Assignment #6 – Serial Output and Oscilloscopes

Objectives
- Students will be able to output information in various serial manners.
- Students will be able to understand the underling nature of the printf command.
- Students will be able to use the MPLAB® Code Configurator.

Goal
- Use the printf command and an oscilloscope to understand all of the details what is output from the EUSART.

Materials
- Breadboard – wire w/ 5V power regulator, switch, and LED
- PIC18F45K22
- 9 V battery
- Computer w/ MPLAB XC8
- PICkit™ 3
- Newhaven 2x16 Serial LCD
- Oscilloscope

Directions
- You will be documenting your work in your lab notebook.
- Task 1: Output a single character at a 9600 baud rate. Document the code in your notebook. Capture the output on an oscilloscope, save the image, print it, and attach it in your notebook, and include a caption (do these things for each task). Answer the questions below in your notebook.
  - How is a "1" bit displayed?
  - How is a "0" bit displayed?
  - What was the binary output?
  - What is the length of one high pulse?
  - What is the length of one low pulse?
  - What was the total length of the output?
- Task 2: Output a different single character at a 9600 baud rate. Has your perception to your answers from task 1 changed?
- Task 3: Output two characters at a 9600 baud rate. Has your perception to your answers from task 1 & 2 changed? Answer the question below.
  - What is happening between the two characters?
- Task 4: Output three characters at a 9600 baud rate. Has your perception to your answers from task 1, 2, and 3 changed?
- Other questions to answer…
  - How many bits are transmitted for every character?
  - How many characters can be transferred per second?
  - What is the percent error between the expected baud rate and the actual baud rate?
  - Is your percent error different than MPLAB's prediction of 0.160%? If so, why do you think there is a difference?
- Make sure to include other observations, questions you have, etc. in your notebook.

Grading: 15 points for you notebook. _____