RC4 WIRELESS

LumenDimPix

Wireless Pixel Driver
Quick Start Guide
Rev. 1.0A

RC4Wireless
LumenDimPix
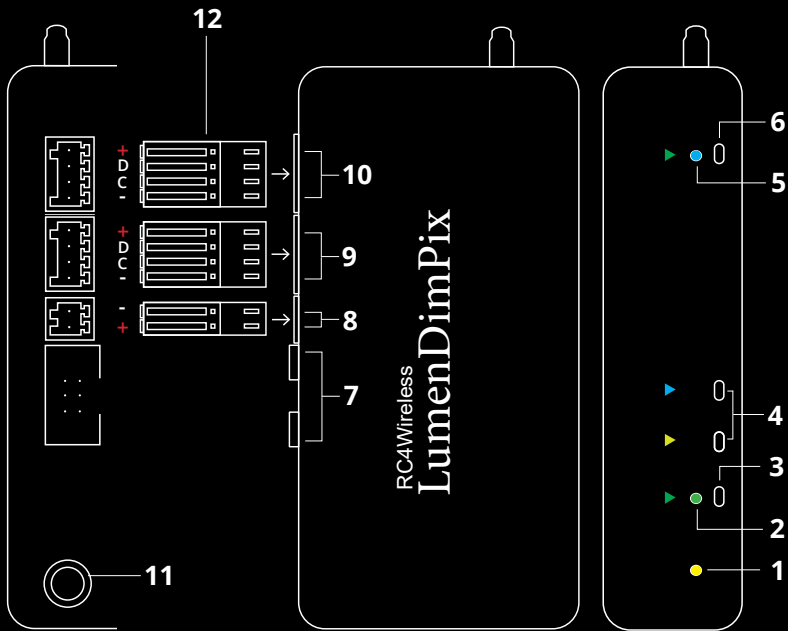
RC4 LumenDimPix

1. DMX Data Indicator
2. Function and COP [3] Indicator
3. Function Button
4. SetA, SetB Buttons
5. RF Connect Indicator for Transmitter Linking
6. RF Connect (Link) Button
7. I2C Data Port (for Advanced Applications)
8. Power Input Connector
9. Pixel Control Port A [1]
10. Pixel Control Port B [1]
11. DMX/RDM Data In/Out
12. Removable Phoenix Connectors for Power and Pixels [2]

[1] Pixel Control Ports provide 4 connections:
   +   Positive power to pixels
   D   Data line for pixel control
   C   Clock line for pixel control (not used with 3-wire pixel products)
   -        Negative (ground) power to pixels
            *For pixel loads drawing more than 6A, pixel power should connect DIRECTLY
            to the power supply or battery, NOT through the LumenDimPix. A common
            ground (-) is always required between the LumenDimPix and the pixels.*

[2] One set of connectors is provided with each new LumenDimPix.
    Additional sets of connectors available separately from RC4 WIreless.

[3] COP means "Computer Operating Properly." This indicator always shows a blink
    pattern, proving that internal firmware is running. Different patterns indicate various
    modes and advanced settings.

LumenDimPix Quick Start Guide

Your RC4 LumenDimPix has a wide variety of patented features that reduce the number of DMX control channels needed to create beautiful looks with up to 1000 pixels. Parameter settings, as a group, are called an RC4 Custom Pixel Profile™, or CPP. CPPs are ideal for pattern-based (rather than video-based) applications of pixel tape, pixel panels, festoon strings, and other pixel products. The small size and light weight of the LumenDimPix make it perfect for costumes and small props, even hats and wigs.

Right out of the box, the LumenDimPix operates like most DMX-controlled pixel drivers. The default CPP settings let you immediately start controlling up to 170 APA102* three-color pixels with one 512-channel DMX universe, starting on the first channel.

This guide helps you discover how to make big looks with fewer resources and in less time, using any of the most popular pixel types, including 3-wire and 4-wire data formats, 3-color and 4-color pixels, and more.

* APA102 is one of several types of pixel. It uses a high internal PWM frequency, making it ideal for motion picture capture without banding or other visual artifacts.

Registering Your Product

Registering your LumenDimPix 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/

LumenDimPix System Components

To use your LumenDimPix wireless dimmer 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 LumenDimPix and pixel products
  you will be operating with it.

- A set of Phoenix connectors (one set is included with the LumenDimPix)

- A small tool, like a bent paperclip, to press the recessed buttons on the
  LumenDimPix, and to press the wire-release buttons on the connectors or
  power and pixels.

