DMX Stepper Motor Board

Technical T

Version 1.0 -2009
WD1556

Overview

The DMX-PWM driver board supports 4 output channels running at 2kHz and in corporates the ability to drive a standard Unipolar stepper motor at 9-12 Vdc @ 4 Amp max or optional PWM output drive for LEDs' or a single RGB LED. The base address may be set anywhere between 1 and 509 and requires 2, 3, or 4 DMX channels per mode setting.

Connection:
Dual 5-Pin XLR Connectors (M / F - IN and Pass Through Out)
Power Supply- Board: 9-12V DC at 0.5 amp to 2.1mm power jack (center positive +, outside jack assembly- negative)
Outputs: 4 Open 1 Amp collector type outputs via screw terminals plus common ground connection point and isolated contact for the Stepper motor +ve supply point if required.

DMX Fault LED:
DMX LED- **ON** when a suitable DMX signal is being received or a flashing LED when **NO** valid DMX signal stream is being received.

Address Selection:
The board base address may be set between 1 and 509 using the onboard DIP switches on any standard DMX512 networks. The Base Address is continuously read. Addresses greater than 509 are treated as being 509. Address 0 is treated as being 1. Switch #10 reserved for Mode setting.

Settings - *(See Pages on Control / Addressing for more details)*
Two-(2) DMX channels are needed for Stepper Motor control and four(4) channels are needed for optional PWM - LED Control. Three (3) DMX Channels are used for PWM RGB LED control.
Set the start base address of the 4-Channels on the Stepper Motor Driver Board as follows:
Select a valid DMX number for output channel-1 (address range 1 to 509). 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. 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, address 51 for output channel-4. Use this process of adding the next channel to the next channel value until all 4 output channels address values are identified.

Range selection:
The DMX-Stepper Motor board may be set to operate in the **Stepper Motor** or optional **PWM** (4-LED's or 1-RGB LED) modes by DIP switch #10 on the addressing switch.

Stepper Motor Drive Mode: (Switch #10 **ON**) The 4 outputs are configured to drive a standard Unipolar stepper motor. The direction and motor speed is controlled by the value on the DMX base address channel.(2 Channels needed) For value greater than 128, the motor rotates in the clockwise direction - a value of 129 produces the slowest rotation at 128msecs per step and 255 produces the fastest rotation speed of 0.5msecs per step. For values less than 128, the motor will rotate in the anticlockwise direction - a value of 127 produces the slowest rotation speed at 128msecs per step and 0 produces the fastest rotation speed of 0.5msecs per step. For the outputs to be energised, the value on the base address+1 channel must be greater than 128 also. Stepping is suspended if no valid DMX signal is recognised o rbase address+1 channel (Ch2) is less the 128

In Optional PWM (LED) mode: (Switch #10 **OFF**) The value in the base address channel controls the PWM stream on channel 1- a value of 0 will switch the load permanently OFF and a value of 255 will switch the load ON. 128 will generate a 50% duty PWM signal running at 2kHz. The resolution of the PWM stream is 8-bit. The value of the base address+1 channel controls output channel 2, channel 3, 4 etc. (1-4 output channels can be used for PWM LED control. RGB 3 channels needed)

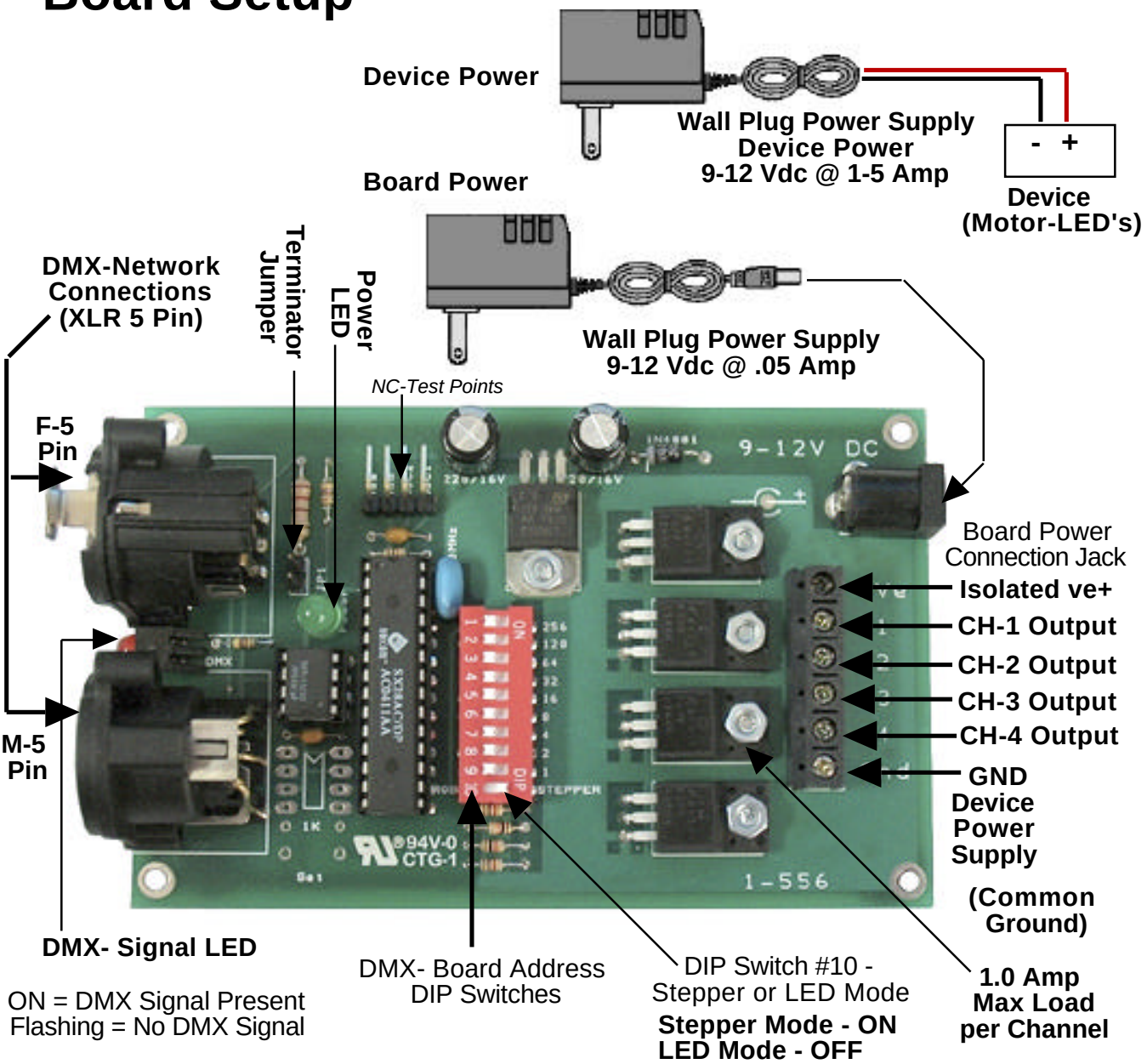
DMX Stepper Motor Board

Technical T

Outputs
The board is rated for a total output max load of 4 Amps / 30VDC or 1.00 amps each per channels 1-4 and are arranged as open collector devices. (MAX Current total board - 4 Amps)

Power Supply:
Power Supply: 9-12V DC at 0.5 amp to 2.1mm power jack (center positive +)

