Microsoft Surface

Microsoft Surface Laptop 7th Edition 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 service or repair.

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A	06/18/2024	Initial Release

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Introduction

This Service 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.

> **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.
>
> **⚠ 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.

Device Identity Information

- Surface Laptop 7th Edition

Support Link – Link

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

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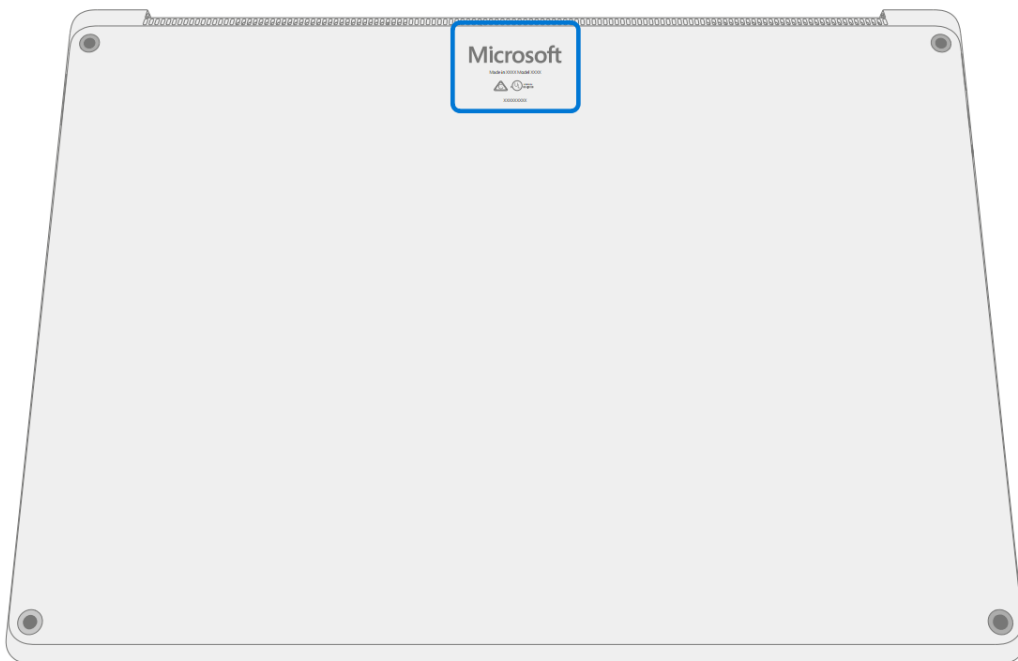
General Information, Precautions, and Warnings

Tools

This section documents the tools recommended or required by Microsoft to successfully complete a repair on a Surface device. Microsoft Service Tools (recommended and required) are sold by iFixit in partnership with Microsoft. Items under Electronic Repair Hardware and Tools can be commonly purchased from electronic repair retailers. Lastly, items under standard tools and misc. items on this list can be commonly purchased from consumer retailers.

Recommended Microsoft Service Tools

ESD-safe Surface Battery Cover - iFixit	

Required Microsoft Service Tools

Required Electronic Repair Hardware or Tools

Anti-static Wrist Strap (1 MOhm resistance)	
ESD-safe mat or benchtop	
Nylon Spudger/Probing Tool	
Plastic Opening Pick	

Plastic Opening Tool	
ESD-safe Tweezers	

Required Standard Tools and Misc Items

- 2IP Torx-Plus Driver
- 3IP Torx-Plus Driver
- 5IP Torx-Plus Driver
- 6IP Torx-Plus Driver
- USB 3.0 Thumb drive – 16 GB minimum storage
- Isopropyl alcohol dispenser bottle (use 70% IPA)
- Cleaning swabs
- Microfiber Cloth
- Lint free cleaning cloth
- 4 Gallon Bucket
- 2.0 Gallons Sand, Clean
- 65W Microsoft Surface Power Supply
- 0.1mm Thickness Gauge
- 0.15mm Thickness Gauge

General Safety Precautions

⚠️ 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.

- Clean your work surface regularly to remove debris and abrasive particles.

- While working on devices, avoid the use of clothing accessories such as bracelets, rings, or watches that can cause electrical shorts and/or damage the battery.

- 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.

- 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 Actions to take in case of a Thermal Event section or contact Microsoft directly for proper device disposition.

For additional product safety information relevant to Microsoft Surface devices, 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.

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Electro-Static Discharge (ESD) Prevention

- Review and follow the general guidelines and ESD prevention steps in this Guide prior to beginning work.

- Ensure your work surface is level/flat and covered with ESD-safe, soft, non-marring material.

- 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.

Repair-Specific Precautions and Warnings

- For Autopilot managed Surface Products refer to the following guidelines posted here.

> ⚠ **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.

- 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.
- Review the General Safety Precautions and Battery Safety Sections of this Guide before beginning work.

> ⚠ **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.
>
> ⚠ **WARNING**: 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.
>
> **IMPORTANT:** Remove the rSSD (removable Solid-State Drive) whenever the Keyboard is removed from the device. rSSD removal disconnects the battery from all device logical components for safety purposes. Refer to Procedure-Removal (rSSD) section for details.
>
> **IMPORTANT:** Whenever the rSSD has been removed, powering on the device requires that the rSSD and Keyboard are installed.
>
> **IMPORTANT:** The serial number for this device model is located on its original cover. To keep track of the device's serial number, please record it using waterproof ink on a sticker or label and apply the sticker or label to an easily accessible area on the device exterior. For serial number location please see the Device Identity Information section. The serial number cannot be added permanently to a replacement part. Microsoft may have provided a label for this use in the replacement part's packaging

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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 available on Microsoft.com and other online part retailers such as iFixit. 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.

> **⚠ WARNING**: It is recommended that an ESD-safe battery cover be placed across the device to protect the battery from any physical contact or accidental damage whenever the display is removed for internal repairs. Ensure corners of cover are always aligned with the corners of the device while battery is exposed. If the battery cover is misaligned during activities in any way, re-align before continuing work.

- 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.
  - Do not 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 the 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.

Battery Warning Level

> **⚠ 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)

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 Process section of this document for battery replacement instructions.

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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.

> ⚠ **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 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.

Actions to take in case of a Thermal Event

- **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.

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:

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- 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.

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.
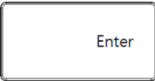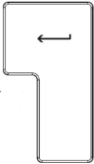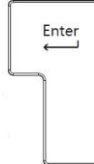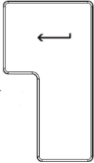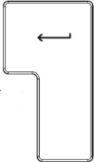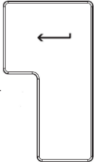
Illustrated Service Parts List
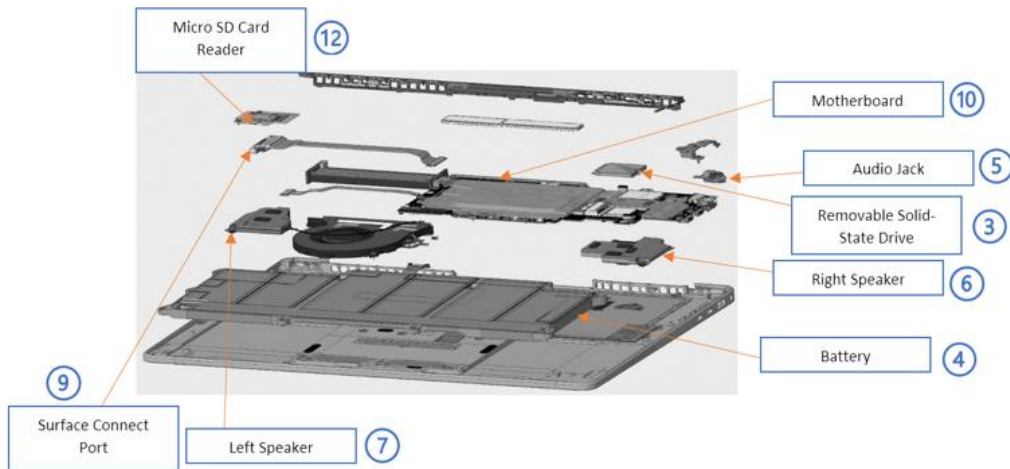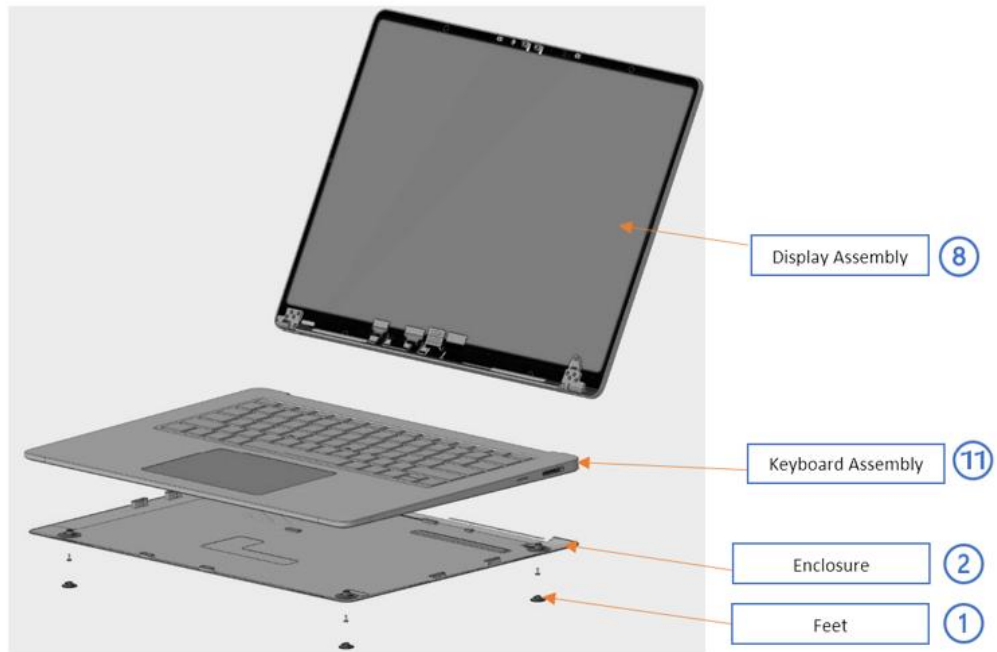
IMPORTANT: Repair workflows may require multiple parts to be ordered to complete the repair successfully. Please check the primary and additional components section in each repair workflow to ensure you have all required parts before beginning your repair.
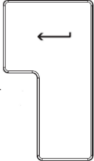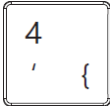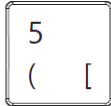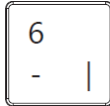
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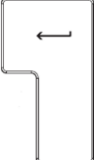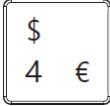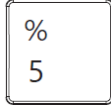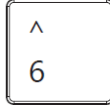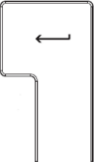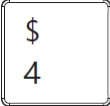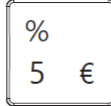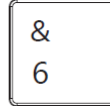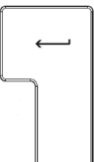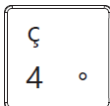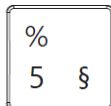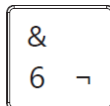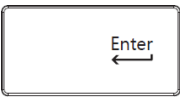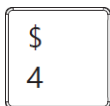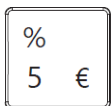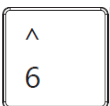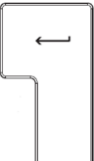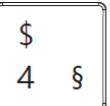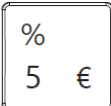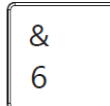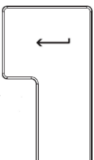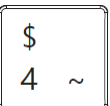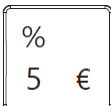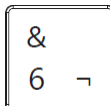
Item	Component	SKU Part No.
1	**Feet**	
	Platinum	E0A-00001
	Graphite	E0A-00002
	Dune	E0A-00003
	Sapphire	E0A-00004
2	**Enclosure**	
	Platinum – 13"	C0X-00001
	Platinum – 15"	C0Y-00001
	Graphite – 13"	C0X-00002
	Graphite – 15"	C0Y-00002
	Dune – 13"	C0X-00003
	Sapphire – 13"	C0X-00004
3	**Removable Solid-State Drive**	
	256GB	E0S-00001
	512GB	E0T-00001
	1TB	E0U-00001
4	**Battery**	
	Battery – 13"	C0A-00001
	Battery – 15"	C0B-00001
5	**Audio Jack**	
	Audio Jack	E0G-00001
6	**Right Speaker**	
	Right Speaker – 13"	E0D-00002
	Right Speaker – 15"	EOL-00002
7	**Left Speaker**	
	Left Speaker – 13"	E0D-00001
	Left Speaker – 15"	E0L-00001
8	**Display Assembly (Includes Camera)**	
	Platinum – 13"	D0K-00001
	Platinum – 15"	D0L-00001
	Graphite – 13"	D0K-00002
	Graphite – 15"	D0L-00002
	Dune – 13"	D0K-00003
	Sapphire – 13"	D0K-00004
9	**Surface Connect Port**	
	Surface Connect Port - 13"	E0B-00001
	Surface Connect Port - 15"	E0I-00001
10	**Motherboard (includes main processor and main memory, and thermal module)**	
	Plus 16GB – 13" Commercial	C0P-00001
	Plus 16GB – 13"	C0P-00002
	Elite 16GB – 13" Commercial	C0Q-00001
	Elite 16GB – 13"	C0Q-00002
	Elite 16GB – 15" Commercial	C0T-00001
	Elite 16GB – 15"	C0T-00002

