



# MacBook Air Models A1237 and A1304 Teardown

Written By: Luke Soules



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# INTRODUCTION

We disassembled this laptop on February 1, 2008.



## TOOLS:

- [Phillips #00 Screwdriver](#) (1)
  - [T6 Torx Screwdriver](#) (1)
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## Step 1 — MacBook Air Models A1237 and A1304 Teardown



- We were relieved to discover the MacBook Air ships in more than just a manila envelope.

## Step 2



- The MacBook Air adds yet another power adapter to Apple's impressively-varied lineup, and is the first Mactel to run on 45 watts.
- A comparison, from top to bottom:
  - iPhone (5-watt)
  - iPod (8-watt)
  - MacBook Air (45-watt)
  - MacBook (60-watt)
  - MacBook Pro (85-watt)

## Step 3



- The new MagSafe power adapter has been rotated 90 degrees to handle the Air's extreme thinness.
- The earlier MacBook power adapter works, but won't fit when the Air is placed on a flat surface.

## Step 4



- The more traditional ports are hidden in a bay that drops down to reveal:
  - One USB port.
  - One headphone jack.
  - And one micro-DVI port.
- The placement of the ports means that the Air doesn't play nicely with bulky connectors. To get your Air to sit flat on the desktop, you'll need either a dongle or slim connectors.

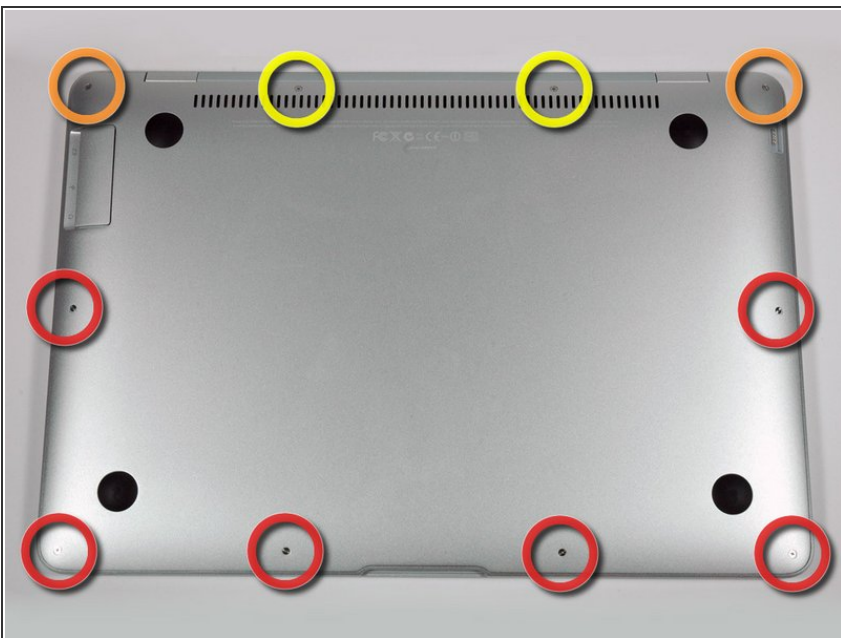
## Step 5



⚠ Laptop on laptop action.

- The Air makes the MacBook look like the new iBook.

## Step 6



- As you'd expect with a computer so devoted to aesthetics, getting to the "user-installable" parts is going to be a bit more challenging than usual.
- The bottom case is held down by 10 screws:
  - Six 3mm #00 Phillips.
  - Two 5.4mm #00 Phillips.
  - Two 7.9mm #00 Phillips.

