QUASAR SCIENCE

Rainbow 2

LED Linear Light
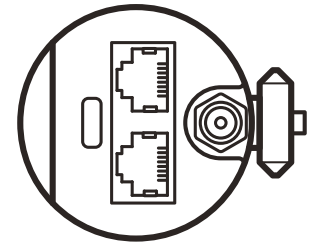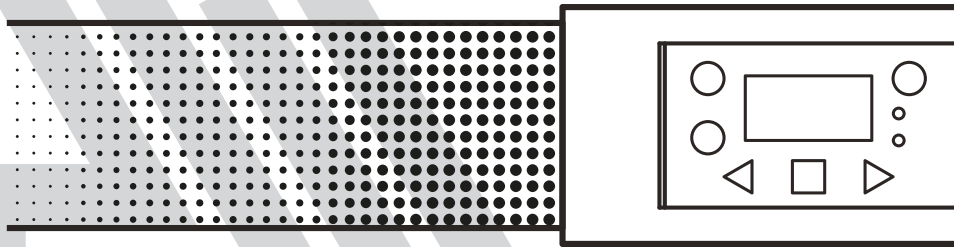
Manual

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Safety Information

Important information on the safe installation and operation of this product. Read this information before operating the product. For your personal safety, read these instructions. Do not operate the product if you do not understand how to use it safely. Save these instructions for future reference.

Warning Symbols Used in these Instructions

Important information on the safe installation and operation of this product. Read this information before operating the product. For your personal safety, read these instructions. Do not operate the product if you do not understand how to use it safely. Save these instructions for future reference.

⚠️ **WARNING**
Where there is a risk of personal injury or injury to others, comments appear supported by the warning triangle symbol. Where there is a risk of damage to the product, associated equipment, process or surroundings, comments appear supported by the word 'Caution'.

⚠️ **DANGER**
Where there is a risk of electric shock, comments appear supported by the hazardous voltage warning triangle.

Electrical Connection

⚠️ **DANGER**
Risk of electric shock. Do not remove cover, no user servicable parts inside the product.

⚠️ **WARNING**
Risk of electric shock. Always check cables for signs of damage. Damaged cables can cause personal injury and/or damage the equipment.

⚠️ **DANGER**
Refer servicing to qualified service personnel.

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Operation

WARNING
Special precautions and handling instructions are contained in this user guide and should be strictly adhered to for safe and reliable operation.

WARNING
Never use flammable or combustible materials and solvents around lights.

CAUTION
The product should not be used outside the operating temperature limits. Refer to the product technical specifi ations for the operating limits for the product.

WARNING
Protect the product from water, moisture and dust. The presence of electricity near water can be dangerous.

CAUTION
Do not directly look into the light, it can cause harm to your eyes.

CAUTION
Do not look at the LEDs with a magnifying glass or any otheroptical instrument that may concentrate the light output.

Maintenance

DANGER
The fitting of non-approved parts or accessories, or the carrying out of non-approved alterations or servicing can be dangerous and could affect the safety of the product. It may also invalidate the terms and conditions of the product warranty.

DANGER
Never attempt to service this light. Refer servicing to qualified service personnel.

Overview

WHAT'S IN THE BOX
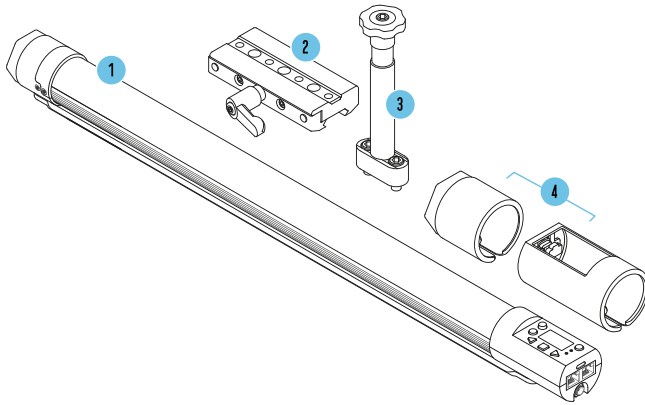
No.	Description	QTY
1	R2 LED Linear Lightwith Ossium Rail(Q25R2 shown)	1
2	QS Slider	1
3	QS Dual ScrewBaby Pin	1
4	Q-Boot Silicon Bumpers	2
N/A	8ft AC Power Cable	1
N/A	8ft DC Power Cable:P-TAP to 2.1mm Barrel	1
N/A	Quick Start Guide	1
N/A	Short Cut Guide	1
N/A	3/16 Hex Wrench	1

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R2 - OVERVIEW
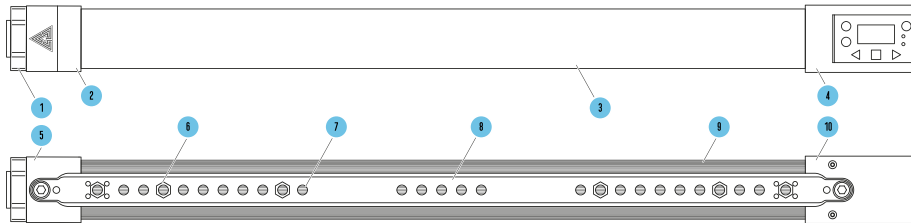
1	Power Side
2	Lens Hatch
3	Slim Diffuser
4	Control Side
5	End Cap
6	(White Hexagons)
7	Mounting Holes
8	Ossium Rail
9	Heat Sink
10	End Cap

*Q25R2 shown as reference

R2 INTERFACE LAYOUT
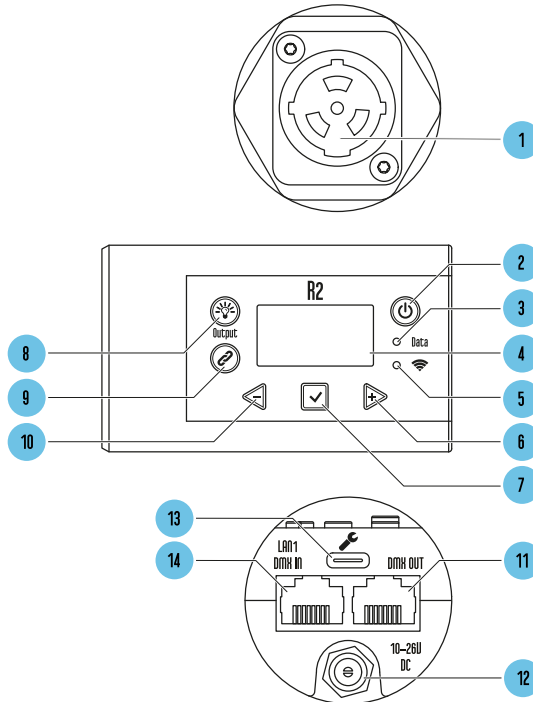
1	AC IN Port
2	Power On / Off
3	"Data" Status Light
4	LED Screen
5	"Wireless" Status Light
6	"Right / +" Button
7	"Enter / Set" Button
8	"Output" Button
9	"Link" Button
10	"Left / -" Button
11	DMX OUT
12	DC IN Port: 2.1mm x 5.5mm ⊖—⊙—⊕
13	USB-C Update Port
14	LAN1 / DMX IN

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⏻ **Power Button:** To turn the light on, press and hold for 1 second. To turn the light off, press and hold for 2 seconds. Double Tap the Power Button to Return to the Main Screen. When on the Main Screen, single tap the Power Button to get to the Sub Status Screen. To change the power on mode, to energize with to turn on when energized, without pressing the Power Button. **See Section: Power On Mode [28].**

💡 **Output Button:** Toggle the button to enable/disable the lamp output in manual mode operation. Users can change the color, intensity or effect of the light without the changes affecting the environment before toggling the lamp back on. An Asterisk (*) appears in the top left corner of the screen whenever the Output Button is not allowing lamp output.

⊘ **Link Button:** On CRMX: For RX, press and hold to unlink light. For TX, Single tap to send pairing signal. Double Tap to bring up Wireless Menu

◁ **Left / Minus Button:** Decrease a value or navigate Left.

▷ **Right / Plus Button:** Increase a value or navigate Right.

☑ **Enter / Save Button:** Enter selection, Save Value.

🔧 **Upgrade Port:** USB-C Port for performing software updates with a USB-C Thumb Drive.

MOUNTING R2

Option A	Option B	Option C	Option D
Mount Dual Screw Baby Pin directly to the light using 3/16 Hex wrench.	Mount Dual Screw Baby Pin to Ossium Rail Slider using 3/16 Hex wrench for added convenience and versatility.	Mount Rotator* using 5/32 hex wrench directly to the light.	Mount Rotator* using 5/32 hex wrench to Ossium Rail Slider for added convenience and versatility.
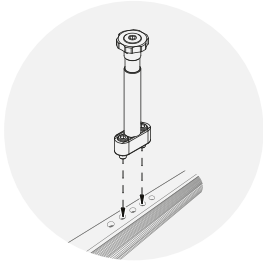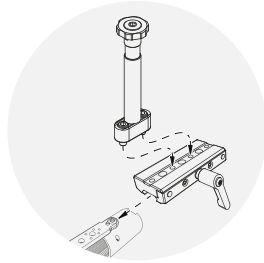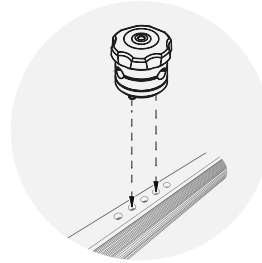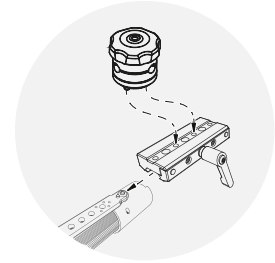
*Rotators and other Ossium Mounting accessories sold separately.

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SCREEN INFORMATION LAYOUT

The Main Status Screen Of The Light Will Display All The Primary Information For Working With The Light.

```
* PIXEL:2    P1:10CH
      MANUAL
BT    DMX: 001    HO
```
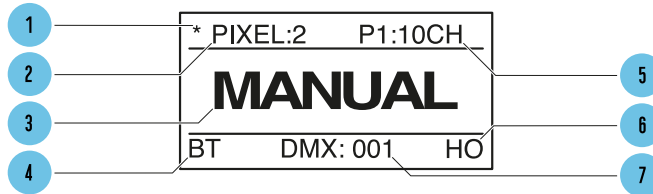
1	"Output" Button Toggle Sign
2	Number of Pixels Configured
3	Control Status
4	Control Mode (DMX, Art-Net, sACN, CRMX, Bluetooth, WiFi)
5	Profile and Number of Channels
6	Output Mode
7	Control Address

Output Button Indicator

Toggle the button to enable/disable lamp output for manual mode operation. **See Section: Output Enable Button [27]**

Number of Pixels

Shows the Number of Pixels selected in the Menu **See Section: Number of Pixels [65]**

Control Mode

Displays the current Control Mode of the light. DMX, Art-Net, sACN, CRMX (Wireless DMX), Bluetooth, Wifi **See Section: Control [33]**

Profile Number

Displays the DMX Profile and Number of Channels the DMX Profile occupies based on the number of pixels set. **See Section: DMX Profiles [77]**

Output Mode

Displays HO=High Output, LO = Low Output, NO = Normal Output modes. **See Section: Output Mode [27]**

Control Address

Displays the DMX address or IP address of the Light - **See Section: DMX Address [77]**

SubStatus Screens

While viewing the Main Status Screen, a single tap of the Power Button will bring up a Sub-Status Screens with additional information. Additional presses of enter will advance to the next screen.

1. **Color Status Screen** - Our Chromaticity Chart and output settings of the light. This displays the live Spectral distribution of the output of the light of Pixel 1 of the Light. It also displays the Values of the light being produced based on the profile of the light: XY coordinates, RGB values, HSIC+
2. **Wired Network information (Wired Art-Net or sACN mode)** - When the light is set to recieve Art-Net or sACN, it will displays the IP and Subnet mask settings and universe of the current network protocol being received. When the light is set to receive DMX, it will display the DMX refresh rate and the current DMX status.
3. **Wireless Network information (Wifi mode)** - Displays the IP and Subnet mask settings and universe. In STA mode this screen will also display the SSID of the network the fixture has joined. In AP mode this screen will show the fixture is broadcasting the SSID.
4. **Hardware Status Screen** - Displays all of the software installed on the fixture, Bootloader, Wifi Module, Timo2 Module and the internal temperature the fixture.
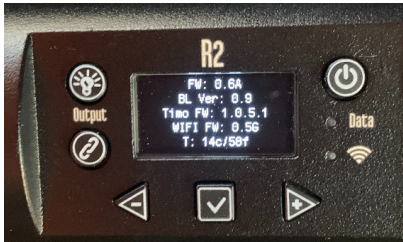
> **NOTE**
> The hardware status screen will display a **T** if the Timo module needs a firmware update

> **NOTE**
> The hardware status screen will display an **!** if the Wifi module needs a firmware update

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Basic Operation

MANUAL MODE

Getting Started
To set the Intensity, Color Temp, +/- Green, Saturation and Hue:

1. Press ◁ or ▷ until desired function is shown on screen, and press ☑ to select.

> Intensity <
100%

◁   ☑   ⊕▷
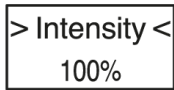
2. The selection carets "**> <**" will move from the "**> Function <**" to the "**> Value <**".

Intensity
>   100%   <

◁   ☑   ⊕▷
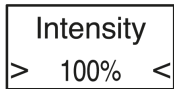
3. Press ◁ or ▷ to set the value. Press ☑ to save.

```
┌──────────────────┐
│    Intensity      │
│ >    87%     <    │
└──────────────────┘
```
◁   ☑   ⊕▷
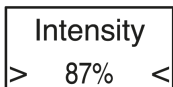
4. The selection carets "**> <**" will move from the "**> Value <**" back to the "**> Function <**".

```
┌──────────────────┐
│ > Intensity <     │
│      87%          │
└──────────────────┘
```
◁   ☑   ⊕▷
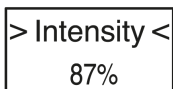
5. For function items that have a submenu(s), **selection asterisks** "*** ***" will show instead of carets. Press to enter and navigate functions in the submenu.

```
┌──────────────────┐
│  *  Config  *     │
│     Menu          │
└──────────────────┘
```
◁   ☑   ⊕▷

Main Menu

*   **> Intensity <** - Adjust the white point's Correlated Color Temperature (CCT) in increments from 1750 Kelvin - 10000 Kelvin.
*   **> Color Temperature <** - Adjust the white point's Correlated Color Temperature (CCT) in increments from 1750 Kelvin - 10000 Kelvin. *Color Calibration Data [125]
*   **> +/- Green <** - Adjust the white point's Tint (duv) in 1% increments from Full Minus Green(-100G) to Full Plus Green(100G). The default value is 0 Tint.
*   **> Saturation** < - 0 to 100% of transition between user-input white point and user-input Hue angle—by 1% increments
*   **> Hue <** - 0° to 360° by 1° increments

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- **> CT Preset <** - Color Temperature Presets – Automatically changes the Color temperature to desired setting and sets the saturation at 0%
  - 2000K
  - 2500K
  - 3000K
  - 3200K (Menu loads here)
  - 4300K
  - 5000K (CIE D50)
  - 5600K (CIE D5600)
  - 6500K (CIE D65)
  - 10000K
- **> Color Preset <** - Hue Color Presets – Automatically changes the Hue to desired color and sets the saturation at 100%

0°	Red
30°	Orange
60°	Yellow
120°	Green
180°	Cyan
240°	Blue
270°	Violet
300°	Magenta

- **> Effects <** - New Effects will come in future updates
  - Rainbow
  - Short Circuit
  - Paparazzi
  - Strobe
  - Fire
  - Emergency Light
  - Demo
- **> Config <**
  - DMX Channel
  - Number of Pixels

- DMX Profile
- Wired Settings
- Wireless Settings
- Lead/Follow
- Output Mode
- Power On Mode
- Status LEDs On/Off
- RDM On/Off
- Language
- Lamp Hours
- Update Firmware
- Firmware Version
- Reset to Default
- BACK to Main Menu

BUTTON SHORTCUTS

- **Min / Max Value Jump:** On parameter menus such as Intensity, Color Temp, Saturation, Hue, and Effects parameters.
  - While pressing and holding ▷ to increase the value, tapping ◁ will jump to the next value or max value.
  - While pressing and holding ◁ to decrease the value, tapping ▷ will jump to the next value or minimum value.
- **Output Mode:** Press ☑ and ▷ simultaneously to change Output Modes from High to Normal to Low Output Mode. (See Output Mode)
- **Enable/Disable Status Lights:** Press and hold ☑ for 5 seconds to disable the status lights. Both lights will flash Redd. Press again for 5 seconds to enable, both lights will flash green.
- **Enable/Disable Wireless:** Press and hold ◁ and ☑ for 2 seconds to disable all Wireless Functions. Press again for 2 seconds to enable Wireless DMX.
- **Reset to Default:** Press and hold ◁ and ▷ for 3 seconds to reset the light to Default settings.
- **CRMX Linking:** Press and hold ⊘ to unpair a light in CRMX mode. On a Lead Light, tap to send pairing signal.
- **Wireless Menu:** Double press ⊘ to open the Wireless Menu.

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- **Reset Bluetooth Connection:** Hold ⊘ for 3 seconds to reset Bluetooth connection.
- **Return to Status Screen:** Double press Power Button ⏻ to return to the status screen.

STATUS LIGHTS

The **Data** and **Wireless Status Lights** can be various colors based on the connection type and status. Check that the light is in the correct wired and wireless modes and that Status lights are enabled in the config.

Data Status Light

🔴 Data	**Solid LED** – Data Received.
⚫ Data	**No Light** – No Data Received or Status Lights turned off.
○─/●─ Data	**Blinking Data Light** - Error with the data received.

Wireless Status Light

🟢 📶	**Solid LED** – Connected to Wireless Device.
🟢─/●─ 📶	**Slow Flashing** – Light is paired with Wireless Device and connected, but Transmitter is not receiving data.
🟢/● 📶	**Fast Flashing** – Light is connecting to Wireless Device or Lamp is paired with Wireless Device but device not found.
⚫ 📶	**No Light** – Light is Not Paired with Wireless Device, Wireless Mode -> Off or Status Lights turned off.

The Status LEDS can be disabled from the > Config MENU < Status LEDS >

The Status LEDs will always display while the display screen is active. If the Status LEDs are disabled they will turn off when the display screen turns off.

