

RF Lighting Control Specification Guide



designed to be better.

 **legrand®**

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Discover RF Lighting Control . . .

RF Lighting Control has been designed to meet the lighting control requirements of residential applications including reliability, aesthetics, functionality, and ease of use and installation. Its completely scalable architecture and no-new-wire RF technology means that it is suitable for new or retrofit applications ranging from individual rooms or offices to entire residences. With a capacity of over 100 rooms and 1000 devices RF Lighting Control has practically unlimited system capacity. RF Lighting Control offers a wide range of devices to extend the system functionality including IR, RS232, and Scene interfaces.



Form and Function

Industry-exclusive Universal Dimmer

superior flexibility with one dimmer capable of operating most dimmable lighting types

Solid State Triac Dimming

highly reliable, rated for a minimum of 300% of dimmer rated capacity

Soft-start Circuitry

significantly extends lamp life by limiting inrush current

Surge Protection

components incorporated to withstand surges of 6000V, in accordance with UL1449 and ANSI/IEEE C62.45

Power Failure Restore

resets lighting to last-used levels prior to power failure

Square Law Dimming

matches light level adjustment to human perception

Stepless Fades

16-bit fade engine prevents visible stairstepping of light levels, even with very slow fades

Long-life Status LED

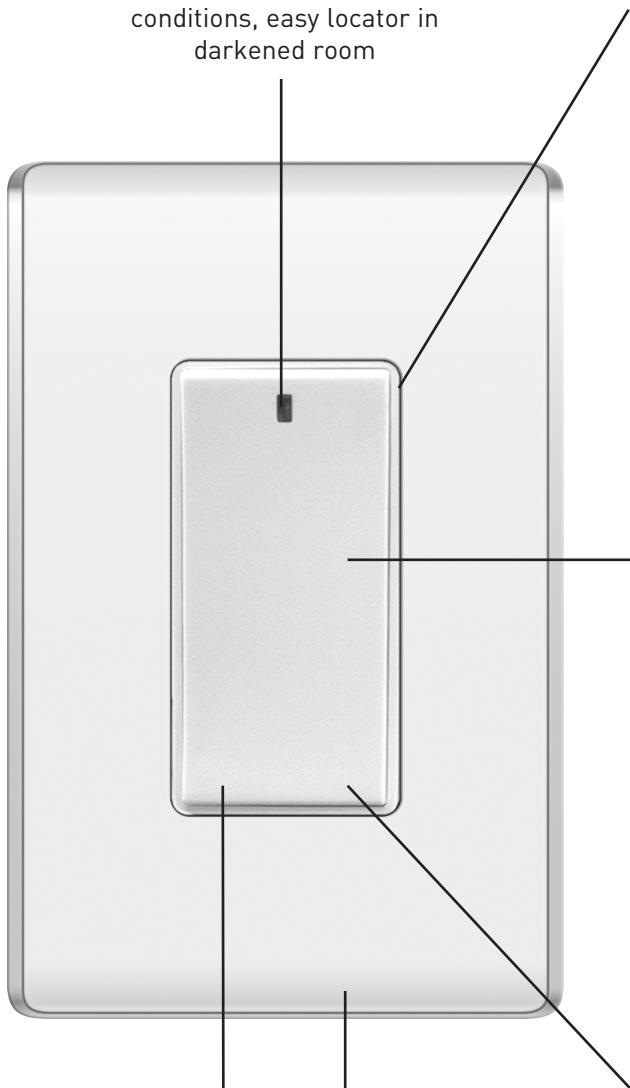
communicates dimmer conditions, easy locator in darkened room

Toroidal Choke

minimizes RF interference

Last Level Recall

single tap recalls last-used light level



Large, Surface-mounted Antenna

ensures maximum broadcast coverage

No Exposed Hardware

affords sleek appearance

Air Gap Switch

ensures safe relamping

Safety Considerations

Lamp Replacement

It is a safety requirement that lighting loads be electrically isolated for relamping.

To do this, press the bottom of the RF Lighting Control Dimmer paddle firmly until it latches about 1/8" below the level of the wall plate.



When the LED goes out, the load is safely isolated. To restore normal operation, press the top of the paddle until it snaps back into place and the status LED lights.

Dimmer Derating

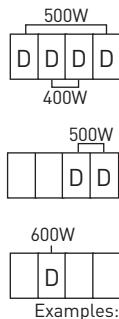
Derate Dimmers by 100W for each of these cases:

(a) The Dimmer is located in a multigang box with other Dimmers or Fan Controllers.

(b) The Dimmer is mounted in a middle position of a 3- or 4-gang box with other Dimmers or Fan Controllers.

(c) The Dimmer is connected to a non-incandescent load, such as: fluorescent, low voltage, neon or cold cathode loads.

Site Dimmers carefully to minimize derating factors.



Overload Protection

RF Lighting Control Dimmers, Switches and Fan Controllers feature patented overload and short-circuit protection. In the event of an overload condition, the device will stop working, and the status LED will be rapidly flashing red at 2 Hz. Set the Dimmer to off, disconnect loads in excess of the Dimmer's rating, and try again.

Derate Dimmers as follows:

	Single Dimmer	Dimmer at end of multigang	Dimmer in middle of a multigang	MAXIMUM CAPACITY
• Incandescent / Quartz Halogen	600W	500W	400W	400W
• Magnetic Low Voltage	500W	400W	300W	300W
• Electronic Low Voltage	500W	400W	300W	300W
• Cold Cathode / Neon	500W	400W	300W	300W
• Fluorescent:				
- Two-wire	500W	400W	300W	300W
- Compact Fluorescent	500W	400W	300W	300W

Introducing RF Lighting Control



RF Lighting Control is a lighting control system for residences, meeting rooms and more.

RF Lighting Control delivers convenient, easy-to-use control:

- One-touch whole house on/off
- Whole house and room scene control
- Sophisticated, frequency-agile RF wireless communications technology (Topdog™)
- Panic alerts and vacation mode
- Integration with other home automation devices and systems
- Coordinated control of lamps, ceiling fans, and small appliances
- UL-approved

Topdog Communications

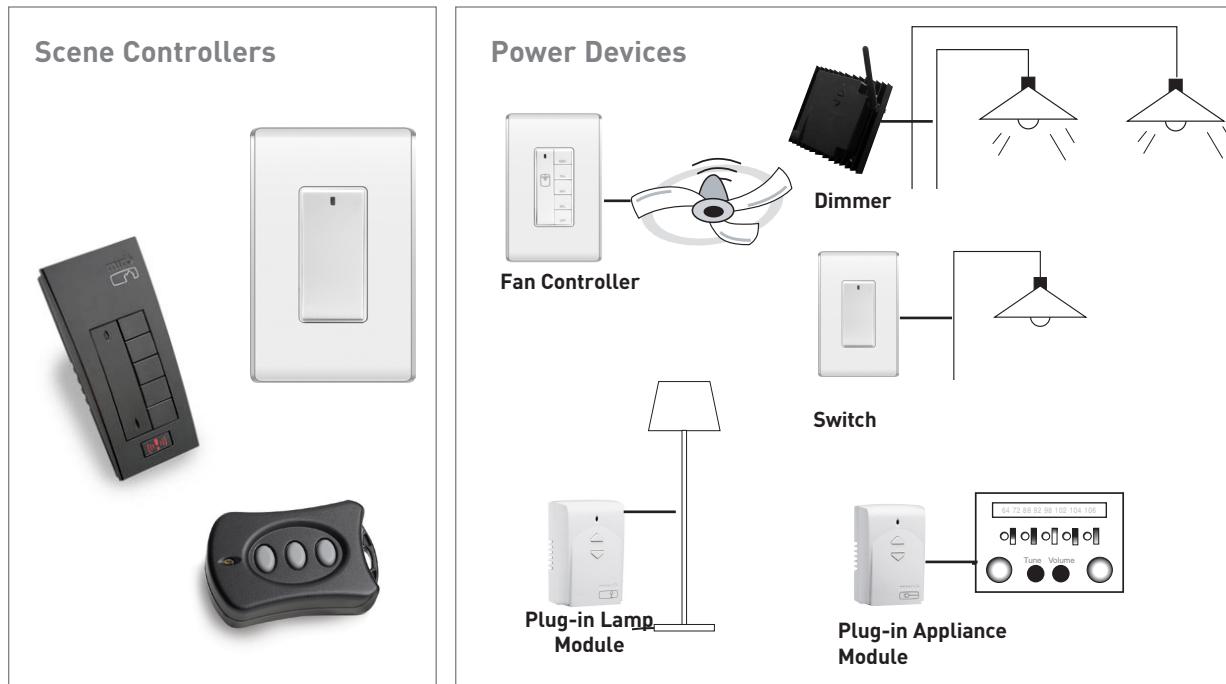
RF Lighting Control uses a revolutionary Topdog RF communications layer with a comprehensive protocol technology. Via this 900 MHz communications technology (like many cordless phones), RF Lighting Control creates an invisible wireless control network throughout the home. And since Topdog is frequency-agile, there's never any interference with other 900 MHz devices. Up to 1000 times faster than traditional power line technologies, Topdog is bi-directional and uses sophisticated error-correcting codes to guarantee reliability. Topdog also automatically assigns a unique ID to every installation (or structure), so there's no chance of interference from neighboring installations – even in multi-installation buildings.

