ECNS-424

IDL #1

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**Creating a Light Meter using the A/D and LCD**

**Objective:** The power of C programming amplifies the PIC18F46K80 processors efficiency. The purpose of this lab is to use C programming to create a digital voltmeter and light meter using the BulldogPIC++ on board light sensor. The Lux and voltage read from the sensor are to be displayed to the onboard LCD display. An 8-bit A/D conversion is the precision to be used and the Lux/Voltage is required to have the words ‘Lux’ and ‘Volts’ after the corresponding value.

**Methods:** To accomplish the LCD displaying ‘Lux’ and ‘Volts’ on screen a constant char array (line1[14] and line2[16]) were used to write the characters one at a time using a for loop to create a splash screen. The voltage value after read in by the A/D was converted to a three digit voltage (425 = 4.25v) via the equation Y = ((X\*500)/255). The three-digit voltage was then parsed by the hundreds, tens, and ones place to be displayed to the LCD. A decimal point was placed using its corresponding ASCII value in between the hundreds and tens place to represent the voltage to two significant digits behind the decimal point. The Lux value was calculated using equation Z = ((Y\*1000)/224) to represent the scale of 2.24 mV/Lux and parsed by digit placement to be displayed to the LCD screen. To achieve the lux value having no leading zeros a series of If statements were used to display ‘nothing’ to the LCD segment to adequately represent small values.

**Results:** The Voltage and Lux values displayed on the PIC++ LCD screen adequately in response to sensor input. At max brightness the voltage displayed was 4.78 Volts with 2133 Lux matching predicted values. This process was verified by single stepping the program in MPLAB X IDE environment, verifying variable values in memory, using math calculation with a calculator, and with the naked eye.

**Conclusion:** The program required multiple moving pieces and had to be laid out based on each task required. The programmer experienced many data type issues based on the method chosen early on. These issues were overcome by single stepping the MPLAB X IDE and verifying each variables expected outcome. The Sprintf statement was explored but a straight-line code approach was chosen in order to troubleshoot errors more efficiently.