

# Texas Instruments Electronics Online Challenge

Discobots Team 1104A

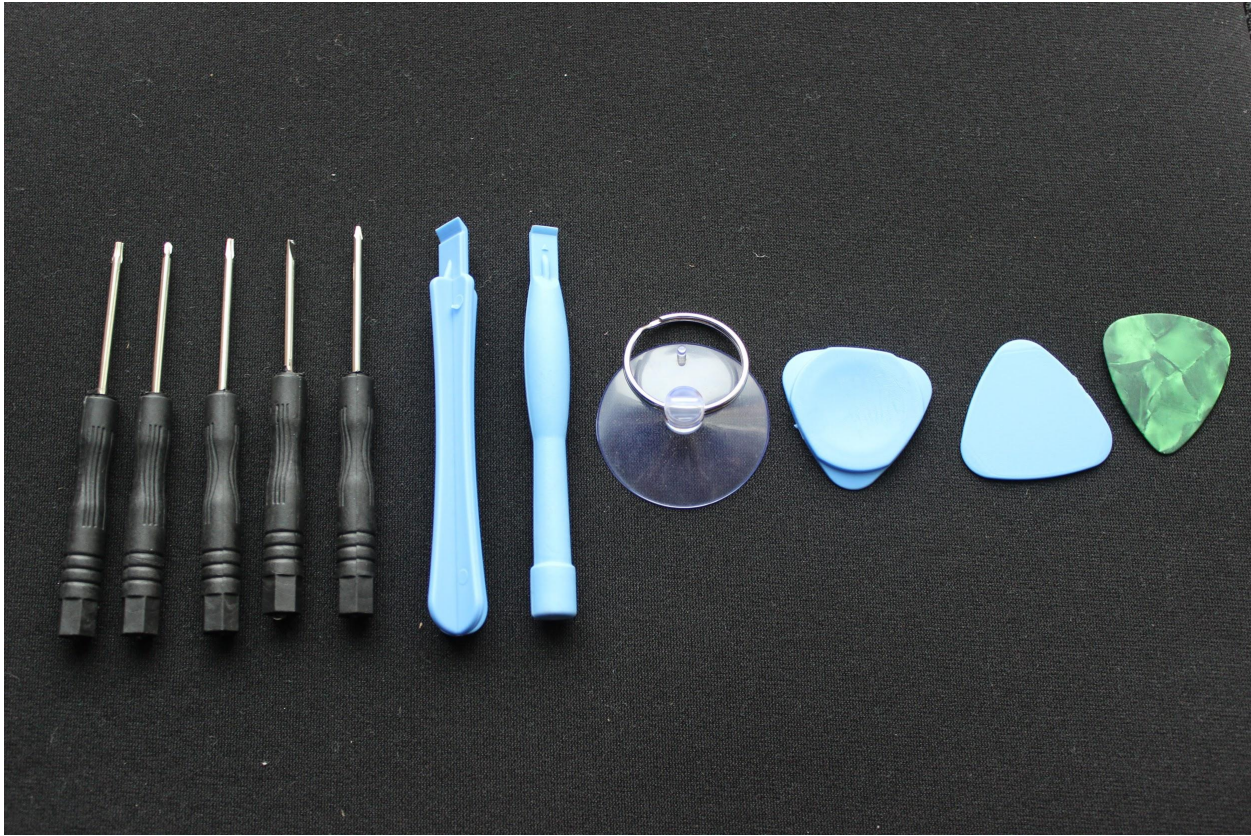


# ***Introduction: Final Report***

**For the Texas Instruments Electronics Online Challenge, the electronic device we chose to deconstruct was a 4th Generation iPod Touch. We selected this electronic device, as we realized that this is an everyday product and is very well-known.**

**We also came to the realization that since this is a 4th Generation iPod, there is not much use for it anymore as the technology company Apple, has released newer generations of it's products. However, we wondered if some of the chips, circuits, sensors, etc used in the iPod Touch were used in everyday technological products today; even if the production of the 4th generation iPod has been discontinued.**

