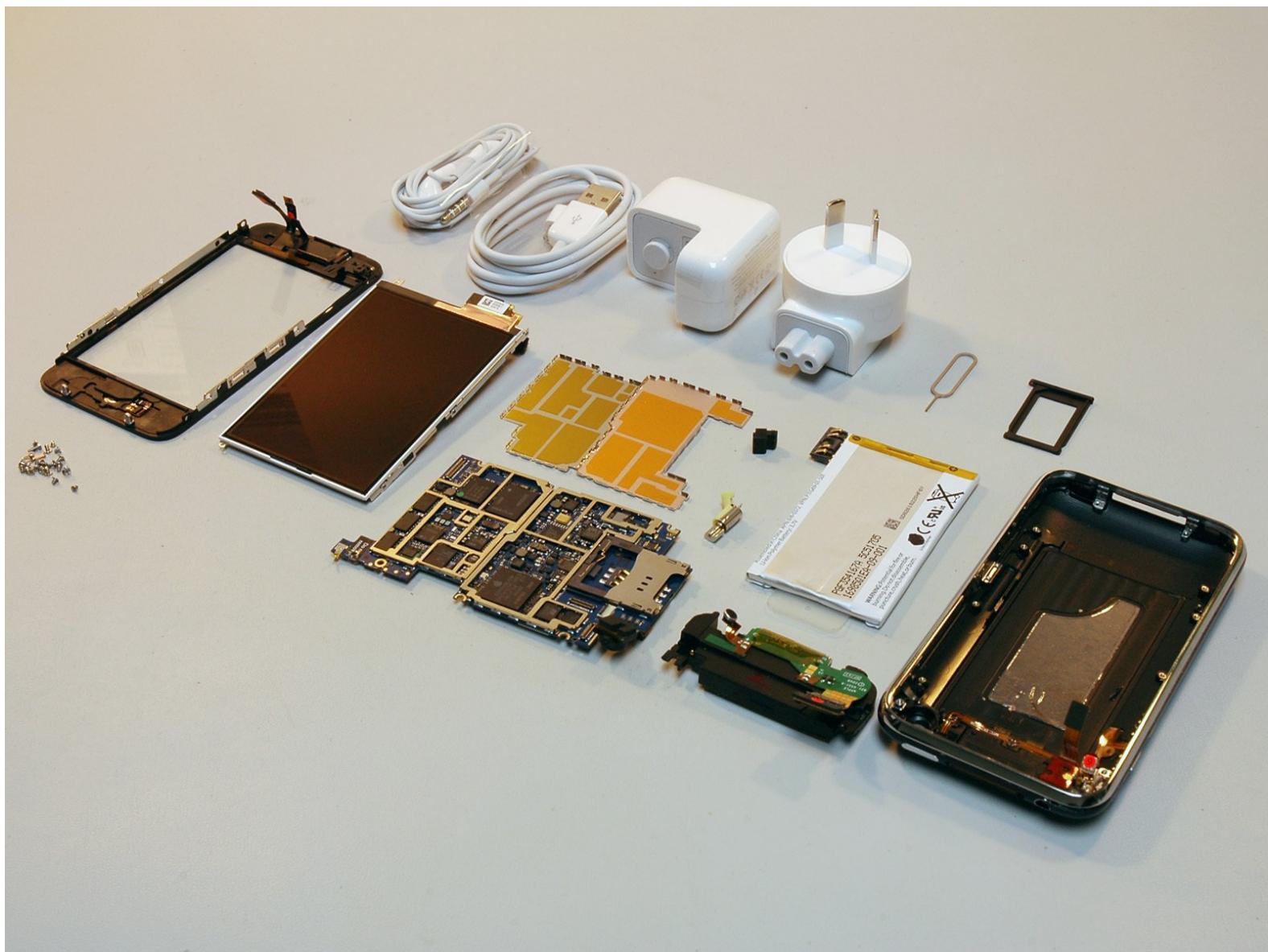




iPhone 3G Teardown

Written By: Luke Soules



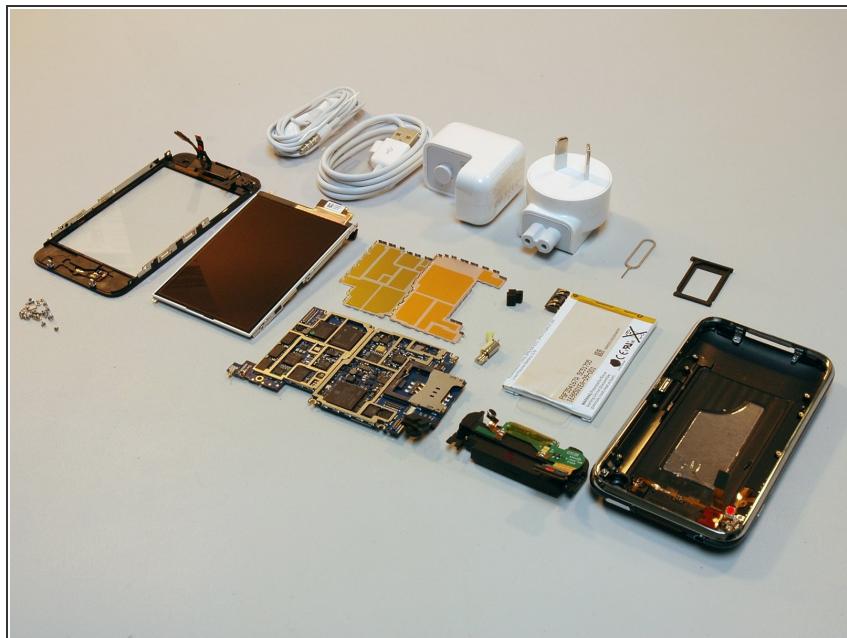
INTRODUCTION

We disassembled this iPhone on July 11, 2008.

