

NLED Pixel Controller Ion

This controller from NLED packs many features into a small form factor. It supports various communication methods for direct control of the outputs, such as USB, TTL serial, or DMX-512. But the focus of the design is the powerful stand-alone color sequence support. The software NLED Aurora Control, allows a user to interface with the controller and create custom color sequences, including custom POVs, that can be uploaded to the controller over USB. The controller can run the loaded color sequences without any data or computer connection. The small size, low current, and dynamic stand-alone color sequences make this controller a good choice for wearables, hoops, staves, poi, bikes, and other pixel based projects. The device currently supports several of the most popular pixel chipsets, with the ability to easily update the firmware with new features and chipset support.

PRELIMINARY

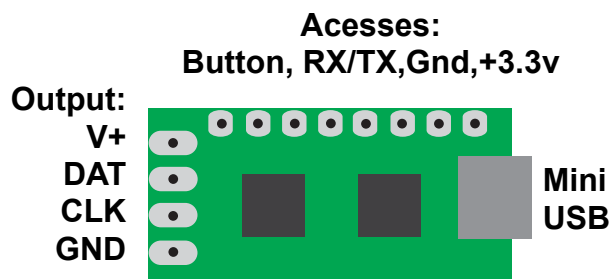
Features:

- Stand-Alone Supports upto 512 channels/170 RGB Pixels/128 RGBW.
- Supports many of the popular pixel chipsets, and more will be added in the future.
- Small size, 1.25" x 0.6" x 0.25", great for wearables, or LED toys such as hoops, staves, or poi.
- 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 Support - Requires External Transciever
- Hardware and Firmware supports single color setups(ex. all blue), RGB, or RGB+W/U.V. configurations.
- NLED Aurora Control Software compatibility, connection via Mini USB
- Create and Upload(save) Custom Stand-Alone Color Sequences to the Controller From a Computer.
- Easily update the firwmare over USB to add new features and chipset support.
- Includes a Full 3 Year Warranty and Satisfaction Guarantee

Specification:

Input Voltage	5v - 12v
Logic Current Draw	< 50mA
Output	512 channels(170 RGB)
Connectors	Various*
Connector Spacing	0.1"
Main PCB Dimension	1.25" x 0.6" x 0.25"

**Screw-down terminal, right angle polarized header, or bare with a JST-SM harness



Rough Dimension and Pinout
1.25" x 0.6" x 0.25"

Firmware Updates Using The Bootloader

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: with the device powered off, while holding down the button or after making the jumper 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. 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

Supported Pixel Chipsets

Name	Color Bits	Data Speed	PWM Frequency
WS2811	8-bit	800Khz	400Hz
WS2812	8-bit	800Khz	400Hz
WS2812B	8-bit	800Khz	400Hz
WS2801	8-bit	2.66MHz SPI	2.5kHz
WS2803	8-bit	2.66MHz SPI	2.5kHz
LPD8806	7-bit	8MHz SPI	4kHz
Adding LPD6803, LPD1886 and more, contact to request support			

NLED Aurora Control Software

Most NLED Controllers are compatible with the NLED 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 connection. Great for any LED project that requires custom color sequences. In addition to standalone sequences, it also supports USB Live Control, send packets over USB to the device for direct control of the outputs. It supports single color, RGB, or RGBW LED configurations. Entirely GUI based and easily to navigated.

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

DMX-512 Usage

The device supports multiple DMX-512 reception modes, a reception mode can be selected through the software.

This controller is not focused on DMX reception, and does not have the hardware for direct control from a DMX universe, as it has no RS-485 transceiver

512 Channel Mode, 8-bit: Standard Direct Control

<u>Channel</u>	<u>Value</u>	<u>Description</u>
1	0 - 255	0 is 0%, 255 is 100%
.....		
512	0 - 255	0 is 0%, 255 is 100%

Need something different? Custom? Contact Support@NLEDshop.com for Help

Want Another Pixel Chipset Supported? Contact Support@NLEDshop.com for To Request It

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. The device receives data in packets, the size (in bytes) of the packet corresponds to how many channels will be controlled. Example: Sending a packet of 90 bytes will control 30 RGB pixels, sending 510 bytes would control 170 RGB pixels. There is a maximum of 5mS between bytes and a minimum of 5mS between packets (end-of-frame), 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 (512th) byte.

Serial Reception can be enabled through the NLED Aurora Control Software by adding it to an index, or by configuring auto-detection. Each method requires the use of the software. 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.

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.

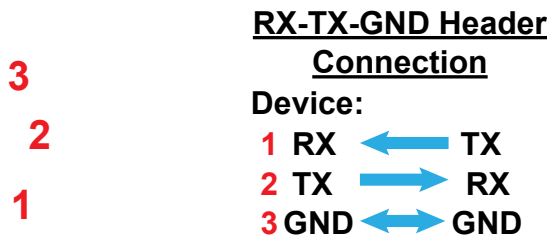


Fig. 6b

Fig. 3c

USB Live Control & USB Commands

Live control over USB allows data sent from a computer to control the Output Channels 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 Output Channels over USB. Live control is started through NLED Aurora Control commands.

NLED Aurora Control commands are compatible with all devices that are compatible with the software. 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. See software documentation for command details and usages.