

Latitude 7290

Owner's Manual



Notes, cautions, and warnings

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

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

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

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Working on your computer

Topics:

- [Safety precautions](#)
- [Before working inside your computer](#)
- [After working inside your computer](#)

Safety precautions

The safety precautions chapter details the primary steps to be taken before performing any disassembly instructions.

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

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power.
- Disconnect all network cables, telephone, and telecommunications lines from the system.
- Use an ESD field service kit when working inside any notebook to avoid electrostatic discharge (ESD) damage.
- After removing any system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to reduce the chance of getting electrocuted.

Standby power

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

Unplugging, pressing and holding the power button for 15 seconds should discharge residual power in the system board. notebooks.

Bonding

Bonding is a method for connecting two or more grounding conductors to the same electrical potential. This is done through the use of a field service electrostatic discharge (ESD) kit. When connecting a bonding wire, ensure that it is connected to bare metal and never to a painted or non-metal surface. The wrist strap should be secure and in full contact with your skin, and ensure that you remove all jewelry such as watches, bracelets, or rings prior to bonding 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 DIMMs, and system boards. Very slight charges can damage circuits in ways that may not be obvious, such as intermittent problems or a shortened product life span. As the industry pushes for lower power requirements and increased density, ESD protection is an increasing concern.

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

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

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

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

Perform the following steps to prevent ESD damage:

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

ESD field service kit

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

Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.
- **Wrist Strap and Bonding Wire** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the ESD mat is not required, or connected to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the ESD mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, mat, and bonding wire. Never use wireless wrist straps. Always be aware that the internal wires of a wrist strap are prone to damage from normal wear and tear, and must be checked regularly with a wrist strap tester in order to avoid accidental ESD hardware damage. It is recommended to test the wrist strap and bonding wire at least once per week.
- **ESD Wrist Strap Tester** – The wires inside of an ESD strap are prone to damage over time. When using an unmonitored kit, it is a best practice to regularly test the strap prior to each service call, and at a minimum, test once per week. A wrist strap tester is the best method for doing this test. If you do not have your own wrist strap tester, check with your regional office to find out if they have one. To perform the test, plug the wrist-strap's bonding-wire into the tester while it is strapped to your wrist and push the button to test. A green LED is lit if the test is successful; a red LED is lit and an alarm sounds if the test fails.
- **Insulator Elements** – It is critical to keep ESD sensitive devices, such as plastic heat sink casings, away from internal parts that are insulators and often highly charged.
- **Working Environment** – Before deploying the ESD Field Service kit, assess the situation at the customer location. For example, deploying the kit for a server environment is different than for a desktop or portable environment. Servers are typically installed in a rack within a data center; desktops or portables are typically placed on office desks or cubicles. Always look for a large open flat work area that is free of clutter and large enough to deploy the ESD kit with additional space to accommodate the type of system that is being repaired. The workspace should also be free of insulators that can cause an ESD event. On the work area, insulators such as Styrofoam and other plastics should always be moved at least 12 inches or 30 centimeters away from sensitive parts before physically handling any hardware components.
- **ESD Packaging** – All ESD-sensitive devices must be shipped and received in static-safe packaging. Metal, static-shielded bags are preferred. However, you should always return the damaged part using the same ESD bag and packaging that the new part arrived in. The ESD bag should be folded over and taped shut and all the same foam packing material should be used in the original box that the new part arrived in. ESD-sensitive devices should be removed from packaging only at an ESD-protected work surface, and parts should never be placed on top of the ESD bag because only the inside of the bag is shielded. Always place parts in your hand, on the ESD mat, in the system, or inside an anti-static bag.

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

ESD protection summary

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

Transporting sensitive components

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

Before working inside your computer

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

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

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

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

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

- 8 Remove any installed ExpressCards or Smart Cards from the appropriate slots.

After working inside your computer

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

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

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

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

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

Removing and installing components

Topics:

- Recommended tools
- Screw size list
- Subscriber identification module card
- Base cover
- Battery
- Solid state drive
- Speaker
- Coin cell battery
- WWAN card
- WLAN card
- Memory modules
- Heat sink
- LED board
- Touchpad buttons board
- Power connector port
- Display Assembly
- Display Bezel
- Display Hinge Caps
- Display panel
- Camera Microphone Module
- System board
- Keyboard
- Palm rest

Recommended tools

The procedures in this document require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe

i | NOTE: The #0 screw driver is for screws 0-1 and the #1 screw driver is for screws 2-4

Screw size list

Table 1. Latitude 7290 screw size list

Component	M2.5 x 6.0	M2.0 x 5.0	M2.5 x 3.5	M2.0 x 3.0	M2.0 x 2.5	M2.0 x 2.0
Back cover	8 (captive screws)					
Battery—3-cell		1				
Battery—4-cell		2				
SSD module				1		
Heat sink module				4		
System fan				2		
Speaker				4		
WWAN card				1		
WLAN card				1		
Power connector port				1		
EDP bracket				2		
LED board					1	
Smart card reader cage					2	
Display hinge			6			
Keyboard support plate					18	
Keyboard						5
System board				8		
Memory module bracket				1		
LCD Back cover		4				2
Touchpad button					2	
Fingerprint					1	
USB Type C bracket				2		
SSD holder				1		

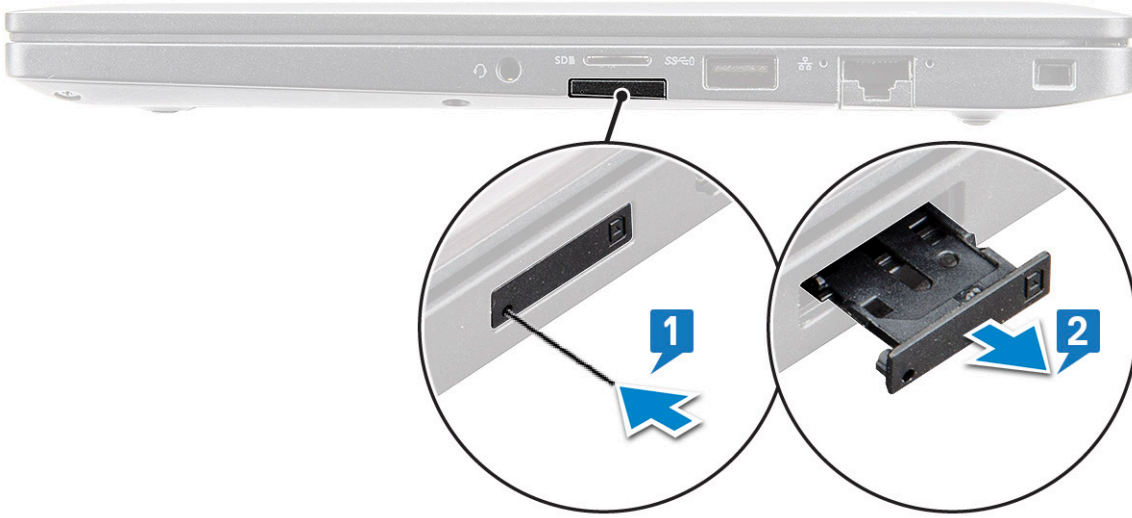
Subscriber identification module card

Removing SIM card or SIM card tray

NOTE: SIM card or SIM card tray removal is only available on systems that are shipped with WWAN module. Hence, removing procedure is only applicable for systems that are shipped with WWAN module.

CAUTION: Removing the SIM card with the system is turned On, may cause data loss or damage to the card. Ensure that your system is turned off or the network connections are disabled.

- 1 Insert a paperclip or a SIM card removal tool into the pinhole on the SIM card tray.
- 2 Use a scribe to pull the SIM card tray.
- 3 If a SIM card is available, remove the SIM card from the SIM card tray.



Replacing SIM card

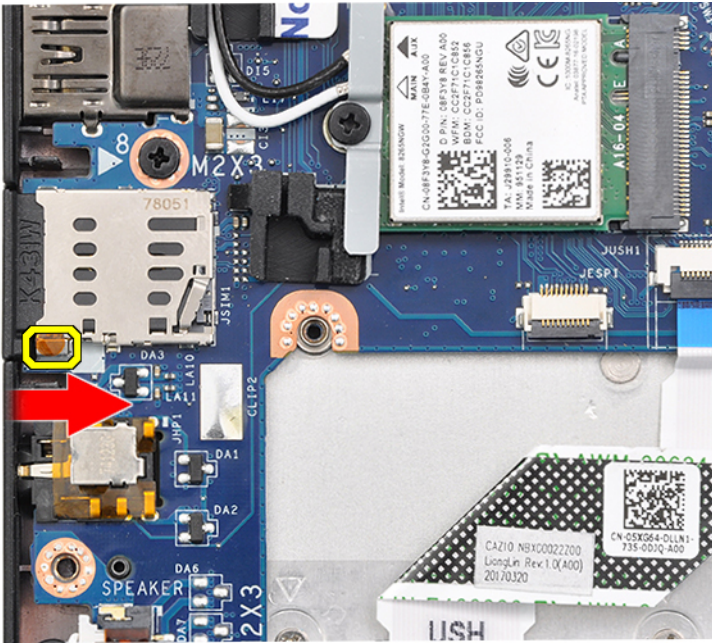
- 1 Insert a paperclip or a SIM card removal tool into the pinhole on the SIM card tray.
- 2 Use a scribe to pull the SIM card tray
- 3 Place on the SIM card on the tray.
- 4 Insert the SIM card tray into the slot.

Removing dummy SIM card tray

For models shipped with a WWAN card, the SIM card tray must first be removed from the system before removing the system board. To remove the SIM card tray from the system follow the steps outlined in the disassembly section.

NOTE: For models shipped with a wireless card only, a dummy SIM card tray must first be removed from the system before removing the system board. The following are the steps for removing the dummy SIM card tray:

- 1 Push the release latch located on the SIM card slot inwards.



- 2 Slide the dummy SIM card tray out of the system.

Base cover

Removing base cover

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 To release the base cover:
 - a Loosen the eight (M2.5 x 6.0) captive screws that secure the base cover to the system [1].

Remember: Exercise caution when loosening the screws. Angle the screw driver to match the head of the screws (Bottom Two) to avoid a possible stripped screw head.
 - b Use a plastic scribe to release the base cover from the edge [2].



3 Lift the base cover from the system.



Installing base cover

- 1 Align the base cover tabs to the slots on the edges of the system.
- 2 Press the edges of the cover until it clicks into place.
- 3 To secure the base cover to the system, tighten the eight (M2.5 x 6.0) captive screws .

Remember: Exercise caution when tightening the screws. Angle the screw driver to match the head of the screw to avoid a possible stripped screw head.

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

Battery

Lithium-ion battery precautions

⚠ CAUTION:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery as much as possible before removing it from the system. This can be done by disconnecting the AC adapter from the system to allow the battery to drain.
- 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.
- 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 Lithium-ion battery can be dangerous. In such an instance, the entire system should be replaced. Contact <https://www.dell.com/support> for assistance and further instructions.
- Always purchase genuine batteries from <https://www.dell.com> or authorized Dell partners and re-sellers.

Removing battery

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

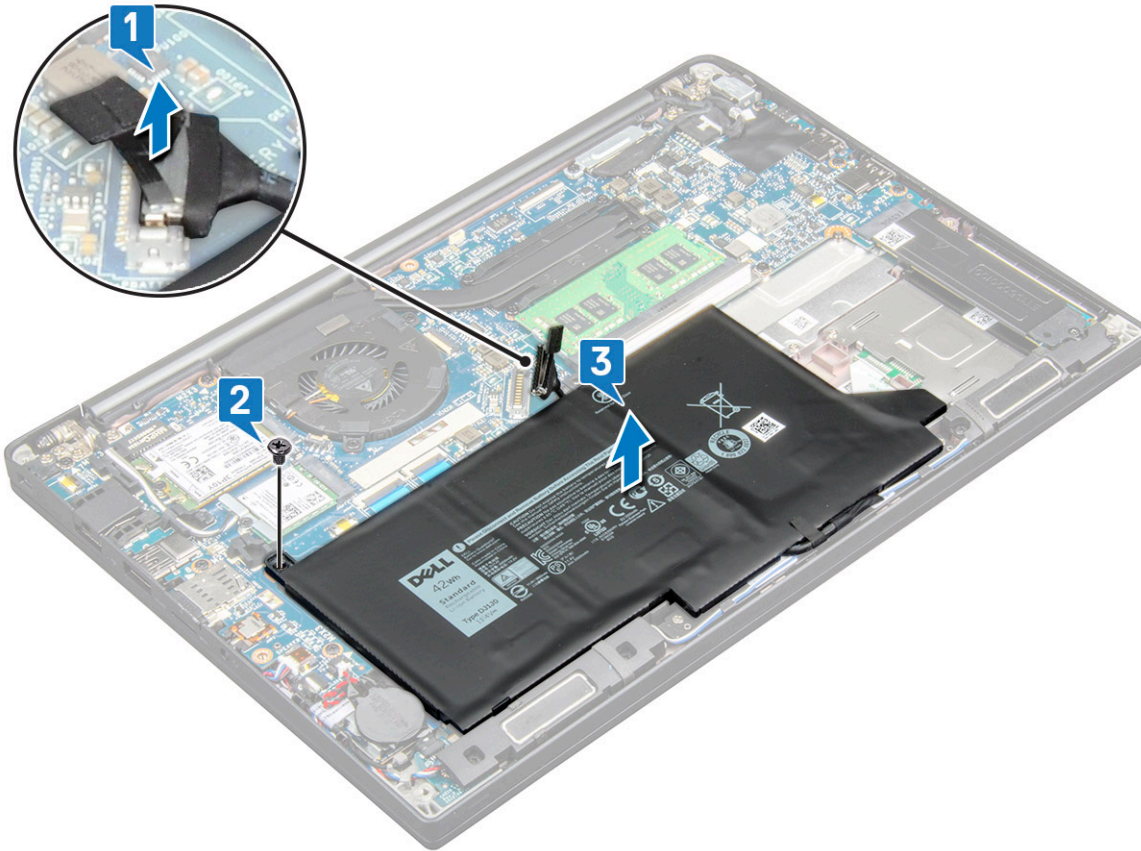
- a Disconnect the battery cable from the connector on the system board [1].

NOTE: The Latitude 7290 features either a 3-cell or 4-cell battery, which needs to be removed before replacing the customer replaceable unit (CRU) parts. Therefore, when performing any disassembly procedure, the battery connection must be disconnected immediately after removing the bottom cover. This procedure is required to disconnect all power sources from the system and to prevent the system from accidentally switching on and shorting the components.

- b Remove the M2.0 x 5.0 screw that secures the battery to the computer [2].

NOTE: A 3-cell battery has a single screw, and a 4-cell battery has two screws. Hence, the image displayed below is a 3-cell battery.

- c Lift the battery from the system [3].



Installing battery

- 1 Route the battery cable through the routing clip and connect the battery cable to the connector on the system board.

NOTE: Route the battery cable, if the cable at the base of the battery is un routed.

- 2 Insert the lower edge of the battery into the slot on the chassis and then seat the battery.
- 3 Tighten the two (M2.0 x 5.0) screws to secure the battery to the system.

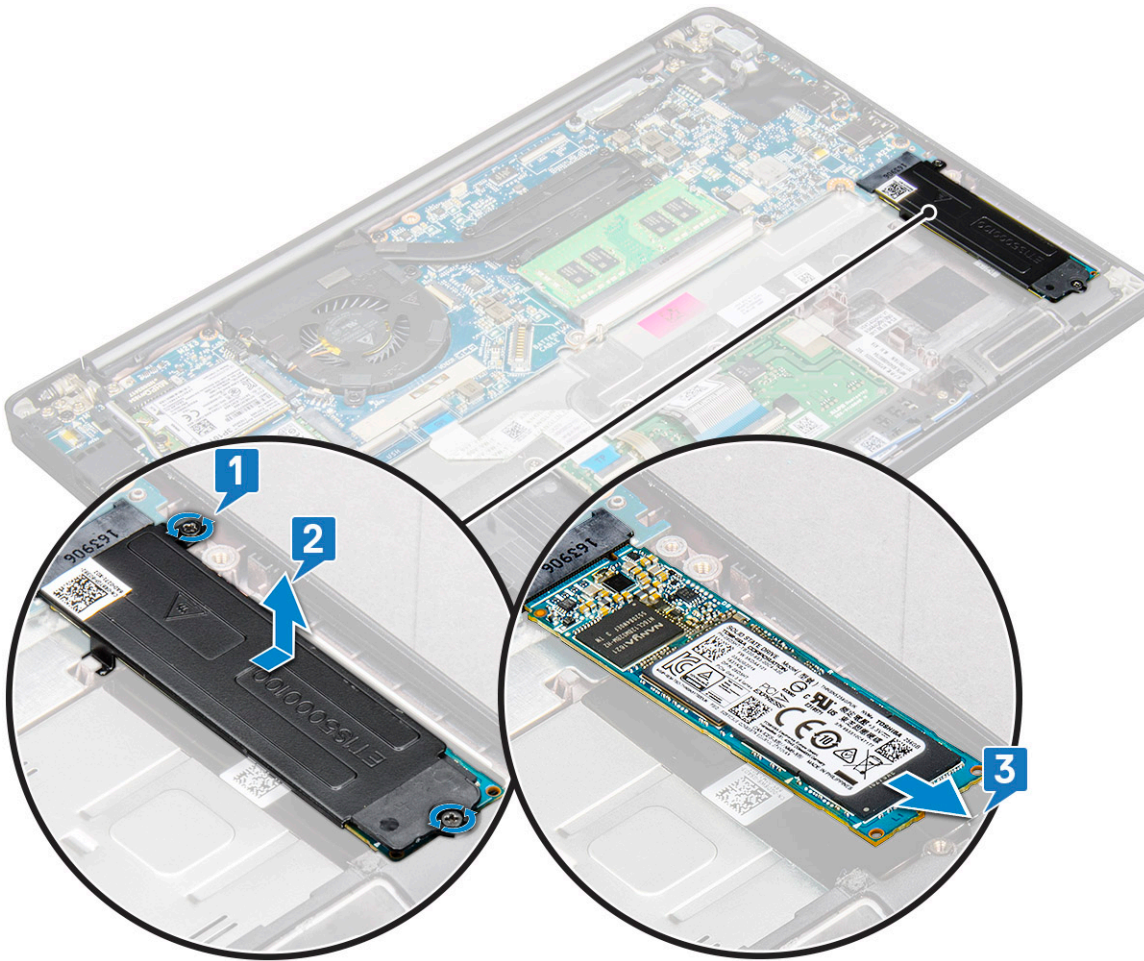
NOTE: A small battery (3-cell) has a single screw, a larger battery (4-cell) has two screws.

- 4 Install the [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Solid state drive

Removing Solid State Drive

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the following components:
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the Solid State Drive:
 - a Loosen the two (M2.0 x 3.0) captive screws that secure the Solid State Drive bracket [1].
 - b Remove the Solid State Drive bracket (optional) [2].
 - c Remove the Solid State Drive from the system [3].



Installing Solid State Drive

- 1 Insert the Solid State Drive into the connector.
- 2 Install the Solid State Drive bracket over the Solid State Drive.
 - ① **NOTE:** When installing the Solid State Drive bracket, ensure that the tab on the bracket is held securely with the tab on the palm rest.
- 3 Tighten the two (M2.0 x 3.0) screws to secure the Solid State Drive to the Solid State Drive bracket and in turn to the Palmrest.
- 4 Install the following components:
 - [battery](#)
 - [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Speaker

Removing speaker module

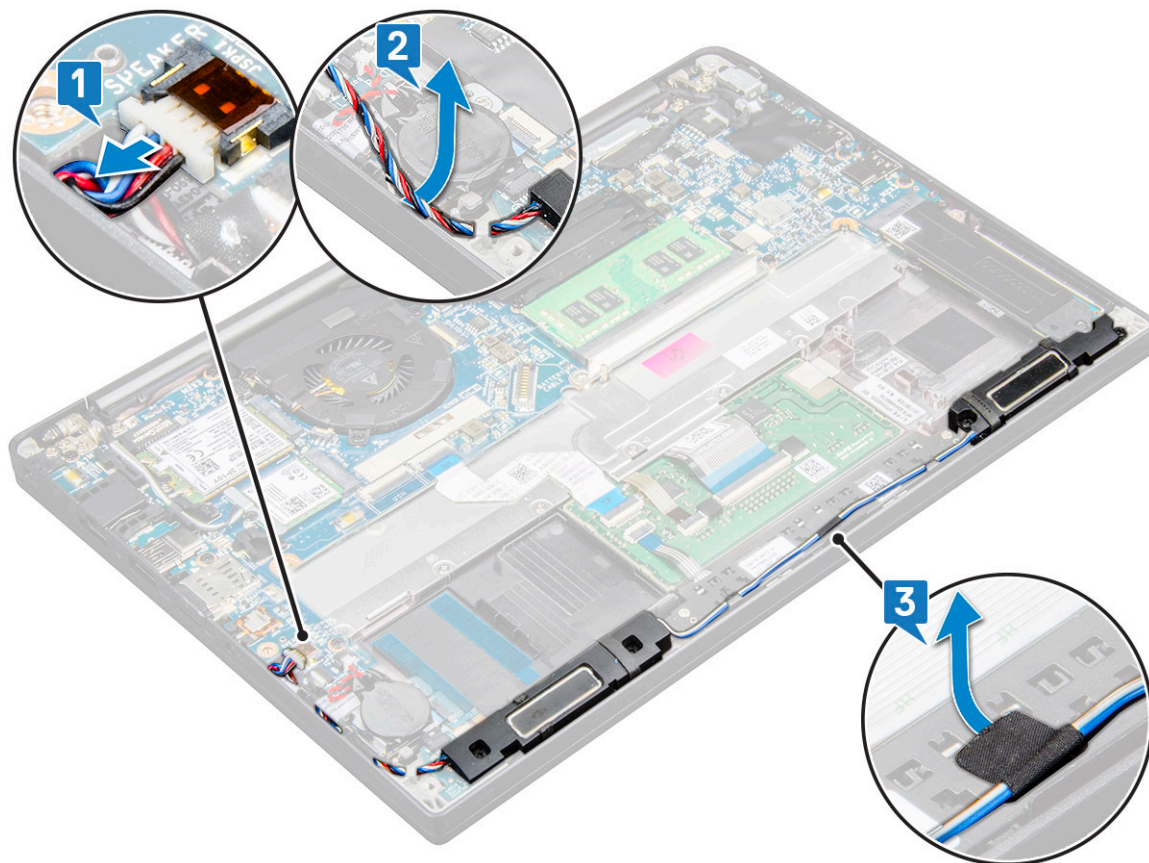
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)

3 To release the speaker module:

- a Disconnect the speaker cable from the connector on the system board [1].

