



Written By: Jake Devincenzi



## INTRODUCTION

Did it come from outer space? Did it rise up from the depths of the lost city of Atlantis? How much of it was really made in the United States? When Google announced the Nexus Q at the I/O keynote on June 27, 2012, we decided to take one apart and see what we could uncover. Join us in our quest to quell our quandary!

Did you miss our [Nexus 7 teardown](#) from two days ago? Want to make sure you never miss another teardown? Follow us on [Twitter](#)!

You know what would pair well with the Q? The [iFixit Android App](#), that's what. Download it if you're keen on viewing iFixit's awesome repair guides in a native format!



### TOOLS:

- [Socket Wrench](#) (1)
  - [Phillips #1 Screwdriver](#) (1)
  - [Spudger](#) (1)
  - [T10 Torx Screwdriver](#) (1)
  - [T6 Torx Screwdriver](#) (1)
  - [Socket 10mm](#) (1)
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## Step 1 — Nexus Q Teardown



- We tried queueing up the Nexus Q with songs, but after staring at its flashy lights for awhile, we decided to do what we do best: tear the sucker down.
- Google's glowing orb features:
  - 16 GB internal flash memory
  - 1 GB RAM
  - 32 RGB perimeter and 1 RGB mute indicator LED
  - OMAP4460 (dual-core ARM Cortex-A9 CPU and SGX540 graphics core)
  - Android 4.0 "Ice Cream Sandwich"
- As an added bonus, we've identified (to the best of our ability) the country of origin of each integrated circuit we found throughout the teardown.

## Step 2



- Here's our first view of the Nexus Q plugged in. Not sure if your device is actually a Q? Check out [this helpful video](#).
  - Round like a circle? *Check*.
  - Little tail? *Check*.
  - Chances are you have a Q in your hands!
- Flipping the device over to check out the zinc base, we see our first clue that this device is both "[Designed and Manufactured in the USA](#)."

## Step 3



### Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
8. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
9. Unplug this apparatus during lightning storms or when unused for long periods of time.
10. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

- Seated in the back side of the base are the I/O ports:
  - Speaker Ports (Banana Jacks)
  - Optical Out
  - Ethernet Port
  - Micro HDMI
  - Micro USB
  - AC-in Power
- As we fetch our sledgehammers and chainsaws to begin the teardown, we find this safety information card. We'll try to follow some of these instructions. Sorry numbers 4 and 10.

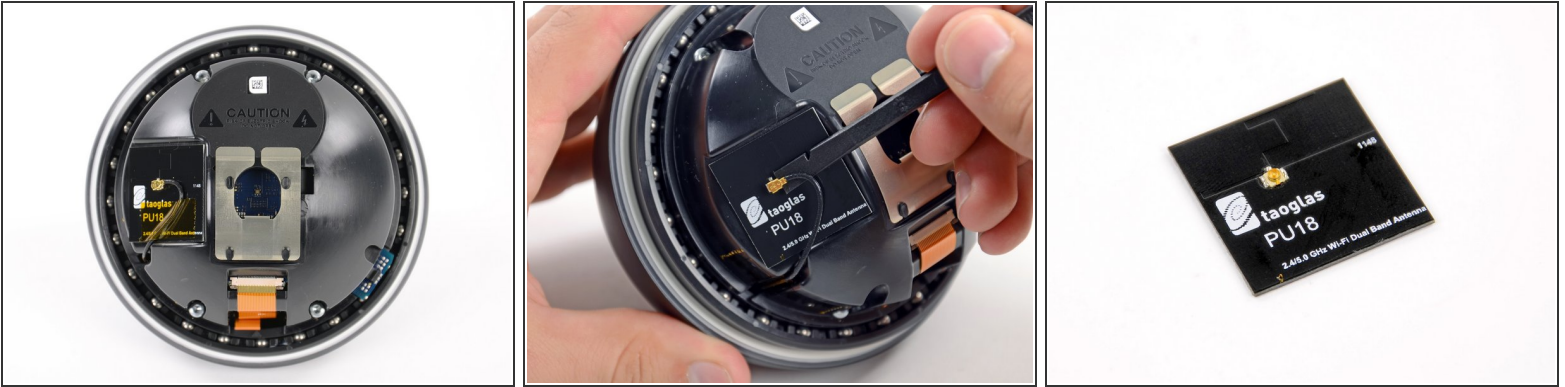
## Step 4



- We are told that this device is designed and manufactured in the USA, but the name makes us wonder if the British Secret Service may be involved. We're watching you, [Q](#).
- If Q is hiding in here somewhere, he isn't very well fortified. The endless-spin volume/select dome pops off with little effort -- no screws or glue hold it in place.
- The touch-sensitive matte black dome contains a diffuser for the status LED. The small clips that line its circumference snap into the base of the Q so it can rotate endlessly.



