

Audio Visualization Documentation

The goal:

To provide a visual representation for audio in your vehicle

Inputs:

Audio jack

USB interface

Microphone

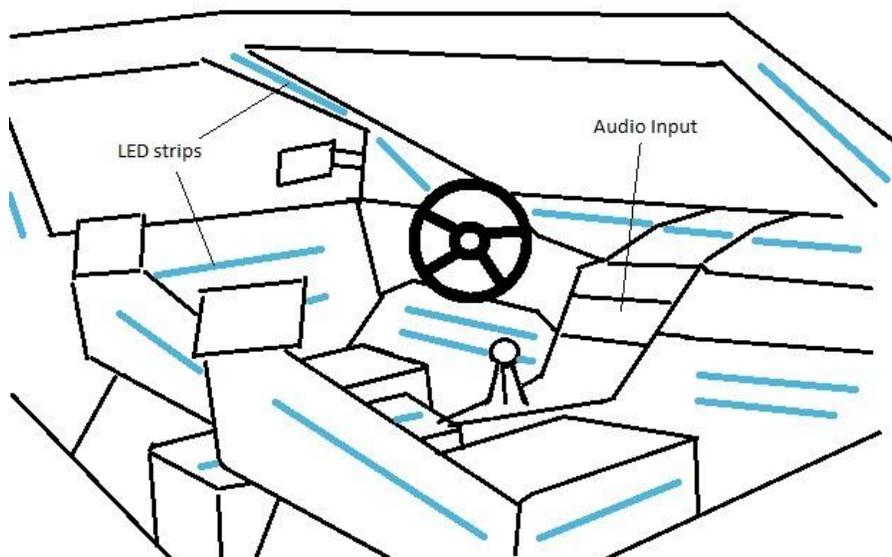
Processing:

Arduino

Output:

LEDs

“For entertainment purposes, we are trying to achieve a new level of enjoying music in your vehicle. By having lights inside your vehicle that react to the different beats and tempo of music we hope to create that immersion. By having LEDs, we hope not to distract from you safely driving your vehicle and also to comply with all local road laws. The sources can be achieved through an MP3 device, CD player, radio or USB interface to conform to all known ways of music playback in any range of vehicles. We hope to one day market this product in a fully immersive and entertaining package for your car.”

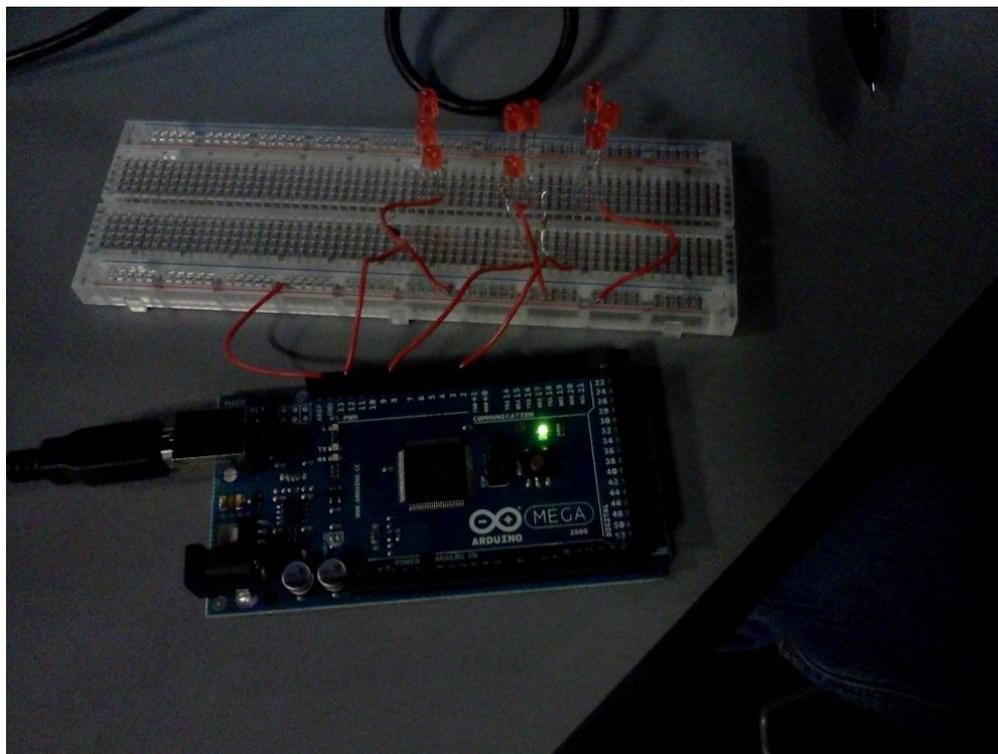


Process:

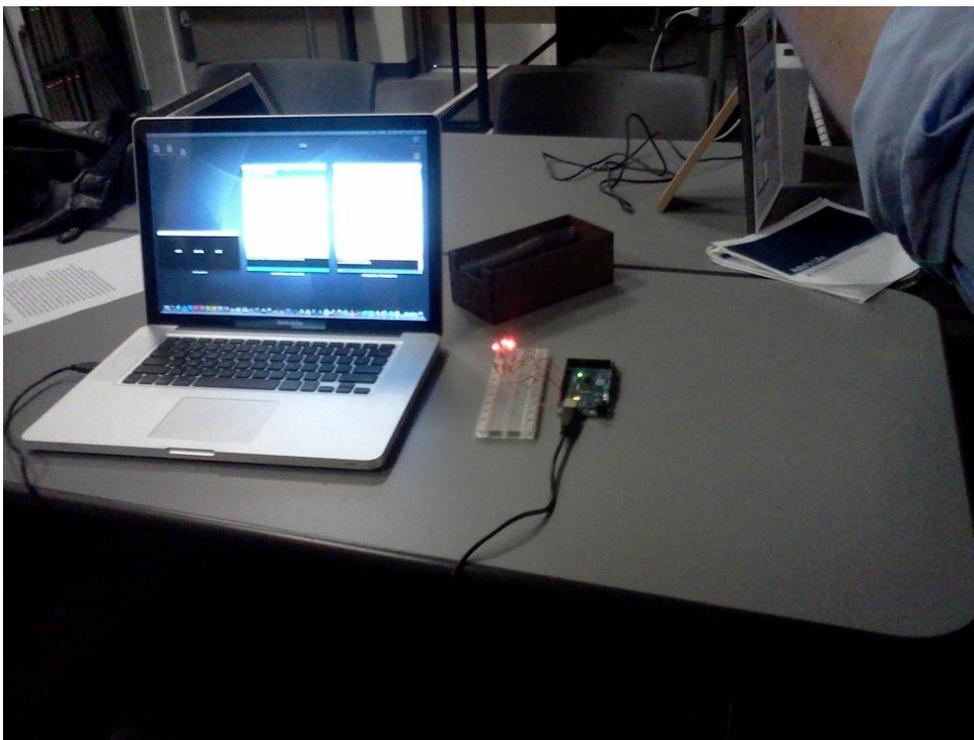
As mentioned previously we wanted to create a music oscillator type device with the intent to entertain the driver and passengers, with that in mind we decided to write down what we wanted and then narrow down what could actually be done. With that in mind we decided to only measure the kick drum the snare and the high hat, and for the LED's to flash on those corresponding beats. Once we decided on that, Julio coded the arduino to match the specifications using both processor and arduino sketch. While Ketan and Chris decided on how to put together this device together, and helping Julio when needed. Due to time constraints and work (we were not able to meet up outside of class often due to work and other classes) we were unable to create a housing for our device, it also didn't help that we had only a very basic understanding of Rhino and were unable to create anything nice when we did attempt it.

Result/Final Output:

The end result of our project came out pretty much as we intended, we had the basic design down pat, and were able to interface the arduino controller with any time of music and get a cohesive and coherent response out of it. Since the amount of space on the breadboard was small and we only had three variables for LEDs to light up to we decided to utilize a compact design for efficiency and placed all three LED's in the middle in the same rows, three deep, as can be seen in these pictures.



Chris Harrison
Ketan Dewan
Julio Norman



Also on each of our wiki's there is a video showing the screen capture of our code and how it works, if you have any questions to the code specifically please look at it by clicking on this [link](#).

Challenges Encountered:

In the interest of time, we limited ourselves to one source of input for the demonstration. Audio input was received through the USB interface, but with additional time (and better skills) we would've like to implement a microphone and an auxiliary jack input as well to relate more closely to our overall goal. Utilizing the auxiliary jack was also much more complicated than originally thought. Hardware implementation would have required a female-to-male cable which would then have to be cut open at the male portion. There would be separate wires for both the left and right sides for stereo input; the wires would then be put into separate slots in the arduino. Software implementation would involve combining and converting both the left and right stereo inputs into one mono output for processing to occur. We currently do not possess the skill for that. Another challenge that occurred is the unknown way our project kept freezing, seemingly random. Sometimes it would freeze after just starting it or freeze after 10 minutes. Trying the recreating the glitch didn't work because of how random this problem was, we could play the same file 20 times and see it freeze at different points every time. Our code is also very simple and shows no errors; a very confusing dilemma.

Limitations/Future Work:

Currently our idea and the ability to implement it are capable of being completely plausible. We have focused on only sound and current car technologies involve a radio, tape deck, CD player, or auxiliary jack for an MP3 device. We have worked out ways to implement all of these audio inputs to reach a complete range of automobiles through the use of a microphone, USB interface, or audio jack. If you can hear it, the system will work for you. The only limitation I can foresee is installation of the system in the car. Since the LEDs will be all encompassing, installing will be a somewhat complicated process depending on the layout that is suitable for your needs. Power utilization would also require either connecting the system to a car battery through the car lighter or using an external source such as a battery pack. One day though, we hope to see our system come preinstalled in cars so that everyone can instantly enjoy their music on a higher level the moment they drive off the lot.