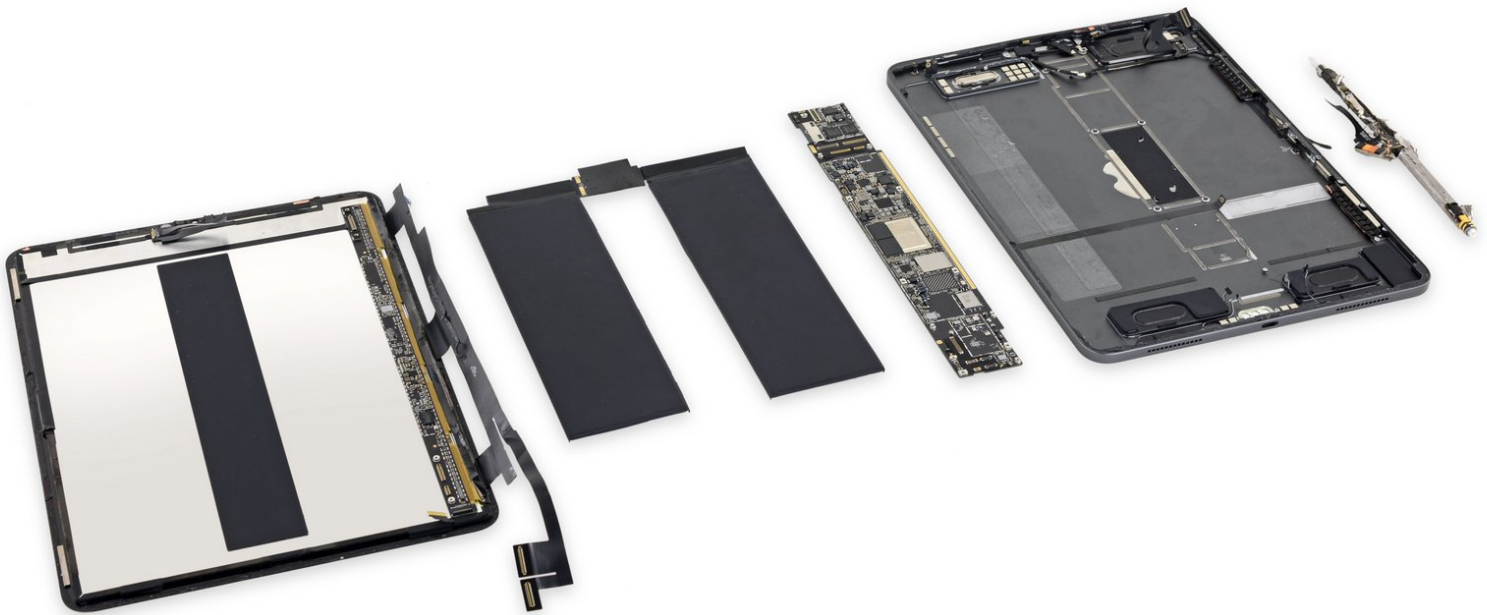# iPad Pro 11" Teardown

Teardown of the iPad Pro 11", performed on November 9, 2018.

Written By: Arthur Shi

INTRODUCTION

The new iPad Pro 11" sports narrower bezels, curvy LCD corners, and cutting edge silicon. This is apparently *the iPad* Apple dreamed about building from the very beginning, but what *we* dream about is a device that is easy to repair. Will this iPad fulfill both dreams, or will ours be left in the pipe? There's only one way to tell—with a teardown!

Catch our [Tweets](), or drift through our [Facebook]() and [Instagram]() pages to keep up with the latest Teardown news!

🔧 TOOLS:

- [iOpener]() (1)
- [Suction Handle]() (1)
- [Phillips #00 Screwdriver]() (1)
- [T3 Torx Screwdriver]() (1)
- [iFixit Opening Picks set of 6]() (1)
- [Tweezers]() (1)
- [Rotary Tool]() (1)
- [Spudger]() (1)

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Step 1 — iPad Pro 11" Teardown

- Let's take a look at what sets this Pro iPad apart from its amateur peers:

  - Fully laminated, 11", LED-backlit, Oxide TFT Liquid Retina display with 2388 × 1668 resolution (264 ppi), featuring ProMotion Technology

  - Octa-core Apple A12X Bionic custom processor, with M12 motion coprocessor and integrated 7-core GPU

  - 12 MP rear camera with 4K video recording at 60 fps, and 7 MP TrueDepth camera with 1080p video

  - Self-balancing, four-speaker audio

  - Face ID, five microphones, ambient light sensor, accelerometer, barometer, and 3-axis gyro

