Dell Pro 16 Plus

PB16250

(Intel Core Ultra 200U Series/Intel Core 100U and 200U Series)

Owner's Manual

Regulatory Model: P135F
Regulatory Type: P135F002/P135F003
November 2025
Rev. A09

DELL Technologies

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

Views of Dell Pro 16 Plus

Right

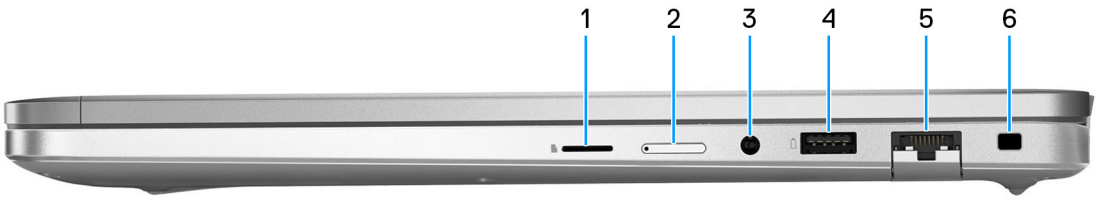


Figure 1. Right view

1. **microSD-card slot**

   Reads from and writes to the microSD-card.

2. **Nano-SIM card slot (optional)**

   Insert a SIM card to connect to a mobile broadband network.

   NOTE: Availability of the SIM card slot depends on the region and configuration ordered.

3. **Global headset jack**

   Connect headphones or a headset (headphone and microphone combo).

4. **USB 3.2 Gen 1 port with PowerShare**

   Connect devices such as external storage devices and printers. It provides data transfer speeds up to 5 Gbps.

   PowerShare enables you to charge your USB devices even when your computer is turned off.

   NOTE: If your computer is turned off or in a hibernate state, you must connect the power adapter to charge your devices using the PowerShare port. You must enable this feature in the BIOS setup program.

5. **RJ45 ethernet port (1 Gbps)**

   Connect an Ethernet (RJ45) cable from a router or a broadband modem for network or Internet access, with a transfer rate of 10/100/1000 Mbps.

6. **Security-cable slot (wedge-shaped)**

   Connect a security cable to prevent unauthorized movement of your computer.

Left

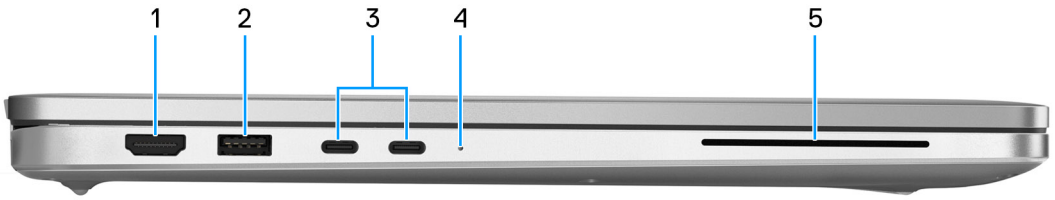


Figure 2. Left view

1. **HDMI 2.1 Transition-minimized differential signaling (TMDS) port**

   Connect to a TV, external display, or another HDMI-in enabled device. Provides video and audio output.

2. **USB 3.2 Gen 1 port**

   Connect devices such as external storage devices and printers.

   It provides data transfer speeds up to 5 Gbps.

3. **Thunderbolt 4 ports with DisplayPort Alt Mode/USB Type-C/USB4/Power Delivery (2)**

   Supports USB4, DisplayPort 2.1, Thunderbolt 4 and also enables you to connect to an external display using a display adapter. Provides data transfer rates of up to 40 Gbps for USB4 and Thunderbolt 4.

   NOTE: You can connect a Dell Docking Station to one of the Thunderbolt 4 ports. For more information, search in the Knowledge Base Resource at Dell Support Site.

   NOTE: A USB Type-C to DisplayPort adapter (sold separately) is required to connect a DisplayPort device.

   NOTE: USB4 is backward compatible with USB 3.2, USB 2.0, and Thunderbolt 3.

   NOTE: Thunderbolt 4 supports two 4K displays or one 8K display.

4. **Battery-status light**

   Battery-status light indicates the battery-charge status.

   - White-Battery is charging.
   - Solid yellow-Battery charge is low.
   - Blinking yellow-Battery charge is critical.
   - Off—Battery is fully charged.

5. **smart card reader slot (optional)**

   Using smart card provides authentication in corporate networks.

Front

Figure 3. Front view

1. **Left microphone**

   Provides digital sound input for audio recording and voice calls.

2. **IR Sensor (optional)**

   Sensor detects the absence of the user and locks the computer for securing the computer and reducing power consumption.

3. **Infrared emitter (optional)**

   The infrared emitter emits infrared light, which enables the infrared camera to sense and track motion.

4. **Camera Shutter**

   Slide the privacy shutter to the left to access the camera lens.

5. **Camera**

   A camera enables you to video chat, capture photos, and record videos.

6. **Camera-status light**

   Turns on when the camera is in use.

7. **Right microphone**

   Provides digital sound input for audio recording and voice calls.

8. **Ambient-light sensor (optional)**

   The sensor detects the ambient light and automatically adjusts the display brightness.

Top

Figure 4. Top view

NOTE: The fingerprint reader is available either on the power button or on the palm-rest assembly depending on the configuration ordered.

1. **Power button with optional fingerprint reader**

   Press to turn on the computer if it is turned off, in sleep state, or in hibernate state.

   When the computer is turned on, press the power button to put the computer into sleep state; press and hold the power button to force shut-down the computer.

   NOTE: You can customize the power-button behavior in Windows.

   NOTE: The power-status light on the power button is available only on computers without the fingerprint reader. Computers that are shipped with the fingerprint reader that is integrated on the power button will not have the power-status light on the power button.

2. **Fingerprint reader (optional)**

   Press your finger on FIPS 201-certified fingerprint reader to log in to your computer. The fingerprint reader enables your computer to recognize your fingerprints as a password.

   NOTE: Configure the fingerprint reader to register your fingerprint and enable access.

3. **NFC/contactless smart card reader (optional)**

   Enables NFC-enabled devices to communicate with your computer.

4. **Touchpad**

   Move your finger on the touchpad to move the mouse pointer. Tap to left-click and two fingers tap to right-click.

Bottom

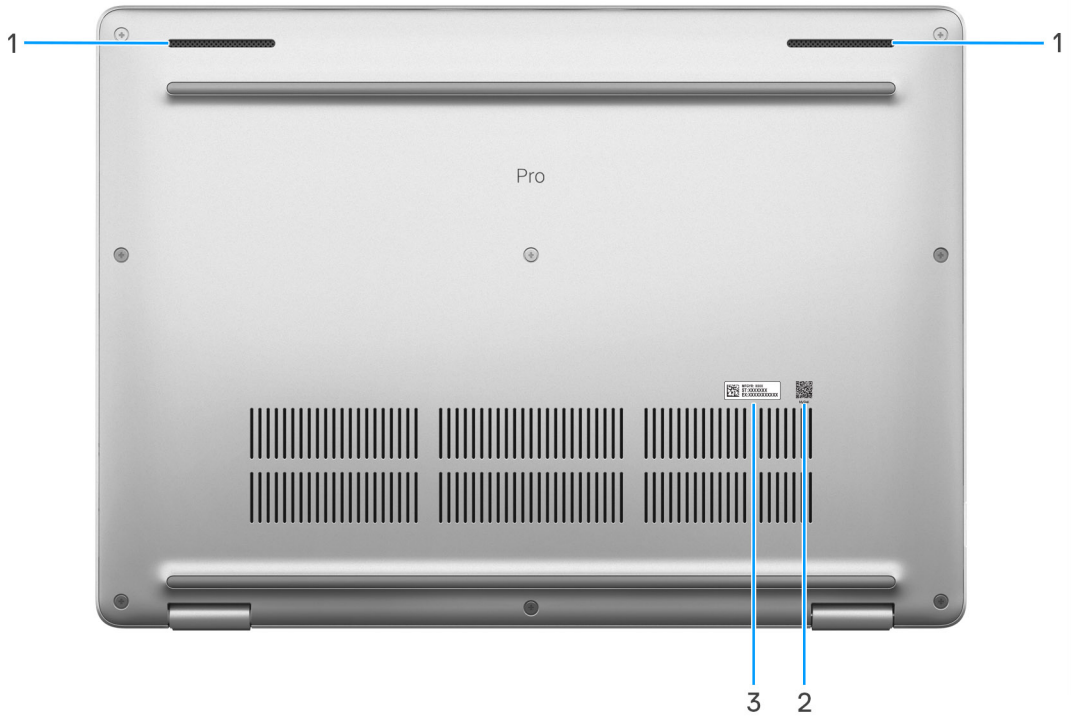


Figure 5. Bottom view

1. **Speakers (2)**

   Provide audio output.

2. **MyDell QR code**

   MyDell is your hub for content personalized to your Dell Pro 16 Plus, including videos, articles, manuals, and access to support.

3. **Service Tag label**

   The Service Tag is a unique alphanumeric identifier that enables Dell service technicians to identify the hardware components in your computer and access warranty information.

Service Tag

The service tag is a unique alphanumeric identifier that allows Dell service technicians to identify the hardware components in your computer and access warranty information.

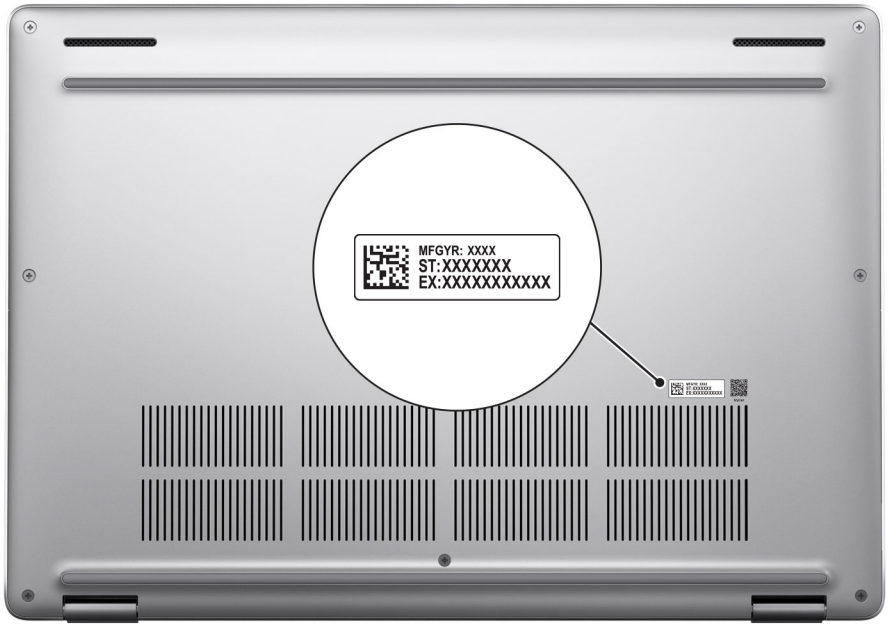


Figure 6. Service tag location

Battery-status light

The following table lists the battery-status light of your Dell Pro 16 Plus.

Table 1. Battery-status light behavior

Power source	LED behavior	System power state	Battery charge level
AC adapter	Off	S0 or S5	100%
AC adapter	Solid white	S0 or S5	< 100%
Battery	Off	S0 or S5	11-100%
Battery	Solid amber	S0 or S5	< 10%

- S0 (ON): The computer is turned on.
- S3 (Sleep): Screen is off and computer is in sleep mode.
- S4 (Hibernate): The computer consumes the least power in the Hibernate state than in the ON or OFF state. The computer is almost in the OFF state. The context data is written to a storage device, allowing you to resume from where you left after the computer is turned on.
- S5 (OFF): The computer is in a shutdown state.

2

Set up your Dell Pro 16 Plus

About this task

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

Steps

1. Connect the power adapter and press the power button.

Figure 7. Connect the power adapter and press the power button.

NOTE: The battery will go into power-saving mode during shipment to conserve charge on the battery. Ensure that the power adapter is connected to your computer when it is turned on for the first time.

2. Finish the operating system setup.

   For Ubuntu:

   Follow the on-screen instructions to complete the setup. For more information about installing and configuring Ubuntu, search in the Knowledge Base Resource at Dell Support Site.

   For Windows:

   Follow the on-screen instructions to complete the setup. When setting up, it is recommended that you:

   - Connect to a network for Windows updates.

     NOTE: If connecting to a secured wireless network, enter the password for the wireless network access when prompted.

   - If connected to the Internet, sign-in with an existing Microsoft account or create a new account. If not connected to the Internet, create an offline account.
   - On the **Support and Protection** screen, enter your contact details.

3. Locate and use Dell apps from the Windows Start menu—Recommended.

Table 2. Locate Dell apps

Resources	Description
	Dell Optimizer is an application that is designed to enhance computer performance and productivity by optimizing settings for power, battery, display, collaboration touchpad, and presence detection. It also provides access to applications purchased with your new computer. For more information, see Dell Optimizer User's Guide at Dell Support Site.
	**Dell Product Registration** Register your computer with Dell.
	**Dell Help & Support** Access help and support for your computer.
	**SupportAssist** SupportAssist is a proactive and predictive technology that offers automated technical support for Dell computers. It proactively monitors both hardware and software, addressing performance issues, preventing security threats, and automating engagement with Dell Technical Support. For more information, see SupportAssist documentation at Dell Support Site. **NOTE:** In SupportAssist, click the warranty expiry date to renew or upgrade your warranty.

3

Specifications of Dell Pro 16 Plus

Dimensions and weight

The following table lists the height, width, depth, and weight of your Dell Pro 16 Plus.

Table 3. Dimensions and weight

Description	300 nits touch and non-touchscreen 400 nits non-touchscreen
Height:	
Front height	19.85 mm (0.78 in.)
Rear height	20.55 mm (0.81 in.)
Maximum Height	21.35 mm (0.84 in.)
Width	358 mm (14.09 in.)
Depth	251.40 mm (9.89 in.)
Weight **NOTE:** The weight of your computer depends on the configuration that is offered.	1.85 kg (4.08 lb) - minimum.

Processor

The following table lists the details of the Processor supported by your Dell Pro 16 Plus

Table 4. Processor

Description	Processor wattage	Processor core count	Processor thread count	Processor speed	Processor cache	Integrated graphics
Intel Core Ultra 5 225U	15 W	12	14	up to 4.8 GHz	12 MB	Intel Graphics
Intel Core Ultra 5 235U	15 W	12	14	up to 4.9 GHz	12 MB	Intel Graphics
Intel Core Ultra 7 255U	15 W	12	14	up to 5.2 GHz	12 MB	Intel Graphics
Intel Core Ultra 7 265U	15 W	12	14	up to 5.3 GHz	12 MB	Intel Graphics
Intel Core 3 100U	15 W	6	8	up to 4.7 GHz	10 MB	Intel Graphics
Intel Core 5 120U	15 W	10	12	up to 5 GHz	12 MB	Intel Graphics
Intel Core 5 220U	15 W	10	12	up to 5 GHz	12 MB	Intel Graphics
Intel Core 7 150U	15 W	10	12	up to 5.4 GHz	12 MB	Intel Graphics
Intel Core 7 250U	15 W	10	12	up to 5.4 GHz	12 MB	Intel Graphics

Chipset

The following table lists the details of the chipset that is supported in your Dell Pro 16 Plus.

Table 5. Chipset

Description	Option one	Option two
Processors	Intel Core Ultra 5/7	Intel Core 3/5/7
Chipset	Integrated in the processor	Integrated in the processor
DRAM bus width	64-bit	64-bit
Flash EPROM	64 MB	64 MB
PCIe bus	Up to Gen4	Up to Gen4

Operating system

Your Dell Pro 16 Plus supports the following operating systems:

- Windows 11 Pro
- Windows 11 Home
- Ubuntu Linux 24.04

NOTE: If you downgrade your computer from Windows 11 to Windows 10 22H2, Dell Technologies support will follow the Microsoft Windows 10 End of Support plan.

Memory

The following table lists the memory specifications of your Dell Pro 16 Plus.

Table 6. Memory specifications

Description	Values
Memory slots	Two SODIMM slots
Memory type	DDR5
Memory speed	• Intel Core Ultra 5/7: 5600 MT/s • Intel Core 3/5/7: 5200 MT/s
Maximum memory configuration	64 GB
Minimum memory configuration	8 GB
Memory configurations supported	• 8 GB: 1 x 8 GB, DDR5, single-channel • 16 GB: 2 x 8 GB, DDR5, dual-channel • 16 GB: 1 x 16 GB, DDR5, single-channel • 32 GB: 2 x 16 GB, DDR5, dual-channel • 32 GB: 1 x 32 GB, DDR5, single-channel • 64 GB: 2 x 32 GB, DDR5, dual-channel

External ports and slots

The following table lists the external ports and slots of your Dell Pro 16 Plus.

Table 7. External ports and slots

Description	Values
Network port	One RJ45 ethernet port (1 Gbps)
USB ports	• Two Thunderbolt 4 ports with DisplayPort Alt Mode/USB Type-C/USB4/Power Delivery **NOTE:** You can connect a Dell Docking Station to this port. For more information, search in the Knowledge Base Resource at Dell Support Site. • One USB 3.2 Gen 1 port with PowerShare • One USB 3.2 Gen 1 port
Audio port	One global headset jack
Video port(s)	One HDMI 2.1 Transition-minimized differential signaling (TMDS) port
Media-card reader	One smart card reader slot (optional)
Power-adapter port	Supported through the USB Type-C port
Security-cable slot	One wedge-shaped security slot
SIM-card slot	Nano-SIM-card slot (optional)
SD card slot	One microSD-card slot

Internal slots

The following table lists the internal slots of your Dell Pro 16 Plus.

Table 8. Internal slots

Description	Values
M.2	• One M.2 2230 slot or M.2 2280 slot for solid state drive • One M.2 3052 slot for WWAN (optional) • One M.2 2230 slot for WLAN **NOTE:** To learn more about the features of different types of M.2 cards, search Dell Support Site.

Ethernet

The following table lists the wired ethernet Local Area Network (LAN) specifications of your Dell Pro 16 Plus.

Table 9. Ethernet specifications

Description	Values
Model	Intel I219-LM

Table 9. Ethernet specifications (continued)

Description	Values
Transfer rate	10/100/1000 Mbps

Wireless module

The following table lists the Wireless Local Area Network (WLAN) module specifications of your Dell Pro 16 Plus.

Table 10. Wireless module specifications

Description	Option one	Option two
Model number	Intel Wi-Fi 7 BE201	Intel Wi-Fi 6E AX211
Transfer rate	Up to 5760 Mbps	Up to 5760 Mbps
Frequency bands supported	2.4 GHz/5 GHz/6 GHz	2.4 GHz/5 GHz/6 GHz
Wireless standards	• WiFi 802.11a/b/g • Wi-Fi 4 (WiFi 802.11n) • Wi-Fi 5 (WiFi 802.11ac) • Wi-Fi 6E (WiFi 802.11ax) • Wi-Fi 7 (WiFi 802.11be)	• WiFi 802.11a/b/g • Wi-Fi 4 (WiFi 802.11n) • Wi-Fi 5 (WiFi 802.11ac) • Wi-Fi 6E (WiFi 802.11ax)
Encryption	• 64-bit/128-bit WEP • AES-CCMP • TKIP	• 64-bit/128-bit WEP • AES-CCMP • TKIP
Bluetooth wireless card	Bluetooth 5.4	Bluetooth 5.3
	NOTE: The functionality of the Bluetooth wireless card may vary depending on the operating system that is installed on your computer.	

WWAN module

The following table lists the Wireless Wide Area Network (WWAN) module that is supported in your Dell Pro 16 Plus.

NOTE: The WWAN module is available only on certain configurations and in certain regions.

NOTE: Availability of the eSIM feature on this module depends on your region.

NOTE: For instructions on how to setup SIM or eSIM connections on your computer, see the *SIM/eSIM Setup Guide* available with your product documentation at Dell Support Site.

Table 11. WWAN module specifications

Description	Values	Values
Model number	DW5826e Qualcomm Snapdragon X12 Global LTE-Advanced	DW5933e MediaTek T700 Global 5G Modem
Form factor	M.2 3052 Key-B	M.2 3052 Key-B
Host interface	PCIe Gen3	PCIe Gen3
Network standard	• LTE FDD • TDD • WCDMA • GPS • BDS	NR FR1(Sub6) FDD/TDD, LTE FDD/TDD, WCDMA/HSPA+, GPS/GLONASS/Galileo/BDS/QZSS

Table 11. WWAN module specifications (continued)

Description	Values	Values
	• GLONASS • Galileo • QZSS	
Transfer data rate	SA: DL 4.67 Gbps/ UL 1.25 Gbps NSA: DL 3.74 Gbps/ UL 835 Mbps LTE: DL 1.6 Gbps (CAT19)/ UL 211 Mbps UMTS: DL384 kbps/ UL 384 kbps DL DC-HSPA+:42 Mbps (CAT24)/ UL 11.5 Mbps (CAT7)	NSA: DL 3.74 Gbps/ UL 835 Mbps LTE: DL 1.6 Gbps (CAT19)/ UL 211 Mbps UMTS: DL384 kbps/ UL 384 kbps DL DC-HSPA+:42 Mbps (CAT24)/ UL 11.5 Mbps (CAT7)
Operating frequency bands	• LTE (B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B18, B19, B20, B25, B26, B28, B29, B32, B38, B39, B40, B41, B42, B43, B48, B66, B71) • WCDMA (1,2,4,5,6,8,9,19)	• LTE (1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 29, 30, 32, 34, 38, 39, 40, 41, 42, 43, 46, 66, 71) • NR (1, 2, 3, 5, 7, 8, 20, 25, 28, 38, 40, 41, 48, 66, 71, 77, 78, 79) • HSPA+ (1, 2, 4, 5, 8)
Power supply	DC 3.135 V to 4.4 V, Typical 3.3 V	DC 3.135 V to 4.4 V, Typical 3.3 V
SIM card	Supported through external SIM slot **NOTE:** The availability of eSIM functionality embedded on the module on the region and specific carrier requirements.	Supported through external SIM slot **NOTE:** The availability of eSIM functionality embedded on the module on the region and specific carrier requirements.
eSIM with dual SIM (DSSA)	Supported	Supported
Antenna diversity	Supported	Supported
Radio on/off	Supported	Supported
Wake On Wireless	Supported	Supported
Temperature	• Normal operating temperature: –30°C to +70°C • Extended operating temperature: –40°C to +85°C • Storage temperature: –40°C to +85°C	• Normal operating temperature: -10°C to + 55°C • Extended operating temperature: -40°C to +85°C • Storage temperature: –60°C to +100°C
Antenna connector	• WWAN TX0 and PRX Connector × 1 • WWAN DRX Combined GPS Connector × 1 • WWAN MIMO PRX Connector × 1 • WWAN TX1 and MIMO DRX Connector × 1 • 4x4 MIMO Antenna x2	• WWAN TX0 and PRX Connector × 1 • WWAN DRX Combined GPS Connector × 1 • WWAN MIMO PRX Connector × 1 • WWAN TX1 and MIMO DRX Connector × 1 • 4x4 MIMO Antenna x2
NOTE: For instructions to find your computer's International Mobile Equipment Identity (IMEI) number, search in the Knowledge Base Resource at Dell Support Site.		

Audio

The following table lists the audio specifications of your Dell Pro 16 Plus.

Table 12. Audio specifications

Description		Values
Audio controller		Cirrus Logic CS42L43
Stereo conversion		Supported
Internal audio interface		Soundwire Interface
External audio interface		Global headset jack
Number of speakers		Two
Internal-speaker amplifier		Supported (audio codec integrated)
External volume controls		Keyboard shortcut controls
Speaker output:		
	Average	2.0 W
	Peak	2.5 W
Microphone		Dual-array microphones in camera assembly

Storage

This section lists the storage options on your Dell Pro 16 Plus.

The availability of eSIM functionality that is embedded on the moduledepends the region and specific carrier requirements.

Table 13. Storage specifications

Storage type	Interface type	Capacity
M.2 2280 solid state drive, Self-encrypting drive, TLC	PCIe Gen4 NVMe, up to 64 Gbps	1 TB
M.2 2280 solid state drive, Self-encrypting drive, TLC	PCIe Gen4 NVMe, up to 64 Gbps	2 TB
M.2 2230 solid state drive, TLC	PCIe Gen4 NVMe, up to 64 Gbps	1 TB
M.2 2230 solid state drive, TLC	PCIe Gen4 NVMe, up to 64 Gbps	512 GB
M.2 2230 solid state drive, QLC	PCIe Gen4 NVMe, up to 64 Gbps	512 GB
M.2 2230 solid state drive, TLC	PCIe Gen4 NVMe, up to 64 Gbps	256 GB

Media-card reader

The following table provides the specification of media cards that are supported by your Dell Pro 16 Plus.

Table 14. Media-card reader specifications

Description	Values
Media-card slot type	SD card
Media-cards supported	• Secure Digital (SD) • Secure Digital High Capacity (SDHC) • Secure Digital Extended Capacity (SDXC)
NOTE: The maximum capacity of the media-card reader varies depending on the standard of the media card that is inserted in your computer.	

Keyboard

The following table lists the keyboard specifications of your Dell Pro 16 Plus.

Table 15. Keyboard specifications

Description	Values
Keyboard type	• Standard backlit keyboard • Standard non-backlit keyboard
Keyboard layout	QWERTY
Number of keys	• United States and Canada: 99 keys • United Kingdom: 100 keys • Japan: 103 keys
Key pitch	X=19.05 mm key pitch Y=18.05 mm key pitch
Keyboard shortcuts	Some keys on your keyboard have two symbols on them. These keys can be used to type alternate characters or to perform secondary functions. • To type the alternate character, press Shift and the desired key. • To perform secondary functions, press Fn and the desired key. **NOTE:** You can define the primary behavior of the function keys (F1–F12) by changing **Function Key Behavior** in the BIOS Setup program. **NOTE:** If Copilot in Windows is not available on your computer, pressing the Copilot key launches Windows search. For more information about Copilot in Windows, see the Knowledge Base Resource at the Dell Support site.

Keyboard shortcuts of Dell Pro 16 Plus

NOTE: Keyboard characters may differ depending on the keyboard language configuration. Keys that are used for shortcuts remain the same across all language configurations.

Some keys on your keyboard have two symbols on them. These keys can be used to type alternate characters or to perform secondary functions. The symbol that is shown on the lower part of the key refers to the character that is typed out when the key is pressed. If you press shift and the key, the symbol that is shown on the upper part of the key is typed out. For example, if you press **2**, 2 is typed out; if you press **Shift** + **2**, @ is typed out.

The keys F1-F12 at the top row of the keyboard are function keys for multimedia control, as indicated by the icon on the key. Press the function key to enable the task represented by the icon. For example, pressing F1 mutes the audio (see the table below).

However, if the function keys F1-F12 are needed for specific software applications, multimedia functionality can be disabled by pressing **fn** + **Esc**. Later, multimedia control can be invoked by pressing **fn** and the respective function key. For example, mute audio by pressing **fn** + **F1**.

NOTE: You can also define the primary behavior of the function keys (F1–F12) by changing **Function Key Behavior** in the BIOS setup program.

Table 16. Function key primary behavior

Function key	Primary behavior
F1	Mute or unmute audio
F2	Decrease volume
F3	Increase volume
F4	Mute/Unmute
F5	Turn on or turn off keyboard backlight (optional). **NOTE:** Nonbacklight keyboards have the F10 function key without the backlight icon and do not support the toggle keyboard backlight function. **NOTE:** Toggle to cycle the keyboard backlight status through off, low-backlight, and high-backlight.
F6	Decrease brightness
F7	Increase brightness
F8	Switch to external display
F10	Print Screen
F11	Home
F12	End

The **fn** key is also used with selected keys on the keyboard to invoke secondary functions.

Table 17. Secondary behavior

Function key	Secondary behavior
fn + F1	Operating system and application-specific F1 behavior
fn + F2	Operating system and application-specific F2 behavior
fn + F3	Operating system and application-specific F3 behavior
fn + F4	Operating system and application-specific F4 behavior
fn + F5	Operating system and application-specific F5 behavior
fn + F6	Operating system and application-specific F6 behavior
fn + F7	Operating system and application-specific F7 behavior

Table 17. Secondary behavior (continued)

Function key	Secondary behavior
fn + F8	Operating system and application-specific F8 behavior
fn + F9	Operating system and application-specific F9 behavior
fn + F10	Operating system and application-specific F10 behavior
fn + F11	Operating system and application-specific F11 behavior
fn + F12	Operating system and application-specific F12 behavior
fn + Copilot	Operating system Context menu behavior.
fn + Esc	Toggle Function key lock
fn + PgUp (cursor up)	Scroll up the document or page
fn + PgDn (cursor down)	Scroll down the document or page

Camera

The following table lists the camera specifications of your Dell Pro 16 Plus.

Table 18. Camera specifications

Description		Values
Number of cameras		One
Camera type		There are 3 camera options: • RGB camera • RGB + IR camera • MIPI + IR camera with Presence Detection (Synaptics)
Camera location		Front camera
Camera sensor type		CMOS sensor technology
Camera resolution:		
	Still image	• 2.07 megapixels • 5.20 megapixels
	Video	• 1920 x 1080 at 30 fps • 2560 x 1440 at 30 fps
Infrared camera resolution:		
	Video	640 x 360 at 15 fps
Diagonal viewing angle:		
	Camera	• 80.20 degrees • 91.20 degrees
	Infrared camera	86.60 degrees

Touchpad

The following table lists the touchpad specifications of your Dell Pro 16 Plus.

Table 19. Touchpad specifications

Description		Values
Touchpad resolution:		>=300 dpi
Touchpad dimensions:		
	Horizontal	125 mm (4.92 in.)
	Vertical	88 mm (3.46 in.)
Touchpad gestures		For more information about the touchpad gestures that are available on: • Windows, search Microsoft Support Site. • Ubuntu, search Ubuntu Support Site.

Power adapter

The following table lists the power adapter specifications of your Dell Pro 16 Plus.

Table 20. Power-adapter specifications

Description		Option one	Option two	Option three
Type		60 W adapter, USB Type-C	65 W adapter, USB Type-C	100 W adapter, USB Type-C
Power-adapter dimensions:				
	Height	22 mm (0.87 in.)	28 mm (1.10 in.)	26.5 mm (1.04 in.)
	Width	55 mm (2.16 in.)	51 mm (2.01 in.)	60 mm (2.36 in.)
	Depth	66 mm (2.60 in.)	112 mm (4.41 in.)	122 mm (4.80 in.)
Input voltage		100 VAC–240 VAC	100 VAC–240 VAC	100 VAC–240 VAC
Input frequency		50 Hz to 60 Hz	50 Hz to 60 Hz	50 Hz to 60 Hz
Input current (maximum)		1.70 A	1.70 A	1.70 A
Output current (continuous)		• 20 V/3 A (continuous) • 15 V/3 A (continuous) • 9.0 V/3 A (continuous) • 5.0 V/3 A (continuous)	• 20 V/3.25 A (continuous) • 15 V/3 A (continuous) • 9 V/3 A (continuous) • 5 V/3 A (continuous)	• 20 V/5 A (continuous) • 15 V/3 A (continuous) • 9.0 V/3 A (continuous) • 5.0 V/3 A (continuous)
Rated output voltage		• 20 VDC • 15 VDC • 9.0 VDC • 5.0 VDC	• 20 VDC • 15 VDC • 9.0 VDC • 5.0 VDC	• 20 VDC • 15 VDC • 9.0 VDC • 5.0 VDC
Temperature range:				
	Operating	0°C to 40°C (32°F to 104°F)	0°C to 40°C (32°F to 104°F)	0°C to 35°C (32°F to 95°F)
	Storage	-20°C to 70°C (-4°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)

Table 20. Power-adapter specifications (continued)

Description	Option one	Option two	Option three
CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.			

Power adapter requirements (for computers shipped with 3-cell, 45 Wh battery)

This section contains the power adapter requirements for the Dell Pro 16 Plus.

NOTE: If you did not purchase the Dell-branded power adapter that is recommended for your computer, ensure that the power adapter you use meets the following requirements:

Table 21. Power adapter requirements for Dell Pro 16 Plus

Description	Value
Power that is required from a power adapter to achieve optimal performance.	65 W
Power that is required to charge the computer at a slower speed. **NOTE:** A warning message appears informing you about the use of a lower-powered adapter and slower charging speed.	Less than 60 W
Minimum power that is required from a power adapter to operate the computer and charge the battery. **NOTE:** A warning message appears informing you about the use of a lower-powered adapter and slower charging speed.	27 W
USB Power Delivery (PD) fast charging	Supported
ExpressCharge mode	Supported **NOTE:** The ExpressCharge mode is supported only when the computer with a 45 Wh battery is connected to a power adapter rated at 65 W or higher.

Power adapter requirements (for computers shipped with 3-cell, 55 Wh battery)

This section contains the power adapter requirements for the Dell Pro 16 Plus.

NOTE: If you did not purchase the Dell-branded power adapter that is recommended for your computer, ensure that the power adapter you use meets the following requirements:

Table 22. Power adapter requirements for Dell Pro 16 Plus

Description	Value
Power that is required from a power adapter to achieve optimal performance.	100 W
Power that is required to charge the computer at a slower speed. **NOTE:** A warning message appears informing you about the use of a lower-powered adapter and slower charging speed.	Less than 60 W

Table 22. Power adapter requirements for Dell Pro 16 Plus (continued)

Description	Value
Minimum power that is required from a power adapter to operate the computer and charge the battery. **NOTE:** A warning message appears informing you about the use of a lower-powered adapter and slower charging speed.	27 W
USB Power Delivery (PD) fast charging	Supported
ExpressCharge mode	Supported **NOTE:** The ExpressCharge mode is supported only when the computer with a 55 Wh battery is connected to a power adapter rated at 65 W or higher.

Battery

The following table lists the battery specifications of your Dell Pro 16 Plus.

Table 23. Battery specifications

Description		Option one	Option two	Option three	Option four
Battery type		3-cell, 45 Wh, ExpressCharge, ExpressCharge Boost	3-cell, 55 Wh, ExpressCharge, ExpressCharge Boost	3-cell, 45 Wh, Long Life Cycle, ExpressCharge, ExpressCharge Boost	3-cell, 55 Wh, Long Cycle Life, ExpressCharge, ExpressCharge Boost
Battery voltage		11.25 V	11.70 VDC	11.25 VDC	11.70 VDC
Battery weight (minimum)		0.20 Kg (0.44 lb)	0.22 kg (0.48 lb)	0.20 kg (0.44 lb)	0.22 kg (0.48 lb)
Battery dimensions:					
	Height	72.80 mm (2.83 in.)	72.80 mm (2.83 in.)	72.80 mm (2.83 in.)	72.80 mm (2.83 in.)
	Width	254.80 mm (10.03 in.)	254.80 mm (10.03 in.)	254.80 mm (10.03 in.)	254.80 mm (10.03 in.)
	Depth	6.30 mm (0.25 in.)	6.30 mm (0.25 in.)	6.30 mm (0.25 in.)	6.30 mm (0.25 in.)
Temperature range:					
	Operating	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 60°C (32°F to 140°F)	0°C to 60°C (32°F to 140°F)
	Storage	–20°C to 65°C (-4°F to 149°F)	–20°C to 65°C (-4°F to 149°F)	–20°C to 60°C (-4°F to 140°F)	–20°C to 60°C (-4°F to 140°F)
Battery operating time		Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions.	Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions.	Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions.	Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions.
Battery charging time (approximate) **NOTE:** Control the charging time, duration,		**Standard charge/ Predominately AC User Charge Method:**	**Standard charge/ Predominately AC User Charge Method:**	**Standard charge/ Predominately AC User Charge Method:**	**Standard charge/ Predominately AC User Charge Method:**

Table 23. Battery specifications (continued)

Description	Option one	Option two	Option three	Option four
start and end time, and so on using the Dell Power Manager application. For more information about Dell Power Manager, search in the Knowledge Base Resource at Dell Support Site.	• 0°C to15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours • 16°C to 45°C maximum allowable charge time from 0% to 100% RSOC is 3 hours **ExpressCharge Method:** • 16°C to 45°C maximum allowable charge time from 0% to 80% RSOC is 1 hour • 16°C to 45°C maximum allowable charge time from 0% to 100% RSOC is 2 hours **ExpressCharge Boost charge Method:** • 16°C to 45°C maximum allowable charge time from 0% to 35% RSOC is 20 min	• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours • 16°C to 45°C maximum allowable charge time from 0% to 100% RSOC is 3 hours **ExpressCharge Method:** • 16°C to 45°C maximum allowable charge time from 0% to 80% RSOC is 1 hour • 16°C to 45°C maximum allowable charge time from 0% to 100% RSOC is 2 hours **ExpressCharge Boost charge Method:** • 16°C to 45°C maximum allowable charge time from 0% to 35% RSOC is 20 min	• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours • 16°C to 45°C maximum allowable charge time from 0% to 100% RSOC is 3 hours **ExpressCharge Method:** • 16°C to 45°C maximum allowable charge time from 0% to 80% RSOC is 1 hour • 16°C to 45°C maximum allowable charge time from 0% to 100% RSOC is 2 hours **ExpressCharge Boost charge Method:** • 16°C to 45°C maximum allowable charge time from 0% to 35% RSOC is 20 min	• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours • 16°C to 45°C maximum allowable charge time from 0% to 100% RSOC is 3 hours **ExpressCharge Method:** • 16°C to 45°C maximum allowable charge time from 0% to 80% RSOC is 1 hour • 16°C to 45°C maximum allowable charge time from 0% to 100% RSOC is 2 hours **ExpressCharge Boost charge Method:** • 16°C to 45°C maximum allowable charge time from 0% to 35% RSOC is 20 min
Coin-cell battery	No	No	No	No

CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.

CAUTION: Dell recommends that you charge the battery regularly for optimal power consumption. If your battery charge is completely depleted, connect the power adapter, turn on your computer, and then restart your computer to reduce the power consumption.

Power requirements (for computers shipped with 3-cell, 45 Wh battery)

NOTE: The information in this section is applicable to the European Union (EU) countries.

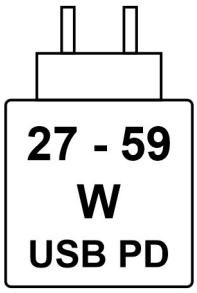


Figure 8. Pictogram for 45 Wh battery

The power that is delivered by the charger must be between a minimum of 27 Watts that is required by the radio equipment, and a maximum of 59 Watts in order to achieve the maximum charging speed.

This computer supports USB Power Delivery (PD) fast charging.

Power requirements (for computers that are shipped with a 3-cell, 55 Wh battery)

NOTE: The information in this section is applicable to the European Union (EU) countries.

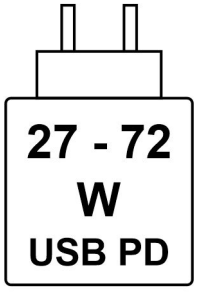


Figure 9. Pictogram for power charging requirements

The power that is delivered by the charger must be between a minimum of 27 Watts that is required by the radio equipment, and a maximum of 72 Watts in order to achieve the maximum charging speed.

This computer supports USB Power Delivery (PD) fast charging.

Display

The following table lists the display specifications of your Dell Pro 16 Plus.

Table 24. Display specifications

Description	Option one	Option two	Option three	Option four
Display type	16-inch Full High Definition Plus (FHD+)	16-inch Full High Definition Plus(FHD+)	16-inch Quad High Definition Plus (QHD+)	16-inch Full High Definition Plus (FHD+)
Display-panel technology	In-Plane Switching (IPS), White Light Emitting Diode (WLED)	In-Plane Switching (IPS), White Light Emitting Diode (WLED)	In-Plane Switching (IPS), White Light Emitting Diode (WLED)	In-Plane Switching (IPS), White Light Emitting Diode (WLED)

Table 24. Display specifications (continued)

Description		Option one	Option two	Option three	Option four
Display-panel dimensions (active area):					
	Height	215.42 mm (8.48 in.)	215.42 mm (8.48 in.)	215.42 mm (8.48 in.)	215.42 mm (8.48 in.)
	Width	344.68 mm (13.57 in.)	344.68 mm (13.57 in.)	344.68 mm (13.57 in.)	344.68 mm (13.57 in.)
	Diagonal	406.46 mm (16.00 in.)	406.46 mm (16.00 in.)	406.46 mm (16.00 in.)	406.46 mm (16.00 in.)
Display-panel native resolution		1920 x 1200	1920 x 1200	2560 x 1600	1920 x 1200
Luminance (typical)		300 nits	300 nits	300 nits	400 nits
Megapixels		2.3	2.3	4.1	2.3
Color gamut		45% NTSC	45% NTSC	100% SRGB	45% NTSC
Pixels Per Inch (PPI)		142	142	189	142
Contrast ratio (typical)		1000:01	1000:01	1000:01	800:01
Response time (maximum)		35 ms	35 ms	35 ms	35 ms
Refresh rate		60 Hz	60 Hz	120 Hz	60 Hz
Horizontal view angle		+/- 80 degrees (min)	+/- 80 degrees (min)	+/- 80 degrees (min)	+/- 80 degrees (min)
Vertical view angle		+/- 80 degrees (min)	+/- 80 degrees (min)	+/- 80 degrees (min)	+/- 80 degrees (min)
Pixel pitch		0.18 mm x 0.18 mm	0.18 x 0.18 mm	0.13 x 0.13 mm	0.18x 0.18 mm
Power consumption (maximum)		4.45 W	5.60 W	4.80 W	5.65 W
Anti-glare vs glossy finish		Anti-glare	Anti-glare	Anti-glare	Anti-glare
Touch options		No	Yes	No	No

Fingerprint reader (optional)

The following table lists the specifications of the optional fingerprint-reader of your Dell Pro 16 Plus.

Table 25. Fingerprint reader specifications

Description	Fingerprint reader on power button	FIPS 201-certified fingerprint reader on palm rest
Sensor technology	Trans-capacitive sensing	Trans-capacitive sensing
Sensor resolution	500 dpi	508 dpi
Sensor pixel size	108 mm x 88 mm	256 mm x 360 mm

GPU—Integrated

The following table lists the specifications of the integrated Graphics Processing Unit (GPU) supported by your Dell Pro 16 Plus.

Table 26. GPU—Integrated

Controller	Memory size	Processor
Intel Graphics	Shared system memory	• Intel Core i3/i5/i7 • Intel Core Ultra 5/7

Multiple display support matrix

The following table lists the multiple display support matrix for your Dell Pro 16 Plus.

Table 27. Multiple display support matrix

Graphics Card	Direct Graphics Controller Direct Output Mode	Supported external displays with computer internal display on	Supported external displays with computer internal display off
Intel Graphics	Integrated	3	4

Hardware security

The following table lists the hardware security of your Dell Pro 16 Plus.

Table 28. Hardware security

Hardware security
Trusted Platform Module (TPM) 2.0 discrete
FIPS 140-2 certification for TPM
TCG Certification for TPM (Trusted Computing Group)
Finger Print Reader in Power =Button available with ControlVault 3 Plus
ControlVault 3 Plus Advanced Authentication with FIPS 140-3 Level 3 Certification
Contacted Smart Card and ControlVault 3 Plus
Contactless Smart Card, NFC, and ControlVault 3 Plus
SED SSD NVMe, SSD, and hard drive (Opal and non-Opal) per SDL
FIPS 201 Full Scan FPR and ControlVault 3 Plus

Smart-card reader

Contactless smart-card reader

This section lists the contactless smart-card reader specifications of your Dell Pro 16 Plus.

Table 29. Contactless smart card reader specifications

Title	Description	Dell ControlVault 3 Plus Contactless smart card reader with NFC
FeliCa Card Support	Reader and software capable of supporting FeliCa contactless cards	Yes

Table 29. Contactless smart card reader specifications (continued)

Title	Description	Dell ControlVault 3 Plus Contactless smart card reader with NFC
Prox (Proximity) (125 kHz) Card support	Reader and software capable of supporting Prox /Proximity/125 kHz contactless cards	No
ISO 14443 Type A Card Support	Reader and software capable of supporting ISO 14443 Type A contactless cards	Yes
ISO 14443 Type B Card Support	Reader and software capable of supporting ISO 14443 Type B contactless cards	Yes
ISO/IEC 21481	Reader and software capable of supporting ISO/IEC 21481 compliant contactless cards and tokens	Yes
ISO/IEC 18092	Reader and software capable of supporting ISO/IEC 21481 compliant contactless cards and tokens	Yes
ISO 15693 Card Support	Reader and software capable of supporting ISO15693 contactless cards	Yes
NFC Tag Support	Supports reading and processing of NFC-compliant tag information	Yes
NFC Reader Mode	Support for NFC Forum Defined Reader mode	Yes
NFC Writer Mode	Support for NFC Forum Defined Writer mode	Yes
NFC Peer-to-Peer Mode	Support for NFC Forum Defined Peer to Peer mode	Yes
NFC Proximity OS Interface	Enumerates NFP (Near Field Proximity) device for operating system to use	Yes
PC/SC operating system interface	Personal Computer/Smart Card specification for integration of hardware readers into personal computer environments	Yes
CCID driver compliance	Common driver support for Integrated Circuit Card Interface Device for operating system level drivers	Yes
Dell ControlVault support	The device connects to Dell ControlVault for usage and processing	Yes

NOTE: 125 Khz proximity cards are not supported.

Table 30. Contactless card types supported

Interface	Card type	Supported functionality
NFC Forum (Microsoft Proximity Device)	Type 1 tag	Read/Write NDEF
	Type 2 tag	Read/Write NDEF
	Type 3 tag	Read/Write NDEF
	Type 4 tag	Read/Write NDEF
	Type 5 tag	Read/Write NDEF

Table 30. Contactless card types supported (continued)

Interface	Card type	Supported functionality
	P2P	Exchange NDEF
RFID (Microsoft Smartcard Device)	ISO14443A	Read UUID and APDU Exchange (ISO7816)
	ISO14443B	Read UUID and APDU Exchange (ISO7816)
	Sony FeliCa	Read UUID only
	Legacy iClass (ISO15693)	Read UUID only
	Mifare Classic	Read UUID only
	Low Frequency (125 KHz)	Not supported

Table 31. Supported cards

Manufacturer	Card
HID	jCOP readertest3 A card (14443a)
	1430 1L
	DESFire D8H
	DESFIRE 4K Standard - 1450NGGNN
	iClass 16K/16 - 2002PGGMN
	iClass SR 16K/16 - 2002HPGGMN
	iCLASS 2K tag
	iCLASS GP - 2003 PGGMN
	iClass Clamshell - 2080PMSMV
	iClass Prox 16K/16 - 2022BGGMNN
	Mifare M1P 1430 NGGNN
	iclass Prox 2020BGGMNM
	DesFire D8P 1456CSGMN
	iCLASS MIFARE Px GM49Y 2623BNPGGBNAB
	iCLASS MIFARE Px 8M1L
	iClass SEOS JW 5006PGGMN
	Crescendo iCLASS Px G8H
	iCLASS Seos IY
	SEOS JMC4 J1Y 5806VNG1NNN4
	SEOS Key FOB 5266PNNA
	SEOS Clamshell 5656PMSAV
	SEOS + Prox 5106RGGMNN
	SEOS + DESFire 5906PNG1ANN7
	SEOS iClass 5006PGGMN7
	Seos Essential + Prox 551PPGGANN
	iCLASS 2K 2000PGGMN
	iCLASS 2K 3000PGGMN

Table 31. Supported cards (continued)

Manufacturer	Card
	MIFARE DESFire 3700CPGGAN
	iCLASS DP
	DESFire 1Y
NXP/Mifare	Mifare DESFire 8K White PVC card
	Mifare Classic 1K White PVC card
	NXP Mifare Classic S50 ISO card
	Mifare DESFire 2K
	Mifare Plus S 2K/4K
	Mifare Plus X 4K
G&D	idOnDemand - SCE3.2 144K
	SCE6.0 FIPS 80K Dual + 1K Mifare
	SCE6.0 nonFIPS 80K Dual + 1K Mifare
	SCE6.0 FIPS 144K Dual + 1K Mifare
	SCE6.0 nonFIPS 144K Dual + 1K Mifare
	SCE7.0 FIPS 144K
Oberthur	idOnDemand - OCS5.2 80K
	ID-One Cosmo 64 RSA D V5.4 T = 0 card
	ID-One Cosmo 128K V5.5 card
Gemalto	TOP DL GX4 144K card
Sony	FeliCa RC-S962
	FeliCa RC-S965
	FeliCa RC-S966
PIVKey	C910 PKI
NIST	PIV1
IDENTIV	PIV programmed cards
	uTrust
Transport cards	Oyster (London) MIFARE DESFire
	T-Money (Korea)
	Octopus Card (Hong Kong)
	SUICA (Japan)

Table 32. Qualified NFC tags

NFC tag	Supported
Tap and do - NFC Forum Type 1 Tag - Topaz 512 (BCM920203)	Yes
Tap and do - NFC Forum Type 1 Tag - Topaz 512 (BCM20203T512)	Yes
Tap and do - NFC Forum Type 1 Tag - Topaz (BCM20203T96)	Yes
Tap and do - NFC Forum Type 2 Tag - Mifare UltraLight	Yes

Table 32. Qualified NFC tags (continued)

NFC tag	Supported
Tap and do - NFC Forum Type 2 Tag - Mifare UltraLight C	Yes
Tap and do - NFC Forum Type 2 Tag - NTAG203	Yes
Tap and do - NFC Forum Type 3 Tag - FeliCa Lite RC-S965	Yes
Tap and do - NFC Forum Type 3 Tag - FeliCa RC-S962	Yes
Tap and do - NFC Forum Type 4 Tag - Mifare DESFire EV1Card 2K	Yes
Tap and do - NFC Forum Type 4 Tag - Mifare DESFire EV1Card 4K	Yes
Tap and do - NFC Forum Type 4 Tag - Mifare DESFire EV1Card 8K	Yes
Tap and do - ISO 15693 - Tag-it Plus	Yes
HID I-code ISO card	Yes

Contacted smart-card reader

The following table lists the contacted smart-card reader specifications of your Dell Pro 16 Plus.

Table 33. Contacted smart card reader specifications

Title	Description	Dell ControlVault 3 Plus Contacted smart card reader
ISO 7816-3 Class A Card Support	Reader capable of reading 5 V powered smart card	Yes
ISO 7816-3 Class B Card Support	Reader capable of reading 3 V powered smart card	Yes
ISO 7816-3 Class C Card support	Reader capable of reading 1.8 V powered smart card	Yes
T = 0 support	Cards support character level transmission	Yes
T = 1 support	Cards support block level transmission	Yes
EMVCo Certified	Formally certified based on EMVCo smart card standards	Yes
PC/SC operating system interface	Personal Computer/Smart Card specification for integration of hardware readers into personal computer environments	Yes
CCID driver compliance	Common driver support for Integrated Circuit Card Interface Device for operating system level drivers	Yes
Windows Certified	Certified by the Windows Hardware Certification program	Yes
FIPS 201 (PIV/HSPD-12) Compliant	Device compliant with FIPS 201/PIV/ HSPD-12 requirements	Yes
ISO 7816-1 Compliant	Specification for the physical characteristics of integrated circuit cards with contacts	Yes

Table 33. Contacted smart card reader specifications (continued)

Title	Description	Dell ControlVault 3 Plus Contacted smart card reader
ISO 7816-2 Compliant	Specification for the dimensions and location of the contacts	Yes
ISO 7816-3 Compliant	Specification for electrical interface and transmission protocols	Yes
ISO 7816-4 Compliant	Specification for organization, security, and commands for interchange	Yes
Dell ControlVault support	The device connects to Dell ControlVault for usage and processing	Yes

Operating and storage environment

This table lists the operating and storage specifications of your Dell Pro 16 Plus.

Airborne contaminant level: G1 as defined by ISA-S71.04-1985

Table 34. Computer environment

Description	Operating	Storage
Temperature range	0°C to 35°C (32°F to 95°F)	-40°C to 65°C (-40°F to 149°F)
Relative humidity (maximum)	10% to 90% (non-condensing)	0% to 95% (non-condensing)
Vibration (maximum)*	0.66 GRMS	1.30 GRMS
Shock (maximum)	110 G†	160 G†
Altitude range	-15.2 m to 3048 m (4.64 ft to 5518.4 ft)	-15.2 m to 10668 m (4.64 ft to 19234.4 ft)
CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.		

