

# DMX Digital-Servo Board

Technical

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Version 1.0 -2012  
WD1-497

## Overview

The DMX Digital-Servo module is designed to provide 8 consecutive channels of output from a standard DMX protocol input signal. The outputs may be configured to be digital (on-off), drive standard R/C type servos, or a combination of any two of these. The base start address of the module may be set from 1 to 249 using the on-board setting DIP switches (all address switches OFF for addresses 1 to 8)



## Setup

### DMX Bus

Duo M/F XLR connectors are provided for connecting the module into the DMX signal network. If the module is the last item on the DMX cable, insert a jumper over the TRM pins to ensure correct end termination.

### Outputs

There are 8 Terminals numbered 1 to 8 each provides an output signal as a +5VDC or a PWM signal with the ground (-5VDC) reference taken from the G terminal on each end of the board at the wire terminal blocks.

The base address of output 1 is determined from the address setting DIP switch block (see addressing chart), the address or output of channel 2 is the board base address plus 1.

The outputs are each +5V TTL level with a 470 ohm series resistor to limit current draw from the processor. The maximum current rating from the processor chip pins is 20mA sink or source with a total of 60mA across the whole 8 output lines.

The configuration for Digital - Servo or combination of the outputs mode is set by on-board DIP switches 6 to 8 on the DMX address switch block.

### Connection:

DMX Input - Output: 5 Pin XLR Connectors (M/F - IN and Out pass through)

Power Input: +9VDC @ 2.5 Amplitude @ 20mA per channel via on-board screw wire terminals

Servo Outputs: Standard PWM Signal per channel via screw wire terminals (1-2msec.)

### DMX512

Number of DMX Channels: 1-249. The board base address may be set between 1 and 249 using the onboard DIP address switch block.. (See address chart for details on DIP switch settings)

### Power Supply: Green Status LED

Power Supply: +9VDC @ 2.5 Amp via 2.1mm connector (center+) Power Input Jack

### Fault LED

The on-board RED default LED will flash if the module does not detect an incoming DMX signal. During this condition, all the outputs are set to their start-up values (0).

The DMX default LED will turn off once a valid DMX signal is received but any previous output state information will need to be re-sent.

## Module DMX Address

**DIP Switch** Jumpers 1 through 5 on the address switch block set the module's base address. The minimum base address (DIP switch address block 1 to 5 set to OFF) is 1. The maximum base address (DIP switch address block 1 to 5 set to ON ) is 249. The base address is continuously read. DIP Switches 6-8 set the board mode (Digital, Servo or combination of)

### Settings - (See Control / Addressing for more details)

Set the start base address of the 8-Channel Digital /Servo Board as follows: Select a valid DMX number for output channel-1 (address range 1 to 249). Look up the DMX switch settings for the selected value from the DMX addressing chart and then move the onboard DIP switches to the correct matching position (On / Off) for the selected DMX value.

**NOTE: DMX address 1 - 8 is all DIP switches OFF**

Example: DIP switches 16 and 32 set to **ON** position, the start base address is now 48 for the board, (Add the value of the address DIP switches set to the **ON** position to calculate the start base address), this value is used to determine the starting address of output channel-1 for DMX control. The next DMX channel would be address 49 for output channel-2, and for channel-3 DMX address 50 for output channel-3, etc. Use this same process of adding the next channel to the next channel value until you have all 8-output channels address values identified.

### Digital Output Control:

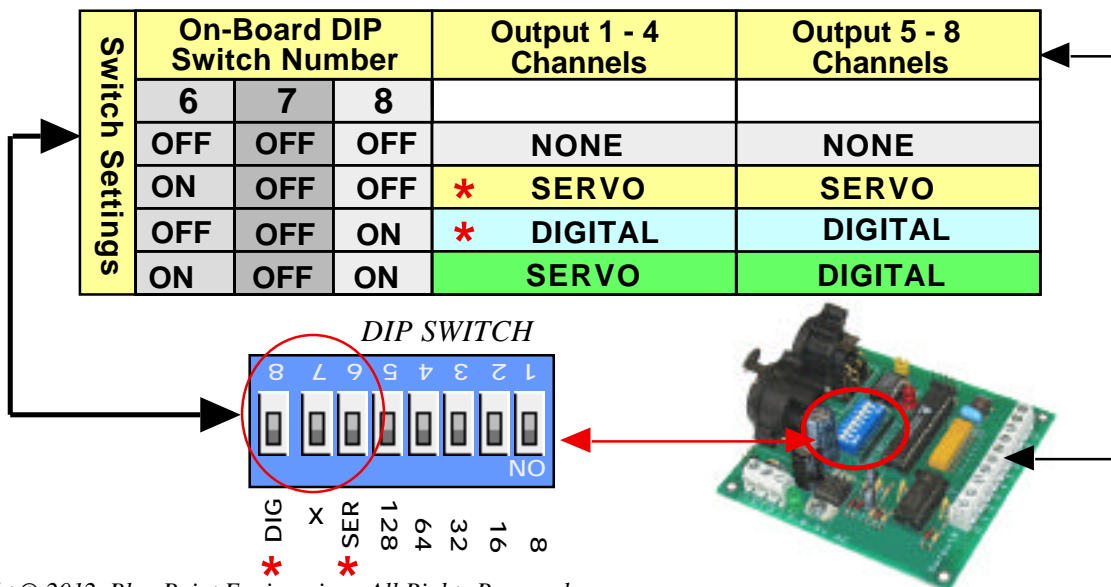
The Digital output control value is set by the incoming data byte or DMX data values sent to board. A value of >127 the output will be ON, (+5VDC Out)  
A value of 127 and lower, the output will be OFF (0VDC).  
Once set, the outputs will remain unchanged until a new data value is received. The output is refreshed every 4usecs. The start-up and default value is 0

### Servo Output Control:

The Servo output is a 1-2 msec duration pulse, repeated every 20msecs.  
A data byte or DMX control value of **0** will output a 1msec moving the servo to travel to position A.  
A pulse data byte or DMX control value of **255** will output a 2msec pulse moving the servo to travel to position B  
A pulse data byte or DMX control value of **127** will output a 1.5msec pulse moving the servo to travel to the center position.  
The output values are refreshed every 20msecs. The default start-up and default value is 1msec.