Distributed Intelligence

With RF Lighting Control, the power is in the network, a key factor in understanding RF Lighting Control's superiority over centrally-wired lighting control systems. With an RF Lighting Control system, there's no expensive central panel and absolutely no control wiring. As a result of its flexibility, additions to an RF Lighting Control network can be made over time.

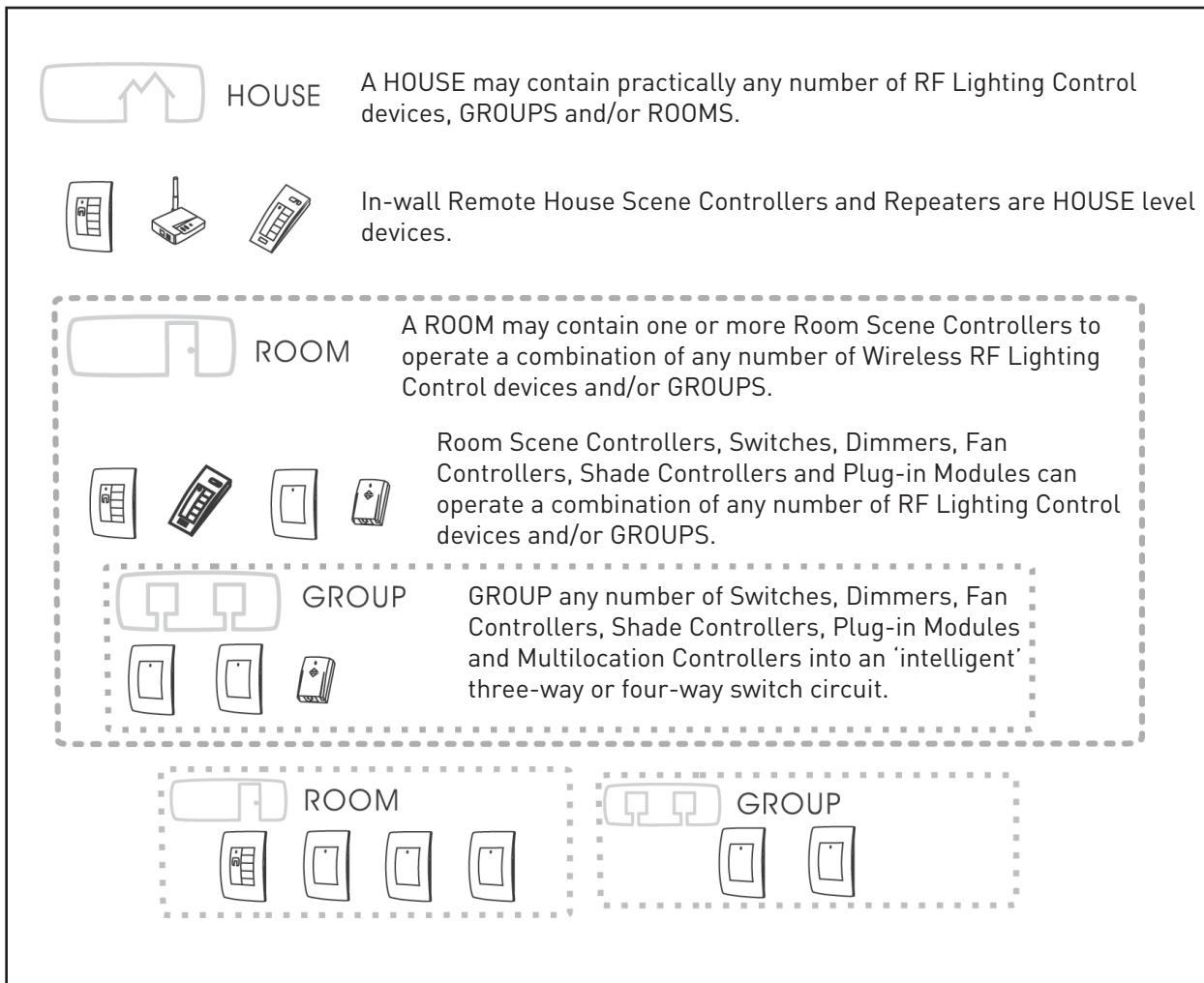
Lowest Installed Cost

RF Lighting Control has no control wiring, and can be configured and installed by any electrician or installer without tools. There's no need for factory technicians to visit the site. As a result, total cost for RF Lighting Control is far more economical than traditional wired systems when compared feature for feature.



RF Lighting Control's Control Design

RF Lighting Control's unique hierachal structure provides three levels of control for unprecedented convenience and flexibility.



Configuring an RF Lighting Control System

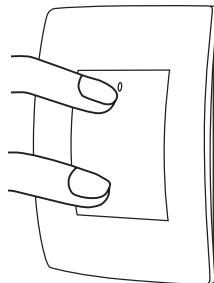
In order to function, RF Lighting Control devices have to be 'bound' together into a simple wireless network. This is very easy to do, but it helps to understand how and why it works.

- 1 All RF Lighting Control devices must obtain a unique house ID to prevent interference with neighboring systems.
- 2 In addition, RF Lighting Control devices may be bound together in GROUPS – usually one or more Multilocation Controllers with a Dimmer or Plug-in Module.
- 3 All RF Lighting Control devices and GROUPS in a room may be bound together with one or more Room Scene Controller(s) to provide pushbutton control of multiple recorded lighting scenes.

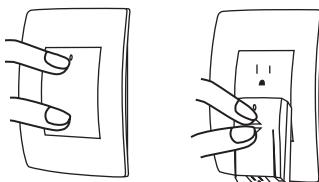
Every programming process in an RF Lighting Control system consists of placing the devices into a 'learn' or program' mode by pressing the top and bottom of the device paddle simultaneously. Once this has been done, any configuration, from establishing a House ID to creating GROUPS, is accomplished by pressing the paddles or buttons on the faces of the devices.

Programming Example: Creating a GROUP

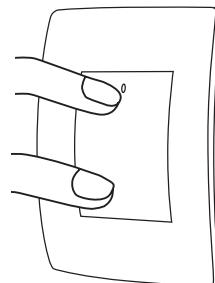
- 1** Pick any device to be included in the GROUP and press \diamond until the LED starts flashing yellow.



- 2** Press \diamond on each additional device until the LED flashes yellow. This indicates that the device has joined the GROUP.



- 3** Return to the device where you began. Press \diamond until all LEDs stop flashing. GROUP binding is done.



RF Lighting Control's Control Design

GROUP Level Control

A GROUP is two or more devices bound together so that each device controls itself and the other devices in the same way. For example, pressing and holding the up paddle on any one device would cause them all to increase in brightness.

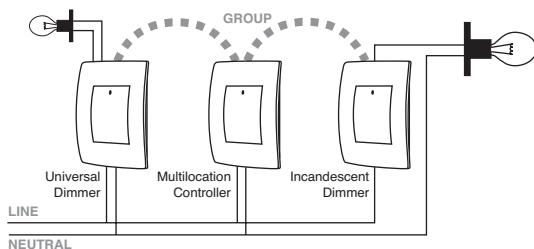
A GROUP usually comprises a dimmer with one or more Multilocution Controllers. GROUPS may also contain multiple dimmers, such as in a large area lit by a large number of ceiling downlights.

ROOM and HOUSE level devices (i.e., Scene Controllers and Repeaters) cannot be included in GROUPS.

Like all RF Lighting Control system elements, all GROUP members must first be bound to the same house ID. GROUPS may be included in ROOMS, but they may also stand alone. RF Lighting Control GROUPS are commonly used as a substitute for a four-way circuit with multiple control points, particularly in retrofits where adding wiring may be an issue.

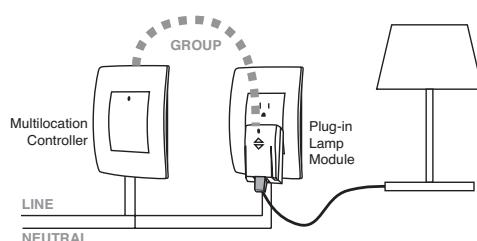
Please note that when a GROUP is bound into a ROOM, it is not necessary to also bind each GROUP member into the ROOM; **one in, all in** is the rule.

GROUP level control examples



All three GROUPED devices provide seamless dimming control from three locations.

Note that each device may be fed from a different circuit – even a different phase. RF Lighting Control's RF communications are independent of AC wiring.