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	Elite 32GB – 13" Commercial		C0R-00001
	Elite 32GB – 13"		C0R-00002
	Elite 32GB – 15" Commercial		C0U-00001
	Elite 32GB – 15"		C0U-00002
	Elite 64GB – 13"		EP2-07971
	Elite 64GB – 15"		EP2-07972
11	**Keyboard Assembly (includes Trackpad)**		
	Platinum – Arabic – 13"		D0P-00008
	Platinum – Arabic – 15"		D0Q-00008
	Graphite – Arabic – 13"		D0P-00026
	Graphite – Arabic – 15"		D0Q-00026
	Dune – Arabic – 13"		EP2-00813
	Sapphire – Arabic – 13"		EP2-00814
	Platinum – Belgium– 13"		D0P-00014
	Platinum – Belgium – 15"		D0Q-00014
	Graphite – Belgium – 13"		D0P-00032
	Graphite – Belgium – 15"		D0Q-00032
	Dune –Belgium – 13"		D0P-00047
	Sapphire – Belgium– 13"		D0P-00058
	Platinum – Chinese Traditional (Taiwan) – 13"		D0P-00007
	Platinum – Chinese Traditional (Taiwan) – 15"		D0Q-00007
	Graphite – Chinese Traditional (Taiwan) – 13"		D0P-00025
	Graphite – Chinese Traditional (Taiwan) – 15"		D0Q-00025
	Platinum – Canada EN/FR – 13"		D0P-00002
	Platinum – Canada EN/FR – 15"		D0Q-00002
	Graphite – Canada EN/FR – 13"		D0P-00020
	Graphite – Canada EN/FR – 15"		D0Q-00020
	Platinum – English International – 13"		D0P-00010
	Platinum – English International – 15"		D0Q-00010
	Graphite – English International – 13"		D0P-00028
	Graphite – English International – 15"		D0Q-00028
	Dune – English International – 13"		D0P-00043
	Sapphire – English International – 15"		D0P-00054
	Platinum – English UK – 13"		D0P-00009
	Platinum – English UK – 15"		D0Q-00009
	Graphite – English UK – 13"		D0P-00053
	Graphite – English UK – 15"		D0Q-00028
	Dune – English UK – 13"		D0P-00042
	Sapphire – English UK – 13"		D0P-00053
	Platinum- English – 13"		D0P-00001
	Platinum – English – 15"		D0Q-00001
	Graphite – English – 13"		D0P-00019
	Graphite – English – 15"		D0Q-00019
	Dune – English – 13"		D0P-00037
	Sapphire – English – 13"		D0P-00048
	Platinum – French – 13"		D0P-00012

Platinum – French – 15"	D0Q-00012
Graphite – French – 13"	D0P-00030
Graphite – French – 15"	D0Q-00030
Dune – French – 13"	D0P-00045
Sapphire – French – 13"	D0P-00056
Platinum – German – 13"	D0P-00011
Platinum – German – 15"	D0Q-00011
Graphite – German – 13"	D0P-00029
Graphite – German – 15"	D0Q-00029
Dune – German – 13"	D0P-00044
Sapphire – German – 13"	D0P-00055
Platinum – Italian – 13"	D0P-00015
Platinum – Italian – 15"	D0Q-00015
Graphite – Italian – 13"	D0P-00033
Graphite – Italian – 15"	D0Q-00033
Platinum – Japanese – 13"	D0P-00004
Platinum – Japanese – 15"	D0Q-00004
Graphite – Japanese – 13"	D0P-00022
Graphite – Japanese – 15"	D0Q-00022
Dune – Japanese – 13"	D0P-00039
Sapphire – Japanese – 13"	D0P-00050
Platinum – Korean – 13"	D0P-00005
Platinum – Korean – 15"	D0Q-00005
Graphite – Korean – 13"	D0P-00023
Graphite – Korean – 15"	D0Q-00023
Dune – Korean – 13"	D0P-00040
Sapphire – Korean – 13"	D0P-00051
Platinum – Nordic – 13"	D0P-00016
Platinum – Nordic – 15"	D0Q-00018
Graphite – Nordic – 13"	D0P-00036
Graphite – Nordic – 15"	D0Q-00036
Platinum – Portuguese – 13"	D0P-00016
Platinum – Portuguese – 15"	D0Q-00016
Graphite – Portuguese – 13"	D0P-00034
Graphite – Portuguese – 15"	D0Q-00016
Platinum – Spanish (Mexico) – 13"	D0P-00003
Platinum – Spanish (Mexico) – 15"	D0Q-00003
Graphite – Spanish (Mexico) – 13"	D0P-00021
Graphite – Spanish (Mexico) -15"	D0Q-00021
Platinum – Spanish (Spain) – 13"	D0P-00017
Platinum – Spanish (Spain) – 15"	D0Q-00017
Graphite – Spanish (Spain) – 13"	D0P-00035
Graphite – Spanish (Spain) – 15"	D0Q-00035
Platinum – Swiss/Luxembourg – 13"	D0P-00013
Platinum – Swiss/Luxembourg – 15"	D0Q-00013
Graphite – Swiss/Luxembourg – 13"	D0P-00031

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	Graphite – Swiss/Luxembourg – 15"	D0Q-00031
	Dune – Swiss/Luxembourg – 13"	D0P-00046
	Sapphire – Swiss/Luxembourg – 13"	D0P-00057
	Platinum – Thai – 13"	D0P-00006
	Platinum – Thai – 15"	D0Q-00006
	Graphite – Thai – 13"	D0P-00024
	Graphite – Thai – 15"	D0Q-00024
12	**Micro SD Card Reader**	
	Micro SD Card Reader – 15"	E0J-00001

Description	Enter Key	"4,5,6" Keys
104 English, US	Enter	$ 4 % 5 ^ 6
105 Canadian, Bilingual	←	$ 4 ¢ % 5 ¤ ? ^ 6 ¬
109 Japan	Enter ←	$ う 4 う % え 5 え & お 6 お
105 Austria/Germany	←	$ 4 % 5 & 6
105 Belgium AZERTY	←	4 ' { 5 ([6 § ^
105 Nordic Denmark, Finland, Norway, Sweden	←	¤ 4 $ % 5 & 6

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Description	Enter Key	"4,5,6" Keys
105 French	←	4 ' { · 5 ([· 6 - |
105 English, UK Ireland	←	$ 4 € · % 5 · ^ 6
105 Italy	←	$ 4 · % 5 € · & 6
105 Switzerland, Luxembourg	←	ç 4 ° · % 5 § · & 6 ¬
104 English, International Netherlands	Enter ←	$ 4 · % 5 € · ^ 6
105 Portuguese	←	$ 4 § · % 5 € · & 6
105 Spanish, European	←	$ 4 ~ · % 5 € · & 6 ¬

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Software Tools – Diagnostic, Calibration, and Troubleshooting

This section covers the software tools required to support a Surface device through problem discovery and resolution.

Genuine Microsoft Replacement Parts

- Genuine Microsoft replacement parts can be obtained directly from Microsoft on Microsoft.com.
- Genuine Microsoft replacement parts are also available on the partner sites below:
    - iFixit

General Support

- For general Surface support, visit www.support.microsoft.com
- To troubleshoot device feature/function problems or learn more about Surface Laptops visit https://support.microsoft.com/surface .
- If you would like to learn more about Windows, visit https://support.microsoft.com/windows
- To learn more about the accessibility features of the Surface Laptop, go to the online user guide at aka.ms/Windows-Accessibility

Software Tools

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

Calibration and Authentication

Specific components require additional software calibration or authentication after completing the installation of the component before the part will function to full capability. The specific steps will be called out in the pertinent repair workflows.

Impacted Parts

- **Display (TDM) –**
    - Pre-installation – requires a pre-installation repair workflow, completed in SDT, to put the device into repair mode.
    - Post-installation – requires a post-installation workflow, completed in SDT, to calibrate the display to the correct settings.
- **Battery –**
    - Pre-installation - requires a pre-installation repair workflow, completed in SDT, to put the device into repair mode.
    - Post-installation – requires a post-installation authentication workflow, completed in SDT, to authenticate the new battery as a valid Microsoft part.
- **Motherboard (PCBA) –**

      o   Post-installation - requires a post-installation workflow for Display and an authentication for Battery, completed in SDT, to calibrate the display to the correct settings with the new board and ensure the battery is detected as an authentic part.

Hardware Troubleshooting Approach

Microsoft recommends the following approach for troubleshooting Surface devices:

1. Update the device to the latest Operating System and Driver/Firmware versions using Windows Update.

> **Important:** Ensuring your device is fully up to date is important for ensuring the issue you are experiencing is not fixed by a software update prior to conducting a hardware repair.

2. Utilize the Surface Diagnostic Toolkit (SDT) after confirming the device is fully updated to confirm the hardware fault is still present prior to repair.
3. After the repair is completed, run the Surface Diagnostic Toolkit (SDT) to validate the original hardware fault is resolved.
    a. If the issue is still being experienced, it is recommended to reimage the device using a Surface Recovery Image (BMR) to return the device to a known OS/FW state. Additional repairs should only be conducted if the issue persists after re-imaging the device.

Component Removal and Replacement Procedures

Prerequisite Steps

Steps outlined in this section should be conducted prior to starting any repair on a Surface device.

- **Power off device –** Ensure the device is powered off completely and the battery has been fully discharged. Refer to the Repair-Specific Precautions and Warnings section for details. Once discharged, the device should be disconnected from all power sources.
- **ESD Prevention –** Ensure ESD prevention steps and general guidelines are followed prior to opening the device. Refer to the ESD Prevention section for details.
- **Position Device –** To prevent damage to the device, ensure the device is placed on a clean surface free of debris.

Feet Replacement

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Soft ESD-Safe Mat

Primary Components

- Feet (Refer to the Illustrated Service Parts List)

Additional Components (Ordered Separately)

- N/A

Procedure – Removal (Feet)

1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.

2. **Remove the Feet –** Using the Nylon Spudger, carefully pry up all four feet to expose the screws.
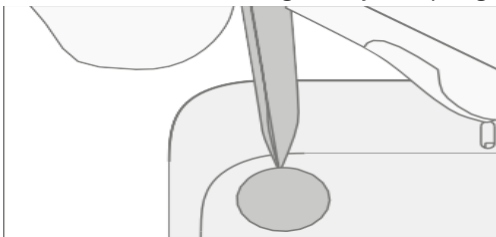
Procedure – Installation (Feet)

1. **Install the Feet -** Line up the posts on the Foot to the matching hole pattern on the Enclosure. Press firmly until the foot clicks into place. Repeat for the other 3 feet.

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Enclosure Replacement

Preliminary Requirements

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

- **Device Serial Number Notation –** The replacement Enclosure supplied for repair will not have a serial number. To ensure the customer has the best experience with future Microsoft support cases, it is recommended to create a notation of the device serial number and provide it to the customer upon completion of the repair.

Required Tools

- Plastic Opening Pick
- Soft ESD-Safe Mat
- 5IP (Torx-Plus) Driver

Primary Components

- Enclosure (Refer to the Illustrated Service Parts List)
  - M1301718 Screws x 4 (Foot screws)

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Enclosure)
1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure screws –** Using a 5IP (Torx-Plus) driver, uninstall each of the 4 screws from under the feet.

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4. **Separate the Enclosure from the Device –** Carefully insert the tip of a Plastic Opening Pick into the space between the Enclosure and the Keyboard Assembly as shown below. Move the Plastic Opening Pick around the perimeter of the device to create a gap. Using both hands, carefully lift the Enclosure off the device and place it on a soft ESD-Safe mat.

Caution: Do Not lift the Enclosure from the black plastic antenna.

Procedure – Installation (Enclosure)

1. **Check for unexpected items within the Device -** Perform a through visual inspection of the device interior, or Enclosure if re-using, for any loose articles that may be present. Of specific importance are the magnets (identified below).

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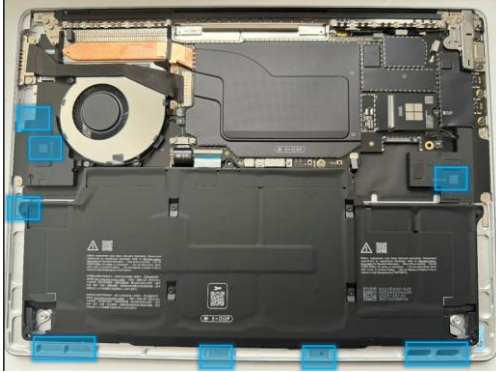
2. **Install the Enclosure -** Using both hands, carefully lower the top or bottom edge of the Enclosure onto the device ensuring you line it up against the top edge as shown below. Once aligned, lower the Enclosure into place on to the Device. Finally, adjust the position of the Enclosure so that the gaps are even on all sides, and none of the sides are catching when you press the Enclosure down flat.

3. **Fasten the Enclosure -** Using a 5IP (Torx-Plus) driver, install the 4 screws into the foot wells on the Enclosure. Each screw should be tightened until snug, and then turned another 45-degrees (1/8th turn) to fully fasten. Adjust the position of the Enclosure as you go to ensure even gaps around the perimeter.

