Microsoft Surface

Surface Laptop 5 Service Guide

SG

Disclaimer of Warranties and Limitation of Damages

All information, content, materials, and products made available in or in conjunction with this Guide are provided by Microsoft on "as-is" and "as available" basis, unless otherwise specified by Microsoft in writing. Microsoft makes no representations or warranties of any kind, express or implied, as to the information, content, materials, and products included or otherwise made available to you or accompanying this Guide unless specified in writing. You expressly agree that your use of the information, content, materials, and product in or accompanying this Guide is at your sole risk.

To the fullest extent permissible by law, Microsoft disclaims all warranties, express or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose. To the fullest extent permissible by law, Microsoft shall not be liable for damages of any kind arising from the use of information, content, materials, or product made available in or in conjunction with this Guide, including but not limited to direct, indirect, incidental, consequential, and/or punitive damages unless otherwise specified in writing.

Notice

Microsoft and its suppliers may have patents, patent applications, trademarks, copyrights, trade secrets and/or other intellectual property rights covering subject matter in this document. Microsoft's furnishing of this document to recipient does not grant or imply any license to any patents, trademarks, copyrights, trade secrets or other intellectual property rights, and recipient's permitted use of any such intellectual property rights, if any, is solely governed by the Agreements.

This document and the information it contains are subject to change without notice. You can find the latest information on Surface device servicing and repair at https://aka.ms/surfaceservicing. Always consult the most up-to-date information available before performing device servicing or repair.

Document Part Number: M1237924

TABLE OF CONTENTS

Device Identity Information

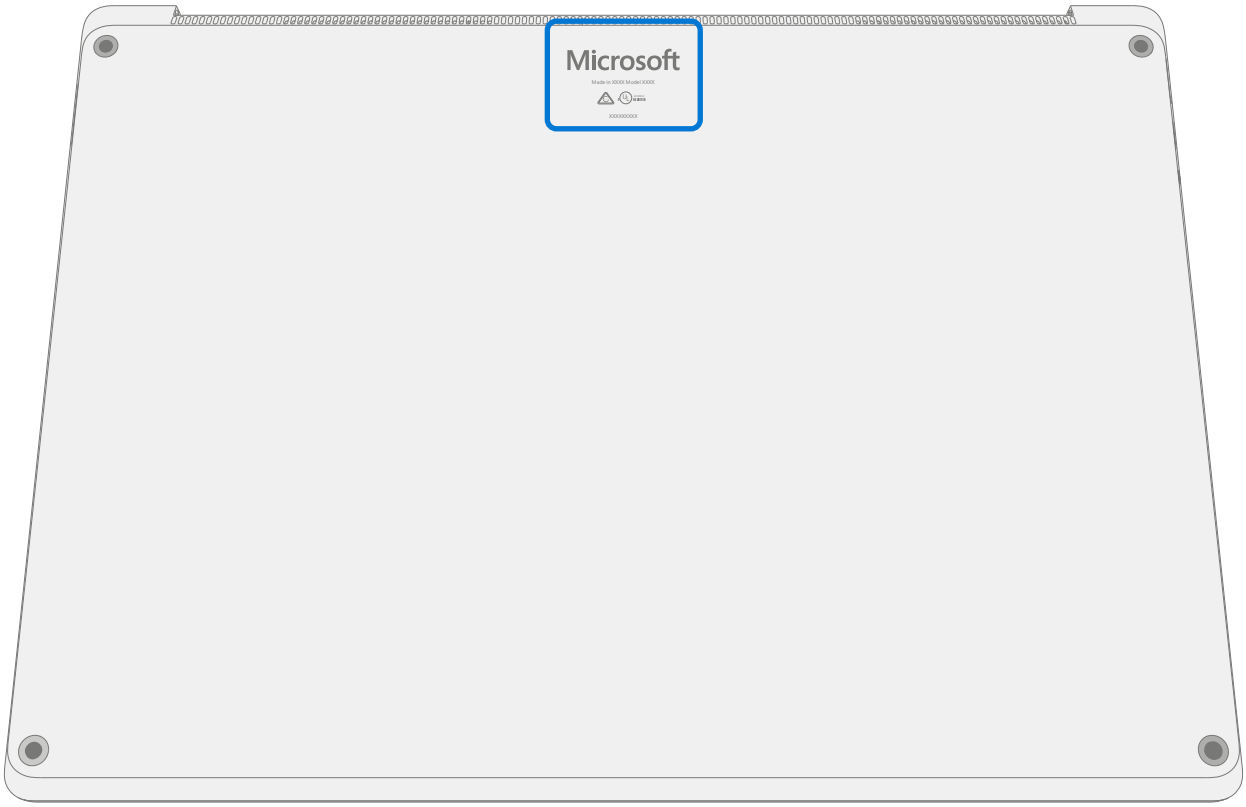
Surface Laptop Models

- 1950 – Surface Laptop 5 13.5" (Fabric)
- 1951 – Surface Laptop 5 13.5" (Metal)
- 1958 – Surface Laptop 5 15" (Fabric)
- 1959 – Surface Laptop 5 15" (Metal)

Surface Support - Laptop: Link

Surface Laptop Technical Specifications: Surface Laptop 5

The model and serial number for Surface Laptop 5 is on the bottom of the device in the upper middle.



Glossary of Terms

The following terms are used throughout this guide.

- **ASP** – Authorized Service Provider. Companies that have received clearance to repair or maintain a product that is still under warranty by Microsoft.
- **BMR** – Bare Metal Recovery refers to the clean imaging process
- **Chassis** – Bottom case of the device
- **CPU** – Central Processing Unit
- **CRU or Commercial Spares** – Customer Replaceable Units. Service parts that can be removed and replaced by the customer.
- **Display or TDM** – The Touch Display Module, the complete screen with all layers
- **ESD** – Electro-Static Discharge
- **FPC** – Flexible Printed Circuit Connections
- **FRU** – Field Replaceable Units. FRUs are available only to ASPs. Some replaceable units will only be available as FRUs and therefore are only supported at an ASP.
- **IPA** – Isopropyl alcohol which should be used to clean adhesive from device as detailed within process steps. Use 70% IPA in all cases.
- **Motherboard or PCBA** – Primary circuit board assembly
- **OS** – Operating System
- **PSA** – Pressure Sensitive Adhesive
- **rSSD** – Removable Solid-State Drive
- **SDT** – Surface Diagnostic Toolkit
- **SoC** – System-on-a-chip, a microchip with several electronic circuits and parts in a single integrated circuit.
- **Spudger** – A tool that is used to assist with opening, prying, installing, and removing components from objects such as electronics. Usually plastic.
- **Thermal Module or THM** – An assembly with heat spreaders and electric fan
- **TIM** – Thermal interface material used between the THM and PCBA

General Information, Precautions, Warnings

⚠ This symbol identifies important safety and health information in this guide.

This symbol identifies important information in this guide.

! This symbol identifies important cautions in this guide.

Service Tools:

Microsoft Recommended Service Tools

- ESD-safe battery cover

Microsoft Provided Software Tools / References

- Surface Power Supply
- How To: Update Surface device firmware and OS
- How To: Surface Tools Video
- Download: Surface drivers and firmware
- Download: Surface Diagnostic Toolkit (SDT)
- Download: Surface Data Eraser
- Download: Surface Imaging Tools

Standard Service Tools:

- Anti-static wrist strap (1 MOhm resistance)
- ESD-safe benchtop
- Gloves
- Safety Glasses
- Spudger tool
- Plastic Opening Pick (example iFixit Opening Picks)
- Bucket (1 gallon)
- Clean, dry, untreated sand (0.5 gallon)
- Exterior monitor (with HDMI connection)
- UDB-C to HDMI adapter
- Non-metallic ruler
- Isopropyl alcohol Dispenser bottle (use 70% IPA)
- Goo Gone
- Cleaning swabs
- ESD-safe tweezers
- USB keyboard
- 0.2mm thickness gauge
- 0.2mm thickness gauge
- 0.25mm thickness gauge

Standard Service Tools (continued)

- 3IP (Torx-plus) driver
- 5IP (Torx-plus) driver
- 6IP (Torx-plus) driver
- USB drive
- Wired Ethernet connection to the Internet
- Microfiber / lint free cloth
- USB Thumb drive
- Heavy duty suction cups (2) – 57.15mm (2.25 in)

The tools identified on this list can be purchased from many different commercial sources, including but not limited to Amazon.com; iFixit; Chemdex, and other vendors. ASP's please refer to the ASP Guidebook for Microsoft tools.

General Safety Precaution

⚠ Always observe the following general safety precautions:

- Opening and/or repairing any device can present electric shock, device damage, fire, and/or personal injury risks and other hazards. Exercise caution when undertaking these activities as described in this guide. Microsoft recommends a familiarity with repair and troubleshooting of consumer electronics equivalent to an CompTIA A+ Certification for the best chances of success in the execution of a device repair.
- Always select and use the appropriate AC power supply for a device. We recommend you use genuine Microsoft power supply units and AC power cords. A genuine Microsoft power supply unit is provided with every device.
- Use only AC power provided by a standard (mains) wall outlet. Do not use non-standard power sources, such as generators or inverters, even if the voltage and frequency appear acceptable.
- Improper use, transport, and/or disposal of lithium-ion batteries may result in fire or explosion. Only open the enclosure on a device as outlined in this guide. Do not heat, puncture, mutilate, or dispose of devices or their batteries in fire. Do not leave or charge devices in direct sunlight or exposed to other extreme sources of heat for an extended period. Doing so may cause damage or melt the batteries.
- Depending on the device type, the available suite of FRUs/CRUs may include replacement lithium-ion batteries. Improper transport, recycling, reuse, or disposal of lithium-ion batteries may result in fire or explosion. Always manage lithium-ion batteries as required by local law or regulation. There are several ways to find battery recycling services and advice in your community. Visit Microsoft End-of-life management and recycling for more information about battery recycling and to find available resources near you.
- Do not dispose of your old device and/or its batteries in a household garbage can or recycling bin.

For additional product safety information, including information about

- Hearing conservation
- Heat related concerns
- Choking hazard/small parts
- Interference with medical devices
- Broken glass
- Photosensitive seizures
- Musculoskeletal disorders

See aka.ms/surface-safety or the Surface app. To open the Surface app, select the Start button, enter Surface into the search box, then select the Surface app.

Repair-Specific Precautions and Warnings

- For Autopilot managed Surface Products refer to the following guidelines posted here.
- Prior to opening device, ensure device is powered off and disconnected from a power supply.
- We recommend wearing protective eyewear as a safety precaution when disassembling/re-assembling a device.
- Before opening device, always check that an anti-static wrist strap is worn, and work area is properly grounded to ensure electrostatic discharge (ESD) safe environment.
- During all activities involving the display, check to ensure that no loose articles are within the internals of the device when reassembling the unit.
- Check to make sure that general guidelines and ESD compliance steps are followed prior to starting activities. Refer to Prior to Device Disassembly section on (page 18) for details.
- If battery damage (e.g., leaking, expansion, folds, evidence of impacts, or other indications) is discovered during the back cover removal/installation process or if the battery is impacted or damaged during the removal/installation process, activities should cease. Refer to Microsoft Operational Guidelines or contact Microsoft directly for information about proper device disposition.
- As you remove each subassembly from the device, place the subassembly (and all accompanying screws) away from the work area to prevent damage to the device and to the subassembly.
- During all activities (excluding feet-only replacement) check to ensure that no loose articles are on the back cover or within the internals of the device when reassembling the unit.

  ⚠ **WARNING:** Ensure rSSD is removed whenever device is opened for repair. rSSD removal disconnects the battery from all device logical components. Refer to the Procedure – Removal (rSSD) (page 33) for details.

- Device Serial Number Notation – The Surface device serial number for this model is located on the bottom of the chassis. When the chassis is replaced during service/repair, the device serial number becomes physically disconnected from the customer's device. To ensure the customer has the best experience if any future Microsoft support is required, it is recommended to create a notation of the device serial number and provide it to the customer upon completion of the repair.

⚠ Safety Policies/Procedures

Microsoft's field product safety program team is referred to as the Rapid Response Team (RRT). All device issues that may be safety related should be managed per the following instructions.

Cease repair on any Microsoft Surface device that visually exhibits any of the following, and contact Microsoft Surface Support to report and receive further guidance:

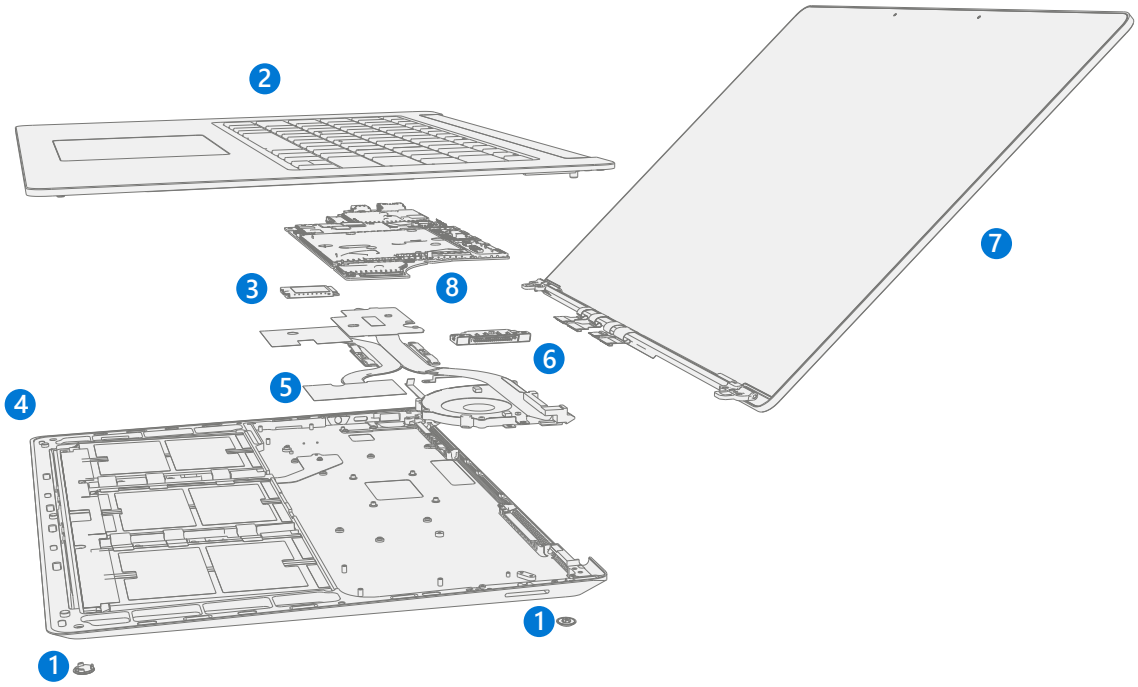
- Any burned or melted components, traces, or plastic parts on the **outside** of the device, including parts or components that otherwise exhibit heat damage, like charring seen in charging or other ports.
- Any burned or melted components, traces, or plastic parts on the **inside** of the device, including parts or components that otherwise exhibit heat damage.
- Any melting or heat damage observed for accessories such as power supplies, keyboards, mice, cables, charging connectors, etc. included with the Microsoft device.
- Any devices that exhibit a case that has separated apart or opened for reasons other than customer abuse (e.g., impact damage from dropping, evidence of tampering, separation caused by an expanded battery).
- Any other finding that may constitute a potential safety hazard to the user, such as sharp edges on plastics.

ASPs should refer to the Guidebook for the Microsoft RRT email address and instructions. All others shall go to Microsoft Surface Support Services to report any above condition(s) observed.

Microsoft will ask for the following information:

- The model and serial number of the affected Microsoft Surface device and/or accessory(ies).
- A description of the damage found.
- Clear photographs depicting the symptoms observed.
- ASPs: The Service Request (SR) Number or alternative service tracking work order that the device was received under

Illustrated Service Parts List



IMPORTANT: Device service part availability is segmented into two groups. FRUs are parts available for repair activity through an Authorized Service Provider under specific contract with Microsoft. CRUs/Spares are parts available for repair activity by a skilled technician.

Item	Component	ASP / FRU Part No.	CRU Part No.	13.5-inch	15-inch
(1)	**Non-Skid Feet**				
	Platinum Feet	RPW-00003	CIG-00002	X	X
	Black Feet	RPW-00001	CIG-00001	X	X
	Sage Feet	RPW-00006	CIG-00006	X	
	Sandstone Feet	RPW-00004	CIG-00004	X	
(2)	**Keyboard (C-Cover) Assembly**				
	Platinum, English (America / Asia)	U1T-00001	U3B-00001	X	
	Platinum, English/French (Canada)	U1T-00002	U3B-00002	X	
	Platinum, Spanish (Mexico)	U1T-00003	U3B-00003	X	
	Platinum, Japanese	U1T-00004	U3B-00004	X	
	Platinum, Korean	U1T-00005	U3B-00005	X	
	Platinum, Taiwan	U1T-00006	U3B-00006	X	
	Platinum, Chinese Traditional (Taiwan)	U1T-00007	U3B-00007	X	
	Platinum, Arabic	U1T-00008	U3B-00008	X	
	Platinum, English (British)	U1T-00009	U3B-00009	X	
	Platinum, English (International)	U1T-00010	U3B-00010	X	
	Platinum, German	U1T-00011	U3B-00011	X	
	Platinum, French (France)	U1T-00012	U3B-00012	X	

Item	Component	ASP / FRU Part No.	CRU Part No.	13.5-inch	15-inch
(2)	**Keyboard (C-Cover) Assembly (Continued)**				
	Platinum, Switzerland/Luxemburg	U1T-00013	U3B-00013	X	
	Platinum, Belgium	U1T-00014	U3B-00014	X	
	Platinum, Italian (Italy)	U1T-00015	U3B-00015	X	
	Platinum, Portuguese (Portugal)	U1T-00016	U3B-00016	X	
	Platinum, Spanish (Spain)	U1T-00017	U3B-00017	X	
	Platinum, Nordic (Denmark, Finland, Norway, Sweden)	U1T-00018	U3B-00018	X	
	Black, English (America / Asia)	U1T-00019	U3B-00019	X	
	Black, English/French (Canada)	U1T-00020	U3B-00020	X	
	Black, Spanish (Mexico)	U1T-00021	U3B-00021	X	
	Black, Japanese	U1T-00022	U3B-00022	X	
	Black, Korean	U1T-00023	U3B-00023	X	
	Black, Taiwan	U1T-00024	U3B-00024	X	
	Black, Chinese Traditional (Taiwan)	U1T-00025	U3B-00025	X	
	Black, Arabic	U1T-00026	U3B-00026	X	
	Black, English (British)	U1T-00027	U3B-00027	X	
	Black, English (International)	U1T-00028	U3B-00028	X	
	Black, German	U1T-00029	U3B-00029	X	
	Black, French (France)	U1T-00030	U3B-00030	X	
	Black, Switzerland/Luxemburg	U1T-00031	U3B-00031	X	
	Black, Belgium	U1T-00032	U3B-00032	X	
	Black, Italian (Italy)	U1T-00033	U3B-00033	X	
	Black, Portuguese (Portugal)	U1T-00034	U3B-00034	X	
	Black, Spanish (Spain)	U1T-00035	U3B-00035	X	
	Black, Nordic (Denmark, Finland, Norway, Sweden)	U1T-00036	U3B-00036	X	
	Sage, English (America / Asia)	U1T-00037	U3B-00037	X	
	Sage, English/French (Canada)	U1T-00038	U3B-00038	X	
	Sage, Japanese	U1T-00039	U3B-00039	X	
	Sage, Chinese Traditional (Taiwan)	U1T-00040	U3B-00040	X	
	Sage, English (British)	U1T-00041	U3B-00041	X	
	Sage, German	U1T-00042	U3B-00042	X	
	Sage, French (France)	U1T-00043	U3B-00043	X	
	Sage, Switzerland/Luxemburg	U1T-00044	U3B-00044	X	
	Sandstone, English (America / Asia)	U1T-00045	U3B-00045	X	
	Sandstone, English/French (Canada)	U1T-00046	U3B-00046	X	
	Sandstone, Japanese	U1T-00047	U3B-00047	X	
	Sandstone, Chinese Traditional (Taiwan)	U1T-00048	U3B-00048	X	
	Sandstone, English (British)	U1T-00049	U3B-00049	X	
	Sandstone, German	U1T-00050	U3B-00050	X	
	Sandstone, French (France)	U1T-00051	U3B-00051	X	
	Sandstone, Switzerland/Luxemburg	U1T-00052	U3B-00052	X	