TOOLS:

- [SIM Card Eject Tool](#) (1)
- [Metal Spudger](#) (1)
- [Phillips #00 Screwdriver](#) (1)

Step 1 — iPhone 3G Teardown



- We performed this disassembly immediately following the iPhone launch at [12:01 July 11, 2008](#), New Zealand time. That's **5:01 AM, July 10**, Pacific time for those of us who aren't islanders.
- Bookmark this page to catch all the action! We'll still be updating this page over the next several days as we learn more about the internals.
- If you're press interested in interviewing us, we'd be happy to talk to you. You can reach our press contact at kyle at ifixit.com.

Step 2



- Auckland, here we come!

Step 3



- We've arrived!
- Five people waited in line overnight. We're in the #4 spot.
- It's cold!
- Vodafone are being very accommodating, and [iPhone Jonny](#) even brought out an excycle!

Step 4



- At about 5pm, someone brought us a TV so we can watch us on the news.
- At 5pm, the line was 15 people, but it ballooned rapidly and wrapped around the corner.

Step 5



- We handed out t-shirts at the Vodafone store last night, and they were hugely popular. You'll have to hit eBay if you want one.
- Engadget are the only other Americans who flew out, and they [have mugshots](#) up of the first ten people in line.

Step 6



- Our stylish shirts in action!
- It's the middle of winter here, and just started raining. Fortunately, we have an awning over our heads.

Step 7



- Only 135 minutes to go and about 90 people in line.
- You can barely see the Vodafone logo from the end of the line.
- Vodafone's red beanies are a big hit.

Step 8



- As you can see from the box, we got the black one. Rumor has it the white iPhones are out there, but as rare as an albino whale. This iPhone cost us \$979 NZ without a contract (but locked to Vodafone, of course). Not sure what we're going to do with a Vodafone-locked iPhone in California, but we'll [figure something out](#).
- The packaging looks familiar...

- All right, here's the specs we know up-front:
 - The iPhone 3G is 4.5x2.4x0.48" (0.02" thicker than the original iPhone), and weighs 4.7 ounces (0.1 ounce less). For reference, this is approximately the weight of two unladen swallows.
 - With its new rounded back, the new iPhone feels smaller. Calculating the phone's volume won't be easy mathematically, and measuring the phone's [displacement](#) the easy way probably isn't a good idea.
 - The display is 3.5" diagonal, 480x320 resolution for 163ppi. Also known as identical to the iPhone (not that we're complaining).

Step 9



- No surprises inside the box:
 - USB docking cable
 - Standard iPhone headphones
 - USB power adapter
- Oh, what's this? A New Zealand power plug! We've never gotten one of these in a box before!

Step 10



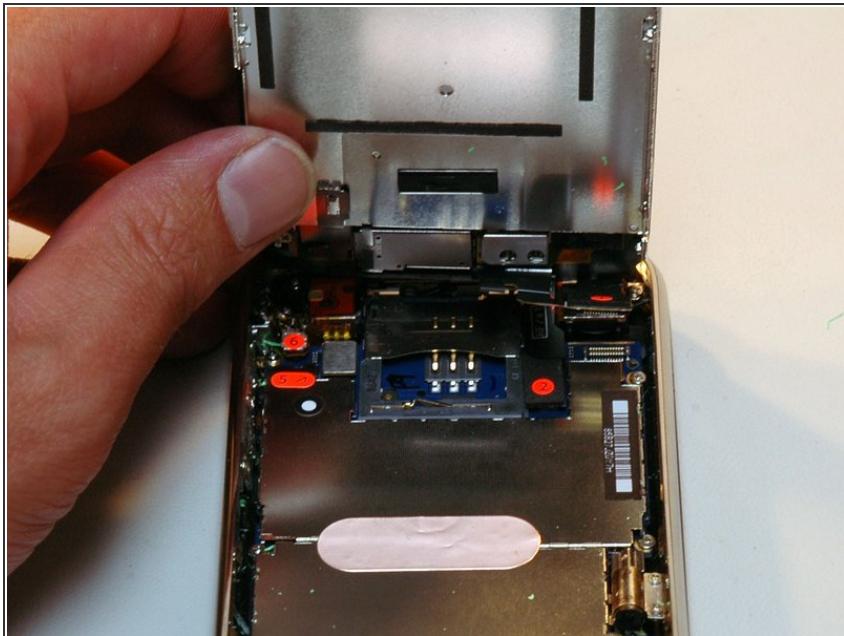
- Removing the SIM card. Fortunately for the world's paper clips, the iPhone 3G comes with a SIM eject tool.
- ⓘ Perhaps the least-touted new feature of the iPhone 3G is the flush headphone jack, allowing non-Apple headphones to be used without an adapter. Yay!

Step 11



- For comparison, here's a link to last-year's [iPhone disassembly](#).
- Our predictions:
 - Apple-labeled Samsung processor. *[correct]*
 - Either some kind of GPS chip, or none at all. If there isn't a GPS chip, then it could be built into the processor. *[Turns out it's an Infineon chip]*
 - Lots of chips with only Apple markings on them. Sometimes we can tell what they are, but most of the time you have to take the chip itself apart first. *[correct, but this one's cheating]*
- Removing the display!

