

Merge2

2 DMX512 Universe Input, 1 DMX512 Universe output

The Merge2 board accepts 2 - DMX512 universes and merges them into a single DMX512 universe output..

DMX512 output:

Merge2 uses controlled slew rate drivers, decreasing the EMI radiated from the RS485 lines, and improving signal fidelity with misterminated lines.

DMX512 input:

Accepts DMX512 digital stage lighting protocol, all 512 channels.
 Only DMX packets with a zero start code will be accepted. Non-zero start code packets will be ignored.
 If non-zero start codes and DMX512 utilizing RDM capability is needed for other DMX receivers down stream from the Merge2, then a separate DMX through connector should be used for those devices.
 Merge2 receivers are equivalent to ¼ unit load to the DMX input.

Merge2 does not have LTP, Latest Takes Precedence, or Lowest Takes Precedence modes.

Address switch: DMX512 B output Start Address selection is via a 9 position mini DIP switch.

Power requirements: 5 to 12 volts DC @ 100 mA.

Board connections: Power and DMX output connections to the board are made via screw terminal blocks. Acceptable wire size is 18 – 24 AWG. See drawing for connector locations.

Physical Dimensions:

3.95" X 2.75" +/- .15"

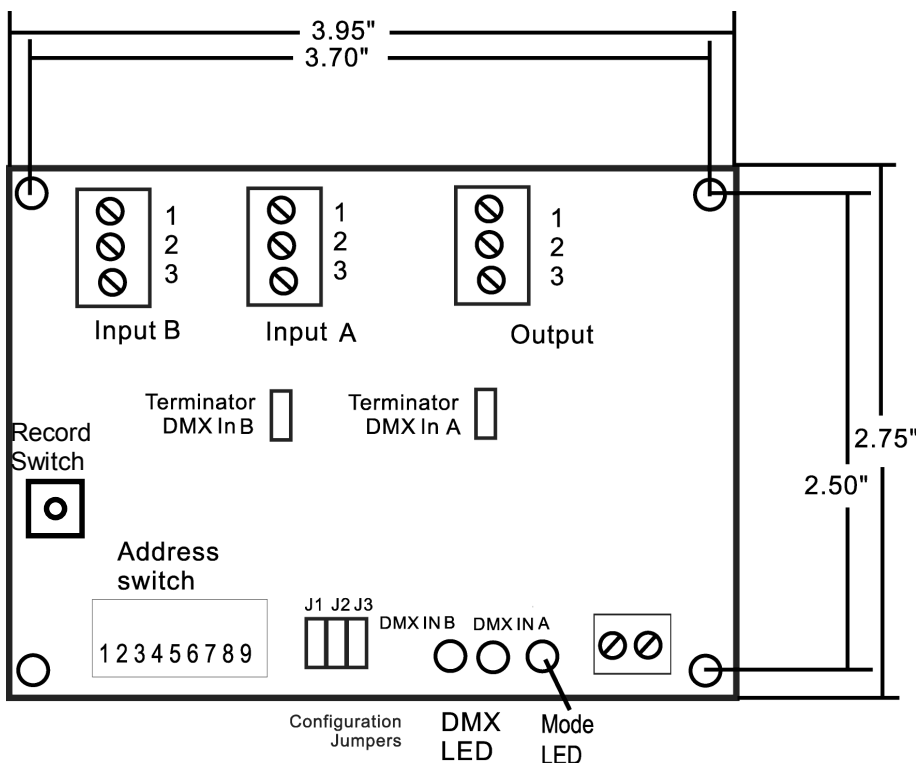
Using the Merge2 board

Power Input

5 to 12 volts DC.
 A current of 100 milliAmps should cover most situations.

DMX512 In connections

The DMX input pin numbers correspond to the XLR pin numbers.
 The ground pin (1) is signal ground – not earth ground.
 XLR pins 4 and 5 are not used.



PIN	WIRE	SIGNAL
1	signal	signal ground/return
2	signal	data compliment (-)
3	signal	data true (+)
4	signal	loop through(-)
5	signal	loop through(+)

Address Switch

The address switch is used to determine the starting channel of the DMX B input, in the DMX512 output packet. For example, if the start address is 8 then the DMX B input data will start on output DMX channel 8.

