

# LED COLOR ORGAN

ECE92

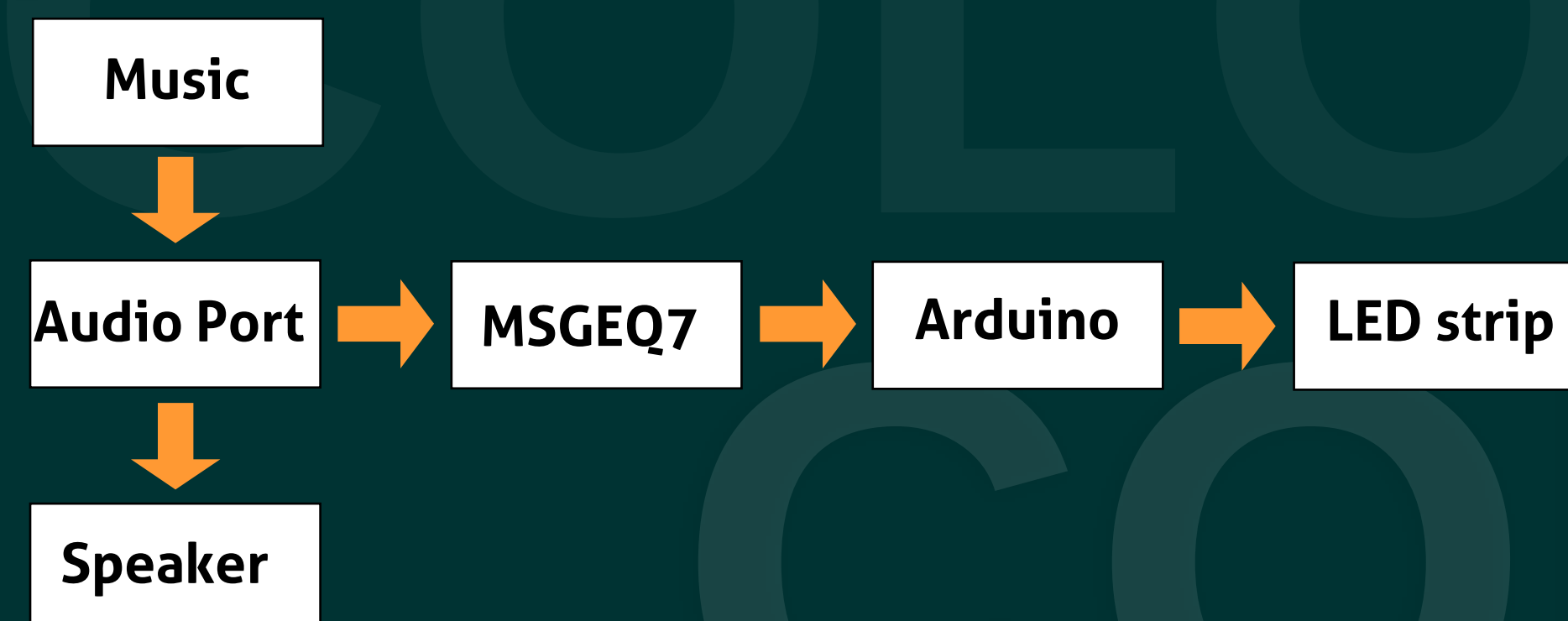
MICROCONTROLLERS



## ABSTRACT

The LED Color Organ displays various patterns of lights corresponding to the music frequencies. The music is read from a device through an audio cord that connects to the Arduino microcontroller.

## DEVICE FLOW



## CONSTRUCTION

The LED Color Organ consists of an Arduino Uno, a MSGEQ7 IC chip, a speaker, and a NeoPixels LED strip. The LED strip is a meter long and has 60 RGB LED lights that can be controlled individually. The circuit receives the audio input from a computer through an audio cable. The input goes through the IC chip that reads in sound frequency and breaks it up into seven bands. This information is processed through the Arduino, which signals the LED strip to light up according to the written algorithm. In the circuit, the speaker is connected to an amplifier to play the music while the LED strip is lighting up.

Yvonne Xiao, Paige Sullivan, Phanitta Chomsinsap



## EVALUATION & FUTURE IMPROVEMENTS

The LED Color Organ effectively reads in music and converts the music to seven bands of frequency. Accessing the frequency, this project outputs colored patterns that correspond with any type of music. An issue that occurred was that our device emitted lights even when no music was playing. This was solved by setting output at a higher frequency, eliminating the white noises. Improvements include a switch attached to set the brightness of the lights, more patterns implemented, and distribution compact frequency to wider range.

## SOFTWARE

The program is written using the Arduino software and Adafruit NeoPixel library to access individual LED pixel. Seven frequency values are initially stored in an array. The algorithm features four different patterns.

- 1) Seven bands: LED strip is cut into seven bands each with different color. The brightness of each band is controlled by the frequency reading.
  - 2) Pulsing outward: LED pixel lights up in a sequence starting from the middle toward both ends.
  - 3) Sliding across: LED pixels traverse across the strip at a constant rate. The intensity and color of the LEDs change as the frequency changes.
  - 4) Water flowing: The number of LED pixels displaying corresponds to the music frequency. LEDs move across the strip like a water flow.
- For loop is utilized to iterate through the LED pixels for display. If-else statements are also used to set a condition that helps prevent unwanted noises produced by the speaker.

## ACKNOWLEDGMENTS

Forrest Brewer  
Shane Langhans & Saili Rajee  
IEEE