

# Dell Chromebook 3100

## Service 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:

- [Before working inside your computer](#)
- [Safety precautions](#)
- [Electrostatic discharge—ESD protection](#)
- [ESD field service kit](#)
- [Transporting sensitive components](#)
- [Safety instructions](#)
- [Storing Chromebooks for long term - best practices](#)
- [After working inside your computer](#)

## Before working inside your computer

### Steps

1. Save and close all open files and exit all open applications.
2. Shut down your computer. Click **Start** > **Power** > **Shut down**.  
 **NOTE:** If you are using a different operating system, see the documentation of your operating system for shut-down instructions.
3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.
5. Remove any media card and optical disc from your computer, if applicable.
6. After the computer is unplugged, press and hold the power button for 5 seconds to ground the system board.  
 **CAUTION:** Place the computer on a flat, soft, and clean surface to avoid scratches on the display.
7. Place the computer face down.

## 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 tablet/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. Remove the battery from tablets.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.

## Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

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

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

# Safety instructions

## Prerequisites

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

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

## About this task

**⚠ WARNING:** Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the [Regulatory Compliance Homepage](#)

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

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

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

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

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

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

# Storing Chromebooks for long term - best practices

Prior to long term (Summer) storage:

1. Update to the latest version of the Chrome OS and charge your Chromebooks so that the battery is at least 80% full.
  - a. This ensures that even when the battery discharges while unplugged over the summer, it will not fully run out of power.
2. Connect the device to a charger and then turn it on.
3. Hold Refresh **C** and Power **⏻** keys at the same time.
4. While holding these keys, remove the power cable from the device and then release the keys. The device should shut down and remain off.
5. Attempt to power the unit on, by pressing the power button. If the unit does not power on, you have completed the steps and can safely store the system. If the unit powers on, you should repeat steps 2 to 4.

Upon redeploying:

1. Connect the Chromebooks to a charger and a power source, which will get them out of the battery disconnect state. Power up your device.
2. Connect your Chromebooks to WiFi and update them to the latest Chrome OS release.
  - a. This can take time, as multiple Chrome OS versions may have been released since the last time the device was updated.

# After working inside your computer

## About this task

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

## Steps

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

# Removing and installing components

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

## Topics:

- [Recommended tools](#)
- [Screw list](#)
- [Major components of your system](#)
- [Disassembly and reassembly](#)

## Recommended tools

The procedures in this document may require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe-Recommended for field technician

## Screw list

The table provides the list of screws that are used for securing different components.

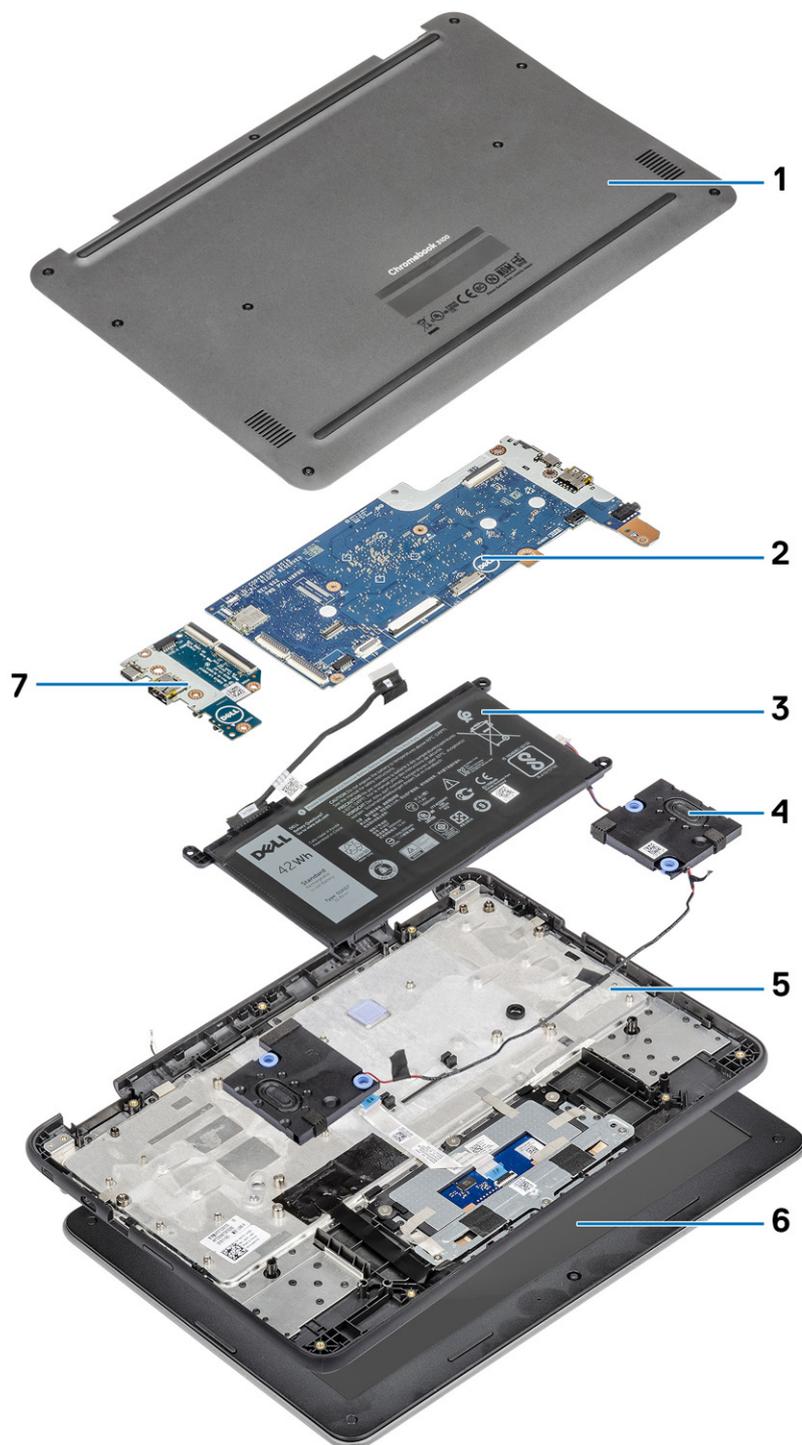
**Table 1. Screw list**

Component	Screw type	Quantity	Screw image
Base cover		9	<b>NOTE:</b> Screw color may vary depending on the configuration ordered.
Battery	M2x4	3	
Input Output bracket	M2x4	2	
Input Output board	M2x4	2 -For WiFi enabled systems 3 -For 4G LTE enabled systems	
System board	M2x4	4	
Keyboard interposer daughterboard	M2x4	2	
Display assembly	M2.5x5	6	
WWAN card bracket - For 4G LTE enabled systems only	M2x4	1	

**Table 1. Screw list**

Component	Screw type	Quantity	Screw image
Wireless card bracket	M2x3	1	
Display cable bracket	M2x4	1	
Display bezel	M2.5x3.8	4	
Display panel	M2x3	4	
Display hinges	M2.5x2.5 M2x3	4 2	

# Major components of your system



1. Base cover
2. System board
3. Battery
4. Speaker
5. Palmrest assembly
6. Display assembly

## 7. Input and output board

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

# Disassembly and reassembly

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

## Base cover

### Removing the base cover

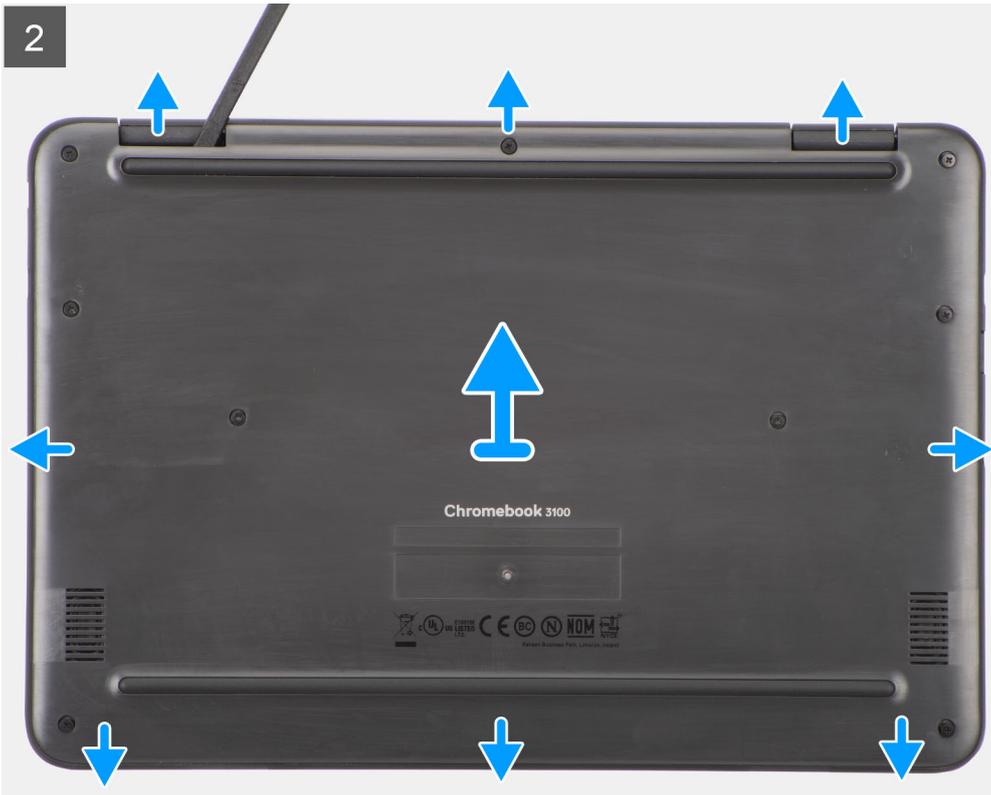
#### Prerequisites

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

#### About this task

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





## Steps

1. Loosen the nine captive screws that secure the base cover to the computer chassis.
2. Use a plastic scribe to pry open the base cover, starting from the U-shaped indents at the top side of the base cover, and then working along the sides.

### **i** NOTE:

While removing the base cover, on-site technicians must take care to remove the base cover carefully. There are prying recess points next to the left and right hinges which ease the disassembly procedure. With the help of a plastic scribe,

pry open from the upper left side of the base cover, continue working your way around the left and right side of the base cover, then remove the base cover from the system.

3. Lift and remove the base cover from the computer chassis.
4. Disconnect the battery cable from the connector on the system board.

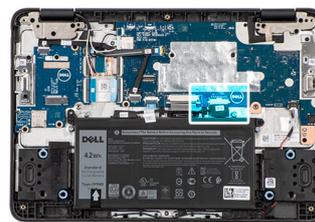
## Installing the base cover

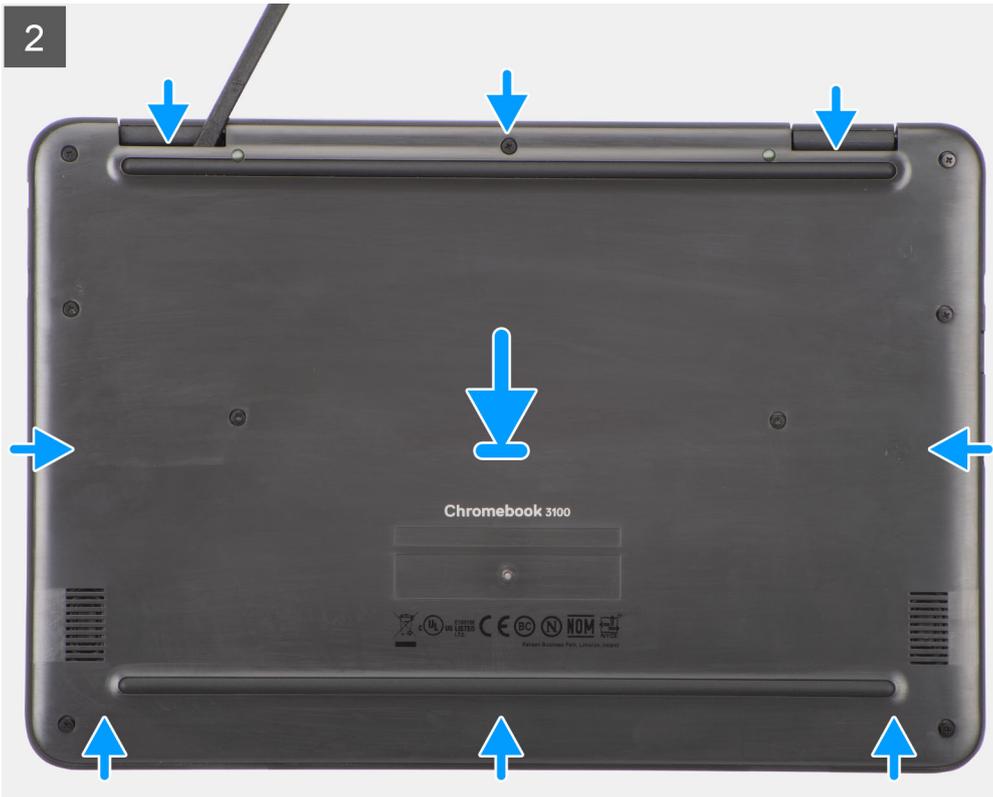
### Prerequisites

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

### About this task

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





## Steps

1. Connect the battery cable to the connector on the system board.
2. Align and place the base cover on the computer chassis, and snap the base cover latches into place.
3. Tighten the nine captive screws to secure the base cover to the computer chassis.

## Next steps

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

# SIM card

## Removing the SIM card

### Prerequisites

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

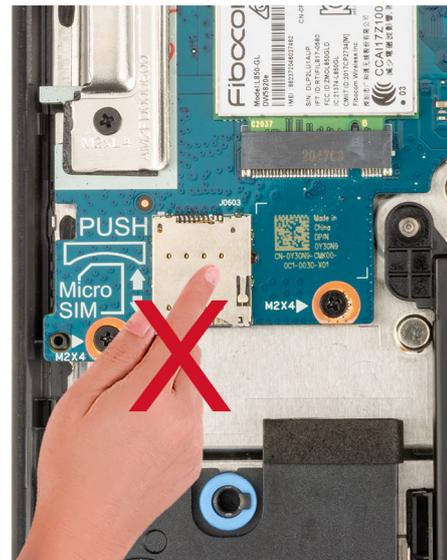
### About this task

 **NOTE:** The following steps are applicable only for 4G LTE enabled systems.

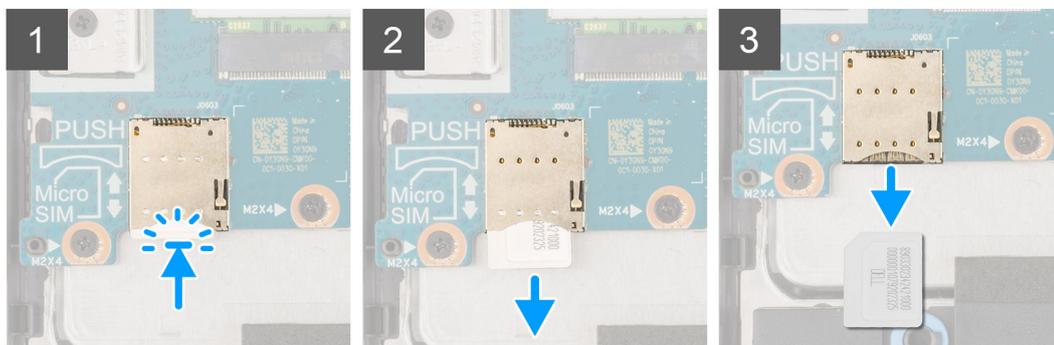
 **NOTE:** The following steps are not applicable for systems configured with pre-installed SIM card.



**WARNING:** Do not press on the SIM card connector.



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



### Steps

1. Gently press the SIM card to release it from the SIM card slot.
2. Slide the SIM card out from the slot on the system board.

## Installing the SIM card

### About this task

 **NOTE:** The following steps are applicable only for 4G LTE enabled systems.

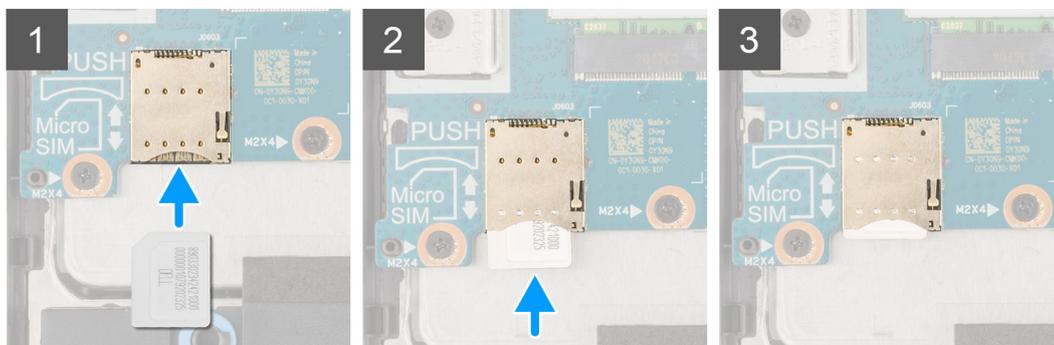
 **NOTE:** The following steps are not applicable for systems configured with pre-installed SIM card.



**WARNING:** Do not press on the SIM card connector.



If you are replacing a component, remove the existing component before performing the installation procedure. The following image indicates the location of the SIM card and provides a visual representation of the installation procedure.



### Steps

1. Align and slide the SIM card in the SIM card slot on the system board.

**NOTE:** Align the SIM card parallel to the system board. Insert the SIM card carefully in the direction of the SIM card slot.

2. Gently press the SIM card until it clicks into place.

For more information on how to enable 4G in your Chromebook, refer [Connect to a mobile data network](#).

### Next steps

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

## WWAN card

### Removing the WWAN card

#### Prerequisites

**NOTE:** The following steps are applicable only for 4G LTE enabled systems.

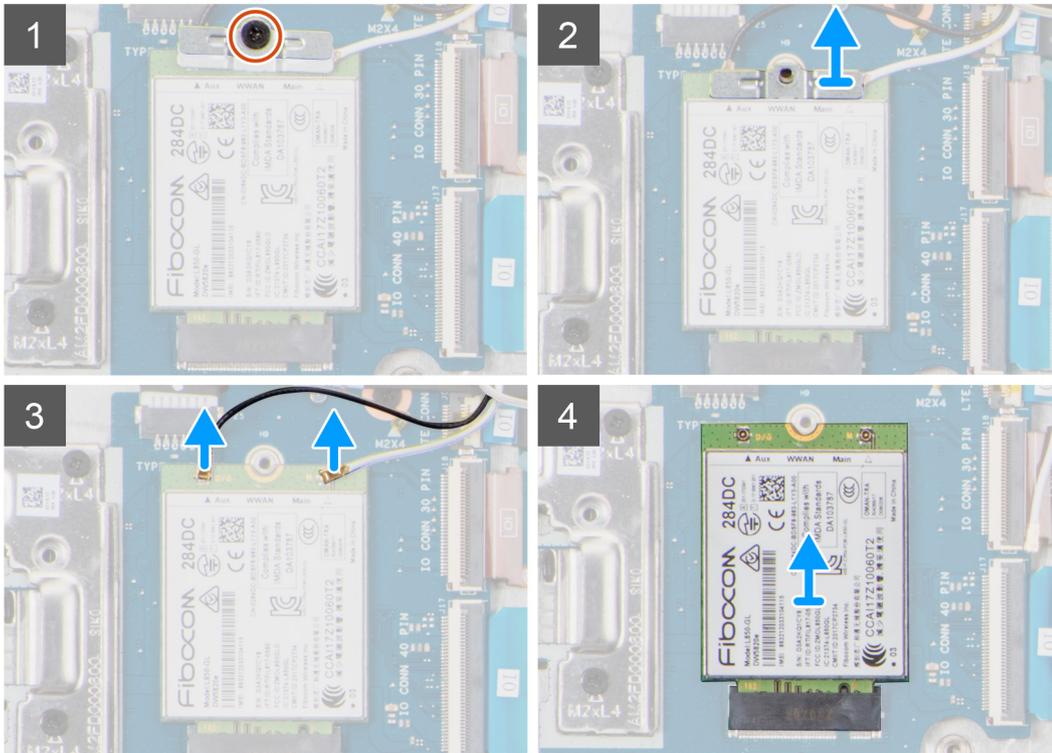
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).

#### About this task

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



1x  
M2x4



### Steps

1. Remove the screw (M2x4) that secures the WWAN bracket to the WWAN card on the system board.
2. Remove the WWAN bracket from the WWAN card that secures the two antenna cables.
3. Disconnect the two antenna cables that are connected to the WWAN card.
4. Disconnect the WWAN card from its slot on the system board.
5. Lift and remove the WWAN card from the system board.

## Installing the WWAN card

### Prerequisites

 **NOTE:** The following steps are applicable only for 4G LTE enabled systems.

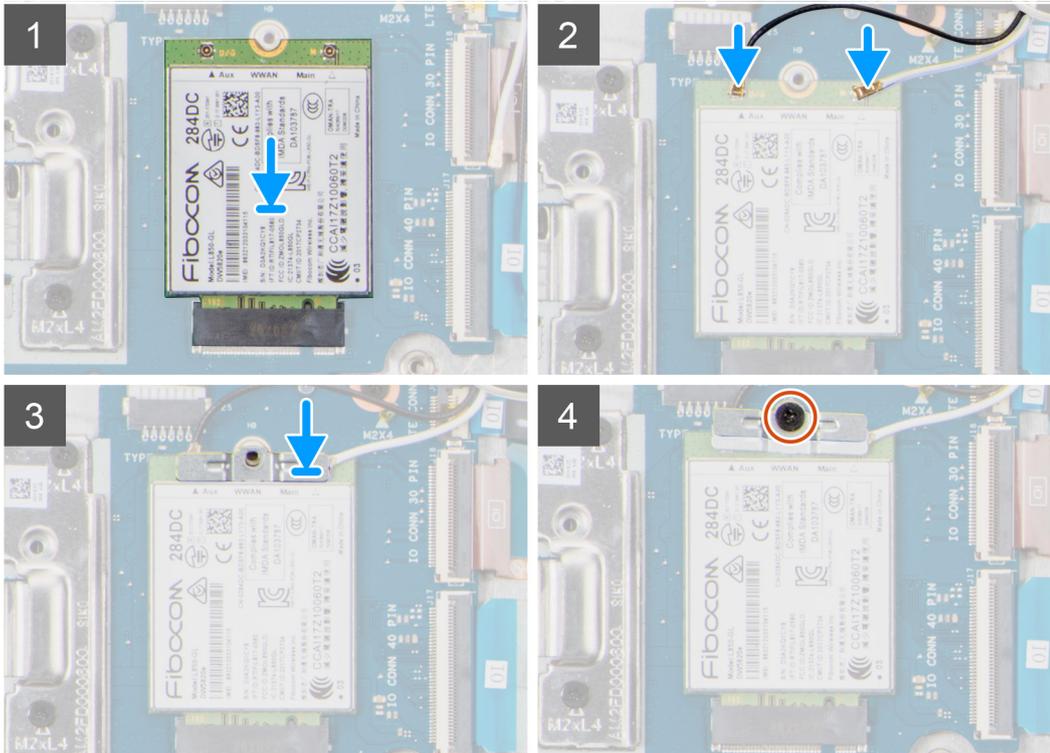
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



1x  
M2x4



### Steps

1. Align and connect the WWAN card into the slot on the system board.
2. Connect the two antenna cables to the WWAN card.
3. Align and place the WWAN bracket on the WWAN card to secure the antenna cables in place.
4. Replace the screw (M2x4) to secure the WWAN bracket on the WWAN card to the system board..

### Next steps

1. Install the [base cover](#).
2. 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 completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.

- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any kind to pry on or against the battery.
- Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.
- If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See [www.dell.com/contactdell](http://www.dell.com/contactdell).
- Always purchase genuine batteries from [www.dell.com](http://www.dell.com) or authorized Dell partners and resellers.

## Removing the battery

### Prerequisites

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

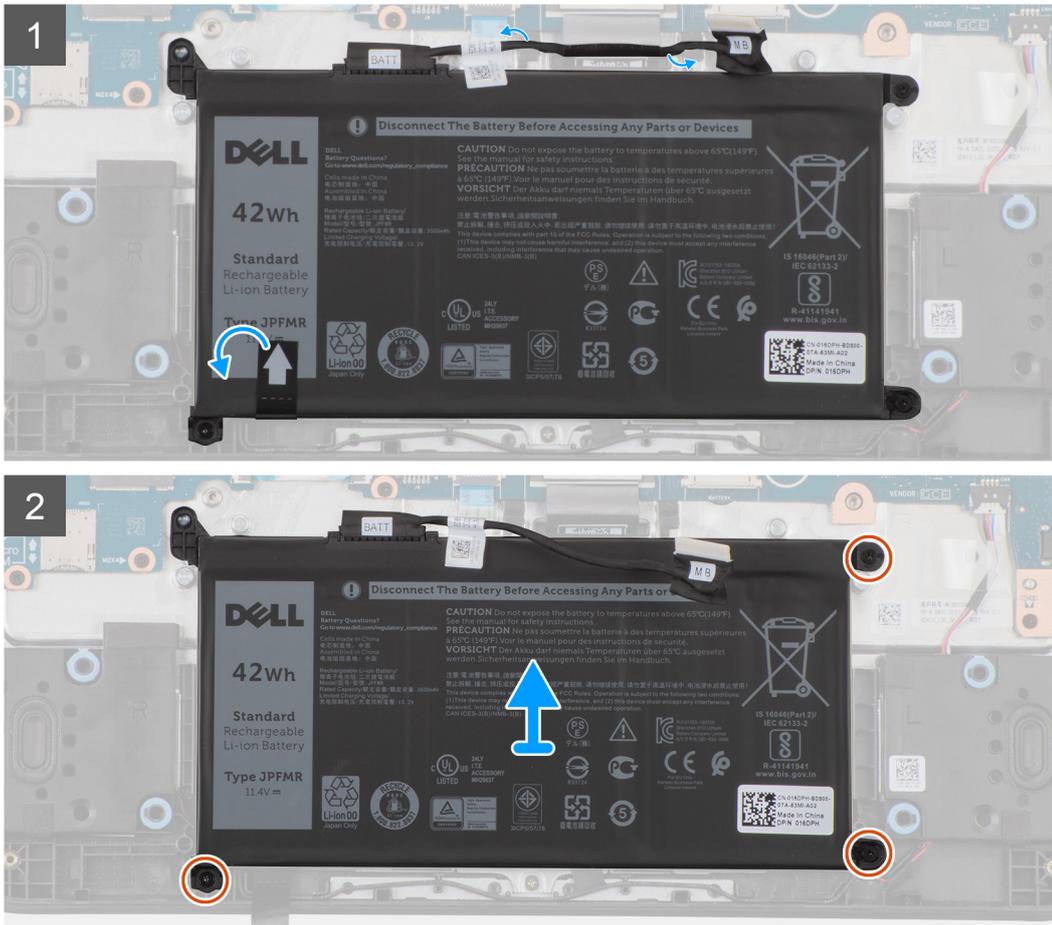
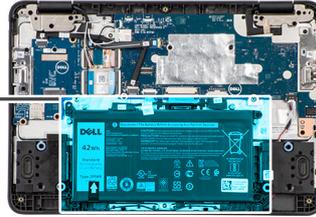
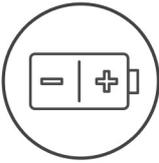
 **NOTE:** If the battery is disconnected from system board, there is delay during computer boot as the computer undergoes Real Time Clock (RTC) reset.

### About this task

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



3x  
M2x4



## Steps

1. Unroute the battery cable from the routing channel in the palmrest assembly.
2. Remove the three screws (M2x4) that secure the battery to the palmrest assembly.
3. Flip the adhesive tape on the bottom-left corner of the battery.
4. Peel the adhesive tape upward to release the battery from the double-sided sticker that secures the battery to the palmrest assembly.

