



Microsoft Surface Laptop Teardown

Teardown is the word of the day, and today we...

Written By: Evan Noronha



INTRODUCTION

Teardown is the *word* of the day, and today we plan to dive into Microsoft's new Surface Laptop. Will this ~~carpeted~~ Alcantara clad laptop *excel* in our teardown room? The *power* is in our hands. Let's get to the *point*... Ladies and gents, it's teardown time!

And there's even more where that came from! Check out our [Surface Pro 5](#) teardown to get your fill of all the latest Microsoft hardware.

Need more *access* to teardowns? Make sure to not miss any *windows* and follow us on [Facebook](#), [Instagram](#), or [Twitter](#) for the latest teardown news.

[video: <https://www.youtube.com/watch?v=xAl6yIZI3rg>]



TOOLS:

[iOpener](#) (1)

[Jimmy](#) (1)

[iFixit Opening Picks \(Set of 6\)](#) (1)

[Spudger](#) (1)

[Tweezers](#) (1)

[Precision Utility Knife](#) (1)

[T4 Torx Screwdriver](#) (1)

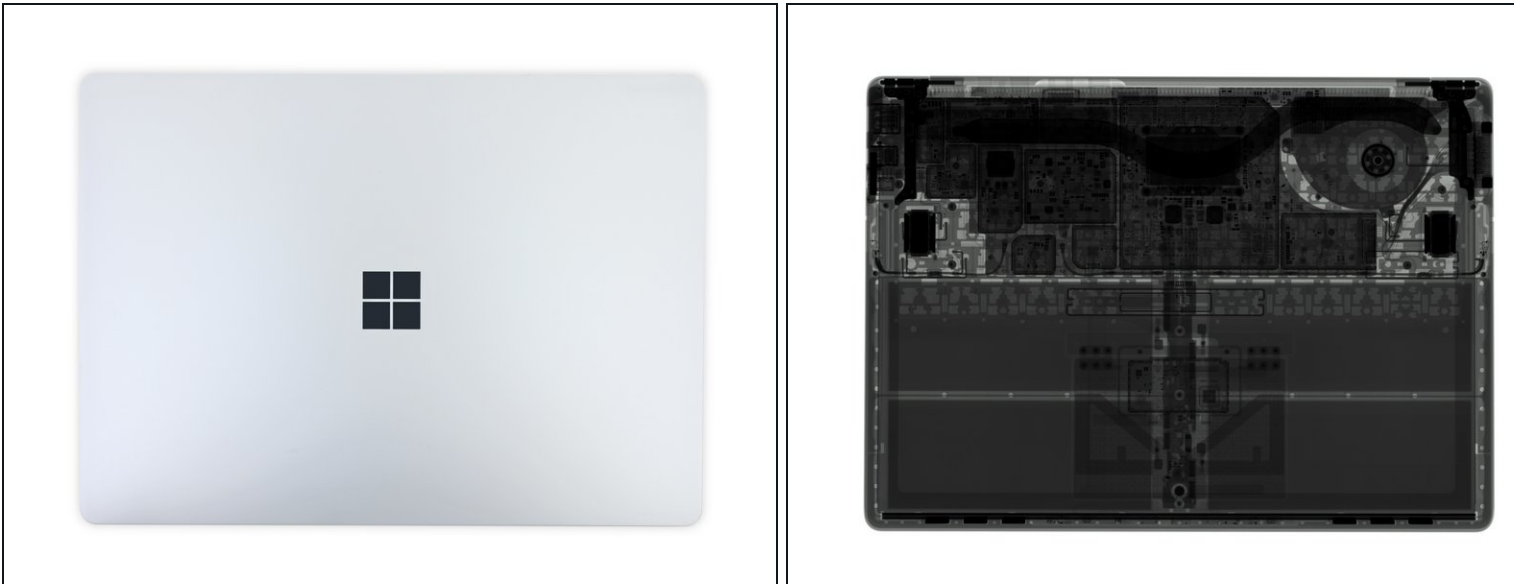
[T6 Torx Screwdriver](#) (1)

