Microsoft Surface

Surface Pro X Service Guide

SG

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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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Device Identity Information

Surface Pro X Models

There are two 1876 model – Pro X one with the SQ1 processor, and one with the SQ2 processor.
Pro X with SQ1 SMBIOS will report the following:

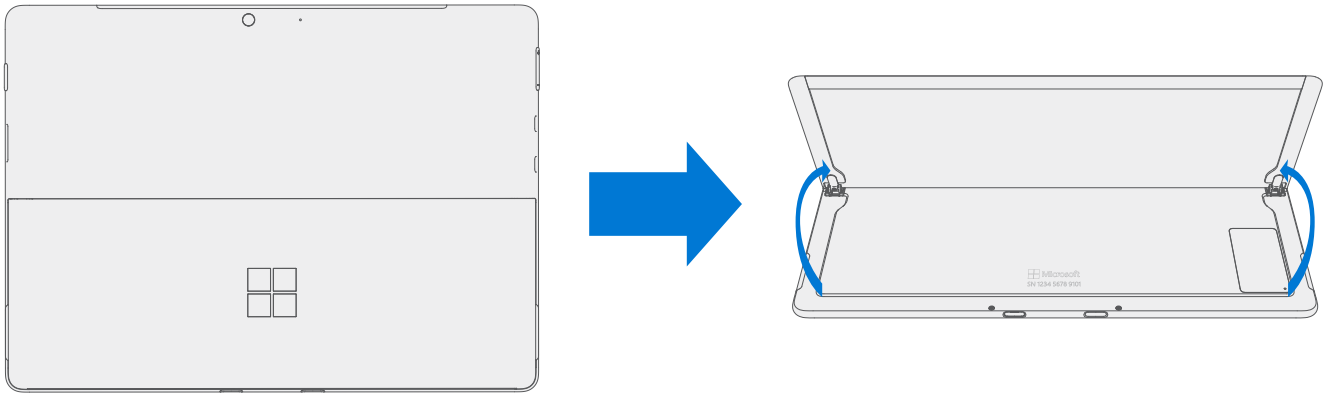
System SKU	Surface_Pro_X_1876
Processor	Microsoft SQ1 @ 3.0 GHz, 2995 Mhz, ...

Pro X with SQ2 SMBIOS will report the following:

System SKU	Surface_Pro_X_H_1876
Processor	Microsoft SQ2 @ 3.15 GHz, 3148 Mhz, ...

2010 – Surface Pro X Wi-Fi

The rSSD drive size and serial number for Surface Pro X are located under the kickstand.



Glossary of Terms

The following terms are used throughout this manual

- **rSSD** – Removable Solid-State Drive
- **TDM** – Touch Display Module is the complete screen with all layers.
- **PSA** – Pressure Sensitive Adhesive
- **IBC** – Tablet Back Cover
- **BMR** – Bare Metal Recovery refers to the clean imaging process.
- **SDT** – Surface Diagnostic Toolkit
- **ESD** – Electro-Static Discharge
- **FRU** – Field Replaceable Units are sub-system components such as the SIM/rSSD door, Kickstand, 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.
- **Commercial Spares/CRU** – Customer Replaceable Units available to commercial customers for repair by a skilled-technician.

General Information, Precautions, Warnings

⚠ This symbol identifies important safety and health messages 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 Tools

- SIM eject tool (or equivalent 0.58 mm / 0.023 in diameter paperclip)
- Surface dock
- TDM PSA bonding frame

Standard Service Tools

- Anti-static wrist strap (1 MOhm resistance)
- Soft Electro-Static Discharge (ESD) safe mat
- iFixit pick
- iFixit opening tool
- Spudger
- Metric ruler
- Bonding weight
    - Weight Requirement: minimum 23 kg (50 lb) / maximum 26 kg (57 lb)
    - Minimum Dimensions: 280 mm x 200 mm (11 in x 8 in)
    - Geometry must be symmetrical, to allow for even weight distribution.
    - Weight used must be a flat plate, with consistent flatness and not protrude from contact plane with Bonding Frame.
    - Weight must contact the full perimeter of the frame when placed above it.
    - Recommended weights: Ruck Plates of 9 kg + 14 kg (20 lb + 30 lb)
    - Alternate: Steel Shot Bags of 9 kg + 14 kg (20 lb + 30 lb)
- Foam pad
    - Material: EVA Foam
    - Thickness: 9.5 mm (3/8 in)
    - Density: 0.03 g/cm3 (2 lb/cu Ft)
    - Dimensions: Minimum 229 mm x 305 mm (9 in x 12 in)
    - Recommended foam pad (McMaster PN: 86095K43)
- Torx-plus screwdriver 3IP
- Loctite SF 7649
- Loctite 243
- Isopropyl alcohol dispenser bottle (use 91% or greater IPA)
- Cotton swab
- USB drive
- Wired Ethernet connection to the Internet
- USB keyboard
- Microfiber / lint free cloth

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. Refer to the ASP Guidebook for Microsoft tools.

General Safety Precautions

⚠ Always observe the following general safety precautions:

- Opening and/or repairing any device can present electric shock, device damage, fire, and/or personal injury risks and other hazards. Exercise caution when undertaking these activities as described in this manual. Only skilled IT technicians to whom Microsoft has provided this manual should attempt CRU repair activities. Only Microsoft-authorized service providers should undertake FRU repair activities.
- Always select and use the appropriate AC power supply for a device. We recommend you use genuine Microsoft power supply units and AC power cords. A genuine Microsoft power supply unit is provided with every device.
- Use only AC power provided by a standard (mains) wall outlet. Do not use non-standard power sources, such as generators or inverters, even if the voltage and frequency appear acceptable.
- Improper use of device batteries may result in fire or explosion. Only open the enclosure on a device as outlined in this manual. Do not heat, puncture, mutilate, or dispose of devices or their batteries in fire. Do not leave or charge devices in direct sunlight or exposed to other extreme sources of heat for an extended period of time. Doing so may cause damage or melt the batteries.

For additional product safety information, including information about

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

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

Repair-Specific Precautions and Warnings

- Prior to opening device, ensure device is powered off and disconnected from a power supply.
- We recommend wearing protective eyewear as a safety precaution when disassembling/re-assembling a device.
- Before opening device, always check that an anti-static wrist strap is worn, and work area is properly grounded to ensure an electrostatic discharge (ESD) safe environment.
- Check to make sure that general guidelines and ESD compliance steps are followed prior to starting activities. Refer to Prior to Device Disassembly section for details.
- As you remove each subassembly from the device, place the subassembly (and all accompanying screws) away from the work area to prevent damage to the device and to the subassembly.

> **IMPORTANT**: Remove rSSD (removable Solid-State Drive) whenever TDM is removed from device. rSSD removal disconnects the battery from all device logical components for safety purposes. Refer to Procedure – Removal (rSSD) (page 13) for details.

Repair - Cross-reference Documents

- M1153910 In Device Battery Inspection process. Devices exhibiting battery issues as outlined in the Battery Inspection Process require whole unit replacement.

Safety Policies/Procedures

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

As a quick guide, any Microsoft Surface device that visually exhibits any of the following symptoms shall be immediately removed from the repair process and delivered to your Variance Manager or IT Support Professional for notification to Microsoft:

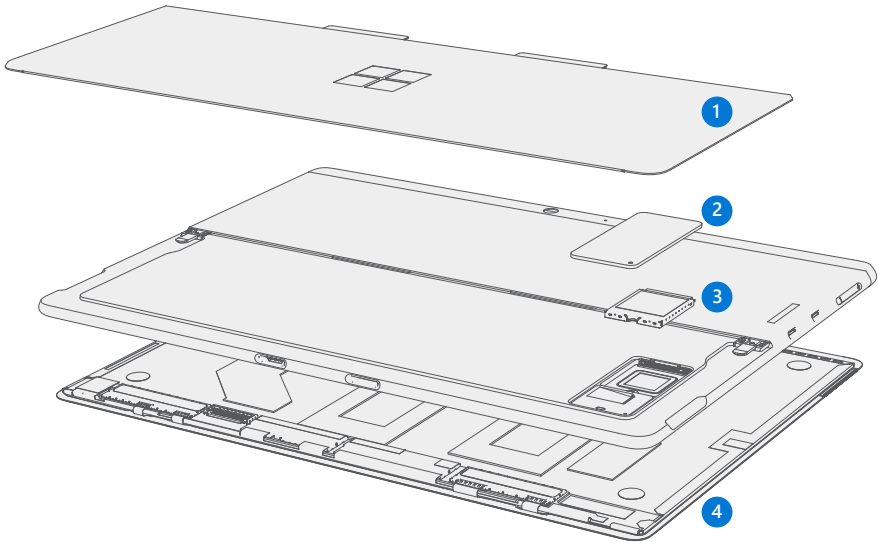
- Any burned or melted components, traces or plastic parts on the **outside** of the device, or which otherwise exhibits heat damage, including charring seen, in charging ports.
- Any burned or melted components, traces or plastic parts on the **inside** of the device, or which otherwise exhibits heat 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 customer abuse (e.g., impact damage from dropping, evidence of tampering, separation caused by a malfunctioning battery).
- Any other finding that may constitute a safety hazard to the user, such as sharp edges on plastics.

The Variance Manager or IT Support Professional must send an email to Microsoft with pictures showing the damage within 24 hours of device receipt. ASP's refer to the Guidebook for the Microsoft RRT email address. Non-ASP's are to contact Microsoft Surface Support Services.
Your email should include:

- The model and serial number of the affected Microsoft Surface device and/or accessory(ies).
- The Service Request (SR) Number or alternative service tracking work order that the device was received under (Note as N/A if no SR exists).
- A brief description of the damage found.
- Clear photographs depicting the symptoms observed.

The Variance Manager or IT Support Specialist must await instructions from Microsoft Product Safety RRT for the affected unit before continuing with activities or returning the device to the end user.

Illustrated Service Parts List



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

				Models		
Item	**Component**	**ASP / FRU Part No.**	**CRU Part No.**	**1876 SQ1**	**1876 SQ2**	**2010**
(1)	**Kickstand**					
	Black Kickstand	RPS-00001	I5C-00004	X		
	Black Kickstand	RPS-00002	I5C-00001		X	
	Platinum Kickstand	RPS-00003	I5C-00002		X	
	Platinum Kickstand	EM8-00001	I5C-00003			X
(2)	**SSD Door**					
	Black SSD Door	RPU-00001 (Min Order Qty 4)	I5D-00001 (Min Order Qty 1)	X	X	
	Platinum SSD Door	RPU-00002 (Min Order Qty 4)	I5D-00002 (Min Order Qty 1)		X	X
		RPU-00006 (Min Order Qty 1)				
(3)	**Removable Solid-State Drive (NOTE: rSSD size must be same as original)**					
	rSSD 128GB	RPX-00001	8LT-00004	X		
	rSSD 256GB	RPZ-00001	8LV-00006	X		
	rSSD 512GB	RQG-00002	8LX-00006	X		
	rSSD 256GB	RPZ-00004	8LV-00005		X	
	rSSD 512GB	RQG-00004	8LX-00005		X	
	rSSD 128GB	EMB-00001	8LT-00003			X
	rSSD 256GB	EMI-00001	8LV-00004			X
	rSSD 512GB	EN1-00001	8LX-00004			X
(4)	**TDM**					
	ProX TDM WW	RPM-00001			X	X
			I5Z-00001			X

Service Diagnostics/Troubleshooting Overview

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

rSSD Troubleshooting Approach:

> **IMPORTANT**: **Ensure that the devices meet all related safety and policy prior to repair.** Follow the Safety Policies/Procedures described on page 10 above when applicable in lieu of continuing repair. ASP's: refer to additional processing instructions in the ASP Guidebook.

The following approach should be considered when troubleshooting Surface devices:

1. Update device to latest OS/FW versions using the SDT tool.

> **IMPORTANT**: Device updates are required as a prerequisite to all hardware replacement.

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.

Component Removal and Replacement Procedures

Prior to Device Disassembly:

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

Battery Warning

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

Battery is replaceable by trained personnel; replacement must follow Microsoft procedure See http://aka.ms/surface-safety for important information.

- Risk of fire or burning – contact Microsoft for assistance
- Do not modify battery, its wiring, or connectors
- Do not short circuit, bend, dent, crush, or puncture battery
- Do not dispose of battery in fire or expose to high temperatures (+140ºF/60ºC)

rSSD Replacement Process

Preliminary Requirements

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

Required Tools and Components

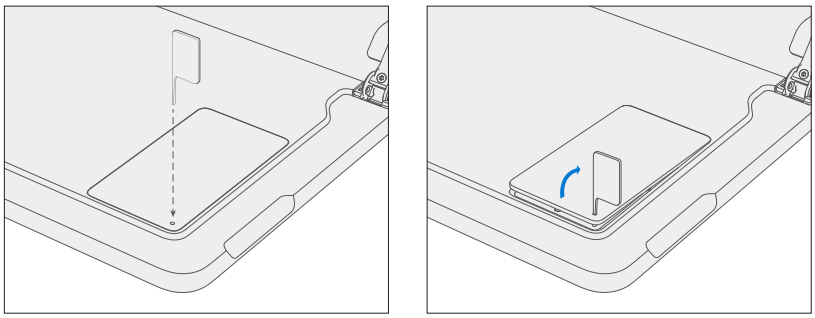
- **Tools:**
  - 3IP (Torx-Plus) driver
  - Anti-static wrist strap (1M Ohm resistance)
  - Soft ESD safe mat
  - Microfiber / Lint free cloth
  - SIM eject tool (or equivalent 0.58 mm / 0.023 in diameter paperclip)
- **Components:**
  - rSSD (Refer to Illustrated Service Parts List)

Prerequisite Steps:

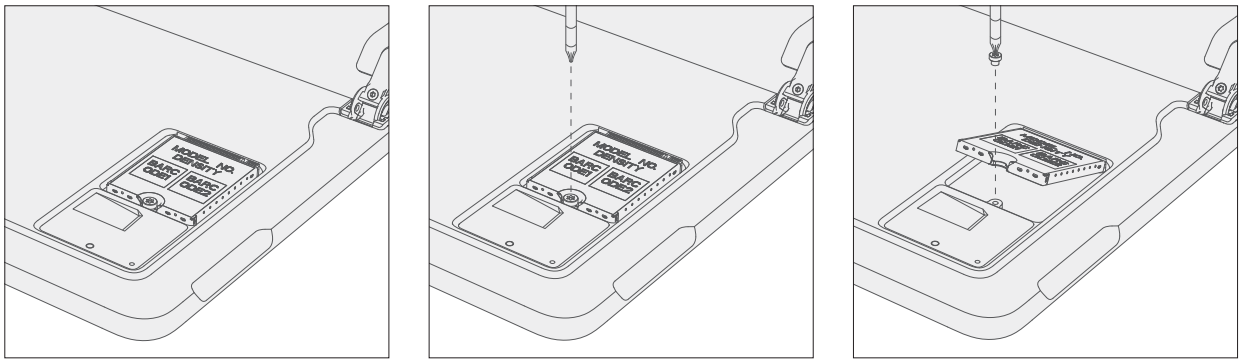
- **Power off device** – Ensure device is powered off and disconnected from a power supply.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening device. Refer to Prior to Device Disassembly section (page 11) for details.

