Electronics Online Challenge Sponsored by Texas Instruments

Team 619B

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Parts List:

- LED display(which is cracked)
- Lithium-Ion battery(which is swollen)
- NFC Antenna
- 1 mechanical buttons
- 1 Potentiometer in form of the knob on the side of the watch
- Apple’s patented Taptic Engine
- Apples’ patented Heart Rate Sensor
- A PCB that serves as the devices Motherboard
- Accelerometer
- Gyroscope
- Barometer
- A coiled wiring with a neodymium magnet in the middle

Fig-1(The dismantled Apple Watch with all the components we found, excluding the wiring.)

For this challenge our team while brainstorming for ideas decided on working on the Apple Watch, because we recognized the technology of the Apple Watch is both relatively overshadowed by the Iphone's popularity and it is also response to global digital revolution, while watches are by itself products of another technological revolution, the Renaissance, timekeeping devices have been in human civilization since the egyptians first used obelisk structures as the first sundials. So it just happens that the Apple Watch carries both a heavy history and interesting technology. The team had also acknowledged the necessity of the technology in revolutionizing personal appliances. We also used a product which was already broken, so that we recycle the parts instead of throwing it away. Which we will then contact a local company for it to be sent to their proper recycling stations. We also took the necessary precaution when working with the product because of its swollen battery, and then disposed of it properly at our local pharmacy.

Due to the Covid-19 related complications most of the work had to be done through online means, mostly through Discord video calls, and the parts were passed by the members of the team through mail, So as everyone would have a chance to experience and contribute to the project. See Fig-2 for more information.

Fig-2(This is one of our team members working on the challenge through a video call.)

The Components of the Apple Watch that the team identified are all shown in Fig-1. The first component which we took apart was the LED display which was positioned on the top of the device, and it serves mainly to of course display information, but it also serves as input as the screen is touchscreen. The screen is divided in two parts, the electronically part with the small light emitting diodes and a cover with a contrast that allows the image to be “decrypted” for our eyes. Additionally it is connected through ribbon cable.

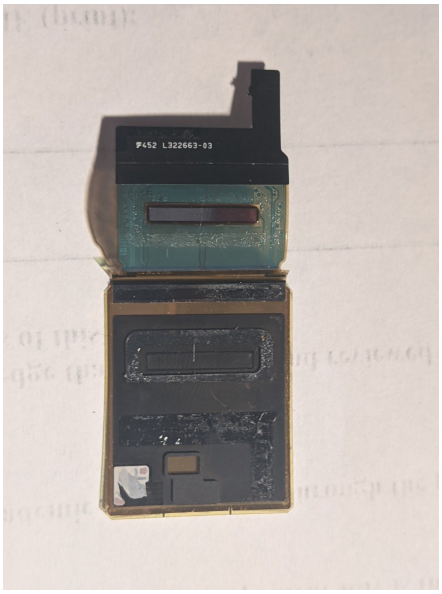

Fig-3(The back of the LED display and the cable connection from it.)

Next we have to take out some cabling and we can see the battery in its slot and then 1 mechanical button, and a potentiometer that serve as inputs to the small computer inside the Watch. The battery is a Lithium-Ion battery that serves to story energy for the Watch.

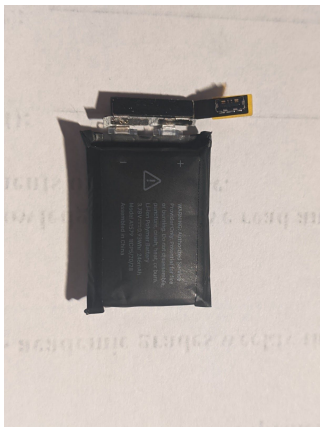

Fig-4(The Lithium-Ion battery, swollen and the reason why the watch stopped working.)

Next we could see A plate which is used to distribute heat away from the motherboard and a the motherboard itself which is the part where the computing happens and information is stored.

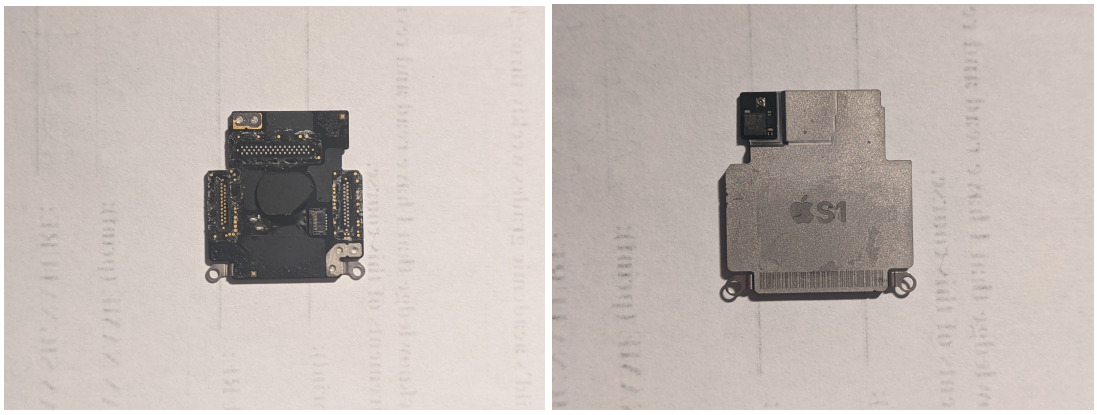

Fig-5,6(The back and fron