RC4 | WIRELESS

LumenDimPixMicro

Miniature Wireless Pixel Driver
Quick Start Guide

Rev. 1.1A

C2 D2 C1 D1 +IN-

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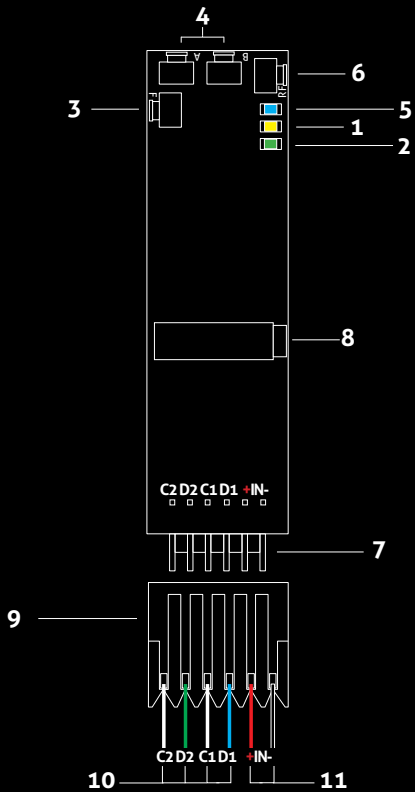
RC4 LumenDimPixMicro

1. DMX Data Indicator
2. Function and COP [2] Indicator
3. Function Button
4. SetA and SetB Buttons
5. RF Connect Indicator for Transmitter Linking
6. RF Connect (Link) Button
7. Male Connector Pins for Power In and Pixel Clock/Data Outputs
8. DMX/RDM In/Out Data Port
9. Disconnectable Female IDC Connector [1] for Power In and Pixel Outputs
10. Pixel Data Connection Wires (Clock/Data1, Clock/Data2)
11. Power Connection Wires (DCin +/-)

1. Connector is Amp MTA-100-Series, 0.1" pin spacing. Shell color indicates wire gauge. Red shell is for 22 AWG wire, Amp connector P/N 3-641190-6. Numerous alternatives are available, each with different P/Ns. Use the correct shell for the wire you are using. Amp also supplies crimping tools for these connectors. One 22 AWG connector assembly is included with each LumenDimPixMicro. Additional cable assemblies are available from RC4 Wireless.

2. COP means "Computer Operating Properly." This indicator always shows a blink pattern, proving that internal firmware is running. Different patterns indicate advanced settings.

LumenDimPixMicro Quick Start Guide

This guide will get you started using your RC4 LumenDimPixMicro. Most LumenDimPixMicro users will find all the information they need right here.

Your LumenDimPixMicro also has a wide variety of expanded features for advanced users. You can find out more about all of them in the RC4 Knowledge Base at *http://rc4.info*.

Registering Your Product

Registering your LumenDimPixMicro is quick and easy. After registration, you'll be notified of new firmware updates, and warranty claims can be resolved more quickly.

Please complete your registration at:
www.rc4wireless.com/support/register/

LumenDimPixMicro System Components

To use your LumenDimPixMicro wireless pixel controller you will need:

- A DMX lighting console.
- A LumenRadio CRMX-compatible wireless transmitter like the
  RC4 LumenDimIO or the LumenRadio TX1.
- A battery or DC power supply for the controller and pixel devices you will be
  operating with it.
- Pixels of a type supported by the LumenDimPixMicro. Common types are
  WS2812 and APA102.

MTA-100 Connector Shell Color and Wire Gauge Matter

The 6-pin connector on the LumenDimPixMicro is the Amp MTA-100-Series,
with 0.1" pin spacing. These are Insulation Displacement Connectors (IDC).
An Amp MTA-100 tool is used to insert the wires.

One 22 AWG red-shell wire-tail assembly is provided with each
LumenDimPixMicro. Additional cable assemblies are available from RC4.

The shell color of MTA connectors indicates the wire gauge it is designed for.
Red shells, **Amp P/N 3-641190-6**, are for 22 AWG wire. Each different wire
gauge uses a connector with a different color and P/N. Use the correct shell for
the wire you are using.

Connections to the wires on RC4 wire-tail connector assemblies can be made
by soldering, crimp connectors, wire caps, or other joiners. Be sure to cover
soldered connections with tubing or tape to avoid accidental short circuits.