Step 1 — Microsoft Surface Laptop Teardown



- Alright, the Surface Book is out of the box and on our ~~chopping block~~ teardown table. Here's what we're looking to find today:
 - 13.5" IPS PixelSense™ Display with 2256 × 1504 resolution (201 PPI)
 - Intel Kaby Lake Core i5 (3M Cache, up to 3.10 GHz) or Core i7 (4M Cache, 4.00 GHz) CPU
 - 4 GB/8 GB/16 GB RAM
 - 128 GB/256 GB/512 GB PCIe SSD storage
 - 720p front-facing camera with Windows Hello sign-in
 - USB 3.0 port, Mini DisplayPort, and SurfaceConnect charging port
 - 802.11ac Wi-Fi wireless networking, IEEE 802.11 a/b/g/n compatible, Bluetooth Wireless 4.0 technology

Step 2



- Before we delve into (presumably) [another repair nightmare](#), let's get the lay of the land with some sweet X-rays.
- ⓘ Thanks, [Creative Electron](#)!
- Looks like we're gonna see a lot of battery, a fan, and a beefy heat sink.
- Plus, a lot of shielding. This thing already looks scary.

Step 3



- All the usual regulatory markings are hiding out on the lower case alongside the model number: 1769.
- We stack it up (literally) against a MacBook Air to play a game of spot the differences...
 - ... But apart from the layout, there's not a ton. Both sport a headphone jack, proprietary charging port, Mini DisplayPort connector, and at least one USB 3.0 port.
 - Connectivity differences include: an SDXC card reader and a second USB port in the Air.

Step 4



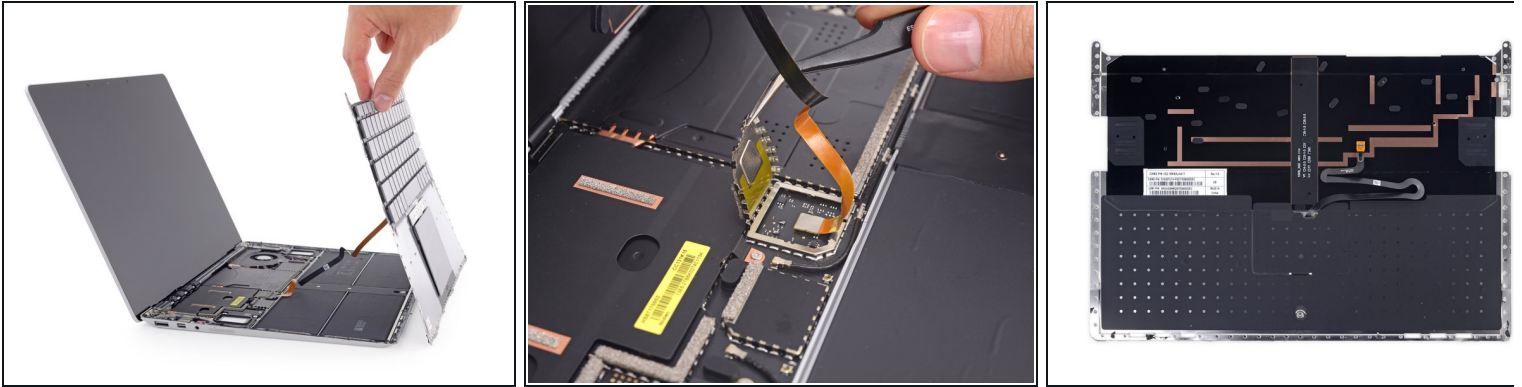
- We take a peek under the suspicious rubber footpads, but find metal feet instead of the screws we were hoping for.
- Looks like we have to peel up that ([dubiously luxurious](#)) Alcantara after all.
- [Jimmy](#) in hand, we start popping clips and peeling adhesive. Already, this doesn't feel like it's going back together.
- We try to remove the fabric cover, but the going gets a lot tougher south of the keyboard. What's going on here?