  - 802.11a/b/g/n/ac dual band MIMO Wi-Fi + Bluetooth 5.0

  - 64 GB, 256 GB, 512 GB, or 1 TB of on-board storage

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Step 2
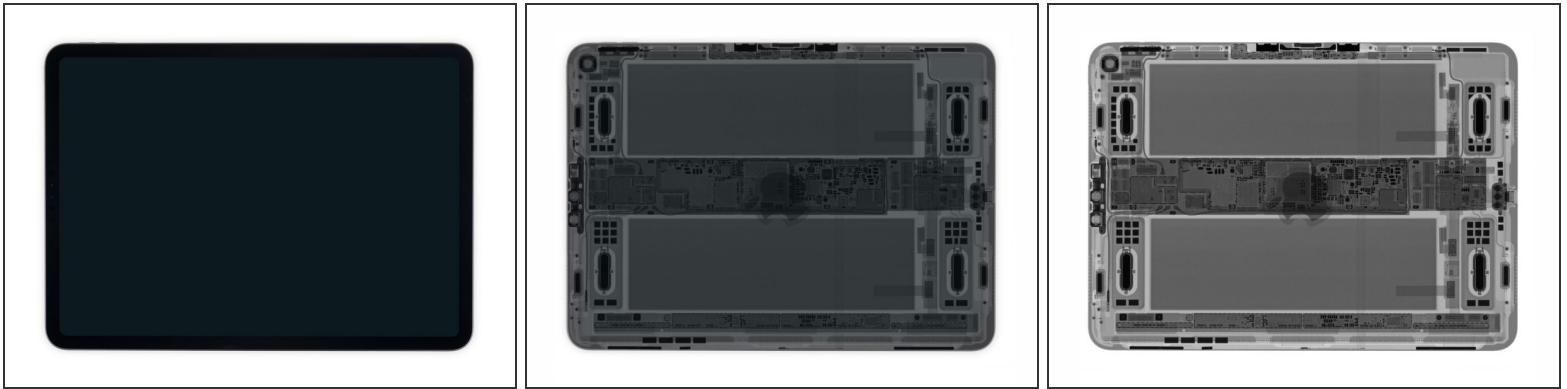
- With each passing year, Apple seemingly gets closer to realizing its dream of selling a blank slab of glass with its logo on the back.

- It's a good thing we've got X-rays on tap from Creative Electron, or this would just look like a black rectangle.

- As always, the darkest areas in the X-ray image represent dense materials that absorb more X-rays—usually magnets, such as those used in speakers and for clip-on accessories.

- We're seeing *considerably* more of those than usual here.

Step 3

- Visual inspection time. Above the newly repositioned Smart Connector, we have a new model number: A1980.

- Compared with its 10.5" predecessor, it looks about the same, and the lost .2 mm are hard to spot due to the squared-off edges.

  - Not that we mind at all—it actually reminds us of some of the iPad's more repairable competitors.

  - ⓘ Could Apple's tablet line be getting a bit more repairable this time? In light of recent teardowns, we're keeping our fingers crossed.

- Final notes before we dive in: no headphone jack ☹, USB-C port (non-Thunderbolt) in place of Lightning, and a long dark oval to charge the new Pencil.

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Step 4

- We loved the experience of cutting through all the glue to open our first iPad, and it has never gotten old.

  - (i) This statement is brought to you by the Coalition of Sarcastic Tinkerers and National Opposite Day.

- It helps to be practiced at this, but these extra-thin bezels make it even a bit more harrowing than usual. Heat, carve, hold your breath, and hope nothing breaks.

- (i) It turns out the case is a little thicker around the Pencil charging area—we started prying there and quickly regretted it.

- On the plus side, the display's ribbon cables are a safe distance from the bezels—but they're also spread out in a way that makes display removal really awkward.

Step 5
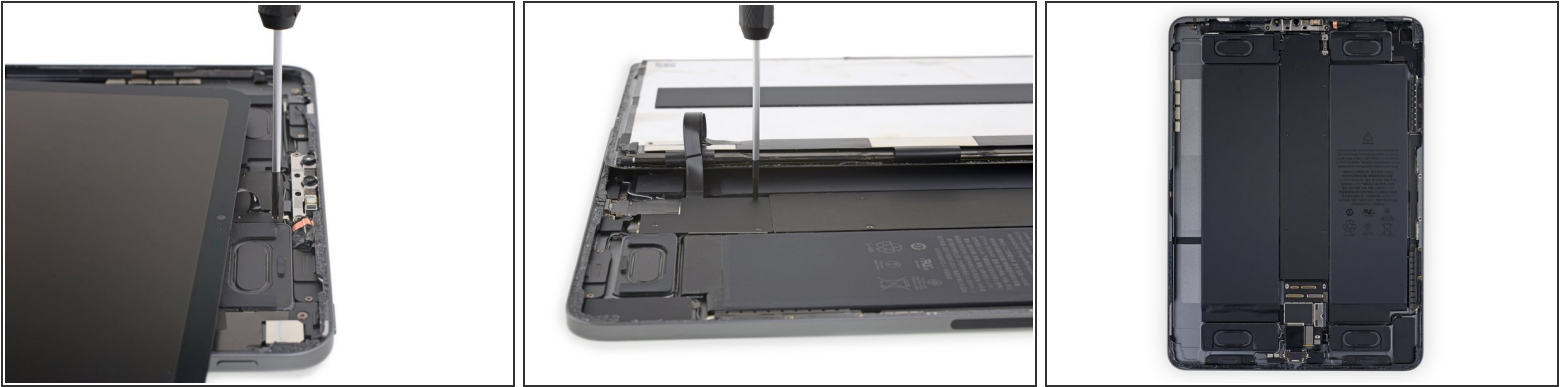
- Those cables aren't safe *quite* yet, as we're forced to lay the display at a weird angle and hopefully not damage anything while we disconnect them.

