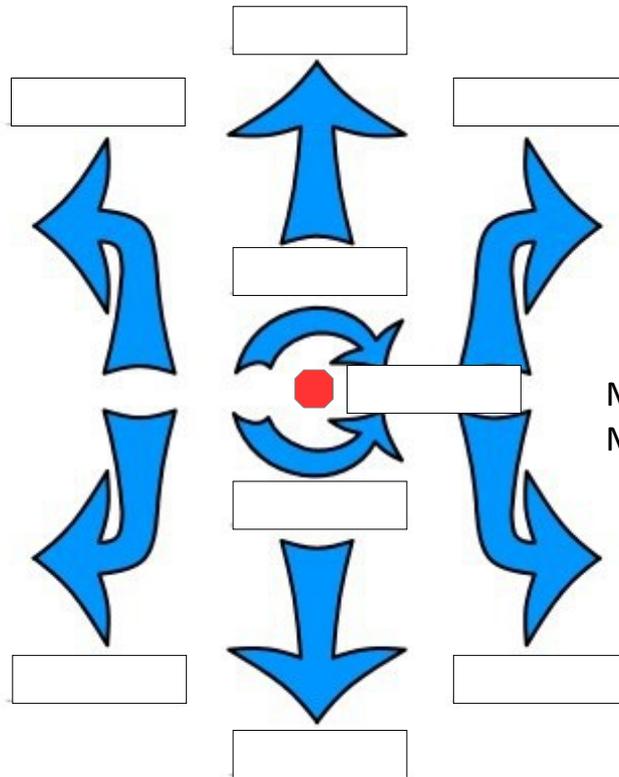


Lesson 1 - Drive the PicoPi

Learn how to move your PicoPi motors in all directions. Then you can make it drive in a square, or triangle, or even as a Crazy Robot^.

Activity:

Using PicoFlow Alpha, control the PicoPi so it turns in each of the following Directions. **Note:** For help with PicoFlow Alpha and the Output Tool, turn to page 2.



Labelling Key:
B5,x,x,C5,C4,C3
(Output Tool PIC Pins)

Note:
M1 = C4/C5 voltages**
M2 = C3/B5 voltages**

TIPS:

- Use an Output Tool, start with all pins Low, change 1 pin High at a time, test it, & record your findings on the diagram above.
- As you find each motor direction, Annotate & copy the Output Tool to a new place in the Designer window.

HINT:

- ** Using the diagram below (left), notice the M1 & M2 pins are labelled C4, C5, C3, & B5. You need to change these pins of the PIC in the Output Tool.
- ^ Crazy Robot needs a Delay Tool between every Output Tool.



PicoMiniDriver — Control Board



PicoPi—Robot (designed by David Oswald & Philip Tallents)

Output Tool

About the Output Tool:

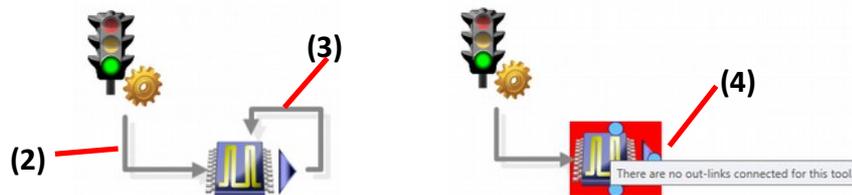
The Output Tool can control the states of all the pins on the selected PIC Micro-controller.

Selecting a PIC for your project: (1)



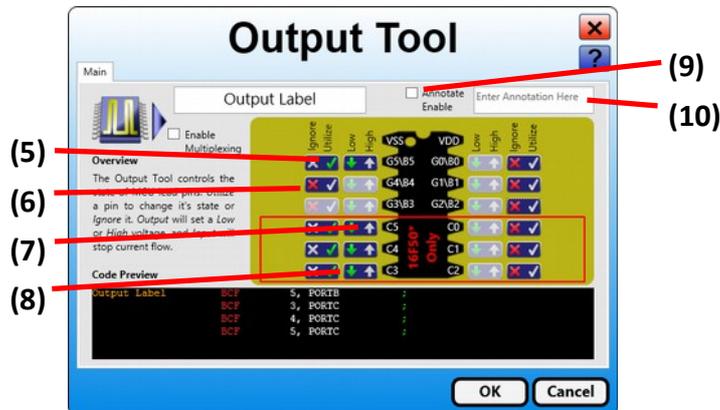
The PicoPi uses a PIC called the PIC16F506⁽¹⁾. This device can be selected in PicoFlow Alpha on the Programming Panel of the Ribbon Bar.

Linking the Output Tool:



The Output Tool must be linked up⁽²⁾ from the Start Tool and at the end the links must loop⁽³⁾ back to the Output Tool. If you don't link it up at the end, then you will receive an error⁽⁴⁾.

Output Tool Settings:



The diagram above shows the black PIC microchip with all its pins. These pins are labelled with a letter and a number, such as B5. Each pin has two buttons to control what it does.

Button 1  ⁽⁵⁾ controls if the pin can also be Utilised (tick), or Ignored (cross).

While button 2  ⁽⁸⁾ sets the pin of the PIC with a Low (0V) or High (5.5V) voltage :

- Utilise ⁽⁵⁾
- Ignore ⁽⁶⁾
- High ⁽⁷⁾
- Low ⁽⁸⁾

Both High and Low are considered outputs because they pass electrical *current* through the pin. High *sources* (puts) current onto the pin and Low *sinks* (takes) current away from the pin.

TIPS:

- Tick  the pins you want to use, and Cross  the pins you don't.
- Tick the Annotate Enable checkbox⁽⁹⁾ and then write a comment in the Annotation textbox⁽¹⁰⁾ to say the direction the PicoPi moves in.
- Plug in the PicoFlow USB Programmer to the PicoPi and Program⁽¹⁾ it. 

1. Drive the PicoPi—Worksheet

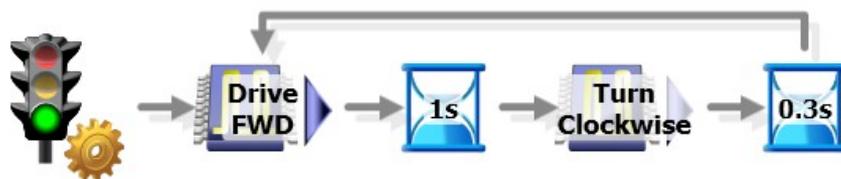
Revision Questions: What does an output tool do?

How many different directions did you find? Explain your answer.

What do the terms *High* and *Low* mean with regard to voltage?

What terms describe the electrical current at the pin?

Explore Further: Add a Delay between multiple Output Tools and make the PicoPi drive around.



Research and explain the purpose of the L293D on the PicoPi.



How might you use a multi-meter to measure the motor current on the PicoPi?