Step 5



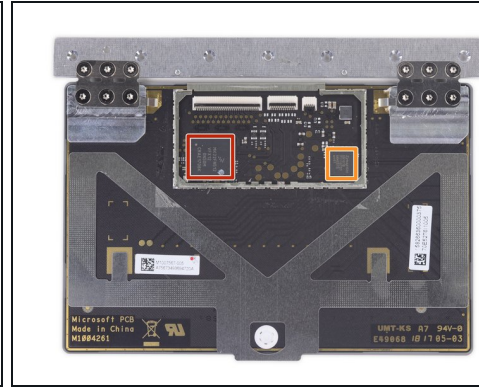
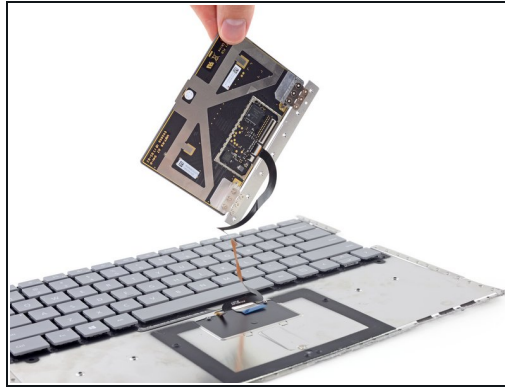
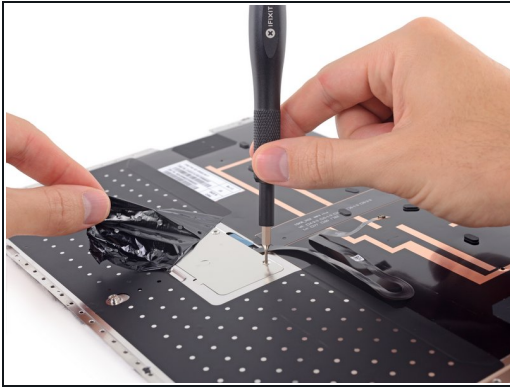
- We have to pull out the big ~~guns~~ knife now, to cut off the rest of the pelt. Layered underneath we find a metal shield, the meat in our Surface sandwich.
- With more adhesive and plastic bits holding the shield from beneath, we fire up the iOpener and get back to popping.
- Now that we've got a clear look at the plastic, it seems these aren't reusable clips at all, but weak ultrasonic spot welds that we've been busting through. This is definitely not going back together without a roll of duct tape.

Step 6



- With the keyboard plate finally wrested free of its sticky and plastic-y jailers, we're at least pleased by the long cable connecting it to the body.
- Our pleasure is short-lived. The connector is trapped under a clip-on shield on the motherboard, complicating its removal.
 - This is surprisingly not that uncommon with recent [Surface devices](#).
- With the keyboard out, we begin the search for the trackpad. Presumably it's in here somewhere, let's follow that cable trail!

Step 7



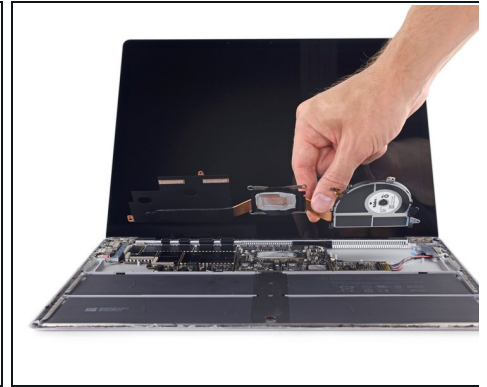
- The trackpad is trapped under tape and a metal shield, but it's nothing we haven't handled before.
- We take a moment to check the silicon before releasing this trackpad into the wild:
 - NXP/Freescale [MK22FN512](#) Kinetis K22-120 MHz ARM Cortex-M4 Core MCU
 - Synaptics S9101B touch controller (as seen in the [Surface Book](#))