* Measured using a random vibration spectrum that simulates the user environment.

† Measured using a 2 ms half-sine pulse.

4

Working inside your computer

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 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 Dell Regulatory Compliance Home Page.

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.

WARNING: For laptops, discharge the battery completely before removing it. Disconnect the AC power adapter from the computer 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.

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

CAUTION: You should only perform troubleshooting and repairs as authorized or directed by the Dell technical support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

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

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 connector on the cable is correctly oriented and aligned with the port.

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

Before working inside your computer

Steps

1. Save and close all open files and exit all open applications.
2. Shut down your computer. For Windows operating system, click **Start** > **Power** > **Shut down**.

   NOTE: If you are using a different operating system, see the documentation of your operating system for instructions.
3. Turn off all the attached peripherals.
4. Disconnect your computer from the electrical outlets.
5. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.
6. Remove any media card and optical drive from your computer, if applicable.
7. To clean the air vents, use a soft brush and move vertically.

NOTE: Do not remove the base cover or use any blower to clean the vents.

8. Enter the Service Mode.

   Service Mode

   Service Mode is used to cut off power without disconnecting the battery cable from the system board before conducting repairs in the computer.

   CAUTION: If you are unable to turn on the computer to put it into Service Mode, proceed to disconnect the battery cable. To disconnect the battery cable, follow the steps in Removing the battery.

   NOTE: Ensure that your computer is shut down and the power adapter is disconnected.

   a. Press and hold the B key and the power button for 3 seconds or until the Dell logo appears on the screen.
   b. Press any key to continue.
   c. If the power adapter is not disconnected, a message prompting you to disconnect the power adapter appears on the screen. Disconnect the power adapter and then press any key to enter into the Service Mode. The Service Mode process automatically skips the following step if the **Owner Tag** of the computer is not set up in advance by the user.
   d. When the **ready-to-proceed** message appears on the screen, press any key to proceed. The computer emits three short beeps and shuts down immediately.
      The computer shuts down and enters the Service Mode.

Safety precautions

This section details the primary steps to be followed before disassembling any device or component.

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

- Turn off the computer and all attached peripherals.
- Disconnect the computer from AC power.
- Disconnect all network cables and peripherals from the computer.
- Use an ESD field service kit when working inside your computer to avoid electrostatic discharge (ESD) damage.
- Place the removed component on an anti-static mat after removing it from the computer.
- Press and hold the power button for 15 seconds to discharge the residual power in the system board.

Bonding

Bonding is a method for connecting two or more grounding conductors to the same electrical potential. This is done by using a field service electrostatic discharge (ESD) kit. When connecting a bonding wire, ensure that it is connected to bare metal and never to a painted or nonmetal surface. Ensure that the wrist strap is secure and in full contact with your skin. Remove all jewelry, watches, bracelets, or rings before grounding yourself and the equipment.

Electrostatic discharge—ESD protection

ESD is a major concern when you handle electronic components, especially sensitive components such as expansion cards, processors, memory modules, and system boards. A slight charge 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.

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 module that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code that is 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 memory module receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms that are 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, and so on.

Intermittent failures that are also called latent or "walking wounded" are difficult to detect and troubleshoot.

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. Wireless anti-static straps 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, use the anti-static wrist strap to discharge the static electricity from your body.

  NOTE: You can protect against ESD and discharge static electricity from your body by touching a metal-grounded object before you interact with anything electronic, for example, an unpainted metal surface on your computer's I/O panel. When connecting a peripheral (including handheld digital assistants) to your computer, you should always ground both yourself and the peripheral before connecting it to the computer. In addition, as you work inside the computer, periodically touch a metal-grounded object to remove any static charge that your body may have accumulated.

  For more information about the wrist strap and ESD wrist strap tester, see Components of an ESD Field Service Kit.
- 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.

CAUTION: It is critical to keep ESD-sensitive devices away from internal parts that are insulated and often highly charged, such as plastic heat sink casings.

Working environment

Before the ESD Field Service kit is deployed, conduct an evaluation of the site to ensure proper setup and readiness. For example, deploying the kit for a server environment is different than for a desktop or laptop environment. Servers are typically installed in a rack within a data center; desktops or laptops 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 computer 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 component 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 anti-static mat, in the computer, or inside an ESD bag.

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 anti-static mat and to any bare metal on the computer being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the anti-static mat. ESD-sensitive items are safe in your hand, on the anti-static mat, in the computer, or inside an ESD bag.
- **Wrist Strap and Bonding Wire** – If an anti-static mat is not being used, the wrist strap and bonding wire should be connected directly between your wrist and an exposed metal part of the hardware. If you are using an anti-static mat, connect the wrist strap and bonding wire to the anti-static mat to ensure protection for any hardware placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the anti-static mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, anti-static mat, and bonding wire. Never use wireless wrist

straps. Always be cautious 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 an ESD strap are prone to damage over time. When using an unmonitored ESD kit, it is recommended to test the wrist strap regularly—ideally before each service session, and at a minimum, once per week. The most reliable method for testing is with a wrist strap tester. To perform the test, connect the bonding wire of the wrist strap to the tester while wearing the strap. Press the test button to initiate the check. A green LED indicates a successful test, while a red LED and audible alarm signal a failure.

NOTE: It is recommended to always use the traditional wired ESD grounding wrist strap and protective anti-static mat when servicing Dell products. In addition, it is critical to keep sensitive parts separate from all insulator parts while servicing the computer.

Transporting sensitive components

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

After working inside your 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, disks, or any other parts that you removed before working on your computer.
4. Connect your computer to their electrical outlets.

   NOTE: To exit service mode, ensure to connect the AC adapter to the power-adapter port on your computer.

5. Press the power button to turn on the computer.

BitLocker

When updating the BIOS on a computer with BitLocker enabled, consider the following precautions.

CAUTION: If BitLocker is not suspended before updating the BIOS, the BitLocker key will not be recognized the next time that you reboot the computer. You are prompted to enter the recovery key to progress, and the computer displays a prompt for the recovery key on each reboot. If the recovery key is not known, this can result in data loss or an operating system reinstall. For more information, see Knowledge Article: updating the BIOS on Dell computers with BitLocker enabled.

The installation of the following components triggers BitLocker:

- Hard disk drive or solid state drive
- System board

Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #0
- Phillips screwdriver #1
- Flat-head slotted screwdriver (less than 4 mm)
- Plastic scribe

Screw list

NOTE: When removing screws from a component, it is recommended to note the screw type and 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.

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

NOTE: Screw color may vary depending on the configuration ordered.

Table 35. Screw list

Component	Screw type	Quantity	Screw image
Base cover	Captive screws	8	
Battery	M2x4 Captive screws	1 4	 
Battery Spacer	M2x4	2	
Wirelesscard	M2x2.5	1	
WLAN bracket	M2x2.5	1	
5G WWAN-card bracket	M1.6x3.2	1	
4G WWAN-card bracket	M1.6x3.2	1	
Solid state drive bracket	M2x3	2	
M.2 2230 solid state drive	M2x4	1	
M.2 2280 solid state drive	M2x4	1	
Fan	M2x4	3	
Speaker	M1.6x3	4	
Heat sink	Captive screw	4	
Display-cable bracket	M2x2.5	2	
System board	M2x3.5	2	

Table 35. Screw list (continued)

Component	Screw type	Quantity	Screw image
	M2x2.5	8	
Type-C bracket	M2x3.5	2	
Power button with fingerprint reader	M2x2	2	
I/O Board	M1.2x1.4	4	
Keyboard	M2x2.2	22	
Smart card reader	M2x2.2	4	
Display-cable bracket	M2x3	2	
Fingerprint-reader	M2x4	3	
Display panel	M2x2.5	2	
FIPS bracket	M2x3	1	
Display hinges	M2.5x5	6	
Display-hinge cap	M2.5x3.5	2	
USH Board	M2x2	2	
Type-C module	M2x5	3	

Major components of Dell Pro 16 Plus

The following image shows the major components of Dell Pro 16 Plus.

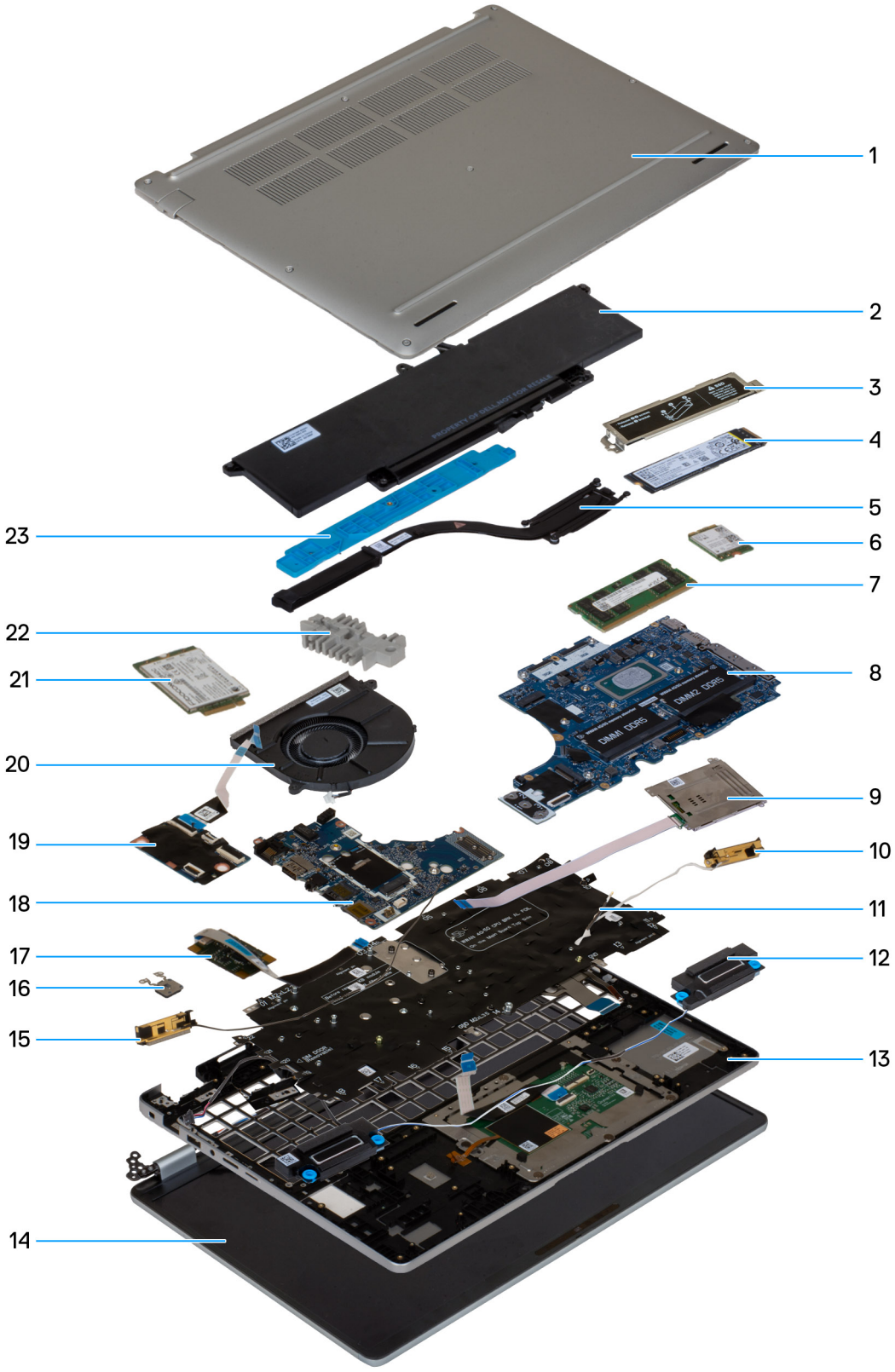


Figure 10. Major Components of your system/Exploded View

1. Base cover
2. Battery

3. Solid state drive shield
4. Solid state drive
5. Heatsink
6. WLAN card
7. Memory
8. System board
9. Smart card reader (optional)
10. WLAN-Antenna
11. Keyboard
12. Speaker
13. Palmrest
14. Display assembly
15. WLAN-Antenna
16. Power button
17. Finger print reader (optional)
18. I/O board
19. USH board
20. Fan
21. 5G/4G WWAN
22. keyboard filler
23. Battery support bracket

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

5

Removing and installing Customer Replaceable Units (CRUs)

The replaceable components in this chapter are Customer Replaceable Units (CRUs).

CAUTION: Customers can replace only the Customer Replaceable Units (CRUs) following the safety precautions and replacement procedures.

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

SIM-card tray (optional)

Removing the SIM-card tray (optional)

Prerequisites

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

NOTE: The procedure for SIM-card tray removal is only applicable for computers that are shipped with a WWAN module.

CAUTION: Removing the SIM-card tray when the computer is turned on can cause data loss or damage to the card. Ensure that your computer is turned off or the network connections are disabled.

About this task

The following images indicate the location of the SIM-card tray and provide a visual representation of the removal procedure.

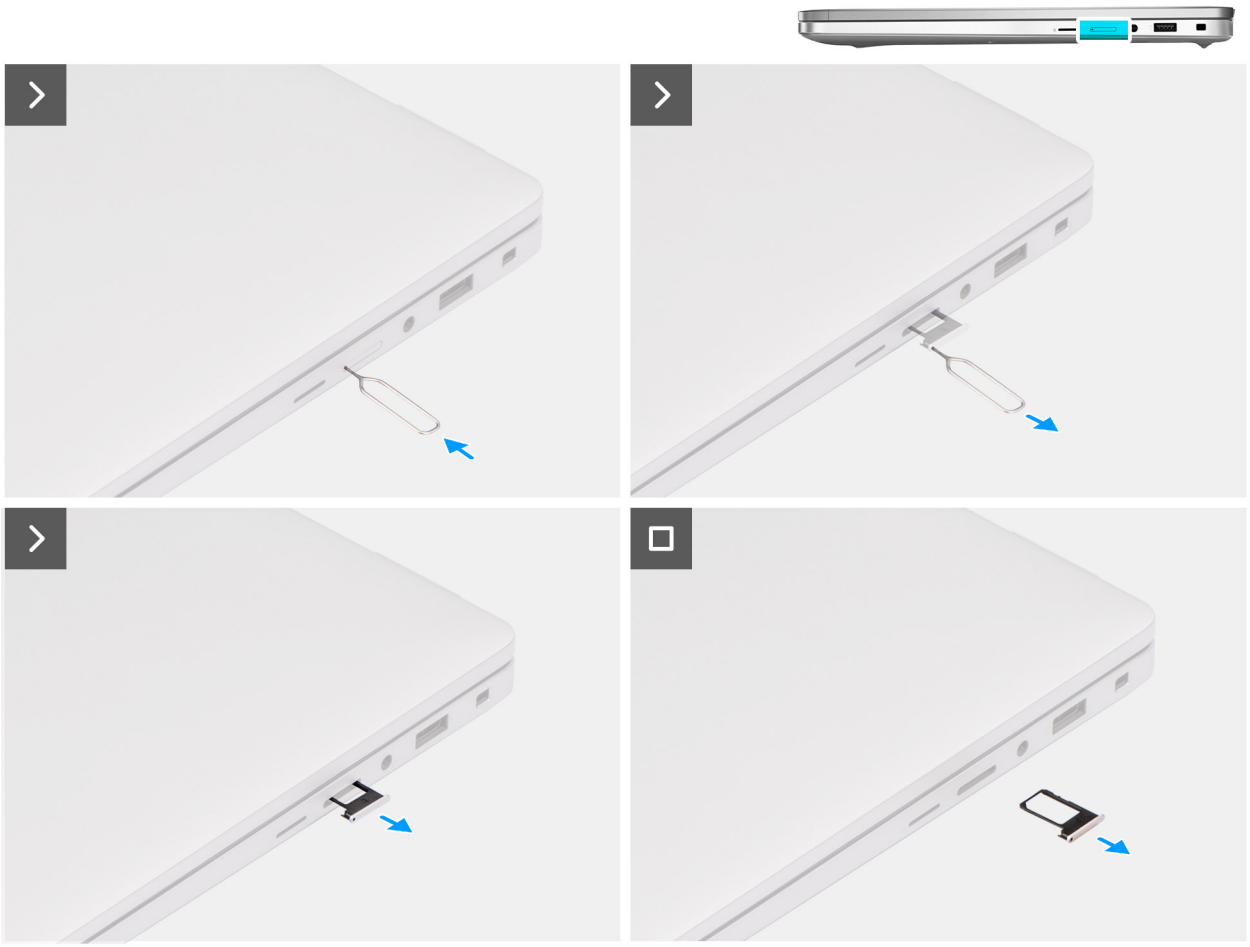


Figure 11. Removing the SIM-card tray

Steps

1. Insert a SIM-ejector pin into the release hole to release the SIM-card tray.
2. Push the SIM-ejector pin to disengage the lock, and eject the SIM-card tray.
3. Slide the SIM-card tray out of the slot on the computer.

Installing the SIM-card tray (optional)

Prerequisites

NOTE: The procedure for SIM card installation is only applicable for computers that are shipped with a WWAN module.

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

About this task

The following images indicate the location of the SIM card and provide a visual representation of the installation procedure.

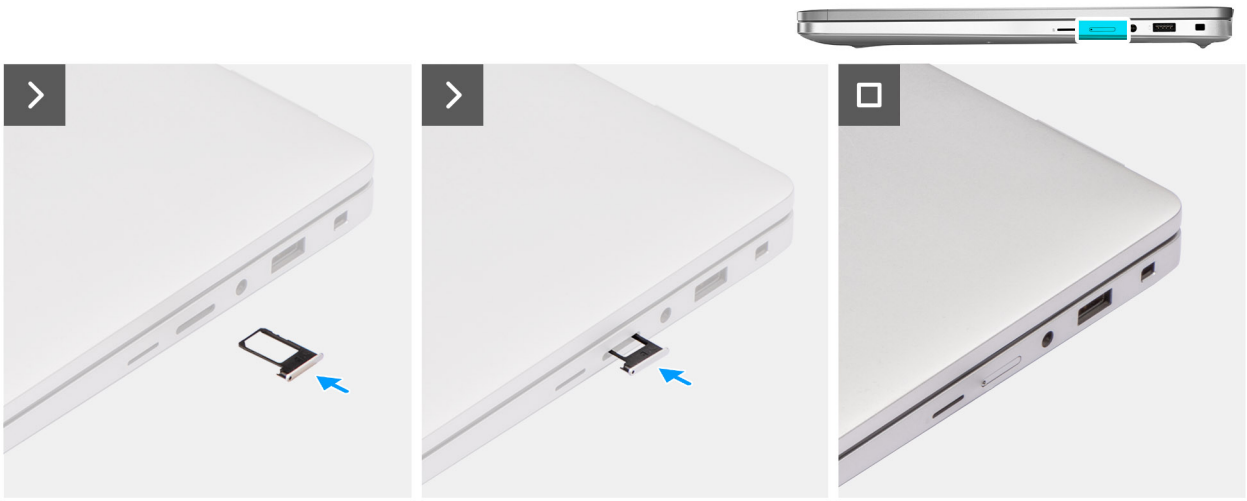


Figure 12. Installing the SIM-card tray

Steps

1. Align the SIM-card tray with the slot on the computer and carefully slide it in.
2. Slide the SIM-card tray into the slot, until it clicks into place.

Next steps

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

Base cover

Removing the base cover

Prerequisites

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

NOTE: Ensure that your computer is in Service Mode. For more information, see Before working inside your computer.

CAUTION: If you are unable to turn on the computer, if your computer is unable to enter Service Mode, or the computer does not support Service Mode, proceed to disconnect the battery cable.

2. Remove the SIM-card tray (optional).

About this task

NOTE: Before removing the base cover, ensure that there is no microSD-card that is installed in the microSD-card slot on your computer.

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

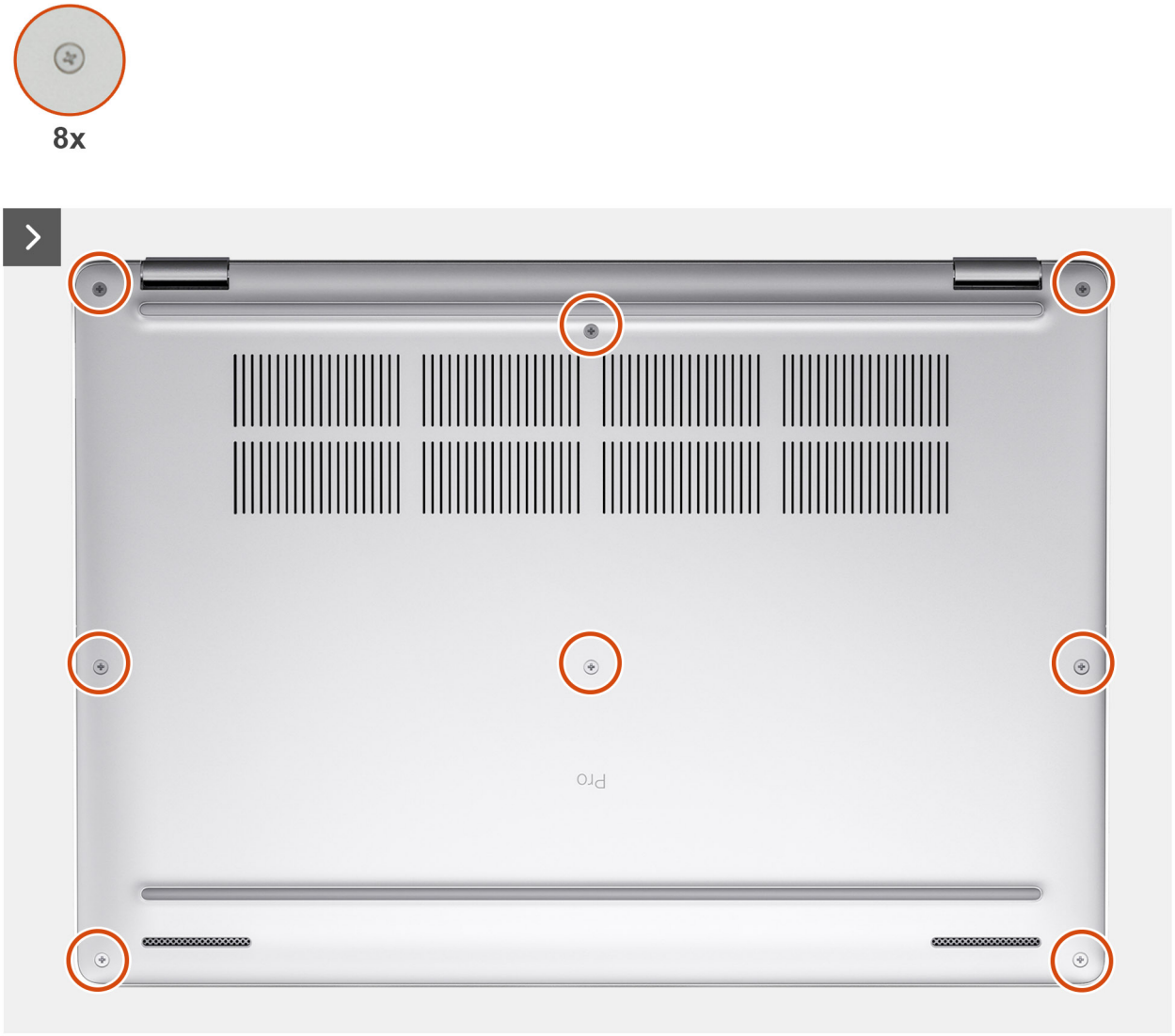


Figure 13. Removing the base cover

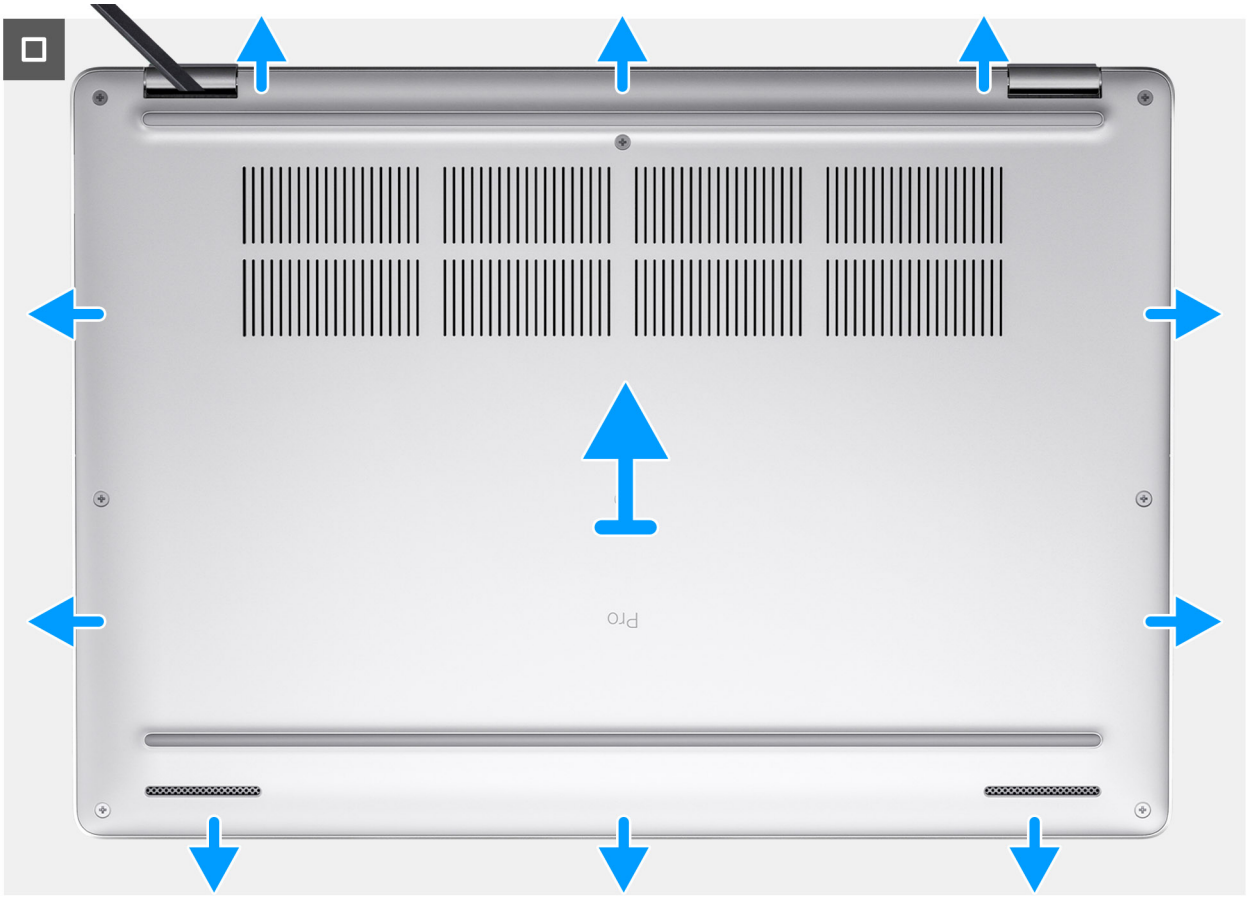


Figure 14. Removing the base cover

Steps

1. Loosen the eight captive screws that secure the base cover to the palm-rest assembly.
2. Using a plastic scribe, pry open the base cover from the recesses that are located in the U-shaped indents at the top edge of the base cover near the hinges.
3. Lift the base cover off the palm-rest assembly.

NOTE:

Ensure that your computer is in Service Mode. If your computer is unable to enter Service Mode, peel off the tape and disconnect the battery cable from the battery-cable connector (BATT1) on the system board. Press and hold the power button for five seconds to ground the computer and drain the flea power.

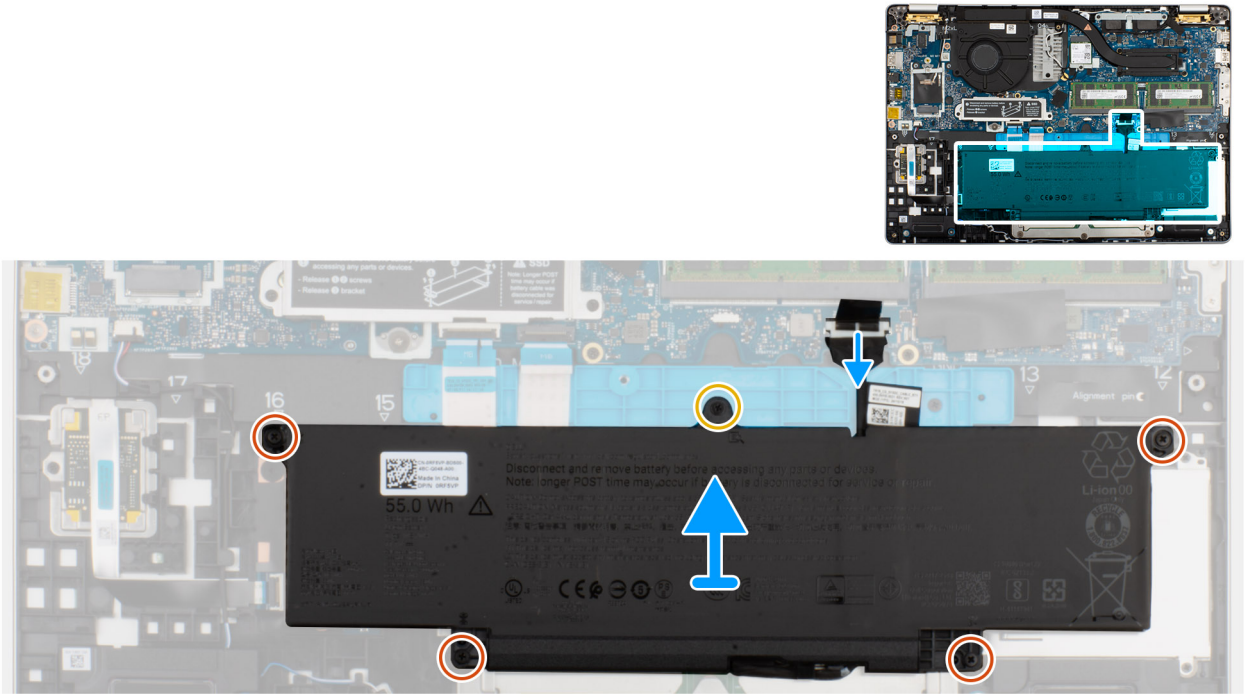


Figure 15. Disconnecting the battery cable

4. Press and hold the power button for five seconds to ground the computer and drain the flea power.

Installing the base cover

Prerequisites

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

About this task

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

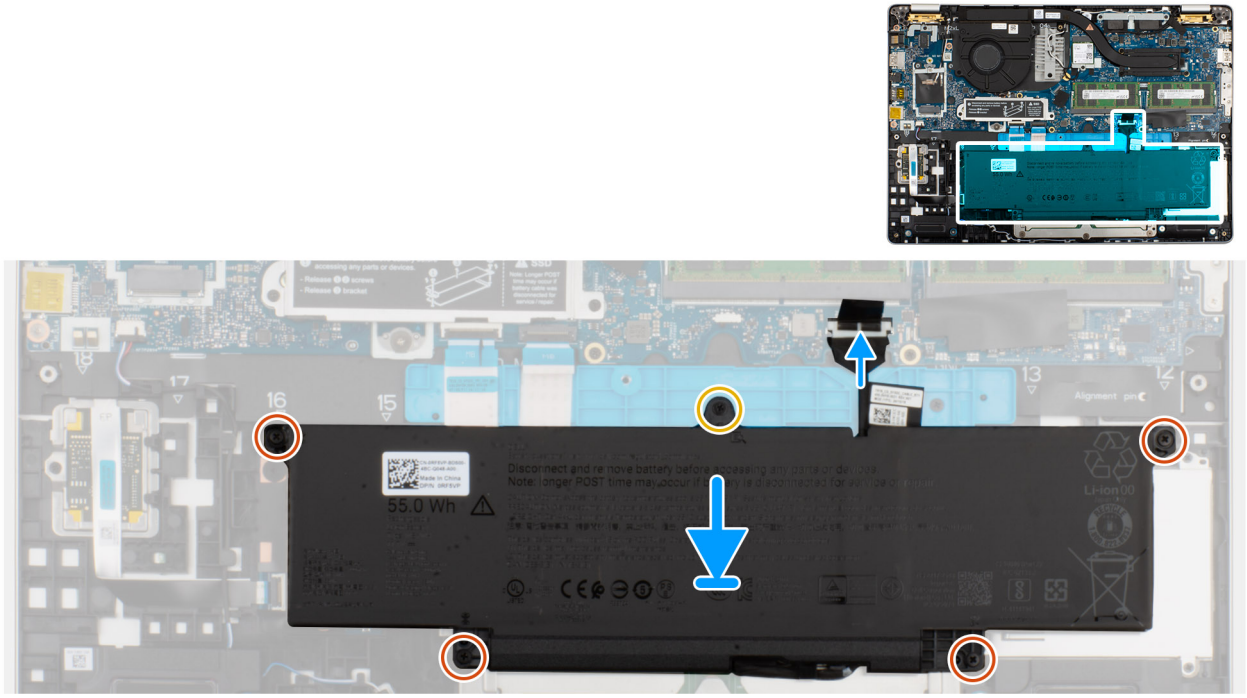
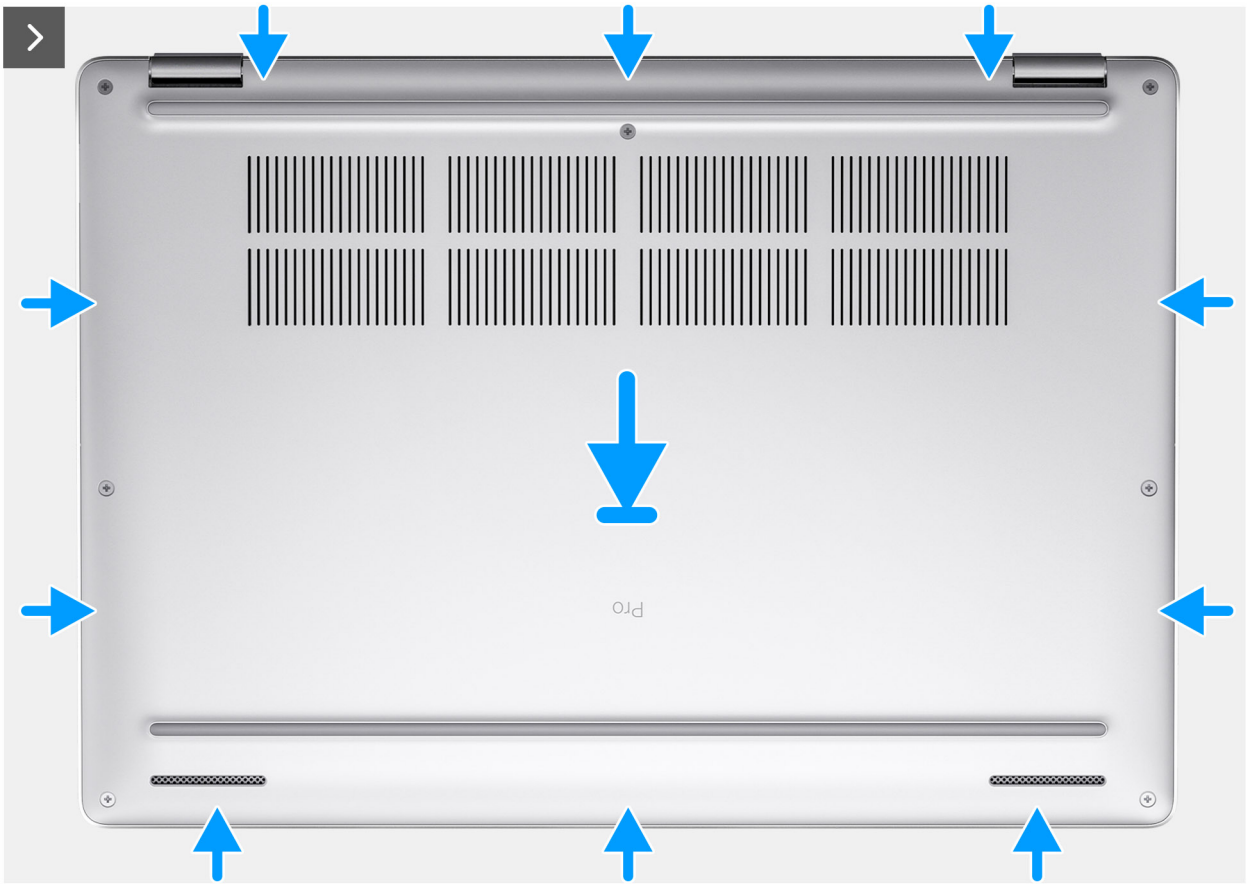
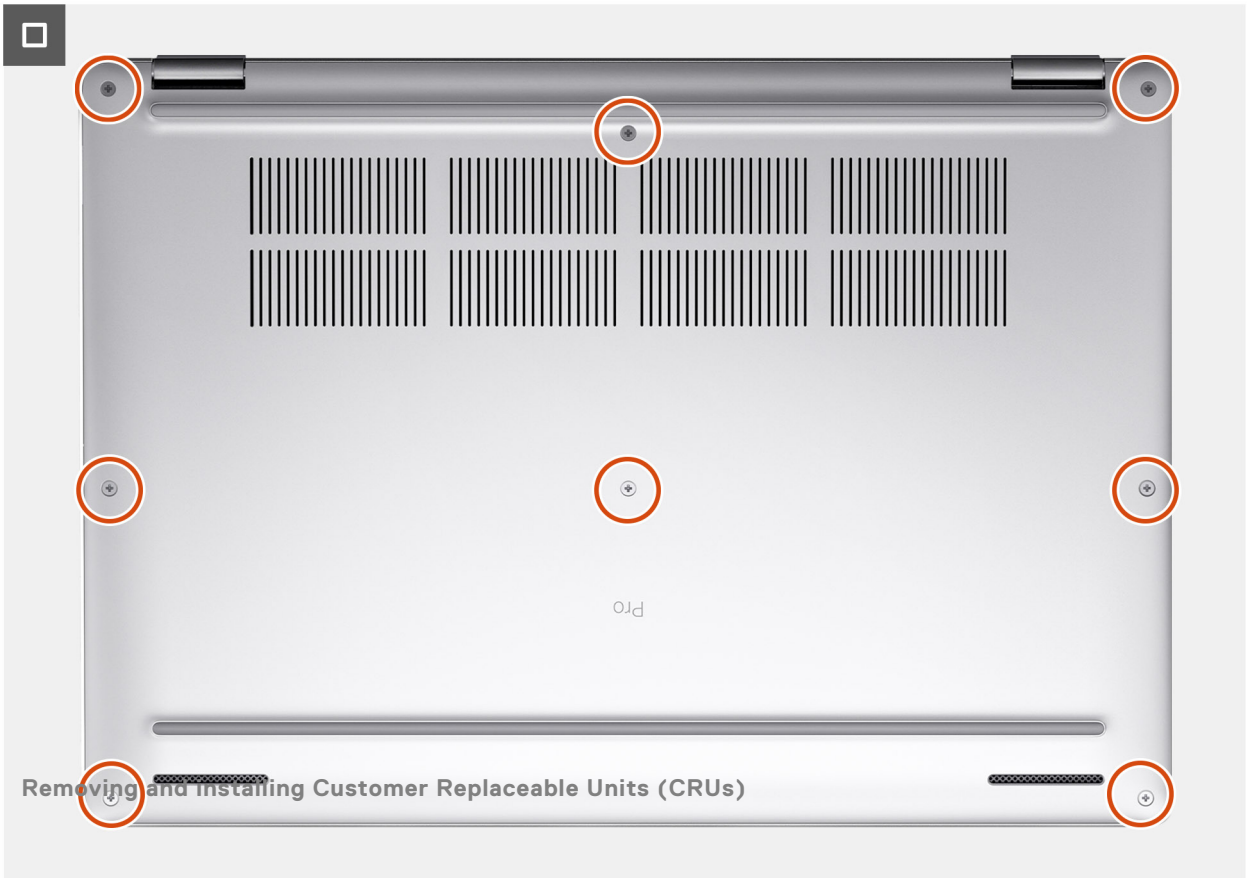


Figure 16. Connecting the battery cable



8x



NOTE: If you have disconnected the battery cable, ensure to connect the battery cable. To connect the battery cable, follow step 1 in the procedure.

Steps

1. Connect the battery cable to the battery-cable connector (BATT1) on the system board.
2. Adhere the tape on the battery cable to the battery.
3. Align the screw holes on the base cover with the screw holes on the palm-rest assembly, and then snap the base cover into place.
4. Tighten the eight captive screws that secure the base cover to the palm-rest assembly.

Next steps

1. Install the SIM-card tray (optional).
2. Follow the procedure in After working inside your computer.

NOTE: Ensure that your computer is in Service Mode. For more information, see Before working inside your computer.

Battery

Rechargeable Li-ion battery precautions

WARNING:

- **Exercise caution when handling rechargeable Li-ion batteries.**
- **Discharge the battery completely before removing it. Disconnect the AC power adapter from the computer 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.**
- **To prevent accidental puncture or damage to the battery and other components, ensure that no screws are lost or misplaced during the servicing of the computer.**
- **Always purchase genuine batteries from Dell Site 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 rechargeable Li-ion batteries, see Handling swollen rechargeable Li-ion batteries.**

Removing the battery

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

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

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

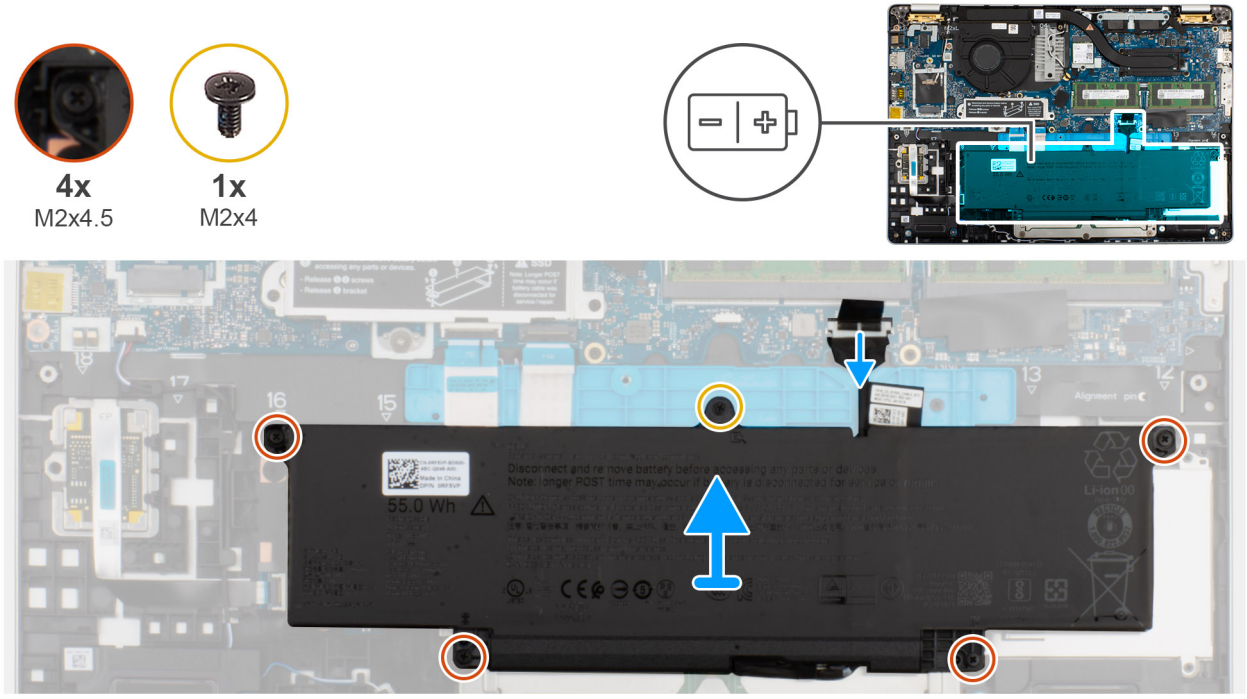


Figure 18. Removing the battery

Steps

1. Disconnect the battery cable from the battery cable connector (BATT1) on the system board (if not disconnected earlier).
2. Loosen the four captive screws that secure the battery to the palm-rest assembly.
3. Lift the battery off the palm-rest assembly.
4. If you are replacing the battery, remove the battery cable to transfer it to the replacement battery. For more information, see Removing the battery cable .

Installing the battery

Prerequisites

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

About this task

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

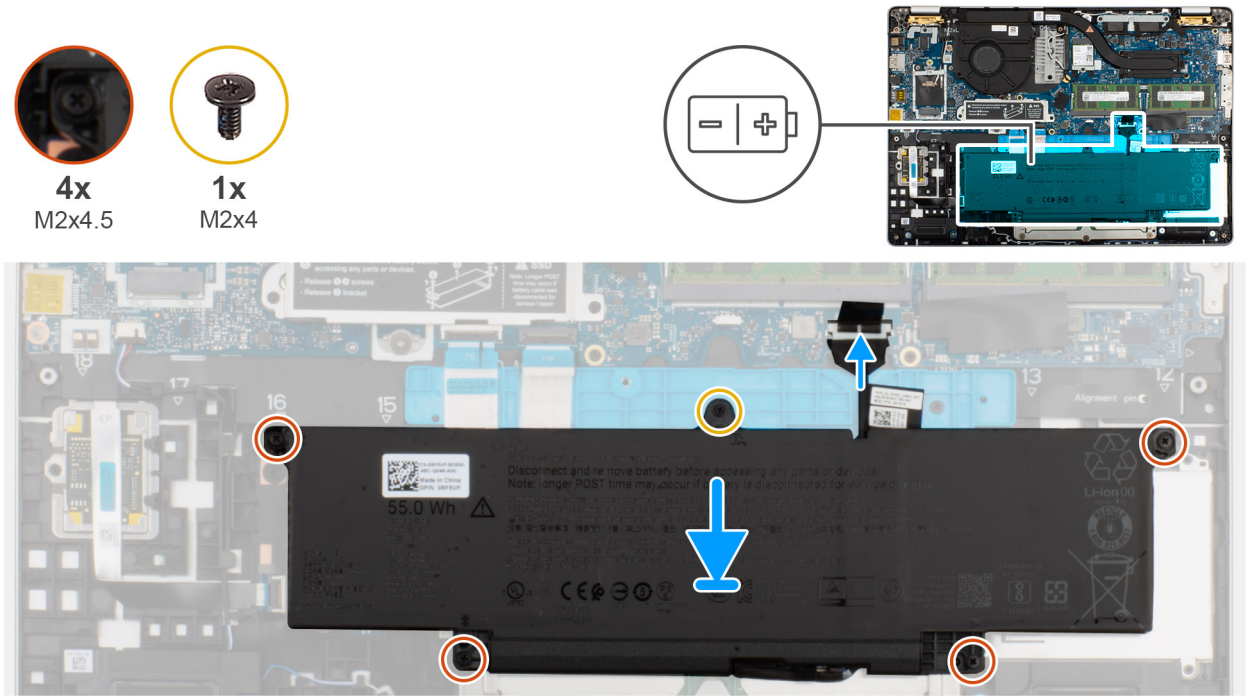


Figure 19. Installing the battery

Steps

1. If the battery cable was removed for replacing the battery you must transfer the battery cable from the old battery to the replacement battery. For more information, see Installing the battery cable.
2. Using the alignment posts, place the battery on the palm-rest assembly.
3. Align the screw holes on the battery with the screw holes on the palm-rest assembly.
4. Tighten the four captive screws that secure the battery to the palm-rest assembly.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Battery cable

Removing the battery cable

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

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

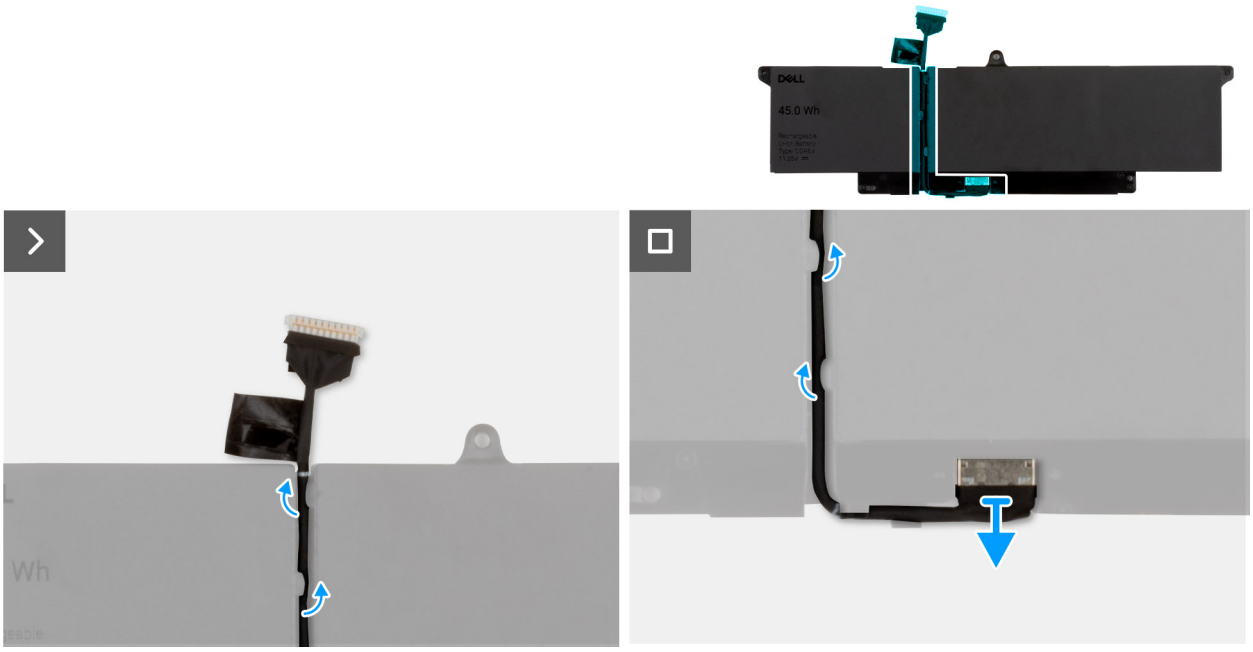


Figure 20. Removing the battery cable

Steps

1. Unroute the battery cable from the routing guides on the battery.
2. Pull the battery cable downward to disconnect the cable from the connector and remove it from the battery.

Installing the battery cable

Prerequisites

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

About this task

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

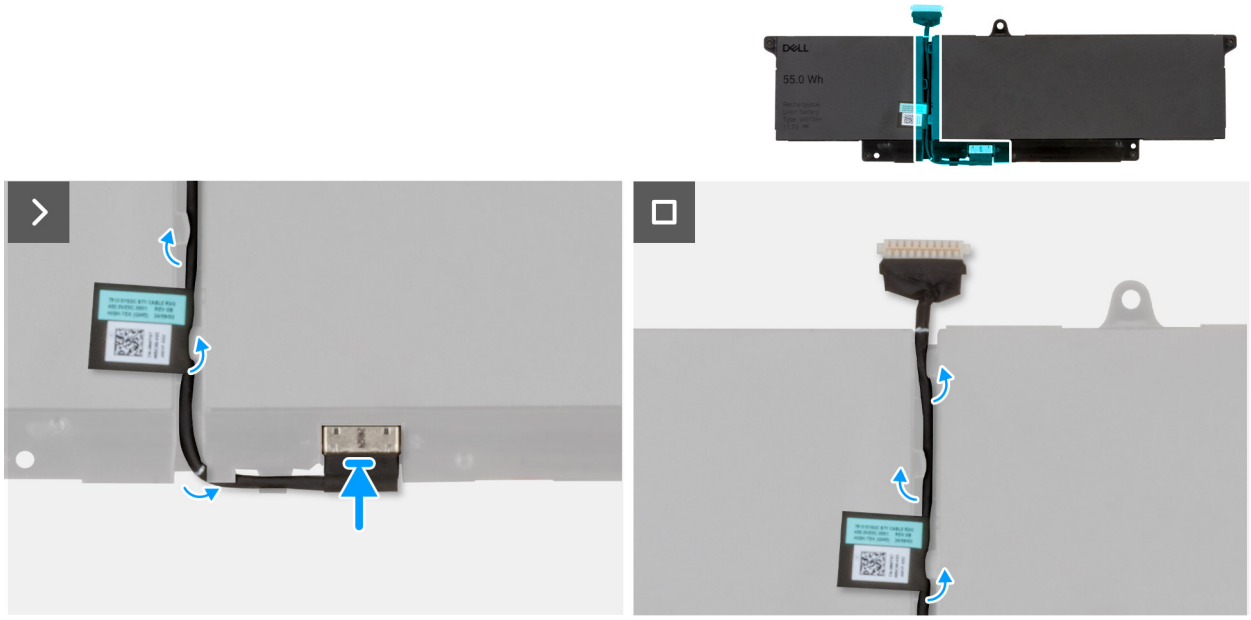


Figure 21. Installing the battery cable

Steps

1. Connect the battery cable to the connector on the battery.
2. Route the battery cable along the routing guides on the battery.