> **Caution:** Ensure that the Enclosure is not stuck on a ledge as you are installing the screws. Shift the Enclosure as needed to avoid this condition.

4. **Install the Feet –** Refer to the Procedure – Installation (Feet) section of this document for detailed instructions.

Removable Solid-State Drive Replacement

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Soft ESD-Safe Mat
- 5IP (Torx-Plus) Driver
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Removable Solid-State Drive (Refer to the Illustrated Service Parts List)
   - M1301718 Screws x 4 (Foot screws)

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o M1246215 Screws x 1 (Solid-State Drive) **▉5IP**

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Removable Solid-State Drive)
1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the tape -** Carefully peel up and completely remove the tape covering the Removable Solid-State Drive and the corresponding receptacle. The gray spacer will also be removed along with the tape. Clean the top surfaces of the Removable Solid-State Drive and receptacle with IPA to remove any residual adhesive.
5. **Remove the Removable Solid-State Drive –** Using a 5IP (Torx-Plus) driver, remove the screw (**▉5IP**) holding the Removable Solid-State Drive onto the Motherboard. Lift the drive out of the device and place it on a soft ESD-Safe mat.
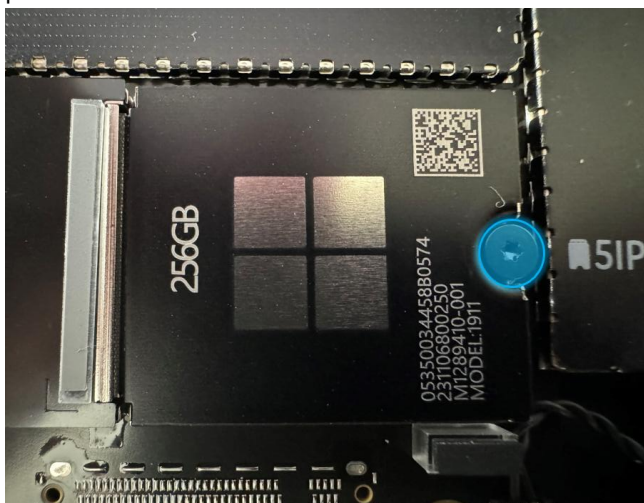
Procedure – Installation (Removable Solid-State Drive)

1. **Insert the Removable Solid-State Drive –** Carefully insert the connector end of the Removable Solid-State Drive into the receptacle on the motherboard while keeping the Removable Solid-State Drive as close as possible to horizontal.

CAUTION: Ensure that the Speaker wire does not get caught or trapped when fastening the Removable Solid-State Drive to the Motherboard.

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2. **Install Removable Solid-State Drive screw –** Using a 5IP (Torx-Plus) driver, install the 1 new rSSD screw (■5IP) until the screw is just snug. Then turn the screw an additional 45-degrees (1/8th turn) until screw is fully fastened.
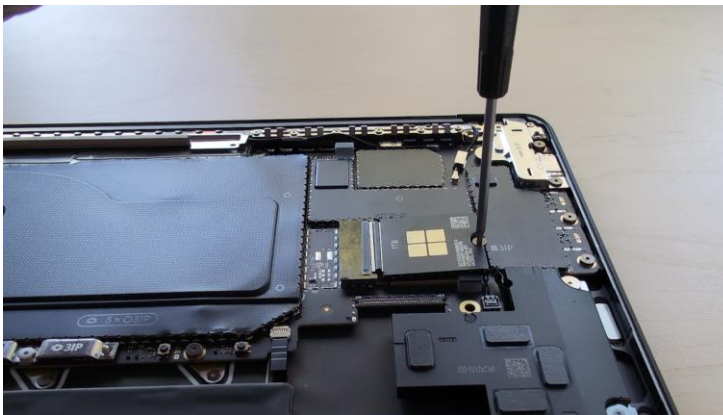
3. **Install Black Tape on Motherboard Receptacle –** Carefully place a new tape on the receptacle, making sure the cutout on the tape matches the shape of the raised flange on the receptacle.
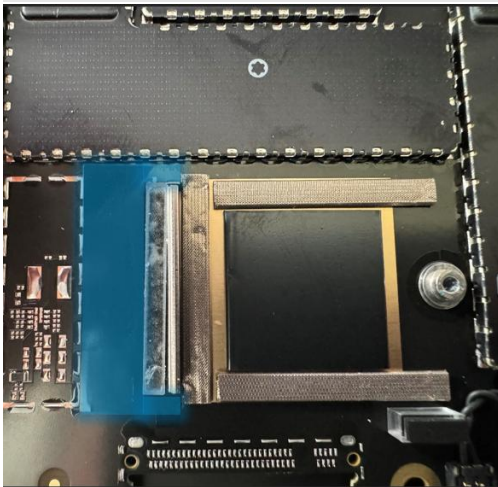
4. **Install Spacer –** Place a new spacer on top of the Black Tape, parallel and as close as possible to the silver flange on the connector receptacle. Ensure the dot on one end of the spacer is oriented towards the display hinge and that the spacer is centered lengthwise with the silver flange.

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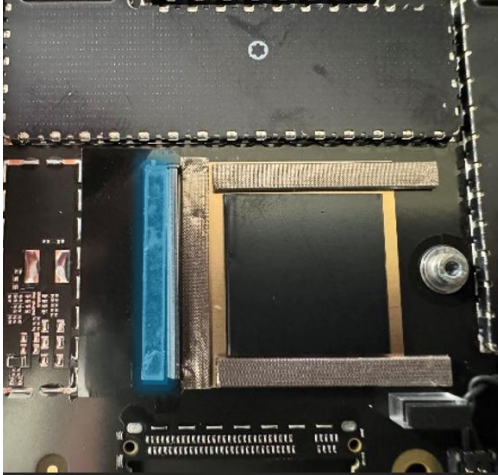
5. **Install Enclosure -** Refer to the Procedure – Installation (Enclosure) section of this document for detailed instructions.
6. **Power on device –** Carefully place the device with the screen side facing up. Connect the device to a power supply and open the Display.
7. **Image the device –** Reinstall the operating system and all drivers/firmware by using a USB-drive containing the latest Surface BMR for your model. Please see the Software Tools – Diagnostic, Calibration, and Troubleshooting section for links to instructions on how to get the latest image and install it.
8. **Run the Surface Diagnostic Toolkit (SDT) –** With Windows installed and sitting at the desktop, insert the USB drive containing SDT and launch the program. Run all diagnostics to ensure the device is functioning as expected before moving forward.
9. **Power off the device –** Once the SDT tests have completed, power down the device and close the display. Invert the device so that the bottom of the device is facing up.
10. **Install the Feet -** Refer to the Procedure – Installation (Feet) section of this document for detailed instructions.

Battery Replacement

Preliminary Requirements

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

WARNING: Prior to handling the battery, the operator must remove all jewelry, wear gloves and safety glasses, and have a bucket of sand prepared in case of any battery event.

WARNING: In the case of a battery event, submerge the entire device in sand. **DO NOT** attempt to pick up the device.

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- Anti-Static wrist strap (1M Ohm resistance)

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- USB drive loaded with the Surface Diagnostic Toolkit
- 4 Gallon Bucket
- 2.0 Gallons of Clean Sand

Primary Components

- Battery (Refer to the Illustrated Service Parts List)
    - M1301718 Screws x 4 (Foot screws)
    - M1246215 Screws x 1 (Solid-State Drive) ▮5IP
    - M1266593 Screws x 2 (Battery FPC Bracket) ⬤3IP - 1
    - M1272782 Screws x 8 (Battery) ⬤5IP - 2

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Preparation (Battery)

> **Important:** This section is only for instances where you are replacing the battery. If the battery is being re-used, then this section is not required.

1. **Connect USB –** Connect USB with the Surface Diagnostic Toolkit (SDT) loaded to an available USB port on the device under repair.
2. **Power on device –** Connect a power supply to the device. Press the power button on the device to power the device on. Allow it to boot to the Windows Desktop before continuing.
3. **Launch SDT –** From the Windows Desktop, use Windows Explorer to navigate to the USB drive. Select the SDT executable (.exe) to launch the Surface Diagnostic Toolkit.
4. **Run Battery Repair (Setup) –** From the SDT launch screen, select **Repair** from the drop-down menu. Next, select **Repair Setup and Validation** to enter the selection screen. Run the **Battery Repair (Setup)** to put your device into repair mode. Follow all on-screen instructions and allow the device to shut down when prompted. Disconnect the Power Supply and remove the USB drive before proceeding forward.

Procedure – Removal (Battery)
1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Remove the Battery Connector Metal Bracket –** Using a 3IP (Torx-Plus) driver, remove the 2 screws (⬤3IP) securing the metal bracket to the motherboard. Lift the metal bracket out of the device to expose the Battery FPC.

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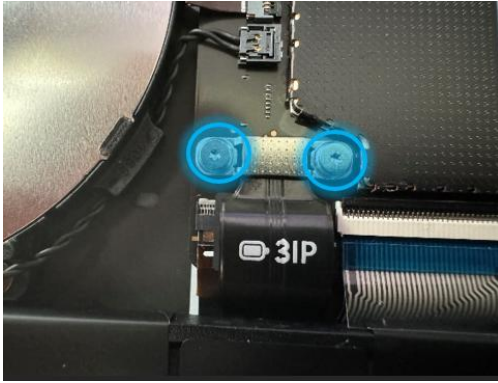
6. **Disconnect the Battery FPC -** Using a Nylon Spudger, pry the Battery FPC connector, starting from the side of the connector, from the Motherboard.
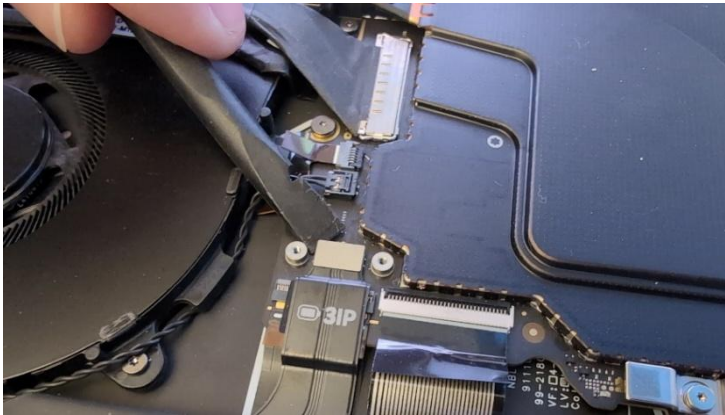
7. **Remove the Battery Screws -** Using a 5IP (Torx-Plus) driver, remove the 8 screws (⬤ 5IP - 2) securing the Battery.
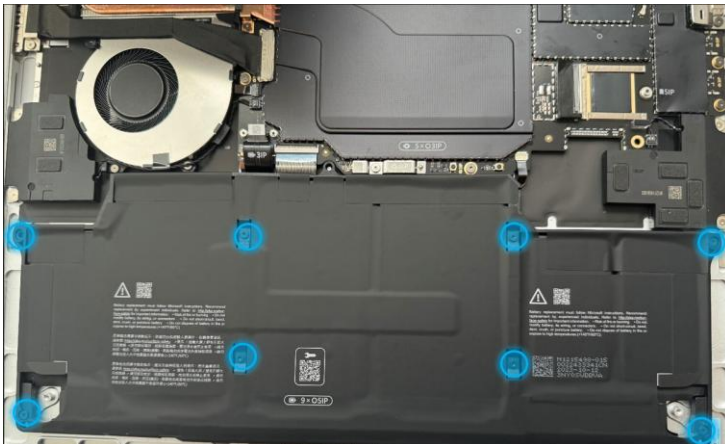
8. **Remove the battery from the device -** Using your hands, grab the battery at the four points identified below and carefully lift the battery out of the device. Place the battery on a clean ESD-Safe Mat free of any debris.

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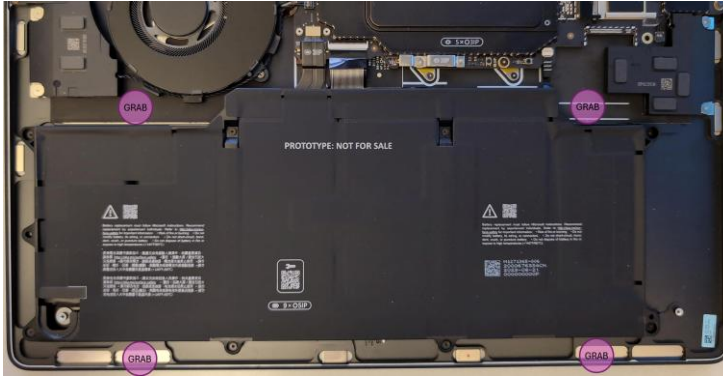
WARNING: Only handle the battery by the plastic frame. Bending, twisting, or impacting the battery may damage the battery, the device, and/or result in severe personal injury or property damage. Always use two hands when handling the battery.

Important: Place the battery somewhere where the battery cannot accidentally be contacted or damaged. **DO NOT** place anything on top of the battery.

Important: When disposing of the battery, ensure you are recycling according to local laws.

Important: The Motherboard Module and Battery are extremely sensitive to ESD and can be easily damaged. It is critical that you ensure proper grounding before performing any work on these parts.

WARNING: In the instance of a battery event, submerge the entire device in a 4-gallon bucket filled with 2.0 gallons of clean sand. Ensure the entire device is submerged. **DO NOT** attempt to pick up the device.

