



Microsoft Surface Teardown

We got our hands on Microsoft's new Surface,...

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INTRODUCTION

We got our hands on Microsoft's new Surface, and to its credit, it lasted a good twenty minutes before we decided to tear it open.

Ready for more than just a surface-level relationship? Follow us on [Twitter](#) or like us on [Friendster 3.0](#).



TOOLS:

[Heat Gun](#) (1)

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

[iFixit Opening Tool](#) (1)

[Spudger](#) (1)

[T4 Torx Screwdriver](#) (1)

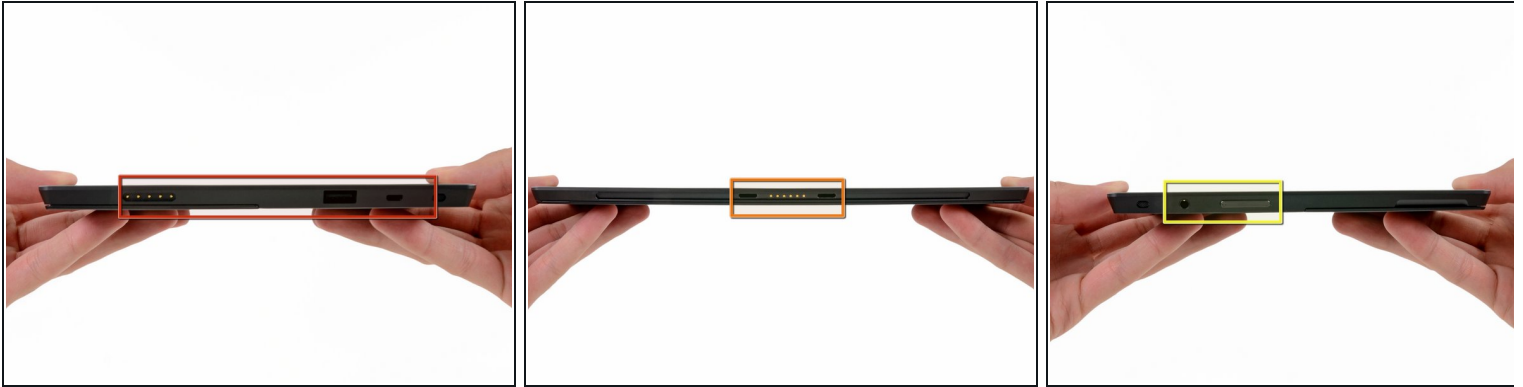
[T5 Torx Screwdriver](#) (1)

Step 1 — Microsoft Surface Teardown



- Is that the display assembly from a PC laptop? Nope, it's the new Microsoft Surface with Windows RT.
- Notable tech specs:
 - 10.6" ClearType HD Display (resolution of 1366x768 pixels)
 - Quad-core NVIDIA Tegra 3 processor
 - 2 GB RAM
 - 32 or 64 GB flash storage
 - Wi-Fi (802.11a/b/g/n) + Bluetooth 4.0
 - 720p HD Front and Rear facing LifeCams

Step 2



- To give the Surface laptop-like connectivity, nearly every edge includes ports and buttons. They are (from left to right):
 - Magnetic charging, USB 2.0, and Micro-HDMI out on the right side
 - Magnetic connection for the Touch Cover or Type Cover on the bottom
 - Headphone jack and volume rocker on the left side

Step 3



- Just like your first big-kid bike, this ~~laptop~~ tablet comes with a kickstand to prop it up in notebook mode.
- One of the most notable features of the Surface is its Touch Cover keyboard, which protects the screen when closed and provides a full QWERTY typing experience when open.
- ① For users who find the Touch Cover to be too much a compromise, Microsoft offers the [Type Cover](#), a chiclet keyboard that also folds up to protect the Surface's LCD.

Step 4



- We begin our expedition by removing the kickstand.
- ⓘ Fun fact: the kickstand is held in place by a few Torx screws.
- Sans kickstand, we can easily view the markings on the back of the Surface's rear case. The Surface with Windows RT has a model number of 1516.

