Christmas Lights Controller with Synchronized Music Using Arduino

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Introduction

Christmas is, generally, one of the most fun times of the year. There is music, caroling, decorations, presents and a number of other fun things to do during this time of year. Decorating ones house with lights, reindeer, Santa Claus, nativity scene, snowmen, snowflakes and other winter or Christmas themed decorations is quite common. In recent years, synchronizing music to ones Christmas lights (and other luminescent decorations) has become quite popular. As a result, there is a number of different ways for one to program and hardwire ones decorations to do this very thing, some more expensive than others. One possible method of doing this is by using an Arduino Uno and using Vixen software. The rest of this proposal will discuss the motivation behind the project, and the project details, such as the architecture.

Motivation

Creating a display of Christmas lights and synchronizing it to music can add a great amount of wonder, inspiration and awe in people. Being creative can help influence people within their lives by inspiring them, or even as simple as giving them a moment or two of happiness. In recent years, creating displays, such as Christmas lights, to music has become increasingly popular.

Project Details

Architecture and Environment

In this project an Arduino Uno will be used along with Vixen software. Basic hardware (wires, resistors, LED lights, and buttons) will be used. The Arduino Uno will be used to control a number of LED channels. Additionally, the Arduino will have two buttons; each button will initialize a different sequence of lights (and songs). The Vixen software will be used to simplify the light sequence.

Implementation Issues and Challenges

A challenge that this project will have is correctly configuring the voltage, set up and controls for the Christmas lights. Another challenge may be correctly setting up Arduino and Vixen. In relation to the music, timing the sequence of lights to the music may be difficult.

Deliverables

This project will produce a display of Christmas lights sequenced in such a way that it is synchronized to (at least) two different pieces of music.

During the first phase of the project modifying the Arduino code [1] and configuring a sequence of lights on Vixen as a sample program will be completed within the first couple of weeks of the project. After this is completed, testing the sample program with LED lights will be conducted.

During the second phase, finishing the sequences on Vixen will be completed, in addition to getting the Arduino to switch between the two sequences. Around this time a progress report will be written.

During the third phase, configuring the set up of the Arduino and Christmas lights will begin, and should take 2-3 weeks to complete.

The final phase of the project will be to test the Arduino/Vixen set up with actual Christmas lights, and fixing any errors that may occur.

Projected Timeline

- Modifying the Arduino Code and configuring a sequence of lights on Vixen – by Early October.
- Testing the Arduino/Vixen set up with LED lights – by Mid-October
- Finishing the sequences of lights in Vixen – Late-October
- Progress Report: End of October
- Configuring the set up for actual Christmas lights – Early November
- Testing the Arduino/Vixen set up with actual Christmas Lights – Mid to late November
- Final Project Write-up – December 3rd, 2014

Conclusion

This project will create a display of Christmas lights synchronized to (at least) two pieces of music. The project will use an Arduino Uno and the Vixen software, in addition to basic hardwire. The Arduino will control the channels of the lights, in addition to the selection of which sequence of lights to display. The Vixen software will be used to simplify the sequence of lights. Inspiring people to be creative, or to give them any amount of happiness, inspiration or wonder, is worth doing this project.

References

[1] http://www.element14.com/community/groups/arduino/blog/2014/03/28/sequencing-leds-using-arduino-and-vixen-lights