Procedure – Installation (Battery)

1. **Pre-installation device inspection –** Check the device interior for any loose articles that may be present.
   a. Check and remove any foreign objects that the magnets may have attracted.
   b. Pay special attention to the magnetized areas around the edges of the interior.
   c. Verify that all removed screws are accounted for and have not been misplaced inside the device.
   d. Loose screws should never be stored on the magnetic areas of the bucket.

Important: Verify the battery's condition. Batteries exhibiting any damage indicated in the Lithium-Ion Battery Inspection section must be replaced.

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2. **Insert the Battery -** Using the attached loops, carefully lower the battery into the new device.

Important: Only handle new batteries with the plastic loops that come attached. If reusing a battery, handle by the frame as indicated in the battery removal instructions. Bending, twisting, or impacting the battery may damage the battery, the device, and/or result in severe personal injury or property damage. Always use two hands when handling the battery.

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3. **Install the Battery screws -** Using a 5IP screwdriver, install the 8 battery frame screws (◉ 5IP - 2) until the screws are just snug, then tighten each by an additional 45-degrees (1/8th turn).

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> **Important:** Do not overtighten the screws on the battery frame or battery. If the frame is cracked, the battery must not be used.

4. **Assemble the Battery FPC and FPC Bracket -** Assemble the Battery FPC to the Motherboard. Using a 3IP (Torx-Plus) driver, install 2 FPC Bracket screws (⬤**3IP**) until the screws are just snug. Turn each screw an additional 45-degrees (1/8th turn) until fully fastened.
5. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.
6. **Install the Enclosure –** Refer to Procedure – Installation (Enclosure) section of this document for detailed instructions.

Procedure – Finalize (Battery)

1. **Power on Device –** Connect a Power Supply to the device and power it on until it reaches the Windows Desktop.
2. **Connect USB –** Connect USB with the Surface Diagnostic Toolkit (SDT) loaded to an available USB port on the device under repair.
3. **Launch SDT –** From the Windows Desktop, use Windows Explorer to navigate to the USB drive. Select the SDT executable (.exe) to launch the Surface Diagnostic Toolkit.
4. **Allow the Battery to charge –** With the device connected to a power supply, allow the battery to charge until the battery icon in Windows reads at least 50% remaining battery charge.
5. **Run Battery Authentication –** From the SDT launch screen, select **Repair** from the drop-down menu. Next, select **Repair Setup and Validation** to enter the selection screen. Select the **Battery Repair (Validation)** tool and follow the on-screen prompts until a successful authentication is completed.

> **Important:** Battery authentication requires a stable internet connection and the latest version of the Surface Management Extension. If the battery validation tool fails or is not detected properly, install the Surface Management Extension, reboot the device, and try again with a new internet connection. If failures continue, reach out to Microsoft Support.

6. **Run the Surface Diagnostic Toolkit (SDT) –** Run all diagnostics to ensure the device is functioning as expected before moving forward.
7. **Install Feet –** Refer to Procedure – Installation (Feet) section of this document for detailed instructions.

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Audio Jack Replacement

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 6IP (Torx-Plus) Driver
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Audio Jack (Refer to the Illustrated Service Parts List)
    - M1301718 Screws x 4 (Foot screws)
    - M1246215 Screws x 1 (Solid-State Drive) ▮5IP
    - M1265600 Screws x 1 (Hinge & Chassis) ▣6IP
    - M1212080 Screws x 2 (Audio Jack Bridge) ☞3IP - 1
    - M1263960 Screws x 1 (Audio Jack) ☞3IP - 2

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Audio Jack)

1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Remove the Audio Jack Bridge –** Using a 3IP (Torx-Plus) and 6IP (Torx-Plus) driver, remove the 3 screws securing the Audio Jack Bridge to the interior. Lift the Audio Jack Bridge out of the device.

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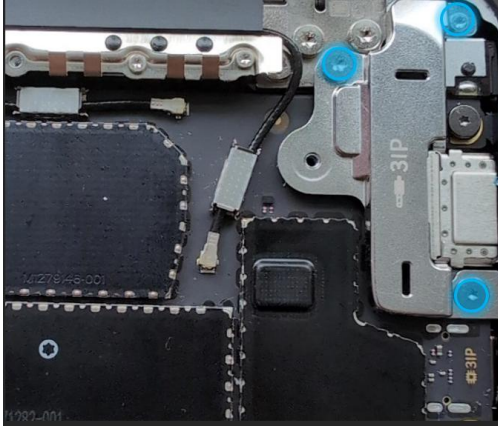
6. **Remove the Audio Jack –**
   a. Using a 3IP (Torx-Plus) screwdriver, remove the 1 screw securing the Audio Jack to the Motherboard.
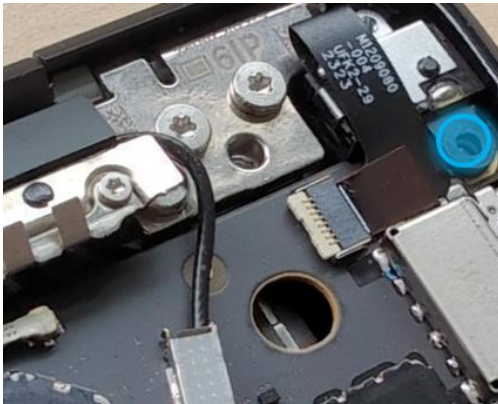
   b. Using a Nylon Spudger, flip the latch on the Motherboard to disengage the lock on the Audio Jack FPC. Remove the Audio Jack FPC from the connector on the Motherboard.
   c. Lift the Audio Jack out of the device.

Procedure – Installation (Audio Jack)
   1. **Install the Audio Jack –**
      a. Place the Audio Jack into its position on the Motherboard.
      b. Make sure the latch on the Motherboard receptacle is in the vertical position.
      c. Insert the Audio Jack FPC into the receptacle and flip the latch down.
      d. Using a 3IP (Torx-Plus) driver to install a new Audio Jack screw (━━ **3IP - 2**) until just snug. Then turn the screw an additional 45-degrees (1/8th turn) until fully fastened.
   2. **Install the Audio Jack Bridge -** Install the previously removed Audio Jack Bridge into its position over the Audio Jack. Using a 3IP (Torx-Plus) and 6IP (Torx-Plus) driver, install 3 new screws (2 x ━━ **3IP - 1**, 1 x ▣**6IP**). All screws should be tightened until just snug, and then turned another 45-degrees (1/8th turn) until fully fastened.
   3. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.
   4. **Install the Enclosure –** Refer to Procedure – Installation (Enclosure) section of this document for detailed instructions.
   5. **Power on device –** Carefully place the device with the screen side facing up. Connect the device to a power supply and open the Display.

6. **Run the Surface Diagnostic Toolkit (SDT) –** Sitting at the desktop, insert the USB drive containing SDT and launch the program. Run all diagnostics to ensure the device is functioning as expected before moving forward.
7. **Power off the device –** Once the SDT tests have completed, power down the device and close the display. Invert the device so that the bottom of the device is facing up.
8. **Install the Feet -** Refer to the Procedure – Installation (Feet) section of this document for detailed instructions.

Right Speaker Replacement

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Right Speaker (Refer to the Illustrated Service Parts List)
  - M1301718 Screws x 4 (Foot screws)
  - M1246215 Screws x 1 (Solid-State Drive) 📱5IP
  - M1211914 Screws x 2 (Speaker)
  - M1167842 Tape x 1 (Right Speaker Tape)

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Right Speaker)
1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Remove the Speaker tape –** Remove the tape and clean the surface with IPA to remove any residual adhesive.

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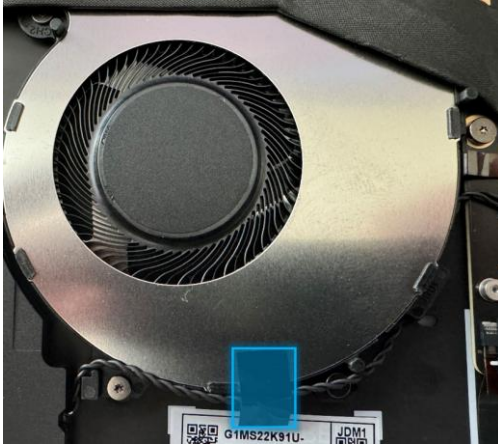
6. **Remove the Right Speaker screws –** Using a 3IP (Torx-Plus) driver to remove the 2 screws securing the Right Speaker (which is on the left side when working on the device) to the Chassis.

7. **Remove the Right Speaker –** Remove the Right Speaker from the Chassis and de-route the cable. To remove the connector from the Motherboard, pull up vertically on the wireless until the connector comes free.

Procedure – Installation (Right Speaker)

1. **Install the Right Speaker -** Place the new Right Speaker into the Chassis. Using a 3IP (Torx-Plus) driver, install 2 new screws. All screws should be installed until just snug, and then turned another 45-degress (1/8th turn) until fully fastened.

2. **Route and connect the Right Speaker wire –** Route the Right Speaker wire as shown below. Install the speaker connector into the receptacle on the Motherboard by pressing vertically until a snap is felt.

NOTE: The connector will have 2 visible gold contacts if it is oriented in the correct direction.

3. **Place new Speaker Tape -** Place a new Tape over the speaker wire as shown below.

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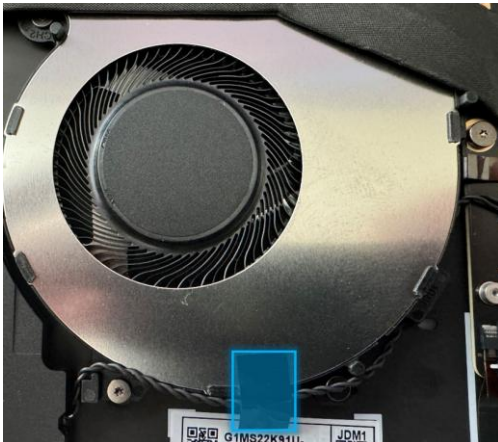
4. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Install the Enclosure –** Refer to Procedure – Installation (Enclosure) section of this document for detailed instructions.
6. **Power on device –** Carefully place the device with the screen side facing up. Connect the device to a power supply and open the Display.
7. **Run the Surface Diagnostic Toolkit (SDT) –** Sitting at the desktop, insert the USB drive containing SDT and launch the program. Run all diagnostics to ensure the device is functioning as expected before moving forward.
8. **Power off the device –** Once the SDT tests have completed, power down the device and close the display. Invert the device so that the bottom of the device is facing up.
9. **Install the Feet -** Refer to the Procedure – Installation (Feet) section of this document for detailed instructions.

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Left Speaker Replacement

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Right Speaker (Refer to the Illustrated Service Parts List)
    - M1301718 Screws x 4 (Foot screws)
    - M1246215 Screws x 1 (Solid-State Drive) 📱5IP
    - M1211914 Screws x 2 (Speaker)

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Left Speaker)
1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Remove the Left Speaker Screws –** Using a 3IP (Torx-Plus), remove the 2 screws securing the Left Speaker, located on the Right side of the device when working on it, to the Chassis.
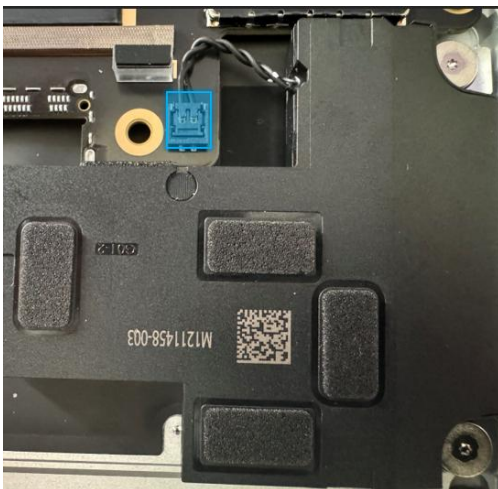
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6. **Remove the Left Speaker –** Remove the Left Speaker from the Chassis. To Remove the connector from the Motherboard, pull up vertically on the wires until the connector comes free.

Procedure – Installation (Left Speaker)

1. **Install the Left Speaker –** Place the new Left Speaker into the Chassis. Using a 3IP (Torx-Plus) driver to install 2 new screws. All screws should be installed until just snug, and then turned another 45-degrees (1/8th turn) until fully fastened.
2. **Connect the Left Speaker –** Insert the speaker connector into the receptable on the Motherboard by pressing vertically until a snap is felt.

NOTE: The connector will have 2 visible gold contacts if it is oriented in the correct direction.

3. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.
4. **Install the Enclosure –** Refer to Procedure – Installation (Enclosure) section of this document for detailed instructions.
5. **Power on device –** Carefully place the device with the screen side facing up. Connect the device to a power supply and open the Display.

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6. **Run the Surface Diagnostic Toolkit (SDT) –** Sitting at the desktop, insert the USB drive containing SDT and launch the program. Run all diagnostics to ensure the device is functioning as expected before moving forward.
7. **Power off the device –** Once the SDT tests have completed, power down the device and close the display. Invert the device so that the bottom of the device is facing up.
8. **Install the Feet -** Refer to the Procedure – Installation (Feet) section of this document for detailed instructions.

