



Apple Thunderbolt Display Teardown

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INTRODUCTION

Crafted from the fire pits of Hephaestus himself, and thrust down to Earth by the mighty Zeus, the Apple Thunderbolt Display arrived at the doorstep of iFixit's headquarters.

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Cool bonus: [Here's a wallpaper](#) of one of Thunderbolt Display's chips, made in the Thunderbolt Display's native 2560 x 1440 resolution.



TOOLS:

- [Heavy-Duty Suction Cups \(Pair\)](#) (1)
 - [Spudger](#) (1)
 - [T10 Torx Screwdriver](#) (1)
 - [T6 Torx Screwdriver](#) (1)
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Step 1 — Apple Thunderbolt Display Teardown



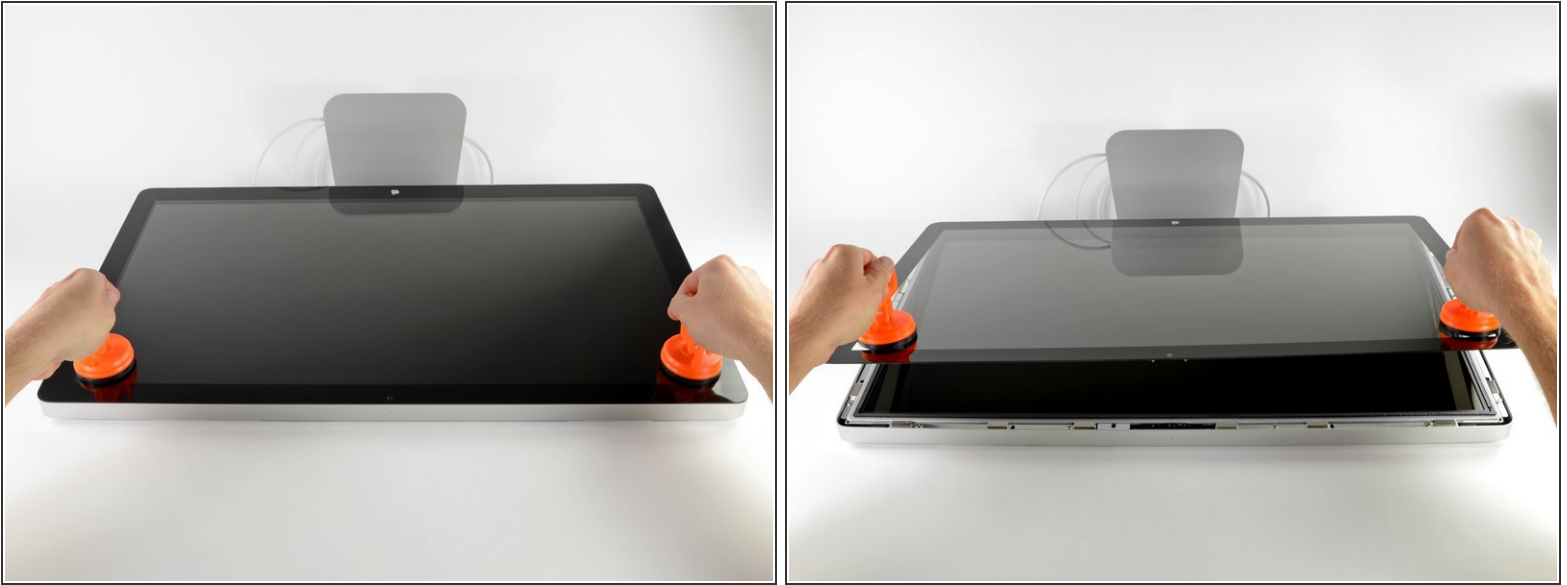
- [By the hammer of Thor!](#) With the new Thunderbolt Display in our hands, the future is looking bright.
 - 27" TFT Active-Matrix LCD
 - 2560 by 1440 Pixel Resolution
 - Built-in Thunderbolt and MagSafe Cables
 - FaceTime HD Camera with Microphone
 - 49 Watt 2.1 Speaker System
 - 16:9 Widescreen Aspect Ratio

Step 2



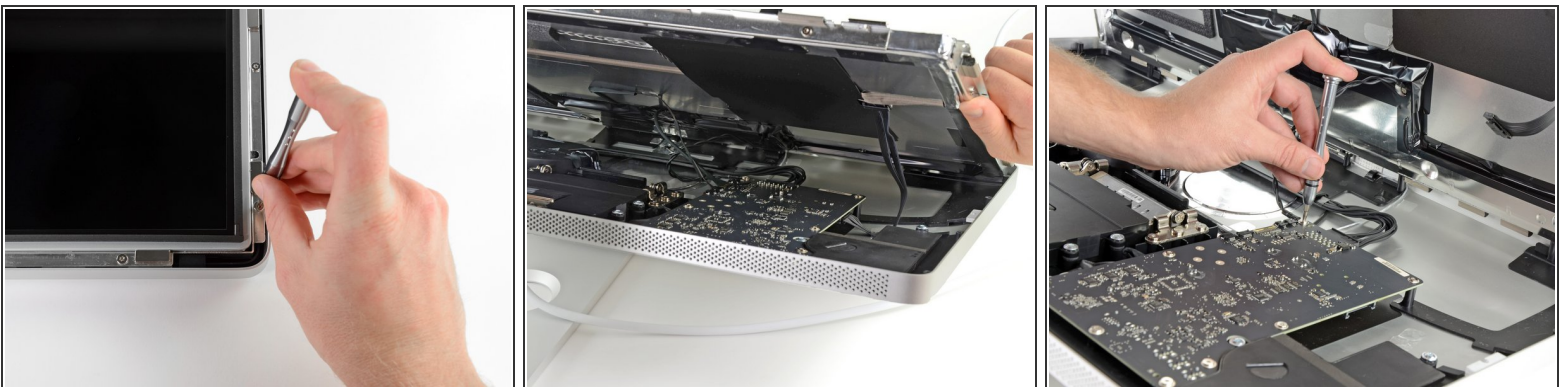
- The Thunderbolt Display contains a sweet lineup of USB, HDMI, VGA, and DisplayPort ports! Oh wait—[wrong thousand-dollar display](#).
- The luscious backside of the Thunderbolt Display contains only a small line of specified ports:
 - Three powered USB 2.0 ports
 - FireWire 800 port
 - Thunderbolt port
 - Gigabit Ethernet port.
- The Thunderbolt Display also comes with a built-in Thunderbolt cable attached to a Universal MagSafe cable.
- ⓘ It seems to be a convenient setup for connecting to your laptop's Thunderbolt port while charging. If you are sporting a [Mid 2011 MacBook Air](#) and your MagSafe port is opposite your Thunderbolt, you'll be glad to know the cable is long enough to reach.