Plug-in Lamp Modules often end up behind furniture. GROUPING them with an in-wall Multilocution Controller provides control where you want it. Coordinate control of nondimmable loads (such as kinetic sculptures and fountains) using Plug-in Appliance Modules.

Any number of Plug-in Lamp or Appliance Modules may be GROUPED in this way to provide control of several devices around the room from a single Multilocution Controller.

ROOM Level Control

A ROOM is a number of RF Lighting Control devices (any except HOUSE level devices or Repeaters) bound together under the control of one or more In-wall or Remote Room Scene Controller(s). Room Scene Controllers allow users to set, modify and recall up to five scenes per Controller, evoke ROOM on/off and proportionally raise/lower overall ROOM brightness. Any number of Room Scene Controllers may be used.

Scenes

A ROOM scene is a configuration of light level and fade time information for every RF Lighting Control device bound to the ROOM. ROOM scenes have a default fade time of two seconds. Scene information is stored in the device connected to the load (Dimmers or Switches), NOT Room Scene Controllers.

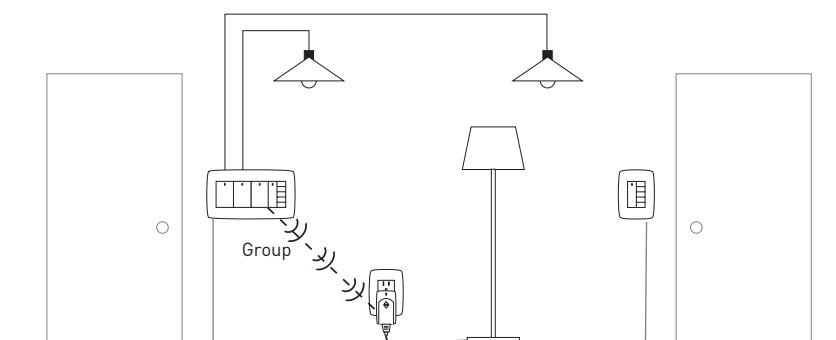
Location

Typically, users locate In-wall Room Scene Controllers at room entrances. They may also wish to have a Remote Room Scene Controller for convenience. Remote Room Scene Controllers operate exactly like In-wall Controllers plus have the ability to adjust individual circuits remotely (also referred to as the Seek function).

Additional Scenes

Most users will find that five ROOM scenes are plenty. For users who want more scenes, RF Lighting Control supports up to 15 scenes per ROOM in sets or ranges of five. In-wall Room Scene Controllers provide three scene ranges while Remote Room Scene Controllers provide two scene ranges. For more detail and instructions on additional scene ranges, refer to the RF Lighting Control Installation Guide.

ROOM level control example



Main Entrance

Two Incandescent Dimmers control the two overhead lighting circuits. A Multilocation Controller is grouped with the Plug-in Lamp Module for the floor lamp. An In-wall Controller provides overall control from the main entrance.

Secondary Entrance

A second In-wall Controller performs the same as the Controller at the room's primary entrance.

Design Tip: Minimizing Wall Space

You don't need to have all the Dimmers and Switches visible on the wall. Here the Multilocation Controller could be eliminated and the two Incandescent Dimmers located in a closet or equipment room.

RF Lighting Control's Control Architecture

HOUSE Level Control

With Wireless RF Lighting Control, users can control their entire home with a single touch using RF Lighting Control HOUSE scenes. Other important HOUSE level functions include occupancy emulation and Panic mode.

House Scene Controllers

House Scene Controllers look like Room Scene Controllers, with the difference being the house icon on the paddle. Typical locations for In-wall House Scene Controllers are inside exterior doorways and inside the doorway to the garage. Remote House Scene Controllers are typically used at the bedside in the master suite.

HOUSE Scenes

RF Lighting Control supports up to ten HOUSE scenes. Commonly used scenes include:

- Pathway lighting (e.g., from the master bedroom to the kitchen)
- Balanced whole HOUSE look for entertaining, including patio and landscape lighting
- HOUSE sleep scene at night, in which desired general lighting is off and low level pathway lighting is on
- HOUSE off scene when leaving, which can include occupancy emulation (see page 21)
- HOUSE arrival scene in which desired lighting throughout the house is on upon arrival

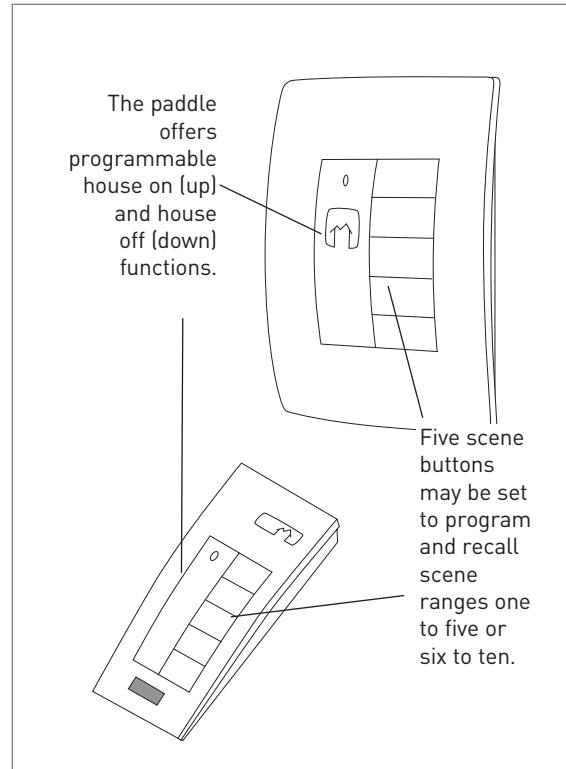
HOUSE scenes differ from ROOM scenes because:

- They may include any or all RF Lighting Control devices and GROUPS in the house
- They may include a Repeater for occupancy emulation (see next page)
- Every device in the scene must be individually bound to that scene.

Devices may be toggled in and out of a HOUSE scene using a simple binding process.

Scene Labels

RF Lighting Control Room and House Scene Controllers come with preprinted labels describing many common scenes and locations. Users may customize their RF Lighting Control control devices to match their settings. Each device also comes with a number of blank labels.



Expanding an RF Lighting Control System

An RF Lighting Control system may be expanded in a number of ways:

- Increase RF range with a Repeater
- Interface with external systems and devices via:
 - RS232 Network Controller
 - Scene Interface
 - IR Interface



Note: Due to differences in construction and other factors, some trial and error in Repeater positioning may be required for optimum coverage.

Increasing RF Range via Repeaters

We recommend including a Repeater in all whole house systems for the following reasons:

- Increases transmit/receive range of an RF Lighting Control network
- Provides occupancy emulation (see P. 21)

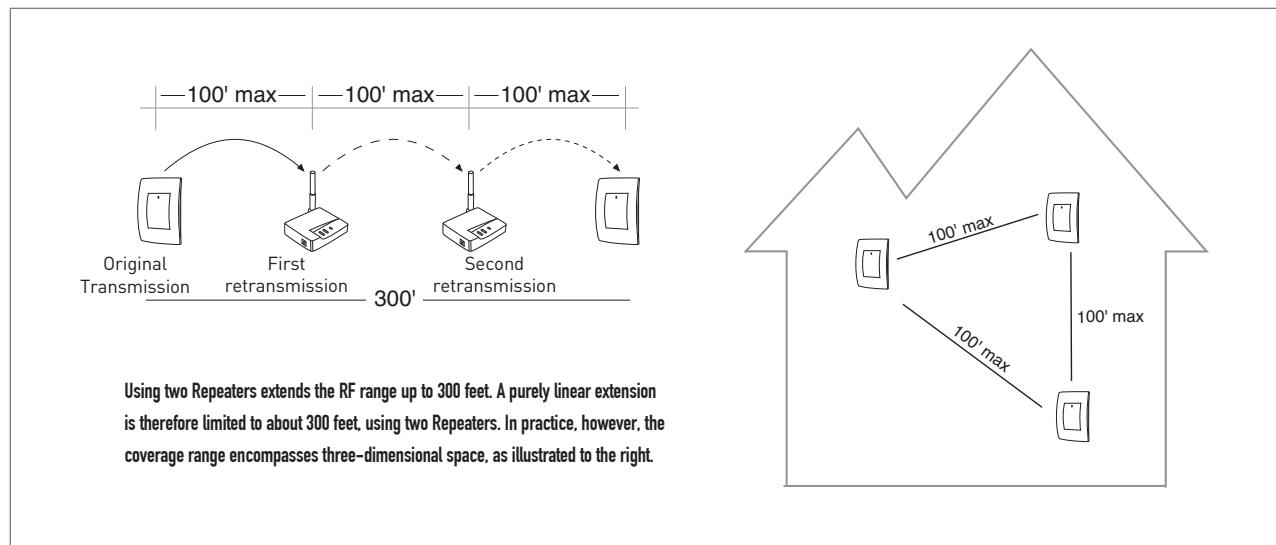
Additional range ensures effective operation in any setting, while occupancy emulation is a significant feature for homeowners.

