Comparator Lab Exercise:   
ANALOG WATCHDOG

# Overview

In this project you will use the analog watchdog to monitor the voltage from a potentiometer-based divider. You will evaluate polling and interrupt-driven software.

# Details

## Hardware

Figure 1. Potentiometer circuit forming voltage divider for comparator monitoring.

### Connections

Build the circuit shown in Figure 1 on your breadboard. Connect the potentiometer signals to MCU board Port A Pin 1.

1. Use polling method and one of the ADC modules, constantly check the voltage in main and whenever it is lower than 1.2 V, turn on the red LED.

Initialize the ADC module and corresponding GPIO port and pin.

Than in the Main:

while(1){

while(!(ADC1->SR&(1UL<<1))){}

while((ADC1->DR)>0x0666){

Turn\_On\_LED(Red);

}

Turn\_Off\_LED(Red);

}

1. Reprogram the code from the project AnalogWatchdog so that the analog watchdog monitor the Port A Pin 1.
2. At what input voltage (from the potentiometer) does the red LED change? Use a multimeter to measure this voltage.

About 1.2 V

1. At what input voltage do you expect the LED to change color, given the source code? Does this match the actual code?

Since LTR is set to 0x0695, we would expect the threshold voltage to be 1685/4095\*Vref =0.411 \* 3V = 1.23V

1. Modify the code to change LED color at 1.00V. Verify that your changes work.

Set the LTR to 0x0555, which will alarms when the Voltage is below 1.00V.

1. Modify the interrupt-based code to introduce hysteresis. When the voltage is falling, don’t switch LED color until 1.2 V. When the voltage is rising, don’t switch LED color until 2.1 V. Demonstrate that your code works.

In this case, the HTR value should be 0x0B33.