Latitude 3310 2-in-1

Service Manual

Regulatory Model: P118G
Regulatory Type: P118G001
August 2021
Rev. A01

Notes, cautions, and warnings

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

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

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

Contents

1

Working on your computer

Topics:

Safety instructions

Prerequisites

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

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

About this task

NOTE: Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the power source.

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage

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

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

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

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

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

Turning off your computer

Turning off your — Windows

About this task

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer .

Steps

1. Click or tap  .
2. Click or tap ⏻ and then click or tap **Shut down**.

   NOTE: Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

Before working inside your computer

Steps

1. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
2. Turn off your computer.
3. If the computer is connected to a docking device (docked), undock it.
4. Disconnect all network cables from the computer (if available).

   CAUTION: If your computer has an RJ45 port, disconnect the network cable by first unplugging the cable from your computer.

5. Disconnect your computer and all attached devices from their electrical outlets.
6. Open the display.
7. Press and hold the power button for a few seconds to ground the system board.

   CAUTION: To guard against electrical shock, unplug your computer from the electrical outlet before performing Step # 8.

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

8. Remove any installed ExpressCards or Smart Cards from their slots.

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.

Safety Precautions

Follow the safety precautions described in the following sections when you perform an installation or a disassembly/reassembly procedure:

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power, and then remove the battery.
- Disconnect all network cables, telephone or telecommunications lines from the system.
- Use a wrist grounding strap and mat when working inside any computer system to avoid electrostatic discharge (ESD) damage.
- After removing a system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to help reduce the risk of being shocked or seriously injured in an electrical accident.

Standby Power

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

After you unplug a system and before you remove components, wait approximately 30 to 45 seconds to allow the charge to drain from the circuits.

Bonding

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

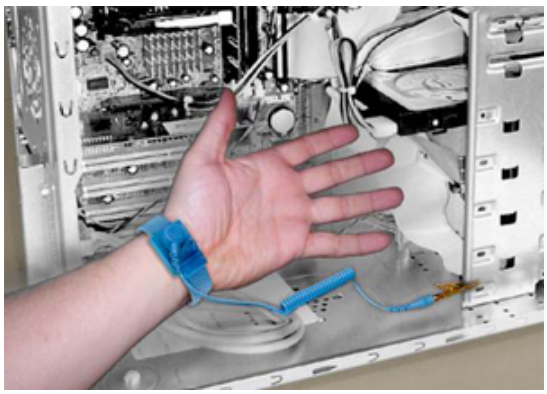


Figure 1. Bonding Properly

Electrostatic Discharge 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 earlier Dell products. For this reason some previously approved methods of handling parts are no longer applicable.

There are two recognized types of ESD damage: catastrophic and intermittent failures.

- **Catastrophic** —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.

  NOTE: Catastrophic failures represent approximately 20 percent of ESD-related failures.

- **Intermittent** —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.

  NOTE: 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 more difficult type of damage to recognize and troubleshoot is the intermittent (also called latent or “walking wounded”) failure. The following image shows an example of intermittent damage to a memory DIMM trace. Although the damage is done, the symptoms may not become an issue or cause permanent failure symptoms for some time after the damage occurs.

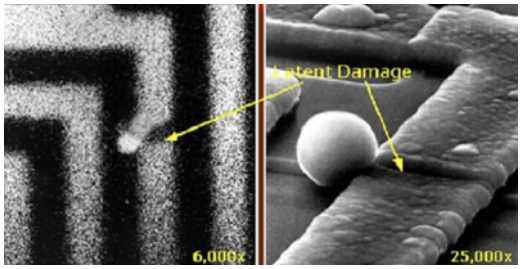


Figure 2. Intermittent (Latent) Damage to a Wiring Trace

Do the following 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.

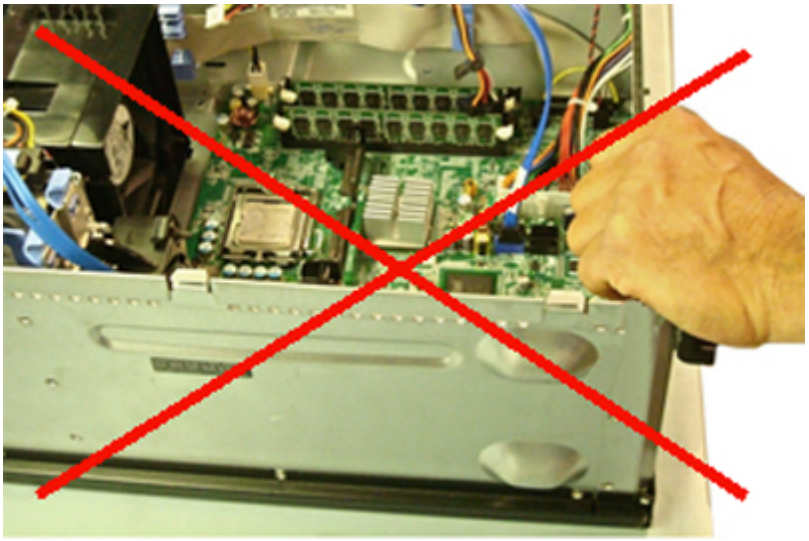


Figure 3. Chassis "Bare Metal" Grounding (Unacceptable)

- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.
- When handling static-sensitive components, grasp them by the sides, not the top. Avoid touching pins and circuit boards.
- 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, be sure to discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

The ESD Field Service Kit

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

Figure 4. ESD Field Service Kit

The anti-static mat is dissipative and should be used to safely place parts on 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 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. Remember, the only safe place for ESD-sensitive items are in your hand, on the ESD mat, in the system, or inside a bag.

Figure 5. Anti-Static Mat

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 a minimum of once per week.

Table 1. Wrist Straps

Wrist Strap and Bonding Wire	Wireless ESD Strap (Unacceptable)
	

ESD Wrist Strap Tester

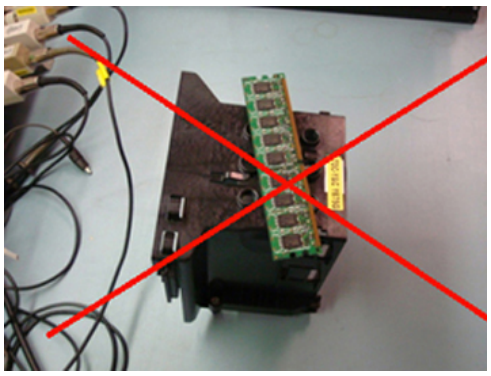
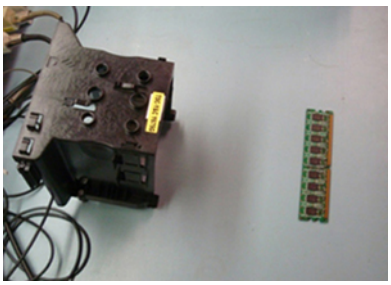
The wires inside of an ESD strap are prone to damage over time. When using an unmonitored kit, it is best practice to regularly test the strap prior to each service call, and at a minimum, test once per week. A wrist strap tester is the best method for doing this test. If you do not have your own wrist 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.

Figure 6. Wrist Strap Tester

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.

Table 2. Placement of Insulator Elements

Unacceptable — DIMM lying on an insulator part (plastic heat sink shroud)	Acceptable — DIMM separated from the insulator part
	

Consider the 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.

Figure 7. ESD Packaging

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 strongly suggested that all field service engineers 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 engineers keep sensitive parts separate from all insulator parts while performing service and that they use anti-static bags for transporting sensitive components.

Lifting Equipment

NOTE: Do not lift greater than 50 pounds. Always obtain assistance from another person or persons, or use a mechanical lifting device.

Adhere to the following guidelines when lifting equipment:

1. Get a firm balanced footing. Keep your feet apart for a stable base, and point your toes out.
2. Bend your knees. Do not bend at the waist.
3. Tighten stomach muscles. Abdominal muscles support your spine when you lift, offsetting the force of the load.
4. Lift with your legs, not your back.
5. Keep the load close. The closer it is to your spine, the less force it exerts on your back.
6. 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.
7. Follow the same techniques in reverse to set the load down.

After working inside your computer

About this task

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

CAUTION: To avoid damage to the computer, use only the battery designed for this particular Dell computer. Do not use batteries designed for other Dell computers.

Steps

1. Connect any external devices, such as a port replicator or media base, and replace any cards, such as an ExpressCard.
2. Connect any telephone or network cables to your computer.

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

3. Connect your computer and all attached devices to their electrical outlets.
4. Turn on your computer.

2

Technology and components

This chapter details the technology and components available in the system.

Topics:

UEFI BIOS

UEFI is an acronym for Unified Extensible Firmware Interface. The UEFI specification defines a new model for the interface between personal computer operating systems and platform firmware. The interface consists of data tables that contain platform related information, plus boot and runtime service calls that are available to the operating system and its loader. Together, these provide a standard environment for booting an operating system and running pre-boot applications. One of the main differences between BIOS and UEFI is the way applications are coded. Assembler was used if functions or applications had to be coded for the BIOS while a higher level language code will be used to program the UEFI.

Dell UEFI BIOS implementation will supersede the existing two different sets of BIOS in the portables and desktop products into one single UEFI BIOS moving forward.

Important Information

There is no difference in between the conventional BIOS and the UEFI BIOS unless the UEFI option is checked in the 'Boot List Option' setting in the BIOS page. This will allow the user to create a UEFI boot option list manually without affecting the existing boot priority list. With the implementation of UEFI BIOS, the changes are more related to the manufacturing tools and functionalities with very minimal impact to the customer's usages.

A few things to remember are:

- If customers have a UEFI boot media, and ONLY if they have UEFI boot media (either in the optical media or via USB storage), the one-time boot menu will show an additional section listing the UEFI boot options. Customers can view this option If they have UEFI boot media attached, and the UEFI boot option is specified manually through the 'Boot Sequence' settings.

How to change Service Tag/Owner Tag?

When the service technician replaces a system board, it's required to set the service tag when the system restarts. Failure to set a service tag may result in system battery not being able to charge. Therefore, it is very important that the service technician set the correct system service tag. If a wrong service tag is set, then the technician will have to place the order for another system board replacement.

How to change Asset tag information?

To change the Asset tag information, we can use one of the following software utilities:

- Portables Technology Dell Command Configure toolkit-

Customers may also report that after a motherboard replacement, the asset field is already populated in the system BIOS, and needs to be cleared or set. For older systems and all newer systems with the UEFI BIOS platform, customers can download the Dell Command Configure Toolkit (DCC) to customize the BIOS options or even change the ownership or asset tag from within Windows.

DDR4

DDR4 (Double Data Rate fourth generation) memory is a higher-speed successor to the DDR2 and DDR3 technologies and allows up to 512 GB in capacity, compared to the DDR3's maximum of 128 GB per DIMM. DDR4 synchronous dynamic random-access memory is keyed differently from both SDRAM and DDR to prevent the user from installing the wrong type of memory into the system.

DDR4 needs 20 percent less or just 1.2 volts, compared to DDR3 which requires 1.5 volts of electrical power to operate. DDR4 also supports a new, deep power-down mode that allows the host device to go into standby without needing to refresh its memory. Deep power-down mode is expected to reduce standby power consumption by 40 to 50 percent.

DDR4 Details

There are subtle differences between DDR3 and DDR4 memory modules, as listed below:

Key notch difference

The key notch on a DDR4 module is in a different location from the key notch on a DDR3 module. Both notches are on the insertion edge but the notch location on the DDR4 is slightly different, to prevent the module from being installed into an incompatible board or platform.

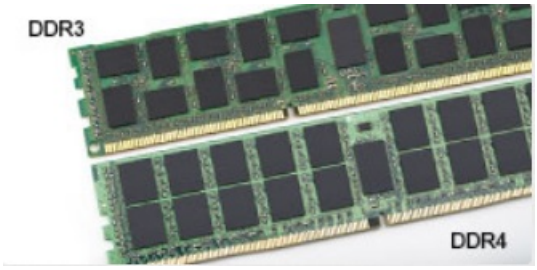


Figure 8. Notch difference

Increased thickness

DDR4 modules are slightly thicker than DDR3, to accommodate more signal layers.

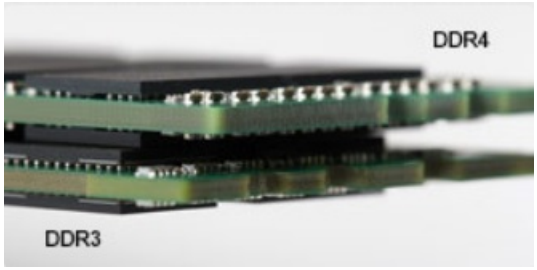


Figure 9. Thickness difference

Curved edge

DDR4 modules feature a curved edge to help with insertion and alleviate stress on the PCB during memory installation.

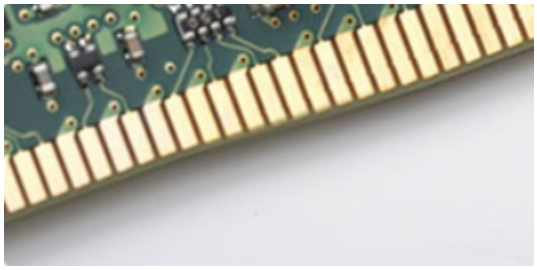


Figure 10. Curved edge

Memory Errors

Memory errors on the system display the new 2 - Amber, 3 - White failure code. If all memory fails, the LCD does not turn on. Troubleshoot for possible memory failure by trying known good memory modules in the memory connectors on the bottom of the system or under the keyboard, as in some portable systems.

Graphics options

This topic lists the graphics specification.

Table 3. Integrated Graphics specification

Parameters	Values
Integrated Graphics Controller	Intel UHD Graphics 610, Intel UHD Graphics 620
Model	Latitude 3310 2 in 1
Bus Type	Internal Interface
Memory Interface	Unified Memory Architecture
Graphics Level	• Intel Core i3/i5- Intel UHD Graphics 620 • Intel Pentium DC- Intel UHD Graphics 610
Estimated Maximum Power Consumption (TDP)	15 W (in the CPU power)
Display Support	On System- eDP (internal), HDMI, DP over USB Type-C
Maximum Vertical Refresh Rate	Up to 85 Hz depending on resolution
Operating Systems Graphics/ Video API Support	DirectX 12, OpenGL 4.5
Supported Resolutions and Max Refresh Rates (Hz), Analog and/or digital	System ports: • Max Digital- (HDMI) 4096x2304@24 Hz; (DP over TYPE-C) 4096x2304@60 Hz
Numbers of Displays Supported	• System Ports- Three displays max with LCD plus one display max on each output (HDMI, DisplayPort over USB Type-C). **NOTE:** A USB Type C Dell dock is optional.

Storage options

This topic lists out the detailed specifications of the supported SSD options.

Table 4. 128 GB SSD

Parameter	Values
Capacity (bytes)	128 GB

Table 4. 128 GB SSD (continued)

Parameter	Values
Dimensions mm (W x D x H)	22 x 80 x 2.38
Interface type	PCIe
MTBF	800 k hours
Logical blocks	250,069,680
Power Source	
Power consumption (reference only).	Idle 0.5 W, Active 2.5 W

Table 5. 256 GB SSD

Parameter	Values
Capacity (bytes)	256 GB
Dimensions mm (W x D x H)	22 x 80 x 2.38
Interface type	PCIe
MTBF	800 k hours
Logical blocks	500,118,192
Power Source	
Power consumption (reference only).	Idle 0.5 W, Active 2.5 W

Table 6. 512 GB SSD

Parameter	Values
Capacity (bytes)	512 GB
Dimensions mm (W x D x H)	22 x 80 x 2.38
Interface type	PCIe
MTBF	800 k hours
Logical blocks	1,000,215,216
Power Source	
Power consumption (reference only).	Idle 0.5 W, Active 2.5 W

HDMI 1.4a

This topic explains the HDMI 1.4a and its features along with the advantages.

HDMI (High-Definition Multimedia Interface) is an industry-supported, uncompressed, all-digital audio/video interface. HDMI provides an interface between any compatible digital audio/video source, such as a DVD player, or A/V receiver and a compatible digital audio and/or video monitor, such as a digital TV (DTV). The primary advantage is cable reduction and content protection provisions. HDMI supports standard, enhanced, or high-definition video, plus multichannel digital audio on a single cable.

HDMI 1.4a Features

- **HDMI Ethernet Channel** - Adds high-speed networking to an HDMI link, allowing users to take full advantage of their IP-enabled devices without a separate Ethernet cable.
- **Audio Return Channel** - Allows an HDMI-connected TV with a built-in tuner to send audio data "upstream" to a surround audio system, eliminating the need for a separate audio cable.

- **3D** - Defines input/output protocols for major 3D video formats, paving the way for true 3D gaming and 3D home theater applications.
- **Content Type** - Real-time signaling of content types between display and source devices, enabling a TV to optimize picture settings based on content type.
- **Additional Color Spaces** - Adds support for additional color models used in digital photography and computer graphics.
- **4K Support** - Enables video resolutions far beyond 1080p, supporting next-generation displays that will rival the Digital Cinema systems used in many commercial movie theaters.
- **HDMI Micro Connector** - A new, smaller connector for phones and other portable devices, supporting video resolutions up to 1080p.
- **Automotive Connection System** - New cables and connectors for automotive video systems, designed to meet the unique demands of the motoring environment while delivering true HD quality.

Advantages of HDMI

- Quality HDMI transfers uncompressed digital audio and video for the highest, crispest image quality.
- Low-cost HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner.
- Audio HDMI supports multiple audio formats from standard stereo to multichannel surround sound.
- HDMI combines video and multichannel audio into a single cable, eliminating the cost, complexity, and confusion of multiple cables currently used in A/V systems.
- HDMI supports communication between the video source (such as a DVD player) and the DTV, enabling new functionality.

Battery specifications

This topic lists out the detailed battery specifications.

Table 7. Battery specifications

Parameter	Values
Battery Type	Polymer 3C 42 Wh smart battery
Dimension:	
Width	191.85 mm (7.55 in.)
Height	103.25 mm (4.06 in.)
Weight	0.20 kg (0.44 lb)
Depth	5.90 mm (0.23 in.)
Voltage	11.40 VDC
Typical Amp-hour capacity	3.684 Ah
Typical Watt-hour capacity	42 Wh
Operating time	0°C–35°C Charge: 0°C–50°C Discharge: 0°C–70°C
Temperature range: Operating	Charge: 0°C–50°C, 32°F–122°F, Discharge: 0°C–70°C, 32°F–158°F
Temperature range: Non-Operating	-20°C–65°C (-4°F–149°F)
Charging time	0 deg~15 deg C: 4 hours, 16 deg~45 deg C: 2 hours, 46 deg~60 deg C: 3 hours
ExpressCharge Capable	Not supported
BATTMAN Capable	Yes

USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drivers, and printers.

Table 8. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 2.0	480 Mbps	High Speed	2000
USB 3.0/USB 3.1 Gen 1	5 Gbps	SuperSpeed	2010

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

- Higher transfer rates (up to 5 Gbps)
- Increased maximum bus power and increased device current draw to better accommodate power-hungry devices
- New power management features
- Full-duplex data transfers and support for new transfer types
- Backward USB 2.0 compatibility
- New connectors and cable

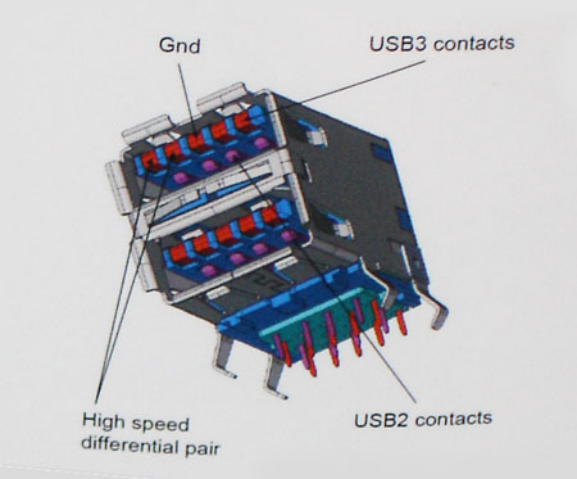
The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8 Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480 Mbps and 12 Mbps respectively and are kept to maintain backward compatibility.

USB 3.0/USB 3.1 Gen 1 achieves the much higher performance by the technical changes below:

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320 Mbps (40 MB/s) — the actual real-world maximum. Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

Listed below are some of the available SuperSpeed USB 3.0/USB 3.1 Gen 1 products:

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives
- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

The good news is that USB 3.0/USB 3.1 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.0/USB 3.1 Gen 1 specifies new physical connections and thus new cables to take advantage of the higher speed capability of the new protocol, the connector itself remains the same rectangular shape with the four USB 2.0 contacts in the exact same location as before. Five new connections to carry receive and transmitted data independently are present on USB 3.0/USB 3.1 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

USB Type-C

USB Type-C is a new, tiny physical connector. The connector itself can support various exciting new USB standards like USB 3.1 and USB power delivery (USB PD).

Alternate Mode

USB Type-C is a new connector standard that is very small. It is about a third the size of an old USB Type-A plug. This is a single connector standard that every device should be able to use. USB Type-C ports can support a variety of different protocols using “alternate modes,” which allows you to have adapters that can output HDMI, VGA, DisplayPort, or other types of connections from that single USB port

USB Power Delivery

The USB PD specification is also closely intertwined with USB Type-C. Currently, smartphones, tablets, and other mobile devices often use a USB connection to charge. A USB 2.0 connection provides up to 2.5 watts of power — that'll charge your phone, but that's about it. A laptop might require up to 60 watts, for example. The USB Power Delivery specification ups this power delivery to 100 watts. It's bi-directional, so a device can either send or receive power. And this power can be transferred at the same time the device is transmitting data across the connection.