### On Board DIP Switch Settings for Output Digital-Servo Modes

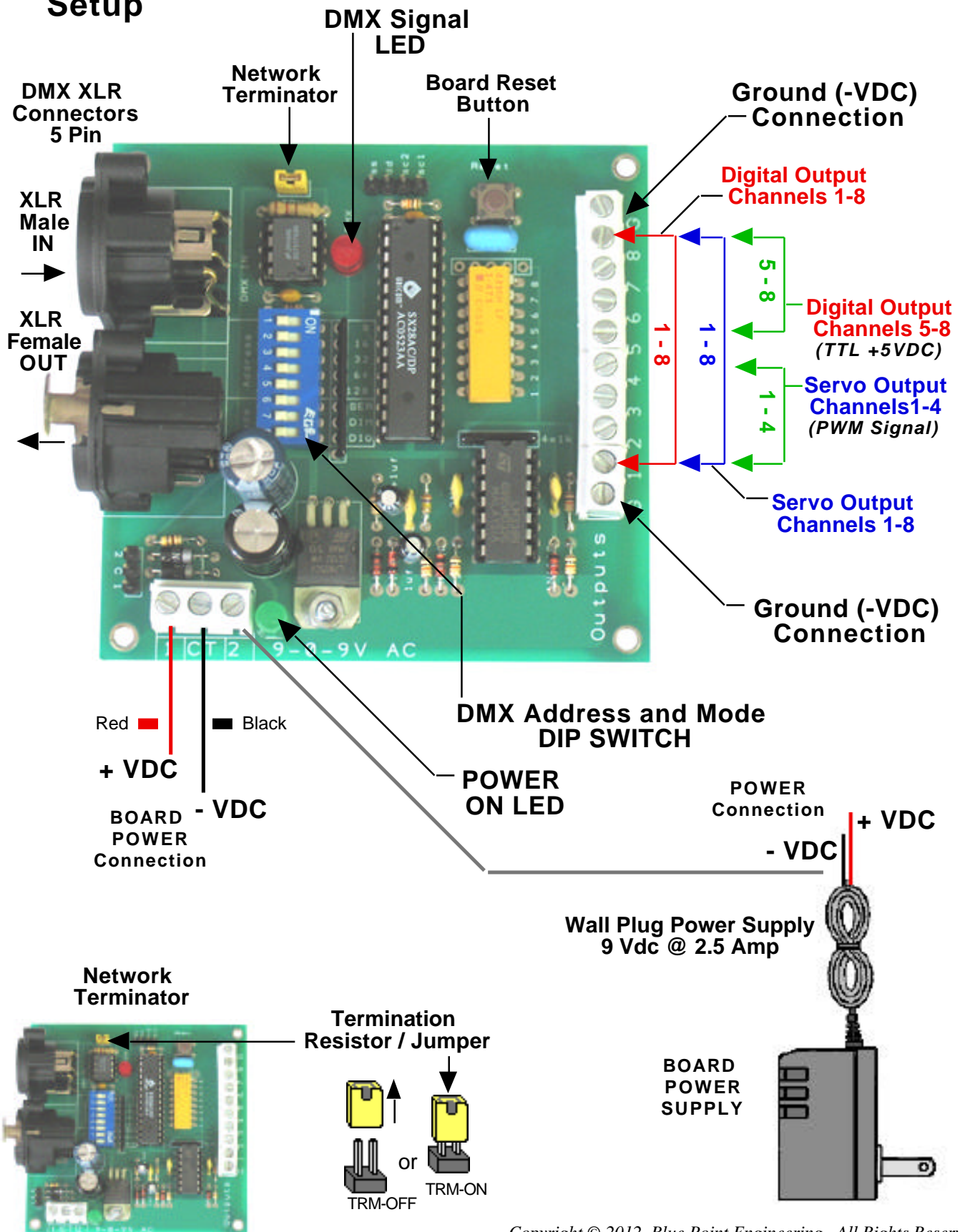
The output configuration switches are read continuously and can be changed with power applied.



# DMX Digital-Servo Board

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## Setup



# DMX Digital-Servo Board

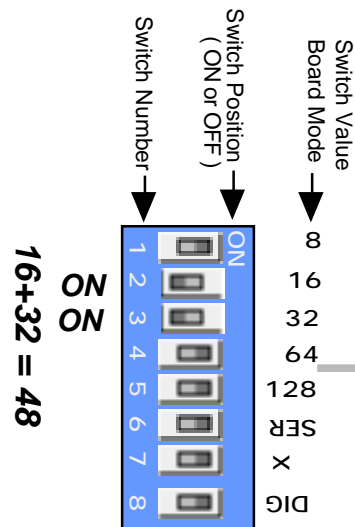
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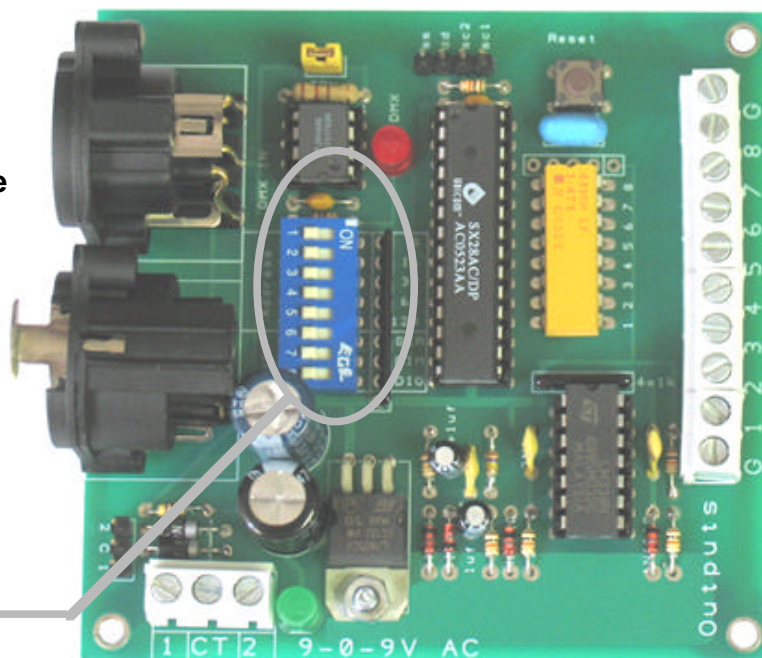
## Board Address DMX - Values

TOP VIEW

Base address selectable  
between 1 and 249



DIP Switches  
(Addressing)



Example

DMX CH

CH4 = 51  
CH3 = 50  
CH2 = 49  
CH1 = 48

### Setting the base address of Output DMX Channels.

Add the value of the address DIP switches set to the **ON** position to calculate the base address.

Example (**CH**): DIP switches 5 and 6 set to **ON** position, the base address is now 48, (16+32) this setting is used to determine the starting address output of Ch1, the next channel would be address 49 for Ch2, and the next 50 for Ch3, and 51 for Ch4 output

### Example Output CH 1-4

Dip Switch 5 and 6 ON = **Base Address 48**

- Channel- 1 Output** (Base Address starting at 48 )
- Channel- 2 Output** (Base Address starting at 49 )
- Channel- 3 Output** (Base Address starting at 50 )
- Channel- 4 Output** (Base Address starting at 51 )

## DMX CONTROL

### Digital Output Control: (DIP SWITCH 8 ON)

The Digital output value is set by the incoming data byte or DMX data values.

A value of >127 the output will be ON , (5VDC Out)

A value of 127 and lower, the output will be OFF (0VDC).

Once set, the outputs will remain unchanged until a new data value is received. The output is refreshed every 4usecs. The start-up and default value is 0

### Servo Output Control: (DIP SWITCH 6 ON)

The Servo output is a 1-2 msec duration pulse, repeated every 20msecs.

A data byte or DMX data value of **0** will output a 1msec moving the servo to travel to position A.

A pulse data byte or DMX control value of **255** will output a 2msec pulse moving the servo to travel to position B

A pulse data byte or DMX control value of **127** will output a 1.5msec pulse moving the servo to travel to the center position. The output values are refreshed every 20msecs. The default start-up and default value is 1msec.

