

Alienware x17 R1

Service Manual

Regulatory Model: P48E
Regulatory Type: P48E001
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A L I E N W A R E 

Notes, cautions, and warnings

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

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

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

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Working inside your computer

Before working inside your computer

About this task

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

Steps

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

Safety instructions

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

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

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

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

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

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

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

 **CAUTION:** When you disconnect a cable, pull it by its connector or its pull tab, not the cable itself. Some cables have connectors with locking tabs or thumbscrews that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly aligned to avoid bending the connector pins. When connecting cables, ensure that the ports and the connectors are correctly oriented and aligned.

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

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

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

Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

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

ESD field service kit

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

Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.
- **Wrist Strap and Bonding Wire** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the ESD mat is not required, or connected to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the ESD mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, mat, and bonding wire. Never use wireless wrist straps. Always be aware that the internal wires of a wrist strap are prone to damage from normal wear and tear, and must be checked regularly with a wrist strap tester in order to avoid accidental ESD hardware damage. It is recommended to test the wrist strap and bonding wire at least once per week.
- **ESD Wrist Strap Tester** – The wires inside of an ESD strap are prone to damage over time. When using an unmonitored kit, it is a best practice to regularly test the strap prior to each service call, and at a minimum, test once per week. A wrist strap tester is the

best method for doing this test. If you do not have your own wrist strap tester, check with your regional office to find out if they have one. To perform the test, plug the wrist-strap's bonding-wire into the tester while it is strapped to your wrist and push the button to test. A green LED is lit if the test is successful; a red LED is lit and an alarm sounds if the test fails.

- **Insulator Elements** – It is critical to keep ESD sensitive devices, such as plastic heat sink casings, away from internal parts that are insulators and often highly charged.
- **Working Environment** – Before deploying the ESD Field Service kit, assess the situation at the customer location. For example, deploying the kit for a server environment is different than for a desktop or portable environment. Servers are typically installed in a rack within a data center; desktops or portables are typically placed on office desks or cubicles. Always look for a large open flat work area that is free of clutter and large enough to deploy the ESD kit with additional space to accommodate the type of system that is being repaired. The workspace should also be free of insulators that can cause an ESD event. On the work area, insulators such as Styrofoam and other plastics should always be moved at least 12 inches or 30 centimeters away from sensitive parts before physically handling any hardware components
- **ESD Packaging** – All ESD-sensitive devices must be shipped and received in static-safe packaging. Metal, static-shielded bags are preferred. However, you should always return the damaged part using the same ESD bag and packaging that the new part arrived in. The ESD bag should be folded over and taped shut and all the same foam packing material should be used in the original box that the new part arrived in. ESD-sensitive devices should be removed from packaging only at an ESD-protected work surface, and parts should never be placed on top of the ESD bag because only the inside of the bag is shielded. Always place parts in your hand, on the ESD mat, in the system, or inside an anti-static bag.
- **Transporting Sensitive Components** – When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

ESD protection summary

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

Transporting sensitive components

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

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

 **CAUTION: Do not lift greater than 50 pounds. Always obtain additional resources or use a mechanical lifting device.**

1. Get a firm balanced footing. Keep your feet apart for a stable base, and point your toes out.
2. Tighten stomach muscles. Abdominal muscles support your spine when you lift, offsetting the force of the load.
3. Lift with your legs, not your back.
4. Keep the load close. The closer it is to your spine, the less force it exerts on your back.
5. Keep your back upright, whether lifting or setting down the load. Do not add the weight of your body to the load. Avoid twisting your body and back.
6. Follow the same techniques in reverse to set the load down.

After working inside your computer

About this task

 **CAUTION: Leaving stray or loose screws inside your computer may severely damage your computer.**

Steps

1. Replace all screws and ensure that no stray screws remain inside your computer.
2. Connect any external devices, peripherals, or cables you removed before working on your computer.
3. Replace any media cards, discs, or any other parts that you removed before working on your computer.

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

Removing and installing components

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

Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #0, #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 surfaces when replacing a component.

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

Table 1. Screw list

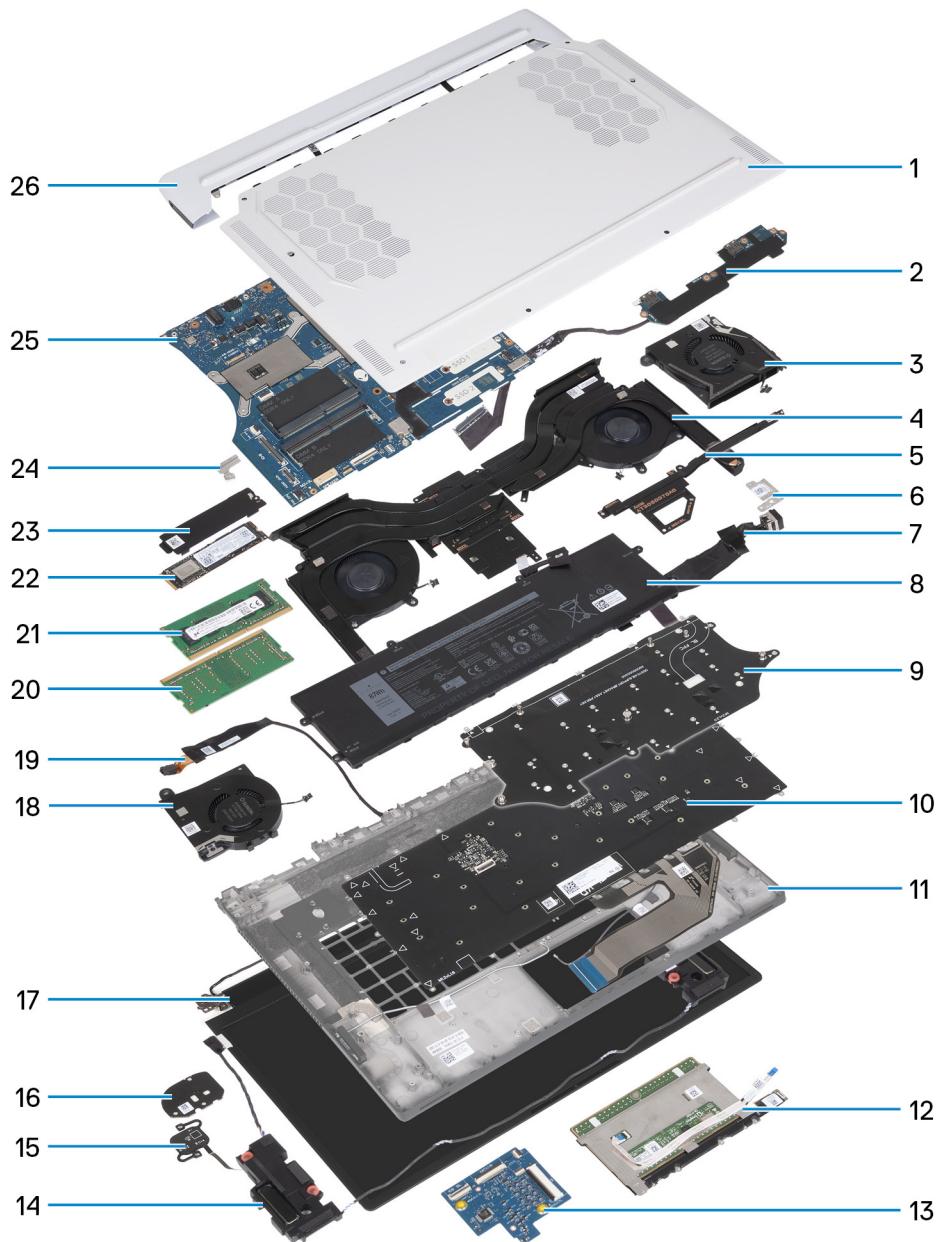
Component	Screw type	Quantity	Screw image
Base cover	M2.5x9	2	
Base cover	M2.5x5, captive	4	
Base cover	M2.5x5	2	
M.2 2230 solid-state drive	M2x3	1 per solid-state drive	
M.2 2280 solid-state drive	M2x3	1 per solid-state drive	
Battery	M2x4	6	
Rear I/O-cover	M2.5x5	2	
Wireless-card bracket	M2x3	1	
Power-adapter port-bracket	M2x3	1	
Power-adapter port-bracket	M2.5x5	2	

Table 1. Screw list (continued)

Component	Screw type	Quantity	Screw image
Left fan	M2x3	2	
Right fan	M2x3	3	
Heat pipe	M2x3	3	
Heat pipe	M2x3	3	
Heat pipe	M2x4	2	
Display assembly	M2.5x5	6	
System board	M2x3	5	
Touchpad	M1.6x2	4	
Keyboard-controller board	M1.6x1.7	2	
Wireless-card bracket	M2x3	1	
System board	M2x3	4	
System board	M2x4	1	
Fan and heat-sink assembly	M2x3	8	
Power-button bracket	M1.6x2	3	
I/O board	M2x3	4	

Major components of Alienware x17 R1

The following image shows the major components of Alienware x17 R1.



1. Base cover
2. I/O board
3. Right fan
4. Fan and heat-sink assembly
5. Heat pipe
6. Power-adapter port-bracket
7. Power-adapter port
8. Battery
9. Keyboard bracket
10. Keyboard
11. Palm rest
12. Touchpad
13. Keyboard-controller board
14. Speakers
15. Power button
16. Power-button bracket
17. Display assembly
18. Left fan
19. Left fan
20. RAM
21. RAM
22. RAM
23. SSD
24. SSD
25. Motherboard
26. Base cover

- 29. Headset port
- 30. Memory module one
- 31. Memory module two
- 32. Solid-state drive
- 33. Solid-state thermal-shield
- 34. Wireless card bracket
- 35. System board
- 36. Rear I/O-cover

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

Disassembly and reassembly

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

Base cover

Removing the base cover

Prerequisites

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

About this task

⚠ **CAUTION:** Before removing the base cover, ensure that there is no micro-SD card installed in the micro-SD card slot on your computer.

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

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

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



2x
M2.5x9

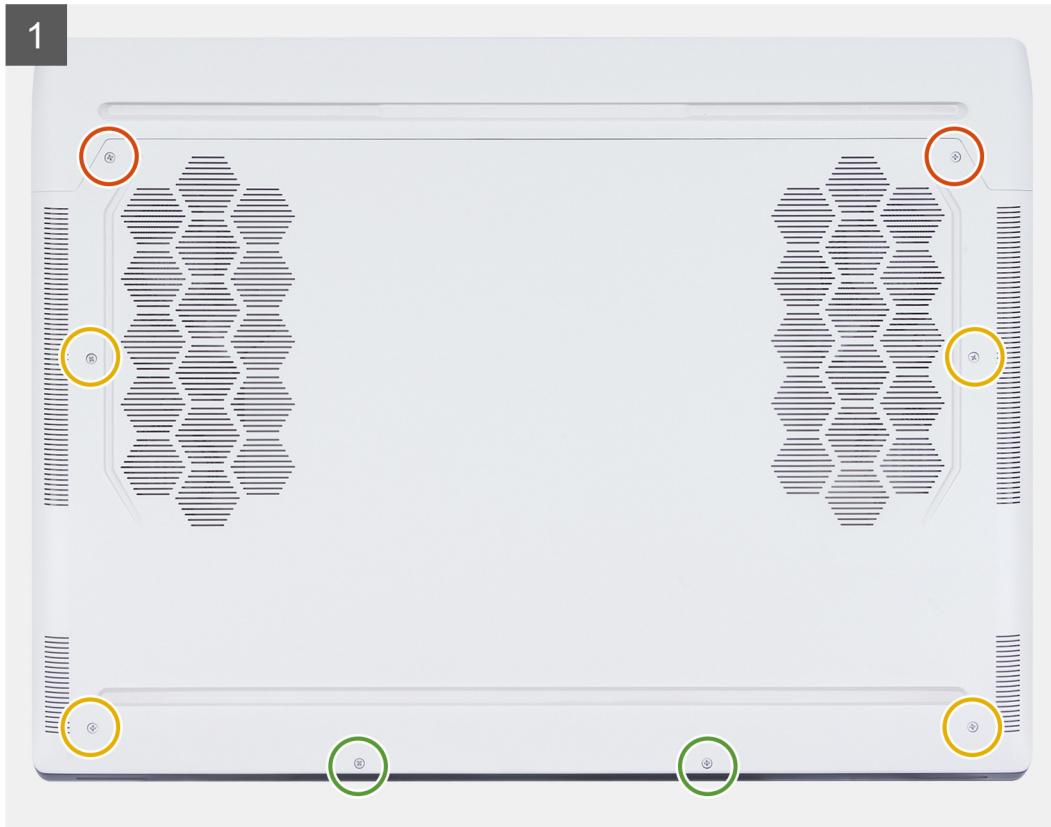


4x
M2.5x5

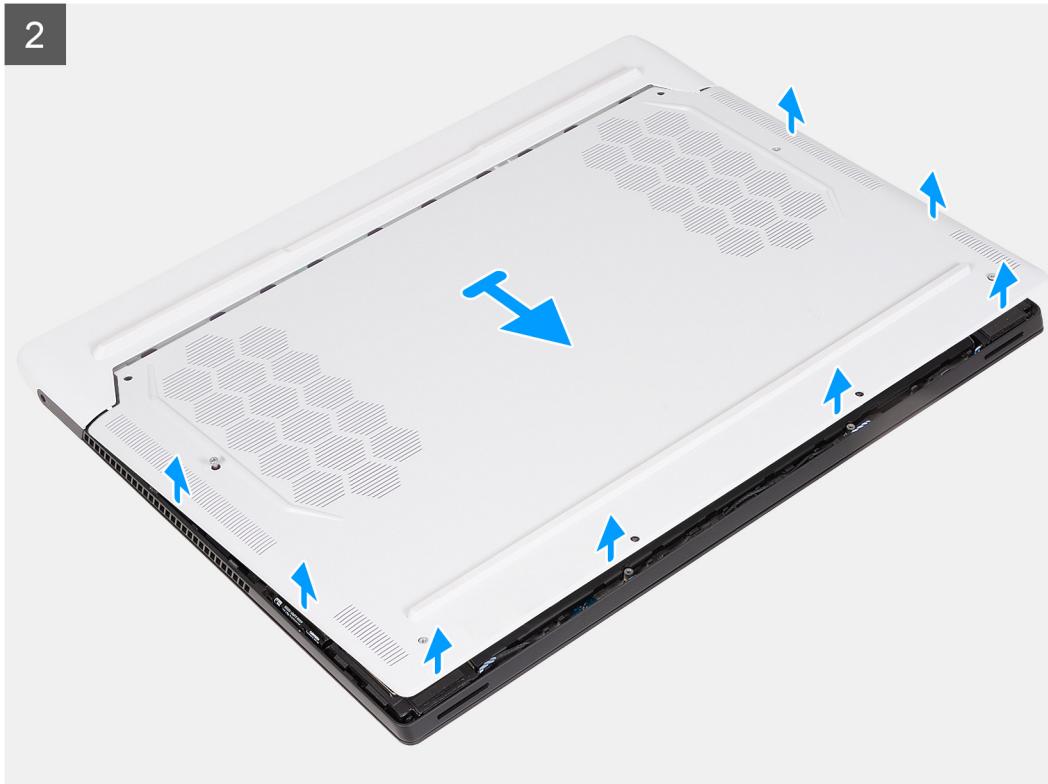


2x
M2.5x5

1



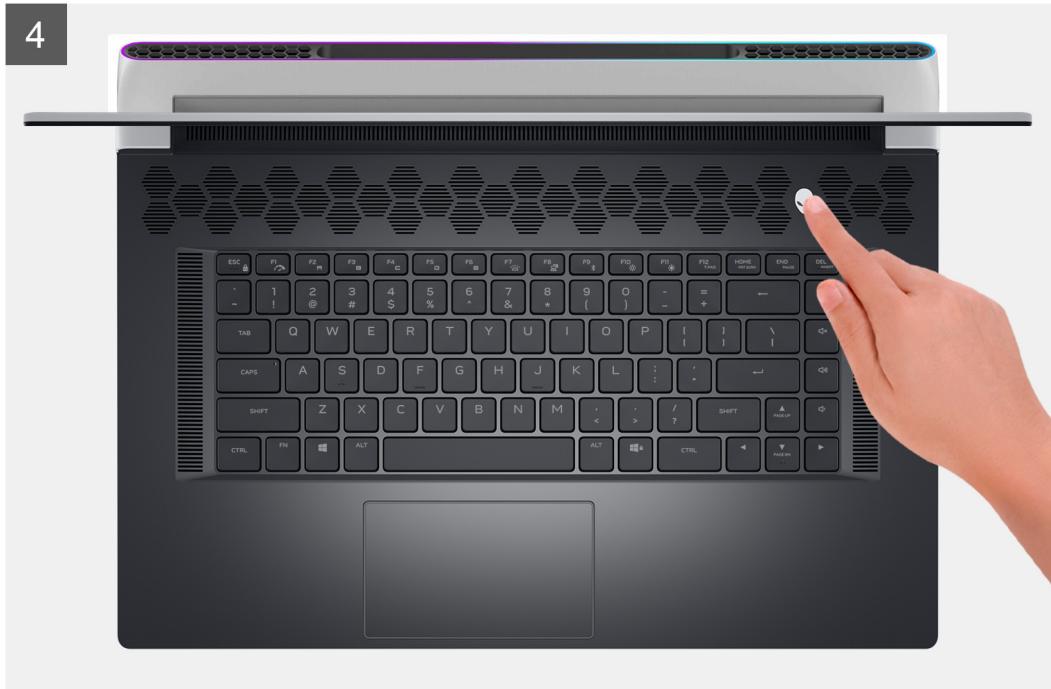
2



3



4



Steps

1. Remove the two screws (M2.5x9) that secure the base cover to the palm-rest and keyboard assembly.
2. Remove the two screws (M2.5x5) that secure the base cover to the palm-rest and keyboard assembly.
3. Loosen the four captive screws (M2.5x5) that secure the base cover to the palm-rest and keyboard assembly.
4. Slide and lift the base cover off the palm-rest and keyboard assembly.

NOTE: The following steps are needed only if other components are being removed from your computer.

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

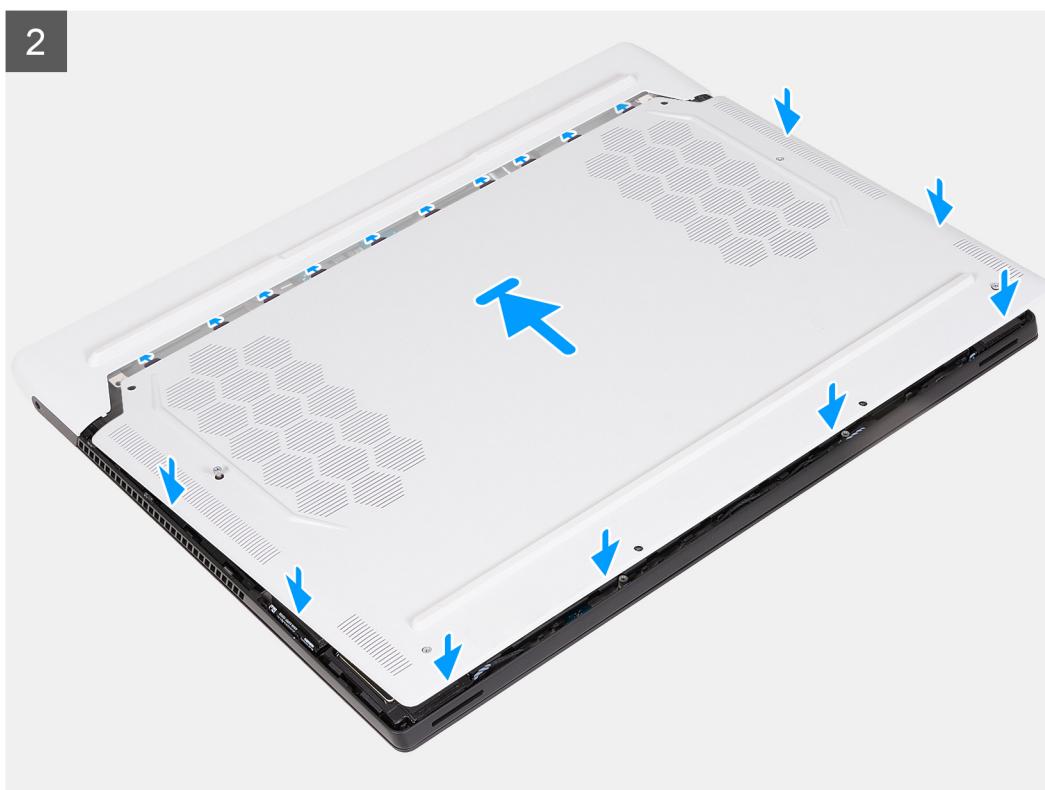
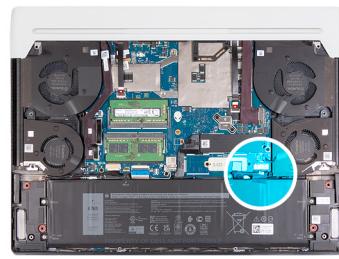
Installing the base cover

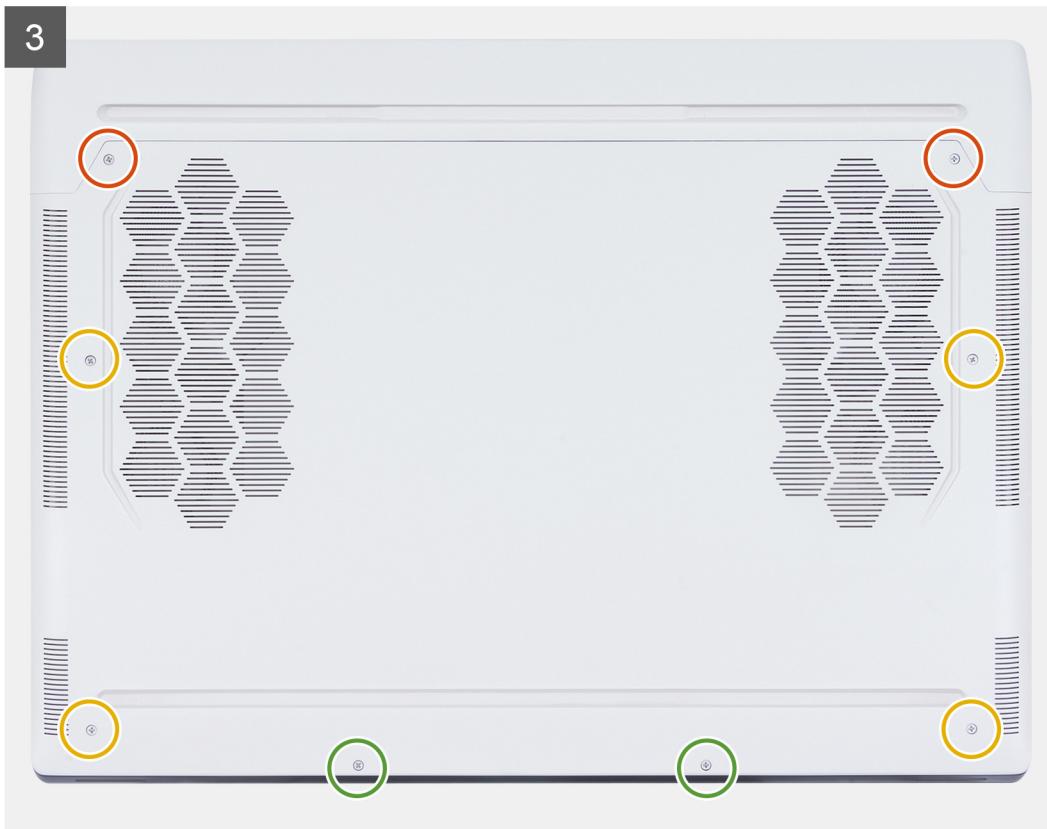
Prerequisites

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

About this task

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





Steps

1. Connect the battery cable to the system board.
2. Place and slide the base cover into place on the palm-rest and keyboard assembly.
3. Tighten the four captive screws (M2.5x5) that secure the base cover to the palm-rest and keyboard assembly.
4. Replace the two screws (M2.5x9) that secure the base cover to the palm-rest and keyboard assembly.
5. Replace the two screws (M2.5x5) that secure the base cover to the palm-rest and keyboard assembly.