This could spell the end of all those proprietary laptop charging cables, with everything charging via a standard USB connection. You could charge your laptop from one of those portable battery packs you charge your smartphones and other portable devices from today. You could plug your laptop into an external display connected to a power cable, and that external display would charge your laptop as you used it as an external display — all via the one little USB Type-C connection. To use this, the device and the cable have to support USB Power Delivery. Just having a USB Type-C connection doesn't necessarily mean they do.

USB Type-C and USB 3.1

USB 3.1 is a new USB standard. USB 3's theoretical bandwidth is 5 Gbps, while USB 3.1's is 10 Gbps. That's double the bandwidth, as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1. USB Type-C is just a connector shape, and the underlying technology could just be USB 2 or USB 3.0. In fact, Nokia's N1 Android tablet uses a USB Type-C connector, but underneath it's all USB 2.0 — not even USB 3.0. However, these technologies are closely related.

Media Card Readers

NOTE: The media card reader is integrated into the system board on portable systems. If there is a hardware failure or the reader malfunctions, replace the system board.

The media card reader expands the usefulness and functionality of portable systems, especially when used with other devices such as digital cameras, portable MP3 players, and handheld devices. All these devices use a form of media card to store information. Media card readers allows for easy transfer of data between these devices.

Several different types of media or memory cards are available today. Below is a list of the different types of cards that work in the media card reader.

SD Card Reader

1. Memory Stick
2. Secure Digital (SD)

3. Secure Digital High Capacity (SDHC)
4. Secure Digital eXtended Capacity(SDXC)

Downloading Windows drivers

Steps

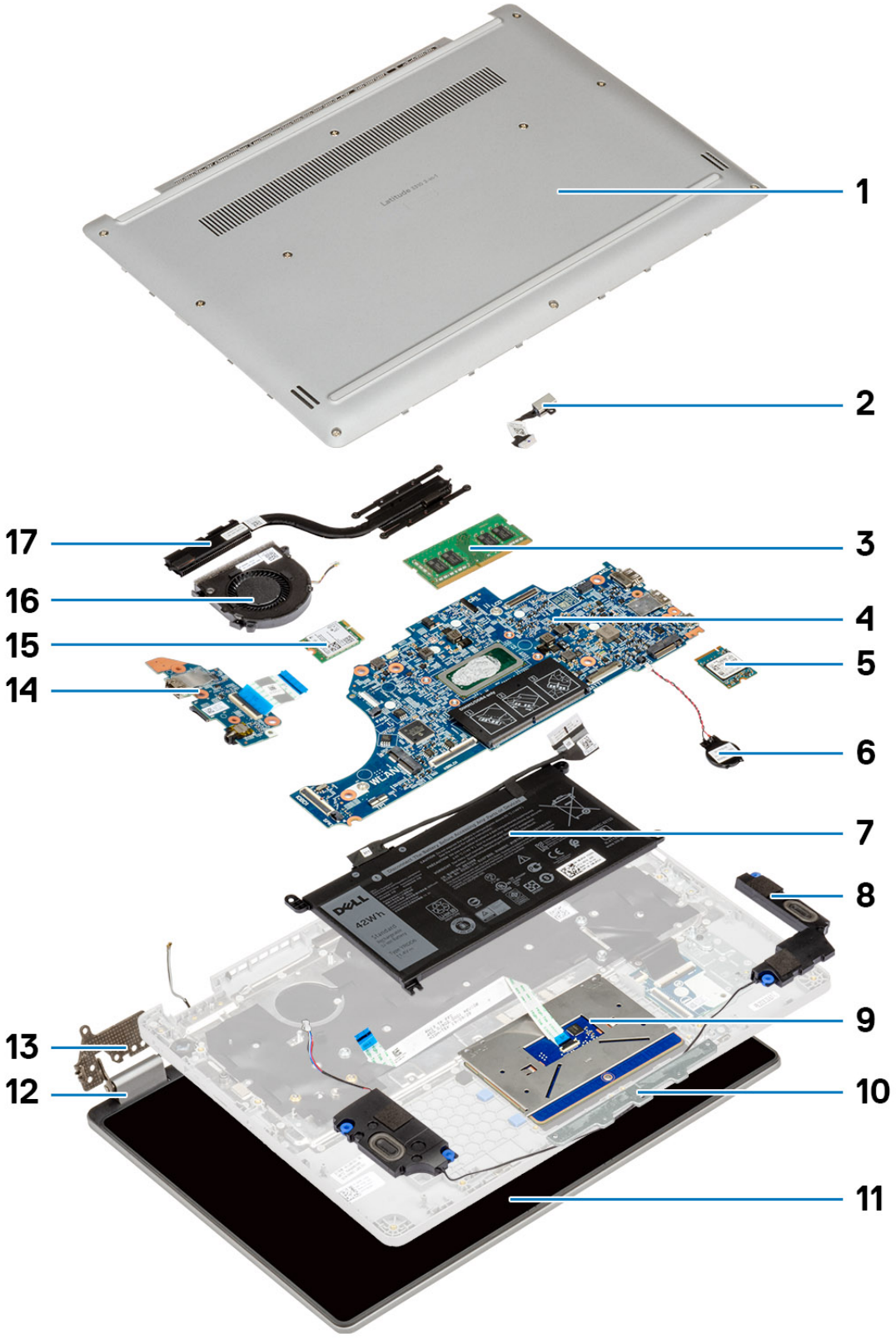
1. Turn on the laptop.
2. Go to Dell.support.com.
3. Click **Product Support**, enter the Service Tag, and then click **Submit**.

   NOTE: If you do not have the Service Tag, use the auto detect feature or manually browse for your laptop model.

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

3

Major components of your system



1. Back cover
2. Dc-in
3. Memory
4. System board
5. Solid state drive (SSD)
6. Coin cell
7. Battery
8. Speakers
9. Touchpad
10. Touchpad bracket
11. LCD
12. Hinge cover
13. Hinge
14. I/O board
15. WLAN
16. System fan
17. Heatsink

4

Disassembly and reassembly

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

Topics:

Base cover

Removing the base cover

Prerequisites

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

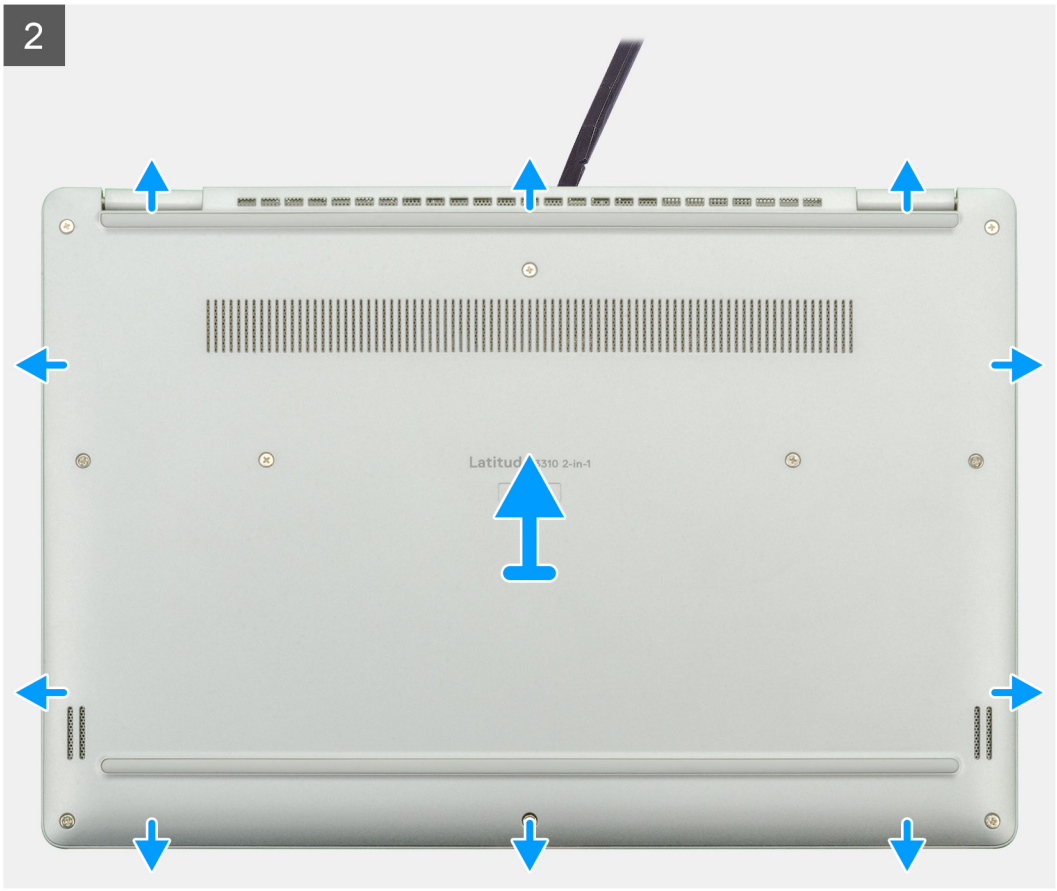
About this task

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

7x
M2.5x5

3x
M2x2

1



Steps

1. Remove the seven M2.5x5 and three M2x2 screws that secure the base cover to the laptop.
2. Pry the base cover starting from the recess at the hinge area and work your way around.
3. Lift the base cover away from the laptop.

Installing the base cover

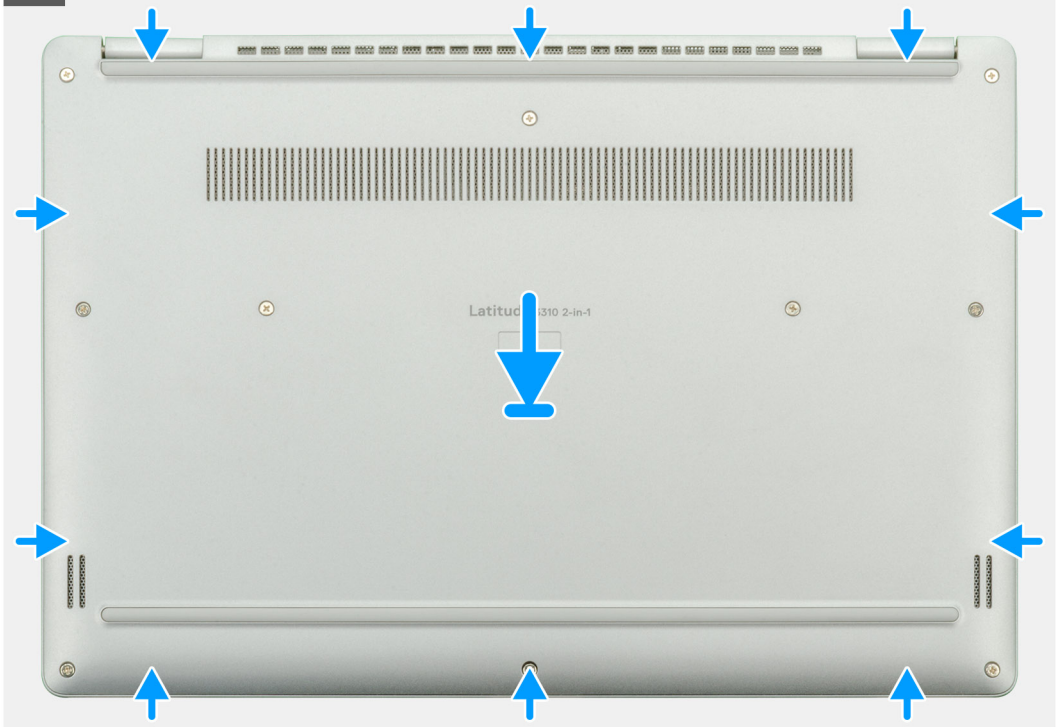
Prerequisites

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

About this task

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

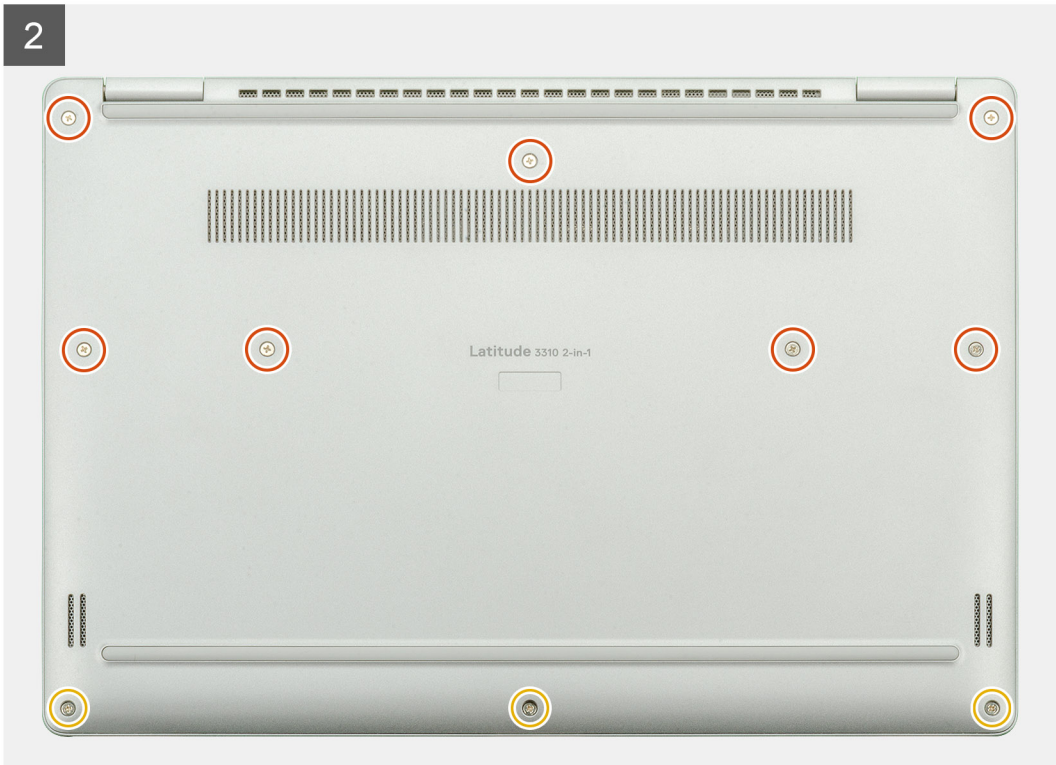
1



7x
M2.5x5

3x
M2x2

2



Steps

1. Place the base cover on the palmrest and keyboard assembly, and snap the base cover into place.
2. Replace the seven M2.5x5 and three M2x2 screws to secure the base cover to the laptop.

Next steps

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

Battery

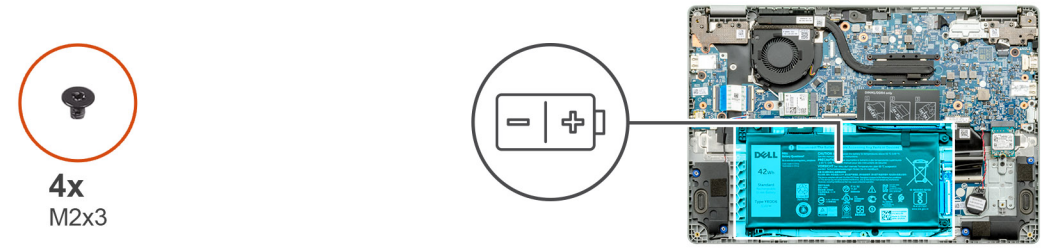
Removing the battery

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.

About this task

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



Steps

1. Peel off the adhesive tape and release the battery cable from the latch.
2. Remove the four (M2x3) screws that secure the battery.
3. Lift the battery off the laptop.

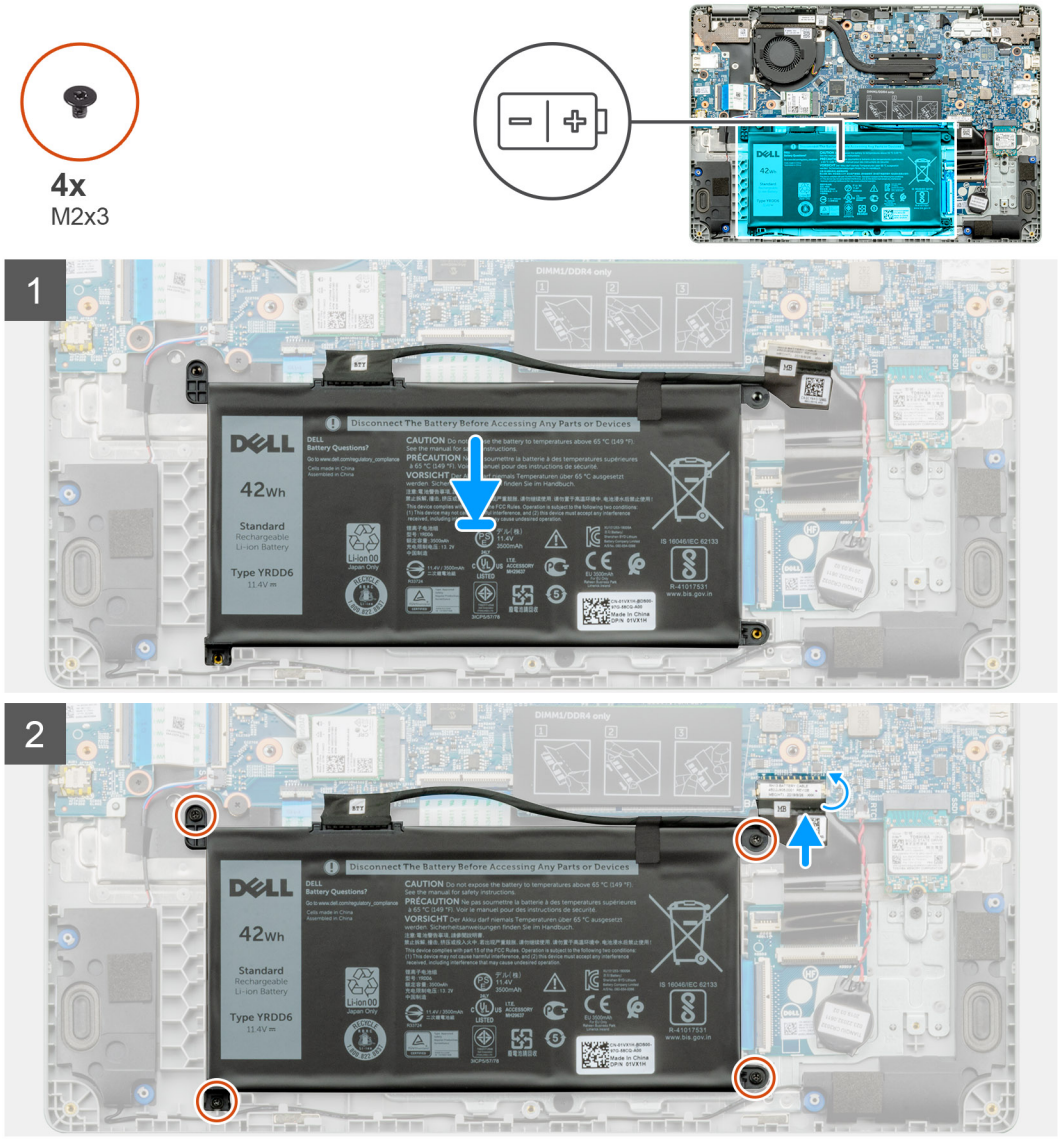
Installing the battery

Prerequisites

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

About this task

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



Steps

1. Place the battery on the palmrest and keyboard assembly and align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.
2. Replace the four (M2x3) captive screws that secure the battery to the laptop.
3. Connect the battery cable to the system board.

Next steps

1. Install the base cover.
2. Follow the procedure in After working inside your computer.

Memory modules

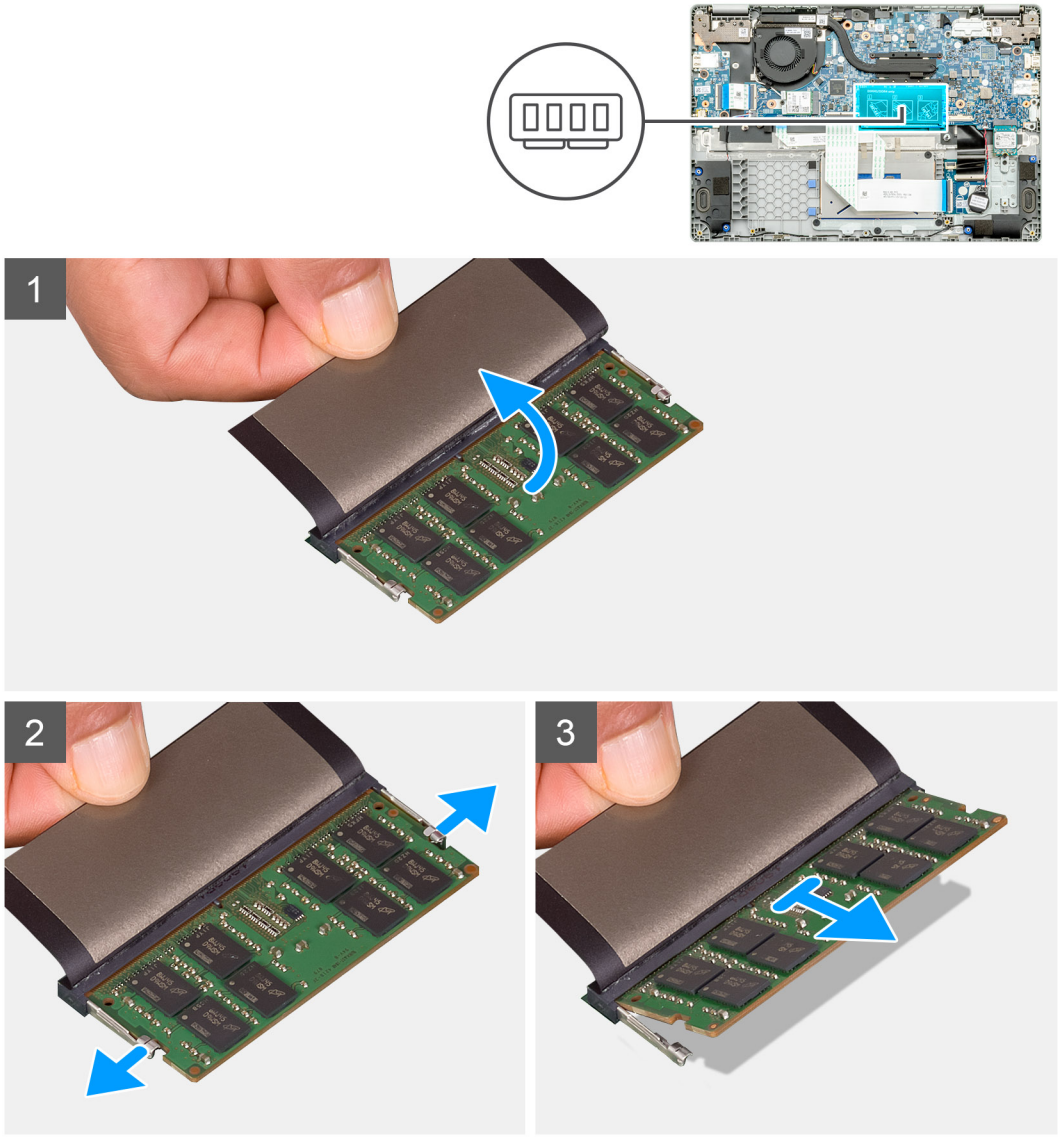
Removing the memory modules

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Disconnect the battery cable.

