Dell Pro Max 16 Plus

MB16250

Owner's Manual

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Notes, cautions, and warnings

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

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

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

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1

Views of Dell Pro Max 16 Plus MB16250

Right

Figure 1. Right view

1. **Global headset port**

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

2. **Thunderbolt 4 (40 Gbps) port with Power Delivery and DisplayPort**

   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 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.

3. **USB 3.2 Gen 1 port**

   Connect peripherals such as a keyboard, mouse, printer, and external storage device. Supports data transfer speeds of up to 5 Gbps.

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

   Connect devices such as external storage devices and printers.

   Supports 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.

   NOTE: Certain USB devices may not charge when the computer is turned off or in a sleep state. In such cases, turn on the computer to charge the device.

5. **Security-cable slot (for Noble lock)**

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

Left

Figure 2. Left view

1. **RJ45 Ethernet port (2.5 Gbps)**

   Connect an RJ45 ethernet cable from a router or a broadband modem for network or Internet access, with a transfer rate of 10/100/1000/2500 Mbps (maximum 2.5 Gbps).

2. **HDMI 2.1 Fixed Rate Link (FRL) port**

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

3. **Thunderbolt 5 (80 Gbps) ports with Power Delivery and DisplayPort (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 80 Gbps for USB4 and Thunderbolt 5.

   NOTE: You can connect a Dell Docking Station to the Thunderbolt 5 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 5 supports two 4K displays or one 8K display.

4. **Battery-status light**

   Indicates the battery-charge status.

   If the computer is connected to an electrical outlet, the battery light operates as follows:

   - Solid white: The battery is charging. When the charge is complete the LED turns off.

   If the computer is running on a battery, the battery light operates as follows:

   - Off: The battery is adequately charged, or the computer is turned off.
   - Solid amber: The battery charge is critically low. A low battery state is approximately 30 minutes or less of battery life remaining (Amber 590 nm +/- 3 nm).

5. **SD-card slot**

   Insert an SD card to expand your storage and store photos, videos, and data from your computer. The computer supports the following card types:

   - Secure Digital (SD)
   - Secure Digital High Capacity (SDHC)
   - Secure Digital Extended Capacity (SDXC)

6. **Smart-card reader slot**

   Using smart card provides authentication in corporate networks.

Top

Figure 3. Top view

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 a sleep state. Press and hold the power button for 10 seconds to force shut-down the computer.

   If the power button has a fingerprint reader, place your finger on the power button steadily to log in.

   NOTE: The power-status light on the power button is available only on computers without the fingerprint reader.

   NOTE: Register your fingerprint as password in Windows settings.

2. **NFC/Contactless smart card reader**

   Provides contactless reading of smart cards. Enables NFC-enabled devices to connect to your computer and supports data transfer across the devices.

3. **Touchpad**

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

Front

Figure 4. Front view

1. **Left microphone**

   Provides digital sound input for audio recording and voice calls.

2. **Infrared camera (optional)**

   Enhances security when paired with Windows Hello face authentication.

3. **Infrared emitter (optional)**

   Emits infrared light, which enables the infrared camera to sense and track motion.

4. **Camera**

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

5. **Camera shutter**

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

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**

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

Bottom

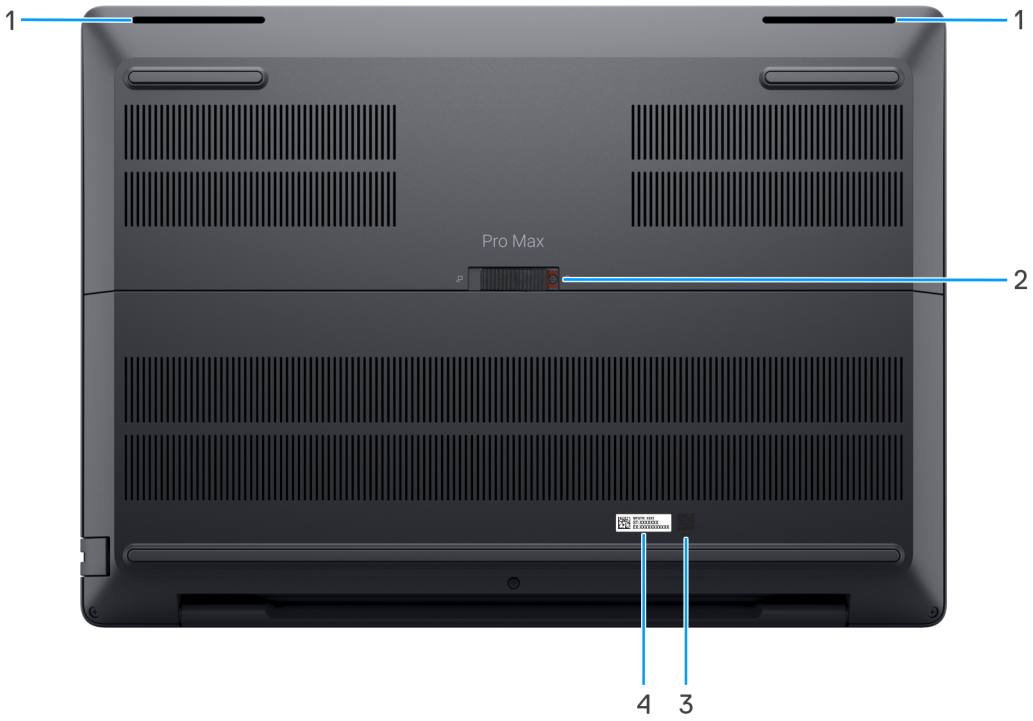

Figure 5. Bottom view

1. **Speakers (2)**

   Provide audio output.

2. **Security latch (optional)**

   The security latch provides easy, quick, and toolless access to the solid state drive (SSD).

   Remove the screw to unlock the latch, release, and remove the door to gain access to the toolless SSD slot. The screw can be stored on the back of the removeable door.

   NOTE: The security latch is not available on computers that are shipped with full base cover.

3. **MyDell QR code**

   MyDell is your hub for content that is personalized to your Dell Pro Max 16 Plus MB16250, including videos, articles, manuals, and access to support.

4. **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.

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

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. The Express Service Code is a numeric version of the Service Tag.

For more information about how to find the Service Tag of your computer, search in the Knowledge Base Resource at the Dell Support Site.

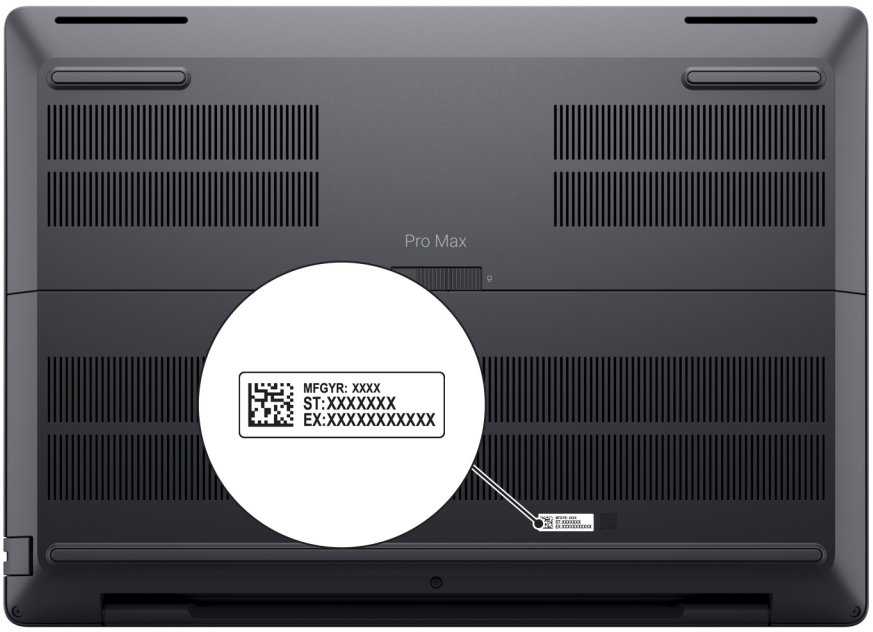

Figure 6. Service Tag/Express Service Code location

Battery-status light

The following table lists the battery-status light behavior of your Dell Pro Max 16 Plus MB16250.

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 (590+/-3 nm)	S0 or S5	< 10%

- S0 (ON): The computer is turned on.
- S4 (Hibernate): The computer consumes the least power in the Hibernate state compared to the ON or OFF states. 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 Max 16 Plus MB16250

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 may 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 an 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 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 Max 16 Plus MB16250

Dimensions and weight

The following table lists the height, width, depth, and weight of your Dell Pro Max 16 Plus MB16250.

Table 3. Dimensions and weight

Description	Values
Height:	
Front height	17.34 mm (0.68 in.)
Rear height	18.97 mm (0.75 in.)
Peak height	• For computers without a sliding door: 29.40 mm (1.16 in.) • For computers with a sliding door: 30.90 mm (1.22 in.)
Width	360 mm (14.17 in.)
Depth	258.60 mm (10.18 in.)
Weight **NOTE:** The weight of your computer depends on the configuration that you ordered.	• Computers shipped with NPU card: 2.85 kg (6.28 lb) • Computers shipped without NPU card: 2.55 kg (5.63 lb)

Processor

The following table lists the details of the processors that are supported on your Dell Pro Max 16 Plus MB16250.

Table 4. Processor

Description	Option one	Option two	Option three
Type	Intel Core Ultra 5 245HX	Intel Core Ultra 7 265HX	Intel Core Ultra 9 285HX
Wattage	55 W	55 W	55 W
Core count	14	20	24
Thread count	14	20	24
Speed	Up to 5.1 GHz	Up to 5.3 GHz	Up to 5.5 GHz
Cache	26 MB	36 MB	40 MB
Integrated graphics	Intel Graphics	Intel Graphics	Intel Graphics

Chipset

The following table lists the details of the chipset that is supported by your Dell Pro Max 16 Plus MB16250.

Table 5. Chipset

Description	Values
Chipset	Intel WM880
Processor	Intel Core Ultra 5/7/9
DRAM bus width	64-bit
Flash EPROM	64 MB
PCIe bus	Up to Gen4

Operating system

Your Dell Pro Max 16 Plus MB16250 supports the following operating systems:

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

NOTE: Windows 10 22H2 is supported only for computers downgraded by end users from Windows 11. Support by Dell Technologies is subjected to the Microsoft Windows 10 End of Support plan.

NOTE: Dell computers with operating systems installed by Dell conform to energy-efficiency regulations.

NOTE: Dell computers without operating systems installed by Dell may not comply with energy-efficiency regulations. For operating system support, go to Windows Support Site or Linux Support Site.

Memory

The following table lists the memory specifications that are supported by your Dell Pro Max 16 Plus MB16250.

CAMM (Compression Attached Memory Module) is a new type of memory module form factor which uses a land grid array (LGA) and a compression connection, allowing for a smaller and more compact design.

Your Dell Pro Max 16 Plus MB16250 supports both CAMM and CSoDIMM and may have either CAMM or CSoDIMM installed depending on the configuration ordered.

NOTE: CSoDIMM and CAMM configurations are not customer interchangeable. To upgrade from a CSoDIMM configuration to a CAMM configuration, contact technical support at Dell.com.

Table 6. Memory specifications

Description	Values
Memory slots	• One CAMM module • One module with two CSoDIMM slots
Memory type	DDR5
Memory speed	**For computers shipped with one CAMM module:** • 128 GB: 1 x 128 GB, 6400 MT/s, CAMM, dual-channel **For computers shipped with one module with two CSoDIMM slots:**

Table 6. Memory specifications (continued)

Description	Values
	• 16 GB: 1 x 16 GB, DDR5, 6400 MT/s, CSoDIMM, Non-ECC • 32 GB: 2 x 16 GB, DDR5, 6400 MT/s, CSoDIMM, Non-ECC • 64 GB: 2 x 32 GB, DDR5, 6400 MT/s, CSoDIMM, Non-ECC
Maximum memory configuration	• For computers shipped with one CAMM module: 128 GB • For computers shipped with one module with two CSoDIMM slots: 64 GB
Minimum memory configuration	• For computers shipped with one CAMM module: 128 GB • For computers shipped with one module with two CSoDIMM slots: 16 GB
Memory size per slot	**For computers shipped with one CAMM module:** • 128 GB **For computers shipped with one module with two CSoDIMM slots:** • 16 GB • 32 GB
Memory configurations supported	**For computers shipped with one CAMM module:** • 128 GB: 1 x 128 GB, 6400 MT/s, CAMM, dual-channel **For computers shipped with one module with two CSoDIMM slots:** • 16 GB: 1 x 16 GB, DDR5, 6400 MT/s, CSoDIMM, Non-ECC • 32 GB: 2 x 16 GB, DDR5, 6400 MT/s, CSoDIMM, Non-ECC • 64 GB: 2 x 32 GB, DDR5, 6400 MT/s, CSoDIMM, Non-ECC

External ports and slots

The following table lists the external ports and slots on your Dell Pro Max 16 Plus MB16250.

Table 7. External ports and slots

Description	Values
Network port	One RJ45 ethernet port (2.5 Gbps)
USB ports	• Two Thunderbolt 5 (80 Gbps) ports with Power Delivery and DisplayPort **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 Thunderbolt 4 (40 Gbps) port with Power Delivery and DisplayPort **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 (5 Gbps) port with PowerShare • One USB 3.2 Gen 1 (5 Gbps) port

Table 7. External ports and slots (continued)

Description	Values
Audio port	One global headset port
Video port(s)	One HDMI 2.1 FRL port
Media-card reader	• One smart card reader slot • One SD-card slot
Power-adapter port	USB Type-C power input
Security-cable slot	One security-cable slot (noble lock)

Internal slots

The following table lists the internal slots of your Dell Pro Max 16 Plus MB16250.

Table 8. Internal slots

Description	Values
M.2	• One M.2 2230 slot for WiFi and Bluetooth combo card • Three M.2 2230/2280 slots for solid state drive **NOTE:** To learn more about the features of different types of M.2 cards, search in the Knowledge Base Resource at Dell Support Site.

Ethernet

The following table lists the wired ethernet Local Area Network (LAN) specifications of your Dell Pro Max 16 Plus MB16250.

Table 9. Ethernet specifications

Description	Values
Model	Intel Ethernet Controller I226-LM
Transfer rate	10/100/1000/2500 Mbps

Wireless module

The following table lists the Wireless Local Area Network (WLAN) module that is supported on your Dell Pro Max 16 Plus MB16250.

Table 10. Wireless module specifications

Description	Values
Model number	Intel BE200
Transfer rate	Up to 5760 Mbps
Frequency bands supported	2.4 GHz/5 GHz/6 GHz
Wireless standards	• WiFi 802.11a/b/g

Table 10. Wireless module specifications (continued)

Description	Values
	• Wi-Fi 4 (WiFi 802.11n) • Wi-Fi 5 (WiFi 802.11ac) • Wi-Fi 6E (WiFi 802.11ax) • Wi-Fi 7 (WiFi 802.11be)
Encryption	• 64-bit/128-bit WEP • AES-CCMP • TKIP
Bluetooth wireless card **NOTE:** The functionality of the Bluetooth wireless card may vary based on the operating system.	Bluetooth 5.4

WWAN module

The following table lists the Wireless Wide Area Network (WWAN) module that is supported in your Dell Pro Max 16 Plus MB16250.

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

NOTE: Availability of the eSIM feature on this module may vary depending on your region and the support that is offered by your mobile carrier.

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

Table 11. WWAN module specifications

Description	Values
Model number	DW5934e, Qualcomm Snapdragon X72 Global 5G Modem
Form factor	M.2 3052 Key-B
Host interface	PCIe Gen3
Network standard	• NR FR1 (Sub6) FDD/TDD • LTE FDD/TDD • WCDMA/HSPA+ • GPS/GLONASS/Galileo/Beidou
Transfer data rate	• 5G NR: DL 4.14 Gbps/UL 900 Mbps • LTE: DL 2.0 Gbps (CAT20)/UL 211 Mbps (CAT18) • UMTS: DL DC-HSPA+ Rel8: 42 Mbps/UL 5.76 Mbps
Operating frequency bands	• NR (n1, n2, n3, n5, n7, n8, n12, n13, n14, 18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n67, n70, n71, n75, n76, n77, n78, n79, n91, n92, n93, n94) • LTE (B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B67, B68, B70, B71) • WCDMA/HSPA+ (1, 2, 4, 5, 8)
Power supply	DC 3.135 V to 3.63 V, typical 3.30 V
SIM card	Supported through external SIM slot

Table 11. WWAN module specifications (continued)

Description	Values
eSIM with dual SIM (DSSA)	Supported **NOTE:** The availability of eSIM functionality embedded on the module is dependent on the region and specific carrier requirements.
Antenna diversity	Supported
Radio on/off	Supported
Wake On Wireless WAN	Supported in Modern Standby mode
Operating temperature	• Normal operating temperature: –30°C to + 70°C • Extended operating temperature: –40°C to +85°C • Storage temperature: –40°C to +85°C
Antenna connector	• WWAN Main Antenna x 1 • WWAN Diversity Antenna x 1 • 4 x 4 MIMO Antenna x 2
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 Max 16 Plus MB16250.

Table 12. Audio specifications

Description		Values
Audio controller		Cirrus Logic CS42L43
Stereo conversion		Supported
Internal audio interface		Soundwire
External audio interface		Global headset port
Number of speakers		Two
Internal-speaker amplifier		Supported
External volume controls		Keyboard shortcut controls
Speaker output:		
	Average	2 W + 2 W
	Peak	2.5 W + 2.5 W
Microphone		Dual-array microphones

Storage

This section lists the storage options on your Dell Pro Max 16 Plus MB16250.

Your Dell Pro Max 16 Plus MB16250 supports up to three M.2 2230/2280 solid state drives.

Table 13. Storage specifications

Storage type	Interface type	Capacity
M.2 2230 Class 35 SSD	TLC PCIe NVMe Gen4 x4, up to 64 Gbps	512 GB
M.2 2280 Class 40 single sided SED (Self-Encrypting Drive)	TLC PCIe NVMe Gen4 x4, up to 64 Gbps	Up to 4 TB
M.2 2280 Class 40 SED (Self-Encrypting Drive)	TLC PCIe NVMe Gen5 x4, up to 64 Gbps	Up to 2 TB

Redundant Array of Independent Disks (RAID)

For optimal performance when configuring drives as a RAID volume, Dell Technologies recommends using identical drive models.

NOTE: RAID is not supported on Intel Optane configurations.

RAID 0 (Striped, Performance) volumes benefit from higher performance when drives are matched because the data is split across multiple drives: However, any I/O operations with block sizes larger than the stripe size will be constrained by the slowest drive in the array. For RAID 0 I/O operations where block sizes are smaller than the stripe size, whichever drive the I/O operation targets, determines the performance, which increases variability and results in inconsistent latencies. This variability is particularly pronounced for write operations, and it can be problematic for applications that are latency sensitive. One such example of this is any application that performs thousands of random writes per second in very small block sizes.

RAID 1 (Mirrored, Data Protection) volumes benefit from higher performance when drives are matched because the data is mirrored across multiple drives all I/O operations must be performed identically to both drives, thus variations in drive performance when the models are different result in the I/O operations completing only as fast as the slowest drive. While this does not suffer from the variable latency issue in small random I/O operations as with RAID 0 across heterogeneous drives, the impact is nonetheless large because the higher performing drive becomes limited in all I/O types. One of the worst examples of constrained performance here is when using unbuffered I/O. To ensure that that writes are fully committed to nonvolatile regions of the RAID volume, unbuffered I/O bypasses cache (for example by using the Force Unit Access bit in the NVMe protocol) and the I/O operation will not complete until all the drives in the RAID volume have completed the request to commit the data. This kind of I/O operation completely negates any advantage of a higher performing drive in the volume.

Care must be taken to match not only the drive vendor, capacity, and class, but also the specific model. Drives from the same vendor, with the same capacity, and even within the same class, can have different performance characteristics for certain types of I/O operations. Thus, matching by model ensures that the RAID volume consists of a homogeneous array of drives that deliver all the benefits of a RAID volume without incurring the additional penalties when one or more drives in the volume are lower performing.

Dell Pro Max 16 Plus MB16250 supports RAID with more than one hard drive configuration.

Media-card reader

The following table provides the specification of media cards that are supported by your Dell Pro Max 16 Plus MB16250.

Table 14. Media-card reader specifications

Description	Values
Media-card slot type	One SD card slot - SD Express 7.0 (PCIe Gen3 x 1)
Media-cards supported	• Secure Digital (SD) • Secure Digital High Capacity (SDHC) • Secure Digital Extended Capacity (SDXC)

Table 14. Media-card reader specifications (continued)

Description	Values
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 Max 16 Plus MB16250.

Table 15. Keyboard specifications

Description	Values
Keyboard lighting technology	• Standard backlit keyboard • Standard non-backlit keyboard
Keyboard layout	QWERTY
Number of keys	• Arabic, Canada (Bilingual) (MUI), Chinese (Traditional), English International, English US, French (Canadian) (MUI), Greek, Hebrew, Korean, Russian, Thai, and Ukrainian: 99 keys • Belgian, Bulgarian, Czech/Slovak (MUI), Danish, English UK, Estonian, French (European), German, Hungarian, Italian, Nordic (MUI), Norwegian, Portuguese, Spanish (Castillian), Spanish (Latin America), Swedish/Finnish, Swiss/European (MUI), Turkish, Turkish (F), and Slovenian: 100 keys • Portuguese (Brazil) and French Canadian Quebec Acnor: 101 keys • Japanese: 103 keys
Key pitch	Horizontal=18.05 mm key pitch Vertical=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) changing **Function Key Behavior** in the BIOS Setup program. For more information, see Keyboard function keys.

Keyboard function keys

The **F1**-**F12** keys at the top of the keyboard are function keys. By default, these keys are used to perform specific functions defined by the software application in use.

You can run the specific functions that are indicated by the symbols on the function keys by pressing the function key with **fn**, for example, **fn** and **F1**. See the table below for the list of secondary tasks and the key combinations to run them.

NOTE: Keyboard characters may differ depending on the keyboard language configuration. Keys that are used for tasks remain the same, regardless of the keyboard language.

NOTE: You can define the primary behavior of function keys in the **Function Key Behavior** menu of 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 the microphone
F5	Turn on or turn off backlit keyboard (optional)
F6	Decrease display brightness
F7	Increase display brightness
F8	Switch to external display
F9	Stealth mode
F10	Print screen
F11	Home
F12	End

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 F6 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 + Ctrl	Open the application menu
fn + Esc	Toggle between multimedia and function key behavior
fn + PgUp (cursor up)	Scroll up the document or page
fn + PgDn (cursor down)	Scroll down the document or page
fn + Home	Move to the beginning of the document
fn + End	Move to the end of the document
Copilot	Launch Copilot in Windows **NOTE:** If Copilot in Windows is not available on your computer, the Copilot key launches Recall. If both Recall and Copilot in Windows are not available on your

Table 17. Secondary behavior (continued)

Function key	Secondary behavior
	computer, the Copilot key launches Windows Search. For more information about Copilot in Windows and Recall, search in the Knowledge Base Resource at the Dell Support Site.

Camera

The following table lists the camera specifications of your Dell Pro Max 16 Plus MB16250.

Table 18. Camera specifications

Description		Option 1	Option 2
Number of cameras		One	One
Camera type		HDR FHD RGB camera	HDR RGB+IR camera
Camera location		Front camera	Front camera
Camera sensor type		CMOS sensor technology	CMOS sensor technology
Camera resolution:			
	Still image	2.07 megapixels	8.29 megapixels
	Video	1920 x 1080 at 30 fps	1920 x 1080 at 30 fps
Infrared camera resolution:			
	Still image	Not applicable	0.23 megapixels
	Video	Not applicable	640 x 360 at 30 fps
Diagonal viewing angle:			
	Camera	80.20 degrees	88.10 degrees
	Infrared camera	Not applicable	86.60 degrees

Touchpad

The following table lists the touchpad specifications of your Dell Pro Max 16 Plus MB16250.

Table 19. Touchpad specifications

Description		Values
Touchpad resolution:		> 300 DPI
Touchpad dimensions:		
	Horizontal	133.00 mm (5.23 in.)
	Vertical	90.00 mm (3.54 in.)
Touchpad gestures		For more information about the touchpad gestures that are available on: • Windows, see the Microsoft Knowledge Base article at Microsoft Support Site.

Table 19. Touchpad specifications (continued)

Description	Values
	• Ubuntu, see Ubuntu Support Site.

Power adapter

The following table lists the power adapter specifications of your Dell Pro Max 16 Plus MB16250.

Table 20. Power-adapter specifications

Description		Option one	Option two
Type		165 W AC adapter	280 W AC adapter
Power-adapter dimensions:			
	Height	22 mm (0.87 in.)	23 mm (0.91 in.)
	Width	66 mm (2.59 in.)	78 mm (3.07 in.)
	Depth	136 mm (5.35 in.)	162 mm (6.38 in.)
Input voltage		100 VAC–240 VAC	• 100 VAC–120 VAC • 200 VAC–240 VAC
Input frequency		50 Hz–60 Hz	50 Hz–60 Hz
Input current (maximum)		2.20 A	• 4 A • 2 A
Output current (continuous)		• 28 V/5.893 A (continuous) • 20 V/6.50 A (continuous) • 15 V/3 A (continuous) • 9 V/3 A (continuous) • 5 V/3 A (continuous)	• 48 V/5.83 A (continuous) • 36 V/5.83 A (continuous) • 28 V/5.89 A (continuous) • 20 V/6.50 A (continuous) • 15 V/3 A (continuous) • 9 V/3 A (continuous) • 5 V/3 A (continuous) • 12 V-48 V/5.30 A (maximum)
Rated output voltage		• 28 VDC • 20 VDC • 15 VDC • 9 VDC • 5 VDC	• 48 VDC • 36 VDC • 28 VDC • 20 VDC • 15 VDC • 9 VDC • 5 VDC
Temperature range:			
	Operating	0°C to 40°C (32°F to 104°F)	0°C to 35°C (32°F to 95°F)
	Storage	–40°C to 70°C (–40°F to 158°F)	–40°C to 70°C (–40°F to 158°F)

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 of Dell Pro Max 16 Plus MB16250

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.

The following table lists the power adapter requirements for your Dell Pro Max 16 Plus MB16250.

Table 21. Power adapter requirements

Description	Value
Power that is required from a power adapter to achieve optimal performance	• Computers shipped with integrated graphics: 165 W • Computers shipped with discrete graphics: 280 W Type-C PDO: • 28 V at 5 A (140 W) • 36 V at 5 A (180 W) • 48 V at 5 A (240 W)
Power that charges the computer at a slower speed **NOTE:** A warning message may appear informing you about the use of a lower-powered adapter and slower charging speed.	• Computers shipped with integrated graphics: Less than 165 W • Computers shipped with discrete graphics: Less than 280 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.	90 W (at 19.50 V and 20 V)
USB Power Delivery (PD) fast charging	Supported
ExpressCharge mode	Supported **NOTE:** Ensure that the computer with a 96 Wh battery is connected to a 165 W power adapter for this feature to be supported. **NOTE:** ExpressCharge mode must also be enabled in the BIOS Setup screen. Select **Power** > **Battery Configuration** > **ExpressCharge**, then press **Enter**.

Battery

The following table lists the battery specifications of your Dell Pro Max 16 Plus MB16250.

Table 22. Battery specifications

Description		Option one	Option two
Battery type		6-cell lithium-ion (96 Wh), ExpressCharge and ExpressChargeBoost, Standard	6-cell lithium-ion (96 Wh), ExpressCharge and ExpressChargeBoost, LCL
Battery voltage		11.70 VDC	11.70 VDC
Battery weight (maximum)		0.38 kg (0.84 lb)	0.39 kg (0.87 lb)
Battery dimensions:			
	Height	15.45 mm (0.60 in.)	15.45 mm (0.60 in.)
	Width	199 mm (7.83 in.)	199 mm (7.83 in.)

Table 22. Battery specifications (continued)

Description		Option one	Option two
	Depth	73 mm (2.87 in.)	73 mm (2.87 in.)
Temperature range:			
	Operating	• Charge: 0°C to 50°C (32°F to 122°F) • Discharge: 0°C to 60°C (32°F to 140°F)	• Charge: 0°C to 50°C (32°F to 122°F) • Discharge: 0°C to 60°C (32°F to 140°F)
	Storage	–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
Battery charging time (approximate) **NOTE:** You can control the charging time, duration, 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.		When the computer is turned off: • From 0% up to 35% in 20 minutes (ExpressCharge Boost) • 2 hours (Express charge) • 3 hours (Standard charge)	When the computer is turned off: • From 0% up to 35% in 20 minutes (ExpressCharge Boost) • 2 hours (Express charge) • 3 hours (Standard charge)
Coin-cell battery		Not applicable	Not applicable

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 Technologies recommends that you charge the battery regularly for optimal power consumption.

Display

The following table lists the display specifications of your Dell Pro Max 16 Plus MB16250.

Table 23. Display specifications

Description		Option one	Option two	Option three
Display type		16-inch Full High Definition+ (FHD+)	16-inch, Full High Definition Plus (FHD+), Low Blue Light	16-inch, Ultra High Definition Plus (UHD+), Low Blue Light
Touch options		No	No	Yes
Display-panel technology		Wide-viewing angle (WVA)	Wide-viewing angle (WVA)	Wide-viewing angle (WVA)
Display-panel dimensions (active area):				
	Height	215.42 mm (8.48 in.)	215.42 mm (8.48 in.)	215.28 mm (8.48 in.)
	Width	344.68 mm (13.57 in.)	344.68 mm (13.57 in.)	344.45 mm (13.56 in.)
	Diagonal	406.46 mm (16.00 in.)	406.46 mm (16.00 in.)	406.19 mm (16.00 in.)

Table 23. Display specifications (continued)

Description	Option one	Option two	Option three
Display-panel native resolution	1920 x 1200	1920 x 1200	3840 x 2400
Luminance (typical)	300 nits	500 nits	500 nits
Megapixels	2.3	2.3	9.2
Color gamut	NTSC 45% (typical)	DCI-P3 100% (typical)	DCI-P3 100% (typical)
Pixels Per Inch (PPI)	142	141	283
Contrast ratio (typical)	1000:1 (typical)	1000:1 (minimum); 1500:1 (typical)	1000000:1 (typical)
Response time (maximum)	35 milliseconds	35 milliseconds	1 millisecond
Refresh rate	60 Hz	30-120 Hz	30-120 Hz
Horizontal view angle	+/- 89 degrees (typical)	+/- 80 degrees (minimum); +/- 89 degrees (typical)	+/- 89 degrees (typical)
Vertical view angle	+/- 89 degrees (typical)	+/- 80 degrees (minimum); +/- 89 degrees (typical)	+/- 89 degrees (typical)
Pixel pitch	0.18 mm x 0.18 mm	0.18 mm x 0.18 mm	0.09 mm
Power consumption (maximum)	4.45 W	5.20 W	12.27 W at SDR 120 Hz
Anti-glare vs glossy finish	Anti-reflection	Anti-glare	Anti-reflection

Fingerprint reader (optional)

The following table lists the specifications of the optional fingerprint-reader of your Dell Pro Max 16 Plus MB16250.

Table 24. Fingerprint reader specifications

Description	Values
Sensor technology	Capacitive
Sensor resolution	500 dpi
Sensor pixel size	108 x 88 pixel

Sensors

The following table lists the sensors of your Dell Pro Max 16 Plus MB16250.

Table 25. Sensor

Sensor support
Accelerometer (for positional sensing)
Windows Auto Brightness
Gyro + Accelerometer

Table 25. Sensor (continued)

Sensor support
Ambient Light Sensor (only with 8MP camera configuration)
Sensor Hub
Hall Effect Sensor

GPU—Integrated

The following table lists the specifications of the integrated Graphics Processing Unit (GPU) supported by your Dell Pro Max 16 Plus MB16250.

Table 26. GPU—Integrated

Controller	Memory size	Processor
Intel Graphics	Shared system memory	Intel Core Ultra 5/7/9

GPU—Discrete

The following table lists the specifications of the discrete Graphics Processing Unit (GPU) supported by your Dell Pro Max 16 Plus MB16250.

Table 27. GPU—Discrete

Controller	Memory size	Memory type
NVIDIA RTX PRO 1000 Blackwell	8 GB	GDDR7
NVIDIA RTX PRO 2000 Blackwell	8 GB	GDDR7
NVIDIA RTX PRO 3000 Blackwell	12 GB	GDDR7
NVIDIA RTX PRO 4000 Blackwell	16 GB	GDDR7
NVIDIA RTX PRO 5000 Blackwell	24 GB	GDDR7

NPU—Discrete

The following table lists the specifications of the discrete NPU supported by your Dell Pro Max 16 Plus MB16250.

Table 28. NPU—Discrete

Controller	Memory size	Memory type
Qualcomm AIC100	64 GB (32 GB per AIC 100 chip)	LPDDR4x

External display support

The following table lists the external display support for your Dell Pro Max 16 Plus MB16250.

Table 29. External display support

Graphics card	Supported external displays with laptop display enabled	Supported external displays with laptop display disabled
Intel Graphics	3	4
NVIDIA RTX PRO 1000 Blackwell	3	4
NVIDIA RTX PRO 2000 Blackwell	3	4
NVIDIA RTX PRO 3000 Blackwell	3	4
NVIDIA RTX PRO 4000 Blackwell	3	4
NVIDIA RTX PRO 5000 Blackwell	3	4

Hardware security

The following table lists the hardware security of your Dell Pro Max 16 Plus MB16250.

Table 30. Hardware security

Hardware security
One noble lock slot
Windows Hello - Fingerprint Reader
Trusted Platform Module (TPM) 2.0 discrete
FIPS 140-2 certification for TPM
Trusted Computing Group (TCG) Certification for TPM
Finger Print Reader in Power Button available with and without 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 (Opal 2.0 only - PCIe Interface)
Chassis Intrusion Detection

Smart-card reader

Contactless smart card reader

This section lists the contactless smart card reader specifications of your Dell Pro Max 16 Plus MB16250. This module is only available in computers that are shipped with smart card readers.

Table 31. 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
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 32. 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
	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 33. 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

Table 33. Supported cards (continued)

Manufacturer	Card
	SEOS + DESFire 5906PNG1ANN7
	SEOS iClass 5006PGGMN7
	Seos Essential + Prox 551PPGGANN
	iCLASS 2K 2000PGGMN
	iCLASS 2K 3000PGGMN
	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 34. 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
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 Max 16 Plus MB16250.

Table 35. 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

Table 35. Contacted smart card reader specifications (continued)

Title	Description	Dell ControlVault 3 Plus Contacted smart card reader
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
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 Max 16 Plus MB16250.

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

Table 36. 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	–15.20 m to 3048 m (–49.87 ft to 10,000 ft)	–15.20 m to 10,668 m (–49.87 ft to 35,000 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.

Dell support policy

For information about Dell support policy, search in the Knowledge Base Resource at Dell Support Site.

Dell low blue light display

WARNING: Prolonged exposure to blue light from the display may lead to long-term effects such as eye strain, eye fatigue, or damage to the eyes.

Blue light is a color in the light spectrum which has a short wavelength and high energy. Chronic exposure to blue light, particularly from digital sources may disrupt sleep patterns and cause long-term effects such as eye strain, eye fatigue, or damage to the eyes.

The display on this computer is designed to minimize blue light and complies with TÜV Rheinland's requirement for low blue light displays.

Low blue light mode is enabled at the factory, so no further configuration is necessary.

To reduce the risk of eye strain, it is also recommended that you:

- Position the display at a comfortable viewing distance between 20 and 28 inches (50 cm and 70 cm) from your eyes.
- Blink frequently to moisten your eyes, wet your eyes with water, or apply suitable eye drops.
- Take an extended break for 20 minutes every two hours.
- Look away from your display, and gaze at a distant object at 20 ft (609.60 cm) away for at least 20 seconds during each break.

ComfortView Plus

WARNING: Prolonged exposure to blue light from the display may lead to long-term effects such as eye strain, eye fatigue, or damage to the eyes.

Blue light is a color in the light spectrum which has a short wavelength and high energy. Chronic exposure to blue light, particularly from digital sources may disrupt sleep patterns and cause long-term effects such as eye strain, eye fatigue, or damage to the eyes.

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- Take an extended break for 20 minutes every two hours.
- Look away from your display, and gaze at a distant object at 20 ft (609.60 cm) away for at least 20 seconds during each break.

Using the privacy shutter

1. Slide the privacy shutter to the left to access the camera lens.
2. Slide the privacy shutter to the right to cover the camera lens.

Figure 8. Camera shutter

Dell Optimizer

Dell Optimizer is an AI-based software application that allows you to customize your computer settings for power and battery, and more.

For Dell Pro Max 16 Plus MB16250 with Dell Optimizer, you can:

- Extend the battery life of your computer with Intelligent Battery Extender and Dynamic Charge.
- Tune the performance, power consumption, cooling, and fan noise with selectable thermal modes.
- Access and secure your computer depending on your physical presence.
- Download and redeem the apps that are purchased with your computer.

For more information about configuring and using these features, search for *Dell Optimizer* at the Dell Support Site.

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

About this task

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

Steps

1. Save and close all open files and exit all open applications.
2. Shut down your computer. 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 outlet.

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, 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 setup 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
- 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 37. Screw list

Component	Screw type	Quantity	Screw image
Sliding door	M2x4	1	
Base cover with sliding door	M2.5x3	3	
CAMM memory heat sink	M2x6	3	
Retention bracket	M2x6	3	
M.2 SSD on slot 1	M2x3	2	
M.2 SSD on slot 3	M2x3	2	
M.2 SSD on slot 2	M2x3	2	
M.2 2230 SSD	M2x2.5	1	
Battery	M2x5	3	
WLAN card	M2x3	1	
GPU card **NOTE:** Applicable for computers shipped with discrete GPU card.	M2x4	4	
NPU card **NOTE:** Applicable for computers shipped with discrete NPU card.	M2x4	4	

Table 37. Screw list (continued)

Component	Screw type	Quantity	Screw image
Integrated FPC beam connector	M2x4	4	
Discrete FPC beam connectors	M2x4	4	
Dummy fan	M2x5	2	
Fan assembly	M2x3	4	
Fan assembly	M2x5	6	
Display assembly	M2x3	1	
Display assembly	M2x5	1	
Display assembly	M2.5x5	6	
Memory interposer board bracket	M2x6	3	
Memory interposer board	M2x4	2	
Power board	M2x3	2	
Power board	M2x7	2	
Heat sink for computers shipped with integrated graphics	M2x5	2	
Heat sink for computers shipped with discrete graphics	M2x5	2	
Heat sink for computers shipped with discrete graphics	M2.5x2.5	1	
WLAN antenna module	M2x5	3	
Display panel for touchscreen displays	M2x2.5	6	
Display panel for non-touchscreen displays	M2x2.5	6	
Display hinges	M2.5x8	6	
Inner frame	M2x5	6	

Table 37. Screw list (continued)

Component	Screw type	Quantity	Screw image
Speakers	M2x2	4	
System board	M2x5	5	
System board	M2x3	1	
USH board cable	M1.4x1.2	2	
Keyboard	M2x2.5	22	
Keyboard	M2x2	1	
Keyboard	M1.2x1.5	6	
Smart card reader	M2x2.5	2	
Power button board	M2x4	1	
Power button	M2x2	2	

Major components of Dell Pro Max 16 Plus MB16250

The following image shows the major components of Dell Pro Max 16 Plus MB16250.

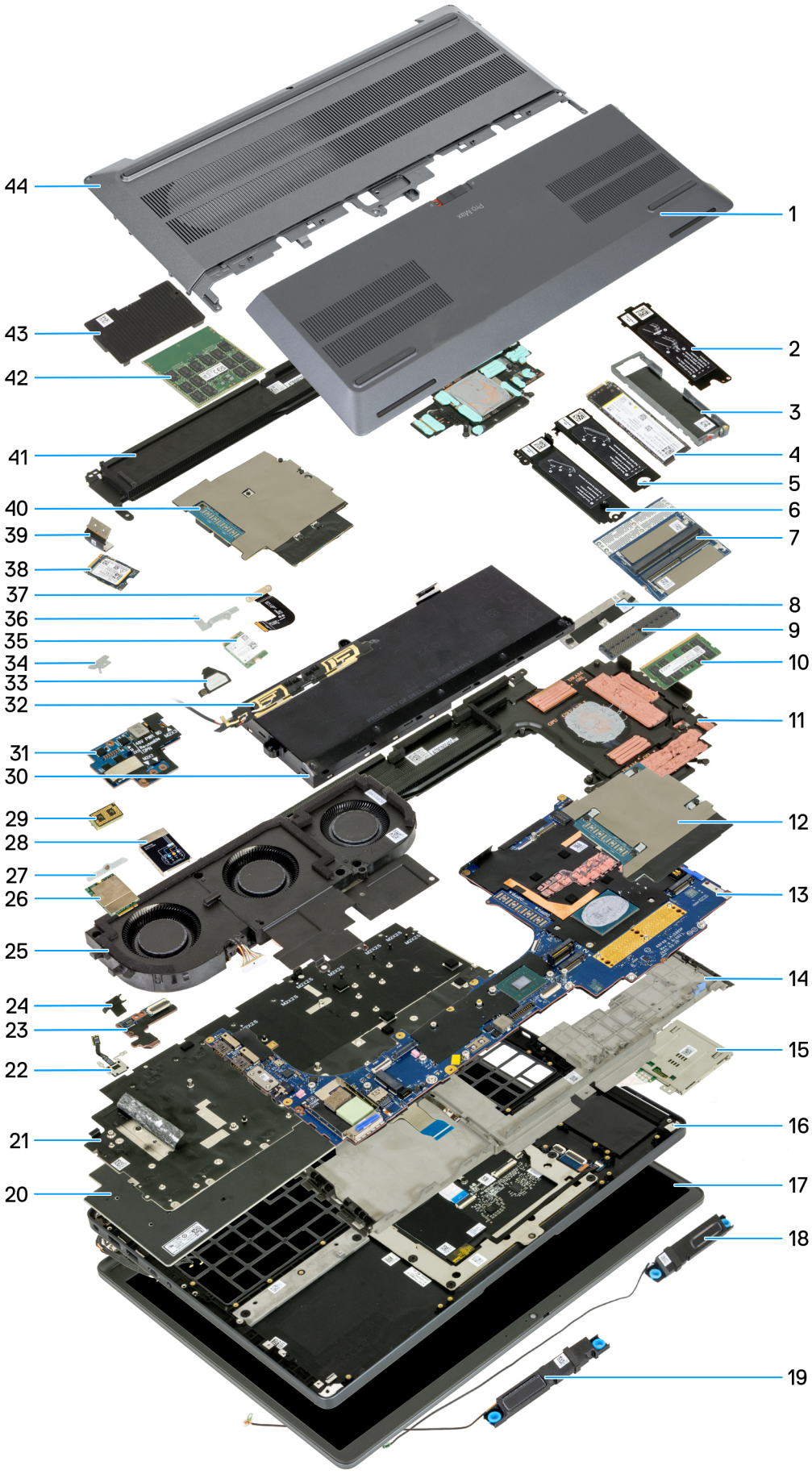


Figure 9. Major components of Dell Pro Max 16 Plus MB16250

1. Sliding door (optional)
2. SSD1 thermal shield
3. SSD holder
4. M.2 2280 SSD
5. SSD3 thermal shield
6. SSD2 thermal shield
7. Memory interposer board
8. Memory interposer board bracket
9. Memory connector
10. Memory module
11. Heat sink for computers shipped with discrete graphics
12. GPU card

NOTE: Applicable for computers shipped with GPU card.

13. System board
14. Inner frame
15. Smart card reader
16. Palm-rest assembly
17. Display assembly
18. Left speaker
19. Right speaker
20. Keyboard
21. Keyboard bracket
22. Power button
23. Power button board
24. Fingerprint reader cable bracket
25. Fan assembly
26. WWAN card
27. WWAN-card bracket
28. WWAN card shielding cover
29. Interposer board
30. Battery
31. Power board
32. WLAN antenna module
33. Display-cable bracket
34. Darwin bracket
35. WLAN card
36. WLAN bracket
37. USH board cable
38. M.2 2230 SSD
39. Base cover for computers with sliding door
40. NPU card

NOTE: Applicable for computers shipped with NPU card.

41. Heat sink for computers shipped with NPU card
42. CAMM module

NOTE: Applicable for computers shipped with a dual-channel CAMM module.

43. CAMM memory heat sink
44. Base cover for computers shipped with sliding door

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

Customer Replaceable Units (CRUs) and Field Replaceable Units (FRUs) list

The replaceable components in your Dell Pro Max 16 Plus MB16250 are either Customer Replaceable Units (CRUs) or Field Replaceable Units (FRUs).

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

Table 38. CRU and FRU list

Customer Replaceable Unit (CRU)	Field Replaceable Unit (FRU)
SD card	GPU card **NOTE:** Applicable for computers shipped with GPU card.
Sliding door	GPU power cable **NOTE:** Applicable for computers shipped with GPU card.
Base cover	NPU card **NOTE:** Applicable for computers shipped with NPU card.
Memory module	NPU power cable **NOTE:** Applicable for computers shipped with NPU card.
M.2 2230 solid state drive	Fan
M.2 2280 solid state drive	CAMM module
Battery	Fan assembly
WLAN card	Display assembly
SIM card	Memory interposer board
WWAN card	Power daughter board
	Heat sink
	Discrete GPU cable
	Display bezel
	Display panel
	WLAN antenna module
	Display hinges
	Camera module
	Display cable
	Display back cover
	Inner frame
	Speakers
	System board
	Left USB Type-C connector module
	Right USB Type-C connector module
	USH board
	Keyboard

Table 38. CRU and FRU list (continued)

Customer Replaceable Unit (CRU)	Field Replaceable Unit (FRU)
	Smart card reader
	Power button daughter board
	Power button daughter board with fingerprint reader
	Power button
	Palm-rest assembly

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.

SD card

Removing the SD card

Prerequisites

Follow the procedure in Before working inside your computer.

Steps

1. Push the SD card to release it from the computer.
2. Slide the SD card out of the computer.

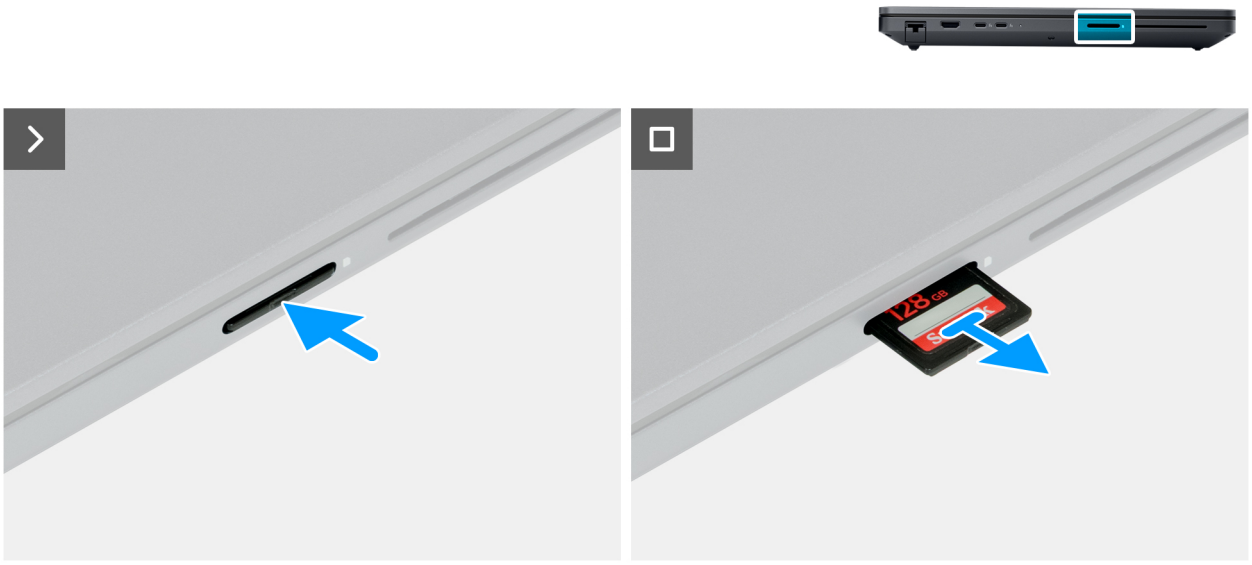


Figure 10. Removing the SD card

Installing the SD card

Steps

1. Align the SD card with its slot on the computer.
2. Slide the SD card into the slot until it clicks into place.

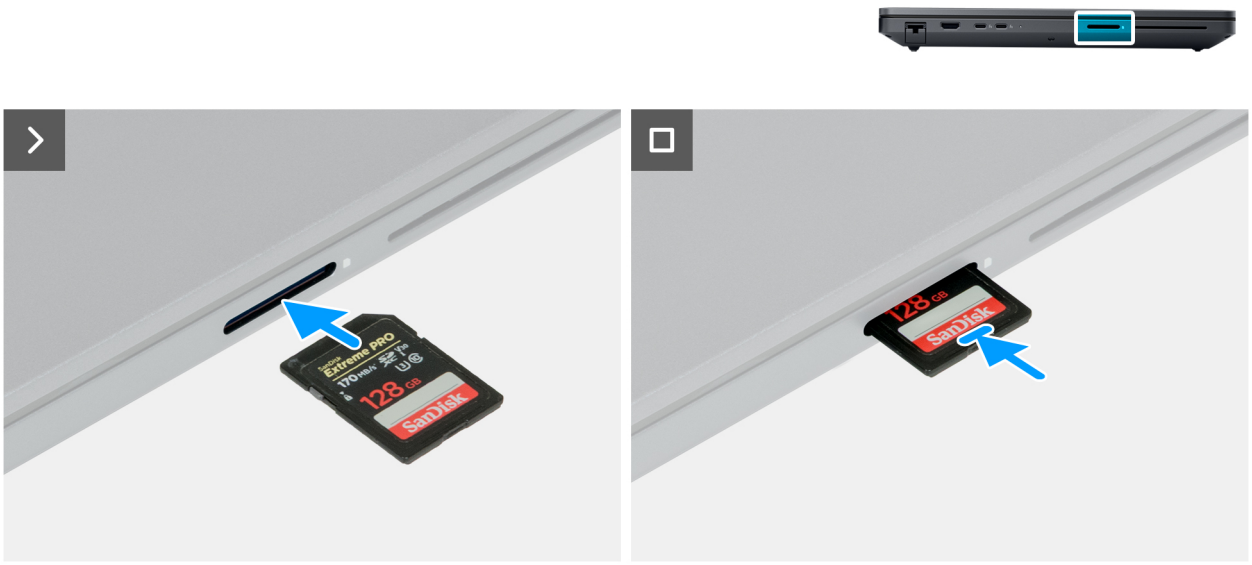


Figure 11. Installing the SD card

Next steps

Follow the procedures in After working inside your computer.

Sliding door

Removing the sliding door

NOTE: The removal procedure is applicable only on computers that are shipped with sliding door.

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 the computer does not turn on, does not enter Service Mode, or does not support Service mode, disconnect the battery cable.

2. Install the SD card.

About this task

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

1x
M2x4

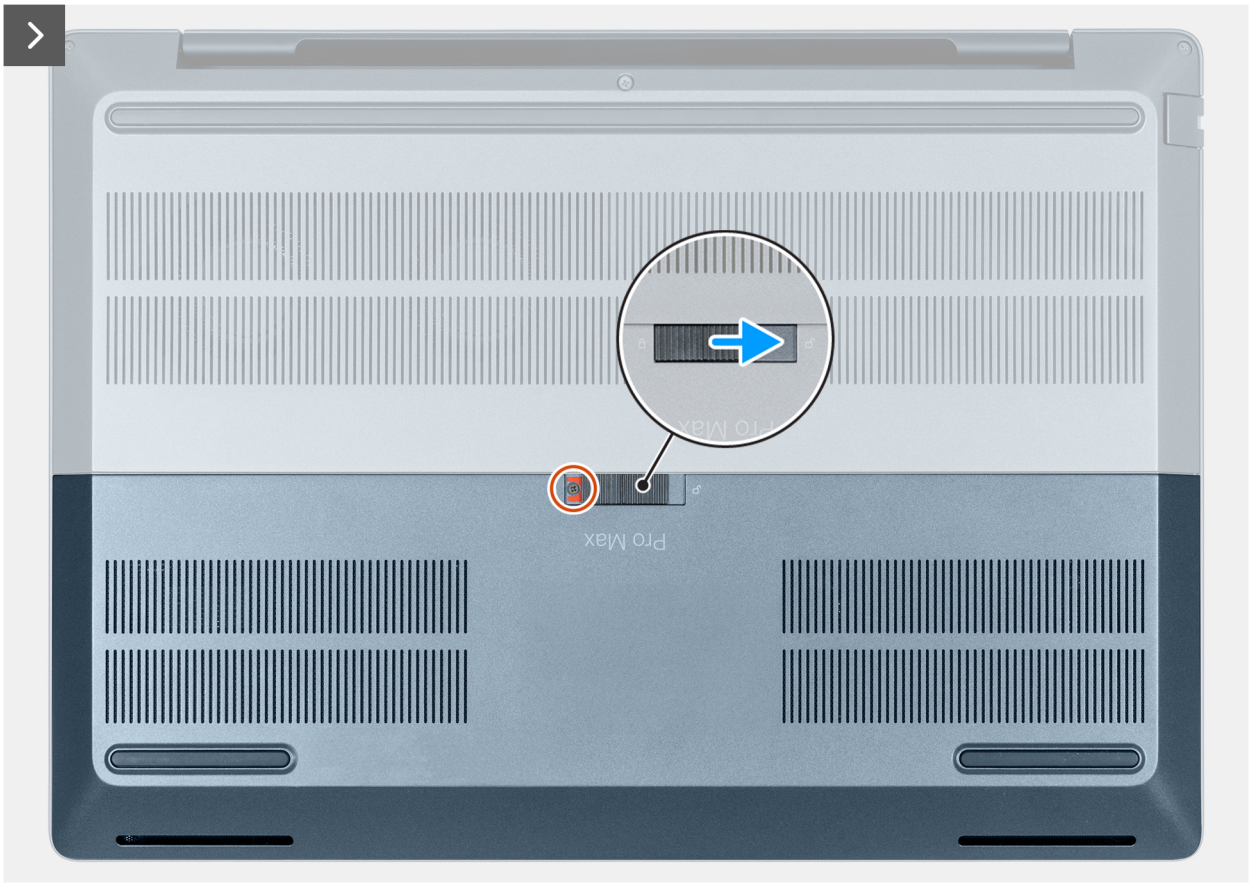


Figure 12. Sliding the door lock to the prelock position and removing the screw

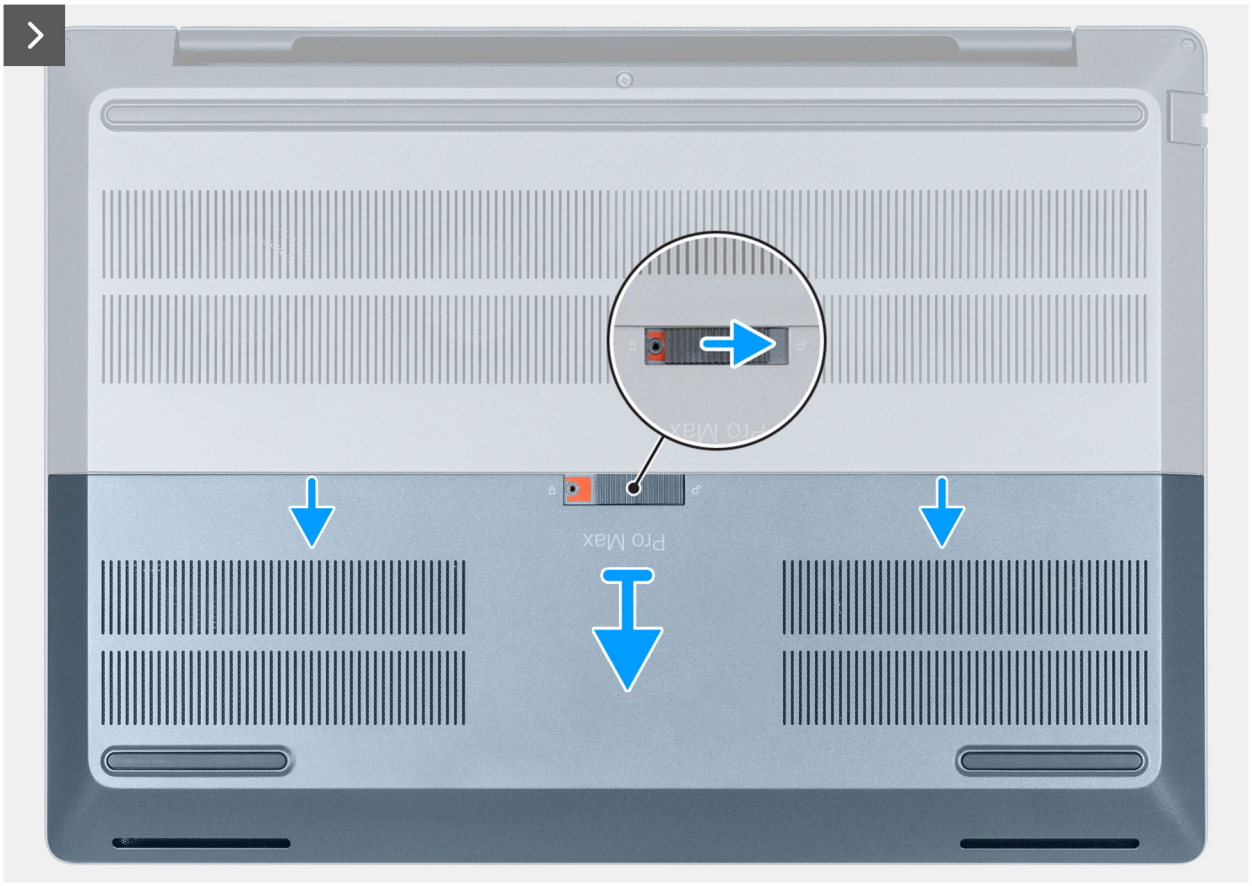


Figure 13. Sliding the door lock to the unlock position and removing the sliding door

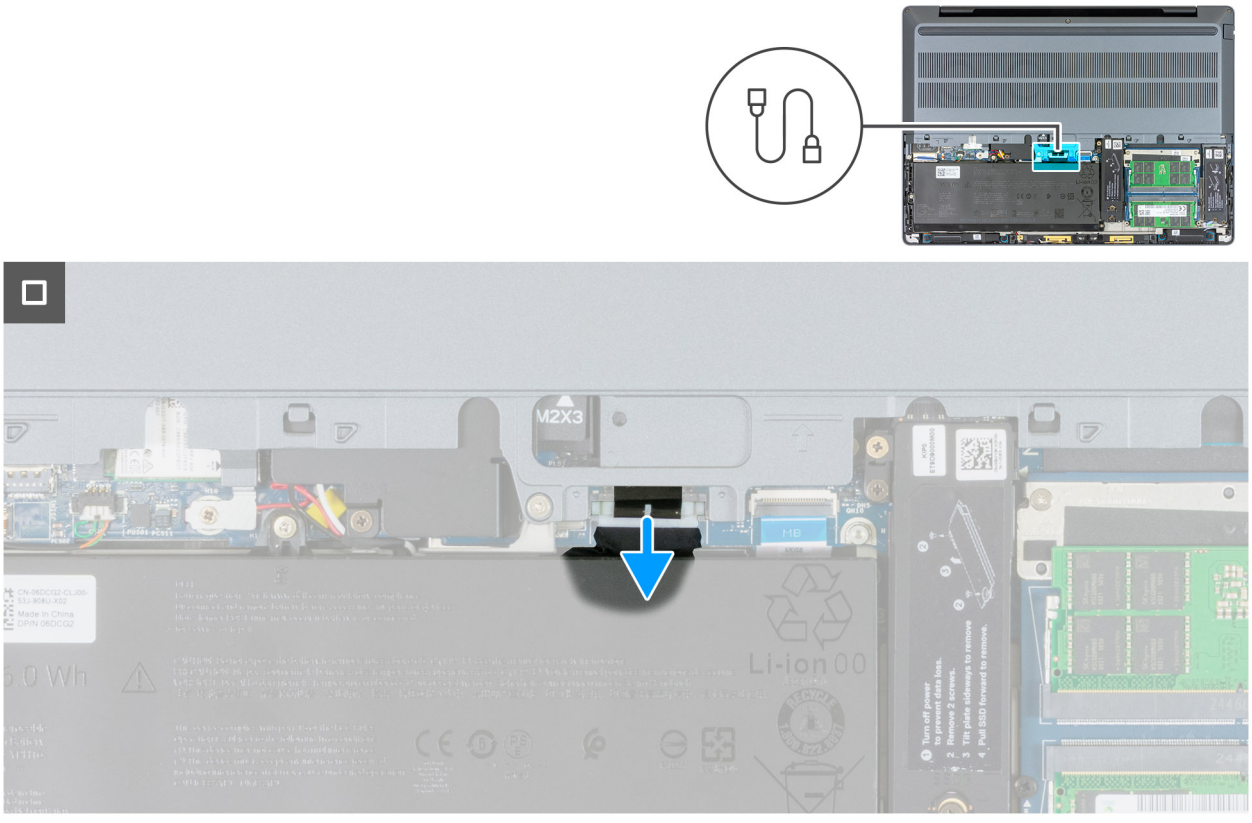


Figure 14. Disconnecting the battery cable

Steps

1. Slide the door lock to the prelock position.

   NOTE: The prelock position is the position where the center ridge of the lock is at the middle of the lock compartment.