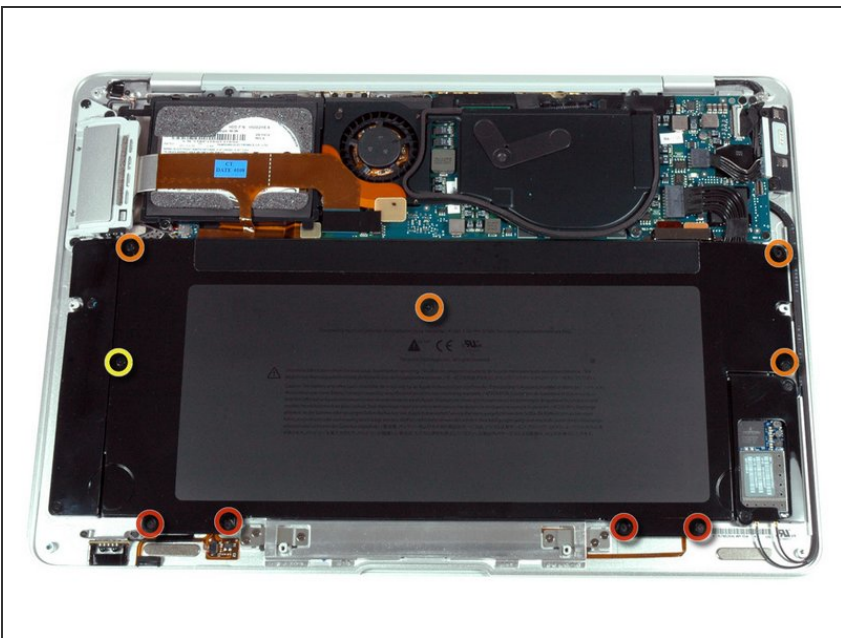


## Step 7



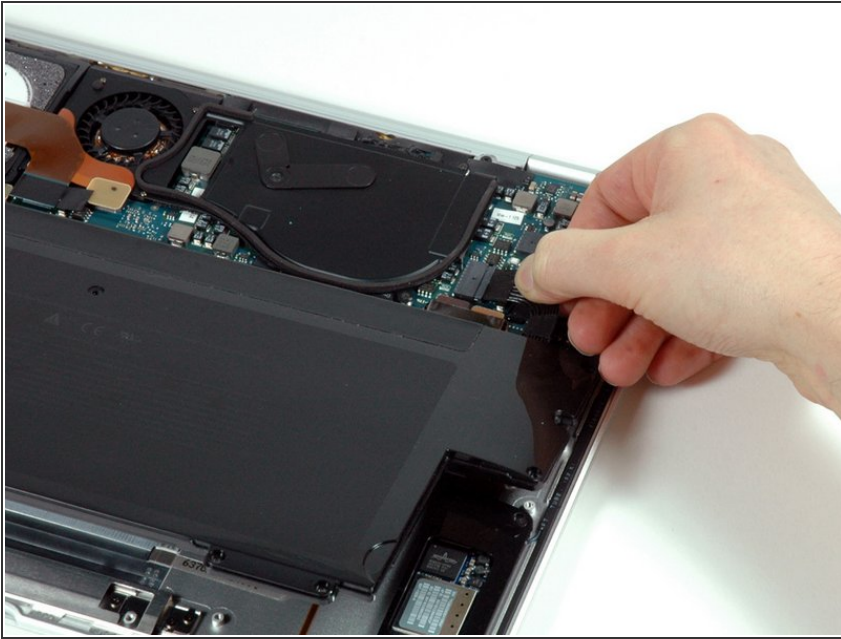
- Removing the lower case proved a surprisingly pleasant task. Thanks Apple.

## Step 8



- Look! We found the battery.
- Unfortunately, it's no longer considered a user-installable part by Apple and is attached to the case by 9 screws:
  - Four 3mm #00 Phillips.
  - Four 3.8mm #00 Phillips.
  - One 7.3mm #00 Phillips.