Item	Component	ASP / FRU Part No.	CRU Part No.	13.5-inch	15-inch
(2)	**Keyboard (C-Cover) Assembly (Continued)**				
	Platinum, English (America / Asia)	U5I-00001	U83-00001		X
	Platinum, English/French (Canada)	U5I-00002	U83-00002		X
	Platinum, Spanish (Mexico)	U5I-00003	U83-00003		X
	Platinum, Japanese	U5I-00004	U83-00004		X
	Platinum, Korean	U5I-00005	U83-00005		X
	Platinum, Taiwan	U5I-00006	U83-00006		X
	Platinum, Chinese Traditional (Taiwan)	U5I-00007	U83-00007		X
	Platinum, Arabic	U5I-00008	U83-00008		X
	Platinum, English (British)	U5I-00009	U83-00009		X
	Platinum, English (International)	U5I-00010	U83-00010		X
	Platinum, German	U5I-00011	U83-00011		X
	Platinum, French (France)	U5I-00012	U83-00012		X
	Platinum, Switzerland/Luxemburg	U5I-00013	U83-00013		X
	Platinum, Belgium	U5I-00014	U83-00014		X
	Platinum, Italian (Italy)	U5I-00015	U83-00015		X
	Platinum, Portuguese (Portugal)	U5I-00016	U83-00016		X
	Platinum, Spanish (Spain)	U5I-00017	U83-00017		X
	Platinum, Nordic (Denmark, Finland, Norway, Sweden)	U5I-00018	U83-00018		X
	Black, English (America / Asia)	U5I-00019	U83-00019		X
	Black, English/French (Canada)	U5I-00020	U83-00020		X
	Black, Spanish (Mexico)	U5I-00021	U83-00021		X
	Black, Japanese	U5I-00022	U83-00022		X
	Black, Korean	U5I-00023	U83-00023		X
	Black, Taiwan	U5I-00024	U83-00024		X
	Black, Chinese Traditional (Taiwan)	U5I-00025	U83-00025		X
	Black, Arabic	U5I-00026	U83-00026		X
	Black, English (British)	U5I-00027	U83-00027		X
	Black, English (International)	U5I-00028	U83-00028		X
	Black, German	U5I-00029	U83-00029		X
	Black, French (France)	U5I-00030	U83-00030		X
	Black, Switzerland/Luxemburg	U5I-00031	U83-00031		X
	Black, Belgium	U5I-00032	U83-00032		X
	Black, Italian (Italy)	U5I-00033	U83-00033		X
	Black, Portuguese (Portugal)	U5I-00034	U83-00034		X
	Black, Spanish (Spain)	U5I-00035	U83-00035		X
	Black, Nordic (Denmark, Finland, Norway, Sweden)	U5I-00036	U83-00036		X

Item	Component	ASP / FRU Part No.	CRU Part No.	13.5-inch	15-inch
(3)	**Removable Solid-State Drive (rSSD, NOTE: rSSD size must be same as original**	**U1P-00001**			
	rSSD 256 GB	U1P-00001	U1Y-00001	X	X
	rSSD 512 GB	U1Q-00001	U1Z-00001	X	X
	rSSD 1 TB	U4I-00001	U7B-00001		X
(4)	**Chassis + Battery**				
	Platinum	U1L-00001	U1V-00001	X	
	Black	U1L-00002	U1V-00002	X	
	Sage	U1L-00003	U1V-00003	X	
	Sandstone	U1L-00004	U1V-00004	X	
	Platinum	U3I-00001	U6B-00001		X
	Black	U3I-00002	U6B-00002		X
(5)	**Thermal Module (THM)**				
	Thermal Module + Fan	U1N-00001	U1X-00001	X	
	Thermal Module + Fan	U1N-00002	U1X-00002		X
(6)	**Surflink Port**				
	Surflink	U1K-00001	U1U-00001	X	
	Surflink	U1K-00002	U1U-00002		X
(7)	**Display (AB-Cover)**				
	Platinum	U1S-00001	U2I-00001	X	
	Sage	U1S-00003	U2I-00003	X	
	Sandstone	U1S-00004	U2I-00004	X	
	Platinum	U5B-00001	U7I-00001		X
	Black	U5B-00002	U7I-00002		X
(8)	**Motherboard (PCBA)**				
	i5, 8GB RAM (Consumer)	U1M-00001		X	
	i5, 8GB RAM (Commercial China Only)	U1M-00002	U1W-00001	X	
	i5, 8GB RAM (Commercial Rest of World)	U1M-00003	U1W-00002	X	
	i5, 16GB RAM (Commercial China Only)	U1M-00007	U1W-00005	X	
	i5, 16GB RAM (Commercial Rest of World)	U1M-00008	U1W-00006	X	
	i5, 16GB RAM (Consumer)	U1M-00009		X	
	i7, 16GB RAM (Commercial China Only)	U1M-00012	U1W-00009	X	
	i7, 16GB RAM (Commercial Rest of World)	U1M-00013	U1W-00010	X	
	i7, 16GB RAM (Consumer)	U1M-00014		X	
	i7, 8GB RAM, (Consumer)	U4B-00001			X
	i7, 8GB RAM (Commercial China Only)	U4B-00002	U6I-00001		X
	i7, 8GB RAM (Commercial Rest of World)	U4B-00003	U6I-00002		X
	i7, 16GB RAM (Commercial China Only)	U4B-00007	U6I-00005		X
	i7, 16GB RAM (Commercial Rest of World)	U4B-00008	U6I-00006		X
	i7, 16GB RAM (Consumer)	U4B-00009			X
	i7, 32GB RAM (Consumer)	U4B-00012			X
	i7, 32GB RAM (Commercial China Only)	U4B-00013	U6I-00009		X
	i7, 32GB RAM (Commercial Rest of World)	U4B-00014	U6I-00010		X

Service Diagnostics/Troubleshooting Overview

- For general Surface support, visit www.support.microsoft.com
- To troubleshoot device feature/function problems or learn more about Surface Laptop 5 visit www.aka.ms/SurfaceProHelp
- If you'd like to learn more about Windows, visit aka.ms/WindowsHelp
- To learn more about the accessibility features of the Surface Laptop 5, go to the online user guide at aka.ms/Windows-Accessibility

Software Tools:

- How To: Update Surface device firmware and OS
- How To: Surface Tools Video
- Download: Surface drivers and firmware
- Download: Surface Diagnostic Toolkit (SDT)
- Download: Surface Data Eraser
- Download: Surface Imaging Tools

Hardware Troubleshooting Approach

The following approach should be taken when troubleshooting Surface devices:

1. Update device to latest OS/FW versions using the SDT tool – Refer to Software Tools section above for details on SDT.

   IMPORTANT: Device updates are required as a prerequisite to all hardware repairs.

2. Verify any suspected hardware failures by setting the device in a known OS/FW version state and running SDT to verify fault:
   a. Replace the device's internal rSSD with a BMR imaged rSSD containing latest OS and FW updates (not supplied – must be created as a fault verification jig/tool) – Refer to Software Tools section above for details on imaging.
   b. Run SDT and verify if condition persists or if resolved with use of BMR imaged drive – Refer to Software Tools section above for details on SDT.
      i. If problem is resolved, then re-image original rSSD or replace original rSSD and image.
      ii. If problem persists, then replace suspected hardware FRU related to the problem by following the detailed replacement procedures covered within this service guide.
3. SDT must be run following all hardware repairs where a FRU was replaced to further verify that problem was resolved by the repair action taken.

Component Removal and Replacement Procedures

Prior to Device Disassembly:

- Before opening the device, always ensure device is powered off and disconnected from the power supply.
- Always ensure that the work surface is covered with an ESD-safe, soft, non-marring material.
- Work surfaces should be cleaned regularly to ensure debris/abrasive particles are not present.
- Check to make sure that general guidelines and ESD compliance steps are followed prior to opening device.

Battery Warning

⚠ **WARNING:** Please note that the battery bears the following warning label. Please heed the information provided on the label.

Battery cannot be easily replaced by user

- Risk of fire or burning – contact Microsoft for assistance
- Do not separate or remove battery from backplate cover
- Do not modify battery, its wiring, or connectors
- Do not replace, short circuit, bend, crush, or puncture battery
- Do not dispose of battery in fire or expose to high temperatures (+140ºF/60ºC)
- For more information: http://aka.ms/surface-security

Non-Skid Feet Replacement Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

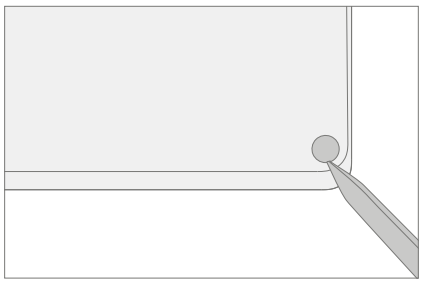
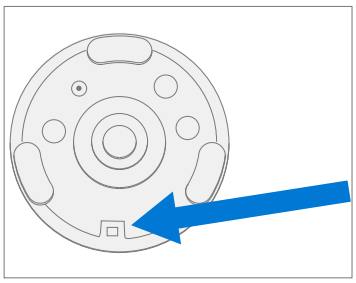
- **Tools:**
  - Plastic tweezers
  - Spudger
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Cleaning swabs
  - Soft ESD-safe mat
  - Microfiber cloth
- **Components:**
  - Feet (Refer to Illustrated Service Parts List)

Prerequisite Steps:

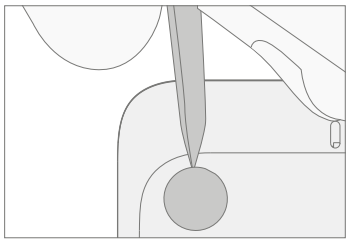
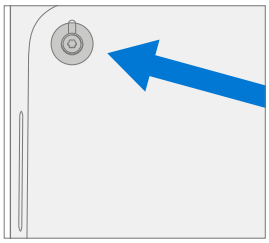
- **Power off device** – Ensure device is powered off and disconnected from a power supply.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.

Procedure – Remove (Feet)

1. **Remove front feet** – Use a plastic tool to pry up the front foot from the front divot and then peel to remove. Repeat for the other foot.

2. **Remove back feet** – Use a plastic tool to pry up the back foot from back divot and then peel to remove. Repeat for the other foot.

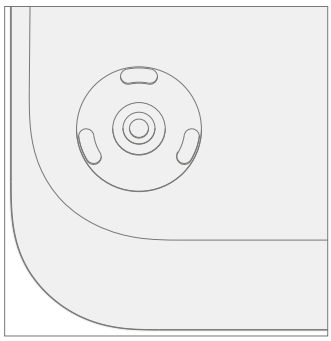
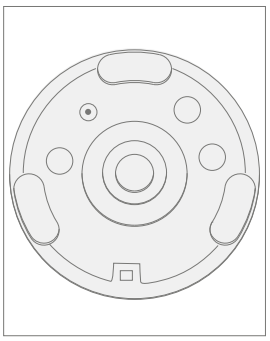
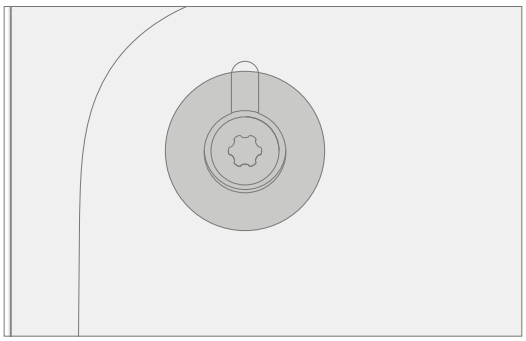



3. **Cleaning** – Remove any adhesive tape remnants from the chassis and clean off any glue residue with 70% or greater Isopropyl Alcohol.

Procedure – Install (Feet)

IMPORTANT: Once removed, the feet must be replaced with new ones.

1. **Device Orientation** – Place device onto a clean surface free of debris with the bottom facing up.
2. **Applying New Feet** – Remove the liners to the adhesive and align the posts on the front feet with the holes in the chassis. Place the foot in the chassis and press down firmly for a few seconds. Repeat the same steps for the remaining front foot. Remove the liners to the adhesive of the back foot and align with the screw hole of the chassis. Place the foot on the chassis and press down firmly for a few seconds. Repeat the same steps for the remaining front foot.

3. **Securing New Feet** – Press down on the foot firmly for about 30 seconds to secure the foot. Repeat the same steps for the remaining feet.

Keyboard Assembly Replacement Process (Metal, Fabric)

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

- **Tools:**
  - Plastic tweezers / spudger
  - Plastic card tool example iFixit Plastic Card
  - Anti-static wrist strap (1 MOhm resistance)
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Cleaning swabs
  - 5IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth
  - Heavy duty suction cups (2) – 57.15mm (2.25 in)
- **Components:**
  - Keyboard Assembly (Refer to Illustrated Service Parts List)
  - Foot Screw (M1091264-001) Qty. 4

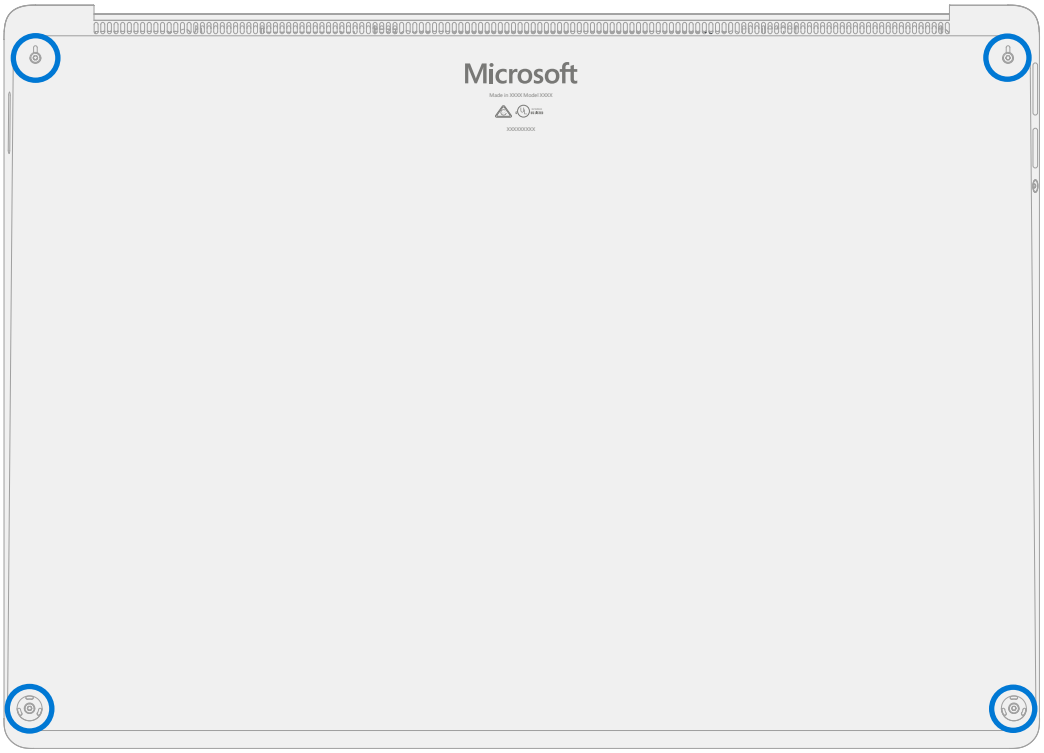
Prerequisite Steps:

- **Power off device** – Ensure device is powered off and disconnected from a power supply. Remove all attached cables and drives.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
- **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.

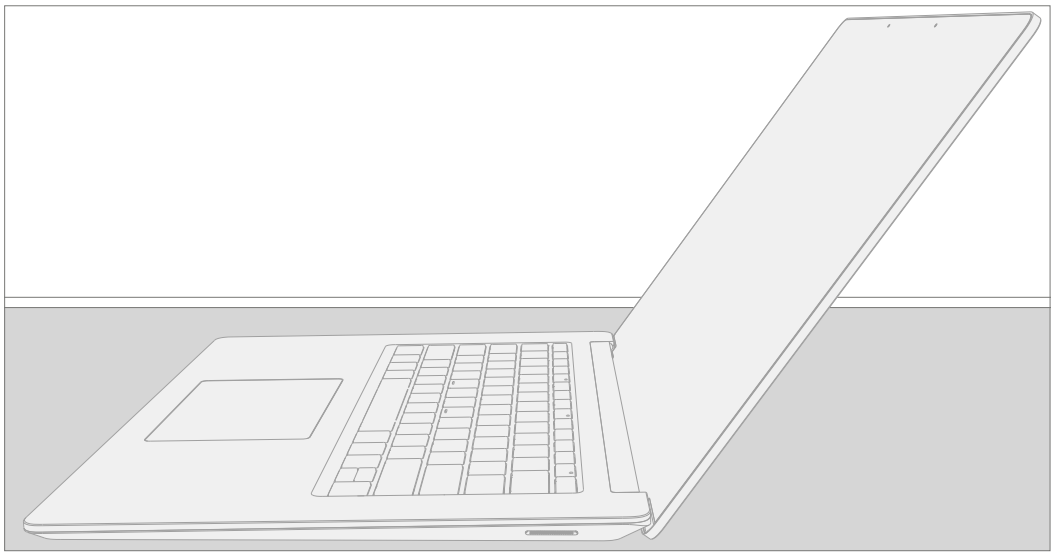
Procedure – Removal (Keyboard Assembly, Metal)

1. **Remove Screws** – Using a 5IP (Torx-plus) screwdriver remove the four screws from under the four feet on the device.

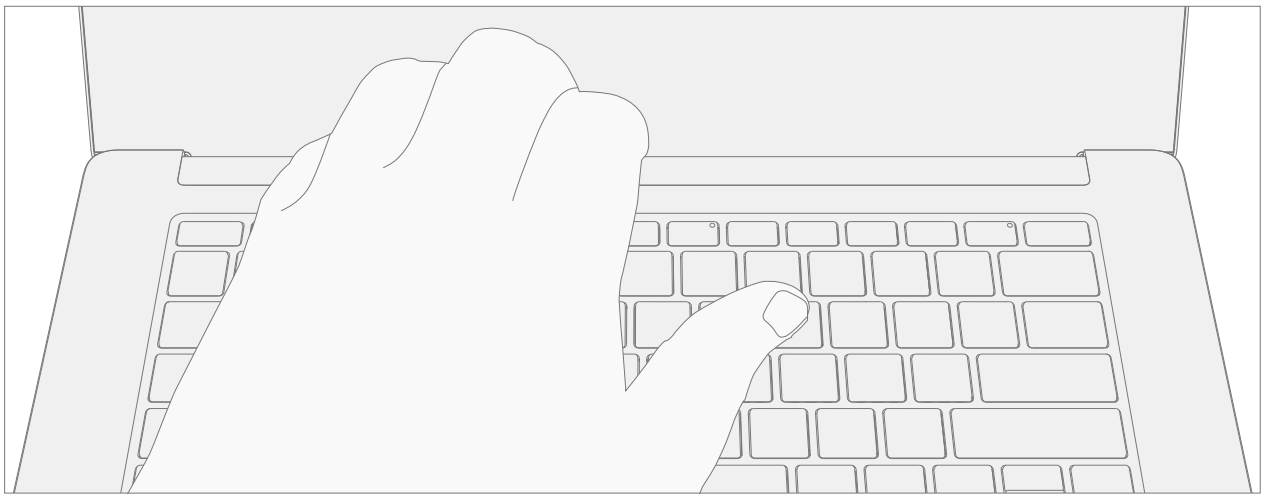
> ! **CAUTION:** Take care to prevent the keyboard power button depressing during this step. If power button is accidentally depressed and device turns on, shut down device as normal through OS Start menu.



2. **Open Device** – Turn device over and open screen to about 110-degrees.

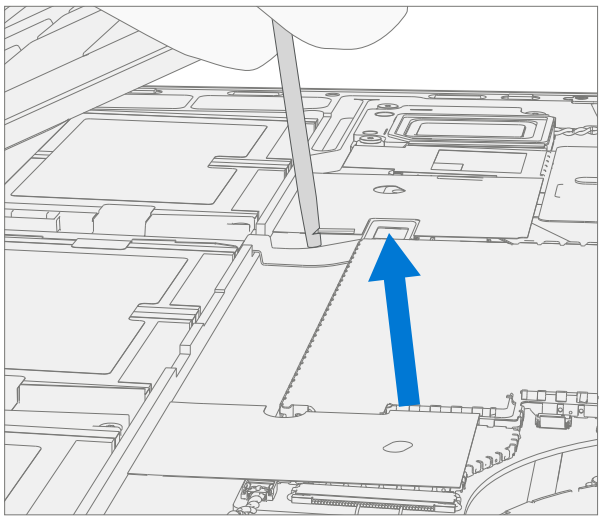


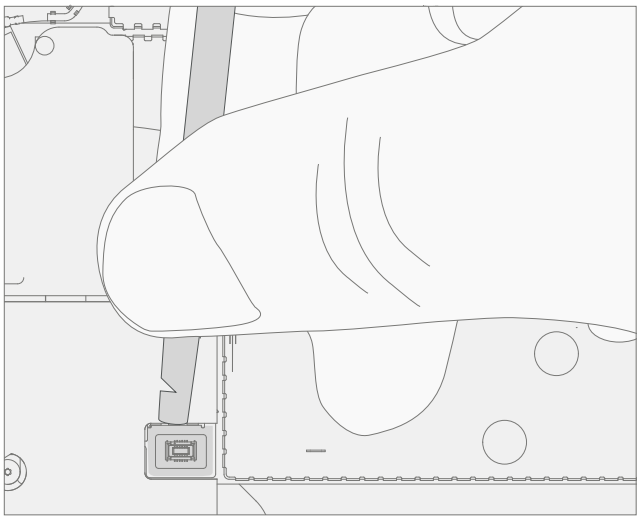
3. **Separate keyboard from device** – Grasp the back of the keyboard, by the display, and pull directly up. Keyboard should lift free from the device.



4. **Disconnect Keyboard** – While holding the keyboard at a ~45-degree angle, use a spudger to remove keyboard FPC from motherboard.

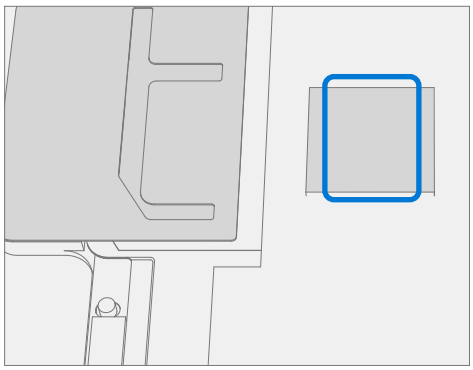
⚠ **WARNING:** It is recommended a Microsoft provided ESD-safe battery cover appropriate for size (either 13.5" or 15" device) is placed across the device to protect the battery from any accidental damage during repair. Ensure corners of cover are always aligned with the corners of the device during repair. If battery cover is misaligned during the repair operation in any way, re-align before continuing repair activities.

