DMX Digital-Servo Board

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 5VDC digital (on-off), drive standard 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 Amps per on-board screw wire terminal block.
Servo Outputs: Standard PWM Signal per channel via screw wire terminals (1-2mesc.)

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, LED ON when power is applied.

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.
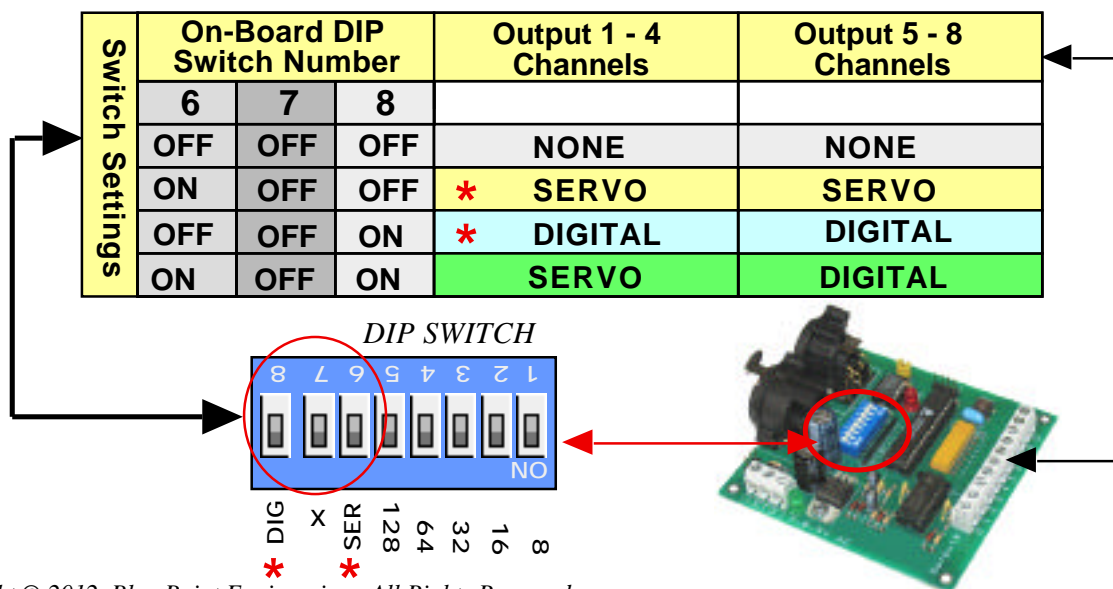
Digital Output Control:
The Digital output control value is set by the incoming data byte or DMX data values sent to board.
A value of >127 the output will be ON, (+5VDC Out)
A value of 127 and lower, the output will be OFF (0VDC).
Once set, the outputs will remain unchanged until a new data value is 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.

Switch Settings	On-Board DIP Switch Number			Output 1 - 4 Channels		Output 5 - 8 Channels
	6	**7**	**8**			
	OFF	OFF	OFF	NONE		NONE
	ON	OFF	OFF	* SERVO		SERVO
	OFF	OFF	ON	* DIGITAL		DIGITAL
	ON	OFF	ON	SERVO		DIGITAL

DIP SWITCH

DMX Digital-Servo Board

Setup

DMX Signal LED

Network Terminator

Board Reset Button

Ground (-VDC) Connection

DMX XLR Connectors 5 Pin

Digital Output Channels 1-8

XLR Male IN →

Digital Output Channels 5-8 *(TTL +5VDC)*

5 - 8

XLR Female OUT

1 - 8

1 - 8

Servo Output Channels 1-4 *(PWM Signal)*

1 - 4

Servo Output Channels 1-8

Ground (-VDC) Connection

DMX Address and Mode DIP SWITCH

Red ▬   ▬ Black

+ VDC

- VDC

BOARD POWER Connection

POWER ON LED

POWER Connection

+ VDC

- VDC

Wall Plug Power Supply 9 Vdc @ 2.5 Amp

Network Terminator

Termination Resistor / Jumper

BOARD POWER SUPPLY

or

TRM-OFF   TRM-ON

DMX Digital-Servo Board

Board Address
DMX - Values

TOP VIEW

**Base address selectable
between 1 and 249**

Switch Number

Switch Position (ON or OFF)