2. Remove the screw (M2x4) in the door lock compartment.
3. Slide the door lock to the unlock position.

   NOTE: The unlock position is the position where the lock is fully to the right of the compartment.

4. Push the sliding door down to release it from the computer.
5. Remove the sliding door from the computer.
6. Disconnect the battery cable from the system board.

   NOTE: Ensure that your computer is in Service Mode. If your computer is unable to enter Service Mode, disconnect the battery cable from the battery cable connector (PBATT1) on the system board.

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

Installing the sliding door

NOTE: The installation procedure is applicable only on computers that are shipped with sliding door.

About this task

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

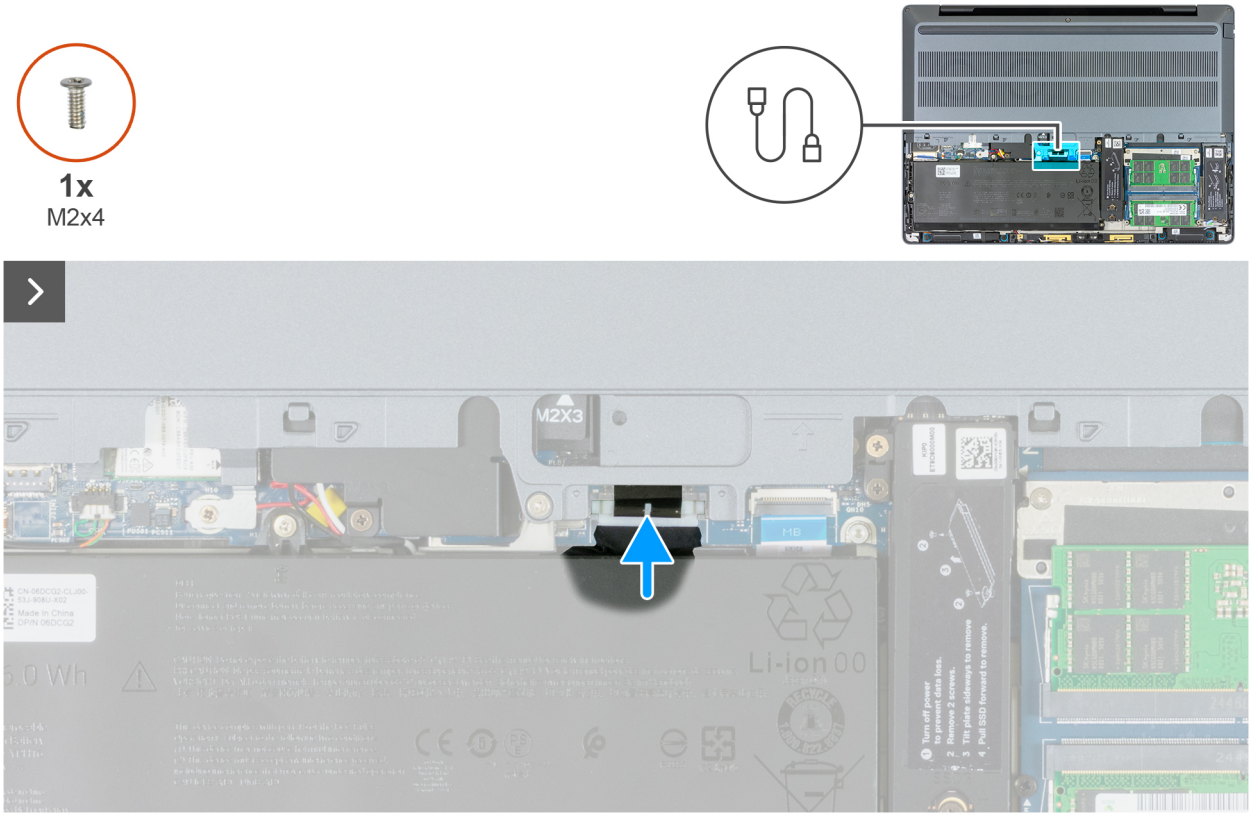


Figure 15. Connecting the battery cable

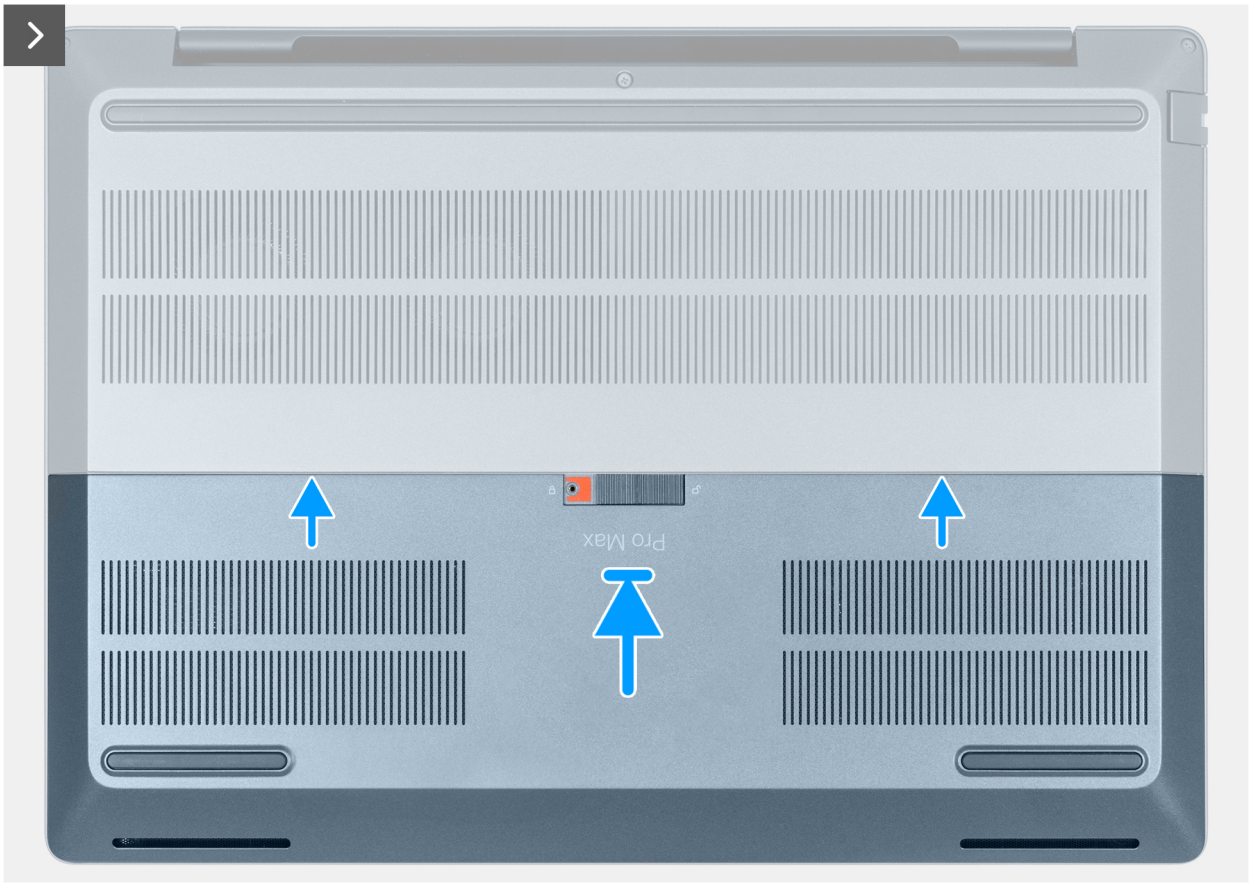


Figure 16. Push the sliding door towards the computer

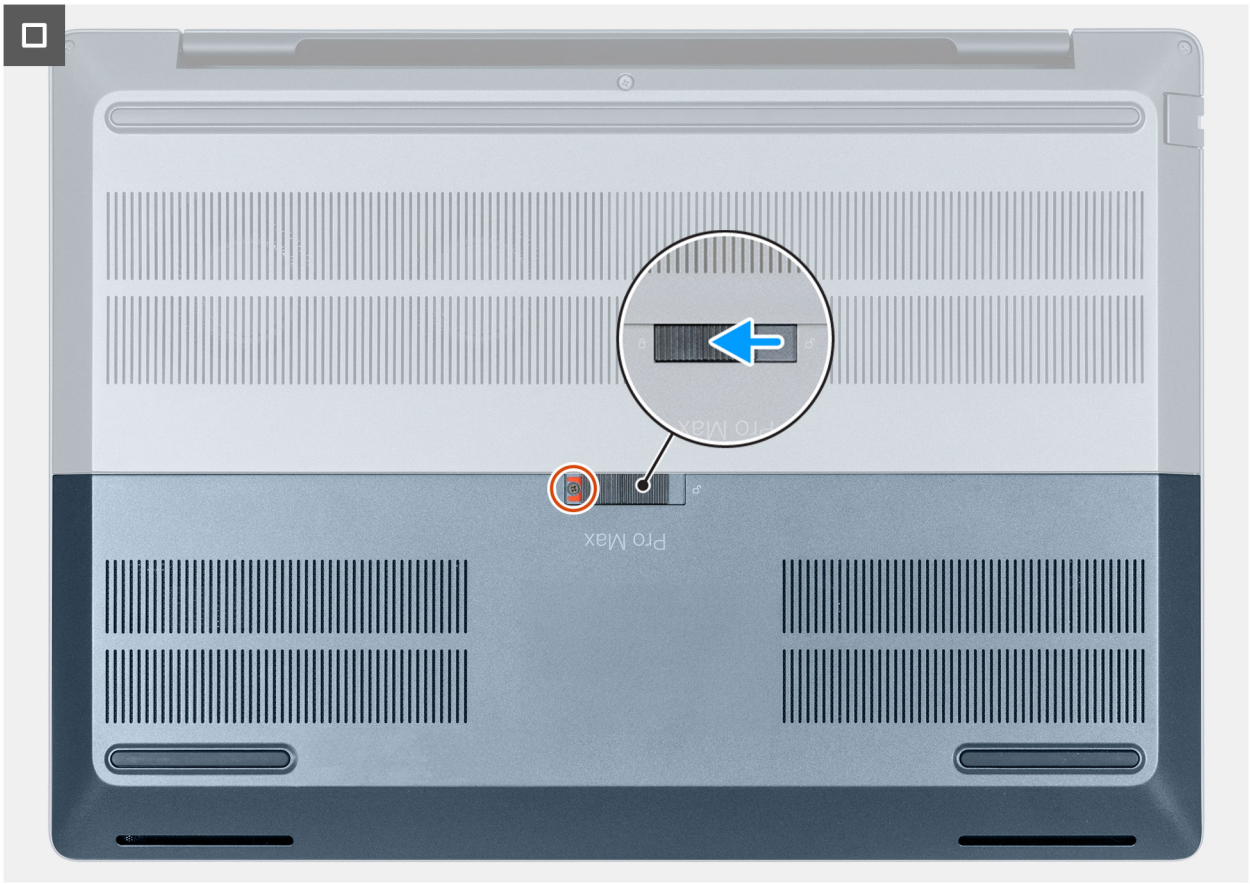


Figure 17. Replacing the screw and sliding the door lock to the lock position

Steps

1. Connect the battery cable to the system board.
2. Replace the sliding door on the computer.
3. Push the sliding door up towards the computer.
4. Slide the door lock to the lock position.

   NOTE: The lock position is the position where the lock is fully to the left of the compartment.

5. Replace the screw (M2x4) in the door lock compartment.
6. Slide the door lock to the lock position.

   NOTE: The lock position is the position where the center ridge of the lock is at the middle of the lock compartment.

Next steps

1. Replace the SD card.
2. Follow the procedures in After working inside your computer.

Base cover

Removing the base cover - for computers shipped with a sliding door

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.

2. Remove the SD card.
3. Remove the sliding door.

About this task

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

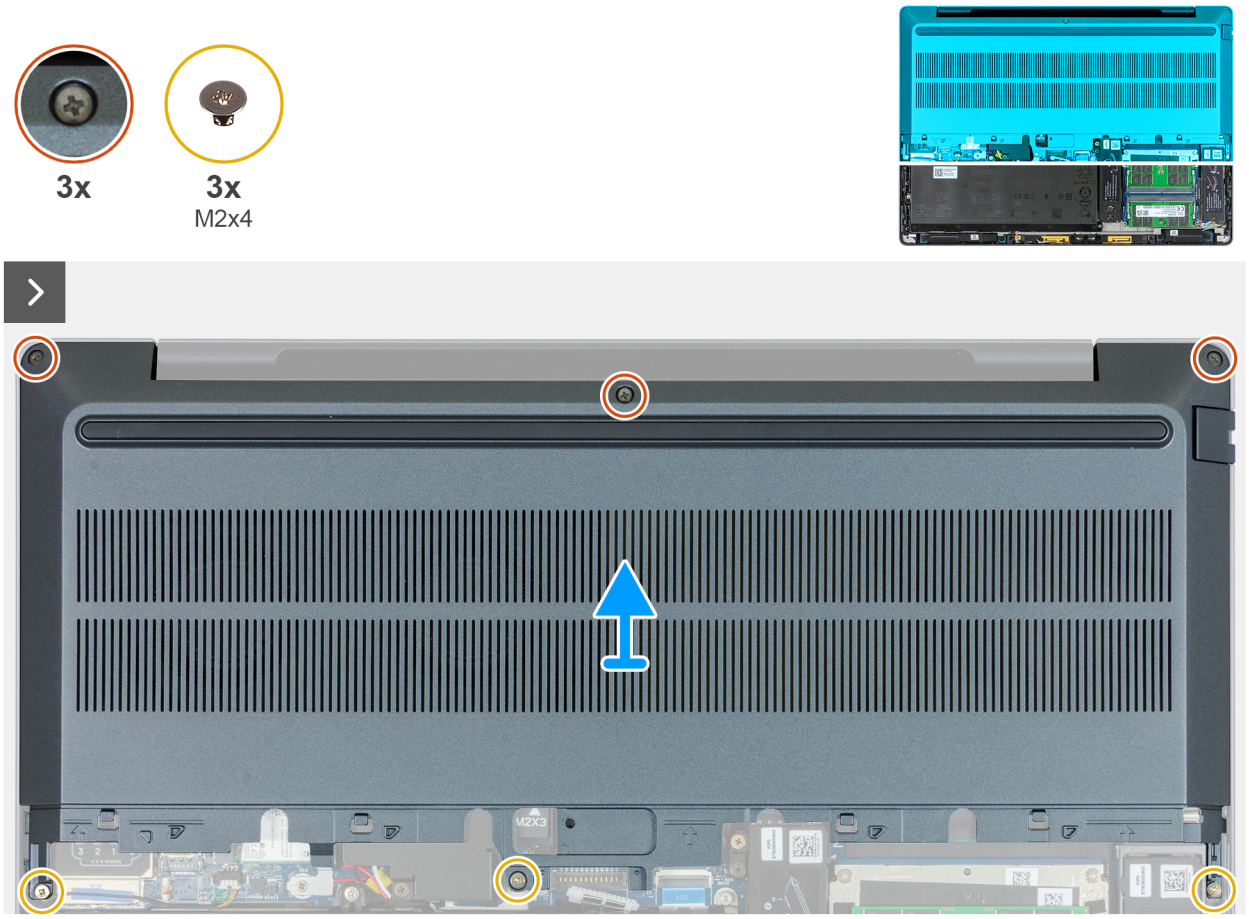


Figure 18. Loosening the three captive screws and removing the three screws

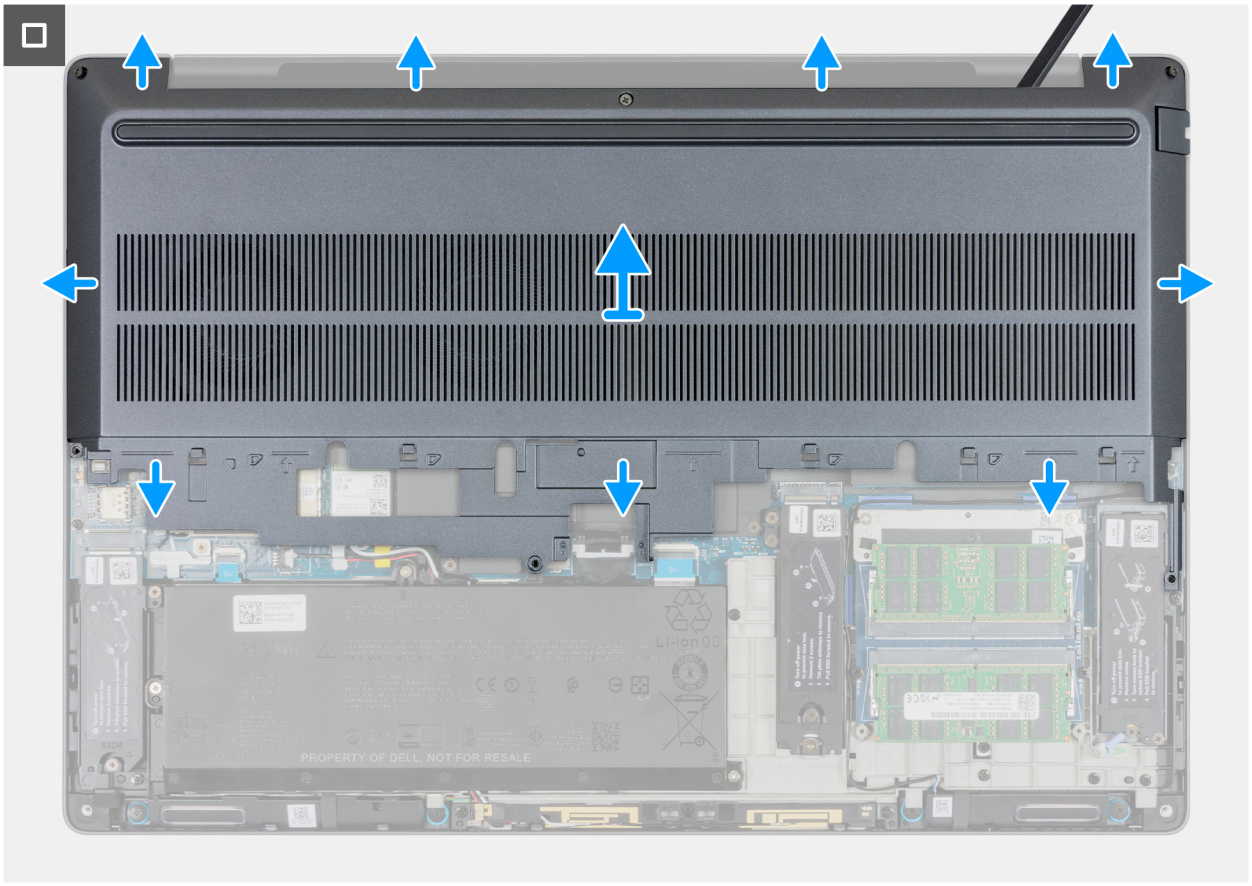


Figure 19. Lifting the base cover off the palm-rest and keyboard assembly

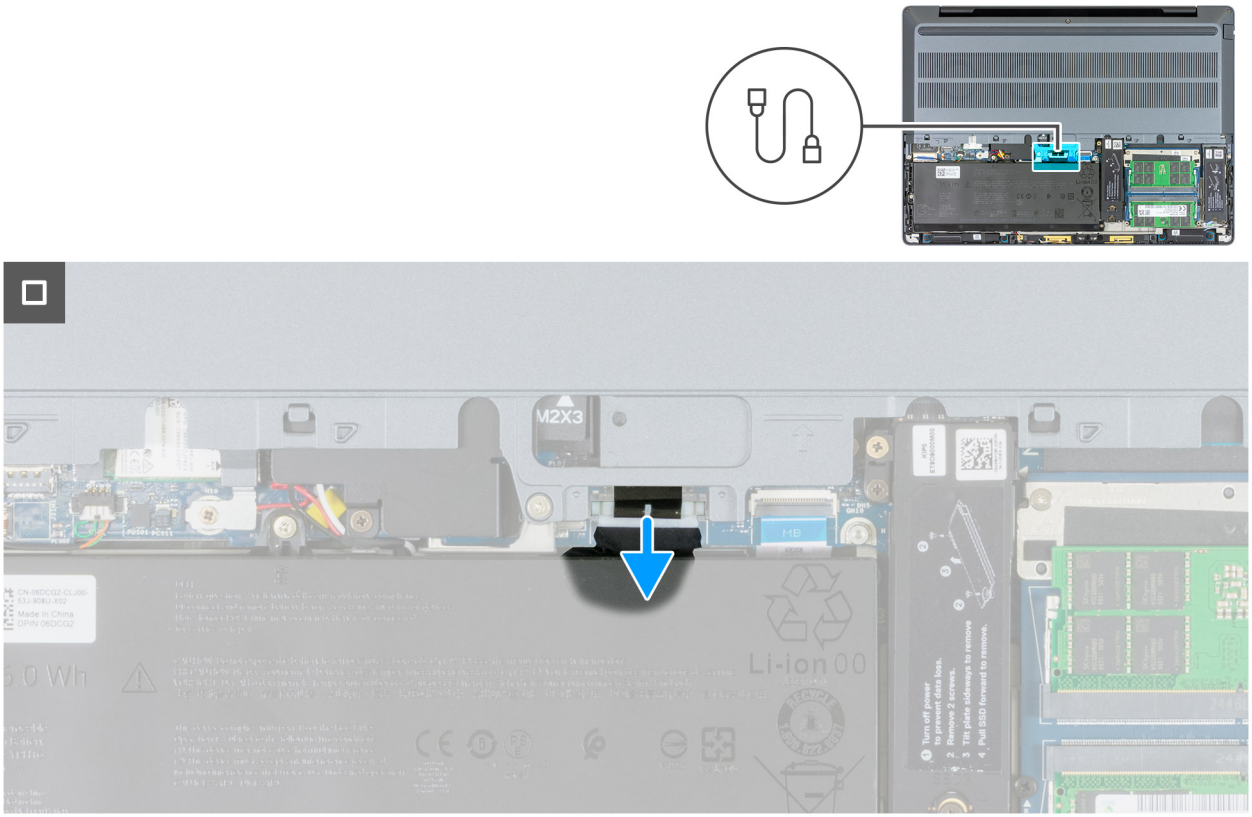


Figure 20. Disconnecting the battery cable

Steps

1. Loosen the three captive screws that secure the base cover to the palm-rest and keyboard assembly.
2. Remove the three screws (M2x4) that secure the base cover to the palm-rest and keyboard assembly.
3. Using your hands, pry open the base cover from the recesses at the top edge of the base cover.
4. Lift the base cover off the palm-rest and keyboard assembly.

   NOTE: Ensure that your computer is in Service Mode. If your computer is unable to enter Service Mode, disconnect the battery cable from the battery cable connector (PBATT1) on the system board.

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

Installing the base cover - for computers shipped with a sliding door

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.

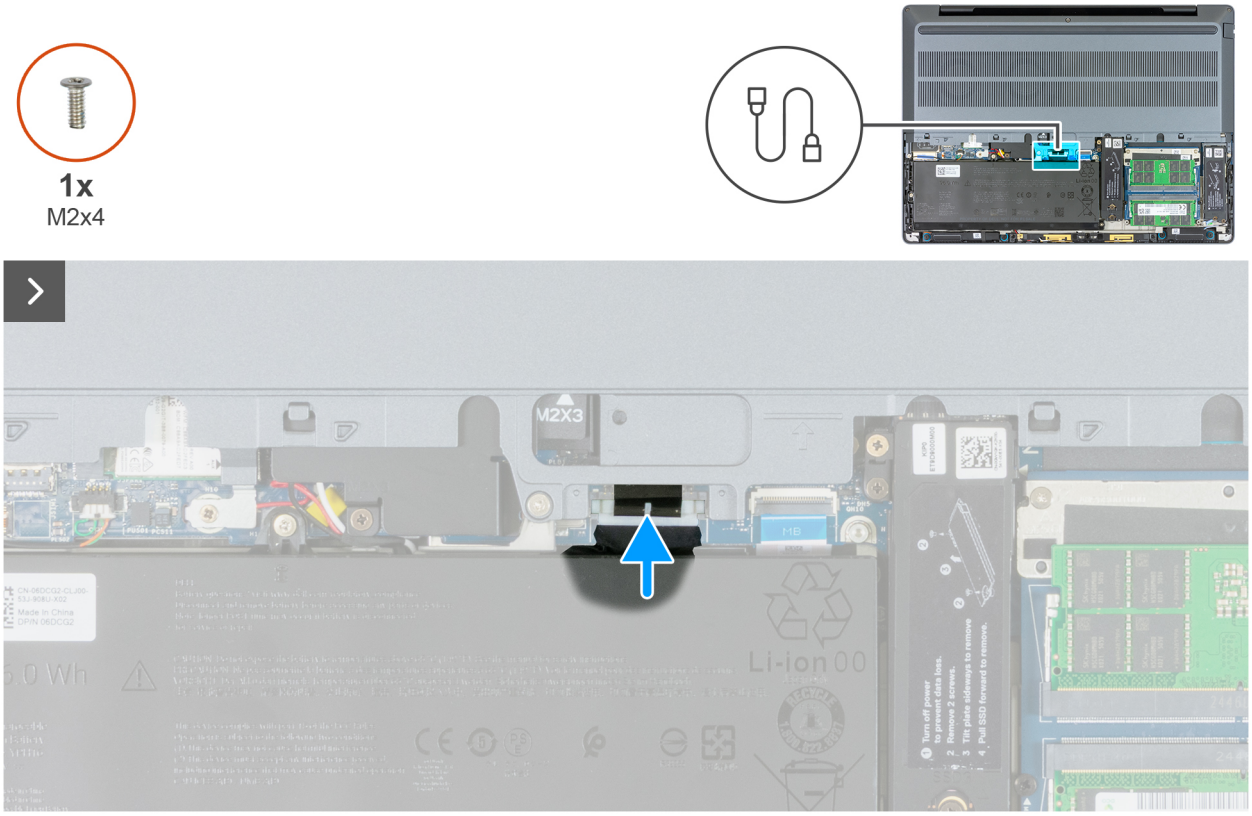


Figure 21. Connecting the battery cable

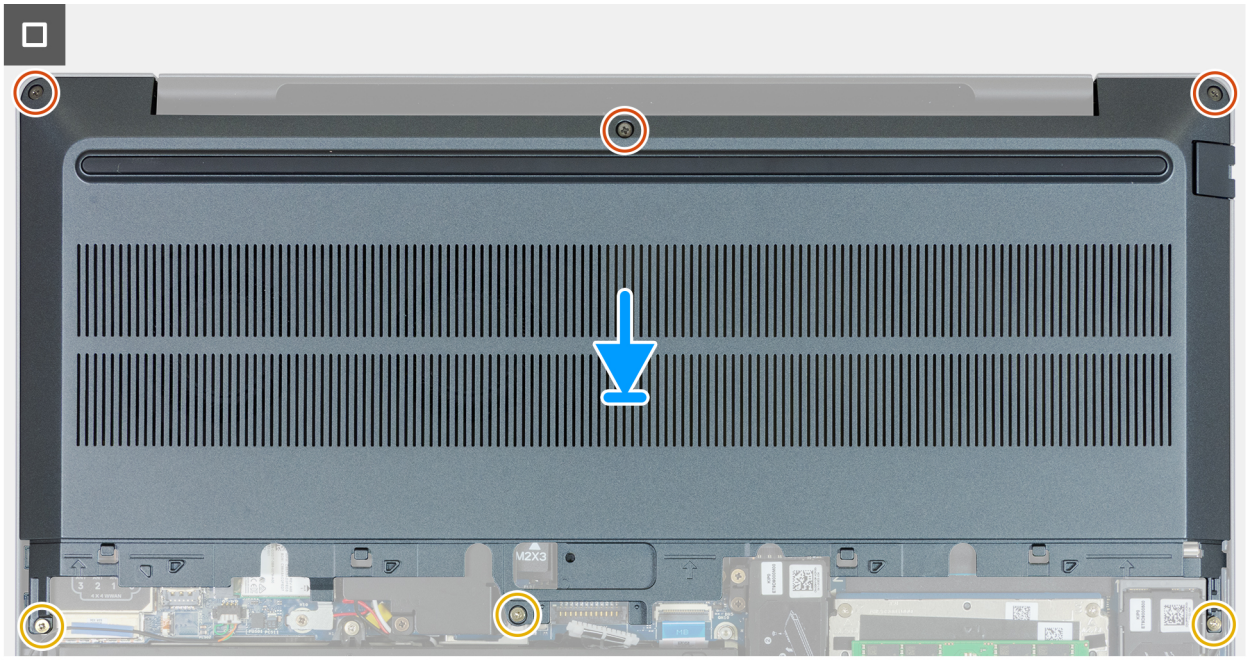


Figure 22. Aligning the screw holes on base cover with screw holes on palm-rest and keyboard assembly and replacing the screws

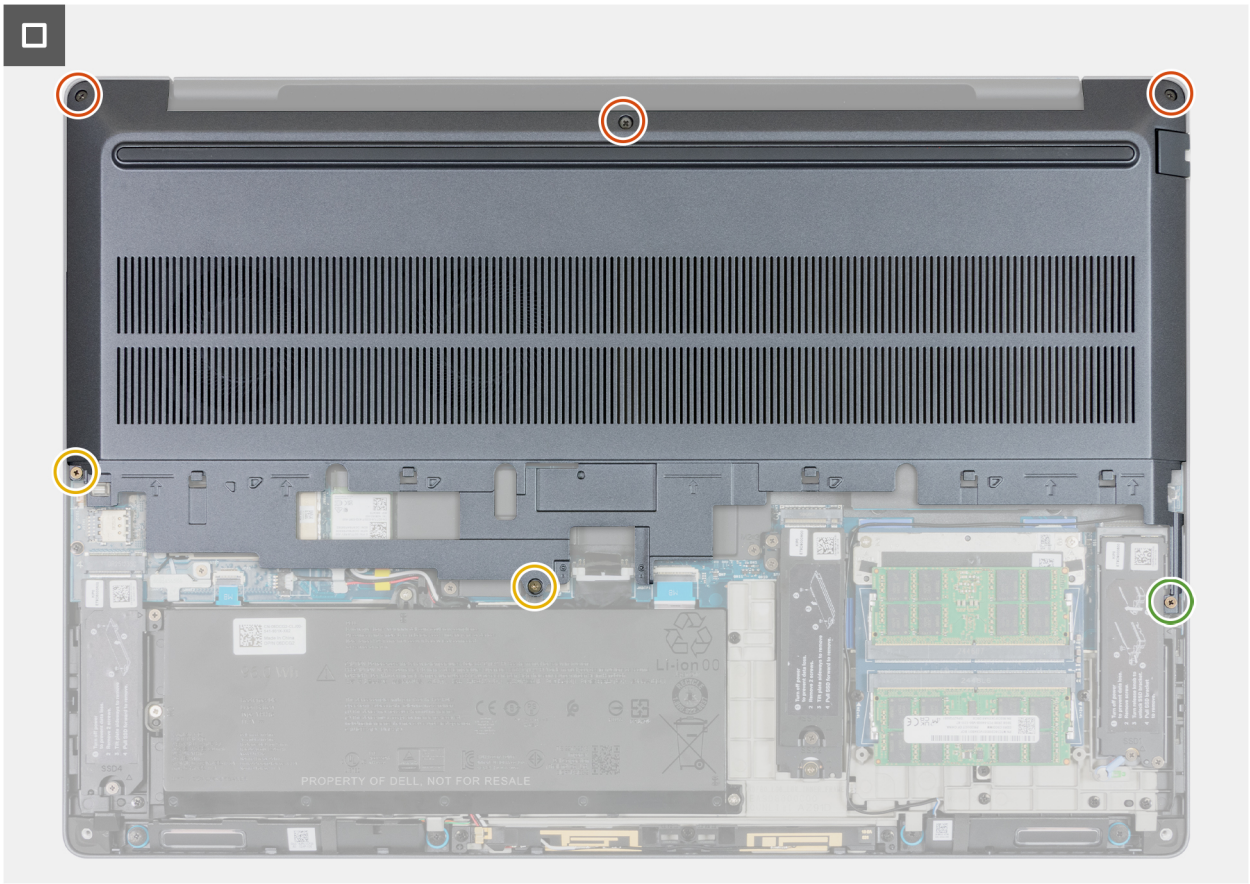


Figure 23. Tightening the three captive screws and replacing the three screws

NOTE: If you have disconnected the battery cable, ensure to connect the battery cable to the battery cable connector (PBATT1) on the system board.

Steps

1. Align the screw holes on the base cover with the screw holes on the palm-rest and keyboard assembly and snap the base cover to the palm-rest and keyboard assembly.
2. Tighten the three captive screws that secure the base cover to the palm-rest and keyboard assembly.
3. Replace the three screws (M2x4) that secure the base cover to the palm-rest and keyboard assembly.

Next steps

1. Install the sliding door.
2. Install the SD card.
3. Follow the procedure in After working inside your computer.

Removing the base cover - for computers shipped with a full 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 the computer does not turn on, does not enter Service Mode, or does not support Service mode, disconnect the battery cable.

2. Remove the SD card.

About this task

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

Figure 24. Loosening the captive screws

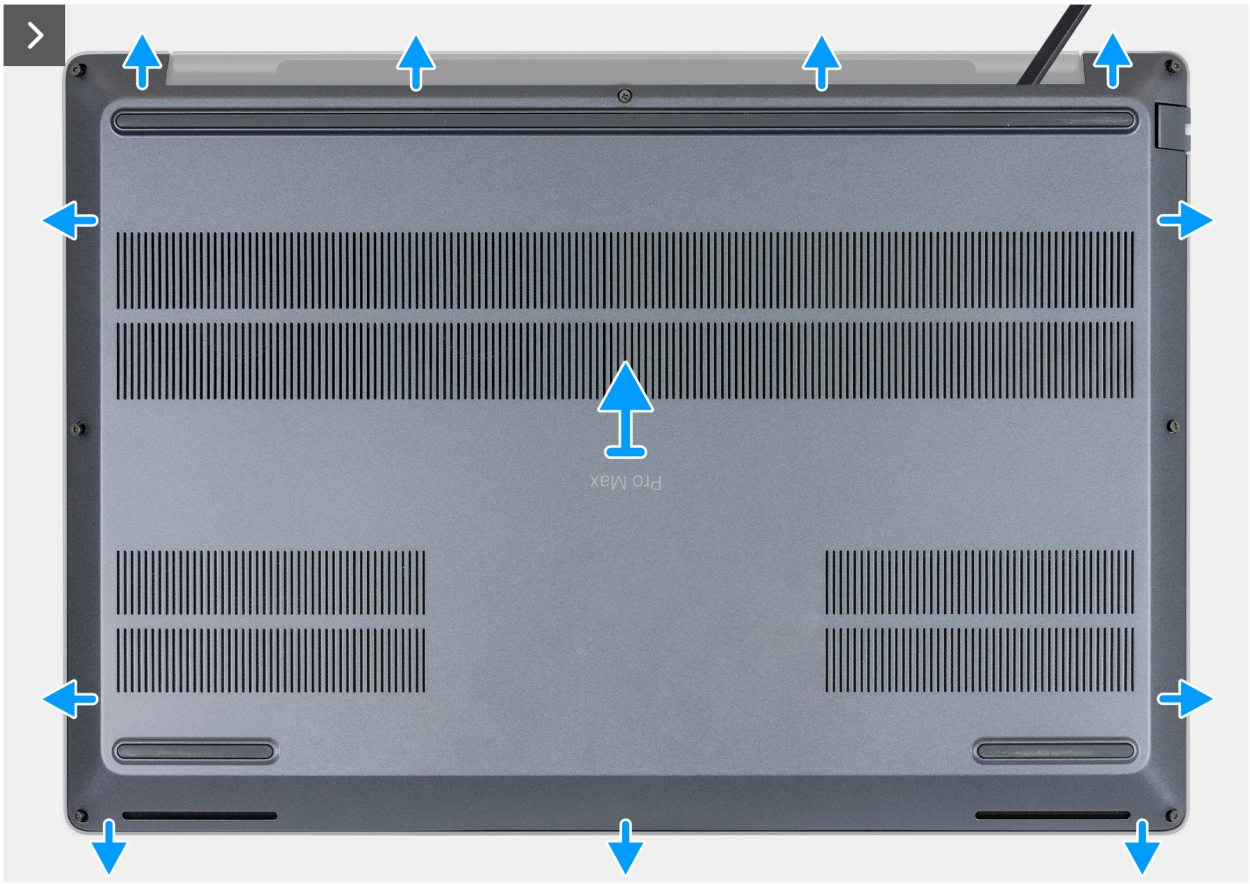


Figure 25. Prying the base cover from the recesses at the top edge of the base cover

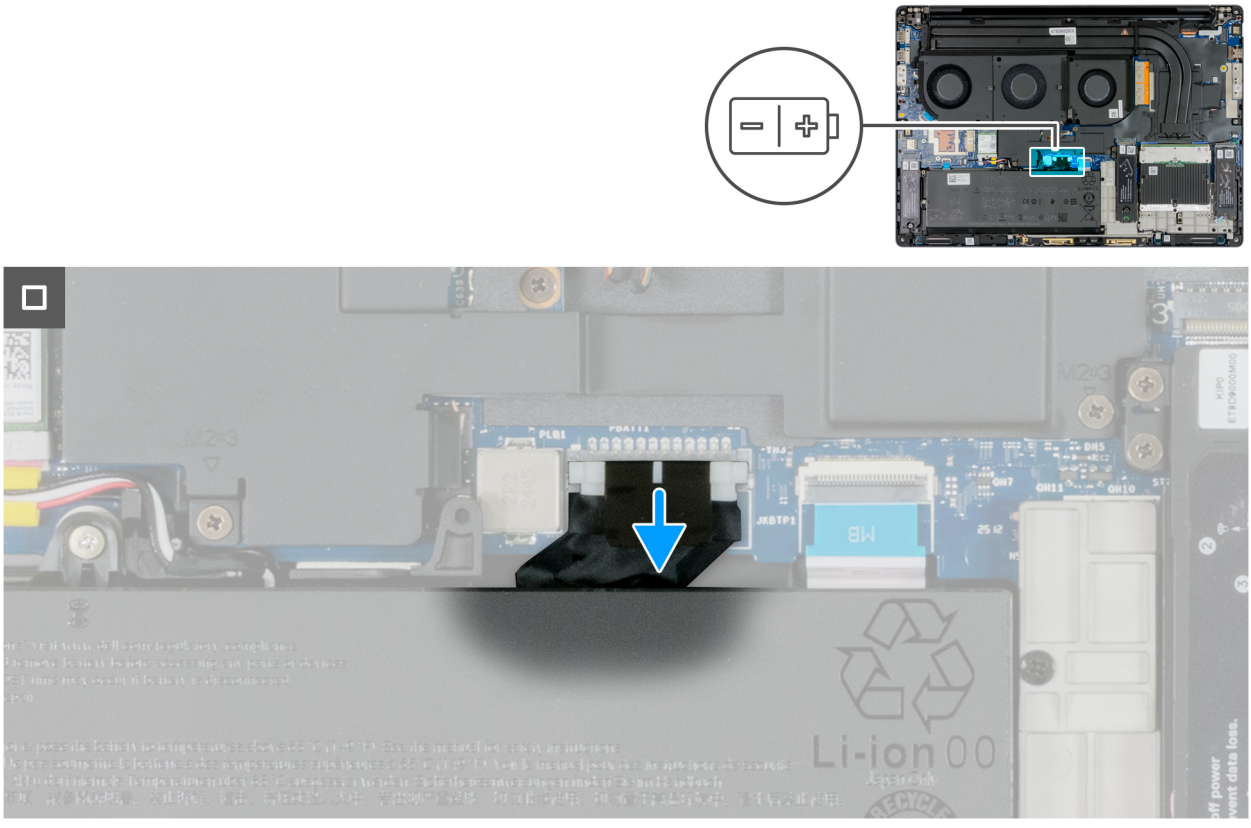


Figure 26. Disconnecting the battery cable

Steps

1. Loosen the seven captive screws that secure the base cover to the palm-rest and keyboard assembly.
2. Using a plastic scribe, pry open the base cover from the recesses at the top edge of the base cover.
3. Lift the base cover off the palm-rest and keyboard assembly.

   NOTE: Ensure that your computer is in Service Mode. If your computer is unable to enter Service Mode, disconnect the battery cable from the battery cable connector (PBATT1) on the system board.

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

Installing the base cover - for computers shipped with a full 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.

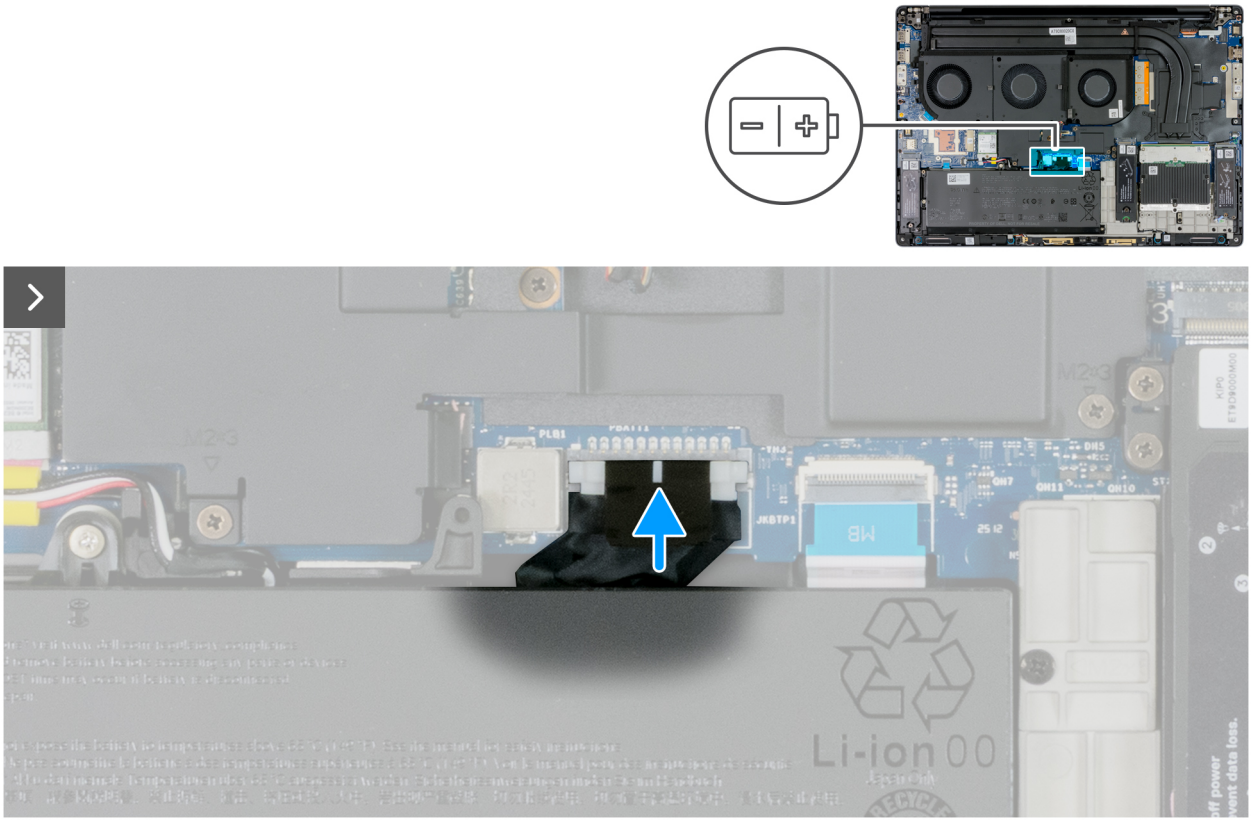


Figure 27. Connecting the battery cable

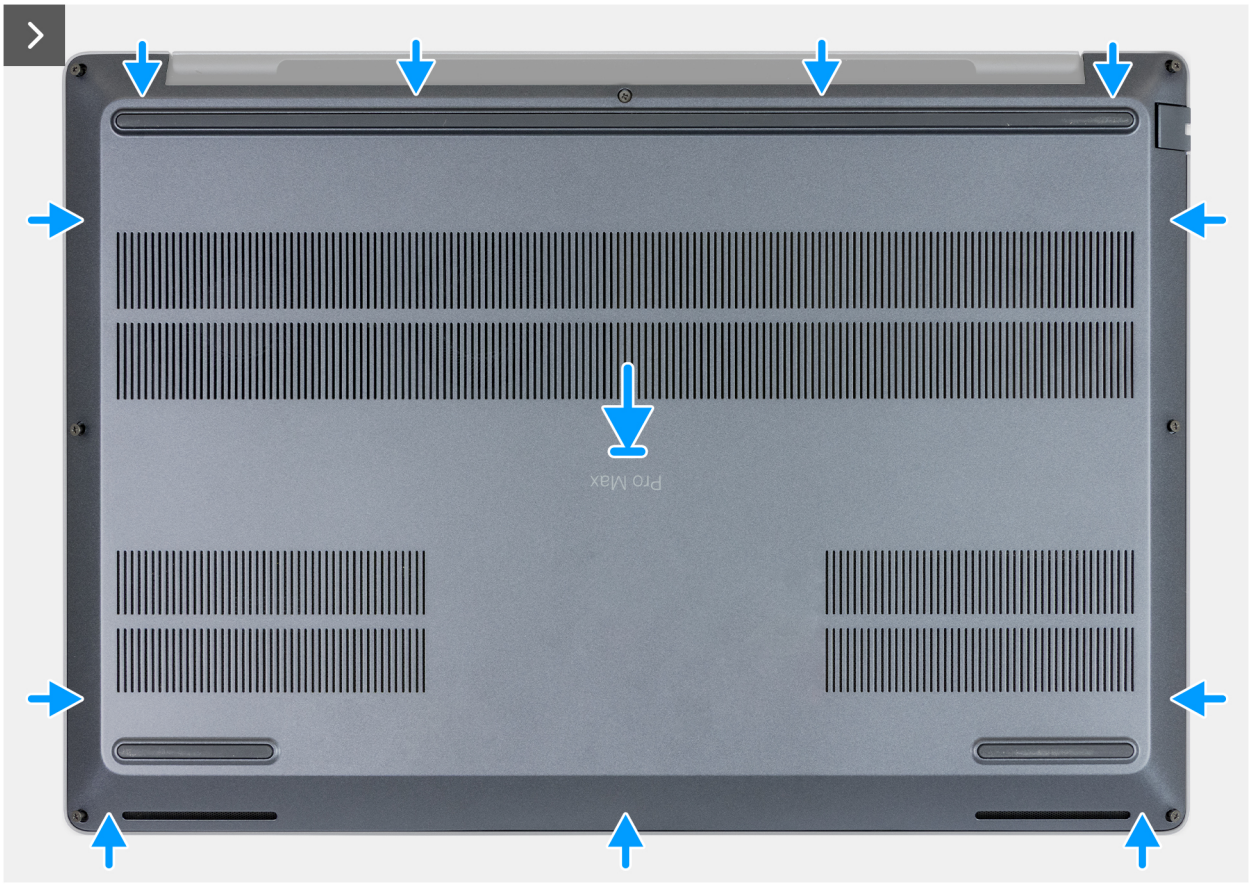


Figure 28. Installing the base cover

Figure 29. Tightening the captive screws

Steps

1. Connect the battery cable to the battery cable connector (PBATT1) on the system board.
2. Align the screw holes on the base cover with the screw holes on the palm-rest and keyboard assembly and snap the base cover into place.
3. Tighten the seven captive screws that secure the base cover to the palm-rest and keyboard assembly.

Next steps

1. Install the SD card.
2. 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 SD card.
3. Remove the sliding door or full base cover, as applicable.

About this task

NOTE: Applicable for computers shipped with a SoDIMM configuration.

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

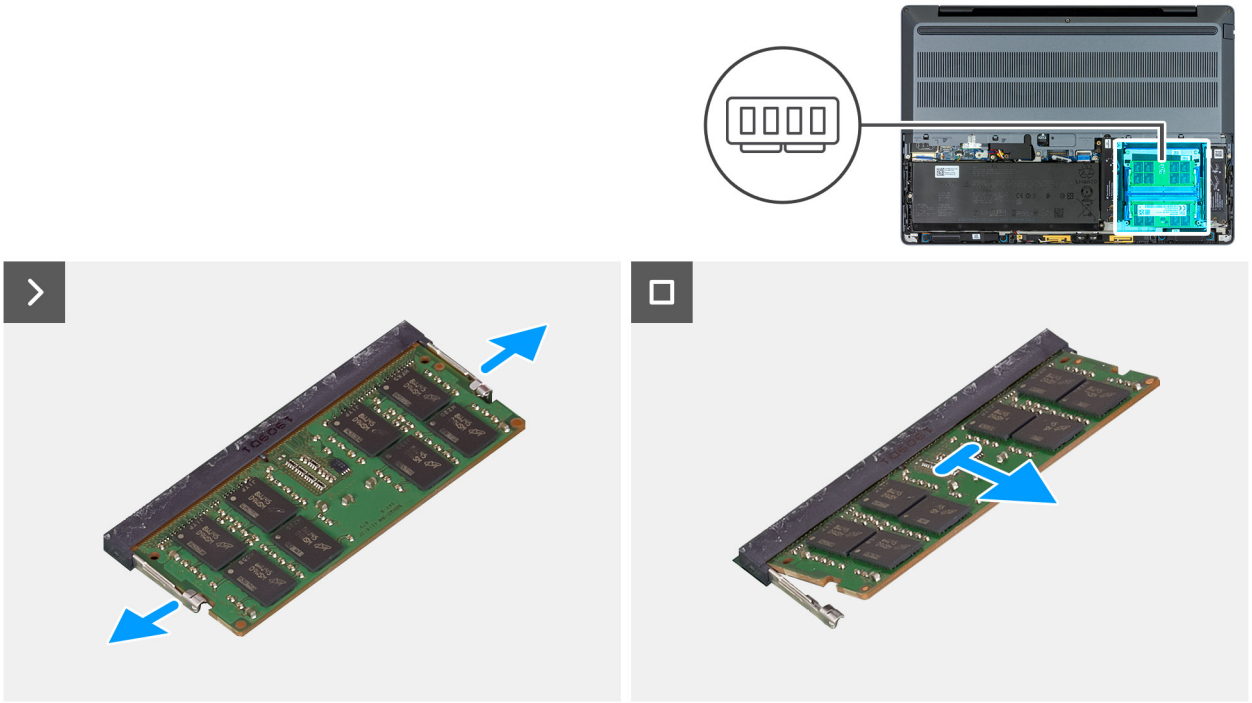


Figure 30. Removing the memory module

Steps

1. Pry the securing clips from both sides of the memory module until the memory module pops up.
2. Remove the memory module from the memory-module slot.

NOTE: Repeat step 1 to step 2 to remove any additional memory module installed in 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

NOTE: Applicable for computers shipped with a SoDIMM configuration.

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

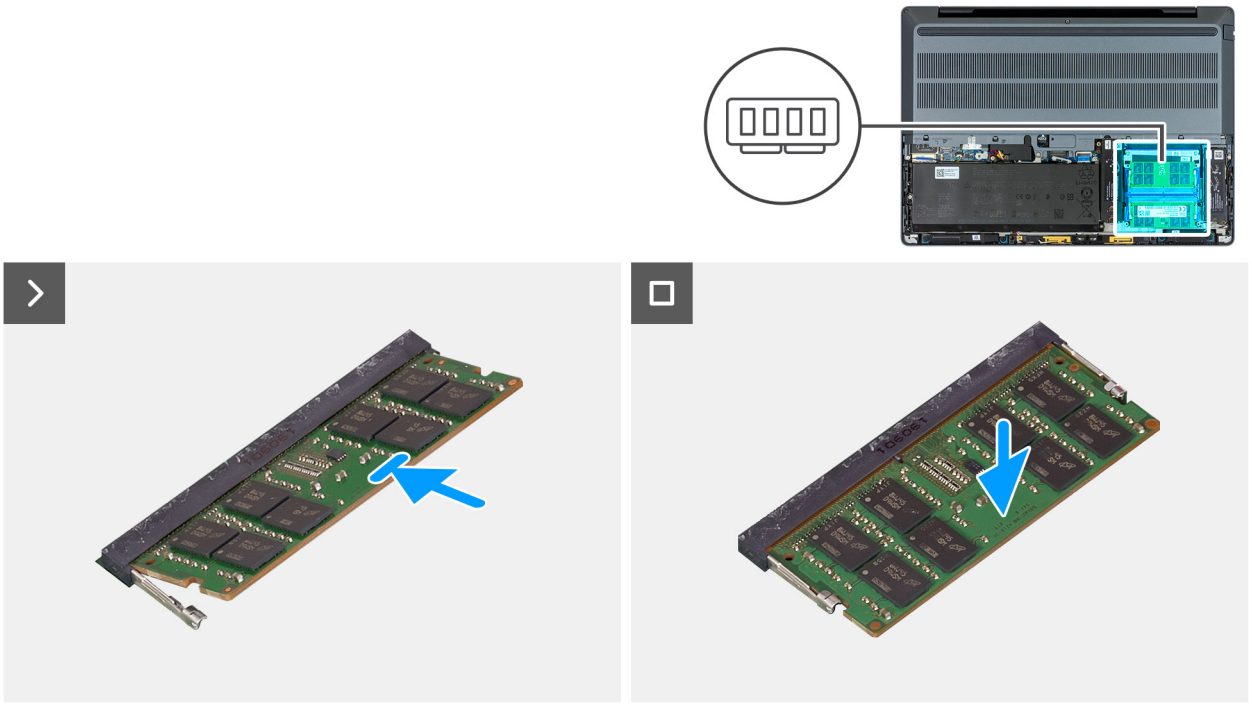


Figure 31. Installing the memory module

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.

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.

NOTE: Repeat step 1 to step 2 to install any additional memory module installed in your computer.

Next steps

1. Install the sliding door or full base cover, as applicable.
2. Install the SD card.
3. Follow the procedures in After working inside your computer.

Solid state drive (SSD)

Removing the M.2 2280 SSD from slot 1 (SSD1)

Prerequisites

NOTE: Applicable for computers shipped with M.2 2280 SSD in slot 1 (SSD1).

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

CAUTION: Solid state drives are fragile. Exercise care when handling the SSD.

CAUTION: To avoid data loss, do not remove the SSD while the computer is turned on or is in a sleep state.

2. Remove the SD card.
3. Remove the sliding door or full base cover, as applicable.

About this task

The following images indicate the location of the M.2 2280 SSD in slot 1 (SSD1) and provide a visual representation of the removal procedure.

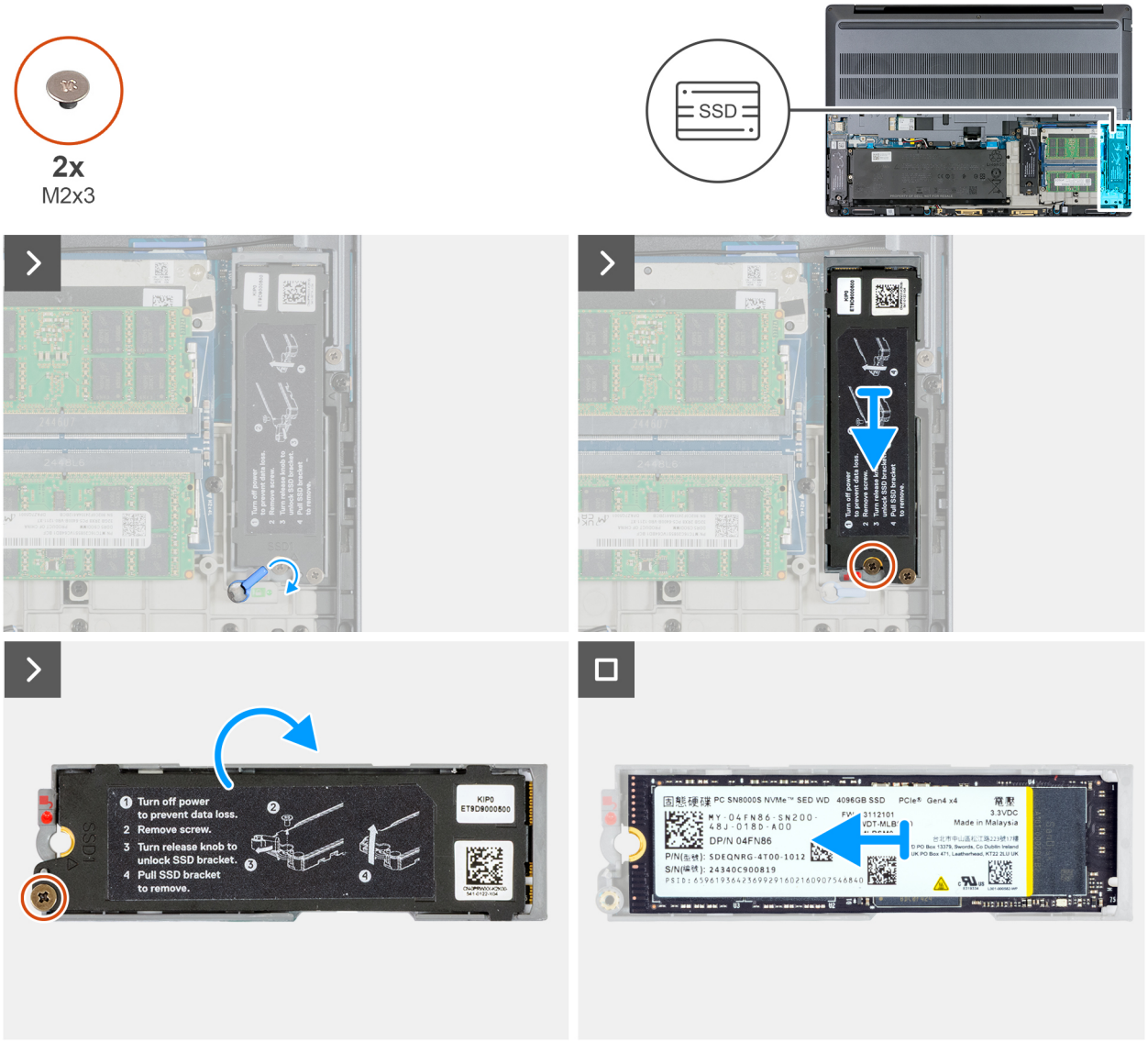


Figure 32. Removing the M.2 2280 SSD from slot 1 (SSD1)

Steps

1. Slide the SSD release latch to the unlock position.
2. Remove the screw (M2x3) that secures the SSD holder and inner frame.
3. Remove the screw (M2x3) that secures the SSD thermal shield to the SSD holder.
4. Remove the SSD thermal shield off the SSD holder.
5. Slide and lift the M.2 2280 SSD off the SSD slot1 (SSD1).

