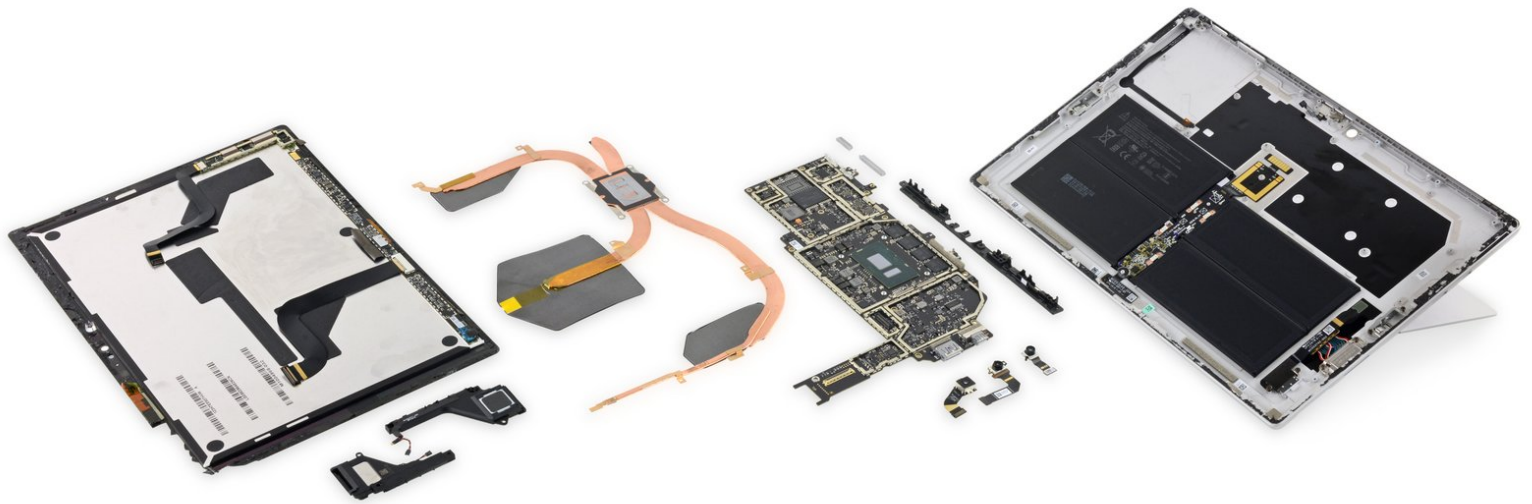




Microsoft Surface Pro 6 Teardown

Teardown of the Microsoft Surface Pro 6, performed on October 16, 2018.

Written By: Taylor Dixon



INTRODUCTION

Microsoft has decided once again to grace their ~~laptops~~ tablets Surfaces with numbers. This year's Surface Pro 6 comes with a sleek new black paint job and the first-ever quad-core processor in a Surface device! What else will we find inside? Only one way to find out—let's tear it down!

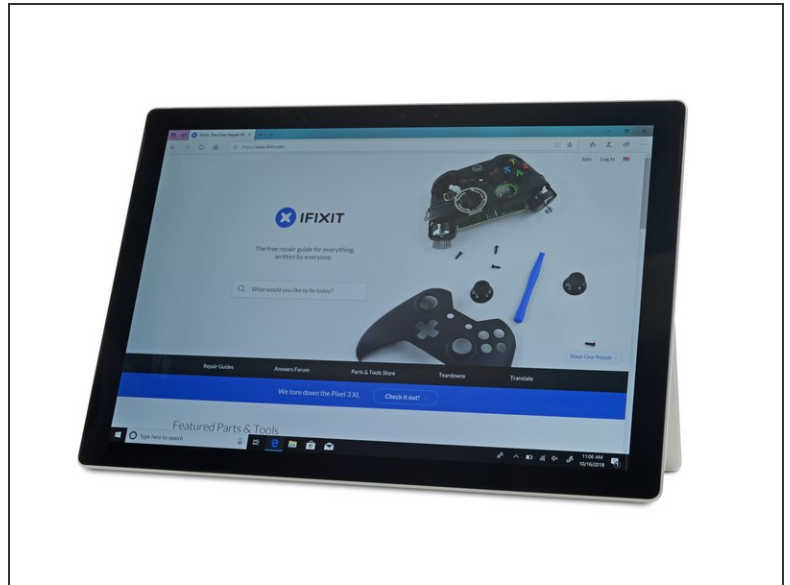
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TOOLS:

- [iOpener](#) (1)
 - [Suction Handle](#) (1)
 - [iFixit Opening Picks set of 6](#) (1)
 - [T3 Torx Screwdriver](#) (1)
 - [T5 Torx Screwdriver](#) (1)
 - [Tweezers](#) (1)
 - [Spudger](#) (1)
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Step 1 — Microsoft Surface Pro 6 Teardown