   NOTE: When installing the battery cable, ensure that the cable is properly routed under the securing tabs.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Memory module

Removing the memory module

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

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

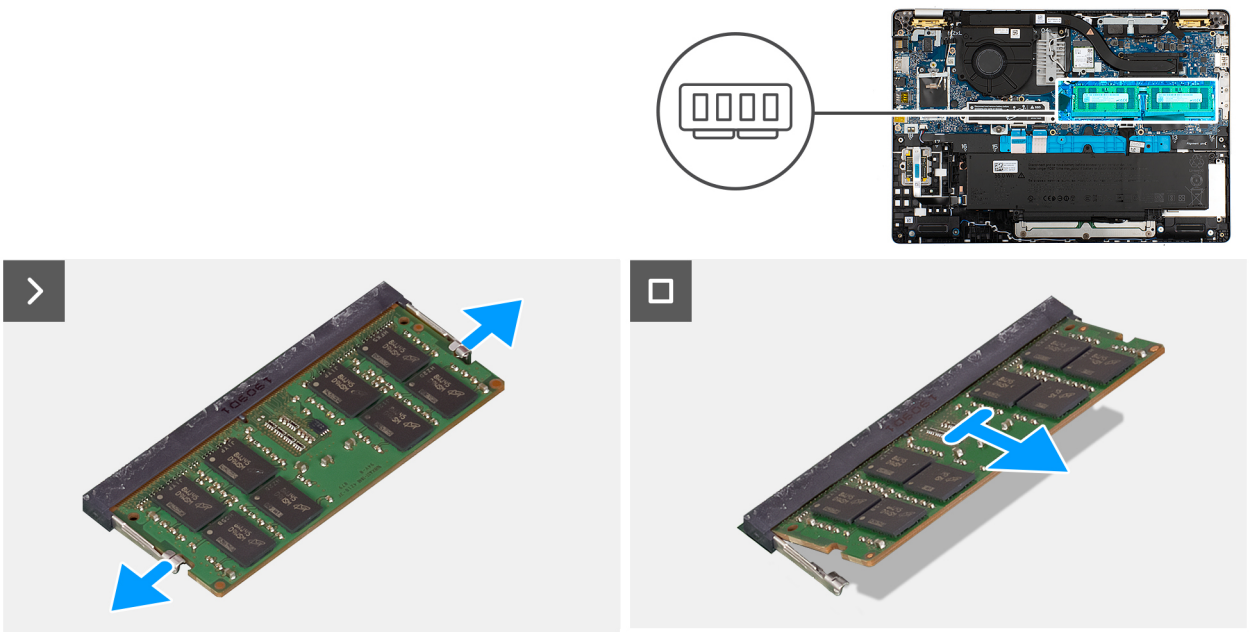


Figure 22. Removing the memory module

Steps

1. Using your fingertips, spread apart the securing clips on the memory-module slot until the memory module pops up.
2. Slide and remove the memory module from the memory-module slot on the system board.

NOTE: Repeat step 1 and step 2 if there is more than one memory module installed on your computer.

CAUTION: To prevent damage to the memory module, hold the memory module by the edges. Do not touch the components or metallic contacts on the memory module as electrostatic discharge (ESD) can inflict severe damage on the components. To read more about ESD protection, see ESD protection.

Installing the memory module

Prerequisites

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

About this task

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

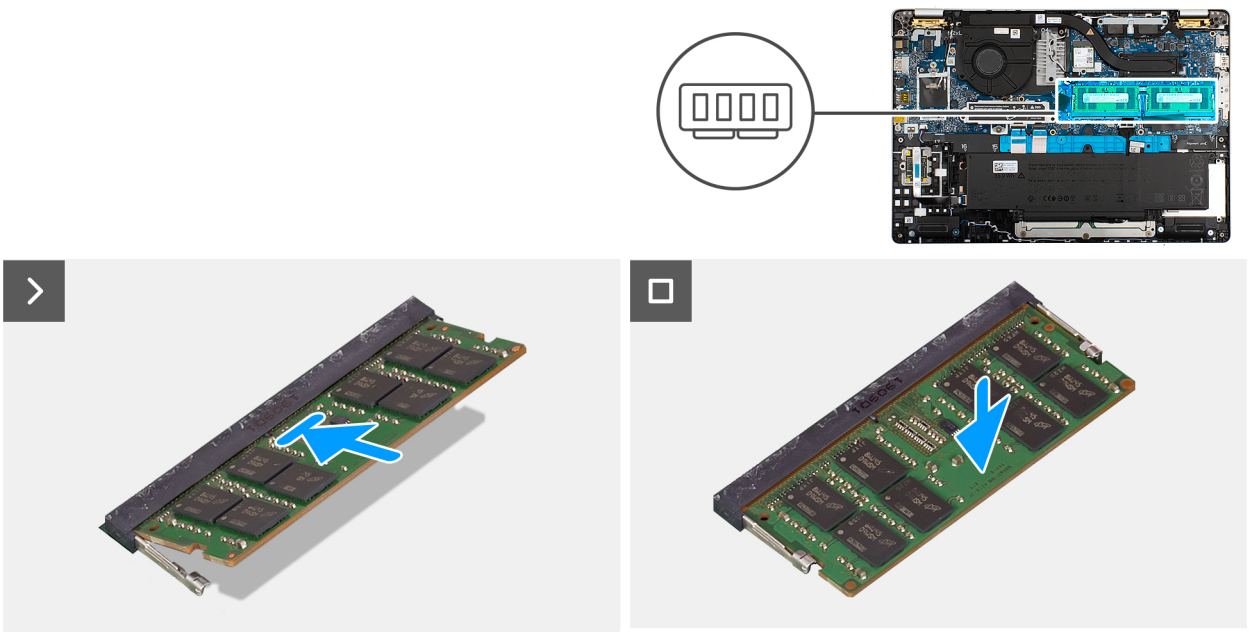


Figure 23. Installing the memory modules

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 and 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.

CAUTION: To prevent damage to the memory module, hold the memory module by the edges. Do not touch the components or metallic contacts on the memory module as electrostatic discharge (ESD) can inflict severe damage on the components. To read more about ESD protection, see ESD protection.

Next steps

1. Install the SIM-card tray (optional).
2. Install the base cover.
3. Follow the procedure in After working inside your computer.

Solid State Drive (SSD)

Removing the M.2 2230 SSD

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

The following images indicate the location of the M.2 2230 SSD and provide a visual representation of the removal procedure.

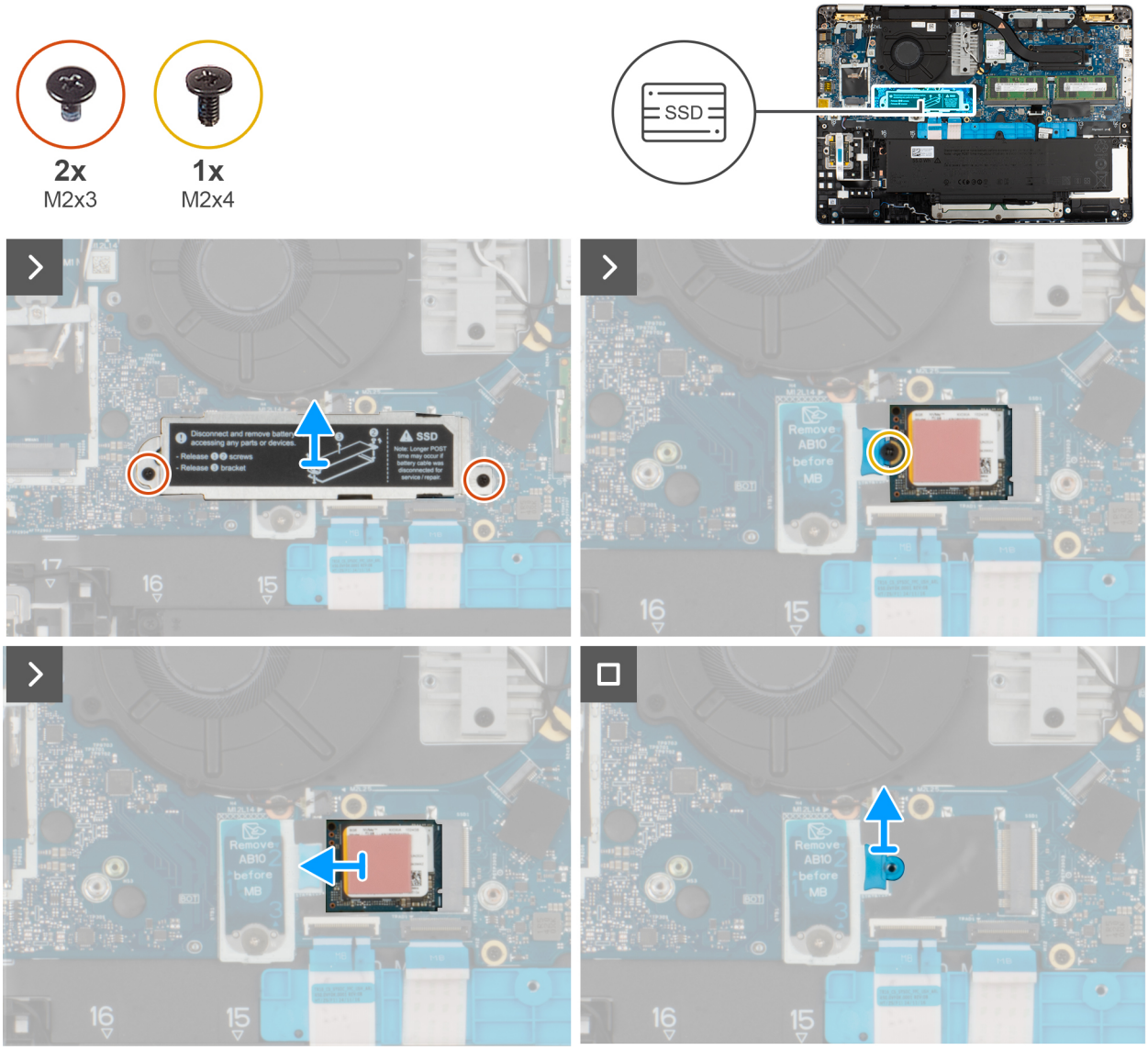


Figure 24. Removing the M.2 2230 SSD

Steps

1. Remove the two screws (M2x3) that secure the SSD thermal shield to the palm-rest assembly.
2. Remove the solid-state thermal shield off the SSD.

   NOTE: If the thermal pads get separated from the shielding cover or gets adhered to the SSD while replacing the SSD, they must be adhered back to the SSD cover before reinstalling it to the computer.

3. Remove the screw (M2x4) that secures the M.2230 SSD to the system board.
4. Slide and remove the SSD from the SSD slot.
5. Remove the SSD screw holder from the system board.

   NOTE: For models shipped with M.2 2230 SSD, if the system board is replaced, ensure to transfer the M.2 2230 SSD screw holder to the replacement system board.

Installing the M.2 2230 SSD

Prerequisites

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

About this task

The following images indicate the location of the M.2 2230 SSD and provide a visual representation of the installation procedure.

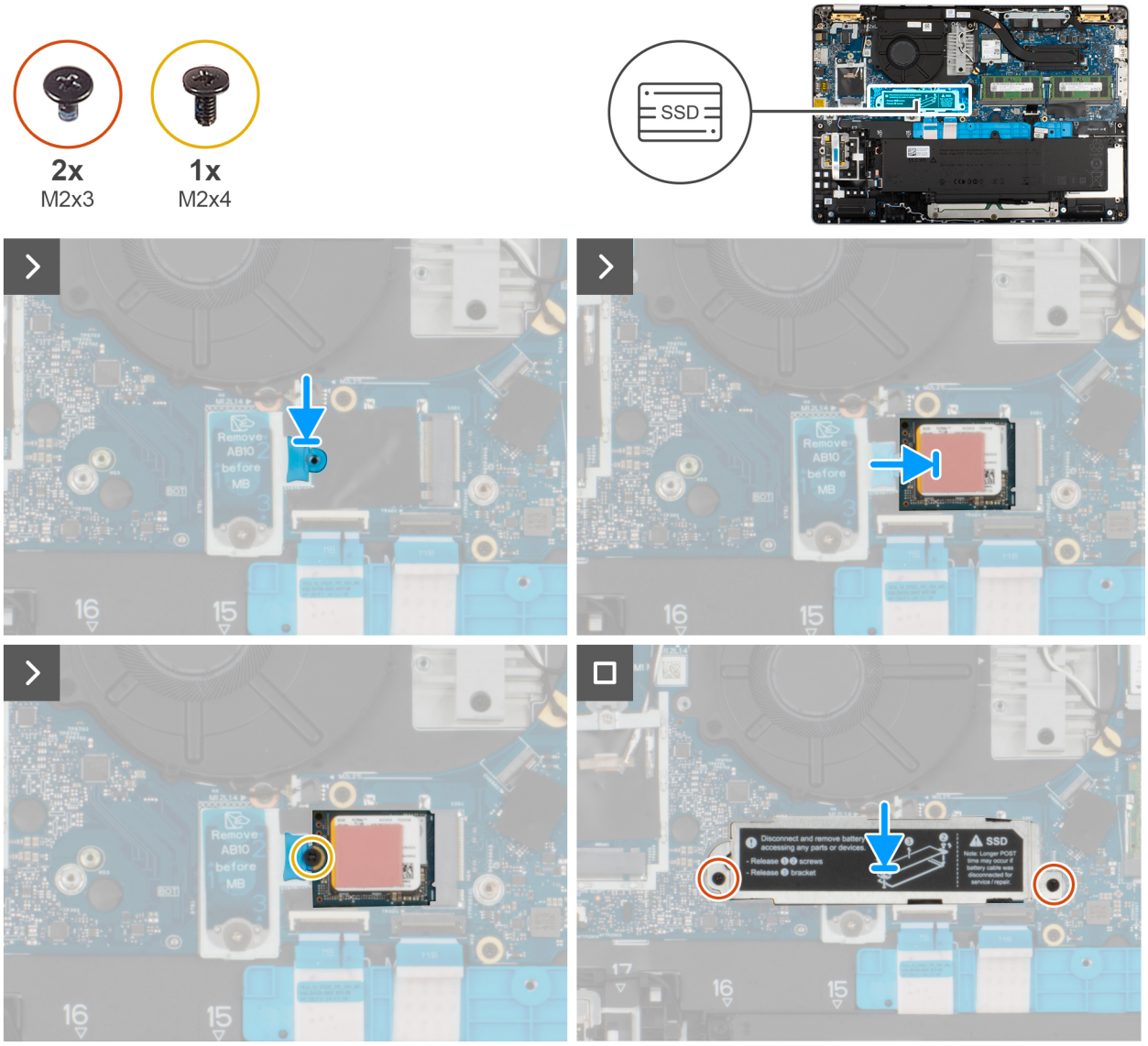


Figure 25. Installing the M.2 2230 SSD

Steps

1. Align and place the SSD screw holder on the system board.

   NOTE: For models shipped with M.2 2230 SSD, if the system board is replaced, ensure to transfer the M.2 2230 SSD screw holder to the replacement system board.

2. Align the notch on the M.2 2230 SSD with the tab on the M.2 2230 SSD slot.
3. Slide the M.2 2230 SSD into the M.2 2230 SSD slot.
4. Replace the screw (M2x4) that secures the M.2 2230 SSD to the system board.
5. Align and place the SSD thermal shield on top of the SSD slot so that it holds the SSD in place.
6. Replace the two screws (M2x3) that secures the SSD thermal shield to the SSD and the palm-rest assembly.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Removing the M.2 2280 SSD

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

The following images indicate the location of the M.2 2280 SSD and provide a visual representation of the removal procedure.

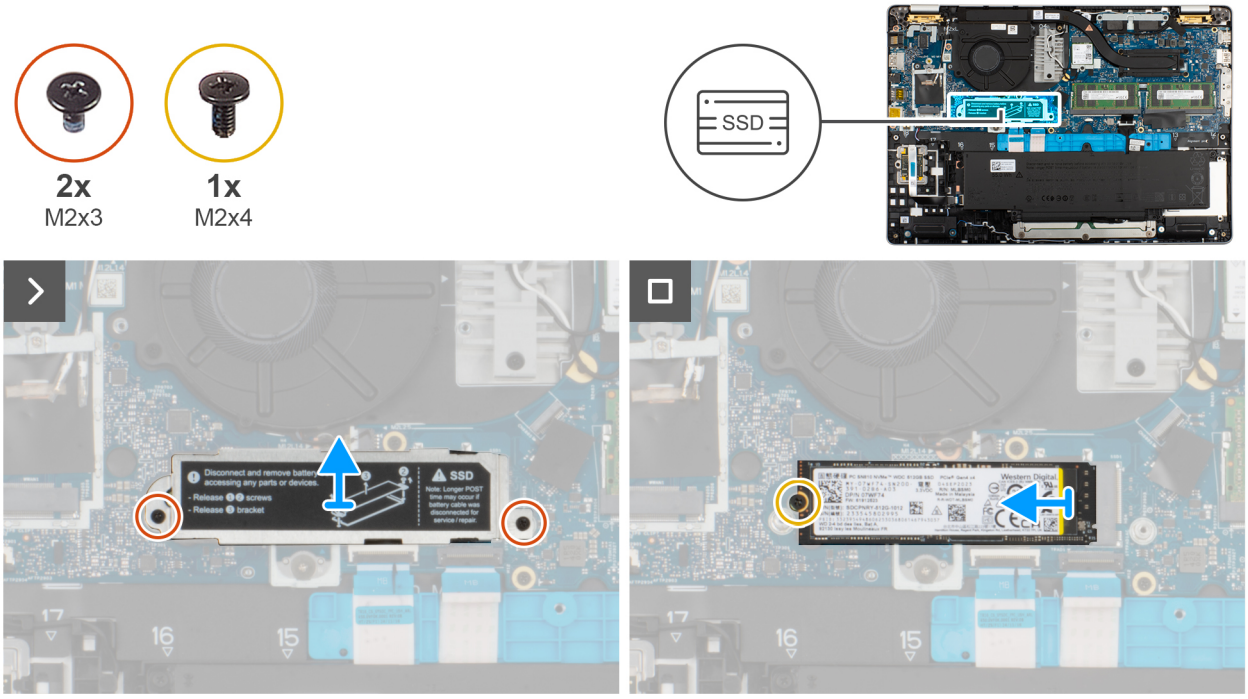


Figure 26. Removing M.2 2230 SSD

Steps

1. Remove the three screws (M2x3) that secure the SSD thermal shield to the palm-rest assembly
2. Lift the SSD thermal shield off the palm-rest assembly.

   NOTE: If the thermal pads get separated from the SSD thermal shield or gets adhered to the SSD while replacing the SSD, the technicians must readhere the thermal pad to the thermal shield before reinstalling it to the computer.

3. Remove the screw (M2x4) that secures the M.2280 SSD to the system board.
4. Slide and remove the M.2 2280 SSD off the SSD slot.

Installing the M.2 2280 SSD

Prerequisites

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

About this task

The following images indicate the location of the M.2 2280 SSD and provide a visual representation of the installation procedure.

Figure 27. Installing the M.2 2280 SSD

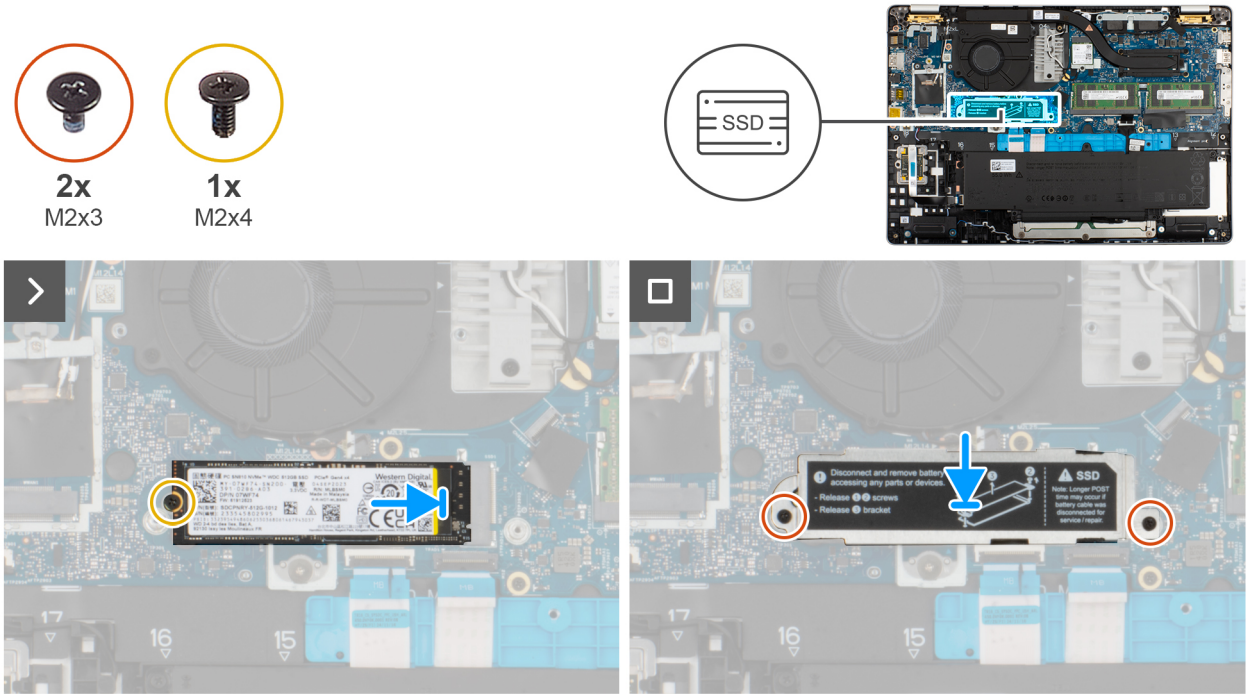


Figure 28. Installing M.2230 SSD

Steps

1. Align the notch on the M.2 2280 SSD with the tab on the M.2 2280 SSD slot.
2. Slide the M.2 2280 SSD into the M.2 2280 SSD slot.
3. Replace the screw (M2x3) that secures the M.2 2280 SSD to the system board.
4. Align and place the SSD thermal shield on the SSD.
5. Replace the two screws (M2x3) that secure the SSD thermal shield to the palm-rest assembly.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Wireless Wide Area Network (WWAN) card

Removing the 5G WWAN card (optional)

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

NOTE: The 5G WWAN card is available only on certain configurations. It is connected to the computer with four antenna cables.

The following images indicate the location of the 5G WWAN card and provide a visual representation of the removal procedure.

Figure 29. Removing the 5G WWAN card

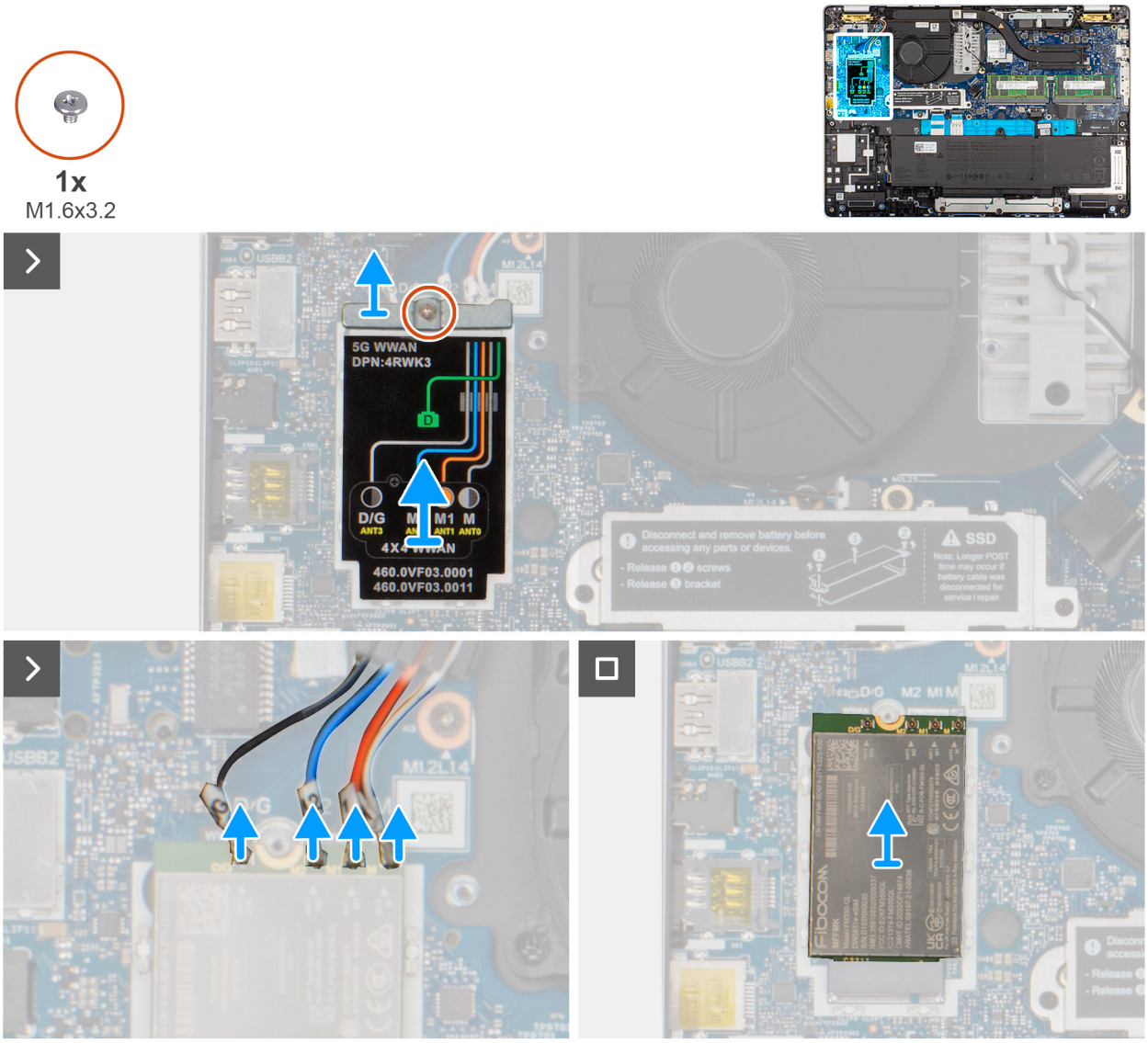


Figure 30. Removing the 5G WWAN card

Steps

1. Loosen the screw (M1.6x3.2) that secures the 5G WWAN-shielding cover to the 5G WWAN card.
2. Lift the 5G WWAN-card shield cover off the 5G WWAN card.
3. Disconnect the antenna cables from the 5G WWAN card.
4. Slide and remove the 5G WWAN card off the 5G WWAN-card slot on the I/O board.

NOTE: If you are replacing the 5G WWAN card, ensure that the thermal pad is in place.

NOTE: If you are replacing the system board, ensure to peel the thermal pad from the old system board to the new system board.

Installing the 5G WWAN Card (optional)

Prerequisites

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

About this task

NOTE: The 5G WWAN card is available only on certain configurations. It is connected to the computer with four antenna cables.

The following images indicate the location of the 5G WWAN card and provide a visual representation of the installation procedure.

Figure 31. Installing the 5G WWAN card

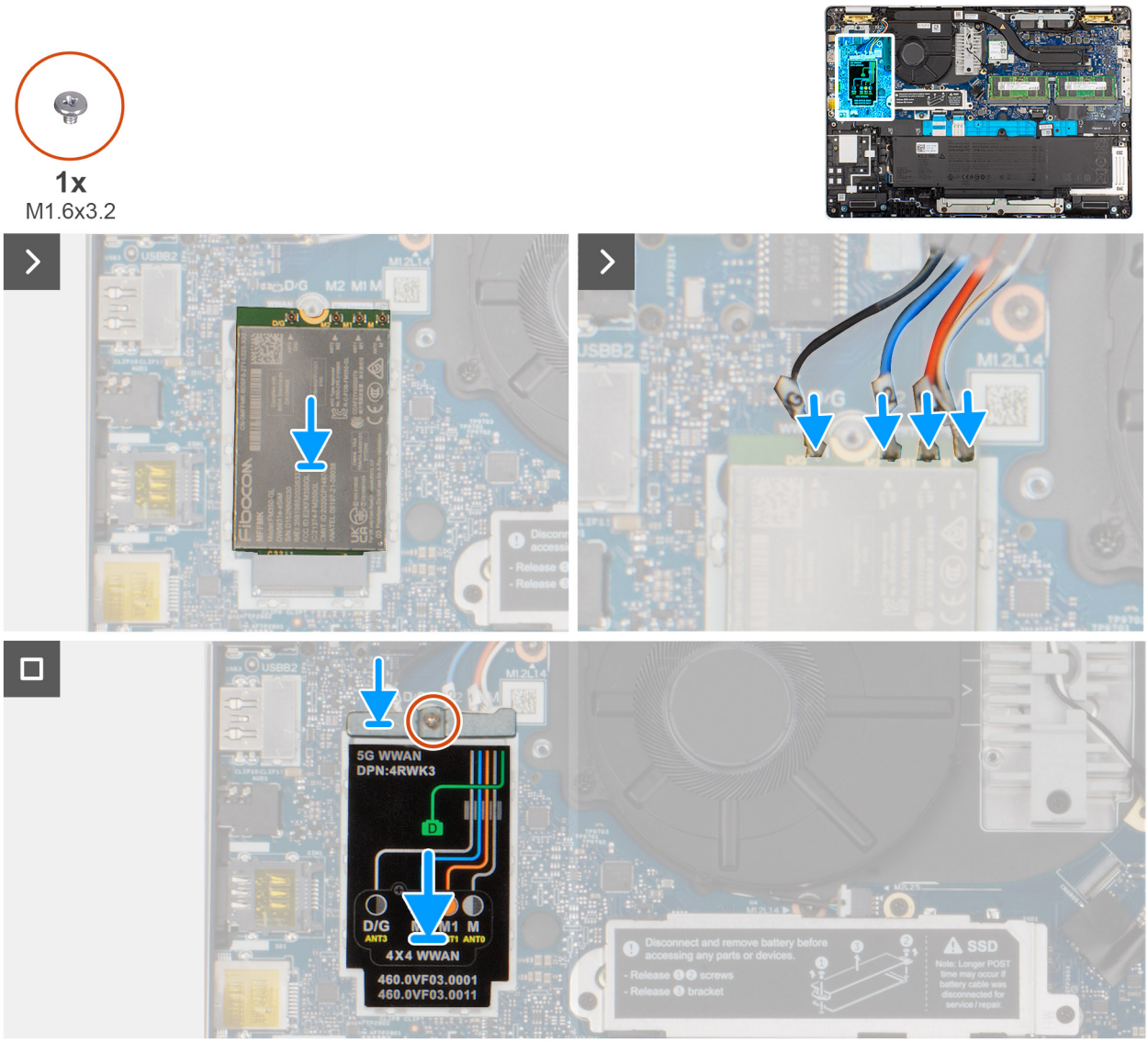


Figure 32. Installing 5G WWAN card

Steps

1. Align the notch on the 5G WWAN card with the tab on the I/O board.

   NOTE: If you are replacing the WWAN card, ensure that the thermal pad is in place.

   NOTE: If you are replacing the system board, ensure to peel the thermal pad from the old system board to the new system board.

   NOTE: If the thermal pad is damaged, peel the thermal pad from the system board and replace it with a new thermal pad. The thermal pad must be purchased separately.

2. Connect the antenna cables to the 5G WWAN card.

   The following table provides the antenna-cable color scheme for the 5G WWAN card that is supported on your computer.

Table 36. Antenna-cable color scheme for 5G WWAN cards

Connectors on the WWAN card	Antenna-cable color	Silkscreen marking	
D/G	Black with a thin white stripe	ANT3 D/G	△ (white triangle)
M2	Blue	ANT2 M2	△ (white triangle)
M1	Orange	ANT1 M1	△ (white triangle)
M	White with a thin gray stripe	ANT0 M	△ (white triangle)

3. Align and place the 5G WWAN-card shield on the 5G WWAN card.
4. Tighten the screw (M1.6x3.2) that secures the 5G WWAN bracket to the 5G WWAN card.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Removing the 4G WWAN card (optional)

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

The following images indicate the location of the 4G WWAN card and provide a visual representation of the removal procedure.

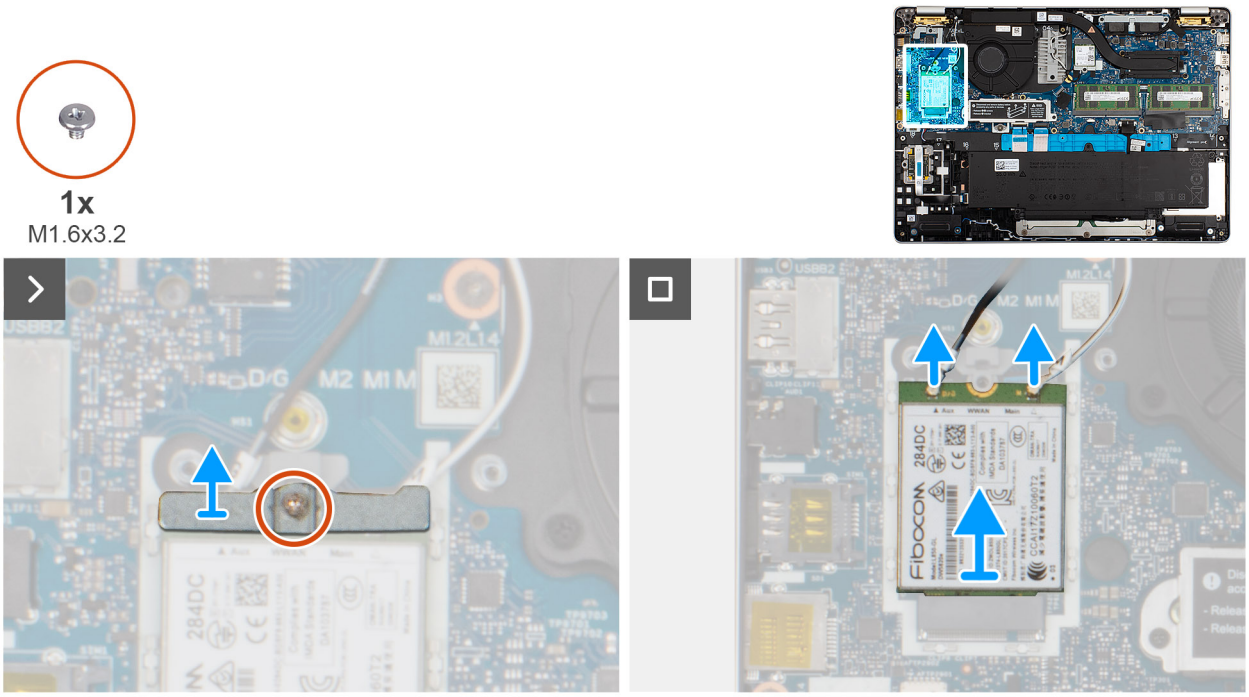


Figure 33. Removing the 4G WWAN card

Steps

1. Loosen the screw (M1.6x3.2) that secures the WWAN-card bracket.
2. Disconnect two antenna cables from the WWAN card.
3. Remove the WWAN card from the WWAN-card slot on the I/O board.

Installing the 4G WWAN card (optional)

Prerequisites

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

About this task

The following images indicate the location of the 4G WWAN card and provide a visual representation of the installation procedure.

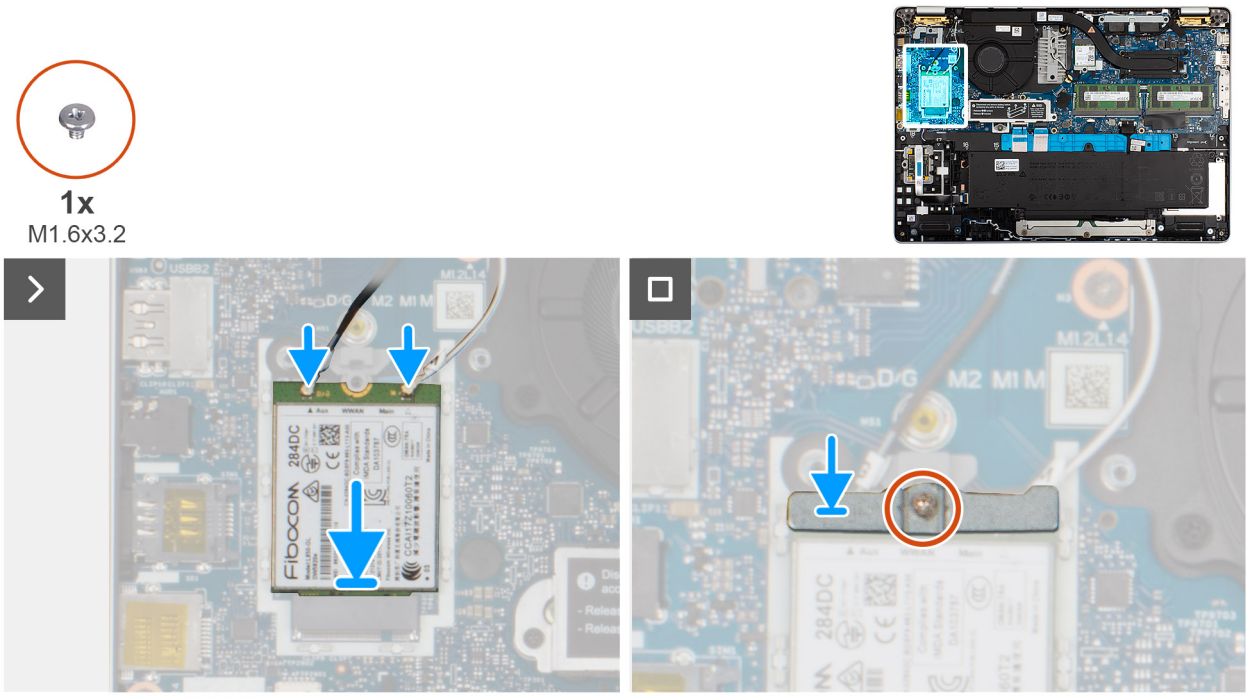


Figure 34. Installing the 4G WWAN card

Steps

1. Insert the WWAN card at an angle into the WWAN-card slot on the I/O board.

   NOTE: If you are replacing the WWAN card, ensure that the thermal pad is in place.

   NOTE: If the thermal pad is damaged, peel the thermal pad from the system board and replace it with a new thermal pad. The thermal pad must be purchased separately.

2. Connect the antenna cables to their respective connectors on the WWAN card.

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

Table 37. Antenna-cable color scheme for 4G WWAN card

Connectors on the WWAN card	Antenna-cable color
6 Aux1	Black with a thin gray stripe
5 Main	White with a thin gray stripe

3. Align the screw holes on the WWAN-card thermal shield with the screw hole on the I/O board.
4. Tighten the screws (M1.6x3.2) that secure the WWAN-card thermal shield to the I/O board.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Wireless Local Area Network (WLAN) card

Removing the WLAN card

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

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

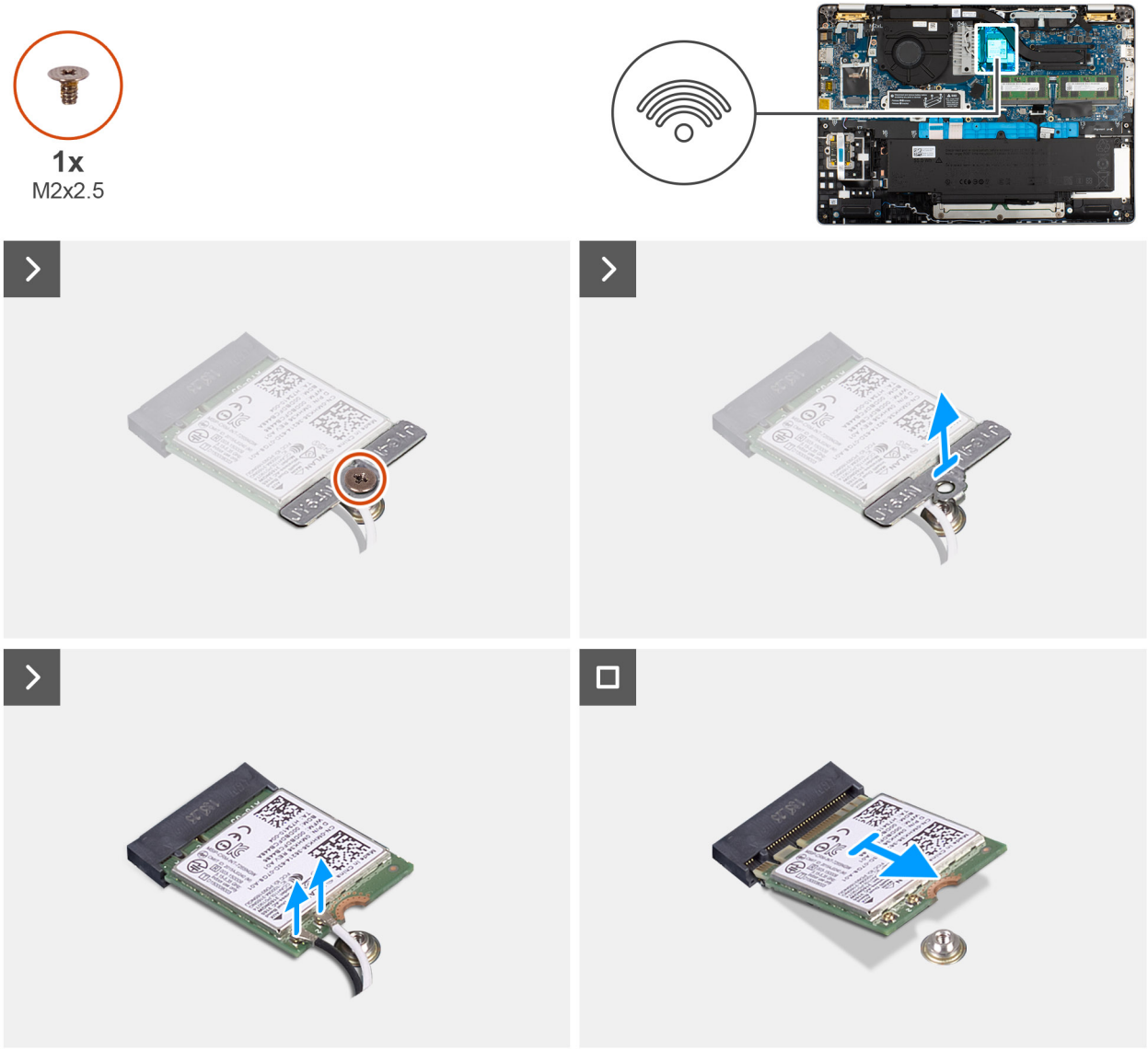


Figure 35. Removing the WLAN card

Steps

1. Remove the screw (M2x2.5) that secures the wireless-card bracket to the system board.
2. Lift the wireless-card bracket from the WLAN card.
3. Disconnect the WLAN antenna cables from the WLAN card.
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 following image indicates the location of the WLAN card and provides a visual representation of the removal procedure.

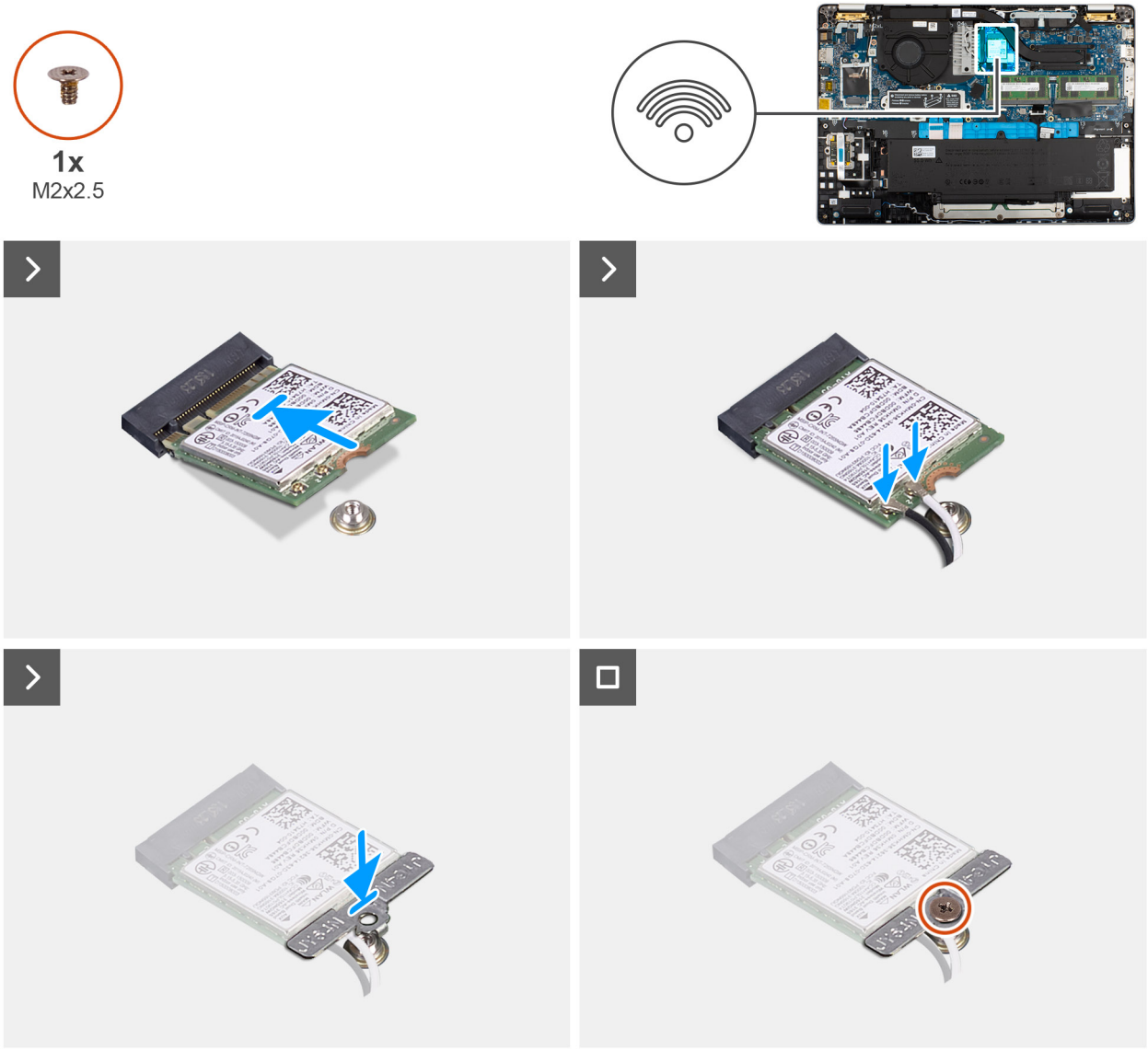


Figure 36. Installing the WLAN card

Steps

1. Connect the WLAN-antenna cables to the respective connectors on the WLAN card.

Table 38. WLAN-antenna cable color scheme

Connectors on the WLAN card	Antenna-cable color
Main - White triangle (△)	White cable
Auxiliary - Solid triangle (▲)	Black cable

2. Align the notch on the WLAN card with the tab on the wireless-card slot.
3. Slide the WLAN card at an angle into the wireless-card slot.
4. Align and place the wireless-card bracket on the WLAN card.
5. Align the screw hole on the wireless-card bracket with the screw hole on the system board.
6. Replace the screw (M2x2.5) that secures the wireless-card bracket and the WLAN card to the system board.

Next steps

1. Install the base cover.

2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Fan

Removing the fan

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

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

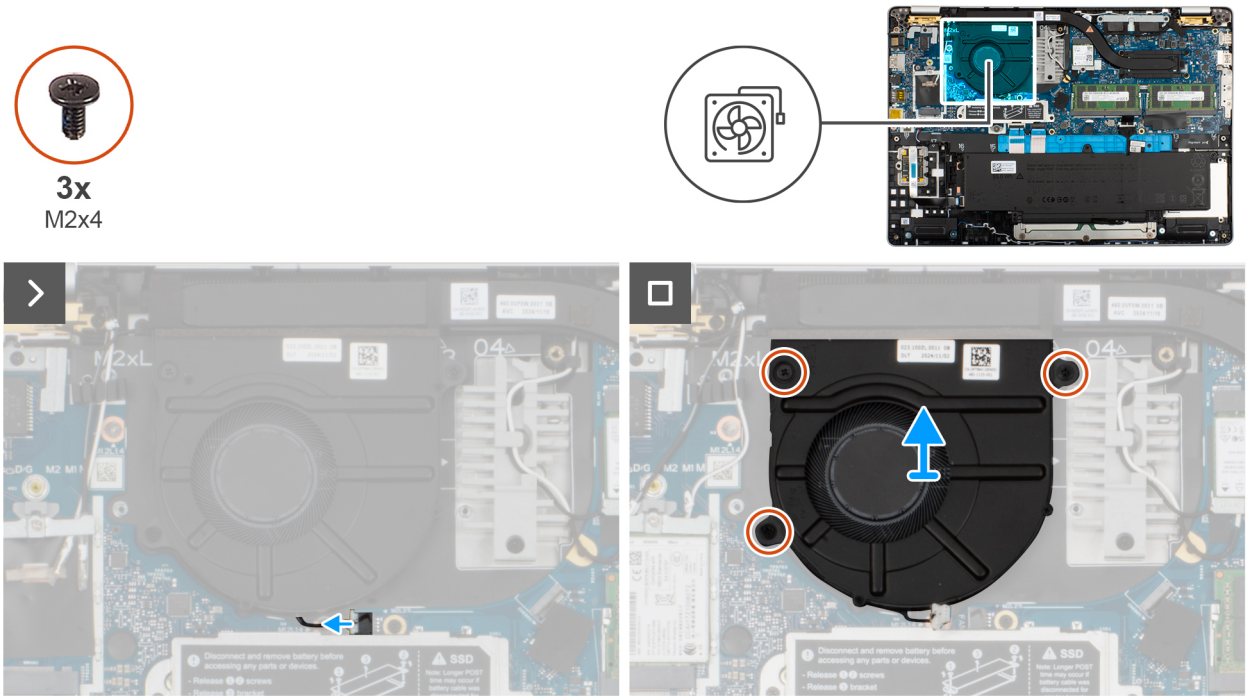


Figure 37. Removing Fan

Steps

1. Disconnect the fan cable from the fan-cable connector (FAN1) on the I/O board.
2. Remove the fan cable from the routing guides on the palm-rest assembly.
3. Remove the three screws (M2x4) that secure the fan to the palm-rest assembly.
4. Lift the fan off the palm-rest assembly.