Board Setup



Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

Power Connection

Example Setup

Power For Device Under Control

Wall Plug Power Supply
9-12 Vdc @ 2 Amp

+ 9-12 VDC

- 9-12 VDC

Power Jack

Wall Plug Power Supply
9-12 Vdc @0.5 Amp

Board Power

POWER JACK Connection

12 Vdc @ 0.5 Amp

outside - Vdc — Black

2.1 mm Connector

center + Vdc — Red

Power Jack

center + Vdc

outside - Vdc

POWER LED

Board Power Connection Jack

- 9-12 VDC

+ 12 VDC

1

2

3

4

GND

- 12 VDC

Switch 10- ON

To: DMX Stepper Motor Output Channels 1 - 4

DEVICE Under Control

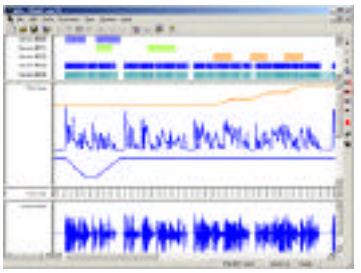
Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

DMX Network Setup - 5 Pin

Overview



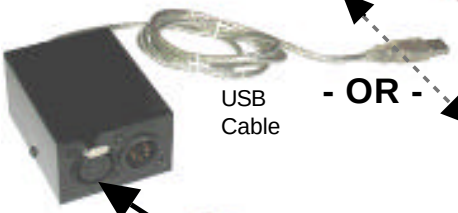
Software

Control Software (VSA)

