



# Surface Laptop 3 / Laptop 4 Service Guide



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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.

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## CONTENTS


<b>INTRODUCTION</b> .....	<b>4</b>
<b>DEVICE IDENTITY INFORMATION</b> .....	<b>4</b>
· SURFACE LAPTOP MODELS.....	4
· GLOSSARY OF TERMS.....	5
<b>GENERAL INFORMATION, PRECAUTIONS, WARNINGS</b> .....	<b>6</b>
· SERVICE TOOLS AND JIGS.....	6
<b>GENERAL SAFETY PRECAUTION</b> .....	<b>7</b>
· REPAIR-SPECIFIC PRECAUTIONS AND WARNINGS.....	8
<b>BATTERY SAFETY</b> .....	<b>9</b>
· LITHIUM-ION BATTERY INSPECTION.....	10
· HANDLING USED, DAMAGED, OR DEFECTIVE LITHIUM-ION BATTERIES .....	10
· REPORT BATTERY THERMAL EVENTS TO MICROSOFT .....	11
· ACTIONS TO TAKE.....	11
· STOP REPAIR AND CONTACT MICROSOFT.....	11
<b>ILLUSTRATED SERVICE PARTS LIST</b> .....	<b>12</b>
<b>SERVICE DIAGNOSTICS/TROUBLESHOOTING OVERVIEW</b> .....	<b>21</b>
· SOFTWARE TOOLS:.....	21
· HARDWARE TROUBLESHOOTING APPROACH.....	21
<b>COMPONENT REMOVAL AND REPLACEMENT PROCEDURES</b> .....	<b>22</b>
· PRIOR TO DEVICE DISASSEMBLY.....	22
· CURRENT BATTERY WARNING.....	22
· NON-SKID FOOT PAD REPLACEMENT PROCESS.....	23
· PRELIMINARY REQUIREMENTS .....	23
· REQUIRED TOOLS AND COMPONENTS.....	23
· PREREQUISITE STEPS: .....	23
· PROCEDURE – REMOVAL (NON-SKID FOOT PAD) .....	23
· PROCEDURE – INSTALLATION (NON-SKID FEET) .....	24
· ALTERNATE PROCEDURE – INSTALLATION (NON-SKID FEET).....	26
· C-COVER KEYBOARD ASSEMBLY REPLACEMENT PROCESSES (METAL, FABRIC).....	28
· REPLACEMENT PROCESS (C-COVER KEYBOARD METAL TYPE) .....	28
· PRELIMINARY REQUIREMENTS .....	28
· REQUIRED TOOLS AND COMPONENTS.....	28
· PREREQUISITE STEPS: .....	28
· PROCEDURE – REMOVAL (C-COVER KEYBOARD METAL TYPE) .....	29
· PROCEDURE – INSTALLATION (C-COVER KEYBOARD METAL TYPE).....	31
· REPLACEMENT PROCESS (C-COVER KEYBOARD FABRIC TYPE) .....	33
· PRELIMINARY REQUIREMENTS .....	33
· REQUIRED TOOLS AND COMPONENTS.....	33
· PREREQUISITE STEPS: .....	33
· PROCEDURE – REMOVAL (C-COVER KEYBOARD FABRIC TYPE KEYBOARD) .....	34
· PROCEDURE – INSTALLATION (C-COVER KEYBOARD FABRIC TYPE) .....	37
· RSSD REPLACEMENT PROCESS .....	39
· PRELIMINARY REQUIREMENTS .....	39
· REQUIRED TOOLS AND COMPONENTS.....	39
· PREREQUISITE STEPS: .....	39
· PROCEDURE – REMOVAL (RSSD) .....	40
· PROCEDURE – INSTALLATION (RSSD).....	41
· AB-COVER DISPLAY ASSEMBLY REPLACEMENT PROCESS.....	42
· PRELIMINARY REQUIREMENTS .....	42
· REQUIRED TOOLS AND COMPONENTS.....	42
· PREREQUISITE STEPS: .....	43
· REMOVAL PROCESS (AB-COVER DISPLAY ASSEMBLY) .....	43
· INSTALLATION PROCEDURES – (AB-COVER DISPLAY ASSEMBLY) .....	45
· PROCEDURE INSTALLATION – (METAL C-COVER DEVICE).....	45
· PROCEDURE INSTALLATION – (FABRIC C-COVER DEVICE) .....	50
· AB-COVER TOUCH CALIBRATION SOFTWARE TOOLS OVERVIEW.....	54
· PRELIMINARY REQUIREMENTS .....	54
· REQUIRED TOOLS AND COMPONENTS.....	54
· PREREQUISITE STEPS: .....	54
· USB DRIVE SETUP – DIRECTORY STRUCTURE AND FILES.....	54
· TOOL RUNTIME DETAILS.....	54
· EXPECTED SCREENSHOTS .....	55
· AB-COVER TOUCH CALIBRATION RETRY (IF REQUIRED).....	61
· TOUCH CALIBRATION STEPS (RETRY): .....	61
<b>ENVIRONMENTAL COMPLIANCE REQUIREMENTS</b> .....	<b>62</b>




## Introduction

This Service Guide (Guide) provides instructions for repairing Microsoft Surface devices using genuine Microsoft parts. It is intended for technically inclined individuals with the knowledge, experience, and specialized tools required to repair Microsoft devices.

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 **IMPORTANT:** Read this Guide in its entirety before starting any repairs. If at any point you are unsure or uncomfortable about performing the repairs, as detailed in this Guide, **DO NOT** proceed. Contact Microsoft for additional support options.

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 **WARNING:** Failure to follow the instructions in this Guide; use of non-Microsoft (non-genuine), incompatible, or modified replacement parts; and/or failure to use proper tools could result in serious personal injury, death, and/or damage to the product or other property.

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## Device Identity Information

### Surface Laptop Models

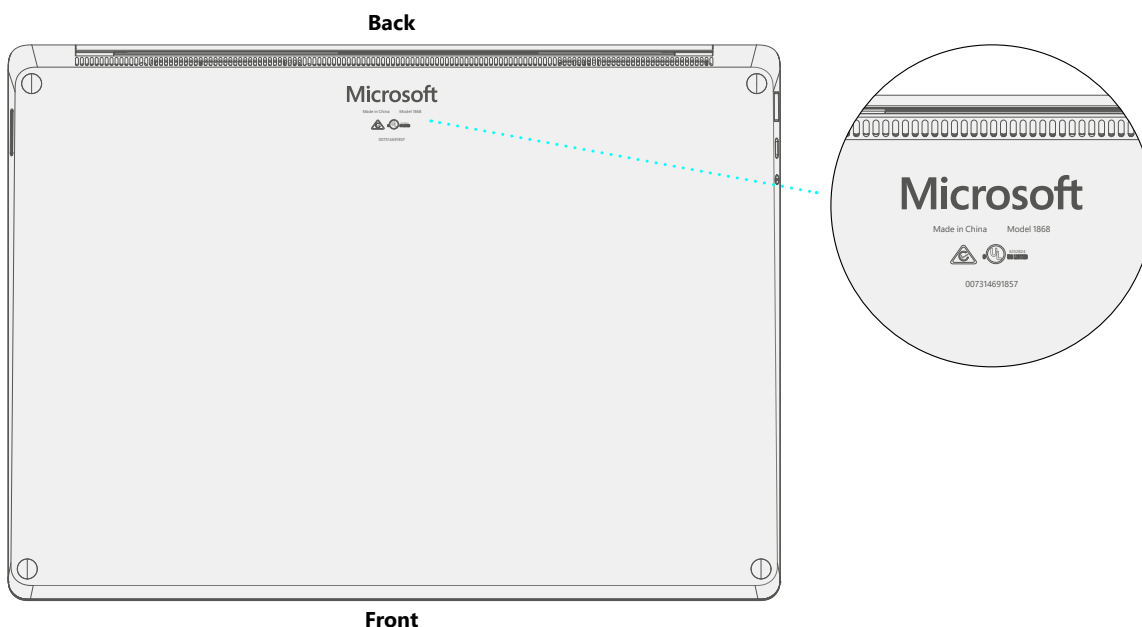
1867 – Surface Laptop 3 – 13.5" (Fabric type keyboard)  
1868 – Surface Laptop 3 – 13.5" (Metal type keyboard)  
1872 – Surface Laptop 3 – 15" (Metal type keyboard)  
1873 – Surface Laptop 3 – 15" (Metal type keyboard)  
1950 – Surface Laptop 4 – 13.5" (Fabric type keyboard)  
1951 – Surface Laptop 4 – 13.5" (Metal type keyboard)  
1953 – Surface Laptop 4 – 15" (Metal type keyboard)  
1958 – Surface Laptop 4 – 13.5" (Fabric type keyboard)  
1959 – Surface Laptop 4 – 13.5" (Metal type keyboard)  
1979 – Surface Laptop 4 – 15" (Metal type keyboard)

Surface Support – Laptop: [Link](#)

Surface Laptop 3 Technical Specifications: [Link](#)

Surface Laptop 4 Technical Specifications: [Link](#)

The model and serial number for Surface Laptops are on the bottom center closest to the display hinge point.



## Glossary of Terms


The following terms are used throughout this manual


- **ASP** – a Microsoft Authorized Service Provider who performs repair services on behalf of Microsoft under an ASP Agreement
- **Commercial Spares/CRU** – Customer Replaceable Units available to commercial customers for repair by a skilled-technician
- **feet** or **foot** – Non-Skid Foot Pads
- **C-cover** – Keyboard Trackpad Assembly
- **rSSD** – Removable Solid-State Drive
- **AB-cover** – Display Assembly or AB-Cover Display Assembly
- **BMR** – Bare Metal Recovery refers to the clean imaging process.
- **chassis** or **D-chassis** or **D-bucket** – Device bottom case
- **SDT** – Surface Diagnostic Toolkit
- **ESD** – Electro-Static Discharge
- **FPC** – Flexible Printed Circuits connections
- **FRU** – Field Replaceable Units are sub-system components such as the C-cover, AB-cover, and rSSD. FRU 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.



## General Information, Precautions, Warnings

 This symbol identifies important safety and health information in this manual.

 This symbol identifies important information in this manual.

 This symbol identifies important cautions in this manual.

### Service Tools and Jigs

#### Microsoft Recommended Service Jigs

- ESD-safe battery cover

#### Microsoft Provided Software Tools / References:

- Software Tool – AB-cover Touch Calibration tool
- 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
- Surface Laptop Power Supply
- USB hub (3 ports required)
- USB keyboard (standard PC keyboard)
- USB mouse (standard PC mouse)
- Standard PC monitor with HDMI or DVI input
- Mini-DP port to HDMI/DVI dongle
- Spudger tool
- Clamps (2), 50.8mm (2 in) spring
- Torx plus drivers 3IP,5IP,6IP
- Isopropyl alcohol dispenser bottle (use 70% IP A)
- Cleaning swabs
- ESD-safe tweezers
- Guitar pick opening tool
- Heavy duty suction cups (2) – 57.15mm (2.25 in)
- Plastic feeler gauge – 0.40mm
- Plastic feeler gauge – 0.50mm
- Plastic feeler gauge – 0.050mm

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.



## General Safety Precaution

 Always observe the following, general safety precautions:

- Opening and/or repairing any electronic device can present a risk of electric shock, fire, serious personal injury, death, damage to the device or other property, and/or other hazards. Exercise caution when undertaking the repair activities described in this Guide. The repair activities identified in this Guide should only be undertaken by technically inclined individuals with the knowledge, experience, and specialized tools required to repair Microsoft devices.
- Improper use or handling of devices or their 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 expose devices or their batteries to temperatures outside the recommended operating range of 0°C to 60°C/32°F to 140°F for an extended period. Doing so can result in battery failure, electric shock, fire, serious personal injury, death, and/or damage to the device or other property.
- We recommend wearing protective eyewear and gloves when disassembling/re-assembling a device.


For additional product safety information relevant to Microsoft Surface devices, see [aka.ms/surface-safety](https://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](#).

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 **WARNING:** Before opening a device, ensure it is powered off and disconnected from its power source. Disconnect the device charger or power cord from mains power.

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- For devices with rechargeable lithium-ion batteries that power on, fully discharge the battery before beginning repair. To expedite the battery discharge process:
  - Disconnect the charger from the device.
  - Increase display brightness to the highest level.
  - Turn on wi-fi and Bluetooth.
  - Open the Camera app in Windows.
  - Play music or video files from a local drive or streaming service.

Operate the device in this mode until the battery is fully discharged and the device powers off.


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 **WARNING:** For Surface devices where the battery is affixed to the back cover, place the back cover with the battery in a location where it will be protected from possible punctures, impacts, crushing, or drops during the repair process. Refer to the [Battery Safety](#) section in this guide for more information.

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- Ensure your work surface is level/flat and covered with ESD-safe, soft, non-marring material.
- We recommend wearing protective eyewear as a safety precaution when disassembling/re-assembling a device.
- Clean your work surface regularly to remove debris and abrasive particles.
- Review and follow the general guidelines and ESD compliance steps in this Guide prior to beginning work. Refer to the [Prior to Device Disassembly](#) section in this Guide for more information.
- Before opening a device, always wear an anti-static wrist strap and confirm your work area is properly grounded to protect vulnerable electronics from electrostatic discharge (ESD).
- Parts removed from a device during the repair process should be stored in ESD-safe bags and packaged for return or recycling in the same packaging that the new replacement part came in.
- If battery damage (e.g., leaking, expansion, folds or other) is discovered during device repair or if the battery is impacted or damaged during replacement, DO NOT proceed. Refer to the ASP Guidebook or contact Microsoft directly for 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 or to the subassembly.
- During all activities (excluding feet-only replacement) check to ensure that no loose articles are on the back cover or remain inside the device before reassembling it.

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 **IMPORTANT:** Remove rSSD (removable Solid-State Drive) whenever C-cover is removed from device. rSSD removal disconnects the battery from all device logical components for safety purposes. Refer to [Procedure-Removal \(rSSD\)](#) section for details.

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 **IMPORTANT:** Whenever the rSSD has been removed, powering on the device requires that the rSSD and C-cover are installed. Refer to [Procedure - Installation \(rSSD\)](#) section for details.

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- Review the [General Safety Precautions](#) and [Battery Safety](#) Sections of this Guide before beginning work. Refer to the “Prior to Device Disassembly” section of the Guide for additional details.
- 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 [\(page 22\)](#) 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.

## Battery Safety

- This device contains a built-in, lithium-ion rechargeable battery. Battery safety is a significant concern when repairing a device.
- For optimum compatibility, performance, and product safety, we recommend using genuine Microsoft replacement parts. Use of non-Microsoft (non-genuine), incompatible, reused, or modified batteries; improper battery installation; improper handling or storage of batteries; and/or failure to follow the instructions in this Guide could cause battery overheating, expansion, venting, leaking, or a thermal event which could result in fire, serious personal injury, death, data loss, or damage to the device or other property damage.
- Before beginning device repair, ensure your workspace is free of flammable debris or materials, has adequate ventilation, and that you have a fire suppressant device (example: fire blanket, container of sand, Class B fire extinguisher) within easy reach or you are within 20 feet of a fireproof enclosure. Fireproof enclosures should be kept free of combustible or flammable materials.
- Use personal protective equipment (PPE) when handling damaged, venting, or hot battery packs.
- Use the following best practices when handling batteries:
  - Always fully discharge batteries by running an application such as video playback with the device unplugged. If the device does not function while unplugged, you may leave out this step.
  - Do not puncture, impact, strike, bend, or crush the battery or a device containing a battery.
  - Keep your workspace clear of debris, extra tools, and sharp objects.
  - Exercise caution when using sharp tools near the battery to avoid impacting or poking the battery.
  - Don't leave loose screws or small parts inside the device.
  - Avoid using tools that conduct electricity.
  - Do not drop or throw a lithium-ion battery.
  - Do not expose the battery to excessive heat, sunlight, or temperatures outside the battery's normal operating range (0°C to 60°C)/(32°F to 140°F).
  - Ensure you handle, recycle, and/or dispose of used or damaged batteries in accordance with local laws and regulations. Follow Handling Used, Damaged or Defective Li-ion Batteries below.
- If device repair cannot be completed immediately and the device needs to be stored temporarily before restarting the repair:
  - Select a storage location and process that follows the battery safety precautions in this Guide.
  - Avoid exposing the device to environmental conditions and objects that could damage the battery pack.
  - Reinspect the battery pack as outlined in this Guide prior to restarting repair and installing the new battery pack.



## Lithium-Ion Battery Inspection

Upon device opening, we recommend that you visually inspect the battery for signs of damage. Factors to consider when inspecting the battery include, but are not limited to:


- Evidence of leaking or venting
- Visible signs of physical or mechanical damage, such as:
  - Expansion or swelling. In expanded or swollen batteries, the soft pouch encasing the cell pulls away from the inner material and appears baggy, loose, or puffy.
  - Discoloration of the battery casing.
  - Odor, smell, or visible corrosion. Leaked battery electrolyte smells like nail polish remover (acetone).
  - Dents along the battery cell edges or on the top surface.
  - Surface scratches that have exposed the aluminum beneath the black coating layer on the battery.
  - Loose or damaged wires.
  - Known misuse or abuse.

Any battery exhibiting the signs listed above must be replaced. Consult the [Battery Replacement](#) section of this document for battery replacement instructions.

### Handling Used, Damaged, or Defective Lithium-Ion Batteries:

- DO NOT dispose of used lithium-ion batteries, whether damaged or not, in household or commercial garbage or recycling bins.

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 **WARNING:** DO NOT SHIP DAMAGED OR DEFECTIVE BATTERIES ALONE OR INSIDE DEVICES. Damaged or defective batteries and devices containing damaged or defective batteries require special packaging and handling. Prior to transport:

- Follow all instructions provided by your local e-waste recycling or household hazardous waste collection provider.
  - Place the device or battery in an individual, non-metallic inner packaging, such as a zip-to-close plastic bag, that completely encloses the device or battery.
  - Surround the inner packaging with non-combustible, electrically non-conductive, absorbent cushioning material.
  - Each damaged battery or device containing a damaged battery should be packed individually in its own carton and that carton should be clearly marked as containing a damaged battery.
- 

For more information on industry practices concerning damaged, defective, or recalled batteries, please see [PHMSA Lithium-Battery-Recycling-Safety-Advisory](#).