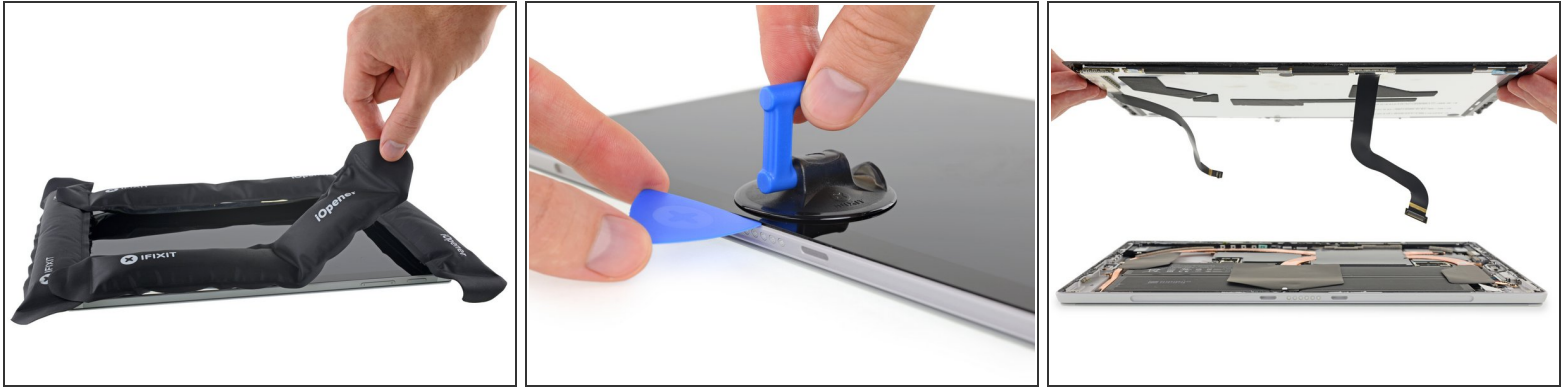
- New Surface, new specs (sorta):
 - 12.3" PixelSense display with 2736 × 1824 resolution (267 ppi)
 - 8th-Gen (Kaby Lake R) quad-core Intel Core i5 processor with Intel UHD Graphics 620
 - 8 GB RAM (16 GB optional)
 - 128 GB solid-state storage (256 GB, 512 GB, and 1 TB configurations optional)
 - 8 MP rear-facing camera with 1080p video, and 5 MP / 1080p front-facing Windows Hello camera
 - USB 3.0, microSDXC, Mini DisplayPort, SurfaceConnect, and 3.5 mm audio ports
 - 802.11a/b/g/n/ac Wi-Fi, Bluetooth 4.1

Step 2



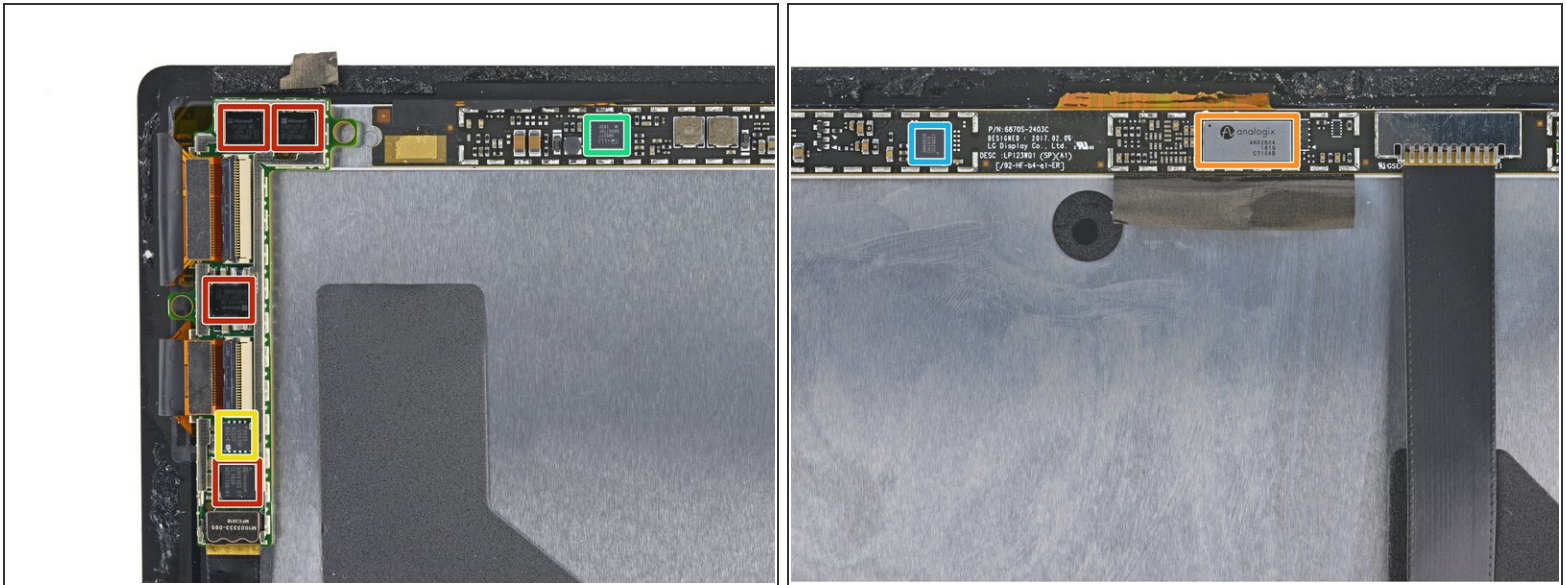
- Looks like we have an extra Surface Pro 6—err, wait, one of those is [last year's Surface Pro](#).
- Well, on the outside not much has changed from last year. Still the same case, hinge, and relatively healthy number of ports.
- ① Noticeably absent for 2018, however, is the ever-popular [USB-C port](#) that found its way onto the [Surface Go](#).
- We have to look pretty close to tell these Surfaces apart. Even the model number under the kickstand is the same as last year: 1796.