USB PORT

Computer

USB to DMX Interface



USB Cable

- OR -

- OR -

Computer

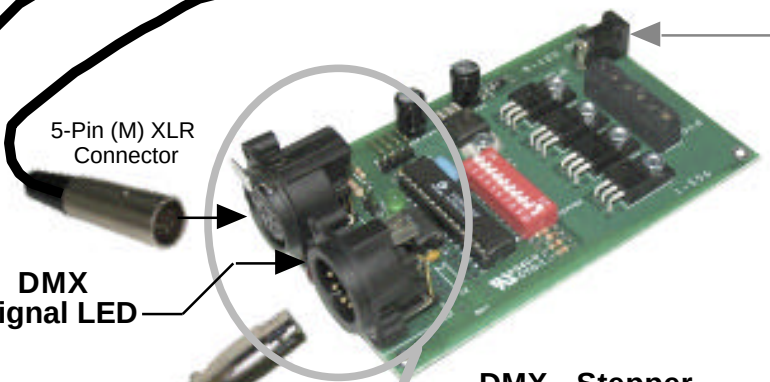
5-Pin (M) XLR Connector

USB Cable

USB PORT

DMX - XLR Cable

DMX - XLR Cable



5-Pin (M) XLR Connector

DMX Signal LED

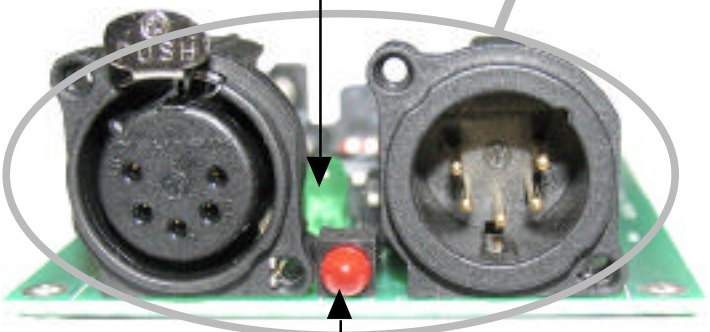
5-Pin (F) XLR Connector

5-Pin (F) XLR Connector

Next DMX Device

DMX - Stepper Motor Board

Power LED



5-Pin (F) XLR Connector

5-Pin (M) XLR Connector

DMX - Signal LED

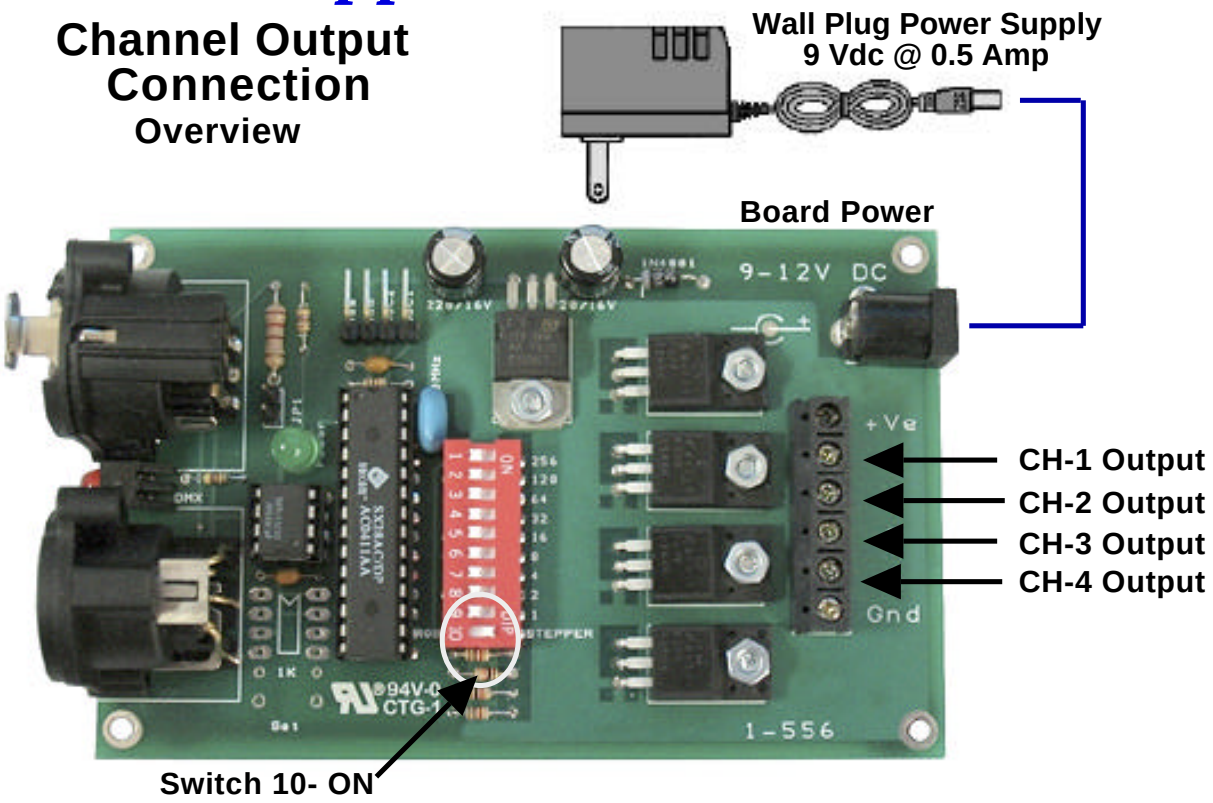
Wall Plug Power Supply 12 Vdc @ 0.5 Amp

Copyright © 2009 Blue Point Engineering, All Rights Reserved

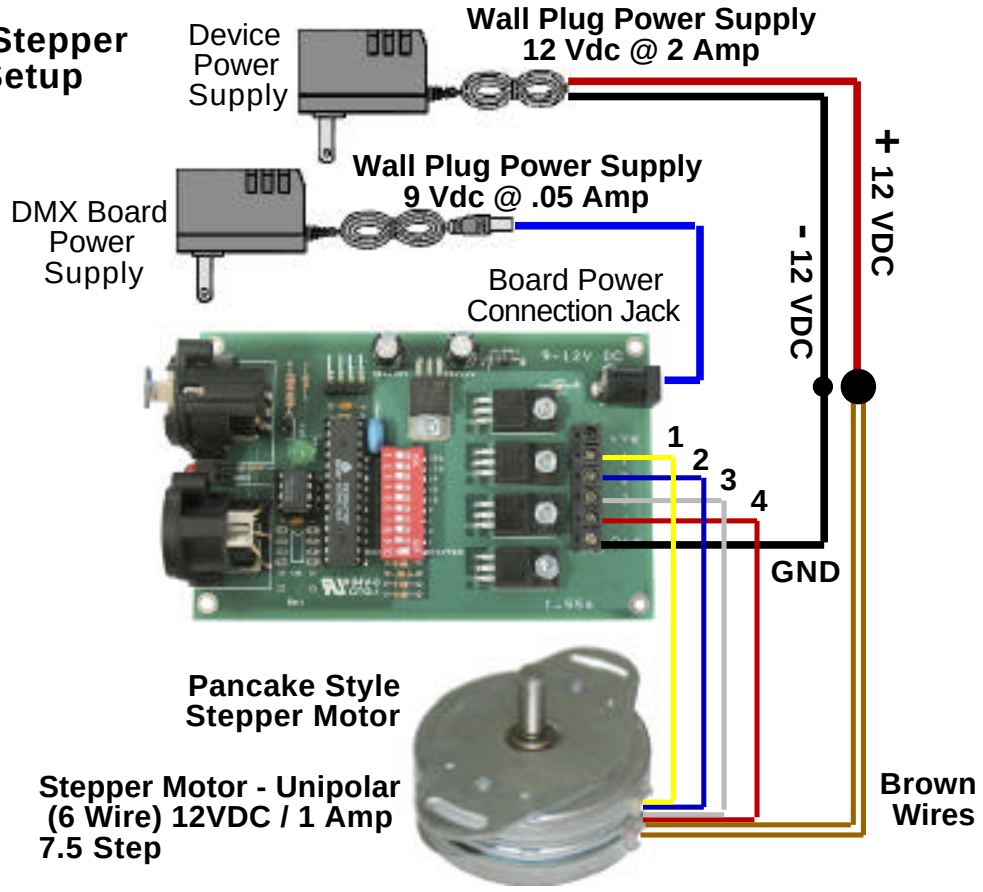
DMX Stepper Motor Board

Technical T

Channel Output Connection Overview



Example- Stepper Motor Setup

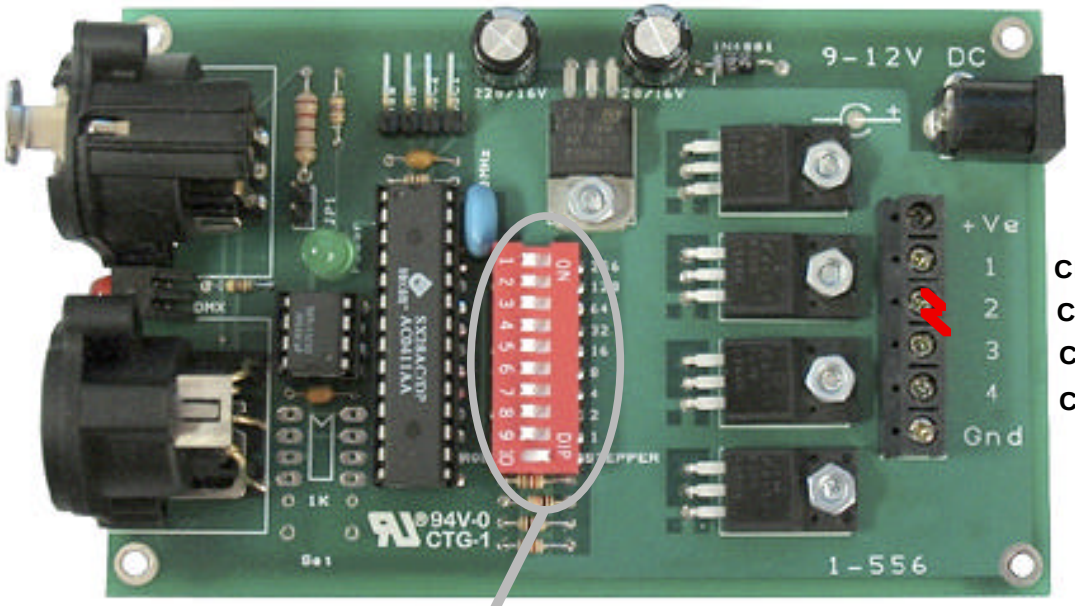


Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

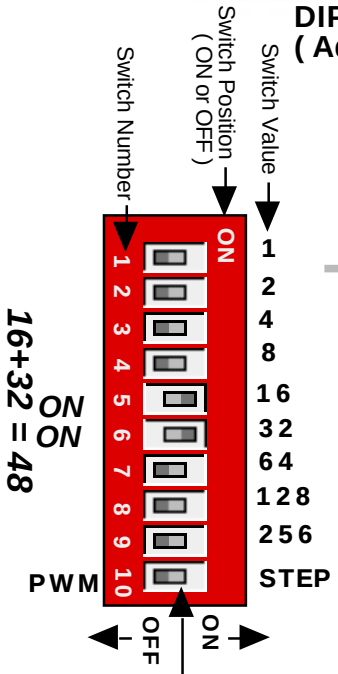
Board Address
DMX - Values



DIP Switches (Addressing)

Base address selectable between 1 and 509

NOTE: DIP Switch No.10
OFF =PWM Mode
ON = **Stepper Motor Mode**



Setting the base address of Output 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

Stepper Motor Drive Mode: (Switch #10 **ON**) The 4 outputs are configured to drive a standard Unipolar stepper motor. The direction and motor speed is controlled by the value on the DMX base address channels. (2 Channels needed)
For value greater than 128, the motor rotates in the clockwise direction - a value of 129 produces the slowest rotation at 128msecs per step and 255 produces the fastest rotation speed of 0.5msecs per step.
For values less than 128, the motor will rotate in the anticlockwise direction - a value of 127 produces the slowest rotation speed at 128msecs per step and 0 produces the fastest rotation speed of 0.5msecs per step. For the outputs to be energised, the value on the base address+1 channel must be greater than 128 also. Stepping is suspended if no valid DMX signal is recognised o rbase address+1 channel (Ch2) is less the 128

In Optional PWM (LED) mode: (Switch #10 **OFF**) The value in the base address channel controls the PWM stream on channel 1- a value of 0 will switch the load permanently OFF and a value of 255 will switch the load ON. 128 will generate a 50% duty PWM signal running at 2kHz. The resolution of the PWM stream is 8-bit. The value of the base address+1 channel controls output channel 2, channel 3, 4 etc. (1-4 output channels can be used for PWM LED control. RGB 3 channels needed)

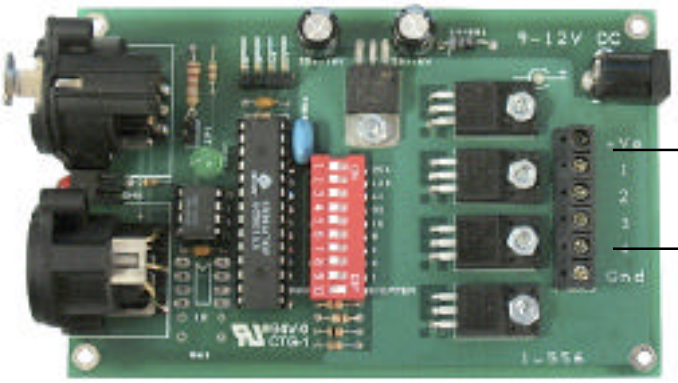
NOTE: DIP Switch No.10
(switch in **OFF** position- PWM Mode on all 4 output channels. (LED's - RGB LED)
(switch in **ON** position) - Stepper Motor Mode