Status Light Colors

The **Status Lights** on the lights are color coded to show what Mode and connection the light is in.The color of the **Data Light** shows the Type of Data that the light is receiving. The color of the **Wireless Light** shows the light's Wireless Signal protocol. The combination of the 2 LEDs will show the status of the light.

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Local	● Data ● 📶	Manual Mode Data: Off / Wireless: Off
Lead/Follow **Wired**	● Data ● 📶	Wired Leader Data: Green / Wireless: Off
	● Data ● 📶	Wired Follower Data: Cyan / Wireless: Off
Lead/Follow **Wireless**	● Data ● 📶	Wireless Leader Data: Green / Wireless: Purple
	● Data ● 📶	Wireless Follower Data: Cyan / Wireless: Purple
Wired	● Data ● 📶	DMX Mode / Data Received Data: Red / Wireless: Off
	● Data ● 📶	Ethernet Mode / Data Received Data: Yellow / Wireless: Off
Wireless	● Data ● 📶	Wireless DMX Data:Red / Wireless: Green (Or Universe Color)
	● Data ● 📶	WiFi Mode (Art-Net over WiFi) Data: Yellow / Wireless: Magenta
	● Data ● 📶	WiFi Access Point Mode (Art-Net over WiFi) Data: Yellow / Wireless: Orange
	● Data ● 📶	Bluetooth Mode Data: Blue / Wireless: Blue

Universe Color for CRMX

When connected to a CRMX Transmitter with the transmitter able to send a Universe color, the Wireless Status light will be the same color as the Universe Color set on the transmitter.

If the Transmitter has no color set, or it is not able to send a Universe Color, the wireless LED will be Grenn

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Lighting Configuration & Settings

CONFIG MENU

- **DMX Channel** - Set the DMX Channel.
- **Number of Pixels** - The light can be set to control all of the pixels as 1 group or individually and multiples in between
  - Q25R2: 1, 2, 5, 10
  - Q50R2: 1, 2, 3, 4, 6, 8, 12, 24
  - Q100R: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
  - RR50: 1, 2, 5, 10, 20
  - RR100: 1, 2, 3, 4, 6, 8, 12, 24, 48
  See Section: Number of Pixels [65]
- **Profile** - DMX Profiles are the arrangement of the light parameters so the user can control the light in the method they choose. **See Section "DMX Profiles [77]"**
- **Wired Settings** - Control the way the Wired Data is used. DMX or Ethernet. **See Page "Wired Control [39]"**
- **Wireless Settings** - Control the way the Wireless Data is received: Wireless DMX, Bluetooth , Wifi. **See Page "Wireless Control [44]"**
- **Lead / Follow** - Allow Manual control from 1 light to all lights connected to it. **See Section "Lead/Follow [59]"**
- **Output Mode** - Set the Output level of the light from Normal, High or Low. **See Section "Output Mode [27]"**
- **Power On Mode** - With Button, turns on with Power Button. With Input, turns on when power is connected. **See Section "Power On Mode [28]"**
- **Status Lights** - When using the lights on camera, the status LEDs on the endcap can be turned off. They also can be turned off with button shortcuts by pressing and holding Enter/Check for 5 seconds.

  > **NOTE**
  > When set to OFF, the status lights do turn on whenever the screen is on. They will turn off again when the screen goes dark. See Section: Button Shortcuts [18]

- **Languages** - English (Check the website for additional languages.)
- **Lamp Hours** - Displays the number of hours the light has been powered on. Press Enter to show the number of hours the LEDs have been illuminated.
- **Update Firmware** - Set the light into Update mode.

- **Firmware** - Displays the Firmware version of the light. Press Enter on the screen to show additional hardware and software versions. **See Section "Updating Firmware [116]"**
- **Reset to Default** - Sets the light back to all its default values.

WIRED CONTROL MENU

Allows For Wired Control Of Quasar Fixtures.

There are three main menus within the Wired Mode menu, DMX512, Art-net, and sACN. DMX512 requires additional settings in the DMX settings menu. Art-net and sACN require additional settings in the Ethernet Settings menu.

- **Wired Mode** - Choose DMX512 or Ethernet Mode to Wire Control the light.
  - **DMX** - Control the light with DMX512.
  - **Ethernet** - Control the light with sACN or Art-Net.
- **DMX Settings**
  - **DMX Channel** - Set the DMX Channel 001 to 512.
  - **Terminate** - Terminate the DMX Signal when last in line.
- **Ethernet Settings**
  - **View IP Address** - Show the IP address automatically received through DHCP or the Static IP address set.
  - **IP Address Mode** - Set the IP Address Mode.
    - **DHCP (Auto)** - Allow the light to obtain the IP address from the router automatically.
    - **Static** - Allow the light to set the IP address manually.
  - **Save DHCP as Static** - Save the info received from the DHCP Router and save as a Static IP, changing Mode to Static.
  - **IP Address, Subnet Mask, Gateway** - Enter the IP address, Subnet mask, and Gateway.
  - **Universe** - Set the Universe for the light.
  - **DMX Channel** - Set the DMX Channel 001 to 512.
  - **Ethernet Mode** - Choose the Ethernet protocol: sACN/Art-Net, sACN Only, Art-Net Only.

DMX5120

DMX signal into the LAN 1 port of the Quasar Fixture. On all Quasar Fixtures LAN 2 outputs the DMX signal. The Quasar Fixture will need a starting DMX address that corresponds with the Patch on the control console.

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To set the start address of the Quasar Fixture in Wired DMX Control:
Go to Config →DMX512 → DMX Channel

To enable the internal resistor that terminates the DMX line to prevent reflection issues:
Go to Config → DMX512 → Terminated

Art-net

Art-net signal into the LAN 1 Port of the Quasar Fixture. Quasar RR fixtures output the Art-net signal on the LAN 2 port. Quasar R2 fixtures DO NOT output Art-net on the LAN 2 port. Fixtures receiving Art-net require the following settings to function.

- IP Address
- Subnet Mask
- Router
- Universe
- Starting DMX Address

If there is a DHCP server on the Lighting Network the IP Address, Subnet Mask, and Router can set automatically in the IP Addr Mode by Enabling Auto.

To configure the lamp to receive Art-net if using DHCP:

- Go to Config → Wired Settings → Art-net
- Config → Ethernet Settings → IP Addr Mode -> Auto
- Config → Ethernet Settings → Universe
- Config → Ethernet Settings → DMX Channel

To configure the lamp to receive Art-net if using Static IP addresses:

- Go to Config → Wired Settings → Art-net
- Config → Ethernet Settings → IP Addr Mode -> Static
- Config → Ethernet Settings → Set IP Addr
- Config → Ethernet Settings → Set Subnet Mask
- Config → Ethernet Settings → Set Gateway
- Config → Ethernet Settings → Universe
- Config → Ethernet Settings → DMX Channel

IP SETTINGS MENU NAVIGATION SACN

Menu structure for Ethernet Settings

- **View IP Address** - Displays the current IP address assigned to the fixture
- **IP Address Mode**
  - **Auto** - The fixture requests an IP Address from a DHCP server on network. Requires a DHCP server to function correctly
  - **Static** - Opens additional submenus that allow for the following
    - **User assigned IP address** Default is 192.168.4.2
    - **Subnet mask** Default is 255.255.255.0
    - **Gateway** Default is 192.168.4.1
- **Save DHCP as Static** - Stores current IP address to onboard memory
- Multicast - **Enabled**/Disabled
- **Universe** - DMX Universe fixture is patched to
- **DMX Channel** - DMX Start address fixture is patched to
- **Node Mode**
  - When *enabled* the LAN 2 Port of the fixture will output DMX
  - When *disabled* the LAN 2 port of **RR** fixtures will function as a network switch
  - When *disabled* the LAN 2 Port of **R2** fixtures is **disabled**
- **DMX Out Universe** - DMX Universe output on LAN2 port when Node Mode is enabled

IP SETTINGS MENU NAVIGATION ART-NET

Art-Net Requires Network Settings To Be Correct To Function
IP addresses of control devices and Quasar Science fixtures must be in the correct ranges for network communication to work correctly.

Menu structure for Ethernet Settings

- **View IP Address** - Displays the current IP address assigned to the fixture
- **IP Address Mode**
  - **Auto** - The fixture requests an IP Address from a DHCP server on network. Requires a DHCP server to function correctly

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- **Static** - Opens additional submenus that allow for the following
  - **User assigned IP address** Default is 192.168.4.2
  - **Subnet mask** Default is 255.255.255.0
  - **Gateway** Default is 192.168.4.1
- **Save DHCP as Static** - Stores current IP address to onboard memory
- **Universe** - DMX Universe fixture is patched to
- **DMX Channel** - DMX Start address fixture is patched to
- **Node Mode** - Disabled/Enabled - DMX Out Uni
  - When *enabled* the LAN 2 Port of the fixture will output DMX
  - When *disabled* the LAN 2 port of **RR** fixtures will function as a network switch
  - When *disabled* the LAN 2 Port of **R2** fixtures is **disabled**
- **DMX Out Universe** - DMX Universe output on LAN2 port when Node Mode is enabled

OUTPUT MODE

The RR And R2 Lights Can Operate In 3 Output Modes
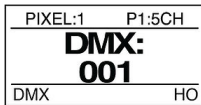
Normal Output: Normal Operating Temperature, standard light output.

High Output: High Operating Temperature, maximum output. This is the default.

Low Output: Gives maximum resolution in the low dimming section of the light. Maximum power is about 25% of High Output.

> **NOTE**
> If you are living in the 0%-25% of the light output when in HIGH OUTPUT MODE, switch to low output to get even better performance.

The Output mode of the fixture can be set several different ways:

- During initial configuration the fixture can be set in any one of the three modes
- Using RDM
- Using Fixture Profiles 31-52 allows for Output mode to be changed dynamically using the last DMX channel of the profile

> **TIP**
> **Button Shortcut:** Press and hold ENTER + RIGHT to change the Output Mode

See Section: Output Mode Channels [72]

POWER ON MODE

Power On Mode is used to tell the light when it should turn on. It can be set to "with Input" or "with Button"

When set to "**with Button**", after connecting the light to a power source the **Power Button** must be pressed. This is recommended for normal operation.

When set to "**with Input**," the light will turn on when power is applied, bypassing the power button. This mode is preferred when the light is rigged in a set or a spot that is remote or difficult to reach. In a Studio setting this would be the preferred method to have the light turn on.

CONFIGURING QUASAR FIXTURES USING RDM

Quasar Fixtures Can Be Remotely Configured Using RDM Over DMX
The following commands are available through RDM

Rainbow 2

- **Identify/Discovery** - When enabled the fixture will flash blue to identify the fixture until the user stops the process.
- **Set DMX Address** - Sets the start address for the fixture
- **Choose Fixture Profile** - Sets what fixture profile the fixture will use
- **Enable/Disable Status LEDs** - A numeric value to turn the status LEDs in the fixture On or Off. Default value is 1.
  - 0 = Off
  - 1 = On
- **Change Output Mode** - A numeric value to change output mode of the fixture. Default value is 2.
  - 0 = Low Output
  - 1 = Normal Output
  - 2 = High Output
- **Change Pixel Mode** - A numeric value to set the Pixel count of the fixture. The below chart defines the values.

Fixture Type	R2-25	R2-50	R2-100	RR-50	RR-100
Pixel Selection			# of Pixels		
0	1	1	1	1	1
1	2	2	2	2	2
2	5	3	3	5	3
3	10	4	4	10	4
4		6	6	20	6
5		8	8		8
6		12	12		12
7		24	16		24
8			24		48
9			48		

- **Set Fixture Name** - Allow the user to assign a name to the fixture using RDM that is discoverable using RDM.
- **Display fixture temperature** - Allow the user to remotely onitor the temperature of the fixture using RDM
- **Power Cycle Fixture** - Allow the user to power cycle fixtures over RDM. The fixture will rebbot with its current configuration.
- **Reset Fixture** - Allow the user to reset the fixture to factory default configuration

> ⚠️ **CAUTION**
> Resetting the fixture to default over Wireless DMX will result in a loss of wireless connectivity due to the fixture turning off the CRMX receiver.

Using RDM with DMXcat to reconfigure Quasar Fixtures

1. Bluetooth pair your phone or tablet to the DMXcat
2. Choose RDM controller
3. RDM devices will populate to device list
   a. Tapping on the device listed opens the quick menu where the DMX Start address can be changed
   b. User can Identify Fixture by choosing the Lightbulb icon
   c. User can enter the RDM menu by choosing the RDM icon
   d. User can enter the DMX database by choosing the DMX icon
   e. Basic Info
      i. Read the Fixture Label
      ii. Change the DMX start address. This is where the user can change the DMX start address of the fixture
      iii. Change the DMX personality The RDM menu has more expansive options for changing device settings. This is where the user can change the profile the fixture is set to
   f. Product Info
      i. Fixture Type
      ii. Manufacturer
      iii. Device Label
      iv. Firmware version
      v. RDM UID
   g. Power Lamp
      i. Device hours
      ii. Lamp hours
   h. Manufacturer Settings
      i. Status LEDs Enable - This is where the user can enable(1) or disable(0) the status LEDs on the fixture
      ii. Output Mode - This is where the user can set the fixture to either High (2), Normal (1), or Low (0) output.
      iii. Pixel Selection - This is where the user can set the number of pixels the fixture uses.

Rainbow 2

Using RDM on EOS
RDM needs to be enabled in several locations on EOS to use it.

To enable RDM over network
In the Shell → Settings → Network → Interface Protocols → RDM

To enable RDM from the DMX ports on the console
Displays → Setup -> System → Output

Toggle RDM on for the port being used

*Device restart is required

To use RDM within EOS
Patch → Device List → RDM → Device Discovery → Enabled

Toggle format to be in Address view to see RDM devices

*Build 2.92 and later Only show RDM devices in address view

Fixture on the Device List can be configured by selecting them

Using RDM on Concert
Quasar fixtures can be configured remotely using RDM and ETC's free Concert software. Concert is a device management program that can be run on the EOS line of consoles or a computer connected to the lighting control network.

RDM needs to be enabled in several locations for this to function correctly.

To enable RDM over network
In the Shell → Settings → Network → Interface Protocols → RDM

Using RDM on Concert

1. Launch Concert and create Network Map
2. Select Gateway on the Network Map

3. Select port and Enable RDM
4. Send device configuration to devices.
5. Recreate Network map to see RDM devices
6. Select Quasar Fixtures
7. Modify devices
8. Send Device configuration to device.

Using RDM with Supernova app over wireless DMX

Quasar fixtures can be configured remotely using RDM and Lumen Radio Supernova App. Supernova is a device management program that can be run on a computer connected to the lighting control network.

1. Connect the Quasar Science fixture to the wireless transmitter. Detailed instructions can be found here.
2. Launch Supernova App on a computer connected to the Wireless DMX transmitter.
3. Allow Supernova to discover connected RDM devices. If this does not happen at start up Discovery can be launched by clicking on the Discovery Icon (Magnifying Glass) on the uper task bar
4. RDM Devices can be selected and modified by clicking on them. This opens a device window that allows the user to modify the various fields on the fixture. When done making changes to the fixture press transmit to send the new configuratiion to the device.

NOTICE
This feature requires the Timo 2 chip to be updated to firmware 1.0.6.3 or later.

Control Options

VIEW THE CONTROL OPTIONS FOR RR AND R2

The RR and R2 has the following methods of control input:

1. **Manual mode** [38] with on screen controls and device buttons
2. **Wired DMX** [39] through the RJ45 ports
3. **Wired Ethernet** [40] for Art-Net [40] and sACN [42] control
4. **Wireless DMX** [44] with on board Lumen Radio chip
5. **Wifi** [44] Control with Art-Net over Wifi
   - Connecting to Luminair over Wifi [47]
   - Connecting to Blackout over Wifi [52]
6. **Wireless Bluetooth** [56] control with iOS / Android apps
   - Bluetooth connections Luminair over Bluetooth [57]
   - Bluetooth connections Blackout over Bluetooth [59]
7. Lead / Follow Mode for manually controlling many RRs - R2s from one light. Through Wired DMX daisy chaining lights or Wirelessly through Wireless DMX

Quasar Science fixtures operate under Hold Last Look when data is lost. If data is interrupted to the fixture, it will freeze output in its current state and go into Manual Mode. If the user begins to make changes to the manual settings the fixture will apply the Intensity, Hue and Saturation values from the first pixel to the entire fixture.

Data Priority
The Order of DMX Priority is: Wired Data first, then Wireless Data.

If a light is being controlled wirelessly and then Wired Data is applied, the Wired data will take priority.