**CAUTION:** Do not pull outward on the tape as it would not release the battery and may damage the tape.

5. Remove the battery from the palmrest assembly.

## Installing the battery

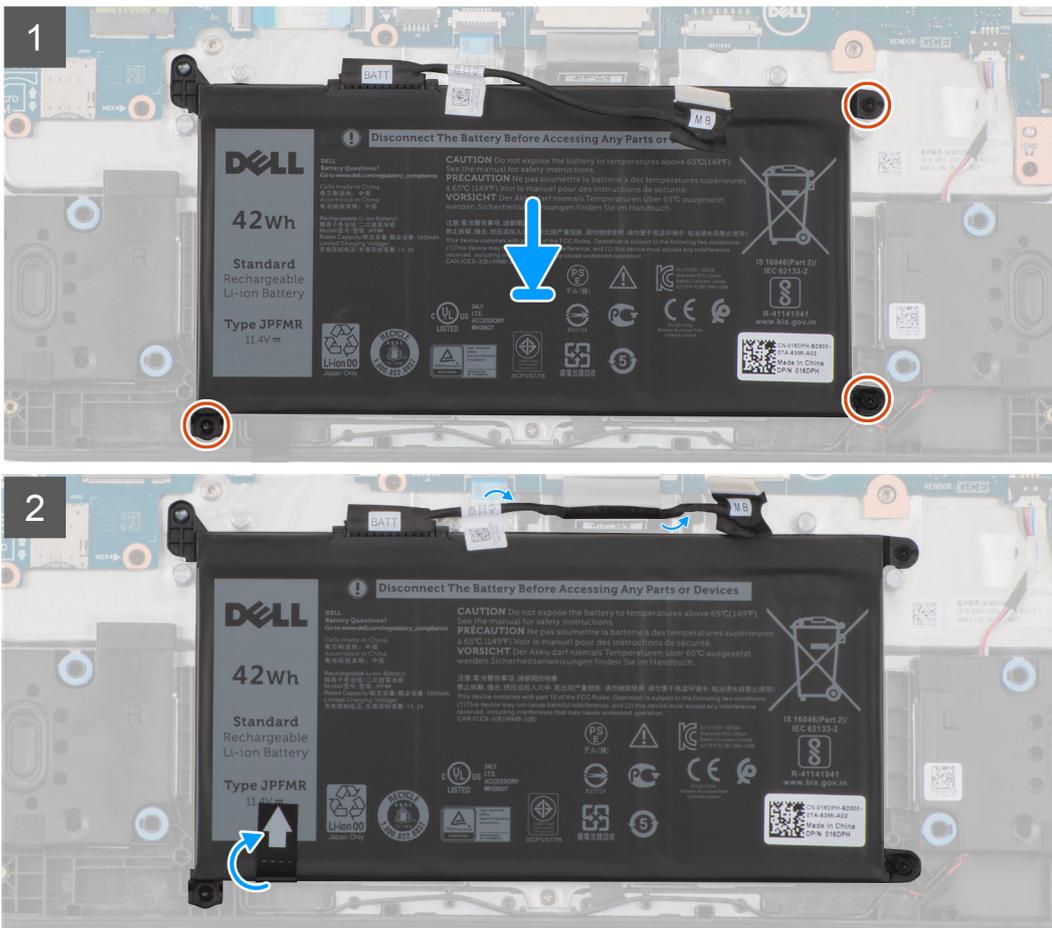
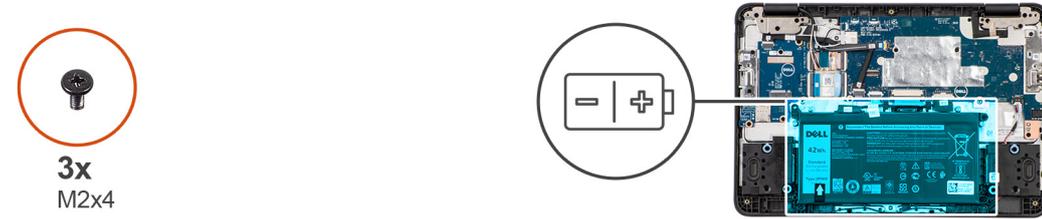
### Prerequisites

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

## About this task

**NOTE:** If the battery is disconnected from system board, there is delay during computer boot as the computer undergoes Real Time Clock (RTC) reset.

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



## Steps

1. Align and place the battery into the slot on the palmrest assembly.
2. Adhere the adhesive tape to secure the battery to the palmrest assembly.
3. Replace the three screws (M2x3) to secure the battery into the palmrest assembly.
4. Route the battery cable through the routing channels in the palmrest assembly.

## Next steps

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

# Keyboard

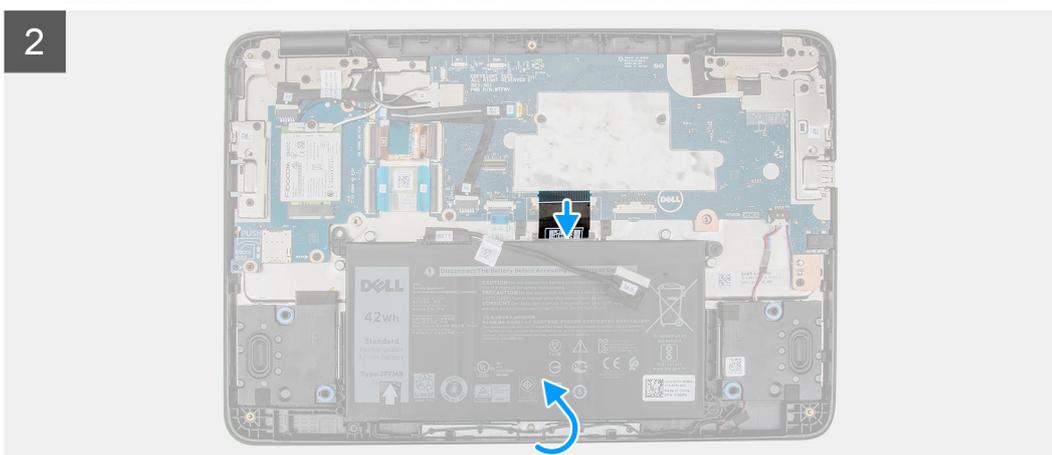
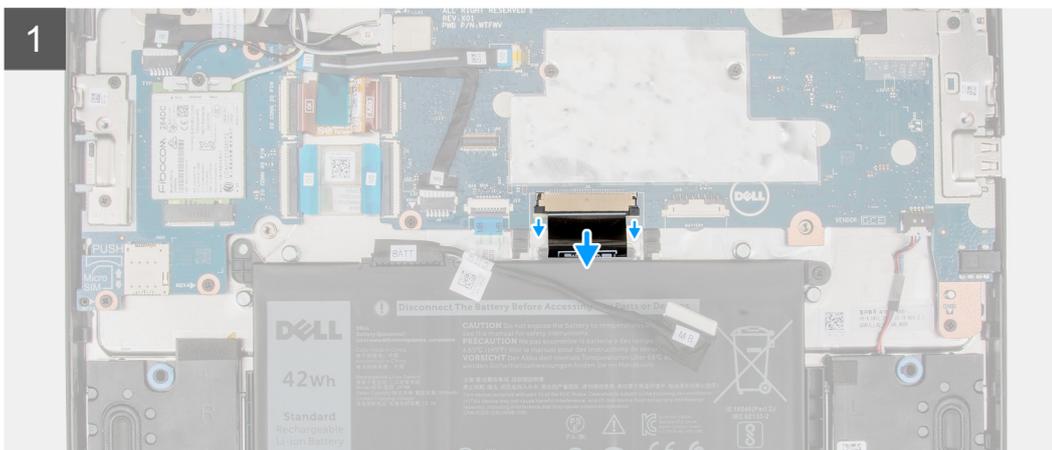
## Removing the keyboard

### Prerequisites

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

### About this task

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





### Steps

1. Unroute the battery cable from the routing channel on the palmrest assembly.
2. Disconnect the keyboard Flexible Printed Circuits cable (FPC) from the connector on the system board.
3. Place the system on a flat surface with the keyboard facing up. Open the system to 180 degrees.
  - NOTE:** The system will automatically power on when it is opened past 5-degree angle. Press the power button to turn off the system and then proceed with the disassembly process.
4. Use a plastic scribe to release the keyboard from the two release holes in the system.
  - NOTE:** The two release holes for the keyboard are indicated by the "KB" labeling.
5. Use a plastic scribe to carefully pry the keyboard from its latches in the palmrest assembly.
6. Lift and remove the keyboard from the palmrest assembly and carefully pull the keyboard FPC cable through the gap on the palmrest assembly.

## Installing the keyboard

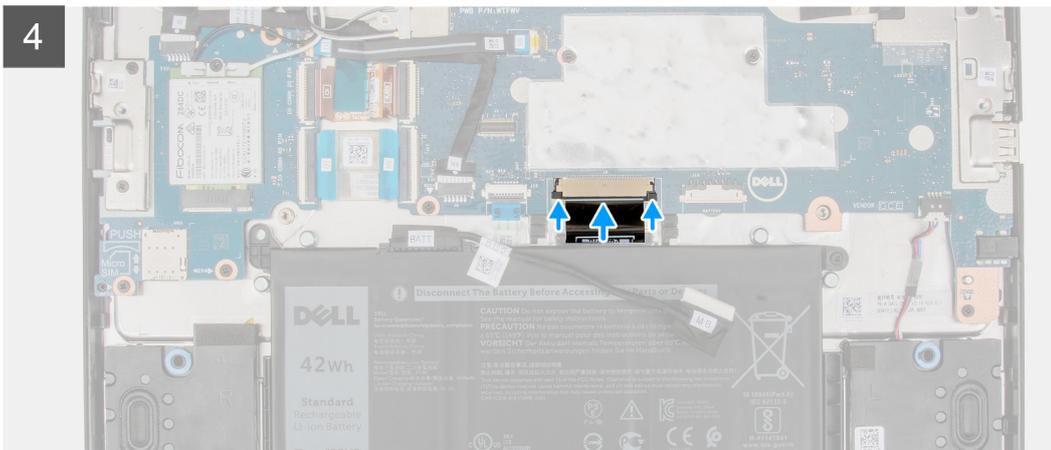
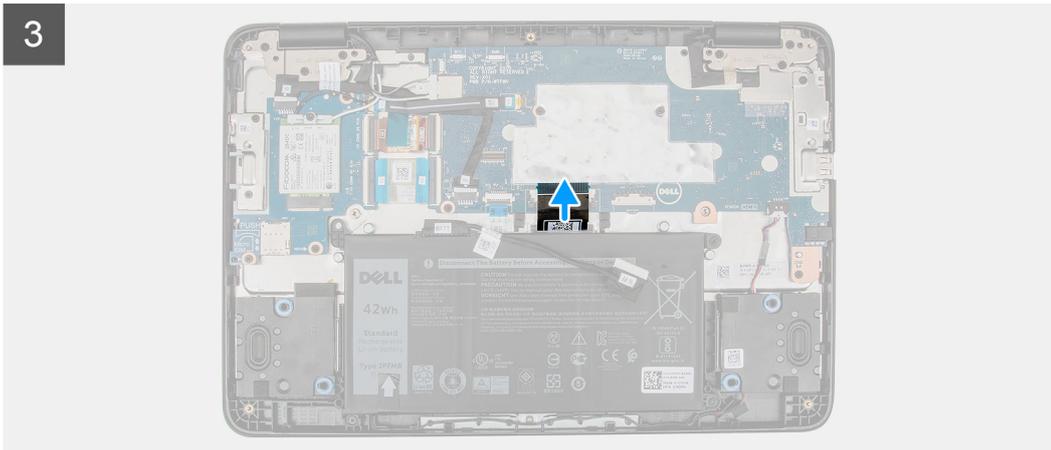
### Prerequisites

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

### About this task

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





### Steps

1. Insert the keyboard FPC cable from the gap in the palmrest assembly.
2. Align the keyboard on the palmrest assembly. Gently press the keyboard and snap it into place.
3. Connect the keyboard FPC cable to the connector on the system board.

### Next steps

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

## Display assembly

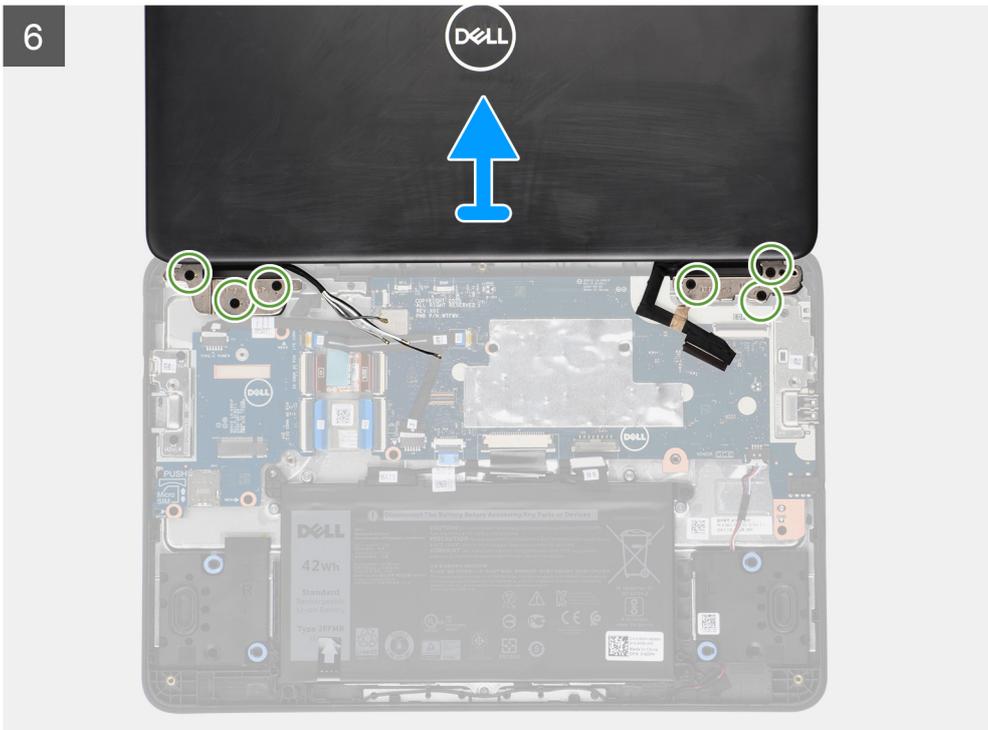
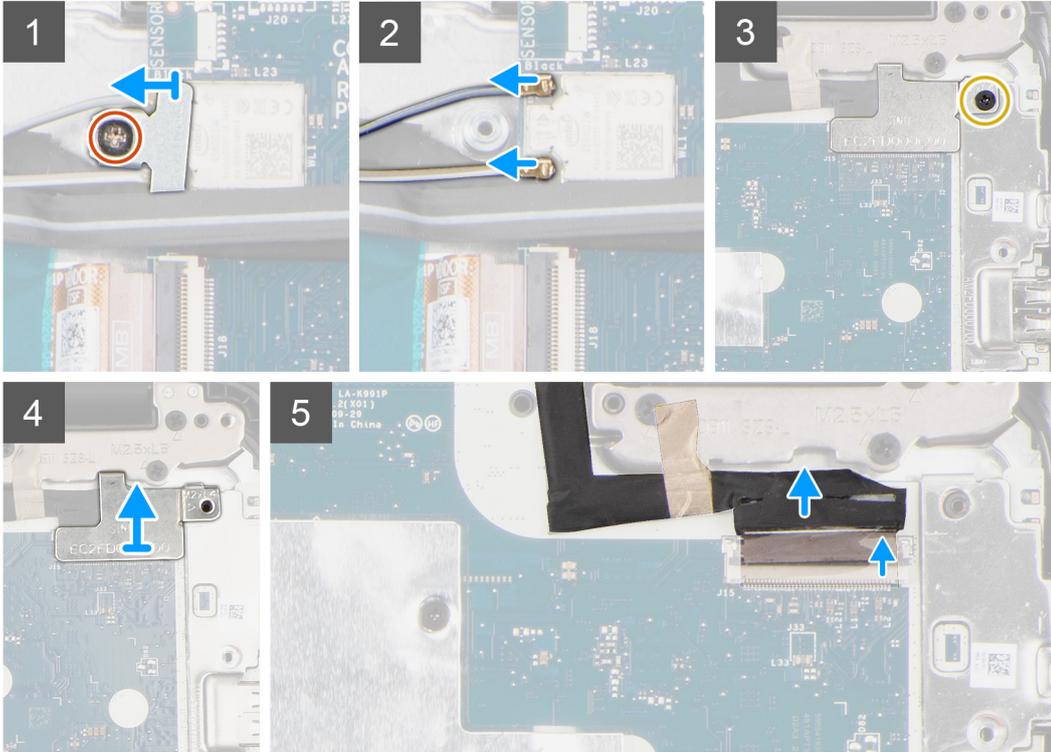
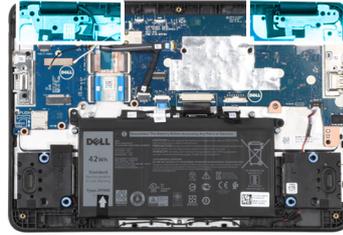
### Removing the display assembly

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [WWAN card](#) for 4G LTE enabled systems.

#### About this task

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



## Steps

1. Remove the screw (M2x3) that secures the WLAN bracket to the system board.
2. Remove the WLAN bracket from the system board.
3. Disconnect the two antenna cables that are connected to the WLAN module.
4. Remove the screw (M2x4) that secures the display cable bracket to the system board.

**i NOTE:** The screw securing the display cable bracket also secures the left Input Output bracket to the system board, as a result removal of the display cable bracket may leave the left Input Output bracket unsecured. Technicians should therefore ensure that the left Input Output bracket is not moved or lost during any subsequent disassembly processes.

5. Lift and remove the display cable bracket from the system board.
6. Open the lock and disconnect the display cable.
7. Peel off the conductive tape that secures the display cable to the system board.
8. Open the system to 180 degrees and place the system on a flat surface, with the display hinges facing up.
9. Remove the six display hinge bracket screws (M2.5x5) that secure the display assembly to the system.
10. Lift and remove the display assembly from the system.

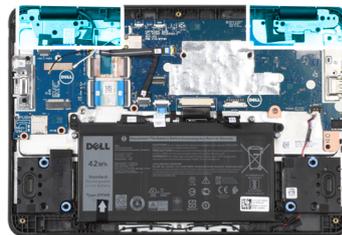
## Installing the display assembly

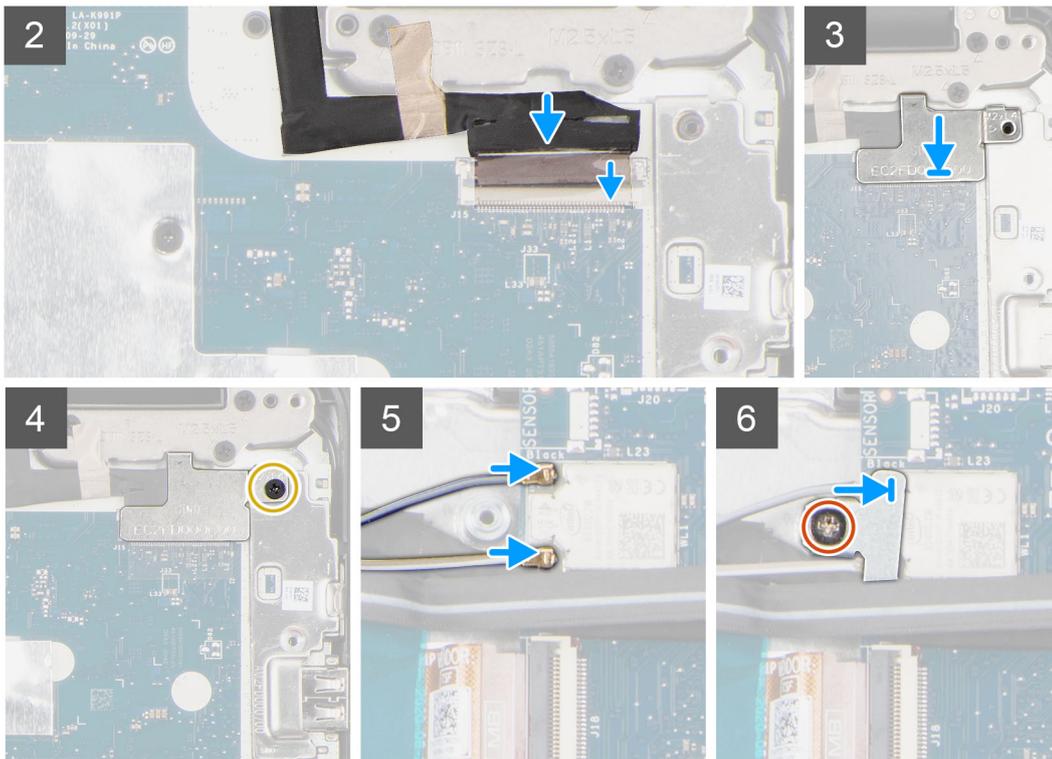
### Prerequisites

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

### About this task

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





### Steps

1. Place the chassis on a plane surface.
2. Align the display assembly with the screw holders on the system.
3. Replace the six display hinge bracket screws (M2.5x5) to secure the display assembly to the system.
4. Lift the system and close the display.
5. Adhere the conductive tape to secure the display cable to the system board.
  - NOTE:** For Chromebook 3100 models with LTE capabilities, the piece of conductive tape on display cable must be adhered onto display hinge bracket and the display cable must be adhered onto the system board.
6. Connect the display cable to the connector on the system board and close the lock.
7. Place the display cable bracket to secure the display cable.
8. Replace the single (M2x4) screw that secures the display cable bracket to the system.
9. Connect the two antennas to the WLAN module
10. Align and place the WLAN bracket on the system board.
11. Replace the screw (M2x3) to secure the WLAN bracket on the system board.

### Next steps

1. Install the [WWAN card](#) for 4G LTE enabled systems.
2. Install the [base cover](#).
3. Follow the procedure in [after working inside your computer](#).

## Input Output board

### Removing the Input Output board

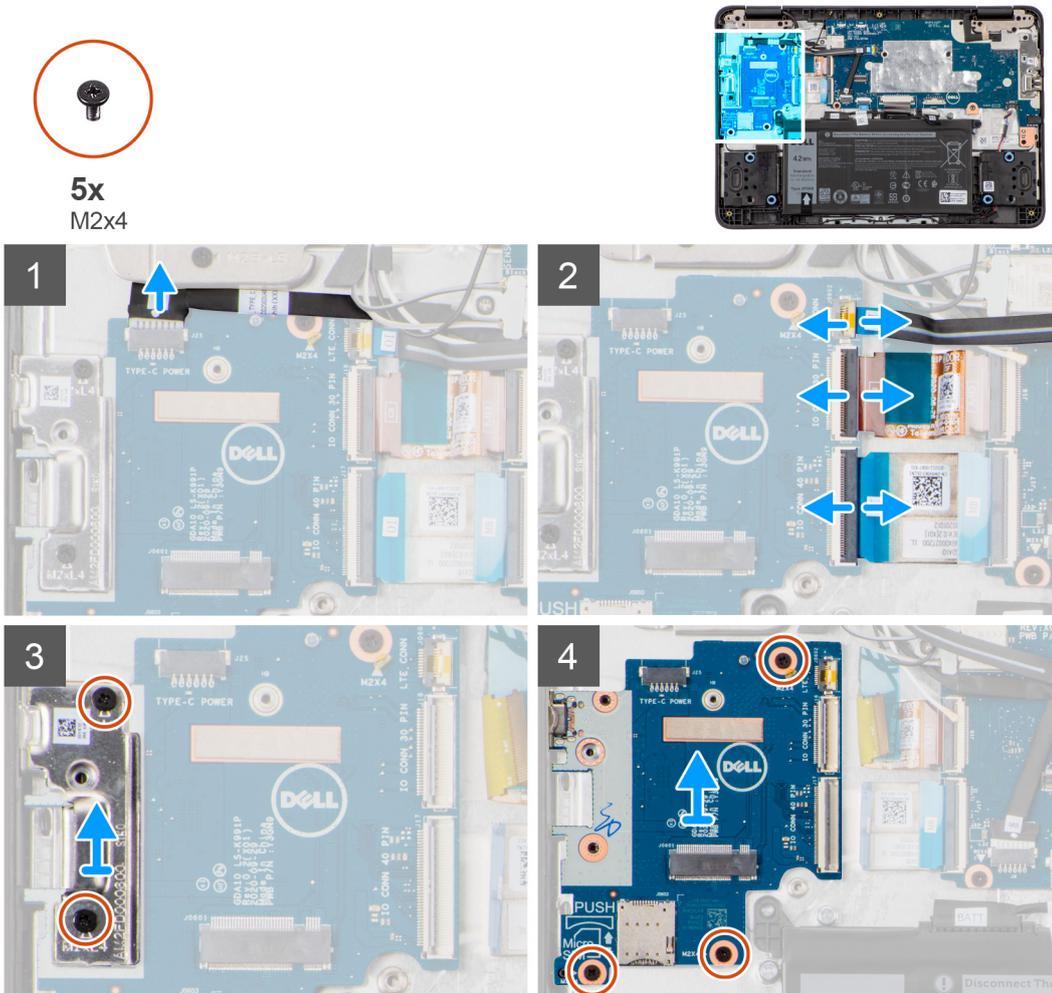
#### Prerequisites

- NOTE:** Not all systems are configured with the Input Output board component. The Input Output board component depends on the configuration being ordered.

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [WWAN card](#) for 4G LTE enabled systems.

### About this task

The following image indicates the location of the Input Output board and provide a visual representation of the removal procedure.



### Steps

1. Disconnect the Type-C power cable from the connector on the Input Output board.
2. For systems enabled with 4G LTE, disconnect the LTE signal cable from the connector on the Input Output board.
3. Open the latch and disconnect the 30-pin FFC and 40-pin FFC Input Output board cables from the connectors on the Input Output board. Peel back the 30-pin FFC and the 40-pin FFC cables from the palmrest assembly.
4. For systems enabled with 4G LTE, open the latch and disconnect the 30-pin FPC and 40-pin FFC Input Output board cable from the connectors on the Input Output board. Peel back the 30-pin FPC cable with conductive tape and the 40-pin FFC cable from the palmrest assembly.
5. Remove the two screws (M2x4) that secure the Type-C bracket to the palmrest assembly.
6. Use a plastic scribe to peel off and remove the Type-C bracket from the palmrest assembly.
7. For systems enabled with 4G LTE, remove the three screws (M2x4) that secure the Input Output board to the palmrest assembly.
8. For systems enabled with WiFi, remove the two screws (M2x4) that secure the Input Output board to the palmrest assembly.
9. Lift and remove the Input Output board with the cables from the palmrest assembly.

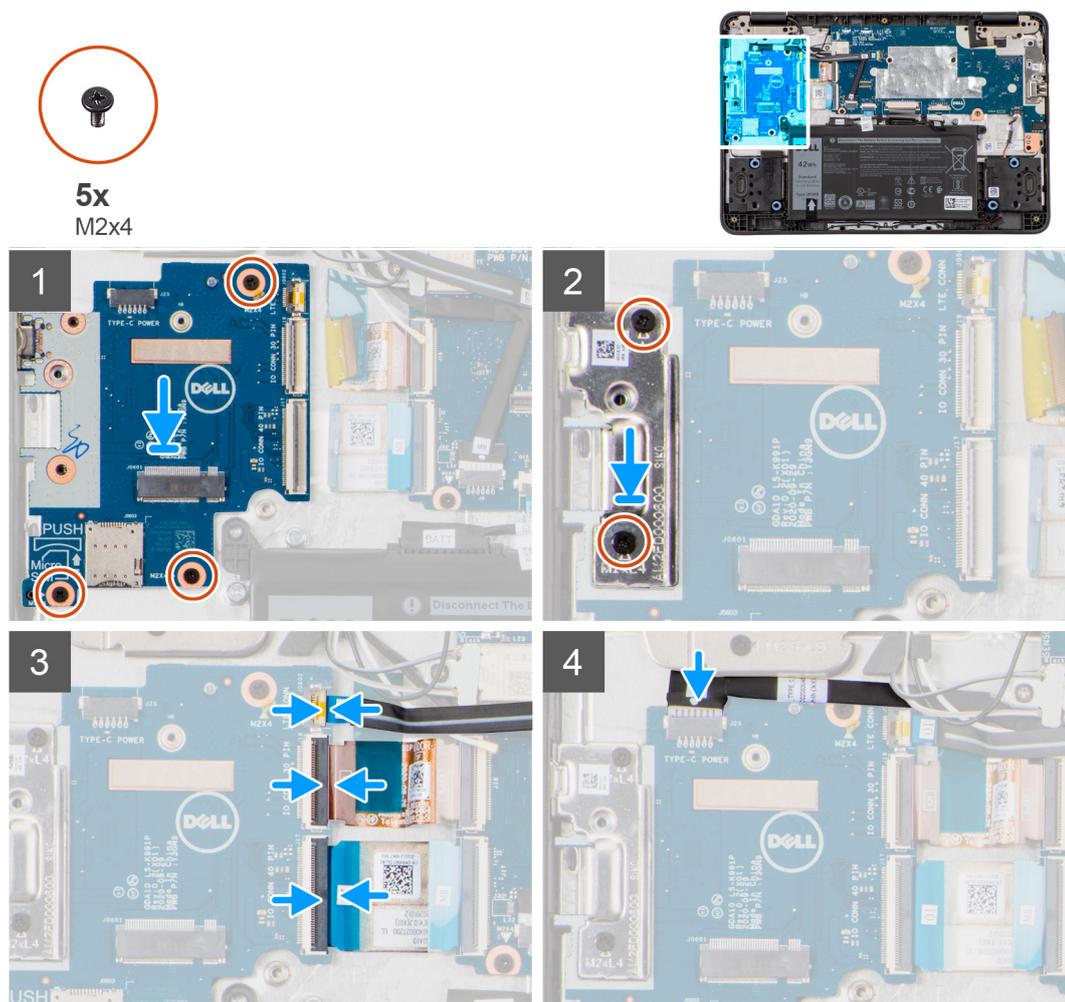
# Installing the Input Output board

## Prerequisites

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

## About this task

The following image indicates the location of the Input Output board and provides a visual representation of the installation procedure.



## Steps

1. Place the Input Output board to its slot on the palmrest assembly.
2. Align and place the Type-C bracket on the Input Output board.
3. Replace the two screws (M2x4) that secure the Type-C bracket to its slot.
4. For systems enabled with 4G LTE, replace the three screws (M2x4) that secure the Input Output board to the palmrest assembly.
5. For systems enabled with WiFi, replace the two screws (M2x4) that secure the Input Output board to the palmrest assembly.
6. Connect the 30-pin FFC and 40-pin FFC Input Output board cables and close the latch to secure them to the Input Output board. Adhere the 30-pin FFC and the 40-pin FFC cables onto the palmrest assembly.
7. For systems enabled with 4G LTE, connect the 30-pin FFC and 40-pin FFC Input Output board cables and close the latch to secure them to the Input Output board. Adhere the 30-pin FFC cable with conductive tape and the 40-pin FFC cable onto the palmrest assembly.
8. For systems enabled with 4G LTE, connect the LTE signal cable to the connector on the Input Output board.

9. Connect the Type-C power cable to the connector on the Input Output board. Adhere the Type-C power cable onto the system board and Input Output board.

**Next steps**

1. Install the [WWAN card](#) for 4G LTE enabled systems.
2. Install the [base cover](#).
3. Follow the procedure in [after working inside your computer](#).