Step 5



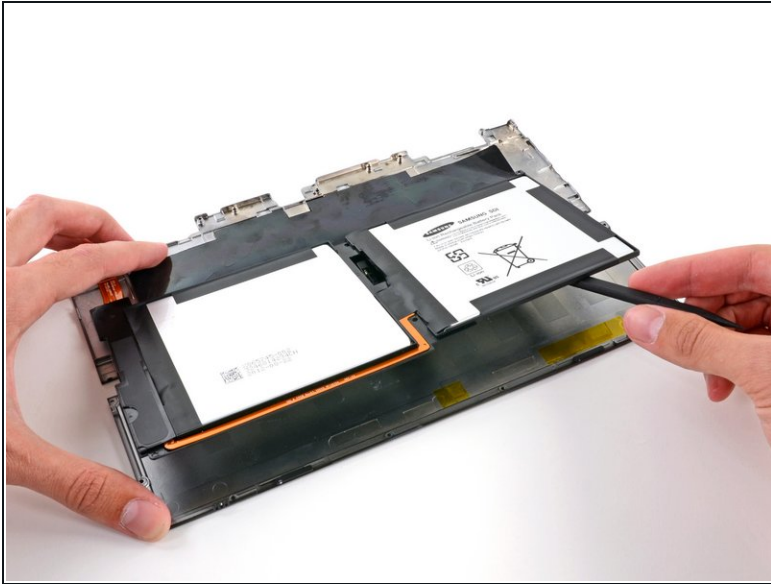
- Small bezels tend to hide screws, so the first place we look to open the Surface is its long plastic camera cover.
- ⓘ Our pictures make it look easy, but removing this plastic cover took about half an hour and a lot of careful prying.
 - Chalk it up to inexperience. This step should take less than ten minutes once we create guides for it.
- Not only did we find the screws we were searching for, but there is also what appears to be a tamper-evident seal that simply reads "Surface."
- ⓘ The tamper-evident label is composed of multiple sections. Unfortunately, it breaks apart upon removal.

Step 6



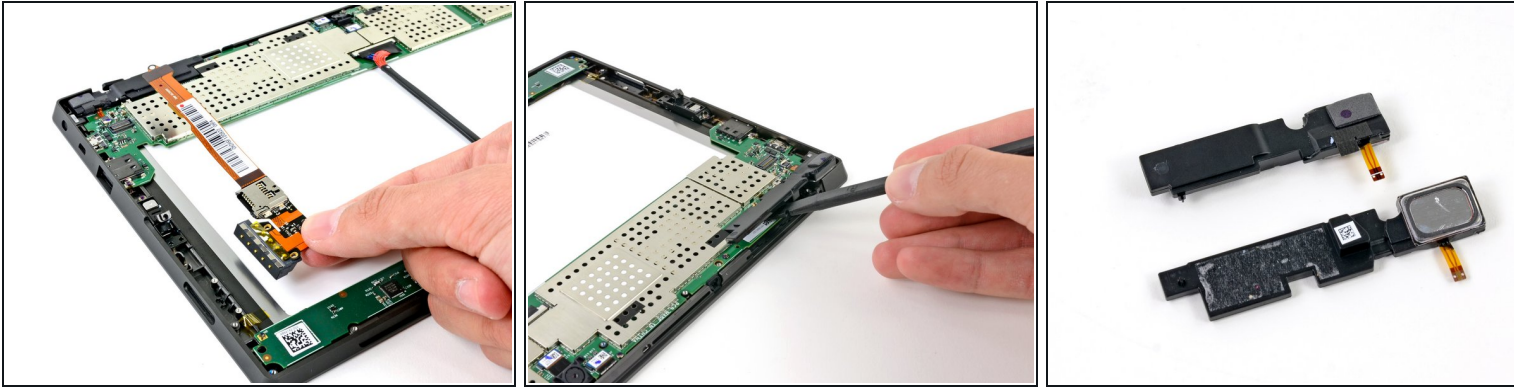
- After removing a total of **17** T5 Torx screws, (10 under the kickstand and 7 under the camera cover), the rear case comes right off—almost.
- A lone ribbon cable still tethers the battery to a ZIF connector on the Surface's motherboard, which we make quick work of with the ever-trusty spudger.

Step 7



- The big question of the day: is the battery easily removed?
- Answer: Yes. It's glued in, but it's way easier to remove than on the iPad. A couple of minutes of spudging around, and it's out.
- We get our first look at the battery. As is the norm, the dual battery cell is adhered to the [VaporMg](#) rear case.
- The 7.4 V, 31.5 Wh battery is manufactured by Samsung. It fits right in between the iPad 2's 25 Wh battery, and the iPad 3's 42.5 Wh unit.