## Step 5



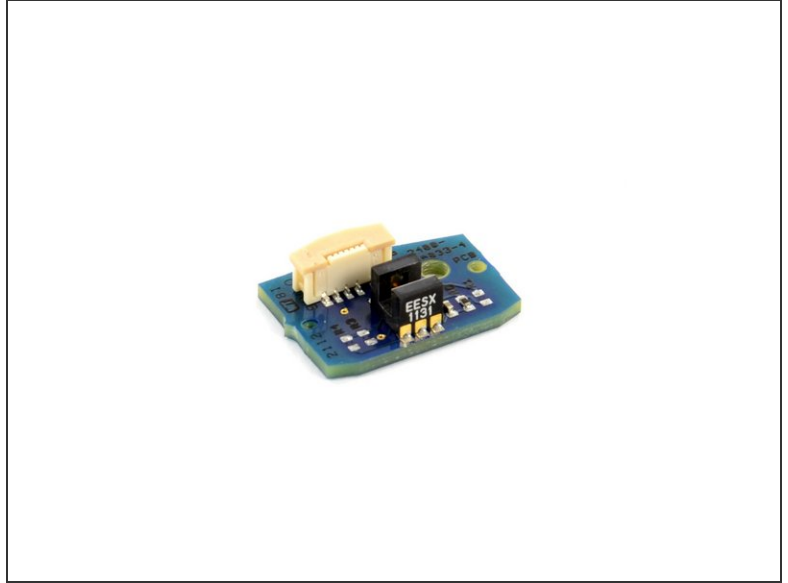
- We are kindly greeted by our first warning label. "Risk of electrical shock. Do not open." Thank you, Google; just like a good big brother, you're always looking out for us.
- Our [spudger](#) interferes with Q-munication as we disconnect the [taoglas PU18](#) 2.4/5.0 GHz Wi-Fi Dual Band Antenna.
- ❗ The Wi-Fi antenna is used solely for connecting to Google's cloud-based apps. This means you cannot browse the web on your Q, but what is the internet really good for, anyway?

## Step 6



- A connector and a couple T10 Torx screws are all that stand between us and the Q's innards.
- Only six steps in, and we're already to the core of the device. I guess you could say we're making [QuickTime](#).

## Step 7



- On the inner dome we find a small daughterboard held in by a T6 Torx screw. It's labeled as E2230JG along with a barcode.
- Mounted on the daughterboard is the [OMRON EE-SX1131](#) Photomicrosensor (manufactured in either Santa Clara, CA or Schaumburg, IL.)
- Photomicrosensors are small photoelectric sensors that provide reliable position sensing in a space-saving and cost-efficient package.



## Step 8



- Hey, we're not just a bunch of quacks in an office, we do real stuff as well!
- We sell [parts](#) and [tools](#) in order to achieve our goal: **to continue building the [free repair manual](#)** for everything in the world.
- Tools like this handy-dandy electronics tool kit that we use to take apart the newest gadgets. We assembled the most-used iFixit tools and put them all in one kit for your convenience.
- Aside from the usual [Mac](#) and [iPhone](#) thoroughfare, we also carry parts for other devices. Want to fix your dead AirPort Express? [We have a kit](#) and [guide](#) for that.
- Heck, there's even a product called the Monster Battery Pack 9000. Trust us, it's legit (it goes to 11).

