

## NLED 30 Channel High Current LED Controller

This 30 channel LED controller from NLED is a versatile design with the ability to run powerful stand-alone sequences or can be controlled remotely using USB, DMX-512, or standard TTL serial. It is compatible with an external LED display that is used for displaying device states and for adjusting the device's configuration options such as the DMX address, selecting a stand-alone color sequence, or serial baud rate, among others. The software NLED Aurora Control is the easy-to-use software that can be used to create and upload custom color sequences to the controller, for it to run by itself without any data connections. It supports either 30 single color channels, 10 RGB channels, 7 RGB+W/U.V. channels, or a mixture of single/RGB/RGBW can be controlled. Either of the communication methods can be utilized to control the output channels. Each communication method supports 8-bit or 16-bit data, as the controller offers 12-bit(4096 levels) PWM resolution outputs. Best utilized with 12 volt LED strip(any configuration or color) or other high-wattage type LED configurations as the device supports up to 6A per output channel.

### Features:

- 30 Output Channels, up to 8A per channel. 2.5A per if all channels are on at once, 75A max for controller.
- Small size, 4.5" x 3.3" x 0.5" or 1" tall
- USB(Emulated Serial Port) Communication via NLED Aurora commands. Easy to interface through many languages to create custom software and for special usages. Control the outputs with 8-bit or 16-bit data.
- DMX-512 With 7 DMX Reception Modes(see page 4 & 5), including 8-bit or 16-bit reception types.
- TTL or RS-485 Serial Reception at a selectable baud rate, communicate with Arduino's, FTDI, and more.
- External 3-Digit LED Display, on a ribbon cable for easy use and case mounting. Blue LED display.
- Hardware and Firmware supports single color LEDs(ex. all blue), RGB or RGB+W/U.V. configurations.
- NLED Aurora Control Software compatibility, connection via USB Type B (same as a printer)
- Create and Upload(save) Custom Stand-Alone Color Sequences to the Controller From a Computer.
- Fast PWM Frequency rate at 1.5KHz with 8-bit or 12-bit PWM Resolution(depends on usage)
- DMX Master Capability, optional DMX transmission during stand-alone usage, sync multiple devices or control other DMX devices of any type. Full packet and Partial packet option.
- All user configurations and settings are saved to the device and restored when powered up.
- Serviceable Design, in case of any damage caused by accidents. Includes a Full 3 Year Warranty and Satisfaction Guarantee

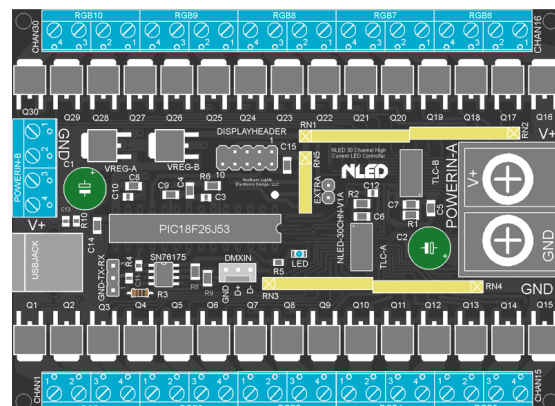
### Specification:

<b>Input Voltage</b>	<b>5v*, 7v - 24v</b>
<b>Logic Current Draw</b>	<b>&lt; 250mA</b>
<b>Output</b>	<b>30 Channels, Current Sink</b>
<b>Max Current Per Output</b>	<b>8 Amps(12v), 4 Amps(24v)</b>
<b>Max Current Overall</b>	<b>75 Amps</b>
<b>PWM Frequency</b>	<b>1.5kHz</b>
<b>Connectors</b>	<b>Terminals**</b>
<b>Connector Spacing</b>	<b>0.2"(5.08mm)</b>
<b>Main PCB Dimension</b>	<b>4.5" x 3.3" x 0.5"</b>
<b>LED Display Dimension</b>	<b>1.5" x 1.5"</b>

\*5 volt input will work, but DMX(RS-485) may not function correctly without a simple hardware tweak.

