

ECE 4175

Project Three

Potentiometer Use

Complete by:
Thursday January 22nd for an A+

References:
Sections 9.1-9.6 ADC for potentiometer

Overview for P3.c

For this project the potentiometer will be used to control the duration of a short timing interval.

You are to modify the T1.c template program to form a new file called P3.c. Create a new function called ReadPot that reads the output of the potentiometer as an eight-bit value by executing the code of Figure 9-6. ReadPot returns with the ADC result register, ADRESH, loaded with an output ranging from 0x00 to 0xFF (or perhaps a little less than this).

In your mainline code, call the ReadPot function every sixth loop time (i.e., about every tenth of a second). Modify the BlinkAlive function so that the LED is turned on during each loop time for a period that is proportional to $ADRESH \times N$ cycles, where N is as small as you can make it. Also generate a pulse on the RB5 pin that is high whenever the LED is on so that you can measure the LED's "on" time by measuring the pulse width. Thus, the pulse width should be equal to

$$\text{Pulse width} = (N \times ADRESH) \pm \text{offset} \text{ microseconds}$$

where you may need to include a small number of microseconds for "offset" and where you may have some minimum value of ADRESH below which this linear relationship is corrupted so that in such a case you substitute this minimum value in place of the ADRESH value.

Be sure to put the chip to sleep after finishing the pulse generation and doing whatever else needs doing in the main loop. Under no circumstance should the CPU still be awake when the watchdog timer's sixteen-millisecond period has occurred (inasmuch as this will reset the chip).