

## Animatronic Wizard - 2 Board

Controller

(BPE No. WAC-0020)

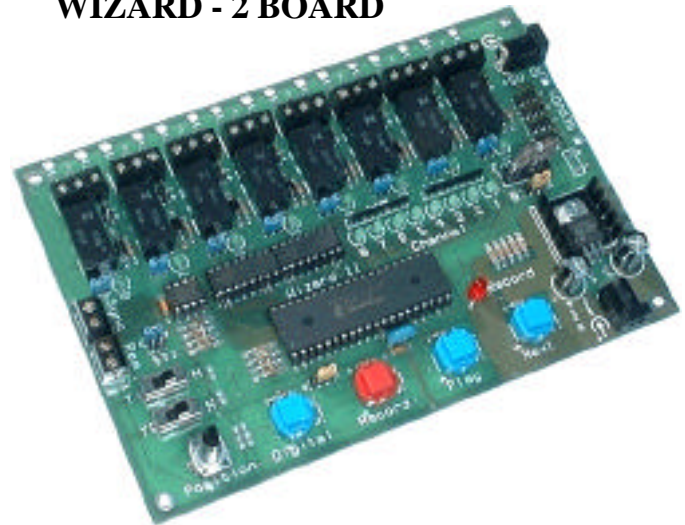
### WIZARD - 2 BOARD

Page 1

The **Wizard - 2 Board** will record and playback up to **5 minutes** of action for up to **4-R/C** type **servos** and **4-digital outputs** or up to **20 minutes** of action for **8-digital outputs**. The board incorporates features such as looping action with variable delay between loops, auto start-up on power up, a connection interface terminal for a PIR, remote switch or floor sensor pressure pad to initiate playback and the ability to daisy chain several cards together.

Recording sessions are built up on a track-by-track basis, no complex programming is required during recording, all previously recorded tracks are re-played to aid in synchronization.

An on-board jumper allows the board to be configured for **8 -Digital outputs** or a combination of **4 -Servo and 4 -Digital outputs**.



Board Size: 6-5/8" L x 4-1/2" W x 7/8"H

Wizard - 2 Board is pre-assembled and tested.

Recommended regulated 9 Volt dc power supply and regulated +5 Volt dc @ 3 Amp power supply

### WIZARD - 2 BOARD FEATURES:

- 4 -Servo output channels, each capable of recording and playback of up to 5 minutes of action.
- 4 -Digital switched ON/ OFF channels with relay outputs, capable of recording and playback of up to 5 minutes of action, or 20 minutes of action, when configured as digital output board.
- On board Potentiometer to adjust servo positions during recording or to determine the time delay between playback loops during automatic loop play - adjustable between 5 and 65 seconds.
- 8- digital channels 0.0 to 4.5 Volt dc @ 100mA pin outputs, when configured as a Digital board.
- 8- On-board selectable relays ( 30 Volt @ 2 Amp DC), configured as 1-4 or 1-8 relay units.
- On board NEXT, PLAY and RECORD programming push buttons. No PC required for programming.
- Record enable / disable jumper block to help safe guard recorded programmed actions.
- AUTO-PLAY and LOOP-PLAY selection switches for configuring board functions / operation.
- Remote activation switch connection for sensor, floor mat switch, manual or relay triggered Go/Playback.
- Programming and operation status on-board Green and Red LED's.
- The servo outputs provide standard pulse coded signals of between 1 msec and 2 msec duration repeated every 20 msecs making it suitable for all standard hobby +5 Volt dc R/C type servos.
- EEPROM - containing the programmed data, can easily be removed and copied to other Wizard boards.
- On board support for other optional control boards (Relays, AC Controller, Motor Bridge, etc.).

### Board Functions

#### **NEXT-channel-key**

Changes the current active channel for manual movement and recording.

Each key-press selects the next channel: 1-8

When the Servo option is selected - servos 1 through 4 and then digital channels 5 through 8.

When the Digital option is selected - digital channels 1 through 8.

**PLAY-key**

Replays a set of recorded programmed moves.

During playback the channel LED's will form a bar-graph indicating the amount of time used.

A switch may be connected to the remote connector to function in the same way as the play-key.

When the moves have finished playing the bar-graph LED's will turn OFF.

**POSITION-control (On-board Potentiometer)**

When not in Playback mode the Position control alters the motion of the servo on the current channel (if selected). **NOTE:** If the digital channels are selected the Move control is inoperative. You can adjust the POSITION-control to set a delay between 5 sec. to 65 sec. for the automatic looped playback mode.

**DIGITAL-key**

When a digital channel is selected, pressing the DIGITAL - key will operate that particular digital channel, **ON** when pressed (Relay ON) and **OFF** when released (Relay OFF). The Digital Key can be Held Down or pulsed ON and OFF as needed.

**D-S Jumper**

With the jumper **IN** place, the board is configured for 8 digital output operation.

With the jumper **OUT**, the board is configured for 4 servo and 4 digital output operation.

If you change the configuration, it is strongly recommended you perform a memory erasure as detailed below otherwise you will get very strange results.

**RECORD-Enable link**

If the jumper is set at the "Enabled" position, recording will be permitted. Remove to "Disable" recordings

If the **RECORD-key** is held down during power up, all memory will be erased. During erase mode the green channel LED's will form a bar-graph indicating count down time till done. (approximately 20 seconds)

**RECORD key**

The RECORD-key has no effect unless enabled by using the RECORD-Enable jumper link.

Press and release the RECORD key to **Start** recording. Press and release the RECORD key to **Stop** recording.

During recording the green channel LED's will form a bar-graph indicating the amount of time used. When the recording mode has finished, or reached the max time allowed, the bar-graph LED's will turn Off.

**NOTE: The recording on channel one will set the maximum available recording time for all other channels.** Always record channel one first. (Digital or Servo) Recording periods for further channels two through eight can not be longer than that set for channel one.

**Examples****1. A Short Servo Motion Recording****Servo  
Channel  
Program**

- Make sure that the D-S Jumper has been removed, to put the Wizard- 2 controller into the Servo / Digital Output Mode. The Enable jumper must be set at the (E) and the LOOP and the AUTO switch must be in the "N" position.
- Power Down the Wizard-2 controller and then hold down the record key during re-power up, all memory will be erased (LED's will count down, aprox 20 sec.)
- Select channel-1 by pressing NEXT-channel-key until the green number 1 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Rotate the Move-position-control for 4 seconds.  
Servo number 1 will move depending on position of MOVE-position-control motion. Other Servos number 2-4 may move, following moves previously recorded.
- Press and release the RECORD-key at the end of the 4 seconds to end recording.
- Select channel- 2 by pressing NEXT-channel-key until the green number 2 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Rotate the MOVE-position-control.  
The recording will end automatically after 4 seconds. (Set by Channel 1 Time)
- Select channel- 3 by pressing NEXT-channel-key until the green number 3 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Rotate the MOVE-position-control.  
The recording will end automatically after 4 seconds. (Set by Channel 1 Time)
- Select channel- 4 by pressing NEXT-channel-key until the green number 4 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Rotate the MOVE-position-control.  
The recording will end automatically after 4 seconds. (Set by Channel 1 Time)
- Press and release the **PLAY-key** to review the recorded sequence.

**Examples****2. A Short Digital Output Recording****Digital  
Channel  
Program**

- Make sure that the **D-S Jumper** has been installed, to put the Wizard- 2 controller into the Digital Output Mode. The Enable jumper must be set at the (**E**) and the LOOP and the AUTO switch must be in the "N" position
- Power Down the Wizard-2 controller and then hold down the record key during re-power up, all memory will be erased (takes approximately 20 seconds)
- Select channel-1 by pressing **NEXT-key** until the green number 1 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Press and hold the Digital-key for 4 seconds.  
Other Digital Channels may activate from previously recorded events.
- Release the Digital-key and then press and release the RECORD-key at the end of the 4 seconds to end recording. (The red LED will turn OFF)
- Select channel- 2 by pressing NEXT-key until the green number 2 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Press and release multiple times, or hold the Digital-key for 4 seconds.  
The recording will end automatically after 4 seconds. (Set by Channel 1 Time)
- Select channel- 3 by pressing NEXT-key until the green number 3 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Press and release multiple times, or hold the Digital-key for 4 seconds.  
The recording will end automatically after 4 seconds. (Set by Channel 1 Time)
- Select channel- 4 by pressing NEXT-key, repeat the record and activate sequence.
- Press and release the **PLAY-key** to review the recorded sequence.

**Examples****3. A Full-length Recording with Servo and Digital****Servo  
Channel  
Program**

- Make sure that the D-S Jumper has been removed, to put the Wizard- 2 controller into the Servo and Digital Output Mode. The Enable jumper must be set at the (**E**) and the LOOP and the AUTO switch must be in the "N" position
- Power Down the Wizard-2 controller and then hold down the record key during re-power up, all memory will be erased (takes approximately 20 seconds)
- Select servo channel-1 by pressing NEXT-channel-key until the number 1 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Rotate the MOVE-position-control.  
Servo 1 will move depending on position of MOVE-position-control.  
Other Servos will move following moves previously recorded.  
Recording will end when EEprom memory is full. (Aprox 5 minutes)  
( During recording the green channel LED's will form a bar-graph indicating the amount of time being used.)
- Select channel- 2 by pressing NEXT-channel-key until the number 2 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Rotate MOVE-position-control.  
Recording will end when EEprom memory is full.  
( During recording the green channel LED's will form a bar-graph indicating the amount of time being used.)
- Select channel- 3 by pressing NEXT-channel-key until the number 3 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)  
Rotate MOVE-position-control.  
Recording will end when EEprom memory is full.
- Select channel- 4 by pressing NEXT-channel-key until the number 4 LED is lit.  
Press and release the RECORD-key. (The red LED will light, record mode is active)
- Rotate MOVE-position-control.  
Recording will end when EEprom memory is full.
- Channel- 1 through Channel- 4 Servos are now programmed.

**Digital  
Channel  
Program**

- Press and release the **PLAY-key** to review the recorded sequence.
- Select channel-5 by pressing NEXT-channel-key until the number 5 LED is lit.
- Press and release the RECORD-key. (The red LED will light, record mode is active)
- Press, Release or Hold the **Digital-key** as needed turning the Relay ON and OFF.  
Recording will end when EEprom memory is full.

