

Texas Instruments Electronics Online Challenge
Sony Cybershot DSC-W310



RYERSON RAMS ROBOTICS

Kalp Shah, Kevin Kai Ye

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INTRODUCTION

The electronic device used for this challenge was the Sony CyberShot DSC-W310. The DSC-W310 is a small yet versatile digital camera with a variety of features. The camera seamlessly encompasses diverse technologically advanced features such as a wide angle zoom, digital image stabilization and an LCD screen, while maintaining a reasonable price point. As for the device itself, the primary deciding factor was collectively chosen to be a mix of functionality and variety of components. For this challenge, we wanted to use a device which contains a unique collection of mechanical and digital parts. Mechanical parts are implemented through its intricate lens design, as well as digital components such as the LCD and various microchips found within the device.



Figure 1: Sony CyberShot DSC-W310

DISASSEMBLY



Step 0

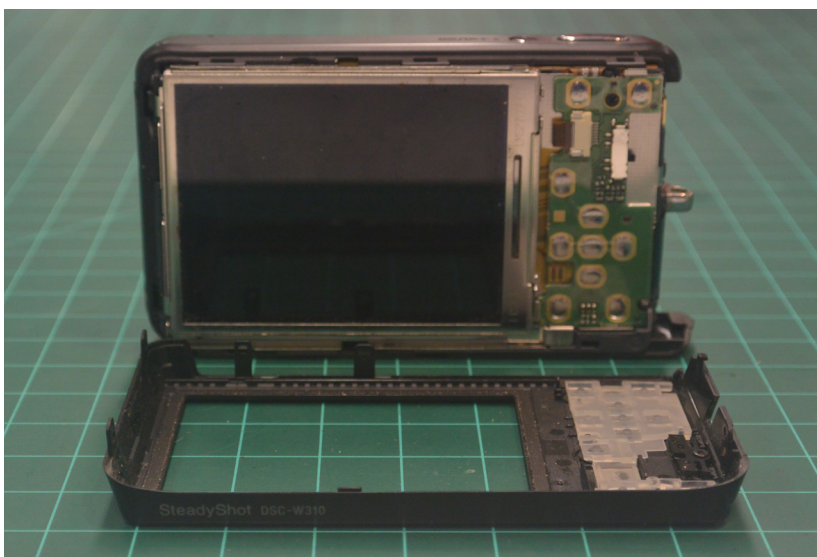
Sony CyberShot DSC-W310

- 12.1 Megapixels
- 4x Optical Zoom



Step 1

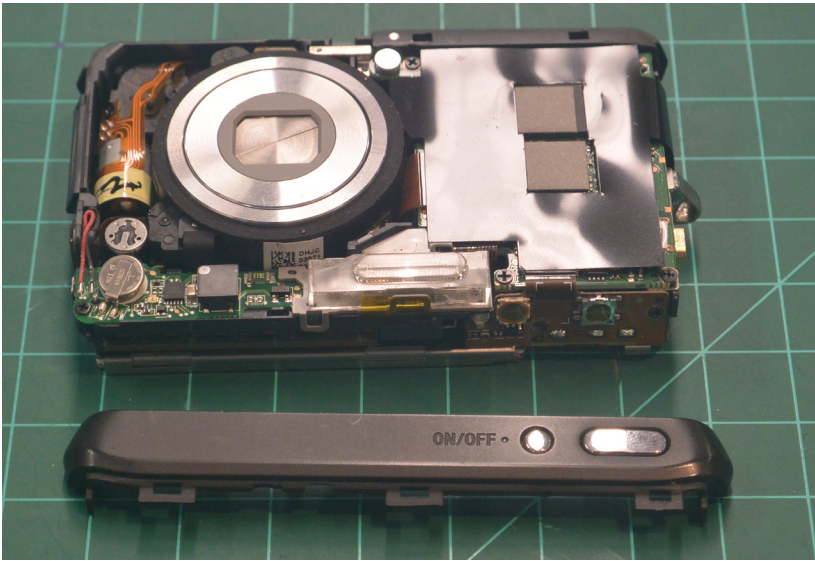
- side panel unscrewed
- side panel removed
- front panel removed