Undamaged, used lithium batteries can be sent to e-waste recycling or household hazardous waste collection points for processing. Please see <https://www.microsoft.com/en-us/legal/compliance/recycling> for more information.



## Report Battery Thermal Events to Microsoft

A thermal event is a rapid chemical chain reaction that can occur inside a battery cell. During a thermal event, the energy stored inside the battery is released suddenly, resulting in heating and/or smoke and, in some instances, fire or flame. A battery thermal event can be triggered by physical damage to the battery (including during replacement/repair), improper storage, or exposure to temperatures outside of the battery's operating range.


Act immediately if you see any of the following symptoms of a battery thermal event:

- Smoke, soot, sparks, or flame emitted by the battery or from a device containing a battery.
- The battery pouch suddenly expands in size.
- A popping or hissing noise from the battery or a device containing a battery.

### Actions to take:

- **DO NOT use water. Immediately smother** the battery or device with clean, dry sand, a fire blanket, or an appropriate (Class B) fire extinguisher. If using sand, dump the sand all at once until the device is completely covered.
- **Contact** local fire authorities if further assistance is needed.
- **Exit** the work area and ventilate it until it is clear of smoke.
- **Wait** at least 2 hours before attempting to touch the device.
- **Dispose** of the damaged battery or device in accordance with local environmental or e-waste laws and guidelines.

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 **WARNING:** DO NOT SHIP DAMAGED OR DEFECTIVE BATTERIES ALONE OR INSIDE DEVICES. Damaged batteries and devices containing damaged batteries require special packaging and handling. See [Handling Used, Damaged, or Defective Lithium-Ion Batteries](#) in this Guide for additional information.

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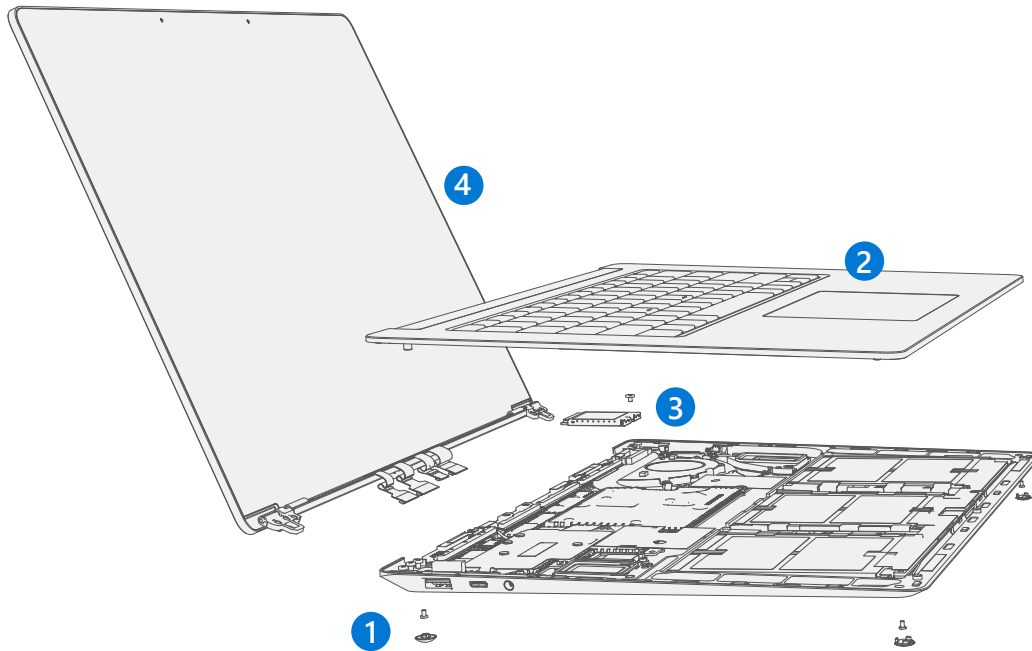
## Stop Repair and Contact Microsoft

If any Microsoft device visually exhibits any of the following symptoms, cease all further repair efforts and contact Microsoft Surface Customer Support to report and obtain next steps:

- Any burned or melted components, traces, or plastic parts on the outside of the device, or which otherwise exhibits heat damage, including charring seen in charging and other ports.
- Any burned or melted components, traces, or plastic parts on the inside of the device, or which otherwise exhibits heat damage.
- Any accessories exhibiting melting or heat damage that are included with the Microsoft device, such as power supplies, keyboards, mice, cables, charging connectors, etc.
- Any devices that exhibit a case that has separated apart or opened for reasons other than impact damage from dropping, evidence of tampering, or separation caused by a malfunctioning battery.
- Any other finding that may constitute a safety hazard to the user, such as sharp edges on plastics. Microsoft Surface Customer Support will ask you to provide the following information:
  - The model and serial number of the affected Microsoft Surface device and/or accessory(ies).
  - A brief description of the damage found.
  - Clear photographs depicting the symptoms observed.



## Illustrated Service Parts List



**IMPORTANT:** Note 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.	Models										
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979	
<b>(1)</b>	<b>Non-Skid Feet</b>													
	Feet Black	RPW-00001	CIG-00001		X	X	X		X	X		X	X	
	Feet Cobalt Blue	RPW-00002	CIG-00005	X										
	Feet Platinum	RPW-00003	CIG-00002	X		X	X	X		X	X			X
	Feet Sandstone	RPW-00004	CIG-00004		X				X				X	
	Feet Ice Blue	RPW-00005	CIG-00003					X				X		



**Models**

Item	Component	ASP / FRU Part No.	CRU Part No.	Models									
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979
<b>(2)</b>	<b>C-cover Keyboard Assembly (Metal or Fabric)</b>												
	C-cover screws		CIH-00001	X	X	X	X	X	X	X	X	X	X
	C Cvr 13.5" AMER/ASIA Black	RPQ-00001	I3P-00001						X			X	
			IDX-00001		X								
	C Cvr 13.5" Mexico Black	RPQ-00069	I3P-00003						X			X	
			IDX-00003		X								
	C Cvr 13.5" Japan Black	RPQ-00003	I3P-00004						X			X	
			IDX-00004		X								
	C Cvr 13.5" French Canadian Black	RPQ-00002	I3P-00002						X			X	
			IDX-00002		X								
	C Cvr 13.5" Korea Black	RPQ-00004	I3P-00005						X			X	
			IDX-00005		X								
	C Cvr 13.5" Thailand Black	RPQ-00005	I3P-00006						X			X	
			IDX-00006		X								
	C Cvr 13.5" Taiwan Black	RPQ-00006	I3P-00007						X			X	
			IDX-00007		X								
	C Cvr 13.5" BH/KW/OM/QA/SA/AE Black	RPQ-00007	I3P-00008						X			X	
			IDX-00008		X								
	C Cvr 13.5" UK/Ireland Only Black	RPQ-00008	I3P-00009						X			X	
			IDX-00009		X								
	C Cvr 13.5" Netherlands Poland Black	RPQ-00009	I3P-00010						X			X	
			IDX-00010		X								
	C Cvr 13.5" Austria Germany Black	RPQ-00010	I3P-00011						X			X	
			IDX-00011		X								
	C Cvr 13.5" France Black	RPQ-00011	I3P-00012						X			X	
			IDX-00012		X								
	C Cvr 13.5" Switz/Lux Black	RPQ-00012	I3P-00013						X			X	
			IDX-00013		X								
	C Cvr 13.5" Blgm Black	RPQ-00013	I3P-00014						X			X	
			IDX-00014		X								
	C Cvr 13.5" Italy Black	RPQ-00014	I3P-00015						X			X	
			IDX-00015		X								



**Models**

Item	Component	ASP / FRU Part No.	CRU Part No.	Models										
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979	
<b>(2)</b>	<b>C-cover Keyboard Assembly (Metal or Fabric)</b>	RPQ-00015	I3P-00016							X			X	
			IDX-00016		X									
C Cvr 13.5" Spain Black	RPQ-00016	I3P-00017								X			X	
		IDX-00017		X										
C Cvr 13.5" DK/FI/NO/SE Black	RPQ-00017	I3P-00018								X			X	
		IDX-00018		X										
C Cvr 13.5" AMER/ASIA Cobalt Blue Fabric	RPQ-00018	IDW-00001	X											
C Cvr 13.5" French Canadian Cobalt Blue Fabric	RPQ-00019	IDW-00020	X											
C Cvr 13.5" Japan Cobalt Blue Fabric	RPQ-00020	IDW-00021	X											
C Cvr 13.5" Taiwan Cobalt Blue Fabric	RPQ-00023	IDW-00022	X											
C Cvr 13.5" UK/Ireland Only Cobalt Blue Fabric	RPQ-00025	IDW-00023	X											
C Cvr 13.5" Austria Germany Cobalt Blue Fabric	RPQ-00027	IDW-00024	X											
C Cvr 13.5" France Cobalt Blue Fabric	RPQ-00028	IDW-00025	X											
C Cvr 13.5" Switz/Lux Cobalt Blue Fabric	RPQ-00029	IDW-00026	X											
C Cvr 13.5" AMER/ASIA Platinum Fabric	RPQ-00035	CID-00001							X				X	
		IDW-00002	X											
C Cvr 13.5" French Canadian Platinum Fabric	RPQ-00036	CID-00002							X				X	
		IDW-00003	X											
C Cvr 13.5" Mexico Platinum Fabric	3BZ-00001	CID-00003							X				X	
		IDW-00004	X											
C Cvr 13.5" Japan Platinum Fabric	RPQ-00037	CID-00004							X				X	
		IDW-00005	X											
C Cvr 13.5" Korea Platinum Fabric	RPQ-00038	CID-00005							X				X	
		IDW-00006	X											



**Models**

Item	Component	ASP / FRU Part No.	CRU Part No.	Models										
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979	
<b>(2)</b>	<b>C-cover Keyboard Assembly (Metal or Fabric)</b>	RPQ-00039	CID-00006						X			X		
			IDW-00007	X										
	C Cvr 13.5" Taiwan Platinum Fabric	RPQ-00040	CID-00007						X			X		
			IDW-00008	X										
	C Cvr 13.5" BH/KW/OM/QA/SA/AE Platinum Fabric	RPQ-00041	CID-00008						X			X		
			IDW-00009	X										
	C Cvr 13.5" UK/Ireland Only Platinum Fabric	RPQ-00042	CID-00009						X			X		
			IDW-00010	X										
	C Cvr 13.5" Netherlands Poland Platinum Fabric	RPQ-00043	CID-00010						X			X		
			IDW-00011	X										
	C Cvr 13.5" Austria Germany Platinum Fabric	RPQ-00044	CID-00011						X			X		
			IDW-00012	X										
	C Cvr 13.5" France Platinum Fabric	RPQ-00045	CID-00012						X			X		
			IDW-00013	X										
	C Cvr 13.5" Switz/Lux Platinum Fabric	RPQ-00046	CID-00013						X			X		
			IDW-00014	X										
	C Cvr 13.5" Blgm Platinum Fabric	RPQ-00047	CID-00014						X			X		
			IDW-00015	X										
	C Cvr 13.5" Italy Platinum Fabric	RPQ-00048	CID-00015						X			X		
			IDW-00016	X										
	C Cvr 13.5" Portugal Platinum Fabric	RPQ-00049	CID-00016						X			X		
			IDW-00017	X										
	C Cvr 13.5" Spain Platinum Fabric	RPQ-00050	CID-00017						X			X		
			IDW-00018	X										
	C Cvr 13.5" DK/FI/NO/SE Platinum Fabric	RPQ-00051	CID-00018						X			X		
			IDW-00019	X										
	C Cvr 13.5" AMER/ASIA Sandstone	RPQ-00052	I3P-00019							X			X	
			IDX-00019		X									
	C Cvr 13.5" French Canadian Sandstone	RPQ-00053	I3P-00020							X			X	
			IDX-00020		X									



**Models**

Item	Component	ASP / FRU Part No.	CRU Part No.	Models										
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979	
<b>(2)</b>	<b>C-cover Keyboard Assembly (Metal or Fabric)</b>	RPQ-00054	I3P-00021							X			X	
			IDX-00021		X									
	C Cvr 13.5" Taiwan Sandstone	RPQ-00057	I3P-00022							X			X	
			IDX-00022		X									
	C Cvr 13.5" UK/Ireland Only Sandstone	RPQ-00059	I3P-00023							X			X	
			IDX-00023		X									
	C Cvr 13.5" Austria Germany Sandstone	RPQ-00061	I3P-00024							X			X	
			IDX-00024		X									
	C Cvr 13.5" France Sandstone	RPQ-00062	I3P-00025							X			X	
			IDX-00025		X									
	C Cvr 13.5" Switz/Lux Sandstone	RPQ-00063	I3P-00026							X			X	
			IDX-00026		X									
	C Cvr 15" AMER/ASIA Black	RPR-00001	CIF-00001								X			X
			IDY-00019			X	X							
	C Cvr 15" French Canadian Black	RPR-00002	CIF-00002								X			X
			IDY-00020			X	X							
	C Cvr 15" Mexico Black	RPR-00037	CIF-00003								X			X
			IDY-00021			X	X							
	C Cvr 15" Japan Black	RPR-00003	CIF-00004								X			X
			IDY-00022			X	X							
	C Cvr 15" Korea Black	RPR-00004	CIF-00005								X			X
			IDY-00023			X	X							
	C Cvr 15" Thailand Black	RPR-00005	CIF-00006								X			X
			IDY-00024			X	X							
	C Cvr 15" Taiwan Black	RPR-00006	CIF-00007								X			X
			IDY-00025			X	X							
	C Cvr 15" BH/KW/OM/QA/SA/AE Black	RPR-00007	CIF-00008								X			X
			IDY-00026			X	X							
	C Cvr 15" UK/Ireland Only Black	RPR-00008	CIF-00009								X			X
			IDY-00027			X	X							





Models

Item	Component	ASP / FRU Part No.	CRU Part No.	Models										
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979	
(2)	C Cvr 15" Netherlands Poland Black	RPR-00009	CIF-00010								X			X
			IDY-00028			X	X							
	C Cvr 15" Austria Germany Black	RPR-00010	CIF-00011								X			X
			IDY-00029			X	X							
	C Cvr 15" France Black	RPR-00011	CIF-00012								X			X
			IDY-00030			X	X							
	C Cvr 15" Switz/Lux Black	RPR-00012	CIF-00013								X			X
			IDY-00031			X	X							
	C Cvr 15" Blgm Black	RPR-00013	CIF-00014								X			X
			IDY-00032			X	X							
	C Cvr 15" Italy Black	RPR-00014	CIF-00015								X			X
			IDY-00033			X	X							
	C Cvr 15" Portugal Black	RPR-00015	CIF-00016								X			X
			IDY-00034			X	X							
	C Cvr 15" Spain Black	RPR-00016	CIF-00017								X			X
			IDY-00035			X	X							
	C Cvr 15" DK/FI/NO/SE Black	RPR-00017	CIF-00018								X			X
			IDY-00036			X	X							
	C Cvr 15" AMER/ASIA Platinum	RPR-00018	CIF-00019								X			X
			IDY-00001			X	X							
	C Cvr 15" French Canadian Platinum	RPR-00019	CIF-00020								X			X
			IDY-00002			X	X							
	C Cvr 15" Mexico Platinum	RPR-00038	CIF-00021								X			X
			IDY-00003			X	X							
	C Cvr 15" Japan Platinum	RPR-00020	CIF-00022								X			X
			IDY-00004			X	X							
	C Cvr 15" Korea Platinum	RPR-00021	CIF-00023								X			X
			IDY-00005			X	X							
	C Cvr 15" Thailand Platinum	RPR-00022	CIF-00024								X			X
			IDY-00006			X	X							
	C Cvr 15" Taiwan Platinum	RPR-00023	CIF-00025								X			X
			IDY-00007			X	X							



**Models**

Item	Component	ASP / FRU Part No.	CRU Part No.	Models										
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979	
<b>(2)</b>	<b>C-cover Keyboard Assembly (Metal or Fabric)</b>													
	C Cvr 15" BH/KW/OM/QA/SA/AE Platinum	RPR-00024	CIF-00026								X			X
			IDY-00008			X	X							
	C Cvr 15" UK/Ireland Only Platinum	RPR-00025	CIF-00027								X			X
			IDY-00009			X	X							
	C Cvr 15" Netherlands Poland Platinum	RPR-00026	CIF-00028								X			X
			IDY-00010			X	X							
	C Cvr 15" Austria Germany Platinum	RPR-00027	CIF-00029								X			X
			IDY-00011			X	X							
	C Cvr 15" France Platinum	RPR-00028	CIF-00030								X			X
			IDY-00012			X	X							
	C Cvr 15" Switz/Lux Platinum	RPR-00029	CIF-00031								X			X
			IDY-00013			X	X							
	C Cvr 15" Blgm Platinum	RPR-00030	CIF-00032								X			X
			IDY-00014			X	X							
	C Cvr 15" Italy Platinum	RPR-00031	CIF-00033								X			X
			IDY-00015			X	X							
	C Cvr 15" Portugal Platinum	RPR-00032	CIF-00034								X			X
			IDY-00016			X	X							
	C Cvr 15" Spain Platinum	RPR-00033	CIF-00035								X			X
IDY-00017					X	X								
C Cvr 15" DK/FI/NO/SE Platinum	RPR-00034	CIF-00036								X			X	
		IDY-00018			X	X								
C Cvr 13.5" Japan Ice Blue Fabric	RPQ-00071	CID-00021						X			X			
C Cvr 13.5" UK/Ireland Only Ice Blue Fabric	RPQ-00072	CID-00023						X			X			
C Cvr 13.5" Switz/Lux Ice Blue Fabric	RPQ-00075	CID-00026						X			X			
C Cvr 13.5" Austria Germany Ice Blue Fabric	RPQ-00073	CID-00024						X			X			
C Cvr 13.5" France Ice Blue Fabric	RPQ-00074	CID-00025						X			X			



