

THE CITY COLLEGE OF NEW YORK
Department of Electrical Engineering

EE425 Computer Engineering Laboratory (1XB) – Summer 2016

Experiment 1 – Square Wave Generation

Objective: The experiment is designed to exhibit some of the capabilities of generating pulses at the ports of the PIC18F4520.

Specific Tasks:

1. Program the microcontroller so that it produces a square wave with duty cycle=50%, in any of the outputs of the expansion board. Two different half-periods must be used: 13ms and 41ms.

The output must be shown in two different ways:
 - in the oscilloscope connected directly to the selected output
 - in the center LED (D5)
2. Program the microcontroller so that it produces a square wave with a different duty cycle (chosen by the students).

Note: Do not use the **Prescaler** option and do not create a second **LoopTime** subroutine to complete this experiment.

There are four distinct phases for the square wave generation:

1. Configure the pins of the PORT as outputs.
2. Send your pulse to the configured pins using appropriate commands (review the following commands: *btg*, *bsf*, *bcf*).
3. Put the program into a wait state for a calculated amount of time to satisfy the frequency and the duty cycle of the pulses.
4. Loop around indefinitely to generate a continuous pulse train.

To read or write anything from a port, it is necessary to configure the port pins accordingly, using the *Special Function Register* (SFR) *TRISx*, where *x* is the name of the port (e.g. *TRISB* configures the pins of port B).

In order to configure a pin as an output, put a 0 in the corresponding bit of *TRISx*. Similarly, to configure a pin as an input, put a 1 in the corresponding bit.

Example: to configure pin 4 of port B as an output and the others as inputs:

```
MOVLFB B'11101111', TRISB
```

where *MOVLFB* is a macro defined as follows:

```
MOVLFB macro    literal,    dest
                movlw    literal
                movwf    dest
                endm
```