\*\*Screw-down, pluggable, screw down, and solder pad types are available

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Pinout detailed on Page 7

## See Next Page for Button and Menu Details

Fig. 2a

DMX Address:	Adr	Adjust the DMX Address using either buttons(Up or Down), press and hold either button to make fast adjustments, release and press again to make fine adjustments. When done, press both buttons at the same time to apply changes, or changes will be saved after a few seconds.
	AUL	Allows user to manually set an output channel to 0% or 100% through the menu. Use the buttons to cycle and select a channel# or ALL. An "A" after the number indicates channel is active(100%) an "o" indicates the channel is off(0%), no letter indicator means it is default.
LED Display Modes:	d 15	<div>ALL</div> <div>Con</div> <div>d in</div> <div>Always On, displays default based on program mode.</div> <div>Countdown to turn off after use.</div> <div>Always on and Dimmed</div>
DMX Reception Mode:	odE	<div>od 1</div> <div>...</div> <div>od 6</div> <div>DMX Reception Mode, 1 - 6</div> <div>Please See Page 4 &amp; 5 for Details</div>
DMX Master/Slave:	SrS	<div>dSA</div> <div>Ful</div> <div>PAr</div> <div>No DMX transmission, Normal Reception, Slave Device.</div> <div>Transmits Full DMX Packets when in stand-alone(see pg. 3)</div> <div>Transmits Partial DMX Packets when in stand-alone(see pg. 3)</div>
Baud Rate:	bAU	<div>b 1 &gt; b 2 &gt; b 3 ... b 9</div> <div>Selects Baud Rate for Serial reception usage.</div> <div>0=9600, 1=19200, 2=38400, 3=57600, 4=115200, 5=230400, 6= 250000, 7=460800, 8=500000, 9=1000000</div> <div>See Page 5 for details.</div>
Auto-Detect:	Aud	<div>dSA</div> <div>SrL</div> <div>dnH</div> <div>No Auto Detection and switch over of control data</div> <div>Auto Detects serial data at the selected baud rate</div> <div>Auto Detects DMX data and will automatically switchover to DMX</div>
DMX Auto-Release:	Aur	<div>EnA</div> <div>dSA</div> <div>Enables DMX timeout, Restores stand-alone after 3 seconds. Without receiving a DMX packet.</div> <div>Disables DMX timeout, once in DMX mode it will wait for packets.</div>
16-Bit or 8-Bit Serial Option:	SrL	<div>8En</div> <div>16E</div> <div>Enables 8-bit Serial Reception</div> <div>Enables 16-bit Serial Reception</div>
RS-485 Usage:	485	<div>EnA</div> <div>dSA</div> <div>Enables RS-485 (use DMXIN) hardware for Serial Control</div> <div>Disables RS-485 (use GND-RX-TX) hardware for Serial Control</div>
Force DMX/Serial Reception:	rEc	<div>SrL</div> <div>dnH</div> <div>Enables/Forces Serial Reception at selected Baud Rate</div> <div>Enables/Forces DMX-512 Reception</div>

Saves State and Restores at Power Up

## **Button Use and Options Menu Navigation**

Pressing and Holding both buttons will open the device menu which allows the device settings and features to be adjusted. When both buttons are pressed, and held, the display will indicate by animating “. . .” Once the menu is open(Enter) use SW2(right) to cycle through the options and SW1(left) to select an option. Changes takes a few seconds(usually 3 seconds) to save to memory after applying.

## **Auto-Detection, DMX or Serial**

One of the configuration options allows the device to detect valid serial data or DMX signal and automatically switch from stand-alone sequences to the selected data signal type. For DMX it will take a few packets of good data for the device to validate the signal and then switch over. Serial auto detection is similar, it must detect several packets of serial data at the correct baud rate for it to validate the signal and switch over from stand-alone sequences. The configuration can be changed in NLED Aurora Control software or through NLED Aurora USB commands. DMX master transmission over rides auto-detect usage.

## **DMX Auto-Release**

Another configuration option that indicates to the device to monitor the DMX packet timing. If a DMX packet is not received for 3 seconds the device will timeout and end DMX mode. It will then start playing stand-alone sequences, starting on the sequence that was last playing. If DMX was triggered through the index it will not leave DMX mode and will continue to wait. If this feature is disabled, once the device enters DMX mode, it will wait endlessly for packets. With it disabled the only way to end DMX mode is to manually change the color sequence using the buttons or commands.

Note: If using DMX Sequence Control mode, when the device releases DMX it will maintain the same sequence that it as playing, but will restore normal stand-alone usage.

## **DMX Master Transmission Modes**



No Master DMX Transmission, device receives normally. As Slave when enabled.



Transmits full DMX Universe when in Stand-Alone Mode, transmits the repeating values of the output channels to all DMX channels. 1-30, 31-60 etc up to 512



Transmits a partial DMX Universe(256 channels) when in Stand-Alone mode. Same as above but output channel values are repeated 1-30,31-60 etc up to channel 256.

Through software 8-bit or 16-bit DMX master transmission can be selected. 16-bit mode transmits MSB first, then LSB. Not compatible with all DMX devices, check device specifications for details.

Note: If a DMX Transmitter is attached to the device(s) it will load the line and Master transmission will not work until the other transmitter is removed from the circuit, and once a device is Master transmitting and DMX transmission is restored, all devices in the universe will act erratically for a few seconds.

## DMX-512 Usage

The device supports multiple DMX-512 reception modes, a reception mode can be selected through the software or external LED display. It can also be a setup as a DMX Master device(detailed on previous page), which will broadcast a DMX universe when running stand-alone color sequences. The data transmitted will be the same as the device's *Output Channel* values. So two or more of the same device could be daisy chained together and would be synchronized.

## DMX Reception Modes

### **30 Channel Mode, 8-bit:** Standard Direct Control(od1)

Channel	Value	Description
---------	-------	-------------

1	0 - 255	Output Channel 1, 0 is Off, 255 is Maximum Value
---	---------	--

.....

