Boe-Bots use Continuous Rotation Servo
- Use analog signal to encode rotation rate
- Protocol: Pulse Width Modulation (PWM)

Servos
- PWM
  - Controlling analog circuits with a processor's digital outputs
  - Voltage source is supplied to the analog load (e.g. motors) by means of a repeating series of on and off pulses
  - The on-time is the time during which the DC supply is applied to the load, and the off-time is the period during which that supply is switched off

Servo Internals
- Control circuitry and potentiometer that is connected to the output shaft
- Potentiometer allows control circuitry to monitor the current angle of the shaft
- Angle is correct
  - Then motor shuts off
- Angle is not correct
  - Then motor is turned to the correct direction until the angle is correct

Source: http://www.seattlerobotics.org/guide/servos.html

Pulse Width and Angle
- The angle is controlled by duration of pulse
- Pulse width of 1.5
  - Neutral Position
  - < 1.5 – clockwise movement
  - > 1.5 – counter clockwise movement
void pulseOut(int length, int portPin)

- Generate a pulse of a specific duration
- Used to generate the control pulses for a servo motor
- The time is measured in 8.68us units
  - With a maximum value of 32767 giving a maximum pulse time of 284.4ms.
  - A time of 0 will not cause a pulse
- To ensure that positive/negative pulse is generated it is a good idea to set the pin low/high using writePin(..)
  - pulseOut inverts the value of the selected pin, wait for specified length and then returns the pin to its original state

Calibrating a servo

- Send a pulse with a pulse width of 1.5ms (i.e. centering pulse width) continuously
- On the back of each servo by the battery pack there is a small hole giving access to a yellow and blue potentiometer
- While running your calibration program, use a Philips screwdriver to the potentiometer until the servo stops turning
  - Make sure you do not turn them too fast

Connections on Boe-Bot

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