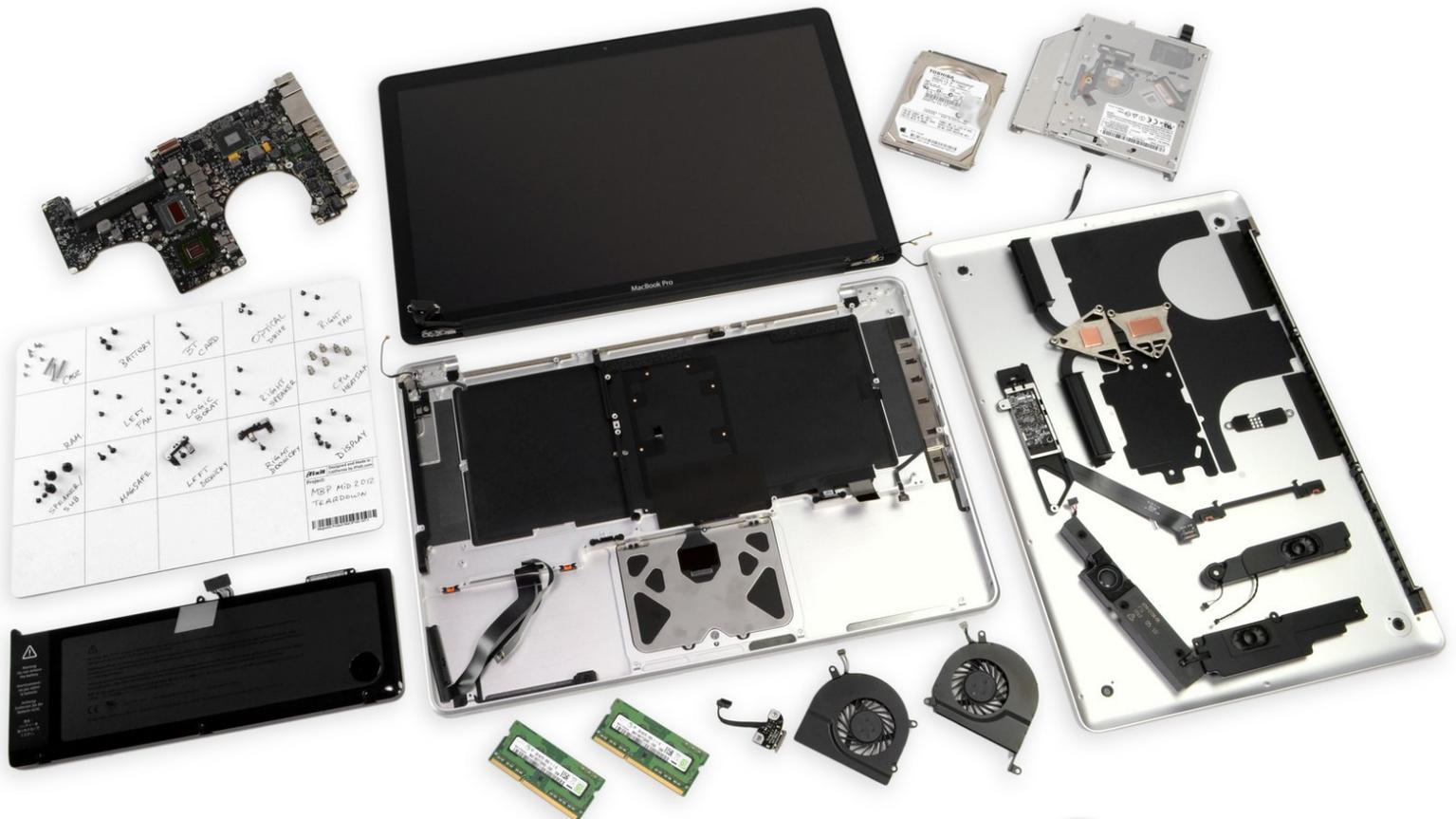




# MacBook Pro 15" Unibody Mid 2012 Teardown

We took apart the mid-2012 MacBook Pro on June 20, 2012.