## Step 9



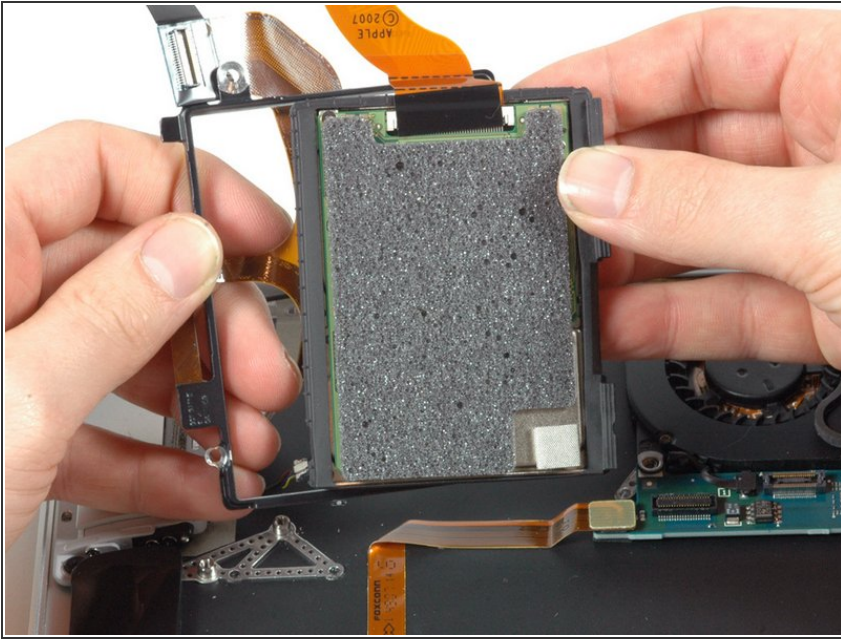
- But things aren't so bad. Once the screws are out, you can just unplug it.
- If you weren't counting, that's 19 screws to remove the battery. Replacing the battery is straightforward, but not something you'll be doing when your battery dies mid-flight.
- ❗ It won't be long before we, along with the rest of the Mac market, will be selling replacement batteries for this machine.

## Step 10



- The hard drive sits beneath the USB, micro-DVI, and audio ribbon cables.
- Borrowing from the iPod design, the hard drive sports both foam padding and rubber bumpers. For those of us too stingy to spring for the shock-resistant SSD, hopefully this will give the hard drive a little extra protection.

## Step 11



- With the cables unplugged, you can lift the hard drive out of its frame.
- A hard drive swap is definitely possible, but it's no longer a trivial procedure like in the MacBook.

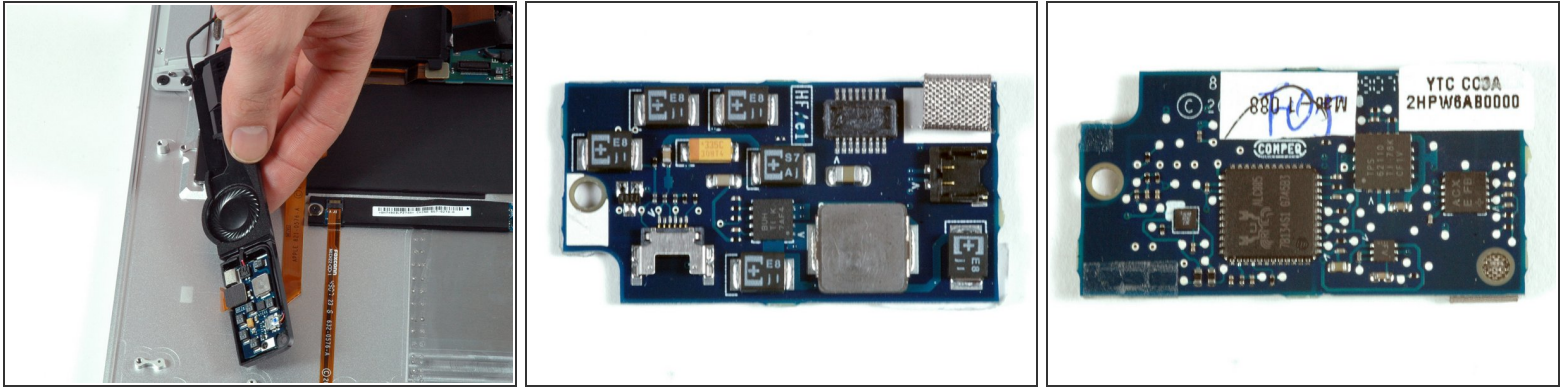
## Step 12



- The MacBook Air comes standard with an 80 GB 4200 RPM Parallel ATA hard disk drive.
- ❗ Just like the 80 GB iPod Classic, the hard drive is 1.8" wide and 5mm tall. Unfortunately, 80 GB is the largest drive in this form factor currently available. If you're a data pack rat, the Air probably isn't for you.