Installing the M.2 2280 SSD in slot 1 (SSD1)

Prerequisites

NOTE: Applicable for computers shipped with M.2 2280 SSD in slot 1 (SSD1).

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 M.2 2280 SSD in slot 1 (SSD1) and provide a visual representation of the installation procedure.

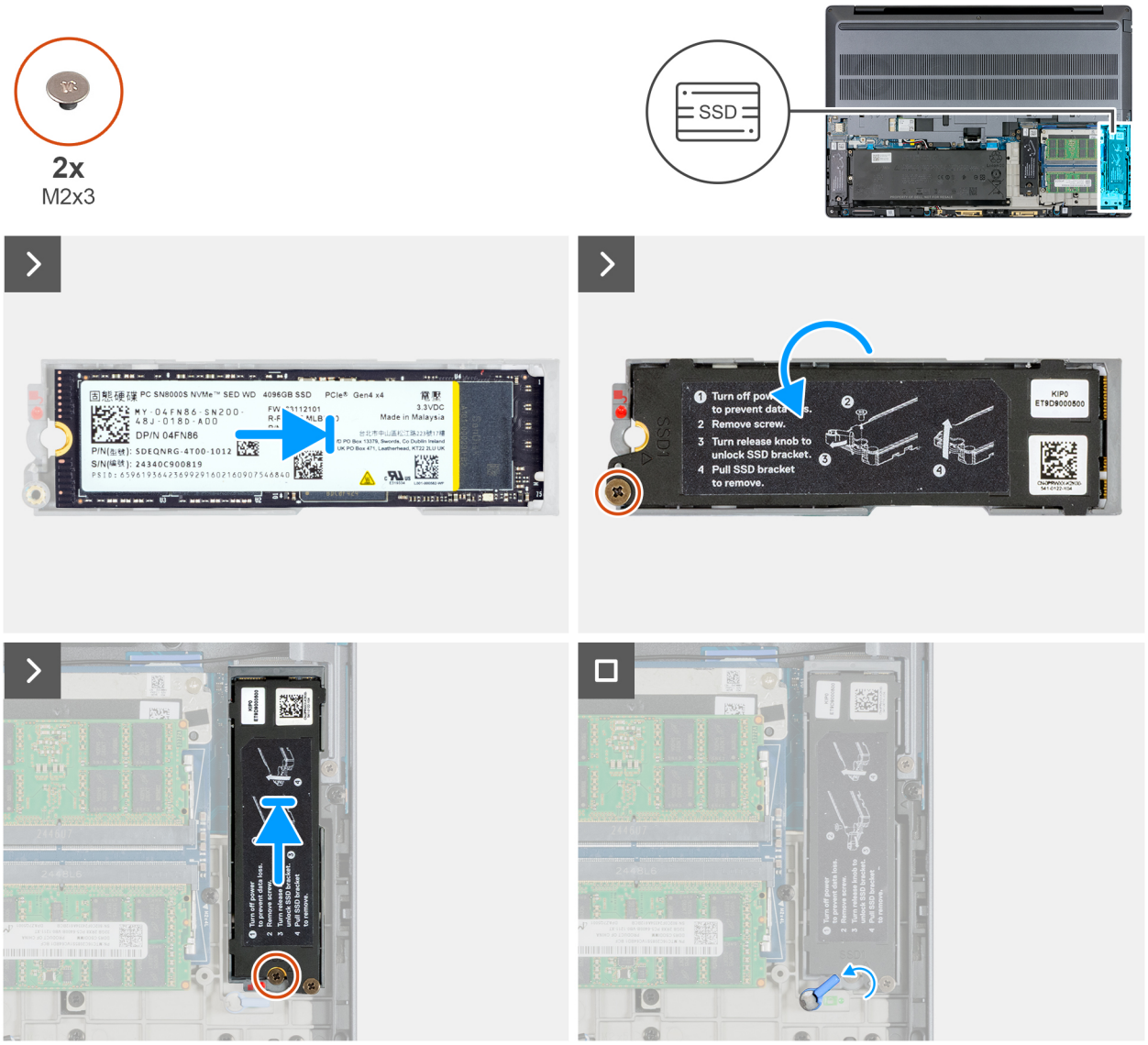


Figure 33. Installing the M.2 2280 SSD in slot 1 (SSD1)

Steps

1. Align the notch on the M.2 2280 SSD with the tab on the M.2 2280 SSD slot (SSD1).
2. Slide the M.2 2280 SSD into the M.2 2280 SSD slot (SSD1).
3. Using the alignment post, place the SSD thermal shield to the SSD holder.
4. Replace the screw (M2x3) that secures the SSD thermal shield to the SSD holder.
5. Replace the screw (M2x3) that secures the SSD holder and inner frame.

6. Slide the SSD release latch to the lock position.

NOTE: If you want to install a M.2 2230 SSD, follow the procedure in Installing the M.2 2230 SSD.

Next steps

1. Install the sliding door or full base cover, as applicable.
2. Install the SD card.
3. Follow the procedures in After working inside your computer.

Removing the M.2 2280 SSD from slot 3 (SSD3)

Prerequisites

NOTE: Applicable for computers shipped with M.2 2280 SSD in slot 3 (SSD3).

NOTE: For computers shipped without an M.2 SSD in slot 3, you can remove the SSD2 thermal shield with the SSD3 thermal shield that is attached to it.

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

CAUTION: Solid state drives are fragile. Exercise care when handling the SSD.

CAUTION: To avoid data loss, do not remove the SSD while the computer is turned on or is in a sleep state.

2. Remove the SD card.
3. Remove the sliding door or full base cover, as applicable.

About this task

The following images indicate the location of the M.2 2280 SSD in slot 3 (SSD3) and provide a visual representation of the removal procedure.

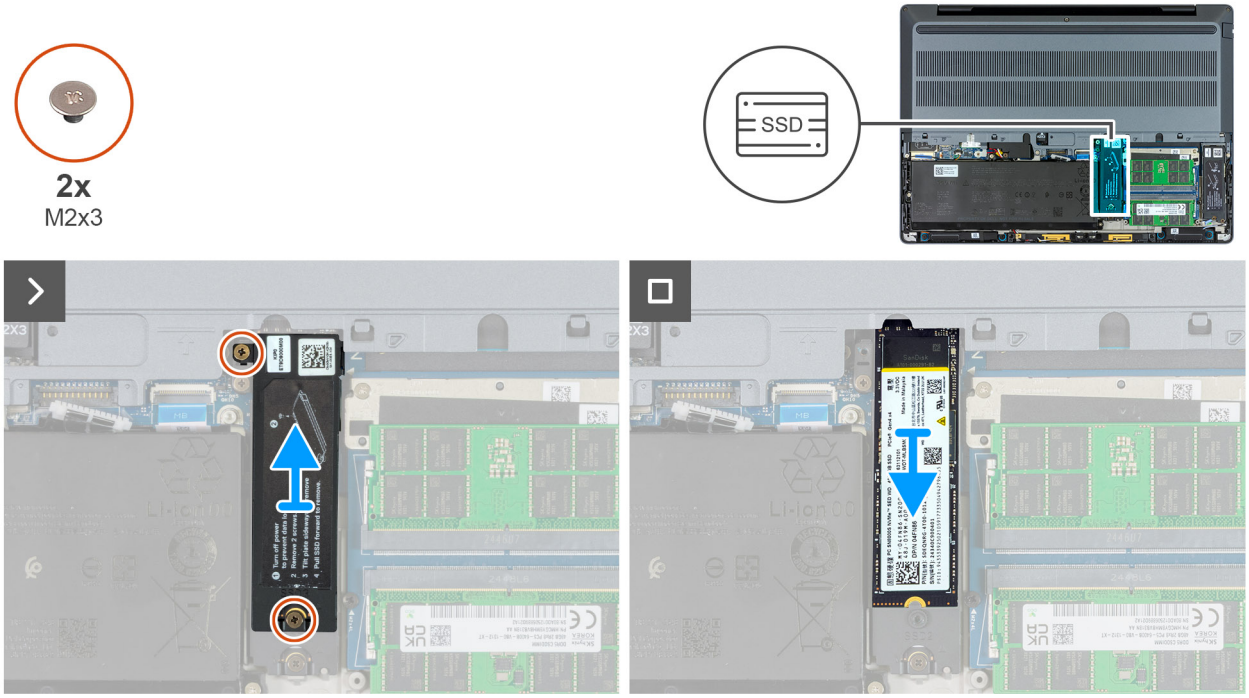


Figure 34. Removing the M.2 2280 SSD from slot 3 (SSD3)

Steps

1. Remove the two screws (M2x3) that secure the SSD thermal shield to the inner frame.
2. Remove the SSD thermal shield off the SSD holder.
3. Slide and lift the M.2 2280 SSD off the SSD slot 3 (SSD3).

Installing the M.2 2280 SSD in slot 3 (SSD3)

Prerequisites

NOTE: Applicable for computers shipped with M.2 2280 SSD in slot 3 (SSD3).

NOTE: For computers shipped without an M.2 SSD in slot 3, you can remove the SSD2 thermal shield with the SSD3 thermal shield that is attached to it.

CAUTION: Solid state drives are fragile. Exercise care when handling the SSD.

CAUTION: To avoid data loss, do not remove the SSD while the computer is turned on or is in a sleep state.

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 M.2 2280 SSD in slot 3 (SSD3) and provide a visual representation of the installation procedure.

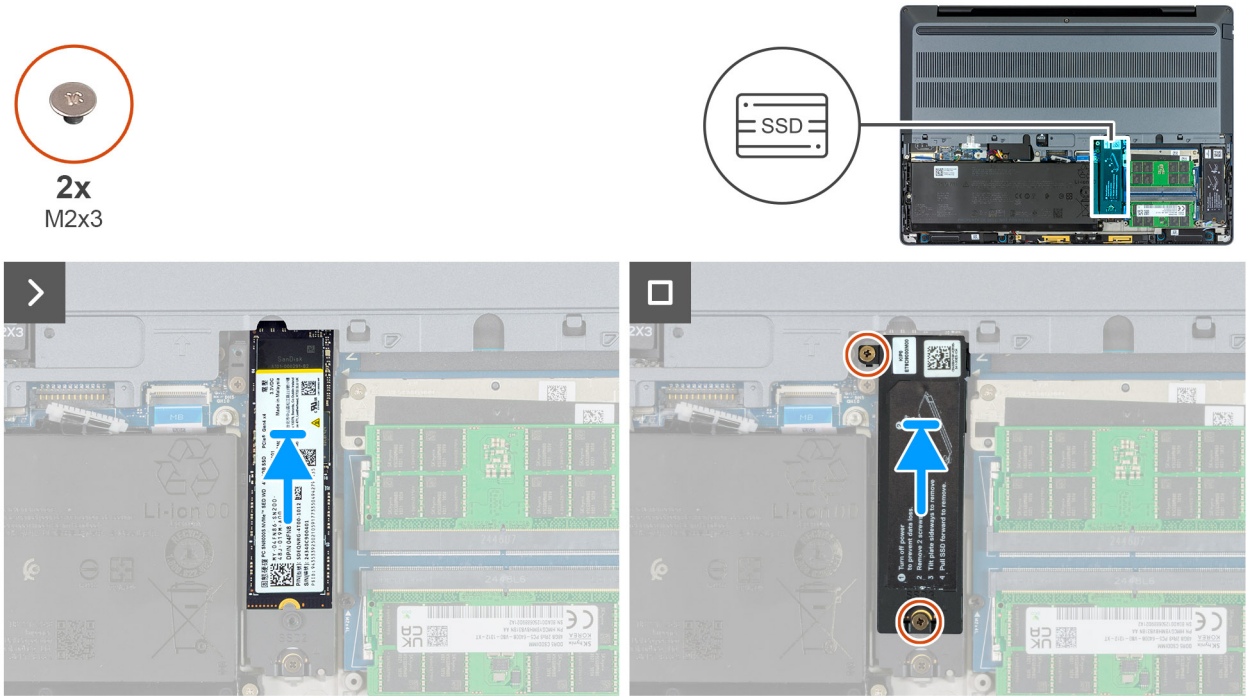


Figure 35. Installing the M.2 2280 SSD in slot 3 (SSD3)

Steps

1. Align the notch on the M.2 2280 SSD with the tab on the M.2 2280 SSD slot 3 (SSD3).
2. Slide the M.2 2280 SSD into the M.2 2280 SSD slot 3 (SSD3).
3. Replace the two screws (M2x3) that secure the SSD thermal shield to the inner frame.
4. Follow the procedure in Installing the M.2 2230 solid state drive, to install a M.2 2230 SSD.

   NOTE: If you want to install a M.2 2230 SSD, follow the procedure in Installing the M.2 2230 SSD.

Next steps

1. Install the sliding door or full base cover, as applicable.
2. Install the SD card.
3. Follow the procedures in After working inside your computer.

Removing the M.2 2280 SSD from slot 2 (SSD2)

Prerequisites

NOTE: Applicable for computers shipped with M.2 2280 SSD in slot 2 (SSD2).

NOTE: For computers shipped without an M.2 SSD installed in slot 3, you can remove the SSD2 thermal shield with the M.2 SSD3 thermal shield that is attached to it.

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

CAUTION: Solid state drives are fragile. Exercise care when handling the SSD.

CAUTION: To avoid data loss, do not remove the SSD while the computer is turned on or is in a sleep state.

2. Remove the SD card.
3. Remove the sliding door or full base cover, as applicable.

About this task

The following images indicate the location of the M.2 2280 SSD in slot 2 (SSD2) and provide a visual representation of the removal procedure.

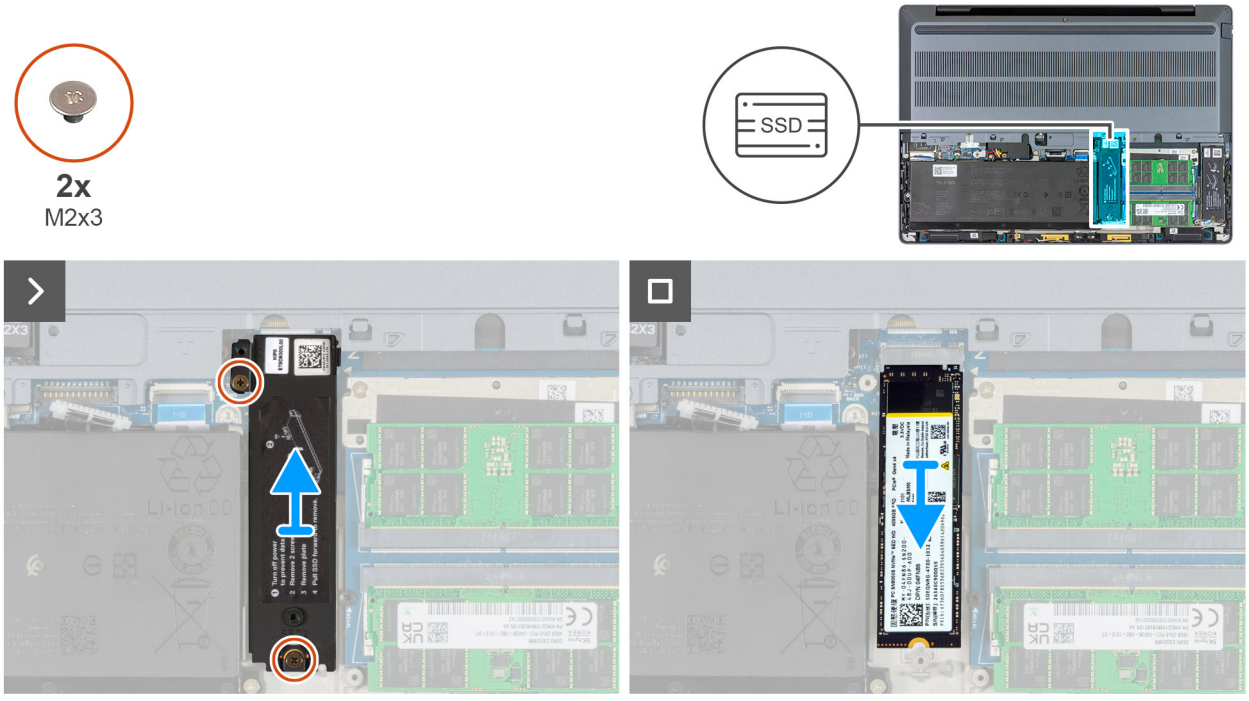


Figure 36. Removing the M.2 2280 SSD from slot 2 (SSD2)

Steps

1. Remove the two screws (M2x3) that secure the SSD thermal shield to the inner frame.
2. Remove the SSD thermal shield off the SSD holder.
3. Slide and lift the M.2 2280 SSD off the SSD slot (SSD2).

Installing the M.2 2280 SSD in slot 2 (SSD2)

Prerequisites

NOTE: Applicable for computers shipped with M.2 2280 SSD in slot 2 (SSD2).

NOTE: For computers shipped without an M.2 SSD installed in slot 3, you can remove the SSD2 thermal shield with the SSD3 thermal shield that is attached to it.

CAUTION: Solid state drives are fragile. Exercise care when handling the SSD.

CAUTION: To avoid data loss, do not remove the SSD while the computer is turned on or is in a sleep state.

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 M.2 2280 SSD in slot 2 (SSD2) and provide a visual representation of the removal procedure.

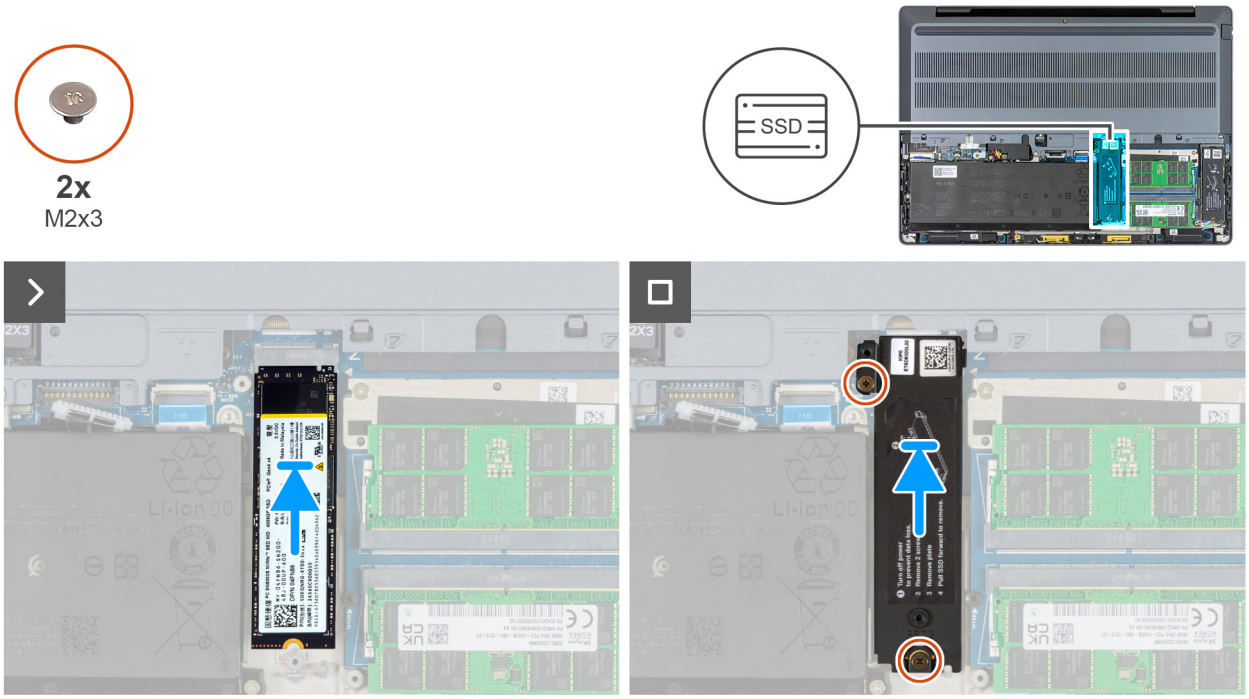


Figure 37. Installing the M.2 2280 SSD in slot 2 (SSD2)

Steps

1. Align the notch on the M.2 2280 SSD with the tab on the M.2 2280 SSD slot 2 (SSD2).
2. Slide the M.2 2280 SSD into the M.2 2280 SSD slot 2 (SSD2).
3. Using the alignment post, place the SSD thermal shield into the slot.
4. Replace the two screws (M2x3) that secure the SSD thermal shield to the inner frame.
5. Follow the procedure in Installing the M.2 2230 solid state drive, to install a M.2 2230 SSD.

   NOTE: If you want to install a M.2 2230 SSD, follow the procedure in Installing the M.2 2230 SSD.

Next steps

1. Install the sliding door or full base cover, as applicable.
2. Install the SD card.
3. Follow the procedures in After working inside your computer.

Removing the M.2 2230 SSD

Prerequisites

NOTE: Applicable for computers shipped with M.2 2230 SSD.

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

   CAUTION: Solid state drives are fragile. Exercise care when handling the SSD.

   CAUTION: To avoid data loss, do not remove the SSD while the computer is turned on or is in a sleep state.

2. Remove the SD card.
3. Remove the sliding door or full base cover, as applicable.

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 38. Removing the M.2 2230 SSD

Steps

1. Remove the screws from the SSD slot.

   NOTE: Follow the procedure to remove the screws from slot 1, slot 2, or slot 3, as applicable.

2. Remove the SSD thermal shield off the SSD holder.
3. Remove the screw (M2x2.5) that secures the M.2 2230 SSD and SSD mounting bracket to the SSD holder.
4. Slide and lift the M.2 2230 SSD off the SSD slot.

Installing the M.2 2230 SSD

Prerequisites

NOTE: Applicable for computers shipped with M.2 2230 SSD.

CAUTION: Solid state drives are fragile. Exercise care when handling the SSD.

CAUTION: To avoid data loss, do not remove the SSD while the computer is turned on or is in a sleep state.

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 M.2 2280 SSD in slot 3 (SSD3) and provide a visual representation of the installation procedure.

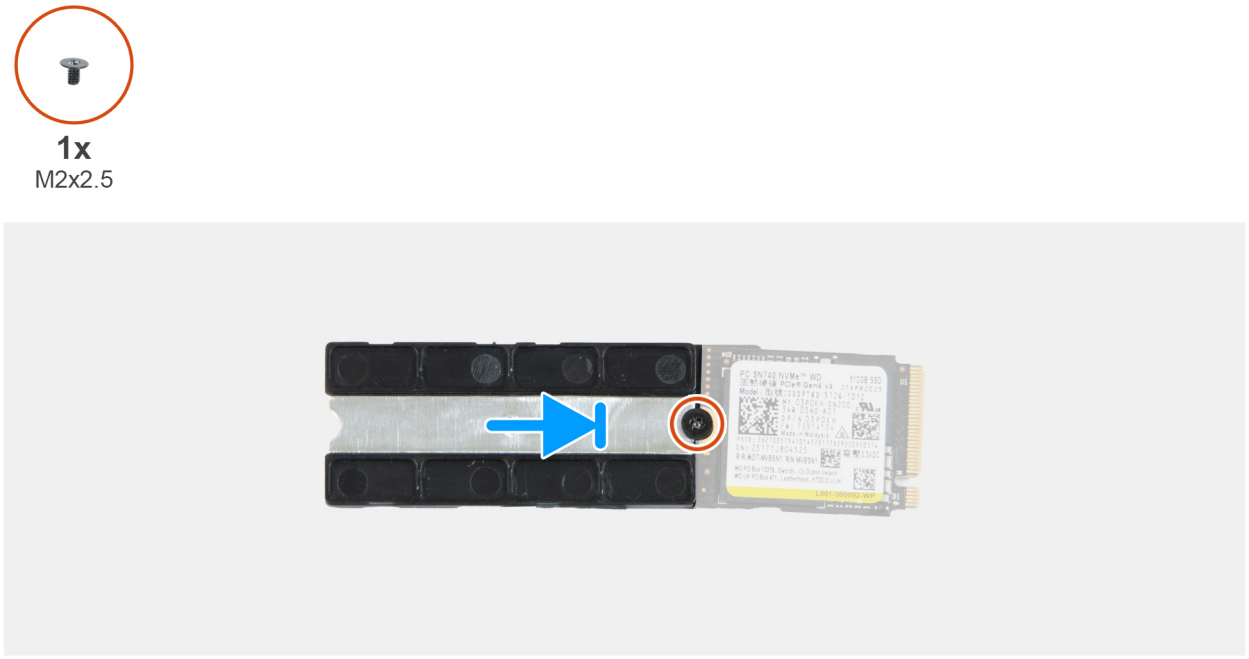


Figure 39. Installing the M.2 2230 SSD

Steps

1. Place the M.2230 SSD on the SSD bracket.
2. Replace the screw (M2x2.5) that secure the SSD to the SSD bracket.
3. Align the notch on the M.2 2230 SSD with the tab on the SSD slot.
4. Slide the M.2 2230 SSD into the SSD slot.
5. You can install an M.2 2280 SSD in the SSD slot.

   NOTE: Depending on SSD slot where you want to install M.2 2280 SSD, follow the procedure in slot 1, slot 2, or slot 3, as applicable.

Next steps

1. Install the sliding door or full base cover, as applicable.
2. Install the SD card.
3. Follow the procedures in After 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

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door or full base cover, as applicable.

About this task

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

Figure 40. Removing the battery

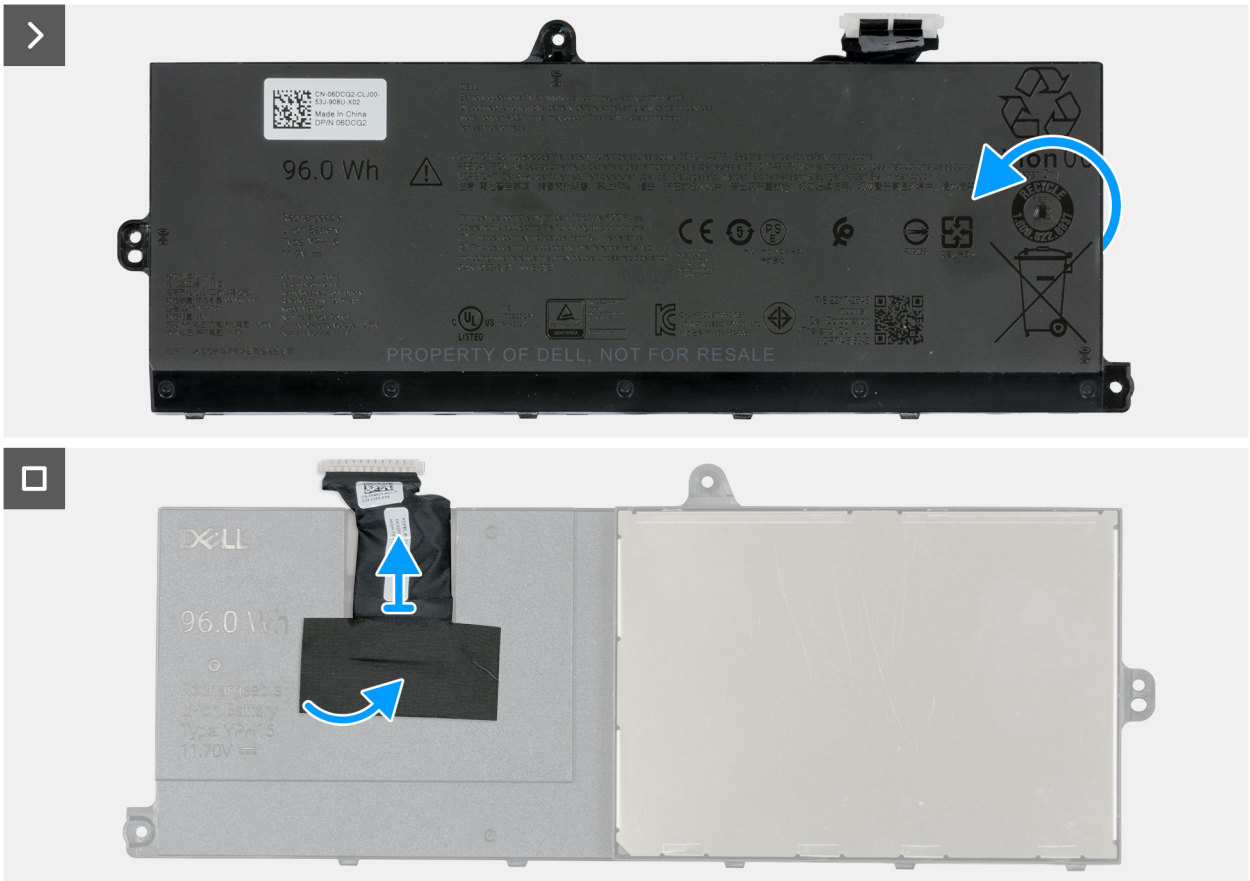


Figure 41. Removing the battery cable from the battery

Steps

1. Remove the three screws (M2x5) that secure the battery to the system board and inner frame.

2. Slide the battery at an angle to release the tabs on the battery from the slots on the inner frame, and lift the battery.
3. Flip the battery and peel the tape that secures the battery cable to the battery.
4. Disconnect the battery cable from the connector on the battery.
5. Peel the battery cable and lift it to remove from the battery.

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 42. Replacing the battery cable

Figure 43. Replacing the battery

Steps

1. Connect the battery cable to its connector on the battery and adhere the battery cable to the battery.
2. Adhere the tape that secures the battery cable to the battery, and flip the battery.
3. Align the tabs on the battery with the tabs on the inner frame and place the battery on the inner frame using the alignment post.
4. Replace the three screws (M2x5) that secure the battery to the system board and inner frame.

Next steps

1. Install the sliding door or full base cover, as applicable.
2. Install the SD card.
3. Follow the procedures in After working inside your computer.

WLAN card

Removing the WLAN card

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the sliding door, applicable for computers that are shipped with the sliding door.
3. Remove the full base cover or base cover with sliding door, as applicable.

About this task

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

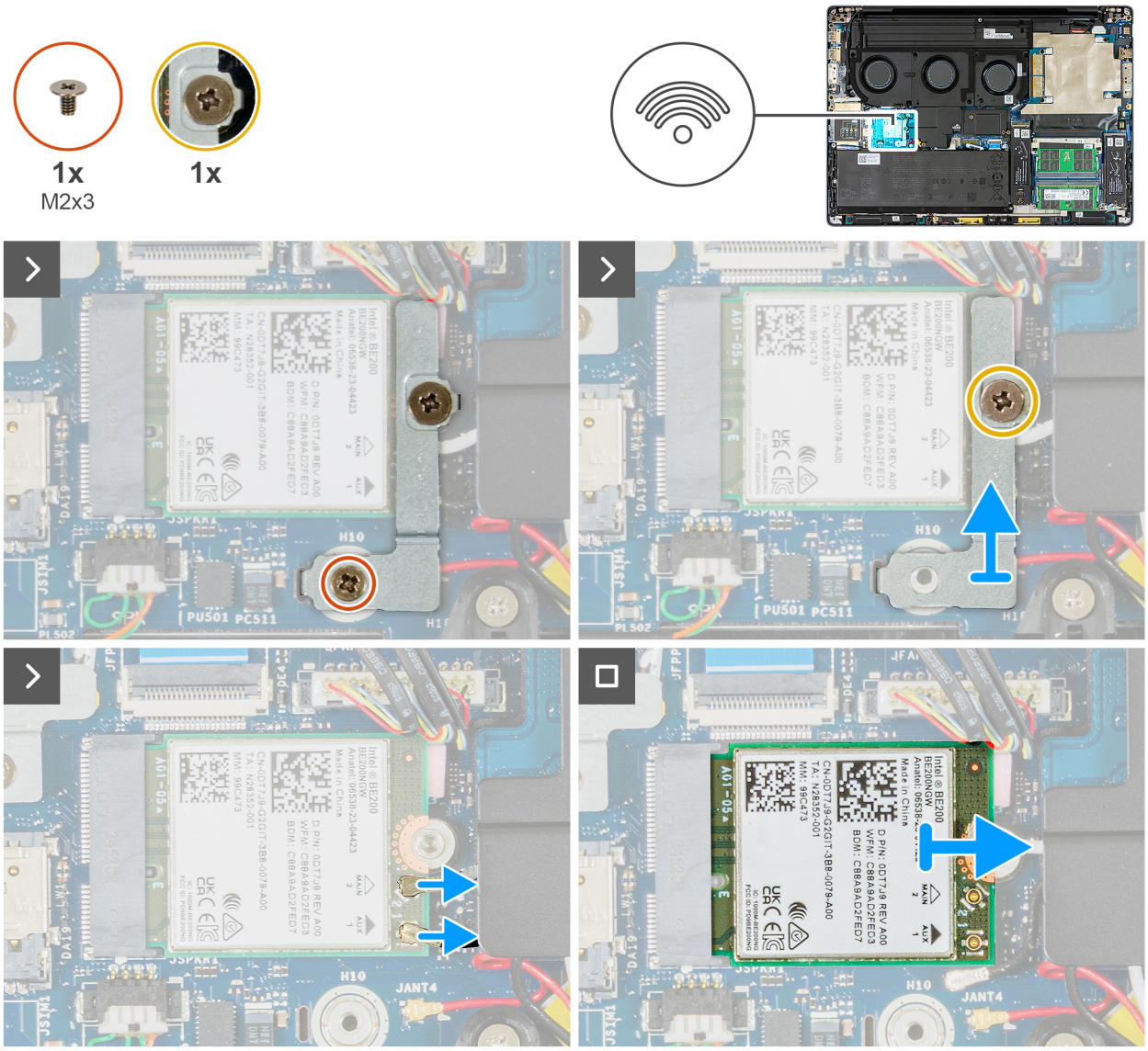


Figure 44. Removing the WLAN card

Steps

1. Loosen the captive screw that secures the WLAN-card bracket to the system board.
2. Lift the WLAN-card bracket from the WLAN card.
3. Remove the screw (M2x3) screw that secures the WLAN card to the system board.
4. Disconnect the antenna cables from the WLAN card.
5. Lift the WLAN card at an angle to slide it out from its slot (JWLAN1).
6. Remove the WLAN card from the WLAN-card slot (JWLAN1) on the system board.

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 images indicate the location of the WLAN card and provide a visual representation of the installation procedure.

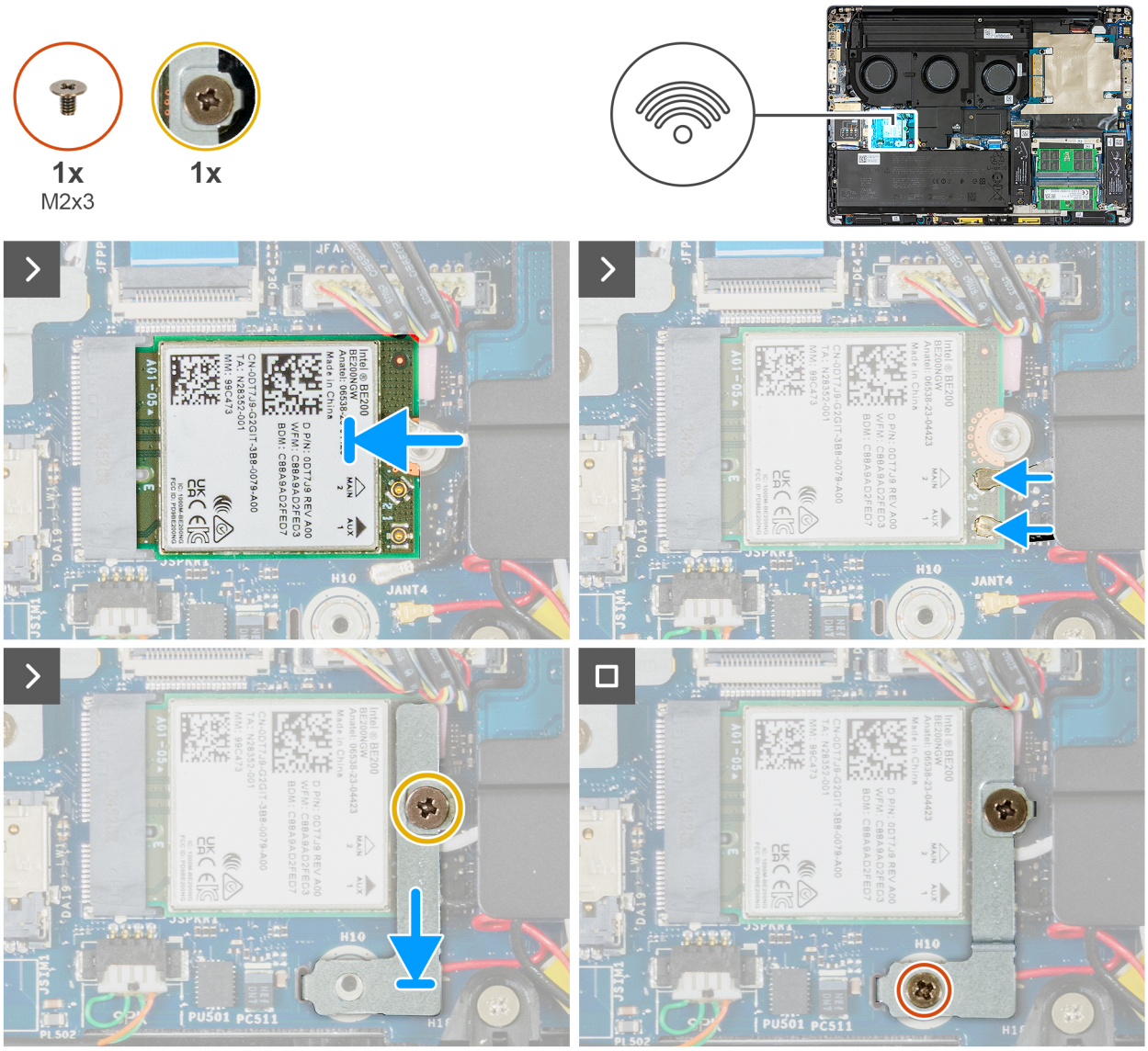


Figure 45. Installing the WLAN card

Steps

1. Align the notch on the WLAN card with the tab on the WLAN-card slot (JWLAN1) and insert the WLAN card into the slot.
2. Using the alignment post, place the WLAN card in the WLAN-card slot (JWLAN1).
3. Connect the antenna cables to the WLAN card.
   The following table provides the antenna-cable color scheme of the WLAN card on your computer.

Table 39. Antenna-cable color scheme

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

4. Align and place the WLAN-card bracket on the WLAN card.
5. Tighten the captive screw that secures the WLAN-card bracket to the system board.
6. Replace the screw (M2x3) that secures the WLAN card bracket to the system board.

Next steps

1. Install the full base cover or base cover with sliding door, as applicable.
2. Install the sliding door, applicable for computers that are shipped with the sliding door.
3. Install the SD card.
4. Follow the procedures in After working inside your computer.

SIM card

Removing the SIM card

Prerequisites

NOTE: Applicable for computers that are shipped with WWAN card.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.

About this task

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

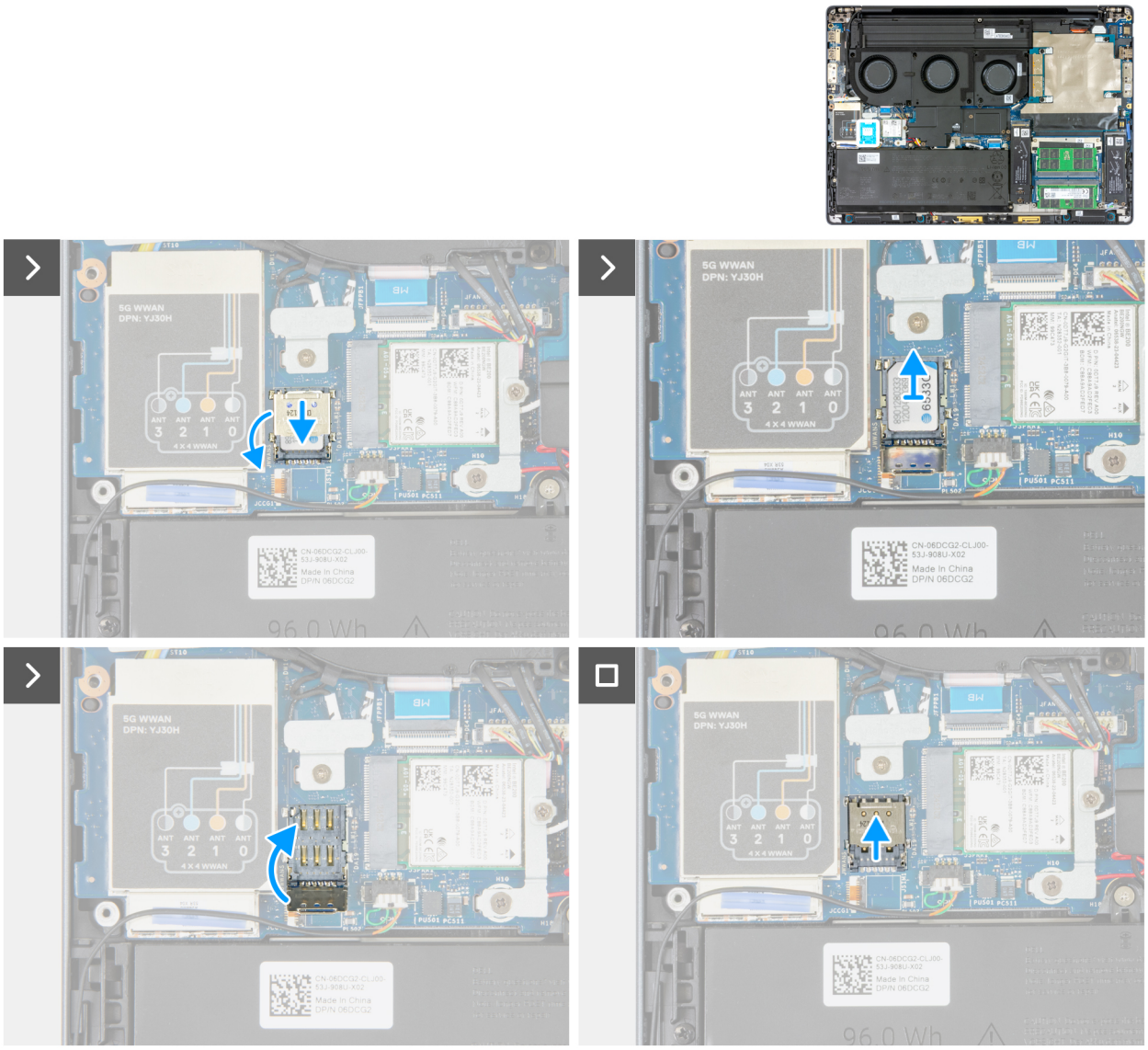


Figure 46. Removing the SIM card

Steps

1. Gently slide the SIM-card cover down to unlock the SIM-card cover.

   CAUTION: The SIM-card cover is fragile. If the SIM-card cover is not unlocked properly before opening, it may get damaged.

2. Flip open the SIM-card cover.
3. Remove the SIM card from the SIM-card slot (JSIM1).
4. Snap the SIM-card cover down.
5. Slide the SIM-card cover to the top to lock the cover.

Installing the SIM card

Prerequisites

NOTE: Applicable for computers that are shipped with WWAN card.

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.

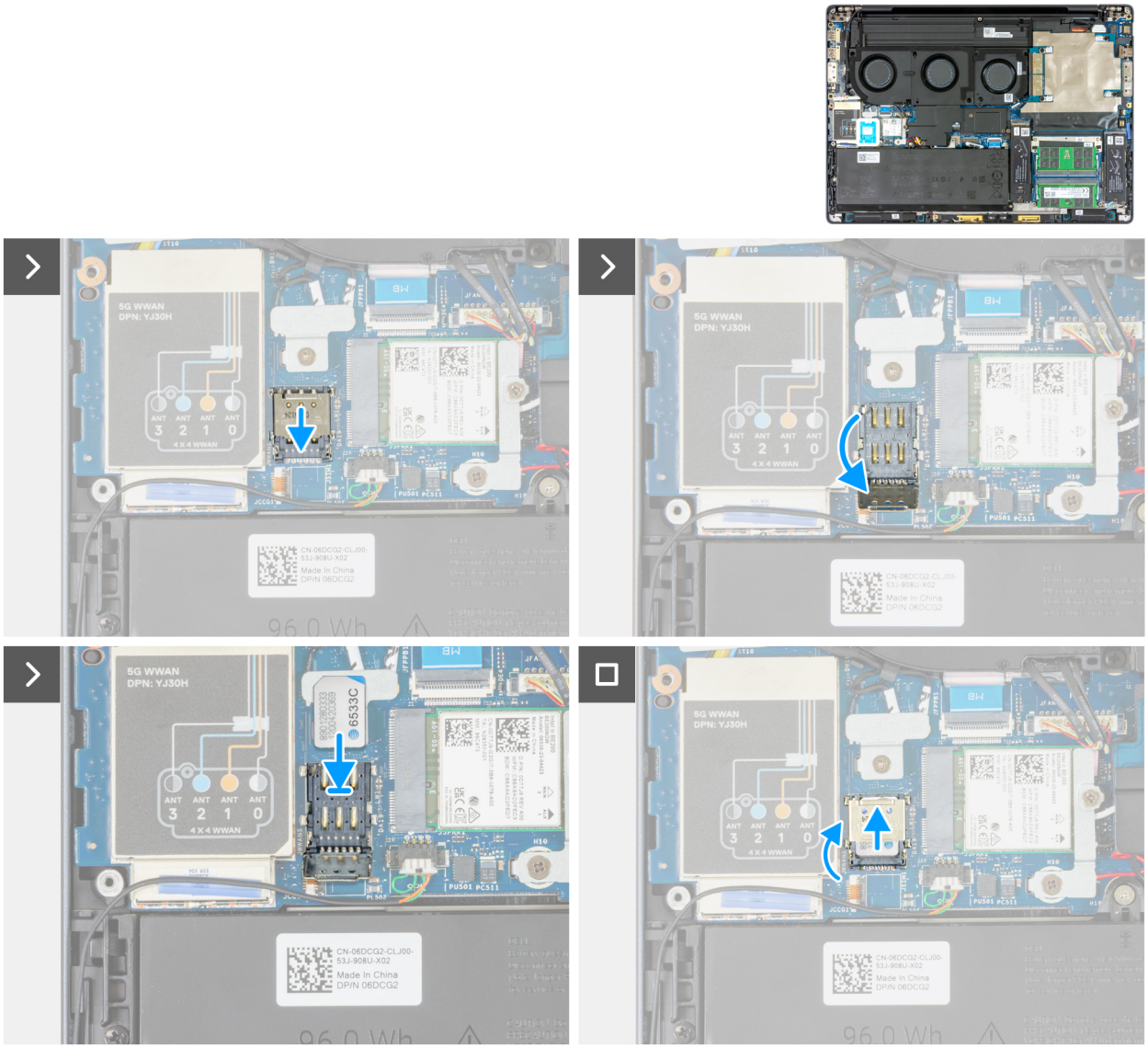


Figure 47. Installing the SIM card

Steps

1. Gently slide the SIM-card cover down to unlock the SIM-card cover.

   CAUTION: The SIM-card cover is fragile. If the SIM-card cover is not unlocked properly before opening, it may get damaged.

2. Flip open the SIM-card cover.
3. Place the SIM card into the SIM-card slot (JSIM1).
4. Snap the SIM-card cover down.
5. Slide the SIM-card cover to the top to lock the cover.

Next steps

1. Install the full base cover or base cover with sliding door, as applicable.
2. Install the sliding door, applicable for computers that are shipped with the sliding door.
3. Install the SD card.
4. Follow the procedures in After working inside your computer.

Wireless Wide Area Network (WWAN) card

Removing the WWAN card (optional)

Prerequisites

NOTE: Applicable for computers that are shipped with WWAN card.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.

About this task

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

Figure 48. Removing the WWAN card

Steps

1. Pry the shielding cover off the WWAN-card slot (JWWANS).
2. Loosen the captive screw that secures the WWAN-card bracket to the system board.
3. Lift the WWAN-card bracket from the WWAN card.
4. Disconnect the antenna cables from the connector on the WWAN card.
5. Slide and remove the WWAN card from its slot on the system board.

Installing the WWAN card (optional)

Prerequisites

NOTE: Applicable for computers that are shipped with WWAN card.

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 WWAN card and provide a visual representation of the installation procedure.

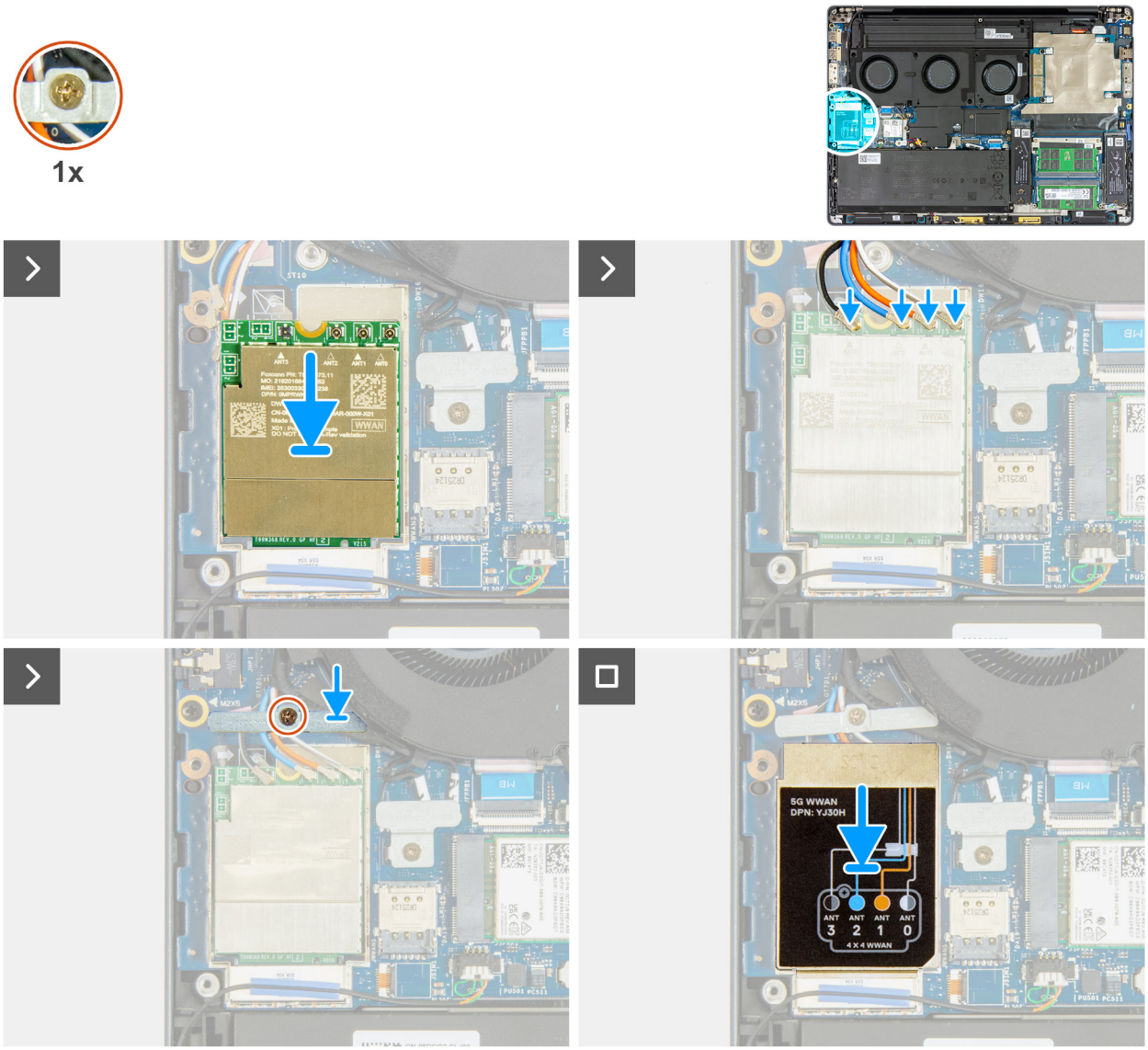


Figure 49. Installing the WWAN card

Steps

1. Slide the WWAN card to the WWAN slot (JWWANS) on the system board.
2. Connect the antenna cables to the connectors on the WWAN card. The following table provides the antenna-cable color scheme of the WWAN card on your computer.

Table 40. Antenna-cable color scheme

Antenna Cable Color	Pin Definition
White/Grey	ANT0
Orange	ANT1
Blue	ANT2
Black/Grey	ANT3

The connections are also printed on the WWAN-card slot (JWWANS).

3. Place the WWAN-card bracket on the WWAN card to secure the antenna cables.
4. Tighten the captive screw that secures the WWAN-card bracket to the system board.

NOTE: For instructions on how to find your computer International Mobile Station Equipment Identity (IMEI) number, see the knowledge base article 000143678 at Dell Support Site.

Next steps

1. Install the full base cover or base cover with sliding door, as applicable.
2. Install the sliding door, applicable for computers that are shipped with the sliding door.
3. Install the SD card.
4. Follow the procedures 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.

GPU card

Removing the GPU card

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

Prerequisites

NOTE: Applicable for computers shipped with discrete GPU card.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.

About this task

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

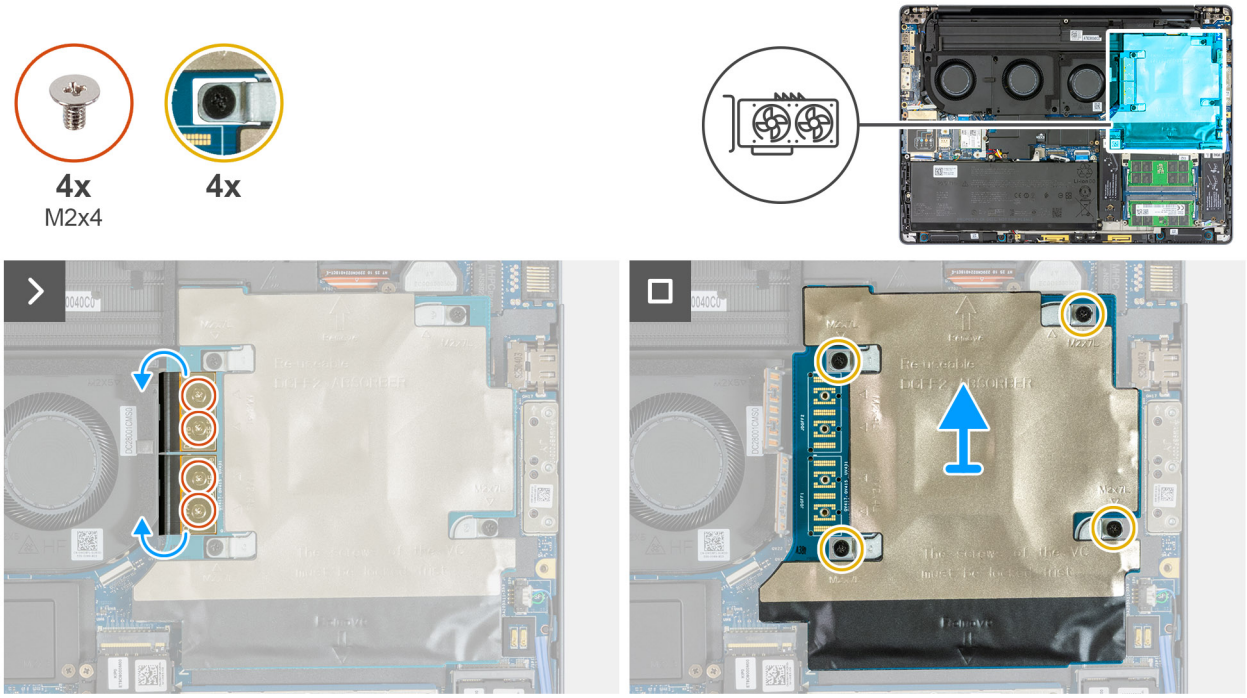


Figure 50. Removing the GPU card

Steps

1. Remove the four screws (M2x4) that secure the two GPU card FPC beam connectors to the system board.
2. Open the two GPU card FPC beam connectors up to a 90-degree angle.
3. In reverse sequential order (4 > 3 > 2 > 1), loosen the four captive screws that secure the GPU card to the heat sink.
4. From the location marked "Remove" on the Mylar, pry off the GPU card.

   CAUTION: DO NOT remove the GPU card by prying from the right side of the card (next to the I/O ports on the system board). Prying from the right side of the card may cause the connector on the card and system board to bend.

5. With two hands, hold the upper left and right corners of the GPU board. Lift the GPU card to remove it off the heat sink.

   NOTE: If the GPU card is defective, adhere the protective mylar over the heat-transfer areas and DRAM modules without cleaning the thermal grease and gel to prepare the GPU card for return.

6. A service kit containing rubber scraper, alcohol wipes, protection mylar, thermal grease, thermal gel, and tech sheet is dispatched along with the replacement GPU card. Follow the instructions in the tech sheet to clean residual thermal grease and gel. Apply new thermal grease and gel for the replacement of the GPU card.

   NOTE: If you are returning the GPU card, adhere the protective mylar over the heat-transfer areas and the DRAM, before placing it into the packaging.