- Select channel-6 by pressing NEXT-channel-key until the number 6 LED is lit.
  - Press and release the RECORD-key. (The red LED will light, record mode is active)
  - Press, Release or Hold the Digital-key as needed.  
Other Digital, Servo Channels may activate from previously recorded events.  
Recording will end when EEPROM memory is full.  
( During recording the green channel LED's will form a bar-graph indicating the amount of time being used.)
  - Select channel-7 by pressing NEXT-channel-key until the number 7 LED is lit.
  - Press and release the RECORD-key. (The red LED will light, record mode is active)
  - Press, Release or Hold the Digital-key as needed.  
Recording will end when EEPROM memory is full.
  - Select channel-8 by pressing NEXT-channel-key until the number 8 LED is lit.
  - Press and release the RECORD-key. (The red LED will light, record mode is active)
  - Press, Release or Hold the Digital-key as needed.  
Recording will end when EEPROM memory is full.
- Press and release the **PLAY-key** to review the recorded sequence.

### **MAKING A PROGRAM CHANGE TO A SINGLE SERVO CHANNEL**

#### **Examples**

#### ***4. Making a Programming change for Servo Channel 4***

- Make sure that the D-S Jumper has been removed, to put the Wizard- 2 controller into the Servo Output Mode. The Enable jumper block must be set at the (E) enabled position. The LOOP switch and the AUTO switch must be in the "N" position.
- Select Servo channel "4" by pressing NEXT-key until green LED "4" is ON.
- Press and release the RECORD-key. (The red LED will light, indicating record mode is active)
- Rotate MOVE-position-control.  
Recording will end when EEPROM memory is full.  
( During recording the green channel LED's may form a bar-graph indicating the amount of time being used automatically).

*Note: Servo "1-3" and Digital outputs "5-8" will be active from previous recorded positions to aid in synchronization, and servo "4" will move as POSITION- control is rotated.)*

*(The selected channel (4) recording will end automatically based on the Start to Stop recorded time entered for servo channel "1" initially).  
(Channel -1 sets the time available for each channel)*

### Servo Channel Editing

### **MAKING A PROGRAM CHANGE TO A SINGLE DIGITAL CHANNEL**

#### **Examples**

#### ***5. Making a Programming change for Digital Channel 8***

Make sure that the D-S Jumper has been installed, to put the Wizard- 2 controller into the Digital Output Mode. The Enable jumper block must be set at the (E)

- enabled position. The LOOP switch and the AUTO switch must be in the "N" position.
- **DIGITAL CHANNEL "8"**
- Select Servo channel "8" by pressing NEXT-key until green LED "8" is ON.
- Press and release the RECORD-key. (The red LED will light, indicating record mode is active)
- Press, Release or Hold the Digital-key as needed.  
Recording will end when EEPROM memory is full.  
( During recording the green channel LED's will form a bar-graph indicating the amount of time being used.)

### Digital Channel Editing

## OPERATING / PLAYBACK

Set the Enable jumper block to the "D" disabled position. (This will protect the recorded program from being cleared or accidentally erased).

Set the LOOP switch and the AUTO switch to the "Y" position.

Press the PLAY-key and watch your recorded programming sequence in action.

You can adjust the POSITION-control to set a delay between 5 sec. to 65 sec. for the looped playback. (Your program will playback, stop-wait and restart automatically based on the time delay you set)

**NOTE:** you can also activate the playback sequence manually away from the Wizard - 2 board with the REMOTE option by moving the LOOP switch to the "N" position, and then pressing the PLAY- key or activate the connected REMOTE switch to start playback. (**Switch** Connected to **Rem** Terminal)  
( Check out the playback options drawing for various playback features available)

Last selected Channel LED will turn ON indicating a waiting status for the next switch activation between playback or recording modes.

### Clearing Memory to start a new program.

The Enable jumper must be set at the (E) enabled position.

The LOOP switch and the AUTO switch must be in the "N" position.

The RECORD - key is held down during Power Up, and released after power is applied.

The LED's "1-8" will form a count down bar- graph indicating that current programmed EEPROM memory is being cleared. (This will takes approximately 20 seconds).

After the initial 20 seconds all green LED's "1-8" will turn OFF and the current selected channel LED will turn ON, indicating the board is now ready for programming.

### SYNC Terminal

Synchronizing connection for multiple board module operation. Terminal connection delivers a pulse low signal (30 msec) at the start of playback and record event which may be used to trigger other Wizard boards connected in a chain or master module - slave module setup. The Sync line signal is normally held high.

### REM Terminal

Used to trigger the Wizard - 2 board by remote switch, sensor. Can also be jumpered together for no-stop playback with a wire loop.

### LOOP - slide switch

To make the Wizard- 2 board play the recorded moves repeatedly, move the switch to the 'Y' position. The recorded moves will start to play when the PLAY-key is pressed. There will be a pause at the end of playing (determine by the position of the Move control) after which the moves will start again.

Note: to record new program moves, the LOOP switch must be set to 'N' position.

### AUTO - slide switch

To make the Wizard-2 board play the recorded moves repeatedly on power - ON or reset, move the switch to 'the Y' position. The recorded moves will start to play on any power-up sequence..

Note: to record new program moves, the AUTO switch must be set to 'N' position.

### Pause between play loop option

When the Wizard- 2 board is set to LOOP play, the length of the pause between repeated playing may be set by the MOVE-position-control.

Turn the MOVE-position-control counter-clockwise for the minimum delay (approx. 5 seconds) and clockwise for the maximum delay (approx. 65 seconds).

### Maximum Recording time

In Servo-Digital configuration, the EEprom which stores the servo moves will store approximately 5 minutes of servo and digital actions. In Digital only mode, the recording time is approximately 20 minutes per channel.

### Servo Outputs

The servo outputs provide standard pulse coded signals of between 1 msec and 2 msec duration repeated every 20 msecs making it suitable for all standard R/C type servos.

### Digital Outputs

The digital outputs are configured as:

(100 mA max, Digital Output per channel 1-8 )

( Relays 1-8, 30 Volt @ 2 Amp with Common, N.O. and N.C contacts)

(Jumper select Digital Output Pins ( + / - ) at 4.5 Volts DC @ 100 mA)

# Power Supply

The Wizard - 2 Board incorporates several power supply options:

## Standard method- Common Power Supply: ( Wall / Battery Power Supply )

Set the jumper B-R jumper to the **B** position. In this configuration, the board control electronics, servos, relays and digital outputs use the same common regulated +5 Volt DC power supply together.

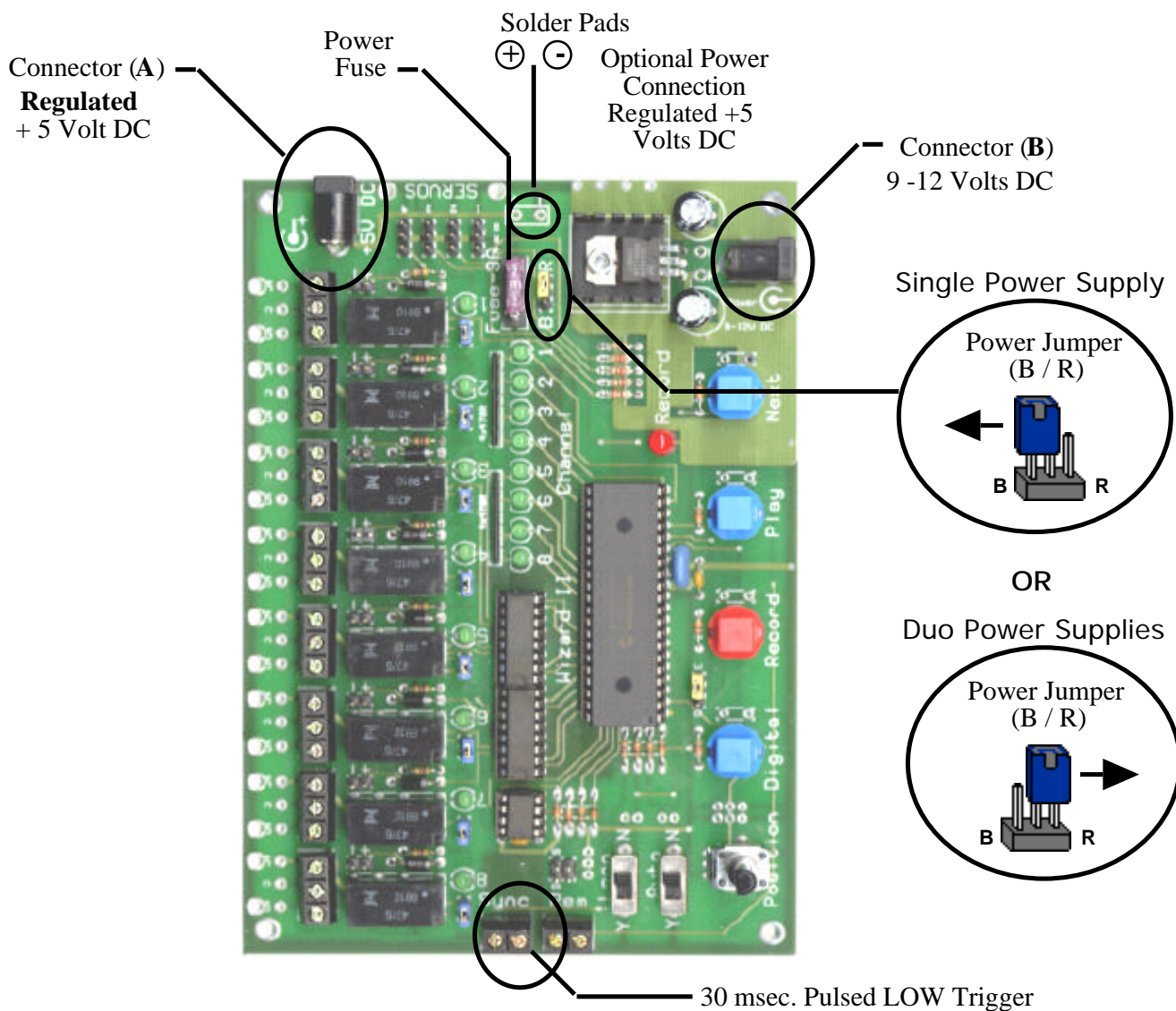
Connect a **REGULATED +5V DC** supply @ 3 Amps rating to the 2.1 mm socket at **Connector A**, marked +5V DC ( center contact positive voltage, outer negative voltage ) or connect to the adjacent optional plus ( + ) and minus ( - ) solder connection pads / holes near Connector A,

## Alternative method- Seperate Duo Power Supplies: ( Wall / Battery Power Supply )

Set the B-R jumper to the **R** position. Connect a stable **REGULATED 5 - 6 Volt DC @ 3 Amp** supply to the **Connector A** or to the adjacent optional plus ( + ) and minus ( - ) solder connection pads / holes near Connector A, This power connection supplies the servos, relays and digital outputs power only.