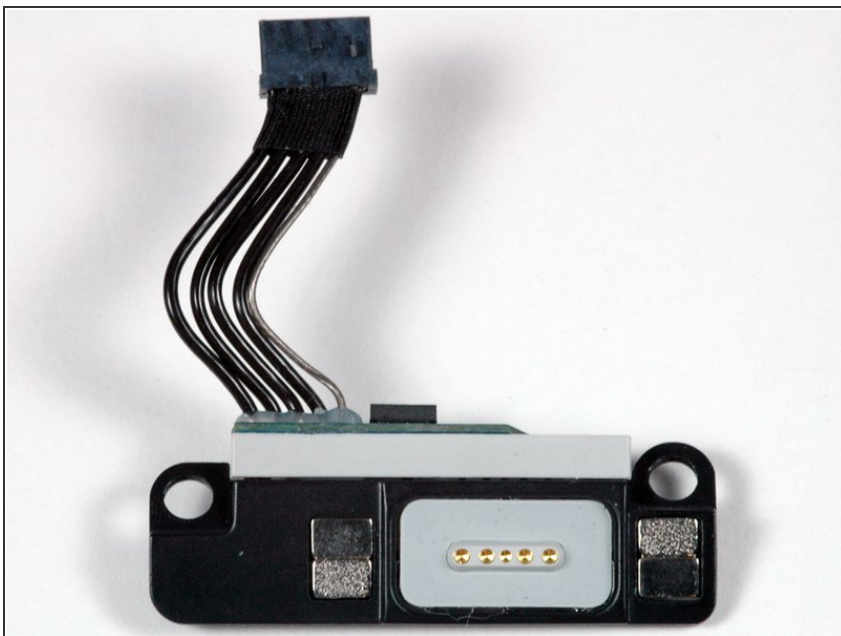


## Step 13



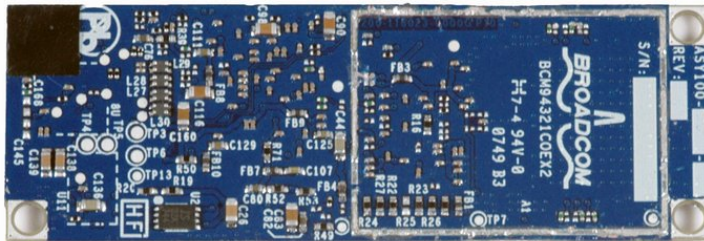
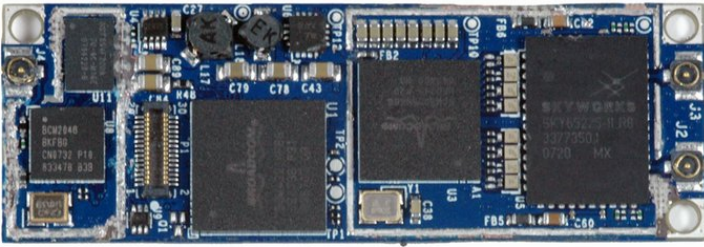
- The speaker board is located beneath the arrow keys on the keyboard.
- It outputs to both the 20mm speaker and the 3.5mm audio jack hidden in the drop down bay.
- We found a Realtek ALC885 audio codec chip on the back of the board along with a TI [TPS62110](#).
- We've posted high resolution photos of the front [308 KB] and back [316 KB] for your viewing pleasure.

## Step 14



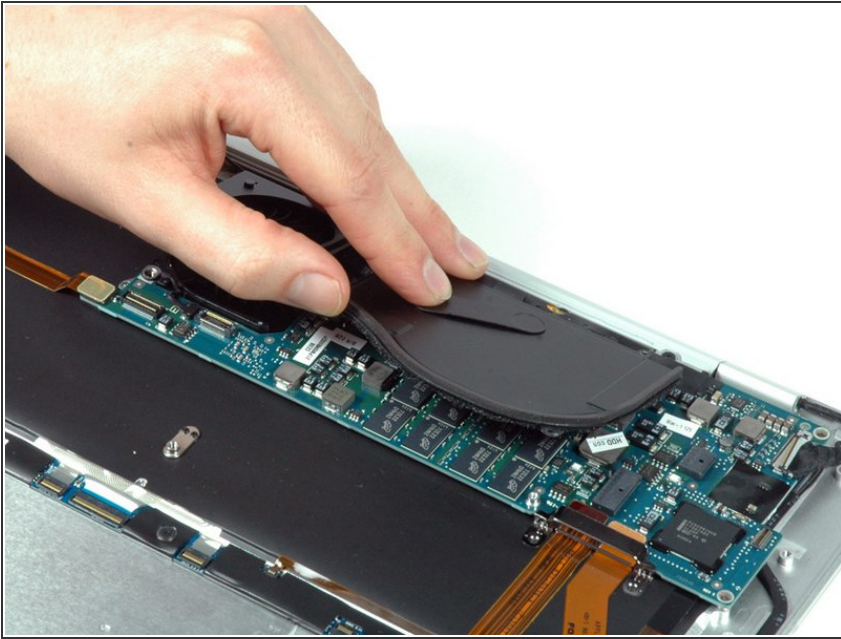
- The power interface connects the MagSafe power adapter to the motherboard.
- The MagSafe connection is guided by several magnets:
  - Four directly behind the MagSafe port.
  - And two on either side.

