EE2361 - Lecture 35

12/2/16

New HW 5

⇒ Due 12/7/16

Pulse width modulation PWM

For the PIC24F the OC module
Can be configured to implement PWM

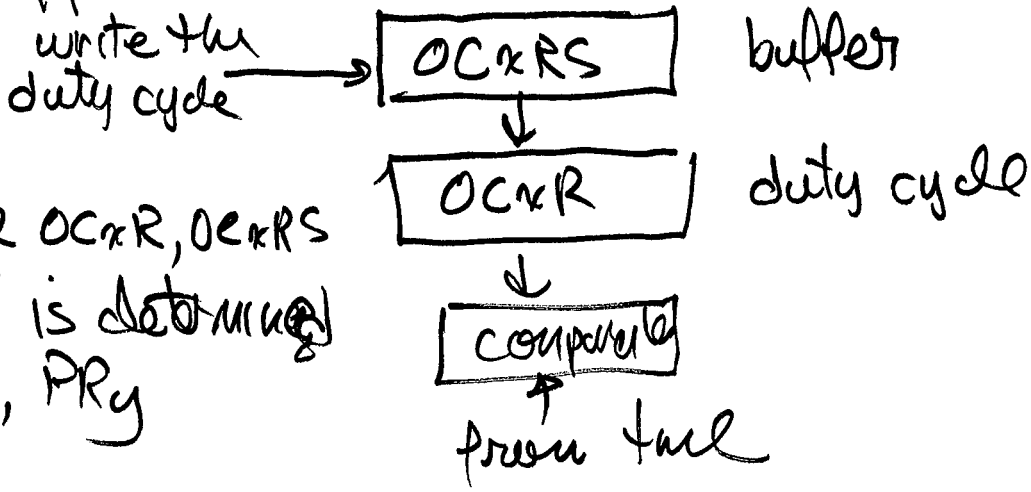
Set the mode bits

→ OCM = 110 PWM, no fault input
OCM = 111 PWM, fault input ✓

OCFA (OC1-OC4)
OCFB (OC5)

When configured in PWM mode (110, 111)

The OCxR and OCxRS registers function as duty cycle register and buffer



- duty cycle OCxR, OCxRS
- PWM period is determined by TMRy, PRy

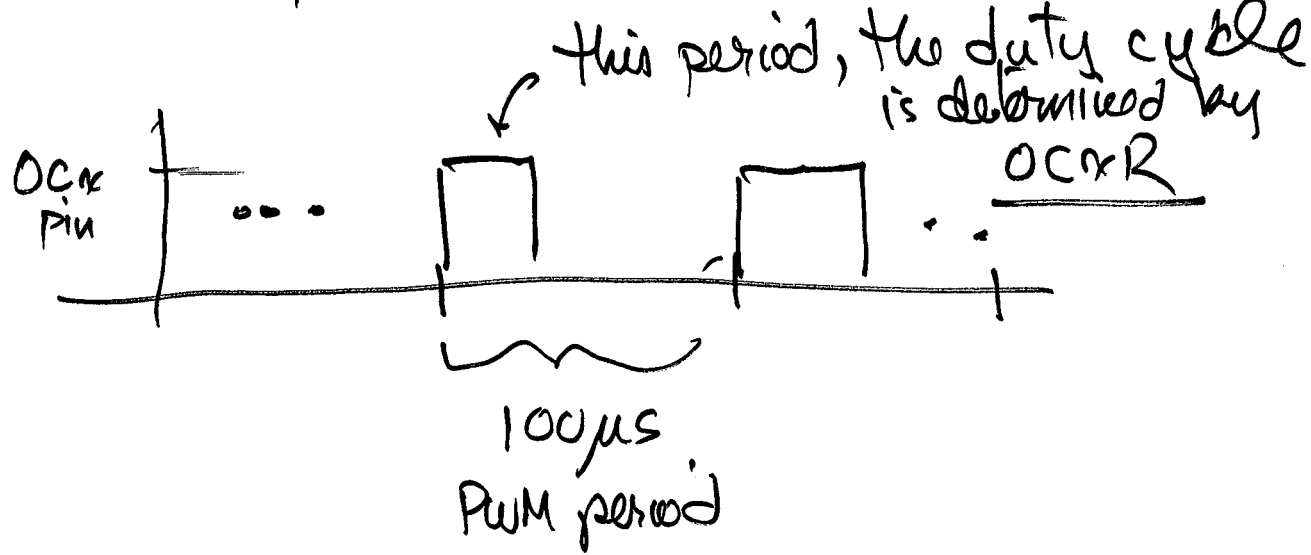
How to ~~determine~~ set the PWM period

$$\text{PWM period} = [(PR_y) + 1] \cdot T_{cy} \cdot (\text{TMR}_y \text{ prescale})$$

Example: We want a 10kHz PWM freq with T_{cy} of 62.5 ns what is PR_y?
Timer$_y$ prescale 1:1

$$(PR_y) = \frac{\text{PWM period}}{T_{cy}} - 1 = \frac{100\,\mu s}{62.5\,ns} - 1 = \underline{\underline{1599}}$$

This would produce a PWM signal on OCx pin



Figures from the FRM for OC PWM operation

[PIC24F FRM Section 16 (DS39706A) pages 16-21 to 16-26]

Example. Adjust the brightness of an LED on RB15 depending on the inputs from RB<0:3>

(16 values)

for input 15 maximum bright

" 0 led is off

PWM period? 1kHz

How to set Timer2 ? PR2 = ?

⇒ Timer2 ⇒ 1:1 prescaling

~~PR2 = 1 × 10^-3 sec~~

PWM period 1 ms = 1×10^{-3} seconds

= (PR2 + 1) T_{cy}

⇒ PR2 = (16000 − 1) = 0x3e80

I'd like to have 16 values for 0 to max PWM

- Code w/ polling
- Code w/ interrupts