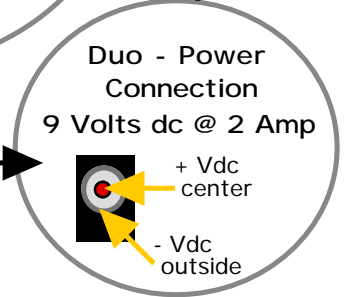
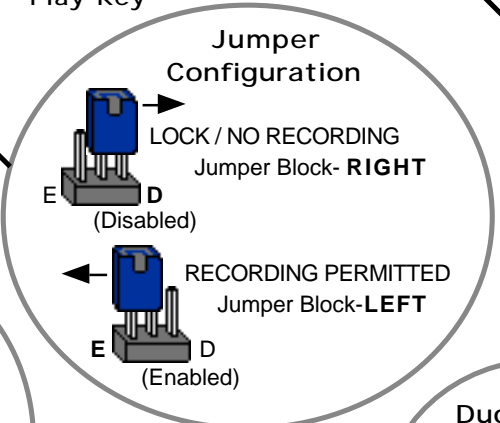
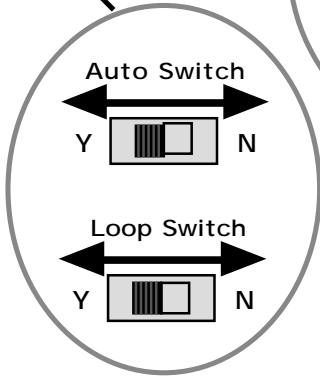
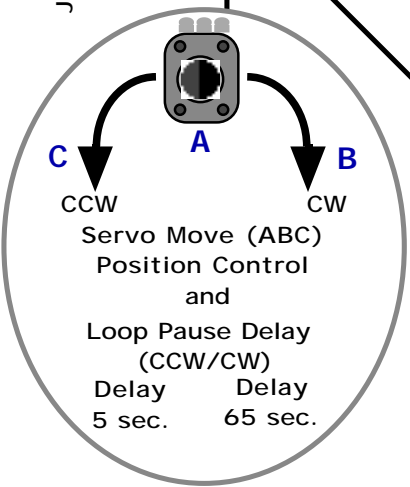
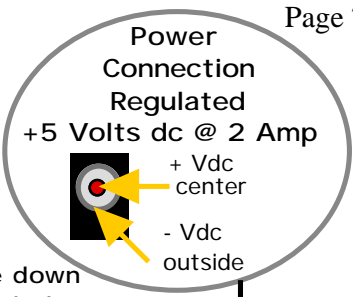
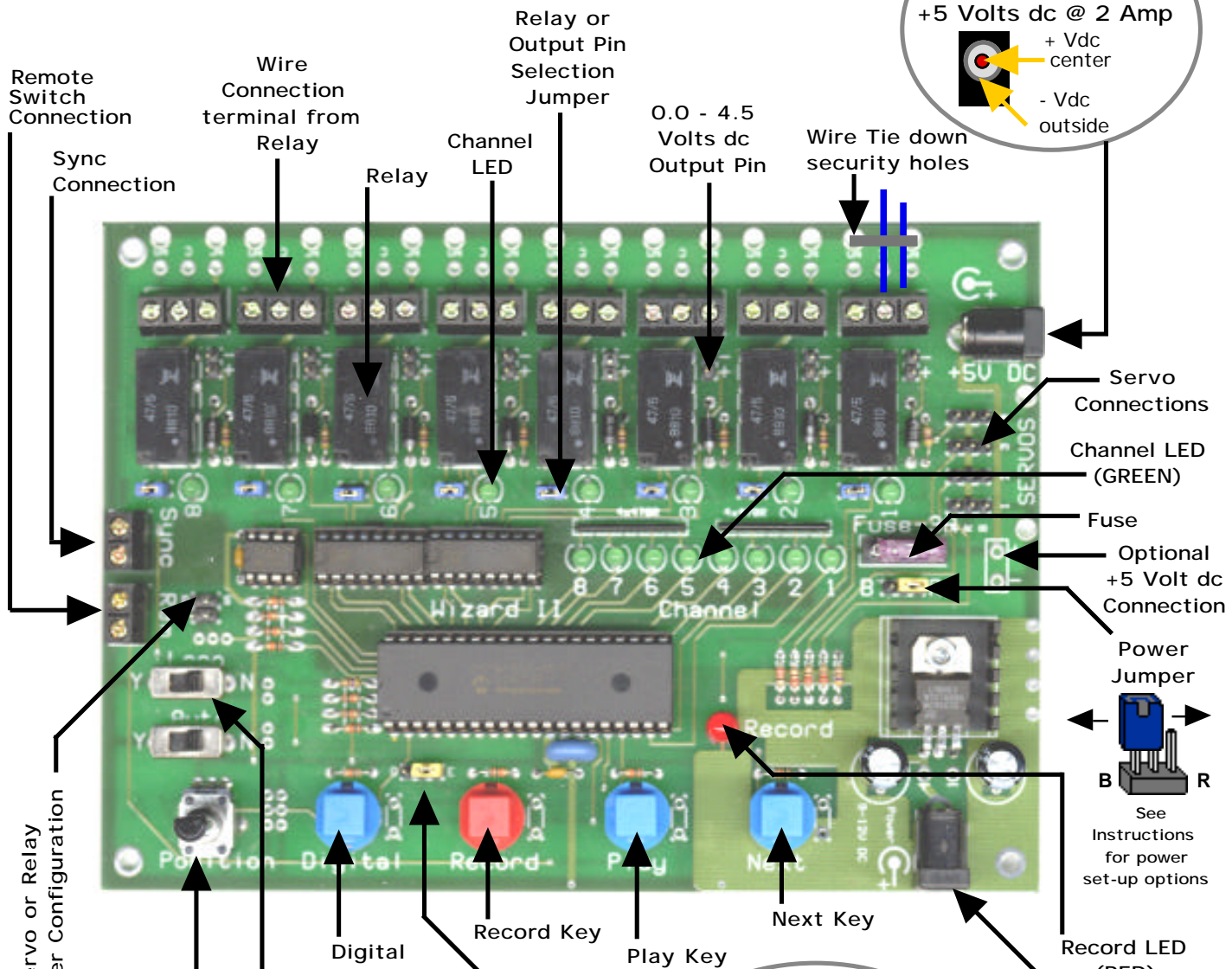
Connect a **9-12 Volt DC supply ( or 9 Volt battery )** to the second **Connector B**. This supplies power to the board control electronics only, via the on-board power regulator component.

( Recommend this option when operating all 4 servos with high loads, relays and digital outputs all together ).