① **NOTE:** Use a plastic scribe to release the cable from the connector. Do not pull the cable as it may result in breakage

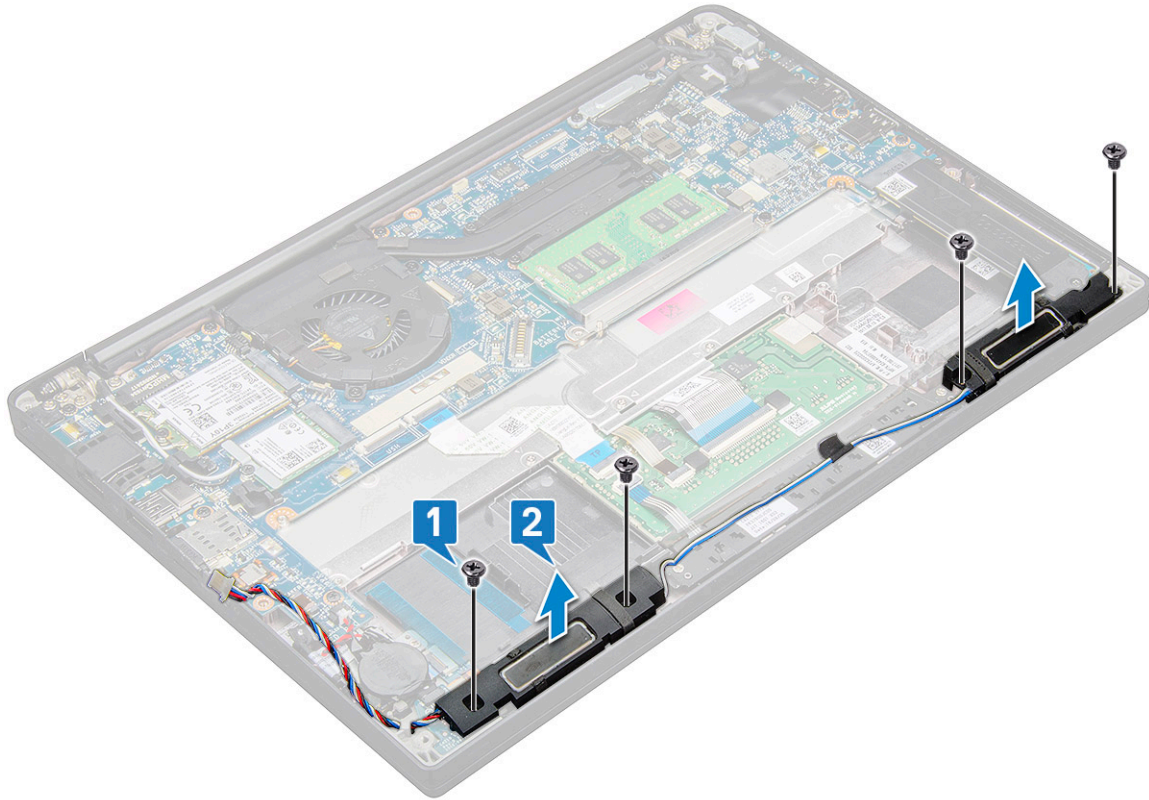
- b Un-route the speaker cable from the two routing clips on the side of touchpad buttons [2].
- c Remove the tape that secures the speaker cables to the touchpad board [3].



4 To remove the speaker module:

- a Remove the four (M2.0 x 3.0) screws that secure the speaker module to the system [1].

① **NOTE:** Refer the [speaker screw list](#).



- b Lift the speaker module from the computer [2].

Installing speaker module

- 1 Place the speaker module into the slots on the system.
- 2 Replace the four (M2.0 x 3.0) screws to secure the speaker to the system.
- 3 Route the speaker cable through the retention clips on the system.

NOTE: Speaker cables are routed below the securing latch on the palm-rest and tucked below the touchpad buttons bracket using tape.

- 4 Connect the speaker cable to the connector on the system board.
- 5 Install the:
 - a battery
 - b base cover
- 6 Follow the procedure in [After working inside your computer](#).

Coin cell battery

Removing the coin cell battery

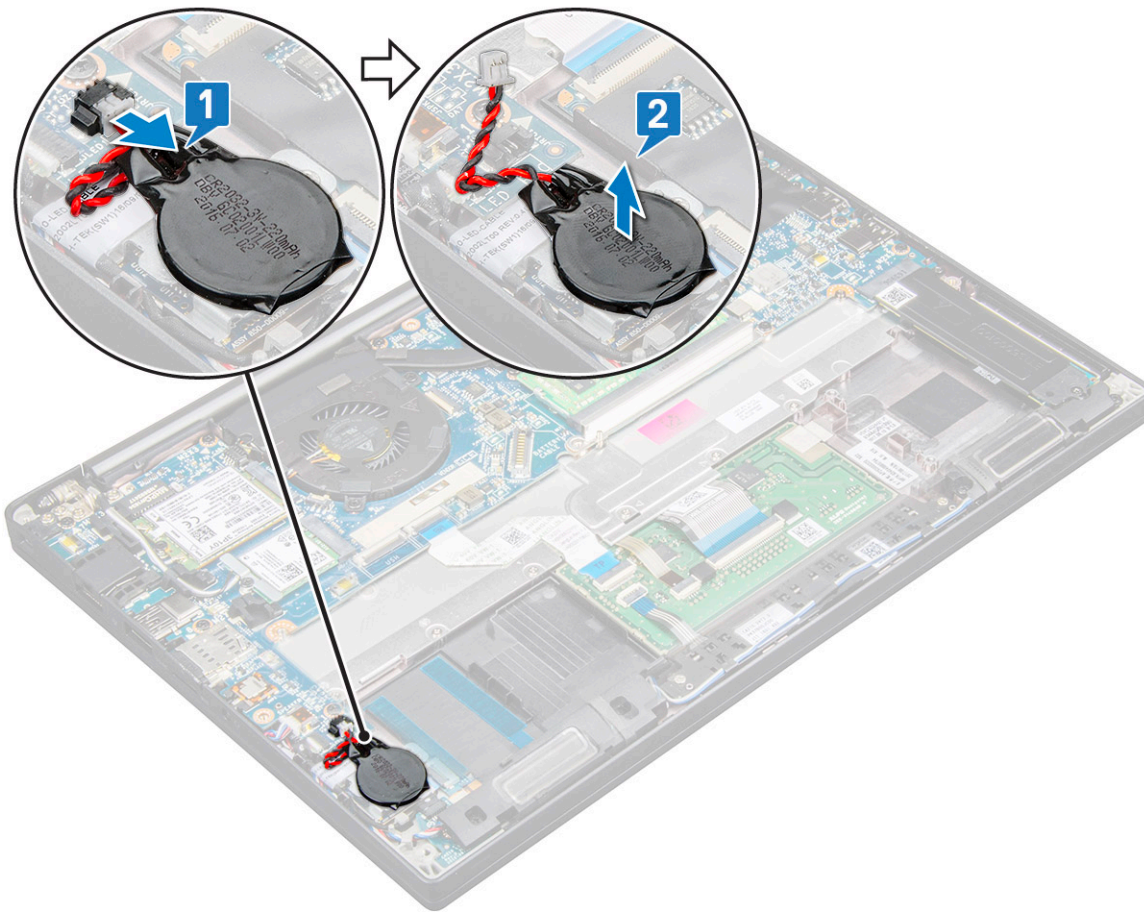
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
- 3 To remove the coin cell battery:

- a Disconnect the coin cell battery cable from the connector on the system board [1].

NOTE: You must un-route the coin cell battery cable from the routing channel.

NOTE: When removing or replacing the RTC battery or system board for Latitude 7490, the RTC battery cable must be routed in the routing channels and secured within the notch on the system board.

- b Lift the coin cell battery to release it from the adhesive [2].



NOTE: When removing or replacing the RTC battery or the system board for Latitude 7290, the RTC battery must be placed and secured with its adhesive onto the fingerprint reader bracket.

Installing coin cell battery

- 1 Affix the coin cell battery on the slot inside the computer.
- 2 Route the coin cell battery cable through the routing channel before connecting the cable.
- 3 Connect the coin cell battery cable to the connector on the system board.

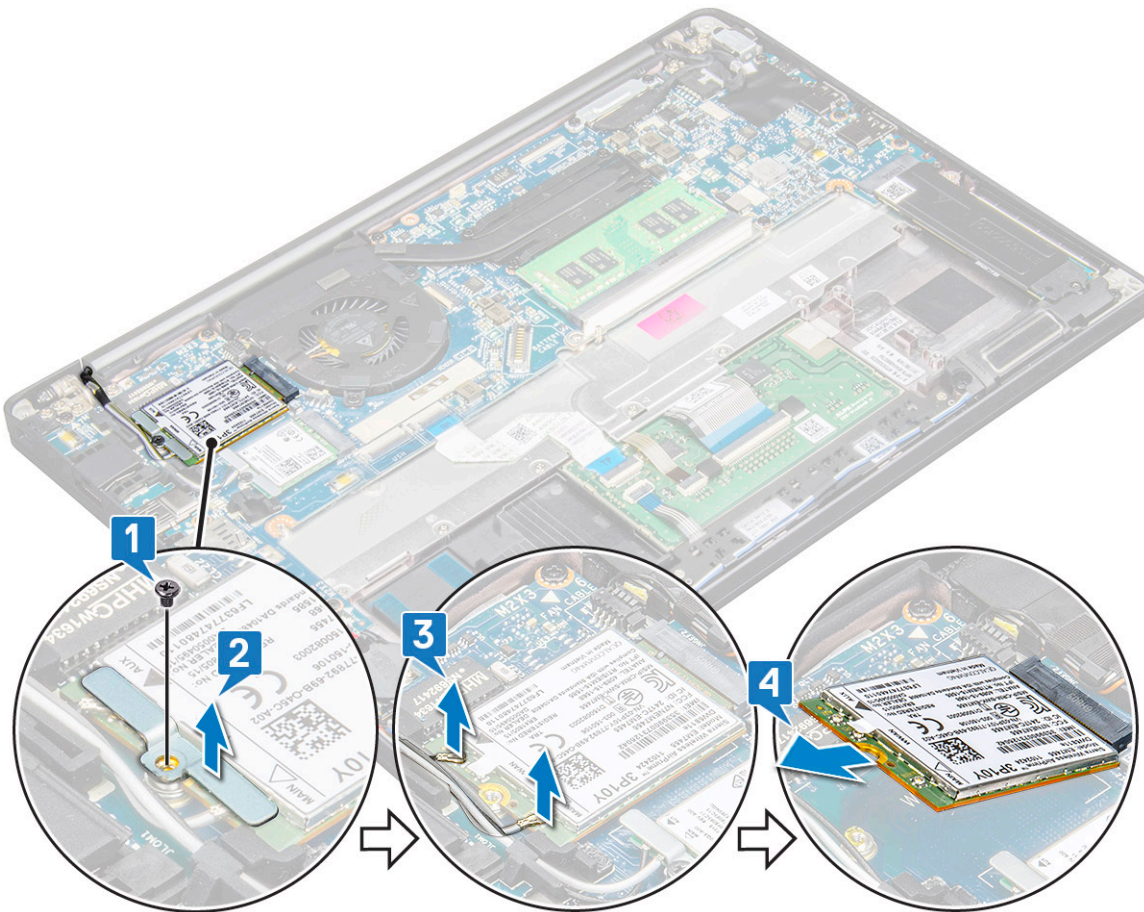
NOTE: When removing or replacing the RTC battery or system board for Latitude 7490, the RTC battery cable must be routed in the routing channels and secured within the notch on the system board.

- 4 Install the:
 - a battery
 - b base cover
- 5 Follow the procedure in [After working inside your computer](#).

WWAN card

Removing WWAN card

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the following components:
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the WWAN card:
 - a Remove the M2.0 x 3.0 screw that secures the WWAN bracket to the WWAN card [1].
 - b Lift the WWAN bracket that secures the WWAN card [2] .
 - c Disconnect the WWAN cables from the connectors on the WWAN card [3] .



NOTE: There is an adhesive pad on the routing pad of the system board which secure the wireless and WWAN cards. Removing the wireless or WWAN card requires a small amount of additional force to separate the card from the adhesive pads

- 4 Remove the WWAN card:

Installing WWAN card

- 1 Insert the WWAN card into the connector on the system board.
- 2 Connect the WWAN cables to the connectors on the WWAN card.

- 3 Place the metal bracket and tighten the M2.0 x 3.0 screw to secure it to the computer.
- 4 Install the:
 - a [battery](#)
 - b [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

① **NOTE:** The IMEI number can also be found on the WWAN card.

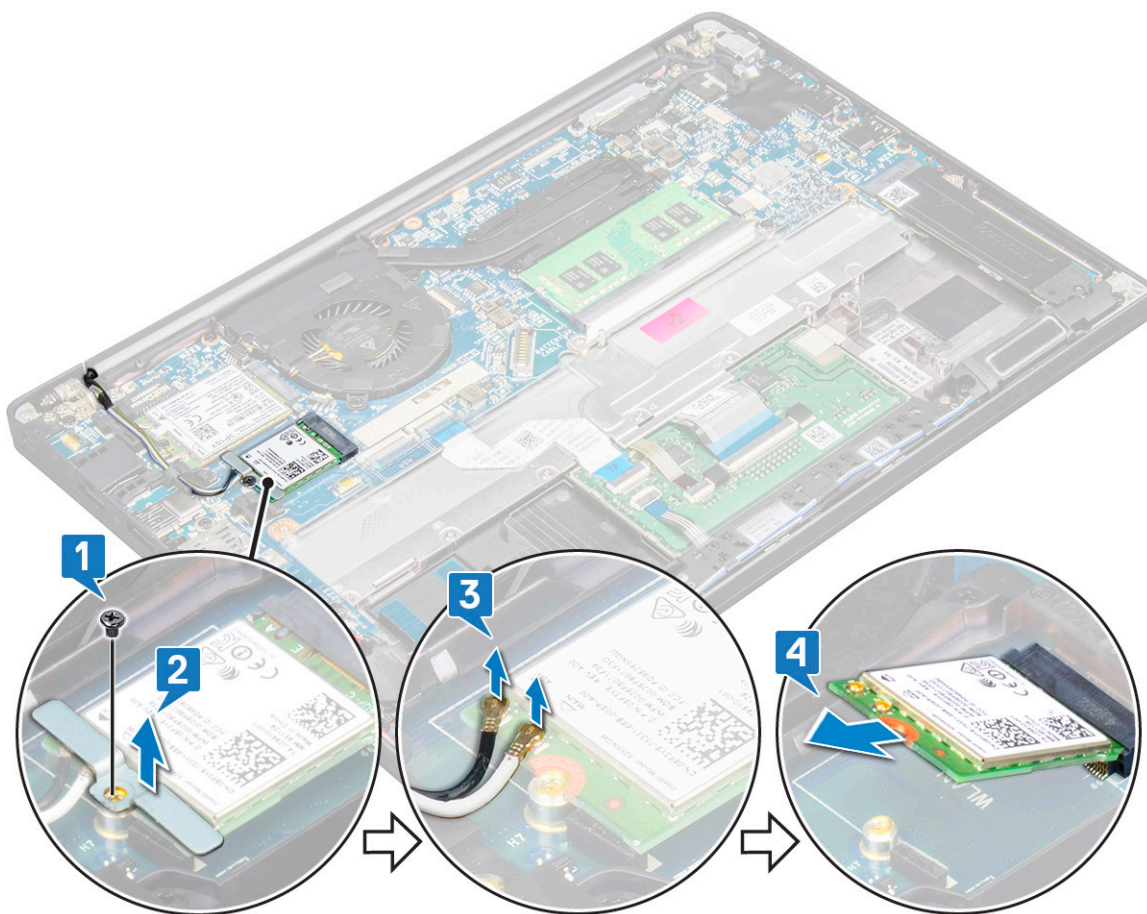
① **NOTE:** When installing the wireless and WWAN antennae must be routed correctly into the routing pads/clips on the system board. For models shipped with a wireless card only, the technicians must always ensure that protective sleeves are used to isolate the antenna connectors before reassembling the system.

WLAN card

Removing WLAN card

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the WLAN card:
 - a Remove the M2.0 x 3.0 screw that secures the metal bracket to the WLAN card [1].
 - b Lift the metal bracket [2].
 - c Disconnect the WLAN cables from the connectors on the WLAN card [3].

① **NOTE:** There is an adhesive pad on the routing pad of the system board which secure the wireless and WWAN cards. Removing the wireless or WWAN card requires a small amount of additional force to separate the card from the adhesive pads.
 - d Remove the WLAN card from the system [4].



Installing WLAN card

- 1 Insert the WLAN card into the connector on the system board.
- 2 Connect the WLAN cables to the connectors on the WLAN card.
- 3 Place the metal bracket and tighten the M2.0 x 3.0 screw to secure it to the WLAN card.

NOTE: When installing the wireless and WWAN antennae must be routed correctly into the routing pads/clips on the system board. For models shipped with a wireless card only, the technicians must always ensure that protective sleeves are used to isolate the antenna connectors before reassembling the system.

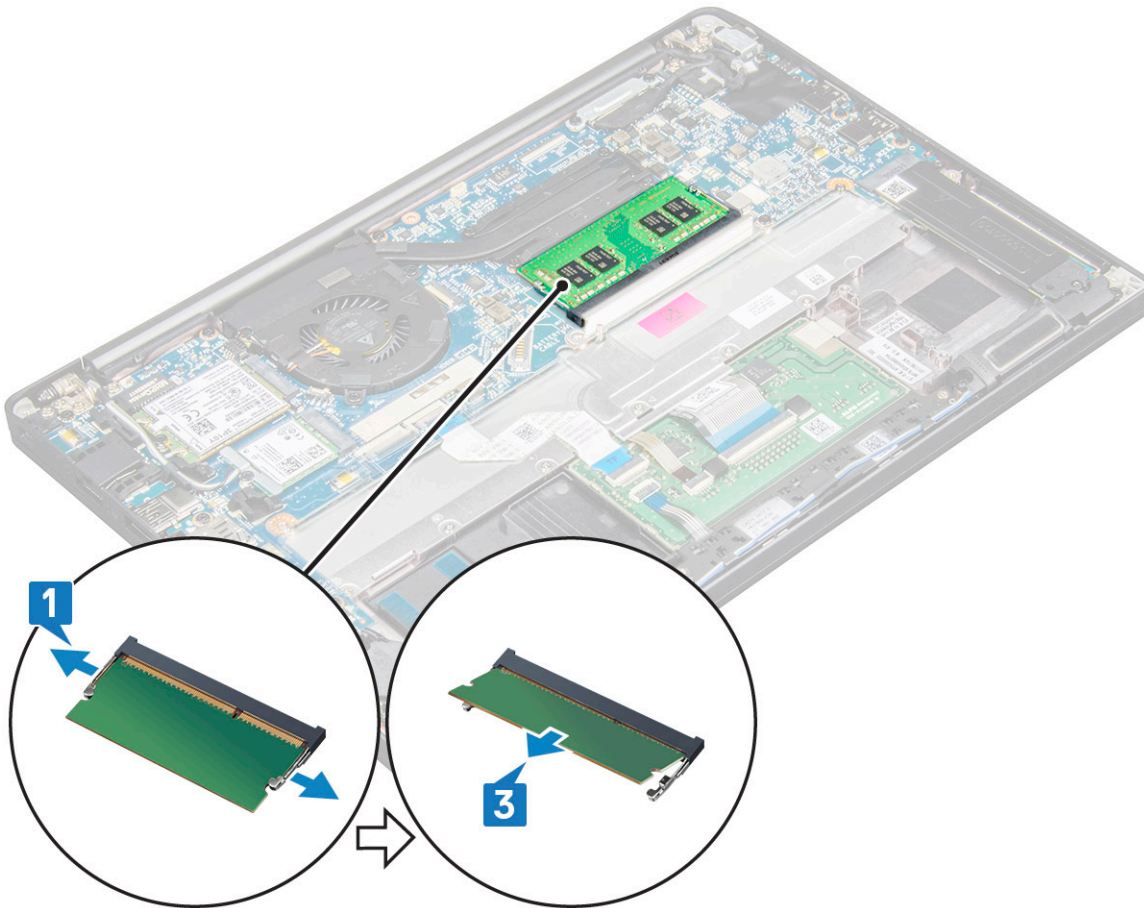
- 4 Install the following:
 - a battery
 - b base cover
- 5 Follow the procedure in [After working inside your computer](#).