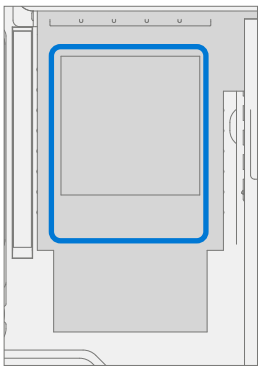




! **CAUTION:** When removed from the device, place the keyboard in a safe place with key and trackpad side down and FPC facing up to avoid bending/creasing the FPC. Be sure the key and trackpad side of the keyboard is protected from cosmetic damage during storage.

5. **Remove TIM from keyboard and rSSD** – Using IPA and a cotton swab, clean the thermal material from the rSSD and the back of the keyboard.





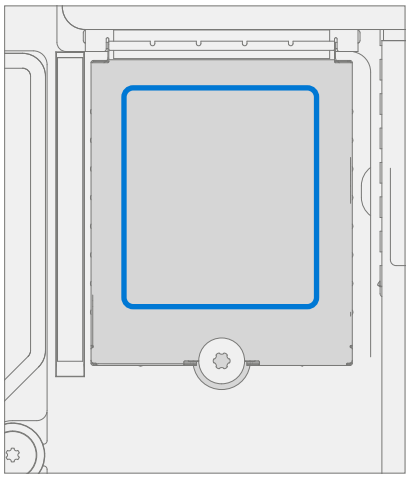
Procedure – Installation (Keyboard Assembly, Metal)

1. **Pre-installation Device Inspection**

   ⚠ **WARNING:** Verify the condition of Liquid Damage Indicator (LDI) inside the audio jack. Use a bright light to illuminate the interior of the audio jack port. Any color other than white indicates liquids have entered the device. Devices exhibiting LDI require whole unit replacement.

2. **Check for unexpected items within device** – Check keyboard (both sides) and device enclosure for any loose articles that may be present inadvertently on the keyboard or within the device enclosure areas.
   a. Check and remove any foreign objects that the magnets may have attracted or that may have been accidentally introduced into the device during replacement.
   b. Carefully inspect the area around battery specifically for any foreign objects before removing battery cover.

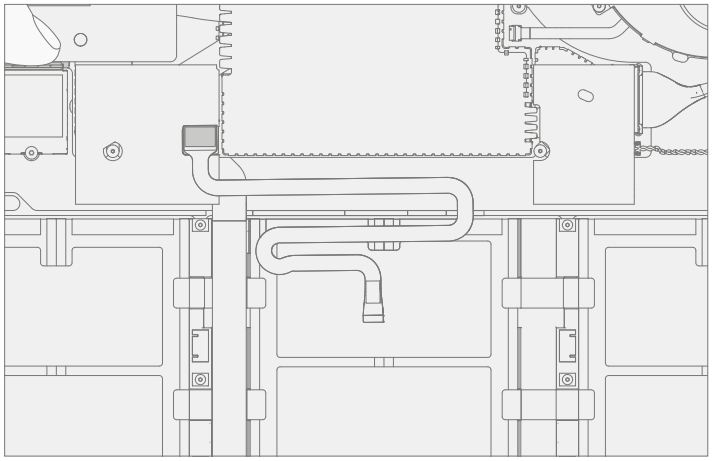
3. **Apply TIM** – Apply a thermal pad to the rSSD approximately as shown in image below.



4. **Remove tape from new keyboard FPC** – Tape secures the keyboard FPC during shipping. Remove this tape before continuing with assembly.

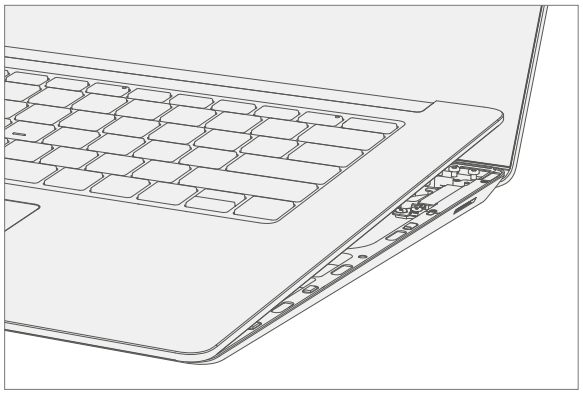
5. **Connect Keyboard** – While holding the keyboard at a 45-degree angle, use your hand to align keyboard FPC with connector on motherboard. Gently push connector into place.

   ! **CAUTION:** Be sure that FPC bends fall in place properly as pre-bent, and no folds or creases are created during re-assembly of keyboard.

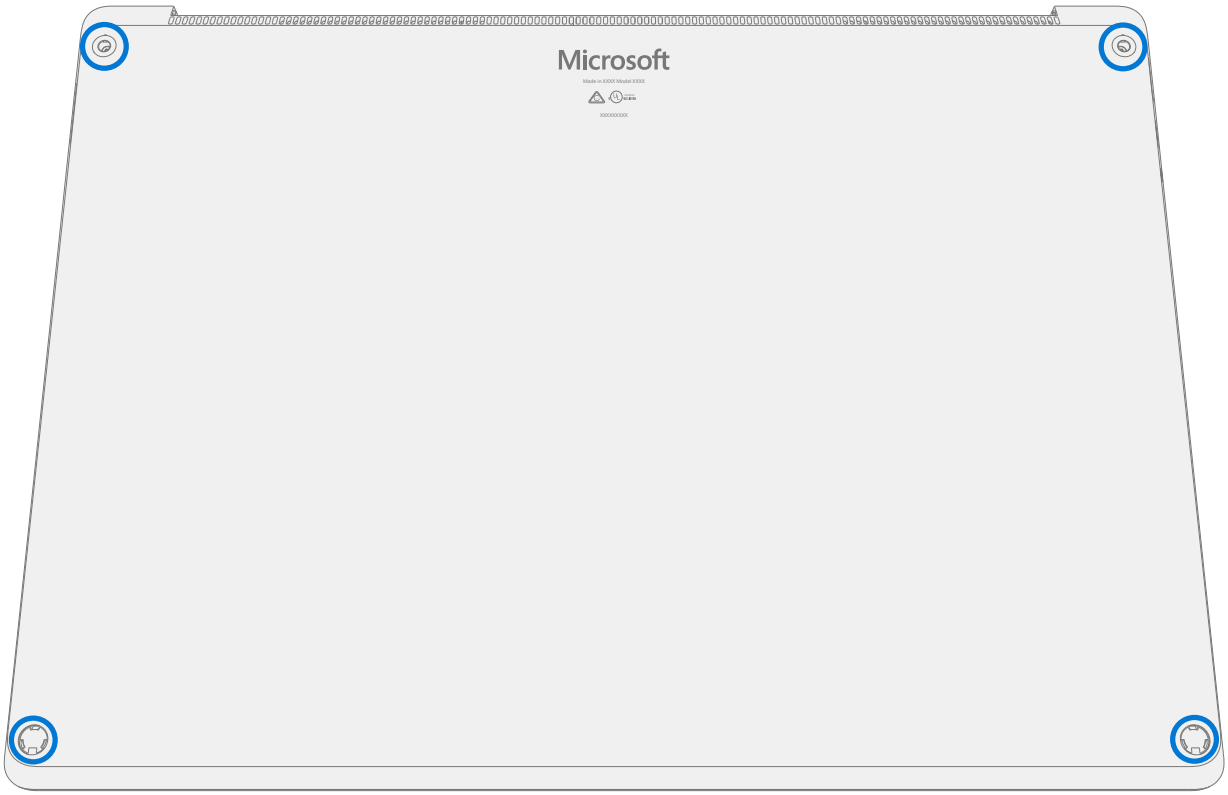


6. **Align keyboard with chassis** – Place keyboard on top of chassis, there should be no discernable gap between keyboard and chassis when viewed from the side.

> ! **CAUTION:** Before installing keyboard, inspect area for loose screws and debris, paying special attention to the magnetic areas around the chassis and the battery.



7. **Flip Device** – Close display and turn device over.
8. **Install New Chassis Screws** – Using a 5IP (Torx-plus) screwdriver install 1 new Chassis Screw in each corner (4 total). Turn all screws until just snug and seated, and then turn another 45-degrees (1/8 turn) or until fully fastened.

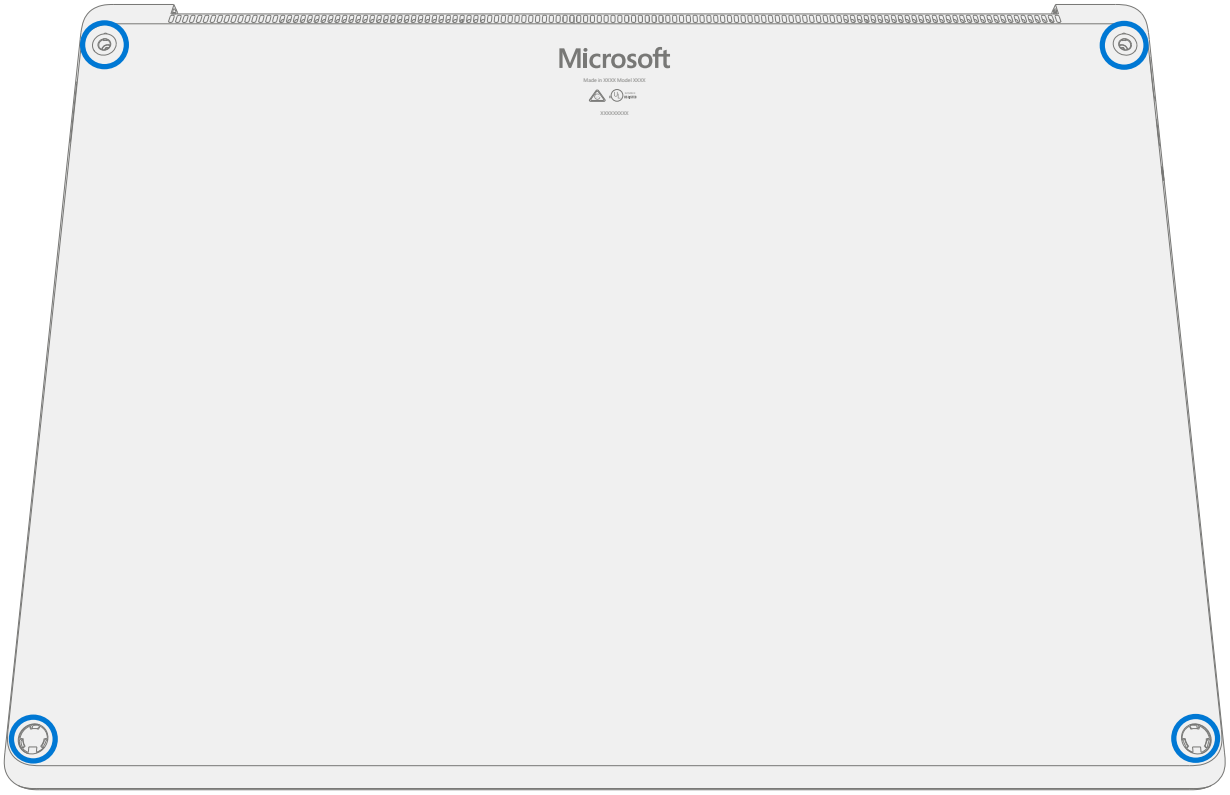


9. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
10. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
11. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

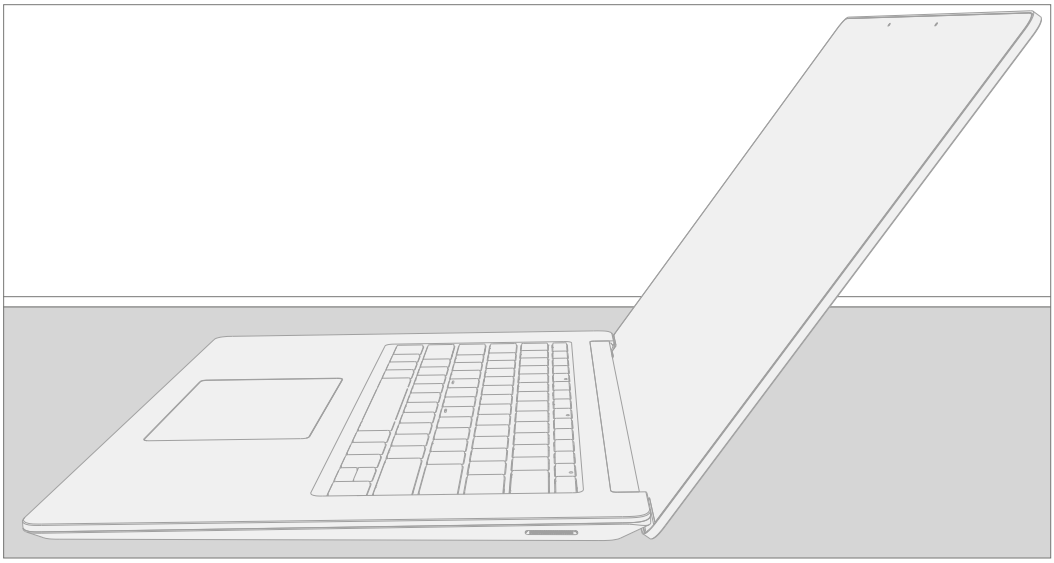
Procedure – Removal (Keyboard Assembly, Fabric)

1. **Remove Screws** – Using a 5IP (Torx-plus) screwdriver remove the four screws from under the four feet on the device.

> **CAUTION:** Take care to prevent the keyboard power button depressing during this step. If power button is accidentally depressed and device turns on, shut down device as normal through OS Start menu.

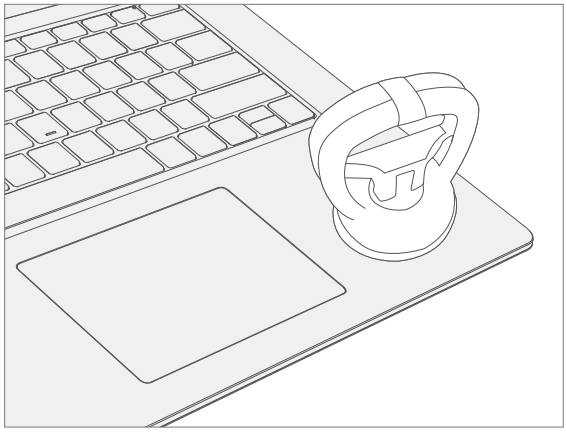


2. **Open Device** – Turn device over and open screen to about 110-degrees.

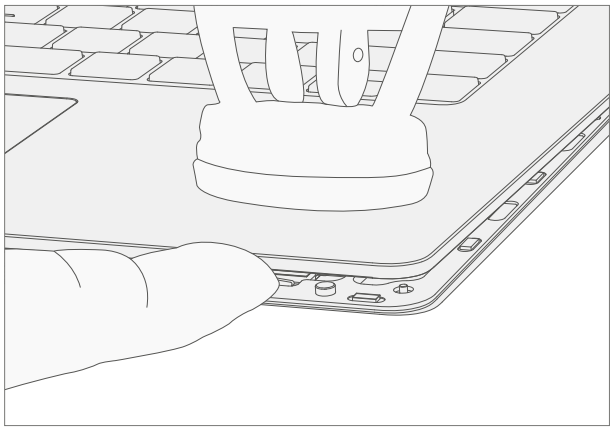


3. **Apply suction cups** – Place suction cup in the bottom palm rest area as shown, as close to the edge as possible.

> **CAUTION:** Do not pull the keyboard apart beyond 45 degrees otherwise damage to keyboard FPC could occur.
>
> **CAUTION:** Do not place suction cup on Trackpad to avoid potential damage to the Trackpad.
>
> **CAUTION:** Do not wet the suction cup in any way as liquid could stain the keyboard fabric. Place thumb holding down the corner hinge side of the cover closest to the user as shown. Keep pressure on the hinge area to prevent back edge of cover from lifting while pulling up on the suction cup. Be careful to prevent back edge from lifting. If suction cup releases before keyboard is separated from chassis, then re-attach suction cup and try again.

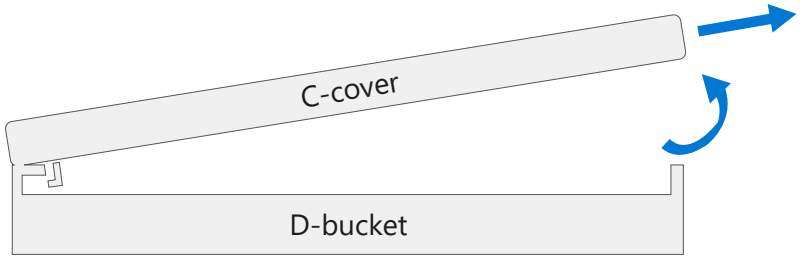


4. **Separate keyboard from device** – Once keyboard separation from the device bottom case is achieved, place a finger between the keyboard and device region. Pull upwards slightly to separate the keyboard from the magnets.



5. **Angle C-cover** – Angle the C-cover at approximately 45 degrees from horizonal – be sure to angle the keyboard **no more than 45 degrees** or else risk damaging the keyboard hook or FPC. If hook is damaged, it needs to be removed carefully to avoid damaging the FPCs, and then a new keyboard needs to be installed.

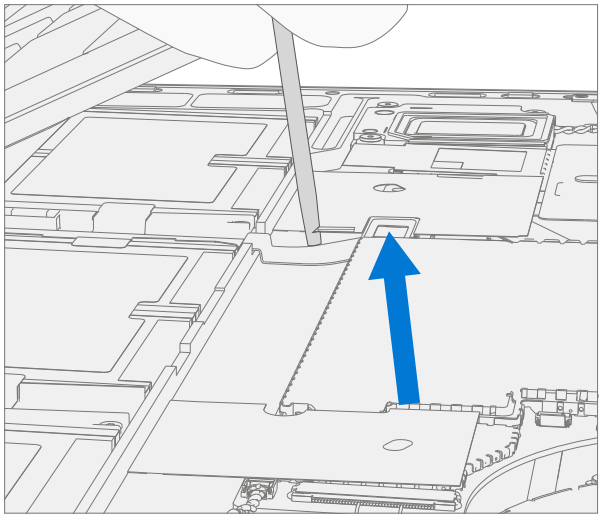
6. **Keyboard hook clearance** – Once angled, keep the angle of the keyboard while pulling the keyboard directly towards yourself. Be sure to avoid pressing on the power button during this procedure.

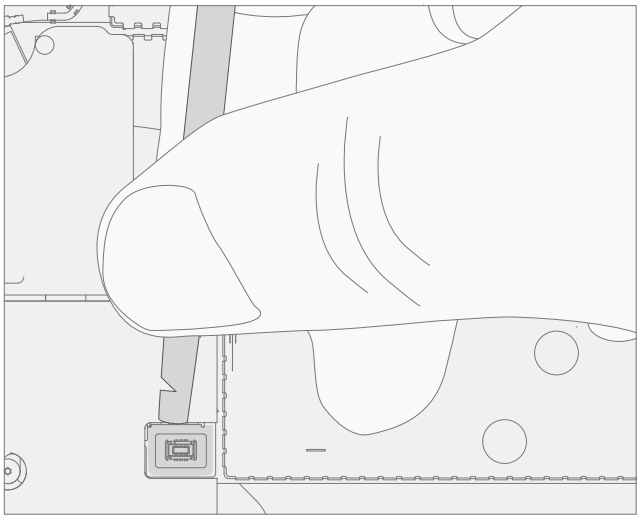


Side View

7. **Disconnect Keyboard** – While holding the keyboard at a ~45-degree angle, use a spudger to remove keyboard FPC from motherboard.

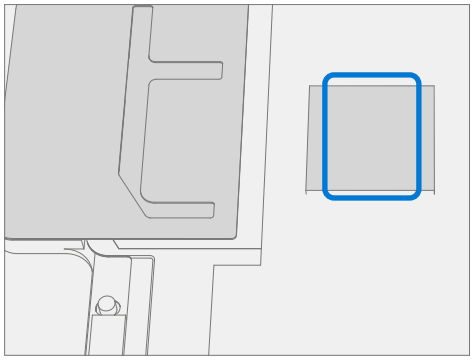
⚠ **WARNING:** It is recommended an ESD-safe battery cover appropriate for size (either 13.5" or 15"device) across the device to protect the battery from any accidental damage during repair. Ensure corners of cover are aligned with the corners of the device at all times during repair. If battery cover is misaligned during the repair operation in any way, re-align before continuing repair activities.

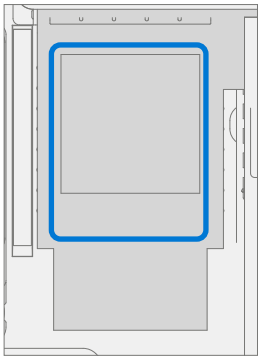




❗ **CAUTION:** When removed from the device, place the C-cover in a safe place with key and trackpad side down and FPC facing up to avoid bending/creasing the FPC. Be sure the key and trackpad side of the C-cover is protected from cosmetic damage during storage.

8. **Remove TIM from keyboard and rSSD** – Using IPA and a cotton swab, clean the thermal material from the rSSD and the back of the keyboard.