## Step 9



- Using a T6 Torx bit from our 54 bit driver kit, we remove another daughterboard from the inner dome.
- Located on the board are a few notable ICs:
  - Atmel [ATMEGA328P](#) (manufactured in Colorado Springs, CO or Nantes, France)
  - NXP Semiconductors [44501](#) Near-Field Communications Controller (manufactured in Germany, China, UK, Netherlands, or Singapore)
  - TXC 8.00 MHz Crystal Quartz Oscillator (manufactured in Taoyuan, Taiwan or Zhejiang, China)
  - YF04E
  - Status LED

## Step 10



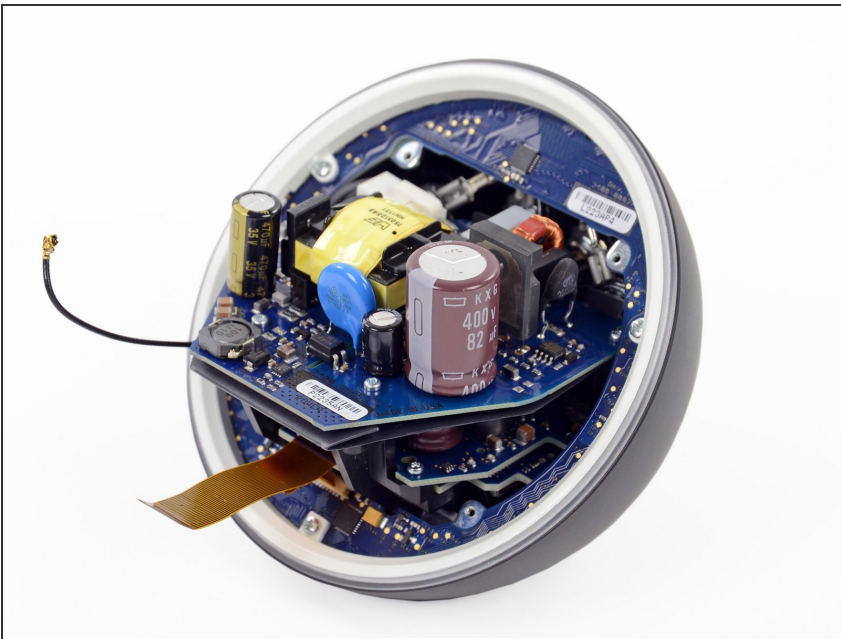
- Inside the dome also rests the [NFC](#) antenna assembly. Perhaps this allows us to contact the [Q Continuum](#)?
- The antenna comes out easily, leaving the metal part permanently attached to the inner dome.
- The inner dome, a key component of the Q's spherical design, is one of the parts that we believe to have been manufactured in the USA. Word on the street is that when design changes arose, the Google engineers could quickly implement these changes by meeting with local manufacturers, as opposed to flying to foreign countries.

## Step 11



- Another few twists from our screwdriver frees the ball bearing ring from the Q.
- Surrounding this ring are the couple of dozen steel balls that make up the ball bearing. The clips on the volume control dome snap into the ring to allow it to spin...[for-ev-ver](#).
- We imagine that cleaning dirt and dust from the Q bearings would only require a few tools and a Q-Tip.