The Repeater has a large antenna which allows it to receive and retransmit transmissions from other devices up to 100 feet away. When the Repeater picks up a message including its own House ID, it retransmits it.

When a single Repeater is being used, users should locate it close to the center of the building, remembering that the building is a three-dimensional space. Identify a place near the vertical and horizontal center line. The Repeater uses an external power supply that needs to plug into any 120-volt outlet.

Up to two Repeaters may be used in very large buildings. There is no benefit to using a second Repeater unless actually necessary.

Expanding an RF Lighting Control System



About RF and RF Range

RF Lighting Control uses the 900MHz band for license-free, high-speed control communication. RF Lighting Control products use multiple channels simultaneously in this band, ensuring reliable communications without interference from other wireless devices.

RF Range

In an open field, Wireless RF Lighting Control devices will reliably communicate over several hundred feet. In a conventional wood or steel frame building, communications typically range up to 100 feet, which is more than adequate for most homes.

Some factors may reduce transmitting range, such as solid concrete walls and slabs. Another factor is the use of metal wall plates – particularly if they are used in combination with metal back-boxes.

These factors are unlikely to be relevant in apartment buildings, as each RF Lighting Control application is usually within a concrete shell. Where multifloor apartments exist, there will probably be a stairwell opening in the slab, enabling communications between floors.

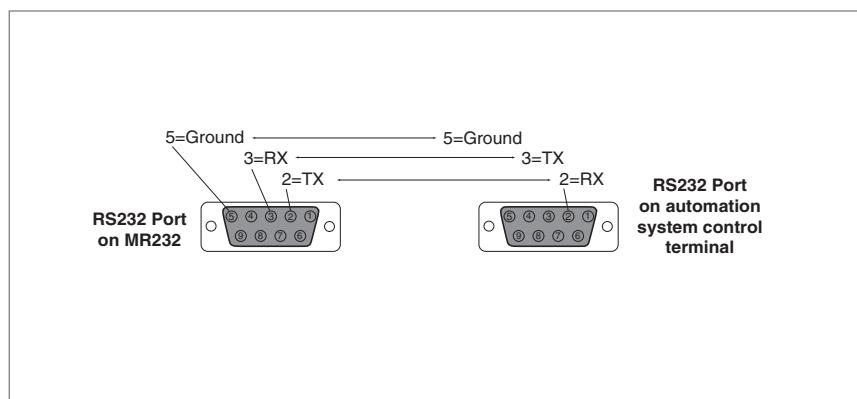
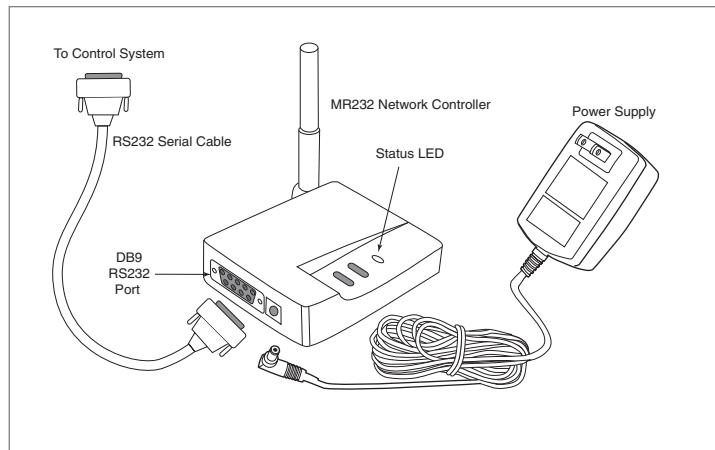
In applications where these factors may be an issue or in very large applications, one or two Repeaters may be used to increase the effective communication range of RF Lighting Control devices.

Interfacing with Other Automation Systems via the RS232 Network Controller

Users can connect their RF Lighting Control system with external automation systems for expanded functionality by using the RS232 Network Controller. The RS232 communicates control commands to RF Lighting Control components using the controllers of other home systems.

Common applications include:

- Home automation systems
- Home theater systems and whole house audio/video
- Control of lighting scenes for television or movie viewing using a home theater controller

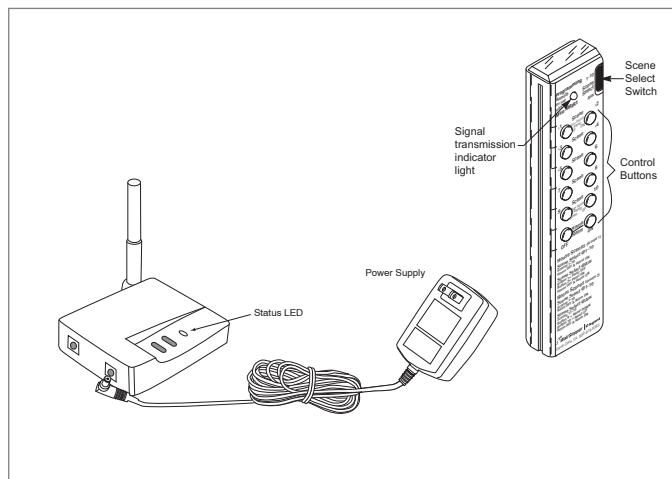


Expanding a RF Lighting Control System

Interfacing with External Devices via IR Interface

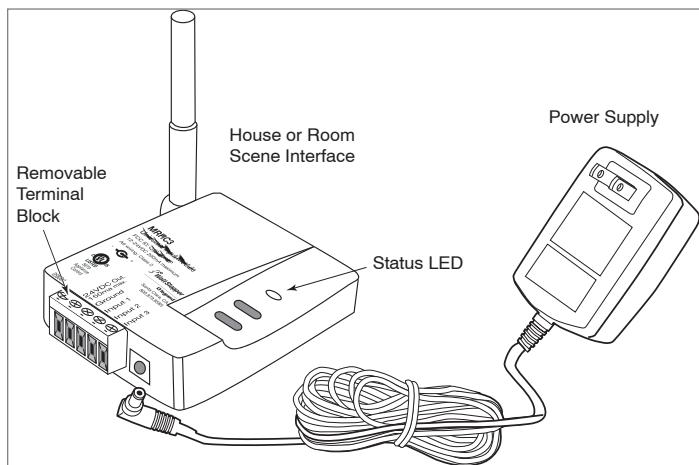
In an RF Lighting Control system, the optional IR to RF Interface (MRIR1) is used as a house or room scene controller that works with external IR systems or components to integrate lighting control with other home automation systems, i.e., whole house audio or home theater systems.

The MRIR1 accepts IR data via an internal IR sensor or an external IR sensor connected to a 3.5mm jack, and then transmits control signals to the appropriate devices on the RF Lighting Control wireless network. The interface is supplied with an external 12V power supply as well as a programming remote.



Interfacing with External Devices via Scene Interfaces

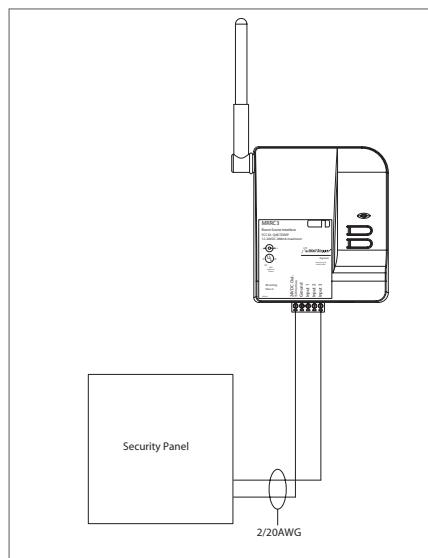
Using the House Scene Interface (MRHC3-G) or Room Scene Interface (MRRC3-G) to connect an RF Lighting Control system with common external devices provides increased functionality. The Scene Interfaces can be set up to accept either momentary or maintained inputs. The scene assignments are fixed and cannot be changed. Mode A is typically used with momentary control signals while Mode B is typically used with maintained control signals.



Common Device Applications

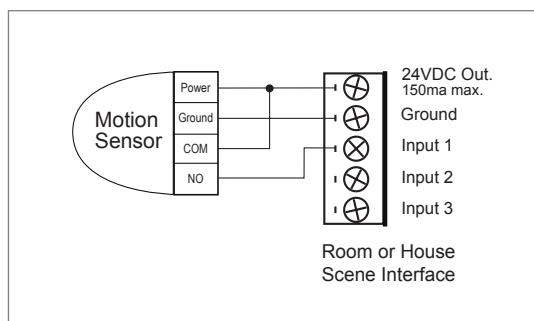
Security Systems

Connect RF Lighting Control Scene Interfaces and security systems using a two-wire connection between a maintained or momentary output relay at the alarm panel and the desired input on the scene interface. Common applications include switching on or flashing house lighting when an alarm event occurs or recalling a scene when the homeowner deactivates the alarm system upon arrival.