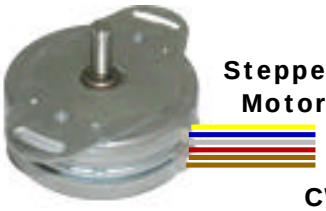
Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

Board Address
DMX - Stepper Motor

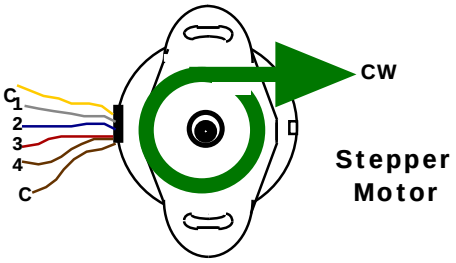




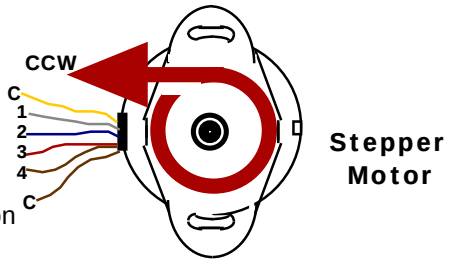
CW Rotation
Ch 1,2,3,4
Set by DMX
Value 128-255

CCW Rotation
Ch 4,3,2,1
Set by DMX
Value 128-0

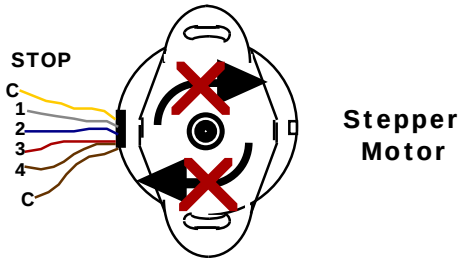
Stepper Motor Drive Mode: (Switch #10 **ON**)
(2- DMX Channels needed)
(Channel - 1 Stepper Motor Rotation - (CW, CCW)
(Channel - 2 Stepper Motor Energize - (ON / OFF)



DMX Channel-1
Clockwise Direction (CW)
Value 128 -255 = Stepper motor rotates in the Clockwise Direction
Value 127-128 = Stepper Movement near Stop
Value 129 = Stepper motor rotates slowest rotation at 128msecs per step in the Clockwise Direction.
Value 255 = Stepper motor rotates fastest rotation speed of 0.5msecs per step in the Clockwise Direction.
Note: Some Stepper motor may stall or shake at a value near 255, the stepper has exceeded the step rate designed in the motor. Lower the Value 255 - 250 to find the **Max** stepper speed for that type stepper design / manufacture.
Note: Some Stepper motor may stall or shake at a value near 126-129, the stepper has exceeded the slowest step rate designed in the motor. Change the Value up to find the **Min** stepper speed for that type stepper design or manufacture type.



DMX Channel-1
Counter ClockWise Direction (CCW)
Values 128-0 = Stepper motor rotates in the Counter Clockwise Direction
Value 127-126 = Stepper Movement near Stop
Value 127= Stepper motor rotates slowest rotation speed at 128msecs per step in the Counter Clockwise Direction.
Value 0 = Stepper motor rotates fastest rotation speed of 0.5msecs per step in the Counter Clockwise Direction.
Note: Some Stepper motor may stall or shake at a value near 0, the stepper has exceeded the step rate designed in the motor. Raise the Value 0-5 to find the **Max** stepper speed for that type stepper design / manufacture.
Note: Some Stepper motor may stall or shake at a value near 126-129, the stepper has exceeded the slowest step rate designed in the motor. Change the Value down to find the **Min** stepper speed for that type stepper design or manufacture type.



DMX Channel-2
Motor Energized - ON / OFF
Value 128 - 255 = Motor energized (ON)
Value 127- 0 = Motor NOT energized (OFF)

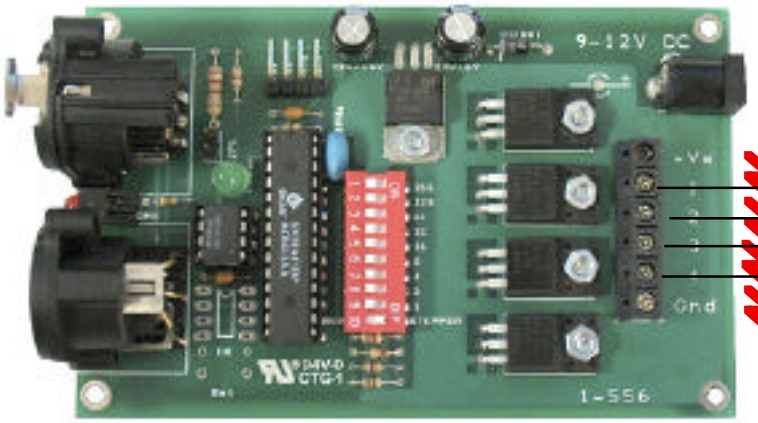
Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

Board Address

DMX - PWM Mode

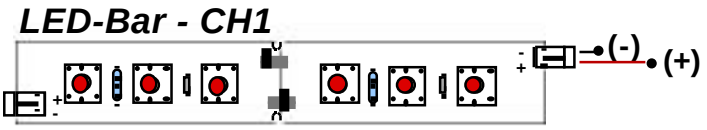


Output

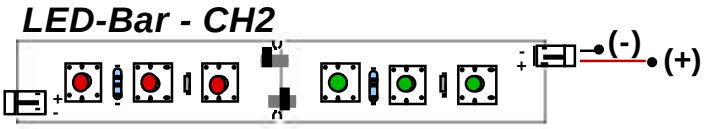
CHANNEL	DMX VALUE
CH1 =	0-255
CH2 =	0-255
CH3 =	0-255
CH4 =	0-255

PWM Drive Mode: (Switch #10 **OFF**)
(4- DMX Channels needed)
(DMX Channel - 1) - Board Output Channel 1
(DMX Channel - 2) - Board Output Channel 2
(DMX Channel - 3) - Board Output Channel 3
(DMX Channel - 4) - Board Output Channel 4

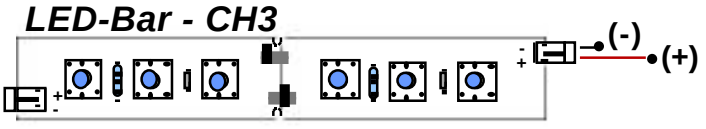
DMX Channel-1
Value of 0 will switch the load permanently **OFF**
Value of 255 will switch the load **ON**
Value of 128 will generate a 50% duty PWM signal running at 2kHz. (The resolution of the PWM stream is 8-bit.)



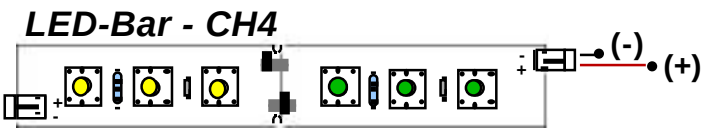
DMX Channel-2
Value of 0 will switch the load permanently **OFF**
Value of 255 will switch the load **ON**
Value of 128 will generate a 50% duty PWM signal running at 2kHz. (The resolution of the PWM stream is 8-bit.)



DMX Channel-3
Value of 0 will switch the load permanently **OFF**
Value of 255 will switch the load **ON**
Value of 128 will generate a 50% duty PWM signal running at 2kHz. (The resolution of the PWM stream is 8-bit.)



