# Blue Point Engineering

Instruction I

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# *Wizard - VI Controller Board*

*Ver 2.0 Controller*

The **Wizard - 6 Controller board** provides random motion for up to 3 servos with speed, dwell, maximum and minimum range setting options.

**Servos 1** and **2** are semi - synchronised
( example for eyes or head left-right, up-down movements)

**Servo 3** is driven independently - pulsed
( example for eye-lid blink action )

*Board Size: 3-1/2" L x 1-3/4" W x 3/8" H*

## Board Connections

**Power**: 9V DC to the board, center pin positive. Wizard - VI Controller board requires approximately 5mA, but allow up to 0.5 Amps per connected standard servo. ( Regulated 9 Vdc @ 2 Amp power supply suggested )

**Servos**: Connect up to 3 servos to the locations indicated - ensure correct polarity otherwise the servos / board may be damaged. (White, Red, Black servo connection pins)

## Setting Controls

**R/S Jumper:** Selects **R**un mode (jumper out) or **S**etting mode (jumper in)

**1,2 and 3 Jumpers**: Placing a jumper over a pin pair selects that servo for rmin and max servo travel settings.

**Rng Jumpe**r ( travel **RANGE**): Selects the servo range - jumper **ON** gives a standard 90 degree rotation range, jumper **Off** gives a 180 degree rotation range pulse stream for servos capable of rotating 180 degree. If using a servo in the 180 degree range, make sure your servos are not hitting their internal stops - this can cause damage to the servo and the Wizard - VI board. The range servo is continuously checked during operation.

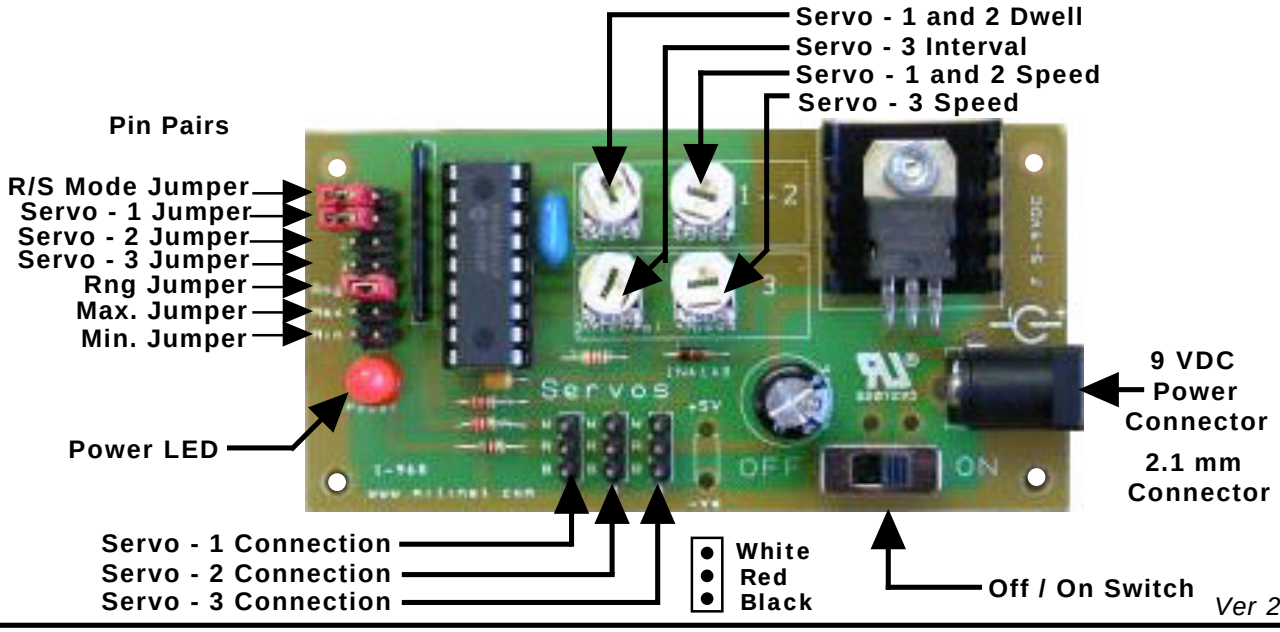
**Max Jumper**: Sets the upper travel limit of the currently selected servo.