## List of Tools used to Deconstruct the device:



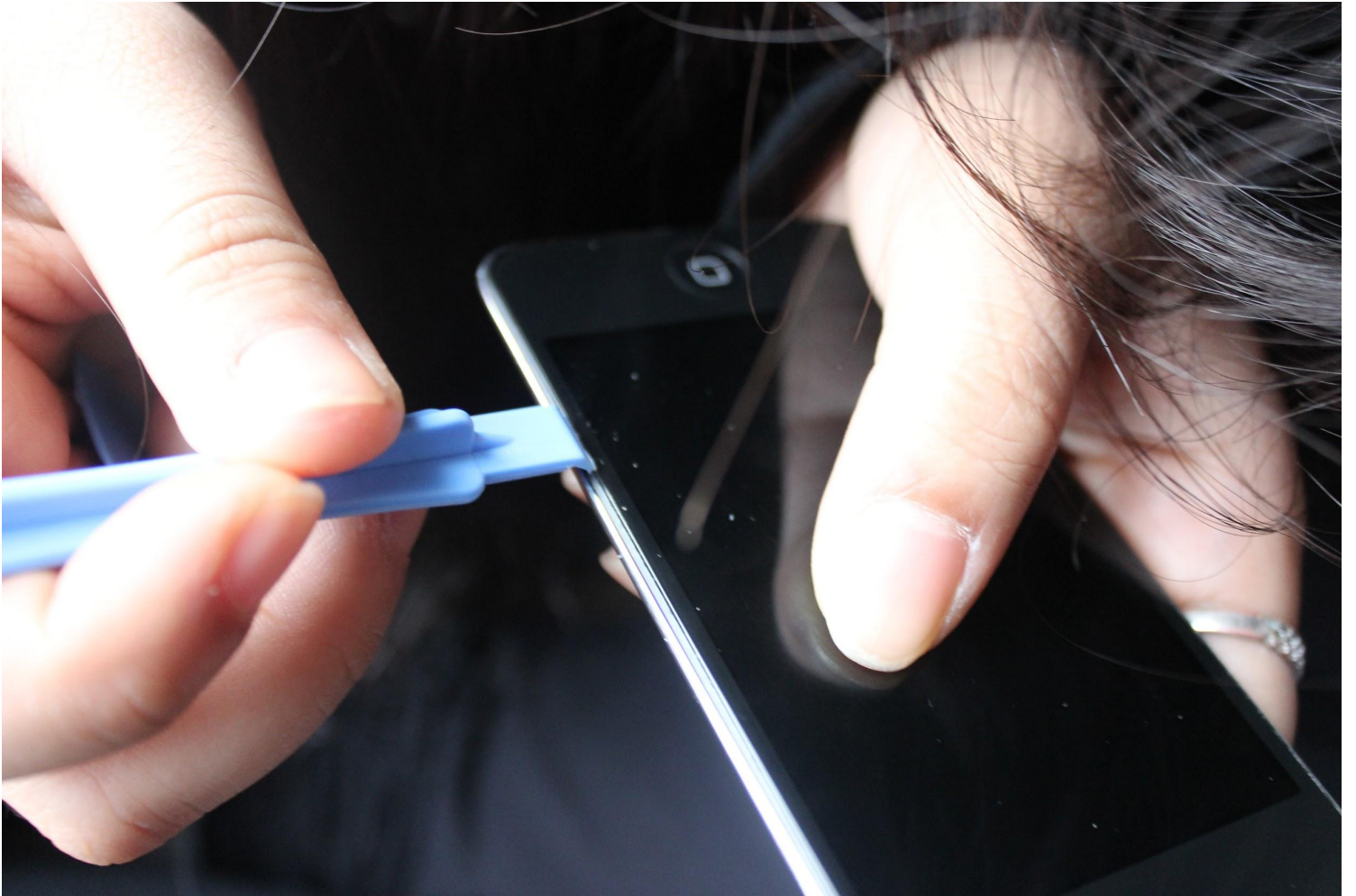
The tools that we used to deconstruct the iPod Touch. The tools range from small Phillips screwdrivers to suction cups.