**Models**

Item	Component	ASP / FRU Part No.	CRU Part No.	Models									
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979
<b>(2)</b>	<b>C-cover Keyboard Assembly (Metal or Fabric)</b>												
	C Cvr 13.5" French Canadian Ice Blue Fabric	RPQ-00070	CID-00020					X			X		
	C Cvr 13.5" AMER/ASIA Ice Blue Fabric	RPQ-00080	CID-00019					X			X		
	C Cvr 13.5" Taiwan Ice Blue Fabric	RPQ-00076	CID-00022					X			X		
<b>(3)</b>	<b>Removable Solid-State Drive (NOTE: rSSD size must be same as original)</b>												
	rSSD Screw		CII-00001	X	X	X	X	X	X	X	X	X	X
	rSSD 128GB	RPX-00002	8LT-00006	X	X	X							
	rSSD 1TB	RPY-00001	8LU-00005	X	X	X							
	rSSD 256GB	RPZ-00002	8LV-00009	X	X	X							
	rSSD 512GB	RQG-00001	8LX-00009	X	X	X							
	rSSD 128GB	RPX-00003	8LT-00005				X						
	rSSD 1TB	RPY-00002	8LU-00004				X						
	rSSD 256GB	RPZ-00003	8LV-00008				X						
	rSSD 512GB	RQG-00003	8LX-00008				X						
	rSSD 256GB	RPZ-00010	8LV-00003							X	X	X	
	rSSD 512GB	RQG-00007	8LX-00003							X	X	X	
	rSSD 128GB	RPX-00008	8LT-00002							X	X	X	
	rSSD 256GB	RPZ-00009	8LV-00002					X	X				X
	rSSD 512GB	RQG-00006	8LX-00002					X	X				X
	rSSD 1TB	RPY-00004	8LU-00002					X	X				X



**Models**

Item	Component	ASP / FRU Part No.	CRU Part No.	Models										
				1867	1868	1872	1873	1950	1951	1953	1958	1959	1979	
<b>(4)</b>	<b>AB-cover Display Assembly</b>													
	A/B Cvr13.5" Black	RPN-00001	CIB-00001		X					X			X	
	A/B Cvr13.5" Cobalt Blue	RPN-00002	CIB-00005	X										
	A/B Cvr13.5" Platinum	RPN-00003	CIB-00002	X					X			X		
	A/B Cvr13.5" Sandstone	RPN-00004	CIB-00004		X					X			X	
	A/B Cvr 15" Black	RPP-00001	CIC-00001			X	X				X			X
	A/B Cvr 15" Platinum	RPP-00002	CIC-00002			X	X				X			X
	A/B Cvr13.5" Ice Blue	RPN-00005	CIB-00003						X			X		

**Component Localization Codes**

Code	Country	Code	Country
BH	Bahrain	FI	Finland
KW	Kuwait	NO	Norway
OM	Oman	SE	Sweden
QA	Qatar	Switz	Switzerland
SA	Saudi Arabia	Lux	Luxembourg
AE	United Arab Emirates	Blgm	Belgium
UK	United Kingdom	AMER	Canada, United States of America
DK	Denmark	ASIA	Australia, China, Hong Kong, Malaysia, New Zealand



## Service Diagnostics/Troubleshooting Overview


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

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 **IMPORTANT:** Ensure that the devices meet all related safety and policy prior to repair. Follow the Safety Policies/Procedures described on [page 7](#) above when applicable in lieu of continuing repair. ASP's refer to additional processing instructions in the ASP Guidebook.

---

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 manual.
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:

- Read this Guide in its entirety before starting any repairs. Pay special attention to the [Repair-Specific Precautions and Warnings](#) and the [Battery Safety](#) sections of the Guide.

### Current Battery Warning

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

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#### **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 (+140°F/60°C)
- For more information: <http://aka.ms/surface-security>



# Non-Skid Foot Pad 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
  - Clamps (2), 2" Irwin spring or 4.5" Fastpro
  - Plastic feeler gauge – 0.050mm
- **Components:**
  - Feet (Refer to Illustrated Service Parts List)

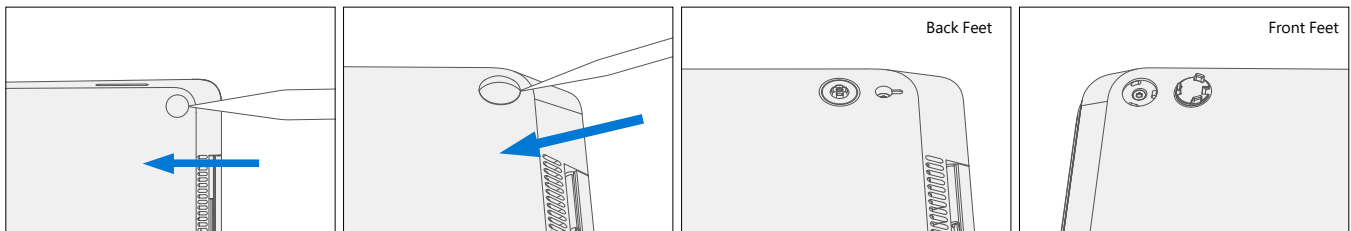
## Prerequisite Steps:

- **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 ([page 22](#)) for details.
- **Position device** - To prevent scratches, flip device over onto a clean surface free of debris with the device bottom facing up for access to the feet for removal.

 **IMPORTANT:** There are two types of feet (front and back) – refer to illustration for details.


## Procedure – Removal (Non-Skid Foot Pad)

1. **Front foot removal** – To remove front feet, insert the pointed end of a plastic Spudger tool (pictured) from the long side of the device under the foot. There is a designed gap in the foot located at the center of the outside edge of the foot. Point the plastic tool directly in the middle of the foot starting from the front edge and push in towards the middle of the device. Removal works best if the spudger is at a relatively low angle relative to the tabletop. Use plastic tweezers / spudger to lift one edge of each foot. Grasp the loose end and pull the foot from the D-bucket.
2. **Rear foot removal** – To remove back feet, perform the same steps as for the front feet but from the back side of the device and along the long edge. Removal works best if the spudger is at a relatively low angle relative to the tabletop.



3. **Adhesive removal** – Remove any adhesive liners in the foot pockets. Use IPA and cotton wipes to clean off any adhesive residue within the foot pocket. Inspect the foot area carefully for any adhesive liner that may have remained. The liner is clear and may be hard to see at first glance. Inspect closely.


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 **IMPORTANT:** Ensure the IPA is completely dried off device and that no adhesive residue is left before applying new feet to avoid the risk of insufficient adhesion of the new feet.

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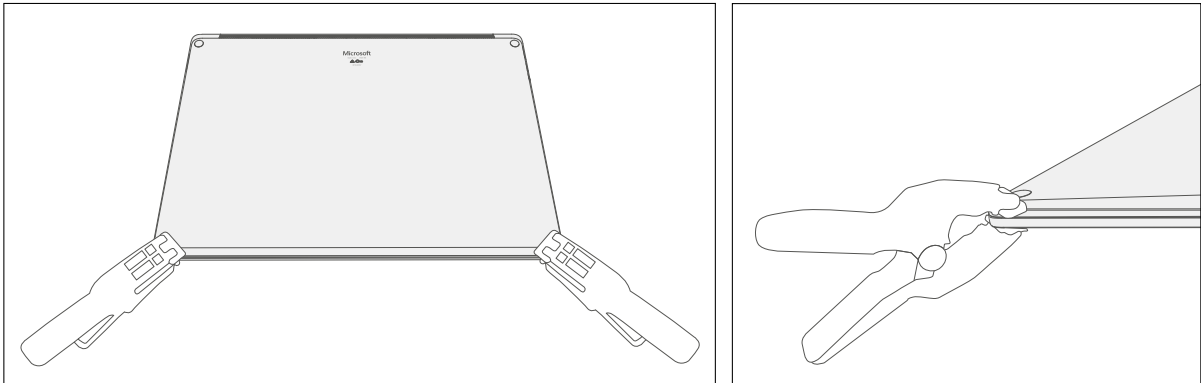
## Procedure – Installation (Non-Skid Feet)

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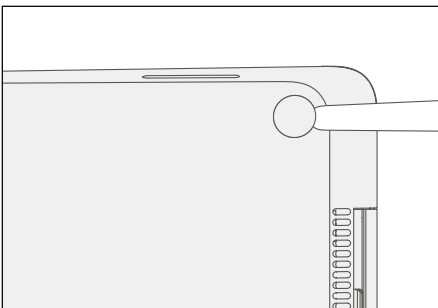
 **IMPORTANT:** Any further repairs that are required on the device should be carried out prior to feet installation. Do not reuse feet previously removed from a device.

---

1. **Prepare new front feet and press into place** – To reassemble front foot, remove protective sheet to expose adhesive on foot. Align the 3 posts with their respective pockets on the bottom side of the unit and hand press the foot in until the foot sits flat. Complete previous steps for the other front foot.
2. **Clamp replaced feet** – Align and center the press head of the clamp onto the front feet. Clamp **both** front feet for 4 minutes.



3. **Inspect for anomalies** – Inspect feet to ensure no cosmetic damage or gaps between the feet and the D-bucket exist.
  - a. If gap exists, use a feeler gauge to verify gap is smaller than 0.05 mm. If gap is larger, replace foot.

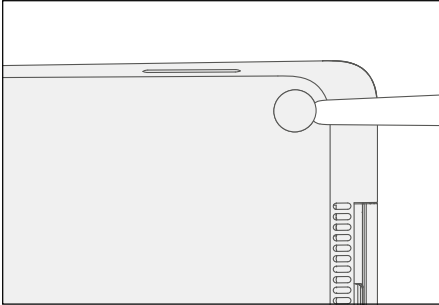


4. **Prepare new back feet and press into place** – To reassemble the back feet, remove protective sheet to expose adhesive on foot. Insert the foot into the pocket on the bottom side of the unit and hand press the foot in until the foot sits flat.






5. **Clamp replaced feet** – Align and center the press head of the clamp onto the rear feet. Clamp **both** rear feet for 4 minutes.
6. **Inspect for anomalies** – Inspect feet to ensure no cosmetic damage or gaps between the feet and the D-bucket exist.
  - a. If gap exists, use a feeler gauge to verify gap is smaller than 0.05 mm. If gap is larger, replace foot.



7. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.


---

 **IMPORTANT:** Before transporting the device, we recommend letting it sit feet-down on a tabletop for at least 12 hours. If this isn't possible, it's recommended to avoid placing the device in a backpack, purse, other types of carriers, until at least 12 hours after installing new feet.

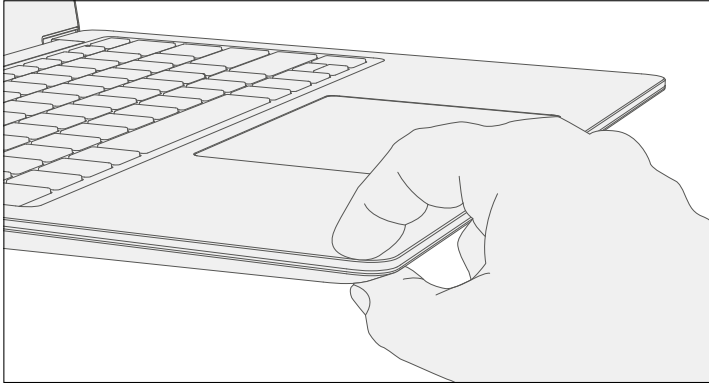
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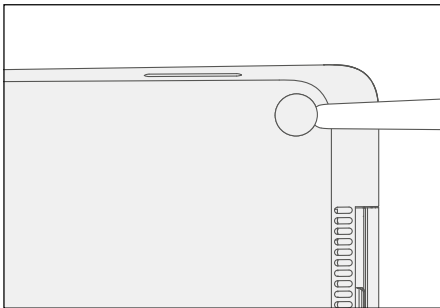
## Alternate Procedure – Installation (Non-Skid Feet)

 **IMPORTANT:** Any further repairs that are required on the device should be carried out prior to feet installation. Do not reuse feet previously removed from a device.

1. **Prepare new front feet and press into place** – To reassemble front foot, remove protective sheet to expose adhesive on foot. Align the 3 posts with their respective pockets on the bottom side of the unit and hand press the foot in until the foot sits flat. Complete previous steps for the other front foot.
2. **Pinch replaced feet** – Placing the keyboard and foot between your thumb and index finger as shown, pinch the foot tightly with your thumb and hold for 20 seconds.



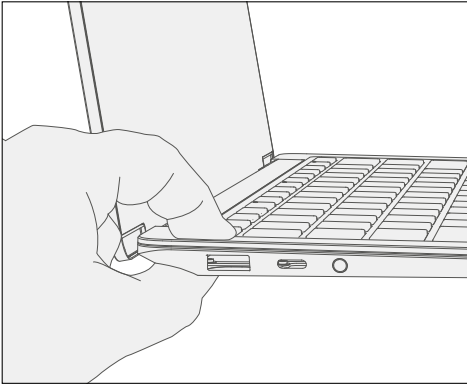
3. **Inspect for anomalies** – Inspect feet after pinching to ensure no cosmetic damage or gaps between the foot and the chassis exist.
  - a. If gap exists, use a feeler gauge to verify gap is smaller than 0.05 mm. If gap is larger, replace foot.



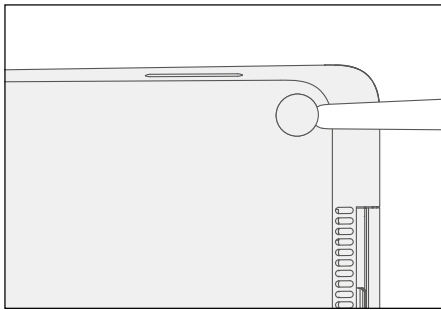
4. **Prepare new back feet and press into place** – To reassemble the back feet, remove protective sheet to expose adhesive on foot. Insert the foot into the pocket on the bottom side of the unit and hand press the foot in until the foot sits flat.



5. **Pinch replaced feet** – Placing the keyboard and foot between your thumb and index finger as shown, pinch the foot tightly with your thumb and hold for 20 seconds.




6. **Inspect for anomalies** – Inspect feet to ensure no cosmetic damage or gaps between the feet and the D-bucket exist.
- a. If gap exists, use a feeler gauge to verify gap is smaller than 0.05 mm. If gap is larger, replace foot.



7. **Run SDT** – Run SDT to ensure all device features and functions operate as expected.

---

 **IMPORTANT:** Before transporting the device, we recommend letting it sit feet-down on a tabletop for at least 12 hours. If this isn't possible, it's recommended to avoid placing the device in a backpack, purse, other types of carriers, until at least 12 hours after installing new feet.

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## C-cover Keyboard Assembly Replacement Processes (Metal, Fabric)

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- ✎ **IMPORTANT:** Devices are built with either a fabric type or metal type C-cover keyboard assembly. The C-cover removal process differs between the metal type and the fabric type C-covers. Be sure to follow the proper procedure based on the device model and associated C-cover type.
- 

### Replacement Process (C-cover Keyboard Metal type)

#### Preliminary Requirements

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

#### Required Tools and Components

- **Tools:**
  - Software Tool – SDT
  - Isopropyl Alcohol Dispenser (use only 70% IPA)
  - 5IP (Torx plus) driver
  - Anti-static wrist strap (1M Ohm resistance)
  - Recommended: ESD-safe battery cover (13.5" or 15")
- **Components:**
  - C-cover (If replacing refer to Illustrated Service Parts List)  
(New 5IP screw quantity= 4 supplied with component)

#### 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 device. Refer to Prior to Device Disassembly section ([page 22](#)) for details.
- **Remove feet** – Follow steps for Procedure-Removal (Non-Skid Feet) section ([page 23](#)).

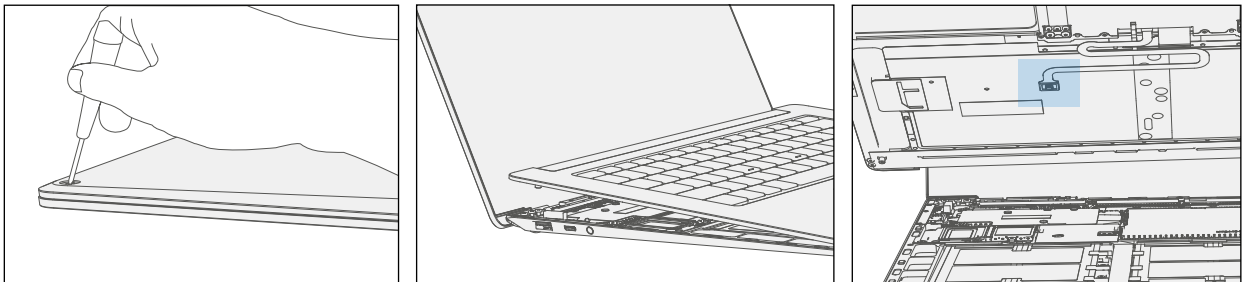
- ✎ **IMPORTANT:** Be sure that all foot adhesive remains have been removed from the bottom device case foot sockets prior to C-cover screw removal to avoid the risk of stripping out the C-cover screw(s).
- 



## Procedure – Removal (C-cover Keyboard Metal Type)

1. **Remove C-cover screws** – Using a 5IP (Torx plus) driver, uninstall 1 screw from each foot socket (4).

- ! **CAUTION:** Take care to prevent from depressing the keyboard power button during this step. If power button is accidentally depressed and device turns on, shut down device as normal through OS Start menu.
- ! **CAUTION:** Prior to unscrewing, ensure the driver is seated correctly in the screw recess by lightly turning the driver clockwise until it can be felt engaging fully with the screw. Also be sure the driver remains perpendicular to the device surface as much as possible during removal. Otherwise, there is a risk of stripping the screw heads.
- ! **CAUTION:** Ensure all (4) screws are removed from the enclosure before starting C-cover removal, otherwise there is a high risk of irreversibly damaging the C-cover.
- ! **CAUTION:** Remove C-Cover exactly as described in this step to avoid damaging the Flexible Printed Circuit (FPC) connected between the C-Cover and the Main Board.
- ! **CAUTION:** Remove C-cover and hold in a hover position as described below to avoid damaging the display glass. Never rest the rear edge of the C-cover on the device at the display hinge point or allow the C-cover to impact or touch the display during this step.

