



Team 95070E: Reverse Engineering Challenge



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Why We Chose This Item

The item which we deconstructed was a Sony MHS-TS20, also known as the Sony Bloggie. It is used to take pictures and videos, but cannot carry out many actions of a cell phone, despite the physical resemblance to a telephone.

We chose this item because we wanted a device that reflected the foundation of the modern technology we use daily, and since cameras are one of the most used electronic devices, we felt that it was fitting. Cameras are incorporated in so many pieces of technology, from phones to laptops, and even surgical robots.

In addition, while the Bloggie may not have cellular capabilities like a modern phone, it possesses a camera and touchscreen that have a similar build to today's.

Team 95070E presents to you our reverse engineering project!



A Sony Bloggie, seen from the back and front respectively.

Daily Logs



Day 1 - 12/18/2021

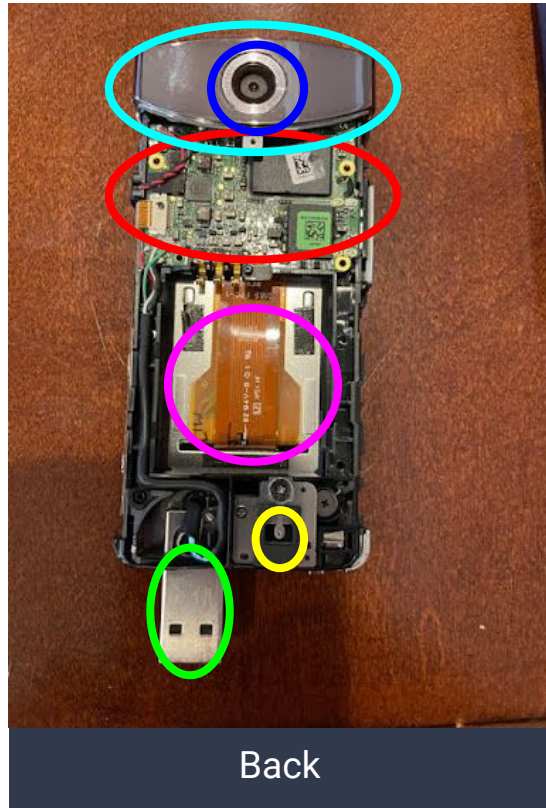


We started off just researching the Sony Bloggie, and we decided that the best thing to do was to take out all of the structural components. The buttons are plastic and rubber. The screws and connectors were hard to take out because they were small, and it was difficult to remove them without any damage.

Components:

- Buttons
- Battery
- Back Frame
- Midframe
- Front Frame
- Screws and connectors