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## INTRODUCTION

We've had a busy week since Apple announced its new products at WWDC on June 11, 2012. We just couldn't stop after digging in to the [MacBook Pro with Retina Display](#) and the [MacBook Air](#), so we got our hands on the Mid 2012 MacBook Pro. While its sibling with the Retina display may have stolen all the press, this MacBook Pro is nothing to scoff at. It's way more repairable and upgradeable than its sleeker-looking sibling. Follow along as we show you inside.

Stay tuned to all the latest teardowns and updates by following us on [Twitter](#).

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### TOOLS:

- [Magnetic Project Mat](#) (1)
  - [Phillips #00 Screwdriver](#) (1)
  - [Spudger](#) (1)
  - [T6 Torx Screwdriver](#) (1)
  - [Tri-point Y0 Screwdriver](#) (1)
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## Step 1 — MacBook Pro 15" Unibody Mid 2012 Teardown



- Drum roll please...we've got Apple's mid 2012 update of the the MacBook Pro and we are ready to get inside.
- The impressive machine boasts:
  - 2.3 GHz quad-core Intel Core i7 processor (Turbo Boost up to 3.3GHz) with Intel HD Graphics 4000
  - NVIDIA GeForce GT 650M GPU with 512 MB of GDDR5 VRAM
  - 4 GB of 1600 MHz DDR3 RAM
  - 500 GB 5400 RPM hard drive
  - 15.4" 1440x900 (110 ppi) LED-backlit display
  - USB 3.0 and Thunderbolt I/O

## Step 2



- We wanted to see how the Mid 2012 MacBook Pro stacked up against its new sibling, the MacBook Pro with Retina display. Other than the difference in size, the main differences between the machines are:
  - Hard disk drive vs. flash storage
  - 8 GB vs. 16 GB maximum configurable RAM (from Apple, at least)
  - One Thunderbolt port vs. two
  - MagSafe vs. MagSafe 2
  - Kensington lock slot vs. flat aluminum
  - Oh yeah...and a standard or Hi-Res (on 15-inch model) LCD vs. a Retina display

## Step 3



- Not surprisingly, ten Phillips screws stand between us and the inside of the updated Pro.
- We are relieved to see such a [familiar sight](#). With no adhesive or pentalobe screws anywhere to be seen, we are excited to get at the upgraded insides of the new Pro.

## Step 4



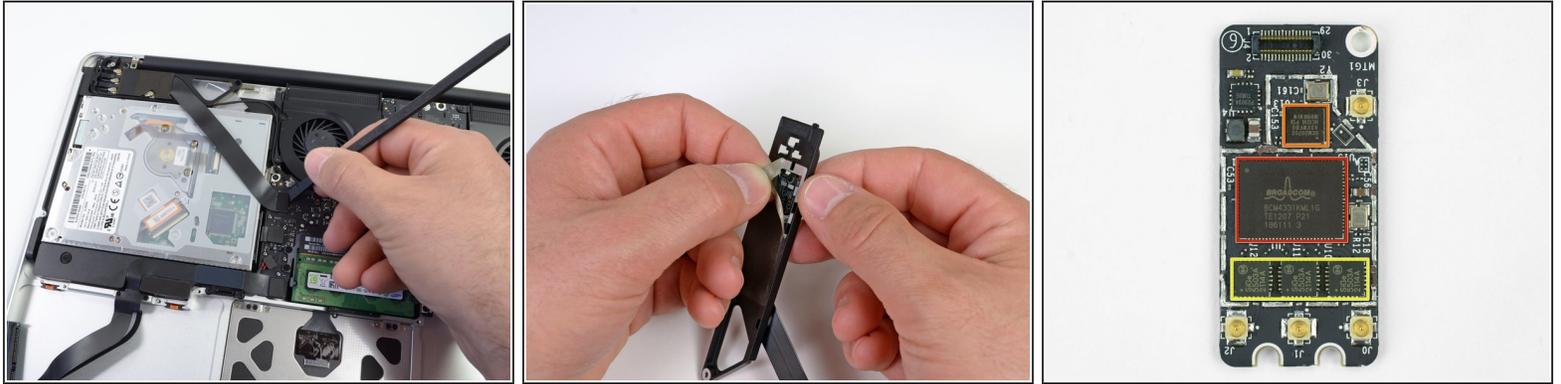
- The only "funky" bit we came across in the MacBook Pro was a Y0 Tri-point screw holding down the battery. Luckily, we were prepared and had our 54-Bit Driver Kit on hand.
- Our faithful [spudger](#) helps us disconnect the battery, which you should always do when performing repairs or maintenance on your MacBook Pro.
- Apple's battery warning labels haven't stopped us before, and they're not stopping us now.
- The battery is [exactly the same](#) as last year's model—77.5 Wh at 10.95 V.
- In case you missed it last year, this battery is 13.8 mm thick and weighs 450 g.
  - By comparison, the battery in the MacBook Pro with Retina display has cells that vary in thickness from 5.25 mm to 8.60 mm.

