

Crestron **CEN-RFGW-EX**
infiNET EX™ Wireless Gateway

Operations & Installation Guide



This document was prepared and written by the Technical Documentation department at:



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Regulatory Compliance

Federal Communications Commission (FCC) Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following conditions:
(1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Industry Canada (IC) Compliance Statement

Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

To satisfy RF exposure requirements, this device and its antenna must operate with a separation distance of at least 20 centimeters from all persons and must not be colocated or operating in conjunction with any other antenna or transmitter.

Shielded LAN cable must be used.



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infiNET EX™ Wireless Gateway: CEN-RFGW-EX

Introduction

The CEN-RFGW-EX is a 2-way RF gateway/transceiver designed to enable communications and management for a complete infiNET EX™ wireless network of dimmers, keypads, remotes and other devices. The CEN-RFGW-EX links the infiNET EX network to a Crestron® control system via high speed Ethernet or Cresnet®. “Wi-Fi friendly” RF technology permits selection from 16 ISM* channels within the 2.4 GHz spectrum to minimize the possibility of interference with other RF equipment including 802.11 devices. Built-in Dynamic Frequency Allocation continuously monitors RF conditions, automatically selecting the clearest channel to prevent interference from neighboring networks, cordless phones and microwaves.

Features and Functions

- infiNET EX wireless gateway
- Ultra dependable mesh network technology
- Dynamic discovery for fast, easy setup
- “Wi-Fi friendly” channel selection for trouble free operation
- Dynamic Frequency Allocation prevents RF interference
- Built-in RF network diagnostics

(Continued on following page)

* Industrial, Scientific and Medical; refers to frequency range used for unlicensed communication applications, such as Wi-Fi.

Features and Functions

(Continued)

- Up to 150 feet (46 meters) range indoors, 250 feet (76 meters) outdoors¹
- Supports up to 100 infiNET EX devices and five expanders²
- Supports up to six MLX-3 and MTX-3 handheld remotes²
- Cresnet or Ethernet control system interface
- Single wire Cresnet or PoE network powered

infiNET EX

Ultra-reliable infiNET EX wireless technology provides steadfast 2-way RF communications throughout a residential or commercial structure without the need for physical control wiring. Employing a 2.4 GHz mesh network topology, nearly every infiNET EX device on the network functions as a relay station, passing command signals though to every other device within range, approximately 150 feet (46 meters) indoors, ensuring that every command reaches its intended destination without disruption. Each infiNET EX device that is added to the network effectively increases the range and stability of the entire network by providing multiple redundant signal paths.¹

Easy Setup

Setting up a complete infiNET EX network is simple, utilizing dynamic discovery to locate and acquire each RF device automatically. At all times, the CEN-RFGW-EX monitors each device on the network, ignoring any other 2.4 GHz signals and reconfiguring the entire network automatically in response to new sources of interference and other changes in RF conditions.

1. Specified range is for direct device to gateway communication. Effective network range is larger due to the mesh networking capabilities of infiNET EX. Battery powered infiNET EX devices do not provide extender functionality and may have reduced RF range capabilities. Consult the specifications for each network device to confirm its actual wireless capabilities.
2. A single infiNET EX gateway supports up to 100 wireless network devices inclusive of up to six MLX-3 and/or MTX-3 remotes.

Up to 100 infiNET EX dimmers, switches, keypads, thermostats, remotes and other devices can be linked to a control system via a single CEN-RFGW-EX gateway.¹ Additional gateways may be installed to support more devices, with up to 16 gateways possible in a complete system (RF conditions allowing). Wireless expanders (model CLW-EXPEX, sold separately) may be added wherever needed to extend the network by filling in gaps between devices.²

Handheld Remote Gateway

The CEN-RFGW-EX also provides a wireless gateway for Crestron MLX-3 and MTX-3 Handheld Remotes (both sold separately). Up to six remotes can be associated with a single gateway.¹ Each wireless connection is monitored continuously, diligently keeping track when any remote goes to sleep or wanders out of range, restoring communications seamlessly when it reappears on the network.