Switch Value Board Mode

ON

ON

16+32 = 48

ON
ON

8
16
32
64
128
SER
X
DIG
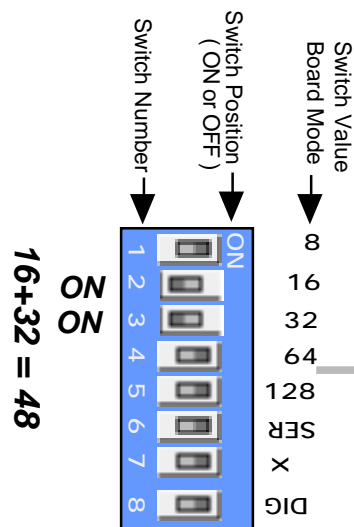
**DIP Switches
(Addressing)**
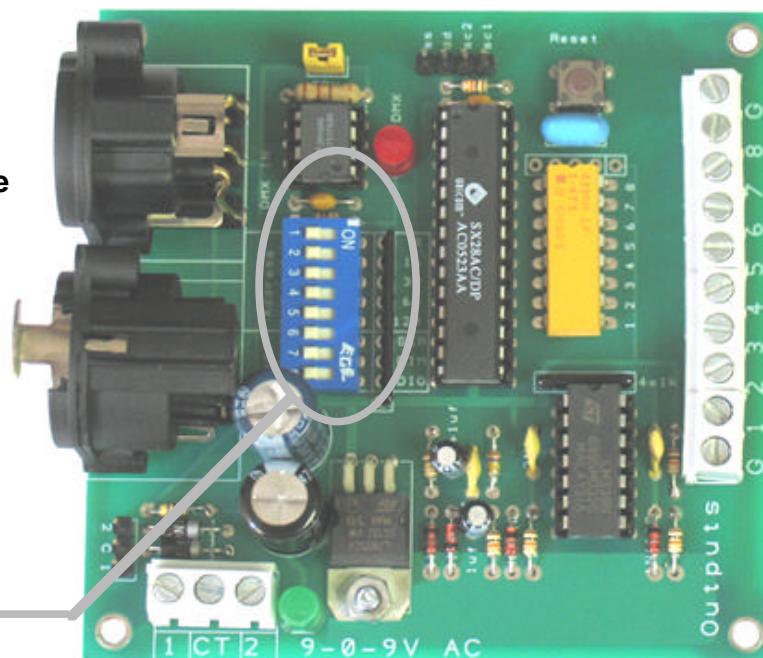
Example