Step 8



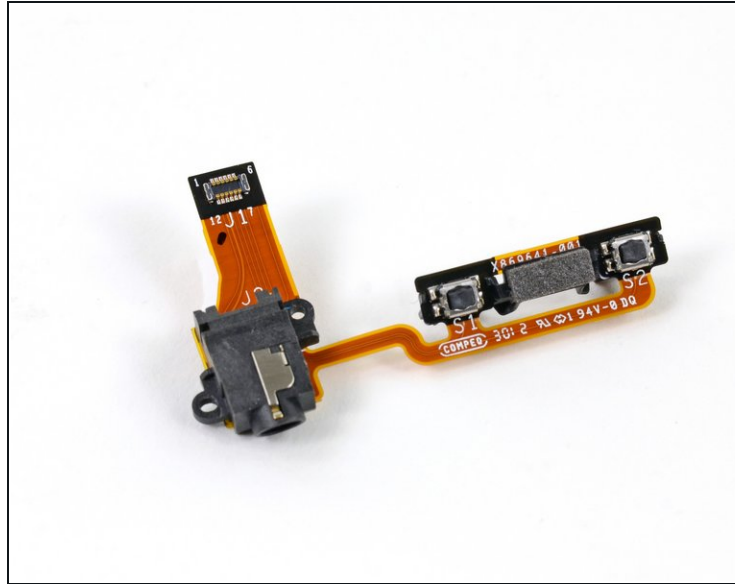
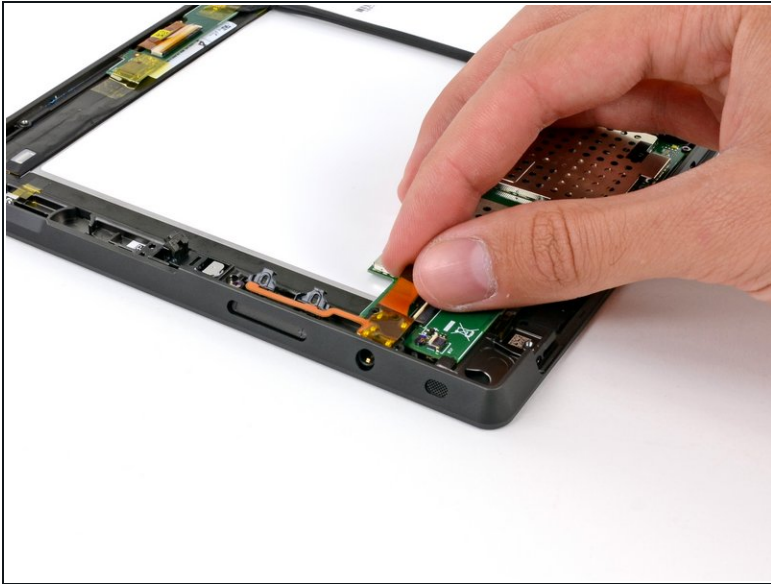
- Next we find a large orange ribbon cable leading to the "Apple-esque" magnetic charging port. The microSDXC card slot that hides underneath the kickstand is also attached to this ribbon cable. [And not a single bother was given that day](#), so we proceeded to dismantle the speakers.
- We love modular components inside tablets and smartphones, and these speakers fit that bill. A little bit of spudgering, and our Surface has gone silent.
- ① With two speaker assemblies we are living in [stereo](#).