Single Wire Hookup

Wired communications between the CEN-RFGW-EX gateway and the control system can be via Cresnet or Ethernet, with power for the gateway delivered over the same Cresnet or Ethernet connection. Power over Ethernet (PoE) simply requires the presence of an 802.3af PoE power source. Crestron offers the PWE-4803RU PoE Injector, which connects in-line with the Ethernet cable, allowing for installation at any convenient location between the gateway and the network switch. The PWE-4803RU is capable of powering a single gateway and is available separately or packaged with the gateway as model CEN-RFGW-EX-PWE.

Crestron also offers Ethernet switches with built-in PoE (models CEN-SW-POE-5 and CEN-SWPOE-24, both sold separately), affording a complete high performance networking solution capable of providing PoE for multiple gateways and other PoE devices. Using an Ethernet switch with built-in PoE eliminates the need for separate PoE injectors.

1. A single infiNET EX gateway supports up to 100 wireless network devices inclusive of up to six MLX-3 and/or MTX-3 remotes.
2. Up to five CLW-EXPEX infiNET EX Expanders may be added to the network for extended range.

Specifications

Specifications for the CEN-RFGW-EX are listed in the following table.

CEN-RFGW-EX Specifications

SPECIFICATION	DETAILS
Wireless RF Transceiver	infiNET EX 2-way RF, 2.4 GHz ISM Channels 11-26 (2400 to 2483.5 MHz), default channel 15; IEEE 802.15.4 compliant
Range (typical)	150 feet (46 meters) indoor, 250 feet (76 meters) outdoor, to nearest mesh network device(s); subject to site-specific conditions and individual device capabilities ¹ Maximum 100 devices and five expanders per gateway ^{2, 3}
Ethernet	10BASE-T/100BASE-TX, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, IEEE 802.3af compliant Unit ships with DHCP enabled
Power Requirements ⁴ Power over Ethernet	IEEE 802.3af Class 1 PoE powered device
Cresnet Power Usage	2 Watts (0.09 Amps @ 24 Volts DC)
Default Net ID	2F
Minimum 2-Series Control System Update File ^{5, 6}	Version 4.001.1012 or later
Minimum Firmware	Version 2.001.0003 or later

(Continued on following page)

CEN-RFGW-EX Specifications (Continued)

SPECIFICATION	DETAILS
Environmental Temperature Humidity Heat Dissipation	41° to 104° F (5° to 40° C) 10% to 90% RH (non-condensing) 7 BTU/Hr
Enclosure Construction Mounting	Aluminum with polycarbonate label overlay and (4) integral mounting flanges Freestanding, surface mount or attach to a single rack rail
Dimensions (without antenna) Height Width Depth	6.41 in (163 mm) 3.91 in (100 mm) 1.43 in (37 mm)
Weight	14 oz (373g)
Available Models CEN-RFGW-EX CEN-RFGW-EX-PWE	infiNET EX Wireless Gateway infiNET EX Wireless Gateway with PoE Injector
Available Accessories ANT-EXT CEN-SW-POE-5 CEN-SWPOE-24 CLW-EXPEX PWE-4803RU	Antenna Extender 5-Port PoE Switch 24-Port Managed PoE Switch InfiNET EX Wireless Expander PoE Injector (included with model CEN-RFGW-EX-PWE)

1. Battery powered infiNET EX devices do not provide extender functionality and may have reduced RF range capabilities. Specified range is for direct device to gateway communication. Effective network range is larger due to the mesh networking capabilities of infiNET EX. Consult the specifications for each network device to confirm its actual wireless capabilities.

2. A single infiNET EX gateway supports up to 100 wireless network devices inclusive of up to six MLX-3 and/or MTX-3 remotes.
3. Up to five CLW-EXPEX infiNET EX Expanders may be added to the network for extended range.
4. May be powered by PoE or Cresnet network power, not both.
5. The latest software versions can be obtained from the Crestron Web site. Refer to the NOTE following these footnotes.
6. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems.