Memory modules

Removing memory module

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the following:
 - a base cover
 - b battery

- 3 To remove the memory module:
 - a Pull the clips securing the memory module until the module snaps-out [1].
 - b Remove the memory module from the connector on the system board [2].



Installing memory module

- 1 Insert module in connector then press Module down onto clips unit it snaps in.
- 2 Install the following:
 - a [battery](#)
 - b [base cover](#)
- 3 Follow the procedures in [After working inside your computer](#).

Heat sink

Removing heat sink assembly

Heat sink assembly comprises of heat sink and the system fan.

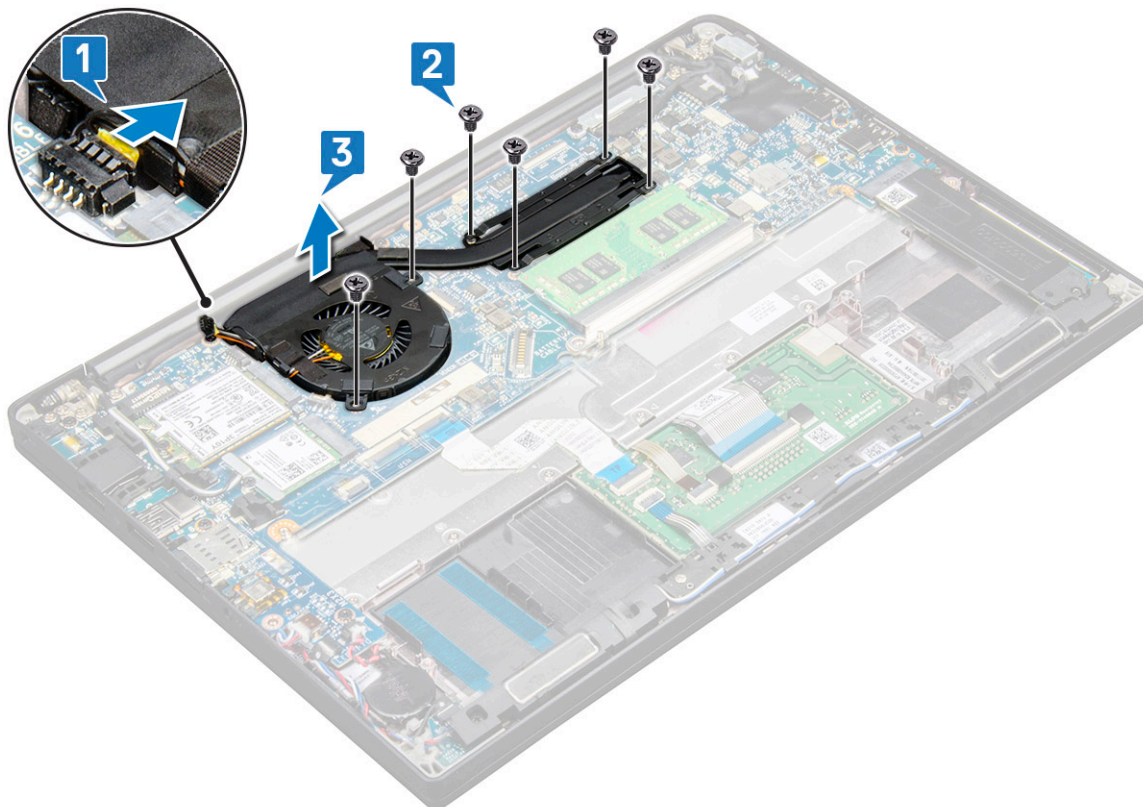
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the following:
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the heat sink assembly:

NOTE: To identify the number of screws, see the [screw list](#).

- a Remove the 2 (M2.0 x 5.0) screws that secure the system fan and the 4 (M2.0 x 3.0) that secures the heat sink assembly to the system board [2].

NOTE: Remove the screws in the order of the callout numbers [1, 2, 3, 4] as indicated on the heat sink.

- b Lift and flip over the heat sink assembly from the system board.
- c Disconnect the fan cable from the system board [1].
- d Separate the heat sink assembly from the system.



Installing heat sink assembly

Heat sink assembly comprises of heat sink and the system fan.

- 1 Align the heat sink assembly with screw holders on the system board.
- 2 Connect the fan cable to the connector on the system board.
- 3 Replace the M2.0 x 3.0 screws to secure the heat sink assembly to the system board.

NOTE: Replace the screws in the order of the callout numbers [1, 2, 3, 4] as indicated on the heat sink.

- 4 Install the following:
 - a [battery](#)
 - b [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

LED board

Removing LED board


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

2 Remove the following:

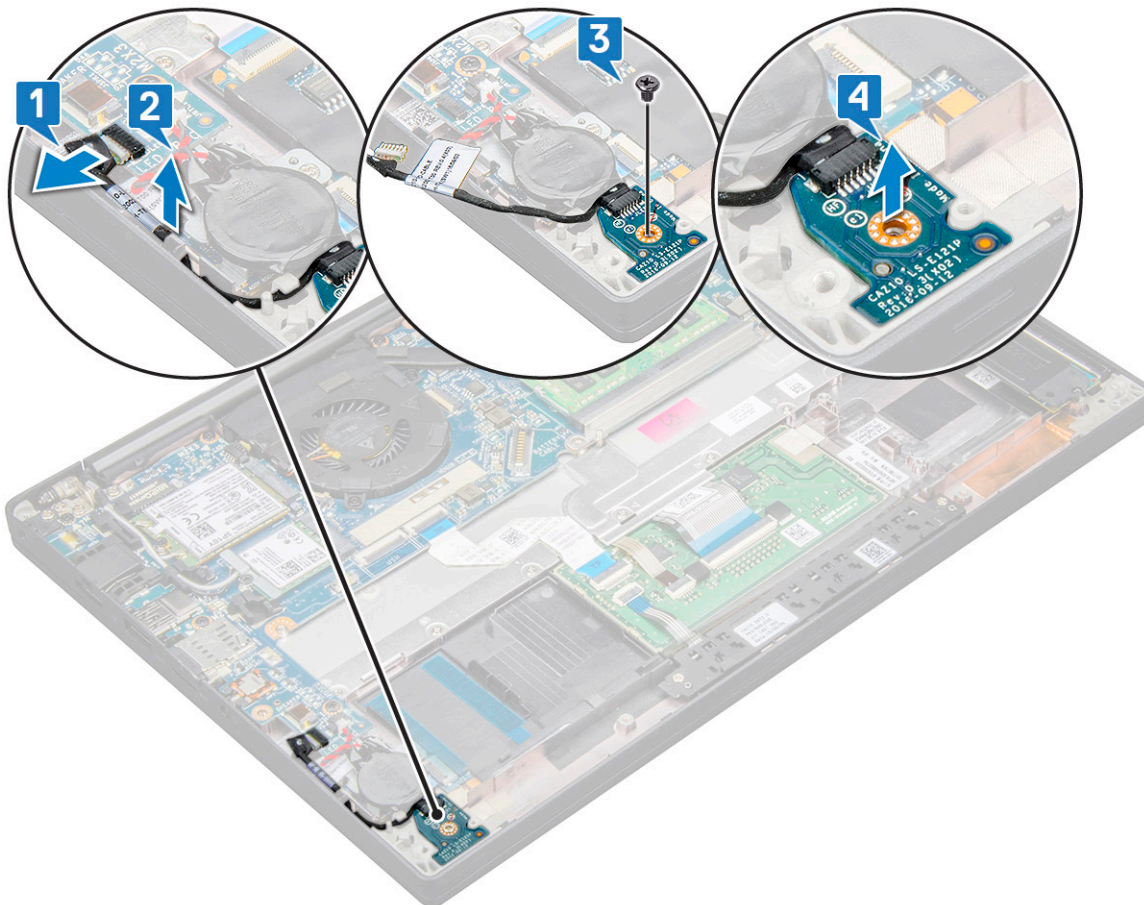
- a [base cover](#)
- b [battery](#)
- c [speaker](#)

3 To remove the LED board:

- a Disconnect the LED cable from the LED board [1].

 **CAUTION:** Avoid pulling the cable as it would result in breaking the cable connector. Instead, use a scribe to push the edges of the cable connector to release the LED cable.

- b Remove the M2.0 x 2.5 screw that secures the LED board to the system [2].
- c Lift the LED board from the system [3].



 **NOTE:** When reassembling the LED daughter board cable on Latitude 7290, properly route the LED daughter board cable in the routing channels along the left side of the fingerprint reader bracket

Installing LED board

- 1 Insert the LED board into the slot on the computer.
- 2 Replace the M2.0 x 2.5 screw to secure the LED board.
- 3 Connect the LED cable to the LED board.

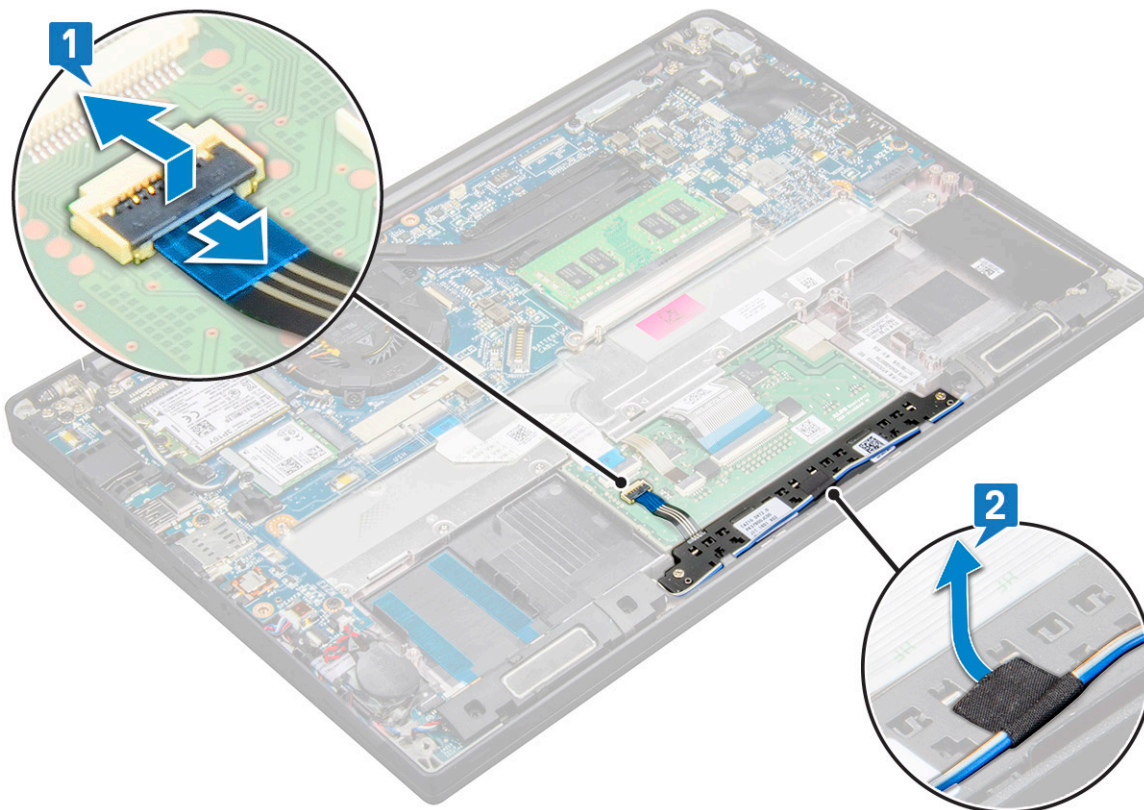
NOTE: When reassembling the LED daughter board cable on Latitude 7290, properly route the LED daughter board cable in the routing channels along the left side of the fingerprint reader bracket.

- 4 Install the following:
 - a speaker
 - b battery
 - c base cover
- 5 Follow the procedure in [After working inside your computer](#).

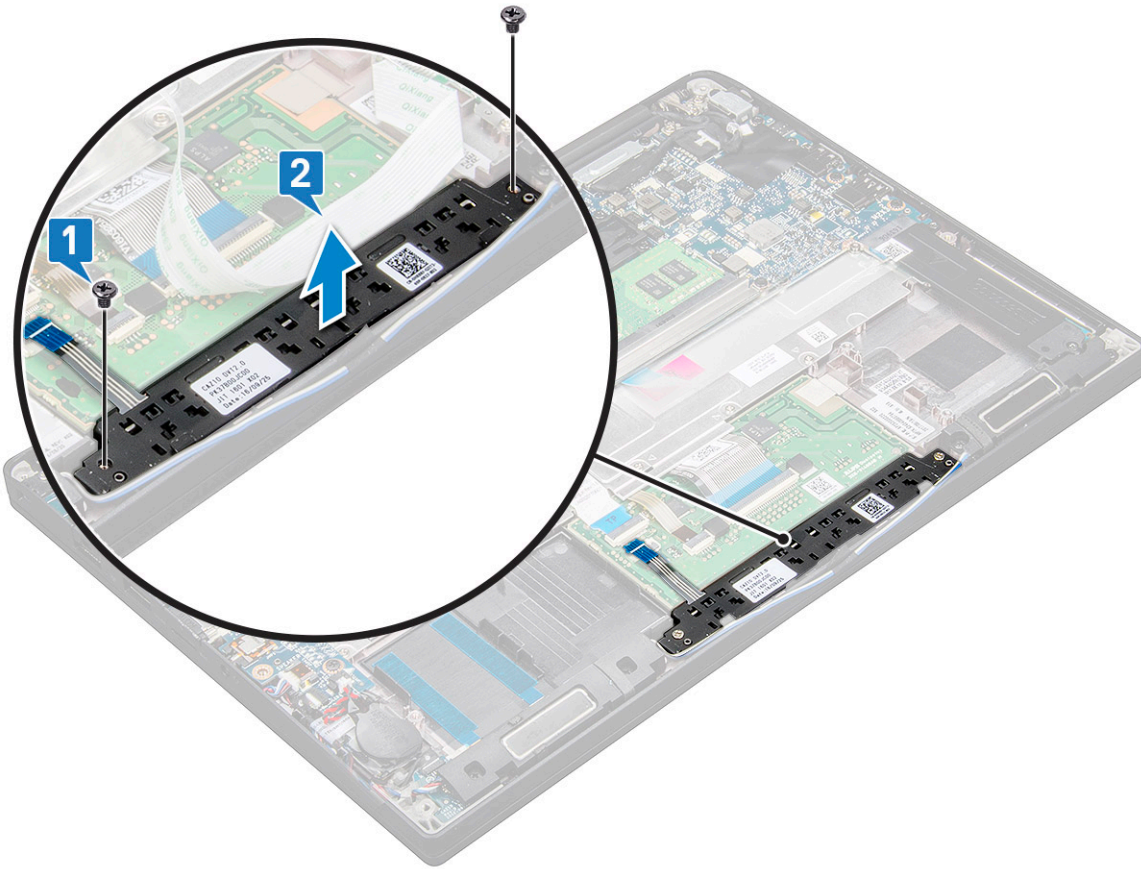
Touchpad buttons board

Removing touchpad buttons board

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
- 3 To remove the touchpad buttons board:
 - a Disconnect the touchpad buttons board cable from the touchpad board [1].
 - b Lift the speaker cable that is affixed to the computer [2] to reveal the touchpad buttons board.



- 4 Remove M2.0 x 2.5 screws that secure the touchpad buttons board [1].
To identify the screws, see [screw list](#).
- 5 Lift the touchpad buttons board from the system [2].



Installing touchpad buttons board

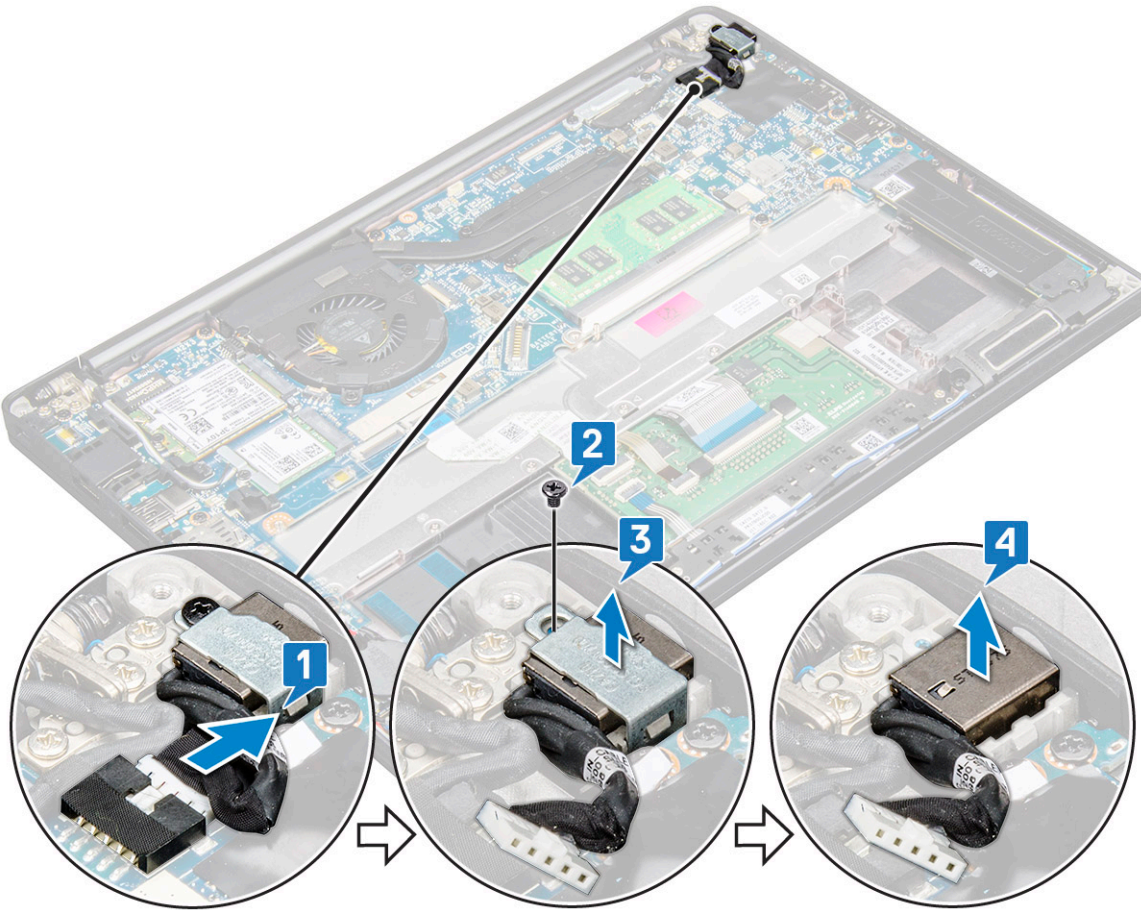
- 1 Insert the touchpad buttons board into the slot to align the tabs with the grooves on the system.
- 2 Replace the two (M2.0 x 2.5) screws to secure the touchpad buttons board to the system.
- 3 Connect the touchpad buttons board cable to the connector on the touchpad board.
- 4 Install the:
 - a [battery](#)
 - b [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Power connector port

Removing power connector port

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the following:
 - a [base cover](#)
 - b [battery](#)

- 3 To remove the power connector port:
 - a Disconnect the power connector port cable from the system board [1].
① | NOTE: Use a plastic scribe to release the cable from the connector. Do not pull the cable as it may result in breakage
 - b Remove the M2.0 x 3.0 screw to release the metal bracket on the power connector port [2].
 - c Lift the metal bracket from the system [3].
 - d Remove the power connector port from the computer [4].



Installing power connector port

- 1 Install the power connector port into the slot on the system.
- 2 Place the metal bracket on the power connector port.
- 3 Replace the M2.0 x 3.0 screw to secure the power connector port to the system.
- 4 Connect the power connector port cable to the connector on the system board.
- 5 Install the following:
 - a battery
 - b base cover
- 6 Follow the procedure in [After working inside your computer](#).

