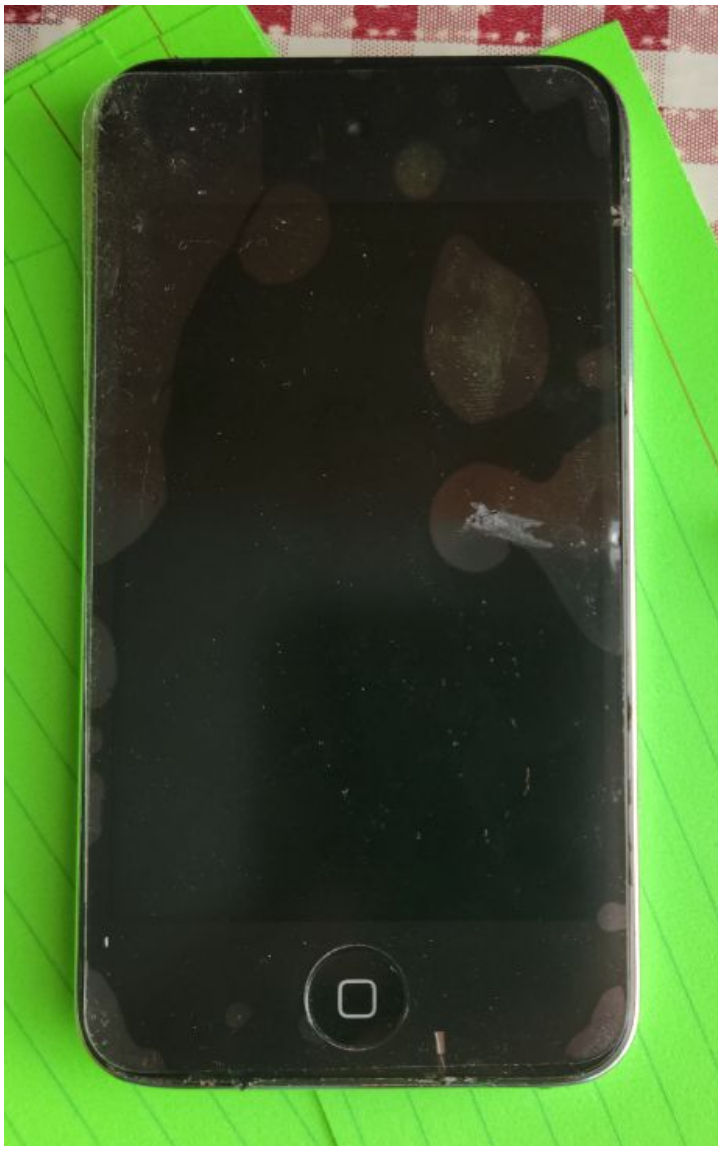
750E Reverse Engineering Challenge

Participating Members: Vishal, Tarun, Ansh, Vivaan, Sreeram, Vinay, and Rian

Team Location: South Brunswick, New Jersey



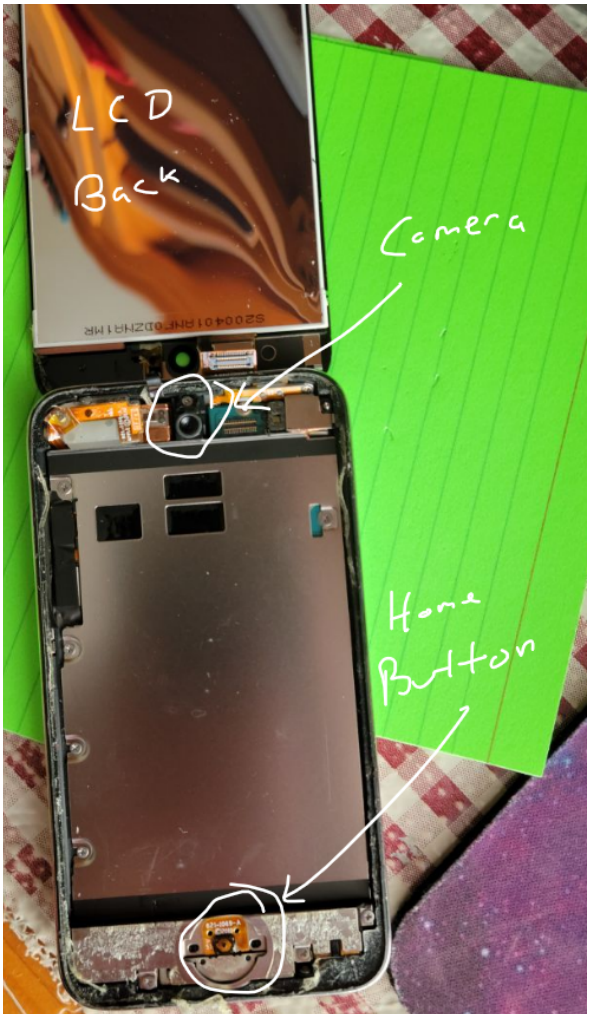
For this reverse engineering challenge, our team, 750E, decided to take apart an old iPod Touch 3 that had been unused for over 5 years (With no charge left). The volume keys on the iPod had broken a while back and we wanted to see what the issue was for ourselves. We chose this device as it was similar to the smartphones we use every day and it presented a great opportunity for us to learn about the internal workings of a device of this kind.

Additionally, we chose this device as it was an older model and we believed that it would provide an opportunity for us to understand the advancements made in technology over the years. By comparing the internal components and design of the iPod Touch 3 to newer models, we could see how the technology has evolved and how it has been incorporated into newer devices. Furthermore, we wanted to understand the repair and maintenance aspects of the device as well, which would give us an understanding of how easy or difficult it is to fix a device of this kind and what kind of repair costs we can expect. Overall, this reverse engineering challenge provided us with a hands-on learning experience and a deeper understanding of the technology that surrounds us.

How we took it apart:

To begin the disassembly process, we used a flat-head screwdriver to carefully pry open the edges of the iPod. We removed the LCD screen and found a metal panel with 7 small screws that proved challenging to remove. During this process, we also located the home button and front-facing camera. We did some research on LCD screens and learned that they work by passing electrical currents through them. They do not actually light up themselves and only work by "filtering" the light behind them.

To further understand the functioning of the LCD screen, we also learned about the liquid crystal solution that is present between the two layers of the screen. This solution is responsible for controlling the amount of light that passes through the screen, which in turn creates the images we see on the device. We also learned about the polarizing layers present on either side of the screen that helps to control the direction of the light. This understanding of the LCD screen and its components helped us appreciate the complexity and precision that goes into designing and manufacturing such a small but essential component of the device. Furthermore, it also helped us understand the importance of proper handling and care when working with these delicate components to avoid any damage or malfunction.