Step 8



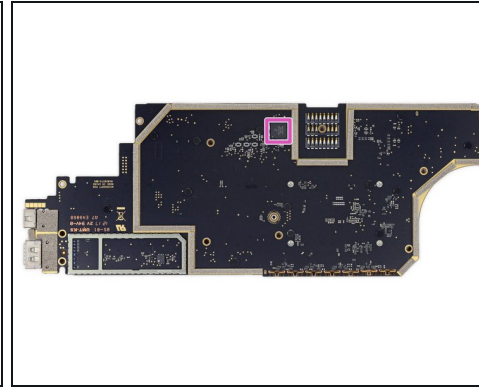
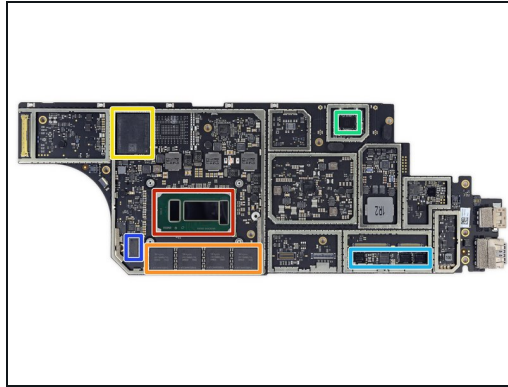
- We look around for a battery connector to dispatch, but it's nowhere to be seen. Looks like we're doing this live! Time to start pulling out parts!
- First up, speakers. What is there to say about speakers? They look like they're pretty good at speaking.
 - Like in the [Surface Pro 4](#), they are not exactly symmetrical. Just like in the [Surface Book](#), there are two of them.
- At first glance, these white dots appear to be water damage indicators. Upon [closer inspection](#), they're actually port covers to contain [damping foam](#), increasing the speakers' bass response.

Step 9



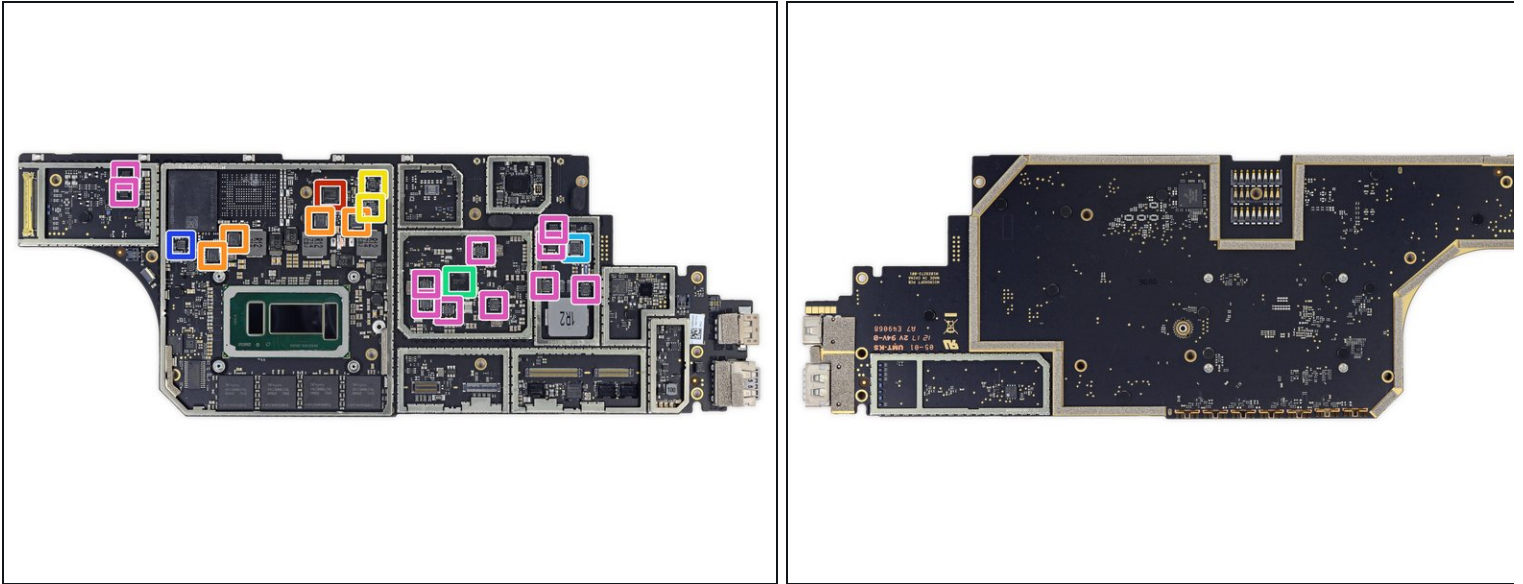
- We are unsurprised to find an antenna nestled behind the plastic RF passthrough on the side of the case.
- Turning back to the motherboard, all of the fun bits are hidden under shields packed with thermal pads. Looks like a lot of things get warm in here.
- We'll have to just take the heat, because this heat sink is next. Out it comes, [and its little fan, too.](#)