Occupancy or Vacancy Sensor

An occupancy sensor application could use either Mode A or Mode B. Most applications would use Mode B. In this configuration, a scene executes when the sensor initially detects motion; a second scene executes when the sensor determines that the space is unoccupied. Mode A allows auto-on, manual-off and manual-on/auto-off functions. A manual-on/auto-off application requires the input to be wired to a NC contact and the scene stored to turn the appropriate lighting off.



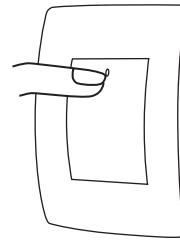
Operating an Wireless RF Lighting Control System

Using RF Lighting Control Dimmers, Switches and Fan Controllers

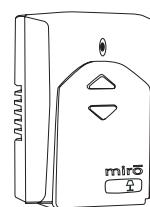
Dimmers and Plug-in Lamp Modules

↑	Tap once	Fade the circuit to its last-used level
↑↑	Tap twice	Full bright
↑	Press and hold	Increase the present level
↓	Tap once	Fade the circuit to off
↓	Press and hold	Decrease the present level

Multilocation Controllers work the same way.



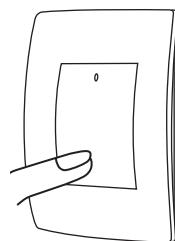
Dimmer



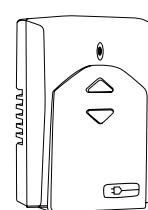
Plug-in Lamp Module

Switches and Plug-in Appliance Modules

↑	Tap once	Turn circuit on
↑	Press and hold	Turn circuit on
↓	Tap once	Turn circuit off
↓	Press and hold	Turn circuit off



Switch



Plug-in Appliance Module

Fan Controller

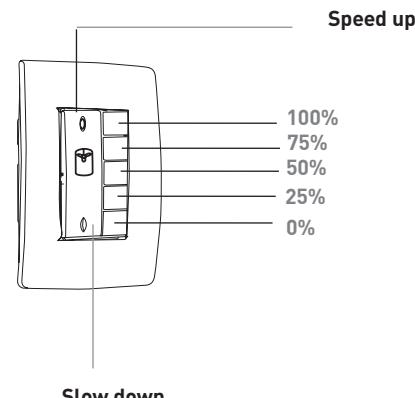
1 Tap ↑ Fan turns on to last used level

2 Taps ↑ Fan turns on at full output

Pressing any of the individual speed buttons will turn the fan on to that speed.

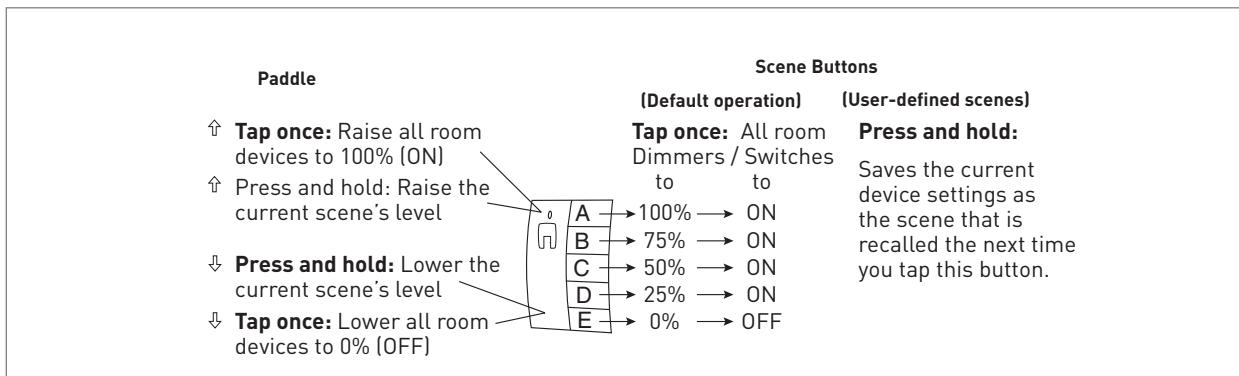
Press and Hold ↑ ↓ Increases or decreases fan speed.

1 Tap ↓ Fan turns off.



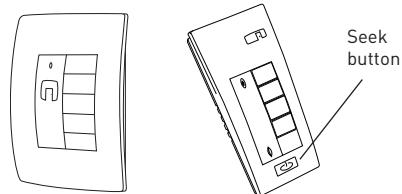
Using RF Lighting Control Room and House Scene Controllers

Room and House Scene Controllers have a paddle on the left and five scene buttons on the right. House Scene Controllers display the icon of a house on the top of the paddle, while Room Scene Controllers display the icon of a doorway on the paddle.



Room Scene Controllers

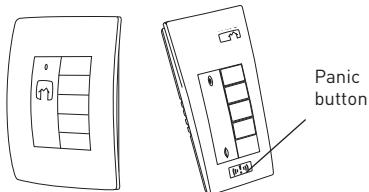
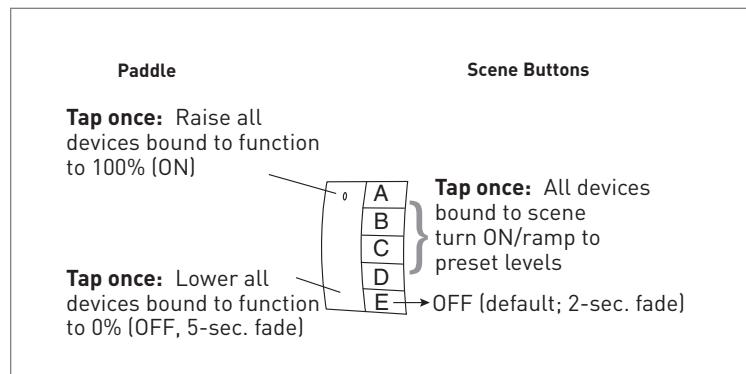
The Seek feature on the Remote Room Scene Controller lets you find up to 30 Wireless RF Lighting Control devices or GROUPS in a room, adjust light levels and turn devices on or off. Use ↑ – and ↓ – to control the device, or use Scene buttons for 0% (bottom button), 25%, 50%, 75% and 100% (top button) levels.



In-wall and Remote Room Scene Controllers

House Scene Controllers

To invoke the Panic mode, which provides a whole house response such as flashing lights, press and hold the Panic button on the Remote House Scene Controller for two seconds. To cancel and revert to normal operation, press the Panic button a second time. Each device included in the Panic mode will revert to its status prior to Panic mode initiation.



In-wall and Remote House Scene Controllers

Operating an RF Lighting Control System

Configuration Lock

To prevent unauthorized tampering, a user can lock the present configuration at the house and the room level using a simple, no-tools procedure. Configuration lock can be done at one level or at both levels.

Activating or removing house lock must be done from a House Scene Controller; room lock must be invoked or removed from a Room Scene Controller.

When house lock is active:

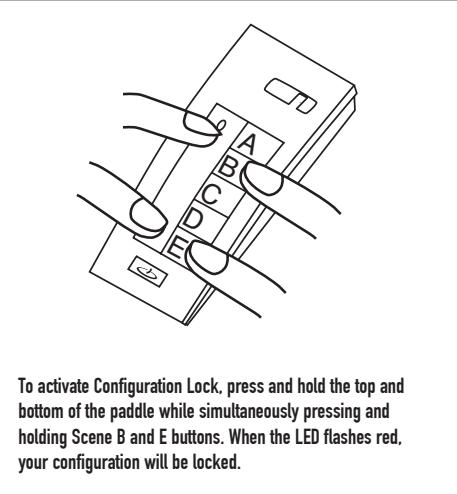
- All binding operations are blocked
- House scene recording is blocked
- Room scenes may be overwritten

When room lock is active:

- Room binding is blocked
- Room scene recording is blocked

RF Lighting Control Key Fob

When pressed by the user, the Key Fob buttons recall room or house scenes or activate the panic feature (flashing lights). Specific button functions are defined during system setup. The device may be locked to prevent inadvertent reset to factory defaults. No auxiliary interfaces are required. An unlimited number of Key Fobs can be added to any existing RF Lighting Control installation.



To activate Configuration Lock, press and hold the top and bottom of the paddle while simultaneously pressing and holding Scene B and E buttons. When the LED flashes red, your configuration will be locked.



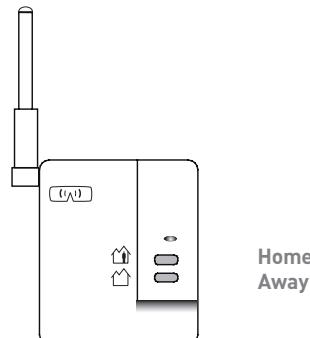
	Mode One	Mode Two	Mode Three
Button 1	HOUSE Scene 1	HOUSE Scene 1	ROOM Scene 1
Button 2	HOUSE Scene 5 (default is off)	HOUSE Scene 5 (default if off)	ROOM Scene 5 (default is off)
Button 3	HOUSE off	Panic	HOUSE Scene 5 (default is off)

Using Occupancy Emulation/Vacation Mode

The Repeater monitors all Wireless RF Lighting Control network traffic, and records a seven day 'loop' of network events. When activated, it 'plays back' the recorded loop, providing a highly realistic emulation of occupancy – a great security feature when homeowners are away.