- We put our [Phillips driver](#) to work releasing both cable connectors.

- Now we see what those X-rays were trying to show us! One thing that immediately stands out is the iPad's quartet of speakers.

  - (i) Four woofers and four tweeters, for a total of *eight* speakers, make for a Netflix powerhouse— because even professionals need a break sometimes.

Step 6
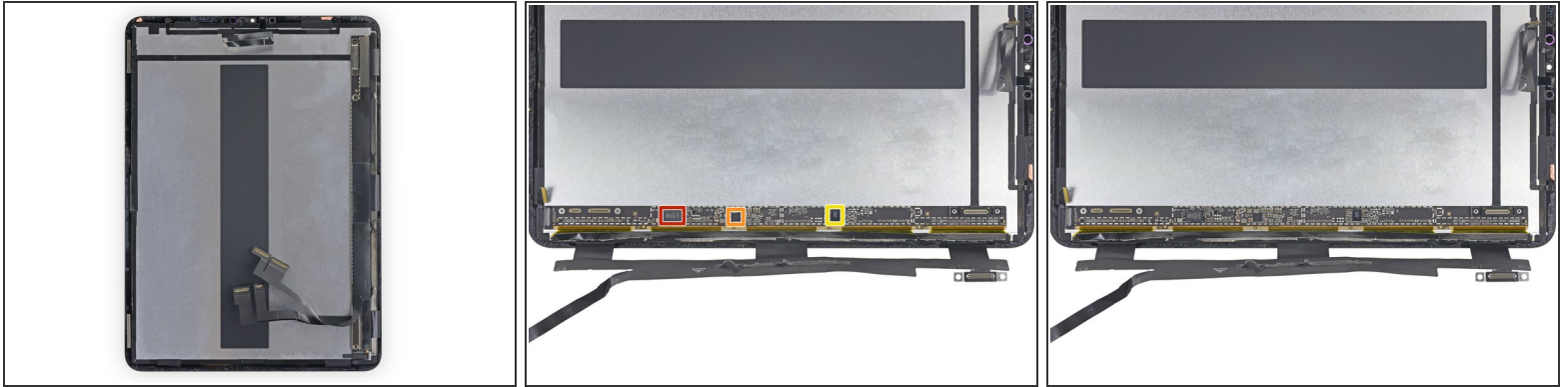
- Here's the new Liquid Retina display—scaled up from when we first saw it, and packing the same awesome 120 Hz refresh rate we saw on the last iPad Pro.

- The fancy new display brings some chips along with it too:

  - Parade Technologies DP825 timing controller (the same one we saw on the iPad Pro 10.5")

  - Texas Instruments TPS65158 (maybe a variation of the TPS65168 LCD Bias IC)

  - Renesas (formerly Intersil) ISL24833A 18-Ch. TFT-LCD reference voltage generator w/ integrated EEPROM (likely)

Step 7
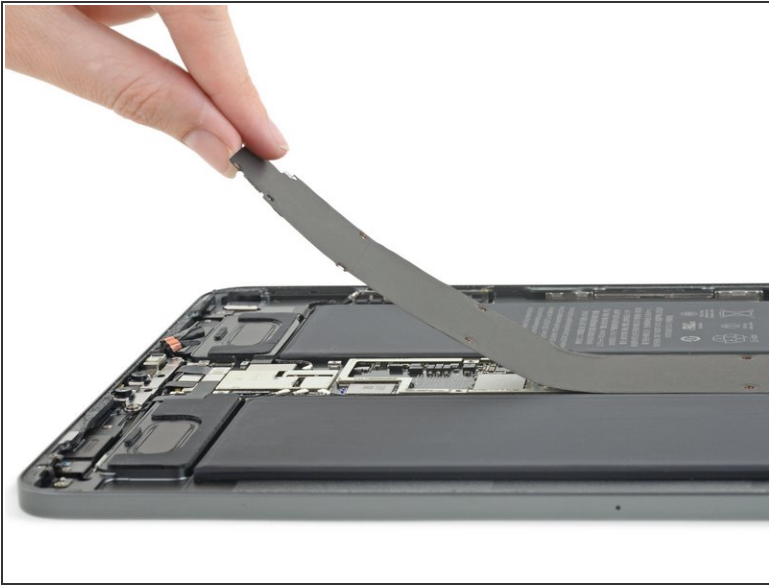
- Anxious for our first glimpse of that A12X~~box~~ chip, we peel away the logic board cover next.

