

Homework 5

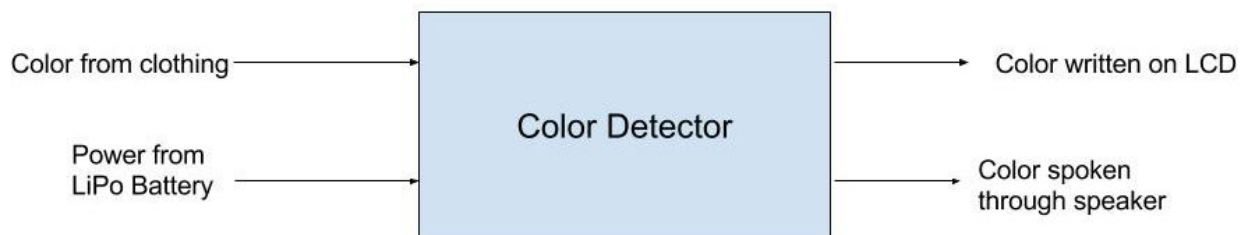
System Design

Functional Decomposition

Our device must meet the following requirements:

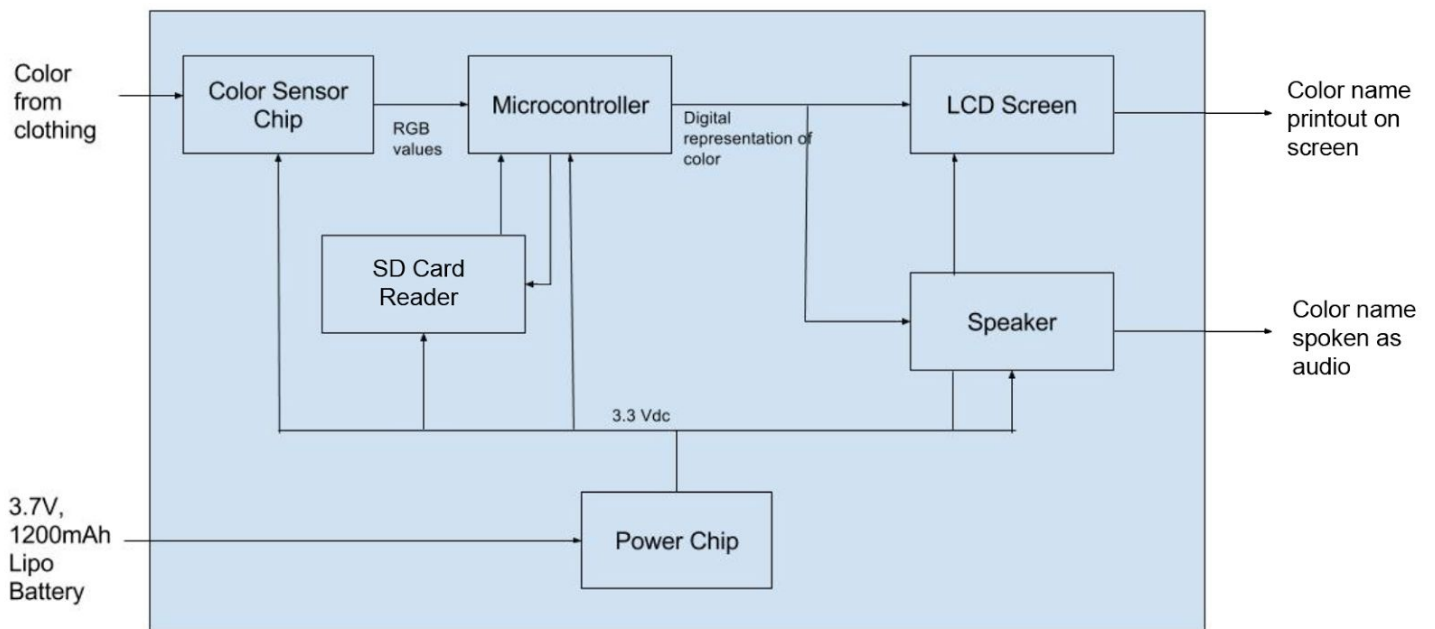
- Use an RGB sensor to detect color of clothing
 - Must detect at least red, blue, green, yellow, black, and white
- Display color from sensor on a LCD display
- Play an audio file from speaker identifying color
- Include a button to begin color identification
- Work under it's own power (internal battery power)
- Have an on/off power switch