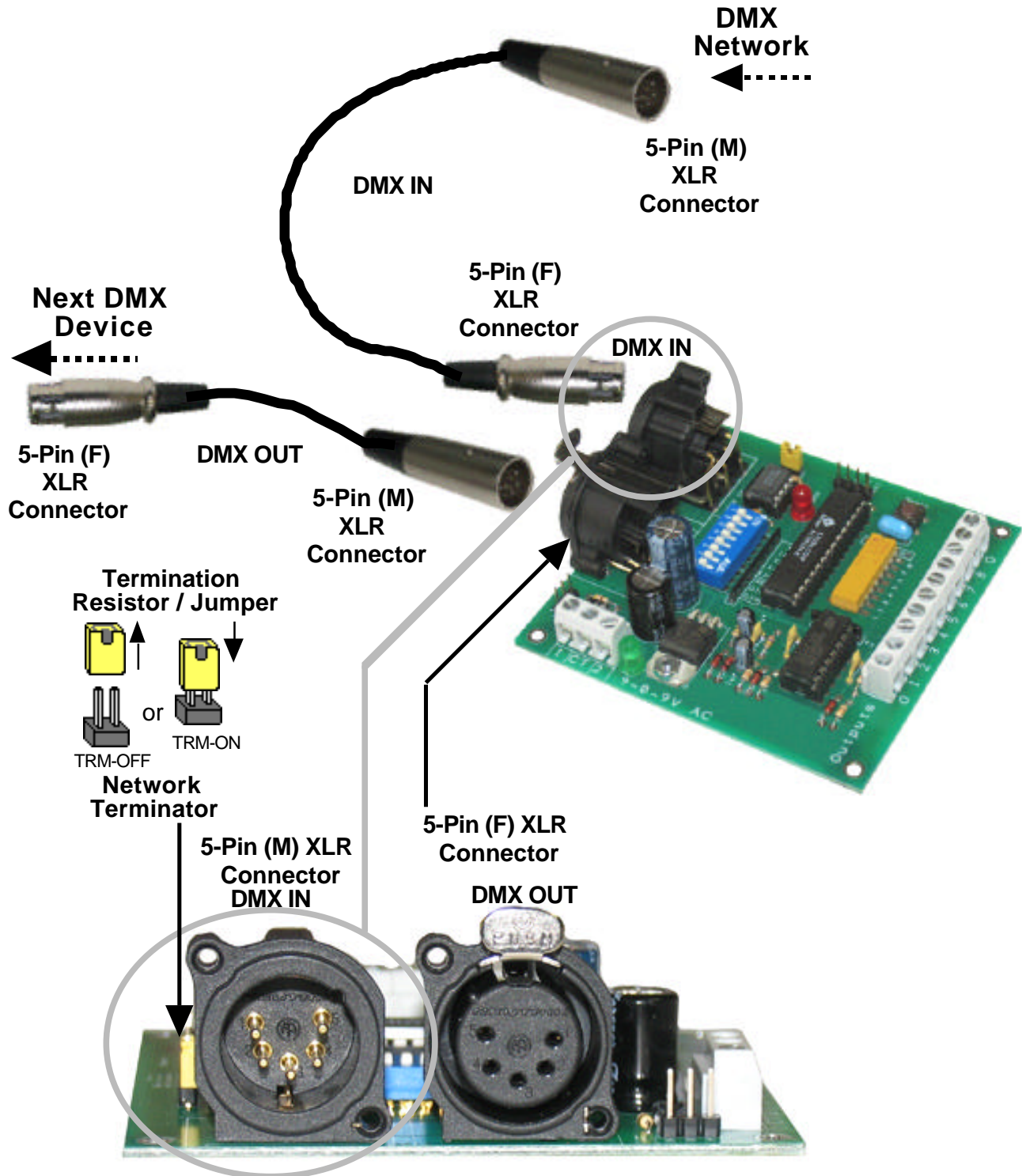
# DMX Digital-Servo Board

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Overview

## DMX Network Setup - 5 Pin



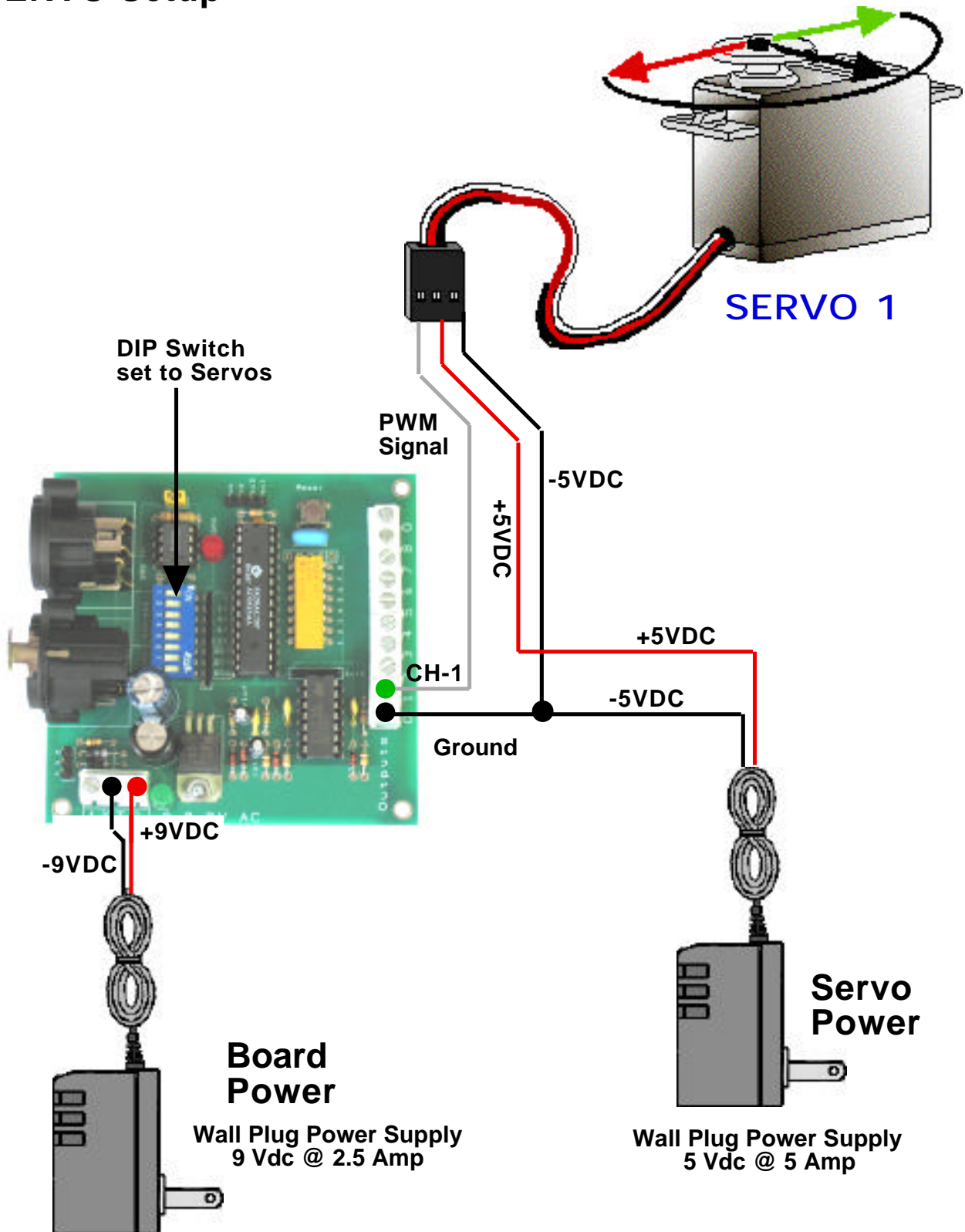
# DMX Digital-Servo Board

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Overview

## SERVO Setup



# DMX Digital-Servo Board

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Overview

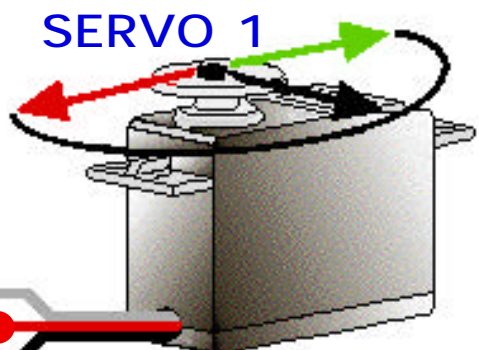
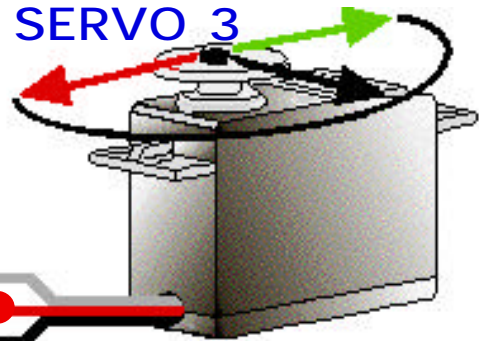
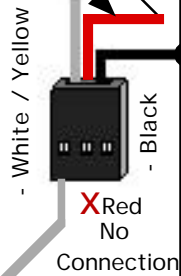
**POWER SUPPLY**  
**5 VDC**  
**3- 5 Amp**