Day 2 - 12/20/2021

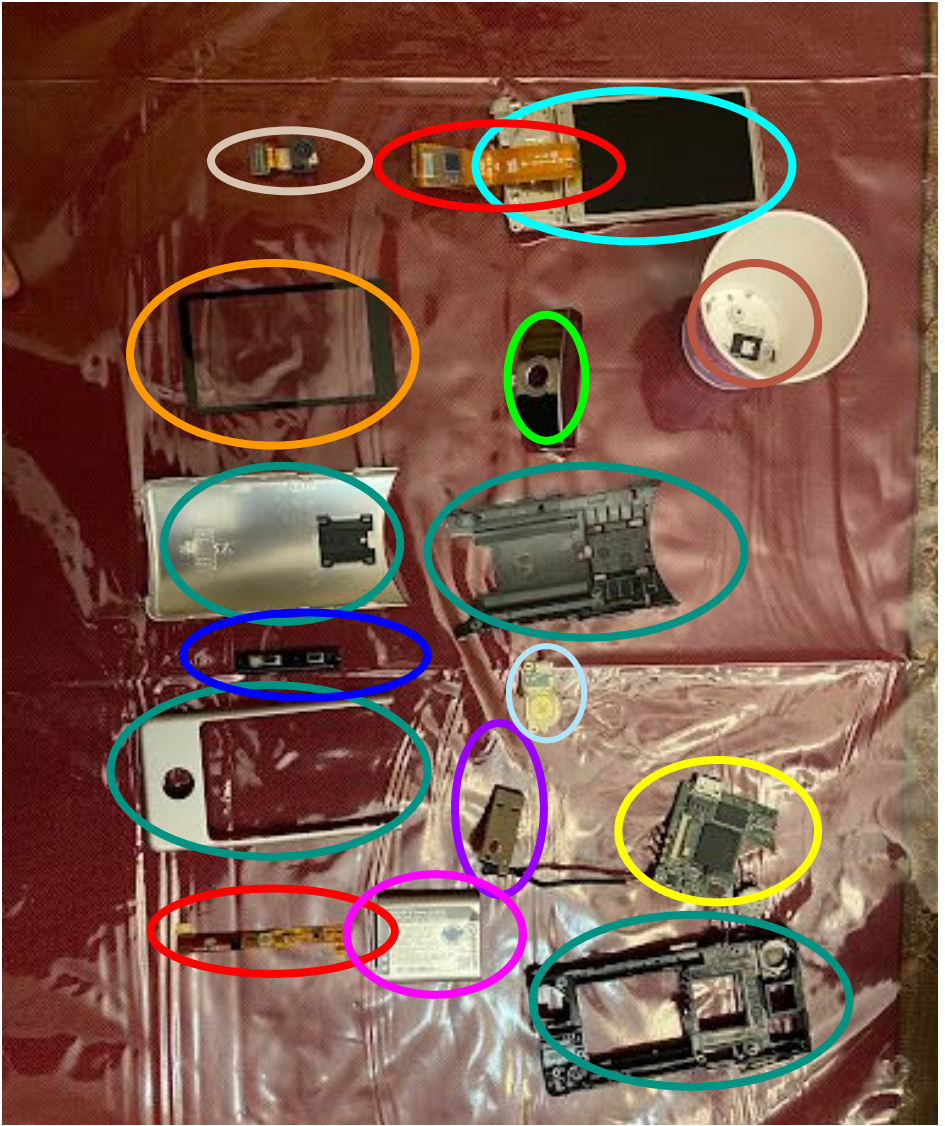


Most of the main electronics, including the motherboard, battery, and USB, have been uncovered, but none have been taken off yet. The camera, for example, is still hidden under the camera frame.

Components:

- Camera
- Camera Holder
- Motherboard
- Yellow ribbon wire/elbow connector (Flex Circuit)
- Touch Sensor
- USB
- Screen Protector (under it the **screen** can be seen)

Day 3 - 12/22/2021



The smaller flex circuit, screen protector, camera holder, touch sensor, motherboard, and USB have all been disconnected. The reverse engineering is done!

Components:

- Smaller Flex Circuits
- Miscellaneous
 - Screws and connectors
- Screen Protector
- Camera Holder
- Screen
- Motherboard - Disconnected
- USB - Disconnected
- Battery
- Frames
- Camera
- Side Buttons
- Touch sensor

