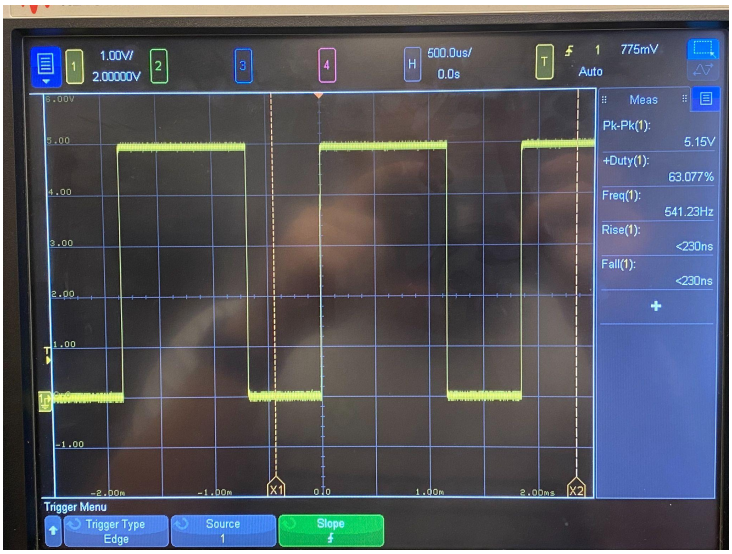
Lab Report 1 - Sam Freed

In this lab, we eased into PCB design by first developing a solderless breadboard model of our circuit. The circuit uses industry favorite 555 timers to create a 500Hz, approximately 50% duty cycle signal that can then be used to drive an LED. Variations within the circuit included changing the resistor that followed in series with the LED and the use of two different 555 timers, one “fast” and one “slow”.

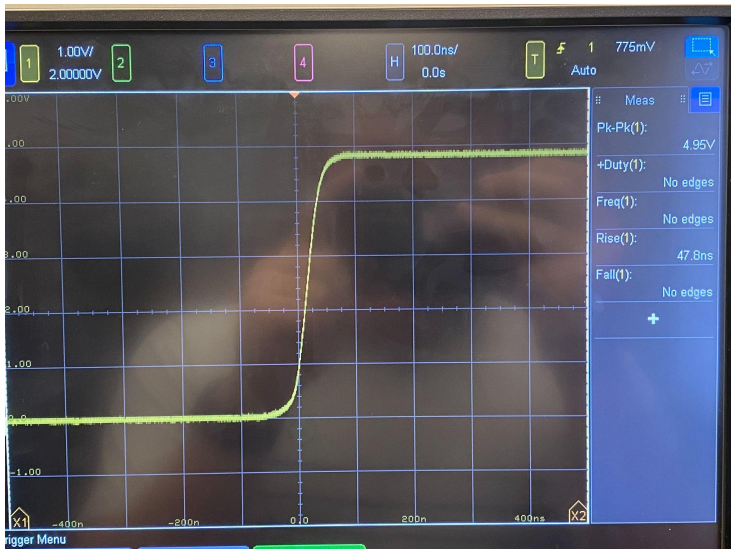


These screenshots were captured with the ICM7555 in the circuit and show a much smoother signal than the equivalent NE555 signal. Using the measurement tools on the scope, the duty cycle is shown to be 63%, as is expected when two 1kΩ resistors are used.

$$\delta = \frac{1k\Omega + 1k\Omega}{1k\Omega + 2 \bullet 1k\Omega} = \frac{2}{3} \approx 66.6\%$$

The frequency is also approximately as expected: $f = \frac{1.38}{(1k\Omega + 2 \bullet 1k\Omega) \bullet 1\mu F} = 460Hz.$

The rise time that is shown to the right also matches the datasheet’s expected range of 45-75ns and also the full 5V peak to peak voltage when unloaded.



This lab was very useful in reintroducing me to the cycle that is circuit design - datasheet, design, measure, debug, and repeat. I was glad to get a refresher on probe

skills and a reminder of the importance of knowing what to expect from components prior to observation.