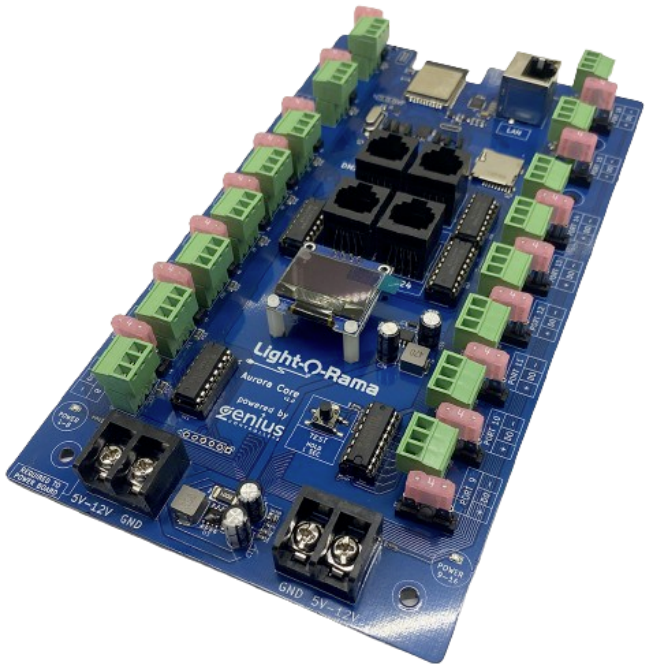


Aurora Core

E1.31/Artnet 16 Port Smart Pixel Controller

2 DMX Ports and 2 Long Range Receiver Outputs

User Manual

November 2023

V1.0

Table of Contents

Introduction

The Aurora Core is a member of the smart pixel controller line of Light-O-Rama (LOR) products and is designed for advanced users.

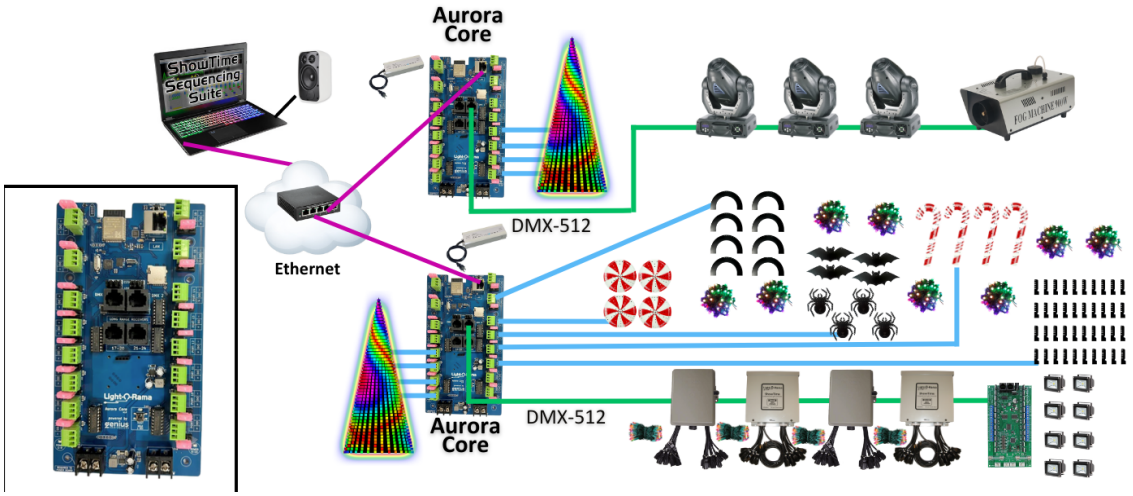
The Aurora Core requires an ethernet connection for communication and can be sent either E1.31 (sACN) or Art-Net command data. Using ethernet to command your show has many advantages, especially in large, complex shows as ethernet allows for a large amount of command data to be sent very fast and efficiently. Configuration of this controller is done in a web browser on a computer or on your mobile device connected directly to the Aurora Core via its built-in wifi hotspot.

Note: The Aurora Core can NOT be used with a Showtime MP3 Director.

The 16 pixel ports on the controller are capable of controlling WS281X pixels only, so make a note of this when purchasing pixels to use with the Aurora Core. Pixel outputs can be used with either 5VDC or 12VDC pixels (requires the corresponding power supply to be used).

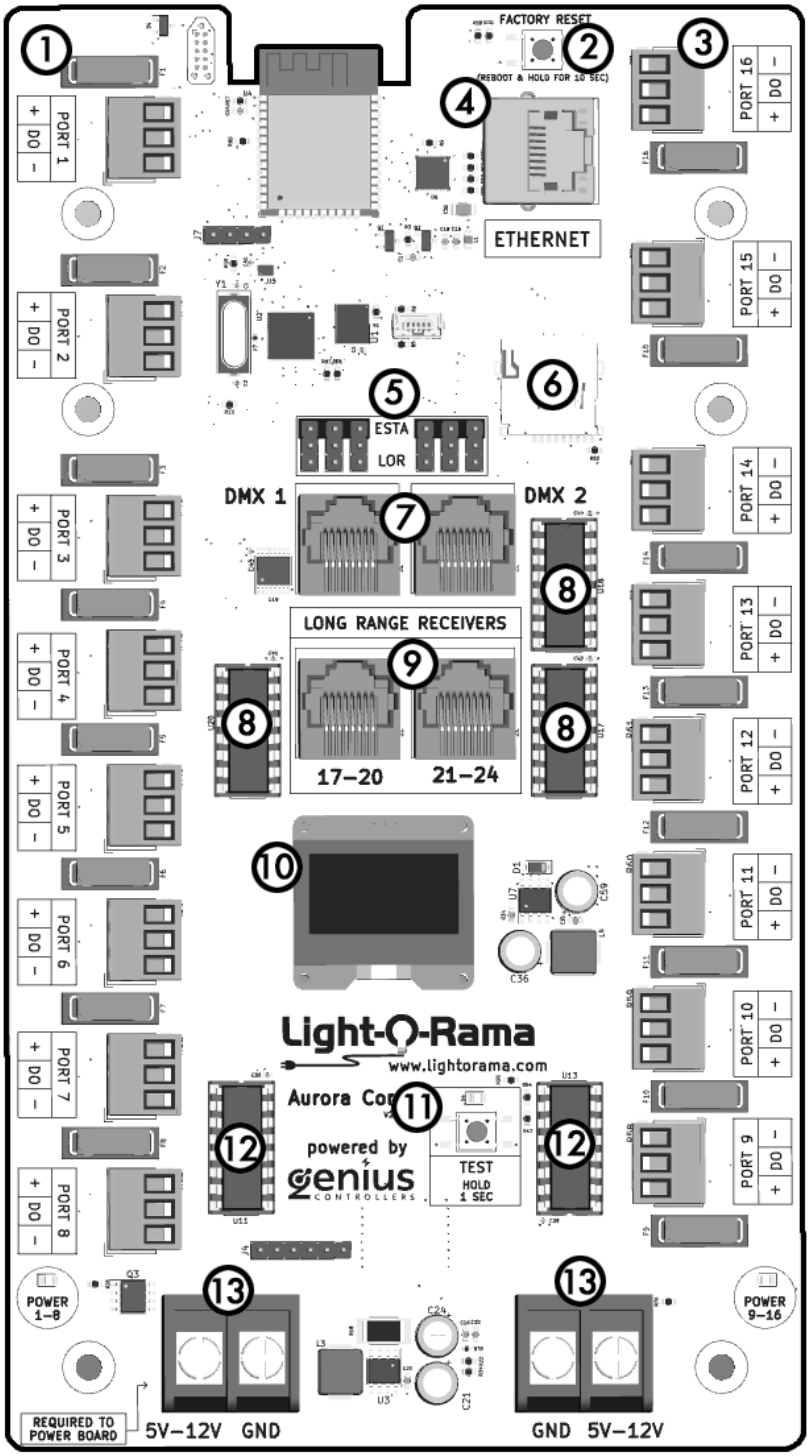
The Aurora Core has 2 DMX output ports, each allowing 1 universe of DMX data to be sent to any serial DMX capable device. This includes LOR AC controllers, CMD24D floor light controllers, and many more. LOR controllers can be hooked up directly to the DMX output using a regular cat5/6 cable and no special adapters. There are also 2 long range pixel receiver outputs for future use.

The Aurora Core is capable of handling up to 58 universes of E1.31/Art-Net data (~10,000 pixels). The amount of pixels that can be connected to each port is limited by power consumption and is not a fixed limit like other pixel controllers. This will be discussed later in the manual.



Hardware Overview

This section of the manual is meant to provide a base level tour of the hardware interfaces on the Aurora Core. Later in the manual, more details will be provided about these elements.



1. **Replaceable Mini Blade Fuses**

   Each of the 16 ports is protected by a 4 amp mini blade fuse (pink).

2. **Factory Reset Button**

   Allows the user the ability to reset the controller to default settings. This includes the IP address of the controller.

3. **Pixel Outputs with Removable 3-Pin Connectors**

   Each of the 16 pixel outputs has a 3-pin connector capable of accepting 18-22 AWG pixel string cables. The pin/pitch spacing on these connectors is 3.81mm.

4. **Ethernet Port**

   Used to connect the Aurora Core to an ethernet network switch or your computer's ethernet port. This port **must** be connected to the same ethernet network as your computer for the controller to function during a show. This port also allows your computer to configure the controller in addition to the ability to configure the controller via wifi.

   Note: Do NOT connect this port to a USB-RS485 adapter.

5. **DMX Output Wiring Configuration Jumpers**

   These jumpers allow for selection between 2 different wiring standards for the DMX outputs. "LOR" allows for the direct connection to LOR-branded DMX capable controllers. ESTA is used for the entertainment industry standard DMX wiring used in many widely-available DMX devices.

6. **Micro SD Card Slot**

   The micro SD card slot is reserved for future functionality and is not currently used.

7. **DMX Output Ports**

   These ports allow the Aurora Core to send serial DMX commands to any DMX capable device, including LOR controllers.

8. **DMX Output and Long Range Receiver Communication Driver Chips**

   These removable components are replaceable in the event of damage occurring from electrical surges or similar accidental electrical damage.

9. **Long Range Receiver Output Ports**

   These ports are used (future use) to connect to long range pixel receivers.

10. **Information Screen**

    This screen will show important controller information such as IP addresses and a QR code to connect the controller via wifi to configure. *Note: It will go to sleep after a certain amount of time. Press the test button momentarily to wake up the screen.*

11. **Test Button and Test Light**

    This button is used to activate test mode by holding down for 1 second. The test light will be illuminated when test mode is active *(Note: test mode can also be activated from the configuration webpage).* Holding the test button down for 1 second also turns off test mode.

12. **Pixel Output Communication Driver Chips**

    These removable components are replaceable in the event of damage occurring from electrical surges or similar accidental electrical damage.

13. **Power Input Connections**

    There are 2 power banks on the Aurora Core, Ports 1-8 (left) and Ports 9-16 (right). The left (ports 1-8) power input is required to have power for the board to power up. Both left and right power banks can be fed either 5VDC or 12VDC. There is a status light for the left and right side to allow confirmation that each bank is receiving power.

Getting Started - Connecting to a Network

The Aurora Core must be connected to a wired ethernet network to run a show and access the configuration interface. Note that this connection is different from an LOR USB-RS485 adapter. Most computers have an ethernet network port built in. USB to ethernet adapters are available from many sources if your computer does not have one built in.

Note: Ethernet devices use IP addresses to identify themselves on the network. These are very similar to LOR Unit IDs in the sense that it is the identifier that the controller uses to respond to commands with. The main difference is that you can't have duplicate IP addresses on the same ethernet network, as you can with LOR Unit IDs.

The term "DHCP" and why it is relevant for the Aurora Core

Ethernet devices are intelligent when it comes to their IP address. Most ethernet devices that are typical in a home (smartphone connected to wifi, computer connected to wifi, etc) have IP addresses but we may never see or care what those addresses are because they use DHCP (Dynamic Host Configuration Protocol). DHCP means that a device was told what IP address to use, typically by a router in a home setup. If a device is not using DHCP on an ethernet network, it has to be told what IP address to use, which is typically called "static IP". The Aurora Core is capable of being on a network with DHCP or using a static IP address. Either way, the IP address of the Aurora Core is always shown on the information screen on the board.

How to Connect

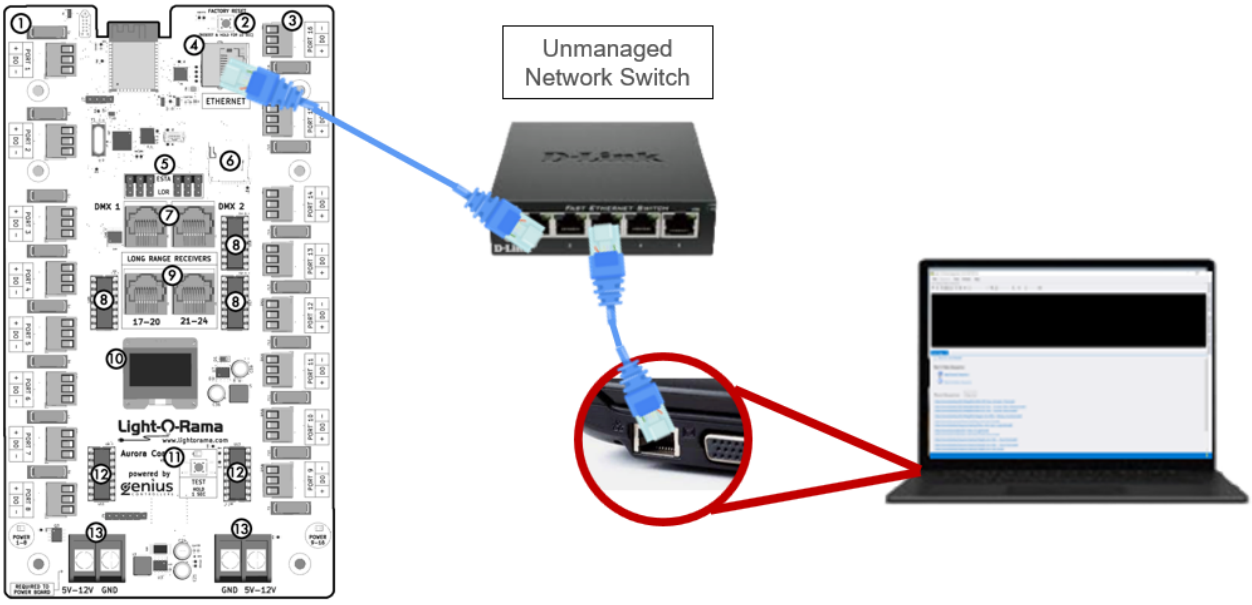
There are 2 main options to connect the Aurora Core to your ethernet network.

1. Standalone/isolated network.
2. Part of your existing network/router.

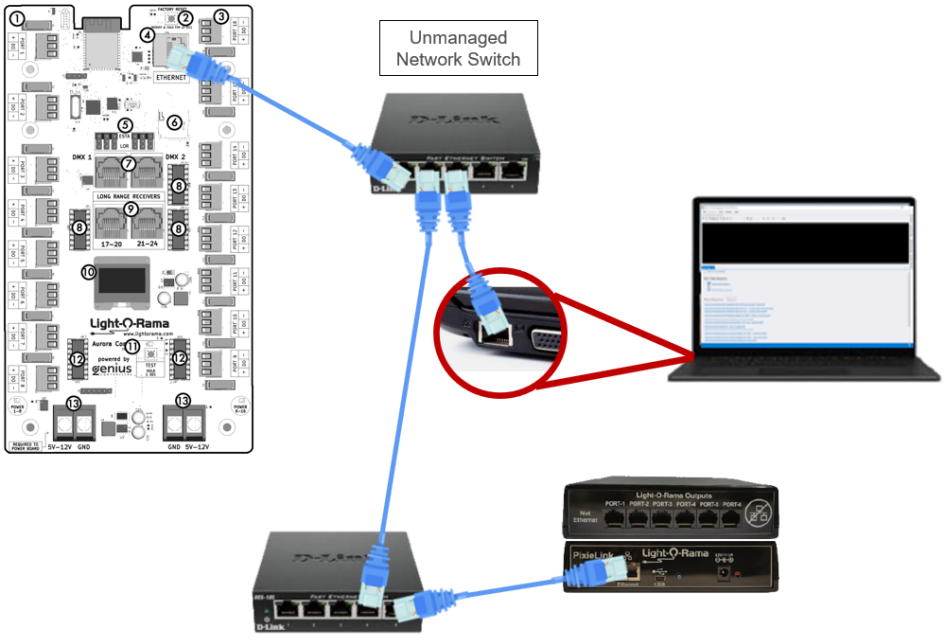
Isolated Network

This is the most common approach to setting up ethernet networks for light shows. This method utilizes the ethernet network port on your computer connected to a network switch and the ethernet port on the Aurora Core connected to the same switch. You could connect the Aurora Core ethernet connection directly to the computer's ethernet port, but it is shown in this manner to illustrate the advantages of ethernet networks in physical hookup and future expansion.

Isolated Example 1

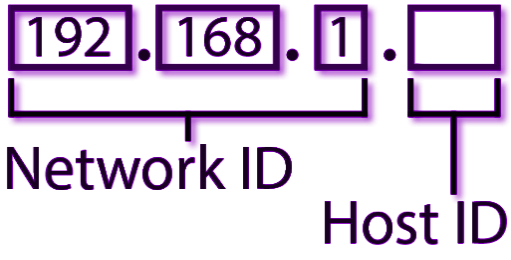


Isolated Example 2



In this scenario, DHCP is not present, so the Aurora Core is not “given” an address and will just default to its factory default static IP address, 192.168.1.50. This IP address will be displayed on the information screen as well as the designation that this is its static address.

In order for your computer to be able to talk to the Aurora Core at this IP address, your computer’s IP address must be set to match the first 3 sections (commonly called network ID) of the Aurora Core’s IP address.



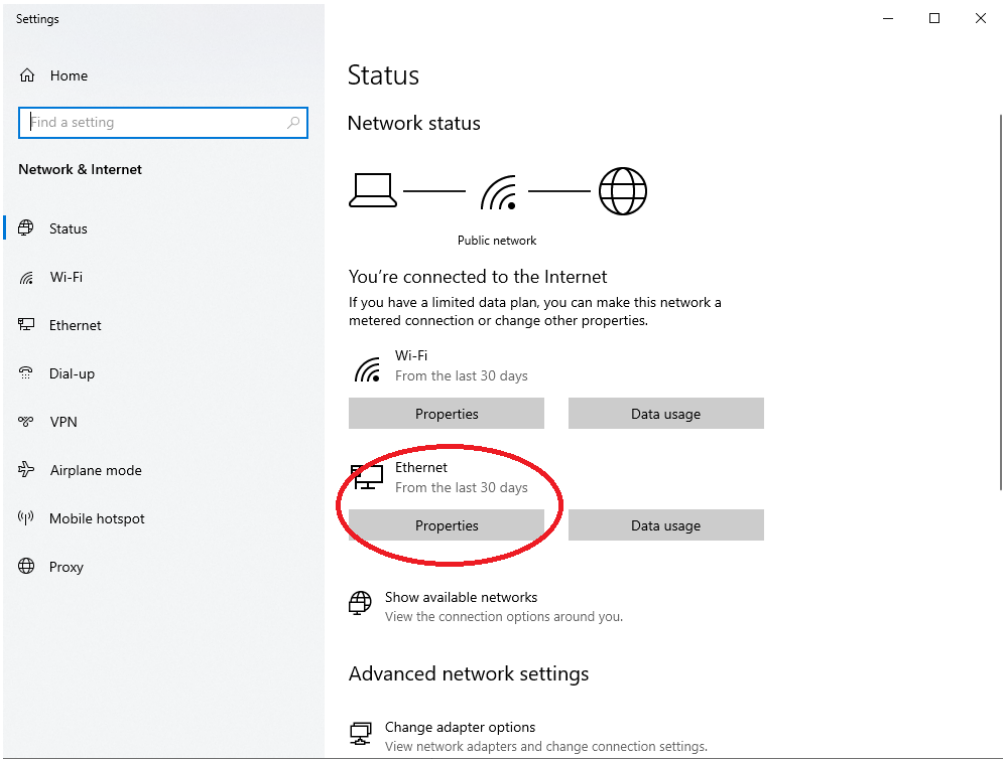
In this example setup, it is important to remember that all devices on this “isolated” ethernet network must all have unique IP addresses. In this sample setup, we will give our show computer an IP address of 192.168.1.200. *Note: Specific to this example, you must use an IP address Host ID between 1 and 253.*

Below is an example of how to set your computer’s static IP address. *Note: these screenshots and steps are specific to Windows 10, so if you are using a different operating system, you may need to refer to online tutorials for how to set a static IP address on your operating system.*