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

Outputs

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

DMX Network
Setup - 5 Pin
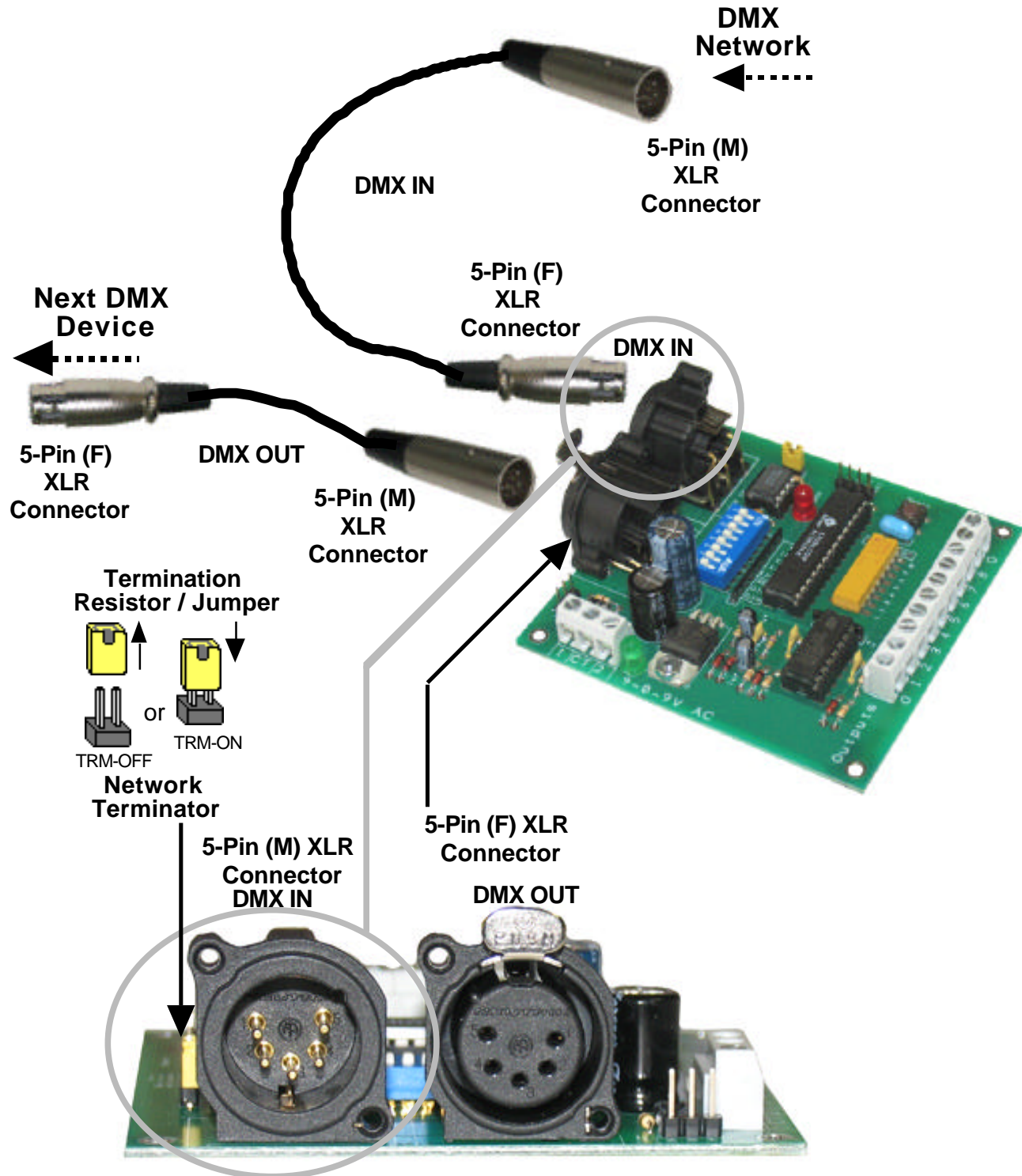
DMX Network

**5-Pin (M)
XLR
Connector**

DMX IN

**Next DMX
Device**

**5-Pin (F)
XLR
Connector**

DMX IN

**5-Pin (F)
XLR
Connector**

DMX OUT

**5-Pin (M)
XLR
Connector**

**Termination
Resistor / Jumper**

or

TRM-OFF   TRM-ON

**Network
Terminator**

**5-Pin (M) XLR
Connector
DMX IN**

**5-Pin (F) XLR
Connector**

DMX OUT

DMX Digital-Servo Board

SERVO Setup

SERVO 1

DIP Switch
set to Servos

PWM
Signal

-5VDC

+5VDC

CH-1

+5VDC

-5VDC

Ground

+9VDC

-9VDC

**Servo
Power**

**Board
Power**

Wall Plug Power Supply
9 Vdc @ 2.5 Amp

Wall Plug Power Supply
5 Vdc @ 5 Amp
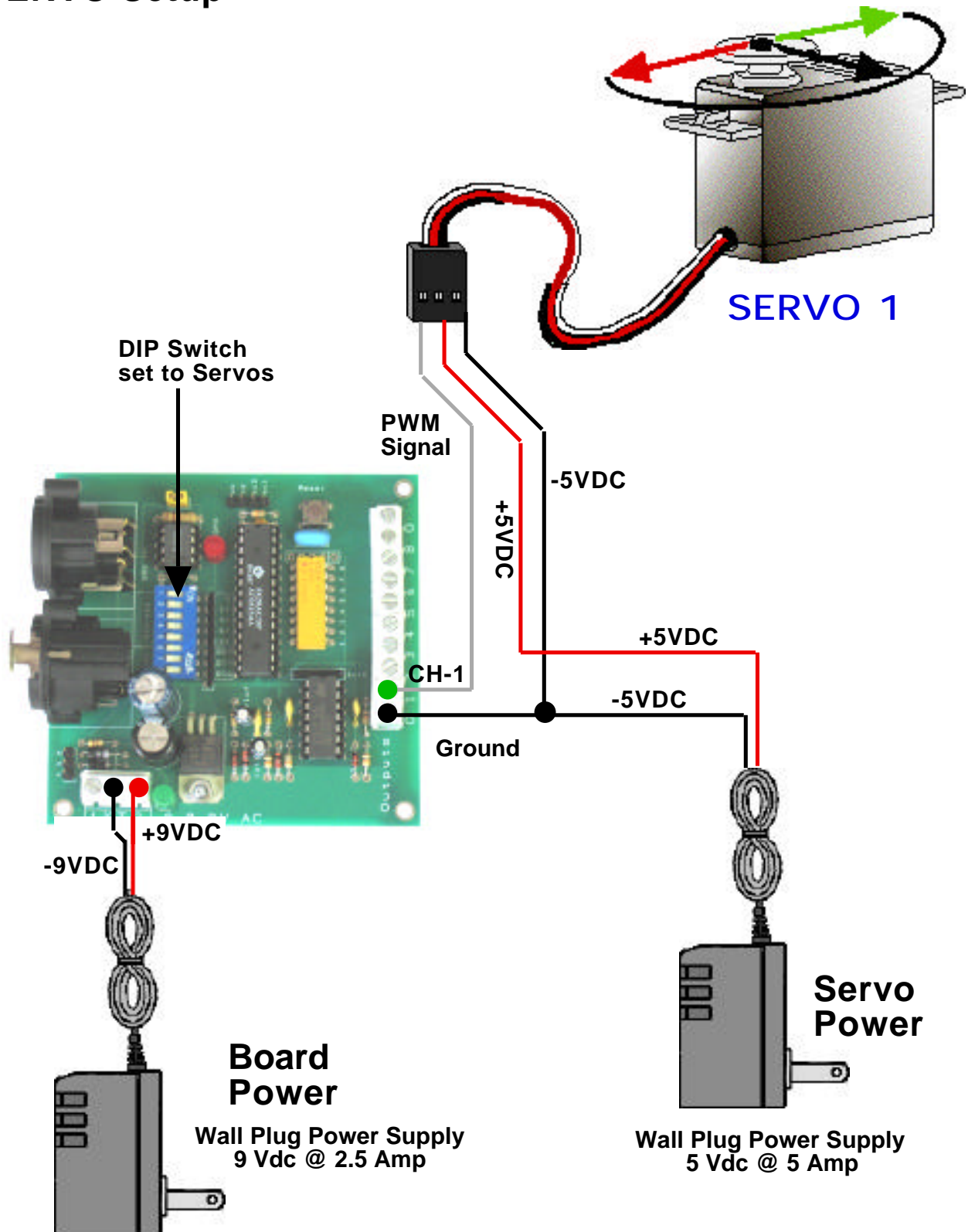
DMX Digital-Servo Board