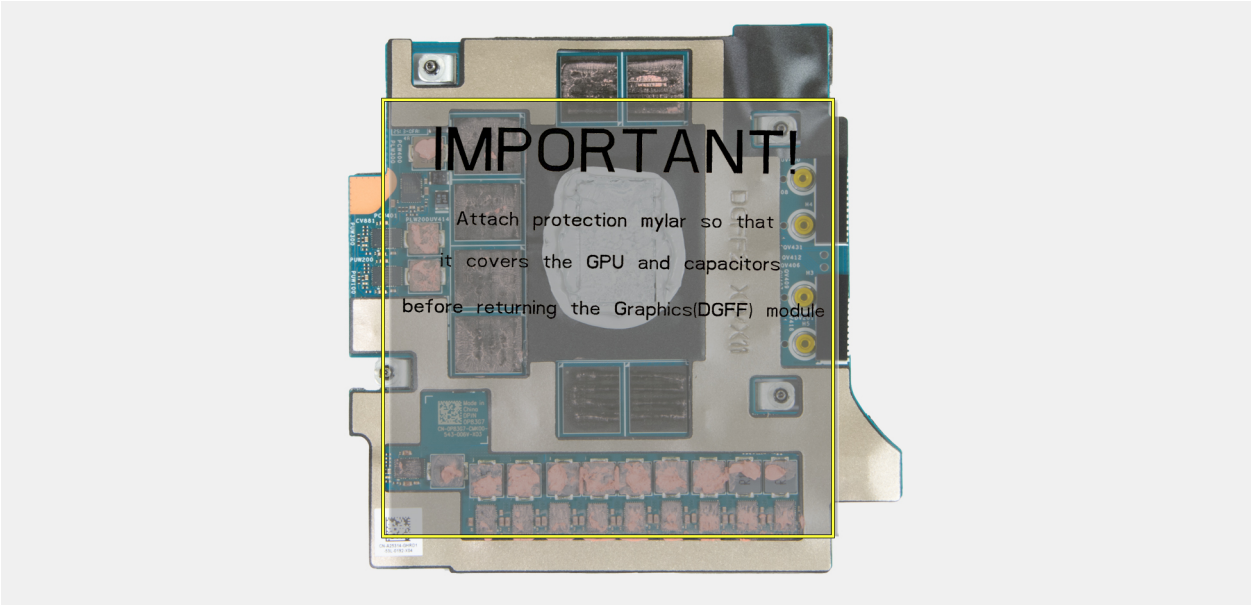


Figure 51. Preparing the defective GPU card for return

Installing the GPU card

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

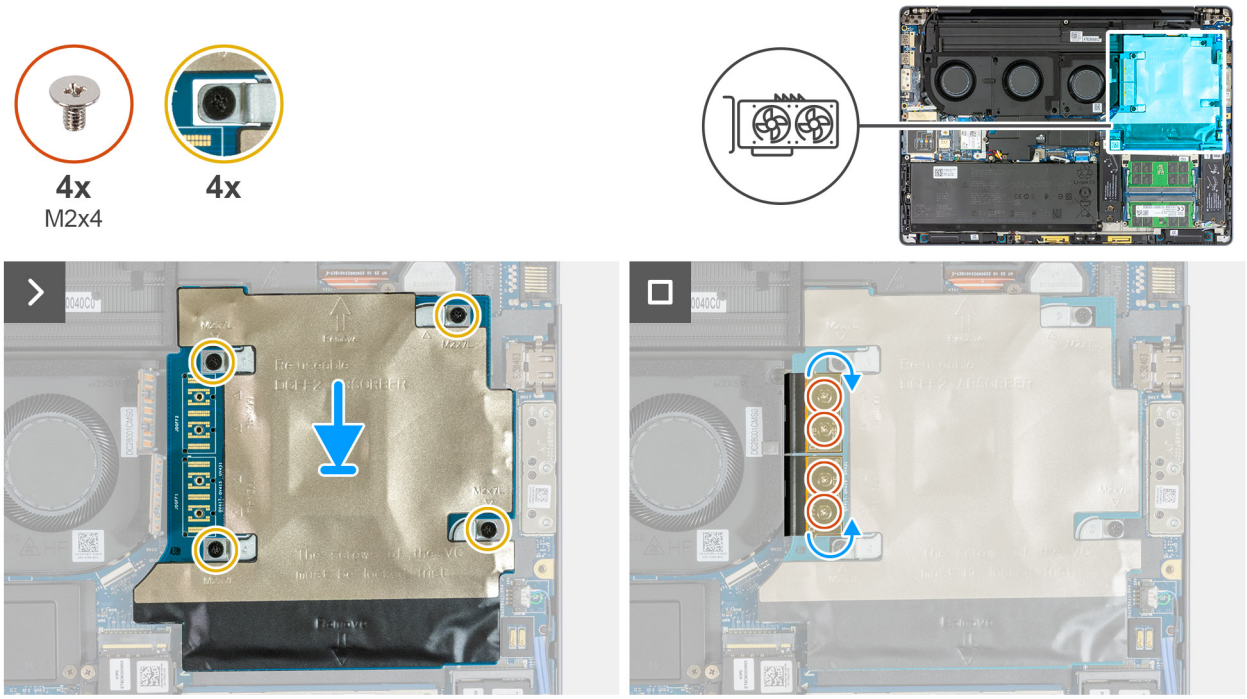


Figure 52. Installing the GPU card

Steps

1. Hold the GPU card firmly by pinching the edges on the upper left and right corners of the card. Place the GPU card on the heat sink.
2. In reverse sequential order (1 > 2 > 3 > 4) as indicated on the card, tighten the four captive screws that secure the GPU card to the heat sink.
3. Close the two GPU card FPC beam connectors.
4. Replace the four screws (M2x4) that secure the two GPU card FPC beam connectors to the system board.

Next steps

1. Install the full base cover or base cover with sliding door, as applicable.
2. Install the sliding door, applicable for computers that are shipped with the sliding door.
3. Install the SD card.
4. Follow the procedures in After working inside your computer.

Integrated FPC beam connector

Removing the integrated FPC beam connector

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

Prerequisites

NOTE: Applicable for computers shipped with integrated graphics only.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.

About this task

The following images indicate the location of the integrated FPC beam connector and provide a visual representation of the removal procedure.

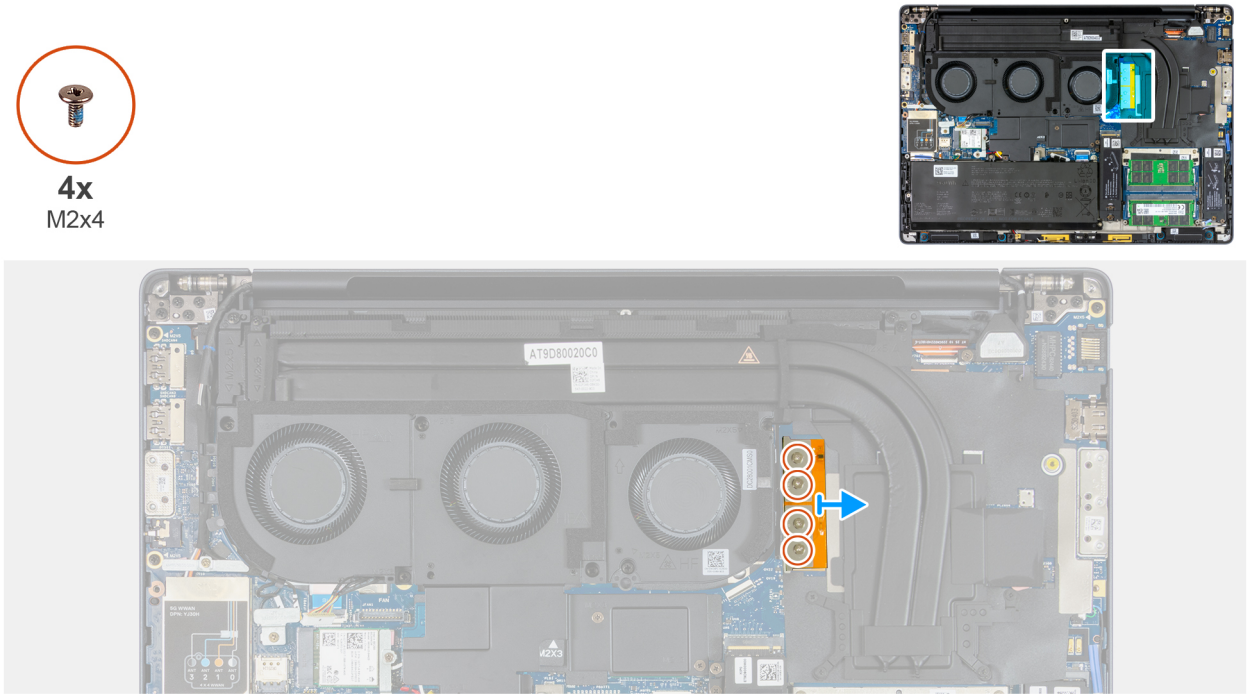


Figure 53. Removing the integrated FPC beam connector

Steps

1. Remove the four screws (M2x4) that secure the integrated FPC beam connector to the system board.
2. Open the two GPU card FPC beam connectors up to a 90-degree angle.
3. Remove the integrated FPC beam connector from the system board.

Installing the integrated FPC beam connector

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

Prerequisites

NOTE: Applicable for computers shipped with integrated graphics only.

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 integrated FPC beam connector and provide a visual representation of the installation procedure.

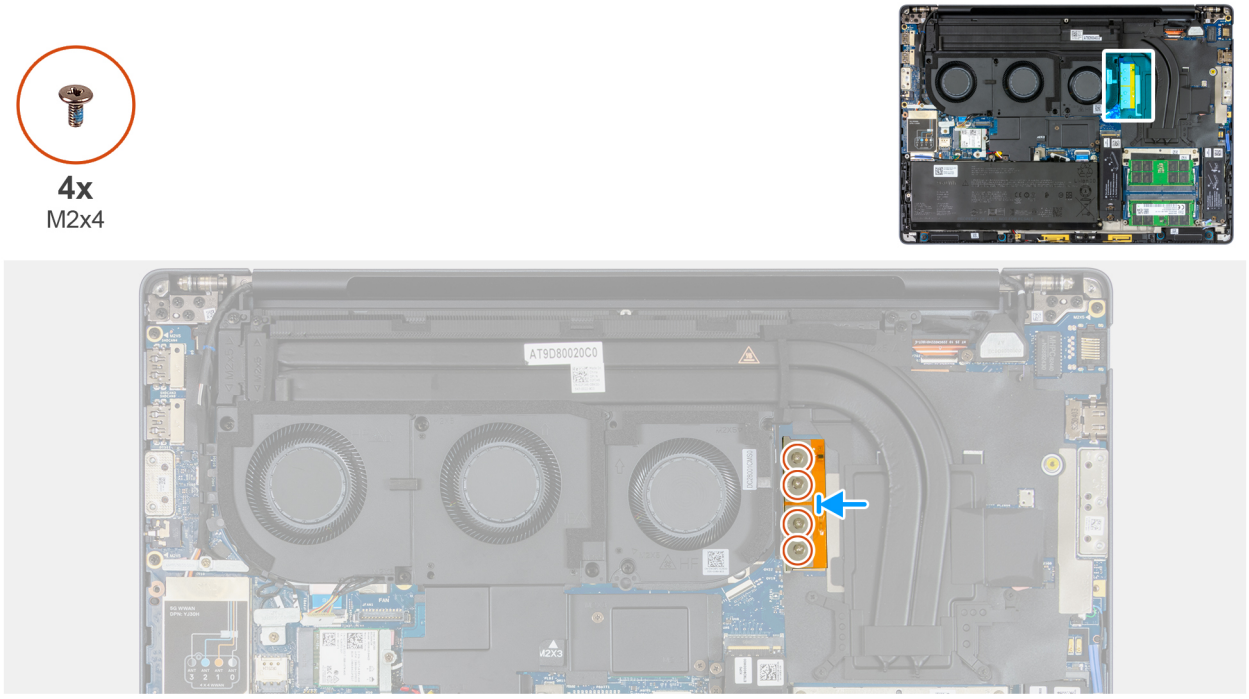


Figure 54. Installing the integrated FPC beam connector

Steps

1. Align the screw holes on the integrated FPC beam connector with the screw holes on the system board.
2. Close the two GPU card FPC beam connectors.
3. Replace the four screws (M2x4) that secure the integrated FPC beam connector to the system board.

Next steps

1. Install the full base cover or base cover with sliding door, as applicable.
2. Install the sliding door, applicable for computers that are shipped with the sliding door.
3. Install the SD card.
4. Follow the procedures in After working inside your computer.

Discrete FPC beam connectors

Removing the discrete FPC beam connector

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

Prerequisites

NOTE: Applicable for computers shipped with discrete graphics only.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the NPU card.
6. Remove the GPU card, applicable for computers that are shipped with discrete graphics card.

About this task

The following images indicate the location of the discrete FPC beam connector and provide a visual representation of the removal procedure.

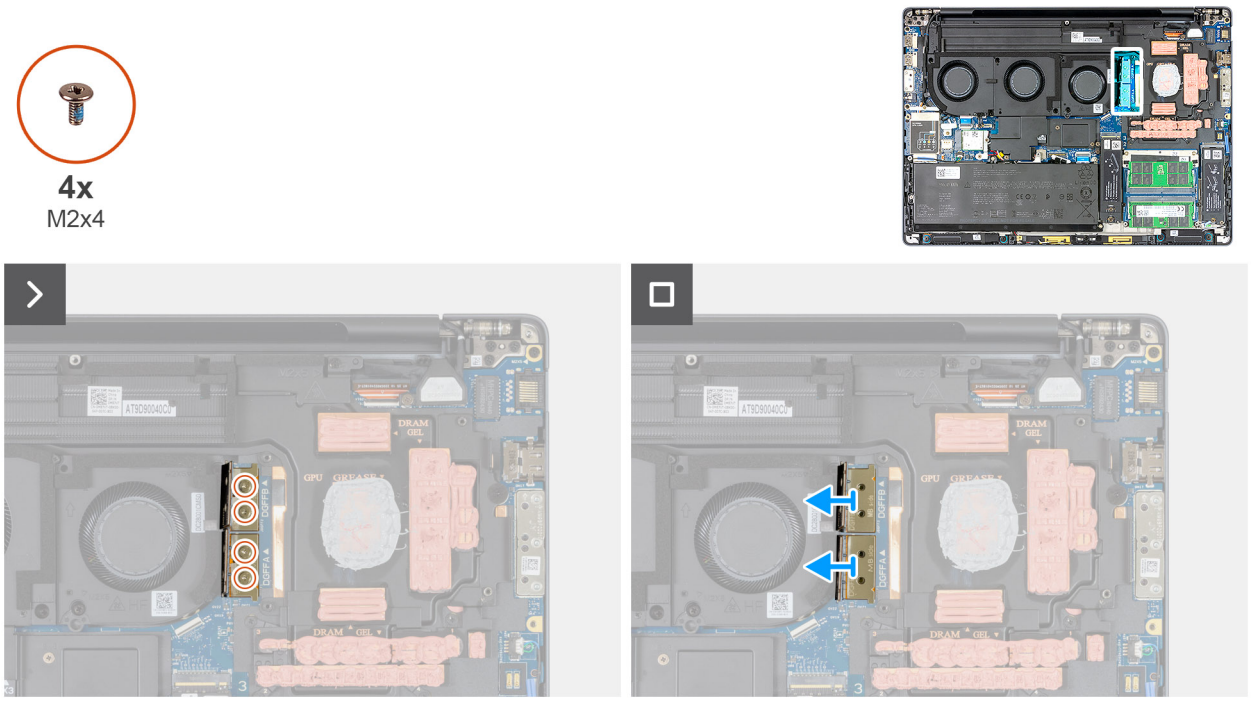


Figure 55. Removing the discrete FPC beam connector

Steps

1. Remove the four screws (M2x4) that secure the discrete FPC beam connectors (DGFFA and DGFFB) to the system board.
2. Open the two GPU card FPC beam connectors up to a 90-degree angle.
3. Remove the discrete FPC beam connectors (DGFFA and DGFFB) from the system board.

Installing the discrete FPC beam connector

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

Prerequisites

NOTE: Applicable for computers shipped with discrete graphics only.

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 discrete FPC beam connector and provide a visual representation of the installation procedure.

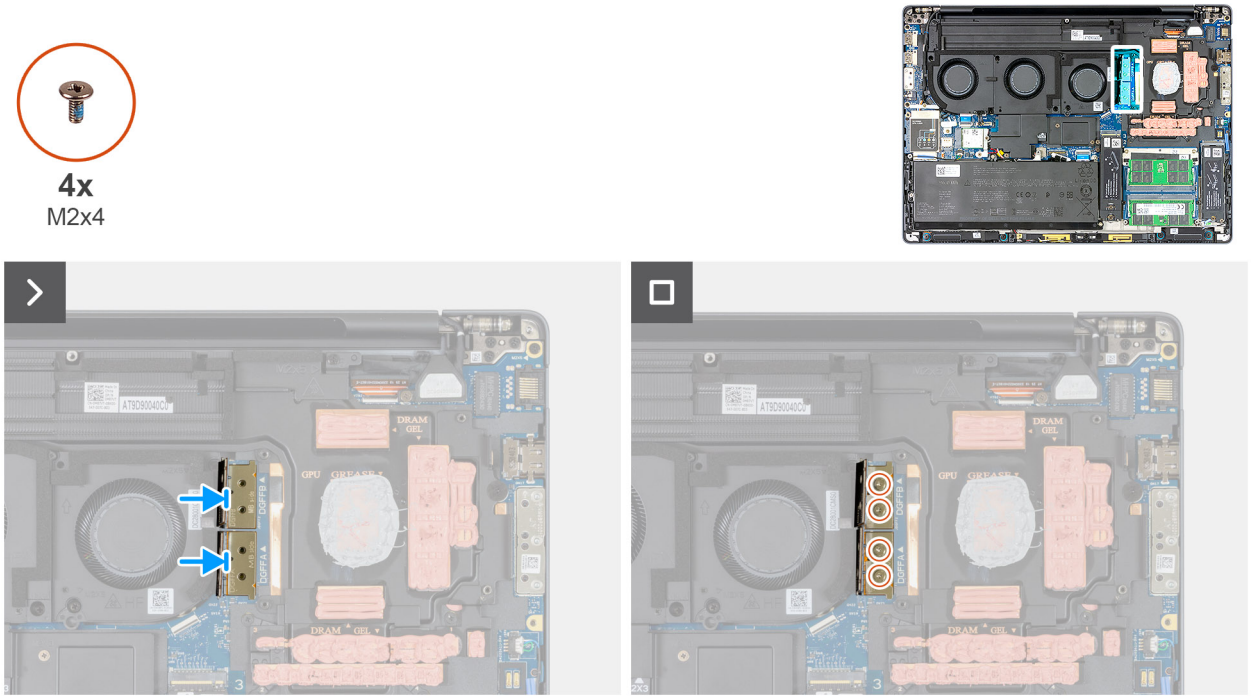


Figure 56. Installing the discrete FPC beam connector

Steps

1. Align the screw holes on the discrete FPC beam connectors (DGFFA and DGFFB) with the screw holes on the system board.
2. Close the two GPU card FPC beam connectors.
3. Replace the four screws (M2x4) that secure the discrete FPC beam connectors (DGFFA and DGFFB) to the system board.

Next steps

1. Install the GPU card, applicable for computers that are shipped with discrete graphics card.
2. Install the NPU card.
3. Install the full base cover or base cover with sliding door, as applicable.
4. Install the sliding door, applicable for computers that are shipped with the sliding door.
5. Install the SD card.
6. Follow the procedures in After working inside your computer.

Dummy fan

Removing the dummy fan

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

Prerequisites

NOTE: Applicable on computers shipped with an integrated GPU.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).

About this task

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

Figure 57. Removing the dummy fan

Steps

1. Remove the screw (M2x3) that secures the Darwin bracket to the system board.
2. Remove the Darwin bracket from the system board.
3. Remove the following cables from the routing guides next to the dummy fan:
   - White/grey 0 antenna cable
   - Orange 1 antenna cable
   - Blue 2 antenna cable
   - Black/grey 3 antenna cable
   - Black WWAN P-sensor cable
   - Darwin 1 antenna cable
   - Darwin 2 antenna cable
4. Disconnect the following cables from the connectors on the system board:
   - Black WWAN P-sensor cable (JANT3)
   - Darwin 1 antenna cable (JANT1)
   - Darwin 2 antenna cable (JANT2)

5. Peel the fan cable off the dummy fan.
6. Remove the two screws (M2x5) that secure the dummy fan to the system board.
7. Remove the dummy fan from the system board.

Installing the dummy fan

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

Prerequisites

NOTE: Applicable on computers shipped with an integrated GPU.

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 dummy fan and provide a visual representation of the installation procedure.

Figure 58. Installing the dummy fan

Steps

1. Using the alignment post, place the dummy fan on the system board.
2. Replace the two screws (M2x5) that secure the dummy fan to the system board.
3. Adhere the fan cable to the dummy fan.
4. Route the following cables along the routing guides next to the dummy fan:
   - White/grey 0 antenna cable
   - Orange 1 antenna cable
   - Blue 2 antenna cable
   - Black/grey 3 antenna cable
   - Black WWAN P-sensor cable
   - Darwin 1 antenna cable
   - Darwin 2 antenna cable
5. Connect the following cables to the connectors on the system board:
   - Black WWAN P-sensor cable (JANT3)
   - Darwin 1 antenna cable (JANT1)
   - Darwin 2 antenna cable (JANT2)
6. Place the Darwin bracket on the system board.
7. Replace the screw (M2x3) that secures the Darwin bracket to the system board.

Next steps

1. Install the WWAN card (optional).
2. Install the full base cover or base cover with sliding door, as applicable.
3. Install the sliding door, applicable for computers that are shipped with the sliding door.
4. Install the SD card.
5. Follow the procedures in After working inside your computer.

Neural Processing Unit (NPU) card

Removing the NPU card

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

Prerequisites

NOTE: Applicable on computers shipped with NPU card.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.

About this task

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

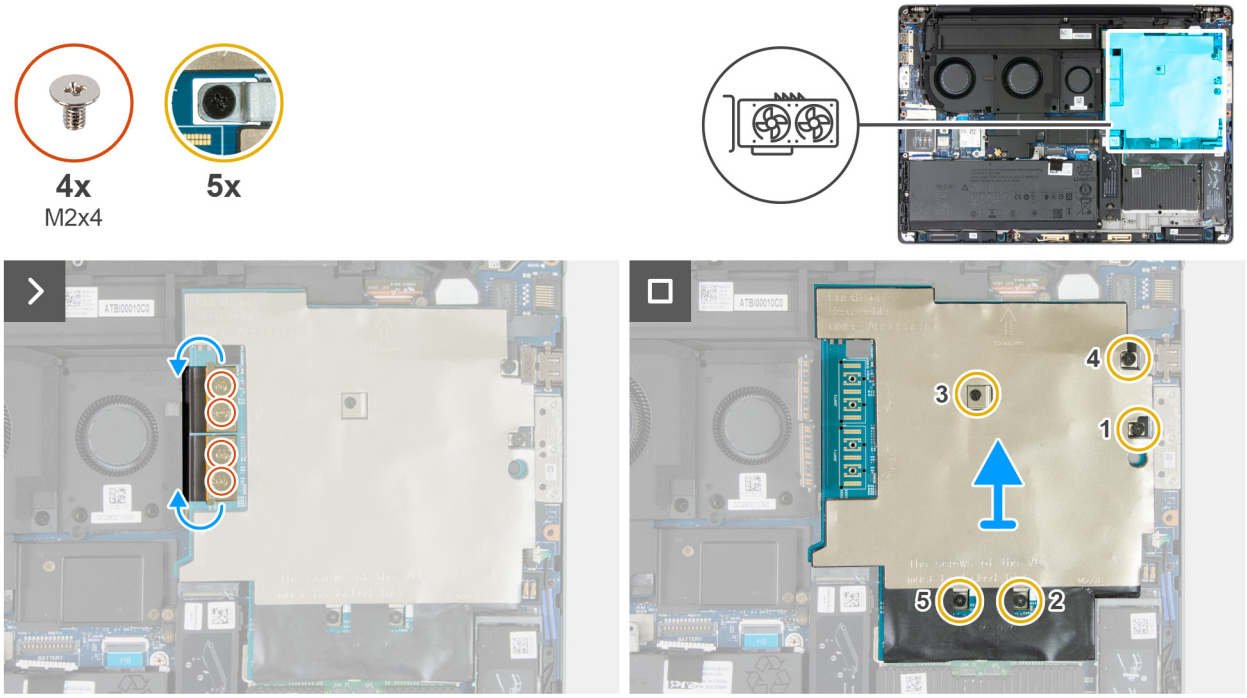


Figure 59. Removing the NPU card

Steps

1. Remove the four screws (M2x4) that secure the two NPU card FPC beam connectors to the system board.
2. Open the two FPC beam connectors up to a 90-degree angle.
3. In the reverse sequential order (5 > 4 > 3 > 2 > 1) as indicated on the NPU card, loosen the five captive screws that secure the NPU card to the system board.
4. Grab the NPU card from the center of the top and bottom side of the NPU card. Then, lift the NPU card to remove it from the computer.

   CAUTION: Do not pry the NPU card from the right side of the card that is next to the I/O ports on the system board. The connector on the card and system board may bend.

   NOTE: If the NPU card is defective, adhere the protective mylar over the heat-transfer areas and DRAM modules without cleaning the thermal grease and gel to prepare the NPU card for return.

5. A service kit containing rubber scraper, alcohol wipes, protection mylar, thermal grease, thermal gel, and tech sheet is dispatched along with the replacement NPU card. Follow the instructions in the tech sheet to clean the residual thermal grease and gel. Apply new thermal grease and gel while replacing the NPU card.

   NOTE: If you are returning the NPU card, adhere the protective mylar over the heat-transfer areas and the DRAM, before placing it into the packaging.

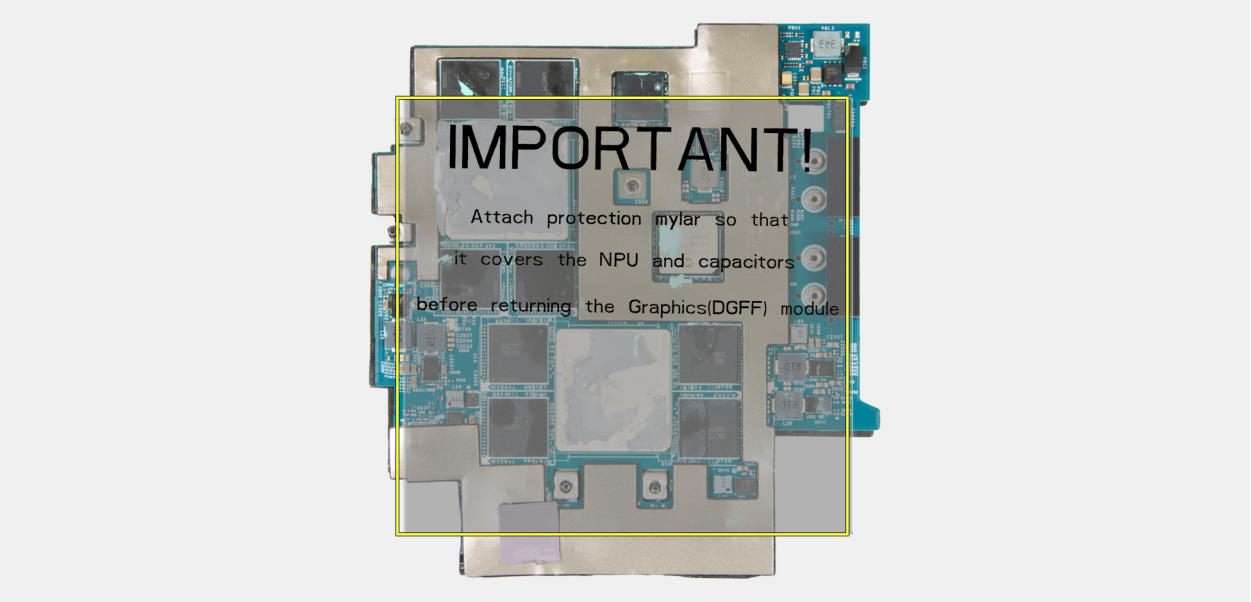


Figure 60. Adhering the protective mylar over the heat-transfer areas and the DRAM

Installing the NPU card

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

Prerequisites

NOTE: Applicable on computers shipped with NPU card.

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 NPU card and provide a visual representation of the installation procedure.

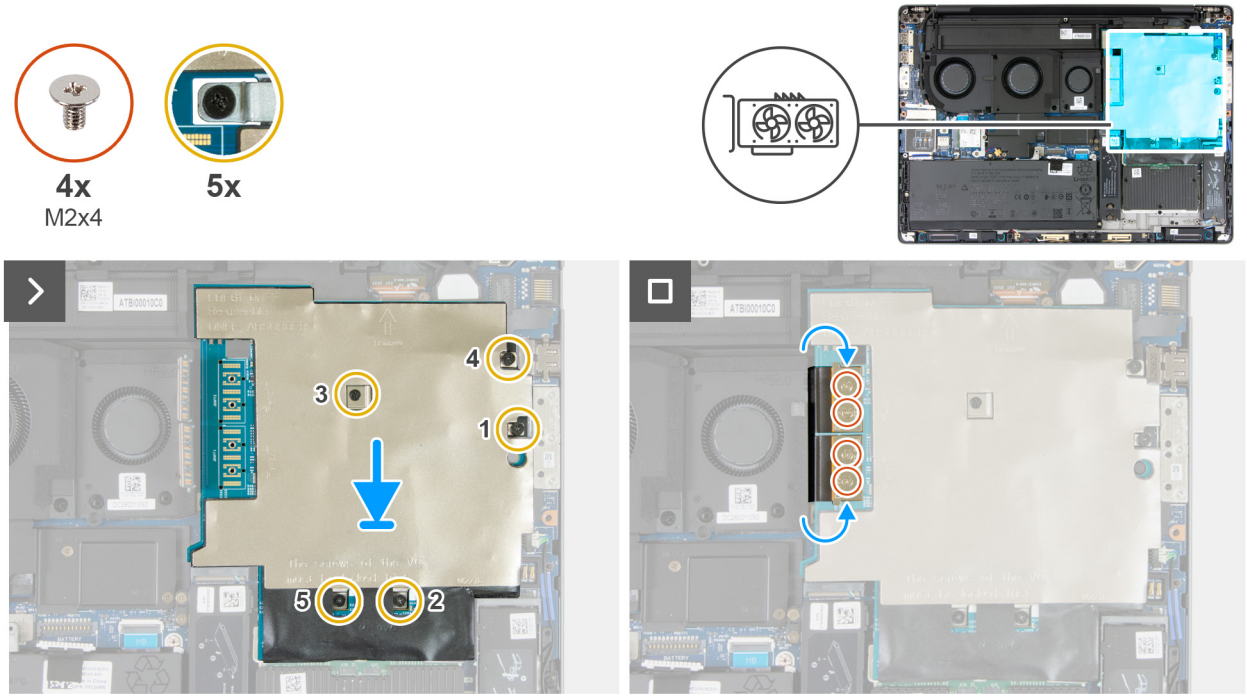


Figure 61. Installing the NPU card

Steps

1. Align the screw holes on the NPU card with the screw holes on the system board and place it on the system board.
2. In the sequential order (1 > 2 > 3 > 4 > 5) as indicated on the NPU card, tighten the five captive screws that secure the NPU card to the system board.
3. Close the two FPC beam connectors.
4. Replace the four screws (M2x4) that secure the two NPU card FPC beam connectors to the system board.

Next steps

1. Install the full base cover or base cover with sliding door, as applicable.
2. Install the sliding door, applicable for computers that are shipped with the sliding door.
3. Install the SD card.
4. Follow the procedures in After working inside your computer.

Compression Attached Memory (CAMM) module

Removing the CAMM module (dual-channel)

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

Prerequisites

NOTE: Applicable for computers that are shipped with a dual-channel CAMM module.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door or full base cover, as applicable.
4. Remove the NPU card.

NOTE: Applicable on computers shipped with NPU card.

About this task

The following images indicate the location of the dual-channel CAMM module and provide a visual representation of the removal procedure.

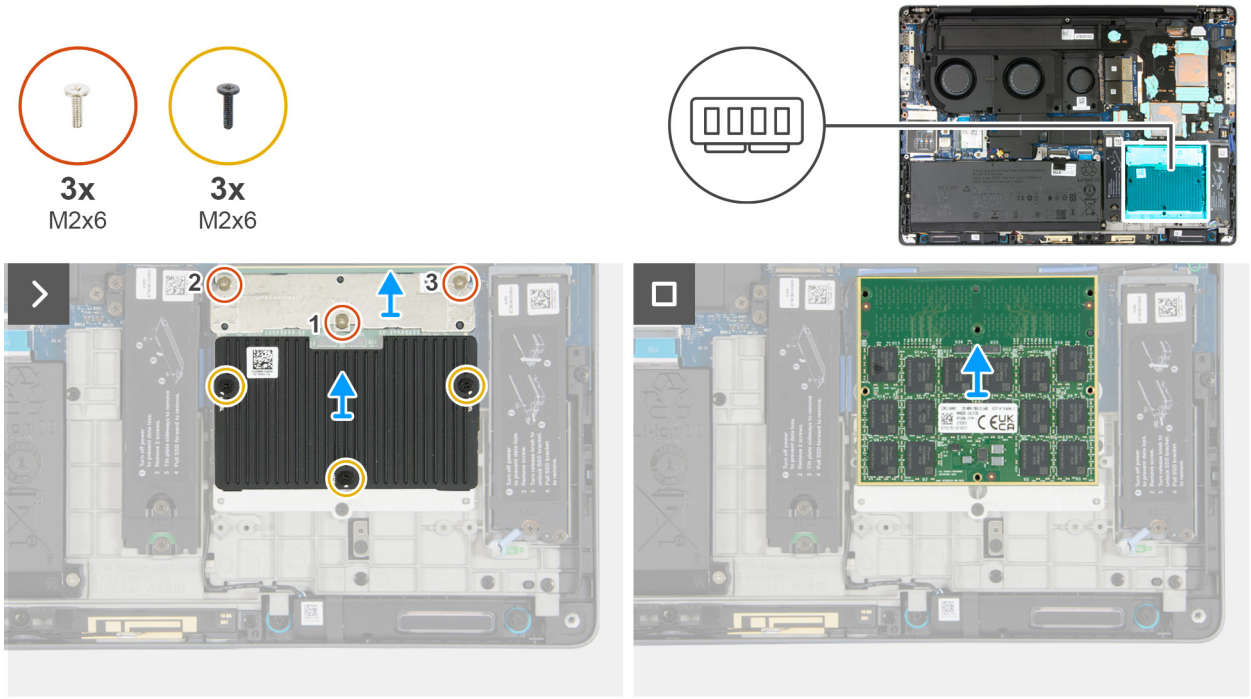


Figure 62. Removing the CAMM module (dual-channel)

Steps

1. Remove the three screws (M2x6) that secure the CAMM memory heat sink to the system board.
2. Remove the CAMM memory heat sink from the system board.
3. In reverse sequential order (3 > 2 > 1) as indicated on the bracket, remove the three screws (M2x6) that secure the retention bracket to the system board.
4. Remove the retention bracket from the system board.
5. Remove the CAMM memory module from the system board.

Installing the CAMM module (dual-channel)

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

Prerequisites

NOTE: Applicable for computers that are shipped with a dual-channel CAMM 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 dual-channel CAMM module and provide a visual representation of the installation procedure.

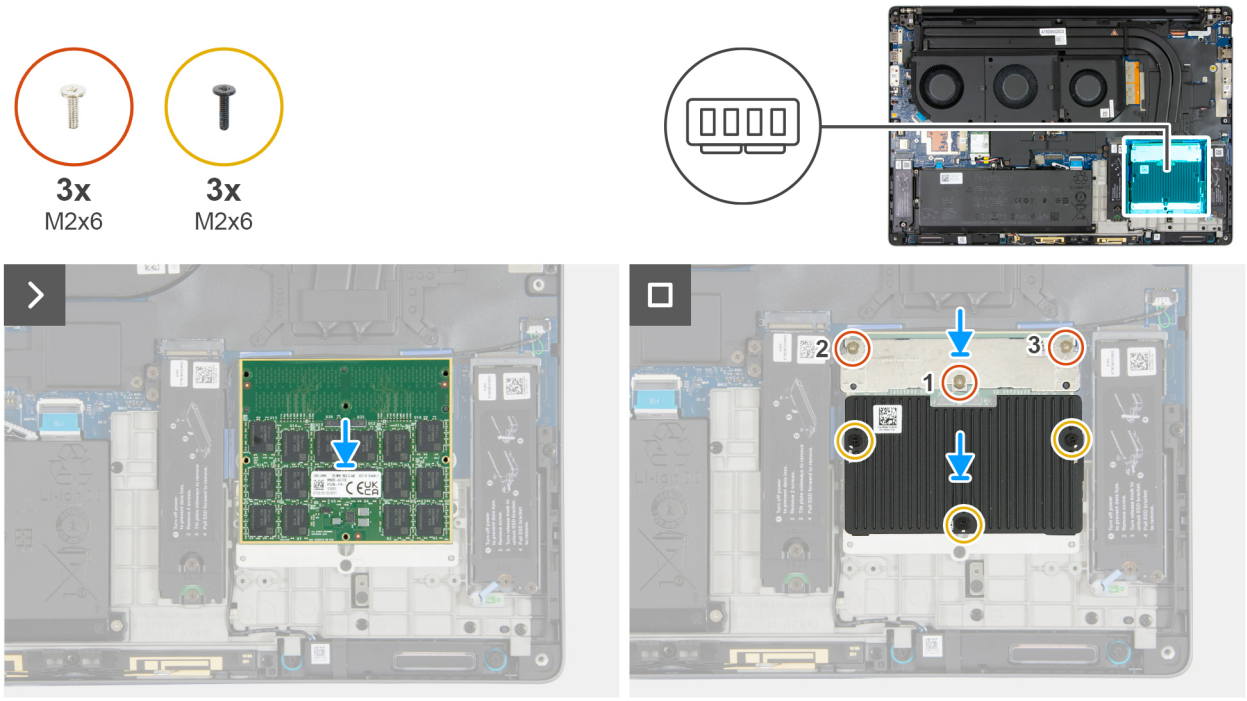


Figure 63. Installing the CAMM module (dual-channel)

Steps

1. Place the CAMM memory module on the system board.
2. Place the retention bracket on the system board.
3. In sequential order (1 > 2 > 3) as indicated on the bracket, replace the three screws (M2x6) that secure the retention bracket to the system board.
4. Place the CAMM memory heat sink on the system board.
5. Replace the three screws (M2x6) that secure the CAMM memory heat sink to the system board.

Next steps

1. Install the NPU card.

   NOTE: Applicable on computers shipped with NPU card.

2. Install the sliding door or full base cover, as applicable.
3. Install the SD card.
4. Follow the procedures in After working inside your computer.

Fan assembly

Removing the fan 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.

5. Remove the WWAN card (optional).
6. Remove the dummy fan, for computers shipped with integrated graphics.

About this task

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

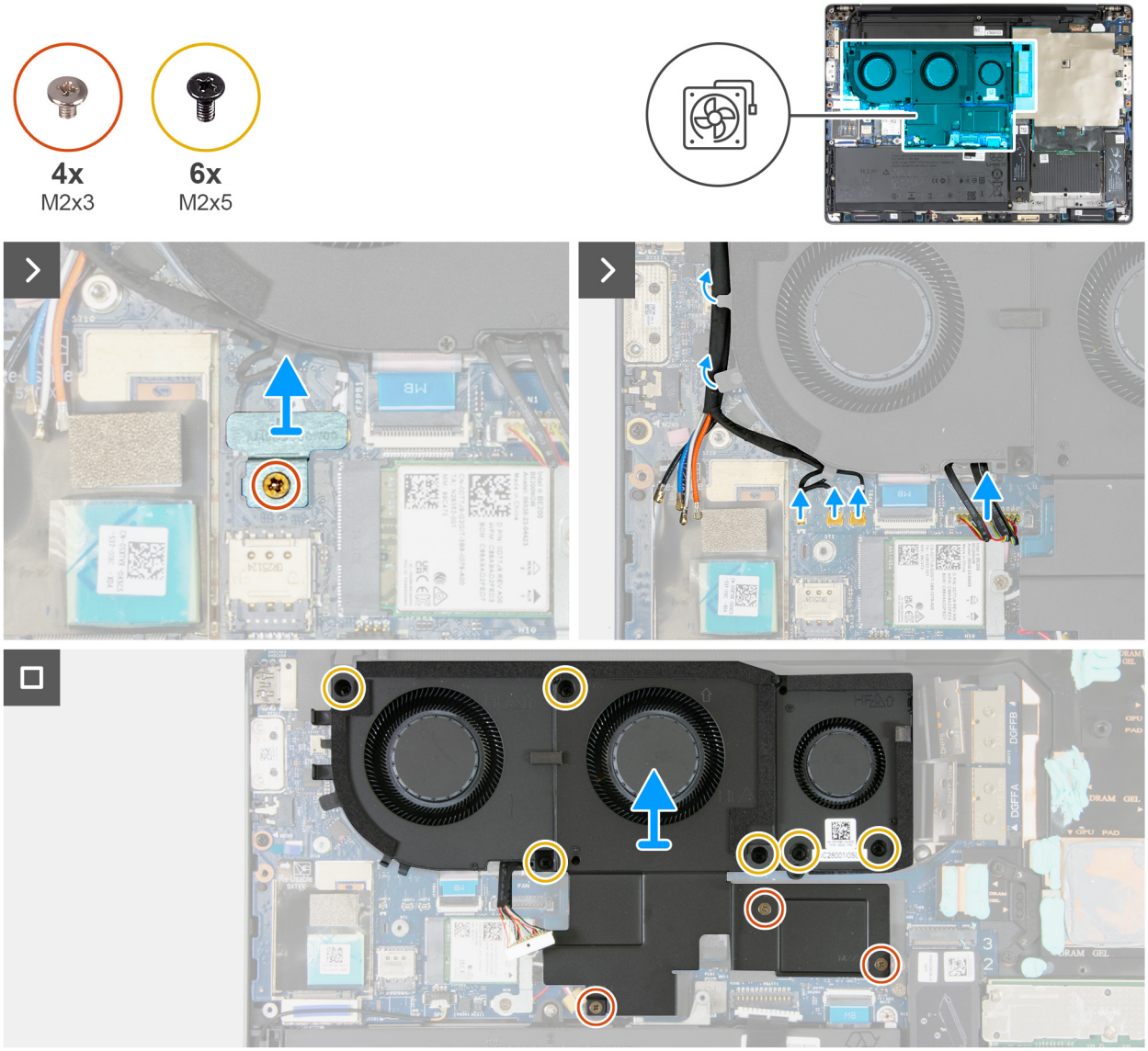


Figure 64. Removing the fan assembly

Steps

1. Follow these steps for computers that are shipped with WWAN antennas and discrete graphics card:
   a. Remove the screw (M2x3) that secures the Darwin bracket to the system board.
   b. Remove the Darwin bracket from the system board.
   c. Disconnect the black WWAN P-sensor cable (JANT3), Darwin 1 antenna cable (JANT1), and Darwin 2 antenna cable (JANT2) from connectors on the system board.
   d. Remove the following cables from the routing guides from the routing guides next to the fan.
      - White/grey 0 antenna cable
      - Orange 1 antenna cable
      - Blue 2 antenna cable
      - Black/grey 3 antenna cable
      - Black WWAN P-sensor cable

- Darwin 1 antenna cable
- Darwin 2 antenna cable

e. Disconnect the fan cable from the connector (JFAN1) on the system board.
f. Remove the three screws (M2x3) that secure the fan assembly to the system board.
g. Remove the six screws (M2x5) that secure the fan assembly to the palm-rest and keyboard assembly.
h. Remove the fan assembly from the system board.

2. Follow these steps for computers shipped with an integrated graphics card:
   a. Disconnect the fan cable from the connector (JFAN1) on the system board.
   b. Remove the three screws (M2x3) that secure the fan assembly to the system board.
   c. Remove the four screws (M2x5) that secure the fan assembly to the system board.
   d. Remove the fan assembly from the system board.

Installing the fan 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 procedure.

About this task

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

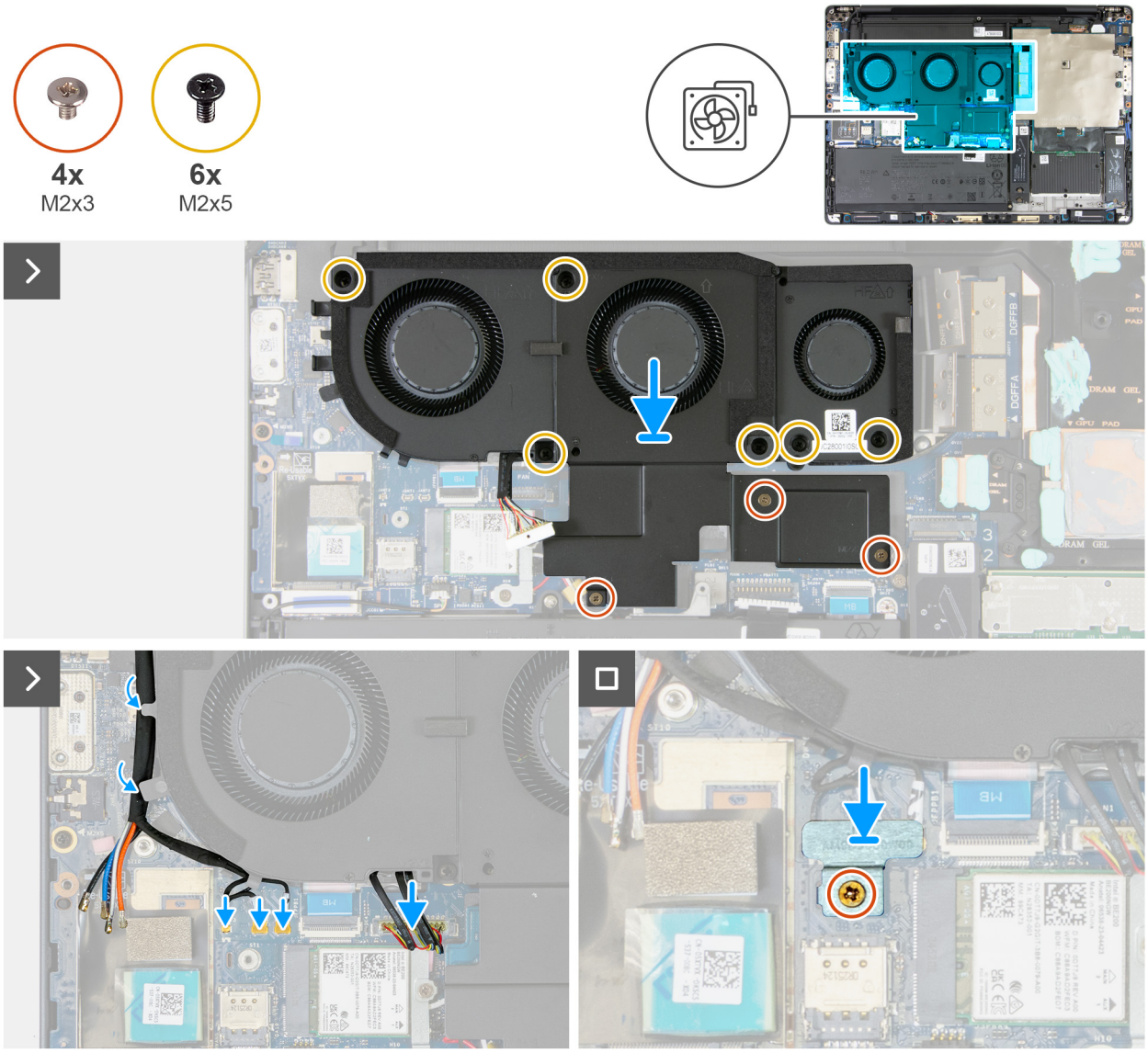


Figure 65. Installing the fan assembly

Steps

1. Follow these steps for computers that are shipped with WWAN antennas and discrete graphics card:
   a. Align the screw holes on the fan assembly with the screw holes on the system board, and place the fan assembly on the system board.
   b. Replace the three screws (M2x3) that secure the fan assembly to the system board.
   c. Replace the six screws (M2x5) that secure the fan assembly to the palm-rest and keyboard assembly.
   d. Connect the fan cable to the connector (JFAN1) on the system board.
   e. Route the following cables along the routing guides next to the fan assembly:
      - White/grey 0 antenna cable
      - Orange 1 antenna cable
      - Blue 2 antenna cable
      - Black/grey 3 antenna cable
      - Black WWAN P-sensor cable
      - Darwin 1 antenna cable
      - Darwin 2 antenna cable
   f. Connect the following cables to the connectors on the system board:
      - Black WWAN P-sensor cable (JANT3)
      - Darwin 1 antenna cable (JANT1)

- Darwin 2 antenna cable (JANT2)

g. Place the Darwin bracket on the system board.
h. Replace the screw (M2x3) that secures the Darwin bracket to the system board.

2. Follow these steps for computers shipped with an integrated graphics card:
   a. Place the fan assembly from the system board.
   b. Replace the three screws (M2x3) and four screws (M2x5) that secure the fan assembly to the system board.
   c. Connect the fan cable to the connector (JFAN1) on the system board.

Next steps

1. Install the dummy fan, for computers shipped with integrated graphics.
2. Install the WWAN card (optional).
3. Install the full base cover or base cover with sliding door, as applicable.
4. Install the sliding door, applicable for computers that are shipped with the sliding door.
5. Install the SD card.
6. Follow the procedures in After working inside your computer.

Display assembly

Removing the display 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).

About this task

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

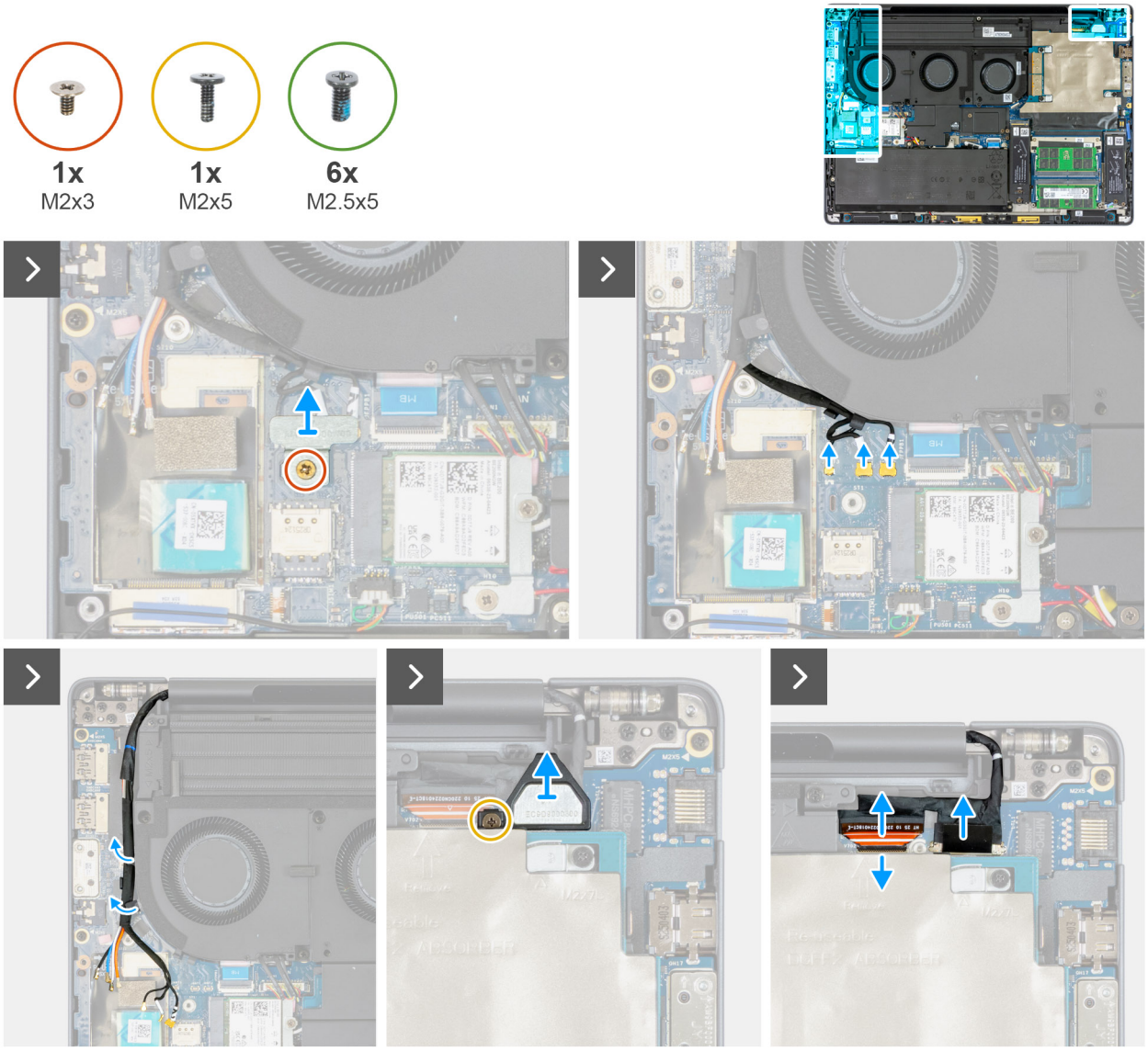


Figure 66. Removing the display assembly

Figure 67. Removing the display assembly

Steps

1. Follow steps 2 to 6, if your computer is shipped with WWAN antennas, else go to step 7.
2. Remove the screw (M2x3) that secures the Darwin bracket to the system board.
3. Lift to remove the Darwin bracket.
4. Disconnect the following cables from the connectors on the system board:
   - Black WWAN P-sensor cable (JANT3)
   - Darwin 1 antenna cable (JANT1)
   - Darwin 2 antenna cable (JANT2)
5. Remove the following cables from the routing guides next to the fan:
   - White/grey 0 antenna cable
   - Orange 1 antenna cable
   - Blue 2 antenna cable
   - Black/grey 3 antenna cable
   - Black WWAN P-sensor cable
   - Darwin 1 antenna cable
   - Darwin 2 antenna cable
6. Remove the screw (M2x3) that secures the display-cable bracket to the system board.
7. Remove the display-cable bracket from the computer.
8. Open the latch to disconnect the camera cable from the connector (IR) on the system board.
9. Disconnect the display cable from the connector (JEDP1) on the system board.
10. Open the display assembly to a 180-degree angle. Place the computer at the edge of a flat table so that the display assembly can extend below the table.
11. Remove the six screws (M2.5x5) that secure the hinges to the palm-rest and keyboard assembly.
12. Remove the display assembly from the palm-rest and keyboard assembly.

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 procedure.

About this task

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

Figure 68. Installing the display assembly

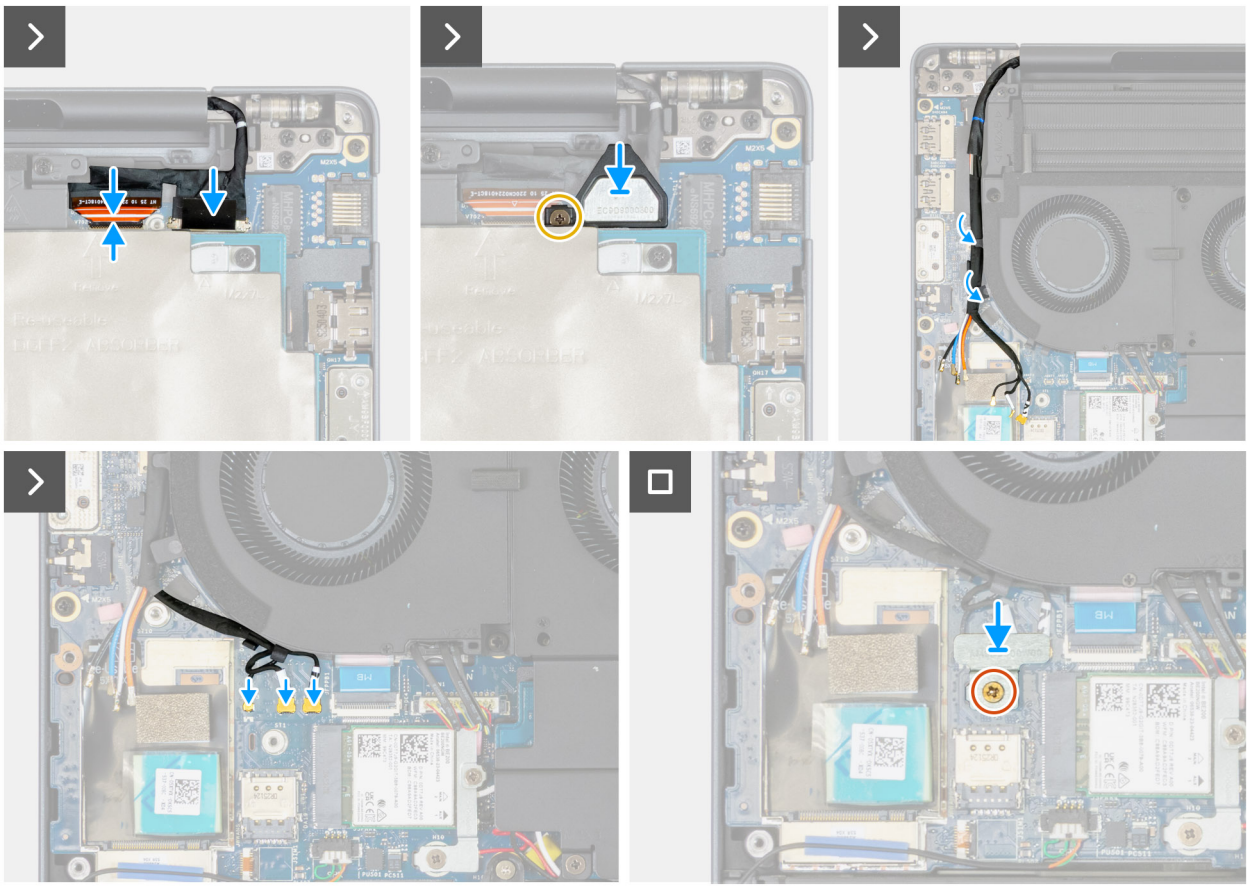


Figure 69. Installing the display assembly

Steps

1. Slide the display assembly below the display hinges to place the display assembly on the alignment post.
2. Replace the six screws (M2.5x5) that secure the hinges to the palm-rest and keyboard assembly.
3. Connect the camera cable to the connector (IR) and close the latch, and the display cable to the connector (JEDP1) on the system board.
4. Replace the display-cable bracket on the computer.
5. Replace the screw (M2x3) that secures the display-cable bracket to the system board.
6. Follow steps 7 to 10, if your computer is shipped with WWAN antennas, else go to step 9.
7. Route the following cables along the routing guides next to the fan:
   - White/grey 0 antenna cable
   - Orange 1 antenna cable
   - Blue 2 antenna cable
   - Black/grey 3 antenna cable
   - Black WWAN P-sensor cable
   - Darwin 1 antenna cable
   - Darwin 2 antenna cable
8. Connect the following cables to the connectors on the system board:
   - Black WWAN P-sensor cable (JANT3)
   - Darwin 1 antenna cable (JANT1)
   - Darwin 2 antenna cable (JANT2)
9. Align and place the Darwin bracket.
10. Replace the screw (M2x3) that secures the Darwin bracket to the system board.

Next steps

1. Install the WWAN card (optional).

2. Install the full base cover or base cover with sliding door, as applicable.
3. Install the sliding door, applicable for computers that are shipped with the sliding door.
4. Install the SD card.
5. Follow the procedures in After working inside your computer.

Memory interposer board

Removing the memory interposer board

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

NOTE: Applicable for computers shipped with a SODIMM configuration.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module.

About this task

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

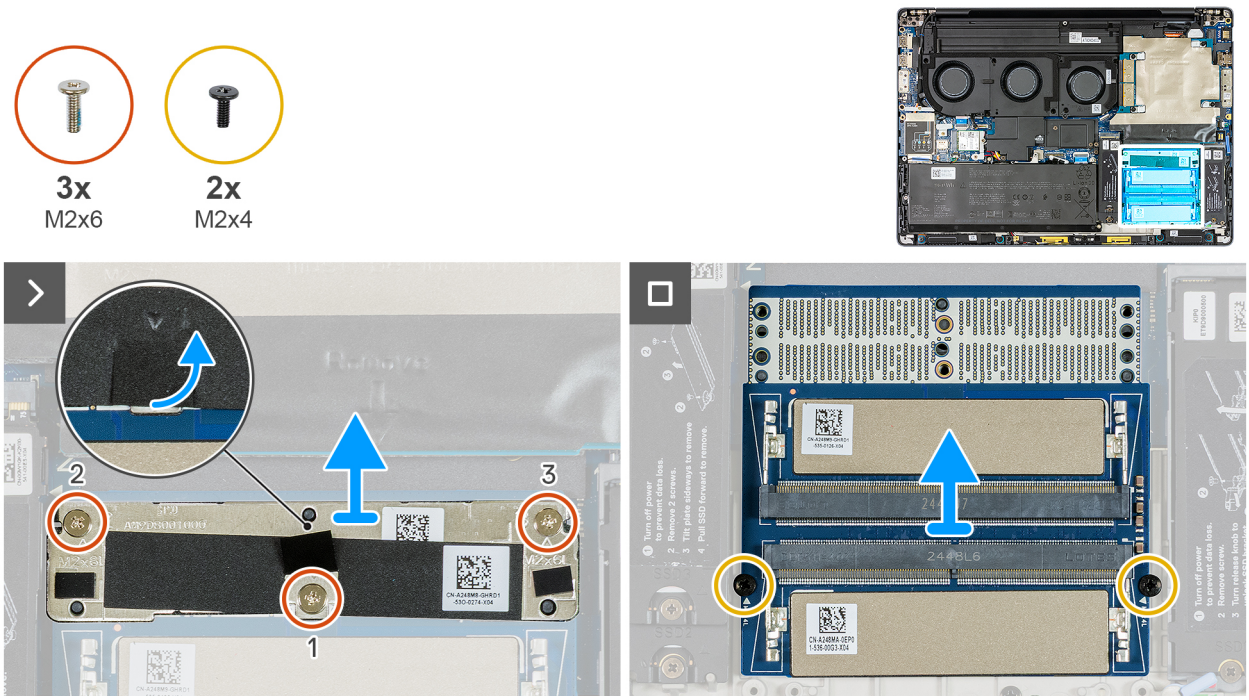


Figure 70. Removing the memory interposer board

Steps

1. In reverse sequential order (3 > 2 > 1), remove the three screws (M2x6) that secure the memory interposer board bracket to the system board.
2. Lift the memory interposer board bracket off the memory interposer board.
3. Remove the two screws (M2x4) that secure the memory interposer board to the inner frame.