**Min Jumper:** Sets the lower travel limit of the currently selected servo.

### Potentiometers

Servos 1-2 **Dwell**: Sets the time between moves (approx. maximum of 50 seconds), (CCW = short, CW = long)
Servos 1-2 **Speed**: Sets the travel speed of servos 1 and 2. ( CCW = slow and CW = fast )
Servo 3 **Interval**: Sets the time rate between servo 3 moves (approx. 20 seconds max.), (CCW = short, CW = long)
Servo 3 **Speed**: Sets the travel speed of servo 3. ( CCW = slow and CW = fast )

**The potentiometers (Dwell, Interval, Speed) used in this controller board are very precise. DO NOT force the potentiometers to the far Left, Right range or press down hard on the potentiometers with a screwdriver. Doing so will damage the potentiometer resulting in physical damage to the controller and cause faulty operation of the on-board electronics.**




*Ver 2.0*

## Setting Up the Servo Travel Limits

The maximum ( **Max** ) and minimum (**Min**) travel positions may be set for each servo and are stored in memory.

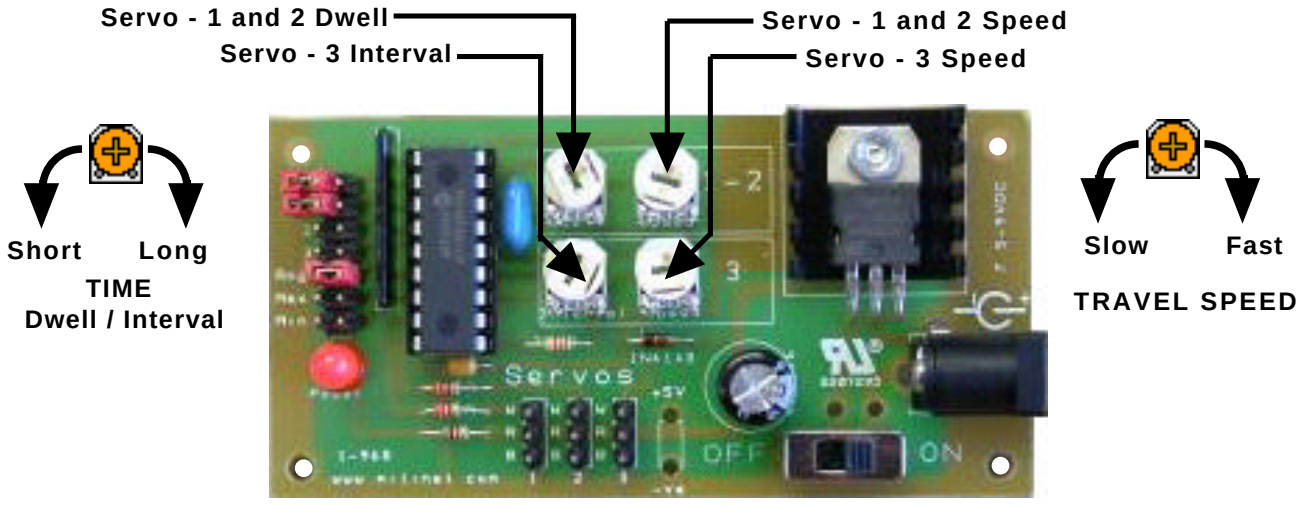
- Switch off the Wizard - VI Controller board (Off and On Switch ).
- Place a jumper over the **R/S** Mode (Run-Set) pin pair. Remove any jumper across the **Servo 1-2-3** pin pairs
- Switch On the Wizard - VI Controller board.
- **Servo 1**
  Place a jumper across Servo-**1** pin pair. The travel position will be controlled by moving the **Dwell** potentiometer.
  When the required **Minimum** position for Servo-**1** is reached, momentarily short together the **Min -** pin pair.
  Re-adjust Servo-**1** to its **Maximum** position by moving the **Dwell** potentiometer
  When the required **Minimum** position for Servo-**1** is reached, momentarily short together the **Max -** pin pair.
  Remove the Servo -**1** select jumper. The **Min** and **Max** servo travel for Servo-**1** has been set.
- **Servo 2**
  Place a jumper across Servo-**2** pin pair. The travel position will be controlled by moving the **Dwell** potentiometer.
  When the required **Minimum** position for Servo-**2** is reached, momentarily short together the **Min -** pin pair.
  Re-adjust Servo-**2** to its **Maximum** position by moving the **Dwell** potentiometer
  When the required **Minimum** position for Servo-**2** is reached, momentarily short together the **Max -** pin pair.
  Remove the Servo -**2** select jumper. The **Min** and **Max** servo travel for Servo-**2** has been set.
- **Servo 3**
  Place a jumper across Servo-**3** pin pair. The travel position will be controlled by moving the **Dwell** potentiometer.
  When the required **Minimum** position for Servo-**3** is reached, momentarily short together the **Min -** pin pair.
  Re-adjust Servo-**3** to its **Maximum** position by moving the **Dwell** potentiometer
  When the required **Minimum** position for Servo-**3** is reached, momentarily short together the **Max -** pin pair.
  Remove the Servo-**3** select jumper. The **Min** and **Max** servo travel for Servo-**3** has been set.
- Switch off power. Remove all jumpers and re-power the Wizard - VI Controller board.