Step 10



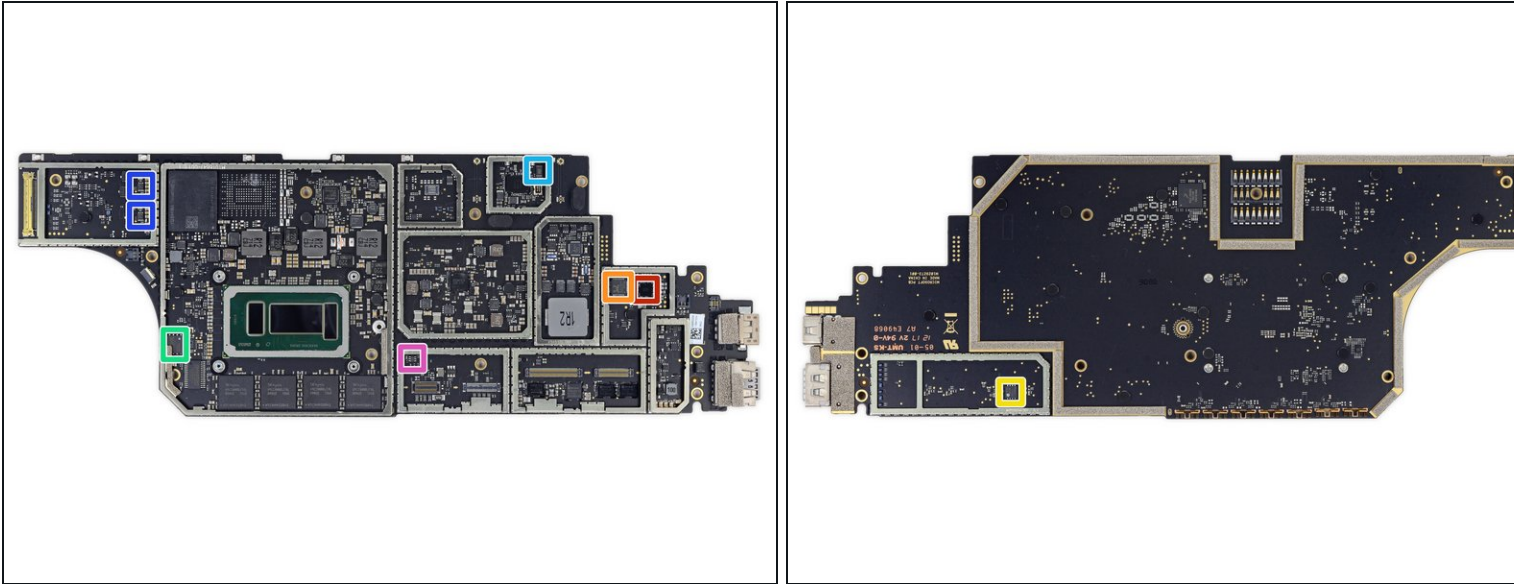
- Stop. Motherboard time!
 - Intel [SR368](#) Core i7-7660U CPU
 - SK Hynix [H9CCNNNBJTAL](#) LPDDR3 RAM
 - Toshiba THNSND256GTYA 256 GB SSD
 - Marvell Avastar [88W8897](#) WLAN/BT/NFC SoC
 - Microsoft X904169 (x3) and X904163 display driver ICs
 - Nuvoton [NPCT650SBBWX](#) TPM IC
 - Freescale/NXP [M22J9VDC](#) Kinetis K22F 512KB 120 MHz ARM Cortex-M4 Based MCU