About this task

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



Steps

1. Peel the adhesive tape, above the memory module, to a 90-degree angle.
2. Using your finger tips gently pry the retention clips away from the memory module until the memory module pops up.
3. Slide and remove the memory module from the memory module slot on the system board.

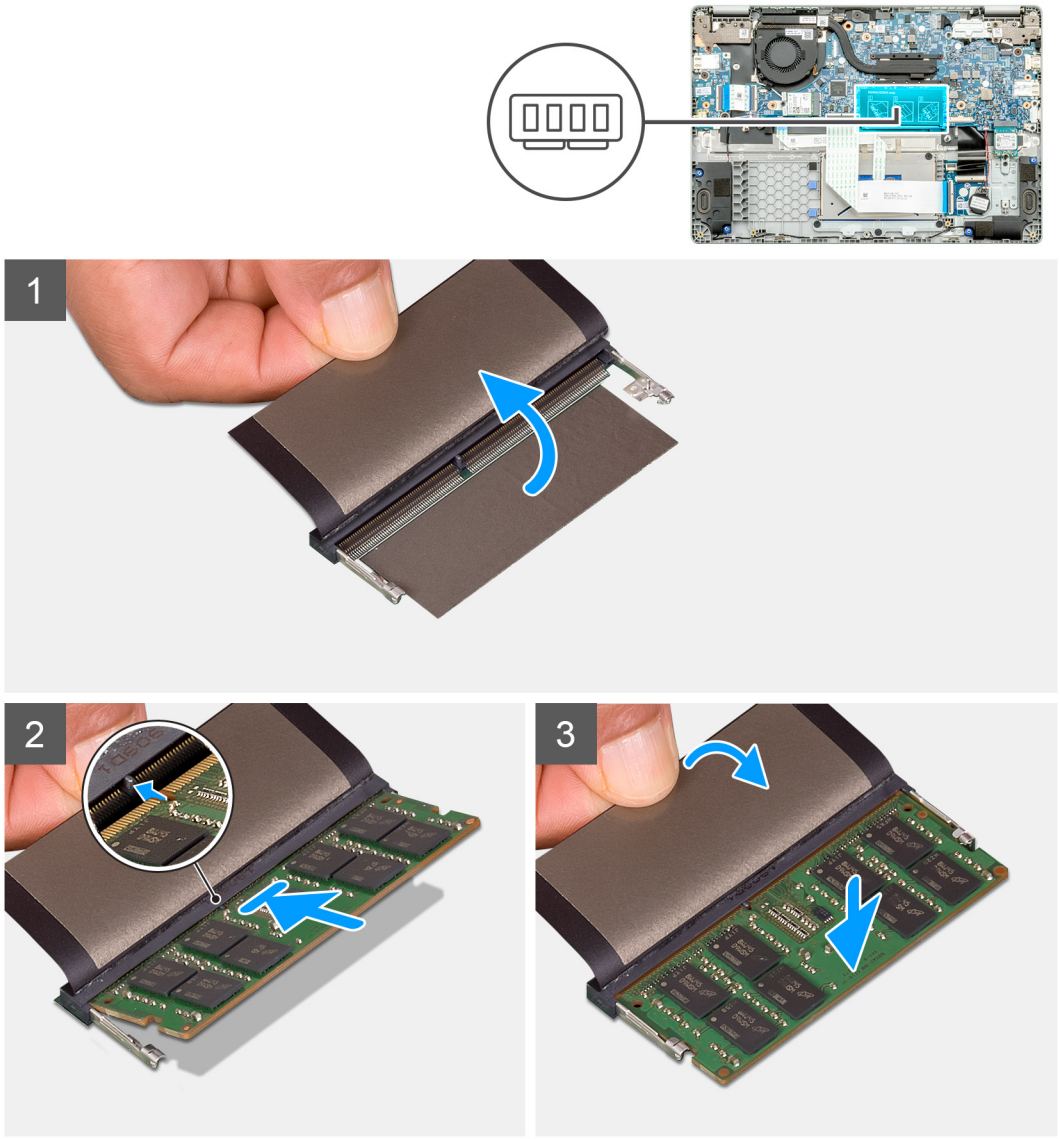
Installing the memory modules

Prerequisites

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

About this task

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



Steps

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

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

Next steps

1. Connect the battery cable.
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

Solid state drive

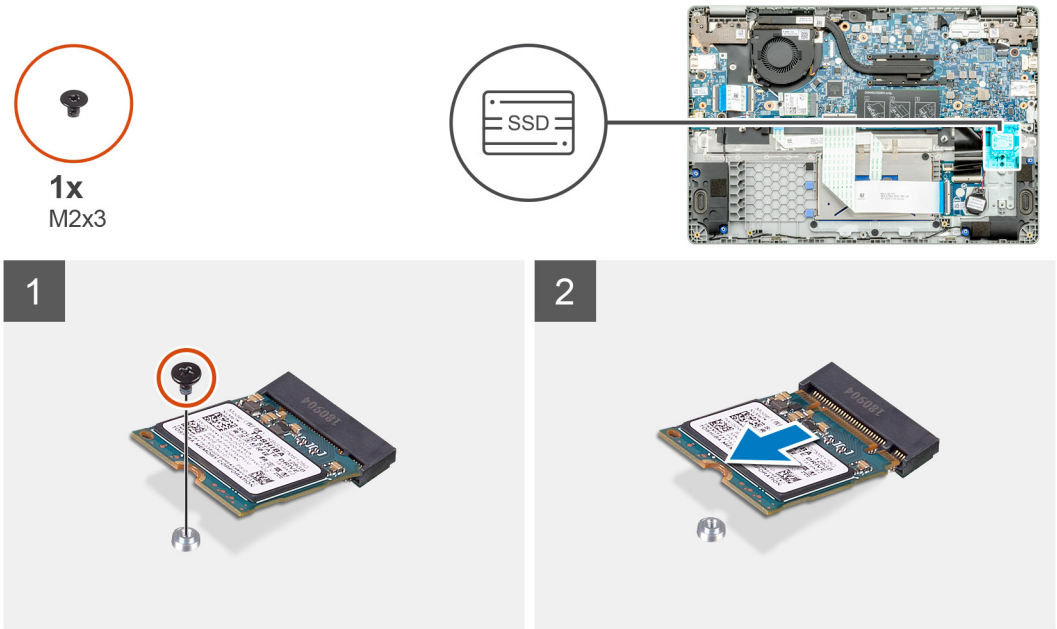
Removing the M.2 2230 solid-state drive

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Disconnect the battery cable.

About this task

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



Steps

1. Remove the single (M2x3) screw that secures the solid-state module to the palmrest assembly.
2. Slide the solid-state module out from the M.2 slot.

Replacing the SSD support bracket

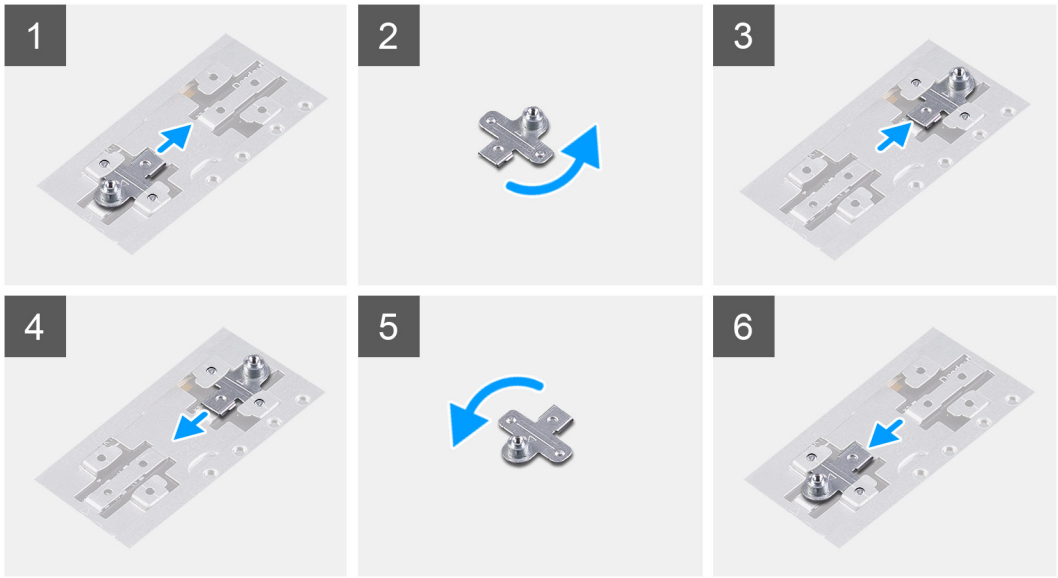
Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Disconnect the battery cable.

4. Remove the M.2 2230 SSD.

About this task

The figure indicates the location of the SSD support bracket and provides a visual representation of the replace procedure.



Steps

1. Slide and remove the SSD support bracket from the support bracket slot.
2. Depending on the type of solid-state drive (M.2 2230/ M.2 2242/ M.2 2280), align and insert the SSD support bracket into the support bracket slot.
3. Install the solid-state drive.

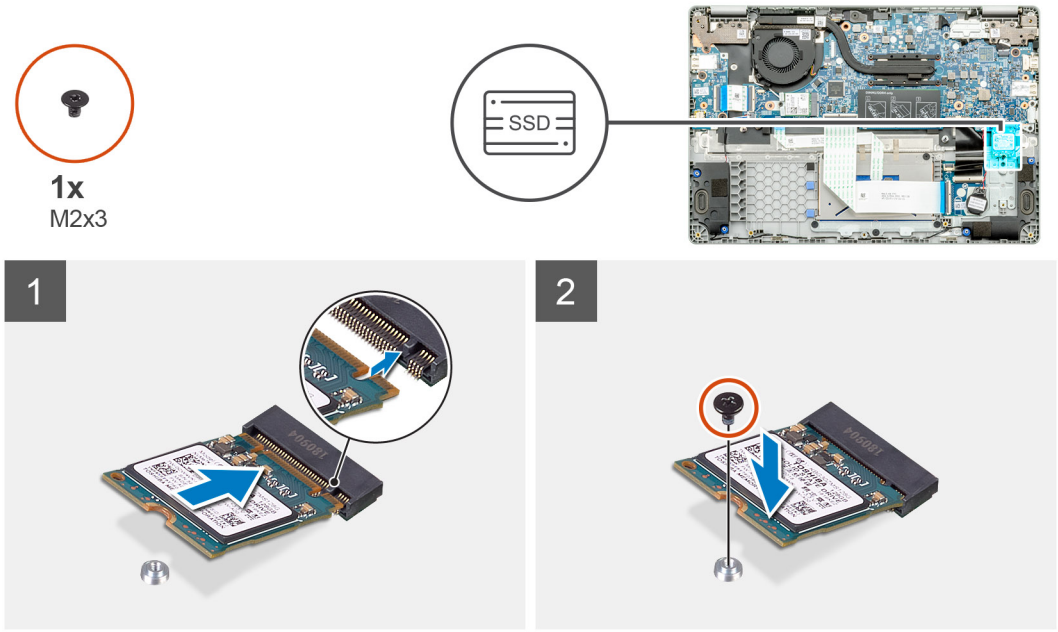
Installing M.2 2230 solid-state drive

Prerequisites

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

About this task

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



Steps

1. Align and slide the solid-state drive into the slot.
2. Replace the single (M2x3) screw to secure the solid-state drive module to the palmrest and keyboard assembly.

Next steps

1. Connect the battery cable.
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

Coin-cell battery

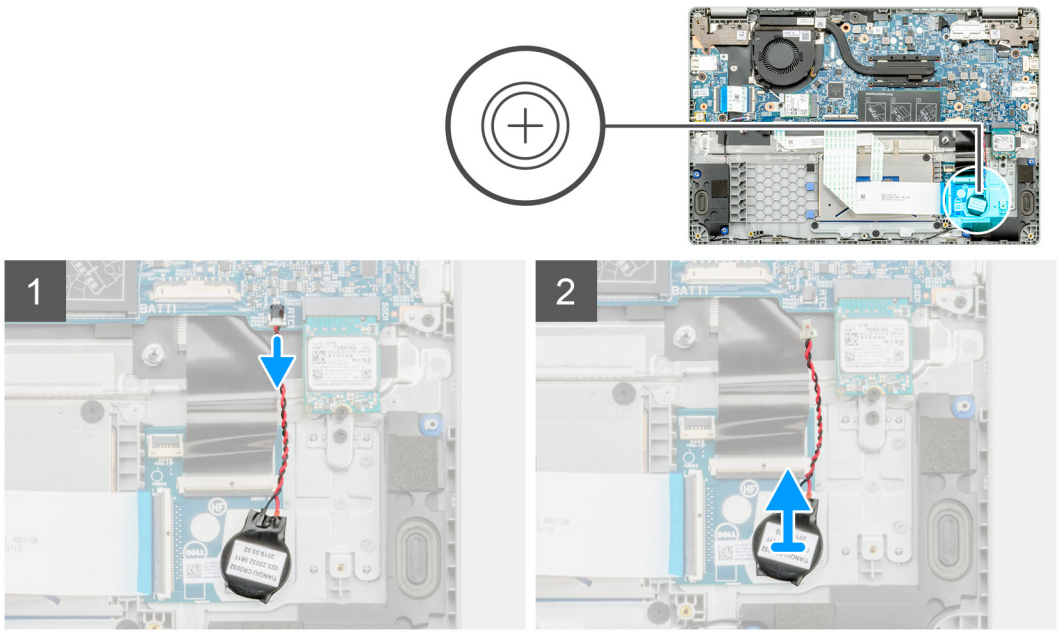
Removing the coin-cell battery

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Disconnect the battery cable.

About this task

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



Steps

1. Disconnect the coin-cell battery cable from the system board.
2. Remove the coin-cell battery cable from the routing guide.
3. Peel the coin-cell battery off the palmrest assembly as the coin-cell is affixed to the board with an adhesive.

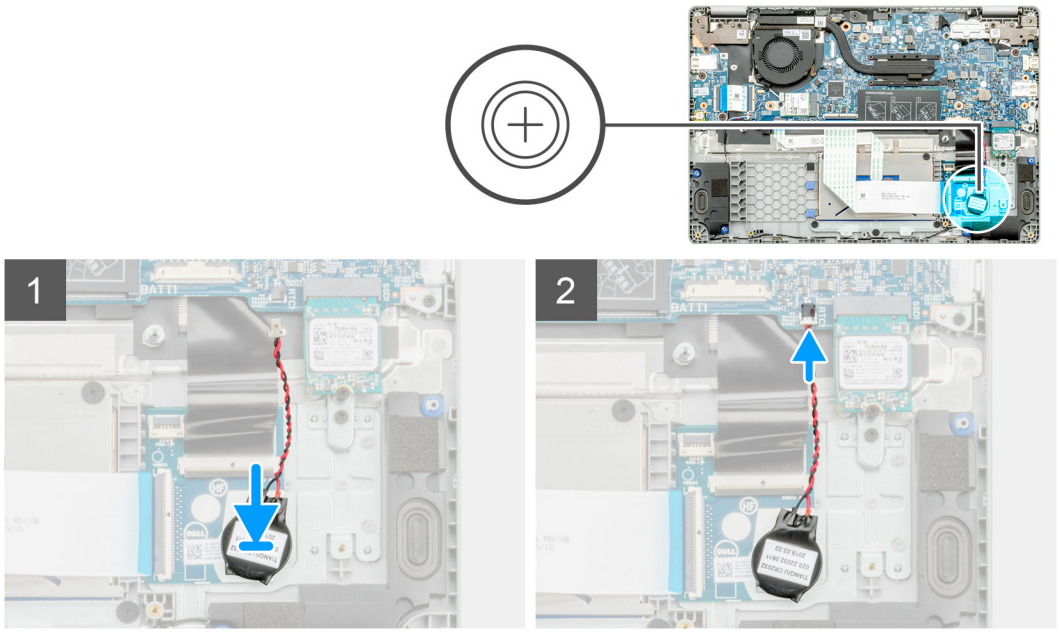
Installing the coin-cell battery

Prerequisites

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

About this task

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



Steps

1. Re-adhere the coin-cell battery to the slot on the palmrest assembly.
2. Route the coin-cell battery cable through the routing guide.
3. Connect the coin-cell battery cable to the system board.

Next steps

1. Connect the battery cable.
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

WLAN card

Removing the WLAN card

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Disconnect the battery cable.

About this task

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

Steps

1. Remove the single (M2x3) screw that secures the WLAN bracket to the computer.
2. Remove the WLAN bracket.
3. Disconnect the WLAN antenna cables from the WLAN module.
4. Slide and remove the WLAN card from the WLAN card slot.

