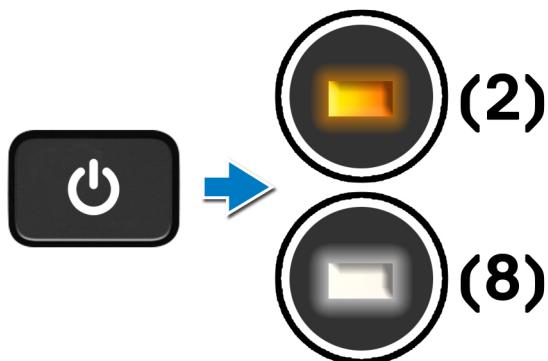
### Steps

1. Press and hold both the M key and the power button to initiate M-BIST.
2. The battery-status light illuminates in amber when there is a failure with the system board.
3. Replace the system board to fix the issue.

**NOTE:** The battery status LED will not illuminate if there is no failure present with the system board. If further troubleshooting is required, proceed with the applicable Guided Resolution for No Power/No POST, etc.

## Display panel power rail built-in self-test (L-BIST)

### About this task

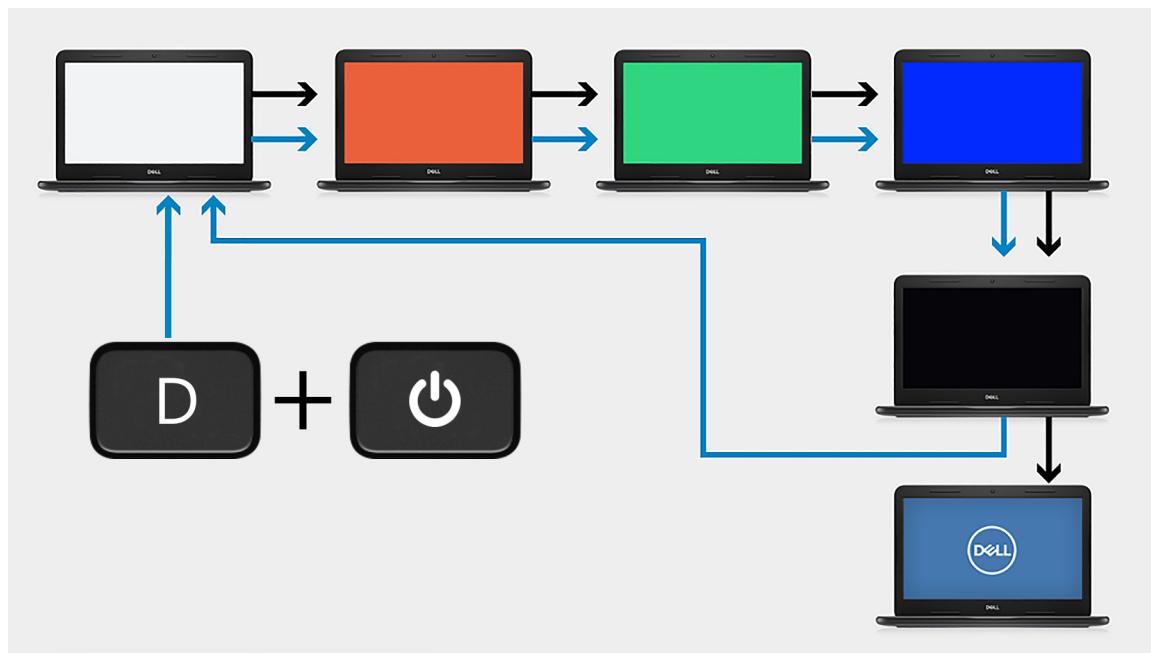


### Next steps

**L-BIST** (LCD Power Rail Test) is an enhancement to the single LED error code diagnostics and is **automatically initiated** during **POST**. L-BIST isolates if the LCD is receiving power from the system board. L-BIST checks if the system board is supplying power to the LCD by performing an LCD Power Rail test. If there is no power going to the LCD, the battery status LED flashes a **[2,8] LED error code**.

# Display panel built-in self-test (LCD-BIST)

## About this task



## Steps

1. Press and hold the D key and then press the power button.
2. Release both the D key and the power button when the computer begins POST.
3. The display panel begins to display a solid color, or cycling through different colors.