30	0 - 255	Output Channel 30, 0 is Off, 255 is Maximum Value
----	---------	---

### **31 Channel Mode, 8-bit:** Standard Direct Control with Intesity(od2)

Channel	Value	Description
---------	-------	-------------

1	0 - 255	Output 1, 0 is Off, 255 is Maximum Value
---	---------	--

.....	0 - 255	
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30	0 - 255	Output 30, 0 is Off, 255 is Maximum Value
----	---------	---

31	0 - 255	Intesity. 0 is 0%, 255 is 100% Maximum Intesity on all channels
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### **60 Channel Mode, 16-bit:** 16-Bit Direct Control (od3)

Channel	Value	Description
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1	0 - 255	MSB of Output 1
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2	0 - 255	LSB of Output 1
---	---------	-----------------

.....	0 - 255	Etc.
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59	0 - 255	MSB of Output 30
----	---------	------------------

60	0 - 255	LSB of Output 30
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Note: The maximum PWM resolution is 12-bits(4096 brightness levels), so the 4 LSBs are unused

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## DMX Reception Modes(Continued)

### **3 Channel Mode:** Standard RGB Compatibility(od4)

Channel	Value	Description
1	0 - 255	All Red Channels, 0 is Off, 255 is Maximum
2	0 - 255	All Green Channels, 0 is Off, 255 is Maximum
3	0 - 255	All Blue Channels, 0 is Off, 255 is Maximum

These 2 DMX Reception Modes are used for control of the stand-alone color sequences. There must be Sequences loaded onto the controller, either the stock ones or user created ones that were created and Indexed with the NLED Aurora Control Software. It is advised not to have any "DMX" or "Serial" or "Linked" sequences on the index.

### **3 Channel Mode:** Basic Sequence Control(od5)

Channel	Function	Value	Description
1	Sequence #	0 - 32	0 Blanks the All Outputs, 1-32 maps to indexed sequences
2	Speed	0 - 255	0 is Pause, 1 - 255 is the speed used for sequence
3	Position/Fade	0 - 255	If Speed is greater than 1, usage is ignored. See Note 1.

### **33 Channel Mode:** Sequence Control with 30 Channel Control(od6)

Channel	Function	Value	Description
1	Sequence #	0 - 32	0 control using channels 4 - 33, 1-32 maps to sequences
2	Speed	0 - 255	0 is Pause, 1 - 255 is the speed used for sequence
3	Position/Fade	0 - 255	If Speed is greater than 1, usage is ignored. See Note 1.
4		0 - 255	Output Channel 1
5		0 - 255	Output Channel 2
...		0 - 255	.....
32		0 - 255	Output Channel 29
33		0 - 255	Output Channel 30

**Note 1:** Position/Fade Control: If the Speed is 0, it allows the position of Instant Sequences to be set by the Positon value. As calculated:  $(\text{Position} / 255) \times \text{Amount of Data Frames}$ . For Fade and Gradient Sequences, it allows the Sequence to run normally for Position value amount of times, which for 8-bit sequences, a value of 255 will run all output channels 1 frame. For Fades and Gradient sequences, the Positon value used is the difference between the previous Position value and the current Position value.

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## Serial Reception Usage

Serial reception can directly control the device's outputs using a common serial transmission device. Such as a standard COM port with level translation, an FTDI adapter, Arduino, PIC UART, wireless XBee, or similar. Data is received in packets of 30 bytes for 8-bit reception mode and 60 bytes, MSB first, for 16-bit mode. There is a maximum of 5mS between bytes and a minimum of 5mS between packets, to allow the data to latch. A delay between received data bytes of more than 5mS will reset the buffer pointer, framing the data. Partial packets will latch after the 5mS delay, or latching will occur immediately after receiving the last(30th or 60th) byte. 8-bit or 16-bit reception modes are selected through the configurations, which can be accessed through the software, USB commands, or through the external LED display.

Serial Reception can be enabled through the NLED Aurora Control Software by adding it to an index, or by selecting through the external LED display. Or in the software, on the Hardware Tab, select the Auto-Detect Serial option to automatically enter Serial Reception when valid data is received, the device can take several packets to detect and validate the data before starting reception. The stock baud rate is 19,200, but the user can set the utilized baud rate using the software through the hardware tab by selecting the desired baud rate from the drop down menu. Or by selecting ID through the external LED display. The byte formatting is the standard 8-N-1(8-bits, no parity, 1 stop bit)

For Serial Reception to function the RS-485 hardware must be configured. RS-485 is a differential transmission method, that DMX-512 utilizes. The user can select through the software or external LED display to utilize the RS-485 hardware for Serial Reception(transmitting device must be RS-485 as well) on the DMXIN header or to disable usage and utilize the RX-TX-GND header for direct TTL (Low=0v, High=5v, 3.3v levels will work as well) control.

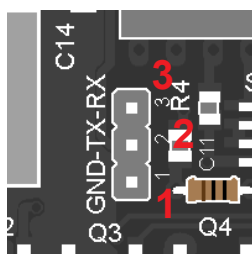


Fig. 3c

### RX-TX-GND Header Connection

Device:

1 RX ← TX  
2 TX → RX  
3 GND ↔ GND

Fig. 6b

ID#	Actual Device Baud	Closest Common Baud Rate	Error %
0	9,615	9,600	0.16%
1	19,230	19,200	0.16%
2	38,461	38,400	0.16%
3	57,142	57,600	0.64%
4	117,647	115,200	-0.79%
5	222,222	230,400	2.12%*
6	250,000		
7	444,444	460,800	-3.55%*
8	500,000		
9	1,000,000	921,600	8.51%

Fig. 6a

8-N-1

\*Note: Percentage of error is within usable limits. And won't affect usage.

