



## **Electronics Online Challenge 2021**

### **Sony ES15 Camera Breakdown**

**By Highschool VRC Team:**

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## Introduction

We chose to disassemble the Samsung ES15 camera, a pocket sized camera over 10 years old. We chose this device as we wanted to understand the large range of electronic and physical components required for the single process of taking a photo as well as how it can be improved through the use of a flash and display. This is useful in considering and realising the use of different sensors and automated processes which could be used to improve our robot. Additionally we chose an older camera model to evaluate the development of technology, from an entire pocket sized device for only taking photos to 'pea-sized' camera modules with higher magnification and resolution in smartphones today.

## Overall Disassembly Process



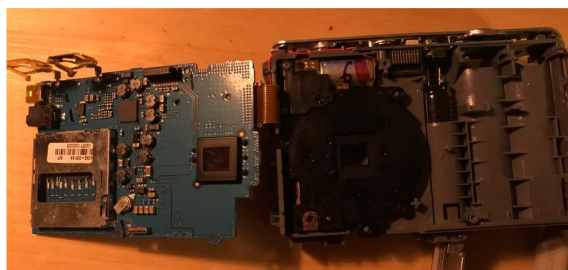
These are initial pictures of the camera, before we began deconstructing it.



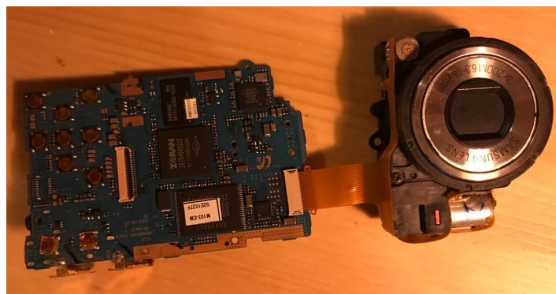
First we removed the casing on either to reveal the internal components, by unscrewing multiple silver screws.

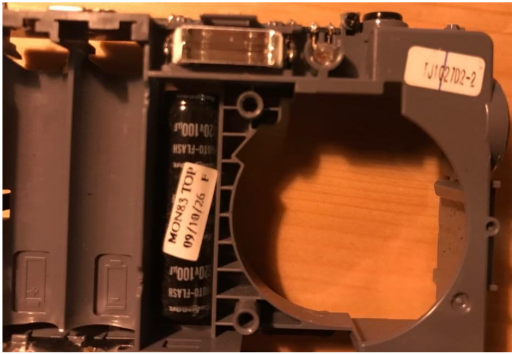
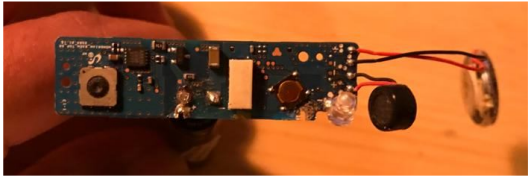


We then removed the display holder and disconnected the display to give better access to the PCB.

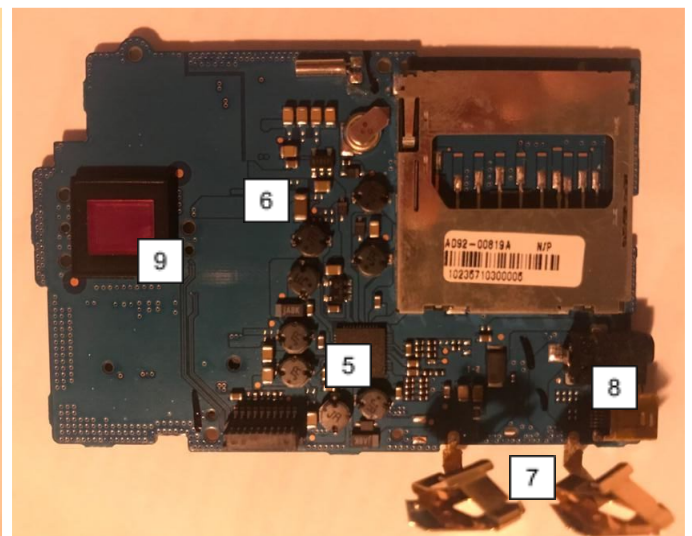
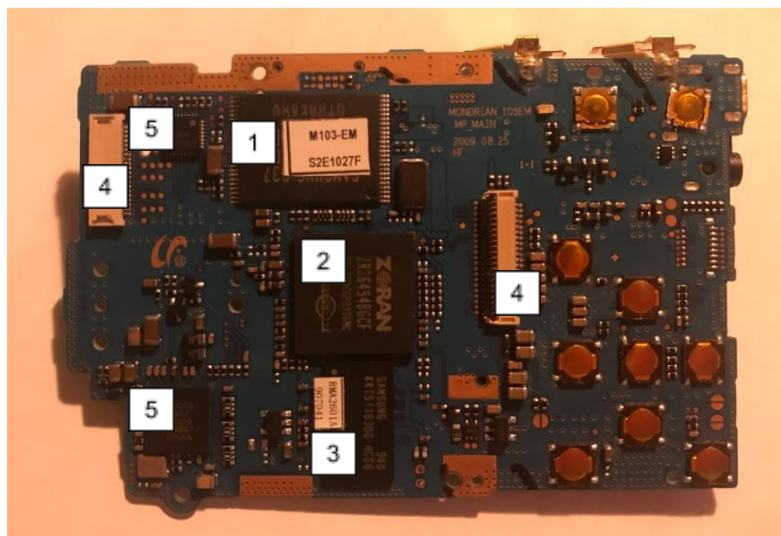