- A pixel product, like APA102 (the default) or WS2812 pixel tape.

Phoenix Connectors for Power and Pixels

Power and pixel connections are made with Phoenix COMBICON FK-MC Series removeable connectors. One set of mating connectors is included with the LumenDimPix. Additional connectors can be purchased from RC4 Wireless. *
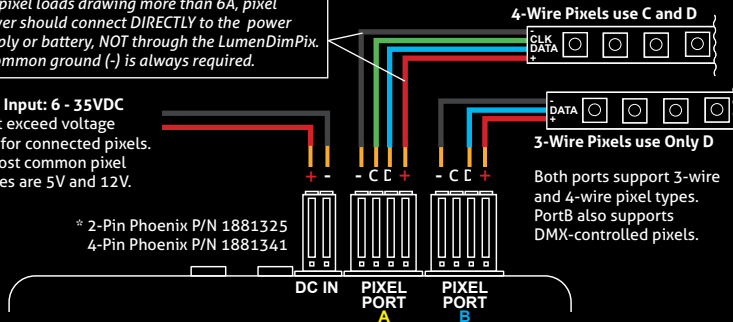Connecting wires is easy:

- Wire must be in the size range of 0.5mm² to 0.75mm² (20 - 18 AWG).
- Strip 8mm (5/16 inch) of insulation from the end of each wire.
- Use a small screwdriver to hold down the orange spring-release button above the wire-entry hole.
- While holding the button, fully insert the bare wire end into the hole.
- With the wire fully inserted, release the orange button.
- Firmly but gently pull back on the wire to confirm a good grip on the wire.

NOTE: It is helpful to use a small vice, spring-loaded clamp, or pliers to hold the connector upright while inserting wires.

For pixel loads drawing more than 6A, pixel power should connect DIRECTLY to the power supply or battery, NOT through the LumenDimPix. A common ground (-) is always required.

4-Wire Pixels use C and D

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

3-Wire Pixels use Only D

Both ports support 3-wire and 4-wire pixel types. PortB also supports DMX-controlled pixels.

* 2-Pin Phoenix P/N 1881325
4-Pin Phoenix P/N 1881341

DC IN

PIXEL PORT A

PIXEL PORT B

Performing a Factory Reset

If someone else has used your LumenDimPix, 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. The DMX Data and
COP indicators will blink several times to confirm that
factory settings are restored.

NOTE: This does NOT affect transmitter linking.

PRO TIPS:
Bending a single paper clip into a U shape will enable
you to easily reach and press both buttons together.

If you are not sure what mode, pixel type, or other
settings you may have selected, you can always get
back to a known starting point by returning to factory
defaults.

RF
Connect ▶ ● 0

Set B ▶ 0

Set A ▶ 0

Func ▶ ● 0
   COP

DMX Data ●
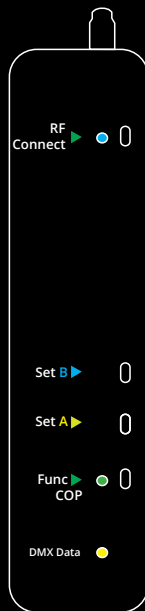
Unlink the LumenDimPix

For all RC4 Wireless products, LED indicators are behind small round holes. Buttons are behind small slots. Do not push tools into round holes. Use a bent paperclip or small screwdriver to push buttons.

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

To unlink it, use a bent paperclip or small screwdriver to 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 LumenDimPix is ready to be linked to your transmitter.

NOTE: Link status is not affected by performing a Factory Reset (see page 7).

Linking Transmitter and Receiver

In this example, we're using an RC4 LumenDimIO transmitter.

If you're using a different transmitter, be sure it is CRMX-compatible, to work with LumenRadio devices. Refer to your transmitter user manual for specific linking instructions.

Have both devices powered on. Put the LumenDimIO Mode switch in the transmit position, then tap the Link button. The Link 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 the LumenDimIO and the LumenDimPix will flash for several seconds and then remain steady, indicating that they are linked.