Performing a Factory Reset

If someone else has used your LumenDimPixMicro, or you just want to get back to a known configuration, performing a factory reset is easy:

Power on the device. The green COP indicator will be blinking.

Press and hold Func, briefly tap (press and release) the SetA button, then release Func. COP and Data indicators will blink together to confirm that factory settings are restored.

NOTE: This does NOT affect transmitter linking. You must intentionally unlink to disconnect from a previously linked transmitter.

PRO TIP: If you are not sure what settings are currently selected, you can always get back to a known starting point by returning to factory default.
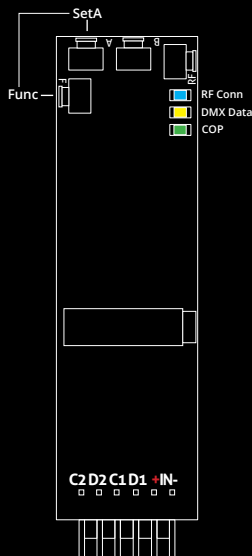
Unlink the LumenDimPixMicro

If the blue RF Connect LED on the LumenDimPixMicro blinks continuously, it is looking for a transmitter that it was previously linked with.

To unlink it, press and hold RF Connect for several seconds until the blue LED goes off and stays off.

If the RF Connect LED remains on, or is blinking, repeat the process until it stays off.

When the RF Connect LED is off, the LumenDimPixMicro is ready to be linked to your transmitter.

Link status is not affected by performing a Factory Reset. You must intentionally unlink to disconnect from a previously linked transmitter.

NOTE: When using a wired RDM controller plugged into the miniplug DMX connector, wireless DMX data must be stopped. This can be done by unlinking, turning off the wireless transmitter, or disconnecting the wired DMX data going into the transmitter.

Linking Transmitter and Receiver

In this example, we're using an RC4 LumenDimIO transmitter. Have both devices powered on. Put the LumenDimIO Mode switch in the transmit position. Connect a DMX data source to the XLR data input on the LumenDimIO.

Tap the Link button. This button is recessed under the small slot to the right of the blue RF Connect LED. Tap it with a small screwdriver or the end of a bent paperclip.

The blue RF Connect LEDs on both devices will flash for several seconds and then remain on, indicating that they are linked.

NOTE: If DMX data is not present at the transmitter, the blue LED will blink slowly rather than staying on.
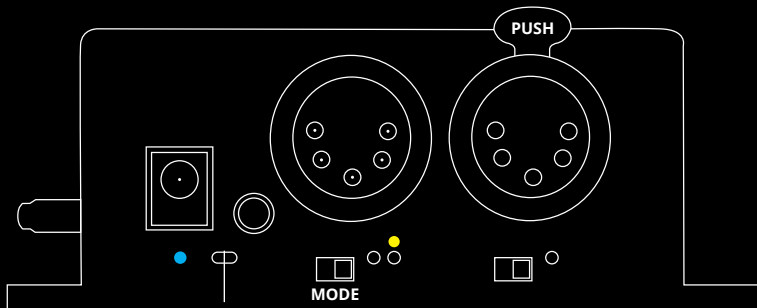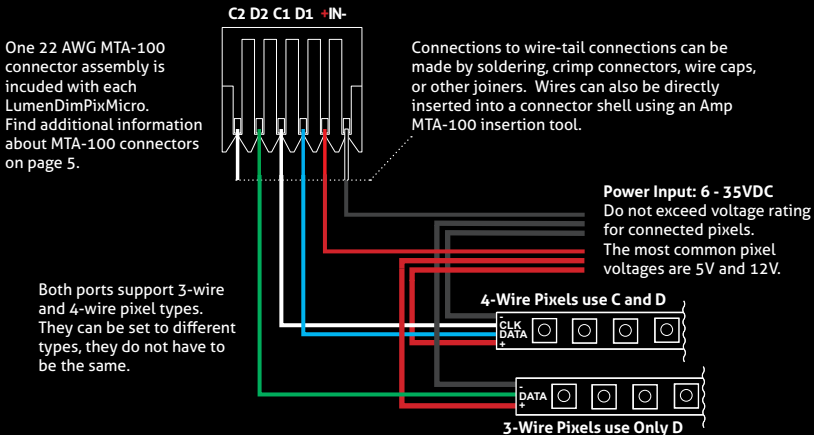
Link Button

Connecting Pixel Strings and Power

To use your LumenDimPixMicro, you must connect pixel products to at least one of the two outputs. When you're connecting anything to your LumenDimPixMicro, be sure that the LumenDimPixMicro is powered down. Connect everything, being sure that the power supply delivers the correct voltage for the pixels you are using; *connecting 5V pixels to 12V power destroys the pixels instantly*.

