



MacBook Pro 13" Touch Bar 2018 Teardown

Teardown of the MacBook Pro 13" Touch Bar 2018, performed July 15, 2018.

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INTRODUCTION

Apple has been quietly improving their pro-level laptops, making them ... quieter. Turns out they've [improved the clacky keyboards more than they've let on](#)—which leaves us wondering, what else is new in here? All we need is a teardown team and several thousand US greenbacks to find out. Grab your best tinkering tools and let's dig in—we're tearing down the 13" MacBook Pro with Touch Bar, 2018 edition.

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TOOLS:

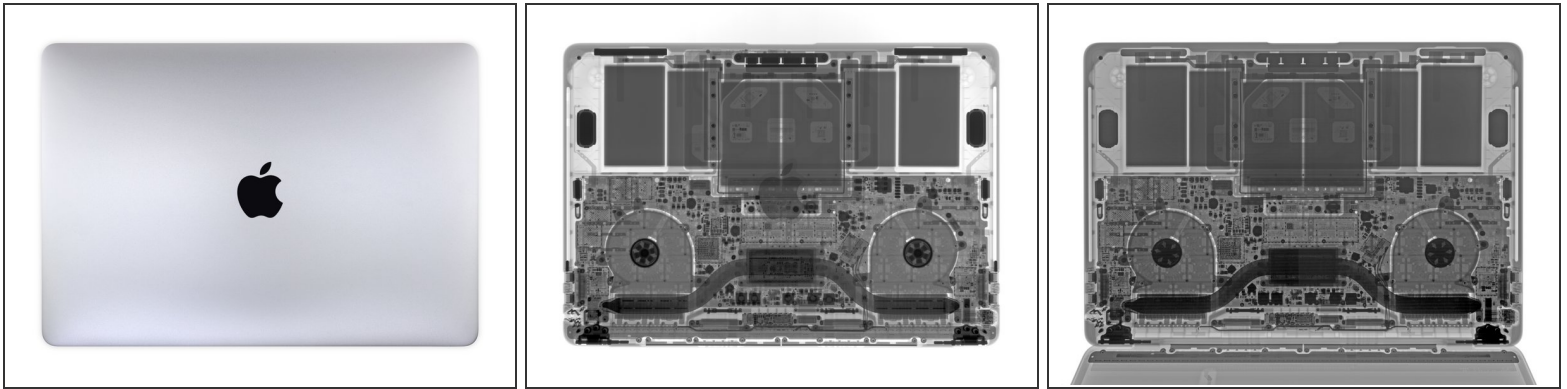
- [P5 Pentalobe Screwdriver Retina MacBook Pro and Air](#) (1)
 - [Suction Handle](#) (1)
 - [iFixit Opening Picks set of 6](#) (1)
 - [Spudger](#) (1)
 - [Tweezers](#) (1)
 - [iOpener](#) (1)
 - [T5 Torx Screwdriver](#) (1)
 - [Phillips #00 Screwdriver](#) (1)
 - [T3 Torx Screwdriver](#) (1)
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Step 1 — MacBook Pro 13" Touch Bar 2018 Teardown



