

# RC4Magic Series 2

Wireless DMX and  
Wireless Dimming System



## User Manual

**RC4**  
Wireless

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## **Disclaimers**

**WIRING AND INSTALLATION OF BATTERIES, DIMMERS, AND LOADS MUST BE IN ACCORDANCE WITH APPLICABLE LOCAL AND NATIONAL ELECTRICAL CODES. RC4 Wireless devices and equipment are operated at the user's own risk and RC4 Wireless accepts no liability, either direct or consequential, as a result of using this equipment.**

### **Not for Use Where Human Safety May Be At Risk**

**RC4 Wireless accepts no liability for direct, indirect, or consequential damages resulting from the use of any RC4 Wireless product or group of products.** RC4 Wireless does not guarantee the suitability of any product for any purpose; user assumes all risk. RC4 dimmers must be used strictly in accordance with manufacturer's instructions and cannot be used for unsupervised operation. RC4 Wireless products must be installed and operated only by qualified technicians, as outlined in the manufacturer's documentation, and should be inspected and tested on a regular basis to ensure proper operation.

### **Not for Control of Pyrotechnical Devices**

**RC4 Wireless receivers should not be used to control pyrotechnics of any kind.** A brief output surge on dimmer outputs during power-up could trigger these devices. RC4 Wireless accepts no liability if RC4 equipment is used for this or any other purpose.

### **Product Safety**

RC4 receiver/dimmers are capable of controlling very large currents at up to 30VDC (typically 12V). Dimmers should not be allowed to operate at dangerous temperatures. Appropriately sized wire and connectors must be used, along with suitable ventilation and external fuses rated for the load being operated. Additional information is provided in this manual.

## **Statements of RF Conformity**

### **United States (FCC)**

RC4Magic Series 2 devices contain XBeePro radios, **FCC ID OUR-XBEEPRO**, and comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: *(i.)* these devices may not cause harmful interference and *(ii.)* these devices must accept any interference received, including interference that may cause undesired operation.

### **Canada (IC)**

RC4Magic Series 2 devices contain XBeePro radios, **IC: 4214A-XBEEPRO**.

### **Japan**

RC4Magic Series 2 devices contain XBeePro radios, **ID: 005NYCA0378**.

### **Europe (ETSI)**

XBeePro radios used in RC4Magic Series 2 devices have been certified for use in several European countries. France imposes restrictions on the 2.4 GHz band. Norway prohibits operation near Ny-Alesund in Svalbard. Other restrictions may apply. For additional information, please contact RC4 Wireless.

### **Other Countries and Jurisdictions**

XBeePro radios used in RC4Magic Series 2 devices have also been issued Declarations of RF Conformity for Australia/New Zealand, and Korea. For additional information, please contact RC4 Wireless.

# RC4Magic Quick Start – It's Easy!

RC4Magic Series 2 is truly Plug-n-Play – you can start using it right away.

## DMX Transmitter

If your system has just one DMXio module, it is configured as a transmitter.

If you have multiple DMXio modules, only one is configured as a transmitter, the rest are configured as receivers. A temporary label has been provided to identify the transmitter.

Connect the supplied wall-transformer power supply to your DMXio transmitter. Plug in a DMX data source and see that the DMX led comes on. That's it – you're on the air.



## DMX Receiver

Connect a supplied wall-transformer power supply to a DMXio receiver. It can take anywhere from 3 to 15 seconds for the receiver to connect with the transmitter. When the DMX led comes on, you have DMX data coming out. That's it – you have a 200 foot wireless DMX link.

## Identifying Transmitters and Receivers

If you've lost track of which DMXio is your transmitter, watch the leds during power-up. An led chase from left to right – think "signal going out" – indicates a transmitter. A chase from right to left – think "signal coming in" – indicates a receiver.

## Wireless Dimming

DMX2dim and DMX4dim receiver-dimmers are complete standalone wireless dimmers. New DMX2dim units are pre-assigned to DMX channels 1 and 2 with a linear dimming curve. DMX4dim units are pre-assigned to DMX channels 1, 2, 3, and 4 with a linear dimming curve. (It's easy to change channel and curve assignments later.)

Using a small screwdriver, connect a power supply (usually a 12V battery) to the +/-DC IN screw terminals. Connect a load (usually an MR16 or MR11 12V lamp) to the DimA+/- terminals. After power-up, it can take anywhere from 3 to 15 seconds for the receiver to connect with the transmitter.

Fade DMX channel 1 up and down. See your lamp dim up and down. That's it!

***Now it's time to read through this manual to learn how to set dimmer channels, change system IDs, and more. Thank you for choosing RC4Magic Series 2!***

## RC4Magic – An Overview



### DMX Cable Replacement / DMX Distribution

The heart of RC4Magic Series 2 (RC4M-S2) is the DMXio module. A DMXio can act as a wireless transmitter or receiver, and any number of receivers can be used in a system. A pair of DMXio units configured as transmitter and receiver replaces a standard DMX cable. RC4Magic modules work reliably to 200 feet or more inside theatres and other performance spaces.

Any number of receivers can be used in an RC4Magic system, taking the place of splitters and distribution boxes, and providing a superior level of electrical isolation along with the uncluttered convenience of wireless.

Configured as a transmitter, the DMXio encodes and encrypts the incoming DMX universe, and broadcasts it using Direct Sequence Spread Spectrum (DSSS) digital radio. Unlike wired DMX, the broadcast signal includes error checking and correction codes, and is not affected by minor interruptions and interference. All incoming DMX channels are broadcast with appropriate speed, redundancy and accuracy, with additional bandwidth dynamically allocated to channels that are changing.

As a receiver, the DMXio decodes the rf signal from the associated transmitter, rebuilds the DMX universe, and generates a DMX signal with the same number of channels and packet timing as the original input. DMX in and out are compliant with the USITT DMX512/1990 standard.

RC4Magic Series 2 does not transmit DMX messages with start codes other than zero. Thus, it can only be used for dimmer data. It will not work with non-zero packets carrying proprietary data or RDM packets. (RDM functionality will be added to the DMXio in future firmware updates.)



### Wireless Low-Voltage Dimming

The DMX2dim and DMX4dim receiver-dimmers decode the rf signal from the DMXio transmitter and send user-selected DMX channel levels to built-in low-voltage dimmers. In addition to DMX channel, each dimmer can be assigned a linear, inverse square-law, or non-dim dimmer curve.

Any number of DMX2dim and DMX4dim receiver-dimmers can be used in an RC4Magic system.

**Note: RC4Magic Series 2 modules cannot communicate with original RC4Magic systems.**

## System ID Numbers

A system ID is a unique code, similar to a password or encryption key. When multiple RC4Magic Series 2 devices are configured with the same ID, they form a Private Area Network (PAN). Other devices on other IDs can form their own PANs. RC4Magic supports over 60,000 unique IDs, and up to 15 independent PANs can operate in the same physical space.

