Capstone Design
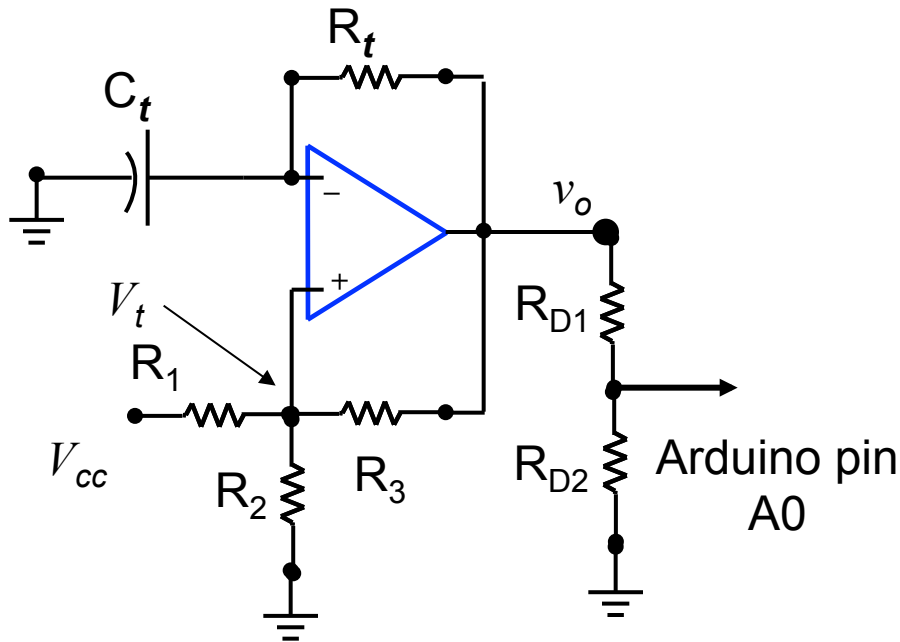
Arduino/Astable

Astable

Build an Astable to yield a Square Wave (50% duty cycle).

Use a single power supply, the 100μf capacitor, the potentiometer as R_f, and any of the resistors in your kit.

Assume the output saturates at 0 and V_{cc}. Also assume $R_1=R_2=R_3$.

Add a voltage divider to the output and make it's impedance large compared to R_f. Since the Arduino reads a maximum of *5 v* and the maximum of v_o= *9v*, make sure that the voltage divider provides a signal less than *5* volts (i.e., $R_{D2}/(R_{D1}+R_{D2})<5/9$).

Arduino

1. Write a sketch that read A0, maps it to a voltage between 0 – 5 volts, and then print it to the Serial Plotter.

2. Vary the potentiometer to demonstrate various frequencies and thereby various pulse widths.

3. From the graph determine frequency and amplitude of the signal.

4. Compare the frequency determined from the plot with the frequency determined from the circuit parameters. Do they align? If not, why?