Step 3



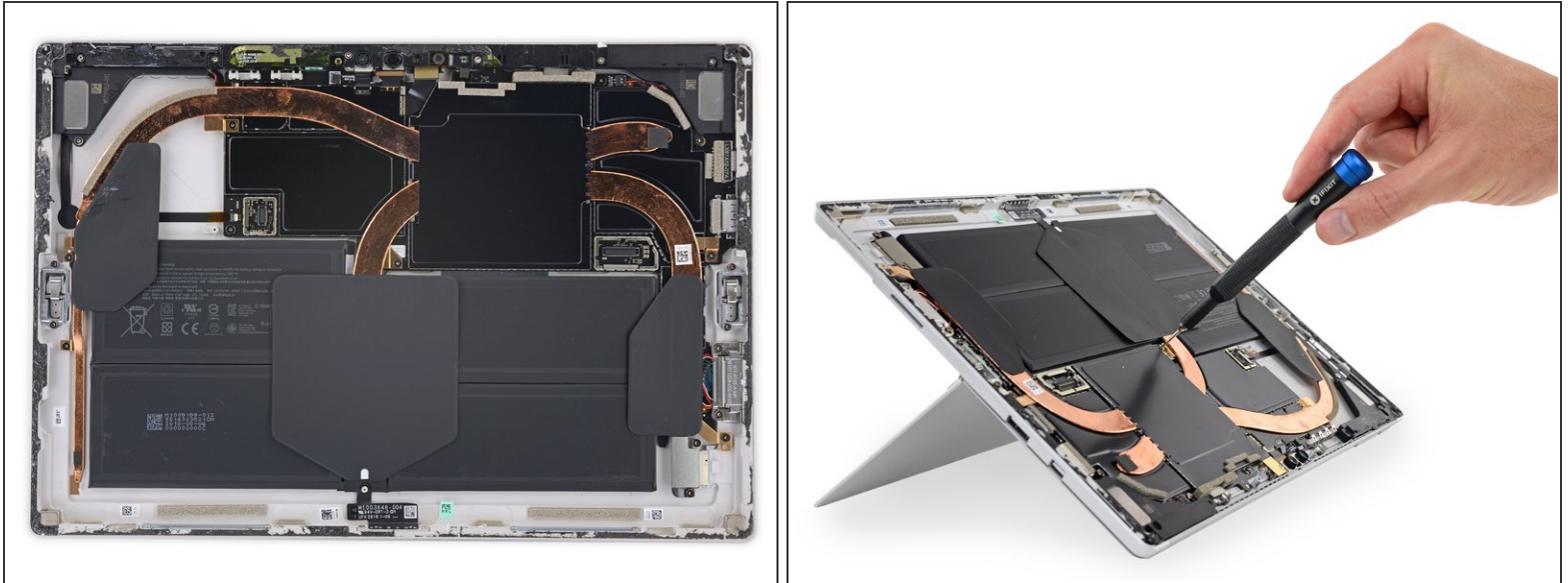
- The Surface Pro series has a few different configurations, and they all come standard with upgraded adhesive.
- Fortunately, we've got a [tried-and-true](#) recipe for Surface screen separation success:
 - Step 1: apply [iOpener](#) liberally.
 - Step 2: grab an [Opening Pick](#) and a [Suction Handle](#), and fight for dear life through Microsoft's gauntlet of adhesive.
 - Step 3 (optional): get impatient, break screen.
- Luckily, we don't run into any surprises as we free the display—everything's pretty much the same as [before](#), save for an extra display cable compared to the [Surface Go](#).

Step 4



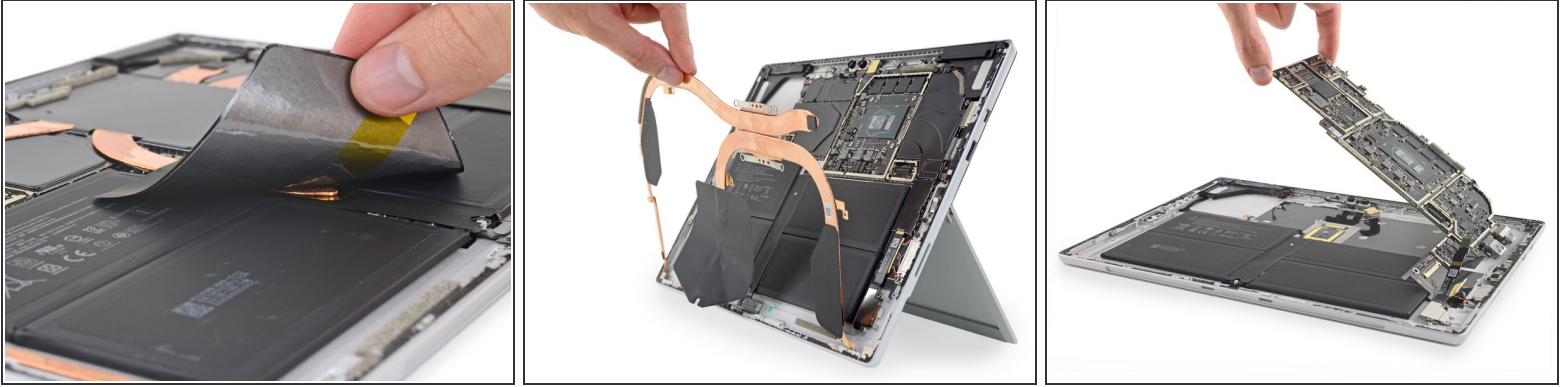
- We interrupt this disassembly to bring you display chips!
 - Microsoft X904169, possibly N-Trig's Surface Pen controller and X904163 (likely touchscreen line driver)
 - Analogix ANX2604, possibly a DisplayPort converter.
 - Macronix [MX25U1635F](#) 16 Mb serial NOR flash memory
 - Silicon Works SW5077 power management
 - Likely Silicon Mitus SM4063B programmable gamma buffer
- LG makes this display, which seems suspiciously similar to the one we found on the [Surface Pro 5](#).
- ❗ Could they be cross-compatible? Yes they could—we dropped last year's display into our Surface Pro 6, and it worked almost like someone planned it that way.