The address switch has no effect on the incoming DMX512 .

The incoming DMX512 will be output in its original form except where it overlaps the other DMX input.

When the incoming DMX inputs overlap the final output will be based on the jumper configuration.

When using the mini DIP switch, the address is entered in the standard binary code starting with 0. See the chart of all 512-switch positions at the back of this manual.

The individual switches are numbered 1 – 9, left to right, on the switch.

Setting the mode using the configuration Jumpers

There are 3 configuration jumpers used to determine how Merge2 handles the output values for the DMX512 inputs.

Basic merge – Highest takes precedence

J1 – Closed(jumper in place) – Mode LED is red.

Standard merge where DMX A and DMX B are combined on a highest takes precedence.

When the DMX receive is lost, the last valid input data will be cleared after 1 second of no valid DMX. Subsequent DMX output will be zero's.

The Address switch is used to set the start of DMX input B in the output packet.

Merge with override

J2 – Closed(jumper in place) – Mode LED is green.

Merge where DMX A and DMX B are combined and DMX B will replace(override) DMX A where the two overlap.

This is most often used when you want DMX A to occupy a set of output slots and DMX B to occupy a higher address set of slots.

For example:

You want DMX A to use slots 1 – 100 and you want DMX B to occupy slots starting at 101.

Set the output start address to 101.

Backup mode

J3 – Closed(jumper in place) – Mode LED is orange.

Backup mode where DMX A will be passed through and DMX B is blocked.

When DMX A signal is lost DMX B will be passed through.

If there is no DMX B then the recorded scene will be output.

Recording a scene for backup mode:

The board must be in backup mode, jumper 3 set.

The scene to record should be on DMX B.

Press and hold the red RECORD button until the MODE led goes out.

Release the RECORD button.

When the MODE led goes back on the recording is done.

If DMX B is not available it will not record, the mode LED will not go out.

The backup scene is all off when shipped.

Ground

The normal configuration for the Merge2 is to not use the earth ground.

The Merge2 is wired with the 0 volt power supply(circuit common ground), connected to both the receiver and transmitter.

The ground, pin 1, will be at the same potential for the receiver and transmitter.

The DC power supply should not have the 0 volt power supply connected to earth ground.

If devices that use non-zero start codes or pins 4 and 5 are needed then a loop through connector is required.

Connecting wires should be very short.

Pins 2 and 3 must be a twisted pair from the connector to the circuit board.

Pins 4 and 5 should be a twisted pair from connector to connector.

Termination: Northlight's Merge2 has a terminating resistor on board for each DMX input.

Setting up the DMX loop through connectors

The current DMX512 standards encourage one to provide passive loop through connectors, even if not required.

The drawing on right shows a typical installation for a DMX512 input and loop through connection.

Connecting wires should be very short.

Pins 2 and 3 must be a twisted pair from the connector to the circuit board.

Pins 4 and 5 should be a twisted pair from connector to connector.

Start code

The Merge2 will not accept DMX512 with non-zero start codes and will not accept DMX512 that uses pins 4 and 5.

If devices that use non-zero start codes or pins 4 and 5 are needed then a loop through connector is required.

Trouble shooting

Basically the board is plug and play. There are no user adjustments. When all connections are properly made, a DMX signal, will pass through to the output pins.

Some notes about DMX512

Splitters/Repeaters

Isolation between the console and dimmers is sometimes required to prevent signal degradation and protect devices from damaging voltages on the control cable. Optically isolated splitters help avoid these problems.

Each DMX512 output can drive up to 32 devices. If there are more devices on the line, a "repeater" is required. Some cheap devices are not fully compliant and actually represent a load equivalent to 2 or more devices.

Long or improper cables, electrically noisy environment (generators, motors) and improper use of passive "Y" splitters all contribute to DMX signal degradation. A splitter/repeater may help to solve these problems.

Why ask WYE?

Wye(Y) splitters are NOT recommended for DMX512 systems. Wye splitters are simply a male inline XLR connector; parallel wired to 2 female inline XLR's. While convenient, Wye splitters cause unwanted signal reflections and possible ground loops, leading to signal degradation.