Users can activate occupancy emulation in either of two ways:

- Press the 'away' button on the Repeater
- Include a Repeater in a house scene



When the Repeater is included in a house scene, the user presses the relevant scene button to activate emulation when leaving the premises. The system begins occupancy emulation after a one-minute interval. Upon an occupant's return, as soon as a user presses any device, the Repeater stops playback and starts updating its loop for the next occasion.



Designing an RF Lighting Control System

Designing an RF Lighting Control system involves significant advance planning, particularly in identifying what the residents want from their lighting on a daily, weekly and occasional basis as well as at different times of the day. The materials included in this Specification Guide offer an overview of the design process. To get started, you can also view our RF Lighting Control solutions by visiting www.legrand.us/rflcsolutions

The basic steps involved in designing an RF Lighting Control project include:

1. Determining the project scope

Projects can range from controlling a few lights to controlling all interior and exterior lighting, selected appliances, and interfacing to other home automation systems.

2. Determining the type of all lighting loads

Determine the type (incandescent, fluorescent, low voltage, etc.) of all lighting loads to be controlled and the location of all control devices. Also determine whether a neutral is present, as all RF Lighting Control devices (except Incandescent Dimmers) require a neutral.

3. Determining and specifying the devices needed to provide the desired level of control

- Power devices (i.e. Dimmers, Switches, Plug-in Modules, Fan Controllers) are required for every load on the wireless network.
- Control devices (i.e. Multilocation, Room and House Scene Controllers) provide additional control points or scene control capability.
- Interface accessories (i.e. RS232 Network Controller or Scene Interface) enable integration with home automation systems (i.e., alarm systems, time clocks).
- Repeaters are for installations requiring greater RF range or where occupancy emulation is desired.
- Plug-in Appliance and Lamp Modules allow coordinated control of lamps and appliances.

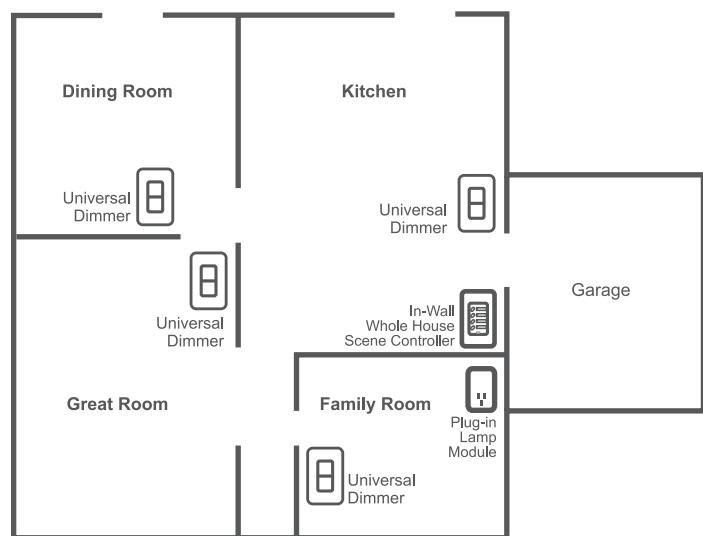
Don't Forget the Plug-in Modules!

- An application may require more than a designer initially anticipates.
- Over time, homeowners will find more uses for them (Christmas lights, coffee machines, radios, TVs and more).
- Include at least one extra Plug-in Lamp Module and one extra Plug-in Appliance Module in any bill of materials.

RF Lighting Control Solutions

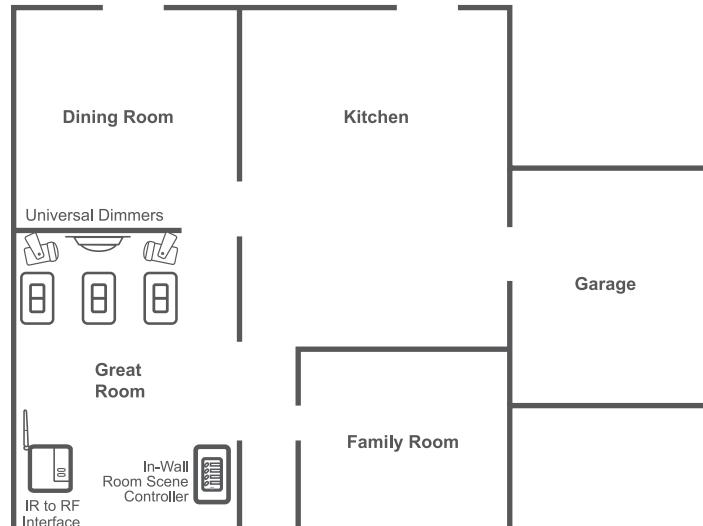
Basic Lighting Control

Product Description	Part #	Qty
In-Wall Universal Dimmer	DRD4-W	4
In-Wall House Scene Controller	DRD5-W V2	1
Plug-In Lamp Module	MRP6-W	1



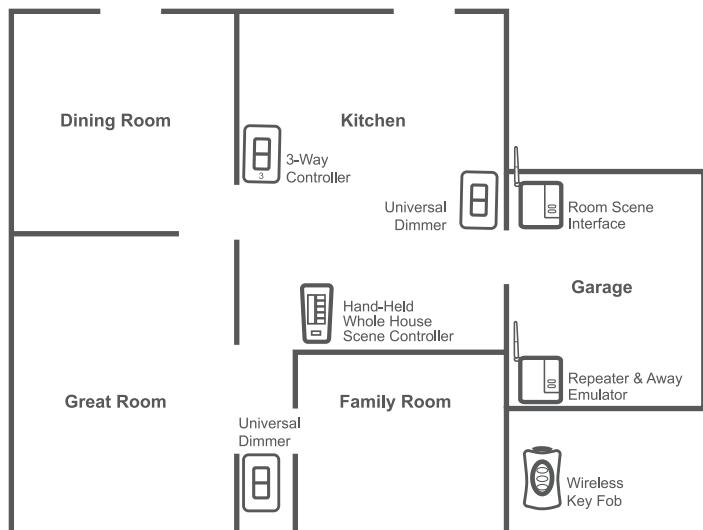
Home Theater Lighting

Product Description	Part #	Qty
In-Wall Universal Dimmer	DRD4-W	3
In-Wall House Scene Controller	DRD5-W V2	1
IR to RF Interface	MRIR1	1



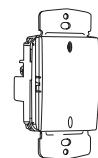
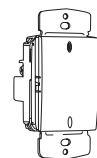
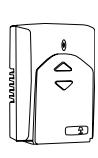
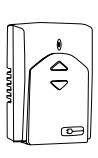
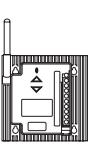
Safety Lighting

Product Description	Part #	Qty
In-Wall Universal Dimmer	DRD4-W	2
3-Way Controller	DRD8-W V2	1
Hand-Held House Scene Controller	MRH5-G	1
Wireless Keyfob	MKF0B	1
Repeater & Away Emulator	MRR2-G	1
Room Scene Interface	MRRC3-G	1



RF Lighting Control Specifications Overview

Power Devices

	Incandescent Dimmers	Universal Dimmers	Switches	Plug-in Lamp Module	Plug-in Appliance Module	Fan Controllers	2000 Watt Dimmer***
Product Description							
Part Number	DRD8-X <input type="checkbox"/>	DRD4-X <input type="checkbox"/>	DRD3-X V2 <input type="checkbox"/>	MRP6-X <input type="checkbox"/>	MRP7-X <input type="checkbox"/>	DRD9-X <input type="checkbox"/>	MR2000 <input type="checkbox"/>

Voltage	120V	120V	120/277V	120V	120V	120V	120V	277V
Max Load	600W*	600W*	1500/3000W	300W	800W	1.5A	2000VA	4432VA
Min Load	60W	25W	N/A	25W	N/A	N/A	100VA	200VA
Neutral required	•	•	•	•	•	•	•	•

Load Types

Incandescent	•	•	•	•	•	•	•
Dimmable magnetic low-voltage	•	•	•	•	•	•	•
Dimmable electronic low-voltage	•	•	•	•	•	•	•
Dimmable neon, cold-cathode	•	•	•	•	•	•	•
Dimmable 2-wire fluorescent **	•	•	•	•	•	•	•
Non-dimmable lighting loads		•		•			
Motors, pumps, up to 1/8 HP		•		•			
Ceiling fan(s)					•		
Appliances		•		•			

Features

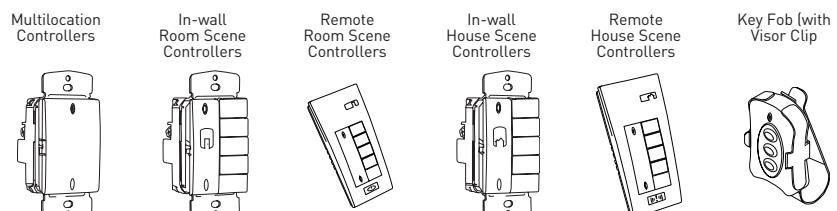
Square-law dimming	•	•	•		•		
Last level recall	•	•		•		•	•
Auto-on			•	•			
Zero-crossing air-gap relay			•		•		
Air-gap isolation switch	•	•				•	
Long-life status LED	•	•	•	•	•	•	•
Default fade rate	2sec	2sec		2sec		2sec	2sec
Overload protection	•	•	•	•	•	•	•
Topdog™ Communications	•	•	•	•	•	•	•
Room scenes	15	15	15	15	15	15	15
House scenes	10	10	10	10	10	10	10
Panic function	•	•	•	•	•	•	•

* Subject to derating when more than one Dimmer is ganged together or when using non-incandescent loads.

