

555 Timer

Forrest Bullard¹

¹California State University, Chico

May 10, 2018

Introduction

The 555 timer is a great circuit and has been in use since 1971 with over one billion 555 timers and other variants made every year. Though we have seen some circuits that can be made with a 555 timer there is an unimaginable amount more. Upon this day we will build a Voltage Controlled Oscillator (VCO).

Procedure

1. Build the VCO circuit shown, using the $1k\Omega$ potentiometers. Either potentiometer will change the frequency. C_1 in series with the series changes the rate at which the capacitor charges and C pin 5 changes the voltage at which on-off transitions occur.
2. Create a voltage control using the photodiode circuit from labVIEW part 1 and attach it to pin 5.
3. Be weird like Sheldon
4. Build another 555 timer circuit

Circuits

Questions

1. In order to get higher frequencies for more light we would need to construct an input such that increasing the light to our photo diode would decrease the voltage to control. I believe the results could be obtained with a similar circuit but instead use an inverting op amp with the photo diode turned around. As well a constant voltage would need to

be applied behind the photodiode so that increasing light reduced the overall voltage to the to the positive side of the amplifier. Similar to what is shown below.

1. The Fourier series for a square wave consists of a sign wave at the same frequency of as the square wave as well as infinitely many sign waves at higher frequencies that are multiples of the lowest frequency. In order to get a nice sound we must select one of these frequencies which may be done by passing the signal through a high pass and a low pass filter such that they have a similar corner frequency. In this way a single frequency may be selected. The signal might, as well, need to be passed through an amplifier as the max voltage of the signal will be reduced by approximately a half.

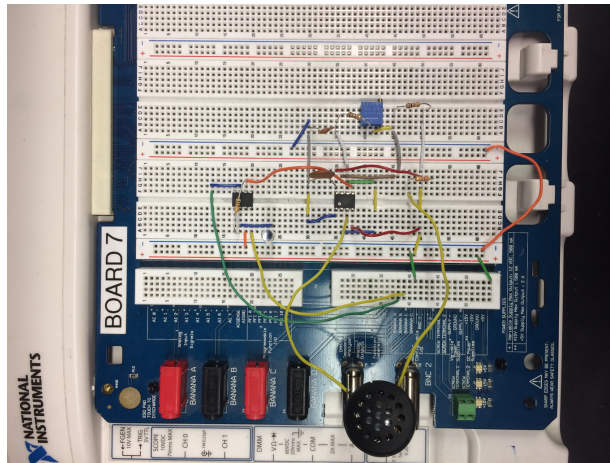


Figure 1: Screecher with diode adjust

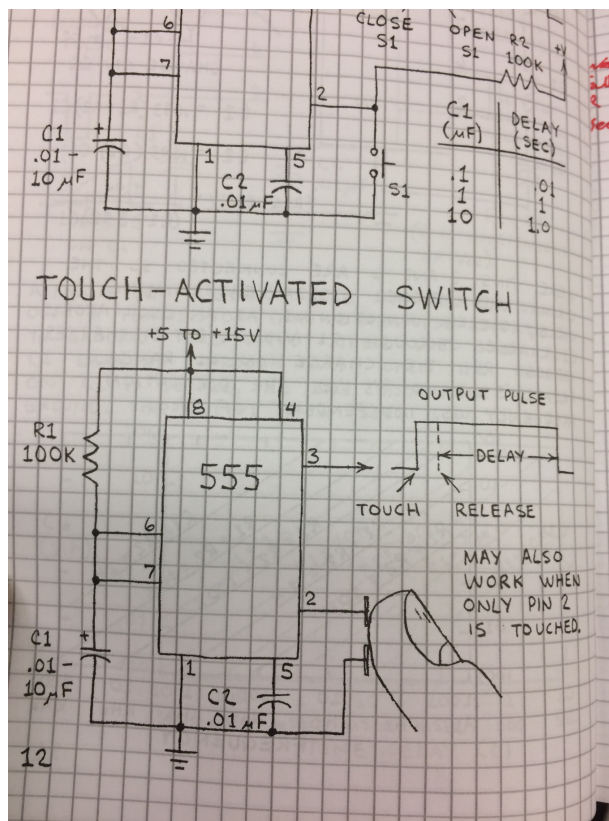


Figure 2: The Finger Grounded Monostable

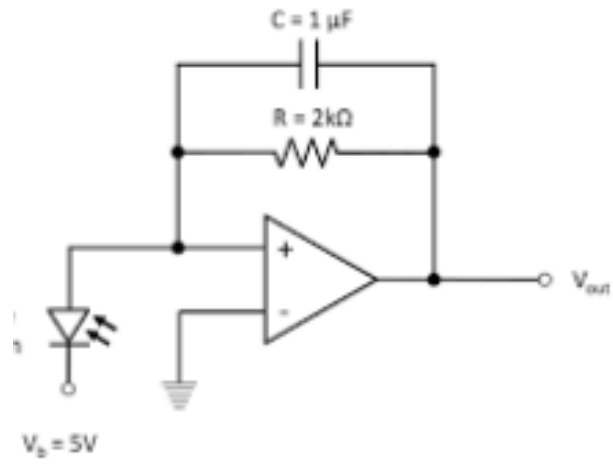


Figure 4: This is a caption