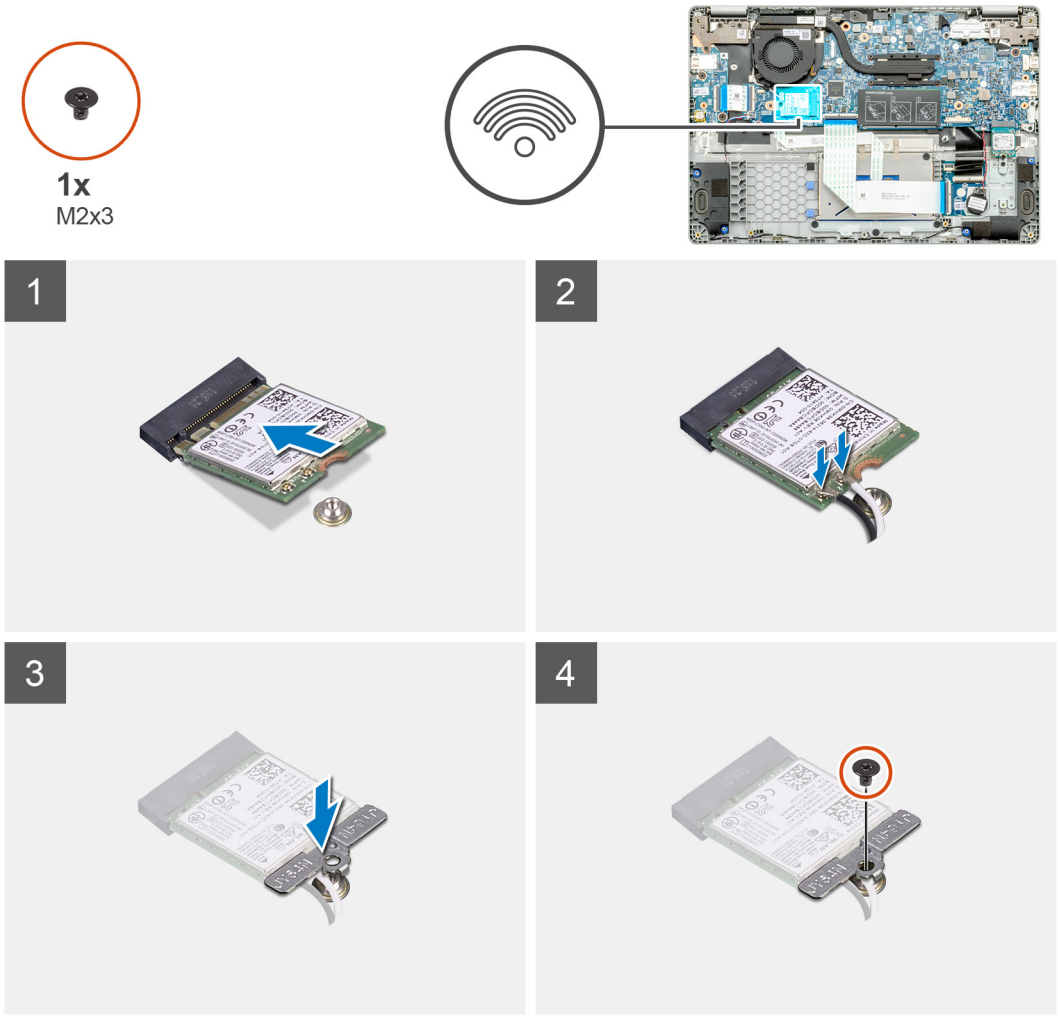
Installing the WLAN card

Prerequisites

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

About this task

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



Steps

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

Next steps

1. Connect the battery cable.
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

Speakers

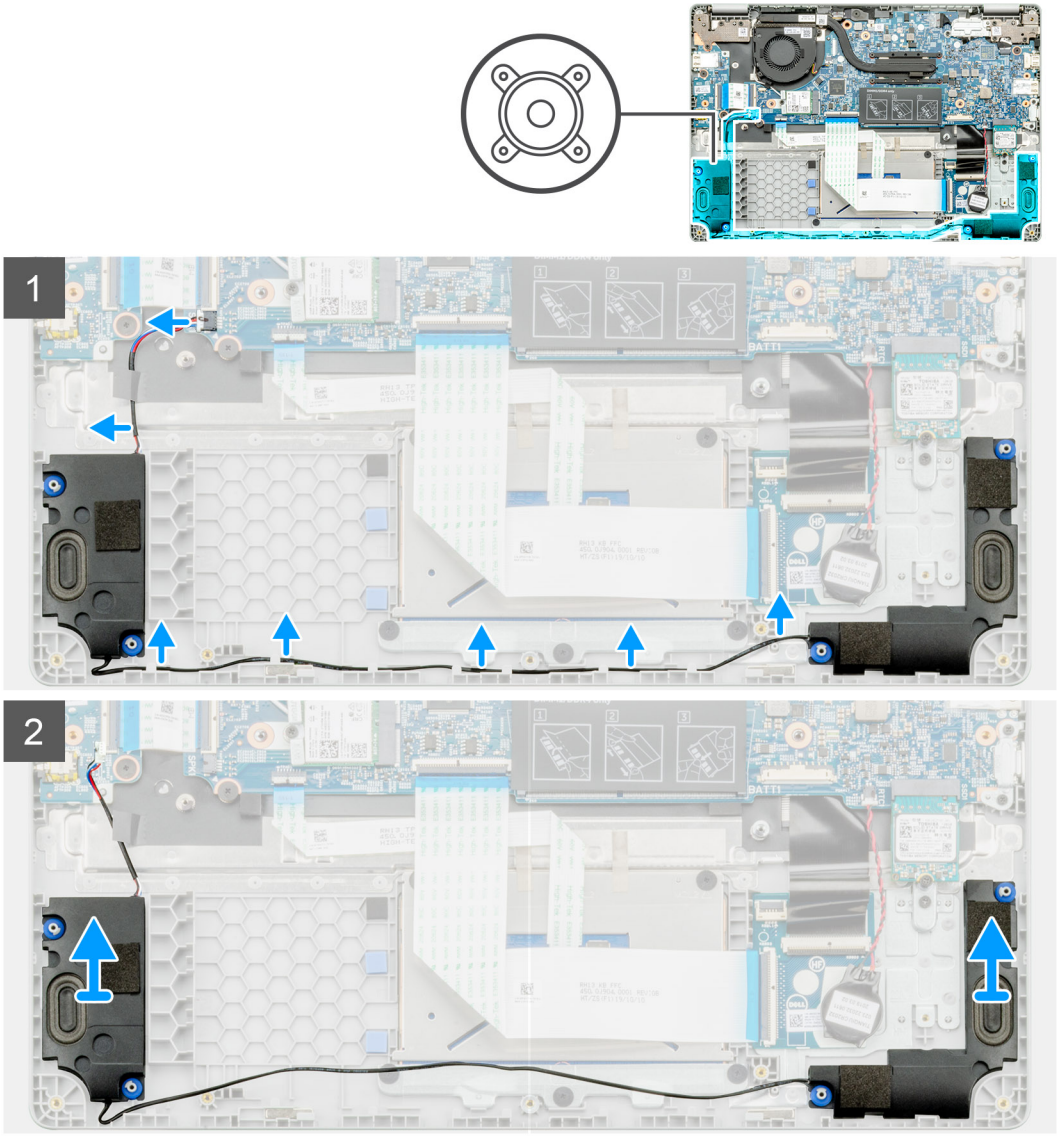
Removing the speakers

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Disconnect the battery cable.

About this task

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



Steps

1. Locate the speakers on your computer.
2. Disconnect the speaker cable from the connector on the system board.
3. Peel the adhesive tape that secures the speaker cable.
4. Unroute the speaker cables from the retention clips on the computer.
5. Lift the speakers out of the computer.

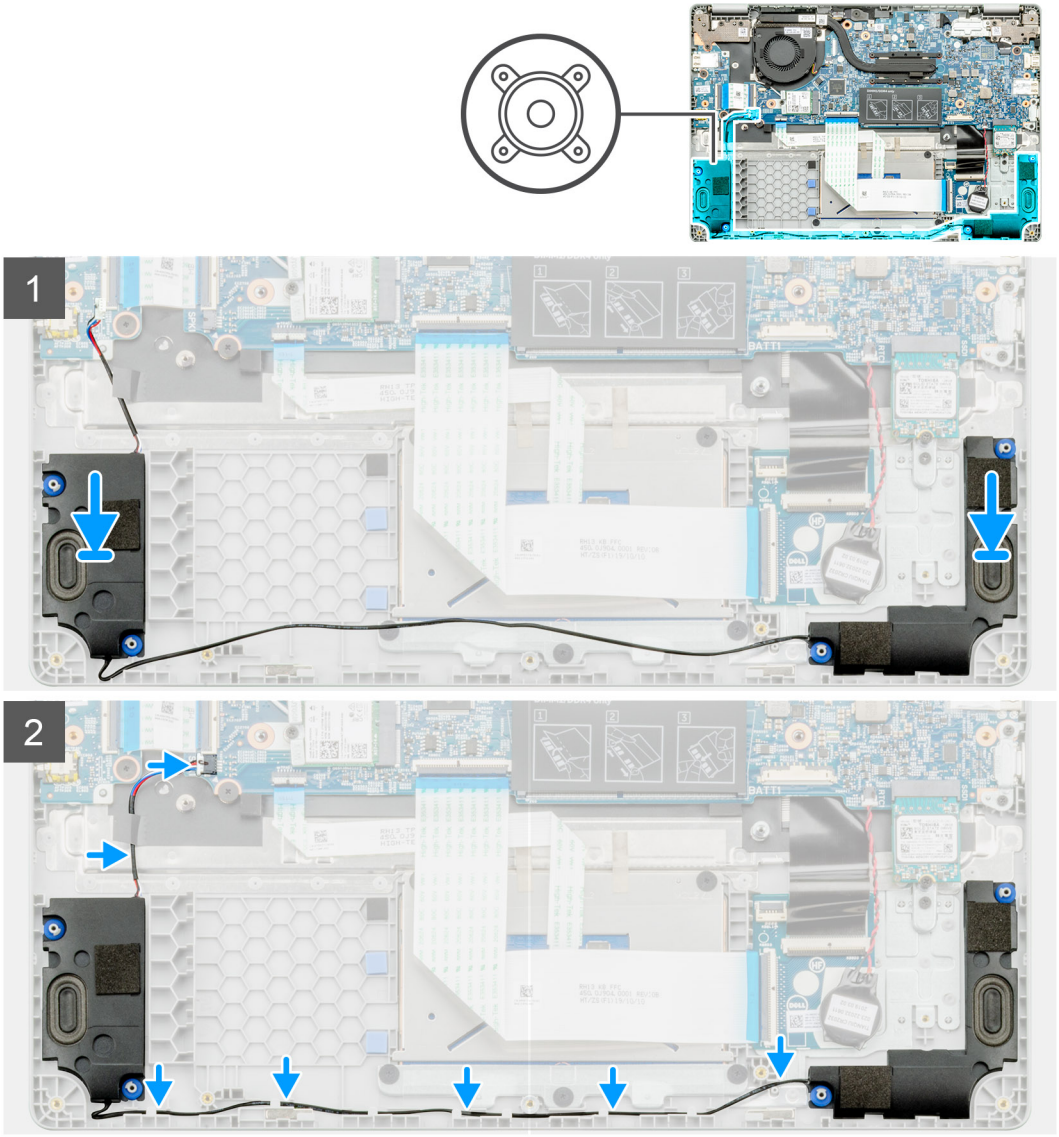
Installing the speakers

Prerequisites

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

About this task

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



Steps

1. Locate the speaker slot on your computer.
2. Align and place the speakers in the slot on your computer.

3. Connect the speaker cable to the connector on the system board.
4. Route the speaker cables through the retention clips on your computer.
5. Adhere the adhesive tape to secure the speaker cable.

Next steps

1. Connect the battery cable.
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

Heatsink assembly

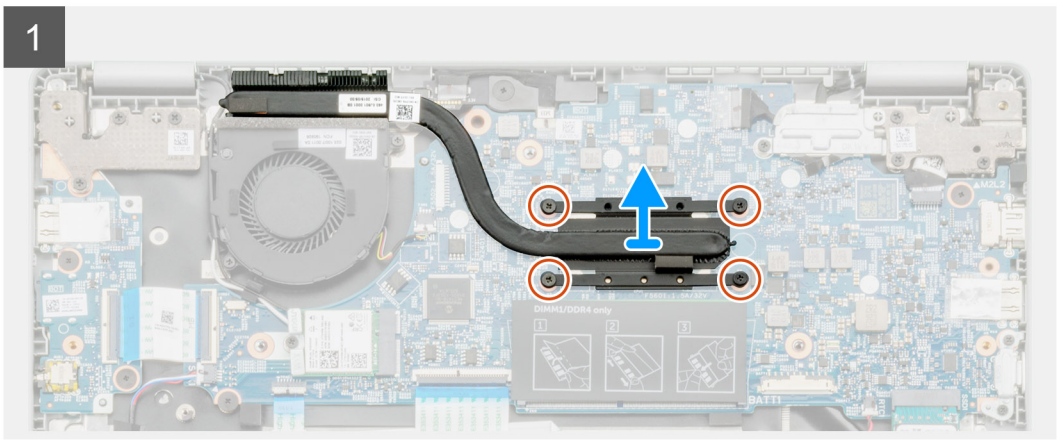
Removing the heatsink assembly

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Remove the battery.

About this task

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



Steps

1. Locate the heatsink assembly on your computer.
2. Remove the four (M2x3) captive screws that secure the heatsink assembly to the computer.
3. Lift the heatsink assembly out of the computer.

NOTE: There will be thermal grease beneath the heatsink.

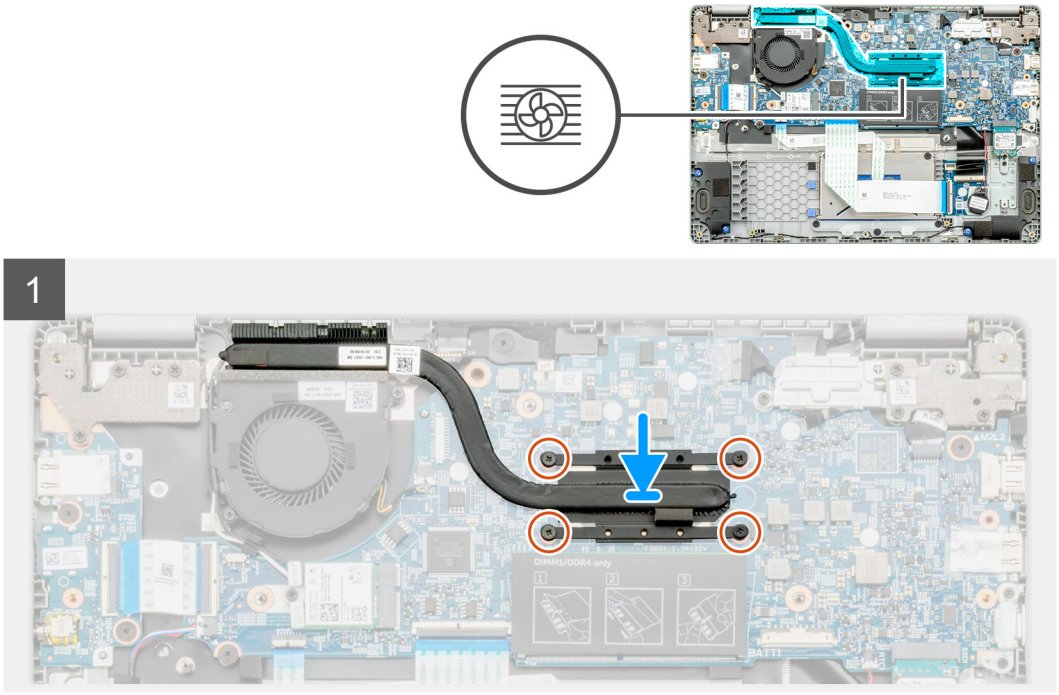
Installing the heatsink assembly

Prerequisites

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

About this task

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



Steps

1. Locate the heatsink slot on your computer.
2. Align and place the heatsink assembly into the slot of your computer.

   NOTE: Ensure to apply the thermal grease to the heatsink assembly.

3. Install the four (M2x3) screw that secures the heatsink assembly.

Next steps

1. Install the battery.
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

System Fan

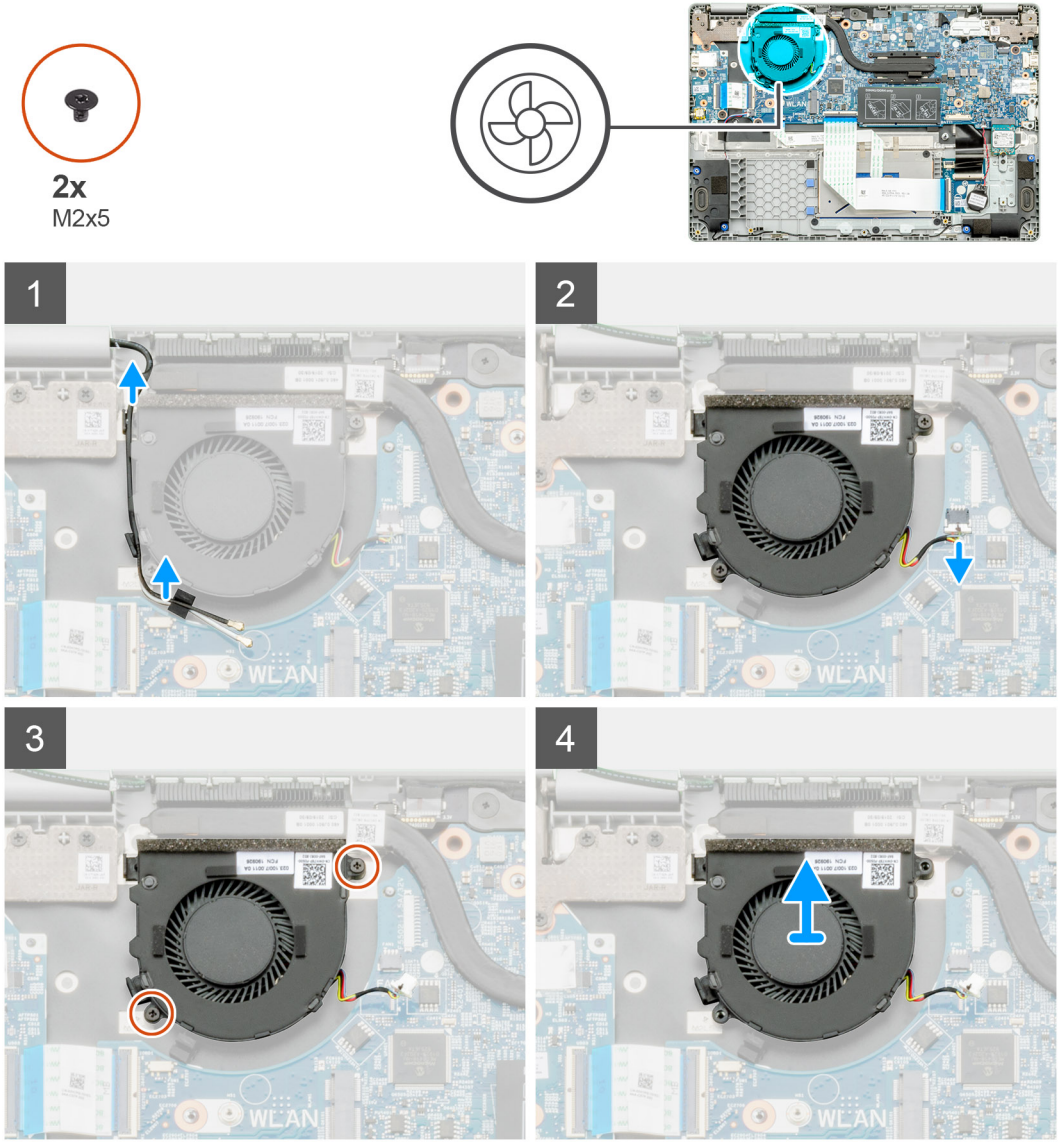
Removing the system fan

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Disconnect the battery cable.
4. Remove the WLAN card.

About this task

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



Steps

1. Locate the system fan on your computer.
2. Unroute the cable and release the wireless cable.
3. Disconnect the system fan cable from the connector on the system board.
4. Remove the two (M2x3) screws that secure the system fan to the palmrest assembly.
5. Lift the system fan off the palmrest assembly.

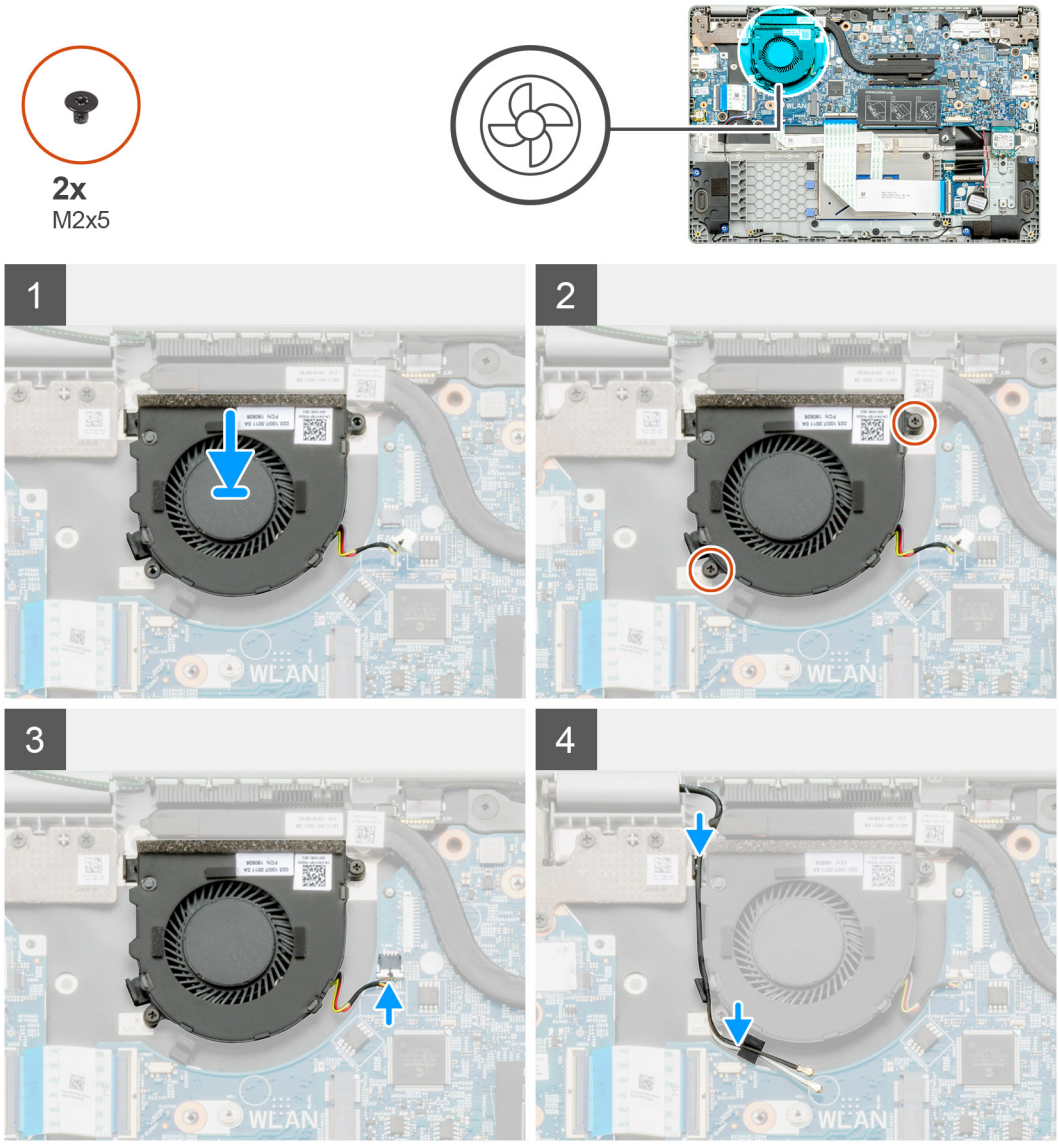
Installing the system fan

Prerequisites

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

About this task

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



Steps

1. Locate the system fan slot on your computer.
2. Align and place the system fan into the slot on the palmrest assembly.
3. Replace the two (M2x3) screws to secure the system fan to the palmrest assembly.
4. Connect the system fan cable to the connector on the system board.
5. Route the wireless cable and connect it to the connector on the system board.

Next steps

1. Install the WLAN card
2. Connect the battery cable.
3. Install the base cover.
4. Follow the procedure in After working inside your computer.