**Servo Power**

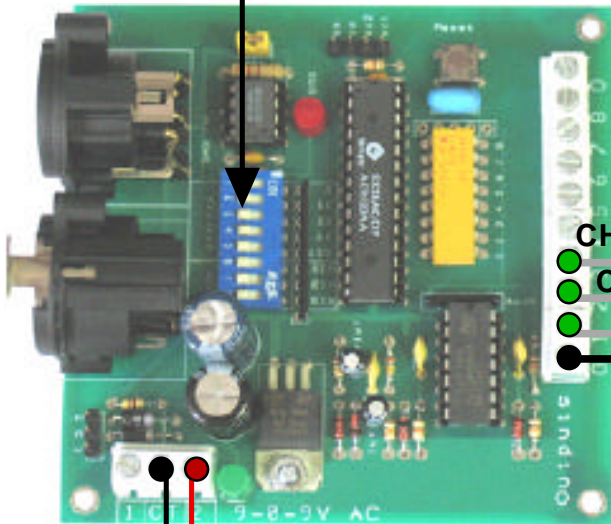
- Red (+)
- Black (-)

Servo Red wire must not be connected to controller board  
**WARNING**

Servo Power Connection  
**X DO NOT Connect**



DIP Switch set to Servos

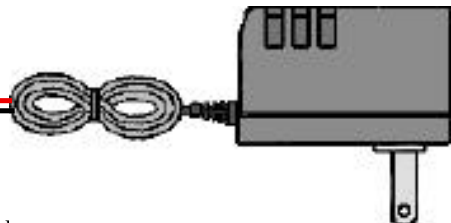


- CH-3
- CH-2
- CH-1

Ground

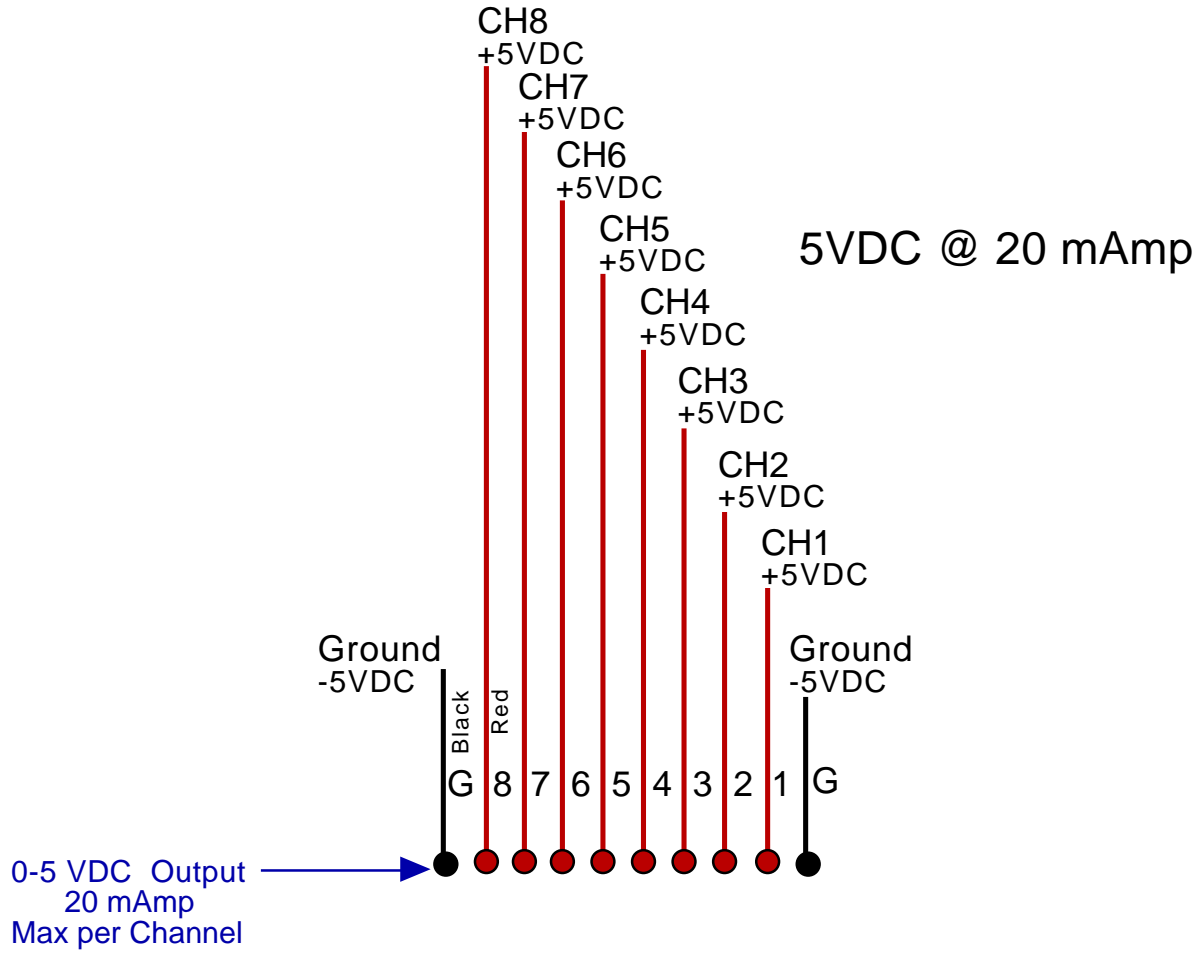
**Board Power**  
Wall Plug Power Supply  
9 Vdc @ 2.5 Amp