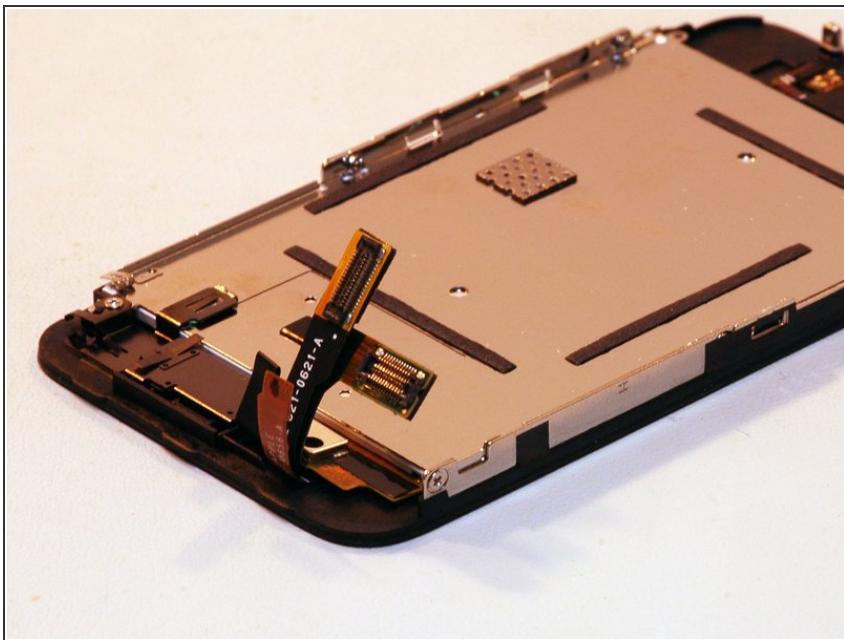
Step 12



- Rotating the display up.
- Apple used orange stickers to number the connectors to the logic board 1 through 6.
- The camera is located in the upper right corner of the phone. Unfortunately, it connects to the bottom of the logic board, meaning you'll likely need to remove the logic board from the phone to remove the camera. We haven't tried removing the camera, but would assume that like the original phone, the camera can be removed for those wanting to bring their iPhone 3G into secure locations.

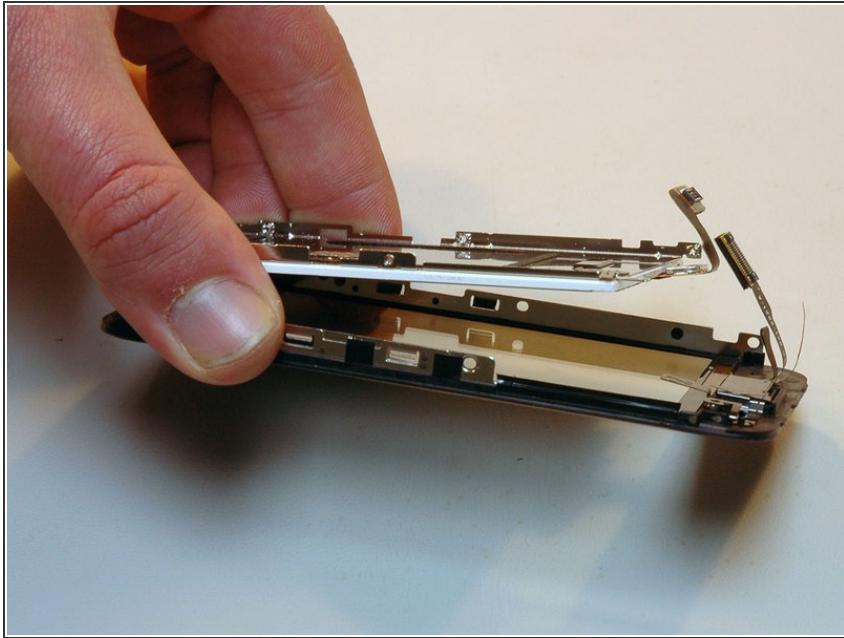
 A little birdy has told me that [TechOnline](#) will be decapping the chips we can't identify tomorrow, after the US release. They soak the chip in an acid bath to eat away the ceramic coating, then use x-rays and other fancy equipment to examine it.

Step 13



- The display assembly separated from the unit.
- In a significant departure from the first iPhone, it appears that the LCD and glass covering are separate components-- just like the iPod Touch. They were glued together before, making replacement screens very expensive. The glass breaks more than anything else, so this is great news for repairing the iPhone 3G!

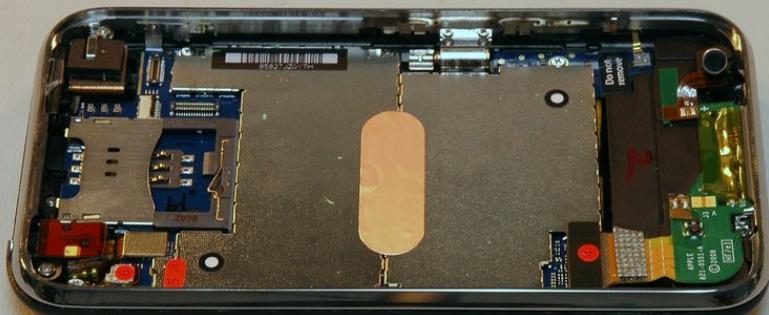
Step 14



- We had to remove 6 Phillips #00 screws to separate the glass from the LCD.
- The glass (with integrated touch sensors and chips) is underneath, while the LCD is being removed.

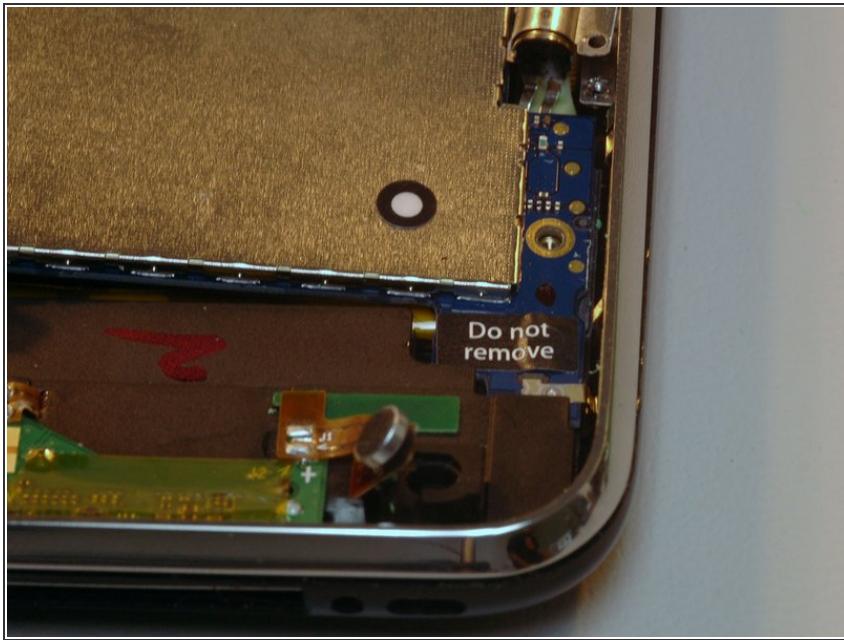
i In the previous iPhone, the display was fairly monolithic. A number of components were connected together via the display assembly-- now the display just connects to the main board. Hopefully this will make obtaining replacement parts easier-- we've had trouble getting quality supplies of iPhone displays to sell.