## System board

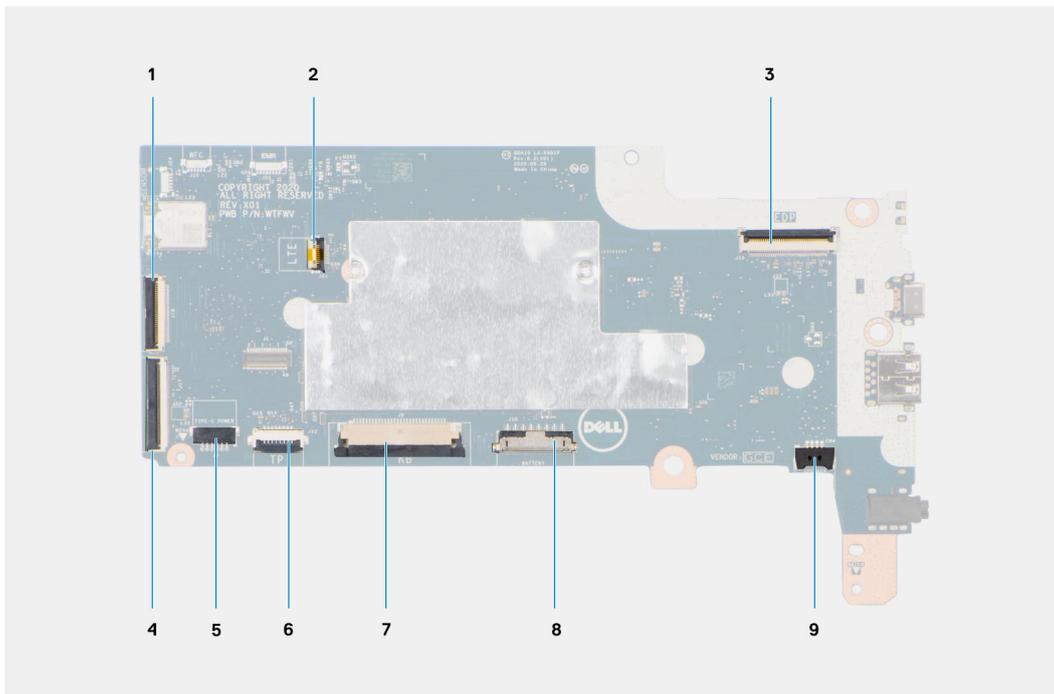
### Removing the system board

**Prerequisites**

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

**About this task**

The following image indicates the connectors on your system board.

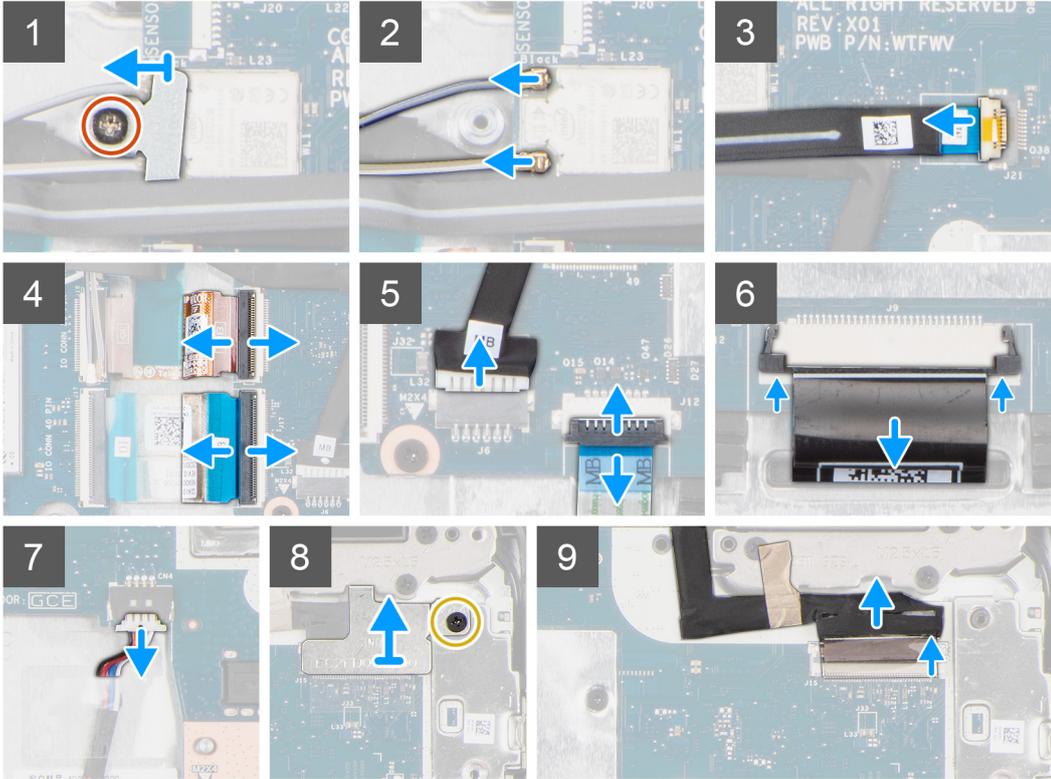
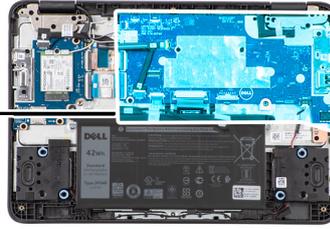


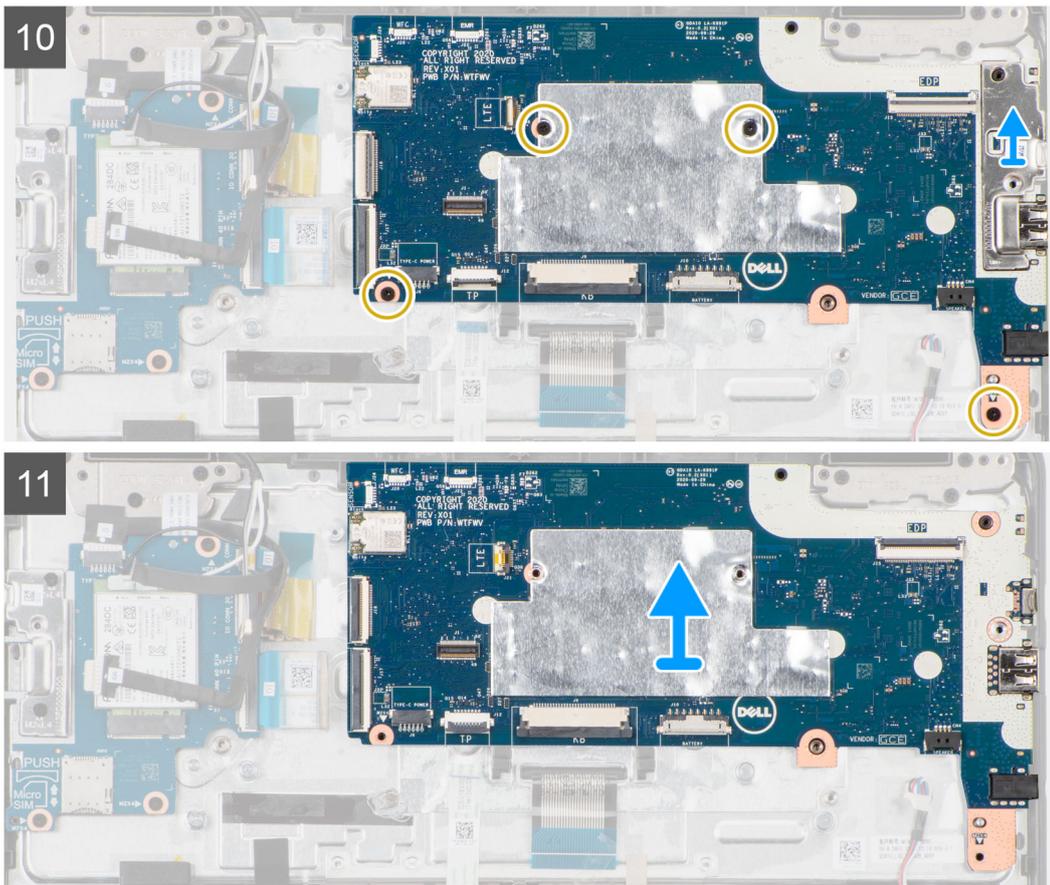
**Figure 1. System-board connectors**

- |   |   |
|---|---|
| 1. 30-pin FFC Input Output board cable ( 30-pin FFC Input Output board cable for systems enabled with 4G LTE) | 2. LTE signal cable (For systems enabled with 4G LTE) |
| 3. Display cable  | 4. 40-pin FFC Input Output board cable                |
| 5. Type-C power cable   | 6. Touchpad cable                                     |
| 7. Keyboard cable   | 8. Battery cable                                      |
| 9. Speaker cable  |   |

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

**NOTE:** The following image is from 4G LTE enabled systems. For WiFi enabled systems, the system board has a different configuration.





## Steps

1. Remove the screw (M2x3) that secures the WLAN bracket to the system board.
2. Remove the WLAN bracket from the system board.
3. Disconnect the two antenna cables that are connected to the WLAN module.
4. For systems enabled with 4G LTE, disconnect the LTE signal cable from the connector on the system board.
5. Disconnect the 30-pin FFC and 40-pin FFC Input Output board cables from the connectors on the system board. Peel the 30-pin FFC and the 40-pin FFC cables.
6. For systems enabled with 4G LTE, disconnect the 30-pin FPC and 40-pin FFC Input Output board cables from the connectors on the system board. Peel the 30-pin FPC cable with conductive tape and the 40-pin FFC cable.
7. Disconnect the Type-C power cable from the connector on the system board.
8. Open the latch and disconnect the touch pad FPC cable from the connector on the system board.
9. Open the latch and disconnect the keyboard FPC cable from the connector on the system board.
10. Disconnect the speaker cable from the connector on the system board.
11. Remove the screw (M2x4) that secures the display cable bracket to the system board. Lift and remove the display cable bracket from the system board.
 

**i NOTE:** The screw securing the display cable bracket also secures the left Input Output bracket to the system board, as a result removal of the display cable bracket may leave the left Input Output bracket unsecured. Technicians should therefore ensure that the left Input Output bracket is not moved or lost during any subsequent disassembly processes.
12. Open the latch and disconnect the display cable from its connector on the system board.
13. Use a plastic scribe to peel and remove the Type-C bracket from the chassis.
14. Remove the four screws (M2x4) that secure the system board in place.
15. Carefully lift and remove the system board from the left side.

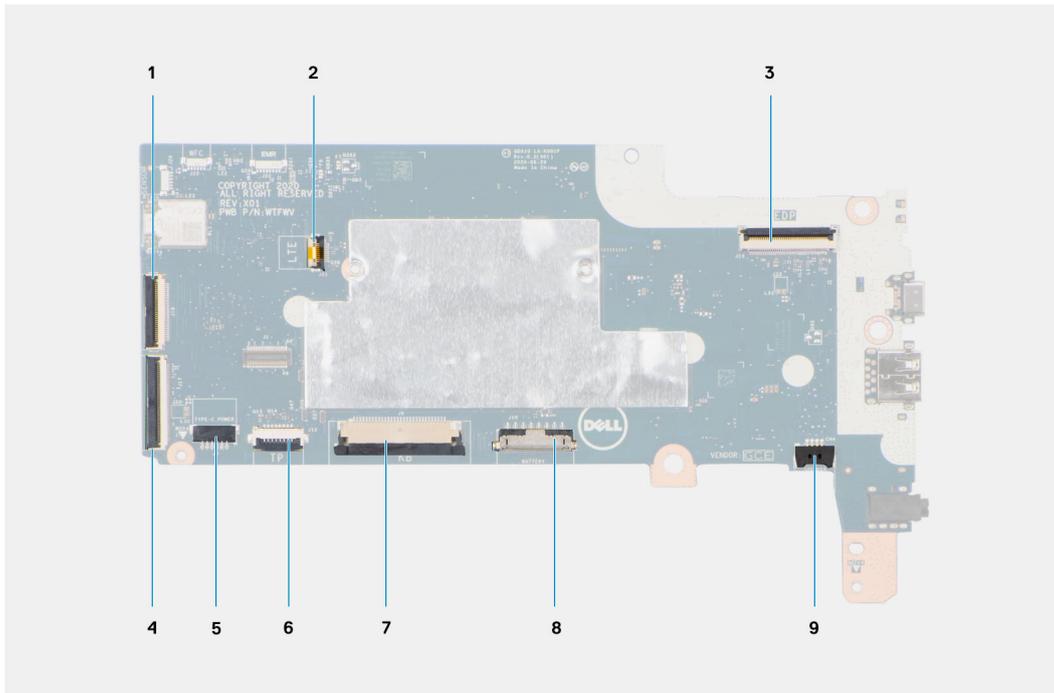
# Installing the system board

## Prerequisites

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

## About this task

The following image indicates the connectors on your system board.



**Figure 2. System-board connectors**

- |   |   |
|---|---|
| 1. 30-pin FFC Input Output board cable ( 30-pin FFC Input Output board cable for systems enabled with 4G LTE) | 2. LTE signal cable (For systems enabled with 4G LTE) |
| 3. Display cable  | 4. 40-pin FFC Input Output board cable                |
| 5. Type-C power cable   | 6. Touchpad cable                                     |
| 7. Keyboard cable   | 8. Battery cable                                      |
| 9. Speaker cable  |   |

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

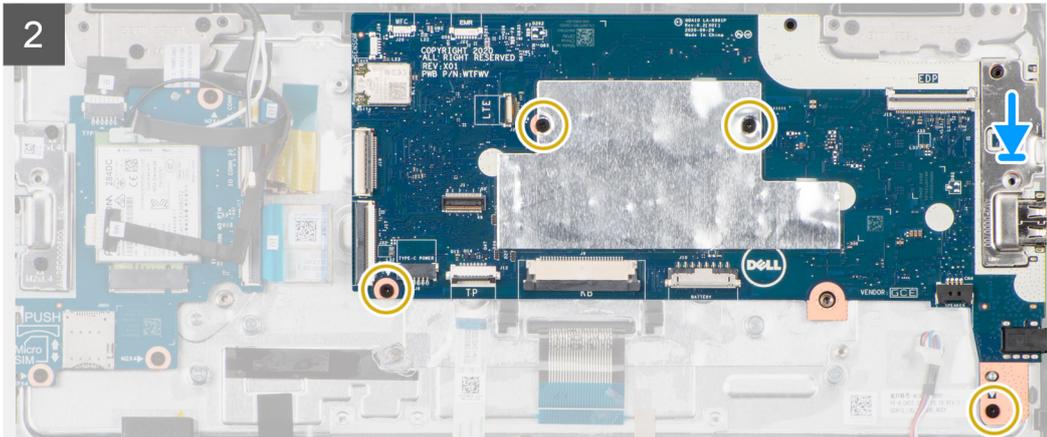
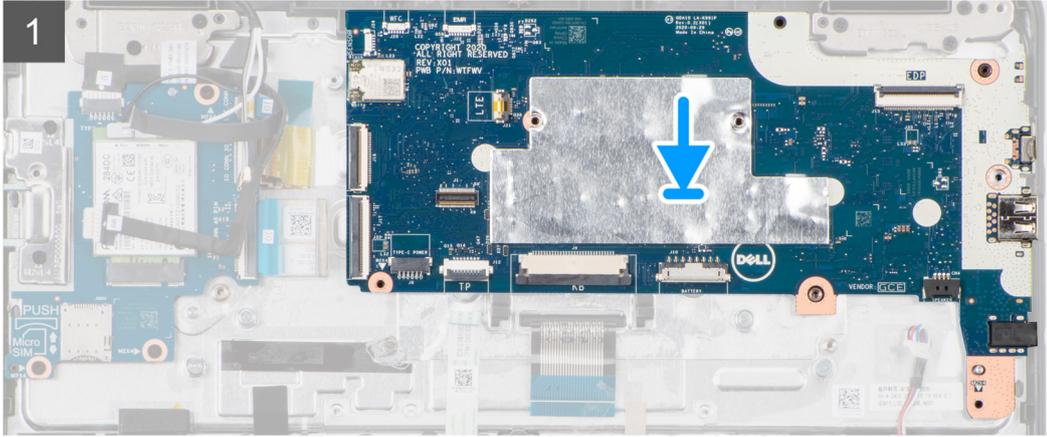
**NOTE:** The following image is from 4G LTE enabled systems. For WiFi enabled systems, the system board has a different configuration.

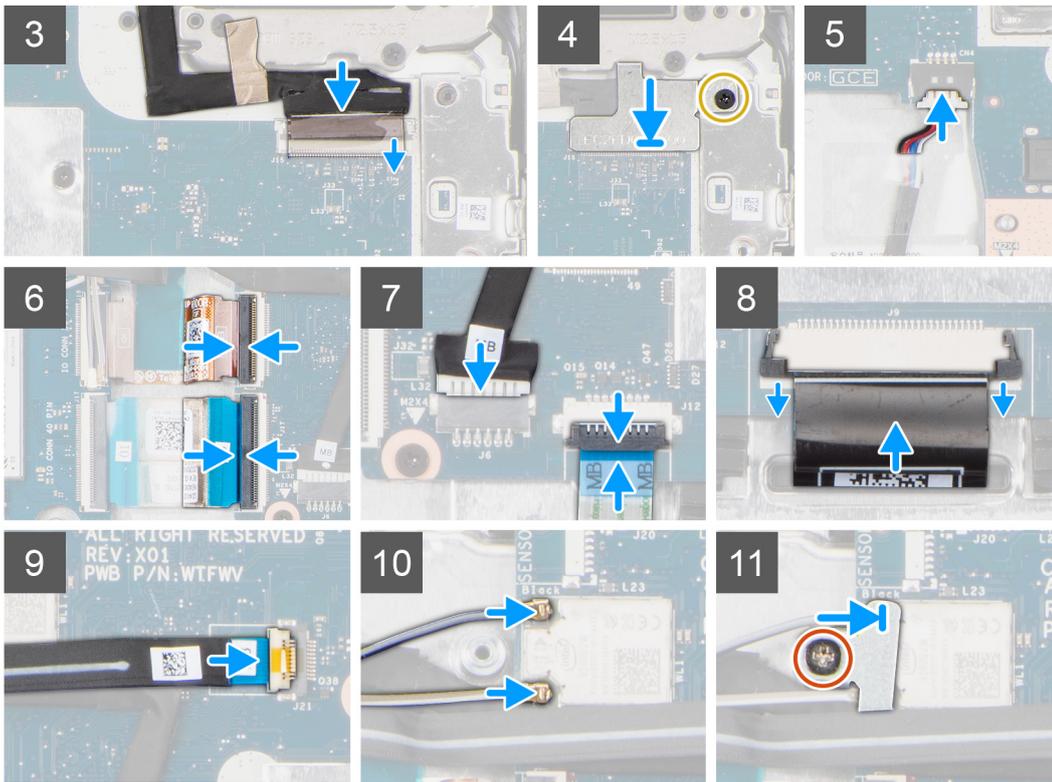


1x  
M2x3



5x  
M2x4





### Steps

1. Align and place the system board into the chassis.
2. Replace the four screws (M2x4) to secure the system board in place.
3. Replace the Type-C bracket on the chassis.
4. Connect the display cable to the connector on the system board and close the latch.
5. Replace the screw (M2x4) to secure the display cable bracket to the system board.
6. Connect the speaker cable to the connector on the system board.
7. Connect the keyboard FPC cable to the connector on the system board and close the latch.
8. Connect the Type-C power cable to the connector on the system board.
9. Connect the touch pad FPC cable to the connector on the system board and close the latch.
10. Connect the 30-pin FFC and 40-pin FFC Input Output board cables and close the latch to secure them to the system board. Adhere the 30-pin FFC and the 40-pin FFC cables.
11. For systems enabled with 4G LTE, connect the 30-pin FFC and 40-pin FFC system board cables and close the latch to secure them to the system board. Adhere the 30-pin FFC cable with conductive tape and the 40-pin FFC cable.
12. For systems enabled with 4G LTE, connect the LTE signal cable to the connector on the system board.
13. Connect the two antenna cables to the WLAN module.
14. Align and place the WLAN bracket to secure the antenna cables on the WLAN module.
15. Replace the screw (M2x3) to secure the WLAN bracket on the system board.

### Next steps

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

# Speaker

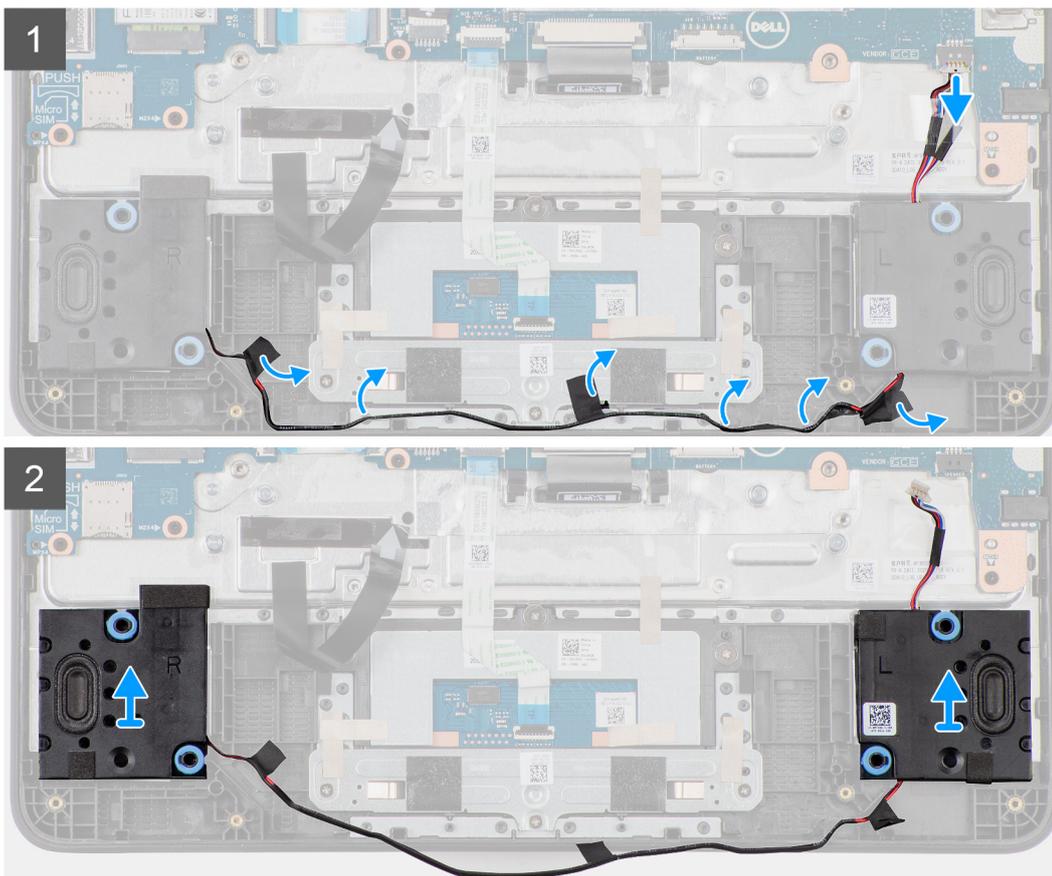
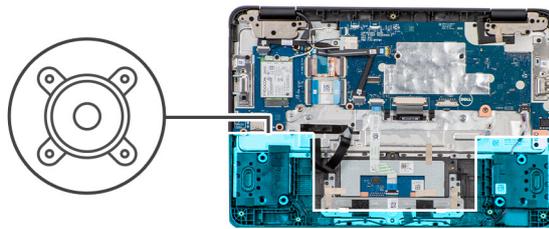
## Removing the speakers

### Prerequisites

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

### About this task

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



### Steps

1. Peel the adhesive tape that secures the speaker cable to the palmrest assembly.
2. Disconnect the speaker cable from the connector on the system board.
3. Peel the transparent tape that secures the speaker cable in place.

**NOTE:** While removing the speakers, technicians must first peel the clear transparent covering the speaker cable. If not peeled, there is a risk of damaging the speaker cable while removing the speakers.

4. Unroute the speaker cable from retention clips in the routing channels at the bottom of the palmrest assembly.
5. Lift and remove the speakers from their slots on the palmrest assembly.

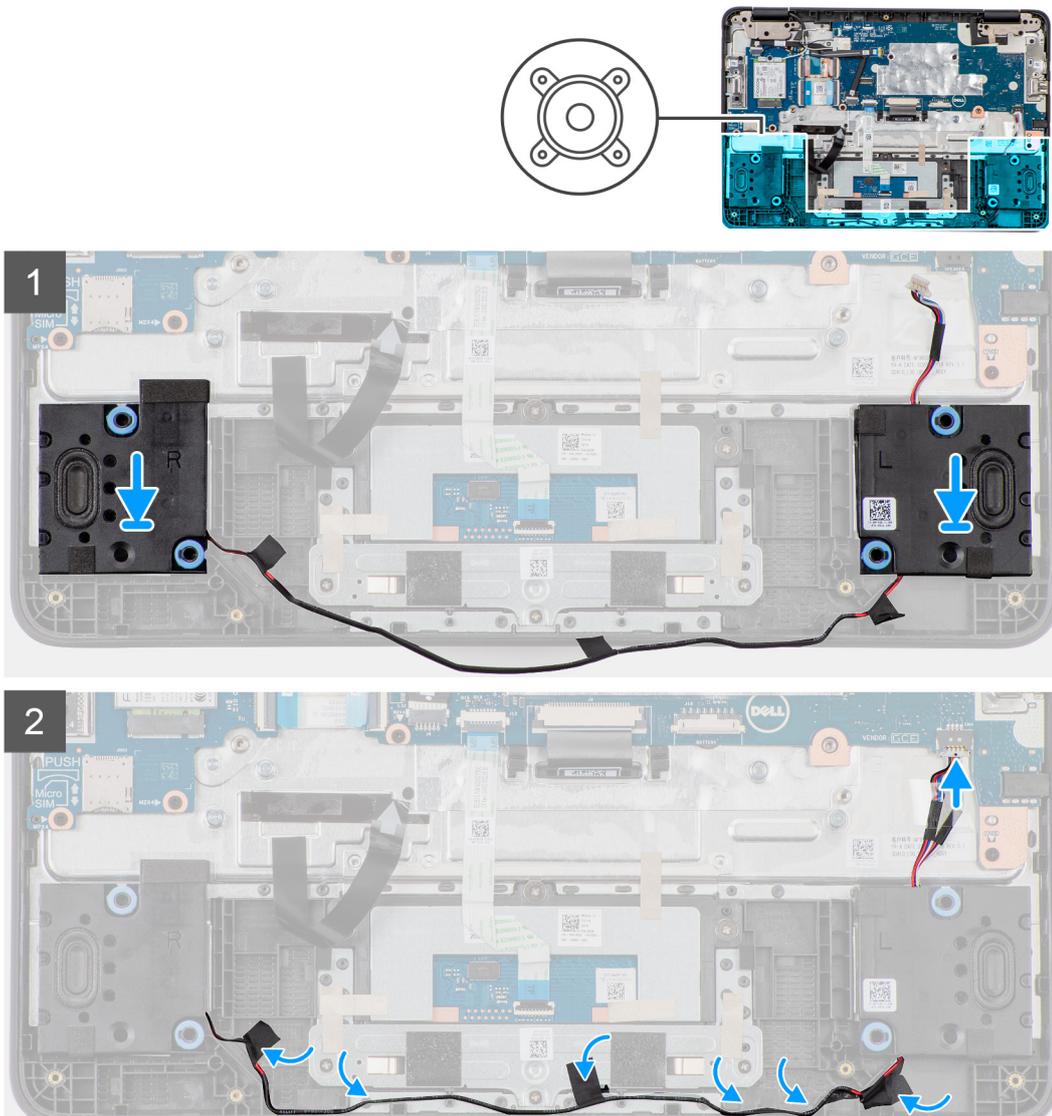
## Installing the speaker

### Prerequisites

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

### About this task

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



### Steps

1. Place the speakers into the slots on the palmrest assembly.
2. Reroute the speaker cable through the retention clips in the routing channel.

**NOTE:** While installing the speakers onto the palmrest assembly, the speaker cables must be routed correctly into the routing channels at the bottom of the palmrest assembly. If not routed properly, the speaker cables may become pinched and damaged when replacing the base cover.

3. Connect the speaker cable to the connector on the system board.
4. Adhere the transparent tape to secure the speaker cable in place.

#### Next steps

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

## Display bezel

### Removing the display bezel

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [WWAN card](#) for 4G LTE enabled systems.
4. Remove the [display assembly](#).