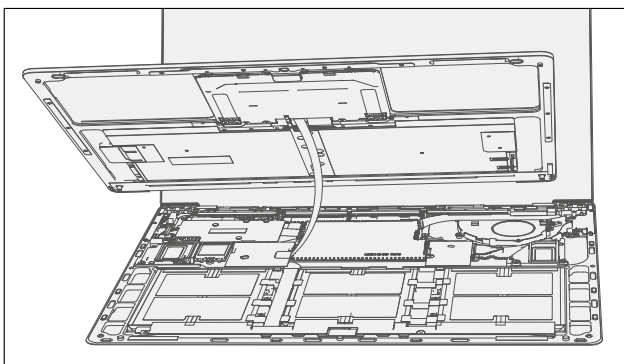


- ✎ **IMPORTANT:** In addition to the (4) C-cover screws, the C-cover is further secured to the device body with magnets. Further separation of the C-cover should be carried out per the following steps.

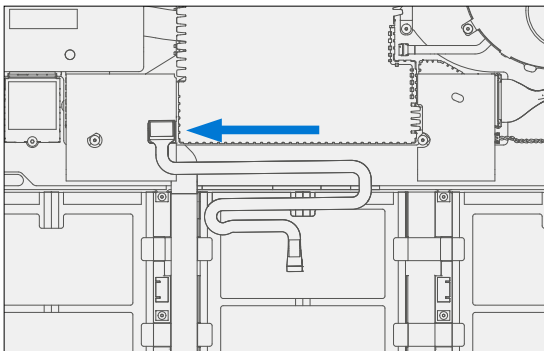
2. **Separate C-cover from device** – Turn device over into standard use position and open the AB-cover display exposing the C-cover keyboard. Grab the C-cover edge closest to display and slowly remove the C-cover at an angle as shown in drawing.

- ! **CAUTION:** Do not pull the C-cover apart beyond **45 degrees** otherwise damage to C-cover FPC could occur.

3. **Position C-cover for FPC removal** – After lifting the C-cover completely from the magnets on the device, angle and hover the C-cover so that the antenna side is facing down towards the device and C-cover FPC is accessible.

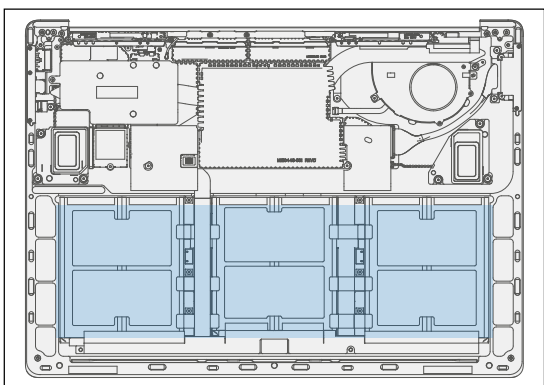


4. **Disconnect FPCs** – While hovering the C-cover, disconnect the FPC from the main board with your other hand. The FPC is easily disconnected by pulling up on the metal head vertically with a fingernail or Spudger tool edge.



! **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.

⚠ **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 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.



🔧 **IMPORTANT:** Remove rSSD (removable Solid-State Drive) whenever C-cover is removed from device. rSSD removal disconnects the battery from all device logical components for safety purposes. Refer to Procedure-Removal (rSSD) section ([page 40](#)) for details.



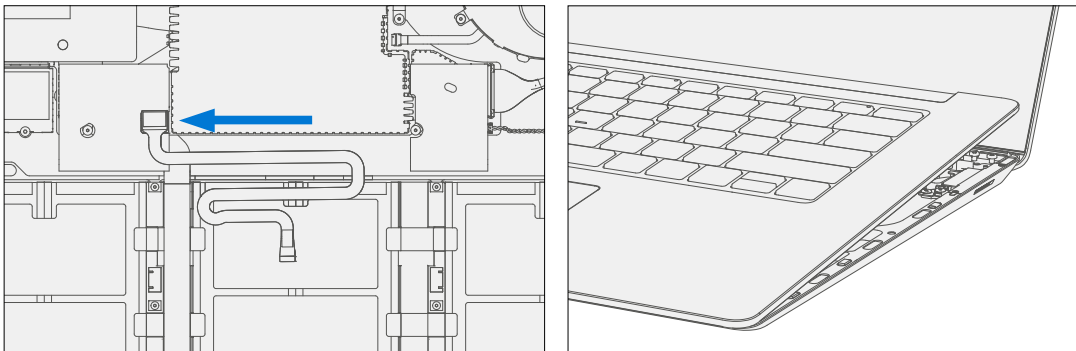
## Procedure – Installation (C-cover Keyboard Metal type)

### 1. Pre-installation Device Inspection

- 
- ⚠ **WARNING:** Verify the battery's condition refer to the M1153910 In Device Battery Inspection process. Devices exhibiting battery issues as outlined in the Battery Inspection Process require whole unit replacement.
  - ⚠ **WARNING:** Verify the condition of LDI (Liquid Damage Indicator) 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 C-cover (both sides) and device enclosure for any loose articles that may be present inadvertently on the C-cover 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. **Install rSSD** – Refer to Procedure-Removal (rSSD) section ([page 40](#)) for details.
4. **Remove tape from new C cover FPC** – Tape secures the C-cover FPC during shipping. Remove this tape before continuing with assembly.
5. **Connect C-cover FPC** – Remove battery cover. Hover the C-cover over the device while assembling the C-cover FPC to the main board by pressing connection using your finger.

- 
- ! **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 the C-cover** – Properly align the cover to the unit using the front edge alignment posts. Carefully place the C-cover back onto the unit and shift until the C-cover snaps into place.

- 
- ! **CAUTION:** Ensure that the C-cover is correctly aligned and seated before closing the device. There is the risk of breaking the display if the device lid is closed before C-cover is aligned.
- 



7. **Install C-cover Screws** – Close the AB-cover. Turn the unit over and use a 5IP screwdriver to install **4 new screws** to secure the C-cover. Screws should be installed until just snug and seated, and then turned another 45 degrees (1/8 turn) or until fully fastened.
8. **Run SDT** – Run SDT to ensure all device features and functions operate as expected. Refer to ([page 21](#)) for details on SDT.
9. **Install Feet** – If SDT tests pass and no further repairs are to be performed on the device, follow steps for Procedure – Installation (Non-Skid Feet) on [page 24](#).






# Replacement Process (C-cover Keyboard Fabric type)

## Preliminary Requirements

---

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

---


## Required Tools and Components

- **Tools:**
  - Software Tool – SDT
  - Isopropyl Alcohol Dispense (use only 70% IPA)
  - 5IP (Torx plus) driver
  - Heavy duty suction cups
  - Anti-static wrist strap (1M Ohm resistance)
  - Recommended: ESD-safe battery cover (13.5" or 15")
- **Components:**
  - C-cover (If replacing refer to Illustrated Service Parts List)  
(New 5IP screw quantity=4 supplied with component)

## 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 device. Refer to Prior to Device Disassembly section ([page 22](#)) for details.
- **Remove feet** – Follow steps for Procedure-Removal (Non-Skid Feet) section ([page 23](#)).

---

 **IMPORTANT:** Be sure that all foot adhesive remains have been removed from the bottom device case foot sockets prior to C-cover screw removal to avoid the risk of stripping out the C-cover screw(s).

---



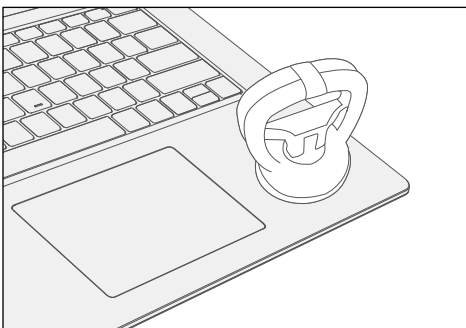
## Procedure – Removal (C-cover Keyboard Fabric Type Keyboard)

1. **Remove C-cover screws** – Using a 5IP (Torx plus) driver, uninstall 1 screw from each foot socket (4).

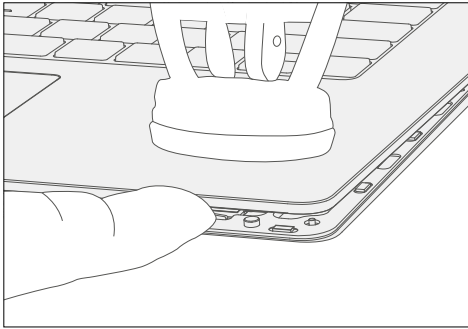
- 
- ! **CAUTION:** Take care to prevent from depressing the keyboard power button during this step. If power button is accidentally depressed and device turns on, shut down device as normal through OS Start menu.
  - ! **CAUTION:** Prior to unscrewing, ensure the driver is seated correctly in the screw recess by lightly turning the driver clockwise until it can be felt engaging fully with the screw. Also be sure the driver remains perpendicular to the device surface as much as possible during removal. Otherwise, there is a risk of stripping the screw heads.
  - ! **CAUTION:** Ensure all (4) screws are removed from the enclosure before starting C-cover removal, otherwise there is a high risk of irreversibly damaging the C-cover.
  - ! **CAUTION:** Fabric C-covers utilize magnets and a hook latching onto the chassis whereas metal C-covers do not. See illustrations for details.
  - ! **CAUTION:** Remove C-Cover exactly as described in this step to avoid damaging the Flexible Printed Circuit (FPC) connected between the C-Cover and the Main Board.
  - ! **CAUTION:** Remove C-cover and hold in a hover position as described below to avoid damaging the display glass. Never rest the rear edge of the C-cover on the device at the display hinge point or allow the C-cover to impact or touch the display during this step.
- 

2. **Apply suction cups** – Turn device over into standard use position and open the AB-cover display exposing the C-cover keyboard. Place suction cup in the bottom palm rest area as shown, as close to the edge as possible.

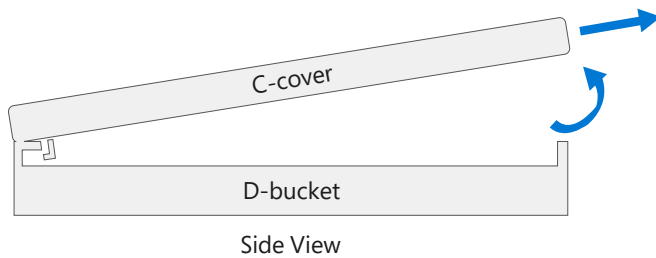
- 
- ! **CAUTION:** Do not pull the C-cover apart beyond **45 degrees** otherwise damage to C-cover FPC could occur.
  - ! **CAUTION:** Do not place suction cup on Trackpad to avoid potential damage to the Trackpad.
  - ! **CAUTION:** Do not wet the suction cup in any way as liquid could stain the keyboard 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 C-cover is separated from device bottom case then re-attach suction cup and try again.
- 



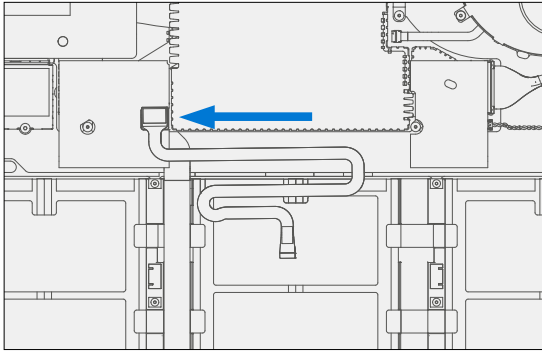
3. **Separate C-cover from device** – Once C-cover separation from the device bottom case is achieved, place a finger between the C-cover and device region. Pull upwards **slightly** to separate the C-cover from the magnets.



4. **Angle C-cover** – Angle the C-cover at approximately 45 degrees from horizontal—be sure to angle the C-cover **no more than 45 degrees** or else risk damaging the C-cover hook or FPC. If hook is damaged, it needs to be removed carefully to avoid damaging the FPCs, and then a new C-cover needs to be installed.
5. **C-cover hook clearance** – Once angled, keep the angle of the C-cover while pulling the C-cover directly towards yourself. Be sure to avoid pressing on the power button during this procedure.

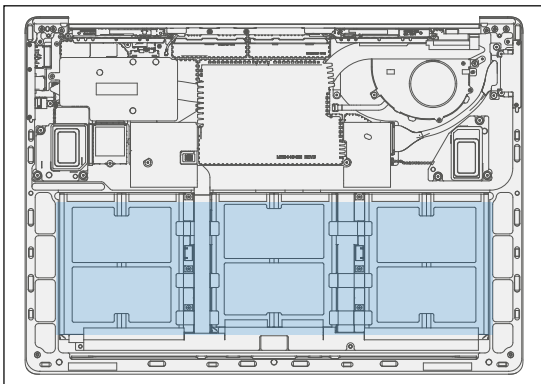


6. **Disconnect FPCs** – While hovering the C-cover, disconnect the FPC from the main board with your other hand. The FPC is easily disconnected by pulling up on the metal head vertically with a fingernail or Spudger tool edge.



! **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.

⚠ **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.



🔧 **IMPORTANT:** Remove rSSD (removable Solid-State Drive) whenever C-cover is removed from device. rSSD removal disconnects the battery from all device logical components for safety purposes. Refer to Procedure-Removal (rSSD) section ([page 40](#)) for details.



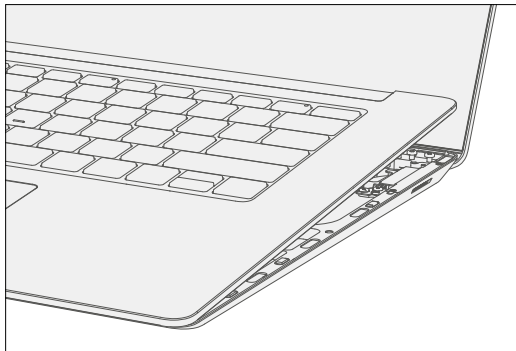
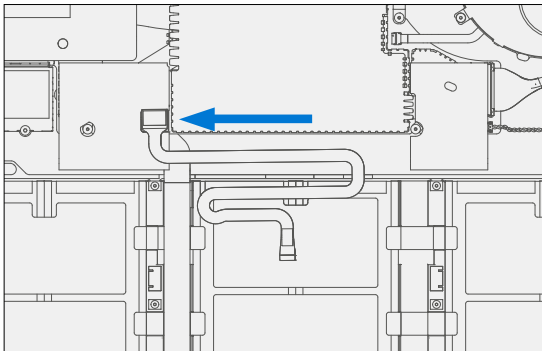
## Procedure – Installation (C-cover Keyboard Fabric type)

### 1. Pre-installation Device Inspection

- 
- ⚠ **WARNING:** Verify the battery's condition; refer to the M1153910 In Device Battery Inspection process. Devices exhibiting battery issues as outlined in the Battery Inspection Process require whole unit replacement.
  - ⚠ **WARNING:** Verify the condition of LDI (Liquid Damage Indicator) 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 C-cover (both sides) and device enclosure for any loose articles that may be present inadvertently on the C-cover 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. **Install rSSD** – Refer to Procedure-Removal (rSSD) section ([page 41](#)) for details.
4. **Remove tape from new C-cover FPC** – Tape secures the C-cover FPC during shipping. Remove this tape before continuing with assembly.
5. **Connect C-cover FPC** – Remove battery cover. Hover the C-cover over the device while assembling the C-cover FPC to the main board by pressing connection using your finger.

- 
- ! **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 the C-cover** – Properly align the cover to the unit using the front edge alignment posts. Carefully place the C-cover back onto the unit and shift until the C-cover snaps into place. The top C-cover area under the display will protrude slightly after C-cover is placed. Press firmly on the top area until you hear a click and the C-cover flattens out.

---

! **CAUTION:** Ensure that the C-cover is correctly aligned and seated before closing the device. There is the risk of breaking the display if the device lid is closed before C-cover is aligned.


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7. **Install C-cover Screws** – Close the AB-cover. Turn the unit over and use a 5IP screwdriver to install **4 new screws** to secure the C-cover. Screws should be installed until just snug and seated, and then turned another 45 degrees (1/8 turn) or until fully fastened.
8. **Run SDT** – Run SDT to ensure all device features and functions operate as expected. Refer to ([page 21](#)) for details on SDT.
9. **Install Feet** – If SDT tests pass and no further repairs are to be performed on the device, follow steps for Procedure – Installation (Non-Skid Feet) on [page 24](#).



# 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:**
  - Software Tool – SDT
  - Isopropyl Alcohol Dispenser (use only 70% IPA)
  - 5IP (Torx plus) driver
  - Anti-static wrist strap (1M Ohm resistance)
  - Recommended: ESD-safe battery cover (13.5" or 15")
- **Components:**
  - rSSD (If replacing refer to Illustrated Service Parts List)  
(New 5IP screw supplied with component)

## 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 device. Refer to Prior to Device Disassembly section ([page 22](#)) for details.
- **Remove feet** – Follow steps for Procedure-Removal (Non-Skid Feet) on ([page 23](#)).
- **Remove C-cover** – Follow steps for C-cover Keyboard Assembly Replacement Processes (Metal, Fabric) on ([page 28](#)).



## Procedure – Removal (rSSD)

1. **Remove rSSD Screw** – Use a 5IP (Torx-Plus) driver to remove the screw securing the rSSD.

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**⚠ WARNING:** Be very careful to position your screwdriver directly over the rSSD screw and to avoid slipping towards the battery during removal. If the battery is contacted, impacted, or damaged in any way during the rSSD removal process, activities should immediately cease, and designated return process should be followed.

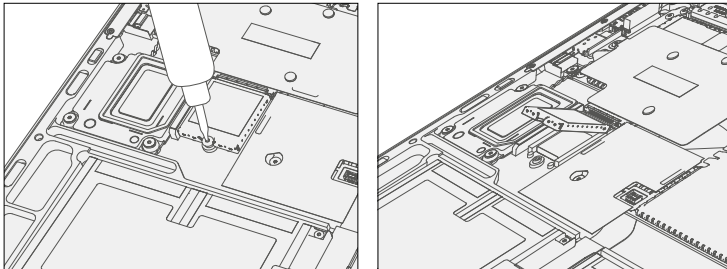
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2. **Remove rSSD** – The rSSD should lift upwards to ~15 degree tilt after screw is removed. Carefully grab sides of rSSD case and pull out of main board socket at same ~15 degree angle.