Step 5



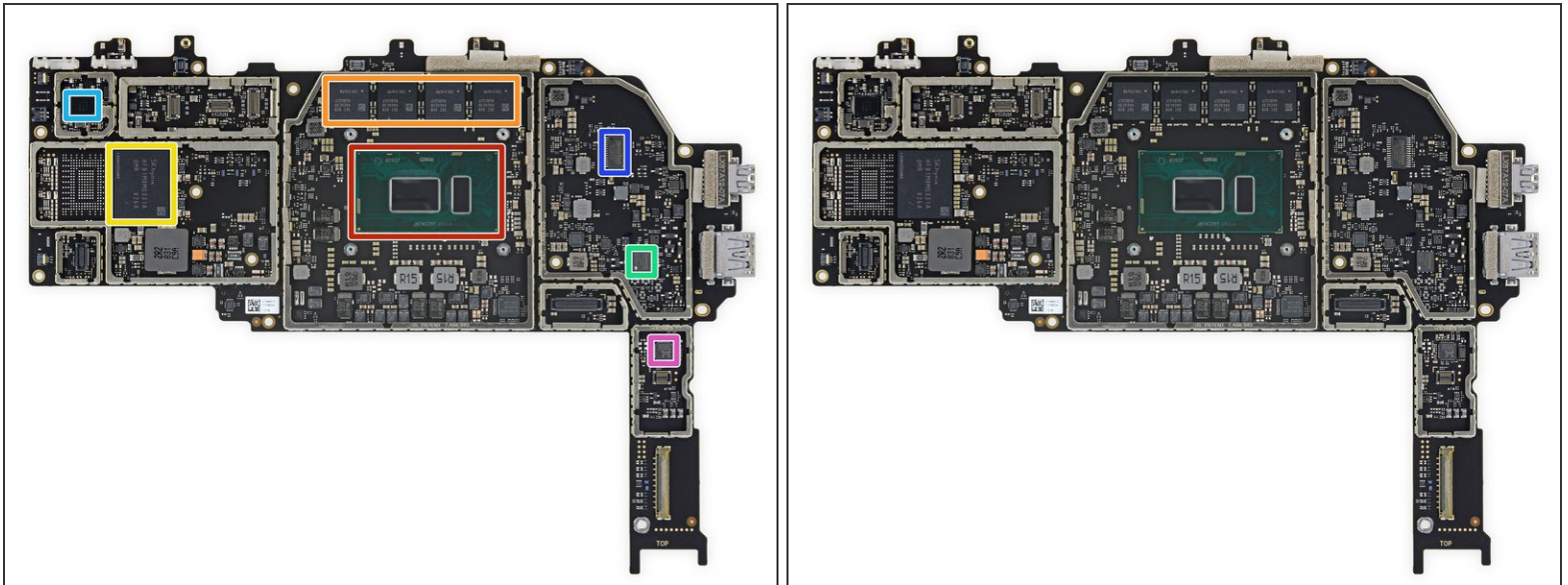
- With the display out of the way, we can get to the good stuff.
- It seems Microsoft has been meddling with their passive cooler a bit—it looks like [last year's](#), but with an extra little pipe down the left side—plus some funky heat-spreading pads.
- ❗ It's impressive to see Microsoft continue to bump up processing power without much additional heat management. It will be interesting to see how well this new setup handles the heat under load.
- Looking south, the similarities continue, with a quad-cell battery taking up most of the case.
- On the plus side, all the screws so far are standard Torx. Let's get to twirling them out!