## Step 15



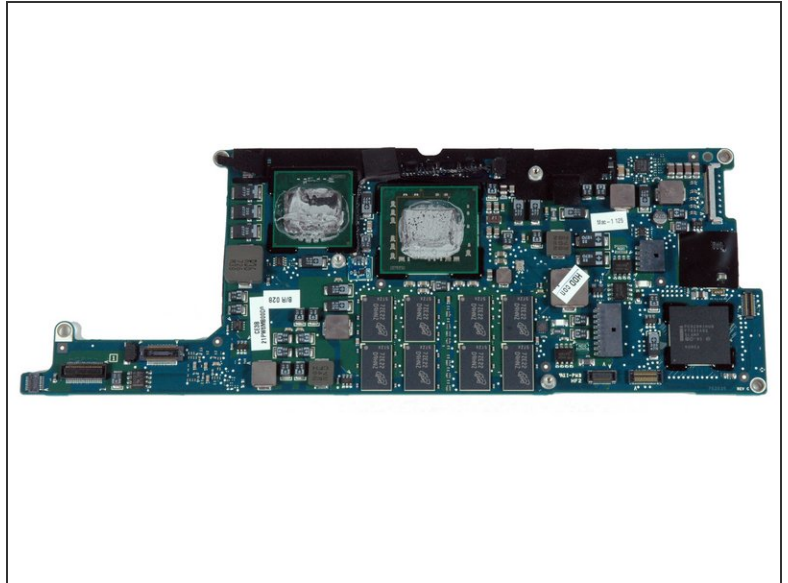
- The RF module, in all its blue glory. We spliced together two photos, so this image shows the front and back of the PCB.
- The Broadcom 802.11 chip had the markings BCM4321KFBG.
- We removed the EMI shield covering the RF chips. We uncovered a Skyworks SKY652225-11 R8, a Broadcom BCM2G55KF86, a Broadcom BCM2046, and an SST 39VF200A. We also found eight of [Anaren's](#) 1mm square [baluns](#) interfaced between the Broadcom and Skyworks chips, presumably running at 2.4GHz and 5GHz.
- And the backside had another chip marked with BCM94321COEX2.

## Step 16



- The heat sink is made of very thin aluminum and looks totally different from anything we've seen in a Mac before.
- The L-shaped aluminum bracket on the heat sink rests tightly against the lower case, providing thermal conductivity without making an electrical connection to the chassis. The inside of the lower case has a patch of non-conducting material to aid this thermal dissipation.