Next steps

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

Memory module

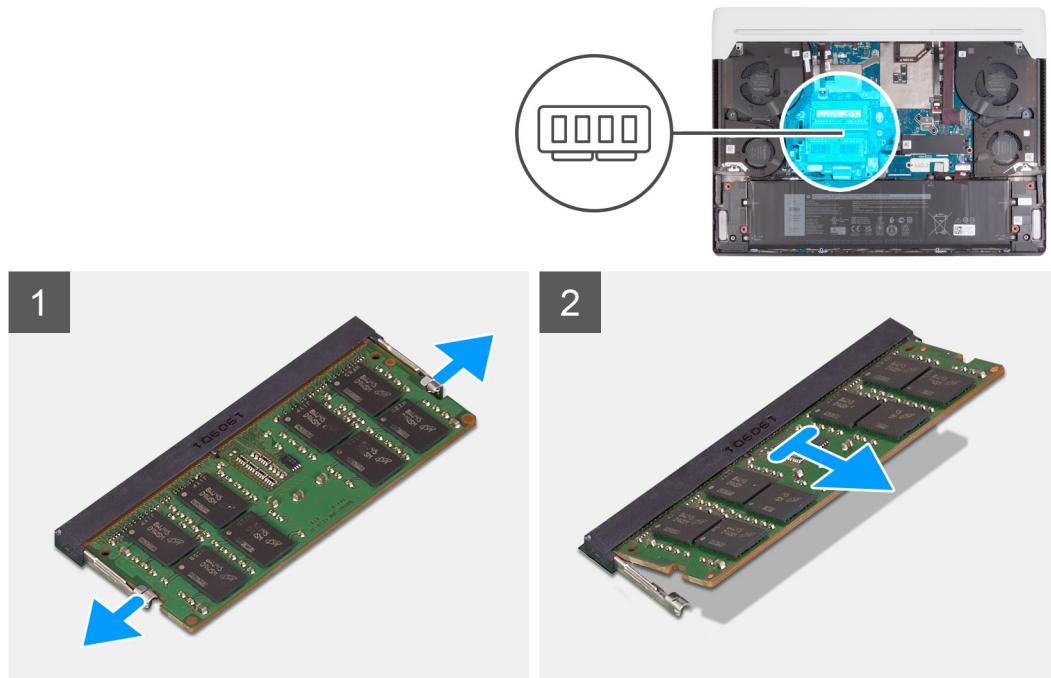
Removing the memory

Prerequisites

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

About this task

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



Steps

1. Using your fingertips, carefully spread apart the securing-clips on each end of the memory-module slot until the memory module pops-up.
2. Remove the memory module from the memory-module slot on the system board.

NOTE: Your computer has two memory modules installed. Repeat steps 1 to 2 for the memory module installed in the second memory slot.

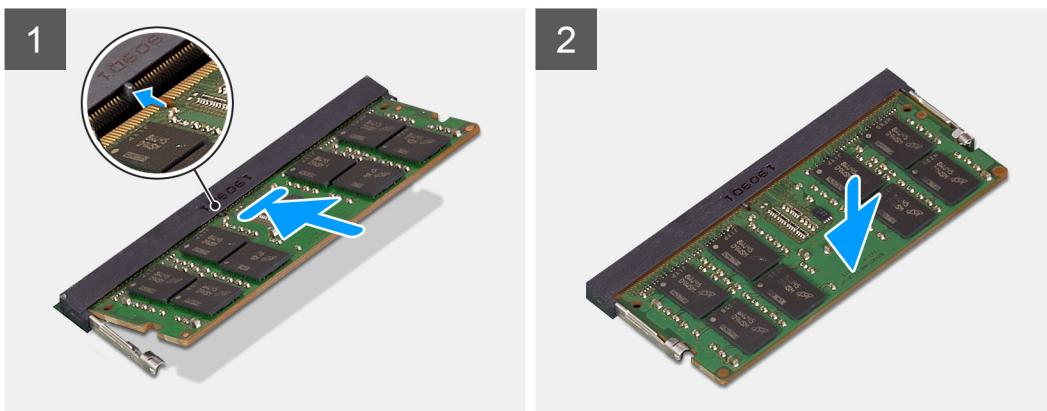
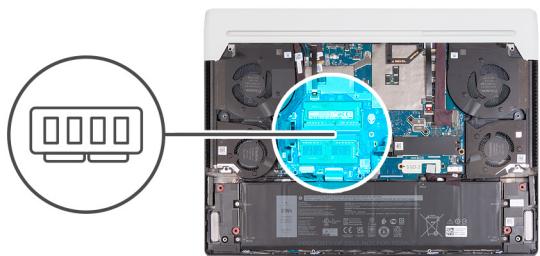
Installing the memory

Prerequisites

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

About this task

The following image(s) indicate the location of the memory 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 on the system board.
2. Slide the memory module into the memory-module slot on the system board.
3. Press down on the memory module till the securing clips click, locking the memory module in place.

(i) | NOTE: Repeat steps 1 to 3 for the second memory module being installed into your computer.

Next steps

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

Solid-state drive

Removing the M.2 2230 solid-state drive

Prerequisites

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

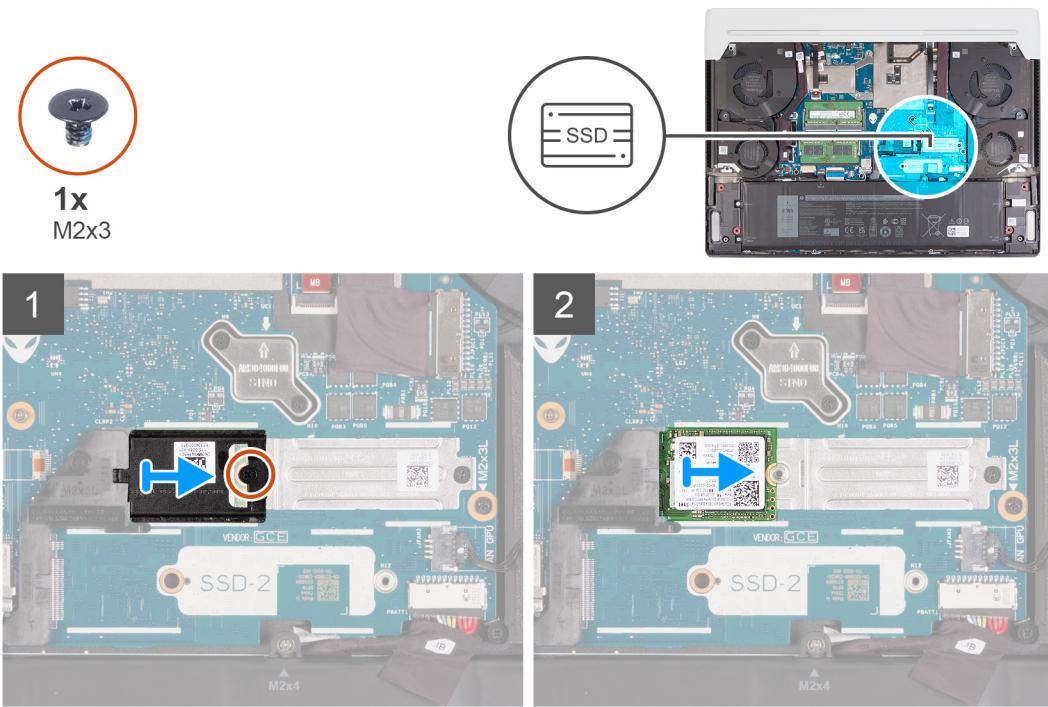
About this task

(i) | NOTE: This procedure applies only to computers shipped with an M.2 2230 solid-state drive installed in M.2 slot one (SSD-1) and/or M.2 slot two (SSD-2).

(i) | NOTE: The M.2 card installed on M.2 slot one (SSD-1) and M.2 slot two (SSD-2) will depend on the configuration ordered.
Supported card configurations:

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

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



Steps

1. Remove the screw (M2x3) that secures the M.2 thermal shield to the M.2 2230 mounting bracket.
2. Slide and lift the M.2 thermal shield off the system board.
3. Slide and lift the M.2 2230 solid-state drive off the system board.

i **NOTE:** Your computer has up to two M.2 2230 solid-state drives installed. Repeat steps 1 to 3 if another M.2 2230 solid-state drive is installed.

Installing the M.2 2230 solid-state drive

Prerequisites

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

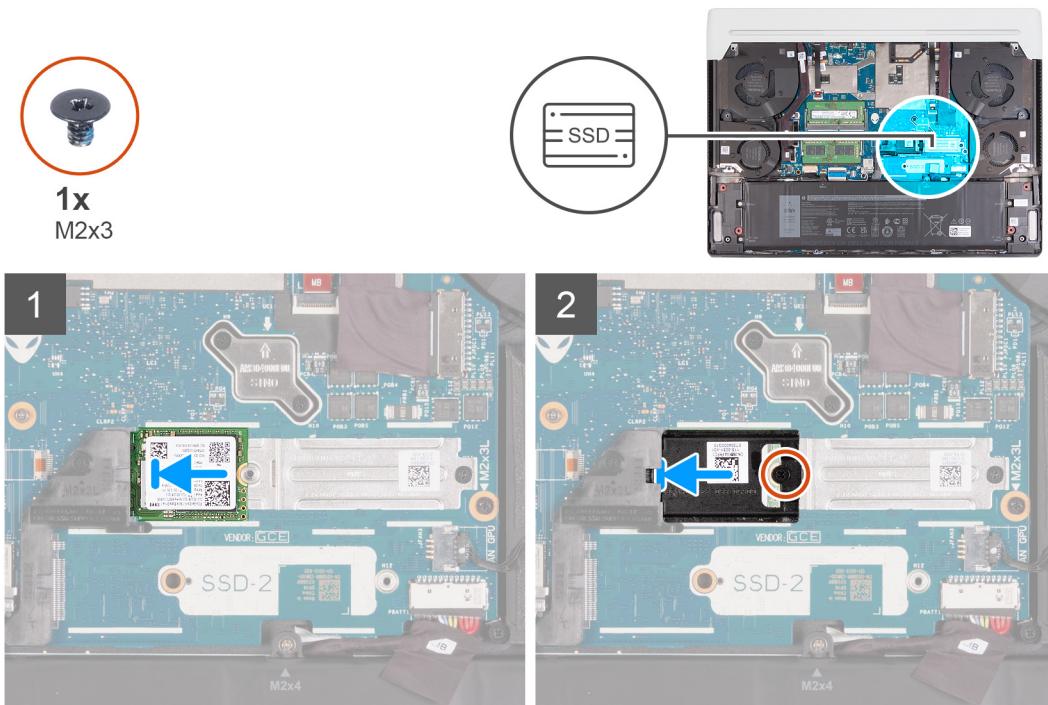
About this task

i **NOTE:** This procedure applies if you are installing a M.2 2220 solid-state drive into M.2 slot one (SSD-1) or M.2 slot two (SSD-2).

i **NOTE:** Supported card configurations on M.2 slot one (SSD-1) and M.2 slot two (SSD-2):

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

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



Steps

1. Align the notch on the M.2 2230 solid-state drive with the tab on the M.2 card slot on the system board.
2. Slide the M.2 2230 solid-state drive into the M.2 card slot on the system board.
3. Slide the tab on the M.2 thermal shield into the M.2 card slot and align the screw hole on the thermal shield to the screw hole on the system board.
4. Replace the screw (M2x3) that secures the M.2 thermal shield to the 2230 mounting bracket.

NOTE: Your computer can have up to two M.2 2230 solid-state drives installed. Repeat steps 1 to 4 to install the second M.2 2230 solid-state drive.

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

NOTE: This procedure applies only to computers shipped with an M.2 2280 solid-state drive installed in M.2 slot one (SSD-1) and/or M.2 slot two (SSD-2).

NOTE: The M.2 card installed on M.2 slot one (SSD-1) and M.2 slot two (SSD-2) will depend on the configuration ordered.

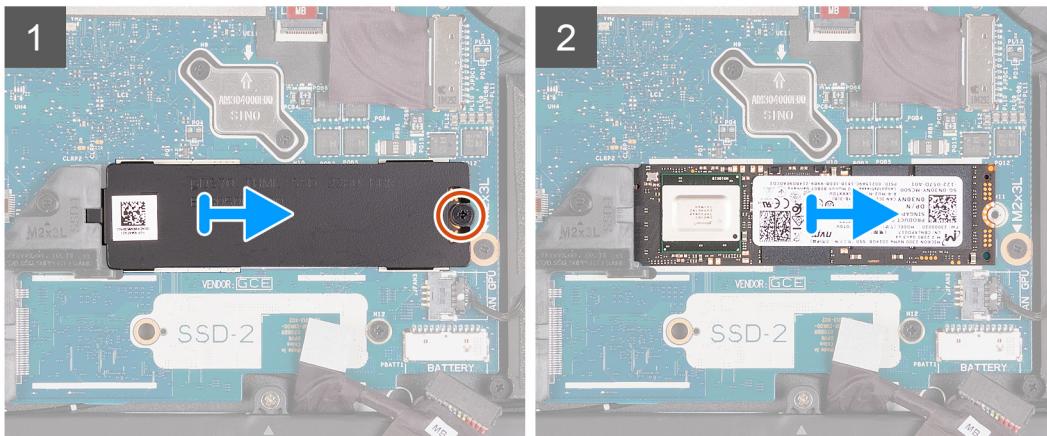
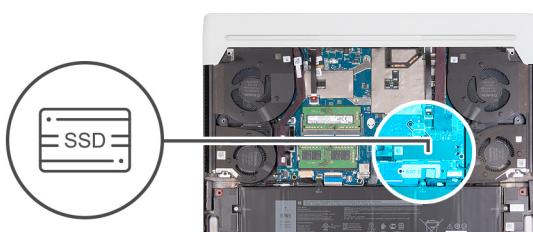
Supported card configurations:

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

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



1x
M2x3



Steps

1. Remove the screw (M2x3) that secures the M.2 thermal shield to the system board.
2. Slide and lift the M.2 thermal shield from the M.2 card slot on the system board.
3. Slide and lift the M.2 2280 solid-state drive from the M.2 card slot on the system board.

i **NOTE:** Your computer has up to two M.2 2280 solid-state drives installed. Repeat steps 1 to 3 if another M.2 2280 solid-state drive is installed.

Installing the M.2 2280 solid-state drive

Prerequisites

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

About this task

i **NOTE:** This procedure applies if you are installing a M.2 2280 solid-state drive into M.2 slot one (SSD-1) or M.2 slot two (SSD-2).

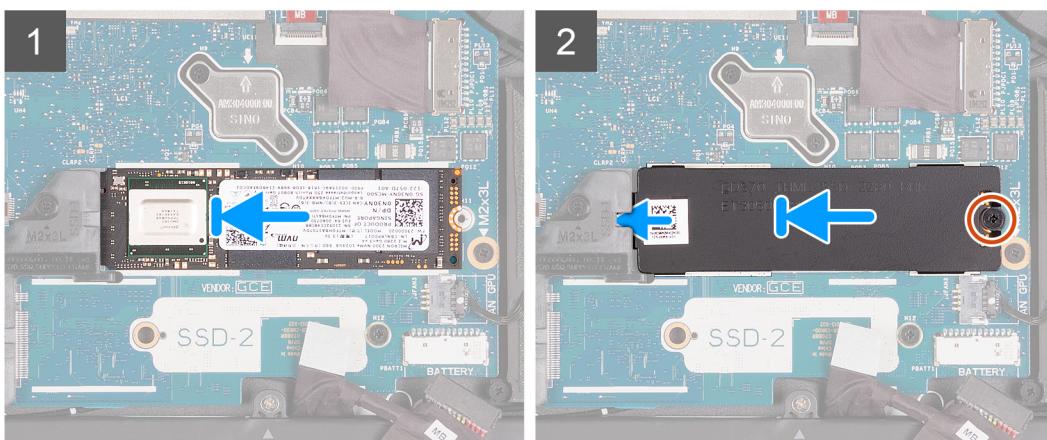
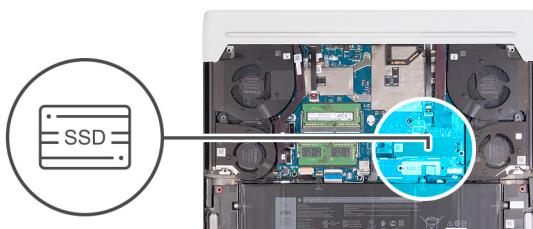
i **NOTE:** Supported card configurations on M.2 slot one (SSD-1) and M.2 slot two (SSD-2):

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

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



1x
M2x3



Steps

1. Align the notch on the M.2 2280 solid-state drive with the tab on the M.2 card slot on the system board.
2. Slide the M.2 2280 solid-state drive into the M.2 card slot on the system board.
3. Slide the tab on the M.2 thermal shield into the M.2 card slot and align the screw hole on the thermal shield to the screw hole on the system board.
4. Replace the screw (M2x3) that secures the M.2 2280 solid-state drive to the system board.

(i) | NOTE: Your computer can have up to two M.2 2280 solid-state drives installed. Repeat steps 1 to 4 to install the second M.2 2280 solid-state drive.

Next steps

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

Removing and installing the M.2 2230 solid-state drive mounting bracket

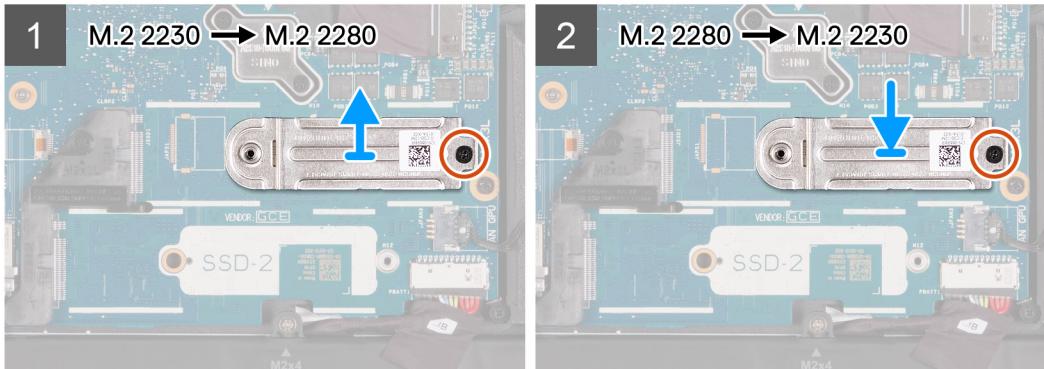
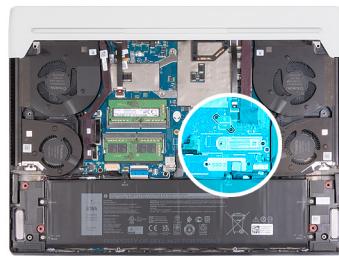
About this task

The following image provides a visual representation of the procedure to remove and install the M.2 2230 solid-state drive mounting bracket.

(i) | NOTE: This procedure is applicable for both M.2 slot one (SSD-1) and M.2 slot two (SSD-2).



1x
M2x3



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.
- Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.
- Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see [Handling swollen Lithium-ion batteries](#).