Every RC4Magic Series 2 device is factory programmed with 3 unique private ID numbers and one common public ID. All 4 IDs are indicated on the outside of each unit. In most cases, all the units in a system share the same 4 ID choices, but this is not strictly necessary.

When ordering additional devices for an existing RC4Magic Series 2 system, you must specify the ID numbers to be factory programmed, which can be any combination of IDs previously assigned to you, and/or new IDs. To ensure the reliability and security of all RC4Magic Series 2 systems for all users, every new system is assigned its own set of private IDs.

Following a special procedure, IDs stored in a DMXio transmitter can be adopted by any RC4Magic Series 2 receiver or receiver-dimmer. Later, the originally programmed factory IDs can easily be restored. Additional information about ID adoption is provided later in this manual.

## Power-Up Sequence and Radio Channel Assignments

When an RC4Magic Series 2 DMXio transmitter first powers up, it scans the 2.4GHz radio band, which is quite large and supports many radio channels, looking for the frequency with the least traffic and lowest pre-existing rf power levels. It then sets itself to operate on that frequency and begins transmitting DMX packets encoded with a specific system ID number. When this power-up process is complete, and signals are being broadcast, the RF Active led blinks steadily at a moderate speed.

When a DMXio receiver or DMX2dim/4dim receiver-dimmer powers up, it scans the 2.4GHz band looking for signals from a DMXio transmitter using the selected ID number. When it finds valid data, the RF Active led blinks steadily at double the speed of the led on the transmitter.

If a receiver does not receive valid data for 5 seconds, the start-up scan procedure repeats. Thus, if the transmitter has been turned off and back on (or there has been a power failure) and it is now transmitting on a different radio frequency, the receiver will reconnect after a brief period of data silence on the original frequency.

Multiple RC4Magic Series 2 systems using different IDs can operate at the same time in the same space, and each system will provide a separate wireless DMX universe. In a space with little or no other radio activity, there is enough bandwidth in the 2.4GHz band to support up to 15 RC4Magic Series 2 systems, each with any number of receivers and dimmers. Even in more crowded rf environments there will usually be enough bandwidth for 3 or more separate RC4Magic systems.

***Note: Only a single ID is used by an RC4Magic device at any one time, supporting one DMX universe with up to 512 channels. A separate DMXio transmitter on a separate ID is required for each DMX universe being broadcast.***

## Advanced Settings

Inside each RC4Magic Series 2 DMXio there are 4 dipswitches. Switch 1 selects transmitter or receiver mode: OFF for transmit, ON for receive. Switches 3 and 4 select a system ID.

DMX2dim and DMX4dim receiver-dimmers have recessed pushbuttons. Holding these buttons down during power-up, or pressing them at particular times, will select different IDs or invoke advanced features and functions.

Additional information about device configuration and ID adoption is provided later in this manual.

# DMXio Transmitter Setup

Only one DMXio in transmitter mode should be operated on each system ID. Multiple transmitters on the same ID will produce undesirable and unpredictable results.

## Mode Selection and Connections

To use an RC4Magic DMXio as a transmitter, internal dipswitch 1 must be in the OFF position. In this mode, the LEDs will chase left to right when first powered up. Simply connect your DMX signal and the supplied power adaptor.

The DMX input is compliant with USITT DMX512/1990(4us), with no internal termination. If you are putting the DMXio at the end of a long DMX cable, a terminator plug should be inserted in the DMX output jack. For short cable runs, termination is often (but not always) unnecessary.

Power should be 8V – 12VDC and can come from the power supply provided (wall transformer) or batteries. A small pack of 6 AA or AAA batteries can be used for portable operation with, for example, a battery powered DMXter, Pocket Console DMX, or other portable DMX signal source. The power inlet is a standard 2.1mm receptacle, center-positive.

The DMX output jack is ideal for inserting the DMXio in a wired DMX network. In many cases, it can be used right at the output of your lighting console or other controller, before your DMX signal continues to other devices in your system. Internally, the DMX input connects directly to the DMX output, so the data will always pass through, even if the DMXio is not powered.

Once everything is connected, position the red circle RF Hotspots on all RC4Magic devices so they are all facing upward. If this is difficult, face the RF Hotspots towards any common reflective surface, like a wall, ceiling, or open floor area.

Line-of-sight is NOT required for RC4Magic, but dense objects between units – like concrete walls – will attenuate the radio signal and reduce the available range.



## LEDs in Transmitter Mode

Four LED indicators assist with troubleshooting. *On power-up, an LED chase from left to right indicates transmitter mode.*

The **DMX** indicator is on when valid DMX data is present at the DMX input. It goes out after 1 second if valid data is no longer present. *In normal operation with DMX data present, this led should be solidly on.*

The **RF Data** indicator is on whenever data is being sent. *In normal operation this LED appears to blink rapidly, and will shimmer or flicker while DMX levels are changing.*

The **RF Active** indicator will light continuously after power-up, while radio channels are being scanned. When a clear channel is located and transmission has begun, this indicator will blink slowly and steadily. *In normal operation, this led should be blinking.*

The **RSSI/COP** indicator – Computer Operating Properly – steadily blinks with a short duty cycle (more off time than on time) to show that the sophisticated software inside the transmitter is running properly. *During normal transmitter operation, this led should be blinking slowly.*



# DMXio Receiver Setup

Any number of DMXio units in receiver mode can be used in an RC4Magic Series 2 system.

## Mode Selection and Connections

To use an RC4Magic DMXio as a receiver, internal dipswitch 1 must be in the ON position. In this mode, the LEDs will chase right to left when first powered up. Simply connect the supplied power adaptor, and connect the DMX output to your DMX devices. It can sometimes take 10 seconds or more for DMXio receiver to connect to the DMXio transmitter and begin outputting useful DMX data, but it will often connect much faster.



The DMXio receiver output is compliant with USITT DMX512/1990, and closely mimics the data going into the associated DMXio transmitter. It will output the same number of channels and the same timing between packets. DMX packets can contain anywhere from 1 to 512 channels, with a frame rate of anywhere from 12 packets to thousands of packets per second. (Of course, high frame rates require fewer channels in each packet.)

If you are putting the DMXio receiver at the beginning of a long DMX cable run, a terminator should be used at the far end. For short cable runs, termination is often (but not always) unnecessary.

**Remember: The DMXio receiver is a DMX data source and acts as a controller.**

Power should be 8V – 12VDC and can come from the power supply provided (wall transformer) or batteries. A small pack of 6 AA or AAA batteries, or a 12V battery, can be used for portable operation. The power inlet is a standard 2.1mm receptacle, center-positive.