## Step 5



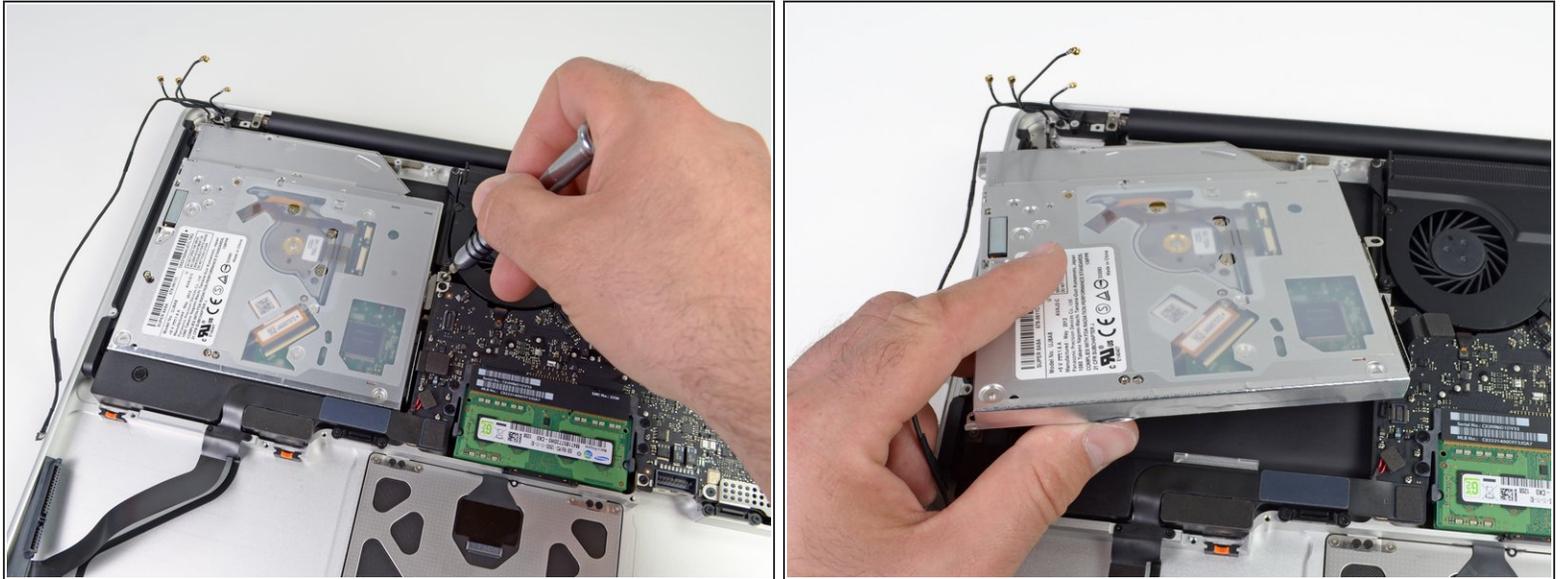
- Standard Phillips screws secure the 500 GB Toshiba hard drive, meaning upgrading to a larger drive will be easy after you decide to start [shooting RAW](#).
- 2.5" profile and a spinning platter? This hard drive is ~~old news~~ still perfectly good for most users' needs.
- ⓘ We were curious about Apple's choice to use a proprietary SSD in the MacBook Pro with Retina display rather than the standard 2.5" SATA drive. Disregarding the speed difference—after all, [SSDs have been around for a while](#)—the choice of the proprietary SSD is motivated by size.
  - The 2.5" SATA drive in this MacBook Pro is almost three times as thick as the proprietary SSD in the MacBook Pro with Retina display: 9.45 mm compared to 3.16 mm, respectively.
  - The drive has 4 mounting posts/screws that can be removed using a T6 torx bit.