Removing the battery

Prerequisites

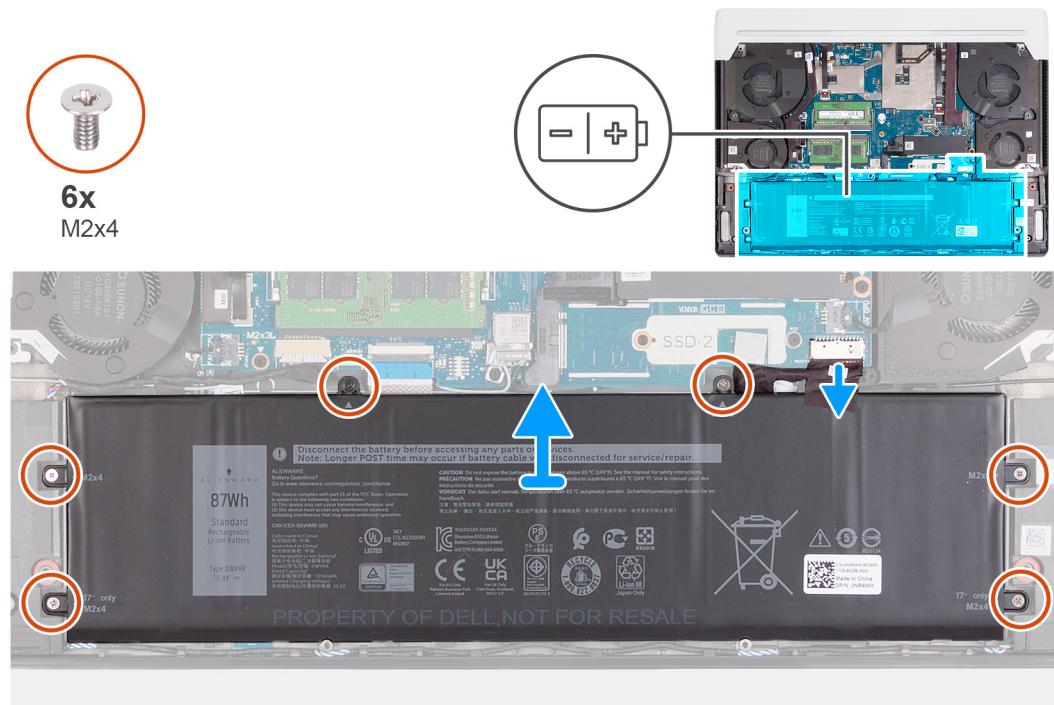
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

About this task

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

(i) NOTE: Removing the battery resets the BIOS setup program's settings to default. It is recommended that you note the BIOS setup program's settings before removing the battery.

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



Steps

1. Peel the tape that secures the battery cable to the battery.
2. Ensure that the battery cable has been disconnected from the system board.
3. Remove the six screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
4. Lift the battery off the palm-rest and keyboard assembly.

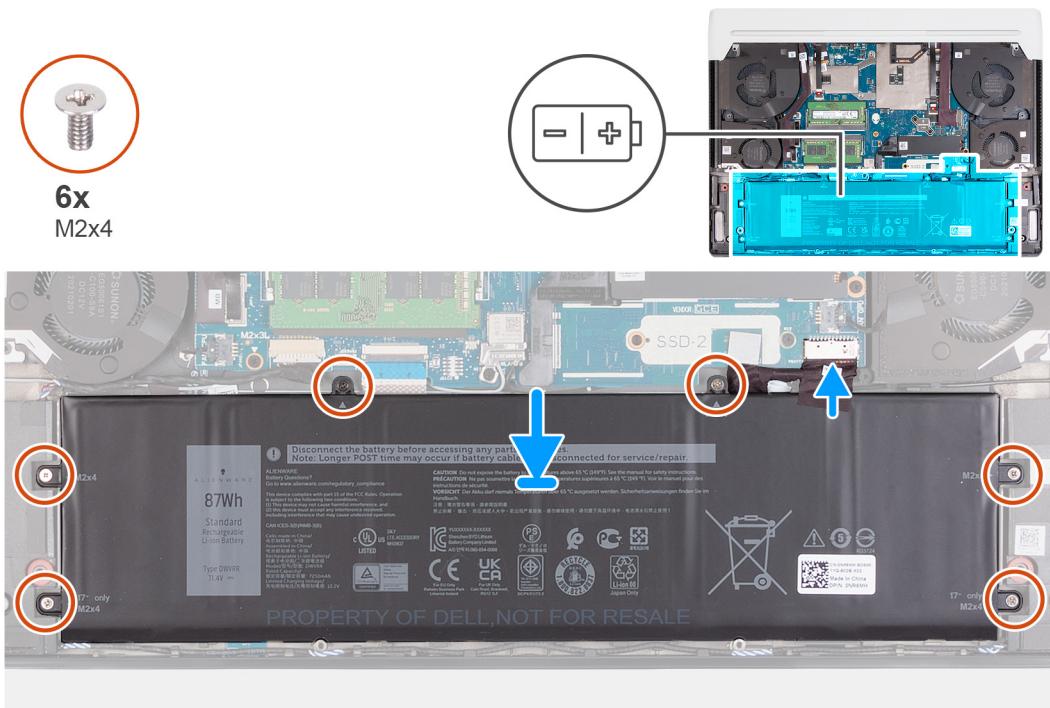
Installing the battery

Prerequisites

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

About this task

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



Steps

1. Align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.
2. Replace the six screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
3. Connect the battery cable to the system board.
4. Adhere the tape that secures the battery cable to the battery.

Next steps

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

Battery cable

Lithium-ion battery precautions

CAUTION:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any kind to pry on or against the battery.
- Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.
- If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See www.dell.com/contactdell.

- Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.
- Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see [Handling swollen Lithium-ion batteries](#).

Removing the battery cable

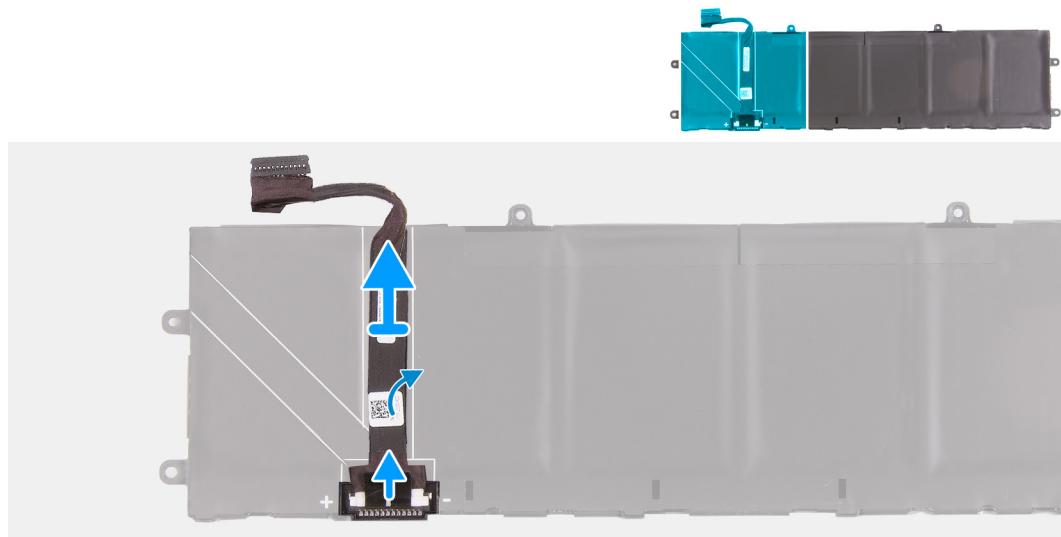
Prerequisites

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

About this task

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

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



Steps

1. Turn the battery over.
2. Peel the battery cable off the battery.
3. Disconnect the battery cable from the battery.
4. Lift the battery cable off the battery.

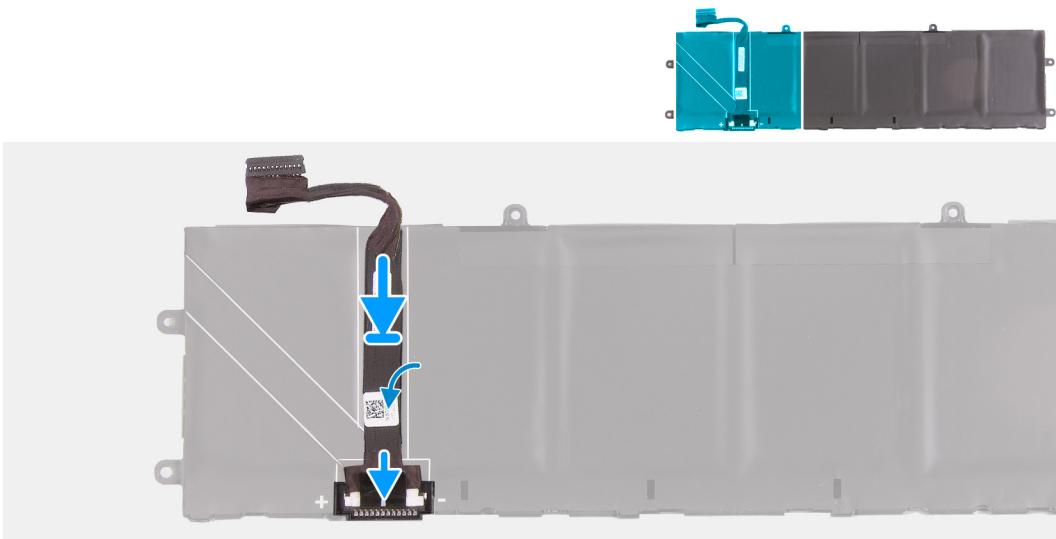
Installing the battery cable

Prerequisites

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

About this task

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



Steps

1. Connect the battery cable to the battery.
2. Adhere the battery cable to the battery.
3. Turn the battery over.

Next steps

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

Rear-I/O cover

Removing the rear-I/O cover

Prerequisites

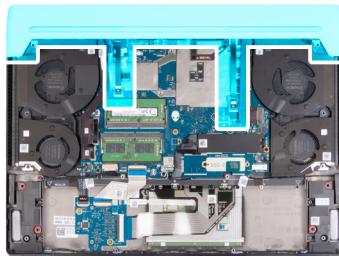
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

About this task

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



2x
M2.5x5



1



2



Steps

1. Remove the two screws (M2.5x5) that secure the rear I/O-cover to the palm-rest and keyboard assembly.
2. Lift the latch and disconnect the Right Tron-light cable from the system board.
3. Lift the latch and disconnect the left Tron-light cable from the system board.

NOTE: To prevent damaging your computer ensure the right and left Tron-light cables have been disconnected from the system board before removing the rear I/O-cover.

4. Firmly grasp the sides of your computer with both hands and push the rubber feet on the rear I/O-cover outwards with your thumbs to release the rear I/O-cover from the palm-rest and keyboard assembly.
5. Lift the rear I/O-cover from the palm-rest and keyboard assembly.

Installing the rear-I/O cover

Prerequisites

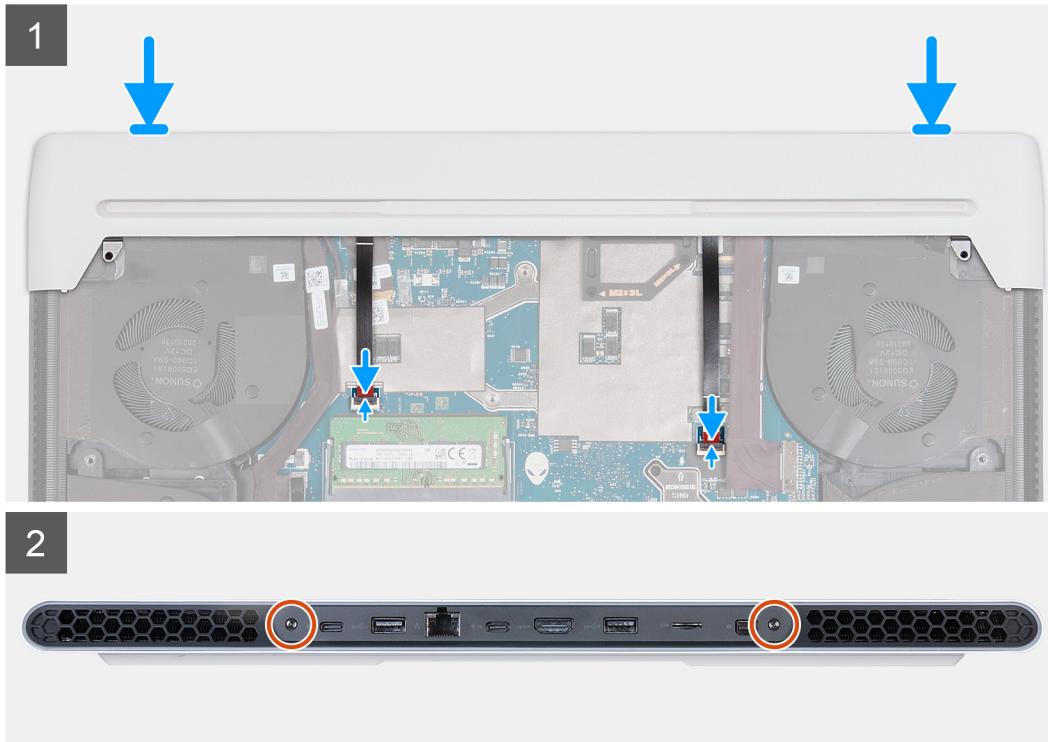
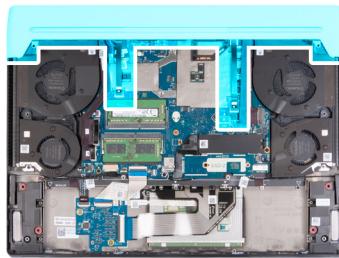
If you are replacing a component, remove the existing component before performing the installation process.

About this task

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



2x
M2.5x5



Steps

1. Push the rear I/O-cover into the palm-rest and keyboard assembly snapping it into place.
*(i) **NOTE:** To avoid damaging your computer, ensure the right and left Tron-light cables are not pinched before snapping the rear I/O-cover into place.*
2. Replace the two screws (M2.5x5) that secure the rear I/O-cover to the palm-rest and keyboard assembly.
3. Connect the left Tron-light cable to the system board and close the latch.
4. Connect the right Tron-light cable to the system board and close the latch.

Next steps

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

Power-adapter port

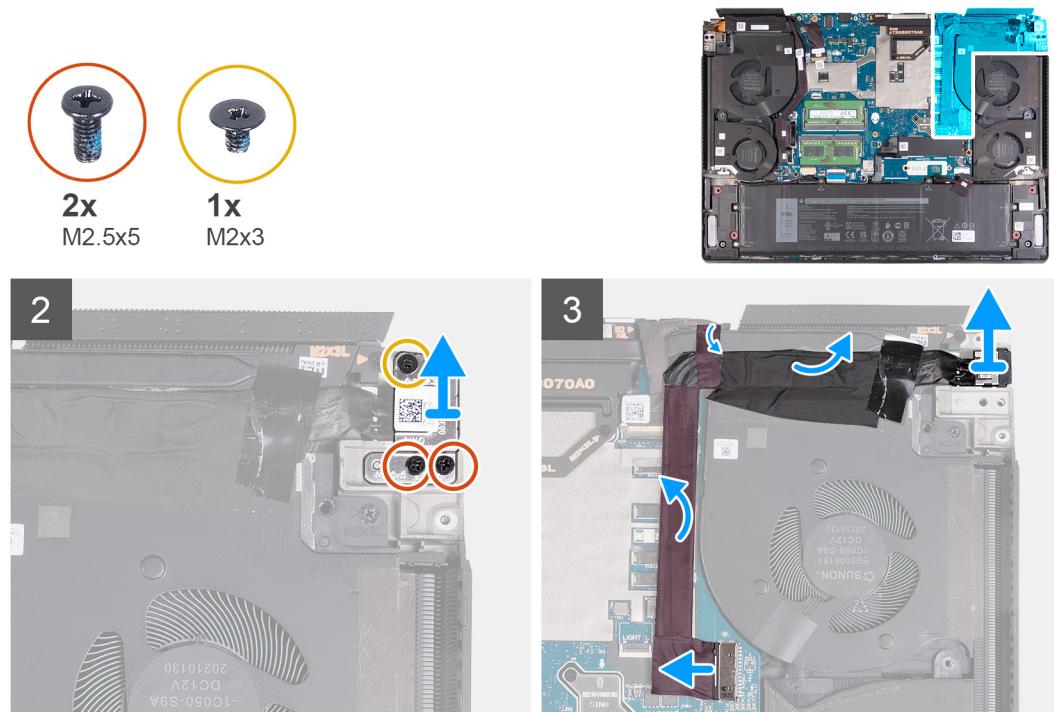
Removing the power-adapter port

Prerequisites

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

About this task

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



Steps

1. Remove the two screws (M2.5x5) that secure the power-adapter port bracket to the palm-rest and keyboard assembly.
2. Remove the screw (M2x3) that secures the power-adapter port bracket to the palm-rest and keyboard assembly.
3. Lift the power-adapter port bracket off the palm-rest and keyboard assembly.
4. Disconnect the power-adapter port from the system board.
5. Peel the tapes that secure the power-adapter port connector to the system board.
6. Peel the power-adapter port-cable from the palm-rest and keyboard assembly.

Installing the power-adapter port

Prerequisites

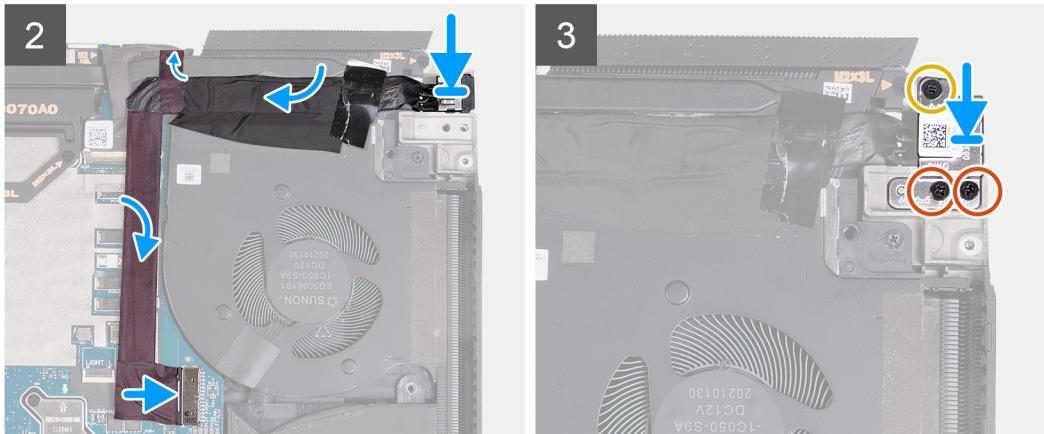
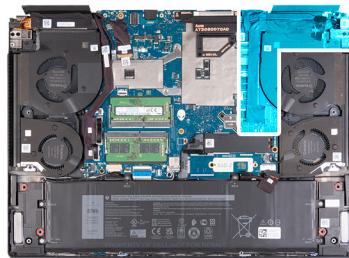
If you are replacing a component, remove the existing component before performing the installation process.

About this task

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



2x M2.5x5
1x M2x3



Steps

1. Connect the power-adapter port cable to the system board.
2. Slide the power-adapter port at an angle into the slot on the palm-rest and keyboard assembly and adhere the power-adapter port cable to the system board.
3. Adhere the tapes that secure the power-adapter port cable to the system board.
4. Place the power-adapter port bracket on the palm-rest and keyboard assembly.
5. Align the screw holes on the power-adapter port bracket to the screw holes on the palm-rest and keyboard assembly.
6. Replace the two screws (M2.5x5) that secure the power-adapter port bracket to the palm-rest and keyboard assembly.
7. Replace the screw (M2x3) that secures the power-adapter port bracket to the palm-rest and keyboard assembly.

