Northlight Systems SRV08 hobby servo motor controller Quick Start guide

Connecting for the first time

Make connections one at a time.
First connect the power.
Is anything hot? Does the green LED blink? Did you measure the power with a voltmeter?
Second connect the DMX source.
Does the LED glow or flash very fast?
Last thing.
Connect your servos last.

Features

- Quality low power DMX receiver chip equal to 1/8 unit load on DMX line
- ESD protection and "fail safe" features on DMX receiver chip
- Allows DMX512 digital protocol to control 8 – RC type servos.
- 256 or 4096 positions across the output range.
- All outputs on standard 3 terminal, .10" , "Futaba" style connectors.
- Mini DIP address switch, address 512 channels.
- On board, low dropout voltage regulator for controller power.
- Separate connectors for board power and servo power.
- 8 - Selectable output pulse widths.

Input Signal

Northlight SRV08 board accepts DMX512 .
The Serv8 board can receive data at the full rate. The SRV08 is responsive to all 512 channels.

Output

Output is 8 servo's @ 1 to 2 milliseconds. Update rate @ 50Hz. Output pulse has 255 or 4096 discrete positions.

Output Pulse Width

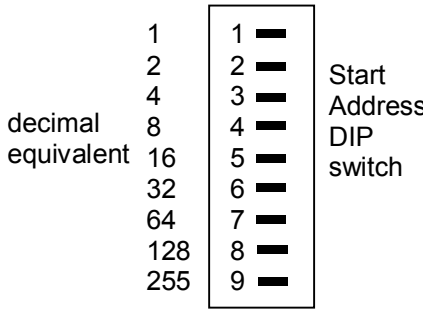
The default output is from 1 to 2 milliseconds @ 50 Hz. By using the configuration jumpers, J1-J3, the output pulse width can be increased or decreased. See the section on setting the pulse width for a chart of the settings.
There are 256 or 4096 discrete servo positions for all pulse widths.

Address switch

9 position mini DIP switch on the circuit board for infrequent address changes or OLED address switch on a ribbon cable for applications requiring an address switch on the front panel of an enclosure.

Setting the Start Address

Set the starting address to the first in a group of 8.
The address is entered on the DIP switches in standard binary code starting with 1.
See the chart of all 512 address switch positions at the back of the manual.
Each switch on the DIP switch, numbered 1-9, has a decimal equivalent.
To calculate the address on the DIP switch, just add up the decimal equivalents of the switches.
For example, to set the DMX output address to 9, set switch 1 and 4 to on. Switch 4 is equal to 8 plus 1 equals 9.



Power requirements

5 to 12 volts DC @ 80 mA. for controller board. Servo power is separate.

LED Indicators:

Green DMX activity LED. Flashing when no DMX or steady on good DMX

Board connections

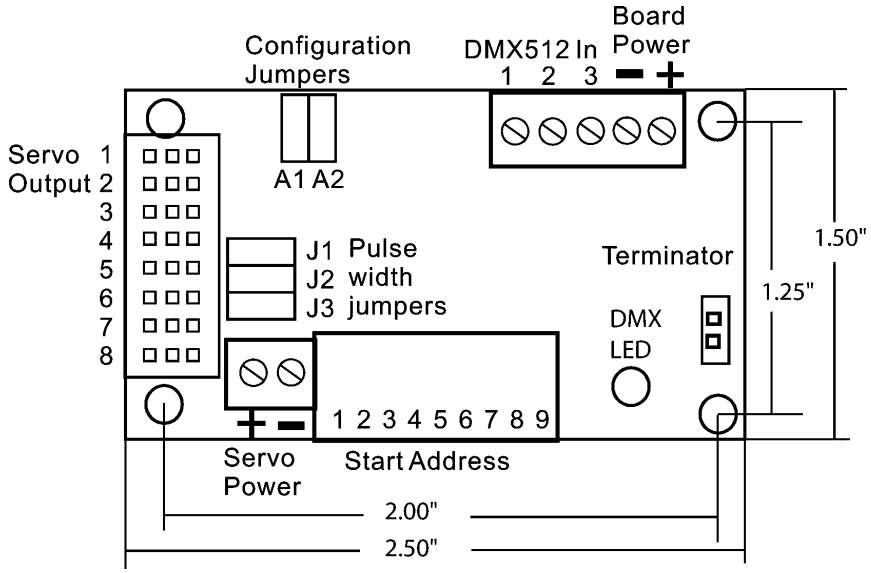
All outputs use standard 3 pin, 0.10", "Futaba" connectors. See drawing for connector locations. Power and DMX512 signals use screw terminals.

Physical Dimensions

2.50"L X 1.50"W +/- .10"

The **DMX input** pin numbers correspond to the XLR pin numbers.

DMX512 ,Pin 1 is signal ground – not earth ground.



Using the configuration jumpers

There are 2 configuration jumpers on the SRV08.

A1 – Determines the output in the event of DMX signal loss.
This function is not affected by the A2 setting.
Open(no jumper) – When the DMX signal is lost, the servo's will go to DMX zero position. This is the default setting.
Closed(jumper in place) – When the DMX signal is lost the Serv8 will hold and continue to output the last valid data.