Procedure – Removal (rSSD)

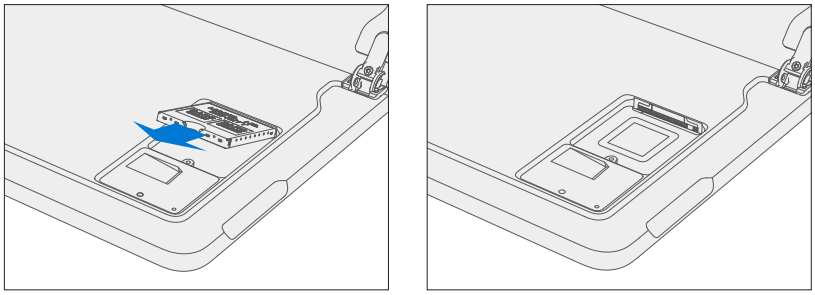
1. **Remove SIM/rSSD door** – Use SIM eject tool.



2. **Remove rSSD 3IP Screw** – Use a 3IP (Torx-Plus) driver to remove the screw securing the rSSD.



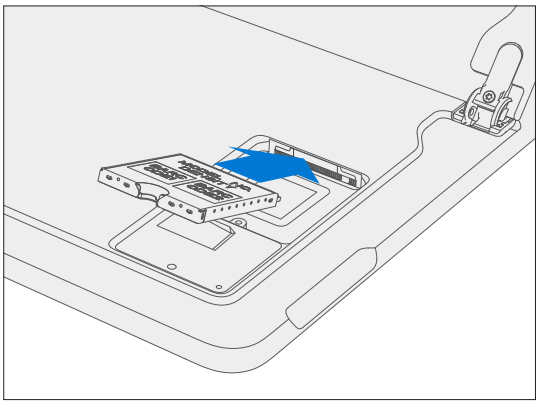
3. **Remove rSSD** – The rSSD should lift upwards to ~15 degree tilt after screw is removed. Carefully grab sides of rSSD case and pull out of main board socket at same ~15 degree angle.



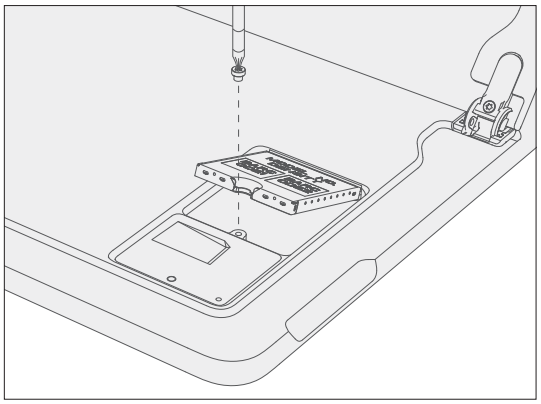
Procedure – Installation (rSSD)

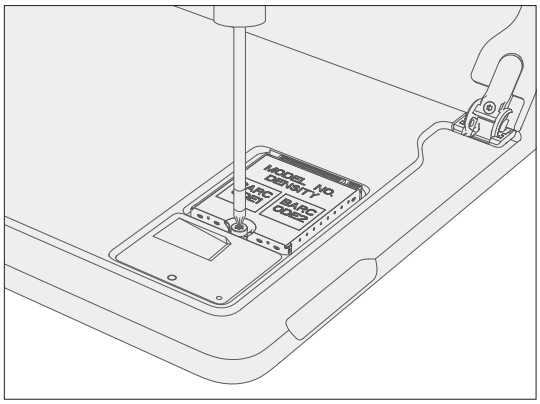
IMPORTANT: Only a Microsoft rSSD of like capacity should be replaced in the device.

1. **Insert rSSD** – Insert the connector end of the rSSD into the rSSD connector on Main board at ~15 degree angle.

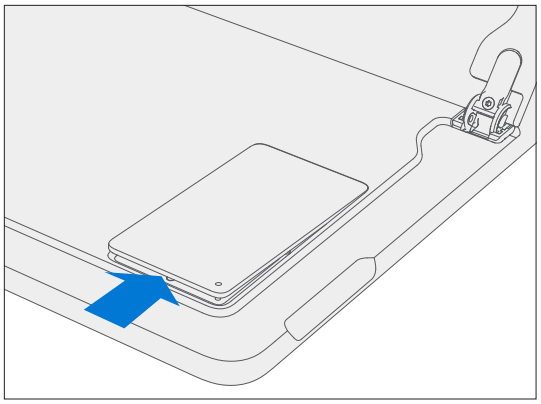


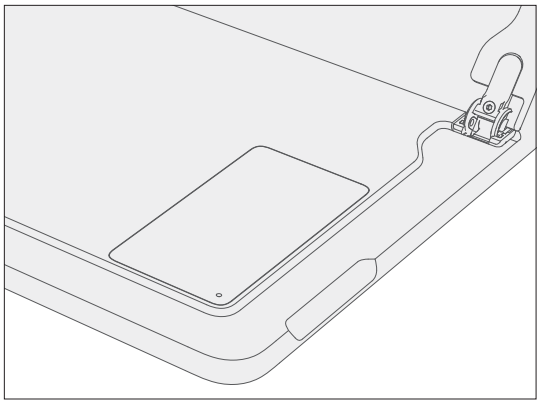
2. **Install new rSSD 3IP screw** – Use a 3IP screwdriver to install a new rSSD screw until the screw is just snug and seated, and then turn another 45 degrees (1/8 turn) or until screw is fully fastened.





3. **Replace SIM/rSSD door.**





4. **Imaging** – Image the new rSSD by using a BMR Imaging USB drive specific to the device model.

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

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

Swap rSSD to a new device process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes, cautions, and warnings in each process section. The rSSD 3IP screw will be reused in this process. Only a Microsoft rSSD of like capacity should be replaced in the device.

Required Tools and Components

- **Tools:**
  - 3IP (Torx-Plus) driver
  - Anti-static wrist strap (1M Ohm resistance)
  - Soft ESD safe mat
  - Microfiber / Lint free cloth
  - SIM eject tool (or equivalent 0.58 mm / 0.023 in diameter paperclip)
  - USB Drive
  - Surface Dock
  - Wired Ethernet connection to the Internet
  - USB keyboard
- **Components:**
  - New SIM/rSSD door if required. (Refer to Illustrated Service Parts List)

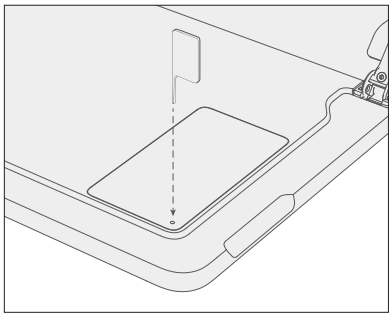
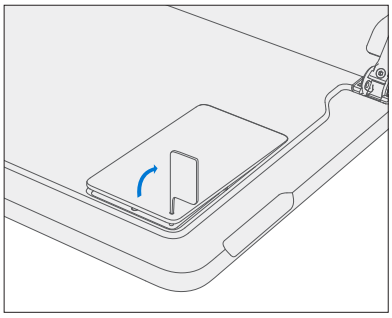
Prerequisite Steps:

- **Using an Internet connection install all available updates:** Navigate to **Settings-> Update and Security** and check for Windows Update.
- Consumer using Windows Home:
  - The Bitlocker recovery key is automatically generated for users with an MSA and can be found by the user by searching the web for "bitlocker recovery key" and logging into their MSA. If the user does not have an MSA based account, the disk will not be encrypted.
- Commercial using Windows Pro:
  - This is managed via commercial policy, and each business may have their own bitlocker policy / recovery method.
  - Confirm that the customer knows the **Windows password to the device.**
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening device. Refer to Prior to Device Disassembly section (page 11) for details.

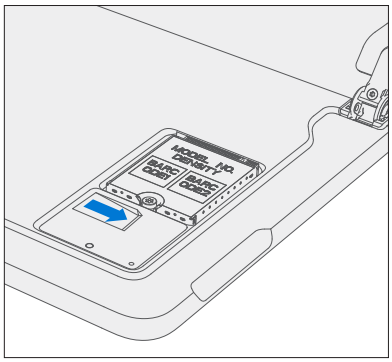
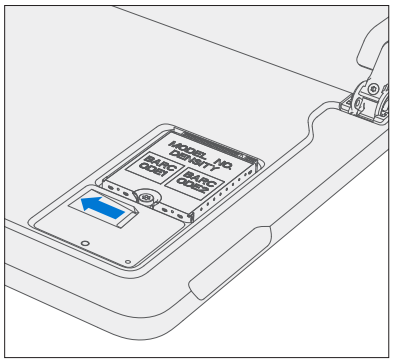
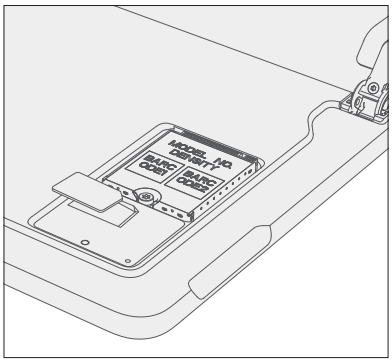
Procedure – Swap (rSSD)

1. **Manage Bitlocker**
    a. If rSSD remains encrypted during swap
        i. Navigate to **Bitlocker >Manage Bitlocker >Generate Bitlocker Recovery Key.**
        ii. Plug in USB drive.
        iii. Save the recovery key to USB storage.
        iv. Remove the USB drive.
    b. If rSSD can be unencrypted before swap
        i. Navigate to **Bitlocker >Manage Bitlocker.**
        ii. Select **Turn Off Bitlocker.**

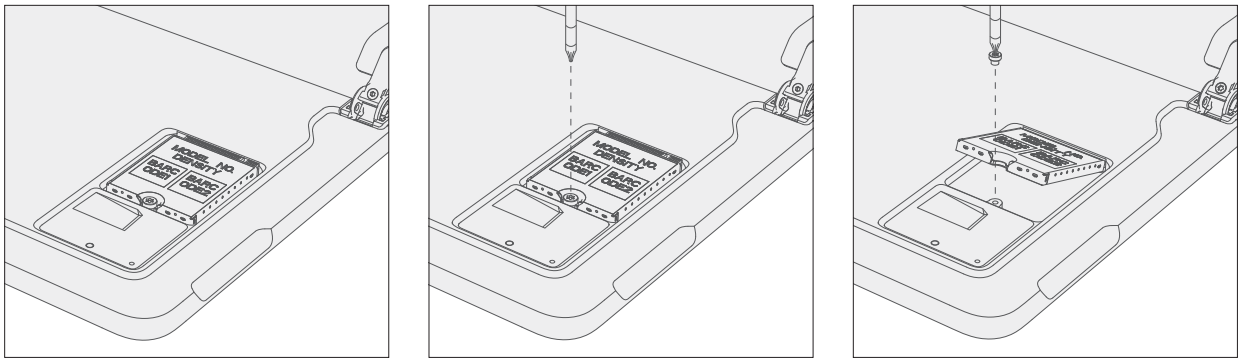
2. **Shut down customer's old device and remove SIM/rSSD door on new device** – Use SIM eject tool.

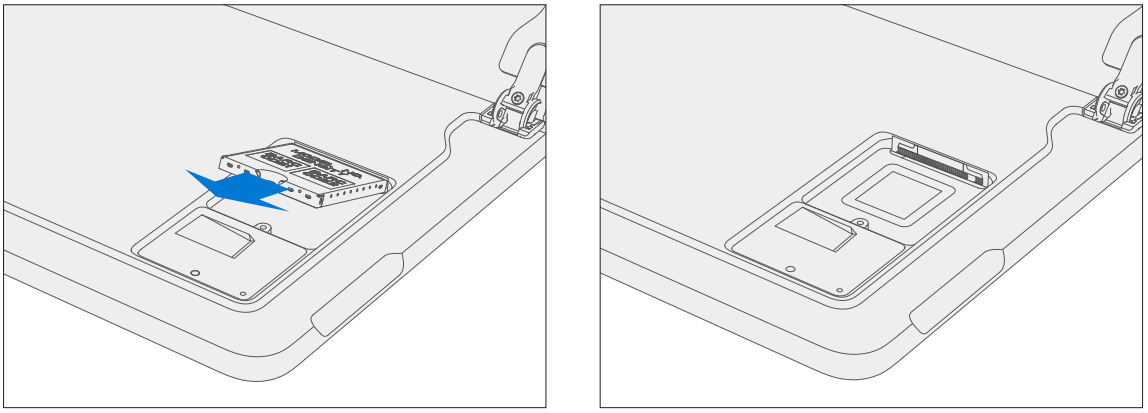
3. **Remove SIM (if present in customer's old device).**

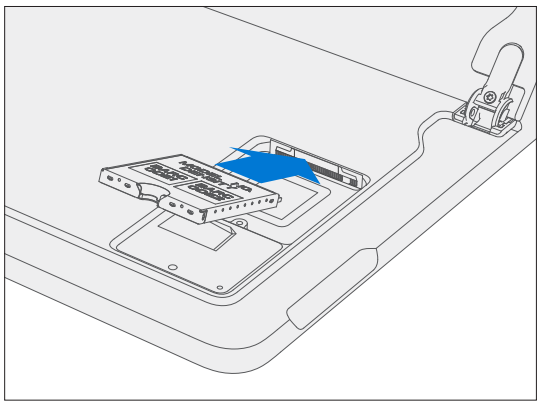
4. **Remove rSSD 3IP Screw from both devices** – Use a 3IP (Torx-Plus) driver to remove the screw securing the rSSD. Take care not to damage the screw; it will be reused.



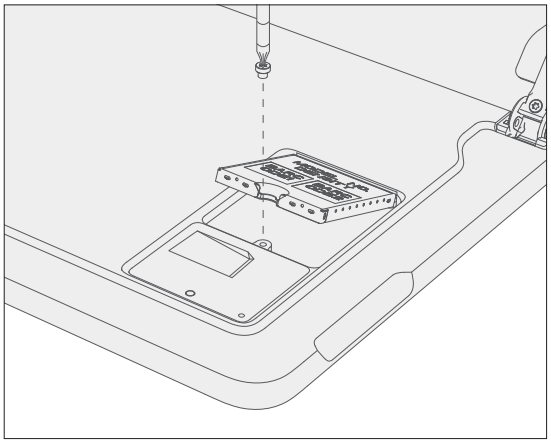
5. **Remove rSSD from both devices** – The rSSD should lift upwards to ~15 degree tilt after screw is removed. Carefully grab sides of rSSD case and pull out of main board socket at same ~15 degree angle.