WIRE AND WIRELESS OPTIONS

1. **Manual** - Manual Mode with On Screen Controls
2. **Wireless [44]** - Wireless DMX via CRMX and W-DMX
   a. Control from Tx hard line DMX from Lighting Console
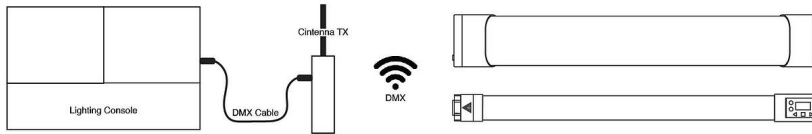
   b. Control from Apollo Bridge/AKS/Satellite (3 different Icons) via Apple iPad over WiFi

3. **Bluetooth [56]**
   a. Bluetooth Direct Control From iOS device to Lamp via Blackout and Luminair

QUASAR SCIENCE
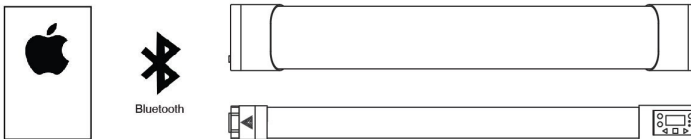
b. Blackout and Luminair Bluetooth to MoonLite to CRMX Control of lamps

Bluetooth   Moonlite   DMX

4. **WiFi [44]**

a. Connect the lamp to a Wireless Access Point to control with Art-Net over Wifi with Console or iOS

WiFi ARTNET   ROUTER   WiFi ARTNET

b. Lamp functions as a Wireless Access Point for iOS to connect directly to 1 lamp

WiFi ARTNET
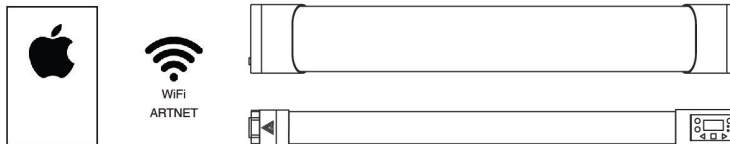
5. **Wired [39]**
    - Hard line DMX Cable from Lighting Console to multiple lamps
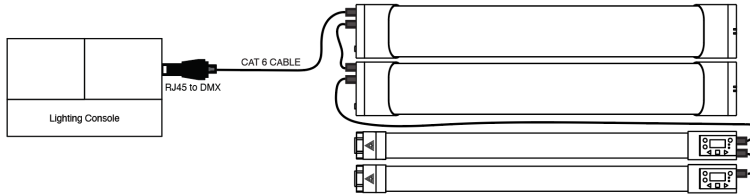
6. **Art-Net [40]** *(Unicast preferred)*
    a. Hard line Cat6 from Lighting Console to RR/R2

    b. Hard line Cat6 from Lighting Console to RR throughput to multiple RRs

Rainbow 2
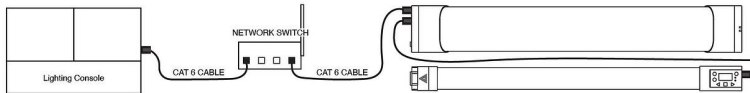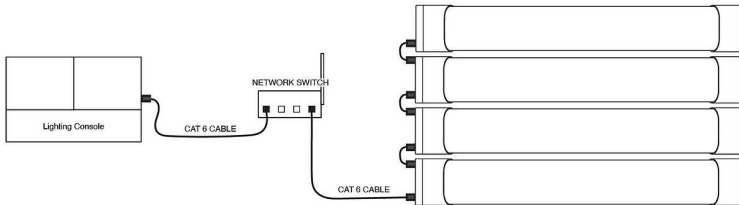
7. **sACN [42]**
   a. Hard line Cat6 from Lighting Console to RR/R2
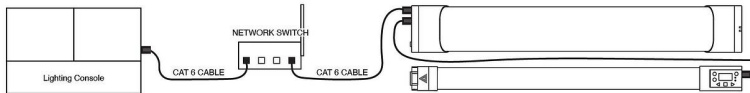
   b. Hard line Cat6 from Lighting Console to RR throughput to multiple RRs
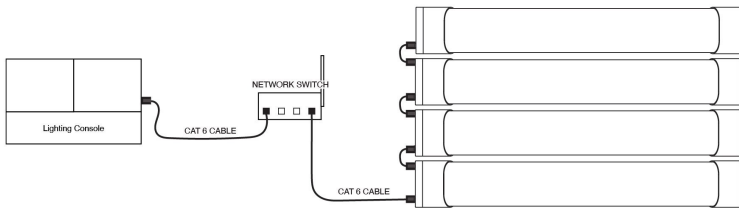
8. **Node Mode [61]**
   - Art-Net or sACN hard line Cat6 from Lighting network to RR/R2 to DMX data out.***Art-Net currently supports the node fixture outputing a different universe within a 14 universe range based on the universe of the node fixture, sACN supports outputting the same universe as the node fixture.
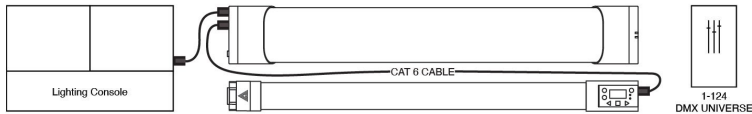
9. **Lead / Follow [59]**

    a. Lead lamp to wired Followers

CAT 6 CABLE

CAT 6 CABLE
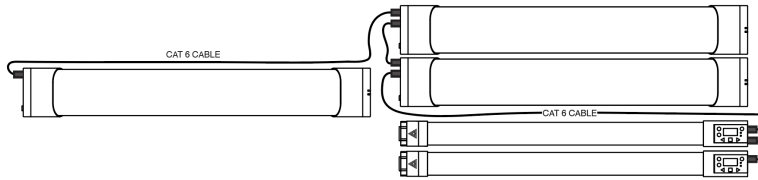
    b. Lead lamp to wireless Followers via CRMX

DMX

MANUAL MODE

PIXEL:1		P1:5CH
MANUAL		
DMX	DMX: 001	LO
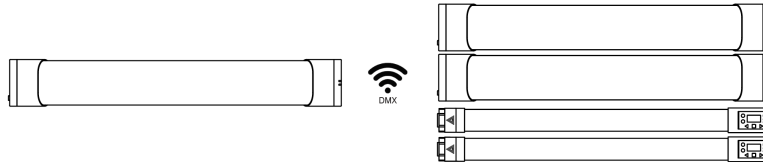
When RRs and R2s are running in **Manual** mode, parameters can be changed directly on each unit with the on board controls and OLED screen. No need for an external controller to be present.

Whenever a light is not being controlled remotely and/or receiving external data, it is in **Manual** mode.

While displaying **Manual** mode, it will also display the data ready for a connection. It will show the number of Pixels, Profile, total number of channels it occupies and the DMX start address.

WIRED CONTROL: DMX

```
PIXEL:1        P1:5CH
       DMX:
       001
DMX              HO
```

RR and R2 lights have RJ45 ports for control with DMX512 or with Ethernet. Conventional DMX 5 pin to RJ45 converters can be used.

To set Lamps to Wired DMX Control:

1. Go to **Config → Wired Settings**, set the **Wired Mode** to "**DMX512**"
2. Go to **Config → Wireless Settings**, set the **Wireless Mode** to "**Off**"
3. Go to **Config → Status Lights** and set to "**ON**"

When the lamp has a Wired Data connection, Wireless connection and Manual data will be ignored, as the priority goes to Wired.

When lights are controlled with **Wired DMX**, the screen displays the DMX start address, the number of Pixels, Profile, total number of channels and **Output Mode**. If the lights lose wired data they will hold last look until either data is restored or a manual change is implemented. If the light is in multipixel mode the and it loses wired data subsequent manual changes will take the state of pixel one and apply it to the entire light.

Each light has a **DMX IN** port and **DMX OUT** port, which allows for daisy chaining.

The lights have an internal switching mechanism between DMX In and Ethernet In. The lights must be set to DMX512 for DMX control.

The pinout of the RJ45 is:

- RJ45 Pin 1: DMX + = DMX 5Pin: Pin 3
- RJ45 Pin 2: DMX − = DMX 5Pin: Pin 2

- RJ45 Pin 7/8: Ground = DMX 5Pin: Pin 1

> **NOTE**
> When the light is set to DMX mode, there is always DMX out on the Outport.

WIRED CONTROL: ART-NET

```
PIXEL:48    P7:432CH
   UNI:037
   DMX:001
ART    IP:000.114    HO
```

Control systems using Art-Net can be either broadcast or unicast. Broadcast systems do not require the IP addresses on the fixtures to be known by the controller. Unicast systems require the fixture to have an IP address as well as a subnet mask since the controller is sending the information directly to the fixture.

> **NOTE**
> The default settings for Quasar Science fixtures is Multicast and DHCP enabled

To set up the fixture to using Art-Net Broadcast

1. Go to Config → Wired Settings → Wired Mode
   and set the light to Art-Net.
2. Go to Config → Ethernet Settings → Universe
   Set the fixture to the universe it is patched to. Art-Net Offsets the universe by -1 so for a fixture patched in Universe 1 set this to 0 on the fixture.
3. Optional Config → Ethernet Settings → IP Add Mode → Static
   The user will can now set the IP and subnet mask of the fixture in the ethernet settings menu. Detailed instructions can be found here [26]
4. Go to Config → Ethernet Settings → DMX Channel
   Set the DMX Address the fixture is patched to

5. Connect the fixture to the lighting control network
6. Profit!!!

To set up the fixture to using Art-Net Unicast

1. Go to Config → Wired Settings → Wired Mode
   and set the light to Art-Net.
2. Go to Config → Ethernet Settings → Multicast → disabled
   The fixture is now in Unicast mode and the controller needs to know the IP address for the fixture
3. Config → Ethernet Settings → IP Add Mode → Static
   The user will can now set the IP and subnet mask of the fixture in the ethernet settings menu. Detailed instructions can be found here
4. Go to Config → Ethernet Settings → Universe
   Set the fixture to the universe it is patched to. Art-Net Offsets the universe by -1 so for a fixture patched in Universe 1 set this to 0 on the fixture.
5. Go to Config → Ethernet Settings → DMX Channel
   Set the DMX Address the fixture is patched to
6. Connect the fixture to the lighting control network
7. Profit!!!

An additional option for Quasar Science fixtures receiving Art-Net is Node Mode which allows the LAN 2 port of the fixture to output DMX.

NOTE

When the light is set to Art-Net, it will not respond to DMX.

Art-Net uses Universe 0 as the first Universe of DMX that it transmits. This should be noted when using Art-Net.

The Universe field on the display will flash if the fixture is set to a universe not being transmitted.

The wired network substatus screen [14] will become enabled when the fixture is set to recieve data via network.

NOTICE

The LAN 2 port on Quasar Science Double Rainbows can act as a network switch and retransmit network traffic that the fixture receives

The LAN 2 port on Quasar Science Rainbow 2's do not act as a network switch and will NOT retransmit network traffic.

WIRED CONTROL: SACN

SACN Is An Network Based Ethernet Protocol Used To Control Lighting Fixtures.

Control systems using sACN can be either multicast or unicast. Multicast systems do not require IP addresses on the fixtures to be known by the controller. Unicast systems require the fixture to have an IP address as well as a subnet mask since the controller is sending the information directly to the fixture.

> **NOTE**
> The default settings for Quasar Science fixtures is Multicast and DHCP enabled

To set up the fixture to using sACN Multicast

1. Go to Config → Wired Settings → Wired Mode
   and set the light to sACN.
2. Go to Config → Ethernet Settings → Universe
   Set the fixture to the universe it is patched to
3. Optional Config → Ethernet Settings → IP Add Mode → Static
   The user will can now set the IP and subnet mask of the fixture in the ethernet settings menu. Detailed instructions can be found here [26]
4. Go to Config → Ethernet Settings → DMX Channel
   Set the DMX Address the fixture is patched to
5. Connect the fixture to the lighting control network
6. Profit!!!

To set up the fixture to using sACN Unicast

1. Go to Config → Wired Settings → Wired Mode
   and set the light to sACN.
2. Go to Config → Ethernet Settings → Multicast → disabled
   The fixture is now in Unicast mode and the controller needs to know the IP address for the fixture
3. Config → Ethernet Settings → IP Add Mode → Static
   The user will can now set the IP and subnet mask of the fixture in the ethernet settings menu. Detailed instructions can be found here [26]
4. Go to Config → Ethernet Settings → Universe

Set the fixture to the universe it is patched to
5. Go to Config → Ethernet Settings → DMX Channel
Set the DMX Address the fixture is patched to
6. Connect the fixture to the lighting control network
7. Profit!!!

An additional option for Quasar Science fixtures receiving sACN is Node Mode [61] which allows the LAN 2 port of the fixture to output DMX.

NOTE

When the light is set to sACN, it will not respond to DMX.

sACN uses Universe 1 as the first Universe of DMX that it transmits. This should be noted when using sACN.

The Universe field on the display will flash if the fixture is set to a universe not being transmitted.

The wired network substatus screen [14] will become enabled when the fixture is set to recieve data via network.

NOTICE

The LAN 2 port on Quasar Science Double Rainbows can act as a network switch and retransmit network traffic that the fixture receives

The LAN 2 port on Quasar Science Rainbow 2's do not act as a network switch and will NOT retransmit network traffic.

WIRELESS CONTROL: CRMX / W-DMX

```
PIXEL:1        P1:5CH
DMX:
001      ▄▄▐█▐█
CRMX           HO
```
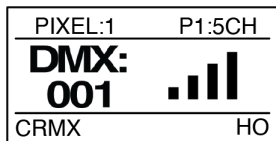
Each RR and R2 is equipped with a Lumen Radio Timo chip for wireless connectivity over CRMX or W-DMX.

For wireless operation, go to **Config → Wireless ON** or Double Press the **Link** ⊘ button

Wireless Pairing

To link an RR or R2 light to a transmitter

1. Go to **Config → Wireless Settings**,
   set the Wireless Mode to "Wireless DMX"
2. Go to **Config → Status Lights** and set to "**ON**"

If the **Link LED** is flashing, press and hold the **Link** ⊘ button to unpair.

On the DMX Transmitter, tap the **Link** button to Pair.

The **Wireless LED** will start to flash and turn solid once paired.

WIRELESS CONTROL: WIFI

Wifi Control Allows Fixtures To Connect To Existing Wireless Networks Or Create Their Own Wireless Network For Control.
RR and R2 can be controlled using Wifi either over an existing wifi network or by using a Quasar Science fixture as a wireles AP to create a Wifi network.
Quasar Science fixtures operate only on the 2.4gHz spectrum for Wifi. Quasar Science fixtures do not use the 5.0gHz spectrum.

Rainbow 2

> **NOTE**
> If updating to 0.6 where Wifi is first introduced, you must update the Wifi Chip separately. **See How to Update Wifi Module**

To Enable control over an existing Wifi network:

1. Set the Wireless mode to
   → Config Wireless Mode → Wifi
   ***In this mode the Wifi Settings menu is active
2. Configure the fixture to join a Wifi network. Go to
   Config → Wireless Settings → Wifi Mode → Client
3. Select the wifi network you would like to join. Go to
   Config → Wireless Settings → Wifi Settings → Set Network.
   The status LEDs will flash as the fixture scans for the wireless networks and displays them in order of signal strength
4. Use the ◁ and ▷ arrows to scroll through the listed networks and ☑ to select.
5. Use the ◁ and ▷ arrows to scroll letters and numbers to set the network Password.
6. Use the ☑ to advance the cursor.
7. The password field loops back to the beginning from the end. In the event that a wrong character is entered in the password field use the ☑ to advance all the way to the right and it will loop back to the beginning
8. Press and hold ☑ after entering the last character in the password.
9. The Wifi Status Screen will display the name of the Wifi network the fixture has joined. If there is a controller broadcasting Art-Net on the wifi the staus LEDs on the fixture will be Data = Yellow, Wifi = Magenta.

To enable control using a Quasar Science fixture as an Access Point (AP):

1. Set the Wireless mode to
   Config → Wireless Mode → Wifi
2. Set the fixture into AP mode,
   Config → Wireless Settings → Wifi Settings → Wifi Mode → AP
   When in AP mode the main display of the fixture will show the SSID of the Wifi network. The AP SSID will begin with QS: XXXXXXXX

3. On the control tablet join the Wifi network being broadcast by the AP fixture. The password for the AP Wifi is:1234567890
4. If there is a controller broadcasting Art-Net on the wifi the staus LEDs on the fixture will be Data = Yellow, Wifi = Magenta.

Wifi Settings

- **Wifi Status** - Show current Wifi connection with signal strength or any errors
- **Set Network** - Display available Wifi networks in descending order of signal strength. When the user selects a network they are prompted to enter the password for the network.
    - Use the ◁ & ▷ buttons to scroll through the alphabet.
    - A short press of ☑ will advance the cursor to the next space.
    - A long press of ☑ will transmit the password and attempt to join the selected Wifi network.
    - The password entry cursor will scroll back to the beginning of the password field from the end of the field.
    - Allowable password characters are: a-z, A-Z, 0-9, !, @, #, $, ?

> **NOTE**
> If the network does not need a password leave the password field blank and press the ☑ to advance the cursor to the end of the entry field to join the network.

- **Set IP** - The user can choose between DHCP or static IP address. This is the menu that allows the user to set a static IP address and subnet on the fixture when connecting to an external Access point.
- **Enable AP Mode** - The fixture can act as its own access point and DHCP server to create a wifi network. The fixture will broadcast the network ssid and act as the WAP and router for the network. The fixture will have an IP address of-192.168.4.1
  The fixture will distribute IP addresses in the following IP Schema:
    - IP address: 192.168.4.XXX
    - Subnet Mask: 255.255.255.0
- **Reset Wifi Settings** - Resets the IP/subnet settings and sets the AP mode to OFF

LED indicators
Wireless LED

- Solid Magenta - Light is connected to wireless network.
- Slow Flashing Magenta - Lamp has router information saved, but it is not found.

- Fast Flashing Magenta - Lamp is connecting to a wireless network.
- Magenta /Red Flashing - Lamp has failed attempt to connect to saved network (Wrong Password or Error).
- Solid Orange - Fixture is acting as Wifi Access Point and broadcasting the network SSID

Data LED

- Yellow - Art-Net DMX packets are being transmitted

> **TIP**
> **Secret Menu Tip:** In Wifi mode, double tap and then press the to get to the wifi settings menu

CONNECTING LUMINAIR ART-NET OVER WIFI NETWORK

Art-Net Over Wifi: Tablet → Wifi → Router → Wifi → RR-R2 | Wired Art-Net: Tablet → Wifi → Router → Cat5 → RR-R2
There are a number of tablet-based apps that will transmit Art-Net over wifi. These systems allow for control of fixtures and freedom of movement for the user and the fixtures. While each applications setup requirements differ they all have a number of common settings that will be required.

One way to set up this system is to have both the tablet and the Quasar science fixture connect to a wifi network using a wireless access point. This network will need a DHCP server handing out IP addresses on it.

To connect the Quasar Science fixture to an existing wifi network

1. Set the Wireless mode to
   Config → Wireless Mode → Wifi
   ***In this mode the Wifi Settings menu is active
2. Configure the fixture to join a Wifi network. Go to
   Config → Wireless Settings → Wifi Mode → Client
3. Select the wifi network you would like to join. Go to
   Config → Wireless Settings → Wifi Settings → Set Network
   The status LEDs will flash as the fixture scans for the wireless networks and displays them in order of signal strength

4. Use the ◁ and ▷ arrows to scroll through the listed networks and ☑ to select.

5. Use the ◁ and ▷ arrows to scroll letters and numbers to set the network Password.

6. Use the ☑ to advance the cursor.

7. Press and hold ☑ after entering the last character in the password.

8. The Wifi Status Screen will display the name of the Wifi network the fixture has joined. If there is a controller broadcasting Art-Net on the Wifi the status LEDs on the fixture will be Data = Yellow, Wifi = Magenta.