The best layout for DMX systems is a Daisy chain configuration, where the signal cable jumps from one device to the next, with no branching. Each chain can have up to 32 devices on it. When using an isolated splitter, each output can be a separate DMX daisy chain.

Termination

A simple terminator consists of a 120 Ohm resistor connected across pins 2-3 of the DMX signal.

Terminators are an impedance matching circuit required to damp signals that "reflect" from the end of an improperly terminated cable, causing signal degradation under certain conditions.

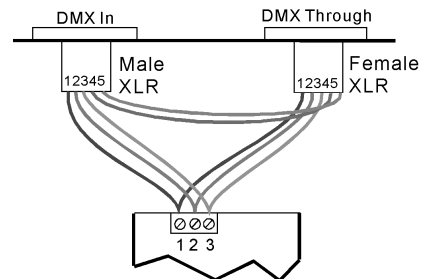
On devices that have a DMX thru, a male XLR connector with terminating resistor connected across pins 2-3 and installed on the DMX thru connector will suffice. Some devices with isolated outputs will not use a terminator on the DMX out. These may have an internal terminator that is selected with a switch.

Wire Type

There is a difference between microphone cable and "Data" cable. Sure you can get away with mic. cable for short runs in many situations. However on longer runs or marginal situations mic. cable will let you down. You may have random errors or the system won't work at all. It comes down to insurance. If you want to insure the most reliable DMX signal distribution you need the most appropriate wire for the job. DMX512 requires wire suitable for RS-485, there is no way to get around that.

Twisted-pair cable is the most common. You can use a range of wire gauges, but the most common is 22 – 24 AWG. The characteristic impedance of the cable should be 100 to 120 Ohms.

Some other requirements are, at least 1 twisted pair plus ground and shield. It should have low capacitance and overall braid and foil shield.



Connectors

DMX512 protocol specifies that 5 pin XLR connectors are used. Female on the transmitter and male on the receiver. When a 3 pin XLR is used it is wired the same as the first 3 pins on the 5 pin XLR.

Address - switches

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

232 = 4, 6, 7, 8
233 = 1, 4, 6, 7, 8
234 = 2, 4, 6, 7, 8
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Address - switches

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Address - switches

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Address - switches

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445 = 1, 3, 4, 5, 6, 8, 9
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Address - switches

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503 = 1, 2, 3, 5, 6, 7, 8, 9
504 = 4, 5, 6, 7, 8, 9
505 = 1, 4, 5, 6, 7, 8, 9
506 = 2, 4, 5, 6, 7, 8, 9
507 = 1, 2, 4, 5, 6, 7, 8, 9
508 = 3, 4, 5, 6, 7, 8, 9
509 = 1, 3, 4, 5, 6, 7, 8, 9
510 = 2, 3, 4, 5, 6, 7, 8, 9
511 = 1, 2, 3, 4, 5, 6, 7, 8, 9
512 = 0

Warranty and Disclaimer

Warranty

Northlight Systems warrants this product against defects in materials and workmanship for a period of 1 year.

Returns Policy

If there is a defect, we will repair or replace the product at our discretion.

We offer a full refund on the purchase price if returned in original, unused and “like new”, condition in less than 30 days.

Return the product with a description of the problem. Free repairs are for defective parts or workmanship only.

Repairs due to improper hookup, over voltage, short circuits, physical damage etc., will be charged to the customer.

Disclaimer of Liability

Northlight Systems is not responsible for any special, incidental, or consequential damages resulting from any breach of warranty, or any legal theory, including lost profits, downtime, goodwill, damage to or replacement of equipment or property, and any costs associated with the use of Northlight Systems products described herein.

Northlight Systems has a policy of continually improving our products as new technology becomes available. Northlight Systems reserves the right to make changes and improvements to the specifications of this equipment at any time without notice.

Northlight Systems has made every attempt to ensure that the information in this document is accurate and complete. Northlight Systems assumes no liability for any damages that result from the use of this manual or the equipment it documents. Northlight Systems reserves the right to make changes to this document at any time without notice.

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