- Yuck—as always, the board is secured with adhesive, and it's made even fussier by the speakers, which block almost all prying access.

- But we're impatient, and soon victorious. The logic board triumphantly emerges from the canyon betwixt the battery cells.

  - ⓘ *That Netflix prowess comes at a price.*

Step 8
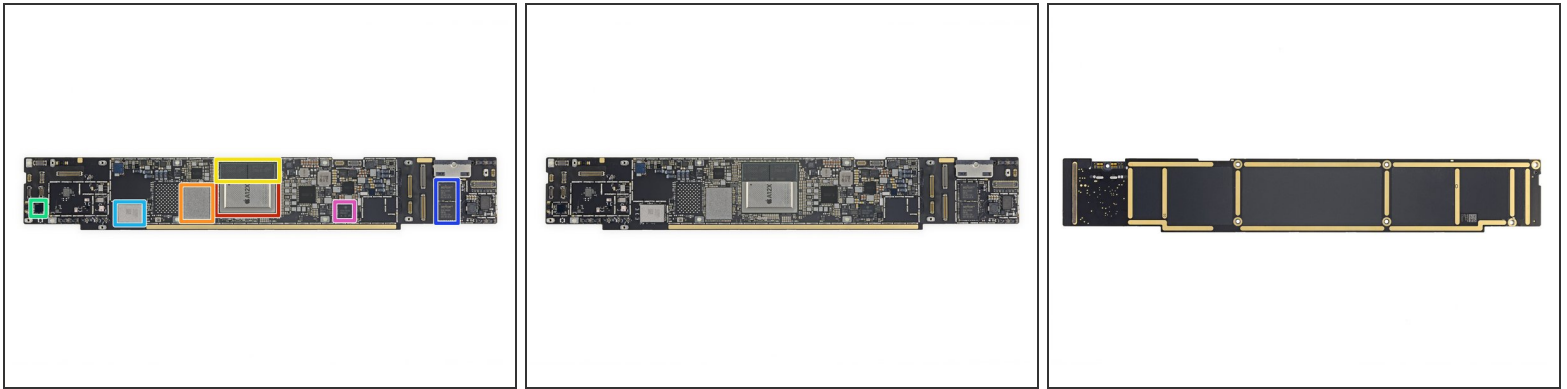
- After all that, we're rewarded with some silicon:
  - Apple APL1083 [A12X Bionic SoC](#)
  - Toshiba TSB3247M61710TWNA1 flash storage (64 GB total)
  - 2x Micron MT53D256M64D4KA-046 XT:B SDRAM (4 GB total)
  - NXP 100VB27 (SN100V) NFC controller
  - Apple / USI 339S00551 Wi-Fi / Bluetooth module
  - 2x Broadcom BCM15900B0KWFBG touch screen controller
  - Texas Instruments CD3215C00 USB-C power controller

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Step 9

- These chips can't be contained to just one step, so here are some more:

  - STMicroelectronics STB601A0 power management (likely)

  - Apple 343S00252-A0 power management (likely)

  - Apple 343S00257-A0 power management (likely)

  - Apple 343S00248-A0 power management (likely)

  - Texas Instruments 343S00235 charger IC (likely)

  - Diodes Incorporated PI3DPX1203 DisplayPort 1.3 4-lane linear re-driver

  - NXP Semiconductor CBTL610 DisplayPort multiplexer (likely)

Step 10

- Main PCB IC Identification, Continued:

  - Winbond [W25Q80DV](#) 8 Mb Serial NOR Flash

  - ON Semiconductor [FUSB301A](#) USB Type-C Controller (Likely)

  - Analog Devices [ADAU7002](#) Stereo Audio Converter

  - Maxim Integrated [MAX98357A](#) 3.2 W Mono Class D Audio Amplifier

  - Texas Instruments [TPD6S300A](#) USB Type-C Port Protector

  - Texas Instruments [TPS61230A](#) 6 A Step-Up Converter

 - Texas Instruments [TPS61178](#) 10 A Synchronous Boost Converter

Step 11
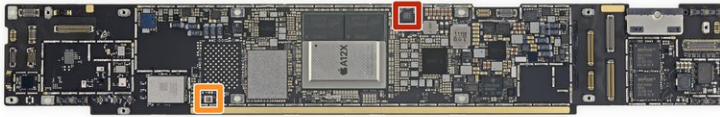
- Sensor IC Identifications:

  - Bosch Sensortec Accelerometer/Gyroscope

  - Bosch Sensortec BMP28x Pressure Sensor (likely)

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Step 12

- Battery time! We were *not* fans of [last year's iPads](#), which skipped out on the stretch-release battery tabs.