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**📝 IMPORTANT:** Confirm condition of thermal pillow that resides beneath the rSSD once rSSD has been removed. Thermal pillow should maintain good contact with an installed rSSD and should not have physical evidence of deterioration such as collapsing, excessive cracking etc. The outside mylar layer of the foam should be intact and no foam should be visible when viewed from above.


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## Procedure – Installation (rSSD)


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 **IMPORTANT:** Only a Microsoft rSSD with part number as specified in the parts list, per device model, and of like capacity should be replaced in the device.

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1. **Insert rSSD** – Insert the connector end of the rSSD into the SSD connector on Mainboard at ~15 degree angle.
2. **Install new rSSD screw** – Use a 5IP screwdriver to install a new rSSD screw until the screw is just snug and seated, and then turned another 45 degrees (1/8 turn) or until screw is fully fastened.

---

 **WARNING:** Be very careful to position your screwdriver directly over the rSSD screw and to avoid slipping towards the battery during removal. If the battery is contacted, impacted, or damaged in any way during the rSSD removal process, activities should immediately cease, and designated return process should be followed.

---

3. **Install C-cover** – Follow steps for C-cover Keyboard Assembly Replacement Processes (Metal, Fabric) on (page 26).
4. **Imaging new rSSD** – Power on device. Apply a new image to the rSSD using a BMR Imaging key specific to the device model. Refer to Surface imaging process - Surface Imaging Tools [Link](#)
5. **Run SDT** – Run SDT to ensure all device features and functions operate as expected. Refer to (page 21) for details on SDT. If SDT tests pass and no further repairs are to be performed on the device continue with the final assembly steps.
6. **Install Feet** – Follow steps for Procedure – Installation (Non-Skid Feet) on (page 24).



## AB-cover Display Assembly Replacement Process

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- ⚠ **WARNING:** The AB-cover is extremely sensitive to ESD and should be managed accordingly. Be sure all ESD safety precautions are taken when handling the AB-cover assembly. AB-cover assembly should always be stored in an ESD bag once new part is removed from package carton. Defective part should be managed in the same manner to enable recovery if applicable.
  - ✍ **IMPORTANT:** The C-cover keyboard assembly type (fabric or metal) on the device being repaired will drive slight differences in processes in this section. Be sure to follow proper sections and associated procedures based on C-cover keyboard assembly type for the device under repair.
  - ✍ **IMPORTANT:** The device must first be set in **AB-cover Replacement Mode** before broken/defective AB-cover is removed from device under repair. Software tools are provided for this purpose. Device must be functional to the point that software tools can be run on device from within the Windows OS. Details provided within process steps in this section.
  - ✍ **IMPORTANT:** If AB-cover on device under repair is non-functional, there is no display or it is unreadable, connect an external PC monitor to the device's Mini-DP port.
- 

## Preliminary Requirements

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

## Required Tools and Components


- **Tools**
  - Software Tool – SDT
  - Software Tool – AB-cover touch calibration tool
  - USB hub
  - USB keyboard (standard PC USB keyboard needed for interaction while running software tools)
  - USB mouse (standard PC USB mouse)
  - Standard PC monitor with HDMI or DVI input
  - Mini-DP port to HDMI/DVI dongle
  - 6IP (Torx plus) driver
  - ESD-safe tweezers
  - Feeler gauge – 0.40mm
  - Guitar pick opening tool
  - Anti-static wrist strap (1M Ohm resistance)
  - Recommended: ESD-safe battery cover (13.5" or 15")
- **Components:**
  - AB-cover (Refer to Illustrated Service Parts List)
    - New 6IP screw quantity=6 (supplied with AB-cover replacement part)
    - New set of AB-cover FPC RF baffles (supplied with AB-cover replacement part)
    - New set of AB-cover FPC RF shields (supplied with AB-cover replacement part)
    - One set of new mylar tapes for metal C-cover only (supplied with AB-cover replacement part)
    - One set of new closure steels for metal C-cover only (supplied with AB-cover replacement part)



## Prerequisite Steps:

- **AB-cover Replacement Mode** – Pulls calibration data from the old AB-Cover.
1. Connect software tools USB drive with software tools to USB connector on device under repair.
  2. Connect power supply to device to enable power on.
  3. Power on device – Depress the power button on the C-cover to power on the device.
  4. Run software tool – At the device OS, use Windows Explorer, navigate to USB drive and run:  
**STEP1\_DisplayModuleReplacement.cmd** – accept the power down prompt once tool is run.

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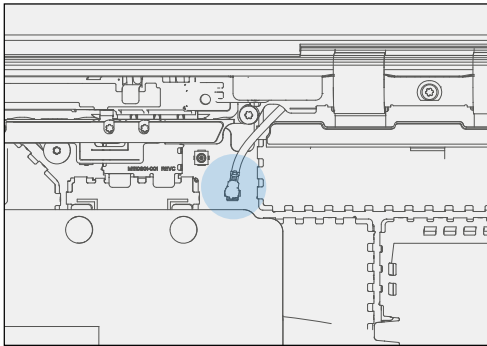
 **IMPORTANT:** This step must be carried out on the device successfully before the broken/faulty AB-cover display assembly is replaced. Retry previous step if error message received.

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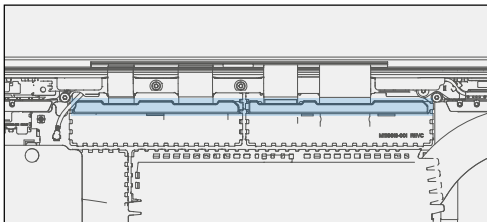
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening device. Refer to Prior to Device Disassembly section ([page 22](#)) for details.
- **Remove feet** – Follow steps for Procedure-Removal (Non-Skid Feet) on ([page 23](#)).
- **Remove C-cover** – Follow steps for C-cover Keyboard Assembly Replacement Processes (Metal, Fabric) on ([page 28](#)).
- **Remove rSSD** – Follow steps for Procedure-Removal (rSSD) section ([page 40](#)).

## Removal Process (AB-cover Display Assembly)

1. **Disconnect Antenna Cable** – Using angled tweezers, disassemble left antenna cable located to the left of the left AB-cover FPC RF shield. This will prevent the antenna cable from being damaged during shield removal.

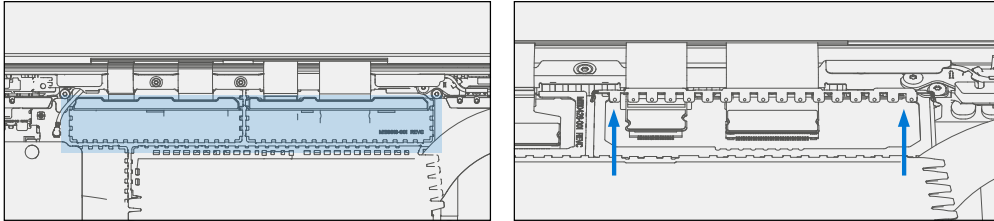


2. **Remove FPC RF Baffles** – Using tweezers, remove the left and right baffles that sit on top of the RF shield cans by prying upwards starting from one end of the baffle.

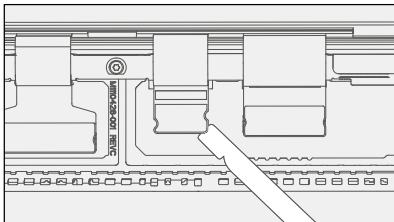


3. **Remove FPC RF Shield Cans** – Using tweezers, remove the two shield lids shown in the illustration below by first peeling on the bottom right corners of the shield. To prevent damage to the FPCs during shield removal, for both shields, peel up the shield along its front edge and bend the shield at 45 degrees. Carefully pull vertically and twist left and right as you pull towards you to remove the shield.

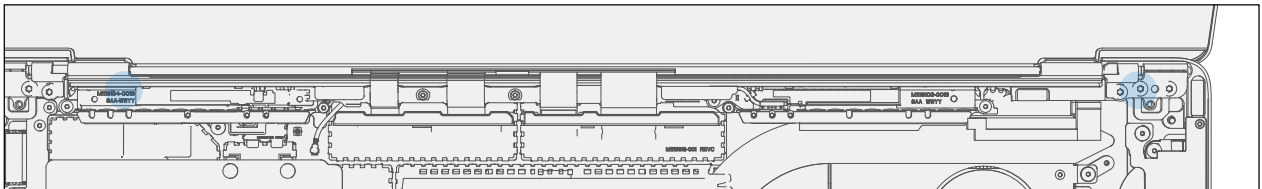
! **CAUTION:** This twisting procedure is necessary to prevent damage to the FPCs by the sharp edges of the shields. Be sure not to apply leverage on surrounding components, RF shields and/or thermal management components.



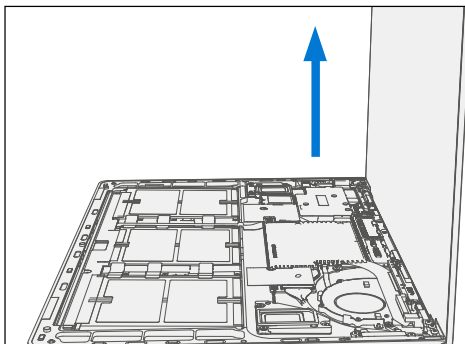
4. **Disconnect FPCs** – Once shields are removed and the 4 FPCs are exposed, use a Spudger tool to disconnect the 4 FPCs shown by prying upwards on the corners first and then along the front edge. Be sure not to bend the FPC head excessively otherwise the head will be damaged (refer to illustration for details). Grab each FPC connector and gently pull the ribbon towards the front of the device to untuck ribbon from underneath the chassis ledge.



5. **Remove Two Inner Hinge Screws** – Using a 6IP screwdriver, remove the inner 2 screws on the left and right hinges (refer to illustration for details).




6. **Set AB-cover Display Angle to 90 deg for Safe Removal** – Place the display module at an angle of about 90 degrees. Then remove the remaining external screw at the left and right hinges while holding the display with your free hand.



7. **Remove AB-cover from Device** – Lift the display module straight up vertically until detached from the unit.

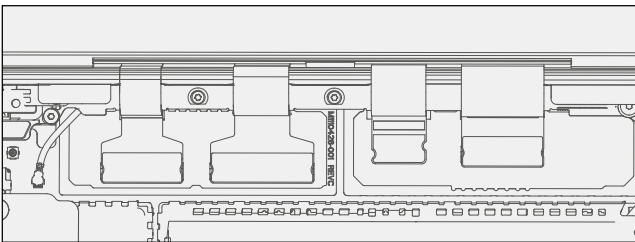


## Installation Procedures – (AB-cover Display Assembly)

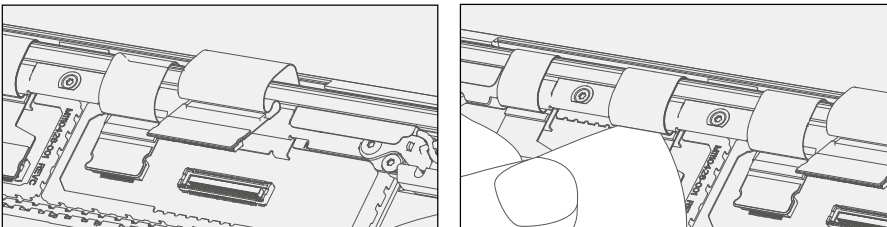
-  **IMPORTANT:** The installation process for the AB-cover varies between C-cover types (Metal vs. Fabric). Each C-cover type creates different AB-cover opening experiences. The opening experience is a differentiating characteristic of the Surface Laptop design. Be sure to move to the proper C-cover reassembly section based on C-cover type.

### Procedure installation – (Metal C-cover Device)

1. **Initial AB-cover Install** – Clean out any residual thread locker surrounding the hinge screw holes or just inside the screw hole before installing replacement AB-cover assembly. Set the new AB-cover in place in the device chassis hinge wells and hold in place while installing 2 new outer screws on each hinge (4 total at this time). Screws should be installed until just snug and seated, and then turned another 90 degrees (1/4 turn) or until fully fastened.
2. **Release Hinge Clamp Force** – Turn all 4 screws 90 degrees (1/4 turn) counterclockwise to release the clamp force from the screws. This will allow for alignment of AB-cover to chassis at a later step.
3. **Connect AB-cover FPCs** – Connect all 4 display module FPCs into their respective connectors.



4. **Tuck FPCs** – Using a guitar pick opening tool, carefully tuck the loose portion of the FPCs under the enclosure lip as shown below. Ensure that the FPC is taut and that there is no remaining slack protruding out from under the lip. Any protrusions could prevent or negatively impact the re-installation of the C-cover.




5. **Touch Calibration Steps** – The new AB-cover must have touch calibration performed:
  - a. **Install rSSD** to enable device operation (device won't power on without rSSD installed). Follow steps for Procedure – Installation (rSSD) section ([page 41](#)).
  - b. **Temporarily connect the C-cover** FPC back on to device main board connector and set the C-cover in place on the device chassis. No screws are required at this time as the C-cover will be used temporarily to control the device; see details in Procedure – Installation (C-cover Keyboard Metal type) section ([page 31](#)).
  - c. **Connect software tools USB drive** with software tools to USB connector on device under repair.
  - d. **Connect power supply** to device to enable power on.



- e. **Power on device** – Depress the power button on the C-cover to power on the device.
- f. **Run software tool** – At the device OS, use Windows Explorer, navigate to USB drive and run: **STEP2\_DisplayModuleReplacement.cmd**. Follow prompts, device will restart. Verify touch by running finger across screen to check that touch is working.
- g. **Power off device** – Use device OS to power down device.
- h. **Remove C-cover.**
- i. **Remove rSSD.**


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 **IMPORTANT: Calibration Failure** – If calibration tool returns an error message that indicates calibration failure, see AB-cover Touch Calibration Retry section on [page 61](#) for details on how to proceed. This must be carried out at this time and prior to complete re-assembly of device.

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- 6. **FPC RF Shield Installation** – Install 2 new shield lids above the 4 AB-cover FPC connectors by orienting them along the outline of the shield fences.

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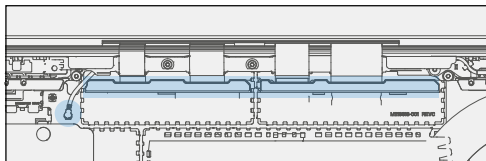
 **IMPORTANT:** Be sure to install the correct shield type onto the corresponding shield fence. The left-hand shield has 2 rectangular embosses in the shape of connector heads and the right-hand shield has 3 rectangular embosses.

Prior to shield installation, visually inspect each shield to ensure that shield fingers are not bent such that they impeded the installation process.

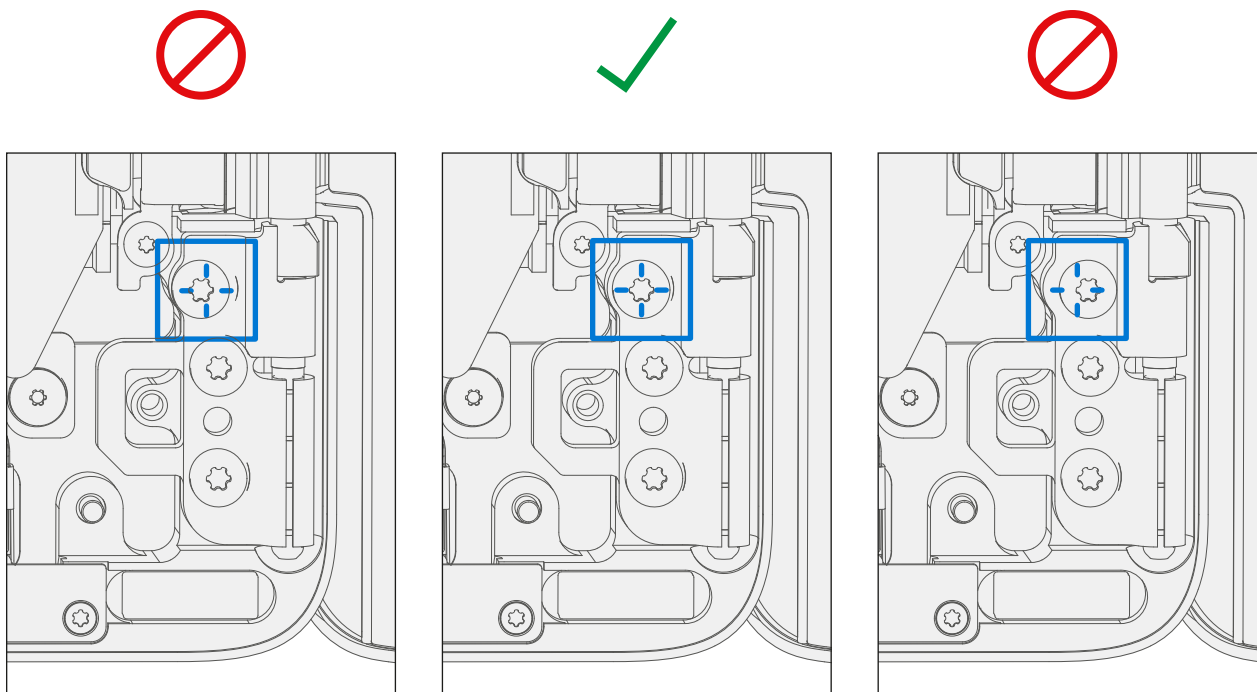
Push the shields vertically downwards onto the fences and snap into place. Ensure the shields are evenly pressed along the entire perimeter of each fence and that the front shield prongs are pressed firmly against the shield fence.

