2021 - 2022

SHATTERING A SAMSUNG

Team #: 27549A

Team Members: Arav, Devananda, Ajitesh, Ryan, Danha, Sebastian

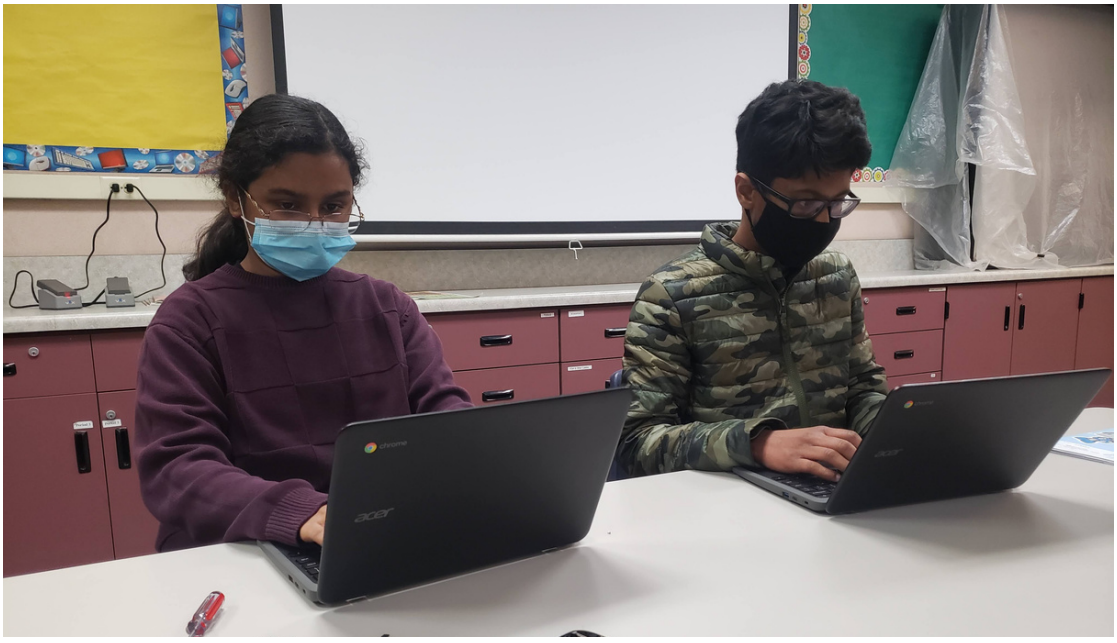
Team Location: Don Juan Avila Middle School, CA

TABLE OF CONTENTS

	TITLE	PAGE NUMBER
01	Introduction	03
02	Complete Parts List	04
03	Complete Parts List	05
04	Complete Parts List	06
05	Complete Parts List	07
06	Summary	08
07	Acknowledgements	09

INTRODUCTION

The device our team chose to take apart for this challenge was a Samsung Galaxy S3 mobile phone. When deciding what to use, we wanted something which would be slightly challenging to finish, yet still be slightly simplistic in nature to complete. Because we had a phone that was available to be taken apart and it met our requirements, we decided to use it.



COMPLETE PARTS LIST

Samsung Battery 2100 mAh 3.8 Li-ion Battery 7.98wh

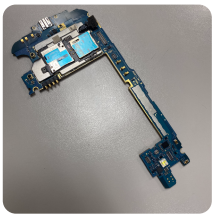
The Samsung 2100 mAh 3.8 Li-ion 7.98wh Battery was first available on May 29, 2012 with the release of the Samsung Galaxy S3. The battery contains chemical energy which is then converted to electrical energy to distribute power to all components of the device.

4.8" HD Super AMOLED Screen (1280 x720 resolution)

A screen's main purpose is to be able to provide a display for the user to interact with. Another feature is that the screen has a touchscreen that works with the touchscreen controller to be able to react to touch commands.

Back Cover

The backcover of a phone may seem like a basic piece; however, it protects and shelters all of the components inside the phone.



Motherboard

The motherboard is the central circuit that connects all of the components and allows them to communicate with each other. Wires are soldered onto the motherboard so that all the individual components are connected to each other. With all of these different parts, the capability of the circuit board is expanded.

Samsung microSD Card 8 GB

The Samsung microSD card is built to be durable and withstand various conditions. The component gives an optimal performance on the device as it has faster file transfers. This allows a device to save images more quickly and have faster upload times. It also provides additional storage as well.