Final Images



Final Images - Structure

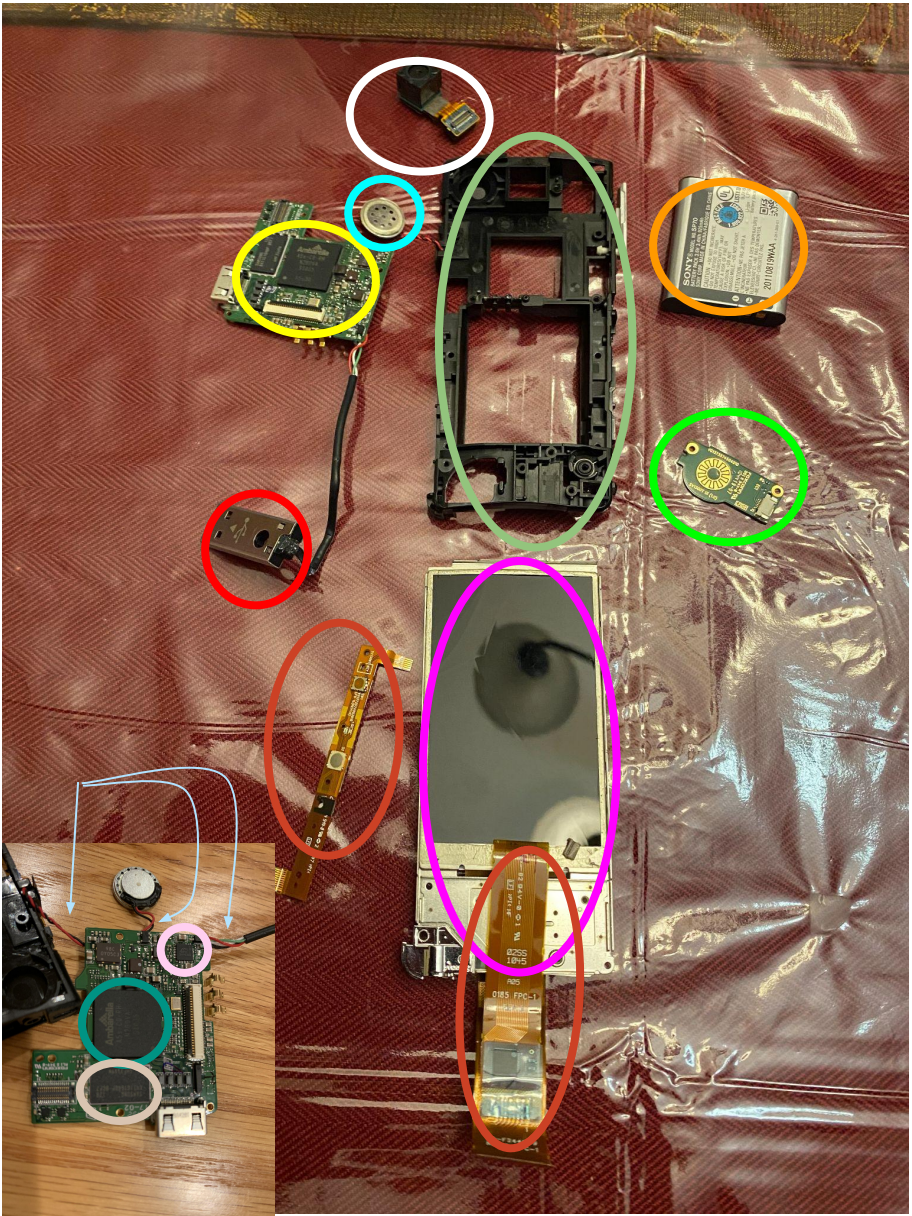


Structural Components

These parts essentially hold the device together, and act like a shell to protect it from damage. Without these key pieces, the Bloggie would be extremely fragile.

- Backframe
- Midframe
- Home Button
- Front Frame
- Camera Holder
- Screen Protector
- Side buttons

Final Images - Electric

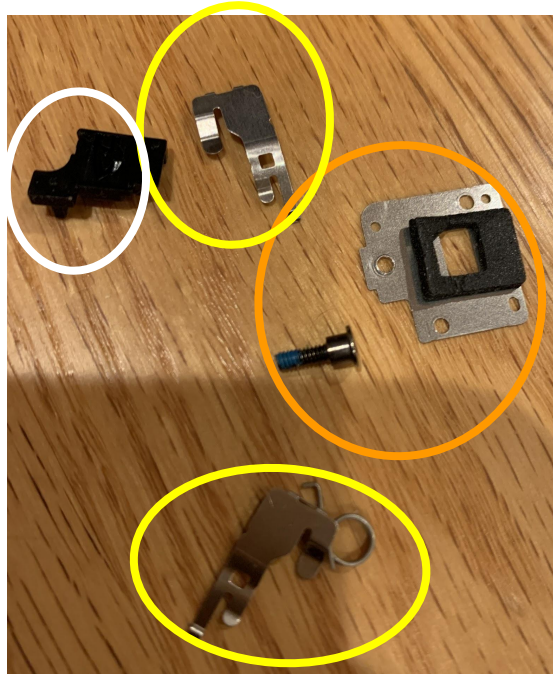


Electrical Components

These parts are what allow for the device to function. These parts provide, transfer, and use electricity for taking and storing photos. Specific values from certain sensors can cause other electrical components to activate or carry out functions:

- USB
- Camera
- Motherboard
 - Wire (look at the arrows)
 - Memory Card
 - Storage
 - CPU
- Battery
- Touch Sensor
- Microphone
- Screen
- Smaller Flex Circuits
- Midframe (Electrical)

Final Images - Misc.



Miscellaneous

The miscellaneous parts are mainly connectors and screws, which hold the structure and the electrical parts together so that they can both work together to create a successful final product:

- Screws
- Metal/styrofoam holders
- Metal Connectors
- Plastic Connectors

Parts List



Parts List & Function

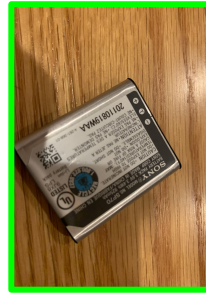
Buttons

- Buttons are simple mechanisms that **close an electrical circuit when pressed down**. They can tell the device to turn on or off or to exit an application.



Battery

- This system's power source is a **lithium-ion battery** which is a rechargeable type of battery that has two electrodes - the anode (negative) and the cathode (positive). **It provides electricity for the entire system**



Front Frame

- The front frame is a flexible metal plate that **holds the buttons, protects the electronic system on the side, and holds the screen**.



Back Frame

- The back frame is a metallic plate that **protects the motherboard, USB, camera, and microphone**. It is separated from the camera holder.



Parts List & Functions

Motherboard

- The motherboard is the **main part of the Bloggie** and is used to **store everything**. It **executes commands** given by the user through sensors or buttons. It **contains the memory card, USB, microphone, and CPU**. It also has a port where everything connects.



Flex Circuits

- Flex circuits are thin, flexible, flat orange wires. They **connect most of the essentials to the motherboard**.



Wire

- Regular wire is used to connect the microphone and the USB to the motherboard. In the photo to the right, the USB's wire is shown. **Data passes through these wires**.



Microphone

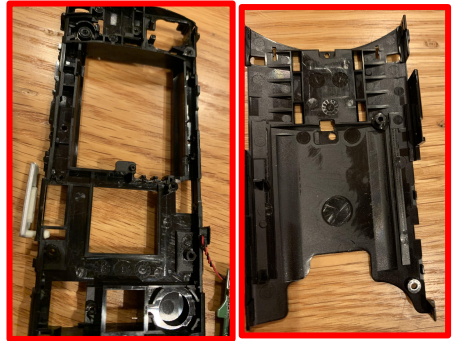
- The microphone is a metallic circular bit connected to the motherboard with a negative and positive wire. It **records sounds and sends that information to the motherboard**.



Parts List & Functions

Midframe

- The midframe is a black plastic case that **holds the electronics**. The motherboard is connected to this piece as well.



Screws/Connecters

- Screws and connectors **hold almost everything together**. There are different types of screws, mainly the flat screws and the pan screws.



Ribbon Wire

- The ribbon wire connects the **electronics to the motherboard by sending information to it**. It is one of the most important parts.



Camera

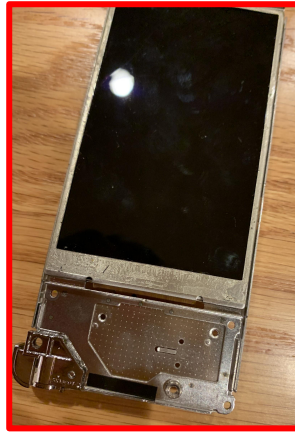
- The camera is a mechanism that **takes pictures and videos and sends them to the motherboard using flex circuits**. The camera is a block structure latched onto the flex connectors.