Additional details and graphics can be found at:

<http://www.nledshop.com/downloads/manuals/nled-serial-reception-manual.pdf>

## Firmware Updates Using The Bootloader

Visit [www.NLEDshop.com/bootloader](http://www.NLEDshop.com/bootloader) for downloads and additional documents.

This device includes a bootloader feature. It allows the firmware on the device to be updated using a USB cable and a small computer program. The bootloader entry method for this is to: with the device powered off, while holding down SW1 on the external LED display or after making the jump connection in Figure 3a, power up the device. Wait a second or two. The device's notification LED should be full on if it entered bootloader mode and will blink steadily if in bootloader mode and successfully communicating with the host computer. When the software is started (or if it is already started) it will automatically connect to the device if one is found.

After the device is connected, please follow the instructions found at [www.NLEDshop.com/bootloader](http://www.NLEDshop.com/bootloader). That is also where the software download links can be found.

Firmware updates are programmed special protection code that prevents other devices from being programmed with the update firmware images. And non-NLED firmwares from being programmed onto the devices. If a firmware image is loaded onto a microcontroller without the special protection code it will respond to commands and USB will work, but the outputs will be off. Contact Us for help restoring your device to original condition if your microcontroller was damaged, erased, 'bricked', or otherwise not working correctly.

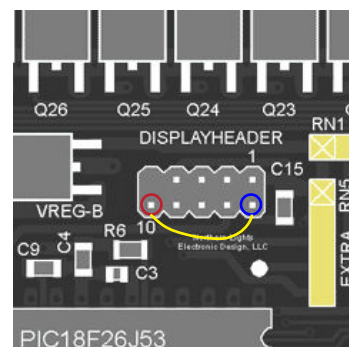


Fig. 3a

**Fig 3a: Jump the blue circled pin to the red one to enter bootloader mode without a external LED display. Or with external LED display hold SW1.**

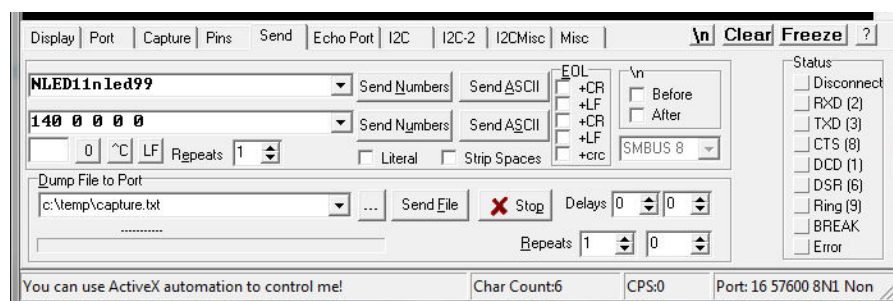
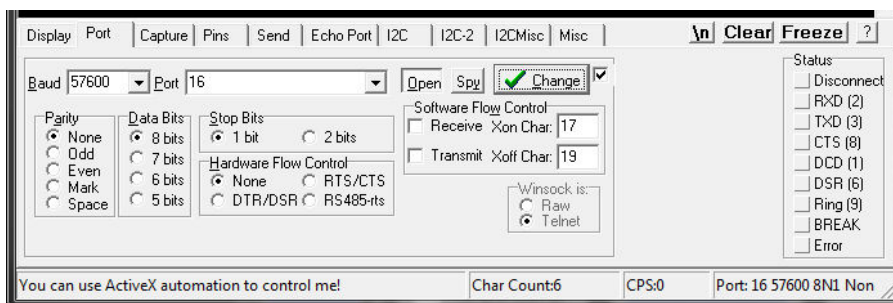
Or the device can enter the bootloader mode via USB commands. Either from NLED Aurora Control, using the button on the upper right on the Hardware Tab.

The command is:

**140 0 0 0 0**

To Enter a command:

- Open the correct COM port
- Select any baud rate, doesn't matter
- Send as ASCII "NLED11"
- Device will respond with "a9"
- Send as ASCII "nled99"
- Device will respond with "f0"
- Send as Numbers "140 0 0 0 0"
- Device will then enter bootloader mode (Note not all devices and firmware versions are compatible)



## NLED Aurora Control Software

Most NLED controllers are compatible with the NLED Aurora Control software. The software is used to create a multitude of patterns and sequences on a computer, then upload them to the compatible controller for the device to run by itself, without a computer connection. The simple GUI makes it easy for anyone to create custom color sequences of any sort and upload them to the controller over the USB, WiFi, Bluetooth, or Serial connection. Great for any LED project that requires custom color sequences and control. In addition to standalone sequences, it also supports USB Live Control, send packets over USB to the device for direct control of the outputs. In addition it offers a command structure for interfacing and controlling with the device. It supports single color, RGB, or RGBW LED configurations. Entirely GUI based and easily to navigated.

This software is fully compatible with up to 512 channels(170 RGB pixels, 128 RGBW pixels) in stand alone mode and the communication methods.