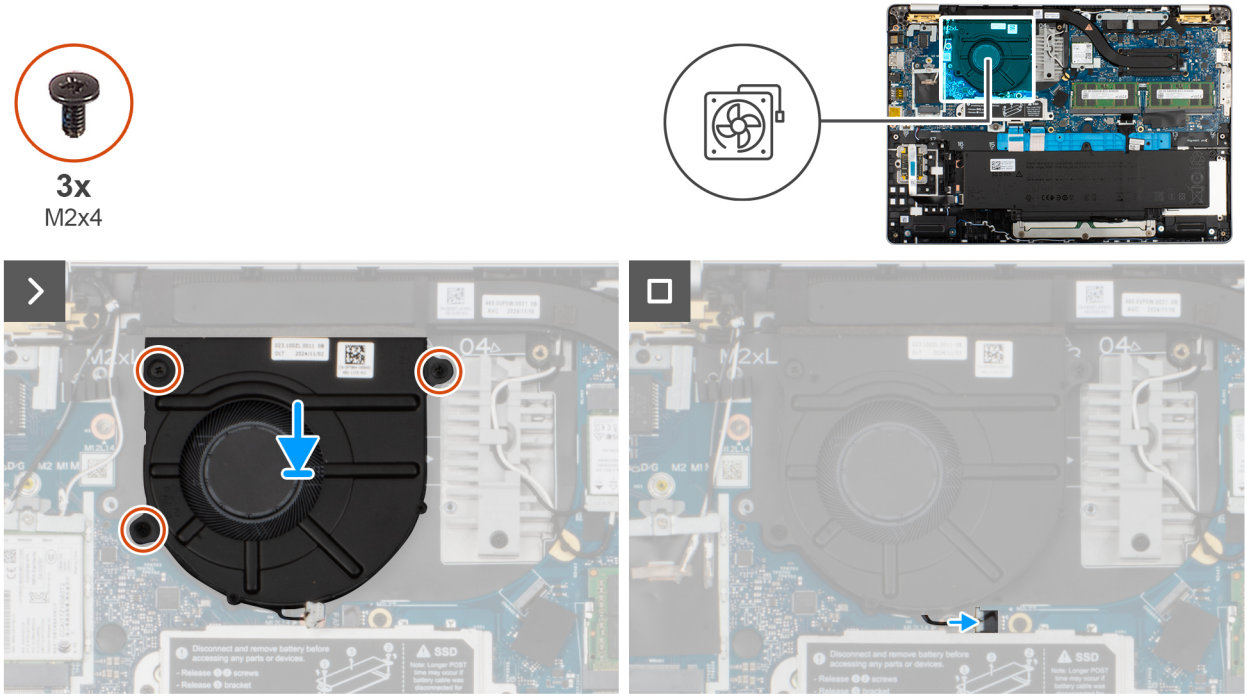
Installing the fan

Prerequisites

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

About this task

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



Steps

1. Align the screw holes on the fan with the screw holes on the palm-rest assembly.
2. Replace the three screws (M2x4) that secure the fan to the palm-rest assembly.
3. Route the fan cable through the routing guides on the palm-rest assembly.
4. Connect the fan cable to the fan-cable connector (FAN1) on the I/O board.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Speakers

Removing the speakers

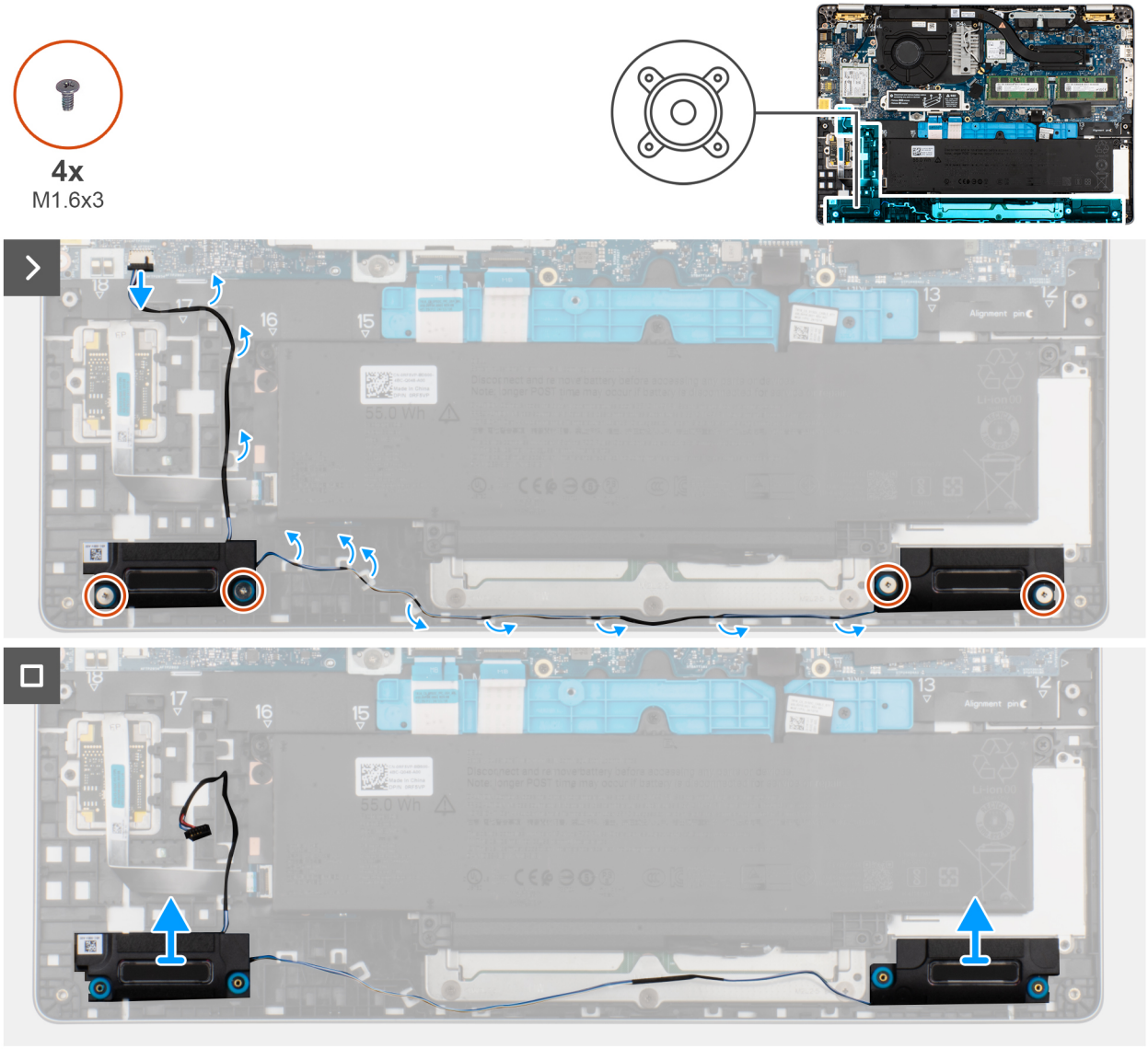
Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

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

Figure 38. Removing the speakers



Steps

1. Disconnect the speaker cable from the I/O board.
2. Remove the four screws (M1.6x3) that secure the speakers to the palm-rest assembly.
3. Remove the speaker cables from the routing guides on the palm-rest assembly.
4. Release the right and left speakers from the rubber grommets and lift the speakers along with the cable, off the palm-rest 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 images indicate the location of the speakers and provide a visual representation of the installation procedure.

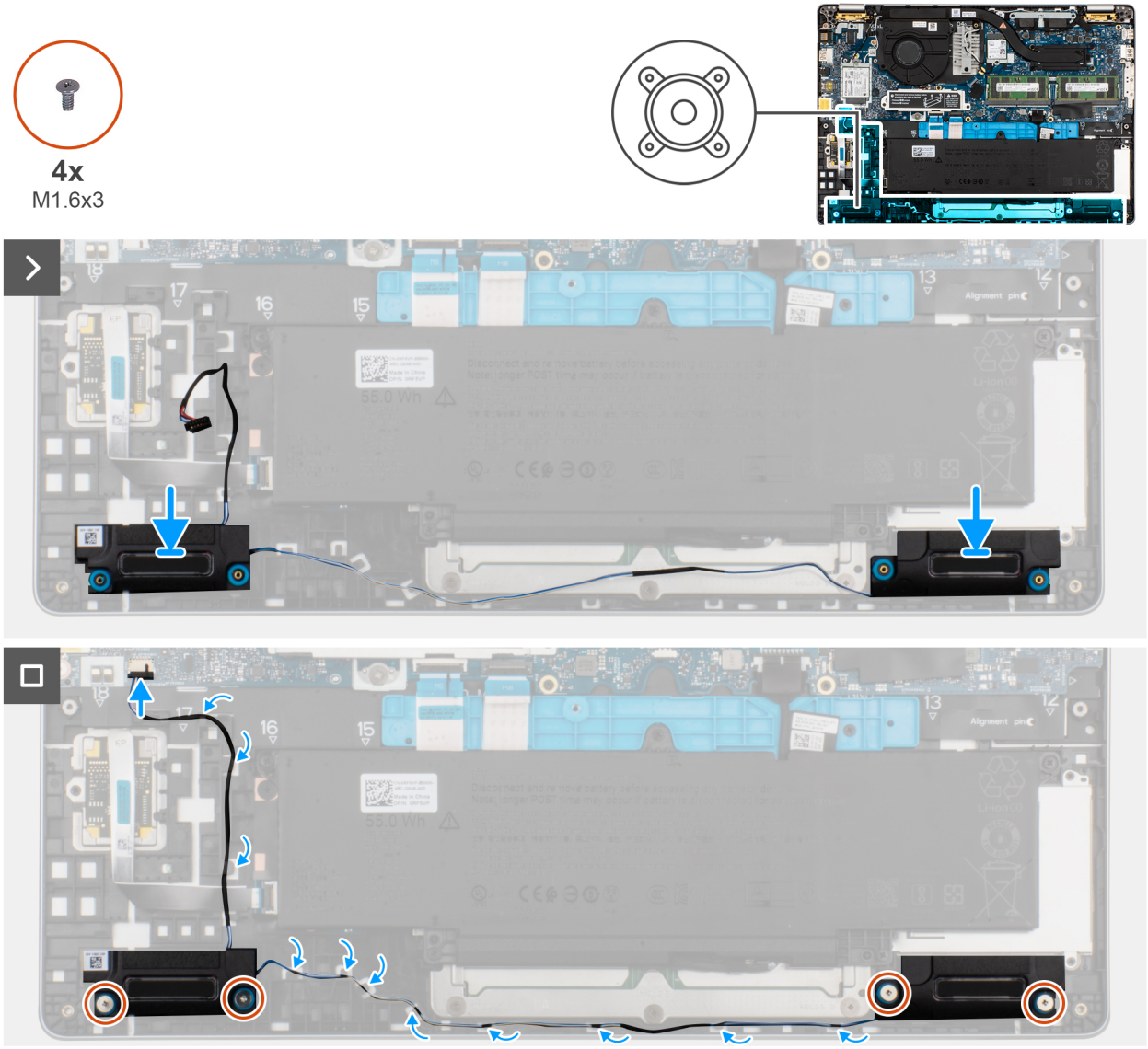


Figure 39. Installing the speakers

Steps

1. Using the alignment posts and rubber grommets, place the left and right speakers into their slots on the palm-rest assembly.

   NOTE: To properly position the speakers, secure the rubber grommets into the hooks.

2. Route the speaker cable through the routing guides on the palm-rest assembly.

   NOTE: Ensure that the rubber grommets are seated into the slot and installed on the speakers properly.

   Figure 40. Rubber grommets

3.
4. Replace the four screws (M1.6x3) that secure the speakers to the palm-rest assembly.
5. Route the speaker cable through the routing guides on the palm-rest assembly
6. Connect the speaker cable to the speaker cable connector on the I/O board.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).

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

6

Removing and installing Field Replaceable Units (FRUs)

The replaceable components in this chapter are Field Replaceable Units (FRUs).

CAUTION: The information in this section is intended for authorized service technicians only.

CAUTION: To avoid any potential damage to the component or loss of data, ensure that an authorized service technician replaces the Field Replaceable Units (FRUs).

CAUTION: Dell Technologies recommends that these procedures be performed by trained technical repair specialists.

CAUTION: Your warranty does not cover damages that may occur during FRU repairs that are not authorized by Dell Technologies.

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

Fingerprint reader

Removing the optional fingerprint reader

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

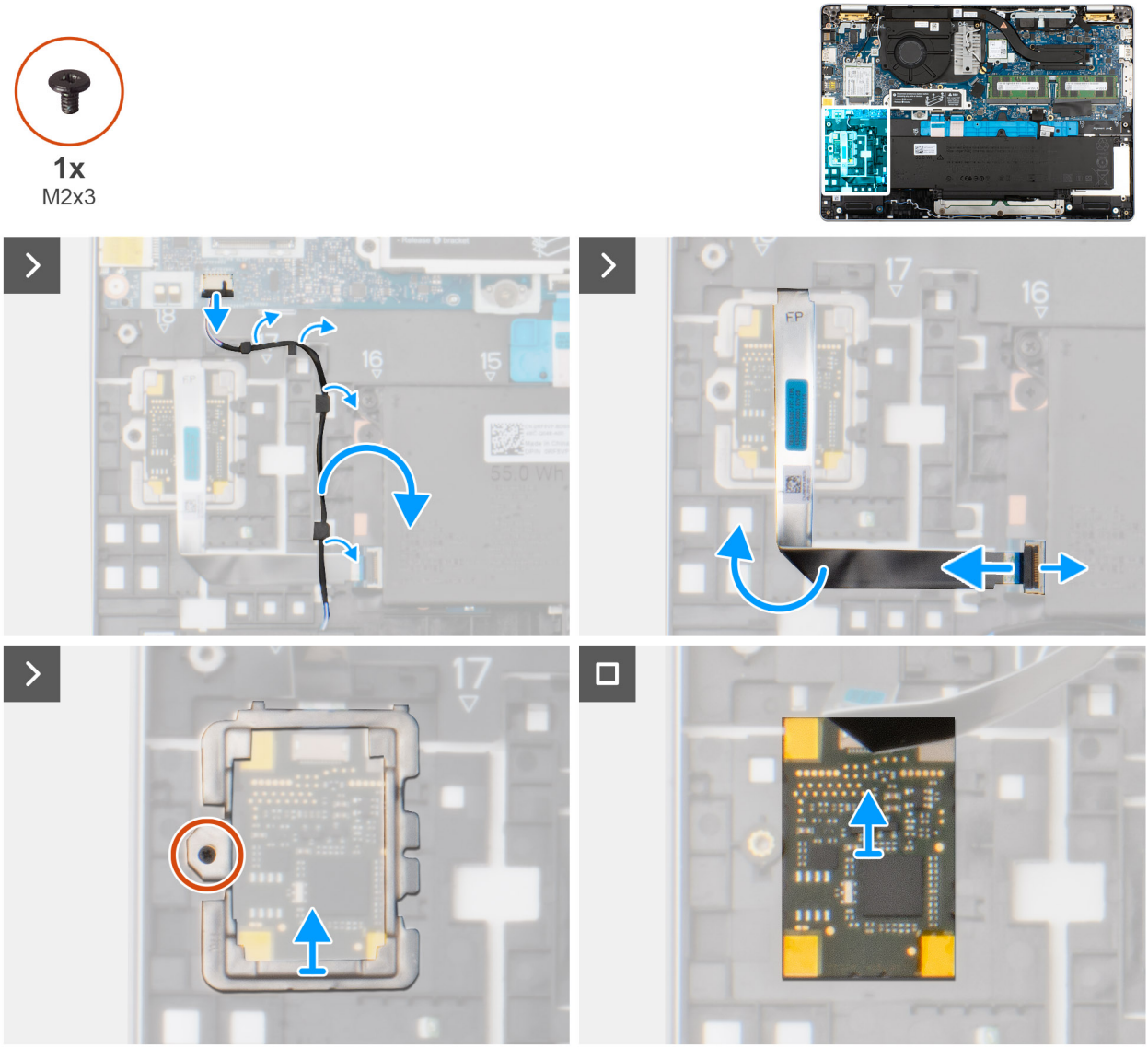
1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the battery.

About this task

The following images indicate the location of the power button with optional fingerprint reader and provide a visual representation of the removal procedure.

NOTE: The following steps are applicable only for computers that are shipped with a fingerprint reader.

Figure 41. Removing optional fingerprint reader



Steps

1. Disconnect the fingerprint reader cable from the USH board.
2. Remove the (M2x3) screw that secures the fingerprint-reader bracket.
3. Remove the fingerprint-reader bracket.
4. Remove the fingerprint-reader bracket along with the cable.

Installing the optional fingerprint reader

CAUTION: The information in this installation section is intended for authorized service technicians only.

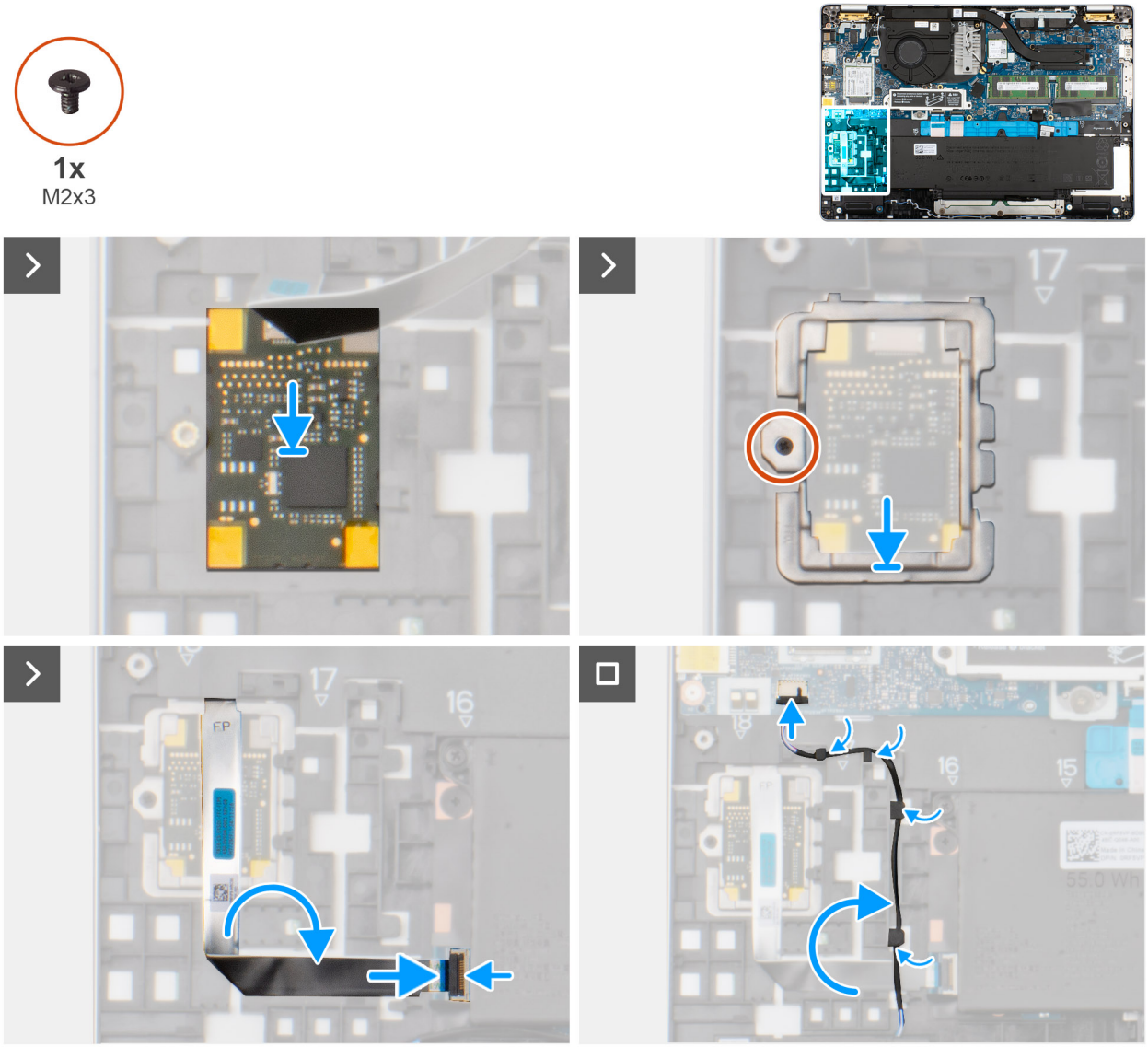
Prerequisites

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

About this task

The following images indicate the location of the power button with optional fingerprint reader and provide a visual representation of the installation procedure.

Figure 42. Installing the optional fingerprint reader



Steps

1. Align and place the fingerprint reader on the palm-rest assembly.
2. Align the fingerprint reader bracket screw hole with the palm-rest assembly.
3. Replace the (M2x3) screws that securing the fingerprint-reader bracket.
4. Connect the fingerprint reader cable to the USH board.

Next steps

1. Install the battery.
2. Install the base cover.
3. Install the SIM-card tray (optional).
4. Follow the procedure in After working inside your computer.

Wireless Local Area Network (WLAN) antenna modules

Removing the WLAN antenna

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.

About this task

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

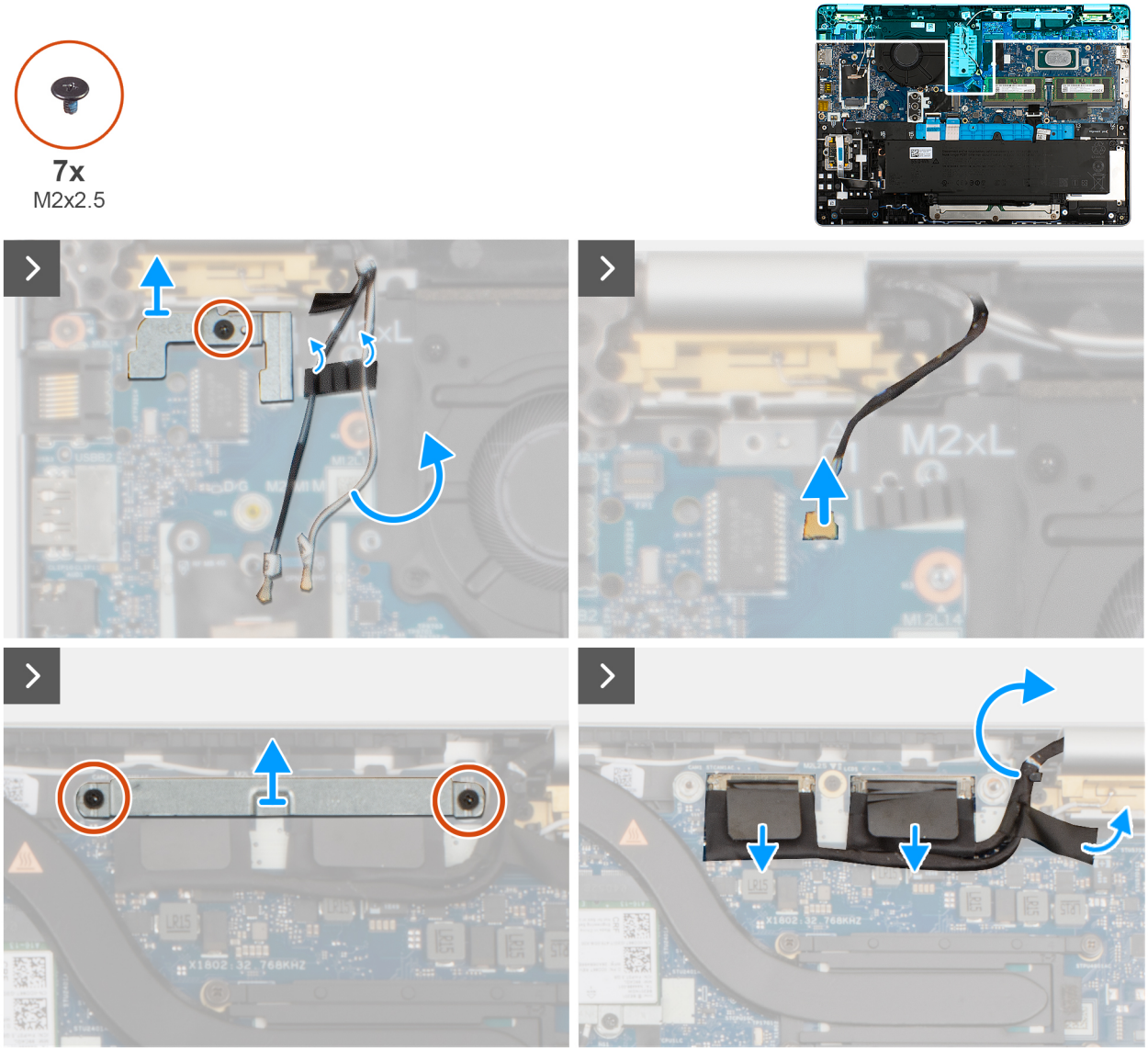


Figure 43. Removing the WLAN antenna

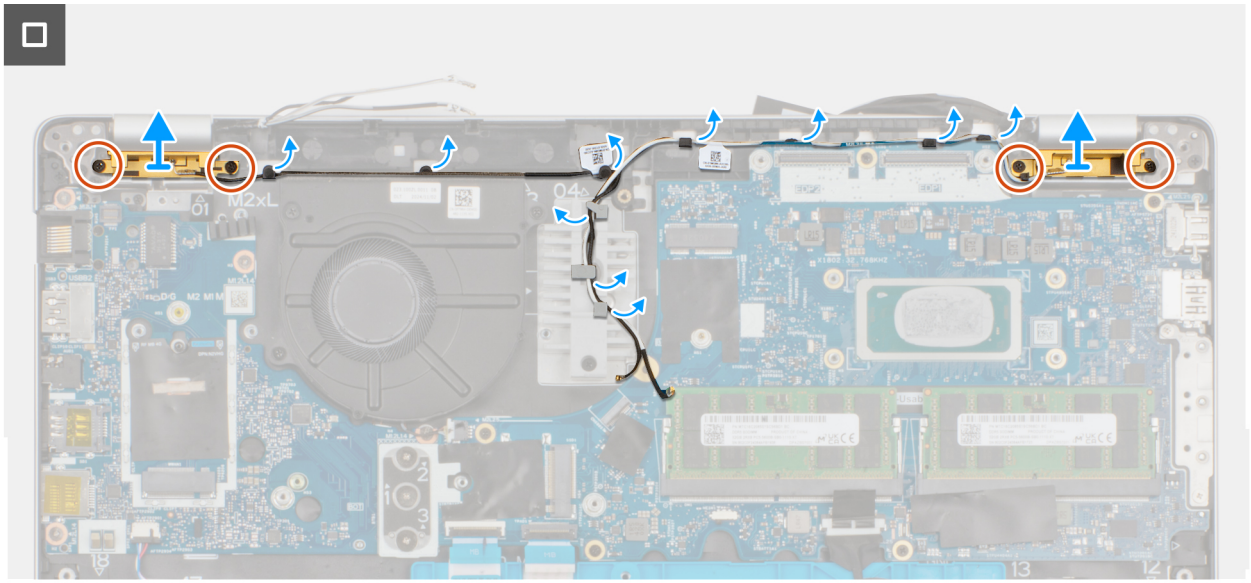


Figure 44. Removing the WLAN antenna

Steps

1. Remove the screw (M2x2.5) that secures the finger print reader on the I/O board on the left side.
2. Lift the 5G WWAN card cables and disconnect thecable that is connected to I/O board.
3. Remove the two (M2x2.5) EDP cable bracket securing the EDP cables on the right side.
4. Unplug the two EDP cables and unroute the cable from the system board.
5. Remove the WLAN antennas as per the routing guides.

Installing the WLAN antenna

Prerequisites

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

About this task

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

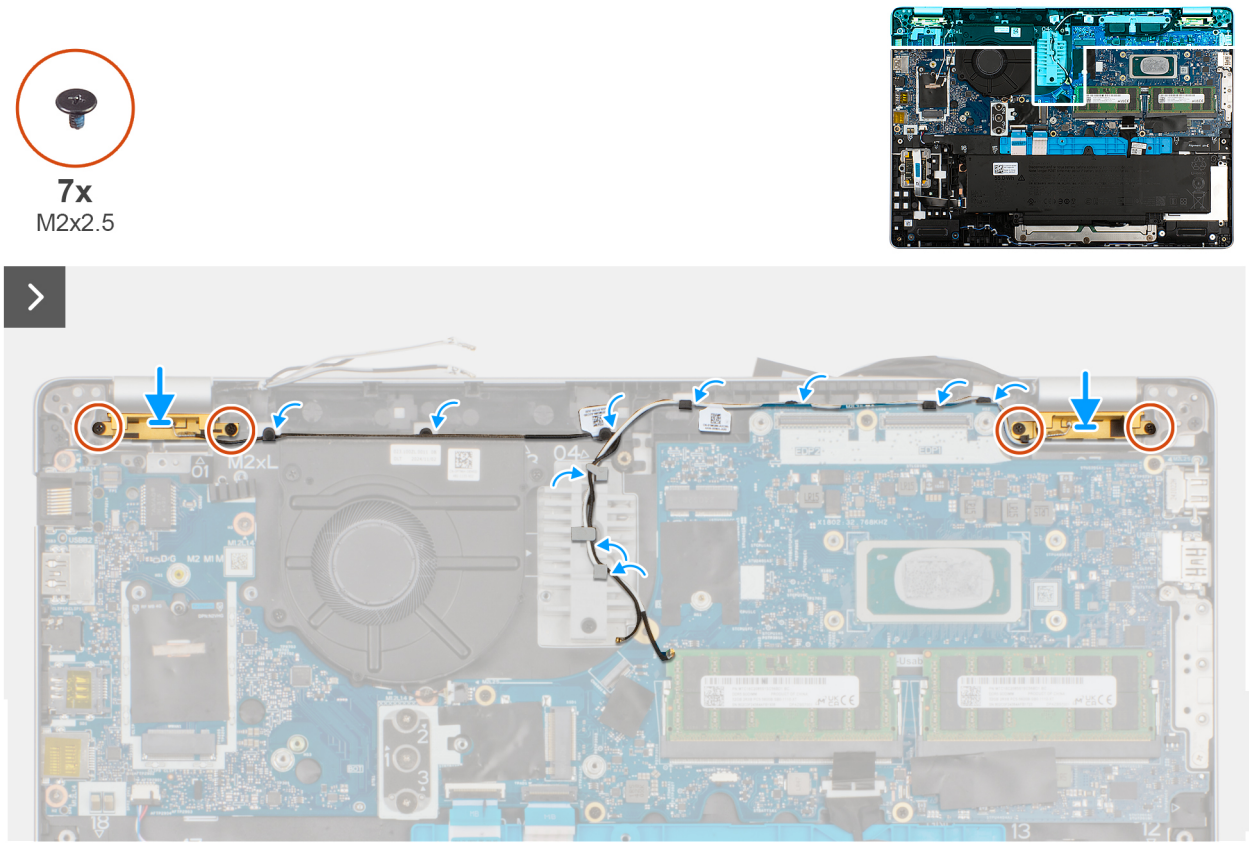


Figure 45. Installing the WLAN antenna

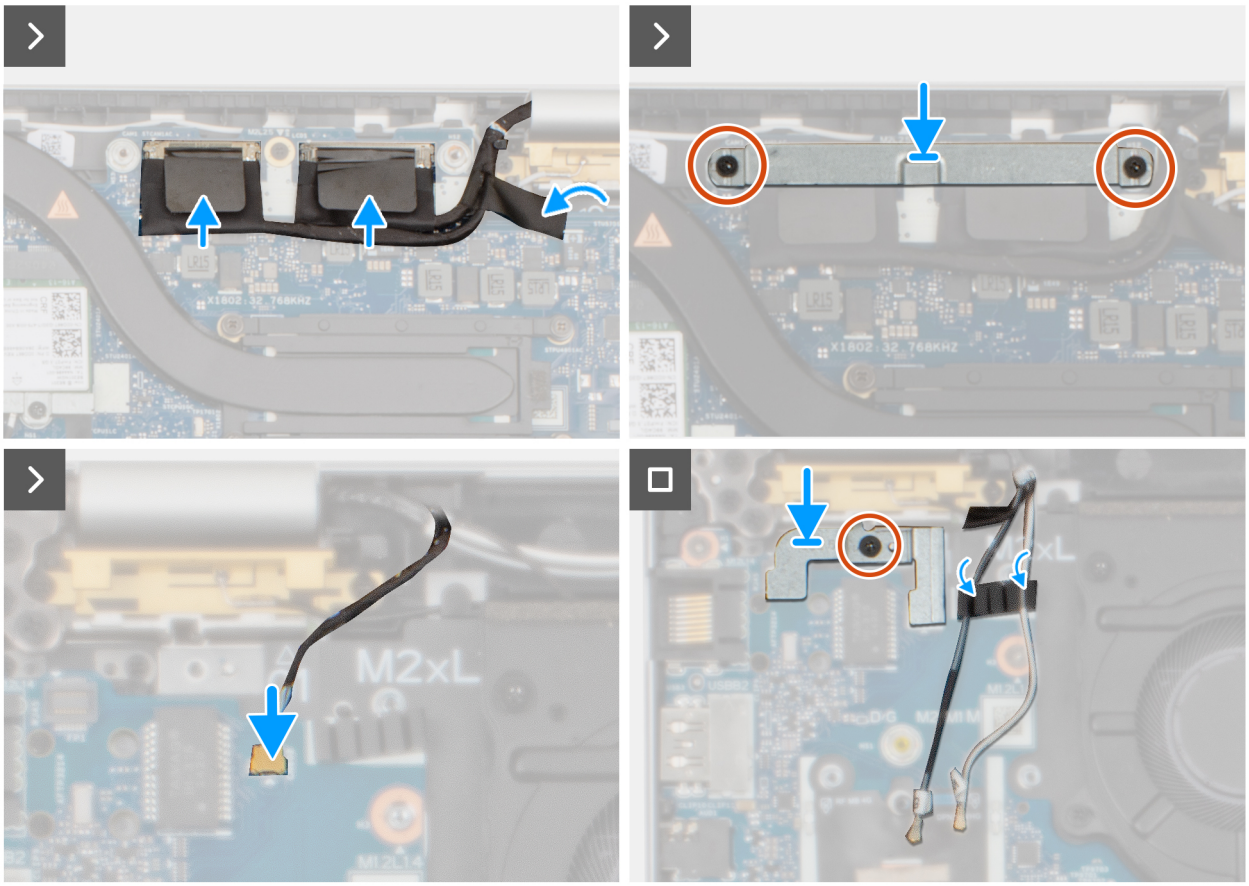


Figure 46. Installing the WLAN antenna

Steps

1. Connect the WLAN-antenna cables to the respective connectors on the WLAN card.

Table 39. WLAN-antenna cable color scheme

Connectors on the WLAN card	Antenna-cable color
Main - White triangle (△)	White cable
Auxiliary - Solid triangle (▲)	Black cable

2. Replace the screw (M2x2.5) that secures the wireless-card bracket and the WLAN card to the system board.
3. Install the WLAN antennas according to the routing guides.
4. Route the cable to the system board and plug in the two EDP cables.
5. Install the two (M2x2.5) EDP cable brackets to secure the EDP cables on the right side.
6. Connect the cable to the I/O board and place the 5G WWAN card cables back in their original position.
7. Insert the screw (M2x2.5) to secure the fingerprint reader on the I/O board on the left side.

Next steps

1. Install the base cover.
2. Install the SIM-card tray (optional).
3. Follow the procedure in After working inside your computer.

Battery support bracket

Removing the battery support bracket

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the battery.

About this task

The following images indicate the location of the Battery support bracket and provide a visual representation of the removal procedure.

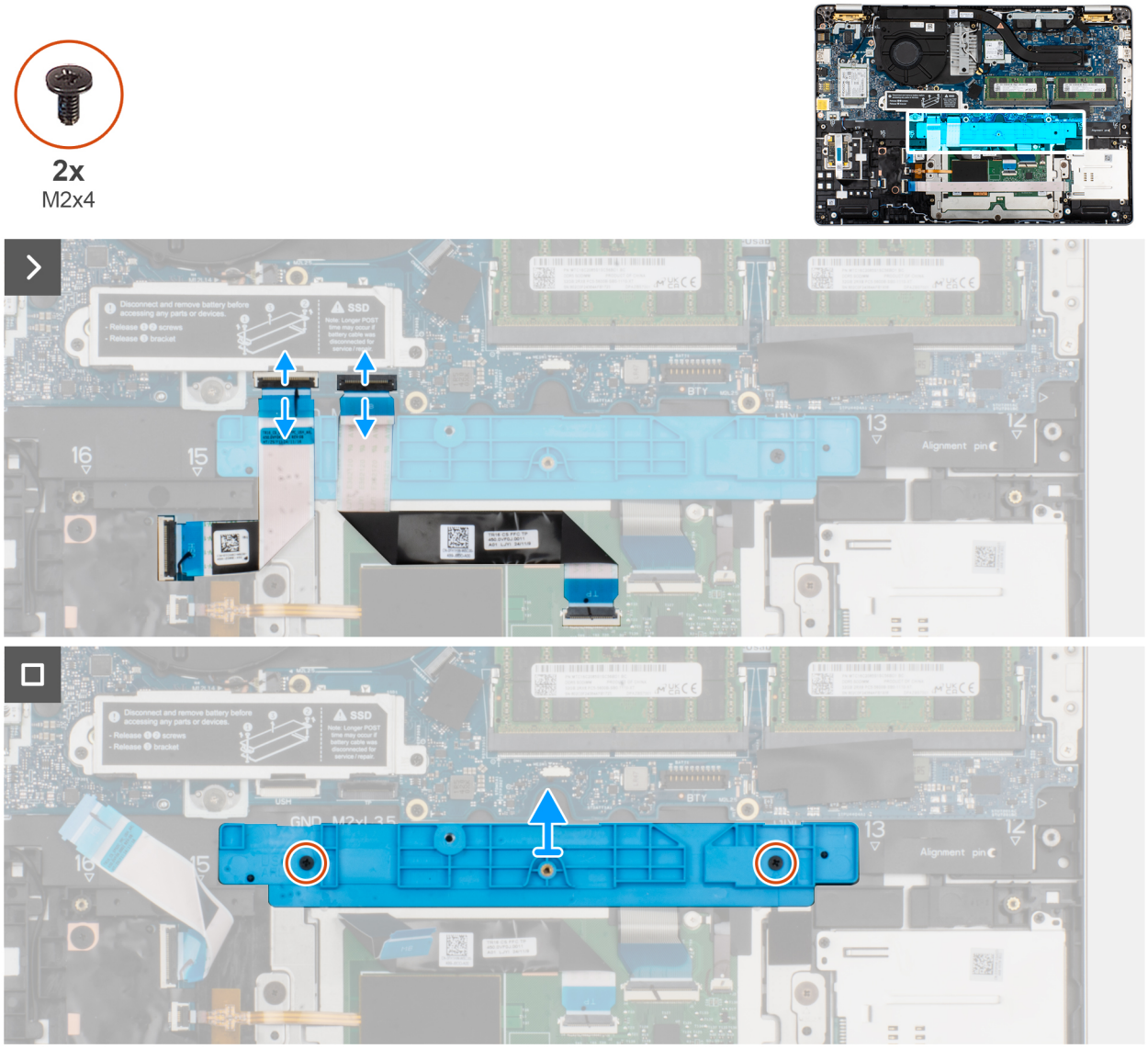


Figure 47. Removing the battery support bracket

Steps

1. Lift the latch and disconnect the USH cable and touchpad cable from the respective connectors on the system board .

2. Remove the two screws (M2x4) that secures the battery support bracket to the system board.
3. Lift the battery support bracket off the palm-rest assembly.

Installing the battery support bracket

Prerequisites

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

About this task

The following images indicate the location of the battery support bracket and provide a visual representation of the installation procedure.

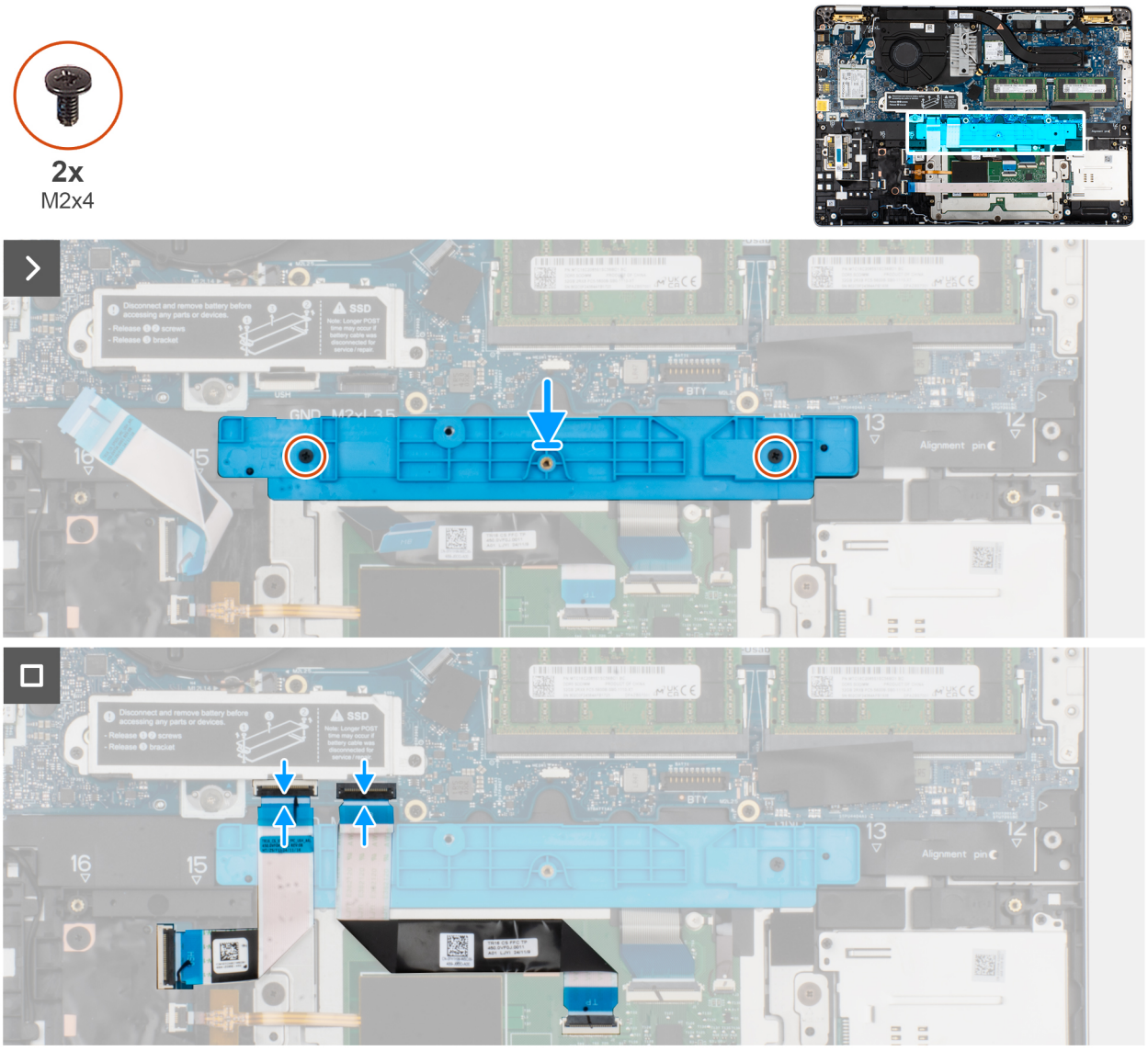


Figure 48. Installing the battery support bracket

Steps

1. Align and place the battery support bracket on the palm-rest assembly.
2. Replace the two screws (M2x4) that secure the battery support bracket to the palm-rest assembly.
3. Connect the USH cable and touchpad cable to the respective connectors on the system board and close the latch to secure the cable.

Next steps

1. Install the battery.
2. Install the base cover.
3. Install the SIM-card tray (optional).
4. Follow the procedure in After working inside your computer.

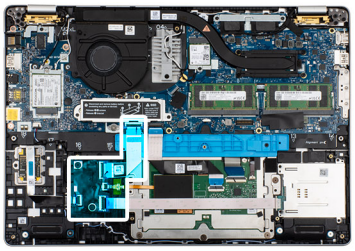
USH board

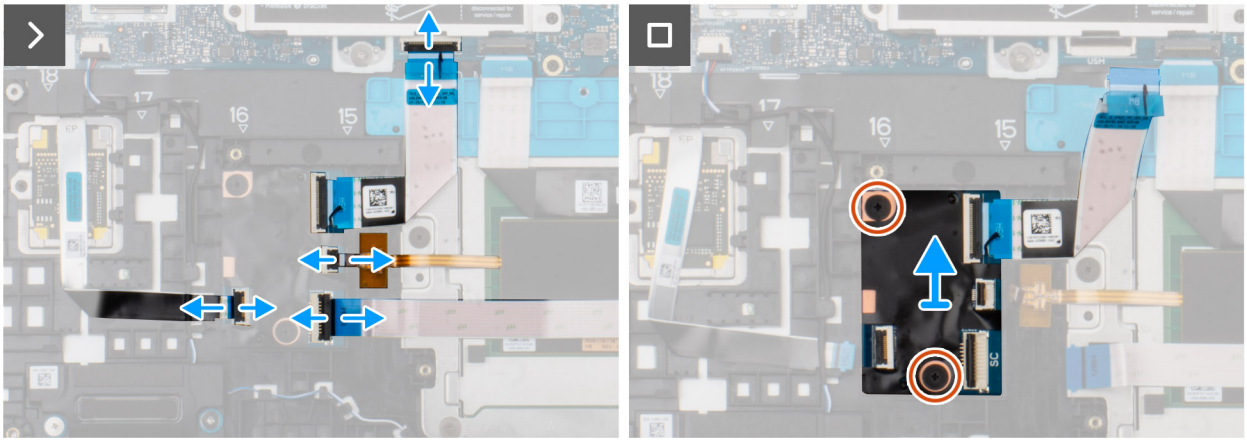
Removing the USH board

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the battery.





Steps

1. Lift the latch and disconnect the smart card reader cable from the connector on the USH board.
2. Lift the latch and disconnect the USH board cable from the system board.
3. Peel the USH board from the I/O board.
4. Lift the latch and disconnect touchpad cable from the connector on the palm-rest assembly.
5. Lift the latch and disconnect the fingerprint reader cable from the connector on the palm-rest assembly.
6. Remove the two screws (M2x2) that secure the USH board to the palm-rest assembly..
7. Lift the USH board off the palm-rest assembly.

Installing the USH board

CAUTION: The information in this installation section is intended for authorized service technicians only.

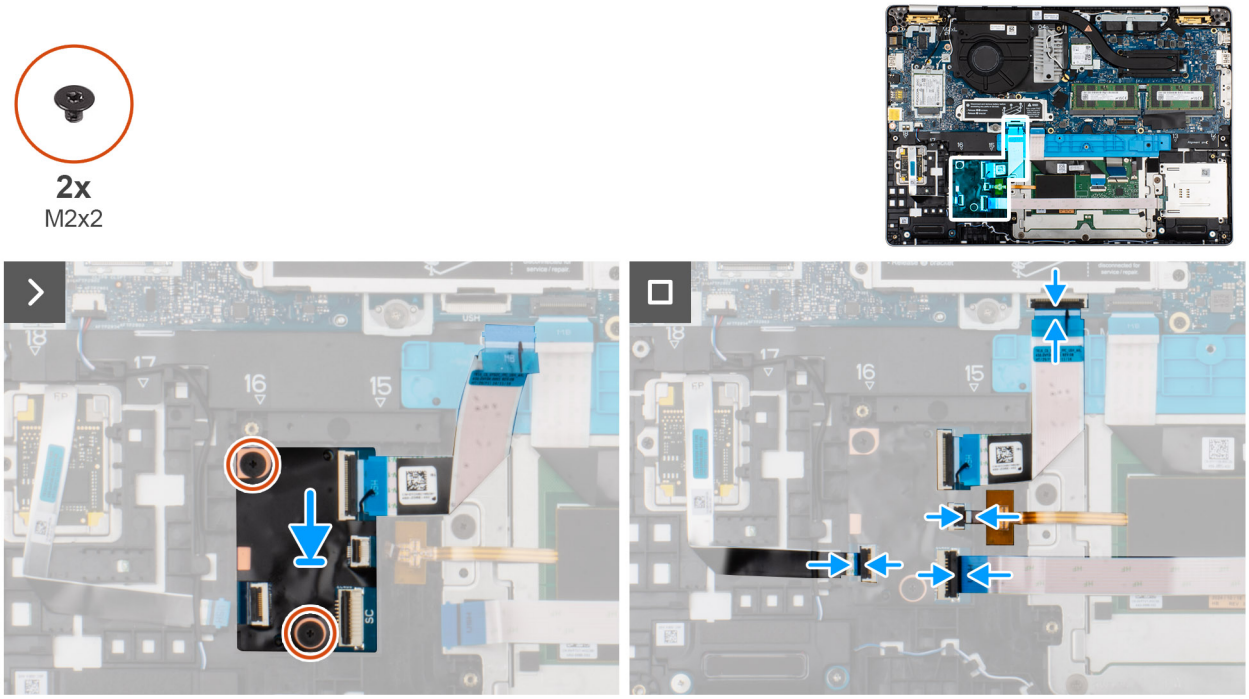


Figure 49. USH board

Steps

1. Align and place the USH board on its slot on the palm-rest assembly.
2. Replace the two screws (M2x2) that secure the USH board to the palm-rest assembly.
3. Adhere the USH board cable to the I/O board.
4. Connect the touchpad cable to the connector on the system board and close the latch to secure the cable.
5. Connect the fingerprint reader cable to the connector on the system board and close the latch to secure the cable.
6. Connect the smart card reader to the connector on the USH board.

Next steps

1. Install the battery.
2. Install the base cover.
3. Install the SIM-card tray (optional).
4. Follow the procedure in After working inside your computer.

Smart card reader

Removing the Smart card reader

CAUTION: The information in this removal section is intended for authorized service technicians only.

NOTE: The Smart card reader is available only on certain configurations.

Prerequisites

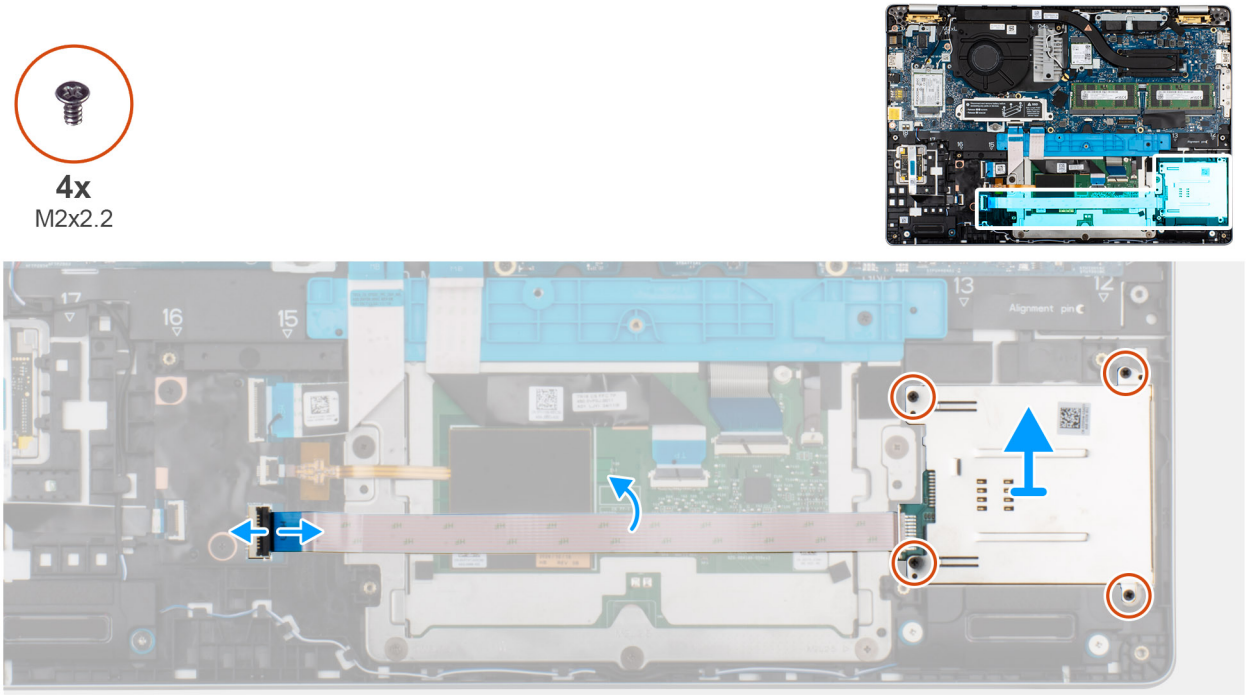
1. Follow the procedure in Before working inside your computer.

2. Remove the SIM-card tray (optional) .
3. Remove the base cover.
4. Remove the battery.

About this task

The following images indicate the location of the Smart card reader and provide a visual representation of the removal procedure.

