

Deconstructing an iPhone 4

A submission to the Texas Instruments Electronics Online Challenge Decabots #63840H



İremsu Baş, Lal Zeynep Nizam, Defne Konuk, Lara Ceren Ergenç, Ayşe Yalçın, Gupse Ada Çelik, Selin Gökçe



Table of Contents

Our Experiment: iPhone 4	3
Disassembly	3
The A4 Processor	5
Touch Screen Controller	5
Conclusion	6
Citations	6



Our Experiment: iPhone 4

It was wanted from us to deconstruct an electronic device that we don't mind breaking apart so we chose an iPhone 4 which was abandoned by our team member, İremsu. Additionally, we thought that it might be intriguing to dismantle a revolutionary smartphone.

iPhone 4 was introduced in the WWDC 2010 in June. It was released after the 3GS. And was terminated in September of 2013.

iPhone 4 brought some innovations to the smartphone industry. With a steel case, it was the thinnest smartphone at that time. It's also the first iPhone to have a front-facing camera.

Disassembly

After a painful search for the right equipment, we tackled the challenge head-on.

- 1. We unscrewed the bottom screws using a pentalobe screwdriver
- 2. Once inside, we removed the battery, which took up a large portion of the space inside.
- 3. After that, we removed the vibration motor in the upper corner.
- 4. Next, the rear-facing camera at the upper left corner. Fun fact: this camera was a major improvement after the 3GS with a 1.8 MP difference.
- 5. Later, the lower antenna/speaker at the bottom
- 6. The L-shaped logic board was definitely an unexpected challenge. In order to see what was going on inside, we had to heat the EMI Shield with a hairdryer to get the screws out.
- 7. Next, we unscrewed the dock connector which is where we connect an external source (chargers, headphones, etc.) to our phones.











The A4 Processor

Manufactured by Samsung, the processor was specifically designed by Apple for iPhone 4 and was subsequently used for first-generation Ipads.

In basic words, the processor was the brain of the iPhone 4. It executed every command and was involved in everything you do with the phone.

Touch Screen Controller

Whether it's a capacitive, resistive, surface wave acoustic (SAW) device, controllers play an essential role in the function of touchscreen devices as all types of touchscreen devices use them to perform their operations.

The touchscreen controller is one or more circuits that connect the controller to the touch screen itself. iPhone 4 uses a capacitive touchscreen just like most of the other



smartphones and tablets on the market today. A capacitive touchscreen uses two layers, one of which is made from indium tin oxide (ITO) sensors, as shown in figure 1, which makes it possible to have a single full sheet on the LCD, to provide a clearer screen.



Conclusion

However simple our devices may seem, on the inside they're very complex. We were expecting a sleeker, more sophisticated design. Alas, after the deconstruction, we've seen that it's actually very organized. The components were minuscule, especially the screws. It was nothing like what we see in spy movies. Seeing how elaborate the design was, we were awestruck thinking about how far technology has come in the last decade and we're eager to learn more.



Citations

- Galan, W. (2010, June 24). iPhone 4 Teardown İFixit. Retrieved December 08, 2020, from <u>https://www.ifixit.com/Teardown/iPhone+4+Teardown/3130</u>
- 2. Siegel, E. (2013). Introduction to capacitive touch-screen controllers. Retrieved December 08, 2020, from <u>Introduction to capacitive touch-screen controllers</u>
- 3. Sanford, G. (2010). History.com. Retrieved December 07, 2020, from https://apple-history.com/iphone_4