Description - Lab Week 7 Part 1

G09 Cole Bardin and Jeremy Matthews

The objective is to generate PWM waveforms of specified frequency and duty cycle on (A) special function pins and (B) Any GPIO pin

Part 1A

You are asked to generate a PWM wavefrom of frequency 5000 Hz and duty cycle 35% on special function pin 5.7 . Answer the following questions

(i) Name the pin in the notation TAx.y

**TA2.2**

(ii) Which timer and CCR must be used?

**TimerA2 and CCR2**

(iii) Set up SMCLK at 3 MHz as the clock for the Timer Ax . Calculate the counts for CCR0 and CCRy

**SMCLK divider of 16 (48MHz of HFXTCLK / 16 = 3MHz)**

**CCR0 = 600 (3 MHz of SMCLK / 5000 Hz desired freq )**

**With SET RESET mode: 35% duty cycle would require CCR2 to turn on LED 65% of CCR0 value:**

**CCR2 = 390 (600\*0.65), this leaves LED on for 210 counts which is 35% of 600**

(iv) The starter project is provided in PWM\_BY\_COMPARE\_ON\_TA0.1.zip

It is designed to generate a PWM waveform with frequency 256 Hz and duty cycle 87.5% on TA0.1

Make necessary modifications in the code to meet the specs given above. Demonstrate its proper functioning by connecting a white LED to pin 5.7

Part 1B

You are asked to generate a PWM waveform of frequency 50 Hz and duty cycle 25% on GPIO pin 1.6

You are free to use any TimerAx and any CCRy (0<=x<=3. 1<=y<=4)

(i) Set up ACLK as the clock for Timer Ax. Calculate the counts for CCR0 and CCRy

**Set LFXTCLK to 128 KHz and base ACLK off it with diver of 4 (freq ACLK = 32 KHz)**

**CCR0 = 640 = 32 KHz of ACLK / 50 Hz desired**

**CCRN: 480 = 640 – 0.25\*640**

(ii) The starter project is provided in PWM\_BY\_COMPARE\_ON\_ANY\_PIN.zip

It is designed to generate a PWM waveform with frequency 1000 Hz and duty cycle 30% on Pin 2.2 (Blue LED2)

Make necessary modifications in the code to meet the specs given above. Demonstrate its proper functioning by connecting a white LED to pin 1.6

Deliverables

Both projects separately zipped

Copy of this page with your answers to the questions highlighted in blue and explanations thereto

Checkoff sheet

Submission due Wed 08/10 end of day