+9VDC  
-9VDC

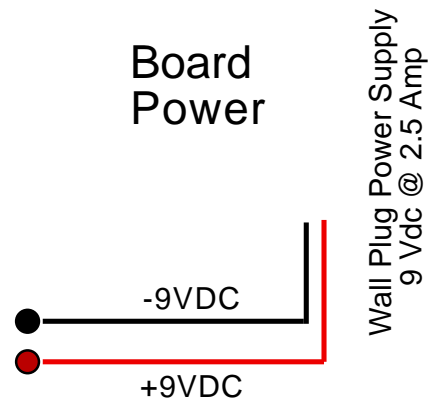


# DMX Digital-Servo Board

## Digital (+5VDC) Output



DIP Switch set to Digital  
SW 8 ON





# DMX Digital-Servo Board

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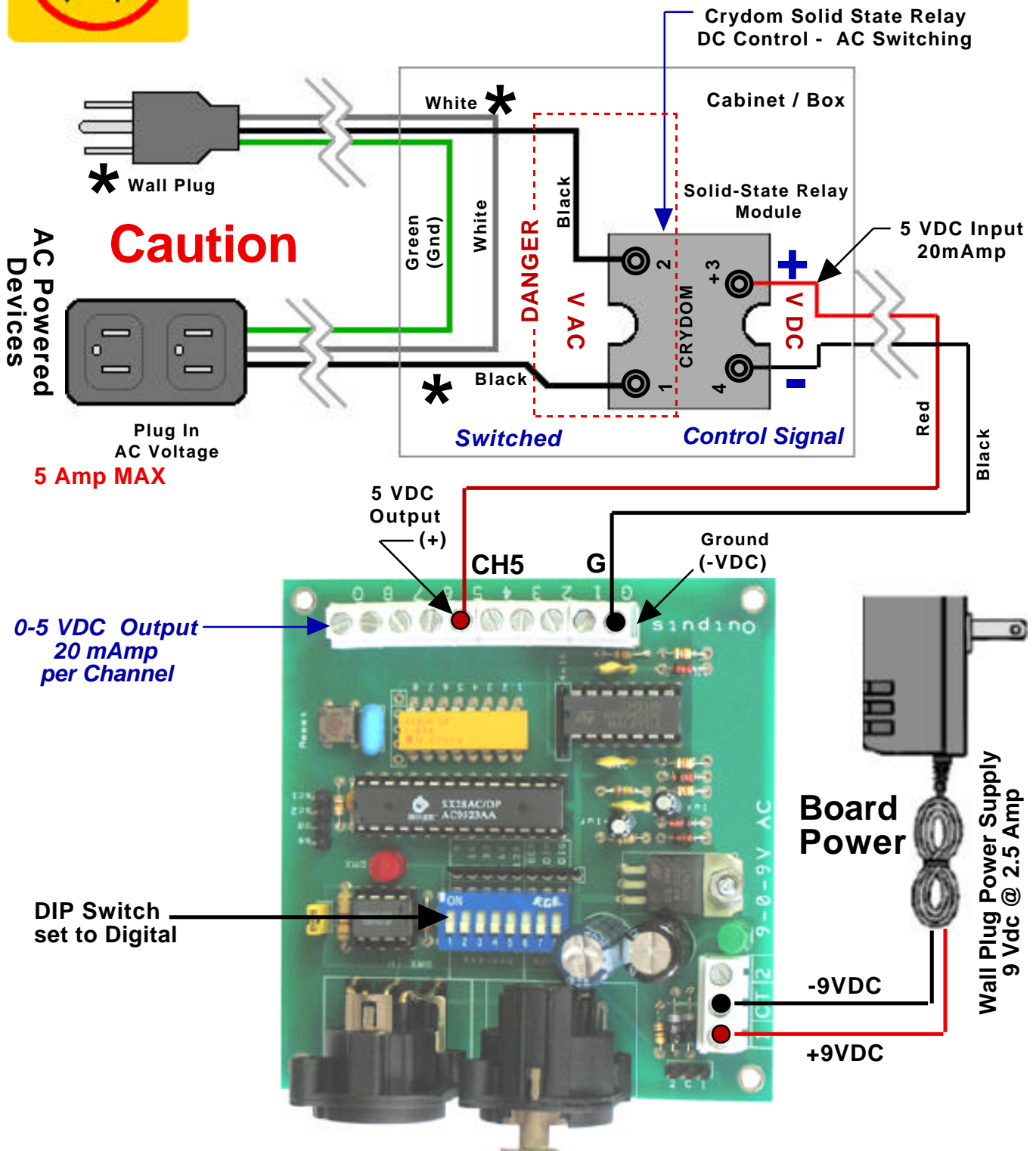
## Overview