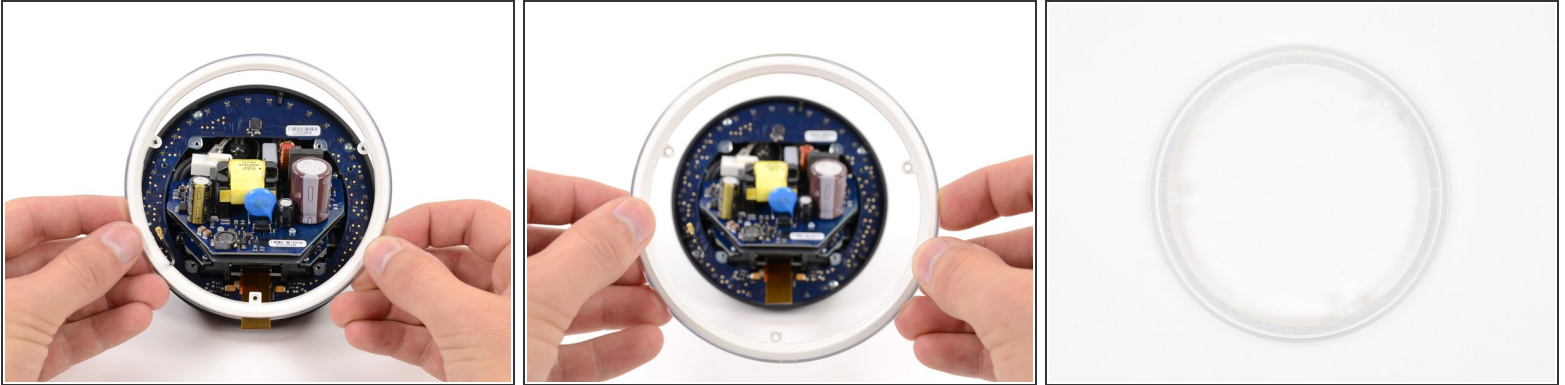
## Step 12



- Holy Capacitor, Batman! As we delve further into the Q, we encounter a wide array of capacitors. The largest of them being a 400 V, 82 microfarad capacitor.
- Physics time! If the capacitance is 82 microfarads, and the voltage is 400 V, that means that this capacitor can hold a charge of 0.033 coulombs.

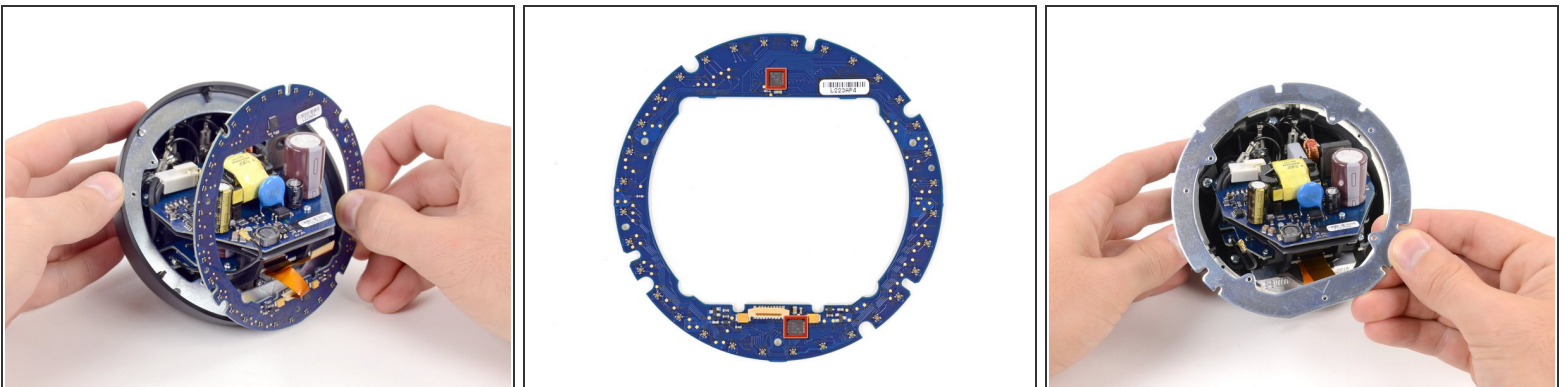
- So in this case,  $Q = 0.033$  coulombs

## Step 13



- It is safe to say that we have never before torn down a device with more circular parts than this. Out comes another one.
- What at first looks like no more than a plastic bezel turns out to be the diffuser for the Q's perimeter LEDs.

