

Experiment 6 (EE381 DCMP Lab. 2017-2018/II)

Objectives:

- Familiarisation with MPLAB IDE and PIC Microcontroller Programming
- To light up an LED

Equipment:

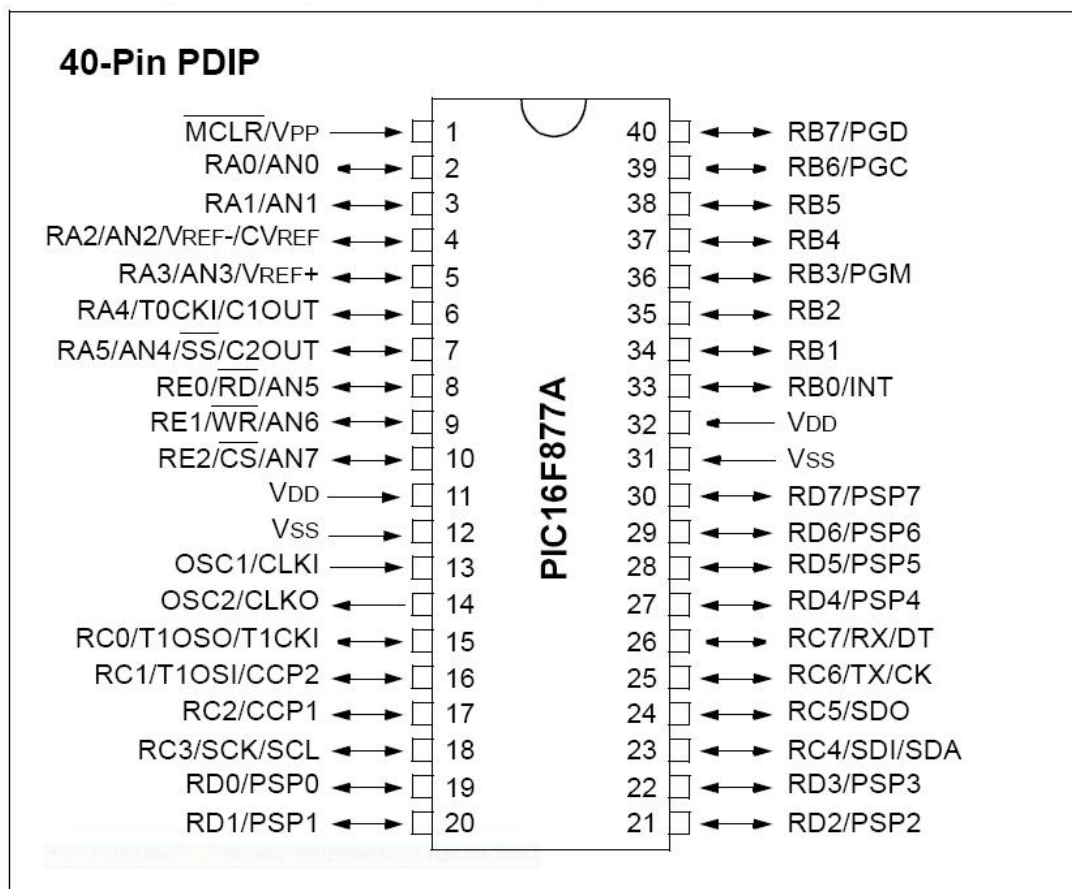
- PIC16F877A IC
- PIC Programmer
- +5V DC Supply
- 2 Capacitors: 22 pF & a 8 MHz Crystal
- A 10 kOhm resistor for \overline{MCLR} Pin
- LED's (each with a 220 Ohm resistor)
- Connecting Wires

PART A) Familiarisation with MPLAB IDE PIC Microcontroller Programming

Go through the tutorial of MPLAB IDE and PIC Programmer. Get familiarized with various features of MPLAB.

We use the MPLAB IDE Software for designing, editing & compiling codes. Look out for the MPLAB Tutorial for details, on how to begin with a new project & end up with a .hex file of the required code (after simulator testing.)

Read the PICPgm Tutorial to know, how to feed the code (.hex file) into the microcontroller.
Feed the Test File into the MicroController to understand the process.