# ***List of Internal Components***

- **Battery**
- **Front Camera**
- **Rear Camera**
- **LCD Display**
- **Home Button**
- **Home Button ribbon cable**
- **EMI Shield**
- **Logic board**
- **Headphone Jack**
- **Singular external antenna**
- **Speaker**



The iPod before deconstruction



First we pried open the screen with a mini pry bar. This took a lot of effort as there was glue holding the screen together.



Once we took apart the screen we were exposed to the LCD ribbon cable. We had to cut the wire in order to separate the iPod in two.



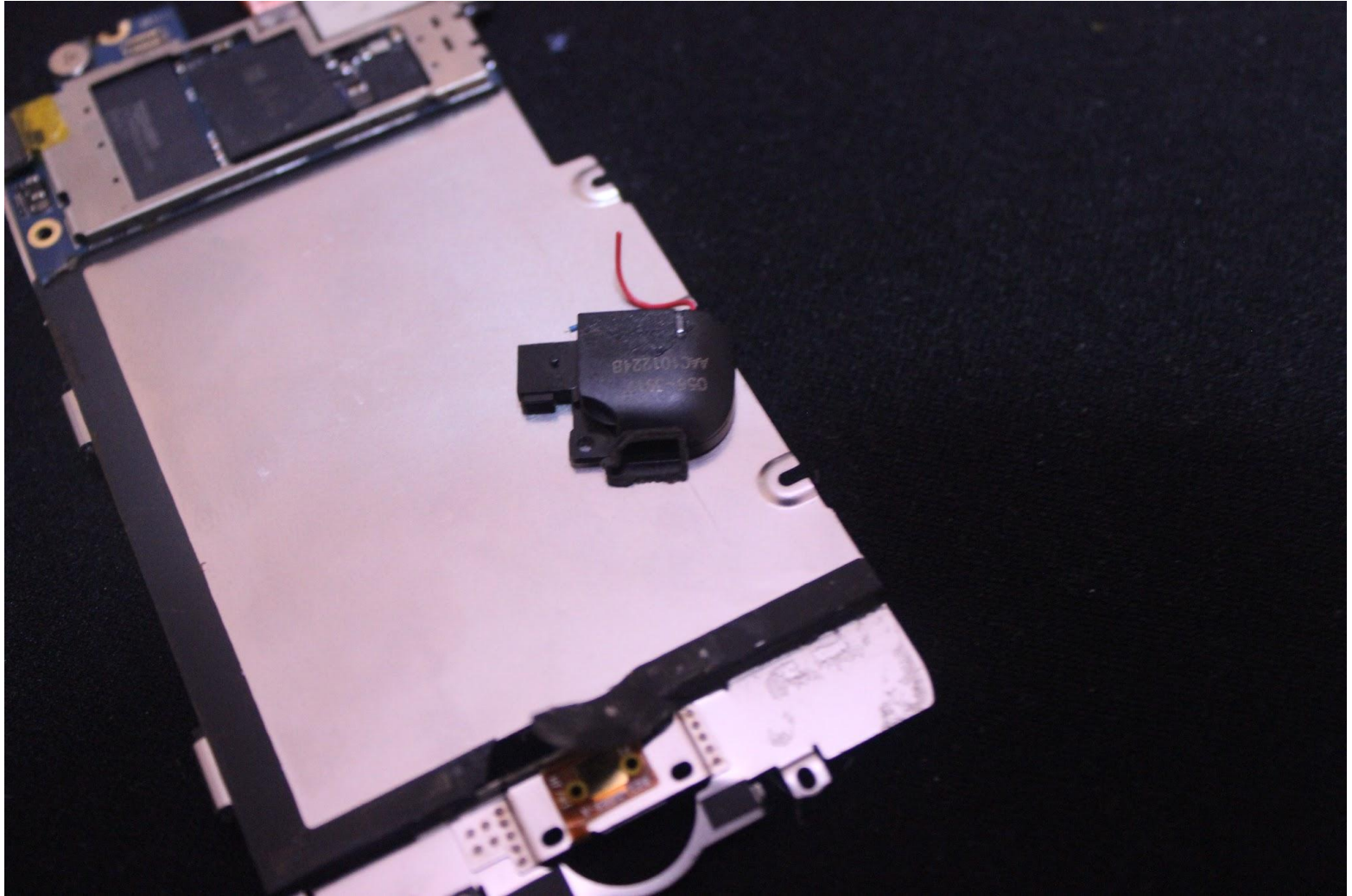
We then unscrewed all the visible screws, to reveal the layer underneath the EMI shield.