Color Detector: Level 0

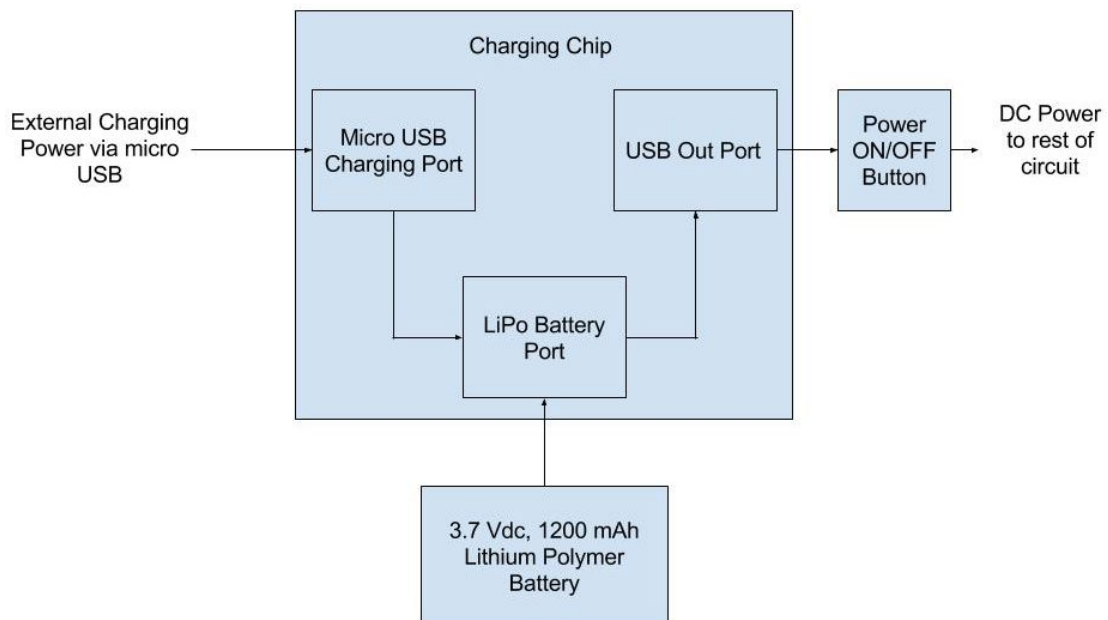


Module	Color Detector device
Inputs	Color from clothing Power from 3.7V, 1200mAh Lithium Polymer battery
Outputs	LCD Display: Written out color Speaker: Audibly speaks the color to the user
Functionality	When operation button is held down, detects color with an RGB sensor and reports it to the user

Color Detector device: Level 1

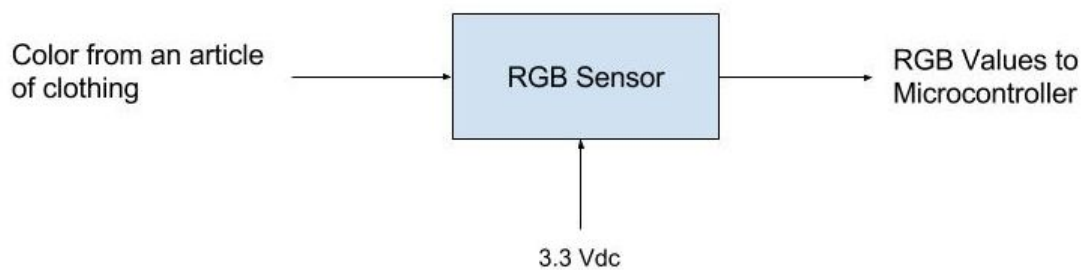


Power Chip: Level 1



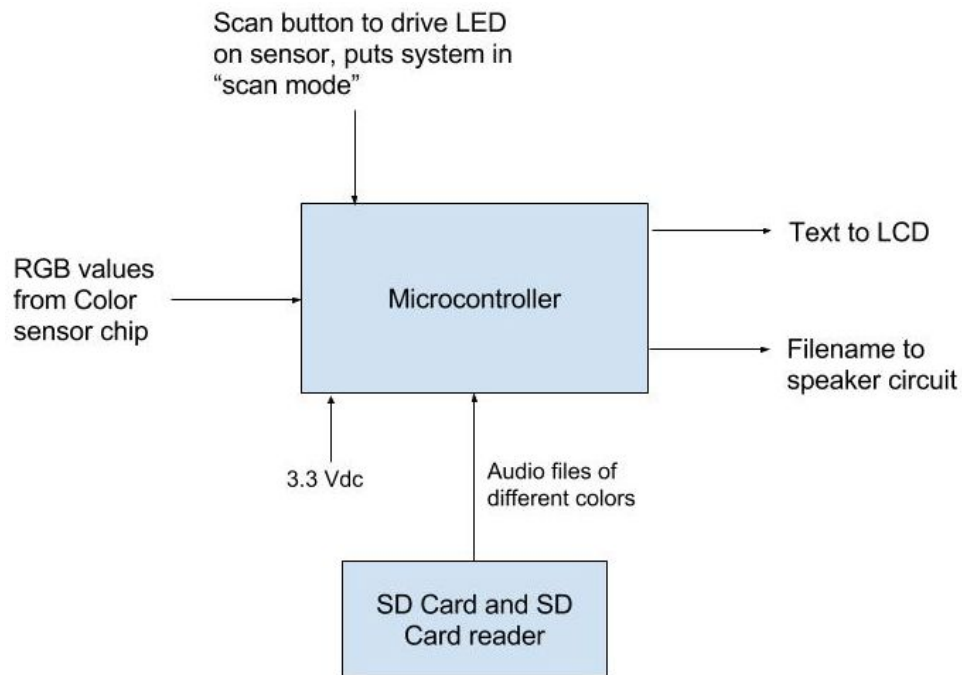
Module	Power chip
Inputs	Power from battery
Outputs	Power out to all powered components
Functionality	Power chip