As you can see in the PIN-Diagram of PIC16F877A, it has 5 Ports that can be used for Input/Output.
Port A : RA0 – RA5 (6 Bit)
Port B : RB0 – RB7 (8 Bit)

Port C : RC0 – RC7 (8 Bit)
Port D : RD0 – RD7 (8 Bit)
Port E : RE0 – RE2 (3 Bit)

Try to locate the pin nos. of these Ports, by scrutinizing the Pin Diagram.

PART B) To Light up an LED

Problem Statement:

Connect an LED to the RB0 of PORTB (Pin No. 33 of the IC), and write a code that will light up the given LED.

Hints for writing the program:

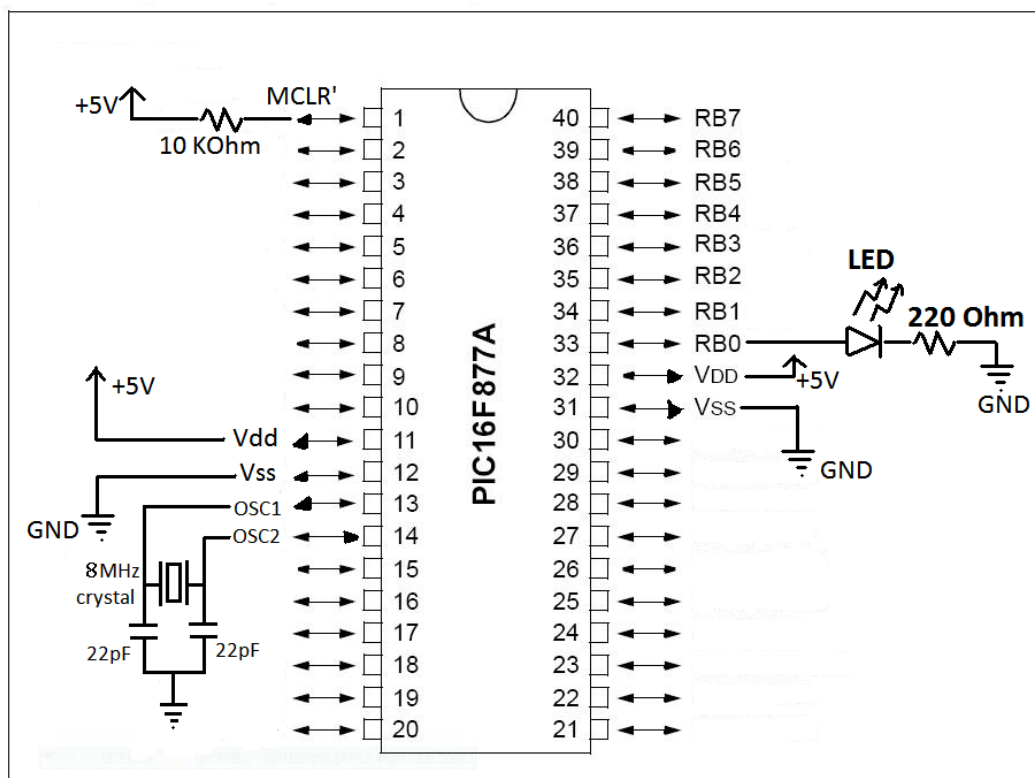
Write codes sequentially for each of the following

- Select the Register Bank that contains the TRISB Register
- Clear (equate to 0) the 0th Bit of TRISB Register (to configure RB0 as an Output Pin)
- Select the Register Bank that contains the PORTB Register
- Set (equate to 1) the 0th Bit of PORTB Register, so that RB0 outputs a High voltage and lights up the LED.

Compile the code, test it using the MPLAB Simulator, and feed the .hex file into the IC.

Circuit Diagram:

Connect the IC on the Bread-Board along with the circuit as shown.



PART C Pulse Train Generation

Problem Statement

To generate a train of pulse through PORTB

Procedure:

Continuously set and reset the bit RB0 (say) in an infinite loop.

Switch on the microcontroller and measure the time period of the square wave in the oscilloscope.

Find out the frequency of the square wave theoretically and compare with the experimentally observed value.