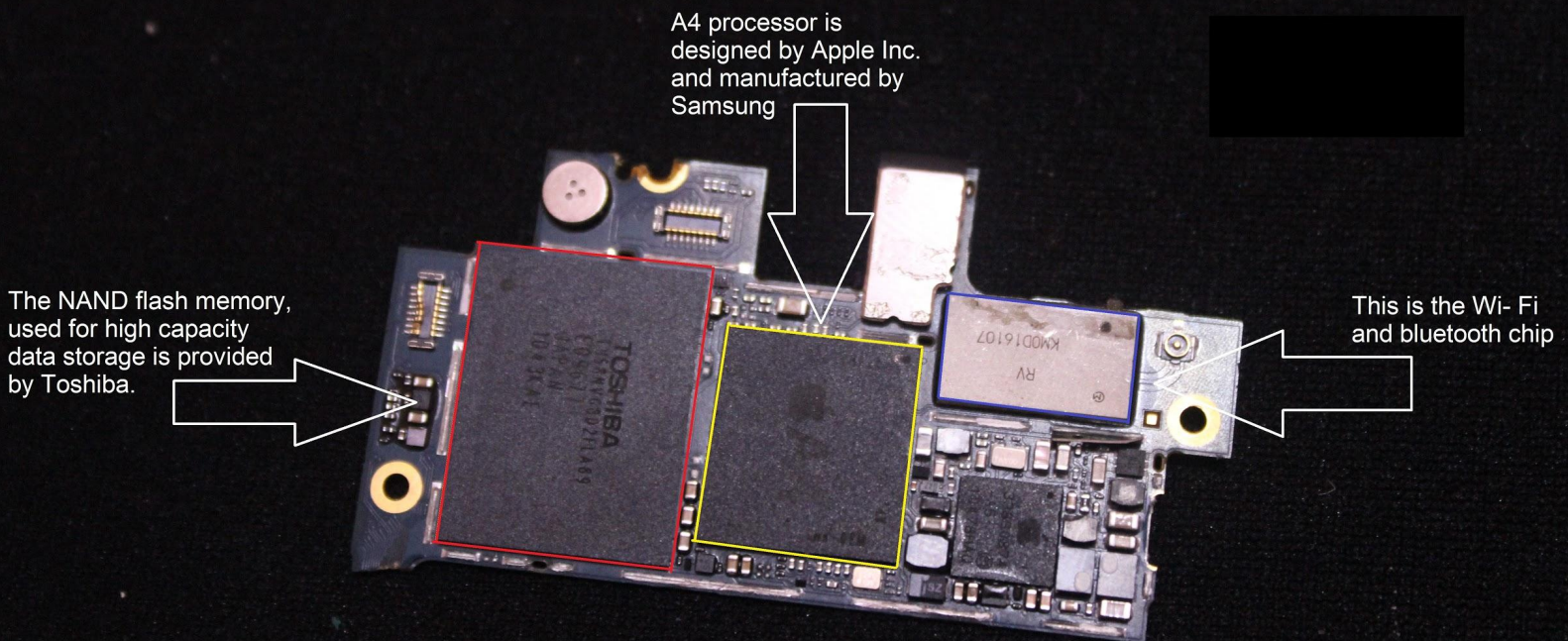
Once we unscrewed the EMI shield, we were able to see the battery as well as numerous sensors, including the logic board.

### **Some sensors found under the EMI shield:**

- Camera
- Battery
- Headphone jack
- Wifi antenna
- Volume/power cable
- Logic board



Here you can see that the home button ribbon cable and the chips from the logic board, also the speaker is disconnected from the iPod.



This is the top part of the Logic board. Here you can see the A4 processor, the NAND flash memory chip and the Wi-Fi/bluetooth chip.