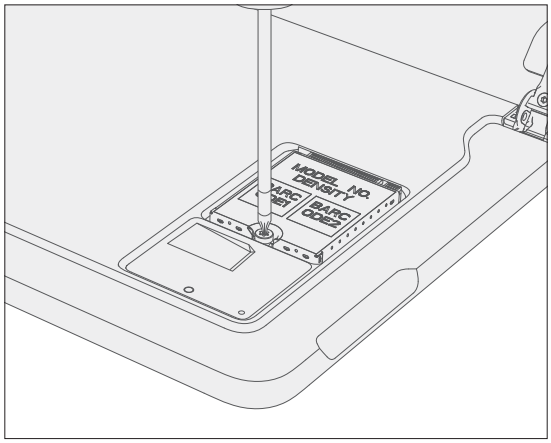


6. **rSSD Swap** – Insert rSSD removed from the new device into customer's original device, then insert customer's original rSSD into new device. Insert the connector end of the rSSD into the rSSD connector on Main board at ~15 degree angle.

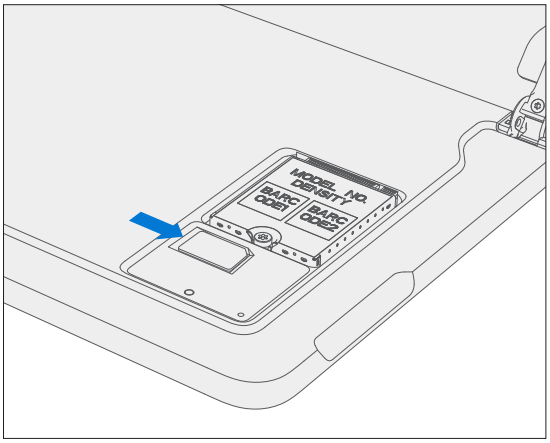


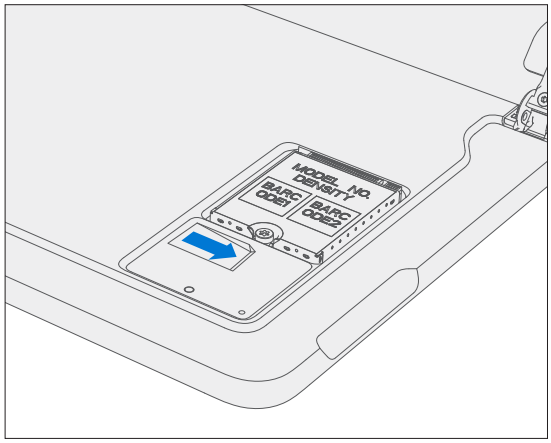
7. **Install rSSD 3IP screw in both devices** – Use a 3IP screwdriver to install the rSSD screw until it is just snug and seated, and then turn another 45 degrees (1/8 turn) or until screw is fully fastened.



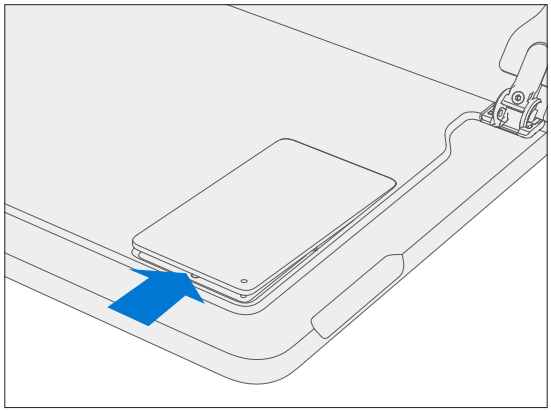


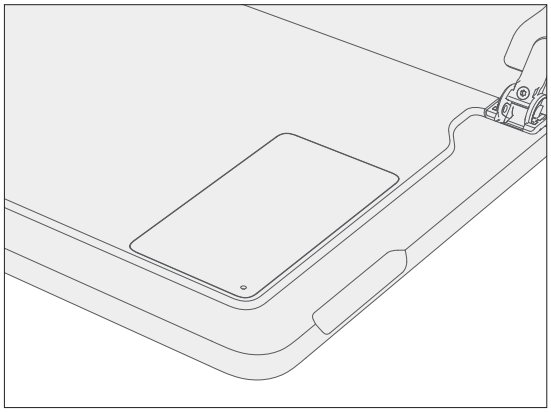
8. **Install SIM (if present from the customer's old device in the new device).**





9. **Replace SIM/rSSD door on both devices.**





10. **Plug new device into power and wired Internet connection.**

11. **Power on new device.** The device may go through a firmware update during startup.

12. **If the SSD remained encrypted during the swap:**
    a. Plug in USB drive with Bitlocker recovery key.
    b. Open the .txt file with the Bitlocker recovery key.
    c. Manually enter the recovery key into the new device.

13. **Connect a keyboard to the new device.**

14. **Navigate to Sign-In Options->Password (key icon on the left side).**

15. **Customer enters Windows password. Select "Sign In".**

16. **Customer may need to go through two-factor** authentication**.**

17. **Once fully signed in, navigate to Start->Account->Sign Out.**

18. **Customer signs in with Windows password again.**

19. **Customer prompted to setup Windows Hello and PIN.**
    a. If the device was previously Bitlockered, navigate to **Bitlocker >Manage Bitlocker >Resume Bitlocker.**

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

21. **Check Windows activation** – Navigate to **Settings >Activation.** If there is any error message, select **Troubleshoot.**

22. **Check Office Account** – Open Office app and then navigate to **File > Account** and check for any error messages.

23. **Check cellular (if SIM present)** – Unplug device from wired network and disable WiFi. Check that cellular network shows connected, and that the device can open a webpage.

24. **Return customer's original device per established procedures.**

Kickstand Replacement Process

Preliminary Requirements

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

Required Tools and Components

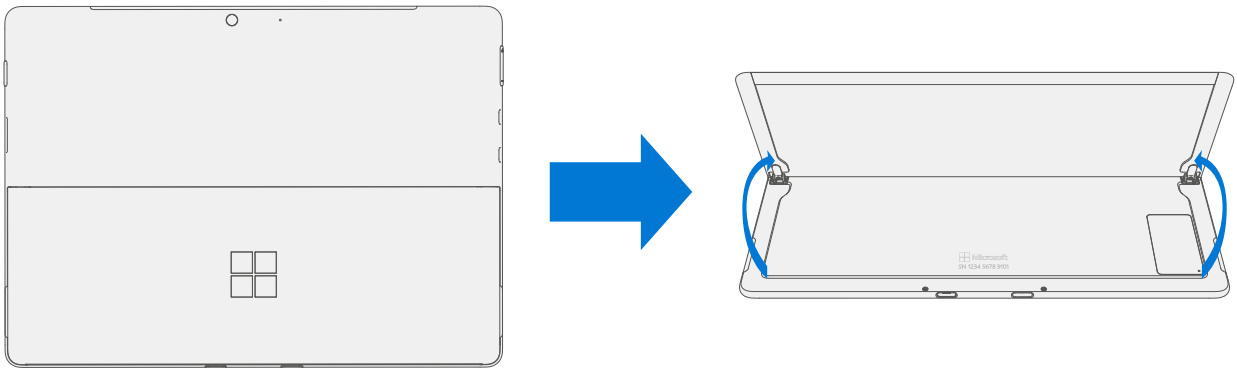
- **Tools:**
  - 3IP (Torx-Plus) driver
  - Loctite SF 7649
  - Loctite 243
  - Soft ESD safe mat
  - Microfiber cloth
- **Components:**
  - Kickstand (Refer to Illustrated Service Parts List)

Prerequisite Steps:

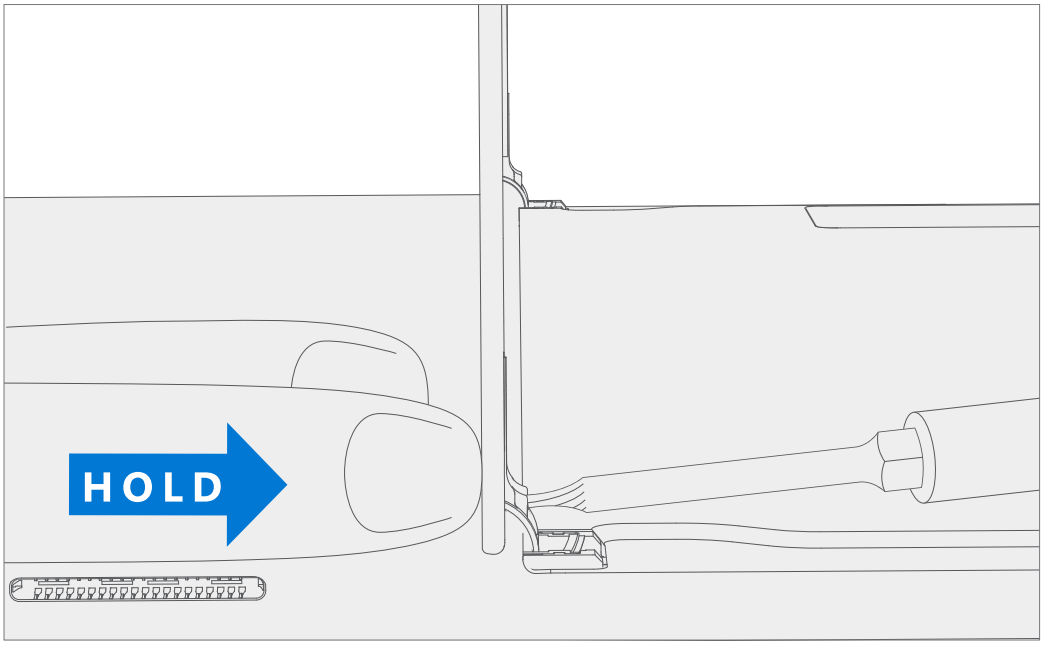
- **Power off device** – Ensure device is powered off and disconnected from a power supply.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening device. Refer to Prior to Device Disassembly section (page 11) for details.

Procedure – Removal (Kickstand)

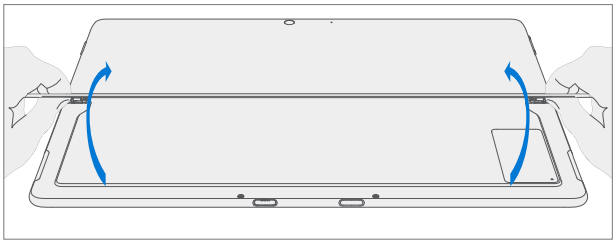
1. **Place device screen-down on soft ESD-safe mat.** Ensure mat is clear of any abrasive material that may scratch the Touch Display Module (TDM) glass.
2. **Extend the kickstand to approximately 90 degrees.**



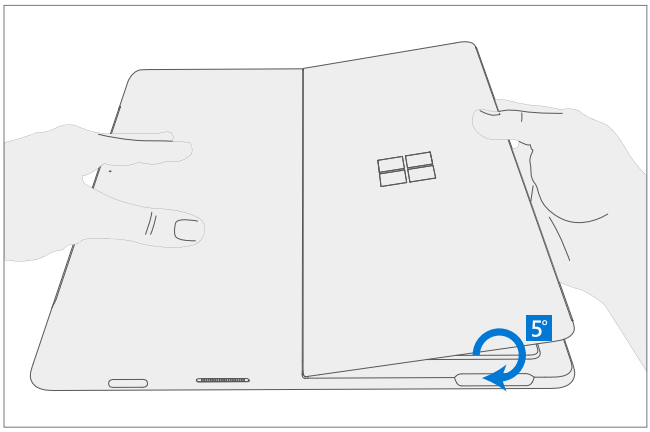
3. **Remove hinge screws** – Use your finger to hold the back of the kickstand behind the hinge while fully removing the hinge screws. One screw for each hinge. Ensure screws do not fall into the hinge opening.



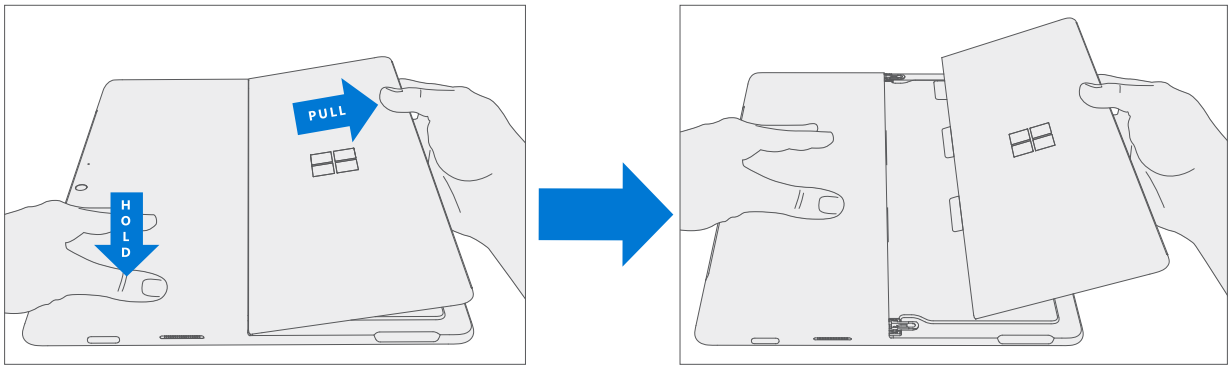
4. **Angle Kickstand Down** – Firmly grip the hinges and the kickstand between thumb and index fingers. Rotate the kickstand from 90 degrees to approximately 45 degrees.



