Magic Trackpad 2 Teardown

Fall is a magical time, marked by harvest...

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INTRODUCTION

Fall is a magical time, marked by harvest festivals, warm sweaters, and pumpkin-spiced everything. Apple decided to celebrate by releasing a new trackpad, the Magic Trackpad 2, bringing their Force Touch technology to desktops. We're wondering what's inside the magical new trackpad and if it's repairable. There's only one way to find out—with a teardown!

Looking for the rest of the 2015 *Maccessory* lineup? Check out the **Magic Mouse 2** and **Magic Keyboard** teardowns!

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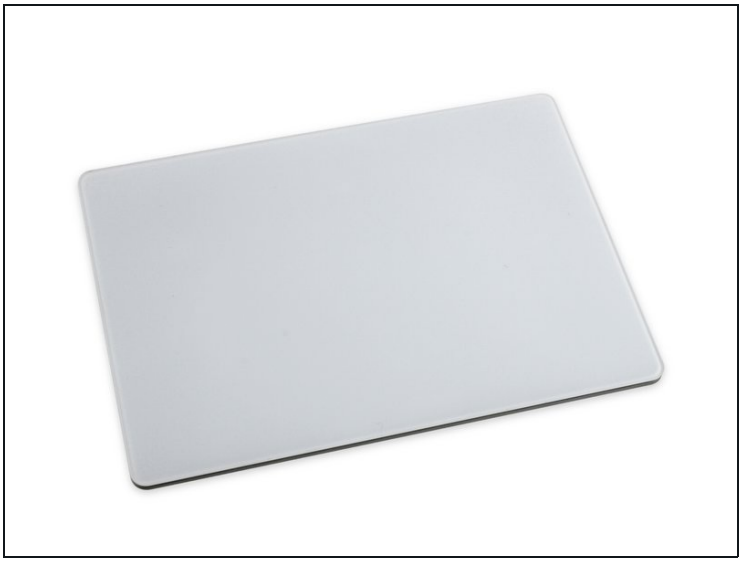
[video: https://www.youtube.com/watch?v=801l3oz3fIs]

TOOLS:

- iOpener (1)
- Curved Razor Blade (1)
- iFixit Opening Picks (Set of 6) (1)
- T3 Torx Screwdriver (1)
- Tweezers (1)
- Spudger (1)
- Utility Knife (1)

Step 1 — Magic Trackpad 2 Teardown





- The jury's still out on just how magical this Trackpad *really* is, but here's what we know so far:
  - Dimensions: 0.43" × 6.3" × 4.52"
  - Bluetooth wireless connectivity
  - Internal lithium-ion battery
  - Lightning port (for charging and pairing)
  - Force Touch and Multi-Touch

Step 2





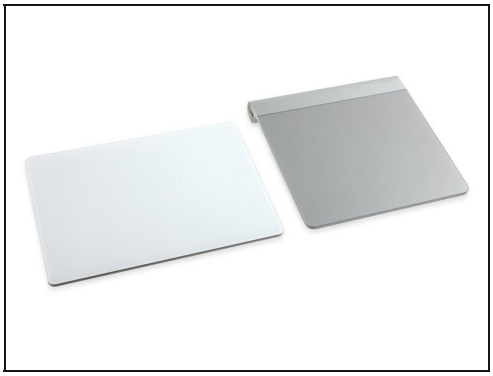
- The rear of the new Magic Trackpad boasts a power switch, Lightning port, and a mysterious plastic bar. We're speculating this might be a break in the metal for an antenna, but we'll have to get inside to see!

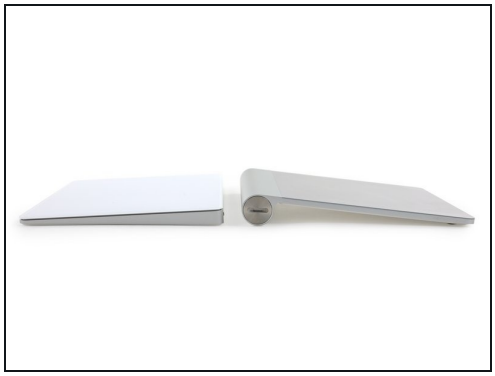
  The Lightning port serves a dual purpose—pairing with your Mac via USB, and charging the trackpad's integrated battery.

- On the bottom of the device we find the new model number: A1535.