- This year, pull tabs are back in style—six U-shaped strips this time! Each strip has *two* tabs, giving fixers a second chance should one of them break. Neat!

  - (i) Maybe we pegged this iPad all wrong. It was painful to open, but these adhesive strips pull out [buttery smooth](#)—

- But the smooth stops there. A huge patch of supergoop runs all the way down the left side. *Sigh.* Time to break out the pry tools.

  - We were left speechless. Why would Apple do this? We could only hypothesize that the adhesive is there for "[rigidity reinforcement](#)".

- This iPad's powered by a 7812 mAh battery running at 3.77 V, for 29.45 Wh—a slight downgrade from the 30.8 Wh pack in the [10.5" iPad Pro](#), and a lot smaller than the most recent [Microsoft Surface Pro's](#) 45 Wh battery.

Step 13
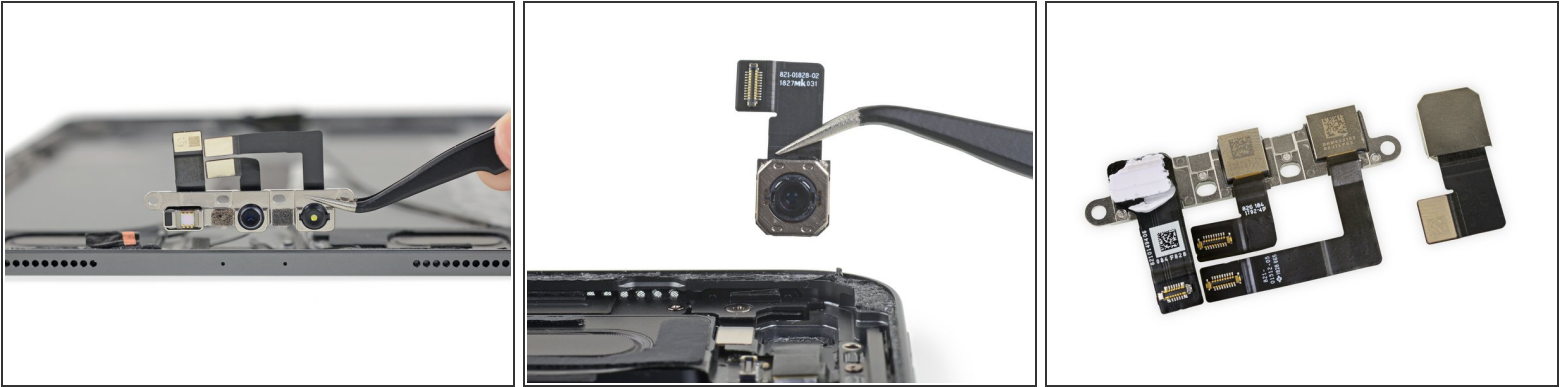
- Next up, making its debut in the iPad: Face ID.

- More specifically, this is the same basic hardware we've seen since [iPhone X](#)—IR dot projector, selfie camera, and IR camera—but in a slightly modified form factor.

- While we're at it, we fish out the rear camera—which Apple says brings the same performance as the camera from the previous iPads, while being re-engineered for more thinness.

  - [With the loss of OIS, and still a huge camera bump](#), this design seems shot through with compromise.

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Step 14

- Let's remove those speakers, shall we?

- That's easier said than tear-done. The housings are carved right into the aluminum case, and were clearly never meant to be removed. Digging them out takes a ton of heat and willpower.

  - The tweeters come out without a fight but the woofer drivers are pretty much toast—hope they're made of never-fail-ium!

- Hiding within the speaker chamber; more magnets! If we had a nickel for every magnet in here, we could melt them all down and make a giant novelty nickel.

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Step 15
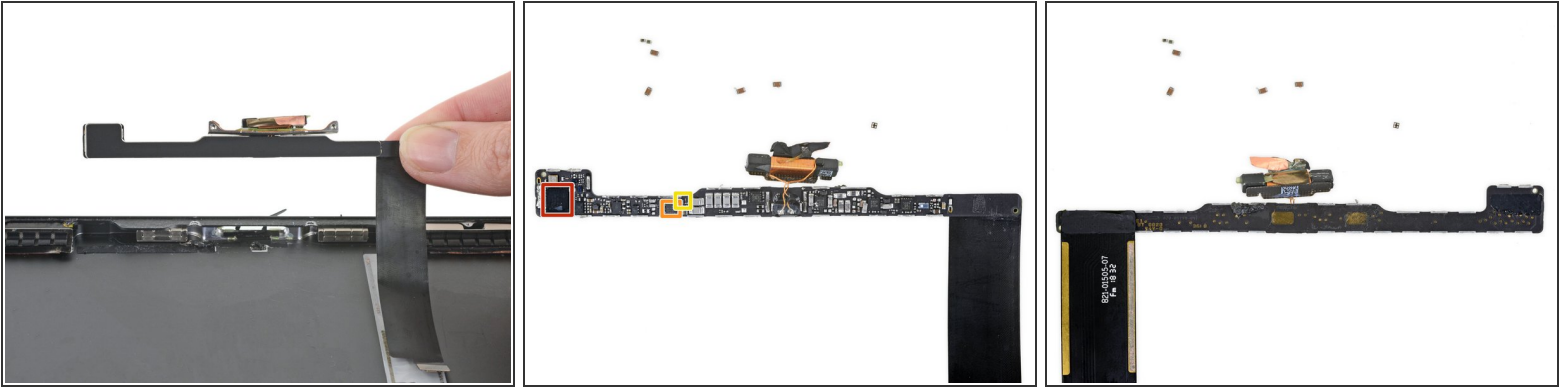
- Next to come out is the Pencil charging board, with its copper charging coils attached.
  - While it's technically out, it's not without casualty...