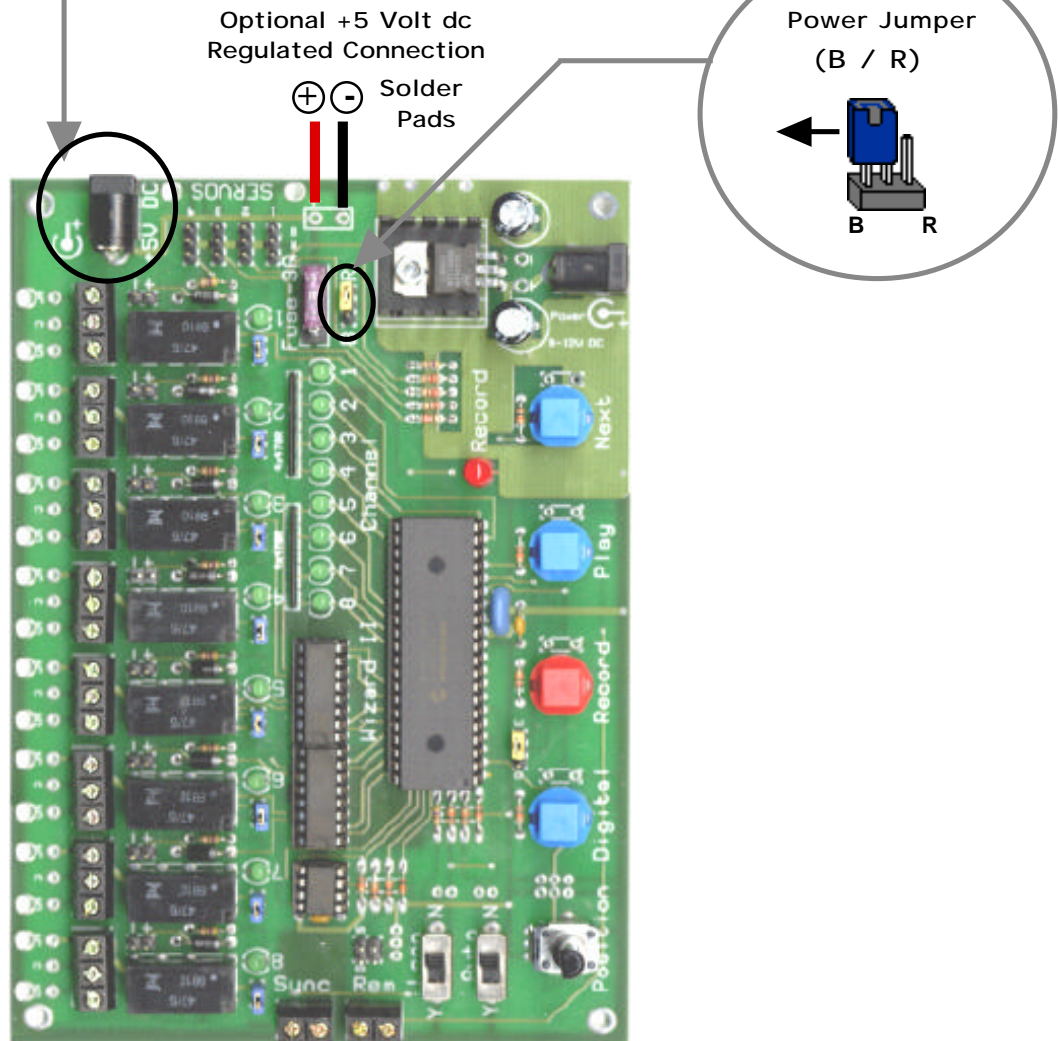
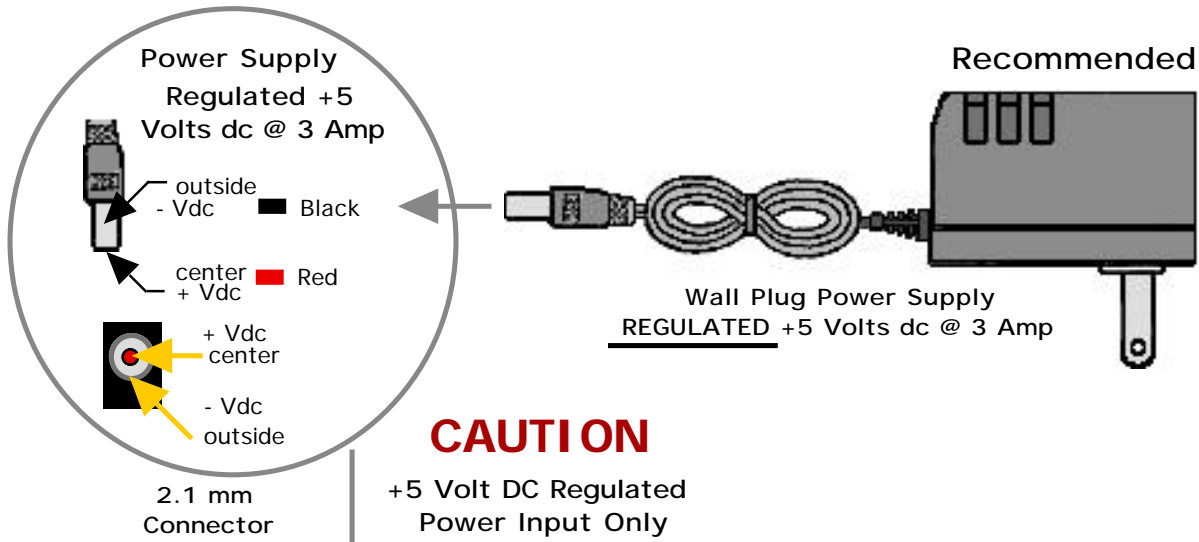


# Wizard - 2 Controller Board Board Overview



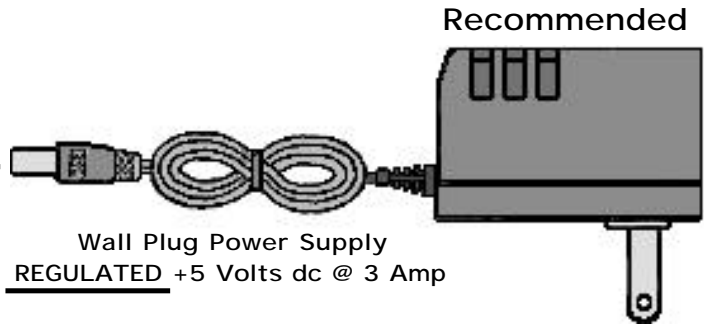
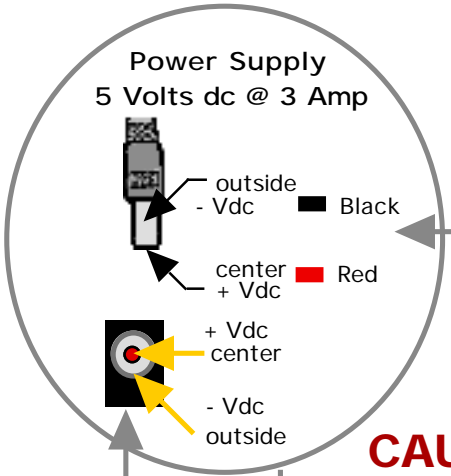
See Instructions for power set-up options

# Wizard - 2 Controller Board Power Set-up Overview





# Wizard - 2 Controller Board Duo Power Supply Overview (Large Servo Loads)

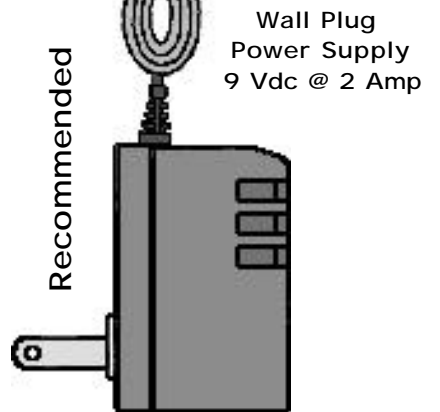
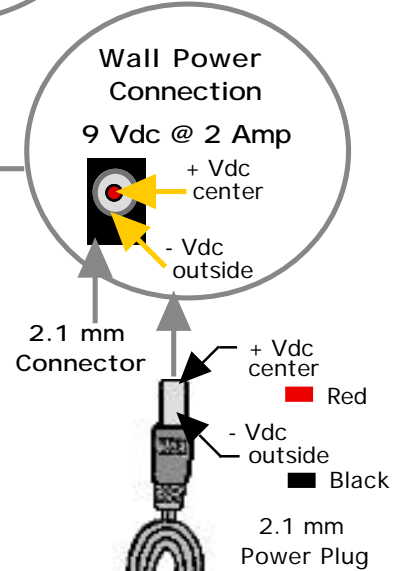
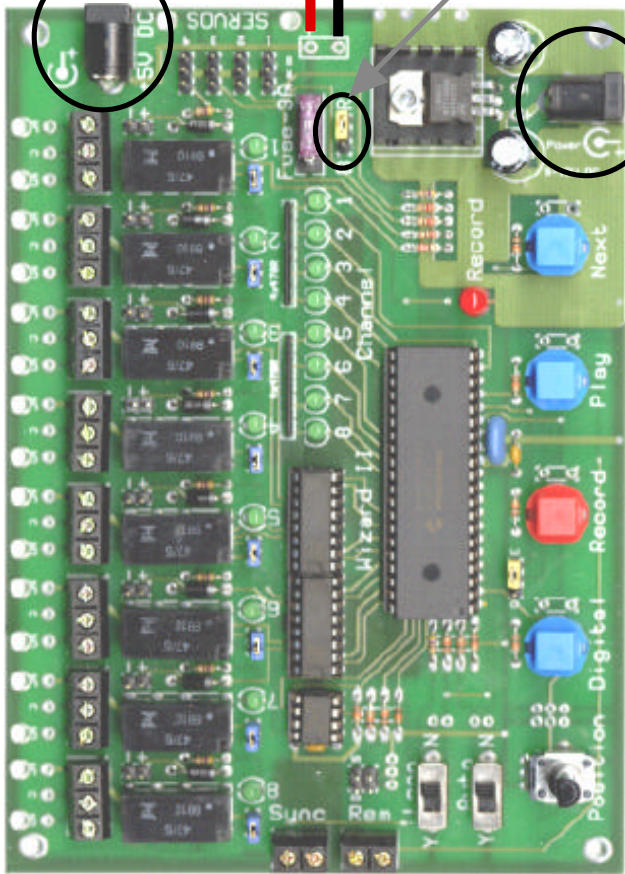
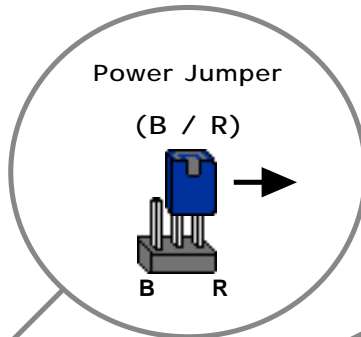