1. Open Settings → Wifi
2. Select the Wifi network and enter the password
3. Launch the control app. In this case it will be Luminair
4. In the App, load your project and open the left tab of the Luminair interface
5. Select **Connections**. This opens up the **Connections** window

6. Select Art-Net. This opens the Art-Net configuration window
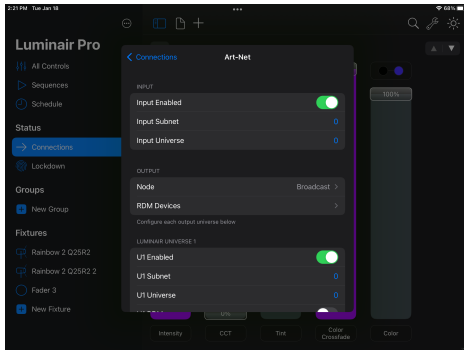
7. Enable the universes of the fixtures to be controlled
   Luminair defaults to Broadcast Art-Net. For more information about this see this article.
8. Once Luminair is connected, the **Wireless Status Light** will be purple and **Data Status Light** will be Yellow. Unless the **Status Lights** have been turned off

To set up the fixture to use Art-Net Broadcast:

Another way to set up this system is to have the tablet connect the network using Wifi, and the Quasar Science fixture connect to the network using a cat5 cable and a switch.

1. Go to Config → Wired Settings → Wired Mode
   and set the light to Art-Net.
2. Go to Config → Ethernet Settings → Universe
   Set the fixture to the universe it is patched to. Art-Net Offsets the universe by -1 so for a fixture patched in Universe 1 set this to 0 on the fixture.
3. Optional Config → Ethernet Settings → IP Add Mode → Static
   The user will can now set the IP and subnet mask of the fixture in the Ethernet Settings menu. Detailed instructions can be found here [26]
4. Go to Config → Ethernet Settings → DMX Channel
   Set the DMX Address the fixture is patched to
5. Connect the fixture to the control network using a Cat5 cable.

To connect the Tablet to an existing wifi network

1. Open Settings → Wifi
2. Select the Wifi network and enter the password
3. Launch the control app. In this case it will be Luminair
4. In the App, load your project and open the left tab of the Luminair interface
5. Select **Connections**. This opens up the **Connections** window

Rainbow 2

6. Select Art-Net. This opens the Art-Net configuration window

7. Enable the universes of the fixtures to be controlled

Luminair defaults to Broadcast Art-Net. For more information about this see this article.

8. Once Luminair is connected, the **Wireless Status Light** will be off and **Data Status Light** will be Yellow. Unless the **Status Lights** have been turned off

> ❗ **IMPORTANT**
>
> On iOS 14 and above, "Local Network" needs to be turned ON for Luminair in the iOS/iPadOS Settings app > Privacy. It's a new setting in iOS 14 and greater that needs to be turned on, otherwise local network communications are blocked.
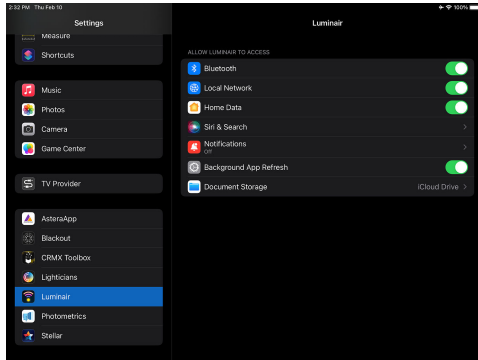
NOTICE

Recent changes to the iOS operating system may require the iPad be set in airplane mode when using wifi to transmit Art-Net. This can be found in Setting General on the iPad

CONNECTING BLACKOUT ART-NET OVER WIFI NETWORK

Art-Net Over Wifi: Tablet → Wifi → Router → Wifi → RR-R2 Wired Art-Net: Tablet → Wifi → Router → Cat5 → RR-R2

There are a number of Tablet based apps that will transmit Art-net over wifi. These systems allow for control of fixtures and freedom of movement for the user and the fixtures. While each applications setup requirements differ they all have a number of common settings that will be required.

One way to set up this system is to have both the tablet and the Quasar science fixture connect to a wifi network using a wireless access point. This network will need a DHCP server handing out IP addresses on it.

Rainbow 2

To connect the Quasar Science fixture to an existing wifi network

1. Set the Wireless mode to
   Config → Wireless Mode → Wifi
   ***In this mode the Wifi Settings menu is active
2. Configure the fixture to join a Wifi network. Go to
   Config → Wireless Settings → Wifi Mode → Client
3. Select the wifi network you would like to join. Go to
   Config → Wireless Settings → Wifi Settings → Set Network.
   The status LEDs will flash as the fixture scans for the wireless networks and displays them in order of signal strength
4. Use the ◁ and ▷ arrows to scroll through the listed networks and ☑ to select.
5. Use the ◁ and ▷ arrows to scroll letters and numbers to set the network Password.
6. Use the ☑ to advance the cursor.
7. Press and hold ☑ after entering the last character in the password.
8. The Wifi Status Screen will display the name of the Wifi network the fixture has joined. If there is a controller broadcasting Art-Net on the wifi the staus LEDs on the fixture will be Data = Yellow, Wifi = Magenta.

To connect the Tablet to an existing wifi network

1. Open Settings → Wifi
2. Select the Wifi network and enter the password
3. Launch the control app. In this case it will be Blackout
4. In the App, load your project and open the left tab of the Blackout interface

5. Select **Link Status**. This opens up the **Link Status** window

6. Select Art-Net as the Output Protocol.

7. In the **Offset** field select the universes of the fixtures to transmitted

Blackout defaults to Broadcast Art-Net. For more information about this see this article.

8. Once Blackout is connected, the **Wireless Status Light** will be purple and **Data Status Light** will be Yellow. Unless the **Status Lights** have been turned off

To set up the fixture to using Art-Net Broadcast

Another way to set up this system is to have the tablet connect the network using a wifi and the Quasar Science fixture connect to the network using cat6 cable and a switch.

1. Go to Config → Wired Settings → Wired Mode

and set the light to Art-Net.

2. Go to Config → Ethernet Settings → Universe

Set the fixture to the universe it is patched to. Art-Net Offsets the universe by -1 so for a fixture patched in Universe 1 set this to 0 on the fixture.

3. Optional Config → Ethernet Settings → IP Add Mode → Static

The user will can now set the IP and subnet mask of the fixture in the ethernet settings menu. Detailed instructions can be found here [26]

4. Go to Config → Ethernet Settings → DMX Channel

Set the DMX Address the fixture is patched to

Rainbow 2

5. Connect the fixture to the control network using a Cat5 cable.

To connect the Tablet to an existing wifi network

1. Open Settings → Wifi
2. Select the Wifi network and enter the password
3. Launch the control app. In this case it will be Blackout
4. In the App, load your project and open the left tab of the Blackout interface
5. Select **Link Status**. This opens up the **Link Status** window

6. Select Art-Net as the Output Protocol.
7. In the **Offset** field select the universes of the fixtures to transmitted
Blackout defaults to Broadcast Art-Net. For more information about this see this article.
8. Once Blackout is connected, the **Wireless Status Light** will be purple and **Data Status Light** will be Yellow. Unless the **Status Lights** have been turned off

WIRELESS CONTROL: BLUETOOTH

How To Connect Over Bluetooth

```
┌─────────────────────────┐
│ PIXEL:2        P1:10CH   │
│ DMX:                     │
│  001         ..▪▮▮▮      │
├─────────────────────────┤
│ BT      DMX: 001         │
└─────────────────────────┘
```

The RR and R2 lights can be controlled over Bluetooth using the Blackout Lighting Console or Luminair app for iOS. Fixture labels will appear in the Bluetooth connections menu of the various apps used to control the fixtures (requires CRMX firmware v1.0.5 or later).

When Wireless Mode is set to Bluetooth, "BT" will appear in the bottom left corner.

When connected over Bluetooth, the Wireless Status Light and Data Status Light will be set to Blue. The Screen will show the Bluetooth Strength, along with the DMX Start Address.

● Data
● 📶

Bluetooth ModeData:

Blue / Wireless: Blue

TIP

Bluetooth connection can be reset by pressing and holding the ⊘ for 3 seconds

Rainbow 2

CONNECTING WITH LUMINAIR OVER BLUETOOTH

Luminair 4

1. In the Lamp's settings, Go to
   Config Menu → Wireless Settings → Bluetooth
2. In the App, load your project and open the left tab of the Luminair interface
3. Select **Connections**. This opens up the **Connections** Window
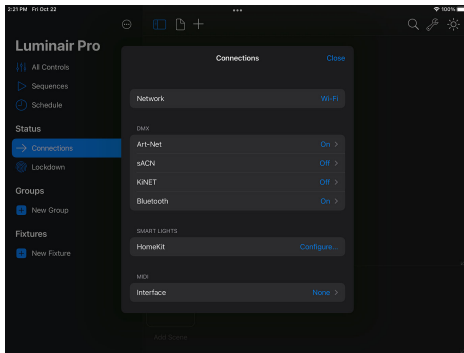
4. Select Bluetooth. This opens up the BLE Devices Window
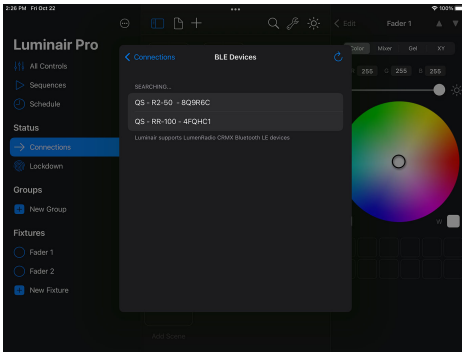
5. Select your Lamps from here.
   a. If the lamps currently appear as "TimoTwo" Quasar Science recommends updating the firmware on the TimoTwo chip. Instructions on this process can be found here. Future updates will have the lamp's name and model number.
   b. Note that only a single app can be connected to BLE hardware as part of the Bluetooth specification.
   c. Also note that only a single DMX Bluetooth accessory can be connected at a time. It isn't currently possible to output over Bluetooth to multiple devices within Luminair.
6. Once connected, the **Wireless Status Light** and **Data Status Light** on the light will both be Blue. Unless the **Status Lights** have been turned off.

Luminair 3

1. In the Lamp's settings, Go to
   Config Menu → Wireless Settings → Bluetooth
2. In the App, select the circle in the top right corner.
3. Go to **Bluetooth → Connect**
4. Select your Lamps from here. They currently appear as "TimoTwo." Future Updates will have the lamp's name and model number.
5. Once connected, the **Wireless Status Light** and **Data Status Light** on the light will both be Blue. Unless the **Status Lights** have been turned off.
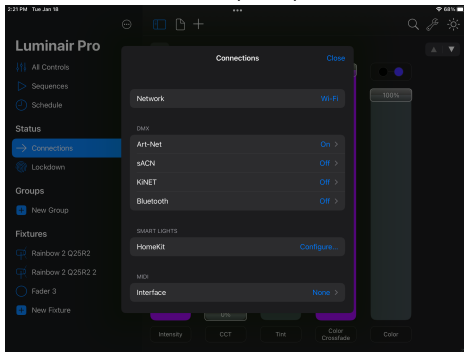**6.** Next up you need to patch the lights into the App in the correct profile to get it all up and Running.

> **NOTE**
> *Patching in Luminair Coming Soon.

CONNECTING WITH BLACKOUT LIGHTING CONSOLE OVER BLUETOOTH

1. In the Lamp's settings, Go to
   Config Menu → Wireless Settings → Bluetooth
2. In the App, load your PROJECT and LOCATION; then select **Link Status** in the top right corner.
3. Select **Bluetooth** and set which Universe to send; then close this window by selecting the "**X**" in the bottom right corner.
4. This opens up a Bluetooth Devices Window
5. Select your Lamps form here. They currently appear as "TimoTwo". Future updates will have the lamp's name and model number.

Once connected, the **Wireless Status Light** and **Data Status Light** on the light will both be Blue. Unless the **Status Lights** have been turned off.

LEAD/FOLLOW CONTROL

Within **MANUAL** control *ONLY,* **Lead/Follow Mode** turns **one** R2 or RR light into a **Lead unit** — a wired or wireless Manual Mode controller for **any** R2 & RR lamps linked as **Follow units**. Specifically, the **Lead unit** directly assumes remote color and FX control of its **Follow units**.

To create dynamic effects across multiple linked units, the **Follow feature has selectable slots from 1 to 9**. These slots run the **same** effects, intensities, and levels as the Lead Unit. **Follow 1** matches the Lead Unit directly, while **Follows 2 through 9** progressively offset effect timings across up to 8 sets of linked units.

Lead	=	Follow 2	Follow 3	Follow 4

+ x sec.   **+ y sec.**   **+ z sec.**
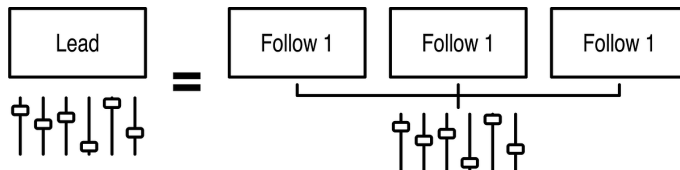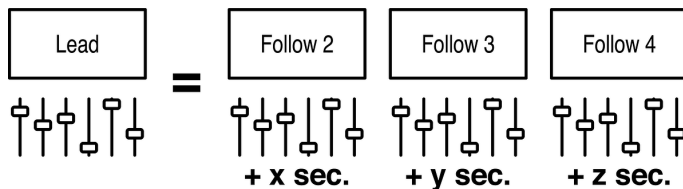
To set up **Lead/Follow**, within the **Config Menu**, navigate to the **Lead/Follow** menu and follow these steps:

1. In the **Lead unit** R2/RR lamp you've chosen to control the **Follow units**:
   a. Set this mode to "**Lead**"
   b. The **Data** status LED will turn **Green** to confirm your light as the **Lead unit**
2. In each of your **Follow** unit R2/RR lamps:
   • Set this mode to your desired **Follow #**:
      i. **Follow 1** matches the **Lead Unit** in effect timing.
      ii. **Follows 2-8** progressively offset effect timing from the **lead unit**

For Wired Linking

1. Connect your **Lead unit** to the **first** desired **Follow unit** in the signal chain using a Cat5 or Cat6 cable. One cable end should go in the **Lead Unit's LAN 2/DMX OUT** port, and the other end should go in the **Follow Unit's LAN 1/DMX IN** port.
2. Connect your **Follow units** together from that **first** follow unit in similar fashion.
3. On the **Follow units**, the **Data** status LED will turn **Cyan** to confirm your light as a **Follow unit**.

> **NOTE**
> When using LEAD/FOLLOW, the lamps should not be receiving DMX data from other sources--unexpected behavior could occur. The Lead Unit should not be receiving outside data and the Lead Unit is distributing the data within the LEAD/FOLLOW system.

For Wireless Linking

1. On the **Lead unit** & **all Follow units**, navigate to the **Wireless Mode** config submenu, set to **CRMX**. Bluetooth is disabled in LEAD/FOLLOW

2. If the **Wireless** status LED flashes on your **Follow units**, press and hold the Link button to un-pair the Follow unit from searching for a prior **Lead Unit**.
3. On the **Lead unit**, tap the **Link** button to send the pairing signal. The **Lead unit Wireless** Status LED will start flashing. The **Follow unit(s) Wireless** Status LED will flash in unison.
4. On the **Follow units**, the **Data** status LED will turn **Cyan** to confirm your light as a **Follow unit**
5. The **Wireless** status LED on ALL **Lead & Follow units** will turn **Magenta** to indicate your units are **(Lead)** transmitting or **(Follow)** receiving Wireless Lead/Follow Data.

Your Lead unit manual on-board controls will now directly control all linked Follow Units!

NOTE
CRMX rules apply with Follow Lamps; if you no longer wish to use a lamp in Follow mode, don't forget to UNLINK the Follow lamp from the Lead lamp; otherwise it will continue to listen to the Lead lamp's CRMX universe broadcast.

WIRED CONTROL: NODE MODE

Ethernet In - DMX Out
When controlling the Quasar Science fixture with wired Art-Net or sACN the LAN2 port on the fixture can be configured to send DMX out to a connected fixture. The process for setting the fixture in Node Mode is almost identical whether using sACN or Art-Net and is outlined below.

Set the fixture in

Wired Setting → Wired Mode → sACN or Wired Settings → Wired Mode → Art-Net

Some additional configuration locatate in Ethernet Settings is require to enable Node ModeNavigate to Wired Settings>Ethernet Settings

1. Set the IP Add Mode as appropriate for the lighting control system
2. Set the Universe as appropriate for the lighting control system
3. Set the DMX Channels as appropriate for the lighting control system
4. Set Node Mode to Enabled

The display will show the Input information on the left side and the output information on the right side

The following step ONLY applies to Wired Art-Net

Set the DMX Out Uni to the Universe to be output on the LAN2 port of the fixture

Connect the Node Mode fixture to the lighting control network through the LAN1 port of the fixture. The Data status LED on the fixture will turn orange when the fixture is receiving valid network signal. Connect the LAN 1 port of the fixture that will recieve DMX to the LAN 2 port of the Node Mode fixture using a cat6 ethernet cable.

> **NOTE**
>
> **sACN node mode** outputs the same Universe the fixture is receiving.
>
> **Art-Net node mode** outputs Universe is limited to a range of 14 universes based on what universe the node mode fixture is set to.

Rainbow 2

> **NOTE**
> The wired network substatus screen [14] will become enabled when the fixture is set to recieve data via network.

Power Options

AC Power
The RR and R2 lights can be powered from AC power through a True 1 Power connector. The Control side endcap has a power button. It accepts Universal Power from 110 to 240 volts for all power systems throughout the world.

DC Power
The Rainbow can be powered from DC power through a 2.1mm locking barrel connector. It accepts 10 volts to 30volts DC.

Battery Usage
When running the lights off of batteries, the following chart can be used for batter life. Many factors contribute to the length of time a battery will last, like age of battery, intensity of Rainbows and more. The following can be used as a guide only. At 24 volts in the same capacity expect double the runtime. Please ensure the battery/cable can handle the amperage.

Battery Size:		3200 mAh	6000 mAh	7200 mAh	10,000 mAh
Voltage:		12v	12v	12v	12v
Q25R2 Runtime:	1.9 amps	60 minutes	90 minutes	160 minutes	240 minutes
Q50R2 / RR50 Runtime:	3.8 amps	30 minutes	60 minutes	90 minutes	120 minutes
Q100R2 / RR100 Runtime:	7.6 amps	-	-	30 minutes	60 minutes

NOTE
When on battery power, when the battery is below operating voltage, the Rainbow will begin to flash.

Rainbow 2

Pixel Patching

PIXEL LAYOUT & GROUPING

Pixel Layout

On all the lights, the first pixel is on the "Gaffer's Left" which means the left or top left pixel for each model. For RR lights, the pixels are numbered in columns. See below.