### Large AC Power Control



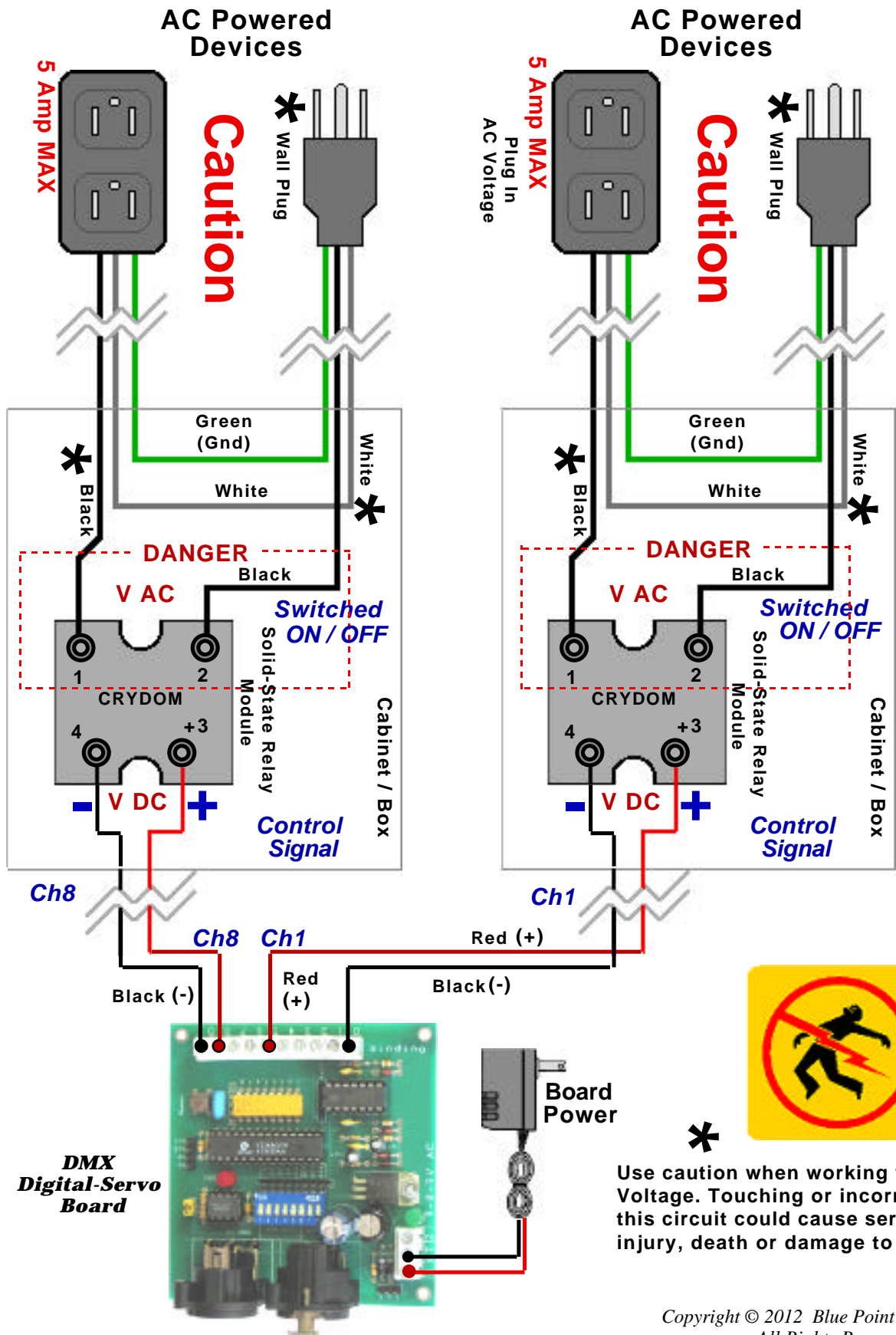
\*

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



# DMX Digital-Servo Board

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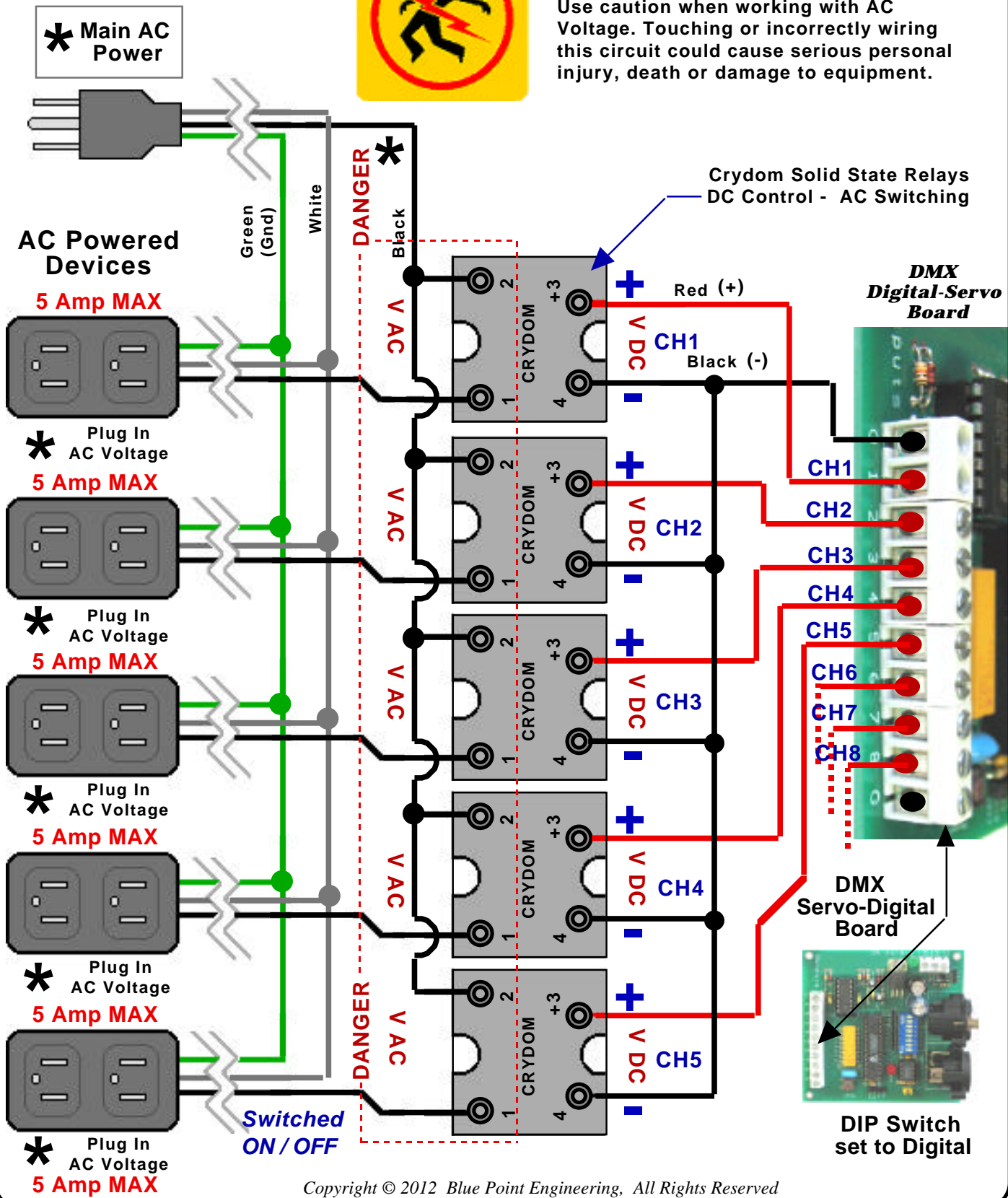


# DMX Digital-Servo Board

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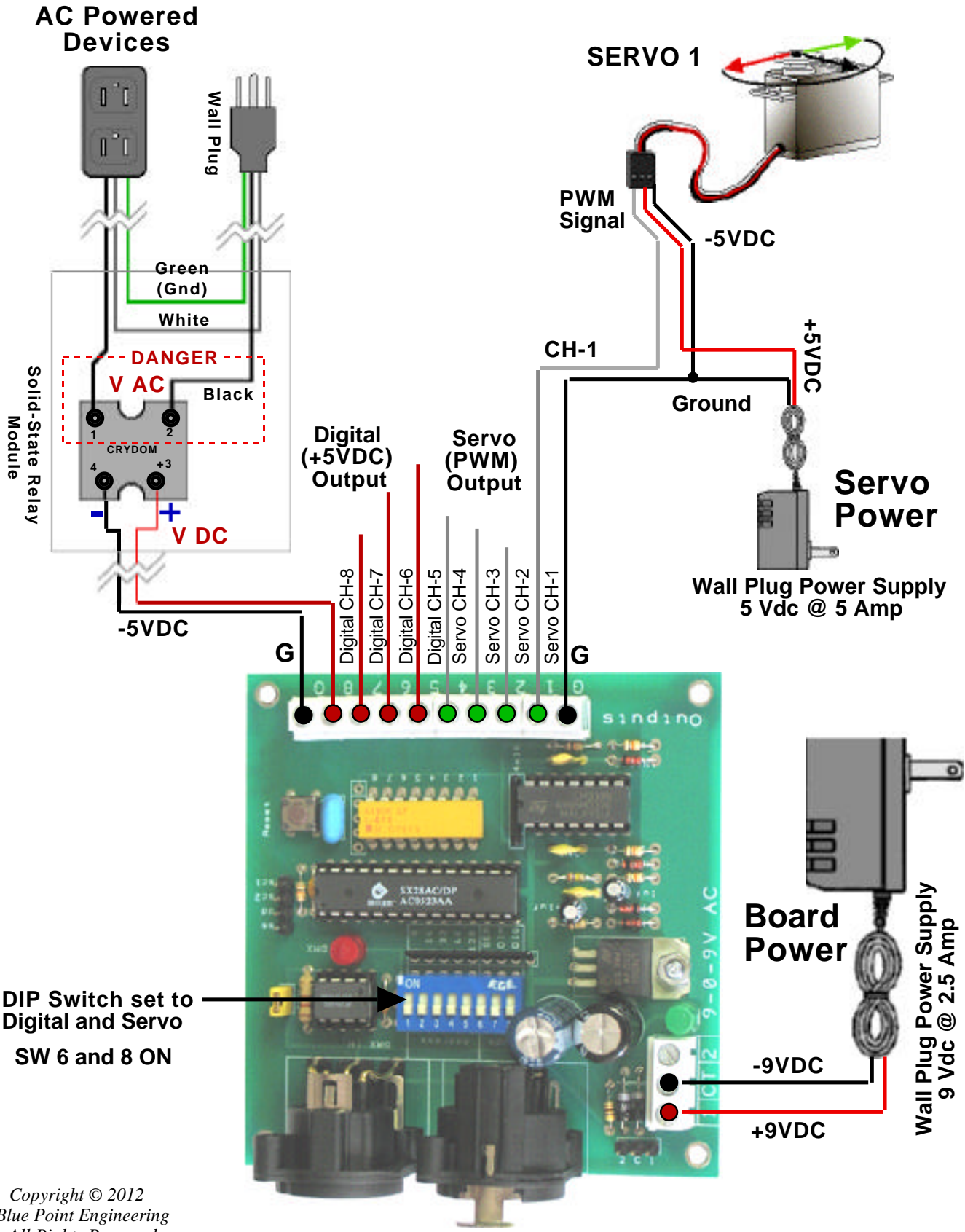


\* Use caution when working with AC Voltage. Touching or incorrectly wiring this circuit could cause serious personal injury, death or damage to equipment.