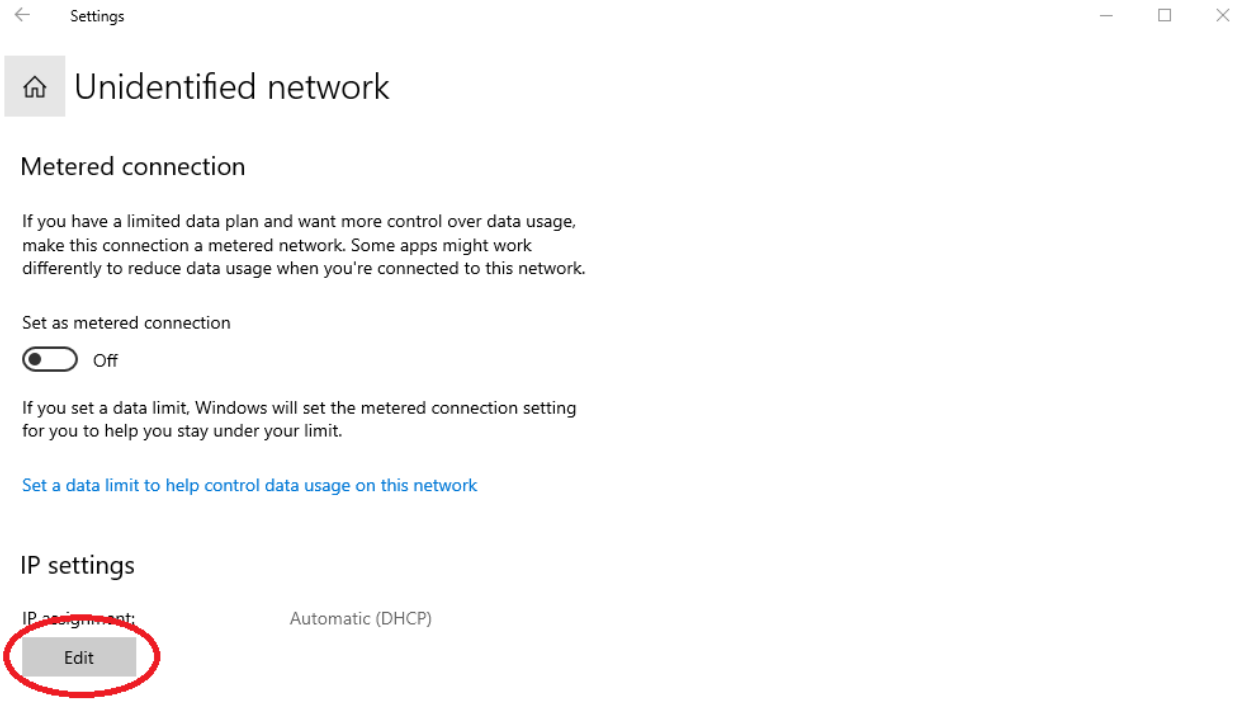
Setting Static IP Address on Windows 10

1. Search for *Network Status* in the bottom left search bar in Windows.

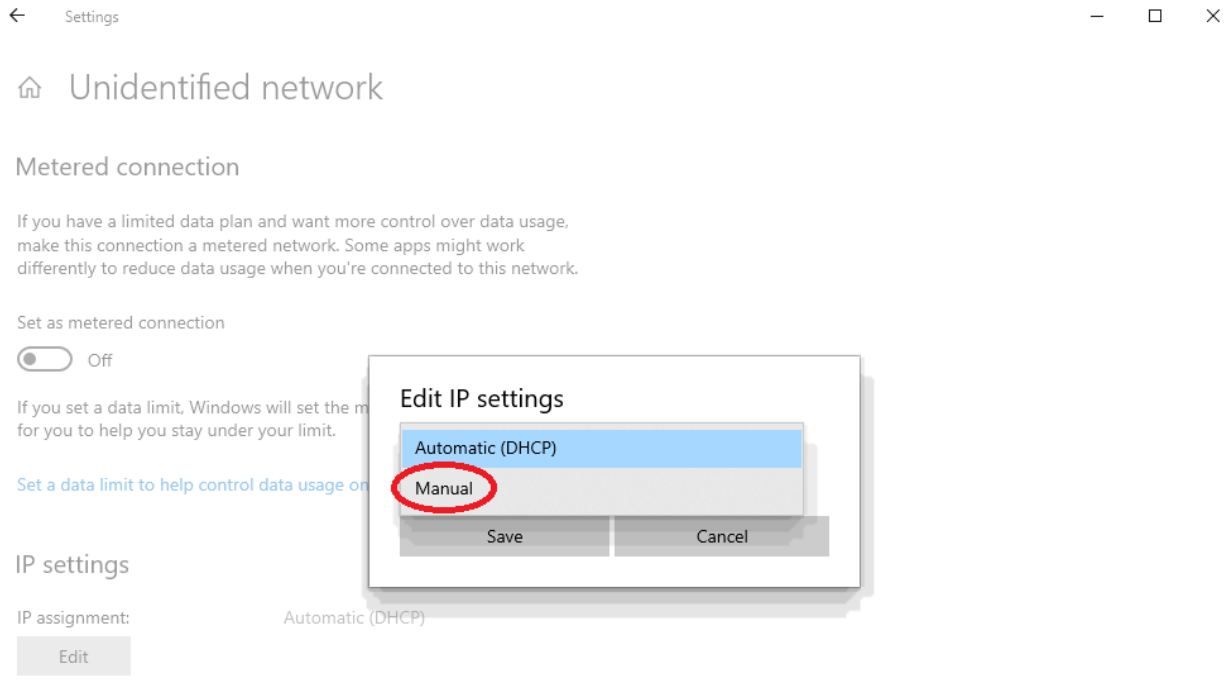
2. Open *Network Status* selection.
3. Select *Ethernet Properties.*



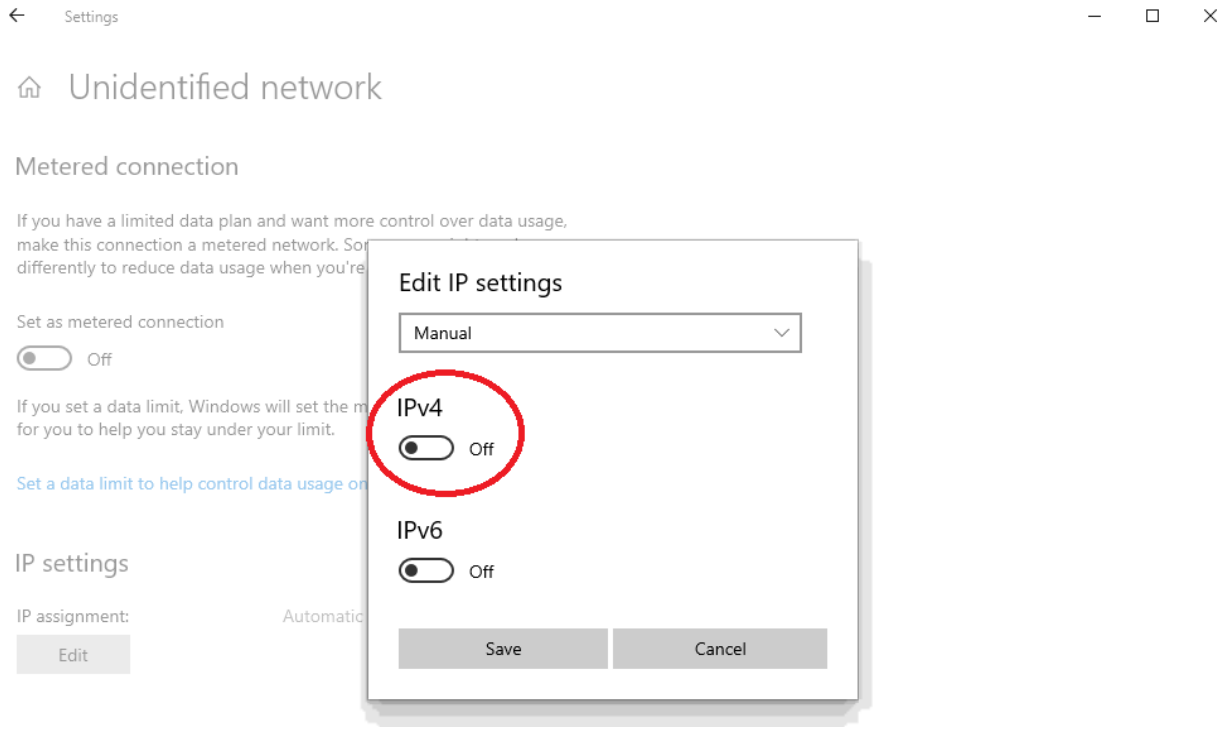
4. You will then see another window appear. Click “edit” under the IP Assignment area.



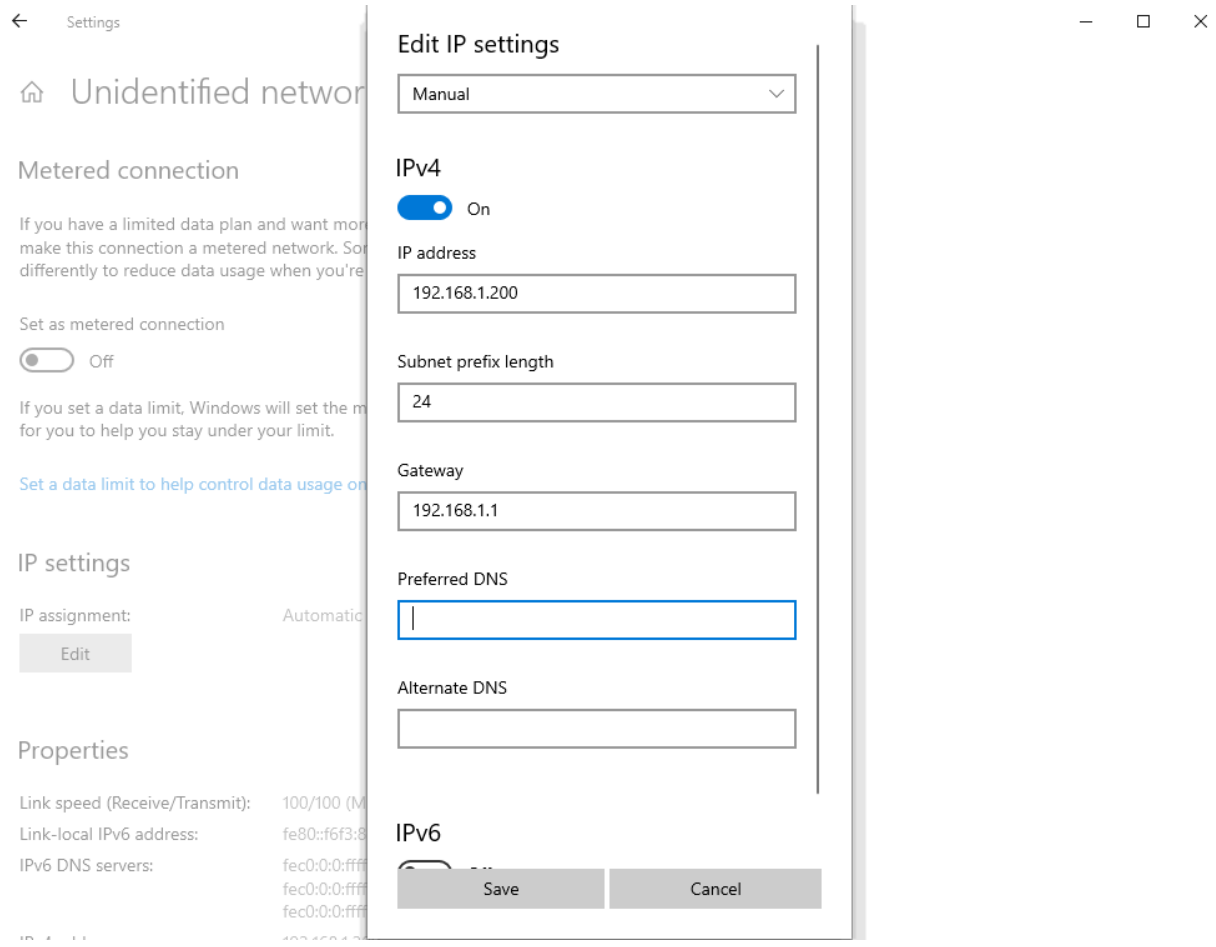
5. Change the drop down selection from Automatic (DHCP) to Manual (static).



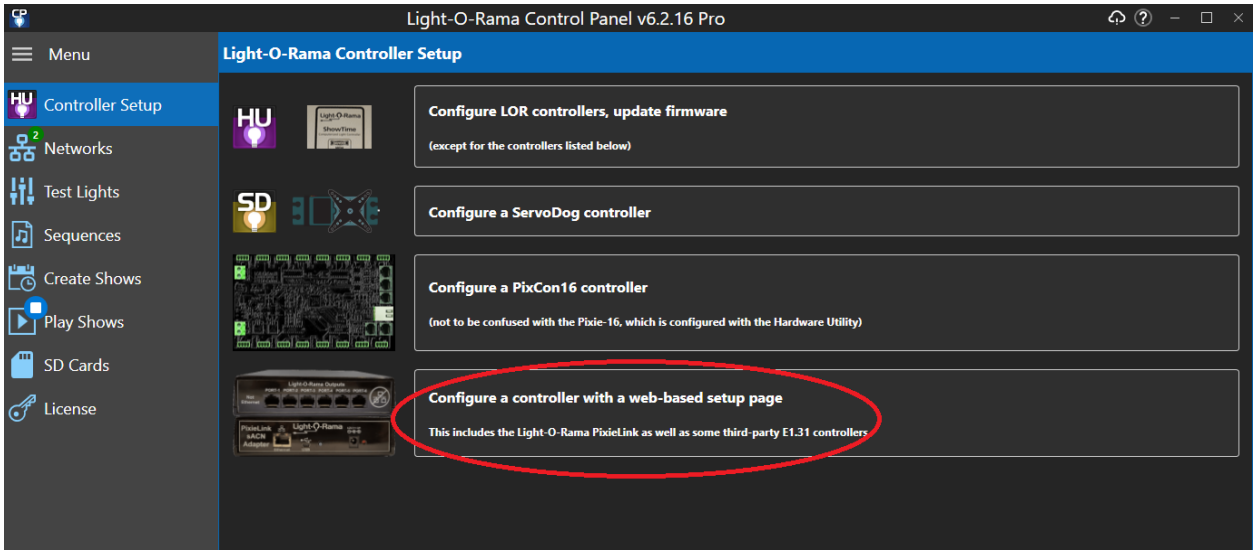
6. Click ON the IPv4 button.



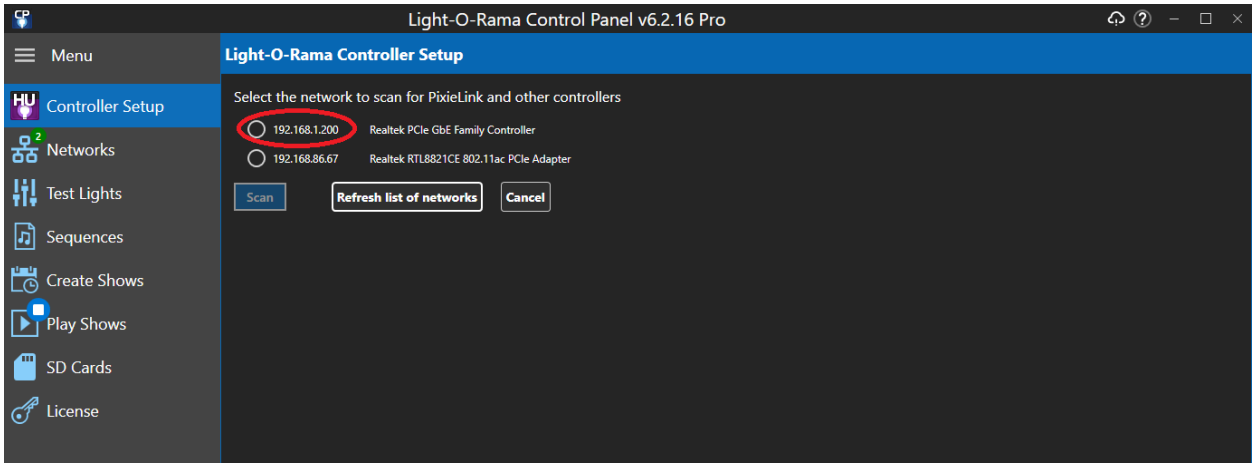
7. For this example, we decided to give our computer address 192.168.1.200. The Subnet prefix length should be set to 24 and the Gateway to 192.168.1.1 if using the IP address style from this example. These values can be different for more advanced network setups.



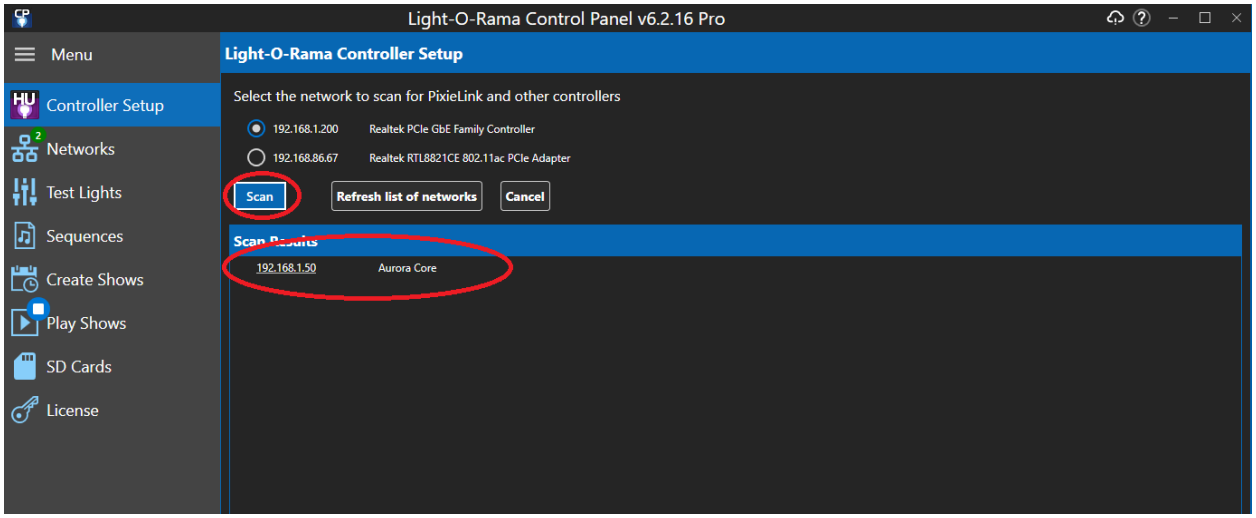
8. Hit save. Ensure that your Aurora Core ethernet port is connected to your computer's ethernet port or to the same switch/network.
9. Open LOR Control Panel and go to the Controller Setup tab. Click the option for “Configure a controller with a web-based setup page.”



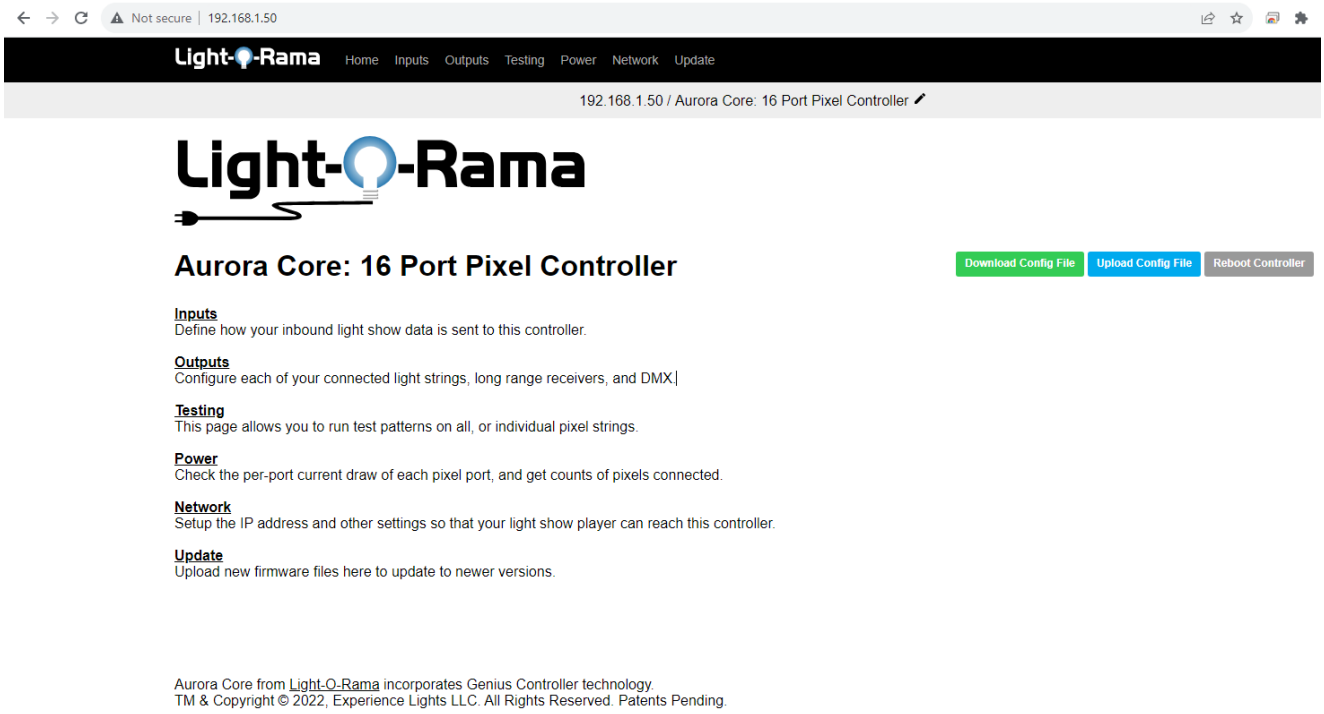
10. Select your wired ethernet network, noted in this example by the IP address 192.168.1.200 that was just setup in the previous steps. You will most likely have another network adapter selection, which most often will be referencing your wifi ethernet network, which you will not be using to connect to your Aurora Core.



11. Press Scan and your network will be searched for any available controllers. In this example, we only have a factory default, out of the box Aurora Core connected to the isolated ethernet network.



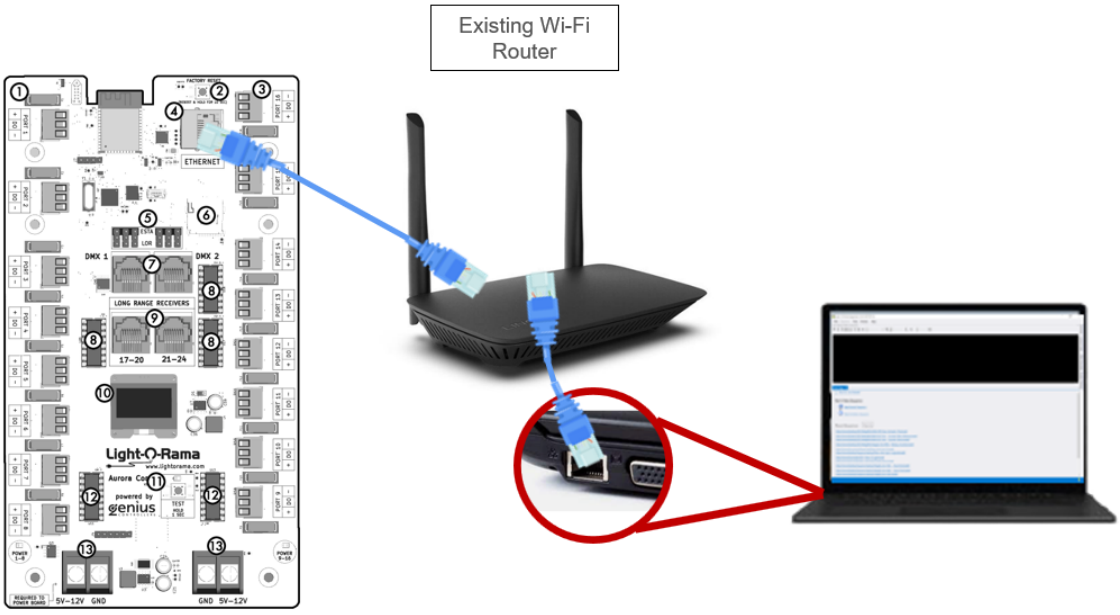
12. Clicking on the IP address 192.168.1.50 in the scan results will take you to the setup page of the Aurora Core.



13. Now you can decide to leave the Aurora Core on the 192.168.1.50 address or change it. We will talk more about network settings on the Aurora Core in another section.