Figure 50. Removing the Smart card reader



Steps

1. Open the latch the latch and disconnect the smart card reader cable from the connector on the USH board.
2. Peel the smart card reader cable from the palm-rest assembly.
3. Remove the four screws (M2x2.2) that secure the smart card reader to the palm-rest assembly.
4. Lift the smart card reader, along with its cable, off the palm-rest assembly.

Installing the Smart card reader

CAUTION: The information in this installation section is intended for authorized service technicians only.

NOTE: The smart card reader is available only on certain configurations.

Prerequisites

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

About this task

The following images indicate the location of the smart card reader and provide a visual representation of the installation procedure.

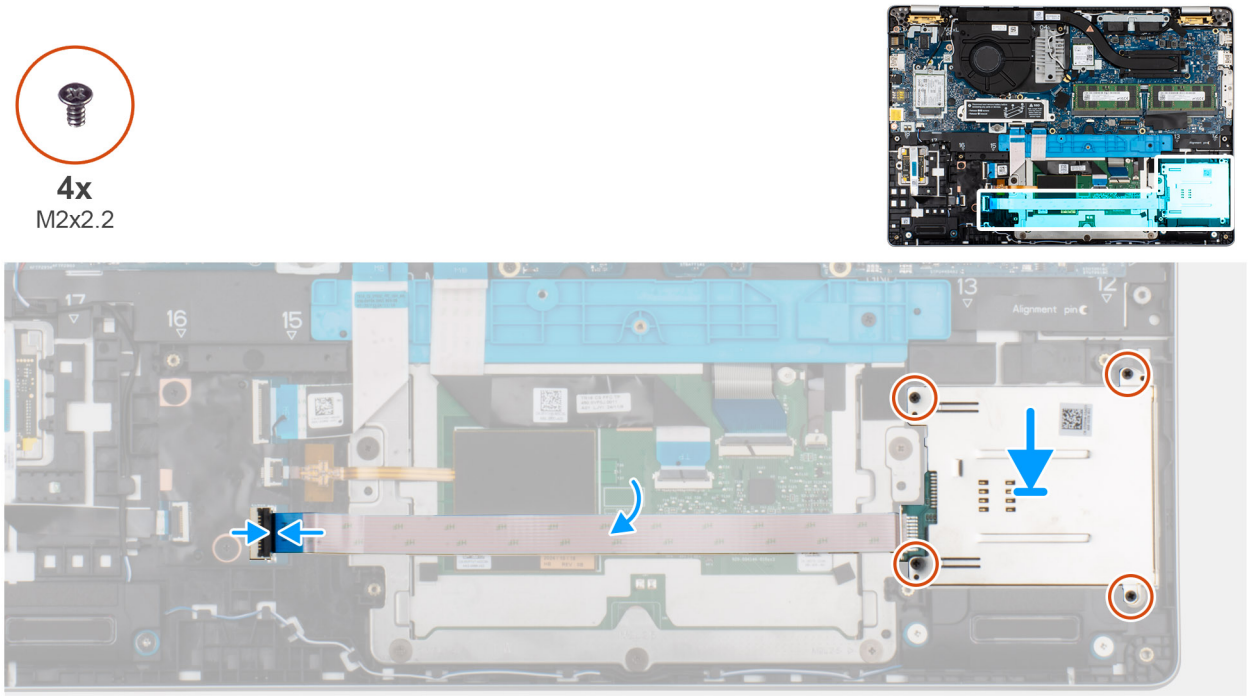


Figure 51. Installing the Smart card reader

Steps

1. Align and place the smart card reader on its slot on the palm-rest assembly.
2. Replace the four screws (M2x2.2) that adheres the smart card reader to the palm-rest assembly.
3. Connect the smart card cable to the connector on the USH board and close the latch.

Next steps

1. Install the battery.
2. Install the base cover.
3. Install the SIM-card tray (optional).
4. Follow the procedure in After working inside your computer.

Heat sink

Removing the heatsink

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the battery.
5. Remove the memory.
6. Remove the M.2 2230 or M.2 2280 SSD, as applicable.
7. Remove the 5G WWAN card or 4G WWAN card, as applicable.
8. Remove the WLAN card, as applicable.
9. Remove the fan.
10. Remove the display assembly.

11. Remove the system board.

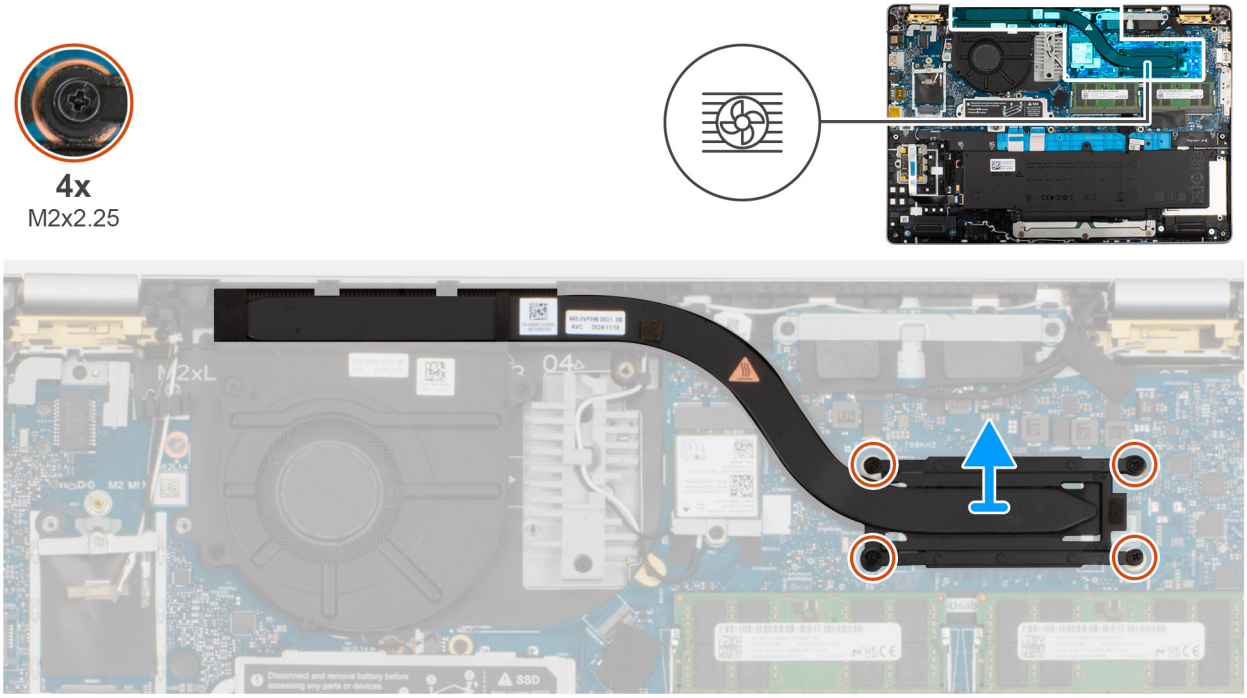
NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

About this task

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

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

The following images indicate the location of the heat sink and provide a visual representation of the removal procedure.



Steps

1. Loosen the four captive screws that secure the heat sink to the system board.

   NOTE: Loosen the captive screws in the reverse sequential order mentioned on the heat sink [4 > 3 > 2 > 1].

2. Lift the heat sink from the system board.

Installing the heatsink

CAUTION: The information in this installation section is intended for authorized service technicians only.

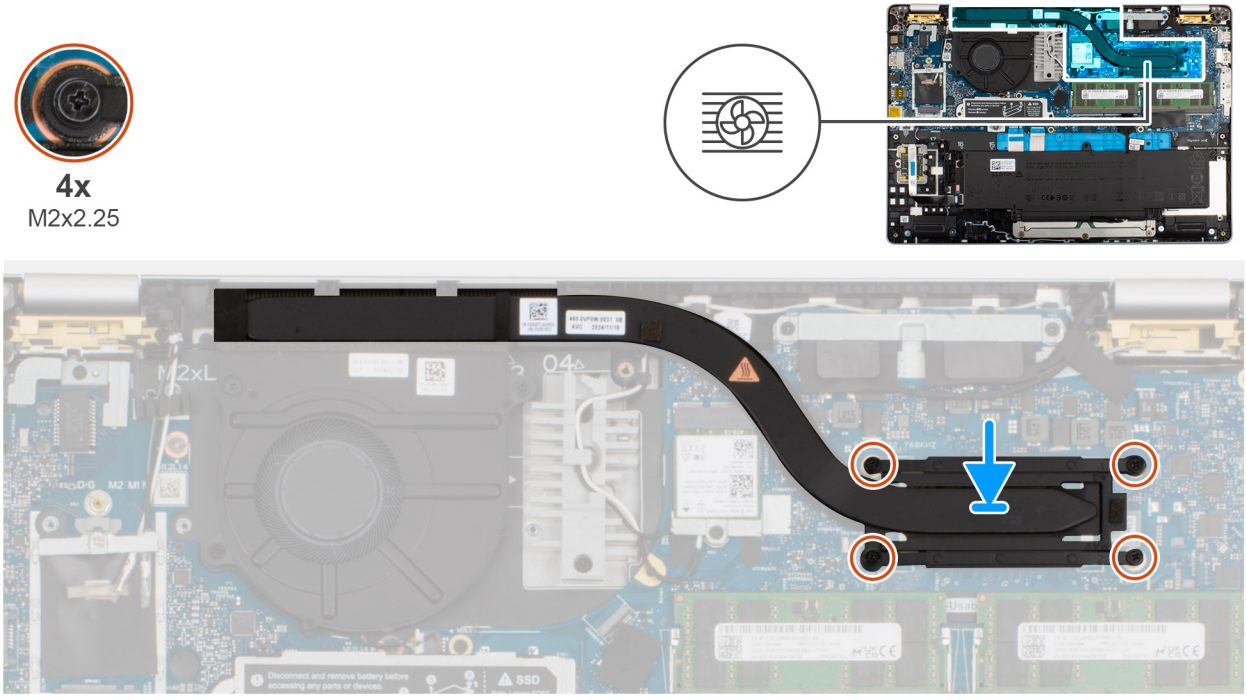
Prerequisites

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

About this task

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

The following images indicate the location of the heat sink and provide a visual representation of the installation procedure.



Steps

1. Align and place the heat sink on the system board.
2. Tighten the four captive screws that secure the heat sink to the system board.

NOTE: Tighten the captive screws in the sequential order mentioned on the heat sink [1 > 2 > 3 > 4].

CAUTION: Incorrect alignment of the Heatsink can damage the system board and processor.

Next steps

1. Follow the procedure in After working inside your computer.
2. Install the SIM-card tray (optional).
3. Install the battery.
4. Install the memory.
5. Install the M.2 2230 or M.2 2280 SSD, as applicable.
6. Install the 5G WWAN card or 4G WWAN card, as applicable.
7. Install the WLAN card, as applicable.
8. Install the fan.
9. Install the display assembly.
10. Install the system board.
11. Install the base cover.

System board

Removing the system board

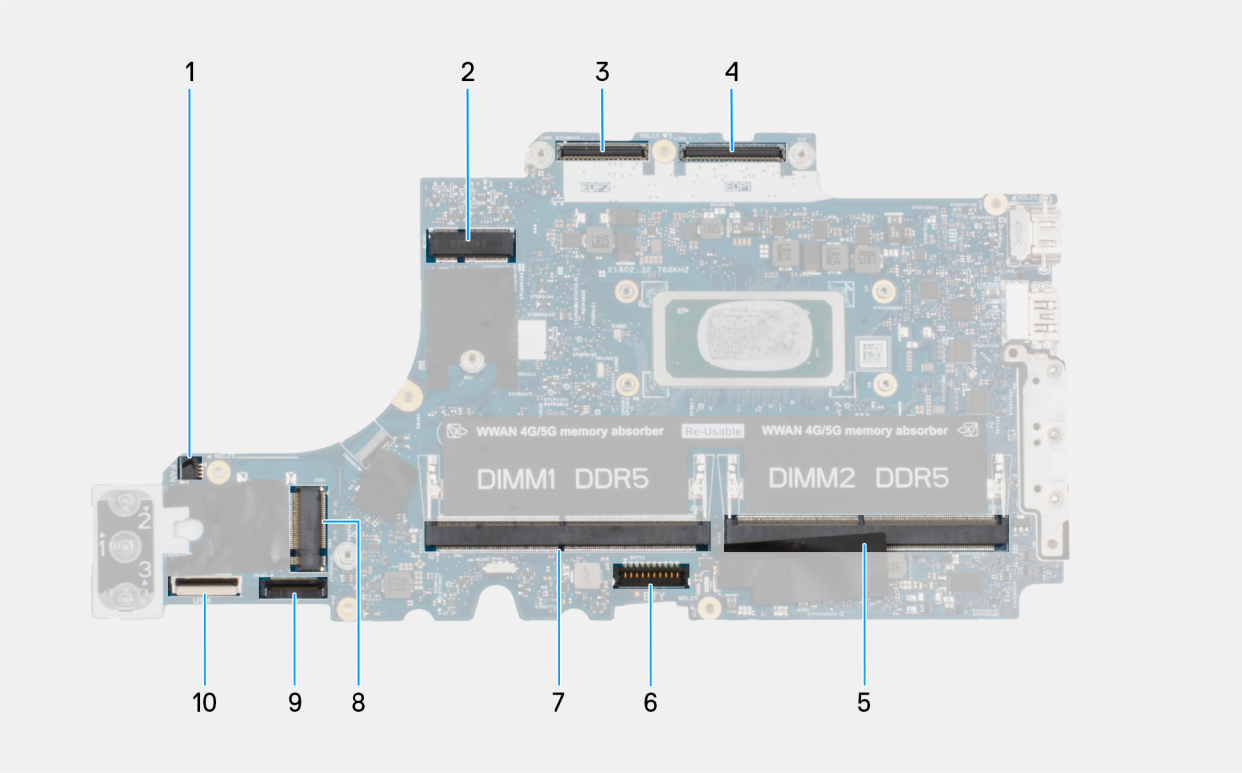
CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the memory.
5. Remove the M.2 2230 SSD or M.2 2280 SSD, as applicable.
6. Remove the WLAN card, as applicable.
7. Remove the fan.
8. Remove the display assembly
9. Remove the I/O board.

About this task

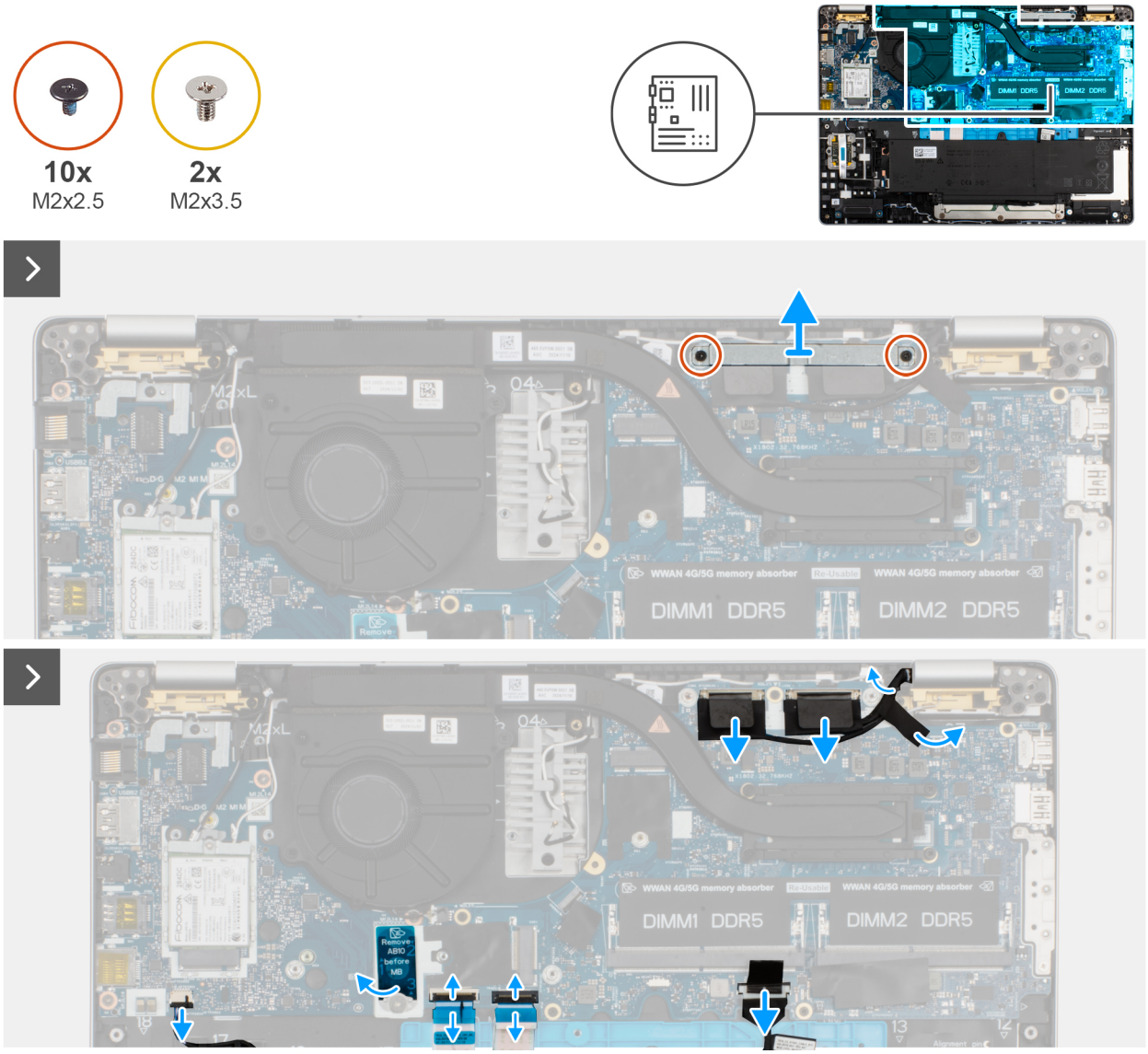
The following images indicate the system board connectors.



1. Fan cable connector
2. Wireless-card (WLAN)
3. Display-cable connector (LCD1)
4. Display-cable connector (LCD1)
5. Memory connector Slot 1
6. Battery-cable connector (BATT1)
7. Memory connector Slot 2
8. Solid-state drive Slot
9. Sensor board-cable connector
10. USH-cable connector

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

Figure 52. Removing the system board



Steps

1. Remove the two screws (M2x2.5) that secure the display-cable bracket to the palm-rest assembly.
2. Lift the display-cable bracket off the palm-rest assembly.
3. Disconnect the camera cable from the connector on the system board.
4. Disconnect the display-cable from the display-cable connector (LCD1) on the system board.
5. Remove the display-cable from the routing guides on the palm-rest-assembly.
6. Lift the pull tab near the antenna cables and uncover the sensor-board cable.
7. Disconnect the sensor-board cable from the connector on the system board.
8. Open the latch and disconnect the USH cable from the USH module.
9. Partly peel the mylar to access the screws on the middle bracket (AB10) that connects the I/O board and system board to the palm-rest assembly.
10. Remove the three (M2x2.5) screws in reverse sequential order as indicated on the middle bracket.
11. Remove five (M2x2.5) screws and two (M2x3.5) screws securing the system board to the palm-rest assembly.
12. Lift the system board off the palm-rest assembly.

NOTE: The USB Type-C connector module is part of the replacement system board but is also a service part that can be replaced independently. See the USB Type-C Connector module section for more information.

Installing the system board

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

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

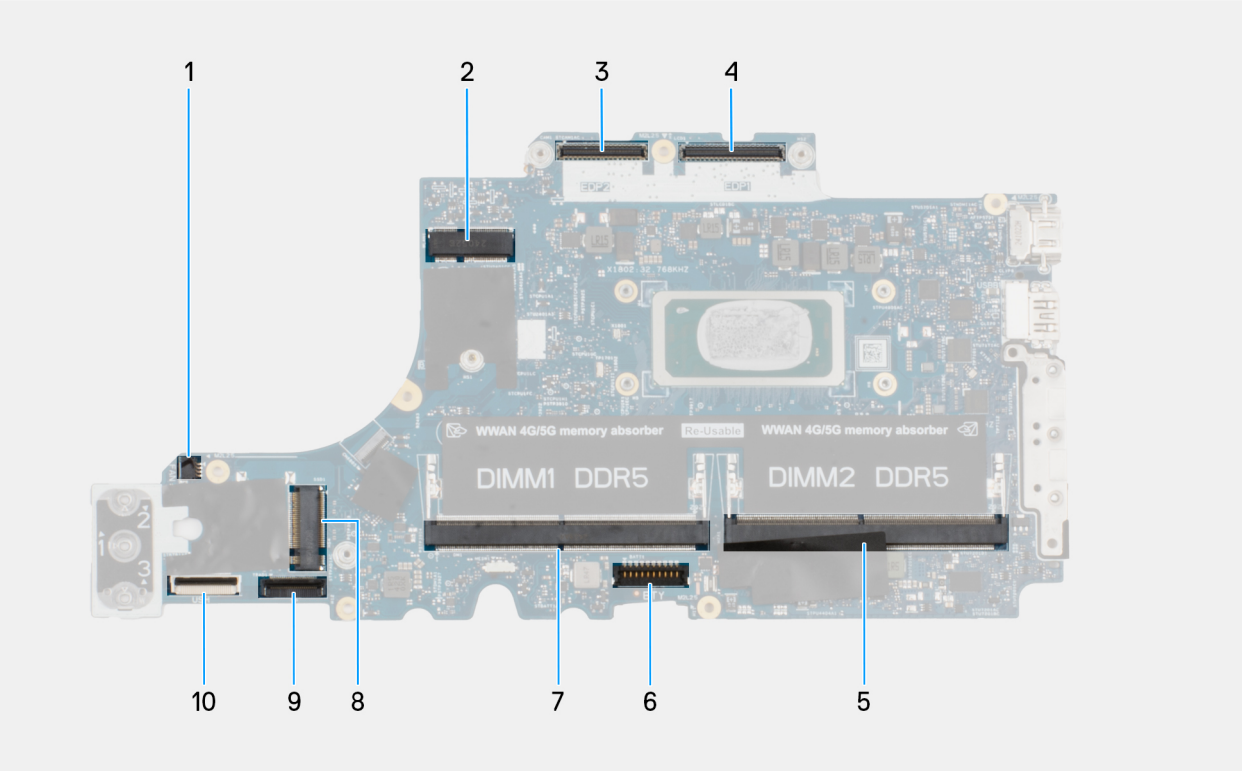


Figure 54. System board connector

1. Fan-cable connector
2. Wireless-card (WLAN)
3. Display-cable connector (LCD1)
4. Display-cable connector (LCD1)
5. Memory connector Slot 1
6. Battery-cable connector (BATT1)
7. Memory connector Slot 2
8. Solid-state drive Slot
9. Sensor board-cable connector
10. USH-cable connector

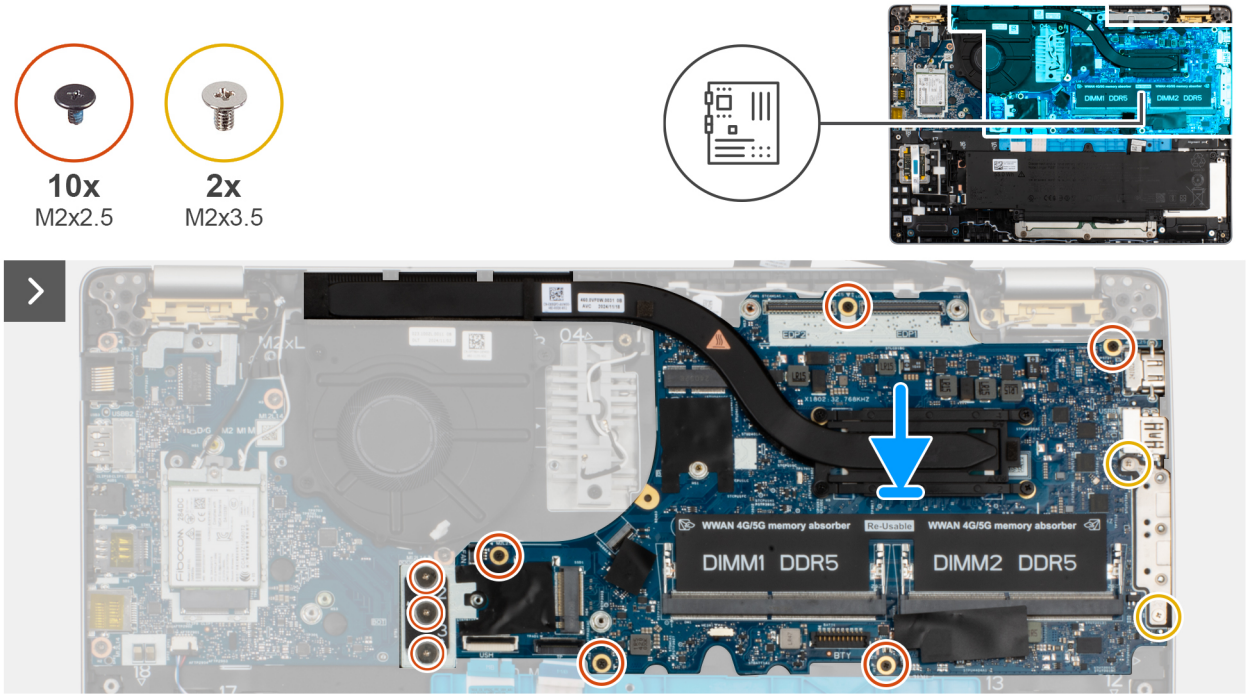


Figure 55. Installing the system board

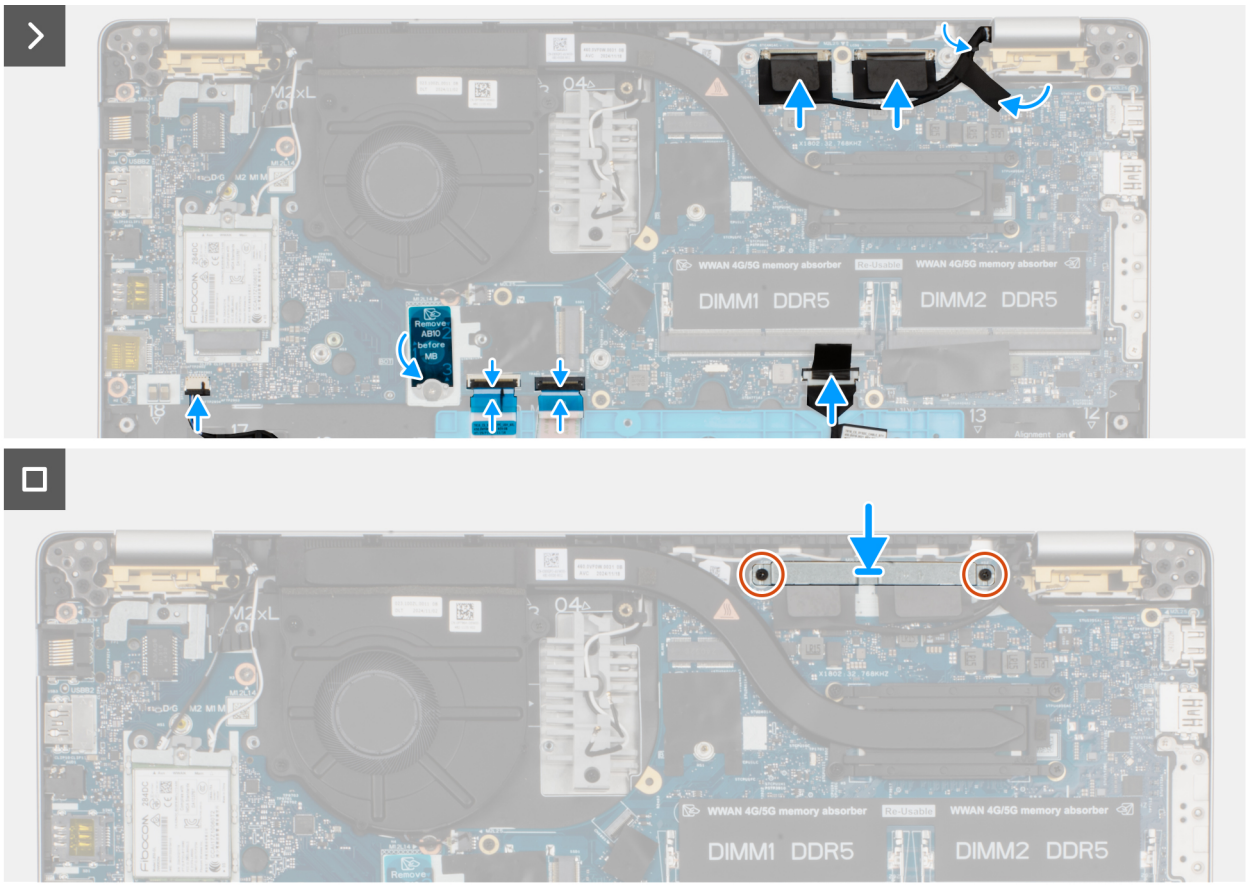


Figure 56. Installing the system board

Steps

1. Align and place the system board on its slot on the palm-rest assembly.

2. Replace five (M2x2.5) screws and two (M2x3.5) screws securing the system board to the palm-rest assembly.
3. Replace the three (M2x2.5) screws in reverse sequential order as indicated on the middle bracket.

   NOTE: The USB-C connector module is part of the replacement system board but is also a service part that can be replaced independently. See the USB-C Connector Module section for more information.

4. Partly place the mylar to access the screws on the middle bracket (AB10) that connects the I/O board and system board to the palm-rest assembly.
5. Connect the USH cable from the USH module.
6. Connect the sensor-board cable from the connector on the system board.
7. Conenct the pull tab near the antenna cables and cover the sensor-board cable.
8. Replace the display-cable from the routing guides on the palm-rest-assembly.
9. Connect the display-cable from the display-cable connector (LCD1) on the system board.
10. Connect the camera cable from the connector on the system board.
11. Connect the display-cable bracket on the palm-rest assembly.
12. Replace the two screws (M2x2.5) that secure the display-cable bracket to the palm-rest assembly.

Next steps

1. Follow the procedure in After working inside your computer.
2. Install the SIM-card tray (optional).
3. Install the memory.
4. Install the M.2 2230 or M.2 2280 SSD, as applicable.
5. Install the 5G WWAN card.
6. Install the WLAN card, as applicable.
7. Install the fan.
8. Install the display assembly
9. Install the I/O board.
10. Install the base cover.

I/O board

Removing the I/O board

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the battery.
5. Remove the memory.
6. Remove the M.2 2230 or M.2 2280 SSD, as applicable.
7. Remove the 5G WWAN card or 4G WWAN card, as applicable.
8. Remove the WLAN card, as applicable.
9. Remove the fan.
10. Remove the display assembly.
11. Remove the system board.

NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

About this task

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

NOTE: The system board can be removed and installed with the heat sink attached in order to simplify the procedure and preserve the thermal bond between the system board and heat sink.

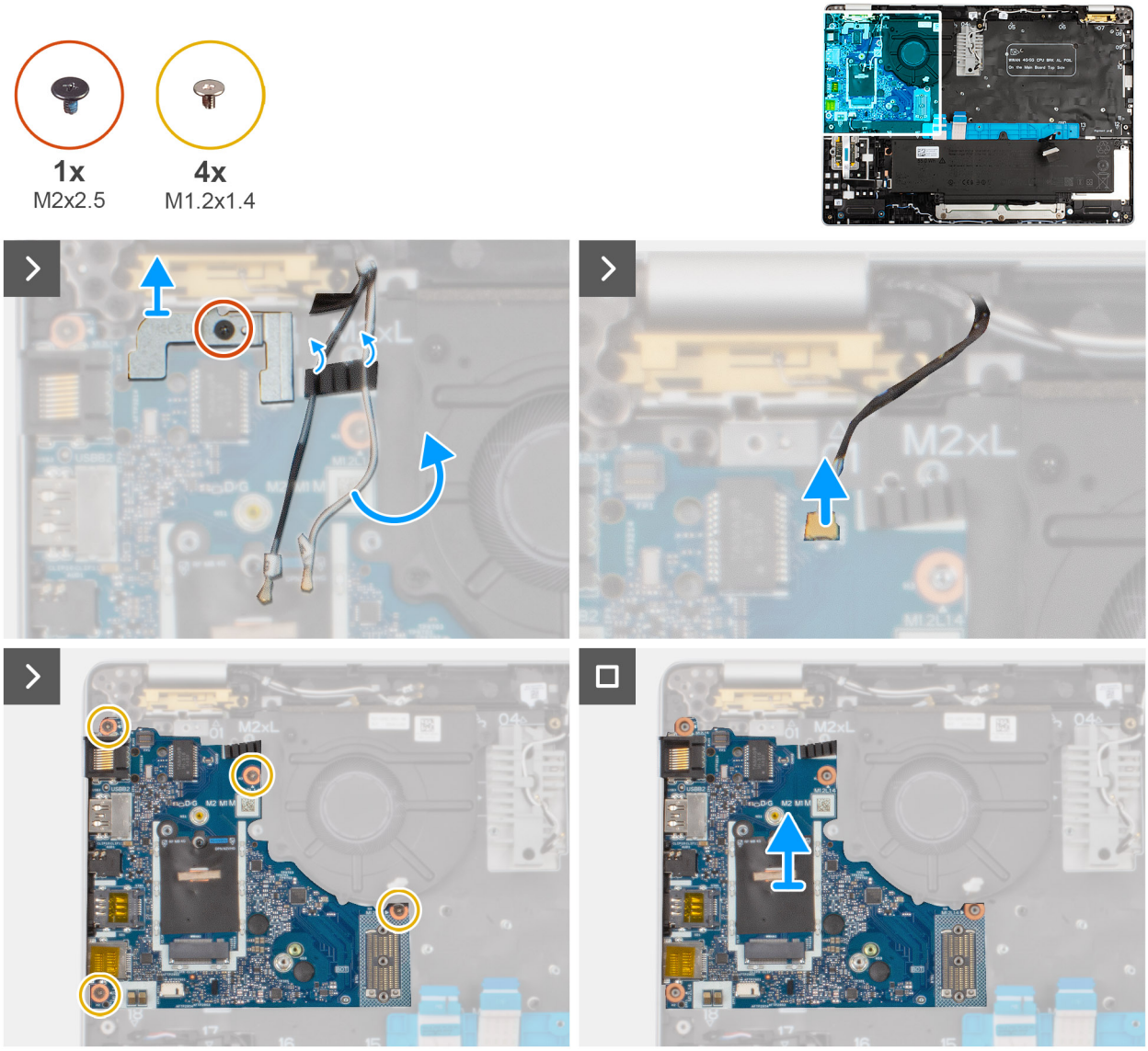


Figure 57. Removing I/O board

Steps

1. Unroute the WWAN antenna cables from the routing guides on the I/O daughter board and move it away from the I/O board.
2. Remove the screw (M2x3) that secures the fingerprint reader bracket in place and remove the fingerprint reader bracket.
3. Peel the USH board flexible flat cable from the I/O daughter board.

   NOTE: This step applies to models shipped with a USH board.

4. Disconnect the fingerprint reader flexible flat cable (for models shipped with a fingerprint reader), Darwin cable, fan cable, touchpad flexible flat cable, and speakers cable from the I/O board.
5. Remove the four screws (M1.2x1.4) that secure the I/O daughter board in place.
6. Lift the I/O daughter board away from the computer.

   NOTE: While replacing the I/O daughter board, the WWAN card thermal pad mylar sticker at the top side of the I/O daughter board must be replaced to the replacement I/O daughter board.

Installing the I/O board

CAUTION: The information in this installation section is intended for authorized service technicians only.

About this task

The following images indicate the location of the I/O daughter board and provide a visual representation of the installation procedure.

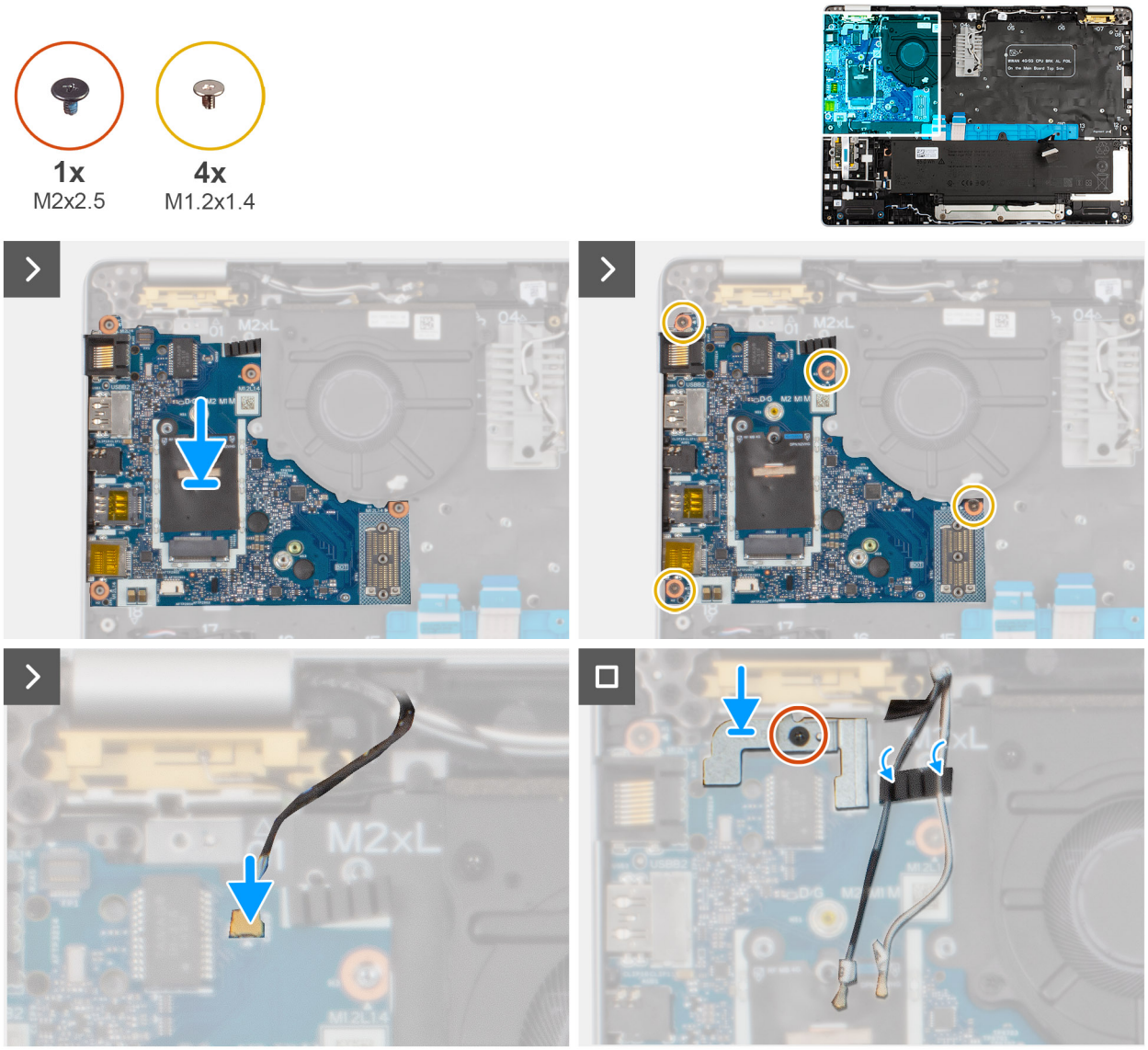


Figure 58. Removing the I/O board

Steps

1. Align and Replace the I/O daughter board on the palm-rest assembly.
2. Replace the four screws (M1.2x1.4) that secure the I/O daughter board in place.
3. Replace the screw (M2x3) that secures the fingerprint-reader bracket in place.
4. Route the WWAN antenna cables along the routing channels on the I/O daughter board.
5. Adhere the USH board FFC on the I/O daughter board (for models shipped with a USH board).
6. Disconnect the fingerprint reader flexible flat cable (for models shipped with a fingerprint reader), Darwin cable, fan cable, touchpad flexible flat cable, and speakers cable from the I/O board.

Next steps

1. Follow the procedure in After working inside your computer.
2. Install the SIM-card tray (optional).
3. Install the battery.
4. Install the memory.
5. Install the M.2 2230 or M.2 2280 SSD, as applicable.
6. Install the 5G WWAN card or 4G WWAN card, as applicable.
7. Install the WLAN card, as applicable.
8. Install the fan.
9. Install the display assembly.
10. Install the Heat sink.
11. Install the system board.

NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

12. Install the base cover.

Power button with optional fingerprint reader

Removing the power button with optional fingerprint reader

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the memory.
5. Remove the M.2 2230 or M.2 2280 SSD, as applicable.
6. Remove the 5G WWAN card or 4G WWAN card, as applicable.
7. Remove the WLAN card, as applicable.
8. Remove the fan.
9. Remove the display assembly.
10. Remove the I/O board.
11. Remove the system board.

NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

About this task

The following images indicate the location of the power button with optional fingerprint reader and provide a visual representation of the removal procedure.

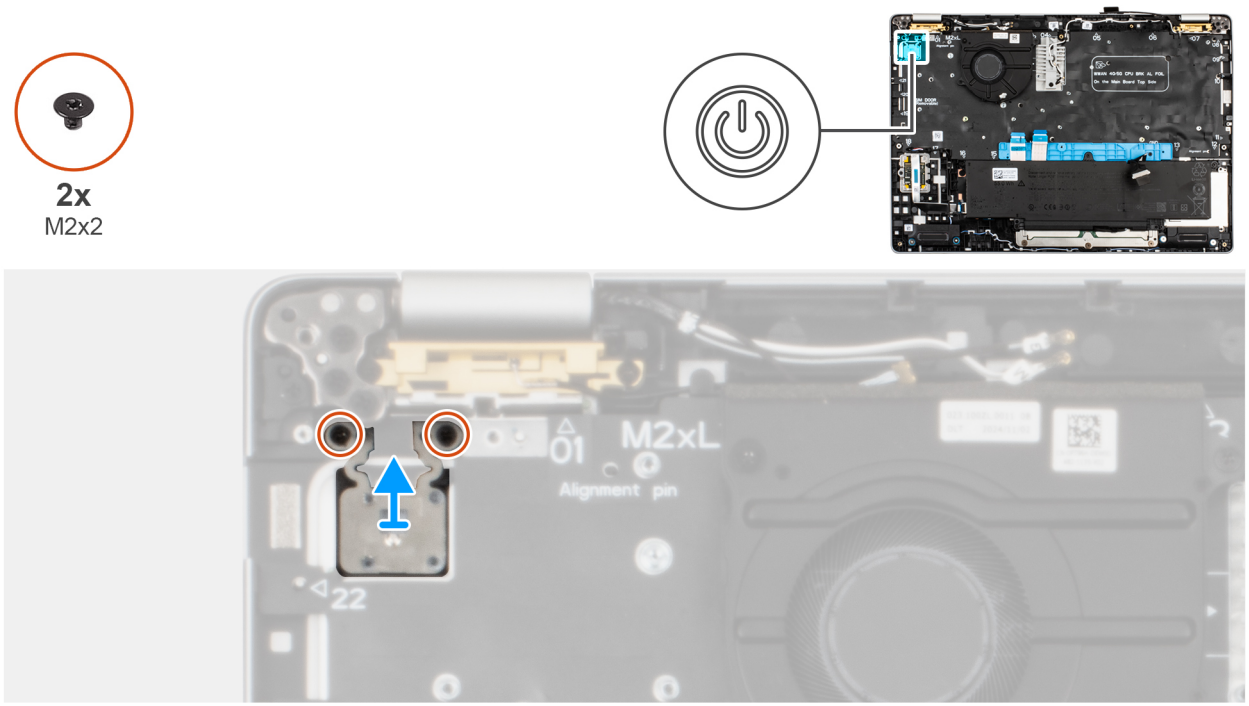


Figure 59. Installing the power button with an optional fingerprint reader

Steps

1. Remove the two screws (M2x2) that secure the power button to the palm-rest assembly.
2. Lift the power button off the palm-rest assembly.

Installing the power button with an optional fingerprint reader

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

The following images indicate the location of the power button with optional fingerprint reader and provide a visual representation of the installation procedure.

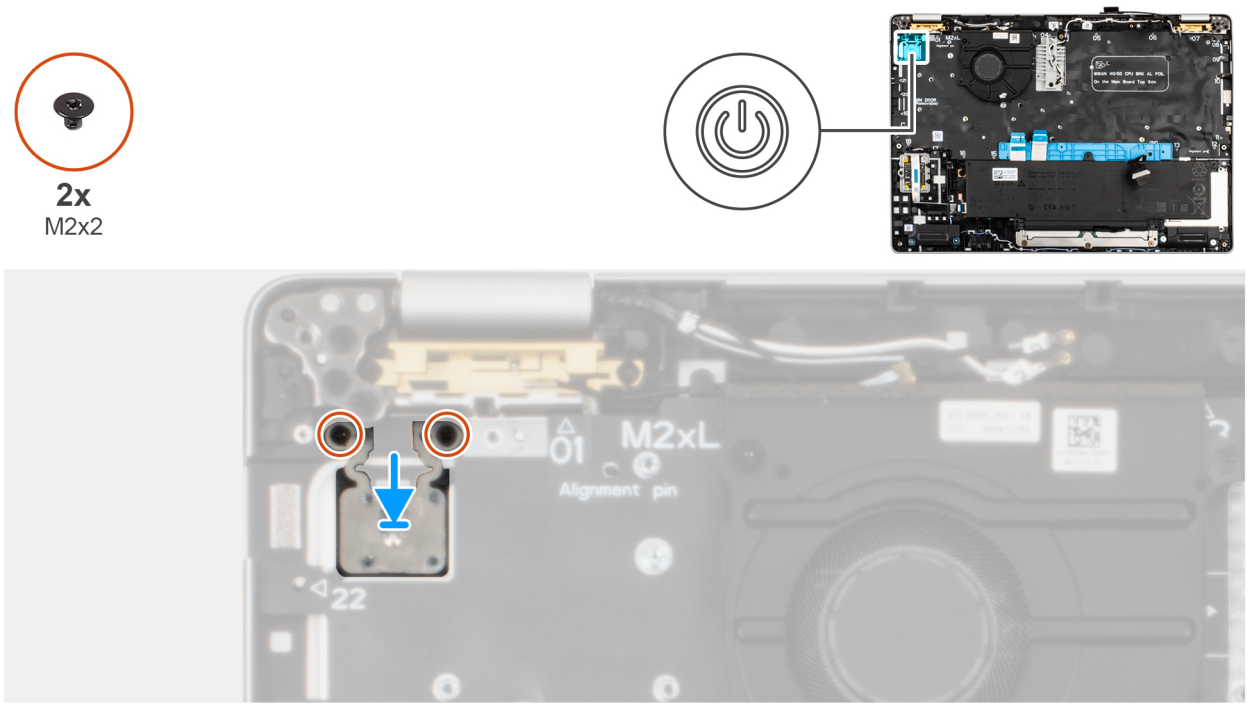


Figure 60. Installing the power button with an optional fingerprint reader

Steps

1. Align and place the power button on the palm-rest assembly.
2. Replace the two screws (M2x2) to secure the power button to the palm-rest assembly.

Next steps

1. Follow the procedure in After working inside your computer.
2. Install the SIM-card tray (optional).
3. Install the memory.
4. Install the M.2 2230 or M.2 2280 SSD, as applicable.
5. Install the 5G WWAN card or 4G WWAN card, as applicable.
6. Install the WLAN card, as applicable.
7. Install the fan.
8. Install the display assembly.
9. Install the I/O board.
10. Install the system board.
11. Install the base cover.

Display assembly

Removing the display assembly

CAUTION: The information in this removing section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the 5G WWAN card or 4G WWAN card, as applicable.

About this task

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

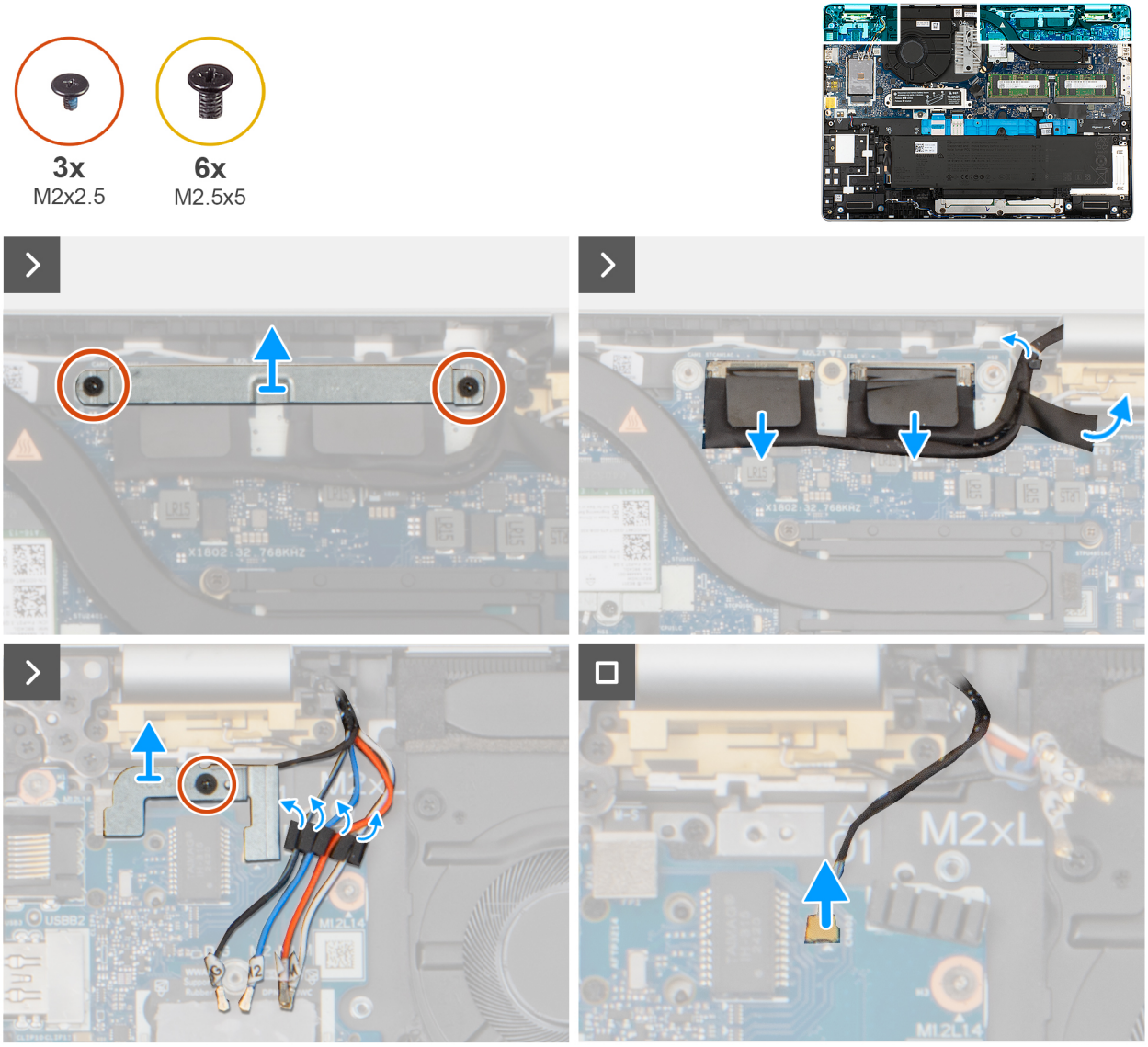


Figure 61. Removing the display assembly

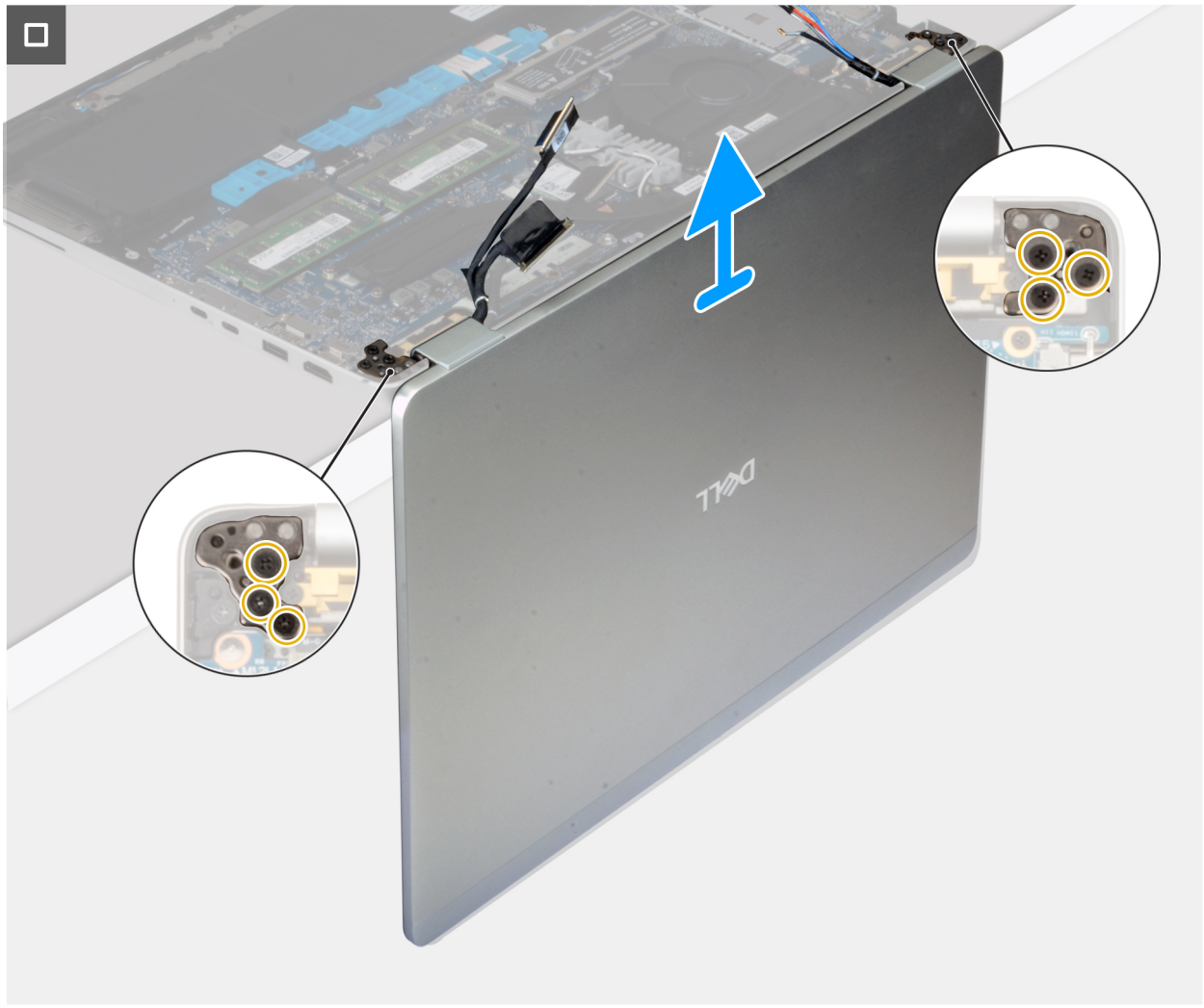


Figure 62. Removing the display assembly

Steps

1. Remove the two screws (M2x2.5) that secures the display-cable bracket in place.
2. Remove the display-cable bracket off the palm-rest assembly.
3. Disconnect the display cable and camera cable (optional) from the display cable connector (LCD1) on the system board.
4. Remove the display cable from the routing guides on the palm-rest-assembly.
5. Remove the antenna cables (where applicable) from the routing guides on the system board.
6. Remove the screw (M2x3) that secures the fingerprint-reader bracket to the palm-rest assembly.
7. Release the WWAN cables from the routing guides on the palm-rest assembly.
8. Disconnect the sensor-board cable from the connector on the system board.
9. Turn the computer over and open the display at an angle of 90 degrees.
10. Remove the six screws (M2.5x5) that secure the left and right display hinges to the palm-rest assembly.
11. Lift the display assembly from the palm-rest assembly.
12. Place the display assembly on a clean, flat surface.