## Step 6



- Round two with the [spudger](#) frees the AirPort/Bluetooth board and unearths the optical drive.
- Hot chips on the wireless card:
  - Broadcom [BCM4331KML1G](#) 802.11n wireless solution
  - Broadcom [BCM20702](#) Bluetooth processor
  - Skyworks [SE5503A](#) 802.11a/b/g/n Wireless LAN

## Step 7



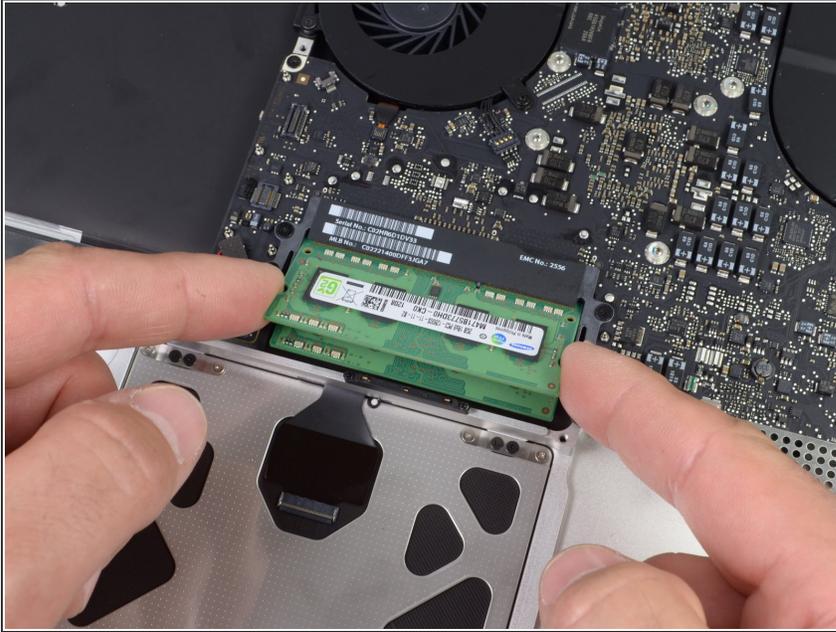
- The optical drive is held in place with more standard Phillips screws.
- A sigh of relief for anyone who wants to replace their optical drive with an [SSD enclosure](#) for more storage with enough room for all [736 episodes of Power Rangers](#) and to install all 36 GB of [Age of Conan](#).
- It seems likely that this will be Apple's last laptop with an optical drive.

## Step 8

The image shows the Dozuki logo, which consists of the word "DOZUKI" in white, uppercase, sans-serif font, centered within a solid orange rectangular background. The background of the entire image is a dark, blurred photograph of what appears to be a person working on a device.