Step 6



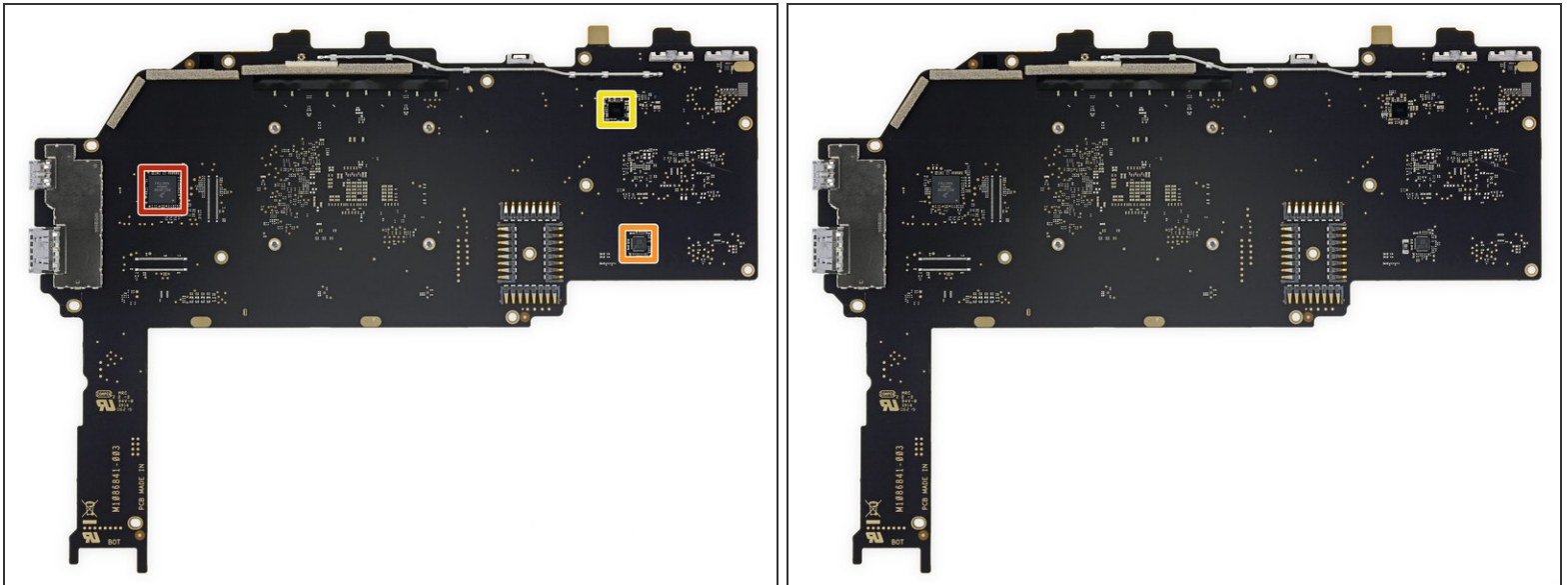
- Searching for the gold at the end of the heatsink, we peel back some ... things. The [Surface Pro 4](#) had a copper heat spreader, but these look like graphite.
- Looking under those heat spreaders didn't lead to any gold, but we're free to remove the heatsink now.
- With the heatsink dispatched, we have access to the heat generators—all that silicon!

Step 7



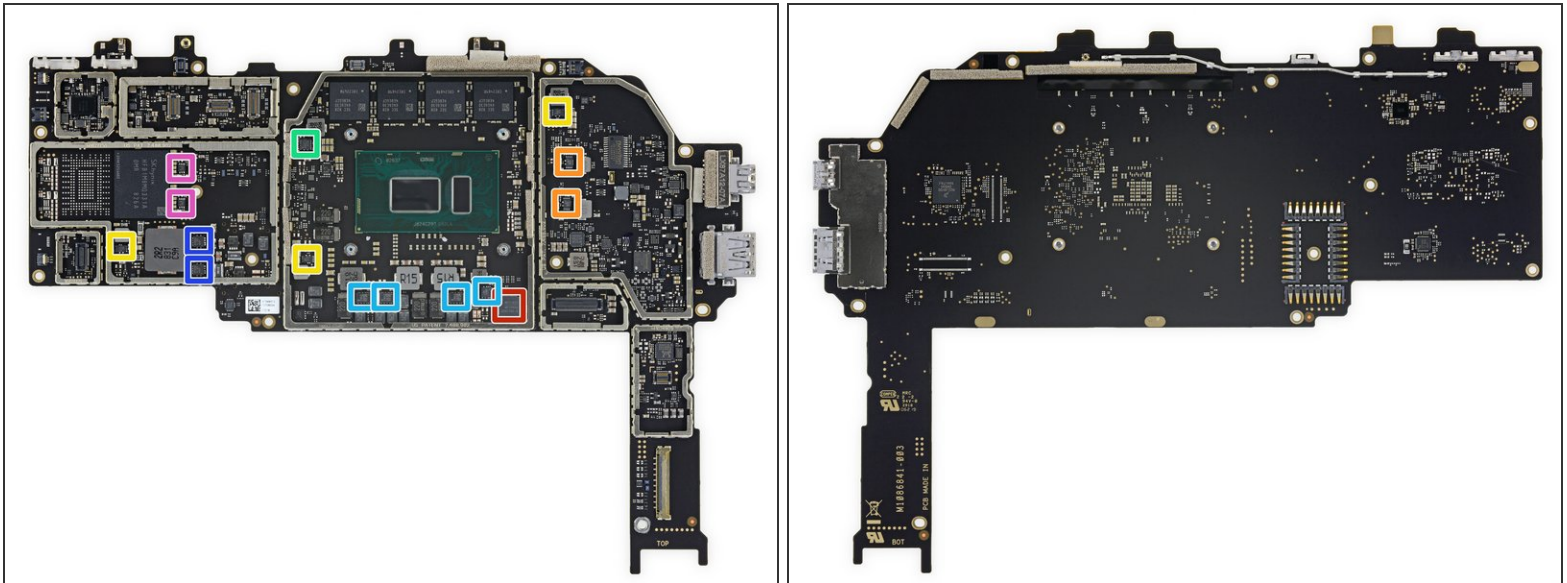
- New chips and stale chips (mostly the latter):
 - Intel Core [i5-8250U](#) processor
 - Samsung [K4E6E304EB-EGCF](#) 2GB LPDDR3 DRAM (4 chips for 8 GB total)
 - SK Hynix [HFB1M8M0331A](#) (BC501) 128 GB NVMe SSD
 - Winbond [25Q128JVPQ](#) 128Mb serial flash memory
 - Marvell [W8897](#) 802.11ac, NFC, and Bluetooth SoC
 - Nuvoton [NPCT650SBCWX](#) Trusted Platform Module
 - Realtek RTS5343 microSD card reader controller