Once everything is connected, position the red circle RF Hotspots on all RC4Magic devices so they are all facing upward. If this is difficult, face the RF Hotspots towards any common reflective surface, like a wall, ceiling, or open floor area.

Line-of-sight is NOT required for RC4Magic, but dense objects between units – like concrete walls – will attenuate the radio signal and reduce the available range.

## LEDs in Receiver Mode

Four LED indicators assist with troubleshooting. *On power-up, an LED chase from right to left indicates receiver mode.*

The **DMX** indicator is on while a DMX data packet is being output. At slow DMX data rates, it will appear to flicker rapidly. *In normal operation this led is continuously on.*

The **RF Data** indicator is on whenever data is being received by radio. *In normal operation this LED appears to blink rapidly, and will shimmer or flicker while DMX levels are changing.*

The **RF Active** indicator will light continuously after power-up, while radio channels are being scanned. When valid data from an associated DMXio transmitter is found, this indicator will blink



at double the speed of the RF Active LED on the transmitter. *In normal operation, this led should be blinking.*

The **RSSI/COP** provides Receiver Signal Strength Indication by blinking faster when the rf signal is stronger. With the strongest signal, it appears to be almost solidly on with a slight shimmer. With no signal at all, it blinks with the same pattern as a transmitter. *In normal operation, this led should be blinking or flickering.*

## DMXio Internal Dipswitches

The DMXio contains 4 internal dipswitches. They can be accessed by removing the 4 screws in the corners of the top cover, and hinging the cover back on the label. Inside the cover is a legend indicating the functions of the switches.



*Make changes with the power removed. New settings do not take effect until the next power-up.*

### DMXio Transmitter Dipswitches

**Dipswitch 1: Mode: OFF for transmitter mode, ON for receiver mode.**

**Dipswitch 2: RF Output Power:**  
OFF for 18dBm (North America)  
ON for 10dBm (Europe, Japan, etc.)

**Dipswitches 3 and 4: Select system ID:**  
both 3 and 4 OFF for private ID0  
3 OFF and 4 ON for private ID1  
3 ON and 4 OFF for private ID2  
Both 3 and 4 ON for the public ID, ID3

### DMXio Receiver Dipswitches

**Dipswitch 1: Mode: ON for receiver mode, OFF for transmitter mode.**

**Dipswitch 2: Restore original factory IDs, and enable adoption of new IDs:**  
ON to restore IDs, and enable adoption of new IDs from an associated transmitter.  
OFF to protect internal IDs.  
Public ID3 must be selected while adopting new IDs.

**Dipswitches 3 and 4: Select system ID:**  
both 3 and 4 OFF for private ID0  
3 OFF and 4 ON for private ID1  
3 ON and 4 OFF for private ID2  
Both 3 and 4 ON for the public ID, ID3

DMXio dipswitch settings are transmitted to all receivers. When the transmitter rf power level is changed, all receiver power levels change automatically. RC4Magic radios are actually transceivers – they can both transmit and receive, and they communicate bidirectionally during system operation.

## DMX2dim Receiver-Dimmer Setup

The DMX2dim is a completely standalone unit that includes a built-in RC4Magic Series 2 radio receiver and 2 low-voltage pulse-width-modulation dimmers.

Any number of DMX2dim receiver-dimmers can be used in an RC4Magic Series 2 system.

The radio operates identically to the DMXio in receiver mode. Line-of-sight is NOT required for RC4Magic, but dense objects between RC4Magic units – like concrete walls – will attenuate the radio signal and reduce the available range. It can take 10 seconds or more for the DMX2dim to connect to the DMXio transmitter and begin powering the dimmer outputs, but it will often connect much faster.



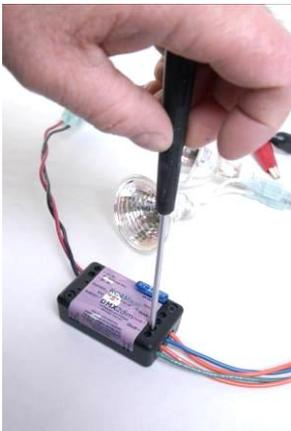
### Connections

Small screw terminals are provided for connection of the power supply (+/-DC IN) and load devices (+/-DimA and +/-DimB). **The power supply operates both the internal electronics and the connected loads and must be powerful enough to run the load without significant voltage drop.** The dimmers use high-frequency pulse-width-modulation, switching on the negative side of the circuit.

The most typical power supply is a 12V rechargeable sealed lead-acid (SLA) battery, sometimes called a “gel cell”. **The maximum voltage for the DMX2dim is 18V (12V nominal).** An internal self-resetting circuit breaker protects the microcontroller, radio, and dimmer electronics. A user-accessible blade-type automotive fuse (Bussmann ATC series) protects the connected wiring and loads and is in the positive side of the circuit. **The maximum fuse size is 15A (ATC-15), and should be the fast-blow type. Always use the smallest possible fuse value for the connected load, and be sure the wire gauge you are using is suitable for the fuse rating chosen.**

The internal circuitry of the DMX2dim requires a minimum of 5V to operate efficiently. It will run at voltages as low as 3.5V, but this is not recommended because the dimmer circuitry may overheat.

Once everything is connected, position the red circle RF Hotspots on all RC4Magic devices so they are all facing upward. If this is difficult, face the RF Hotspots towards any common reflective surface, like a wall, ceiling, or open floor area.



**WIRING AND INSTALLATION OF BATTERIES, DIMMERS, AND LOADS MUST BE IN ACCORDANCE WITH APPLICABLE LOCAL AND NATIONAL ELECTRICAL CODES. Low voltage circuitry CAN be dangerous. RC4 Wireless devices and equipment are operated at the user's own risk and RC4 Wireless accepts no liability, either direct or consequential, as a result of using this equipment.**

### Selecting System IDs

Each RC4Magic Series 2 DMX2dim has 3 system IDs programmed internally. IDs are selected by holding down a recessed pushbutton during power-up.

**Note: Although the associated DMXio transmitter can be set to any of 4 available IDs, only 3 are available on the DMX2dim. When using DMX2dim dimmers, do not use ID2 on the DMXio transmitter.**

To select ID0, hold down the SetA/ID0 button while powering on the DMX2dim unit. The left-most RSSI led will blink 10 times rapidly to confirm the setting. Immediately release the button when the blink confirmation appears.

To select ID1, hold down the SetB/ID1 button while powering on the unit. The middle Data led will blink 10 times rapidly to confirm the setting. Immediately release the button when the blink confirmation appears.

To select ID3 (the public ID), hold down both buttons together while powering on. The three left-most leds (RSSI, Data, and RF Con) will blink together 10 times rapidly to confirm the setting. Immediately release the buttons when the blink confirmation appears.