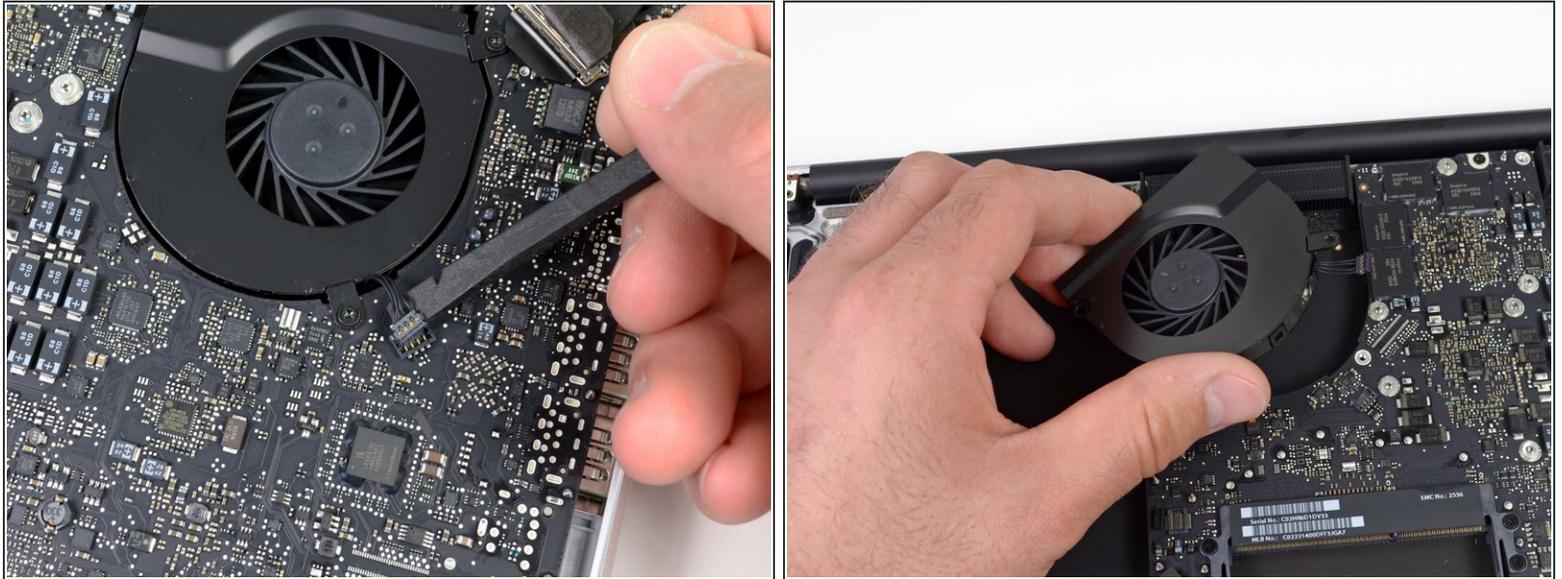
- By the way: we also make software for teaching people to do things. [Dozuki](#) makes it easy to create vibrant how-to manuals.
- Dozuki is great for:
- **[Standardized work instructions](#)**: improve quality by documenting how to get things done, one step at a time.
- **[Building product support sites](#)**: make your customers love you by teaching them how to do amazing things.
- **[Training and e-learning software](#)**: we've used Dozuki to teach over ten million people to repair electronics.
- **[Online community platform](#)**: build a knowledge base of expert knowledge with Answers, the Q&A engine that drives the popular [iFixit Answers](#).

## Step 9



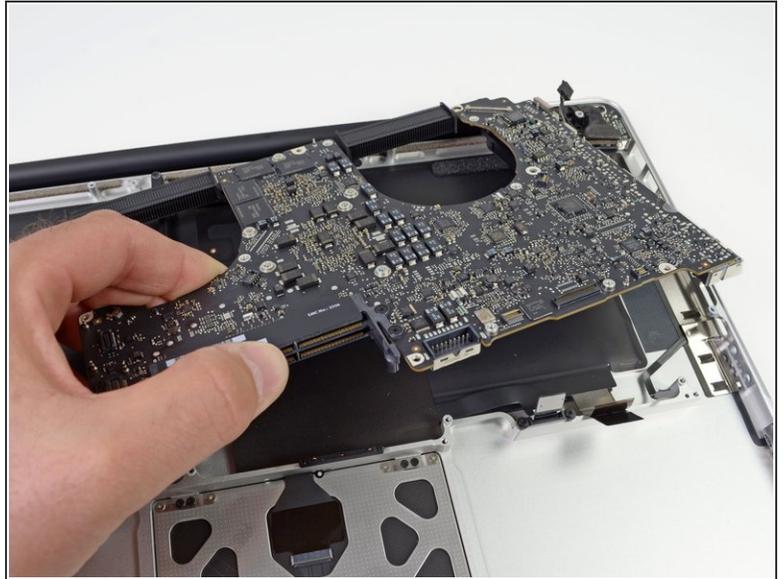
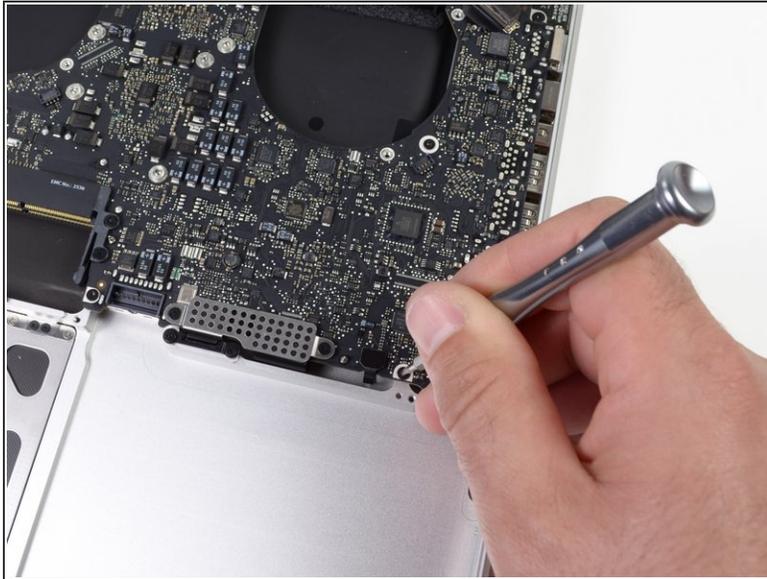
- Next we pulled out our favorite flavor of RAM: user-serviceable.
- While you can only configure your MacBook Pro with up to 8 GB of RAM from Apple, you can install up to 16 GB yourself with no issues.
- This is another sigh of relief from those DIYers who ~~want~~ need to upgrade their RAM on an annual basis.
- While the individual RAM modules here are thin (~3.15 mm), the "stacked" RAM slot is a whopping 9.15 mm thick.
- When [your entire device](#) is only 18 mm thick, allocating half of that dimension to RAM slots can be too much of a sacrifice, as we have witnessed in the MacBook Air and now in the MacBook Pro with Retina display.
- Don't lose hope! An individual RAM slot is only 4.27 mm thick. If the design of the logic board would feature the RAM slots side by side, we could still see user-replaceable RAM for years to come.

