WORKSHOP 6

The aim of this workshop is to :

1. familiarise yourself with calculating the values for the Interval Load Register and the prescaler register
2. familiarise yourself with using a one shot timer to generate a delay.
3. familiarise yourself with using interrupts with a periodic signal.

1 Calculating Interval and Prescale Values

Assume the System Clock Frequency is 16MHz. Calculate the Interval Load Register and the Prescaler Register values for the timer to generate the following periods:

(a) ½ second
(b) 0.05 seconds
(c) 2 ms

2 Coding a One Shot Timer

Write a program to toggle the PK2 pin at 1Hz (½ second on, ½ second off) using a ½ second delay function based upon a Timer peripheral in one shot mode. You must create the ½ second delay function using TIMER1A. Check that the program is operating correctly by connecting PK2 to the oscilloscope.

Was the pulse width the expected ½ second value? If not, adjust the parameters of the timer to get the timer as close as possible to the ½ second pulse width.

3 Coding a Periodic Timer with Interrupts

Modify question 2 to write a program that generates a periodic signal on PK2 with TIMER1A being placed into periodic mode, and TIMER1A setup to use interrupts.