Step 15



- Behold, the iPhone! Can you see the 3G bits inside?
- The two boards (logic and communications) are now one. Rather than stacking them, as in the last model, they laid it out along the entire length. We're guessing this allowed them to make the battery longer.
- We're not used to taking photos outside our studio, but these pictures are turning out great because of our awesome friends in NZ.
- Props to Andrei Smirnov of [Mac Solutions](#) for helping us out. They are a Macintosh sales and support company established in 1998 and based on the North Shore, Auckland. Do us a favor and use his services the next time you're in Auckland!

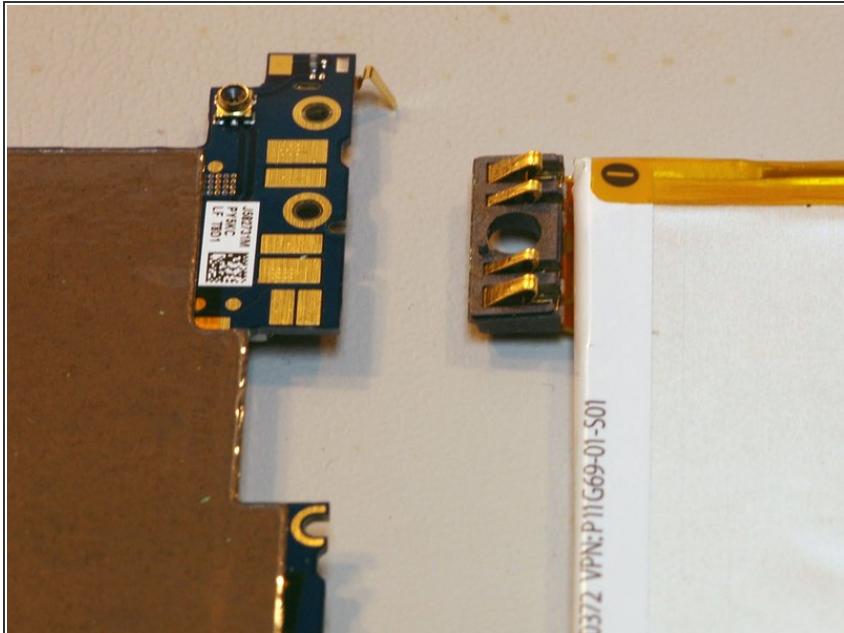
Step 16



- Uh oh.
- Let's try removing that.

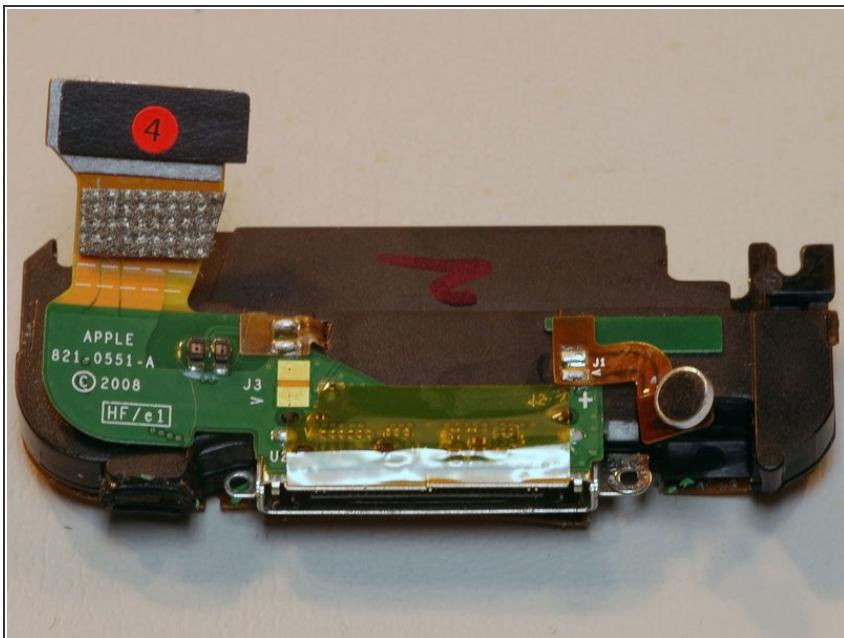
⚠ And the iPhone explodes!