Step 9



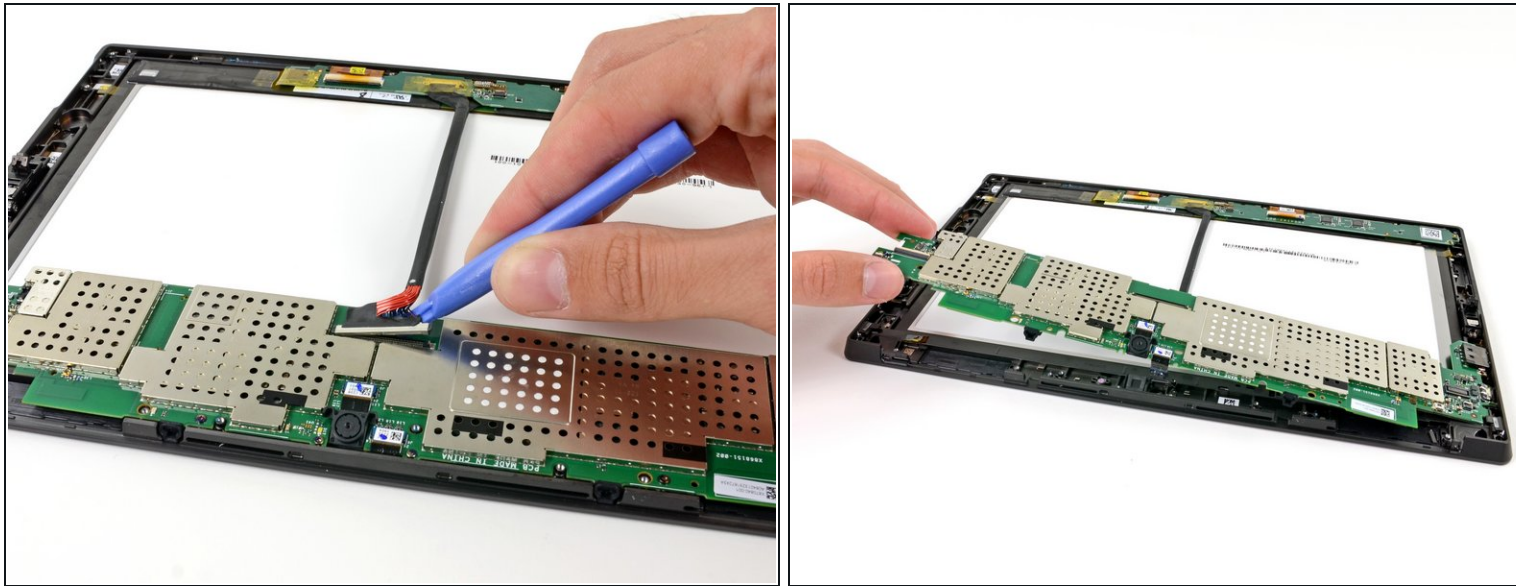
- Next to the display in the front case we find, well, some speaker-looking thing.
- Inside the case of our mystery component we found a voice coil, so we're pretty sure it's some sort of microphone or secondary speaker, or possibly a linear vibration motor.
- ① Update: It looks like a Precision Microdrives [Precision Haptic Linear Resonant Vibrator](#), responsible for haptic feedback.

Step 10



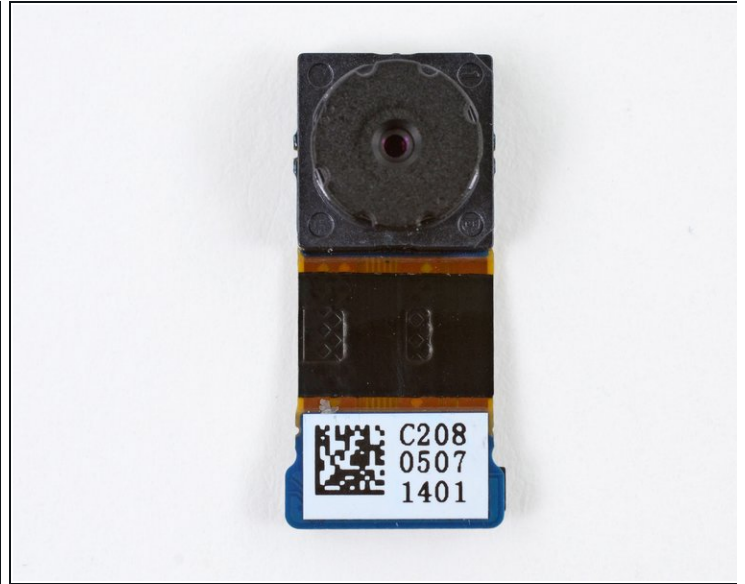
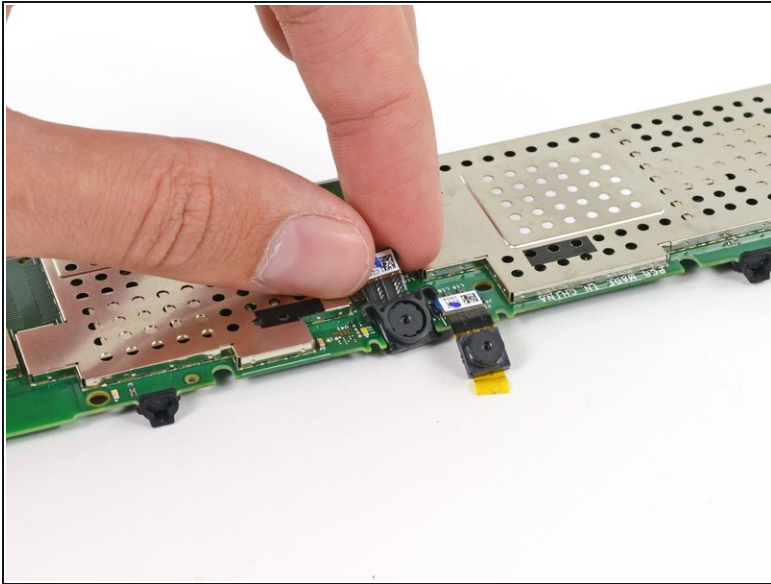
- The headphone jack and volume buttons aren't holding on to their real estate too tightly, and they easily come out next.
- We still count this as a modular component, even though it's two things on the same ribbon cable. We have certainly [seen worse](#) lately as far as modularity goes.