Step 3



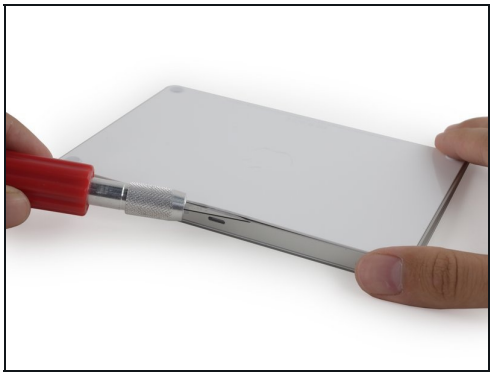
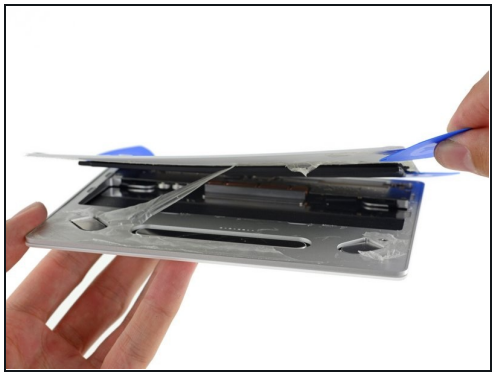




- Let's compare notes and see what Apple has thought up for the Magic Trackpad 2.
  - Just like the new Magic Keyboard , the Magic Trackpad 2 takes full advantage of ditching those AAs to slim down the design—and to make the entire top surface trackpad-able.
    - This new "Magic" gen, like the old before it, has uniform styling for a coordinated desk.
  - At about an inch wider and a quarter inch deeper, the new device has around 6 square inches of additional tracking surface.

Step 4



- There's no easy way into the Magic Trackpad 2, so we set our iOpener to *Stun* to weaken the adhesive holding the trackpad together.
- We know this drill. With our ~~scimitar~~ razor blade in hand, we (un)stick it to the intense adhesive holding the rear cover in place.
- We slice, pry, and wiggle our way through the adhesive bit-by-bit.
  - Many ~~Bothans~~ opening picks died in the making of this teardown.
- Once we find our way inside, we're greeted with something resembling Shelob's lair—a terrifying, sticky mess.

Step 5





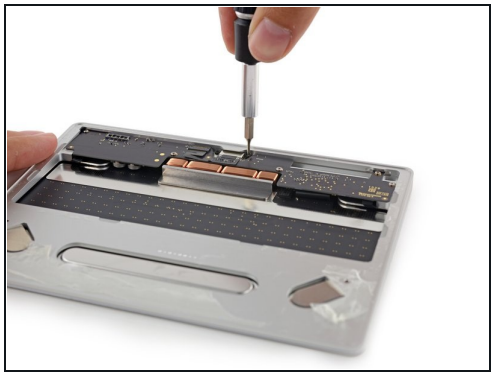
- Upon opening, we realize the magic holding this trackpad together is really just oodles of tape doing what could probably be done with screws.

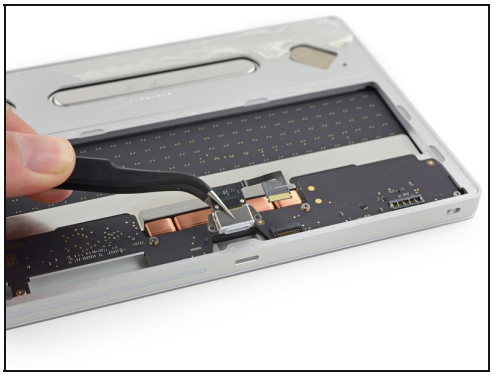
- We find what *appears* to be a big iPhone battery adhered to the rear panel. But weighing in at 3.78 V, 7.65 Whr, this 2024 mAh Lithium-ion polymer battery falls short of the 2750 mAh battery in the 6s Plus.

Apple claims the integrated rechargeable battery reduces waste by eliminating the use of disposable AA's in the previous trackpad.

- While this is certainly a laudable notion, responsible owners of the Magic Trackpad v1.0 used their own rechargeable AA's—saving waste *and* making the device more recyclable at the end of its lifespan.