**Note: Failure to release buttons before the blinking confirmation completes could invoke other features and functions. Due to the small size of the DMX2dim dimmer, various functions and operations have been multiplexed onto these two buttons.**

The ID setting is stored in non-volatile eeprom memory and will be used for all subsequent operations until the ID is changed using this same procedure.

## Assigning DMX Channels to DMX2dim Dimmers

Assigning DMX channels and dimmer curves is easy. The process requires a powered and functioning DMXio in transmitter mode, a DMX data source, and the DMX2dim dimmer. It is easiest if you set everything up together, near your DMX console. If you are not using a console, useful alternatives include a DMXter, a Pocket Console DMX, or any similar DMX tester or controller capable of outputting a DMX level on a specific channel.



Follow these simple steps:

1. Apply power to your DMXio transmitter and DMX2dim dimmer. Wait for the scanning process to complete. The RF Active indicator on the transmitter, and the RF Con indicator on the receiver, should both be blinking. (The indicator on the dimmer blinks faster.)
2. At your DMX source, set all DMX channels to zero.
3. Bring up the level of a single channel you wish to assign to a DMX2dim dimmer. To assign a non-dim curve (ideal for relays, power inverters, and solenoids), set the channel level between 75% and 100%. To assign a linear dimming curve (ideal for incandescent and halogen fixtures, like MR16s and MR11s), set the channel between 50% and 75%. To assign an inverse-square-law dimming curve (ideal for LEDs), set the channel level between 25% and 50%. Channels below 25% are ignored.
4. On the DMX2dim, use the end of a bent paper clip or other small tool to press and hold the SetA or SetB recessed button until the corresponding dimmer led comes on (be sure the load fuse is good or the dimmer leds will not work). The selected dimmer will be assigned to the lowest non-zero DMX channel currently being broadcast from the associated DMXio transmitter.

Channel and dimmer curve assignments are stored in non-volatile eeprom memory and will be used for all subsequent operations until settings are changed using this same procedure.

## Hidden Functions

The small size of the DMX2dim only allows for 2 small recessed buttons. Thus, various functions have been multiplexed onto them. This has been designed to cause the least possible aggravation for everyday users, but requires patience and concentration when accessing advanced features.

To restore original factory IDs and enable adoption of new IDs (equivalent to setting dipswitch 2 in a DMXio unit):

Power up the unit with no buttons down. When the power-up right-to-left led chase begins, immediately press and hold both SetA and SetB together. Watch the leds. When the center Data led remains lit while the RSSI and RF Con leds blink alternately, release the buttons. Factory IDs are now restored, and ID adoption is enabled until power is removed. If power is interrupted before new IDs have been received, this step must be repeated.

See the *How Do I...* section of this manual for additional information about changing ID assignments.

**Note: When adoption is enabled in the dimmer, it immediately restores original factory IDs before waiting for new IDs from the transmitter.**

## LED Indicators

Five LED indicators on the narrow front side of the DMX2dim assist with troubleshooting.

The right-most **DimA** and **DimB** indicators are directly connected to the dimmer outputs, after the power fuse. Thus, a blown fuse will disable these indicators. They appear to dim more smoothly and linearly when using the inverse-square-law dimming curve – this is because leds have a square-law response.



The **Data** indicator is on whenever data is being received by radio. *In normal operation this LED appears to blink rapidly, and will shimmer or flicker while DMX levels are changing.*

The **RF Con** indicator will light continuously after power-up, while radio channels are being scanned. When valid data from an associated DMXio transmitter is found, this indicator will blink at double the speed of the RF Active LED on the transmitter. *In normal operation, this led should be blinking.*

The **RSSI** led provides Receiver Signal Strength Indication by blinking faster when the rf signal is stronger. With the strongest signal, it appears to be almost solidly on with a slight shimmer. With no signal at all, it blinks with the same pattern as a DMXio transmitter. *In normal operation, this led should be blinking or flickering.*

## DMX4dim Receiver-Dimmer Setup

The DMX4dim is a completely standalone unit that includes a built-in RC4Magic Series 2 radio receiver and 4 low-voltage pulse-width-modulation dimmers.

Any number of DMX4dim receiver-dimmers can be used in an RC4Magic Series 2 system.

The radio operates identically to the DMXio in receiver mode. Line-of-sight is NOT required for RC4Magic, but dense objects between RC4Magic units – like concrete walls – will attenuate the radio signal and reduce the available range. It can take 10 seconds or more for the DMX4dim to connect to the DMXio transmitter and begin powering the dimmer outputs, but it will often connect much faster.



### Connections

Small screw terminals are provided for connection of the power supply (+/-DC IN) and load devices (+/-DimA, +/-DimB, +/-DimC, +/-DimD). **The power supply operates both the internal electronics and the connected loads and must be powerful enough to run the load without significant voltage drop.** The dimmers use high-frequency pulse-width-modulation, switching on the negative side of the circuit.

The most typical power supply is a 12V rechargeable sealed lead-acid (SLA) battery, sometimes called a "gel cell". **The maximum voltage for the DMX4dim is 18V (12V nominal).** An internal self-resetting circuit breaker protects the microcontroller, radio, and dimmer electronics. A user-accessible blade-type automotive fuse (Bussmann ATC series) protects the connected wiring and loads and is in the positive side of the circuit. **The maximum fuse size is 15A (ATC-15), and should be the fast-blow type. Always use the smallest possible fuse value for the connected load, and be sure the wire gauge you are using is suitable for the fuse rating chosen.**

The internal circuitry of the DMX4dim requires a minimum of 5V to operate efficiently. It will run at voltages as low as 3.5V, but this is not recommended because the dimmer circuitry may overheat.

Once everything is connected, position the red circle RF Hotspots on all RC4Magic devices so they are all facing upward. If this is difficult, face the RF Hotspots towards any common reflective surface, like a wall, ceiling, or open floor area.

***WIRING AND INSTALLATION OF BATTERIES, DIMMERS, AND LOADS MUST BE IN ACCORDANCE WITH APPLICABLE LOCAL AND NATIONAL ELECTRICAL CODES. Low voltage circuitry CAN be dangerous. RC4 Wireless devices and equipment are operated at the user's own risk and RC4 Wireless accepts no liability, either direct or consequential, as a result of using this equipment.***

### Selecting System IDs

Each RC4Magic Series 2 DMX4dim has 4 system IDs programmed internally. IDs are selected by holding down a recessed pushbutton during power-up.

To select ID0, hold down the SetA/ID0 button while powering on the DMX2dim unit. The left-most RSSI led will blink 10 times rapidly to confirm the setting. Immediately release the button when the blink confirmation appears.

To select ID1, hold down the SetB/ID1 button while powering on the unit. The middle Data led will blink 10 times rapidly to confirm the setting. Immediately release the button when the blink confirmation appears.

To select ID2, hold down the SetC/ID2 button while powering on the unit. The right RF Con led will blink 10 times rapidly to confirm the setting. Immediately release the button when the blink confirmation appears.