POWER SUPPLY
5 VDC
3- 5 Amp

Servo Power

- Red (+)

- Black (-)

Servo Red wire must
not be connected to
controller board
WARNING

CUT

SERVO 3

Servo Power
Connection
X DO NOT Connect

- White / Yellow

- Black

X Red
No
Connection

SERVO 2

**DIP Switch
set to Servos**

SERVO 1

CH-3
CH-2
CH-1

Board Power
Wall Plug Power Supply
9 Vdc @ 2.5 Amp

Ground

+9VDC

-9VDC

DMX Digital-Servo Board

Digital (+5VDC) Output

CH8
+5VDC

CH7
+5VDC

CH6
+5VDC

CH5
+5VDC

5VDC @ 20 mAmp

CH4
+5VDC

CH3
+5VDC

CH2
+5VDC

CH1
+5VDC

Ground
-5VDC

Ground
-5VDC

G Black

Red

G 8 7 6 5 4 3 2 1 G

*0-5 VDC Output
20 mAmp
Max per Channel*

sindino

**DIP Switch
set to Digital
SW 8 ON**

**Board
Power**

Wall Plug Power Supply
9 Vdc @ 2.5 Amp

-9VDC

+9VDC

9-0-9V AC

DMX Digital-Servo Board

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.

Crydom Solid State Relay
DC Control - AC Switching

Cabinet / Box

White *

Wall Plug *

Caution

AC Powered Devices

Green (Gnd)

White

DANGER

V AC

Black

Black *

Solid-State Relay Module

CRYDOM

2

1

+3

4
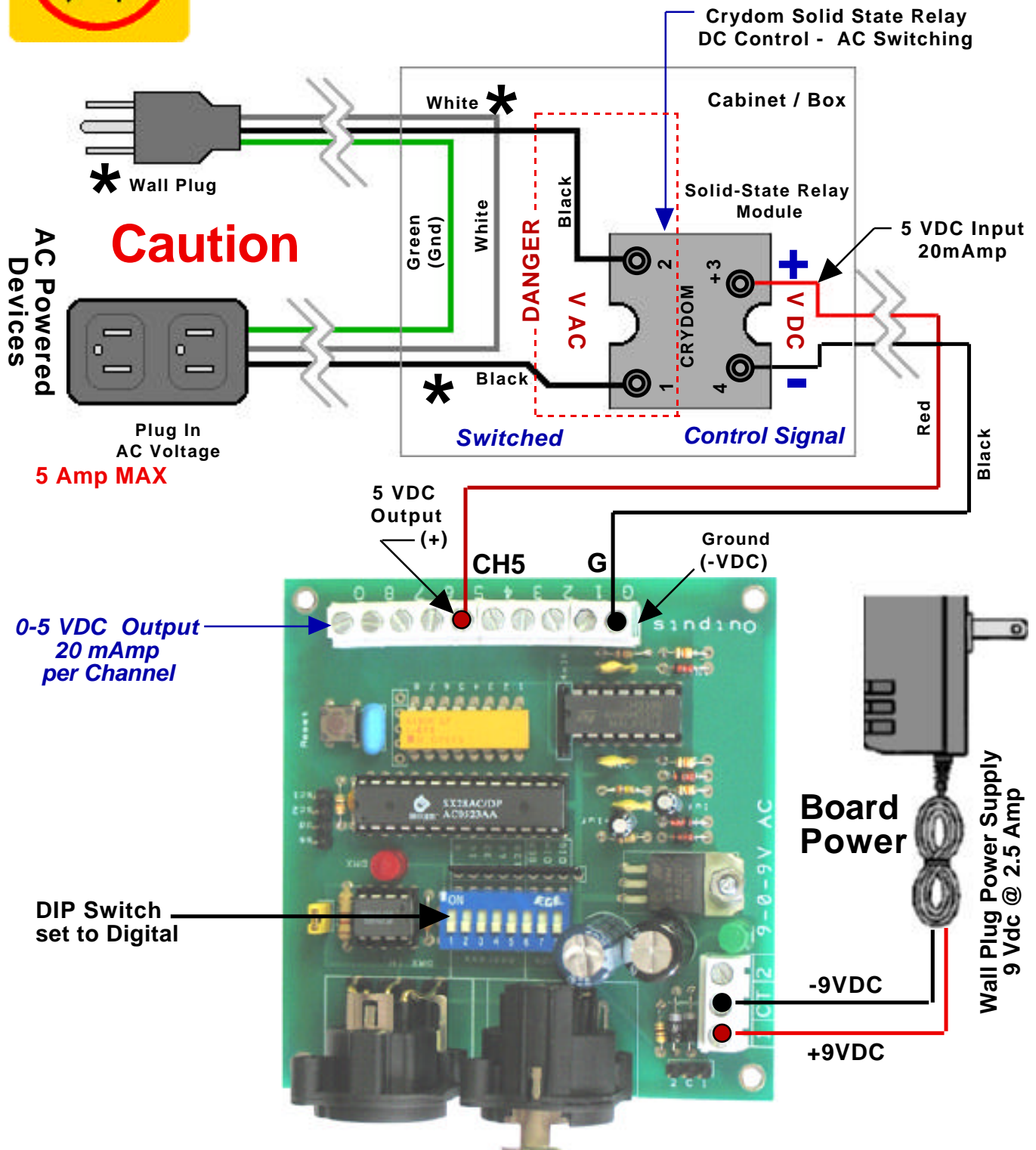
+ V DC **−**

5 VDC Input
20mAmp

Plug In
AC Voltage
5 Amp MAX

Switched

Control Signal

Red

Black

5 VDC
Output
(+)

CH5

G

Ground
(-VDC)