4. Lift and remove the memory interposer board from the system board.

Installing the memory interposer board

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

NOTE: Applicable for computers shipped with a SODIMM configuration.

Prerequisites

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

About this task

NOTE:

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

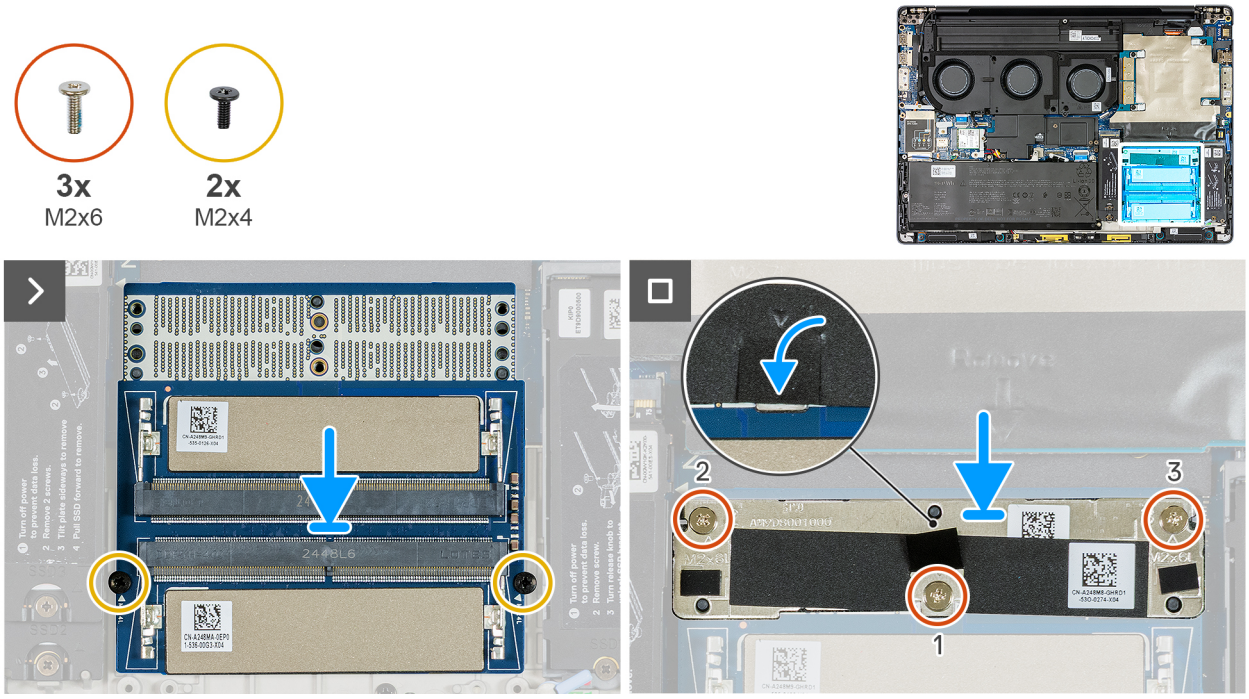


Figure 71. Installing the display assembly

Steps

1. Place the memory interposer board on the system board.
2. Replace the two screws (M2x4) that secure the memory interposer board to the inner frame.
3. Place the memory interposer board bracket on the memory interposer board.
4. In sequential order (1 > 2 > 3), replace three screws (M2x6) that secure the memory interposer board bracket to the memory interposer board.

Next steps

1. Install the memory module.
2. Install the full base cover or base cover with sliding door, as applicable.
3. Install the sliding door, applicable for computers that are shipped with the sliding door.
4. Install the SD card.
5. Follow the procedures in After working inside your computer.

Memory connector

Removing the memory connector

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.

About this task

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

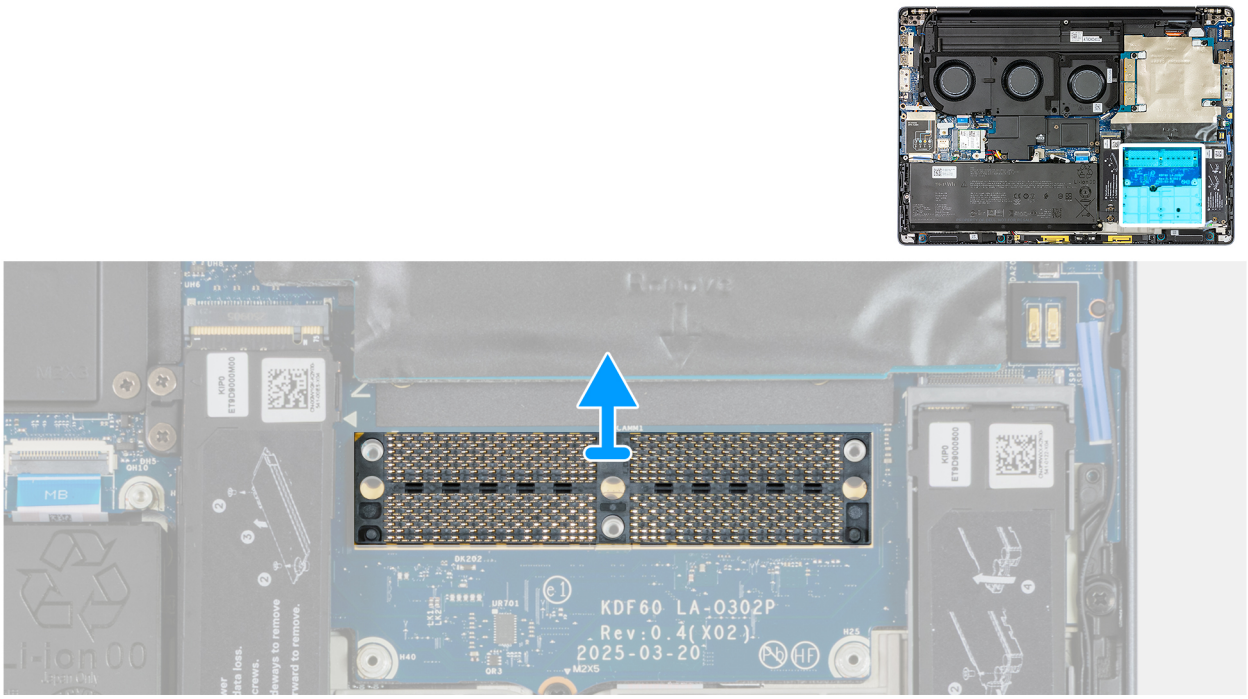


Figure 72. Removing the memory connector

Steps

Using your fingers, pinch the top and bottom of the memory connector to lift and remove the memory connecter (JCAMM1) from the system board.

NOTE: To prevent the risk of damaging pins while handling the memory connector, you only need to remove the memory connector when you are replacing the system board.

Installing the memory connector

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 memory connector and provide a visual representation of the installation procedure.

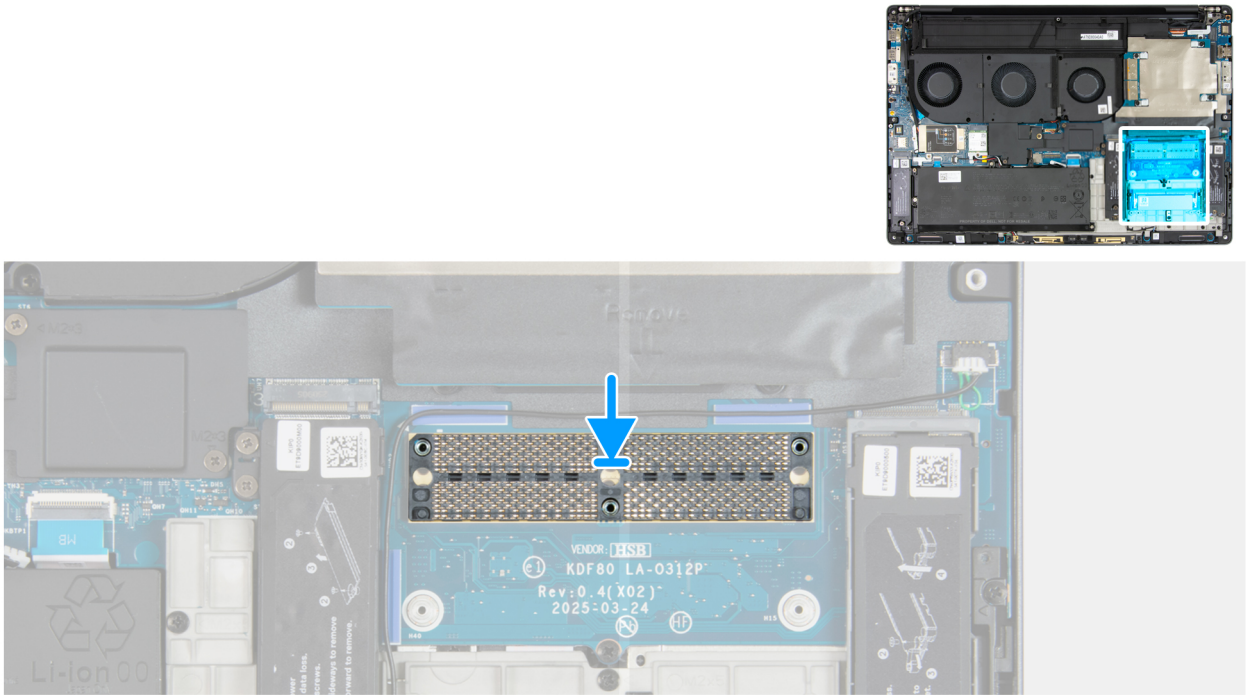


Figure 73. Installing the memory connector

Steps

1. Ensure that the memory connector is oriented correctly with the triangle etching or beveled corner at the top-left hand side of the memory connector.
2. Using the alignment posts, place the memory connector (JCAMM1) on the system board.

Next steps

1. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
2. Install the memory module, if applicable.
3. Install the full base cover or base cover with sliding door, as applicable.
4. Install the sliding door, applicable for computers that are shipped with the sliding door.
5. Install the SD card.
6. Follow the procedures in After working inside your computer.

Power board

Removing the power 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
6. Remove the fan assembly.

About this task

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

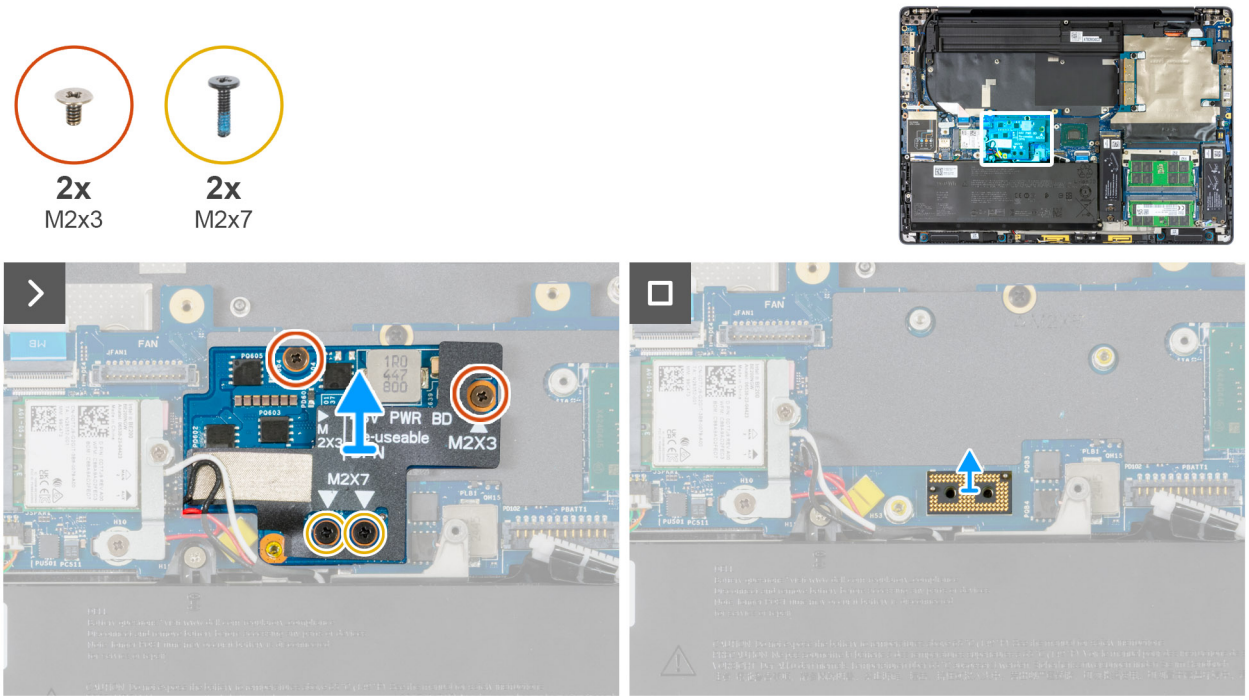


Figure 74. Removing the power board

Steps

1. Remove the two screws (M2x3) that secure the power board to the system board.
2. Remove the two screws (M2x7) that secure the power board to the system board.
3. Remove the power board off the system board.
4. Remove the interposer board off the connector (P3LVL1) on the system board.

Installing the power 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 procedure.

About this task

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

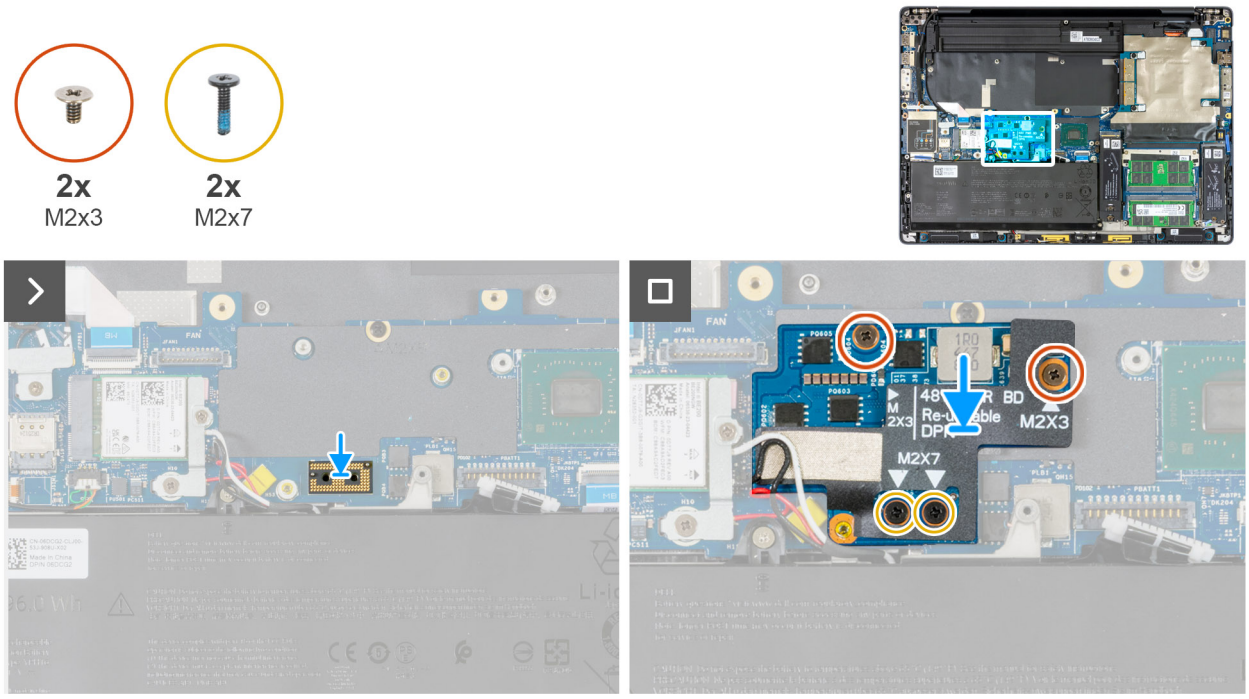


Figure 75. Installing the power board

Steps

1. Using the alignment posts, place the interposer board on the connector (P3LVL1) on the system board.
2. Using the alignment posts, place the power board on the system board.
3. Replace the two screws (M2x7) that secure the power board to the system board.
4. Replace the two screws (M2x3) that secure the power board to the system board.

NOTE: If the power board is faulty or improperly installed, the computer fails to turn on, and the power-status indicator does not light up.

Next steps

1. Install the fan assembly.
2. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
3. Install the full base cover or base cover with sliding door, as applicable.
4. Install the sliding door, applicable for computers that are shipped with the sliding door.
5. Install the SD card.
6. Follow the procedures in After working inside your computer.

Heat sink

Removing the heat sink for computers shipped with integrated graphics

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.

4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the fan assembly.
6. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
7. Remove the NPU card, applicable for computers that are shipped with NPU card.

About this task

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

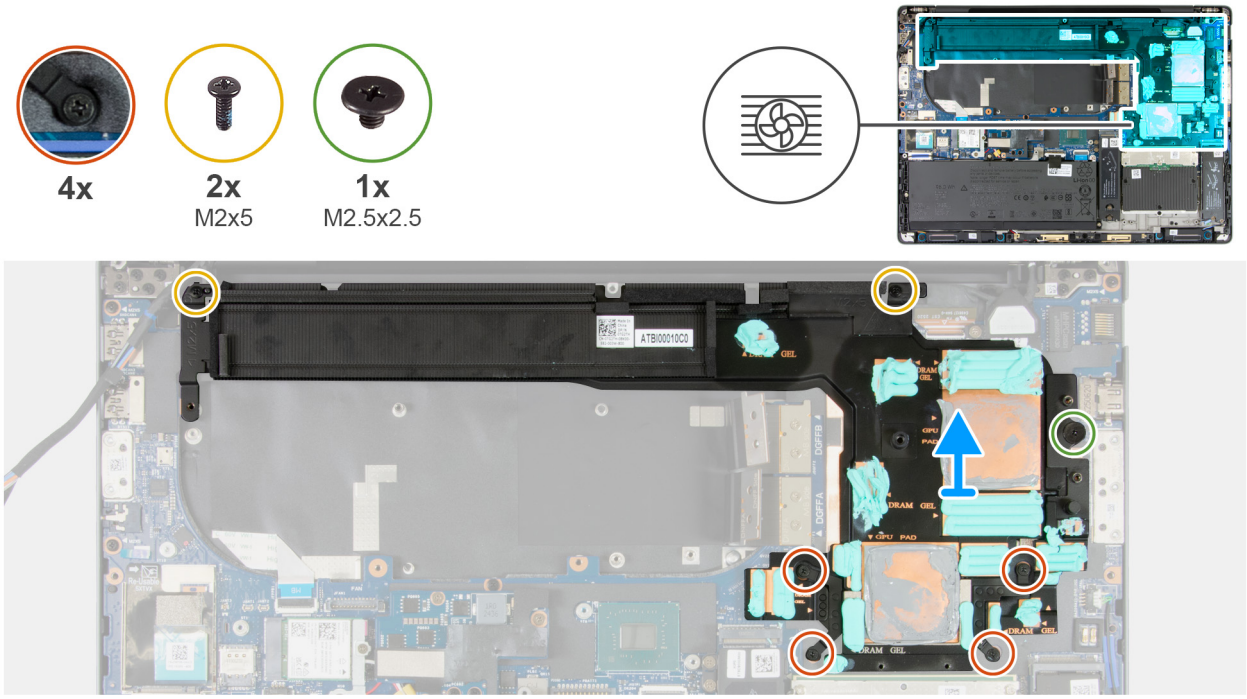


Figure 76. Removing the heat sink for computers shipped with integrated graphics

Steps

1. Remove the two screws (M2x5) that secure the heat sink to the system board.
2. Remove the screw (M2.5x2.5) that secures the heat sink to the system board.
3. In reverse sequential order (4 > 3 > 2 > 1) as indicated on the heat sink, loosen the four captive screws that secure the heat sink to the system board.
4. Lift the heat sink off the system board.

Installing the heat sink for computers shipped with integrated graphics

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 heat sink and provide a visual representation of the installation procedure.

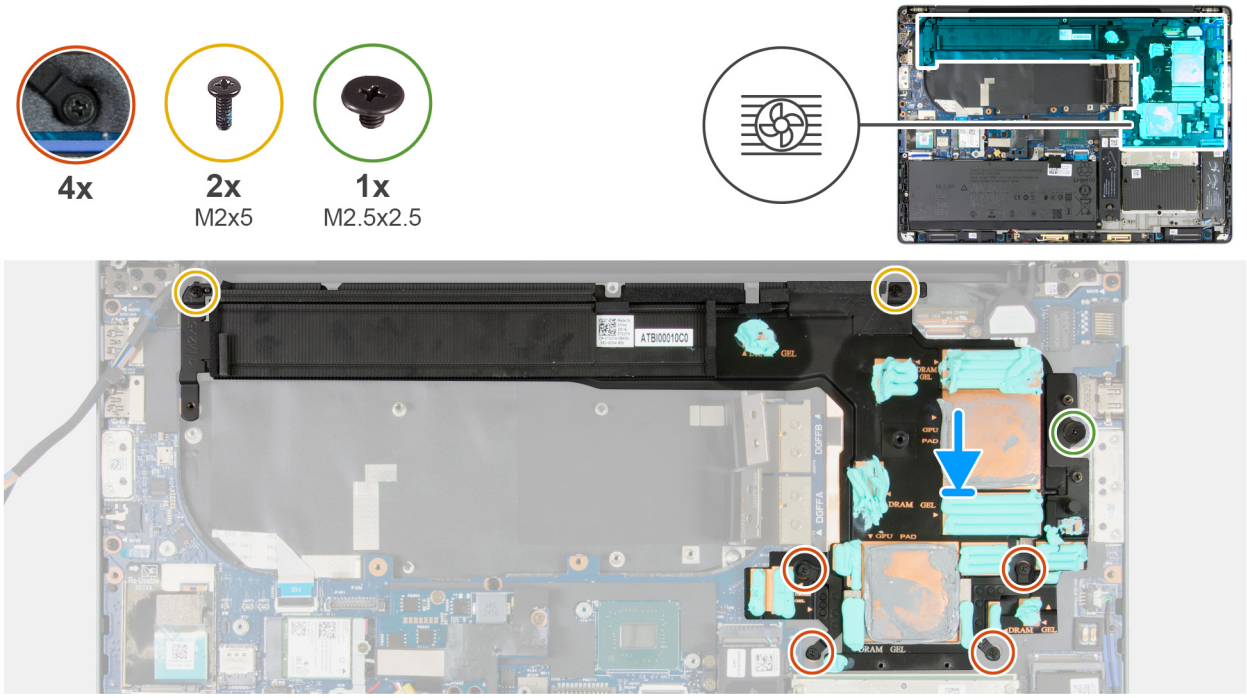


Figure 77. Installing the heat sink for computers shipped with integrated graphics

Steps

1. Align the screw holes on the heat sink with the screw holes on the system board.
2. In sequential order (1 > 2 > 3 > 4), as indicated on the heat sink, tighten the four captive screws that secure the heat sink to the system board.
3. Replace the screw (M2.5x2.5) that secures the heat sink to the system board.
4. Replace the two screws (M2x5) that secure the heat sink to the system board.

Next steps

1. Install the NPU card, applicable for computers that are shipped with NPU card.
2. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
3. Install the fan assembly.
4. Install the full base cover or base cover with sliding door, as applicable.
5. Install the sliding door, applicable for computers that are shipped with the sliding door.
6. Install the SD card.
7. Follow the procedures in After working inside your computer.

Removing the heat sink for computers shipped with discrete graphics

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the GPU card, applicable for computers that are shipped with discrete graphics card.
6. Remove the fan assembly.
7. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.

About this task

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

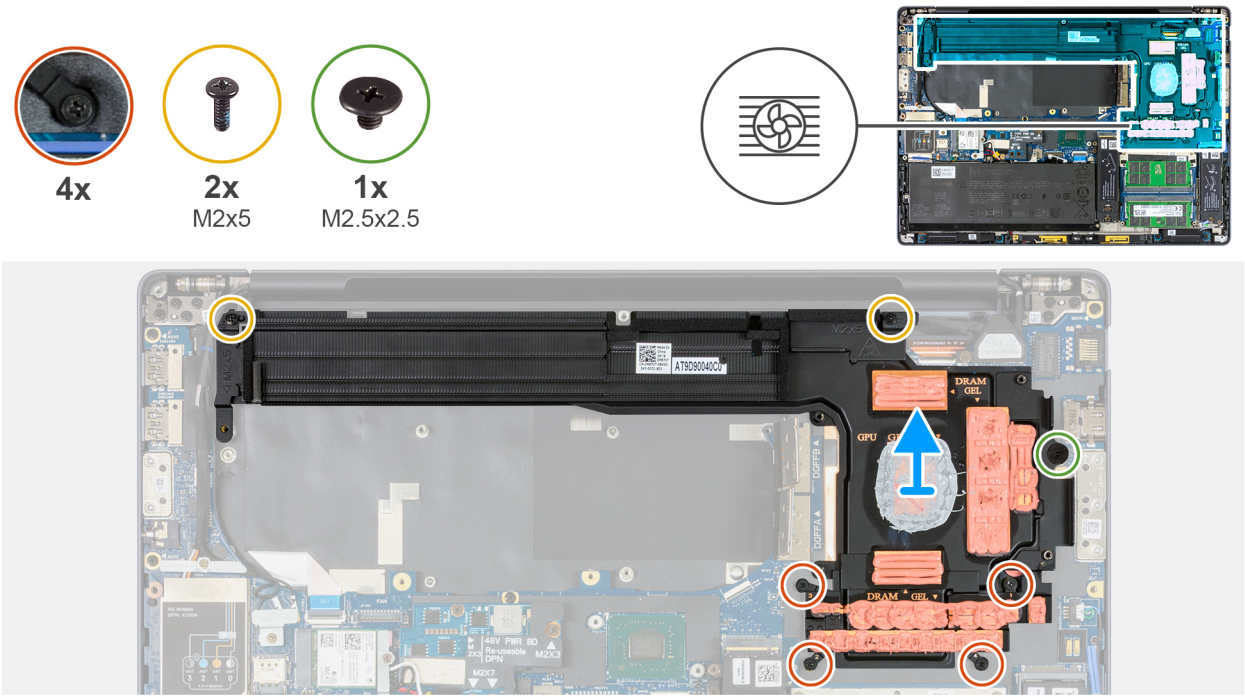


Figure 78. Removing the heat sink for computers shipped with discrete graphics

Steps

1. Remove the two screws (M2x5) that secure the heat sink to the system board.
2. Remove the screw (M2.5x2.5) that secures the heat sink to the system board.
3. In reverse sequential order (4 > 3 > 2 > 1) as indicated on the heat sink, loosen the four captive screws that secure the heat sink to the system board.
4. Lift the heat sink off the system board.

Installing the heat sink for computers shipped with discrete graphics

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 heat sink and provide a visual representation of the installation procedure.

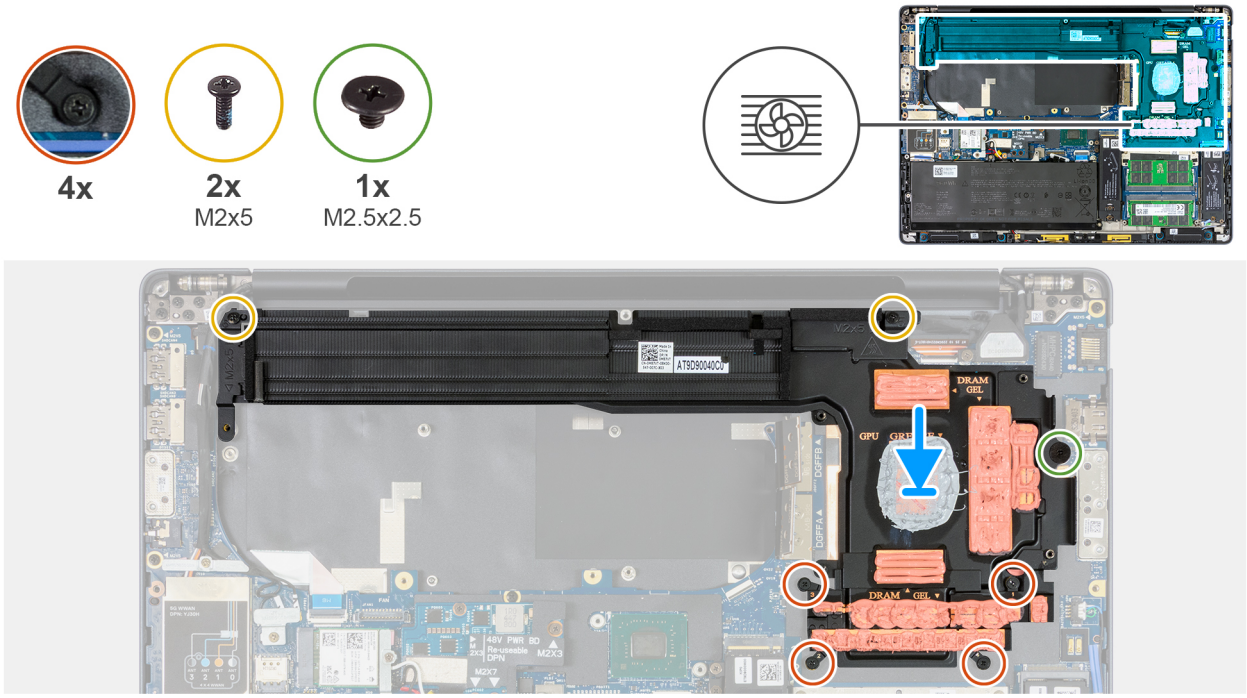


Figure 79. Installing the heat sink for computers shipped with discrete graphics

Steps

1. Using the alignment post, place the heat sink on the system board.
2. Align the screw holes on the heat sink with the screw holes on the system board.
3. In sequential order (1 > 2 > 3 > 4), as indicated on the heat sink, tighten the four captive screws that secure the heat sink to the system board.
4. Replace the screw (M2.5x2.5) that secures the heat sink to the system board.
5. Replace the two screws (M2x5) that secure the heat sink to the system board.

Next steps

1. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
2. Install the fan assembly.
3. Install the GPU card, applicable for computers that are shipped with discrete graphics card.
4. Install the full base cover or base cover with sliding door, as applicable.
5. Install the sliding door, applicable for computers that are shipped with the sliding door.
6. Install the SD card.
7. Follow the procedures in After working inside your computer.

WLAN antenna module

Removing the WLAN antenna 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.

5. Remove the WLAN card.
6. Remove the battery.

About this task

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

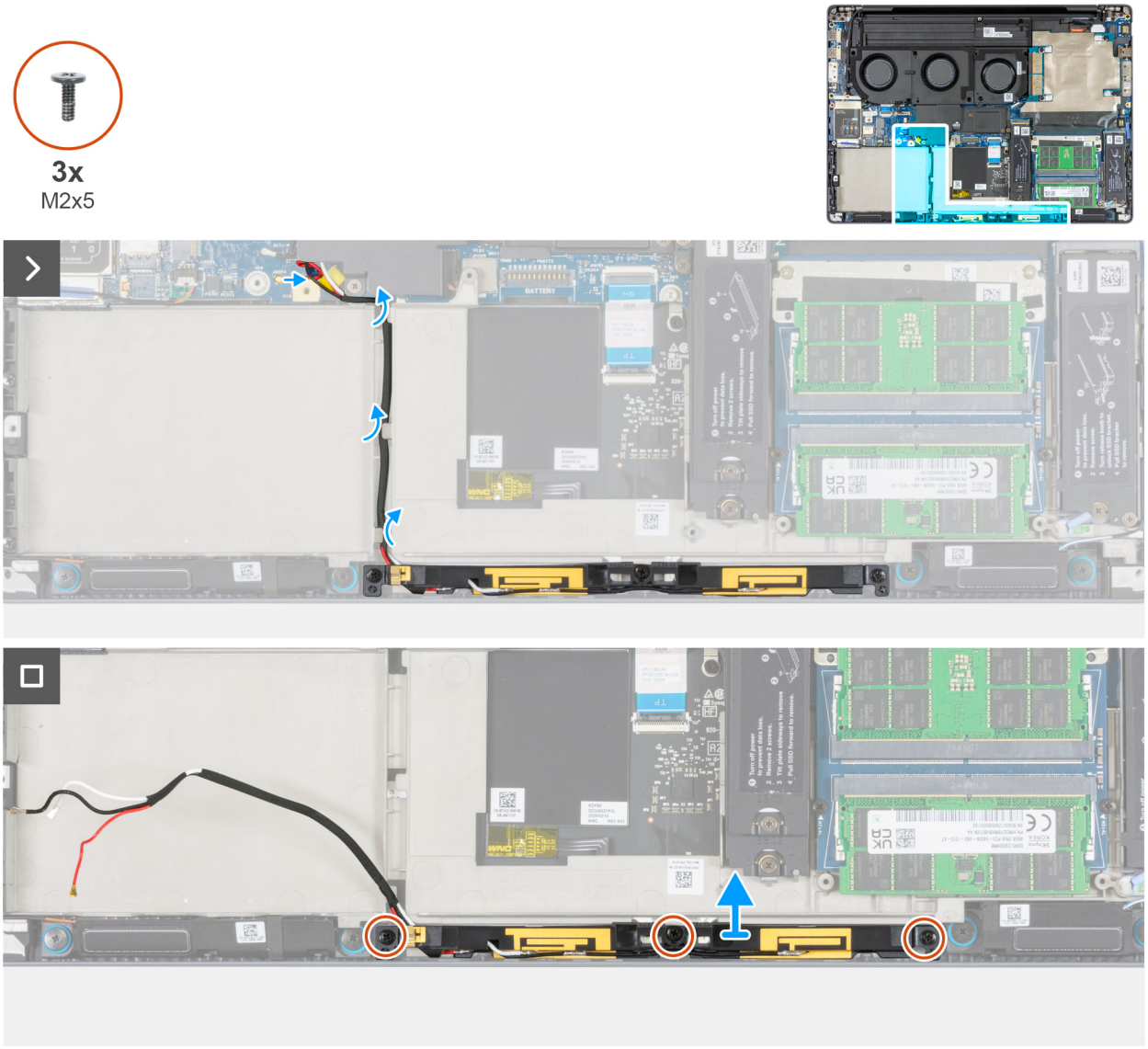


Figure 80. Removing the WLAN antenna module

Steps

1. Disconnect the red WLAN P-sensor cable from the connector (JANT3) on the system board.
2. Remove the following cables from the routing guides on the inner frame.
   - White main WLAN antenna cable
   - Black aux WLAN antenna cable
   - Red WLAN P-sensor antenna cable
3. Remove the three screws (M2x5) that secures the WLAN antenna module to the inner frame.
4. Remove the WLAN antenna module from the inner frame.

Installing the WLAN antenna 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 WLAN antenna module and provide a visual representation of the installation procedure.

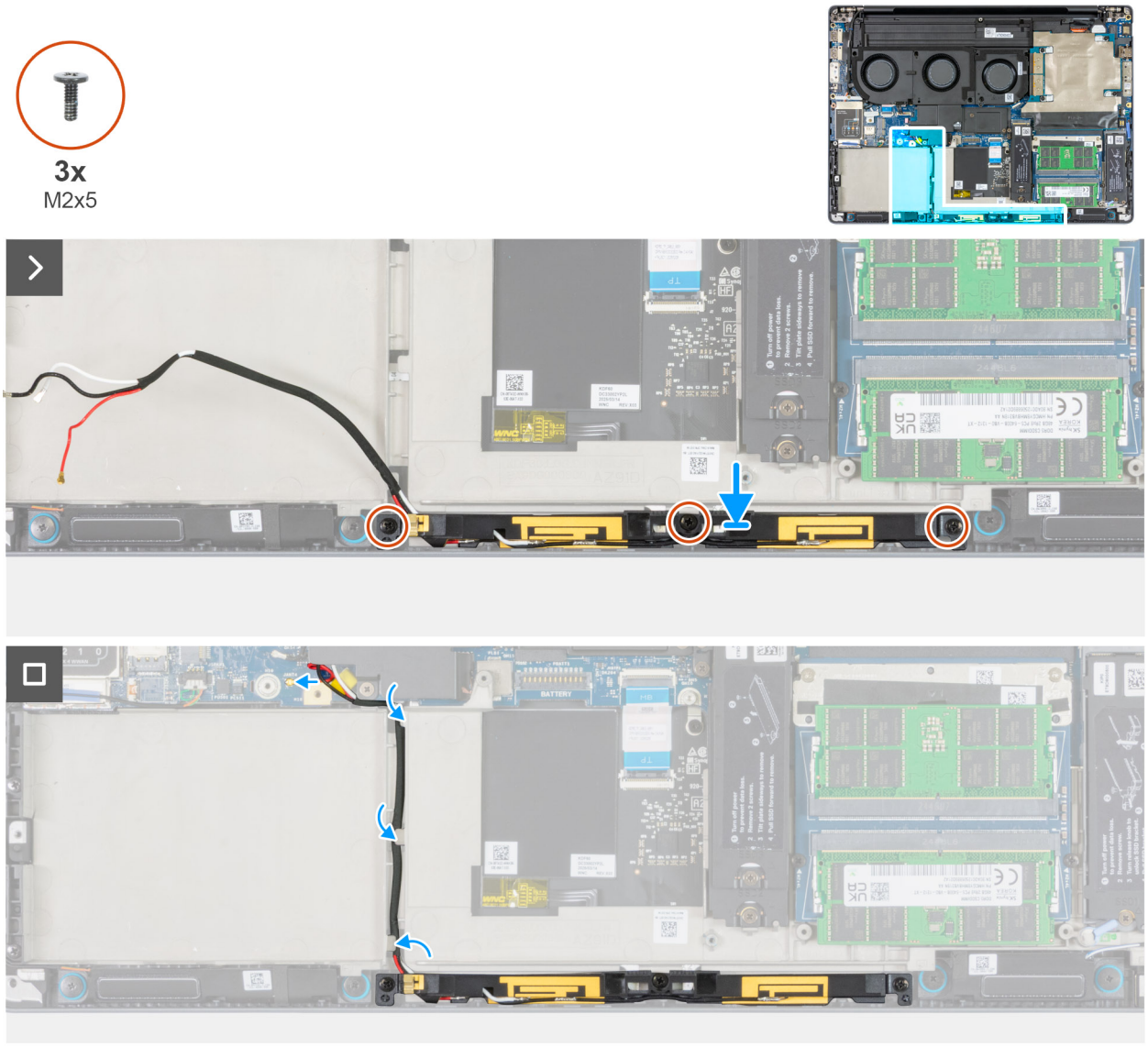


Figure 81. Installing the WLAN antenna module

Steps

1. Using the alignment posts, place the WLAN antenna module on the inner frame.
2. Replace the three screws (M2x5) that secures the WLAN antenna module to the inner frame.
3. Route the following cables along the routing guides on the inner frame.
   - White main WLAN antenna cable
   - Black aux WLAN antenna cable

- Red WLAN P-sensor antenna cable

4. Connect the red WLAN P-sensor cable to the connector (JANT3) on the system board.

Next steps

1. Install the battery.
2. Install the WLAN card.
3. Install the full base cover or base cover with sliding door, as applicable.
4. Install the sliding door, applicable for computers that are shipped with the sliding door.
5. Install the SD card.
6. Follow the procedures in After working inside your computer.

Inner frame

Removing the inner frame

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the M.2 2280 SSD from slot 1 (SSD1).
7. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
8. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
9. Remove the M.2 2230 SSD.
10. Remove the WLAN card.
11. Remove the WWAN card (optional).
12. Remove the NPU card.
13. Remove the battery.
14. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable
15. Remove the WLAN antenna module.

About this task

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

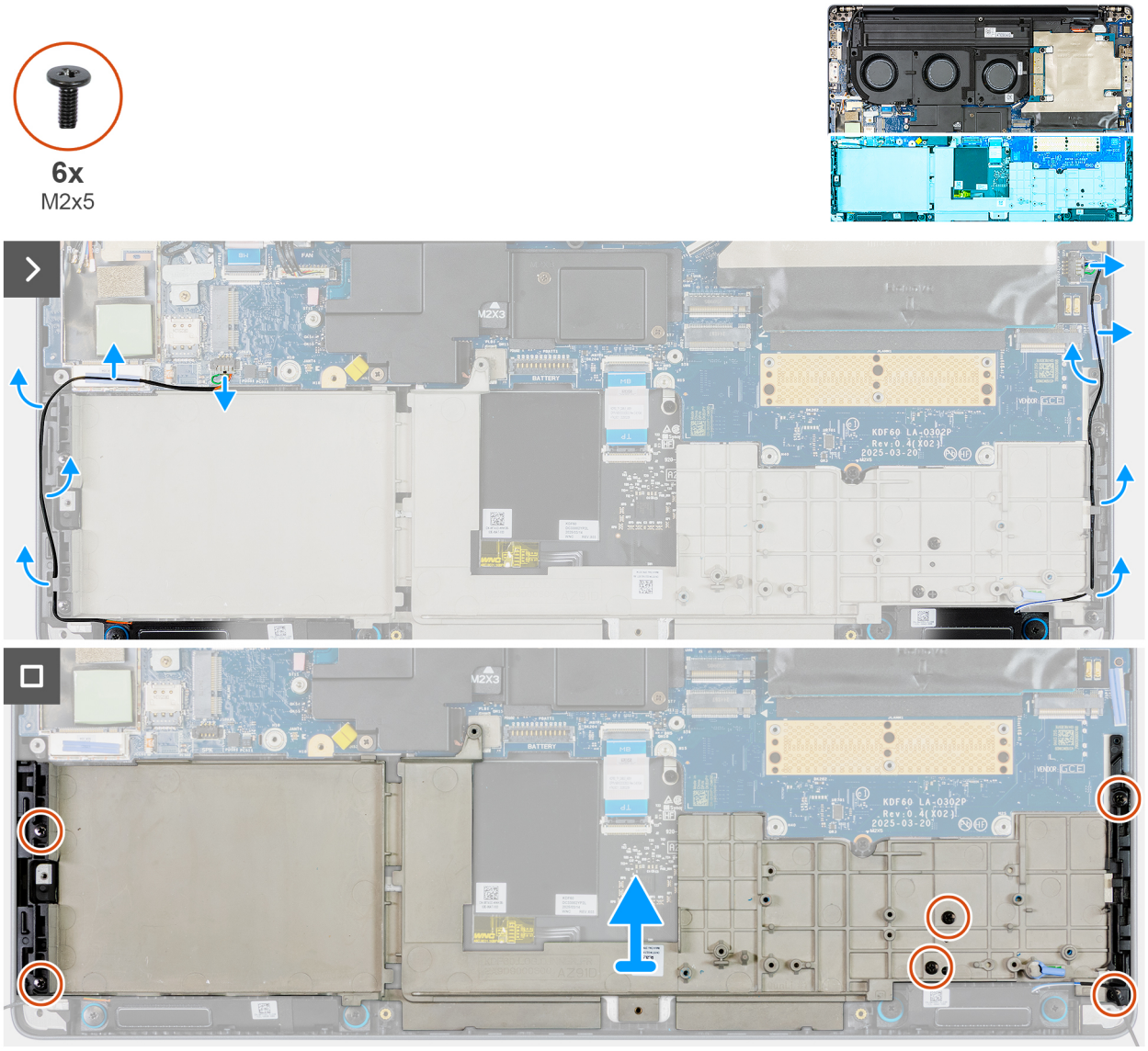


Figure 82. Removing the inner frame

Steps

1. For models shipped with dual-channel CAMM memory, remove the three screws (M1.6x2) that secures the CAMM memory thermal plate in place.
2. For models shipped with dual-channel CAMM memory, remove the CAMM memory thermal plate from the computer.
3. Disconnect the left speaker cable from the connector (JSPKL1) on the system board.
4. Disconnect the right speaker cable from the connector (JSPKR1) on the system board.
5. Remove the left speaker and right speaker cables from the routing guides on the system board and inner frame.
6. Remove the six screws (M2x5) that secure the inner frame to the palm-rest and keyboard assembly.
7. Remove the inner frame from the computer.

Installing the inner frame

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 inner frame and provide a visual representation of the installation procedure.

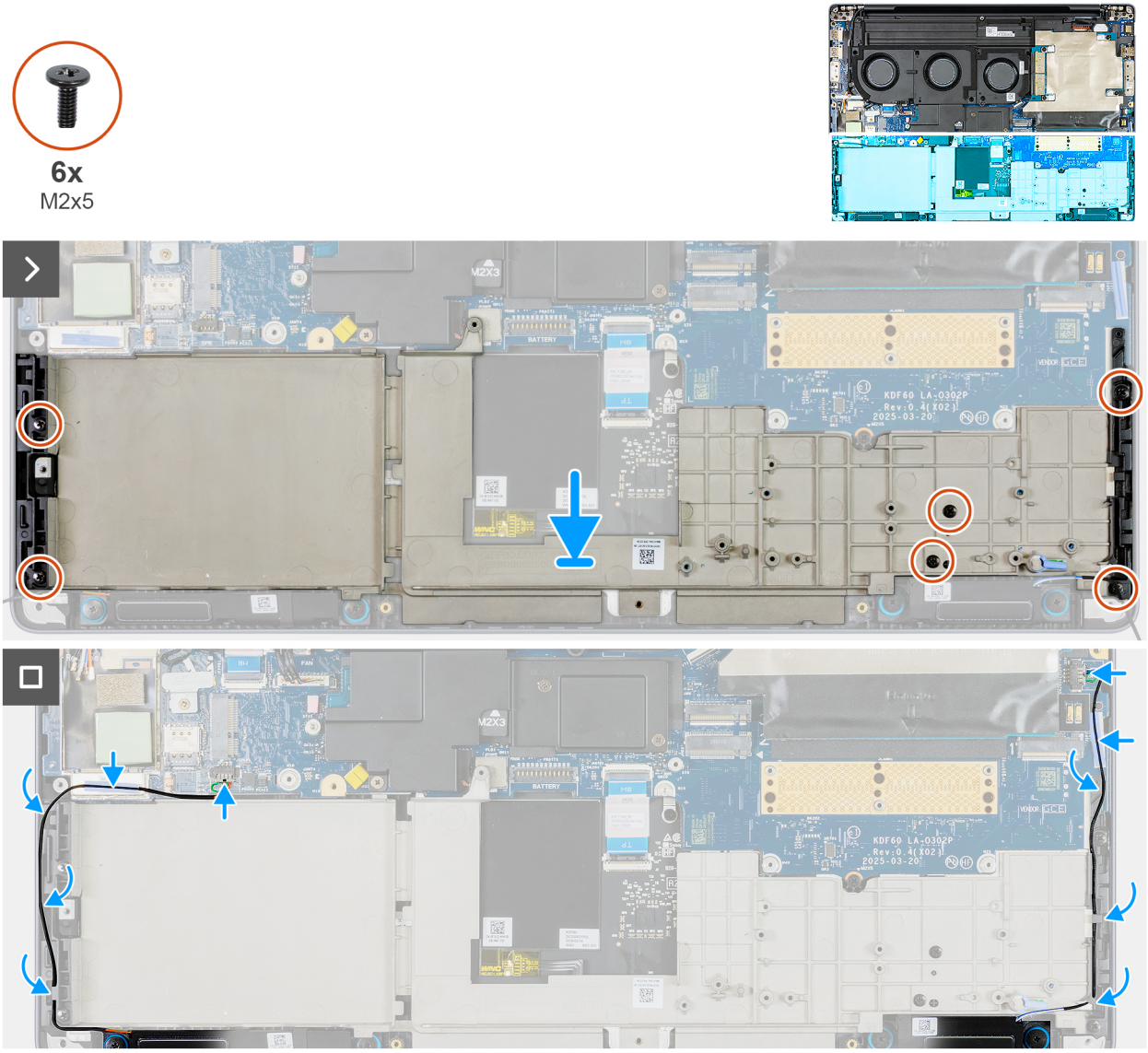


Figure 83. Installing the inner frame

Steps

1. Using the alignment posts, place the inner frame on the palm-rest assembly.
2. Replace the six screws (M2x5) that secure the inner frame to the palm-rest and keyboard assembly.
3. Route the left speaker and right speaker cables along the routing guides on the system board and inner frame.
4. Connect the left speaker cable to the connector (JSPKL1) on the system board.
5. Connect the right speaker cable to the connector (JSPKR1) on the system board.
6. For models shipped with dual-channel CAMM memory, replace the CAMM memory thermal plate on the computer.
7. For models shipped with dual-channel CAMM memory, replace the three screws (M1.6x2) that secures the CAMM memory thermal plate in place.

Next steps

1. Install the WLAN antenna module.
2. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
3. Install the battery.
4. Install the NPU card.

5. Install the WWAN card (optional).
6. Install the WLAN card.
7. Install the M.2 2230 SSD.
8. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
9. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
10. Install the M.2 2280 SSD from slot 1 (SSD1).
11. Install the memory module, if applicable.
12. Install the full base cover or base cover with sliding door, as applicable.
13. Install the sliding door, applicable for computers that are shipped with the sliding door.
14. Install the SD card.
15. Follow the procedures in After working inside your computer.

Speakers

Removing the speakers

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the M.2 2280 SSD from slot 1 (SSD1).
7. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
8. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
9. Remove the M.2 2230 SSD.
10. Remove the WLAN card.
11. Remove the WWAN card (optional).
12. Remove the NPU card.
13. Remove the battery.
14. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
15. Remove the WLAN antenna module.
16. Remove the inner frame.

About this task

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

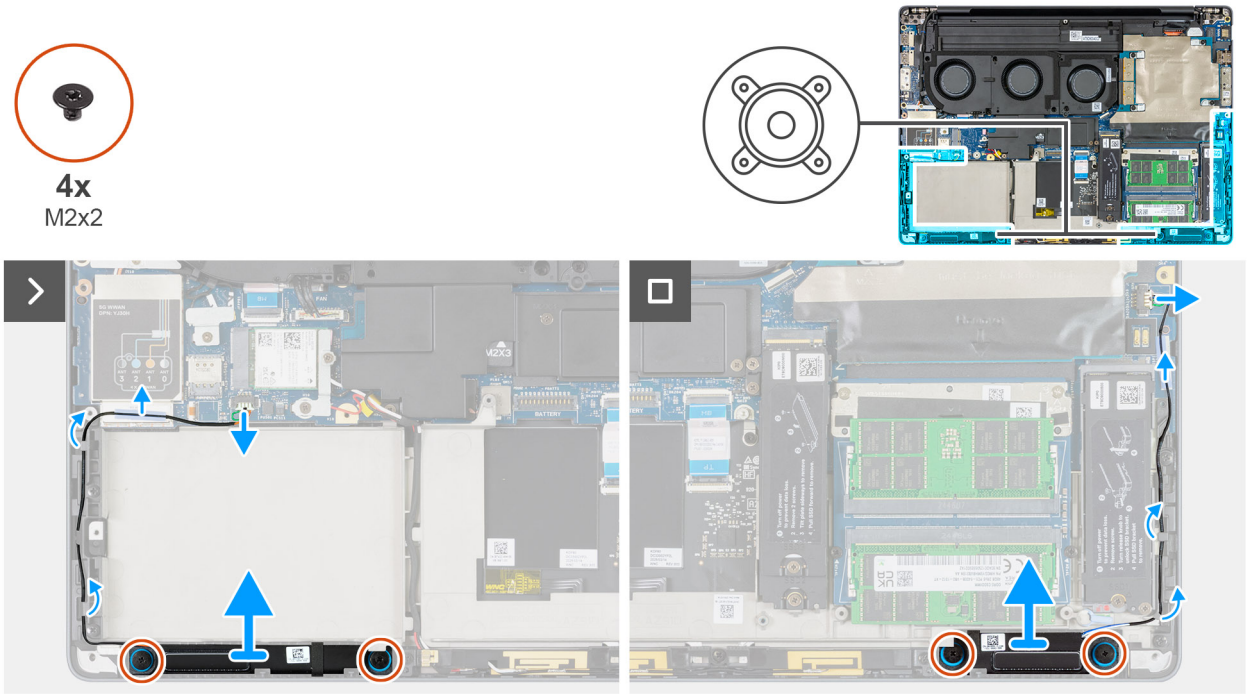


Figure 84. Removing the speakers

Steps

1. Remove the four screws (M2x2) that secure the speakers to the palm-rest and keyboard assembly.
2. Remove the speakers from the palm-rest and keyboard assembly.

Installing the speakers

Prerequisites

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

About this task

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

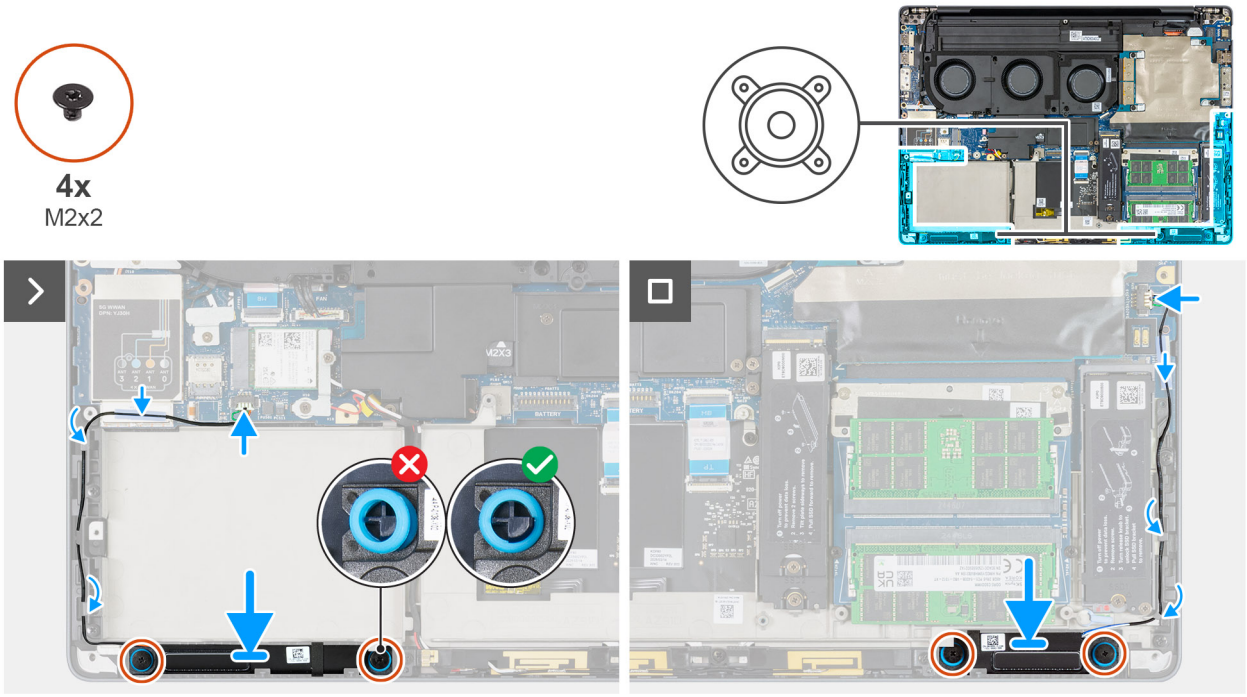


Figure 85. Instaling the speakers

Steps

1. Using the alignment post, place the speakers into its slots on the palm-rest and keyboard assembly.
2. Replace the four screws (M2x2) that secure the speakers to the palm-rest and keyboard assembly.

Next steps

1. Install the inner frame.
2. Install the WLAN antenna module.
3. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
4. Install the battery.
5. Install the NPU card.
6. Install the WWAN card (optional).
7. Install the WLAN card.
8. Install the M.2 2230 SSD.
9. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
11. Install the M.2 2280 SSD from slot 1 (SSD1).
12. Install the memory module, if applicable.
13. Install the full base cover or base cover with sliding door, as applicable.
14. Install the sliding door, applicable for computers that are shipped with the sliding door.
15. Install the SD card.
16. Follow the procedures 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

NOTE: Applicable for computers shipped with non-touchscreen display only.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).
6. Remove the display assembly.