# ***Chips inside the logic board (top portion):***

## **- A4 Processor**

***Its use***– The A4 processor was first released by Apple from the release of iPad. This chip is manufactured by Samsung. This chip is the processor, holds memory, supplies power, graphics and the I/O.

***Where else it can be found***– As we just talked about, the A4 processor chip was first recognized in the iPad, then released in the iPhone 4, the Apple tv then again in the iPod 4.

## **- Flash Memory Chip by Toshiba**

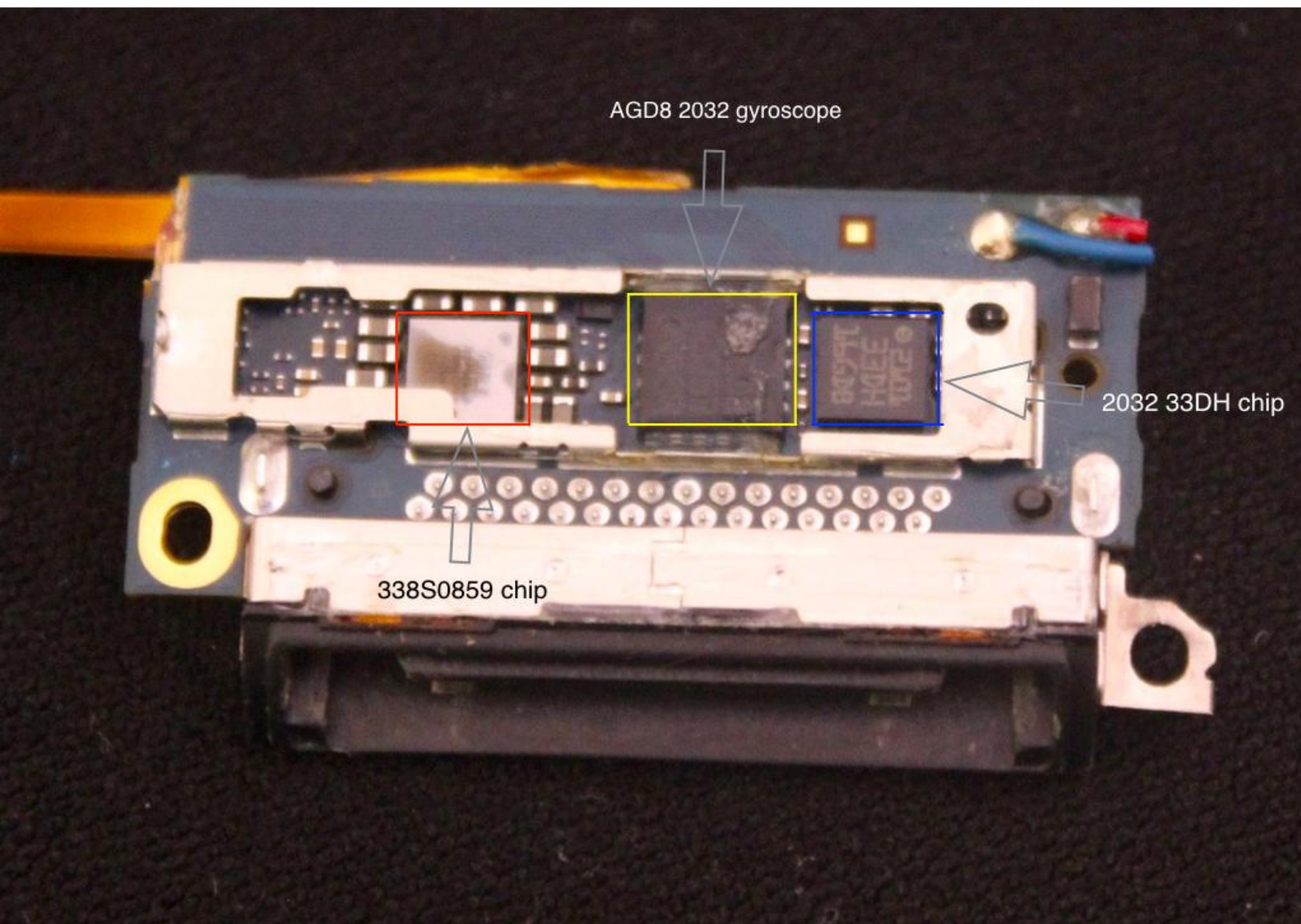
***Its use***– The flash memory chip created by Toshiba is meant to erase data at 'block level'. This chip is really fascinating to us because this chip can erase data even if the device is powered off.