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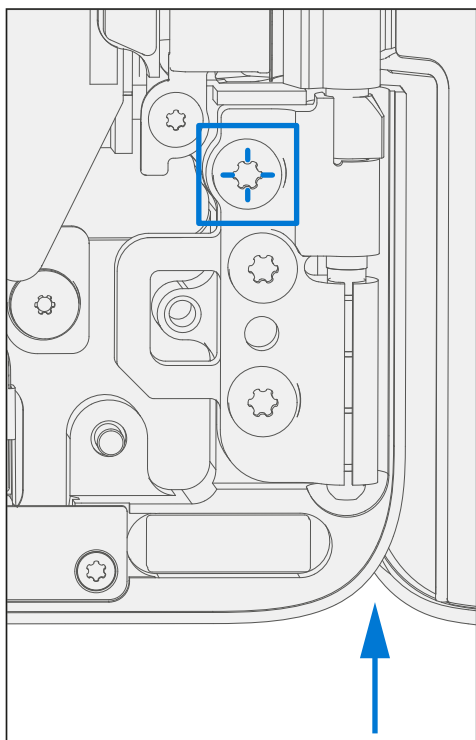
- 7. **Connect WiFi Antenna** – Reconnect the left WiFi antenna cable (see illustration below).
- 8. **RF Baffle Installation** – Install 2 new RF baffles on top of the shield by peeling off the adhesive protector sheet and snapping them into place near the back of the shields. Firmly press your finger along the top of the RF Baffle wall to adhere adhesive to shield.



9. **AB-cover Hinge Alignment** – It is necessary to properly align the front edge of the AB-cover to the lower device case to ensure step gap between front edges are proper.
- a. **Hinge Alignment** – Set Display Module to 90 degrees. Shift innermost screw on each side so that the screws are concentric with the circular feature on the hinge.



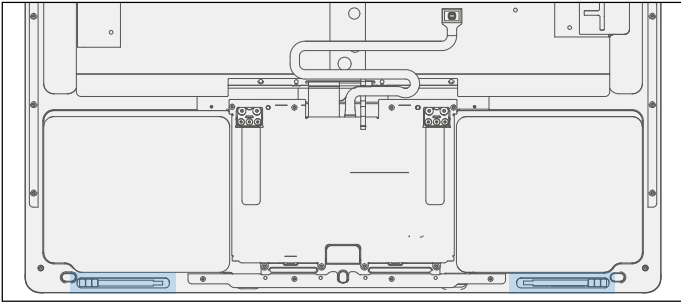
- b. **Verify Hinge Alignment** – With the screws concentrically aligned verify hinge alignment inserting a plastic 0.40mm feeler gauge in between the display and chassis (shown by blue arrow). Feeler gauge should be able to slide through smoothly. If gauge does not fit, re-alignment may be necessary.



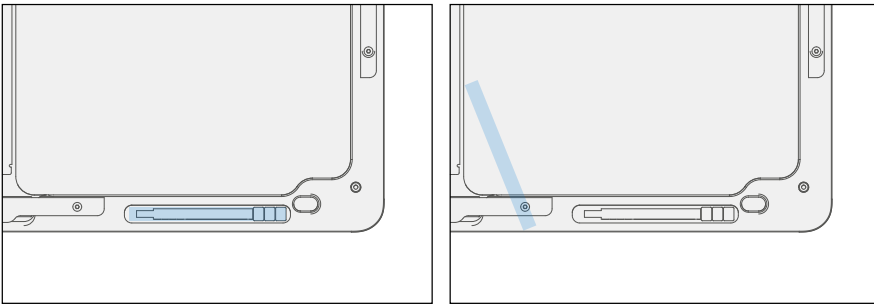
- c. **Secure hinge** – Turn all 6 hinge screws another 90 degrees (1/4 turn) or until fully fastened.

10. **Opening Strength Adjustment (Metal C-cover)** – As part of the AB-cover removal process, we will need to remove the current C-cover steels which are located at the bottom front edge pockets and install new provided steels.

a. **C-cover Steels Mylar Removal** – Take C-cover and remove mylars covering the closure steels using tweezers.



b. **C-cover Steels Removal** – Using tweezers again, remove the closure steels located in the two regions at the front edge of the C-cover.

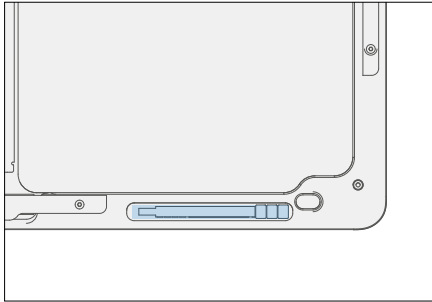


- c. **Clean Closure Steel Area** – Clean off the closure steel area thoroughly with a cotton swab and IPA. Be sure there is no debris or residue left over.
- d. **Install New Closure Steels** – Install new closure steels about 2mm from the outside edge of the C-cover as shown in the image below using tweezers.
- e. **Left Closure Steel Placement** – Place **single closure steel** into left enclosure pocket about 2mm from the outside left edge of C-cover.
- f. **Secure Left Closure Steel** – Using the back of the tweezers, press continuously and firmly along the surface of the steel for 80 seconds.
- g. **Tape Left Closure Steel** – Place mylar tape over the steel. Black tape should fully cover steel and overlap onto the C-cover.
- h. **Smooth Left Closure Steel Tape** – Use Spudger tool to smooth out and flatten the tape to secure the steel.
- i. **Right Closure Steel Placement** – Place **single closure steel** into right enclosure pocket about 2mm from the outside right edge of C-cover.





- j. **Secure Right Closure Steel** – Using the back of the tweezers, press continuously and firmly along the surface of the steel for 80 sec.
- k. **Tape Right Closure Steel** – Place black tape over the steel. Black tape should fully cover steel and overlap onto the C-cover.
- l. **Smooth Right Closure Steel Tape** – Use Spudger to smooth out and flatten the tape to secure the steel. Ensure that all metal keyboard covers have the mylar tape on top of the steel before final assembly of the keyboard.

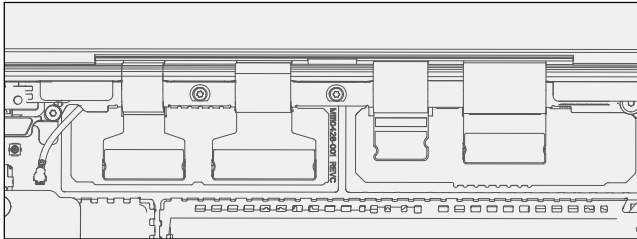


- 11. **Fit C-cover** – Follow steps 2-4 of the C-cover reassembly instructions. Do not install any Feet screws.
- 12. **Check AB-cover alignment** – Close the device and confirm flushness of feeler gauge to display module cover across the entire front edge.
  - a. If flush, move to next step in this section.
  - b. If not flush, follow steps for removing AB-hinge screws and steps for 9a thru 9c again until flush. Then follow steps for C-cover reassembly.
- 13. **rSSD Install** – Follow steps for Procedure – Installation (rSSD) section ([page 41](#)).
- 14. **C-cover Install** – Follow steps for Procedure – Installation (C-cover Keyboard metal type) section ([page 31](#)).
- 15. **Run SDT** – Power on device. Validate full device functionality by running SDT tool.
  - a. If an SDT failure occurs, assess failure to determine if caused by any improper or missed step in the repair process and correct.
  - b. Any failure that is not correctable should result in device exchange.
- 16. **Install Feet** – If SDT tests pass and no further actions are to be performed on the device, follow steps for Procedure – Installation (Non-Skid Feet) section ([page 24](#)).

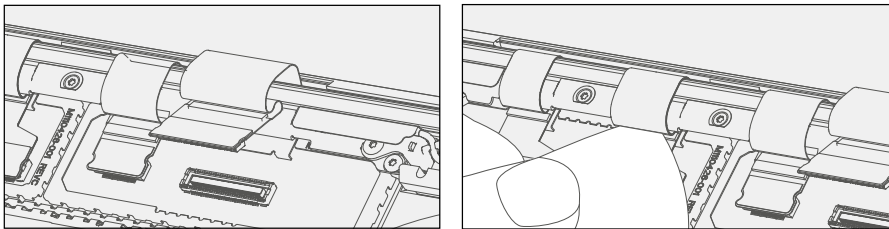


## Procedure installation – (Fabric C-cover Device)

1. **Initial AB-cover Install** – Clean out any residual thread locker surrounding the hinge screw holes or just inside the screw hole before installing replacement AB-cover assembly. Set the new AB-cover in place in the device chassis hinge wells and hold in place while installing 2 new outer screws on each hinge (4 total at this time). Screws should be installed until just snug and seated, and then turned another 90 degrees (1/4 turn) or until fully fastened.
2. **Release Hinge Clamp Force** – Turn all 4 screws 90 degrees (1/4 turn) counterclockwise to release the clamp force from those screws. This will allow for alignment of AB-cover to chassis at a later step.
3. **Connect AB-cover FPCs** – Connect all 4 display module FPCs into their respective connectors.




4. **Tuck FPCs** – Using a guitar pick opening tool, carefully tuck the loose portion of the FPCs under the enclosure lip as shown below. Ensure that the FPC is taut and that there is no remaining slack protruding out from under the lip. Any protrusions could prevent or negatively impact the re-installation of the C-cover.



5. **Touch Calibration Steps** – The new AB-cover must have touch calibration performed:
  - a. **Install rSSD** to enable device operation (device won't power on without rSSD installed). Follow steps for Procedure – Installation (rSSD) section ([page 41](#)).
  - b. **Temporarily connect the C-cover** FPC back on to device main board connector and set the C-cover in place on the device chassis. No screws are required at this time as the C-cover will be used temporarily to control the device; see details in Procedure – Installation (C-cover Keyboard Fabric type) section ([page 37](#)).
  - c. **Connect software tools USB drive** with software tools to USB connector on device under repair.
  - d. **Connect power supply** to device to enable power on.
  - e. **Power on device** – Depress the power button on the C-cover to power on the device.
  - f. **Run software tool** – At the device OS, use Windows Explorer, navigate to USB drive and run: **STEP2\_DisplayModuleReplacement.cmd**. Follow prompts, device will restart. Verify touch by running finger across screen to check that touch is working.

---

 **IMPORTANT: Calibration Failure** – If calibration tool returns an error message that indicates calibration failure, see AB-cover Touch Calibration Retry section on [page 61](#) for details on how to proceed. This must be carried out at this time and prior to complete re-assembly of device.

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- g. **Power off device** – Use device OS to power down device.



- h. **Remove C-cover.**
  - i. **Remove rSSD.**
6. **FPC RF Shield Installation** – Install 2 new shield lids above the 4 AB-cover FPC connectors by orienting them along the outline of the shield fences.

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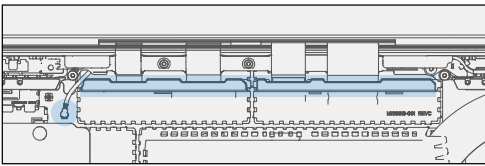
✍ **IMPORTANT:** Be sure to install the correct shield type onto the corresponding shield fence. The left-hand shield has 2 rectangular embosses in the shape of connector heads and the right-hand shield has 3 rectangular embosses.

Prior to shield installation, visually inspect each shield to ensure that shield fingers are not bent such that they impede the installation process.

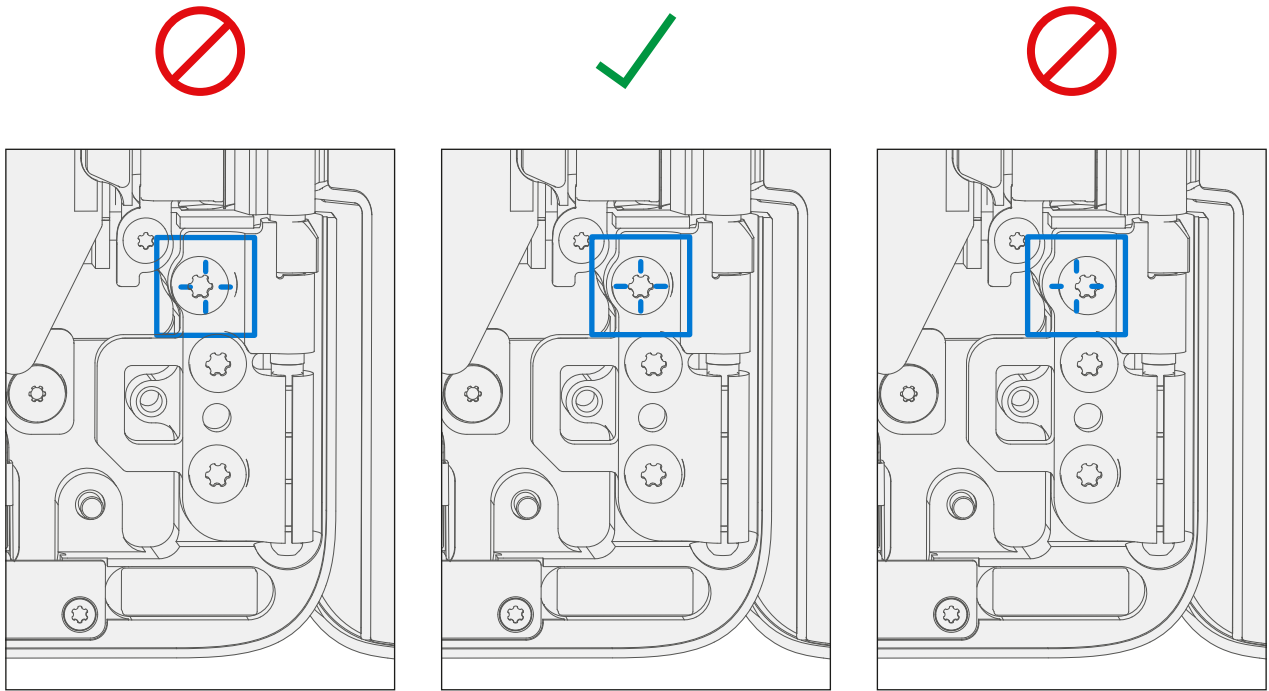
Push the shields vertically downwards onto the fences and snap into place. Ensure the shields are evenly pressed along the entire perimeter of each fence and that the front shield prongs are pressed firmly against the shield fence.

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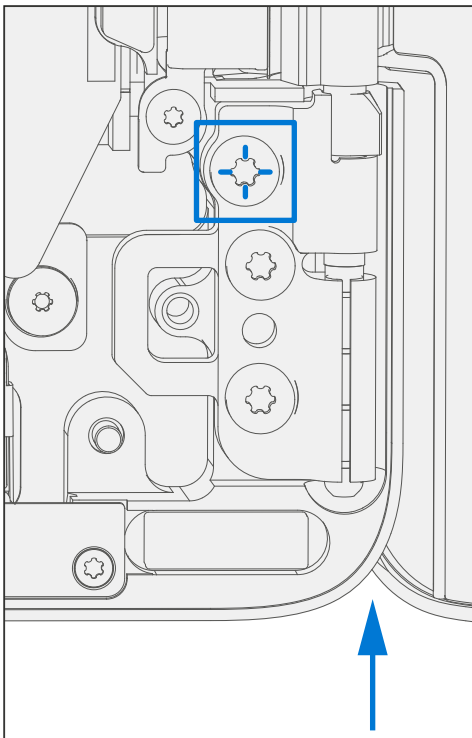
7. **Connect WiFi Antenna** – Reconnect the left WiFi antenna cable (see illustration below).
8. **RF Baffle Installation** – Install 2 new RF baffles on top of the shield by peeling off the adhesive protector sheet and snapping them into place near the back of the shields. Firmly press your finger along the top of the RF Baffle wall to adhere adhesive to shield.



9. **AB-cover Hinge Alignment** – It is necessary to properly align the front edge of the AB-cover to the lower device case to ensure step gap between front edges are proper.
- a. **Hinge Alignment** – Set Display Module to 90 degrees. Shift innermost screw on each side so that the screws are concentric with the circular feature on the hinge.



- b. **Verify Hinge Alignment** – With the screws concentrically aligned verify hinge alignment inserting a plastic 0.40mm feeler gauge in between the display and chassis (shown by blue arrow). Feeler gauge should be able to slide through smoothly. If gauge does not fit, re-alignment may be necessary.



- c. **Secure hinge** – Turn all 6 hinge screws another 90 degrees (1/4 turn) or until fully fastened.

10. **Fit C-cover** – Follow steps 2-4 of the C-cover reassembly instructions. Do not install any Feet screws.
11. **Check AB-cover alignment** – Close the device and confirm flushness of feeler gauge to display module cover across the rear corners of each hinge.
  - a. If flush, move to next step in this section.
  - b. If not flush, follow steps for removing AB-hinge screws and steps for 9a thru 9c again until flush. Then follow steps for C-cover reassembly.
12. **rSSD Install** – Follow steps for Procedure – Installation (rSSD) section ([page 41](#)).
13. **C-cover Install** – Follow steps for Procedure – Installation (C-cover Keyboard metal type) section ([page 31](#)).
14. **Run SDT** – Power on device. Validate full device functionality by running SDT tool.
  - a. If an SDT failure occurs, assess failure to determine if caused by any improper or missed step in the repair process and correct.
  - b. Any failure that is not correctable should result in device exchange.
15. **Install Feet** – If SDT tests pass and no further actions are to be performed on the device, follow steps for Procedure – Installation (Non-Skid Feet) section ([page 24](#)).



## AB-Cover Touch Calibration Software Tools Overview

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- ✍ **IMPORTANT:** A calibration routine is provided to carry out the required touch calibration sequence on an AB-cover Display Assembly when replaced. Touch Calibration software tool details are provided within this section. The calibration tool runs from a USB drive connected to the device under repair and runs within the Windows OS. Follow steps within the AB-cover Display Assembly Replacement Process section ([page 40](#)) noting when to run tools and which file to choose based on the step in the process.
- 

### Preliminary Requirements

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

### Required Tools and Components

- **Tools:**
  - AB-cover Touch Calibration Software Tool

### Prerequisite Steps:

- **AB-cover replacement** – Refer to AB-cover Display Assembly Replacement Process section ([page 42](#)).

### USB Drive Setup – Directory Structure and Files

Copy tools to the root directory of USB drive for easy access during the calibration process.