I/O board

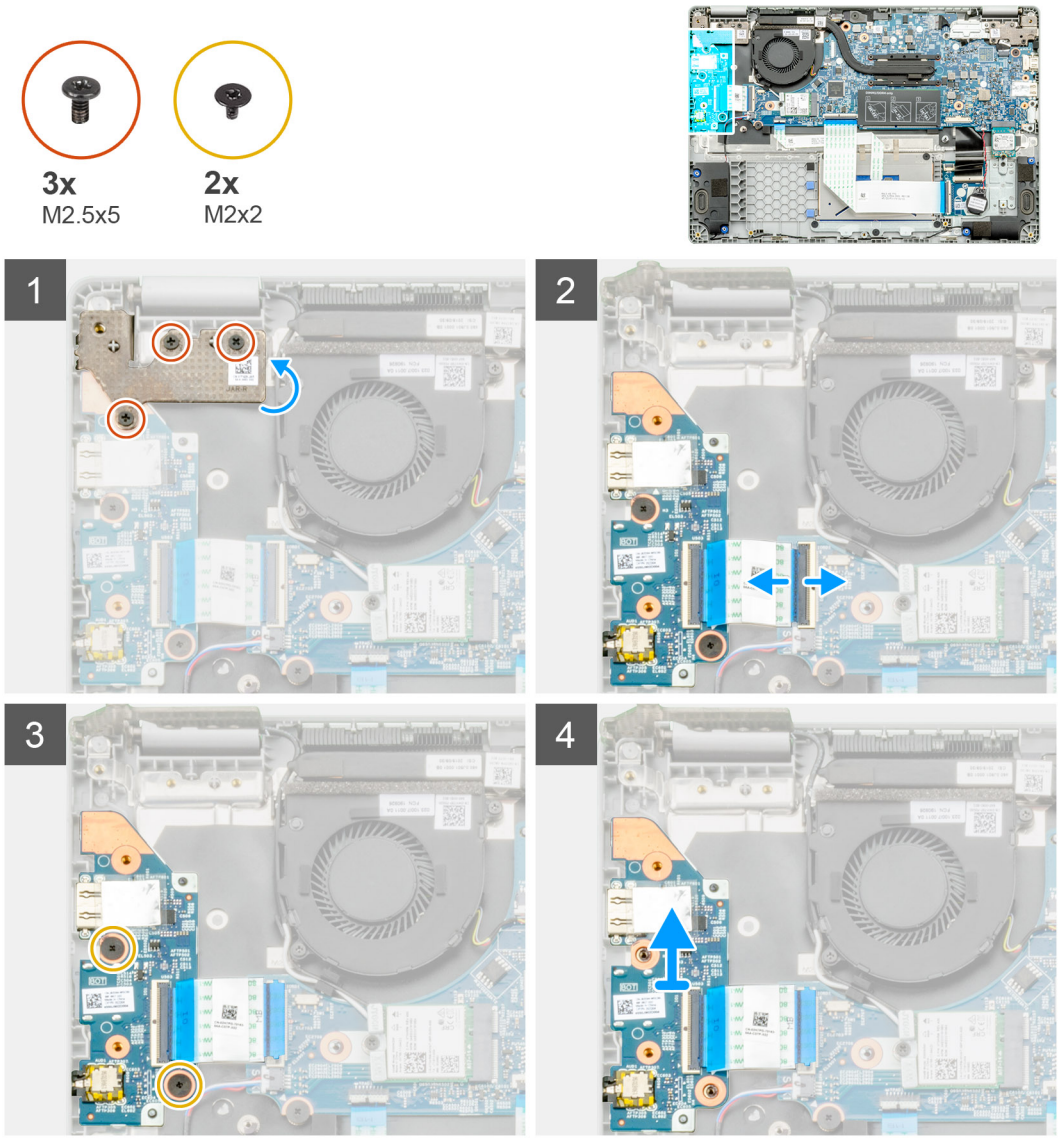
Removing the input and output board

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Remove the battery.

About this task

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



Steps

1. Locate the I/O board on your computer.
2. Remove the three (M2.5x5) screws that secure the hinge to the computer.
3. Lift up the plastic lever and disconnect the cable from the computer.
4. Remove the two (M2x2) screws that secure the I/O board to the computer.

5. Lift the I/O board out of the computer.

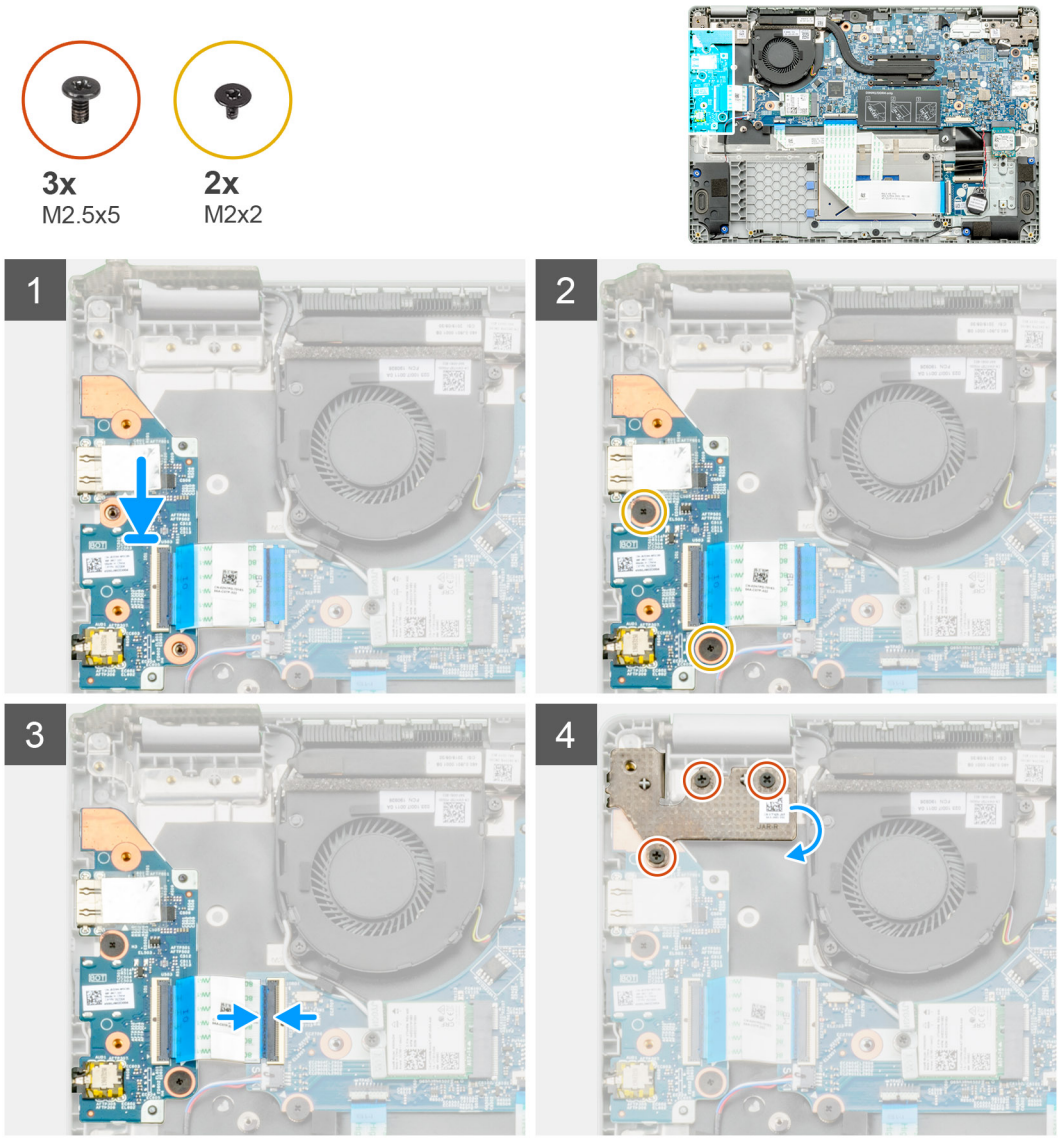
Installing the input and output board

Prerequisites

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

About this task

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



Steps

1. Locate the I/O board on your computer.
2. Align and place the I/O board into the computer.
3. Install the two (M2x2) screws that secure the I/O board to the computer.
4. Connect the cable to the computer.
5. Install the three (M2.5x5) screws that secure the hinge to the computer.

Next steps

1. Install the battery.
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

DC-in port

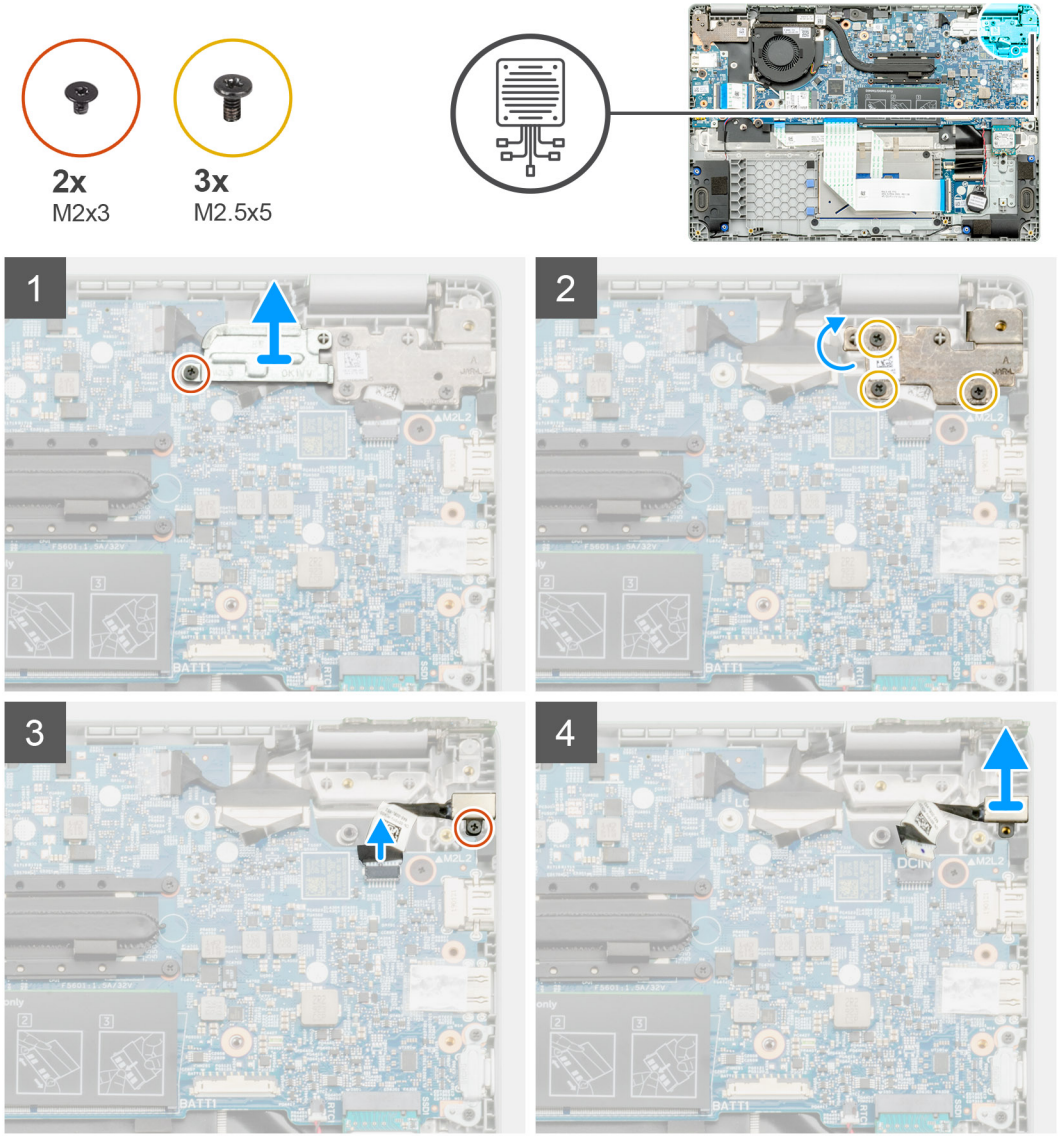
Removing the DC-in

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Remove the battery.

About this task

The figure indicates the location of the DC-in and provides a visual representation of the removal procedure.



Steps

1. Locate the DC-in port on your computer.
2. Remove the single (M2x3) screw and lift metal bracket covering the display connector.
3. Remove the three (M2.5x5) screws and lift the hinge.
4. Disconnect the DC-in cable from the computer and remove the single (M2x3) screw.
5. Remove the DC-in port from the computer.

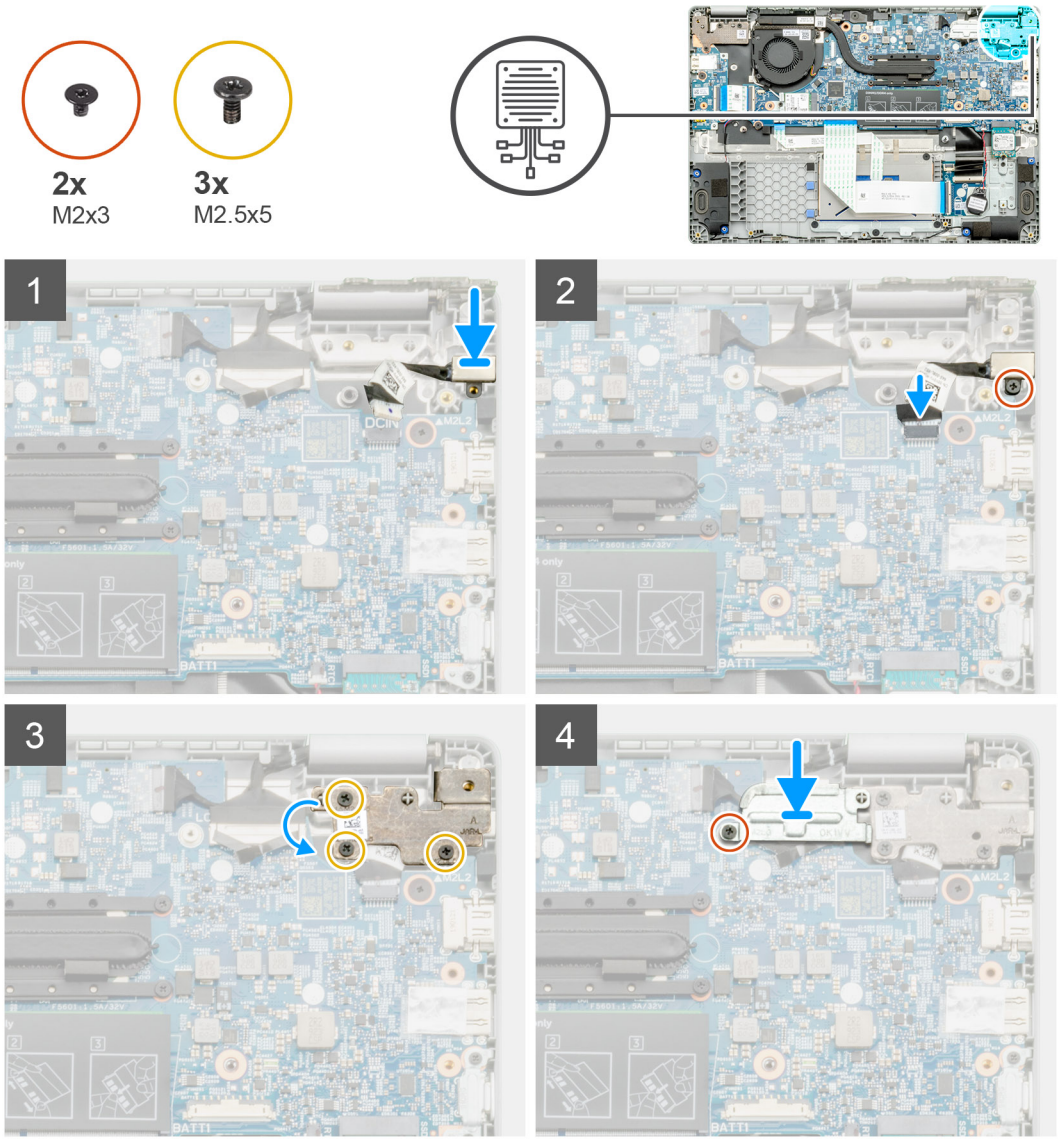
Installing the DC-in

Prerequisites

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

About this task

The figure indicates the location of the DC-in port and provides a visual representation of the installation procedure.



Steps

1. Locate the DC-in port on your computer.
2. Install the (M2x3) screw and connect the DC-in cable to the system board.

3. Install the three (M2.5x5) screws and fix the DC-in metal bracket.
4. Install the (M2x3) screw and fix the metal bracket covering the display connector.

Next steps

1. Install the battery.
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

World facing camera

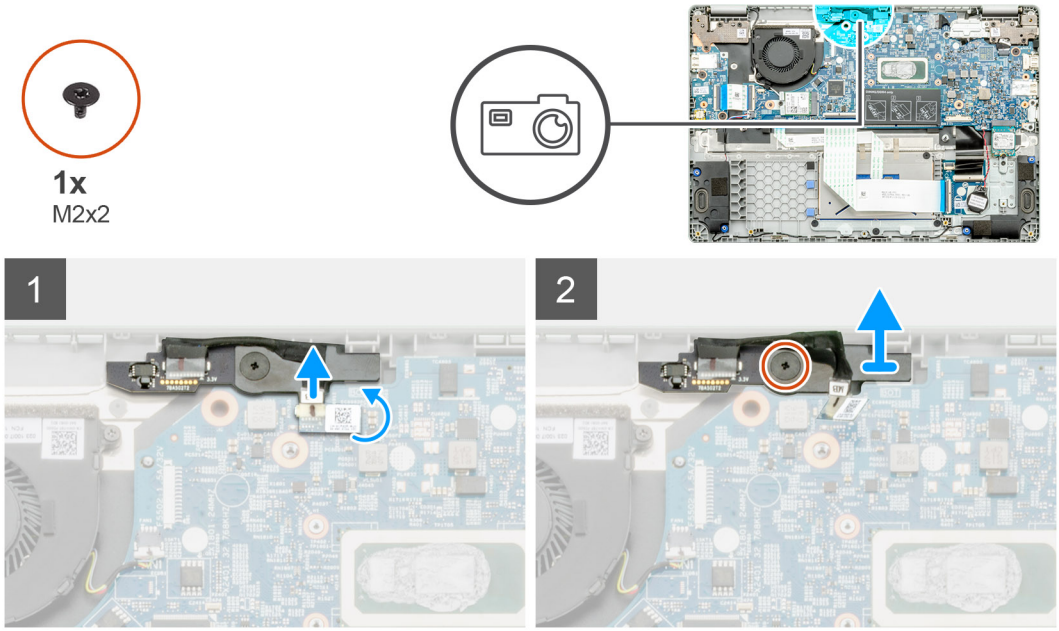
Removing the world-facing camera

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the Heatsink.

About this task

The figure indicates the location of the world facing camera on the plamrest and provides a visual representation of the removal procedure.



Steps

1. Locate the world-facing camera on your computer.
2. Peel back the world-facing camera cable.

   NOTE: The world facing camera cable is secured to the computer by an adhesive strip.

3. Remove the single (M2x3) screw that secures the world-facing camera to the computer.
4. Lift the world-facing camera out of the computer.

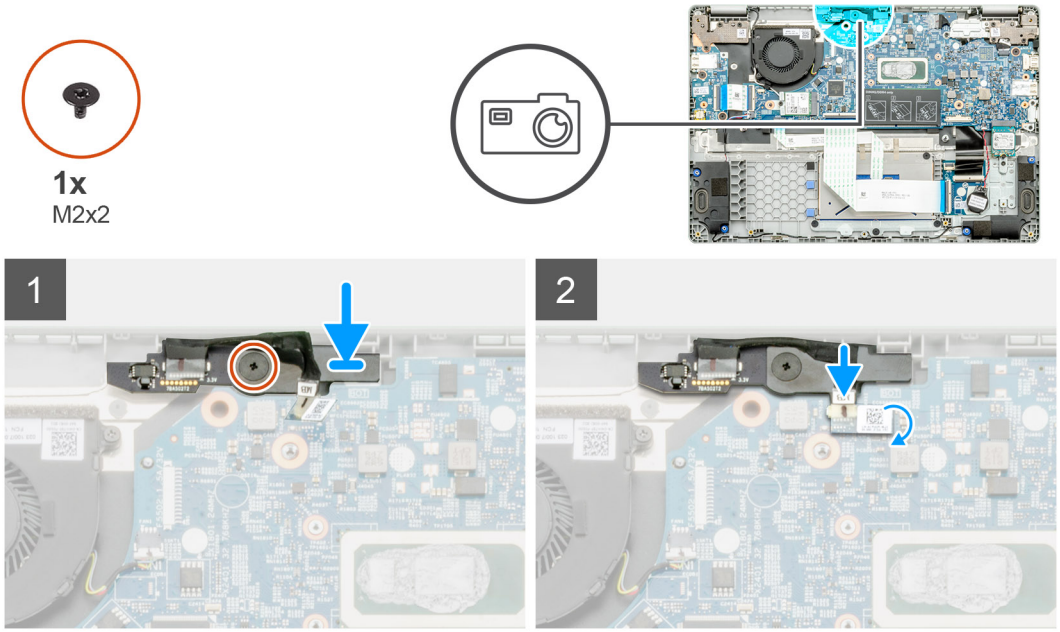
Installing the world-facing camera

Prerequisites

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

About this task

The figure indicates the location of the world-facing camera on the plamrest and provides a visual representation of the removal procedure.



Steps

1. Locate the world-facing camera slot on your computer.
2. Align and place the world-facing camera on the computer.
3. Install the single (M2x3) screw that secures the world-facing camera to the computer.
4. Insert the camera cable to it's slot on the system board

Next steps

1. Install the Heatsink
2. Install the battery.
3. Install the base cover.
4. Follow the procedure in After working inside your computer.