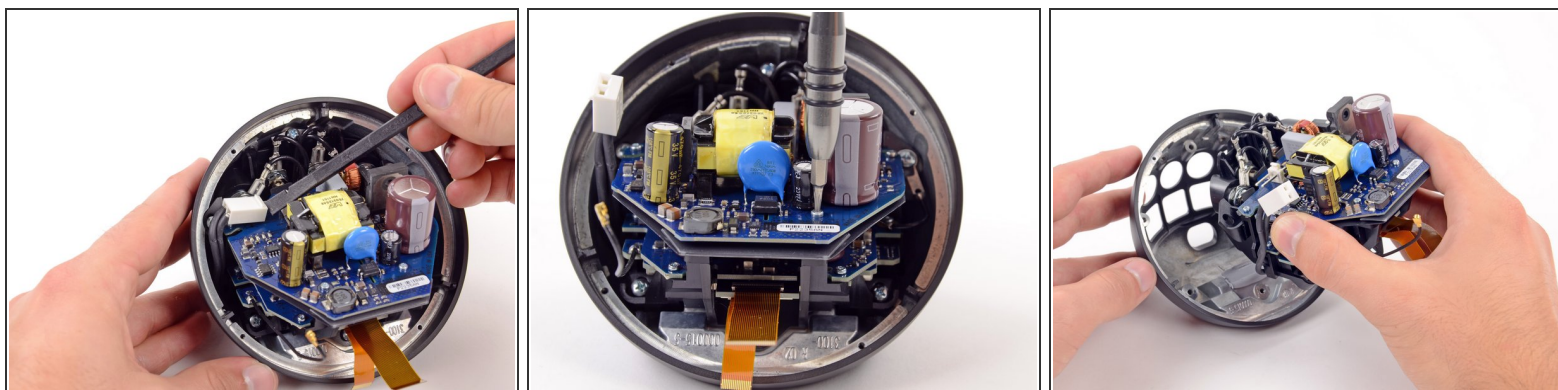
## Step 14



- Cue the lights! With the diffuser out, we gain access to the LED board. The perimeter of the Q is lined with 32 RGB LEDs, enabling it to put on one heck of a light show.
- The board also houses two Texas Instruments [TLC5947](#) 24-channel, 12-bit PWM LED drivers with internal oscillators, which could've been made in [one of several locations](#) in the world.
- And the rings continue to appear. Could this be the last of them? Only time will tell...



## Step 15



- *Click. Creek. Phwiiip!* With a couple typical teardown noises, the rest of the Q's internals are evacuated.



## Step 16



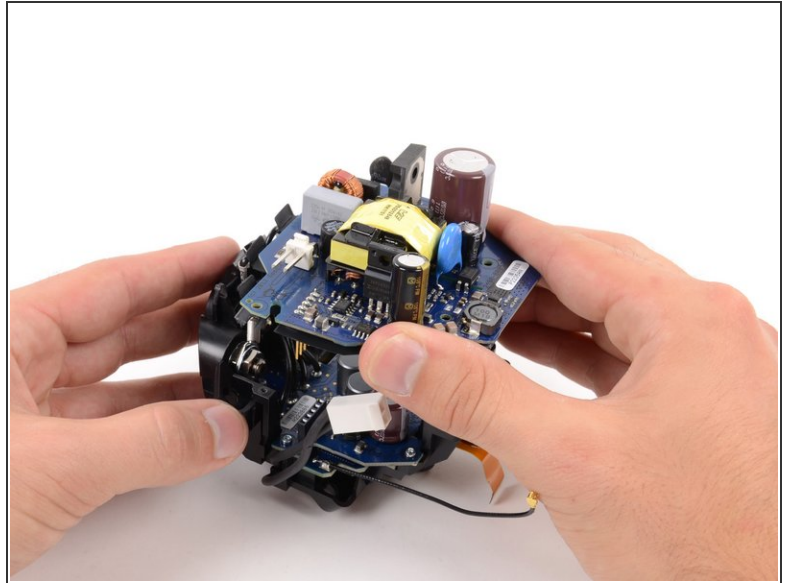
- Let's be serious for a minute. We're not just a bunch of punny folks, we also make software for teaching people to do things. [Dozuki](#) makes it easy to create vibrant how-to manuals.
- Dozuki is great for:
  - [Standardized work instructions](#): improve quality by documenting how to get things 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 17