# DMX Digital-Servo Board

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Overview



# DMX Digital-Servo Board

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## Board Test

TESTING

### Digital Outputs

Set DIP switches 6 OFF, 7 OFF and 8 ON on the Board

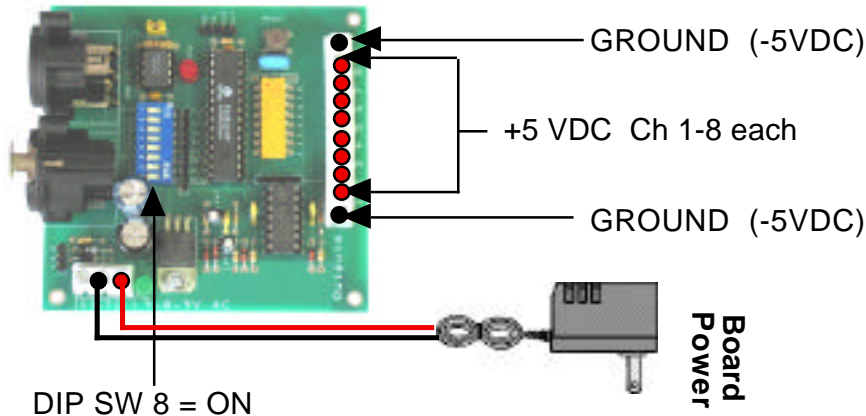
This puts the board into Digital output mode

Set up a DMX network to the board (use DMX 8-CH slider box, XLR cable between box and the board)

Place a Volt Meter positive lead on the output wire connector for channel-1 output (1) and the meter negative lead to ground on the ground (G) terminal of the board

Slide the DMX slider box channel 1 output to DMX value 255, the volt meter should read +5 VDC, and then 0 VDC when the slide is set to DMX value 0

Do this for all 8 Channels making sure to get 5/0 VDC on each channel 1-8



### Servo Outputs

Set DIP switches 6 ON, 7 OFF and 8 OFF on the Board

This puts the board into Servo output mode

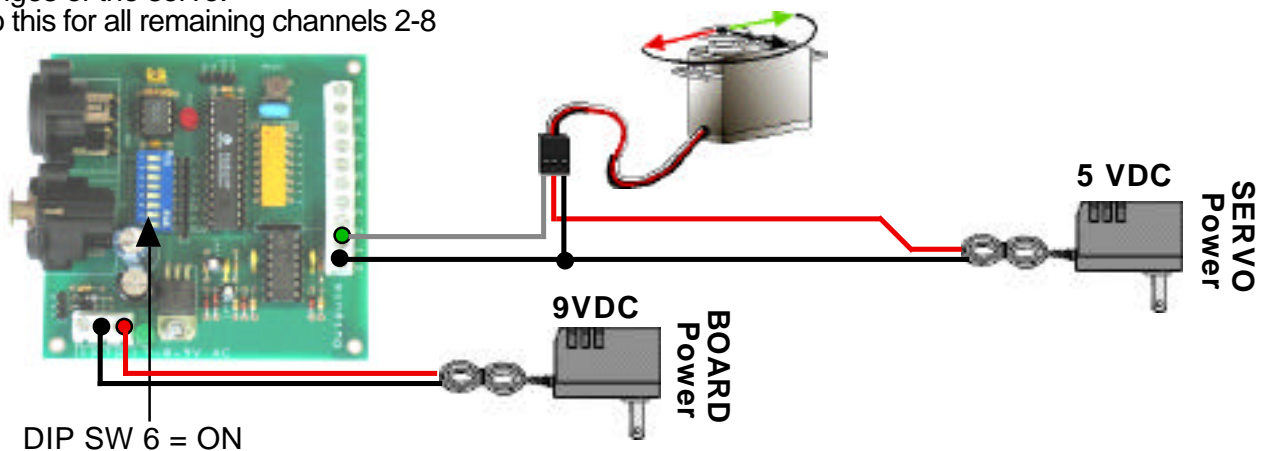
Set up a DMX network to the board (use DMX 8-CH slider box, XLR cable between box and the board)

Attach a R/C servo to the Board ( WHITE wire from servo to DMX board channel-1 output (1), Positive wire (RED) from Servo to the +5 VDC power supply and the BLACK wire from the servo to the - 5 VDC on the servo power supply.

Connect a second black wire from the servo power supply negative - 5vdc to the wire connection on the G terminal of the board.

Slide the DMX output for channel 1 on the DMX box up, the servo should move. Set the DMX box slider to DMX value 127, the R/C servo should be center, moving the slide channel 1 on the DMX box above DMX value 127 and below DMX 127 should move the servo to the outer movement travels ranges of the servo.