Step 2

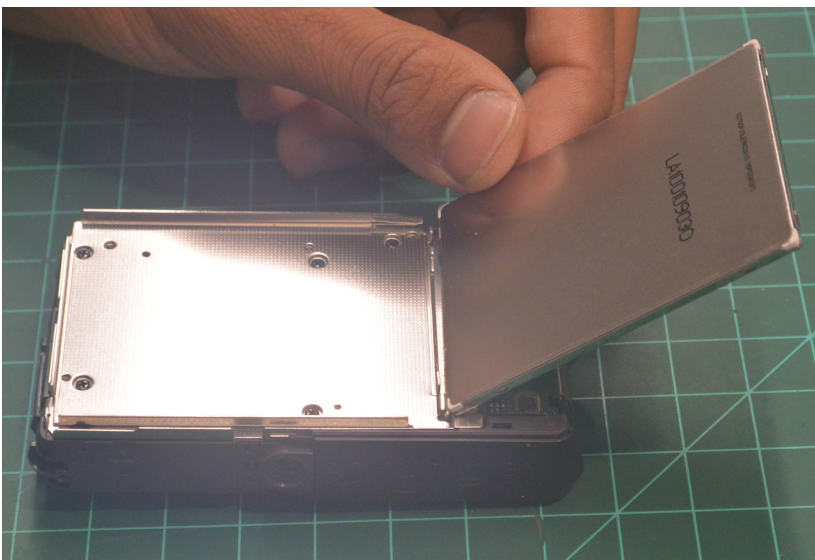
- back panel removed

DISASSEMBLY



Step 3

- top panel removed



Step 4

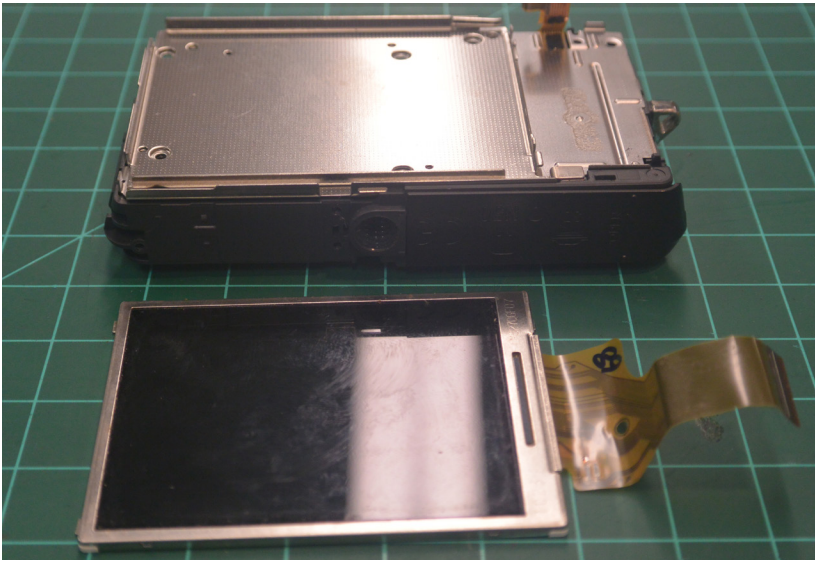
- LCD screen detached



Step 5

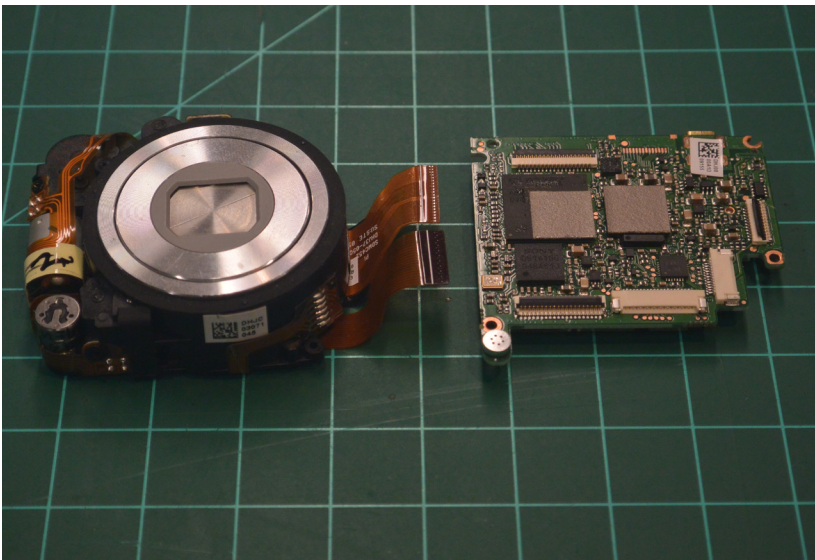
- button interface removed

DISASSEMBLY



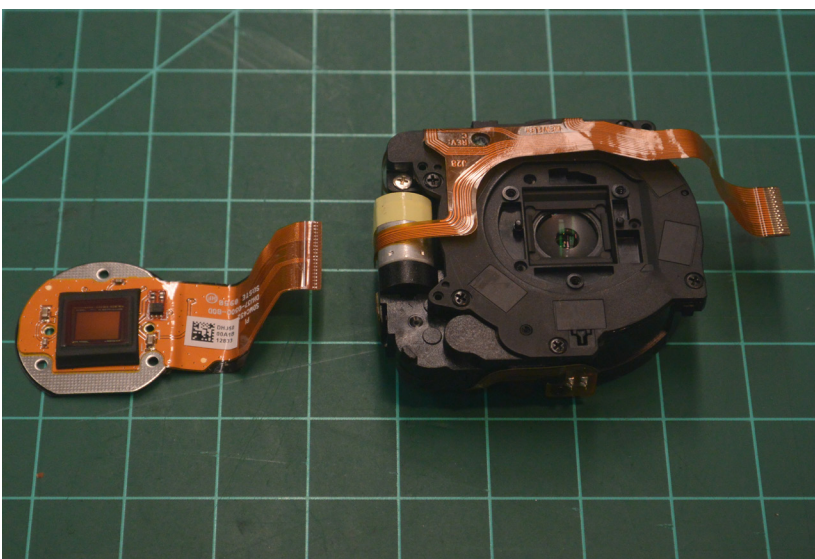
Step 6

- LCD panel removed



Step 7

- lens assembly separated
