

# ECSESS

# RoboElectronics

# Fall 2014

Week 3 Build

# Goals for Today

- Add the adc.lpp and adc.h files to your MPLab X project
- Connect the SHARP distance sensor to power and the PIC16F88
- Write a function to read the distance sensor using the ADC and return a value
- Use the debugger function on MPLab X to find the value of the distance sensor

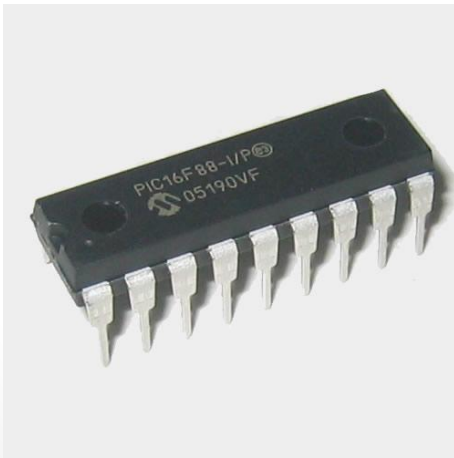
## Next Week

- Motor control using H-Bridges



# Required Material

- Circuit
  - PIC16F88
  - PicKit3
  - Yellow LED
  - Blue LED
  - 100, 150 ohm resistor
  - a capacitor
- Robot
  - IR Sensor



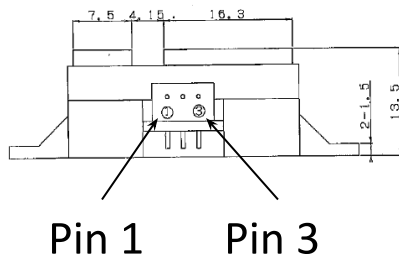
# SHARP Distance Sensor

- The SHARP distance sensor uses an infrared beam to determine if an object is in its field of view
  - The sensor can measure a distance between 4cm and 30cm
  - It does this by varying a voltage on a pin
  - The device also needs to be powered



Connector signal

	Signal name
①	V <sub>o</sub>
②	GND
③	V <sub>CC</sub>

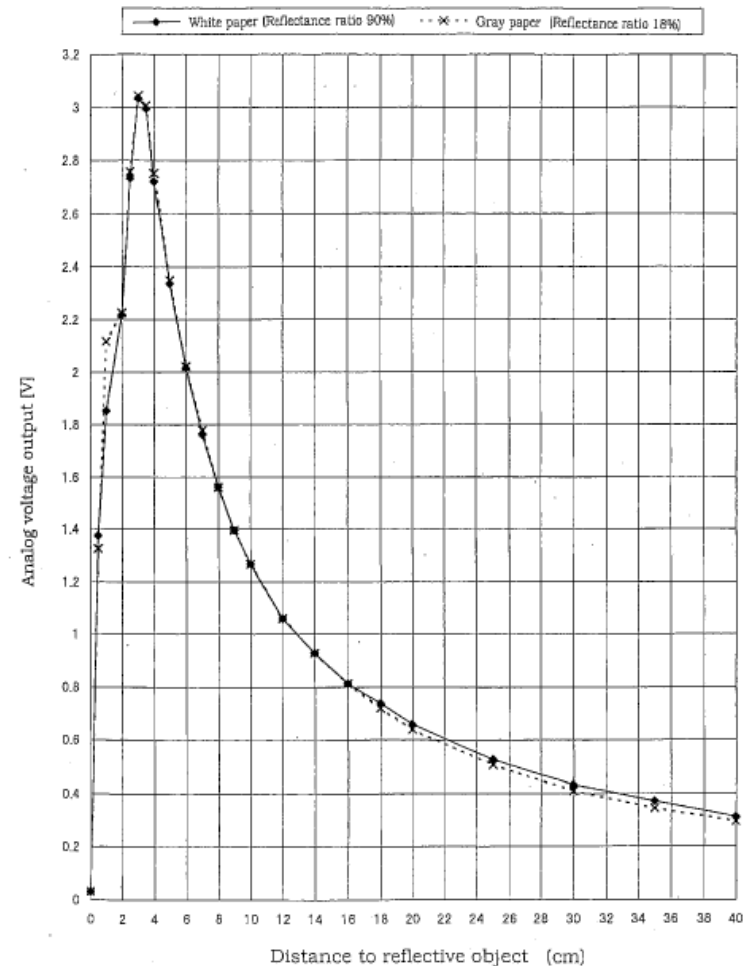


Absolute maximum ratings

Parameter	Symbol	Ratings
Supply voltage	V <sub>CC</sub>	-0.3 to +7
Output terminal voltage	V <sub>o</sub>	-0.3 to V <sub>CC</sub> +0.3

# Computing distance from bits

- Once you convert the bit value of the ADC to a voltage, you will need to convert it to a distance
- The SHARP datasheet gives a curve that relates distance to voltage
- There is also a curve that gives the inverse relationship between distance and voltage
- You will have to decide what factor and math to use to get a distance
  - Note, only use **integer** math. Do not use floats
  - Avoid divides at all costs

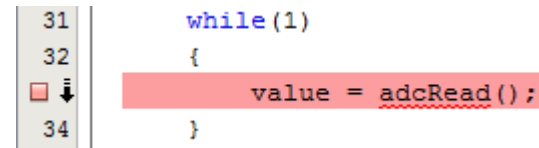


# Debugging in MPLabX IDE

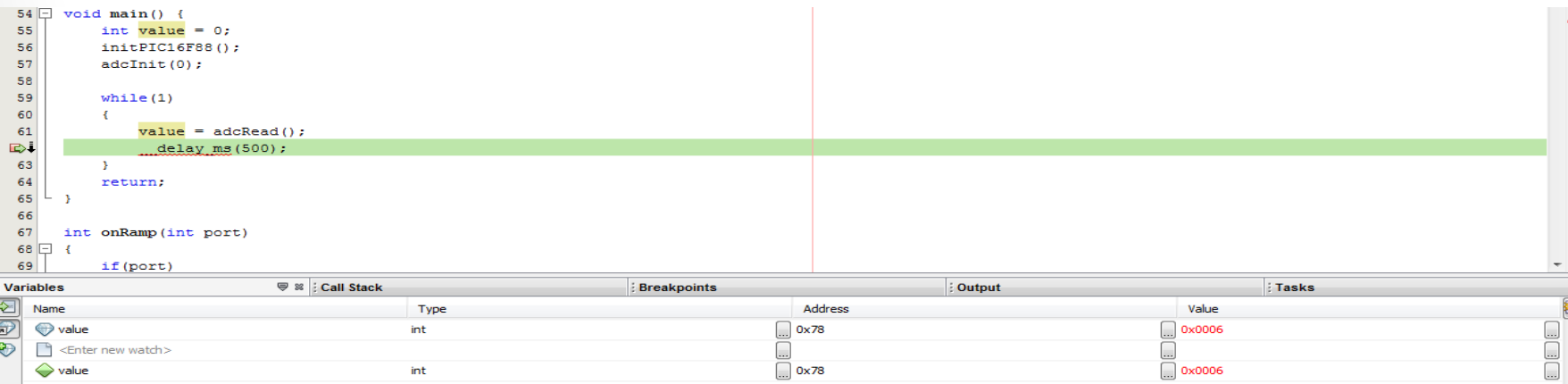
- Debugging allows us to see what values have been returned by an operation.
- We insert a breakpoint at a specific point in our code where we want to stop the program and look at a specific value.
- You can use the watch window to see the value of variable you are debugging



Debug Button on far right



Breakpoint in red on left



# Circuit to Build

