Lab 6
Universal Synchronous/Asynchronous Receiver/Transmitter (USART)

This lab familiarizes the student with the use of serial port communication (also called USART communication, or RS-232 communication) using a PIC microcontroller. You will need a simple serial port program running on your PC for this lab.

1. Download and install the Windows-based Serial Port Program from the **Resources** link on the course web site (run setup.exe). This is a simple program that sends and receives data on the PC's serial port. Alternatively, you could use some other Windows-based Serial Port Program with which you are comfortable, such as HyperTerminal.

2. Run a loopback test by connecting a serial cable to one of your PC serial ports. If you don't have a serial port, you can buy a serial to USB adaptor to connect or use a computer in the lab. Use a paper clip or wire to connect pins 2 and 3 on the open end of the cable to each other as shown in the lecture slides. When you send characters out of the serial port using the Serial Port Program you should see the same characters being received. This confirms that the program is working correctly, that the PC serial port is working correctly, and that the cable is working correctly.

3. Create a new project with lab06a.asm. Connect an RS-232 transceiver chip, such as a MAX202, between the PIC and the PC, as shown in the lecture slides. Run the PIC program. If you run the PC Serial Port Program at 9600 baud, you should see the characters A – Z being transmitted by the PIC to the PC and being displayed on your PC, one character every half-second.

4. Create a new project with lab06b.asm. Connect an RS-232 transceiver chip between the PIC and the PC. Connect the RC0, RC1, and RC2 pins to LEDs. Use a green LED for RC0 and red LEDs for the other pins. Run the program. If you run the PC Serial Port Program, you can transmit characters from the PC to the PIC. You can transmit a 0, 1, or 2 to turn on the RC0, RC1, or RC2 LED. If you transmit an X you should see all three LEDs turn off.