Step 17



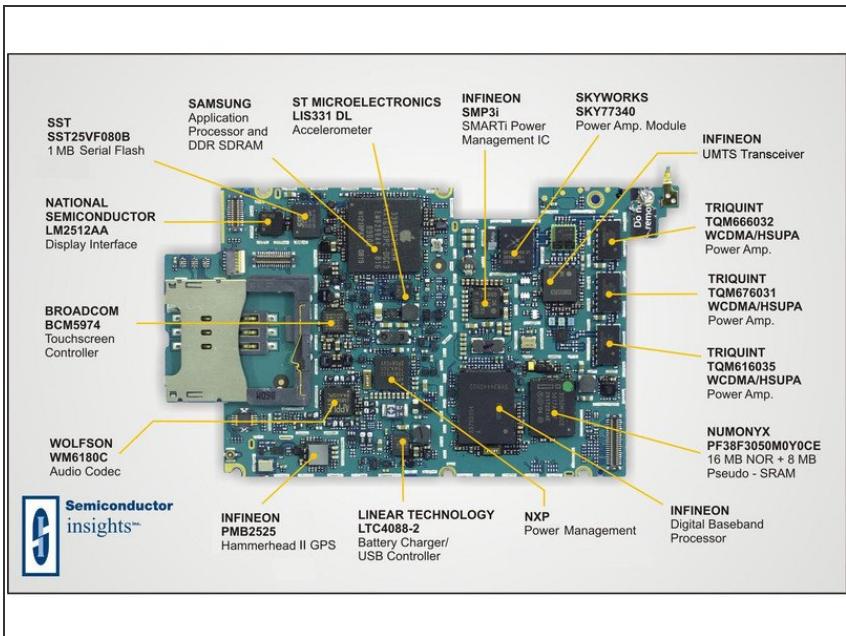
- Just kidding. Look, the battery isn't soldered on!
- Apple actually listens to us! Or something.

Step 18



- Dock and headphone connector.
- The primary antenna is on the other side of this part.
- Once we get the phone completely apart, we'll start posting chip numbers. We'd love help identifying chips from all of you, send us any inside information to iphone3g@ifixit.com. We'll keep it anonymous.

Step 19



- This is where we get excited! We've done our best to identify everything that's on the iPhone board.

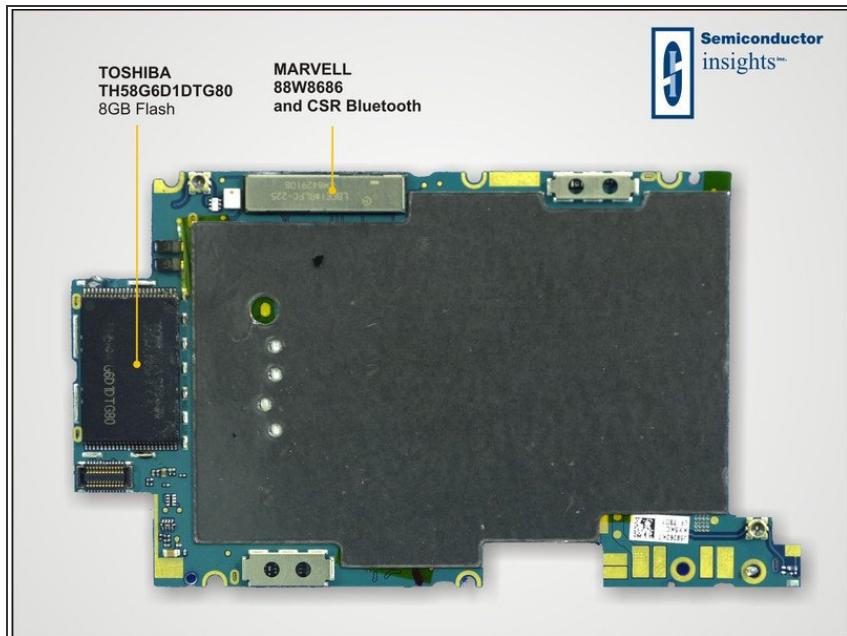
- [Semiconductor Insights](#) and [TechOnline](#) have released the almost-authoritative list of all substantial iPhone chips. They've graciously provided us with their images. We're going through and verifying their results now, but we expect that their accuracy will surpass our own.

- So by our count, here's the chip counts by manufacturer (more important chips are bold):

- **Broadcom 1**, **Infineon 4**, **Intel 1**, **Linear Technology 1**, **Marvell 1**, **National Semi 1**, **NXP 1**, **Samsung 1**, **Skyworks 1**, **SST 1**, **ST Micro 1**, **Toshiba 1**, **Triquint 3** (big win!), **Wolfson 1**.

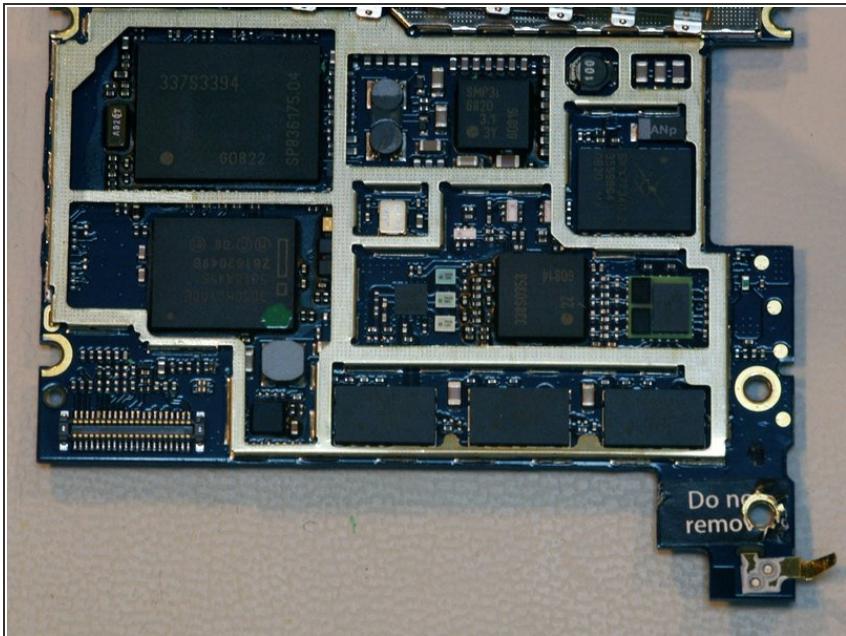
(i) Our list undoubtably omits a number of components. Don't freak out if the chip you spent years slaving over isn't mentioned, please! We're happy to update it if you let us know.