We then removed the PCB and camera module.



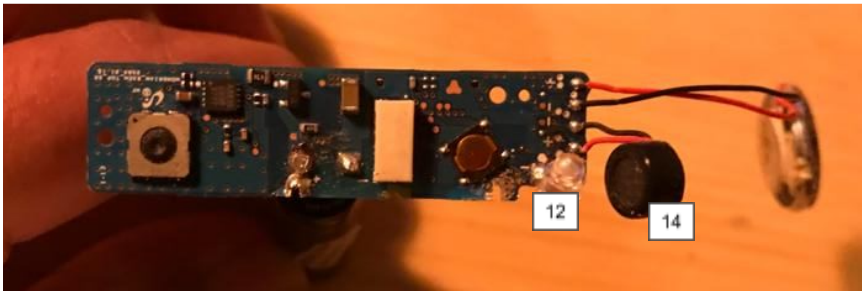
	<p>This revealed the internal casing and flash system, containing a photo flash capacitor.</p>
	<p>Finally, we removed the flash pcb.</p>

### PCB Component Analysis



1. Samsung K9F5608U0D - 32M x 8 Bit NAND Flash Memory
  - NAND is the most common form of flash memory and is non volatile, meaning it stores memory even when turned off.
2. Zoran IC Chip
  - An integrated circuit chip is a versatile chip acting as a microprocessor or amplifier
3. Samsung 940 Ram Chip
  - An integral part of memory that allow implementation of random access memory in hardware
4. Connector Ports
  - Allows the connection of camera module and display

5. Another IC Chip
  - As there are multiple IC chips each would likely be in charge of separate functions
6. Capacitors
  - A component which stores electrical energy, 'condensing' it. These can be dangerous and should be discharged before dealt with
7. Battery Terminals
  - Allow the transfer of energy from the AA batteries used to power the camera
8. Micro USB Port
  - Allows the use of a micro-usb cable to connect the camera to a computer to move photos
9. Camera Sensor
  - Sensor which captures light rays and converts it into signals, which allow an image to be formed and displayed on the screen



10. Rubycon Photo Flash Capacitor
  - Used to store large amounts of energy that can be released quickly to power an LED for a bright camera flash
11. Display
  - Allows photos to be viewed by a user on the camera itself and interact with different options to edit photos in GUI
12. LED
  - This is lit when the flash capacitor releases energy, and is amplified by a mirror prism to achieve a flash when taking a photo
13. Speaker Module
  - This allows for video sound playback and notification of when a picture has been taken
14. Microphone
  - This allows videos to be recorded with sound

## **Conclusion**

Overall, we learnt a lot about the use of different chips and PCB components in producing a functioning camera. This opened our eyes to the complexity of electronic products and the specific requirements of a system, from generic components like microphones and speakers to highly specific components like camera sensors, to achieve a certain function. As a result we will give greater and more careful thought to our use of sensors and physical mechanisms when designing our robot for driving and autonomous.

Wordcount: 496

## **Citations**

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