Connections should be made to an MTA-100 connector. Attach the connector to the LumenDimPixMicro after wiring is completed and checked, then apply power.

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One 22 AWG MTA-100 connector assembly is incuded with each LumenDimPixMicro. Find additional information about MTA-100 connectors on page 5.

Connections to wire-tail connections can be made by soldering, crimp connectors, wire caps, or other joiners. Wires can also be directly inserted into a connector shell using an Amp MTA-100 insertion tool.

Power Input: 6 - 35VDC
Do not exceed voltage rating for connected pixels. The most common pixel voltages are 5V and 12V.

Both ports support 3-wire and 4-wire pixel types. They can be set to different types, they do not have to be the same.

4-Wire Pixels use C and D
CLK
DATA
+

DATA
+

3-Wire Pixels use Only D

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RC4 Custom Pixel Profiles™

The LumenDimPixMicro with patented RC4 Custom Pixel Profiles™ (CPP) provides a simple but powerful means of creating and controlling up to 1000 pixels. RC4 CPP vastly reduces the number of channels needed, while supporting a level of designer creativity not possible with other channel-saving techniques. Unlike drivers that provide preset or canned effects, CPP still allows you to create your own patterns in real time from your DMX console.

Instead of having your console handle the replication of patterns across a large number of pixels, which consumes at least 3 channels (and sometimes more) per pixel, that duty is moved to the pixel driver and handled by RC4 Custom Pixel Profiles™.

Keyframes

◄── Keyframe

You decide how many DMX channels will be used for creating your pattern by setting the **Keyframe Length**. A Keyframe Length of 170 pixels (the default) will map 510 DMX channels directly to pixels, as is done with most DMX-controlled drivers.

Setting a shorter Keyframe Length reduces the number of channels needed to display patterns nearly identical to what an expensive console generates using multiple universes and huge numbers of DMX channels.

The keyframe length can be anything from 1 to 170 pixels long. A particularly powerful and channel-conservative Keyframe Length is 60 pixels*, which utilizes just 180 DMX channels, approximately 35% of one DMX universe.

Replication (Duplication, Mirroring, etc.)

The LumenDimPixMicro and CPP driver replicates the keyframe down the entire length of connected pixels, up to 500 for each of two pixel driver ports.   A variety of **Replication Methods** are available to choose from, and more will be added with future firmware updates.

Replication works even with a Keyframe Length of 170, allowing one port to control 500 pixels with only the data for the first 170. Two ports provide a total of 1000 3-color pixels controlled from a single LumenDimPix.

Grouping

Another way to reduce DMX channels while controlling more pixels is **Grouping**. In this case, the LumenDimPixMicro with CPP controls multiple physical pixels with one console pixel. A Group Length setting of 3 will cause each console pixel to control three physical pixels in a row. This is the equivalent of nine (or more) DMX channels if done from the console. Grouping effectively widens the visual pattern or effect without consuming more DMX channels.

The combination of **Keyframe Length**, **Group Length**, and **Replication Method,** applied to patterns generated live by the lighting console, ensures maximum creative flexibility while substantially reducing the number of DMX channels needed. *CPP parameters are described in detail on pages 14 - 17.*

* A Keyframe Length of 60 is evenly divisible by 2, 3, 4, 5, 6, 10, 12, 15, 20, and 30, making it easy to create the appearance of varying pattern lengths without the need to actually change CPP settings in the LumenDimPixMicro. Of course, there are numerous lengths with interesting benefits and advantages.

RC4 OneTouch™ for Setting Parameters
with DMX Channel Levels

NOTE: To use RC4 OneTouch™, the LumenDimPixMicro must be paired to a CRMX transmitter, and live DMX channel data must be streaming.

RC4 OneTouch™ uses four DMX channel levels to assign values to LumenDimPixMicro parameters. Channel levels are captured and saved with the press of a single button for each driver port using the SetA and SetB buttons.