To select the public ID (ID3), hold down the SetD/ID3 button while powering on the unit. The three left-most leds (RSSI, Data, and RF Con) will blink together 10 times rapidly to confirm the setting. Immediately release the button when the blink confirmation appears.

The ID setting is stored in non-volatile eeprom memory and will be used for all subsequent operations until the ID is changed using this same procedure.

## Assigning DMX Channels to DMX4dim Dimmers

Assigning DMX channels and dimmer curves is easy. The process requires a powered and functioning DMXio in transmitter mode, a DMX data source, and the DMX4dim dimmer. It is easiest if you set everything up together, near your DMX console. If you are not using a console, useful alternatives include a DMXter, a Pocket Console DMX, or any similar DMX tester or controller capable of outputting a DMX level on a specific channel.



Follow these simple steps:

1. Apply power to your DMXio transmitter and DMX4dim dimmer. Wait for the scanning process to complete. The RF Active indicator on the transmitter, and the RF Con indicator on the receiver, should both be blinking. (The indicator on the dimmer blinks faster.)
2. At your DMX source, set all DMX channels to zero.
3. Bring up the level of a single channel you wish to assign to a DMX4dim dimmer. To assign a non-dim curve (ideal for relays, power inverters, and solenoids), set the channel level between 75% and 100%. To assign a linear dimming curve (ideal for incandescent and halogen fixtures, like MR16s and MR11s), set the channel between 50% and 75%. To assign an inverse-square-law dimming curve (ideal for LEDs), set the channel level between 25% and 50%. Channels below 25% are ignored.
4. On the DMX4dim, use the end of a bent paper clip or other small tool to press and hold the SetA, SetB, SetC, or SetD recessed button until the corresponding dimmer led comes on (be sure the load fuse is good or the dimmer leds will not work). The selected dimmer will be assigned to the lowest non-zero DMX channel currently being broadcast from the associated DMXio transmitter.

Channel and dimmer curve assignments are stored in non-volatile eeprom memory and will be used for all subsequent operations until settings are changed using this same procedure.

## Hidden Functions

The small size of the DMX4dim only allows for 4 small recessed buttons. Thus, various functions have been multiplexed onto them. This has been designed to cause the least possible aggravation for everyday users, but requires patience and concentration when accessing advanced features.

To restore original factory IDs and enable adoption of new IDs (equivalent to setting dipswitch 2 in a DMXio unit):

Power up the unit with no buttons down. When the power-up right-to-left led chase begins, immediately press and hold both SetA and SetD together. Watch the leds. When the center Data led remains lit while the RSSI and RF Con leds blink alternately, release the buttons. Factory IDs

are now restored, and ID adoption is enabled until power is removed. If power is interrupted before new IDs have been received, this step must be repeated.

See the *How Do I...* section of the manual for additional information about changing ID assignments.

**Note:** *When adoption is enabled in the dimmer, it immediately restores original factory IDs before waiting for new IDs from the transmitter.*

## LED Indicators

Seven LED indicators on the narrow front side of the DMX4dim assist with troubleshooting.

The left-most **DimA/B/C/D** indicators are directly connected to the dimmer outputs, after the power fuse. Thus, a blown fuse will disable these indicators. They appear to dim more smoothly and linearly when using the inverse-square-law dimming curve – this is because leds have a square-law response.



The **Data** indicator is on whenever data is being received by radio. *In normal operation this LED appears to blink rapidly, and will shimmer or flicker while DMX levels are changing.*

The **RF Con** indicator will light continuously after power-up, while radio channels are being scanned. When valid data from an associated DMXio transmitter is found, this indicator will blink at double the speed of the RF Active LED on the transmitter. *In normal operation, this led should be blinking.*

The **RSSI** led provides Receiver Signal Strength Indication by blinking faster when the rf signal is stronger. With the strongest signal, it appears to be almost solidly on with a slight shimmer. With no signal at all, it blinks with the same pattern as a DMXio transmitter. *In normal operation, this led should be blinking or flickering.*

## ***Dimmer Curves and Output Resolution***

### **ISL and LEDs**

DMX2dim and DMX4dim Series 2 pulse-width-modulation (pwm) dimmers are capable of very high resolution, making them ideal for smoothly dimming LEDs. To look smooth to the human eye, LEDs must be dimmed with an Inverse Square Law (ISL) curve, demanding very small changes in level at the bottom of the curve. At maximum resolution, RC4Magic dimmers can deliver 16,384 steps, so a single step represents 0.0061% of full power. Compare this to standard linear DMX dimmers with 256 steps where each step represents 0.3% of full level.

At maximum resolution, with 16,384 steps, the RC4Magic pwm period is 667us (microseconds), or 1500 updates per second. Compare this to the 60 Hz power line timing of conventional ac dimmers. The disadvantage of 1500Hz pwm is that it can be audible. If an incandescent lamp is used with the highest resolution ISL curve, the filament will noticeably sing.

***For the highest possible ISL performance, all dimmers in a single DMX2dim or DMX4dim unit must be set for ISL output.***

### **Linear and Incandescent Lamps**

When a linear dimming curve is used with an incandescent lamp, resolution is less critical and singing filaments are distracting. To achieve the lowest lamp noise, the frequency of pwm pulses must be increased. With 1024 steps, RC4Magic pwm period is 40us, or 25,000 updates per second. This is well above human hearing, and still provides a resolution that is 4 times higher than conventional 256-step DMX dimming.

***For high-frequency silent operation, all dimmers in a single DMX2dim or DMX4dim unit must be set for linear output.***

### **Non-Dim**

Some loads, including relays, solenoids, and power inverters, must be provided with simple on/off non-dim power. The non-dim output option ensures this will be the case, and includes level hysteresis: the source DMX level must rise about 53% to turn on, and drop below 47% to turn off. This ensures that the load will not oscillate if the source DMX signal is jittery or sitting around 50%.

### **Mixing ISL and Linear Outputs – A Compromise**

Of course, there will be times when a mix of LEDs and incandescent lamps must be operated from a single RC4Magic dimmer. Dimmer hardware requires that all 4 outputs share the same base frequency and resolution, so a compromise is required when producing different dimming curves for each dimmer output. In this case, the pwm frequency is dropped to 12kHz, which is very high and produces minimal filament ring. The resolution for ISL is 2048 steps, which is far below the smooth perfection of 16,384 steps, but still far better than what would be seen with a traditional 256-step dimmer.

***If any two DMX2dim or DMX4dim dimmers within a single unit are set for different output curves, the compromise frequency and resolution will be used. Linear and ISL curves are still provided, but they share the base resolution of 2048 steps at 12kHz.***

***For optimal performance with different dimmer curves in the same location, use multiple DMX2dim and DMX4dim units with all dimmers in a single unit configured for the same dimmer curve.***

## Optimizing Radio Performance



Under ideal circumstances, the range of RC4Magic Series 2 radios exceeds 300 feet, but ideal circumstances are rare. Our published specification of 200 feet is realistic in most common situations.