***Where else it can be found***– Mobile devices, camcorders, audiovisual systems, car navigation systems, servers. These are only a few of the many devices the NAND flash memory chip.

## **- Wifi and Bluetooth Chip**

***Its use***– This chip helps with wifi and bluetooth connection.

***Where else it can be found***– Any device that needs wifi or has a bluetooth connection.



Here you see the bottom half of the Logic board. Here you see the 338S0859 chip, AGD8 2032 gyroscope and the 2032 33DH chip.

# ***Chips Inside The Logic Board (bottom portion)***

## **- 338S0859 chip**

***Its use***– This chip is used for audio in the iPod. This chip is similar to the Cirrus Logic chip in the iPhone 4.

***Where else it can be found***– As of now the only devices this chip can be found in is the iPod 4.

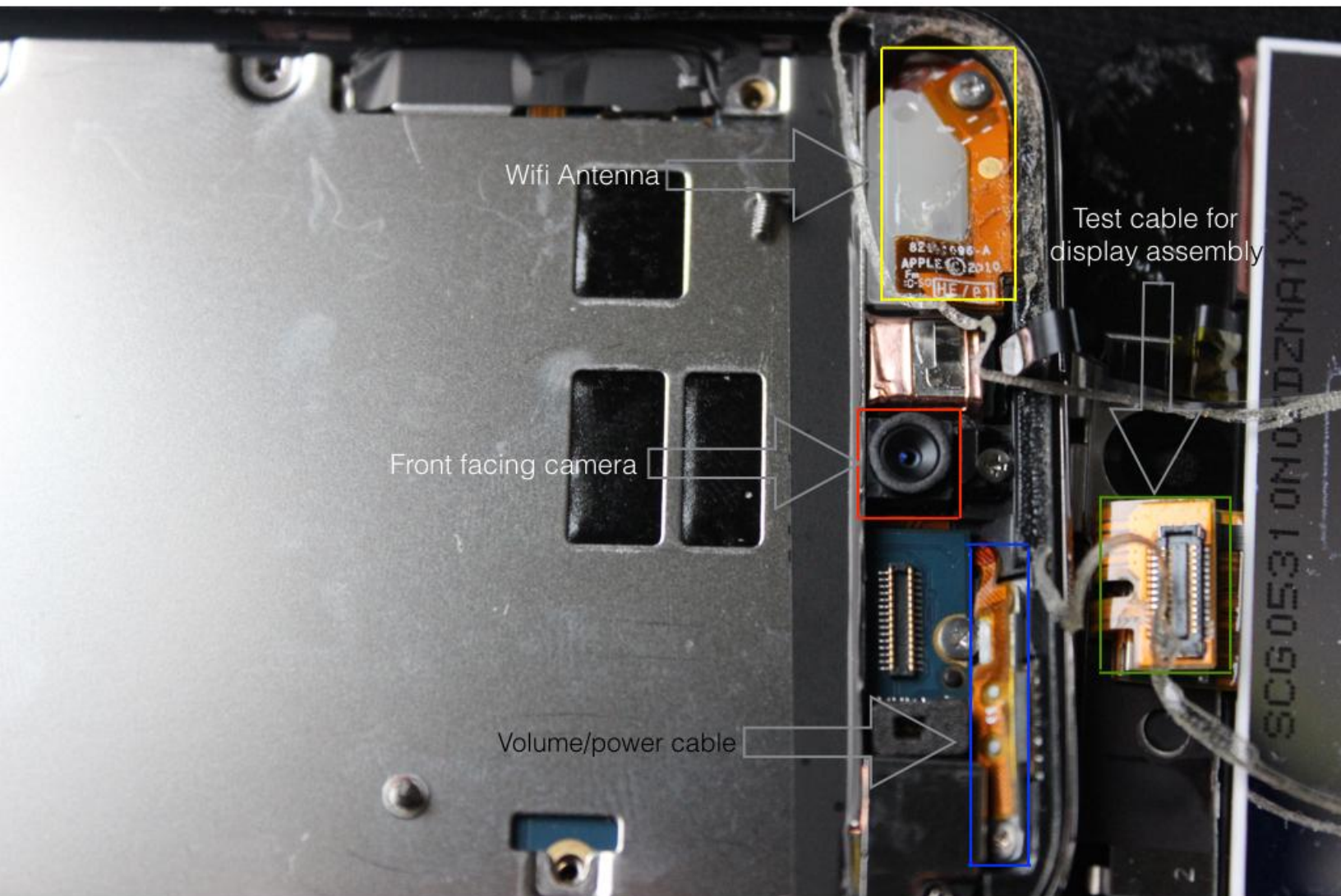
## **- AGD8 2032 Gyroscope**

***Its use***– This gyroscope is a vibrational gyroscope, also a 3-axis gyroscope. This gyroscope uses the earth's gravitational pull to determine its orientation.

***Where else it can be found***– This type of gyroscope is commonly used in smartphones.

## **- 2032 33DH chip**

***Its use***– It is an Accelerometer ic for screen rotation.



Here you can see the numerous sensors that play an important role in the device.

# ***Chips Which Play An Important Role In The iPod***

## ***- Wifi Antenna***

***Its use***– The wifi antenna is used to to get wifi reception. There is also a white block under the antenna in order for the antenna to stay above the lower metal housing to achieve proper RF gain.

***Where else it can be found***– Any devices that connect to wifi have a wifi antenna.

## ***- Front Facing Camera ( VGA 720p)***

***Its use***– This is a significant feature because the generation iPod (3rd generation) before the 4th generation didn't have any cameras.

***Where else it can be found***– Most devices nowadays have front facing camera but this camera is found in the ipad. The iPhone 4 has a similar camera but with higher resolution.