## Step 10



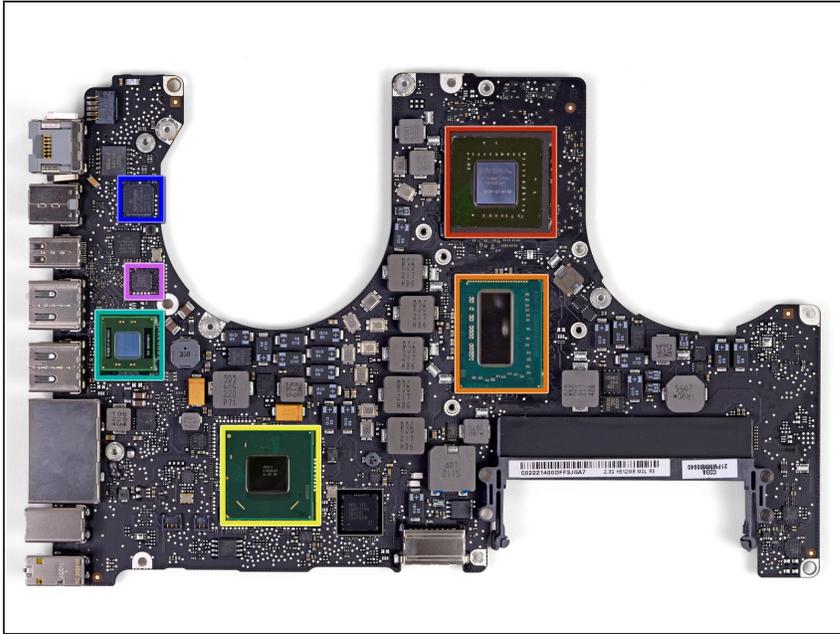
- The [spudger](#) is back out as we remove the fan.
- Three standard Phillips screws and a connector are all it takes to remove the fan for dust bunny extermination.
- ❗ Just in case you didn't know, dust can be a real threat to electronics by clogging air passages. Without enough air to cool heat sinks, internal temperatures can soar, severely shortening the life of electronics. [Dust bunnies may also be hazardous to humans](#) as they may contain toxins, mites, and parasites.
- Unlike its cousins, the 2012 MacBook Pro does not have irregularly-spaced fan blades. Just boring old fans in here.