Installing the display assembly

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

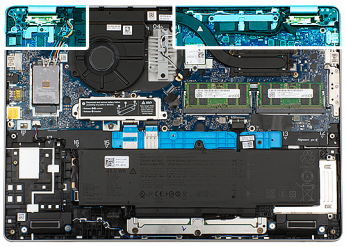
About this task

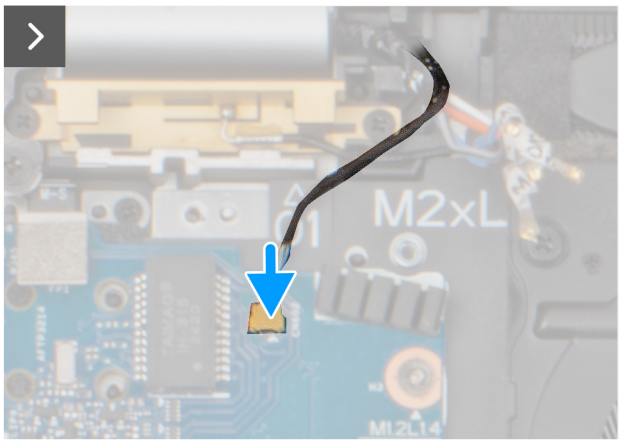
The following images indicate the location of the display assembly and provide a visual representation of the installation procedure.

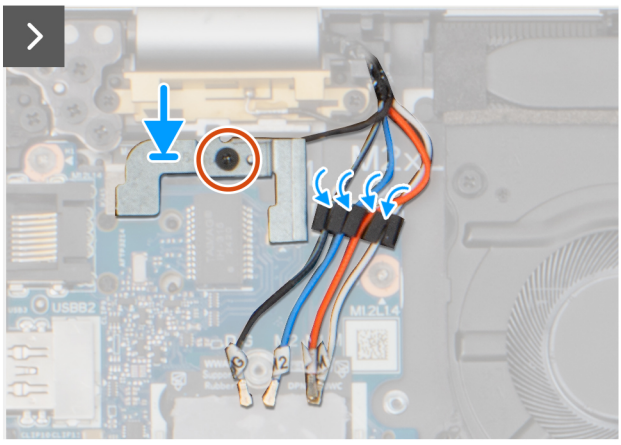
Figure 63. Installing the display assembly

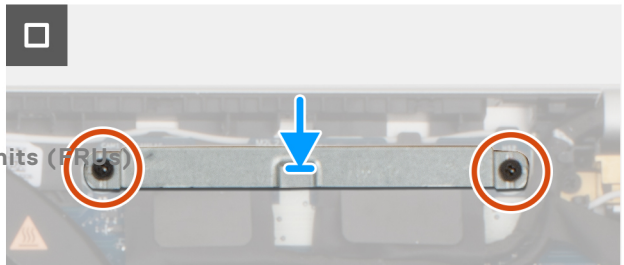
3x
M2x2.5

6x
M2.5x5









Steps

1. Place the palm-rest assembly facing upwards on a flat table and place the display assembly at a 90-degree angle.
2. Align the screw holes on the palm-rest assembly with the screw holes on the display hinges.
3. Replace the six screws (M2.5x5) that secure the left and right display hinges to the palm-rest assembly.
4. Connect the sensor-board cable to the connector on the system board.
5. Route the antenna cables through the routing guides on the palm-rest-assembly.
6. Connect the camera cable (optional) and the display cable to the respective connectors (LCD1) on the system board.
7. Adhere the tape that secures the display cable to the system board.
8. Align the screw holes on the display-cable bracket with the screw holes on the system board.
9. Replace the two (M2x2.5) screws that secure the display-cable bracket to the system board.

Next steps

1. Install the 5G WWAN card or 4G WWAN card, as applicable.
2. Install the base cover.
3. Install the SIM-card tray (optional).
4. Follow the procedure in After working inside your computer.

Display bezel

Removing the display bezel

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the display assembly.
5. Remove the 5G WWAN card or 4G WWAN card, as applicable.

About this task

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

Figure 64. Prying the plastic bezel

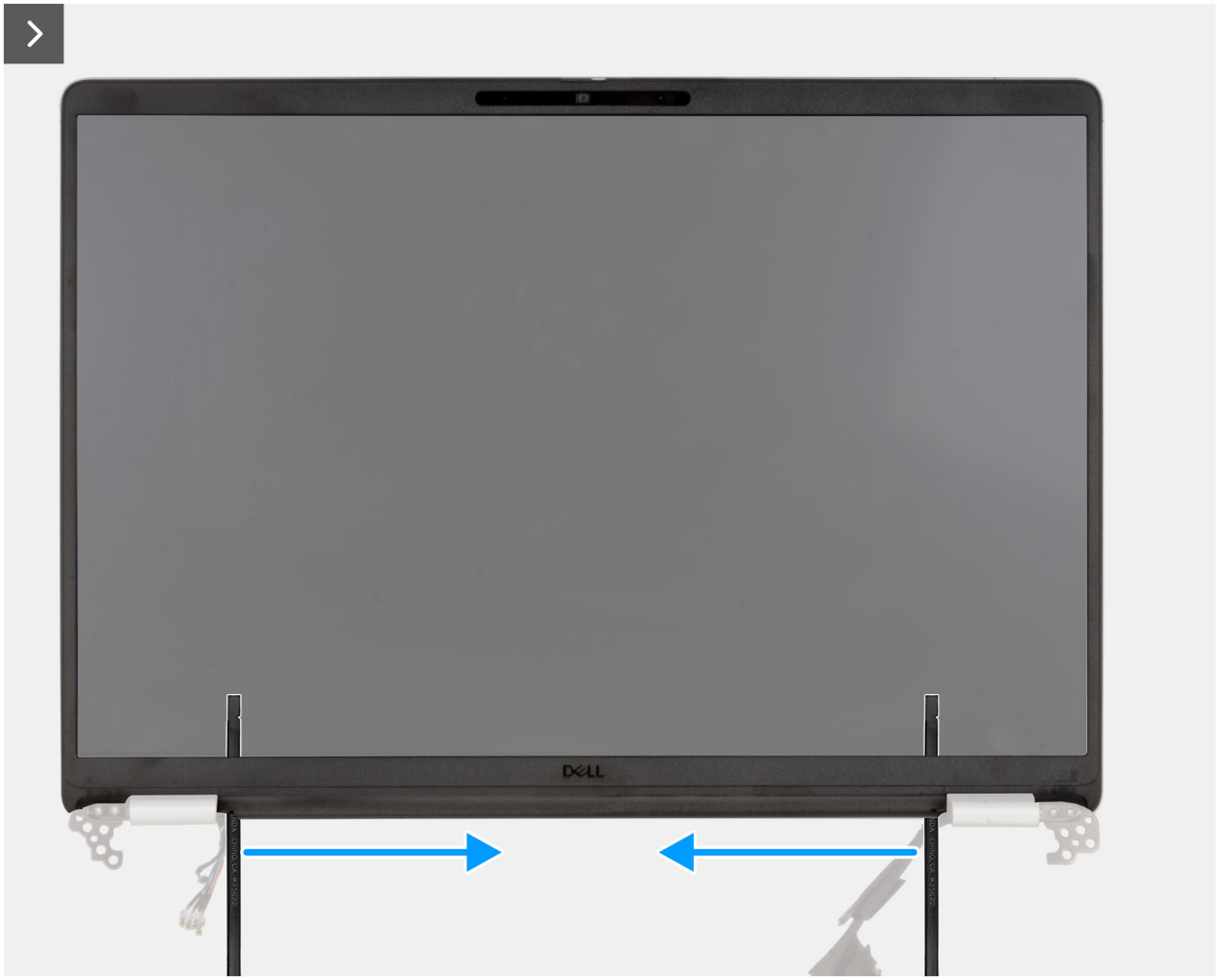


Figure 65. Prying the bezel along the sides

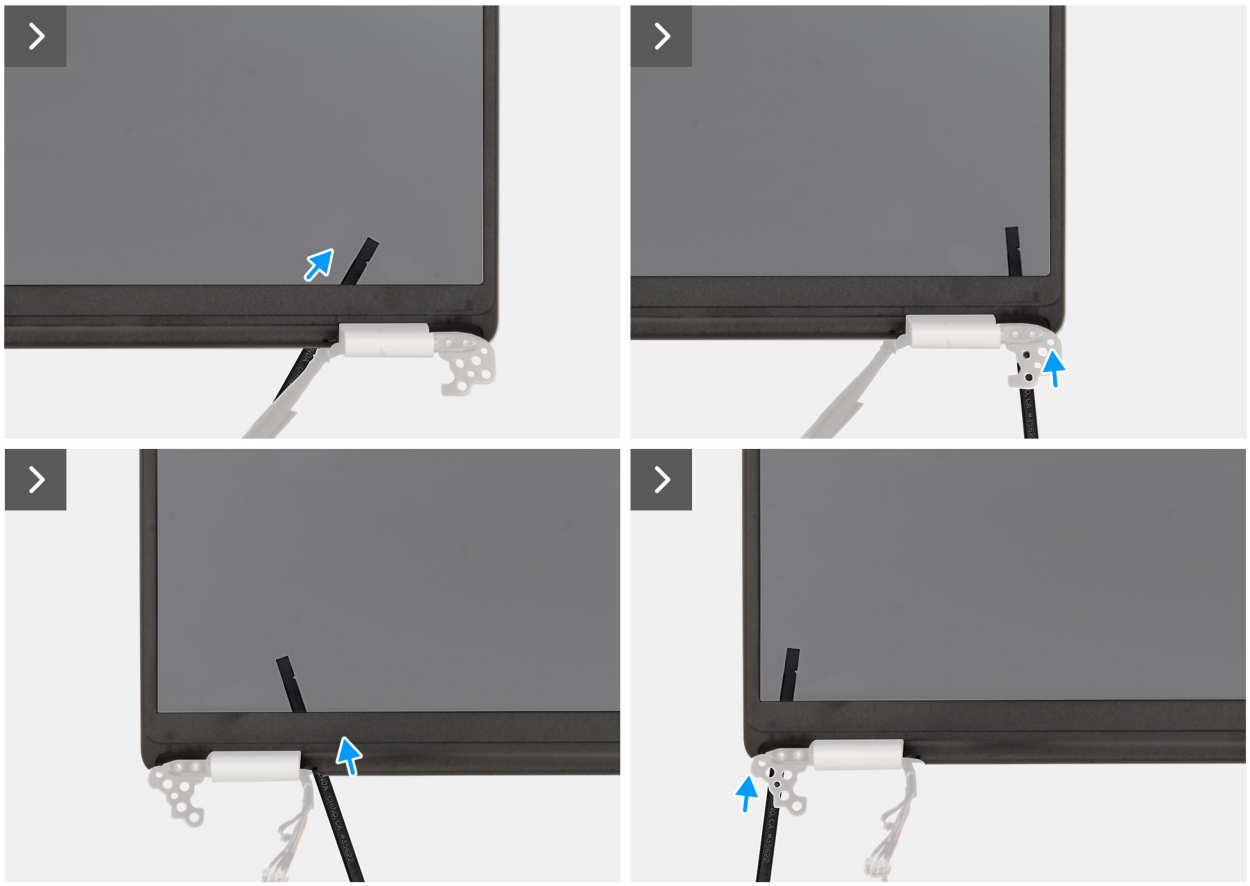


Figure 66. Removing the display bezel

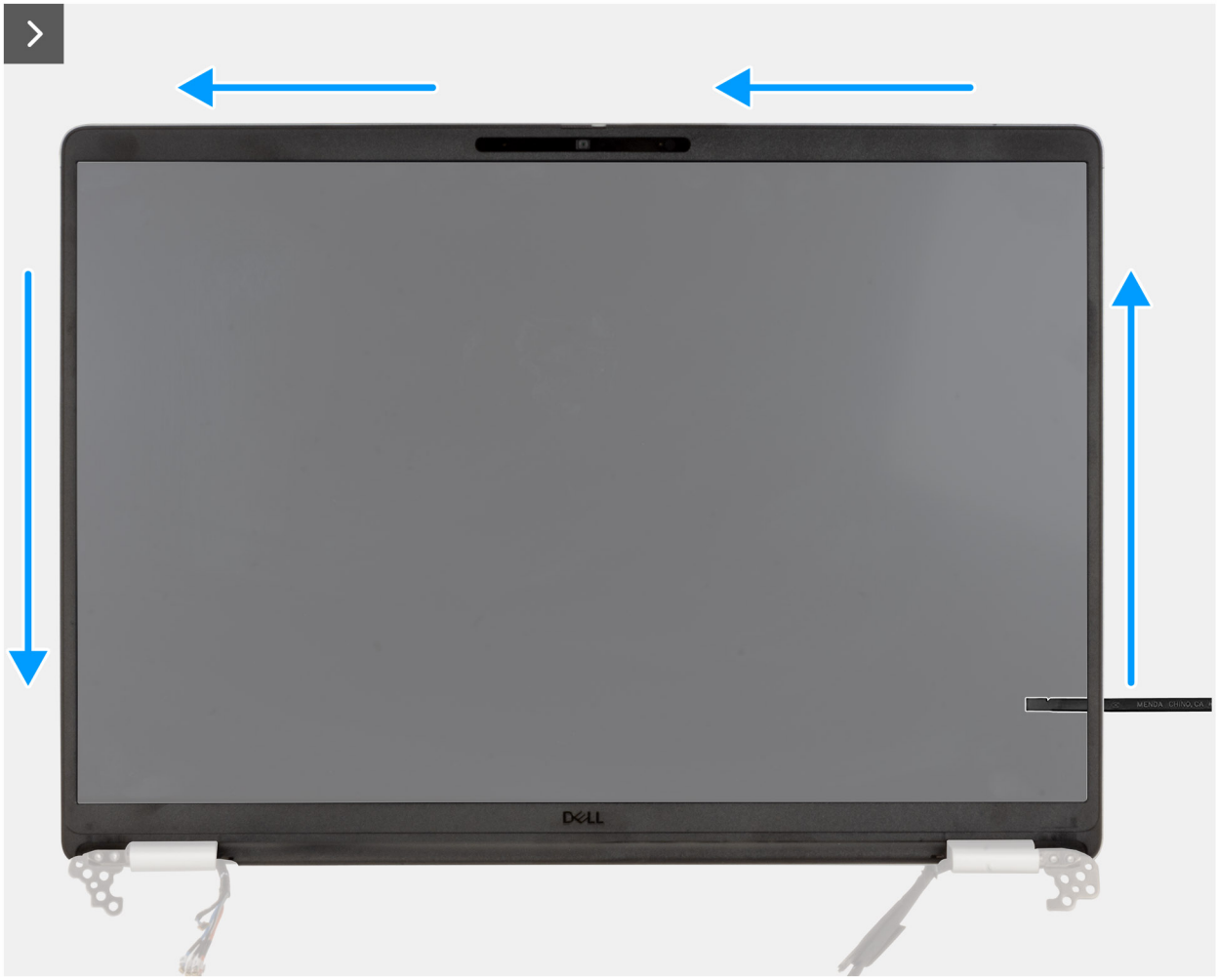


Figure 67. Removing the display bezel

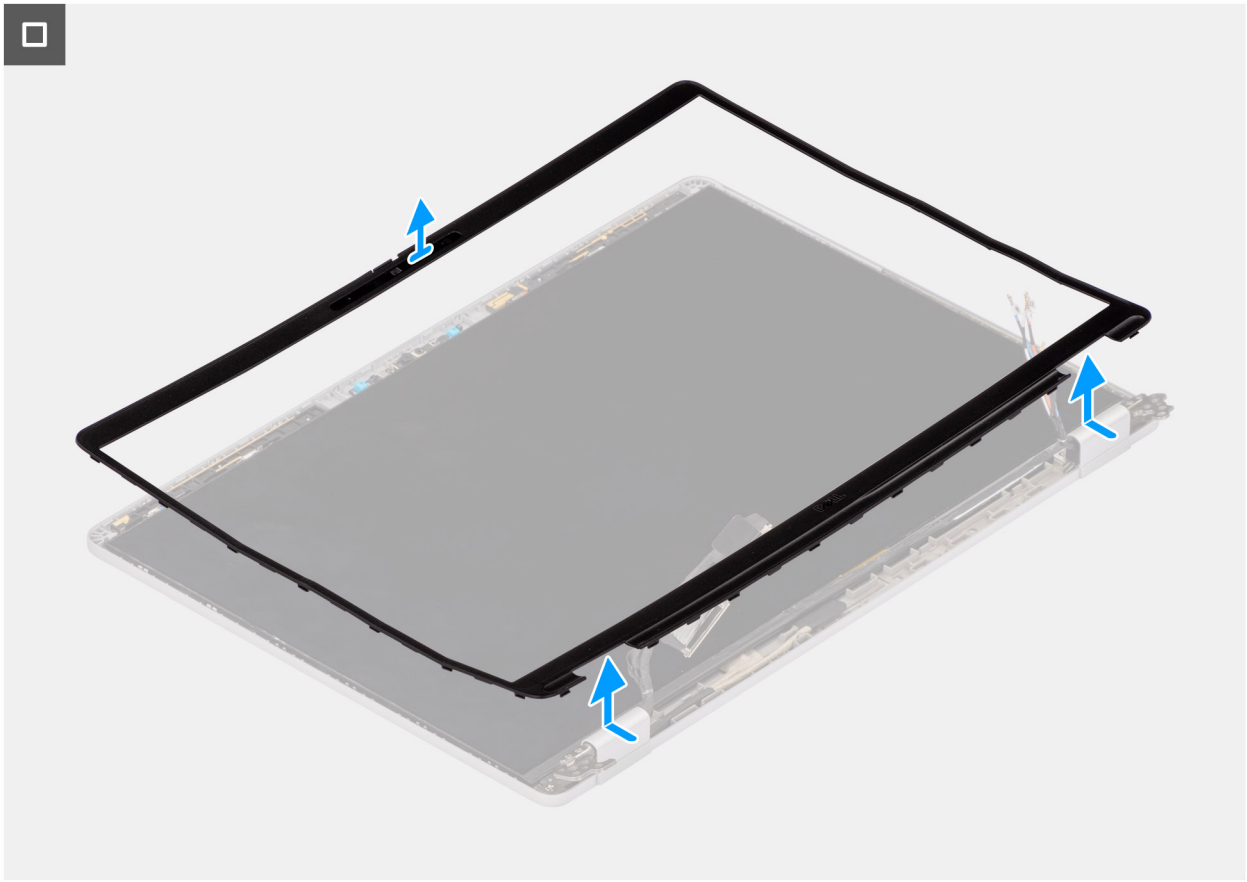


Figure 68. Removing the display bezel

Steps

1. Insert a flat-head screwdriver (maximum width: 4 mm) into the recess on the display bezel near the hinges, and gently apply pressure to release the bezel at both ends, creating a gap.

   NOTE: The bezel is deformed from this process. This is acceptable because the bezel is defined as a consumable part and should be replaced with a new one.

   CAUTION: Do not use the flat head (slotted) screwdriver to release up the rest of the bezel. Switch to the plastic scribe to continue to release along the bezel.

2. Insert the flat end of the scribe into the gap created under the display bezel.

   CAUTION: When inserting the scribe into the bezel, keep it parallel to the display. Pressing it downward can damage the display. Do not use the flat head (slotted) screwdriver to release up the rest of the bezel. Switch to the plastic scribe to continue prying along the bezel.

3. Keeping the scribe parallel to the display, carefully slide it along the bottom edge of the bezel to release the adhesive and the lower side.

   CAUTION: Do NOT lift the scribe up vertically as that damages the LCD. Slide the scribe horizontally to release the adhesive and pry the bezel up.

4. Insert the scribe diagonally into the hinge section to carefully release up the portion of the bezel above the hinge.
5. Insert the scribe into the corner of the display bezel near the hinge. Keeping the scribe parallel to the display, carefully slide the scribe along the edges from one corner to the other (right to left or left to right). As you do this, use your fingers to help with releasing the bezel from the clips and adhesive.
6. Lift the display bezel off the display assembly.

Installing the display bezel

CAUTION: The information in this installation section is intended for authorized service technicians only.

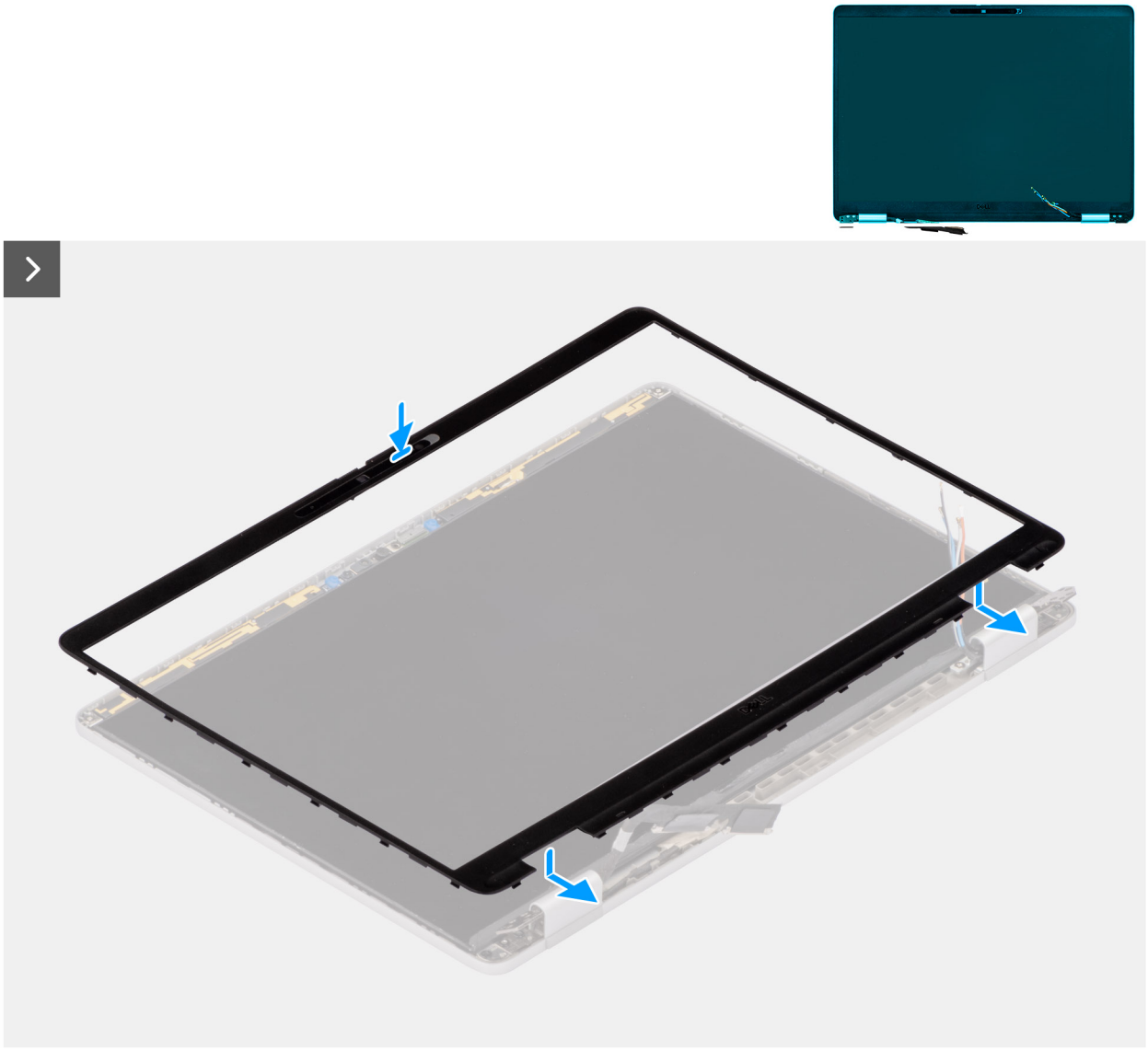
Prerequisites

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

About this task

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

Figure 69. Installing the display bezel



Steps

1. Align and place the display bezel on the display assembly.
2. Gently press along the edges of the display bezel to secure it with the clips on the display assembly.

Next steps

1. Install the 5G WWAN card or 4G WWAN card, as applicable.
2. Install the display assembly.

3. Install the base cover.
4. Install the SIM-card tray (optional).
5. Follow the procedure in After working inside your computer.

Display panel

Removing the display panel

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the display assembly.
5. Remove the display bezel.
6. Remove the 5G WWAN card or 4G WWAN card, as applicable.

About this task

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

Figure 70. Removing the display panel

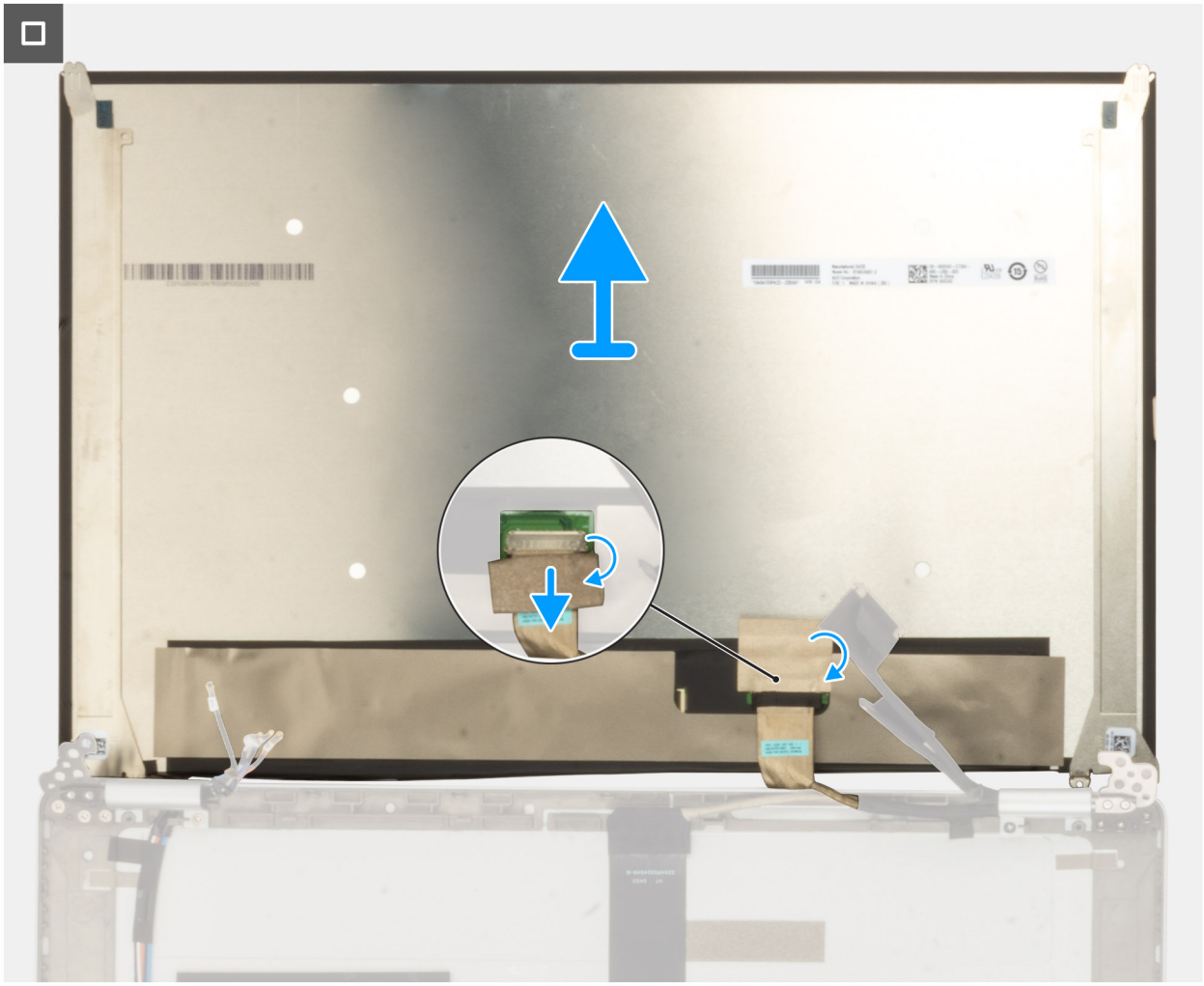


Figure 71. Removing the display panel

Steps

1. Remove the two screws (M1.6x1.4) that secure the display panel to the display back cover.
2. Gently flip the display panel to access the display cable.
3. Peel the tape on the display cable connector.
4. Open the latch and disconnect the cable from the connector on the display panel.
5. Lift the display panel away off the display back cover.

Installing the display panel

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

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

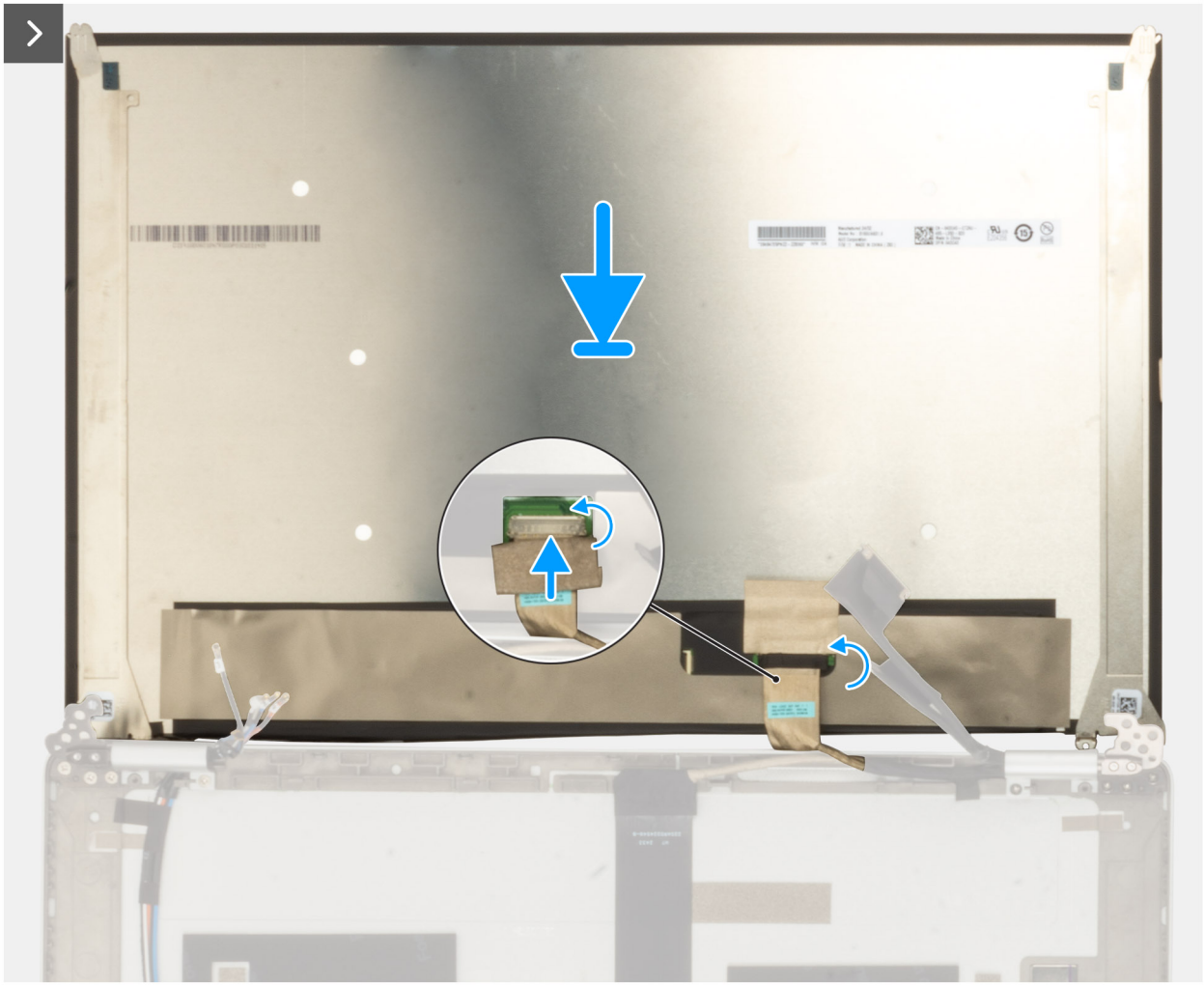


Figure 72. Installing the display panel

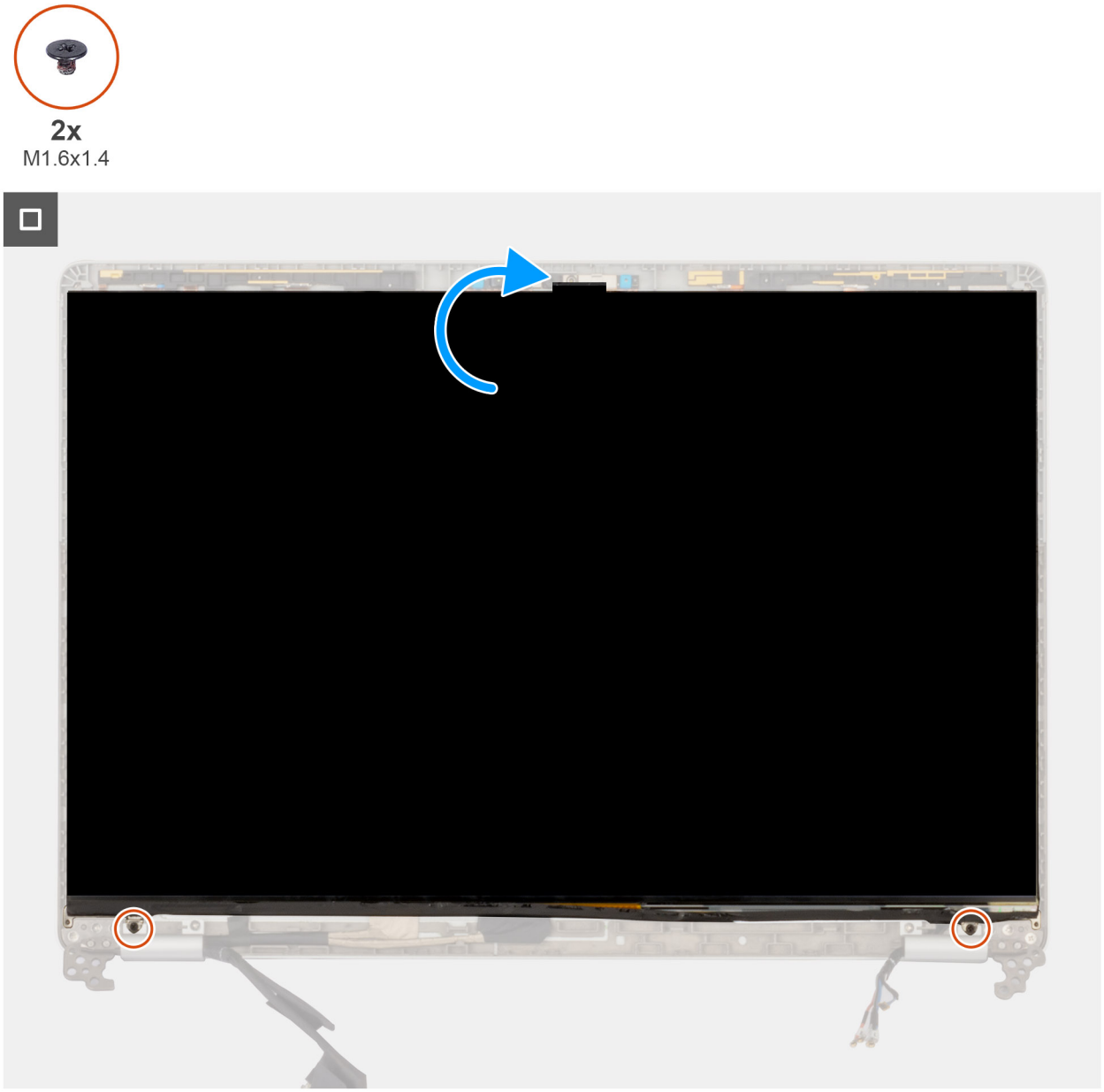


Figure 73. Installing the display panel

Steps

1. Connect the display cable to the connector on the display panel and close the latch.
2. Adhere the conductive tape to secure the display cable to the display panel.
3. Close the display panel and the display back cover to assemble.

   NOTE: Ensure that the display panel tabs are inserted into the slots on the display cover.

4. Replace the two screws (M1.6x1.4) to secure the display panel to the display back cover.

Next steps

1. Install the 5G WWAN card or 4G WWAN card, as applicable.
2. Install the display bezel.
3. Install the display assembly.
4. Install the base cover.
5. Install the SIM-card tray (optional).
6. Follow the procedure in After working inside your computer.

Display hinge cap

Removing the display hinge cap

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the 5G WWAN card or 4G WWAN card, as applicable.
5. Remove the display assembly.
6. Remove the display bezel.
7. Remove the display panel.

About this task

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

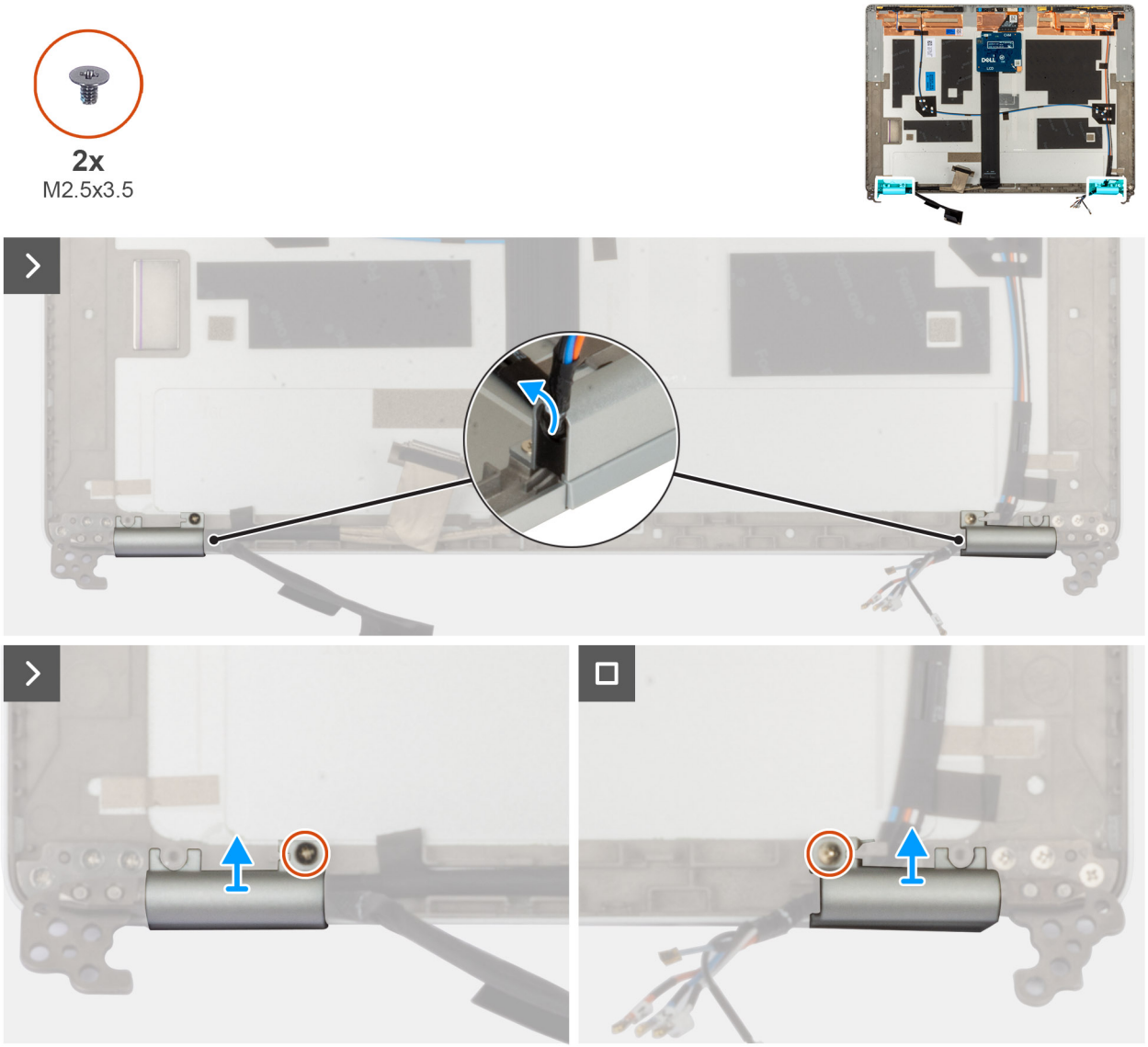


Figure 74. Removing the Display hinges cap

Steps

1. Remove the 5G WWAN cable from the hinge caps.
2. Remove the screw (M2.5x3.5) that secures the right hinge to the display back cover.
3. Lift the right hinge off the display back cover.
4. Remove the screw (M2.5x3.5) that secures the left hinge to the display back cover.
5. Lift the left hinge off the display back cover.

Installing the display hinge cap

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

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

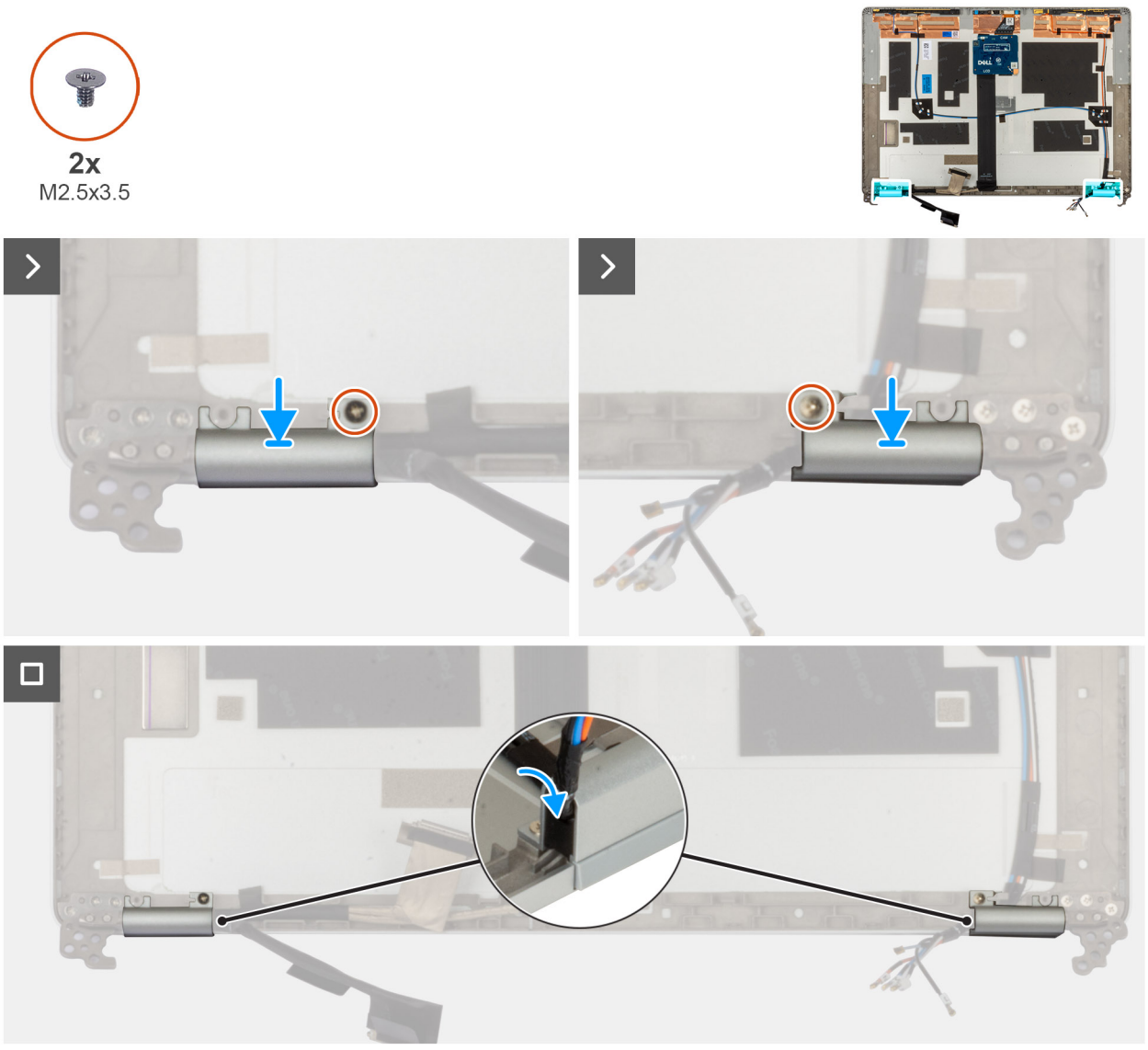


Figure 75. Installing the display hinge cap

Steps

1. Align the screw hole on the left hinge cap with the screw hole on the display back cover.
2. Replace the screw (M2.5x3.5) that secures the left hinge to the display back cover.
3. Align the screw hole on the right hinge with the screw hole on the display back cover.
4. Replace the screw (M2.5x3.5) that secures the right hinge to the display back cover.
5. Route the 5G WWAN cable through the left hinge cap.

Next steps

1. Install the display panel.
2. Install the display bezel.
3. Install the display assembly.
4. Install the 5G WWAN card or 4G WWAN card, as applicable.
5. Install the base cover.
6. Install the SIM-card tray (optional).
7. Follow the procedure in After working inside your computer.

Display cable

Removing the display cable

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the 5G WWAN card or 4G WWAN card, as applicable.
5. Remove the display assembly.
6. Remove the display bezel.
7. Remove the display panel.
8. Remove the display hinges.

About this task

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

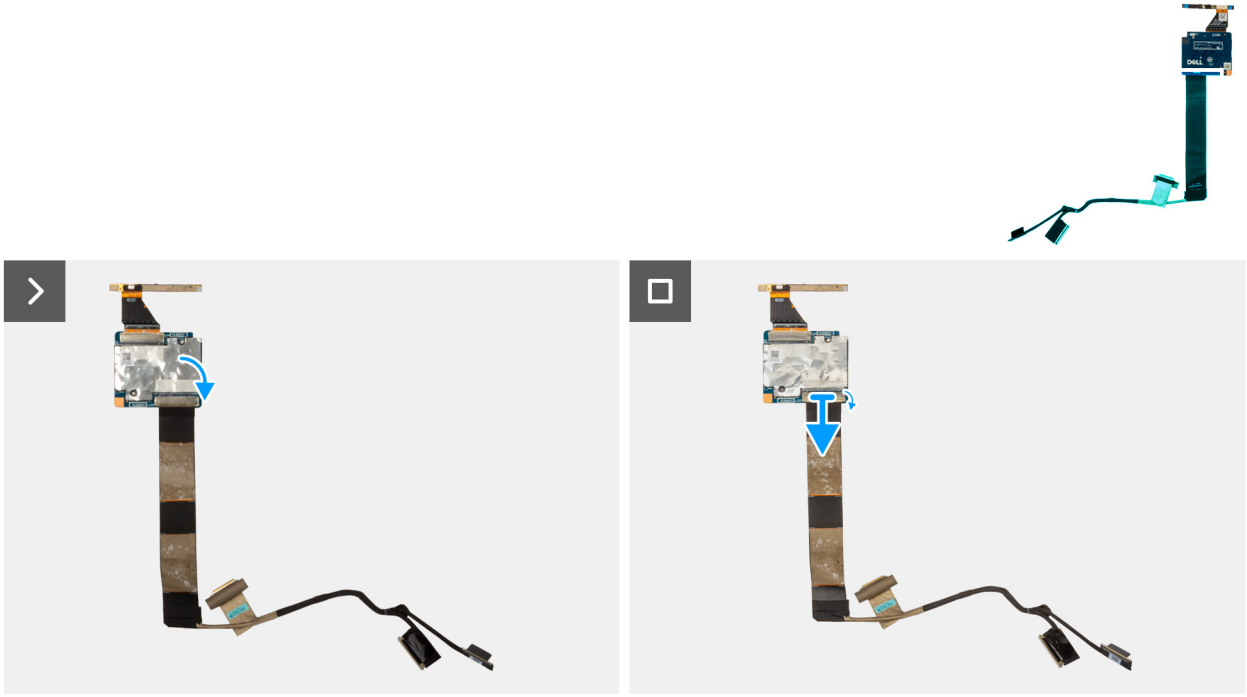


Figure 76. Removing the display cable

Steps

1. Peel the tape that secures the display cable to the camera module.
2. Disconnect the display cable from the camera module.
3. Peel the display cable to release it from adhesive and lift the display cable off the camera module.