**Color Sequence:** A color pattern, contains all the data to control the LEDs. Or dataset(how the color data is stored) that creates colors, patterns, and sequences. Can be single color, RGB or RGBW, all are still color sequences.

**Channels:** A channel represents a single output on a controller or a single color of a pixel.

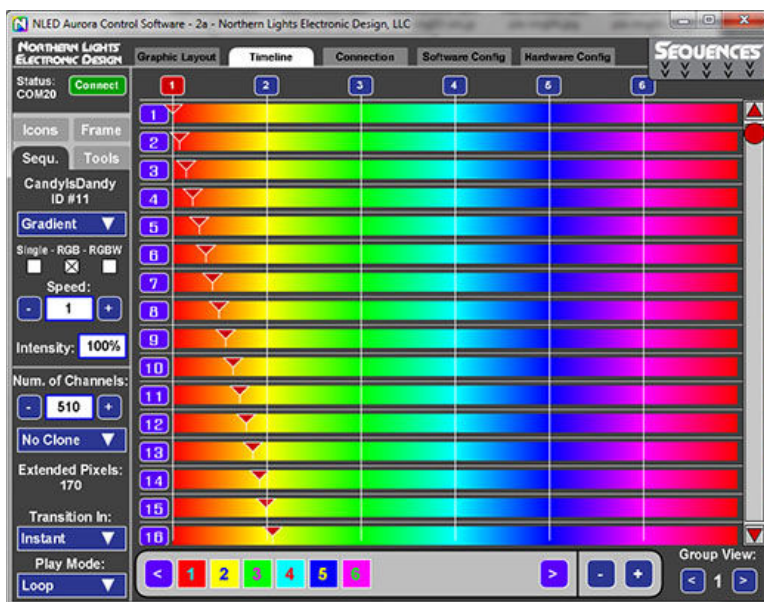
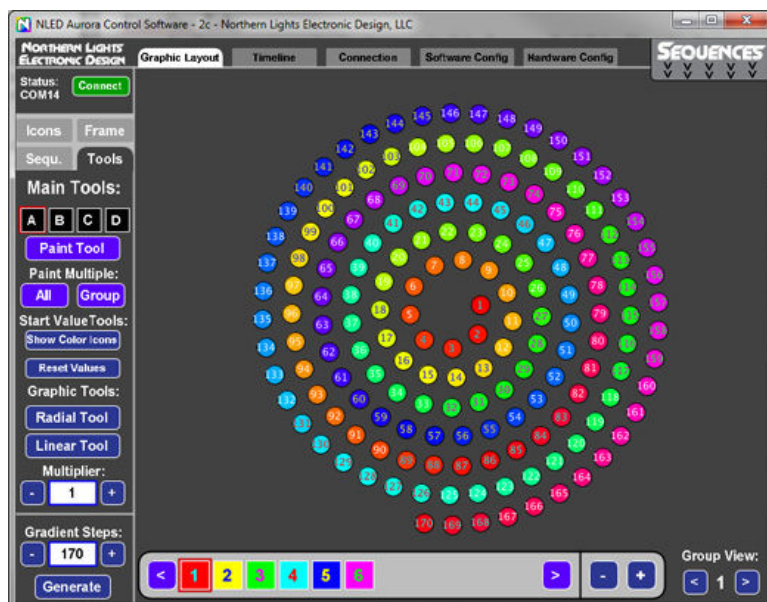
**Color Channel:** Represents a single LED or pixel. That could be either single color, RGB, or RGBW(or RGB+U.V.) A Color Channel is seen as 1 or more Channels. A sequence set to RGB Pixel Data Type will use 3 Channels Color Channel. A LED Icon(on the Graphic Layout tab) or a row on the Timeline tab represent a Color Channel.

**Frame:** The data stored in each Frame will be displayed on the outputs/pixels sequentially. A Frame can be thought of as a single frame of a video, it holds all the data to create those colors. See Manual for details.

**Index:** Contains a directory or order of the color sequences that will be uploaded to the controller.

**Pixel Data Type:** Tells the software and controller the LEDs that will be controlled are either a single color LED(like just blue), RGB, or RGBW(Any 4 colors)

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## **NLED Aurora Protocol**

The NLED Aurora Protocol offers a command interface to communicate with NLED controllers. Almost every function and feature of the Aurora stack is available through commands. Such as play/pause, output color selection, device status, upload and download commands, and numerous others. The commands can be executed from any software or program that can connect to the device. Communication involves a simple byte exchange and acknowledge, then the command byte and 4 data bytes are sent to the device. Commands can be issued over a USB interface is available or through the serial interfaces that all NLED controllers offer.

Please see the software documentation for command details and usages.

Visit [www.NLEDshop.com/nledaurora](http://www.NLEDshop.com/nledaurora) for the up to date list of documents.

## **USB Live Control & Commands**

Live control over USB allows data sent from a computer to control the pixel colors/intensities. This device when connected over USB is an Emulated Serial Port or VCP. This allows computers to see the device as a regular serial port. Many languages provide communication with serial devices, which allows many options for a user to create custom software to control the connected pixels over USB. Live control is started through NLED Aurora Control commands. (Command sheet available for download) The method is very simple, send the USB Live Control command, which includes the amount the channels that should be controlled, then send the data in packets the size of the channel amount that was sent with the command.