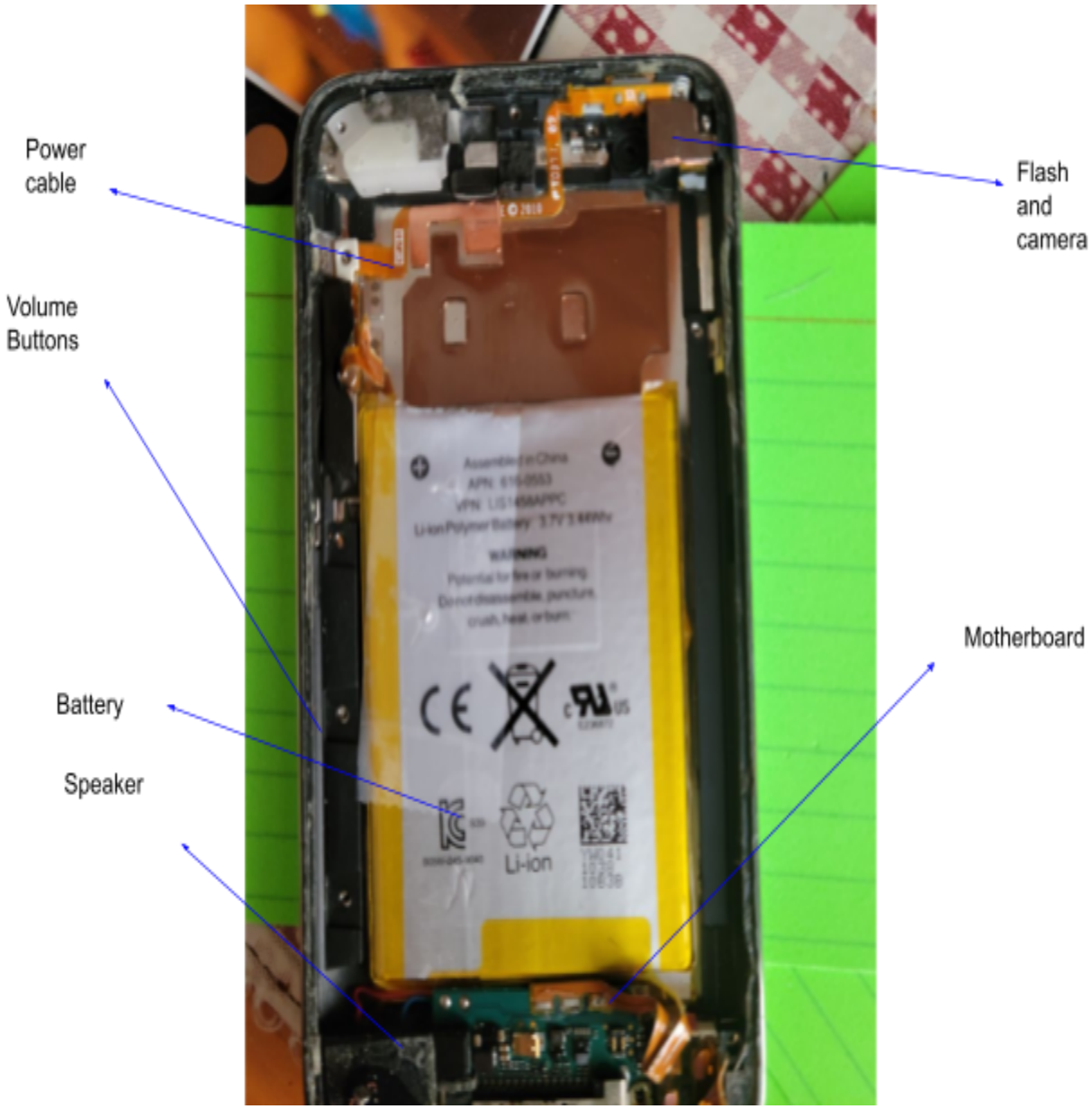


The next day, we finally managed to remove the metal panel after spending hours trying to open the small screws. We were aware that there was likely no charge left in the device after it had been unused for 5 years, but we still took all necessary precautions. Unfortunately, despite our best efforts, we did end up scratching the lithium-ion battery. We were concerned about the potential dangers and consulted various sources to understand the risks involved. We were informed that the battery might explode or catch fire. To mitigate these risks, we attached tape to the battery and had a fire extinguisher on standby as a precautionary measure. Since the battery wasn't punctured, we continued with our exploration. During this process, we also found the charging port of the device.

During our research on lithium-ion batteries, we also learned about the importance of safety measures when dealing with them. We found out that Lithium-ion batteries can be dangerous if they are damaged, as they may overheat, catch fire or explode. We also learned about the importance of proper disposal of these batteries, as they can be harmful to the environment if not disposed of properly.

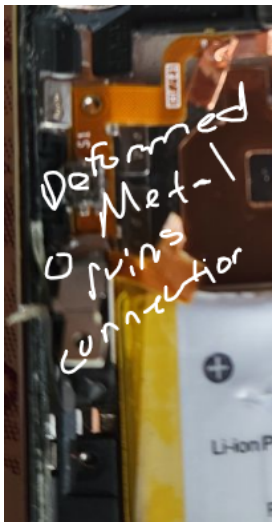
Additionally, we also found out that lithium-ion batteries tend to degrade over time and lose capacity if they are not used for a long period of time. This was likely the case with the battery we encountered in our iPod, which had likely lost most of its capacity due to its prolonged storage.