Step 11



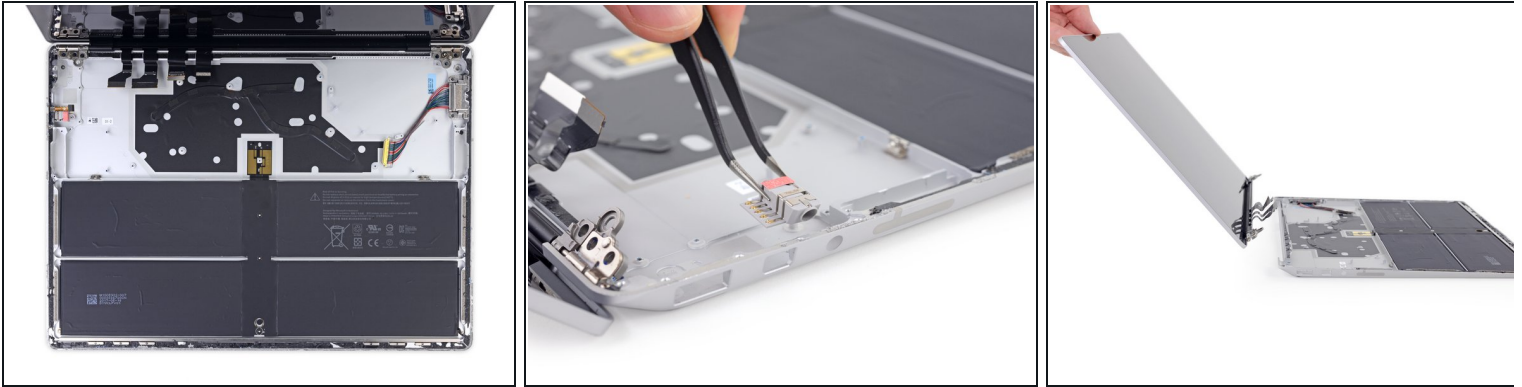
- IC Identification, pt. 2:
 - Renesas (formerly Intersil) [ISL95857A](#) Intel CPU power supply
 - Texas Instruments [CSD97396Q4M](#) synchronous buck power stage
 - Texas Instruments [TPS62134C](#) 3.2 A step-down converter for Intel Skylake processors
 - Rohm power management
 - Renesas (formerly Intersil) [ISL9237](#) SMBus li-ion battery charger
 - Texas Instruments [TPS62177](#) 0.5 A step-down converter
 - Texas Instruments [CSD87333Q3D](#), [CSD87334Q3D](#), [CSD25402Q3A](#), and [TPCC8105](#) MOSFETs

Step 12



- IC Identification, pt. 3:
 - Realtek audio codec
 - Realtek ALC1304M card reader (likely)
 - Macronix [MX25U1635F](#) 16 Mb serial NOR flash memory
 - Winbond [W25Q128FV](#) 128 Mb serial NOR flash memory
 - Likely Ablic (formerly Seiko Instruments) [S-24C16D-A8T1U5](#) 16 Kb serial EEPROM memory
 - Texas Instruments [TPS62085](#) 3 A step-down converter
 - Texas Instruments [TLV3011](#) comparator w/ 1.242 V reference

Step 13



- That's right folks, ten steps in and the battery is finally disconnected!
- The Laptop packs a 45.2 Wh battery, roughly the same capacity as the latest [Surface Pro](#) (45 Wh), and more than both [iPad Pro 10.5"](#) (31 wh) and latest [MacBook Retina](#) 41 Wh).
- Also visible in the rear case, a secondary heat pipe stuck to the rear case, helping dissipate heat from both sides of the motherboard.
- The modular headphone jack, not charged with any crime, is free to go, contacts and all.
- No Surface product is complete without a hinge, but these feel a little pedestrian compared to the [other](#) offerings. And with that, the display is unhinged.

Step 14



- The Surface Laptop is finally ~~vanquished~~ disassembled!
- Verdict: The Surface Laptop is not a laptop. It's a glue-filled monstrosity. There is nothing about it that is upgradable or long-lasting, and it literally can't be opened without destroying it. (Show us the procedure, Microsoft, we'd love to be wrong.)
- Here for your viewing pleasure: the parts that will never be whole again...
- For more teardown below the Surface, check out the [2017 Surface Pro](#) teardown!

Step 15 — Final Thoughts

REPAIRABILITY SCORE:



- Microsoft Surface Laptop
Repairability Score: **0 out of 10** (10 is easiest to repair)
- This laptop is not meant to be opened or repaired; you can't get inside without inflicting a lot of damage.
- The CPU, RAM, and onboard storage are soldered to the motherboard, making upgrades a no-go.
- The headphone jack, while modular, can only be accessed by removing the heat sink, fan, display, and motherboard.
- The battery is difficult and dangerous to replace, giving the device a limited lifespan.