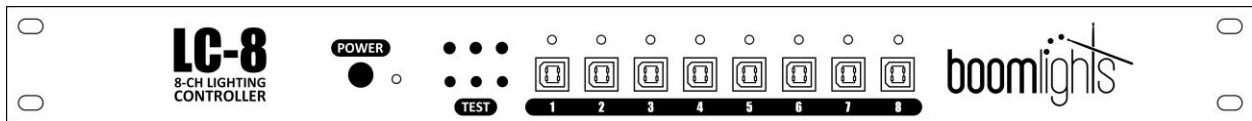




LC-8

8-CH LIGHTING CONTROLLER



USER MANUAL

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WARNING



For your own safety, please read this manual to learn how to safely use, store and maintain the LC-8 prior to use.

WHAT'S INCLUDED

- LC-8
- DC12V 10A 90~240VAC Power Supply
- User Manual
- MIDI to USB Adapter
- 5' MIDI Cable

SAFETY INSTRUCTIONS



CAUTION! Please keep this unit stored in an area with no moisture.

- Do not operate this unit at temperatures above 113°F
- Only use the supplied power supply
- Make sure the power supply's cord is not pinched or damaged in any way
- Make sure the power supply is plugged into an appropriate voltage source
- Before making any changes to the DIP switches inside the unit, turn off the power and unplug the unit
- If resettable fuse keeps blowing, determine why the channels are overloaded before powering the unit back on
- If any defects with the unit are discovered, please contact an authorized service technician for assistance

1.0 INTRODUCTION

1.1 Overview

The LC-8 is an 8-channel RGB LED lighting controller that has been specially designed by musicians for musicians. Treat your lighting like an instrument by using MIDI to create custom automated light shows. No additional hardware or software required. The LC-8 seamlessly integrates with any existing hardware or software set-up. Just plug and play to begin elevating your performances with synchronized lighting.

The LC-8 is controlled using 8 groups of 3 MIDI notes (24 MIDI notes total), which represent 1 RGB channel each. An individual RGB colour is designated to a specific MIDI note. MIDI velocity is used to control the brightness/intensity of RGB colours. By combining MIDI notes within an RGB channel group and adjusting their velocities, you can create an array of colours within the RGB colour spectrum.

1.2 Features

1 - Power Button: Pressing this button will turn on the unit. Make sure the power supply is plugged in and connected to the unit.

2 - Power Indicator Light: Under normal operating conditions, this indicator light will be green while the unit is powered on. If the resettable fuse has blown, this indicator light will be red and the unit will not work.

3 - Test Buttons: Pressing any of these 3 buttons will test the associated colour on all 8 channels. For example, if you press the green test button, the green LEDs on all channels will illuminate. Pressing these test buttons will not override the colour output of illuminated channels. In other words, the test button colour will combine with the colour of any illuminated channels. For example, if you hold down the green test button while all channels are illuminated red, the resultant colour on all channels will be yellow.

4 - RGB Channel Output Connectors: Each of these 4-pin USB type B connectors is used for driving any 12V common anode RGB LED strip. **DO NOT CONNECT TO A USB PORT ON A COMPUTER!**

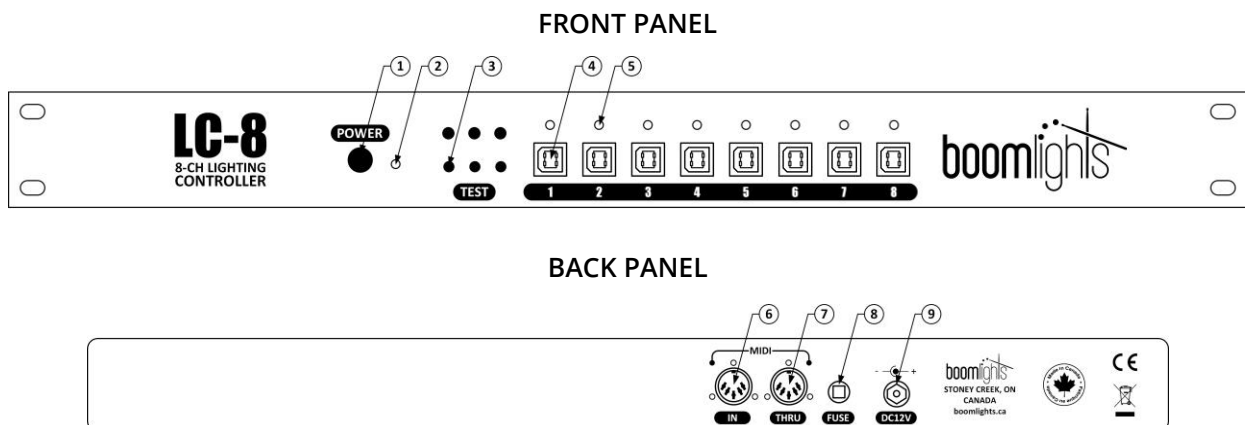
5 - Channel Indicator Light: Displays the colour output of each RGB channel. These indicator lights can also be used to monitor a light show remotely or to display a light show without any LED strips connected.