Step 3



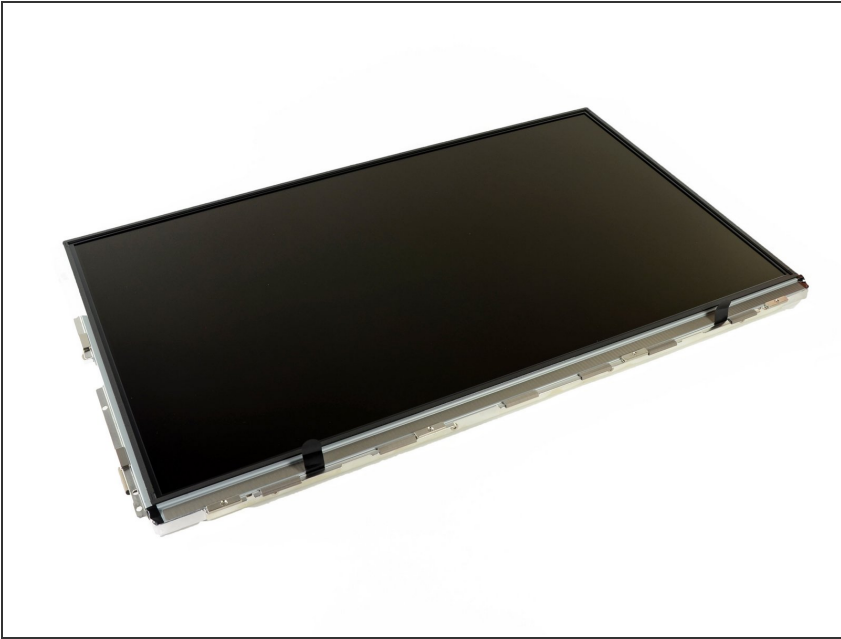
- Much like the [iMac we tore apart](#) earlier this year (and the iMacs before it), the Thunderbolt Display's front glass panel comes off with the help of some [heavy duty suction cups](#).
- ⓘ While we're handling this gigantic sheet of silica, we thought we'd share a fun glass fact with you: the [Plymouth Barracuda](#) featured—at its time—the largest piece of automotive glass produced to date.

Step 4



- It's time to take a look under the hood. With the help of our 54-piece bit driver kit, we liberate a few screws (12 to be exact, but who's counting?) from their asylum.
- A few connectors and a ground screw are all that prevent the freedom of the LCD.

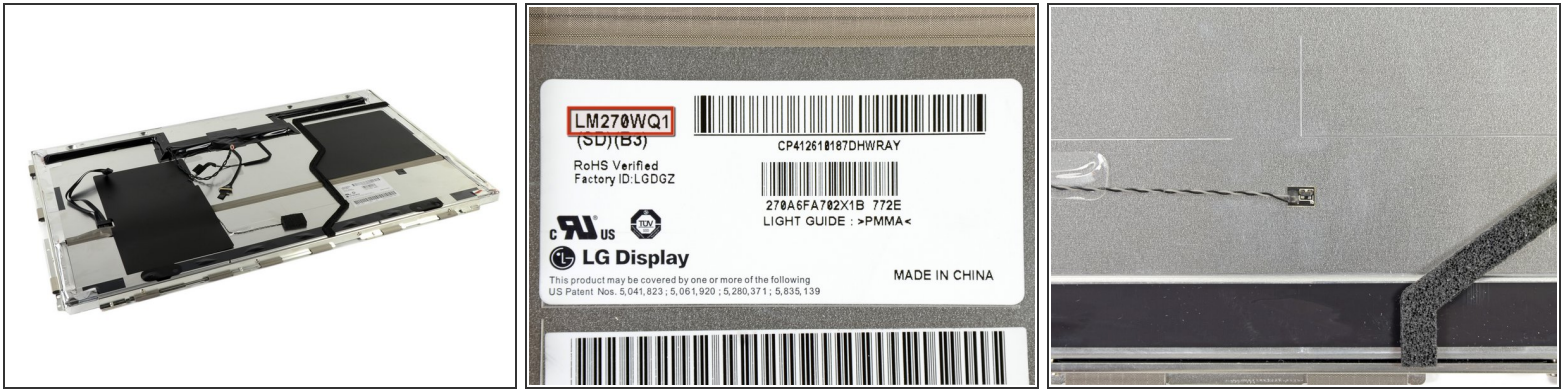
Step 5



- The 27-inch (diagonal) TFT active-matrix LCD has a resolution of 2560 by 1440 pixels, the standard for displays of this size and price. Its 12 ms response time and 16.7 million colors, however, fall short of the 6 ms response time and 1.07 billion colors of Dell's [comparable display](#).
- We might be splitting hairs here, but those hairs would be viewed with 1,053,300,000 fewer colors on Apple's display. Just saying.