## Using the Dwell and Speed Settings for Servo - 1 and Servo - 2

- Set the **Dwell** and **Speed** (1-2) potentiometers to adjust the wait time and speed action of the servos 1-2.
  The Wait Time ( time between servo action 1, 2 ) is controlled by adjusting the **Dwell** potentiometer.
  Adjusting the **Dwell** potentiometer to the left (**CCW**) will decrease ( **short** ) the time between servo action and adjusting the potentiometer to the right (**CW**) will increase ( **long** ) the time between servo action.
  The **Speed** (1-2) (servo travel motion ) is controlled by adjusting the **Speed** potentiometer.
  Adjusting the **Speed** potentiometer to the left (**CCW**) will decrease ( **slow** ) the servo motion and adjusting the potentiometer to the right (**CW**) will increase ( **fast** ) the speed of the servo motion.

## Using the Interval and Speed Settings for Servo - 3

- Set the **Interval** and **Speed** (3) potentiometers to adjust the wait time and speed action of servo 3
  The Wait Time ( time between servo action 3 ) is controlled by adjusting the **Interval** potentiometer.
  Adjusting the **Interval** potentiometer to the left (**CCW**) will decrease ( **short** ) the time between servo action and adjusting the potentiometer to the right (**CW**) will increase ( **long** ) the time between servo action.
  The **Speed** (3) (servo travel motion ) is controlled by adjusting the **Speed** potentiometer.
  Adjusting the **Speed** potentiometer to the left (**CCW**) will decrease ( **slow** ) the servo motion and adjusting the potentiometer to the right (**CW**) will increase ( **fast** ) the speed of the servo motion.