R2

Q25R2	◄ 1 2 3 4 5 6 7 8 9 10
Q50R2	◄ 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Q100R2	◄ 1 2 3 4 5 6 7 8 9 10 11 ∫∫ 38 39 40 41 42 43 44 45 46 47 48

RR

| RR50 | ◄ 1 3 5 7 9 11 13 15 17 19 / 2 4 6 8 10 12 14 16 18 20 |
| RR100 | ◄ 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 / 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 |
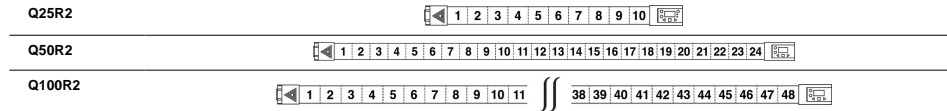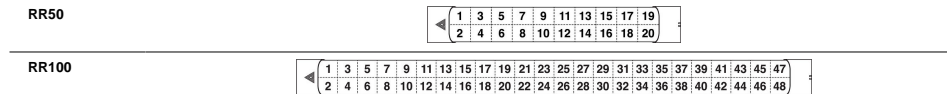
Number of Pixels

The Lights can all be simplified to be controlled as less pixels when the situation needs it. When the light is set to lower number of pixels than the total number of available pixels.

Q25R2 Pixel Grouping

Q25R2 Pixel Grouping

Number of Pixels = 1
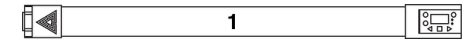
Number of Pixels = 2
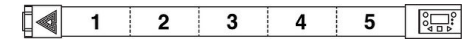
Number of Pixels = 5
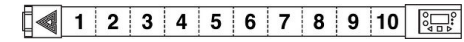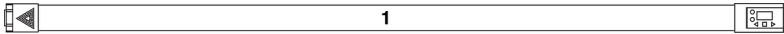
Number of Pixels = 10

Rainbow 2
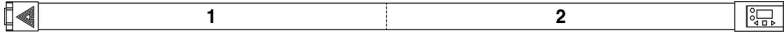
Q50R2 Pixel Grouping

Q50R2
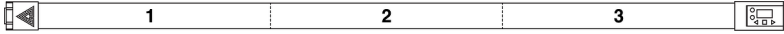
Number of Pixels = 1
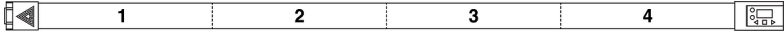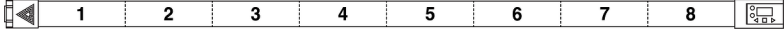
1

Number of Pixels = 2

1	2

Number of Pixels = 3

1	2	3

Number of Pixels = 4

1	2	3	4

Number of Pixels = 6

1	2	3	4	5	6

Number of Pixels = 8

1	2	3	4	5	6	7	8

Number of Pixels = 12

1	2	3	4	5	6	7	8	9	10	11	12
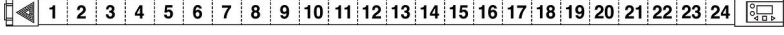
Number of Pixels = 24

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Q100R2 Pixel Grouping

Q100R2

Number of Pixels = 1

1 | 1

Number of Pixels = 2

1 | 2

Number of Pixels = 3

1 | 2 | 3

Number of Pixels = 4

1 | 2 | 3 | 4

Number of Pixels = 6

1 | 2 | 3 | 4 | 5 | 6

Number of Pixels = 8

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

Number of Pixels = 12

1 | 2 | 3 | 10 | 11 | 12

Rainbow 2

Q100R2

Number of Pixels = 16

| 1 | 2 | 3 | 4 | ... | 13 | 14 | 15 | 16 | |

Number of Pixels = 24

| 1 | 2 | 3 | 4 | 5 | ... | 20 | 21 | 22 | 23 | 24 | |

Number of Pixels = 48

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | ... | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | |

RR50 Pixel Grouping

RR50

Number of Pixels = 1
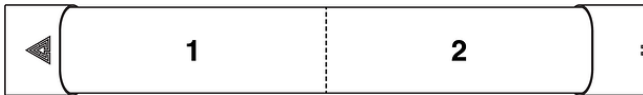
Number of Pixels = 2

Number of Pixels = 5
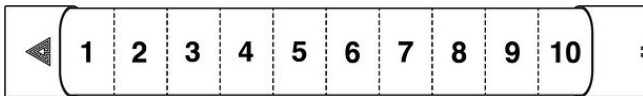
Number of Pixels = 10

Number of Pixels = 20
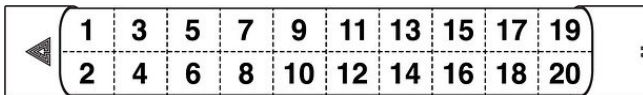
Rainbow 2

RR100 Pixel Grouping

RR100

Number of Pixels = 1

1

Number of Pixels = 2

1	2

Number of Pixels = 3

1	2	3

Number of Pixels = 4

1	2	3	4

Number of Pixels = 6

1	2	3	4	5	6

Number of Pixels = 8

1	2	3	4	5	6	7	8

Number of Pixels = 12

RR100											
1	2	3	4	5	6	7	8	9	10	11	12

Number of Pixels = 24

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Number of Pixels = 48

1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48

PARAMETER, FX, & OUTPUT CHANNEL GROUPS

Parameter Channel Groups

When programming the light pixels, each **pixel** acts as its own single "light" unit, ie, **a Parameter Channel Group** (PC Group). Each **PC Group** contains a single set of **DMX channels**, defined by the selected **DMX Profile**, to control the individual pixel.

For example, if the **Number of Pixels = 1**, the entire fixture functions as 1 group controlled by the currently set DMX Profile. If **DMX Profile** = "1: HSIC Mode – 8 Bit – 5 Channels", that group has 5 DMX control channels:

1. Intensity (%)
2. Color Temp (K)
3. +/- Green (XXXG - 0 - XXXM)
4. Hue (deg)
5. Saturation (%)

Rainbow 2

With the following layout of DMX Channel mapping for the PC Group:

	PC Group 1 of DMX Profile 1: HSIC				
	Int %	CCT	± G	Hue	Sat %
DMX Channel #	1	2	3	4	5

When using the light in multi-pixel modes, there must be a PC Group patched for each pixel. If Number of Pixels = 2, there are 10 total channels for DMX Profile 1:

	PC Group 1					PC Group 2				
	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %
DMX Channel #	1	2	3	4	5	6	7	8	9	10

When you configure, for example, the RR100 or the Q100R2, to have Number of Pixels = 48, the light has 48 Parameter Channel Groups of DMX Profile 1 for a total of 240 DMX channels:

PC Group 1					PC Group 2					PC Group 3					PC Group 4				
Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %
001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020

PC Group 45					PC Group 46					PC Group 47					PC Group 48				
Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240

Therefore, when the light is set to different profiles, the PC Group size will be different, and therefore the final DMX channel count will be different.

FX Channel Groups

Now when patching Effects profiles, there is only 1 set of Effects control channels per entire fixture. This single effects control group controls all the PC Groups, ie, all the pixels at once. We call this an FX Channel Group. For example:

	FX Channel Group		
	FX	Rate	Size
DMX Channel #	1	2	3

When using a DMX FX Profile, like DMX Profile = "9: HSIC+FX – 8 Bit — 5 DMX Channels per Pixel + 3 FX Channels", as indicated by the profile descriptor "HSIC+FX", you must add on the FX Channel Group to the end of your entire DMX patch.

For example, if Number of Pixels = 1:

	PC Group 1					FX Channel Group		
	Int %	CCT	± G	Hue	Sat %	FX	Rate	Size
DMX Channel #	001	002	003	004	005	006	007	008

If you want to have more than one pixel, the FX Channel Group must be added after ALL of the Parameter Channel Groups. So if Number of Pixels = 48, DMX Profile 9 adds 3 DMX channels for a total of 243 DMX channels:

PC Group 1					PC Group 2					PC Group 3					PC Group 4				
Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %
001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020

PC Group 47					PC Group 48					FX Channel Group		
Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	FX	Rate	Size
231	232	233	234	235	236	237	238	239	240	241	242	243

Rainbow 2

Output Channel Groups

Now when patching Standard Effects profiles, there is only 1 set of Output control channels per entire fixture. This single output control group controls all the PC Groups, ie, all the pixels at once.

We call this an Output Channel Group. For example:

	Output Channel Group
	Output
DMX Channel #	1

When using a DMX FX Profile, like DMX Profile = "9: HSIC+FX – 8 Bit — 5 DMX Channels per Pixel + 3 FX Channels", as indicated by the profile descriptor "HSIC+FX", you must add on the FX Channel Group to the end of your entire DMX patch.

For example, if Number of Pixels = 1:

	PC Group 1					FX Channel Group		
	Int %	CCT	± G	Hue	Sat %	Output	Rate	Size
DMX Channel #	001	002	003	004	005	006	007	008

If you want to have more than one pixel, the FX Channel Group must be added after ALL of the Parameter Channel Groups. So if Number of Pixels = 48, DMX Profile 9 adds 3 DMX channels for a total of 243 DMX channels:

PC Group 1					PC Group 2					PC Group 3					PC Group 4				
Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %
001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020

PC Group 47					PC Group 48					FX Channel Group		
Int %	CCT	± G	Hue	Sat %	Int %	CCT	± G	Hue	Sat %	FX	Rate	Size
231	232	233	234	235	236	237	238	239	240	241	242	243

QUASAR SCIENCE

Examples: Here is a sample patch for the RR50. 20 Pixels
For Using Profile 39, CCT RGB +O

The CCT & RGB is repeated 20 times, then 1 Output Channel per fixture

Add 20 Fixtures of "RR / R2 - Profile 7 CCT&RGB" . Give them Fixture Numbers of 401.1 → 401.20

Add 1 Fixture of "RR /R2 - Output Channel". Give it a fixture number of 401.21

Now Type 401 @ 1/001 Enter

THEN When you type in 401, you see all the parameters ALONG with the OUPUT CONTROL.

RR / R2 - Profile 07 CCT&RGB 16b	
401.1	1: 1
401.2	1: 10
401.3	1: 19
401.4	1: 28
401.5	1: 37
401.6	1: 46
401.7	1: 55
401.8	1: 64
401.9	1: 73
401.10	1: 82
401.11	1: 91
401.12	1: 100
401.13	1: 109
401.14	1: 118
401.15	1: 127
401.16	1: 136
401.17	1: 145
401.18	1: 154
401.19	1: 163
401.20	1: 172
RR / R2 - Output Channel	
401.21	1: 181

DMX Profiles

TYPES OF DMX PROFILES

The RR - R2s have 3 types of DMX Profiles

1. **DMX Standard Profiles [77]** - Profiles 1-8, 13-15
2. **DMX FX Profiles with DMX Control of Built in FX Profile** 9-12
3. **DMX Standard & FX Profiles with Output Mode [95]** - Profiles 31-45

When using DMX profiles, the amount of pixels selected determines how many instances of the profile there will be.

DMX STANDARD PROFILES & CHARTS

8bit vs. 16bit

With 8 bit profiles, each parameter is given 1 DMX channel.

With 16 bit profiles, Intensity and Hue/Crossfade are given an additional DMX channel to allow for smoother dimming and finer control of the Rainbow.

1: HSIC – 8 Bit – 5 Channels Per Pixel

HSIC – Hue, Saturation, Intensity, Color Temperature and +/- Green Control. This mode is great if all you have are sliders.

2: HSIC – 16 Bit – 8 Channels Per Pixel

Hue, Saturation, Intensity, Color Temperature and +/- Green Control.

Intensity and Hue are 2 channels each.

3: HSI – 8 bit – 3 channels Per Pixel

HSI – Hue, Saturation, Intensity

White Light is locked at 4000K.

4: Crossfade with +/- Green – 8 Bit - 3 channels Per Pixel
Intensity, Color Temperature and +/- Green Control.

5: Crossfade – 8 bit – 2 Channels Per Pixel
Intensity and Color Temperature.

6: CCT & RGB – 8 bit – 7 Channels Per Pixel
Intensity, Color Temperature and +/- Green Control,

Crossfade from White to Color, Red, Green Blue.

7: CCT & RGB – 16 bit – 9 Channels Per Pixel
Intensity, Color Temperature and +/- Green Control, Crossfade from White to Color, Red, Green Blue.

Intensity and Crossfade are 2 channels each.

This mode is preferred for lighting consoles.

8: RGB – 8 bit – 3 Channels Per Pixel
Red, Green Blue

White Light is locked at 4000K.

13: RGBTD – 8 bit – 5 Channels Per Pixel
Red, Green, Blue. 2000K Diode, 6000K Diode

14: RGBTD – 16 bit – 10 Channels Per Pixel
Red, Green, Blue. 2000K Diode, 6000K Diode

15: RGB – 16 bit – 6 Channels Per Pixel
Red, Green Blue

White Light is locked at 4000K.

19: xy – 8 bit – 3 Channels Per Pixel
Intensity, x coordinate, y coordinate.

20: xy – 16 bit – 6 Channels Per Pixel
Intensity, x coordinate, y coordinate.

21: xy + Spectrum – 8 bit – 3 Channels Per Pixel + 1 Channel Spectrum per Channel
Intensity, x coordinate, y coordinate.

22: xy + Spectrum – 16 bit – 6 Channels Per Pixel +1 Channel Spectrum per Channel
Intensity, x coordinate, y coordinate.

QUASAR SCIENCE

Profile 1					
HSIC – 8 Bit					
5 DMX Channels Per Pixel					
Channel	**Function**	**Value**	**Percentage**	**Description**	**Default % / DMX**
1	Intensity	0-255	0-100		0
2	Color Temp	0-255	0-100	1,750K to 10,000K	0
3	+/- Green			**SEE GREEN TABLE**	50% / 128
4	Hue	0-255	0 to 360	0° to 360°	0
5	Saturation	0-255	0-100	White Light to RGB	0

Profile 2					
HSIC – 16 Bit					
8 DMX Channels per Pixel					
Channel	**Function**	**Value**	**Percentage**	**Description**	**Default % / DMX**
1/2	Intensity	0-65,535	0-100		0
3	Color Temp	0-255	0-100	1750K to 10,000K	0
4	+/- Green			**SEE GREEN TABLE**	50% / 128
5/6	Hue	0-65,535	0 to 360	0° to 360°	0
7/8	Saturation	0-255	0-100	White Light to RGB	0

Profile 3					
HSI 8 bit					
3 DMX Channels per Pixel					
Channel	**Function**	**Value**	**Percentage**	**Description**	**Default % / DMX**

Rainbow 2

1	Intensity	0-255	0-100		0
2	Hue	0-255	0 to 360	0° to 360°	0
3	Saturation	0-255	0-100	4000K to RGB	0

*The white light value in this mode is 4000K

Profile 4

Crossfade & CC - 8 bit

3 DMX Channels per Pixel

Channel	Function	Value	Percentage	Description	Default % / DMX
1	Intensity	0-255	0-100		0
2	Color Temp	0-255	0-100	1750K to 10,000K	0
3	+/- Green			**SEE GREEN TABLE**	50% / 128

Profile 5

Crossfade - 8 bit

2 DMX Channels per Pixel

Channel	Function	Value	Percentage	Description	Default % / DMX
1	Intensity	0-255	0-100		0
2	Color Temp	0-255	0-100	1750K to 10,000K	0

Profile 6

CCT & RGB – 8 Bit

7 DMX Channels per Pixel

Channel	Function	Value	Percentage	Description	Default % / DMX
1	Intensity	0-255	0-100		0
2	Color Temp	0-255	0-100	1750K to 10,000K	0
3	+/- Green			**SEE GREEN TABLE**	50% / 128
4	Crossfade	0-255	0-100	White Light to RGB	0
5	Red	0-255	0-100		0
6	Green	0-255	0-100		0

Rainbow 2

QUASAR SCIENCE

7	Blue	0-255	0-100		0

Profile 7

CCT & RGB – 16 Bit

9 DMX Channels per Pixel

Channel	Function	Value	Percentage	Description	Default % / DMX
1/2	Intensity	0-65,535	0-100		0
3	Color Temp	0-255	0-100	1750K to 10,000K	0
4	+/- Green			**SEE GREEN TABLE**	50% / 128
5/6	Crossfade	0-65,535	0-100	White Light to RGB	0
7	Red	0-255	0-100		0
8	Green	0-255	0-100		0
9	Blue	0-255	0-100		0

Profile 8

RGB – 8 Bit

3 DMX Channels per Pixel

Channel	Function	Value	Percentage	Description	Default % / DMX
1	Red	0-255	0-100		0
2	Green	0-255	0-100		0
3	Blue	0-255	0-100		0

Profile 8

RGB – 8 Bit

3 DMX Channels per Pixel

Channel	Function	Value	Percentage	Description	Default % / DMX
1	Red	0-255	0-100		0
2	Green	0-255	0-100		0
3	Blue	0-255	0-100		0

Profile 13

RGBTD – 8 Bit

5 DMX Channels per Pixel

Channel	Function	Value	Percentage	Description	Default % / DMX
1	Red	0-255	0-100		0
2	Green	0-255	0-100		0
3	Blue	0-255	0-100		0
4	2000K	0-255	0-100		0
5	6000K	0-255	0-100		0

Profile 14

RGBTD – 16 Bit

10 DMX Channels per Pixel

Channel	Function	Value	Percentage	Description	Default % / DMX
1/2	Red	0-65,535	0-100		0
3/4	Green	0-65,535	0-100		0
5/6	Blue	0-65,535	0-100		0
7/8	2000K	0-65,535	0-100		0
910	6000K	0-65,535	0-100		0

Rainbow 2

Profile 15					
RGB 16 Bit					
6 DMX Channels per Pixel					
Channel	Function	Value	Percentage	Description	Default % / DMX
1/2	Red	0-65,535	0-100		0
3/4	Green	0-65,535	0-100		0
5/6	Blue	0-65,535	0-100		0

*The white light value in this mode is 4000K

+/- Green Table					
Channel	Function	Value	Percentage	Description	Default % / DMX
Channel #	+/- Green			Plus and Minus Green	50% / 128
		0-10	0-4	No Effect	
		11-20	5-8	Full Minus Green	
		21-119	8-46	-99% to -1%	
		120-145	47-57	Neutral	
		146-244	57-96	1% to 99%	
		245-255	96-100	Full Plus Green	

DMX FX PROFILES & CHARTS

The Lights Allows For Direct Access To The Built In FX From With The DMX Parameters. Through DMX, The User Can Set The Effect And Parameters Of The Effect.