Link Button
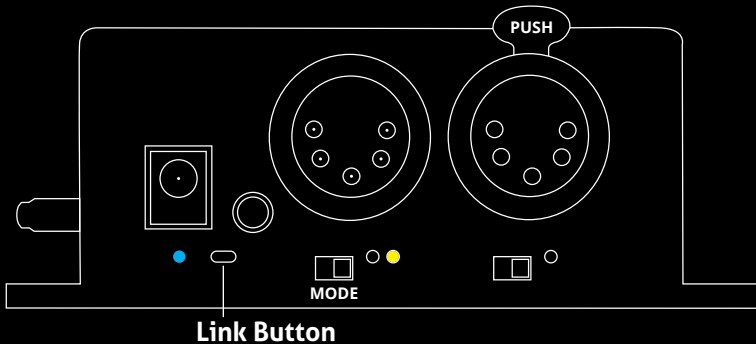
RC4 Custom Pixel Profiles™

The LumenDimPix 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

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.)

◄— Keyframe

The LumenDimPix 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

◄— Keyframe

Another way to reduce DMX channels while controlling more pixels is **Grouping**. In this case, the LumenDimPix 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 LumenDimPix. 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 LumenDimPix 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 LumenDimPix 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 LumenDimPix 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 LumenDimPix

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

Level of DMX Start sets pixel type
First channel up sets DMX Start

Channels below Start at zero (0)

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

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 . . . .
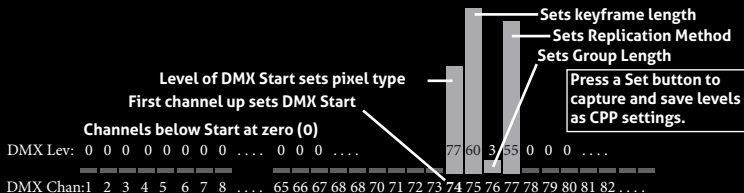
Set DMX Start Channel and Pixel Type for Each Port

To use RC4 OneTouch™, the LumenDimPix 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 LumenDimPix)**
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.**

First non-zero channel becomes DMX Start

Channels below Start at zero (0)

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

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 ....
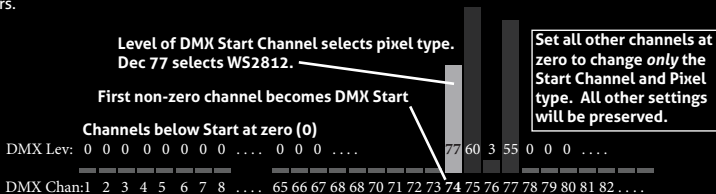
Select Pixel Color Order

Repeatedly pressing the same Set button will cycle through 6 color orders. Select the color-order of the pixel product being used, and the LumenDimPix 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 ....

15
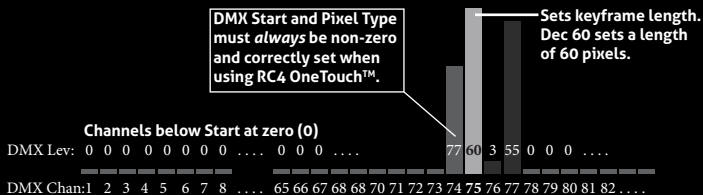
Set Group Size in Pixels

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   . . . .   77 60 **3** 55 0 0 0   . . . .

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

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	70	71	72	73	**74**	75	76	**77**	78	79	80	81	82 ....

Advanced Features

The LumenDimPix 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 LumenDimPix can also control LPD8806 pixels, MY9231 pixels*, and Port B can control strings that read DMX data directly. 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 LumenDimPix 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 LumenDimPix 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 can be used to select DMX start channel and pixel string type for each pixel port. The LumenDimPix support both wired and wireless RDM when used with an RDM-capable CRMX transmitter. (Future firmware updates, always provided at no charge, will provide access to RC4 Custom Pixel Profile™ parameters. Watch for firmware update announcements.)

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

Caring for Your LumenDimPix

- **The LumenDimPix 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.

- Do not exceed the maximum total power handling of the LumenDimPix, which is 6A. To drive larger pixel loads, connect the pixel power lines directly to your power supply or battery. *A common ground is always required between the LumenDimPix 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 LumenDimPix 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

1-866-258-4577   **Toll Free, North America**
1-919-229-9950   **North Carolina, USA, Local**
+44 (0)20 3289 8765   **London, UK**
1-866-237-6641   **Toll Free Fax, North America**

Email: *support@theatrewireless.com*
Website: *www.rc4wireless.com*
Knowledge Base: *http://rc4.info*

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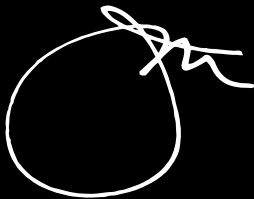
James David Smith
President and Chief Product Designer
RC4 Wireless