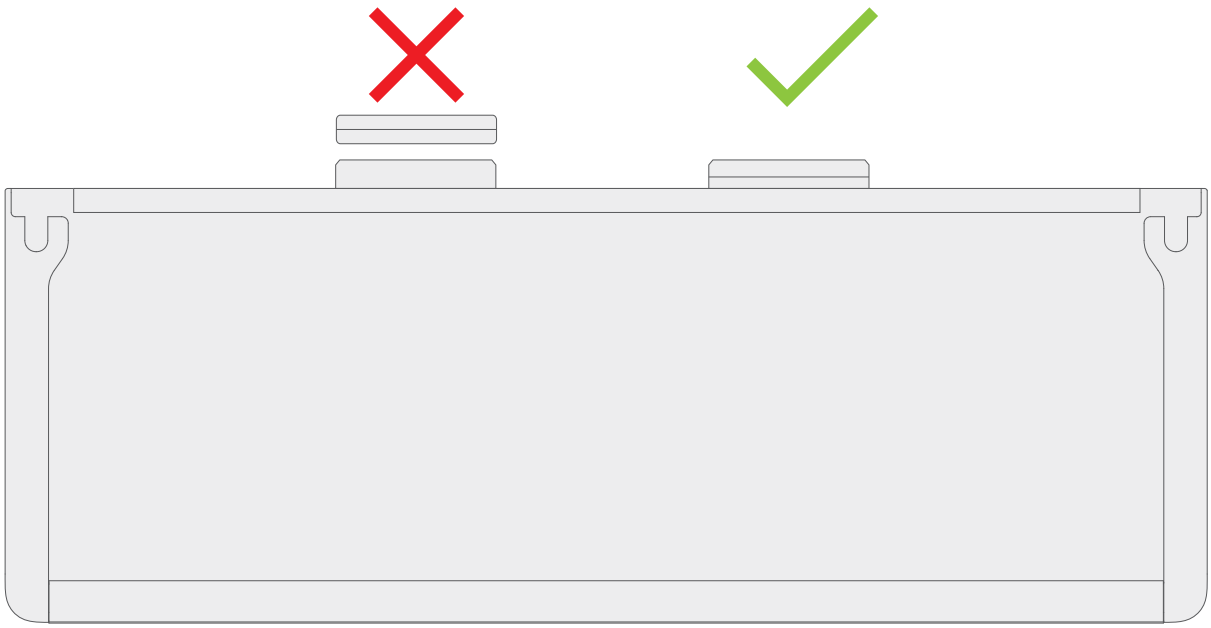
5. **Release Kickstand Threaded Bosses** – Using fingers on the underside of the kickstand and thumb on the topside, slightly rotate the kickstand about the axis as shown below. The kickstand should rotate ~5 degrees to free the two threaded bosses of the kickstand from the recesses of the hinges.



6. **Remove Kickstand** – Using the palm of your hand, firmly hold the device down from the center of the IBC. Simultaneously, grip the kickstand off-center between your thumb and index finger and firmly pull. Pull with a moderate amount of force until the foam inserts slide out of the device. If the kickstand is stuck, ensure the threaded bosses has not slipped back into the recess on the hinges.



⚠ **WARNING**: Inspect Removed Kickstand Foam Tabs – Damaged foam or tabs cannot be safely removed. Attempts to do so can damage internal components. Do not insert anything other than the tabs into the slots. Ensure both tabs are complete and show no signs of tearing. If tabs show signs of tearing, part of the foam may still be inside the device. Before proceeding, all foam must be removed from the device. Foam left inside warrants whole unit exchange.

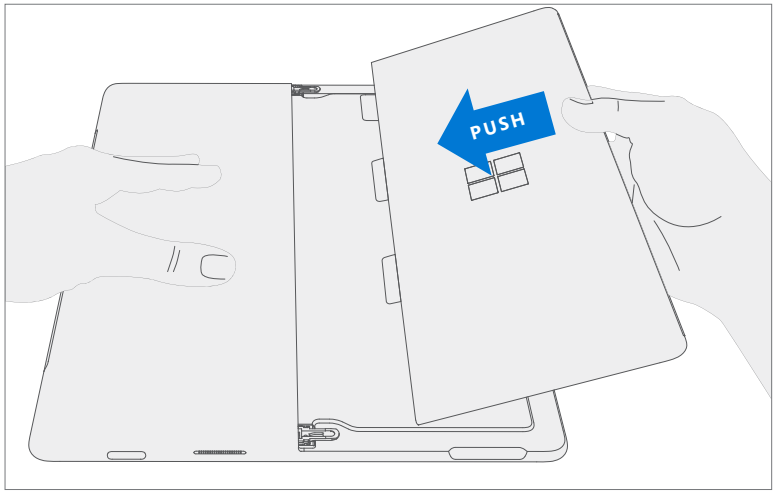


Procedure – Installation (Kickstand)

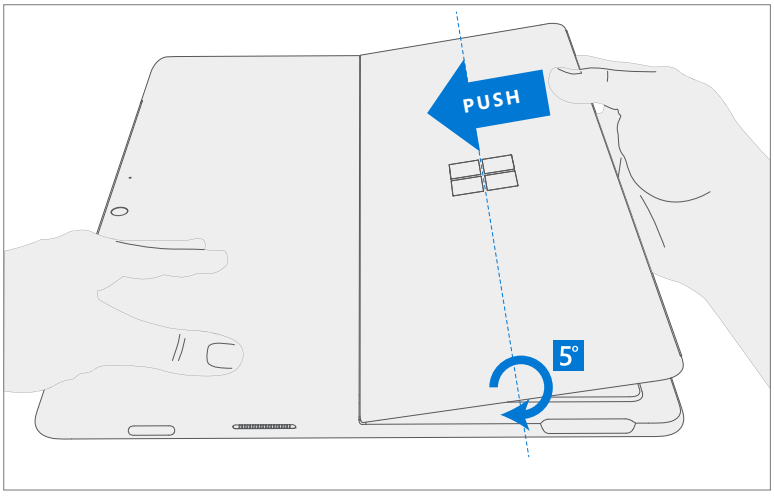
IMPORTANT: Use caution when handling new kickstand assembly to avoid cosmetic damage of the kickstand and the device.

1. **Insert Foam Tabs** – With the hinges still at ~45 degrees start to slide the new kickstand's foam tabs into the slots on the back of the IBC. Foam should slide in with minimal force—do not crumple the foam by using excess force. Do not slide the foams completely into the device—insert the foam tabs until ~3/4 of the foam tabs are inside the device.

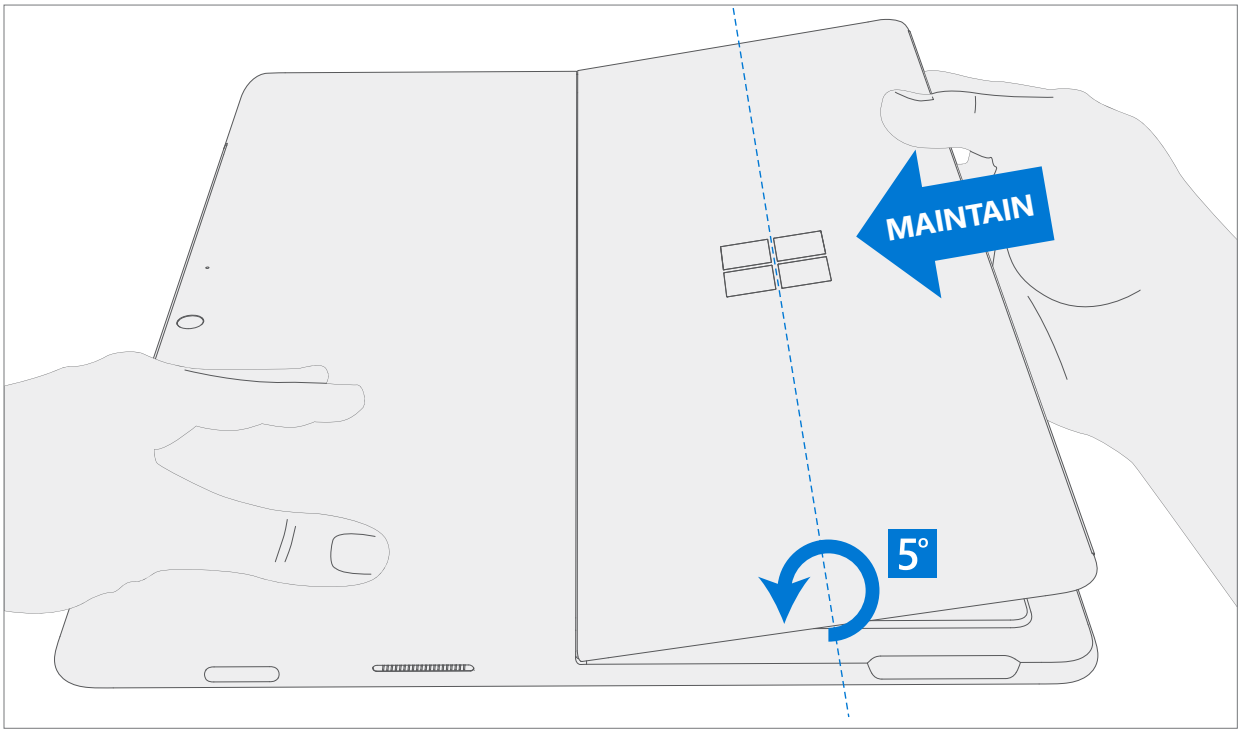
CAUTION: Do not use any tool or sharp object to assist inserting the tabs into the slots. Only the tabs should be inserted. Doing so could damage internal components.



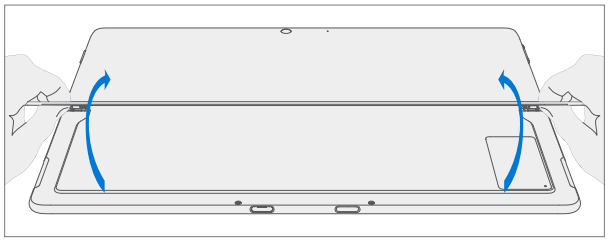
2. **Slot Outer Lip of Hinge into Kickstand** – Using fingers on the underside of the kickstand and thumb on the topside, slightly rotate the kickstand about the axis as shown below. The kickstand should rotate ~5 degrees to catch the outer lip of the hinge. Push the kickstand toward the device.



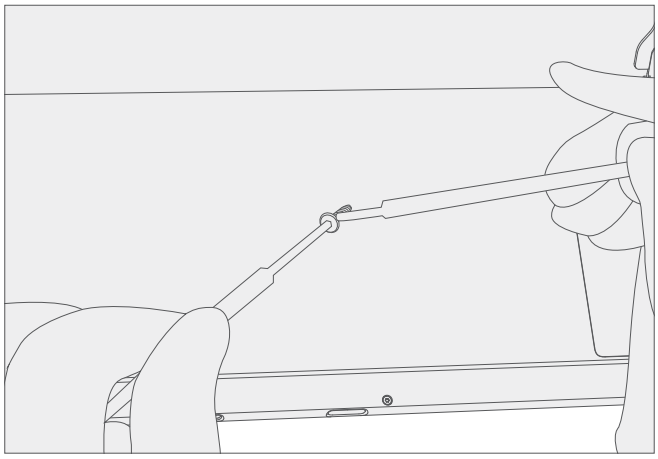
3. **Slip Kickstand Threaded Bosses into Hinge Recesses** – Maintaining pressure on the kickstand to prevent it from backing out, rotate the kickstand down into place. The threaded bosses of the kickstand should slip into the recesses of the hinges.



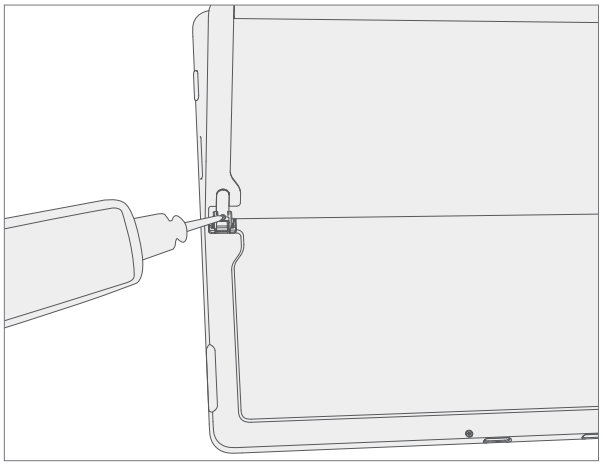
4. **Rotate the Kickstand Up** – Firmly grip the hinges and the kickstand between thumb and index fingers as shown below. Rotate the kickstand from 45 degrees to approximately 90 degrees.

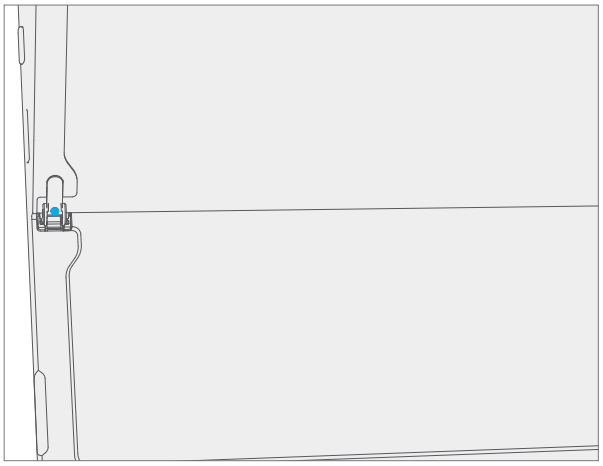


5. **Apply thread locker to screws** – Brush new screws with Loctite SF 7649 Activator. Let screws sit for 2 minutes after activator is applied before assembling to device.

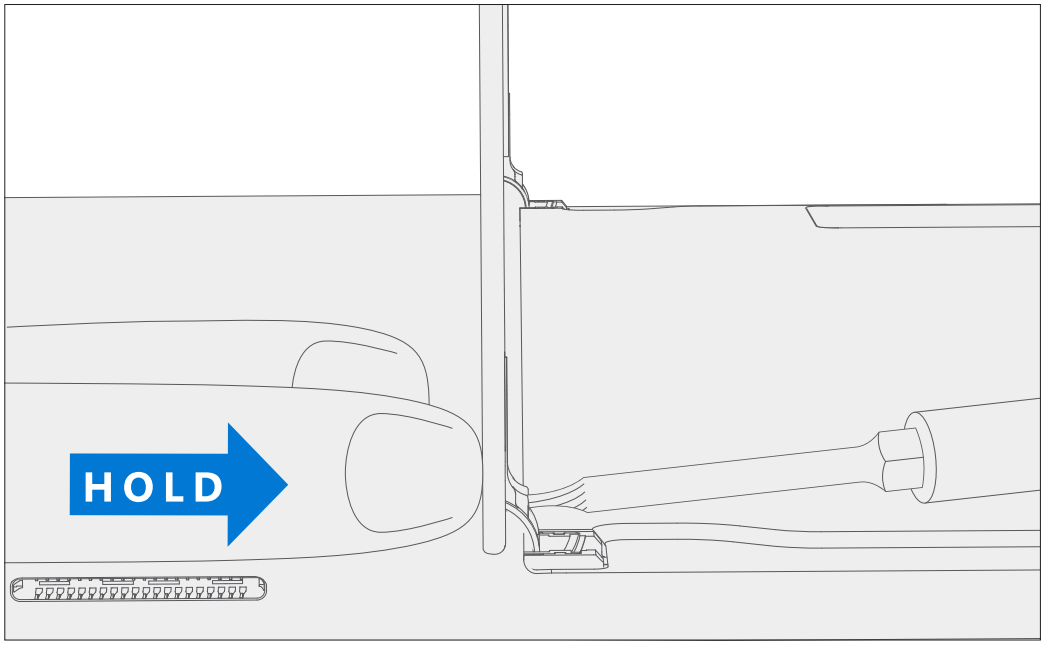


6. **Apply thread locker to screws bosses** – Apply one drop of Loctite 243 thread locker to each screw boss.