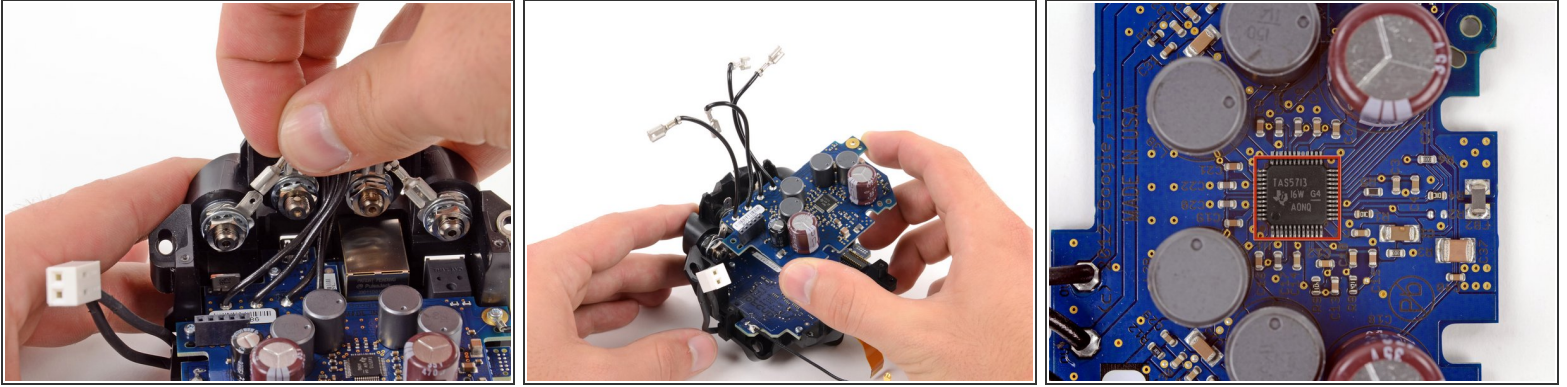
- Before we examine the rest of the Q's internals, we remove some thermal pads and rubber foot to take a look at the die-cast zinc base dome.
- The whole Q weighs 923 grams (about 2 pounds), according to the Google Play website. The hefty base accounts for 423 grams, or 45.8% of the total weight!
- ❗ Pro tip: if you have a home invasion and no weapon to defend yourself, feel free to chuck the Q at the perp. It's not as heavy as a [shot](#), but it'll give the recipient a solid gash in the head.
- Google's [push to quickly implement](#) design iterations without sending engineers overseas resulted in the dome's components being produced in the USA.
- Our question is: will you spend a little more in the store for a tag in the back that says [USA](#)?

## Step 18



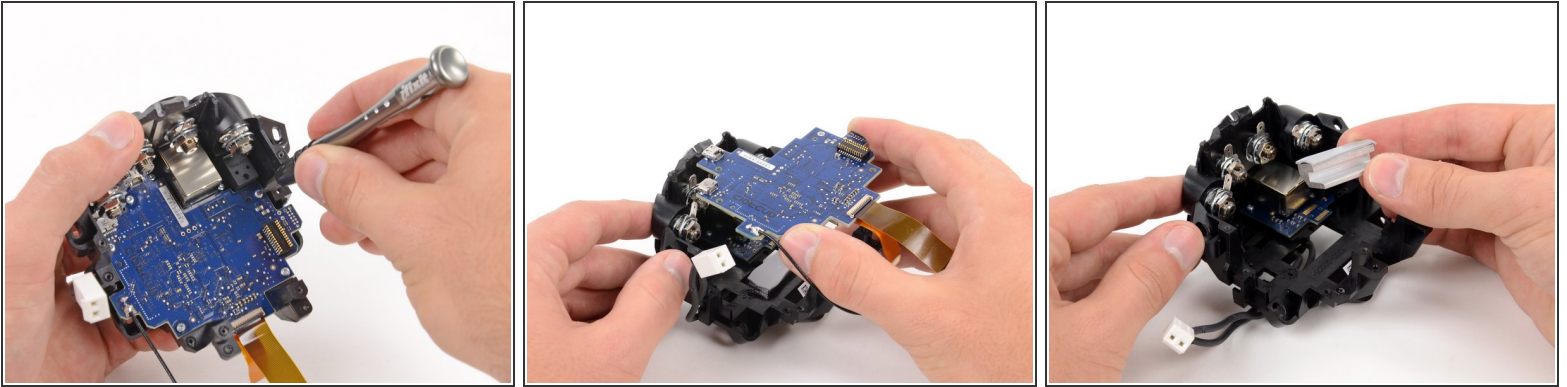
- We've gone too far and unleashed the Q's [sentinel guardian](#)!
- *Whew!* Turns out it's only the internal assembly of the Nexus Q. Crisis averted. Let's take it apart.
- Just in case this little guy sparks to life and tries to kill us, let's first take out the power supply. The integrated 35 W switching power supply sports a world-ready 50/60 Hz 85-265 V AC input.

## Step 19



- Removing the audio board requires disconnecting the speaker terminal wires from their respective posts located on the back of the speaker ports.
- How did we know this was the audio board? Easy. It bears a striking resemblance to one of our [favorite musicians](#).
- Featured on the audio board is the Texas Instruments [TAS5713](#) 25 watt digital audio power amplifier with EQ and DRC, which could also have been sourced from any one of the numerous TI fab locations.