Next steps

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

Headset port

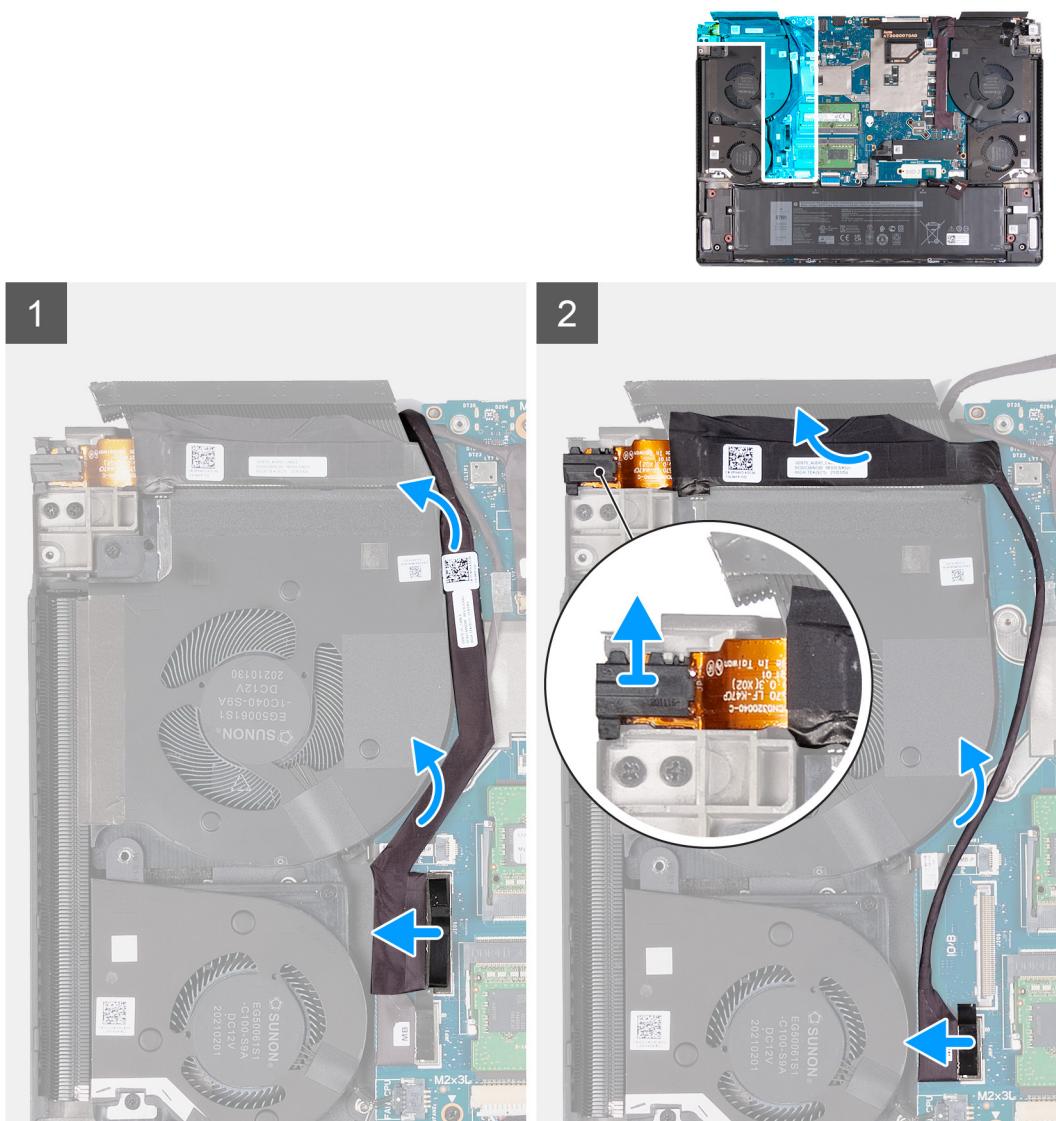
Removing the headset port

Prerequisites

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

About this task

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



Steps

1. Using the pull tab, disconnect the I/O-board cable from the system board.
2. Move the I/O-board cable off the system board and headset-port cable.
3. Using the pull tab, disconnect the headset-port cable from the system board.
4. Peel the headset-port cable off the palm-rest and keyboard assembly and lift the headset port and its cable off the palm-rest and keyboard assembly.

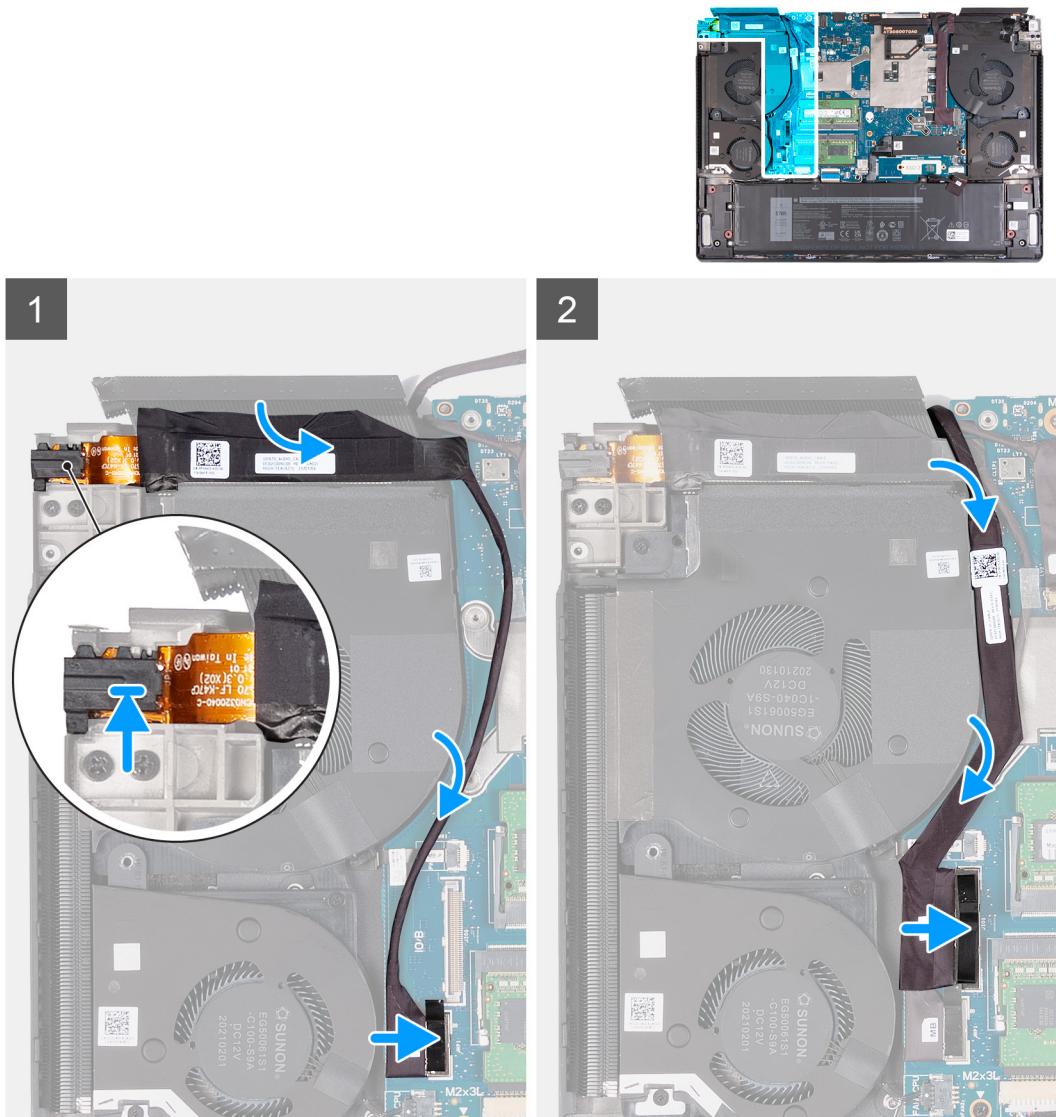
Installing the headset port

Prerequisites

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

About this task

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



Steps

1. Place the headset port into the slot on the palm-rest and keyboard assembly.
2. Adhere the headset-port cable to the palm-rest and keyboard assembly.
3. Connect the headset-port cable to the system board.
4. Move the I/O-board cable back into place and connect the I/O-board cable to the system board.

Next steps

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

Speakers

Removing the speakers

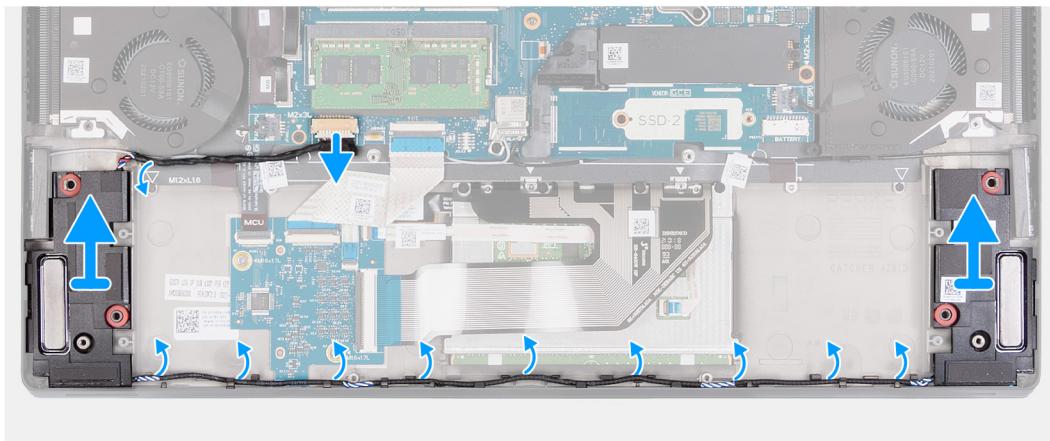
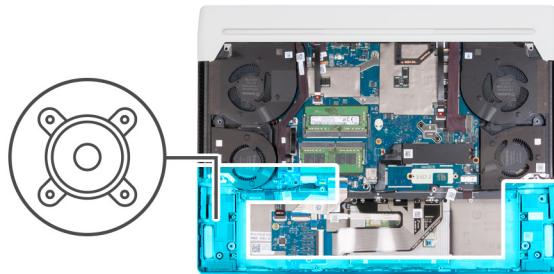
Prerequisites

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

3. Remove the [battery](#).

About this task

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



Steps

1. Disconnect the speaker cable from the system board.
2. Remove the speaker cables from the routing guides on the palm-rest and keyboard assembly.
3. Lift the speakers along with their cables off the palm-rest and keyboard assembly.

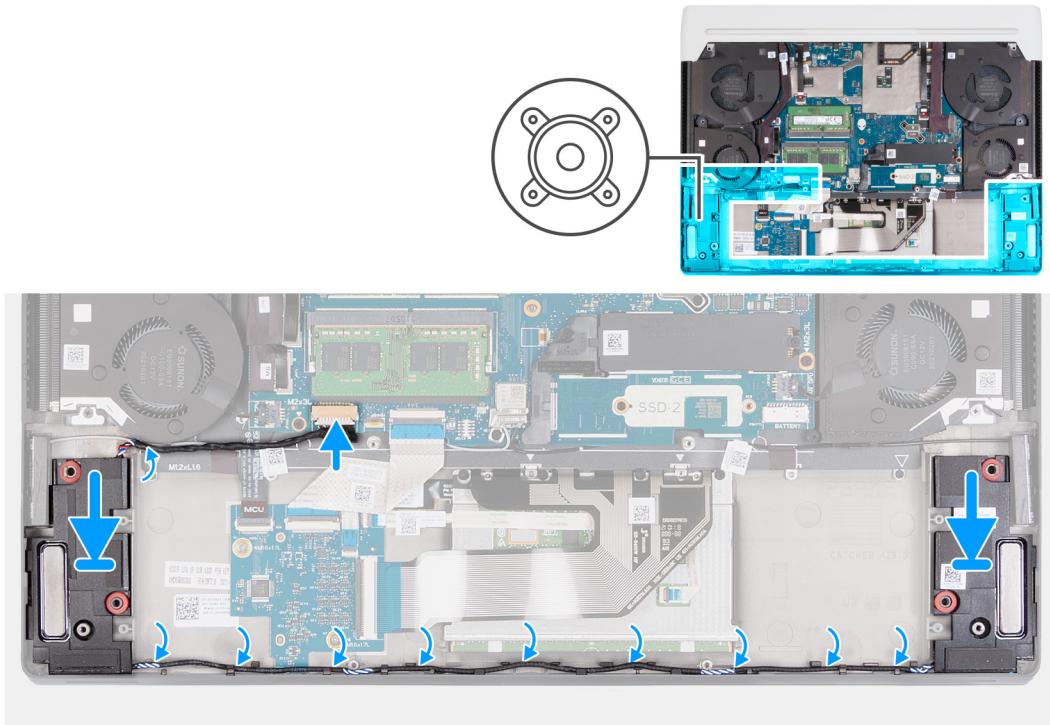
Installing the speakers

Prerequisites

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

About this task

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



Steps

1. Using the alignment posts, place the left and right speakers on the palm-rest and keyboard assembly.
2. Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.
3. Connect the speaker cable to the system board.

Next steps

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

Fans

Removing the left fan

Prerequisites

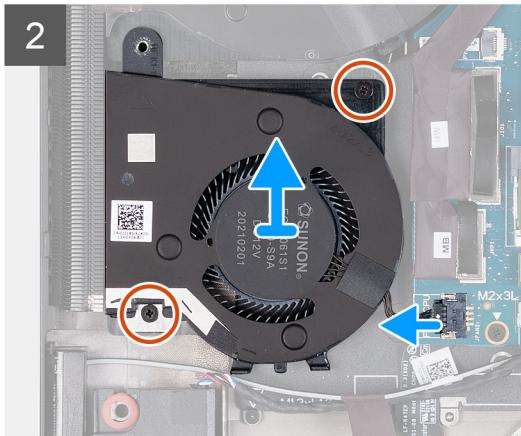
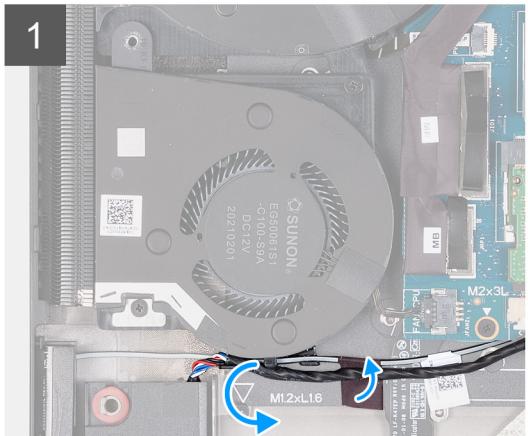
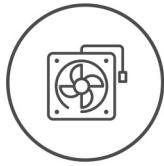
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).

About this task

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



2x
M2x3



Steps

1. Move the speaker cable and antenna cable off the routing guides on the left fan.
2. Peel the tape that secures the antenna cable to the palm-rest and keyboard assembly.
3. Disconnect the left-fan cable from the system board.
4. Remove the two screws (M2x3) that secure the right fan to the palm-rest and keyboard assembly.
5. Lift the fan off the palm-rest and keyboard assembly.

Installing the left fan

Prerequisites

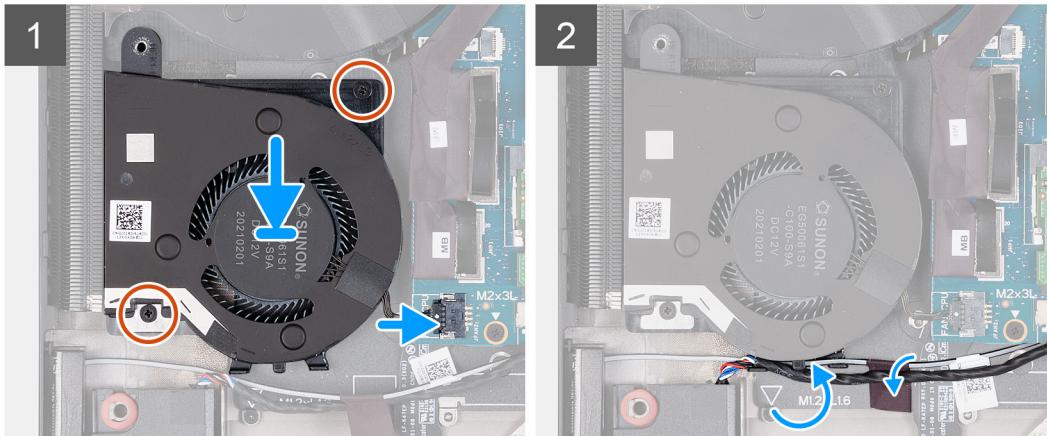
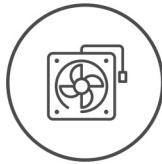
If you are replacing a component, remove the existing component before performing the installation process.

About this task

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



2x
M2x3



Steps

1. Place the fan on the palm-rest and keyboard assembly.
2. Align the screw holes on the fan with the screw holes on the palm-rest and keyboard assembly.
3. Replace the two screws (M2x3) that secure the fan to the palm-rest and keyboard assembly.
4. Connect the fan cable to the system board.
5. Move the speaker cable and antenna cable over the routing guides on the left fan.
6. Adhere the tape that secures the antenna cable to the palm-rest and keyboard assembly.

Next steps

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

Removing the right fan

Prerequisites

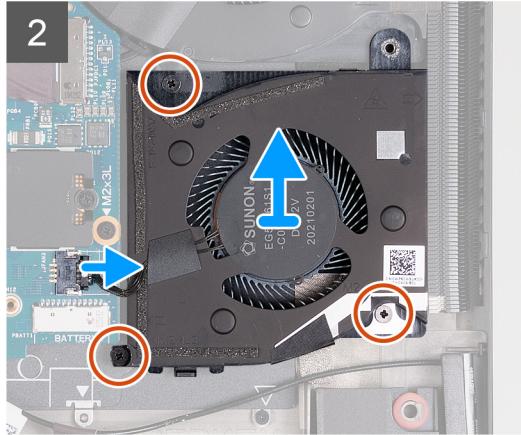
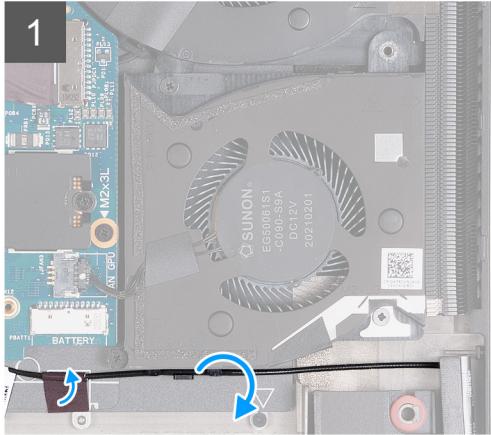
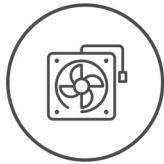
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).

About this task

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



3x
M2x3



Steps

1. Peel the tape that secures the antenna cable to the palm-rest and keyboard assembly.
2. Move the antenna cable off the routing guides on the right fan.
3. Disconnect the right-fan cable from the system board.
4. Remove the three screws (M2x3) that secure the right fan to the palm-rest and keyboard assembly.
5. Lift the fan off the palm-rest and keyboard assembly.

Installing the right fan

Prerequisites

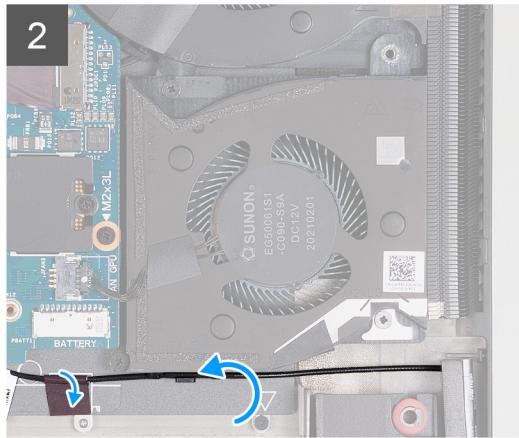
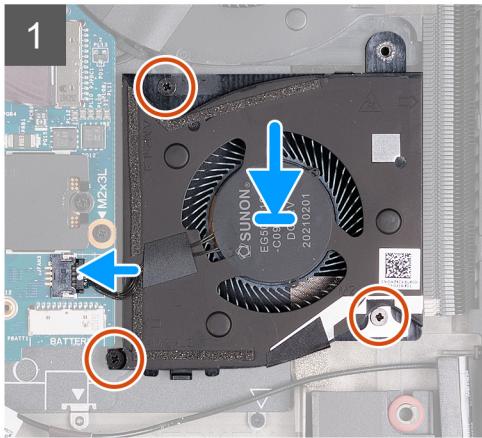
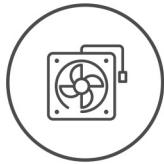
If you are replacing a component, remove the existing component before performing the installation process.

About this task

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



3x
M2x3



Steps

1. Place the right fan on the palm-rest and keyboard assembly.
2. Align the screw holes on the right fan with the screw holes on the palm-rest and keyboard assembly.
3. Replace the three screws (M2x5) that secure the right fan to the palm-rest and keyboard assembly.
4. Connect the right-fan cable to the system board.
5. Move the antenna cable over the routing guides on the right fan.
6. Adhere the tape that secures the antenna cable to the palm-rest and keyboard assembly.

Next steps

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

Heat pipe

Removing the heat pipe

Prerequisites

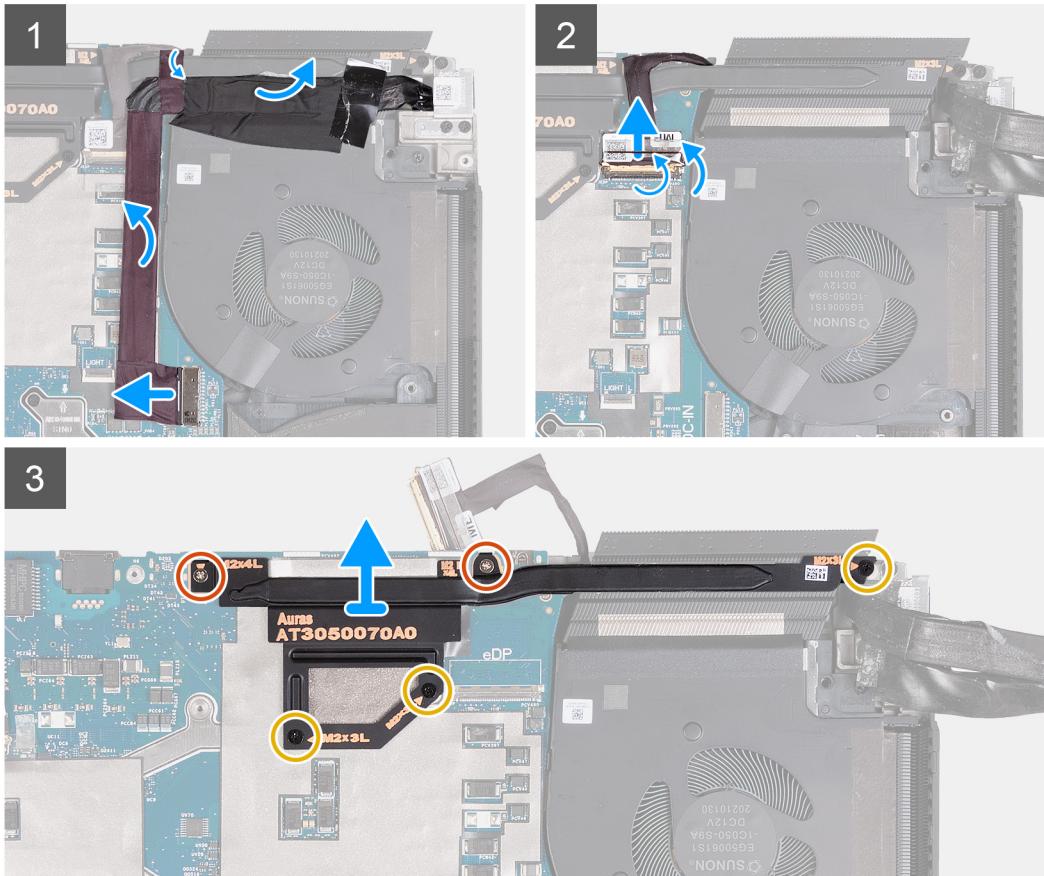
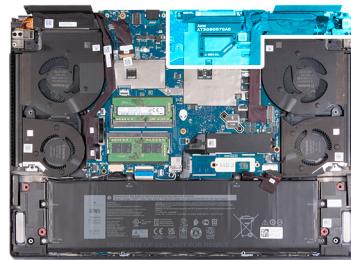
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

About this task

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

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

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



Steps

1. Peel the tapes that secure the power-adapter port connector to the system board.
2. Disconnect the power-adapter port from the system board.
3. Peel the power-adapter port-cable from the palm-rest and keyboard assembly.
4. Peel the tape that secures the display-cable connector latch to the system board.
5. Move the power-adapter port cable off the system board.
6. Lift the latch and disconnect the display cable from the system board.
7. Remove the two screws (M2x4) that secure the heat pipe to the system board.
8. Remove the three screws (M2x3) that secure the heat pipe to the system board.
9. Lift the heat pipe off the system board.