Step 11



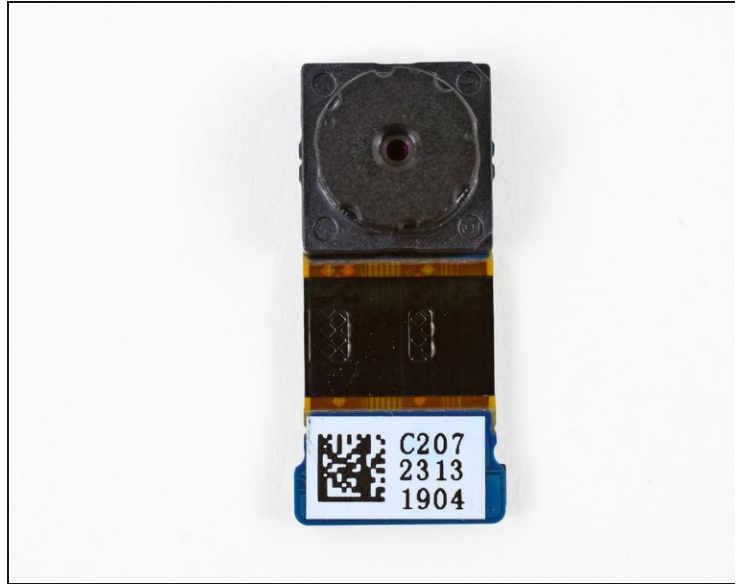
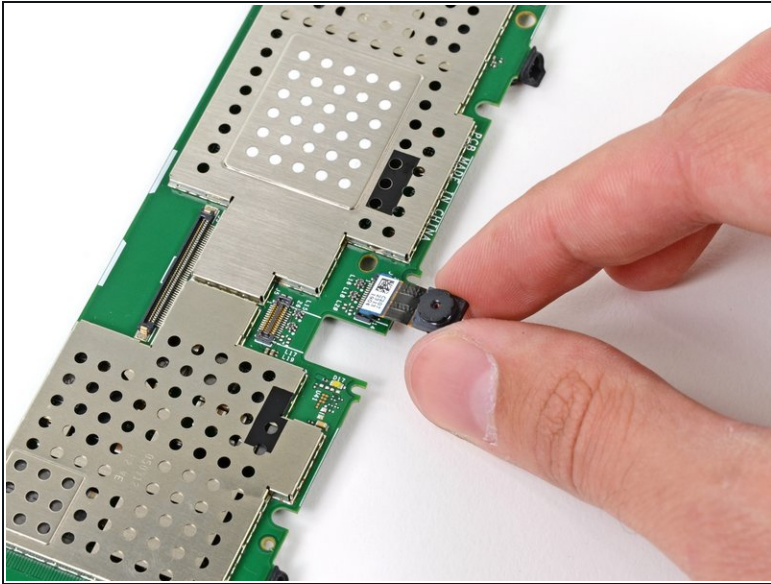
- We disconnect the display and digitizer cable from the motherboard with the help of a plastic opening tool.
- Let's get the motherboard out and see what goodies are attached to it.