Step 8



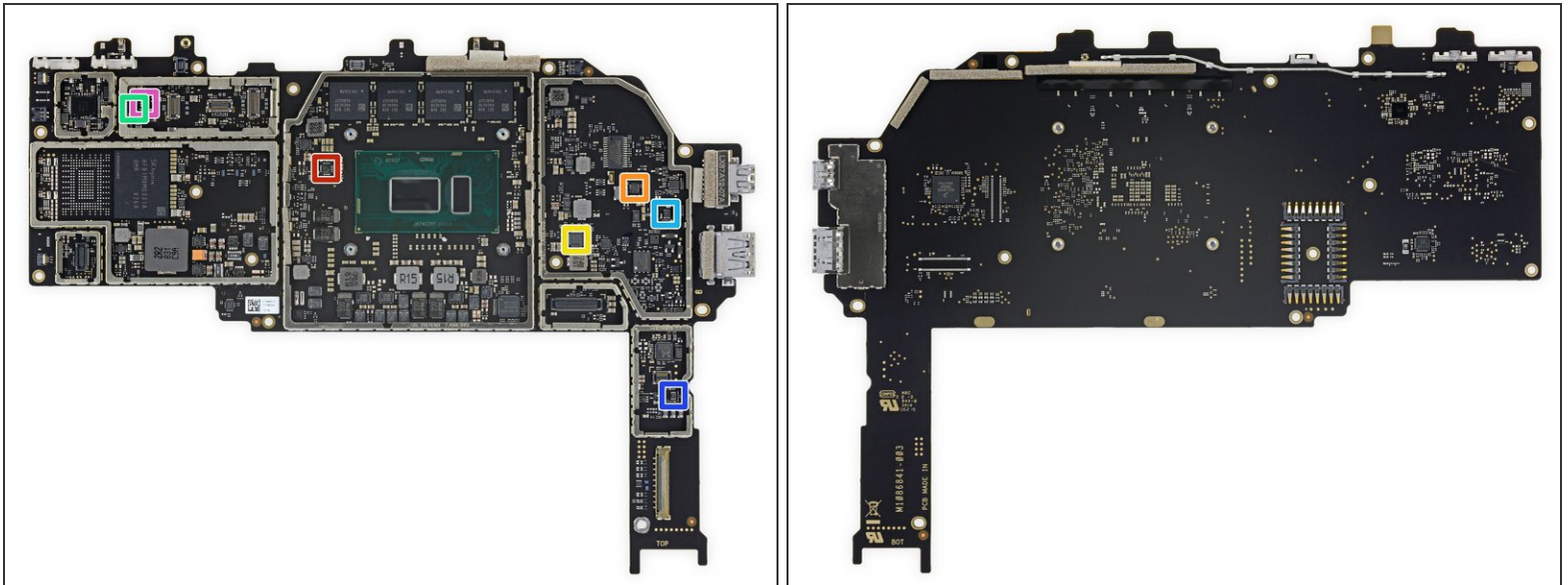
- On the flip side:
 - Freescale/NXP [M22J9VDC](#) Kinetis K22F 512KB 120 MHz ARM Cortex-M4 based MCU
 - Texas Instruments [BQ25700A](#) battery buck-boost charge controller
 - Realtek ALC3269 audio codec

Step 9



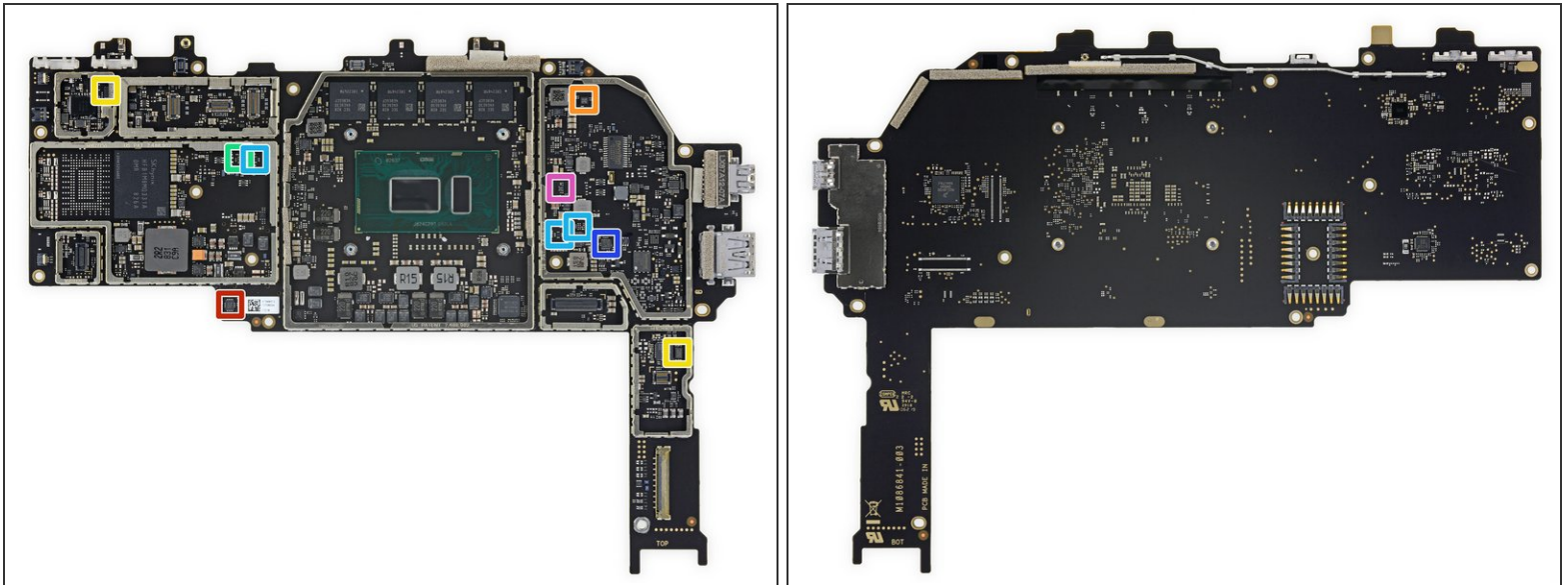
- IC Identification, pt. 2:
 - Monolithic Power Systems MP2949A tri-loop digital multi-phase controller w/ PMBus interface
 - Monolithic Power Systems [NB681](#) 6 A synchronous buck converter
 - Monolithic Power Systems [NB679A](#) and [NB680GD](#) 8 A synchronous buck converter
 - Monolithic Power Systems [NB685A](#) 12 A synchronous buck converter
 - Monolithic Power Systems MP86901-A and MP86902-B power phase
 - Texas Instruments [CSD87334Q3D](#) 20 A power block
 - Texas Instruments [TLV62085](#) 3 A step-down converter