DMX Channel-4
Value of 0 will switch the load permanently **OFF**
Value of 255 will switch the load **ON**
Value of 128 will generate a 50% duty PWM signal running at 2kHz. (The resolution of the PWM stream is 8-bit.)



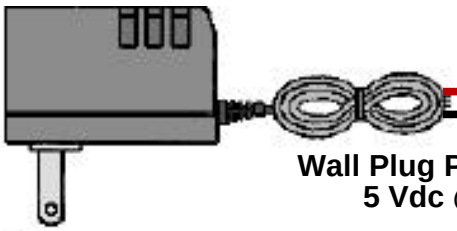
Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

Unipolar Stepper Motor Connection

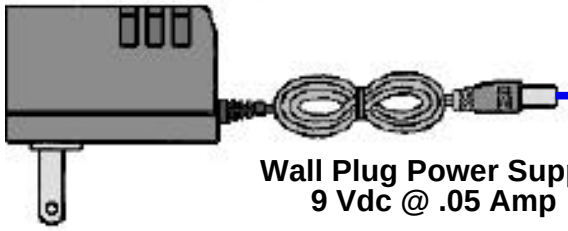
Example Setup



+ 5 VDC

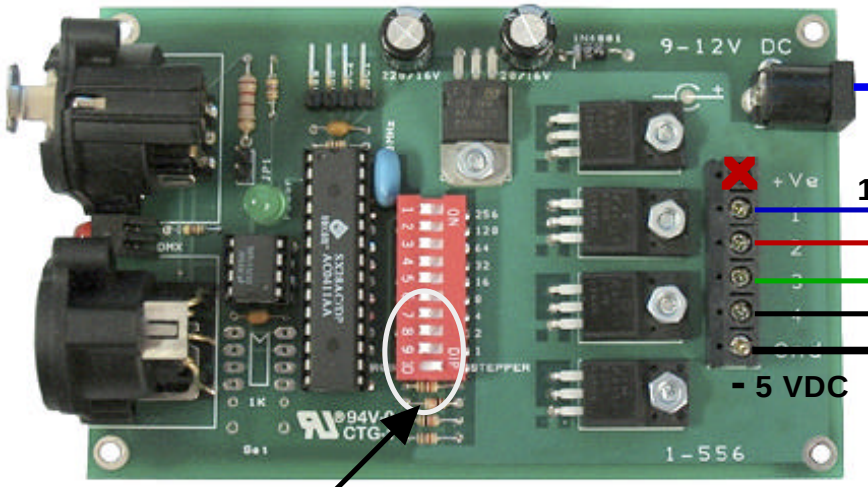
- 5 VDC

Wall Plug Power Supply
5 Vdc @ 2 Amp



Wall Plug Power Supply
9 Vdc @ .05 Amp

Board Power Connection Jack



+ 5 VDC

- 5 VDC

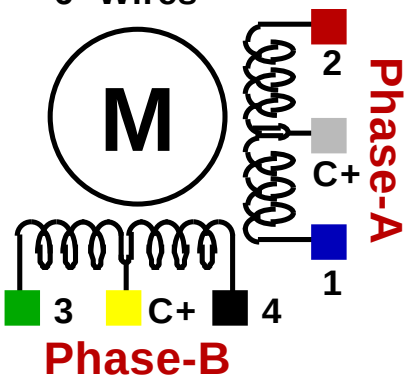
1
2
3
4
GND
- 5 VDC

Switch 10- ON

Oriental Motor Manufacture

Unipolar Type (6 Wire)
5VDC / 1 Amp
1.8 Step

6- Wires



Blue Wire
Red Wire
Green Wire
Black Wire
White Wire
Yellow Wire
White Wire
Yellow Wire

Cylindrical Shape with a Rectangular Mounting Flange

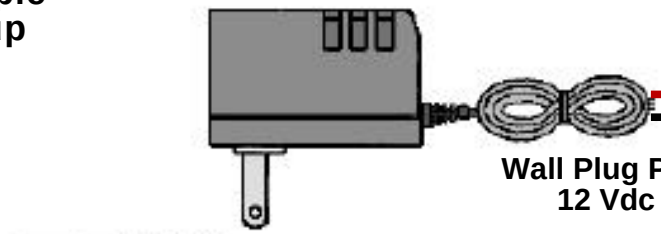
Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

Unipolar Stepper Motor Connection

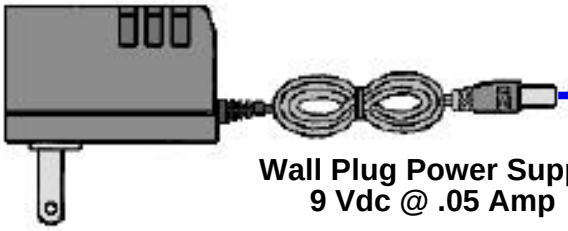
Example Setup



+ 12 VDC

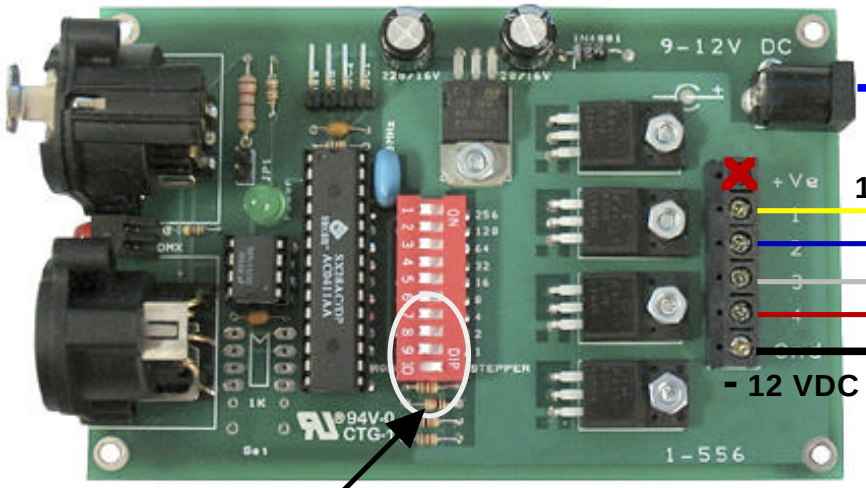
- 12 VDC

Wall Plug Power Supply
12 Vdc @ 2 Amp



Wall Plug Power Supply
9 Vdc @ .05 Amp

Board Power Connection Jack



+ 12 VDC

- 12 VDC

Brown Wire

Brown Wire

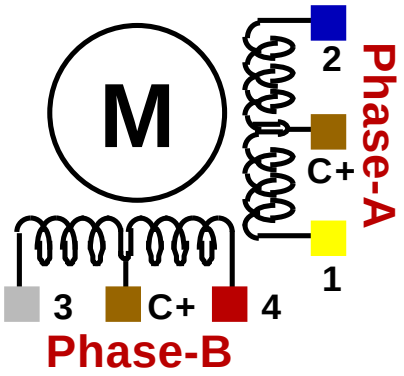
Yellow Wire

Blue Wire

White Wire

Red Wire

6- Wires



Copal Electra Manufacture

Unipolar Type (6 Wire)
12VDC / 1 Amp
7.5 Step

Stacked Cans with Diamond-Shaped Mounting Flange

Brown Wires

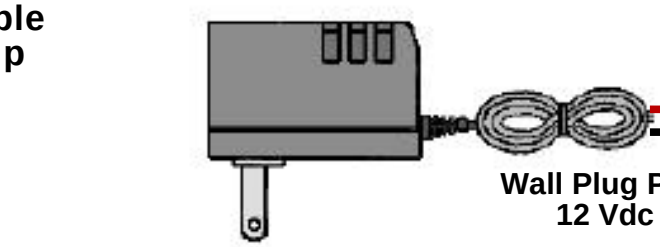
Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

