

EE 333 Project 2

Steven Warren

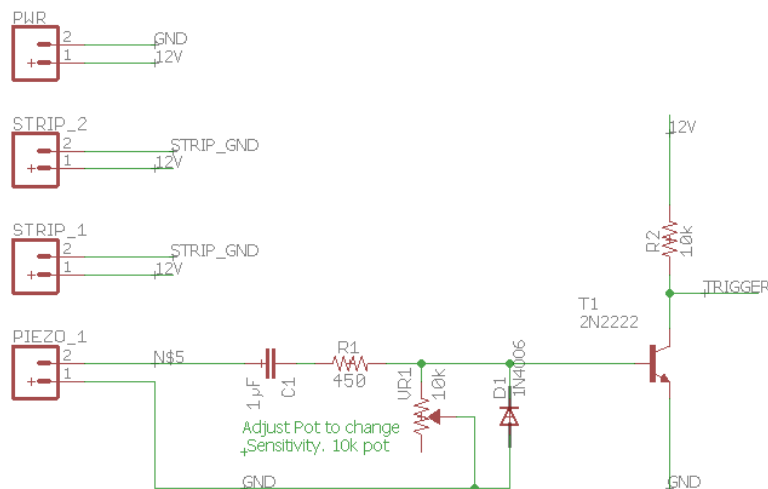
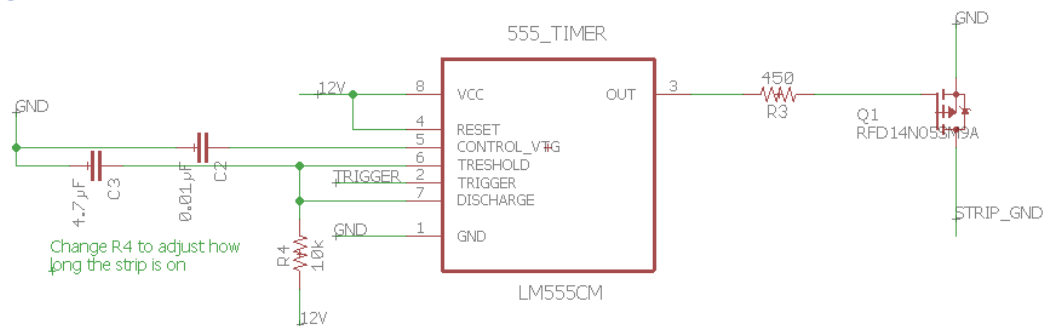
Project Description

This project's goal is to light up a drum when the drum is hit by using a completely analog circuit design. This project will use a piezo sensor, a regulating circuit for the piezo's voltage, a 555 timer, Mosfet and a BJT. This will work by having the piezo circuit trip the trigger of the 555 timer. The 555 timer will send a pulse for how long to turn on a mosfet which will be turning the led strips on and off. This project will be developed by a group of one, Steven Warren.

Simulation

<https://www.youtube.com/watch?v=y9cULWrM014>

Circuit Diagram



Bill of Materials (BOM)

Newark Part No.	Notes	Qty/Board	Unit Price	Total						
25R0951	Pizeo	1		0.355	1.065					
78K6011	555 Timer	1		0.307	0.921					
60R6325	1uF cap	1		0.055	0.165					
06R4179	4.7uF cap	1		0.028	0.084					
96M1408	.01uF cap	1		0.01	0.03					
59M8584	470Ω Res	2		0.042	0.252					
68R0258	10kΩ Res	2		0.007	0.042					
15R3459	N-Mosfet	1		0.616	1.848					
58K2047	PN222	1		0.144	0.432					
Part	Qty	Unit Price	Cost total	Per Device	Site					
12V/ 8 AA Battery Holder	1	5.59		5.59	5.59	https://www.amazon.com/Battery-Holder-Standard-Snap-Connector/dp/B000LFRTIK				
10k Potentiometer	1	0.95		2.85	2.85	https://www.sparkfun.com/products/9806				
Jumper Wires	1	0		0	0	Parts Shop				
8 AA Batteries	1	0		0	0	Parts Shop				
PCB OSH Park	1	12.7		12.7	4.2333333	https://oshpark.com/uploads/new				

Testing Plan

Initially the circuit will be developed on a bread board. After the circuit is tested and developed, the circuit will be put onto a perforated board to be soldered together to ensure the circuit still works. If both are successful, the board will be created in eagle and checked multiple times over to ensure every trace and part specification matches how it was created.

Once the PCB is in hand, the board will be first looked over to ensure there are no issues with the manufacturing such as the traces, part schematics, or other visual issues. Once completed, the parts will be soldered together. Another check will be done to ensure only the traces that are supposed to be connected are connected by running through a quick continuity check across multiple traces. The power and ground will also be checked for a lack of continuity to make sure they are not shorted together. After these checks are completed, I will slowly apply power to the circuit and ramp it up to the correct voltage (12V).

If any issues are discovered, the voltage will be turned off and a look at what was causing the issue will ensue. This will be attempted with the power off to ensure no parts will become burnt out. Otherwise, the circuit should work and a short bit of stress testing will take place to ensure the circuit can handle what it was supposed to. This will be done by using a 5m roll of LEDs (1m is what it was made for but it can handle much more) and hitting the piezo and seeing how the LEDs react to the 5m roll.