Micro SD Reader Replacement

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Micro SD (Refer to the Illustrated Service Parts List)
    - M1301718 Screws x 4 (Foot screws)
    - M1246215 Screws x 1 (Solid-State Drive) 🔩5IP
    - M1235998 Screws x 2 (Micro SD) 🔩3IP

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Micro SD Reader)

1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Disconnect the Micro SD Reader Cable –** Using a Nylon Spudger, flip up the latch on the Micro SD Reader board and disconnect the connector.
6. **Remove the Micro SD Reader –** Using a 3IP (Torx-Plus) driver, remove the 2 screws holding the Micro SD Reader into the Chassis and lift the Micro SD Reader out of the device.

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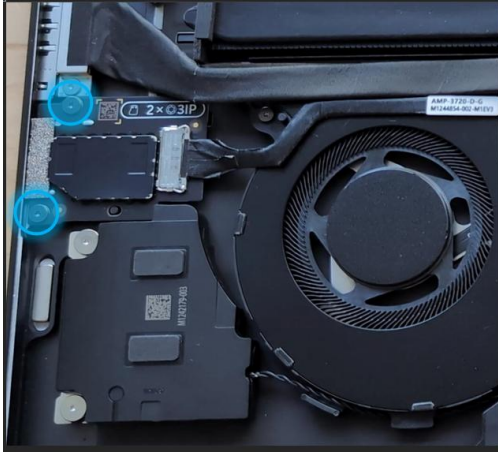
Procedure – Installation (Micro SD Reader)

1. **Install the Micro SD Reader –**
   a. Carefully place the new Micro SD Reader into the device chassis.
   b. Verify that the reader is aligned with the opening on the outside of the device chassis.
   c. Using a 3IP (Torx-Plus) driver, install 2 new screws (🔩3IP) until just snug and then turn each another 45-degrees (1/8th turn) until fully fastened.
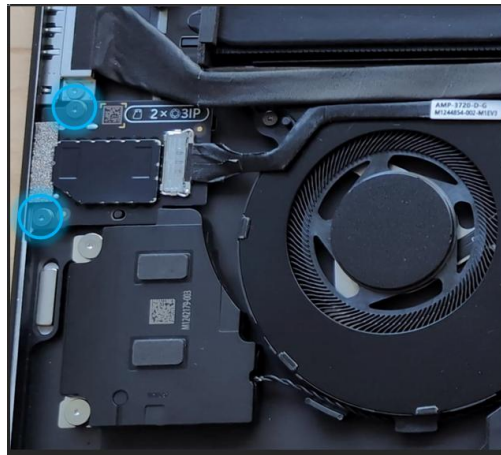
2. **Connect the Micro SD Reader Cable -** Insert the Micro SD Reader cable into the receptacle on the Micro SD Reader board and close the latch. There should be a lick if the connector is inserted correctly, and the latch is fully closed.
3. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.
4. **Install the Enclosure –** Refer to Procedure – Installation (Enclosure) section of this document for detailed instructions.
5. **Power on device –** Carefully place the device with the screen side facing up. Connect the device to a power supply and open the Display.
6. **Run the Surface Diagnostic Toolkit (SDT) –** Sitting at the desktop, insert the USB drive containing SDT and launch the program. Run all diagnostics to ensure the device is functioning as expected before moving forward.
7. **Power off the device –** Once the SDT tests have completed, power down the device and close the display. Invert the device so that the bottom of the device is facing up.

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8. **Install the Feet -** Refer to the [Procedure – Installation (Feet)](#) section of this document for detailed instructions.

Display Assembly Replacement

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 6IP (Torx-Plus) Driver
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Display Assembly (Refer to the Illustrated Service Parts List)
  - M1301718 Screws x 4 (Foot screws)
  - M1246215 Screws x 1 (Solid-State Drive) 📱5IP
  - M1265600 Screws x 8 (Hinge & Chassis)
  - M1274578 Screws x 12 (Antenna)
  - M1212080 Screws x 1 (Audio Jack Bridge)
  - M1263960 Screws x 2 (Audio Jack)
  - M1235995 Screws x 1 (Motherboard)
  - M1265416 Shield x 2 (Coax Cable Lid)
  - M1271924 Shield x 1 (T3 Shield)
  - M1288973 Foam x 1 (T3 Shield Foam #1)
  - M1288974 Foam x 1 (T3 Shield Foam #2)
  - M1291196 Tape x 1 (Display Assembly FPC Tape)

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Preparation (Display Assembly)

> **Important:** This section is only for instances where you are replacing the Display. If the Display is being re-used, then this section is not required. If Display is unusable due to damage or fault, connect an external monitor to the device to perform these steps.

1. **Connect USB –** Connect USB with the Surface Diagnostic Toolkit (SDT) loaded to an available USB port on the device under repair.
2. **Power on device –** Connect a power supply to the device. Press the power button on the device to power the device on. Allow it to boot to the Windows Desktop before continuing.

3. **Launch SDT –** From the Windows Desktop, use Windows Explorer to navigate to the USB drive. Select the SDT executable (.exe) to launch the Surface Diagnostic Toolkit.
4. **Run Touch Display Setup –** From the SDT launch screen, select **Repair** from the drop-down menu. Next, select **Repair Setup and Validation** to enter the selection screen. Run the **Touch Display (Setup)** tool to prepare your device for Display replacement. Follow all on-screen instructions and allow the device to shut down when prompted. Disconnect the Power Supply and remove the USB drive before proceeding forward.

Procedure – Removal (Display Assembly)

1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Remove the Audio Jack -** Refer to the Procedure – Removal (Audio Jack) section of this document for detailed instructions.
6. **Remove the Antenna –**
   a) Using a Nylon Spudger, pry up the 2 Coax Cable Lids.
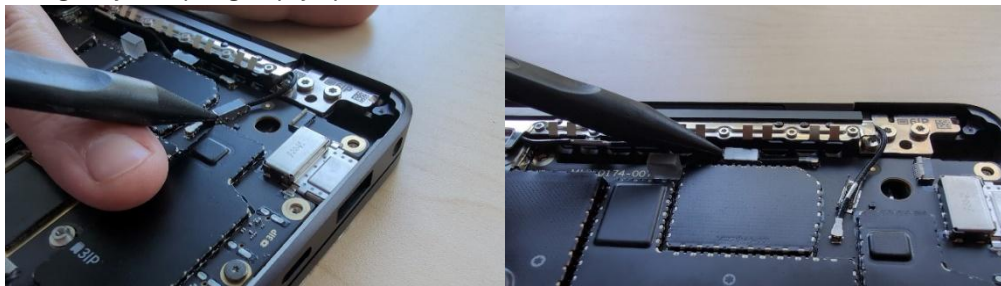
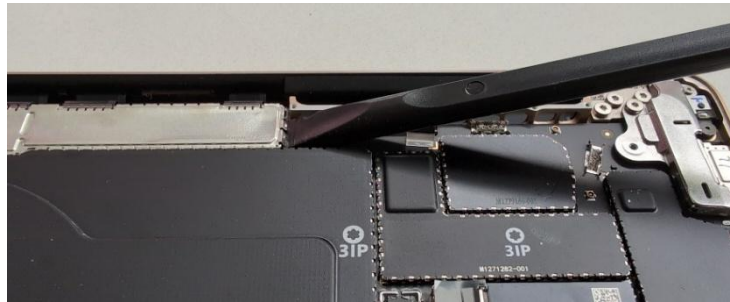   b) Using a Nylon Spudger, disconnect the 2 Coax Cables.

   c) Using a 3IP (Torx-Plus) driver, remove the 11 screws from the antenna.

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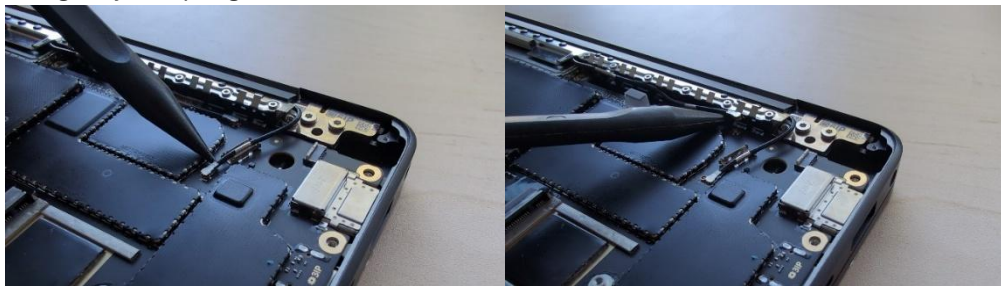
   d)   Lift the Antenna out of the Chassis.

7. **Remove the T3 Shield Lid –**

    a)   Using a Nylon Spudger, pry up the T3 Shield Lid starting with the right edge.

NOTE: Remove the Motherboard screw next to the T3 Shield can give better access for removal of the shield.

    b)   Slide the Nylon Spudger under the shield moving right to left. Pause and shift the shield up and down as you work your way left as the shield will get stuck on its latches.
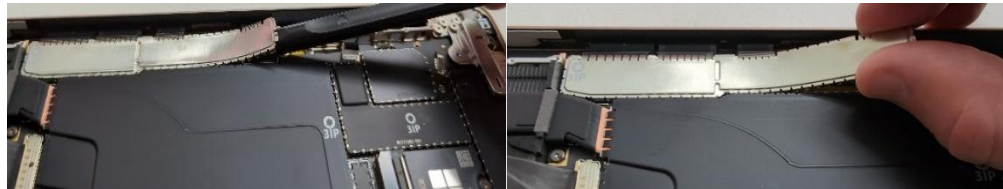
Caution: Ensure that the shield does not damage the Display FPC's during removal.

8. **Disconnect the Display Assembly FPCs -** Using a Nylon Spudger, pry up the connectors from the side and gently wiggle them free. If the connectors start giving resistance as they are being pried up, lightly push the edge being pried back down.

Caution: Do not force the connector if it starts to give resistance. Rock the connector back in the other direction to remove.

9. **Reorient the Device –**

    a)   Open the Display Assembly to 90 Degrees.

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b) Place the backside of the Display Assembly on the ESD-Safe Mat with the screen and keyboard facing up.

10. **Remove the Left Hinge Screws – With** one hand holding the device still, use a 6IP (Torx-Plus) driver to remove the 3 screws on the Left Hinge.

11. **Remove the Right Hinge Screws -** With one hand holding the device still, use a 6IP (Torx-Plus) driver to remove the 4 screws on the Right Hinge.

12. **Remove the Display Assembly from the Device -** Carefully lift the Chassis from the Display Assembly. Place the Display Assembly on an ESD-Safe mat.

Procedure – Installation (Display Assembly)

1. **Orient Display Assembly –** Place the backside of the new Display Assembly on the ESD mat with each of the hinges set at 90-degree angles.

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2. **Install the new Display Assembly –** Carefully align the hinges into the packets on the device Enclosure.

Important: Ensure the Enclosure does not impact on the display assembly glass.

3. **Pre-fasten the right hinge screws -** Using a 6IP (Torx-Plus) driver, install 4 new right side hinge screws (▣6IP) and tighten until it is just snug.
4. **Pre-fasten the left hinge screws -** Using a 6IP (Torx-Plus) driver, install 3 new left side hinge screws (▣6IP) and tighten until just snug.
5. **Check alignment –**
   a. Close the device.
   b. Loosen all 8 hinge screws 90 degrees (1/4th turn).
   c. Adjust the alignment until the gap between the Display Assembly and the Chassis is as even as possible.

   d. Tighten down 1 screw on the left hinge until snug. Adjust to the right side so that the Chassis surface is flush with the Display Assembly.
   e. Tighten down 1 screw on the right hinge. Loosen the screw that was tightened down on the left hinge. Adjust the left side so that the Chassis surface is flush with the Display Assembly.
   f. Repeat as necessary until the left and right gaps are even and the back surfaces are flush.
6. **Tighten all hinge screws -** Tighten all 7 hinge screws until they are snug, and then tighten an additional 90 degrees (1/4 turn) to ensure they are securely fastened.
7. **Connect the Display Assembly FPCs to the Motherboard -** Attach the display module cables to the receptacles on the Motherboard.
8. **Place the Display Assembly FPC Tape –** Place the Display Assembly FPC Tape to the Display Assembly FPC as shown.

Important: Tape should be applied only to the Display Assembly FPC.
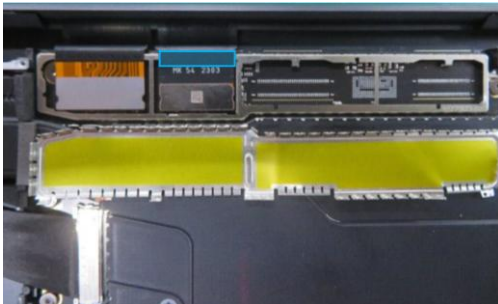
9. **Install the T3 Shield Foams (as needed) –**
   a. If the Display Assembly being installed has 2 FPCs, inspect the shield fence for foams. If the foams are not present, install the supplied foams as shown.

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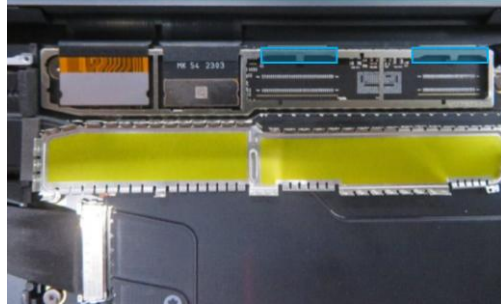
b.   If the Display Assembly being installed has 4 FPCs, inspect the shield fence for foams. Any foams on the shield fence should be removed.