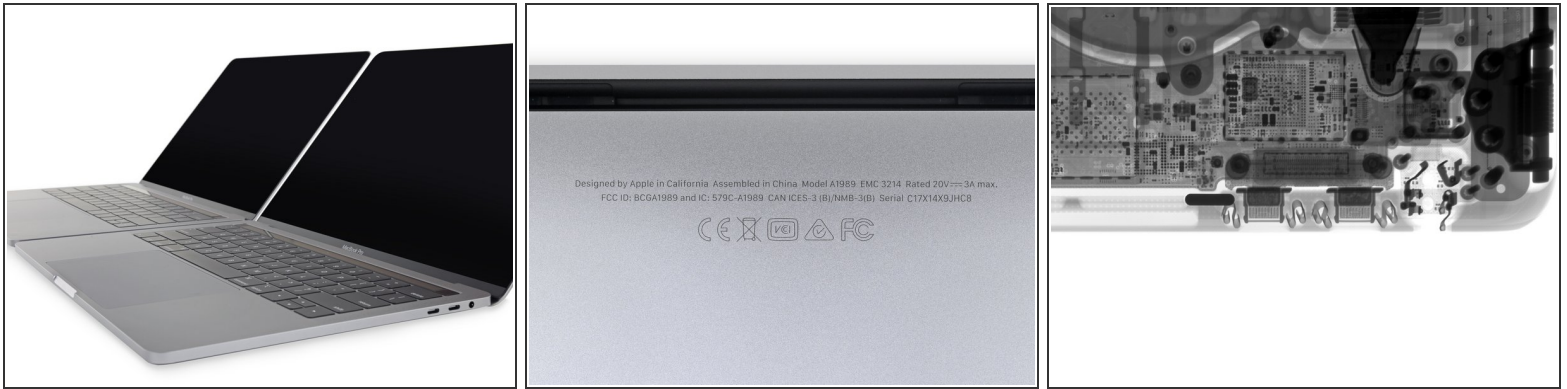
- Before we put this one under the knife, let's review what we expect to find:
 - 13.3" LED-backlit IPS Retina display with True Tone, 2560 x 1600 resolution (227 dpi), P3 wide color gamut
 - 2.3 GHz quad-core Intel Core i5 (Turbo Boost up to 3.8 GHz) with integrated Intel Iris Plus Graphics 655
 - Apple T2 custom coprocessor
 - 8 GB of 2133 MHz LPDDR3 SDRAM
 - 256 GB PCIe-based SSD
 - 802.11ac Wi-Fi and Bluetooth 5.0
 - Four Thunderbolt 3 (USB-C) ports supporting charging, DisplayPort, Thunderbolt, USB 3.1 Gen 2

Step 2



- Spoiler alert! As always, we like to start off with a superhero's-eye-view of our victim's internals.
 - These X-ray images come to you thanks to our ingenious pals at [Creative Electron](#).
- Don't worry, we're still going to take it apart. Hold that thought ...

Step 3



- We open up [last year's 13" MacBook Pro with Touch Bar](#) for a quick comparison—and if we were to judge a MacBook by its cover, we'd say these were the same machine.
- [Apple says this butterfly keyboard is a bit quieter, but otherwise unchanged](#). After banging away at the keys in a side-by-side sound-off, we definitely perceive a lower, less clacky *tone*, but any difference in decibels is difficult to detect.
- ⓘ Of course, if you saw [our early report on the 15" model](#), you probably already know where this is going. No reading ahead! We're getting to that.
- The biggest change so far: a new model number—A1989, and EMC 3214.
- X-rays also show the return of the modular headphone jack, and provide a peep at the Thunderbolt hardware—which [now runs at full speed on all four ports](#), thanks in part to the 8th-gen Core processor's four additional PCIe lanes.

Step 4



- Our teardown begins in earnest—we dispatch a sextuplet of pentalobe screws, and dash through what by now is a [pretty familiar](#) opening procedure.
- At first glance, the internals look very similar to the 13" MacBook Pro from [last year](#) ... and the [year before that](#).
- At second glance, we decide to go in closer for a third glance.

Step 5



- We disconnect the battery without any drama—it's [buttoned down with a T5 Torx screw](#), so we use one of our blue and black [Pro Tech specialty drivers](#) to dispatch it.
- At 58.0 Wh, this battery has gotten a significant boost over the [49.2 Wh](#) unit we found in our original 13" Touch Bar teardown.
- Turns out that extra 'oomph' comes from a *slightly* bigger battery—arrayed into six cells this time, instead of five. It's also heavier, weighing in at in at 232.7 g, versus the old battery's 196.7 g.
 - And yet this MacBook Pro's total weight hasn't changed one iota. We're not sure which parts of this device have been on a diet, but it does look like Apple shaved some mass off the top case.
- ❗ Despite all that, Apple still rates battery life the same as the prior model. Those extra processor cores don't come for free.
- The new-and-improved speakers (on the right) have grown, too—they're longer and narrower, filling all the remaining space, and bumping right up against the logic board thanks to the revised top case design.