Display Assembly

Removing display assembly

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

2 Remove the:

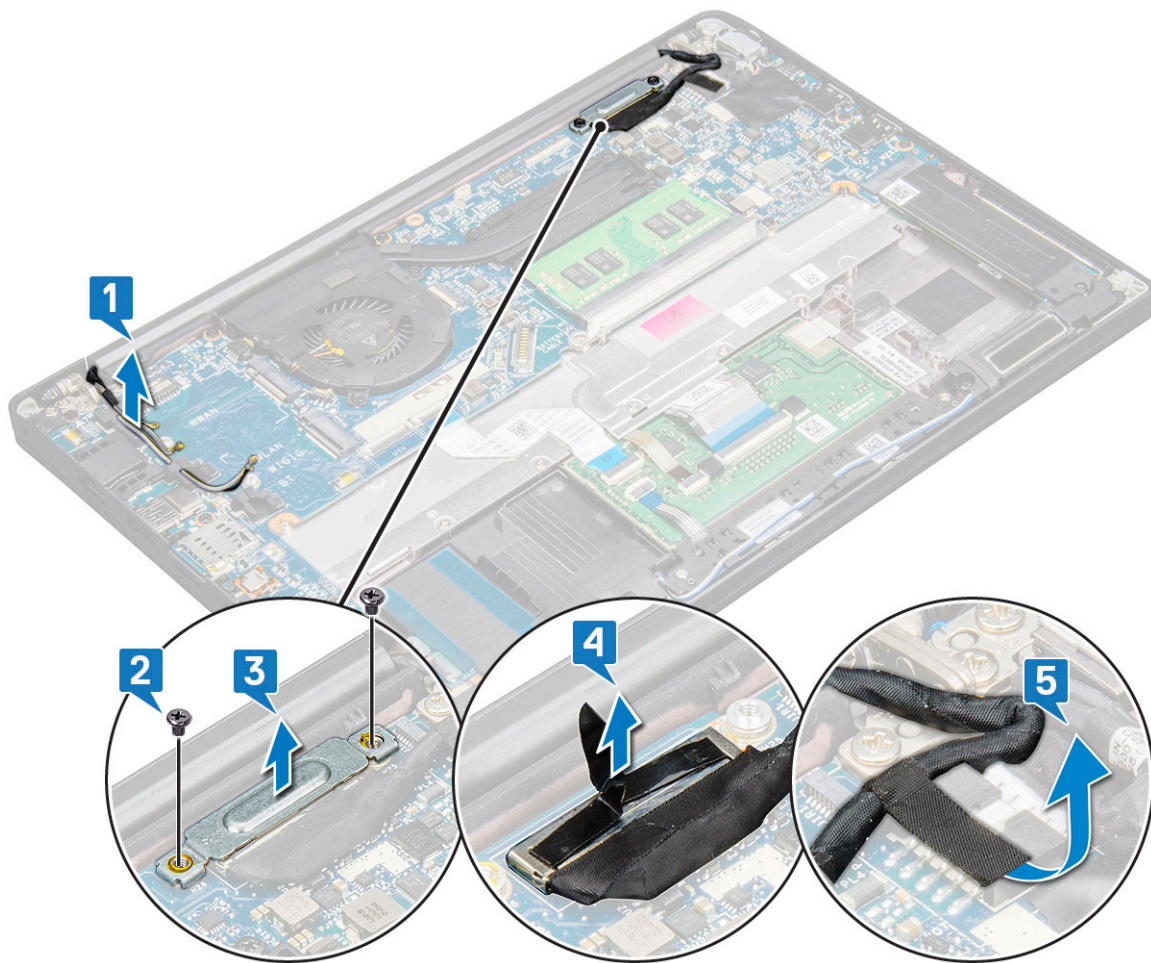
- a [base cover](#)
- b [battery](#)
- c [WLAN card](#)
- d [WWAN card](#)

NOTE: To identify the number of screws, see [screw list](#)

3 To remove the display assembly:

- a Un route the WLAN and WWAN cables from the routing channels [1].
- b Remove the M2.0 x 3.0 screws that secures the eDP bracket [2].
- c Lift the eDP bracket from the eDP cable [3].
- d Lift the eDP cable to disconnect it from the connector on the system board [4].
- e Un route the eDP cable from the routing channel [5].

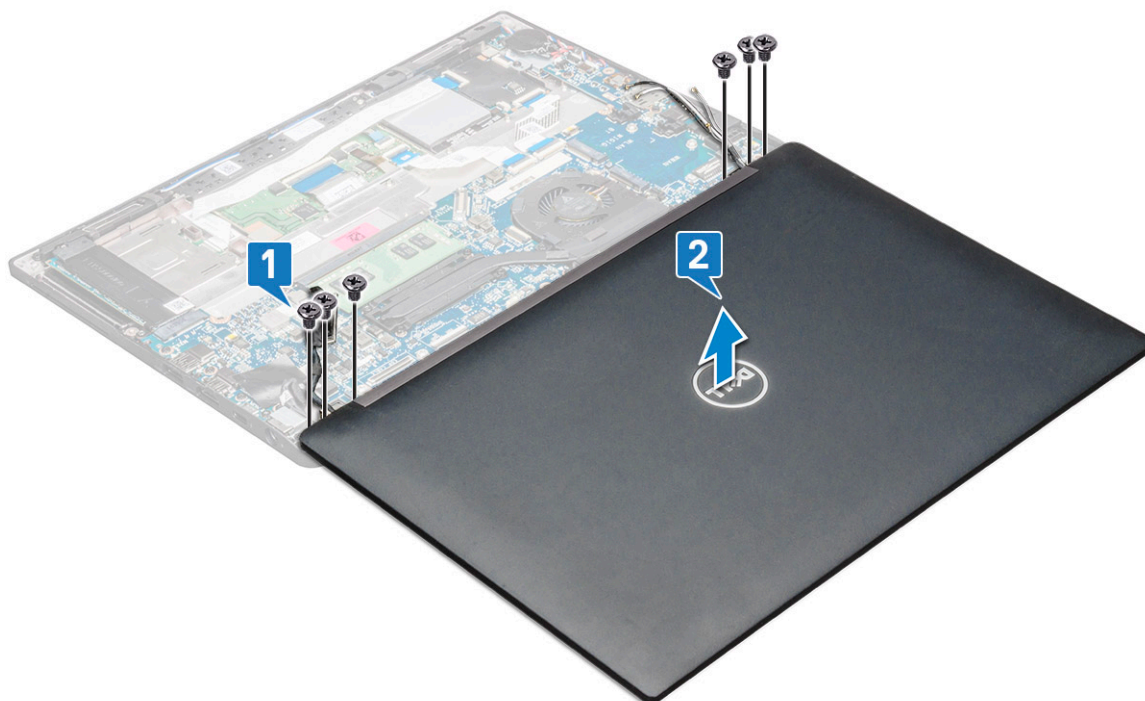
NOTE: When removing the display assembly or system board, the display bracket must be removed and the piece of tape adhered to the power-adaptor connector on the system board must be peeled back in order to disconnect the display cable.



4 To remove the display assembly:

- a Open the display of the computer and lay it on a flat surface at 180 degree angle
- b Remove the six (M2.5 x 3.5) screws that secure the display hinge to the display assembly [1].

- c Lift the display assembly from the system.



Installing display assembly

- 1 Place the base of the computer on a clean flat surface.
- 2 Install the display assembly to align it with the display hinge holders on the system.
- 3 Holding the display assembly, replace the six (M2.5 x 3.5) screws to secure the display hinges on the system display assembly with the system unit.
- 4 Route the eDP cable from the routing channel.
- 5 Affix the tapes to secure the eDP cable (display cable) to the system board.
- 6 Connect the eDP cable to the connector on the system board.

NOTE: WLAN and WWAN antennas must be routed correctly into the routing pads on the system board and protective sleeves must be used to isolate the antenna connectors.

- 7 Install the eDP metal bracket on the eDP cable and tighten the M2.0 x 3.0 screws.
- 8 Route the WLAN and WWAN cables through the routing channels.
- 9 Install the:
 - a WLAN card
 - b WWAN card
 - c battery
 - d base cover
- 10 Follow the procedure in [After working inside your computer](#).

Display Bezel

Removing display bezel

① **NOTE:** The display bezel removal procedure is applicable only for nontouch systems.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [WLAN card](#)
 - d [WWAN card](#)
 - e [display assembly](#)
- 3 To remove the display bezel:
 - a Use a plastic scribe, find recess to loosen the bottom edge of the display bezel [1].
 - b Loosen the tabs on the edges of the display [2,3,4].



⚠ **CAUTION:** The adhesive used on the LCD bezel to seal it with the LCD itself, pry at edges and work your way around to release the bezel. Seal can peel the layers up or crack the glass when trying to force pry the two items apart.

- 4 Remove the display bezel from the display assembly.

Installing display bezel

 **NOTE:** The display bezel installation procedure is applicable only for non-touch systems.

- 1 Place the display bezel on the display assembly.
- 2 Press the edges of the display bezel until it clicks onto the display assembly.

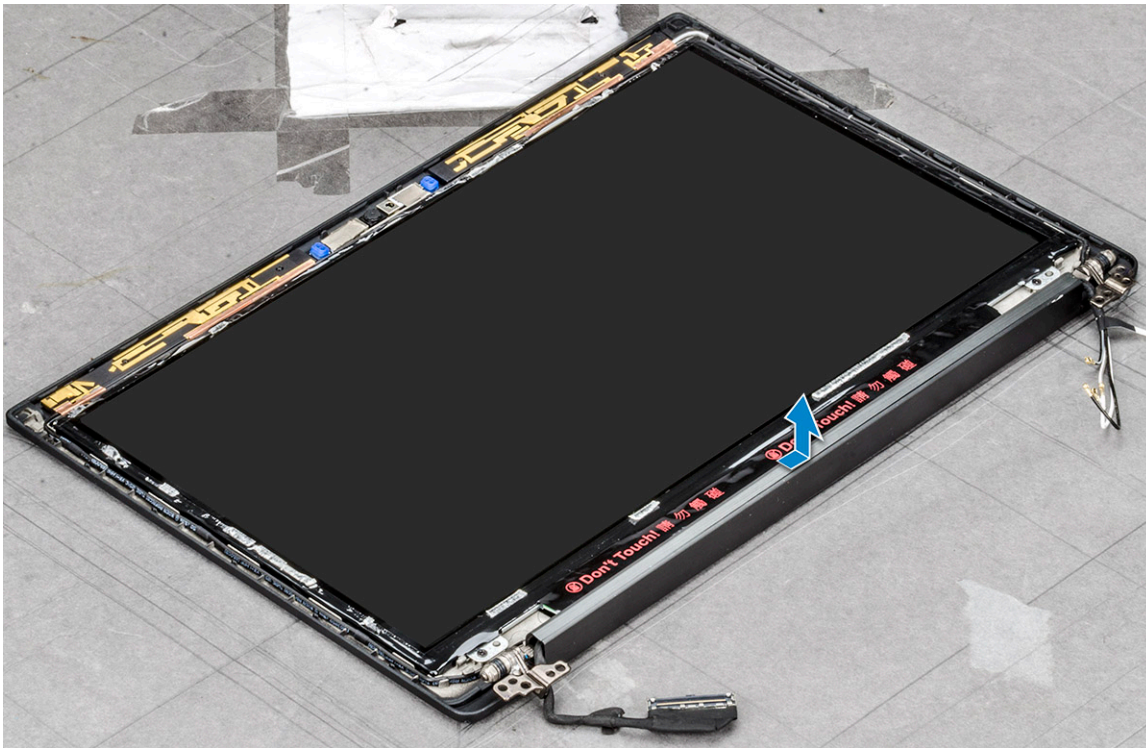
 **NOTE:** Adhesive is used to secure the display bezel to the display panel.

- 3 Install the:
 - a [display assembly](#)
 - b [WLAN card](#)
 - c [WWAN card](#)
 - d [battery](#)
 - e [base cover](#)
- 4 Follow the procedure in [After working inside your computer](#).

Display Hinge Caps

Removing the display hinge cap

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the following components:
 - a [base cover](#)
 - b [battery](#)
 - c [WLAN card](#)
 - d [WWAN card](#)
 - e [display assembly](#)
- 3 Slide hinge cap from left to the right to release and remove the display hinge cap from the display panel.



Installing the display hinge cap

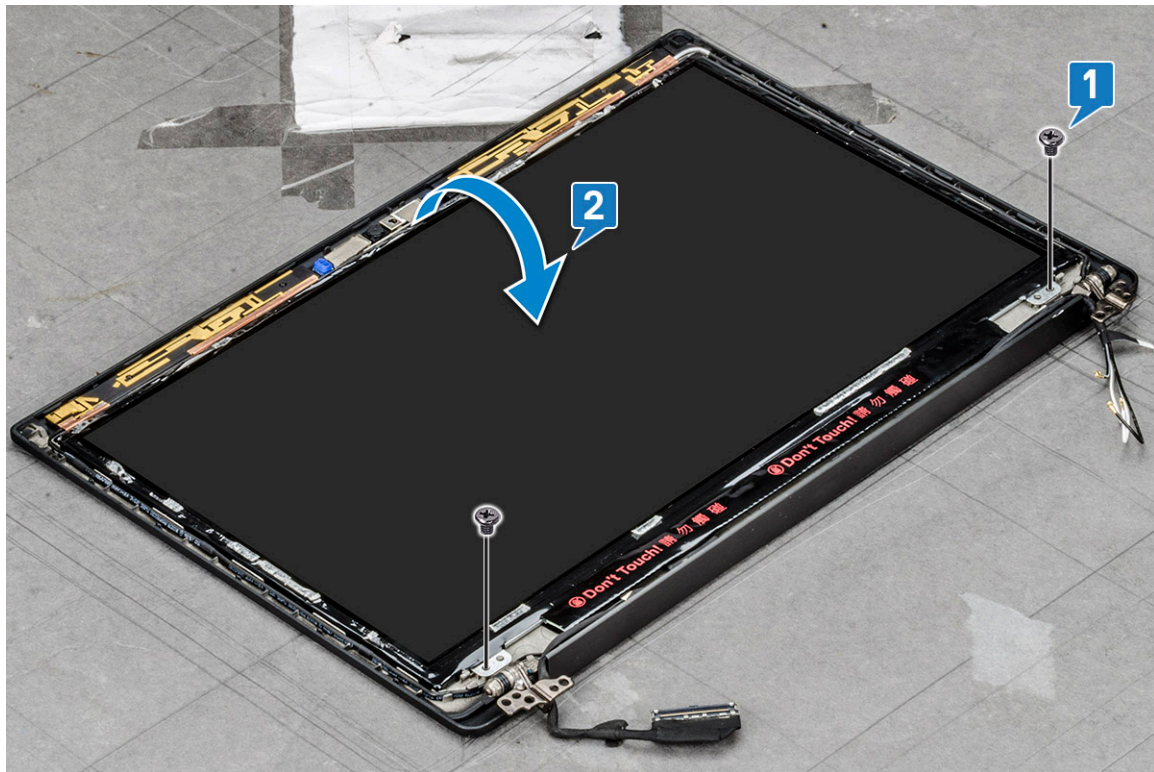
- 1 Place the display hinge cap on the slot and slide it back to fit on the display assembly.
- 2 Install the:
 - a [display assembly](#)
 - b [WLAN card](#)
 - c [WWAN card](#)
 - d [battery](#)
 - e [base cover](#)
- 3 Follow the procedure in [After working inside your computer](#).

Display panel

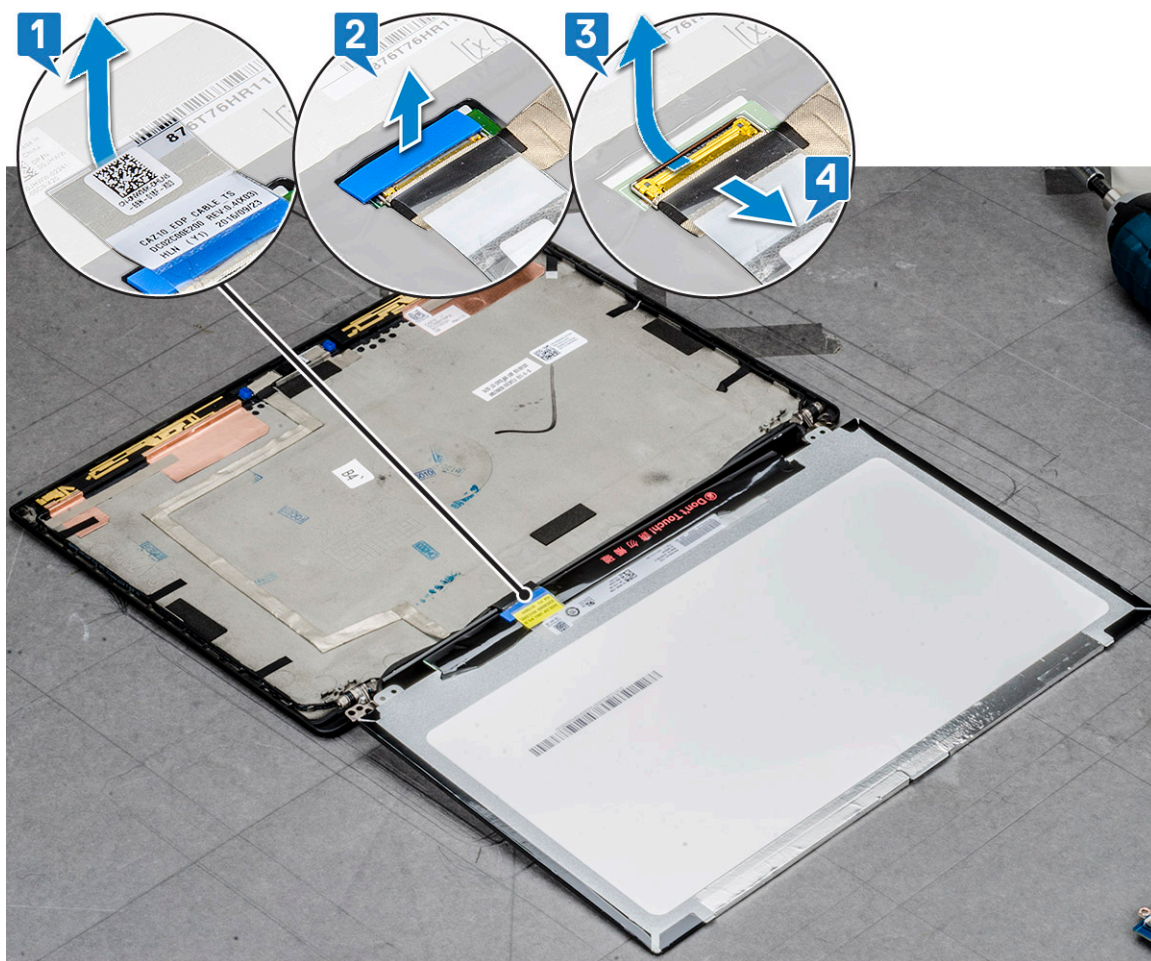
Removing the display panel

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the following components:
 - a [base cover](#)
 - b [battery](#)
 - c [WLAN card](#)
 - d [WWAN card](#)
 - e [display assembly](#)
 - f [display bezel](#)
 - g [hinge caps](#)
- 3 To remove the display panel:
 - a Remove the two (M2.0 x 2.0) screws on the panel [1].

- b Slide the display panel away from the system and flip the display panel over [2].



- c Peel off the display connector adhesive strip from the display panel [1]
d Peel off the mylar tape securing the display cable on the back of the display panel [2].
e Lift the metal tab and disconnect the display cable from the back of the display panel [3,4].



f Remove the display panel.



Installing the display panel


- 1 Connect the display cable on the back of the display panel.
- 2 Affix the mylar tape securing the display cable on the back of the display panel.
- 3 Affix display connector adhesive strip to the display panel.
- 4 Flip the display panel over and slide the display panel towards the system.
- 5 Replace the two (M2.0 x 2.0) screws on the panel
- 6 Install the:
 - a Bezel
 - b Hinge Cap
 - c display assembly
 - d WLAN card
 - e WWAN card
 - f battery
 - g base cover
- 7 Follow the procedure in [After working inside your computer](#).