- mainboard separated



Step 8

- lens separated
- image sensor separated

CLOSE-UPS

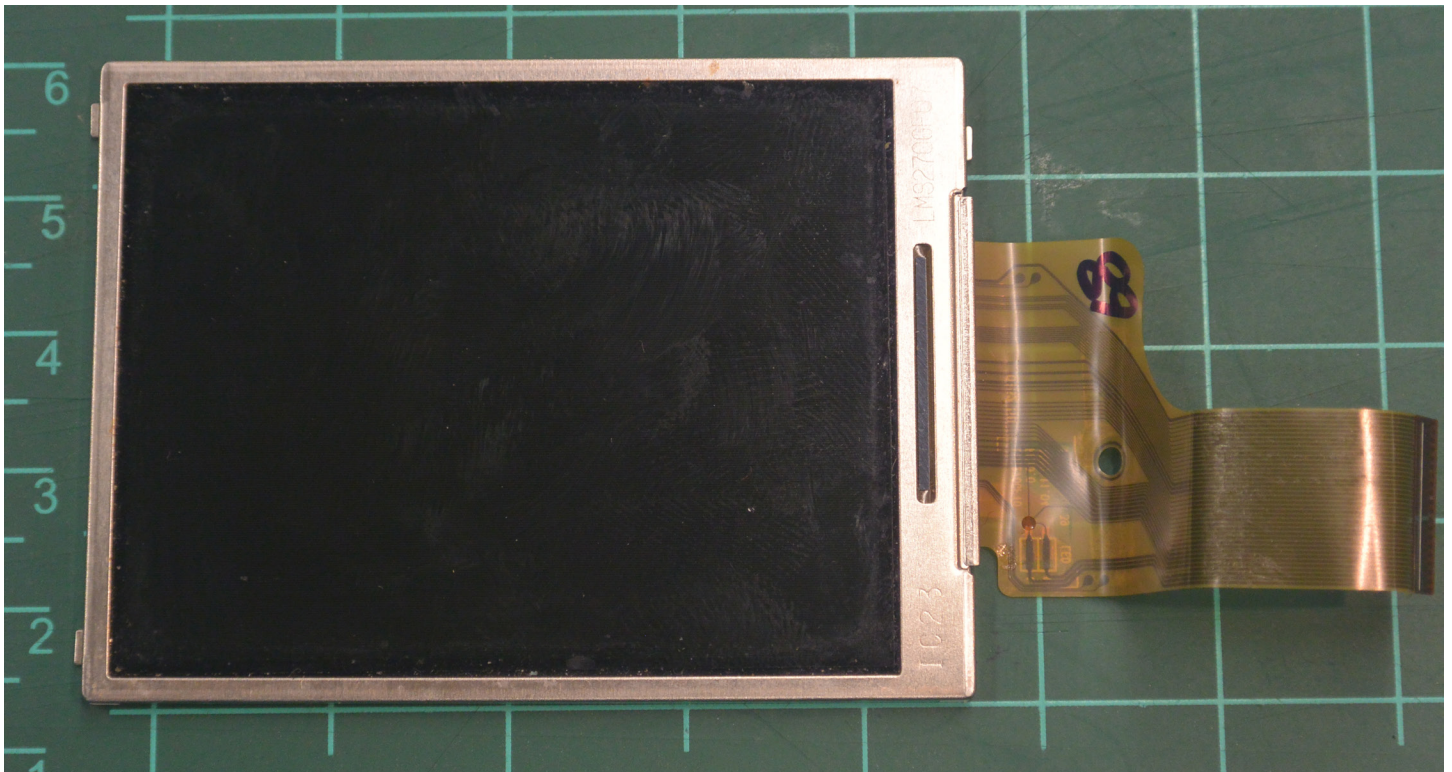


Figure 2: LCD Panel

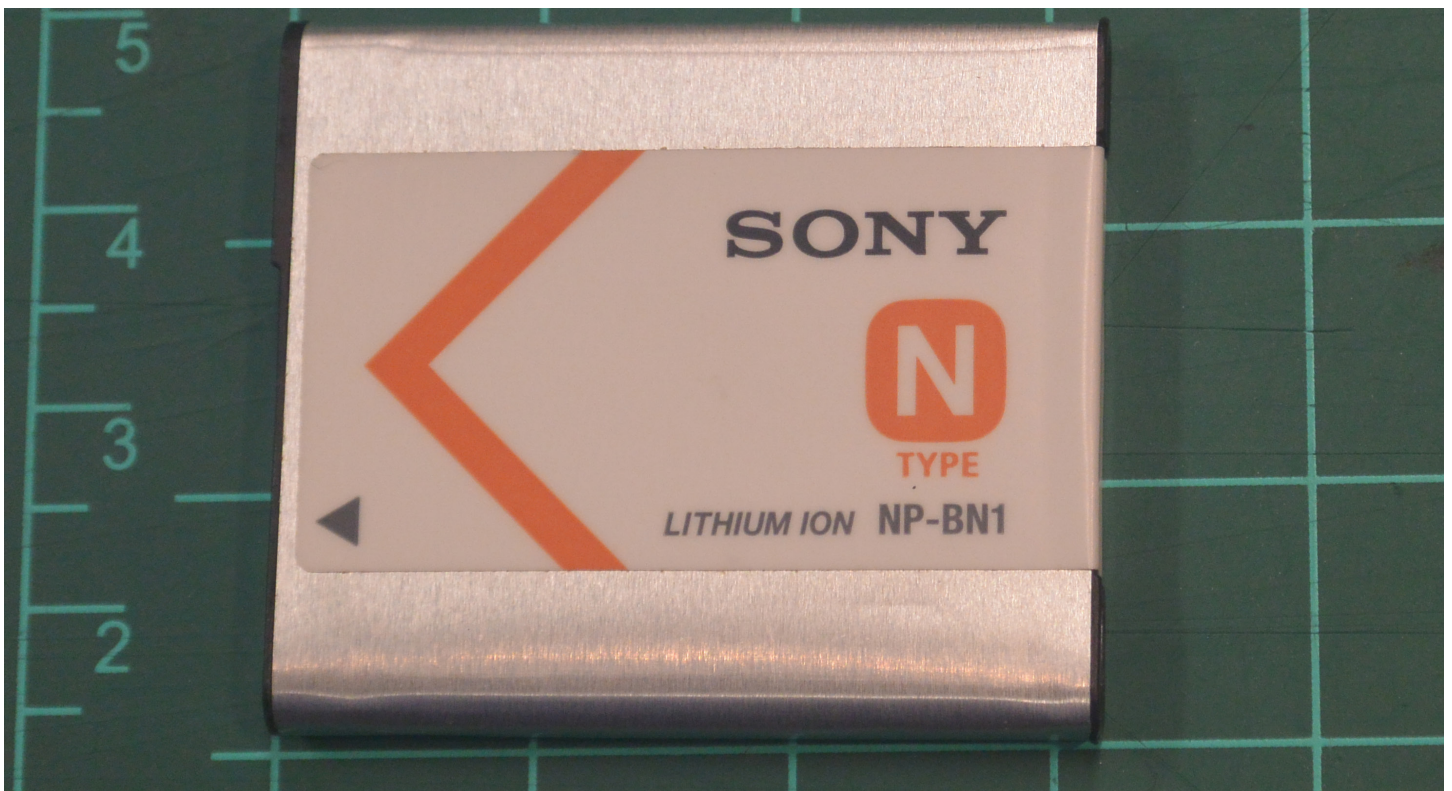


Figure 3: Battery

CLOSE-UPS

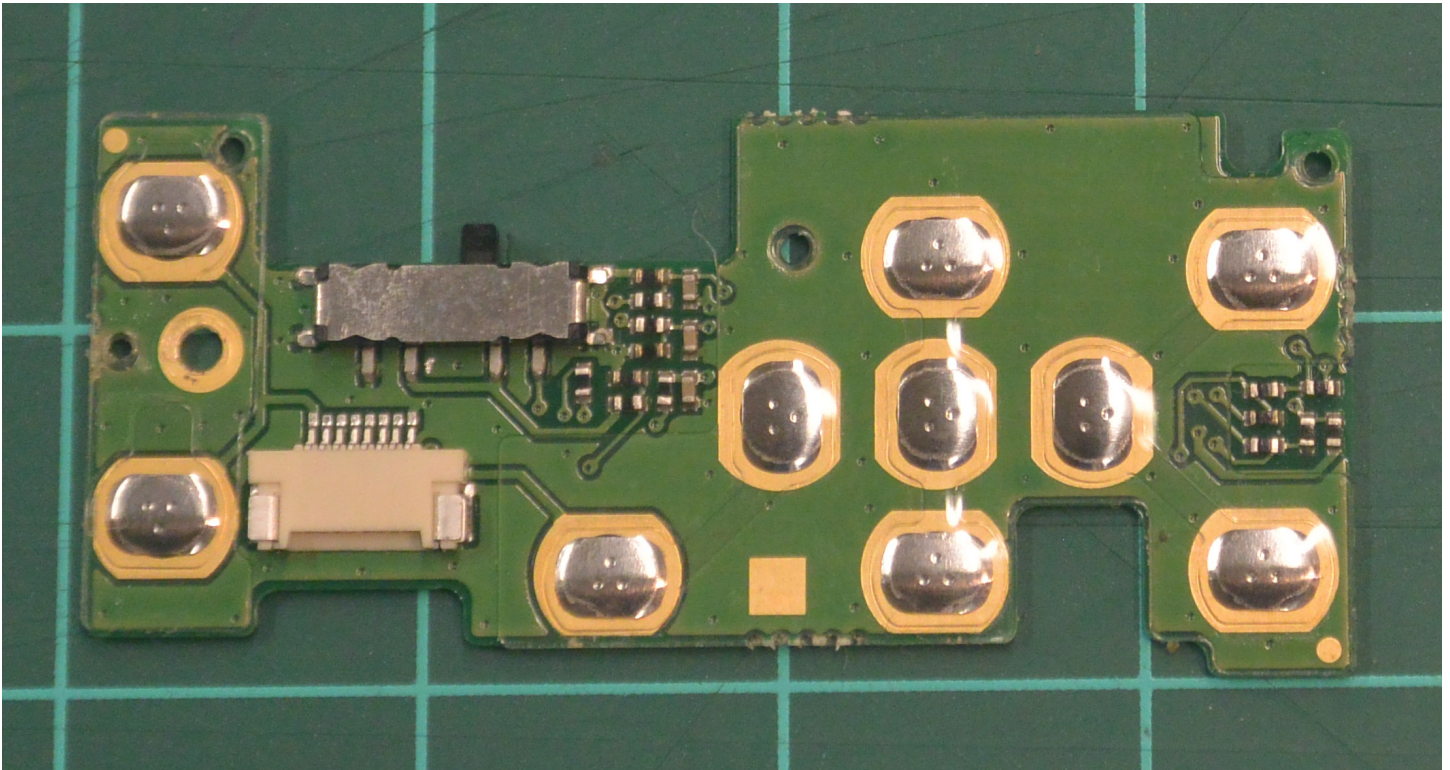


Figure 4: Button battery interface

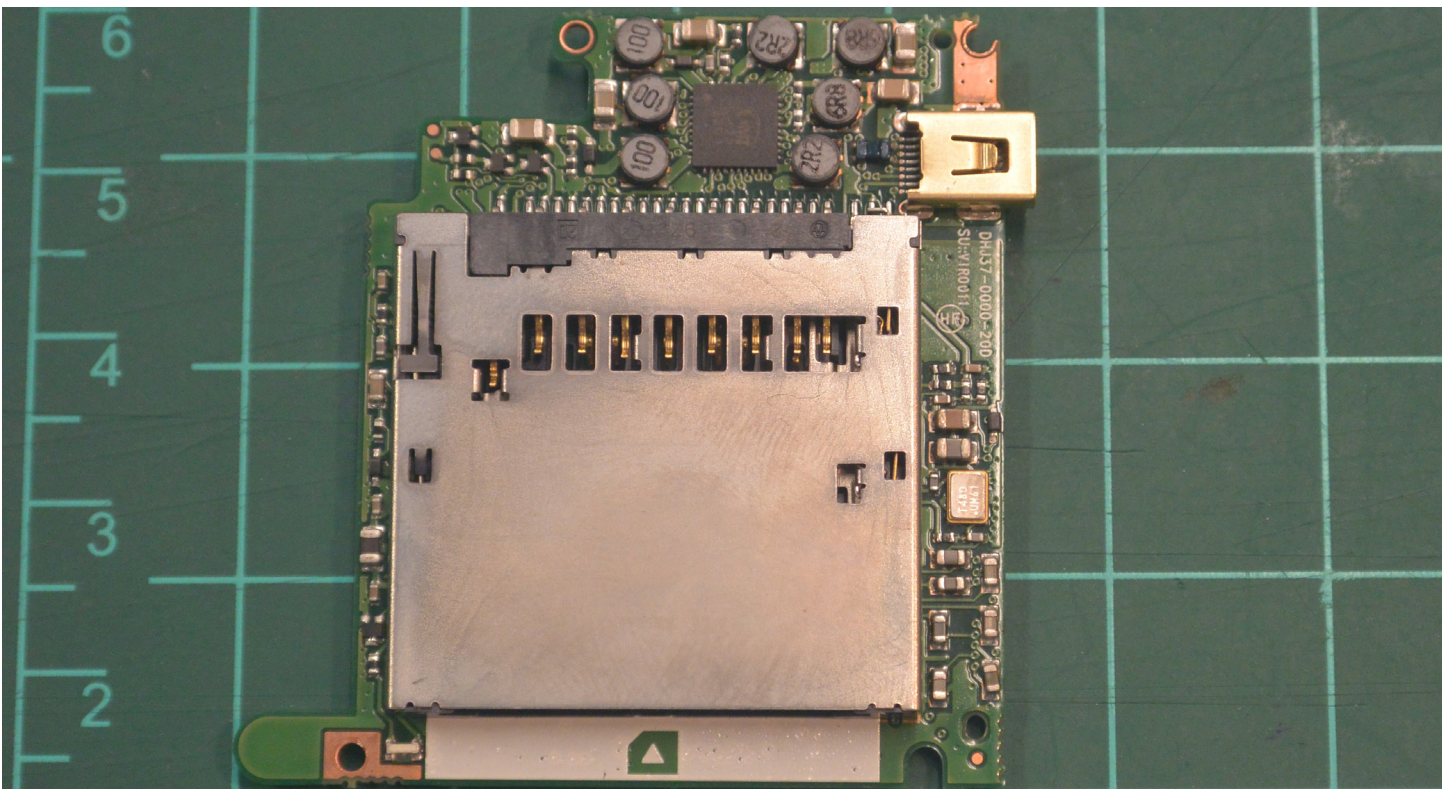


Figure 5: SD card reader, mini USB board

