**T62 Tutorial 9**

1. Given that the clock frequency is 4 MHz, calculate TACQ and TAD.

(4 marks)

1. Given that the clock frequency is 4 MHz, show the changed instruction so that TACQ and TAD are equal to 8μs and 1μs, respectively.

(4 marks)

Changed instruction:

movlw 0xA4

movwf ADCON2, A

Use the MPLAB (choose Pickit 3 as the Debugger) to examine the program.

1. Open a watch windrow to check PRODH and PRODL
2. Set a break point at the first NOP instruction.
3. Tune the variable resistor.
4. Press “Run” button.
5. Check the contents at PRODH and PRODL.
6. Repeat step 3 to step 5 for a number of times.
7. Write a program that performs the ADC operation on AN0 with 8-bit resolution and display the 8-bit value on the 8 LEDs using PORTD. Copy the program from the editor window.

(8 marks)

LIST P=18F4520 ;directive to define processor

#include <P18F4520.INC> ;CPU specific variable definitions

CONFIG OSC = XT

CONFIG WDT = OFF

CONFIG LVP = OFF

ORG 0x0000

goto Start

ORG 0x400

Start:

movlw 0x01 ; select channel AN0 and enable A/D

movwf ADCON0, A

movlw 0x0E ; use VDD & VSS as reference voltages &

movwf ADCON1, A ; configure channel AN0 as analog input

movlw 0x08 ; select right justification, set TACQ and TAD

movwf ADCON2, A ; 00 001 000

clrf TRISD

clrf PORTD

Here:

bsf ADCON0, GO, A ; start A/D conversion

wait\_con:

btfsc ADCON0, DONE, A ; wait until conversion is done

bra wait\_con

movff ADRESH, PRODH ; save conversion result

movff ADRESL, PRODL

nop

nop

movff PRODH, PORTD

goto Here

END

**Submission**

Enter your name, student ID number, and the answers in the MS Word document file. Re-name the file with your student ID number, e.g. 12345678.docx. **Deduct 4 marks for wrong file name.**

Submit the file by e-mail ([itklchan@cityu.edu.hk](mailto:itklchan@cityu.edu.hk)) before 3:00 pm. **Late submission will not be accepted.**