- Tiny capacitors and other board bits go flying in protest as we remove the shields. Are we sorry? No we're not.

- What's this we see, hiding in the corner? It's an STMicroelectronics STM32L476JGY6 ARM Cortex MCU.

- Texas Instruments TPS60151 5V charge pump

- ON Semiconductor FPF1204UCX Load Switch

Step 16
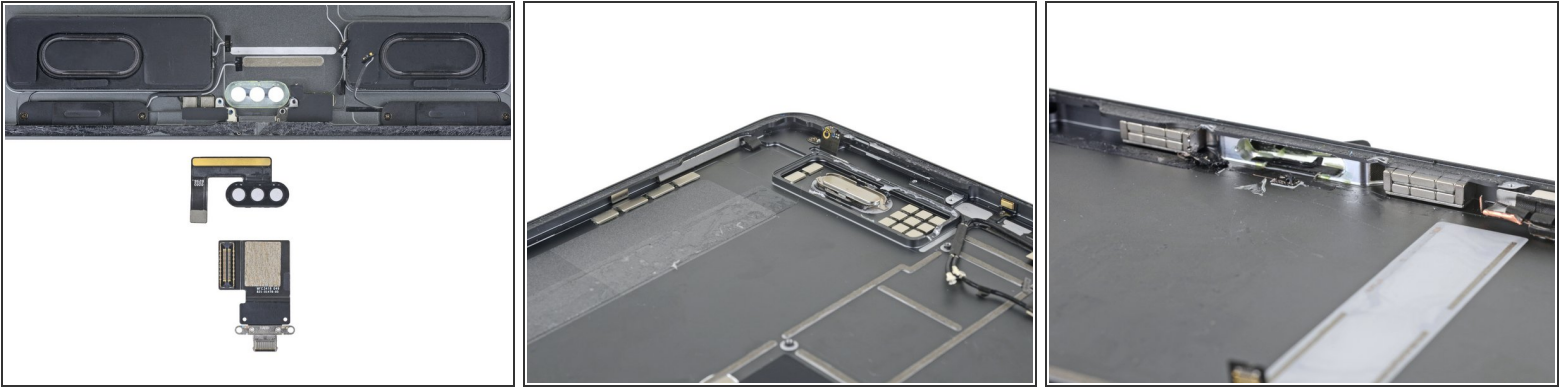
- Last to come out is the USB-C port—which unlike previous iPads, is fully modular.

  - (i) *Technically* previous iPads didn't have USB-C at all—but they had Lightning ports for the same purpose, and *those* were soldered to the logic board.

- This is a high-wear component, so the ability to replace it independently of the main board is a nice repair win.

- It might not be a win for people who are heavily invested in Lightning, but our message to those people is: At least USB-C offers faster throughput in a standardized, non-proprietary form factor.

- About the only things left in the chassis are a whole **ton** of ~~nickels~~ magnets.