** Advance MK X or equivalent

*** Installs in a 4" square box with 1½" extension ring, switches a dimmable load type. Also operates with non-RF RF Lighting Control products.

Control Devices



Product Description

Multilocation Controllers	In-wall Room Scene Controllers	Remote Room Scene Controllers	In-wall House Scene Controllers	Remote House Scene Controllers	Key Fob (with Visor Clip)
Use one or more for multilocation control with any power device	Program and recall five Room scenes	Program and recall five Room scenes plus individual load control	Program and recall five House scenes	Program and recall five House scenes plus panic control	Recall room or house scenes

Part Number

DRD8-X V2 DRD6-X V2 MRH6-G DRD5-X V2 MRH5-G MKFOB

Voltage	120/277V	120/277V	Battery	120/277V	Battery	120V	Battery
Neutral required	•	•	N/A	•	N/A	•	N/A

Features

Long-life status LED	•	•	•	•	•	•	•
Topdog™ Communications	•	•	•	•	•	•	•
Group raise/lower	•		•			•	
Room raise/lower		•	•			•	
Room on/off	•		•			•	•
Seek Function		•					
Room Scenes		5/15	5/10			15	2
House Scenes				5/10	5/10	10	3
Sets of Scenes	3	2	2	2			3
House on/off				•	•	•	•
Panic Function					•		•
Preprinted Scene Labels	•		•				
Occupancy Emulation			•	•	•	•	
Configuration Lock	•	•	•	•	•	•	•

Environmental

All RF Lighting Control electronic products are rated for ambient temperatures between 0-40°C (32-104°F), humidity 0-80% non-condensing.

RF Lighting Control Wallbox Devices

RF Lighting Control Decorator Style

	DRD2-W* DRD2-A* DRD2-I* DRD2-B*	Incandescent Dimmer, 60W - 600W, 120V
	DRD4-W* DRD4-A* DRD4-I* DRD4-B*	Universal Dimmer, 25W - 600W, 120V
	DRD3-W V2 DRD3-A V2 DRD3-I V2 DRD3-B V2	Switch 1500W, 120V 3000W, 277V
	DRD9-W DRD9-A DRD9-I DRD9-B	Fan Controller 1.5A
	DRD8-W V2 DRD8-A V2 DRD8-I V2 DRD8-B V2	Multilocation Controller, 120/277V
	DRD6-W V2 DRD6-A V2 DRD6-I V2 DRD6-B V2	In-wall Room Scene Controller, 120/277V
	DRD5-W V2 DRD5-A V2 DRD5-I V2 DRD5-B V2	In-wall House Scene Controller, 120/277V

Neutral required for all in wall devices, except Incandescent Dimmers (DRD2).

*Universal Dimmers (DRD4) recommended for all dimming applications except where a neutral is not present.

Wall plates must be ordered separately

Derate Dimmers as follows:	MAXIMUM CAPACITY		
	Single Dimmer	Dimmer at end of multigang	Dimmer in middle of a multigang
• Incandescent / Quartz Halogen	600W	500W	400W
• Magnetic Low Voltage	500W	400W	300W
• Electronic Low Voltage	500W	400W	300W
• Cold Cathode / Neon	500W	400W	300W
• Fluorescent:			
- Two-wire	500W	400W	300W
- Compact Fluorescent	500W	400W	300W

RF Lighting Control System Components

	MRH6-G	Remote Room Scene Controller 3 AAA batteries (included)
	MRH5-G	Remote House Scene Controller 3 AAA batteries (included)
	MRP6-W	Plug-in Lamp Module 300W
	MRP7-W	Plug-in Appliance Module 800W
	MKF0B	Key Fob with Visor Clip
	MRIR1-G	IR to RF Interface
	MR2000	2000 Watt Dimmer 100VA to 2000VA @120V 200VA to 4432VA @ 277V Remote mount to 4" box with 1.5" extension
	MRR2-G	Repeater, 120V
	MR232-G	RS232 Network Controller
	MRHC3-G MRRC3-G	House Scene Interface Room Scene Interface

Specifications

Physical

All wireless devices and accessories shall be UL listed and FCC approved as required.

All wireless devices for installation in standard NEMA electrical wallboxes shall incorporate heavy duty plated steel or aluminum straps, with auto-alignment lugs designed to locate accurately on a plated steel subframe.

Devices shall be available in either warm white, light almond, or charcoal gray textured polycarbonate. Thermoset materials shall not be acceptable.

Devices shall require a maximum of two screws per device to mount the device and its wall plate or its portion of a multigang wall plate. No screws shall be visible from the front of the wall plate.

Switches

Single pole, 3-way and 4-way switches with pilot lights shall incorporate green light emitting diodes. The pilot light shall be on when the circuit is off.

No part of the Switch paddle may protrude more than 2mm outside the front surface of the wall plate when in either the on or off position, or while transitioning between them.

Switches shall incorporate pressure plate backwire terminals.

Dimmers

All Dimmers shall incorporate automatic load sensing firmware causing the dimmer to close down and signal an error condition to the user in the event that the Dimmer is energized with an overload or load side short circuit condition, without causing damage to the dimmer, and without the use of integral fuses or current trips.

All dimmers shall be controlled using only a single paddle, covering the whole of the front of the device, with no surrounding rim. Tapping the top of the paddle once shall cause the dimmer to return to its last-used non-zero level. Tapping the top of the paddle twice shall cause the dimmer to execute a two-second ramp to full bright. Tapping and holding the top of the paddle shall cause the dimmer's load to gradually increase in brightness. Tapping the bottom of the paddle shall cause the dimmer to execute a 2-second fade to off. Pressing and holding the bottom of the paddle shall cause the dimmer's load to gradually decrease in brightness.

All dimmers shall incorporate a status LED, providing indication of correct function and various fault conditions.

All permanently-installed dimmers shall incorporate a means to isolate the load for relamping, without any switches or other controls visible from the front of the dimmer, and without requiring tools.

Incandescent Dimmers

Dimmers designated as incandescent dimmers shall be rated for use with incandescent loads only. Incandescent dimmers shall be designed to be inserted in series with a resistive load and shall not require a neutral connection.

Universal Dimmers

Dimmers designated as universal dimmers shall be rated for incandescent loads and for dimmable magnetic low voltage, electronic low voltage, neon, cold cathode and 2-wire fluorescent (Advance MK X or equivalent) loads. Universal dimmers shall require a neutral connection in order to function.

Dimmers and Multilocation Controllers

In non-wireless applications, dimmers shall have the ability to be used either alone, or as part of a control circuit with up to eight Multilocation Controllers. The Dimmer shall be connected to the load circuit and may be designated either incandescent or universal (see above). When used as part of a multilocation control circuit with up to eight Multilocation Controllers, each Controller shall be connected to the Dimmer, using a 14-gauge insulated wire. When so connected, it shall be possible to control the load in the manner described above from either the dimmer or from any of the Multilocation Controllers. The Multilocation Controller shall be identical in appearance to the Dimmer with the exception that a status LED shall not be required.

Dimmers and Switches for Permanent Installation

Dimmers shall incorporate all the dimmer features indicated above with the exception of multilocation control.

Switches shall be identical in appearance to dimmers, but shall incorporate an air-gap relay providing zero-crossing switching of any loads up to 800 watts. The switch shall be controlled manually by pressing the top of its paddle for on or the bottom for off.

Plug-in Lamp and Appliance Modules

The Plug-in Lamp and Appliance Modules shall function exactly as described above for the Universal Dimmer and the Switch.

The Plug-in Modules shall plug into any grounded 120 volt 15 amp or 20 amp receptacle, and shall pass the ground connection through to the load, which shall connect to a grounded 15 amp receptacle embodied into the Plug-in Module.