About this task

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

Figure 86. Removing the display bezel

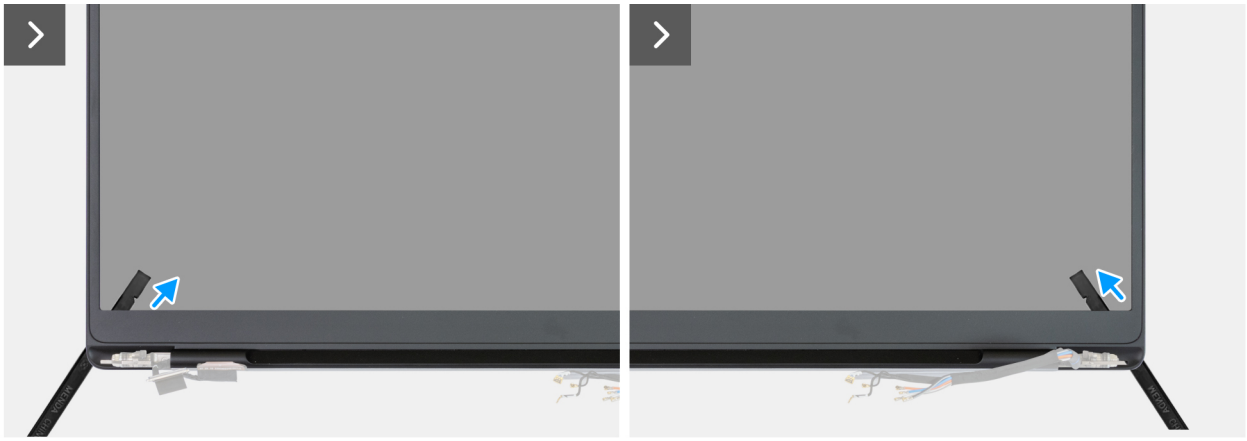


Figure 87. Removing the display bezel

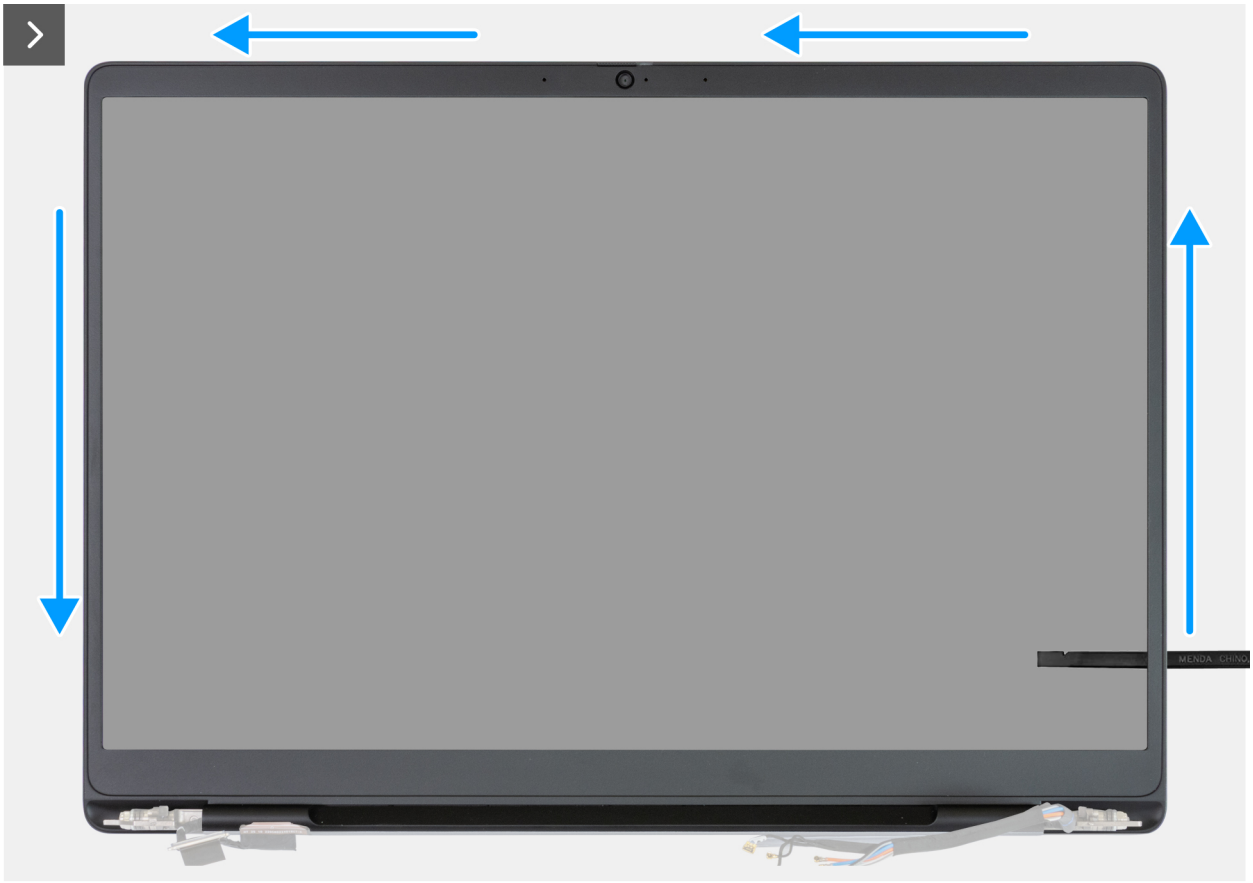


Figure 88. Removing the display bezel

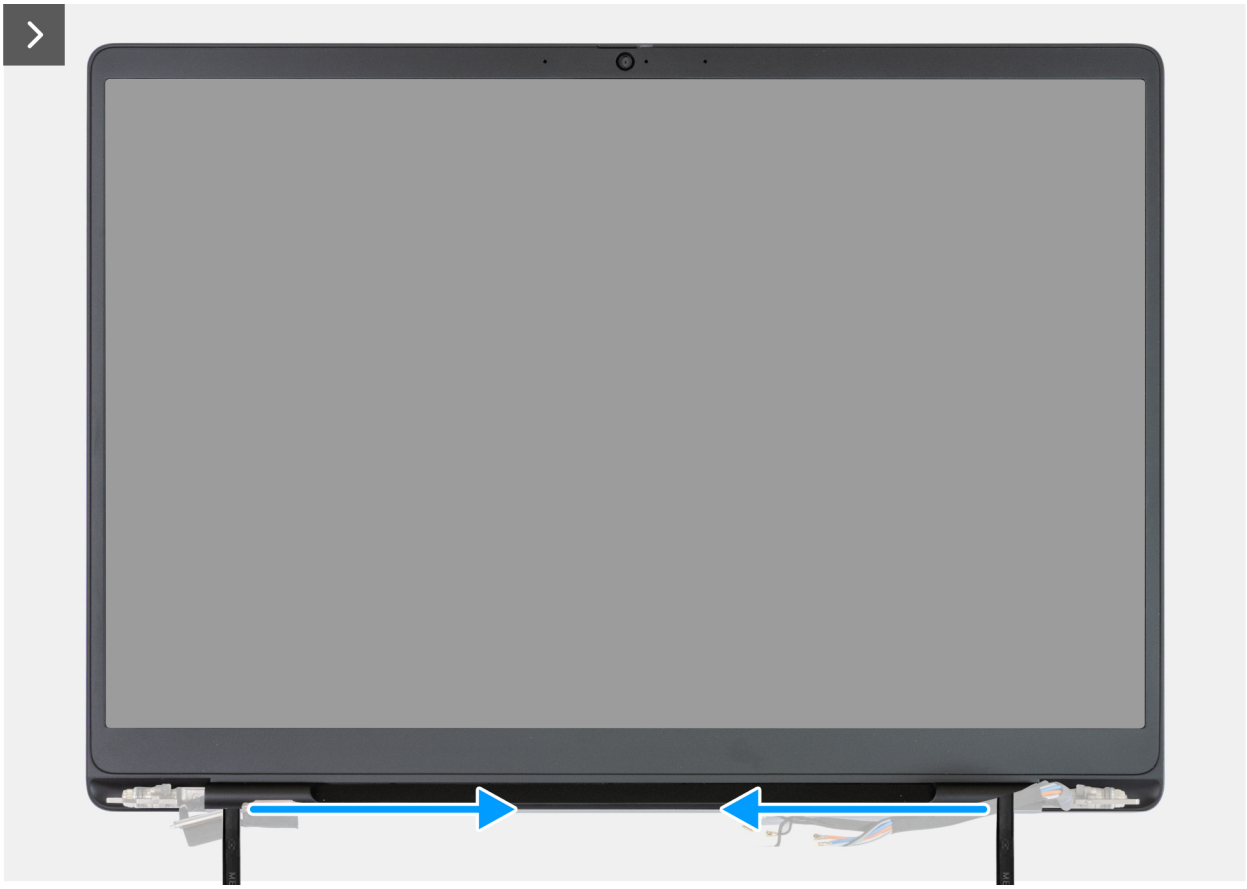


Figure 89. Removing the display bezel

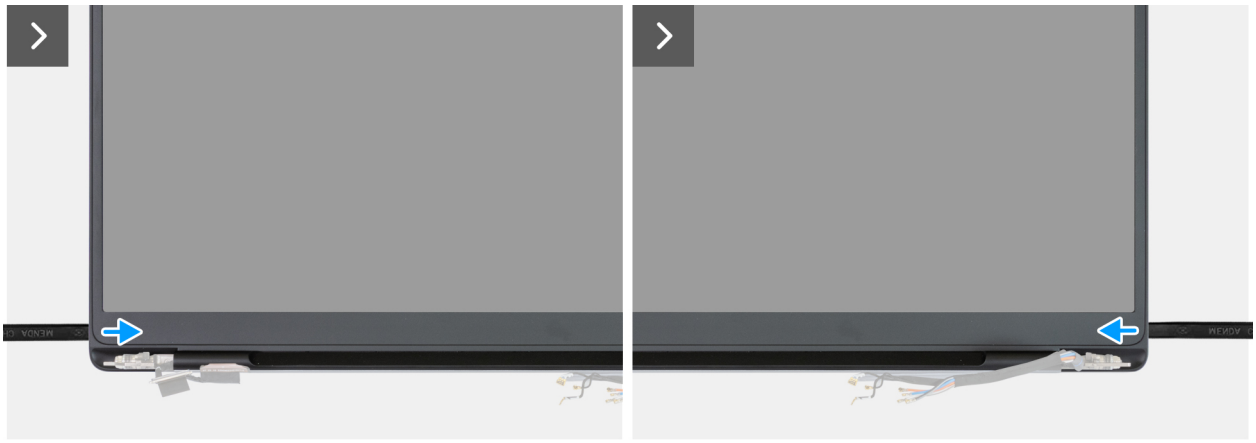


Figure 90. Removing the display bezel

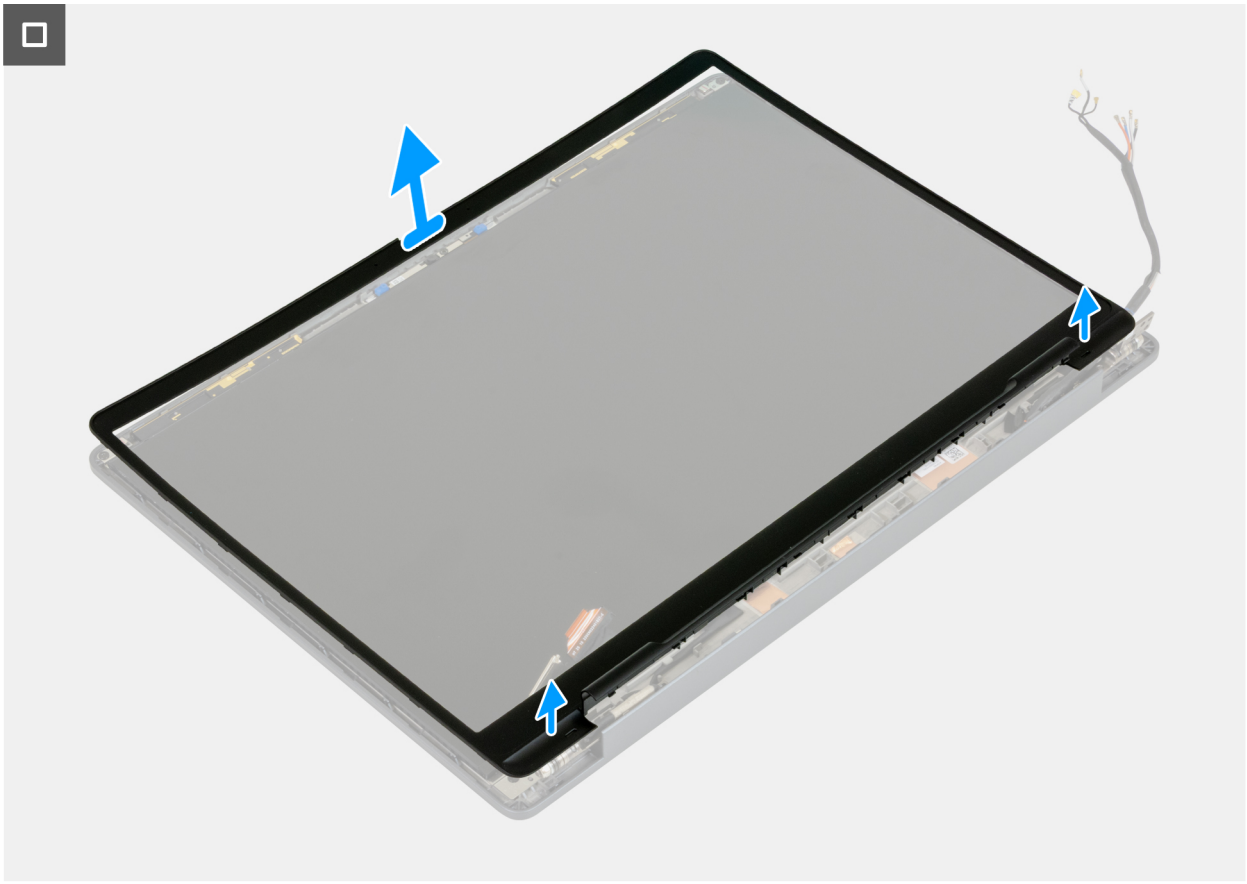


Figure 91. Removing the display bezel

Steps

1. Place the display assembly on a clean, flat surface and gently open the display hinges to at least 90 degrees.
2. Using the flat-side plastic scribe, pry open the display bezel in the locations shown on the left and right hinges.
3. Carefully insert a plastic scribe into the openings near the right display hinge, parallel to the display panel, to release the display bezel from the display.

   NOTE: The display bezel may get damaged during this step. If this happens, replace the display bezel with a new one.

   CAUTION: When inserting the plastic scribe under the display bezel, ensure that it is parallel to the display panel. Pressing it down can damage the display panel.

4. Carefully insert a plastic scribe into the openings near the left display hinge, parallel to the display panel, to release the display bezel from the display.

   NOTE: The display bezel may get damaged during this step. If this happens, replace the display bezel with a new one.

   CAUTION: When inserting the plastic scribe under the display bezel, ensure that it is parallel to the display panel. Pressing it down can damage the display panel.

5. Keeping the plastic scribe parallel to the display panel, pry open the left, right, and top edges of the display bezel and carefully release it from the latches and adhesive on the display assembly.
6. Carefully insert the plastic scribe into the display-hinge cap at an angle of 90 degrees and pry open the display-hinge cap.
7. Keeping the plastic scribe at an angle of 90 degrees to the display panel, continue prying the bottom edge of the display bezel by sliding the scribe across the bottom edge and release it from the latches and adhesive on the display assembly.
8. Keeping the plastic scribe parallel to the right display hinge, insert the plastic scribe into the display bezel from the right edge. Then, carefully release the bezel, above the right display hinge, from the latches and adhesive on the display panel.
9. Keeping the plastic scribe parallel to the left display hinge, insert the plastic scribe into the display bezel from the right edge. Then, carefully release the bezel, above the left display hinge, from the latches and adhesive on the display panel.

10. Lift the bezel to an angle of 15 degrees and gently pry along the middle part of the bottom edge and release the bezel from the latches and adhesive on the display panel.
11. Once all edges are released, carefully 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.

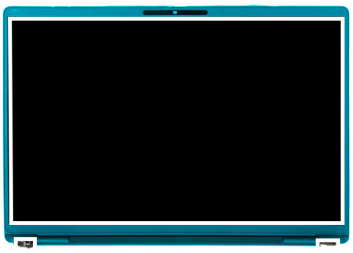
Prerequisites

NOTE: Applicable for computers shipped with non-touchscreen display only.

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

About this task

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



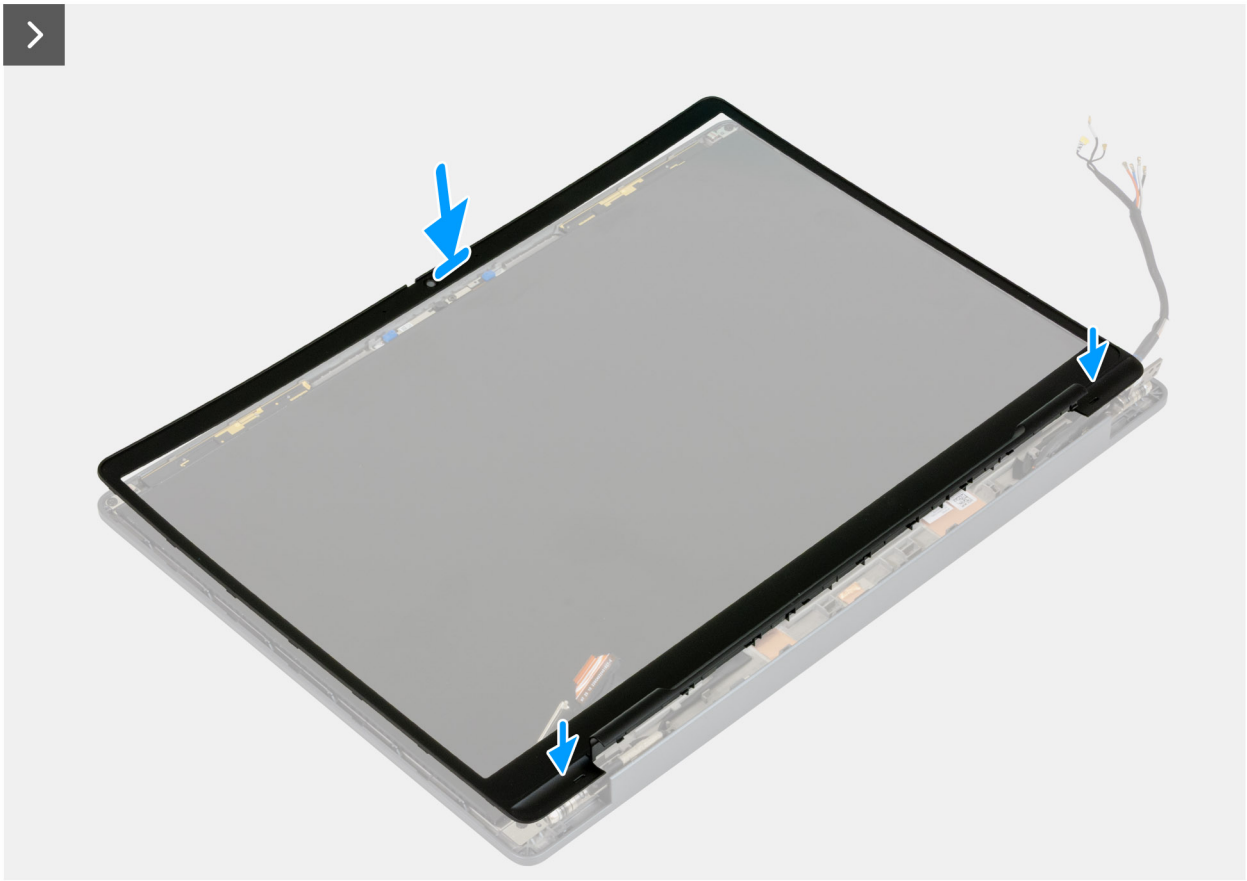


Figure 92. Installing the display bezel

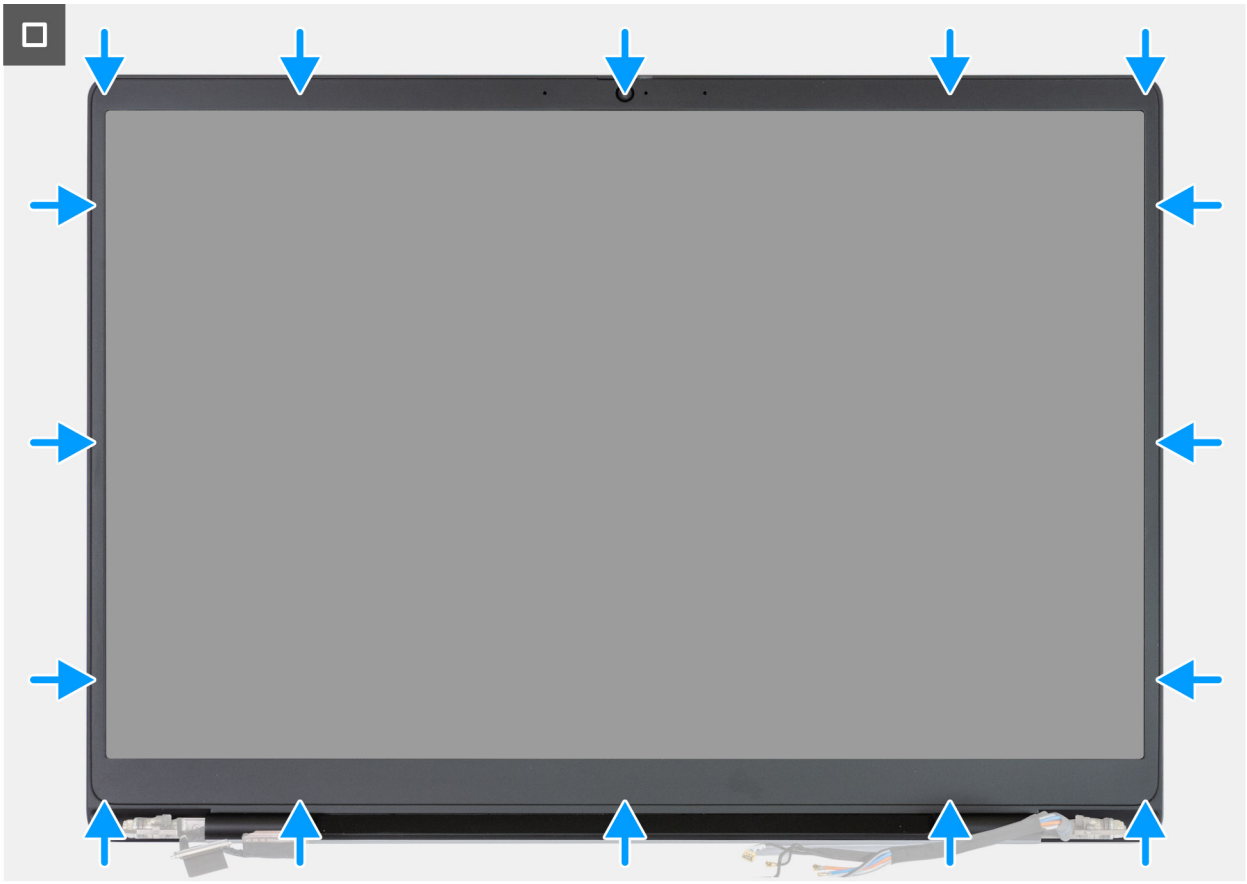


Figure 93. Installing the display bezel

Steps

1. Place the display assembly on a clean and flat surface.
2. Align and place the display bezel on the display assembly.
3. Route the display cable and wireless-antenna cables through the respective display-hinge caps.
4. Press the display-hinge caps down on the display hinges, until they click in place.
5. Starting from the bottom corner, press the display bezel and work around the entire bezel until it snaps onto the display assembly.

Next steps

1. Install the display assembly.
2. Install the WWAN card (optional).
3. Install the full base cover or base cover with sliding door, as applicable.
4. Install the sliding door, applicable for computers that are shipped with the sliding door.
5. Install the SD card.
6. Follow the procedures in After working inside your computer.

Display panel

Removing the display panel for touchscreen displays

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

Prerequisites

NOTE: Applicable for touchscreen displays only.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).
6. Remove the display assembly.

About this task

The following images indicate the location of the display panel (for touchscreen displays) and provide a visual representation of the removal procedure.

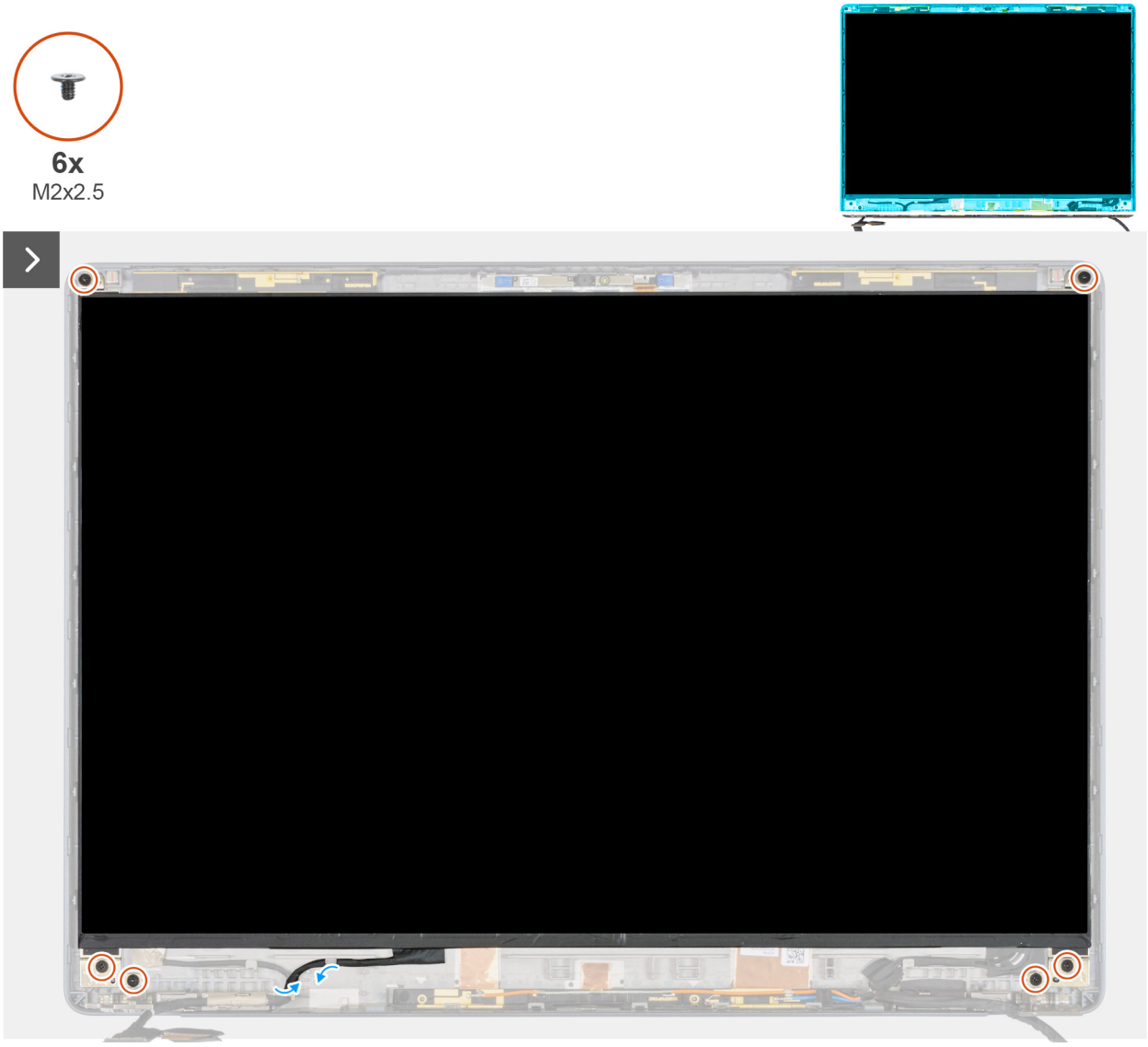


Figure 94. Removing the display panel for touchscreen displays

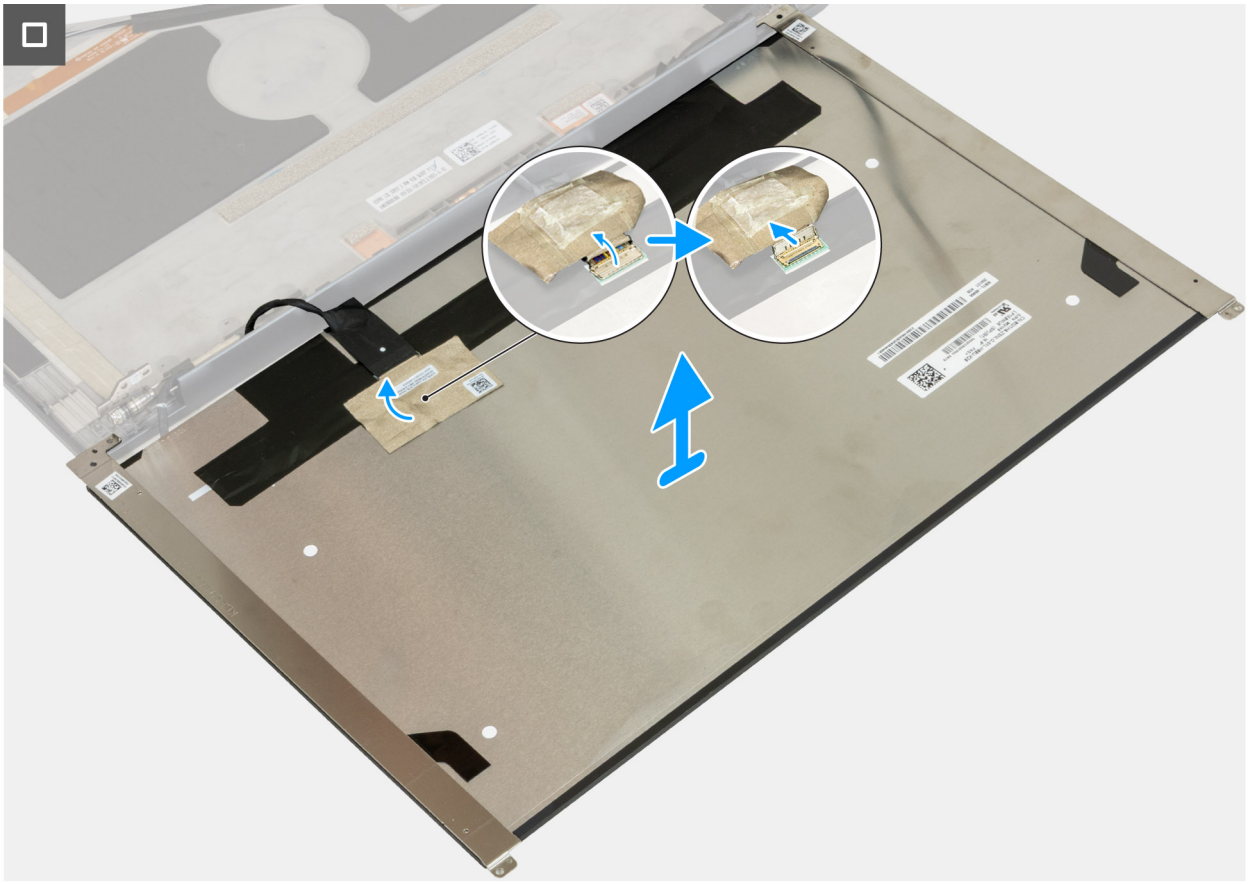


Figure 95. Removing the display panel for touchscreen displays

Steps

1. Peel the display cable from the left display hinge.
2. Remove the six screws (M2x2.5) that secure the display panel to the display back cover.
3. Lift and flip open the display panel to access the display cable.
4. Peel the conductive tape on the display cable connector.
5. Open the latch and disconnect the display cable from the connector on the display panel.
6. Lift the display panel away from the display back cover.

   NOTE: The display panel and its bezel are a single assembly and cannot be further disassembled once it is removed from the display back cover. DO NOT attempt to pry the bezel off the display panel. If the display panel or bezel is malfunctioning and must be replaced, replace the entire display bezel and panel assembly.

7. If your computer is shipped with an IR camera, disconnect the display cable from the IR sensor board. Otherwise, skip this step.

Installing the display panel for touchscreen displays

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 (for touchscreen displays) and provide a visual representation of the removal procedure.

Figure 96. Installing the display panel for touchscreen displays

Figure 97. Installing the display panel for touchscreen displays

Steps

1. If your computer is shipped with an IR camera, connect the display cable from the IR sensor board. Otherwise, skip this step.
2. Using the alignment posts, place the display panel close to the display hinges on the display back cover.
3. Connect the display cable to the connector on the display panel and close the latch.
4. Adhere the conductive tape on the display cable connector.
5. Flip and close the display panel to connect the display cable.
6. Adhere the display cable to the left display hinge.
7. Replace the six screws (M2x2.5) that secure the display panel to the display back cover.

Next steps

1. Install the display assembly.
2. Install the WWAN card (optional).
3. Install the full base cover or base cover with sliding door, as applicable.
4. Install the sliding door, applicable for computers that are shipped with the sliding door.
5. Install the SD card.
6. Follow the procedures in After working inside your computer.

Removing the display panel for non-touchscreen displays

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

Prerequisites

NOTE: Applicable for non-touchscreen displays only.

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).
6. Remove the display assembly.

About this task

The following images indicate the location of the display panel (for non-touchscreen displays) and provide a visual representation of the removal procedure.

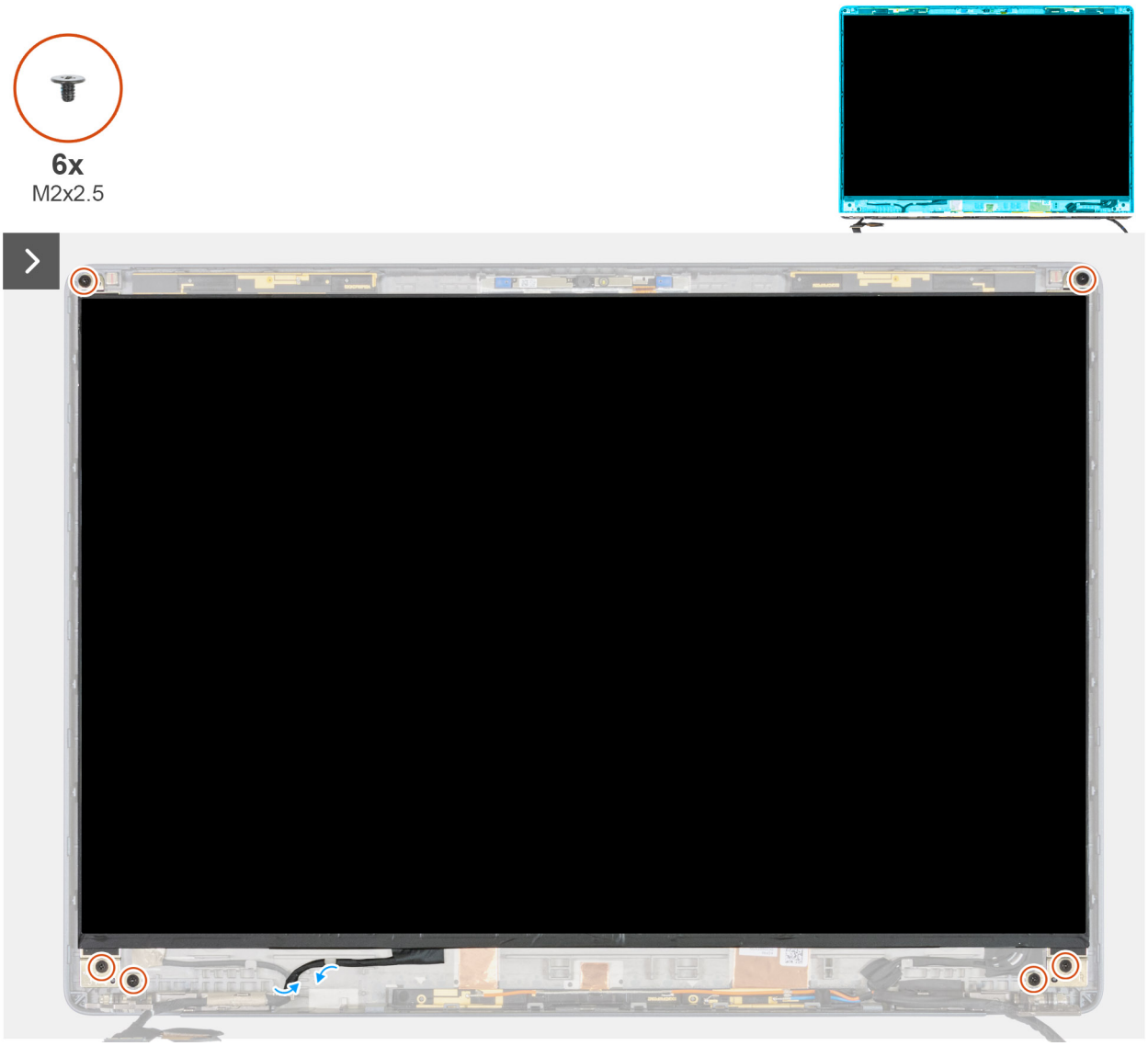


Figure 98. Removing the display panel for non-touchscreen displays

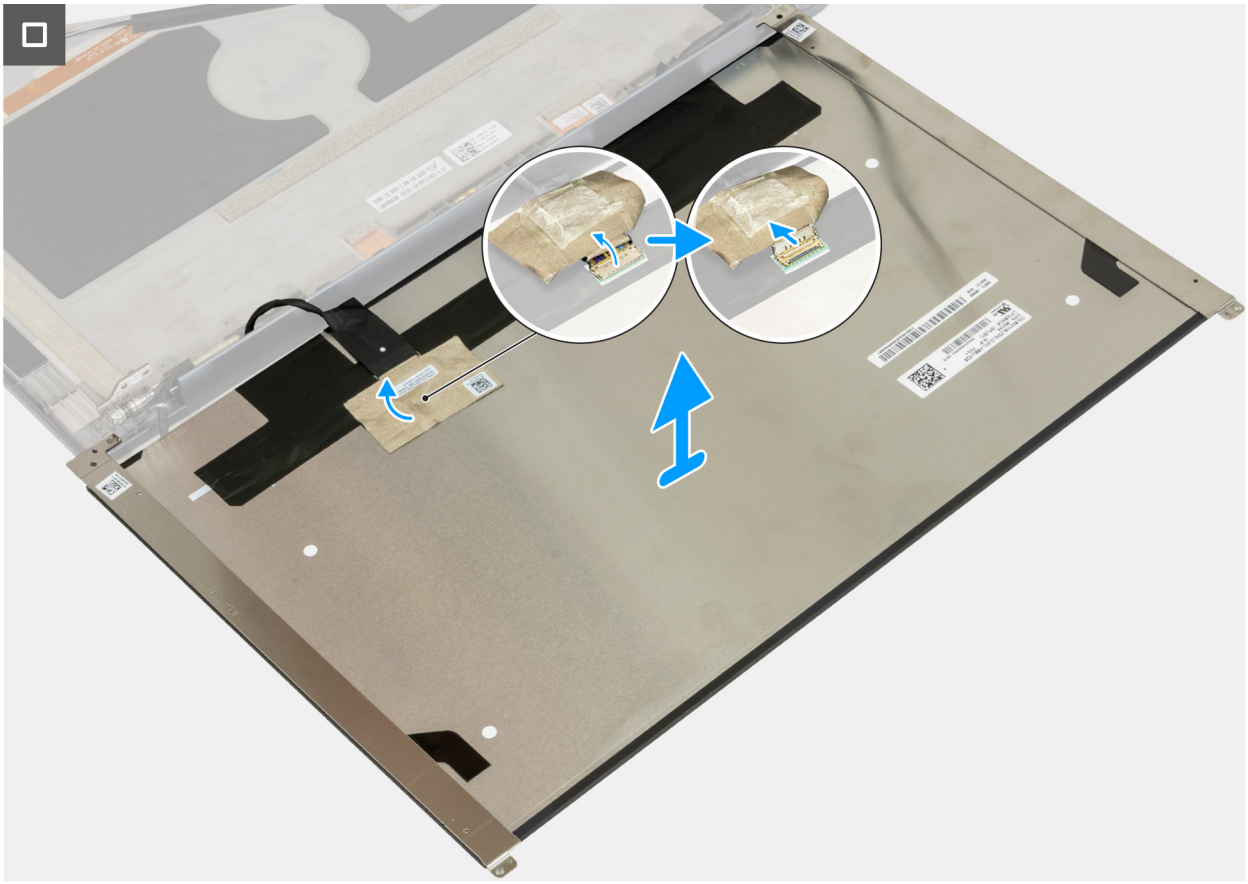


Figure 99. Removing the display panel for non-touchscreen displays

Steps

1. If your computer is shipped with an IR camera, disconnect the display cable from the IR sensor board. Otherwise, go to Step 2.
2. Peel the display cable from the left display hinge.
3. Remove the six screws (M2x2.5) that secure the display panel to the display back cover.
4. Lift and flip open the display panel to access the display cable.
5. Peel the conductive tape on the display cable connector.
6. Open the latch and disconnect the display cable from the connector on the display panel.
7. Lift the display panel away from the display back cover.

Installing the display panel for non-touchscreen displays

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 display panel (for non-touchscreen displays) and provide a visual representation of the installation procedure.

Figure 100. Installing the display panel for non-touchscreen displays

Figure 101. Installing the display panel for non-touchscreen displays

Steps

1. Using the alignment posts, place the display panel close to the display hinges on the display back cover.
2. Connect the display cable to the connector on the display panel and close the latch.
3. Adhere the conductive tape on the display cable connector.
4. Flip and close the display panel to connect the display cable.
5. Adhere the display cable to the left display hinge.
6. Replace the six screws (M2x2.5) that secure the display panel to the display back cover.
7. If your computer is shipped with an IR camera, connect the display cable to the IR sensor board. Otherwise, skip this step.

Next steps

1. Install the display assembly.
2. Install the WWAN card (optional).
3. Install the full base cover or base cover with sliding door, as applicable.
4. Install the sliding door, applicable for computers that are shipped with the sliding door.
5. Install the SD card.
6. Follow the procedures in After working inside your computer.

Display hinges

Removing the display hinges

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).
6. Remove the display assembly.
7. Remove the display bezel.
8. Remove the display panel for touchscreen displays or the display panel for non-touchscreen displays, as applicable.

About this task

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

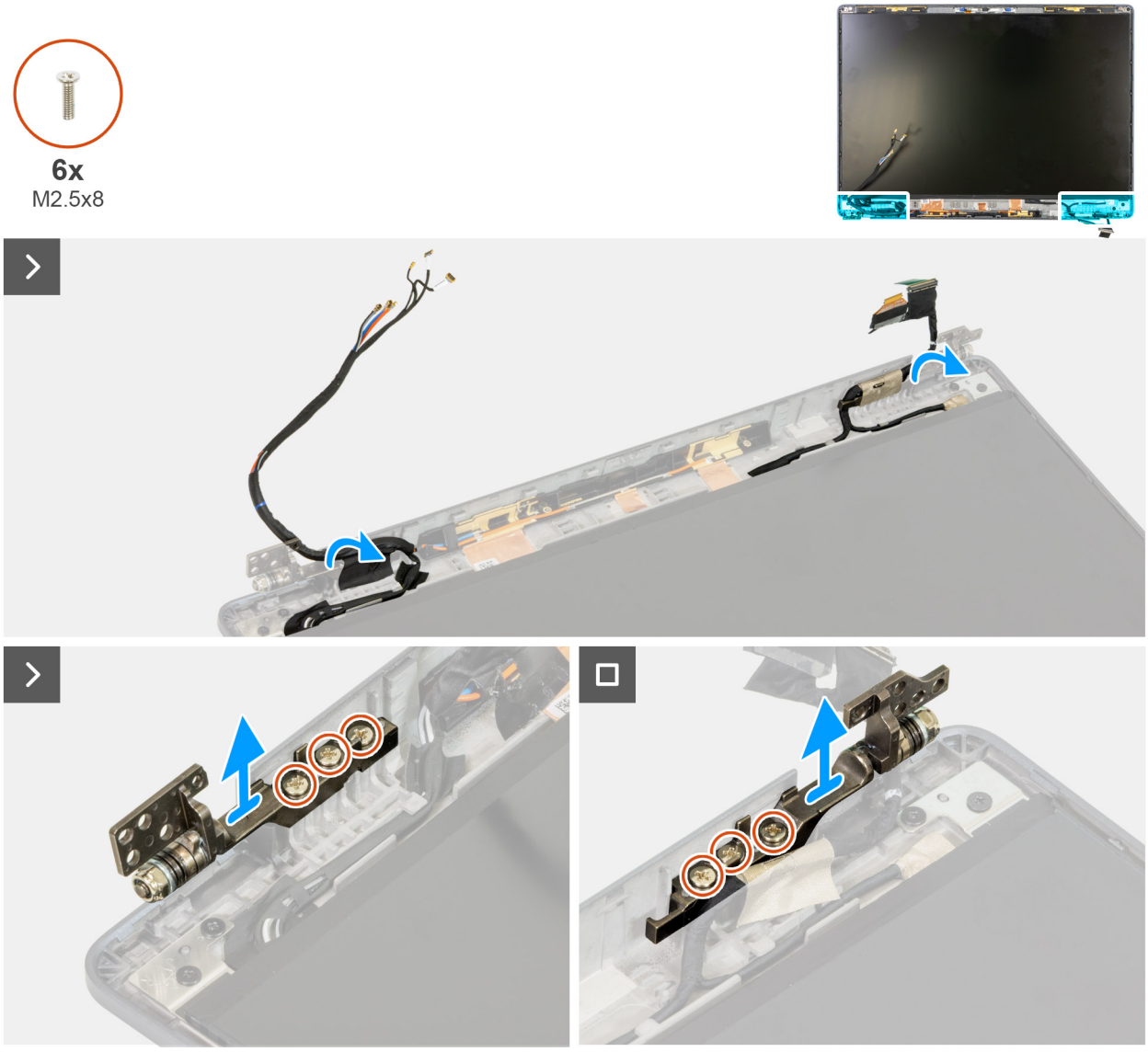


Figure 102. Removing the display hinges

Steps

1. Peel the following cables from the display hinges:
   - Display cable
   - WWAN antenna cables (for computers shipped with WWAN antennas)
2. Remove the six screws (M2.5x8) that secure the display hinges to the display back cover.

3. Remove the hinges from the display back cover.

Installing the display hinges

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 display hinges and provide a visual representation of the installation procedure.

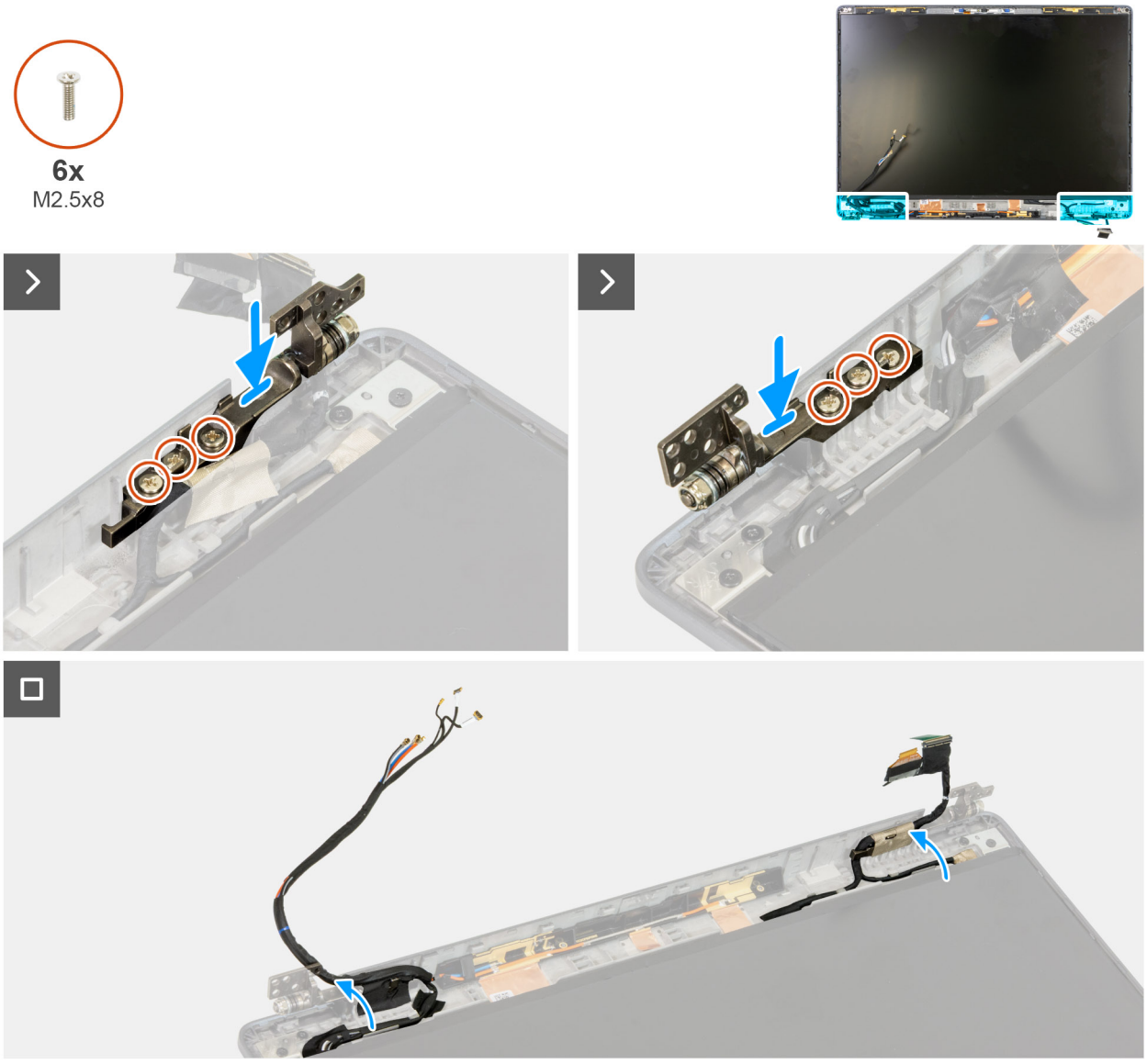


Figure 103. Installing the display hinges

Steps

1. Align the screw holes on the hinges with the screw holes on the display back cover.
2. Using the alignment posts, place the display hinges on the display back cover.
3. Replace the six screws (M2.5x8) that secure the display hinges to the display back cover.
4. Thread the display cable under the hook of the left-display hinge.

5. Adhere the following cables to the display hinges:
   - Display cable
   - WWAN antenna cables (for computers shipped with WWAN antennas)

Next steps

1. Install the display panel for touchscreen displays or the display panel for non-touchscreen displays, as applicable.
2. Install the display bezel.
3. Install the display assembly.
4. Install the WWAN card (optional).
5. Install the full base cover or base cover with sliding door, as applicable.
6. Install the sliding door, applicable for computers that are shipped with the sliding door.
7. Install the SD card.
8. Follow the procedures 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).
6. Remove the display assembly.
7. Remove the WLAN card.
8. Remove the display bezel.
9. Remove the display panel for touchscreen displays or the display panel for non-touchscreen displays, as applicable.

About this task

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

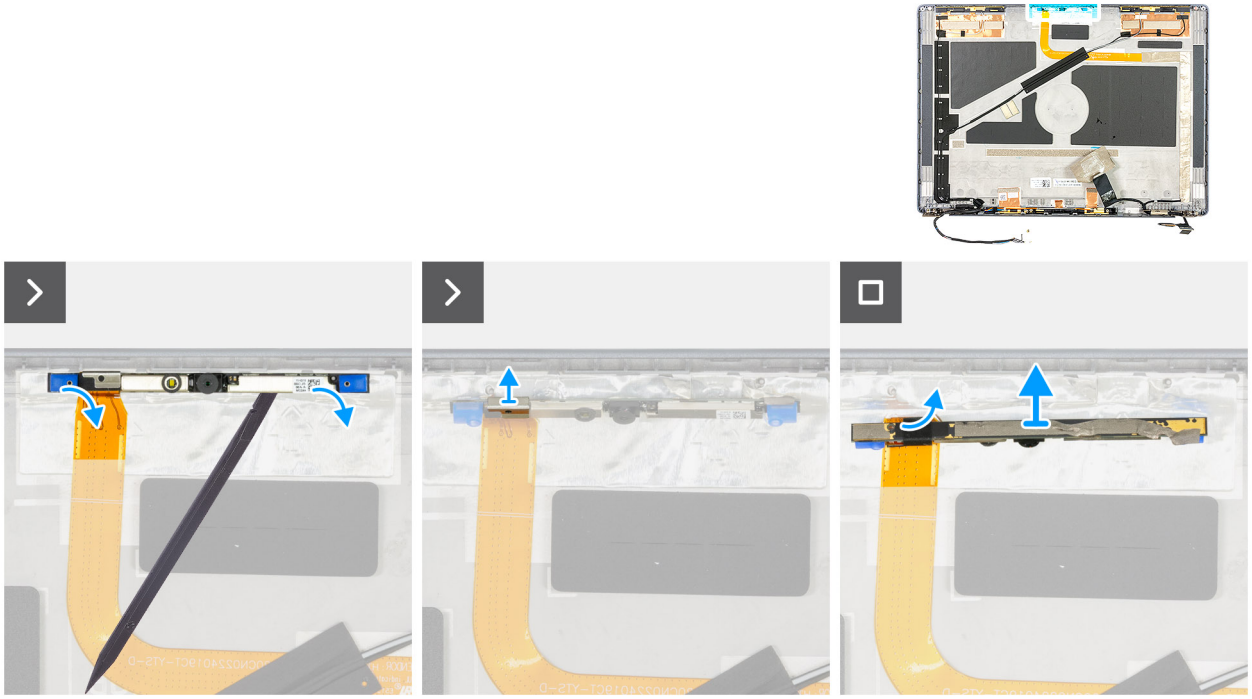


Figure 104. Removing the camera module

Steps

1. Using the flat end of a plastic scribe, pry the camera from the display back cover from the pry points at the bottom edge of the camera.
2. Remove the clip that secures the display cable connector to the camera.
3. Peel the piece of tape securing the display cable connector to the camera.
4. Disconnect the display cable from the camera to remove the camera.

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 procedure.

About this task

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

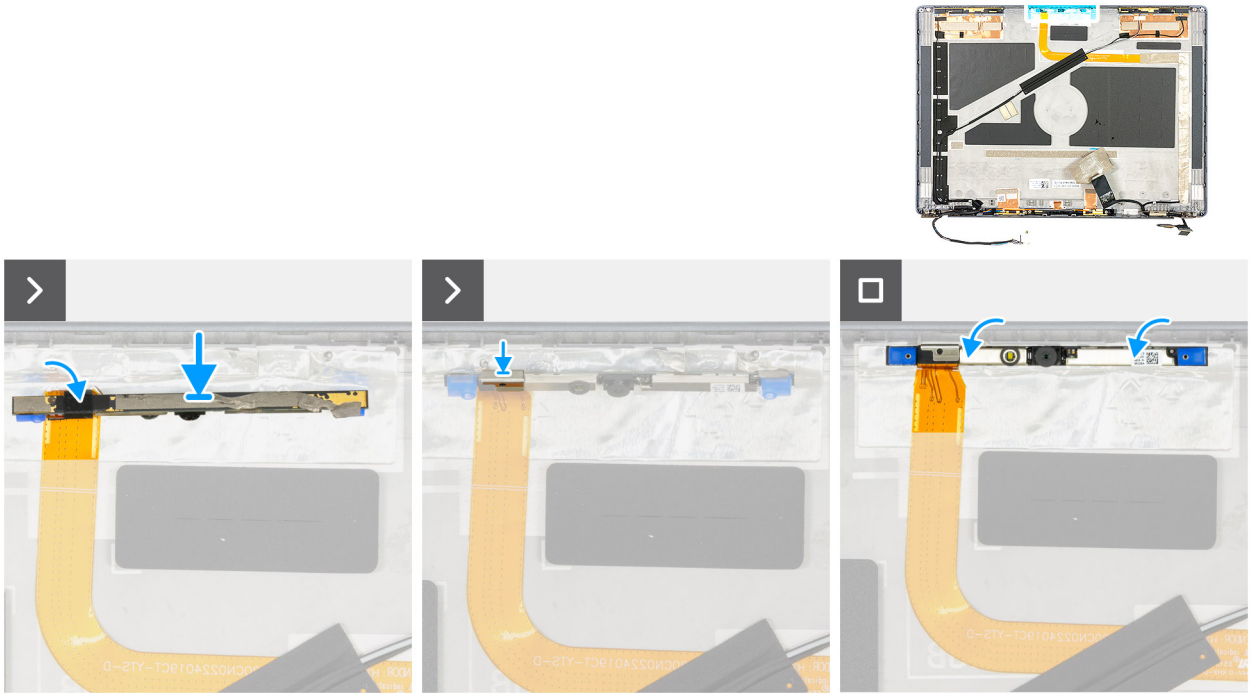


Figure 105. Installing the camera module

Figure 106. Installing the camera module

Steps

1. Connect the display cable to the camera.
2. Adhere the piece of tape that secures the display cable connector to the camera.
3. Replace the clip that secures the display cable connector to the camera.
4. Using the alignment post, place the camera on the display back cover.

Next steps

1. Install the display panel for touchscreen displays or the display panel for non-touchscreen displays, as applicable.
2. Install the display bezel.
3. Install the WLAN card.
4. Install the display assembly.
5. Install the WWAN card (optional).
6. Install the full base cover or base cover with sliding door, as applicable.
7. Install the sliding door, applicable for computers that are shipped with the sliding door.
8. Install the SD card.
9. Follow the procedures 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 SD card.

3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).
6. Remove the display assembly.
7. Remove the WLAN card.
8. Remove the display bezel.
9. Remove the display panel for touchscreen displays or the display panel for non-touchscreen displays.
10. Remove the camera module.

About this task

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

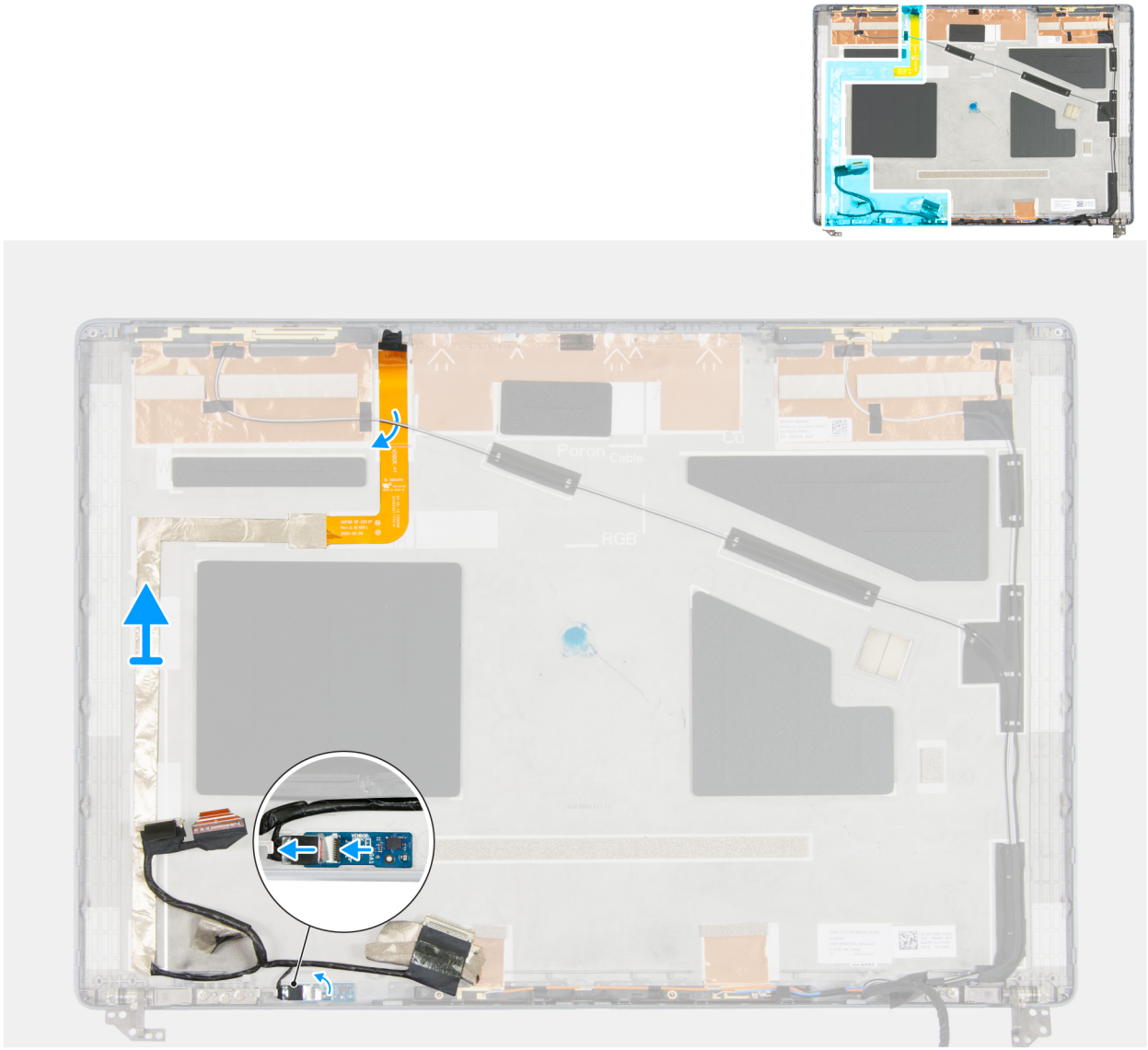


Figure 107. Removing the display cable

Steps

1. Peel the display cable to release it from the adhesive.
2. Lift the display cable off the display back cover.

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 procedure.