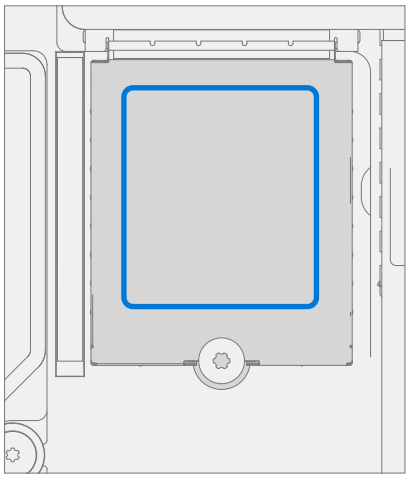
Procedure – Installation (Keyboard Assembly, Fabric)

1. **Pre-installation Device Inspection**

   ⚠ **WARNING:** Verify the condition of Liquid Damage Indicator (LDI) inside the audio jack. Use a bright light to illuminate the interior of the audio jack port. Any color other than white indicates liquids have entered the device. Devices exhibiting LDI require whole unit replacement.

2. **Check for unexpected items within device** – Check keyboard (both sides) and device enclosure for any loose articles that may be present inadvertently on the keyboard or within the device enclosure areas.
   a. Check and remove any foreign objects that the magnets may have attracted or that may have been accidentally introduced into the device during replacement.
   b. Carefully inspect the area around battery specifically for any foreign objects before removing battery cover.

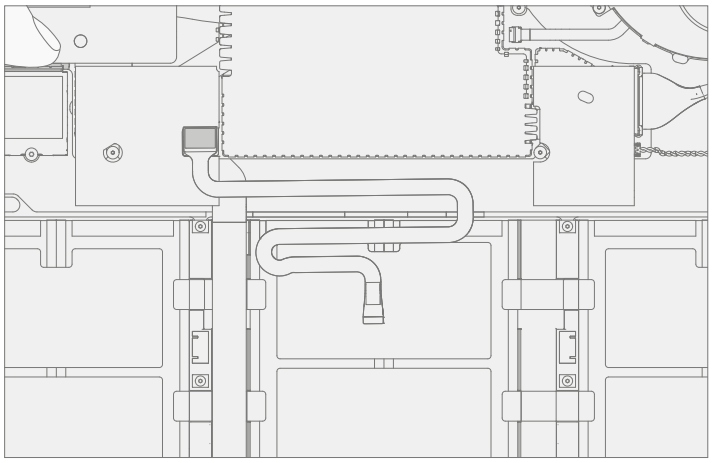
3. **Apply TIM** – Apply a thermal pad to the rSSD approximately as shown in image below.



4. **Remove tape from new keyboard FPC** – Tape secures the keyboard FPC during shipping. Remove this tape before continuing with assembly.

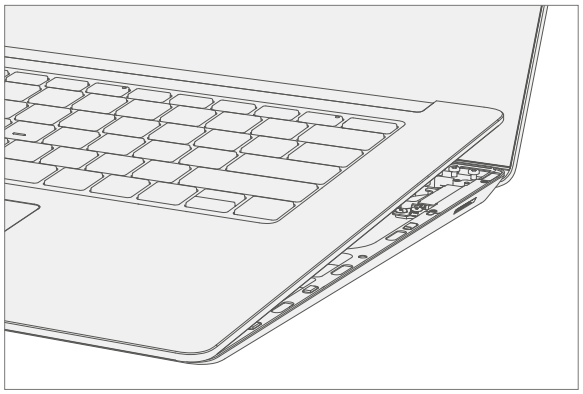
5. **Connect Keyboard** – While holding the keyboard at a 45-degree angle, use your hand to align keyboard FPC with connector on motherboard. Gently push connector into place.

   ! **CAUTION:** Be sure that FPC bends fall in place properly as pre-bent, and no folds or creases are created during re-assembly of C-cover.

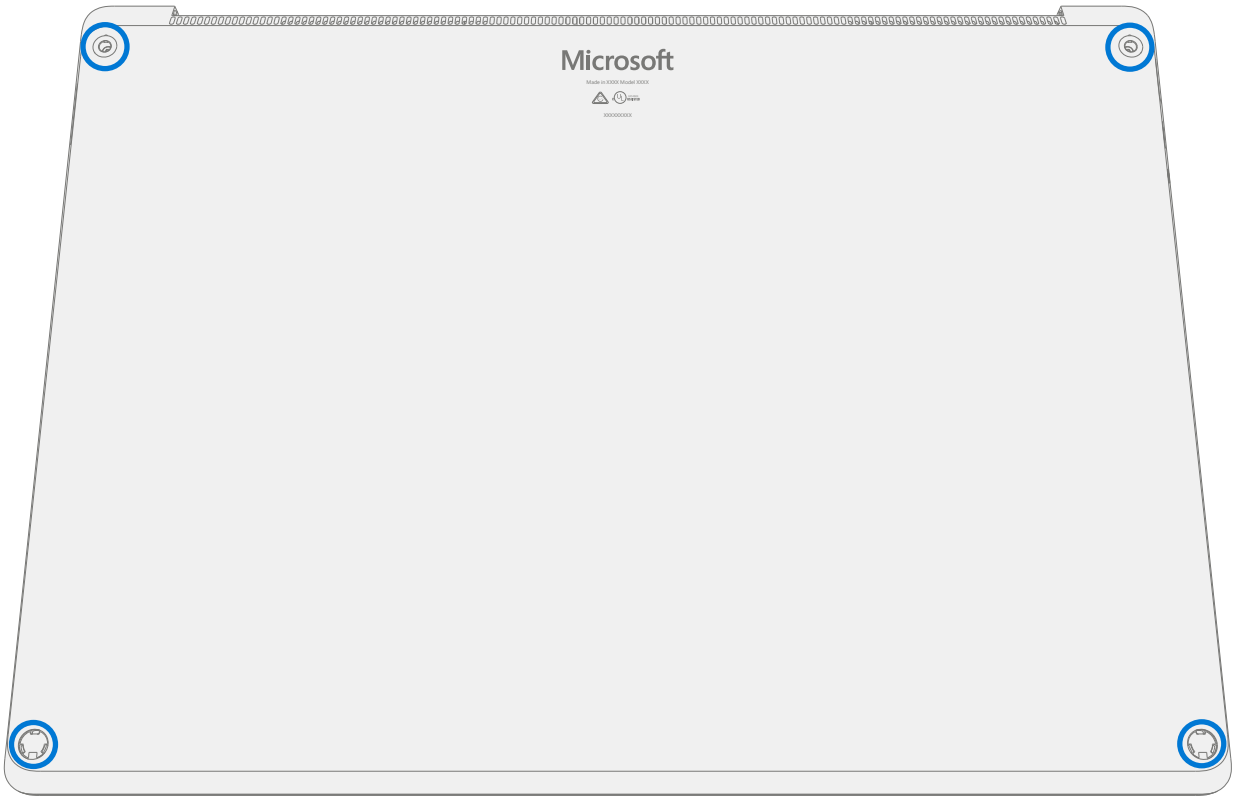


6. **Align keyboard with chassis** – Place keyboard on top of chassis, there should be no discernable gap between keyboard and chassis when viewed from the side.

> ! **CAUTION:** Before installing keyboard, inspect area for loose screws and debris, paying special attention to the magnetic areas around the chassis and the battery.



7. **Flip Device** – Close display and turn device over.
8. **Install New Chassis Screws** – Using a 5IP (Torx-plus) screwdriver install 1 new Chassis Screw in each corner (4 total). Turn all screws until just snug and seated, and then turn another 45-degrees (1/8 turn) or until fully fastened.



9. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
10. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
11. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

rSSD Replacement Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

- **Tools:**
  - Plastic tweezers / spudger
  - Anti-static wrist strap (1 MOhm resistance)
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Cleaning swabs
  - 5IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth
- **Components:**
  - rSSD (Refer to Illustrated Service Parts List) if replacing
  - rSSD Screw (M1108751-001) Qty. 1

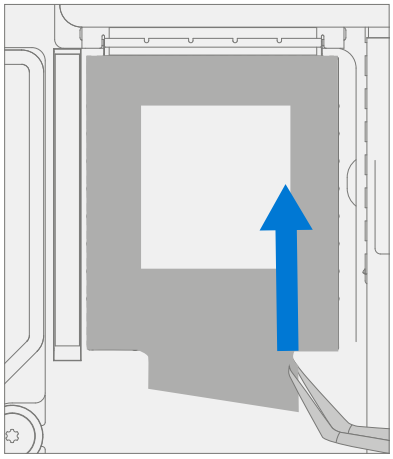
Prerequisite Steps:

- **Power off device** – Ensure device is powered off and disconnected from a power supply.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
- **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.
- **Remove Keyboard** – Refer to Procedure – Removal (Keyboard) on (page 22) for details.

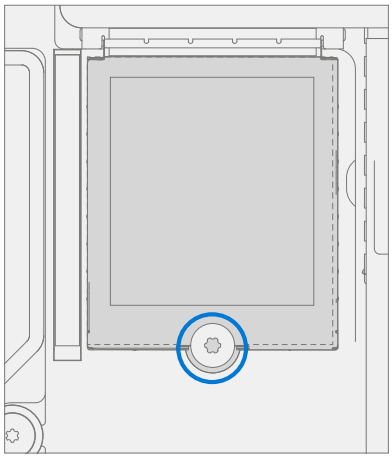
Procedure – Removal (rSSD)

> **IMPORTANT:** Removing the rSSD disconnects the battery from the rest of the electronic components in the unit. Remove the rSSD to **safely** power down the device prior to performing any repairs.

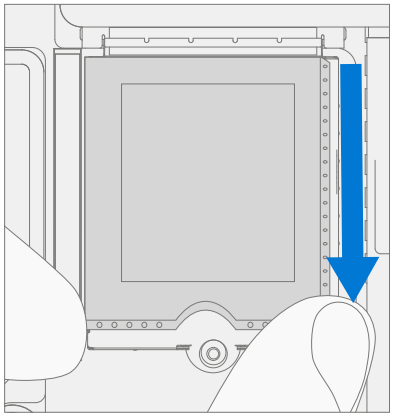
1. **Remove desense** – On the **15" model only**, there is a desense sticker covering the rSSD. Carefully peel the sticker off using a pair of tweezers.



2. **Remove rSSD screw** – Using a 5IP (Torx-plus) driver remove the screw securing the rSSD.

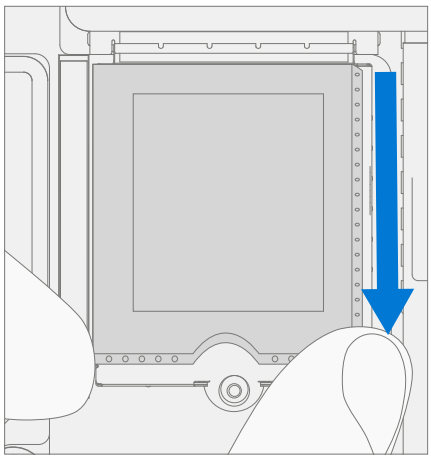


3. **Remove rSSD** – The rSSD should lift upwards to ~15-degrees after screw is removed. Carefully grab sides of rSSD case and pull out of main board socket at same ~15-degree angle.

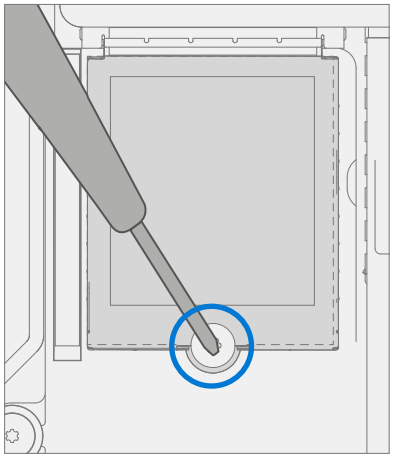


Procedure – Installation (rSSD)

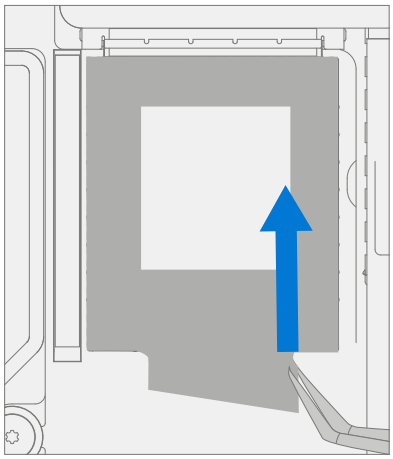
1. **Insert rSSD** – Insert the connector end of the rSSD into the receptacle on the motherboard at a ~15-degree angle.



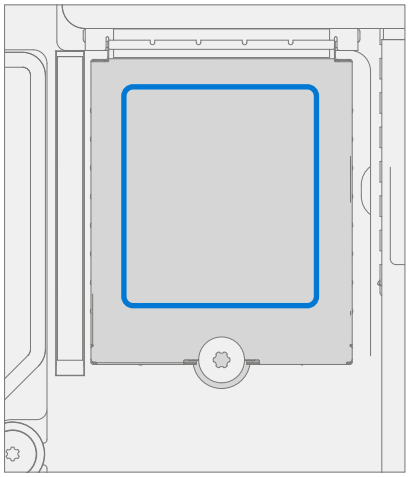
2. **Install new rSSD screw** – Using a 5IP (Torx-plus) driver install the rSSD screw. Turn the screw until just snug and seated, and then turn another 45 degrees (1/8 turn) or until fully fastened.



3. **Apply desense** – On the **15" model only**, there is a desense sticker covering the rSSD. Carefully align the desense sticker over the rSSD and apply.



4. **Apply TIM** – Apply a thermal pad to the rSSD approximately as shown in image below.



5. **Connect Keyboard** – Connect keyboard as detailed on Procedure – Installation (Keyboard Assembly) (page 30).
6. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
7. **Imaging** – Image the new rSSD by using a BMR Imaging USB drive specific to the device model.

> **IMPORTANT:** Refer to Surface imaging process - Surface Imaging Tools

8. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
9. **Install Keyboard** – Refer to Procedure – Installation (Keyboard) on (page 30) for details.
10. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

rSSD Swap to a New Device Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

- **Tools:**
  - Plastic tweezers / spudger
  - Anti-static wrist strap (1 MOhm resistance)
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Cleaning swabs
  - 5IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth

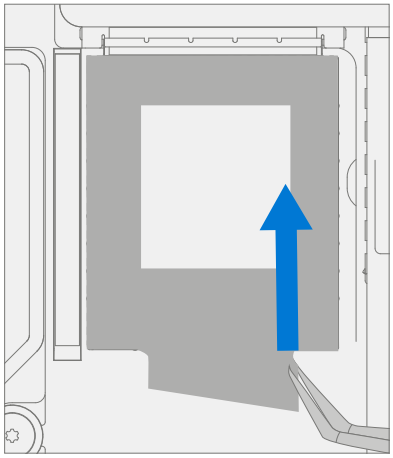
Prerequisite Steps:

- Using an Internet connection install all available updates: Navigate to *Settings -> Update and Security* and check for Windows Update.
- Consumer using Windows Home:
  - The Bitlocker recovery key is automatically generated for users with an MSA and can be found by the user by searching the web for "bitlocker recovery key" and logging into their MSA. If the user does not have an MSA based account, the disk will not be encrypted.
- Commercial using Windows Pro:
  - This is managed via commercial policy, and each business may have their own bitlocker policy / recovery method.
  - Confirm that the customer knows the **Windows password to the device**.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening device. Refer to Prior to Device Disassembly section (page 18) for details.

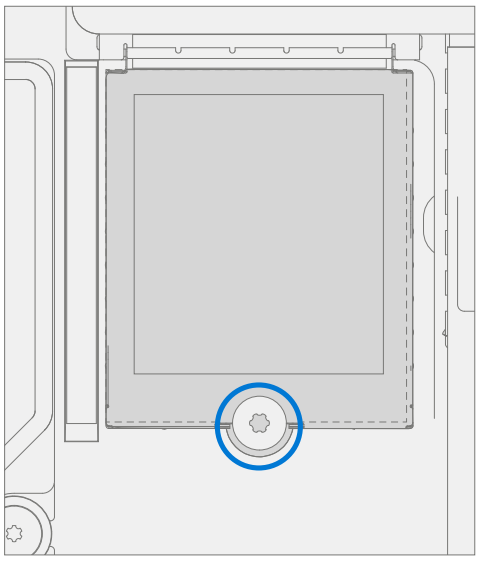
Procedure – Swap (rSSD)

> **IMPORTANT:** Removing the rSSD disconnects the battery from the rest of the electronic components in the unit. Remove the rSSD to **safely** power down the device prior to performing any repairs.

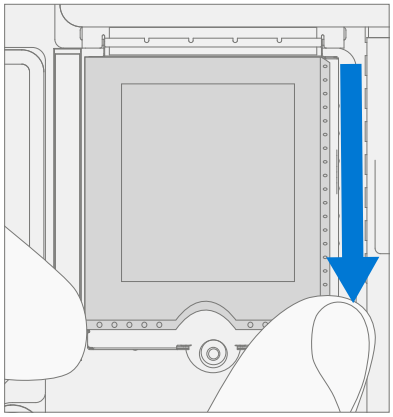
1. **Manage Bitlocker**
   a. **If rSSD remains encrypted during swap**
      i. Navigate to *Bitlocker -> Manage Bitlocker -> Generate Bitlocker Recovery Key*.
      ii. Plug in USB drive.
      iii. Save the recovery key to USB storage.
      iv. Remove the USB drive.
   b. **If rSSD can be unencrypted before swap**
      i. Navigate to *Bitlocker -> Manage Bitlocker*.
      ii. Select *Turn Off Bitlocker*.
   c. **If Bitlocker key has been lost**
      i. Follow the instructions for recovering your Bitlocker key.
2. **Power off device** – Ensure device is powered off and disconnected from a power supply.
3. **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
4. **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.
5. **Remove Keyboard** – Refer to Procedure – Removal (Keyboard) on (page 22) for details.
6. **Remove desense** – On the **15" model only**, there is a desense sticker covering the rSSD. Carefully peel the sticker off using a pair of tweezers.



7. **Remove rSSD screw** – Using a 5IP (Torx-plus) driver remove the screw securing the rSSD. Take care not to damage the screw; it will be reused.

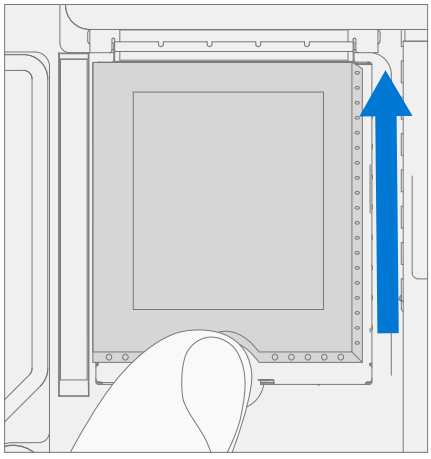


8. **Remove rSSD** – The rSSD should lift upwards to ~15-degrees after screw is removed. Carefully grab sides of rSSD case and pull out of main board socket at same ~15-degree angle.

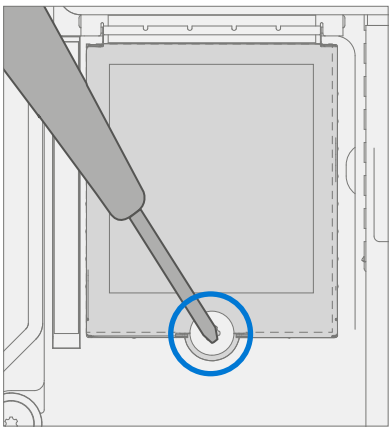


9. **Clean TIM** – Using IPA alcohol and a cotton swab, remove any residual TIM from both rSSD's.

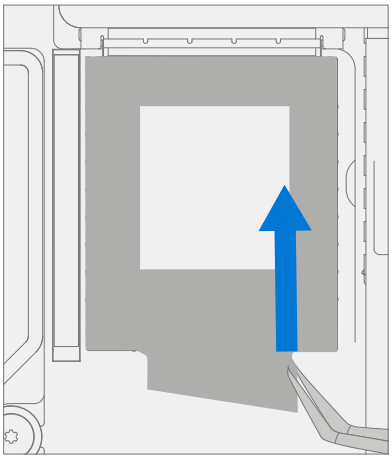
10. **rSSD Swap** – Insert rSSD removed from the new device into customer's original device, then insert customer's original rSSD into new device. Insert the connector end of the rSSD into the rSSD connector on Main board at ~ 15-degree angle.



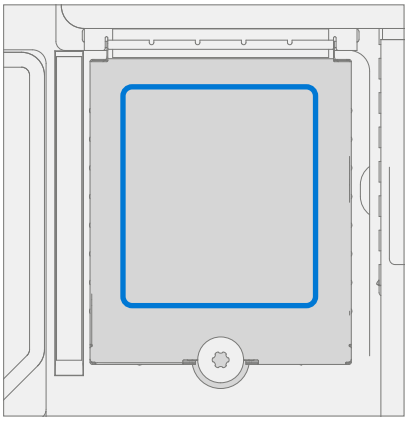
11. **Install rSSD screws in both devices** – Use a 5IP (Torx-plus) driver to install a new rSSD screw until the screw is just snug and seated, and then turn another 45-degrees (1/8 turn) or until screw is fully fastened.



12. **Apply desense** – On the **15" model only**, there is a desense sticker covering the rSSD. Carefully align the desense sticker over the rSSD and apply.



13. **Apply TIM** – Apply a thermal pad to the rSSD approximately as shown in image below.



14. **Install Keyboard** – Refer to Procedure – Installation (Keyboard) on (page 30) for details.
15. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.
16. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
17. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.