Installing the heat pipe

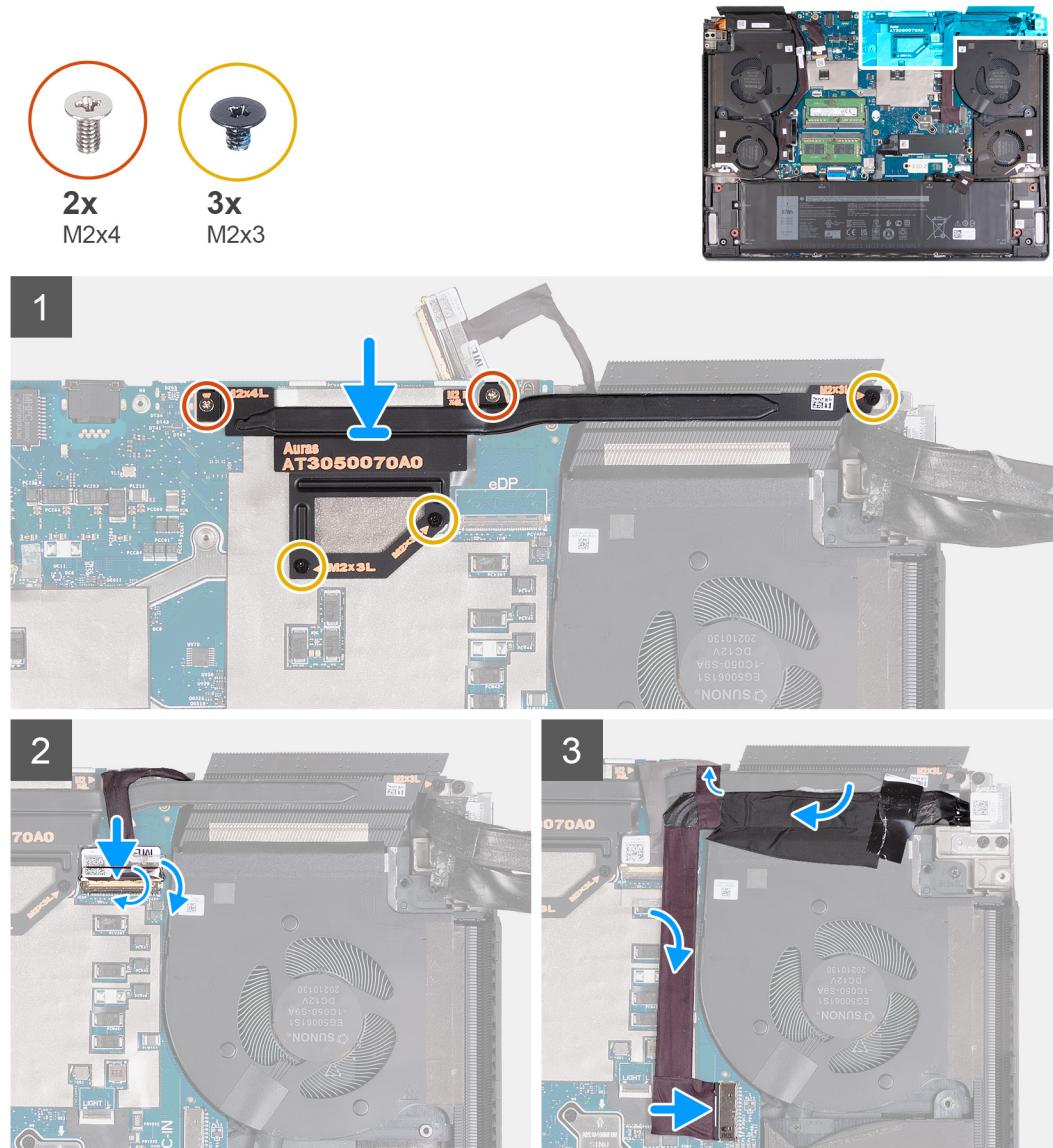
Prerequisites

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

About this task

(i) NOTE: If either the system board or the heat pipe is replaced, use the thermal grease provided in the kit to ensure that thermal conductivity is achieved.

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



Steps

1. Place the heat pipe on the system board
2. Align the screw holes on the heat pipe to the screw holes on the system board.
3. Replace the two screws (M2x4) that secure the heat pipe to the system board.
4. Replace the three screws (M2x3) that secure the heat pipe to the system board.
5. Connect the display cable to the system board and close the latch.
6. Adhere the tape that secures the display-cable connector latch to the system board.
7. Adhere the power-adapter port cable to the system board.
8. Connect the power-adapter port cable to the system board.
9. Adhere the tapes that secure the power-adapter port cable to the system board.

Next steps

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

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

Display assembly

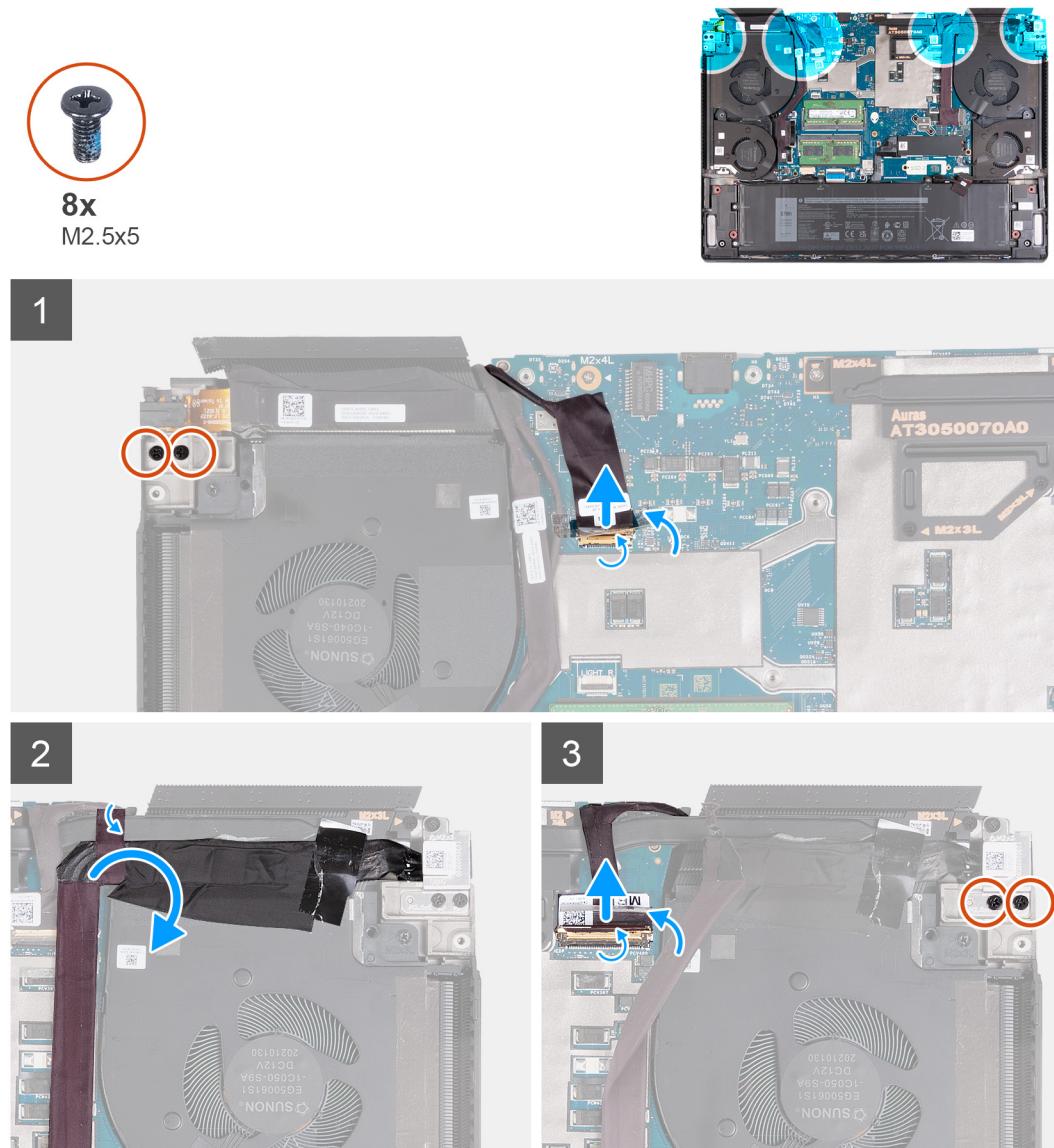
Removing the display assembly

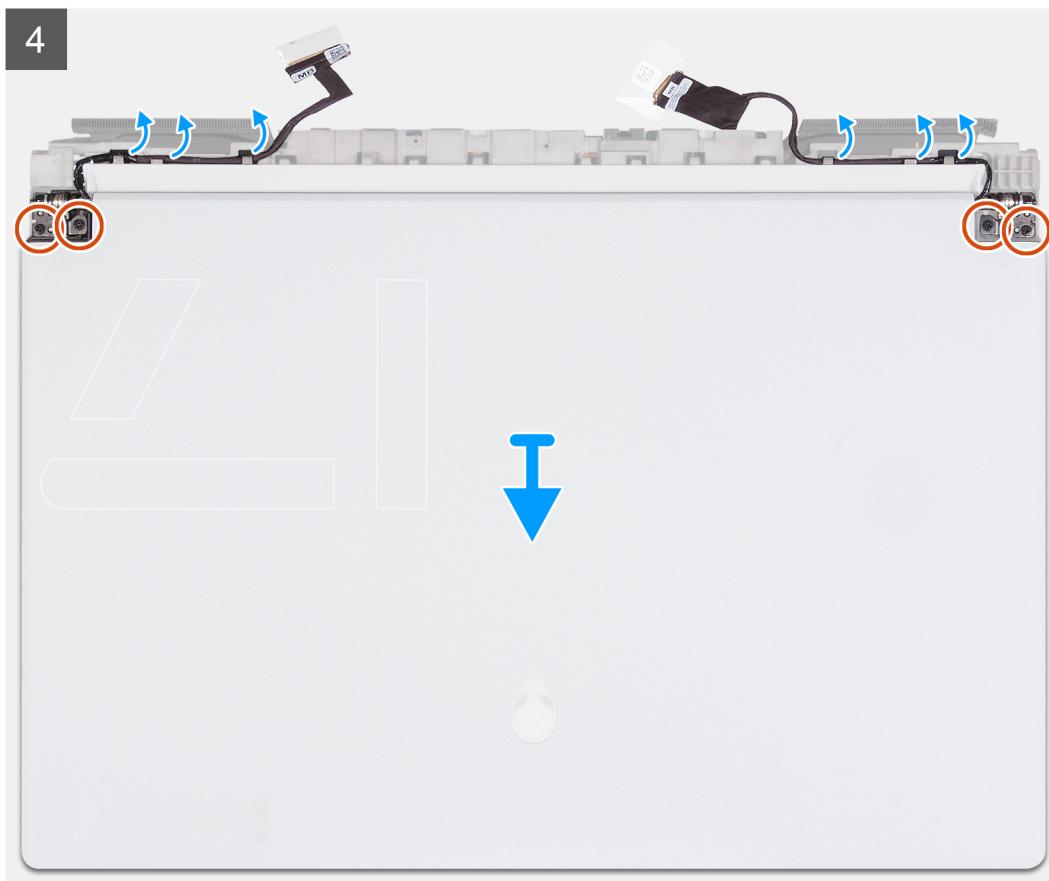
Prerequisites

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

About this task

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





Steps

1. Remove the two screws (M2.5x5) that secure the left-display hinge to the palm-rest and keyboard assembly.
2. Peel the tape that secures the camera-cable connector latch to the system board.
3. Lift the latch and disconnect the camera cable from the system board.
4. Peel the tapes that secure the power-adapter port cable to the system board.
5. Move the power-adapter port cable off the display-cable connector on the system board.
6. Peel the tape that secures the display-cable connector latch to the system board.
7. Lift the latch and disconnect the display-cable connector from the system board.
8. Remove the two screws (M2.5x5) that secure the power-adapter port-bracket to the palm-rest and keyboard assembly.
9. Turn the computer over
10. Remove the display cable from the routing guide on the palm-rest and keyboard assembly.
11. Remove the Tobii-eye cable from the routing guide on the palm-rest and keyboard assembly.
12. Remove the four screws (M2.5x5) that secure the display assembly to the palm-rest and keyboard assembly.
13. Lift the display assembly off the palm-rest and keyboard assembly.

Installing the display assembly

Prerequisites

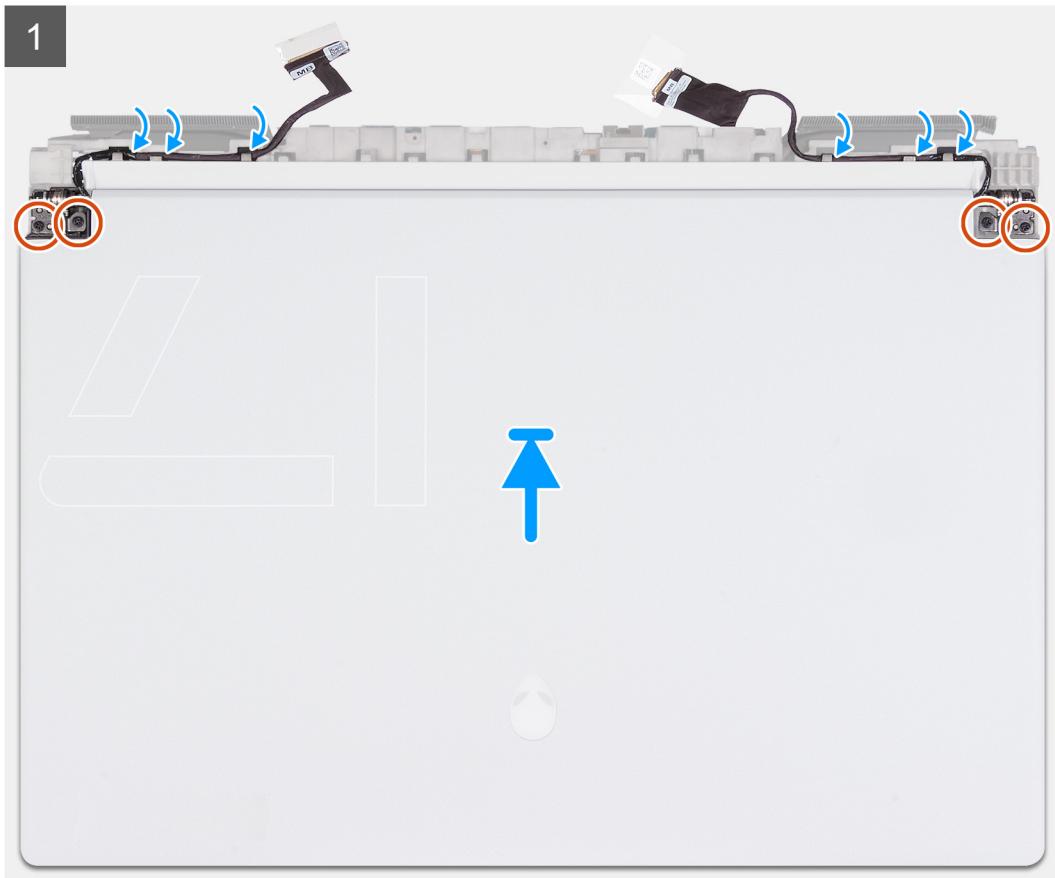
If you are replacing a component, remove the existing component before performing the installation process.

About this task

 **CAUTION: Place the display assembly on a clean and flat surface to avoid damaging the display assembly.**

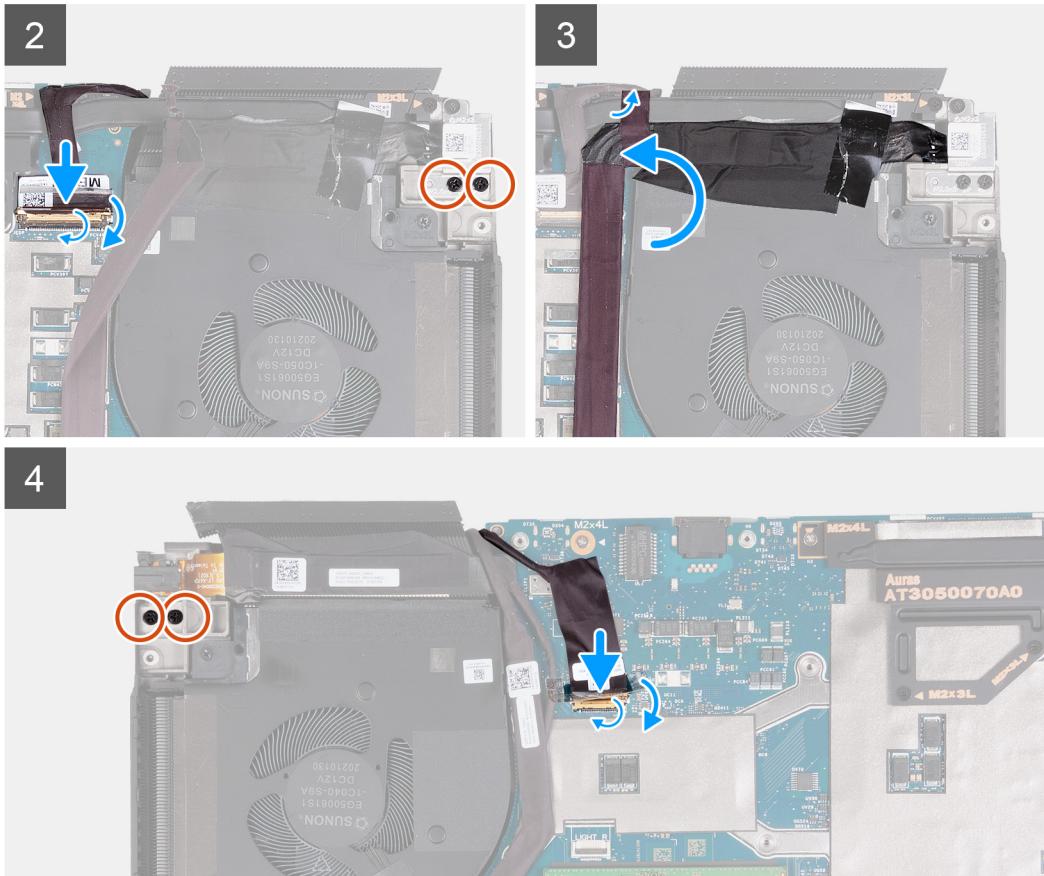
The following image(s) indicate the location of the display assembly and provides a visual representation of the installation procedure.

1





8x
M2.5x5



Steps

1. Place the display assembly over the palm-rest and keyboard assembly and align the screw holes on the display hinges to the screw holes on the palm-rest and keyboard assembly.
2. Replace the four screws (M2.5x5) that secure the display assembly to the palm-rest and keyboard assembly.
3. Route the display cable and camera cable through the routing guides on the display assembly.
4. Turn over the computer.
5. Connect the display cable to the connector on the system board and close the latch.
6. Adhere the tape that secures the display-cable connector latch to the system board.
7. Replace the two screws (M2.5x5) that secure the power-adapter port-bracket to the palm-rest and keyboard assembly.
8. Move the power-adapter port cable back into place over the system board.
9. Adhere the tapes that secure the power-adapter port cable to the system board.
10. Connect the camera cable to the connector on the system board and close the latch.
11. Adhere the tape that secures the camera-cable connector latch to the system board.
12. Replace the two screws (M2.5x5) that secure the left-display hinge to the palm-rest and keyboard assembly.