Step 10



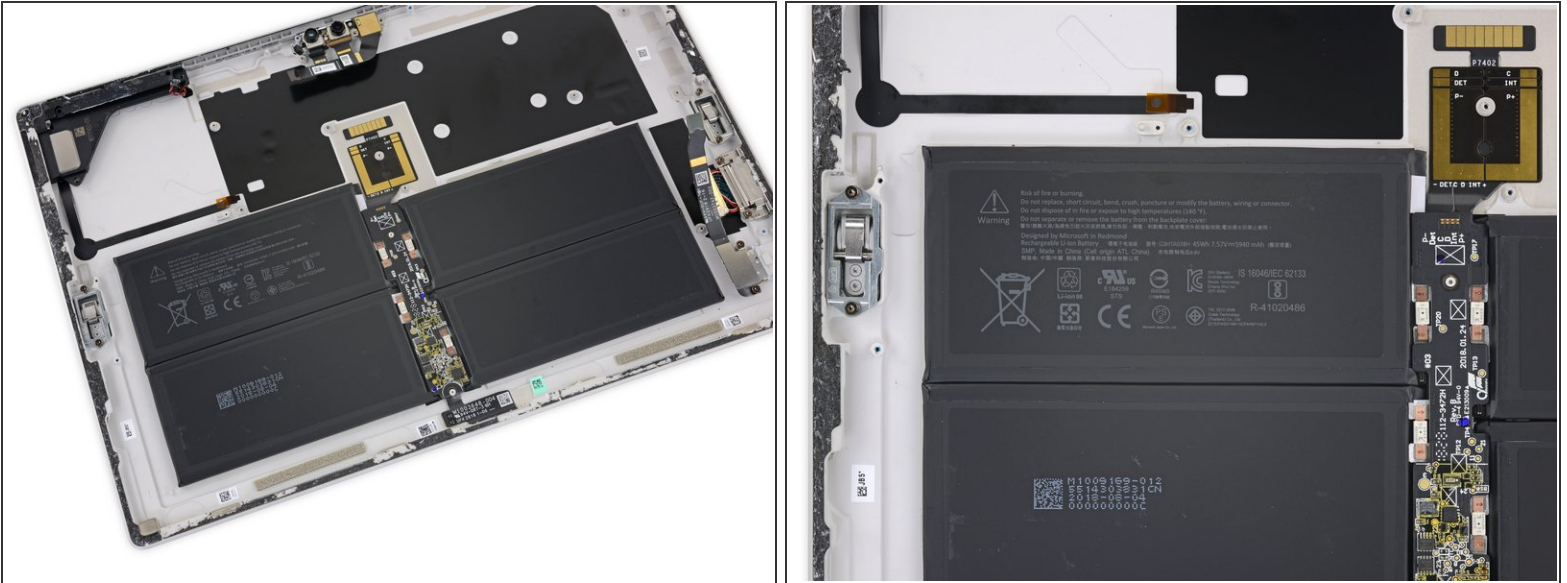
- IC Identification, pt. 3:
 - Texas Instruments [TPS62140](#) 2 A step-down converter
 - Texas Instruments [TPS62175](#) 0.5 A step down converter
 - Monolithic Power Systems [MP3376A](#) 8-ch. WLED driver
 - Monolithic Power Systems [MP2370DGT](#) white LED driver
 - Texas Instruments [TPS70933](#) 150 mA LDO regulator
 - Texas Instruments [TPS3700](#) 18 V voltage detector
 - Texas Instruments [TLV3011](#) comparator w/ voltage reference