7. **Install hinge screws** – Use your finger to hold the back of the kickstand behind the hinge while installing the screws until they are fully seated. Ensure the kickstand is properly aligned and seated in the hinges, then tighten the screws an additional ~quarter turn (~90 degrees). Be careful to tighten the screws only until snug and not to strip the kickstand threads. Ensure screws do not fall into hinge opening.



8. **Final inspection Kickstand installation** – Fold the kickstand down and peel off protective plastic from the kickstand and logo if present. Verify the side edges of the kickstand are aligned with the midframe walls and that there are no obvious steps/gaps between the kickstand and the IBC. Wipe the device thoroughly (including under the kickstand) with the microfiber cloth to remove all fingerprints.

TDM Replacement Process

Preliminary Requirements

IMPORTANT: Be sure to follow all special (bolded) notes, cautions, and warnings in each process section.

Required Tools and Components

- **Tools:**
  - 3IP (Torx-Plus) driver
  - Anti-static wrist strap (1M Ohm resistance)
  - Soft ESD safe mat
  - Microfiber / lint free cloth
  - SIM eject tool (or equivalent 0.58 mm / 0.023 in diameter paperclip)
  - Isopropyl alcohol dispenser bottle (use 91% or greater IPA)
  - Cotton swab
  - USB drive with Surface Diagnostic Toolkit
  - Spudger
  - iFixit pick
  - iFixit opening tool
  - Metric ruler
  - TDM PSA bonding frame
  - Foam Pad
    (Material: EVA Foam, Thickness: 9.5 mm, Density: 0.03 g/cm3, Minimum 229 mm x 305 mm)
    (Recommended McMaster PN: 86095K43)
  - TDM bonding weights minimum 23 kg (50 lb) / maximum 26 kg (57 lb)
    (Recommended using two Ruck weights one 9 kg, one 14 kg)
    (Alternate using steel shot bags one 9 kg, one 14 kg)
- **Components:**
  - TDM (Refer to Illustrated Service Parts List)

Prerequisite Steps:

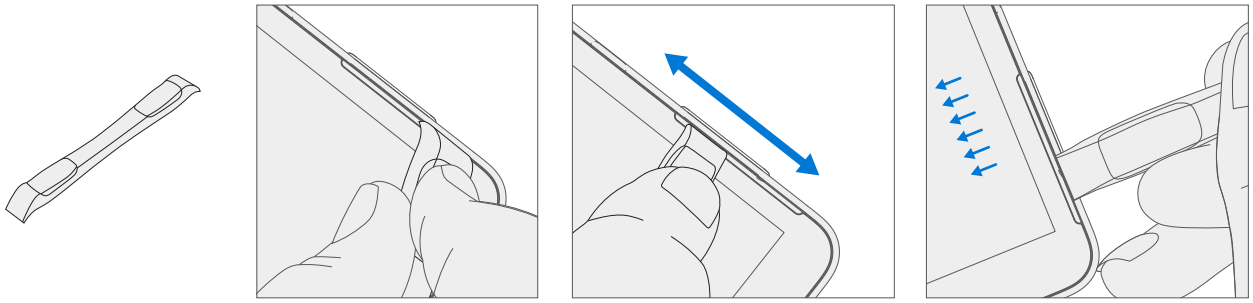
- **Prep Device** – Device must be set in **TDM Replacement Mode** prior to removing TDM.
    a. **Connect software tools USB drive** with SDT to USB connector on device under repair.
    b. **Connect power supply** to device.
    c. **Power on device** – Depress the power button on the side of the device.
    d. **Run software tool** – At the device OS, use Windows Explorer, navigate to USB drive and run: **SDT** – Select Repair setup and validation. Run the Touch Display Setup. At the end of the tool process device will power down.

⚠ **WARNING**: This step must be carried out on the device successfully before the TDM is replaced.

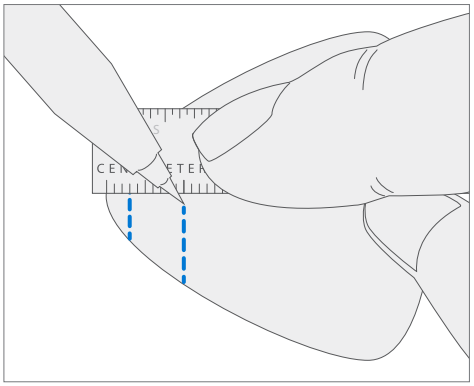
- **Power off device** – Ensure device is powered off and disconnected from a power supply. Remove all attached cables and drives.
- **General Safety** – Check to make sure that general guidelines and ESD compliance steps are followed prior to opening device. Refer to Prior to Device Disassembly section (page 11) for details.
- **Remove rSSD** – Remove the rSSD as detailed in the Procedure – Removal (rSSD) (page 13)

Procedure – Removal (TDM)

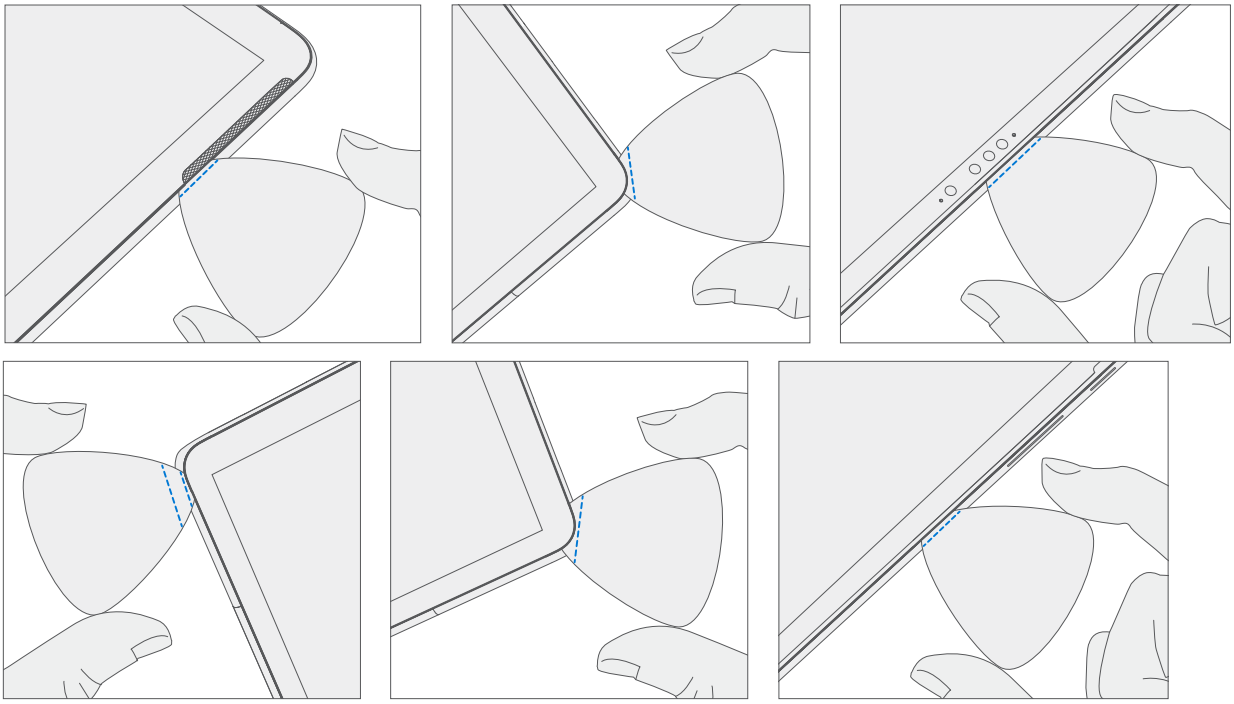
1. **Speaker Mesh Preparation** – Place the device face up on a Soft ESD safe mat. Use an iFixit opening tool to widen the gap between the right speaker mesh and device. Push the sharp edge into the gap and side to side along the device edge. Once the flat tip fits fully in the gap, use it to push the speaker mesh towards the device, repeating uniformly along the length of the speaker mesh. The metal mesh will either fold lengthwise or slide completely under the glass. Repeat this process for left speaker mesh.



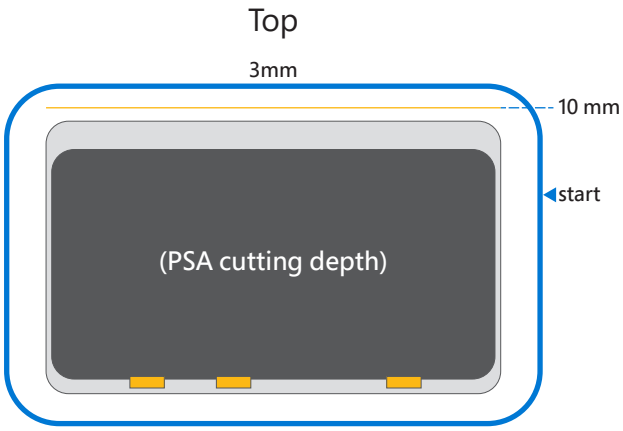
2. **Debonding TDM Marking Pick Depth** – Using a metric ruler draw a 3mm mark and 10 mm mark on the iFixit pick.



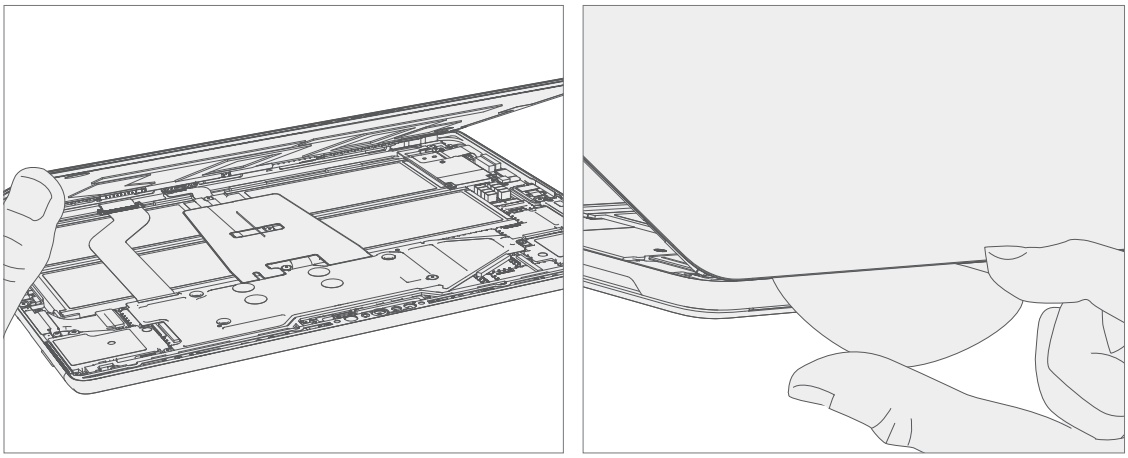
3. **Debonding TDM** – Replace the iFixit pick if all the tips look scratched or deformed. Securing the device with one hand insert one of the iFixit pick tips into the right speaker mesh area. Carefully cut the PSA, applying a steady force along all edges of the TDM. Use the 3mm marking as a guide to avoid cutting too deep along the sides and bottom of the TDM. Use the 10mm marking as a guide to avoid cutting too deep along the top of the TDM.



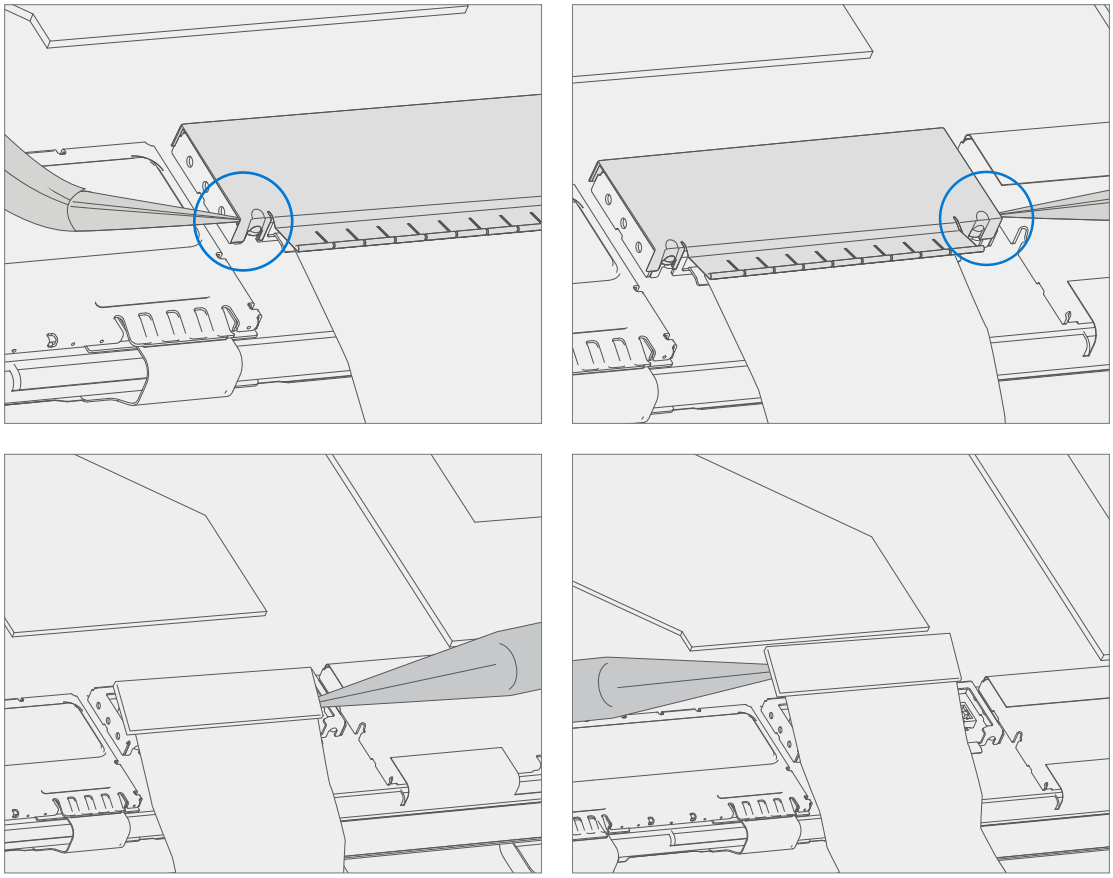
! **CAUTION**: Do not insert the pick more than 3mm along the left and right sides or bottom edge of the TDM. The TDM has three FPC's along the bottom edge that may get damaged. Refer to the yellow boxes in the following cut path diagram. The pick depth should not exceed 10mm along the top edge of the TDM.