6 - MIDI In: Transfers MIDI input signal from a connected source to the unit.

7 - MIDI Thru: Passes through an exact copy of the MIDI input signal. This allows multiple units or other MIDI devices to be chained together and controlled by a common source.

8 - Main Resettable Fuse: When the unit's total load exceeds 8A, this fuse will blow. Reduce the total load and press and hold the fuse button to reset the fuse.

9 - DC12V Input: Main power connection for the unit used to connect the DC12V power supply.



2.0 OPERATION

2.1 Getting Started

The unit comes set-up with the following default settings: MIDI notes 0, 1 and 2 control the green, red, and blue LEDs plugged into channel 1 respectively, MIDI notes 3, 4 and 5 control the green, red and blue LEDs on channel 2 respectively and continues in the same manner up to MIDI note 23. The unit's default MIDI channel is set to be MIDI channel 1. However, both the MIDI channel and MIDI note settings can be changed easily by removing the unit's lid and adjusting the internal DIP switches. More detailed information on changing the unit's default settings will be covered in section 2.2.

Below is a diagram that illustrates the unit's default setup. In the 1 measure example shown below, the LEDs will illuminate the colour white in succession beginning with channel 1 and concluding with channel 8.

4 / 4	1	1.2	1.3	1.4	2
B-1					NOTE 23 B
A#-1					NOTE 22 R } CH 8
A-1					NOTE 21 G
G#-1				NOTE 20 B	
G-1				NOTE 19 R } CH 7	
F#-1				NOTE 18 G	
F-1				NOTE 17 B	
E-1				NOTE 16 R } CH 6	
D#-1				NOTE 15 G	
D-1			NOTE 14 B		
C#-1			NOTE 13 R } CH 5		
C-1			NOTE 12 G		
B-2			NOTE 11 B		
A#-2			NOTE 10 R } CH 4		
A-2			NOTE 9 G		
G#-2		NOTE 8 B			
G-2		NOTE 7 R } CH 3			
F#-2		NOTE 6 G			
F-2		NOTE 5 B			
E-2		NOTE 4 R } CH 2			
D#-2		NOTE 3 G			
D-2	NOTE 2 B				
C#-2	NOTE 1 R } CH 1				
C-2	NOTE 0 G				

2.2 Colour Combinations

You can create an array of different colours within the RGB colour spectrum by illuminating various combinations of the green, red and blue LEDs on each channel. For example, if the green and red LEDs are simultaneously illuminated on the same channel, the resultant colour will be yellow. MIDI velocity can be adjusted to change the overall brightness/intensity of the LED designated to the corresponding MIDI note. MIDI velocity changes can also be used to create additional colours and shades, particularly when the MIDI velocity value of multiple notes from the same channel are unequal.

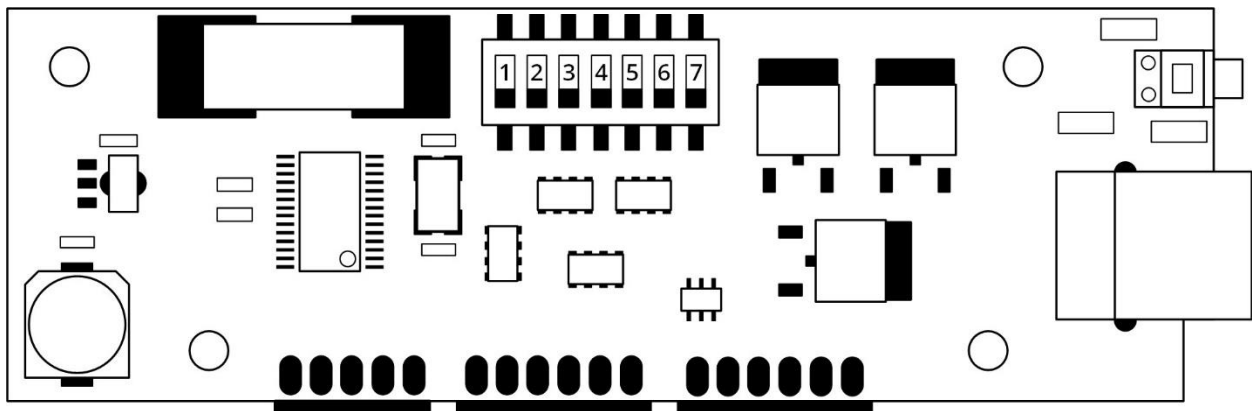
The following table shows the available fundamental colours and their corresponding RGB colour combinations.