NOTE: Crestron software and any files on the Web site are for authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

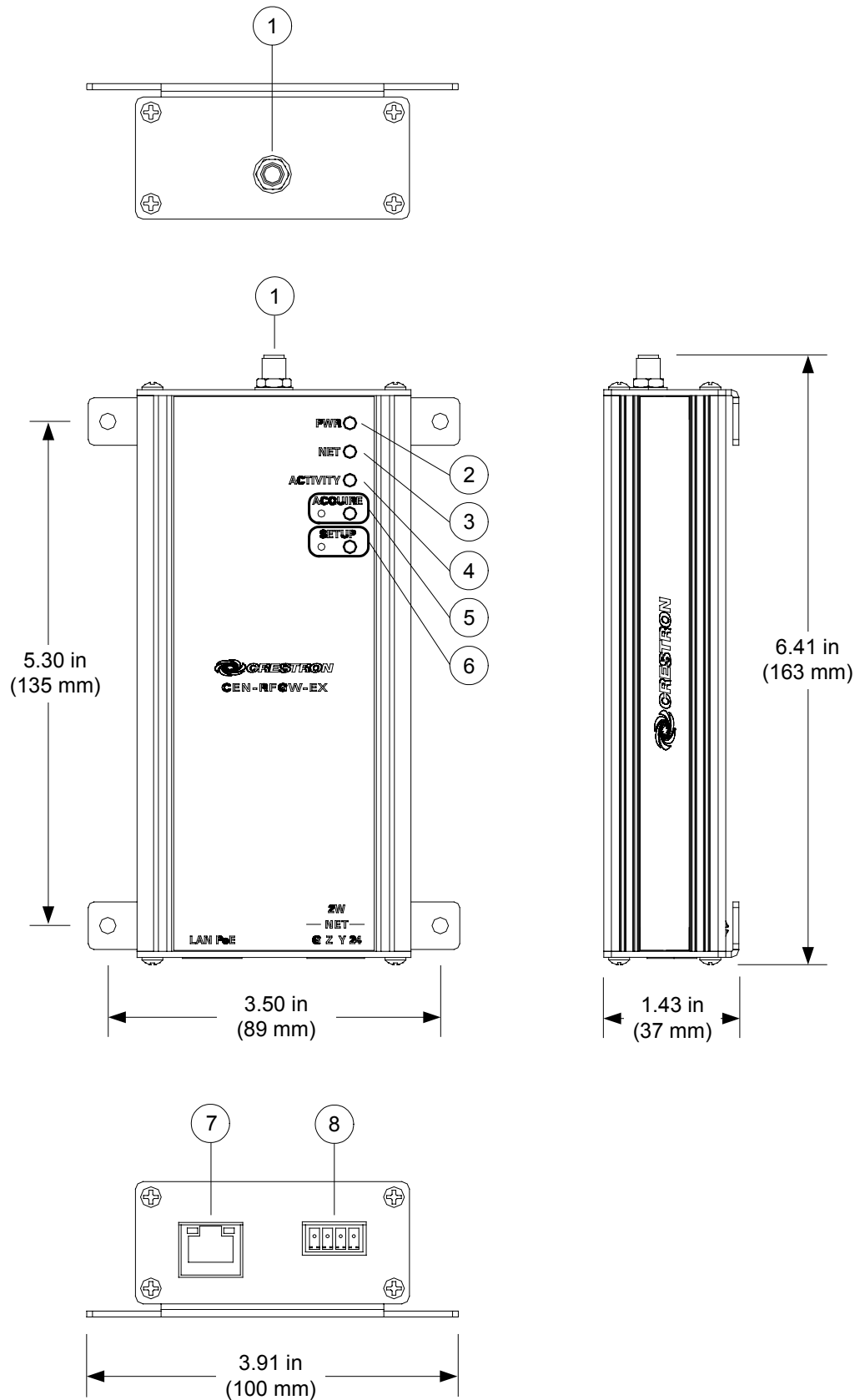
Physical Description

This section provides information on the connections, controls and indicators available on your CEN-RFGW-EX.