We also learned about the importance of maintaining the proper voltage level of these batteries to ensure their safety and prolong their lifespan. We found the charging port of the device, which enabled us to understand the charging mechanism of the device. We learned about the various charging standards used in different devices and the importance of using the correct charger for the device to avoid any damage or malfunctions.

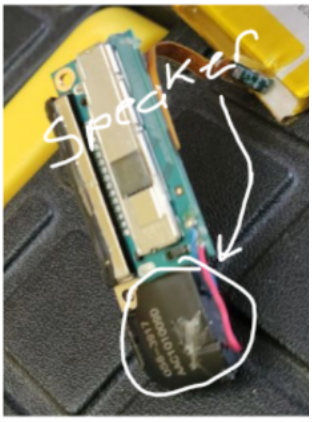


Next, we removed the logic board, which is the blue-green circuit present in the device. We found the speaker located on the bottom right and removed it. We also located the volume buttons and discovered that a deformed piece of metal was preventing them from working correctly. This helped us solve the mystery of the broken volume keys. Additionally, we removed the rear camera and found a snaking orange cable, which we concluded was the power cable.

Upon further examination of the logic board, we were able to identify various components such as the processor, memory, and other integrated circuits that make up the device's main computing system. We also noticed the presence of several connectors and ports, such as the headphone jack, that allow the device to connect to external devices and peripherals.



We also examined the speaker and the volume buttons more closely. We found that the speaker was connected to the logic board through a set of wires and that the volume buttons were connected to the board through a small ribbon cable. This helped us understand the connections and communication between different components of the device.



The rear camera also caught our attention, as we were able to see the various lenses and sensors that make up the camera module. We also identified the power cable that we found earlier, which was connected to the camera module. This helped us understand the power requirements of the camera module and how it is connected to the device's power source.

After we were done taking it apart we decided to look online for a breakdown of the ipod. In our search, we found this: [iPod Touch 3rd Generation Teardown](#).

What we learned:

After completing the disassembly process, we looked online for a breakdown of the iPod Touch 3rd Generation. In our search, we found a teardown article and video that provided valuable information about the device. We learned that the back side of the LCD display is a mirror that reflects the backlight, which is an important component in the functioning of the device's display. Additionally, we found that motherboards are actually a lot smaller than we had initially thought. In reality, the motherboard is a small rectangle located at the bottom of the device. This helped us understand how manufacturers are able to fit all the components of the device within a small enough case that can be held with one hand.

Furthermore, from the teardown article and video, we were able to identify various other components of the device that we were not able to locate during our disassembly process. This included components such as the Wi-Fi and Bluetooth module, the flashlight, and the power management IC. This helped us understand the complexity of the device and how all the components work together to make the device function.

Additionally, we were also able to compare the internal components and design of the iPod Touch 3rd Generation with newer models. This helped us understand the advancements

made in technology over the years, and how the components have been made smaller and more efficient.

Lastly, we were able to understand the repair and maintenance aspects of the device as well. We saw how easy or difficult it is to fix a device of this kind, and what kind of repair costs we can expect. This helped us understand the cost-benefit analysis of repairing an older device as opposed to purchasing a new one.

We learned that cell phones are a lot more complicated than we had initially thought. We discovered many intricate wires and perfect spacing to ensure everything fits within the device's case. The disassembly process helped us understand the various components that make up a device like this and the challenges involved in designing and manufacturing such a device.

We found that this reverse engineering challenge was a valuable learning experience for our team. We gained a deeper understanding of the internal workings of a device like the iPod Touch 3rd Generation and the challenges involved in designing and manufacturing such a device. We hope that this report provides a comprehensive and detailed account of our process and findings, and can serve as a useful reference for others who may be interested in similar projects. Additionally, we hope that it demonstrates the importance of proper research, documentation, and safety precautions when undertaking a reverse engineering project. Our team members, Vishal, Tarun, Ansh, Vivaan, Sreeram, Vinay, and Rian, were all actively involved in this challenge and we learned a lot from this experience. We would like to thank our team members for their contributions and dedication to this project.

Parts list:

Battery
Front-facing Camera
Back camera
Case
Motherboard
Speaker
Wifi
Lcd
Flashlight
Charging port
Volume buttons
Home button
Wires