Parts List & Functions

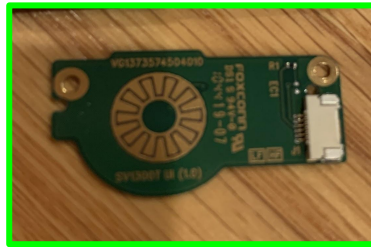
Screen

- The screen projects what you are taking, whether it be a picture or a video, visually. **It displays everything necessary for the user**, such as stored images and video recordings.



Touch Sensor

- The touch sensor is a green bit that is under the button and **senses when a user presses the button**. If pressed, it **sends a message to the motherboard** so that it executes a certain command.



Camera Holder

- The camera holder is a **protective metallic case** for the camera that has a lens that the camera can take pictures and videos through.



Screen Protector

- The screen protector is a clear flat plastic piece that **protects the screen from any damage** because the screen is fragile.



Parts List and Functions

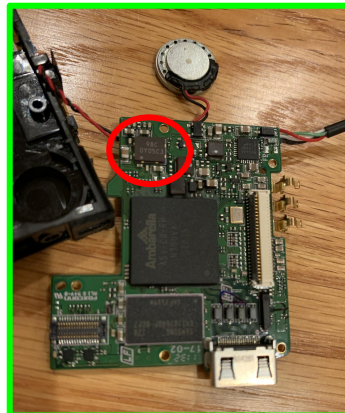
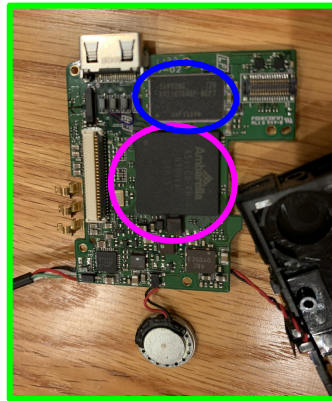
USB

- The USB connects to the user's device, such as their computer, and is linked to the motherboard. **It allows for the downloading and uploading of images.**



Storage, Memory, & CPU,

- **The storage** keeps all of the data given by the user in the **form of megabytes on a long-term basis.**
- **Memory** also does the same but is used inside the digital camera **specifically for transferring and storing the data in gigabytes.** It is a short-term location for data.
- **The CPU** is the main component of the motherboard and it is the **"brain"** of the device. It **controls the circuitry to input data and outputs it for the user.** It also processes data and stores it.



Final Recap



Final Recap

We learned a lot from disassembling our camera. For example, we now know that the **back frame, midframe, buttons, front frame, camera holder, and screen protector** are all part of the structure and are necessary to keep the device together. All the hardware, including screws and connectors, hold the electronics to the structural parts. Tinier components other than screws, connectors, and smaller metallic bits were glued onto the side of the USB cable.

All the electronic components are connected to the **motherboard**, one of the most important parts of the device. The flex circuit connects the screen to the motherboard, and the smaller ribbon wire connects the motherboard to the touch sensor, camera, and other buttons.

Other wires include **regular black, red, and other intertwining wires** used to connect the USB, microphone, and midframe to the motherboard. The motherboard **has a small central processing unit, storage, and a memory card**. A lithium-ion battery powers the device, and the front button is linked with a touch sensor.

Most parts were screwed on, but we expected some of the components to be soldered into the system, such as the buttons and battery. Much to our surprise, **most other parts were glued in, making them easier to take apart**.

One of the main things we learned was that every electronic component connects to the motherboard. Most parts were connected to a flex circuit, which led to the motherboard. However, the motherboard, USB, and microphone were connected with a different wire system.

Another important thing we learned was that many small parts are put together to create a functional device. Every little piece plays a role in helping the Bloggie work. Even the smallest of circuits can make a huge impact on the performance of the entire device, which is quite similar to how our robot and team works.