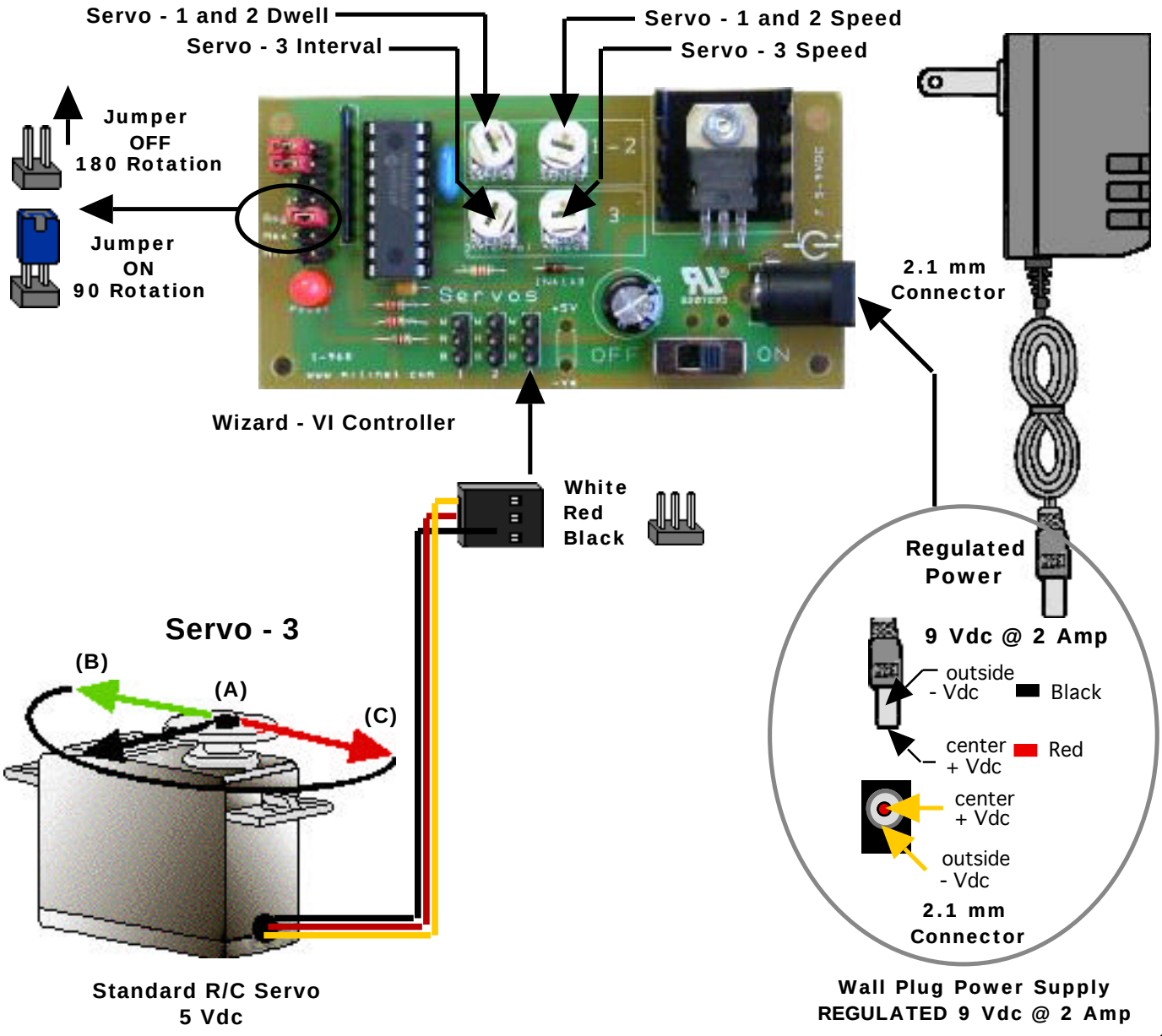


## Running

- Ensure the **R/S, 1, 2, 3, Rng, Max, Min jumpers** are removed. (OFF of pins )
- Select the required servo range.
  **Rng Jumpe**r: Selects the servo range - jumper **ON** gives a standard 90 degree motion range, jumper **Off** gives a 180 degree range pulse stream for servos capable of rotating 180 degree. If using a servo in the 180 degree range, make sure your servos are not hitting their internal stops- this can cause damage to the servo and the Wizard board. The range servo is continuously checked during operation.

- Turn the **Interval** and **Dwell** potentiometers fully CCW ( Counter ClockWise - Left ) , Interval, Dwell set to Short wait between actions. ( This is the shortest wait between action setting)
- Turn the **Speed 1-2 and Speed 3** potentiometers fully CW ( ClockWise - R ight ) , Speed set to Fast servo motion. ( This is the fastest speed action setting)
- Connect 3 servos to the servo header pins, observe correct connection (White, Red, Black) and turn on power to the Wizard - VI Controller board.
  The servos will start to move in a random manner, Adjusting the **Speed, Interval** and **Dwell** will create a variety of random servo travel movements.

**NOTE:** Switch OFF power and turn power ON, between adjusting Dwell, Interval and Speed potentiometer changes to reset the controller quickly for the new potentiometer settings each time.