Do this for all remaining channels 2-8



# DMX Digital-Servo Board



Reference **R**

Chart A - US  
Standard DMX 512

## DMX 512 Chart - US Standard

Address Switch Setting

Ch - Switches	Ch - Switches	Ch - Switches	Ch - Switches	Ch - Switches
1 = 1	53 = 1, 3, 5, 6	105 = 1, 4, 6, 7	157 = 1, 3, 4, 5, 8	209 = 1, 5, 7, 8
2 = 2	54 = 2, 3, 5, 6	106 = 2, 4, 6, 7	158 = 2, 3, 4, 5, 8	210 = 2, 5, 7, 8
3 = 1, 2	55 = 1, 2, 3, 5, 6	107 = 1, 2, 4, 6, 7	159 = 1, 2, 3, 4, 5, 8	211 = 1, 2, 5, 7, 8
4 = 3	56 = 4, 5, 6	108 = 3, 4, 6, 7	160 = 6, 8	212 = 3, 5, 7, 8
5 = 1, 3	57 = 1, 4, 5, 6	109 = 1, 3, 4, 6, 7	161 = 1, 6, 8	213 = 1, 3, 5, 7, 8
6 = 2, 3	58 = 2, 4, 5, 6	110 = 2, 3, 4, 6, 7	162 = 2, 6, 8	214 = 2, 3, 5, 7, 8
7 = 1, 2, 3	59 = 1, 2, 4, 5, 6	111 = 1, 2, 3, 4, 6, 7	163 = 1, 2, 6, 8	215 = 1, 2, 3, 5, 7, 8
8 = 4	60 = 3, 4, 5, 6	112 = 5, 6, 7	164 = 3, 6, 8	216 = 4, 5, 7, 8
9 = 1, 4	61 = 1, 3, 4, 5, 6	113 = 1, 5, 6, 7	165 = 1, 3, 6, 8	217 = 1, 4, 5, 7, 8
10 = 2, 4	62 = 2, 3, 4, 5, 6	114 = 2, 5, 6, 7	166 = 2, 3, 6, 8	218 = 2, 4, 5, 7, 8
11 = 1, 2, 4	63 = 1, 2, 3, 4, 5, 6	115 = 1, 2, 5, 6, 7	167 = 1, 2, 3, 6, 8	219 = 1, 2, 4, 5, 7, 8
12 = 3, 4	64 = 7	116 = 3, 5, 6, 7	168 = 4, 6, 8	220 = 3, 4, 5, 7, 8
13 = 1, 3, 4	65 = 1, 7	117 = 1, 3, 5, 6, 7	169 = 1, 4, 6, 8	221 = 1, 3, 4, 5, 7, 8
14 = 2, 3, 4	66 = 2, 7	118 = 2, 3, 5, 6, 7	170 = 2, 4, 6, 8	222 = 2, 3, 4, 5, 7, 8
15 = 1, 2, 3, 4	67 = 1, 2, 7	119 = 1, 2, 3, 5, 6, 7	171 = 1, 2, 4, 6, 8	223 = 1, 2, 3, 4, 5, 7, 8
16 = 5	68 = 3, 7	120 = 4, 5, 6, 7	172 = 3, 4, 6, 8	224 = 6, 7, 8
17 = 1, 5	69 = 1, 3, 7	121 = 1, 4, 5, 6, 7	173 = 1, 3, 4, 6, 8	225 = 1, 6, 7, 8
18 = 2, 5	70 = 2, 3, 7	122 = 2, 4, 5, 6, 7	174 = 2, 3, 4, 6, 8	226 = 2, 6, 7, 8
19 = 1, 2, 5	71 = 1, 2, 3, 7	123 = 1, 2, 4, 5, 6, 7	175 = 1, 2, 3, 4, 6, 8	227 = 1, 2, 6, 7, 8
20 = 3, 5	72 = 4, 7	124 = 3, 4, 5, 6, 7	176 = 5, 6, 8	228 = 3, 6, 7, 8
21 = 1, 3, 5	73 = 1, 4, 7	125 = 1, 3, 4, 5, 6, 7	177 = 1, 5, 6, 8	229 = 1, 3, 6, 7, 8
22 = 2, 3, 5	74 = 2, 4, 7	126 = 2, 3, 4, 5, 6, 7	178 = 2, 5, 6, 8	230 = 2, 3, 6, 7, 8
23 = 1, 2, 3, 5	75 = 1, 2, 4, 7	127 = 1, 2, 3, 4, 5, 6, 7	179 = 1, 2, 5, 6, 8	231 = 1, 2, 3, 6, 7, 8
24 = 4, 5	76 = 3, 4, 7	128 = 8	180 = 3, 5, 6, 8	232 = 4, 6, 7, 8
25 = 1, 4, 5	77 = 1, 3, 4, 7	129 = 1, 8	181 = 1, 3, 5, 6, 8	233 = 1, 4, 6, 7, 8
26 = 2, 4, 5	78 = 2, 3, 4, 7	130 = 2, 8	182 = 2, 3, 5, 6, 8	234 = 2, 4, 6, 7, 8
27 = 1, 2, 4, 5	79 = 1, 3, 4, 7	131 = 1, 2, 8	183 = 1, 2, 3, 5, 6, 8	235 = 1, 2, 4, 6, 7, 8
28 = 3, 4, 5	80 = 5, 7	132 = 3, 8	184 = 4, 5, 6, 8	236 = 3, 4, 6, 7, 8
29 = 1, 3, 4, 5	81 = 1, 5, 7	133 = 1, 3, 8	185 = 1, 4, 5, 6, 8	237 = 1, 3, 4, 6, 7, 8
30 = 2, 3, 4, 5	82 = 2, 5, 7	134 = 2, 3, 8	186 = 2, 4, 5, 6, 8	238 = 2, 3, 4, 6, 7, 8
31 = 1, 2, 3, 4, 5	83 = 1, 2, 5, 7	135 = 1, 2, 3, 8	187 = 1, 2, 4, 5, 6, 8	239 = 1, 2, 3, 4, 6, 7, 8
32 = 6	84 = 3, 5, 7	136 = 4, 8	188 = 3, 4, 5, 6, 8	240 = 5, 6, 7, 8
33 = 1, 6	85 = 1, 3, 5, 7	137 = 1, 4, 8	189 = 1, 3, 4, 5, 6, 8	241 = 1, 5, 6, 7, 8
34 = 2, 6	86 = 2, 3, 5, 7	138 = 2, 4, 8	190 = 2, 3, 4, 5, 6, 8	242 = 2, 5, 6, 7, 8
35 = 1, 2, 6	87 = 1, 2, 3, 5, 7	139 = 1, 2, 4, 8	191 = 1, 2, 3, 4, 5, 6, 8	243 = 1, 2, 5, 6, 7, 8
36 = 3, 6	88 = 4, 5, 7	140 = 3, 4, 8	192 = 7, 8	244 = 3, 5, 6, 7, 8
37 = 1, 3, 6	89 = 1, 4, 5, 7	141 = 1, 3, 4, 8	193 = 1, 7, 8	245 = 1, 3, 5, 6, 7, 8
38 = 2, 3, 6	90 = 2, 4, 5, 7	142 = 2, 3, 4, 8	194 = 2, 7, 8	246 = 2, 3, 5, 6, 7, 8
39 = 1, 2, 3, 6	91 = 1, 2, 4, 5, 7	143 = 1, 2, 3, 4, 8	195 = 1, 2, 7, 8	247 = 1, 2, 3, 5, 6, 7, 8
40 = 4, 6	92 = 3, 4, 5, 7	144 = 5, 8	196 = 3, 7, 8	248 = 4, 5, 6, 7, 8
41 = 1, 4, 6	93 = 1, 3, 4, 5, 7	145 = 1, 5, 8	197 = 1, 3, 7, 8	249 = 1, 4, 5, 6, 7, 8
42 = 2, 4, 6	94 = 2, 3, 4, 5, 7	146 = 2, 5, 8	198 = 2, 3, 7, 8	
43 = 1, 2, 4, 6	95 = 1, 2, 3, 4, 5, 7	147 = 1, 2, 5, 8	199 = 1, 2, 3, 7, 8	
44 = 3, 4, 6	96 = 6, 7	148 = 3, 5, 8	200 = 4, 7, 8	
45 = 1, 3, 4, 6	97 = 1, 6, 7	149 = 1, 3, 5, 8	201 = 1, 4, 7, 8	
46 = 2, 3, 4, 6	98 = 2, 6, 7	150 = 2, 3, 5, 8	202 = 2, 4, 7, 8	
47 = 1, 2, 3, 4, 6	99 = 1, 2, 6, 7	151 = 1, 2, 3, 5, 8	203 = 1, 2, 4, 7, 8	
48 = 5, 6	100 = 3, 6, 7	152 = 4, 5, 8	204 = 3, 4, 7, 8	
49 = 1, 5, 6	101 = 1, 3, 6, 7	153 = 1, 4, 5, 8	205 = 1, 3, 4, 7, 8	
50 = 2, 5, 6	102 = 2, 3, 6, 7	154 = 2, 4, 5, 8	206 = 2, 3, 4, 7, 8	
51 = 1, 2, 5, 6	103 = 1, 2, 3, 6, 7	155 = 1, 2, 4, 5, 8	207 = 1, 2, 3, 4, 7, 8	
52 = 3, 5, 6	104 = 4, 6, 7	156 = 3, 4, 5, 8	208 = 5, 7, 8	

# DMX Digital-Servo Board

## Notes / Work Sheet:

DMX BOARD NO: \_\_\_\_\_

Application: \_\_\_\_\_

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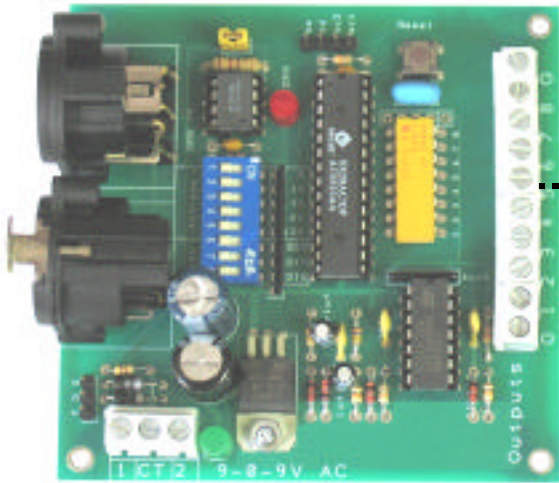
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### Addressing

### Application

CH - 8

CH - 7

CH - 6

CH - 5

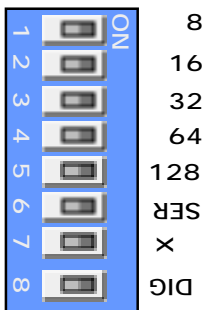
CH - 4

CH - 3

CH - 2

CH - 1

### Addressing



DIP Switches  
( Addressing )

DMX	Value		Switch Positions ( UP / Down )	S, D, SD MODE
	0	1		
	OFF	ON		
SW-1	_____	_____		
SW-2	_____	_____		
SW-3	_____	_____		
SW-4	_____	_____		
SW-5	_____	_____		
SW-6	_____	_____		
SW-7	_____	_____		
SW-8	_____	_____		