#### About this task

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



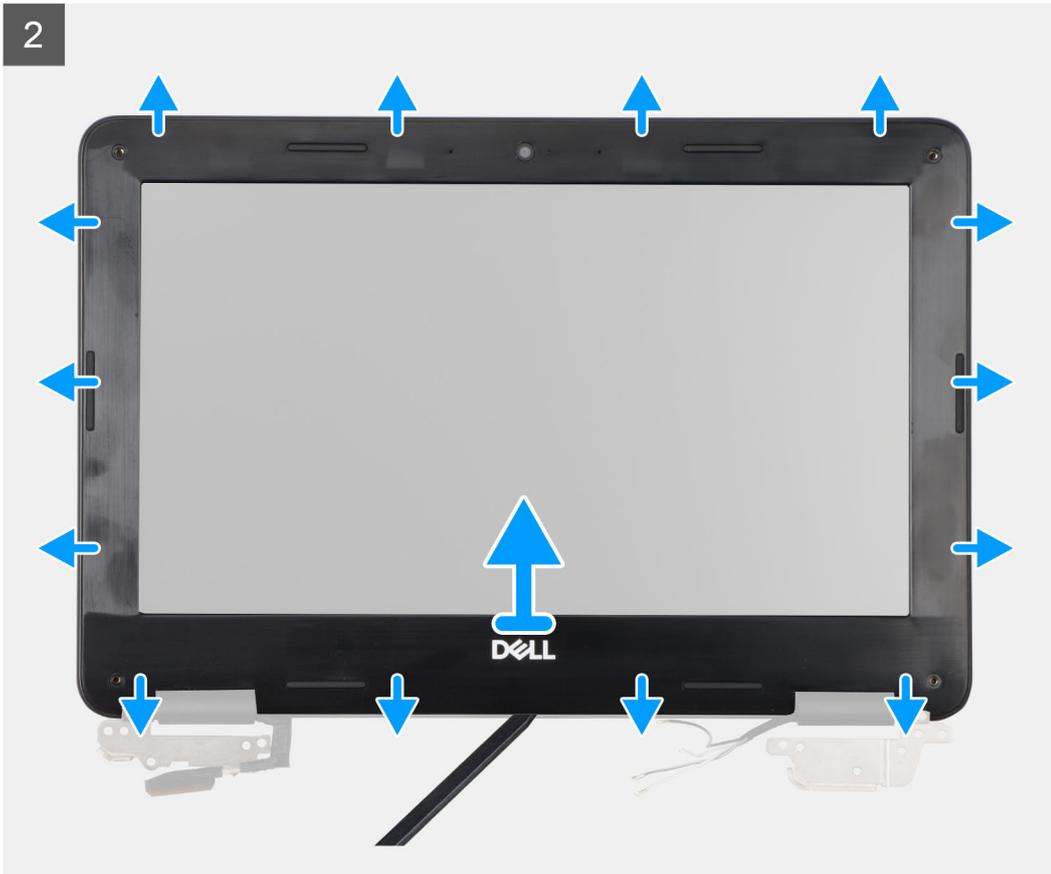
**4x**  
M2.5x3.8



1



2



### Steps

1.  **NOTE:** The bezel screws are covered with disposable cosmetic mylar stickers that must not be peeled off before bezel screw removal.  
Use a blade to peel the four bezel stickers covering the screw.
2. Remove the four screws (M2.5x3.8) that secure the display bezel on the display assembly.
3. Use a plastic scribe to carefully pry open the upper right or upper left corners of the outer edge of the display bezel.
4. Use the scribe to pry open the outside edge of the top, left, and right sides of the display bezel.  
 **NOTE:** Carefully pry the display bezel as peeling the adhesive on display bezel can damage the display panel.
5. Use the scribe to pry open the inside edge of the top, left, right, and bottom side of the display bezel.
6. Lift and remove the display bezel from the display assembly.

## Installing the display bezel

### Prerequisites

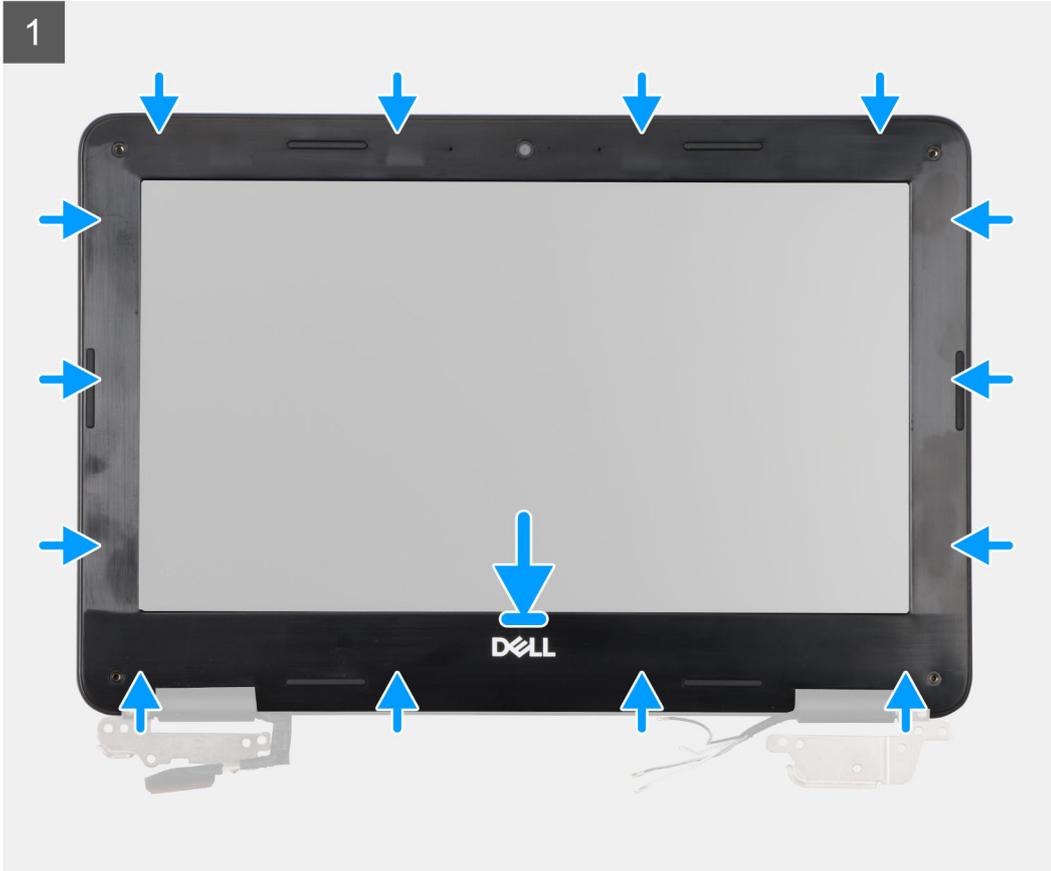
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



4x  
M2.5x3.8





### Steps

1. Align the display bezel with the display assembly. Gently snap the display bezel into place.
2. Replace the four screws (M2.5x3.8) to secure the display bezel on the display assembly.
3. Adhere the stickers over the screws once the screws have been secured.

**i** **NOTE:** A new set of stickers is included with any replacement display bezel. When replacing the new display bezel, adhere the new stickers over the screws once the screws have been secured.

### Next steps

1. Install the [display assembly](#).
2. Install the [WWAN card](#) for 4G LTE enabled systems.
3. Install the [base cover](#).
4. Follow the procedure in [after working inside your computer](#).

## Display panel

### Removing the display panel

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [WWAN card](#) for 4G LTE enabled systems.
4. Remove the [display assembly](#).
5. Remove the [display bezel](#).

**About this task**

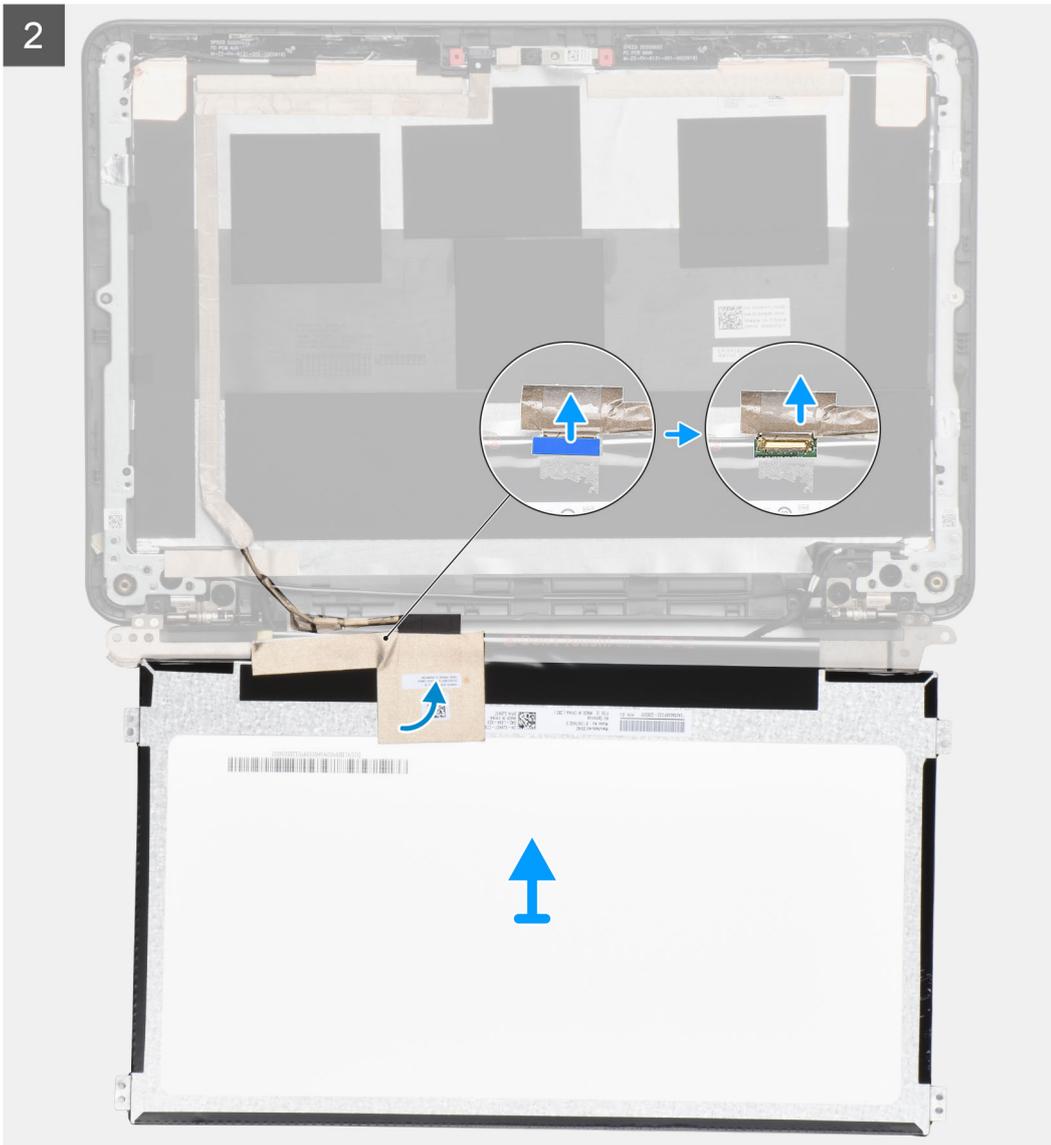
The following images indicate the location of the display panel and provide a visual representation of the removal procedure.



**4x**  
M2x3



2



### Steps

1. Remove the four (M2x3) screws that secure the display panel to the display assembly.
2. Lift to turn over the display panel to access the display cable.
3. Peel the conductive tape covering the display cable connector.
4. Peel the clear tape covering the display cable connector.
5. Peel the rubber spacer covering the display cable.
6. Lift the latch and disconnect the display cable from the connector on the display panel.

## Installing the display panel

### Prerequisites

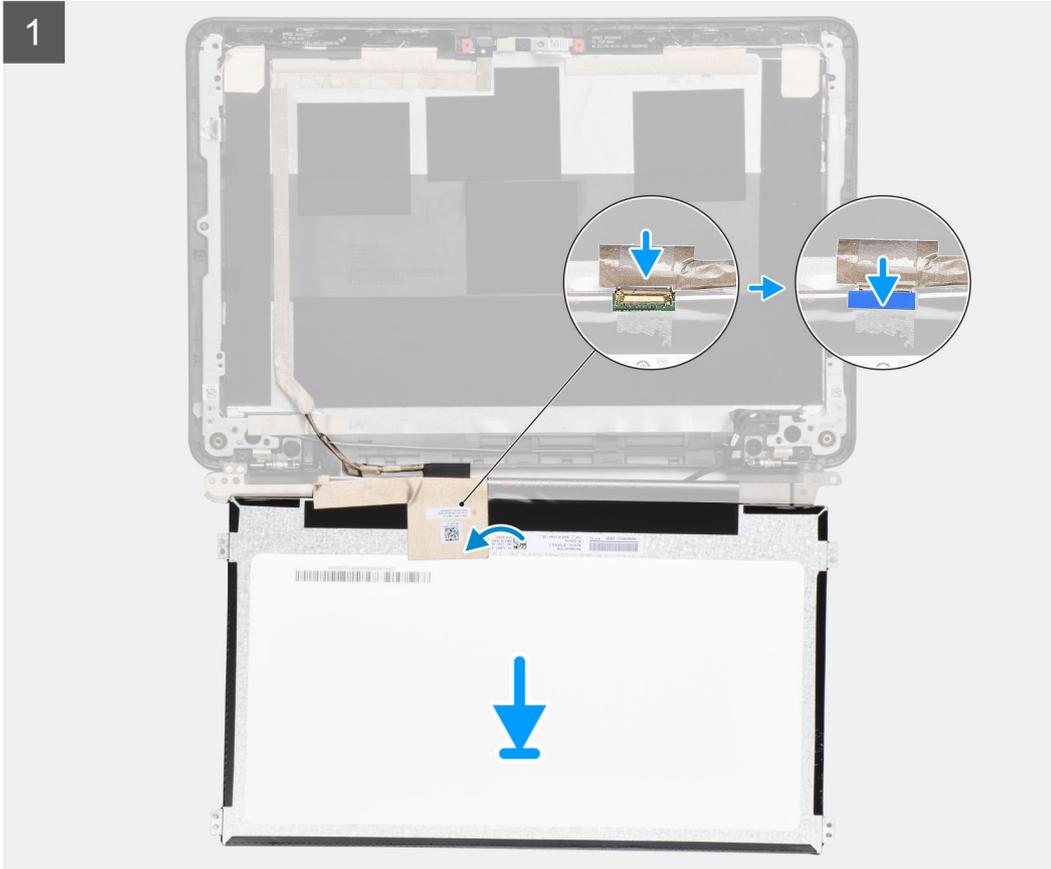
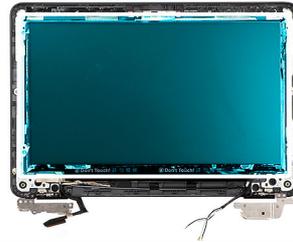
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

The following image indicates the location of the display panel and provides a visual representation of the installation procedure.



4x  
M2x3





### Steps

1. Connect the display cable to the connector and close the latch.
2. Adhere the rubber spacer covering the display cable.
3. Adhere the conductive tape covering the display cable connector.
4. Adhere the clear tape to cover the display cable connector.
5. Insert the display panel tabs into the slots on the display cover.
6. Replace the four (M2x3) screws to secure the display panel to the display assembly.

### Next steps

1. Install the [display bezel](#).
2. Install the [display assembly](#).
3. Install the [WWAN card](#) for 4G LTE enabled systems.
4. Install the [base cover](#).
5. Follow the procedure in [after working inside your computer](#).

## Camera

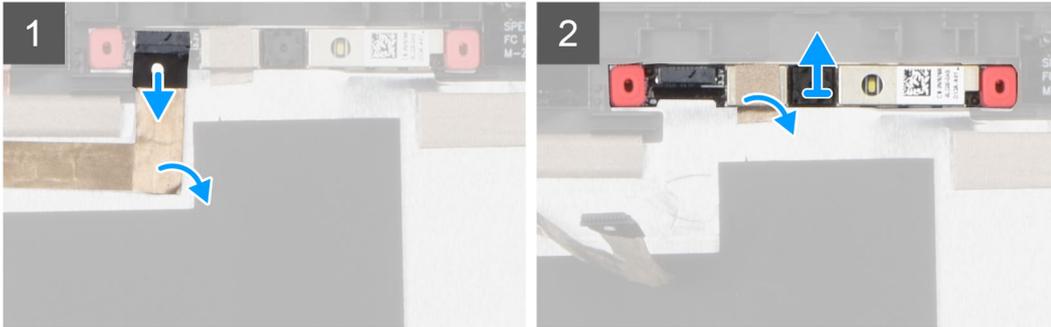
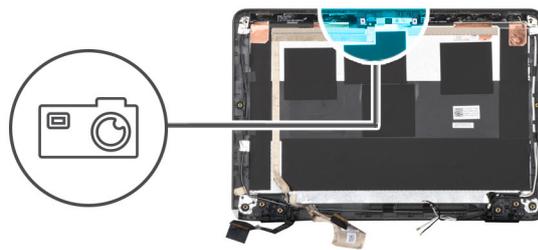
### Removing the camera

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [WWAN card](#) for 4G LTE enabled systems.
4. Remove the [display assembly](#).
5. Remove the [display bezel](#).

### About this task

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



### Steps

1. Disconnect the camera cable from its connector on the camera.
2. Peel the conductive tape that secures the camera in place.
3. Use a plastic scribe to carefully pry the camera starting from the top side of the camera module.
4. Lift and remove the camera module from the display back cover.

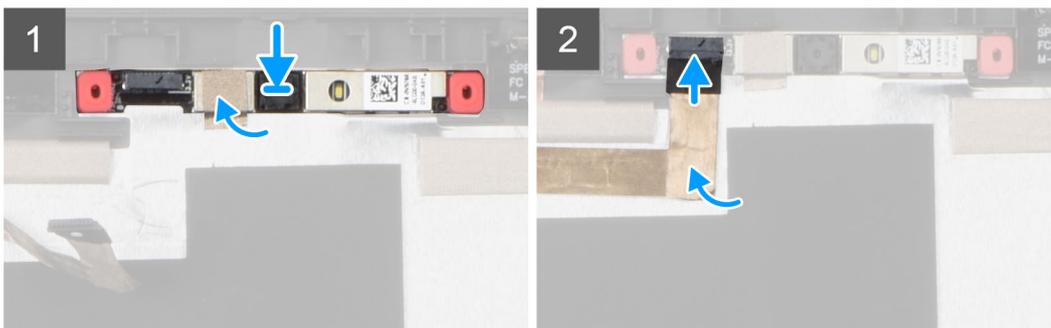
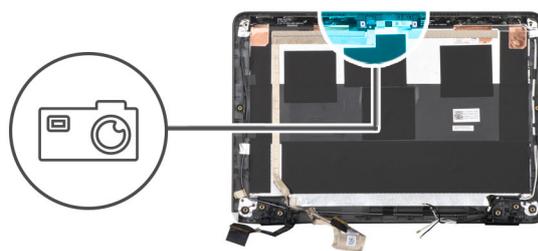
## Installing the camera

### Prerequisites

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

### About this task

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



### Steps

1. Insert the camera into the slot on the display back cover.
2. Adhere the adhesive tape and secure the camera in place.
3. Connect the camera cable to the connector.

### Next steps

1. Install the [display bezel](#).
2. Install the [display assembly](#).
3. Install the [WWAN](#) for 4G LTE enabled systems.
4. Install the [base cover](#).
5. Follow the procedure in [after working inside your computer](#).

## Display hinges

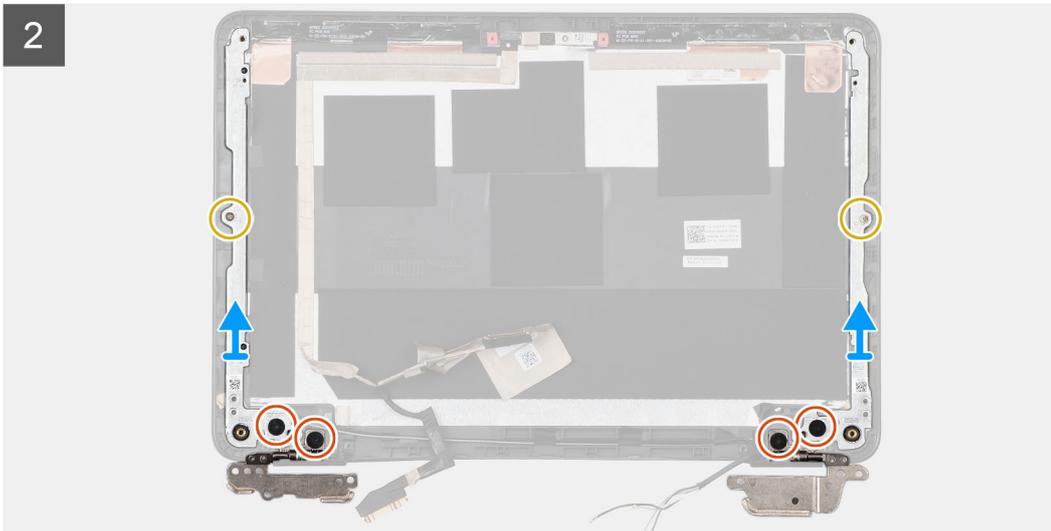
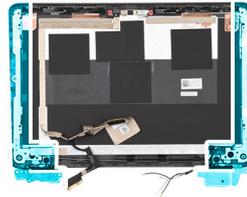
### Removing the display hinges

#### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [WWAN card](#) for 4G LTE enabled systems.
4. Remove the [display assembly](#).
5. Remove the [display bezel](#).
6. Remove the [display panel](#).

#### About this task

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



### Steps

1. Peel the conductive tape that secures the display cable in place from the left display hinge.
2. Remove the four (M2.5x2.5) and two (M2x3) screws that secure the left and right display hinges.
3. Remove the display hinges from the display back cover.

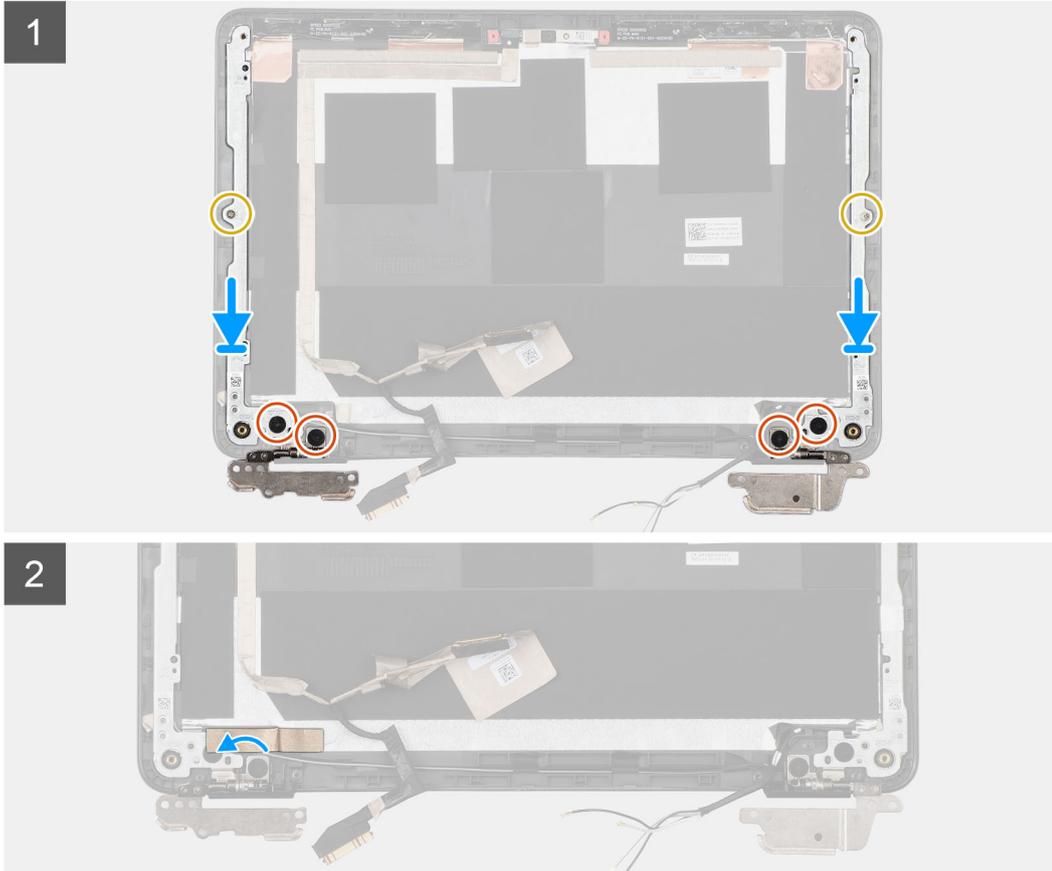
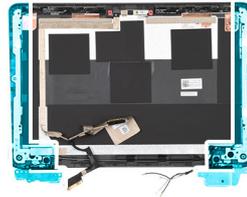
## Installing the display hinges

### Prerequisites

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

### About this task

The following image indicates the location of the display hinges and provides a visual representation of the installation procedure.



### Steps

1. Lower the display hinges on the display assembly.
2. Replace the four (M2.5x2.5) and two (M2x3) screws to secure the left and right display hinges to the display back cover.
3. Adhere the conductive tape to secure the display cable in place at the left display hinge.

### Next steps

1. Install the [display panel](#).
2. Install the [display bezel](#).
3. Install the [display assembly](#).
4. Install the [WWAN card](#) for 4G LTE enabled systems.
5. Install the [base cover](#).
6. Follow the procedure in [after working inside your computer](#).

# Display cable

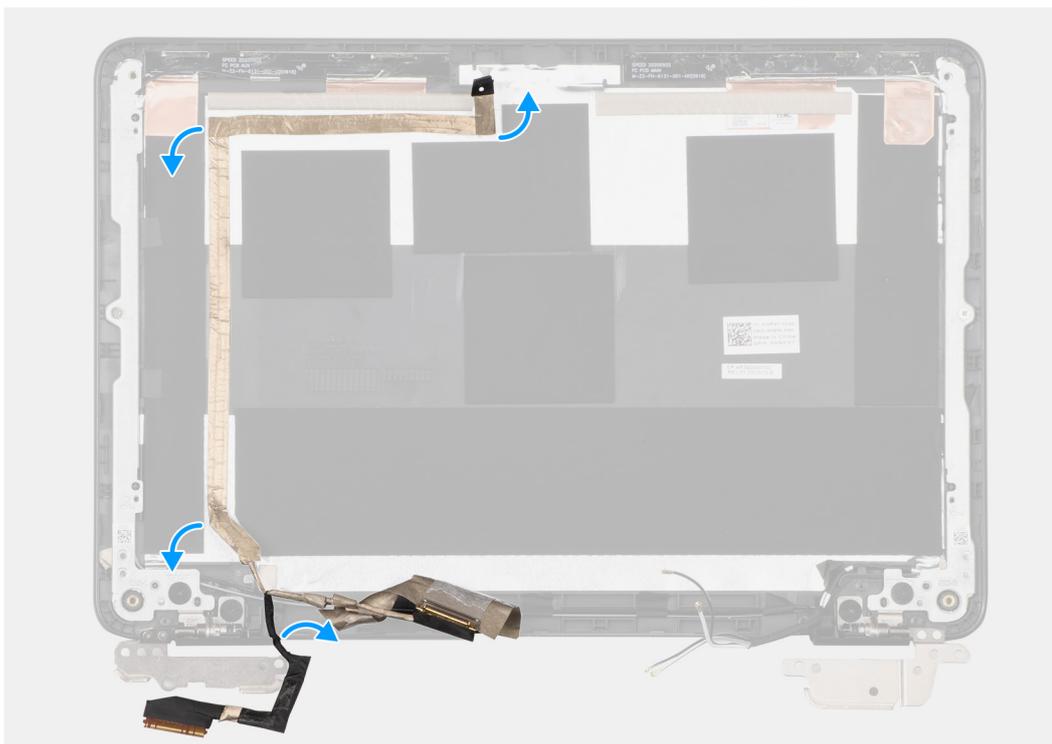
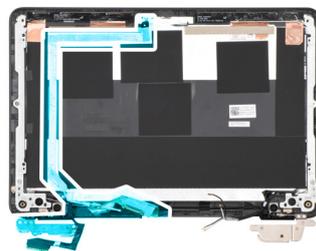
## Removing the Display cable

### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [WWAN card](#) for 4G LTE enabled systems.
4. Remove the [display assembly](#).
5. Remove the [display bezel](#).
6. Remove the [display panel](#).

### About this task

The following image indicates the location of the display cable and provides a visual representation of the removal procedure.



### Steps

1. Peel the tape that secures the display cable to the display back cover.
2. Unroute the display cable from its routing channel.
3. Remove the display cable from the display back cover.

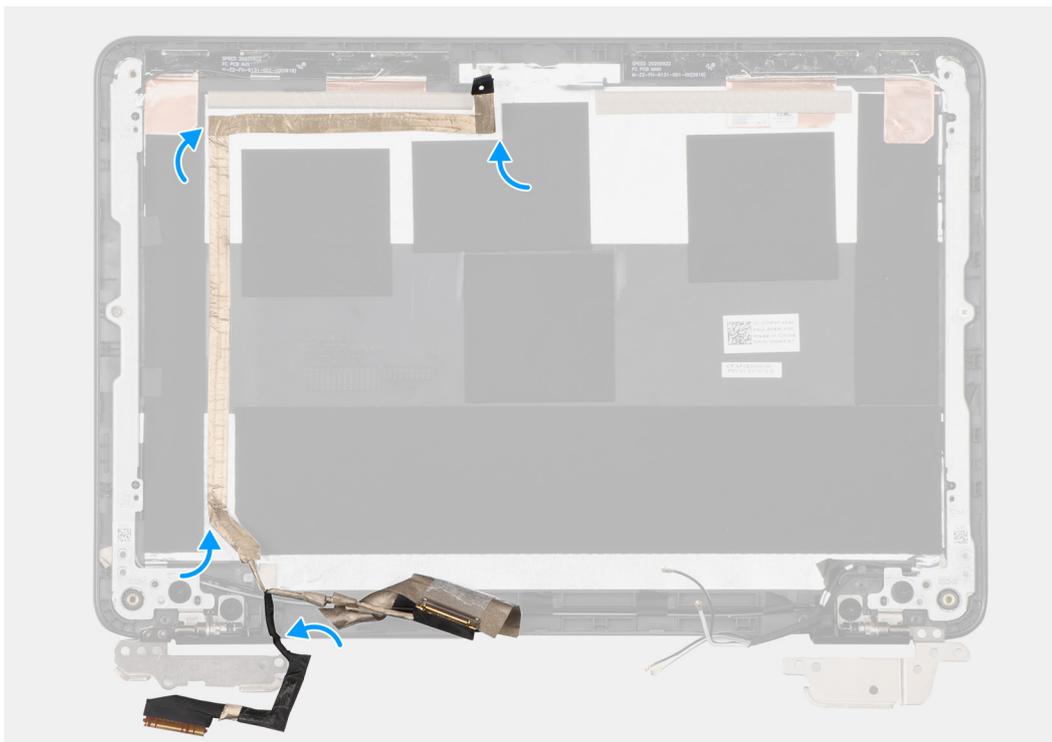
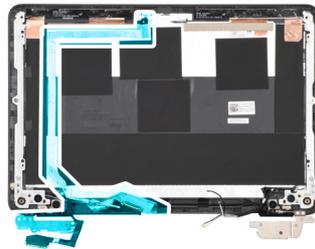
## Installing the display cable

### Prerequisites

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

### About this task

The following image indicates the location of the display cable and provides a visual representation of the installation procedure.