2.1 mm Connector

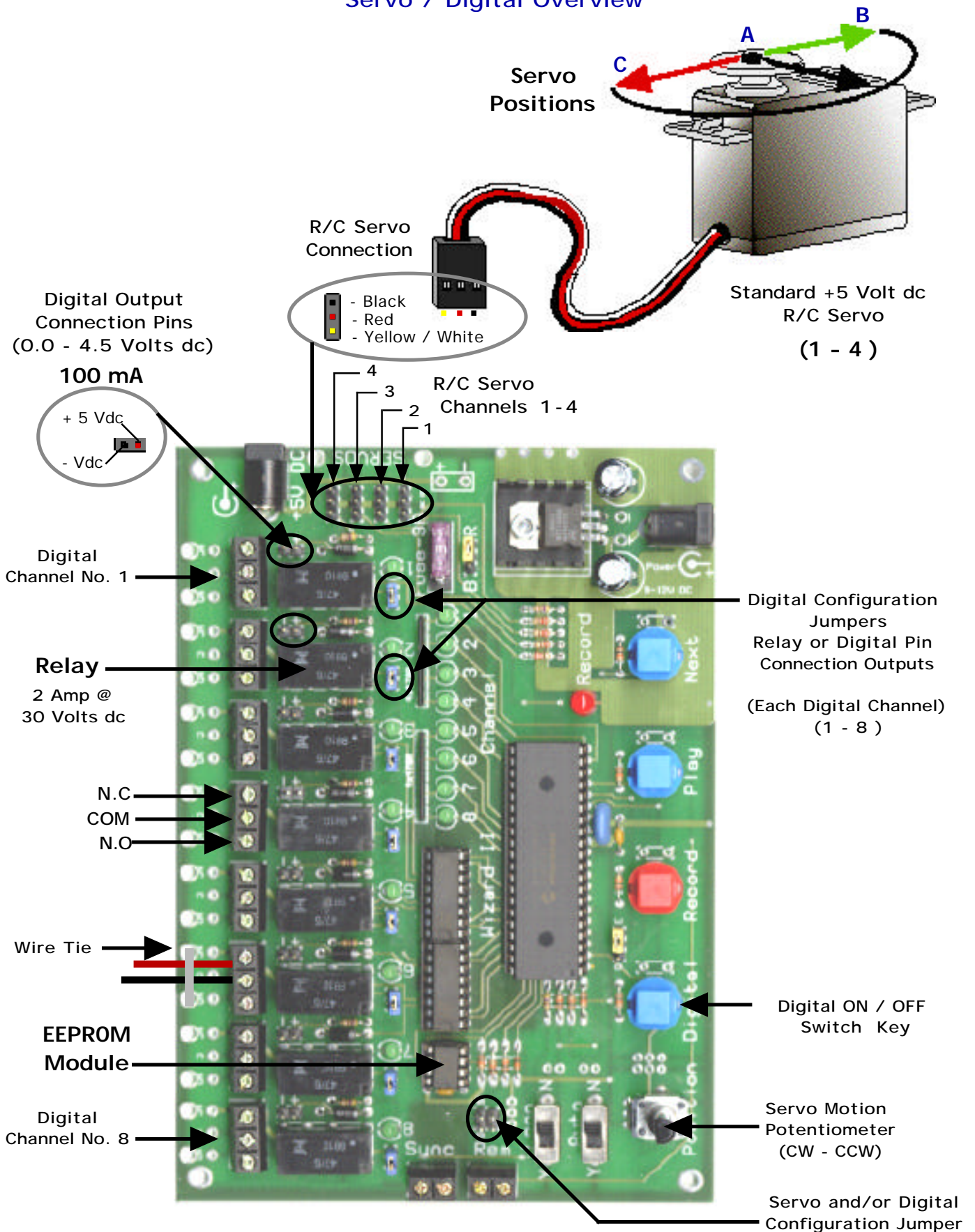
**CAUTION**  
+5 Volts DC Regulated  
Power Input Only

Optional +5 Volt dc  
Regulated Connection

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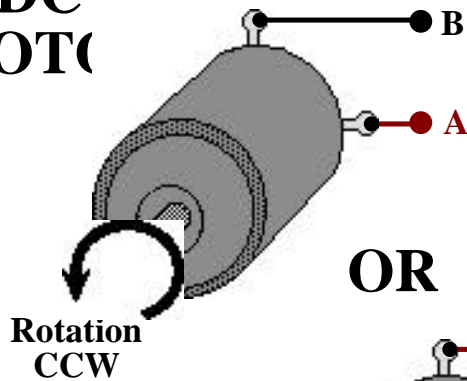
# Wizard - 2 Controller Board Servo / Digital Overview



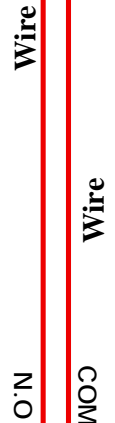
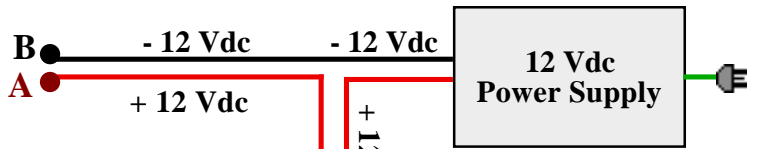
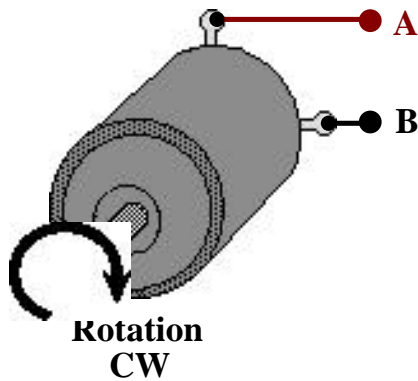


## Wizard -2 Controller Board Relays to Motor Control

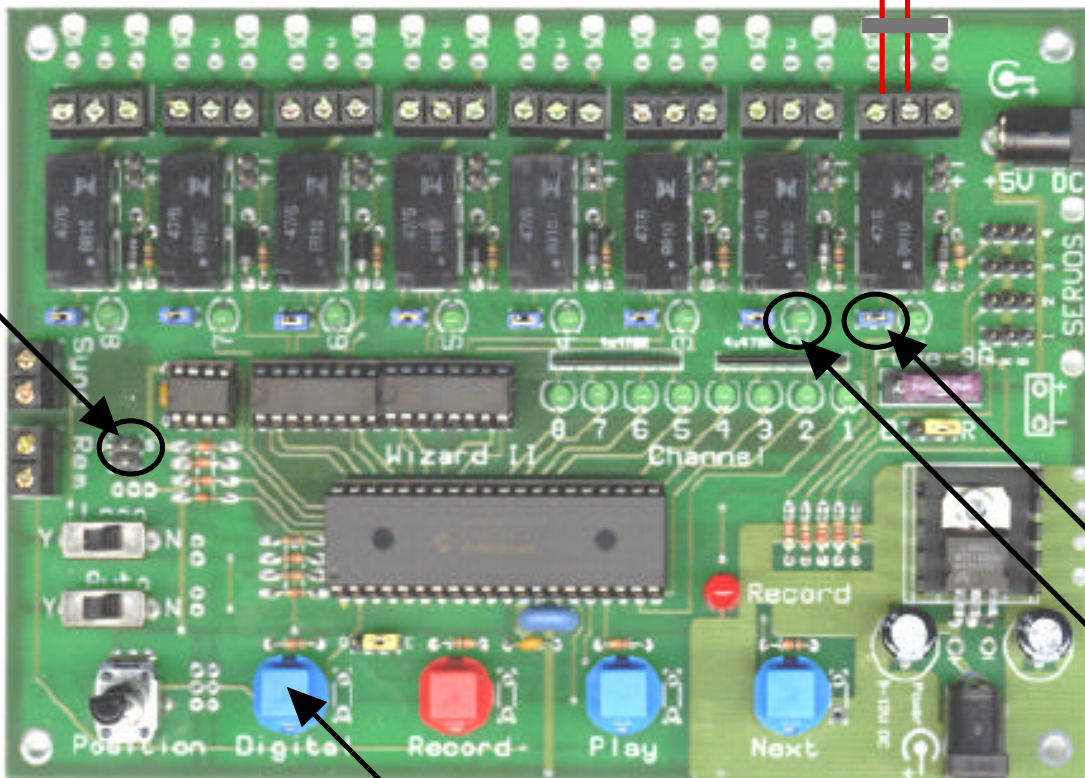
**DC  
MOTOR**



**OR**



**Wizard- 2 Board**



Servo and/or Digital  
Configuration Jumper

Digital Configuration  
Jumper  
Relay or Pin Output  
(Each Digital Channel)

Digital ON / OFF Key

Relay  
Channel LED

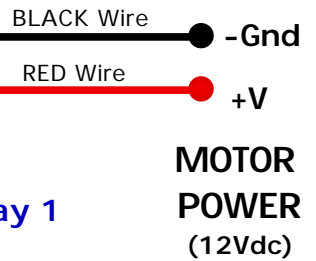
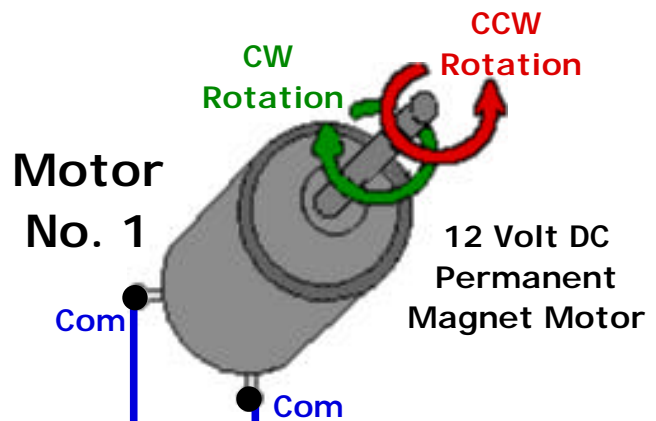
# Wizard - 2 Controller Board Relays to Motor Rotation Control

## Motor Logic

**Relay 1 ON** = Motor CCW Rotation  
**Relay 2 OFF**

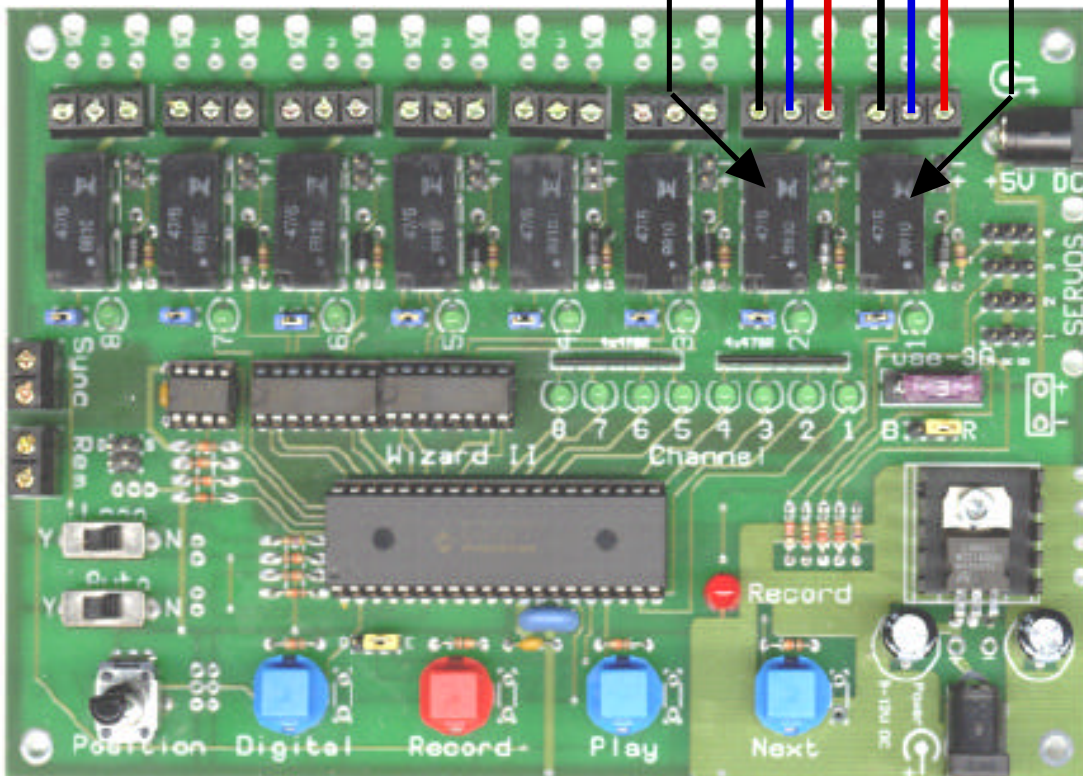
**Relay 1 OFF** = Motor CW Rotation  
**Relay 2 ON**