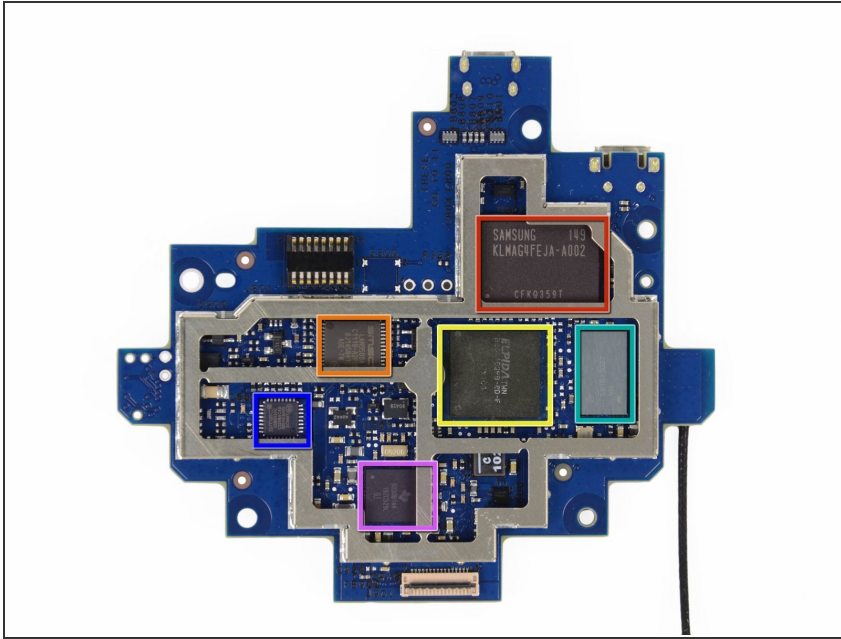
## Step 20



- And now for the moment we've all been waiting for: the motherboard.
- It usually takes a little bit of effort to separate the heat sink from the motherboard, but a simple thermal pad is all that connects the two inside the Q.
- ☑ Remember the thermal pad we removed earlier? That provided conduction between this small heat sink and the base, turning that hunk of zinc into one large heat sink that then expels heat to the surroundings.



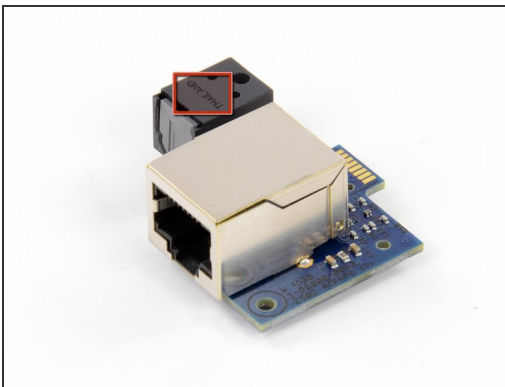
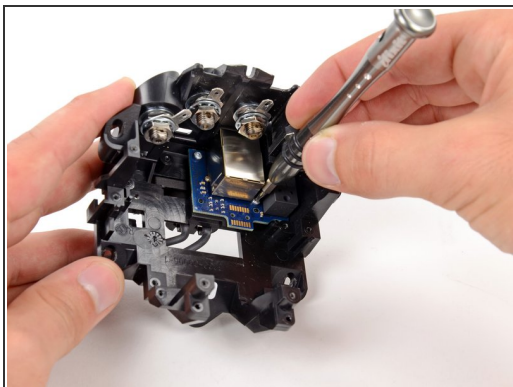
## Step 21



- Time to test our IQ with a little chip ID:
  - Samsung [KLMAG4FEJA-A002](#) 16 GB moviNAND Flash Memory (manufactured in Hwaseong, South Korea, or Austin, TX)
  - SMSC [LAN95000A](#) Hi-Speed USB 2.0 to 10/100 Ethernet Controller (manufactured in North America, Taiwan, Japan, Korea, China, India or Europe)
  - Elpida [B8064B2PB](#) 1 GB DRAM and Texas Instruments OMAP4460 Application Processor SOC
  - Murata KM10L3002 (manufactured in Japan, China, or Taiwan)
  - SMSC [USB3320C](#) Highly Integrated Full Featured Hi-Speed USB 2.0 ULPI Transceiver (manufactured in North America, Taiwan, Japan, Korea, China, India or Europe)
  - Texas Instruments [6030B1A4](#) integrated power management (manufactured in USA, Germany, China, Japan, or the Philippines)