Next steps

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

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

Touchpad

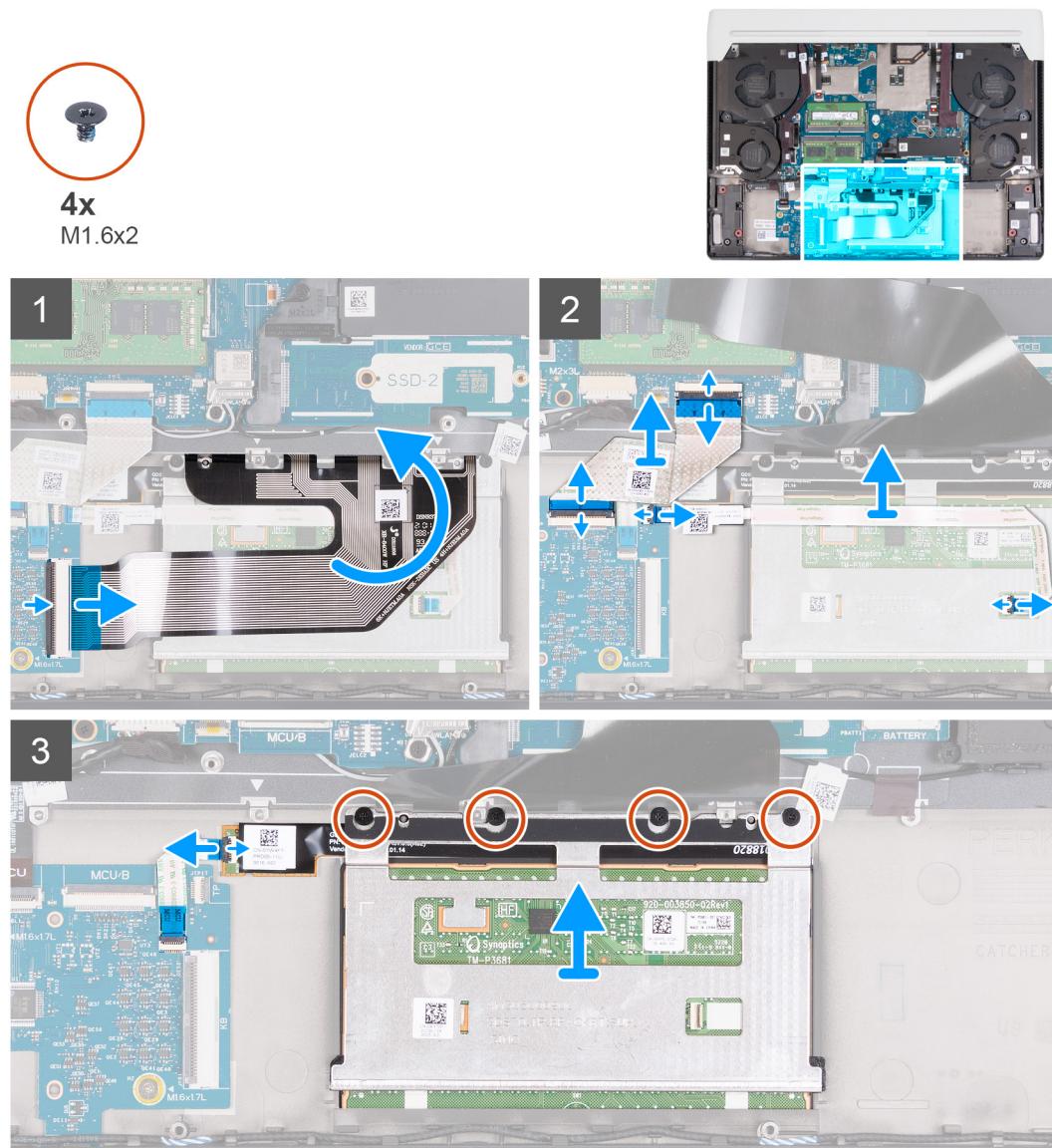
Removing the touchpad

Prerequisites

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

About this task

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



Steps

1. Lift the latch and disconnect the keyboard cable from the keyboard-controller board.
2. Peel and move the keyboard cable off the touchpad.
3. Lift the latches and disconnect the keyboard-controller board cable from the system board and keyboard-controller board.

4. Lift the keyboard-controller board cable off the palm-rest and keyboard assembly.
5. Lift the latches and disconnect the touchpad cable from the keyboard-controller board and the touchpad.
6. Disconnect the touchpad-light cable from the touchpad assembly.
7. Remove the four screws (M1.6x2) that secure the touchpad assembly to the palm-rest and keyboard assembly.
8. At an angle, slide and lift the touchpad assembly from the slot on the palm-rest and keyboard assembly.

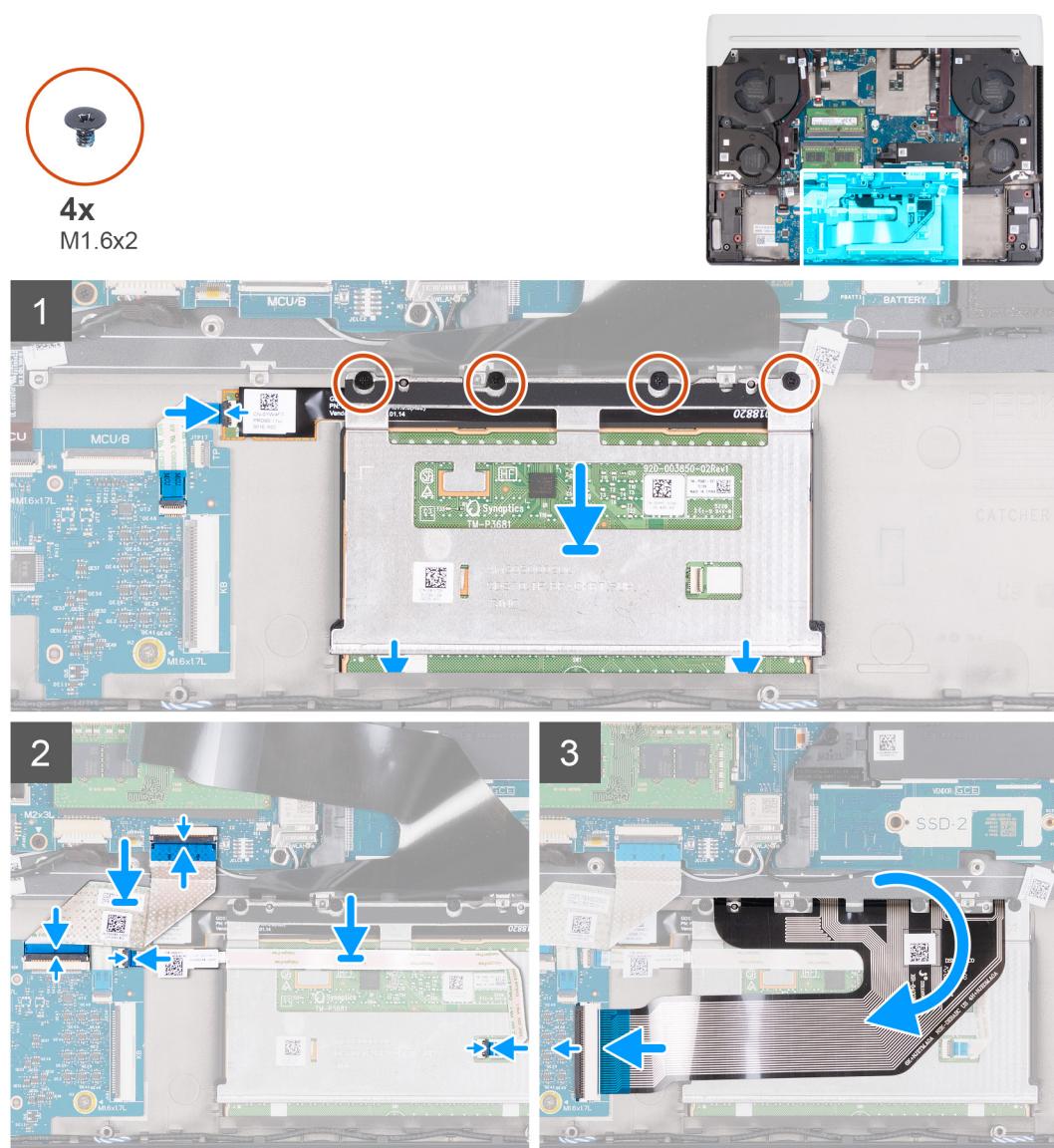
Installing the touchpad

Prerequisites

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

About this task

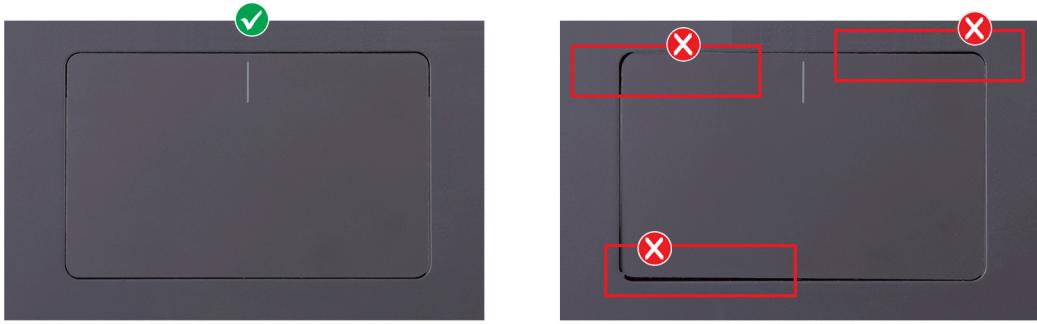
The following image(s) indicate the location of the touchpad and provides a visual representation of the installation procedure.



Steps

1. At an angle slide the touchpad assembly into the slot on the palm-rest and keyboard assembly.
2. Turn the computer over and open the display to ensure that the touchpad is equally aligned on all sides.

(i) | NOTE: The image below shows the proper touchpad alignment for your computer.



3. Close the display and place the computer in the position shown.
4. Replace the four screws (M1.6x2) that secure the touchpad assembly to the palm-rest and keyboard assembly.
5. Connect the touchpad-light cable to the touchpad assembly and close the latch.
6. Place the touchpad cable on the touchpad, connect the cable to the keyboard-controller board and touchpad and close the latches.
7. Place the keyboard-controller board on the palm-rest and keyboard assembly, connect the cable to the keyboard-controller board and system board and close the latches.

Next steps

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

Keyboard-controller board

Removing the keyboard-controller board

Prerequisites

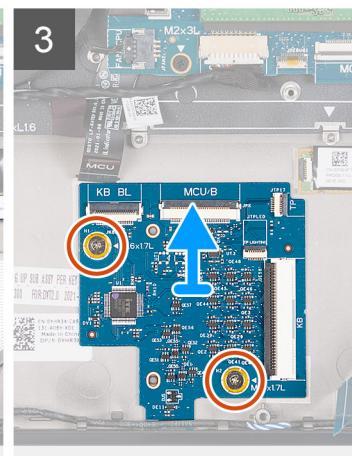
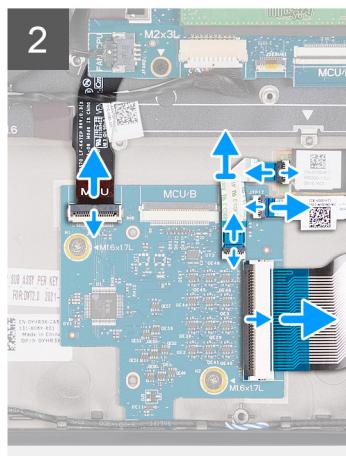
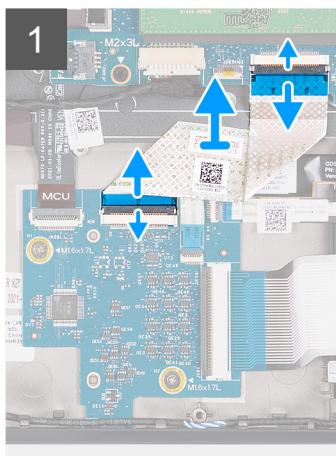
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [battery](#).

About this task

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



2x
M1.6x1.7



Steps

1. Lift the latches and disconnect the keyboard-controller board cable from the system board and keyboard-controller board.
2. Lift the latch and disconnect the keyboard-backlight cable from the keyboard-controller board.
3. Lift the latches and disconnect the touchpad-light cable from the keyboard-controller board and touchpad assembly.
4. Lift the latch and disconnect the touchpad cable from the keyboard controller board.
5. Lift the latch and disconnect the keyboard cable from the system board.
6. Remove the two screws (M1.6x1.7) that secures the keyboard-controller board to the palm-rest and keyboard assembly.
7. Lift the keyboard-controller board off the palm-rest and keyboard assembly.

Installing the keyboard-controller board

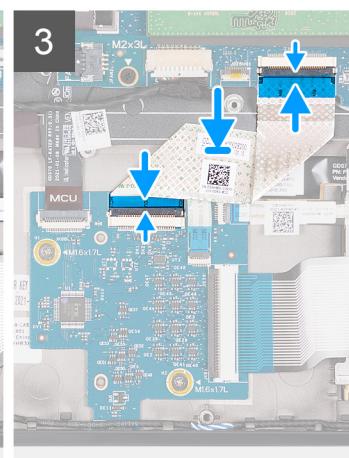
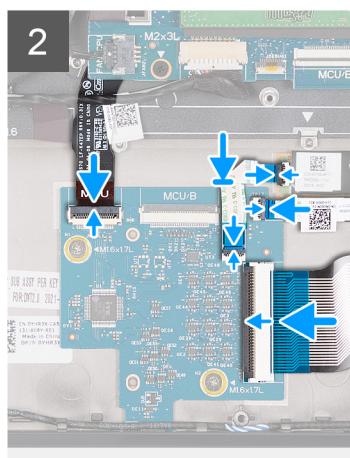
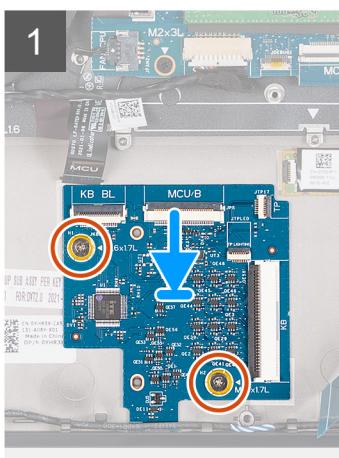
Prerequisites

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

About this task

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

2x
M1.6x1.7



Steps

1. Place the keyboard-controller board on the palm-rest and keyboard assembly and align the screw holes on the keyboard-controller board to the screw holes on the palm-rest and keyboard assembly.
2. Replace the two screws (M1.6x1.7) that secures the keyboard-controller board to the palm-rest and keyboard assembly.
3. Connect the keyboard cable to the system board and close the latch.
4. Connect the touchpad cable to the keyboard controller board and close the latch
5. Connect the touchpad-light cable to the keyboard-controller board and touchpad assembly and close the latches
6. Connect the keyboard-backlight cable to the keyboard-controller board and close the latch.
7. Connect the keyboard-controller board cable to the system board and keyboard-controller board and close the latches.

(i) | NOTE: A keyboard-controller board setup in the BIOS is required after replacing the keyboard-controller board.

Next steps

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

System board

Removing the system board

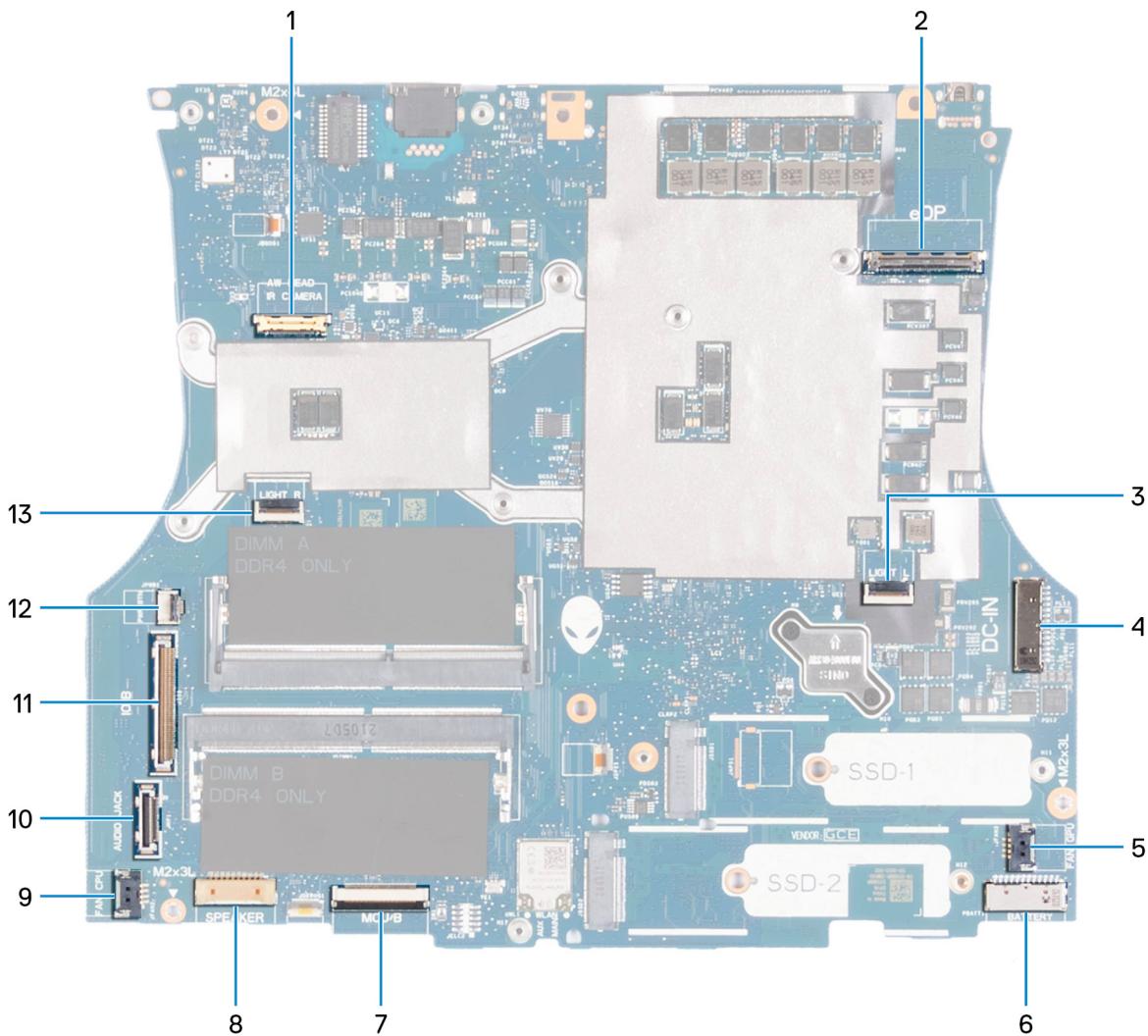
Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [memory](#).
4. Remove the [M.2 2230 solid-state drive](#).
5. Remove the [M.2 2280 solid-state drive](#).
6. Remove the [battery](#).
7. Remove the [rear-I/O cover](#).

8. Remove the [power-adapter port](#).
9. Remove the [headset port](#).
10. Remove the [left fan](#).
11. Remove the [right fan](#).
12. Remove the [heat pipe](#).

About this task

The following image indicates the connectors on your system board.