While you are using RC4 OneTouch™, only DMX channels that are setting parameters should be at levels above zero. All other channels should be off. *NOTE: Channels being used in your DMX system for house-lights and moving light parameters (like pan and tilt) must also be at true zero.*

When a RC4 OneTouch™ button is pressed, the driver sets the first non-zero channel as the DMX Start Channel. In addition, the level of that channel selects one of four popular pixel types. The three channels immediately following the DMX Start Channel are used to set Keyframe Length, Group Length, and Replication Method.

Settings are remembered even when power is cycled. After parameters are set, return to using your DMX console as you normally do, controlling LumenDimPixMicro pixels and everything else in your lighting system.

Using RC4 OneTouch™ is easy:
1. Set channel levels to reflect desired settings for a driver port.
2. Press the Set button for the port.
3. Repeat for other ports, and other devices in your system.
4. Proceed with using your DMX console as you normally do.

RC4 OneTouch™ Implementation in LumenDimPixMicro

In the implementation chart below, channel S is the DMX Start Channel, range 1 to 512. The level of channel S and the next three channels set RC4 Custom Pixel Profile™ parameters. *Parameters are described in detail on pages 14 - 17.*

Before pressing a Set button, the start (S) channel must be at the correct level for the pixel type being used. If the level of any subsequent parameter channel is at zero, the previous setting for that parameter is retained. This makes it easy to change only the start channel and pixel type.

DMX Start Channel for Pixel Control:	S (any chan from 1 to 512)
Keyframe Length in Pixels:	S + 1
Group Length in Pixels:	S + 2
Pattern Replication Method:	S + 3

RC4 OneTouch™ channel levels only matter at the moment a Set button is pressed.
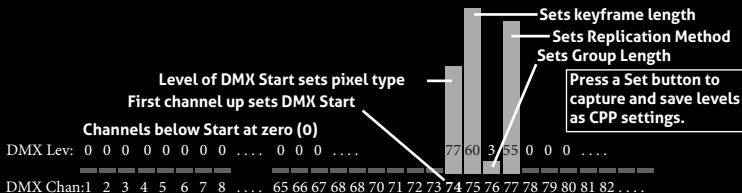
Example:
DMX Start Channel 74 (first non-zero ch is 74)
WS2812 Pixel Type (start ch at level 77, which is 30%)
60-pixel Keyframe Length (first ch above Start, ch 75, set to level of 60)
Pixels controlled in Groups of 3 (ch76 set to level of 3)
Increment/Decrement Replication Method (ch 77 at 55, which is 22%)

Sets keyframe length
Sets Replication Method
Sets Group Length

Press a Set button to capture and save levels as CPP settings.

Level of DMX Start sets pixel type
First channel up sets DMX Start
Channels below Start at zero (0)

DMX Lev: 0 0 0   0 0 0 0 0 .... 0 0 0 ....   77 60 3 55 0 0 0 ....

DMX Chan:1 2 3 4 5   6 7 8 .... 65 66 67 68 68 70 71 72 73 74 75 76 77 78 79 80 81 82 ....

Set DMX Start Channel and Pixel Type for Each Port

To use RC4 OneTouch™, the LumenDimPixMicro must be paired to a CRMX transmitter, and live DMX channel data must be streaming.
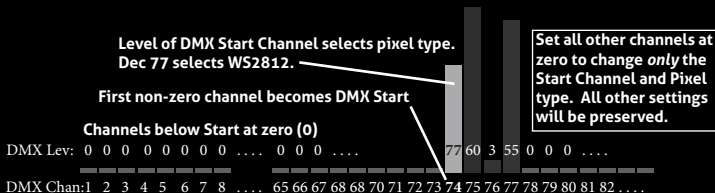
The first channel in the DMX universe that is at a non-zero level will be assigned as the DMX Start Channel. The Start Channel must be at the correct level for the pixel type being used:

Dec Level	% Level	String Type Selected
0 – 37	<15%	Channel Ignored
38 – 101	30%	WS2811/WS2812 *
102 – 152	50%	WS2801
153 – 203	**70%**	**APA102 (default for LumenDimPixMicro)**
204 – 255	100%	SK6812RGBW (4-colors per pixel)

Additional pixel types can be selected using Remote Device Management (RDM).