Step 17
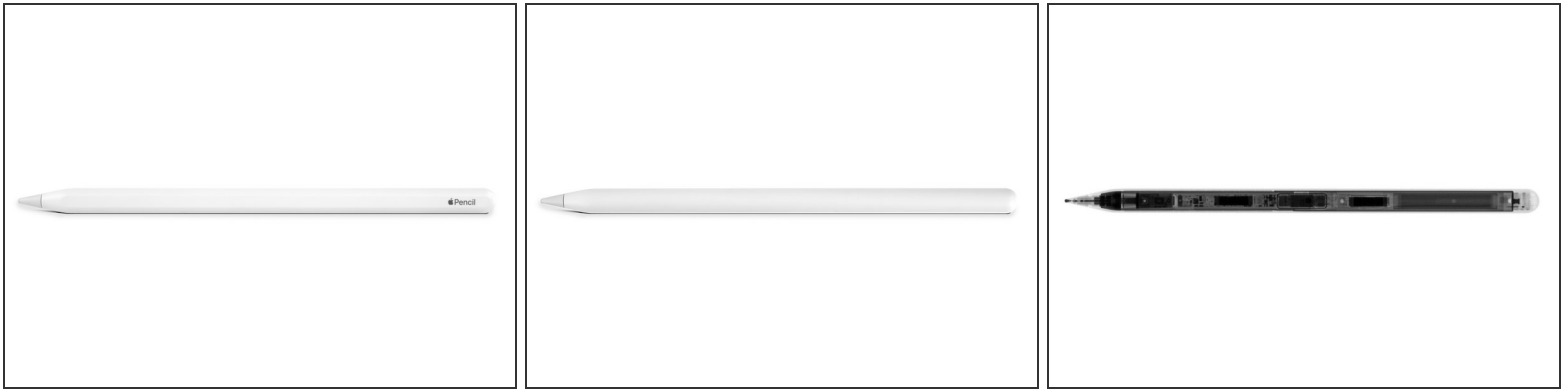
- **Bonus round**: we also picked up the new Apple Pencil.

- We can already tell, based on the number of visible entry points (read: zero), that this isn't going to be pretty. ([Again.](#))

- Let's start with an X-ray before things get messy.

Step 18
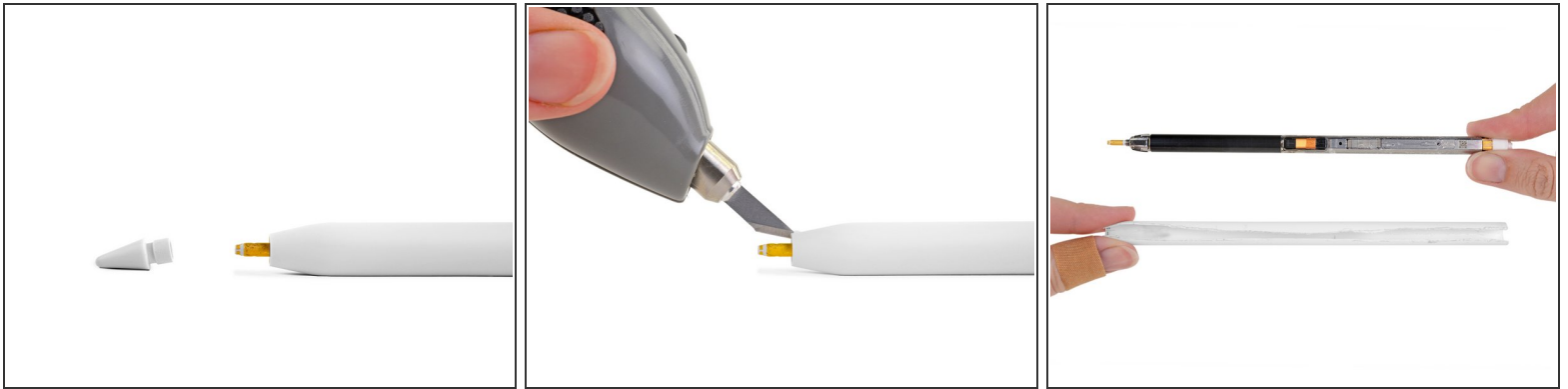
- Okay so technically there is *one* entry point, but we all know nothing's getting in through that tip.
  - ⓘ The tip is actually the one thing that is compatible with the previous model—if you bought a new iPad this year and want a Pencil, get ready to spend some more money.

- With the tip removed, we go straight for the big guns. Bring out the [ultrasonic blade](#)!

- When the dust settles, a metal rod emerges from the Apple-white plastic shell.

- Looking around, we spot the new wireless charging getup, some magnets, a black sheath, and a wounded teardown engineer. ☹
  - ⓘ Only one engineer was harmed in the making of this teardown.

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Step 19
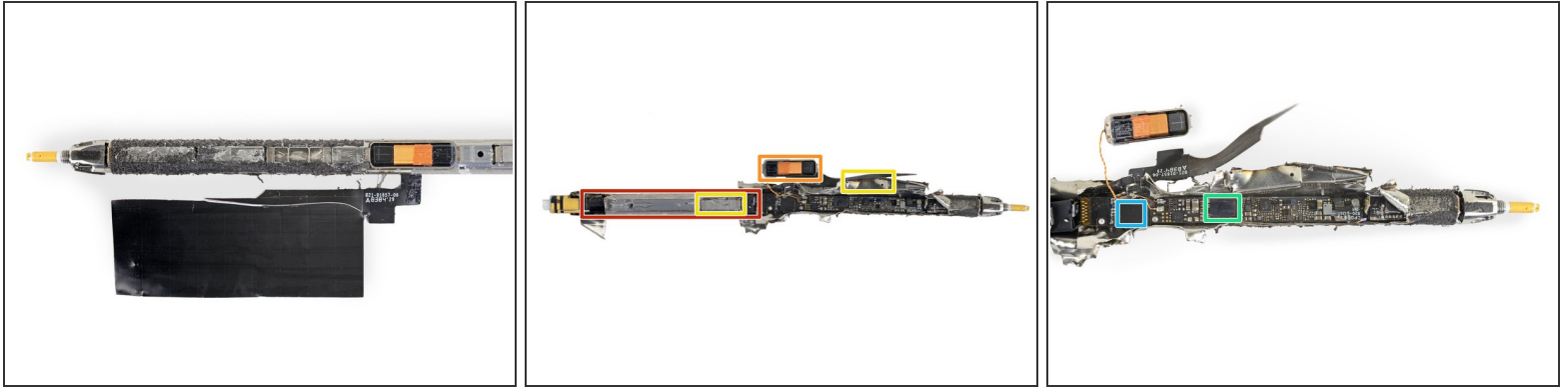
- A large black ribbon cable unfurls from around the Pencil body, revealing what looks like a capacitative grid!