About this task

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

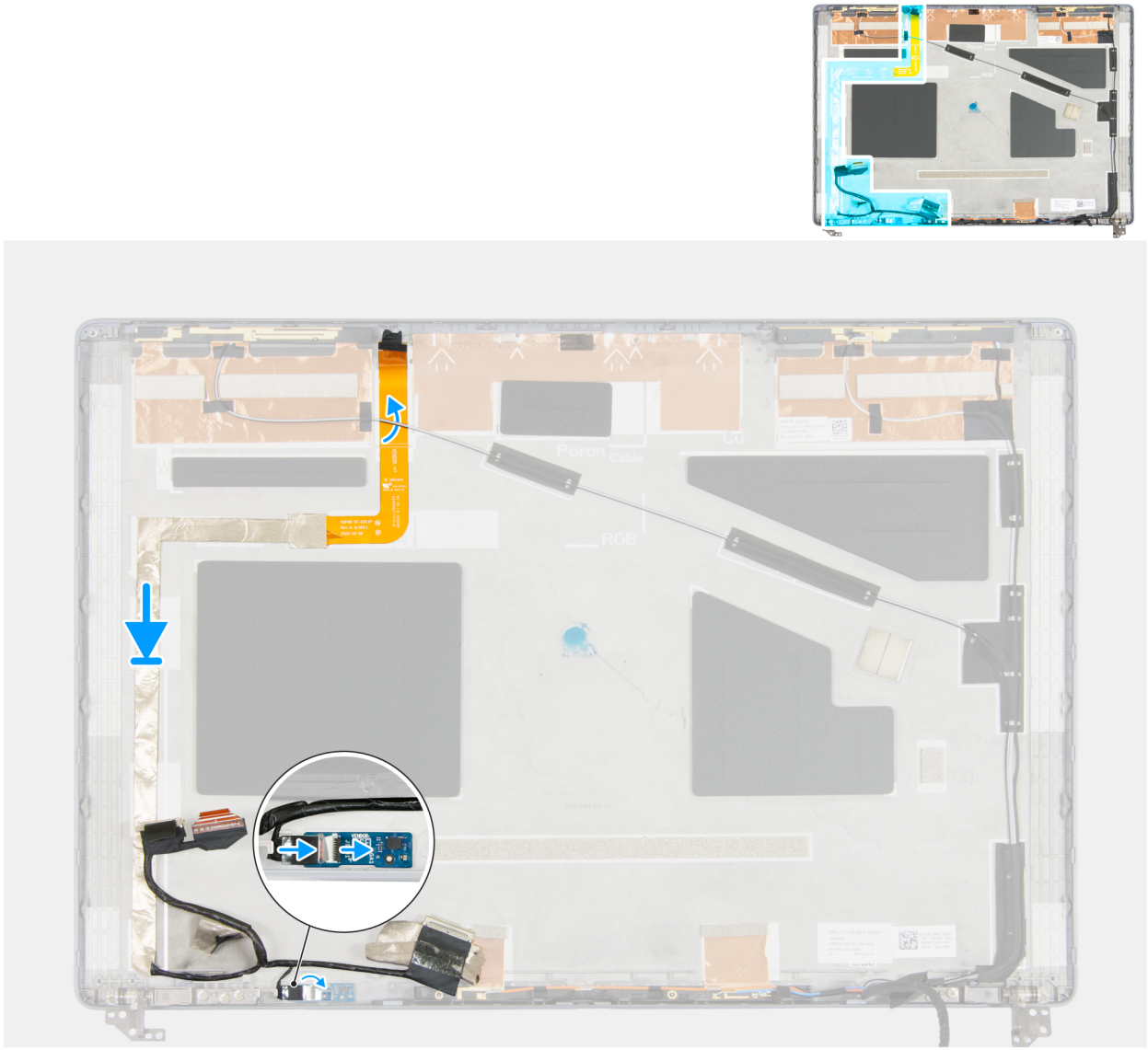


Figure 108. Installing the display cable

Steps

1. Place the display cable on the display back cover.
2. Adhere the display cable to the display back cover.

Next steps

1. Install the camera module.
2. Install the display panel for touchscreen displays or the display panel for non-touchscreen displays, as applicable.

3. Install the display bezel.
4. Install the WLAN card.
5. Install the display assembly.
6. Install the WWAN card (optional).
7. Install the full base cover or base cover with sliding door, as applicable.
8. Install the sliding door, applicable for computers that are shipped with the sliding door.
9. Install the SD card.
10. Follow the procedures 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the WWAN card (optional).
6. Remove the display assembly.
7. Remove the WLAN card.
8. Remove the display bezel.
9. Remove the display panel for touchscreen displays or the display panel for non-touchscreen displays.
10. Remove the camera module.
11. Remove the display cable.

About this task

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

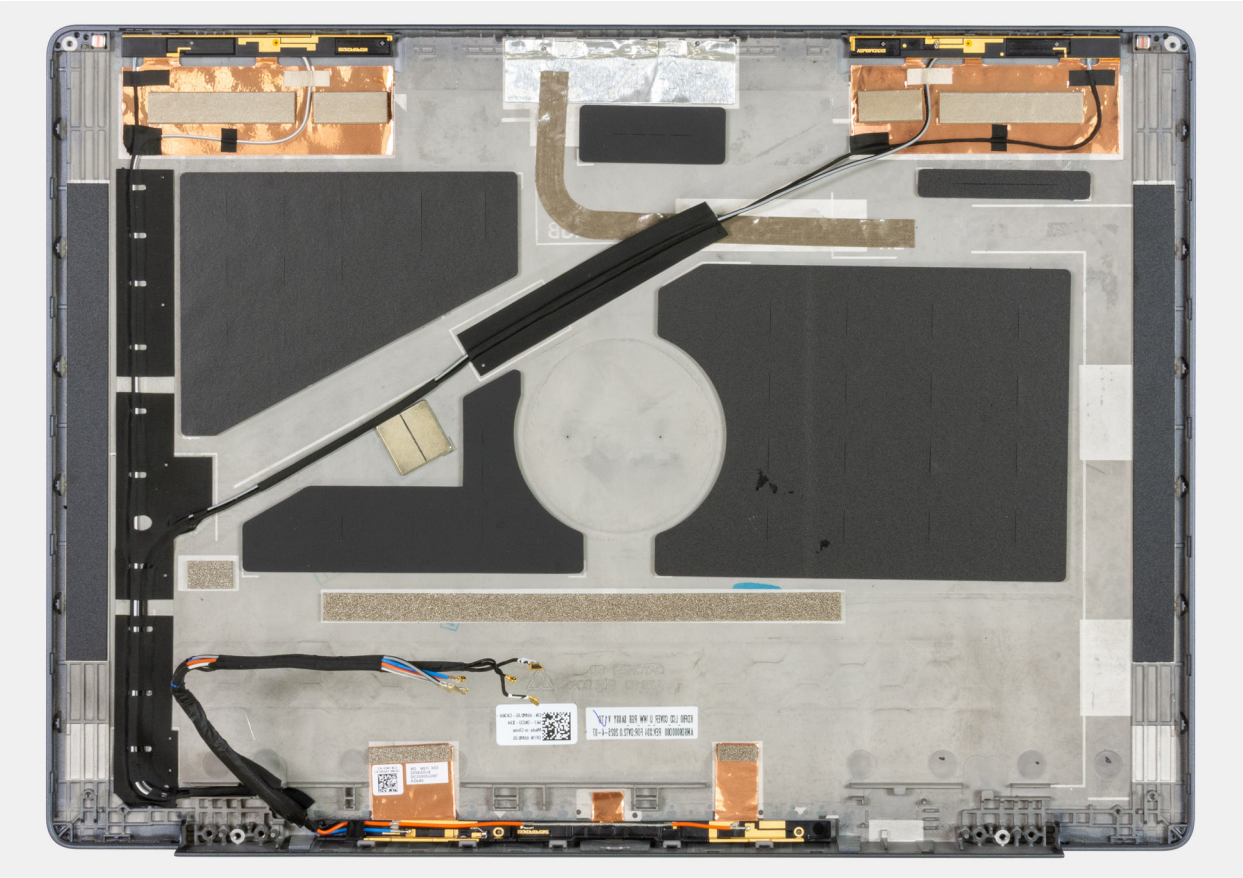


Figure 109. Display back cover

Steps

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

About this task

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

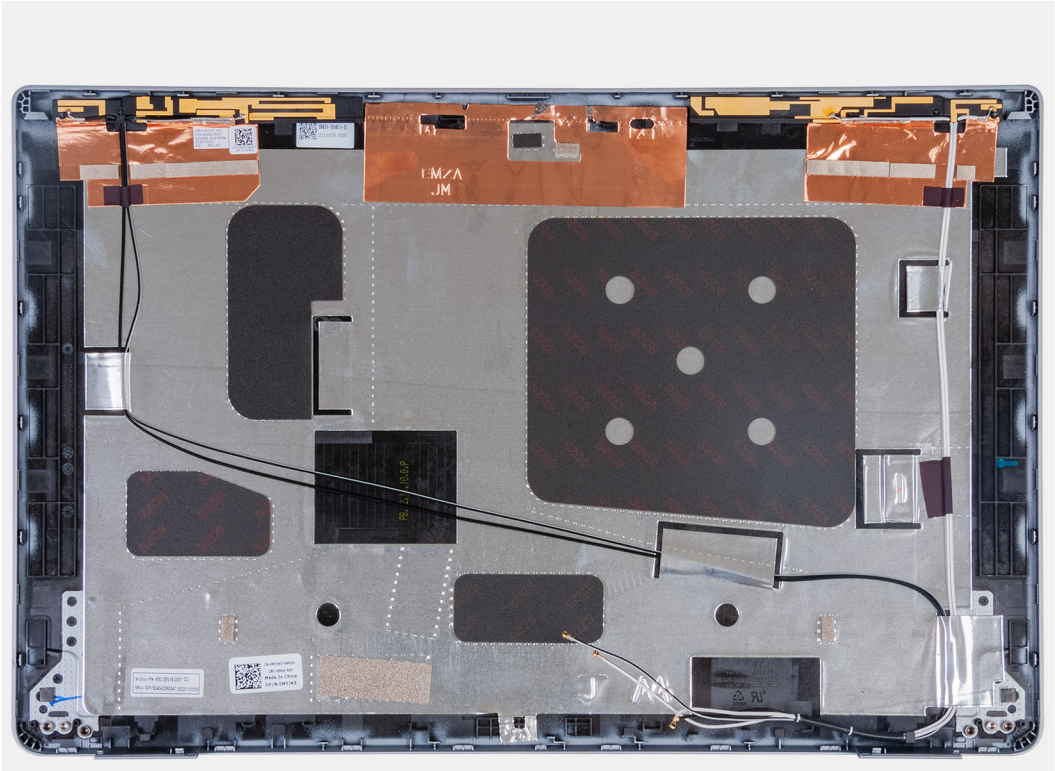


Figure 110. Display back cover

Steps

Place the display back cover on a flat surface.

Next steps

1. Install the display cable.
2. Install the camera module.
3. Install the display panel for touchscreen displays or the display panel for non-touchscreen displays, as applicable.
4. Install the display bezel.
5. Install the WLAN card.
6. Install the display assembly.
7. Install the WWAN card (optional).
8. Install the full base cover or base cover with sliding door, as applicable.
9. Install the sliding door, applicable for computers that are shipped with the sliding door.
10. Install the SD card.
11. Follow the procedures in After working inside your computer.

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.

5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the memory connector.
8. Remove the M.2 2280 SSD from slot 1 (SSD1).
9. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
10. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
11. Remove the M.2 2230 SSD.
12. Remove the battery.
13. Remove the WLAN card.
14. Remove the SIM card.
15. Remove the WWAN card (optional).
16. Remove the NPU card.
17. Remove the GPU card, applicable for computers that are shipped with discrete graphics card.
18. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
19. Remove the fan assembly.
20. Remove the power board.
21. Remove the heat sink on computers with integrated graphics card or heat sink on computers with discrete graphics card, as applicable.
22. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
23. Remove the WLAN antenna module.
24. Remove the inner frame.

About this task

The following image indicates the connectors on your system board:

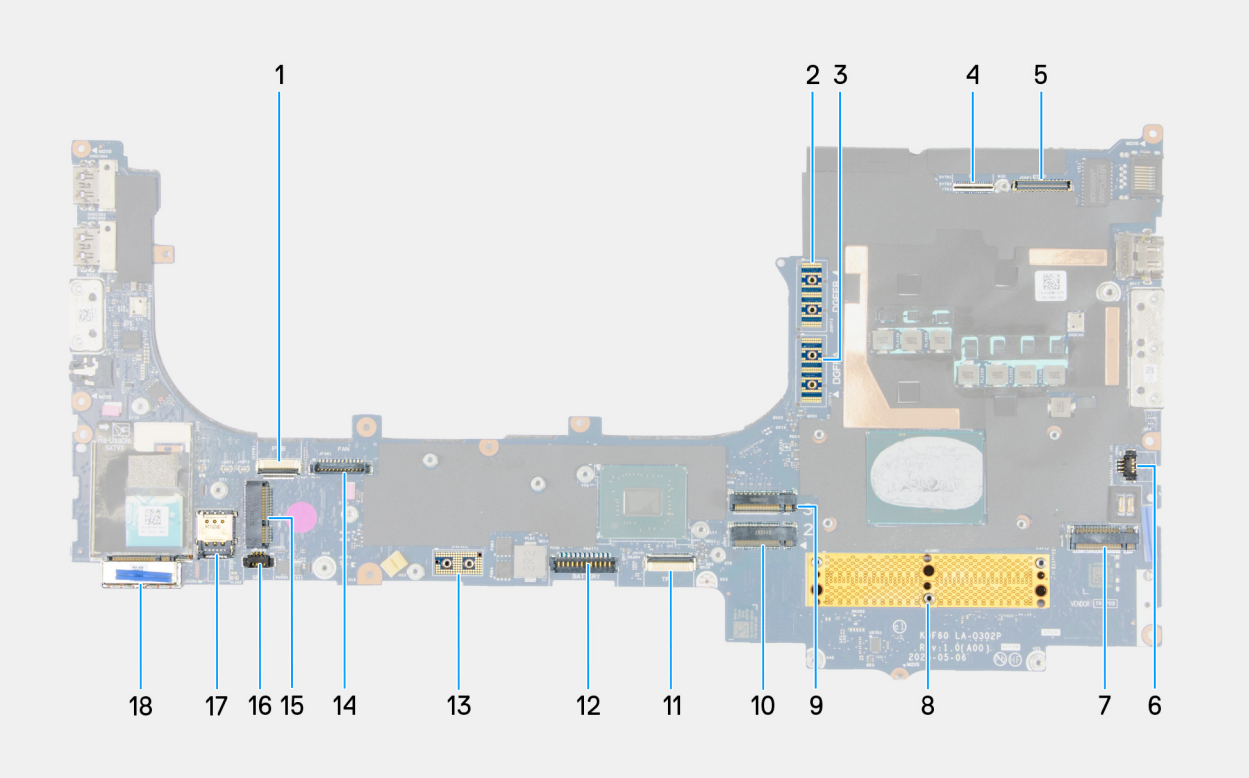


Figure 111. System-board components

1. Power board with fingerprint reader connector (JFPBB1)
2. Integrated FPC beam connector (DGFFB)
3. Integrated FPC beam connector (DGFFA)
4. IR camera cable connector (IR)
5. Display cable connector (JEDP1)
6. Left speaker cable connector (JSPKL1)

7. M.2 SSD slot 1 connector (SSD1)
8. CAMM module connector (JCAMM1)
9. M.2 SSD slot 3 connector (SSD3)
10. M.2 SSD slot 2 connector (SSD2)
11. Touchpad cable connector (JKBTP1)
12. Battery cable connector (PBATT1)
13. DIMM module connector (JSLVL1)
14. Fan assembly connector (JFAN1)
15. Power board connector (P3LVL1)
16. Right speaker cable connector (JSPKR1)
17. SIM card slot (JSIM1)
18. WWAN card slot (JWWANS)

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

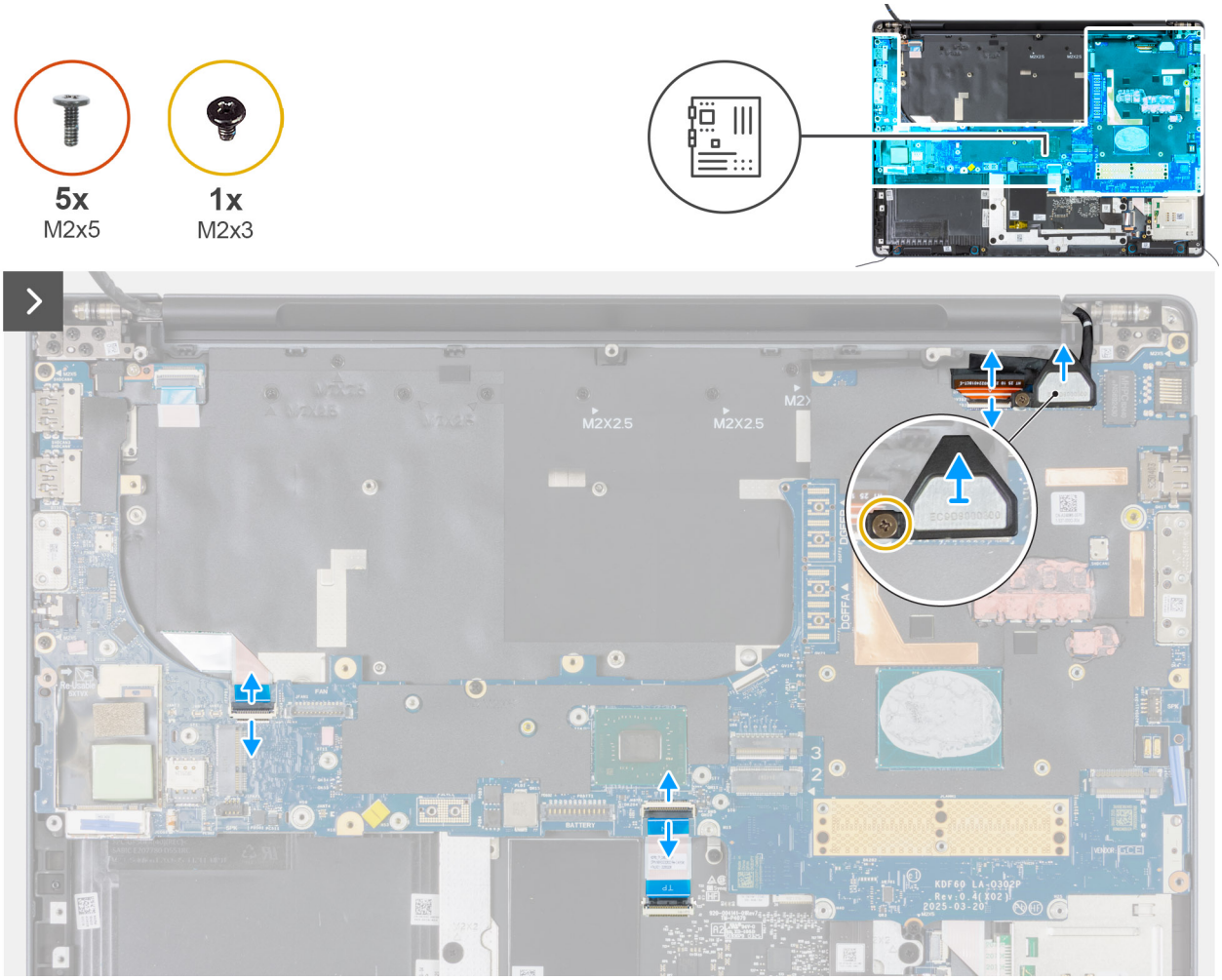


Figure 112. Removing the system board

Figure 113. Removing the system board

Steps

1. Remove the screw (M2x3) that secures the display cable bracket to the palm-rest and keyboard assembly.
2. Remove the display-cable bracket off the computer.
3. Disconnect the following cables from the system board:
   - Camera cable
   - Display cable
   - Touchpad cable
   - Power-button board cable
4. Disconnect the USH board cable from the USH board.
5. If you are replacing the system board, remove the five screws (M2x5) that secure the system board to the palm-rest and keyboard assembly.
6. If you are removing the system board with the heat sink and GPU card attached, remove the five system board screws (M2x5) and two heat sink screws (M2x5) that secure the system board to the palm-rest and keyboard assembly.
7. Remove the system board off the palm-rest and keyboard assembly.

   NOTE: If you are replacing the system board on computers with WWAN antennas, peel off the WWAN thermal pad sticker and CPU mylar absorber sticker. Then, transfer the WWAN thermal pad sticker to the new system board.

   NOTE: If you are replacing the system board, follow the instructions in the Removing the USH board cable.

8. After performing all the above steps, you are left with the system board.

   NOTE: If the system board is defective, adhere the protective Mylar on the heat-transfer areas and DRAM without cleaning the thermal grease and gel to prepare the system board for return.

   CAUTION: Once the system-board assembly is removed from the computer, follow the instructions in the tech sheet that is dispatched with the replacement system-board assembly.

9. A service kit containing a rubber scraper, alcohol wipes, protection mylar, thermal grease, thermal gel, and tech sheet is dispatched with the replacement system board. Follow the instructions to clean residual thermal grease and gel and apply new thermal grease and gel for the replacement of the system board.

   NOTE: If you are returning the system board, adhere the protective mylar over the heat-transfer areas and the DRAM, before placing it into the packaging.

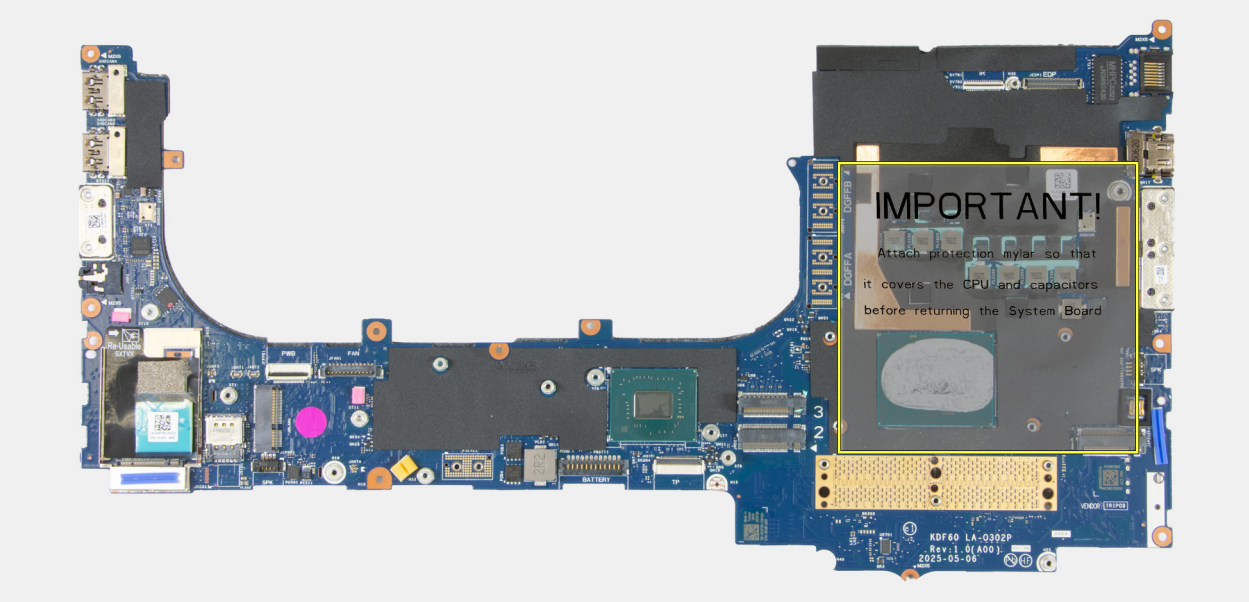


Figure 114. Preparing the defective system board for return

Installing the system board

Prerequisites

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

About this task

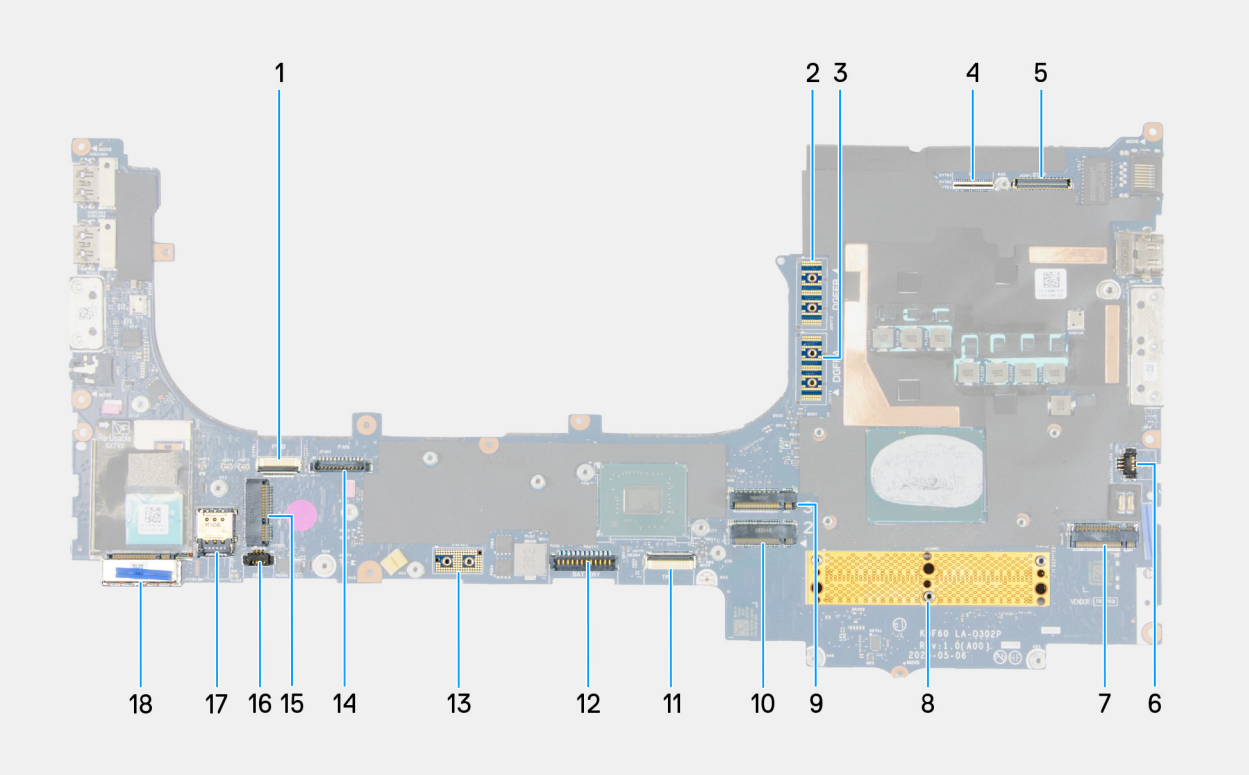


Figure 115. System-board components

1. Power board with fingerprint reader connector (JFPBB1)
2. Integrated FPC beam connector (DGFFB)
3. Integrated FPC beam connector (DGFFA)
4. IR camera cable connector (IR)
5. Display cable connector (JEDP1)
6. Left speaker cable connector (JSPKL1)
7. M.2 SSD slot 1 connector (SSD1)
8. CAMM module connector (JCAMM1)
9. M.2 SSD slot 3 connector (SSD3)
10. M.2 SSD slot 2 connector (SSD2)
11. Touchpad cable connector (JKBTP1)
12. Battery cable connector (PBATT1)
13. DIMM module connector (JSLVL1)
14. Fan assembly connector (JFAN1)
15. Power board connector (P3LVL1)
16. Right speaker cable connector (JSPKR1)
17. SIM card slot (JSIM1)
18. WWAN card slot (JWWANS)

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

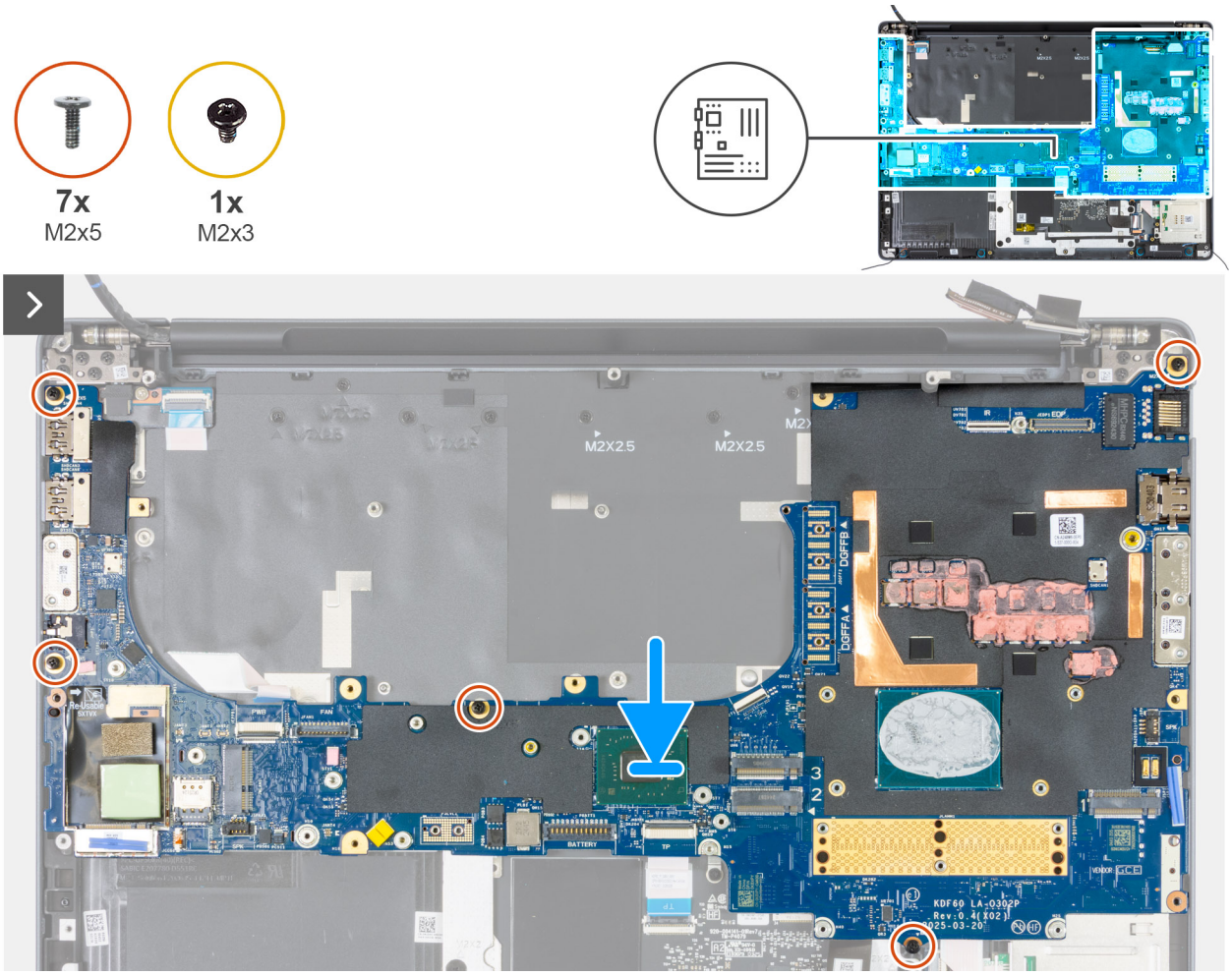


Figure 116. Installing the system board

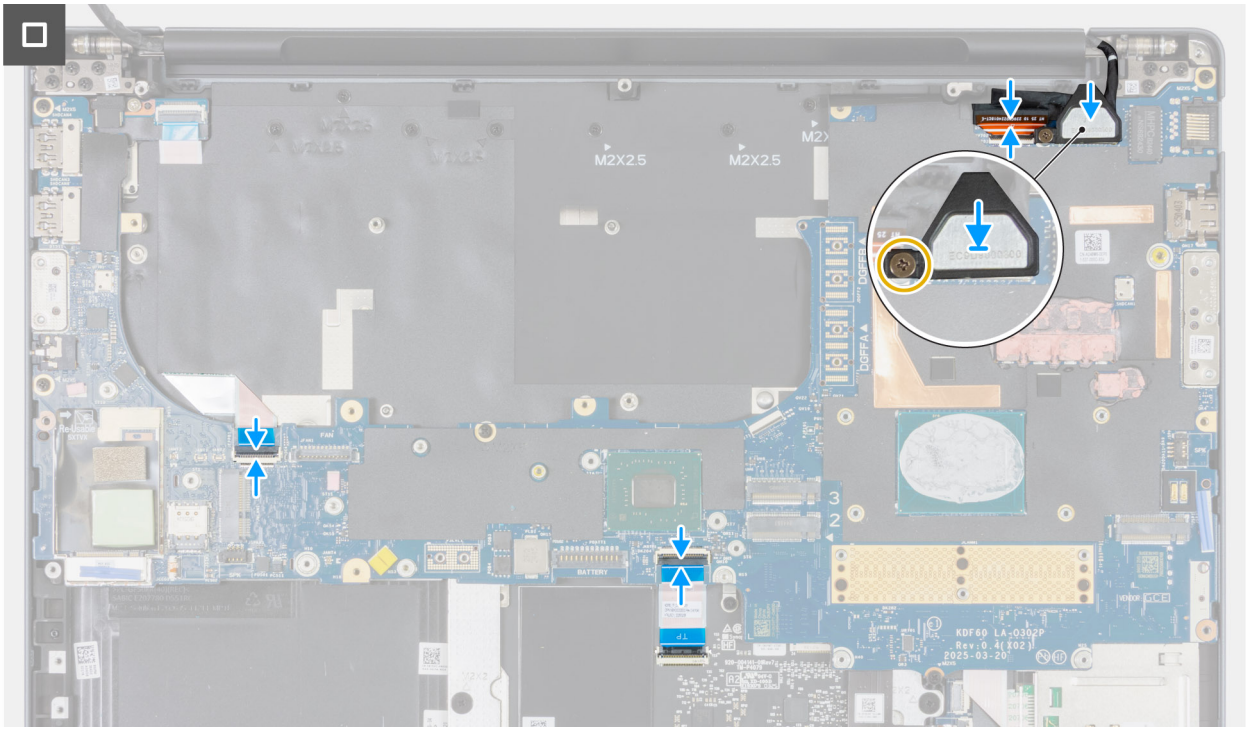


Figure 117. Installing the system board

Steps

1. Place the system board on the palm-rest and keyboard assembly.

   NOTE: If you are replacing the system board on computers with WWAN antennas, adhere the WWAN thermal pad sticker and CPU mylar absorber sticker. Ensure that the WWAN thermal pad sticker to the new system board.

   NOTE: If you are replacing the system board, follow the instructions in the Removing the USH board cable.

2. If you are replacing the system board with the heat sink and GPU card attached, replace the five system board screws (M2x5) and two heat sink screws (M2x5) that secure the system board to the palm-rest and keyboard assembly.
3. If you are replacing a new system board, replace the five screws (M2x5) that secure the system board to the palm-rest and keyboard assembly.
4. Connect the USH board cable from the USH board.
5. Connect the following cables from the system board:
   - Camera cable
   - Display cable
   - Touchpad cable
   - Power-button board cable
6. Replace the display-cable bracket to the computer.
7. Replace the screw (M2x3) that secures the display cable bracket to the palm-rest and keyboard assembly.

Next steps

1. Install the inner frame.
2. Install the WLAN antenna module.
3. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
4. Install the heat sink on computers with integrated graphics card or heat sink on computers with discrete graphics card, as applicable.
5. Install the power board.
6. Install the fan assembly.
7. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
8. Install the GPU card, applicable for computers that are shipped with discrete graphics card.
9. Install the NPU card.

10. Install the WWAN card (optional).
11. Install the SIM card.
12. Install the WLAN card.
13. Install the M.2 2230 SSD.
14. Install the battery.
15. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
16. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
17. Install the M.2 2280 SSD from slot 1 (SSD1).
18. Install the memory connector.
19. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
20. Install the memory module, if applicable.
21. Install the full base cover or base cover with sliding door, as applicable.
22. Install the sliding door, applicable for computers that are shipped with the sliding door.
23. Install the SD card.
24. Follow the procedures 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.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the M.2 2280 SSD from slot 1 (SSD1).
8. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
9. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Remove the M.2 2230 SSD.
11. Remove the battery.
12. Remove the WLAN card.
13. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
14. Remove the fan assembly.
15. Remove the power board.
16. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
17. Remove the WLAN antenna module.
18. Remove the inner frame.
19. Remove the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

About this task

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

Figure 118. Removing the USB Type-C connector module

Steps

1. Gently turn the system board over.
2. Remove the five screws (M2x5) that secure the USB Type-C connector module to the system board.
3. Remove the USB Type-C connector module off 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 119. Installing the USB Type-C connector module

Steps

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

Next steps

1. Install the system board.

   NOTE: The system board can be removed and installed along with the following components:
   - heat sink
   - memory connector
   - WWAN card, if applicable
   - GPU card, only on computers shipped with discrete graphics

   This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

2. Install the inner frame.
3. Install the WLAN antenna module.
4. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
5. Install the power board.
6. Install the fan assembly.
7. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
8. Install the WLAN card.
9. Install the M.2 2230 SSD.
10. Install the battery.
11. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
12. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
13. Install the M.2 2280 SSD from slot 1 (SSD1).
14. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
15. Install the memory module, if applicable.
16. Install the full base cover or base cover with sliding door, as applicable.
17. Install the sliding door, applicable for computers that are shipped with the sliding door.

18. Install the SD card.
19. Follow the procedure in After working inside your computer.

USH board cable

Removing the USH board 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the M.2 2280 SSD from slot 1 (SSD1).
8. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
9. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Remove the M.2 2230 SSD.
11. Remove the battery.
12. Remove the WLAN card.
13. Remove the SIM card.
14. Remove the WWAN card (optional).
15. Remove the NPU card.
16. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
17. Remove the fan assembly.
18. Remove the power board.
19. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
20. Remove the WLAN antenna module.
21. Remove the inner frame.
22. Remove the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

About this task

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

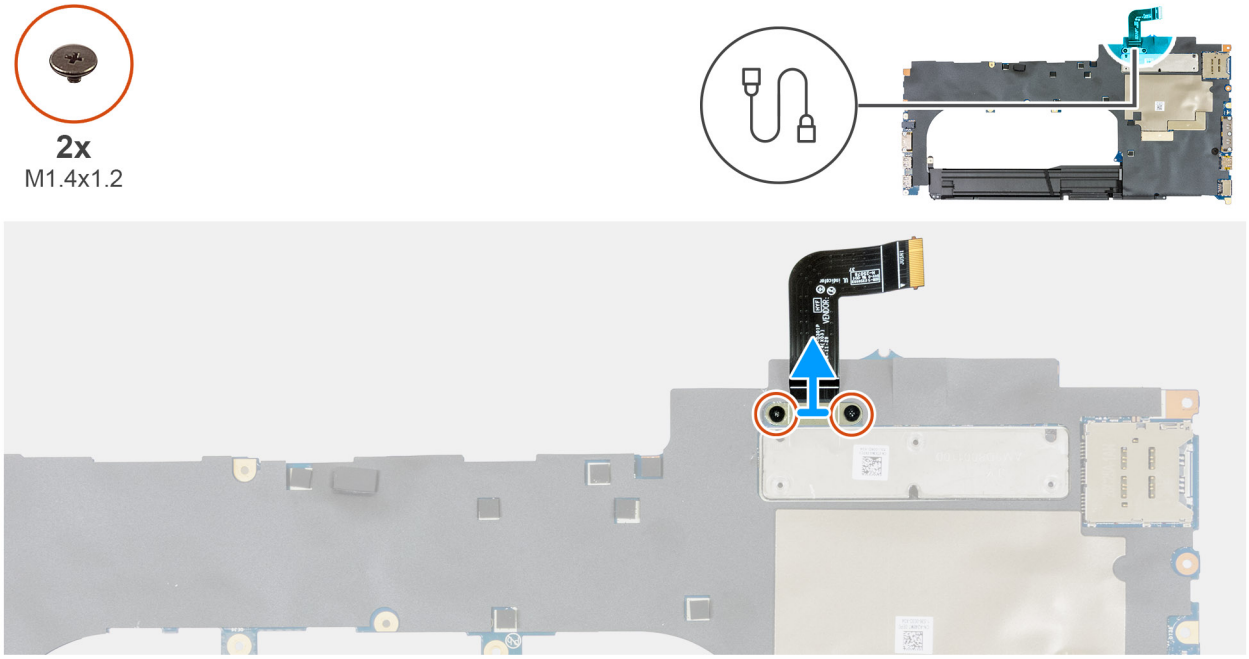


Figure 120. Removing the USH board cable

Steps

1. Flip the system board.
2. Remove the two screws(M1.4x1.2) that secure the USH board cable to the system board.
3. Disconnect and remove the USH board cable from the system board.

Installing the USH board 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 procedure.

About this task

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

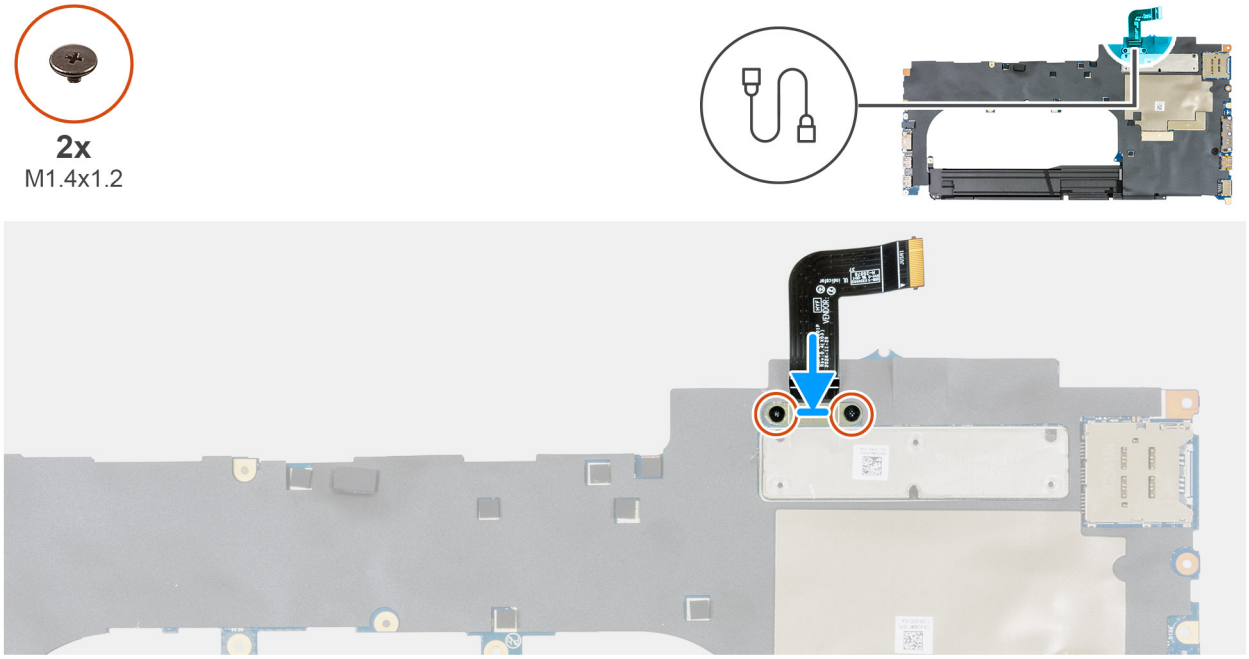


Figure 121. Installing the USH board cable

Steps

1. Connect the USH daughter board cable to the system board.
2. Replace the two screws(M1.4x1.2) that secure the USH board cable to the system board.

Next steps

1. Install the system board.

   NOTE: The system board can be removed and installed along with the following components:
   - heat sink
   - memory connector
   - WWAN card, if applicable
   - GPU card, only on computers shipped with discrete graphics

   This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

2. Install the inner frame.
3. Install the WLAN antenna module.
4. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
5. Install the power board.
6. Install the fan assembly.
7. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
8. Install the NPU card.
9. Install the WWAN card (optional).
10. Install the SIM card.
11. Install the WLAN card.
12. Install the M.2 2230 SSD.
13. Install the battery.
14. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
15. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
16. Install the M.2 2280 SSD from slot 1 (SSD1).
17. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.

18. Install the memory module, if applicable.
19. Install the full base cover or base cover with sliding door, as applicable.
20. Install the sliding door, applicable for computers that are shipped with the sliding door.
21. Install the SD card.
22. Follow the procedures in After working inside your computer.

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the M.2 2280 SSD from slot 1 (SSD1).
8. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
9. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Remove the M.2 2230 SSD.
11. Remove the battery.
12. Remove the WLAN card.
13. Remove the SIM card.
14. Remove the WWAN card (optional).
15. Remove the NPU card.
16. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
17. Remove the fan assembly.
18. Remove the power board.
19. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
20. Remove the WLAN antenna module.
21. Remove the inner frame.
22. Remove the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

About this task

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

Figure 122. Removing the keyboard

Steps

1. Open the latch and disconnect the keyboard cable and keyboard backlight cable (for computers that are shipped with a keyboard backlight) from the touchpad.
2. Remove the 22 screws (M2x2.5) that secure the keyboard and keyboard bracket to the palm-rest assembly.
3. Remove the screw (M2x2) that secures the keyboard and keyboard bracket to the palm-rest assembly.
4. Remove the keyboard and keyboard support bracket from the palm-rest assembly.
5. Remove the six screws (M1.2x1.5) that secure the keyboard to the palm-rest assembly.
6. Remove the keyboard from the keyboard bracket.

Installing the keyboard

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 keyboard and provide a visual representation of the installation procedure.

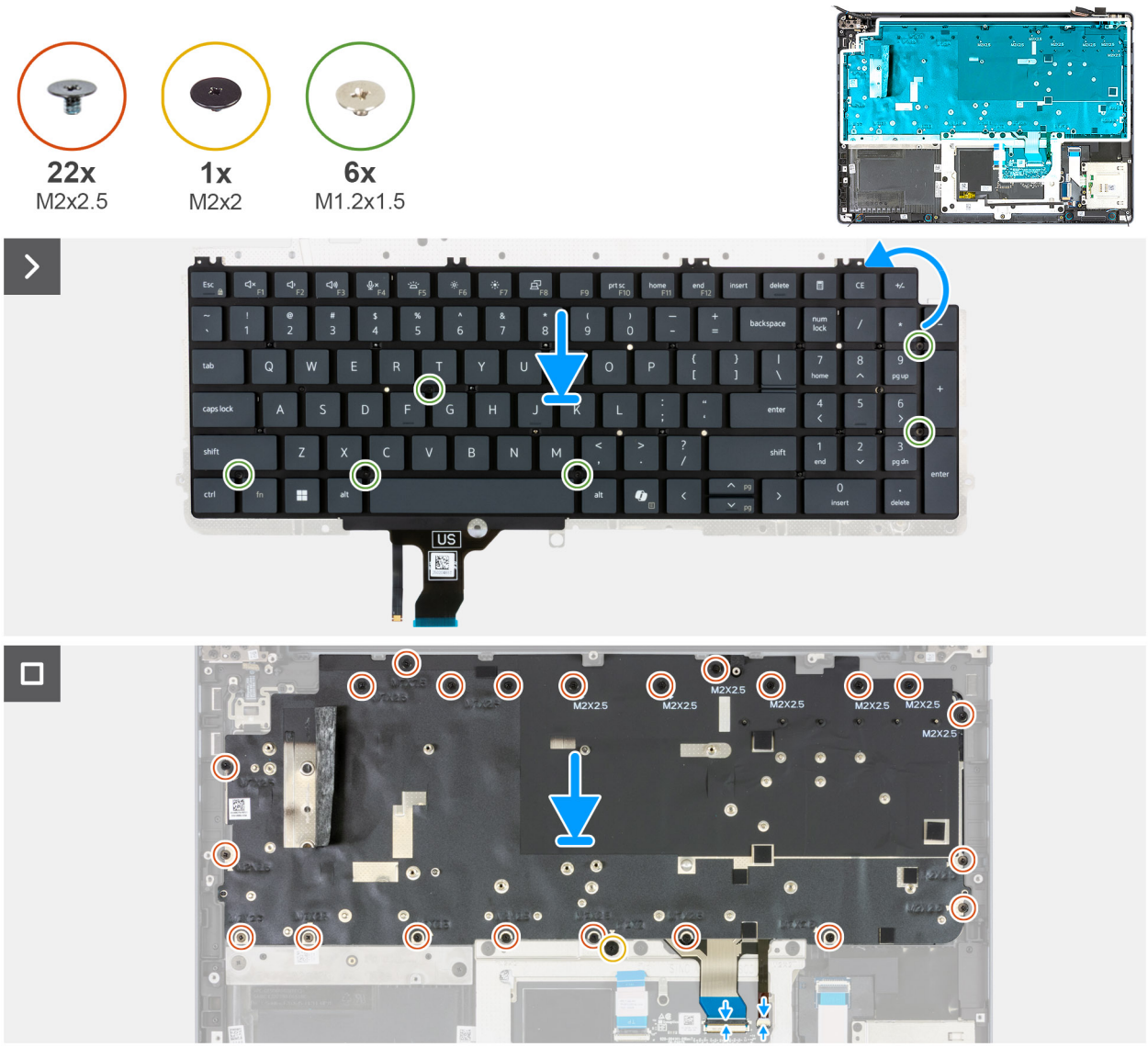


Figure 123. Installing the keyboard

Steps

1. Place the keyboard on the keyboard bracket.
2. Replace the six screws (M1.2x1.5) that secure the keyboard to the palm-rest assembly.
3. Replace the keyboard and keyboard support bracket on the palm-rest assembly.
4. Replace the screw (M2x2) that secures the keyboard and keyboard bracket to the palm-rest assembly.
5. Replace the 22 screws (M2x2.5) that secure the keyboard and keyboard bracket to the palm-rest assembly.
6. Connect the keyboard cable and keyboard backlight cable (for computers that are shipped with a keyboard backlight) to the touchpad and close the latch.

Next steps

1. Install the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

2. Install the inner frame.
3. Install the WLAN antenna module.
4. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
5. Install the power board.
6. Install the fan assembly.
7. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
8. Install the NPU card.
9. Install the WWAN card (optional).
10. Install the SIM card.
11. Install the WLAN card.
12. Install the M.2 2230 SSD.
13. Install the battery.
14. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
15. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
16. Install the M.2 2280 SSD from slot 1 (SSD1).
17. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
18. Install the memory module, if applicable.
19. Install the full base cover or base cover with sliding door, as applicable.
20. Install the sliding door, applicable for computers that are shipped with the sliding door.
21. Install the SD card.
22. Follow the procedures 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.

Prerequisites

1. Follow the procedure in Before working inside your computer.
2. Remove the SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the M.2 2280 SSD from slot 1 (SSD1).
8. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
9. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Remove the M.2 2230 SSD.
11. Remove the battery.
12. Remove the WLAN card.
13. Remove the SIM card.
14. Remove the WWAN card (optional).
15. Remove the NPU card.
16. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
17. Remove the fan assembly.
18. Remove the power board.
19. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
20. Remove the WLAN antenna module.
21. Remove the inner frame.
22. Remove the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

About this task

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

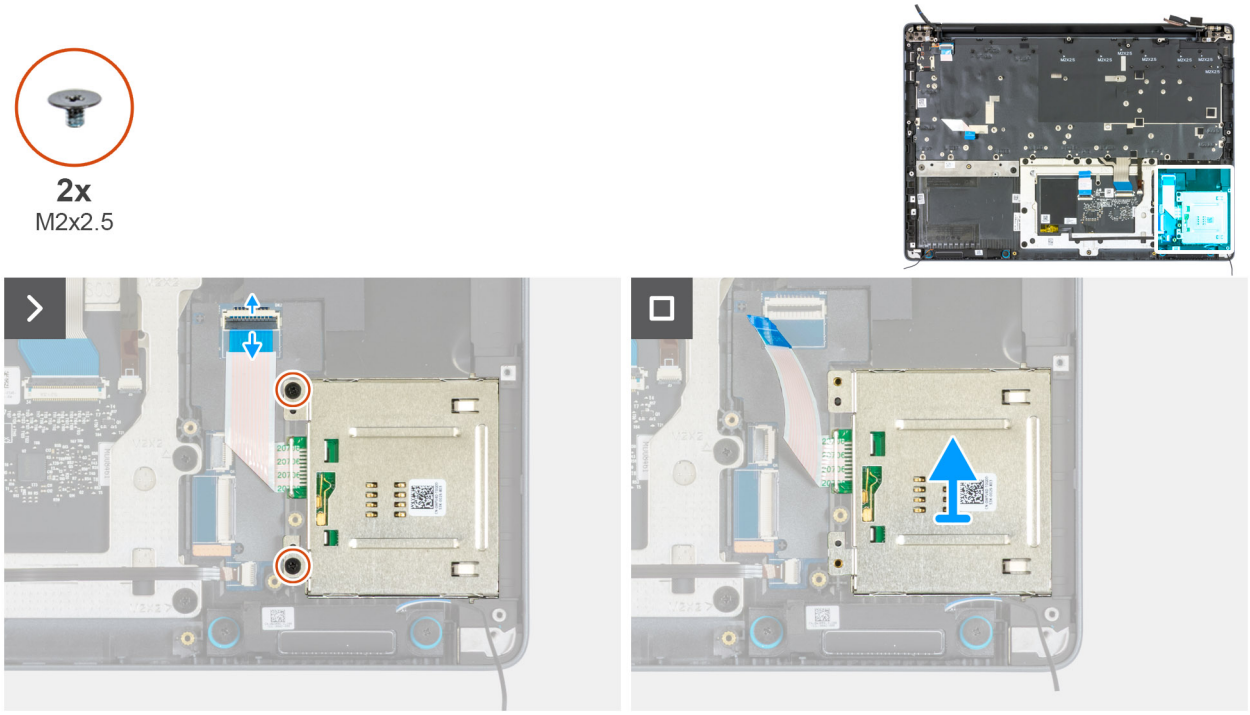


Figure 124. Removing the smart card reader

Steps

1. Open the latch and disconnect the smart card reader cable from the connector on the USH board.
2. Remove the two screws (M2x2.5) that secure the smart card reader to the palm-rest assembly.
3. Remove the smart card reader from the palm-rest assembly.

Installing the smart card reader

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 keyboard and provide a visual representation of the installation procedure.

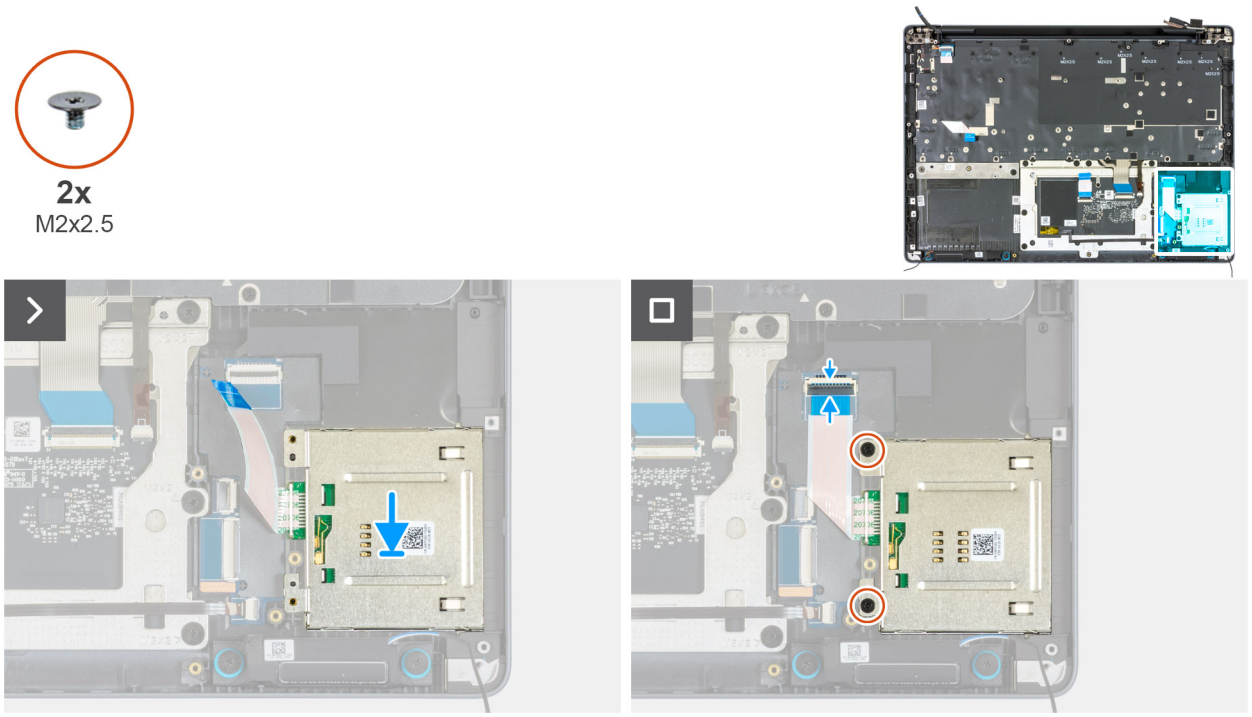


Figure 125. Installing the smart card reader

Steps

1. Using the alignment post, place the smart card reader on the palm-rest assembly.
2. Replace the two screws (M2x2.5) that secure the smart card reader to the palm-rest assembly.
3. Connect the smart card reader cable to the connector on the USH board and close the latch.

Next steps

1. Install the system board.

   NOTE: The system board can be removed and installed along with the following components:
   - heat sink
   - memory connector
   - WWAN card, if applicable
   - GPU card, only on computers shipped with discrete graphics

   This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

2. Install the inner frame.
3. Install the WLAN antenna module.
4. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
5. Install the power board.
6. Install the fan assembly.
7. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
8. Install the NPU card.
9. Install the WWAN card (optional).
10. Install the SIM card.
11. Install the WLAN card.
12. Install the M.2 2230 SSD.
13. Install the battery.
14. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
15. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
16. Install the M.2 2280 SSD from slot 1 (SSD1).

17. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
18. Install the memory module, if applicable.
19. Install the full base cover or base cover with sliding door, as applicable.
20. Install the sliding door, applicable for computers that are shipped with the sliding door.
21. Install the SD card.
22. Follow the procedures in After working inside your computer.

Power button board cable

Removing the power button board 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the M.2 2280 SSD from slot 1 (SSD1).
8. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
9. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Remove the M.2 2230 SSD.
11. Remove the battery.
12. Remove the WLAN card.
13. Remove the SIM card.
14. Remove the WWAN card (optional).
15. Remove the NPU card.
16. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
17. Remove the fan assembly.
18. Remove the power board.
19. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
20. Remove the WLAN antenna module.
21. Remove the inner frame.
22. Remove the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

About this task

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

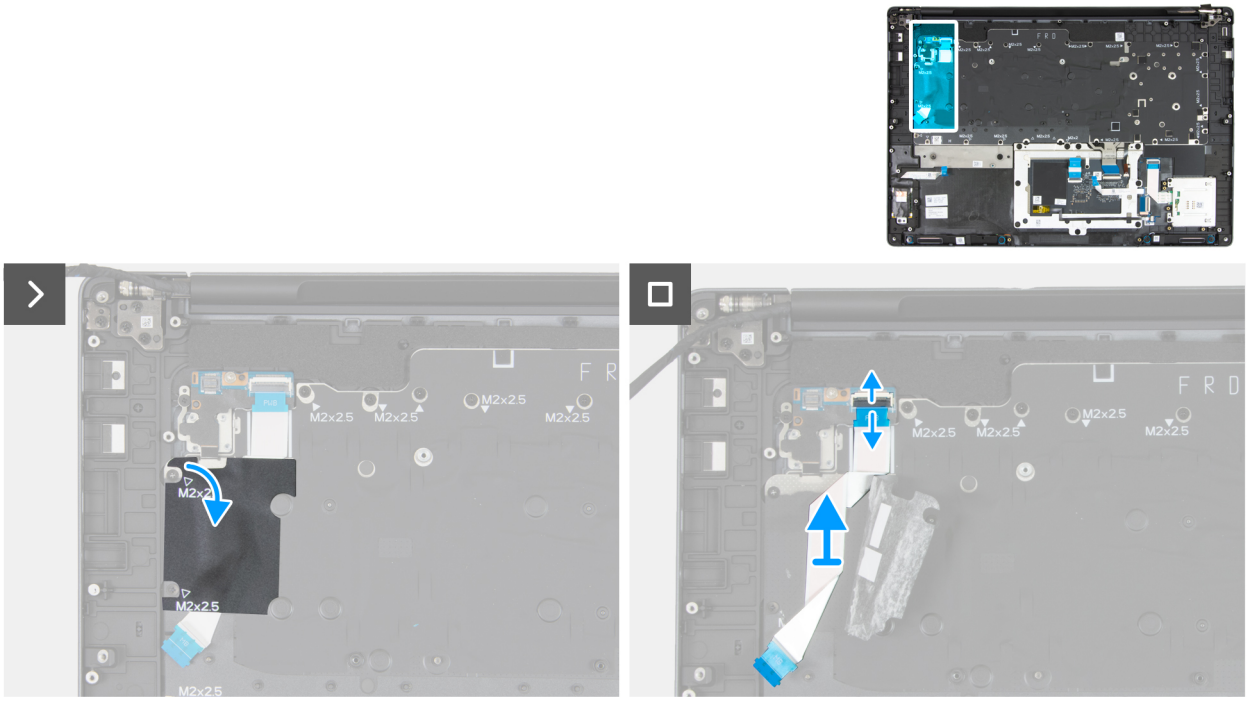


Figure 126. Removing the power button board cable

Steps

1. Peel the keyboard mylar off the power button board cable.
2. Disconnect the power button board cable from the power button board.
3. Peel off and remove the power button board cable from the keyboard bracket.