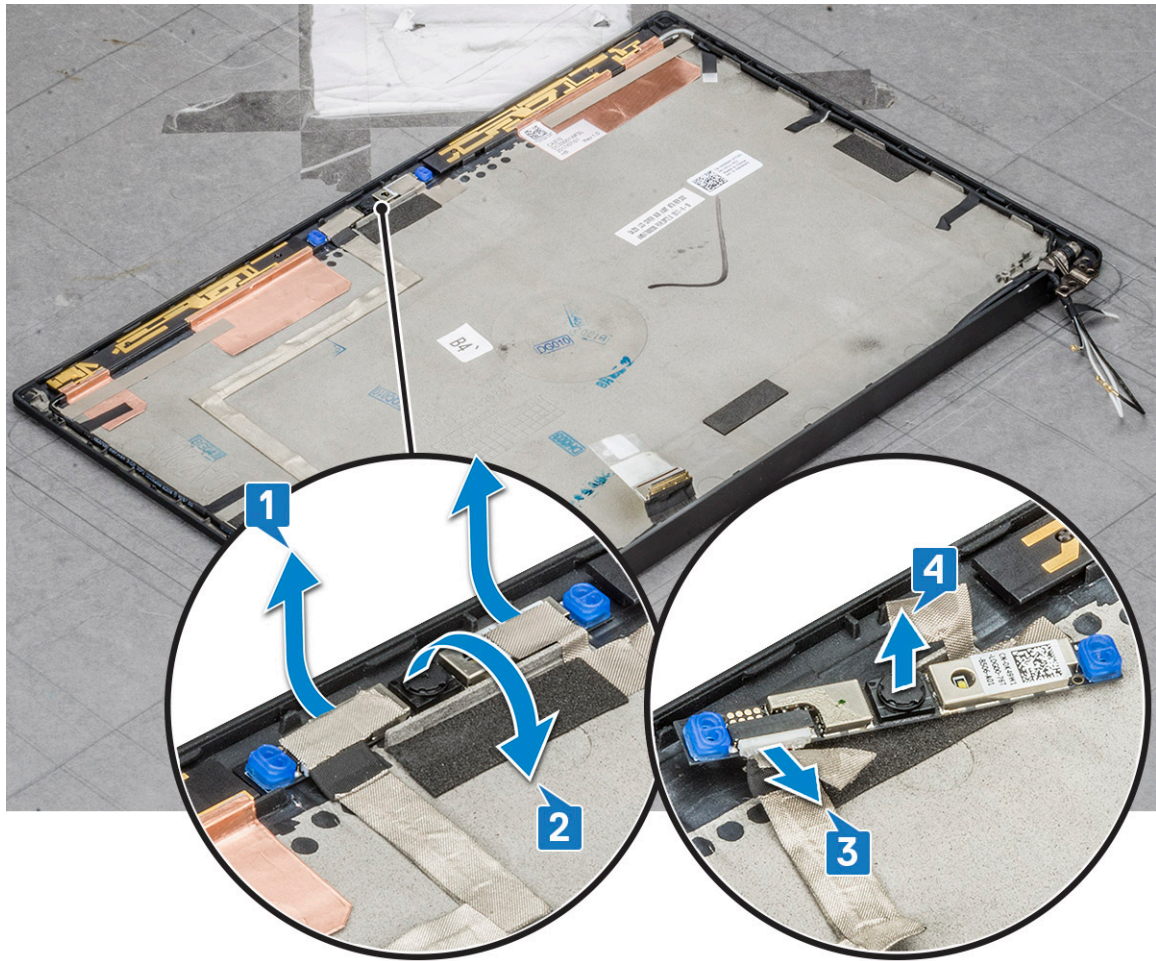
Camera Microphone Module

Removing camera-microphone module

The removal procedure of the microphone camera module is only for a touch display.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the following:
 - a base cover
 - b battery
 - c WLAN card
 - d WWAN card
 - e display assembly
 - f bezel
 - g display hinge
- 3 To remove the camera microphone module:
 - a Peel off the two pieces of conductive tape covering the camera microphone module [1].

 **NOTE:** The conductive tape is a separate part from the camera module that must be removed and then re-attached when replacing the camera microphone module.
 - b Lift the camera microphone module [2].
 - c Disconnect the camera cable from the camera module [3].
 - d Lift and remove the camera microphone module [4].



Installing camera

The installation procedure is applicable only for systems shipping with touch display assembly.

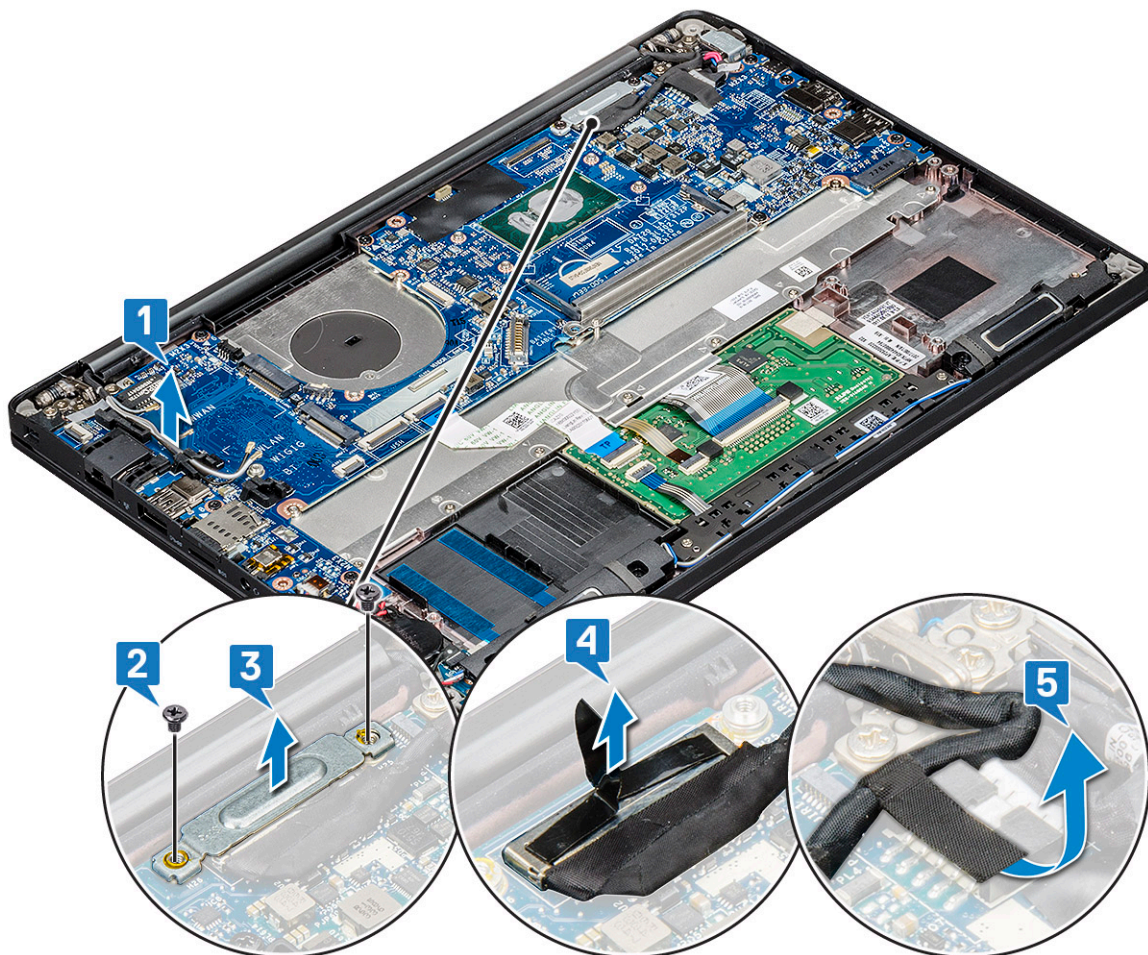
- 1 Connect the camera cable.
- 2 Insert the camera microphone module into the slot on the display assembly.
- 3 Affix the tape securing the camera microphone module
- 4 Install the following:
 - a [display bezel](#)
 - b [display assembly](#)
 - c [Display Hinges](#)
 - d [removing Display Panel](#)
 - e [WLAN card](#)
 - f [WWAN card](#)
 - g [battery](#)
 - h [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

NOTE: The two conductive tape pieces must be removed and then reattached when replacing the camera module.

System board

Removing system board

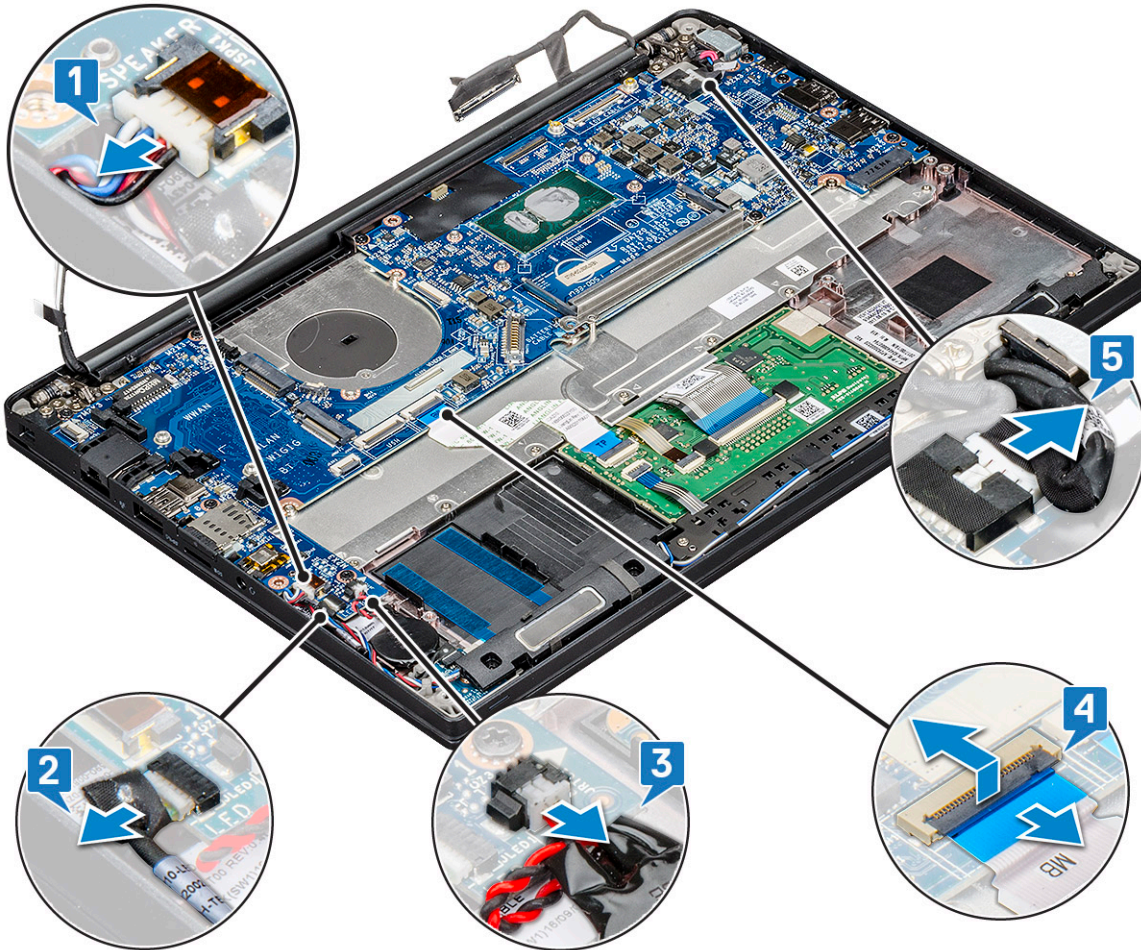
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [SIM card/dummy SIM card tray](#)
 - d [memory module](#)
 - e [PCIe SSD](#)
 - f [WLAN card](#)
 - g [WWAN card](#)
 - h [heat sink assembly](#)
- 1 To identify the screws, see [screw list](#)
- 3 To disconnect the eDP cable:
 - a Un route the WLAN and WWAN cables from the routing channels [1].
 - b Remove the two (M2.0 x 3.0) screws that secures the eDP cable [2].
 - c Remove the eDP cable bracket [3].
 - d Disconnect the eDP cable from the system board [4].
 - e Lift the tape that secures the eDP cable to the system board [5].



4 To disconnect the cables:

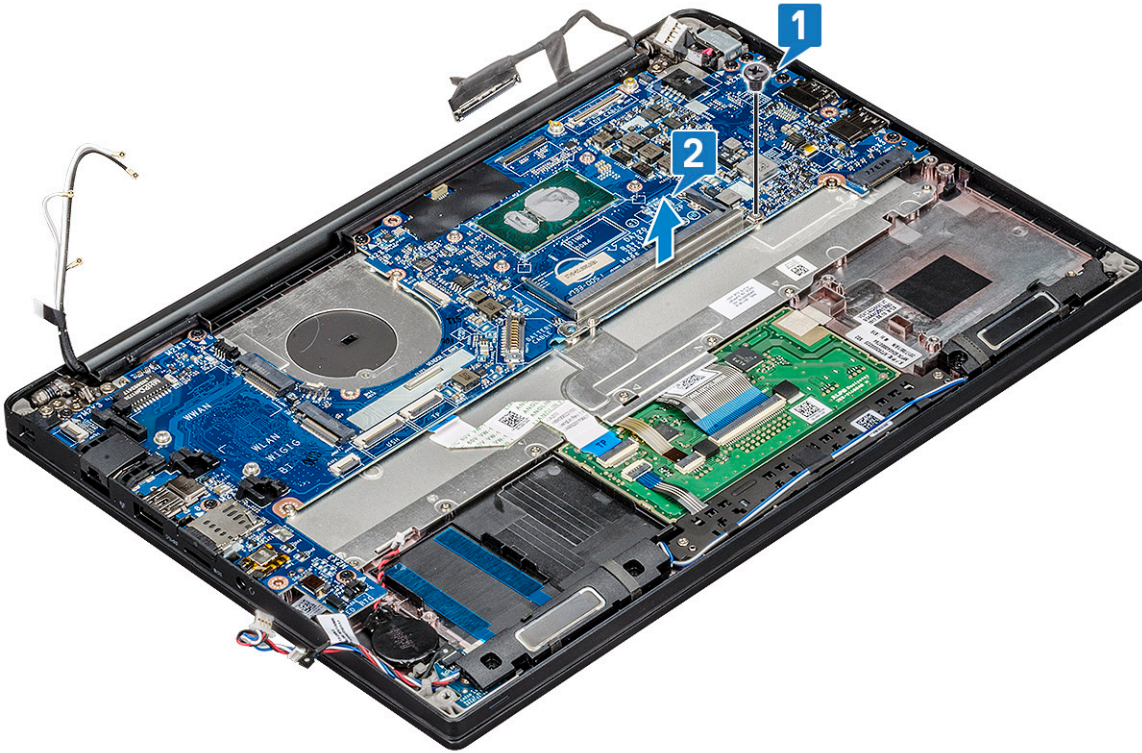
NOTE: To disconnect the speaker, LED board, coin cell battery and the power connector port cables, use a plastic scribe to release the cables from the connectors. Do not pull the cable as it may result in breakage

- a speaker cable [1]
- b LED board cable [2]
- c coin cell battery cable [3]
- d touchpad cable and USH board cable [4]
- e power connector port [5]

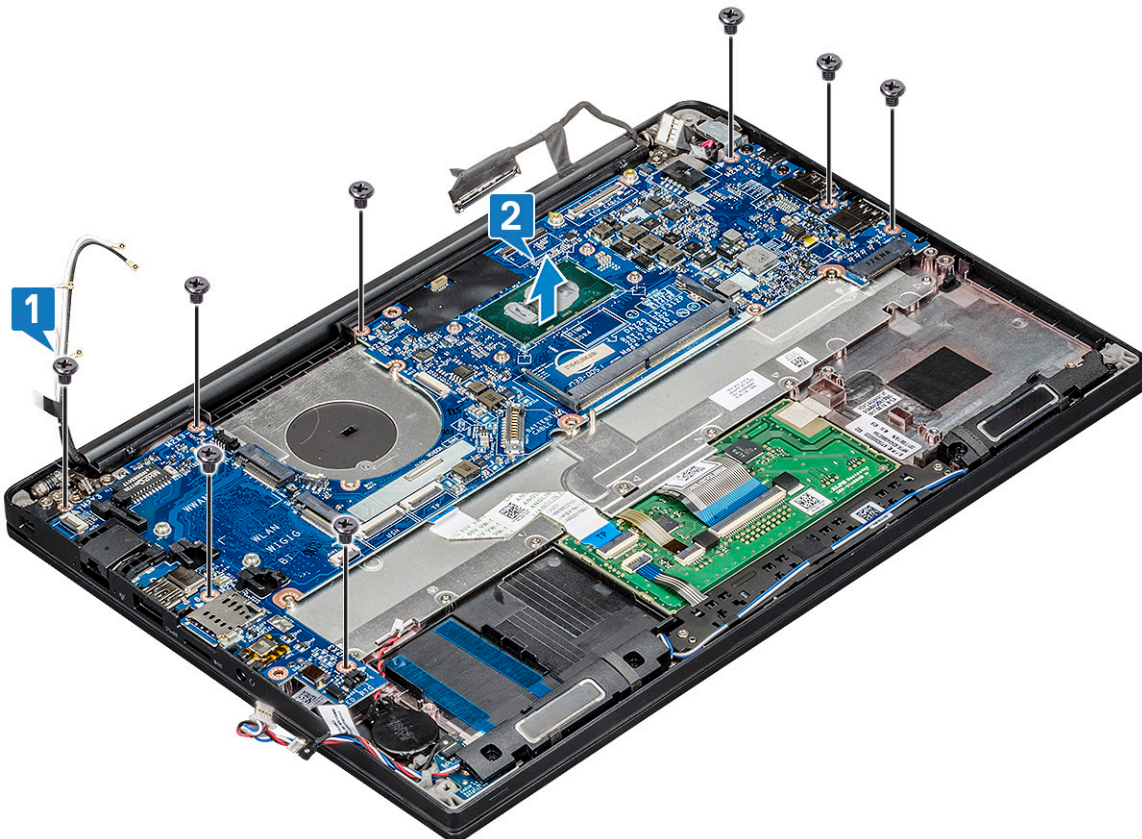


5 To remove the memory module bracket:

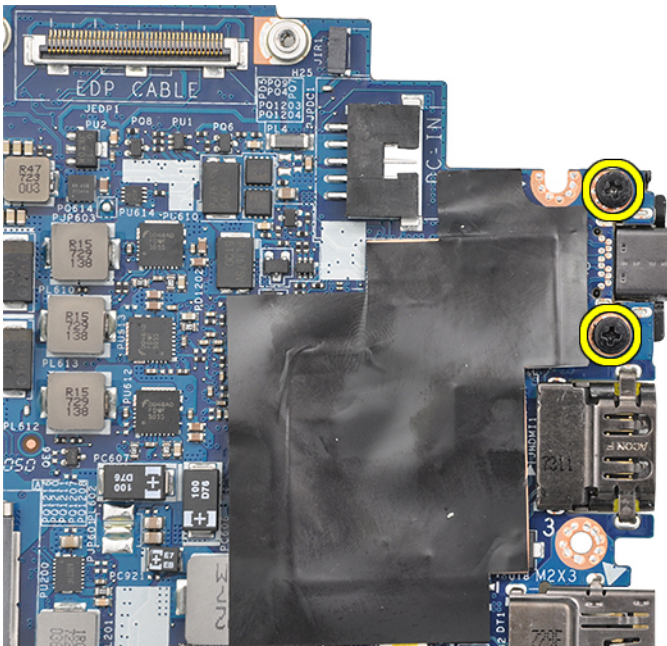
- a Remove the (M2.0 x 3.0) screw that secure memory module bracket to the system board [1].
- b Lift the memory module bracket from the system board [2].



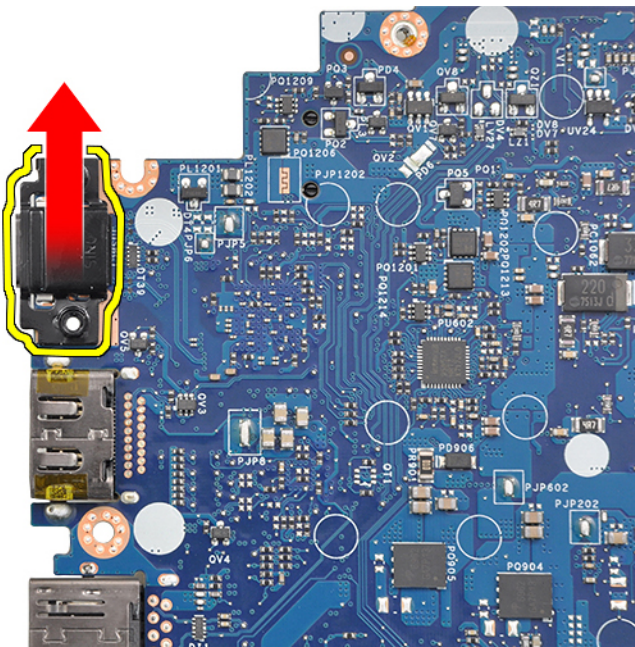
- 6 To remove the system board:
- a Remove the USB Type-C bracket.
Image does not display the USB Type-C bracket removal.
 - b Remove the eight (M2.0 x 3.0) screws that secure the system board [1].
 - c Lift the system board away from the system [2].