This device is compatible with 8-bit or 16-bit live control. 16-bit allows 65,536 intensity levels, although the device converts it down to 12-bit(4096).

## **Serial Communication**

As briefly mentioned in the NLED Aurora Control section this controller offers Dual Command Mode configuration(see Configurations Settings page). This allows the user the option to command the controller using USB as the primary communication port for commands and uploads. Or allow commands to be communicated from TTL serial devices and modules, such as WiFi, FTDI, Arduinos, or Bluetooth.

**Disabled(Default):** Aurora commands, such as sequence uploading and sequence control, can only be issued over the USB interface. All other serial and DMX functions work as normal.

**Enabled:** The controller will disable serial reception, DMX reception, and DMX master transmission. This allows for external TTL serial devices such as FTDI adapters, WiFi modules(X-Bee, ESP8266), Bluetooth modules, or Arduino's to issue commands to the controller. The USB interface works concurrently with the external serial module and either can send and receive commands.

## **Device Configurations Settings**

Since this device is not compatible with an external LED display or other method of user input the only way the configurations can be changed is through the software NLED Aurora Control. The configurations affect how the controller functions, what pixel chipset it expects, notification LED options and more. After connecting the device to the software these options can be found on the Hardware Config tab.

**Serial Baud Rate:** Sets the expected baud rate used for serial reception and serial communication. The controllers baud must match the baud rate of the transmitting device.

**DMX Address:** The starting address for DMX reception.

**DMX Reception Mode:** Options for DMX Reception modes(see pg. 3)

**DMX Master Mode:** Enables the controller to output a DMX-512 universe as a master transmitter. This allows the current stand-alone color sequence to be sent to other controllers, to either duplicate/mirror multiple of the same controller, even ones of different makes and models.

**Activity LED Mode:** Controls how the notification LED functions, when stand-alone sequences are running and/or a serial or DMX packet has been successfully received.

**Auto-Detect Options:** Options allow the device to detect and automatically switch from stand-alone to the selected control method(DMX or Serial)

**Dual Mode Communication:** Allows a TTL serial device, such as a FTDI, X-Bee, Arduino, or ESP8266 to interface and command the controller over the RX/TX/GND serial connection. Serial control reception, DMX reception, and DMX transmission are disabled. USB remains enabled, both modes can run concurrently.

**Gamma Correction:** Enables or disables the use of the internal gamma correction table. See the Aurora Manual for information on this feature or search online for Gamma Correction for an overview.

**External LED Display Mode:** Configures the display action of the LED display. See page 2.  
Note: Always On mode is not recommend for this controller if input voltage is greater than 12 volts.

**Serial RS-485:** For use with serial reception, DMX usage ignores. If enabled it will use the RS-485 transceiver and the data terminals D-, D+, & GND to collect standard 8-N-1 serial data at the user selected baud rate. If disabled the TTL(0v, 5v) serial header(RX,TX,GND) can be used for serial reception normally.

**DMX Timeout Release:** Sets the option to detect loss of DMX signal and returns to playing stand-alone color sequences. Option allows either to restore the color sequence it had been playing. Or to start playing the Idle sequence once DMX signal is lost. Timer is set to 3 seconds, if a valid DMX packet is not received within that period, the controller will start playing color sequences.

**Enable I.R. Remote Control(Addon Card):** Enables the device to be able to interface with the NEC Infrared Decoder and Encoder Board. The addon board converts infrared remote signals into serial commands that are received by the controller. The addon boards are hardware set to either use 19200 baud or 250,000 baud. To enable usage you must select the correct baud value for your addon card.

Default Configurations: DMX Reception mode 1, Activity LED Mode - Both, Auto-detect DMX enable

## Pinout And Hardware Layout

There are three hardware versions, v.1a and v.1b have no hardware differences. While v.1c hardware has an alteration to the GND-TX-RX header used for serial communication. The newest v.1c hardware has an additional power pin for the serial header. A solder jumper is used to select 3.3 volts or 5 volts output for that pin. That allows external devices such as Infrared, WiFi, or Bluetooth modules to be connected and powered.