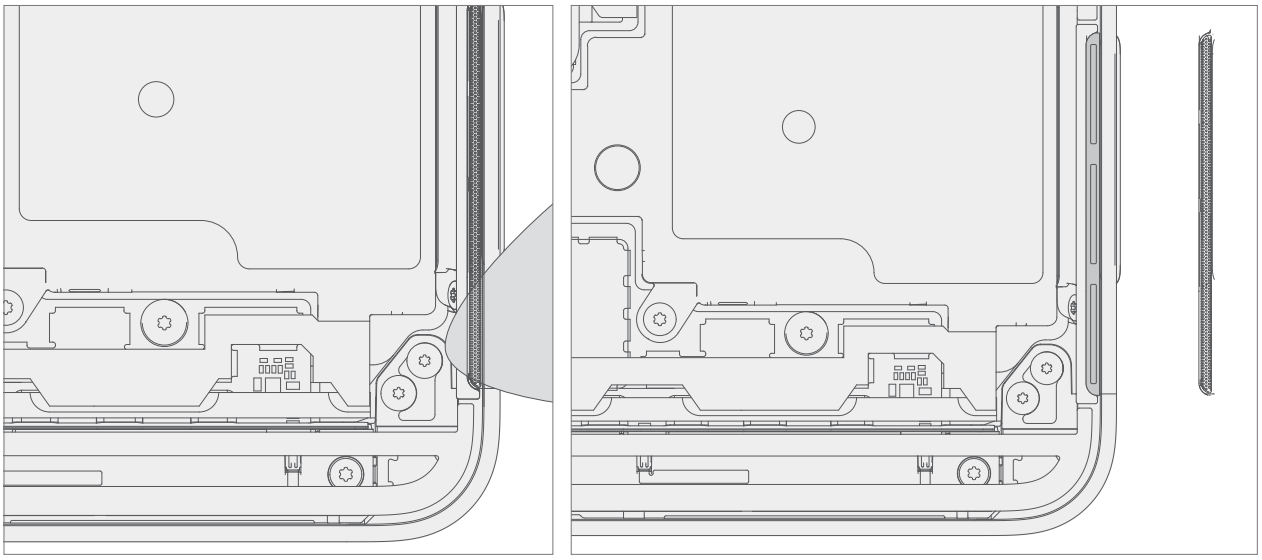
4. **Separate TDM From IBC** – Place the device face up on a Soft ESD safe mat. Gently pull up vertically on the top edge of the glass while pushing down on the IBC with your thumbs to separate the glass. Lift the edges of the TDM and inspect for any remaining PSA. Slice or remove (with an iFixit Pick) any strands still connecting the TDM to the IBC.



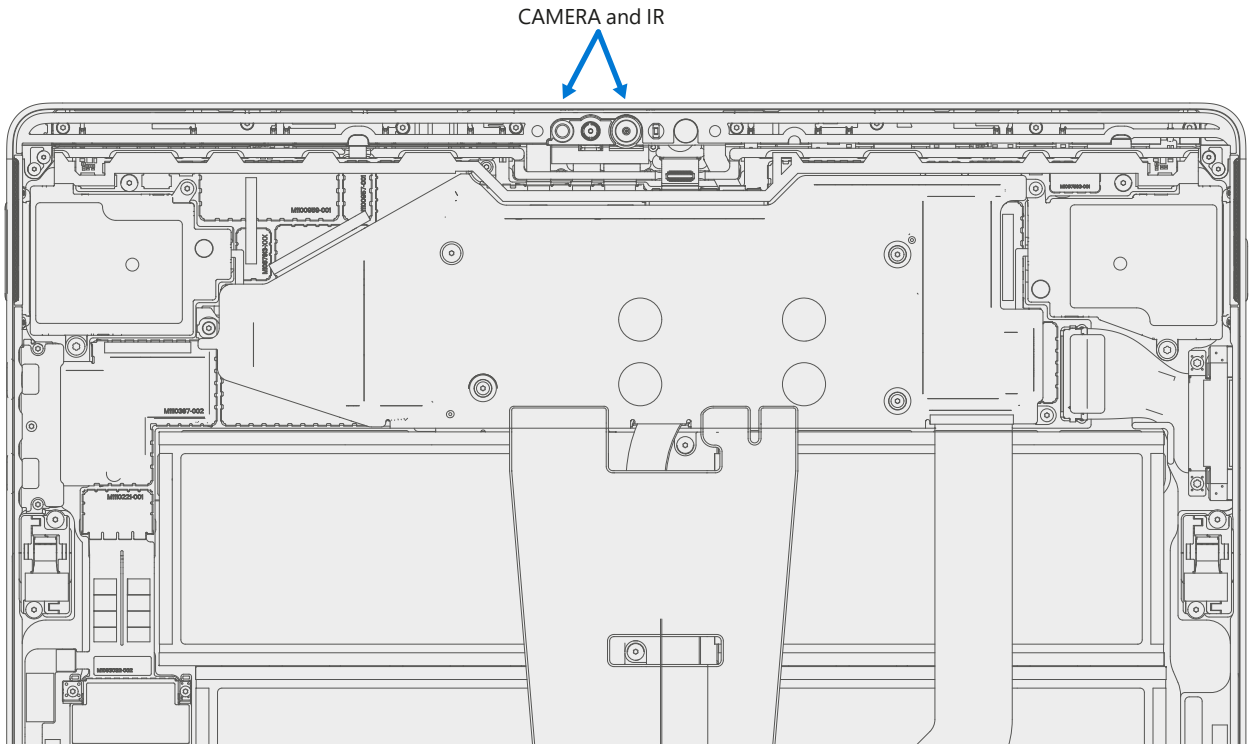
5. **Disconnect TDM FPC** – Place the TDM face down on top of the device. Remove the shield lid on the TDM FPC by inserting tweezers underneath the taps at the front of the shield (circled). Then gently pull upwards and the shield will come off. Disconnect the TDM FPC using the pointed end of a spudger. Do not pull on the FPC to disconnect.



6. **Remove Speaker Mesh from IBC** – Remove any remaining speaker mesh from the IBC. Use a handheld pick to remove it by inserting the pick between the Speaker mesh and the enclosure. Confirm a successful removal of the speaker mesh and its adhesive by verifying the three cutouts of the IBC are exposed, as shown below.



7. **Remove Residual IBC PSA** – Using IPA and cotton swabs clean residual PSA off the IBC. Ensure area around the Camera and IR Sensor is clean and free of any dust or other contamination. Wipe the area around the camera with a lint free cloth.



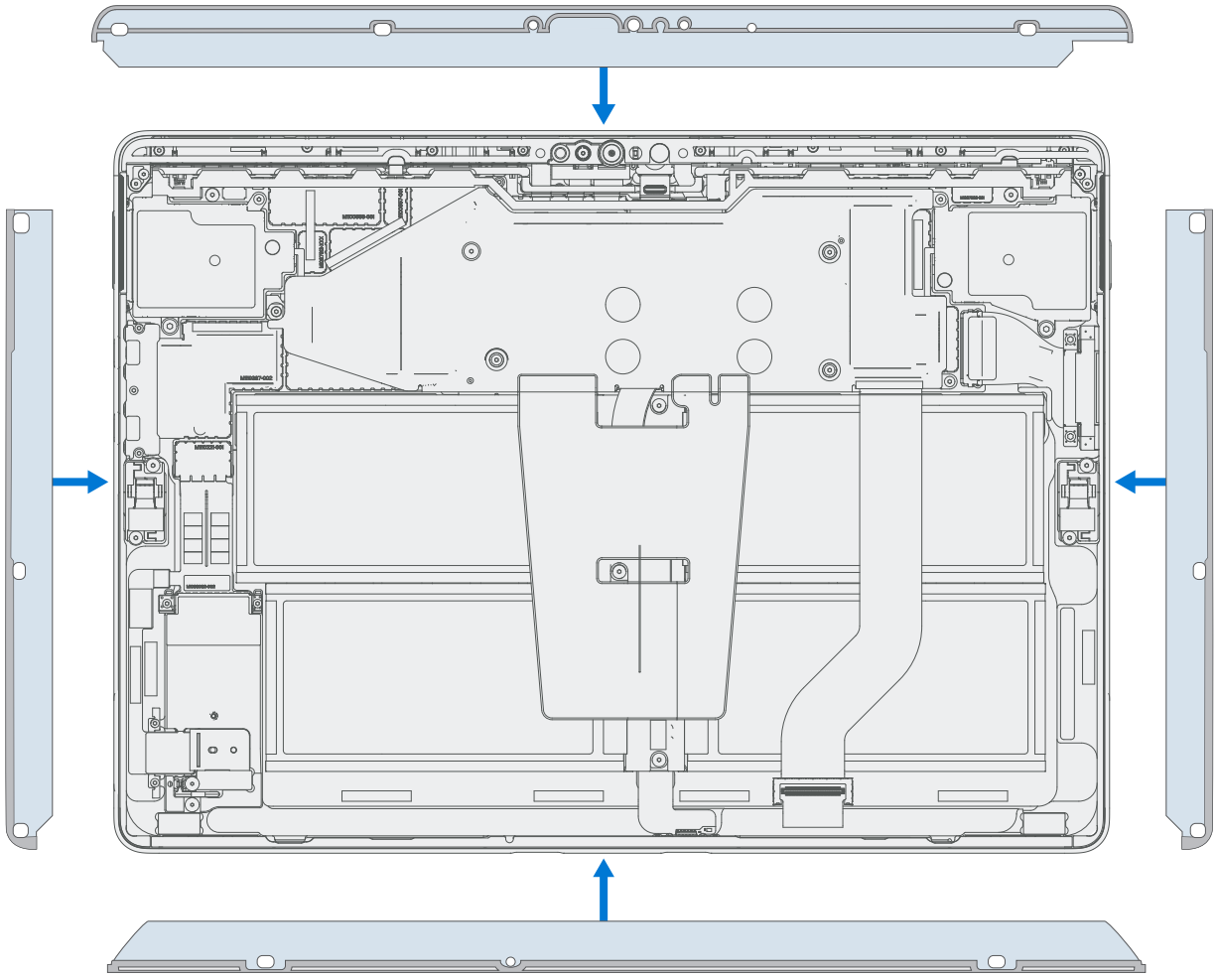
Procedure – Installation (TDM)

1. **Pre-installation Device Inspection**

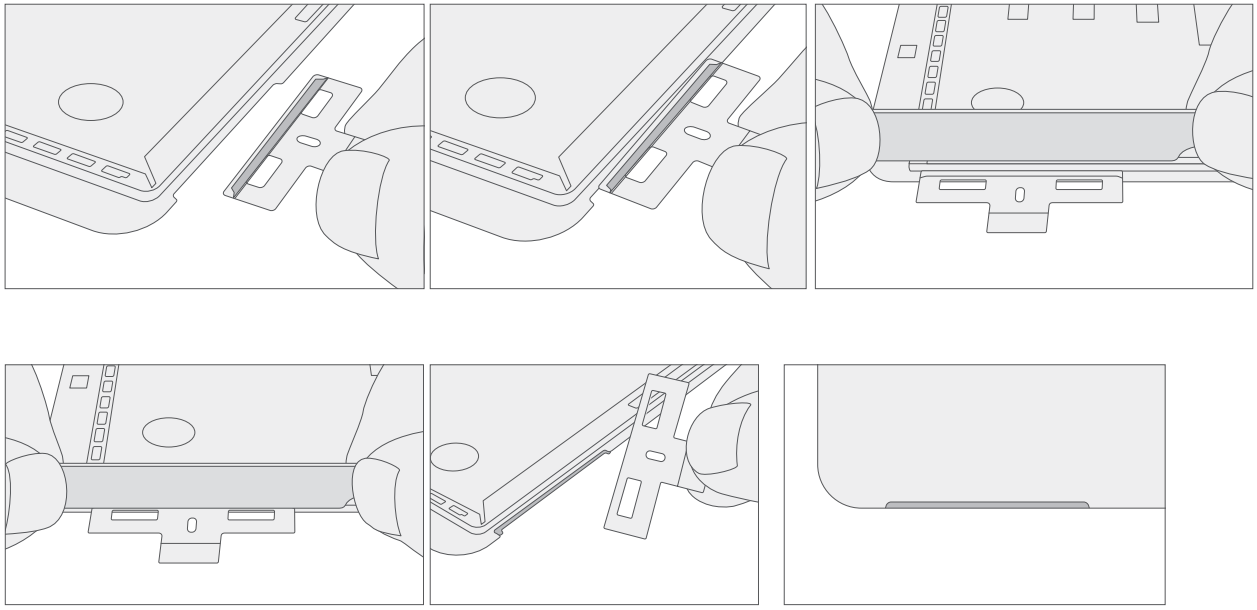
> ⚠ **WARNING**: Verify the battery's condition refer to the M1153910 In Device Battery Inspection process. Devices exhibiting battery issues as outlined in the Battery Inspection Process require whole unit replacement.

> **IMPORTANT**: Remove Leave protective cling on new TDM during all installation steps.
>
> **IMPORTANT**: Carefully inspect the internal areas of the bucket. Ensure the area around battery is free of any foreign objects..