CEN-RFGW-EX Physical View



CEN-RFGW-EX Overall Dimensions (Top, Front, Side and Bottom Views)

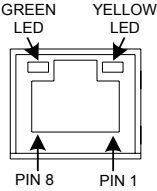
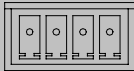


Connectors, Controls & Indicators

#	CONNECTORS¹, CONTROLS & INDICATORS	DESCRIPTION
1	ANTENNA	(1) Connection for supplied antenna
2	PWR LED	(1) Green LED, indicates operating power supplied from Cresnet network or PoE
3	NET LED	(1) Yellow LED, indicates communication with the Cresnet system
4	ACTIVITY LED	(1) Red LED, indicates wireless communications
5	ACQUIRE (Button and LED)	(1) Recessed push button with red LED, used to set up connections with wireless devices
6	SETUP (Button and LED)	(1) Recessed push button with red LED, used to set up connection with the control system via Cresnet or Ethernet

(Continued on following page)

Connectors, Controls & Indicators (Continued)

#	CONNECTORS ¹ , CONTROLS & INDICATORS	DESCRIPTION																				
7	<p>LAN PoE^{2, 3, 4}</p> 	<p>(1) 8-wire RJ-45 female, with two LED indicators; 10BASE-T/100BASE-TX Ethernet port, 802.3af Power over Ethernet compliant; Green LED indicates link status; Yellow LED indicates Ethernet activity</p> <table border="1" data-bbox="919 810 1442 1020"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> <th>PIN</th> <th>SIGNAL</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TX +</td> <td>5</td> <td>N/C</td> </tr> <tr> <td>2</td> <td>TX -</td> <td>6</td> <td>RC -</td> </tr> <tr> <td>3</td> <td>RC +</td> <td>7</td> <td>N/C</td> </tr> <tr> <td>4</td> <td>N/C</td> <td>8</td> <td>N/C</td> </tr> </tbody> </table>	PIN	SIGNAL	PIN	SIGNAL	1	TX +	5	N/C	2	TX -	6	RC -	3	RC +	7	N/C	4	N/C	8	N/C
PIN	SIGNAL	PIN	SIGNAL																			
1	TX +	5	N/C																			
2	TX -	6	RC -																			
3	RC +	7	N/C																			
4	N/C	8	N/C																			
8	<p>NET³</p> 	<p>(1) 4-pin 3.5 mm detachable terminal block; Cresnet slave port, connects to Cresnet control network</p> <p>24: Power (24 Volts DC) Y: Data Z: Data G: Ground</p>																				

1. An interface connector for the **NET** port is provided with the unit.
2. To determine which is pin 1 on the cable, hold the cable so the end of the eight pin modular plug is facing away from you, with the clip down and copper side up. Pin 1 is on the far left.
3. Power should be supplied through either the **LAN PoE** port or the **NET** port but not both.
4. The pin out table indicates signal connections. DC power applied by Ethernet power sourcing equipment (PSE) can connect to either signal pins or N/C pins.

Setup

Network Wiring

When wiring the Cresnet network, consider the following:

- Use Crestron Certified Wire.
- Use Crestron power supplies for Crestron equipment.
- Provide sufficient power to the system.

CAUTION: Insufficient power can lead to unpredictable results or damage to the equipment. Please use the Crestron Power Calculator to help calculate how much power is needed for the system (www.crestron.com/calculators).

For networks with 20 or more devices, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

For more details, refer to “Check Network Wiring” which starts on page 28.

The CEN-RFGW-EX can also use high-speed Ethernet for communications between the device and a control system, computer, media server and other IP-based devices.

For information on connecting Ethernet devices in a Crestron system, refer to the latest version of the Crestron e-Control® Reference Guide (Doc. 6052), which is available from the Crestron Web site (www.crestron.com/manuals).

Identity Code

Net ID

The Net ID of the CEN-RFGW-EX has been factory set to **2F**. The Net IDs of multiple CEN-RFGW-EX devices in the same system must be unique. Net IDs are changed from a personal computer (PC) via Crestron Toolbox™ (refer to “Establishing Communication” which starts on page 20).

When setting the Net ID, consider the following:

- The Net ID of each unit must match an ID code specified in the SIMPL Windows program.
- Each network device must have a unique Net ID.

For more details, refer to the Crestron Toolbox help file.

IP ID

The IP ID is set within the CEN-RFGW-EX's table using Crestron Toolbox. For information on setting an IP table, refer to the Crestron Toolbox help file. The IP IDs of multiple CEN-RFGW-EX devices in the same system must be unique.

When setting the IP ID, consider the following:

- The IP ID of each unit must match an IP ID specified in the SIMPL Windows program.
- Each device using IP to communicate with a control system must have a unique IP ID.