> **Important:** New Display Assemblies will only have 2 FPCs. The remaining 2 connections on the Motherboard will remain empty. This is by design.

10. **Install the Motherboard screw -** Using a 3IP (Torx-Plus) driver, install 1 new Motherboard screw (⚙3IP) until just snug and seated, and then turn another 45-degrees (1/8th turn) until fully fastened.

11. **Install the Antenna –**

a.   Install the previously removed Antenna. Using a 3IP (Torx-Plus) driver, install 12 new screws ((•)3IP). All screws should be installed until just snug, and then turned another 45-degrees (1/8th turn) until fully fastened.
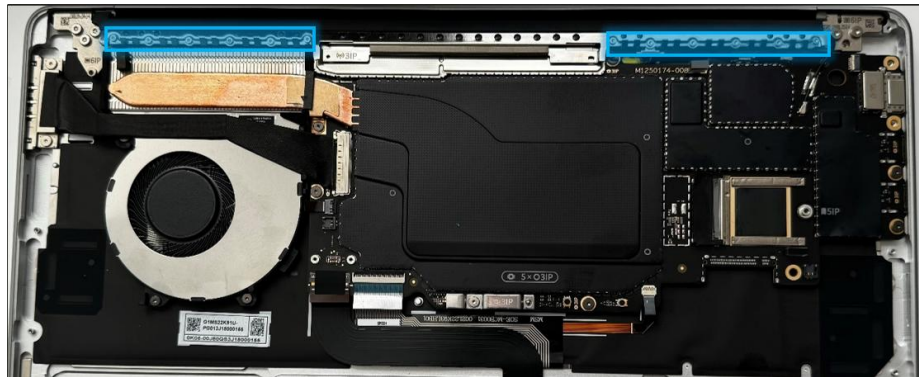
b.   Connect the 2 Coax Cables to the Motherboard by aligning each with the socket, and pressing down until a click is felt.

c.   Install 2 new Coax Cable Lids to the Motherboard over the Coax Cables. Align and press into place until a click is felt.

12. **Install the Audio Jack –** Refer to Procedure – Installation (Audio Jack) section of this document for detailed instructions.

13. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.

14. **Install the Enclosure –** Refer to Procedure – Installation (Enclosure) section of this document for detailed instructions.

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15. **Power on device –** Carefully place the device with the screen side facing up. Connect the device to a power supply and open the Display.

Procedure – Finalize (Display Assembly)

> **Important:** This section is only for instances where you are replacing the Display. If the Display is being re-used, then this section is not required. If Display is unusable due to damage or fault, connect an external monitor to the device to perform these steps.

1. **Connect USB –** Connect USB with the Surface Diagnostic Toolkit (SDT) loaded to an available USB port on the device under repair.
2. **Launch SDT –** From the Windows Desktop, use Windows Explorer to navigate to the USB drive. Select the SDT executable (.exe) to launch the Surface Diagnostic Toolkit.
3. **Run Touch Display Calibration –** From the SDT launch screen, select **Repair** from the drop-down menu. Next, select **Repair Setup and Validation** to enter the selection screen. Run the **Touch Display (Calibration)** tool to calibrate your new Display. Follow all on-screen instructions and allow the device to restart when prompted.

> **Important:** If the calibration fails, reboot the device, and attempt again. If the failure continues, then the Display may be faulty and require replacement.

4. **Launch SDT –** Once the device has rebooted and is at the Windows Desktop, use Windows Explorer to navigate to the USB drive. Select the SDT executable (.exe) to launch the Surface Diagnostic Toolkit.
5. **Run the Surface Diagnostic Toolkit (SDT) –** Run all diagnostics to ensure the device is functioning as expected before moving forward.
6. **Install Feet –** Refer to Procedure – Installation (Feet) for steps to install Feet.

Surface Connect Replacement

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- Isopropyl alcohol (91% or greater)
- Cleaning swabs
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Surface Connect (Refer to the Illustrated Service Parts List)
    - M1301718 Screws x 4 (Foot screws)
    - M1246215 Screws x 1 (Solid-State Drive) █5IP
    - M1277572 Screws x 2 (Surface Connect)
    - M1301902 PSA x 1 (Surface Connect & Fan)

Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Surface Connect)

1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Disconnect the Surface Connect connector –** Using a Nylon Spudger, flip up the latch on the Motherboard, and disconnect the Surface Connect connector from the Motherboard.

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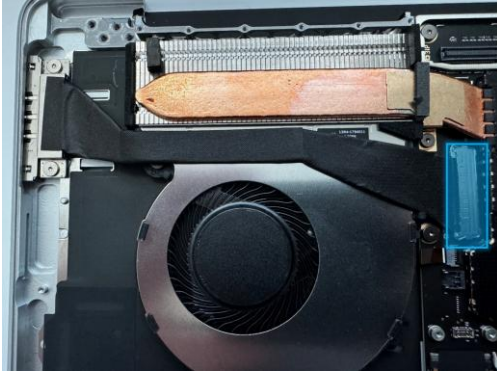
6. **Remove the Surface Connect Cable -** Using a 3IP (Torx-Plus) driver, remove the 2 screws securing the Surface Connect port to the Motherboard. Lift the cable out of the device and place it on an ESD-Safe mat.
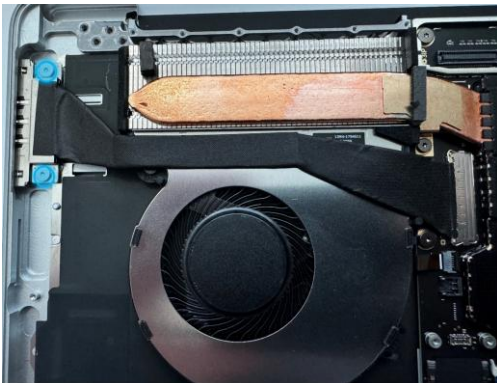
7. **Remove residual adhesive -** Gently peel up the PSA (pressure-sensitive adhesive) under the Surface Connect Cable (on the Fan) and remove. Clean up the surface with IPA and cleaning swabs until all residual adhesive has been removed and the surface is clean.

Procedure – Installation (Surface Connect)

1. **Install new PSA -** Place a new piece of PSA down onto the Fan as shown.
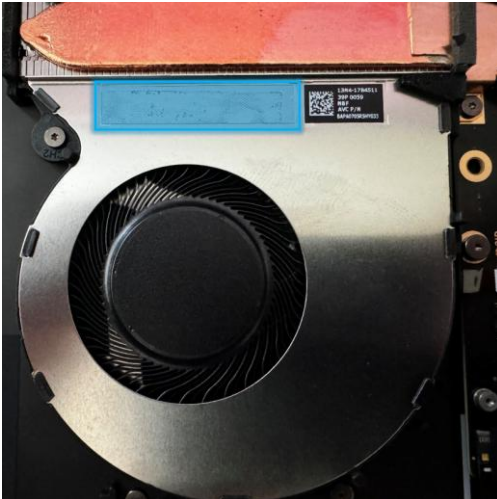
2. **Install the Surface Connect Cable –**
   a. Insert the connector of the Surface Connect Cable into the receptacle on the Motherboard and close the latch to secure it. There should be a click if the connector is inserted correct and the latch is fully closed.

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b. Toe in the Surface Connect connector into the device chassis ensuring that the plastic housing is flush with the outside surface of the chassis. The port should be fully aligned with the external opening.

c. Using a 3IP (Torx-Plus) driver, install the 2 new Surface Connect screws until the screw is just snug and seated, and then turn each another 45-degrees (1/8th turn) until fully fastened.
d. Lightly press the cable into the PSA to adhere the cable to the fan.
3. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.
4. **Install the Enclosure –** Refer to Procedure – Installation (Enclosure) section of this document for detailed instructions.
5. **Power on device –** Carefully place the device with the screen side facing up. Connect the device to a power supply and open the Display.
6. **Run the Surface Diagnostic Toolkit (SDT) –** Sitting at the desktop, insert the USB drive containing SDT and launch the program. Run all diagnostics to ensure the device is functioning as expected before moving forward.
7. **Power off the device –** Once the SDT tests have completed, power down the device and close the display. Invert the device so that the bottom of the device is facing up.
8. **Install the Feet -** Refer to the Procedure – Installation (Feet) section of this document for detailed instructions.

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Motherboard Replacement Process

Preliminary Requirements

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

> **Important:** If replacing both the Motherboard and the Display Assembly – complete the Motherboard replacement prior to performing the Display Assembly Replacement to ensure proper part operation.

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 6IP (Torx-Plus) Driver
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- Isopropyl alcohol (91% or greater)
- Cleaning swabs
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Motherboard (Refer to the Illustrated Service Parts List)
  - M1301718 Screws x 4 (Foot screws)
  - M1266593 Screws x 2 (Battery FPC Bracket) 🔲 3IP - 1
  - M1272782 Screws x 8 (Battery) 🔲 5IP - 2
  - M1246215 Screws x 1 (Solid-State Drive) 🔋 5IP
  - M1265600 Screws x 1 (Hinge & Chassis) 🔲 6IP
  - M1274578 Screws x 14 (Antenna) (( )) 3IP
  - M1212080 Screws x 1 (Audio Jack Bridge) 🔌 3IP - 1
  - M1263960 Screws x 2 (Audio Jack) 🔌 3IP - 2
  - M1235995 Screws x 8 (Motherboard) ⚙ 3IP - 1
  - M1263961 Screws x 2 (Motherboard) ⚙ 3IP - 2
  - M1277573 Screws x 1 (Motherboard) ⚙ 3IP - 3
  - M1265416 Shield x 2 (Coax Cable Lid)
  - M1271279 Shield x 1 (T1 Shield
  - M1271924 Shield x 1 (T3 Shield)
  - M1288973 Foam x 1 (T3 Shield Foam #1)
  - M1288974 Foam x 1 (T3 Shield Foam #2)
  - M1287120 Tape x 1 (Touchpad FPC Tape)
  - M1019757 Syringe x 1 (Thermal Paste)
  - M1301902 PSA x 1 (Surface Connect & Fan)

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Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Motherboard)

1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Remove the Audio Jack -** Refer to the Procedure – Removal (Audio Jack) section of this document for detailed instructions.
6. **Remove the Battery –** Refer to the Procedure – Removal (Battery) section of this document for detailed instructions.
7. **Remove the Antenna –**
   a. Using a Nylon Spudger, pry up the 2 Coax Cable Lids.
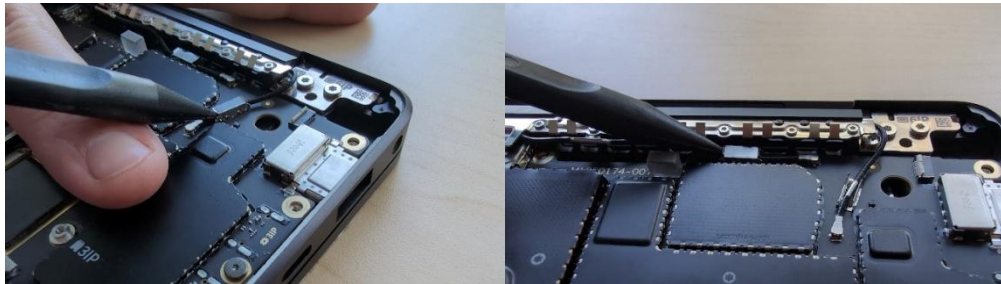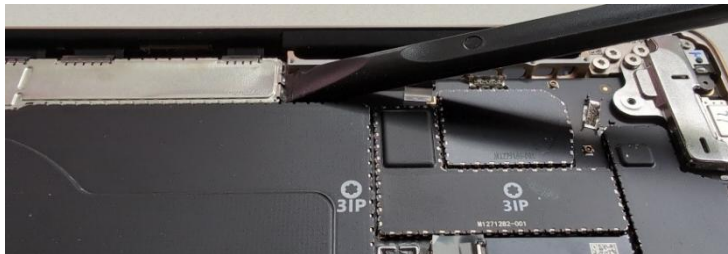

   b. Using a Nylon Spudger, disconnect the 2 Coax Cables.
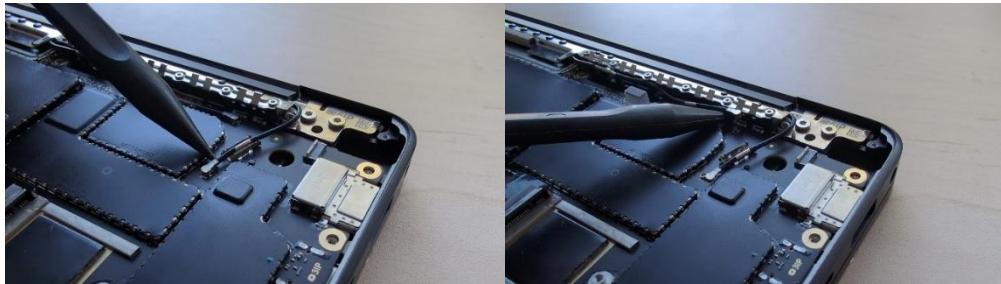
   c. Using a 3IP (Torx-Plus) driver, remove the 11 screws from the antenna.
   d. Lift the Antenna out of the Chassis.
8. **Remove the T3 Shield Lid –**
   a. Using a Nylon Spudger, pry up the T3 Shield Lid starting with the right edge.

