



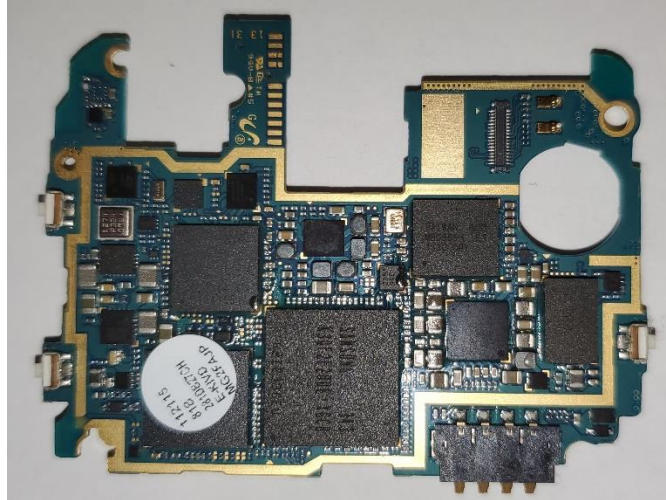
**Electronics Online  
Challenge  
PUPR Team**

For this year's online challenge, our team decided to use an electronic device that was not being used to avoid the possibility of damaging or reducing its useful life. With that in mind, we decided to disassemble a smartphone that is not being used anymore that any teammate could provide. This way, we managed to obtain a "Samsung Galaxy S4" to study all parts and components it requires to operate.

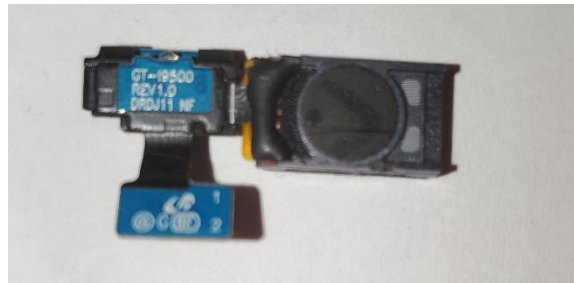
Upon disassembling the "Samsung Galaxy S4" and analyzing it, there were no TI components. The contents found included a small board on the bottom part which contains the charging pin, the antenna, and the audio connections, a larger board (the motherboard) on the upper part which includes all processors and memory units used by the analyzed mobile device. Attached into the motherboard are also included the proximity sensor & ear speaker component, frontal camera, headphones plug, rear camera, and the vibration component. Other components include the speaker, the battery, and most importantly the display (screen).



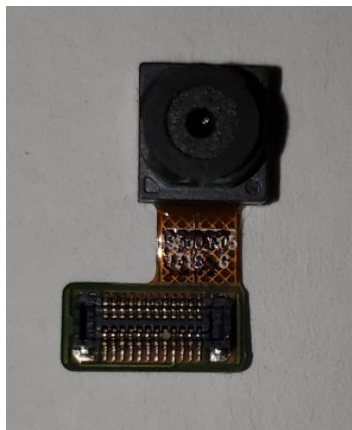
Charging Pin + Antenna



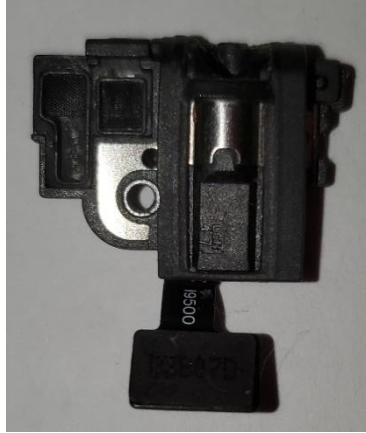
Motherboard



Proximity Sensor and Ear Speaker Component



Frontal Camera



Headphones Plug



Rear Camera



Vibration Component



Speaker



Battery



Display (Screen)



All Structural and Logical Components

Starting from the board on the bottom side, there is the antenna, which will be receiving the signal for the phone; without it, the phone will not be able to receive signal from your corresponding mobile service provider. Secondly, the charging pin is used to charge up or connect the phone to another device such as a computer. This one throws a large cable, on which the display is also connected, onto the motherboard and is then connected to the battery and other data processing units (to allow moving pictures to a computer for example). Finally, on top of it is located the case containing the speaker, which is used when playing music, or upon receiving a call.

Following to the motherboard on the upper side of the cellphone, we can find it has embedded within it the 8-Core processor with a 2GB DRAM, Baseband Processor (used for radio signal processing), 16GB memory, Power Management unit, Audio Hub and Voice processing DSP, MHL 2.0 (provides the mobile device an audio/video interface to connect to high definition devices without using other devices), 32 bit Microcontroller, and a Wi-Fi processing unit. Moving on to the attached components, the proximity sensor allows the phone to recognize whether the user put up their phone close to their face to talk in order to

turn off the display to prevent accidental hang ups and to save battery, the frontal camera is used to take photos from the display's side, so the users can see themselves, the headphones plug allows to connect the headphones, the rear camera allows to take pictures at a higher quality than the frontal camera, and the vibration unit makes the phone vibrate upon using certain applications or receiving a call.

This experiment allowed us to disassemble and analyze the components of an electronic device. From doing this, we learned how this mobile device's components operate. Finally, we were able to have a glimpse on how small devices have evolved, although this device is already outdated nowadays.

