ECE 3710 Lab 9 – Fall 2018

Due Date: Week of November 12 at the beginning of your lab section (20 points)

Objectives

The purpose of this lab is to learn how set up and use a full-duplex serial communication line between the microcontroller and the PC.

Overview

For this lab, you will build a UART character acknowledge system. Lowercase characters ('a' to 'z') will be typed into a serial terminal on the PC and sent to the microcontroller. The microcontroller will send the uppercase version of the character back to the PC.

Preparation

1. Come with the following:
    a. ECE 3710 Lab Kit
    b. STM32L476 Discovery Board
    c. Textbook
2. Read section 22.1 of the textbook.

Requirements

1. Design UART serial communication system that complies with the following requirements:
    a. The microcontroller's USART2 is connected to the ST_LINK USB interface. Configure USART2 to run at 9600 Baud, no hardware flow control, 8 data bits, no parity, 1 start bit, and 1 stop bit. Set oversampling to 16.
    b. The PC runs PuTTy or a similar serial terminal program.

c. Characters are typed into the terminal and sent serially to the microcontroller (over USB). Valid characters received by the microcontroller ('a' to 'z') are acknowledged by replying with the uppercase version of the same character. All other characters are ignored.

Pre-Lab

1. Draw a block diagram of the serial communication system, including PC, microcontroller, and connections. Label interesting GPIO ports.

2. **Pre-lab Pass-off:** Pass off your diagram to the TA.

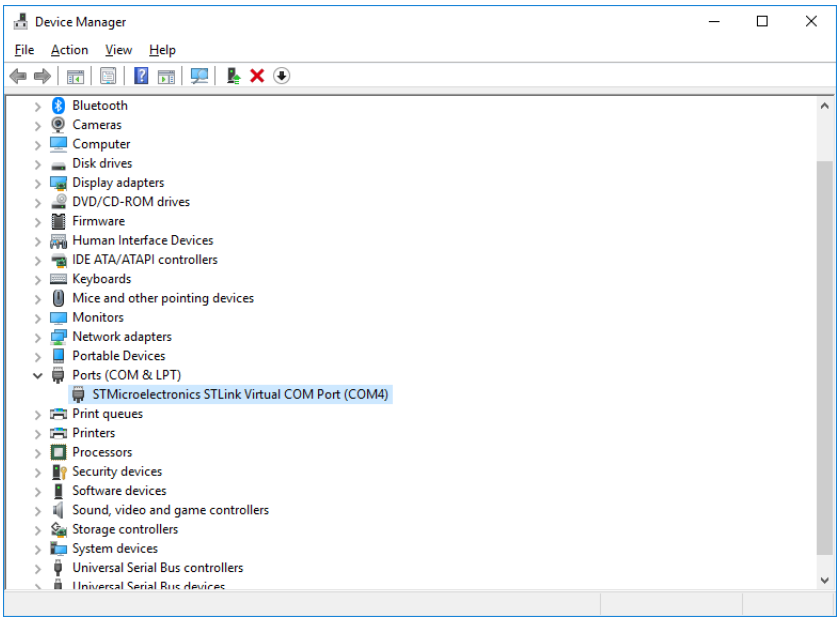
Procedure

1. Write pseudocode for a microcontroller program that accomplishes the described task. Think about interrupts, clock rates, etc.

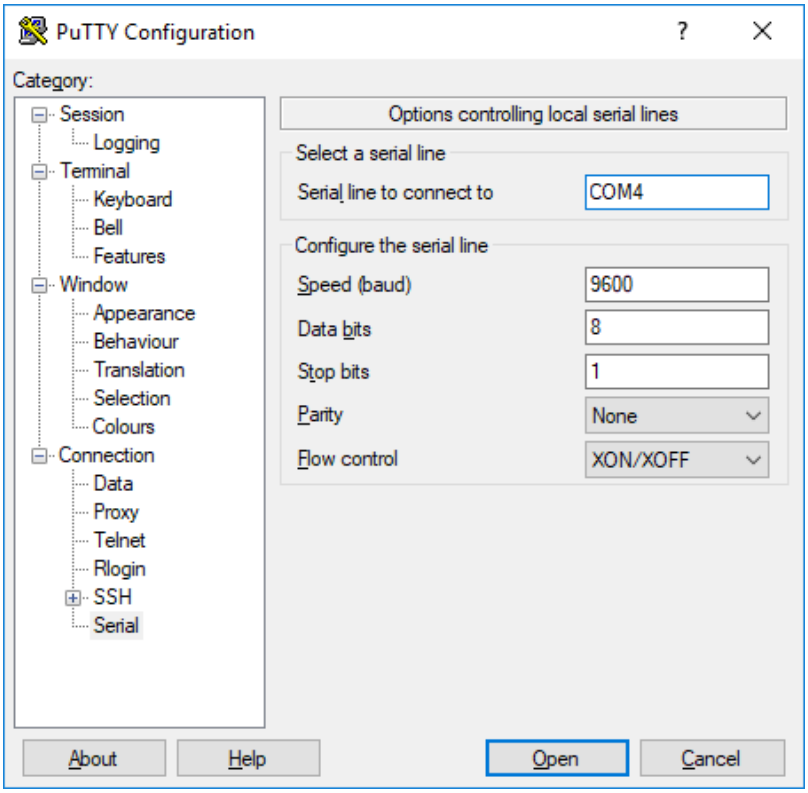
2. Show your pseudocode to the TA.

3. Implement your code.

4. Configure PuTTy or another PC terminal program to talk to your microcontroller. In Windows, look at "Ports" under "Device Manager" (while your development board is connected to the PC) to determine which virtual COM port is tied to your USB device. It is COM4 in the picture below.



An example of serial line configuration is shown below:



5. Pass off your working system to the TA.

Documentation

Prepare your lab report following the same style and rubric that you've followed in previous labs.