- 7 Remove the one (M2.0 x 3.0) screws that secure the USB Type-C bracket.



- 8 Flip the system board, peel off the tapes(if any) securing the bracket and remove the USB Type-C port from underneath the system board.



NOTE: When removing or reinstalling the USB Type-C bracket to the system board, technicians must place the system board on an ESD mat to avoid damage.

Installing system board

- 1 Align the system board with the screw holders on the system.
- 2 Replace the M2.0 x 3.0 screws to secure the system board to the system.
- 3 Connect the speaker, LED board, coin cell battery, touchpad, and USH cables, and power connector, cables to the connectors on the system board.

- 4 Connect the eDP cable to the connector on the system board.
- 5 Place the metal bracket over the eDP cable and replace the M2.0 x 3.0 screws to secure it.
- 6 Place the metal bracket over the memory module connectors and replace the M2.0 x 3.0 screws to secure it to the system.

NOTE: Replacement system boards do not include the SIM card tray(if available) , USB Type-C bracket, and DDR ESD bracket and needs to be transferred.

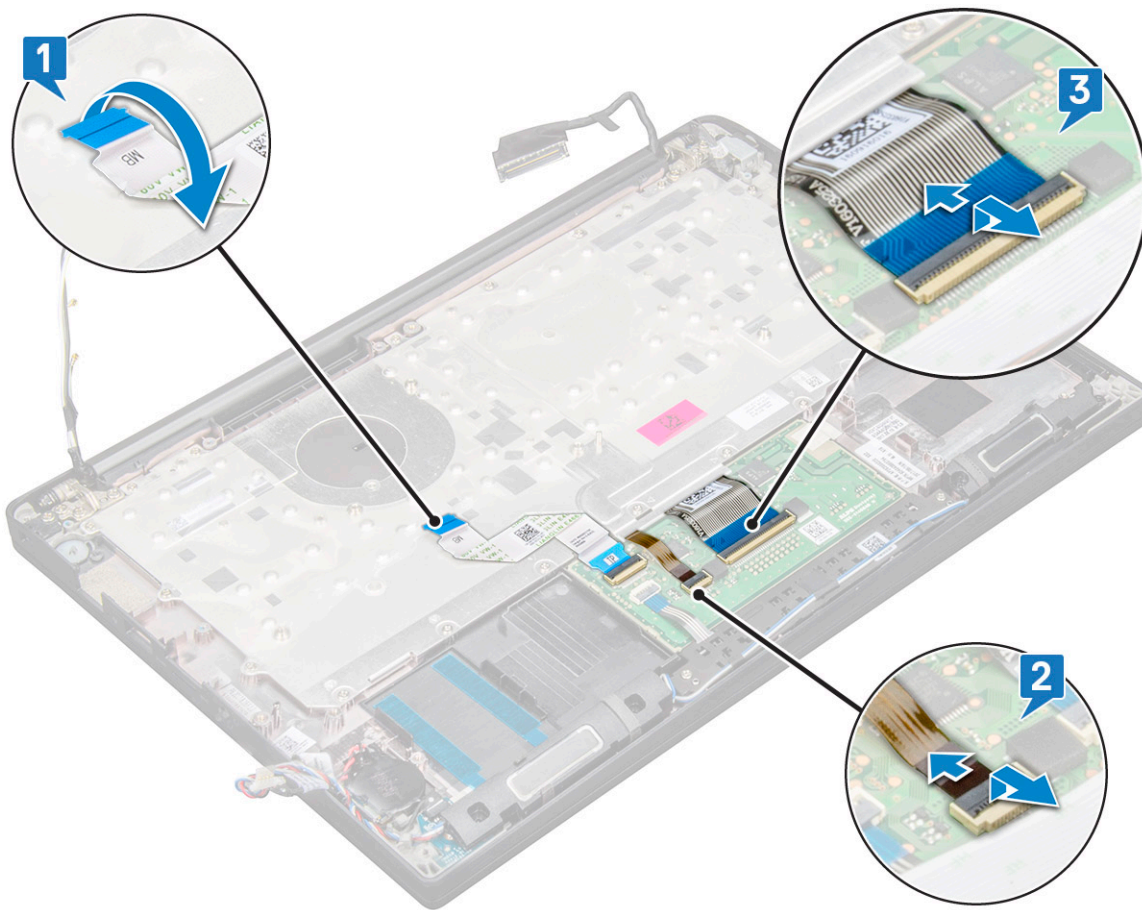
- 7 Install the following:
 - a heat sink
 - b WLAN card
 - c WWAN card
 - d PCIe SSD card
 - e memory module
 - f battery
 - g base cover
 - h dummy SIM card tray
 - i SIM card
- 8 Follow the procedure in [After working inside your computer.](#)

Keyboard

Removing keyboard assembly

NOTE: The keyboard and the keyboard tray together are called the keyboard assembly.

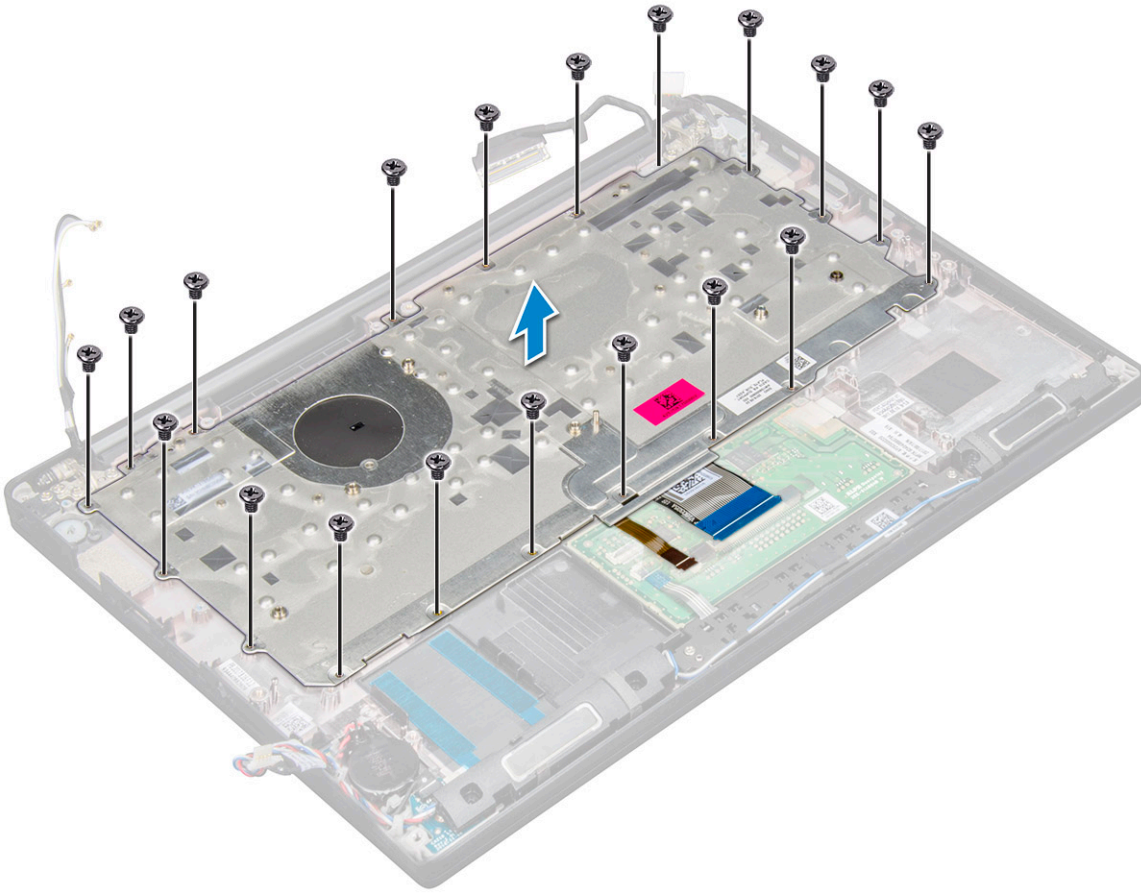
- 1 Follow the procedure in [Before working inside your computer.](#)
- 2 Remove:
 - a base cover
 - b battery
 - c memory module
 - d PCIe SSD
 - e WLAN card
 - f WWAN card
 - g heat sink assembly
 - h system board
- 3 Disconnect the cables from the palmrest end:
 - a Touchpad board cable [1]
 - b keyboard backlight cable [2] , USH Board cable(Optional)
 - c keyboard cable [3]



4 To remove the keyboard assembly:

NOTE: To identify the screws, see [screw list](#)

- a Remove the 18 (M2.0 x 2.5) screws that secure the keyboard [1].
- b Lift the keyboard assembly from the chassis [2].



Removing keyboard from keyboard tray

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [keyboard assembly](#)
- 3 Remove the M2.0 x 2.0 screws that secure the keyboard to the keyboard assembly.
- 4 Lift the keyboard away from the keyboard tray.

Installing keyboard to keyboard tray

- 1 Align the keyboard with the screw holders on the keyboard tray.
- 2 Tighten the M2.0 x 2.0 screws to secure the keyboard to the keyboard tray.
- 3 Install the [keyboard assembly](#).

Installing keyboard assembly

NOTE: The keyboard and the keyboard tray together are called the keyboard assembly.

- 1 Align the keyboard assembly with the screw holders on the computer.
- 2 Tighten the M2.0 x 2.5 screws that secure the keyboard to the chassis.
- 3 Connect the keyboard cable, USH board cable(optional), keyboard backlight cable, and touchpad cable cable to the connectors on the touchpad buttons board.
- 4 Install the:

- a system board
- b heat sink
- c WLAN card
- d WWAN card
- e PCIe SSD card
- f memory module
- g battery
- h base cover

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

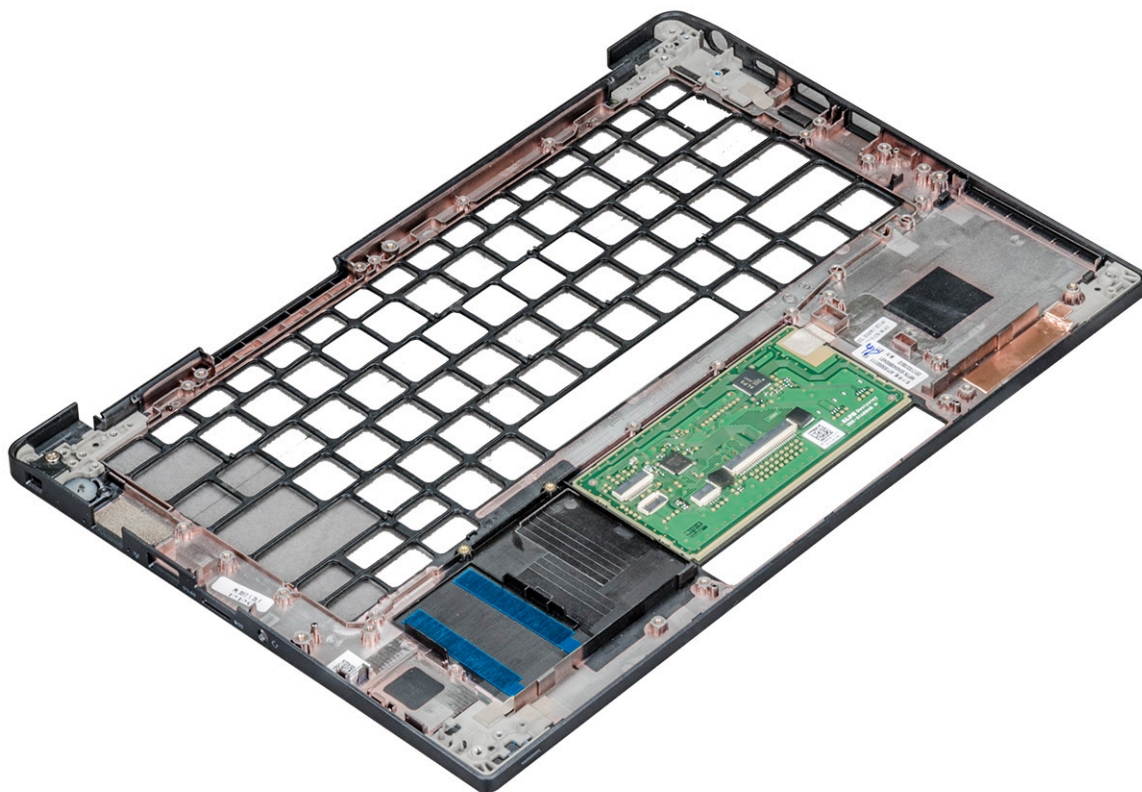
Palm rest

Replacing palm rest

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

2 Remove the:

- a base cover
- b battery
- c memory module
- d PCIe SSD
- e WLAN card
- f WWAN card
- g heat sink assembly
- h system board
- i power connector port
- j coin cell battery
- k speaker



The component you are left with is the palm rest.

- 3 Replace the palm rest.
- 4 Install the:
 - a [speaker](#)
 - b [coin cell battery](#)
 - c [power connector port](#)
 - d [system board](#)
 - e [heat sink](#)
 - f [WLAN card](#)
 - g [WWAN card](#)
 - h [PCIe SSD card](#)
 - i [memory module](#)
 - j [battery](#)
 - k [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Technology and components

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

Topics:

- [DDR4](#)
- [HDMI 1.4](#)
- [USB features](#)
- [USB Type-C](#)
- [Thunderbolt over USB Type-C](#)

DDR4

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

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

DDR4 Details

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

Key notch difference

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

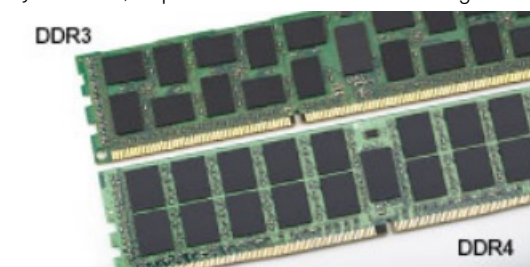


Figure 1. Notch difference

Increased thickness

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

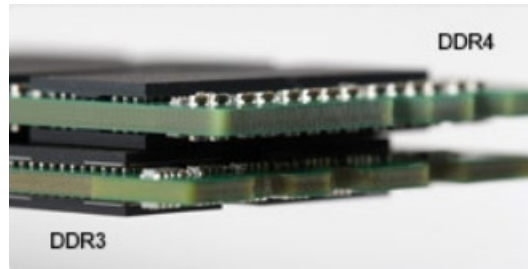


Figure 2. Thickness difference

Curved edge

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



Figure 3. Curved edge

Memory Errors

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

HDMI 1.4

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

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

NOTE: The HDMI 1.4 will provide 5.1 channel audio support.

HDMI 1.4 Features

- **HDMI Ethernet Channel** - Adds high-speed networking to an HDMI link, allowing users to take full advantage of their IP-enabled devices without a separate Ethernet cable
- **Audio Return Channel** - Allows an HDMI-connected TV with a built-in tuner to send audio data "upstream" to a surround audio system, eliminating the need for a separate audio cable
- **3D** - Defines input/output protocols for major 3D video formats, paving the way for true 3D gaming and 3D home theater applications
- **Content Type** - Real-time signaling of content types between display and source devices, enabling a TV to optimize picture settings based on content type
- **Additional Color Spaces** - Adds support for additional color models used in digital photography and computer graphics

- **4K Support** - Enables video resolutions far beyond 1080p, supporting next-generation displays that will rival the Digital Cinema systems used in many commercial movie theaters
- **HDMI Micro Connector** - A new, smaller connector for phones and other portable devices, supporting video resolutions up to 1080p
- **Automotive Connection System** - New cables and connectors for automotive video systems, designed to meet the unique demands of the motoring environment while delivering true HD quality

Advantages of HDMI

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

USB features

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

Let's take a quick look on the USB evolution referencing to the table below.

Table 2. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 2.0	480 Mbps	High Speed	2000
USB 3.0/USB 3.1 Gen 1	5 Gbps	Super Speed	2010
USB 3.1 Gen 2	10 Gbps	Super Speed	2013

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

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

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

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

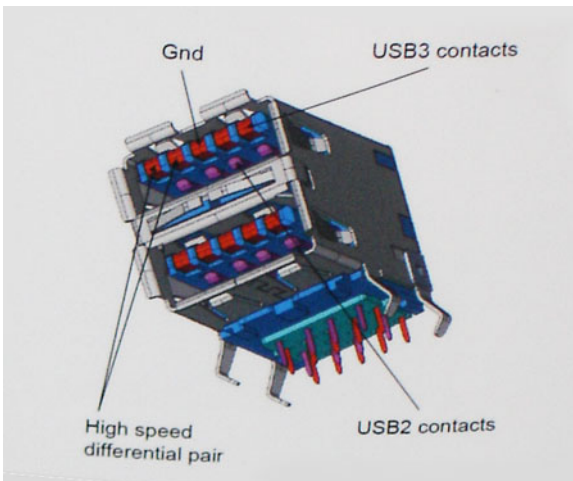


Speed

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

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

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



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

Applications

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

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

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives

- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

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

Windows 8/10 will be bringing native support for USB 3.1 Gen 1 controllers. This is in contrast to previous versions of Windows, which continue to require separate drivers for USB 3.0/USB 3.1 Gen 1 controllers.

Microsoft announced that Windows 7 would have USB 3.1 Gen 1 support, perhaps not on its immediate release, but in a subsequent Service Pack or update. It is not out of the question to think that following a successful release of USB 3.0/USB 3.1 Gen 1 support in Windows 7, SuperSpeed support would trickle down to Vista. Microsoft has confirmed this by stating that most of their partners share the opinion that Vista should also support USB 3.0/USB 3.1 Gen 1.

USB Type-C

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

Alternate Mode

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

USB Power Delivery

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

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

USB Type-C and USB 3.1

USB 3.1 is a new USB standard. USB 3's theoretical bandwidth is 5 Gbps, while USB 3.1 Gen2 is 10Gbps. That's double the bandwidth, as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1. USB Type-C is just a connector shape, and

the underlying technology could just be USB 2 or USB 3.0. In fact, Nokia's N1 Android tablet uses a USB Type-C connector, but underneath it's all USB 2.0 — not even USB 3.0. However, these technologies are closely related.

Thunderbolt over USB Type-C

Thunderbolt is a hardware interface that combines data, video, audio, and power in a single connection. Thunderbolt combines PCI Express (PCIe) and DisplayPort (DP) into one serial signal, and additionally provides DC power, all in one cable. Thunderbolt 1 and Thunderbolt 2 use the same connector [1] as miniDP (DisplayPort) to connect to peripherals, while Thunderbolt 3 uses a USB Type-C connector [2].

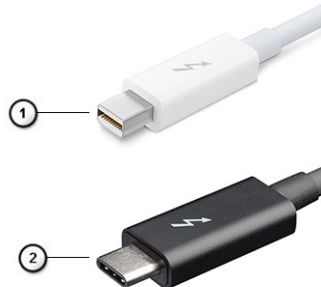


Figure 4. Thunderbolt 1 and Thunderbolt 3

- 1 Thunderbolt 1 and Thunderbolt 2 (using a miniDP connector)
- 2 Thunderbolt 3 (using a USB Type-C connector)

Thunderbolt 3 over USB Type-C

Thunderbolt 3 brings Thunderbolt to USB Type-C at speeds up to 40 Gbps, creating one compact port that does it all - delivering the fastest, most versatile connection to any dock, display or data device like an external hard drive. Thunderbolt 3 uses a USB Type-C connector/port to connect to supported peripherals.

- 1 Thunderbolt 3 uses USB Type-C connector and cables - It is compact and reversible
- 2 Thunderbolt 3 supports speed up to 40 Gbps
- 3 DisplayPort 1.2 – compatible with existing DisplayPort monitors, devices and cables
- 4 USB Power Delivery - Up to 130W on supported computers

Key Features of Thunderbolt 3 over USB Type-C

- 1 Thunderbolt, USB, DisplayPort and power on USB Type-C on a single cable (features vary between different products)
- 2 USB Type-C connector and cables which are compact and reversible
- 3 Supports Thunderbolt Networking (*varies between different products)
- 4 Supports up to 4K displays
- 5 Up to 40 Gbps

NOTE: Data transfer speed may vary between different devices.

System specifications

Topics:

- [Technical specifications](#)
- [Hot key combinations](#)

Technical specifications

NOTE: Offerings may vary by region. The following specifications are only those required by law to ship with your computer. For more information about the configuration of your computer, go to **Help and Support** in your Windows operating system and select the option to view information about your computer.