Step 6



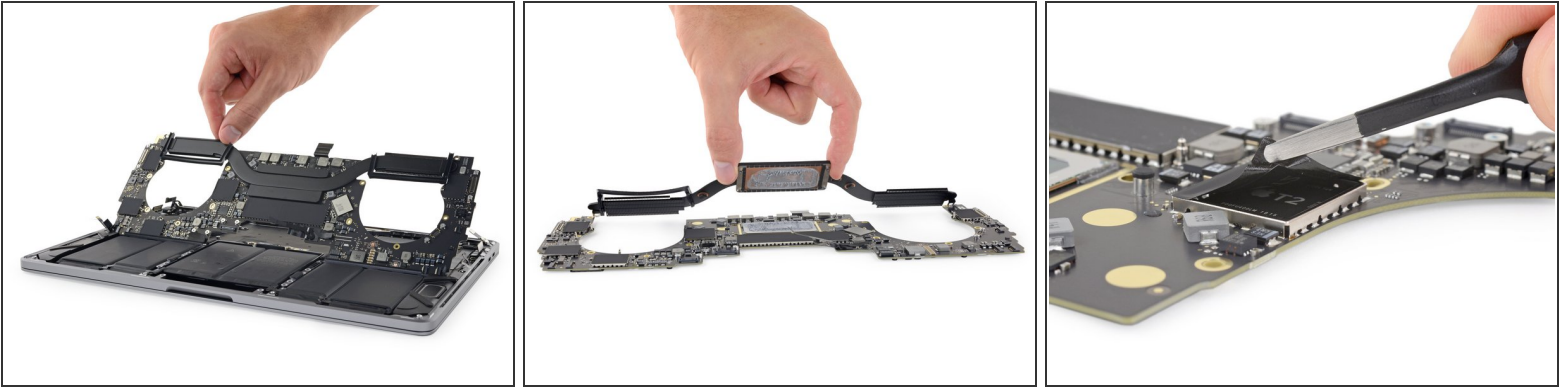
- In a lone piece of happy repair news: the trackpad is replaceable as ever. Twirl away a few Torx screws, and off it flies.
- We get our first taste of some chips under the trackpad (looking virtually unchanged from their first outing [back in 2016](#)):
 - STMicroelectronics [STM32F103VB](#) ARM Cortex-M3 MCU
 - Broadcom BCM5976C1KUFBG Touch Controller
 - Maxim Integrated MAX11291ENX 24-Bit, 6-Channel Delta-Sigma ADC
- Meanwhile, we can't help but notice the earlier model's [port to nowhere](#)—which [turned out to be for data recovery](#)—is mysteriously absent.
 - ☑ Given this MacBook's non-removable storage, Apple must have a new recovery method?
 - ☑ **Update:** [They didn't](#)—until [they did](#).