Installing the display cable

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

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

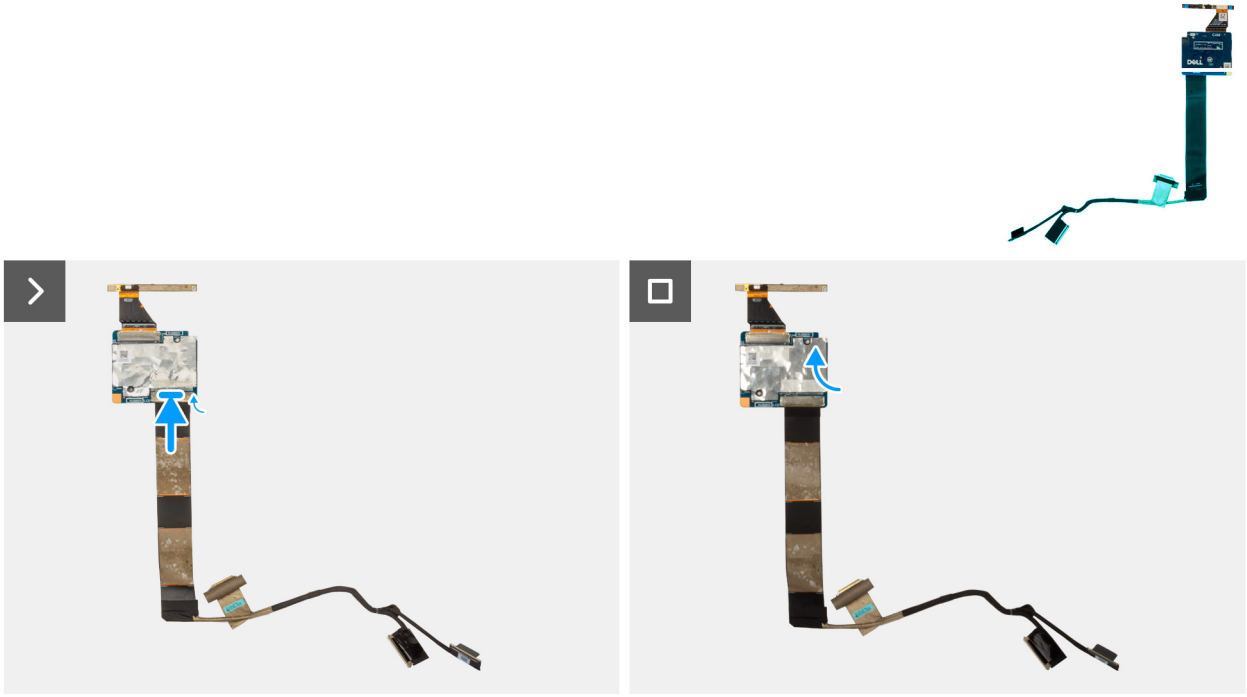


Figure 77. Installing the display cable

Steps

1. Connect the display cable to the connector on the camera.
2. Adhere the display cable to the camera module.
3. Adhere the tape that secures the display cable to the camera module.

Next steps

1. Install the display hinges.
2. Install the display panel.
3. Install the display bezel.
4. Install the display assembly.
5. Install the 5G WWAN card or 4G WWAN card, as applicable.
6. Install the base cover.
7. Install the SIM-card tray (optional).
8. Follow the procedure in After working inside your computer.

Camera module

Removing the camera module

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the 5G WWAN card or 4G WWAN card, as applicable.
5. Remove the display assembly.
6. Remove the display bezel.

7. Remove the display panel.
8. Remove the display hinges.
9. Remove the display cable.

About this task

The following images indicate the location of the camera module and provide a visual representation of the removal procedure.

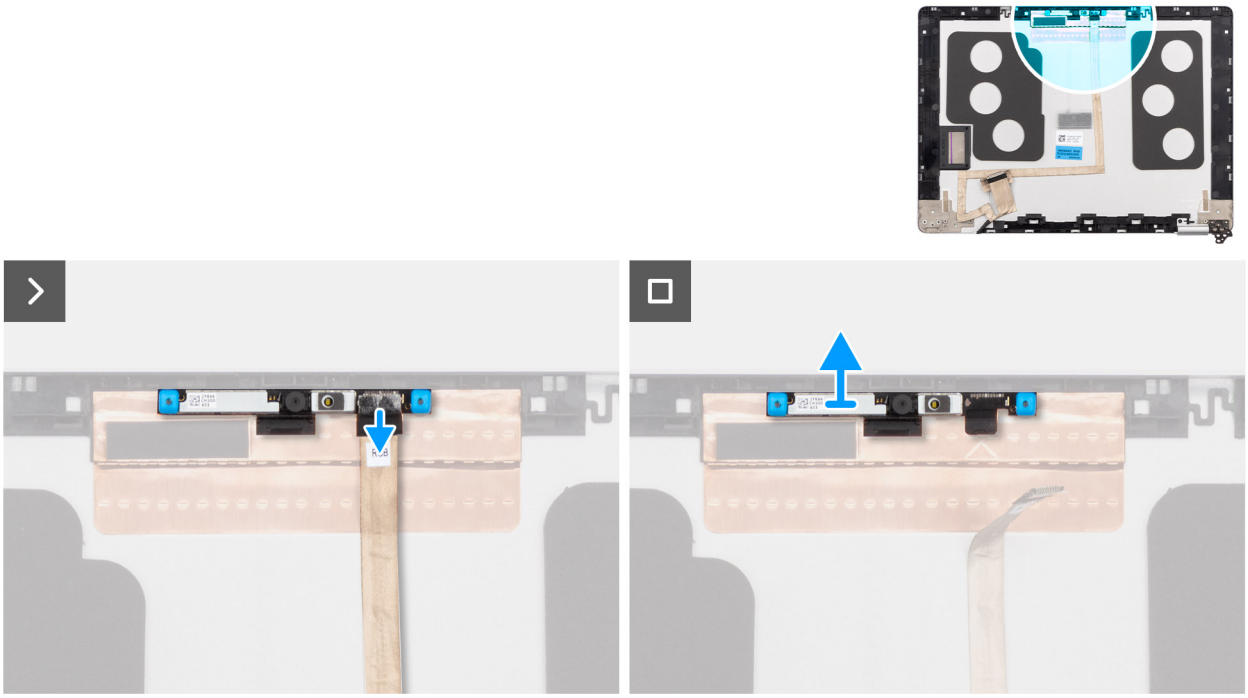


Figure 78. Removing the camera module

Steps

1. Peel the tape that secures the camera cable to the display back cover.
2. Disconnect the camera cable from the camera.
3. Carefully lift the camera module starting from the prying point at the bottom edge of the camera module.
4. Lift the camera module off the display back cover.

Installing the camera module

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

The following images indicate the location of the camera module and provide a visual representation of the installation procedure.

Figure 79. Installing the camera module

Steps

1. Align and place the camera module into the slot on the display back cover.
2. Connect the camera module cable to the connector on the camera module.
3. Adhere the tape that secure the camera cable to the camera.

Next steps

1. Install the display cable.
2. Install the display hinges.
3. Install the display panel.
4. Install the display bezel.
5. Install the display assembly.
6. Install the 5G WWAN card or 4G WWAN card, as applicable.
7. Install the base cover.
8. Install the SIM-card tray (optional).
9. Follow the procedure in After working inside your computer.

Display back cover

Removing the display back cover

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray.
3. Remove the base cover.
4. Remove the 5G WWAN card or 4G WWAN card, as applicable.
5. Remove the display assembly.

6. Remove the display bezel.
7. Remove the display panel.
8. Remove the display hinge cap.
9. Remove the display cable.
10. Remove the camera.

About this task

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

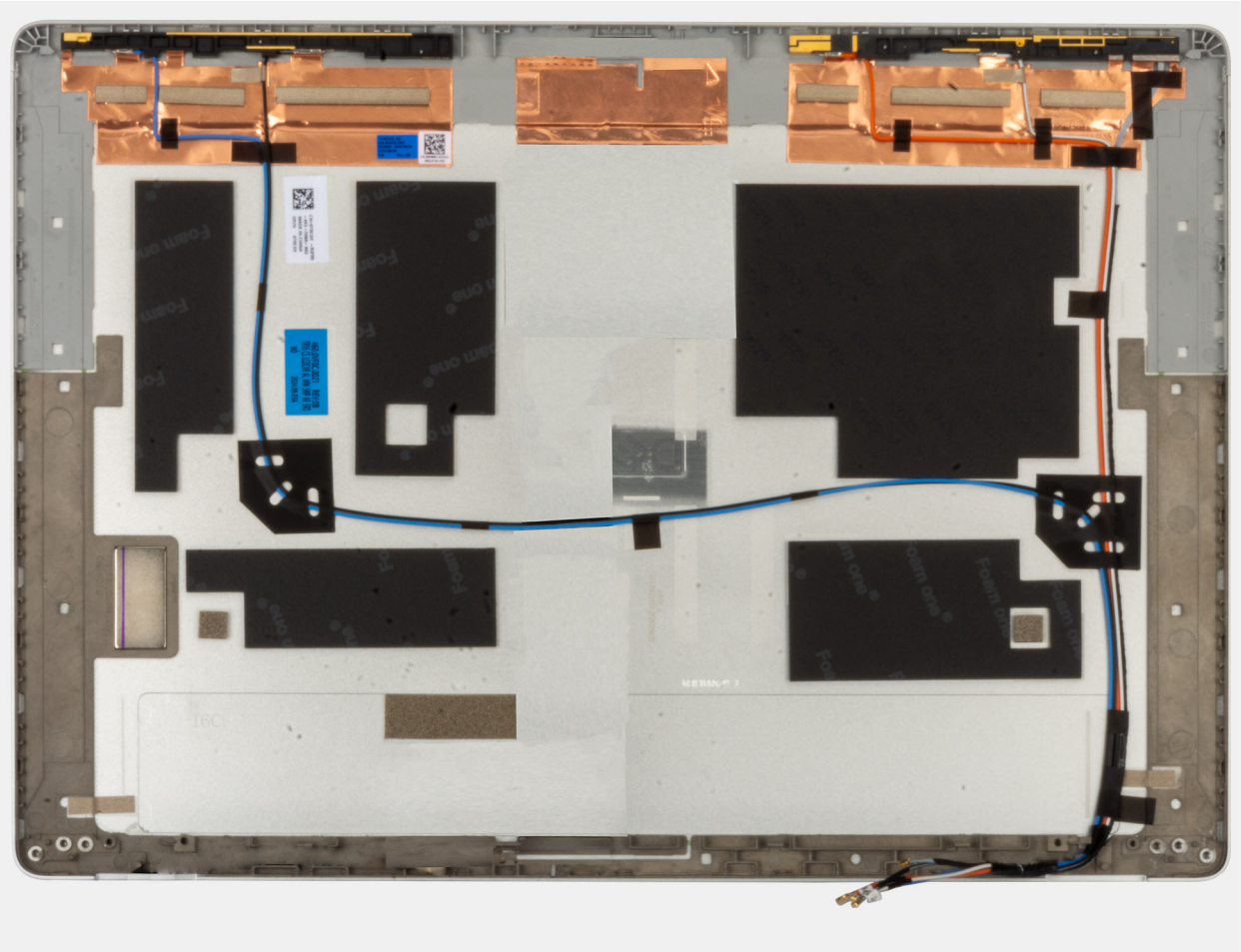


Figure 80. Removing the display back cover

Steps

Remove all the components mentioned in the pre-requisites to get the display back cover.

Installing the display back cover

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

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

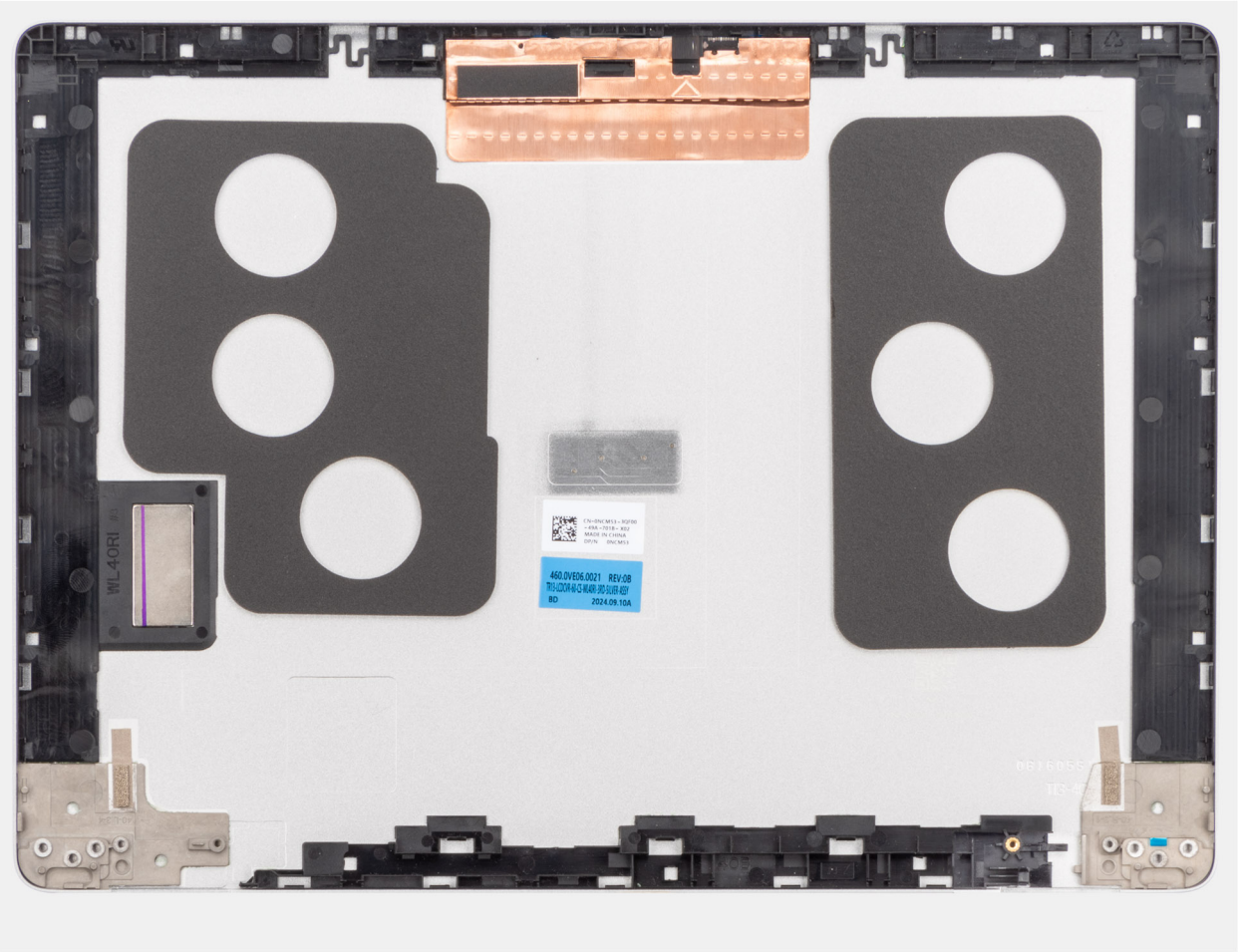


Figure 81. Installing the display back cover

Steps

Place the display back cover on a flat surface.

Next steps

1. Install the base cover.
2. Install the camera.
3. Install the display cable.
4. Install the display hinges .
5. Install the display panel.
6. Install the display bezel.
7. Install the display assembly.
8. Install the 5G WWAN card or 4G WWAN card, as applicable.
9. Install the SIM-card tray (optional).
10. Follow the procedure in After working inside your computer.

USB Type-C connector module

Removing the USB Type- C connector module

CAUTION: The information in this removal section is intended for authorized service technicians only.

About this task

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the battery.
5. Remove the memory.
6. Remove the M.2 2230 or M.2 2280 SSD, as applicable.
7. Remove the WLAN card, as applicable.
8. Remove the fan.
9. Remove the display assembly
10. Remove the system board.

NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

The following images indicate the location of the USB Type-C connector module and provide a visual representation of the removal procedure.

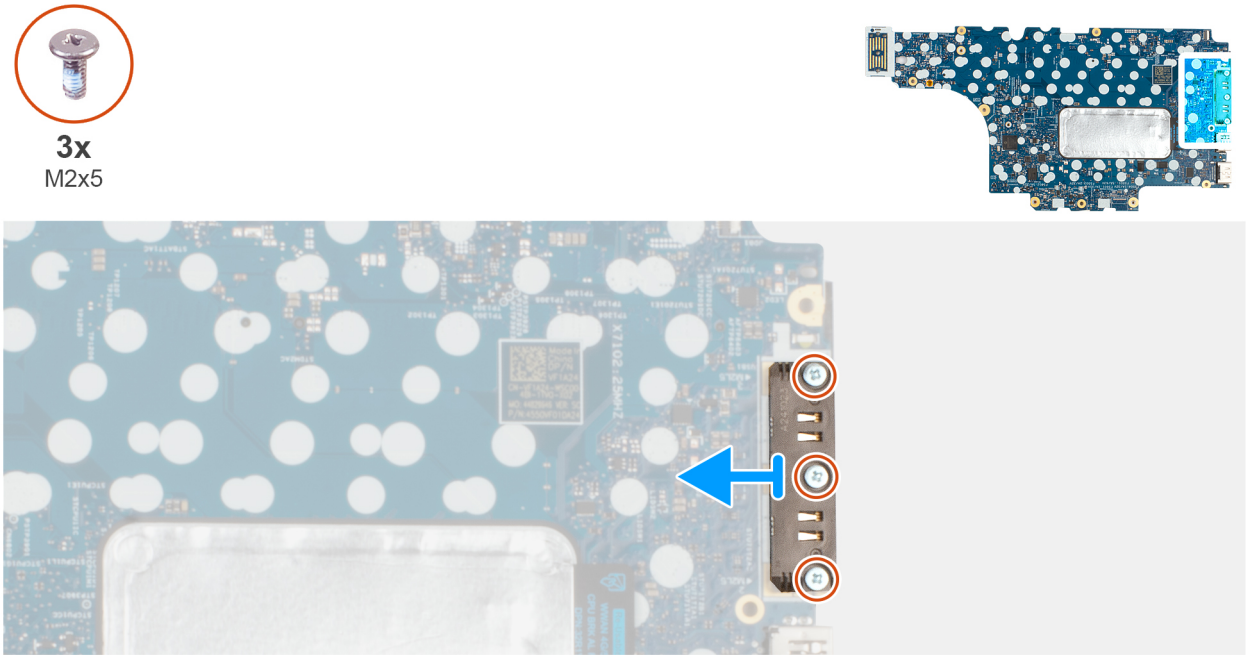


Figure 82. Removing the USB Type-C Connector Module

Steps

1. Remove the three screws (M2x5) that secure the USB Type-C connector module to the bottom side of the system board.
2. Remove the USB Type-C connector module from the system board.

Installing the USB Type-C Connector module

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

The following images indicate the location of the USB Type-C connector module and provide a visual representation of the installation procedure.

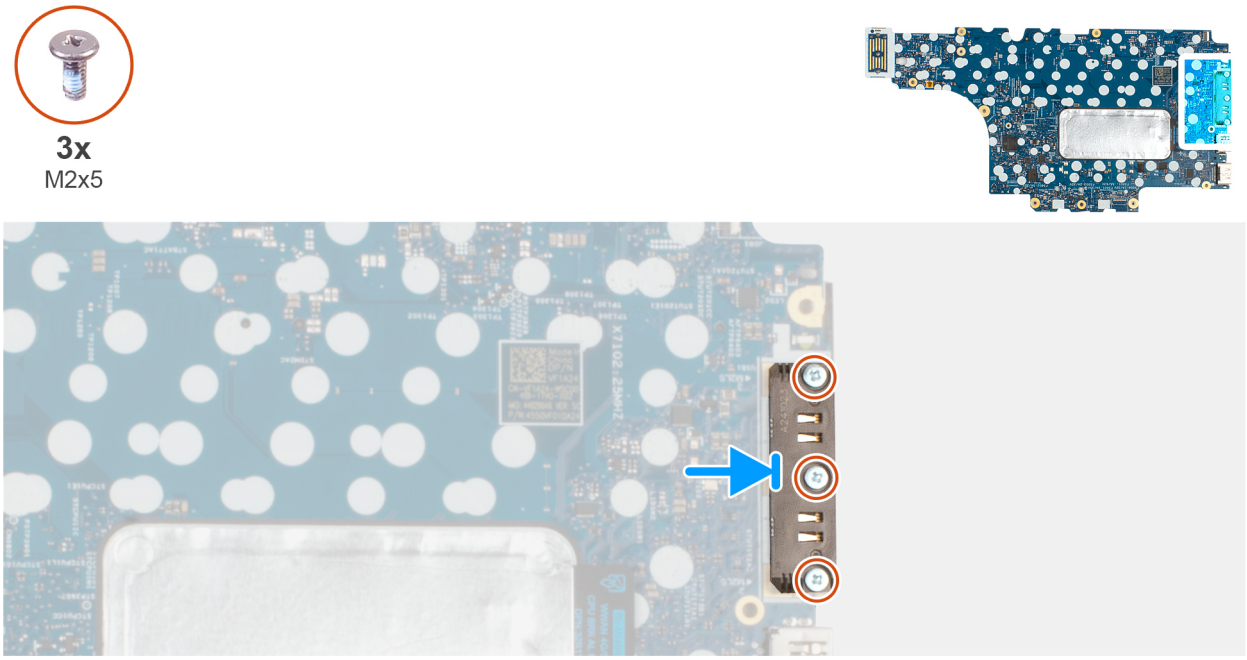


Figure 83. Installing the USB Type-C Connector Module

Steps

1. Align and place the USB Type-C module connector to the slot on the bottom side of the system board.
2. Replace the three screws (M2x5) that secure the USB Type-C connector module in place.

Next steps

1. Follow the procedure in After working inside your computer.
2. Install the SIM-card tray (optional).
3. Install the battery.
4. Install the memory.
5. Install the M.2 2230 or M.2 2280 SSD, as applicable.
6. Install the WLAN card, as applicable.
7. Install the fan.
8. Install the display assembly
9. Install the Installing the system board.

NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

10. Install the base cover.

Keyboard

Removing the keyboard

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the battery.
5. Remove the battery support bracket.
6. Remove the memory.
7. Remove the M.2 2230 or M.2 2280 SSD.
8. Remove the 5G WWAN card or 4G WWAN card, as applicable.
9. Remove the WLAN card.
10. Remove the fan.
11. Remove the display assembly.
12. Remove the speakers.
13. Remove the power button with an optional fingerprint-reader.
14. Remove the smart card reader.
15. Remove the USH board.
16. Remove the system board.

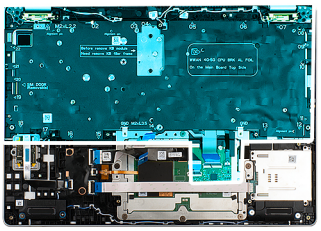
    NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

17. Remove the I/O board.
18.

About this task

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

32x
M2x2.2



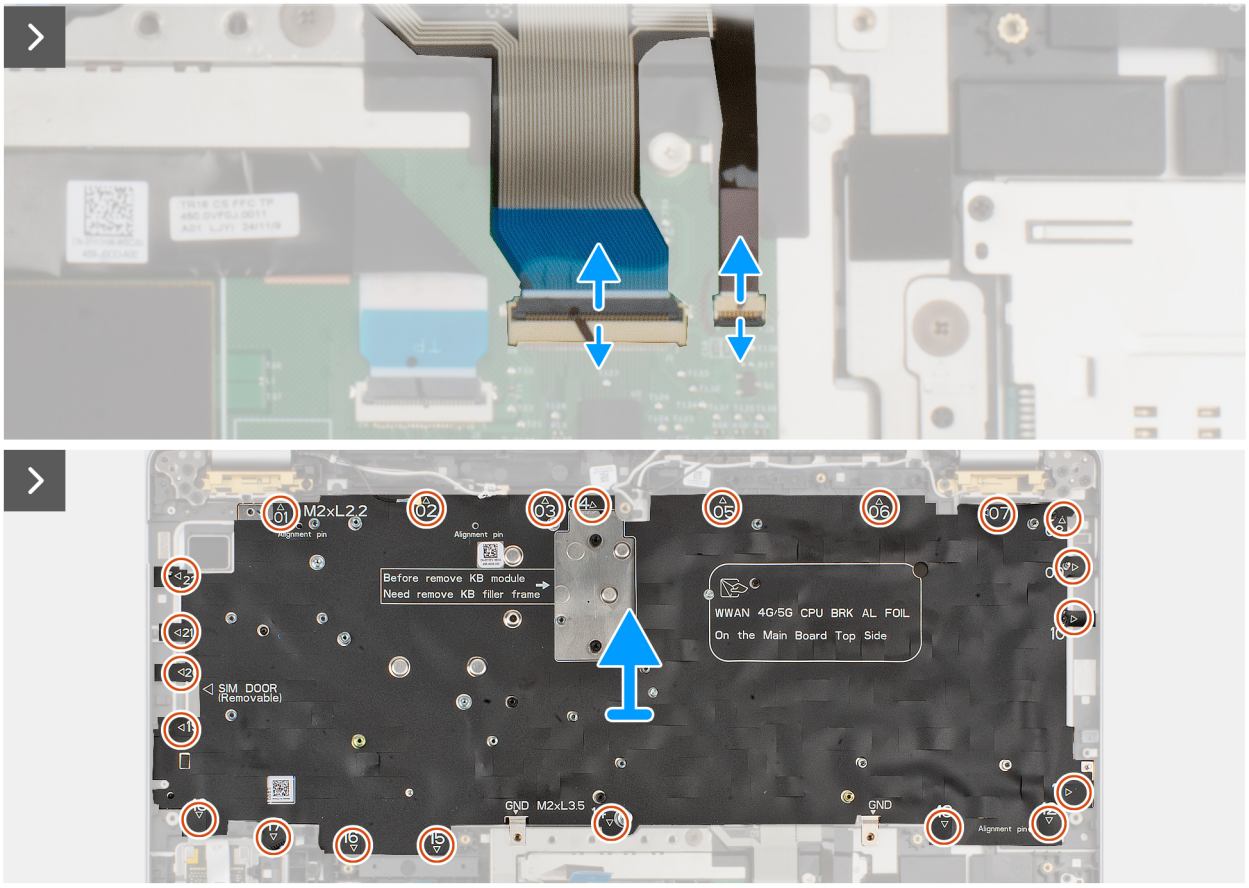


Figure 84. Removing the keyboard

Figure 85. Removing the keyboard

Steps

1. Open the latch and disconnect the keyboard cable from the touchpad.

   NOTE: For the keyboard, the latch is the "black" portion of the connector.

2. Open the latch and disconnect the keyboard-backlight cable from the touchpad.

   NOTE: For the keyboard-backlight, the latch is the "white" portion of the connector.

3. Remove the 22 screws (M2x2.2) that secure the keyboard bracket to the palm-rest assembly.
4. Lift the keyboard bracket off the palm-rest assembly.
5. Turn the keyboard bracket over.
6. Remove the 10 screws (M2x2.2) that secure the keyboard to the keyboard bracket.
7. Lift the keyboard off the keyboard bracket.

Installing the keyboard

CAUTION: The information in this installation section is intended for authorized service technicians only.

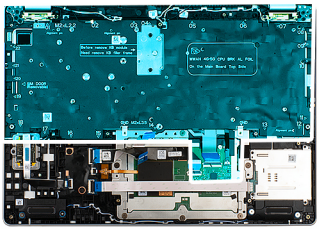
Prerequisites

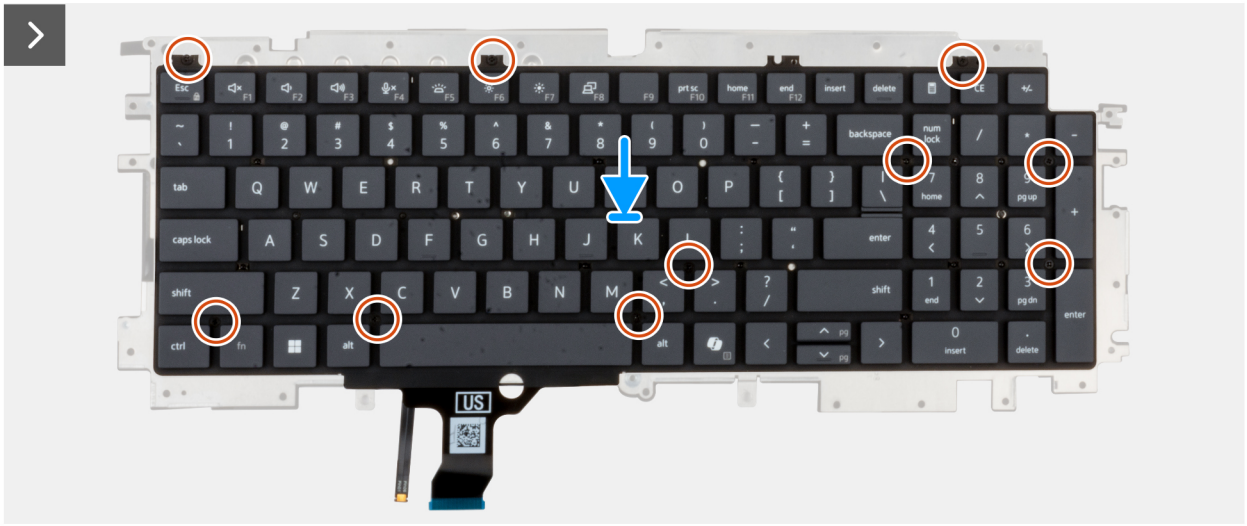
If you are replacing a component, remove the existing component before performing the installation process.

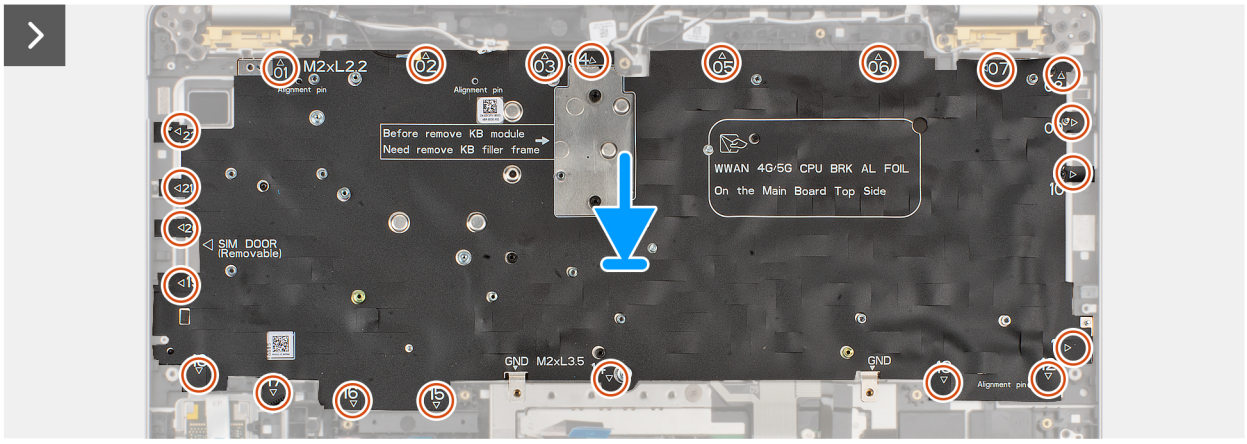
About this task

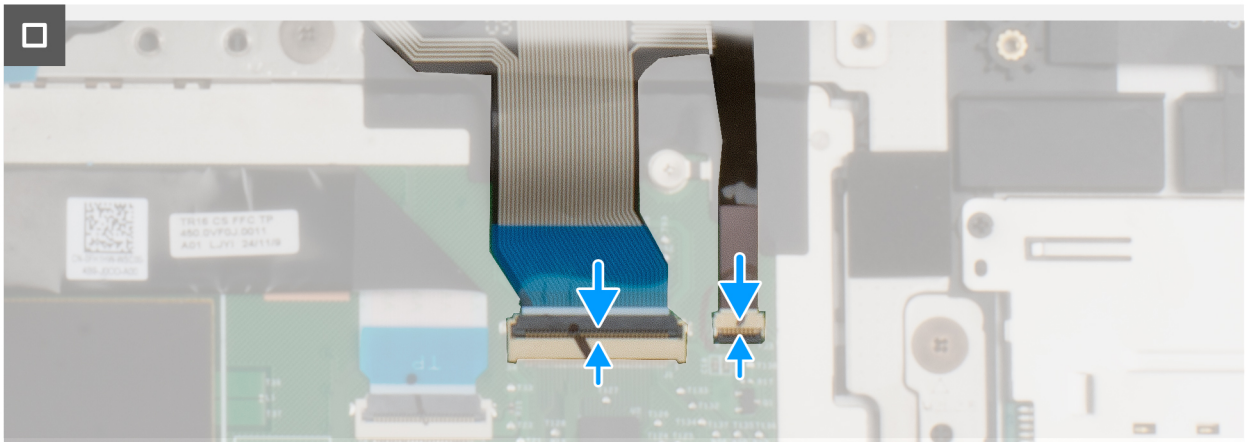
The following images indicate the location of the keyboard and provide a visual representation of the installation procedure.

32x
M2x2.2









Steps

1. Align and place the keyboard on the keyboard bracket.
2. Replace the 10 screws (M2x2.2) to secure the keyboard to the keyboard bracket.
3. Turn the keyboard bracket over.
4. Align and place the keyboard bracket on the palm-rest assembly.
5. Replace the 22 screws (M2x2.2) that secure the keyboard bracket to the palm-rest assembly.
6. Connect the keyboard-backlight cable to the connector on the touchpad and close the latch to secure the cable.

   NOTE: For the keyboard-backlight, the latch is the "white" portion of the connector.

7. Connect the keyboard cable to the connector on the touchpad and close the latch to secure the cable.

   NOTE: For the keyboard, the latch is the "black" portion of the connector.

Next steps

1. Install the I/O board.
2. Install the system board.

   NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

3. Install the USH board.
4. Install the fan.
5. Install the display assembly.
6. Install the smart card reader.
7. Install the power button with an optional fingerprint-reader.
8. Install the speakers.
9. Install the WLAN card, as applicable.
10. Install the 5G WWAN card or 4G WWAN card, as applicable.
11. Install the M.2 2230 or M.2 2280 SSD, as applicable.
12. Install the memory.
13. Install the battery support bracket.
14. Install the battery.
15. Install the base cover.
16. Install the SIM-card tray (optional).
17. Follow the procedure in After working inside your computer.

keyboard filler

Removing the keyboard filler

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover.
4. Remove the battery.
5. Remove the battery support bracket.
6. Remove the memory.
7. Remove the M.2 2230 or M.2 2280 SSD.
8. Remove the 5G WWAN card or 4G WWAN card, as applicable.
9. Remove the WLAN card.
10. Remove the fan.
11. Remove the display assembly.
12. Remove the speakers.

13. Remove the power button with an optional fingerprint-reader.
14. Remove the smart card reader.
15. Remove the USH board.
16. Remove the system board.

NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

17. Remove the I/O board.
18. Remove the keyboard.

About this task

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

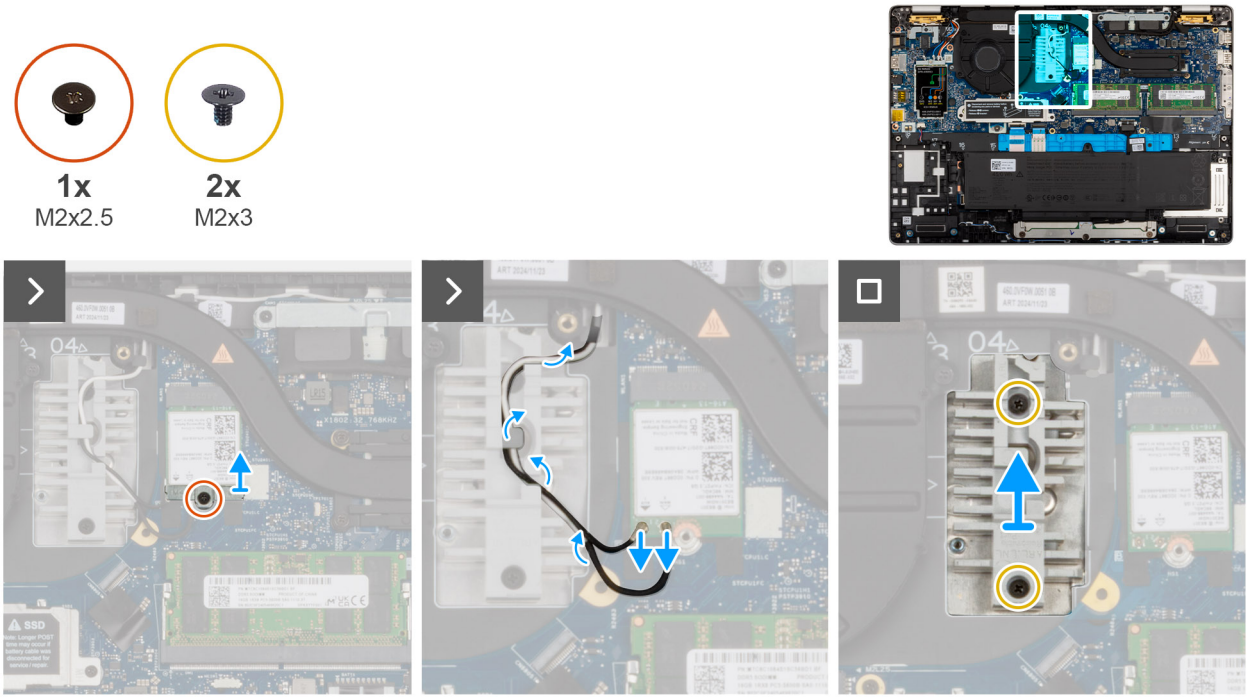


Figure 86. Removing the keyboard filler

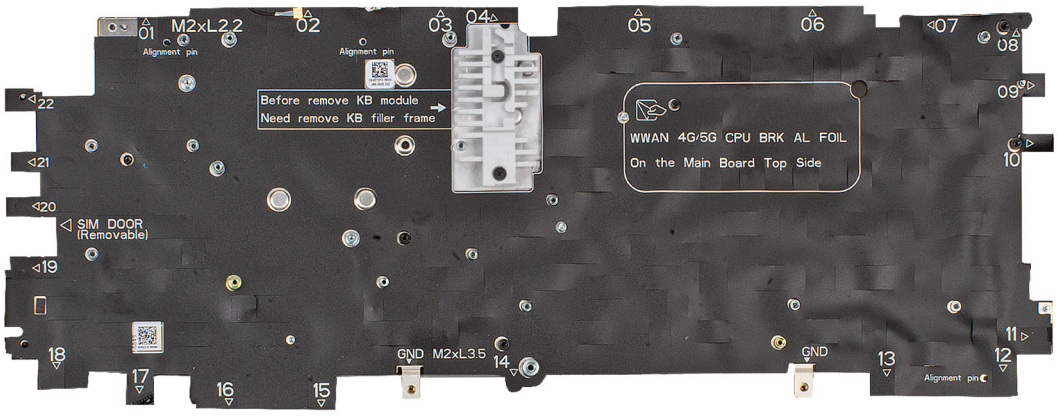


Figure 87. Removing the keyboard filler

Steps

1. Remove (M2x2.5) screw which secures the WLAN bracket.
2. Disconnect the WLAN antenna from the WLAN bracket .
3. Remove two (M2x3) screws securing the keyboard filler on the Palm-rest assembly.
4. Lift the keyboard filler off the palm-rest assembly.

Installing the keyboard filler

Prerequisites

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

About this task

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

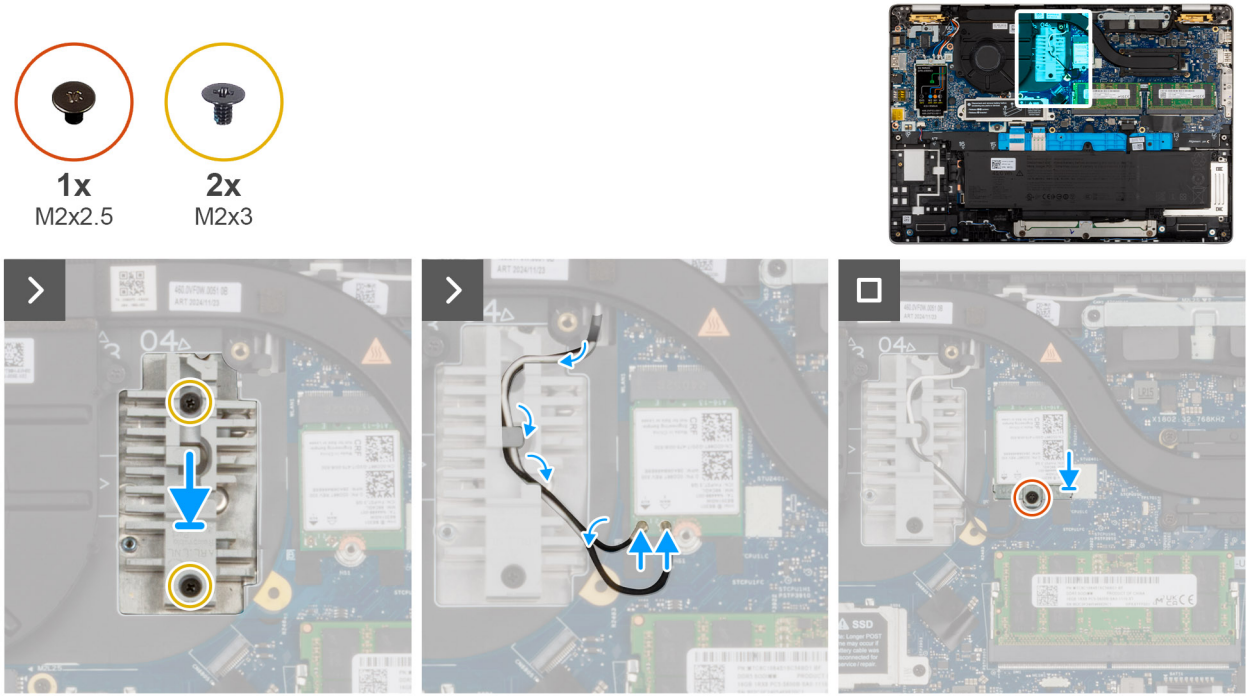


Figure 88. Installing the keyboard filler

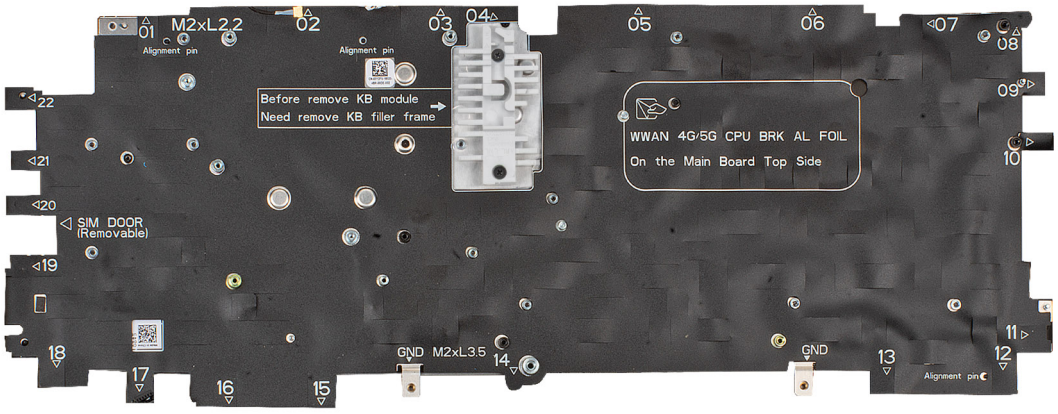


Figure 89. Installing the keyboard filler

Steps

1. Place the keyboard filler on the palm-rest assembly.
2. Replace two (M2x3) screws securing the keyboard filler on the Palm-rest assembly.
3. Connect the WLAN antennas from the WLAN bracket .
4. Replace (M2x2.5) screw which secures the WLAN bracket.

Next steps

1. Install the keyboard.
2. Install the I/O board.
3. Install the system board.

   NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

4. Install the USH board.
5. Install the fan.
6. Install the display assembly.
7. Install the smart card reader.
8. Install the power button with an optional fingerprint-reader.
9. Install the speakers.
10. Install the WLAN card, as applicable.
11. Install the 5G WWAN card or 4G WWAN card, as applicable.
12. Install the M.2 2230 or M.2 2280 SSD, as applicable.
13. Install the memory.
14. Install the battery support bracket.
15. Install the battery.
16. Install the base cover.
17. Install the SIM-card tray (optional).
18. Follow the procedure in After working inside your computer.

Palm-rest assembly

Removing the palm-rest assembly

CAUTION: The information in this removal section is intended for authorized service technicians only.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SIM-card tray (optional).
3. Remove the base cover
4. Remove the battery.
5. Remove the battery support bracket.
6. Remove the memory.
7. Remove the 5G WWAN card or 4G WWAN card, as applicable.
8. Remove the M.2 2230 or M.2 2280 SSD.
9. Remove the WLAN card.
10. Remove the speakers.
11. Remove the power button with an optional fingerprint-reader.
12. Remove the smart card reader.
13. Remove the fan.
14. Remove the display assembly.
15. Remove the USH board.
16. Remove the I/O board.
17. Remove the system board.

    NOTE: The system board can be removed and installed with the heat sink to preserve the thermal bond.

18. Remove the keyboard.

About this task

NOTE: When replacing the palm-rest assembly, transfer the dummy SIM filler to the new palm-rest assembly.

The following image indicates the location of the palm-rest assembly and provides a visual representation of the removal procedure.

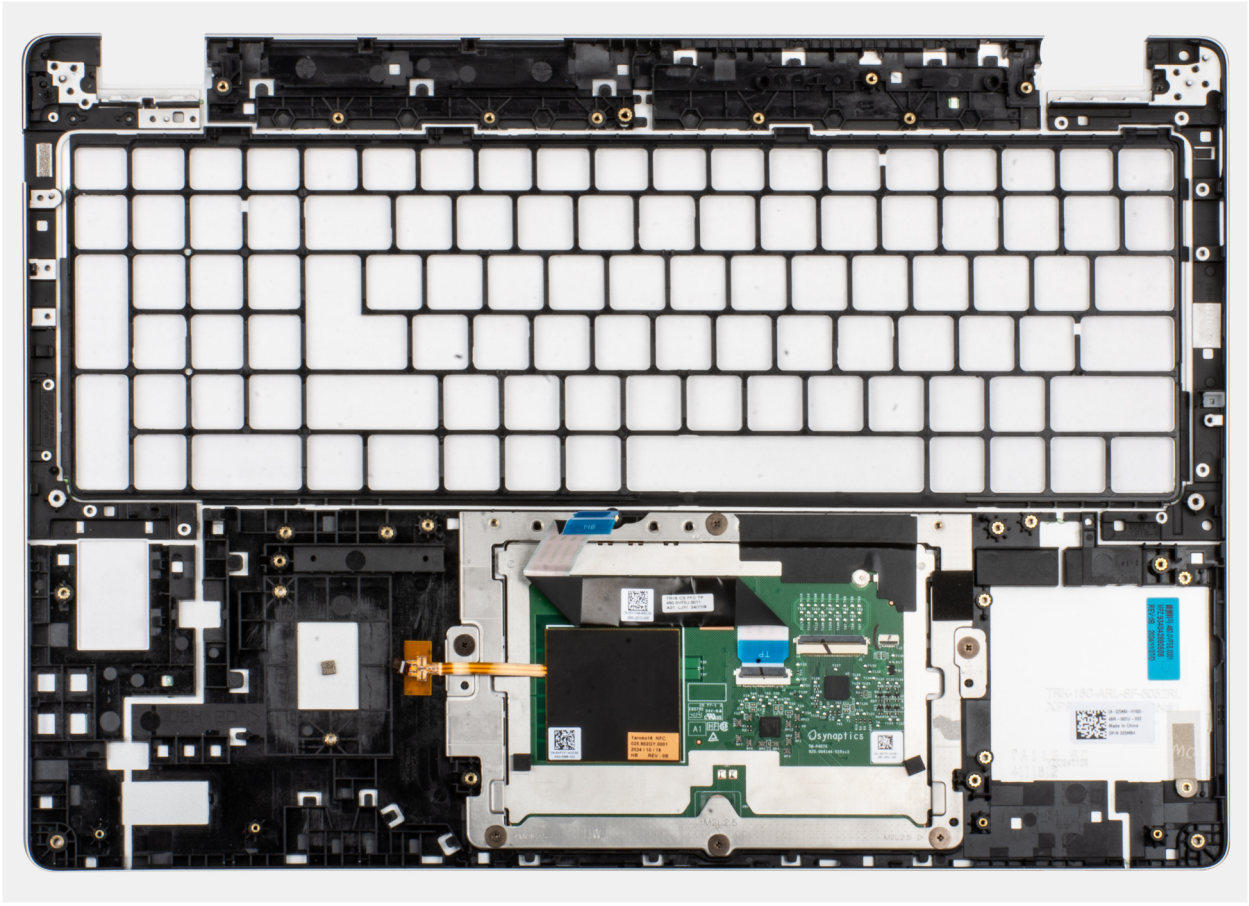


Figure 90. Removing the palm-rest assembly

Steps

Remove all the components mentioned in the pre-requisites to get the palm-rest assembly.

NOTE: Do not remove the touchpad from the palm-rest assembly.

NOTE: Battery-support bracket and the keyboard-bracket must be removed from the palm-rest assembly.

NOTE: Security-cable slot (wedge-shaped) is part of Palm-rest assembly.

Installing the palm-rest assembly

CAUTION: The information in this installation section is intended for authorized service technicians only.

Prerequisites

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

About this task

The following image indicates the location of the palm-rest assembly and provides a visual representation of the installation procedure.

NOTE: When replacing the palm rest for models shipped with WLAN card, ensure to transfer the SIM-card slot filler over the replacement palm rest.

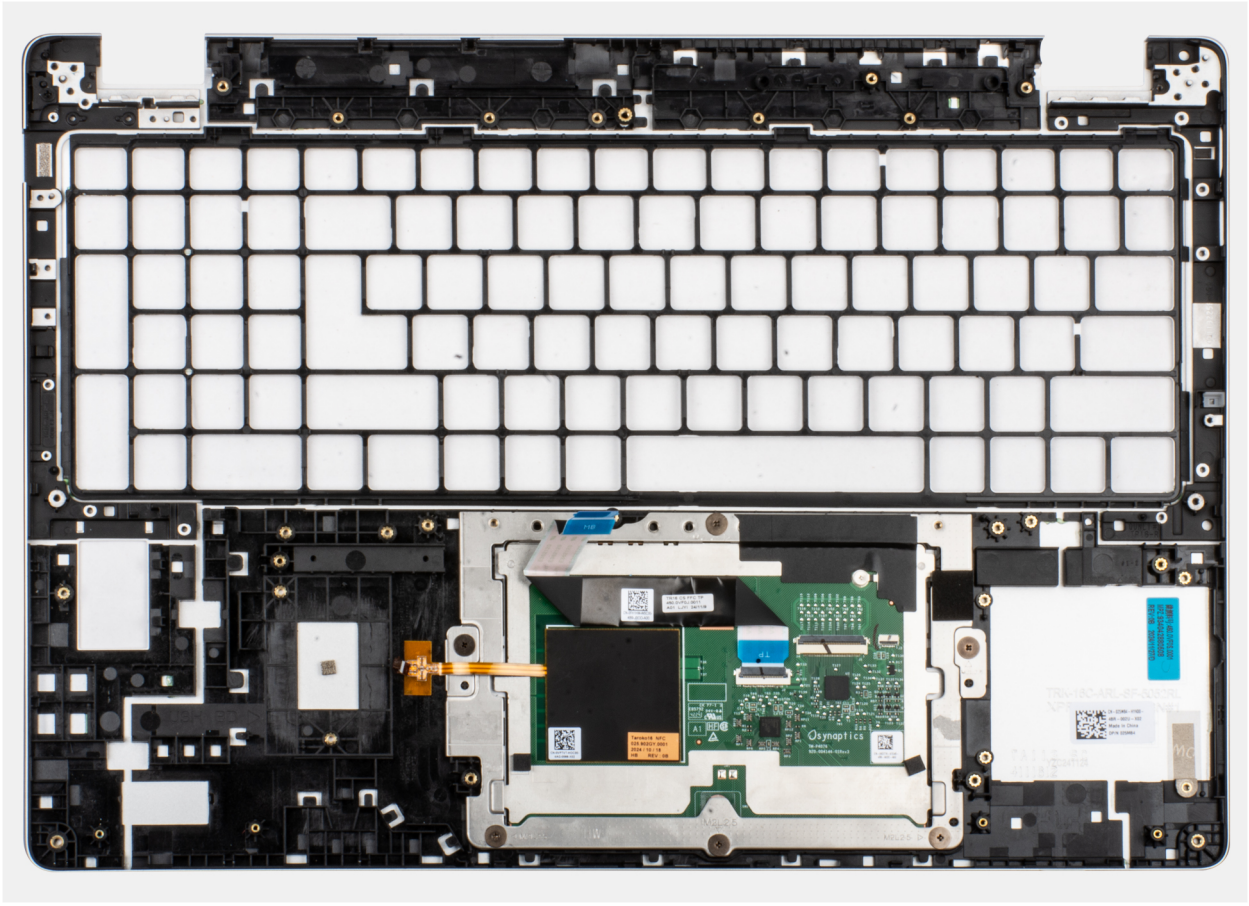


Figure 91. Removing the palm-rest assembly

Steps

Place the palm-rest assembly on a clean and flat surface.