COLOUR	RGB FORMULA
RED	R
GREEN	G
BLUE	B
YELLOW	R + G
MAGENTA	R + B
CYAN	G + B
WHITE	R + G + B

2.3 Changing the Default Settings

2.3.1 Changing the MIDI Note DIP Switches

After removing the unit's lid, you will notice that each channel has a corresponding vertical circuit board module. Each channel module has a DIP switch that can be set to various values. Setting the DIP switch on each channel module determines which MIDI notes that channel will respond to. See DIP switches 1 through 7 in the diagram below.



By setting the DIP switches, you are effectively setting the MIDI note that will control the colour green for that specific channel. The colours red and blue will always be the following 2 MIDI notes. For example, setting the DIP switches to the binary value 0 (all switches in the down position), means that this particular module's channel will respond to MIDI notes 0, 1 and 2, which will be green, red and blue respectively. If you refer to the table in section 2.3.2, you can see the default DIP switch settings which are highlighted in grey.

To set the DIP switches correctly to the desired MIDI note, refer to the "Binary" column on the table. These 7 number sequences represent the individual DIP switch positions. When a DIP switch is in the up position, it is considered "1" and, when it is in the down position, it is considered "0". These binary codes are used to configure the channel to respond to specific MIDI notes. For example, if you set only DIP switch number 1 in the up position and leave the 6 remaining DIP switches in the down position (resulting in the binary code 1000000), MIDI note 64 (E3) will control the colour green on that particular channel. Therefore, MIDI note 65 (F3) and 66 (F#3) will control the colours red and blue respectively on the same channel.

It is important to note that any changes to the DIP switches must be done while the unit is powered off, as the unit only checks the DIP switch settings during startup.

2.3.2 MIDI Note DIP Switch Table

Note	Octave	Number	Binary
C	-2	0	0000000
C#	-2	1	0000001
D	-2	2	0000010
D#	-2	3	0000011
E	-2	4	0000100
F	-2	5	0000101
F#	-2	6	0000110
G	-2	7	0000111
G#	-2	8	0001000
A	-2	9	0001001
A#	-2	10	0001010
B	-2	11	0001011
C	-1	12	0001100
C#	-1	13	0001101
D	-1	14	0001110
D#	-1	15	0001111
E	-1	16	0010000
F	-1	17	0010001
F#	-1	18	0010010
G	-1	19	0010011
G#	-1	20	0010100
A	-1	21	0010101
A#	-1	22	0010110
B	-1	23	0010111
C	0	24	0011000
C#	0	25	0011001
D	0	26	0011010
D#	0	27	0011011
E	0	28	0011100
F	0	29	0011101
F#	0	30	0011110
G	0	31	0011111
G#	0	32	0100000
A	0	33	0100001
A#	0	34	0100010
B	0	35	0100011