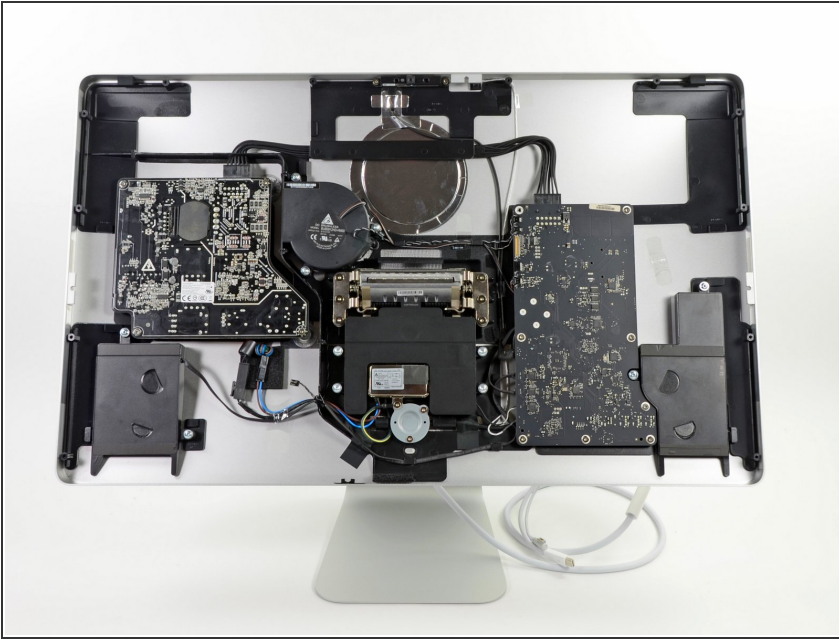
i Be it 16.7 million or 1.07 billion colors, we say, "Let's see what you've got, [Crayola!](#)"

Step 6



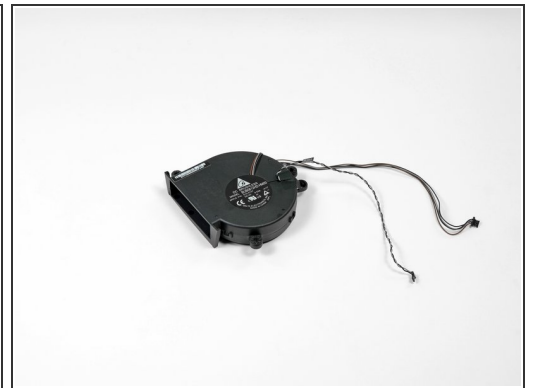
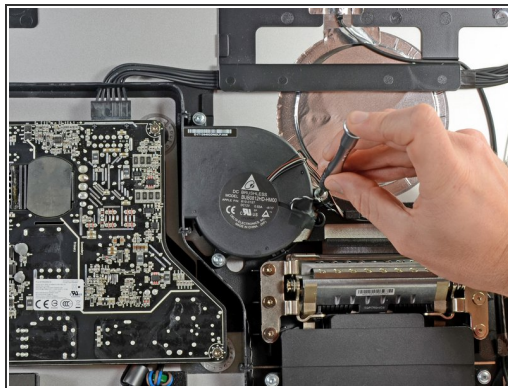
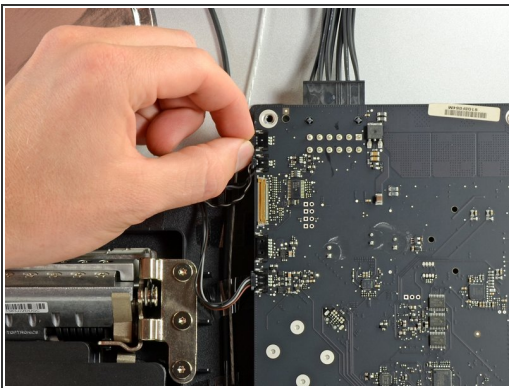
- The back of the LCD display has only a few cables, none too exciting:
 - DisplayPort
 - LED backlight
 - LED backlight sync
 - Ground loop.
- The LG display reads model number LM270WQ1. Is it possible that we [may have seen](#) this [model number before](#)?
- Yes, it appears to be the same display found in the iMac Intel 27" from October of 2009, as well as the same basic LG display found in Dell's competing 27" monitor, though the Apple version uses LED backlights as opposed to Dell's traditional CCFL.
- Dell's version is also matte, something that lots of Mac users have been harping for once the old 30" Cinema Display was phased out.