Unipolar Stepper Motor Connection

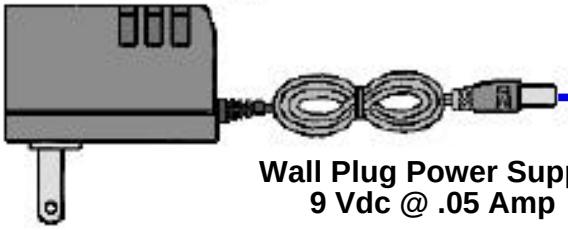
Example Setup



+ 5 VDC

- 5 VDC

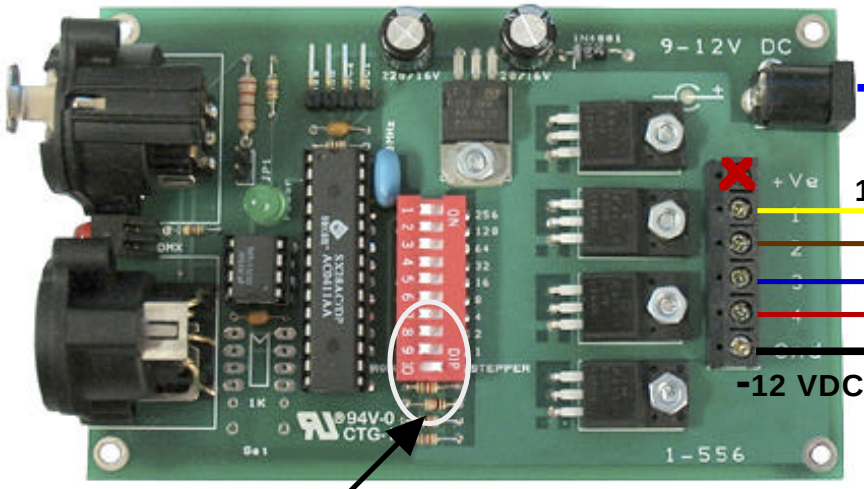
Wall Plug Power Supply
12 Vdc @ 2 Amp



Wall Plug Power Supply
9 Vdc @ .05 Amp

Board Power Connection Jack

+ 12 VDC



- 12 VDC

Switch 10- ON

Yellow Wire

Brown Wire

Blue Wire

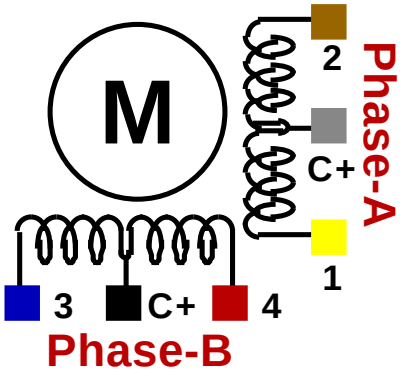
Red Wire

White Wire

Black Wire

White Wire

6- Wires



Soyo Manufacture

Unipolar Type (6 Wire)
12VDC / 1 Amp
1.8 Step

Cube shape with Face Surface Mounting

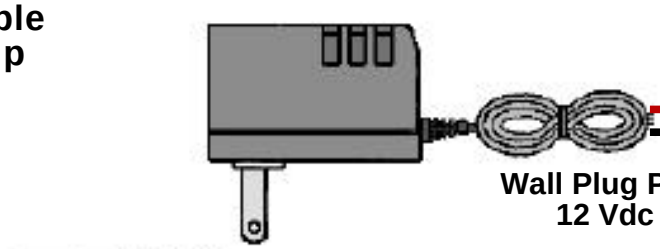
Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

Unipolar Stepper Motor Connection

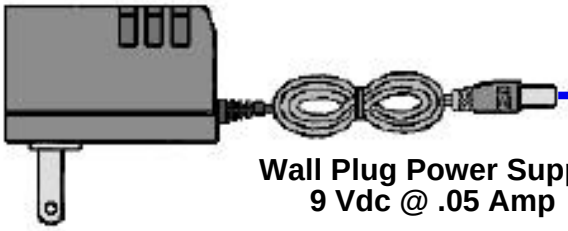
Example Setup



+ 12 VDC

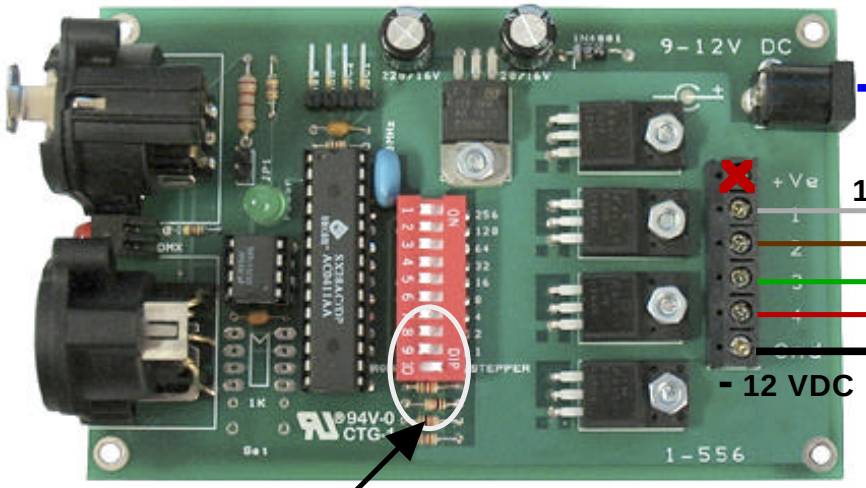
- 12 VDC

Wall Plug Power Supply
12 Vdc @ 2 Amp



Wall Plug Power Supply
9 Vdc @ .05 Amp

Board Power Connection Jack



+ 12 VDC

- 12 VDC

Black Wire

Switch 10- ON

White Wire

Brown Wire

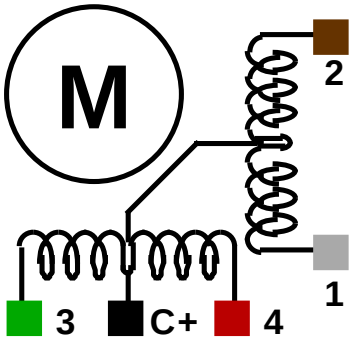
Green Wire

Red Wire

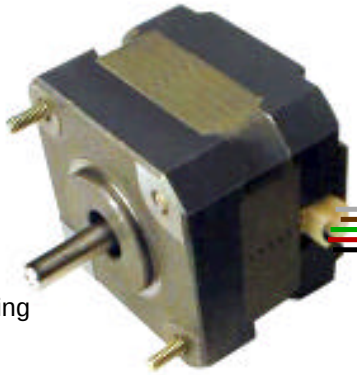
Black Wire

Japan Servo Co Manufacture

5- Wires



Unipolar Type (5 Wire)
12VDC / 1 Amp
3.6 Step



Cube shape with
Face Bolt Mounting

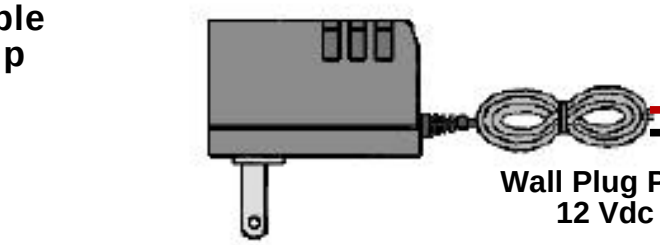
Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