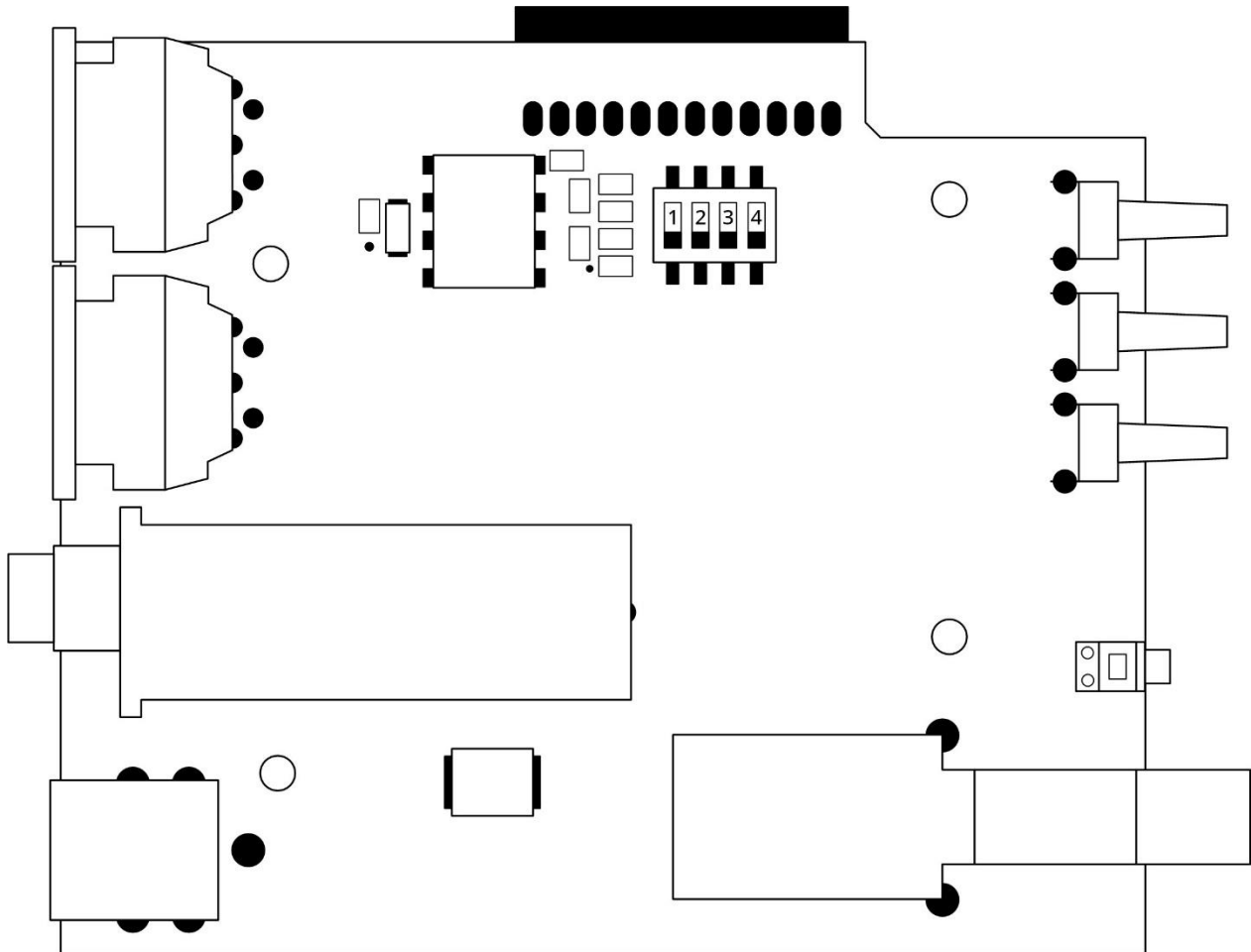
Note	Octave	Number	Binary
C	1	36	0100100
C#	1	37	0100101
D	1	38	0100110
D#	1	39	0100111
E	1	40	0101000
F	1	41	0101001
F#	1	42	0101010
G	1	43	0101011
G#	1	44	0101100
A	1	45	0101101
A#	1	46	0101110
B	1	47	0101111
C	2	48	0110000
C#	2	49	0110001
D	2	50	0110010
D#	2	51	0110011
E	2	52	0110100
F	2	53	0110101
F#	2	54	0110110
G	2	55	0110111
G#	2	56	0111000
A	2	57	0111001
A#	2	58	0111010
B	2	59	0111011
C	3	60	0111100
C#	3	61	0111101
D	3	62	0111110
D#	3	63	0111111
E	3	64	1000000
F	3	65	1000001
F#	3	66	1000010
G	3	67	1000011
G#	3	68	1000100
A	3	69	1000101
A#	3	70	1000110
B	3	71	1000111

Note	Octave	Number	Binary
C	4	72	1001000
C#	4	73	1001001
D	4	74	1001010
D#	4	75	1001011
E	4	76	1001100
F	4	77	1001101
F#	4	78	1001110
G	4	79	1001111
G#	4	80	1010000
A	4	81	1010001
A#	4	82	1010010
B	4	83	1010011
C	5	84	1010100
C#	5	85	1010101
D	5	86	1010110
D#	5	87	1010111
E	5	88	1011000
F	5	89	1011001
F#	5	90	1011010
G	5	91	1011011
G#	5	92	1011100
A	5	93	1011101
A#	5	94	1011110
B	5	95	1011111
C	6	96	1100000
C#	6	97	1100001
D	6	98	1100010
D#	6	99	1100011
E	6	100	1100100
F	6	101	1100101
F#	6	102	1100110
G	6	103	1100111
G#	6	104	1101000
A	6	105	1101001
A#	6	106	1101010
B	6	107	1101011