Fig. 10a

### v.1a & v.1b

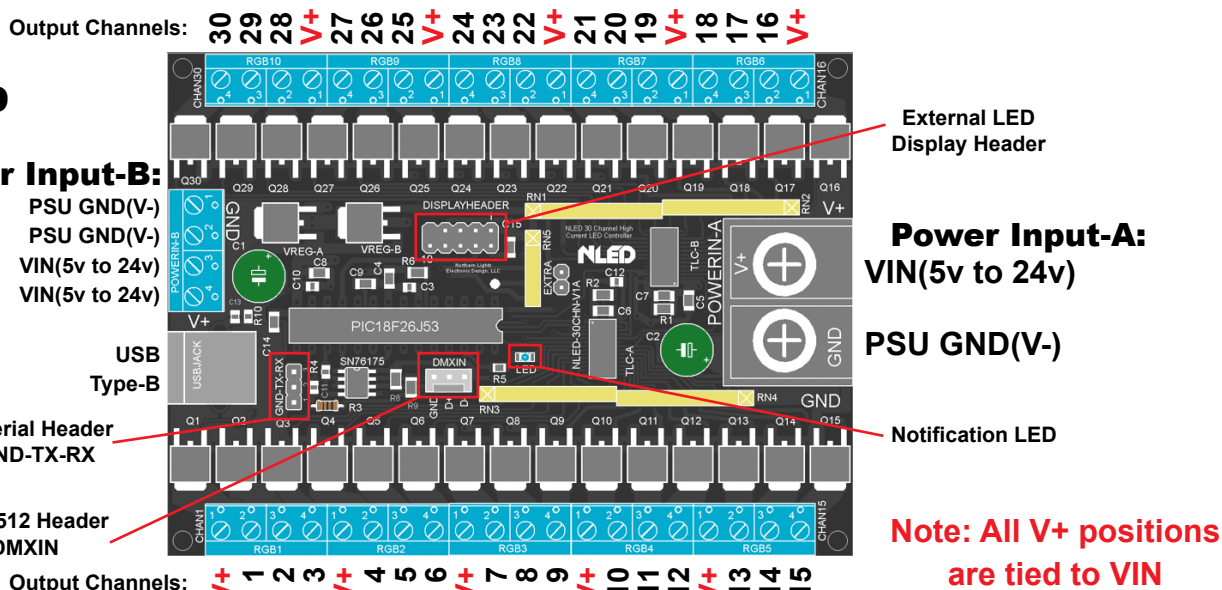
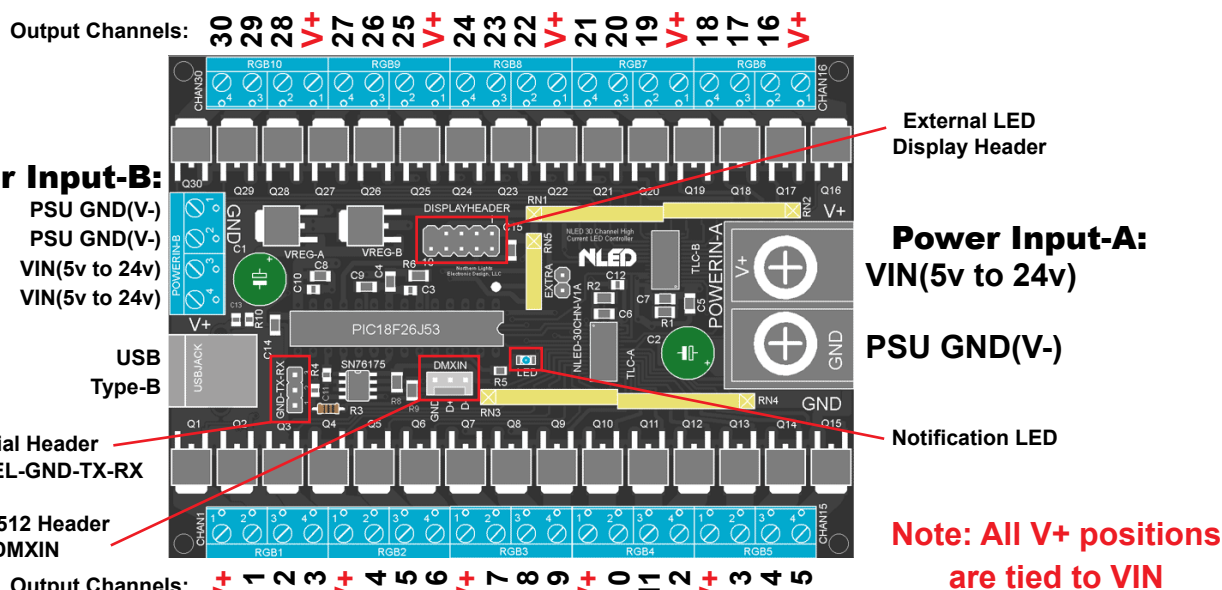