The following files are required and should reside in the same directory on the USB key:

- Folder: Project
- File: STEP1\_DisplayModuleReplacement.cmd
- File: STEP2\_DisplayModuleReplacement.cmd

### Tool Runtime Details

- The calibration tool runs within the Windows OS and therefore the device under repair must be functional to the point that the tools will run on device OS.
- For devices with secured Windows login accounts, login credentials are required to gain access to OS features that enable program execution.
- Once device is running and Windows login is completed, leverage Windows Explorer to navigate to the USB drive containing the calibration tools.
- Run the calibration tools in accordance with associated process steps within the AB-cover Display Assembly Replacement Process section ([page 42](#)).
- The tools perform the following two functions:
  - Set device under repair into AB-cover replacement mode.
  - Perform touch calibration on replaced (new) AB-cover.

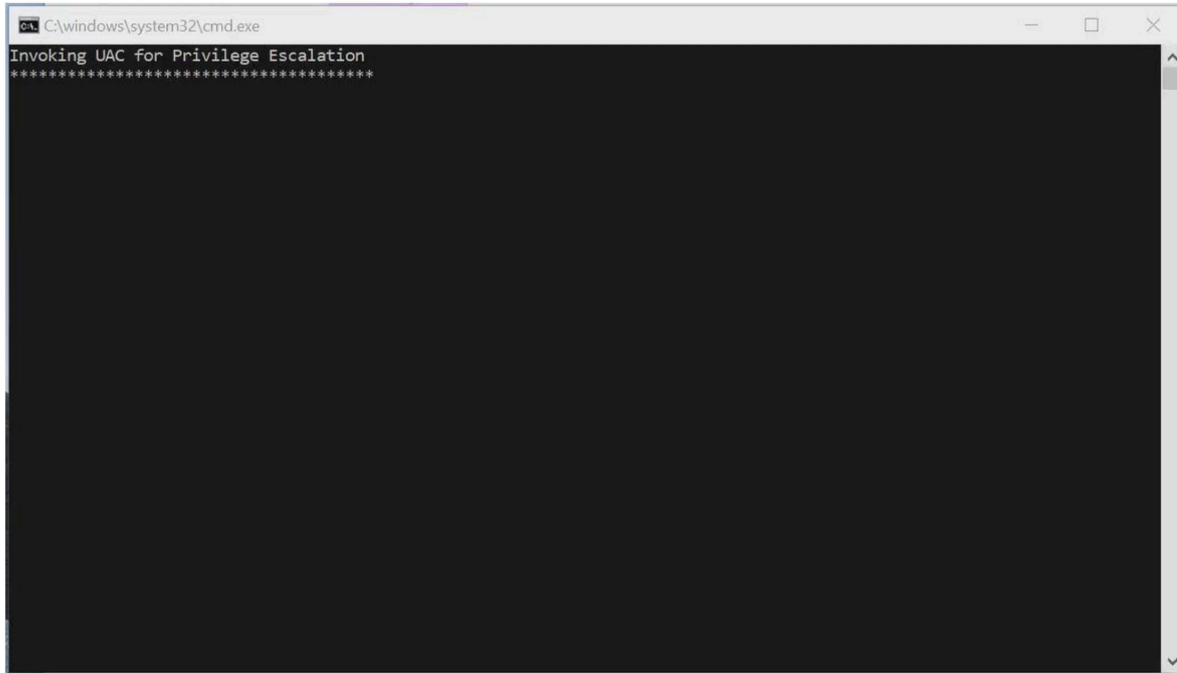


## Expected Screenshots

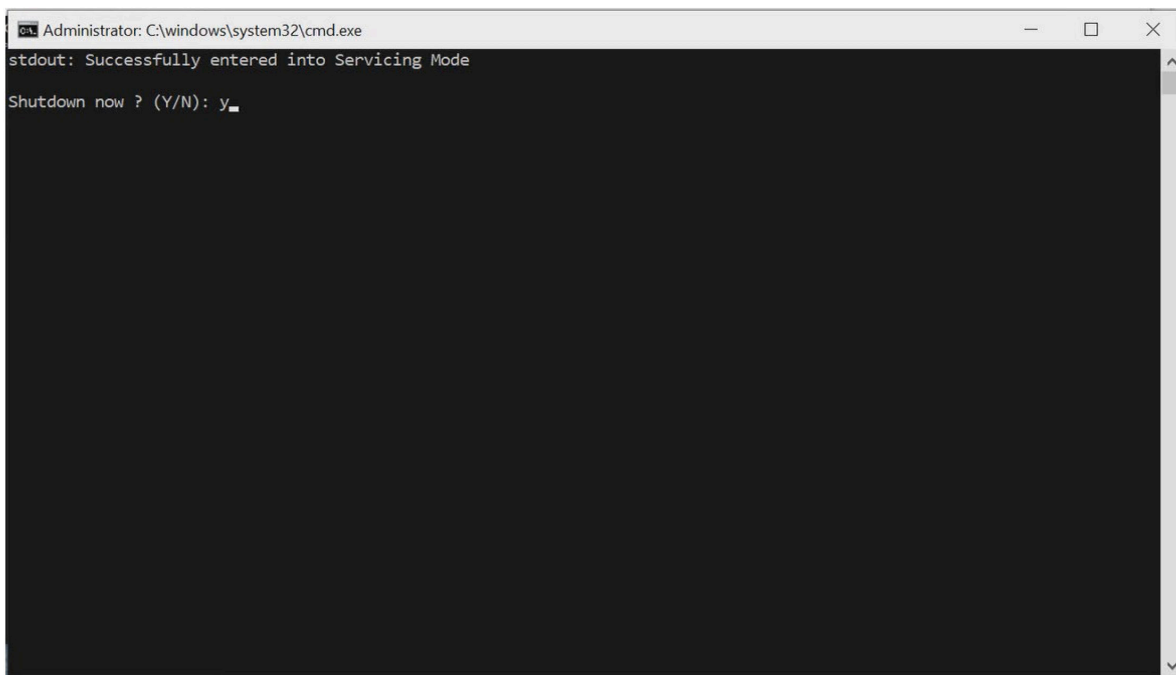
The following screenshots will be presented during tool operation:

When **STEP1\_DisplayModuleReplacement.cmd** is invoked:

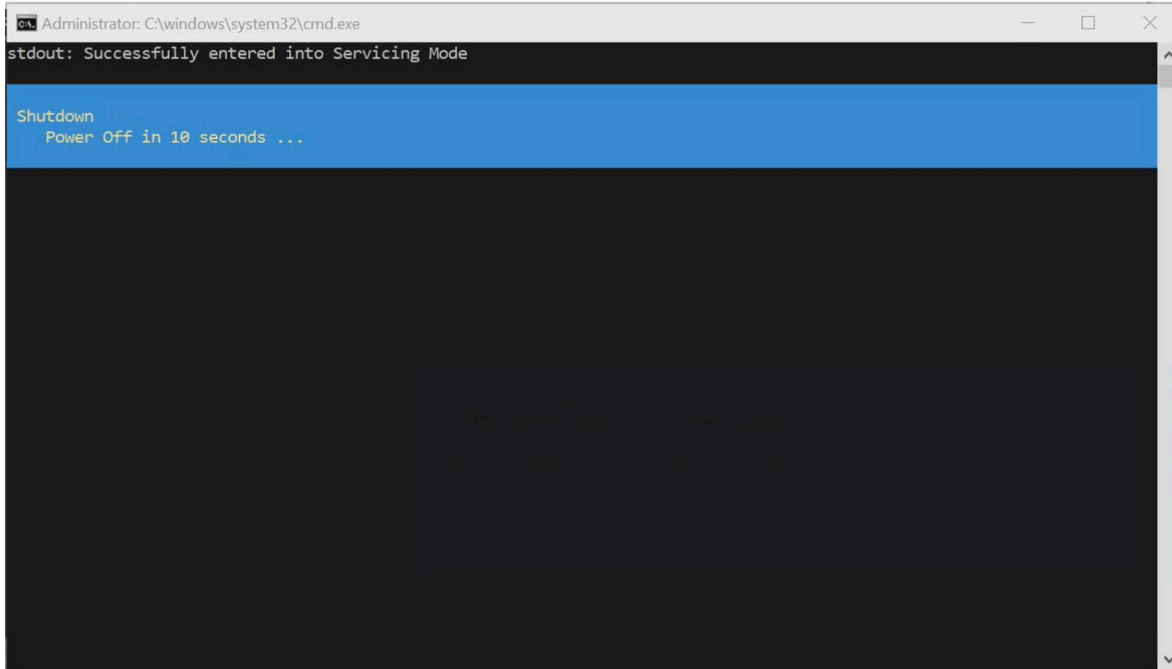
**STEP\_1 Screen 1:** Initial screen indicates Step 1 initiation.



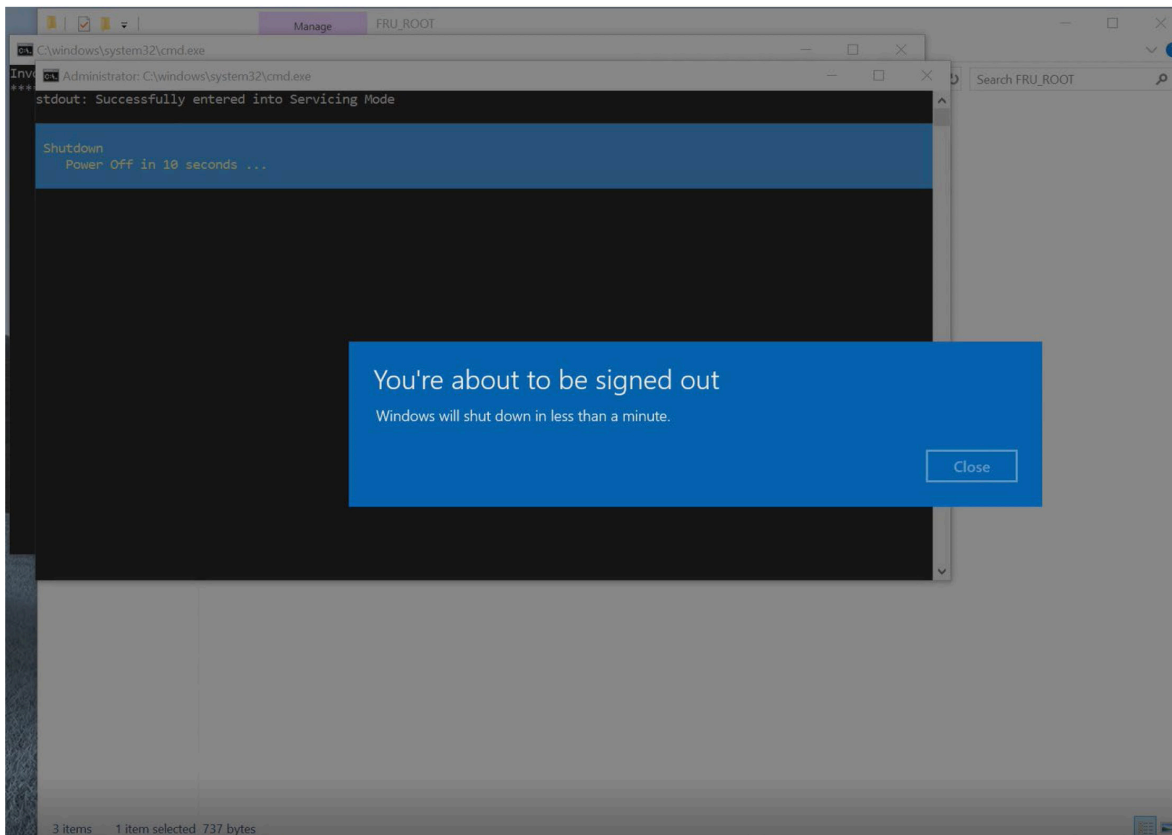
**STEP\_1 Screen 2:** Indicates device has been set into AB-cover replacement mode (Servicing Mode). Operator prompted to authorize device shutdown by entering y or Y and pressing ENTER.



**STEP\_1 Screen 3:** Tool confirms device shutdown authorization.



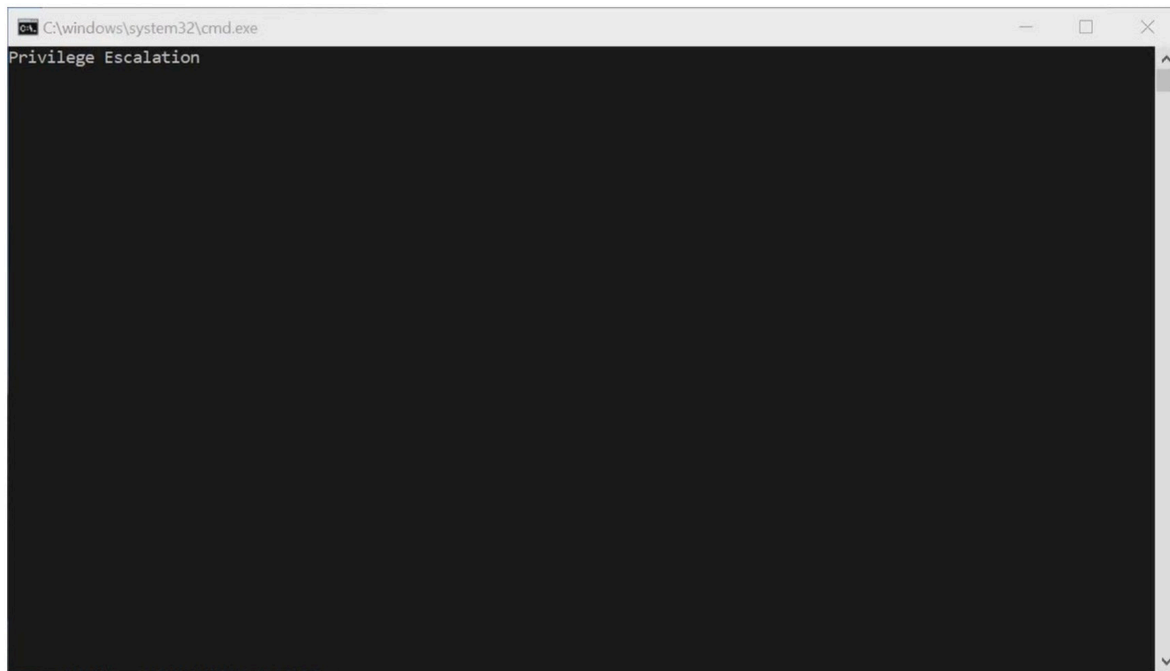
**STEP\_1 Screen 4:** Windows OS alert noting device shutdown – Select **Close** and device shuts down to enable next process steps within AB-cover Display Assembly Replacement Process.



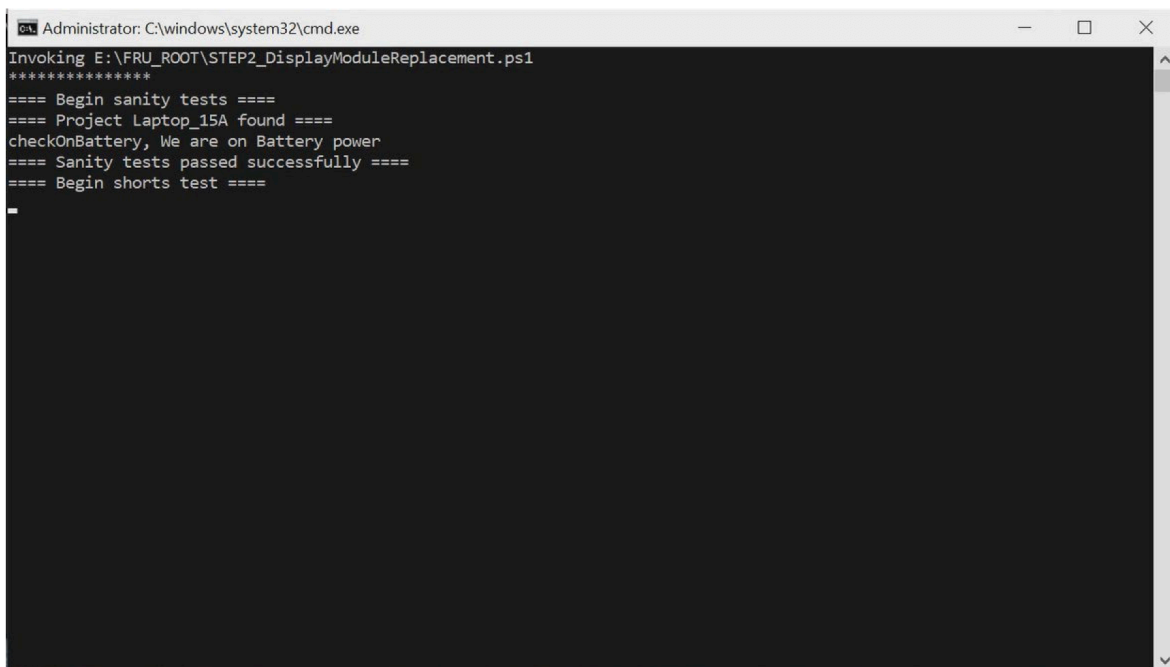


When **STEP2\_DisplayModuleReplacement.cmd** is invoked:

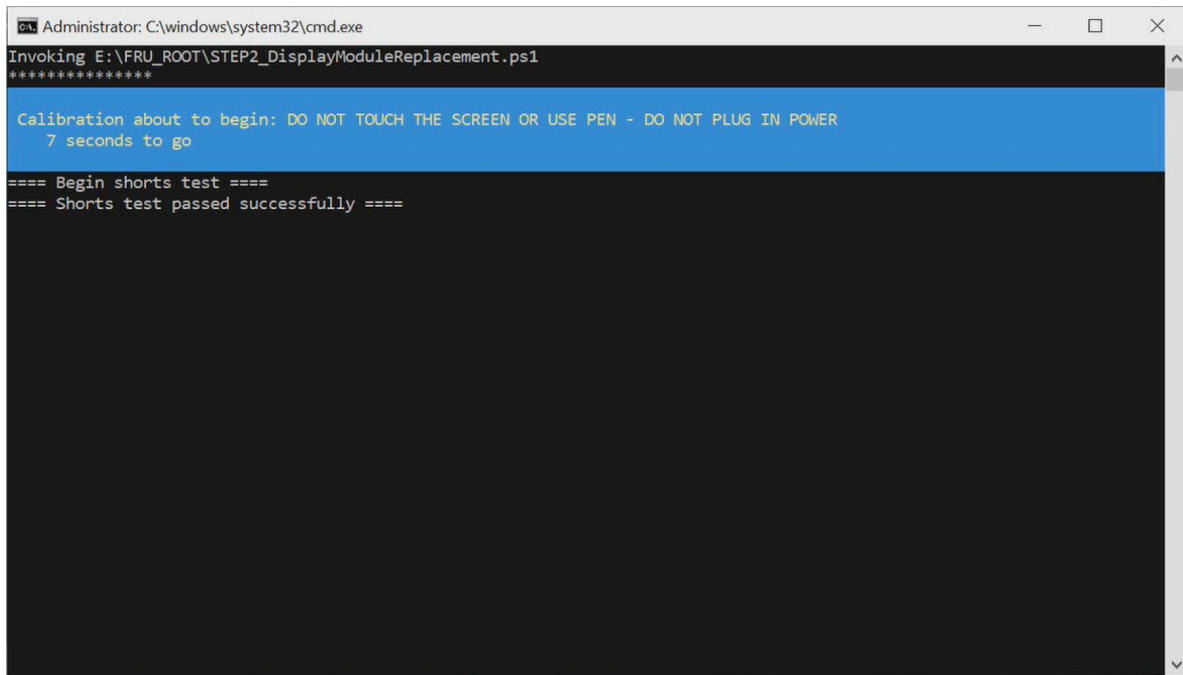
**STEP\_2 Screen 1:** Initial screen indicates tool running.