Step 6



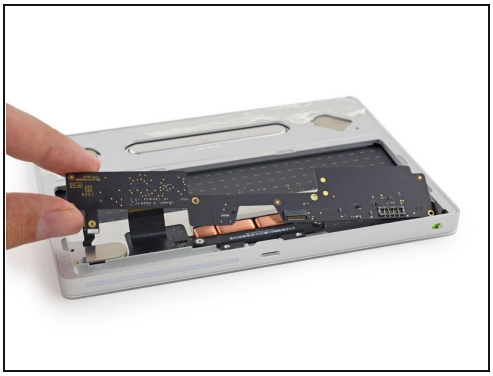
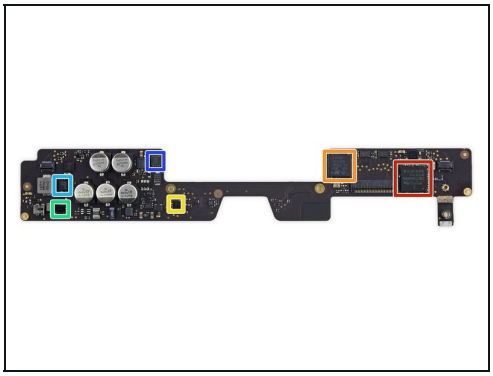
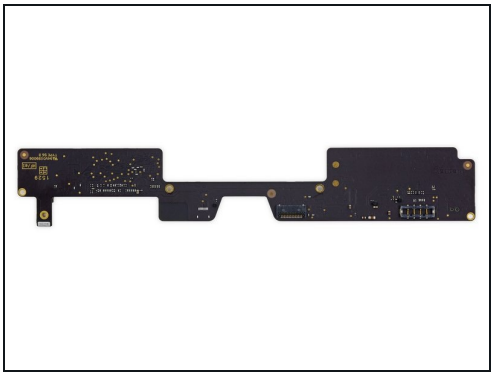




- Casting the battery and rear panel aside, we turn our attention to the front panel and all of its goodies.
- Be still, our hearts—this Lighting connector cable looks suspiciously unsoldered and removable.
- Sure enough, we flip the ZIF latch, remove the T3 screws, and *voilà*—the Lightning connector springs free!

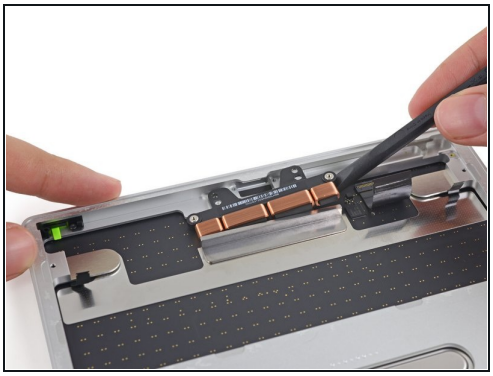
That's good news for repair—a combined charging and data port suffers frequent use and can be a common point of failure.

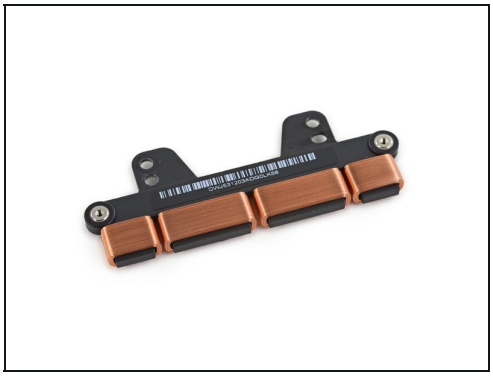
Step 7

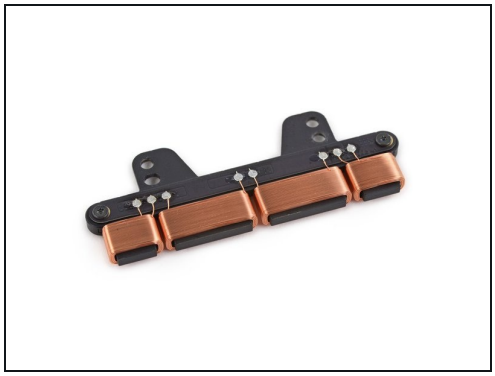




- We pluck out the slender logic board to get a better view of its silicon. Here's what we find:
  - Broadcom BCM20733 Enhanced Data Rate Bluetooth 3.0 Single-Chip Solution
  - ST Microelectronics STM32F103VB 72 MHz 32-bit RISC ARM Cortex-M3
  - NXP 1608A1 Charging IC
  - Texas Instruments BQ24250C Single Input I2C/Standalone Switch-Mode Li-Ion Battery Charger
  - Intersil ISL656A Two-Phase PWM Controller
  - International Rectifier IRFH3702 Single N-Channel HEXFET Power MOSFET

Step 8







- Prying out the Taptic Engine, we're disappointed that the only haptic feedback we get is the force of our spudger on the aluminum frame of the trackpad.