Step 7



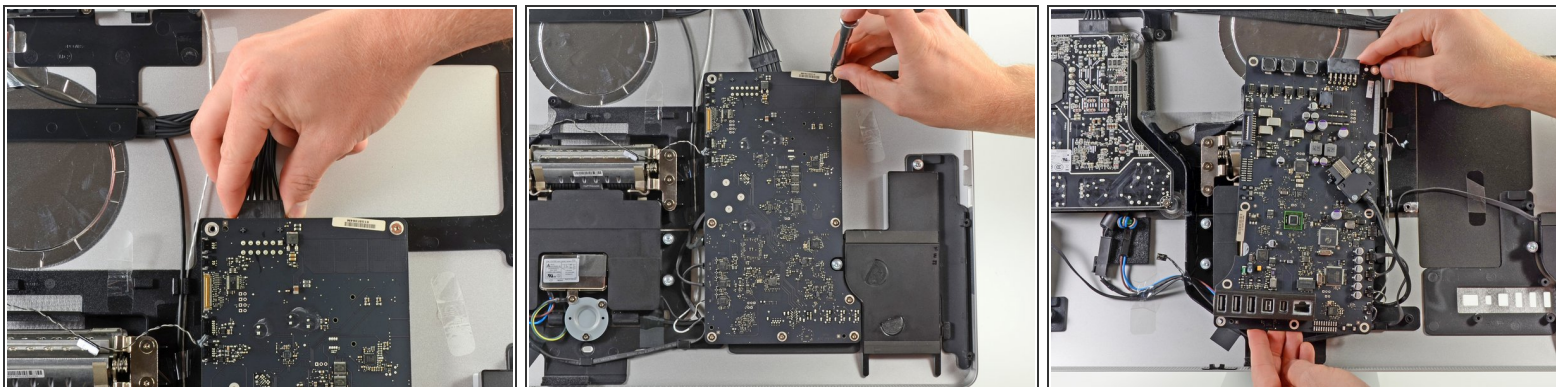
- Great Odin's Raven! With that old, crappy LCD removed (who needs it anyway), we get a full frontal view of the Thunderbolt Display's inner layout.
- Where to start . . . the fan you say? Sounds good to us.

Step 8



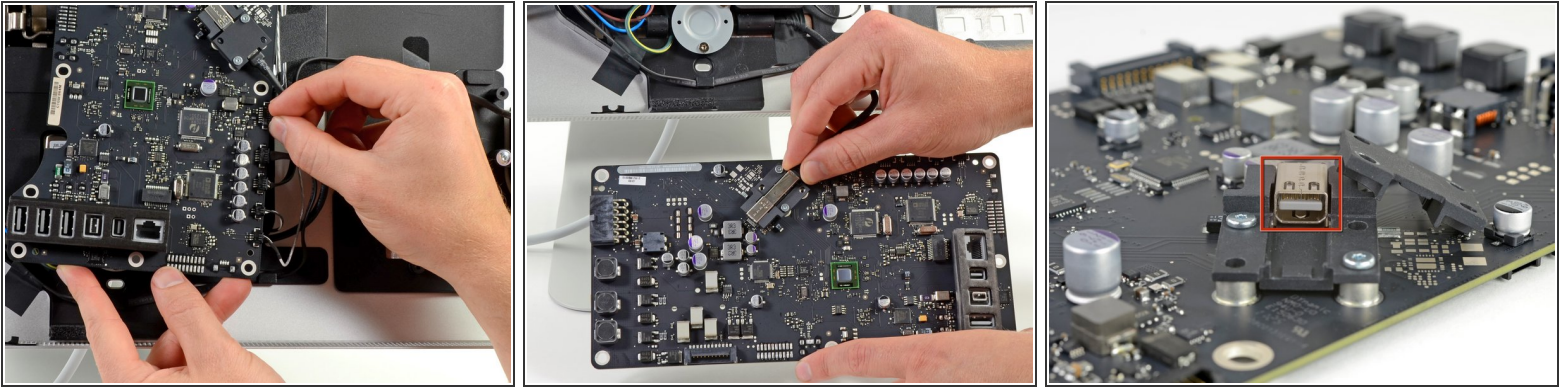
- The fan is easily removed simply by detaching a couple of connectors and unfastening a few screws.
- Apple has, as usual, chosen to go with a large, brushless fan to keep the colossal Thunderbolt Display nice and cool.

Step 9



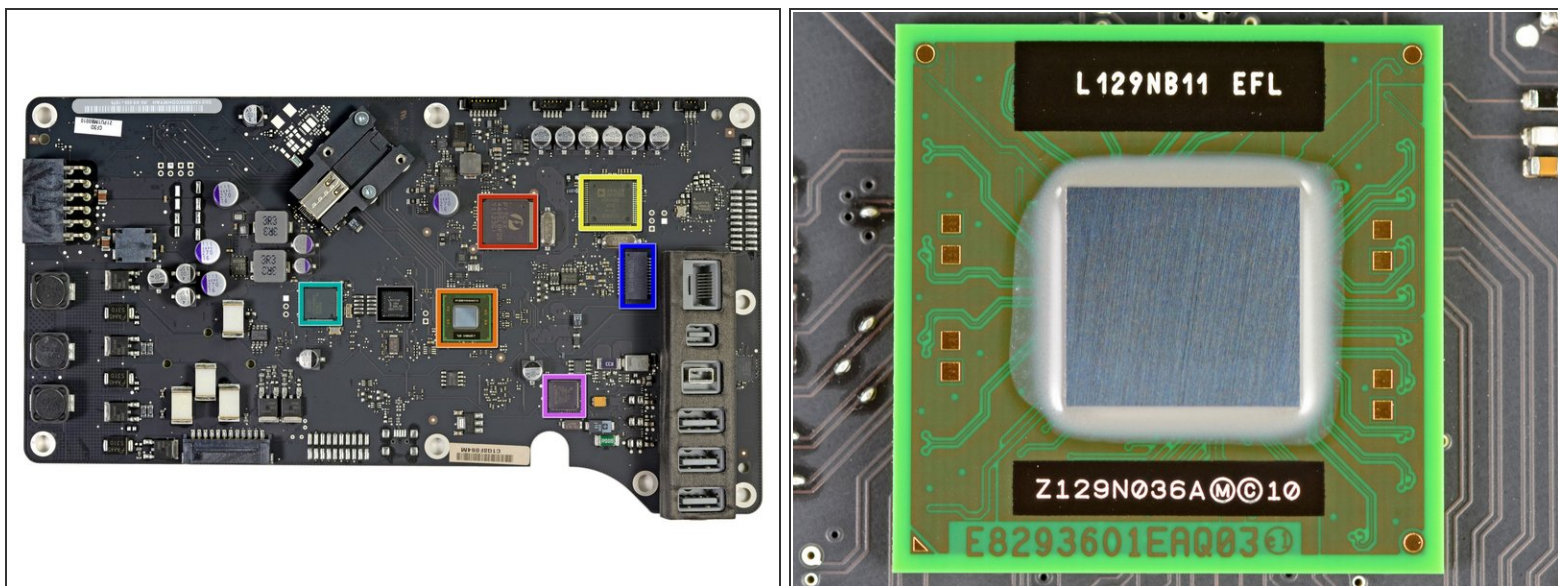
- In our pursuit of self-preservation, we begin by disconnecting the power supply connector from its socket on the logic board to prevent any electrifying experiences.
- A few more T10 Torx screws bite the dust at the hand of our bit driver kit, and the logic board is detached.