CLOSE-UPS

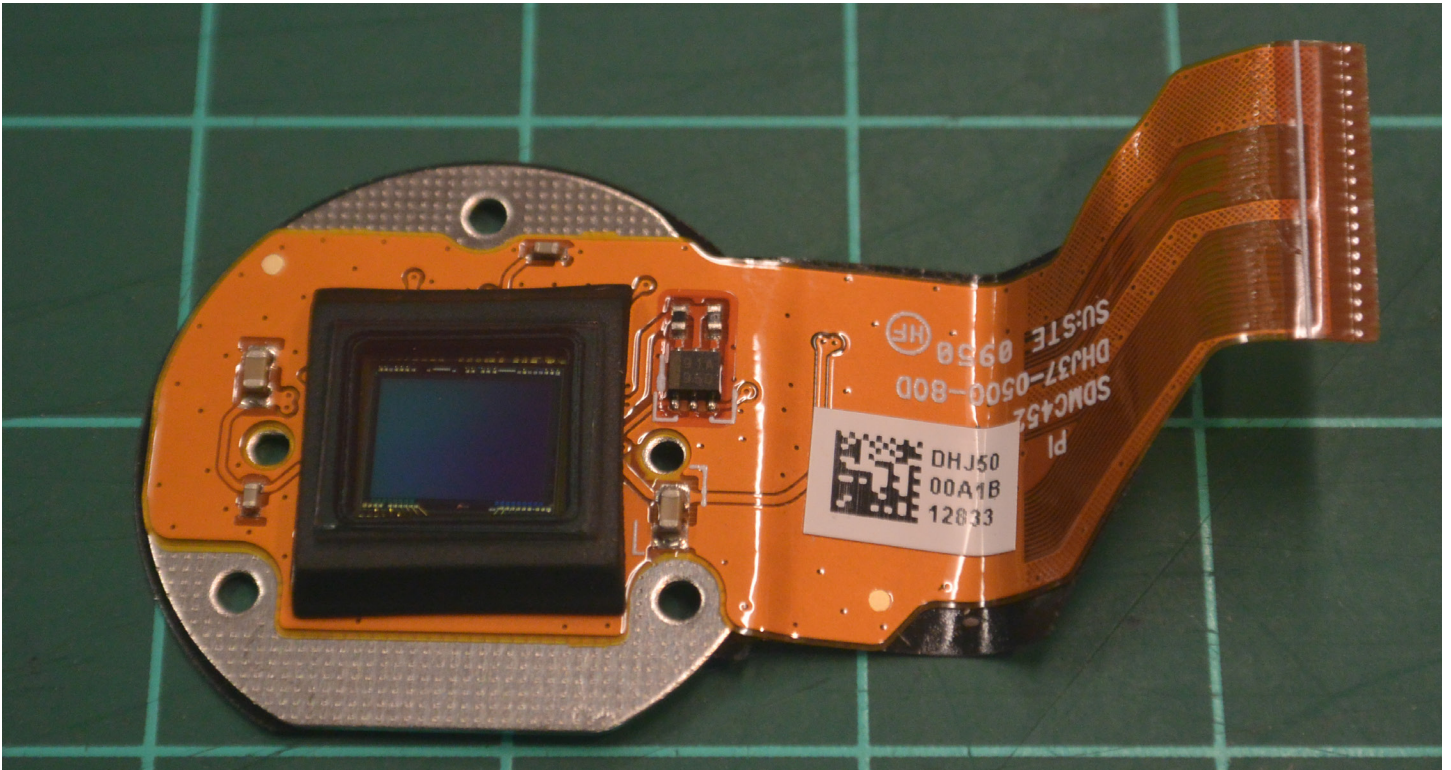


Figure 6: Image Sensor

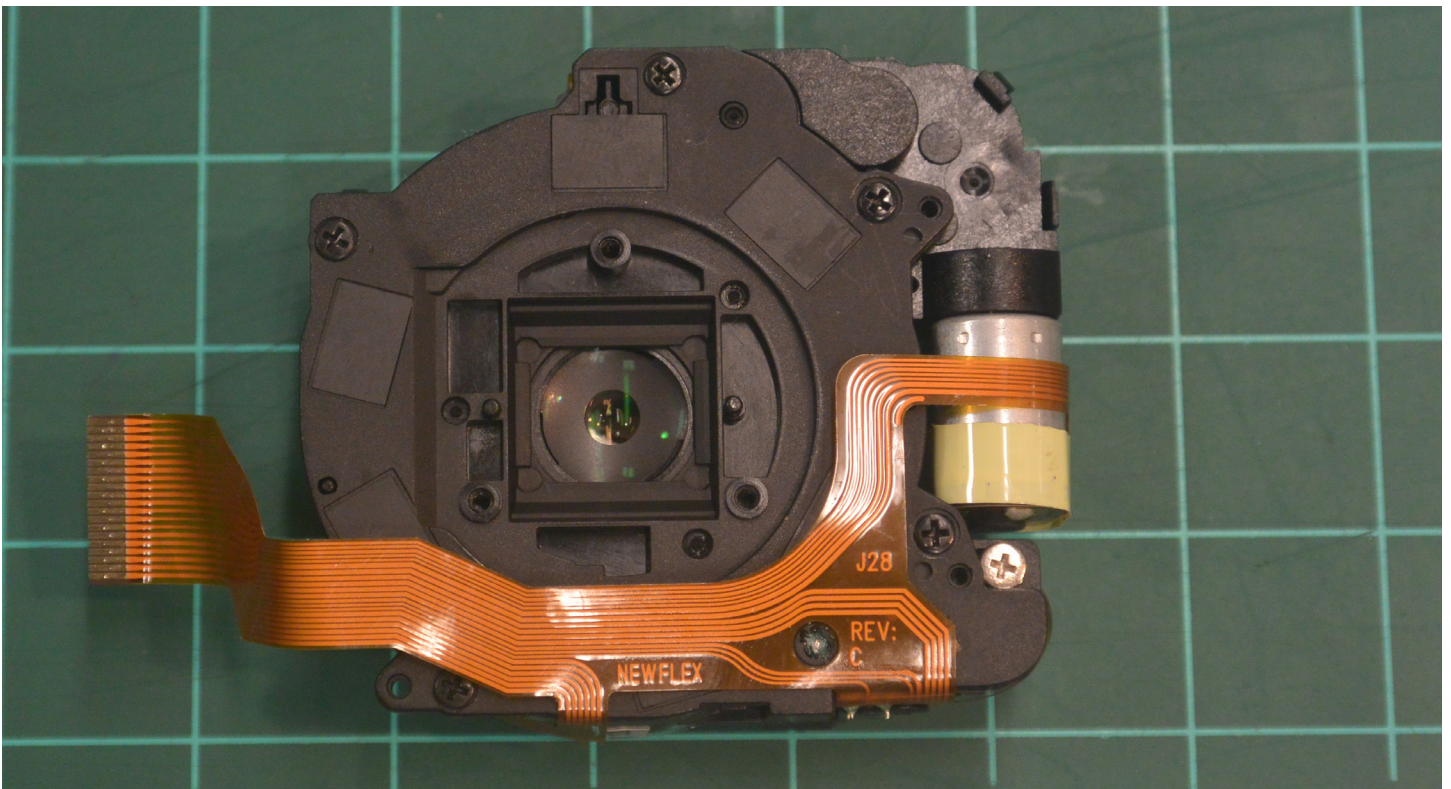


Figure 7: Lens

SUMMARY OF COMPONENTS



Figure 8: Layout of disassembled components

1. Side panel
2. Front panel
3. Back panel
4. Top panel
5. LCD screen
6. Button interface
7. Mini USB board
8. SD card reader
9. Lens
10. Image sensor
11. Battery