Surflink Replacement Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

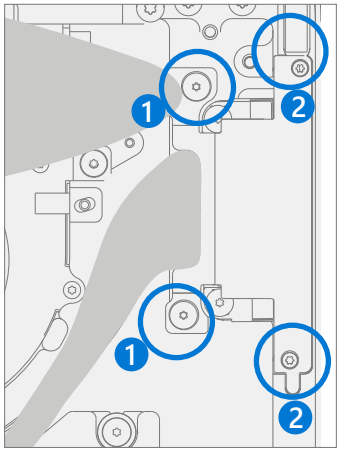
- **Tools:**
  - Plastic tweezers / spudger
  - Anti-static wrist strap (1 MOhm resistance)
  - Non-Metallic ruler (Amazon Example)
  - 3IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth
- **Components:**
  - Surflink Port (Refer to Illustrated Service Parts List)
  - Bracket Screw 1 (M1086672-001) Qty. 2
  - Bracket Screw 2 (M1109237-001) Qty. 2
  - Surflink Screw (M1093898-001) Qty. 2

Prerequisite Steps:

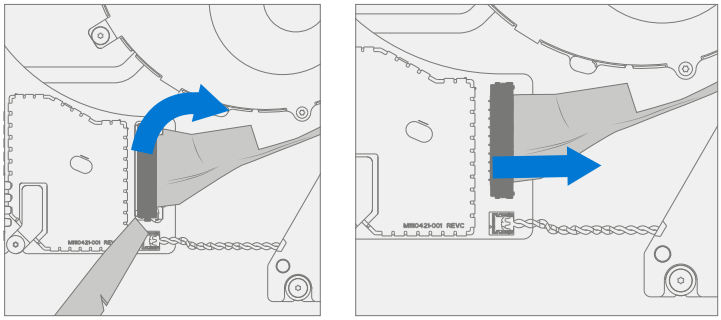
- **Power off device** – Ensure device is powered off and disconnected from a power supply. Remove all attached cables and drives.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
- **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.
- **Remove Keyboard** – Refer to Procedure – Removal (Keyboard) on (page 22) for details.
- **Remove rSSD** – Refer to Procedure – Removal (rSSD) on (page 33) for details.

Procedure – Removal (Surflink)

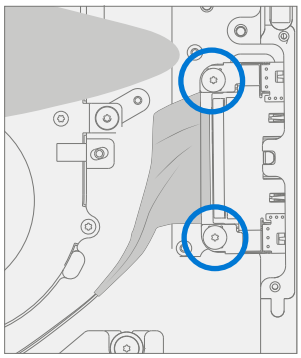
1. **Remove bracket** – Using a 3IP (Torx-plus) driver remove the 4 Bracket Screws securing the bracket to the chassis. Remove the bracket.



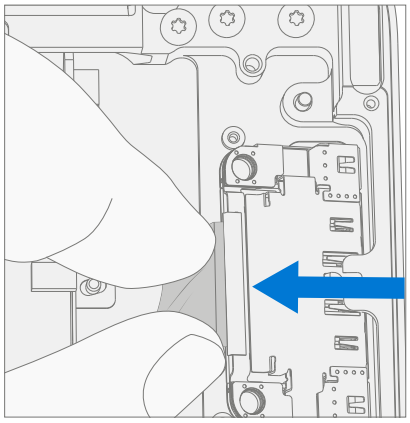
2. **Remove Surflink FPC** – Using a plastic spudger lift locking connector on FPC and use spudger to remove connector from motherboard.



3. **Remove Surflink Port Screws** – Using a 3IP (Torx-plus) driver remove the 2 Surflink Screws securing the Surflink Port to the chassis.

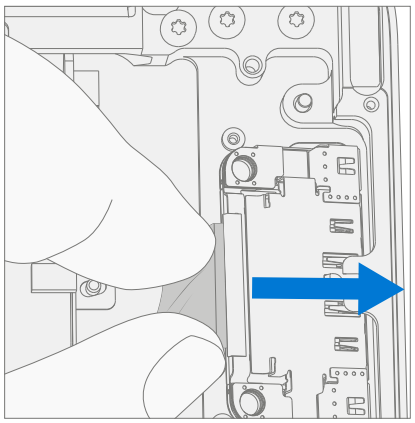


4. **Remove Surflink Port** – Remove the Surflink Port from the chassis.

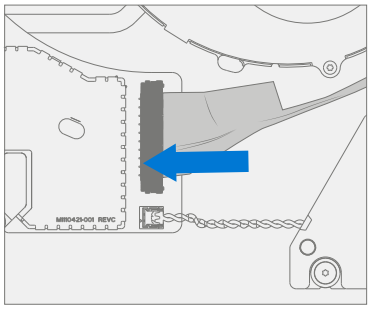


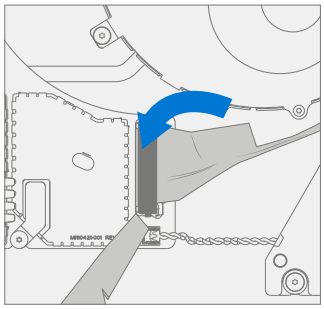
Procedure – Installation (Surflink)

1. **Install Surflink Port** – Place the Surflink Port into the chassis. Ensure the chassis posts nest into the Surflink Port slot.

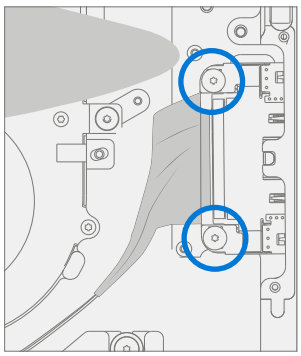


2. **Connect Surflink FPCs** – Align the FPC's connectors to the motherboard and slide into connector. Press down on locking cover.

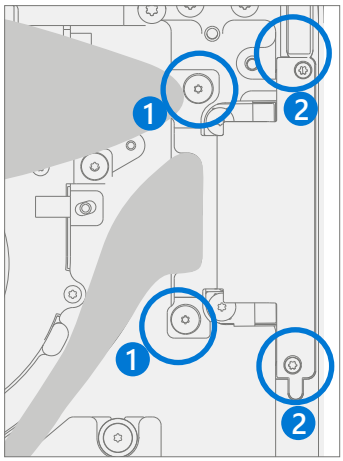




3. **Install new Surflink Screws** – Using a 3IP (Torx-plus) driver install 2 new Surflink Screws. Turn all screws until just snug and seated, and then turn another 45-degrees (1/8 turn) or until fully fastened.



4. **Install bracket** – Place the Surflink bracket over the Surflink. Using a 3IP (Torx-plus) driver install 4 new Bracket Screws. Turn all screws until they are just snug and seated, and then turn another 45-degrees (1/8 turn) or until fully fastened.



5. **Install rSSD** – Refer to Procedure – Installation (rSSD) on (page 34) for details.
6. **Install Keyboard** – Refer to Procedure – Installation (Keyboard) on (page 30) for details.
7. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
8. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
9. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

Thermal Module Replacement Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

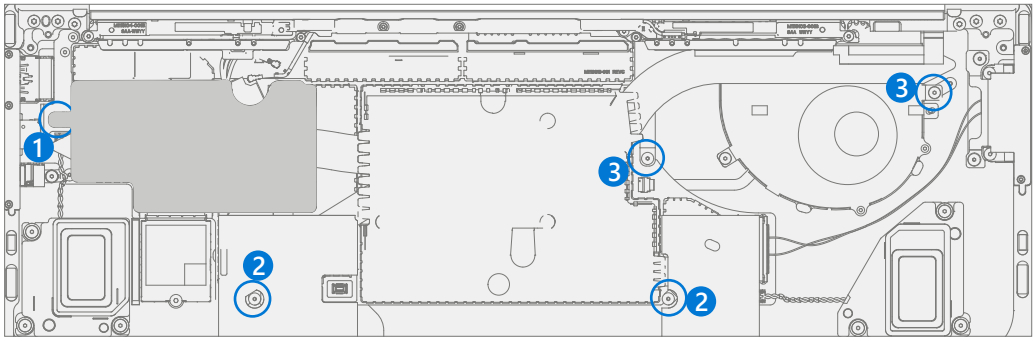
- **Tools:**
  - Plastic tweezers
  - Plastic spudger
  - Anti-static wrist strap (1 MOhm resistance)
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Cleaning swabs
  - 3IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth
- **Components:**
  - Thermal Module + Fan (Refer to Illustrated Service Parts List)
  - Thermal Module + Fan Screw 1 (M1101188-001) Qty. 1
  - Thermal Module + Fan Screw 2 (MM1086672-001) Qty. 2
  - Thermal Module + Fan Screw 3 (M1091265-001) Qty. 2 (Qty. 3 for 15")
  - Socket Screw 1 (M1108753-001) Qty. 2
  - Socket Screw 2 (M1108752-001) Qty. 2

Prerequisite Steps:

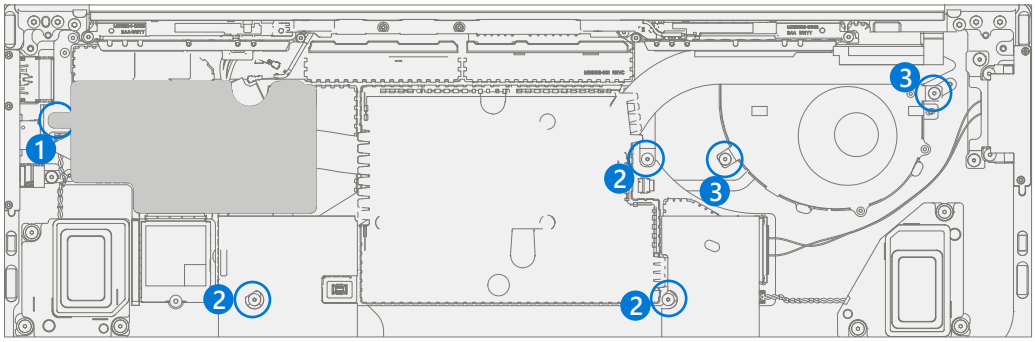
- **Power off device** – Ensure device is powered off and disconnected from a power supply. Remove all attached cables and drives.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
- **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.
- **Remove Keyboard** – Refer to Procedure – Removal (Keyboard) on (page 22) for details.
- **Remove rSSD** – Refer to Procedure – Removal (rSSD) on (page 33) for details.

Procedure – Removal (Thermal Module)

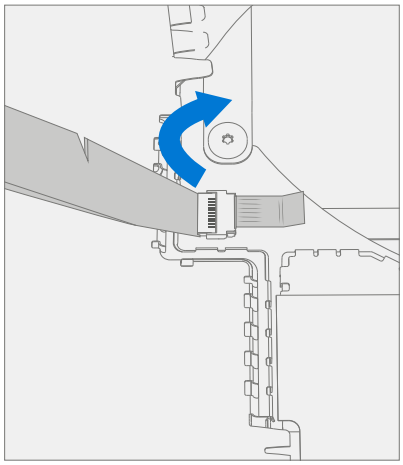
1. **Remove Screws** – Using a 3IP (Torx-plus) driver remove the 5 screws securing the Thermal Module + Fan to the chassis.

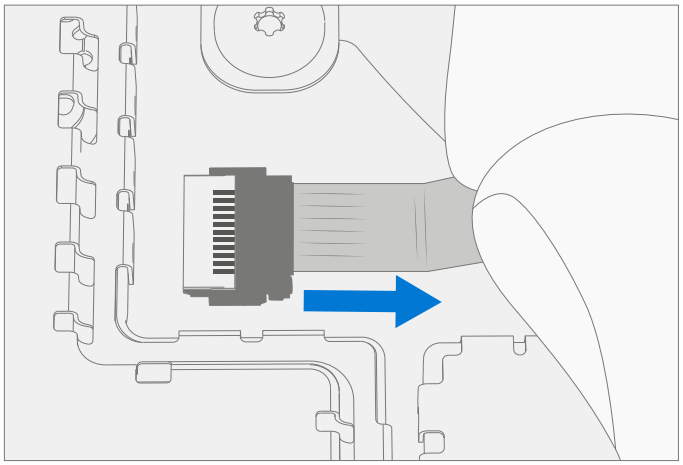


IMPORTANT: The 15" model has six screws on the thermal module. Locations are listed below.

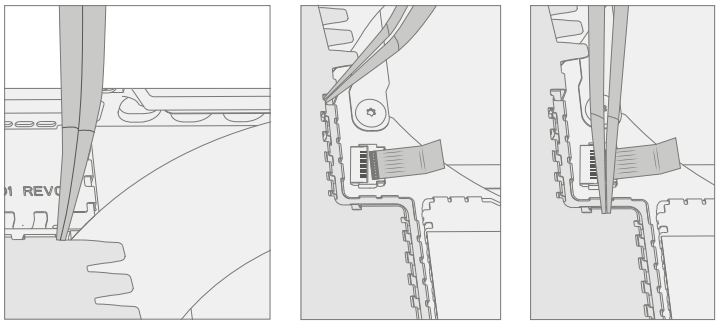


2. **Remove fan connector** – Using a plastic spudger lift the locking tab on the fan connector and pull fan FPC out of connector.

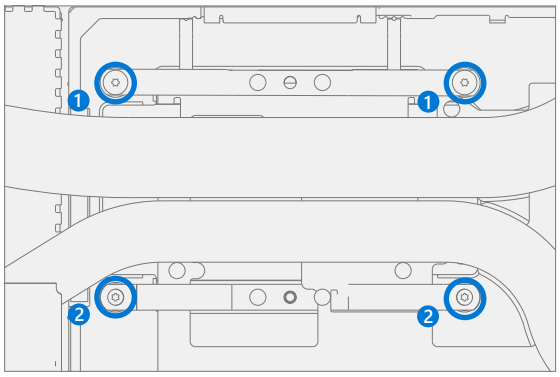




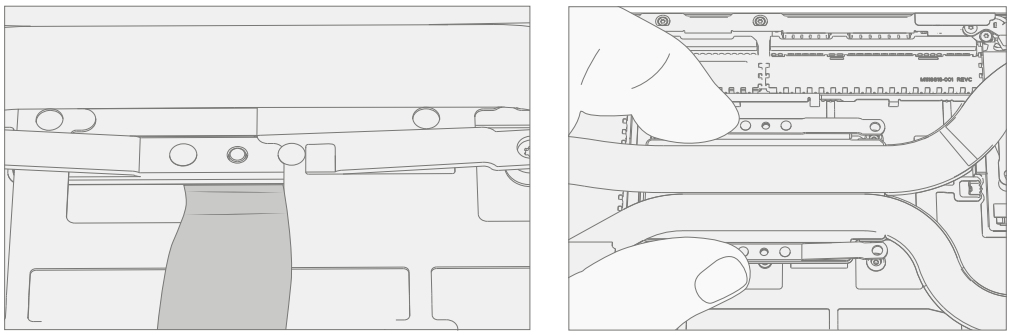
3. **Remove thermal module shield** – Using plastic tweezers work around the right-side of the thermal shield, gently prying it up. Once the right side is separated from the retention frame underneath the shield, gently pull up using fingers.



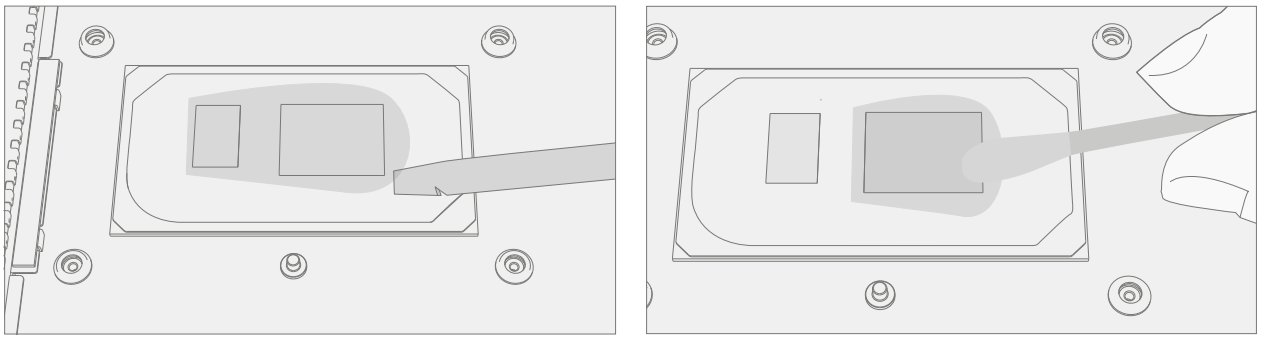
4. **Remove socket screws** – Using a 3IP (Torx-plus) driver remove the 4 socket screws securing the Thermal Module + Fan to the motherboard.



5. **Remove thermal module** – Using a plastic spudger gently work under the edge of the thermal module to break the seal with the TIM underneath. Lift out thermal module.



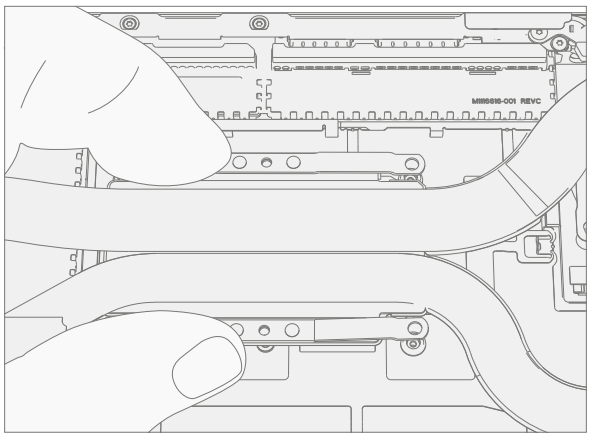
6. **Clean residual TIM** – Using a plastic spudger gently scrape off left over TIM. Use a cotton swab dipped in IPA to clean off residual TIM. Clean with microfiber cloth.



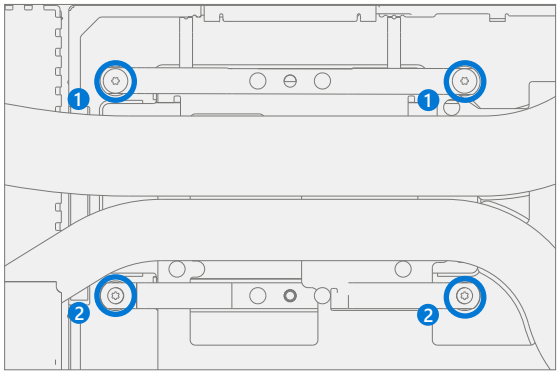
Procedure – Installation (Thermal Module)

1. **Install thermal module** – Place new thermal module + fan into device. Be sure to align screw holes with chassis posts.

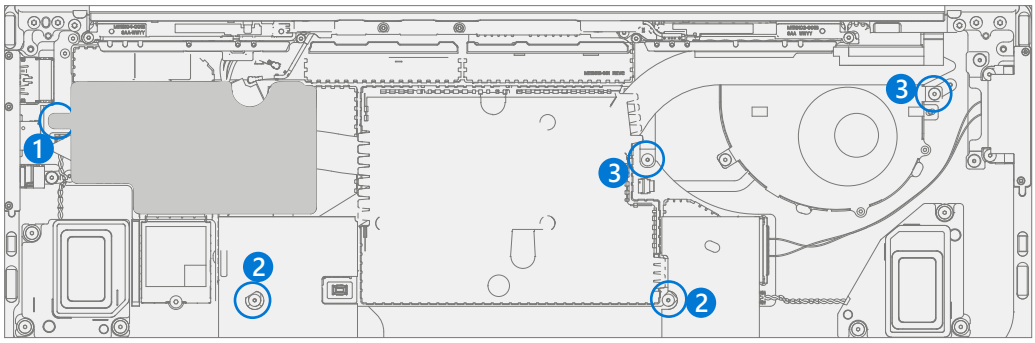
   IMPORTANT: Do not reposition device once placed. Thermal Interface Material on thermal module is not procurable separately.



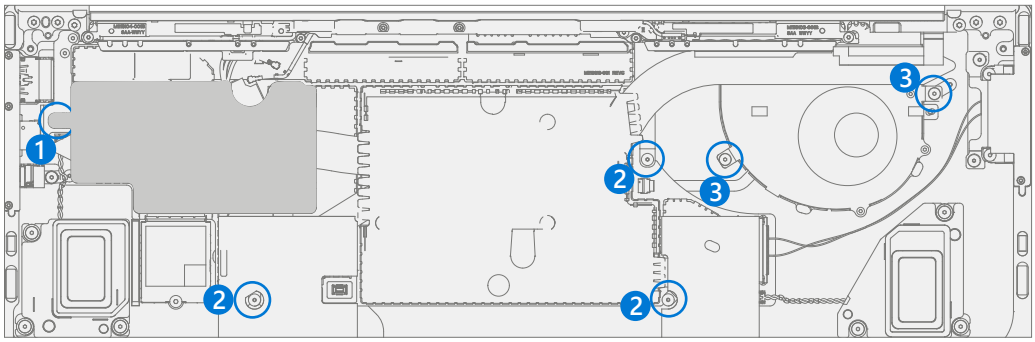
2. **Install socket screws** – Using a 3IP (Torx-plus) driver install the 4 new socket screws in each corner tensioner. Turn each screw until just snug and seated, and then turn another 45 degrees (1/8 turn) or until screws are fully fastened.