Step 10



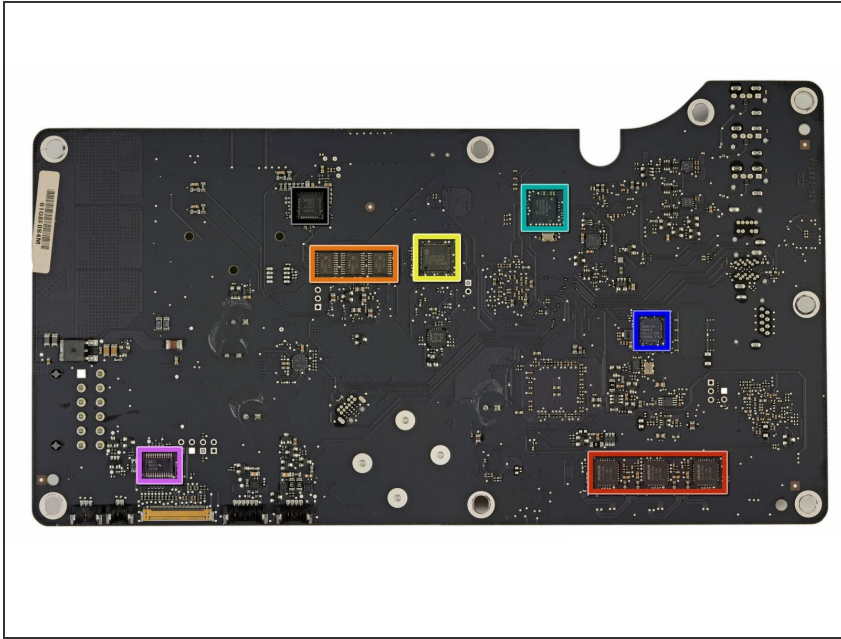
- Stop—it's connector time! We remove a plethora (that's right, plethora, we're using our five dollar words) of connectors from the logic board, leaving only the brains behind the Thunderbolt port between us and the display's control center.
- A few T6 Torx screws are knocked out to remove the connector cover, and the Thunderbolt cable is disconnected.
- Interestingly enough, the Thunderbolt cable that routes into the display also plugs into a standard Thunderbolt socket on the logic board. Apple could have just soldered the cable wires to the board, but instead chose to implement a cover that prevents the cable from being detached from the logic board's Thunderbolt socket.

Step 11



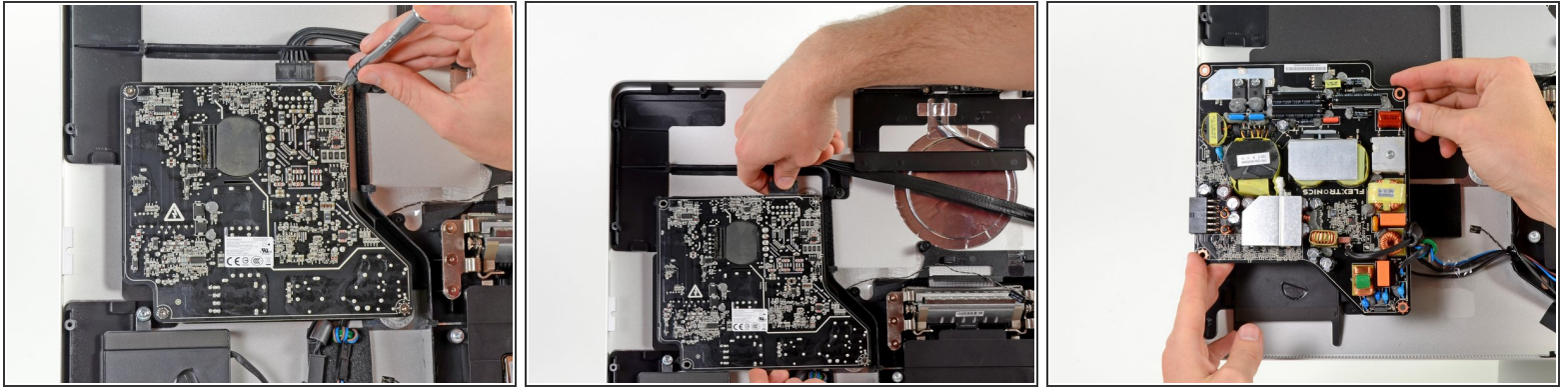
- St. Damien's beard! The [front](#) of the logic board includes these stellar packages:
 - Pericom [PI7C9X440SL](#) PCIe-to-USB 2.0 host controller
 - [L129NB11 EFL](#), which looks to be the Thunderbolt port controller (as viewed in the second picture)
 - Analog Devices [AD4601](#) audio processor
 - NXP [LPC2144](#) USB 2.0 microcontroller
 - Delta [LFE9249](#) 10/100/1000 Base-T LAN filter
 - SMSC [USB2517-JZX](#) USB 2.0 hub controller
 - LPC 1114F