## ***- Test Cable For Display Assembly***

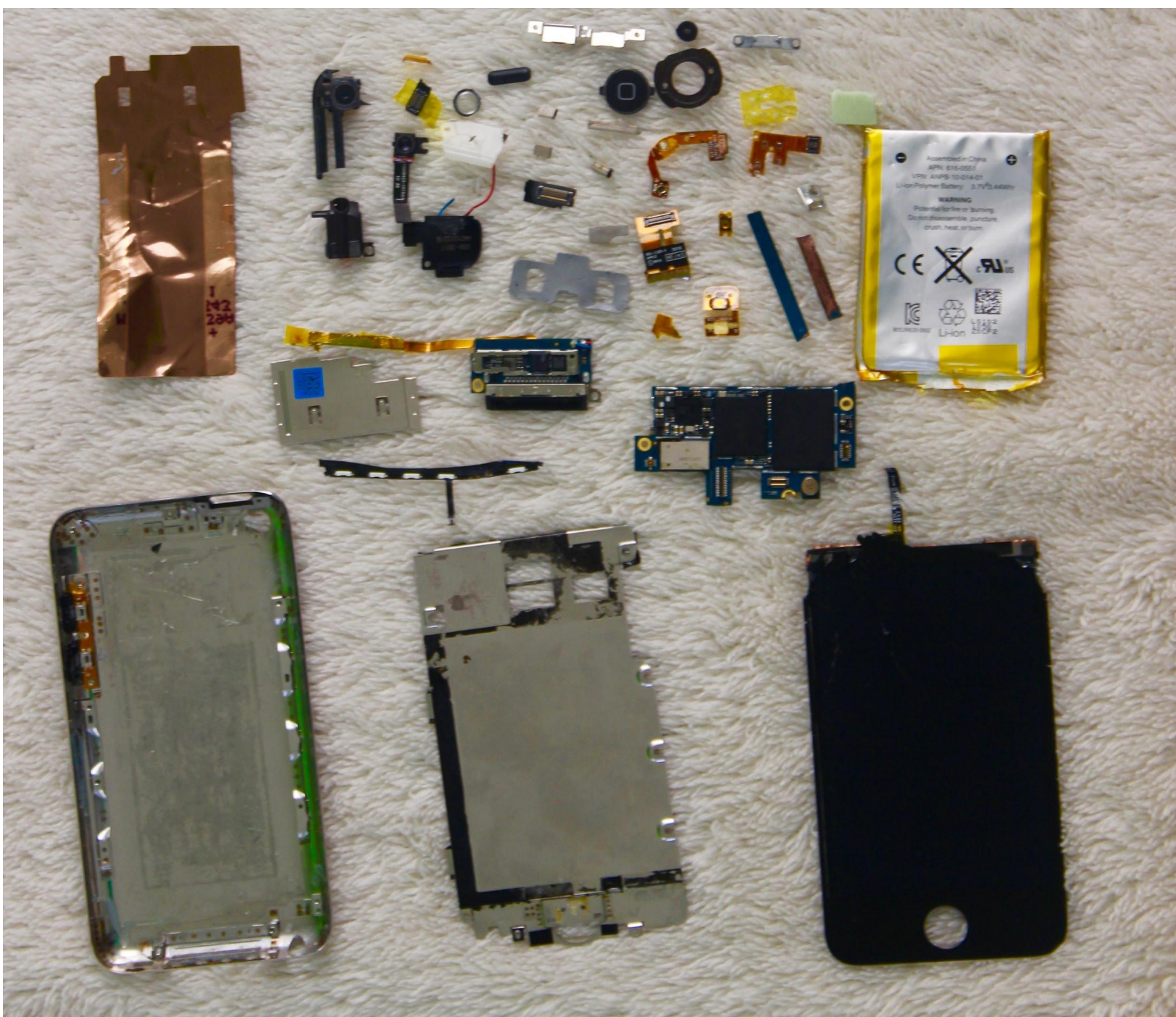
***Its use***– This cable is very efficient in testing out the LCD display and other without damaging any other cables.

***Where else it can be found***– This cable is in any devices which have a LCD display. This is mostly used in smartphones.

## ***- Volume/Power Cable***

***Its use***– This cable is connected to both the volume buttons and the power button and helps those buttons function.

***Where else it can be found***– This cable once again is found in mostly Apple devices. Other phones can have 2 separate cables, one for the power button and one for the volume buttons.



This is a picture of all the components from the iPod

# ***Our Difficulties***

**Our first difficulty was that there were no screws visible on the outside of the iPod. Unfortunately, we did not have a heat gun to soften the adhesive holding the display assembly in place. So, we had to work around the object. We had to take apart the screen from the back portion of the iPod. It took a little bit of effort to take off the screen but we eventually got it. Once we opened the screen we realized the thing that was giving us the most problem was the glue that was meant to keep it together. Most Apple devices nowadays have screws on the outside, and if the iPod had screws on it, on the outside, it would have been much easier to take it apart.**

**Inside the iPod there was a metal casing to protect the battery and other sensors. We took out the screws on the casing and on the sensors. There were a lot of screws and effort taken into taking off the casing. Once the case was off we were exposed to the battery and more sensors and circuits. A difficulty we faced here is was taking off the casing. We saw pictures of the Ipod at that stage and the metal bar that connected both sides of the logic board was stuck to the metal casing. We eventually had to cut the metal bar.**

**Another difficulty we faced was taking off the plastic casing around the back of the iPod. This was difficult because the plastic was covering a lot of sensors as well as both parts of the logic board.**

**Although we ran into some difficulties, we managed to successfully deconstruct the iPod.**

## ***Conclusion***

**In conclusion, we learned a lot of new things. At first we thought that Apple made their own chips but after looking at the chips and researching them we realized Apple does not actually manufacture the iPod. We also learned about a lot of new chips and it was really intriguing learning about something that was so commonly used. Unfortunately, we were unable to find any Texas Instruments components inside the iPod. Overall this challenge was an amazing learning opportunity and a lot of fun.**

## ***Cited Sources***

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