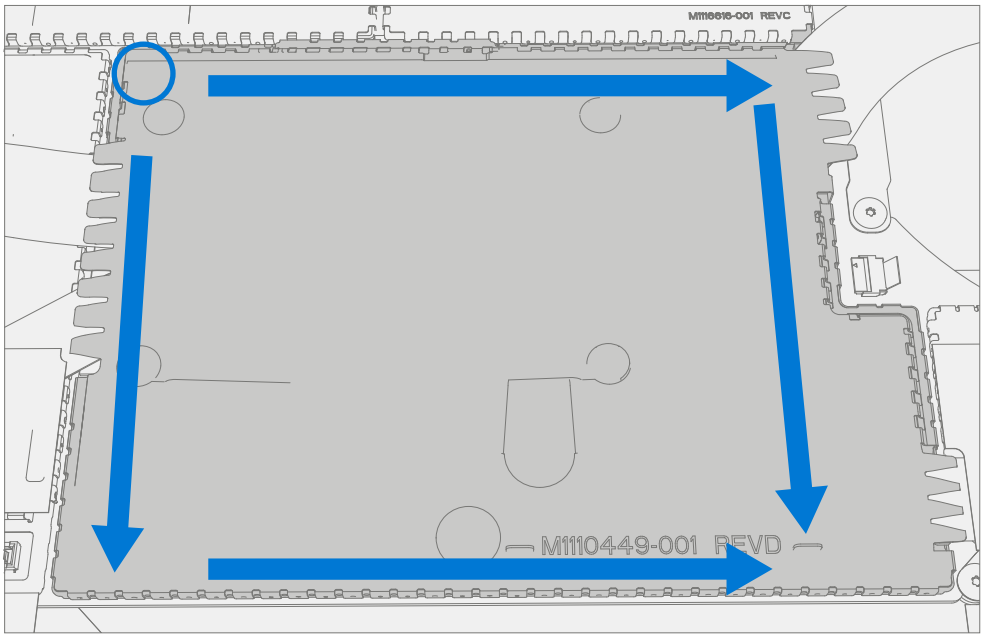
3. **Install thermal module screws** – Using a 3IP (Torx-plus) driver install the 5 new Thermal Module Screws that secure it to the chassis. Turn each screw until just snug and seated, and then turn another 45-degrees (1/8 turn) or until screws are fully fastened.



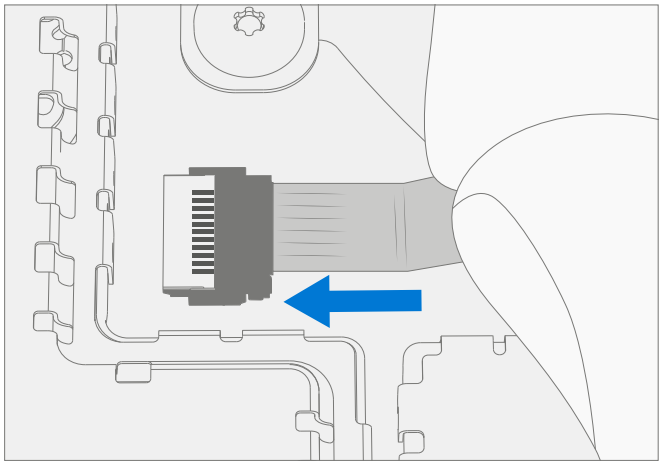
IMPORTANT: The 15" model has 6 screws on the thermal module. Locations are listed below.



4. **Install thermal module shield** – Align shield around retention frame and press down the upper left corner. Then work around the outer edge of the shield, there should be clicking as the shield seats properly.



5. **Install fan connector** – Reconnect fan FPC and press down the locking tab on the connector.



6. **Install rSSD** – Refer to Procedure – Installation (rSSD) on (page 34) for details.
7. **Install Keyboard** – Refer to Procedure – Installation (Keyboard) on (page 30) for details.
8. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
9. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
10. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

Speaker Replacement Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

- **Tools:**
  - Plastic tweezers / spudger
  - Anti-static wrist strap (1 MOhm resistance)
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Cleaning swabs
  - 3IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth
- **Components:**
  - Speakers (Refer to Illustrated Service Parts List)
  - Speaker Screw (M1014142-001) Qty. 6

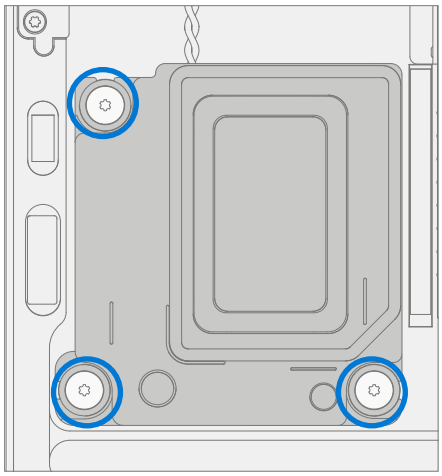
Prerequisite Steps:

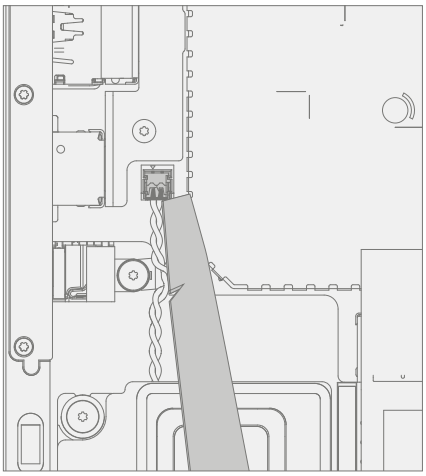
- **Power off device** – Ensure device is powered off and disconnected from a power supply. Remove all attached cables and drives.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
- **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.
- **Remove Keyboard** – Refer to Procedure – Removal (Keyboard) on (page 22) for details.
- **Remove rSSD** – Refer to Procedure – Removal (rSSD) on (page 33) for details.
- **Remove Thermal Module** – Refer to Procedure – Removal (Thermal Module) on (page 46) for details.

Procedure – Removal (Speakers)

1. **Remove right speaker** – Using a 3IP (Torx-plus) driver remove the 3 screws securing the left speaker to the chassis. Disconnect speaker from motherboard using a plastic spudger, by lifting the cable up from the motherboard. Remove the left speaker.

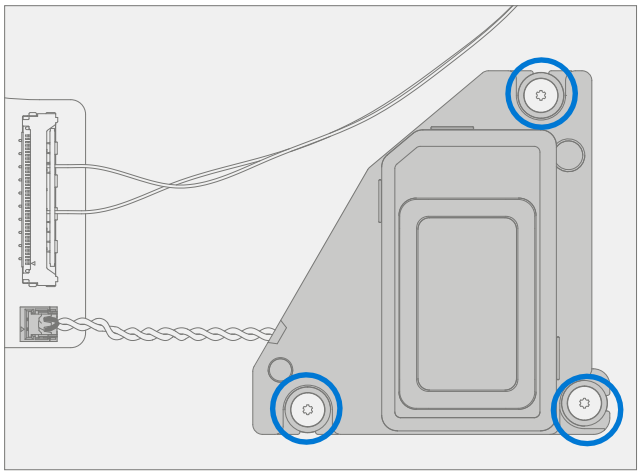
> ! **CAUTION:** Do not attempt to pull cable out, cable slots into the connector from the top and should be lifted out of the chassis.

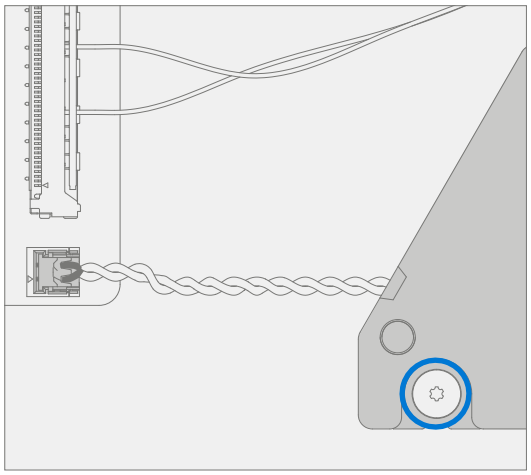




2. **Remove right speaker** – Using a 3IP (Torx-plus) driver remove the 3 screws securing the right speaker to the chassis. Disconnect speaker from motherboard using a plastic spudger, by lifting the cable up from the motherboard. Remove the right speaker.

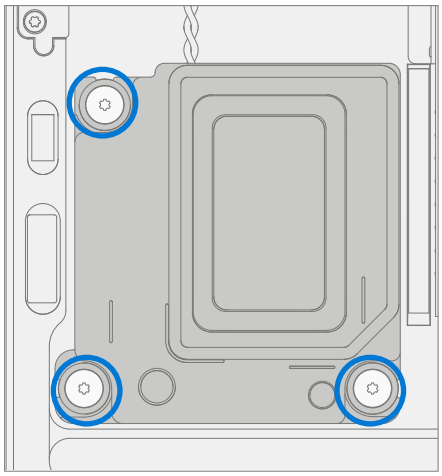
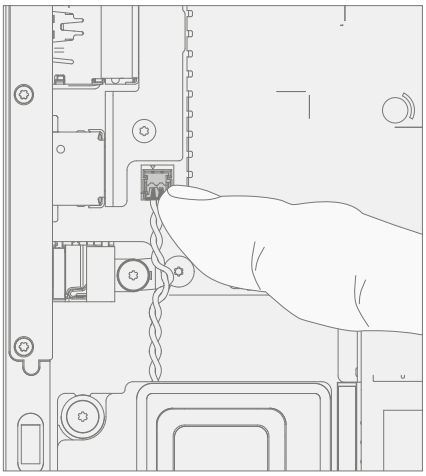
> ! **CAUTION:** Do not attempt to pull cable out, cable slots into the connector from the top and should be lifted out of the chassis.



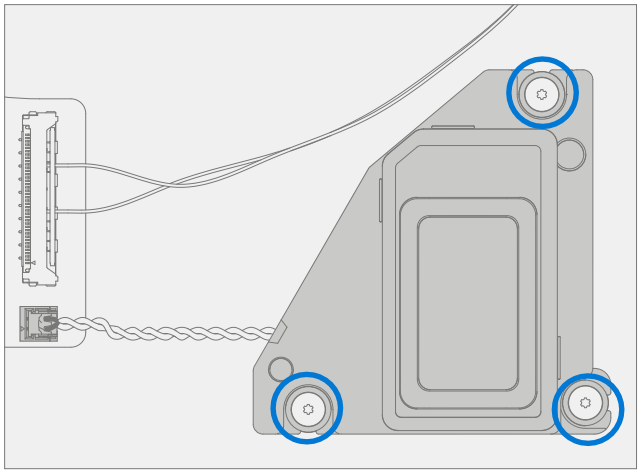
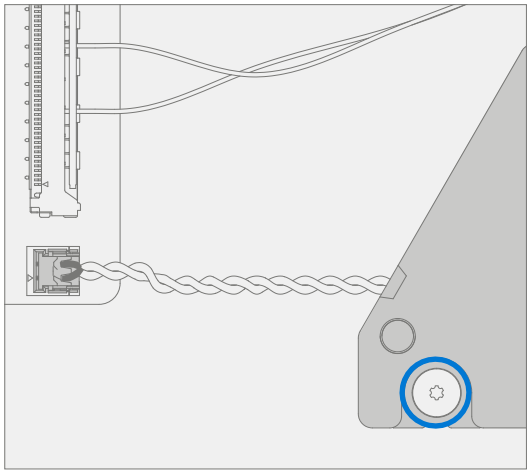


Procedure – Installation (Speakers)

1. **Install left speaker** – Place left speaker in chassis. Using a 3IP (Torx-plus) driver install the 3 Speaker Screws securing the left speaker to the chassis until finger tight. Then turn each screw an additional ~45-degrees (1/8 turn), or until fully fastened. Connect speaker to motherboard.

2. **Install right speaker** – Place right speaker in chassis. Using a 3IP (Torx-plus) driver install the 3 screws securing the right speaker to the chassis until finger tight. Then turn each screw an additional ~45-degrees (1/8 turn), or until fully fastened. Connect speaker to motherboard.

3. **Install rSSD** – Refer to Procedure – Installation (rSSD) on (page 34) for details.
4. **Install Keyboard** – Refer to Procedure – Installation (Keyboard) on (page 30) for details.
5. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
6. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
7. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

Display Replacement Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

- **Tools:**
  - Plastic tweezers / spudger
  - Anti-static wrist strap (1 MOhm resistance)
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Cleaning swabs
  - 3IP (Torx-plus) driver
  - 6IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth
  - 0.1mm thickness gauge
  - 0.15mm thickness gauge
- **Components:**
  - Display (Refer to Illustrated Service Parts List) if replacing+
  - Hinge Screw (M1005491-001) Qty. 6
  - Display Connector Shields 1 (M1116612-001) Qty. 1
  - Display Connector Shields 2 (M1116616-001) Qty. 1

Prerequisite Steps:

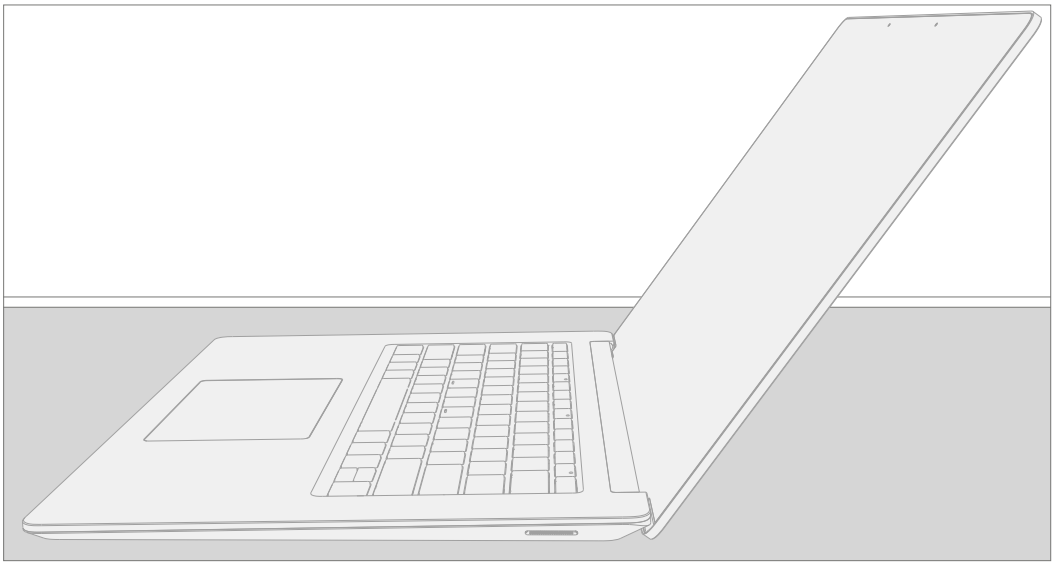
- **Prep Device** – Device must be set in **TDM Replacement Mode** prior to removing a **faulty** display. This is not required if the original display will be reinstalled.

  ⚠ **WARNING:** This step must be carried out on the device successfully before removal of a faulty display. If display is unusable, connect an external monitor to run these steps.

  - **Connect USB** – Connect USB with SDT to USB connector on device under repair.
  - **Power on device** – Connect power supply to device. Press the power button on the device.
  - **Run SDT** – At the device OS, use Windows Explorer to navigate to USB drive: select Repair Setup and Validation. Run the Touch Display Setup. At the end of the tool process device will power down.
- **Power off device** – Ensure device is powered off and disconnected from a power supply. Remove all attached cables and drives.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
- **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.
- **Remove Keyboard** – Refer to Procedure – Removal (Keyboard) on (page 22) for details.
- **Remove rSSD** – Refer to Procedure – Removal (rSSD) on (page 33) for details.
- **Remove Thermal Module** – Refer to Procedure – Removal (Thermal Module) on (page 46) for details.

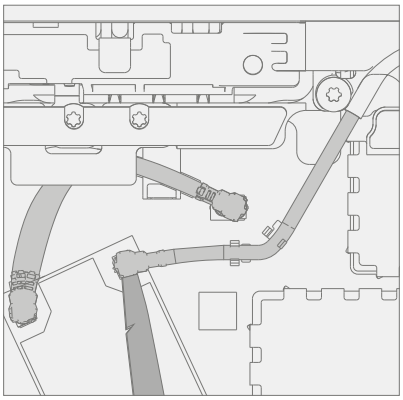
Procedure – Removal (Display)

1. **Open display** – Open display to approximately 110-degrees.



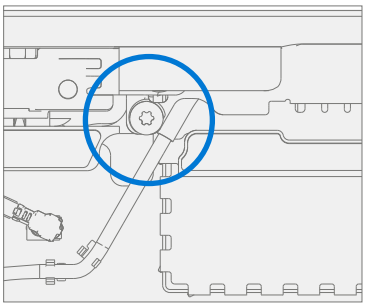
2. **Remove Antenna** – Using a spudger, remove the black WiFi antenna from the WiFi module.

> ! **CAUTION:** Connectors on WiFi module are very fragile. Do not attempt to remove with fingers. If connector is damaged, motherboard must be replaced.



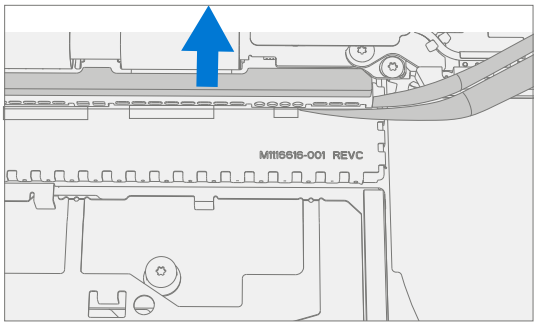
3. **Loosen WiFi deck** – Remove the marked screw on the WiFi deck using a 3IP (Torx-plus) driver. Move WiFi antenna off to the side.

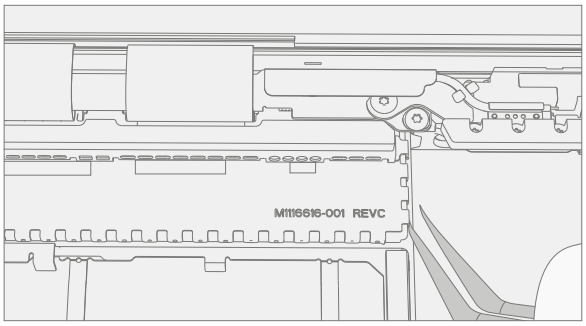
> **IMPORTANT:** Retain screw for future use during reassembly.



4. **Remove connector shielding** – Using a pair of tweezers, remove the display FPC covers.

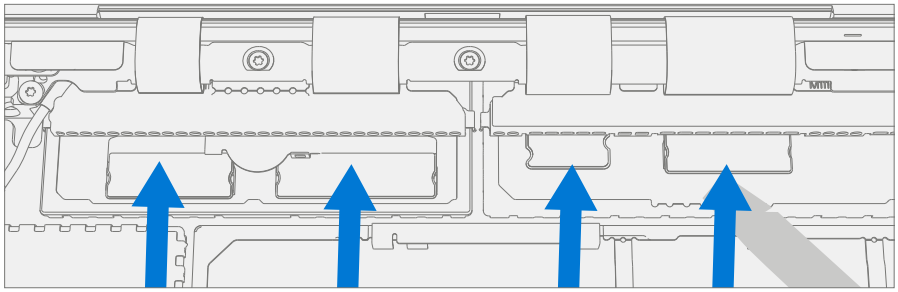
> ! **CAUTION:** When removing the connector shields ensure to only remove the black shields and not the silver shield retainers.
>
> ! **CAUTION:** The nearby foams are very delicate. Take care not to damage or remove them.



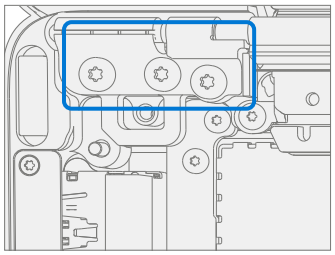


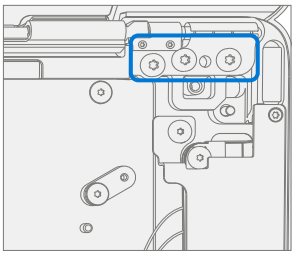
5. **Remove display connectors** – Using a plastic spudger remove the 4 display connectors from the motherboard by slowly working the spudger back and forth on each connector until it comes off.

> ! **CAUTION:** The connectors on the motherboard side are very fragile. Take care not to damage them.

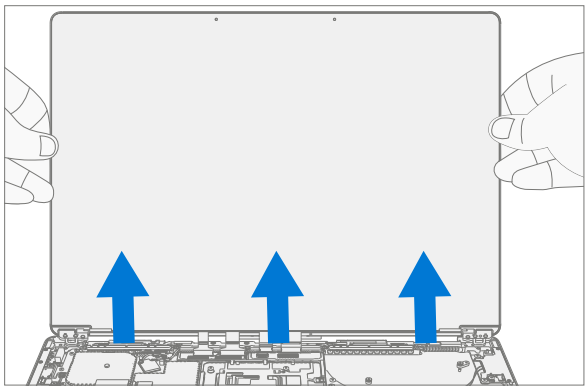


6. **Remove hinge screws** – While supporting the display with one hand, use a 6IP (Torx-plus) driver to remove the 6 screws securing the display to the chassis.