**Relay 1 and 2 ON** = Motor All Stop  
**Relay 1 and 2 OFF** = Motor All Stop



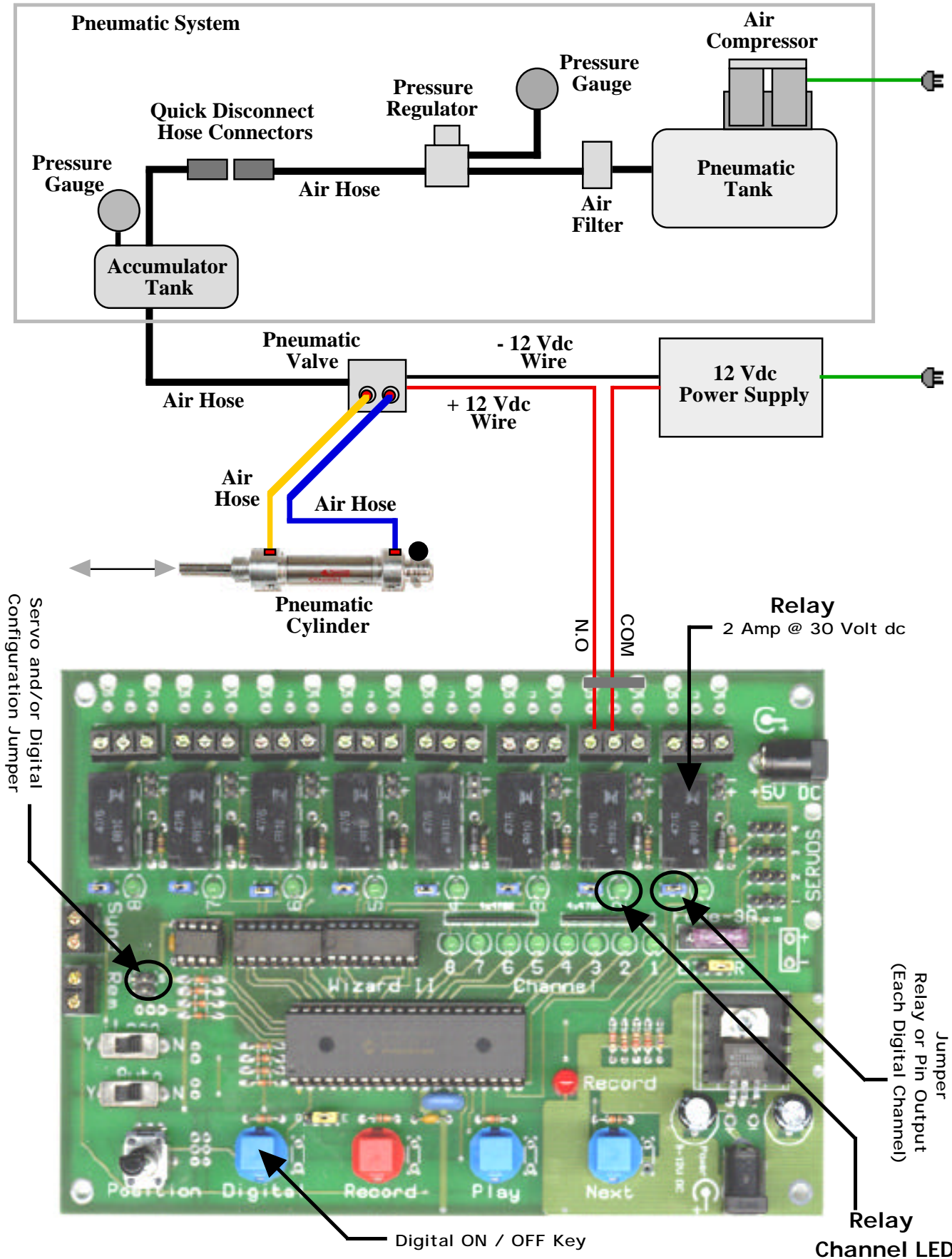
Relay 2                      Relay 1

Wizard- 2 Board



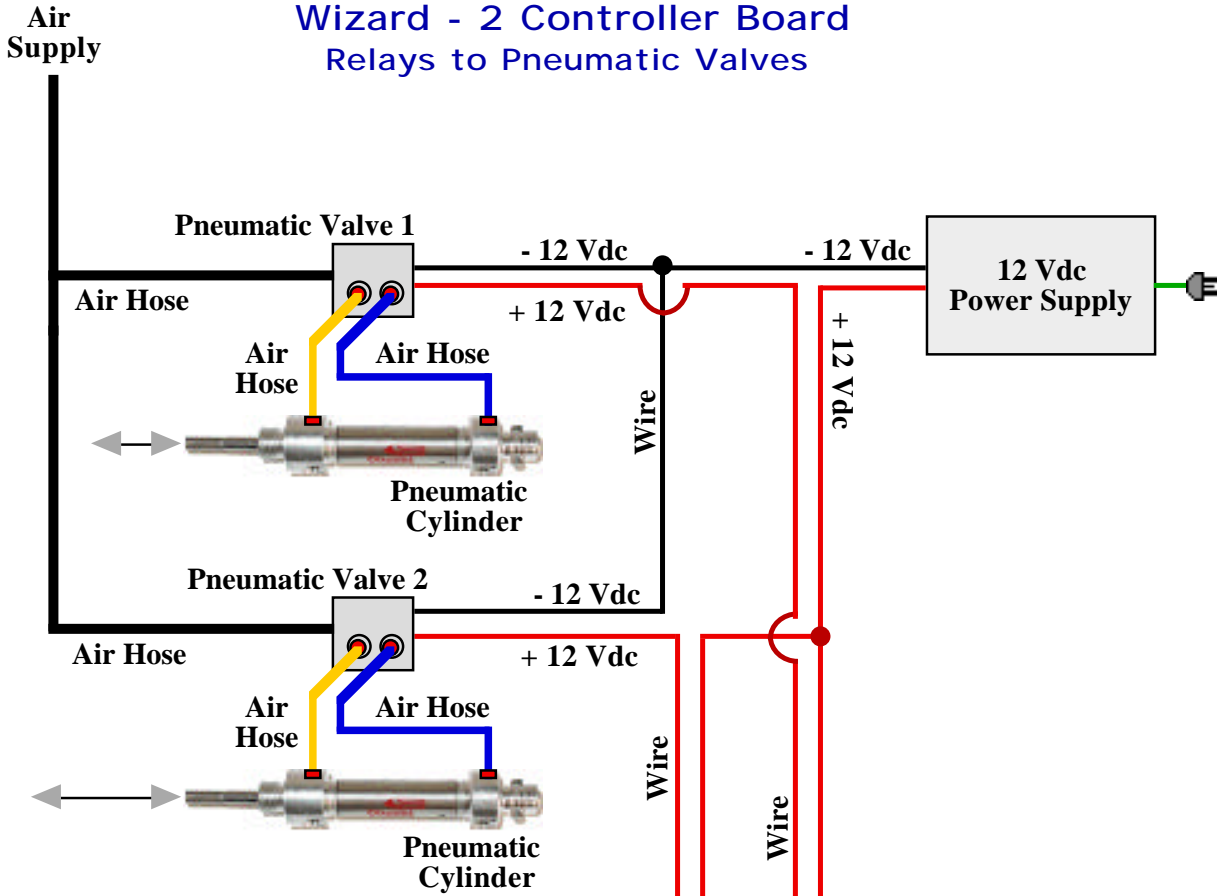


## Wizard - 2 Controller Board Relay to Pneumatic Valves

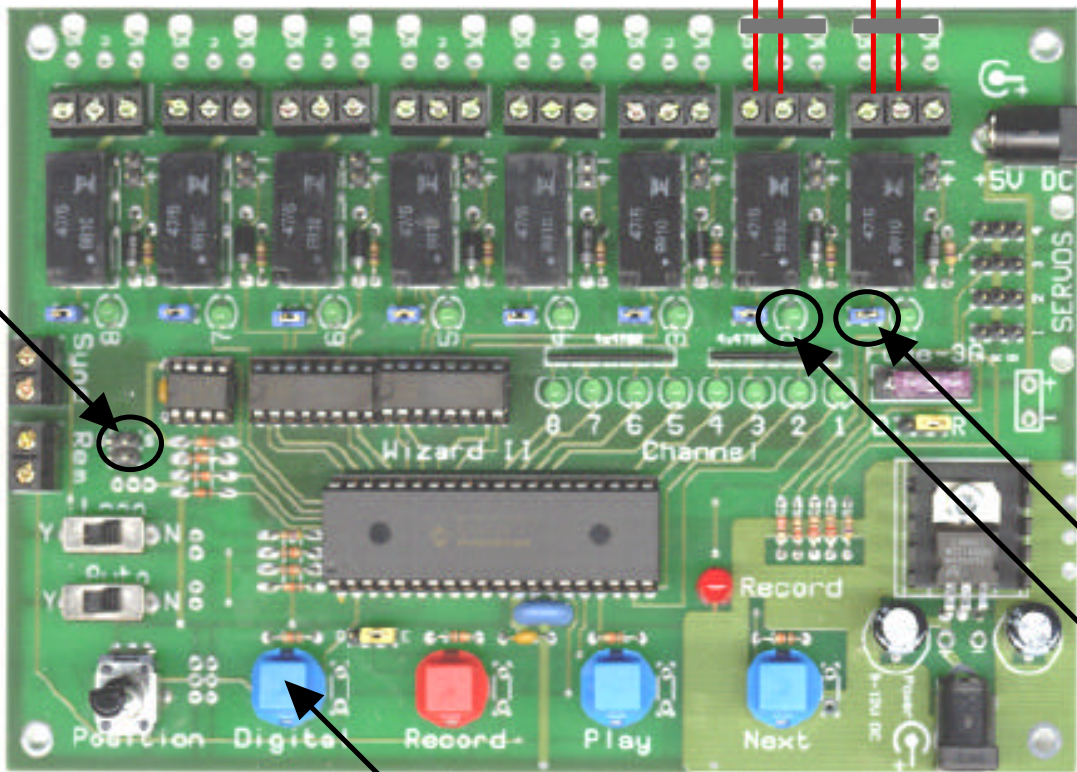




## Wizard - 2 Controller Board Relays to Pneumatic Valves



Servo and/or Digital  
Configuration Jumper



Digital ON / OFF Key

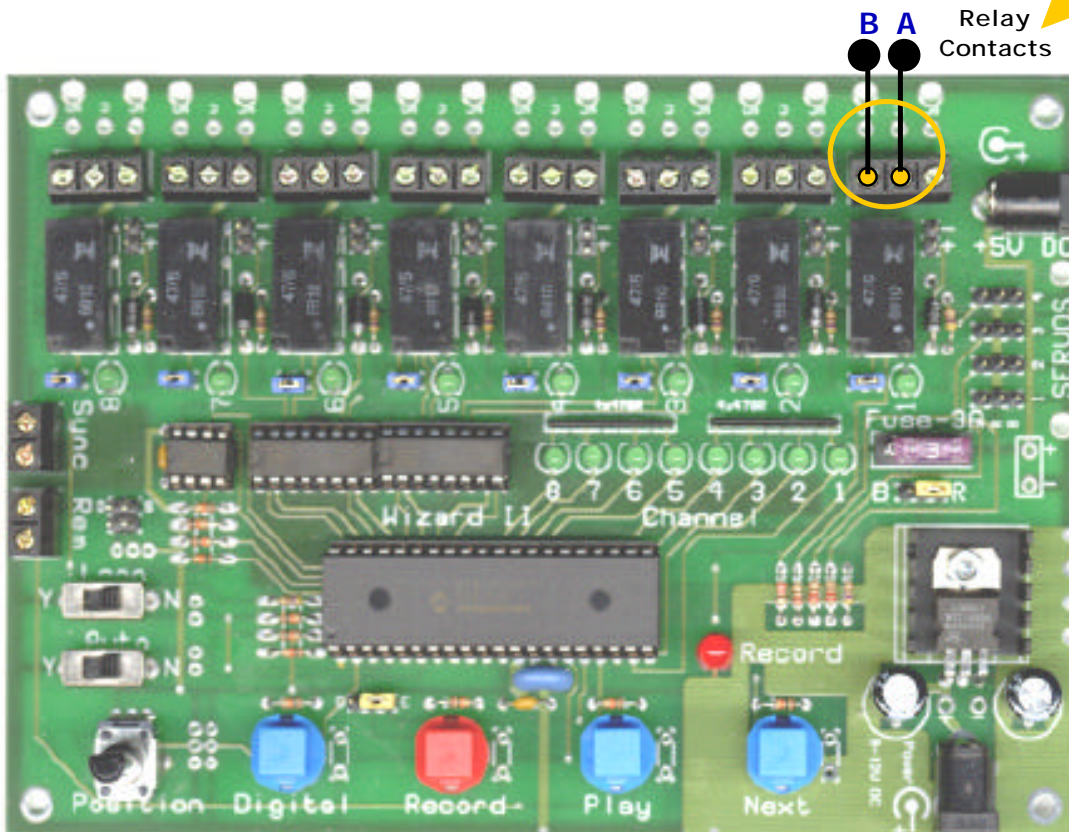
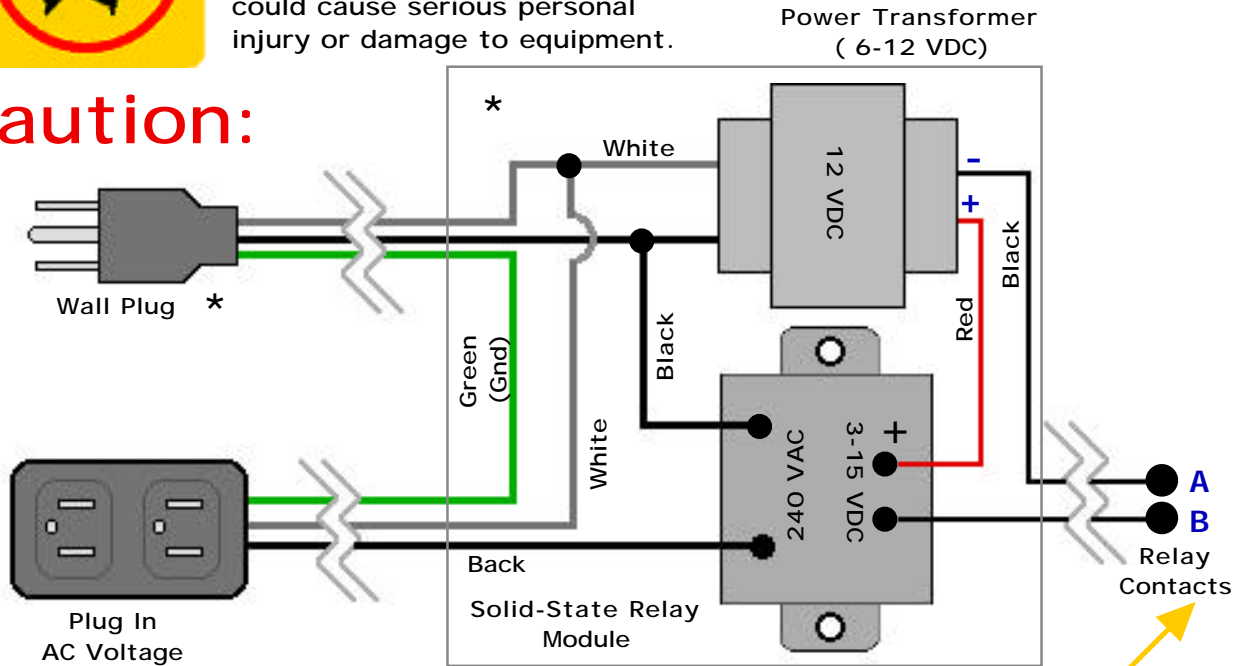
Relay  
Channel LED

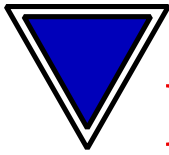
