University of Jordan

School of Engineering

Department of Mechatronics Engineering

Microprocessor and Microcontroller Laboratory

0908432

Exp.10: - Serial with A/D protocol-based transmission

**Objectives**

1. To become familiar with the process of writing an assembly language program for the PIC.
2. To demonstrate different methods of handling the A/D conversion process.
3. To demonstrate different methods of handling the serial communications through the USART.
4. To demonstrate methods of remote control using serial communications.
5. To demonstrate the use of internal interrupts.

**Pre-lab Preparation:**

1. Review the sections in the book regarding the A/D.
2. Review the instruction set of the PIC 16F877A.
3. Review the sections in the book regarding the USART.
4. Read the PIC16F877A data sheet especially chapter 10.

**Procedure:**

In this lab experiment you are required to write an assembly code for a PIC16F877A which operates as data acquisition system (DAQ) for machine that has two analogue sensors:

1) Pressure Sensor

2) Temperature Sensor

Your code should transmit for each sensor a message that contains the sensor readings and a control bit to the computer. The message consists of the following fields:

1. **Control Bit**: It is a 9th bit of Transmit Data: -
   * Zero: to indicate that the message contains the pressure sensor reading.
   * One: to indicate that the message contains the Temperature sensor reading.
2. **Message data**: - It is the Most 8-Significant Bit (MSB) of the A/D conversion result.

The serial transmission for the pressure sensor is ***event*** *driven*: the reading should be transmitted whenever **absolute difference** between two readings greater than 25, the reading is ready to transmit, without considering the time spent between these different readings.

However, the serial transmission for the Temperature sensor reading is ***time*** *driven*: the readings should be transmitted every 50 ms.