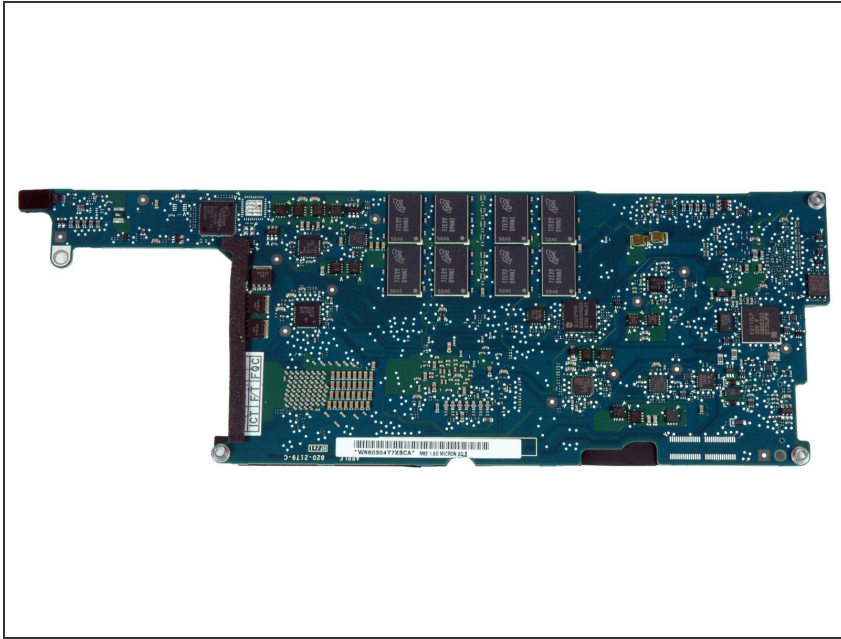
## Step 17



- We found Intel's new Core 2 Duo chip right beneath the heat sink (no surprises there). A temperature sensor sits on an external board glued between the CPU and graphics chips. A high-resolution image is available [here](#).
- There are 16 RAM chips (eight one-gigabit chips on each side of the logic board) for a total of 2 GB 667MHz DDR2 SDRAM.
- The large microchip in the center of the picture is a low power Intel North Bridge GS965 integrated graphics chip with the markings LE82GS965.
- Three chips adjacent to the North Bridge/graphics controller have a semi-transparent blue epoxy covering them, as part of the [HDCP](#) hardware requirement for digital video signals.