Note	Octave	Number	Binary
C	7	108	1101100
C#	7	109	1101101
D	7	110	1101110
D#	7	111	1101111
E	7	112	1110000
F	7	113	1110001
F#	7	114	1110010
G	7	115	1110011
G#	7	116	1110100
A	7	117	1110101
A#	7	118	1110110
B	7	119	1110111
C	8	120	1111000
C#	8	121	1111001
D	8	122	1111010
D#	8	123	1111011
E	8	124	1111100
F	8	125	1111101
F#	8	126	1111110
G	8	127	1111111
G#	8	-	-
A	8	-	-
A#	8	-	-
B	8	-	-

2.3.3 Changing the MIDI Channel DIP Switches

Setting the DIP switches on the main board determines which MIDI channel the unit will respond to. See DIP switches 1 through 4 in the diagram below.



These DIP switches are set in the same way in which the channel DIP switches are set. That is, when a DIP switch is in the up position, it is considered “1” and, when it is in the down position, it is considered “0”. These binary codes are used to configure the MIDI channel in which the unit will respond to. For example, if only DIP switch 4 is in the up position on the main board while the other switches are in the down position (resulting in the binary code 0001), the unit will respond to MIDI channel 2. Refer to the “Binary” column on the table in section 2.3.4 for the DIP switch positions required to change the unit’s designated MIDI channel. The default DIP switch setting is highlighted in grey.

Again, it is important to note that any changes to the DIP switches must be done while the unit is powered off, as the unit only checks the DIP switch settings during startup.

2.3.4 MIDI Channel DIP Switch Table

MIDI Channel	Binary
1	0000
2	0001
3	0010
4	0011
5	0100
6	0101
7	0110
8	0111
9	1000
10	1001
11	1010
12	1011
13	1100
14	1101
15	1110
16	1111

2.4 Linking Multiple Units Together

Multiple units can be linked together using the MIDI in and MIDI thru connectors found on the back panel of each unit. Using a standard MIDI cable, you can connect the MIDI thru of the unit that is receiving incoming MIDI data with the MIDI in of the other unit you want to link. This same process can be applied to link additional units. There are several approaches to using multiple units in conjunction.

Firstly, you can control multiple units using the same MIDI data by leaving the MIDI note and MIDI channel DIP switches in their default positions on each unit. In other words, this approach will simply mirror the output to all linked units.

Alternatively, you can assign multiple units to different MIDI note ranges and control them via the same MIDI channel by adjusting the MIDI note DIP switches accordingly (see table in section 2.3.2 for MIDI note DIP switch settings), but leaving the MIDI channel DIP switches in their default positions on each unit. This approach allows you to expand the number of independently controlled channels available on a single MIDI channel.

You can also assign multiple units to different MIDI channels by adjusting the MIDI channel DIP switches accordingly (see table 2.3.4 for MIDI channel DIP switch settings). This is particularly useful when the maximum MIDI note range has been reached on a single MIDI channel. In combination with this approach, you can still assign the MIDI note ranges of each unit independently.

3.0 CURRENT LIMITS

3.1 Total Current Draw / Main Resettable Fuse

The unit can handle a total current draw of 8A before the main resettable fuse blows. If the fuse blows, the power indicator light will change from green to red and the unit will stop working. This is an indication that the total current draw has exceeded 8A. As previously discussed, you will need to reduce the total load and then press and hold the fuse button to reset the fuse.

To avoid this issue, it is important to know that the longer the LED strip is, the more current it draws from the channel it is connected to. Each individual channel is capable of drawing up to 2.5A. Therefore, when calculating the power budget for a lighting setup, there are two key current values to consider: each individual channel cannot exceed 2.5A and the sum of the current draw from all 8 channels cannot exceed 8A.

On average, our LED strips consume 1A for approximately every 40". With that said, there are numerous ways you can distribute the unit's overall power budget. You can use equal length LED strips that draw up to 1A for each of the 8 channels (see "Example 1" below) or you can use various lengths of LED strips that add up to draw a maximum of 8A across all 8 channels, pending you do not exceed 2.5A on a single channel (see "Example 2" below).