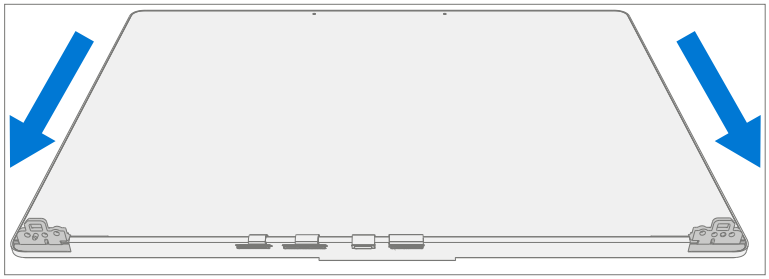


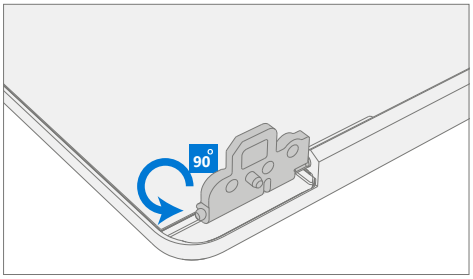
7. **Remove display** – Using two hands lift display away from chassis and set aside.



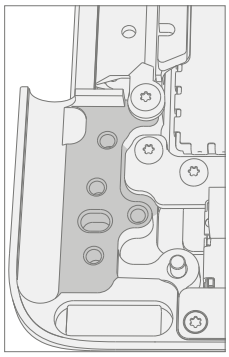
Procedure – Installation (Display)

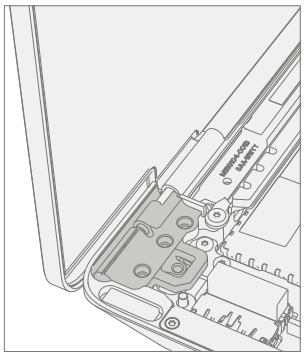
1. **Position hinges** – Place the backside of the display module on the ESD safe workbench. Adjust hinges until they are approximately set at 90 degrees.



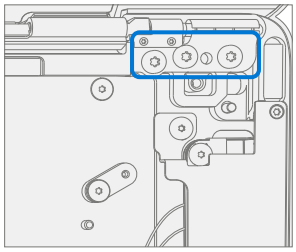


2. **Install display module onto chassis** – While holding the display with one hand. Carefully align the hinges into the pockets on the chassis.

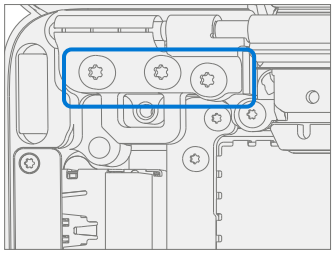




3. **Pre-fasten right hinge screws** – Using a 6IP (Torx-plus) driver assemble 3 new Hinge Screws in the right-side hinge and tighten until just snug.



4. **Pre-fasten left hinge screws** – Using a 6IP (Torx-plus) driver assemble 3 new Hinge Screws in the left-side hinge and tighten until just snug.

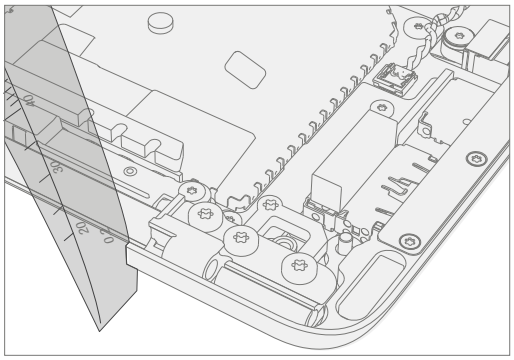


5. **Hinge alignment**

   a. Loosen all 6 hinge screws 90 degrees (1/4 turn).

   b. Close the lid and adjust the alignment until the back edge is flush across the hinge and chassis surfaces.

   c. Verify a 0.1 mm plastic thickness gauge can slide easily in the hinge gap.



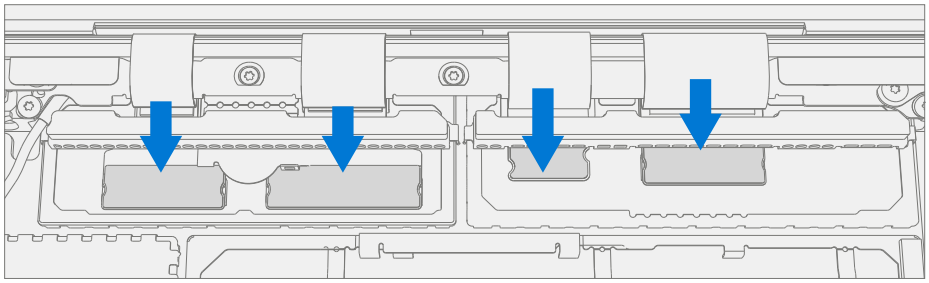
   d. Open the lid and tighten 1 screw on each hinge until snug then turn an additional 90 degrees (1/4 turn), recheck alignment, and 0.1mm gaps.

   e. Repeat steps b through d on each of the 5 remaining hinge screws.

IMPORTANT: Placing a 0.15 mm plastic thickness gauge in the smaller of the 2 hinge gaps during step "d." will aid in achieving a 0.1 mm gap after tightening.

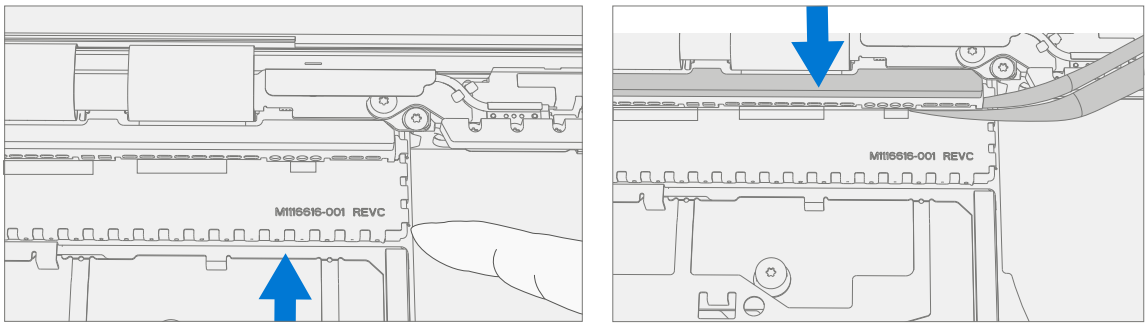
6. **Connect 4 Display Cables** – Carefully connect the 4 display cables into the motherboard connectors. Ensure the connections are fully seated.

CAUTION: Connectors are fragile. Ensure that they are properly aligned before pressing down to snap into motherboard. If motherboard side connectors are damaged the motherboard must be replaced.



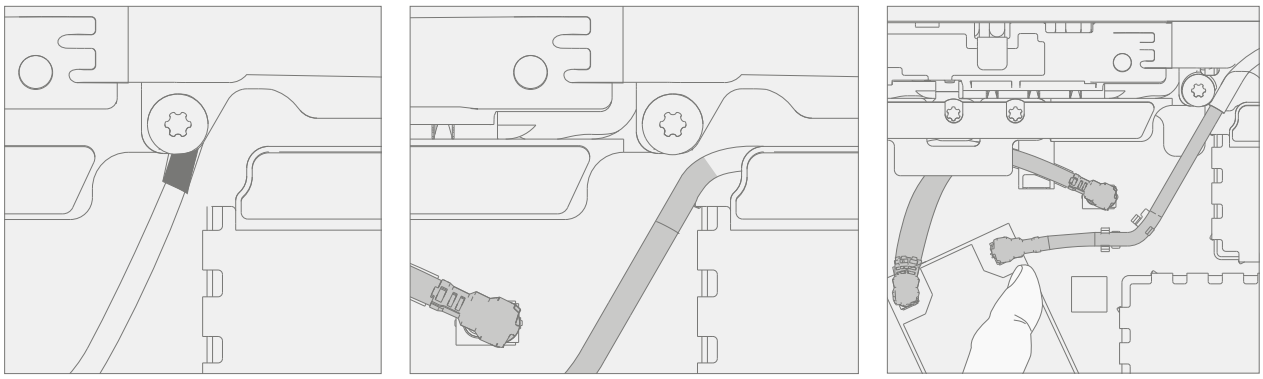
7. **Install connector shielding** – Using a pair of tweezers, slide the display FPC shields into place. Once shields are properly positioned press into place.

> ! **CAUTION:** The nearby foams are very delicate. Take care not to damage or remove them.

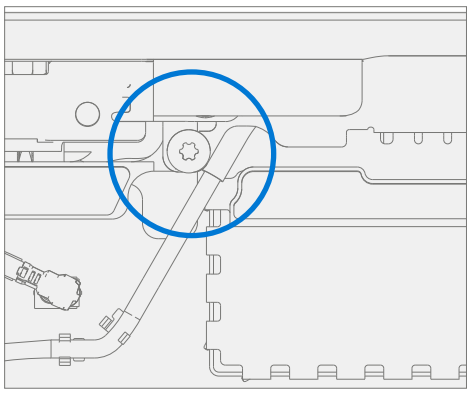


8. **Install Antenna** – Using your fingers, gently move the black WiFi antenna into place under the WiFi deck as shown below. Then connect the black antenna to the WiFi module.

> ! **CAUTION:** Connectors on WiFi module are very fragile. If connector is damaged, Motherboard must be replaced.



9. **Secure WiFi deck** – Using the screw retained in Procedure – Removal (Display) step 3 and a 3IP (Torx-plus) driver, tighten the WiFi deck back down onto the chassis until finger tight. Then turn the screw an additional ~45-degrees (1/8 turn), or until fully fastened.



10. **Install Thermal Module** – Refer to Procedure – Installation (Thermal Module) on (page 48) for details.
11. **Install rSSD** – Refer to Procedure – Installation (rSSD) on (page 34) for details.
12. **Install Keyboard** – Refer to Procedure – Installation (Keyboard) on (page 30) for details.
13. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
14. **New display calibration** – On installation of a new display, final calibration relies on the successful completion of the TDM Replacement Mode. Display calibration is not required when installing the originally removed display.
    a. **Connect software tools USB** drive with SDT to USB connector on device under repair.
    b. **Run software tool** – At the device OS, use Windows Explorer, navigate to USB drive, and run:
    SDT – Select Repair setup and validation. Run the Touch Display Calibration. Accept the restart prompt at the end of the tool process.

    IMPORTANT: This step must be carried out on the device successfully on installation of a new display.
15. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
16. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

Motherboard Replacement Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

- **Tools:**
  - Plastic tweezers / spudger
  - Anti-static wrist strap (1 MOhm resistance)
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Goo Gone
  - Cleaning swabs
  - Metric plastic thickness gauges
  - Non-Metallic ruler (Amazon Example)
  - 3IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth
- **Components:**
  - Motherboard (Refer to Illustrated Service Parts List) if replacing
  - Motherboard Screw (M1086672-001) Qty. 6
  - Grounding Bar Screw (M1101188-001) Qty. 2
  - Retention Bracket Screw (M1109237-001) Qty. 3

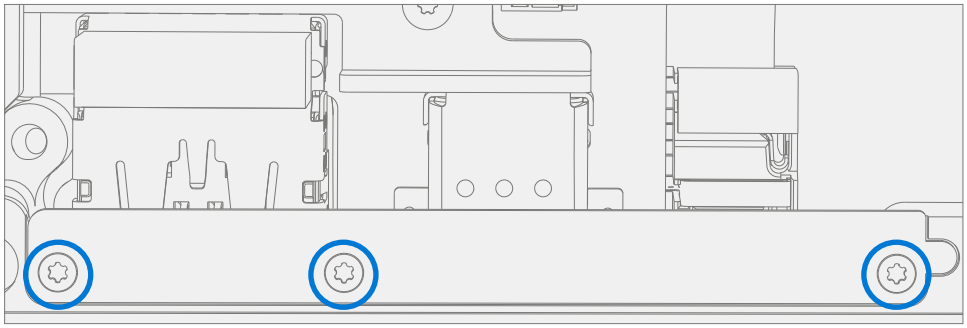
Prerequisite Steps:

- **Power off device** – Ensure device is powered off and disconnected from a power supply. Remove all attached cables and drives.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
- **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.
- **Remove Keyboard** – Refer to Procedure – Removal (Keyboard) on (page 22) for details.
- **Remove rSSD** – Refer to Procedure – Removal (rSSD) on (page 33) for details.
- **Remove Thermal Module** – Refer to Procedure – Removal (Thermal Module) on (page 46) for details.
- **Remove Speakers** – Refer to Procedure – Removal (Speakers) on (page 52) for details.
- **Remove Display** – Refer to Procedure – Removal (Display) on (page 56) for details.

Procedure – Removal (Motherboard)

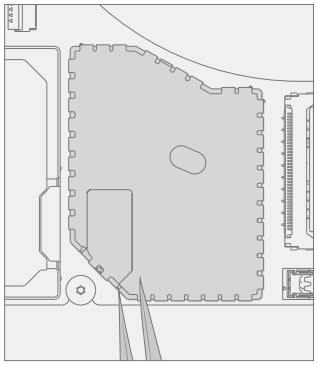
> **CAUTION:** The Motherboard and Chassis + Battery are very sensitive to ESD and can be easily damaged. Ensure proper grounding before performing any work on these parts.

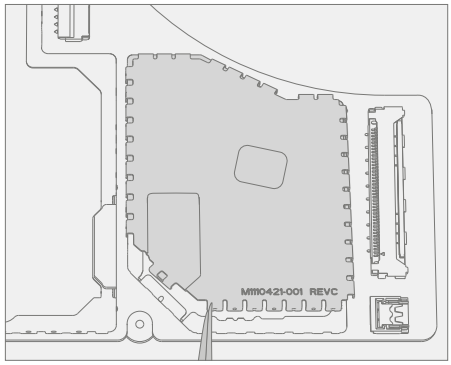
1. **Remove retention clip** – Using a 3IP (Torx-plus) driver remove the 3 screws securing the retention bracket to chassis. This bracket is located on the right side of the chassis, above USB port.



2. **Remove right shield** – Using a pair of tweezers remove the right-hand shield from the motherboard.

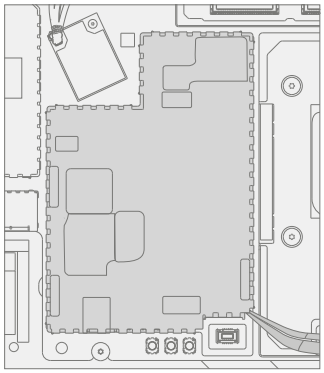
> **CAUTION:** When removing the connector shield be careful not to remove the shield retainers under shield lids.



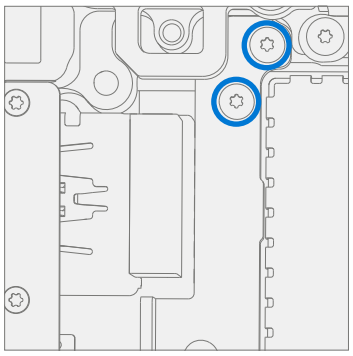


3. Remove left shield – Using a pair of tweezers remove the left-hand shield from the motherboard.

> **CAUTION:** When removing the connector shield be careful not to remove the shield retainers under shield lids.

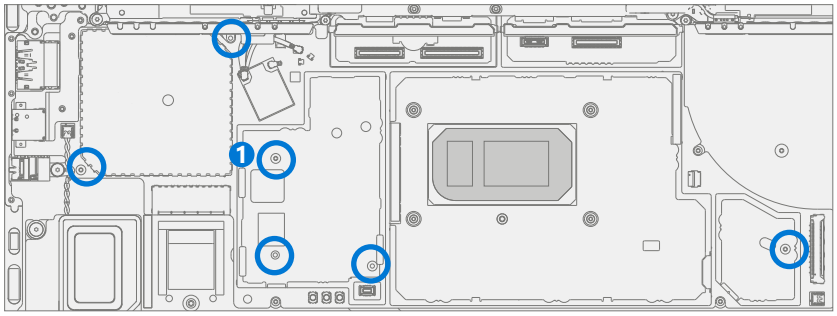


4. **Remove stiffener bar** – On right side of motherboard, using a 3IP (Torx-plus) driver remove the 2 screws securing the stiffening bar to the motherboard and chassis.

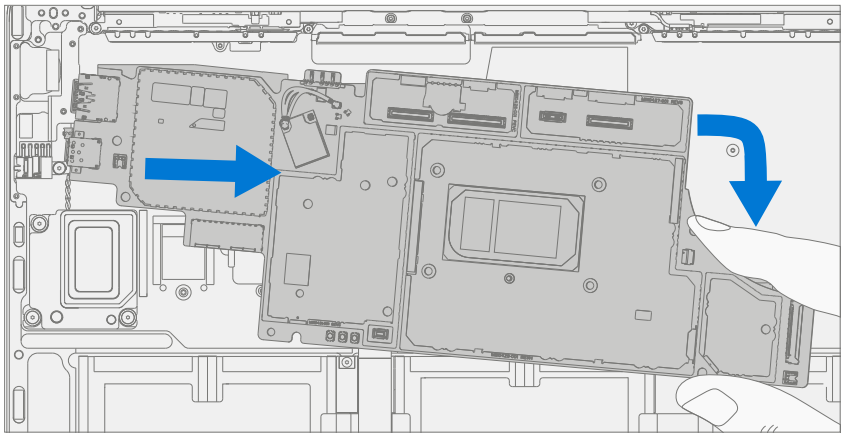


5. **Remove motherboard screws** – Using a 3IP (Torx-plus) driver remove the 6 screws securing the motherboard to the chassis.

IMPORTANT: Screw marked #1 is hidden by a plastic cover. Remove cover with plastic tweezers.

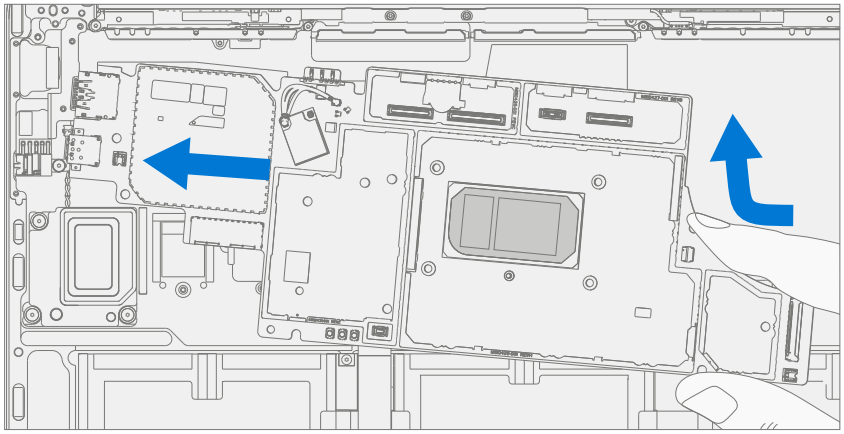


6. **Remove motherboard** – Grab the right-hand side of the motherboard and lift until just of the chassis standoffs while gently rotating it toward you and pulling gently to the right. A wiggling motion will be required to loosen the top of the board from the chassis. Lift the motherboard out of the Chassis.



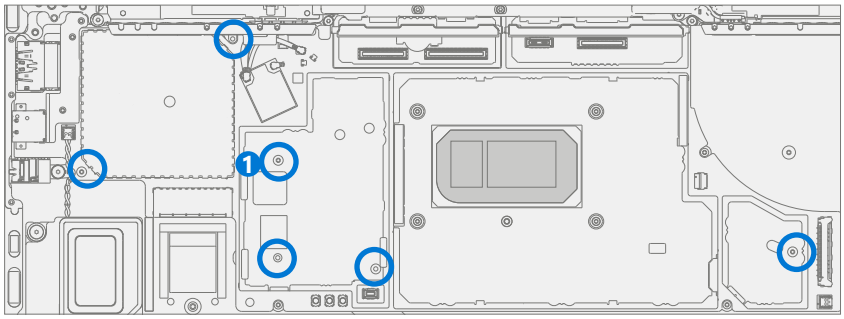
Procedure – Installation (Motherboard)

1. **Insert motherboard** – While holding the right-hand side of the motherboard, insert the USB ports into the left-hand side of the chassis. Once inserted, rotate the board down and into the chassis under the WiFi deck.

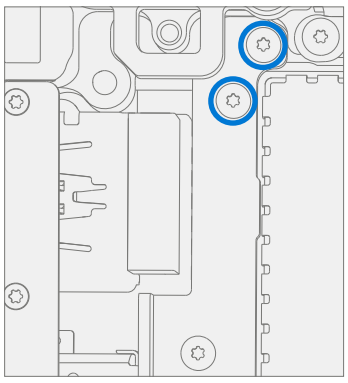


2. **Install motherboard screws** – Using a 3IP (Torx-plus) driver install 6 screws new motherboard screws in the location below until finger tight. Then turn each screw an additional ~45-degrees (1/8 turn), or until fully fastened.

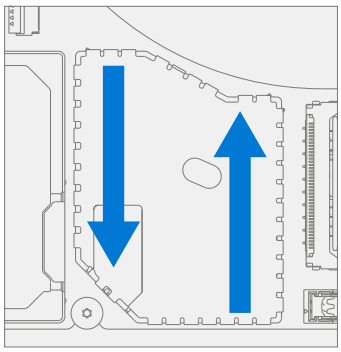
> **IMPORTANT:** Do not to forget to add the rubber cap to screw marked #1



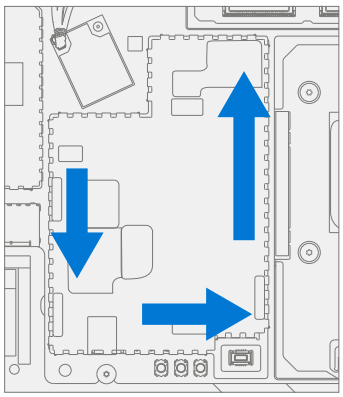
3. **Install stiffening bar** – Using a 3IP (Torx-plus) driver install the 2 stiffening bar screws securing the stiffening bar to the motherboard and chassis.