9: HSIC + FX – 8 Bit
5 Channels Per Pixel + 3 FX Channels

Hue, Saturation, Intensity, Color Temperature and +/- Green Control, FX Selection, FX Rate, FX Size. This mode is great if all you have are sliders.

10: HSIC + FX – 16 Bit
7 Channels Per Pixel + 3 FX Channels

Hue, Saturation, Intensity, Color Temperature and +/- Green Control, FX Selection, FX Rate, FX Size. Intensity and Hue are 2 channels each.

11: CCT & RGB + FX – 8 bit
7 Channels Per Pixel + 3 FX Channels

Intensity, Color Temperature and +/- Green Control, Crossfade from White to Color, Red, Green Blue, FX Selection, FX Rate, FX Size.

12: CCT & RGB + FX – 16 bit
8 Channels Per Pixel + 3 FX Channels

Intensity, Color Temperature and +/- Green Control, Crossfade from White to Color, Red, Green Blue, FX Selection, FX Rate, FX Size. Intensity and Hue are 2 channels each.

39: HSIC + FX + Output – 8 Bit
5 Channels Per Pixel + 3 FX Channels + 1 Output Channel

40: HSIC + FX + Output – 16 Bit
8 Channels Per Pixel + 3 FX Channels + 1 Output Channel

41: CCT & RGB + Output + FX – 8 bit
7 Channels Per Pixel + 3 FX Channels + 1 Output Channel

42: CCT & RGB + FX + Output – 16 bit
9 Channels Per Pixel + 3 FX Channels + 1 Output Channel

Rainbow 2

Channel	Function	Value	Percentage	Description	Default % / DMX
			FX Profile 9		
			HSIC+FX – 8 Bit		
		5 DMX Channels per Pixel + 3 FX Channels			
1	Intensity	0-255	0-100		0
2	Color Temp	0-255	0-100	1750K to 10,000K	0
3	+/- Green			**SEE GREEN TABLE**	50% / 128
4	Hue	0-255	0 to 360	0° to 360°	0
5	Saturation	0-255	0-100	White Light to RGB	0
6	FX			**SEE FX TABLE**	0
7	FX Rate			**SEE FX RATE TABLE**	100%/128
8	FX Size	0-255	0-100%		0

Channel	Function	Value	Percentage	Description	Default % / DMX
FX Profile 10					
HSIC+FX – 16 Bit					
8 DMX Channels per Pixel + 3 FX Channels					
1/2	Intensity	0-65,535	0-100		0
3	Color Temp	0-255	0-100	1750K to 10,000K	0
4	+/- Green			**SEE GREEN TABLE**	50% / 128
5/6	Hue	0-65,535	0 to 360	0° to 360°	0
7/8	Saturation	0-65,535	0-100	White Light to RGB	0
9	FX			**SEE FX TABLE**	0
10	FX Rate			**SEE FX RATE TABLE**	100%/128
11	FX Size	0-255	0-100%		0

Rainbow 2

Channel	Function	Value	Percentage	Description	Default % / DMX
		FX Profile 11			
		CCT & RGB+FX – 8 Bit			
		7 DMX Channels per Pixel + 3 FX Channels			
1	Intensity	0-255	0-100		0
2	Color Temp	0-255	0-100	1750K to 10,000K	0
3	+/- Green			**SEE GREEN TABLE**	50% / 128
4	Crossfade	0-255	0-100	White Light to RGB	0
5	Red	0-255	0-100		0
6	Green	0-255	0-100		0
7	Blue	0-255	0-100		0
8	FX			**SEE FX TABLE**	0
9	FX Rate			**SEE FX RATE TABLE**	100%/128
10	FX Size	0-255	0-100%		0

				FX Profile 12		
				CCT & RGB + FX – 16 Bit		
				9 DMX Channels per Pixel + 3 FX Channels		
Channel	**Function**	**Value**	**Percentage**	**Description**	**Default % / DMX**	
1/2	Intensity	0-65.535	0-100		0	
3	Color Temp	0-255	0-100	1750K to 10,000K	0	
4	+/- Green			**SEE GREEN TABLE**	50% / 128	
5/6	Crossfade	0-65.535	0-100	White Light to RGB	0	
7	Red	0-255	0-100		0	
8	Green	0-255	0-100		0	
9	Blue	0-255	0-100		0	
10	FX			**SEE FX TABLE**	0	
11	FX Rate			**SEE FX RATE TABLE**	100%/128	
12	FX Size	0-255	0-100%		0	

Rainbow 2

Channel	Function	Value	Percentage	Description	Default % / DMX
			+/- Green Table		
Channel #	+/- Green			Plus and Minus Green	50% / 128
		0-10	0-4	No Effect	
		11-20	5-8	Full Minus Green	
		21-119	8-46	-99% to -1%	
		120-145	47-57	Neutral	
		146-244	57-96	1% to 99%	
		245-255	96-100	Full Plus Green	

QUASAR SCIENCE

FX Table

Channel	Function	Value	Percentage	Description	Default % / DMX
Channel #	FX	0 - 27	0 - 10	OFF	
	35	28 - 39	11 - 15	Rainbow	
	45	40 - 51	16 - 20	Short Circuit	
	60	52 - 64	21 - 25	Paparazzi	
	75	65 - 77	26 - 30	Strobe	
	85	79 - 90	31 - 35	Fire	
	100	91 - 103	36 - 40	Emergency Light	
Future					
		103 - 115	41 - 45	TV	
		116 - 128	46 - 50	Bouncer	
		129 - 141	51 - 55	Sprinkles	
		142 - 153	56 - 60	Zoom	
		154 - 166	61 - 65	Science	
		167 - 255	66 - 100	Chase	
				Demo	

FX Rate Table

Channel	Function	Value	Percentage	Description	Default % / DMX
Channel #	FX Rate	0-255	0-100	0% to 200%	100%/128
		0-10	0-4	No Effect	
		11-20	5-8	0% (paused)	
		21-119	8-46	1% to 99%	
	200	120-145	47-57	100% Default	
		146-244	57-96	101% to 199%	
		245-255	96-100	200%	

Rainbow 2

FX EMERGENCY LIGHT PATTERNS

Profiles 9,10,11,12

Channel	Function	Value	Percentage	Description	Default % / DMX
Channel #	FX Size	0-255	0-100		0/0
		0 - 38	0 - 15	Single	
		39 - 77	16 - 30	Single/Off	
		78 - 115	31 - 45	Double	
		116 - 153	46 - 60	Triple	
		154 - 191	61 - 75	Quad	
		192 - 255	76 - 100	Future Use	

EMERGENCY LIGHT HUE PRESET TABLE

Chan-nel	Func-tion	DMX Value	Hue An-gle	Percent-age	Description	De-fault % / DMX
Chan-nel #	Hue	0 - 13	0 - 19	0 - 5	Red & Blue	100%/ 128
		14 - 26	20 - 38	6 - 10	Blue & Blue	
		27 - 38	39 - 55	11 - 15	Red & Orange	
		39 - 51	56 - 73	16 - 20	Red & White (3200)	
		52 - 64	74 - 91	21 - 25	Red & White (5600)	
		65 - 77	92 - 109	26 - 30	Blue & White (3200)	
		78 - 89	110 - 127	31 - 35	Blue & White (5600)	
		90 - 102	128 - 145	36 - 40	Green & White(3200)	
		103 - 115	146 - 163	41 - 45	Green & White(5600)	
		116 - 128	164 - 181	46 - 50	Orange & White (3200)	
		129 - 140	182 - 199	51 - 55	Orange & White (5600)	
		141 - 153	200 - 217	56 - 60	White & White (3200)	
		154 - 166	218 - 235	61 - 65	White & White (5600)	
		167 - 255	236 - 360	66 - 100	No Effect / Future Use	

Rainbow 2

DMX STANDARD & FX PROFILES WITH OUTPUT MODE

The Lights Allows For Direct Access To The Built In FX From With The DMX Parameters. Through DMX, The User Can Set The Effect And Parameters Of The Effect.

See Section: Output Mode [27]

Channel	Function	Value	Percentage	Description	Default % / DMX
DMX OUTPUT CHANNEL					
Profiles 31-45					
X	Output Mode	0-255	0-100		0/0
		0 - 77	0-30	High	
		78-153	31-60	Standard	
		153-255	61-100	Low	

31: HSIC – 8 Bit – 5 Channels Per Pixel + 1 Output Channel

32: HSIC – 16 Bit – 8 Channels Per Pixel + 1 Output Channel
Hue, Saturation, Intensity, Color Temperature and +/- Green Control.

Intensity and Hue are 2 channels each.

33: HSI – 8 bit – 3 channels Per Pixel + 1 Output Channel
HSI – Hue, Saturation, Intensity White Light is locked at 4000K.

34: Crossfade with +/- Green – 8 Bit - 3 channels Per Pixel + 1 Output Channel

35: Crossfade – 8 bit – 2 Channels Per Pixel + 1 Output Channel

36: CCT & RGB – 8 bit – 7 Channels Per Pixel + 1 Output Channel

37: CCT & RGB – 16 bit – 9 Channels Per Pixel + 1 Output Channel

38: RGB – 8 bit – 3 Channels Per Pixel + 1 Output Channel

43: RGBTD – 8 bit – 5 Channels Per Pixel + 1 Output Channel

44: RGBTD – 16 bit – 10 Channels Per Pixel + 1 Output Channel

45: RGB – 16 bit – 6 Channels Per Pixel + 1 Output Channel

FX Profiles

39: HSIC + FX + Output – 8 Bit 5 Channels Per Pixel + 3 FX Channels + 1 Output Channel

40: HSIC + FX + Output – 16 Bit 8 Channels Per Pixel + 3 FX Channels + 1 Output Channel

41: CCT & RGB + Output + FX – 8 bit 7 Channels Per Pixel + 3 FX Channels + 1 Output Channel

42: CCT & RGB + FX + Output – 16 bit 9 Channels Per Pixel + 3 FX Channels + 1 Output Channel

LIGHTING CONSOLE PROFILES

HOG4

Hog4 V3.15 - Quasar Science - Rainbow Profiles V3.hog4show

- Save the Backup showfile to a USB stick and transfer the USB to the console
- Open Backup File and Create new show

or

• 2. Go to Show → Merge File
• In the Fixture Schedule, the lights will appear as "Custom"

EOS Platform

EOS Platform - Quasar Science - RR and R2 Profiles

• Save the showfile to a USB stick; mount the USB to the Console.
• In the EOS CIA browser navigate to File → Merge → USB drive
• Choose Advanced → Fixtures (Only)
• This will merge all of the profiles into the user's showfile in the "Custom" Fixtures Folder.
• All Profiles begin with the letters "RR" and then list the Protocol number followed by the Pixel Count. This file contains a (1) Pixel version of each profile and a (48) Pixel Multicell version.

grandMA

Quasar Science - RR R2 Profiles

MODIFYING QUASAR FIXTURES WITHIN THE EOS FIXTURE LIBRARY.

In An Effort To Keep The Size Of Showfiles Down To Facilitate Rapid Transfer Over Network, Quasar Has Created Fixtures In Single Pixel And 48 Pixel Mode. The Following Guide Is For EOS Users Needing To Modify The Fixtures For Different Pixel Counts.
Open the showfile that will be used.

If the Quasar fixtures aren't in the fixture library they can be downloaded from the website

Instructions for merging fixtures into the showfile can be found **here** [96].

Enter the patch by double tapping [Address]
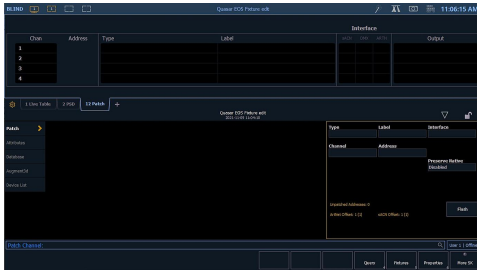
Enter the Fixture editor by pressing {Fixtures} on the screen
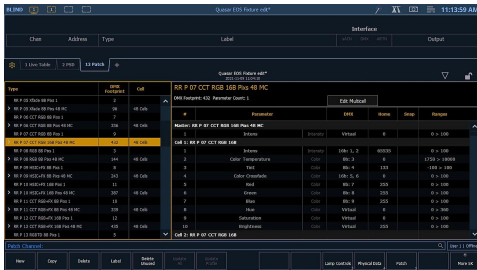
Rainbow 2

Scroll down and select the fixture type to be modified.

Press {Copy} on the screen.

Press {Label} on the screen to rename the new fixture.
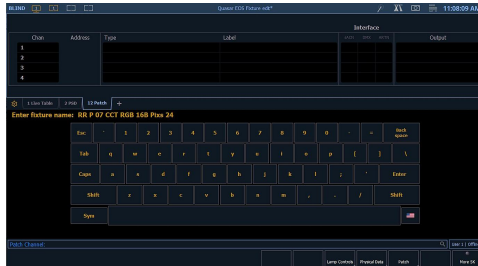
Press {Edit Multicell} on the screen to enter the fixture editor

Press the {+} icon on the screen to edit the cells in the fixture
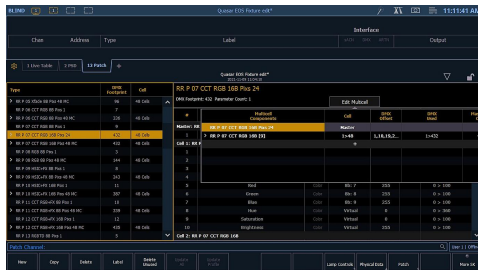
Select the existing cell used for the fixture. Use the arrow keys or select the field and change the number of cells in the editor to match the number of cells on the fixture.

Press {OK}
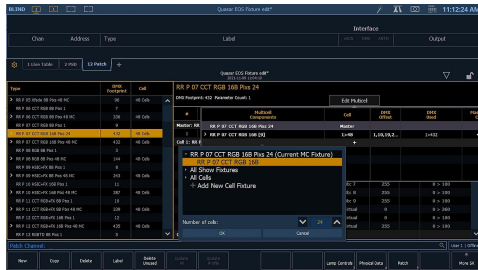
If the fixture doesn't have Output or FX settings {Save Fixture} and exit to {Patch} to patch the fixtures into the show.

Fixtures with FX and Output Channel need further modification

Select {DMX Offset} for the Parent. Set this to one more than the highest DMX used by the Cells.
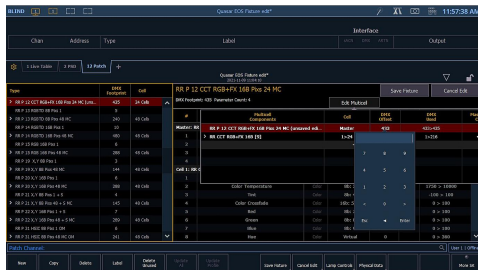
{Save Fixture} and exit to {Patch} to patch the fixtures into the show.

Effects

MANUAL EFFECTS

All Effects are compatible with Lead/Follow mode

Intensity: Control the Intensity of the Effect from 0% to 100%

Rate: Rate is the speed that the effect is running. 100% is normal speed. It can go from 0% to 200%

For Fire Effects:
Maximum: This is the highest value the fire effect will reach

Minimum: This is the lowest value the fire effect will reach

EFFECTS TYPES

Rainbow Effect
The Rainbow Effect Scrolls through all the colors. The Rate at 100% will scroll though all the saturated colors in 6 seconds. The Rate at 0% will be 36 seconds. The Rate at 200% will be 1 second.

Short Circuit Effect
Lamp is on with bursts of turning off. The Short Circuit effect applies to the entire light.

Paparazzi Effect
Lamp is off with flashes of turning on. The Paparazzi.

Rainbow 2

Strobe

Fire Effect

Emergency Light Effect

Demo Effect
Scroll through the Hue from 0° at varying Saturation at 1750K and 10,000K. Showcasing the Rainbow effect at Varying Saturation Levels.

DMX EFFECTS

FX Selection:

Channel	Function	Value	Percentage	Description	Default % / DMX
Channel #	FX	0 - 27	0 - 10	OFF	0%/0
		28 - 39	11 - 15	Rainbow	
		40 - 51	16 - 20	Short Circuit	
		52 - 64	21 - 25	Paparazzi	
		65 - 77	26 - 30	Strobe	
		78 - 90	31 - 35	Fire	
		91 - 102	36 - 40	Emergency Light	

FX Rate:
Used to control the speed of the running effect

0-200% for the speed of the effect.

100% is normal speed.

FX Rate Table

Channel	Function	Value	Percentage	Description	Default% / DMX
Channel #	FX Rate	0-255	0-100		100%/128
		0-10	0-4	No Effect	
		11-20	5-8	0%	
		21-119	8-46	1% to 99%	
		120-145	47-57	100% Default	
		146-244	57-96	101% to 199%	
		245-255	96-100	200%	

Rainbow 2

EMERGENCY LIGHT HUE PRESET TABLE

Chan-nel	Func-tion	DMX Value	Hue Angle	Percent-age	Description	De-fault % / DMX
Chan-nel #	Hue	0 - 13	0 - 19	0 - 5	Red & Blue	0%/0
		14 - 26	20 - 38	6 - 10	Blue & Blue	
		27 - 38	39 - 55	11 - 15	Red & Orange	
		39 - 51	56 - 73	16 - 20	Red & White (3200)	
		52 - 64	74 - 91	21 - 25	Red & White (5600)	
		65 - 77	92 - 109	26 - 30	Blue & White (3200)	
		78 - 89	110 - 127	31 - 35	Blue & White (5600)	
		90 - 102	128 - 145	36 - 40	Green & White(3200)	
		103 - 115	146 - 163	41 - 45	Green & White(5600)	
		116 - 128	164 - 181	46 - 50	Orange & White (3200)	
		129 - 140	182 - 199	51 - 55	Orange & White (5600)	
		141 - 153	200 - 217	56 - 60	White & White (3200)	
		154 - 166	218 - 235	61 - 65	White & White (5600)	
		167 - 255	236 - 360	66 - 100	No Effect / Future Use	

FX EMERGENCY LIGHT PATTERNS - Profiles 9,10,11,12

| Channel	Function	Value	Percentage	Description	Default % / DMX
X	FX Size	0-255	0-100		0%/0
		0 - 38	0 - 15	Single	
		39 - 77	16 - 30	Single/Off	
		78 - 115	31 - 45	Double	
		116 - 153	46 - 60	Triple	
		154 - 191	61 - 75	Quad	
		192 - 255	76 - 100	Future Use	

FX Size:

Used to control the minimum and maximum values for Fire Effect.