Table 3. Specifications

Type	Feature
Processor family	Intel Core i5-8250U (Quad Core, 1.6GHz, 6M Cache, 15W) Intel Core i5-8350U (Quad Core, 1.7GHz, 6M Cache, 15W) vPro Intel Core i7-8650U (Quad Core, 1.9GHz, 8M Cache, 15W) vPro
System	<ul style="list-style-type: none"> • Chipset—Intel Kaby Lake -U/R—Integrated in the processor • DRAM bus width— 64 bits • Flash EPROM— SPI 128 Mbits • PCIe bus— 100 MHz • External Bus Frequency— PCIe Gen3 (8 GT/s)
Operating System	<ul style="list-style-type: none"> • Microsoft Windows 10 Home • Microsoft Windows 10 Pro 64 bit • Ubuntu
Memory	<ul style="list-style-type: none"> • DDR4 2400 SDRAM operates at 2133 with Intel 7th Gen • DDR4 2400 SDRAM operates at 2400 with Intel 8th Gen • One DIMM slot up to 16 GB
Chipset	Intel Kaby Lake -U/R—Integrated in the processor
Video	<ul style="list-style-type: none"> • Intel HD Graphics 620 (7th Gen Intel Core) • Intel UHD Graphics 620 (8th Gen Intel Core)
Audio	<ul style="list-style-type: none"> • Types— Four-channel high-definition audio • Controller— Realtek ALC3246 • Stereo conversion— 24-bit-analog-to-digital and digital-to-analog • Internal interface— High-definition audio • External interface— Microphone-in, stereo headphones, and headset combo connector

	<ul style="list-style-type: none"> • Speakers—Two • Internal speaker amplifier— 2 W (RMS) per channel • Volume controls— Hot keys
Display	<ul style="list-style-type: none"> • 12.5 inch HD (1366 x 768) Anti-Glare, HD CAM/Mic, WLAN capable, Mag Alloy back, Non Touch • 12.5 inch HD (1366 x 768) Anti-Glare, HD CAM/Mic, WLAN/WWAN, Mag Alloy back, Non Touch • 12.5 inch HD (1366 x 768) Anti-Glare, Mic only, WLAN capable, Mag Alloy back, Non Touch
Storage options	<p>Primary Storage:</p> <ul style="list-style-type: none"> • 128 GB M.2 2280 SATA SSD • 256 GB M.2 2280 SATA SSD • 512 GB M.2 2280 SATA SSD • 512 GB M.2 2280 SATA SED SSD • 128 GB M.2 2230 PCIe SSD • 256 GB M.2 2280 PCIe SSD • 512 GB M.2 2280 PCIe SSD • 1 TB M.2 2280 PCIe SSD • 256 GB M.2 2280 PCIe SED SSD • 512 GB M.2 2280 PCIe SED SSD
Security	<p>TPM 2.0 FIPS 140-2 Certified, TCG Certified (February 2018)</p> <p>Optional Hardware Authentication Bundle 1: FIPS 201 Contacted Smart Card with Control Vault 2.0 Advanced Authentication with FIPS 140-2 Level 3 Certification</p> <p>Optional Hardware Authentication Bundle 2: Touch Fingerprint Reader, FIPS 201 Contacted Smart Card, Contactless Smart Card, NFC, Control Vault 2.0 Advanced Authentication with FIPS 140-2 Level 3 Certification</p>
Docking options	<ul style="list-style-type: none"> • Dell Dock WD15 (optional) • Dell Thunderbolt Dock TB16 (optional on Thunderbolt 3 equipped systems)
Multimedia	<ul style="list-style-type: none"> • Integrated High-Quality Speakers • Headset and mic combo jack • Noise reducing array microphones • Optional HD Cam(0.92 M)
Optical Drive Options	External Options Only
Battery options	<ul style="list-style-type: none"> • 3 - Cell, 42 Whr Li-Ion Prismatic, ExpressCharge Capable • 4 - Cell, 60 Whr Li-Ion Polymer, ExpressCharge Capable • 4 - Cell, 60 Whr Li-Ion Long Life Cycle (polymer) <p>42 WHr (3-cell):</p> <ul style="list-style-type: none"> • Length—200.5mm (7.89 inch) • Width—95.9mm (3.78 inch) • Height—5.70mm (0.22 inch) • Weight—185.00 g (0.41lb) • Voltage—11.4VDC

60 WHr (4-cell):

- Length—238mm (9.37 inch)
- Width—95.9mm (3.78 inch)
- Height—5.70mm (0.22 inch)
- Weight—270.00 g (0.6lb)
- Voltage—7.6VDC

60 WHr Long Life Cycle polymer battery (4-cell):

- Length—238mm (9.37 inch)
- Width—95.9mm (3.78 inch)
- Height—5.70mm (0.22 inch)
- Weight—270.00 g (0.6lb)
- Voltage—7.6VDC

Power adapter

- Type— E5: 65 W or E5: 90 W
- Input voltage— 100 V AC to 240 V AC
- Input current-maximum— 1.7 A(65 Watt Adapter) and 1.6 A(90 Watt Adapter)
- Input frequency— 50 Hz to 60 Hz
- Output current— 3.34 A and 4.62 A
- Rated output voltage— 19.5 V DC
- Weight— 230 g/0.5 lbs (65 W) and 320 g/0.7 lbs (90 W)
- Dimensions— 22 x 66 x 106 mm/0.87 x 2.60 x 4.17 inch (65 W) and 22 x 66 x 130/0.87 x 2.60 x 5.12 inch (90 W)
- Temperature range-Operating— 0°C to 40°C (32°F to 104°F)
- Temperature range-Non-Operating— -40°C to 70°C (-40°F to 158°F)

Communications

Network adapter—10/100/1000 Mb/s Gigabit Ethernet (RJ-45)

Wireless LAN Options:

- No WLAN option
- Qualcomm QCA61x4A 2x2 AC + Bluetooth 4.1 (non vPro)
- Qualcomm QCA6174A XR 2x2 AC + Bluetooth 4.1 (non vPro)
- Intel Dual-Band Wireless-AC 8265 2x2 + Bluetooth 4.2 (non vPro)

Optional Mobile Broadband Options:

- Qualcomm Snapdragon X7 LTE-A (DW5811e) for AT&T, Verizon & Sprint. (US)
- Qualcomm Snapdragon X7 LTE-A (DW5811e) (EMEA/APJ/ROW)
- Qualcomm Snapdragon X7 HSPA + (DW5811e) (China/Indonesia/ India)
- Qualcomm Snapdragon X7 LTE-A (DW5816e) (Japan/ANZ/India/South Korea/Taiwan)

Ports, Slots, and Chassis

- HDMI 1.4 (1)
 - Universal Jack
 - MultiMedia card reader (SD 4.0)
 - uSIM (external)
 - 2 x USB 3.1 Gen1 (one with PowerShare)
 - DisplayPort over USB Type-C (optional Thunderbolt 3 (1)
 - RJ45
 - Optional Smartcard reader
 - Noble lock-Full size
-

	<ul style="list-style-type: none"> DC-in
Camera	<ul style="list-style-type: none"> Type—HD fixed focus Sensor type—CMOS sensor technology Imaging rate—Up to 30 frames per second Video Resolution—1280 x 720 pixels (0.92 MP)
Touchpad	<p>Active area</p> <ul style="list-style-type: none"> X-axis—99.50 mm Y-axis—53.0 mm X/Y position resolution— X: 1048cpi; Y:984cpi Multi-touch—Configurable single finger and multi-finger gestures
Internal Keyboards	<ul style="list-style-type: none"> 12.5 inches Single Pointing, non backlit 12.5 inches Single Pointing, backlit (optional)
Physical specifications	<ul style="list-style-type: none"> Height Front to Back (Non-Touch) —0.65 inches(front and back); 16.53(front), 16.54(back) Width—12.00 inch; 304.80 mm Depth—8.19 inch; 207.95 mm Starting weight— 1.19 kg; 2.63 lbs
Environmental specifications	<p>Temperature Specifications</p> <ul style="list-style-type: none"> Operating : 0°C to 35°C (32°F to 95°F) Storage : -40°C to 65°C (-40°F to 149°F) <p>Relative humidity—maximum Specifications</p> <ul style="list-style-type: none"> Operating—10% to 90% (non-condensing) Storage— 5% to 95% (non-condensing) <p>Altitude—maximum Specifications</p> <ul style="list-style-type: none"> Operating: 0 to 3048 m (0 to 10,000 ft) 0°C to 35°C Non-operating— 0 to 10668 m Airborne contaminant level— G2 or lower as defined by ISA S71.04-1985

Display specifications in detail

Table 4. 12.5 inches (16:9) AG HD WLED 200 nits eDP 1.2 TN , HD CAM/Mic, WLAN capable, Mag Alloy back, Non Touch

Feature	Specification
Type	HD Anti-Glare
Luminance (typical)	200 nits
Dimensions (Active Area)	<ul style="list-style-type: none"> Height: 155.52mm Width: 276.62mm Diagonal: 12.5 inch
Native Resolution	1366x768

Megapixels	1.05
Pixels per Inch (PPI)	125
Contrast Ratio (min)	300:1
Response Time (max)	25 msec rise/fall
Refresh Rate	60 Hz
Horizontal View Angle	+/- 40 degrees
Vertical View Angle	+10/-30 degrees
Pixel Pitch	0.2025 mm
Power Consumption (maximum)	2.9 W

Table 5. 12.5 inches (16:9) AG HD WLED 200 nits eDP 1.2 TN, HD CAM/Mic, WLAN/WWAN, Mag Alloy back, Non Touch

Feature	Specification
Type	HD Anti-Glare
Luminance (typical)	200 nits
Dimensions (Active Area)	<ul style="list-style-type: none"> Height: 155.52mm Width: 276.62mm Diagonal: 12.5 inch
Native Resolution	1366x768
Megapixels	1.05
Pixels per Inch (PPI)	125
Contrast Ratio (min)	300:1
Response Time (max)	25 msec rise/fall
Refresh Rate	60 Hz
Horizontal View Angle	+/- 40 degrees
Vertical View Angle	+10/-30 degrees
Pixel Pitch	0.2025 mm
Power Consumption (maximum)	2.9 W


Table 6. 12.5 inches (16:9) AG HD WLED 200 nits eDP 1.2 TN, Mic only, WLAN capable, Mag Alloy back, Non Touch

Feature	Specification
Type	HD Anti-Glare
Luminance (typical)	200 nits
Dimensions (Active Area)	<ul style="list-style-type: none"> Height: 155.52mm Width: 276.62mm Diagonal: 12.5 inch
Native Resolution	1366x768
Megapixels	1.05

Pixels per Inch (PPI)	125
Contrast Ratio (min)	300:1
Response Time (max)	25 msec rise/fall
Refresh Rate	60 Hz
Horizontal View Angle	+/- 40 degrees
Vertical View Angle	+10/-30 degrees
Pixel Pitch	0.2025 mm
Power Consumption (maximum)	2.9 W

Hot key combinations

Table 7. Hot key combinations

Function key combination	Latitude 7290
Fn+ESC	Fn Toggle
Fn+ F1	Speaker Mute
Fn+ F2	Volume Down
Fn+ F3	Volume Up
Fn+ F4	Mic Mute  NOTE: LED Indicator lit means Mic is mute
Fn+ F5	Num Lock
Fn+ F6	Scroll Lock
Fn+ F8	Display Toggle (Win + P)
Fn+ F9	Search
Fn+ F10	Increase keyboard back light brightness
Fn+ F11	Print screen
Fn+ F12	Insert
Fn + Home	WLAN on/off
Fn + End	Sleep
Fn + up arrow	Increase display brightness
Fn + down arrow	Decrease display brightness

System setup

System setup enables you to manage your notebook hardware and specify BIOS level options. From the System setup, you can:

- Change the NVRAM settings after you add or remove hardware
- View the system hardware configuration
- Enable or disable integrated devices
- Set performance and power management thresholds
- Manage your computer security

Topics:

- [Boot menu](#)
- [Navigation keys](#)
- [System setup options](#)
- [General screen options](#)
- [System Configuration screen options](#)
- [Video screen options](#)
- [Security screen options](#)
- [Secure Boot screen options](#)
- [Intel software guard extensions screen options](#)
- [Performance screen options](#)
- [Power management screen options](#)
- [POST behavior screen options](#)
- [Manageability](#)
- [Virtualization support screen options](#)
- [Wireless screen options](#)
- [Maintenance screen options](#)
- [System logs screen options](#)
- [Admin and System password](#)
- [Updating the BIOS in Windows](#)

Boot menu

Press <F12> when the Dell™ logo appears to initiate a one-time boot menu with a list of the valid boot devices for the system. Diagnostics and BIOS Setup options are also included in this menu. The devices listed on the boot menu depend on the bootable devices in the system. This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the system. Using the boot menu does not make any changes to the boot order stored in the BIOS.

The options are:

- UEFI Boot:
 - Windows Boot Manager
- Other Options:
 - BIOS Setup
 - BIOS Flash Update

- Diagnostics
- Change Boot Mode Settings

Navigation keys

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

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

System setup options

NOTE: Depending on the notebook and its installed devices, the items listed in this section may or may not appear.

General screen options


This section lists the primary hardware features of your computer.

Option	Description
System Information	<p>This section lists the primary hardware features of your computer.</p> <ul style="list-style-type: none"> • System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date, Express Service Code, the Signed Firmware update—enabled by default • Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channels Mode, Memory Technology, DIMM A Size, DIMM B Size, • Processor Information: Displays Processor Type, Core Count, Processor ID, Current Clock Speed, Minimum Clock Speed, Maximum Clock Speed, Processor L2 Cache, Processor L3 Cache, HT Capable, and 64-Bit Technology • Device Information: Displays M.2 SATA, M.2 PCIe SSD-0, LOM MAC Address, Passthrough MAC address, Video Controller, Video BIOS Version, Video Memory, Panel Type, Native Resolution, Audio Controller, Wi-Fi Device, WiGig Device, Cellular Device, Bluetooth Device
Battery Information	Displays the battery status health and whether the AC adapter is installed.
Boot Sequence	<p>Allows you to change the order in which the computer attempts to find an operating system.</p> <p>Legacy Boot Sequence</p> <ul style="list-style-type: none"> • Diskette Drive • Internal HDD • USB Storage Device • CD/DVD/CD-RW Drive • Onboard NIC

Option	Description
	UEFI Boot option <ul style="list-style-type: none"> Windows Boot Manager(Default) Boot list Options <ul style="list-style-type: none"> Legacy UEFI—selected by default
Advanced Boot Options	This option allows you the legacy option ROMs to load. By default, the Enable Legacy Option ROMs is disabled. Enable Attempt Legacy Boot is disabled by default.
UEFI boot path security	<ul style="list-style-type: none"> Always, except internal HDD Always Never
Date/Time	Allows you to change the date and time.

System Configuration screen options

Option	Description
Integrated NIC	Allows you to configure the integrated network controller. The options are: <ul style="list-style-type: none"> Disabled Enabled Enable UEFI network stack: This option is enabled by default. Enabled w/PXE
SATA Operation	Allows you to configure the internal SATA hard-drive controller. The options are: <ul style="list-style-type: none"> Disabled AHCI RAID On: This option is enabled by default.
Drives	Allows you to configure the SATA drives on board. All drives are enabled by default. The options are: <ul style="list-style-type: none"> SATA-2 M.2 PCI-e SSD-0
SMART Reporting	This field controls whether hard drive errors for integrated drives are reported during system startup. This technology is part of the SMART (Self-Monitoring Analysis and Reporting Technology) specification. This option is disabled by default. <ul style="list-style-type: none"> Enable SMART Reporting
USB Configuration	<p>This is an optional feature.</p> <p>This field configures the integrated USB controller. If Boot Support is enabled, the system is allowed to boot any type of USB Mass Storage Devices—HDD, memory key, floppy.</p> <p>If USB port is enabled, device attached to this port is enabled and available for OS.</p> <p>If USB port is disabled, the OS cannot see any device attached to this port.</p>

Option	Description
	<p>The options are:</p> <ul style="list-style-type: none"> • Enable USB Boot Support—enabled by default • Enable External USB Port—enabled by default <p> NOTE: USB keyboard and mouse always work in the BIOS setup irrespective of these settings.</p>
Dell Type-C Dock Configuration	Always Allow Dell Docs. This option is enabled by default.
USB PowerShare	This field configures the USB PowerShare feature behavior. This option allows you to charge external devices using the stored system battery power through the USB PowerShare port. This option is disabled by default
Audio	<p>This field enables or disables the integrated audio controller. By default, the Enable Audio option is selected. The options are:</p> <ul style="list-style-type: none"> • Enable Microphone—by default enable • Enable Internal Speaker—by default enable
Keyboard Illumination	<p>This field lets you choose the operating mode of the keyboard illumination feature. The keyboard brightness level can be set from 0% to 100%. The options are:</p> <ul style="list-style-type: none"> • Disabled • Dim • Bright—enabled by default
Keyboard Backlight with AC	The Keyboard Backlight with AC option does not affect the main keyboard illumination feature. Keyboard Illumination will continue to support the various illumination levels. This field has an effect when the backlight is enabled. This option is enabled by default.
Keyboard Backlight Timeout on AC	<p>The Keyboard Backlight Timeout dims out with AC option. The main keyboard illumination feature is not affected. Keyboard Illumination will continue to support the various illumination levels. This field has an effect when the backlight is enabled. The options are:</p> <ul style="list-style-type: none"> • 5 sec • 10 sec—enabled by default • 15 sec • 30 sec • 1 min • 5 min • 15 min • Never
Keyboard Backlight Timeout on Battery	<p>The Keyboard Backlight Timeout dims out with the Battery option. The main keyboard illumination feature is not affected. Keyboard Illumination will continue to support the various illumination levels. This field has an effect when the backlight is enabled. The options are:</p> <ul style="list-style-type: none"> • 5 sec • 10 sec—enabled by default • 15 sec • 30 sec • 1 min • 5 min • 15 min

Option	Description
	<ul style="list-style-type: none"> Never
Unobtrusive Mode	This option, when enabled, pressing Fn+F7 turns off all light and sound emissions in the system. To resume normal operation, press Fn+F7 again. This option is disabled by default.
Miscellaneous Devices	Allows you to enable or disable the following devices: <ul style="list-style-type: none"> Enable Camera—enabled by default Secure Digital (SD) card—enabled by default Secure Digital (SD) card boot Secure Digital (SD) card read-only-mode



Video screen options

Option	Description
LCD Brightness	Allows you to set the display brightness depending up on the power source—On Battery and On AC. The LCD brightness is independent for battery and AC adapter. It can be set using the slider.

NOTE: The video setting is visible only when a video card is installed into the system.