### Steps

1. Adhere the tape to securing the display cable to the display back cover.
2. Route the display cable through its routing channel.

### Next steps

1. Install the [display panel](#).
2. Install the [display bezel](#).
3. Install the [display assembly](#).
4. Install the [WWAN card](#) for 4G LTE enabled systems.
5. Install the [base cover](#).
6. Follow the procedure in [after working inside your computer](#).

# Display back cover

## Removing the display back-cover and antenna assembly

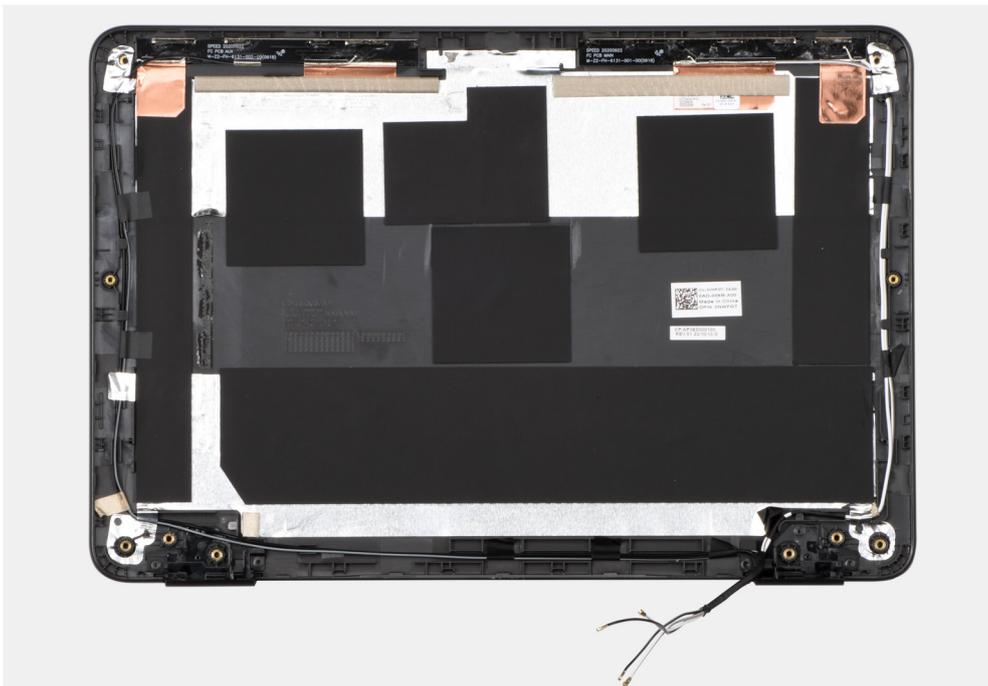
### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [WWAN card](#) for 4G LTE enabled systems.
4. Remove the [display assembly](#).
5. Remove the [display bezel](#).
6. Remove the [display panel](#).
7. Remove the [display hinges](#).
8. Remove the [camera](#).
9. Remove the [Display cable](#).

### About this task

**i** **NOTE:** The display back cover and antenna assembly cannot be further disassembled once all of the pre-removal parts procedures are completed. If the WLAN (For WiFi enabled systems) and/or WWAN (For 4G LTE enabled systems) antenna cables are malfunctioning and need to be replaced, replace the entire display back cover and antenna assembly.

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



### Steps

After performing the preceding steps, you are left with the display back cover.

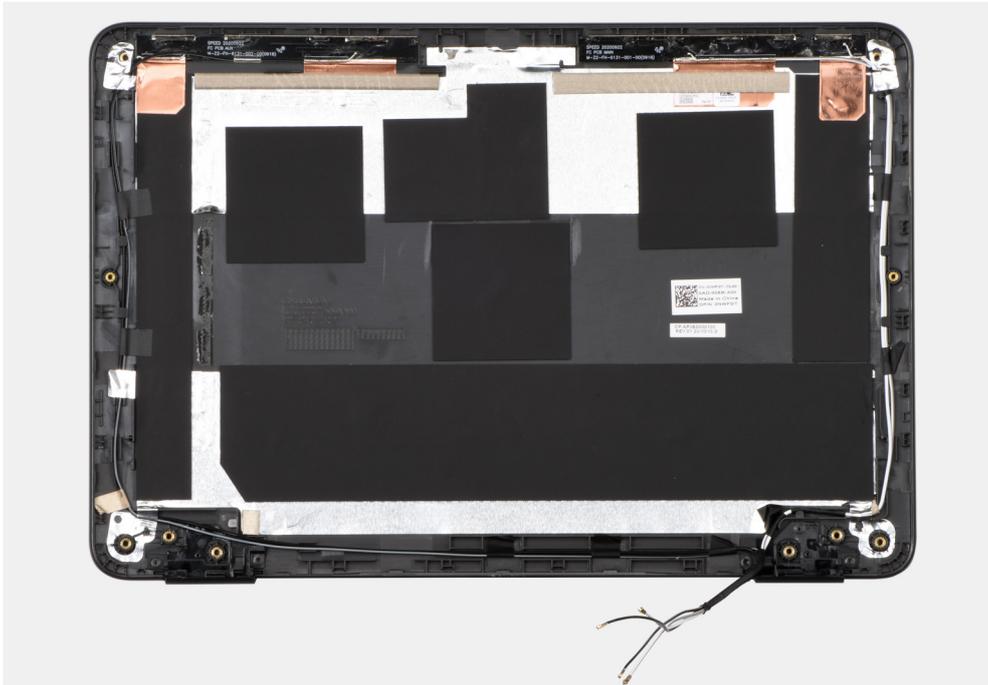
## Installing the display back-cover and antenna assembly

### Prerequisites

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

### About this task

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



### Steps

Place the display back-cover on a flat surface and perform the following steps to install the display back cover.

### Next steps

1. Install the [display cable](#).
2. Install the [camera](#).
3. Install the [display hinges](#).
4. Install the [display panel](#).
5. Install the [display bezel](#).
6. Install the [display assembly](#).
7. Install the [WWAN card](#) for 4G LTE enabled systems.
8. Install the [base cover](#).
9. Follow the procedure in [after working inside your computer](#).

## Palmrest assembly

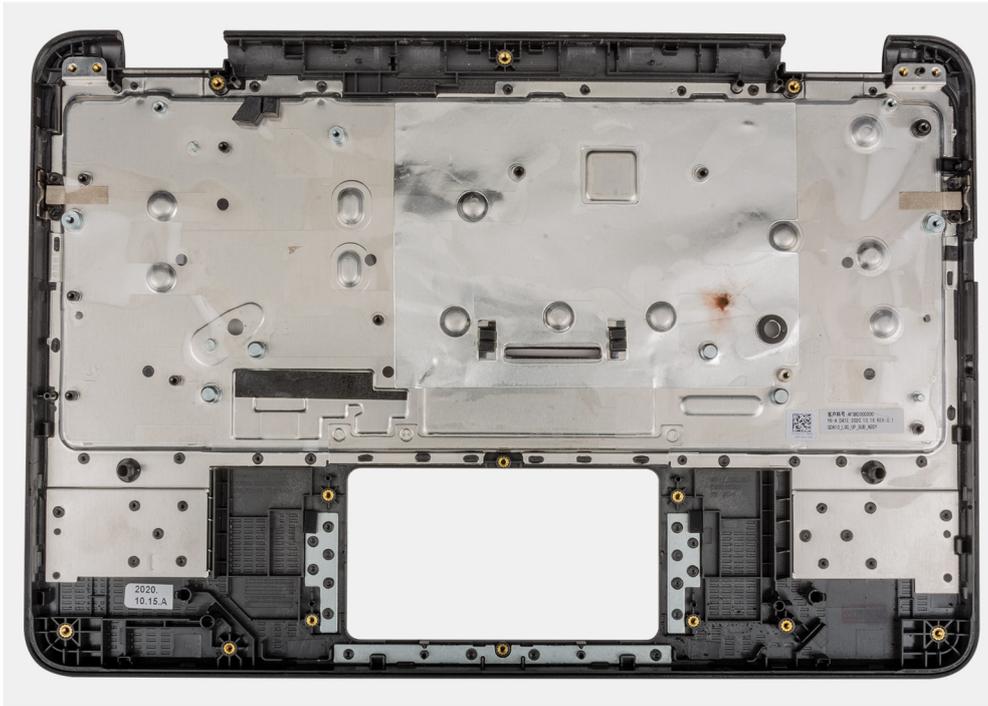
### Installing the palmrest assembly

#### Prerequisites

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

#### About this task

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



## Steps

Place the palmrest assembly on a flat surface.

## Next steps

1. Install the [speakers](#).
2. Install the [system board](#).
3. Install the [Input Output board](#).
4. Install the [display assembly](#).
5. Install the [keyboard](#).
6. Install the [WWAN card](#) for 4G LTE enabled systems.
7. Install the [battery](#).
8. Install the [base cover](#).
9. Follow the procedure in [after working inside your computer](#).

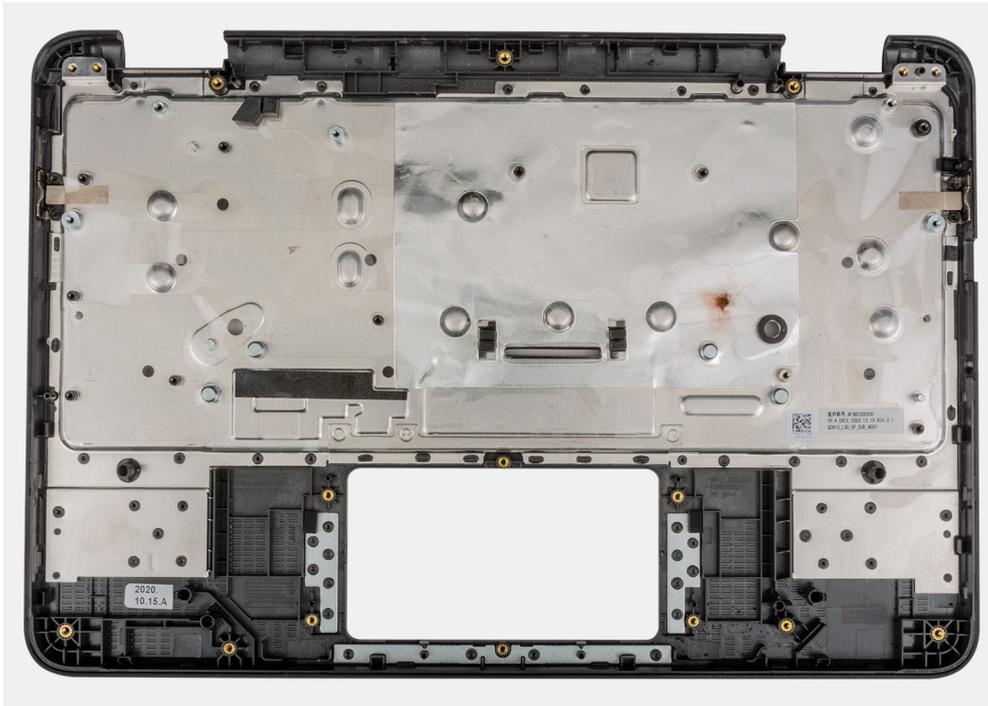
## Removing palmrest assembly

### Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove [WWAN card](#) for 4G LTE enabled systems.
5. Remove [keyboard](#).
6. Remove the [display assembly](#).
7. Remove [Input Output board](#).
8. Remove [system board](#).
9. Remove [speakers](#).

### About this task

The following image indicates the location of the palmrest assembly and provide a visual representation of the removal procedure.



## Steps

The component you are left with is the palmrest assembly.

- i** **NOTE:** The palmrest assembly cannot be further disassembled once all the pre-removal parts procedures are completed. If the touchpad frame, touchpad support bracket, touchpad mylar, touchpad module, touchpad FFC, conductive tape, or thermal pad are malfunctioning and need to be replaced, replace the entire palmrest assembly.

# Technology and components

**NOTE:** Instructions provided in this section are applicable on computers shipped with Windows 10 operating system. Windows 10 is factory-installed with this computer.

## Topics:

- [USB features](#)
- [USB Type-C](#)
- [Keyboard](#)
- [Touchpad](#)
- [Bluetooth](#)

## 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.

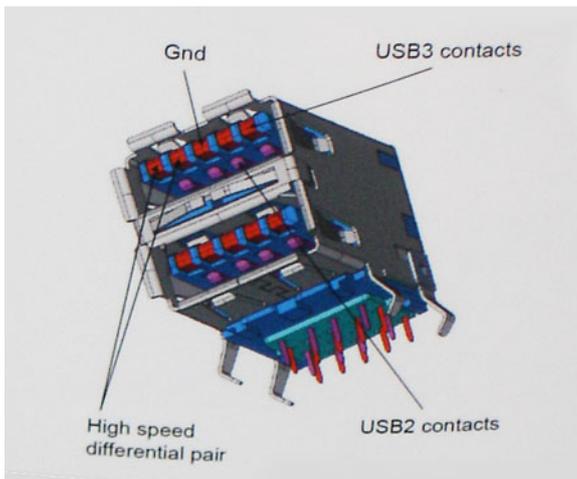


## Speed

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 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.

## USB Type-C

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

### Alternate Mode

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

### USB Power Delivery

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

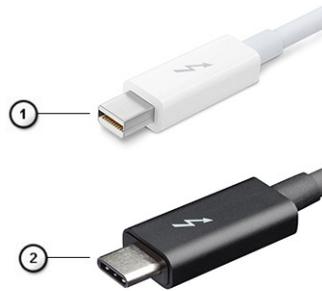
This could spell the end of all those proprietary laptop charging cables, with everything charging via a standard USB connection. You could charge your laptop from one of those portable battery packs you charge your smartphones and other portable devices from today. You could plug your laptop into an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

### USB Type-C and USB 3.1

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

### 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 as miniDP (DisplayPort) to connect to peripherals, while Thunderbolt 3 uses a USB Type-C connector.



**Figure 3. 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 1.4 – 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.

## Thunderbolt Icons

Protocol	USB Type-A	USB Type-C	Notes
Thunderbolt	Not Applicable		Will use industry standard icon regardless of port style (i.e., mDP or USB Type-C)
Thunderbolt w/ Power Delivery	Not Applicable		Up to 130 Watts via USB Type-C

**Figure 4. Thunderbolt Iconography Variations**

## Keyboard

Dell Chromebook 3100 keyboards have a few extra features to help you browse the web effortlessly and efficiently. The keyboard contains a dedicated search key and a new row of web shortcut keys. A standard USB Windows keyboard

can also be used with the Chromebook, using the same keyboard shortcuts. The image below shows the keyboard



layout.

## Keyboard keys function

The Chrome device keyboard is designed to help you get to the things you need the most. The table below is an overview of the special keys on the top row of the keyboard:

**Table 3. Special keys**

Special keys	
	Go to the previous page in browser history
	Go to the next page in browser history
	Reload current page
	Enter Immersive mode, which hides the tabs and launcher
	Enter Overview mode, which shows all windows
	Decrease screen brightness
	Increase screen brightness
	Mute
	Decrease the volume

**Table 3. Special keys**

Special keys	
	Increase the volume
	Search applications and the web at the same time. On a Chromebook, this key is on the side, where the Caps Lock key is normally located.

## Keyboard shortcut keys

**Table 4. Shortcut keys**

Function	Combination keys
Page up	Press Alt and the up arrow
Page down	Press Alt and the down arrow
Home	Press Ctrl+Alt, and the up arrow
End	Press, Ctrl+Alt and the down arrow
Delete	Press Alt+Backspace
Toggle the bookmark bar	Ctrl+Shift+B
Search current webpage	Ctrl+F
Open a new tab	Ctrl+T
Open a new window	Ctrl+N
Open the link that you clicked in a new background tab	Press Alt and click a link
Switch to next tab	Ctrl+Tab
Sign out of Google Account	Ctrl+Shift+Q
Close current tab	Ctrl+W

To see more shortcuts, simply press Ctrl+Alt+?. To open the keyboard viewer on your screen.

## Touchpad

This page contains information for Dell touchpad gestures.

The following table lists some gestures and actions supported by the Chromebook touchpad:

**Table 5. Touch pad gestures**

Touchpad gestures	
Gestures	Explanation
	Simply move your finger across the touchpad.

**Table 5. Touch pad gestures**

Touchpad gestures	
	Press down on the lower half of the touchpad. Since tap-to-click is enabled by default, you can quickly tap the touchpad to click.
	Click the touchpad with two fingers.
	Place two fingers on the touchpad and move them up and down to scroll vertically, left and right to scroll horizontally. If you have Australian scrolling enabled, move two fingers up to scroll down. (It works in the same way as say, your smartphone or tablet.) If you have multiple browser tabs open, you can also swipe left and right with three fingers to quickly move between tabs.
Swipe	Quickly move two fingers left or right to go backward or forward on web pages or while using apps.
	Click the item you want to move with one finger. With a second finger, move the item. Release both fingers to drop the item at its new location.

## Bluetooth

This section outlines the instruction to pair a bluetooth device with your Chrome devices.

Bluetooth technology lets you connect devices wirelessly over short distances. To use the Bluetooth accessories with your Chromebook, first check if your Chromebook supports Bluetooth. You will then need to pair it with the accessory.

To see if you can use the Bluetooth accessories with your Chromebook, click the status area in the lower right corner, where

your account picture appears. If you see the Bluetooth icon  or  in the menu, your Chromebook supports Bluetooth. If you do not see either of these icons, your Chromebook does not support Bluetooth. If your Chromebook supports Bluetooth, it can connect to a wide range of the Bluetooth accessories, including the following:

- Keyboards
- Mice
- Speakers
- Headphones
- Headsets (audio only)

To connect a Bluetooth device with your Chromebook, you need to pair them. Here is how:

1. Sign in to your Chromebook.
2. Click the status area in the lower-right corner, where your account picture appears.

3. Select your Bluetooth status in the menu that appears.

4. If Bluetooth is disconnected, click the disconnected icon.  or click Enable Bluetooth in the menu. Your Chromebook will automatically begin scanning for available Bluetooth devices.
5. Pick the device you want to add from the list of available Bluetooth devices and click Connect.
6. Follow the instructions on the screen to connect your Bluetooth device.
- If you are connecting a mouse, no PIN is normally required. If you are prompted for a PIN, enter the PIN for your mouse using your Chrome device's keyboard.
  - If you are connecting a keyboard, enter the randomly generated PIN on the keyboard you wish to pair and press Enter.

To confirm that your Bluetooth device is connected, check the Bluetooth status. You should see your device listed there.

 **NOTE:** Just got your Chromebook or Chromebox? If you are turning on your chrome device for the first time and you have a Bluetooth device nearby that is also turned on, your chrome device may automatically detect the device and show you steps to pair it. You will see these instructions only if your chrome device does not already have a similar device connected or its functionality is not built in, like a keyboard or trackpad.

# Troubleshooting

## Topics:

- [Basic troubleshooting](#)
- [CROSH](#)
- [CROSH commands](#)
- [Chrome commands](#)
- [Commonly used CROSH command](#)
- [Reset Chromebook](#)
- [Recovery Chromebook](#)

## Basic troubleshooting

This page contains all the information for Dell Chromebook 3100 basic troubleshooting.

**i** **NOTE:** Refer to [Google Help Center](#) for the online troubleshooter.

**i** **NOTE:** [Resetting](#) the Chromebook, also known as Powerwash, can be attempted before [Recovering](#) the Chromebook. Recovering the Chromebook is the last resort.

## Power issues

**Table 6. Power issue**

Power issues	
Issue	Possible solutions
Chromebook would not Power On	<p>If the Chromebook will not turn on, follow these steps:</p> <ol style="list-style-type: none"> <li>1. Remove all external devices.           <ol style="list-style-type: none"> <li>a. If the Chromebook starts, reconnect devices one at a time while restarting the computer to figure out which device is causing the problem. You are done.</li> <li>b. If the Chromebook still does not start or exhibits the same problem, do not reconnect anything, and continue troubleshooting.</li> </ol> </li> <li>2. The battery life might be too low. Plug the Chromebook into the AC adapter and let it charge for at least an hour and try turning it on again.           <p><b>i</b> <b>NOTE:</b> When a new Chromebook is used for the first time, the battery is still in shipping mode. To resolve this issue, turn off the Chromebook and plug in the AC adapter and turn on the Chromebook again.</p> </li> <li>3. Depending on the Chromebook you have, you may see a power indicator light close to the charging port. If you have let the Chromebook charge and the light is not coming on, perform a hard reset.           <p><b>i</b> <b>NOTE:</b> You can perform a hard reset by pressing Refresh + Power.</p> </li> <li>4. Use a different AC adapter with the same power voltage.</li> <li>5. Remove the AC adapter, and turn on with the battery power only.</li> </ol>

## Display issue

**Table 7. Display issue**

Display issue	
Issue	Possible solutions
Screen is Blank	<p>If the Chromebook's screen is blank, try the following troubleshooting steps to resolve the issue, checking to see if the screen turns on after each step:</p> <ol style="list-style-type: none"> <li>1. Make sure that the Chromebook is on. If you are using the battery, plug the Chromebook in and press the power button.</li> <li>2. Restart the Chromebook by holding the power button down until the device turns off, then turn it back on again.</li> <li>3. Reset or Recover the Chromebook.</li> </ol>

## Audio, screen, and camera issues

**Table 8. Audio, screen, and camera issues (continued)**

Audio, screen, and camera issues	
Issues	Possible solutions
Audio issues	<p>If you hear static, or the volume from the speakers is low when attempting to listen to audio:</p> <ol style="list-style-type: none"> <li>1. Make sure that the device is not muted. Try adjusting the volume.</li> <li>2. Try rebooting the Chromebook.</li> <li>3. Try playing audio from various sources, including YouTube and audio files stored locally on the Chromebook.</li> </ol> <p>If the speakers are not responding when attempting to listen to audio:</p> <ol style="list-style-type: none"> <li>1. Unplug the device from all cables (USB, headphones, and displays).</li> <li>2. Try playing audio from various sources, including YouTube and audio files stored locally on the Chromebook.</li> <li>3. Try rebooting the Chromebook.</li> <li>4. If audio still does not respond, try to Reset or Recover the Chromebook.</li> </ol>
Screen issues	<p>If the screen is not operating properly (images are too dark or no image is appearing):</p> <ol style="list-style-type: none"> <li>1. Try adjusting the brightness with the brightness keys at the top of the keyboard.</li> <li>2. In the status area in the bottom-right of the screen, check the display and make sure there are no issues with a mirrored or extended display.</li> <li>3. Try rebooting the Chromebook</li> <li>4. If the screen issues persist, try to Reset or Recover the Chromebook.</li> </ol>
Camera issues	<p>If the camera is not operating properly (blurry images or poor performance):</p> <ol style="list-style-type: none"> <li>1. Check that the camera is not being blocked or covered by a privacy screen or other obstruction.</li> <li>2. Try using different apps that use the camera. Try a Google+ Hangout or the onboard camera app</li> <li>3. Try rebooting the Chromebook</li> </ol>

**Table 8. Audio, screen, and camera issues**

Audio, screen, and camera issues	
	4. If the camera issues persist, try to Reset or Recover the Chromebook.

## Bluetooth issue

**Table 9. Bluetooth issue**

Bluetooth issue	
Issue	Possible solutions
Bluetooth issues	<p>If you run into issues while attempting to pair or use a Bluetooth device with the Chromebook, try the following steps to resolve the issue:</p> <ol style="list-style-type: none"> <li>1. First, make sure that the Bluetooth device you are trying to pair is supported by the Chromebook.</li> <li>2. Try disabling and re-enabling Bluetooth connectivity from the status area in the lower-right corner.</li> <li>3. Try restarting the Chromebook.</li> <li>4. If you are still encountering issue with bluetooth, try to Reset or Recover the Chromebook.</li> </ol>

## Touchpad and Hotkeys issues

**Table 10. Touchpad and hotkeys issues (continued)**

Touchpad / Hotkeys issues	
Issue	Possible solutions
Touchpad not responding	<p>If the touch pad has stopped responding, try the following steps to resolve the issue: Try moving the cursor after each step:</p> <ol style="list-style-type: none"> <li>1. Tap the Esc key several times.</li> <li>2. Drumroll the fingers across the touch pad for a few seconds.</li> <li>3. Restart the Chrome OS by holding down the power button until the device turns off, and then turn it back on again.</li> <li>4. If the cursor still does not move when using the touch pad, try logging in from the Guest account using the tab key to navigate.</li> <li>5. If users experience touch pad issues with the account that is not the owner (primary) account, delete the user account and re-create it. Again, use the tab key to navigate.</li> <li>6. If none of the above steps work, try to Reset or Recover the Chromebook.</li> </ol>
Top row of keys (Hotkeys) not responding	<p>If a hotkey (like the volume or brightness keys) are not responding, try the following troubleshooting steps, making sure to test the keys after each one:</p> <ol style="list-style-type: none"> <li>1. If the affected key is volume or brightness, check to make sure you are not at the upper or lower limit for that setting.</li> <li>2. If the backward or forward buttons do not work, check that the same icons in a web browser are not grayed out. For example, if the back button on a web page is grayed, this is because the browser is not aware of a page to move backward to.</li> </ol>

**Table 10. Touchpad and hotkeys issues**

<b>Touchpad / Hotkeys issues</b>	
	<ol style="list-style-type: none"> <li>3. Restart the Chrome OS by holding down the power button until the device turns off, and then turn it back on again.</li> <li>4. Try using the keys in the Guest account.</li> <li>5. If users experience hotkey issues with the account that is not the owner (primary) account, delete the user account and re-create it.</li> <li>6. If none of the above steps work, try to Reset or Recover the Chromebook.</li> </ol>

## Chrome OS issue

**Table 11. Chrome OS issue (continued)**

<b>Chrome OS issues</b>	
<b>He's Dead, Jim!</b> error message	<p>If the Chromebook becomes slow or unresponsive, and the <b>He's Dead, Jim!</b> error message appears, the system could be running low on memory.</p> <p><b>i</b> <b>NOTE:</b> If you terminated the process using Google Chrome's Task Manager, the system's task manager, or with a command line tool, this message will appear as well.</p> <ol style="list-style-type: none"> <li>1. If the page was not ended intentionally, reload the page to continue. If the message continues to appear, try closing inactive tabs or other programs to free up more memory.</li> <li>2. If issue persists, please see He's Dead, Jim! from Google knowledge base.</li> </ol>
Chrome OS is missing or damaged	<p>If the Chromebook does not start and displays the message, <b>Chrome OS is missing or damaged. Please insert a recovery USB stick into the USB ports on the device:</b></p> <p>Perform a system recovery. See performing Recover Chromebook for more information.</p>
Chrome OS stops responding and nothing moves on the computer display	<p>If the Chrome OS stops responding and nothing moves on the computer display:</p> <ol style="list-style-type: none"> <li>1. Turn off the computer.</li> <li>2. Disconnect all peripheral devices, and remove all USB devices and media cards.</li> <li>3. Disconnect the AC adapter.</li> <li>4. Press and hold the power button for 10 seconds.</li> <li>5. Reconnect the AC adapter, and turn on the system.</li> <li>6. If issue persists, please perform a Reset or Recover the Chromebook.</li> </ol>
Lost / Forget Sign in password (Chrome OS)	<p>If you lost/forget the sign-in password to the Chromebook:</p> <ol style="list-style-type: none"> <li>1. Check if this is a managed device (Enterprise enrolled device).             <ol style="list-style-type: none"> <li>a. If this is a managed device, please contact the administrator to have them reset the password via Google Admin Console.</li> <li>b. If this is not a managed device, please proceed with the following steps:</li> </ol> </li> <li>2. Sign in as guest or use a different PC.</li> <li>3. Open an internet browser, and navigate to <a href="https://www.google.com/accounts/recovery/">https://www.google.com/accounts/recovery/</a></li> <li>4. Select I do not know my password, and then enter the email address that you use to sign in to Google.</li> </ol>

**Table 11. Chrome OS issue**

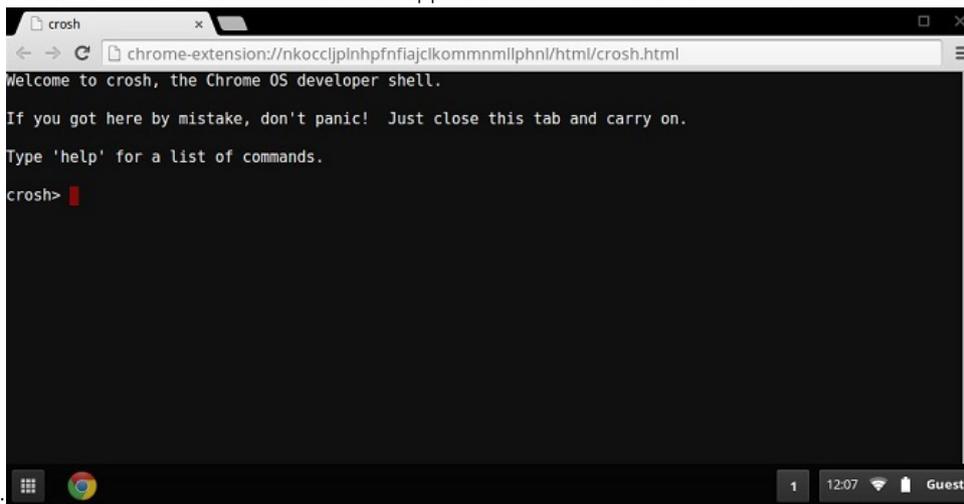
Chrome OS issues	
	5. Click Continue and follow the on-screen instructions to reset the password.
Other Chromebook lock up or freeze symptoms that are not listed here	If none of the above symptoms match the Chromebook's issue, refer to Google Help Center for the online troubleshooter and more help.