Step 20



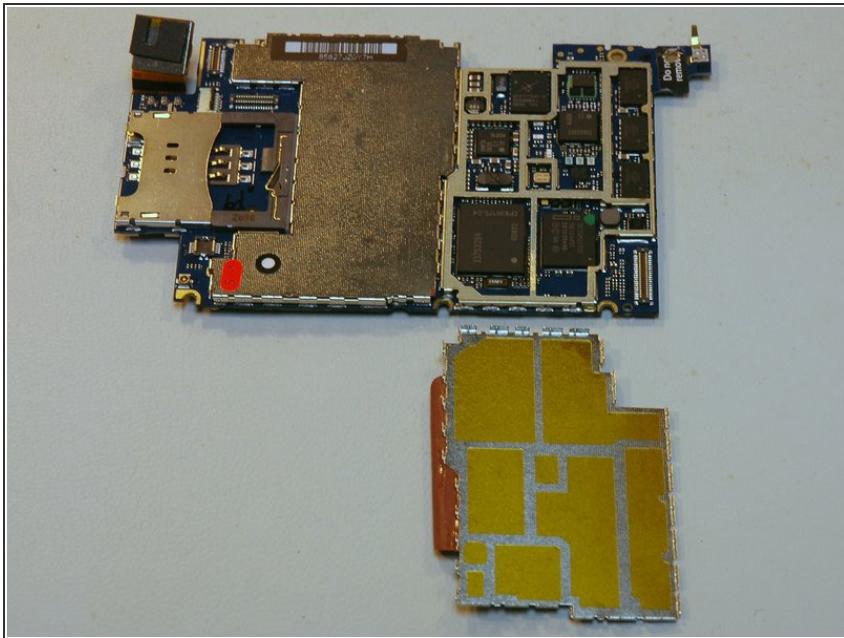
- And Marvell for the win on the CSR BlueCore Bluetooth + WiFi. This is the same chip as the iPod Touch and first iPhone.
- Toshiba manufactured the flash in both iPhone logic boards we've seen so far. We'll see if this trend holds.

Step 21



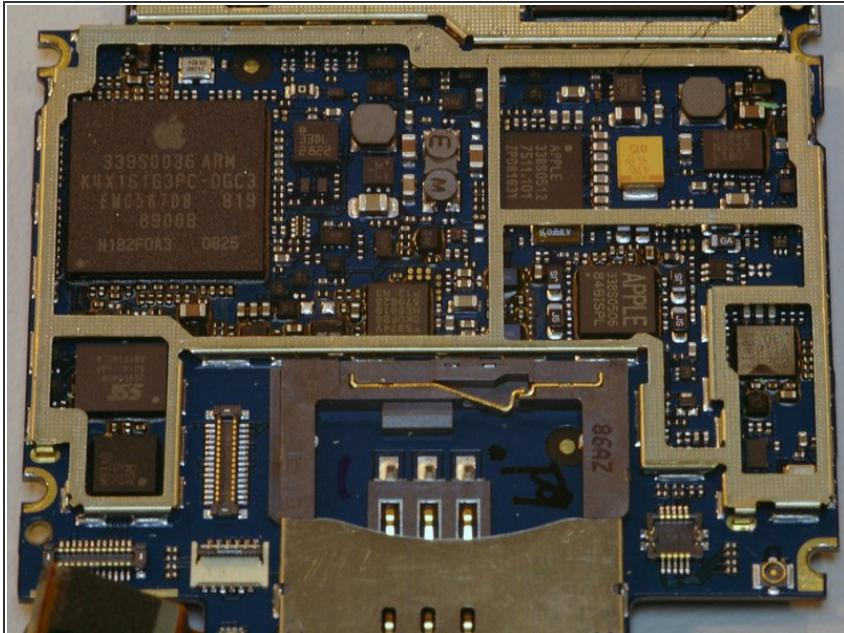
- Intel NOR flash in the middle left of the shot: 3050M0Y0CE 5818A456.
- The largest chip in the top left corner is an Infineon 337S3394 WEDGE baseband marked SP836175 G0822.
- Small chip to the right of the NOR: Infineon [BGA736](#) (Tri-Band HSDPA LNA). Just beneath that is an Infineon UMTS Transceiver marked 338S03532Z 60814.
- Skyworks power amplifier SKY77340 (Power Amplifier Module Quad) on the top right: [Octopart datasheet](#)
- The chip in the top middle is SMP 3i 6820, Infineon SM-Power3i. From Infineon: the part is "optimized to support modem and data card applications based upon X-GOLD208 and X-GOLD 608, with features ranging from EDGE up to 3G and HSDPA."
- Chips we need to identify: 6475 with M logo (rumored to be Murata IF SAW Filter).

Step 22



- The entire board (the EMI shield is removed from the right side).
- The previous shot is the top right portion of this picture.
- Removing the EMI shielding is tricky, so we're taking our time.
- If you'd like to comment publicly, use the [Gizmodo forums](#) or reply via twitter to [ifixit](#), and [Summize](#) will pull it up.