0-5 VDC Output
20 mAmp
per Channel

sindino

**DIP Switch
set to Digital**

**Board
Power**

Wall Plug Power Supply
9 Vdc @ 2.5 Amp

CT2 9-0-9V AC

-9VDC

+9VDC

DMX Digital-Servo Board

AC Powered Devices

5 Amp MAX

Caution

* Wall Plug

Plug In AC Voltage

Green (Gnd)

White

White

* Black

DANGER

V AC

Black

Switched ON / OFF

Solid-State Relay Module

1   2

CRYDOM

4   +3

− V DC +

Control Signal

Cabinet / Box

Ch8

AC Powered Devices

5 Amp MAX

Caution

* Wall Plug

Plug In AC Voltage

Green (Gnd)

White

White

* Black

DANGER

V AC

Black

Switched ON / OFF

Solid-State Relay Module

1   2

CRYDOM

4   +3

− V DC +

Control Signal

Cabinet / Box

Ch1

Ch8   Ch1   Red (+)

Black (−)   Red (+)   Black (−)

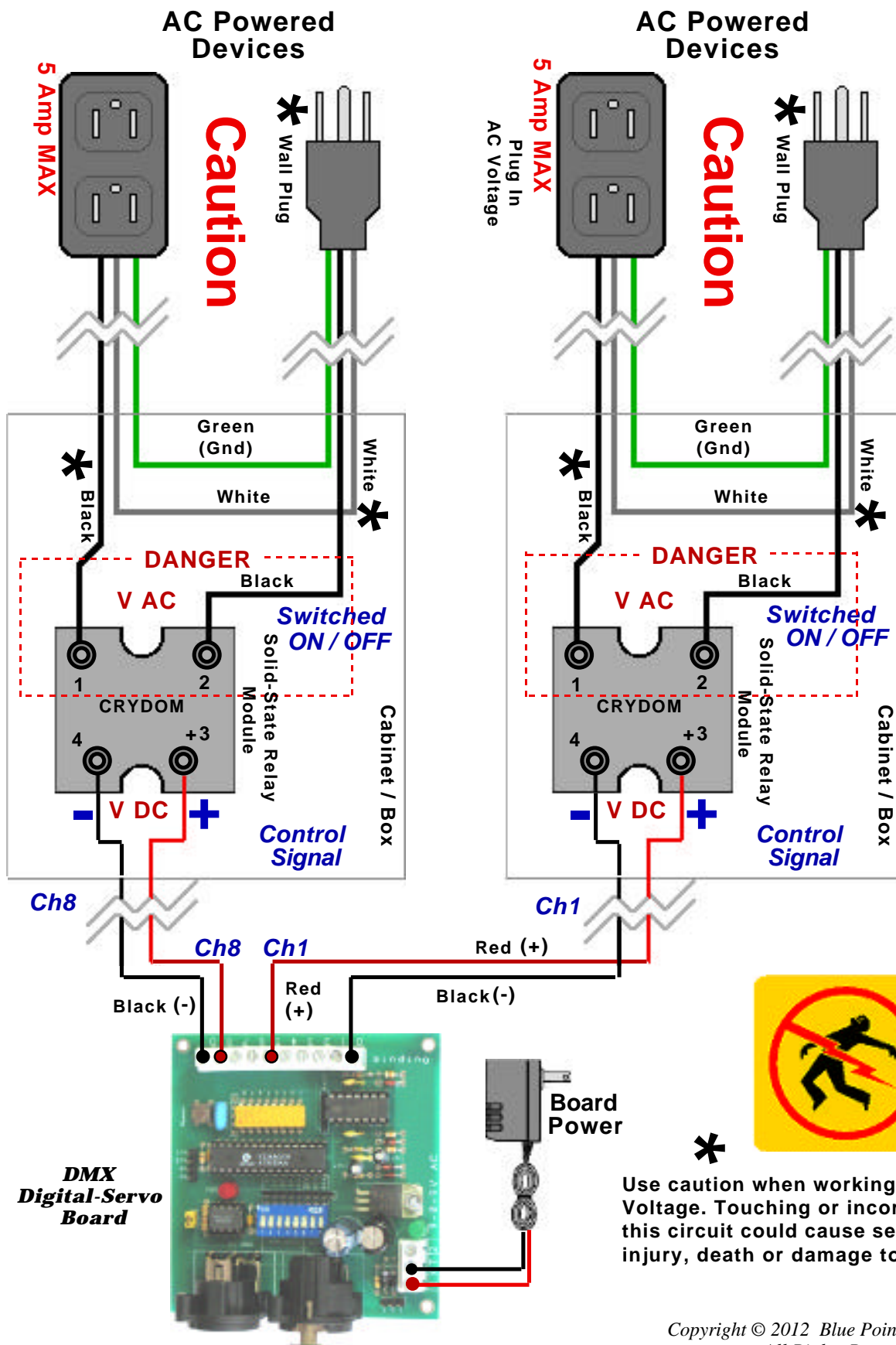*DMX Digital-Servo Board*

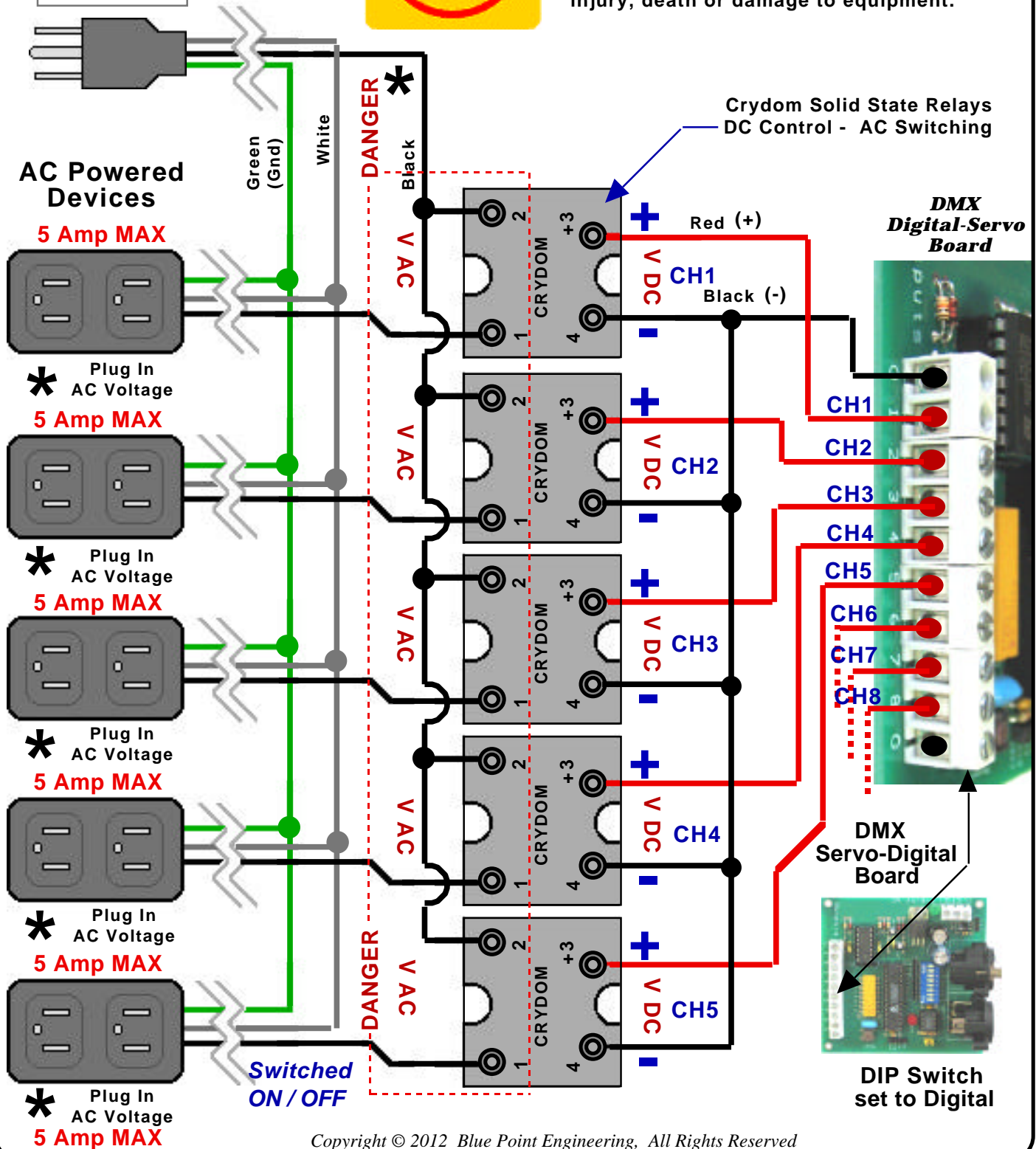**Board Power**

* 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

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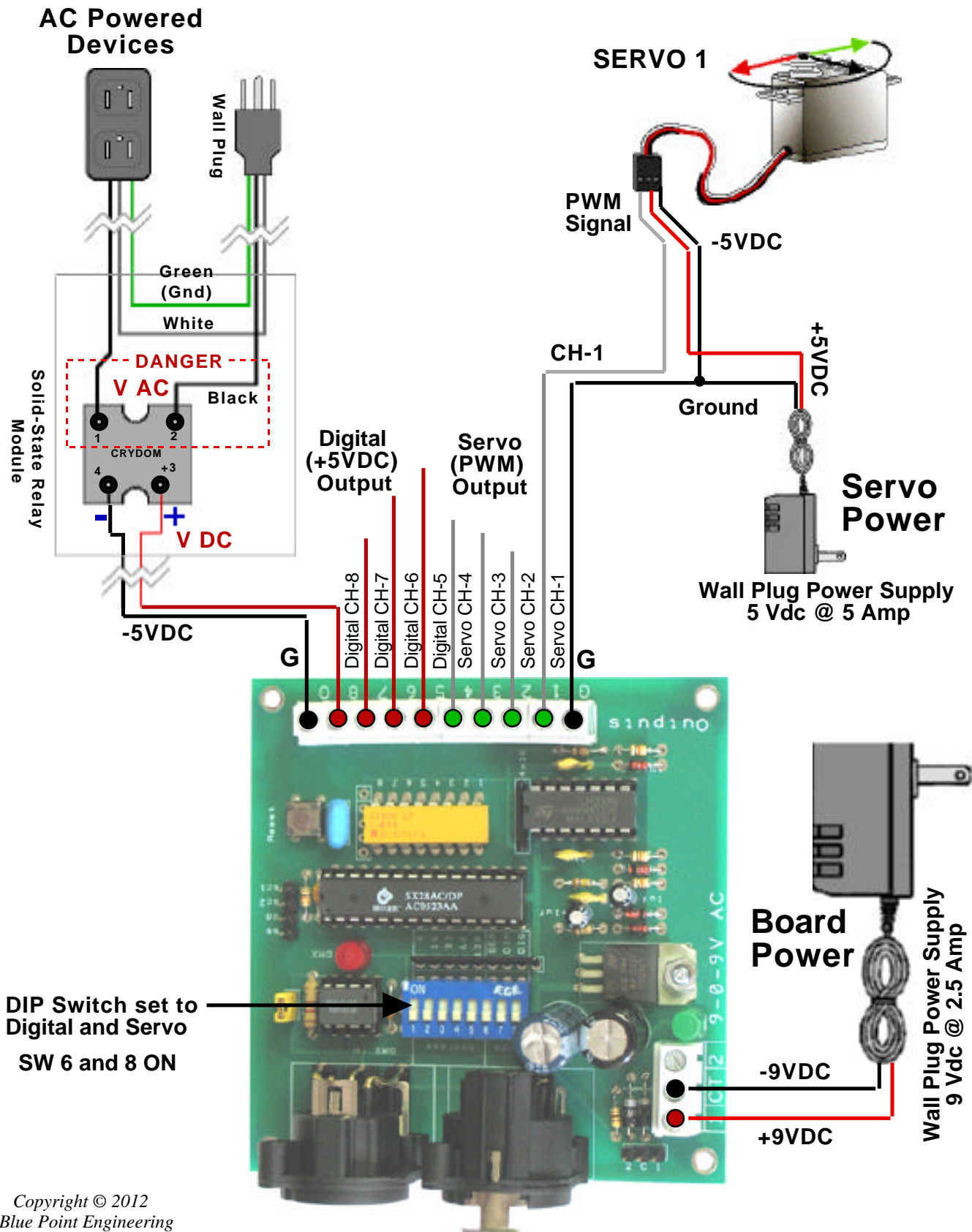
* Main AC Power

Crydom Solid State Relays
DC Control - AC Switching

AC Powered Devices

Green (Gnd)
White
DANGER
Black

5 Amp MAX

* Plug In AC Voltage

5 Amp MAX

* Plug In AC Voltage

5 Amp MAX

* Plug In AC Voltage

5 Amp MAX

* Plug In AC Voltage

5 Amp MAX

DANGER

Switched ON / OFF

* Plug In AC Voltage

5 Amp MAX

V AC — CRYDOM — +3 — Red (+) — V DC CH1 — Black (-)
V AC — CRYDOM — +3 — V DC CH2
V AC — CRYDOM — +3 — V DC CH3
V AC — CRYDOM — +3 — V DC CH4
V AC — CRYDOM — +3 — V DC CH5

DMX Digital-Servo Board

CH1
CH2
CH3
CH4
CH5
CH6
CH7
CH8

DMX Servo-Digital Board

DIP Switch set to Digital

DMX Digital-Servo Board

AC Powered Devices

Wall Plug

SERVO 1

PWM Signal

-5VDC

Green (Gnd)

White

CH-1

+5VDC

DANGER V AC

Black

CRYDOM

1 2

4 +3

Solid-State Relay Module

– **+**

V DC

Ground

Servo Power

Digital (+5VDC) Output

Servo (PWM) Output

Wall Plug Power Supply 5 Vdc @ 5 Amp

-5VDC

G

Digital CH-8
Digital CH-7
Digital CH-6
Digital CH-5
Servo CH-4
Servo CH-3
Servo CH-2
Servo CH-1

G

sindino

DIP Switch set to Digital and Servo

SW 6 and 8 ON

Board Power

9 - 0 - 9V AC

-9VDC

+9VDC

Wall Plug Power Supply 9 Vdc @ 2.5 Amp

DMX Digital-Servo Board

Board Test

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

GROUND (-5VDC)