Range is affected by:

1. The distance between radios.
2. The orientation of the antennas (RF Hotspots) relative to each other.
3. The number of obstructions between radios.
4. The density of obstructions between radios.
5. Other activity in the 2.4GHz radio band, including leaky microwave ovens.
6. General electrical interference from ac dimmer racks and other power equipment.

Each piece of the RC4Magic Series 2 system has a radio antenna inside which must not be obstructed with metal or other dense objects. The position of the antenna is indicated with red circles on the device label – this is called the RF Hotspot.

For best performance, face all RF Hotspots in the same direction, usually upward.

Often there are numerous obstructions between the transmitter and receivers, or there are several receivers positioned in various locations around a room or performance space. In this case, aim all the RF Hotspots toward a common reflective surface like a ceiling or wall.

The high frequency radio signals used by the RC4Magic system tend to reflect more than penetrate. This means that more of the signal will bounce around a room, rather than radiate through the walls to an adjacent space. This helps improve performance between receivers in a performance space, even when line-of-sight between devices is not possible.

Even so, some of the radio signal does penetrate walls and other objects. Provided the transmitter is not too far away, you can successfully place receivers inside theatrical props and practicals, behind flats, and under risers. In these cases, try to place the transmitter as close as possible to these pieces.



## How do I...

### Select a different ID for a DMXio?

You choose between 4 different IDs (ID0, ID1, ID2, or ID3) by changing the dipswitch setting inside the DMXio module. Remove the 4 screws from the top of the unit. Fold open the cover (it hinges on the product label). A label on the inside of the cover indicates the various dipswitch setting options. Dipswitches 3 and 4 select the ID.

### Select a different ID for a DMX2dim or DMX4dim?

This is done by holding down one or more of the recessed pushbuttons while powering up the unit. The DMX2dim can be set to ID0, ID1, or ID3 (no access to ID2). The DMX4dim provides access to ID0 – ID3. Further details are provided in the sections entitled *Selecting System IDs* for each of the two dimmer models.

### Program new IDs into a DMXio?

A DMXio in receiver mode can adopt the four system ID codes in a DMXio transmitter. These codes remain available when a receiver is switched from transmitter mode to receiver mode, allowing transmitters to be cloned.

ID adoption will occur only when operating on the public system ID, ID3. When running on ID3, DMXio transmitters embed system ID codes in the data stream being broadcast. DMXio receivers will not adopt and save incoming ID codes unless internal dipswitch 2 is ON.

To copy system ID settings from one DMXio to another, follow these steps:

1. Put the DMXio source unit in transmitter mode on public ID3, by setting internal dipswitch 1 OFF, and dipswitches 3 and 4 ON.
2. Put the destination unit in receiver mode on public ID3, by setting internal dipswitch 1 ON, and dipswitches 3 and 4 ON.
3. Enable ID adoption on the receiver by setting the adoption enable dipswitch 2 ON. *All 4 dipswitches are ON.*
4. Power-up the DMXio receiver.

***With dipswitch 2 on, the unit immediately restores the internal IDs to original factory settings. If this is your goal, do not turn on the transmitter, go to step 6.***

5. Turn on the DMXio transmitter. It may take up to 15 seconds for them to connect. After they connect, a unique up-down led chase on the receiver indicates that new IDs have been sent from the transmitter and been adopted and saved in the receiver.
6. On the receiver unit, turn adoption enable dipswitch 2 OFF.
7. Change both units to ID0 by setting dipswitches 3 and 4 OFF.
8. Turn power off, then on, on both units. If they connect and work normally, they now share the same set of IDs.

Multiple receivers can be set to adopt at the same time, it is not necessary to do one at a time.

### Program new IDs into a DMX2dim or DMX4dim?

ID adoption will occur only when operating on the public system ID, ID3. When running on ID3, DMXio transmitters embed system IDs codes in the data stream being broadcast. DMX2dim and DMX4dim receiver-dimmers will not adopt and save incoming ID codes unless ID adoption is enabled.

To copy system ID settings from a DMXio to a DMX2dim or DMX4dim dimmer, follow these steps:

1. Put the DMXio source unit in transmitter mode on public ID3, by setting internal dipswitch 1 OFF, and dipswitches 3 and 4 ON.
2. Set the destination dimmer unit on public ID3. On a DMX2dim, power up with both buttons (SetA and SetB) held down. On a DMX4dim, power up with the SetD button held down. Release the button(s) while three leds will blink together in acknowledgement. The dimmer is now set to the public ID.
3. Enable adoption on the destination dimmer unit. Power up the unit with no buttons down. When the power-up right-to-left led light chase begins, immediately press and hold two buttons together: SetA and SetB on the DMX2dim, SetA and SetD on the DMX4dim. Watch the leds. When the center Data led remains lit while the RSSI and RF Con leds blink alternately, release the buttons.

***Internal IDs have now been restored to original factory settings. If this is your goal, do not turn on the transmitter, go to step 6.***

The dimmer now has adoption enabled until it is powered down. Keep the unit powered on. (If power is interrupted before new IDs have been received, this step must be repeated.)

4. Power up the DMXio transmitter configured in step 1. It will transmit data with embedded ID data. It may take up to 15 seconds for the transmitter and receiver to connect. After they connect, a unique up-down led chase on the receiver indicates that new IDs have been adopted and saved.
5. Turn off the DMXio transmitter, and change it to ID0 by setting dipswitches 3 and 4 OFF.
6. Turn off the DMX2dim or DMX4dim dimmer, and power it back up with the SetA/ID0 button held down. Release the button while the RSSI led blinks 10 times. The unit is now set for ID0.
7. Power up the DMXio transmitter. If the transmitter and dimmer connect and work normally, they now share the same set of IDs.

## **Combine multiple RC4Magic Series 2 systems for a large project?**

There are two ways:

1. Use the common public ID that all RC4Magic Series 2 devices can access.
2. Temporarily use the public ID, and set all receivers to adopt private IDs from one transmitter. Then, switch all units to a common private ID. This method is more work, but is also more secure since you are using a private ID that only you can access. When the project is done, it's easy to restore the original IDs to any units that have been reprogrammed.

## **Restore the original factory IDs in my various RC4Magic Series 2 units?**

Follow the steps for adopting new IDs (outlined above), without operating a DMXio transmitter. If no new IDs are received, the internal IDs are restored to the original factory IDs issued to you at time of purchase.