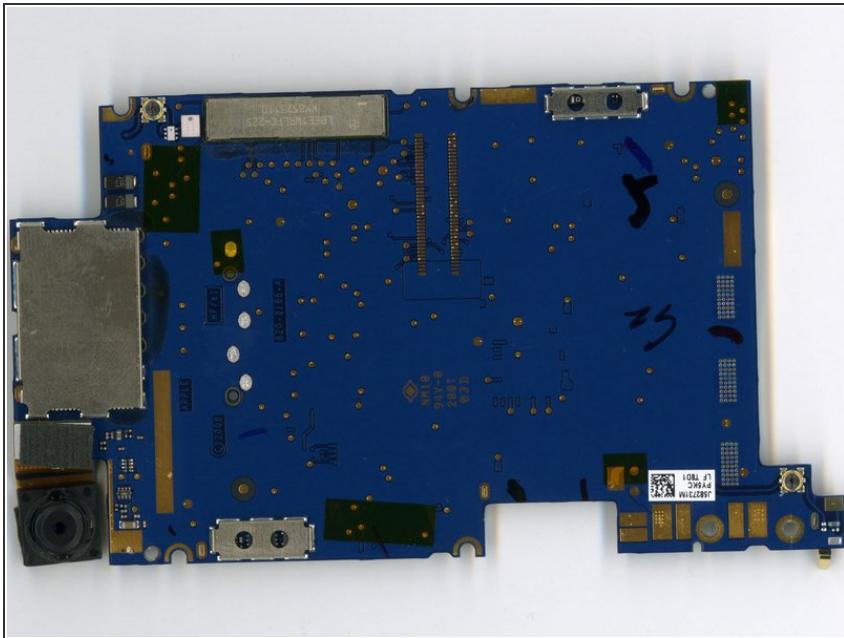
Step 23



- The other half of the board. Note the Apple-branded ARM on the left and the SIM card holder at bottom center
- Big news: Samsung DDR SRAM markers on the processor again. Looks like they win on the processor front again (not that we were expecting anything different).

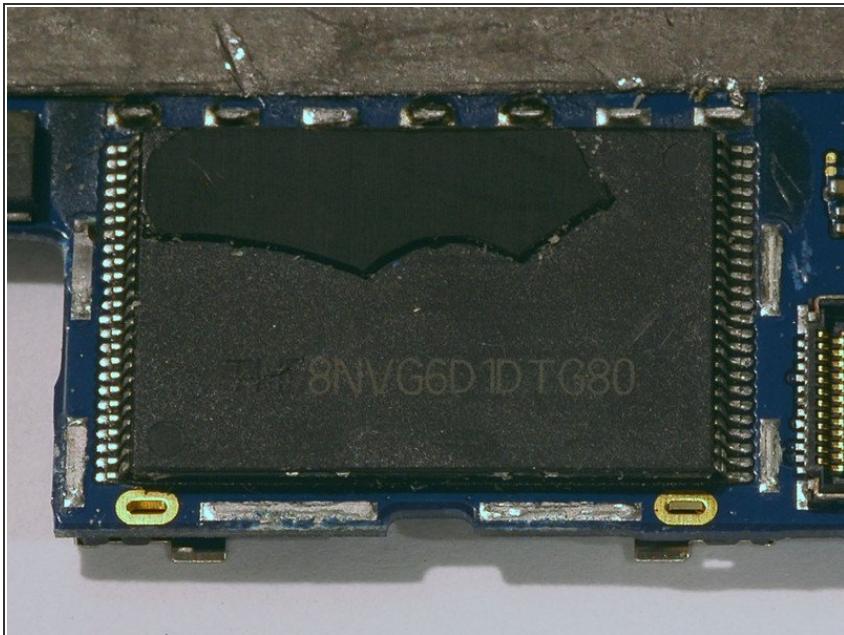
- Processor markers: 339S0036
ARM EMC567DB 819 8900B
N182F0A3 0825 7511.101
ZPD8163Y, 5974V CKUFBG
HE0819 870628 P12 N3.
Samsung DDR on the chip
([K4X1G163PC-DGC3](#)) is slightly
different from the first iPhone,
which was K4X1G153PC.
- SST [SST25VF040B](#) 1MB SPI Serial
Flash to the left of the SIM card,
along with a National Semiconductor
LM2512AA Display Interface.
- APPLE 338S0506 is a Wolfson
WM6180C (We haven't seen
Wolfson disguise their chips like this
before). APPLE 338S0512 is an
obfuscated NXP power
management chip.
- The GPS chip is the grey chip in the
middle-right side of the board. It is
an [Infineon PBM2525 Hammerhead](#)
[II](#)! Rumors that it would be
integrated into the processor have
been disproved
- The round grey chip to the right of
the Apple-logo processor is the [ST](#)
[Micro LIS331 DL Accelerometer](#).

Step 24



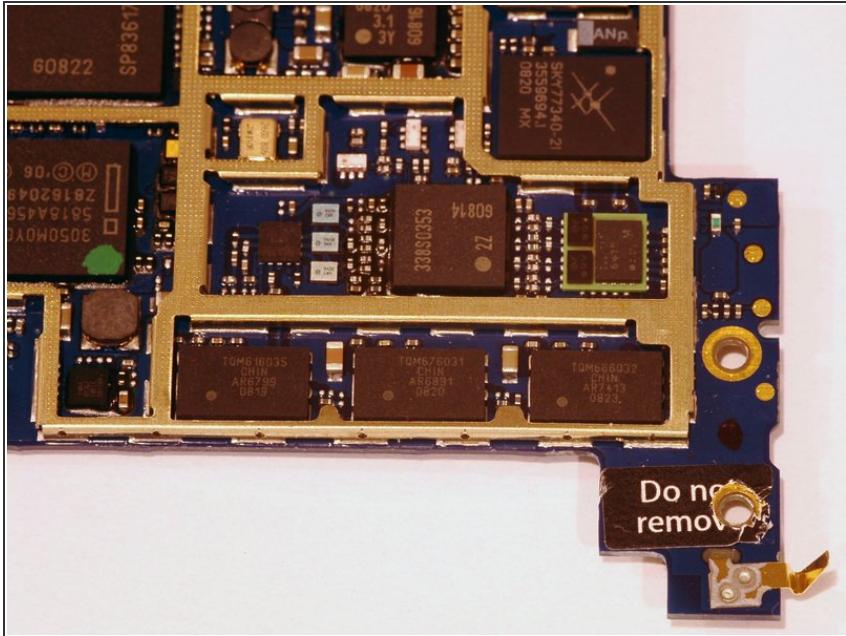
- The back of the logic board, after pulling up the metallic shielding.