# Wizard - VI Controller Board

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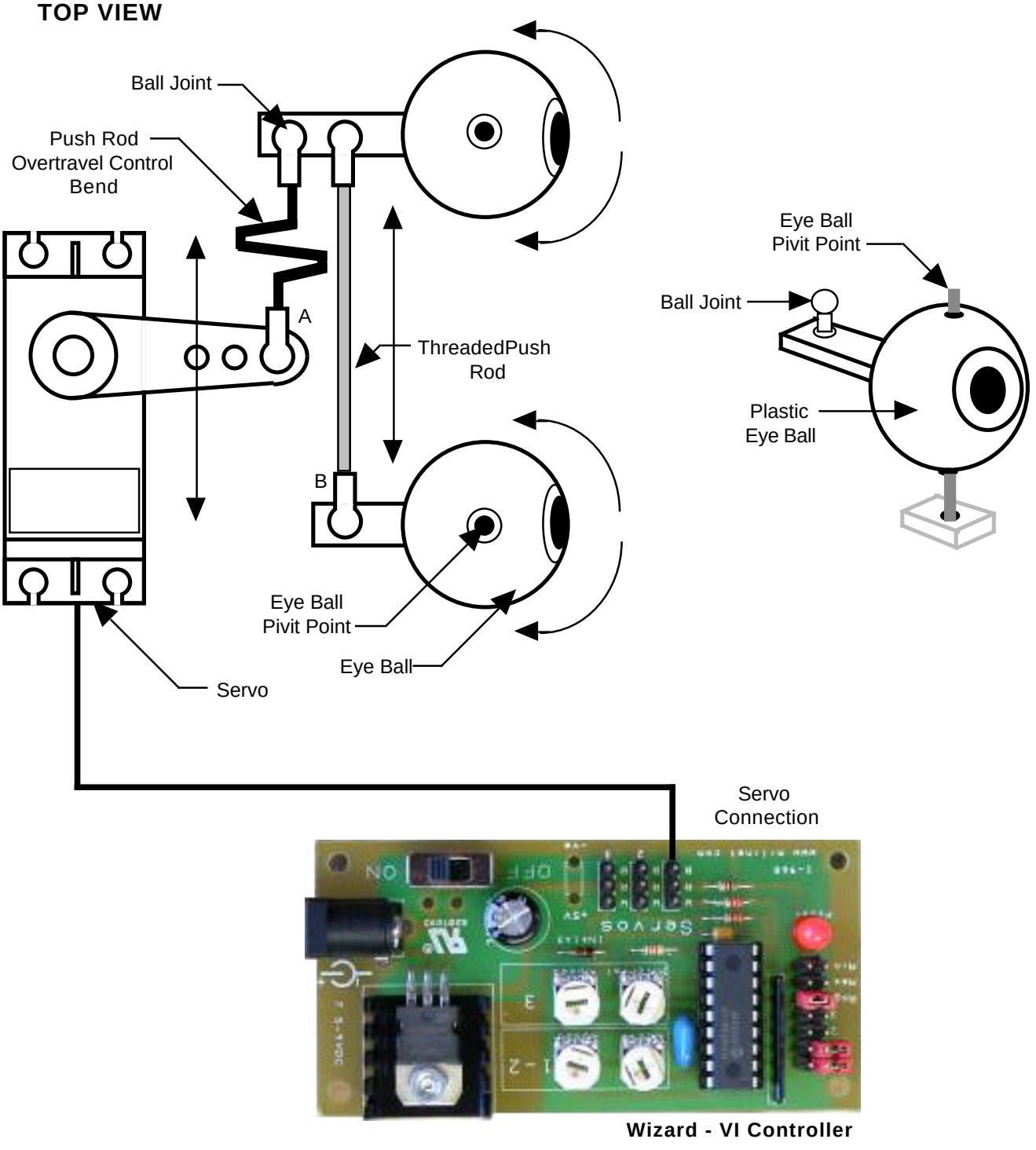
## Example Eye Module