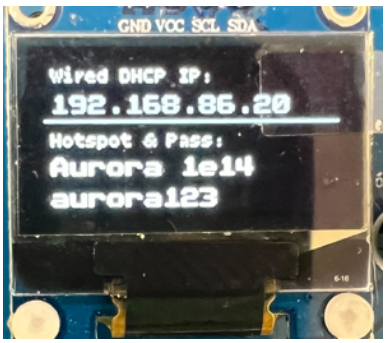
Part of your Existing DHCP Network

It is also an option to plug your Aurora Core into your existing ethernet network. Most wifi routers are set up to utilize DHCP to automatically assign IP addresses to devices. There are some potential issues with running your show with the below setup in terms of having it on the same network as your home and all of its devices, but it is a valid setup.



Note: In the above example, your computer can be connected to your existing network either hardwired as shown above OR via wifi to configure the Aurora Core, but a hardwire connected from your show computer to your ethernet network is required while running a show.

When the Aurora Core is plugged into a network with DHCP and receives an IP address automatically, the information screen will reflect this information and note that the address is a DHCP IP.

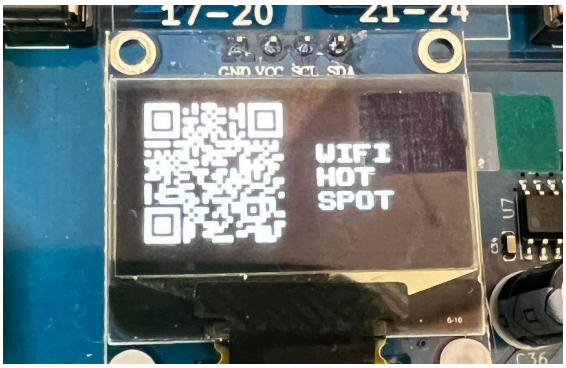


In this scenario, as long as your computer is on the same network as the Aurora Core, the Aurora Core setup page can be accessed by either using the scanner in Controller Setup in Control Panel (same step as the previous section) or typing the IP address of the Aurora Core directly into a web browser.

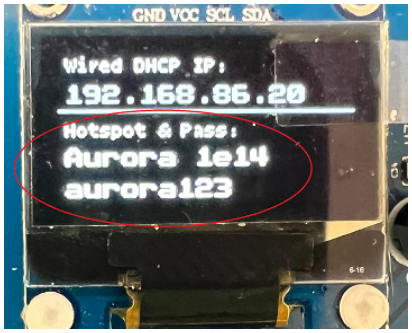
Configuring Over Wifi

The Aurora Core also has the ability to allow configuration of the controller via its own wifi hotspot. The primary use of this feature is to allow direct connection to the Aurora Core from a mobile device no matter the status of the ethernet connection.

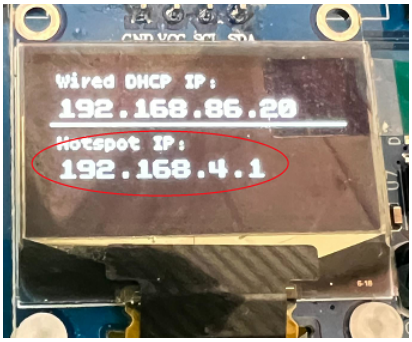
In order to connect to the Aurora Core via wifi hotspot, reference the information screen on the board. There is a QR code that will appear on the screen (typically mobile phones require opening the camera app to scan a QR code). Scanning of the QR code allows your mobile device to directly prompt you to join the direct wifi connection to the Aurora Core. By default, the wifi name will be set to “AuroraXXXX” (where XXXX are the last 4 digits of the unique MAC hardware address of the Aurora). This wifi hotspot network name is configurable on the configuration options (this will be covered in another section in the manual).



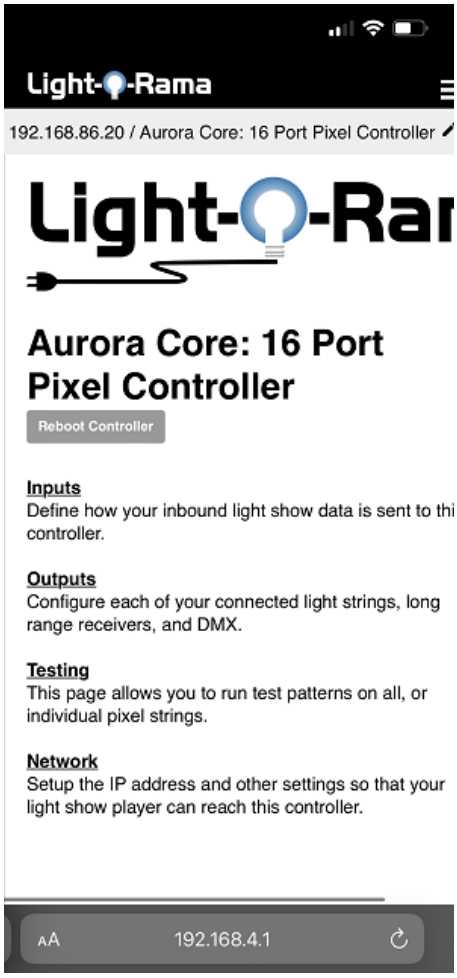
You can also see the direct wifi network name and password on the information screen to use to connect instead of using the QR code:



Once you have connected your device to the direct wifi (AuroraXXXX), reference the information screen to find the hotspot IP.



Open the web browser on your device and enter the hotspot IP in the address bar and the configuration page will load. Having this page open will not affect the controller's operation while running a show and this method of connecting can be used to check on the controller's status during a show if you are within range of the controller.ome sections of the configuration page (Outputs) will only offer a simplified version without all options as the wifi hotspot configuration feature is not meant for performing full out of the box setup.

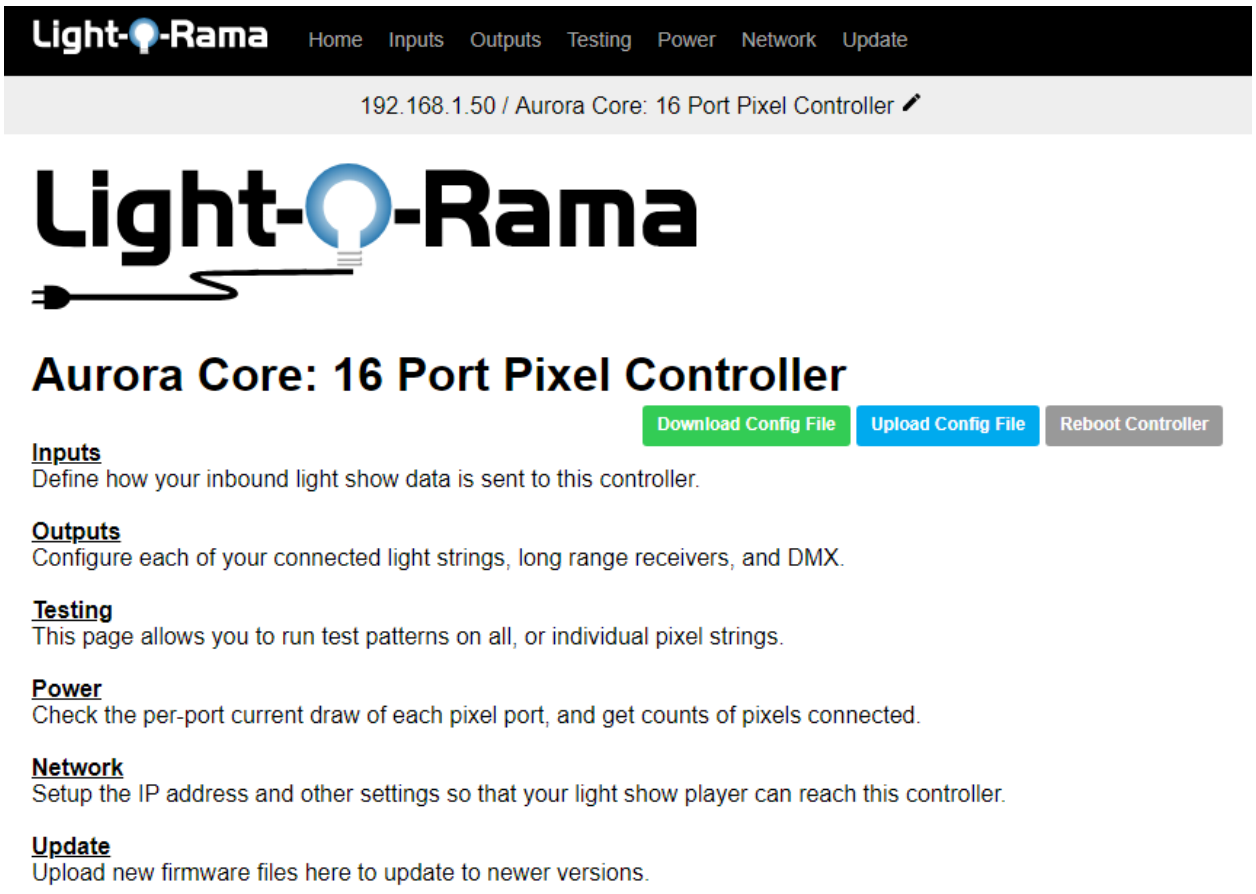


Controller Setup - Web Interface

Once you have the Aurora Core powered up and successfully connected to your computer, it is time to set your controller settings for your specific use.

Home Page

The home page allows for navigation to all of the specific configuration pages. The gray row under the navigation tabs shows the IP address of the controller and the name of the controller. The name of the controller can be changed to a custom name, allowing for easy confirmation of the controller when you log into the webpage. Note that the IP address shown on the top of this page is the IP address that is used for LOR to send show commands. If configuring via wifi hotspot, the IP address used to get to this webpage may be different, but this IP address at the top of the page is always what LOR should be using to send show commands.



The home page also offers the ability to perform 3 maintenance functions:

Download Config File

Clicking this option will download 1 file to your computer that contains a copy of all of the settings on your Aurora Core for backup purposes. It is always a good idea to keep a backup copy of your controller settings.

Upload Config File

Clicking this option will allow you to use a backup config file that you previously saved to set all the configuration options. This feature would be used in the case of replacing a controller and simply uploading the backup config file to a brand new controller to copy all of your settings.

Reboot Controller

This option will turn off the controller and have it boot back up. This option is helpful when troubleshooting to restart the controller.

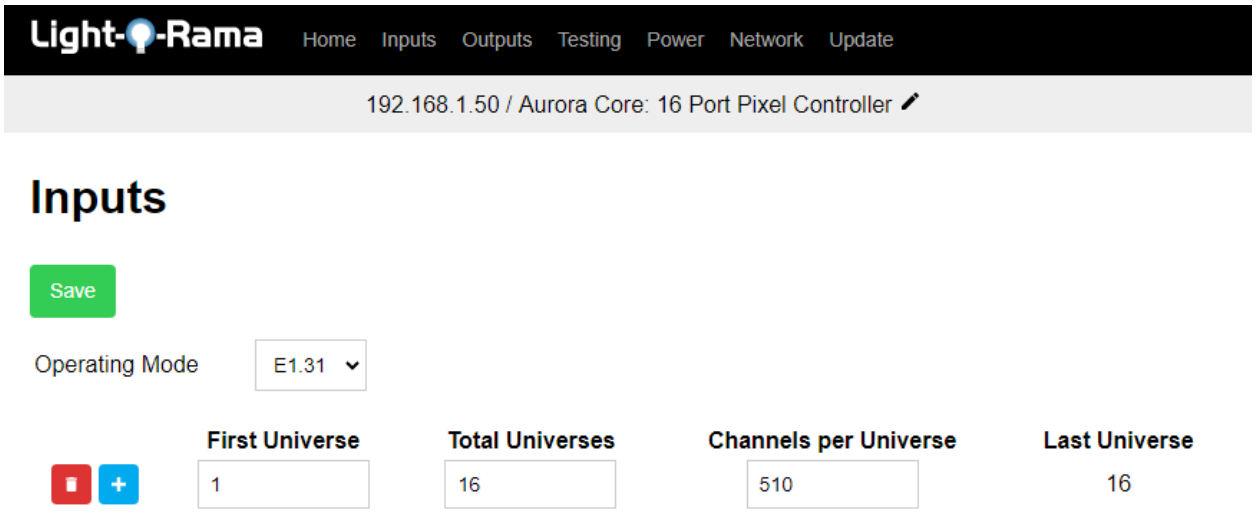
Inputs

The operating mode on this page defines what language/protocol the controller listens for, E1.31 or Art-Net. This must match the language that you have specified your show player to be using. Changing the Operating Mode does not change the universe/channel user interface.

The Inputs page also defines what universes and how many channels the Aurora Core is to listen for. The Aurora Core can be sent a maximum of 58 total universes (~10,000 3 channel RGB pixels). The input page will notify you if you try to define more than 58 universes in the input tab.

The default factory configuration is set to 16 total universes, starting at universe 1, with 510 channels per universe. If you are not using sequential universes, you can click the + button to generate another row of input data.

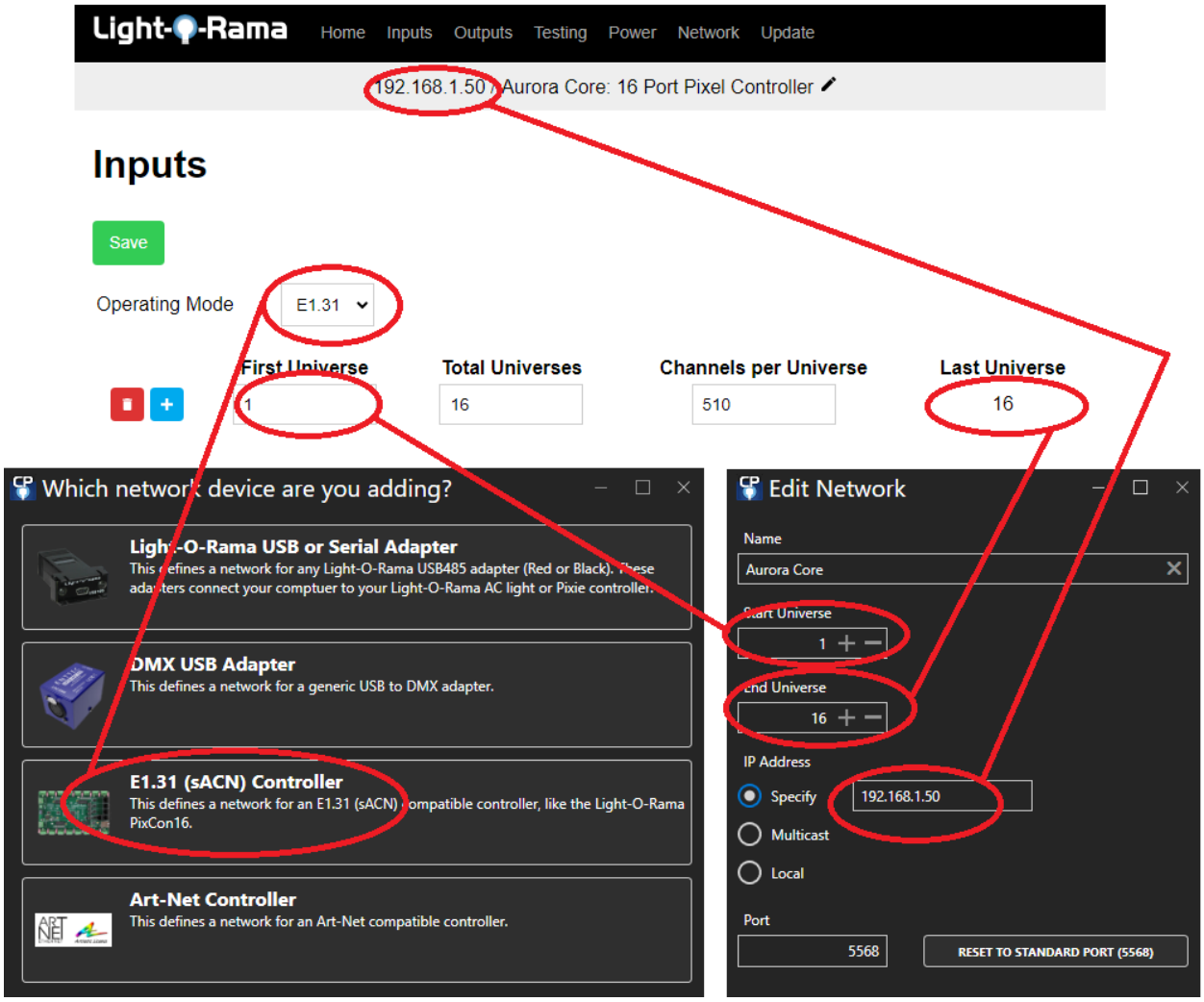
Note: Remember to hit the save button after making any changes in the Inputs tab.



The default Channels per Universe is set to 510 (even though a universe has a maximum of 512 channels) since this is the typical maximum number of channels that are used per universe for pixels (170 pixels x 3 = 510). Most typical configurations on the Aurora Core will not require the Channels per Universe to be set to anything other than 510. The Channels per Universe value directly affects the automatic calculations on the Output page.

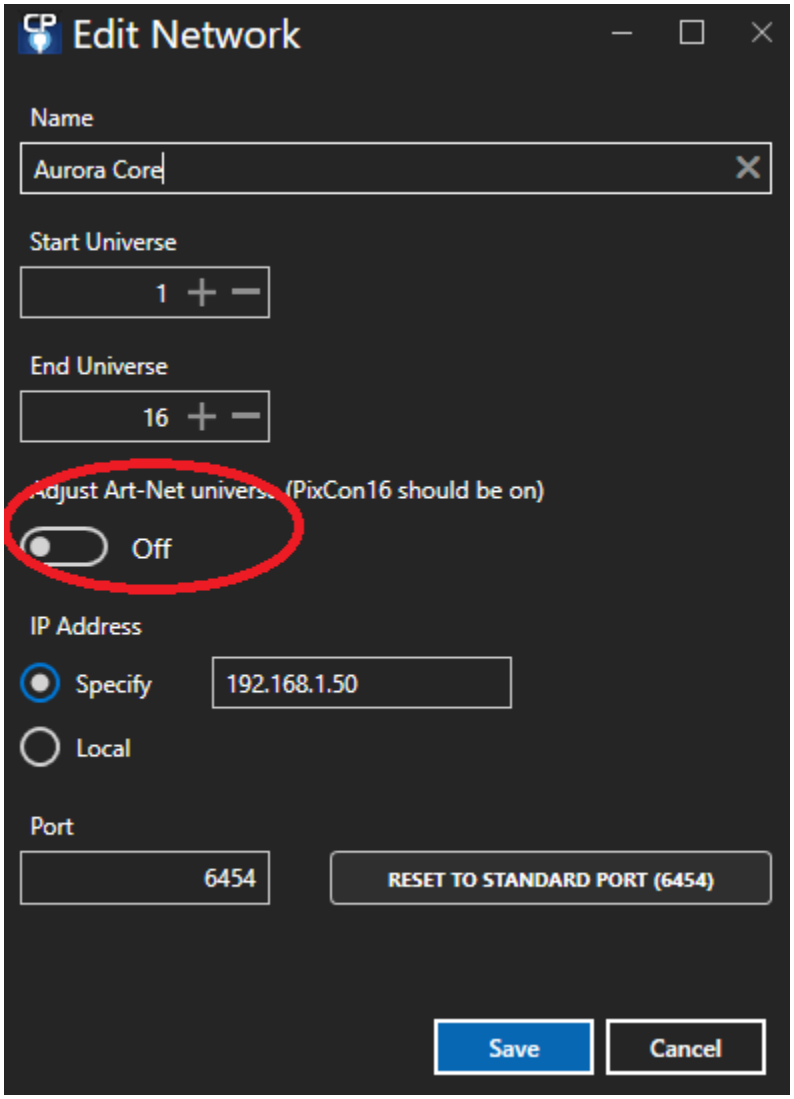
*****The Light-O-Rama S6 Control Panel Configuration for networks must reflect and match all of the information seen on the Aurora Core Input page for your show to communicate properly*****

See the below diagram for the correlation between Inputs configuration and network configuration in S6 Control Panel:



In the networks tab in the Control Panel in S6, a successful Aurora Core configuration for the example of the default IP Address and universes is shown below. A green check mark signifies that the Control Panel can communicate with the Aurora Core, but the universe numbers that are configured to be sent to the Aurora Core must be properly defined.

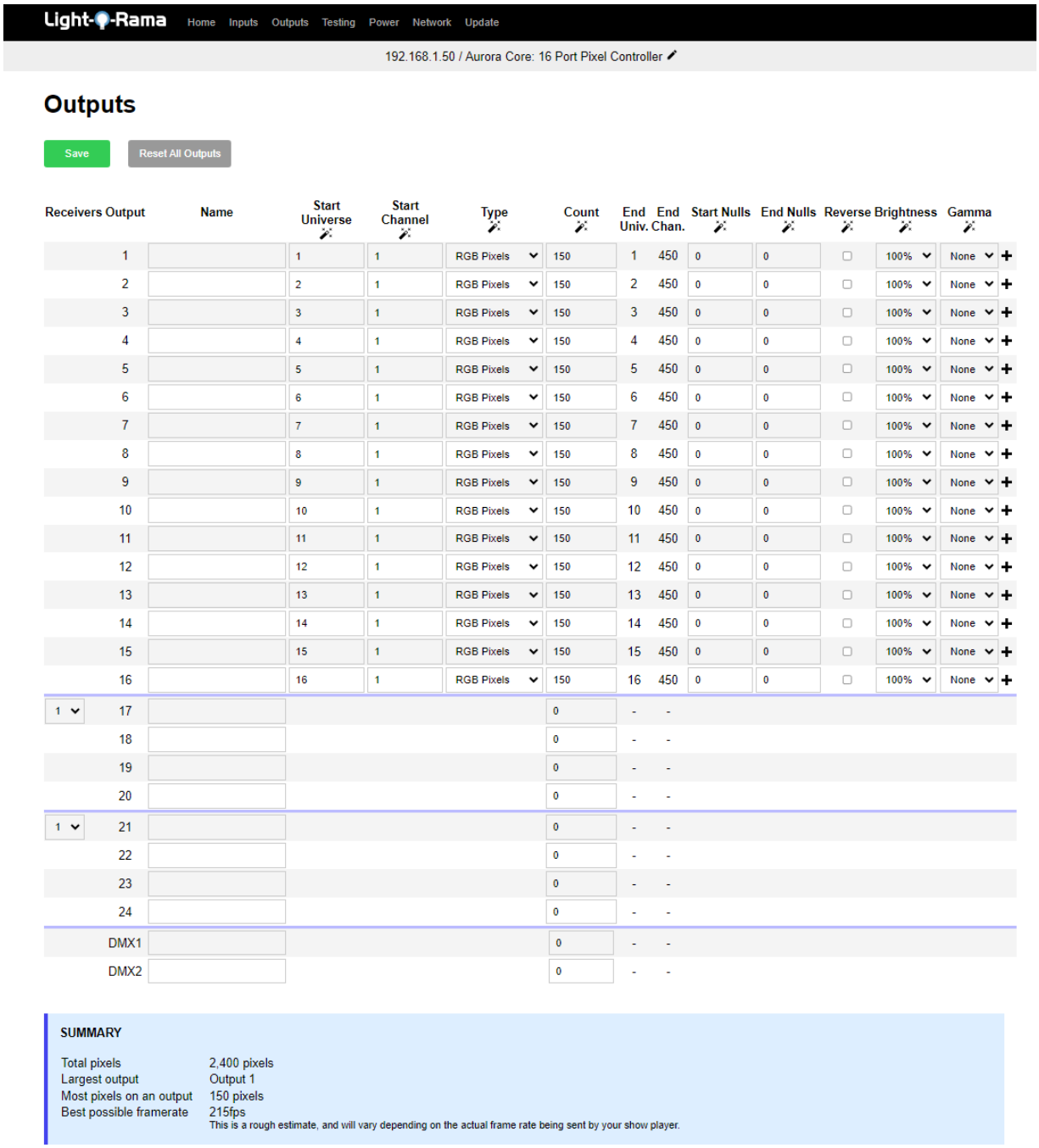
Note: If using Art-Net, when adding the network in Control Panel, ensure that the "Adjust Art-Net universe" setting is OFF if using an Aurora Core.