Step 12



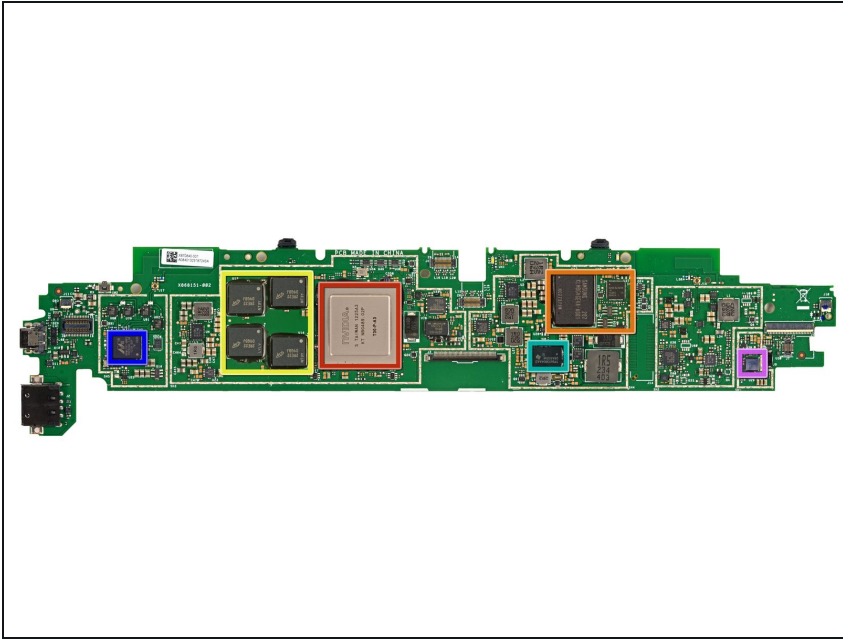
- Oh no! We can't Skype with our grandmothers now that the front-facing camera is gone!
 - ① We had to wait until the motherboard was out to remove this camera, as a plastic bezel pins it down from beneath.

Step 13



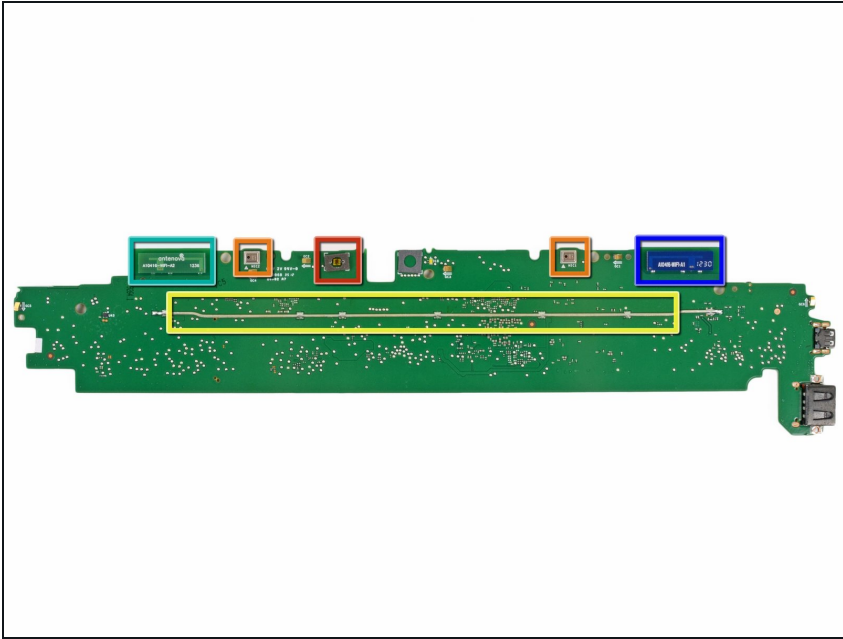
- Off comes another 720p camera from the motherboard. It feels like we've done this before...
- The exclusion of a 1080p rear-facing camera either means cost was a big concern, or that Microsoft's designers don't expect you to use the Surface as your main camera.
- Perhaps they too realized how [goofy you might look](#) when taking pictures with a tablet.