Step 12



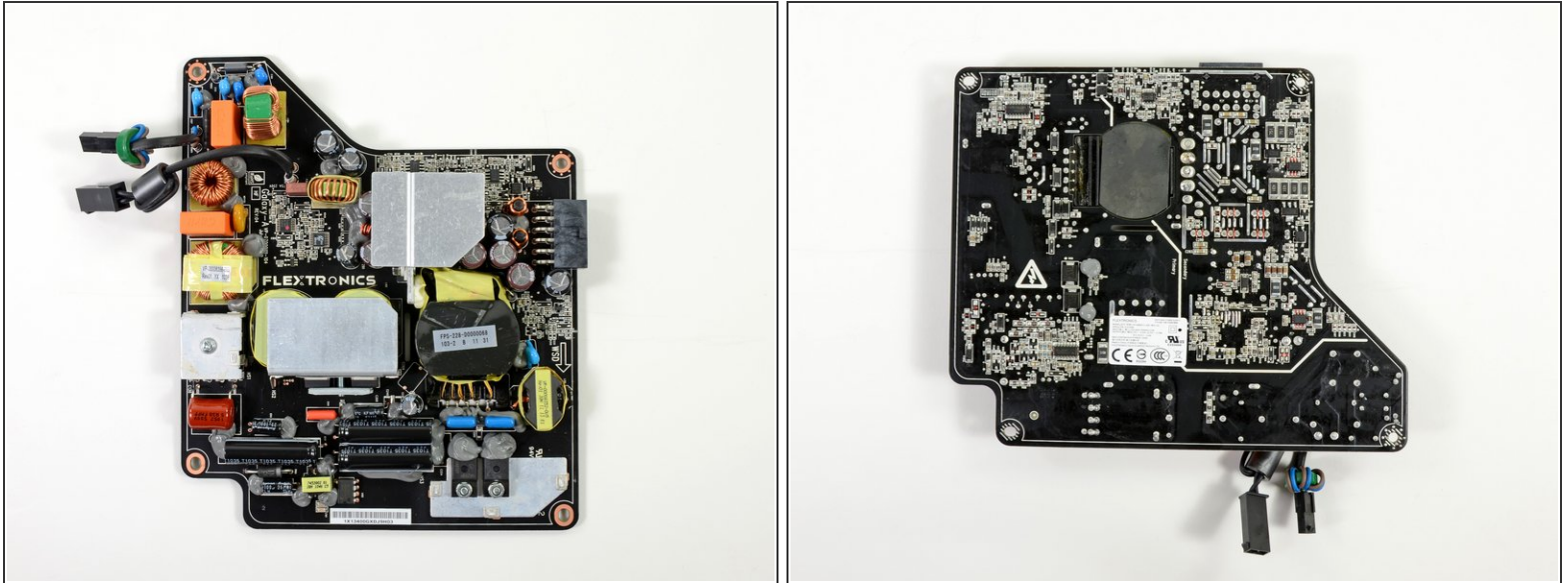
- Sweet grandmother's spatula! The [back](#) of the board also contains oodles of chips:
 - Maxim [MAX9736B](#) Mono/Stereo High-Power Class D Amplifier
 - Texas Instruments [LC573A](#) D-type Latch
 - Silego [SLG8SP568VCK505](#) Clock Generator
 - LSI [L-FW643E-2](#) Open Host Controller Interface
 - Broadcom [BCM57761](#) Gigabit ethernet controller
 - Texas Instruments [NH245](#) Dual Supply Translator
 - Supertex [HV9982](#) 3-channel switch-mode LED driver IC

Step 13



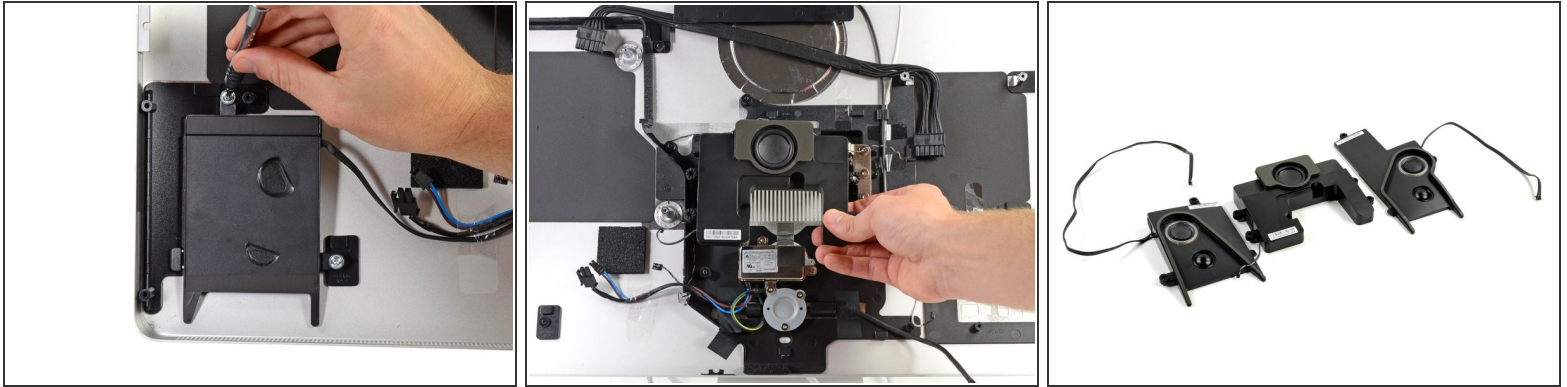
- With the logic board removed, we move on to the power supply board.
- A few screws and connectors are all that are stopping us from removing the board.
- We make quick work of them and the Flextronics power supply board comes free.