Step 7



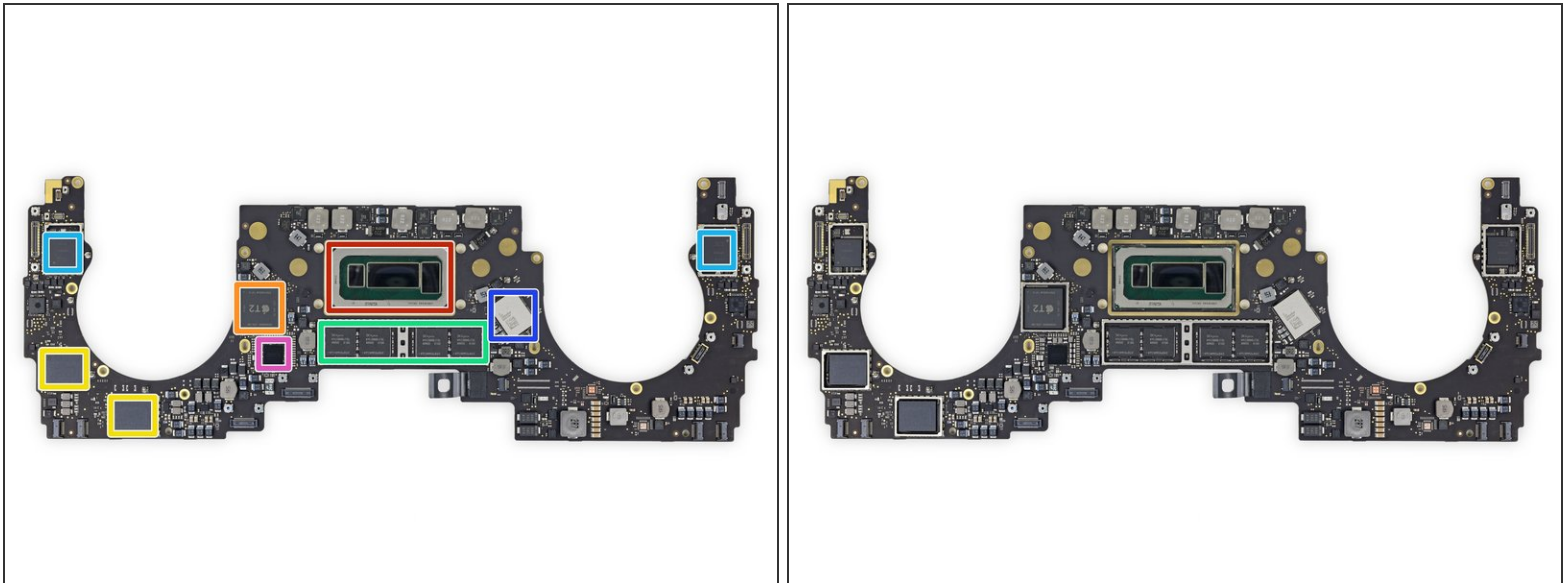
- Apple was careful to mention its latest third-gen keyboard in its press release. The added *quietness* seems a bit underwhelming to our ears, and we suspect there's something more going on.
- After three years of key-cap removal, we're able to pop this lid open without damaging the delicate clips, and boy are we rewarded.
- As you [may have heard](#), there's a brand new silicone barrier under here.
 - ① [Apple says this new addition is purely for soundproofing](#), but it bears a suspicious resemblance to their [2016 ingress-proofing patent](#)—one that might help prevent the keyboard failures we keep hearing about.
- This bears further analysis. We'll have a deeper dive on the keyboard situation later in the week. Stay tuned!

Step 8



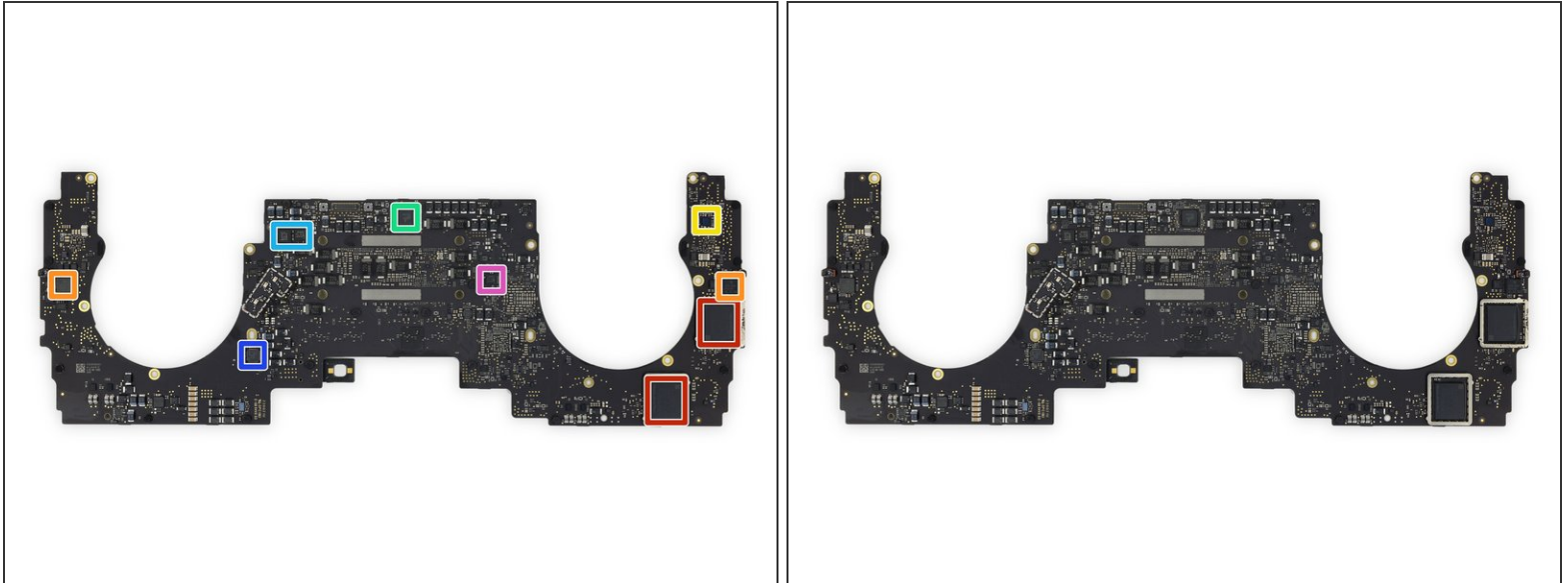
- Time to liberate that logic board and look around!
- As usual, a relatively modest-looking heat sink handles cooling for the CPU and integrated graphics. Another par for the course: Apple's typical glut of thermal paste.
- And our first peep of silicon reveals: the touted T2!
- Seen previously in the [iMac Pro](#), Apple's custom T2 chip has taken over an impressive number of functions—but, we still expect to find a lot of other silicon on this board. Let's check it out!