It is the plus and minus variation of Intensity.

Ex. Intensity 50% with Size of 10 will be an effect from 40% to 60%

Rainbow 2

RGBX Spectral Science Color Engine
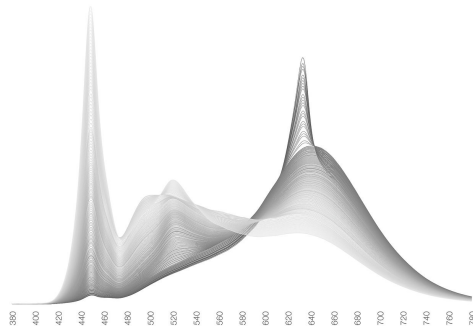
The R2 & RR fixtures feature a unique color control system called the Quasar Science RGBX Spectral Science Color Engine (RGBX SSCE). It composes target spectral power distributions (SPD) compromised of the component RGBX LEDS of 630nm, 520nm, 450nm, 2000K, and 6000K SPDs. Quasar Alchemy, Quasar Science's internal color science think tank, developed a state-of-the-art set of algorithms that offer a groundbreaking & novel set of color science based concepts first seen in the R2 and RR product lines.

RGBX SSCE features a groundbreaking set of lighting control concepts that build upon the 1st generation Rainbow's diode set and base control scheme, as seen mapped within the CIE 1976 u' v' Chromaticity diagram below:

CIE 1976
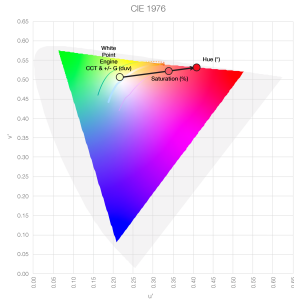
RGBX SSCE produces light in a manner similar to digital computer image color control systems by visualizing the chromatic input as a vector in the color gamut created by the Quasar Science RGBX diode set. Users first define a "White Point", the base color of this vector. The vector's angle of direction corresponds to a chosen endpoint, ie. the Hue, defined by the RGBX diode set's color gamut edges. The vector length between base and endpoint corresponds to the Saturation. 0% Saturation means the base, ie the white point, 50% saturation means a halfway blend between the White Point spectrum and the Hue spectrum, and 100% saturation corresponds to the end, ie the pure Hue.

WHITE LIGHT ENGINE

CIE 1976: RGBX CCT range

RR / R2 - Profile 07 CCT&RGB 16b		
401.1		1: 1
401.2		1: 10
401.3		1: 19
401.4		1: 28
401.5		1: 37
401.6		1: 46
401.7		1: 55
401.8		1: 64
401.9		1: 73
401.10		1: 82
401.11		1: 91
401.12		1: 100
401.13		1: 109
401.14		1: 118
401.15		1: 127
401.16		1: 136
401.17		1: 145
401.18		1: 154
401.19		1: 163
401.20		1: 172
RR / R2 - Output Channel		
401.21		1: 181

Rainbow 2

CCT

The RGBX diode set provides 1750K to 10,000K calibrated SPDs with Spectral Similarity Index (SSI) scores ranging from 61 to 91* when compared to the TM-30-18 reference illuminant SPDs. Quasar Alchemy calculated diode combinations from RGBX for the highest SSI score possible from its diode set for any given CCT

+/- Green

Quasar Alchemy also internally developed a new set of +/- Green targets based upon theoretical CC36G and CC30M Wratten filters combined with the TM-30-18 reference illuminant SPDs. Since real filters & gels create undesired CCT shifts while adjusting the green/magenta tint (duv), the RGBX SSCE addresses this problem by maintaining the CCT for +/- Green adjustments.
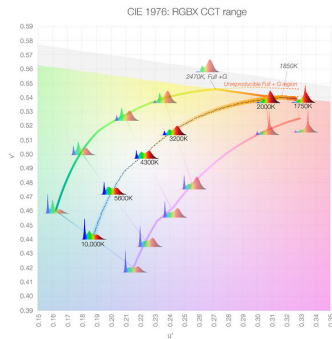
Since a portion of the Full Plus Green chromaticity range extends beyond the RGBX LED gamut, Quasar Alchemy also calculated the unreproducible Full Plus Green chromaticity range: 2470K to 1750K. Furthermore, from 1850K to 1750K, no achievable amount of + green adjustment (+ duv values) exists in RGBX, so the engine outputs CCT light values for + G adjustments in this CCT region.

Perceptual Threshold Manual Control

Most lighting fixture digital controls do not provide even color change increments of CCT control throughout the Kelvin range. For example, a 50K increase at 2500K produces a greater noticeable color change than a 50K increase at 5600K.

CIE 1976: RGBX CCT range
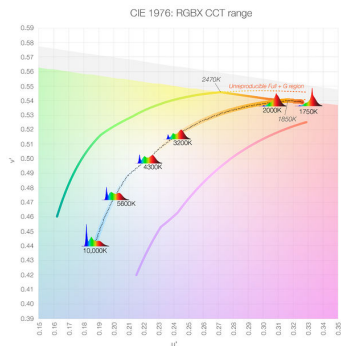
Most lighting fixture digital controls do not provide even color change increments of CCT control throughout the Kelvin range. For example, a 50K increase at 2500K produces a greater noticeable color change than a 50K increase at 5600K.

SATURATED COLOR CONTROL

Hue

The RGBX SSCE has defined its absolute Hue angles by mapping key points in the RGBX LED gamut to established monochromatic wavelengths for different colors.

It also has determined the most spectrally accurate mix possible for the RGBX LED diode set between Hue angles 0° to 120°.

It then equally divides up each hue between these eight primary and secondary colors to provide the most even amount of saturated hue color control.

Rainbow 2

CIE 1976: RGBX Hue Range
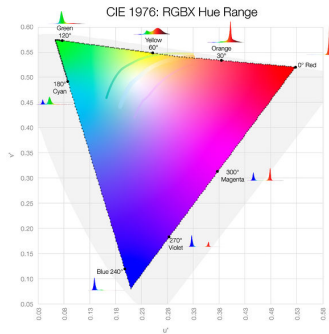
Hue Intensity Equalization

Quasar Alchemy created Hue Intensity Equalization (HIE), an advanced under-the-hood calibration feature, to provide the most even exposure of saturated color with respect to the light's white point.
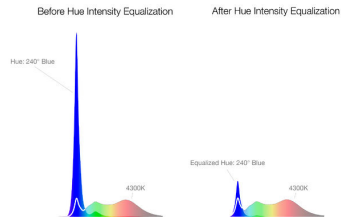
As seen in the left figure, the blue diode natively outputs about 4-5 times the amount of spectral energy in the blue region of RGBX SSCE 4300K white light.

This intensity difference cannot be measured by traditional incident or spot light meters. Blue illuminated objects often overexpose or clips in photographic images, especially when lighting effects transition between this saturated hue with others. This overexposure lies at the heart of what is often mistaken for a "color gamut" problem.

Quasar Alchemy profiled each RGBX diode for its energy in relation to its relevant counterpart in TM-30-18 reference 4300K SPD and wrote a software algorithm in the R2 and RR firmware to automatically adjust any saturated light intensity to its relevant region in 4300K light. Future development and updates will dynamically equalize to the currently set white point

Before Hue Intensity Equalization   After Hue Intensity Equalization
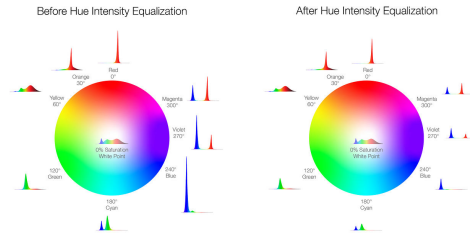
Saturation

RGBX SSCE defines saturation as the % mix between an SPD from its white point engine and the absolute Hue angle at the edge of the RGBX LED gamut. 50% saturation describes the halfway point on the CIE 1976 u'v' diagram between the white point and the Hue.
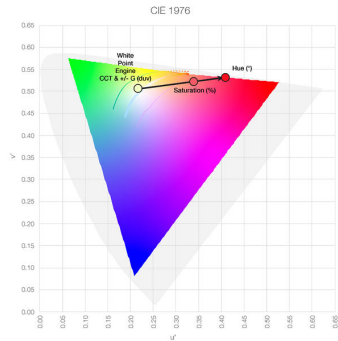
CIE 1931 XY CHROMATICITY CONTROL

RGBX SSCE can now take direct CIE 1931 xy chromaticity value input and allows control of its full range of spectral variations for any one of those chromaticity inputs.
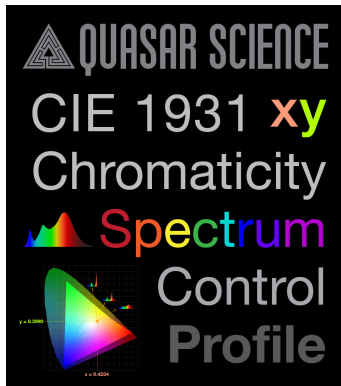
This input comes currently in the form of DMX control profiles and will soon come via manual entry. The CIE 1931 xy DMX control profiles expect: Channel 1— intensity value in %; Channels 2 & 3— x and y values ranging between 0 to 0.8 scaled to 0% to 100% of the channel value; and Channel 4— Spectrum control value.

The conversion formula for Channels 2 & 3 is (input x or y value)/0.8 = DMX %. For example, a desired coordinate of x = 0.31 and y = 0.31 must be transmitted as 0.31/0.8 = 0.3875, or 38.75% for each channel.

For Channel 4, RGBX SSCE has been calibrated to provide the RGBX diode set's entire range of spectrum possibilities for each point in the entire device's gamut. Please refer to the follow section for further explanation of this novel feature.

Spectrum Control

RGBX SSCE now provides Spectrum Control, a novel color control feature that provides the full range of spectral possibilities for any given color value. Since an infinite array of spectral fingerprints (technically called illuminant metamers) can generate any desired xy or u'v' chromaticity value, R2 and RR devices now have full calibration to provide any possible spectral combination, as seen in the below illustration for 3200K white light:
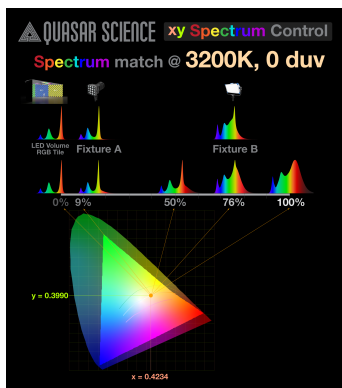
This function serves both technical and creative purposes. It can either be used to provide any level of spectral quality to match or complement other fixtures in a lighting setup, or it can be used to provide a dynamic creative lighting effect in real time.

Currently, this function can only be accessed via the CIE 1931 xy chromaticity DMX profile. When chromaticity control is fully integrated into manual control, the Spectrum Control will also be a manual control parameter.

Parameterized Calibration

Underneath the hood, the RGBX SSCE uses dynamic equations to implement device color calibrations. This software design philosophy creates:

• Faster updates
• Faster & more accurate calibration cycles
• Faster factory batch calibration

Rainbow 2

- Speeds refinement of color calibration for the entire CIE1931 xy or CIE 1976 u'v' map
- Facilitates 3rd party bluetooth app integration
- Users will soon be able to custom "trim" adjust different fixtures and eventually send in their lights for factory recalibration.

Update Firmware

UPDATING RR & R2 FIRMWARE

How To Update Your RR And R2 Linear Lights
To Update the RR & R2 lights, they must be updated with a USB-C thumb drive in FAT32 format.

> **❗ IMPORTANT**
> This method is for updating the Light Firmware and the Update Firmware (Bootloader). Please update your Wi-Fi Module first, before updating your light firmware. For the Wi-Fi Module Update, it must be completed over Wi-Fi. Click here for instructions. [117]

1. Download the latest firmware update files from https://www.quasarscience.com/pages/support-double-rainbow-and-rainbow-2
2. Copy all the files in the update to the root directory of your USB-C drive. If it is a zip file, unzip to the root of your USB-C Drive. They may look like this: *QS_PC_FW_0.4e.bin or QS_PC_BL_0.9.bin.*
3. If on, power off the light.
4. Press and hold the ENTER button on the light and then press/hold the POWER button for 3 seconds. The Data LED will flash blue and the display will show Insert USB when the fixture is in Update Mode.
5. Insert the USB-C Thumb Drive with the firmware on it.
6. The light will then install all updates found on the drive. It will first check to see if you have a new Bootloader file. If it is newer than what is on the light, it will install the new version. Then the light will reboot and install the new Light Firmware. It will check for the highest version number of all relevant files.
7. When the update is complete, the status lights will flash green and the light will reboot. Please note at that you should see the newest firmware version indicated on the LED screen on boot up.
8. Alternatively, you can go to CONFIG → FIRMWARE to check to make sure the light updated.
9. To exit the Update Screen, tap the power button.

Rainbow 2

NOTE
With Bootloader Version 0.9, you can now put all of your lights into update mode and then hop the USB-C drive from light to light. The Update screen will not time out. Tap the power button to exit update mode.

DO NOT REMOVE THE USB-C DRIVE DURING THE UPDATE PROCESS!
If the Firmware update process is interrupted and the fixture becomes unresponsive, it can be placed into update mode using the hardware shortcut of holding the [Enter] button while powering up the fixture.

NOTICE
If you have copied your files to the USB-C Drive and inserted the thumb drive and the screen locks up at Mounted the USB, the drive may not be compatible with the RR and R2. SMI USB driver controllers are not compatible. Please try a different brand or type of USB-C drive.

WI-FI MODULE FIRMWARE UPDATE

Updating The Wi-Fi On Your RR And R2 Lights
For use with Light Firmware Version 0.6A and beyond.

Please update your light Firmware

DANGER
Uploading the wrong firmware to the Wi-Fi module will result in an unrecoverable Wi-Fi module.

This will require the use of an additional computer or phone/tablet and access to the internet.

TIP
This page can be accessed from www.Quasarscience.com/wifi and the firmware file is at the top of the page. This makes for much easier downloading of the Wi-Fi Firmware onto your phone.

QUASAR SCIENCE

1. Download the Wifi Module firmware from our Support Page here and save it to the desktop of the computer. **MAKE SURE THAT THIS IS THE CORRECT FIRMWARE.**
   *File format should be QS_PC_WIFI_X.X.wifi*
   LOADING THE WRONG FIRMWARE WILL END LIFE AS WE KNOW IT, CAUSE YOUR FAVORITE TV SHOW TO BE CANCELED AND TURN THE FIXTURE INTO A HEAP OF MOLTEN PLASTIC. (Not all of those things will happen but it will break it and you'll be sad which is probably just as bad.)
2. Set the fixture into Update Mode. There are 3 ways:
   a. With the light powered off, press and hold the **ENTER** button on the light and then press/hold the **POWER** button for 3 seconds.
   b. User can also get there through the menu, Config → Update FW.
   c. With the light powered off, press and hold the ENTER button and plug in the light.
3. From a phone or laptop, connect to the Wi-Fi network the Quasar Fixture is broadcasting
   (This will be QS: XXXXXXXX.)
4. Enter the Password for the fixture's AP: **1234567890**
5. Launch web browser *(Quasar recommends Chrome).*
   If this is the first time to update the Wi-Fi, please proceed to step 6.If the Wi-Fi has been updated to version QS_PC_WIFI_1.0B.wifi or later, please proceed to step 11. *To check the firmware installed on the fixture enter the config menu by pressing the left arrow from the main display. press the left arrow four times until the firmware of the fixture is displayed. Pressing enter on this screen will cycle through the various firmwares installed on the fixture.*

For First time update of Wi-Fi:

6. Navigate to 192.168.0.1 on the navigation bar of the device you are using.
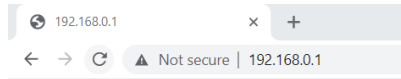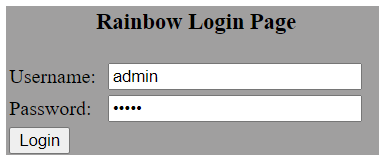
7. Enter the user name and password for the fixture
   Username:admin
   Password:admin

8. Choose the Wi-Fi firmware previously downloaded. **QS_PC_WIFI_X.X.wifi**
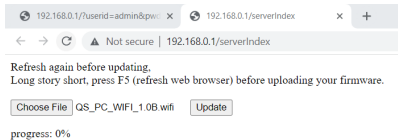
9. Click Update
10. When the Update reaches 100%, tap the Power Button on the light to restart. This will restart the wifi and the user will need to reconnect to the wifi if they want too control the Quasar Science fixture over wifi.
    Proceed to step 16 to verify installation.

For Updating Wi-Fi with V1.0B or later installed:

11. Navigate to 192.168.4.1 on the navigation bar of the device you are using

12. Enter the user name and password for the Quasar Fixture.
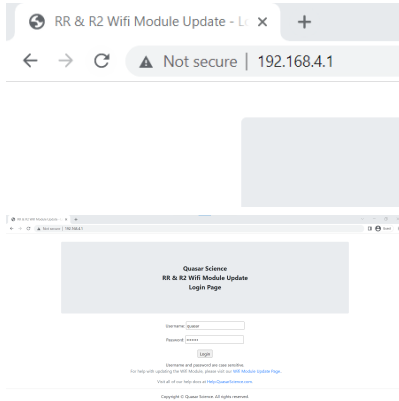**Username**: quasar
Password: science

13. Choose the Wi-Fi firmware previously downloaded. **QS_PC_WIFI_X.X.wifi**
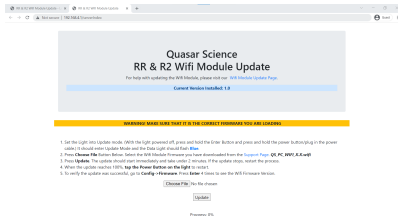
14. Click Update

15. When the Update reaches 100%, tap the Power Button on the light to restart. This will restart the wifi and the user will need to reconnect to the wifi if they want too control the Quasar Science fixture over wifi.

16. To verify the update was successful, enter the config menu by pressing the left arrow from the main display. press the left arrow three times until the firmware of the fixture is displayed. Pressing enter on this screen will cycle through the various firmwares installed on the fixture.

> **NOTE**
> The Wifi module update should take no more than 2 minutes. If the update stops mid cycle confirm the fixture is in bootloader mode and try again.

HOW TO UPDATE TIMO2 FIRMWARE VIA CRMX APP

Instructions On Updating Lumen Radio TimoTwo.

1. Check the version of your TimoTwo Firmware.
On the Light, go to → Config Firmware. Press Enter x 2. It will display "Timo FW. 1.X.X.X."