## CROSH

This topic covers the information that you need to know for the Chrome Shell (CROSH). CROSH and the Google Chrome URL commands provide some troubleshooting tools, information, and advanced settings.

The Chrome OS does not support ePSA, Dell BIOS, the F12 boot menu, or DellConnect. There are no preboot diagnostics. All troubleshooting must be done inside the OS. Chrome Shell (CROSH) and the Chrome URL commands provide some troubleshooting tools, information, and advanced settings. CROSH is a command line interface similar to the Linux BASH or Windows command (cmd.exe) terminals. Chrome OS is based on Linux, but CROSH does not recognize most Linux commands. The most useful commands for troubleshooting are memory test, storage\_test\_1, storage\_test\_2, ping, and tracepath. Ping works differently than it does in Windows. By default, it repeats until you press **<Ctrl> + <C>**, and it does not show any statistics. The tracepath command is similar to the Windows traceroute command. A detailed explanation of the commands can be viewed below, by typing help, or help\_advanced in CROSH.

1. Open the Chrome browser.
2. Press **<Ctrl> + <Alt> + <T>** The interface appears as shown in the screenshot



below:

3. Type in the CROSH command for diagnostics. Type **'help'** for a list of available commands. Type **help\_advanced** to display a complete list of commands for debugging purposes

Alternately, refer to CROSH Commands for the list of the CROSH commands available for diagnostics.

## CROSH commands

The table below lists the available commands in Chrome Shell (CROSH).

**Table 12. Help commands**

Command	Purpose
exit	Exits the CROSH Shell.
help	Displays this help.
help_advanced	Displays the help for more advanced commands, which are used for debugging.

**Table 12. Help commands**

Command	Purpose
ping	[-c count] [-i interval] [-n] [-s packetsize] [-W waittime] — Sends ICMP ECHO_REQUEST packets to a network host. If it is "gw", then the next hop gateway for the default route is used. It works like the ping command on other operating systems. Press <b>&lt;Ctrl&gt; + &lt;C&gt;</b> to stop the ping process or halt any other command in CROSH.
ssh	[optional args...] — Starts the ssh subsystem if invoked without any arguments. "ssh <user> <host>", "ssh <user> <host> <port>", "ssh< user>@<host>". or "ssh <user>@<host> <port>" connect without entering the subsystem
ssh_forget_host	Removes a host from the list of known ssh hosts. This command displays a menu of known hosts and prompts for the host to forget.
top	Sets the chaps debug logging level. No arguments start verbose logging

**Table 13. Advanced help command**

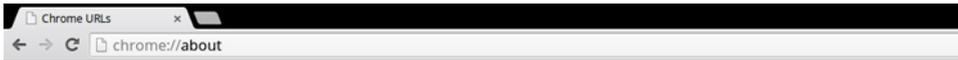
Command	Purpose
battery_test[<test length>]	Tests the battery discharge rate for a given number of seconds. No argument defaults to a 300 s test.
bt_console [<agent capability>]	Enters a Bluetooth debugging console. The <b>Optional</b> argument specifies the capability of a pairing agent the console provides; see the <b>Bluetooth Core</b> specification for valid options.
chaps_debug [start stop <log_level>]	Sets the chaps debug logging level. No arguments will start verbose logging.
connectivity	Shows connectivity status.
experimental_storage<status enable disable>	Enables or disables experimental storage features.
ff_debug [<tag_expr>] [--help] [--list_valid_tags] [--reset]	Adds and removes flimflam debugging tags.
memory_test	Performs extensive memory testing on the available free memory.
modem <command> [args...]	Interacts with the 3G modem. Run <b>modem help</b> for detailed help.
modem_set_carrier carrier-name	Configures the modem for the specified carrier.
network_diag[--date] [--link] [--show-macs] [--wifi] [--help] [--wifi-mon] <host>	Performs a suite of network diagnostics and saves a copy of the output to your download directory
network_logging <wifi cellular ethernet>	Enables a predefined set of tags useful for debugging the specified device.
p2p_update [enable   disable]	Enables or disables the peer-to-peer (P2P) sharing of updates over the local network. This will both attempt to get updates from other peers in the network and shares the downloaded updates with them. Run this command without arguments to see the current state.
rlz < status   enable   disable>	Enables or disables RLZ.
rollback	Attempts to roll back to the previous update cached on your system. Only available on non-stable channels and non-enterprise enrolled devices. Please note that this will power wash your device.

**Table 13. Advanced help command**

Command	Purpose
route [-n] [-6]	Displays the routing tables.
set_apn [-n <network-id>] [-u <username>] [-p <password>] <apn>	Sets the APN to use when connecting to the network specified by <network-id>. If <network-id> is not specified, use the network-id of the currently registered network.
set_apn - c	Clears the APN to be used, so that the default APN is used instead.
set_arpgw <true   false>	Turns on the extra network state checking to make sure the default gateway is reachable.
set_cellular_ppp [-u <username>] [-p <password>]	Sets the PPP username and/or password for an existing cellular connection. If neither -u nor -p is provided, this shows the existing PPP username for the cellular connection.
set_cellular_ppp -c	Clears any existing PPP username and PPP password for an existing cellular connection.
sound <command> <argument>	Low level sound configuration. Can be used to play/record audio samples and enable beam forming on Pixel. <b>sound beamforming &lt;on off &gt;</b> will enable/disable the feature. <b>sound record [duration]</b> will start recording. <b>sound play &lt;filename&gt;</b> plays the recorded audio samples
storage_status	Reads storage device SMART health status, vendor attributes, and error logs.
storage_test_1	Performs a short offline SMART test.
storage_test_2	Performs an extensive readability test.
syslog <message>	Logs a message to system log.
tpcontrol{status   taptoclick [on off] sensitivity [1-5]   set <property>< value>} tpcontrol {syntp [on off]}	Allows the user to manually adjust advanced touchpad settings.
tracpath [-n] <destination>[/port]	Traces the path/route to a network host.
update_over_cellular [enable disable]	Enables or disables the auto updates over cellular networks. Run without arguments to see the current state.
upload_crashes	Uploads available crash reports to the crash server.
wpa_debug [<debug_level>] [--help] [--list_valid_level] [--reset]	Sets the wpa_supplicant debugging level.
xset m [acc_mult[/acc_div] [thr]] xset m default	Tweaks the mouse acceleration rate.
xset r rate [delay [rate]]	Tweaks the autorepeat rates. The delay is the number of milliseconds before autorepeat starts. The rate is the number of repeats per second.
xset r [keycode] < on off >	Turns autorepeat on/off. If a keycode is specified, it affects only that key. If not specified, it affects global behavior.

## Chrome commands

Chrome:// pages contain experimental features, diagnostic tools, and detailed statistics. They are hidden in Chrome's user interface. **Chrome://about** page lists all Chrome's internal pages. To view all the commands, type **chrome://about** in the Chrome browser URL as shown below:



### List of Chrome URLs

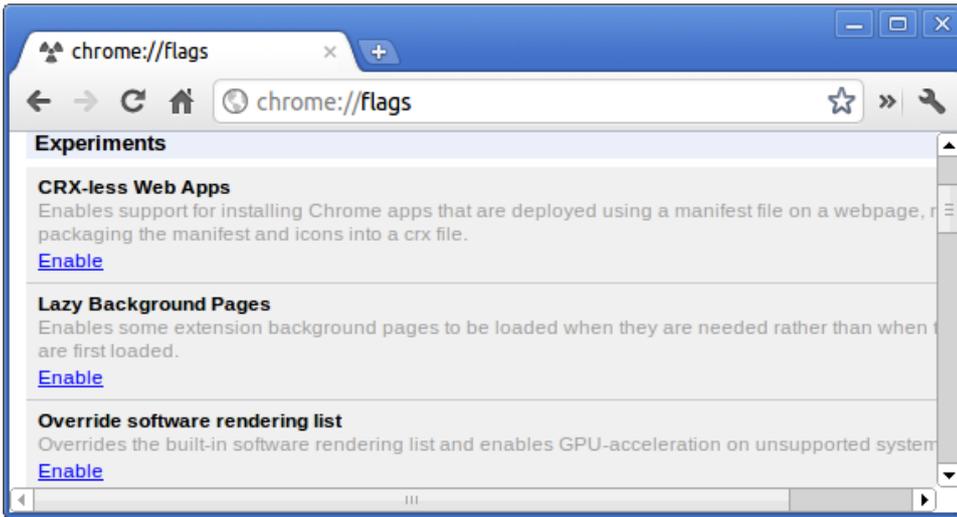
- [chrome://accessibility](#)
- [chrome://appcache-internals](#)
- [chrome://blob-internals](#)
- [chrome://bookmarks](#)
- [chrome://cache](#)
- [chrome://choose-mobile-network](#)
- [chrome://chrome-urls](#)
- [chrome://components](#)
- [chrome://crashes](#)
- [chrome://credits](#)
- [chrome://cryptohome](#)
- [chrome://diagnostics](#)
- [chrome://discards](#)
- [chrome://dns](#)
- [chrome://downloads](#)
- [chrome://drive-internals](#)
- [chrome://extensions](#)
- [chrome://first-run](#)
- [chrome://flags](#)
- [chrome://flash](#)
- [chrome://gpu](#)
- [chrome://histograms](#)
- [chrome://history](#)

**Table 14. Chrome browser shortcuts**

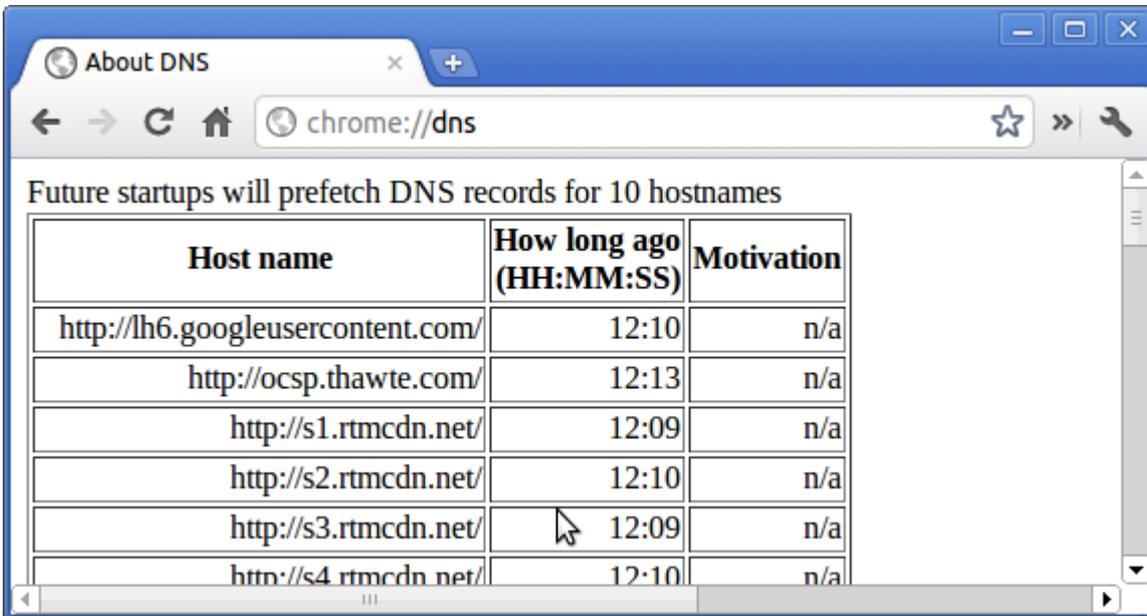
Purpose	Browser Shortcut	Explanation
System Information	<code>chrome://system/</code>	"Who am I".. BIOS version, and so on
Basic Connectivity Diags	<code>chrome://diagnostics/</code>	Test for NIC and Internet connection
Chrome Information	<code>chrome://version</code>	More "Who am I" type of stuff
Create Recovery USB Stick	<code>chrome://imageburner/</code>	Google's version of DBAR/DBRM
Chrome Flags	<code>chrome://flags</code>	Experimental features beyond the scope of what Dell supports
Memory Troubleshooting	<code>chrome://memory</code>	View running processes and memory utilization
Module Load	<code>chrome://conflicts</code>	Shows conflicts of all modules loaded by Chrome
Chrome Sync Status	<code>chrome://syncchrome://sync-internals</code>	Allows troubleshooting of connected accounts
Connectivity Troubleshooting	<code>chrome://net-internals</code>	Comprehensive network/connectivity diagnostics, including DNS analysis, Waterfall and Bandwidth diagnostics, and so on
Histogram	<code>chrome://histograms</code>	Actual work and I/O audit
Credits	<code>chrome://credits</code>	References to all module/libs contributions and their respective wiki/license URLs
Crash Reporting	<code>chrome://crashes</code>	Shows detailed crash report, if the feature was enabled
Apps RAM Utilization	<code>chrome://appcache-internals</code>	Detailed memory usage for apps/extensions, especially handy for 2 GB Chromebooks

Following are the 12 most helpful `chrome://` commands that you should know:

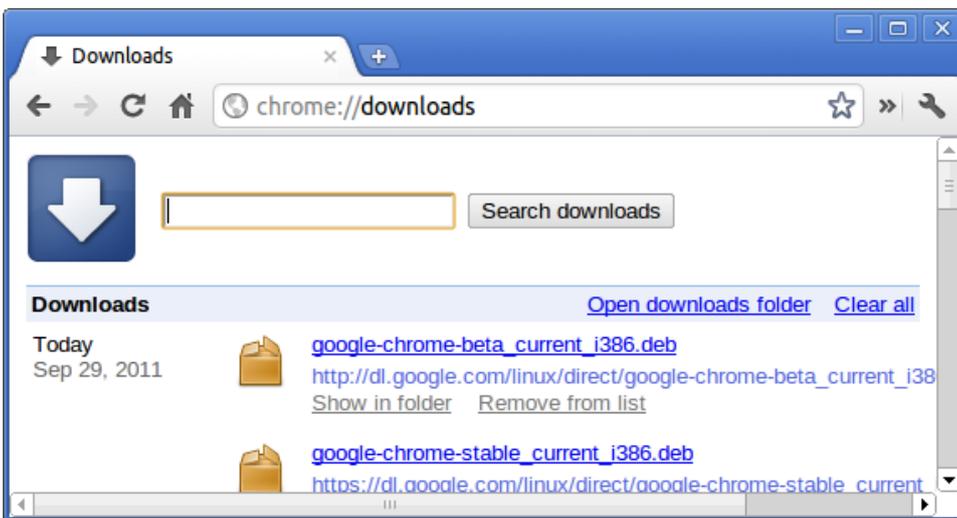
1. **chrome://flags** : From here you can enable some of the experimental features that are hidden in the Google Chrome browser. Please note that as mentioned on this page, since these are experimental, these might not work as expected and might cause issues. Enable these features, and use it at your own risk.



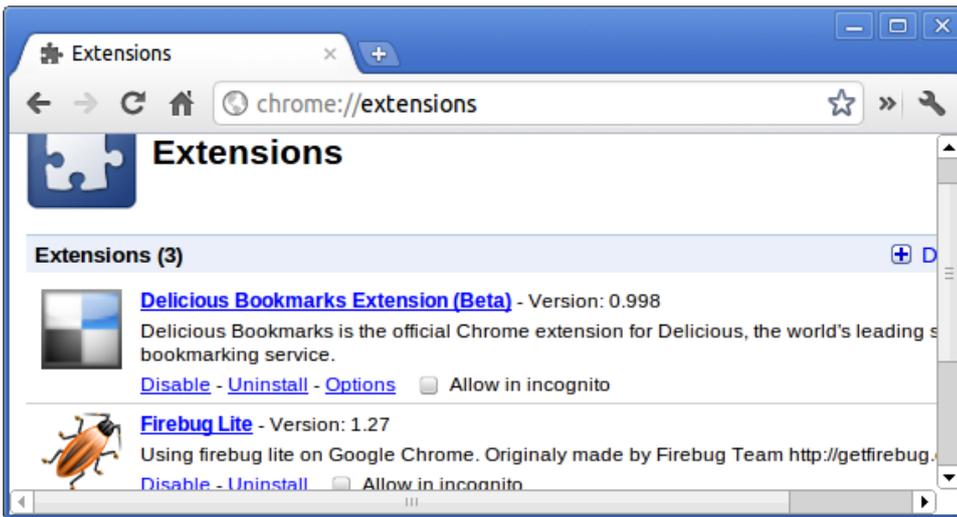
2. **chrome://dns**: This displays the list of host names for which the browser will pre-fetch the DNS records.



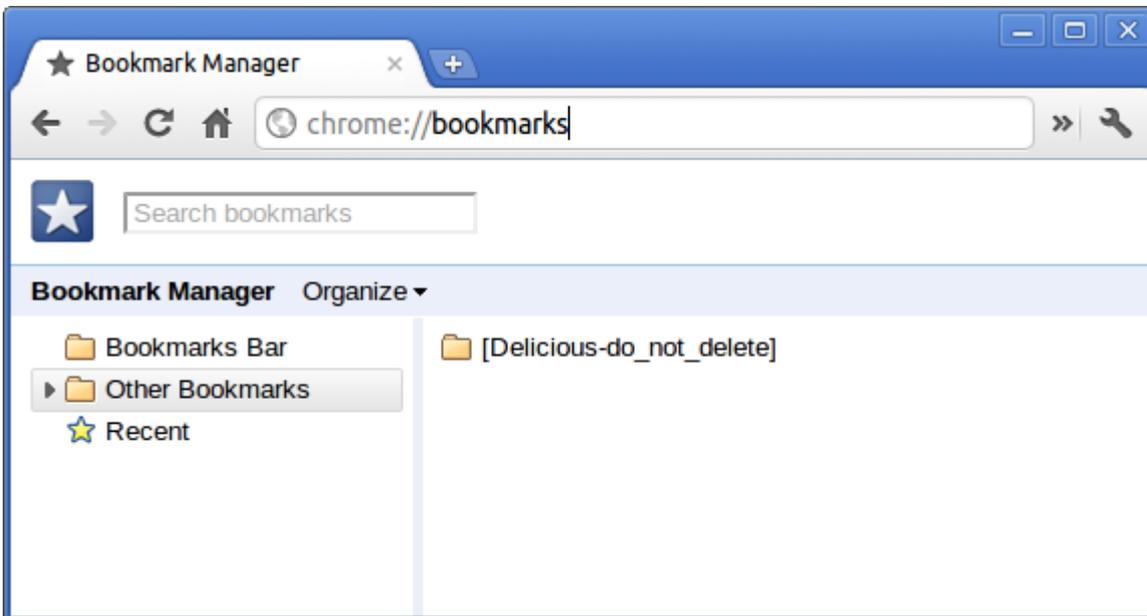
3. **chrome://downloads**: This is also available from the Menu > Downloads. Shortcut key is Ctrl+J.



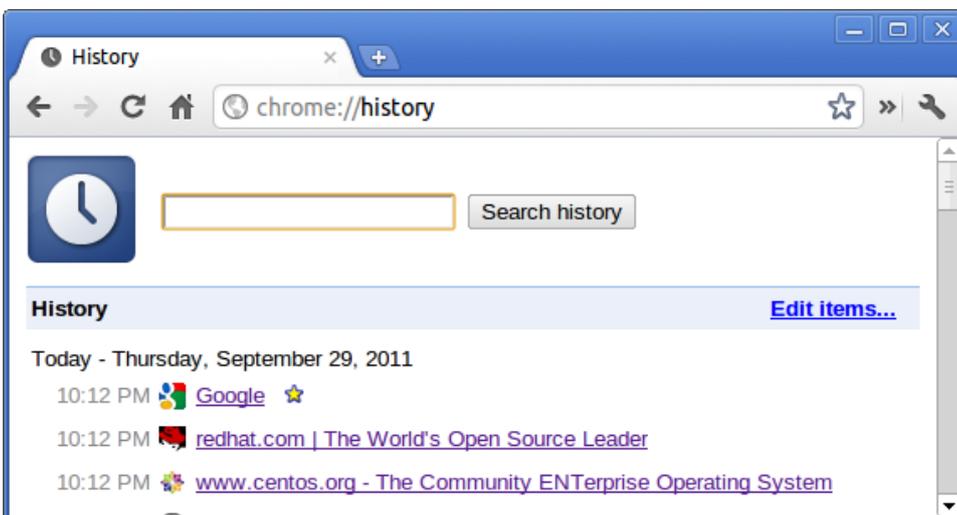
4. **chrome://extensions**: This is also available from the Menu > Tools > Extensions.



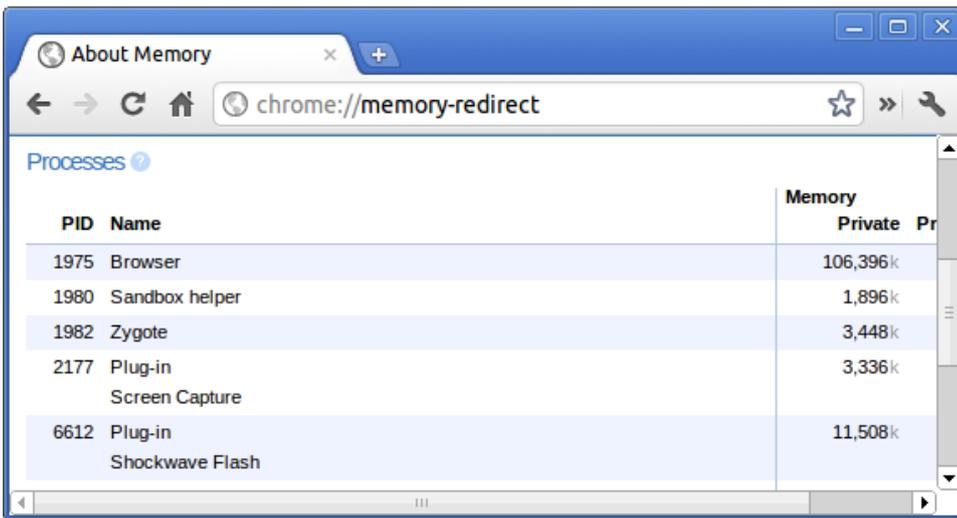
5. **chrome://bookmarks**: This is also available from the Menu > Bookmarks > Bookmark Manager. Short cut key is Ctrl+Shift+O.



6. **chrome://history**: This is also available from the Menu > History. Short cut key is Ctrl+H.

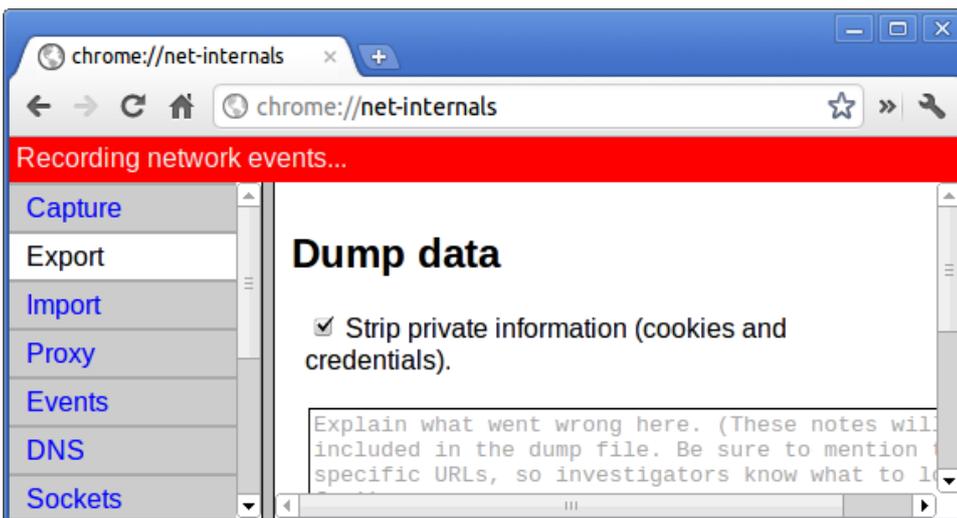


7. **chrome://memory:** This will redirect to “chrome://memory-redirect/”. This will display the memory used by the Google Chrome browser. This also displays all the process related to browser with their PID, process name, and the memory it takes.

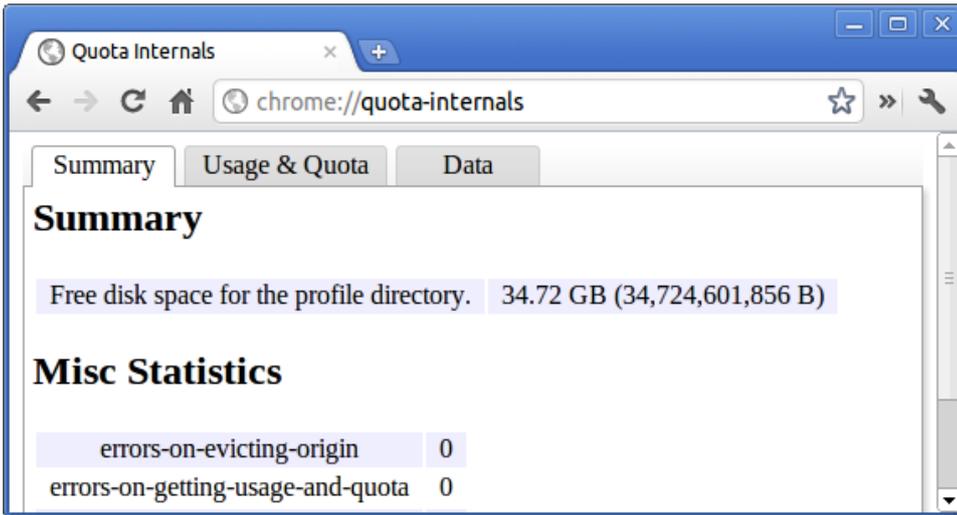


8. **NOTE:** Net-internals events viewer and related functionality has been removed. Please use Chrome://net-export to save netlogs and the external [Catapult netlog\\_viewer](#) to view them.

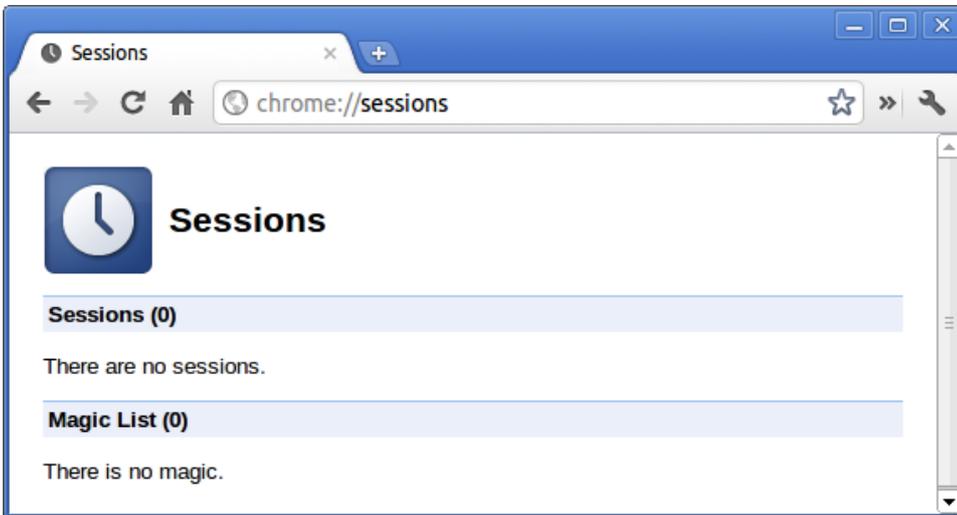
**chrome://net-internals:** This displays all networking related information. Use this to capture network events generated by the browser. You can also export this data. You can view DNS host resolver cache. One of the important features in this feature is “Test”. If a URL failed to load, you can go to “chrome://net-internals” > click on “Tests” tab > type that URL which failed, and click on “Start Test”, which does some test and report you why that URL failed. chrome://plugins/.



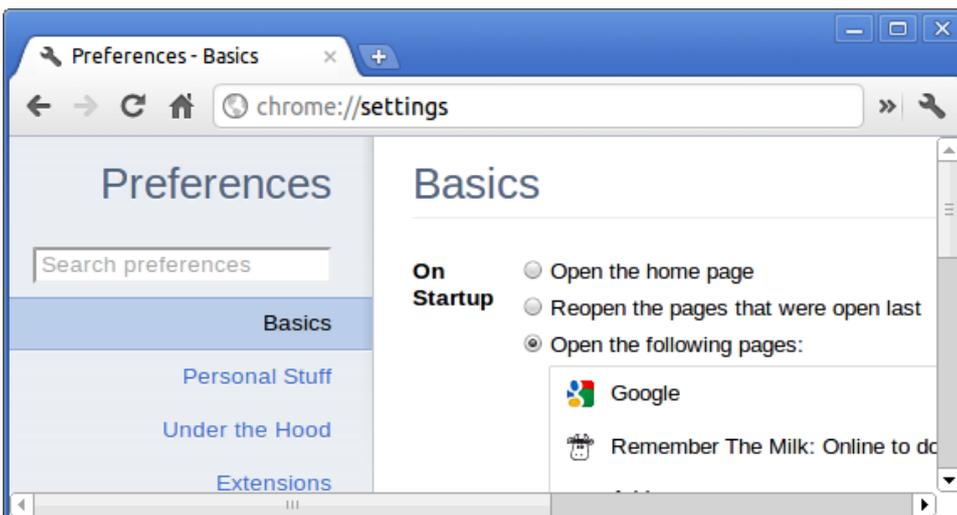
9. **chrome://quota-internals:** This gives information about the disk space quote used by the browser, including the breakdown of how much space the individual websites took under temporary files.