System board

Removing the system board

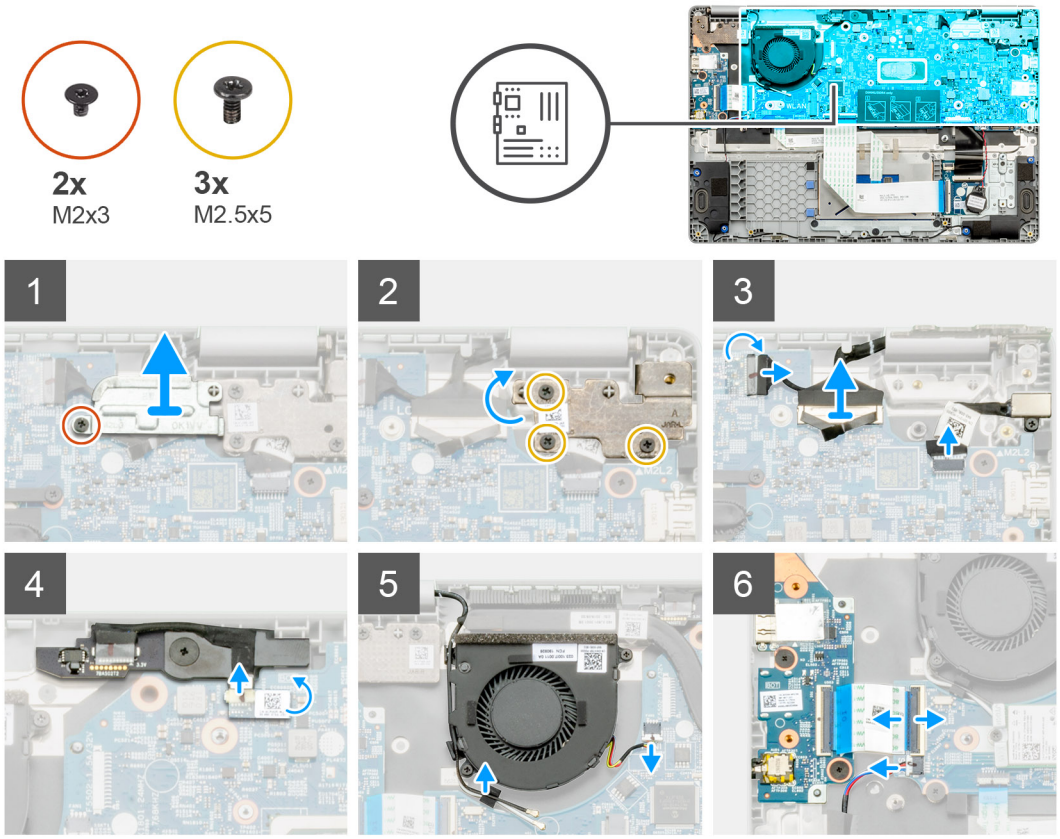
Prerequisites

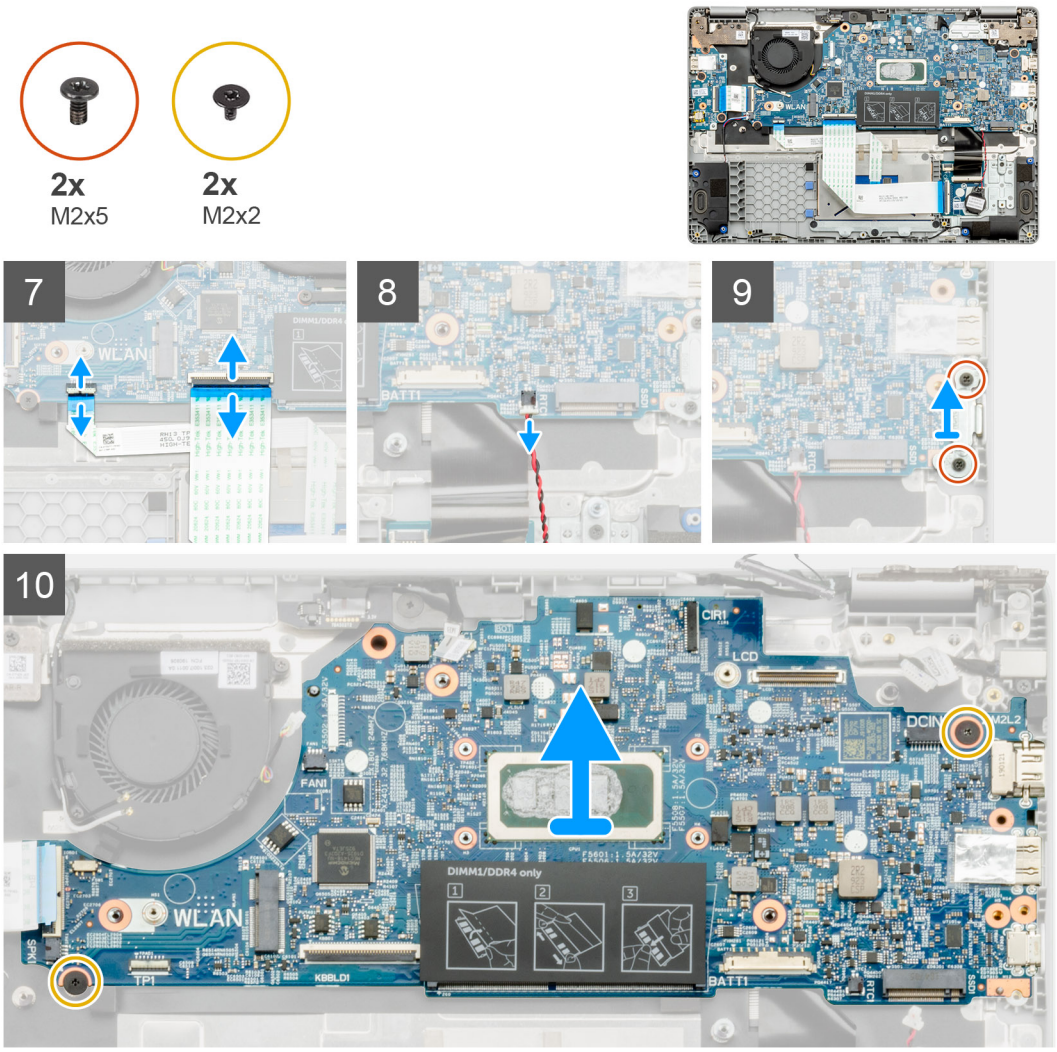
1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the memory.
5. Remove the Solid state drive

6. Remove the WLAN card.
7. Remove the Heatsink.

About this task

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





Steps

1. Locate the system board on your computer.
2. Remove the single (M2x3) screw and lift metal bracket covering the display connector.
3. Remove the three (M2.5x5) screws and lift the hinge.
4. Peel off the adhesive tape and remove the touchscreen cable from the latch. Lift the ED cable and remove the display cable from the latch on the system board.
5. Peel off the adhesive tape and remove the world-facing camera cable from the latch.
6. Unroute the cable, release the wireless cable, and disconnect the system fan cable from the connector on the system board.
7. Disconnect the I/O board cable, keyboard transfer cable, and touchpad cable from the latch.
8. Release the coin-cell cable from the latch.
9. Remove the two (M2x5) screws that secure the type-C metal bracket to the computer.
10. Remove the two (M2x2) screws that secure the system board to the palmrest and keyboard assembly.
11. Lift the system board off the palmrest and keyboard assembly.

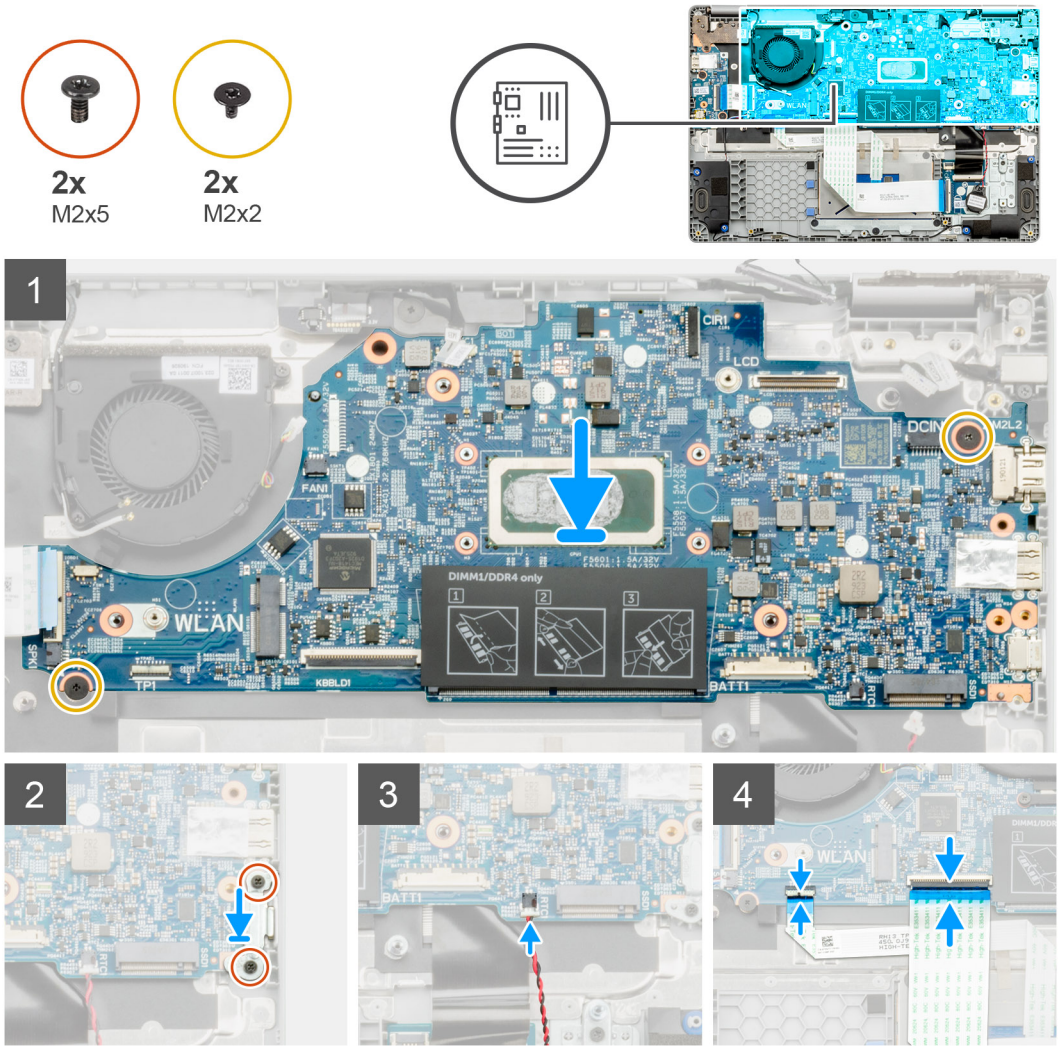
Installing the system board

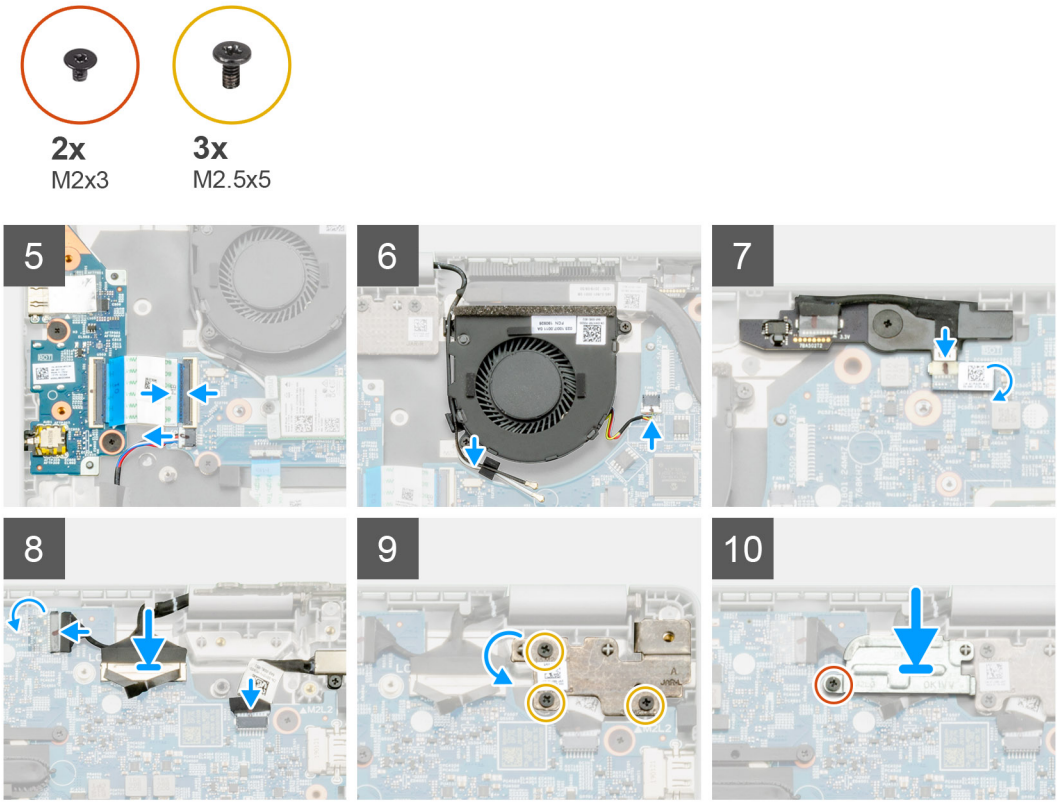
Prerequisites

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

About this task

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





Steps

1. Locate the system board slot on your computer.
2. Slide the ports on the system board into the slots on the palm-rest and keyboard assembly and align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.
3. Install the two (M2x2) screws that secure the system board to the palmrest and keyboard assembly.
4. Replace the two (M2x5) screw to secure the type-C metal bracket to the computer.
5. Connect the coin-cell cable to the latch.
6. Connect the I/O board cable, keyboard transfer cable, and touchpad cable to the latch.
7. Route the cable, install the wireless cable, and connect the system fan cable to the connector on the system board.
8. Affix back the adhesive tape and connect the touchscreen cable to the latch. Replace the ED cable and connect the display cable to the latch on the system board.
9. Affix back the adhesive tape and connect the world-facing camera cable to the latch.
10. Replace the three (M2.5x5) screws to fix the hinge.
11. Replace the single (M2x3) screw to fix the metal bracket.

Next steps

1. Install the Heatsink.
2. Install the WLAN card.
3. Install the Solid state drive.
4. Install the memory.
5. Install the battery.
6. Install the base cover.
7. Follow the procedure in After working inside your computer.

Display assembly

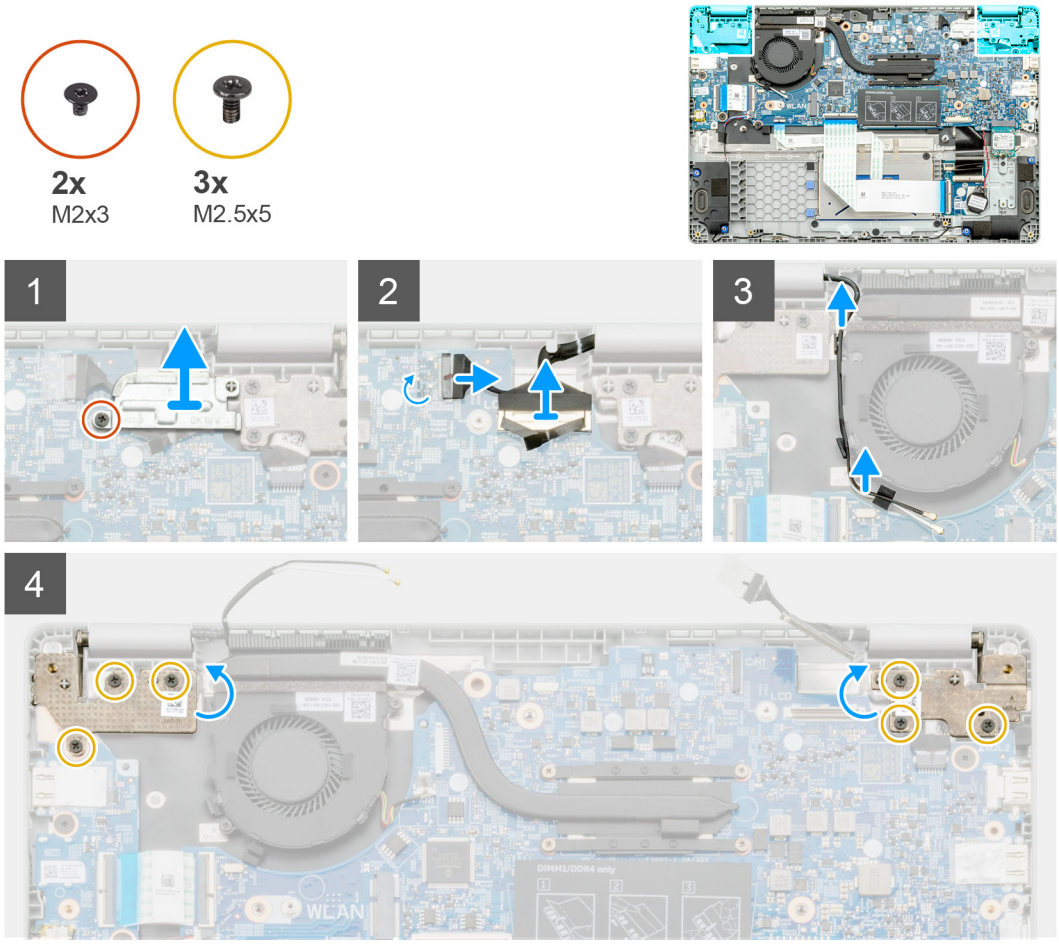
Removing the display assembly

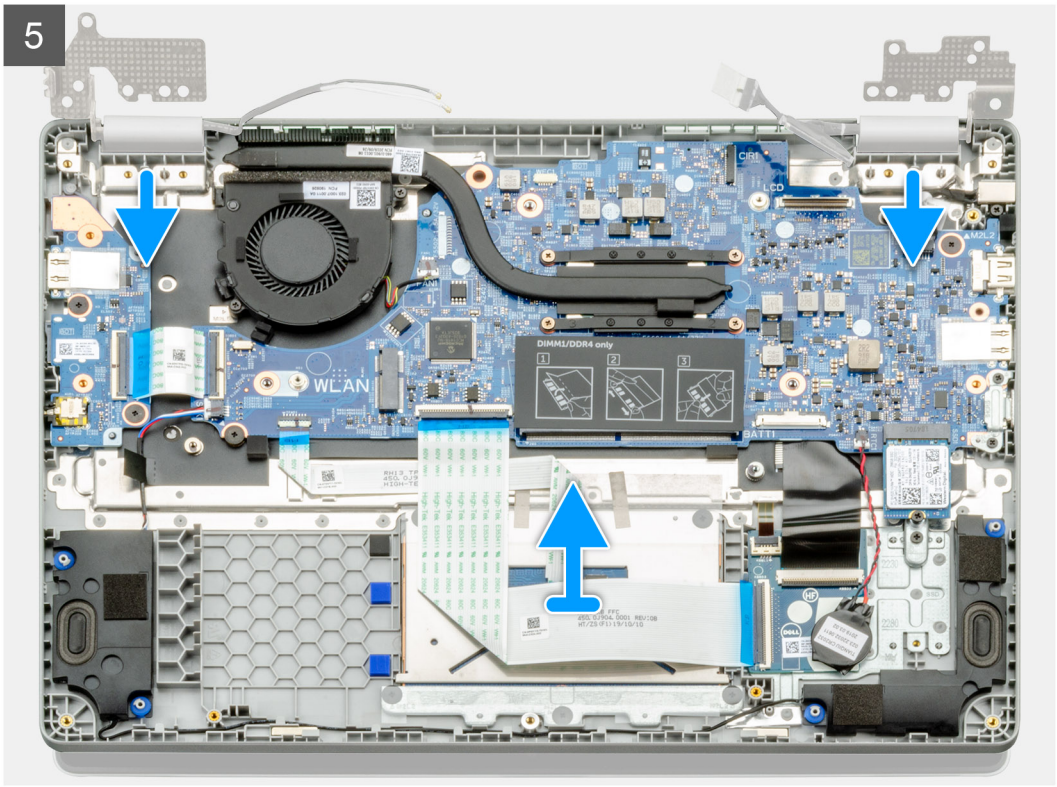
Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the WLAN card.

About this task

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





Steps

1. Locate the display hinges on your computer.
2. Remove the six (M2.5x5) screws that secure the display hinges to the chassis of your computer.
3. Open the display hinges at an angle of 90 degrees and slightly open the display.
4. Slide and remove the palm-rest and keyboard assembly off the display assembly.