  - ⓘ This is likely used to register tap inputs, but this grid ought to help the Pencil know where—not just when—you tap. Could more complex gestures be on the way?

- Unfortunately, it's back to destruction from here—the Pencil's many welded steel layers put up quite a fight, and we're only able to reveal a few components.

  - Battery (even we don't want to tempt that little explosive)

  - Wireless charging coil

  - Alignment magnets

  - Broadcom BCM59358A0 wireless charging IC (likely)

  - Analog Devices 343S00250 Apple Pencil nib sensor controller (likely)

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Step 20
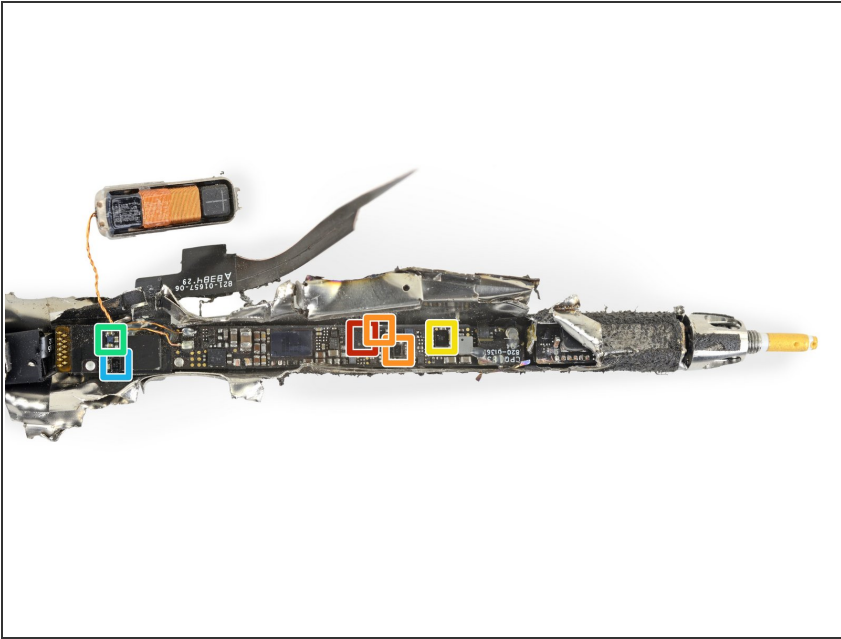
- Apple Pencil IC Identification, Continued:
  - Bosch Sensortec [BMA456](#) 3-axis accelerometer
  - Maxim Integrated [MAX44284](#) current-sense amplifier
  - Maxim Integrated [MAX4971](#) overvoltage protection controller
  - ON Semiconductor [NCP161AFCS180T2G](#) 450 mA LDO regulator
  - SiTime MEMS oscillator

Step 21

- This iPad Pro is no mo'—we've broken it down to its constituent parts!

- It's hard to tell if this is a good Apple, or a bad one. There's a modular USB-C port and stretch-release battery adhesive, but it's still mostly glued together and a strip of tough conventional adhesive also secures the battery.

- It looks like Apple is trying to change, but the voice on the other shoulder was a little louder than the repairability angel this time around. That said, with all of Apple's late 2018 products showing some improvement, we're hoping the repairability angel is gaining influence.

Step 22 — Final Thoughts

REPAIRABILITY SCORE:
3 OUT OF 10
IFIXIT

- The iPad Pro 11" earns a **3 out of 10** on our repairability scale (10 is the easiest to repair):
  - The USB-C port is modular and can be independently replaced.
  - The lack of a physical home button eliminates a common failure point and may simplify repairs.
  - The battery is secured with both easier-to-remove stretch-release tabs *and* conventional, non-removable adhesive.
  - The LCD and front panel glass are fused together—simplifying the opening procedure, but increasing the cost of repair.
  - Gobs of adhesive hold most everything in place, making all repairs more difficult.