***Note: Your original IDs are private, assigned only to you and your system. Unless special arrangements have been made, no other RC4Magic user has been assigned the same IDs.***

# Troubleshooting and Frequently Asked Questions

## General

### **What simple actions can I try if I am having performance difficulties with my RC4Magic Series 2 system?**

First, turn your DMXio transmitter off and on. This will force it to rescan the 2.4GHz radio band and find a new radio channel. Receivers that are already running will take approximately 10 seconds to respond to the loss of data and find the transmitter on the new channel.

The most common cause of problems with DMX2dim dimmers (and all other wireless dimmers on the market) is weak or dead batteries, or batteries that are too small to reliably operate the radio electronics and the external load. Replace, recharge, or upgrade your batteries to resolve the issue.

Test your batteries and loads by directly connecting them together. If they don't work on their own, or they don't last very long, they will not work any better with the dimmer.

## Radio Performance

### **What is the maximum range of the RC4Magic radio link?**

Under ideal circumstances range exceeds 300 feet. More typically, it is around 200 feet. Depending on your situation, range could be less. See *Optimizing Radio Performance* in this manual for additional information.

### **Is it possible to extend the range of the RC4Magic radio link?**

Range can be improved by reducing obstructions, aiming the RF Hotspots differently, eliminating sources of electrical interference, and trying other frequencies (by turning the DMXio transmitter off and on).

In particular, substantial improvements can be achieved by placing the transmitter high enough to radiate over people's heads.

It is also possible to use high-gain external antennas with the DMXio. This requires returning the units to the factory for modifications at nominal additional cost. Wireless data can be transmitted over very long distances using precisely aimed directional antennas. Contact RC4 Wireless for additional information.

A high-gain version of the DMXio with a whip antenna is now available as a regular item. Note, however, that most users and situations will not benefit from it – internal RC4Magic Series 2 antennas are very efficient, despite being hidden within the device enclosure.

### **How common are radio interference problems?**

*Not common at all.* We give this issue a fair amount of attention because users fear radio problems and are very concerned about them. In fact, RC4Magic radios are among the best available and rarely suffer problems. Their ability to automatically seek out and use unoccupied frequencies virtually eliminates radio related issues, and makes it very easy to overcome them when they do arise.

### **How can I tell if a performance problem is related to radio interference or not?**

Watch the LED indicators on the RC4Magic units. On the transmitter, be sure the RF Active indicator is slowly blinking, which means it has found a frequency and is transmitting. Then, see that the RF Active indicator is blinking twice as fast on the receiver. If it is, then the receiver has found and connected with the transmitter. Now check the receiver RF Data indicator. It should blink and shimmer with DMX activity. If it occasionally drops out or appears dim, then some DMX data packets are getting lost. In this case, try aiming the RF Hotspot differently and/or reducing the distance between the transmitter and receiver. Also, watch the speed of the receiver RSSI led, which indicates the strength of the radio signal. The faster the blink, the better the signal.

You can also monitor radio activity in the 2.4GHz rf band with external test equipment. The low-cost Wi-Spy spectrum analyzer from [www.metageek.net](http://www.metageek.net) is particularly useful.

### **What causes radio interference?**

Radio interference is caused by other radio signals on or near the same frequency, and sometimes by harmonics of lower radio frequencies. Sources include other radio devices (including WiFi, Bluetooth, and Zigbee devices) and leaky microwave ovens.

Many radio devices (including WiFi, Bluetooth, and Zigbee) only transmit when they need to. Thus, it is possible that the RC4Magic could find a free channel that is not actually free all the time – intermittent interference could occur when the other device occasionally transmits. In this case, turn the RC4Magic DMXio transmitter off and on, forcing it to find a new channel. Ideally, turn it on when other devices are transmitting.

Very few rf devices are as accommodating as RC4Magic – most are user-configured for a particular rf channel and stay there. Thus, it is often best to turn on your RC4Magic system last, after all other systems are up and running.

## **Mounting and Positioning**

### **Can I put an RC4Magic receiver inside a metal prop, practical, or wagon?**

If a radio receiver is completely surrounded by metal, particularly grounded metal, it is unlikely to work well. This is why our product cases are made of plastic – so radio signals will go through to the antenna inside. Some signal will usually get through openings and wire mesh. Note, however, that mesh does not pass radio at all frequencies – this is part of the reason why a glass and mesh window can be used in the door of a microwave oven. In general, the more open the mesh, the better it will pass the RC4Magic radio signal.

If possible, build your set pieces out of fibreglass, wood, and plastic. These materials are more transparent to radio than metal is. Minimize the use of metal. Metal framing is fine, but a non-metallic covering over the frame is preferred.

### **How critical is RF Hotspot positioning?**

At distances under 100 feet, RF hotspot positioning is usually not critical at all. When trying to operate at the greatest possible distances, positioning becomes much more important. Performance is usually best when all Hotspots face up, but there are some cases where it is better to face them towards a clear nearby surface, like the theatre back wall.

## **Dimmer Drop-Outs**

### **One of the dimmers in a pack is occasionally blinking or flickering. The other is fine. Why?**

This is most likely caused by loose wiring, faulty or poorly mated connectors, or broken solder joints. If everything outside the dimmer seems fine, take the dimmer apart and check the screw terminals and solder joints on the circuit board – connector pins and solder joints can break under heavy use, particularly after over-tightening.

Some users may choose to remove the original screw terminals and solder 16- or 18-gauge wires directly to the circuit board. Done neatly and carefully, this will not void your product warranty.

**Both of the dimmers on a DMX2dim occasionally shut off by themselves at the same time, and stay off for quite a long time. Why?**

The radio receiver is resetting, and then takes 10 seconds or more to reconnect to the DMXio transmitter. This is usually a power-supply or battery problem, but could also be an electrical interference problem, or a DMX fault before the DMXio transmitter.

First, be sure the DMX data source at the DMXio transmitter is operating properly. If DMX input data disappears for more than 1 second, dimmer levels will drop to zero and DMXio receivers will stop outputting data.

Next, confirm that:

1. The RF Con indicator on the DMX2dim is blinking to indicate it is connected to a transmitter. If this indicator stays solidly on, the unit may be assigned to the wrong system ID.
2. The RSSI led is blinking reasonably fast to indicate adequate rf signal strength.
3. The Data indicator is blinking and shimmering with DMX data.

Be sure the battery is in good condition, is fully charged (if rechargeable), and is large enough to power the connected load. Measure the battery voltage with a volt-meter while you bring up the dimmer channels. If the voltage drops substantially under load, the battery is inadequate for the task at hand.