Security screen options

Option	Description
Admin Password	<p>Allows you to set, change, or delete the administrator (admin) password.</p> <p>NOTE: You must set the admin password before you set the system or hard drive password. Deleting the admin password automatically deletes the system password and the hard drive password.</p> <p>NOTE: Successful password changes take effect immediately.</p> <p>Default setting: Not set</p>
System Password	<p>Allows you to set, change, or delete the system password.</p> <p>NOTE: Successful password changes take effect immediately.</p> <p>Default setting: Not set</p>
M.2 SATA SSD-2 Password	<p>Allows you to set, change, or delete the password on the system's M.2 SATA solid state drive(SSD).</p> <p>Default setting: Not set</p>
Strong Password	<p>Allows you to enforce the option to always set strong passwords.</p> <p>Default Setting: Enable Strong Password is not selected.</p> <p>NOTE: If Strong Password is enabled, the Admin and System passwords must contain at least one uppercase character, one lowercase character and be at least 8 characters long.</p>
Password Configuration	<p>Allows you to specify the minimum and max password lengths of the Administrator and System passwords.</p> <ul style="list-style-type: none"> min-4—by default, if you want to change you can increase the number max-32—you can decrease the number

Option	Description
Password Bypass	<p>Allows you to enable or disable the permission to bypass the System and the Internal HDD password, when they are set. The options are:</p> <ul style="list-style-type: none"> • Disabled • Reboot bypass <p>Default setting: Disabled</p>
Password Change	<p>Allows you to enable the disable permission to the System and Hard Drive passwords when the admin password is set.</p> <p>Default setting: Allow Non-Admin Password Changes is selected.</p>
Non-Admin Setup Changes	<p>Allows you to determine whether changes to the setup options are allowed when an Administrator Password is set. If disabled the setup options are locked by the admin password.</p> <p>Option "allow wireless switch changes" is not selected by default.</p>
UEFI Capsule Firmware Updates	<p>This option controls if the system allows BIOS updates through UEFI capsule packages.</p> <ul style="list-style-type: none"> • Enable UEFI Capsule Firmware Updates. This option is enabled by default.
TPM 2.0 Security	<p>Allows you to enable the Trusted Platform Module (TPM) during POST. The options are:</p> <ul style="list-style-type: none"> • UEFI capsule Firmware updates—enabled by default • TPM On—enabled by default • Clear • PPI Bypass for Enable Commands • PPI Bypass for Disabled Commands • Attestation enable—enabled by default • Key storage enable—enabled by default • SHA-256—enabled by default • Disabled • Enabled—enabled by default <p> NOTE: To upgrade or downgrade TPM 2.0, download the TPM wrapper tool—software.</p>
Computrace	<p>Allows you to activate or disable the optional Computrace software The options are:</p> <ul style="list-style-type: none"> • Deactivate • Disable • Activate—enabled by default <p> NOTE: The Activate and Disable options will permanently activate or disable the feature and no further changes are allowed</p>
CPU XD Support	<p>Allows you to enable the Execute Disable mode of the processor.</p> <p>Enable CPU XD Support—enabled by default</p>
OROM Keyboard Access	<p>Allows you to set an option to enter the Option ROM Configuration screens using hotkeys during boot. The options are:</p> <ul style="list-style-type: none"> • Enabled • One Time Enable

Option	Description <ul style="list-style-type: none"> · Disable <p>Default setting: Enable</p>
Admin Setup Lockout	<p>Allows you to prevent users from entering Setup when an Administrator password is set.</p> <p>Default Setting: This option is enabled</p>
Master password lockdown	<p>This option is not enabled by default</p>
SMM Security Mitigation	<p>This option enables or disables additional UEFI SMM Security Mitigation protections.</p> <ul style="list-style-type: none"> · SMM Security Mitigation

Secure Boot screen options

Option	Description
Secure Boot Enable	<p>This option enables or disables the Secure Boot feature.</p> <ul style="list-style-type: none"> · Disabled · Enabled <p>Default setting: Disabled</p>
Expert Key Management	<p>Allows you to manipulate the security key databases only if the system is in Custom Mode. The Enable Custom Mode option is disabled by default. The options are:</p> <ul style="list-style-type: none"> · PK—enabled by default · KEK · db · dbx <p>If you enable the Custom Mode, the relevant options for PK, KEK, db, and dbx appear. The options are:</p> <ul style="list-style-type: none"> · Save to File—Saves the key to a user-selected file · Replace from File—Replaces the current key with a key from a user-selected file · Append from File—Adds a key to the current database from a user-selected file · Delete—Deletes the selected key · Reset All Keys—Resets to default setting · Delete All Keys—Deletes all the keys <p> NOTE: If you disable the Custom Mode, all the changes made are erased and the keys restore to default settings.</p>

Intel software guard extensions screen options

Option	Description
Intel SGX Enable	<p>This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS. The options are:</p> <ul style="list-style-type: none"> · Disabled

Option	Description <ul style="list-style-type: none"> • Enabled • Software Controlled <p>Default setting: Software Controlled</p>
Enclave Memory Size	<p>This option sets SGX Enclave Reserve Memory Size. The options are:</p> <ul style="list-style-type: none"> • 32 MB • 64 MB • 128 MB—enabled by default

Performance screen options

Option	Description
Multi-Core Support	<p>This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores. This option is enabled by default. Allows you to enable or disable multi-core support for the processor. The installed processor supports two cores. If you enable Multi-Core Support, two cores are enabled. If you disable Multi-Core Support, one core is enabled.</p> <ul style="list-style-type: none"> • Enable Multi-Core Support <p>Default setting: The option is enabled.</p>
Intel SpeedStep	<p>Allows you to enable or disable the Intel SpeedStep feature.</p> <ul style="list-style-type: none"> • Enable Intel SpeedStep <p>Default setting: The option is enabled.</p>
C-States Control	<p>Allows you to enable or disable the additional processor sleep states.</p> <ul style="list-style-type: none"> • C states <p>Default setting: The option is enabled.</p>
Intel TurboBoost	<p>Allows you to enable or disable the Intel TurboBoost mode of the processor.</p> <ul style="list-style-type: none"> • Enable Intel TurboBoost <p>Default setting: The option is enabled.</p>
HyperThread Control	<p>Allows you to enable or disable the Hyper-Threading in the processor.</p> <ul style="list-style-type: none"> • Disabled • Enabled <p>Default setting: Enabled is selected.</p>

Power management screen options

Option	Description
AC Behavior	Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected.

Option	Description Default setting: Wake on AC is not selected.
Enable Intel Speed Shift Technology	This option is used to enable or disable Intel speed shift technology. Default setting: Enable Intel Speed Shift Technology is enabled.
Auto On Time	Allows you to set the time at which the computer must turn on automatically. The options are: <ul style="list-style-type: none"> • Disabled • Every Day • Weekdays • Select Days Default setting: Disabled
USB Wake Support	Allows you to enable USB devices to wake the system from Standby. <p>NOTE: This feature is only functional when the AC power adapter is connected. If the AC power adapter is removed during Standby, the system setup removes power from all the USB ports to conserve battery power.</p> <ul style="list-style-type: none"> • Enable USB Wake Support • Wake on Dell USB-C dock Default setting: The option is disabled.
Wireless Radio Control	Allows you to enable or disable the feature that automatically switches from wired or wireless networks without depending on the physical connection. <ul style="list-style-type: none"> • Control WLAN Radio • Control WWAN Radio Default setting: The options are disabled.
Wake on WLAN	Allows you to enable or disable the feature that powers on the computer from the Off state when triggered by a LAN signal. <ul style="list-style-type: none"> • Disabled • LAN Only • WLAN Only • LAN or WLAN • Disabled • WLAN Default setting: Disabled
Block Sleep	This option lets you block entering to sleep (S3 state) in operating system environment. Block Sleep (S3 state) <p>Default setting: This option is disabled</p>
Peak Shift	This option enables you to minimize the AC power consumption during the peak power times of day. After you enable this option, your system runs only in battery even if the AC is attached.

Option	Description <ul style="list-style-type: none"> • Enable peak shift • Set battery threshold (15% to 100%) - 15 % (enabled by default) • Enable peak shift—is disabled • Set battery threshold (15% to 100%) - 15 % (enabled by default)
Advanced Battery Charge Configuration	<p>This option enables you to maximize the battery health. By enabling this option, your system uses the standard charging algorithm and other techniques, during the nonwork hours to improve the battery health.</p> <p>Disabled</p> <p>Default setting: Disabled</p>
Primary Battery Charge Configuration	<p>Allows you to select the charging mode for the battery. The options are:</p> <ul style="list-style-type: none"> • Adaptive—enabled by default • Standard—Fully charges your battery at a standard rate. • ExpressCharge—The battery charges over a shorter time using Dell's fast charging technology. This option is enabled by default. • Primarily AC use • Custom <p>If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop.</p> <p>NOTE: All charging mode may not be available for all the batteries. To enable this option, disable the Advanced Battery Charge Configuration option.</p>
Type-C connector power	<ul style="list-style-type: none"> • 7.5 Watts • 15 Watts—enabled by default

POST behavior screen options

Option	Description
Adapter Warnings	<p>Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters.</p> <p>Default setting: Enable Adapter Warnings</p>
Keypad (Embedded)	<p>Allows you to choose one of two methods to enable the keypad that is embedded in the internal keyboard.</p> <ul style="list-style-type: none"> • Fn Key Only—default. • By Numlock <p>NOTE: When setup is running, this option has no effect. Setup works in Fn Key Only mode.</p>
Numlock Enable	<p>Allows you to enable the Numlock option when the computer boots.</p> <p>Enable Network. This option is enabled by default.</p>
Fn Key Emulation	<p>Allows you to set the option where the Scroll Lock key is used to simulate the Fn key feature.</p> <p>Enable Fn Key Emulation (default)</p>

Option	Description
Fn Lock Options	<p>Allows you to let hot key combinations Fn + Esc toggle the primary behavior of F1–F12, between their standard and secondary functions. If you disable this option, you cannot toggle dynamically the primary behavior of these keys. The available options are:</p> <ul style="list-style-type: none"> • Fn Lock—enabled by default • Lock Mode Disable/Standard—enabled by default • Lock Mode Enable/Secondary
Fastboot	<p>Allows you to speed up the boot process by bypassing some of the compatibility steps. The options are:</p> <ul style="list-style-type: none"> • Minimal—enabled by default • Thorough • Auto
Extended BIOS POST Time	<p>Allows you to create an extra preboot delay. The options are:</p> <ul style="list-style-type: none"> • 0 seconds—enabled by default. • 5 seconds • 10 seconds
Full Screen Log	<ul style="list-style-type: none"> • Enable Full Screen Logo—not enabled
Warnings and errors	<ul style="list-style-type: none"> • Prompt on warnings and errors—enabled by default • Continue on warnings • Continue on warnings and errors

Manageability

Option	Description
USB provision	Enable USB provision is not selected by default
MEBX Hotkey — enabled by default	<p>Allows you to specify whether the MEBx Hotkey function should enable, during the system boot.</p> <ul style="list-style-type: none"> • Disabled • Enabled <p>Default setting: Enabled</p>

Virtualization support screen options

Option	Description
Virtualization	<p>This field specifies whether a virtual Machine Monitor (VMM) can utilize the conditional hardware capabilities provided by Intel Virtualization Technology.</p> <p>Enable Intel Virtualization Technology—enabled by default.</p>
VT for Direct I/O	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel® Virtualization technology for direct I/O.

Option	Description
	Enable VT for Direct I/O - enabled by default.

Wireless screen options

Option	Description
Wireless Switch	<p>Allows to set the wireless devices that can be controlled by the wireless switch. The options are:</p> <ul style="list-style-type: none"> • WWAN • GPS (on WWAN Module) • WLAN • Bluetooth <p>All the options are enabled by default.</p> <p>NOTE: For WLAN enable or disable controls are tied together and they cannot be enabled or disabled independently.</p>
Wireless Device Enable	<p>Allows you to enable or disable the internal wireless devices.</p> <ul style="list-style-type: none"> • WWAN/GPS • WLAN • Bluetooth <p>All the options are enabled by default.</p>

NOTE: IMEI number for WWAN can be found on the outer box or the WWAN card.

Maintenance screen options

Option	Description
Service Tag	Displays the Service Tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
BIOS Downgrade	This controls flashing of the system firmware to previous revisions. Option 'Allow BIOS downgrade' is enabled by default.
Data Wipe	<p>This field allows users to erase the data securely from all internal storage devices. Option 'Wipe on Next boot' is not enabled by default. The following is list of devices affected:</p> <ul style="list-style-type: none"> • Internal SATA HDD/SSD • Internal M.2 SATA SSD • Internal M.2 PCIe SSD • Internal eMMC
BIOS Recovery	<p>This field allows you to recover from certain corrupted BIOS conditions from a recover file on the user primary hard drive or an external USB key.</p> <ul style="list-style-type: none"> • BIOS Recovery from Hard Drive—enabled by default • Always perform integrity check—disabled by default

System logs screen options

Option	Description
BIOS Events	Allows you to view and clear the System Setup (BIOS) POST events.
Thermal Events	Allows you to view and clear the System Setup (Thermal) events.
Power Events	Allows you to view and clear the System Setup (Power) events.

Admin and System password

You can create a system or admin password to secure your computer.

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

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

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

ℹ **NOTE:** By default system and admin password features are disabled.

Assigning a system setup password

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

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

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

Deleting or changing an existing system setup password

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

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

- 1 In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
The **System Security** screen is displayed.
- 2 In the **System Security** screen, verify that **Password Status** is **Unlocked**.

- 3 Select **System Password**, alter or delete the existing system password and press Enter or Tab.
- 4 Select **Setup Password**, alter or delete the existing setup password and press Enter or Tab.

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

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

The computer reboot.

Updating the BIOS in Windows

It is recommended to update your BIOS (System Setup), when you replace the system board or if an update is available. For laptops, ensure that your computer battery is fully charged and connected to a power outlet.

NOTE: If BitLocker is enabled, it must be suspended prior to updating the system BIOS, and then re-enabled after the BIOS update is completed.

- 1 Restart the computer.
- 2 Go to **Dell.com/support**.
 - Enter the **Service Tag** or **Express Service Code** and click **Submit**.
 - Click **Detect Product** and follow the instructions on screen.
- 3 If you are unable to detect or find the Service Tag, click **Choose from all products**.
- 4 Choose the **Products** category from the list.

NOTE: Choose the appropriate category to reach the product page

- 5 Select your computer model and the **Product Support** page of your computer appears.
- 6 Click **Get drivers** and click **Drivers and Downloads**.

The Drivers and Downloads section opens.
- 7 Click **Find it myself**.
- 8 Click **BIOS** to view the BIOS versions.
- 9 Identify the latest BIOS file and click **Download**.
- 10 Select your preferred download method in the **Please select your download method below** window, click **Download File**.

The **File Download** window appears.
- 11 Click **Save** to save the file on your computer.
- 12 Click **Run** to install the updated BIOS settings on your computer.

Follow the instructions on the screen.

Updating BIOS on systems with BitLocker enabled

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <http://www.dell.com/support/article/sln153694>

Updating your system BIOS using a USB flash drive

If the system cannot load into Windows but there is still a need to update the BIOS, download the BIOS file using another system and save it to a bootable USB Flash Drive.

① **NOTE:** You will need to use a bootable USB Flash drive. Please refer to the following article for further details: <https://www.dell.com/support/article/us/en/19/sln143196>

- 1 Download the BIOS update .EXE file to another system.
- 2 Copy the file e.g. O9010A12.EXE onto the bootable USB Flash drive.
- 3 Insert the USB Flash drive into the system that requires the BIOS update.
- 4 Restart the system and press F12 when the Dell Splash logo appears to display the One Time Boot Menu.
- 5 Using arrow keys, select **USB Storage Device** and click Return.
- 6 The system will boot to a Diag C:\> prompt.
- 7 Run the file by typing the full filename e.g. O9010A12.exe and press Return.
- 8 The BIOS Update Utility will load, follow the instructions on screen.

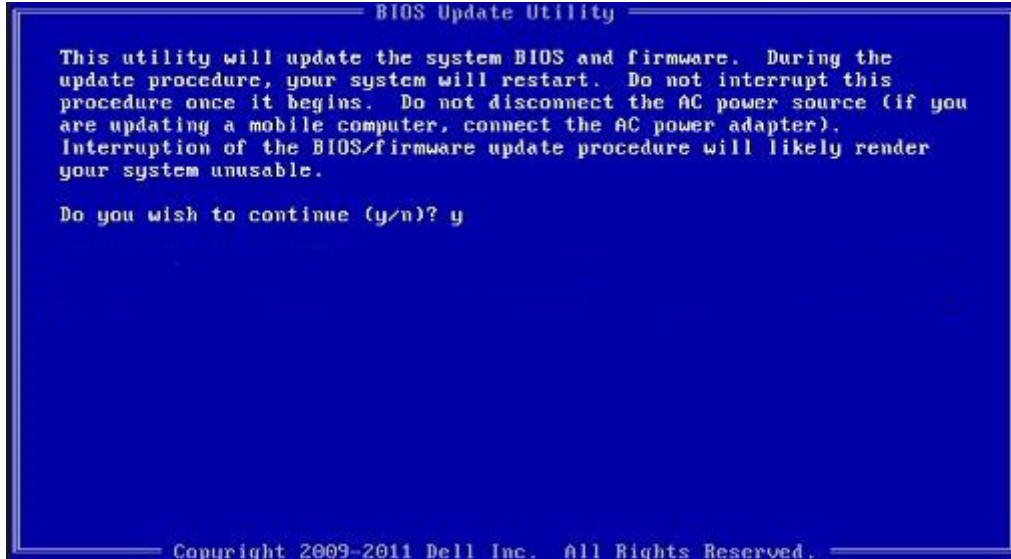


Figure 5. DOS BIOS Update Screen

Updating the Dell BIOS in Linux and Ubuntu environments

If you want to update the system BIOS in a Linux environment such as Ubuntu, see <http://www.dell.com/support/article/sln171755>.

Software

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

Topics:

- [Supported operating systems](#)
- [Downloading drivers](#)
- [Chipset driver](#)
- [Video driver](#)
- [Audio driver](#)
- [Network driver](#)
- [USB driver](#)
- [Storage driver](#)
- [Other drivers](#)

Supported operating systems

The topic lists the operating systems supported for Latitude 7280 Latitude 7290.

Table 8. Supported operating systems

Supported operating systems	Description
Windows 10	<ul style="list-style-type: none"> • Microsoft Windows 10 Pro 64-bit • Microsoft Windows 10 Home 64-bit
Other	<ul style="list-style-type: none"> • Ubuntu 16.04 LTS SP1 64-bit • NeoKylin v6.0 64-bit (China)

Downloading drivers

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

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

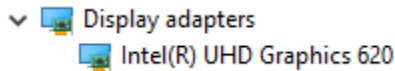
- 4 Click **Drivers and Downloads**.
- 5 Select the operating system installed on your notebook.
- 6 Scroll down the page and select the driver to install.
- 7 Click **Download File** to download the driver for your notebook.
- 8 After the download is complete, navigate to the folder where you saved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

Chipset driver

Verify if the Intel chipset and Intel Management Engine Interface drivers are already installed in the system.

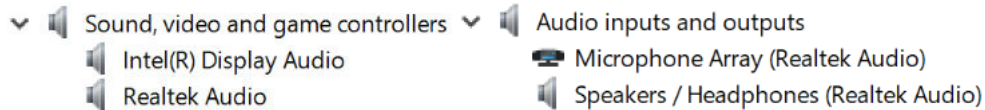
Video driver

Verify if the video driver is already installed in the system.



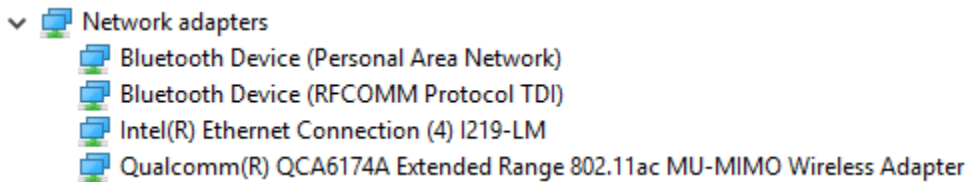
Audio driver

Verify if audio drivers is already installed in the system.



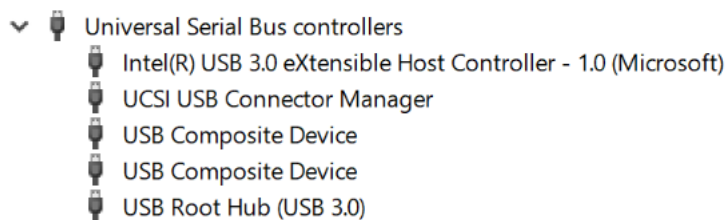
Network driver

This system comes with both LAN and WiFi drivers and is able to detect the LAN and WiFi without going through the drivers installation.



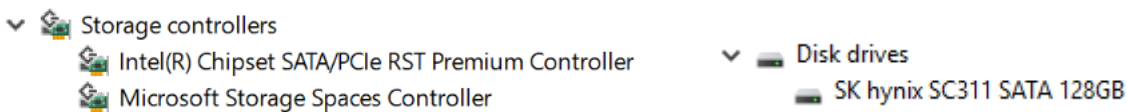
USB driver

Verify if the USB drivers are already installed in the system.



Storage driver

Verify if the storage controller drivers are installed in the system.



Other drivers

This section lists driver details for all the other components in the Device Manager.

Security device driver

Verify if the security device driver is installed in the system.

- ▼  Security devices
 -  Trusted Platform Module 2.0

HID

Verify if the HID driver is installed in the system.





















- ▼  Human Interface Devices
 -  Converted Portable Device Control device
 -  Dell Touchpad
 -  HID-compliant consumer control device
 -  HID-compliant consumer control device
 -  HID-compliant system controller
 -  HID-compliant system controller
 -  HID-compliant touch pad
 -  HID-compliant vendor-defined device
 -  HID-compliant vendor-defined device
 -  HID-compliant vendor-defined device
 -  HID-compliant wireless radio controls
 -  I2C HID Device
 -  Intel(R) HID Event Filter
 -  Microsoft Input Configuration Device
 -  Portable Device Control device
 -  USB Input Device
 -  USB Input Device

Image device driver

Verify if the image device driver is installed in the system.

- ▼  Imaging devices
 -  Integrated Webcam

Troubleshooting

Dell Enhanced Pre-Boot System Assessment — ePSA Diagnostic 3.0

You can invoke the ePSA diagnostics by either of the following ways :

- Press the F12 key when the system posts and choose **ePSA or Diagnostics** option on One Time Boot Menu.
- Press and hold Fn(Function key on keyboard) and **Power On** (PWR) the system.

Real Time Clock reset

The Real Time Clock (RTC) reset function allows you to recover your Dell system from **No POST/No Boot/No Power** situations. To initiate the RTC reset on the system make sure system is in a power-off state and is connected to power source . Press and hold the power button for 25 seconds and then release the power button. Go to [how to reset real time clock](#).

NOTE: If AC power is disconnected from the system during the process or the power button is held longer than 40 seconds, the RTC reset process is aborted.

The RTC reset will reset the BIOS to Defaults, un-provision Intel vPro and reset the system date and time. The following items are unaffected by the RTC reset:

- Service Tag
- Asset Tag
- Ownership Tag
- Admin Password
- System Password
- HDD Password
- TPM on and Active
- Key Databases
- System Logs

The following items may or may not reset based on your custom BIOS setting selections:

- The Boot List
- Enable Legacy OROMs
- Secure Boot Enable
- Allow BIOS Downgrade

Contacting Dell

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

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

- 1 Go to **Dell.com/support**.
- 2 Select your support category.
- 3 Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
- 4 Select the appropriate service or support link based on your need.