Step 14



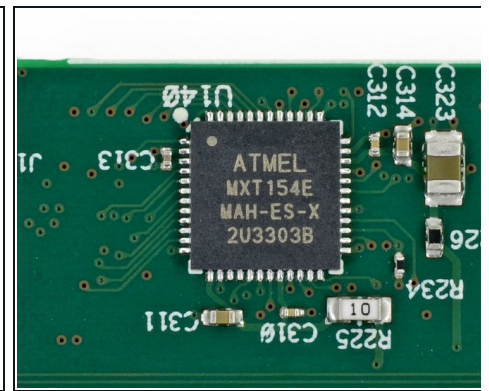
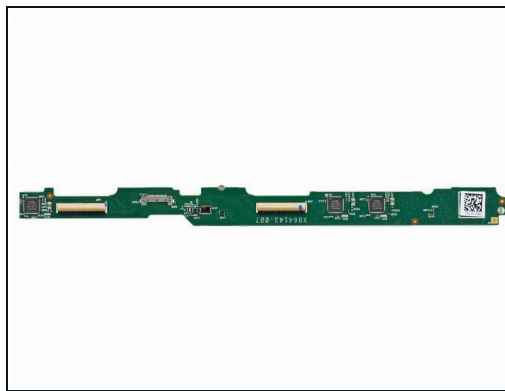
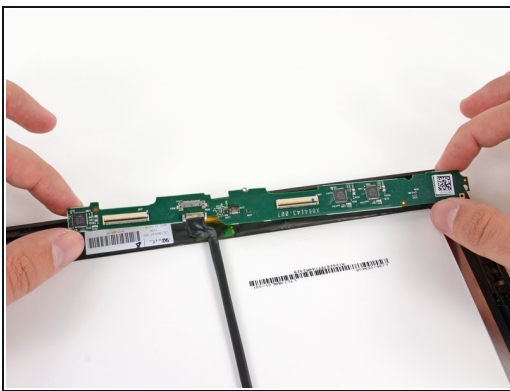
- Prominent ICs on the bottom of the motherboard:
 - NVIDIA [1.4 GHz Tegra 3](#) Processor
 - Samsung [KLMBG4GE4A](#) 32 GB NAND Flash (left) and [Atmel UC3L microprocessor](#) (top right).
 - Micron 2RE22 D9QBJ 2 GB DDR3 SDRAM
 - Texas Instruments [TPS659110](#) power management IC
 - Marvell [88W8797-BMP2](#) wireless MIMO SoC
 - Wolfson [8962E](#) low power audio codec
 - Cypress Semiconductor [CY8C20466A](#) CapSense® Controller with SmartSense™ Auto-tuning

Step 15



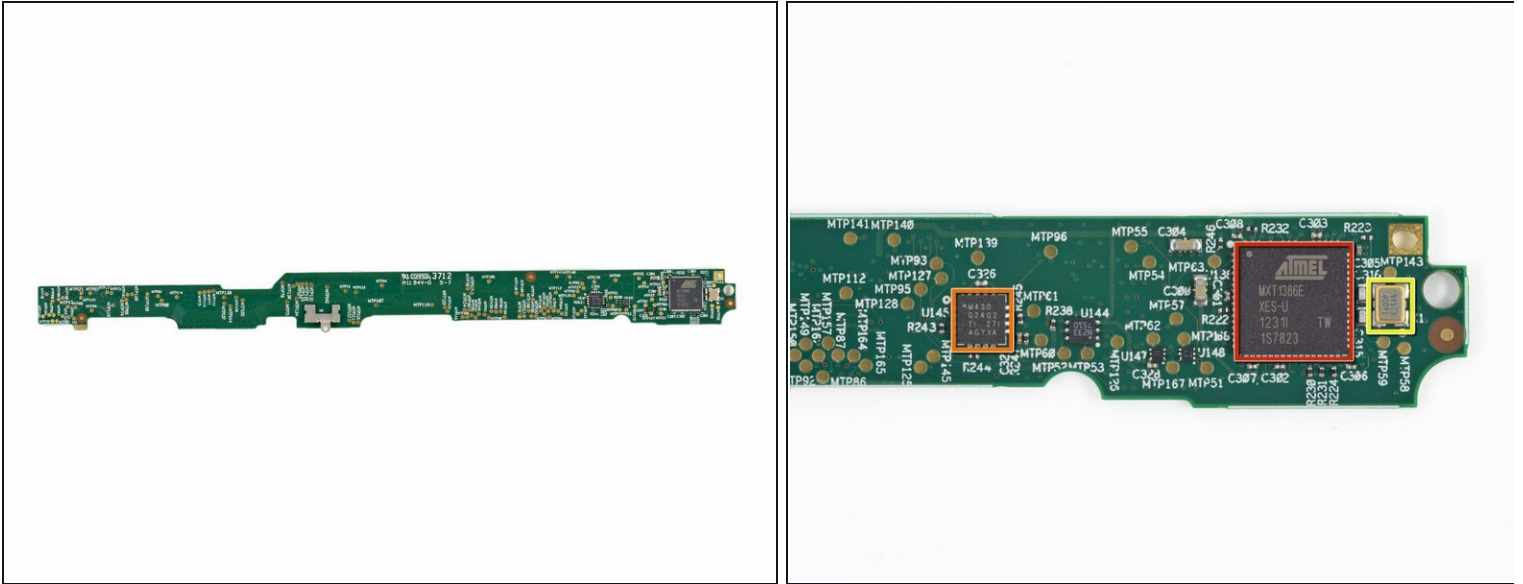
- The backside of the motherboard doesn't have any chips, but it does have two Wi-Fi antennas, the ambient light sensor, a couple microphones, and a precarious wire running most of its length.
 - Ambient light sensor
 - Wolfson [WM7220](#) Microphones
 - Precarious wire
- The Wi-Fi antennas are labeled:
 - Antenova A10416-WIFI-A2
 - Antenova A10416-WIFI-A1