Step 9



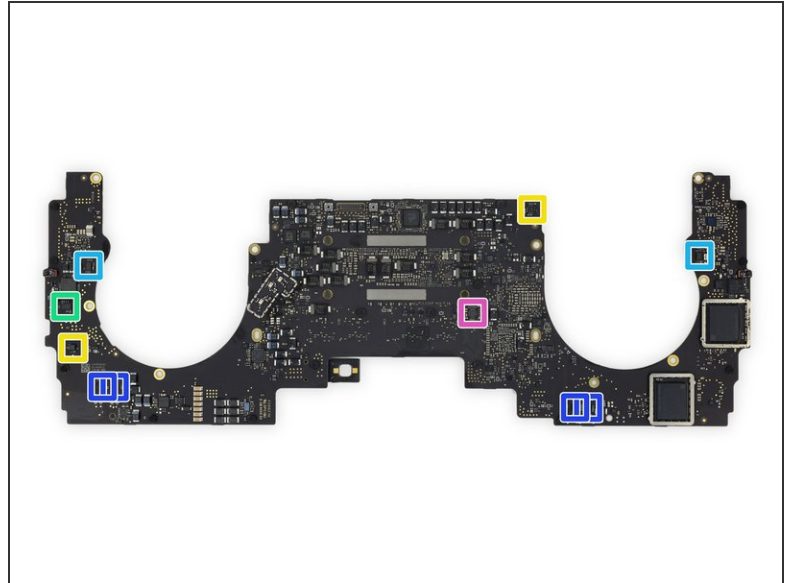
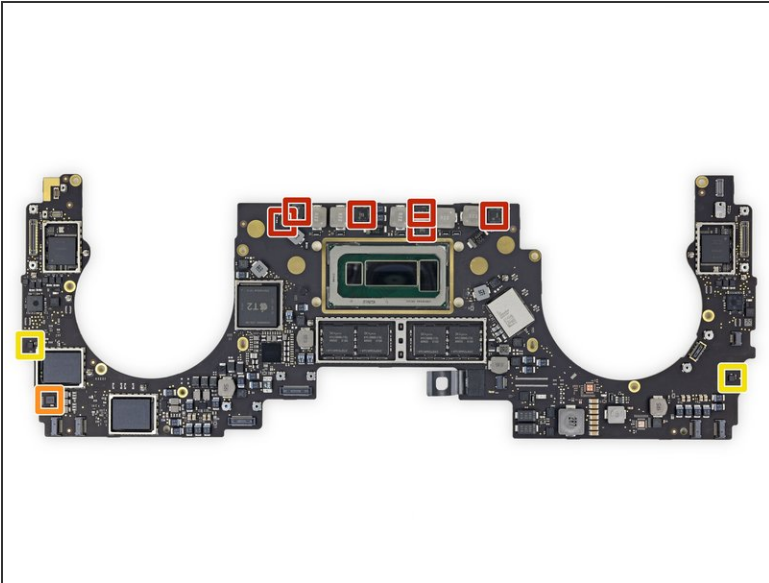
- Here's a familiar mustache full of chips:
 - 8th-generation Intel Core [i5-8259U](#) CPU with Intel Iris Plus Graphics 655
 - Apple T2 APL1027 339S00533 coprocessor, layered over 1 GB Micron MT53B256M32D1TG-062 XT:C LPDDR4
 - Toshiba TSB 3226 J86404 TWNA1 (likely 2x 64 GB flash memory, 128 GB total on this side)
 - 4x SKhynix [H9CCNNNBJTALAR-NVD](#) 16 Gb LPDDR3 2133 MHz (8 GB total)
 - Intel [JHL7540](#) Thunderbolt 3 Controller
 - Apple/Universal Scientific Industrial (USI) 339S00428 Wi-Fi/Bluetooth module
 - 338S00267-A0 (likely Apple PMIC)

