Pre-Lab 4: Calibrate Internal Oscillator

In this lab, we will calibrate the internal oscillator of the pic16f883. As mentioned in the programming specification document, there is a register in the configuration address space of the PIC which is used to store a value which calibrates the internal oscillator. This internal oscillator provides an 8 MHz clock for the device. Consider the questions below to prepare for the lab.

1. Review the PIC16F88X Memory Programming Specification document to understand how the internal oscillator is configured.
    a. What is the address for the oscillator calibration register?
    b. To measure the actual frequency of the generated clock signal, we will need to output the clock signal. What values should be written to the CONFIG registers to configure the PIC to use the internal oscillator, and to output the clock signal?
    c. Using the pic16f883 data sheet, determine what SFR (special function register) bits must be set to configure the frequency of the clock signal. What is the default configuration for clock frequency? (See Chapter 4 – Oscillator module)
2. Calibrating the internal oscillator could be accomplished by setting the Oscillator Calibration bits value to 0, then measuring the clock signal frequency, then incrementing the Oscillator Calibration bits value by 1 and repeating for all possible values. The calibration value which provided the clock frequency closest to the desired frequency would be the desired calibration value.
    a. How many iterations would this sweep approach take (note the number of bits)?
    b. How could you design a more efficient scan to determine the optimal calibration value?
3. Create a test plan including schematics for this test?

Due by Wednesday, April 20, 2016