NOTE: Touchpad is pre-assembeled with the palm-rest assembly.

NOTE: Battery support bracket and the keyboard-bracket must be added to the replacement palm-rest assembly.

NOTE: Security-cable slot (wedge-shaped) is part of Palm-rest assembly.

Next steps

1. Install the system board.

   NOTE: The system board can be removed and installed with the heat sink attached in order to simplify the procedure and preserve the thermal bond between the system board and heat sink.

2. Install the I/O board.
3. Install the keyboard .
4. Install the USH board.
5. Install the fan.
6. Install the display assembly.
7. Install the smart card reader.
8. Install the power button with an optional fingerprint-reader.
9. Install the speakers.
10. Install the WLAN card, as applicable.
11. Install the 5G WWAN card or 4G WWAN card, as applicable.
12. Install the M.2 2230 or M.2 2280 SSD, as applicable.

13. Install the memory.
14. Install the battery support bracket.
15. Install the battery.
16. Install the base cover.
17. Install the SIM-card tray (optional).
18. Follow the procedure in After working inside your computer.

7

Software

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

Operating system

Your Dell Pro 16 Plus supports the following operating systems:

- Windows 11 Pro
- Windows 11 Home
- Ubuntu Linux 24.04

NOTE: If you downgrade your computer from Windows 11 to Windows 10 22H2, Dell Technologies support will follow the Microsoft Windows 10 End of Support plan.

Drivers and downloads

When troubleshooting, downloading, or installing drivers, it is recommended that you read the Dell Knowledge Base article Drivers and Downloads FAQs.

8

BIOS Setup

CAUTION: Certain changes can make your computer work incorrectly. Before you change the settings in BIOS Setup, it is recommended that you note down the original settings for future reference.

NOTE: Depending on the computer and the installed devices, the options that are listed in this section may differ.

Use BIOS Setup for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the capacity of the storage device.
- Change the system configuration information.
- Set or change user-selectable options such as the user password, enabling or disabling base devices, and configuring hard drive settings.

Entering BIOS Setup program

About this task

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

Navigation keys

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

Table 40. Navigation keys

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 follows 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 restart the computer.

F12 One Time Boot menu

To enter the One Time Boot menu, turn on or restart your computer, and then press F12 immediately.

NOTE: If you are unable to enter the One Time Boot menu, repeat the above action.

The One Time Boot menu displays the devices that you can boot from and also display the options to start diagnostics. 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 One Time Boot menu screen also displays the option to access BIOS Setup.

View Advanced Setup options

About this task

Some BIOS Setup options are only visible by enabling **Advanced Setup** mode, which is disabled by default.

NOTE: BIOS Setup options, including **Advanced Setup** options, are described in the **System setup options** option.

To enable Advanced Setup:

Steps

1. Enter BIOS Setup.
   The Overview menu appears.
2. Click the **Advanced Setup** option to move it to the **ON** mode.
   Advanced BIOS Setup options are displayed.

View Service options

About this task

Service options are hidden by default and only visible by entering a hotkey command.

NOTE: Service options are described in the **System setup options** section.

To view Service options:

Steps

1. Enter BIOS Setup.
   The Overview menu appears.
2. Enter the hotkey combination **Ctrl +Alt + s** to view the **Service** options.
   Service options are visible.

BIOS Setup options

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

Table 41. BIOS Setup options—Overview menu

Overview	
Dell Pro 16 Plus	
BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Displays the Asset Tag of the computer.

Table 41. BIOS Setup options—Overview menu (continued)

Overview	
Manufacture Date	Displays the manufacture date of the computer.
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the Express Service Code of the computer.
Ownership Tag	Displays the Ownership Tag of the computer.
Signed Firmware Update	Displays whether the Signed Firmware Update is enabled on your computer. By default, the **Signed Firmware Update** option is enabled.
Battery Information	
Primary	Displays the primary battery of the computer.
Battery Level	Displays the battery level of the computer.
Battery State	Displays the battery state of the computer.
Health	Displays the battery health of the computer.
AC Adapter	Displays whether an AC adapter is connected. If connected, displays the type of AC adapter that is connected.
Battery Life Type	Displays the battery life type.
Processor Information	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed.
Minimum Clock Speed	Displays the minimum processor clock speed.
Current Clock Speed	Displays the current processor clock speed.
Core Count	Displays the number of cores on the processor.
Processor ID	Displays the processor identification code.
Microcode Version	Displays the microcode version.
Intel Hyper-Threading Capable	Displays whether the processor is Hyper-Threading (HT) capable.
Intel vPro Technology	Displays the Intel vPro Technology.
Processor L2 Cache	Displays the L2 Cache.
Processor L3 Cache	Displays the L3 Cache.
Memory Information	
Memory Installed	Displays the total memory that is installed on the computer.
Memory Available	Displays the total memory available on the computer.
Memory Speed	Displays the memory speed.
Memory Channel Mode	Displays single or dual channel mode.
Memory Technology	Displays the technology that is used for the memory.
Devices Information	
Panel Type	Displays the type of display panel available on the computer.
Panel Revision	Displays the panel revision of the computer.
Video Controller	Displays the type of video controller available on the computer.
Video Memory	Displays the video memory information of the computer.
Wi-Fi Device	Displays the wireless device information of the computer.

Table 41. BIOS Setup options—Overview menu (continued)

Overview	
Native Resolution	Displays the native resolution of the computer.
Video BIOS Version	Displays the video BIOS version of the computer.
Audio Controller	Displays the audio controller information of the computer.
Bluetooth Device	Displays the Bluetooth device information of the computer.
Pass Through MAC Address	Displays the MAC address of the video pass-through.
Cellular Device	Displays the Cellular device information of the computer.

Table 42. BIOS Setup options—Boot Configuration menu

Boot Configuration	
Boot Sequence	
Boot Mode: UEFI only	Displays the boot mode of the computer.
Boot Sequence	Displays the boot sequence.
Secure Boot	Secure Boot is a method of guaranteeing the integrity of the boot path by performing additional validation of the operating system and PCI add-in cards. The computer stops booting to the operating system when a component is not authenticated during the boot process. Secure Boot can be enabled in BIOS setup or using management interfaces like Dell Command|Configure, but can only be disabled from BIOS setup.
Enable Secure Boot	Enables the computer to boot using only validated boot software. By default, the **Enable Secure Boot** option is disabled. For additional security, Dell Technologies recommends keeping the **Secure Boot** option enabled to ensure that the UEFI firmware validates the operating system during the boot process. **NOTE:** For Secure Boot to be enabled, the computer is required to be in UEFI boot mode and the Enable Legacy Option ROMs option is required to be turned off.
Secure Boot Mode	Enables or disables the Secure Boot operation mode. By default, the **Deployed Mode** is selected. **NOTE:** **Deployed Mode** should be selected for normal operation of Secure Boot.
Enable Microsoft UEFI CA	When disabled, the UEFI CA is removed from the BIOS UEFI Secure Boot database. By default, the **Enable Microsoft UEFI CA** option is disabled.
Expert Key Management	
Enable Custom Mode	Enables or disables the ability to modify the keys in the PK, KEK, db, and dbx security key databases to be modified. By default, the **Enable Custom Mode** option is disabled.
Custom Mode Key Management	Selects the custom values for expert key management. By default, the **PK** option is selected.

Table 43. BIOS Setup options—Integrated Devices menu

Integrated Devices
Date/Time

Table 43. BIOS Setup options—Integrated Devices menu (continued)

Integrated Devices	
Date	Sets the computer date in MM/DD/YYYY format. Changes to the date format take effect immediately.
Time	Sets the computer time in HH/MM/SS 24-hour format. You can switch between a 12-hour and 24-hour clock. Changes to the time format take effect immediately.
Camera	
Enable Camera	Enables the camera. By default, the **Enable Camera** option is enabled. **NOTE:** Depending on the configuration ordered, the camera setup option may not be available.
Audio	
Enable Audio	Enables all integrated audio controller. By default, all the options are enabled.
Enable Microphone	Enables the microphone. By default, the **Enable Microphone** option is enabled. **NOTE:** Depending on the configuration ordered, the microphone setup option may not be available.
Enable Internal Speaker	Enables the internal speaker. By default, the **Enable Intenal Speaker** option is enabled.
USB/Thunderbolt Configuration	
Enable USB Boot Support	Enables booting from USB mass storage devices that are connected to external USB ports. By default, the **Enable USB Boot Support** option is enabled.
Enable External USB Ports	Enables the external USB ports. By default, the **Enable External USB Ports** option is enabled.
Enable Thunderbolt Technology Support	
Enable Thunderbolt Technology Support	Enables the associated ports and adapters for Thunderbolt Technology support. By default, the **Enable Thunderbolt Technology Support** option is enabled.
Enable Thunderbolt Boot Support	
Enable Thunderbolt Boot Support	Enables the Thunderbolt adapter-peripheral device and USB devices that are connected to the Thunderbolt adapter to be used during BIOS Preboot. By default, the **Enable Thunderbolt Boot Support** option is disabled.
Enable Thunderbolt (and PCIe behind TBT) pre-boot modules	Enables the PCIe devices that are connected through a Thunderbolt adapter to run the PCIe devices UEFI Option ROM (if present) during preboot. By default, the **Enable Thunderbolt (and PCIe behind TBT) pre-boot modules** option is disabled.
Disable USB4 PCIE Tunneling	Disables the USB4 PCIE Tunneling option. By default, the **Disable USB4 PCIE Tunneling** option is disabled.
Video/Power only on Type-C Ports	Enables or disables the Type-C port functionality to video or only power. By default, the **Video/Power only on Type-C Ports** option is disabled.
Type-C Dock	

Table 43. BIOS Setup options—Integrated Devices menu (continued)

Integrated Devices	
Type-C Dock Override	Enables or disables to use connected Type-C Dell Dock to provide data stream with external USB ports disabled. When Type-C Dock override is enabled, the Video/Audio/LAN submenu is activated. By default, the **Type-C Dock Override** option is enabled.
Type-C Dock Audio	Enables or disables the usage of audio inputs and outputs from the connected Type-C Dell docking station. By default, the **Type-C Dock Audio** option is enabled.
Type-C Dock LAN	Enables or disables the usage of LAN on the external ports of the connected Type-C Dell docking station. By default, the **Type-C Dock LAN** option is enabled.
Miscellaneous Devices	
Enable Fingerprint Reader Device	Enables the Fingerprint Reader Device option. By default, the **Enable Fingerprint Reader Device** option is enabled.
Unobtrusive mode	Enables or disables the unobtrusive mode. When enabled, all system LEDs, LCD panel backlight and audio devices of the computer are turned off. By default, the **Unobtrusive Mode** option is disabled. **NOTE:** On computers with collaboration touchpad, the Collaboration Touchpad is disabled when the **Unobtrusive Mode** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.

Table 44. BIOS Setup options—Storage menu

Storage	
SATA/NVMe Operation	
SATA/NVMe Operation	Sets the operating mode of the integrated SATA hard drive controller. By default, the **RAID ON** option is selected. The storage device is configured for RAID mode.
Storage Interface	Displays the information of various onboard drives.
Port Enablement	Enables or disables the M.2 PCIe SSD option. By default, the **M.2 PCIe SSD** option is enabled.
Smart Reporting	Enables or disables the Smart reporting option. By default, the **Smart Reporting** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
Drive Information	Displays the information of onboard drives.

Table 45. BIOS Setup options—Display menu

Display	
Display Brightness	
Brightness on battery power	Enables to set the screen brightness when the computer is running on battery power. By default, the screen brightness is set to 50 when the computer is running on battery power.

Table 45. BIOS Setup options—Display menu (continued)

Display	
Brightness on AC power	Enables to set the screen brightness when the computer is running on AC power. By default, the screen brightness is set to 100 when the computer is running on AC power.
Touchscreen	Enables or disables the touch screen option. By default, the **Touchscreen** option is enabled.
Full Screen Logo	Enables or disables the computer to display a full-screen logo, if the image matches screen resolution. By default, the **Full Screen Logo** option is disabled.

Table 46. BIOS Setup options—Connection menu

Connection	
Wireless Device Enable	
WLAN	Enables or disables the internal WLAN device. By default, the **WLAN** option enabled.
WWAN/GPS	Enables or disables the internal WWAN device. By default, the **WWAN/GPS** option is enabled.
Bluetooth	Enables or disables the internal Bluetooth device. By default, the **Bluetooth** option enabled.
Contactless Smartcard/NFC	Enables or disables the smartcard device. By default, the **Contactless Smartcard/NFC** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
Enable UEFI Network Stack	Enables or disables the UEFI Network Stack and controls the onboard LAN Controller. By default, the **Enable UEFI Network Stack** option is enabled.
Wireless Radio Control	
Control WLAN Radio	Enables to sense the connection of the computer to a wired network and then disables the selected wireless radios (WLAN and/or WWAN). Upon disconnection from the wired network, the selected wireless radios are reenabled. By default, the **Control WLAN Radio** option is disabled.
Control WWAN Radio	Enables to sense the connection of the computer to a wired network and then disables the selected WWAN radios. By default, the **Control WWAN Radio** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
WWAN Bus Mode	
Enable UEFI Bluetooth Stack	Enables or disables the UEFI Bluetooth Stack and controls the onboard LAN Controller. By default, the **Enable UEFI Bluetooth Stack** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
HTTP(s) Boot Feature	

Table 46. BIOS Setup options—Connection menu (continued)

Connection	
HTTP(s) Boot	When enabled, supports HTTP(s) boot on the client BIOS, which offers wired or wireless and HTTP/HTTPS connection options. **NOTE:** To view this option, enable **HTTP(s) Boot** as described in View Advance Set up options.
HTTP(s) Boot Modes	In Auto Mode, the boot URL is obtained from the DHCP response; the boot URL specifies the HTTP Boot Server and location of the Network Boot Program (NBP) file. In Manual mode, the user enters the URL in the text box, which must start with `http://` or `https://` and end with the NBP file name. By default, the **Control WWAN Radio** option is disabled. By default, **Auto Mode** is selected. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.

Table 47. BIOS Setup options—Power menu

Power	
Battery Configuration	Enables or disables the computer to run on battery during peak power usage hours. Use the table **Custom Charge Start** and **Custom Charge Stop**, to prevent AC power usage between certain times of each day. By default, the **Adaptive** option is selected. Battery settings are adaptively optimized based on your typical battery usage pattern.
Advanced Configuration	
Enable Advanced Battery Charge Configuration	Enables Advanced Battery Charge Configuration from the beginning of the day to a specified work period. When enabled, Advanced Battery Charged maximizes battery health while still supporting heavy use during the work day. By default, the **Enable Advanced Battery Charge Configuration** option is disabled.
Peak Shift	
Enable Peak Shift	Enables the computer to run on battery during peak power usage hours. By default, the **Enable Peak Shift** option is disabled.
Type-C Connector Power	
USB PowerShare	Enables or disables the USB PowerShare on the computer. By default, the **USB Powershare** option is disabled.
Thermal Management	Enables or disables cooling of fan and manages processor heat to adjust the computer performance, noise, and temperature. By default, the **Optimized** option is selected. Standard setting for balanced performance, noise, and temperature.
USB Wake Support	
Wake on Dell USB Type-C Dock	When enabled, connecting a Dell USB Type-C Dock wakes the computer from Standby, Hibernate, and Power Off. By default, the **Wake on Dell USB Type-C Dock** option is enabled.
Block Sleep	Enables or disables the computer from entering Sleep (S3) mode in the operating system. By default, the **Block Sleep** option is disabled.

Table 47. BIOS Setup options—Power menu (continued)

Power	
	NOTE: When enabled, the computer does not go to Sleep, Intel Rapid Start is disabled automatically, and the operating system power option is blank if it was set to Sleep.
Lid Switch	
Enable Lid Switch	Enables or disables the Lid Switch. By default, the **Enable Lid Switch** option is enabled.
Intel Speed Shift Technology	Enables or disables the Intel Speed Shift Technology support. When enabled, the operating system selects the appropriate processor performance automatically. By default, the **Intel Speed Shift Technology** option is enabled.

Table 48. BIOS Setup options—Security menu

Security	
Trusted Platform Module (TPM)	The Trusted Platform Module (TPM) provides various cryptographic services which serve as the cornerstone for many platform security technologies. Trusted Platform Module (TPM) is a security device that stores computer-generated keys for encryption and features such as BitLocker, Virtual Secure Mode, remote Attestation. By default, the **Trusted Platform Module (TPM)** option is enabled. For additional security, Dell Technologies recommends keeping **Trusted Platform Module (TPM)** enabled to allow these security technologies to fully function. **NOTE:** The options that are listed apply to computers with a discrete **Trusted Platform Module (TPM)** chip.
TPM On	Allows you to enable or disable TPM. By default, the **TPM On** option is enabled. For additional security, Dell Technologies recommends keeping **TPM On** enabled to allow these security technologies to fully function.
Physical Presence Interface (PPI) Bypass for Enable Commands	The Physical Presence Interface (PPI) Bypass options can be used to allow the operating system to manage certain aspects of the TPM. If these options are enabled, you are not prompted to confirm certain changes to the TPM configuration. By default, the **PPI Bypass for Enable Commands** option is enabled. For additional security, Dell Technologies recommends keeping the **PPI Bypass for Enable Commands** option enabled.
Physical Presence Interface (PPI) Bypass for Disable Commands	By default, the **PPI Bypass for Disable Commands** option is disabled. For additional security, Dell Technologies recommends keeping the **PPI Bypass for Disable Commands** option disabled.
Physical Presence Interface (PPI) Bypass for Clear Commands	By default, the **PPI Bypass for Clear Commands** option is disabled. For additional security, Dell Technologies recommends keeping the **PPI Bypass for Clear Commands** option disabled.
Attestation Enable	The **Attestation Enable** option controls the endorsement hierarchy of TPM. Disabling the **Attestation Enable** option prevents TPM from being used to digitally sign certificates. By default, the **Attestation Enable** option is enabled.

Table 48. BIOS Setup options—Security menu (continued)

Security	
	For additional security, Dell Technologies recommends keeping the **Attestation Enable** option enabled. **NOTE:** When disabled, this feature may cause compatibility issues or loss of functionality in some operating systems.
Key Storage Enable	The **Key Storage Enable** option controls the storage hierarchy of TPM, which is used to store digital keys. Disabling the **Key Storage Enable** option restricts the ability of TPM to store owner's data. By default, the **Key Storage Enable** option is enabled. For additional security, Dell Technologies recommends keeping the **Key Storage Enable** option enabled. **NOTE:** When disabled, this feature may cause compatibility issues or loss of functionality in some operating systems.
Clear	When enabled, the **Clear** option clears information that is stored in the TPM after exiting the computer's BIOS. This option returns to the disabled state when the computer restarts. By default, the **Clear** option is disabled. Dell Technologies recommends enabling the **Clear** option only when TPM data is required to be cleared.
Intel Total Memory Encryption	Enables or disables the processor's memory encryption feature. By default, the **Intel Total Memory Encryption** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
Chassis intrusion	
Chassis Intrusion	The chassis intrusion detection enables a physical switch that triggers an event when the computer cover is opened. When set to **Enabled**, a notification is displayed on the next boot and the event is logged in the BIOS Events log. When set to **On-Silent**, the event is logged in the BIOS Events log, but no notification is displayed. When set to **Disabled**, no notification is displayed and no event is logged in the BIOS Events log. By default, the **Chassis Intrusion Detection** option is **On-Silent**. For additional security, Dell Technologies recommends keeping the **Chassis Intrusion Detection** option **Enabled**.
Block Boot Until Cleared	Enables or disables the Block Boot Until Cleared option. By default, the **Block Boot Until Cleared** option is **Disabled**. **NOTE:** When enabled, the computer does not boot until the chassis intrusion is cleared. If the administrator password is set, Setup has to be unlocked before the warning can be cleared.
SMM Security Mitigation	Enables or disables additional UEFI SMM Security Mitigation protections. This option uses the Windows SMM Security Mitigations Table (WSMT) to confirm to the operating system that security best practices have been implemented by the UEFI firmware. By default, the **SMM Security Mitigation** option is enabled.

Table 48. BIOS Setup options—Security menu (continued)

Security	
	For additional security, Dell Technologies recommends keeping the **SMM Security Mitigation** option enabled unless you have a specific application which is not compatible. **NOTE:** This feature may cause compatibility issues or loss of functionality with some legacy tools and applications.
Data Wipe on Next Boot	
Start Data Wipe	Data Wipe is a secure wipe operation that deletes information from a storage device. **CAUTION: The secure Data Wipe operation deletes information in a way that it cannot be reconstructed.** Commands such as delete and format in the operating system may remove files from showing up in the file system. However, they can be reconstructed through forensic means as they are still represented on the physical media. Data Wipe prevents this reconstruction and the data can no longer be recovered. When enabled, the data wipe option provides prompts to wipe any storage devices that are connected to the computer on the next boot. By default, the **Start Data Wipe** option is disabled.
Absolute	Absolute Software provides various cyber security solutions, some requiring software preloaded on Dell computers and integrated into the BIOS. To use these features, you must enable the Absolute BIOS setting and contact Absolute for configuration and activation. By default, the **Absolute** option is enabled. For additional security, Dell Technologies recommends keeping the **Absolute** option enabled. **NOTE:** When the Absolute features are activated, the Absolute integration cannot be disabled from the BIOS setup screen.
UEFI Boot Path Security	Enables or disables the computer to prompt the user to enter the Administrator password (if set) when booting to a UEFI boot path device from the F12 boot menu. By default, the **Always Except Internal HDD** option is enabled.
Authenticated BIOS Interface	
Enable Authenticated BIOS Interface	Allows the administrator to control access to BIOS configuration through an authenticated interface. When enabled, this option ensures that BIOS configuration changes are secured by authentication. By default, the **Enable Authenticated BIOS Interface** option is disabled.
Clear Certificate Store	Allows the administrator to delete all certificates stored in the Key Management System (KMS). When enabled, this option will remove all certificates, which may be necessary for security purposes or if the certificates have expired or are no longer valid. By default, the **Clear Certificate Store** option is disabled.
Legacy Manageability Interface Access	Allows the administrator to control the access to BIOS configuration through the Legacy Manageability Interface option. When enabled, this prevents the BIOS Administrator password-based manageability tools from running, prevents some Dell software applications from reading configuration settings, and/or prevents changes to the BIOS configuration settings. When enabled, this option only supports the Authenticated BIOS Manageability Interface (ABI) for managing the BIOS configuration changes. To support this feature, ABI must be enabled and provisioned.

Table 48. BIOS Setup options—Security menu (continued)

Security	
	When set to **Enabled** , the Legacy Manageability Interface can be used to read and change BIOS configuration settings. When set to **Read-Only** , BIOS configuration settings can be read, but cannot be changed through the Legacy Manageability Interface. When set to **Disabled** , the Legacy Manageability Interface is disabled. BIOS configuration reads and writes are blocked.
Firmware Device Tamper Detection	Allows you to control the firmware device tamper detection feature. This feature notifies the user when the firmware device is tampered. When enabled, a screen warning messages are displayed on the computer and a tamper detection event is logged in the BIOS Events log. The computer fails to reboot until the event is cleared. By default, the **Firmware Device Tamper Detection** option is enabled. For additional security, Dell Technologies recommends keeping the **Firmware Device Tamper Detection** option enabled.
Clear Firmware Device Tamper Detection	Allows you to clear the events that are logged when tampering of firmware device is detected. By default, the **Clear Firmware Device Tamper Detection** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.

Table 49. BIOS Setup options—Passwords menu

Passwords	
Administrator Password	The Administrator Password prevents unauthorized access to the BIOS Setup options. Once the administrator password is set, the BIOS setup options can only be modified after providing the correct password. The following rules and dependencies apply to the Administrator Password - • The administrator password cannot be set if computer and/or internal storage passwords are previously set. • The administrator password can be used in place of the computer and/or internal storage passwords. • When set, the administrator password must be provided during a firmware update. • Clearing the administrator password also clears the computer password (if set). Dell Technologies recommends using an administrator password to prevent unauthorized changes to BIOS setup options.
System Password	The System Password prevents the computer from booting to an operating system without entering the correct password. The following rules and dependencies apply when the System Password is used - • The computer shuts down when idle for approximately 10 minutes at the computer password prompt. • The computer shuts down after three incorrect attempts to enter the computer password. • The computer shuts down when the **Esc** key is pressed at the System Password prompt. • The computer password is not prompted when the computer resumes from standby mode. Dell Technologies recommends using the computer password in situations where it is likely that a computer may be lost or stolen.

Table 49. BIOS Setup options—Passwords menu (continued)

Passwords	
M.2 PCIe SSD-0	The hard drive password can be set to prevent unauthorized access of the data stored on the solid-state drive. The computer prompts for the hard drive password during boot in order to unlock the drive. A password-secured hard drive stays locked even when removed from the computer or placed into another computer. It prevents an attacker from accessing data on the drive without authorization. The following rules and dependencies apply when the **Hard Drive Password** or **M.2 PCIe SSD-0 Password** option is used. • The hard drive password option cannot be accessed when the hard drive is disabled in the BIOS Setup. • The computer shuts down when idle for approximately 10 minutes at the hard drive password prompt. • The computer shuts down after three incorrect attempts to enter the hard drive password and treats the hard drive as not available. • The hard drive does not accept password unlock attempts after five incorrect attempts to enter the hard drive password from the BIOS Setup. The hard drive password must be reset for the new password unlock attempts. • The computer treats the hard drive as not available when the **Esc** key is pressed at the hard drive password prompt. • The hard drive password is not prompted when the computer resumes from standby mode. When the hard drive is unlocked by the user before the computer goes into standby mode, it remains unlocked after the computer resumes from standby mode. • If the system and hard drive passwords are set to the same value, the hard drive unlocks after the correct system password is entered. Dell Technologies recommends using a hard drive password to protect unauthorized data access.
Password Configuration	The Password configuration page includes several options for changing the requirements of BIOS passwords. You can modify the minimum and maximum length of the passwords and require passwords to contain certain character classes (upper case, lower case, digit, special character). Dell Technologies recommends setting the minimum password length to at least eight characters.
Password Bypass	The **Password Bypass** option allows the computer to reboot from the operating system without entering the computer or hard drive password. If the computer has already booted to the operating system, it is presumed that the user has already entered the correct computer or hard drive password. **NOTE:** This option does not remove the requirement to enter the password after shutting down. By default, the **Password Bypass** option is disabled. For additional security, Dell Technologies recommends keeping the **Password Bypass** option enabled.
Password Changes	
Admin Setup Lockout	The **Admin Setup Lockout** option prevents an end user from even viewing the BIOS setup configuration without first entering the administrator password (if set). By default, the **Admin Setup Lockout** option is disabled. For additional security, Dell Technologies recommends keeping the **Admin Setup Lockout** option disabled.
Master Password Lockout	

Table 49. BIOS Setup options—Passwords menu (continued)

Passwords	
Enable Master Password Lockout	The Master Password Lockout setting allows you to disable the Recovery Password feature. If the computer, administrator, or hard drive password is forgotten, the computer becomes unusable. **NOTE:** When the owner password is set, the Master Password Lockout option is not available. **NOTE:** When an internal hard drive password is set, it must first be cleared before Master Password Lockout can be changed. By default, the **Enable Master Password Lockout** option is disabled. Dell does not recommend enabling the **Master Password Lockout** unless you have implemented your own password recovery computer.
Allow Non-Admin PSID Revert	The **Allow Non-Admin PSID Revert** option allows a user to clear the hard drive password without entering the BIOS Admin Password. When an Admin Password is set, the ability to enter the PSID is protected by requiring authentication with the Admin Password. If this option is enabled, any user can clear the drive without entering the Admin Password. By default, the **Enable Allow Non-Admin PSID Revert** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.

Table 50. BIOS Setup options—Update, Recovery menu

Update, Recovery	
UEFI Capsule Firmware Updates	
Enable UEFI Capsule Firmware Updates	Enables or disables BIOS updates through UEFI capsule update packages. **NOTE:** Disabling this option blocks the BIOS updates from services such as Microsoft Windows Update and Linux Vendor Firmware Service (LVFS). By default, the **Enable UEFI Capsule Firmware Updates** option is enabled.
BIOS Recovery from Hard Drive	Enables or disables the user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key. By default, the **BIOS Recovery from Hard Drive** option is enabled. **NOTE:** BIOS Recovery from Hard Drive is not available for self-encrypting drives (SED). **NOTE:** BIOS recovery is designed to fix the main BIOS block and cannot work if the Boot Block is damaged. In addition, this feature cannot work in the event of EC corruption, ME corruption, or a hardware issue. The recovery image must exist on an unencrypted partition on the drive.
BIOS Downgrade	
Allow BIOS Downgrade	Controls flashing of the computer firmware to previous revisions. By default, the **Allow BIOS Downgrade** option is enabled.
SupportAssist OS Recovery	Enables or disables the boot flow for SupportAssist OS Recovery tool in the event of certain computer errors. By default, the **SupportAssist OS Recovery** option is enabled.
BIOSConnect	Enables or disables cloud Service operating system recovery if the main operating system fails to boot with the number of failures equal to or greater than the value specified by the Auto OS Recovery Threshold setup option and local Service operating system does not boot or is not installed. By default, the **BIOSConnect** option is enabled.

Table 50. BIOS Setup options—Update, Recovery menu (continued)

Update, Recovery	
Dell Auto OS Recovery Threshold	Allows you to control the automatic boot flow for SupportAssist System Resolution Console and for Dell OS Recovery Tool. By default, the **Dell Auto OS Recovery Threshold** value is set to 2.

Table 51. BIOS Setup options—System Management menu

System Management	
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Creates a computer Asset Tag that can be used by an IT administrator to uniquely identify a particular computer. **NOTE:** Once set in BIOS, the Asset Tag cannot be changed.
AC Behavior	
Wake on AC	Enables or disables the computer to turn on and go to boot when AC power is supplied to the computer. By default, the **Wake on AC** option is disabled.
Wake on LAN	Enables or disables the computer to turn on by a special LAN signal. By default, the **Wake on LAN** option is disabled.
Auto On Time	Enable to set the computer to turn on automatically every day or on a preselected date and time. This option can be configured only if the Auto On Time is set to Everyday, Weekdays, or Selected Days. By default, the **Auto On Time** option is disabled.
Intel AMT Capability	Configure Intel Active Management Technology (AMT) options, which can be enabled, disabled, or restricted. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
First Power On Date	
Diagnostics	Enable or disable the option for applications running in the operating system to run with preboot diagnostics on subsequent boots. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
Power-on-Self-Test Automatic Recovery	Enable or disable the automatic recovery of the computer from no power or no-POST failure by applying mitigation steps. By default, the **Power-On-Self-Test Automatic Recovery** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.

Table 52. BIOS Setup options—Keyboard menu

Keyboard	
Fn Lock Options	Enables or disables the Fn Lock option. By default, the **Fn Lock** option is enabled.
Lock Mode	By default, the **Lock Mode Secondary** option is enabled. With this option, the F1-F12 keys scan the code for their secondary functions.
Keyboard Illumination	Configures the operating mode of the keyboard illumination feature. By default, the **Dim** option is selected. Enables the keyboard illumination feature at 100% brightness level.

Table 52. BIOS Setup options—Keyboard menu (continued)

Keyboard	
Keyboard Backlight Timeout on AC	Sets the timeout value for the keyboard backlight when an AC adapter is connected to the computer. By default, the **10 seconds** option is selected.
Keyboard Backlight Timeout on Battery	Sets the timeout value for the keyboard backlight when the computer is running only on the battery power. The keyboard backlight timeout value is only effective when the backlight is enabled. By default, the **10 seconds** option is selected.
Device Configuration HotKey Access	Allows you to control whether you can access device configuration screens through hotkeys during computer startup. By default, the **Device Configuration HotKey Access** option is enabled. **NOTE:** This setting controls only the Intel RAID (CTRL+I), MEBX (CTRL+P), and LSI RAID (CTRL+C) Option ROMs. Other preboot Option ROMs, which support entry using a key sequence, are not affected by this setting.

Table 53. BIOS Setup options—Pre-boot Behavior menu

Preboot Behavior	
Adapter Warnings	
Enable Dock Warning Messages	Enables the warning messages during boot when the adapters with less power capacity are detected. By default, the **Enable Dock Warning Messages** option is enabled.
Warnings and Errors	Enables or disables the action to be taken when a warning or error is encountered. By default, the **Prompt on Warnings and Errors** option is selected. **NOTE:** Errors deemed critical to the operation of the computer hardware stop the functioning of the computer.
Extend BIOS POST Time	Sets the BIOS POST (Power-On Self-Test) load time. By default, the **0 seconds** option is selected.
MAC Address Pass-Through	Replaces the external NIC MAC address (in a supported dock or dongle) with the selected MAC address from the computer. By default, the **System Unique MAC Address** option is selected.
Sign of Life	
Ownership tag with Logo	Display Ownership tag with Logo. By default, the **Ownership tag with Logo** option is enabled.
Early Keyboard Backlight	Keyboard Backlight Sign of Life. By default, the **Early Keyboard Backlight** option is enabled.

Table 54. BIOS Setup options—Virtualization menu

Virtualization Support	
Intel Virtualization Technology	
Enable Intel Virtualization Technology (VT)	When enabled, the computer can run a Virtual Machine Monitor (VMM). By default, the **Enable Intel Virtualization Technology (VT)** option is enabled.
VT for Direct I/O	

Table 54. BIOS Setup options—Virtualization menu (continued)

Virtualization Support	
Enable Intel VT for Direct I/O	When enabled, the computer can perform Virtualization Technology for Direct I/O (VT-d). VT-d is an Intel method that provides virtualization for memory map I/O. By default, the **Enable Intel VT for Direct I/O** option is enabled.
Intel Trusted Execution Technology (TXT)	Intel Trusted Execution Technology (TXT) is a set of hardware extensions to Intel processors and chipsets. It provides a hardware-based root of trust to ensure that a platform boots with a known good configuration of firmware, BIOS, virtual machine monitor, and operating system. The following must be enabled in order to enable Intel TXT - • Intel Virtualization Technology - X • Intel Virtualization Technology - Direct By default, the **Intel Trusted Execution Technology (TXT)** option is enabled. For additional security, Dell Technologies recommends keeping the **Intel Trusted Execution Technology (TXT)** option enabled.
DMA Protection	
Enable Pre-Boot DMA Support	Allows you to control the Pre-Boot DMA protection for both internal and external ports. This option does not directly enable DMA protection in the operating system. **NOTE:** This option is not available when the virtualization setting for IOMMU is disabled (VT-d/AMD Vi). By default, the **Enable Pre-Boot DMA Support** option is enabled. For additional security, Dell Technologies recommends keeping the **Enable Pre-Boot DMA Support** option enabled. **NOTE:** This option is provided only for compatibility purposes, since some older hardware is not DMA capable.
Enable OS Kernel DMA Support	Allows you to control the Kernel DMA protection for both internal and external ports. This option does not directly enable DMA protection in the operating system. For operating systems that support DMA protection, this setting indicates to the operating system that the BIOS supports the feature. **NOTE:** This option is not available when the virtualization setting for IOMMU is disabled (VT-d/AMD Vi). By default, the **Enable OS Kernel DMA Support** option is enabled. **NOTE:** This option is provided only for compatibility purposes, since some older hardware is not DMA capable.
Internal Port DMA Compatibility Mode	Allows you to control the Internal Port DMA Compatibility for both internal and external ports. By default, the **Internal Port DMA Compatibility Mode** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.

Table 55. BIOS Setup options—Performance menu

Performance	
Multi-Core Support	
Active Multiple Performance Cores (P-Cores) Select	Allows to change the number of Atom cores available to the operating system. The default value is set to the maximum number of cores. By default, the **All Cores** option is selected.

Table 55. BIOS Setup options—Performance menu (continued)

Performance	
	NOTE: To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
Intel SpeedStep	
Enable Intel SpeedStep Technology	Enables the computer to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production. By default, the **Enable Intel SpeedStep Technology** option is enabled. **NOTE:** To view this option, enable **Service** options as described in View Advance Set up options.
C-State Control	
Enable C-State Control	Enables or disables the ability of the CPU to enter and exit low-power state. When disabled, it disables all C-states. When enabled, it enables all C-states that the chipset or platform allows. By default, the **Enable C-State Control** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.
Intel Turbo Boost Technology	
Enable Intel Turbo Boost Technology	Enables or disables the Intel TurboBoost mode of the processor. When enabled, the Intel TurboBoost driver increases the performance of the CPU or graphics processor. By default, the **Enable Intel Turbo Boost Technology** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advance Set up options.

Table 56. BIOS Setup options—System Logs menu

System Logs	
BIOS Event Log	
Clear BIOS Event Log	Allows you to select option to keep or clear BIOS events logs. By default, the **Keep Log** option is selected.
Thermal Event Log	
Clear Thermal Event Log	Allows you to select option to keep or clear thermal events logs. By default, the **Keep Log** option is selected.
Power Event Log	
Clear Power Event Log	Allows you to select option to keep or clear power events logs. By default, the **Keep Log** option is selected.

Updating the BIOS

Updating the BIOS in Windows

About this task

CAUTION: If BitLocker is not suspended before updating the BIOS, the BitLocker key is not recognized the next time you reboot the computer. You will then be prompted to enter the recovery key to proceed, and the computer displays a prompt for the recovery key on each reboot. Failure to provide the recovery key can result in data loss or an operating system reinstall. For more information, refer Updating the BIOS on Dell systems with BitLocker enabled.

CAUTION: Do not turn off the computer during the BIOS flash update process. The computer may not boot if you turn off your computer.

Steps

1. Go to Dell Support Site.
2. Go to **Identify your product or ask support**. In the box, enter the product identifier, model, service request or describe what you are looking for, and then click **Search**.

   NOTE: If you do not have the Service Tag, click **Detect This PC**. The site automatically detects your device, and you can then click **Explore Product Support** to go to the support page for your device. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**.
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, navigate to the folder where the BIOS update file has been saved.
8. Double-click the BIOS update file and follow the on-screen instructions.

   For more information, search Dell Support Site.

Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see How to Update the Dell BIOS in the Ubuntu or Linux Environment at Dell Support Site.

Updating the BIOS using the USB drive in Windows

About this task

CAUTION: If BitLocker is not suspended before updating the BIOS, the BitLocker key is not recognized the next time you reboot the computer. You will then be prompted to enter the recovery key to proceed, and the computer displays a prompt for the recovery key on each reboot. Failure to provide the recovery key can result in data loss or an operating system reinstall. For more information, refer Updating the BIOS on Dell systems with BitLocker enabled.

CAUTION: Do not turn off the computer during the BIOS flash update process. The computer may not boot if you turn off your computer.

Steps

1. Go to Dell Support Site.
2. Go to **Identify your product or ask support**. In the box, enter the product identifier, model, service request or describe what you are looking for, and then click **Search**.

NOTE: If you do not have the Service Tag, click **Detect This PC**. The site automatically detects your device, and you can then click **Explore Product Support** to go to the support page for your device. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**.
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. Create a bootable USB drive. For more information, search Dell Support Site.
8. Copy the BIOS setup program file to the bootable USB drive.
9. Connect the bootable USB drive to the computer that needs the BIOS update.
10. Restart the computer and press **F12**.
11. Select the USB drive from the **One Time Boot Menu**.
12. Type the BIOS setup program filename and press **Enter**.
    The **BIOS Update Utility** appears.
13. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS from the One-Time boot menu

To update the BIOS from the One-Time boot menu, see Updating the BIOS from the One Time Boot Menu at Dell Support Site..

System and setup password

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

CAUTION: Ensure that your computer is locked when it is not in use. Anyone can access the data that is stored on your computer, when left unattended.

Table 57. System and setup password

Password type	Description
System password	Password that you must enter to boot to your operating system.
Setup password	Password that you must enter to access and change the BIOS settings of your computer.

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

NOTE: The System and setup password feature is disabled by default.

Assigning a System Setup password

Prerequisites

You can assign a new System or Admin Password only when the status is set to **Not Set**. To enter BIOS System Setup, press F2 immediately after a power-on or reboot.

Steps

1. To enter the **System Setup**, press **F2** immediately after a power-on or reboot.
2. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
   The **Security** screen is displayed.
3. Select **System/Admin Password** and create a password in the **Enter the new password** field.
   Use the following guidelines to create the system password:

- Password can be up to 32 characters.
- Password must contain at least one special character: "(! " # $ % & ' * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | })"
- The password can contain numbers from 0 to 9.
- The password can contain alphabets A to Z and a to z.

4. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
5. Press Y to save the changes.
   The computer restarts.

Deleting or changing an existing system password or setup password

Prerequisites

Ensure that the **Password Status** is Unlocked in the System Setup before attempting to delete or change the existing system password and/or setup password. You cannot delete or change an existing system password or setup password if the **Password Status** is Locked. To enter the System Setup, press F2 immediately after a power-on or reboot.

Steps

1. To enter the **System Setup**, press **F2** immediately after a power-on or reboot.
2. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
   The **System Security** screen is displayed.
3. In the **System Security** screen, verify that the **Password Status** is Unlocked.
4. Select **System Password**. Update or delete the existing system password, and press Enter or Tab.
5. Select **Setup Password**. Update or delete the existing setup password, and press Enter or Tab.

   NOTE: If you change the system password and/or setup password, reenter the new password when prompted. If you delete the system password and/or setup password, confirm the deletion when prompted.

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

Clearing system and setup passwords

About this task

To clear the system or setup passwords, contact Dell technical support as described at Contact Support.

NOTE: For information about how to reset Windows or application passwords, see the documentation accompanying Windows or your application.

9

Troubleshooting

Handling swollen rechargeable Li-ion batteries

Like most laptops, Dell laptops use Lithium-ion batteries. One type of Lithium-ion battery is the rechargeable Li-ion battery. Rechargeable Li-ion batteries have increased in popularity in recent years and have become a 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 rechargeable Li-ion battery technology is the potential for swelling of the battery cells.

A 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 must be replaced and disposed of properly. We recommend contacting Dell 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 rechargeable Li-ion batteries are as follows:

- Exercise caution when handling rechargeable Li-ion batteries.
- Discharge the battery before removing it from the laptop. To discharge the battery, unplug the AC adapter from the computer and operate the computer only 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 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 Support at Dell Support Site 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 Dell Site or otherwise directly from Dell.

Rechargeable Li-ion batteries can swell for various reasons such as age, number of charge cycles, or exposure to high heat. For more information about how to improve the performance and lifespan of the laptop battery and to minimize the possibility of occurrence of the issue, search Dell laptop battery at Dell Support Site.

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

Your Dell computer is uniquely identified with 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 Dell Support Site.

For more information about how to find the Service Tag for your computer, see Instructions on how to find your Service Tag or Serial Number.

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 within the BIOS and launched by the BIOS internally. The embedded system diagnostics provides options for particular devices or device groups allowing you to:

- Run tests automatically or in an interactive mode.
- Repeat the tests.
- Display or save test results.
- Run thorough tests to add more options and obtain details about any failed devices.
- View status messages that inform you when the 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 when the diagnostic tests are performed.

For more information, see How to Run Dell Preboot Diagnostics and Hardware Tests on Your Dell Computer.

Running the SupportAssist Pre-Boot System Performance Check

Steps

1. Turn on your computer.
2. As the computer boots, press the F12 key.
3. On the boot menu screen, select **Diagnostics**.
   The diagnostic quick test begins.
   NOTE: For more information about running the SupportAssist Pre-Boot System Performance Check on a specific device, see Dell Support Site.
4. If there are any issues, error codes are displayed.
   Note the error code and validation number and contact Dell.

Built-in self-test (BIST)

Motherboard Built-In Self-Test (M-BIST)

M-BIST is the system board onboard self-test diagnostics tool that improves the diagnostics accuracy of system board Embedded Controller (EC) failures.

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

How to run M-BIST

NOTE: Before initiating M-BIST, ensure that the computer is in a power-off state.

1. Press and hold both the **M** key and the power button to initiate M-BIST.
2. The battery-status light may exhibit two states:
   - Off: No fault was detected.
   - Amber and White: Indicates a problem with the system board.
3. If there is a failure with the system board, the battery-status light flashes one of the following error codes for 30 seconds:

Table 58. 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	Memory/RAM failure

4. If there is no failure with the system board, the LCD cycles through the solid color screens (that are described in the LCD-BIST) for 30 seconds and then turn off.

Logic Built-in Self-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 (that is if the L-BIST circuit fails), the battery status LED flashes 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 the L-BIST

1. Turn on your computer.
2. If the computer 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 that is 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 (LCD-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 computer settings.

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

How to invoke the LCD-BIST

1. Turn off your computer.
2. Disconnect any peripherals that are connected to the computer. Connect only the AC adapter (charger) to the computer.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold the **D** key and press the power button to enter LCD-BIST mode. Continue to hold the **D** key until the computer boots up.
5. The screen displays solid colors and changes colors on the entire screen to white, black, red, green, and blue twice.
6. Then it displays 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 computer shuts down.

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

System-diagnostic lights

This section lists the system-diagnostic lights of your Dell Pro 16 Plus.

Table 59. System-diagnostic lights

Blinking pattern		Problem description	Suggested resolution
Amber	**White**		
1	1	TPM detection failure	Replace the system board.
1	2	Unrecoverable SPI Flash Failure	Replace the system board.
1	4	Hinge Cable OCP	Replace LCM (cable and Panel)
1	5	EC unable to program i-Fuse	Replace the system board.
1	6	Generic catch-all for ungraceful EC code flow errors	Disconnect all power source (AC, battery, coin cell) and drain flea power by pressing and holding down the power button for 3~5 seconds.
1	7	Non-RPMC Flash on Boot Guard fused system	Flash latest BIOS version. If the problem persists, replace the system board.
1	8	Chipset “Catastrophic Error” signal has tripped	Replace the CPU.
2	1	CPU failure	• Run the Dell SupportAssist or Dell Diagnostics tool. • If the problem persists, replace the system board.
2	2	System board failure (included BIOS corruption or ROM error)	• Flash latest BIOS version • If the problem persists, replace the system board.
2	3	No memory, or RAM detected	• Confirm that the memory module is installed properly. • If the problem persists, replace the memory module.
2	4	Memory, or RAM failure	• Reset and swap memory modules among the slots. • If the problem persists, replace the memory module.
2	5	Invalid memory installed	• Reset and swap memory modules among the slots. • If the problem persists, replace the memory module.
2	6	System board or Chipset Error	Replace the system board.
2	7	LCD failure (SBIOS message)	Replace the LCD module.

Table 59. System-diagnostic lights (continued)

Blinking pattern		Problem description	Suggested resolution
Amber	White		
2	8	Display power-rail failure on the system board	Replace the system board.
3	1	CMOS battery failure	• Reset the main battery connection. • If the problem persists, replace the main battery.
3	2	PCI or Video card or chip failure	Replace the system board.
3	3	BIOS Recovery image not found	• Flash latest BIOS version • If the problem persists, replace the system board.
3	4	BIOS Recovery image found but invalid	• Flash latest BIOS version • If the problem persists, replace the system board.
3	5	Power rail failure	Replace the system board.
3	6	Flash corruption is detected by SBIOS.	• Press the power button for over 25 seconds to do RTC reset. If the problem persists, replace the system board. • Disconnect all power source (AC, battery, coin cell) and drain flea power by pressing and holding down the power button 3~5 seconds to ensure all power are drained. • Run "BIOS recovery from USB", and the instructions are in the website Dell support. • If the problem persists, replace the system board.
3	7	Timeout waiting on ME to reply to HECI message.	Replace the system board.
4	1	Memory DIMM power rail failure	Replace the system board.
4	2	CPU Power cable connection issue	• Perform the PSU BIST Test, reseat the cable. • If this does not work, replace the system board, power supply or cabling.
4	4	LCD Power Rail Failure	Replace system board.

NOTE: Blinking 3-3-3 LEDs on Lock LED (Caps-Lock or Num-Lock), Power button LED (without Fingerprint reader), and Diagnostic LED indicates failure to provide input during LCD panel test on Dell SupportAssist Pre-boot System Performance Check diagnostics.

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 stand-alone tool that is preinstalled on Dell computers running the 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, and 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 the 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 Serviceability Tools at the Dell Support Site. Click **SupportAssist** and then click **SupportAssist OS Recovery**.

NOTE: Windows 11 IoT Enterprise LTSC 2024 and Dell ThinOS 10 do not support Dell SupportAssist. For more information about recovering ThinOS 10, see Recovery mode using R-Key.

Real-Time Clock (RTC Reset)

The Real-Time Clock (RTC) reset function enables you or the service technician to recover Dell computers from No POST/No Power/No Boot situations.

Start the RTC reset with the computer powered off and connected to AC power. Press and hold the power button for twenty-five seconds. The computer RTC Reset occurs after you release the power button.

Backup media and recovery options

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

Network power cycle

About this task

If your computer is unable to access the Internet due to network connectivity issues, reset your network devices by performing the following steps:

Steps

1. Turn off the computer.
2. Turn off the modem.
   NOTE: Some Internet service providers (ISPs) provide a modem and router combo device.
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 the computer.

Drain 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 must drain residual flea power before removing or replacing any components in your computer.

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

Perform the following steps to drain the flea power:

Steps

1. Turn off the computer.
2. Disconnect the power adapter from the 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 the computer.
9. Turn on the computer.

NOTE: For more information about performing a hard reset, go to Dell Support Site. On the menu bar at the top of the Support page, select Support > Support Library. In the Search field on the Support Library page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.

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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 60. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	Dell Site
Contact Support	In Windows search, type `Contact Support`, and press Enter.
Online help for operating system	Windows Support Site Linux Support Site
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals, and documents.	Your Dell computer is uniquely identified using 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 Dell Support Site. For more information about how to find the Service Tag for your computer, see Locate the Service Tag on your computer.
Dell knowledge base articles	1. Go to Dell Support Site. 2. On the menu bar at the top of the Support page, select **Support** > **Support Library**. 3. In the Search field on the Support Library page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.

Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see Dell Support Site.

NOTE: Availability of the services may vary depending on the country or region, and product.

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

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Revision history

Tracks all updates that are made to the document. It typically includes the date of change, version number, and a brief description of the modification. This log helps maintain transparency, accountability, and a clear timeline of progress.

Table 61. Revision history

Revision	Date	Description
A00	03-20-2025	Original publish date
A02	06-27-2025	• Added revision history topic. • Updated camera specifications.
A03	07-21-2025	• Updated BIOS setup options topic • Added 4G WWAN topic. • Updated display specifications. • Updated battery specifications. • Updated USH board topic.
A04	08-11-2025	Added multiple display support matrix specifications.
A05	09-08-2025	• Updated power adapter specifications. • Updated battery specifications. • Updated right view topic.
A06	09-12-2025	• Updated processor specifications. • Updated 5G WWAN specifications. • Updated display specifications.
A07	11-17-2025	Updated Dimensions and weight specifications.
A08	11-19-2025	• Updated system diagnostic light topic. • Updated BIOS setup topic.
A09	11-26-2025	Updated top view topic.