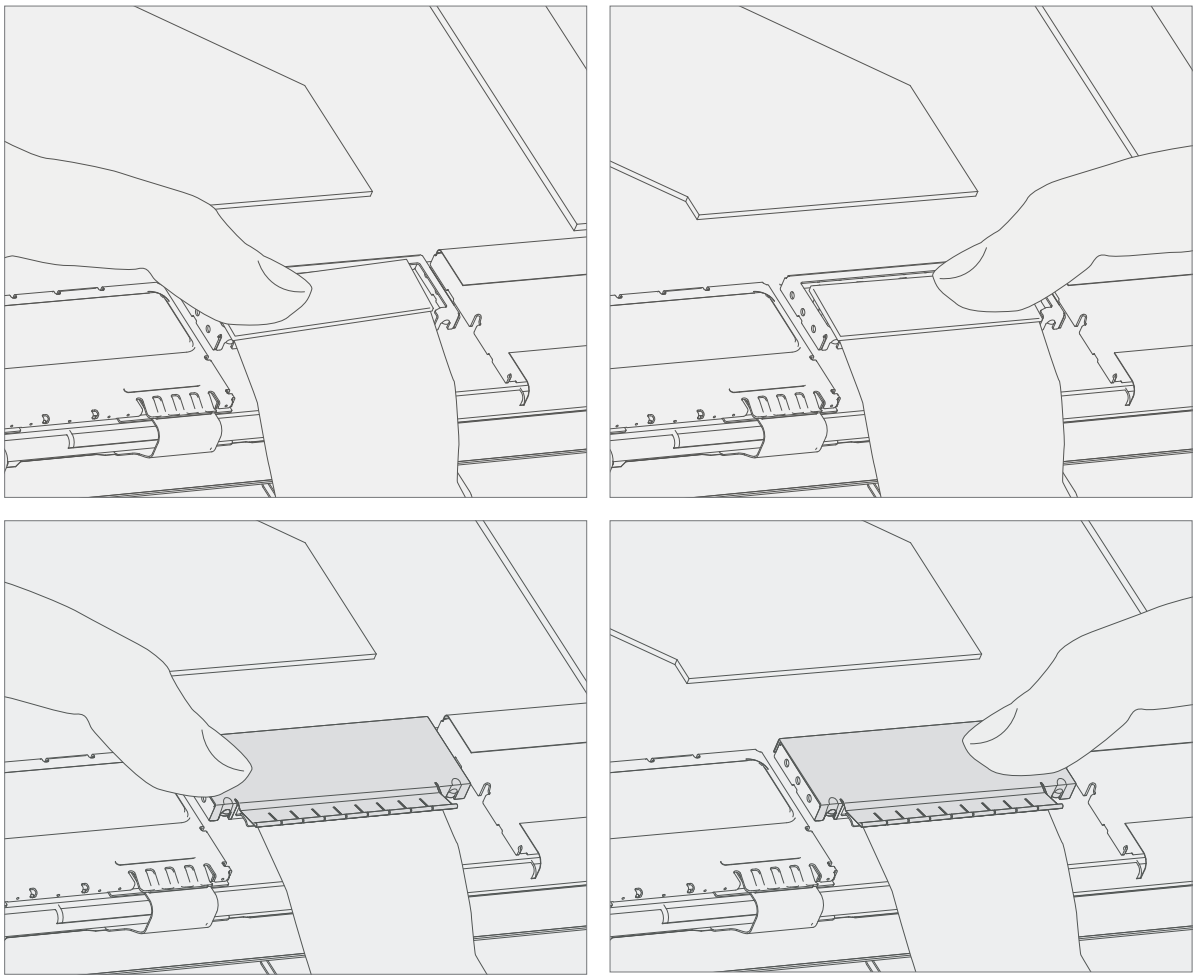
2. **TDM PSA Application** – Thoroughly clean the IBC along the TDM PSA bonding surface using IPA and a cotton swab. Wait at least 30 seconds before applying new PSA. Apply the 4 strips of PSA to the IBC. Align the PSA following the outline on the IBC. Leave the blue liner on the PSA, it will be removed at a later step. Refer to the below illustration for PSA locations.



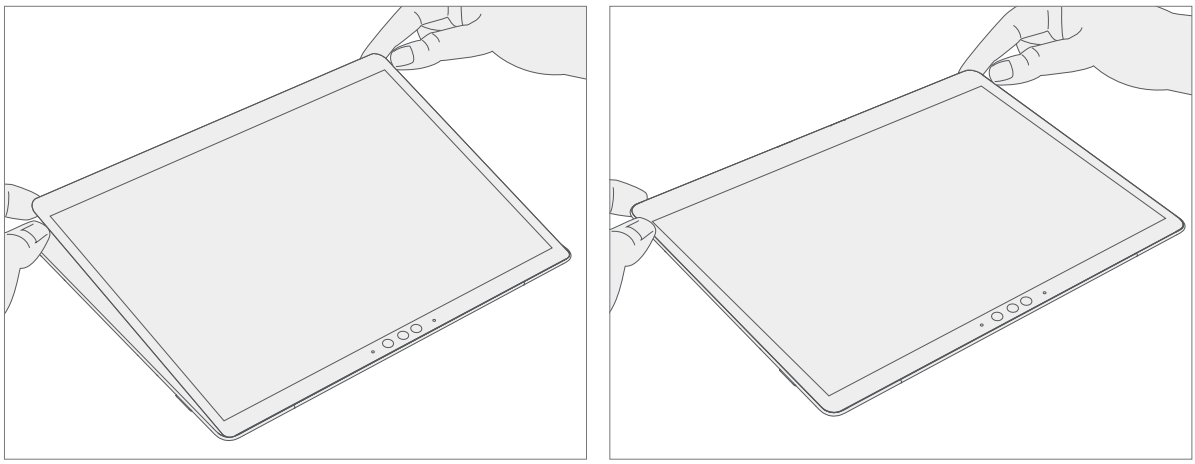
3. **Speaker Mesh Application** – Place the new TDM face-down on a Soft ESD safe mat. Wipe down the outer edges of the TDM with a lint free cloth. Remove the protective liner from the speaker mesh. Using the clear handle align the speaker mesh into the TDM speaker opening. Press onto the mesh for 10 seconds to activate the adhesive. Carefully remove the clear handle. Repeat this process for the other side of the TDM.



4. **Connect TDM FPC** – Place the TDM face down on top of the device. Slide the FPC into the TDM connector. Install a new shield on the TDM FPC connection. Ensure all edges of the shield are pressed down over the connector.

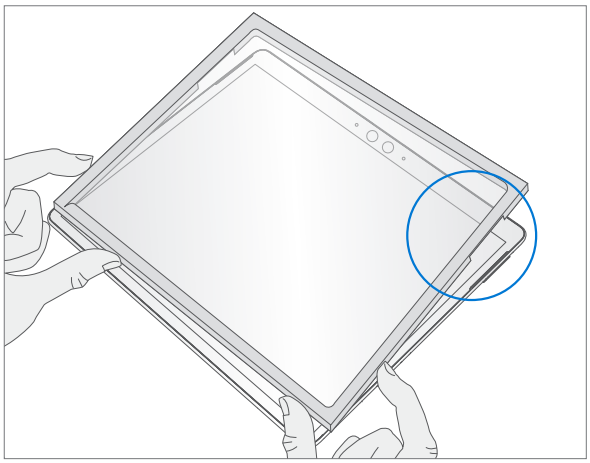


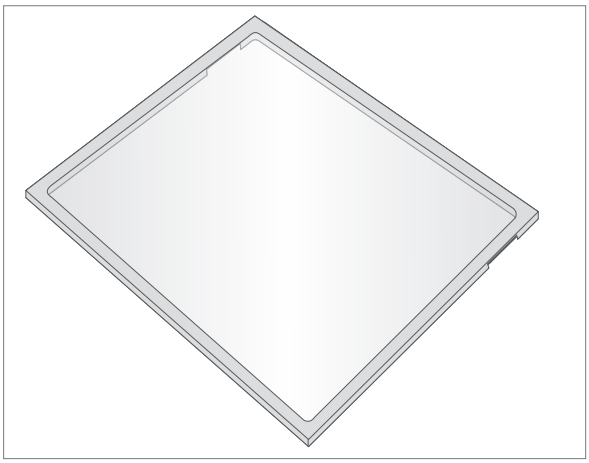
5. **Apply TDM to Bucket** – Hover the TDM and remove the PSA Liners to expose adhesive. Turn the TDM over and place it on the IBC. Align the TDM along the top edge first (Toe-in) and lower after alignment is found. Ensure that the glass sits flush in the IBC and does not rest anywhere on top of the IBC lip.

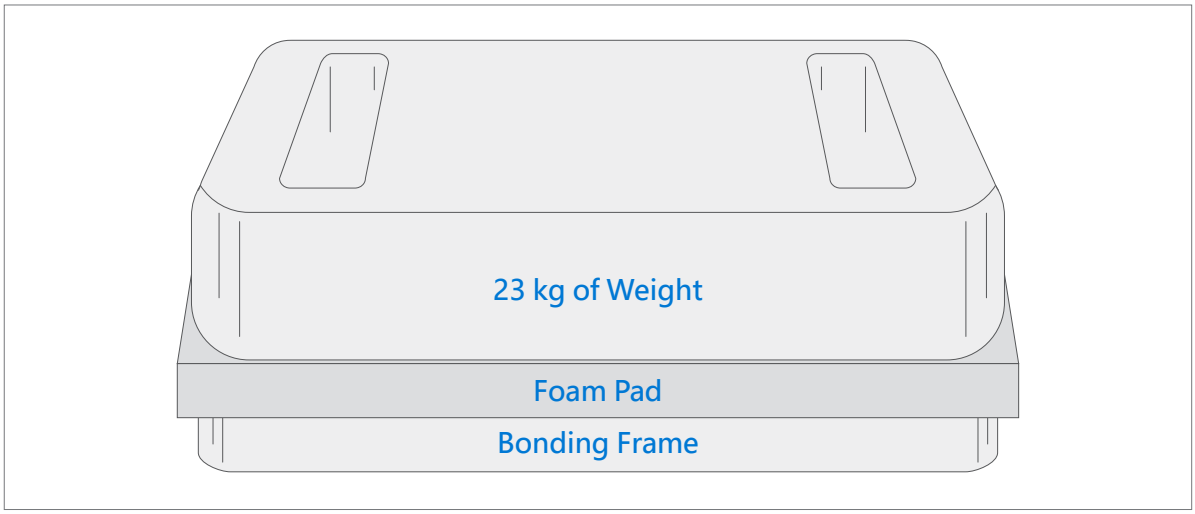


6. **Bonding PSA** – Place the bonding frame on the device, ensuring that the cutouts on the sides line up with the volume/power buttons. Place foam pad over bonding frame. Place the 23 kg of weight on top of the foam pad and bonding fame. Leave weight in place for 1 minute.

IMPORTANT: Weight Requirement:
Minimum 23 kg (50 lb) / Maximum 26 kg (57 lb)
Minimum Dimensions: 280mm x 200mm
Geometry must be symmetrical, to allow for even weight distribution.
Weight used must be a flat plate, with consistent flatness and not protrude from contact plane with Bonding Frame.
Weight must contact the full perimeter of the frame when placed above it.
Recommended weights (Ruck Plates of 9 kg + 14 kg)
When using Ruck weights place the 14 kg weight first, then stack the 9 kg weight on top.
Ensure foam pad covers entire bonding frame.







7. **After Bonding Inspection** – Remove the weights, foam pad, and the frame. Lift carefully to avoid damaging the device. Inspect the TDM for scratches, cracks, large gaps, and its flushness with respect to the IBC.

8. **Install rSSD** – Install the rSSD as detailed in the Procedure – Installation (rSSD) (page 14)

9. **TDM Calibration** – Device final calibration relies on the successful completion of the TDM Replacement Mode.

    a. **Connect software tools USB drive** with SDT to USB connector on device under repair.
    b. **Power on device** – Depress the power button on the side of the device.
    c. **Run software tool** – At the device OS, use Windows Explorer, navigate to USB drive and run: **SDT** – Select Repair setup and validation. Run the Touch Display Calibration. Accept the restart prompt at the end of the tool process.

⚠ **WARNING**: This step must be carried out on the device successfully. Any tool failures require restarting the TDM replacement process with a new FRU.

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

11. **Final inspection TDM installation** – Remove protective cling from the TDM. Verify the side edges of the TDM are flush, and that there are no obvious steps/gaps between the TDM and the IBC. Wipe the device thoroughly (including under the kickstand) with the microfiber cloth to remove all fingerprints.

Procedure – Alternate Installation (TDM)

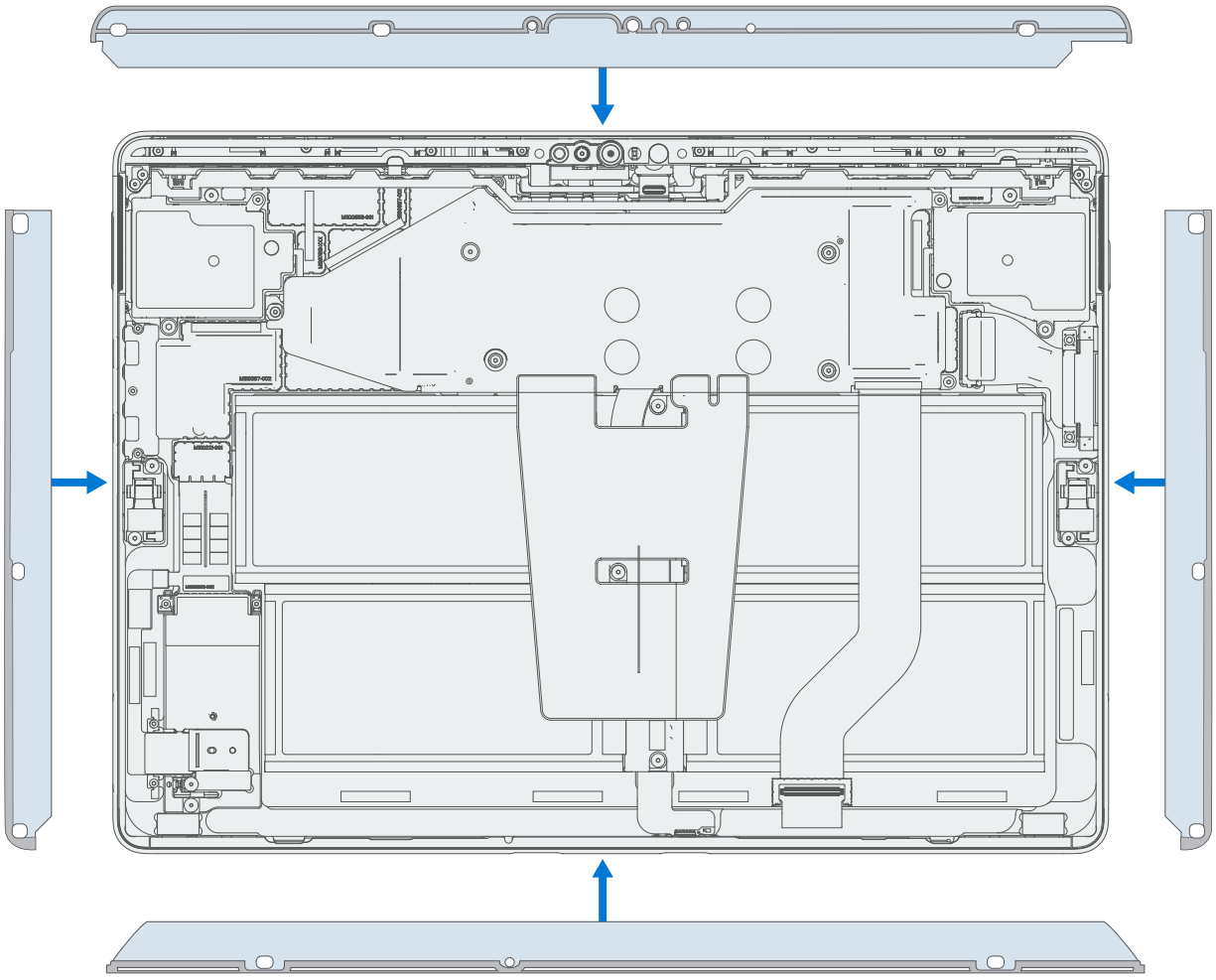
1. **Pre-installation Device Inspection**

   ⚠ **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.