12. Screws x21

RESEARCH

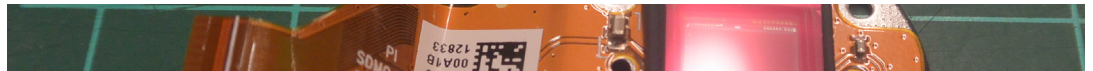
The components to be analyzed in the following report are following; Microchip, Image sensor, Lens, and Onboard Flash Memory.

MICROCHIP



The microchip is a vital part of any computer system, it combines all the functionalities of a CPU onto a miniature chip. This miniscule device is capable of providing basic computational and control functionalities and performs vital arithmetic and logic operations of data.

IMAGE SENSOR



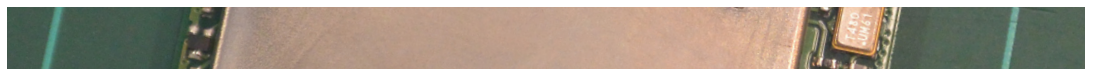
The image sensor plays an essential role in any camera system. It is responsible for converting light into the corresponding electronic signals. The image sensor used by the DSC-W310, is a charge coupled device (CCD). Once the sensor converts light into electrons, it is able to read the value of each cell in the image. The sensor then transports the charge across the chip and reads it at a corner of the array. An analog-to-digital converter then converts each pixel value into a digital value by measuring the amount of charge at each photosite and converting that measurement into binary form.