Step 14



- Hot pot of coffee! Let's see what the Thunderbolt Display's power supply board can do for us.
- How about 250 watts of maximum continuous power -- is that enough for you?
- Fun science fact, the "thunderbolts" (AKA [lightning](#)) in nature can put out an average of 1,000,000,000,000 watts, that's 4 billion times the output of the Thunderbolt Display's power supply! But lets be fair...lightning bolts are much, much larger than this power supply and last only fractions of a second.

Step 15



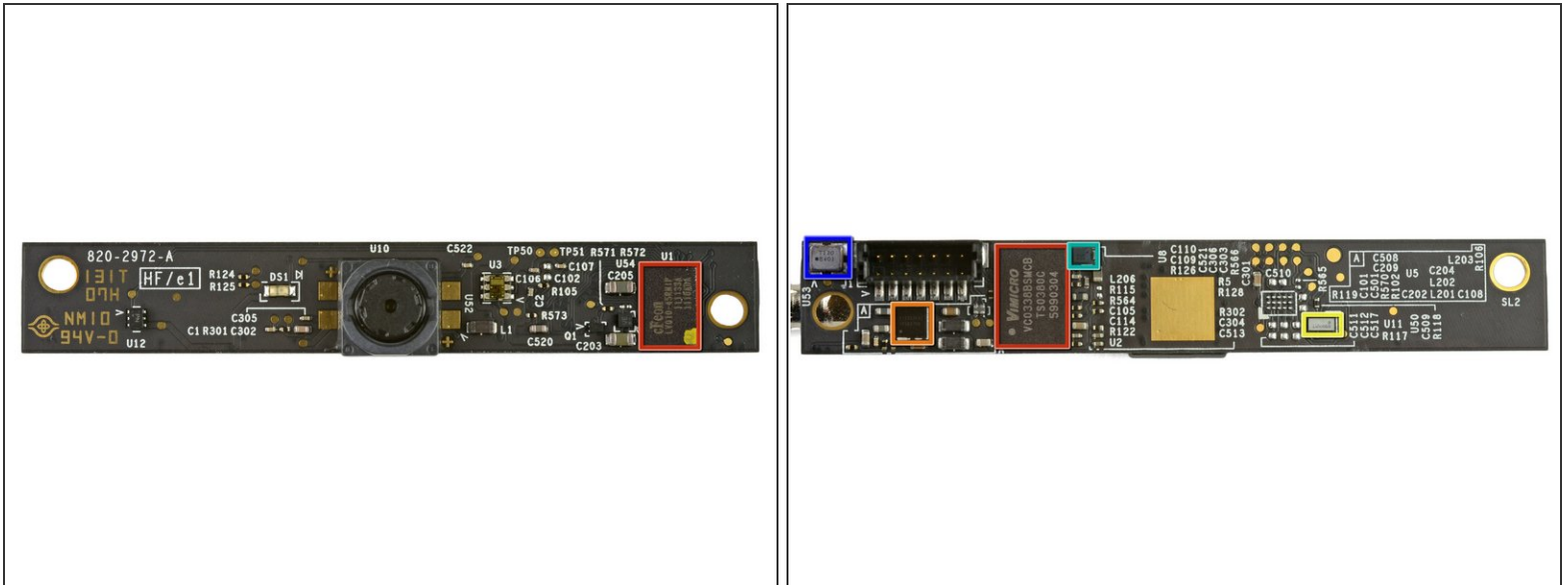
- We see some fairly large speaker enclosures (well, for a monitor) near the side edges of the Thunderbolt Display and eagerly remove the screws holding them in place.
- Wait! What have we here? Is that a built-in 1-inch subwoofer, as well?
- ⓘ The Thunderbolt Display comes with a 49 watt 2.1-speaker sound system, including a miniature subwoofer.
- Basically, your display will sound something [like this](#). Okay, so maybe not, but you will get some pretty decent sound out of this bad boy.

Step 16



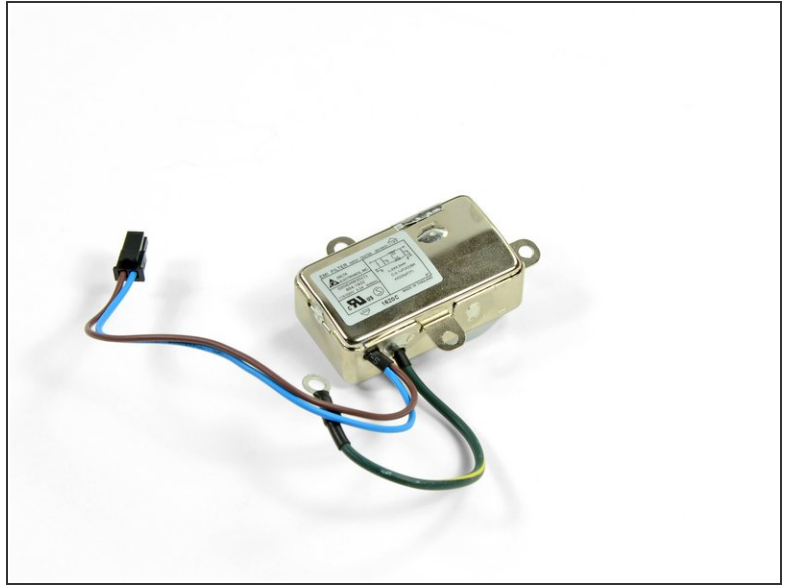
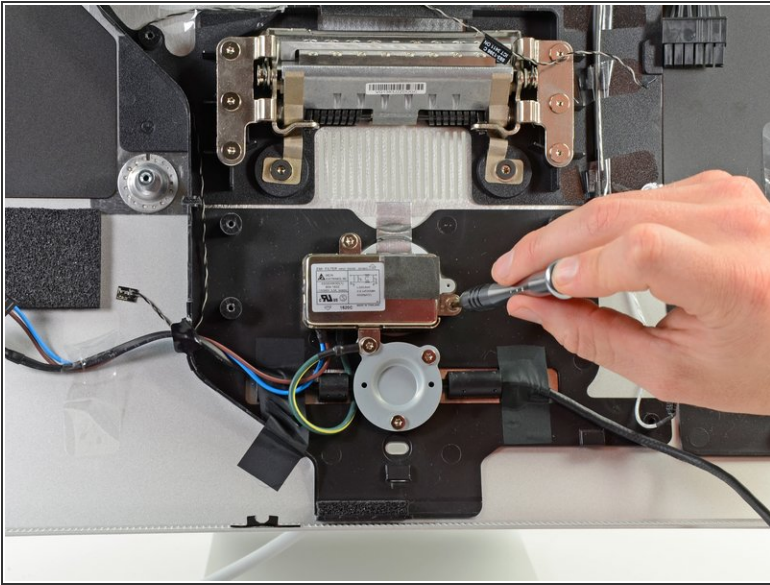
- A couple screws and a single connector keep the HD FaceTime camera secured to the case.
- Yoink! Out comes the camera and its ability to record video up to 720p, as well as its ability to support widescreen 16 x 9 aspect ratios.