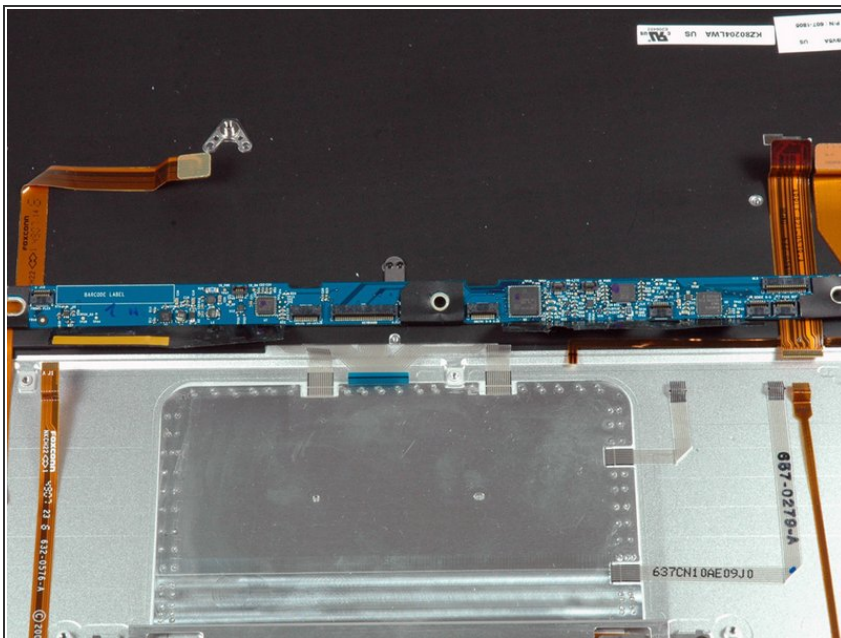


## Step 18



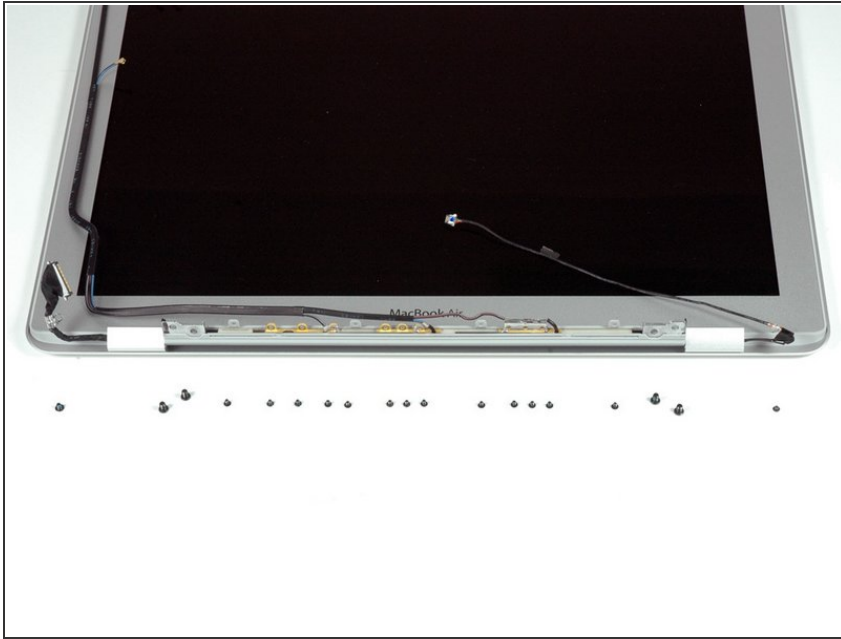
- The reverse side of the logic board. Many of these chips are for power management. A high-resolution image is available [here](#).
- You can see the second half of the Micron RAM chips.
- We identified the Silicon Image [SIL1392CNU](#) HDMI video chip and Texas Instruments [TPS51120](#) dual current mode synchronous step-down controller (power management).

## Step 19



- We found a Broadcom BCM5974 touch screen controller chip on the interconnect board.
- ⓘ This is the same chip you'll find in the iPhone and iPod Touch.
- This board also contains an SST 25VF020 Serial Flash chip, likely containing machine code for a nearby chip. There are a few CYPRIUS chips nearby, one of which we identified as the CY7C638 low-speed USB peripheral controller.

## Step 20



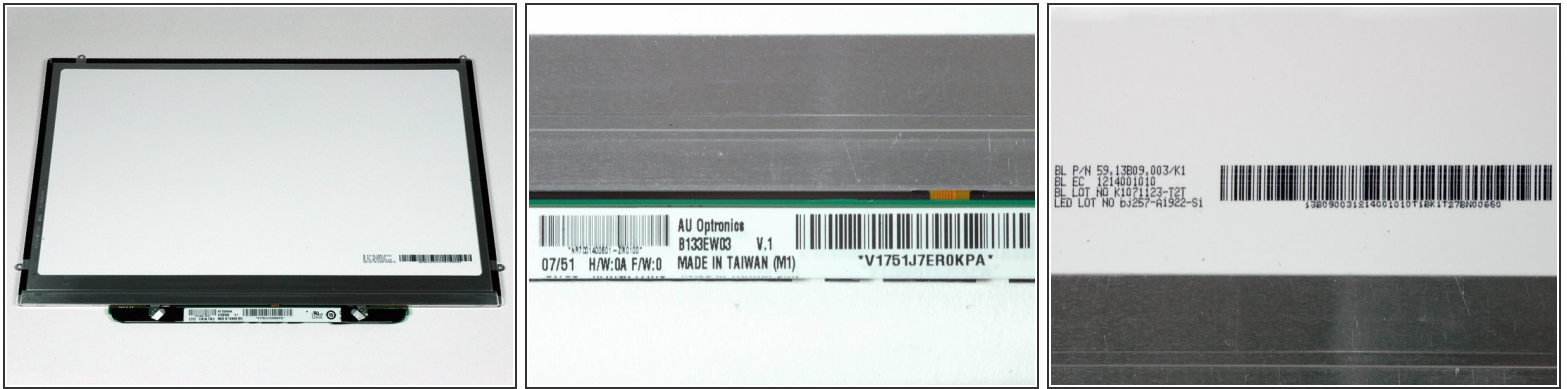
- The display assembly is attached to the case with 19 small screws:
  - Four (relatively) large Torx which screw into the hinges.
  - Thirteen #00 Phillips which hold down the clutch cover.
  - And two #00 Phillips which screw into cable ground loops.
- Apple made no compromises on the Air's display. Amazingly, the entire display assembly weighs only 465 g (slightly more than a pound), 34 percent less than the functionally-equivalent display assembly on the MacBook.