**Random Eye Motion ( Left and Right )**

**TOP VIEW**




**Wizard - VI Controller**

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*Version 2.0*

# Wizard - VI Controller Board

*Controller*

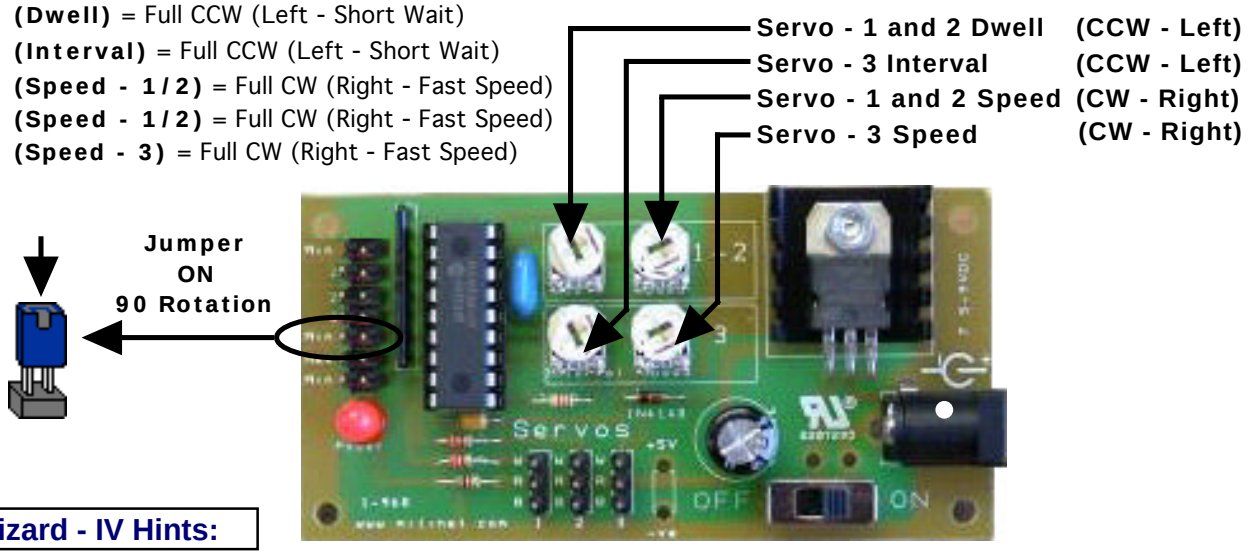
## Wizard - IV Test Settings

- **Wizard - IV Controller Default Settings**

**(R/S)** Jumper - OFF
**(1)** Servo 1 = Jumper OFF
**(2)** Servo 2 = Jumper OFF
**(3)** Servo 3 = Jumper OFF

**NOTE:** Be sure to set the Max and Min travel range of the Servos. (See instructions for more details)

**(Rng)** Range = Jumper ON / 90 Degree Servo Rotation **OR** (Jumper OFF for 180 Degree Servo Rotaton)
**(Max)** = Jumper OFF
**(Min)** = Jumper OFF
**(Dwell)** = Full CCW (Left - Short Wait)
**(Interval)** = Full CCW (Left - Short Wait)
**(Speed - 1/2)** = Full CW (Right - Fast Speed)
**(Speed - 1/2)** = Full CW (Right - Fast Speed)
**(Speed - 3)** = Full CW (Right - Fast Speed)




## Wizard - IV Hints:

**Q: Servo moving very little in motion. (Tiny back and forth motion or no movement)**
**A:** Set the servo range (**Rng** pins). Jumper **ON** gives a standard 90-degree motion range; jumper **OFF** gives a 180-degree range pulse stream for servos capable of rotating 180 degree. (Use caution not to overdrive the servo).
**A:** The servo travel limits maybe set to small. Set the Min and Max servo travel, by selecting the servo jumper pins 1, 2, or 3 and momentarily short together the **Max or Min** pin pairs. (See instructions for more details on setting the servo travel limits)
**A:** Adjust the Speed, Dwell or Interval potentiometers to match the mechanical ability of the servo. Large servos move slower, then the wait time set. If Dwell, Interval or Speed is faster then the servo's mechanical, then the servo never reaches its full motion range, before being sent a new wait time (Dwell, Interval or Speed) setting.

**Q: Servo moving very slow or has no motion.**
**A:** Set the **Interval**, **Dwell** and **Speed** potentiometers for the fastest speed and shortest wait between actions, and then adjust each potentiometer as needed. (See instructions for more details on setting the servo travel limits)

**Q: An on-board potentiometer is adjusted but nothing happens.**
**A:** Power OFF then turn back ON the controller board between adjustments, this will quickly reset the new changes made from the potentiometers. When a change is made, the microcontroller must continue the current program code until a power reset or the end of the code program is reached and the program starts over with the new potentiometer control value codes generated by the potentiometer adjustments.

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