Setting only this parameter, with all other DMX channels at zero, will change the DMX Start Channel and pixel type without changing other CPP parameters.

* WS2812 is the most common data protocol for pixel control. There are many compatible products. If you are using a 3-wire device with D but no C connection, it will most likely work using the WS2812 driver setting. The SK6812RGBW uses the same data protocol but allocates 4 control channels to each pixel, for 4 colors.

Level of DMX Start Channel selects pixel type.
Dec 77 selects WS2812.

Set all other channels at zero to change *only* the Start Channel and Pixel type. All other settings will be preserved.

First non-zero channel becomes DMX Start

Channels below Start at zero (0)

DMX Lev: 0 0 0 0 0 0 0 0 .... 0 0 0 .... 77 60 3 55 0 0 0 ....

DMX Chan:1 2 3 4 5 6 7 8 .... 65 66 67 68 68 70 71 72 73 74 75 76 77 78 79 80 81 82 ....

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Select Pixel Color Order

Repeatedly pressing the same Set button will cycle through 6 color orders. Select the color-order of the pixel product being used, and the LumenDimPixMicro will re-order the control channels for red/green/blue control from your console:

RGB ▪▪▪◻ **(red/green/blue, default)**
GRB ▪▪▪
RBG ▪▪▪
BRG ▪▪▪
GBR ▪▪▪
BGR ▪▪▪

NOTE: When using RGBW 4-color pixel products, only the first 3 colors are rotated to change color order. The 4th channel in each pixel must be white.

Set Keyframe Length in Pixels

The channel immediately after the DMX Start Channel sets the Keyframe Length in pixels, limited to the range 1 - 170. A value of zero will be ignored, so the previously set Keyframe Length will remain unchanged. Values higher than 170 will set a length of 170 pixels.

The default Keyframe Length is 170 RGB pixels, using 510 DMX channels.

DMX Start and Pixel Type must *always* be non-zero and correctly set when using RC4 OneTouch™.

Sets keyframe length. Dec 60 sets a length of 60 pixels.

Channels below Start at zero (0)

DMX Lev: 0 0 0   0 0 0 0 0 .... 0 0 0 ....   77 60 3 55 0 0 0 ....

DMX Chan:1 2 3   4 5 6 7 8 .... 65 66 67 68 68 70 71 72 73 74 **75** 76 77 78 79 80 81 82 ....
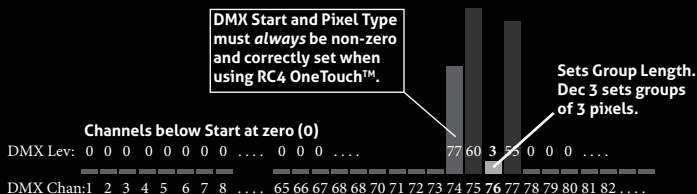
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Set Group Size in Pixels

The second channel after the DMX Start Channel sets the Group Length in pixels. A value of zero will be ignored, so the previously set Group Length will remain unchanged.

For decimal values 1 - 250, that value directly becomes the Group Length. The remaining high levels result in the following Group Lengths:

DMX Chan Lev	Group Length Selected
251	300
252	350
253	400
254	450
255	500 (unison mode)

A Group Length of 500 with a Keyframe Length of 1 is Unison Mode, where all pixels in a string are controlled by just three DMX channels (DMX Start Channel for red, the next channel for green, the next for blue).

The default Group Length is 1.

DMX Start and Pixel Type must *always* be non-zero and correctly set when using RC4 OneTouch™.

Sets Group Length. Dec 3 sets groups of 3 pixels.

Channels below Start at zero (0)

DMX Lev: 0 0 0   0 0 0 0 0   . . . .   0 0 0   . . . .   77 60 **3** 55 0 0 0   . . . .

DMX Chan:1 2 3   4 5   6 7 8   . . . . 65 66 67 68 68 70 71 72 73 74 75 **76** 77 78 79 80 81 82 . . . .

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Set Pattern Replication Method

This parameter is configured to support 12 different methods of extending the Keyframe pattern over the length of all pixels controlled by a CPP driver. The first 4 methods are currently assigned. The remaining 8 methods are not yet designed, and selecting one will default to method 1 (Incremental).