Motherboard Cover

The motherboard cover protects the components of themotherboard from electrostatic discharge.

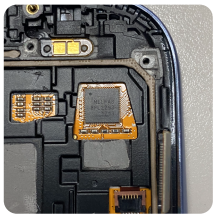
COMPLETE PARTS LIST

Headphone jack and speaker

The headphone jack and speaker are two different components merged together. The headphone jack is used to connect headphones to a phone so that the user can receive audio through the headphones. The speaker, meanwhile, can emit audio signals without having any separate device connected to the phone.

M Rev0.6 Vibration motor

A vibration motor is a DC motor which is used to deliver haptic feedback to the user by vibrating the phone when receiving notifications or calls.

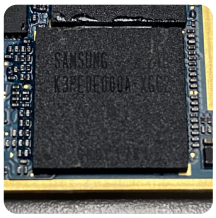


MELFAS touchscreen controller

The MELFAS touchscreen controller transmits information made by sensing a touch input to the main controller. It is designed to detect touch commands which can then be followed by the respective action via the device's operating system.

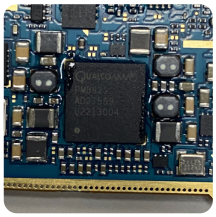
Samsung K3PE0E000A-XGC2 16GB LPDDR2 Mobile DRAM (2GB)

Samsung K3PE0E000A-XGC2 16GB LPDDR2 Mobile DRAM is a high-speed SDRAM internally configured as an 8-bank memory device. It is used for data or program code needed by a computer processor to function.



16 GB Samsung KLMAG4FE4B-B002 storage chip

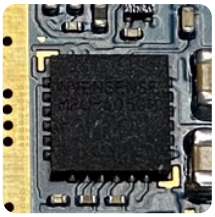
This component, as shown in its name, gives extra space to store photos, apps, and files on your device.



Qualcomm PM8921 power management IC

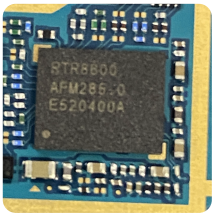
The Qualcomm PM8921 power management integrated-circuit is a solid state device that controls the flow and direction of electrical power. The purpose is to manage power on an electronic device that has a range of voltages. This ensures an efficient and reliable way to operate electrical distribution systems.

COMPLETE PARTS LIST



Invensense MPU-6050 6-axis (gyro + accelerometer) MEMS MotionTracking device

The Invensense MPU-6050 MEMS MotionTracking device supports the tracking of movements and transfers the recognized data to an application for additional processing. This device is based on the phone's camera.

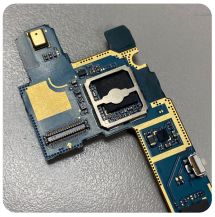


Qualcomm RTR8600 multi-band/mode RF transceiver

This component is used for multiple wireless communication systems.

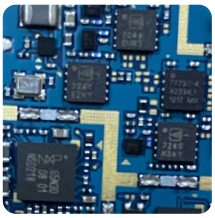
Murata RF antenna switch module

A phone needs continuous communication with cell towers meaning that whenever the connection is weak, the phone is weaker, having reduced battery life. This module selects the best antenna in the system which is why it is vital for a phone's operation. Smart antenna management is important as phones keep getting an increase in functionality.



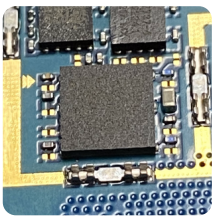
CML0801 Cmos IC

The CML0801 Cmos IC is an integrated circuit that is used to move around power in the device. This component is popular in the technology industry as it is super efficient in doing it's job, being able to distribute power to all the other components.



20 v P-Channel PowerTrench MOSFET

The 20 v P-Channel PowerTrench helps optimizes performance on other automotive components such as audio amplifiers.



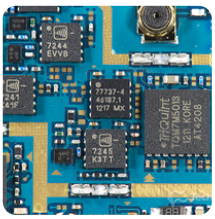
TriQuint Edge - Linear Power Amplifier Module

Linear Power Amplifier Modules generally produces signals that are more accurate to the original input. This is different from other power amplifier modules which is why it uses the term linear.