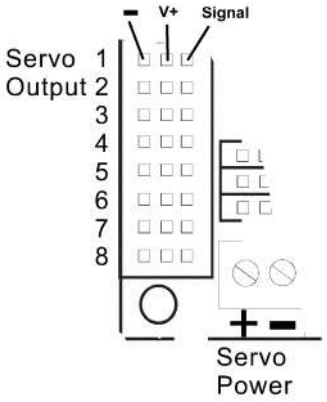
A2 – Determines the control signal protocol.
Open(no jumper) – the Serv8 is configured to receive DMX512. 1 DMX cannel per servo, 8 bit.
This is the default setting.
Closed(jumper in place) – The serv8 is configured to receive 12 bit DMX. 2 DMX channels per servo with the first channel representing "coarse" and the second channel representing "fine" control. Thie mode the servo pulse has 4096 steps from 0- 4095.
Servo1 = DMX channel 1(coarse) DMX channel 2(fine).
Servo2 = DMX channel 3(coarse) DMX channel 4(fine).
Servo3 = DMX channel 5(coarse) DMX channel 6(fine).
Servo4 = DMX channel 7(coarse) DMX channel 8(fine).
Servo5 = DMX channel 9(coarse) DMX channel 10(fine).
Servo6 = DMX channel 11(coarse) DMX channel 12(fine).
Servo7 = DMX channel 13(coarse) DMX channel 14(fine).
Servo8 = DMX channel 15(coarse) DMX channel 16(fine).

Termination

A common problem with DMX systems is improper termination.
A simple terminator consists of a 120 Ohm resistor connected across pins 2-3 of the DMX signal

The servo board provides an on board terminator using standard square pin connectors on .10" centers.
A toggle switch can be placed across the terminals for convenient front panel terminator selection.

The termination resistor should only be in when the servo board is the last device on the DMX link.



Servo connections

Standard "futaba" connections. Typically Black is ground , Red is V+ and yellow is signal.

Setting the Pulse width

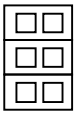
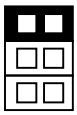
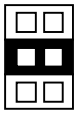
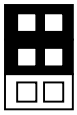
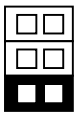
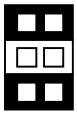
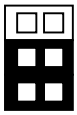
The Serv8 board is capable of 8 pulse widths. The most common is a pulse of 1-2 milliseconds @ 50Hz with 1.5 ms as center or rotation. On most servos this produces 90 degrees of movement. This is the default setting when shipped.

The maximum pulse width produces about 180 degrees of movement. Some servos don't have this much travel and may be damaged.

Be careful when using the longer pulse widths. If the servo "chatters" the pulse width is too wide.

When the pulse is shorter than normal or stretched, the center of the pulse will be maintained at 1.5 Msec to keep the servo centered.

The table below shows the jumper settings for 8 pulse widths.

Jumpers	Min pulse width	Max pulse width	Pulse range
 J1 J2 J3	1.25 mS	1.75 mS	0.50 mS
 J1 J2 J3	1.18 mS	1.83 mS	0.65 mS
 J1 J2 J3	1.10 mS	1.90 mS	0.80 mS
 J1 J2 J3	1.00 mS	2.00 mS	1.00 mS
 J1 J2 J3	0.90 mS	2.10 mS	1.20 mS
 J1 J2 J3	0.85 mS	2.153 mS	1.30 mS
 J1 J2 J3	0.775 mS	2.25 mS	1.45 mS
 J1 J2 J3	0.65 mS	2.325 mS	1.60 mS

8 BIT DMX vs 16(12) BIT DMX

8 bit DMX is a single channel that will produce 256 (0-255) discrete pulse widths.

In 16 bit DMX , 2 channels are used, they are linked together to form a 16 bit “word”.
The first channel is the “coarse” adjustment and the second channel is the “fine” adjustment.
This is not the same as two adjacent channels where they are acting independently.

For example, assume that you are moving the servo from zero to 90°.
At the beginning, both the coarse and fine channels are at 0. As you start the move, the fine channel increments from 0-255. When the fine channel reaches 255, it resets to zero and the coarse channel increments from 0 to 1. The process then repeats, incrementing the coarse channel until the first 4 bits of the coarse channel are set.
The SRV08 uses 12 bits This gives the servo a total of 4096 possible pulse widths, resulting in much more precise control. The advantage of 12-bit resolution is the smoothness of the movement and precise placement.

To get full resolution with 4096 steps requires a quality servo and tight linkage. If you are trying to sweep 90°, that would be .021° per step. That is not that easy to even measure. Any slop/backlash in the internal gears of the servo or external linkage might appear to be a missed step or inconsistent movement.
A cheapo analog servo might not resolve such fine steps.
Analog servos have what is called a 'deadband'. This is the amount of variation in the pulse width that has to occur before a change in position. If the deadband is too narrow, the servo could oscillate due to noise and consume more power than required. If the deadband is too wide the servo will not be as sensitive to changes in the pulse width.

According ti HiTec , standard (Analog) servos have a deadband of around 8us and high performance servos have a deadband of 1~3us.
The point is that 'analog' servos have a finite resolution.

A 'digital' servo will also have a deadband that will limit its ultimate resolution. however many can be set to very low or 0 deadband.