## Step 21



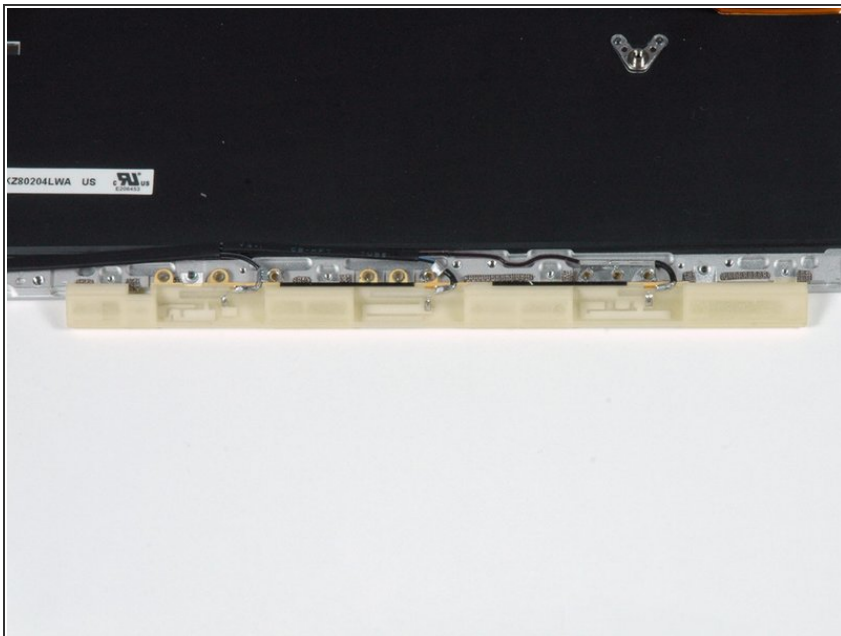
- Unfortunately, getting into the display assembly isn't as easy as cracking open the lower case. There are no screws holding the front bezel to the display, only (very, very sticky) double-sided tape.
- We bent the bezel a bit getting it off. Things aren't as bad as they were with the Titanium, but it's no cakewalk.

## Step 22



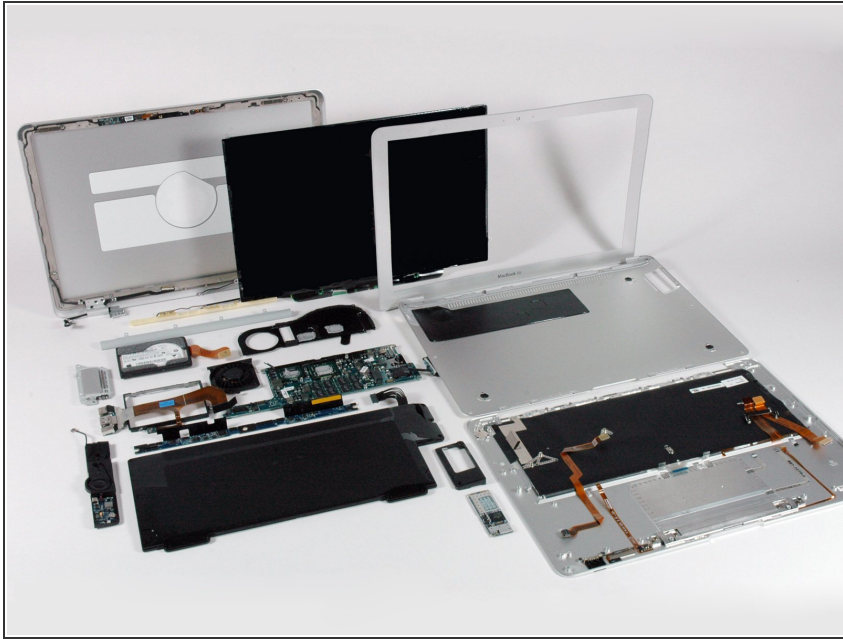
- The LED display. The display is manufactured by AU Optronics and is model #B133EW03. The actual panel is less than 3mm thick.
- Thanks to the LED display technology, there is no inverter board. A single cable provides the data and power to the display.

## Step 23



- The antennas, perhaps the most under-valued components of a modern laptop.
- Apple obviously expects everyone to be using wireless on the Air, so a substantial engineering effort went into designing robust antennas.

## Step 24



- We're left with 88 screws and lots of parts. It's hard to believe everything here weighs in at only three pounds. A high-resolution image is available [here](#).
- If you have any additional information about components in the MacBook Air, or interesting information about its construction, please drop us a note. We're happy to post additional information.

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