Step 11



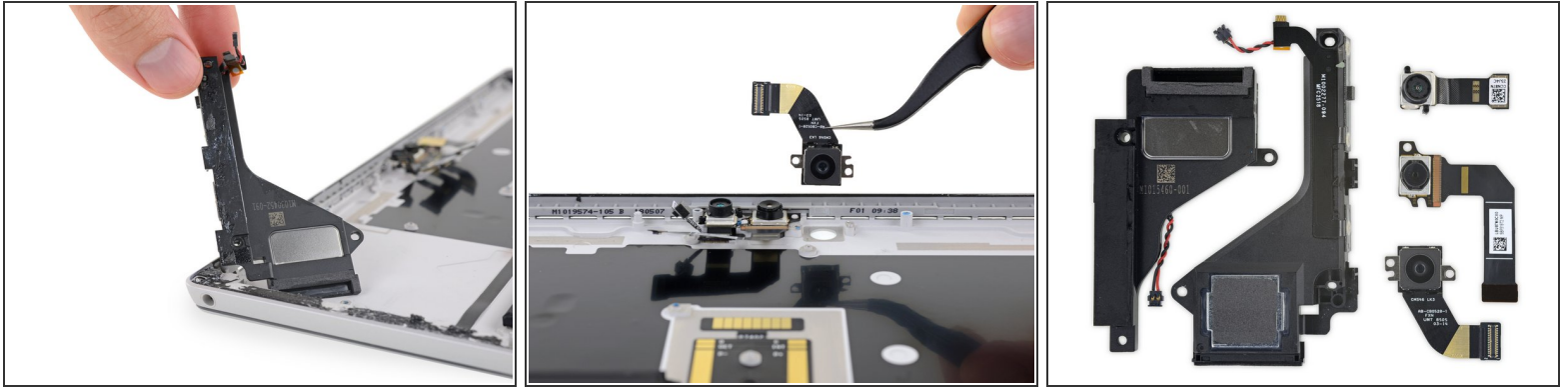
- IC Identification, pt. 4:
 - Bosch Sensortec [BMI160](#) 3-axis accelerometer/gyroscope
 - Bosch Sensortec BMA254 accelerometer (likely)
 - ON Semiconductor [CAT24C16](#) 16 Kb serial EEPROM memory and Winbond [W25X40CL](#) 4 Mb serial NOR flash memory
 - Texas Instruments [SN74AVC2T245](#) dual-supply bus transceiver
 - Texas Instruments [TS3USB30E](#) high-speed USB 2.0 1:2 mux/demux switch
 - Nexperia (formerly NXP Semiconductor) [74LVC125A](#) 3-state quad buffer/line driver
 - Nexperia (formerly NXP Semiconductor) [74AUP1G32](#) 2-input OR-gate

Step 12



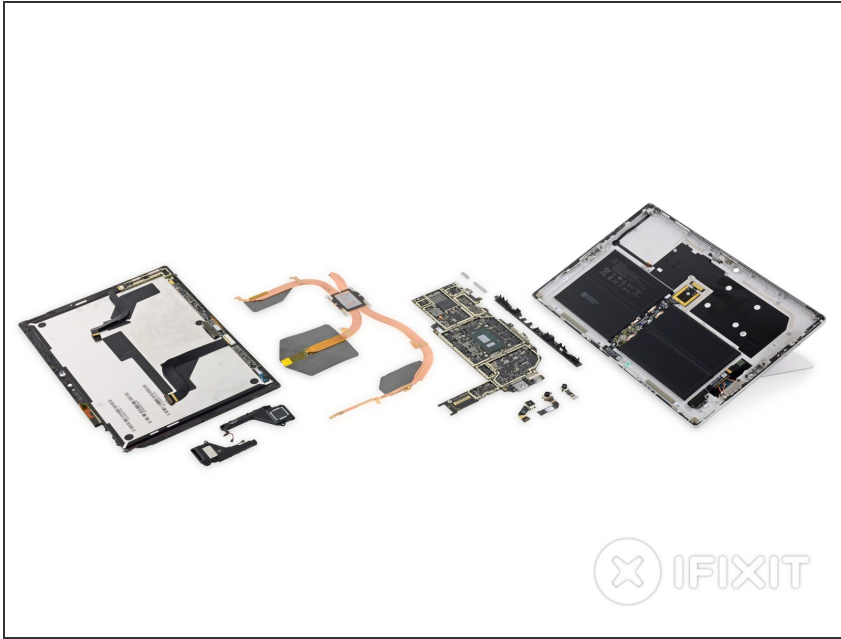
- We've once again come to that inevitable junction in any Surface teardown: take out the heavily-glued battery, or leave it be?
- Considering there are no stretch release battery tabs, and we've had our fill of prying, we opt to let the beast slumber for now.
- This battery weighs in at 45 Wh (7.57 V x 5940 mAh), exactly the same as [last year](#).
- That's expectedly larger than its more [mobile sibling](#), and even a little larger than the [most recent iPad](#).

Step 13



- Really scraping the bottom of the barrel case, hoping for *something* new, we pull out the speakers and cameras.
- The cameras are *still* hidden under the bracket holding the antennas (which are incredibly easy to mangle upon opening).
- The speakers are *still* corner mounted triangles for that surround sound feel.
- I guess there's not much this tablet could do to raise its repairability score at this point.... But a fixer can dream...

Step 14



- Here's a shucked Surface for your viewing pleasure! In theory this is a tablet, but in our reality it was a pain in the butt!
- The Surface Pro 6 brings more processing power (and heat) without changing its cooling solution much. Will the new thermal spreaders on the heat sink be enough to handle the power boost? Only time will tell.
- After hearing rumors of a modular Studio, we were hoping this generation of Surface Pro would steer that direction. Alas, it's just as un-upgradable and un-repairable as ever, and it doesn't even get a USB-C port.

Step 15 — Final Thoughts

REPAIRABILITY SCORE:



- Microsoft's Surface Pro 6 earns a **1 out of 10** on our repairability scale (10 is the easiest to repair):
 - To the extent that screws are used, they are all standard Torx fasteners.
 - This tablet still has a headphone jack, which is modular and replaceable, if you can get to it.
 - All repairs require first removing the display assembly—which is stubbornly glued in place, expensive, and prone to shattering.
 - The battery is firmly glued in place, with its connector pinned under the motherboard—requiring near-total disassembly for service.
 - Once upon a time, Surface Pro storage was removable—but not in this version.
 - Complex construction makes all disassembly and reassembly tedious in comparison to other tablets.