## Step 11



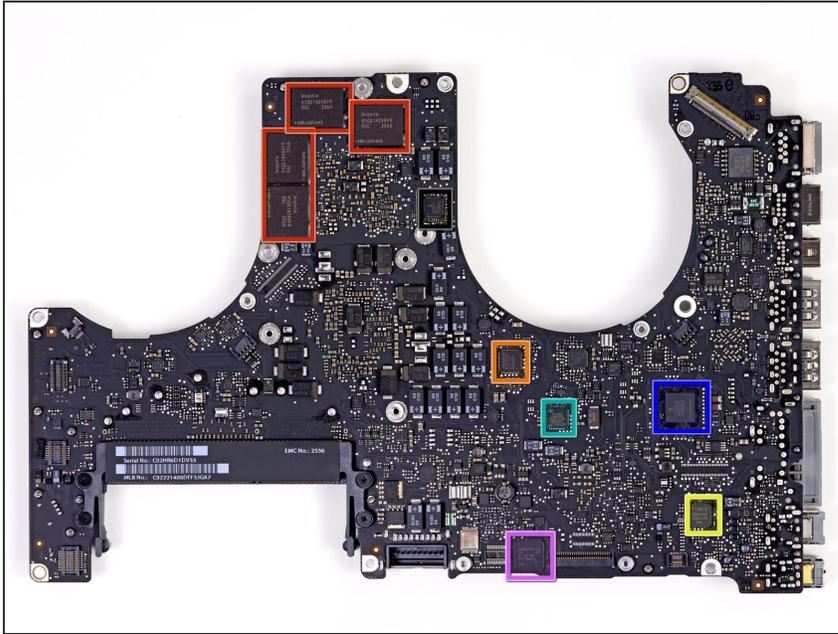
- It doesn't take a [genius](#) to figure out how to remove the last few Torx screws securing the logic board to the upper case.
- ⓘ Every time we remove a logic board from an Apple device, we like to pretend that we are [more logical](#) than the computer. [For now](#), at least.

## Step 12



- Front side of the logic board:
  - NVIDIA [GeForce GT 650M](#) GPU
  - Intel [Core i7-3615QM](#) 2.30 GHz quad-core processor with Turbo Boost (labeled as Intel C208A046 SR0MP)
  - What appears to be an Intel E2088369 Platform Controller Hub
  - Intel L206IA58
  - Broadcom [BCM57765B0KMLG](#) Integrated Gigabit Ethernet and Memory Card Reader Controller
  - Parade PS8301
- Texas Instruments [Stellaris LM4FS1AH](#) microcontroller with integrated ARM core

## Step 13



- Back side of the logic board:
  - Hynix [H5GQ1H24BFR](#) 1 Gb GDDR5 SDRAM (Total of 4 Gb = 512 MB)
  - Maxim MAX15119 Apple-specific IMVP7 CPU/GPU power controller
  - Cirrus Logic 4206BCNZ Audio Controller
  - SMSC [USB25138](#) USB controller
  - Lattice Semiconductor [LFXP2-5E](#) Low-Cost Non-Volatile FPGA
  - Cypress Semiconductor [CY8C24794-24L](#) - a Programmable SoC
- Infineon 62882C

## Step 14



- The hinges are the last thing securing the display assembly to the case.
- ⓘ While the display may not be a Retina, a damaged LCD will still be the most expensive—besides the logic board—repair on this machine. Display replacement is arguably the most difficult MacBook Pro repair, as even the most experienced technician risks shattering the glass panel during removal.

## Step 15



- There you have it, all the screws from the MacBook Pro Mid 2012, on our fancy [magnetic project mat](#). As you can see there are no pesky pentalobe screws, just Phillips, Torx, and [Tri-Wing](#).
- By the way, we don't just make awesome teardowns—we **we sell [parts](#). And [tools](#)!** Lots and lots of **tools**.
- Like this handy-dandy electronics tool kit that we used to take apart the new iPad. You know you want one. It'll pay for itself the first time you use it!
- We sell [Mac parts & upgrades](#), parts for [iPhone screen repair](#), kits for fixing the infamous [Xbox Red Ring of Death](#), and tons more.
- **We need your support** to continue building the [free repair manual](#) for everything in the world.

## Step 16



- MacBook Pro 15" Unibody Mid 2012 Repairability Score: **7 out of 10** (10 is easiest to repair).
- Easily removable bottom panel and readily accessible battery, optical drive, hard drive, fans, and RAM.
- Standard screws were used for all components, save for the battery.
- Significant amounts of thermal paste may be a pain in later repairs.
- Tri-wing screws on the battery require a specialty driver that an average user may not have.
- LCD replacement is still the most difficult repair. Inexperienced (and even experienced) technicians may shatter the glass during repair.