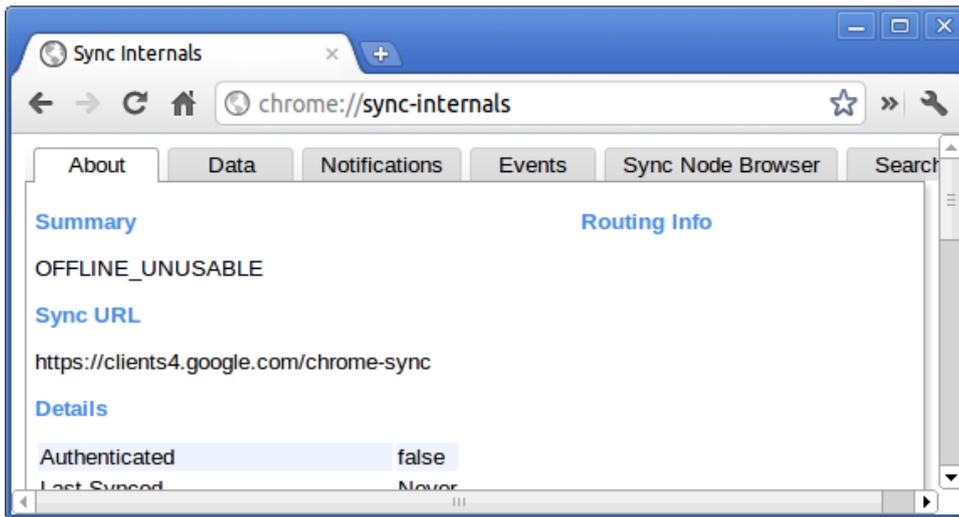
10. **chrome://sessions**: This displays the number of sessions and magic list that are currently running.



11. **chrome://settings**: This is also available from the Menu > Options (on Windows), and Menu > Preferences (on Linux). From here you can control various browser related settings.



12. **chrome://sync-internals**: This gives information about the Chrome sync feature, including the Sync URL used by Google, and sync statistics.



## Commonly used CROSH command

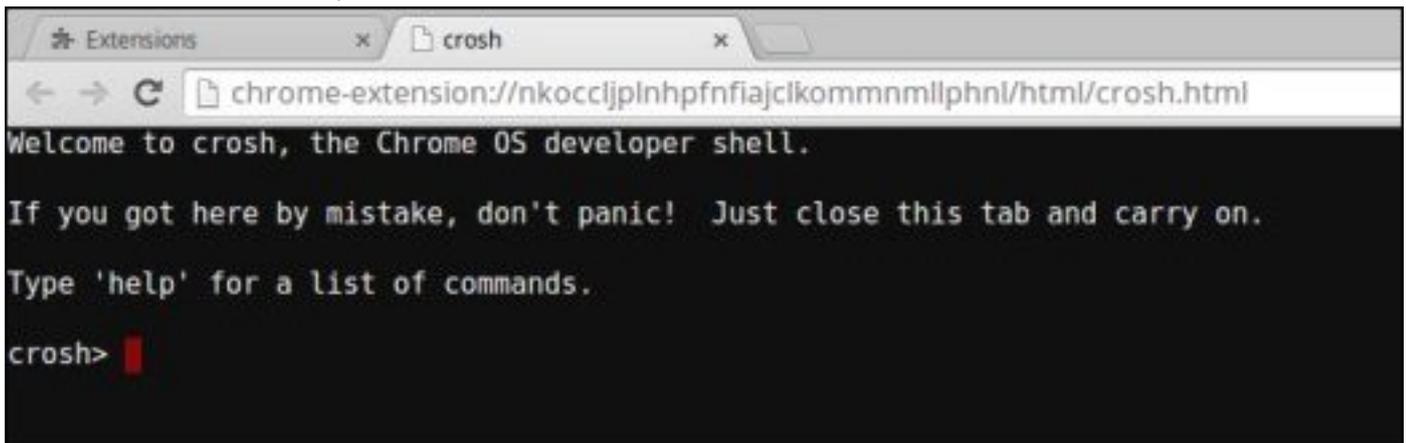
This page contains information about the most commonly used CROSH commands to diagnose the Dell Chromebook 3100. Below are some of the most commonly used CROSH commands to troubleshoot a hardware issue.

**NOTE:** CROSH storage\_test\_1 and storage\_test\_2 are not supported on the eMMC storage device.

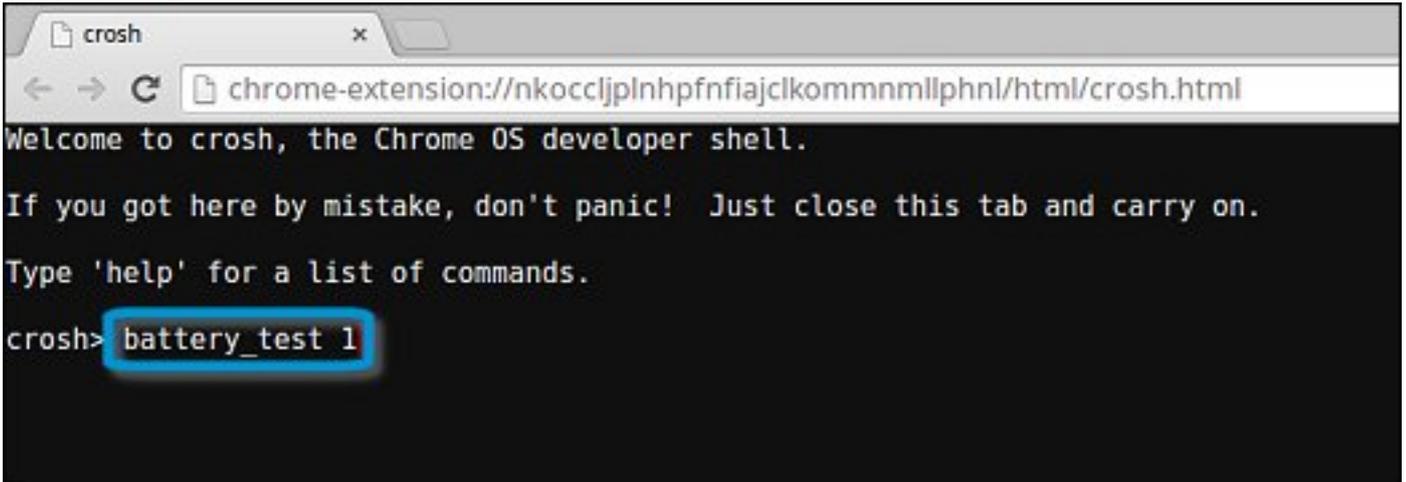
## Check battery charging status

The Chrome Shell (CROSH) includes a simple battery health diagnostic test. This is to confirm that the battery is charging and to check on the battery health and discharge rate. Follow the instruction provided to check on the battery charging status:

1. Connect the AC adapter to the Chromebook and a power outlet.
2. Turn on, and sign in to the Chromebook.
3. Open the Chrome browser.
4. Press CTRL + ALT + T to open CROSH.

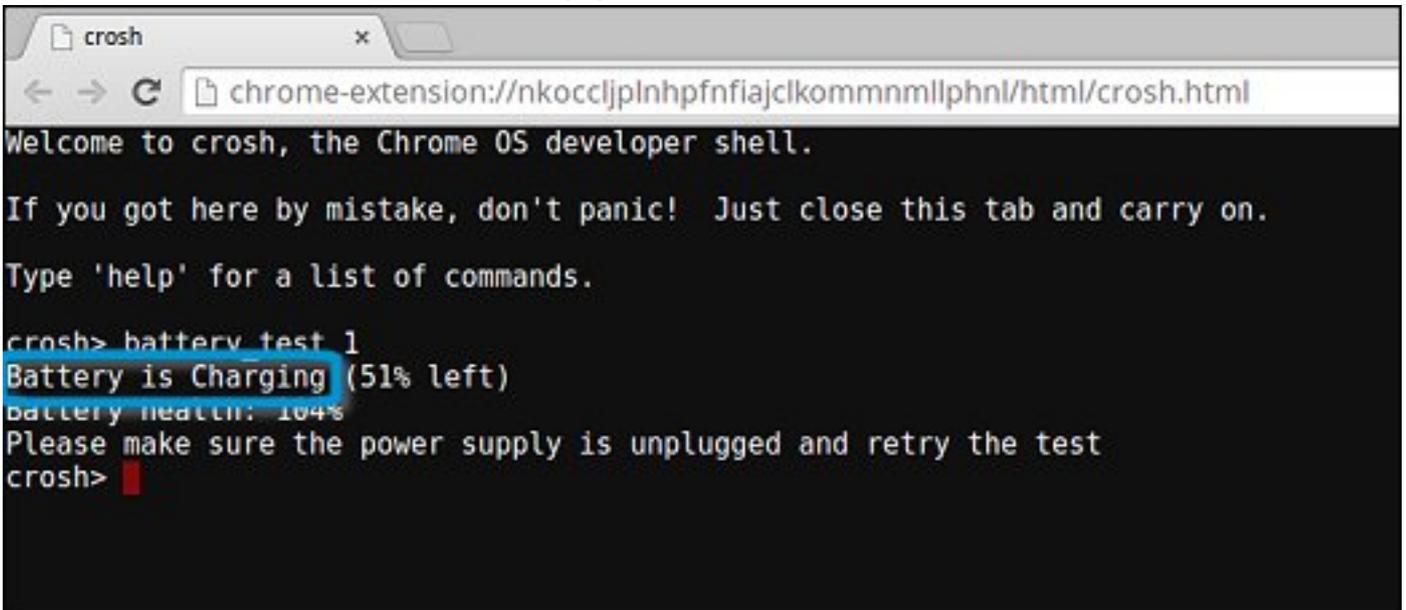


5. Type `battery_test 1` into CROSH, and then press **Enter**.



```
chrome-extension://nkoccljplnhpfnfajclkommmnmlphnl/html/crosh.html
Welcome to crosh, the Chrome OS developer shell.
If you got here by mistake, don't panic! Just close this tab and carry on.
Type 'help' for a list of commands.
crosh> battery_test 1
```

6. Check the result to confirm that the battery is charging.



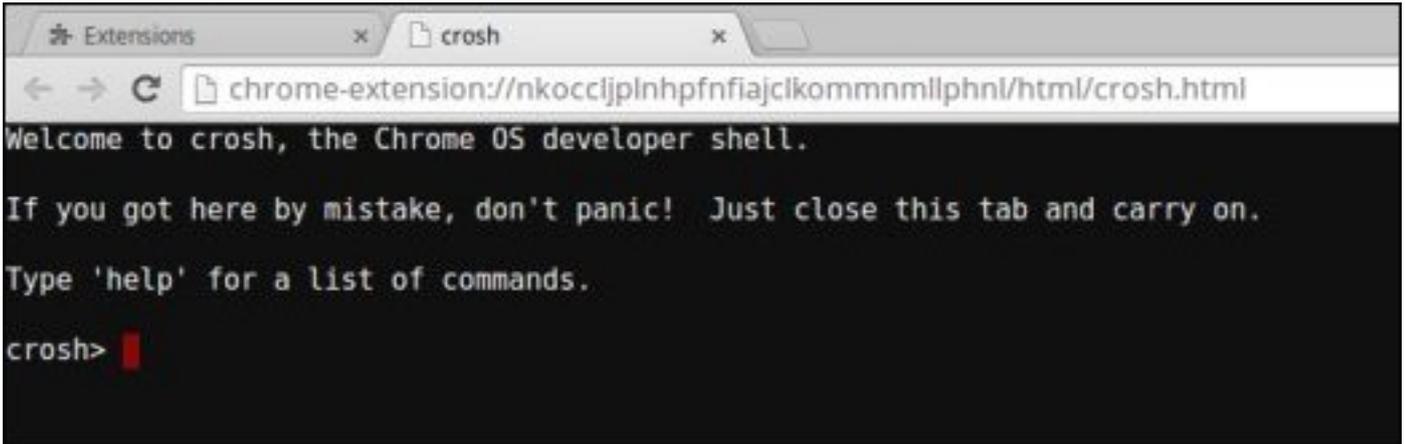
```
chrome-extension://nkoccljplnhpfnfajclkommmnmlphnl/html/crosh.html
Welcome to crosh, the Chrome OS developer shell.
If you got here by mistake, don't panic! Just close this tab and carry on.
Type 'help' for a list of commands.
crosh> battery_test 1
Battery is Charging (51% left)
battery health: 104%
Please make sure the power supply is unplugged and retry the test
crosh> █
```

## Check battery health

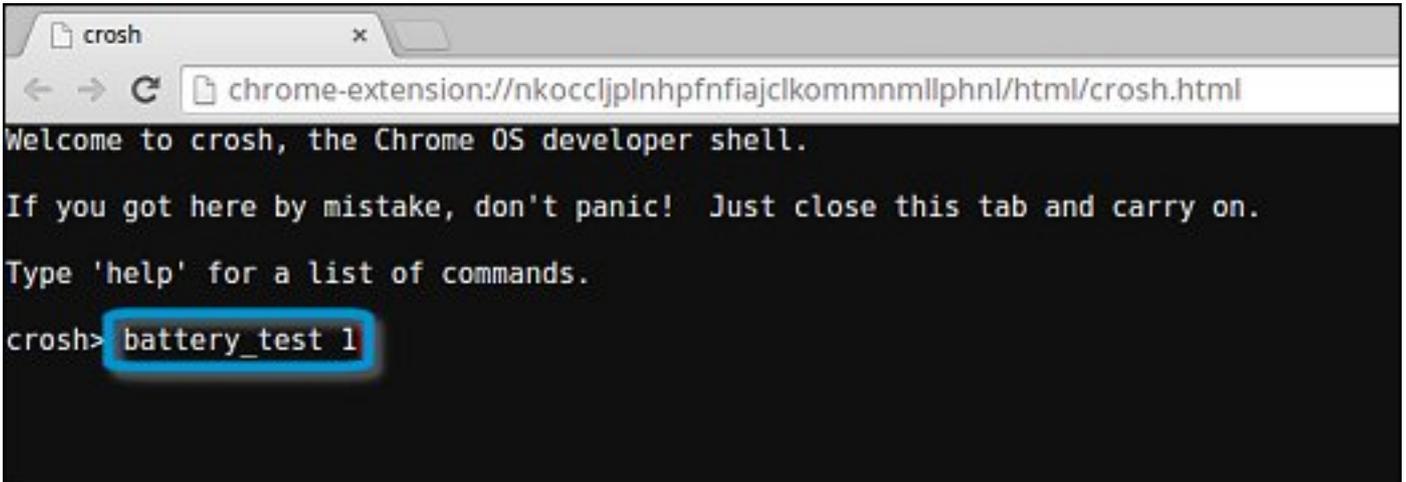
Follow the steps to evaluate the health of the Chromebook battery, and check the discharge rate:

1. Disconnect the AC adapter from the Chromebook.
2. Turn on and sign in to Chromebook.
3. Open the Chrome browser.

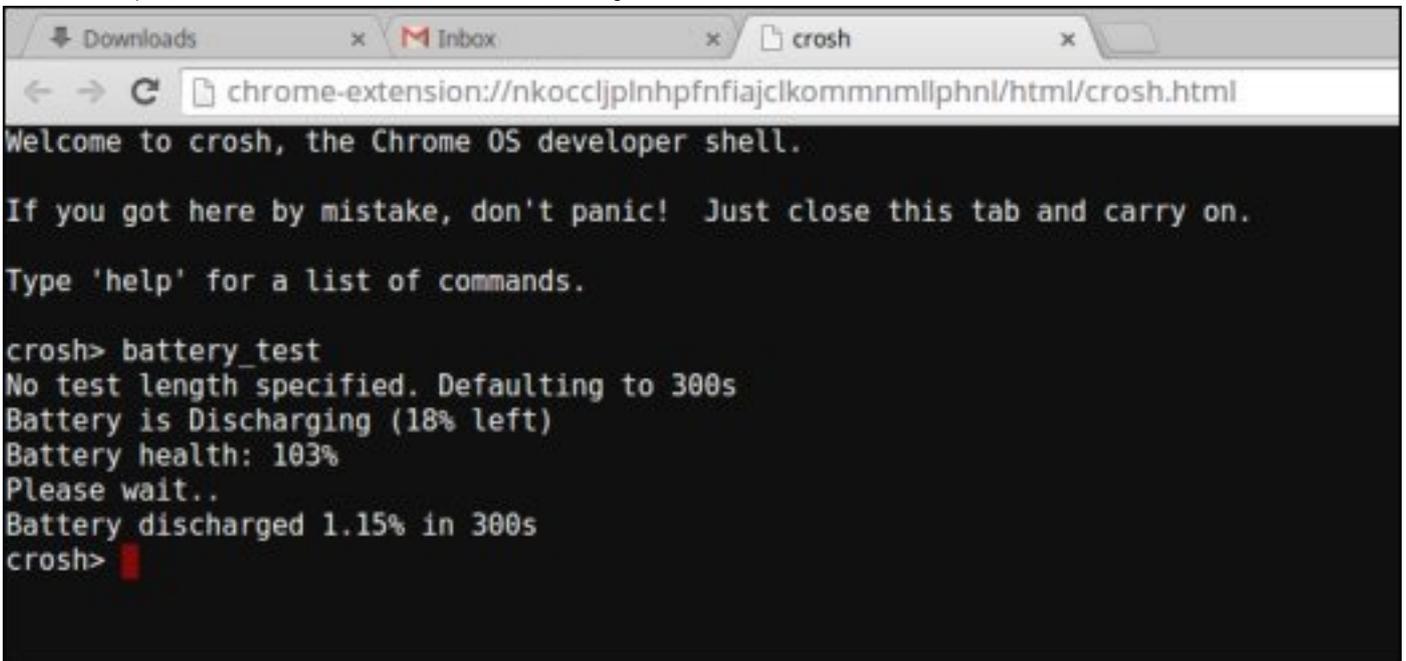
4. Press CTRL + ALT + T to open CROSH.



5. Type battery\_test 1 into CROSH, and then press Enter.



6. A screen displays the current battery health and discharge rate.



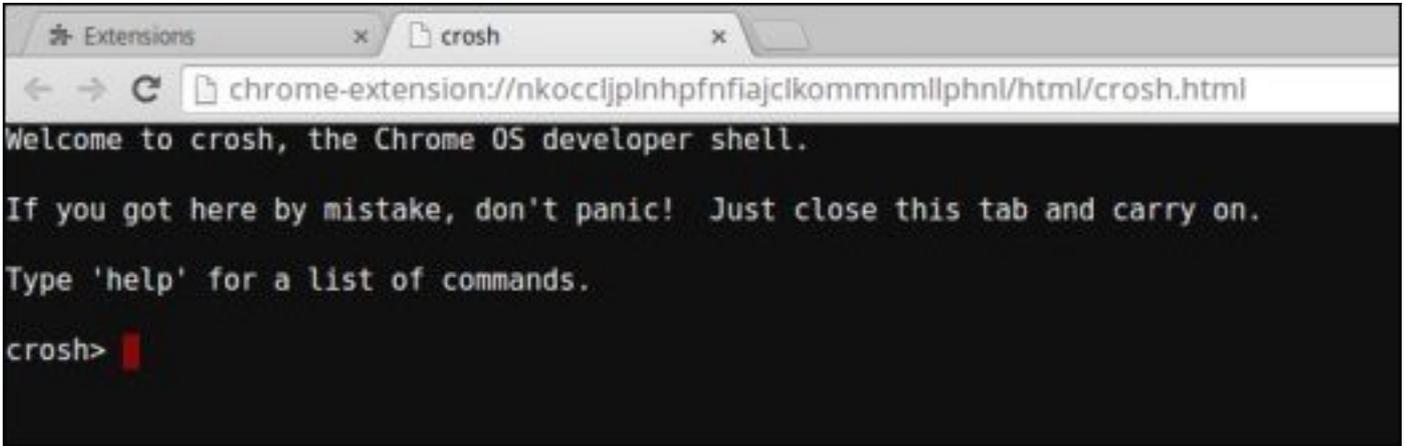
- If the Battery health percentage is greater than 50%, the battery is within the expected wear limits.
- If the Battery health percentage is equal to or less than 50% and the battery is less than a year old, the battery is outside expected wear limits and might need to be replaced.
- If the test results show that Battery is Unknown, the battery might need to be replaced.

## Checking memory

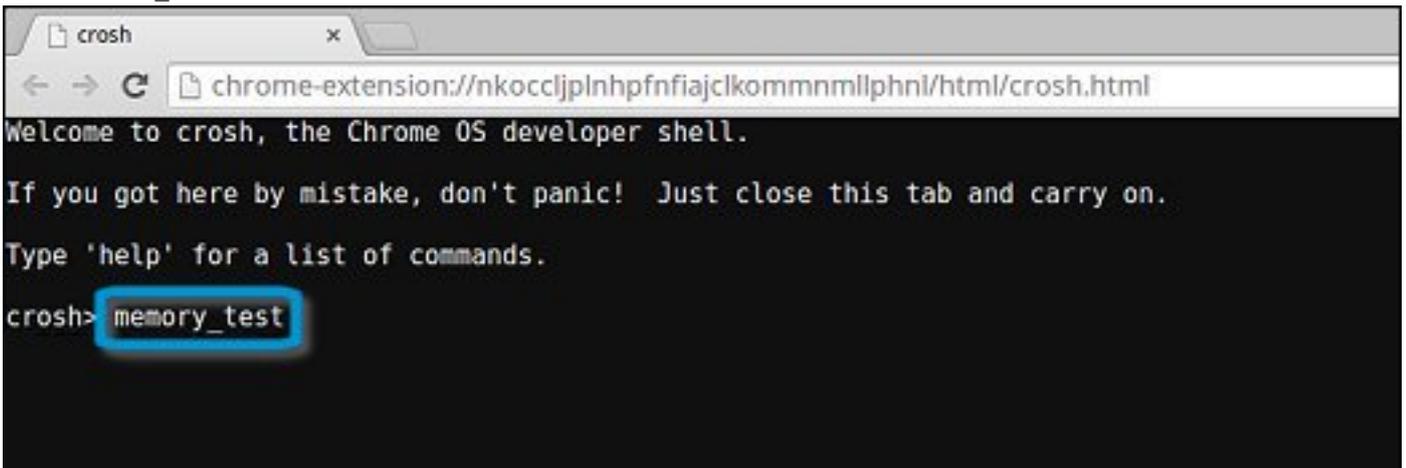
Follow the steps below to perform a memory check for Chromebook:

**NOTE:** This will approximately take 20 minutes to complete the test, and it also depends on the capacity of the memory.

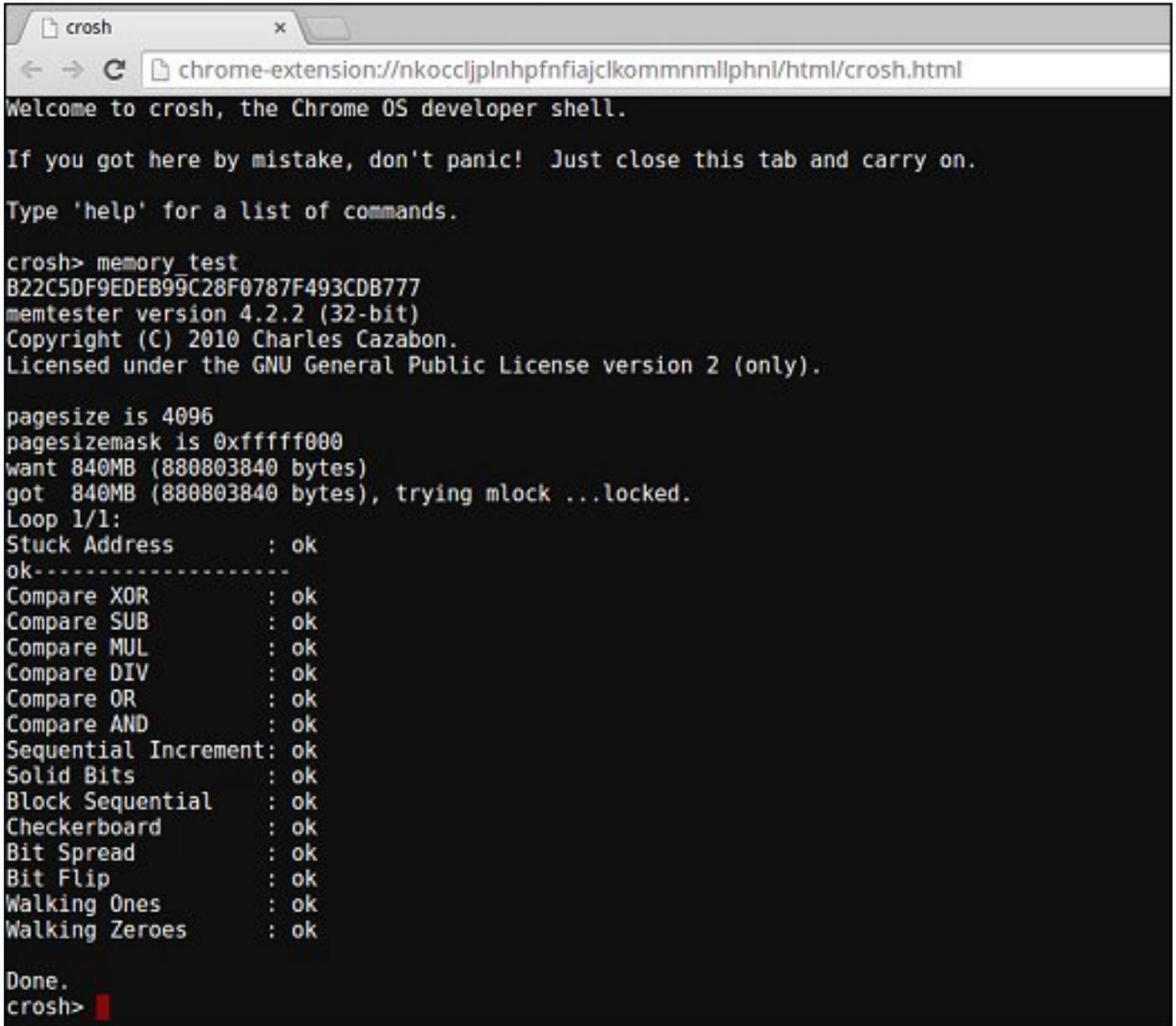
1. Turn on and sign in to Chromebook.
2. Open the Chrome browser.
3. Press CTRL + ALT + T to open CROSH.



4. Type `memory_test` into CROSH, and then press `Enter`.



5. A diagnostic screen displays the result of the memory test passed without any errors.



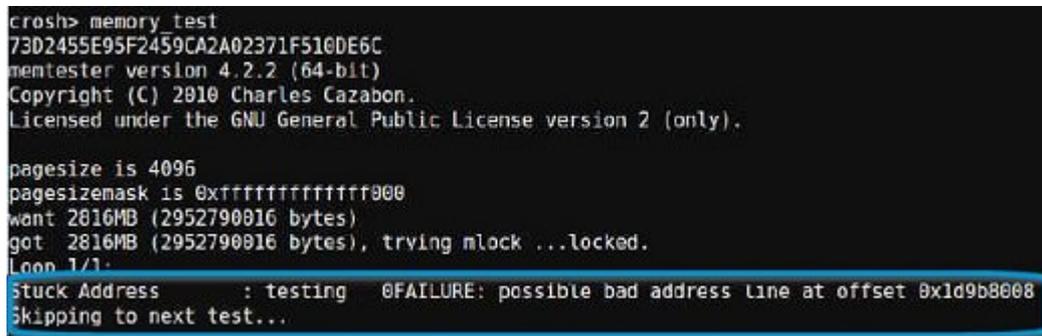
```
crosh
chrome-extension://nkoccljplnhpfnfajclkommmmlphnl/html/crosh.html
Welcome to crosh, the Chrome OS developer shell.
If you got here by mistake, don't panic! Just close this tab and carry on.
Type 'help' for a list of commands.

crosh> memory test
B22C5DF9EDEB99C28F0787F493CDB777
memtester version 4.2.2 (32-bit)
Copyright (C) 2010 Charles Cazabon.
Licensed under the GNU General Public License version 2 (only).

pagesize is 4096
pagesizemask is 0xfffff000
want 840MB (880803840 bytes)
got 840MB (880803840 bytes), trying mlock ...locked.
Loop 1/1:
Stuck Address      : ok
ok-----
Compare XOR        : ok
Compare SUB        : ok
Compare MUL        : ok
Compare DIV        : ok
Compare OR         : ok
Compare AND        : ok
Sequential Increment: ok
Solid Bits         : ok
Block Sequential   : ok
Checkerboard       : ok
Bit Spread         : ok
Bit Flip           : ok
Walking Ones      : ok
Walking Zeroes    : ok

Done.
crosh>
```

Example of a memory test failure.



```
crosh> memory test
7302455E95F2459CA2A02371F510DE6C
memtester version 4.2.2 (64-bit)
Copyright (C) 2010 Charles Cazabon.
Licensed under the GNU General Public License version 2 (only).

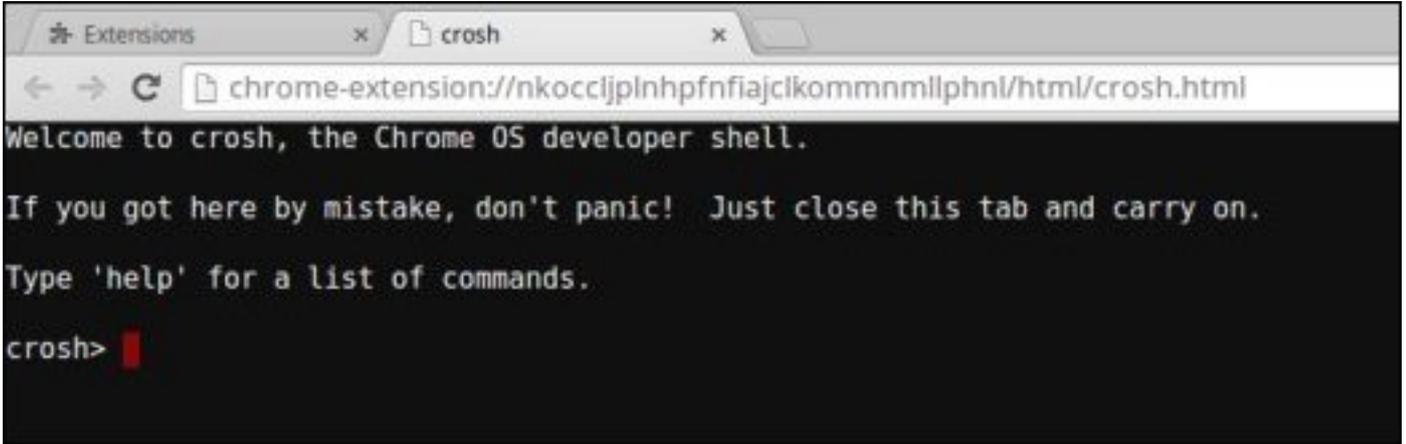
pagesize is 4096
pagesizemask is 0xfffffffff000
want 2816MB (2952790016 bytes)
got 2816MB (2952790016 bytes), trying mlock ...locked.
Loop 1/1:
Stuck Address      : testing @FAILURE: possible bad address line at offset 0x1d9b8008
Skipping to next test...
```

## Checking network status

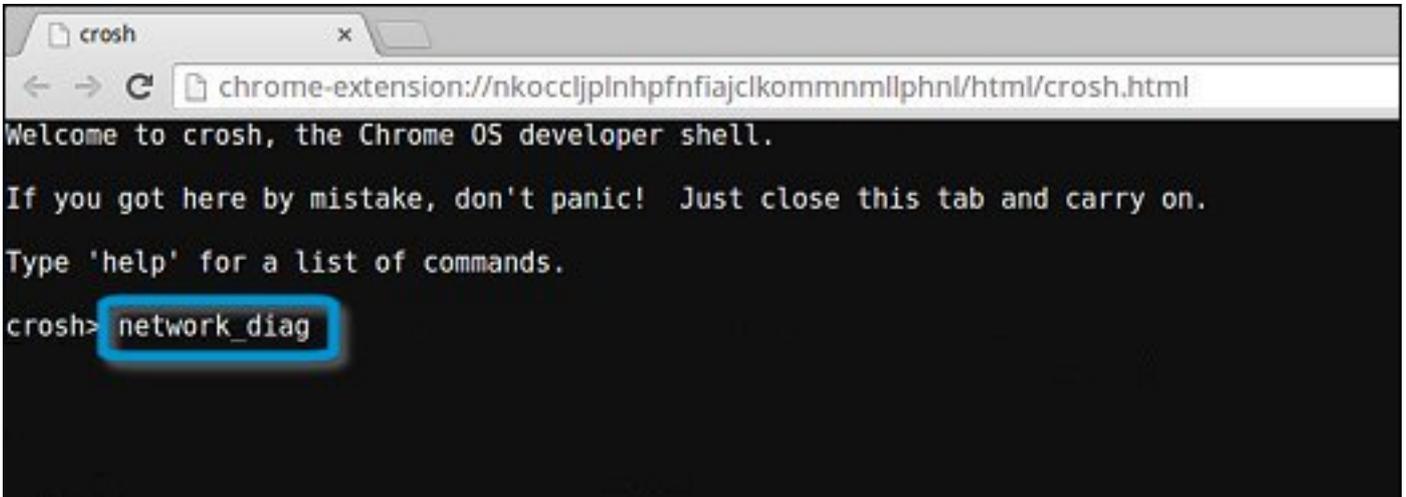
If you are having trouble connecting to the Internet, use the steps in one or more of the following sections to test the network adapter:

Follow the instruction to gather the information about the network and diagnose the network errors.