+5 VDC Ch 1-8 each

GROUND (-5VDC)

Board Power

DIP SW 8 = ON
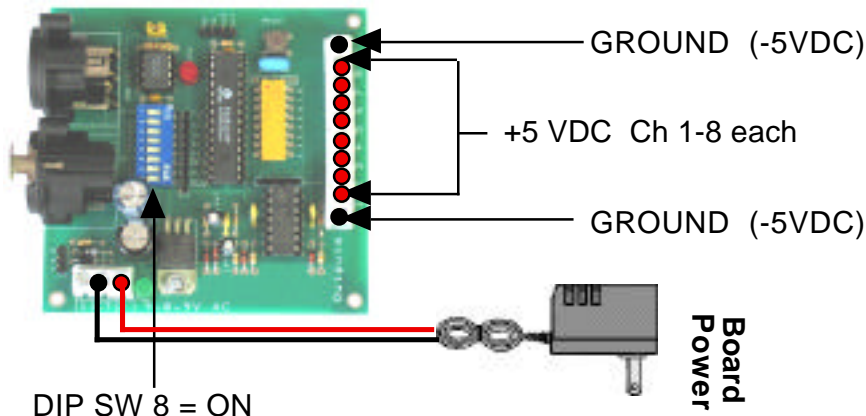
Servo Outputs

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

5 VDC

SERVO Power

9VDC

BOARD Power

DIP SW 6 = ON
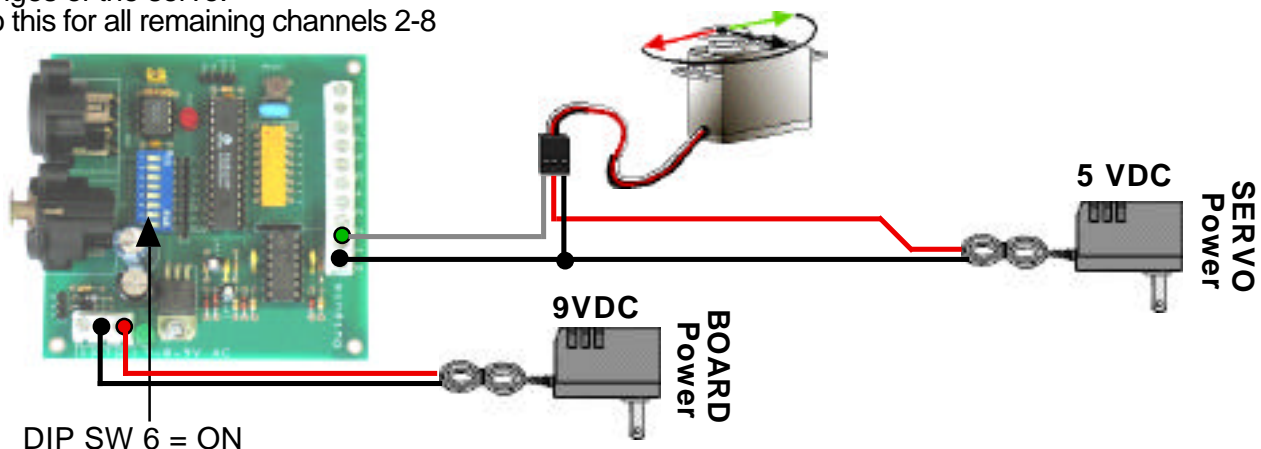
DMX Digital-Servo Board

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: _____

_____

_____

_____

_____

_____

_____

_____
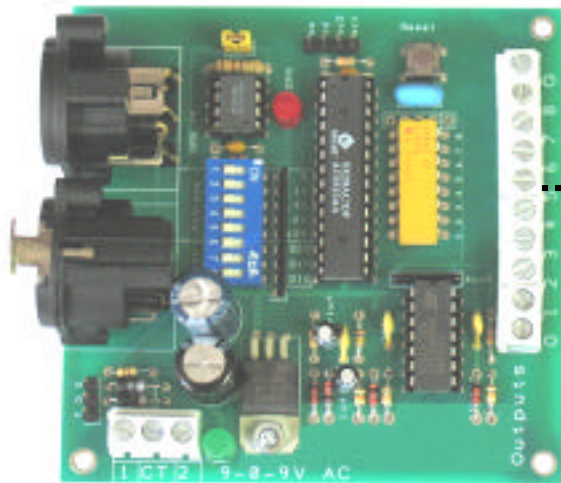
Addressing	Application
CH - 8	_____
CH - 7	_____
CH - 6	_____
CH - 5	_____
CH - 4	_____
CH - 3	_____
CH - 2	_____
CH - 1	

Addressing

DIP Switches (Addressing)

	8
	16
	32
	64
	128
	SER
	X
	DIG

DMX	Value (0)	OFF ON (1)	Switch Positions (UP / Down)
SW-1			
SW-2			
SW-3			
SW-4			
SW-5			
SW-6			
SW-7			
SW-8			

S, D, SD MODE