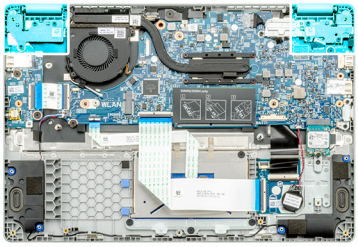
Installing the display assembly

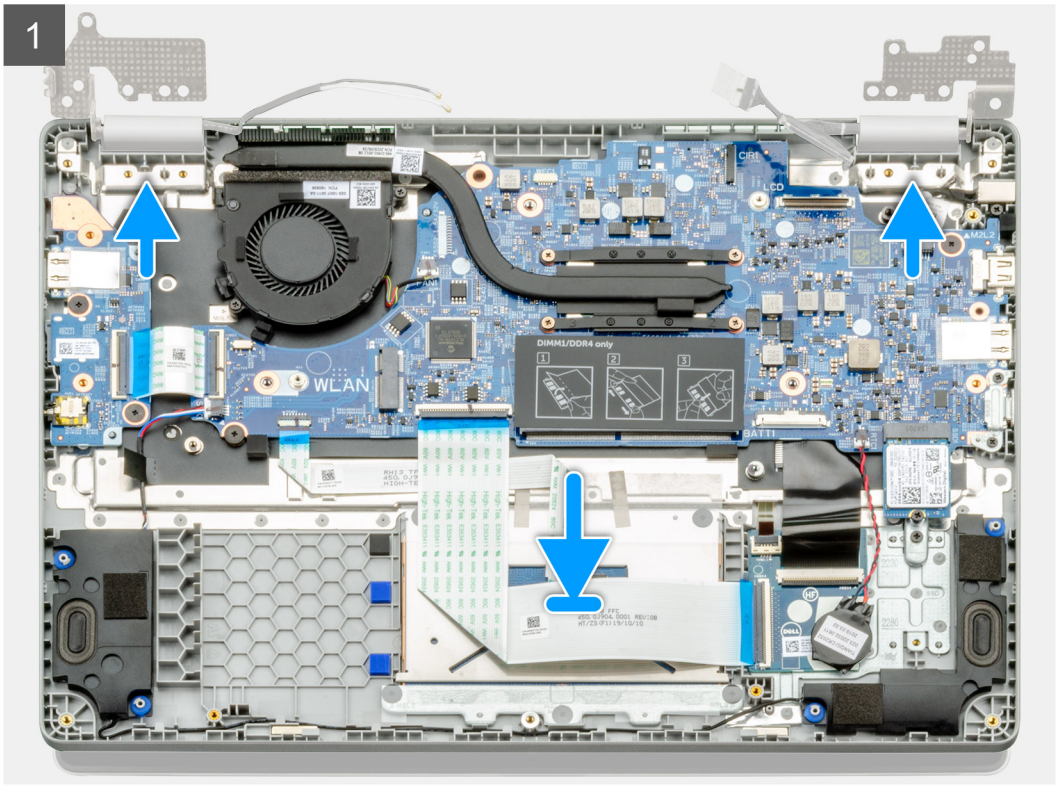
Prerequisites

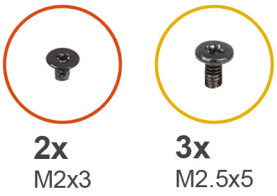
If you are replacing a component, remove the existing component before performing the installation procedure.

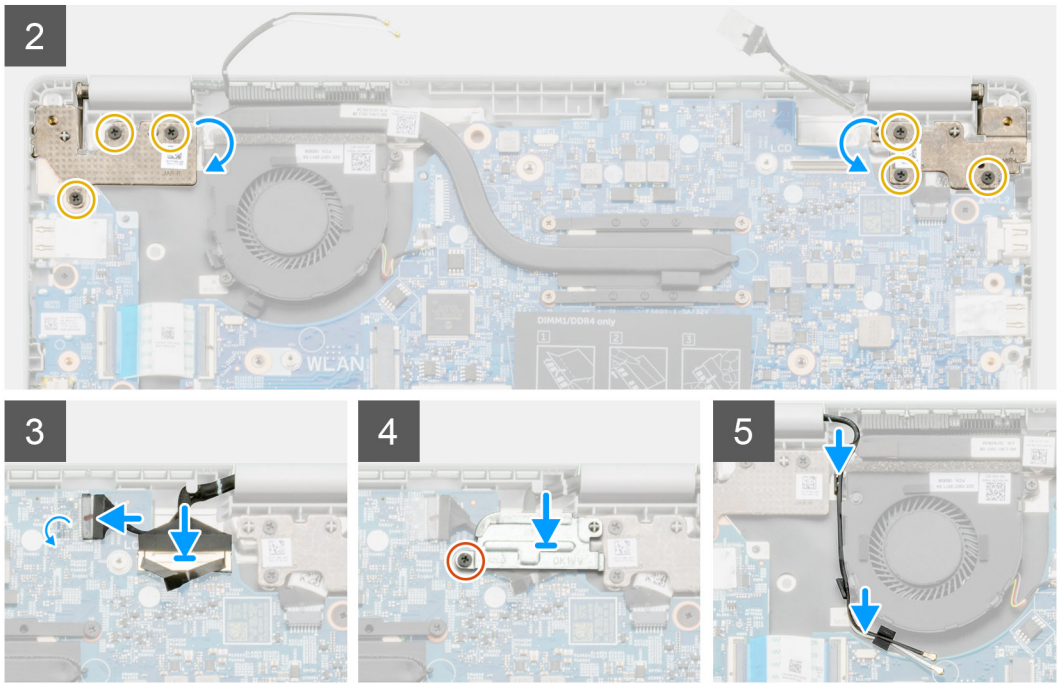
About this task

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




1
WLAN
DIMM1/DDR4 only
LCD
BATT





Steps

1. Place the display assembly on a clean and flat surface.
2. Align and place the palmrest and keyboard assembly on the display assembly.
3. Using the alignment posts, close the display hinges.
4. Connect the display cable to the system board and adhere the tape to secure the display cable.
5. Place the EDP metal bracket on the display cable connector.
6. Install the six (M2.5x5) screws that secure the display hinges to the chassis of your computer.

Next steps

1. Install the WLAN card.
2. Install the battery.
3. Install the base cover.
4. Follow the procedure in After working inside your computer.

Camera microphone module

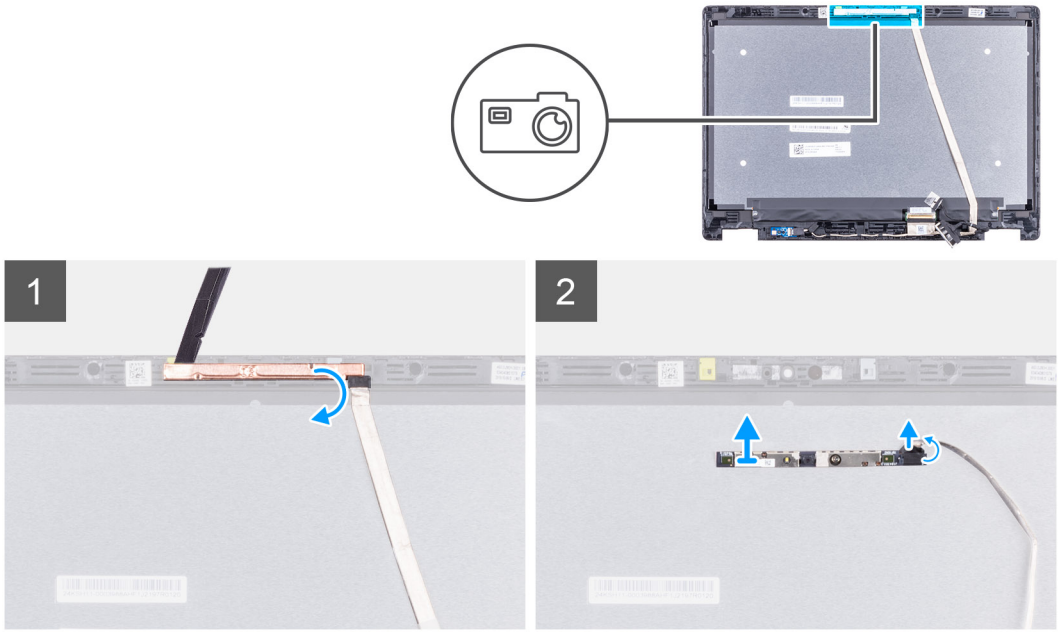
Removing the camera-microphone module

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the Display assembly.

About this task

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



Steps

1. Disconnect the EDP cable from the microphone-camera module.
2. Lift the camera-microphone module from the display assembly.

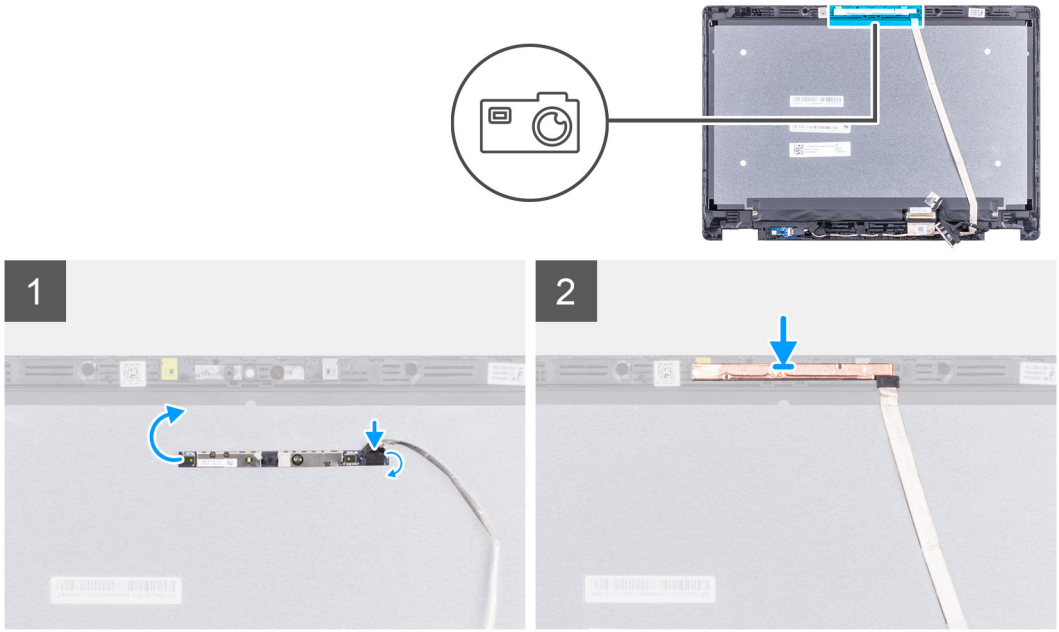
Installing the camera-microphone module

Prerequisites

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

About this task

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



Steps

1. Align and place the camera-microphone module on the LCD back cover assembly.
2. Connect the EDP cable to the camera-microphone module.

Next steps

1. Install the Display assembly .
2. Follow the procedure in After working inside your computer.

LCD panel

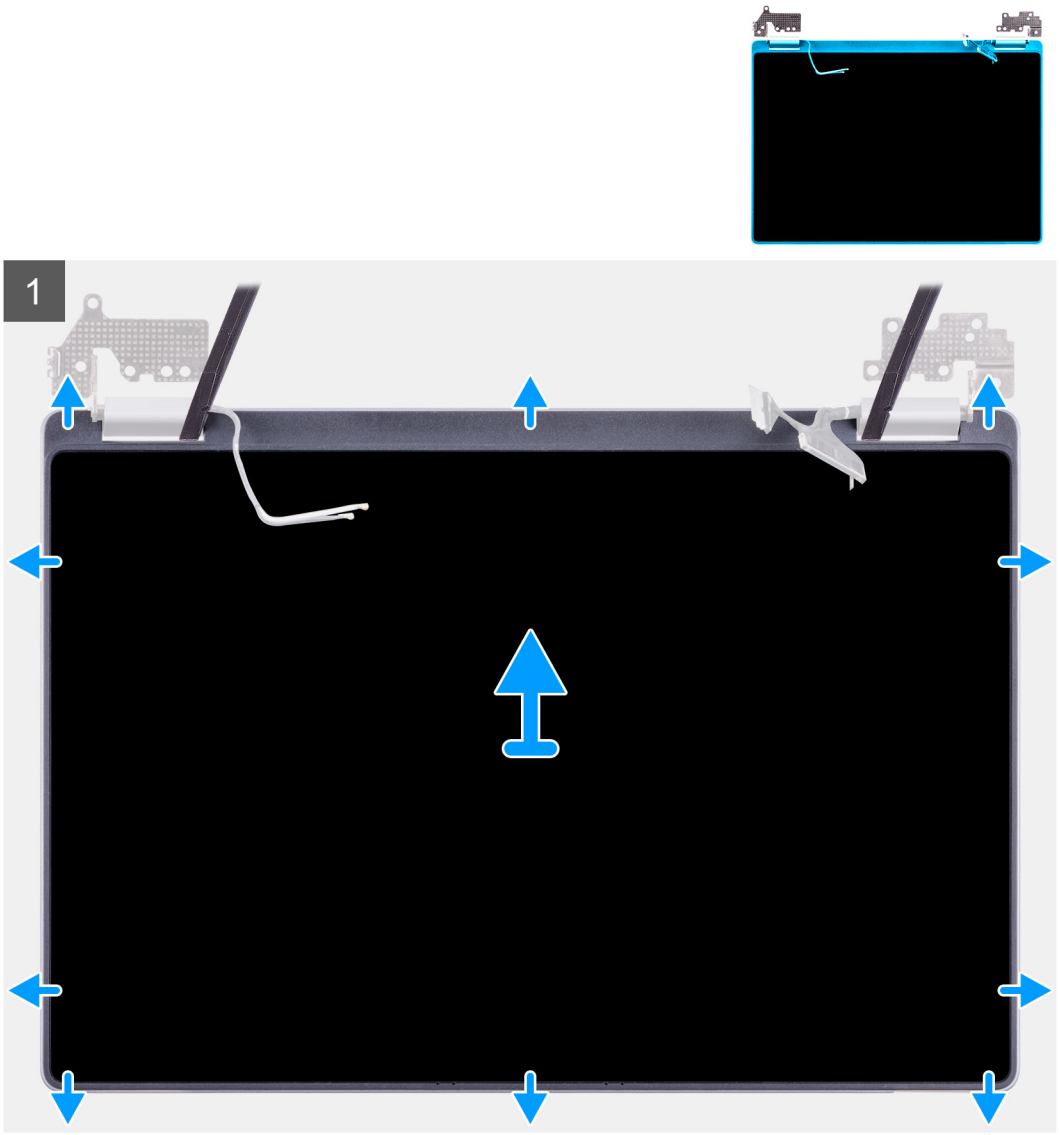
Removing the LCD panel

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the Display assembly.

About this task

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



NOTE: When replacing the display panel, ensure that the hooks on the top of the display panel assembly are inserted prior before snapping the sides of the assembly in place.

Steps

1. Use a plastic scribe to pry from the recess at the hinge area.
2. Work your way around pry from all the sides.
3. Lift the LCD panel.

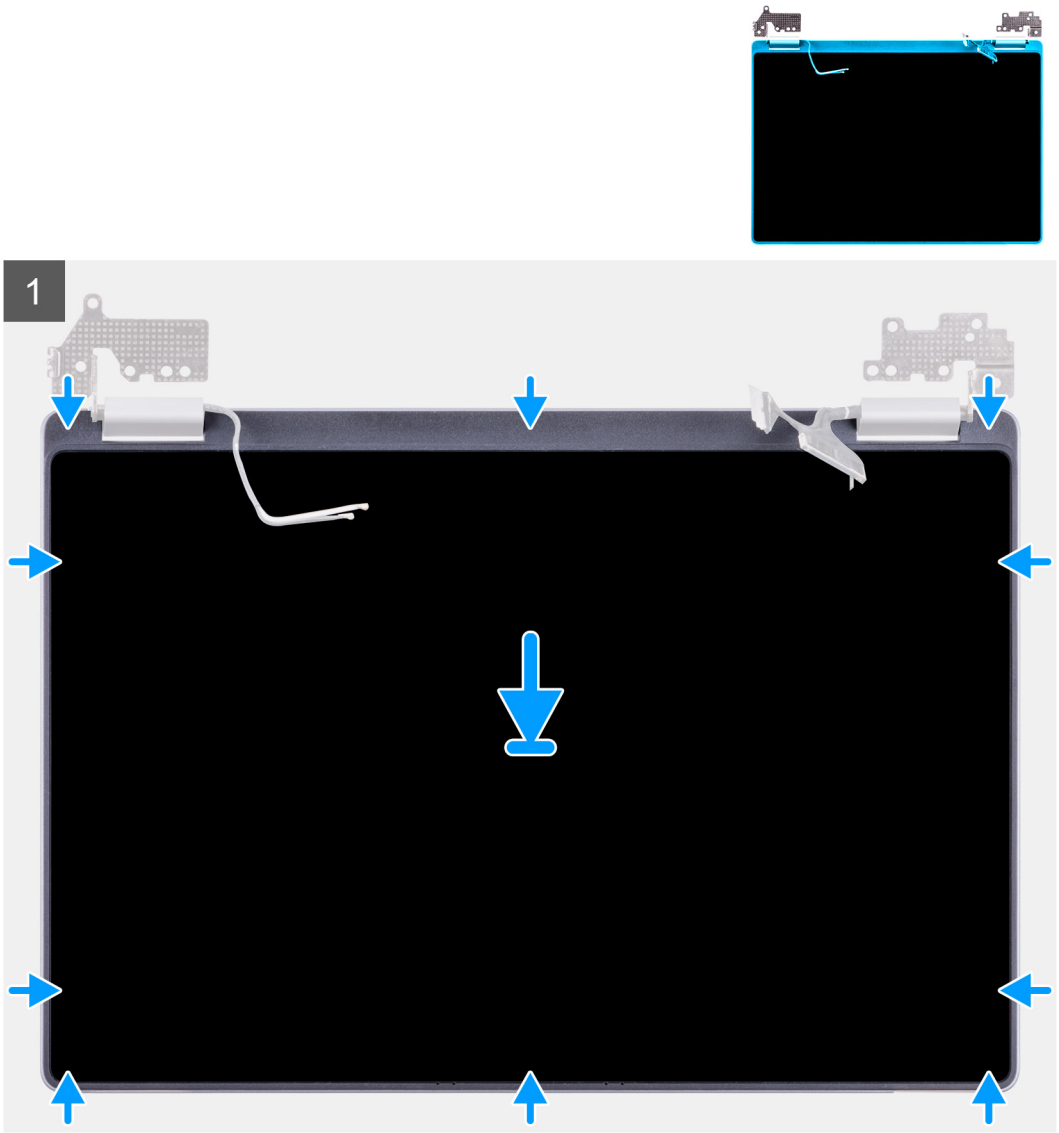
Installing the LCD panel

Prerequisites

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

About this task

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



Steps

1. Align the LCD panel to the back cover.
2. Angle the hinges and install the hinges on the back cover.

NOTE: Ensure that the hooks on the top of the display panel assembly are inserted prior before snapping the sides of the assembly in place.

Next steps

1. Install the hinges.
2. Install the Display assembly .
3. Follow the procedure in After working inside your computer.

Display hinges

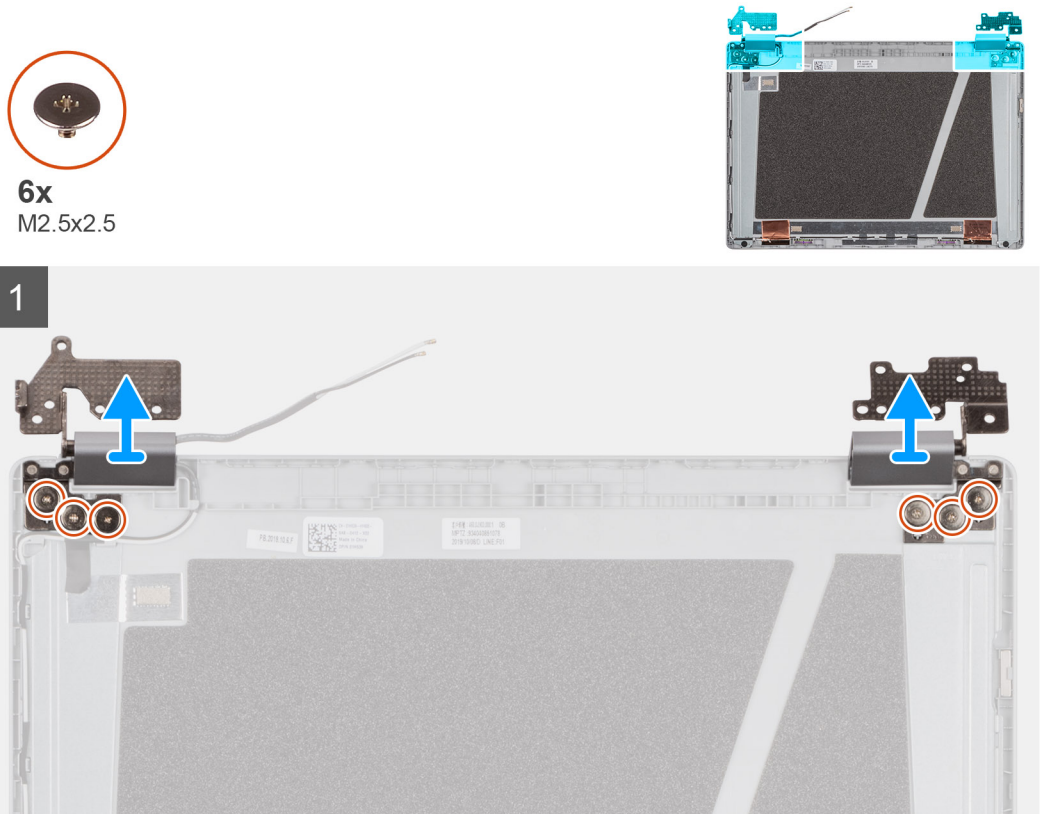
Removing the display hinges

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the Display assembly.

About this task

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



Steps

1. Remove the six (M2.5x2.5) screws on either side securing the hinges to the back cover.
2. Angle the hinges and lift the hinges up and away from the back cover.