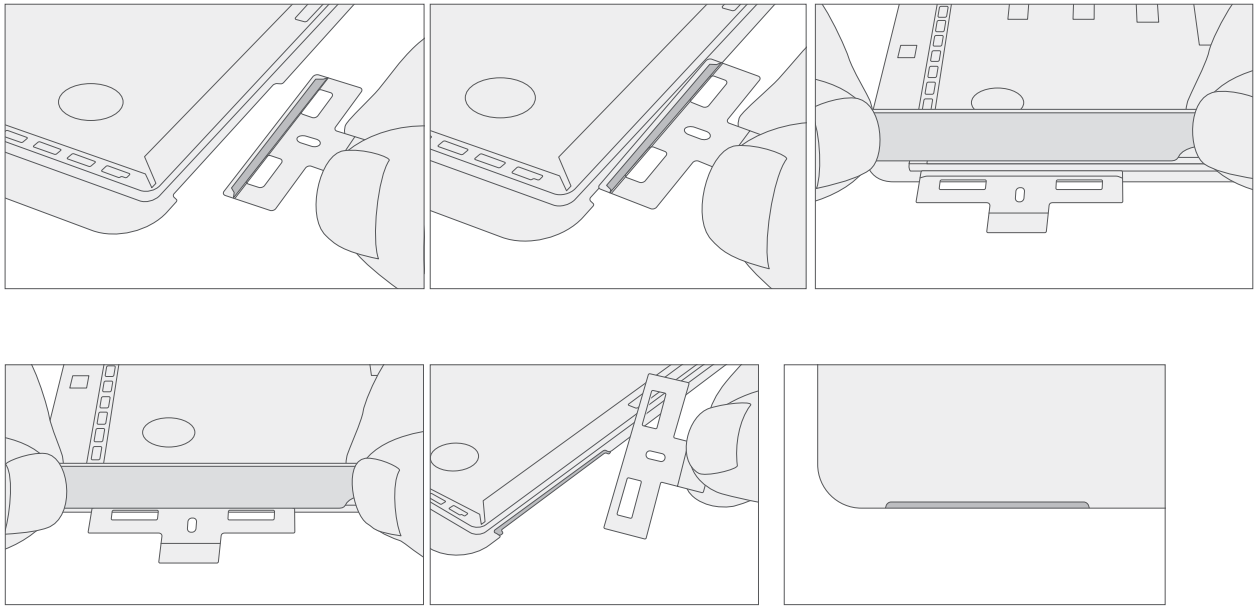
   IMPORTANT: Leave protective cling on new TDM during all installation steps.

   IMPORTANT: Carefully inspect the internal areas of the bucket. Ensure the area around battery is free of any foreign objects.

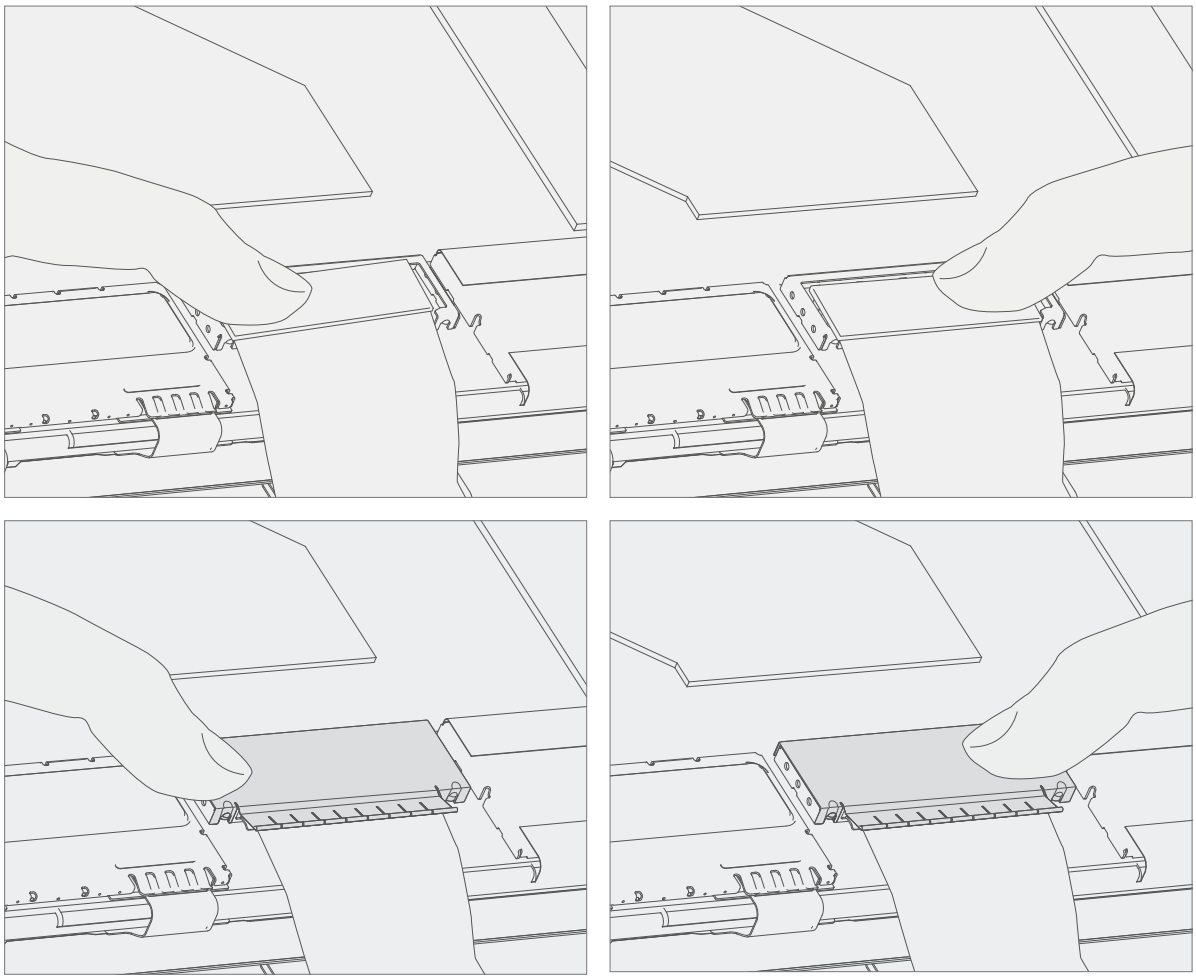
2. **TDM PSA Application** – Thoroughly clean the IBC along the TDM PSA bonding surface using IPA and a cotton swab. Wait at least 30 seconds before applying new PSA. Apply the 4 strips of PSA to the IBC. Align the PSA following the outline on the IBC. Leave the blue liner on the PSA, it will be removed at a later step. Refer to the below illustration for PSA locations.



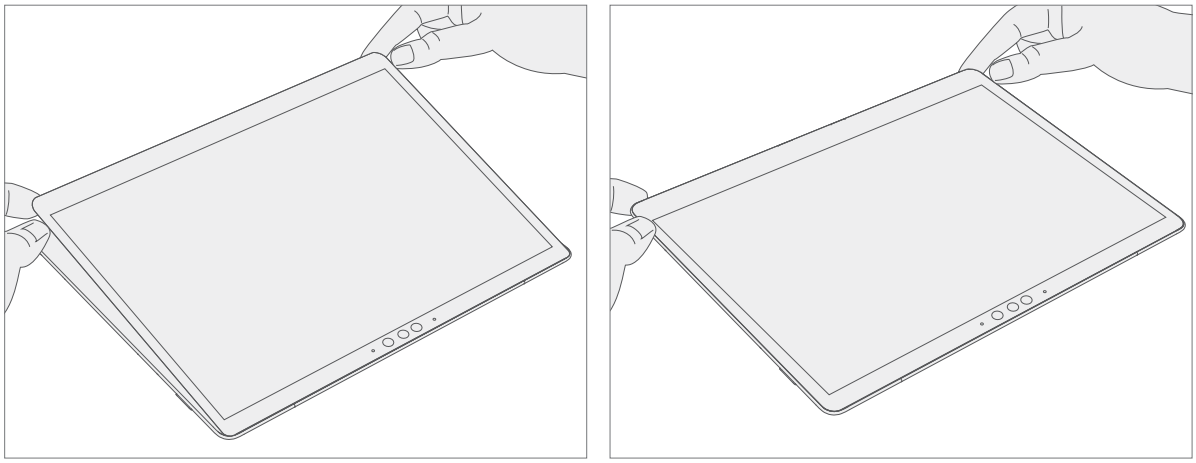
3. **Speaker Mesh Application** – Place the new TDM face-down on a Soft ESD safe mat. Wipe down the outer edges of the TDM with a lint free cloth. Remove the protective liner from the speaker mesh. Using the clear handle align the speaker mesh into the TDM speaker opening. Press onto the mesh for 10 seconds to activate the adhesive. Carefully remove the clear handle. Repeat this process for the other side of the TDM.



4. **Connect TDM FPC** – Place the TDM face down on top of the device. Slide the FPC into the TDM connector. Install a new shield on the TDM FPC connection. Ensure all edges of the shield are pressed down over the connector.

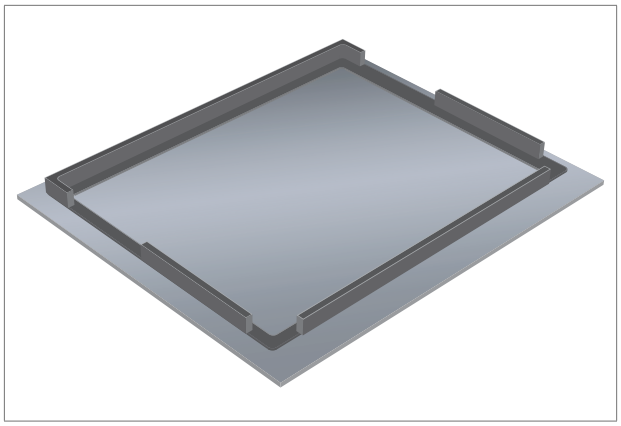


5. **Apply TDM to Bucket** – Hover the TDM and remove the PSA Liners to expose adhesive. Turn the TDM over and place it on the IBC. Align the TDM along the top edge first (Toe-in) and lower after alignment is found. Ensure that the glass sits flush in the IBC and does not rest anywhere on top of the IBC lip. Lightly press on the edges of the TDM to create an initial bond.

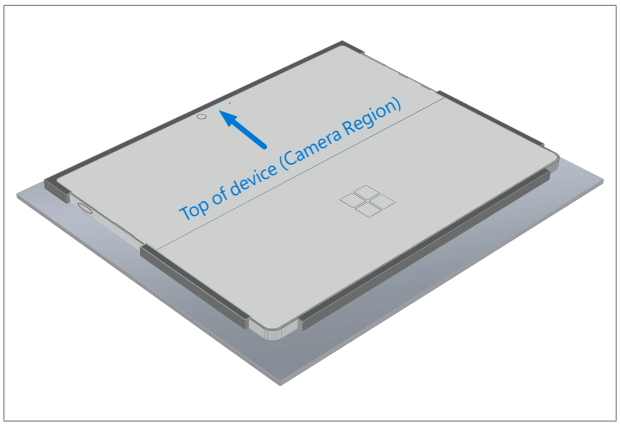


6. **Alternate Bonding PSA** – Bonding is a multi-step process. Refer to the below illustrations.

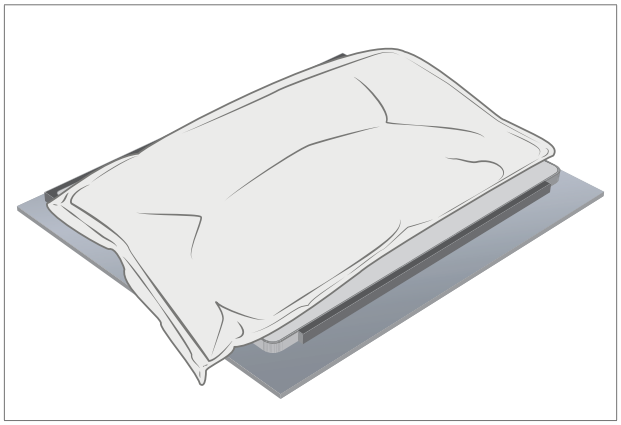
⚠ **IMPORTANT**: Use steel shot bags one 9 kg and one 14 kg. Apply the 9 kg bag, and then the 14 kg bag.



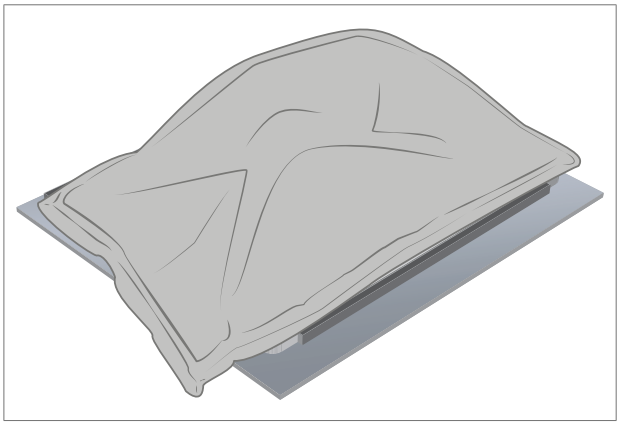
Foam pad with bonding frame face down



Place device display side down into bonding frame



Place 9 kg steel shot bag onto device



Place 14 kg steel shot bag onto 9 kg steel shot bag
Bond for 1 minute

7. **After Bonding Inspection –** Remove the steel shot bags and lift device out of the frame. Lift carefully to avoid damaging the device. Inspect the TDM for scratches, cracks, large gaps, and its flushness with respect to the IBC.

8. **Install rSSD –** Install the rSSD as detailed in the Procedure – Installation (rSSD) (page 14)

9. **TDM Calibration –** Device final calibration relies on the successful completion of the TDM Replacement Mode.
    a. **Connect software tools USB drive** with SDT to USB connector on device under repair.
    b. **Power on device** – Depress the power button on the side of the device.
    c. **Run software tool** – At the device OS, use Windows Explorer, navigate to USB drive and run:
    SDT – Select Repair setup and validation. Run the Touch Display Calibration. Accept the restart prompt at the end of the tool process.

⚠ **WARNING**: This step must be carried out on the device successfully. Any tool failures require restarting the TDM replacement process with a new FRU.

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

11. **Final inspection TDM installation** – Remove protective cling from the TDM. Verify the side edges of the TDM are flush, and that there are no obvious steps/gaps between the TDM and the IBC. Wipe the device thoroughly (including under the kickstand) with the microfiber cloth to remove all fingerprints.

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.

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