Step 10



- And we flip it around for some bonus silicon:
 - 2x Toshiba TSB 3226 J86404 TWNA1 64 GB flash memory, for 128 GB on this side and 256 GB total)
 - 2x Texas Instruments CD3215C00 83CFZST
 - Cirrus Logic CS42L83A Audio Codec
 - Intersil ISL95828AHRTZ PWM controller
 - 2x NXP Semiconductor CBTL06142F display port multiplexer
 - Texas Instruments TPS51980A synchronous buck controller
 - NXP Semiconductor PN80V secure NFC module

Step 11



- IC Identifications, continued:
 - ON Semiconductor FDMF5808A, FDMF5804, and Vishay [SIC532](#) power stage
 - Apple 338S00438 ? power management
 - Bosch Sensortec BMA282 accelerometer and Texas Instruments [TMP464](#) 5-Ch. remote/local temperature sensor
 - Diodes Incorporated [PI3USB32](#) dual SPST USB 2.0 switch
 - Winbond [W25Q80DV](#) 8 Mb serial NOR flash memory
 - Texas Instruments TASxxxx audio amplifier
 - Texas Instruments [TPS51916](#) DDR memory power management

Step 12



- And for our dessert course we have: a brand new USB-C power adapter!
- The A/C adapter included with this 13" MacBook Pro does indeed sport the new model number A1947 (vs. A1718, bottom), so it's time to bust out the ultrasonic cutter and go to town.
- After clawing painfully through more layers and rubberized filler than we've ever seen in one of these things, we finally free the internals.
- Opening the previous adapter (on the left) was a walk in the park compared to this unit, but it does look like this model benefits from redesigned internals, some additional shielding, and lots of impact-resistant foam rubber.
- That said, Apple has also swapped the aluminum USB-C port for a plastic one ...

Step 13



- Here's what's left after the 2018 MacBook Pro gave up its secrets, including:
 - A [bigger battery](#) that squeezed the speakers into a narrower form factor.
 - A [keyboard decked out with a thin silicone barrier](#), which *could* be for sound baffling, but matches Apple ingress-proofing patents.
 - And a seemingly unchanged [thermal management system](#), despite the extra power under the hood.
- **Teardown Update:** we wanted to drill a bit deeper into the new keyboard, so we did some testing and then gave it another teardown all to itself. [Check it out!](#)
- ① And if we missed something, check out our teardowns of the [2016](#) and [2017](#) models—you may well find it there!

Step 14 — Final Thoughts

REPAIRABILITY SCORE:



- The 2018 MacBook Pro 13" with Touch Bar earns a **1 out of 10** on our repairability scale (10 is easiest to repair):
 - The trackpad can be removed without first removing the battery.
 - The processor, RAM, *and* flash memory are soldered to the logic board. Repairs and upgrades will be impractical at best.
 - The top case assembly, which includes the keyboard, battery, and speakers, is glued together—making all those components impractical to replace separately.
 - The Touch ID sensor doubles as the power switch, and is paired with the T2 chip on the logic board. Fixing a broken power switch may require help from Apple, or a new logic board.