The Plug-in Lamp Module shall function as a Universal Dimmer, with a maximum load of 300 watts. The Plug-in Appliance Module shall function as a switch, with a maximum load of 800 watts.

The Plug-in Lamp Module shall sense the load connected to it and switch on if it senses that the load circuit is being opened and closed (i.e., person turning switch on or off). It shall be possible to configure the Plug-in Appliance Module to do the same, for use with non-dimmable floor and table lamps.

Fan Controllers

Fan Controllers shall be designed to mount in a standard NEMA back box and be uniform in size and general appearance with dimmers and switches. Fan Controllers shall be rated for continuous use with one or two 120 volt ceiling fans of the same type and with a combined load no greater than 1.5 amps.

Fan Controllers shall incorporate software-controlled overcurrent and short circuit protection that shall be able to safely close down the controller and switch off the load in the event that the control is energized with a load-side short circuit or overload, without the use of fuses or current trip and without damage to the Fan Controller.

Fan Controllers shall incorporate silent or 'de-humming' technology and shall neither buzz audibly themselves nor cause the fan(s) connected to them to buzz.

Fan Controllers shall provide pushbutton control of a minimum of four fan speeds and off. It shall be possible to switch from off to any desired speed, without passing through full speed.

It shall be possible to increase or decrease the fan speed by pressing the Fan Controller paddle up or down respectively.

Fan Controllers shall be available for stand alone operation or as part of a wireless network.

The Wireless Network

It shall be possible to construct a distributed peer-to-peer network of dimmers, controllers and other devices, using the unlicensed 900MHz radio band. Each device in the network shall have an RF range of not less than 100' in a timber construction building. It shall be possible to increase this range to 300' by the use of two Repeaters.

It shall not be necessary to apply filters or bridges to the building's power supply to correctly operate the wireless network.

All communications across the wireless network shall be bi-directional, at a speed (baud rate) not less than 9600 baud. The wireless network shall incorporate means to avoid message contention and shall operate dynamically over at least five channels in the permitted band to avoid interference with other 900MHz devices.

The wireless network shall automatically establish a system (House) ID, and shall provide that ID to each member of the network. It shall not be possible for neighboring systems to interfere with or to be influenced by other similar systems.

The use of special tools or computers to configure or program the wireless network shall not be a requirement.

The wireless network shall support, within system range, at least 255 discrete House IDs, 127 rooms per house, 1023 devices/groups per house.

Wireless Groups

It shall be possible to GROUP two or more wireless Dimmers, Switches, Fan Controllers, Plug-in Lamp Modules, Plug-in Appliance Modules or Multilocation Controllers together without the use of tools or coding devices. When so grouped, the devices shall act as one.

Wireless Room Control

It shall be possible to assign one or more Room Scene Controllers with a number of other wireless devices in a room, without the use of tools or coding devices. When so assigned, it shall be possible to record up to fifteen lighting scenes per room.

The Room Scene Controller shall incorporate five large push buttons, each of which shall be assigned to a room scene. Each room scene shall include a level (on/off) for all of the dimming or non-dimmable devices in the room. It shall be possible to record and recall a room scene with a single touch, and without the use of tools or coding devices. It shall be possible to increase or decrease light levels in the room by pressing a paddle incorporated in the face of the Room Scene Controller.

A handheld Room Scene Remote shall be available, incorporating all the functions of the Room Scene Controller and also allowing the user to control individual loads assigned to the room. The Room Scene Remote shall incorporate the same RF technology as the wireless network, and it shall not be required to aim the remote at a device in order to function.

Wireless House Control

It shall be possible to record and play back up to 10 house scenes per network, including every load-connected wireless device in the house. It shall be possible to record actual wireless network usage for a period not less than seven days, and to play it back through the touch of a single button to emulate occupancy when the building is unoccupied.

Through the use of a House Scene Remote, it shall be possible to record and recall a Panic setting, which shall cause dimmers assigned to it to flash on and off, and switches assigned to it to latch on.

Configuration Locking

It shall be possible, without the use of tools or coding devices, to lock system configuration at the house and/or the room level. When the house is locked, no changes to system configuration or house scenes are allowed, but room scenes may be modified at will. When a room is locked, no changes to room configuration or scenes are allowed.

Scene Interface/Contact Closure

The Scene Interfaces shall include house level and room level devices incorporating a 2-wire interface from other control devices. It shall provide two operating modes for maintained and momentary type outputs respectively. It shall contain three inputs providing access for up to six functions.

RS232 Interface

The RS232 Network Controller shall be compatible with the RS232 standard. It shall communicate with standard ASCII communication protocol and shall utilize a 38.4 Kbd baud rate. It shall provide two user interfaces and be accessible via any PC running a terminal emulator.

FAQs

Q: Is RF Lighting Control's Top Dog protocol the same as or compatible with Zigbee or Zensys RF protocol?

A: No, we specifically engineered RF Lighting Control's Top Dog, frequency-agile RF protocol to power our lighting control system. That way, we could enhance system operation for top-notch performance.

Q: Can I interface RF Lighting Control with other home automation systems like time clocks, occupancy sensors and touch screens?

A: Yes, RF Lighting Control includes two primary means of interfacing with other home automation systems. For systems utilizing an RS232 protocol, users can select the RF Lighting Control MR232 Network Controller. For systems requiring a contact closure output, RF Lighting Control offers Room and House Scene interfaces [MRRC3 and MRHC3].

Q: Since RF Lighting Control operates on the 900 Mz band, can a RF Lighting Control system cause interference or be interfered with by other RF products?

A: No, RF Lighting Control is frequency agile, which means that it broadcasts each message over five channels simultaneously. System devices listen over the clearest channel ensuring reliable communication without interference from other RF devices.

Q: Can multiple RF Lighting Control systems within RF range interfere with one another?

A: No, each RF Lighting Control system automatically assigns a unique ID ensuring that one RF Lighting Control system cannot interfere with another.

Q: If each RF Lighting Control system has a unique ID, can I expand my system?

A: Yes, just install the new device(s) and they will receive a broadcast of the previously assigned house ID.

Q: What is the capacity of a RF Lighting Control installation and how does this compare to other commercially available RF systems?

A: RF Lighting Control's capacity is 1023 groups/devices and 127 rooms. (Each room can support 15 scenes and there are 10 house scenes). This capacity is significantly greater than other RF systems on the market.

Q: Can I adjust the fade rate of scenes?

A: Yes, the optional touch screen allows fade rates up to 254 seconds.

Q: Do I need to use a Repeater?

A: A Repeater is typically not necessary for partial home lighting control or smaller homes; however, it is recommended for homes greater than 2500 square feet or where there is obstructing material such as concrete walls or floors. You may use up to two Repeaters for very large homes.

Q: What is the typical RF range?

A: There is no precise way to measure RF range, since it can be affected by any number of application-specific factors (i.e., wall composition, amount and placement of windows/mirrors, etc). That being said, the average range for effective RF transmission is up to 100 feet without a Repeater. An additional 100 feet per Repeater may be obtained, with up three Repeaters for a 300 foot coverage (see P. 14).

Q: How is system programming accomplished?

A: All programming is accomplished by simply pressing the top and bottom of an RF Lighting Control device paddle (see P. 9). This sends an RF broadcast message throughout the system, which allows devices to be bound into the desired groups and room configurations.

Q: Once the system is configured can it be locked?

A: Yes, there is a very simple procedure users can follow to keep their systems from being tampered with (see P. 20).

Q: What happens in the event of a power failure?

A: RF Lighting Control has a non-volatile memory, which maintains all system setup and programming. Upon return of power, the memory restores the lighting exactly as it was when the power failed.

Q: What is underload and overload protection?

A: These are convenience and safety features that alert a user (via a flashing red LED) to the fact that there is an issue that needs to be resolved.

Q: When should I specify an Incandescent Dimmer?

A: Specify an Incandescent Dimmer (DRD2-X) **ONLY** when you have at least 60W of line voltage incandescent loads, and no neutral is available in the wallbox.

Q: How can one Dimmer dim practically all dimmable loads?

A: RF Lighting Control Universal Dimmers incorporate a high-performance microcontroller that actively monitors the load's behavior and adopts the Dimmer's operation to match. The smooth and accurate level transitions made by these Dimmers let them control most dimmable load types flawlessly. In addition, because the microcontroller can be instructed to change its dimming curve, one model is able to meet the needs of both standard and two-wire fluorescent applications.

Q: Are neutrals required?

A: Yes, all RF Lighting Control products except an Incandescent Dimmer (DRD2-X) require a neutral.

Q: Can RF Lighting Control devices be clustered together (e.g., placing all dimmers in an electrical closet) rather than distributing the devices throughout the application?

A: Yes, however for optimum RF performance and user convenience (especially in residential applications) it is recommended that the devices be distributed throughout the application. If clustering of devices is preferred, it is recommended that an RF Lighting Control Repeater (MRR2-G) be placed approximately six feet from the devices and that other precautions be taken.

For more information visit:

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