Outputs

This page is where the behavior of all output ports (16 pixel outputs, 2 DMX outputs, and 2 Long Range Receiver outputs) is configured. All E1.31/Art-Net commands that are sent to the Aurora Core are told where to go by the settings on this page.

All settings that you configure on the output page of your controller will need to match the Channel settings for your props in your preview. ANY props connected to an Aurora Core will be configured to use “DMX” in the Channel section of the prop.



The above image shows the default configuration of the Aurora Core - 150 pixels per port, 16 universes.

Column Details

Receivers Output

- Outputs 1-16 correspond to the 16 pixel output ports on the Aurora Core
- Outputs 17-24 correspond to any Long Range Receiver that are used
- DMX1 and DMX2 correspond to the 2 DMX outputs on the Aurora Core (each capable of 512 channels/1 universe)

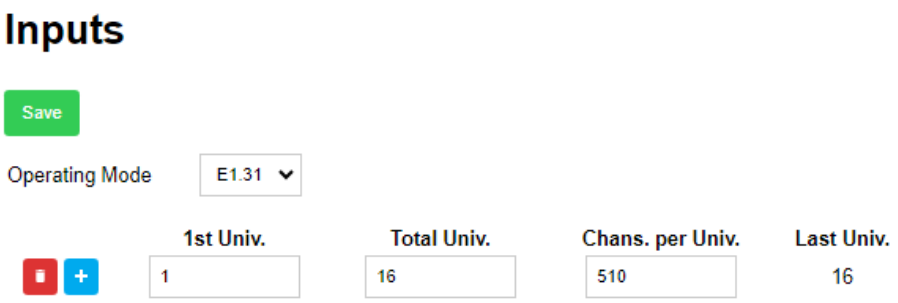
Name

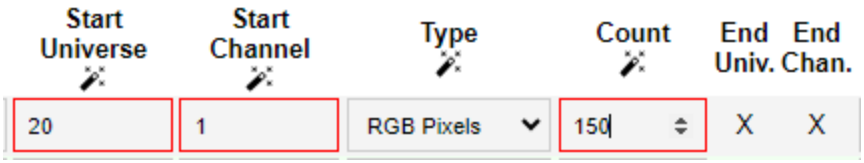
- This text field allows for a description of the output/port to be set for organization purposes.
    - Example:

Receivers Output	Name
1	Mega Tree 1-2
2	Mega Tree 3-4
3	Mega Tree 5-6
4	Mega Tree 7-8

Start Universe

- This defines the first universe to be used for pixels on this output port. The term “first” is used because the Aurora Core can potentially have multiple universes assigned to a port (example, outputting over 170 pixels on an output port).
- If a Start Universe is entered that is not properly defined in the Inputs tab, the box in question will be outlined in RED.
    - Example:





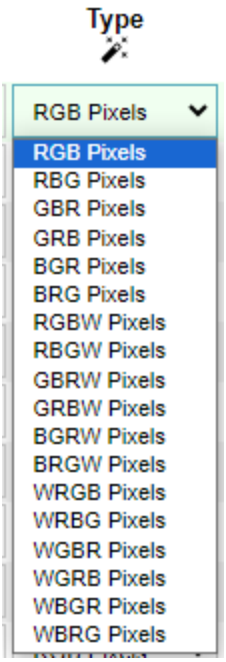
- The Magic Wand at the top of the Start Universe column will simply auto-number the Start Universe values for all rows in this column, starting from the **first universe configured in the Inputs tab,** and incrementing 1 universe per row. The auto-numbering only applies to outputs that have pixels/channels defined. For example, if you configured your controller to listen for Universes 25 to 35 in the Inputs tab, then went to the output tab and hit the Magic Wand for the start universe column, the Start Universe values for each output would auto-fill 25…26…27…etc.

Start Channel

- This defines the first channel (relative to the Start Universe for that output port) to use for the respective output port. *Note: Ensure that channel and universe numbers in your props in the preview match the configuration and physical pixel layout in your show.*
- If a Start Channel entered that is greater than the number of channels defined in the settings on the Inputs tab, the box in question will be outlined in RED.
- The magic wand at the top of the Start Channel column will take whatever value is entered into the Start Channel box for Output 1 and copy it to all other active outputs.

Type

- The 16 pixel ports on the Aurora Core support any WS281X protocol pixels. The default value of the RGB order is “RGB” = Red, Green, Blue. If the color order of your pixels differs, the Type setting will allow for the proper setting of the color order for each port. 4 Channel (RGBW) smart pixels are supported by the Aurora Core, but are not currently supported in the LOR Sequencer.
- The magic wand will copy the value from Output 1 and duplicate it to all other active outputs.

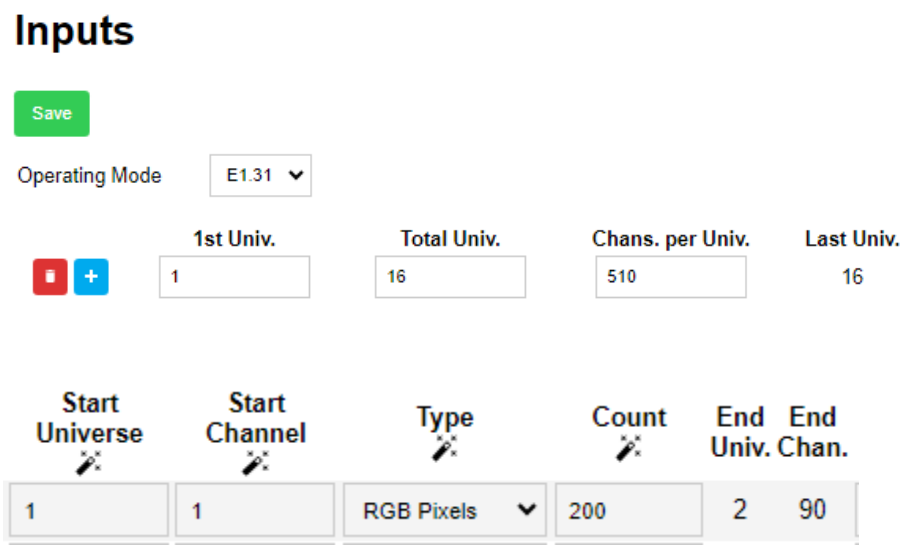


Count

- This defines the total number of pixels connected to this output.
- If a pixel count that increases the universes needed to beyond what is defined on the Inputs tab, the box in question will turn RED
- The magic wand will copy the Count value from Output 1 and duplicate it to all other active outputs.

End Universe

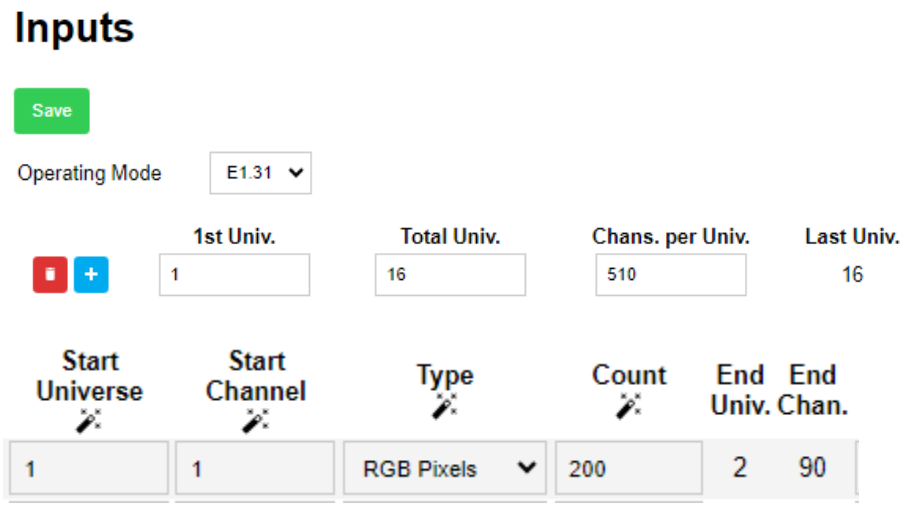
- This value is calculated automatically based on what is configured for a given output for the start universe, start channel, and count.
    - Example: Start Universe = 1, Start Channel = 1, Count = 200
        - Assuming Channels per Universe on Inputs tab is set to 510 (170 Pixels).
        - End Universe would be 2 because the first 170 pixels (510 channels) would be in universe 1 and the remaining 30 would be in universe 2, hence End Universe = 2.



- If a value for a given output causes the End Universe to not be able to be correctly calculated, an “X” will appear in this field.

End Channel

- This value is calculated automatically based on what is configured for a given output for the Start Universe, Start Channel, and Count. The End Channel value is the last channel that will be used in the End Universe on an output.
    - Example: Start Universe = 1, Start Channel = 1, Count = 200.
        - Assuming channels per universe on the Inputs tab is set to 510 (170 pixels).
        - End Channel would be 90 because the first 170 pixels (510 channels) would be in Universe 1 and the remaining 30 pixels (90 channels) would be in the end universe 2, with End Channel = 90.



- If a value for a given output causes the End Universe to not be able to be correctly calculated, an “X” will appear in this field.

Start and End Nulls

- This is a method to have the Aurora Core “ignore” pixels at the beginning/start of a string or at the end
    - Example: Count = 100, Start Nulls = 5.
        - Commands sent to this output port meant for pixel 1 on the physical string will light up pixel 6 on the string, and so on. It will act like the first 5 pixels on the string don’t exist.
- Even if you have multiple physical strings (50+50+50 for instance) on a single output port, null pixel settings treat the entire length of pixels on an output port as “one string” in terms of setting null pixels.
- Pixels at the beginning or end of a string can also be setup in your preview when assigning channels, the null setting on the controller just allows for different methods to skip pixels in your physical setup.
- The magic wand will copy the nulls value from Output 1 and duplicate it to all other active outputs.

Reverse

- When enabled, this setting will take all pixel data for the given output and send it to the pixels on that output exactly in reverse.
    - Example: Count = 100, Reverse = True
        - Commands sent to this output meant for pixel 1 will go to pixel 100, commands for pixel 2 will go to 99, and so on.

Brightness

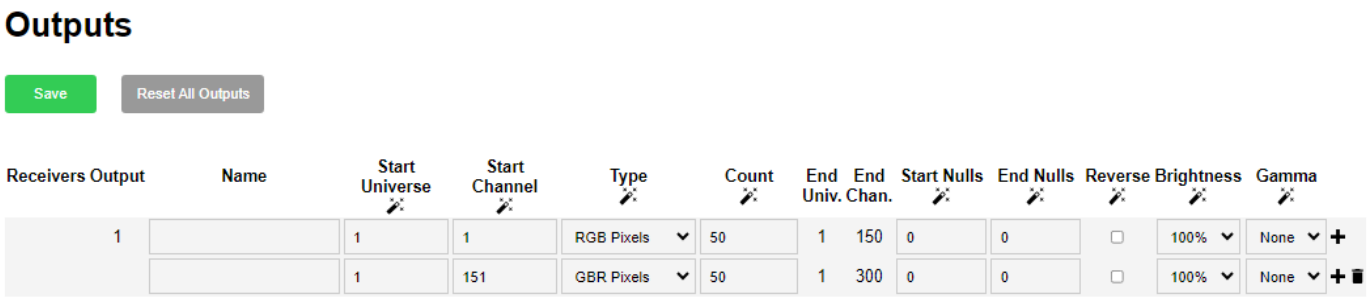
- This setting will take any commands to a given output and reduce them by a certain percentage. Setting the brightness on the controller like this ensures that no matter what commands are sent, the pixels on a given port will not be capable of lighting up brighter than a certain percentage of the commands they are given.
- If you leave the brightness at 100% on the Aurora Core, Dimming Curves can also be applied to your individual props in your preview.
- WARNING: Setting a reduced brightness on the Aurora Core AND on the prop in your preview will result in unexpected (dimmer) results than expected.
- The magic wand will copy the brightness value from Output 1 and duplicate it to all other active outputs.

Gamma

- Gamma correction is an advanced setting, designed to adjust color values and how humans perceive color change and brightness levels. This option is available for users to experiment with if certain pixels are not giving the desired color output.
- The magic wand will copy the gamma value from Output 1 and duplicate it to all other active outputs.

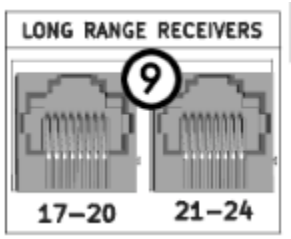
Virtual Strings

- The “+” button at the far right side of the output row will allow you to divide up a single output to multiple rows to allow for different settings among strings connected to a single output port.
    - Example: 2 strings of 50 pixels connected end to end on output port 1, but 1 of the strings is RGB order and the other is GRB order.



Long Range Receivers

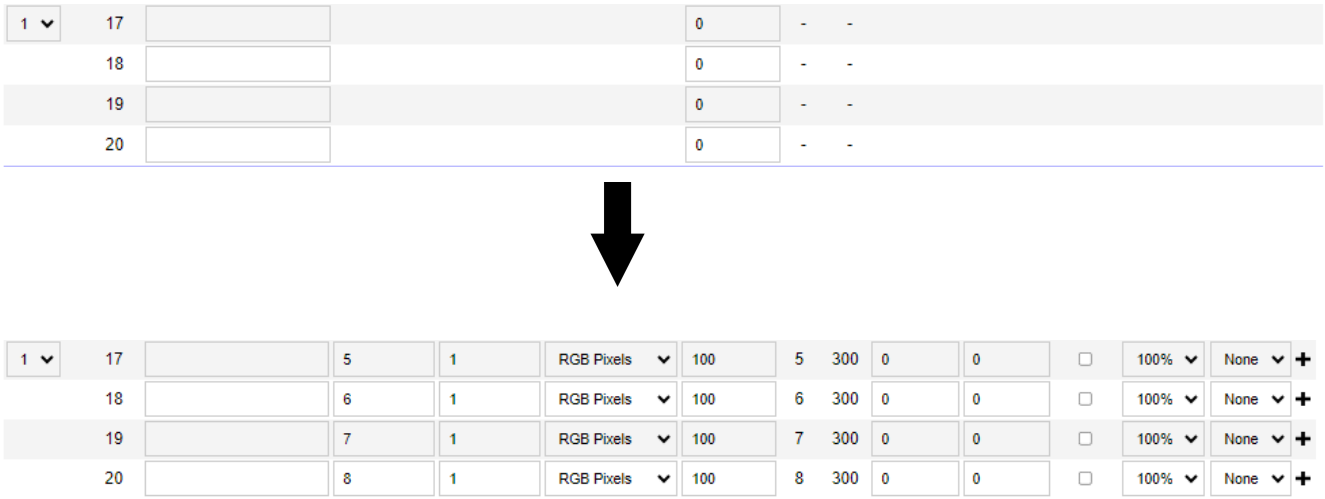
If using Long Range Pixel Receivers, enter the configuration information in the output rows 17-20 and 21-24. These number (port) ranges will match up the labeling on the Aurora Core for the 2 Long Range Outputs.



Long Range Receivers work by the Aurora Core sending the pixel data only over a cat5/6 cable to a remote receiver, where the pixels are actually connected to. This is “future use” advanced feature to support users that wish to use long range receivers.

Note: Any pixels configured on the Output page, including ports 17-24 Long Range, count toward the 10,000 total pixel limit on the Aurora Core.

The default configuration is to have “0” pixels configured for ports 17-24. If you wish to use long range receivers, the first step is to enter a pixel count for any of the ports in the 17-24 output section.



The drop down selector on the left can then be used to select how many long range receivers you will be using per port. The letter designations will be used in how your long range receivers are addressed.

2	17a		5	1	RGB Pixels	100	5	300	0	0		100%	None	+
	17b		5	301	RGB Pixels	100	6	90	0	0		100%	None	+
	18a		7	1	RGB Pixels	100	7	300	0	0		100%	None	+
	18b		7	301	RGB Pixels	100	8	90	0	0		100%	None	+
	19b		9	1	RGB Pixels	100	9	300	0	0		100%	None	+
	19a		9	301	RGB Pixels	100	10	90	0	0		100%	None	+
	20b		11	1	RGB Pixels	100	11	300	0	0		100%	None	+
	20a		11	301	RGB Pixels	100	12	90	0	0		100%	None	+

If more information is needed on Long Range Receiver setup, contact LOR (www.lightorama.com).

DMX Output

If using the DMX output feature, you must configure the number of channels and what universe is sent to the specific DMX output. The default configuration is “0” channels in the count field for the DMX outputs:

To enable a DMX output, enter a value of how many channels you wish to use (max 512 or whatever the Channels per Universe is set to on the Inputs tab).

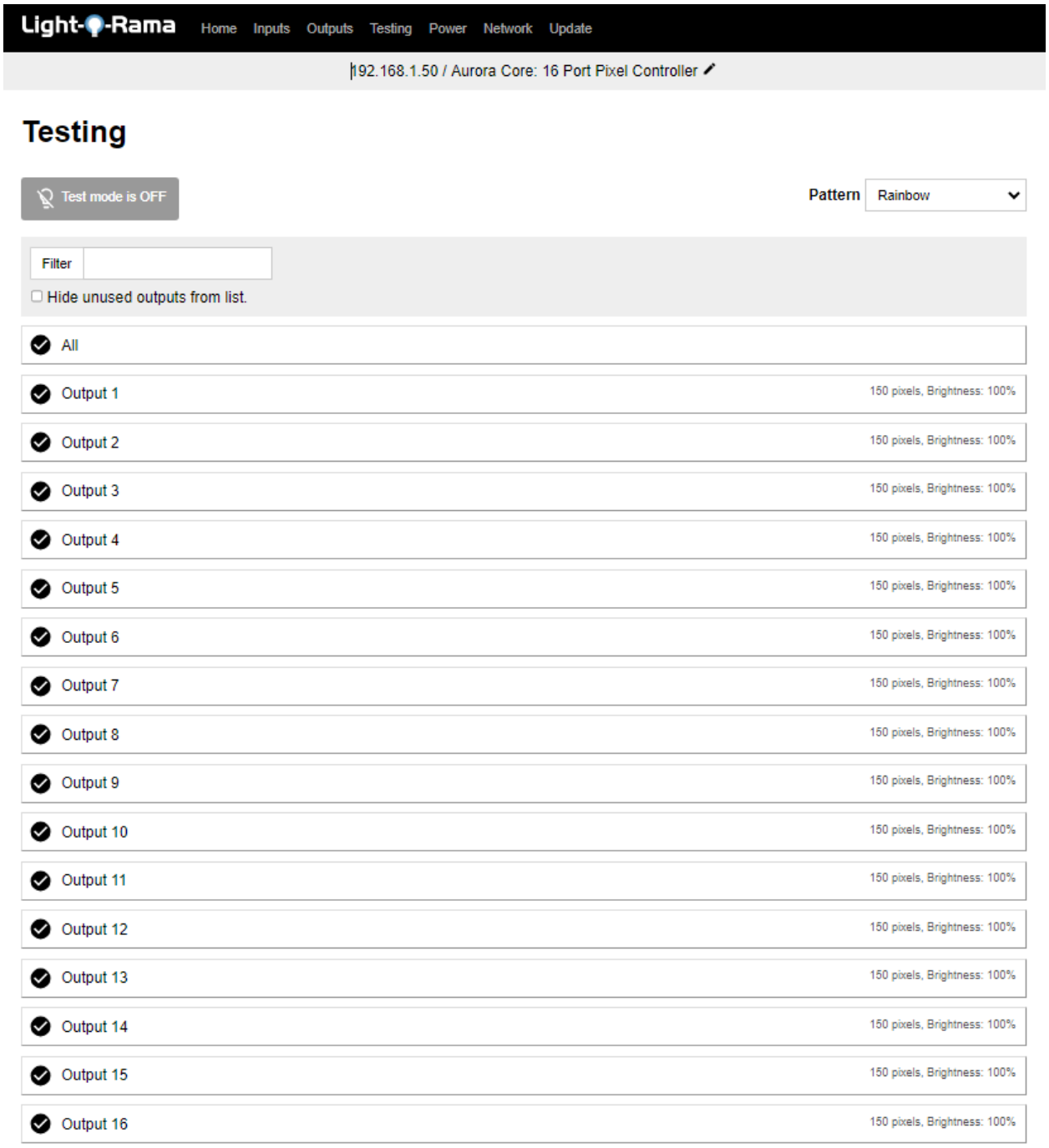
Note: If the channel count entered is higher than the Channels per Universe setting on the Input tab, the channels will automatically spill over into the next universe.

In this example, any commands sent from your show to Universe 17, would be routed to the DMX1 Output on the Aurora Core:

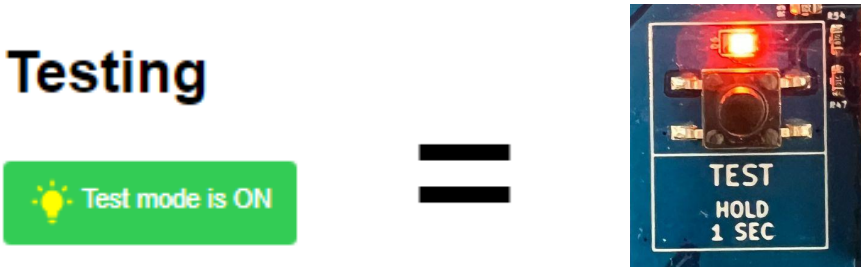
Testing

The testing page allows for customized testing options.

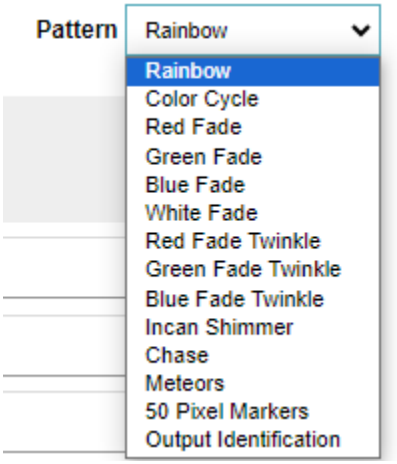
Note: If the test mode on the Aurora Core is active, all E1.31/Art-Net commands will be ignored, and the test mode will run.