Fig. 10ba

### v.1c









## NLED Quasar Model

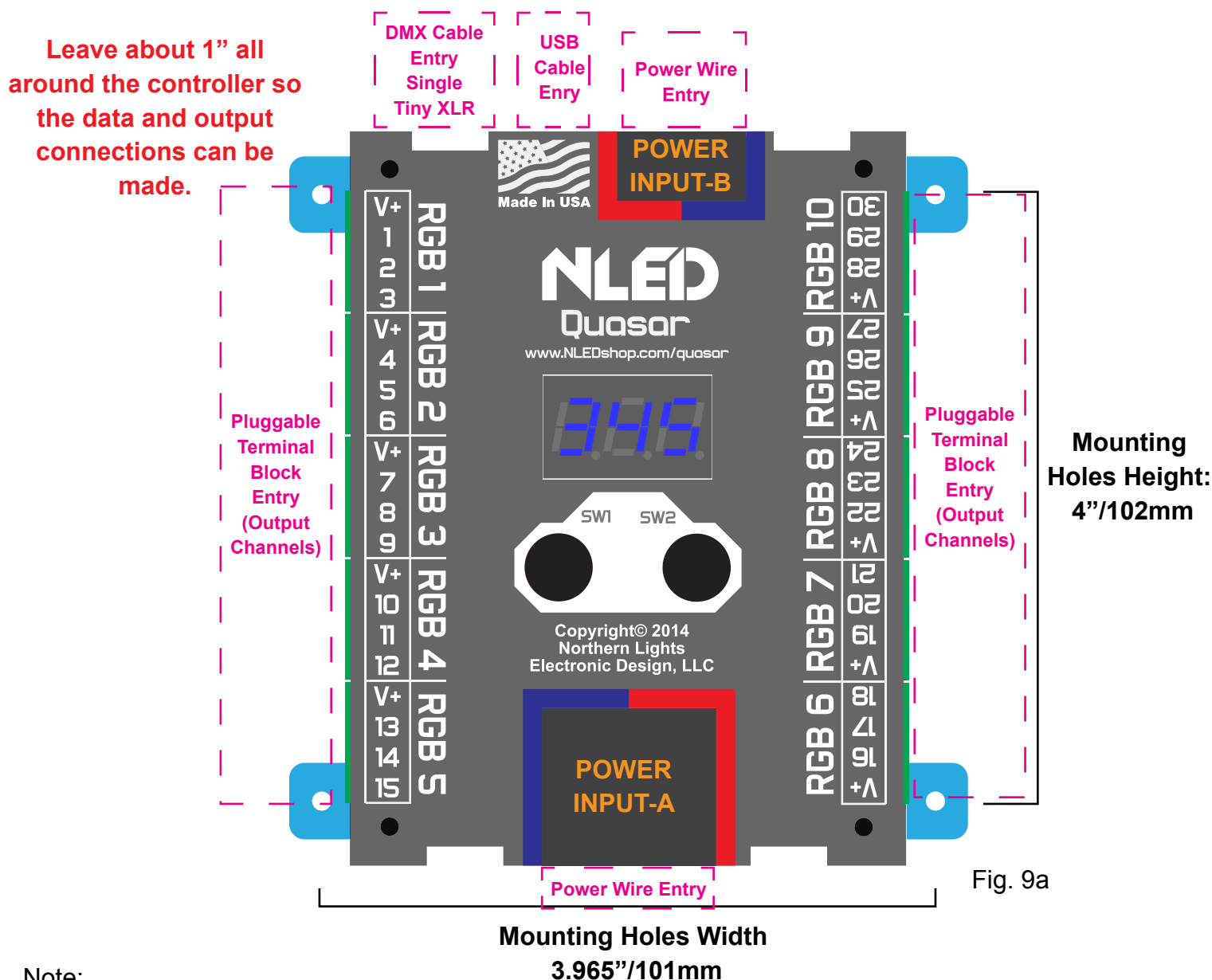
The NLED 30 High Current LED Controller is also available in turnkey controller with case. The NLED Quasar controller. It offers all the available features with pluggable terminal blocks, a fully enclosed decorative enclosure, with access to all the data connections(excluding TX-RX-GND), DMX-512 is accessible via a Tiny XLR(mini, Rean RT3MPR). The Tiny XLR jack requires a custom cable designed for use with the NLED Quasar which converts male and female 3-pin XLRs into the required Tiny XLR.

## Dimensions and Mounting Considerations

**Total Dimensions:**

**5"/127mm x 4.5"/114mm x 1.25"/32mm Tall**

**Material: 1/8" Acrylic**



Note:

The enclosure is not water or weather proofed. Care must be take when choosing a mounting location. The enclosure has venting slots, they can not be obstrucrted or sealed.

## **Common Issues and Troubleshooting**

Please Contact [Support@NLEDshop.com](mailto:Support@NLEDshop.com) with any Questions, Comments, or Bug Reports.

Most issues can be resolved by power off the device, waiting a few seconds, and powering it back up.

**Problem:** Device with connected LEDs does not produce any light.

First ensure the LEDs are properly powered and wired to the controller and power source. Try to cycle through the Sequences or modes using the button or External LED display.

**Problem:** Device with connected LEDs is full on, or all white.

Potential microcontroller issue, attempt to flash the firmware using the bootloader (see page 3) or contact support for assistance.

**Problem:** Device appears to be “bricked”, unresponsive to user inputs and/or communication(USB etc)

Attempt to upload a new firmware image via the Bootloader, see page 4 for details.

**Problem:** USB connection is not being established.

Check to make sure the USB cable is plugged and seated correctly, then power up the device. Check for connection via NLED Control or your operating systems device manager, it should be listed as a COM port. All major operating systems should not require a driver. So the device should plug and play.

**Problem:** Outputs flicker or have inconsistent light output.

Power supply may not be properly rated or has poor load/line regulation.

**Problem:** One or more outputs won't turn off or won't turn on

If multiple control methods are tried and problem persists, it is probably a shorted MOSFET and will need to be replaced, contact for assistance.

## **Have Any Ideas for Future Updates:**

Northern Lights Electronic Design, LLC is constantly looking to make our products better and improve upon our designs. If you have any ideas for future products, updates to current products, or features that you would find useful, please Contact Us at [Sales@NLEDshop.com](mailto:Sales@NLEDshop.com). There is a good chance you can receive coupons or free items for your help.