EE2361 - Lecture 12
10/3/16

Exam 1 Friday
⇒ covers material up to
Friday 9/30/2016 (HW1, HW2)
⇒ HW2 - due Wednesday

Example code to blink an led

⇒ electrical physical side of the design

⇒ software part of the design

ALL THE INFORMATION WE NEED IS ON THE DATA SHEET

Use the PIC24FJ64GA002

⇒ select for capabelity peripherals / memory

⇒ choose an appropriate package

Look at hooking up an led to a PIC24

⇒ ensure the hardware is sized properly

⇒ need to use and configure the pins correctly

⇒ use a "general purpose" I/O port & pin

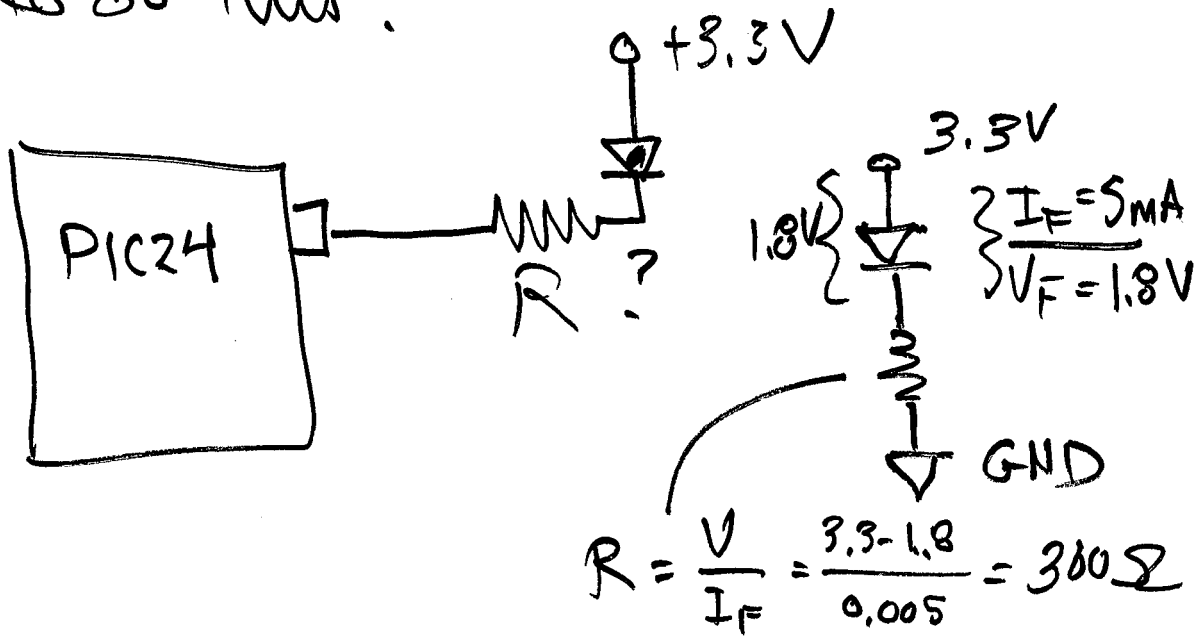
→ See section 2 figure 2-1 of the datasheet for the minimum connections of a PIC24FJ64GA002

→ See section 27.0 for the electrical characteristics. Note that the currents listed are typically well above what is used, operating at an absolute maximum rating will adversely affect the device over any but a short length of time.

→ The pin-out for a PIC24FJ64002 is found on page 2 of the datasheet

Connect an LED to a I/O pin

How to do this?



How does the I/O port work

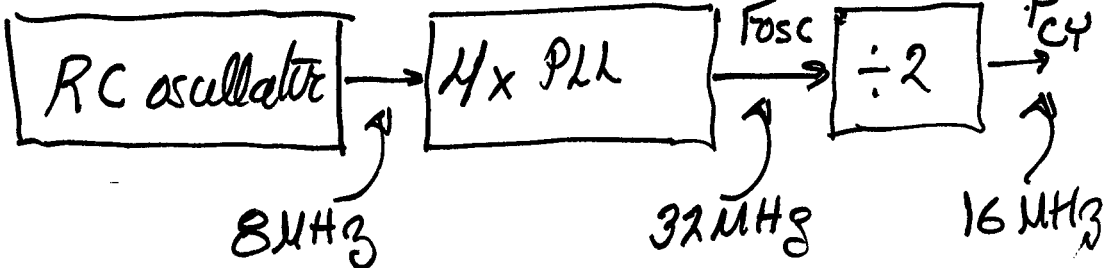
- section in data sheet

How does the clock work?

- section in data sheet

How the clock is configured is discussed in section 8 of the datasheet, see in particular figure 8-1 and read section 8-1

We use the RC oscillator built into the device - the instruction clock is found cl



The instruction clock period $T_{CY} = 62.5\,ns = \frac{1}{F_{CY}}$

I/O ports are discussed in section 10 of the datasheet, see in particular figure 10-1

→ The TRIS Latch determines if the pin is input or output (1 = input, 0 = output)

→ The ADIPCFG register determines if the pin is analog or digital

→ Some pins have different voltage tolerances than others, see table 10-1 in the data sheet

Note that a write to the latch register is the same as a write to the port

However, a read from a latch register reads the register value, a read from a port reads the port THESE MAY RETURN DIFFERENT VALUES

How long does the for loop need to execute?

for ½ second

So what should N be.?

With 16MHz clock and instruction time of 62.5 ns $\frac{16MHz}{2} = F_{cy}$

Look at C code to blink an LED on PORTB, bit RB1S

One method is to look at corresponding instructions in a loop, count the instructions, and then toggle RB1S every 0.5 sec

$\Rightarrow$ Find N so that

$$0.5\ \text{sec} = N \times (\text{number of instructions}) \times 62.5\ \text{nS}$$