LENS



Lens are an indispensable part of any camera system. They play the important role of controlling the amount of light which reaches the image sensor surface. In order to precisely accomplish this task, the lens may control the Aperture, and Shutter Speed. The aperture implements the size of opening within the lens. This gives the camera fine control over the light contacting the image sensor. The shutter speed represents the amount of time light is allowed to pass through the aperture. This allows pictures to have the correct color while avoiding oversaturation. In tandem, these two factors work together to capture the optimal amount of light.

FLASH STORAGE



Flash storage plays a fundamental role in literally every digital device. Within a digital camera, Flash storage is used to store vital information regarding the operating system and various other functions. Specifically, the memory is referred to as EEPROM which stands for electrically erasable programmable read-only memory and is a type of non-volatile memory used in all electronic devices, to store small amounts of data.

CONCLUSION

In conclusion, this challenge is a great learning experience for students. It highlights the intricacies of common, everyday items. It also aids students in developing an inquisitive nature. An important skill for any career they may choose in the future.

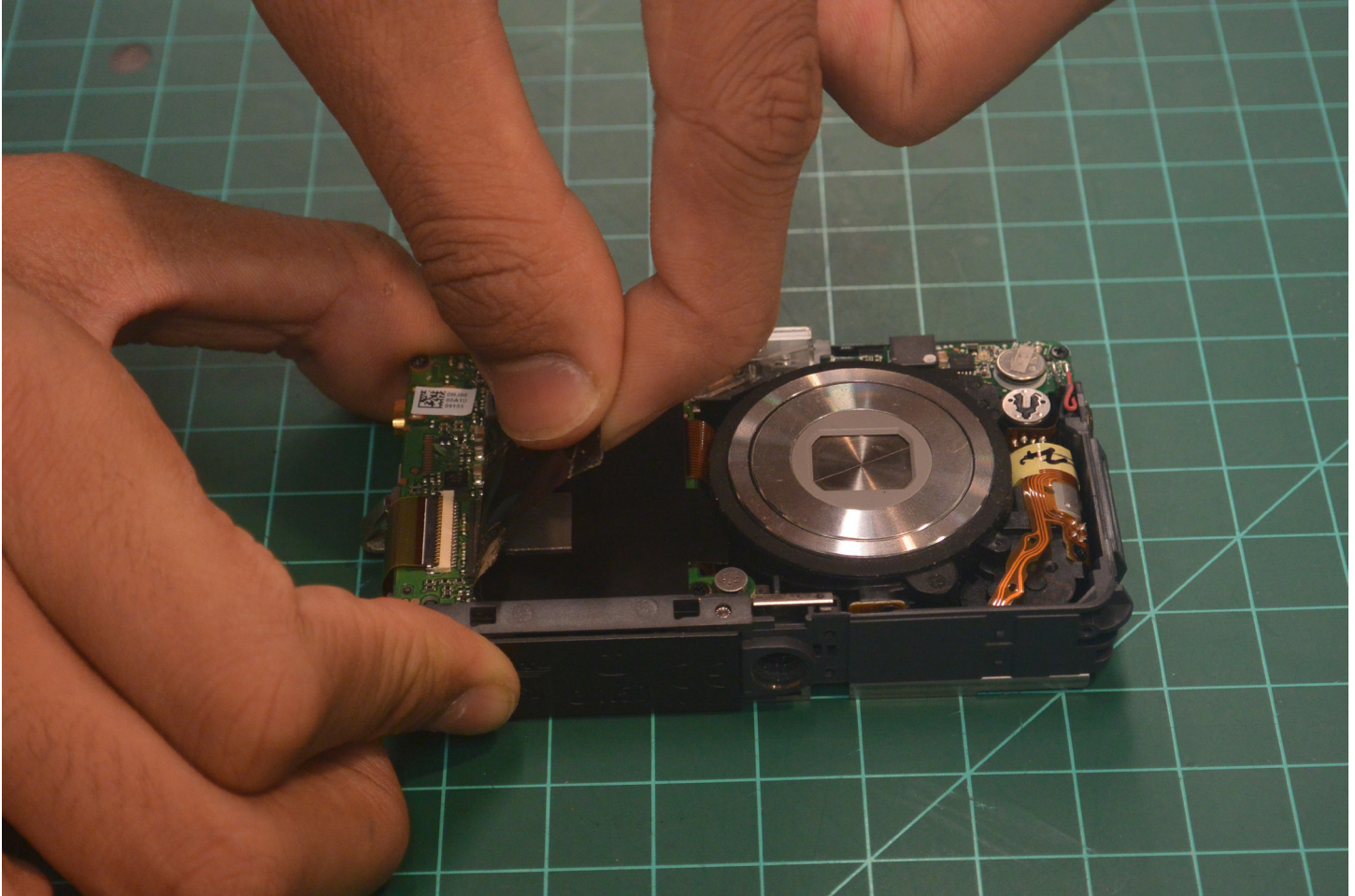


Figure 9: Struggles with the Sony CyberShot DSC-W310

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