Last Time

Serial transmission of data
• Asynchronous serial interface on the mega8
• Serial access functions
  – getchar()
  – putchar()
  – printf()
  – scanf()
Today

- Project 2
- A first mega8 circuit
- Serial interface example

- Homework 3 due on Thursday
Setting the Throttle

We want to generate the following string to the serial port:

```
tDDD\n\r
```

- DDD = 1-3 digit number
- How?
Last Time

- Project 2 specification
Today

• A bit more on project 2
• Timing/counting in hardware
void set_throttle(uint8_t val)
{
    if(val > 0 && val <= 255)
        printf("t%d\n\r", val);
}

tDDD\n\r
Using the Throttle

How do we use this function so that we generate a smooth ramp-up of the throttle?
Using the Throttle

```c
int main(void)
{
    uint8_t counter;
    ioinit();
    for(counter = 60; counter < 150;
        counter += 5)
    {
        set_throttle(counter);
        delay_ms(500);
    }
}
```
A More Complicated Circuit

(Projects 2-4)
A More Complicated Circuit

• Connect through adapter to AVR ISP

• Do not reverse the pins!
A More Complicated Circuit

Extra LED allows you to see when a program is being downloaded.
A More Complicated Circuit

16 MHz crystal

- Optional!
- Without it, your processor will run at 1MHz (in general, we will use 16MHz clock)
Project 2 In-Class Work I

• Given: a compass bearing and a goal bearing

• How do you properly compute the difference between the two?
  – Must account for the fact that 5 degrees is near 355 degrees
  – We also call this the **heading error**
Project 2 In-Class Work II

Given the current compass heading: how do you estimate the yaw velocity?

- Again – you must deal with the issue of wrap-around

- Hint: assuming that the heading goal is not changing, error velocity and yaw velocity will be the same thing
What does the implementation of `get_heading()` look like?