Example 1: Equal Channel Current Draw

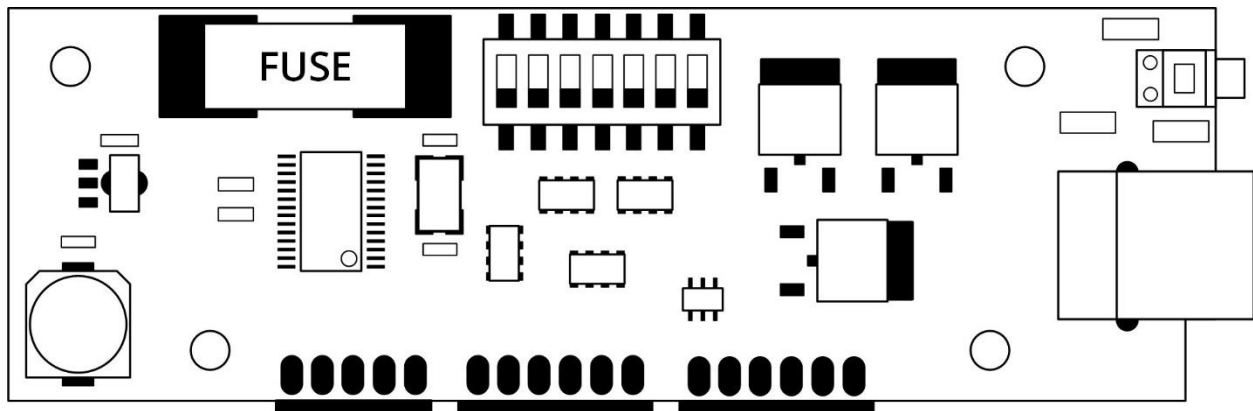
Channel	Current	LED Strip Length
1	1A	40"
2	1A	40"
3	1A	40"
4	1A	40"
5	1A	40"
6	1A	40"
7	1A	40"
8	1A	40"

Example 2: Variable Channel Current Draw

Channel	Current	LED Strip Length
1	2.5A	122"
2	1A	40"
3	0.5A	14"
4	1A	40"
5	1.5A	68"
6	0.5A	14"
7	0.5A	14"
8	0.5A	14"

3.2 Individual Channel Current Draw / Individual Channel Fuse

As stated in the previous section, each individual channel can draw up to a maximum of 2.5A. If you connect an LED strip that draws more than 2.5A to a single channel, you will blow that channel module's fuse and the channel will no longer function correctly. However, you can replace the fuse by opening the unit's lid, locating the blown channel module's fuse and swapping the blown fuse with a new one. There are spare fuses located on the main board which can be used to replace blown channel module fuses. See fuse location in the diagram below.



4.0 TROUBLESHOOTING

Issue: Changed the DIP switches to use other MIDI notes or to use another MIDI channel, but the unit is not responding to the new changes and is continuing to use the original note and channel assignments.

Solution: Make sure the unit is powered off when changing the MIDI notes or MIDI channel DIP switches, as the unit only checks for new DIP switch settings during startup.

Issue: Changed the MIDI notes or MIDI channel DIP switches while the unit was powered off, but, after startup, the unit is still not responding to the new MIDI notes or MIDI channel selected.

Solution: Power off the unit and check to make sure the DIP switches are fully set in their intended positions. Sometimes, if you do not press hard enough when moving a DIP switch, it can get stuck in a middle position, which will result in the wrong MIDI notes or MIDI channel being selected.

Issue: LED strip is connected to a channel and the corresponding channel's indicator light is displaying the intended colour, but the LED strip is not illuminating. However, the other channels are working fine.

Solution: The corresponding channel module's fuse may be blown. Check to make sure that the LED strip is no longer than 122", as an LED strip longer than this length will have a current draw that exceeds the 2.5A maximum for a single channel. To replace the channel module's fuse, see section 3.1. Alternatively, if the corresponding channel module's fuse is not blown, check to make sure the USB cable you are using to connect the LED strip to the unit has no shorts or defects, as this could also prevent the LED strip from illuminating.

5.0 SPECIFICATIONS

LC-8 : 8-CH LIGHTING CONTROLLER

Controls: Power Button, 3x Test Buttons (Green, Red, Blue)

Indicators: Power Indicator Light, 8x Channel Indicator Lights

Connectors: 8x RGB Channel Output, MIDI In, MIDI Thru, DC12V Input

Power Supply: DC12V 10A 90~240VAC

Maximum Current Draw: 8A (2.5A / channel)

Dimensions: 19" x 4.125" x 1.75" (483 mm x 105 mm x 45 mm)

Weight: 1.86 lbs (0.84 kg)