**STEP\_2 Screen 2:** Calibration preliminary device testing initiated.



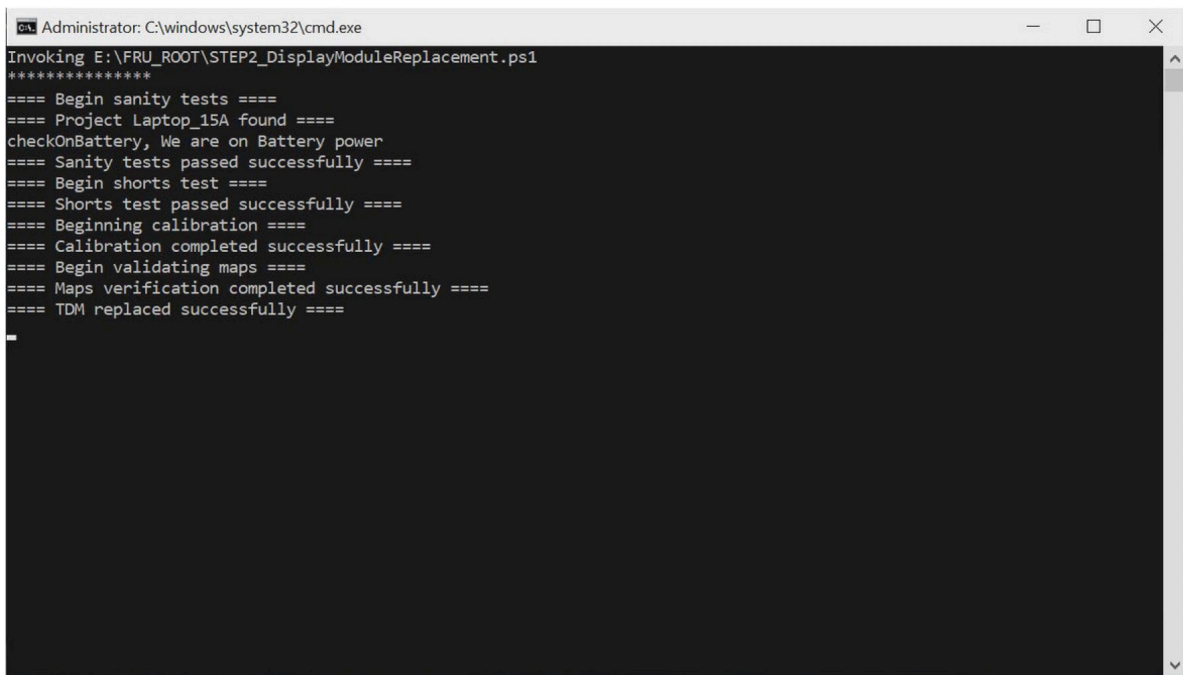
**STEP\_2 Screen 3:** Tool prompts operator that calibration is about to commence with reminders that screen should not be touched and power should not be applied to the device during calibration.



```
Administrator: C:\windows\system32\cmd.exe
Invoking E:\FRU_ROOT\STEP2_DisplayModuleReplacement.ps1
*****
Calibration about to begin: DO NOT TOUCH THE SCREEN OR USE PEN - DO NOT PLUG IN POWER
7 seconds to go

==== Begin shorts test ====
==== Shorts test passed successfully ====
```

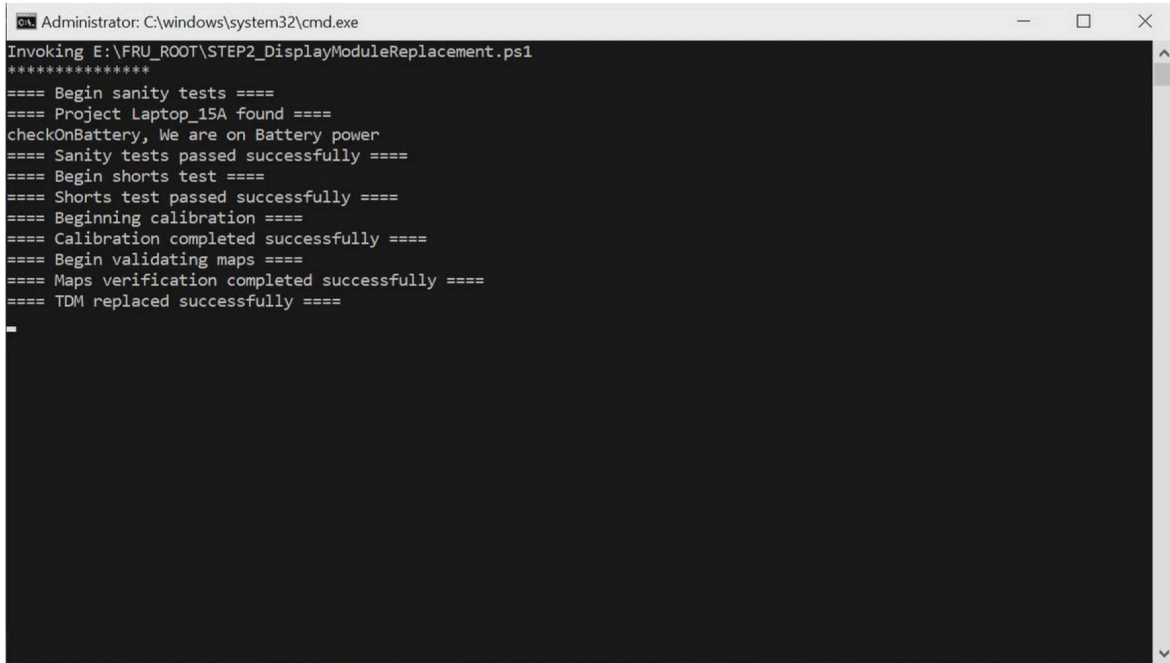
**STEP\_2 Screen 4:** Tool reports that calibration routine is in progress.



```
Administrator: C:\windows\system32\cmd.exe
Invoking E:\FRU_ROOT\STEP2_DisplayModuleReplacement.ps1
*****
==== Begin sanity tests ====
==== Project Laptop_15A found ====
checkOnBattery, We are on Battery power
==== Sanity tests passed successfully ====
==== Begin shorts test ====
==== Shorts test passed successfully ====
==== Beginning calibration ====
==== Calibration completed successfully ====
==== Begin validating maps ====
==== Maps verification completed successfully ====
==== TDM replaced successfully ====
```

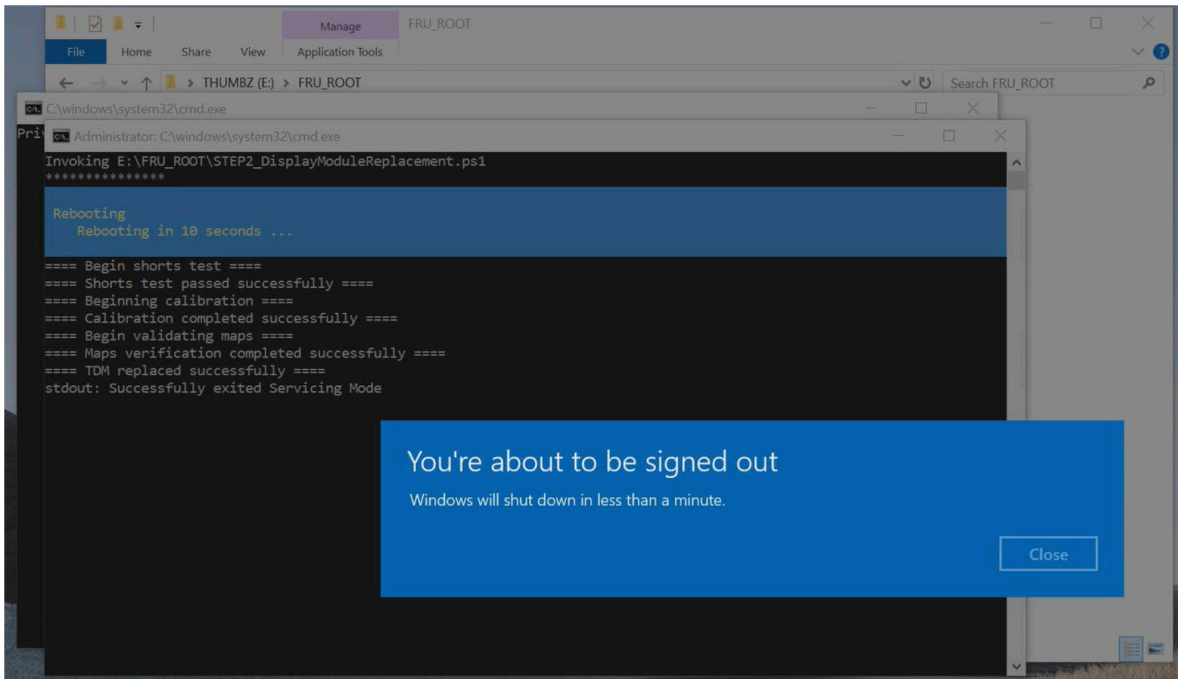


**STEP\_2 Screen 5:** Tool reports results of calibration process.

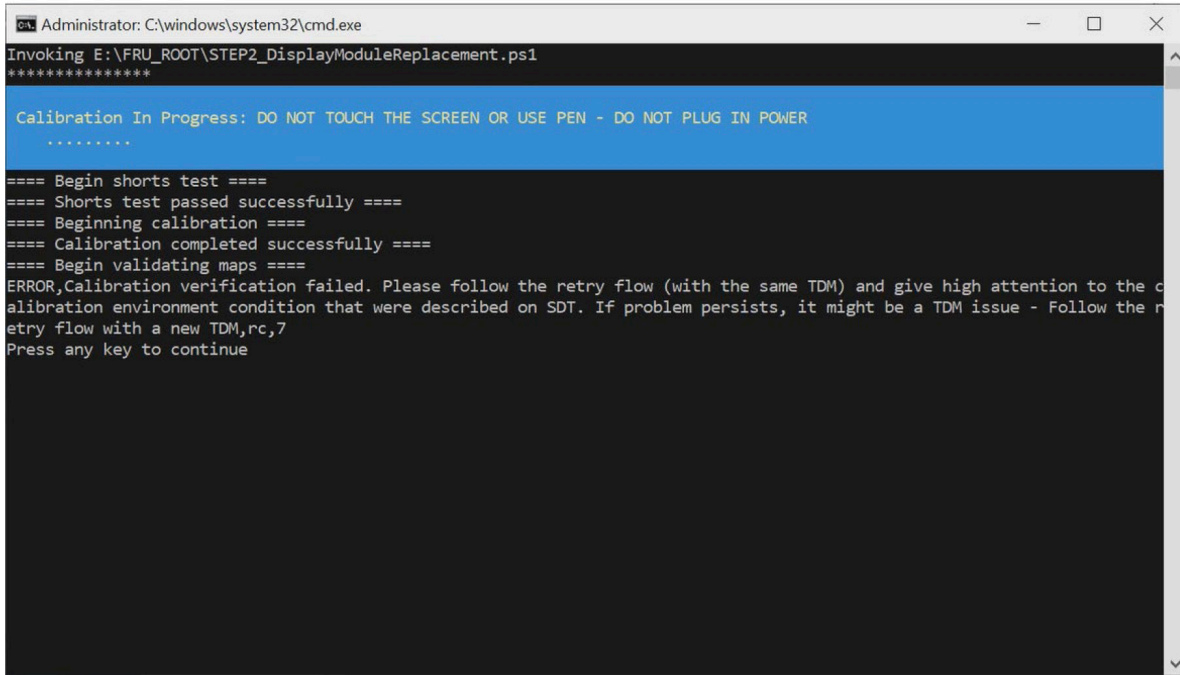


```
Administrator: C:\windows\system32\cmd.exe
Invoking E:\FRU_ROOT\STEP2_DisplayModuleReplacement.ps1
*****
==== Begin sanity tests ====
==== Project Laptop_15A found ====
checkOnBattery, We are on Battery power
==== Sanity tests passed successfully ====
==== Begin shorts test ====
==== Shorts test passed successfully ====
==== Beginning calibration ====
==== Calibration completed successfully ====
==== Begin validating maps ====
==== Maps verification completed successfully ====
==== TDM replaced successfully ====
```

**STEP\_2 Screen 6:** Tool initiates OS restart and OS alerts operator that device will restart – Select **Close**.



**STEP\_2 Error Screen Example:** In the case that calibration fails, follow screen prompts provided by tool. If retry attempt fails, refer to AB-cover Touch Calibration Retry section (page 61) for next steps.




```
Administrator: C:\windows\system32\cmd.exe
Invoking E:\FRU_ROOT\STEP2_DisplayModuleReplacement.ps1
*****
Calibration In Progress: DO NOT TOUCH THE SCREEN OR USE PEN - DO NOT PLUG IN POWER
.....
==== Begin shorts test ====
==== Shorts test passed successfully ====
==== Beginning calibration ====
==== Calibration completed successfully ====
==== Begin validating maps ====
ERROR,Calibration verification failed. Please follow the retry flow (with the same TDM) and give high attention to the calibration environment condition that were described on SDT. If problem persists, it might be a TDM issue - Follow the retry flow with a new TDM,rc,7
Press any key to continue
```



## AB-Cover Touch Calibration Retry (if required)

---

 **IMPORTANT:** If touch calibration fails it is necessary to take the following steps to retry the calibration process.

---

### Touch Calibration Steps (Retry):

1. **Preparation** – Confirm that the following steps have been completed:
  - a. **Install rSSD** to enable device operation. Follow steps for Procedure – Installation (rSSD) on section (page 41).
  - b. **Temporarily connect the C-cover** FPC back on to device main board connector and set the C-cover in place on the device chassis. No screws are required at this time as the C-cover will be used temporarily to control the device; see details in Procedure – Installation (C-cover Keyboard Fabric type) section (page 37) or Procedure – Installation (C-cover Keyboard Metal type) section (page 31).
  - c. **Connect software tools USB drive** with software tools to USB connector on device under repair.
  - d. **Connect power supply** to device to enable power on.
  - e. **Power on device** – Depress the power button on the C-cover to power on the device.
  - f. **Run software tool** – At the device OS, use Windows Explorer, navigate to USB drive and run: **STEP1\_DisplayModuleReplacement.cmd**. Accept the power down prompt once tool is run.
2. **Take the following steps:**
  - a. **Device Powered Off** – Ensure device is powered off and disconnected from a power supply.
  - b. **Remove C-cover** which was temporarily installed to allow device control. Be sure to follow proper actions when removing and storing the C-cover; see Procedure – Removal (C-cover Keyboard Fabric type) section (page 34) or Procedure – Removal (C-cover Keyboard Metal type) section (page 29).
  - c. **Battery Cover in place** – Ensure 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.
  - d. **rSSD Removed** – Follow steps for Procedure – Removal (rSSD) section (page 40). Removing the rSSD will ensure that all power is removed from the device.
3. **Remove AB-cover** – Remove new AB-cover installed to device and install another new AB-cover into device. The device under repair must see a new AB-cover in order to accept new touch calibration data. Follow steps for Procedure – Removal (AB-cover Display Assembly) section (page 43).


---

 **IMPORTANT:** This step must be carried out to re-enable touch calibration.

---

4. **Preparation** – Confirm that the following steps have been completed:
  - a. **Install rSSD** to enable device operation (device won't power on without rSSD installed).
  - b. **Temporarily connect the C-cover** FPC back on to device main board connector and set the C-cover in place on the device chassis. No screws are required at this time as the C-cover will be used temporarily to control the device; see details in Procedure – Installation (C-cover Keyboard Fabric type) on (page 37). or Procedure – Installation (C-cover Keyboard Metal type) section (page 31).
  - c. **Connect software tools USB drive** with software tools to USB connector on device under repair.
  - d. **Connect power supply** to device to enable power on.
  - e. **Power on device** – Depress the power button on the C-cover to power on the device.
  - f. **Run software tool** – At the device OS, use Windows Explorer, navigate to USB drive and run: **STEP2\_DisplayModuleReplacement.cmd**. Follow prompts, device will restart. Verify touch by running finger across screen to check that touch is working.
5. **Navigate to USB key with software tools** – Using Windows Explorer, navigate to USB drive and run the SDT tool.
6. **Run SDT** – Within SDT tool, choose Select Tests, Touch Display Repair and initiate by clicking on **Run Selected button** – follow instructions provided by tool.

---

 **IMPORTANT:** If calibration tool continues to return an error message that indicates calibration failure, device should be processed as an exchange and sent back to Microsoft for repair.

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## 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-pk/download/details.aspx?id=11691> In case of questions, please contact [AskECT@microsoft.com](mailto:AskECT@microsoft.com)