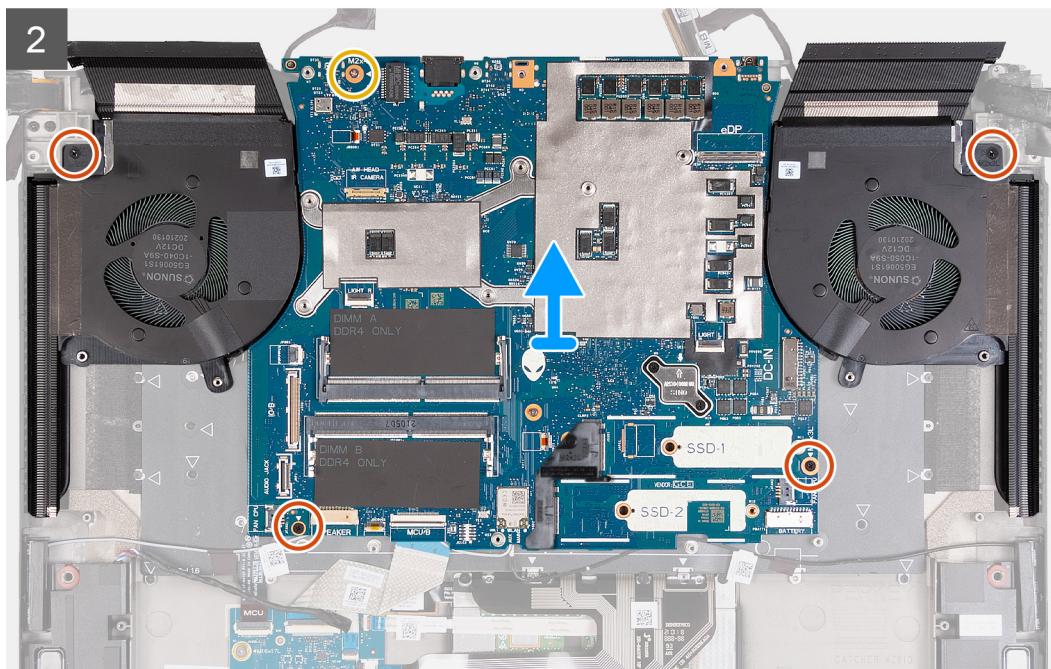
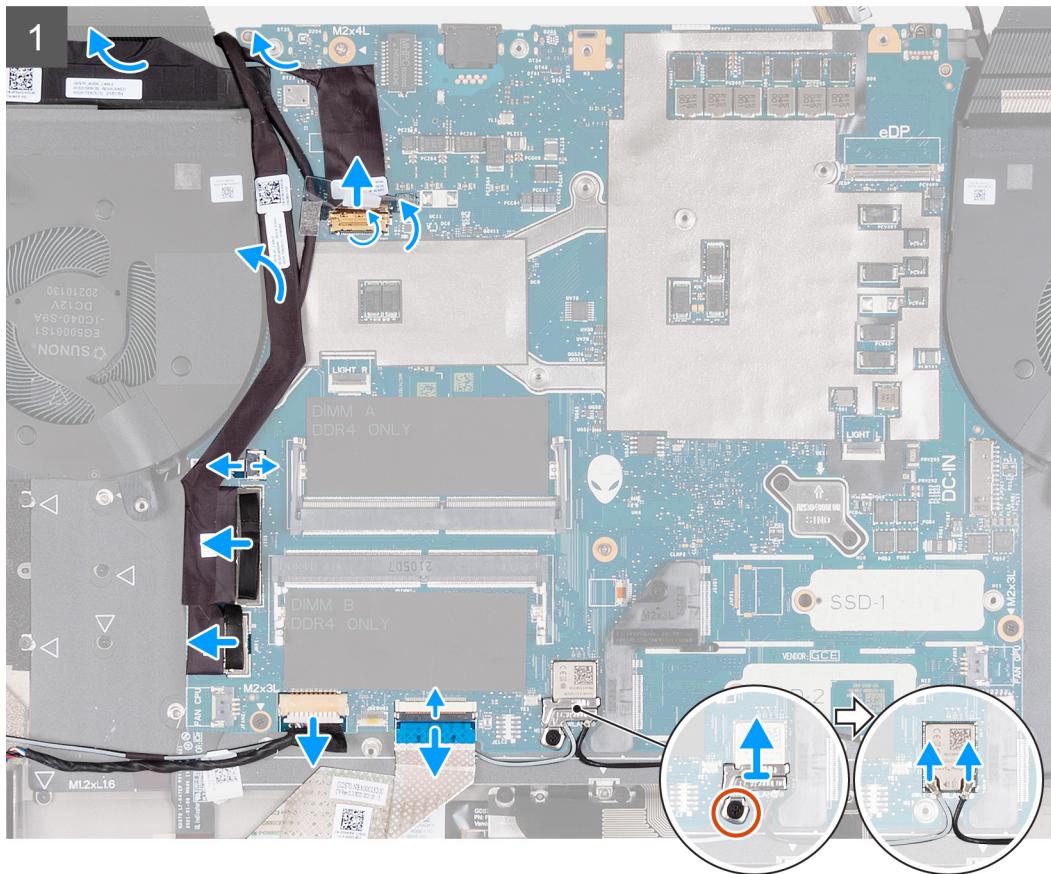
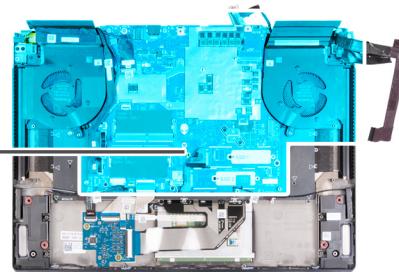
1. Camera cable
2. Display cable
3. Left Tron-light cable
4. Power-button cable
5. Right fan cable
6. Battery cable
7. Keyboard-controller board cable
8. Speaker cable
9. Left fan cable
10. Headset port cable
11. I/O-board cable
12. Power button cable
13. Right Tron-light cable

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



5x
M2x3

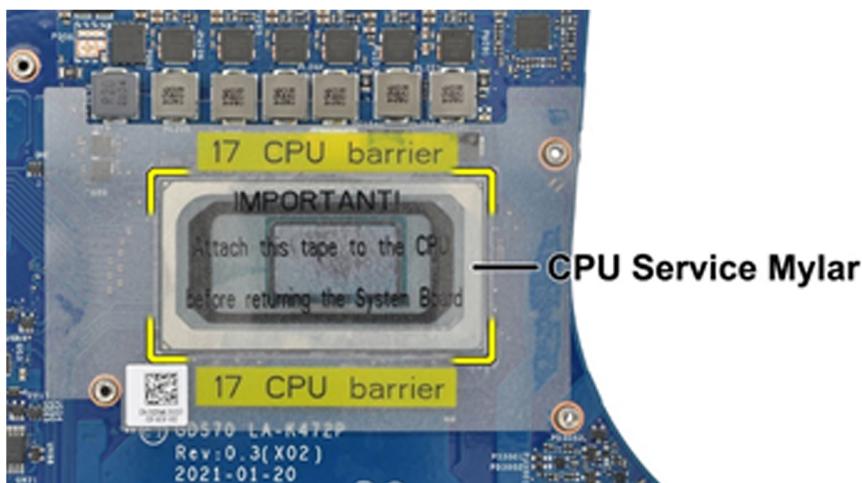
1x
M2x4



Steps

1. Peel the tape that secures the camera-cable connector latch to the system board.
2. Lift the latch and disconnect the camera cable from the system board.
3. Move the camera cable off the system board.
4. Disconnect the left-fan cable from the system board.
5. Using the pull tab, disconnect the I/O-board cable from the system board.
6. Move the I/O-board cable off the system board.
7. Using the pull tab, disconnect the headset-port cable from the system board.
8. Move the headset-port cable off the system board.
9. Lift and latch and disconnect the power-button cable from the system board.
10. Disconnect the speakers cable from the system board.
11. Lift the latch and disconnect the keyboard-controller board cable from the system board.
12. Remove the screw (M2x3) that secures the wireless-card bracket to the system board.
13. Lift the wireless card bracket off the system board.
14. Disconnect the antenna cables from the wireless-card on the system board.
15. Remove the four screws (M2x3) that secure the system-board and heat-sink assembly to the palm-rest and keyboard assembly.
16. Remove the screw (M2x4) that secures the system board to the palm-rest and keyboard assembly.
17. Hold firmly on the left and right fans and lift the system-board assembly off the palm-rest and keyboard assembly.
18. Remove the [fan and heat-sink assembly](#).

 **NOTE:** Before returning the old system board. Adhere the processor (CPU) sticker over the processor (CPU) chip surface and ensure that it is fully covered .



 **CAUTION:** Once the system board assembly has been removed from the computer, follow the instructions in the tech sheet dispatched with the replacement system board assembly.

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

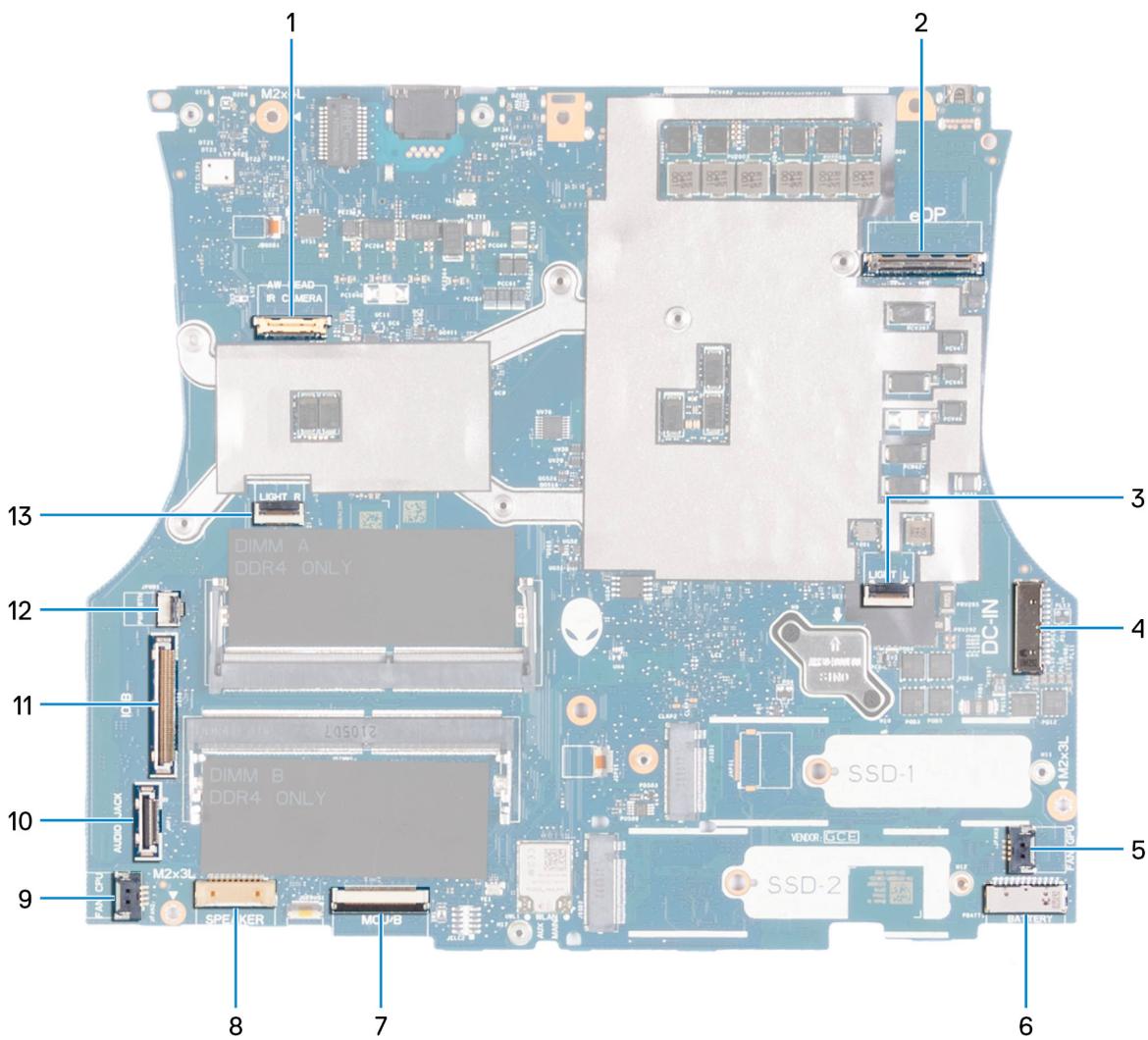
Installing the system board

Prerequisites

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

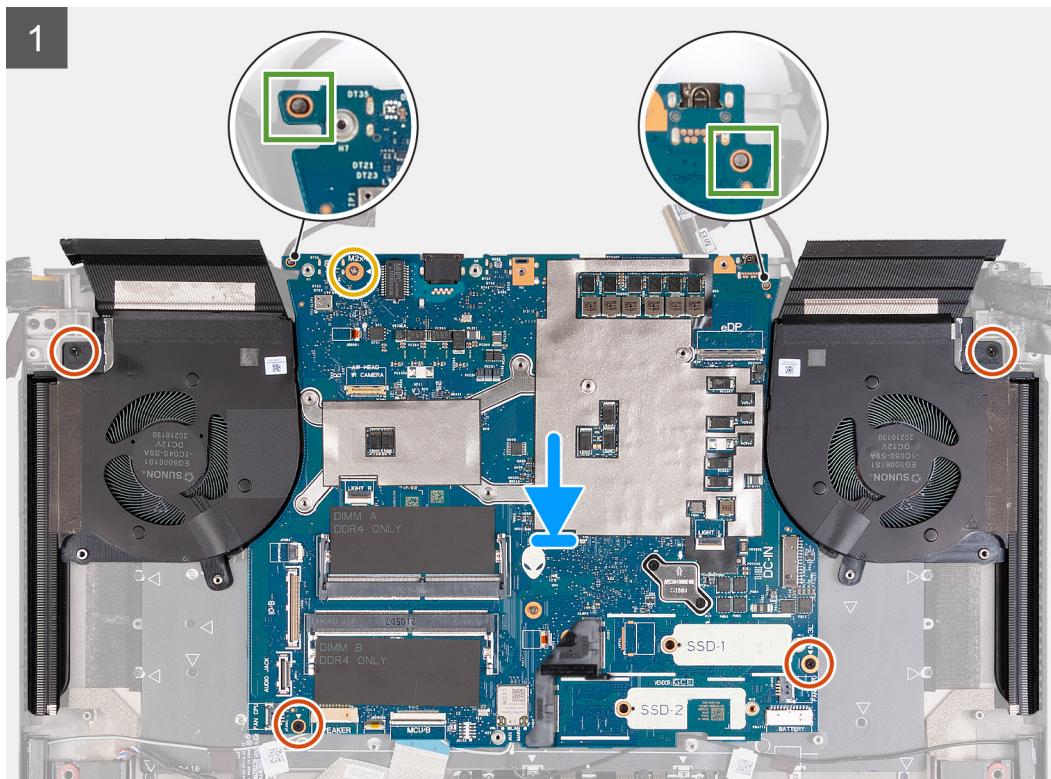
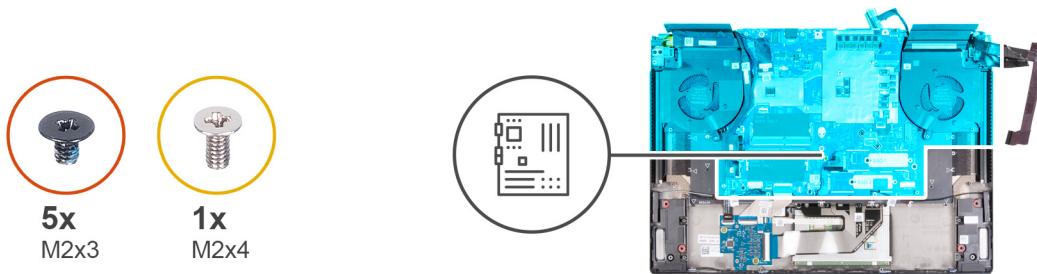
About this task

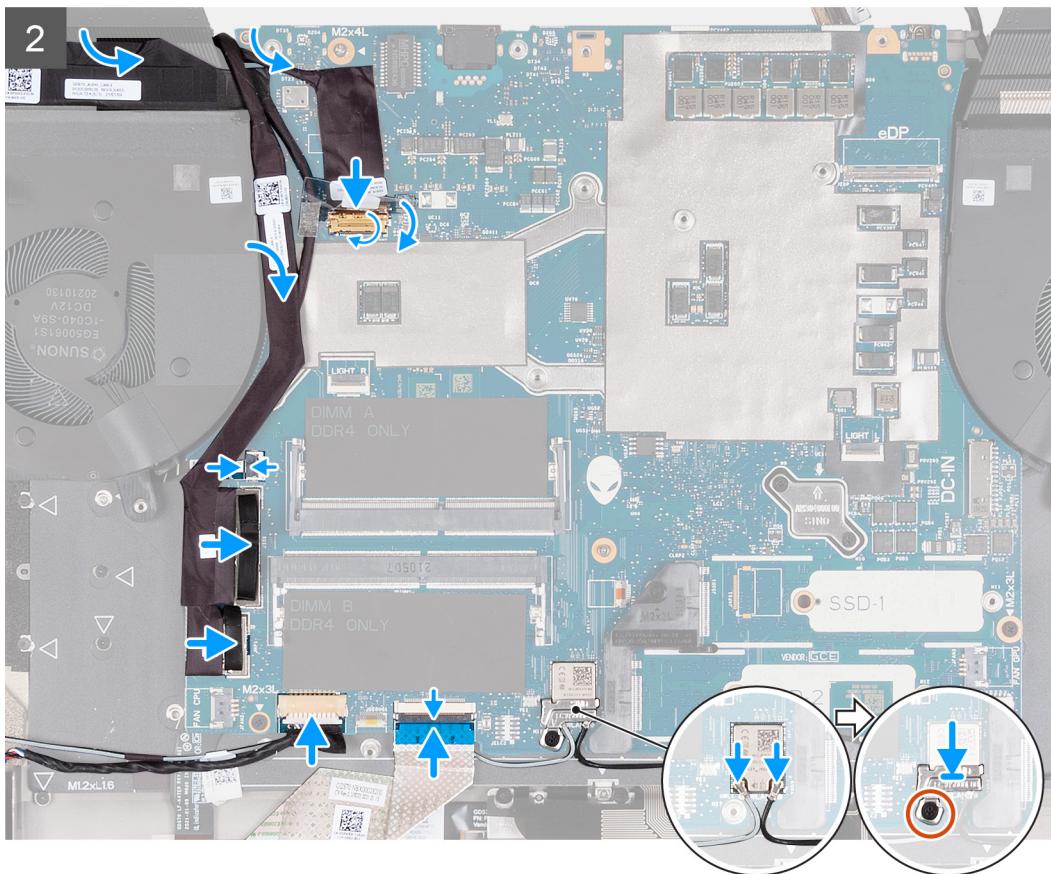
The following image indicates the connectors on your system board.



1. Camera cable
2. Display cable
3. Left Tron-light cable
4. Power-button cable
5. Right fan cable
6. Battery cable
7. Keyboard-controller board cable
8. Speaker cable
9. Left fan cable
10. Headset port cable
11. I/O-board cable
12. Power button cable
13. Right Tron-light cable

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





Steps

1. Turn the system-board assembly over.
2. Install the [fan and heat-sink assembly](#).
3. Using the two alignment posts shown in the image, place the system-board assembly on the palm-rest and keyboard assembly.

NOTE: When placing the system-board assembly on the palm-rest and keyboard assembly ensure that the power button cable is placed on top of the system board. Overlooking the power-button cable connection to the system board will result in no-power failure after service.
4. Align the screw holes on the system-board assembly to the screw holes on the palm-rest and keyboard assembly.
5. Replace the four screws (M2x3) that secure the system-board and heat-sink assembly to the palm-rest and keyboard assembly.
6. Replace the screw (M2x4) that secures the system board to the palm-rest and keyboard assembly.
7. Connect the antenna cables to the wireless-card on the system board.

Table 2. Antenna-cable color scheme

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

8. Place the wireless card bracket over the wireless card on the system board.
9. Replace the screw (M2x3) that secures the wireless-card bracket to the system board.
10. Connect the keyboard-controller board cable to the system board and close the latch.
11. Connect the speakers cable to the system board.
12. Connect the power-button cable to the system board and close the latch.
13. Move the headset-port cable over the system board.
14. Connect the headset-port cable to the system board.

15. Move the I/O-board cable over the system board.
16. Connect the I/O-board cable to the system board.
17. Connect the left-fan cable to the system board.
18. Move the camera cable over the system board.
19. Connect the camera cable to the system board and close the latch.
20. Adhere the tape that secures the camera-cable connector latch to the system board.

Next steps

1. Install the [heat pipe](#).
2. Install the [left fan](#).
3. Install the [right fan](#).
4. Install the [headset port](#).
5. Install the [power-adapter port](#).
6. Install the [rear-I/O cover](#).
7. Install the [battery](#).
8. Install the [M.2 2230 solid-state drive](#).
9. Install the [M.2 2280 solid-state drive](#).
10. Install the [memory](#).
11. Install the [base cover](#).

Fan and heat-sink assembly

Removing the fan and heat-sink assembly

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [rear-I/O cover](#).
5. Remove the [power-adapter port](#).
6. Remove the [headset port](#).
7. Remove the [left fan](#).
8. Remove the [right fan](#).
9. Remove the [heat pipe](#).
10. Remove the [system board](#).

About this task

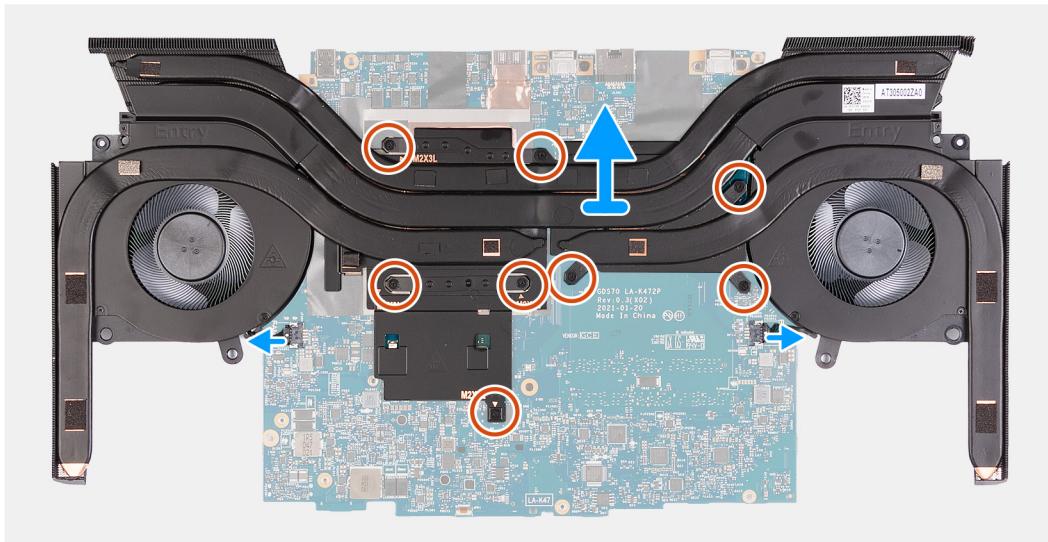
 **CAUTION:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.