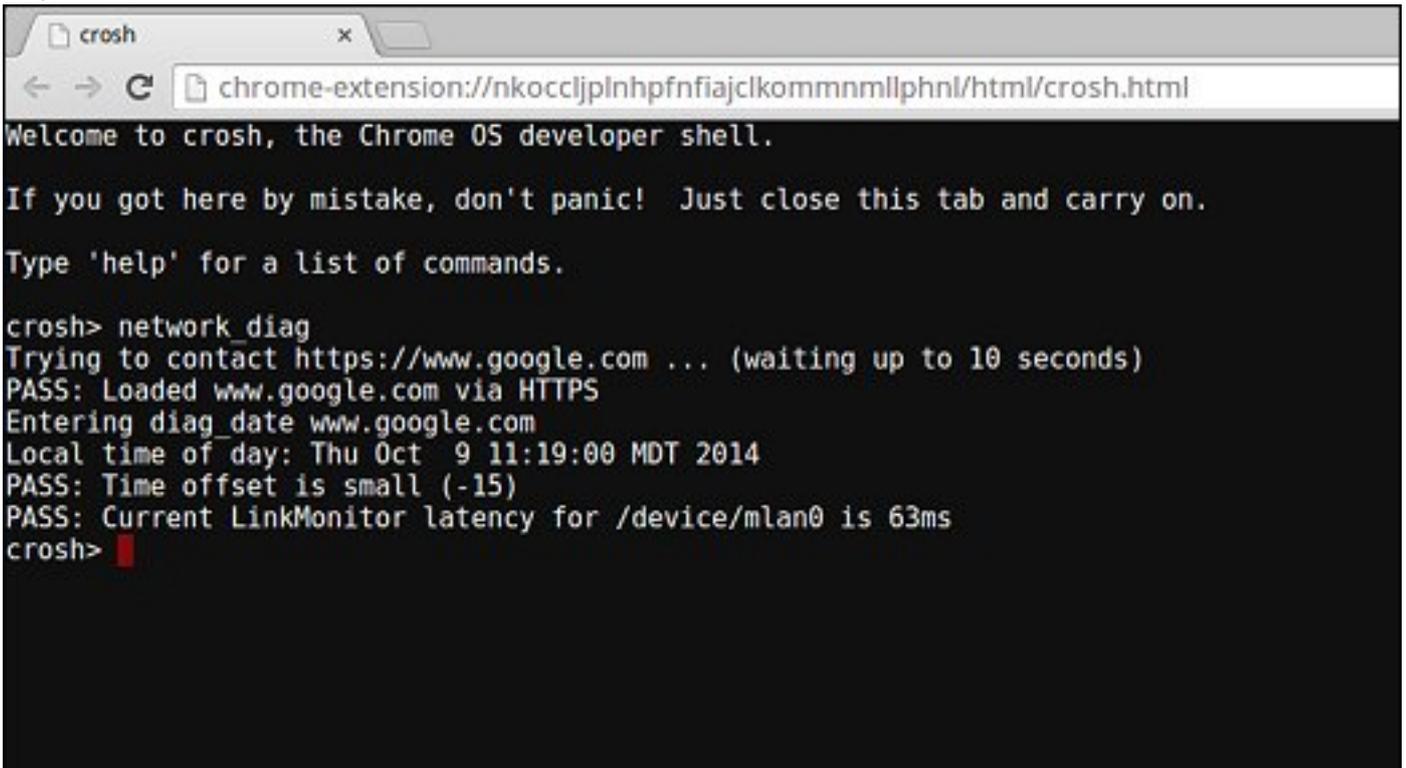
1. Turn on and sign in to Chromebook.
2. Open the Chrome browser.
3. Press **CTRL + ALT + T** to open CROSH.



4. Type `network_diag` into CROSH, and then press **Enter**.



5. Wait while CROSH performs a set of network diagnostic tests. A diagnostic screen displays the results of the network adapter health test.



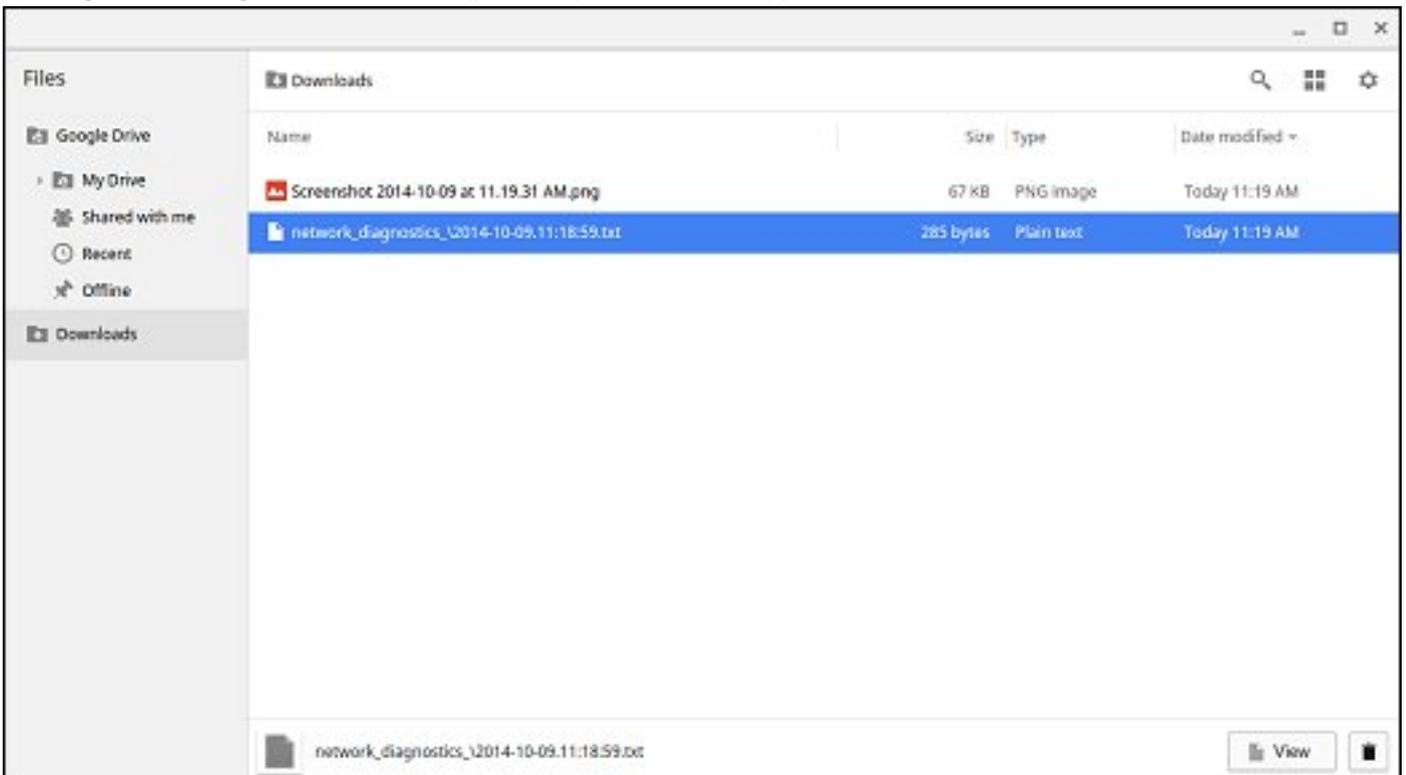
```
chrome-extension://nkoccljplnhpfnfajclkommmmlphnl/html/crosh.html
Welcome to crosh, the Chrome OS developer shell.

If you got here by mistake, don't panic! Just close this tab and carry on.

Type 'help' for a list of commands.

crosh> network_diag
Trying to contact https://www.google.com ... (waiting up to 10 seconds)
PASS: Loaded www.google.com via HTTPS
Entering diag_date www.google.com
Local time of day: Thu Oct 9 11:19:00 MDT 2014
PASS: Time offset is small (-15)
PASS: Current LinkMonitor latency for /device/mlan0 is 63ms
crosh>
```

6. The diagnostic test log is saved as a .txt (plain text) file in the Files app.



7. If the diagnostic test returns a failure message, make sure the Wi-Fi adapter is enabled and connect to a network.

```
Entering diag ping 192.168.1.254
connect: Network is unreachable
FAIL: We can reach the nameservers but were not able to resolve hostnames
FAIL: You may be behind a captive portal or there may be a DNS
FAIL: configuration problem
Entering get_device_list
```

## Reset Chromebook

This page contains all information about resetting Dell Chromebook 3100.

All local user data stored on the Chromebook can be cleared by resetting it to its original factory state (also known as Powerwash).

This step might be helpful if you want to reset owner permissions or if you are experiencing issues with your user profile.

**NOTE:** All data stored on your Chromebook such as downloaded files, photos, owner permissions, and saved networks, will be deleted for all accounts when performing a factory reset. After clearing this data, you will be guided through the initial setup again. Resetting your device will not affect your accounts themselves, or any data synced to these accounts.

**NOTE:** Do not follow the instructions below if you're using a managed Chrome device, as you will not be able to re-enroll your device after powerwashing it.

Follow these steps to reset your Chromebook to its original factory state:

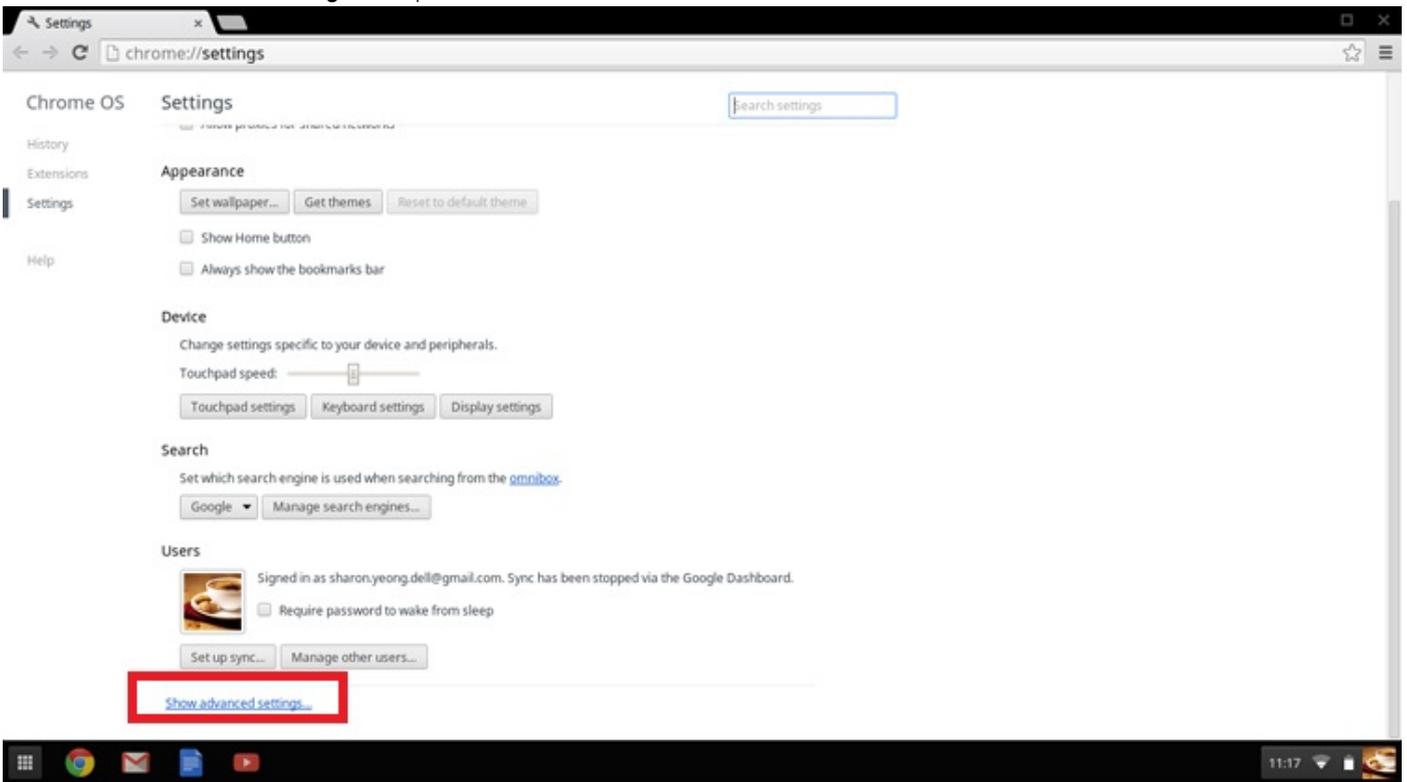
1. Click the status area in the lower-right corner, where your account picture appears.



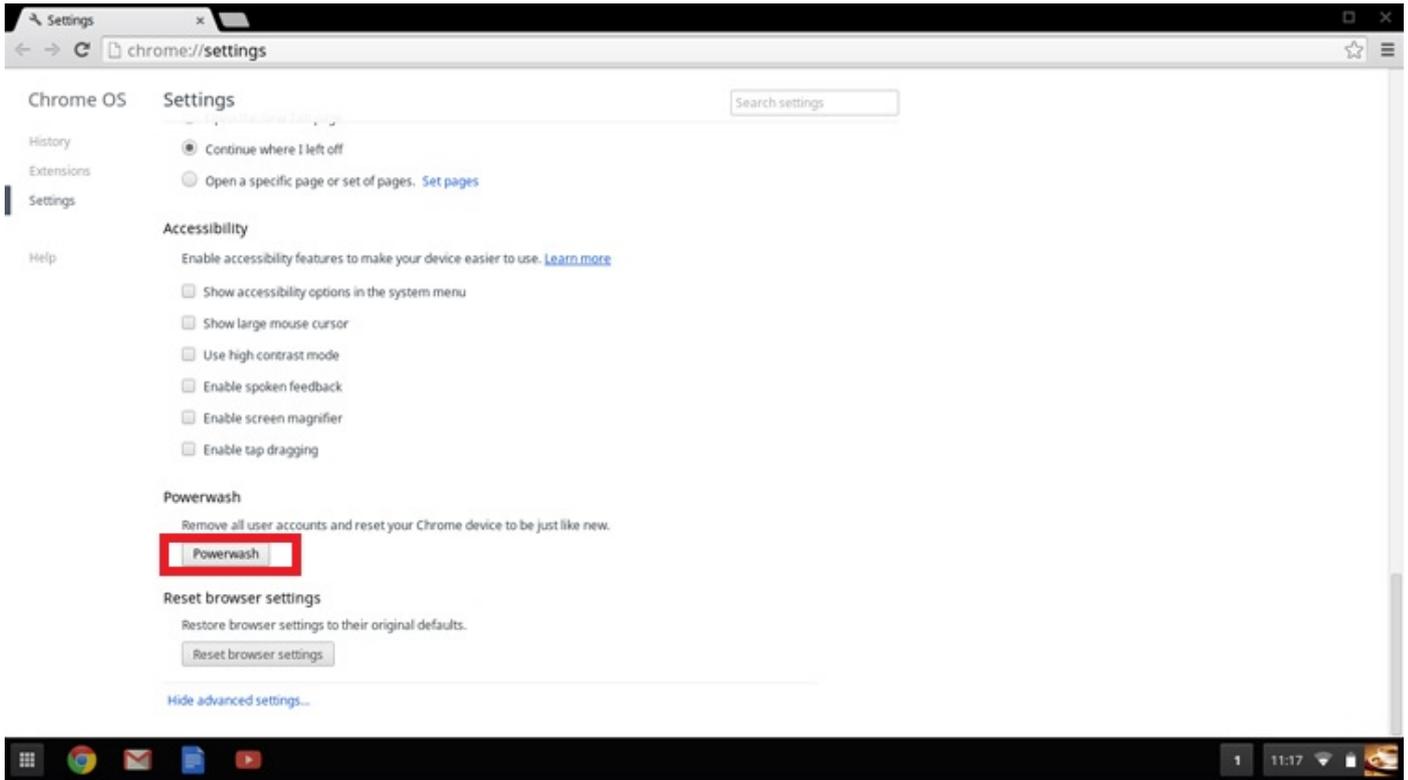
2. Click **Settings** as highlighted from the screenshot below.



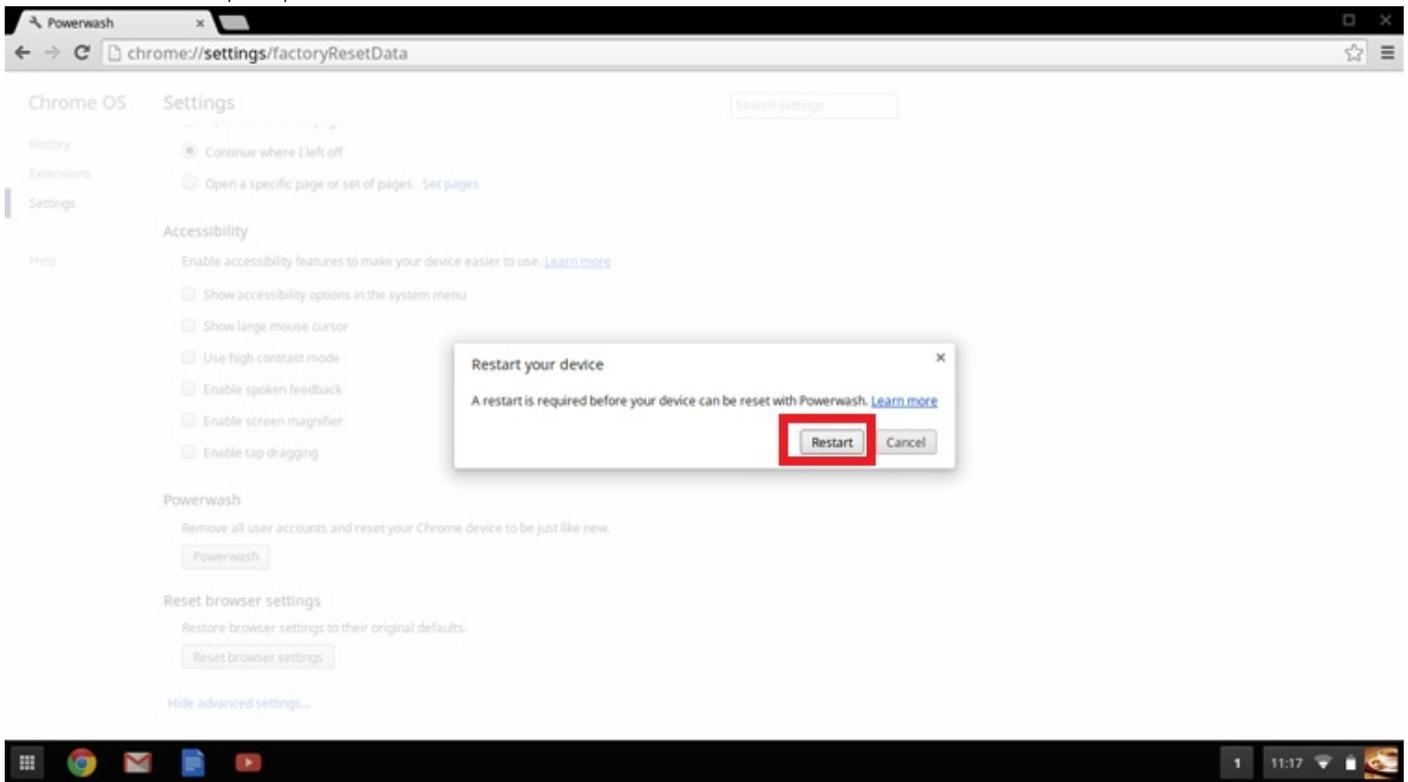
3. Click **Show advanced settings** to expand the menu.



4. Click the **Powerwash** button.



5. Click **Restart** when prompted.



You can also reset your Chromebook from the sign-in screen by holding down the keys **Ctrl+Alt+Shift+R** and clicking **Restart**. (If you are signed in to your Chromebook, sign out first before you press on **Ctrl+Alt+Shift+R**, then click **Restart**.) Once the Chromebook is restarted, click **Reset**.)

After you restart the Chromebook, you should now see the setup screen. Follow the instructions on the screen to set up your Chromebook again. Make sure you sign in with your primary Google Account, because this account is set as the owner account.

# Recovery Chromebook

This page contains information about recovering Dell Chromebook 3100.

## Recovering the Chromebook

Install a new version of the Chrome operating system on your Chromebook by going through the recovery process. You may want to go through this process if you are having problems updating your Chromebook or if it stops working.

**NOTE:** All account information and data stored on your Chromebook, such as photos, downloaded files, and saved networks, will be deleted. Owner privileges for your primary account will also be reset. However, the actual Google Accounts and any data synced to these accounts are not affected by the recovery process. After the recovery process is complete, you will be guided through the initial setup again.

### Prerequisites:

Before starting this process, you need the following:

- A Chrome device, Windows, Mac, or the Linux computer with administrative rights.
- A 4 GB or larger USB flash drive or SD card that you do not mind clearing.

## Step 1- Check for the Chrome OS is missing or damaged message

If you see this message, you can first try to perform a hard reset on your Chromebook by pressing Refresh + Power. If you still see this message after performing a hard reset, please proceed to Step 2.

If you see the **Chrome OS verification is turned off** message, refer to **Chrome OS verification is turned off** section below.

## Step 2- Create the recovery USB flash drive or SD card

Insert a USB flash drive or SD card into your computer and follow the instructions below

Table 15. USB flash drive or SD card (continued)

Operating System	Instructions
Chrome Device Instructions	<p>Create a recovery flash drive by using the Image Burner. The tool may not be available in all languages.</p> <ol style="list-style-type: none"><li>1. Type <code>chrome://imageburner</code> into the omnibox (browser's address bar) .</li><li>2. Run the tool and follow the instructions that appear on your screen.</li></ol> <p><b>NOTE:</b> When recovering your Chromebook, make sure to create the recovery flash drive on the same model.</p>
Windows Instructions	<ol style="list-style-type: none"><li>1. Click this <a href="#">link</a> to download the Recovery Tool. If you are a network administrator for your school, business, or organization, click this link to download the Recovery Tool: 2. 3.</li><li>2. Run the tool and follow the instructions that appear on your screen.</li><li>3. After you recover your Chromebook, you must format your USB flash drive or SD card using the Recovery Tool. If you do not format your USB flash drive or SD card, you will not be able to use all the storage space on your external device. Additionally, your USB flash drive or SD card may not be recognizable by Windows.</li></ol>
Mac Instructions	<p>Create a recovery flash drive by using the Recovery Tool. The tool may not be available in all languages.</p> <ol style="list-style-type: none"><li>1. Click this <a href="#">link</a> to download the Recovery Tool.</li></ol>

**Table 15. USB flash drive or SD card**

Operating System	Instructions
	<p><b>2.</b> Run the tool and follow the instructions that appear on your screen.</p> <p>After the process is complete, you might see an alert saying your USB drive or SD card is unreadable. If this fails, try removing and reinserting your USB drive or SD card. Your USB drive or SD card should now be ready to use for recovery.</p>
Linux Instructions	<p>Create a recovery flash drive by using the Recovery Tool. The tool may not be available in all languages.</p> <ol style="list-style-type: none"> <li>1. Click this <a href="#">link</a> to download the Recovery Tool.</li> <li>2. Modify the script permissions to allow execution with the following command: <code>\$ &amp; sudo chmod 755 linux_recovery.sh</code></li> <li>3. Run the script with root privileges with the following command: <code>\$ sudo bash linux_recovery.sh</code></li> <li>4. Follow the prompts from the tool to complete building the operating system image.</li> </ol>

## Reinstall the Chrome Operating System

1. Start your Chromebook.
2. When the **Chrome OS is missing or damaged** screen appears, insert the USB flash drive or SD card you created into the USB port or SD card slot on your Chrome device
3. Wait for the Chromebook to boot up from the flash drive
4. Follow the instructions that appear on the screen.
5. On successful installation of the Chrome operating system, you will be prompted to remove the USB flash drive or SD card.
6. Remove the USB flash drive or SD card when prompted, and your Chromebook will automatically restart.

You should now be able to start your Chromebook as normal. Because the data stored on your Chromebook has been cleared, you will need to go through the initial setup again. Make sure you sign in with your primary Google Account, because this account will be set as the owner account.

## Chrome OS verification is turned off Message

By default, Chromebooks are set to the normal user mode. If you've set the user mode to developer mode instead, you'll see a screen with the message "Chrome OS verification is turned off" when you start up. Use the developer mode if you want to test your own version of the Chrome operating system.

Press **Ctrl+D** to enter developer mode. If you press the space bar instead, you'll see a screen asking to recover your device.

## Troubleshooting Tips

**Table 16. Troubleshooting tips (continued)**

Question	Solution
I am unable to recover my Chromebook	To help ensure that you are running the latest version of Chrome OS once you recover your Chromebook, we recommend creating the recovery media with the latest version of Chrome OS and avoid using recovery media that may contain an older version of the operating system.
An error message <b>An unexpected error has occurred.</b>	<p>Try the following steps:</p> <ol style="list-style-type: none"> <li>1. Confirm that you successfully completed all instructions exactly as specified in Step 2: Create the recovery USB flash drive or SD card above.</li> <li>2. Try using a different USB stick or SD card.</li> </ol>

**Table 16. Troubleshooting tips**

<b>Question</b>	<b>Solution</b>
	<b>3.</b> If the problem persists, contact Google Chrome support team.
An error message <b>You are using an out-of-date Chrome OS recovery image.</b>	You should download an up-to date recovery image. Simply follow all the instructions exactly as specified in Step 2 above.
You successfully recovered your Chromebook but now you can not use your USB or SD card with Windows	After you have completed recovery, you need to format your USB or SD card using the recovery tool.
You successfully recovered your Chromebook but now Windows does not recognize the whole size of the USB or SD card used for recover.	After you have completed recovery, you need to format your USB or SD card using the recovery tool.

# Getting help and contacting Dell

## Self-help resources

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

**Table 17. Self-help resources**

Self-help resources	Resource location
Information about Dell products and services	<a href="http://www.dell.com">www.dell.com</a>
My Dell app	
Tips	
Contact Support	In Windows search, type <code>Contact Support</code> , and press Enter.
Online help for operating system	<a href="http://www.dell.com/support/windows">www.dell.com/support/windows</a>
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents.	Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at <a href="http://www.dell.com/support">www.dell.com/support</a> .  For more information on how to find the Service Tag for your computer, see <a href="#">Locate the Service Tag on your computer</a> .
Dell knowledge base articles for a variety of computer concerns	<ol style="list-style-type: none"> <li>1. Go to <a href="http://www.dell.com/support">www.dell.com/support</a>.</li> <li>2. On the menu bar at the top of the Support page, select <b>Support &gt; Knowledge Base</b>.</li> <li>3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.</li> </ol>

## Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see [www.dell.com/contactdell](http://www.dell.com/contactdell).

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

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