# RC4Magic Specifications

## RC4Magic RF Technology

Indoor/Urban Range:	Up to 300' (100 m), 200' (66 m) typical
Outdoor Line-of-Sight Range:	Up to 1 mile (1.6 km)
Transmit Power Output:	Up to 100 mW (20 dBm) EIRP <sup>1</sup>
Receiver Sensitivity:	-100dBm
Operating Frequency:	2.4 GHz ISM band
Agency Approvals:	United States FCC OUR-XBEEPRO Canada IC 4214A XBEEPRO Europe CE ETSI <sup>1</sup> Japan 005NYCA0378 <sup>1</sup>

<sup>1</sup> RC4Magic radio modules must be configured for 10dBm output in Europe, Japan and some other jurisdictions. Output power is configurable with an internal dipswitch in the DMXio unit.

## RC4Magic DMX Protocol Compliance

DMX inputs and outputs comply with USITT DMX512/1990(4us). Packets with non-zero start codes are not transmitted; RC4Magic cannot transfer proprietary data or RDM packets. (RDM functionality is expected to be added in future firmware updates.) DMXio receiver output closely mimics DMXio transmitter input, providing the same number of DMX channels and the same number of packets per second (pps).

Minimum number of DMX channels per packet:	1
Maximum number of DMX channels per packet:	512
Minimum packet-per-second rate:	12pps (slow rates used <i>only</i> when incoming dmx is slow)
Maximum packet-per-second rate:	44pps with 512 channels, 10000pps with 1 channel

## DMXio

RF Specifications as indicated above. Hidden internal antenna.

Dimensions:	3.4" x 2.2" x 1.6" nominal (approx. 86mm x 56mm x 40mm)
Power Input:	8VDC – 12VDC, 500mA standard 2.1mm power receptacle, center positive

### Transmitter Mode

Only 1 DMXio transmitter should be operated on each system ID.

DMX Input:	meets USITT DMX512/1990(4us) with 1-second data hold after dropout NO INTERNAL DMX TERMINATION
DMX Output:	straight-thru hardware connection from DMX input to output

### Receiver Mode

Any number of DMXio receivers may be used in a system.

DMX Output:	meets USITT DMX512/1990, closely mimics DMX data coming into the associated DMXio transmitter, providing the same number of DMX channels with the same number of packets per second
Power Input:	8VDC – 12VDC, 500mA standard 2.1mm power receptacle, center positive



## DMX2dim Receiver-Dimmer

RF Specifications as indicated above. Hidden internal antenna.

Any number of DMX2dim receiver-dimmers may be used in a system.

Dimensions:	2.4" x 1.4" x 0.8" nominal (approx. 61mm x 36mm x 20mm)
Power Input:	6VDC – 18VDC (12V typical), 70mA minimum, screw terminal connections
Dimmer Outputs:	2 individual dimmer channels, each with assignable DMX channel and dimmer curve, screw terminal connections
Dimmer Technology:	MOSFET PWM (pulse-width-modulation) maximum pwm resolution 14-bit (16,384 steps) maximum output power per dimmer 10A maximum total device output power 15A



**MAXIMUM TOTAL OUTPUT POWER IS LIMITED BY CIRCUIT BOARD TRACE SIZE. User changeable Bussmann ATC load fuse should not exceed 15A and should be fast-blow type.**

## DMX4dim Receiver-Dimmer

RF Specifications as indicated above. Hidden internal antenna.

Any number of DMX4dim receiver-dimmers may be used in a system.

Dimensions:	3.15" x 1.55" x 0.8" nominal (approx. 80mm x 40mm x 20mm)
Power Input:	6VDC – 18VDC (12V typical), 70mA minimum, screw terminal connections
Dimmer Outputs:	4 individual dimmer channels, each with assignable DMX channel and dimmer curve, screw terminal connections
Dimmer Technology:	MOSFET PWM (pulse-width-modulation) maximum pwm resolution 14-bit (16,384 steps) maximum output power per dimmer 10A maximum total device output power 15A



**MAXIMUM TOTAL OUTPUT POWER IS LIMITED BY CIRCUIT BOARD TRACE SIZE. User changeable Bussmann ATC load fuse should not exceed 15A and should be fast-blow type.**

***RC4Magic Series 2 technical specifications are subject to change without notice.***

# Warranty Policy

## Seven-Day Easy Return

You may return any RC4 Wireless Products delivered to you new within the last seven days for a refund, *excluding custom engineered and/or custom manufactured items*. We regret that we cannot refund the shipping charges, or pay for shipping the item back to us. We will not hassle you with mountains of paperwork, but we do require that items be returned *unused in the original packaging*.

## Thirty-Day Replacement or Fast-Turn Service Guarantee

If RC4 Wireless technology delivered new to you during the last thirty days fails to perform to published specifications while being used for its intended application, we will ship a replacement unit to you and arrange for pickup of your original unit. We will pay all shipping charges using your choice of next-day carrier (typically Federal Express or UPS). You will usually have a functioning unit within two business days (including Saturday where delivery services are available) at no charge to you. If a replacement unit is not in stock, we will service your unit in our shop with 48 hour turnaround.

## One Year Parts and Labor General Guarantee

If RC4 Wireless technology you have received during the last twelve months fails to perform to published specifications while being used for its intended application, we will service it in our own shop with no charge to you for parts or labor. You pay the shipping to return the unit to us. We pay the shipping to send it back to you fully repaired. Service work is guaranteed for thirty days, during which our fast-turn policy (with free shipping) applies.

## Out of Warranty Service Policy

If your RC4 Wireless technology requires servicing after the first year, our regular shop rate will apply and parts will be billed at nominal costs. You pay the shipping charges both ways. Service work is guaranteed for thirty days, during which our fast-turn policy (with free shipping) applies.

## Disclaimers We Must Make

All repair periods are subject to parts availability. For critical projects, we recommend purchasing spare equipment. You cannot use our equipment in a show, then try to return it for a refund: our warranty is not a free rental program. The above warranty policies will not apply if equipment has been abused, misused, or mishandled. We will not be responsible for physical damage, failures caused by incorrect wiring, electrical overloading and/or over-voltage, overheating caused by insufficient ventilation, or damage caused by insufficient packaging during return shipping. We will not be responsible for consequential damages to other equipment, or for lost revenues. We do not guarantee our equipment to be suitable for applications other than those discussed in our application notes and brochures. Published power output ratings of some items are accurate only at specific voltages, duty-cycles, and operating temperatures. Some items may require additional cooling and/or protection circuitry to operate reliably with certain loads. Call RC4 Wireless for advice if you are unsure about any operating characteristics.

If your account payments are not up to date, we reserve the right to withhold service until payment is received.

RC4 Wireless pricing, warranty terms, and technical specifications are subject to change without notice.

**We want you to be a happy and satisfied customer. Please help us serve you better by letting us know exactly what you need. Thank You!**

## ***How to Reach Us***

### Physical Address

RC4 Wireless is a registered trade-name of Soundsculpture Incorporated

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# RC4*Magic*

## Series 2

Wireless DMX and Wireless Dimming System

**User Manual R1.0 Mar-2008**

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