A Replication Method is always active. When using a 170 pixel keyframe, replication will apply from the 171st pixel through to the 500th. Data for all 500 pixels is always there, regardless of how many real pixels are connected.

Ch Lev   Replication Method Selected
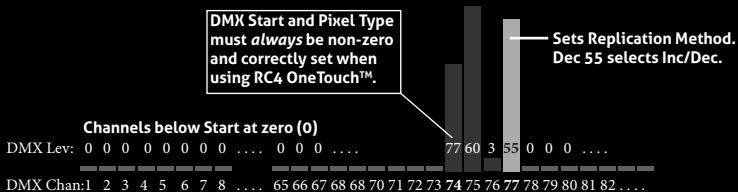
0 – 15:   No Function, channel ignored.

16 – 31: Increment Channels (default): Repeat Keyframe beginning to end:

32 – 47:   Decrement Channels: Repeat Keyframe end to beginning, starting with a mirrored (reversed) keyframe:

48 – 63:   Inc/Dec Channels: Alternating Increment and Decrement patterns:

64 – 79:   Dec/Inc Channels: Alternating Decrement and Increment patterns starting with a mirrored (reversed) keyframe:

80 – 255: Reserved for additional Replication Methods in the future.

DMX Start and Pixel Type must *always* be non-zero and correctly set when using RC4 OneTouch™.

Sets Replication Method. Dec 55 selects Inc/Dec.

Channels below Start at zero (0)

DMX Lev:	0	0	0	0	0	0	0	0	....	0	0	0	....	77	60	3	55	0	0	0	....
DMX Chan:	1	2	3	4	5	6	7	8	....	65	66	67	68	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	....

Advanced Features

The LumenDimPixMicro is a multifaceted device for users of all experience levels. The features below can be explored further at *http://rc4.info/* or by asking us for help at *support@rc4wireless.com*:

- In addition to the pixel types referred to in this Quick Start Guide, the LumenDimPixMicro can also control LPD8806 pixels and MY9231 pixels*. New pixel types will be supported with firmware updates from time to time, all of which can be selected using DMX Remote Device Management (RDM).

- The LumenDimPixMicro includes RC4 ColorMatch™, allowing you to visually match the color rendering of different pixel strings. This lets you use multiple string types, brands, and batches that do not inherently look the same, and correct their output for better color continuity.

- Using a small adaptor cable, the LumenDimPixMicro can be used as a wireless data receiver to deliver DMX to other devices. It can also be used as a wired DMX pixel driver: the miniplug DMX port becomes an input when the device is not linked to a transmitter.

- DMX Remote Device Management (RDM) can be used to configure all available parameters in the device, including some parameters not accessible any other way. The LumenDimPixMicro supports wireless RDM when used with an RDM-capable CRMX transmitter.

* MY9231 control requires a very small clock adaptor module between the LumenDimPixMicro and the first pixel, available from RC4 Wireless.

- When you purchased your LumenDimPixMicro, you selected either internal chip antenna, or external antenna via the U.FL connector.

  If you are comfortable with precision electronic soldering, *you can change the antenna type yourself.* The LumenRadio TiMo RF module uses its on-board chip antenna if pins 5 and 6 are jumpered together. With no jumper, the TiMo will use the external U.FL connector by default. Go to the RC4 Wireless online Knowledge Base for more details. Don't hesitate to ask for assistance!

Caring for Your LumenDimPixMicro

- **The LumenDimPixMicro should not be used with AC power or with any voltage higher than 35VDC.** Doing so will severely damage the device and is extremely dangerous for the operator.

- Connect the pixel power lines directly to your power supply or battery.

- *Common ground is always required between the LumenDimPixMicro and the pixels.*

- Always use a fuse or circuit breaker at the source of power and always use an appropriate wire size for the fuse rating. For example, if using a 10A fuse, use wire that can safely carry 10A.

- The LumenDimPixMicro should be kept away from excessive heat, cold, dust and moisture.

- Do not immerse in water or other fluids.

Failing to observe appropriate safety precautions can result in fire or other risk. RC4 Wireless cannot be held responsible or liable in such cases.

Get in Touch

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Knowledge Base: *http://rc4.info*

We're here to help you at any time.
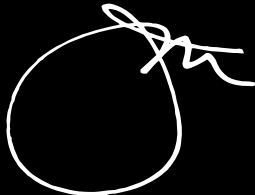
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