4. **Install right shield** – Align shield with shield retainer. Press along the edge of the shield until the shield is fully seated.



5. **Install left shield** – Align shield with shield retainer. Press along the edge of the shield until the shield is fully seated.



6. **Install Speakers** – Refer to Procedure – Installation (Speakers) on (page 53) for details.
7. **Install Display** – Refer to Procedure – Installation (Display) on (page 58) for details.
8. **Install Thermal Module** – Refer to Procedure – Installation (Thermal Module) on (page 48) for details.
9. **Install rSSD** – Refer to Procedure – Installation (rSSD) on (page 34) for details.
10. **Install Keyboard** – Refer to Procedure – Installation (Keyboard) on (page 30) for details.
11. **Power On Device** – Carefully place device top side up. Connect device to power supply, open display, and power on.
12. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
13. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

Chassis + Battery Replacement Process

Preliminary Requirements

> **IMPORTANT:** Be sure to follow all special (bolded) notes of caution within each process section.

Required Tools and Components

- **Tools:**
  - Plastic tweezers / spudger
  - Anti-static wrist strap (1 MOhm resistance)
  - Isopropyl Alcohol Dispenser Bottle (use only 70% IPA)
  - Goo Gone
  - Cleaning swabs
  - Metric plastic thickness gauges
  - Non-Metallic ruler (Amazon Example)
  - 3IP (Torx-plus) driver
  - USB Thumb drive with SDT
  - Surface Power Supply
  - Soft ESD-safe mat
  - Microfiber cloth
  - Bucket (1 gallon)
  - Clean, dry, untreated sand (0.5 gallon)
- **Components:**
  - Chassis + Battery (Refer to Illustrated Service Parts List)
  - Audio Jack Screw (M1014142-001) Qty. #
  - WiFi Deck Screw 1 (M1108756-001) Qty. 2
  - WiFi Deck Screw 2 (M1118001-001) Qty. 6
  - WiFi Deck Screw 3 (M1109237-001) Qty. 2
  - WiFi Deck Screw 4 (M1108754-001) Qty. 1
  - WiFi Deck Screw 5 (X930709-XXX) Qty. 2

Prerequisite Steps:

- **Device Serial Number Notation** – The Surface device serial number for this model is located on the bottom of the chassis. When the chassis is replaced during service/repair, the device serial number becomes physically disconnected from the customer's device. To ensure the customer has the best experience if any future Microsoft support is required, it is recommended to create a notation of the device serial number and provide it to the customer upon completion of the repair.
- **Run SDT** – Insert the SDT USB drive and execute the Battery Repair (Setup) workflow to have the device enter repair mode.
- **Power off device** – Ensure device is powered off and disconnected from a power supply.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening the device. Refer to Prior to Device Disassembly section on (page 18) for details.
- **Position device** – Place device onto a clean surface free of debris with the bottom facing up.
- **Remove Feet** – Refer to Procedure – Removal (Feet) on (page 20) for details.
- **Remove Keyboard** – Refer to Procedure – Removal (Keyboard) on (page 22) for details.
- **Remove rSSD** – Refer to Procedure – Removal (rSSD) on (page 33) for details.
- **Remove Thermal Module** – Refer to Procedure – Removal (Thermal Module) on (page 46) for details.
- **Remove Speakers** – Refer to Procedure – Removal (Speakers) on (page 52) for details.
- **Remove Display** – Refer to Procedure – Removal (Display) on (page 56) for details.
- **Remove Motherboard** – Refer to Procedure – Removal (Motherboard) on (page 63) for details.

Procedure – Removal (Chassis + Battery)

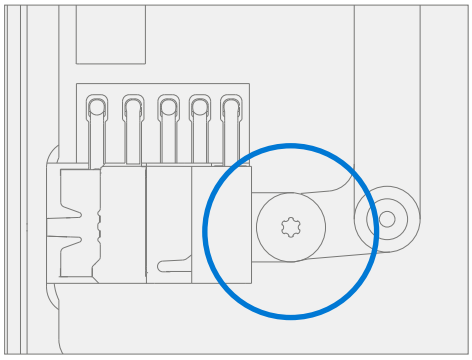
IMPORTANT: Place the chassis somewhere where the battery cannot accidentally be contacted or damaged. The chassis is preferably stored vertically to prevent anything from being placed on top of the battery.

IMPORTANT: When disposing of the chassis, recycle the old battery according to local laws.

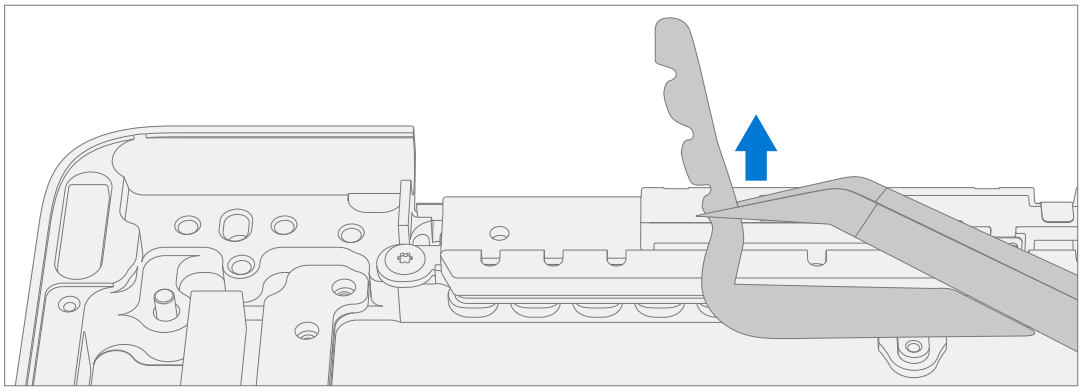
CAUTION: The Motherboard and Chassis + Battery are very sensitive to ESD and can be easily damaged. Ensure proper grounding before performing any work on these parts.

WARNING: In case of battery event submerge entire device sand in. **Do not attempt to pick up device.**

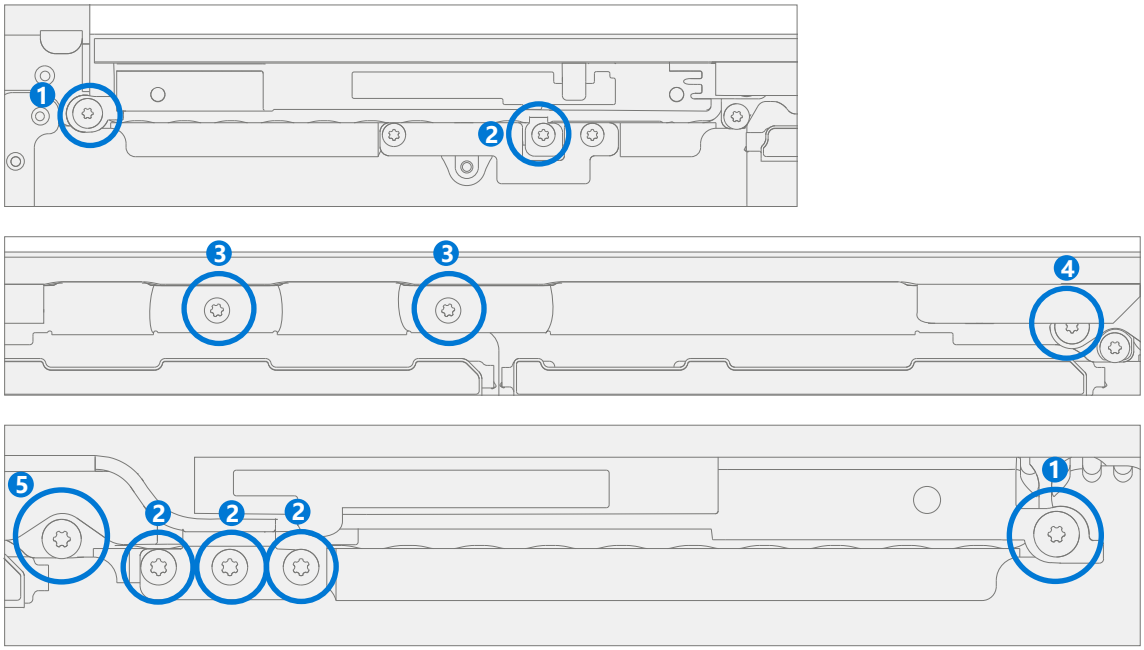
1. **Remove audio jack** – Using a 3IP (Torx-plus) driver remove the screw that holds in the audio jack. Remove audio jack and set aside.



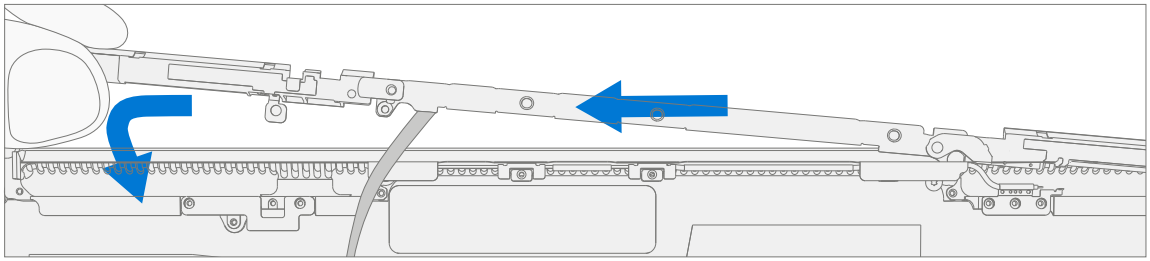
2. **Remove padding** – Using a pair of plastic tweezers remove the padding next to the WiFi deck on the left and right side of the chassis.



3. **Remove WiFi deck screws** – Using a 3IP (Torx-plus) driver remove the 12 screws that hold in the WiFi deck.



4. **Lift WiFi deck out of chassis.**



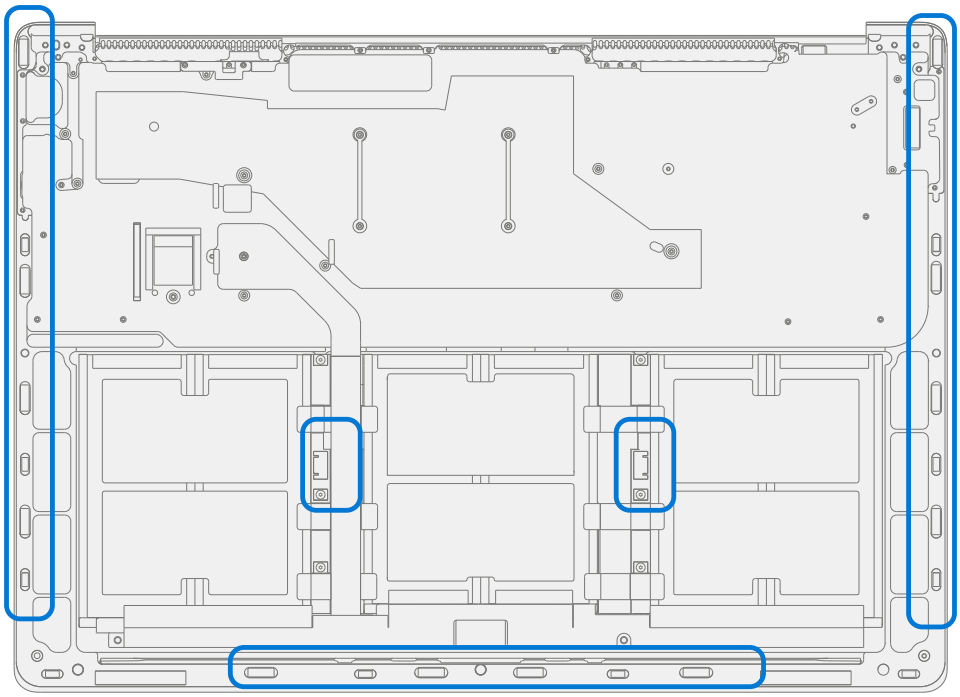
Procedure – Installation (Chassis + Battery)

1. **Pre-installation Device Inspection** – Check chassis (both sides) and device enclosure for any loose articles that may be present.
   a. Check and remove any foreign objects that the magnets may have attracted. Refer to the circled Magnetized areas pictured below.
   b. Pay special attention to the magnetized area around the bottom of the trackpad.
   c. Verify all removed screws are accounted for and have not been misplaced in the device.
   d. Loose screws should never be stored on the magnetic areas of the chassis.
   e. Inspect battery for any signs of damage or deformation.

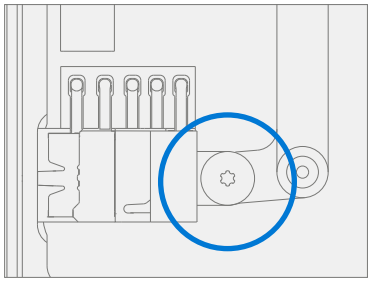
   ⚠ **WARNING:** In case of battery event submerge entire device sand in. Do not attempt to pick up device.

2. **Position the chassis** – Place the chassis above the device as pictured below. The bottom of the chassis should be on the table with the battery facing up.

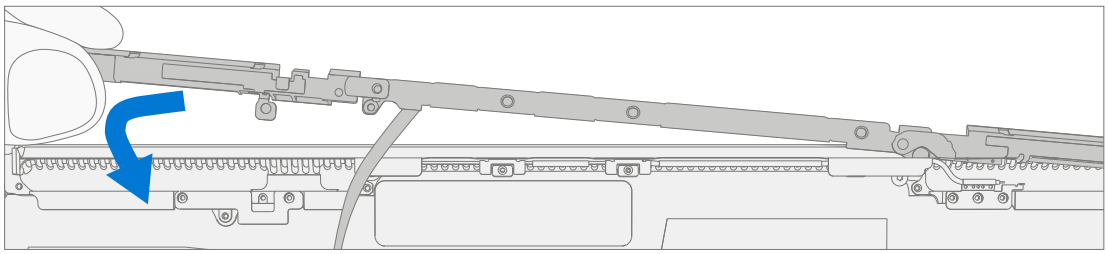
   ! **CAUTION:** Highlighted areas of chassis are magnetized. Ensure no loose screws or debris is stuck to the chassis.



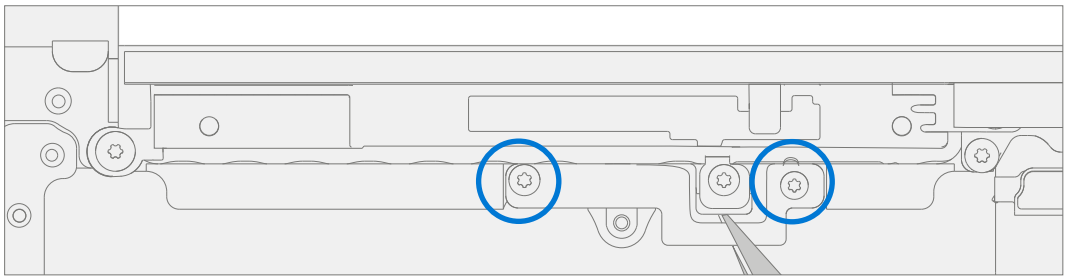
3. **Install audio jack** – Using a 3IP (Torx-plus) driver install the audio jack then secure with the audio jack screw in the location below until finger tight. Then turn screw an additional ~45-degrees (1/8 turn), or until fully fastened.



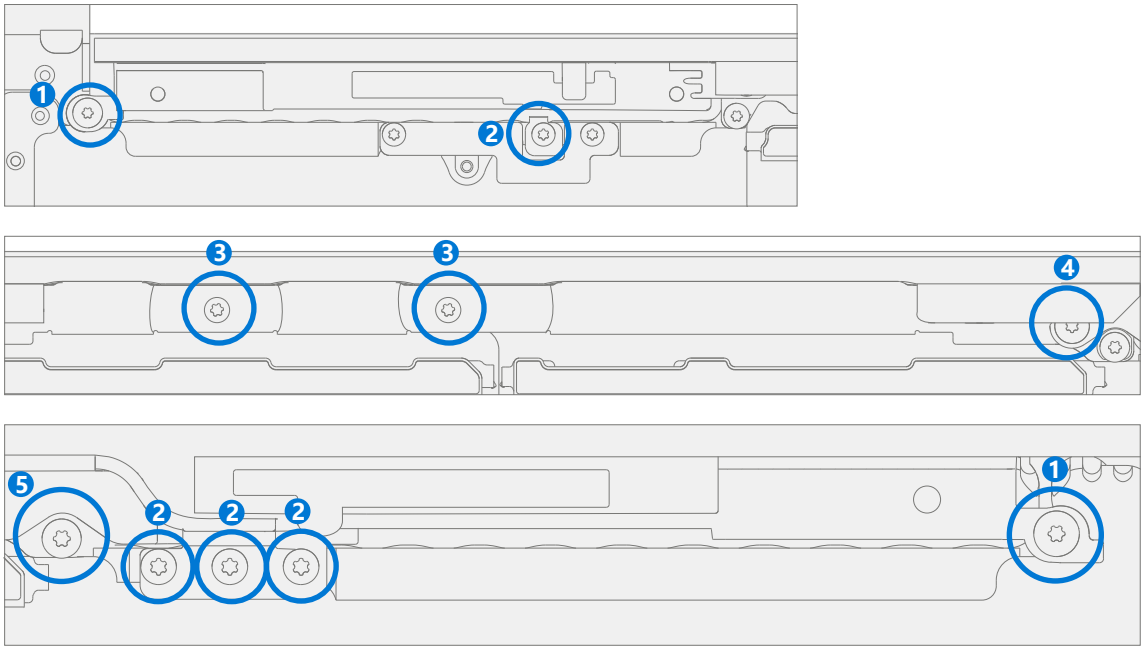
4. **Position WiFi deck** – Align the WiFi deck to the posts on the Chassis. Be sure to make sure the black WiFi antenna is not pinched between the chassis and the deck.



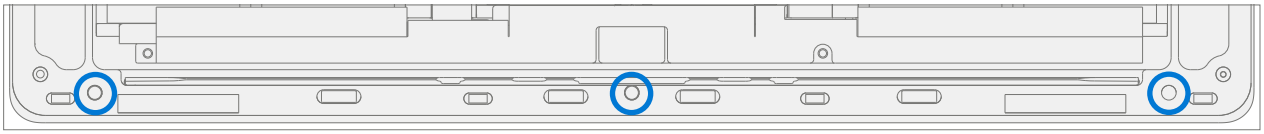
5. **Install WiFi clip** – Using a pair of tweezers, align WiFi clip with screw holes. Then use a 3IP (Torx-plus) driver install 2 WiFi clip 2 screws until finger tight. Then turn screw an additional ~45-degrees (1/8 turn), or until fully fastened.



6. **Install WiFi deck screws** – Using a 3IP (Torx-plus) driver install the 10 marked WiFi deck screws until finger tight. Numbers correspond to the relevant WiFi deck screw. Then turn screw an additional ~45-degrees (1/8 turn), or until fully fastened.



7. **Install rubber caps** – Install rubber caps on chassis standoff where shown below.



8. **Install Motherboard** – Refer to Procedure – Installation (Motherboard) on (page 65) for details.
9. **Install Speakers** – Refer to Procedure – Installation (Speakers) on (page 53) for details.
10. **Install Display** – Refer to Procedure – Installation (Display) on (page 58) for details.
11. **Install Thermal Module** – Refer to Procedure – Installation (Thermal Module) on (page 48) for details.
12. **Install rSSD** – Refer to Procedure – Installation (rSSD) on (page 34) for details.
13. **Install Keyboard** – Refer to Procedure – Installation (Keyboard) on (page 30) for details.
14. **New Battery Charging** – New batteries are shipped and stored at low states of charge in compliance with shipping regulations. The battery should be charged to at least 50%. This step will take between 20 and 60 minutes and is needed to validate full functionality of the new battery. Carefully place device right-side up. Open device, connect the power supply, and power it on.
15. **New Battery Authentication** – After charging the new battery to at least 50%, ensure new battery reads as authenticated in the Battery Repair (Validation) workflow in SDT. If the battery shows inauthentic run the SDT Battery Repair (Validation) workflow in its entirety.
    a. Connect the SDT Configuration USB drive.
    b. Run the SDT Battery Repair (Validation) to ensure battery is properly authenticated and all features and functions operate as expected.

    IMPORTANT: Battery authentication requires a stable internet connection. If any battery steps fail retry with a new internet connection. If failures continue reach out to Microsoft Support.

    c. Power off at completion of tests. Remove SDT Configuration Files USB drive and power supply.
    d. If no further repairs are required proceed to final steps.
16. **Original Battery Verify Device Functions** – Carefully place device right-side up. Open device and connect the SDT USB drive, and power supply. Power on device then Run SDT to ensure all features and functions operate as expected. Power off at completion of tests. Remove SDT USB drive and power supply. If no further repairs are required proceed to final steps.
17. **Power On Device –** Carefully place device top side up. Connect device to power supply, open display, and power on.
18. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.
19. **Install Feet** – Refer to Procedure – Installation (Feet) on (page 20) for details.

Environmental Compliance Requirements

All waste electrical and electronic equipment (WEEE), waste electronic components, waste batteries, and electronic waste residuals must be managed according to applicable laws and regulations. and H09117, "Conformance Standards for Environmentally Sound Management of Waste Electrical and Electronic Equipment (WEEE)," which is available at this link: https://www.microsoft.com/en-us/download/details.aspx?id=11691 In case of questions, please contact AskECT@microsoft.com