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

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



8x
M2x3



Steps

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

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

Installing the fan and heat-sink assembly

Prerequisites

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

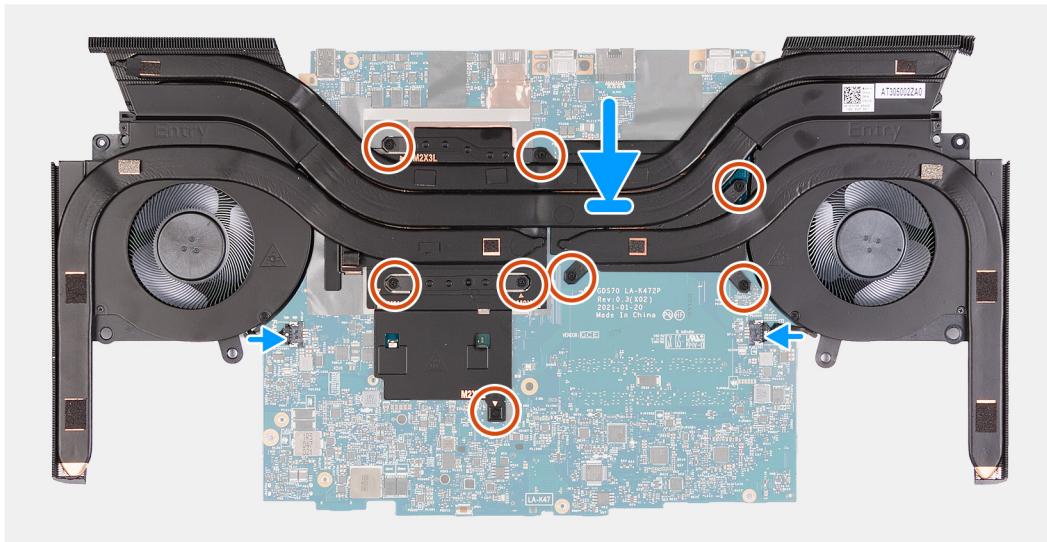
About this task

(i) NOTE: If either the system board or the fan and heat-sink assembly is replaced, use the thermal grease provided in the kit to ensure that thermal conductivity is achieved.

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



8x
M2x3



Steps

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

Next steps

1. Install the [system board](#).
2. Install the [heat pipe](#).
3. Install the [left fan](#).
4. Install the [right fan](#).
5. Install the [headset port](#).
6. Install the [power-adapter port](#).
7. Install the [rear-I/O cover](#).
8. Install the [battery](#).
9. Install the [base cover](#).
10. Follow the procedure in [After working inside your computer](#).

Power button

Removing the power button

Prerequisites

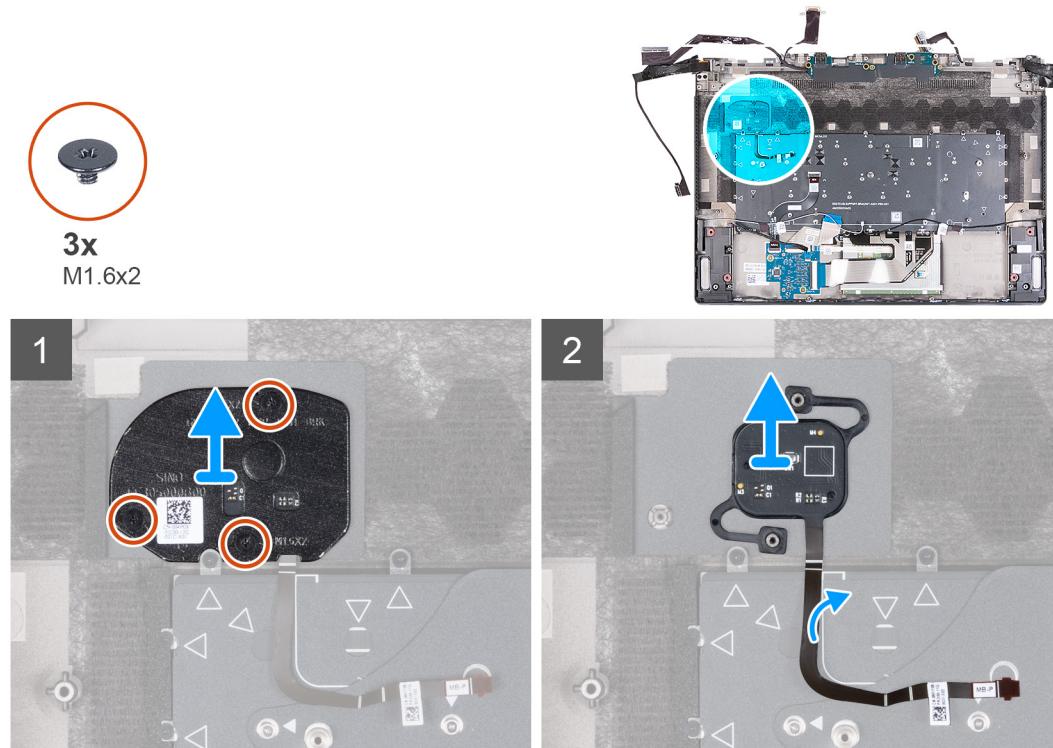
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).

4. Remove the [rear-I/O cover](#).
5. Remove the [power-adapter port](#).
6. Remove the [headset port](#).
7. Remove the [left fan](#).
8. Remove the [right fan](#).
9. Remove the [heat pipe](#).
10. Remove the [system board](#).

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

About this task

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



Steps

1. Remove the three screws (M1.6x2) that secure the power-button bracket to the palm-rest and keyboard assembly.
2. Lift the power-button bracket off the palm-rest and keyboard assembly.
3. Peel the power-button cable off the palm-rest and keyboard assembly and lift the power button and its cable off the palm-rest and keyboard assembly.

Installing the power button

Prerequisites

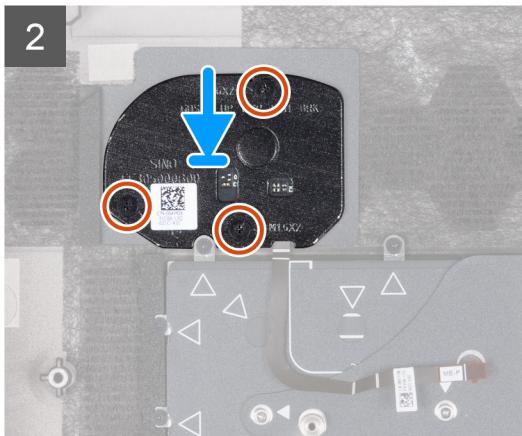
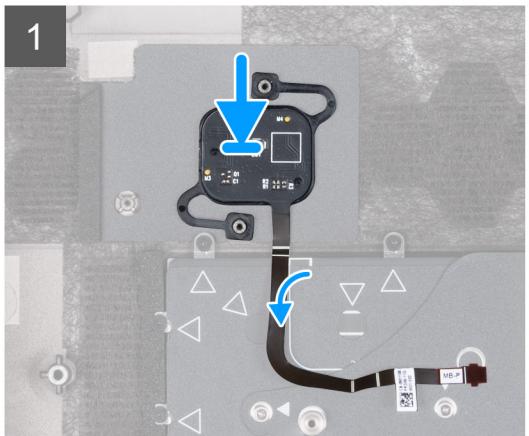
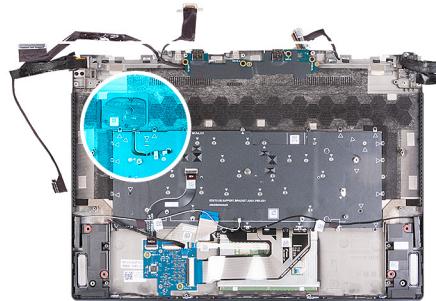
If you are replacing a component, remove the existing component before performing the installation process.

About this task

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



3x
M1.6x2



Steps

1. Using the alignment posts, place the power button into its slot on the palm-rest and keyboard assembly.
2. Place the power-button bracket over the power button and align the screw holes on the power-button bracket to the screw holes on the palm-rest and keyboard assembly.
3. Replace the screw (M2x3) that secures the power-button with optional fingerprint reader to the palm-rest and keyboard assembly.

Next steps

1. Install the [system board](#).
2. Install the [heat pipe](#).
3. Install the [left fan](#).
4. Install the [right fan](#).
5. Install the [headset port](#).
6. Install the [power-adapter port](#).
7. Install the [rear-I/O cover](#).
8. Install the [battery](#).
9. Install the [base cover](#).
10. Follow the procedure in [After working inside your computer](#).

I/O board

Removing the I/O board

Prerequisites

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

6. Remove the [headset port](#).

7. Remove the [left fan](#).

8. Remove the [right fan](#).

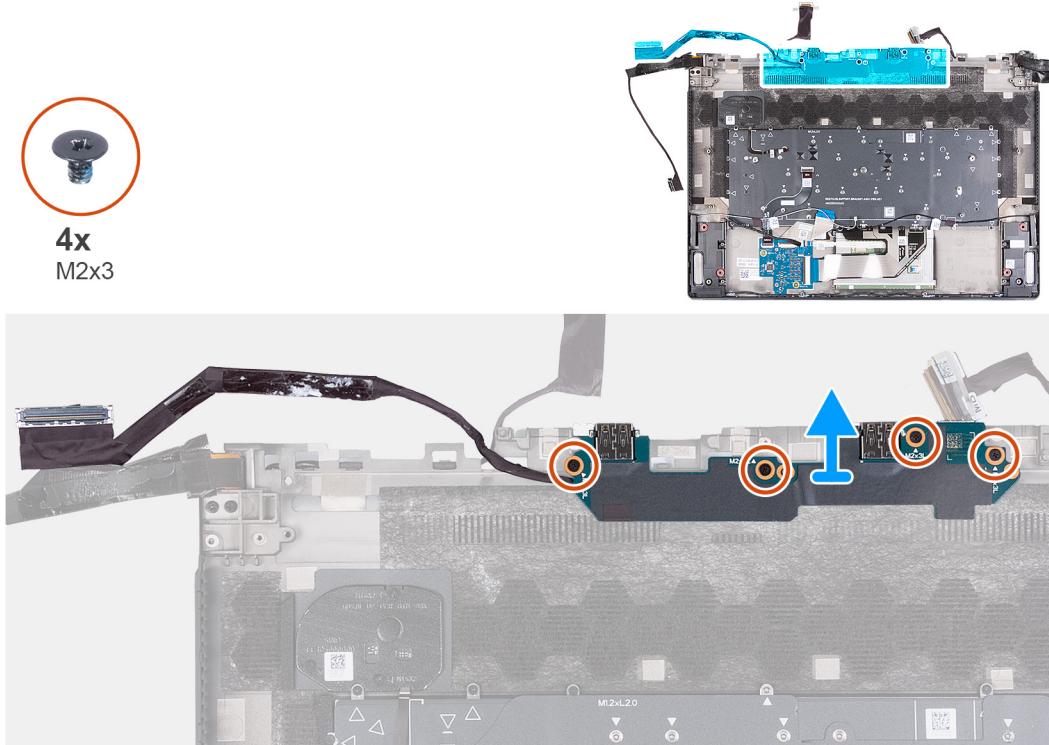
9. Remove the [heat pipe](#).

10. Remove the [system board](#).

NOTE: The system board can be removed and installed along with the heat sink, memory and solid-state drives. This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board and heat sink.

About this task

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



Steps

1. Remove the four screws (M2x3) that secure the I/O board to the palm-rest and keyboard assembly.

2. Lift the I/O board and its cable off the palm-rest and keyboard assembly.

Installing the I/O board

Prerequisites

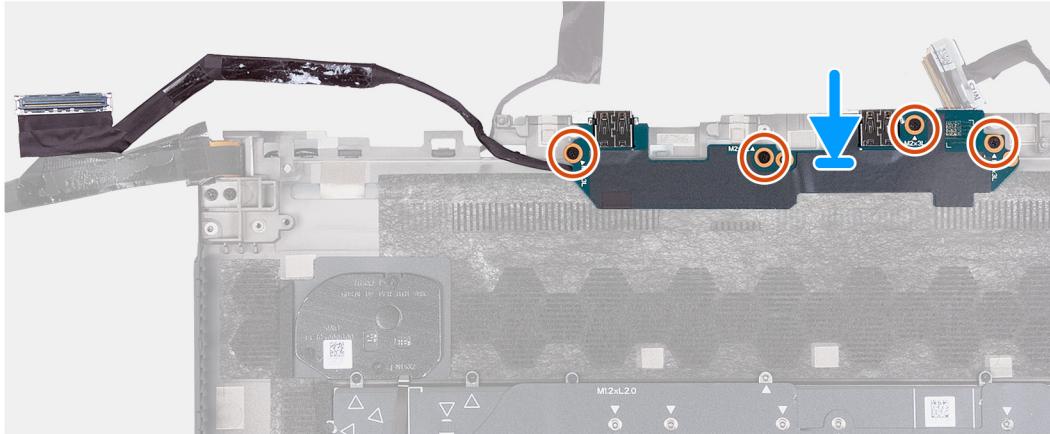
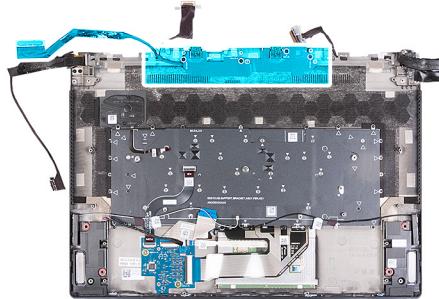
If you are replacing a component, remove the existing component before performing the installation process.

About this task

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



4x
M2x3



Steps

1. Place the I/O board on the palm-rest and keyboard assembly and align the screw holes on the I/O board to the screw holes on the palm-rest and keyboard assembly.
2. Replace the four screws (M2x3) that secure the I/O board to the palm-rest and keyboard assembly.

Next steps

1. Install the [system board](#).
2. Install the [heat pipe](#).
3. Install the [left fan](#).
4. Install the [right fan](#).
5. Install the [headset port](#).
6. Install the [power-adapter port](#).
7. Install the [rear-I/O cover](#).
8. Install the [battery](#).
9. Install the [base cover](#).
10. Follow the procedure in [After working inside your computer](#).

Palm-rest and keyboard assembly

Removing the palm-rest and keyboard assembly

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [memory](#).
4. Remove the [battery](#).
5. Remove the [rear-I/O cover](#).
6. Remove the [power-adapter port](#).
7. Remove the [headset port](#).
8. Remove the [speakers](#).

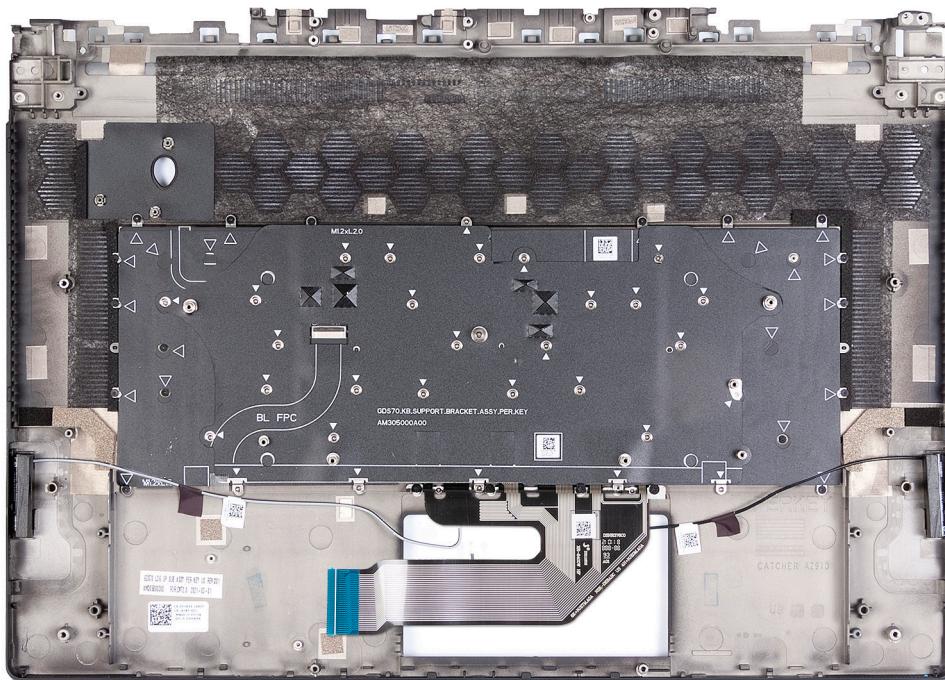
9. Remove the [left fan](#).
10. Remove the [right fan](#).
11. Remove the [heat pipe](#).
12. Remove the [display assembly](#).
13. Remove the [touchpad](#).
14. Remove the [keyboard-controller board](#).
15. Remove the [system board](#).

(i) NOTE: The system board can be removed and installed along with the heat sink, memory and solid-state drives. This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board and heat sink.

16. Remove the [power button](#).
17. Remove the [I/O board](#).

About this task

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



Steps

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

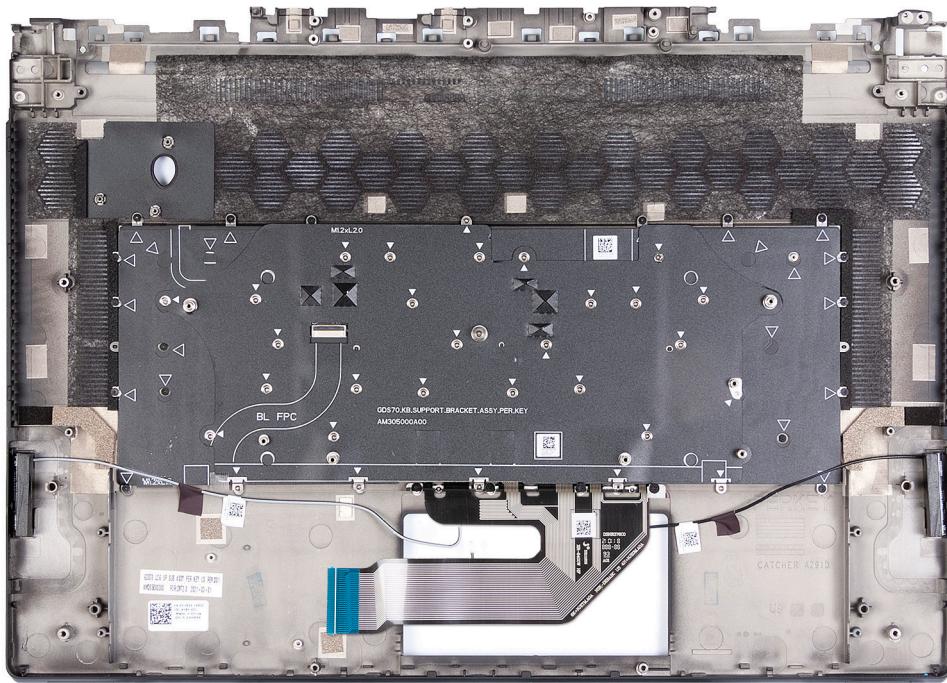
Installing the palm-rest and keyboard assembly

Prerequisites

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

About this task

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



Steps

Place the palm-rest and keyboard assembly on a flat and clean surface and perform the post-requisites to install the palm-rest and keyboard assembly.

Next steps

1. Install the [I/O board](#).
2. Install the [power button](#).
3. Install the [fan and heat-sink assembly](#).
4. Install the [system board](#).
5. Install the [touchpad](#).
6. Install the [display assembly](#).
7. Install the [heat pipe](#).
8. Install the [left fan](#).
9. Install the [right fan](#).
10. Install the [speakers](#).
11. Install the [headset port](#).
12. Install the [power-adapter port](#).
13. Install the [rear-I/O cover](#).
14. Install the [battery](#).
15. Install the [memory](#).
16. Install the [base cover](#).
17. Follow the procedure in [After working inside your computer](#).

Drivers and downloads

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

System setup

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

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

Use the BIOS Setup program for the following purposes:

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

Entering BIOS setup program

About this task

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

Navigation keys

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

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
Enter	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

Boot Sequence

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

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

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

- Removable Drive (if available)
- STXXXX Drive (if available)

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

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

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

System setup options

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

Table 3. System setup options—Main menu

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

Table 4. System setup options—Advance menu

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

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

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

Table 5. System setup options—Security menu

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

Table 6. System setup options—Boot menu

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

Table 7. System setup options—Exit menu

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

System and setup password

Table 8. System and setup password

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

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

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

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

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

Assigning a system setup password

Prerequisites

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

About this task

To enter the system setup, press F12 immediately after a power-on or reboot.

Steps

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter. The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field. Use the following guidelines to assign the system password:
 - A password can have up to 32 characters.
 - At least one special character: ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | }
 - Numbers 0 through 9.
 - Upper case letters from A to Z.
 - Lower case letters from a to z.
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press Esc and save the changes as prompted by the pop-up message.
5. Press Y to save the changes. The computer restarts.

Deleting or changing an existing system setup password

Prerequisites

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

About this task

To enter the System Setup, press F12 immediately after a power-on or reboot.

Steps

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

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

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

Clearing CMOS settings

About this task

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

Steps

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

Clearing BIOS (System Setup) and System passwords

About this task

To clear the system or BIOS passwords, contact Dell technical support as described at www.dell.com/contactdell.

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

Updating the BIOS

Updating the BIOS in Windows

Steps

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

(i) | NOTE: If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.

For more information, see knowledge base article [000124211](https://www.dell.com/support/article/000124211) at www.dell.com/support.

Updating the BIOS using the USB drive in Windows

Steps

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

Troubleshooting

Handling swollen Lithium-ion batteries

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

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

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

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

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

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

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

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

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

System-diagnostic lights

Power and battery-status light

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

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

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

Off:

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

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

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

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

(i) NOTE: The following diagnostic light codes and recommended solutions are intended for Dell service technicians to troubleshoot problems. You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

Table 9. Diagnostic-light LED codes

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

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

SupportAssist diagnostics

About this task

The SupportAssist diagnostics (previously known as ePSA diagnostics) performs a complete check of your hardware. The SupportAssist diagnostics is embedded in the BIOS and is launched by it internally. The SupportAssist diagnostics provides a set of options for particular devices or device groups. It allows you to:

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

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

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

Recovering the operating system

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

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

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

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

WiFi power cycle

About this task

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

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

Steps

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

Drain residual flea power (perform hard reset)

About this task

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

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

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

To drain residual flea power (perform a hard reset)

Steps

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

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

Getting help and contacting Alienware

Self-help resources

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

Table 10. Alienware products and online self-help resources

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

Contacting Alienware

To contact Alienware for sales, technical support, or customer service issues, see www.alienware.com.

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

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