2. Check to see what the latest firmware Version is available from Lumen Radio

3. On your Apple or Android Device, download "CRMX toolbox" from the Apple App Store or Google Play Store

4. Open the App on your device.

5. On your Rainbow 2 or Double Rainbow, enable Bluetooth.
Go to Config → Wireless Mode → Bluetooth

6. In the app choose Connect Device.

7. Select one of the devices listed on the screen and tap Connect Device from the pop-up.

Rainbow 2
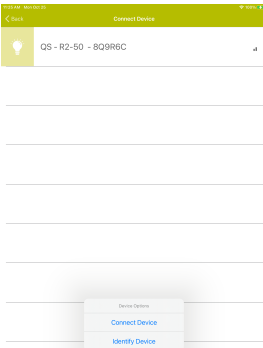
8. Once connected it will display the Name of the device as well as its current firmware. If there is an available firmware update for the chip that Update Firmware button will be selectable. *(Note: Your tablet/phone will need an internet connection to retrieve the new firmware while connected to tube via Bluetooth)*

QS - R2-50 - 8Q9R6C
Firmware version: 1.0.5.1
Mode: RX
DMX Hold: Off
Universe Color: ● Green
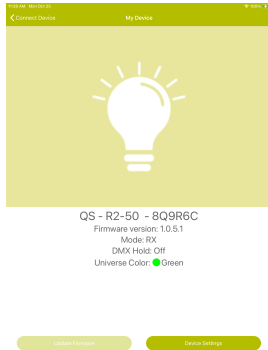
9. Tap the Update Firmware button and allow the update process to finish completely.

10. Choose Connect Device to return to the Connect Device List.

11. Repeat the process as needed.

Technical Specifications

RR & R2 VECTORWORKS SYMBOLS

Quasar Science lighting symbols for Vectorworks Spotlight are now available for download on the website
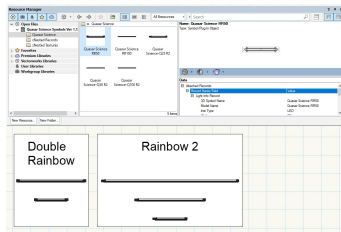
Download the symbol files for VW 2020 here

Download the symbol files for VW 2021 here

Quasar Science advises suggest that the user copy the symbol resources from the downloaded file into the users symbol library file located in "Resource Manager Favorites"

1. Open the downloaded file "Quasar Science Symbols"
2. In the resource Browser local the folder labeled "Quasar Science"
3. Right click on the folder and select export
4. Select the destination to copy the resource into

Another option is to import the resource folder directly into a working project. In this case both the project file and the downloaded Quasar Science Symbol file need to be open.

Rainbow 2

1. Set the new project to the active tab
2. Open the resource manager the open files tab should list the new project in Bold and the Quasar Science Symbols file in normal font. In this tab expand the Quasar Science Symbols file tree.
3. Right Click on the folder labeled "Quasar Science" and select import
4. Select the import destination in the new project file.

Quasar Science has included 3d geometry with these symbols so that they will correctly display in any renders done

DEVICE COLOR CALIBRATION & ACCURACY

Calibration Targets

Device Channel Color Information								
Channel		x	y	u'	v'	CCT	duv	SSI
R (630nm peak)		0.6939	0.3046	0.5269	0.5204			
G (520nm peak)		0.1772	0.7241	0.0625	0.5749			
B (450nm peak)		0.1570	0.0270	0.2086	0.0807			
T (2000K)		0.5287	0.4196	0.3031	0.5412	2020K ± 28K	0.0019	SSI[P2020] 91
D (6000K)		0.3188	0.3289	0.2021	0.4692	6180K ± 170K	0.0001	SSI[CIE D6180] 72

Raw Diode (no diffusion lens or optics) Color Information								
Channel		x	y	u'	v'	CCT	duv	SSI
R (630nm peak)		0.6934	0.3048	0.5262	0.5205			
G (520nm peak)		0.1775	0.7245	0.0626	0.5751			
B (450nm peak)		0.1569	0.0279	0.2077	0.0832			
T (2000K)		0.5273	0.4228	0.3005	0.5421	2050K ± 29K	0.0028	SSI[P2050] 91
D (6000K)		0.3227	0.3398	0.2007	0.4755	5950K ± 160K	0.0038	SSI[CIE D5950] 75

For any given input CCT, the RGBX Spectral Science White Point Engine emulates the following TM-30-18 reference illuminant specification for both spectral and chromaticity standards:

- 1750K to 4000K: Planckian blackbody spectral power distribution (SPD)
- 4000K to 5000K: TM-30-18 Reference illuminant standard—a proportionately transitioned, linear combination of SPD between pure Planckian blackbody at 4000K and pure CIE D50 daylight illuminant at 5000K. At 4500K, the SPDs mix 50% Planckian Blackbody SPD + 50% CIE D50 SPD.

• 5000K to 10,000K*: CIE Daylight Illuminant series

*Above 10,000K, the CIE Daylight SSI value dips below 60, so we did not include CCT above 10,000K. Only by future demand will this extended range be added.

For +/- Green adjustments, the RGBX Spectral Science White Point Engine emulates the combination of a given TM-30-18 reference illuminant + an idealized Kodak Wratten CC36G filter as its "Full Plus Green" standard, and Kodak Wratten CC30M filter as its "Full Minus Green" standard. Legacy gels from Lee, Rosco, etc used those two filters as their targets.

For any +/- Green adjustment, the RGBX Spectral Science White Point Engine maintains the CCT of the device. In this regard, R2 and RR units slightly differ from "real world" behavior of +/- Green filtration that alters the CCT in conjunction with its intended duv change.

The 100% saturated Hue targets are calibrated as close as possible to the spectral locus of different established wavelengths for respective colors:

	Target Peak Wavelength (nm)	x	y	u'	v'
Red	637	0.6939	0.3046	0.5269	0.5204
Orange	600	0.6139	0.3603	0.4028	0.5319
2000K Diode	651	0.5287	0.4196	0.3031	0.5412
Yellow	580	0.4876	0.4552	0.2605	0.5472
Green	540	0.0625	0.0296	0.0774	0.5728
Green Diode	518	0.1772	0.7241	0.0625	0.5749
Cyan	495	0.1685	0.4233	0.0870	0.4921
Blue	465	0.1575	0.0427	0.1970	0.1202
Blue Diode	450	0.1570	0.0270	0.2086	0.0807
Magenta	540nm -> D65 line	0.3665	0.1353	0.3768	0.3130

All intermediary hues are equally spaced between the above target colors within the CIE1976 u'v' Uniform Color Space:

Rainbow 2
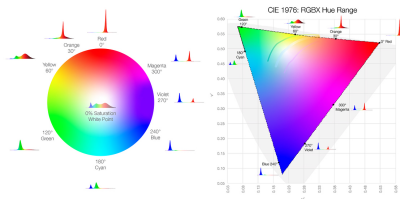
CCT SSI Values

The RGBX Spectral Science White Point engine attempts to match TM-30-18 reference illuminants and +/- Green filtration for any white point (CCT and +/- green) value by choosing ideal RGBX diode combinations that maximize the appropriate AMPAS Spectral Similarity Index (SSI) score:

1750K SSI[P1750] **82**

2000K SSI[P2000] **90**

2250K SSI[P2250] **91**

2500K SSI[P2500] **89**

2856K SSI[CIE A] **85**

3000K SSI[P3000] **84**

3200K SSI[P3200] **83**

3450K SSI[P3450] **81**

3700K SSI[P3700] **79**

4000K SSI[P4000] **77**

4300K SSI[TM30 4300] **77**

4500K SSI[TM30 4500] **76**

4750K SSI[TM30 4750] **76**

5000K SSI[CIE D50] **76**

5500K SSI[CIE D55] **74**

5600K SSI[CIE D5600] **74**

6000K SSI[CIE D6000] **73**

6500K SSI[CIE D65] **71**

7500K SSI[CIE D7500] **67**

10000K SSI[CIE D10000] **61**

Output Color Accuracy/Tolerance

All color settings have a chromatic tolerance to deviate from its intended specification within three Just Noticeable Difference (JND) units. This amount yields a circle within the CIE 1976 u' v' chromaticity space with a radius of   u'v' = 0.0033.

For white light, this range of tolerance translates to a ~2.5 step SDCM / MacAdams Ellipse. In CCT & duv terms this results with the following tolerances:

1750K ±27K, ± 0.0022 duv

2000K ±41K, ± 0.0022 duv

2250K ±50K, ± 0.0022 duv

2500K ±60K, ± 0.0022 duv

2856K ±75K, ± 0.0023 duv

3000K ±82K, ± 0.0023 duv

3200K ±91K, ± 0.0023 duv

3450K ±102K, ± 0.0023 duv

3700K ±114K, ± 0.0024 duv

4000K ±128K, ± 0.0024 duv

4300K ±143K, ± 0.0025 duv

4500K ±154K, ± 0.0025 duv

4750K ±167K, ± 0.0025 duv

Rainbow 2

5000K ±181K, ± 0.0026 duv

5500K ±212K, ± 0.0026 duv

5600K ±218K, ± 0.0027 duv

6000K ±245K, ± 0.0027 duv

6500K ±281K, ± 0.0028 duv

7500K ±365K, ± 0.0028 duv

10000K ±639K, ± 0.003 duv

To help decipher the duv tolerance, the following chart illustrates the 3 JND tolerance level in +/- Green filter strengths:
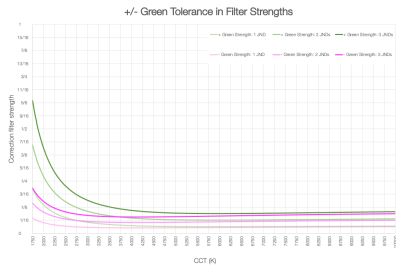
The top, bold lines for both colors show, for any given color temperature, the current color shift tolerance as equivalent to color shift in plus or minus green correction filters. For example, a +duv shift at 3500K, equivalent to 3 JNDs, approximates adding a 1/8th Plus Green Gel.

WHITE LIGHT PHOTOMETRICS

	Foot Candles at 10' away					Lux at 3m away				
CCT	Q25R2	Q50R2	Q100R2	RR50	RR100	Q25R2	Q50R2	Q100R2	RR50	RR100
1750	2.70	6.10	8.40	5.06	9.83	28.1	63.6	87.6	52.8	102
2000	2.90	6.55	9.02	5.44	10.6	30.2	68.3	94.1	56.7	110
2800	3.21	7.26	10.0	6.02	11.7	33.5	75.7	104	62.8	122
3200	3.33	7.53	10.4	6.25	12.1	34.7	78.6	108	65.2	127
4300	3.62	8.19	11.3	6.80	13.2	37.7	85.4	118	70.9	138
5600	3.90	8.83	12.2	7.33	14.2	40.7	92.1	127	76.4	148
6500	3.99	9.02	12.4	7.49	14.5	41.6	94.1	130	78.1	152
10000	3.67	8.31	11.4	6.90	13.4	38.3	86.7	119	71.9	140

ELECTRONICS SPECIFICATIONS

Model	RR50	RR100
Pixels	2 Rows of 10 = 20 Total	2 Rows of 24 = 48 Total
Wattage	Max 50W	Max 100W
Weight	3.30lbs (1.5 kg)	5.73lbs (2.6 kg)
Dimensions	22.7 x 3.34 in (577 x 84.8 mm)	46.1 x 3.34 in (1171 x 84.8 mm)
Power (vac)	120vac = 0.45 amp	120vac = 0.90 amp
	240vac = 0.25 amp	240vac = 0.50 amp
Power (vdc)	12vdc = 4.50 amp	12vdc = n/a
	24vdc = 2.30 amp	24vdc = 4.80 amp

Rainbow 2

Model	Q25R2	Q50R2	Q100R2
Pixels	10	24	48
Wattage	Max 25W	Max 50W	Max 100W
Weight	1.76lbs (0.8kg)	3.30lbs (1.50kg)	5.84lbs (2.64kg)
Dimensions	23 x 1.75 in (584.2 x 44.45 mm)	46.9 x 1.75 in (1161.7 x 44.45 mm)	90.86 x 1.75 in (2307.8 x 44.45 mm)
Power (vac)	120vac = 0.25 amp	120vac = 0.45 amp	120vac = 0.90 amp
	240vac = 0.13 amp	240vac = 0.25 amp	240vac = 0.50 amp
Power (vdc)	12vdc = 2.50 amp	12vdc = 4.50 amp	12vdc = n/a
	24vdc = 1.30 amp	24vdc = 2.30 amp	24vdc = 4.80 amp

Troubleshooting

THE CCT OUTPUT ISN'T MATCHING WHAT THE CONTROL CONSOLE SAYS IT SHOULD BE

Quasar Science is always listening to the users and working to improve our fixtures to provide better features. One of these improvements was an expansion of the CCT range. The initial CCT range that Quasar Science Rainbow 2 and Double Rainbow fixtures could accuratly acheive was 2000K-6000K. Improvements to the software and the Quasar Science Color Science engine increased this CCT range to 1750K-10,000K. This improvement happened with firmware release 0.4S and is reflected in the fixture profiles that Quasar Science makes available for download on the website. Using these updated profiles on fixtures with pre 0.4s firmware will result in inaccuracy in CCT output.

Quasar Science recomends updating any fixtures to the most recent firmware. Instructions on how to do that can be found here [116].

TIPS AND TRICKS

Working With RR And R2 Secrets
Here we will add any cool tips, shortcuts or tricks to get the best performance out of RR and R2.

1. **OUTPUT MODE:** It is best to understand Output mode here [27].
2. **BUTTON SHORTCUT:** Double Tap the Power Button on any screen to go back to the Main Status Screen. More Button Shortcuts here [18].
3. **BUTTON SHORTCUT:** When on the Main Status screen, tap the power button to see the other Status screens, such as Color Status, Network Status. More Button Shortcuts here [18].
4. When Daisy-chaining Double Rainbows over sACN or Art-Net, max out around 6-8 units. Each daisy chain through a network switch can add latency to the light.

Rainbow 2

HOW DO I WIRELESSLY CONNECT WITH LEAD/FOLLOW OVER CRMX?

Lead/Follow Mode turns one R2 or RR light into a Lead unit — a wired or wireless Manual Mode controller for any R2 & RR lamps linked as Follow units. Specifically, the Lead unit directly assumes remote color and FX control of its Follow units.

To create dynamic effects across multiple linked units, the Follow feature has selectable slots from 1 to 8. These slots run the same effects, intensities, and levels as the Lead unit. Follow 1 matches the Lead Unit directly, while Follow 2 through 8 progressively offset effect timings across the 8 sets of linked units.
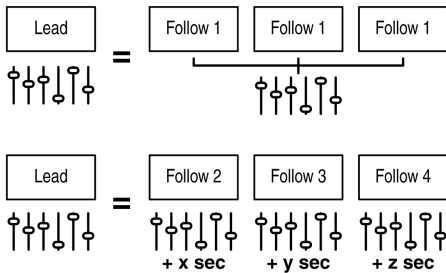
To set up this feature, within the Config Menu, navigate to the Lead/Follow menu and follow these steps:

1. In your chosen Lead unit R2/RR light to control the Follow units:
   - Set this mode to Lead.
   - The Data status LED will turn green to confirm your light as the Lead unit.
2. In each of your Follow unit R2/RR lights, set this mode to your desired Follow #:
   - Follow 1 matched the Lead Unit in effect timing.
   - Follow 2-8 progressively offset effect timing from Lead unit.
3. For wired linking:
   - Connect your Lead unit to the first desired Follow unit in the signal chain using a Cat5 or Cat6 cable. One cable end should go in the Lead Unit's LAN 2/DMX OUT port, and the other end should go in the Follow Unit's LAN 1/DMX IN port.
   - Connect your Follow units together from that first follow unit in similar fashion.

- On the Follow units, the Data status LED will turn Cyan to confirm your light as a Follow unit.
4. For wireless linking:
   - On the Lead unit & all Follow units, navigate to the Wireless Mode config submenu, set to CRMX.
   - If the Wireless status LED flashes on your Follow units, press and hold the Link button to un-pair the Follow unit from searching for a prior Lead Unit.
   - On the Lead unit, tap the Link button to send the pairing signal. The Lead unit Wireless Status LED will start flashing. The Follow unit(s) Wireless Status LED will flash in unison.
   - On the Follow units, the Data status LED will turn Cyan to confirm your light as a Follow unit.
   - The Wireless status LED on ALL Lead & Follow units will turn Magenta to indicate your units are (Lead) transmitting or (Follow) receiving Wireless Lead/Follow Data.
5. Your Lead unit manual on-board controls will now directly control all linked Follow Units!

TROUBLESHOOTING

Lead/Follow Mode:
Blinking Data Light: A lamp in "Follow" Mode is not receiving data from the lamp in "Lead" Mode. Reseat signal cable in both the lead and follow fixture if using a wired connection. If using CRMX, unpair receiver on "Follow" tube by pressing and holding the Link button and then re-pair to the "Lead" tube by tapping the Link button on the "Lead" tube.

Bluetooth connections:
If a fixture is not discoverable in Bluetooth mode check to confirm it is not set as LEAD fixture.

Art-Net connections:
The Universe display will flash if the fixture is set to a universe that it is not receiving.

Display is showing DMX when sending Art-Net to the fixture: Confirm that the fixture is set into Wired Mode → Art-Net and that the network cable is plugged into the LAN 1 port.

Wifi Mode:
Fixtures in wifi mode are slow to respond, confirm that the controller is only transmitting 1 universe of Art-Net to the fixtures receiving Wifi.

Rainbow 2

CCT output on one fixture doesn't match other fixtures or Console settings:

Check to see that the firmware on the fixtures is the same and the most recent. The most recent firmware can be found here [116]. The firmware is displayed when the fixture powers up next to the quasar logo or it can be seen by entering the configuration menu and pressing the left arrow 3 times.

Warranty

In order for a product to be covered under Quasar Sciences warranty, the customer must provide proof of purchase. However, please note that this warranty is transferable.

3 Year warranty from date of purchase.

Customer must provide proof of purchase.

This warranty is transferable.

Quasar Science will pay for:
The replacement parts, repair and/or labor costs to correct defects in materials and workmanship.

Service must be provided by Quasar Science or an Authorized Quasar Science Service Center

Quasar Science will not pay for:
Damage resulting from accident, misuse or abuse. Acts of God. Any failure that occurs for any other reason than materials and workmanship. Any shipping orhandling costs.

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