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NOTE: Remove the Motherboard screw next to the T3 Shield can give better access for removal of the shield.

  b. Slide the Nylon Spudger under the shield moving right to left. Pause and shift the shield up and down as you work your way left as the shield will get stuck on its latches.
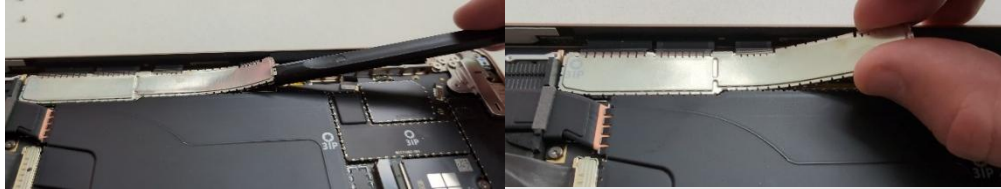

Caution: Ensure that the shield does not damage the Display FPC's during removal.

9. **Disconnect the Display Assembly FPCs -** Using a Nylon Spudger, pry up the connectors from the side and gently wiggle them free. If the connectors start giving resistance as they are being pried up, lightly push the edge being pried back down.

Caution: Do not force the connector if it starts to give resistance. Rock the connector back in the other direction to remove.

10. **Remove the T1 Shield –** Using a Nylon Spudger or ESD-Safe Tweezers, peel up the corner of the shield. Pry up the rest of the shield and remove.
11. **Remove the T5 Shield -** Using a Nylon Spudger or ESD-Safe Tweezers, peel up the corner of the shield. Pry up the rest of the shield and remove.
12. **Disconnect the Surface Connect Cable –** Using a Nylon Spudger, flip up the latch on the Motherboard and disconnect the Surface Connect connector from the Motherboard.
13. **Disconnect the Microsoft SD Reader Cable –** Using a Nylon Spudger, flip up the latch on the Micro SD Reader board and disconnect the connector from the Motherboard.
14. **Remove Microsoft SD Reader Cable PSA on Fan -** Peel up the Micro SD Reader cable from the Fan. Peel up and remove the PSA on the fan. Clean the surface with IPA and cleaning swabs until all residual adhesive is removed.
15. **Remove the Surface Connect PSA on Fan -** Peel up the Surface Connect cable from the Fan. Peel up and remove the PSA on the fan. Clean the surface with IPA and cleaning swabs until all residual adhesive is removed.
16. **Disconnect the Fan FPC -** Flip the latch on the Motherboard to disengage the lock on the Fan FPC. Remove the Fan FPC from the connector on the Motherboard.

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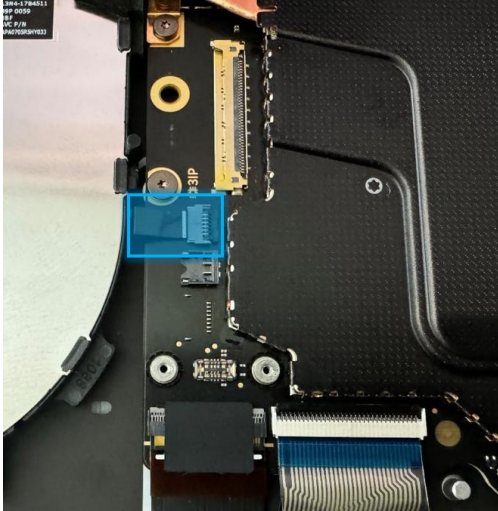
17. **Disconnect the Keyboard FPC -** Flip the latch on the Motherboard to disengage the lock on the Keyboard FPC. Remove the Keyboard FPC from the connector on the Motherboard.
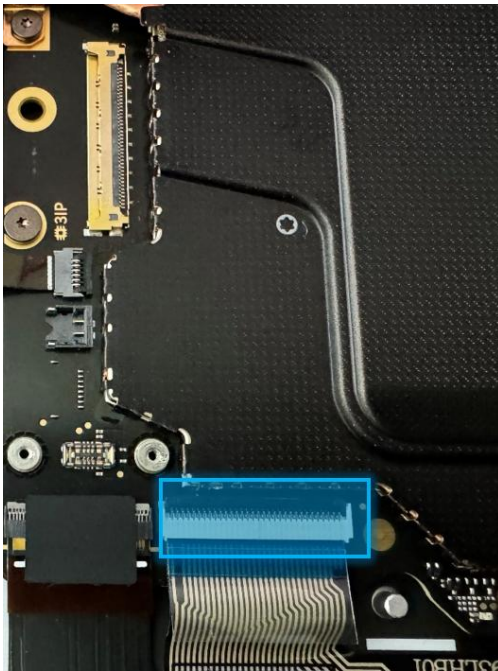

18. **Disconnect the Touch FPC –**
    a. Remove the black tape covering the Touchpad FPC and the connector. Clean the surface with IPA and cleaning swabs to ensure all residual adhesive is removed.

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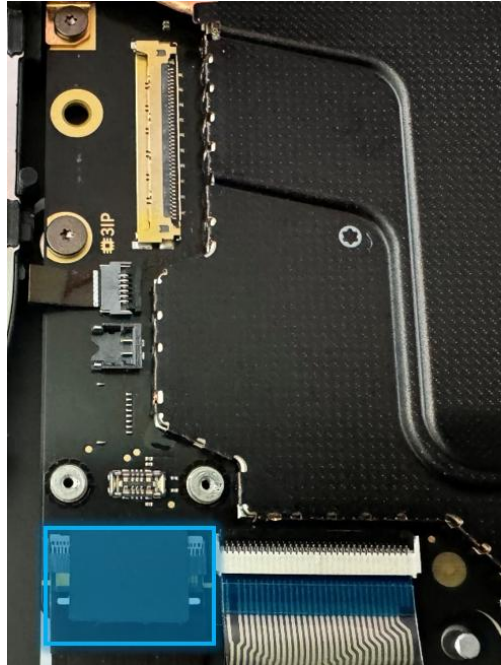
b. Flip the latch on the Motherboard to disengage the lock on the Touchpad FPC. Remove the Touchpad FPC from the connector on the Motherboard.

19. **Disconnect the Keyboard Backlight FPC -** Flip the latch on the Motherboard to disengage the lock on the Keyboard Backlight FPC. Remove the Keyboard Backlight FPC from the connector on the Motherboard.
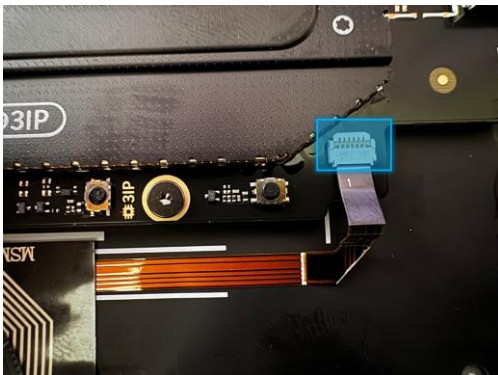

20. **Disconnect the Left Speaker -** To remove the connector from the Motherboard, pull up vertically on the wires until the connector comes free.

21. **Disconnect the Right Speaker -** To remove the connector from the Motherboard, pull up vertically on the wires until the connector comes free.

22. **Remove the Motherboard Steel Bracket –** Using a 3IP (Torx-Plus) Driver, remove the 1 screw holding the Motherboard Steel Bracket to the Enclosure.

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23. **Remove the Motherboard Shields–** Using ESD-Safe Tweezers, carefully remove the two metal shields identified below to expose the Motherboard screws underneath.
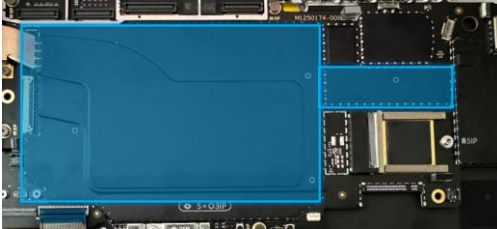
24. **Remove the Motherboard Screws -** Using a 3IP (Torx-Plus) driver, remove the 10 screws holding the Motherboard to the Chassis.
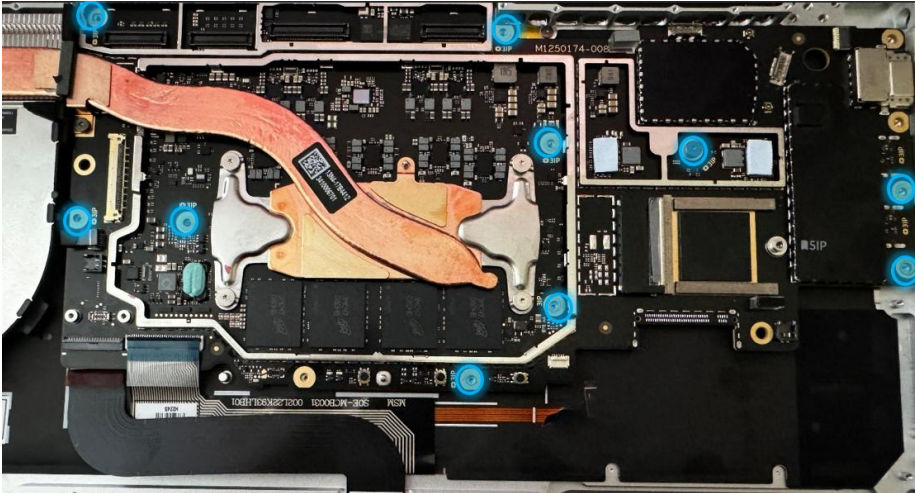

25. **Remove the Motherboard –** Using both hands, carefully lift the Motherboard out and up, taking care to avoid pulling on the thermal module or any connectors.

**Procedure – Installation (Motherboard)**

1. **Install the Micro SD Reader Cable –** Insert the Micro SD Reader Cable into the connector on the bottom side of the Motherboard.
2. **Install the Motherboard –**

> **Important:** The Thermal Module should be installed onto the Motherboard. Take caution during installation of the Motherboard to avoid damage to the Thermal Module. Damage to the Thermal Module will require replacement of the Motherboard or device.

a. Lower the Motherboard USB-C side first into the device chassis. Ensure that the USB-C connectors fit in the corresponding holes in the Chassis.
b. Lower the left side of the Motherboard and use your other hand to keep the component FPCs out of the way.
c. Adjust the position of the Motherboard until all the hole's line up with the screw bosses.
d. Using a 3IP (Torx-Plus) driver, install 8 new Motherboard screws (⚙ 3IP - 1) until just snug. Turn each screw another 45-degrees (1/8th turn) until fully fastened.

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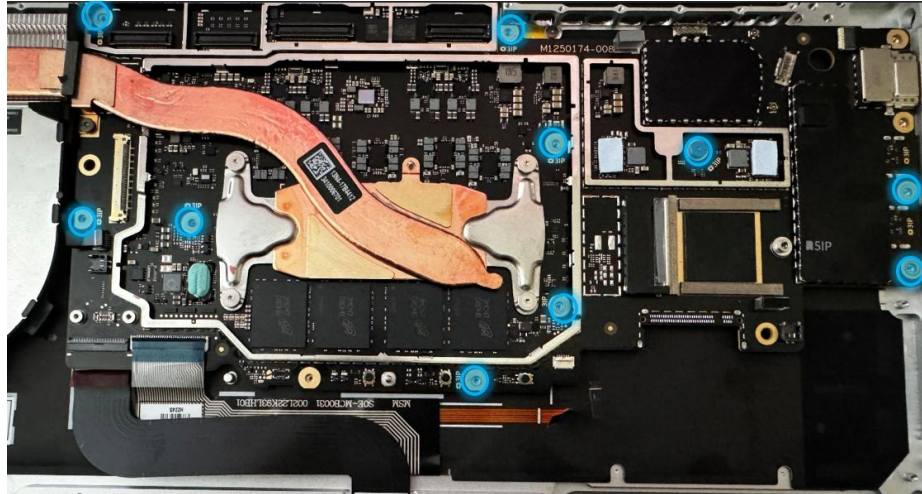
e. Using a 3IP (Torx-Plus) driver, install 2 new Motherboard screws (⚙3IP - 2) until just snug. Turn each screw another 45-degrees (1/8th turn) until fully fastened.
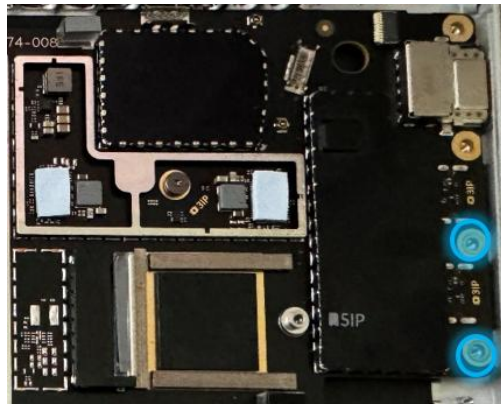

> **Important:** Ensure that the slots next to the thermal module screws sit over the posts in the device chassis.

3. **Assemble the T1 Shield –**
    a. Using the provided syringe of thermal paste, apply the equivalent of 2 tick marks (marked on the side of the syringe) of thermal paste to the component marked below.

    b. Using the same syringe of thermal paste, apply the equivalent of ½ ticket mark (marked on the side of the syringe) of thermal paste to the component marked below.