COMPLETE PARTS LIST

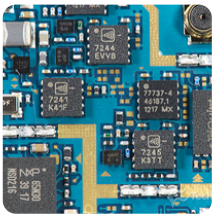
8MP rear-facing camera 0_V0.4G

A rear, or back facing camera has a higher mega pixel count than the camera above the screen making it the primary option for taking pictures.



Skyworks 77737 Power Amplifier Module

A power amplifier module amplifies, or changes a low-power signal to a high-power signal. In order for your device to have a large amount of power, it is required to have this component.

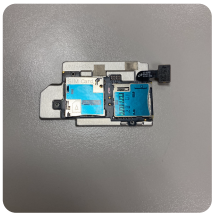


RFMD 7244, 7241, 7245 power amplifier packages

RFMD power amplifiers packages are additional components that contribute to a higher overall performance for the device, amplifying low-power signals just like other power amplifiers.

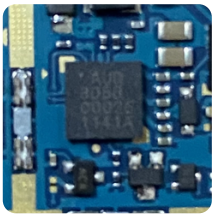
Silicon Image MHL transmitter

An image transmitter is a component that removes the requirement for any other additional active adapters to carry video and audio data.



SIM and microSD Card Slot

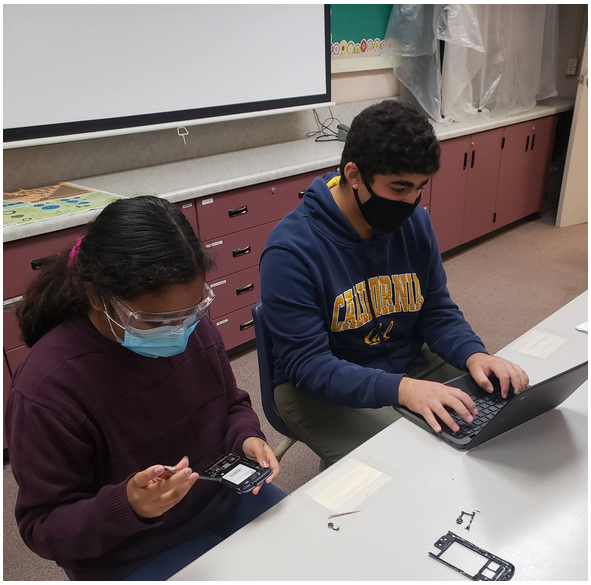
The Samsung microSD card is built to be durable and withstand various conditions. The component gives an optimal performance on the device as it has faster file transfers. This allows a device to save images more quickly and have faster upload times. It also provides additional storage as well. In order for the Samsung microSD Card to be used, it needs to be inserted into the microSD card slot.



Audience eS305 Audio Processor

This component allows for better voice communications and quality, its designed to the needs of the human hearing system. Sound quality is not affected by high volume making this component a good upgrade in sound clarity.

SUMMARY



As a team, we decided to deconstruct a Samsung Galaxy S3. It would allow us to explore the inner workings of a smartphone, an essential to have in the modern world. When we opened up the phone, we found a multitude of components ranging from the motherboard to a storage chip.

Although we found many parts of different sizes, we observed that every part played a vital role in the smooth functioning of the smartphone. However, the main components of the Samsung Galaxy S3 are the motherboard, the battery, the screen, the touchscreen controller, and the storage chip. The motherboard connects most of the components, making it the foundation of the phone. The battery is the main power source of the device which then distributes energy to other components by power management systems. These components then amplify power throughout the phone. The screen is the output of the phone which is controlled by the touchscreen controller. The screen gives contact with the user to interact with every application available on the phone. The storage chip stores images, videos, apps, and other files on the device. Without a storage chip, it would be difficult to make good use of the device.

From the components that allow us to take pictures and call others, we uncovered parts that allow the system inside to function. Working as a team not only helped us learn about the world of technology and electronics, but also the importance of effective teamwork and collaboration skills. We will be able to apply the skills we gained while reverse engineering an electronic device in our lives.

ACKNOWLEDGEMENTS

Team Members:

- Arav
- Ajitesh
- Ryan
- Sebastian
- Devananda
- Danha

Citations

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- amazon.com
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Contact

Team Horsepower

Coach Ms. Lu

Don Juan Avila Middle School

26278 Wood Canyon Drive, Aliso Viejo, CA 92656

(949) 362-0348