Installing the power button board 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 procedure.

About this task

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

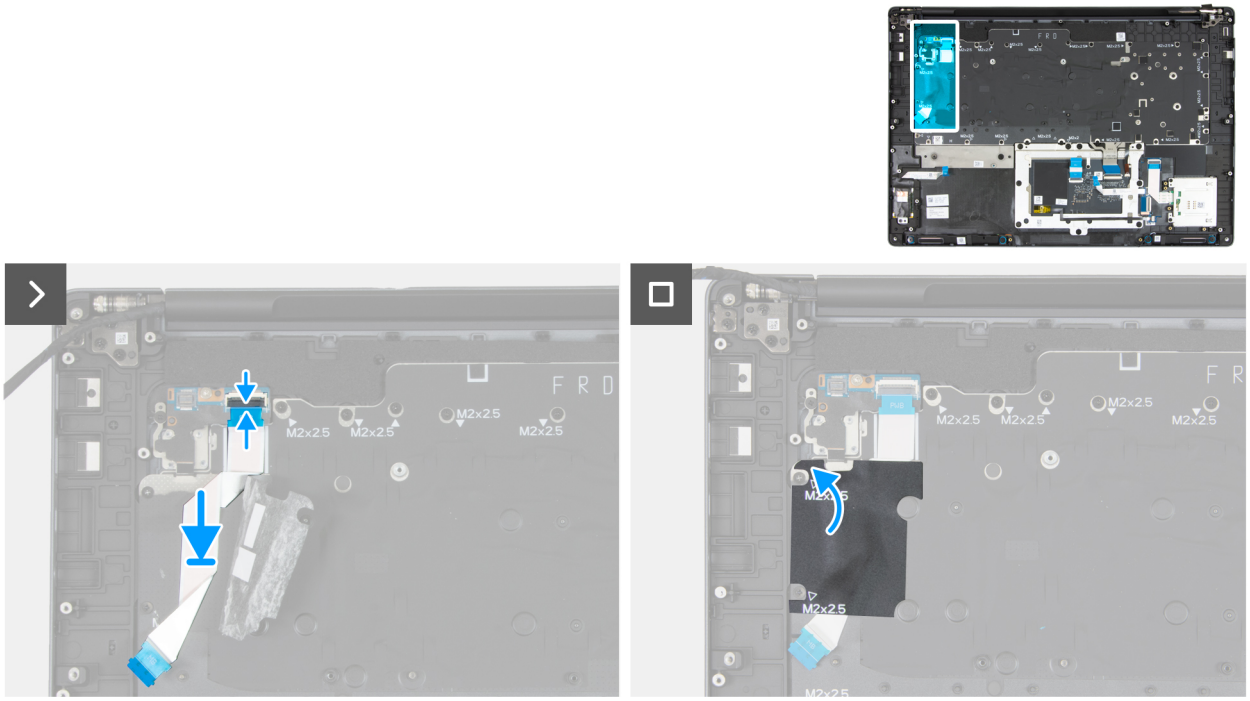


Figure 127. Installing the power button board cable

Steps

1. Connect the power button board cable to the power button board.
2. Adhere the power button board cable to the keyboard bracket.
3. Adhere the keyboard mylar to the power button board cable.

Next steps

1. Install the system board.

   NOTE: The system board can be removed and installed along with the following components:
   - heat sink
   - memory connector
   - WWAN card, if applicable
   - GPU card, only on computers shipped with discrete graphics

   This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

2. Install the inner frame.
3. Install the WLAN antenna module.
4. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
5. Install the power board.
6. Install the fan assembly.
7. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
8. Install the NPU card.
9. Install the WWAN card (optional).
10. Install the SIM card.
11. Install the WLAN card.
12. Install the M.2 2230 SSD.
13. Install the battery.
14. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
15. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
16. Install the M.2 2280 SSD from slot 1 (SSD1).

17. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
18. Install the memory module, if applicable.
19. Install the full base cover or base cover with sliding door, as applicable.
20. Install the sliding door, applicable for computers that are shipped with the sliding door.
21. Install the SD card.
22. Follow the procedures in After working inside your computer.

Power button board

Removing the power button 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the M.2 2280 SSD from slot 1 (SSD1).
8. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
9. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Remove the M.2 2230 SSD.
11. Remove the battery.
12. Remove the WLAN card.
13. Remove the SIM card.
14. Remove the WWAN card (optional).
15. Remove the NPU card.
16. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
17. Remove the fan assembly.
18. Remove the power board.
19. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
20. Remove the WLAN antenna module.
21. Remove the inner frame.
22. Remove the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

About this task

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

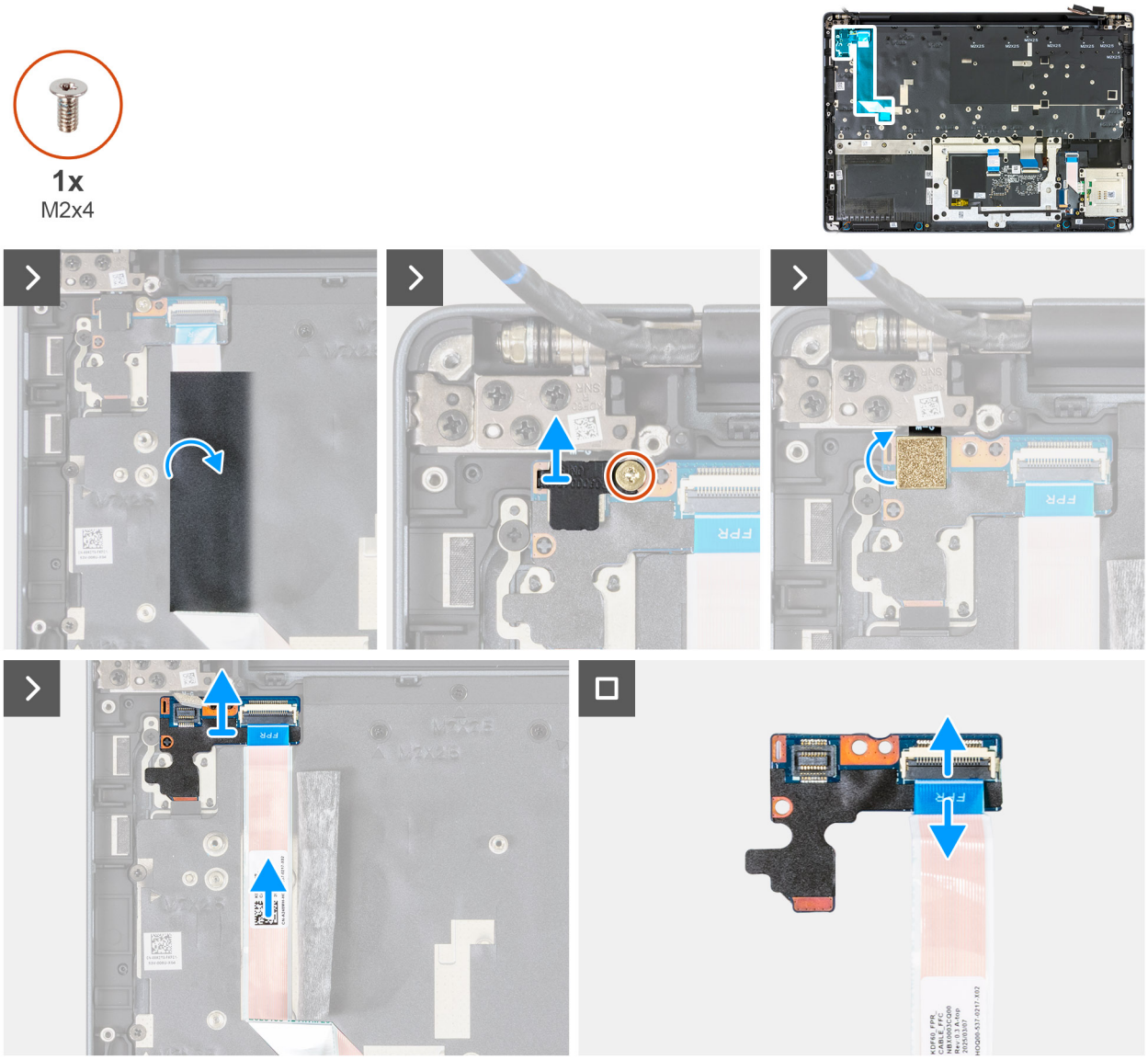


Figure 128. Removing the power button board

Steps

1. Peel the mylar from the power-button board cable.
2. Remove the screw (M2x4) that secures the power-button board bracket to the power button board.
3. Lift the power-button board bracket from the computer.
4. Peel the tape that secures the power button connector.
5. Open the latch to disconnect the fingerprint reader cable from the power button board.
6. Lift the power button board off the computer.

Installing the power button 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 procedure.

About this task

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

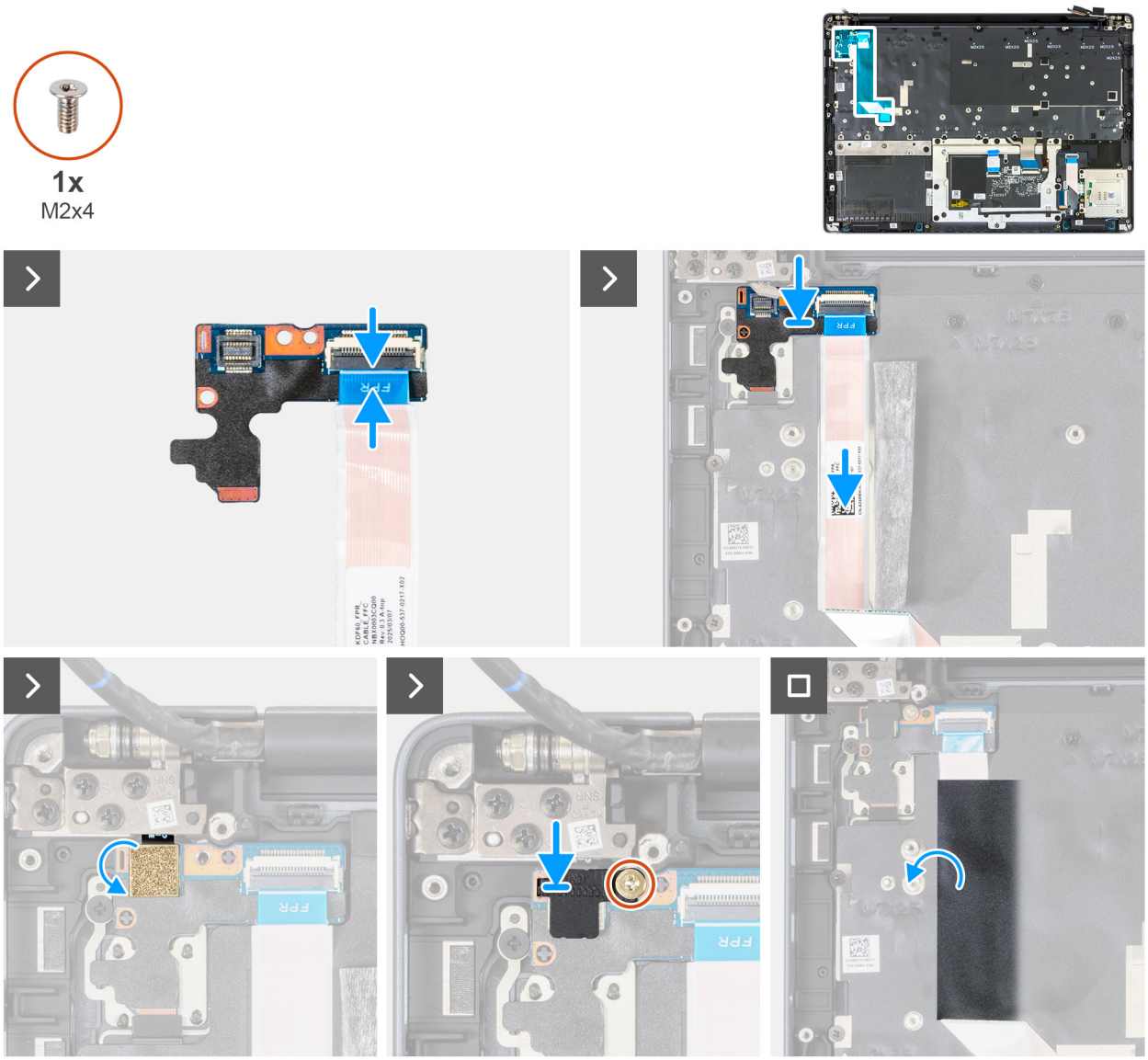


Figure 129. Installing the power button board

Steps

1. Using the alignment post, place the power button board along with the fingerprint reader cable on the computer.
2. Connect the fingerprint reader cable to the power button board, and close the latch.
3. Adhere the tape that secures the power button connector.
4. Using the alignment post, place the fingerprint reader cable bracket on the computer.
5. Replace the screw (M2x4) that secures the fingerprint reader cable bracket to the power button board.
6. Adhere the mylar on the fingerprint reader cable.

Next steps

1. Install the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector

- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

2. Install the inner frame.
3. Install the WLAN antenna module.
4. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
5. Install the power board.
6. Install the fan assembly.
7. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
8. Install the NPU card.
9. Install the WWAN card (optional).
10. Install the SIM card.
11. Install the WLAN card.
12. Install the M.2 2230 SSD.
13. Install the battery.
14. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
15. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
16. Install the M.2 2280 SSD from slot 1 (SSD1).
17. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
18. Install the memory module, if applicable.
19. Install the full base cover or base cover with sliding door, as applicable.
20. Install the sliding door, applicable for computers that are shipped with the sliding door.
21. Install the SD card.
22. Follow the procedures in After working inside your computer.

Power button

Removing the power button

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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the M.2 2280 SSD from slot 1 (SSD1).
8. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
9. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Remove the M.2 2230 SSD.
11. Remove the battery.
12. Remove the WLAN card.
13. Remove the SIM card.
14. Remove the WWAN card (optional).
15. Remove the NPU card.
16. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
17. Remove the fan assembly.
18. Remove the power board.
19. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
20. Remove the WLAN antenna module.

21. Remove the inner frame.
22. Remove the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

23. Remove the power button board with fingerprint reader.

About this task

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

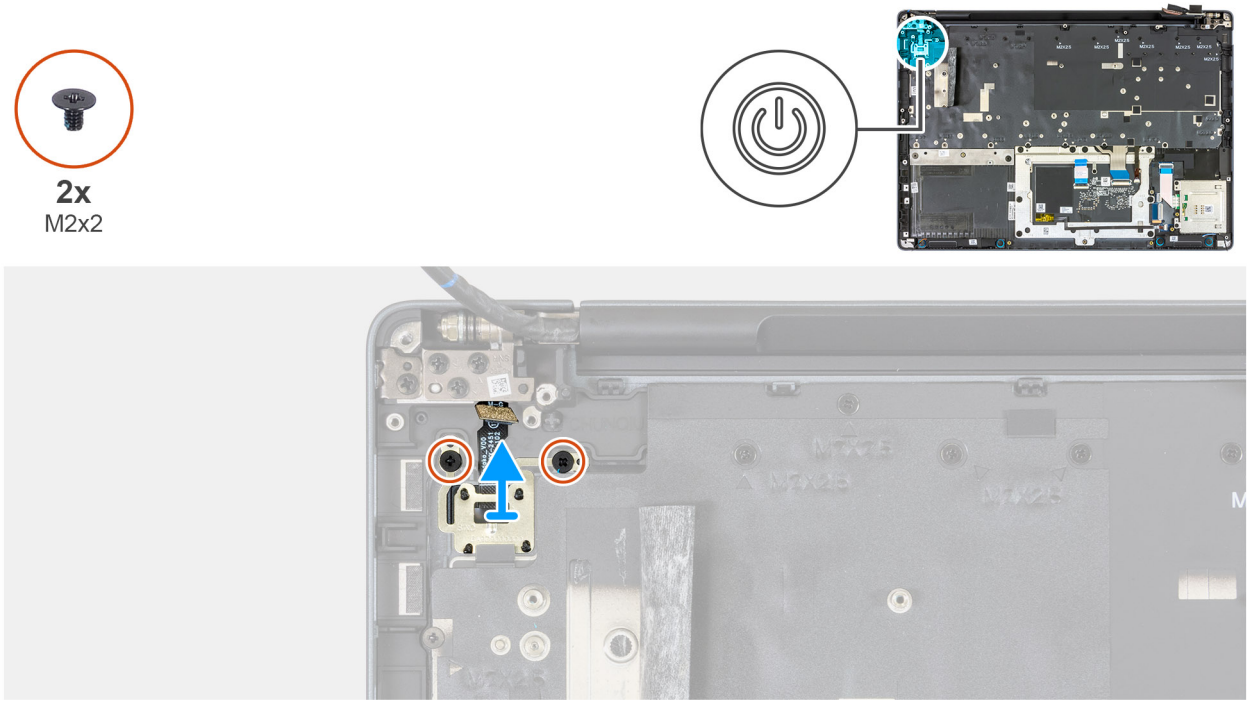


Figure 130. Removing the power button

Steps

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

Installing the power button

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 power button and provide a visual representation of the installation procedure.

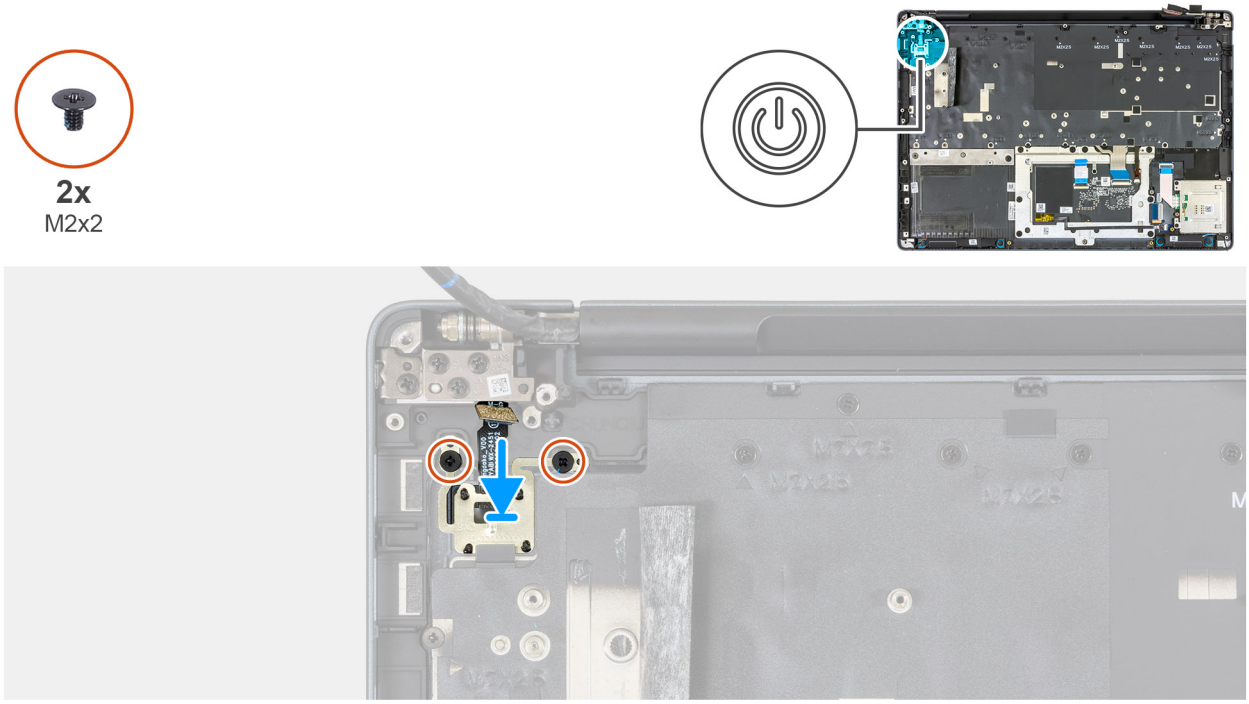


Figure 131. Installing the power button

Steps

1. Using the alignment post, place the power button along with its cable on the palm-rest assembly.
2. Replace the two screws (M2x2) that secure the power button to the palm-rest assembly.

Next steps

1. Install the power button board.
2. Install the system board.

> **NOTE:** The system board can be removed and installed along with the following components:
> - heat sink
> - memory connector
> - WWAN card, if applicable
> - GPU card, only on computers shipped with discrete graphics
>
> This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

3. Install the inner frame.
4. Install the WLAN antenna module.
5. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
6. Install the power board.
7. Install the fan assembly.
8. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
9. Install the NPU card.
10. Install the WWAN card (optional).
11. Install the SIM card.
12. Install the WLAN card.
13. Install the M.2 2230 SSD.
14. Install the battery.
15. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
16. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
17. Install the M.2 2280 SSD from slot 1 (SSD1).

18. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
19. Install the memory module, if applicable.
20. Install the full base cover or base cover with sliding door, as applicable.
21. Install the sliding door, applicable for computers that are shipped with the sliding door.
22. Install the SD card.
23. Follow the procedures 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 SD card.
3. Remove the sliding door, applicable for computers that are shipped with the sliding door.
4. Remove the full base cover or base cover with sliding door, as applicable.
5. Remove the memory module, if applicable.
6. Remove the CAMM module (dual-channel) or the memory interposer board, as applicable.
7. Remove the M.2 2280 SSD from slot 1 (SSD1).
8. Remove the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
9. Remove the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
10. Remove the M.2 2230 SSD.
11. Remove the battery.
12. Remove the WLAN card.
13. Remove the SIM card.
14. Remove the WWAN card (optional).
15. Remove the NPU card.
16. Remove the dummy fan, applicable for computers that are shipped with an integrated graphics card.
17. Remove the fan assembly.
18. Remove the power board.
19. Remove the integrated FPC beam connector or discrete FPC beam connector, as applicable.
20. Remove the WLAN antenna module.
21. Remove the inner frame.
22. Remove the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

23. Remove the power button board cable.
24. Remove the keyboard.
25. Remove the power button board.
26. Remove the power button.

About this task

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

NOTE: The palm-rest assembly replacement kit is shipped as an assembly that consists of the following components and can be removed and installed with these components attached.

- Power button board
- SmartCard reader, optional
- USH board
- Touchpad
- Touchpad cable
- NFC module
- Power button

Figure 132. Palm-rest assembly

Steps

After performing the steps in the pre-requisites, you are left with the 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 images indicate the location of the palm-rest assembly and provide a visual representation of the installation procedure.

NOTE: The palm-rest assembly replacement kit is shipped as an assembly that consists of the following components and can be removed and installed with these components attached.

- Power button board
- SmartCard reader, optional
- USH board
- Touchpad
- Touchpad cable
- NFC module
- Power button

Figure 133. Palm-rest assembly

Steps

Place the palm-rest assembly on a flat surface.

Next steps

1. Install the power button.
2. Install the power button board.
3. Install the keyboard.
4. Install the power button board cable
5. Install the system board.

NOTE: The system board can be removed and installed along with the following components:

- heat sink
- memory connector
- WWAN card, if applicable
- GPU card, only on computers shipped with discrete graphics

This simplifies the removal and installation procedure and avoids breaking the thermal bond between the system board, heat sink, and the GPU card.

6. Install the inner frame.
7. Install the WLAN antenna module.
8. Install the integrated FPC beam connector or discrete FPC beam connector, as applicable.
9. Install the power board.
10. Install the fan assembly.
11. Install the dummy fan, applicable for computers that are shipped with an integrated graphics card.
12. Install the NPU card.
13. Install the WWAN card (optional).
14. Install the SIM card.
15. Install the WLAN card.
16. Install the M.2 2230 SSD.
17. Install the battery.
18. Install the M.2 2280 SSD from slot 2 (SSD2), for computers shipped with an M.2 SSD installed in slot 2.
19. Install the M.2 2280 SSD from slot 3 (SSD3), for computers shipped with an M.2 SSD installed in slot 3.
20. Install the M.2 2280 SSD from slot 1 (SSD1).
21. Install the CAMM module (dual-channel) or the memory interposer board, as applicable.
22. Install the memory module, if applicable.
23. Install the full base cover or base cover with sliding door, as applicable.
24. Install the sliding door, applicable for computers that are shipped with the sliding door.
25. Install the SD card.
26. Follow the procedures 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 Max 16 Plus MB16250 supports the following operating systems:

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

NOTE: Windows 10 22H2 is supported only for computers downgraded by end users from Windows 11. Support by Dell Technologies is subjected to the Microsoft Windows 10 End of Support plan.

NOTE: Dell computers with operating systems installed by Dell conform to energy-efficiency regulations.

NOTE: Dell computers without operating systems installed by Dell may not comply with energy-efficiency regulations. For operating system support, go to Windows Support Site or Linux Support Site.

Drivers and downloads

When troubleshooting, downloading, or installing drivers, it is recommended that you read the Dell Knowledge Base article Drivers and Downloads FAQs 000123347.

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

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 41. 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**.

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 BIOS Setup options.

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 displayed.

BIOS Setup options

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

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

Table 42. System Setup options—Overview menu

Overview	
Dell Pro Max 16 Plus MB16250	
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 42. System 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.
BATTERY	
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 of the computer.
PROCESSOR	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Core Count	Displays the number of cores on the processor.
Processor ID	Displays the processor identification code.
Processor L2 Cache	Displays the processor L2 cache size.
Processor L3 Cache	Displays the processor L3 cache size.
Microcode Version	Displays the microcode version. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Intel Hyper-Threading Capable	Displays whether the processor is Hyper-Threading (HT) capable. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Intel vPro Technology	Displays if Intel vPro Technology is enabled or configured on your laptop.
MEMORY	
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Memory Technology	Displays the technology that is used for the memory.
DIMM_SLOT A	Displays the DIMM_SLOT A memory size.
DEVICES	
Panel Type	Displays the type of display panel available on the computer.
Panel Revision	Displays the display panel revision available on the computer.
Video Controller	Displays the type of video controller available on the computer.

Table 42. System Setup options—Overview menu (continued)

Overview	
Video Memory	Displays the video memory information of the computer.
Wi-Fi Device	Displays the wireless device information of the computer.
Native Resolution	Displays the native resolution of the computer.
Video BIOS Version	Displays the video BIOS version of the computer. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Audio Controller	Displays the audio controller information of the computer.
Bluetooth Device	Displays the Bluetooth device information of the computer.
LOM MAC Address	Displays the LAN On Motherboard (LOM) MAC address 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.
dGPU Video Controller	Displays the dGPU video controller type of the computer.

Table 43. System Setup options—Boot Configuration menu

Boot Configuration	
Boot Sequence	
Boot Mode: UEFI only	Displays the boot mode of the computer. **NOTE:** To view this option, enable **Service** options as described in View Service options.
Boot Sequence	Displays the boot sequence.
Enable PXE Boot Priority	When enabled, if a new PXE boot option is detected, it is added to the top of the Boot Sequence.
Secure Digital (SD) Card Boot	Enables or disables read-only boot from Secure Digital (SD) card. By default, the **Secure Digital (SD) Card Boot** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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, this **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:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options. **NOTE:** To enable Secure Boot, the computer must be in UEFI boot mode and the Enable Legacy Option ROMs option must be turned off.
Enable Microsoft UEFI CA	When disabled, the UEFI CA is removed from the BIOS UEFI Secure Boot database ('db' variable).

Table 43. System Setup options—Boot Configuration menu (continued)

Boot Configuration	
	CAUTION: If you disable Microsoft UEFI CA, the computer may not boot, computer graphics may not function, some devices may not function properly, and the computer could become unrecoverable. By default, the **Enable Microsoft UEFI CA** option is enabled. Microsoft HLK requirements for DeviceGuard requied the UEFI 3rd party CA removal from the UEFI Secure Boot database (db). Setting this option to Allow Pre-Boot Modules Only, allows the UEFI 3rd party CA to be used to validate pre-boot option ROMs, but does not allow a bootloader signed with the UEFI 3rd party CA to be loaded. For additional security, Dell Technologies recommends setting the Microsoft UEFI CA option to **Enabled** to ensure the broadest compatibility with devices and operating systems.
Secure Boot Mode	Enables or disables the Secure Boot operation mode. By default, the **Deployed Mode** is selected. **Deployed Mode** should be selected for normal operation of Secure Boot. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Expert Key Management	
Enable Custom Mode	Enables or disables the keys in the PK, KEK, db, and dbx security key databases to be modified. By default, the **Enable Custom Mode** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Custom Mode Key Management	Selects the custom values for expert key management. By default, the **PK** option is selected. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.

Table 44. System Setup options—Integrated Devices menu

Integrated Devices	
Date/Time	
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 select between a 12-hour or 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.

Table 44. System Setup options—Integrated Devices menu (continued)

Integrated Devices	
	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 Internal Speaker** option is enabled.
USB/Thunderbolt Configuration	
Enable External USB Ports	Enables the external USB ports. By default, the **Enable External USB Ports** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Disable USB4 PCIE Tunneling	Disables the USB4 PCIE Tunneling option. By default, the **Disable USB4 PCIE Tunneling** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in Entering BIOS Setup program.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in Entering BIOS Setup program.

Table 44. System Setup options—Integrated Devices menu (continued)

Integrated Devices	
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Miscellaneous Devices	
Enable Fingerprint Reader Device	Enables or disables the Fingerprint Reader Device option. By default, the **Enable Fingerprint Reader Device** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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 Advanced Setup options.

Table 45. System 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.
Storage Interface	Displays the information of various onboard drives.
Port Enablement	Enables or disables the M.2 PCIe SSD option.
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 Advanced Setup options.
Drive Information	Displays the information of onboard drives.
Enable MediaCard	
Secure Digital (SD) Card	Enables or disables the SD card. By default, the **Secure Digital (SD) Card** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Secure Digital (SD) Card Read-Only Mode	Enables or disables the SD card read-only mode.

Table 45. System Setup options—Storage menu (continued)

Storage	
	NOTE: To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options. By default, the **Secure Digital (SD) Card Read-Only Mode** option is disabled.

Table 46. System Setup options—Display menu

Display	
Display Brightness	
Brightness on battery power	By default, the screen brightness is set to 50 when the computer is running on battery power. Set the screen brightness when the computer is running on battery power. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Brightness on AC power	By default, the screen brightness is set to 100 when the computer is running on AC power. Set the screen brightness when the computer is running on AC power. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Hybrid Graphics / Advanced Optimus	
Enable Hybrid Graphics / Advanced Optimus (when available)	If selected, the computer allows both the integrated and discrete graphics controllers to work together for optimized capability and battery life. If not selected, the internal display and the left side Thunderbolt ports will be driven by the discrete graphics controller to prioritized graphics capability over battery life. For more information about the limitations on the number and type of supported displays, see *External Display Connection Guide*.
Discrete Graphics Controller Direct Output Mode	If selected, the computer sets the left side Thunderbolt ports to be managed by the discrete graphics controller, with the purpose of enabling unique discrete graphics controller features. The internal display will be managed by the integrated graphics controller. For more information about the limitations on the number and type of supported displays, see *External Display Connection Guide*.

Table 47. System Setup options—Connection menu

Connection	
Integrated NIC	Controls the onboard LAN controller. By default, the **Enabled with PXE** option is enabled.
Wireless Device Enable	
WLAN	Enables or disables the internal WLAN device. By default, the **WLAN** option is enabled.
Bluetooth	Enables or disables the internal Bluetooth device. By default, the **Bluetooth** option is enabled.
Contactless Smartcard/NFC	Enables or disables the smartcard device. By default, the **Contactless Smartcard/NFC** option is enabled.

Table 47. System Setup options—Connection menu (continued)

Connection	
	NOTE: To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Enable UEFI Network Stack	Enables or disables the UEFI Network Stack and controls the onboard LAN Controller. By default, the **Auto Enabled** option is selected. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Wireless Radio Control	
Control WLAN Radio	Allows the computer to detect a wired network connection and then disable 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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Enable UEFI Bluetooth Stack	
Enable UEFI Bluetooth Stack	When enabled, UEFI Bluetooth protocols are installed and available, allowing pre-OS Bluetooth HID features. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
HTTP(s) Booth Feature	
HTTP(s) Boot	When enabled, displays the available HTTP(s) Boot capabilities.
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, **Auto Mode** is selected. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
CA Certificate	Upload or delete the CA certificate. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.

Table 48. System 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.

Table 48. System Setup options—Power menu (continued)

Power	
	NOTE: To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Peak Shift	
Enable Peak Shift	Enables the computer to switch to battery power automatically during peak energy usage hours. By default, the **Enable Peak Shift** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Type-C Connector Power	Enables you to set the maximum power that can be drawn from the Type-C connector. **NOTE:** Setting a higher power value for the Type-C connector may cause the computer to throttle sooner, if the total computer power budget is exceeded. If the power budget is exceeded, it does not damage your computer or peripherals but may cause your computer to run more slowly. By default, the **7.5 Watts** is selected.
USB PowerShare	
Enable USB PowerShare	Enables or disables the USB PowerShare on the computer. By default, the **Enable USB PowerShare** option is disabled.
Thermal Management	Allows you to manage the fan settings to regulate processor temperature and control computer performance, noise, and thermal levels. By default, the **Optimized** option is selected.
USB Wake Support	
Wake on Dell USB-C Dock	When Wake on Dell USB-C Dock is enabled, connecting a Dell USB-C Dock wakes the computer from Standby, Hibernate, or Power Off.
Block Sleep	Enables or disables the computer from entering Sleep (S3) mode in the operating system. By default, the **Block Sleep** option is disabled. **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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Lid Switch	
Enable Lid Switch	Enables or disables the Lid Switch. By default, the **Enable Lid Switch** option is enabled.
Power On Lid Open	When enabled, allows the computer to turn on from the off state whenever the lid is opened. By default, the **Power On Lid Open** option is enabled.

Table 49. System Setup options—Security menu

Security	
TPM 2.0 Security	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.

Table 49. System Setup options—Security menu (continued)

Security	
	By default, the **TPM 2.0 Security** option is enabled. For additional security, Dell Technologies recommends keeping the Trusted Platform Module (TPM) enabled to allow these security technologies to fully function.
TPM 2.0 Security On	Enables or disables the TPM. By default, the **TPM 2.0 Securty On** option is enabled. For additional security, Dell Technologies recommends keeping TPM enabled to allow these security technologies to fully function. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. 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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Service** options as described in View Service options.
Clear	When enabled, the **Clear** option clears information that is stored in the TPM after exiting the system'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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
PPI Bypass for Clear Commands	The Physical Presence Interface (PPI) Bypass for Clear Commands option allows the operating system to manage certain aspects of PTT. When enabled, you are not prompted to confirm changes to the PTT configuration. 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.
Intel Total Memory Encryption	Enables or disables the processor's memory encryption feature.

Table 49. System Setup options—Security menu (continued)

Security	
	By default, the **Intel Total Memory Encryption** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Chassis Intrusion	
Chassis Intrusion	Enables or disables the detection of chassis intrusion events. This feature notifies the user when the base cover has been removed from the computer. 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 **Disabled**, no notification is displayed and no 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. By default, the **Chassis Intrusion Detection** option is disabled. For additional security, Dell Technologies recommends keeping the **Chassis Intrusion** option enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Block Boot Until Cleared	The **Block Boot Until Clear** option is enabled when **Chassis Intrusion** is enabled. When enabled, the computer does not boot until the chassis intrusion is cleared. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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 preventsthis 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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
HDD Security	
SED Block SID Authentication	The SED Block SID Authentication setting controls a mechanism that is used by the BIOS to block entities from taking ownership of the Self-Encrypting Drive (SED) when the drive does not have a password set. By default, the **SED Block SID Authentication** option is enabled.
PPI Bypass for SED Block SID Command	The PPI Bypass for SED Block SID Command setting controls the SED Block SID Physical Presence Interface (PPI). By default, the **PPI Bypass for SED Block SID Command** 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

Table 49. System Setup options—Security menu (continued)

Security	
	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. **WARNING: The Permanently Disabled option can only be selected once. When Permanently Disabled is selected, Absolute Persistence cannot be reenabled. No further changes to the Enable/Disable states are allowed.** **NOTE:** The Enable/Disable options are unavailable while the computer is in the activated state. **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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Authenticated BIOS Interface	
Enable Authenticated BIOS Interface	Enables or disables Authenticated BIOS Interface. By default, the **Enable Authenticated BIOS Interface** option is disabled.
Clear Certificate Store	Clears all certificates in KMS storage. By default, the **Clear Certificate Store** option is disabled.
Legacy Manageability Interface Access	
Legacy Manageability Interface Access	Allows the platform administrator to control access through the Legacy Manageability Interfface when ABI is enabled and provisioned. By default, the **Legacy Manageability Interface Access** option is enabled.
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 message is 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 set to **Silent**. For additional security, Dell Technologies recommends keeping the **Firmware Device Tamper Detection** option enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Clear Firmware Device Tamper Detection	Allows you to clear the events that are logged when tampering of a 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 Advanced Setup options.

Table 50. System Setup options—Passwords menu

Passwords	
Admin Password	The Admin 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 device passwords are already set. ● The administrator password can be used in place of the system and/or internal storage passwords. ● When set, the administrator password must be provided during a firmware update. ● Clearing the administrator password also clears the system 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 system password prompt. ● The computer shuts down after three incorrect attempts to enter the system password. ● The computer shuts down when the **Esc** key is pressed at the **System Password** prompt. ● The system password is not prompted when the computer resumes from standby mode. Dell Technologies recommends using the system password in situations where it is likely that a computer may be lost or stolen.
Hard Drive Password **NOTE:** On some computers, the **M.2 PCIe SSD-0 Password** option is shown.	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.

Table 50. System Setup options—Passwords menu (continued)

Passwords	
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). When the **Upper Case Letter** option is enabled, the password requires at least one upper case letter. When the **Lower Case Letter** option is enabled, the password requires at least one lower case letter. When the **Digit** option is enabled, the password requires at least one numeric digit. When the **Special Character** option is enabled, the password requires at least one special character from the set: !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~. When setting **Minimum Characters** for password length, Dell Technologies recommends setting the minimum password length to at least four characters. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Password Bypass	The **Password Bypass** option allows the computer to reboot from the operating system without entering the system 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 system 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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Password Changes	
Allow Non-Admin Password Changes	The **Allow Non-Admin Password Changes** option in BIOS Setup allows an end user to set or change the system or hard drive passwords without entering the administrator password. This gives an administrator control over the BIOS settings but enables an end user to provide their own password. By default, the **Allow Non-Admin Password Changes** option is enabled. For additional security, Dell Technologies recommends keeping the **Allow Non-Admin Password Changes** option disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Admin Setup Lockout	
Enable 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 **Enable Admin Setup Lockout** option is disabled. For additional security, Dell Technologies recommends keeping the **Admin Setup Lockout** option disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Master Password Lockout	

Table 50. System Setup options—Passwords menu (continued)

Passwords	
Enable Master Password Lockout	The **Master Password Lockout** option allows you to disable the Recovery Password feature. If the system, 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 Technologies does not recommend enabling the **Master Password Lockout** unless you have implemented your own password recovery system. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Enable 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 Advanced Setup options.

Table 51. System Setup options—Update, Recovery menu

Update, Recovery	
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 drive. 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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
BIOS Downgrade	
Allow BIOS Downgrade	Allows downgrading of the system 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 if certain system errors occur. 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 the local service operating system does not boot or is not installed. By default, the **BIOSConnect** option is enabled.

Table 51. System Setup options—Update, Recovery menu (continued)

Update, Recovery	
Dell Auto OS Recovery Threshold	Allows the control of the automatic boot flow for the SupportAssist System Resolution Console and the Dell OS Recovery Tool. By default, the **Dell Auto OS Recovery Threshold** value is set to **2**. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.

Table 52. System Setup options—System Management menu

System Management	
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Creates a computer Asset Tag that an IT administrator can use to uniquely identify a particular computer. **NOTE:** Once set in the 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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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 Advanced Setup options.
First Power On Date	
Set Ownership Date	Allows you to set the Ownership date.
Diagnostics	
OS Agent Requests	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 Advanced Setup 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.

Table 52. System Setup options—System Management menu (continued)

System Management	
	NOTE: To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.

Table 53. System Setup options—Keyboard menu

Keyboard	
Numlock Enable	
Enable Numlock	Enables or disables Numlock when the computer boots. Default: ON
Fn Lock Options	Enables or disables the Fn Lock option. By default, the **Fn Lock Options** 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 **Bright** option is selected. Enables the keyboard illumination feature at 100% brightness level.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Device Configuration HotKey Access	Allows you to control whether you can access device configuration screens through hotkeys during system 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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.

Table 54. System Setup options—Pre-boot Behavior menu

Pre-boot 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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.

Table 54. System Setup options—Pre-boot Behavior menu (continued)

Pre-boot Behavior	
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Extend BIOS POST Time	Sets the BIOS POST (Power-On Self-Test) load time. By default, the **0 seconds** option is selected. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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	
Early Logo Display	Displays the Logo Sign of Life. By default, the **Early Logo Display** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Early Keyboard Backlight	Enables or disables the Keyboard Backlight Sign of Life. By default, the **Early Keyboard Backlight** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Show Ownership Tag with Logo	
Show Ownership Tag with Logo	Displays the system Ownership Tag in addition to the BIOS Boot logo, when enabled. By default, the **Show Ownership Tag with Logo** option is enabled.

Table 55. System Setup options—Virtualization Support menu

Virtualization Support	
Intel Trusted Execution Technology (TXT)	Specifies whether a measured Virtual Machine Monitor (MVMM) can use the additional hardware capabilities that are provided by Intel Trusted Execution Technology. The following must be enabled in order to enable Intel TXT - • Trusted Platform Module (TPM) • Intel Hyper-Threading • All CPU cores (Multi-Core Support) • Intel Virtualization Technology • Intel VT for Direct I/O By default, the **Intel Trusted Execution Technology (TXT)** option is disabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
DMA Protection	

Table 55. System Setup options—Virtualization Support menu (continued)

Virtualization Support	
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
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. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Internal Port DMA Compatibility Mode	When enabled, BIOS notifies the operating system that the internal ports are not DMA capable. This is intended to help with devices that have OS DMA compatibility issues. By default, the **Internal Port DMA Compatibility Mode** option is disabled. **NOTE:** This setting does not affect external port DMA or Pre-boot DMA support.

Table 56. System Setup options—Performance menu

Performance	
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 Service options.
Enable Adaptive C-States for Discrete Graphics	Adaptive C-States allows the computer to dynamically detect the usage of discrete graphics and adjust system parameters for higher performance during that time period. The feature requires the AC adapter due to higher energy consumption and does not dynamically activate higher performance without an appropriate AC adapter powering the computer. Other settings made to conserve power may block this feature from activating. By default, the **Enable Adaptive C-States for Discrete Graphics** option is enabled. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.

Table 57. System Setup options—System Logs menu

System Logs	
BIOS Event Log	
Clear BIOS Event Log	Select the option to keep or clear BIOS events logs. By default, the **Keep Log** option is selected. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Thermal Event Log	
Clear Thermal Event Log	Select the option to keep or clear thermal events logs. By default, the **Keep Log** option is selected. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.
Power Event Log	
Clear Power Event Log	Select the option to keep or clear power events logs. By default, the **Keep Log** option is selected. **NOTE:** To view this option, enable **Advanced Setup** mode as described in View Advanced Setup options.

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, see the Knowledge Base Resource 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 in the Knowledge Base Resource at 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 the Dell Knowledge Base article 000131486 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, see the Knowledge Base Resource 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 in the Knowledge Base Resource at 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 Dell Knowledge Base article 000128928 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 58. 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 CMOS settings

About this task

CAUTION: Clearing CMOS settings resets the BIOS settings on your computer.

Steps

1. Remove the full base cover or base cover with sliding door, as applicable.
2. Disconnect the battery cable from the system board.
3. Wait for one minute.
4. Connect the battery cable to the system board.
5. Install the full base cover or base cover with sliding door, as applicable.

Clearing Chassis Intrusion Alert

This computer features a chassis intrusion switch which can detect anytime the base cover has been removed from the computer.

The alert to notify you of any intrusion can be enabled using the **Chassis Intrusion** field in the **Security** submenu of the BIOS setup menu.

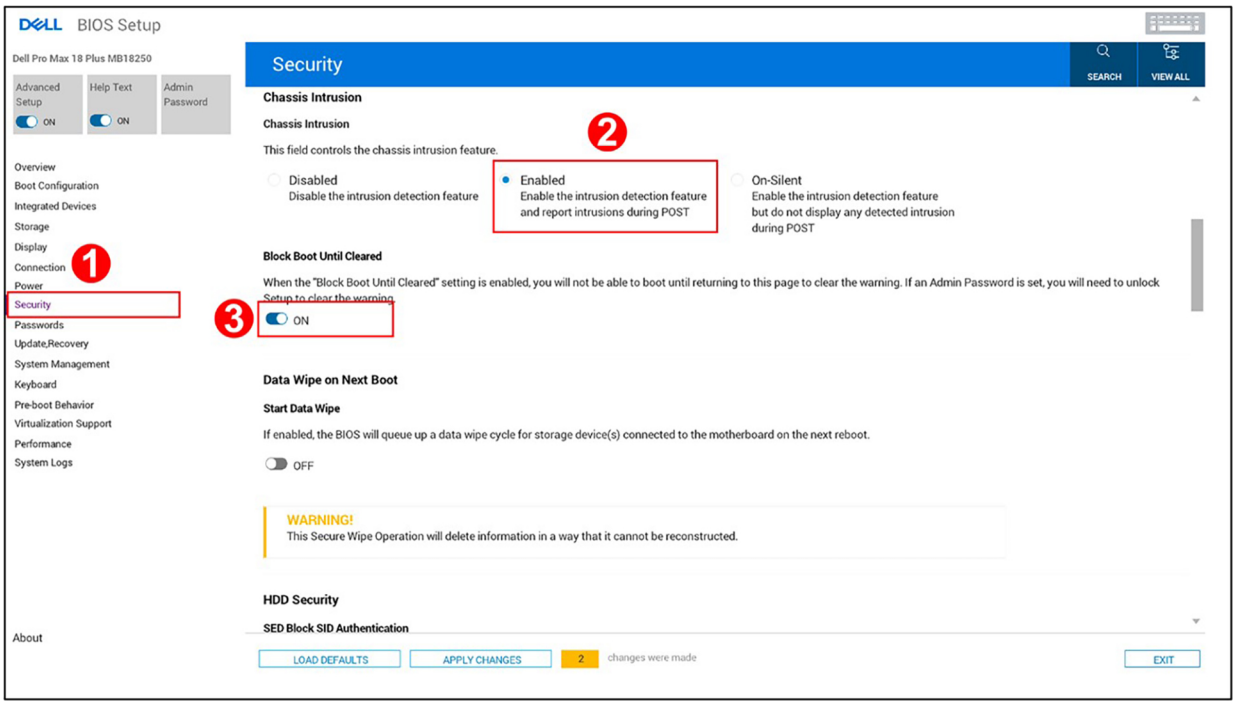


Figure 134. Configuring the Chassis Intrusion Alert settings

When enabled, the **Block Boot Until Cleared** field allows you to decide whether to prevent normal boot up of the computer until the intrusion alert is cleared.

NOTE: If **On-Silent** is selected, no alert message is displayed after the base cover has been removed from the computer. Only a message appears in the **System Log** > **BIOS Event Log** submenu and a **Clear Intrusion Warning** option is available in the **Security** submenu of the BIOS menu.

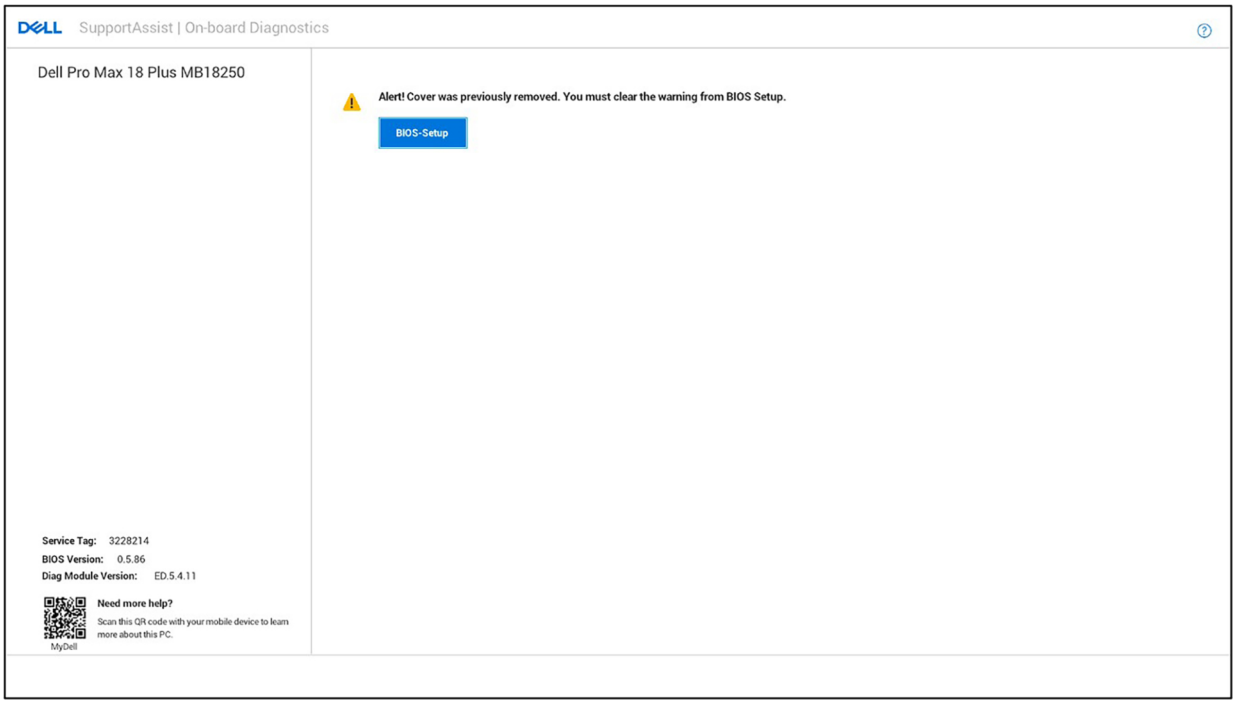


Figure 135. Chassis intrusion alert with Block Boot Until Cleared enabled

NOTE: If **Block Boot Until Cleared** is set to **OFF**, select **Continue** to boot up normally or **BIOS-Setup** to clear the alert.

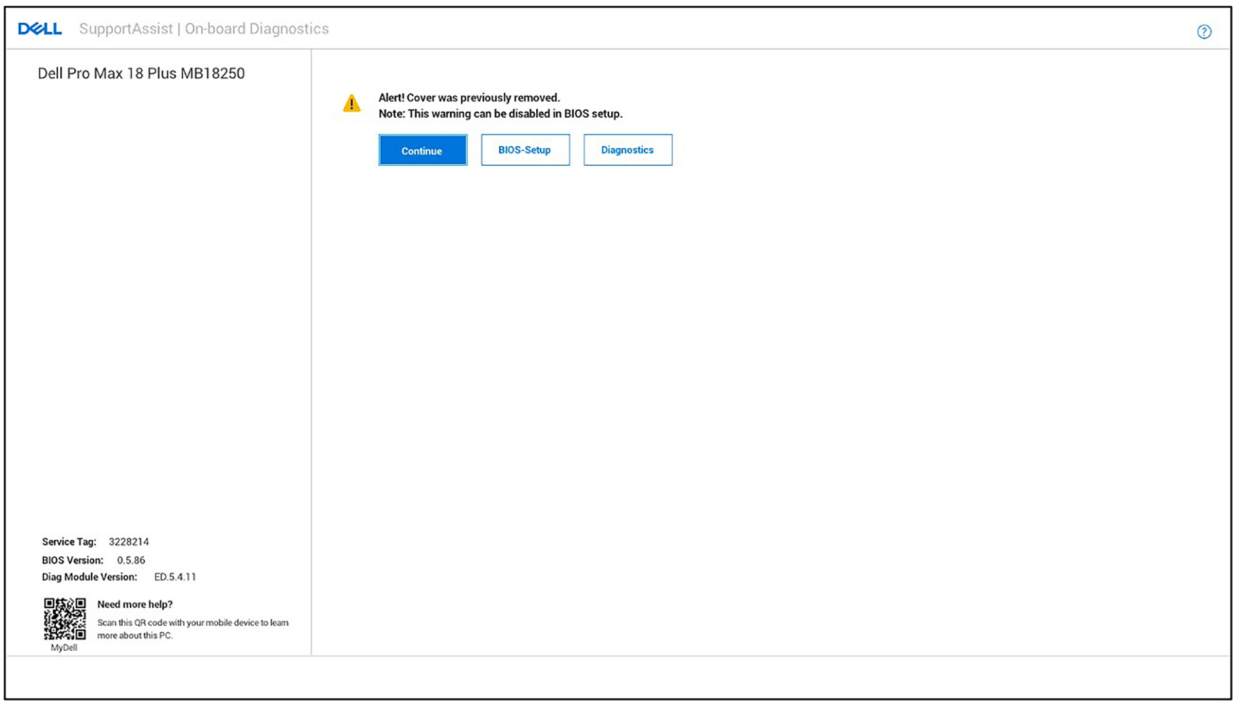


Figure 136. Chassis intrusion alert with Block Boot Until Cleared set to OFF

NOTE: If **Continue** is selected, the user continues to see the alert each time the computer is turned on until the alert is cleared. To clear the alert, select **ON** in the **Clear Intrusion Warning** field in the **Security** submenu of the BIOS setup menu.

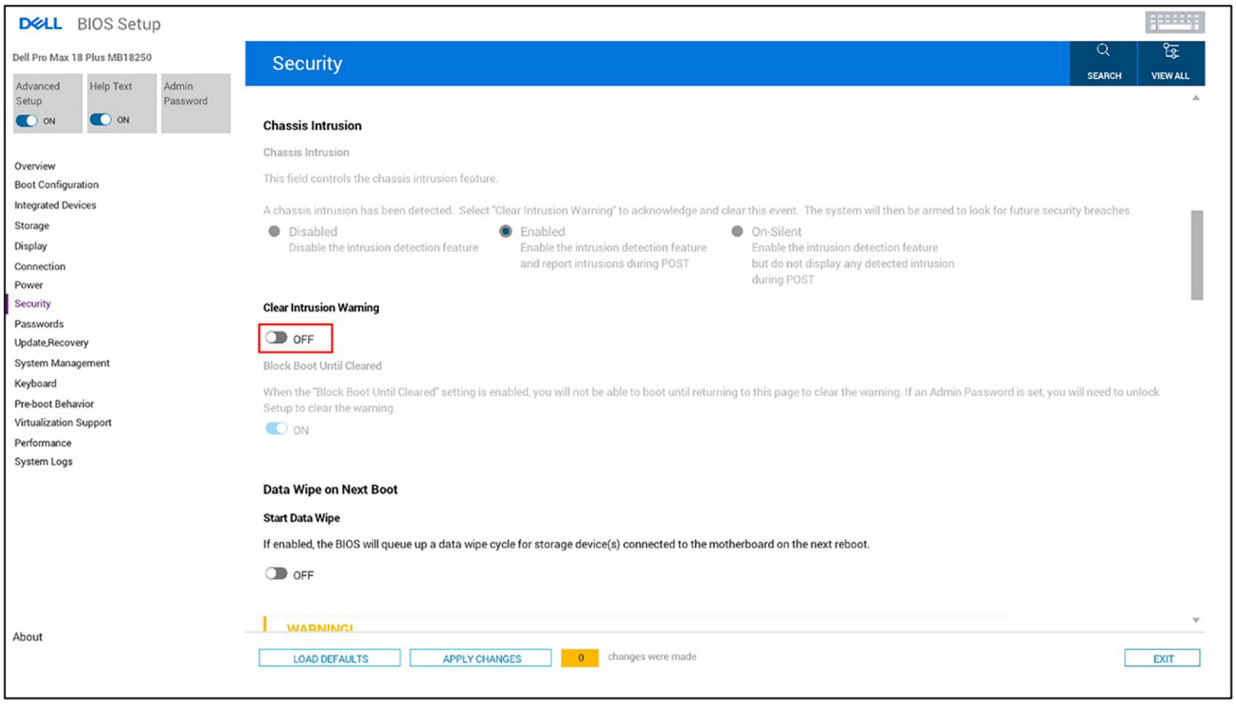


Figure 137. Clearing the Chassis Intrusion Alert in the BIOS

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.

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 the knowledge base article 000181163.

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 59. 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 Max 16 Plus MB16250.

The following table shows different Service LED blinking patterns and associated problems. The diagnostic light codes consist of a two-digit number, and the digits are separated by a comma. The number stands for a blinking pattern. The first digit shows the number of blinks in amber color, and the second digit shows the number of blinks in white color. The Service LED blinks in the following manner:

- The Service LED blinks the number of times equal to the value of the first digit and turns off with a short pause.
- After that, the Service LED blinks the number of times equal to the value of the second digit.
- The Service LED turns off again with a longer pause.
- After the second pause, the blinking pattern will be repeated.

Table 60. Diagnostic light codes

Diagnostic light codes (Amber, White)	Problem description
1,1	TPM detection failure
1,2	Unrecoverable SPI Flash Failure
1,5	EC unable to program i-Fuse
1,6	Generic catch-all for ungraceful EC code flow errors
1,7	Non-RPMC Flash on Boot Guard fused system
1,8	Chipset “Catastrophic Error” signal has tripped
2,1	CPU configuration or CPU failure
2,2	System board: BIOS or Read-Only Memory (ROM) failure
2,3	No memory or Random-Access Memory (RAM) detected
2,4	Memory or Random-Access Memory (RAM) failure
2,5	Invalid memory installed
2,6	System board/chipset error
2,7	LCD failure SBIOS message
2,8	Display power-rail failure on the system board
3,1	CMOS battery failure
3,2	PCI of Video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	EC power-rail error
3,6	Flash corruption detected by SBIOS
3,7	Timeout waiting on ME to reply to HECI message
4,1	Memory DIMM power rail failure
4,2	CPU power cable connection issue

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.

   CAUTION: The battery is a Field Replaceable Unit (FRU) and the removal and installation procedures are intended for authorized service technicians only.
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.

10

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 61. 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 Contact Support at 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.

11

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 62. Revision history

Revision	Date	Description
A00	07-17-2025	Original publish date.
A01	08-05-2025	Update to include USB Type-C connector module removal and replacement procedures.
A02	08-18-2025	Included updated SSD2 images.
A03	09-15-2025	Removed the sensor board removal and installation procedures.
A04	11-20-2025	Update to include NPU card information.
A05	11-25-2025	Update to viewing angle in Display specifications.