**NOTE:** The sequence of colors may vary due to different display panel vendor. The user only needs to ensure that the colors are being displayed correctly without distortion or graphical anomalies.

4. The computer reboots at the end of the last solid color.

## Outcome

### About this task

The following table shows the outcome of running different types of BIST.

**Table 22. BIST outcome**

<b>M-BIST</b>	
Off	No fault detected with system board.
Solid amber	Indicates a problem with the system board.

**Table 22. BIST outcome**

<b>L-BIST</b>	
Off	No fault detected with system board.
LED error code of [2,8] blinks Amber x2, then pause, then blinks White x8	Indicates a problem with the system board.

**Table 22. BIST outcome**

LCD-BIST
The LCD that flashes White, Red, Green, and Blue shows that the display is working fine and there is no fault with the LCD panel.

## Flashing BIOS (USB key)

### Steps

1. Follow the procedure from step 1 to step 7 in "Flashing the BIOS" to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information see the knowledge base article [SLN143196](#) at [www.dell.com/support](http://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** when the Dell logo is displayed on the screen.
6. Boot to the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
8. The **BIOS Update Utility** appears. Follow the instructions on the screen to complete the BIOS update.

## Flashing the BIOS

### About this task

You may need to flash (update) the BIOS when an update is available or when you replace the system board.

Follow these steps to flash the BIOS:

### Steps

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

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

4. Click **Drivers & downloads > Find it myself**.
5. Select the operating system installed on your computer.
6. Scroll down the page and expand **BIOS**.
7. Click **Download** to download the latest version of the BIOS for your computer.
8. After the download is complete, navigate to the folder where you saved the BIOS update file.
9. Double-click the BIOS update file icon and follow the instructions on the screen.

## Backup media and recovery options

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

## WiFi power cycle

### About this task

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

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

## Steps

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

# Flea power release

## About this task

Flea power is the residual static electricity that remains on the computer even after it has been powered off and the battery has been disconnected from the system board. The following procedure provides the instructions on how to release the flea power:

## Steps

1. Turn off your computer.
2. Remove the [base cover](#).

 **NOTE:** The battery must be disconnected from the system board. See Step 4 in [Removing the base cover](#).

3. Press and hold the power button for 15 seconds to drain the flea power.
4. Install the [base cover](#).
5. Turn on your computer.

# Getting help and contacting Dell

## Self-help resources

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

**Table 23. Self-help resources**

Self-help resources	Resource location
Information about Dell products and services	<a href="http://www.dell.com">www.dell.com</a>
My Dell	
Tips	
Contact Support	In Windows search, type <b>Contact Support</b> , and press Enter.
Online help for operating system	<a href="http://www.dell.com/support/windows">www.dell.com/support/windows</a> <a href="http://www.dell.com/support/linux">www.dell.com/support/linux</a>
Troubleshooting information, user manuals, set up instructions, product specifications, technical help blogs, drivers, software updates, and so on.	<a href="http://www.dell.com/support">www.dell.com/support</a>
Dell knowledge base articles for a variety of computer concerns	<ol style="list-style-type: none"> <li>1. Go to <a href="http://www.dell.com/support">www.dell.com/support</a>.</li> <li>2. On the menu bar at the top of the Support page, select <b>Support &gt; Knowledge Base</b>.</li> <li>3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.</li> </ol>
Learn and know the following information about your product: <ul style="list-style-type: none"> <li>Product specifications</li> <li>Operating system</li> <li>Setting up and using your product</li> <li>Data backup</li> <li>Troubleshooting and diagnostics</li> <li>Factory and system restore</li> <li>BIOS information</li> </ul>	<p>See <i>Me and My Dell</i> at <a href="http://www.dell.com/support/manuals">www.dell.com/support/manuals</a>.</p> <p>To locate the <i>Me and My Dell</i> relevant to your product, identify your product through one of the following:</p> <ul style="list-style-type: none"> <li>Select <b>Detect Product</b>.</li> <li>Locate your product through the drop-down menu under <b>View Products</b>.</li> <li>Enter the <b>Service Tag number</b> or <b>Product ID</b> in the search bar.</li> </ul>

## Contacting Dell

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

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

 **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.