## Step 22



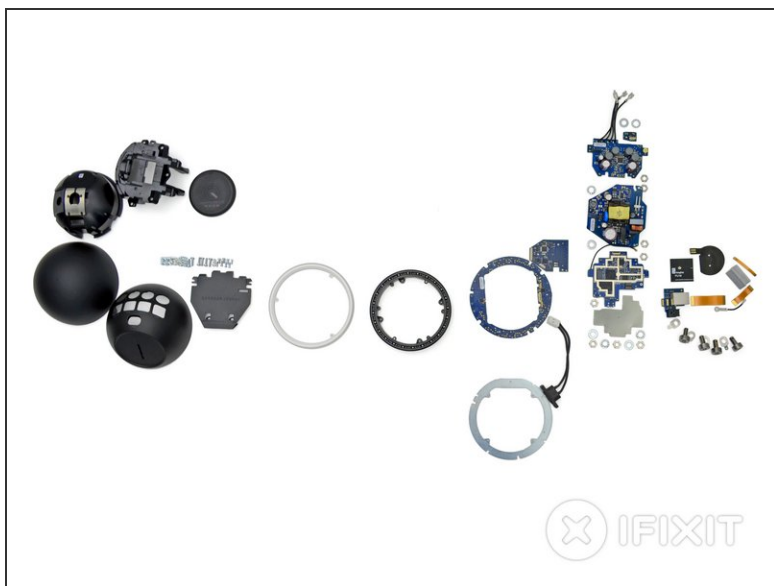
- Next we pull out the ethernet and optical out ports board.
- Obviously, not every component could be sourced in the USA -- nor did Google claim anything of the sort. The "Thailand" marking is direct evidence of components from overseas.
- Notable markings on the ethernet and optical ports board:
  - The ethernet port is labeled as a PulseJack J0011D0NL (manufactured in China).
  - The optical out port is labeled as a Toshiba TX147APL (manufactured in Japan).

## Step 23

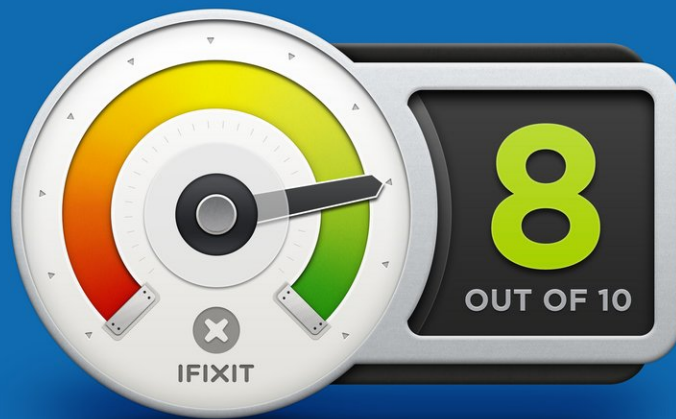


- The last thing left in this little ball of joy is the set of four speaker jacks. Let's pop them out.
- To get the jacks out we had to use a tool we don't call on every day—a ratcheting socket wrench and a 3/8" socket—in order to remove the nuts holding the jacks in place.
- Aww, look at them rolling around on the table. They're so Q-ute!

## Step 24



## REPAIRABILITY SCORE:



- The folks at Google decided to [take a cue from us](#), so we felt the need to reciprocate. Googlers, consider this an outstanding invitation to use the image on the left as a Google Doodle!
- Nexus Q Repairability Score: **8 out of 10** (10 is the easiest to repair):
  - Removing the top cover requires no tools. Very limited amounts of adhesive and fasteners with no exotic screw heads simplify disassembly.
  - Very few components are soldered to the main boards, making replacing them easier and less expensive.
  - The entire disassembly is pretty straightforward.
  - Lots of components could make you lose track of important parts if you're not careful.
  - Everything is packed very tightly into one package, which makes replacing some components a tad difficult.
  - The power supply is readily exposed once inside, making repairing the device a bit dangerous unless proper caution is taken.

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