## Wizard - 2 Controller Board Optional Digital to AC Control Output Mode



\* Use caution when working with AC Voltage. Touching or incorrectly wiring this circuit could cause serious personal injury or damage to equipment.

**Caution:**

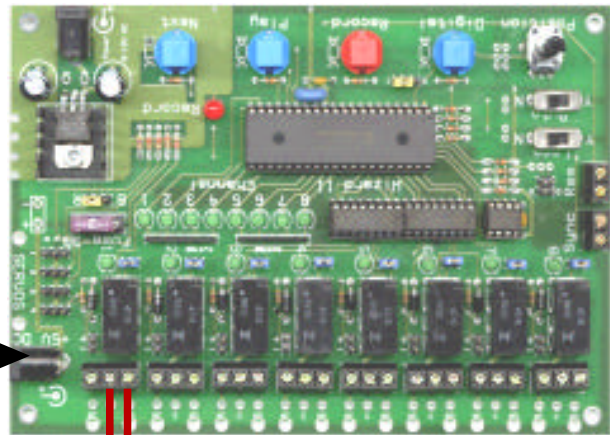




## Controlling Devices by Wizard-2 Relays

### Relay to LED Bar, and Single LED's

Wizard - 2 Controller



Relay Output

Wall Power Supply  
(12 Vdc @ 1 Amp)

Red Wire (C)

Red Wire (NO)

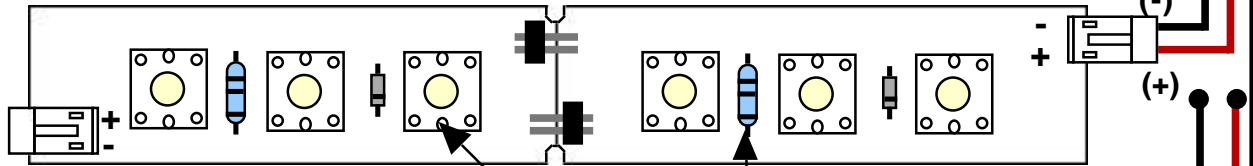
Relay Output

Red Wire

Black Wire (-)

LED-Bar 1

LED-Light Bars



LED's

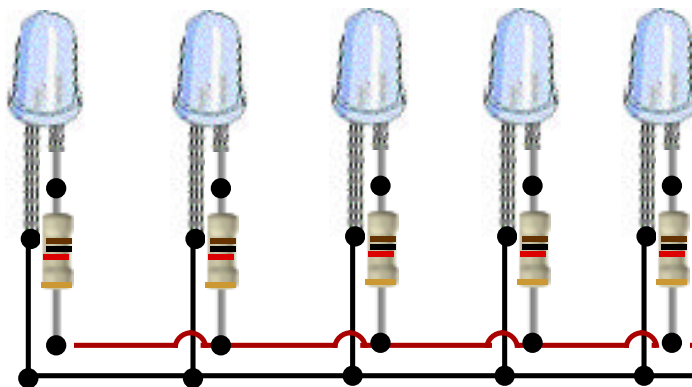
LED

Resistor

- OR -

LED

Resistor

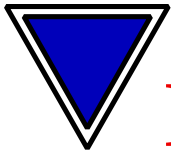


Custom Equipment, Unique Electronic Products

Blue Point Engineering LLC.