Unipolar Stepper Motor Connection

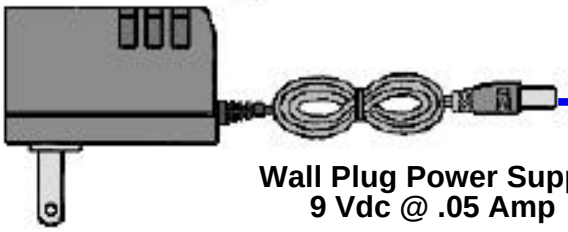
Example Setup



+ 12 VDC

- 12 VDC

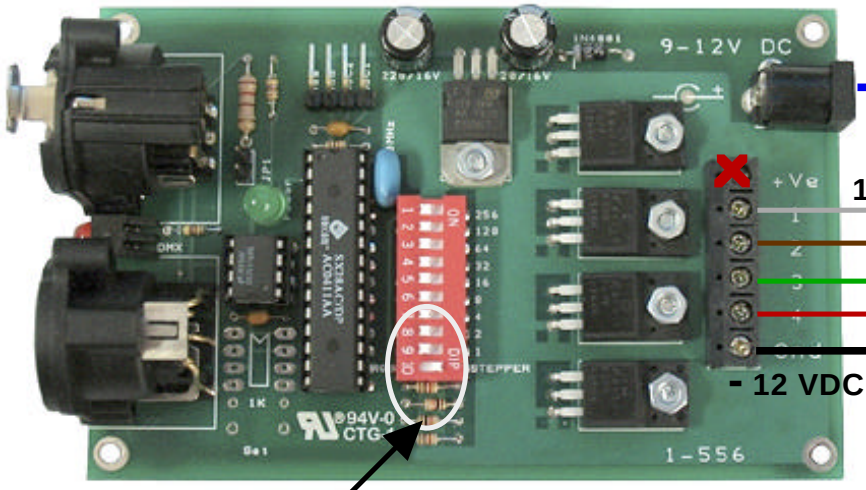
Wall Plug Power Supply
12 Vdc @ 1 Amp



Wall Plug Power Supply
9 Vdc @ .05 Amp

Board Power Connection Jack

+ 12 VDC



Switch 10- ON

White Wire

Brown Wire

Green Wire

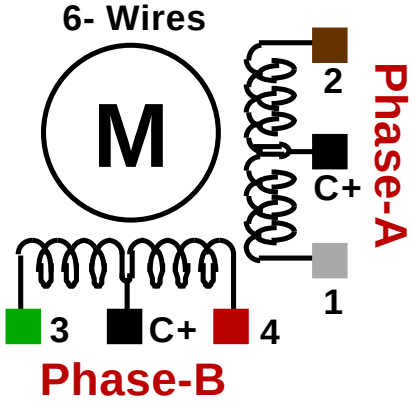
Red Wire

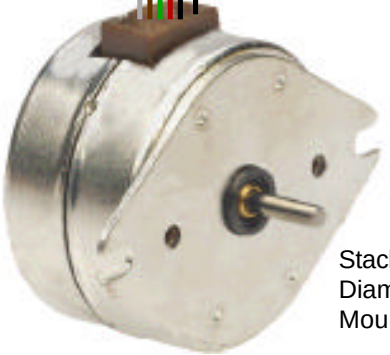
Black Wire

Black Wire

Black Wire

6- Wires





Phillips Manufacture

Unipolar Type (6 Wire)
12VDC / 1 Amp
3.6 Step

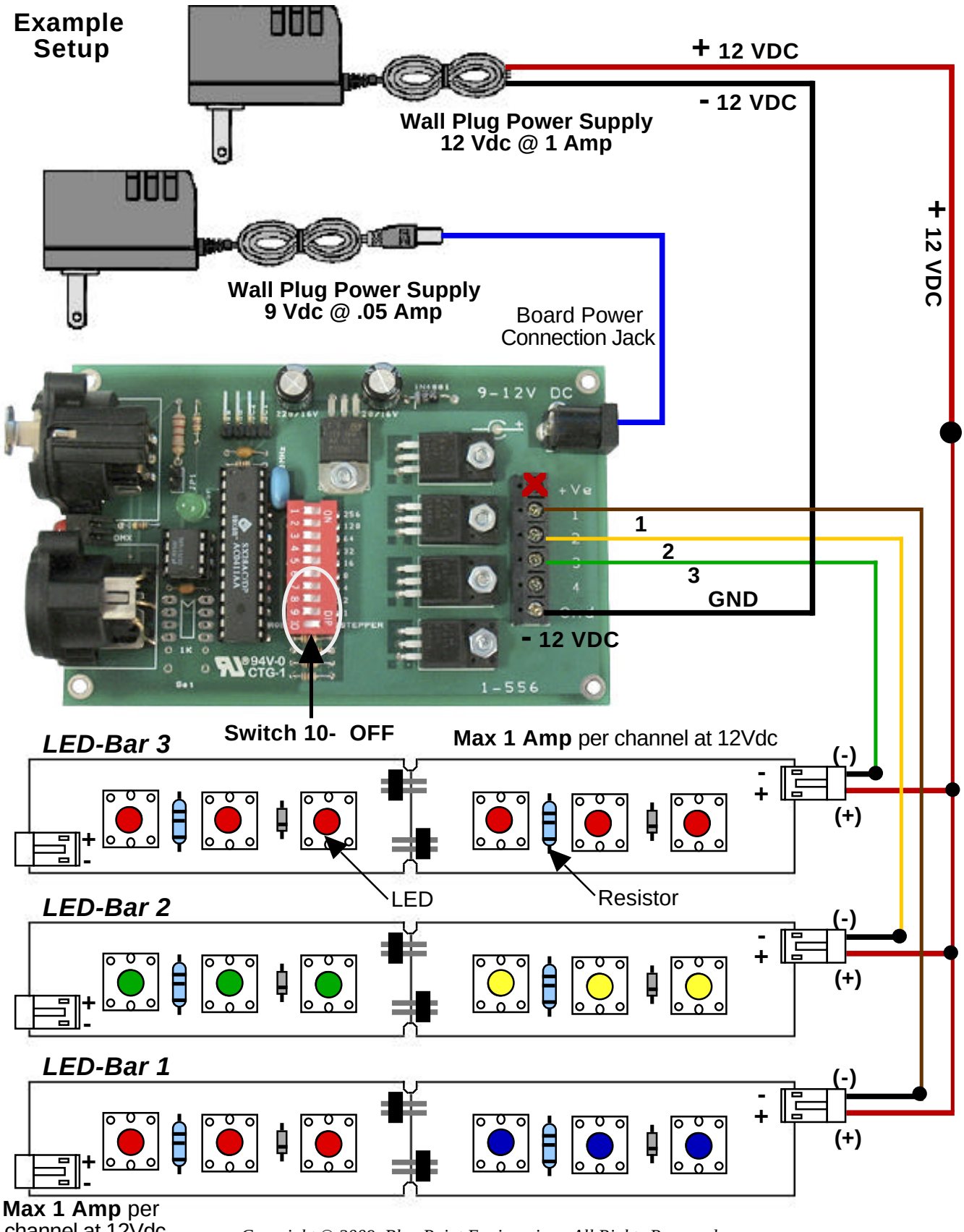
Stacked Cans with Diamond-Shaped Mounting Flange

Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

LED Bar Connection

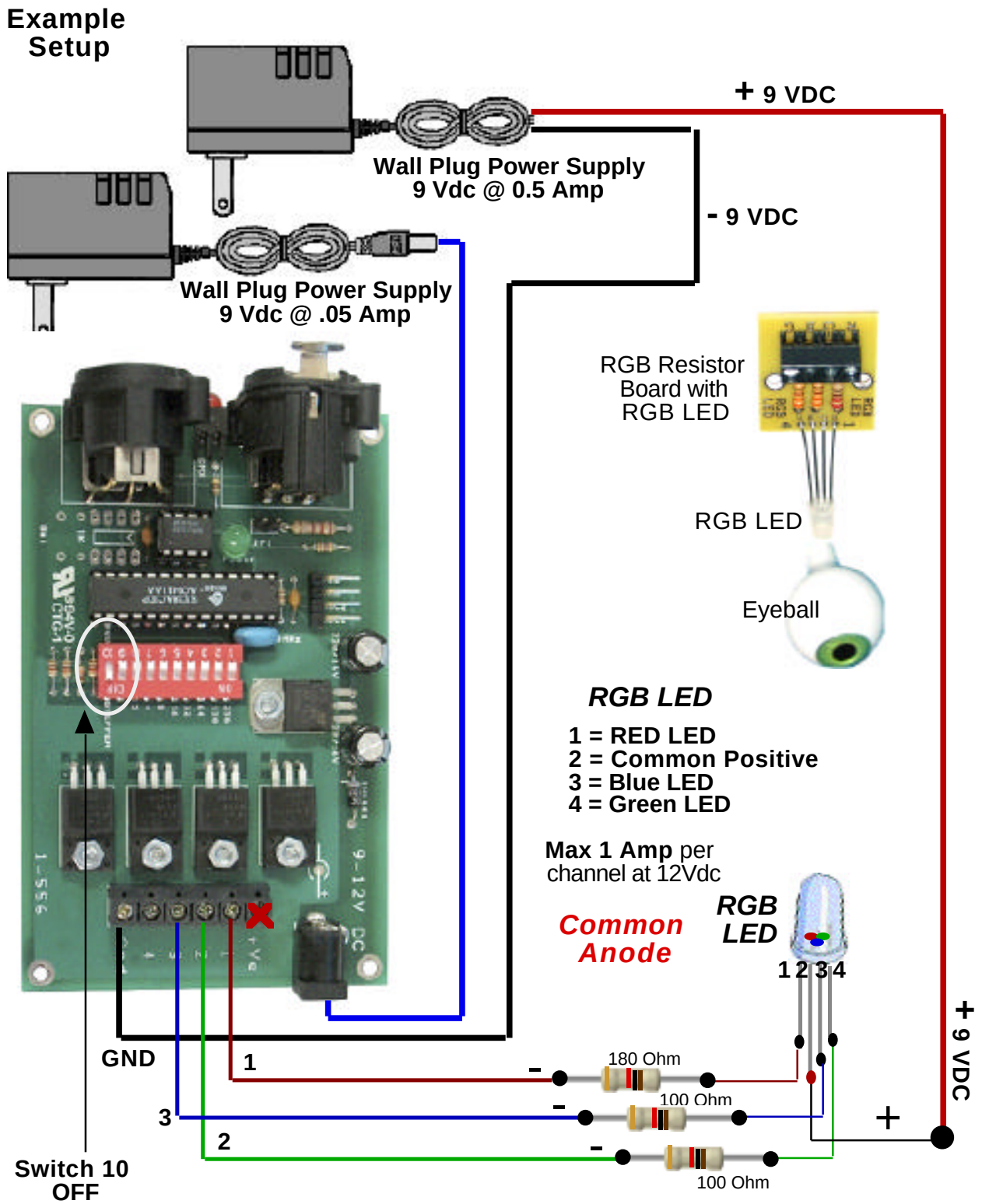


Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

RGB - LED Connection



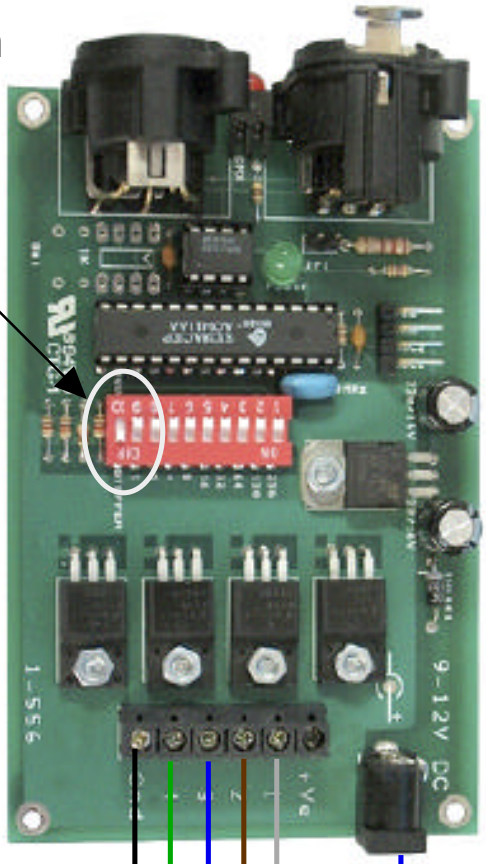
Note: Each Resistor is based on the RGB specifications. Check with manufacture for resistor values needed.

Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

LED Connection



Note: Each Resistor is calculated on Power Supply / LED Operating Voltage and Current / Resistance needed

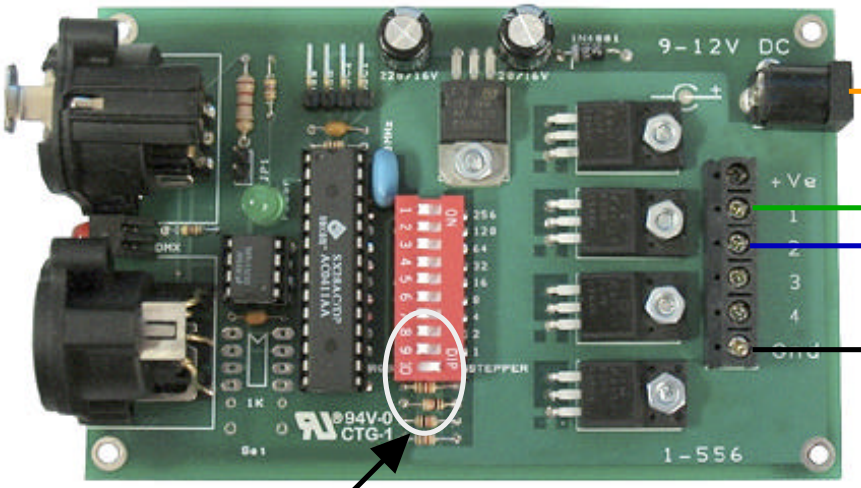
(See chart on calculating resistors needed for LED's)

Copyright © 2009 Blue Point Engineering, All Rights Reserved

DMX Stepper Motor Board

Technical T

LED Connection



Power Supply
9 VDC
@ 0.5 Amp

Power Supply
12 VDC
@ 2 Amp

\- +

Switch 10- OFF

Same Color LED's
Clear RED

LED's

Current Limiting Resistor
1/2 Watt

+ +

390 Ohm

NOTE
Max 1 Amp
per channel at
12 Vdc

Channels x 4

Multiple Color LED's

LED's

150 Ohm | 220 Ohm | 150 Ohm | 330 Ohm | 330 Ohm

Current Limiting Resistors
1/4 Watt

+ +

Channels x 4

NOTE
Max 1 Amp
per channel at
12 Vdc

Note: **Each Resistor is calculated on Power Supply / LED Operating Voltage and Current / Resistance needed**

(See chart on calculating resistors needed for LED's)

Common Anode

Copyright © 2009 Blue Point Engineering, All Rights Reserved