Color Sensor Chip: Level 1



Module	Color Sensor chip
Inputs	Light from surface of clothes
Outputs	Red, Green, and Blue light temperature data
Functionality	Converts light from clothes to data for our program.

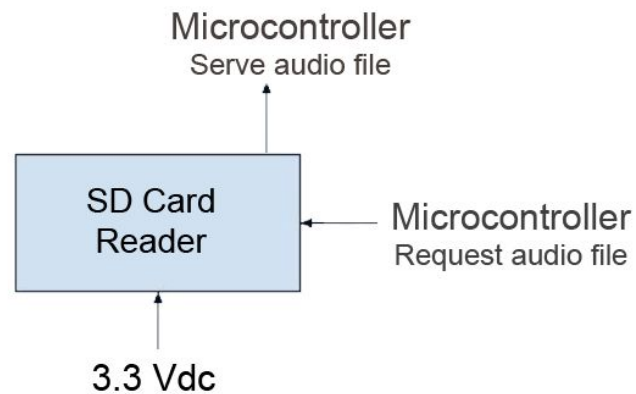
Microcontroller: Level 1



Module	Microcontroller
Inputs	Data from color sensor, power, audio files from SD card
Outputs	LCD and Speaker
Functionality	The microcontroller will run our software that will take data from color sensor, decode the color, and send information to LCD, and pull audio file from SD card and send audio information to speaker.

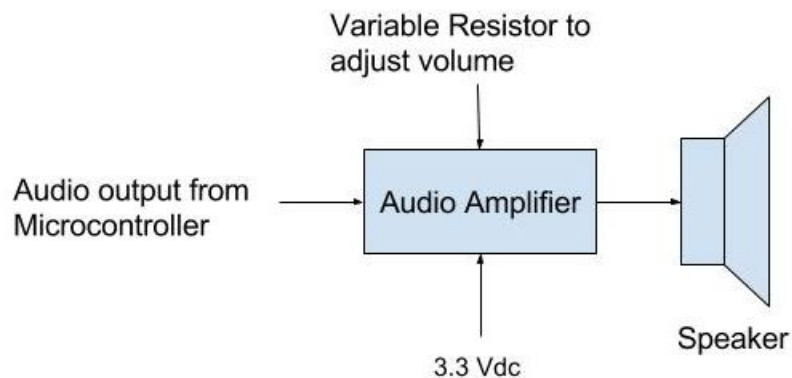
Module	Scan button
Inputs	User presses the button
Outputs	Voltage change detected
Functionality	This button will be pressed down when scanning

SD Card Reader: Level 1



Module	SD card reader
Inputs	SD card data
Outputs	Audio file to microcontroller
Functionality	SD card will hold the audio files and send them to the microcontroller, and on to the speaker, when requested

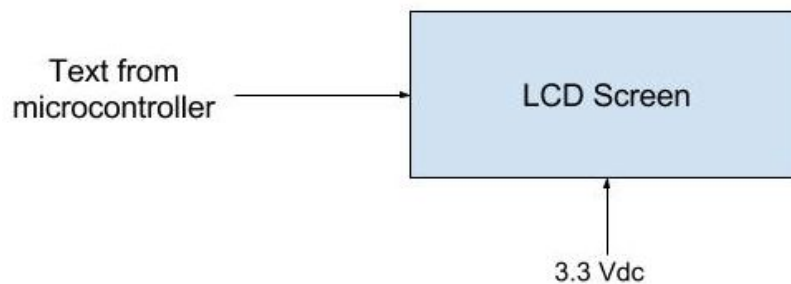
Speaker: Level 1



Module	Speaker
Inputs	Audio signal from microcontroller, power
Outputs	Audio signal
Functionality	Play audio data from microcontroller

Module	Volume Controller
Inputs	Power chip
Outputs	Volume level to speaker
Functionality	This would control the volume level of the speaker output

LCD: Level 1



Module	LCD screen
Inputs	Signal from microcontroller
Outputs	Display color name
Functionality	This will display the name of the color sensed by the device