Step 16



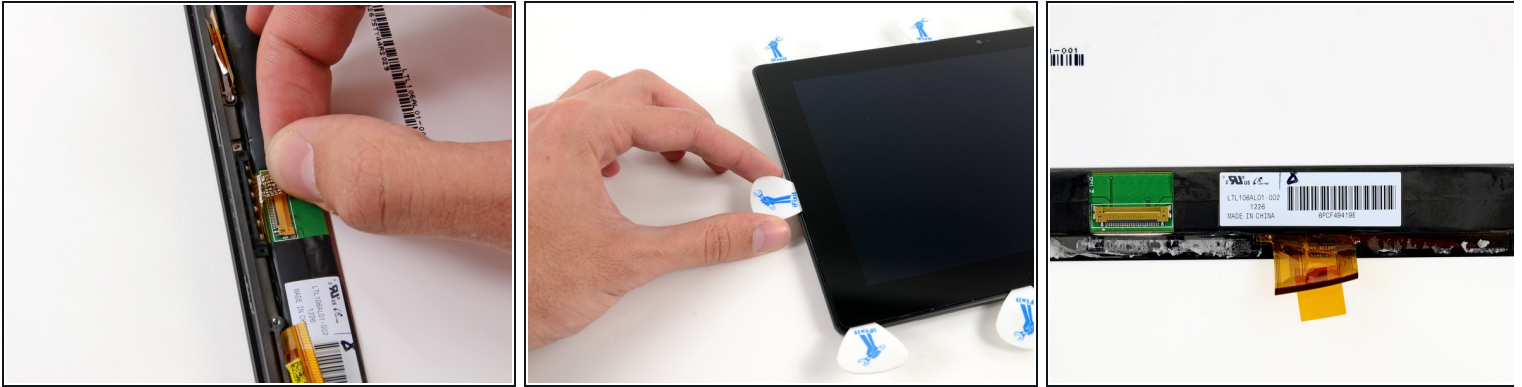
- Following the mother(board) is the daughter(board) featuring three Atmel MXT154E touchscreen controllers.
- This board only deals with matters pertaining to the 10.6" touchscreen. Everything else is either located on the motherboard or on its own ribbon cable.

Step 17



- The back side of the daughterboard contains only a few prominent ICs:
 - Atmel MXT1386 touchscreen controller
 - [TI MSP430G2402](#) Microcontroller
 - 1600P E284A Crystal Oscillator

Step 18



- We tried to remove the keyboard connector, but were [disappointed](#) to find it's wedged firmly under the LCD. Replacing the connector will require either bending the magnesium frame or separating the display.
- We were on a teardown roll, so we pressed on and pulled the display from the VaporMG frame, which required a heat gun, some guitar picks, and plenty of patience.
- The display's LTL106AL01-002 label indicates Samsung as the manufacturer. Its sister panel, the [LTL106AL01-001](#), appears to be 1280 x 800 resolution. We didn't test the Surface's display before taking it apart, and we trust Microsoft not to lie...
- But maybe someone can do a quicky double-check on the display resolution, just for giggles?

Step 19



- Microsoft Surface Repairability: **4 out of 10** (10 is easiest to repair).
 - Several components are modular and replaceable without requiring desoldering.
 - You can remove the battery pretty easily—once you've suffered through the opening procedure.
 - It's pretty difficult to remove the rear panel and gain access to the device.
 - It is impossible to remove the keyboard connector without first removing the display from the frame.
 - LCD and glass are fused together and strongly adhered to the case, increasing cost of replacement.
 - You'll have to use a heat gun and lots of patience to gain access to the glass and LCD.

To reassemble your device, follow these instructions in reverse order.