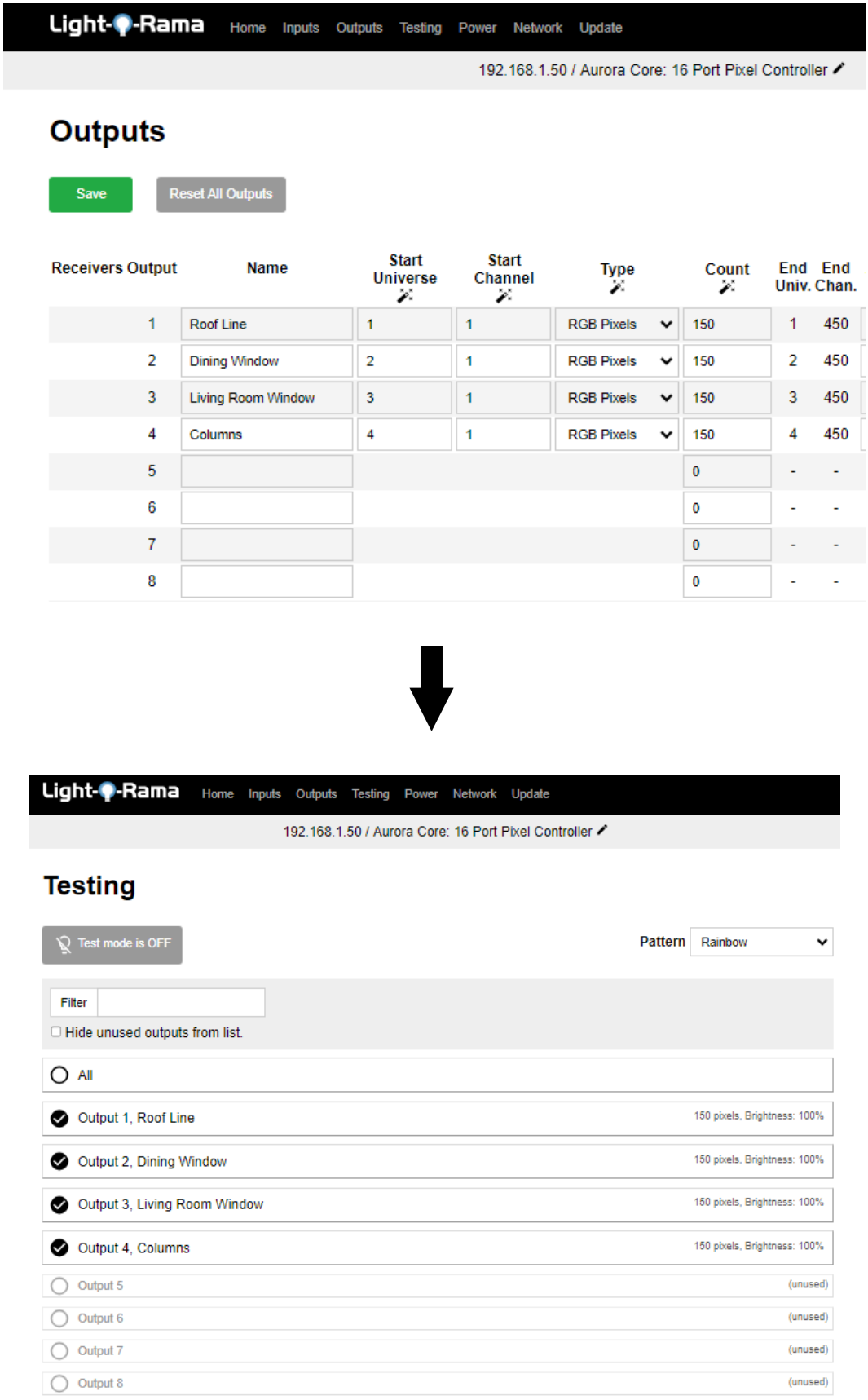
The light bulb button on the top left of the page will turn on test mode for whichever outputs are enabled for test mode (have the check marks). Turning on the test mode from the webpage is the same result as turning on the test mode from the test button on the board. Testing using the button on the board is achieved by holding the test button on the board down for 1 second. The test mode light on the board will illuminate when test mode is active. Test Mode will run until it is turned back off, or the controller is turned off.



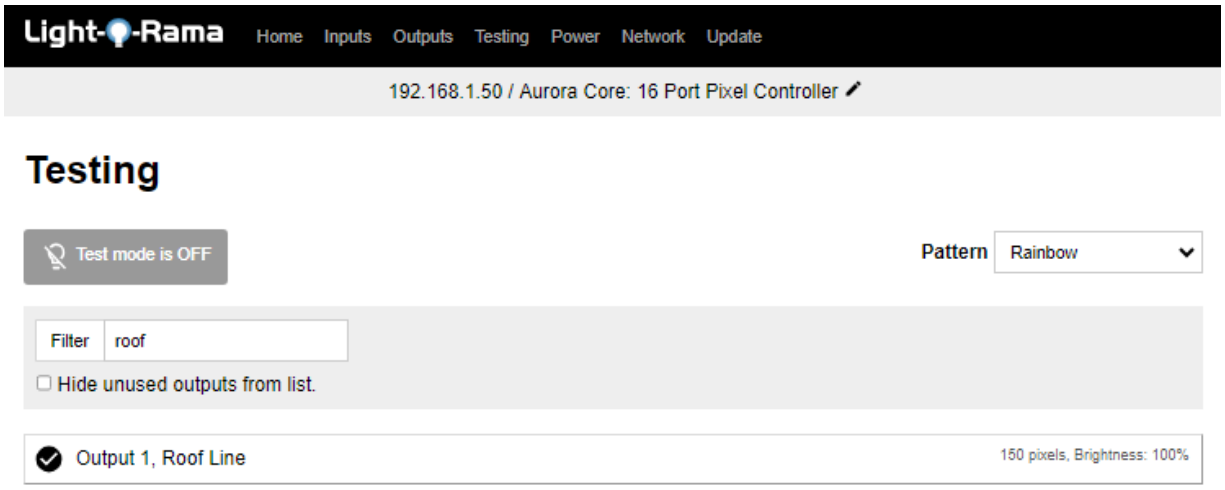
There are multiple test patterns available on the drop down selections on the top right. Which pattern is selected can also be changed by a quick momentary push of the test button on the board.



If an output is configured for no pixels on the Output tab, it will be grayed out in the Testing tab. The Testing tab also is a good summary of output names, numbers of pixels, and brightness to reference during testing.


Light-O-Rama
Home Inputs Outputs Testing Power Network Update
192.168.1.50 / Aurora Core: 16 Port Pixel Controller
Outputs
Save
Reset All Outputs
Receivers Output
Name
Start Universe
Start Channel
Type
Count
End Univ.
End Chan.
1 Roof Line 1 1 RGB Pixels 150 1 450
2 Dining Window 2 1 RGB Pixels 150 2 450
3 Living Room Window 3 1 RGB Pixels 150 3 450
4 Columns 4 1 RGB Pixels 150 4 450
5 0 - -
6 0 - -
7 0 - -
8 0 - -
Light-O-Rama
Home Inputs Outputs Testing Power Network Update
192.168.1.50 / Aurora Core: 16 Port Pixel Controller
Testing
Test mode is OFF
Pattern
Rainbow
Filter
Hide unused outputs from list.
All
Output 1, Roof Line
150 pixels, Brightness: 100%
Output 2, Dining Window
150 pixels, Brightness: 100%
Output 3, Living Room Window
150 pixels, Brightness: 100%
Output 4, Columns
150 pixels, Brightness: 100%
Output 5
(unused)
Output 6
(unused)
Output 7
(unused)
Output 8
(unused)

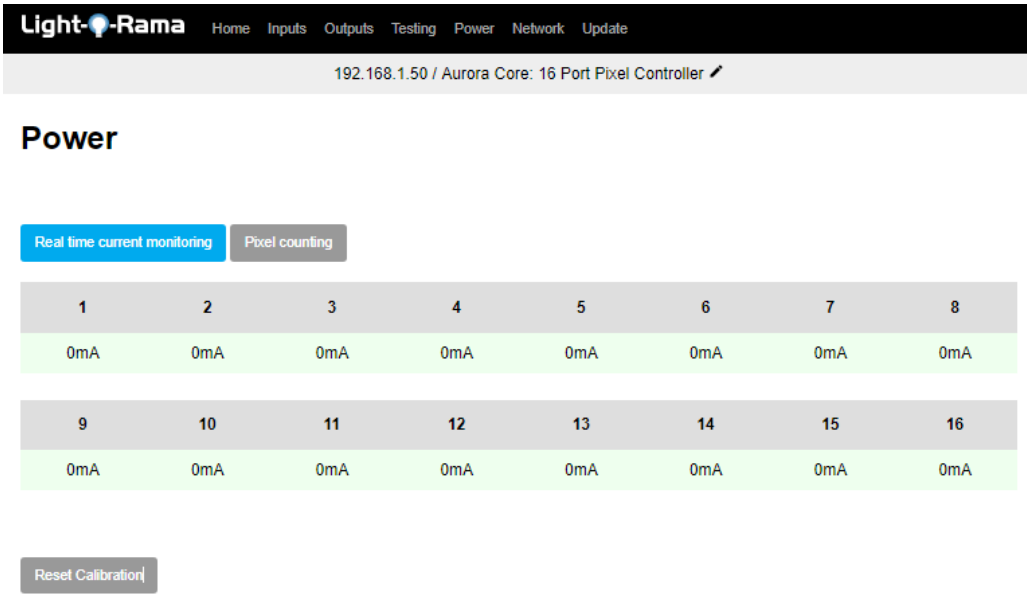
The filter search bar can also be used to quickly find outputs to test.



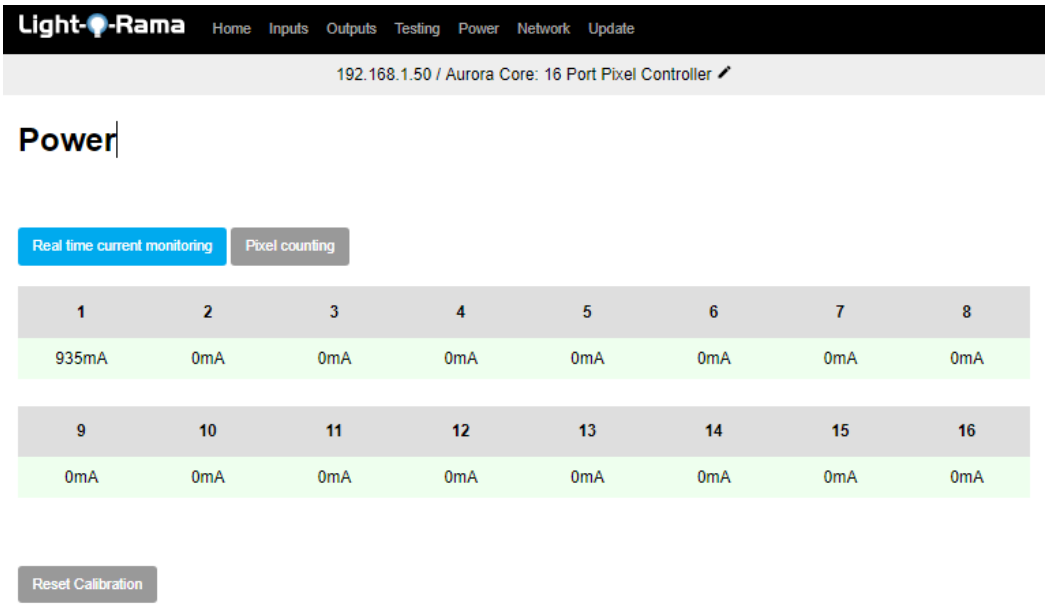
Isolating certain outputs in test modes can help track down issues during troubleshooting.

Power

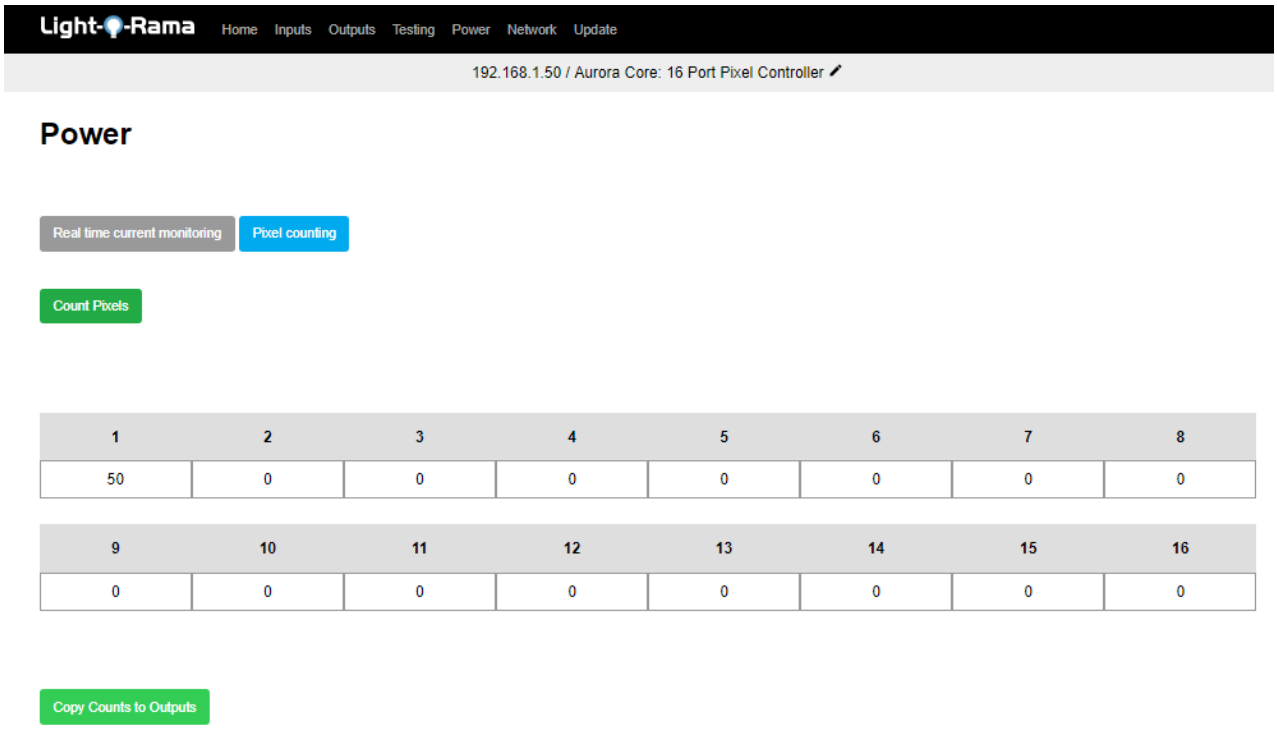
This page can be used to monitor how much power is being used by each port. Before using this feature for the first time, unplug all pixels from all ports, press the reset calibration button, then perform the calibration. Each port will now say 0mA and the feature can now be used.



After plugging in lights and turning them on, you will start to see the live readout of how much power is being used:



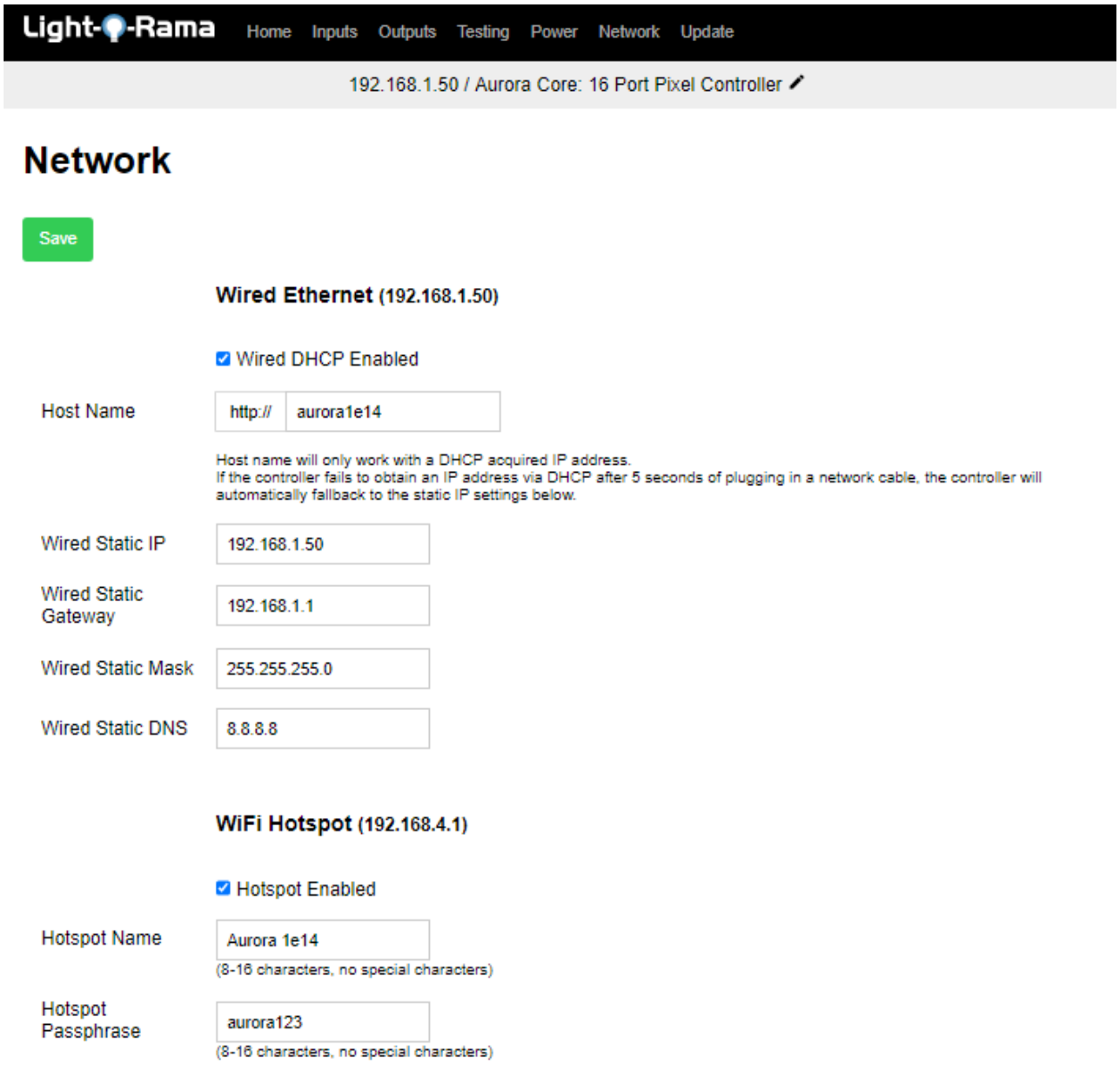
The count pixel feature is able to automatically calculate the number of pixels hooked up to any of the 16 output ports. This feature works correctly with most pixels available on the market, but should be used only as a helpful feature.



Network

The network page allows for control of the network settings for both the wired ethernet port and the wifi hotspot (reminder: wifi hotspot used for configuration only).

The **bold** headers list what the current IP addresses are for both wired ethernet and wifi hotspot:



Wired Ethernet Network

Wired DHCP Enabled
When this option is checked, if the Aurora Core is plugged into a network where DHCP is present (typical on a home router network), an IP address will be requested and the IP address that comes from DHCP will be the one that is used (and shown in the bold header). Even when this box is checked, if DHCP is not detected, the Wired Static IP will be used.

It is typically okay to just keep this box checked, unless you are in the situation of putting your Aurora Core on a DHCP network, but you wish to assign it a specific (static) IP address.

Note: It is always important to remember that the on board information screen will always show what IP address is currently in use to be able to communicate with the Aurora Core.

Host Name
- The default hostname is unique for each Aurora Core as the last 4 characters are made of the up the hardware address of the board (unique for all boards).
- Hostname can be changed to a friendly name like “NorthYardArches”. This only matters if you are trying to use host-named-based features in your network and only if you are using a DHCP network. This name will not be used by LOR software at all.

Wired Static IP
- This field is where you are able to manually set the IP address of the Aurora Core. The factory default Static IP Address is 192.168.1.50. If you have more than one ethernet controller and are running a standalone ethernet network, you will most likely come to this page to change this value to another address so none of your ethernet devices have the same IP address.
- Reminder: If you have the Aurora Core connected to a DHCP network, this field will not be used, as the Aurora Core will get an address automatically.

Wired Static Gateway
- This field is where you are able to manually set the gateway setting for the Aurora Core. This will only come into play if you are using an advanced network setup that requires this to be changed to represent the specific nature of the network. If you are using a standalone network as described earlier in the manual, this field can be left at its default 192.168.1.1.
- Reminder: If you have the Aurora Core connected to a DHCP network, this field will not be used, as the Aurora Core will get a gateway address automatically.

Wired Static Mask
- This field is where you are able to manually set the subnet mask setting for the Aurora Core. This will only come into play if you are using an advanced network setup that

requires this to be changed to represent the specific nature of the network. If you are using a standalone network as described earlier in the manual, this field can be left at its default 255.255.255.0.

- Reminder: If you have the Aurora Core connected to a DHCP network, this field will not be used, as the Aurora Core will get a gateway address automatically.

Wired Static DNS

- This field is where you are able to manually set the DNS server setting for the Aurora Core. This will only come into play if you are using an advanced network setup that requires this to be changed to represent the specific nature of the network. If you are using a standalone network as described earlier in the manual, this field can be left at its default 8.8.8.8.
- Reminder: If you have the Aurora Core connected to a DHCP network, this field will not be used, as the Aurora Core will get a DNS server address automatically.

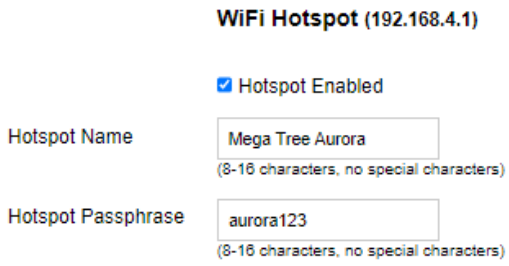
Wifi Hotspot

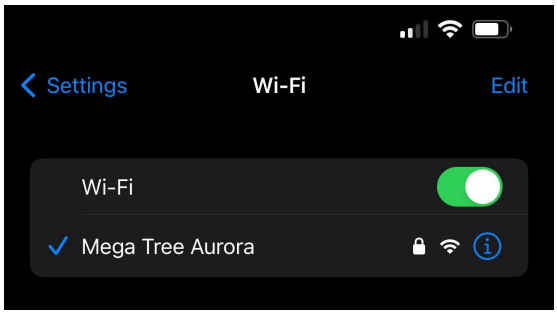
The wifi hotspot is a feature that is used to access a mobile version of the configuration page with a direct wifi connection from your device to the Aurora Core.