Step 17



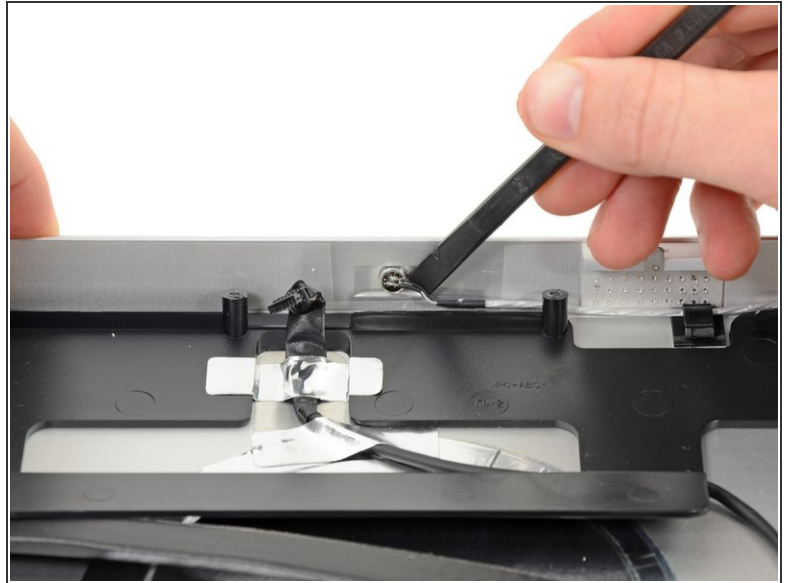
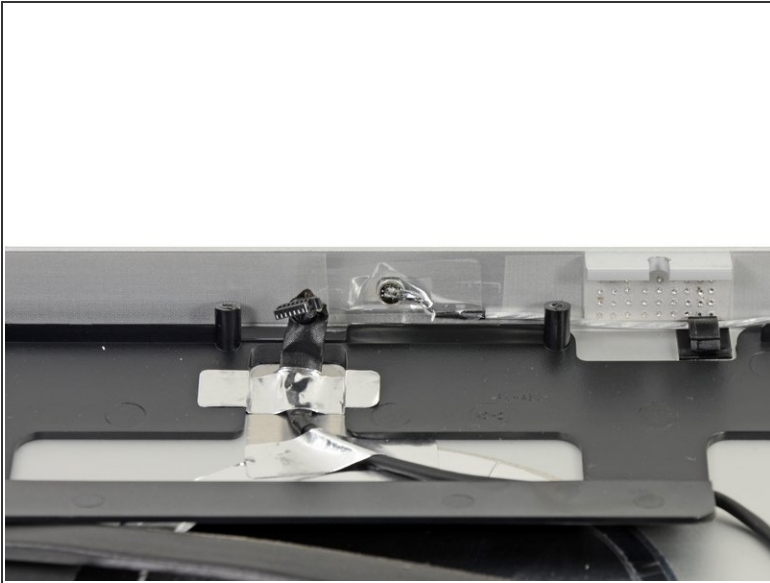
- The front side of the camera board:
 - cFeon LV010-45RNIP 11113A 1110ADA
- The rear side of the camera board:
 - Vimicro [VC0338BSMCB](#) Camera Controller
 - Texas Instruments [TPS65708](#) Power Management Unit
 - 0BNHM7
 - 408F N109
 - T120 Bd01

Step 18



- Uncle Jonathan's corn cob pipe! Just a few Torx 10 screws stand between us and the AC power adapter.
- The AC-Inlet in all its infinite glory.

Step 19



- Hey Mic, you seem like you're in a tight spot. Here, let me help you out.
- Good ol' [spudger](#) would never let a friend like Mic down.

Step 20



- Thunderbolt Display Repairability Score: **8 out of 10** (10 is easiest to repair)
 - Only T6 and T10 torx screws hold it together, meaning minimal tooling is required to service.
 - Minimal use of adhesives means reassembly will be easier and cleaner.
 - Front glass panel and LCD are easy to remove and major components are exposed upon removal.
 - You have to use suction cups to remove the front glass, which could end poorly if not done properly.
 - While disassembly was very straightforward, there are a lot of parts, cables and connectors, making full reassembly not for the faint of heart.

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