- Resembling the Taptic Engines in both the Retina MacBook and MacBook Pro, this new Taptic Engine should bring a similar Force Touch experience to the Magic Trackpad 2.

  These coils of copper wire form powerful electromagnets that push and pull against the steel bar mounted to the underside of the trackpad surface, causing the entire surface to rapidly and shortly buzz, simulating the sound and feel of a click.

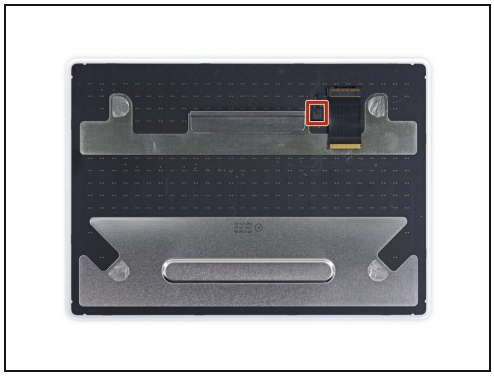
Step 9



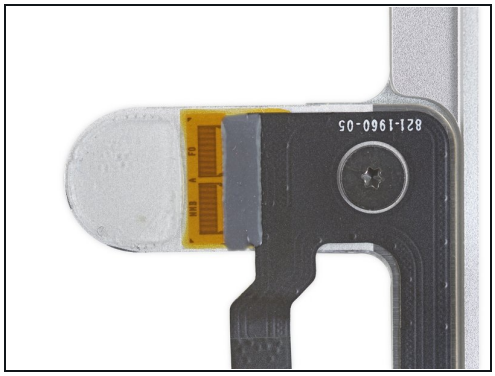


- Just like other Force Touch implementations we've seen, the trackpad rests on four springy metal tabs, secured with clear adhesive pads.
- The only way to separate the trackpad and get a closer look is to cut through the adhesive. Unfortunately, that's also the only way to replace a damaged trackpad surface.
- With the glue cut, let's get a look at what was hiding between the aluminum trackpad frame and the trackpad surface.

Step 10





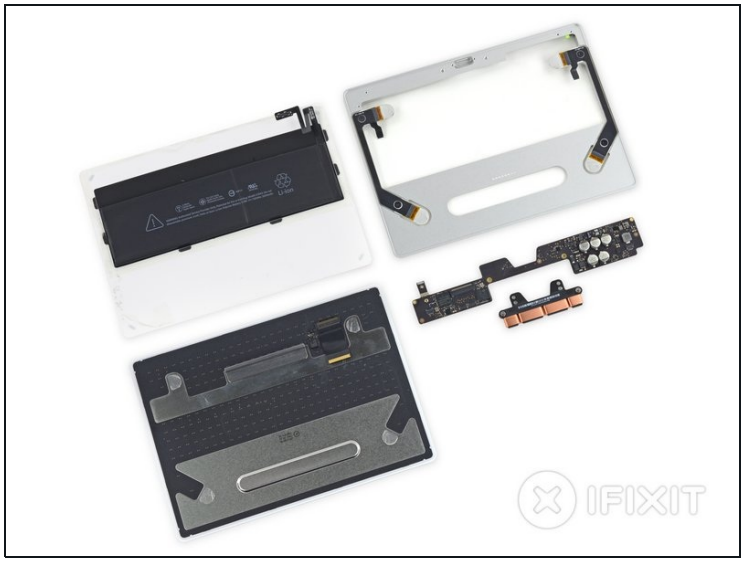


- A single, elegant chip resides on the touchpad.
  - Broadcom BCM5976 Touch Controller (part of the same series of Broadcom touch controller chips used in many Apple devices)

- The strain gauges, mounted on each of the four spring tabs, are used to measure the force applied to the trackpad surface.

ⓘ As you press down on the trackpad, the springs deflect, stretching the strain gauges and increasing their resistance. A microcontroller measures that resistance and determines the appropriate level of ~~haptic~~ Taptic feedback to deliver.

Step 11





- The Magic Trackpad 2 Repairability Score: **3 out of 10** (10 is easiest to repair)
  - The Lightning port and battery can be replaced independently of the logic board—if you can get the device open.
  - Replacing a damaged trackpad surface means cutting and reapplying the adhesive on the spring tabs.
  - Excessive use of strong adhesive makes it very difficult to remove the rear panel, hindering access to every internal component.
  - Without a service manual, it is difficult to open the trackpad without damaging internal components such as the battery and Taptic Engine.