Note: It is recommended to always keep the wifi hotspot feature enabled as it is a backup way to communicate with the Aurora Core in the case that there are wired ethernet issues and your computer loses communication with the Aurora Core.

Hotspot Name

- You are able to change the hotspot name (the wifi name that you connect to on your device). The default name will be unique for all Aurora Cores, but this setting allows you to change the hotspot name to something friendly like “Mega Tree Aurora.”



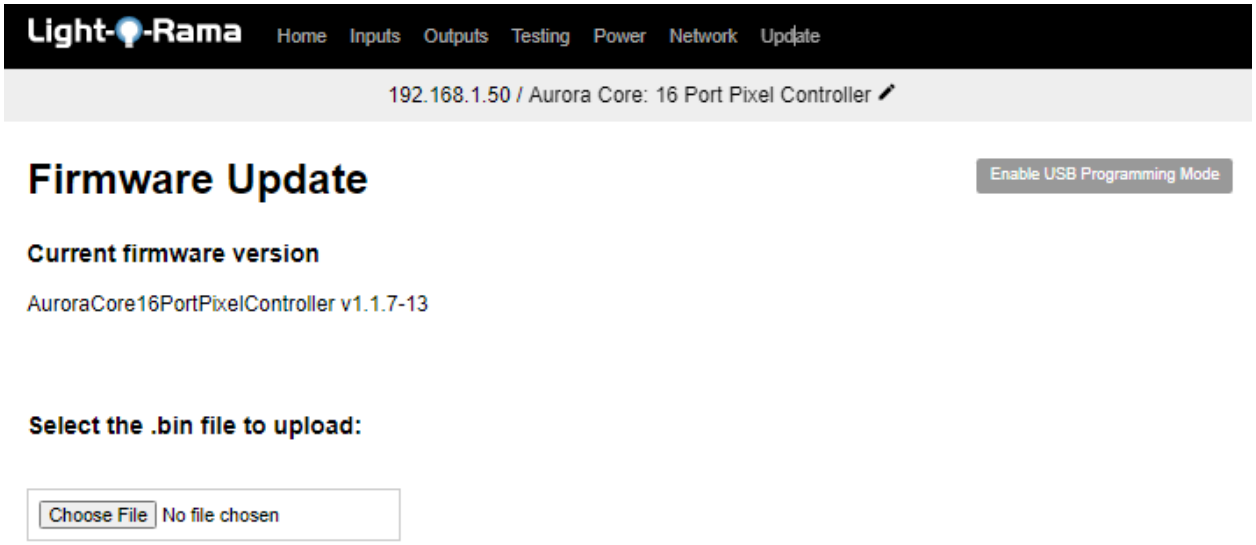


Hotspot Passphrase

- The factory default passphrase is “aurora123”. You can change the password if you wish.
- Reminder: Even if the password and/or hotspot name are changed, the QR code on the information screen on the Aurora Core will still allow you to scan and automatically connect to the hotspot (including automatically entering the passphrase into your device).

Update

This page is used to perform firmware updates for the Aurora Core.



The current firmware version is shown on this page for reference when determining if a firmware update is needed. High-level firmware updates are performed on this page with .bin files on the LOR Firmware update webpage.

https://store.lightorama.com/pages/controller-firmware-updates

If lower-level updates are required, a Micro USB cable is used to update the secondary microprocessor. Updating via the Micro USB port is not as commonly required.

Updating via the Web Interface with *.bin files

(1) Open the Aurora Core configuration page in a web browser-
(2) Click on the "Update" tab.
(3) Select the '*.bin' firmware file that you have downloaded.
(4) Follow the on-screen prompts, and wait for the update to complete.

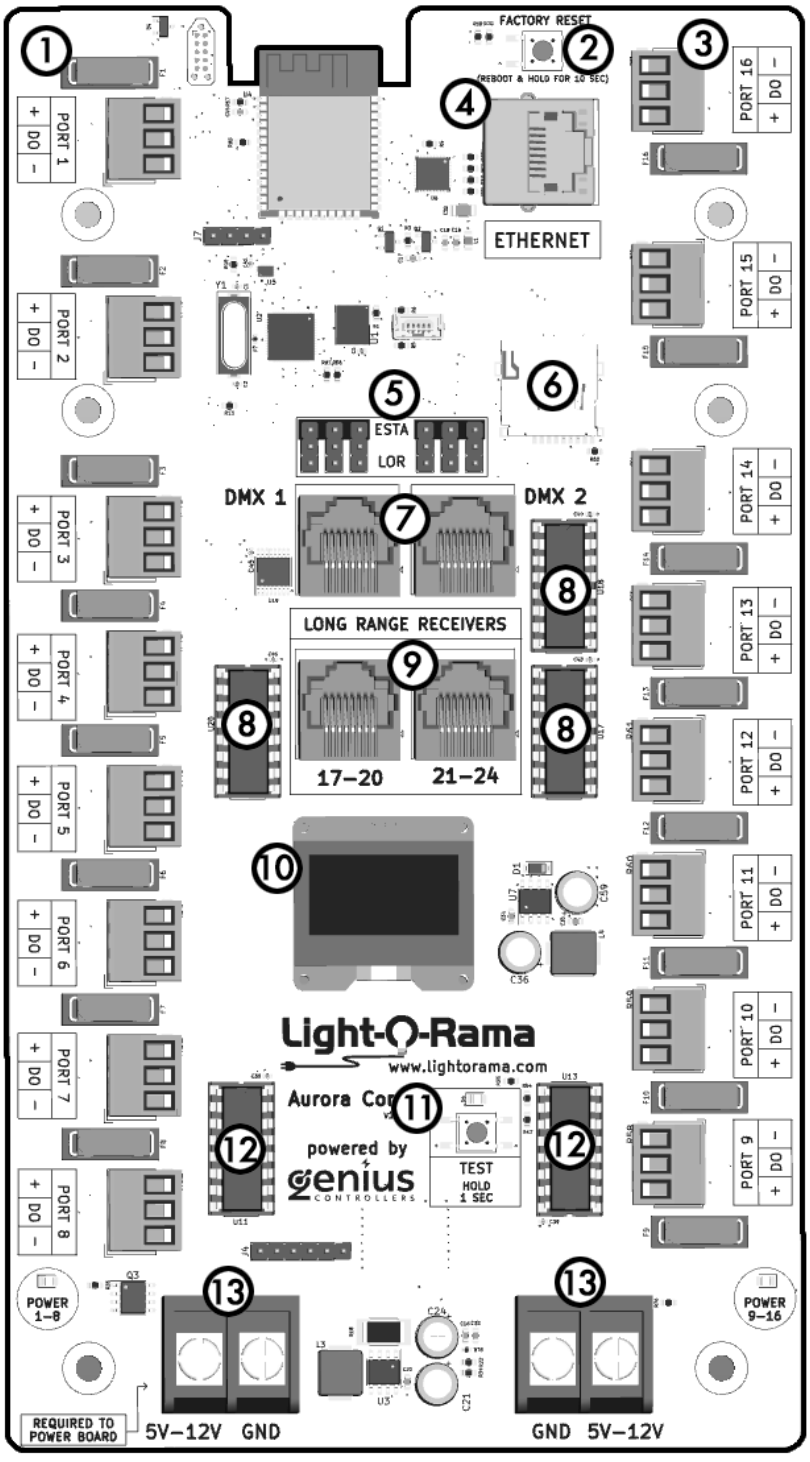
Updating via Micro USB with *.uf2 files (uncommon)

*****Only perform these steps if you have been explicitly instructed to do so and have a .uf2 file downloaded*****

1. Open the Aurora Core configuration page in a web browser.
2. Click on the "Update" tab.
3. Connect a Micro USB cable from Aurora Core to your computer.
4. Click “Enable USB Programming Mode" in the web interface.
5. A USB mass storage device should now appear in “My Computer”.
6. Drag and drop the ".uf2" firmware file to this new drive.
7. When the programming is complete, the USB drive will automatically disappear.
8. Remove power to the Aurora Core to complete the process
9. Restore power to the Aurora Core. Watch the information screen on the board. As the board powers on, the on board information screen will momentarily show the version of the low level firmware so you can confirm that the update was successful

Hardware Details

This section will provide more in-depth details about the hardware interfaces on the Aurora Core.



1. Replaceable Mini Blade Fuses

Each of the 16 output ports is protected by a 4 amp “mini blade fuse” (pink). These fuses are available from many sources online and in-store (typically automotive parts stores). They are sometimes referred to as “ATM-4” fuses and the pink color is used by most manufacturers to denote the 4 amp (A) size. These are the same fuses used for LOR Pixie controllers

The main symptom that will warrant the checking of a fuse is a specific port not lighting pixel strings up both when commanding from LOR software and when using the test mode. A visual inspection of the fuse can tell you if the fuse needs to be replaced. If a fuse is blown, you will see the small “s” shaped metal piece visually broken inside of the fuse.

Note: Fuses typically blow due to either a damaged pixel cable that is allowing the “+” wire to touch one of the other 2 wires, or defective pixels. If you have 2 fuses blow on the same port back to back, there is most likely an issue with the pixels/cables you are plugging into that port. The fuse is blowing to protect the Aurora Core.

*****Do not replace these fuses with any size larger than 4A as this could cause damage to occur to the Aurora Core board*****

2. Factory Reset Button

Allows the user the ability to reset the controller to factory default settings. Performing a factory reset will change ALL settings back to factory settings, including any IP address settings that have been changed. As mentioned in other sections in the manual, the default settings include a commonly used setup of inputs and outputs (universes 1-16, 150 pixels per port, 1 universe per port). This feature is good to use if you want to ensure that you are starting from scratch in configuring your controller.

Steps to perform factory reset:

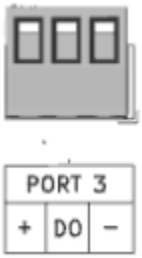
1. Remove all power from the Aurora Core (verify by ensuring both power LEDs on the board are not illuminated).
2. Press and hold the Factory Reset button.
3. Restore power to the Aurora Core (ensuring that at least the “Power 1-8” light is lit) while continuing to hold the Factory Reset button.
4. Continue holding the Factory Reset button for 10 seconds, then release.
5. The Aurora Core will reset and reboot. You will see the Light-O-Rama logo flash a few times on the on board information screen. The Aurora Core will now boot up and is ready to use and has been restored to factory settings.

3. Pixel Outputs with Removable 3-Pin Connectors

Each of the 16 pixel outputs has a 3-pin connector capable of accepting 18-22 AWG size pixel string cables. The pin/pitch spacing on these connectors is 3.81mm. These connectors are widely available online or from the Light-O-Rama Store.

Note: While these connectors may be the same size as connectors used for the LOR Pixie controllers, the Pixie uses 4-pin connectors. **You can’t use Pixie connectors on the Aurora Core outputs.**

Before inserting wires into the connector, ensure that the corresponding screw has been loosened and the socket visually verified to ensure that the clamp has opened up to accept the wire. Ensure that wire has been stripped at least .25” back before inserting into the socket.



When wiring up dangles to connectors:

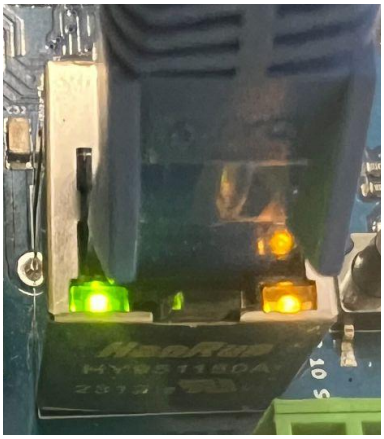
- “+” indicates positive voltage for the pixel wiring.
- “DO” indicates the data line for the pixel wiring.
- “-” indicates the negative/ground for the pixel wiring.

*****Care must be taken to ensure that the + and - are properly connected so that damages does not occur to pixels or the Aurora Core*****

4. Ethernet Port

Used to connect the Aurora Core to an ethernet network switch or your computer's ethernet port. This port **must** be connected to your computer running the show for the controller to function in your system during a show. This port also allows your computer to configure the controller in addition to the ability to configure the controller via wifi.

There are 2 indicator lights on the ethernet port to denote status:



The yellow (right side) light will illuminate when the ethernet port detects an ethernet network and will begin to blink rapidly when there is network activity (blinking rapidly is good!)

The green (left side) light will illuminate (solid, no blinking) when a 100Mbps ethernet connection is detected. If the green light on the left is not illuminated, but the yellow light on the right is illuminated and blinking, this denotes a 10Mbps ethernet connection.

Note: Using a 10Mbps ethernet connection is not recommended as it may cause poor show performance. Most all network switches available are capable of 100Mbs speed.

If you are seeing a light pattern on the ethernet port that is not expected, check your cat5/6 cables and ensure that you are plugging the cable into an ethernet network device. Issues with custom/field made cat5/6 cables can cause the ethernet port not to properly link, but the good news is that the status lights will let you know if the ethernet port is successfully communicating.

Note Do NOT connect this port to a USB-RS485 adapter.

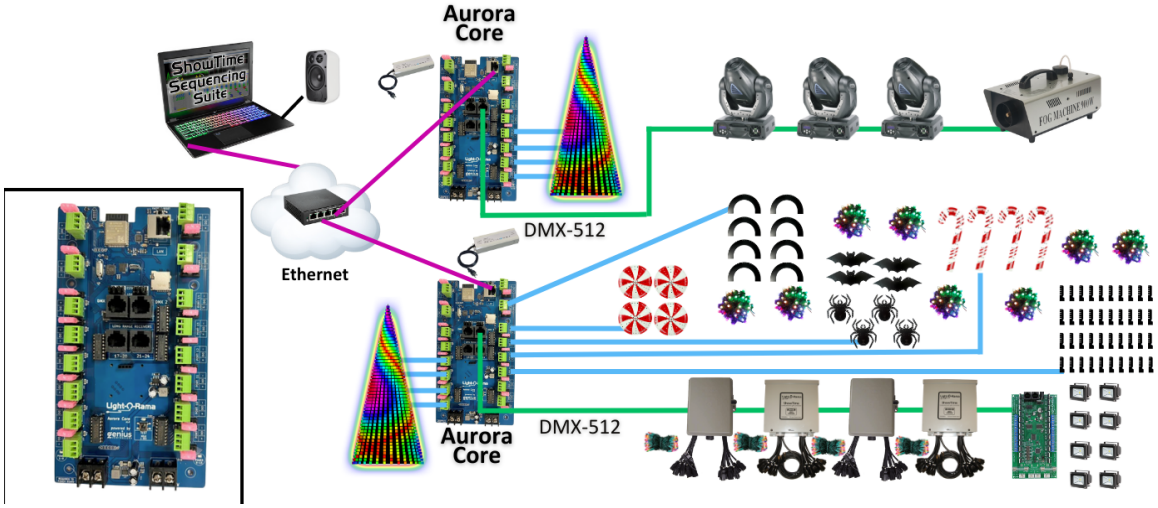
5. DMX Output Wiring Configuration Jumpers

These jumpers allow for selection between 2 different wiring standards for the DMX output RJ45 ports. "LOR" allows for the direct connection to LOR-branded DMX capable

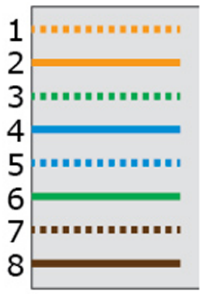
controllers. “ESTA” is used for the entertainment industry standard DMX wiring used in many widely available DMX devices.

With the jumpers in LOR configuration, you are able to connect directly from an Aurora Core DMX output (with a standard cat5 or cat6 cable) to any DMX capable LOR products and send **DMX** commands to them. Jumpers need to be in LOR configuration when using the RJ45 to XLR adapter available from LOR as well.

<u>DMX Capable LOR products:</u>
Any LOR AC controller (with updated firmware)
CMB-24D
Pixie2 (running in DMX mode)
LOR 50W Flood
ServoDog



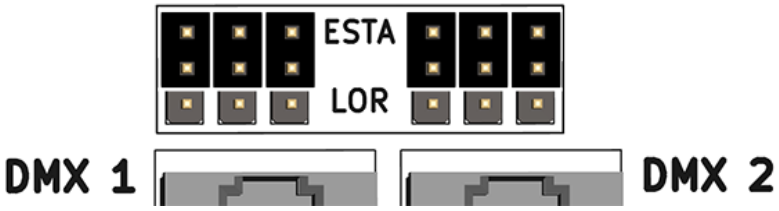
Below is the RJ45 wiring pin out that is achieved for both options:



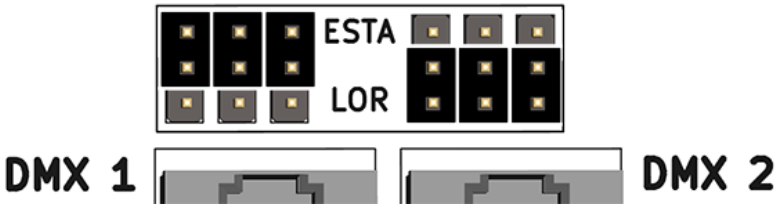
	ESTA	LOR
1	Data +	
2	Data -	
3		
4		Data +
5		Data -
6		GND
7	GND	
8	GND	GND

Note: All 3 jumpers must be moved into the proper position for the wiring configuration to be changed. See examples below.

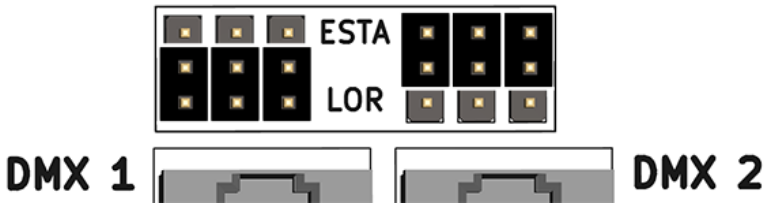
DMX 1 and DMX2 both configured for ESTA:



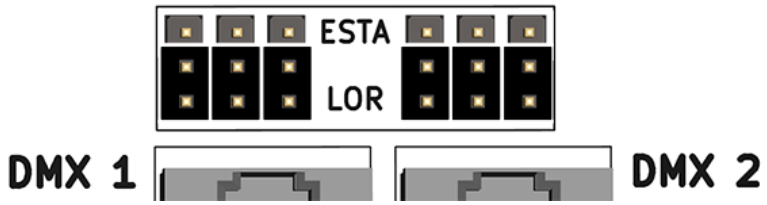
DMX 1 configured for ESTA and DMX 2 configured for LOR



DMX 1 configured for LOR and DMX 2 configured for ESTA



DMX 1 and DMX 2 both configured for LOR



6. Micro SD Card Slot

The micro SD card slot is reserved for future functionality and is not currently used.

7. DMX Output Ports

These ports allow the Aurora Core to send serial DMX commands (1 universe per port) to any DMX capable device, including LOR controllers. See section 5 above for wiring options and jumper selection.

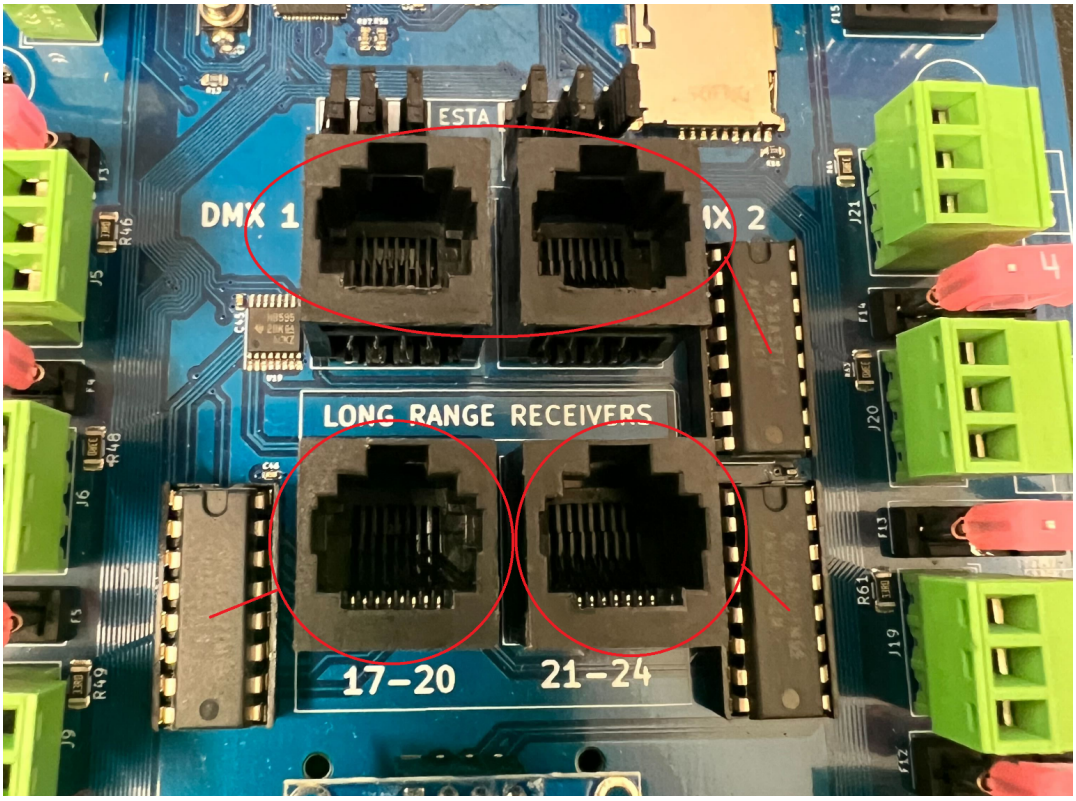
8. DMX Output and Long Range Receiver Communication Driver Chips

These removable components are replaceable in the event of damage occurring from electrical surges or similar accidental electrical damage.

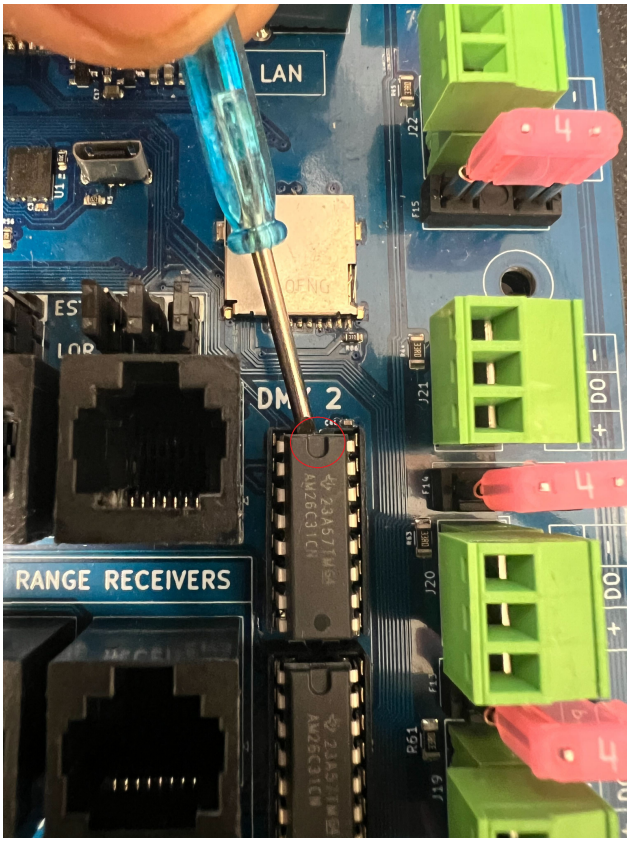
If all other features of the Aurora Core are working properly, but all of a sudden, one of the DMX or Long Range Receiver Outputs has stopped working, the cause may be that the driver chip has blown. These chips are replaceable, but care must be taken when removing the chip, as the pins are very fragile and easy to bend.