Installing the hinges

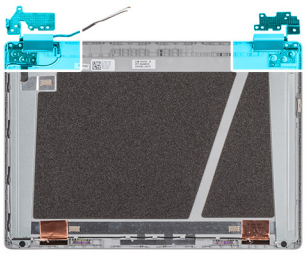
Prerequisites

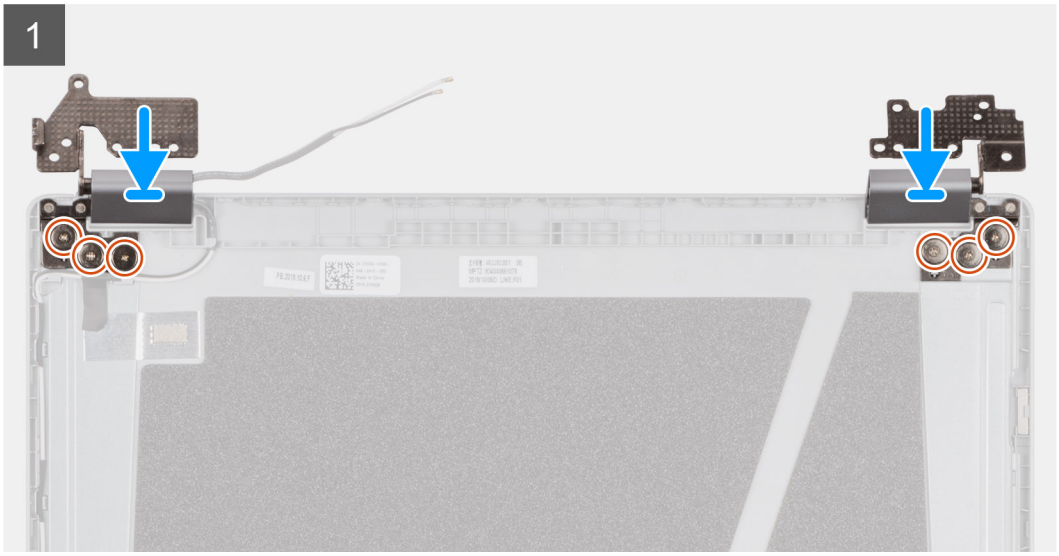
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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

6x
M2.5x2.5





Steps

1. Angle the hinges and install the hinges on the LCD back cover.
2. Install the six (M2.5x2.5) screws to secure the hinges to the LCD back cover.

Next steps

1. Install the Display assembly .
2. Follow the procedure in After working inside your computer.

eDP cable

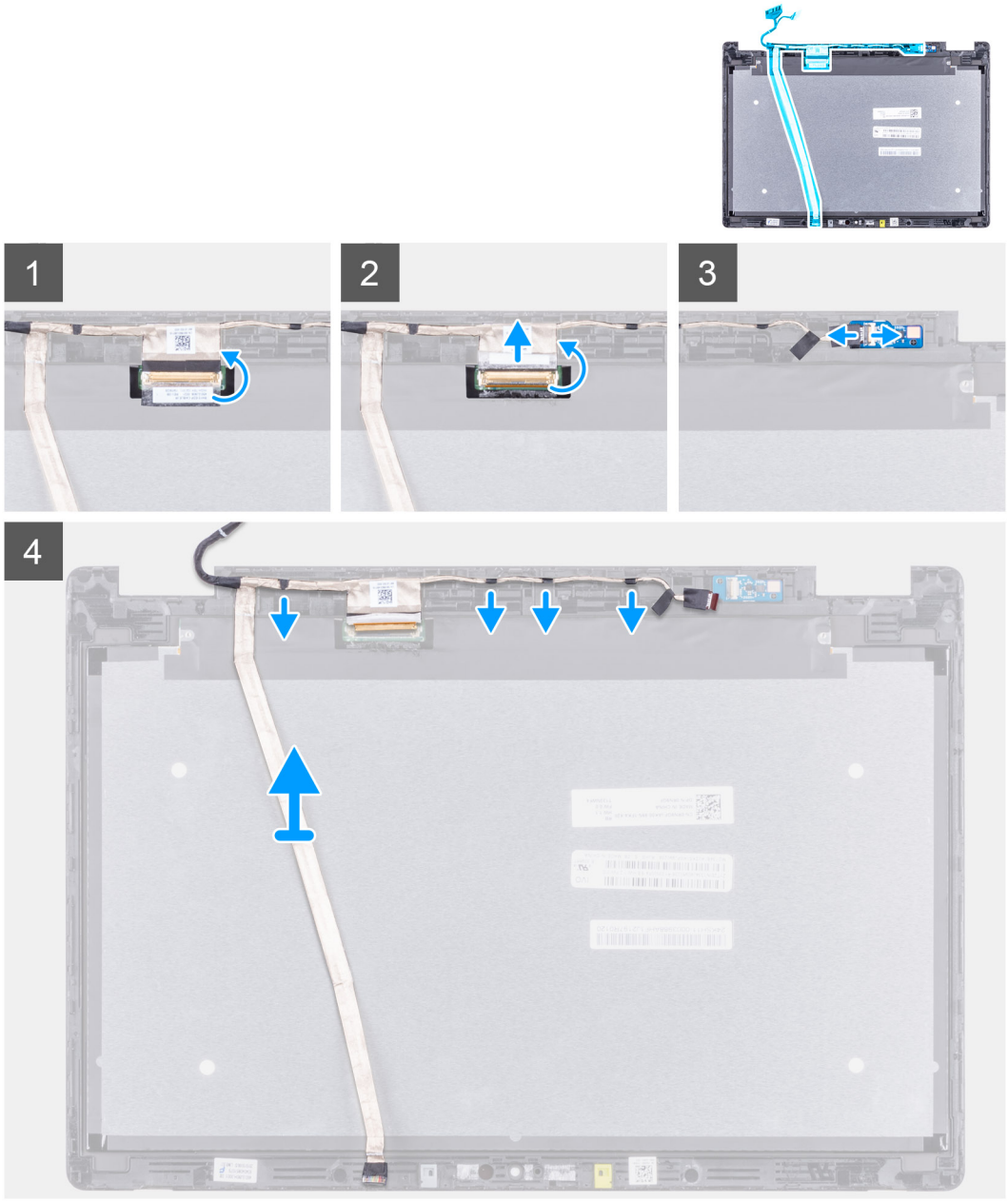
Removing the eDP cable

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the Display assembly.
3. Remove the hinges.

About this task

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



Steps

1. Peel off the tape securing the eDP cable to the back cover and remove the metal foil.
2. Un-route the eDP cable tucked along the back cover and remove the eDP cable from the computer.

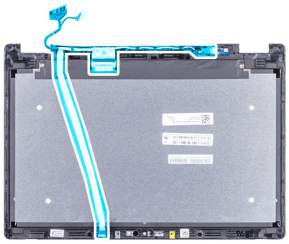
Installing the eDP cable

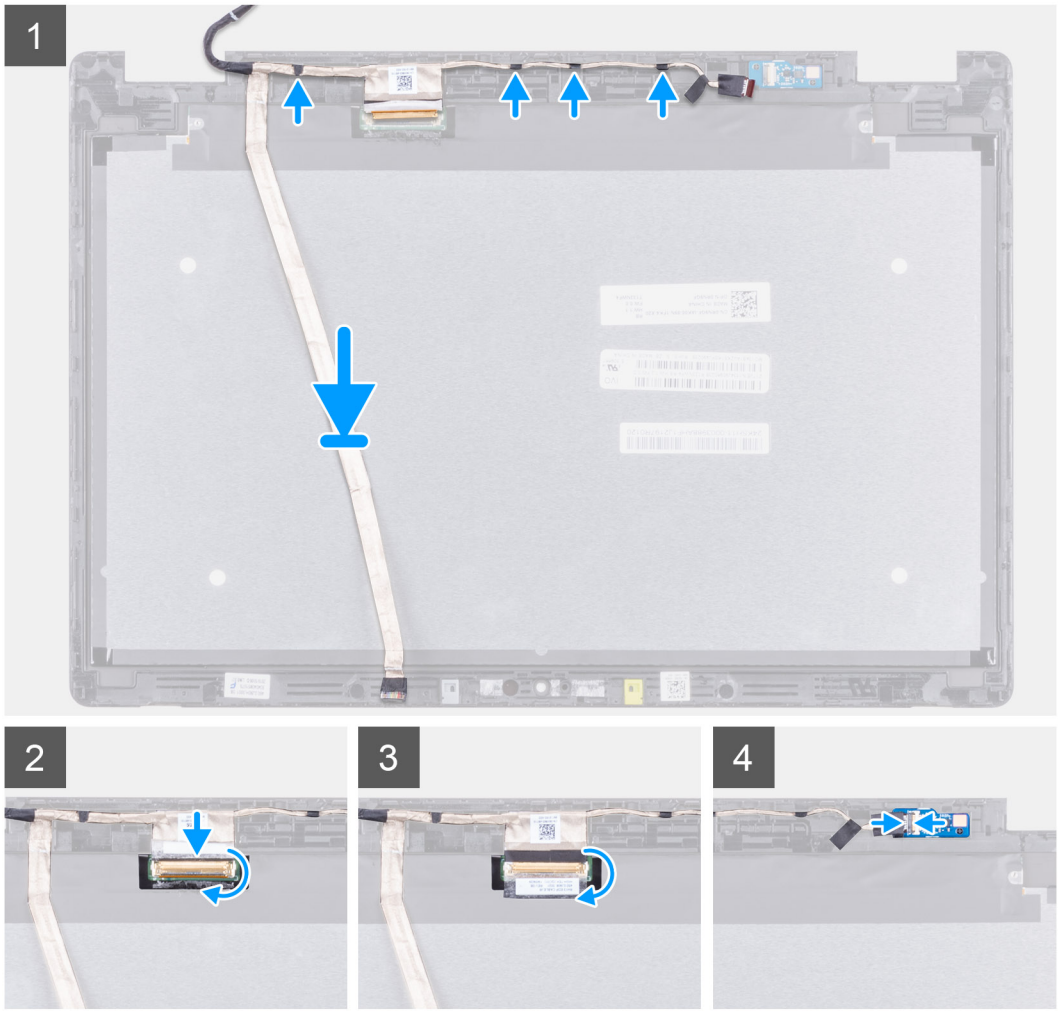
Prerequisites

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

About this task

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





Steps

1. Route the eDP cable along the edges of the LCD back cover.
2. Stick the tape securing the eDP cable to the back cover and install the metal foil to secure the eDP cable to the LCD back cover.

Next steps

1. Install the Display assembly .
2. Follow the procedure in After working inside your computer.

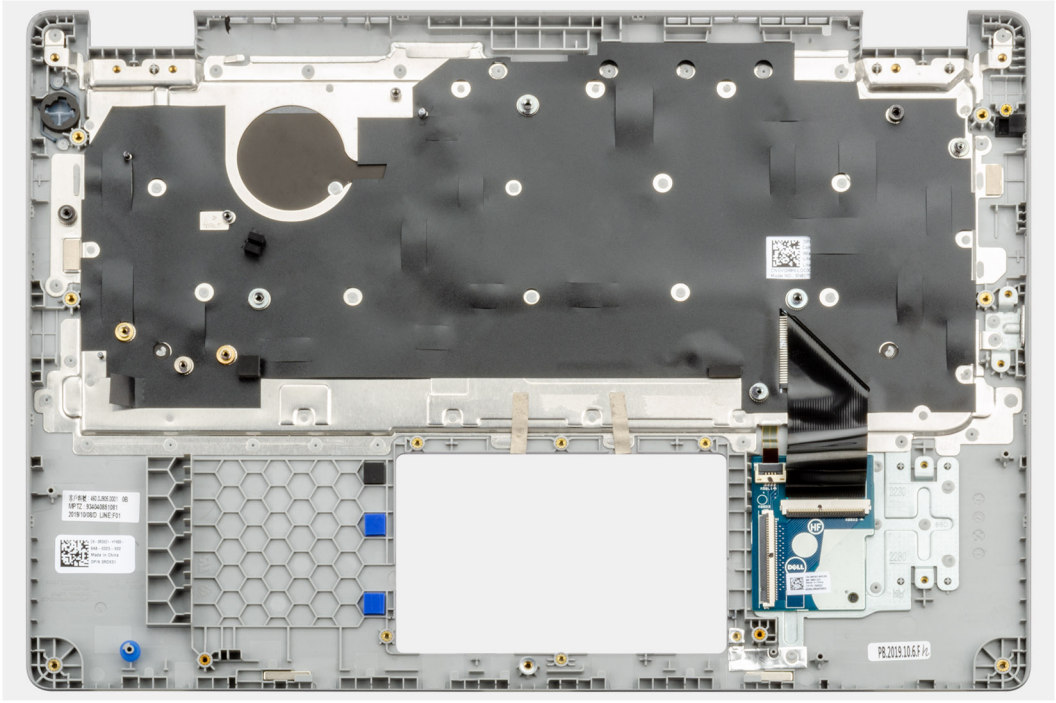
Plamrest

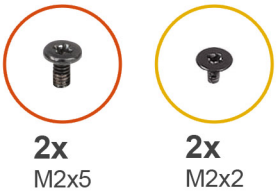
Prerequisites

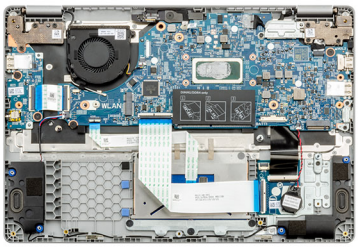
NOTE: After disassembling the system board, you are left with the palmrest along with the touchpad which is one complete unit.

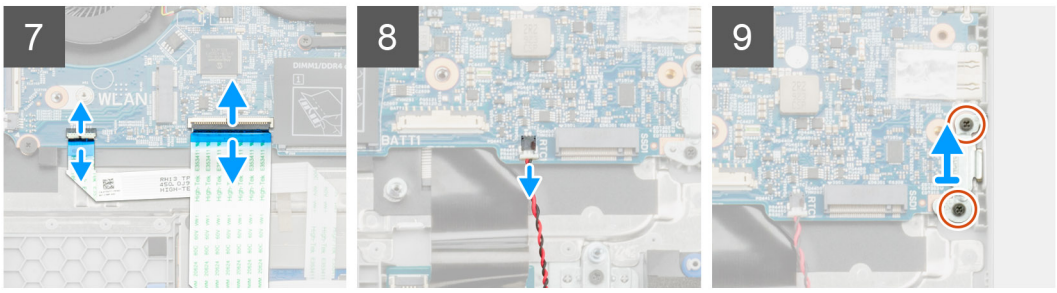
1. Follow the procedure in Before working inside your computer.
2. Remove the base cover.
3. Remove the battery.
4. Remove the memory.
5. Remove the Solid state drive
6. Remove the WLAN card.
7. Remove the Heatsink.
8. Remove the system board.
9. Remove the hinges.
10. Remove the display assembly.
11. Remove the LCD panel.

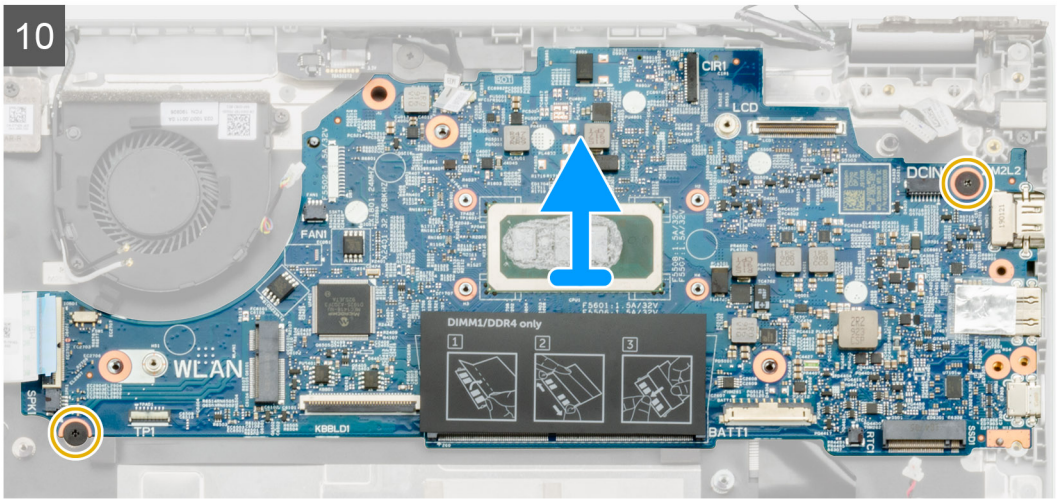
About this task











Next steps

1. Install the LCD panel.
2. Install the display assembly.
3. Install the hinges.
4. Install the system board.
5. Install the Heatsink.
6. Install the WLAN card.
7. Install the Solid state drive.
8. Install the memory.
9. Install the battery.
10. Install the base cover.
11. Follow the procedure in After working inside your computer.

5

Troubleshooting

Topics:

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.

Dell SupportAssist Pre-boot System Performance Check diagnostics

About this task

SupportAssist diagnostics (also known as system diagnostics) performs a complete check of your hardware. The Dell SupportAssist Pre-boot System Performance Check diagnostics is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

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

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

For more information, see https://www.dell.com/support/kbdoc/000180971.

Running the SupportAssist Pre-Boot System Performance Check

Steps

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

WiFi power cycle

About this task

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

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.

Built-in self-test (BIST)

M-BIST

M-BIST (Built In Self-Test) is the system board's built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures.

NOTE: M-BIST can be manually initiated before POST (Power On Self Test).

How to run M-BIST

NOTE: M-BIST must be initiated on the system from a power-off state either connected to AC power or with battery only.

1. Press and hold both the **M** key on the keyboard and the **power button** to initiate M-BIST.
2. With both the **M** key and the **power button** held down, the battery indicator LED may exhibit two states:
   a. OFF: No fault detected with the system board
   b. AMBER: Indicates a problem with the system board
3. If there is a failure with the system board, the battery status LED will flash one of the following error codes for 30 seconds:

Table 9. LED error codes

Blinking Pattern		Possible Problem
Amber	**White**	
2	1	CPU Failure
2	8	LCD Power Rail Failure
1	1	TPM Detection Failure
2	4	Unrecoverable SPI Failure

4. If there is no failure with the system board, the LCD will cycle through the solid color screens described in the LCD-BIST section for 30 seconds and then power off.

LCD Power rail test (L-BIST)

L-BIST is an enhancement to the single LED error code diagnostics and is automatically initiated during POST. L-BIST will check the LCD power rail. If there is no power being supplied to the LCD (i.e., the L-BIST circuit fails), the battery status LED will flash either an error code [2,8] or an error code [2,7].

NOTE: If L-BIST fails, LCD-BIST cannot function as no power will be supplied to the LCD.

How to invoke L-BIST Test:

1. Press the power button to start the system.
2. If the system does not start up normally, look at the battery status LED:
   - If the battery status LED flashes an error code [2,7], the display cable may not be connected properly.
   - If the battery status LED flashes an error code [2,8], there is a failure on the LCD power rail of the system board, hence there is no power supplied to the LCD.
3. For cases, when a [2,7] error code is shown, check to see if the display cable is properly connected.
4. For cases when a [2,8] error code is shown, replace the system board.

LCD Built-in Self Test (BIST)

Dell laptops have a built-in diagnostic tool that helps you determine if the screen abnormality you are experiencing is an inherent problem with the LCD (screen) of the Dell laptop or with the video card (GPU) and PC settings.

When you notice screen abnormalities like flickering, distortion, clarity issues, fuzzy or blurry image, horizontal or vertical lines, color fade etc., it is always a good practice to isolate the LCD (screen) by running the Built-In Self Test (BIST).

How to invoke LCD BIST Test

1. Power off the Dell laptop.
2. Disconnect any peripherals that are connected to the laptop. Connect only the AC adapter (charger) to the laptop.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold **D** key and **Power on** the laptop to enter LCD built-in self test (BIST) mode. Continue to hold the D key, until the system boots up.
5. The screen will display solid colors and change colors on the entire screen to white, black, red, green, and blue twice.
6. Then it will display the colors white, black and red.
7. Carefully inspect the screen for abnormalities (any lines, fuzzy color or distortion on the screen).
8. At the end of the last solid color (red), the system will shut down.

NOTE: Dell SupportAssist Pre-boot diagnostics upon launch, initiates an LCD BIST first, expecting a user intervention confirm functionality of the LCD.

Diagnostic LEDs

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

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

The system will not shutdown when displaying the Diagnostic Error Codes.

Diagnostic Error Codes will always supersede any other use of the LED. For instance, on laptops, battery codes for Low Battery or Battery Failure situations will not be displayed when Diagnostic Error Codes are being displayed.

Table 10. Diagnostic LEDs

Blinking Pattern		Problem Description	Suggested Resolution
Amber	White		
2	1	CPU failure	Replace the system board.
2	2	System board failure (included BIOS corruption or ROM error)	Flash latest BIOS version. If problem persists, replace the system board.
2	3	No memory/RAM detected	Confirm that the memory module is installed properly. If problem persists, replace the memory module.
2	4	Memory/RAM failure	Replace the memory module.
2	5	Invalid memory installed	Replace the memory module.
2	6	System board/Chipset error	Replace the system board.
2	7	LCD failure	Replace the LCD module.
2	8	LCD Power rail failure	Replace the system board.
3	1	CMOS battery failure	Replace the RTS battery.
3	2	PCI or Video card/chip failure	Replace the system board.
3	3	BIOS Recovery Image not found	Flash latest BIOS version. If problem persists, replace the system board.
3	4	BIOS Recovery Image found but invalid	Flash latest BIOS version. If problem persists, replace the system board.

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

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**.

Backup media and recovery options

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

WiFi power cycle

About this task

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

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.

NOTE: For more information about performing a hard reset, see the knowledge base article 000130881 at www.dell.com/support.

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Getting help and contacting Dell

Self-help resources

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

Table 11. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
Dell Help and Support app	
Accessing help	In Windows search, type `Help and Support`, and press Enter.
Online help for operating system	www.dell.com/support/windows
Troubleshooting information, user manuals, set up instructions, product specifications, technical help blogs, drivers, software updates, and so on.	www.dell.com/support
Dell knowledge base articles for various computer concerns	1. Go to www.dell.com/support. 2. Type the subject or keyword in the **Search** box. 3. Click **Search** to retrieve the related articles.
Learn and know the following information about your product: ● Product specifications ● Operating system ● Setting up and using your product ● Data backup ● Troubleshooting and diagnostics ● Factory and system restore ● BIOS information	See *Me and My Dell* at www.dell.com/support/manuals. To locate the *Me and My Dell* relevant to your product, identify your product through one of the following: ● Select **Detect Product**. ● Locate your product through the drop-down menu under **View Products**. ● Enter the **Service Tag number** or **Product ID** in the search bar.

Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see www.dell.com/contactdell.

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

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.