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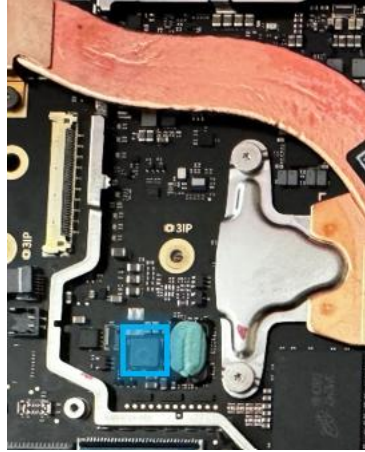
      c.   Assemble and install a new T1 Shield.

4. **Assemble the Motherboard Steel Bracket -** Using a 3IP (Torx-Plus) driver, install 1 new screw (⚙3IP - 3) until just snug, and then turn another 45-degrees (1/8th turn) until fully fastened.

5. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.

6. **Connect the Fan FPC -** Ensure the latch on the Motherboard receptable for the Fan FPC is in a vertical position before inserting the Fan FPC. Flip the latch on the Motherboard down to secure the Fan FPC.

7. **Connect the Left Speaker wire -** Insert the speaker connector into the receptable on the Motherboard by pressing vertically until a snap is felt.

8. **Connect the Right Speaker wire -** Insert the speaker connector into the receptable on the Motherboard by pressing vertically until a snap is felt.

9. **Connect the Touchpad FPC -**
      a.   Ensure the latch on the Motherboard connector for the Touchpad FPC is in the vertical position before inserting the Touchpad FPC. Flip the latch on the Motherboard down to secure the Touchpad FPC.
      b.   Apply a new Touchpad FPC Tape across the FPC and the Motherboard connector.

10. **Connect the Keyboard FPC -** Ensure the latch on the Motherboard connector for the Keyboard FPC is in a vertical position before inserting the Keyboard FPC. Flip the latch on the Motherboard down to secure the Keyboard FPC.
11. **Connect the Keyset Backlight FPC -** Ensure the latch on the Motherboard connector for the Keyset Backlight FPC is in a vertical position before inserting the Keyset Backlight FPC. Flip the latch on the Motherboard down to secure the Keyset Backlight FPC.
12. **Connect the Audio Jack FPC -** Ensure the latch on the Motherboard connector for the Audio Jack FPC is in the vertical position before inserting the Audio Jack FPC. Flip the latch on the Motherboard down to secure the Audio Jack FPC.
13. **Install new PSA -** Place a new piece of PSA down onto the Fan as shown.
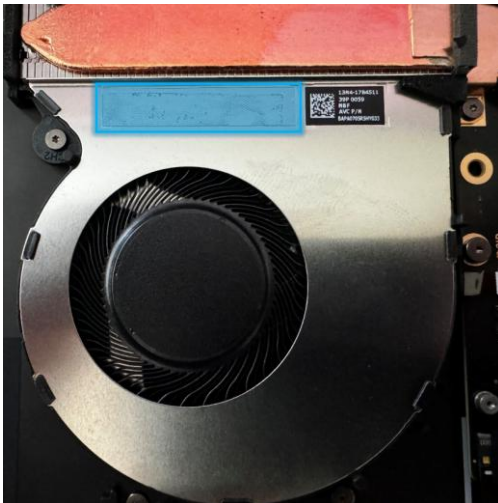
14. **Install the Surface Connect Cable –** Insert the connector of the Surface Connect Cable into the receptacle on the Motherboard and close the latch to secure it. There should be a click if the connector is inserted correct and the latch is fully closed.
15. **Install the Display Assembly FPC's, T3 Shield, and Antenna -** Refer to the Procedure – Installation (Display Assembly) section of this document for detailed instructions.

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16. **Install the Audio Jack -** Refer to the Procedure – Installation (Audio Jack) section of this document for detailed instructions.
17. **Install the Battery - Refer** to the Procedure – Installation (Battery) section of this document for detailed instructions.
18. **Install the Enclosure –** Refer to Procedure – Installation (Enclosure) section of this document for detailed instructions.

Procedure – Finalize (Motherboard)

> **Important:** If replacing both the Motherboard Module and the Display Assembly – complete the Motherboard Module replacement prior to performing the Display Assembly Replacement to ensure proper part operation.

1. **Power on Device –** Connect a Power Supply to the device and power it on until it reaches the Windows Desktop.
2. **Connect USB –** Connect USB with the Surface Diagnostic Toolkit (SDT) loaded to an available USB port on the device under repair.
3. **Launch SDT –** From the Windows Desktop, use Windows Explorer to navigate to the USB drive. Select the SDT executable (.exe) to launch the Surface Diagnostic Toolkit.
4. **Run Touch Display Calibration –** From the SDT launch screen, select **Repair** from the drop-down menu. Next, select **Repair Setup and Validation** to enter the selection screen. Run the **Touch Display (Calibration)** tool to calibrate your new Display. Follow all on-screen instructions and allow the device to restart when prompted.

> **Important:** If the calibration fails, reboot the device, and attempt again. If the failure continues, then the Display may be faulty and require replacement.

5. **Allow the Battery to charge –** With the device connected to a power supply, allow the battery to charge until the battery icon in Windows reads at least 50% remaining battery charge.
6. **Launch SDT –** Once the device has rebooted and is at the Windows Desktop, use Windows Explorer to navigate to the USB drive. Select the SDT executable (.exe) to launch the Surface Diagnostic Toolkit.
7. **Run Battery Authentication –** From the SDT launch screen, select **Repair** from the drop-down menu. Next, select **Repair Setup and Validation** to enter the selection screen. Select the **Battery Repair (Validation)** tool to ensure the battery is detected as properly authenticated. If the battery reads anything other than authenticated, run the Validation tool in its entirety.

> **Important:** Battery authentication requires a stable internet connection and the latest version of the Surface Management Extension. If the battery validation tool fails or is not detected properly, install the Surface Management Extension, reboot the device, and try again with a new internet connection. If failures continue, reach out to Microsoft Support.

8. **Run the Surface Diagnostic Toolkit (SDT) –** Run all diagnostics to ensure the device is functioning as expected before moving forward.
9. **Install Feet –** Refer to Procedure – Installation (Feet) for steps to install Feet.

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Keyboard Replacement Process

Preliminary Requirements

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

Required Tools

- Plastic Opening Pick
- Nylon Spudger
- ESD-Safe Tweezers
- Soft ESD-Safe Mat
- 6IP (Torx-Plus) Driver
- 5IP (Torx-Plus) Driver
- 3IP (Torx-Plus) Driver
- 2IP (Torx-Plus) Driver
- Isopropyl alcohol (91% or greater)
- Cleaning swabs
- Anti-Static wrist strap (1M Ohm resistance)
- USB drive loaded with the Surface Diagnostic Toolkit

Primary Components

- Keyboard Assembly (Refer to the Illustrated Service Parts List)
    - M1301718 Screws x 4 (Foot screws)
    - M1266593 Screws x 2 (Battery FPC Bracket) 🔲 3IP - 1
    - M1272782 Screws x 8 (Battery) 🔲 5IP - 2
    - M1246215 Screws x 1 (Solid-State Drive) 📱5IP
    - M1265600 Screws x 1 (Hinge & Chassis) 🔲6IP
    - M1274578 Screws x 14 (Antenna) 📶3IP
    - M1212080 Screws x 1 (Audio Jack Bridge) ▭▶3IP - 1
    - M1263960 Screws x 2 (Audio Jack) ▭▶3IP - 2
    - M1235995 Screws x 8 (Motherboard) ⚙3IP - 1
    - M1263961 Screws x 2 (Motherboard) ⚙3IP - 2
    - M1277573 Screws x 1 (Motherboard) ⚙3IP - 3
    - M1211014 Screws x 4 (Speakers)
    - M1277572 Screws x 2 (Surface Connect)
    - M1235134 Screws x 3 (Fan)
    - M1249236 Screws x 4 (Mounting Brackets)
    - M1265416 Shield x 2 (Coax Cable Lid)
    - M1271279 Shield x 1 (T1 Shield
    - M1271924 Shield x 1 (T3 Shield)
    - M1288973 Foam x 1 (T3 Shield Foam #1)
    - M1288974 Foam x 1 (T3 Shield Foam #2)
    - M1287120 Tape x 1 (Touchpad FPC Tape)
    - M1167842 Tape x 1 (Right Speaker Tape)
    - M1019757 Syringe x 1 (Thermal Paste)
    - M1301902 PSA x 1 (Surface Connect & Fan)

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Additional Components (Ordered Separately)

- Feet (Refer to the Illustrated Service Parts List)

Procedure – Removal (Keyboard Assembly)
1. **Place Device –** Carefully place the closed device Display side down with the Feet facing up on a soft ESD-Safe Mat.
2. **Remove the Feet –** Refer to the Procedure – Removal (Feet) section of this document for detailed instructions.
3. **Remove the Enclosure –** Refer to the Procedure – Removal (Enclosure) section of this document for detailed instructions.
4. **Remove the Removable Solid-State Drive -** Refer to the Procedure – Removal (Removable Solid-State Drive) section of this document for detailed instructions.
5. **Remove the Audio Jack -** Refer to the Procedure – Removal (Audio Jack) section of this document for detailed instructions.
6. **Remove the Battery –** Refer to the Procedure – Removal (Battery) section of this document for detailed instructions.
7. **Remove the Left Speaker –** Refer to the Procedure – Removal (Left Speaker) section of this document for detailed instructions.
8. **Remove the Right Speaker -** Refer to the Procedure – Removal (Right Speaker) section of this document for detailed instructions.
9. **Remove the Micro SD Reader –** Refer to the Procedure – Removal (Micro SD Reader) section of this document for detailed instructions.
10. **Remove the Display Assembly –** Refer to the Procedure – Removal (Display Assembly) section of this document for detailed instructions.
11. **Remove the Surface Connect –** Refer to the Procedure – Removal (Surface Connect) section of this document for detailed instructions.
12. **Remove the Motherboard -** Refer to the Procedure – Removal (Motherboard) section of this document for detailed instructions.
13. **Remove the Fan –** Using a 3IP (Torx-Plus) driver, remove the 3 screws securing the Fan to the Keyboard Assembly. Remove the Fan from the device.
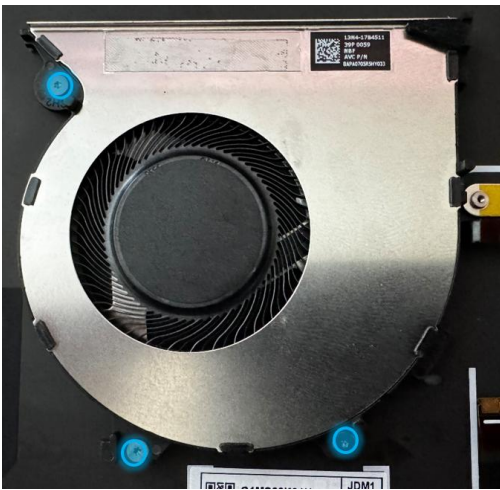
14. **Remove the Mounting Brackets–** Using a 2IP (Torx-Plus) driver, remove the 2 screws holding each of the Mounting Brackets to the Keyboard Assembly. Remove the 2 Mounting Brackets from the device.

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Procedure – Installation (Keyboard Assembly)

1. **Install the Mounting Brackets –**
   a. Place the 2 previously removed Mounting Brackets so that the yellow side is visible, and they are arranged as shown here.

   b. Using a 2IP (Torx-Plus) driver, install 4 new Mounting Bracket screws until the screws are just snug, and then turn each another 45-degrees (1/8th turn) until fully fastened.
2. **Install the Motherboard -** Refer to the Procedure – Installation (Motherboard) section of this document for detailed instructions. Complete steps 1-4 in that section.
3. **Install the Removable Solid-State Drive –** Refer to Procedure – Installation (Removable Solid-State Drive) section of this document for detailed instructions.
4. **Install the Fan -**
   a. Using a 3IP (Torx-Plus) driver, install 3 new Fan screws until they are just snug, and then turn each another 45-degrees (1/8th turn) until fully fastened.

   b. Ensure the latch on the Motherboard connector for the Fan is in a vertical position before inserting the Fan FPC. Flip the latch down to secure the Fan FPC.
5. **Install the Left Speaker -** Refer to Procedure – Installation (Left Speaker) section of this document for detailed instructions.
6. **Install the Right Speaker -** Refer to Procedure – Installation (Right Speaker) section of this document for detailed instructions.
7. **Continue with Motherboard installation -** Refer to the Procedure – Installation (Motherboard) section of this document for detailed instructions. You will start at Step 6.

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8. **Install the Display -** Refer to the Procedure – Installation (Display) section of this document for detailed instructions.
9. **Install the Audio Jack -** Refer to the Procedure – Installation (Audio Jack) section of this document for detailed instructions.
10. **Install the Surface Connect -** Refer to the Procedure – Installation (Surface Connect) section of this document for detailed instructions.
11. **Install the Battery -** Refer to the Procedure – Installation (Battery) section of this document for detailed instructions.
12. **Install the Enclosure -** Refer to the Procedure – Installation (Enclosure) section of this document for detailed instructions.
13. **Power on device –** Carefully place the device with the screen side facing up. Connect the device to a power supply and open the Display.
14. **Run the Surface Diagnostic Toolkit (SDT) –** Sitting at the desktop, insert the USB drive containing SDT and launch the program. Run all diagnostics to ensure the device is functioning as expected before moving forward.
15. **Power off the device –** Once the SDT tests have completed, power down the device and close the display. Invert the device so that the bottom of the device is facing up.
16. **Install the Feet -** Refer to the Procedure – Installation (Feet) section of this document for detailed instructions.

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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 .

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