Note: Power down Aurora Core completely before attempting to remove or re-insert these chips

See below image for which driver chips belong to which output ports:



One method for chip removal is to use a very small flat head screwdriver and slowly pry the far ends up little by little until the chip is free. When inserting a new chip, be sure to insert the proper orientation, identified by the notch on the chip noted in the image below:



Manufacturer: Texas Instruments
Part Number: AM26C31CN
This part is available from many resellers or by contacting LOR.

*****If you are unsure of your ability to perform this replacement or unsure if this chip is causing your issue, contact LOR*****

9. Long Range Receiver Output Ports

These ports are used to connect to long range pixel receivers (future use).

Pixels connected to Long Range Receivers count as part of the 10,000 pixel total that is able to be controlled by the Aurora Core. In the Outputs tab of the web configuration page, you are able to configure what data gets sent to the long range receiver ports in the 17-20 and 21-24 section. Long Range Receivers are treated as an additional 8 ports of pixel outputs.

Contact LOR for more information on the Long Range Receiver feature.

10. Information Screen

This screen will show important controller information such as IP address and QR code to connect to controller via wifi to configure. *Note: Screen will go to sleep after a certain amount of time. Press the test button momentarily to wake up the screen.*

A quick glance at the information screen can tell you if the Aurora Core is using a static IP address or a DHCP assigned IP address. The Hotspot IP (that you enter into your mobile device web browser when connected to the hotspot) is only shown on the information screen when a device is connected to the hotspot.

Reminder: To use the hotspot feature, simply open the camera on your mobile device and point it at the information screen. When the Wifi Hotspot QR code appears, your phone will give you the option to tap a button that allows your device to automatically connect to the Aurora Core via the hotspot. Then open your web browser on your device and enter the Hotspot IP address that is displayed on the information screen.

Note: When powering on the Aurora Core, the information screen will momentarily show the low level firmware version. See Firmware Update section for more information.

11. Test Button and Test Light

This button is used to activate test mode by holding down for 1 second. The test light will be illuminated when test mode is active (*Note: test mode can also be activated from the configuration webpage).* Holding the test button down for 1 second also turns off test mode.

A momentary press of the test button while test mode is active will change to the next test mode effect. More information about the effects and more test mode options can be seen in the configuration web page for the Aurora Core.

As mentioned in the previous section, a momentary press of the test button will wake up the information screen if it has gone to sleep.

12. Pixel Output Communication Driver Chips

These removable components are replaceable in the event of damage occurring from electrical surges or similar accidental electrical damage.

If all other features of the Aurora Core are working properly, but all of a sudden one or more of the pixel outputs has stopped working, the cause may be that the driver chip has blown. If only 1 pixel output was stopped working, check the fuse for that port and wiring before suspecting the driver chip as the issue.

There is 1 driver chip for ports 1-8 and 1 for ports 9-16.

These chips are replaceable, but take care when removing the chip, as the pins are very fragile and easy to bend.

Note: Power down Aurora Core completely before attempting to remove or re-insert these chips.

When inserting a new chip, be sure to insert the proper orientation, identified by the notch on the chip noted in the image below. See section 8 above on tips for chip removal.

Manufacturer: Texas Instruments
Part Number: SN74AHCT595N
This part is available from many resellers or by contacting LOR.

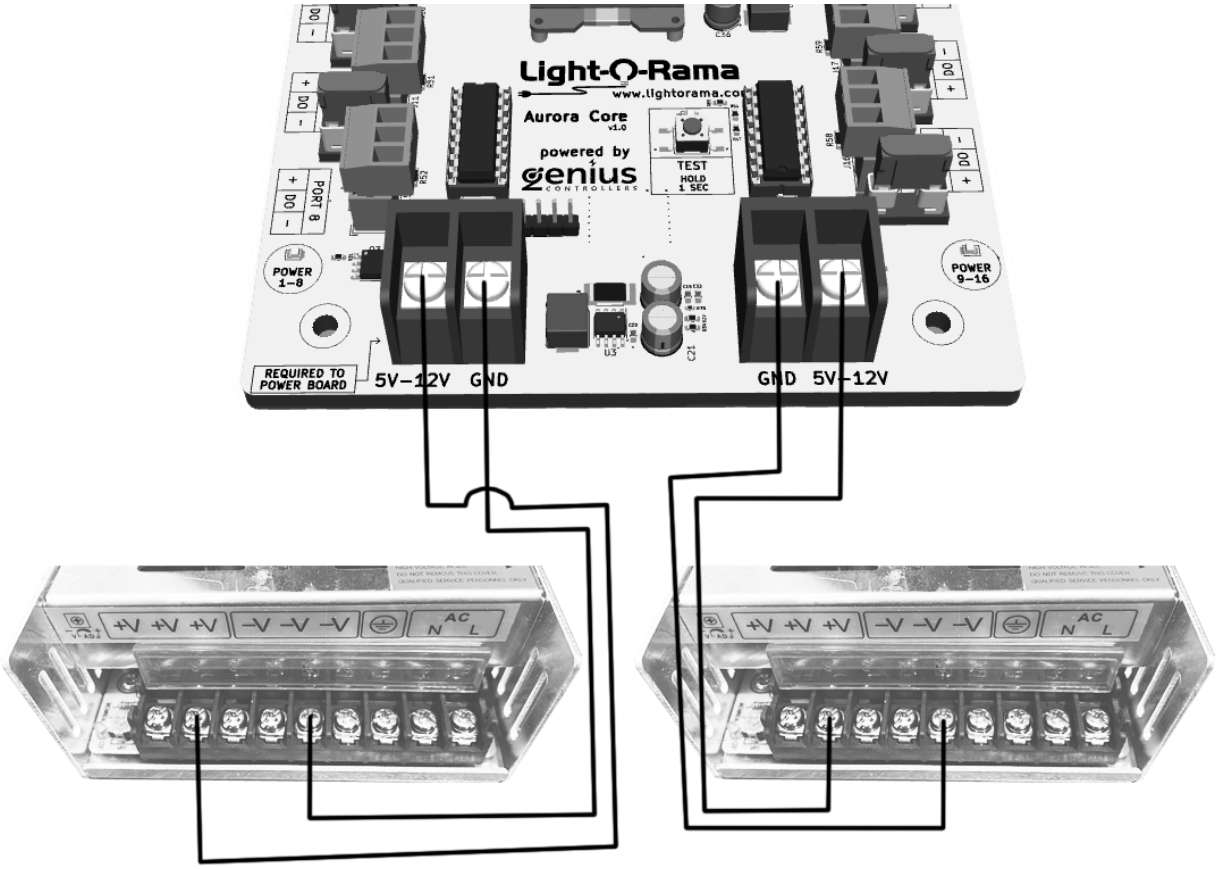
*****If you are unsure of your ability to perform this replacement or unsure if this chip is causing your issue, contact LOR*****

13. Power Input Connections

There are 2 power banks on the Aurora Core, Ports 1-8 (left) and Ports 9-16 (right). The left (ports 1-8) power input is required to have power for the board to power up. Both left and right power banks can be fed either 5VDC or 12VDC. There is a status light for the left and right side to allow confirmation that each bank is receiving power.

5V-12V Terminal corresponds to the terminal typically labeled “+V” on the power supply.

GND Terminal corresponds to the terminal typically labeled “-V” on the power supply.



Two power supplies can be used (like above), especially in the situation of needing one side of the controller to be 5V and the other 12V. It is also fine to use 1 larger power supply connected to both 1-8 and 9-16 sides of the controller.

Pixels Per Port

Unlike other LOR pixel controllers, there is not a pre-defined limit of pixels per port. The overarching limit of the Aurora Core is ~10,000 (58 universes) total RGB pixels. The per port limit is then defined by a few factors, the largest of which is the use of “power injection” on a continuous string(s) of pixels.

Without Power Injection
If power injection is not used, the amount of pixels per port is varied by the brightness used for that port. Remember that the brightness can either be set at the prop in your preview (Dimming Curve) or on the Aurora Core Output page. Attempting to connect more than the below amounts of pixels to a port may result in some/all pixels not performing as expected.

30% Brightness
300 pixels* per port.

100% Brightness
120 pixels* per port.

*The above estimates are based on standard bullet pixels. These are not hard limits and it may be experienced that depending on the conditions of the installation, these valves may be slightly higher or lower.

Note: Light-O-Rama is not responsible for implementations of power injection on pixel strings. Performing power injection voids the warranty of Light-O-Rama pixels

With Power Injection
If power injection is used, the main limit of pixels per port will be the impact on the maximum frame rate that can be achieved. As you configure the output ports on the web interface, the summary at the bottom of the page will update you on the “Best Possible Framerate.” It is recommended that you do not put so many pixels on a port, that you cause the best possible frame rate to drop below 20fps.

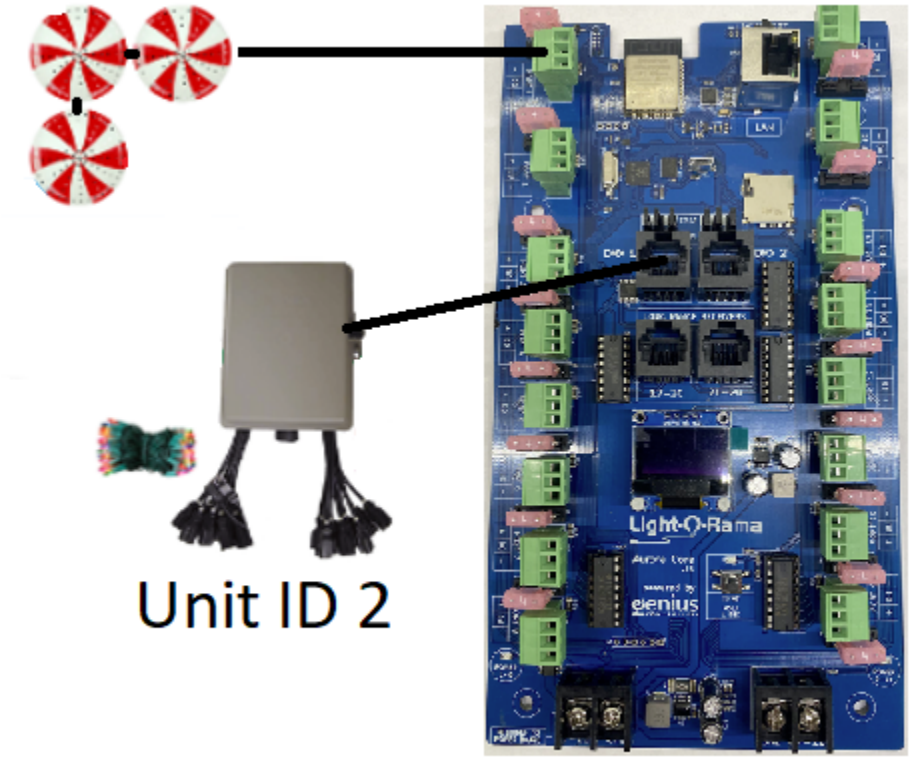
Example Configurations

This section will show example configurations, showing a sample LOR Preview and S6 Control Panel configuration, all the way to the Aurora Core port configuration.

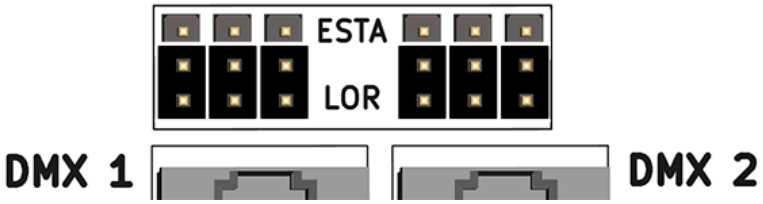
Pixels and AC Controller

This simple setup will be used as an example of end to end configuration. Port 1 of the Aurora Core has 3, 100 pixel spinners, connected together, end to end. DMX 1 output is connected directly to a CTB16PC controller that has been set to unit ID 2 with an 8 channel arch connected to Channels/Circuits 1-8 on the controller.

For the purpose of this example, the Aurora Core will be at its default static IP address, 192.168.1.50 and we will assume that the diagram below is the entirety of our show. Remember that when assigning DMX universes in your preview that you can't duplicate assignments to any universe (Preview will tell you if you accidentally do this).

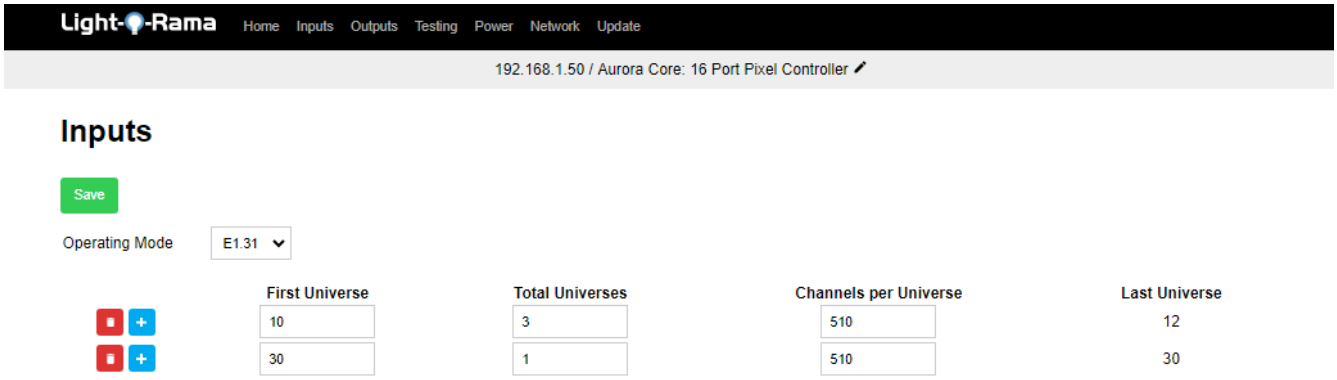


From a physical configuration standpoint, the jumpers for DMX1 have been verified to be in the LOR position:

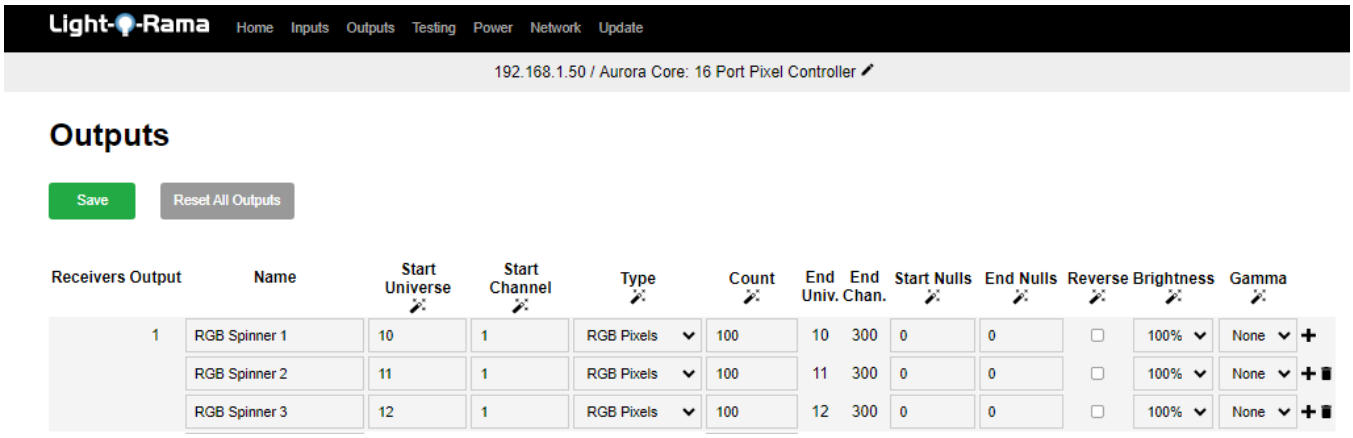


Let's start with the Aurora Core configuration. The universe numbers were chosen randomly for this example to illustrate that depending on your setup, your universe numbers may not be sequential.

Our Input settings denote that we expect to send Universes 10,11,12, and 30 to this Aurora Core (192.168.1.50):



Our Output settings show that we plan to plug all 3 100 pixel spinners into output port 1. For purposes of example, we created virtual strings for Spinner 2 and 3 so that the remaining channels on Universe 10 (301-510) were skipped and Spinner 2 started fresh on Universe 11, channel 1. This is to illustrate that if a virtual string had not been created, that spinner 2 would have automatically picked up at channel 301, Universe 10 since the strings are connected end to end.



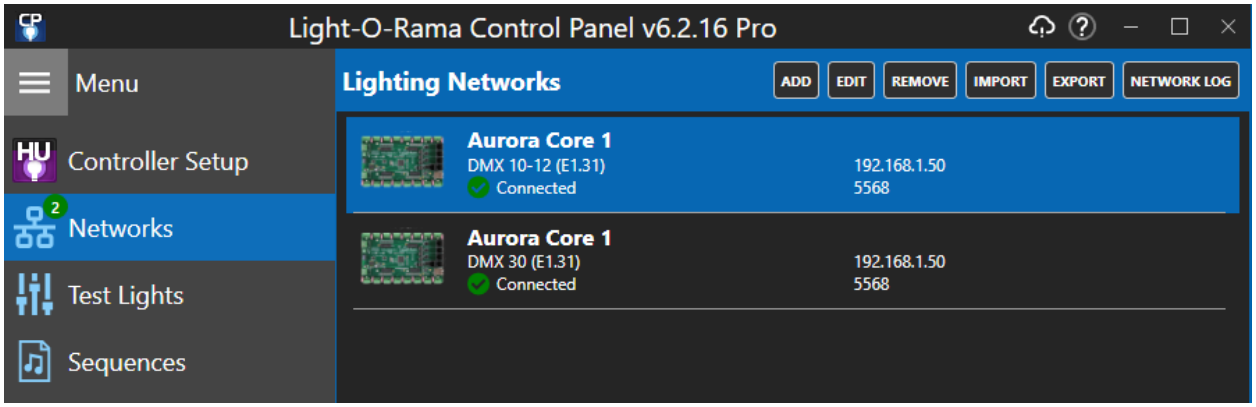
Note: Starting a new universe per spinner like the example above is by no means a requirement. This was done to illustrate the virtual string feature for this example.

DMX 1 output is set to use Universe 30, 510 total channels, meaning that any command that is sent to any channel on universe 30 will be sent to DMX 1 output on this Aurora Core:

DMX1		30	1	510	30	510
DMX2				0	-	-

Note as well above that the brightness of the ports is set to 100%.

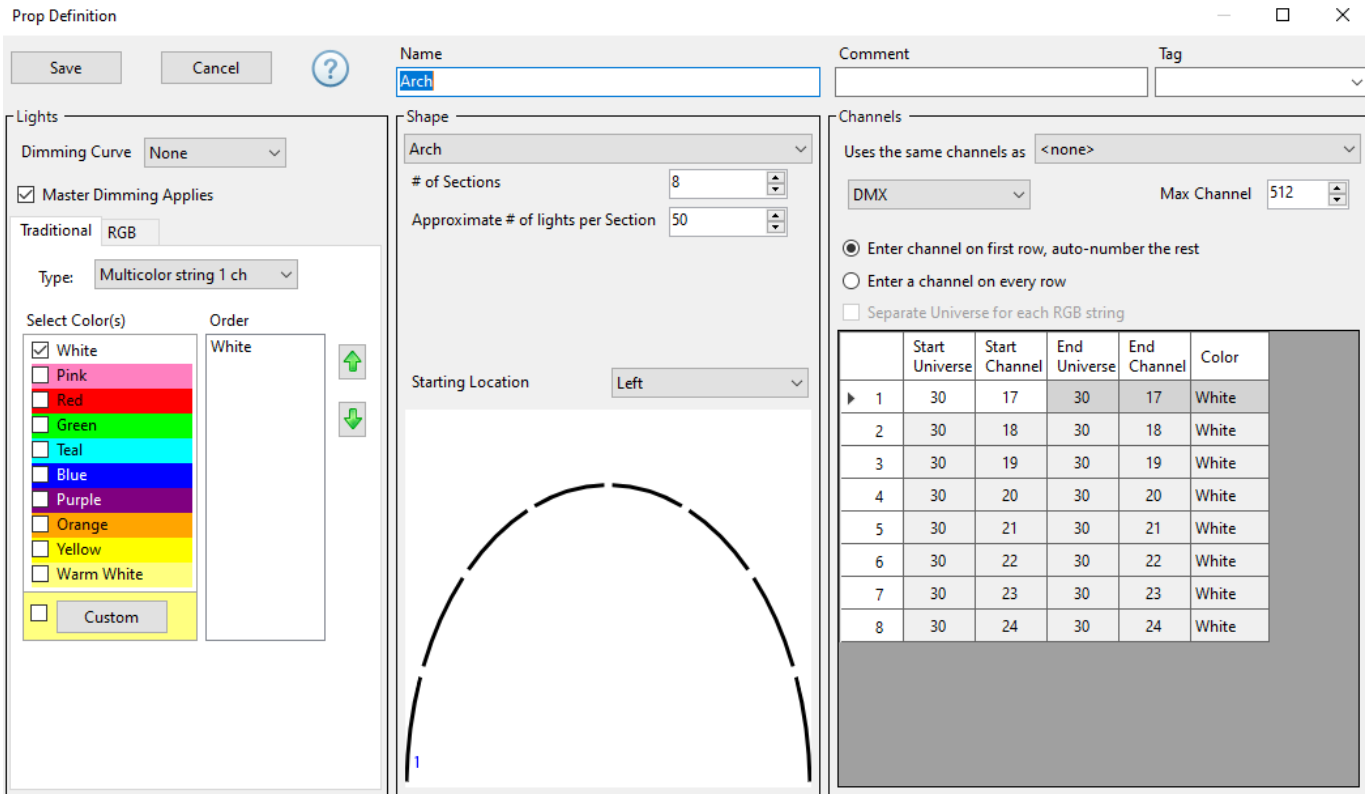
Let's next take a look at the S6 Control Panel - Networks. Remember, the networks tab in the control panel for this Aurora Core must match/include everything in the Input tab. This is what it would look like. There will only be 2 entries for the same E1.31 controller like this if there is a gap in universes that are being sent to the controller like in this example:



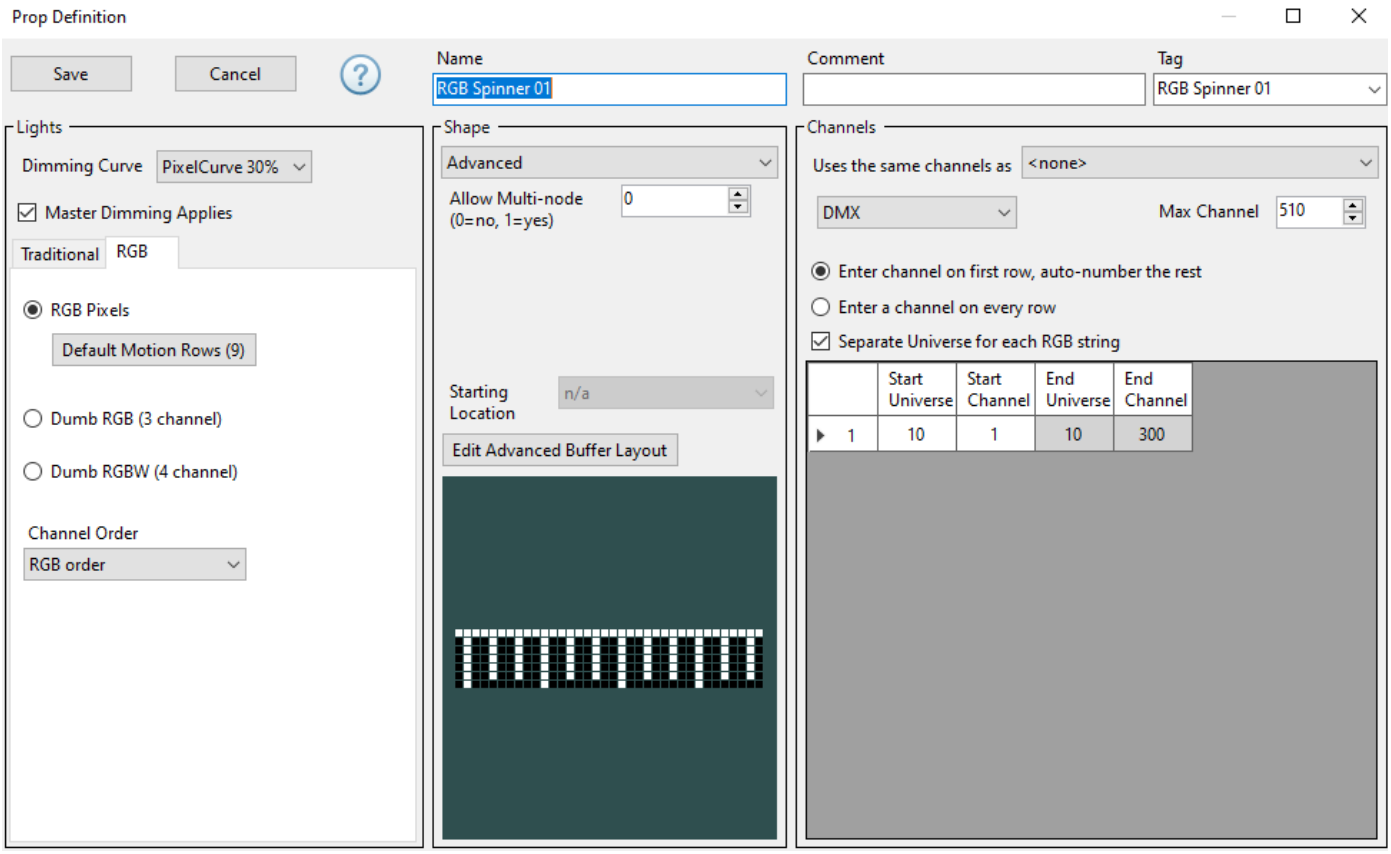
Now we can take a look at the Preview in the Sequencer.

Here is the prop definition for the 8 channel AC Arch. As expected, we are using DMX as the network type and Universe for all channels is 30. The reason that we are using channels 17-24 for the AC channels is because the Unit ID of the AC controller is set to ID 2 (See Appendix A for more information). When an LOR AC controller is used with DMX and is set to ID 2, circuit 1 responds to channel 17, circuit 2 responds to channel 18, and so on.

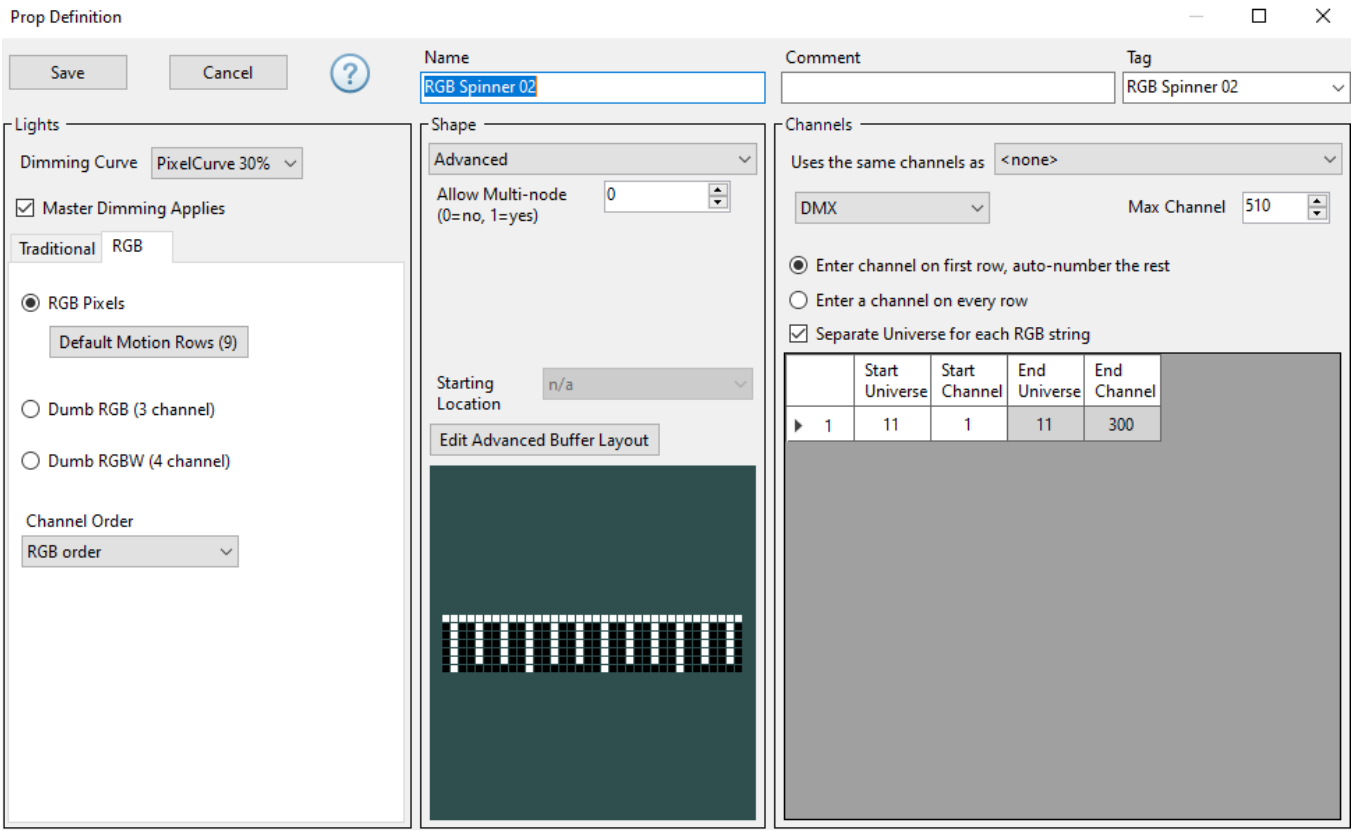
Note: If another AC controller was daisy chained off of this AC controller and set to Unit ID 3, its channels would also all be in Universe 30, and would be channels 33-48.



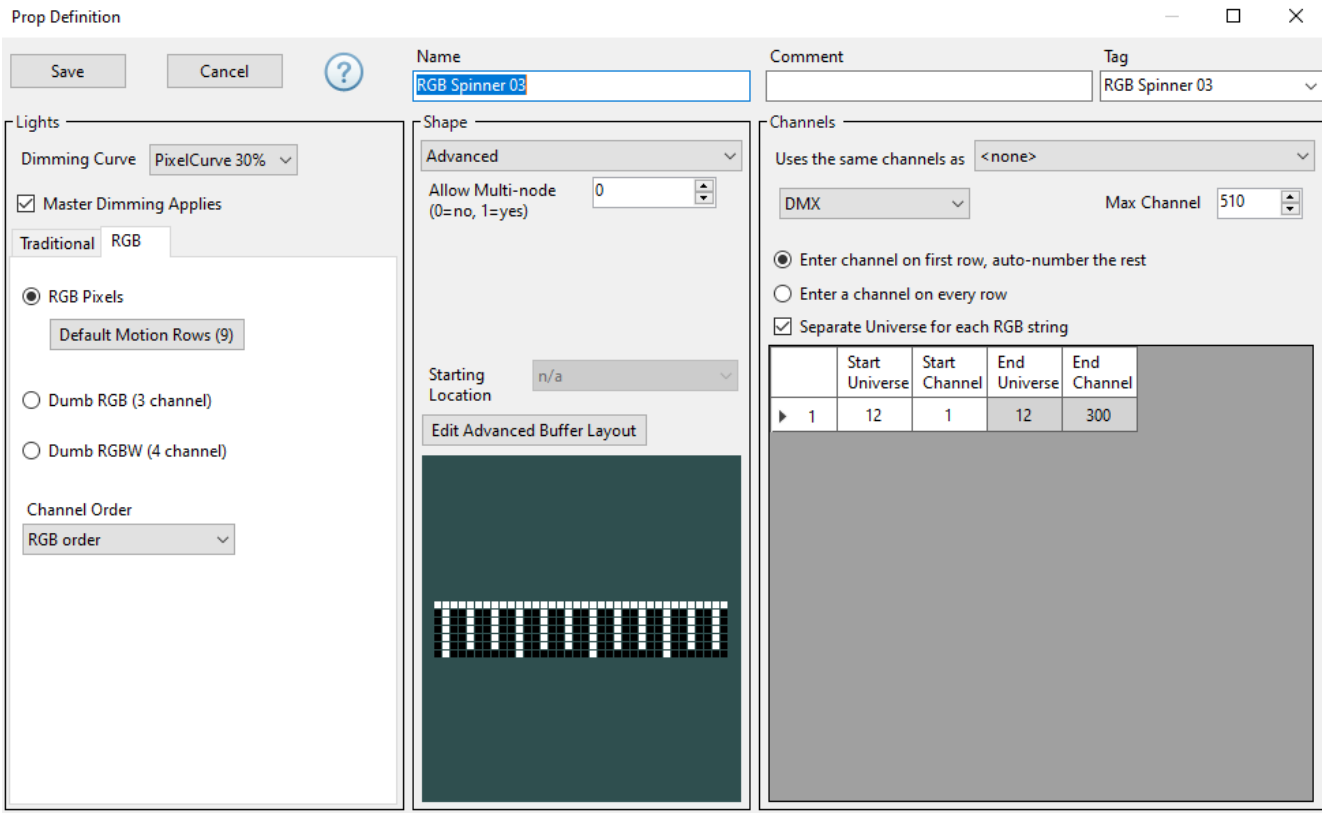
Spinner 1 is defined using DMX as the network type and Universe 10, start channel 1. This matches what we configured the Aurora Core to expect in the Output page. Note the dimming curve of “PixelCurve 30%”. Because the prop is set to 30%, the Aurora Core is configured to 100%. Note as well that we have Max channel set to 510 to match the Aurora Core setting in the Inputs tab, however the max channel setting is not at play here since this prop does not get above 300 channels.



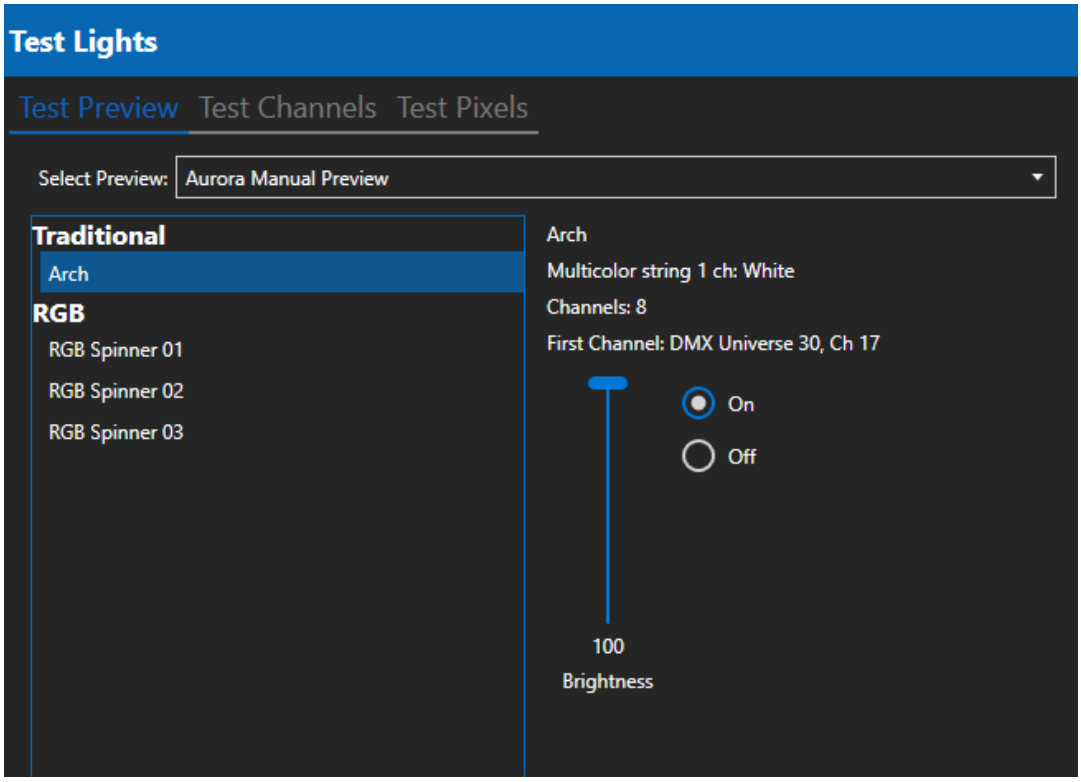
Spinner 2 is configured to DMX, with a start Universe of 11 and start channel of 1. To fully utilize Universe channel spaces, this prop could have also been chosen to start at Universe 10, channel 301 and the Aurora Output configured similarly.

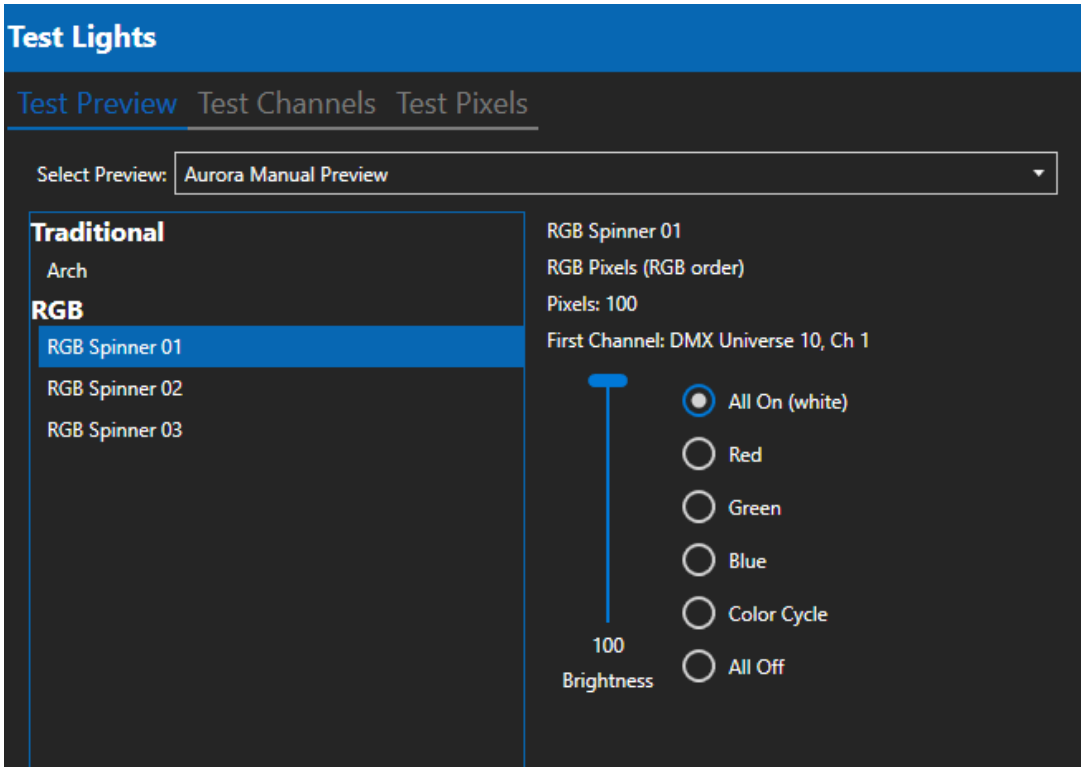


Finally, Spinner 3 is configured to DMX, with a start Universe of 12 and start channel of 1:



To fully check your end to end configuration, visit the Test Lights tab of the Control Panel and the Test Preview tab. This allows you to send commands from end to end to test that your preview is correctly set up to match how you have your lights physically hooked up.





Appendix A - LOR Controllers and DMX

The addressing used in a LOR network is a little different than the addressing scheme used in DMX, however they are close enough that the LOR paradigm can be extended to DMX addressing. In a LOR network, regardless of the number of outputs (channels) a Unit has, it is assigned a single Unit ID (address). (Refer a device's manual for instructions to set the Unit ID).

When used in a DMX network, the Unit's Unit ID is used to map to the starting DMX address for the Unit's Circuits. The addresses for the circuits on a Unit will be assigned sequentially based on the starting address. For example, if a 16 channel Unit has the Unit ID "01" then the DMX addresses for that Unit's channels are 1 thru 16. With Unit ID "02" the DMX addresses are 17 thru 32. See the Unit ID – Starting DMX address table.

Unit ID to Starting DMX Address Table

LOR Unit ID	DMX Address		LOR Unit ID	DMX Address
"01"	1		"11"	257
"02"	17		"12"	273
"03"	33		"13"	289
"04"	49		"14"	305
"05"	65		"15"	321
"06"	81		"16"	337
"07"	97		"17"	353
"08"	113		"18"	369
"09"	129		"19"	385
"0A"	145		"1A"	401
"0B"	161		"1B"	417
"0C"	177		"1C"	433
"0D"	193		"1D"	449
"0E"	209		"1E"	465
"0F"	225		"1F"	481
"10"	241		"20"	497

Connecting the LOR Unit to the DMX Universe

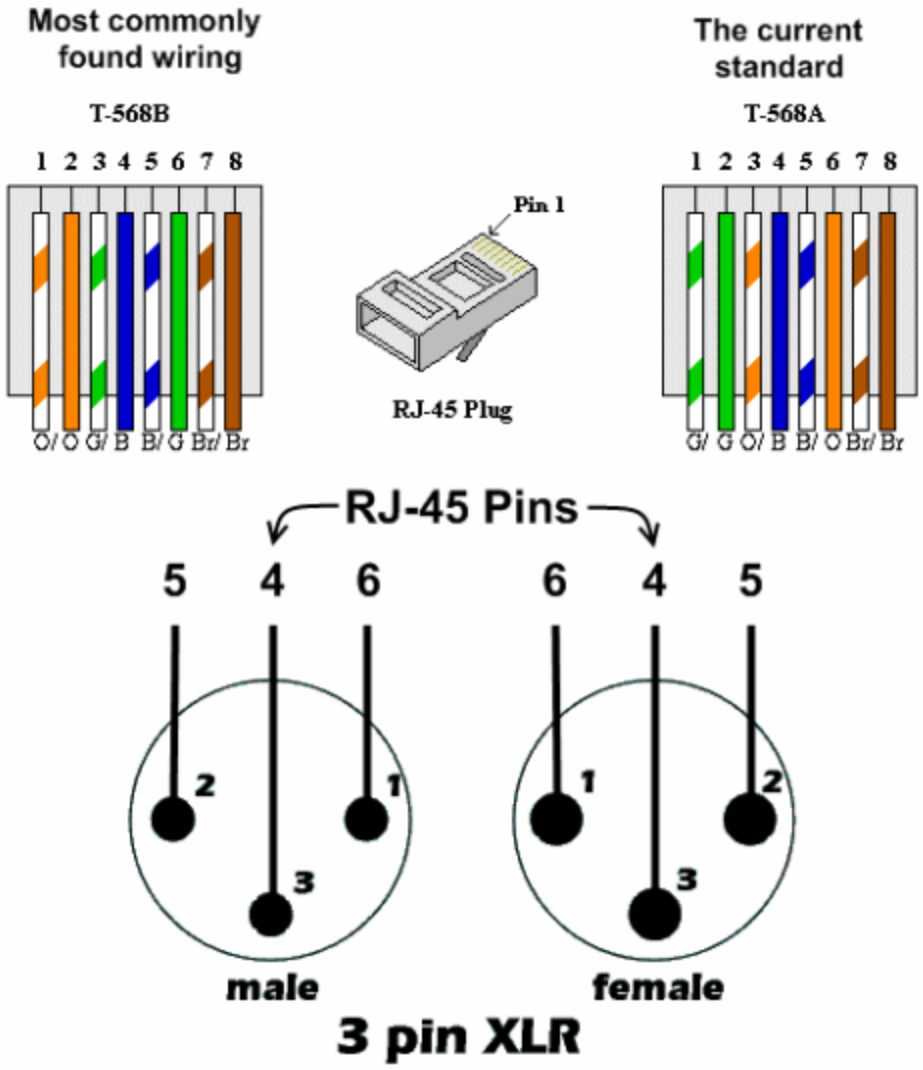
LOR networks are usually wired using standard CAT5 (CAT5e) patch cables.The cables are wired straight through. To connect a LOR Unit to a DMX universe you will need an adapter. Most commonly, DMX hardware uses XLR connectors.

LOR/DMX Adapter Pin Connections

RJ45 Pin	XLR Pin (3 Pin XLR)
4	3
5	2
6	1

The Light-O-Rama RJ-45 to XLR DMX Pin Map

This is the pin map used to create an RJ-45/XLR adapter to connect a Light-O-Rama, DMX enabled controller to a DMX universe.



With 5 pin XLR you do not use XLR pins 4 and 5. Pins 1, 2 and 3 are connected as above.