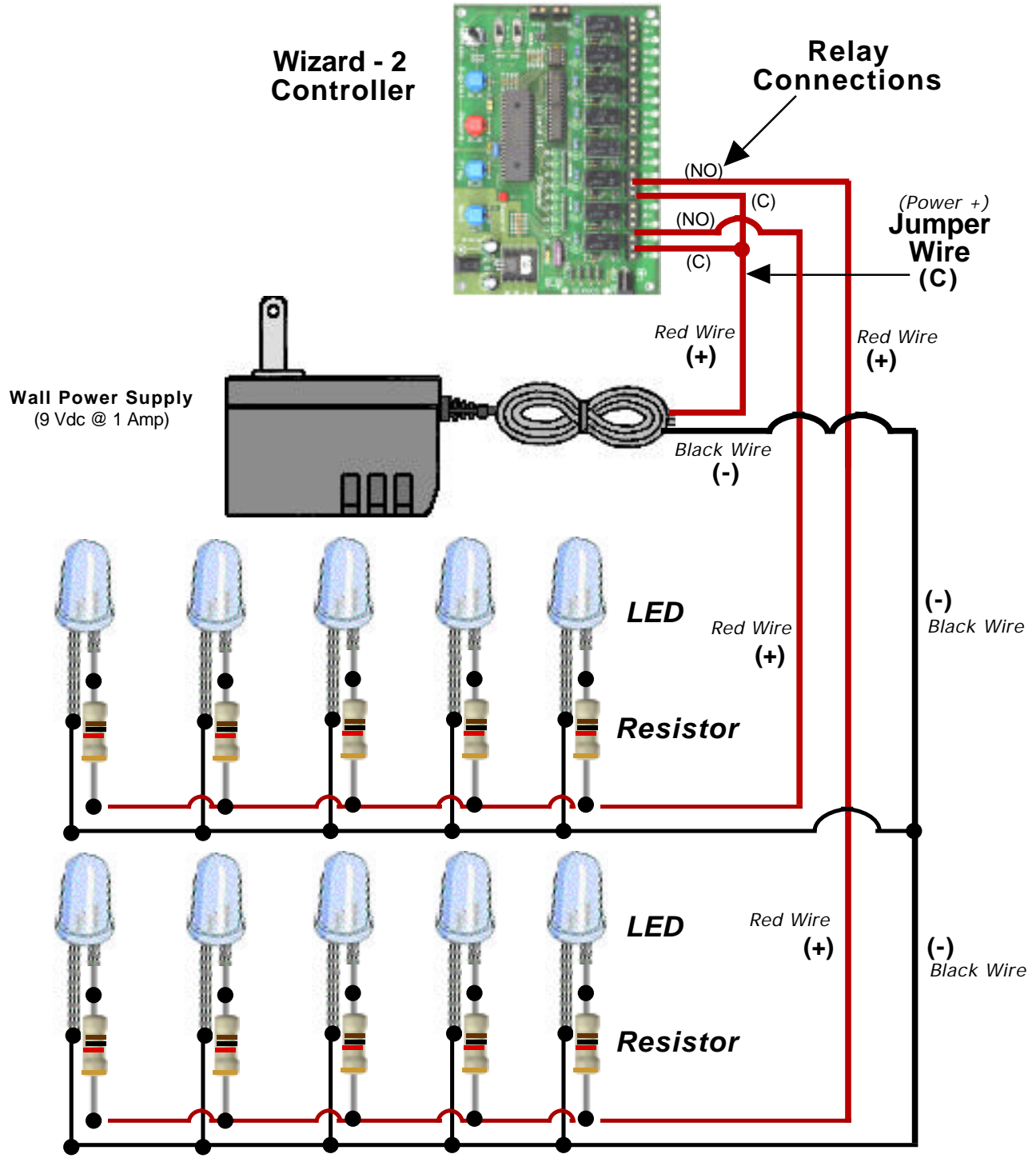
Phone (303) 651-3794  
www.BPEsolutions.com





## Controlling Devices by Wizard-2 Relays

### Relays to Ch1 LED's and Ch2 LED's

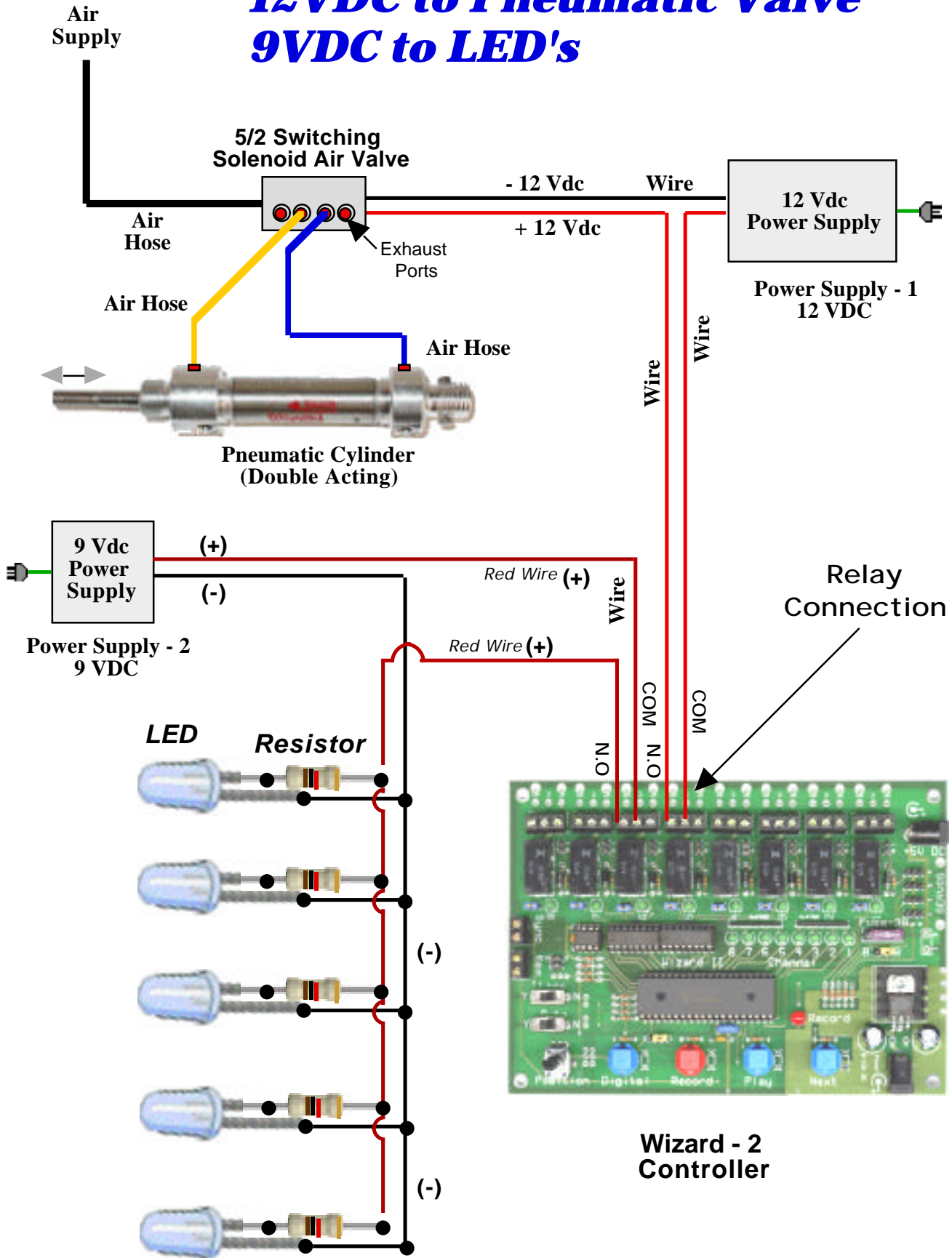


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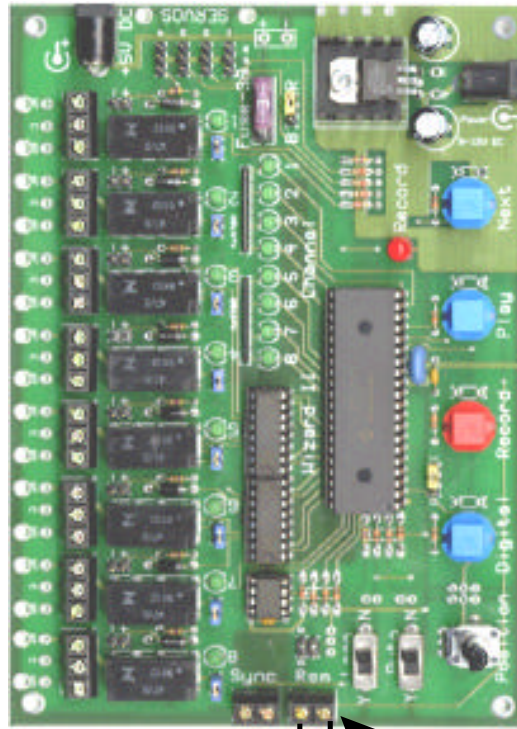
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# 12VDC to Pneumatic Valve 9VDC to LED's

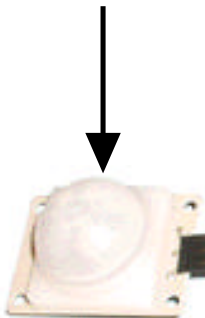




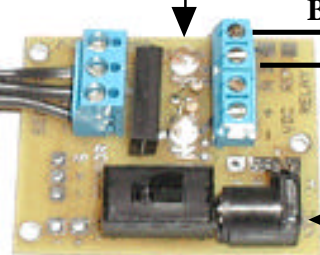
# Wizard - 2 Controller Board Optional PIR Sensor Control



PIR Sensor



Sensor Status LED



PIR Power / Relay Board

Wizard - 2  
REM connection

Wire

Wire

Note:  
PIR module has a 25 sec.  
Warm - up Delay when  
first powered on.

+ 9 VDC  
Power

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# Wizard - 2 Interface Board

Wizard Board to Sound Board Pro and Pneumatic Air Valve