Step 25



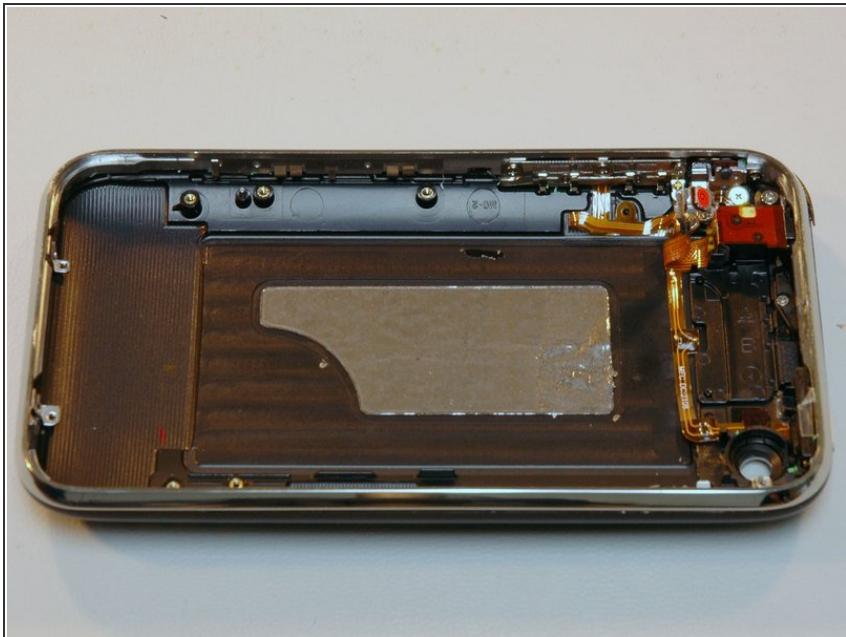
- The 8GB NAND flash chip (Toshiba TH58NVG6D1DTG80), revealed after removing a soldered-down cover. This chip was covered by a plastic shield as well, which we've partially removed to see the markings beneath.

Step 26



- The three chips along the bottom are [TriQuint Tritium PA-duplexers](#): TQM616035 TQM676031 TQM666032. Presumably each one works on a different frequency band: "Each highly-integrated module contains a Tx input filter, a linear Power Amplifier, Duplexer, and Coupler."
- i This is a big win for TriQuint! Their stock has been doing [a bit better](#) since we discovered this.

Step 27



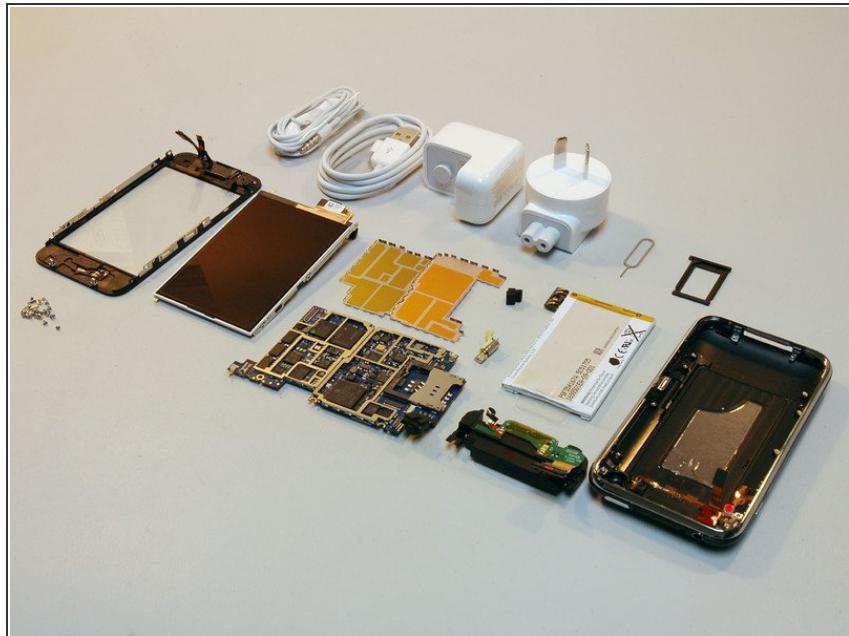
- The rear panel remains. Looks like that leaked shot was reasonably accurate.
- Unlike the metal rear panel on the original iPhone, the rear panel appears to be made from ABS plastic. The coat on the back feels nice and is very reflective, hopefully it's durable as well.
- i There doesn't appear to be a serial number on the back panel of our phone. We don't know if that's unique to our phone, or true with all 3G iPhones.

Step 28



- The battery. Put your soldering irons away, they won't be needed! Apple part #616-0372.
- The recycle marker on the battery is blacked out with a sharpie. Suspicious...
- We were all expecting a bigger battery, and I can't verify this, but [this page](#) references the part number on the battery and lists a capacity of 1150 mAh, not the 1400 mAh in the original. Can anyone dig up more information?

Step 29



- From top left to bottom right: Display glass, LCD, Main board and EMI shield, Antenna and battery, Back panel.
- That's it! We'll keep updating the chips above, so keep checking back. We'll post more photos as requested, but we're going to snag some sleep after waiting in line for two nights.
- We'd like to thank some gracious Auckland residents for making this happen:
 - Grant Virtue of [brochuresunlimited](#) for the facility in downtown Auckland.
 - Oleg Boukhvalov of [Weblab](#) for his electronics expertise and help with the disassembly.
 - Andrei Smirnov of [MacSolutions](#) for coordinating everything.
 - We'll be adding a selection of [iPhone 3G parts](#) soon, as well as a detailed [take-apart guide](#).

Step 30 — Final Thoughts



- iPhone 3G Repairability Score: **7 out of 10** (10 is easiest to repair).
 - LCD and front glass are not fused and can be replaced individually.
 - Standard Phillips screws used throughout.
- Battery is buried under the logic board, making it difficult to replace.

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