Installation

Ventilation

To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consider using forced air ventilation and/or incrementing the spacing between units to reduce overheating. Consideration must be given if installed in a closed or multi-unit rack assembly since the operating ambient temperature of the environment may be greater than the room ambient temperature. Contact with thermal insulating materials should be avoided on all sides of the unit.

Placement Tips

When installing a CEN-RFGW-EX near another CEN-RFGW-EX, for optimum performance, keep the following in mind:

- Do not place multiple gateways on the same channel. Refer to “Appendix A: The RF Spectrum” on page 31 for details.
- Gateways on adjacent channels should be at least 12 feet (3.7 meters) apart.
- Gateways on non-adjacent channels should be at least three feet (0.9 meters) apart.

When installing a CEN-RFGW-EX near a Wi-Fi access point, for optimum performance, keep the following in mind:

- Gateways on RF channels adjacent to operating Wi-Fi channels should be placed at least 12 feet (3.7 meters) from the nearest Wi-Fi access point.
- Gateways on RF channels that are non-adjacent to Wi-Fi channels should be located at least six feet (1.8 meters) from the nearest Wi-Fi access point.

For more information on RF channels and their interaction with the Wi-Fi spectrum, refer to “Appendix A: The RF Spectrum” on page 31. For additional information on optimal gateway placement, refer to “Appendix B: Optimum RF Reception Guidelines” which starts on page 32.

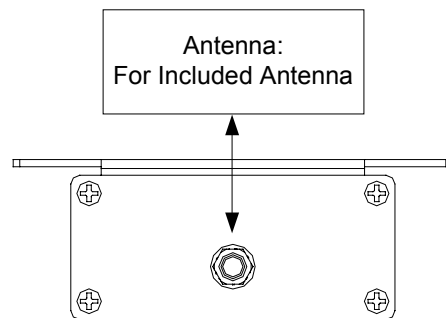
Hardware Hookup

Make the necessary connections as called out in the illustrations that follow this paragraph. Refer to “Network Wiring” on page 11 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

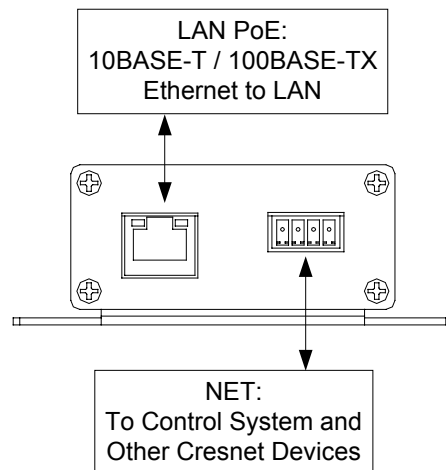
NOTE: Power should be supplied through either the **LAN PoE** port or the **NET** port but not both.

When making connections to the CEN-RFGW-EX, use Crestron power supplies for Crestron equipment.

Hardware Connections for the CEN-RFGW-EX (Top View)



Hardware Connections for the CEN-RFGW-EX (Bottom View)



NOTE: Antenna must be attached directly to the antenna connector. It can be extended with an optional ANT-EXT-5 or ANT-EXT-10 Antenna Extender (both sold separately).

NOTE: Although both the **LAN PoE** and **NET** ports can be used for configuration, there can only be one control connection to the control system.

Programming Software

Have a question or comment about Crestron software?

Answers to frequently asked questions (FAQs) can be viewed in the Online Help section of the Crestron Web site. To post a question or view questions you have submitted to Crestron's True Blue Support, log in at <http://support.crestron.com>. First-time users will need to establish a user account.

Earliest Version Software Requirements for the PC

NOTE: Crestron recommends that you use the latest software to take advantage of the most recently released features. The latest software is available from the Crestron Web site (www.crestron.com/software).

Crestron provides an assortment of Windows®-based software tools to develop a customized system. Use SystemBuilder™ or SIMPL Windows to create a program to control the CEN-RFGW-EX.

Programming with SystemBuilder

SystemBuilder is a comprehensive programming environment. Appropriate for most systems, it can quickly and easily generate a complete working program including both control processor logic and touch screen graphics.

Programming with SIMPL Windows

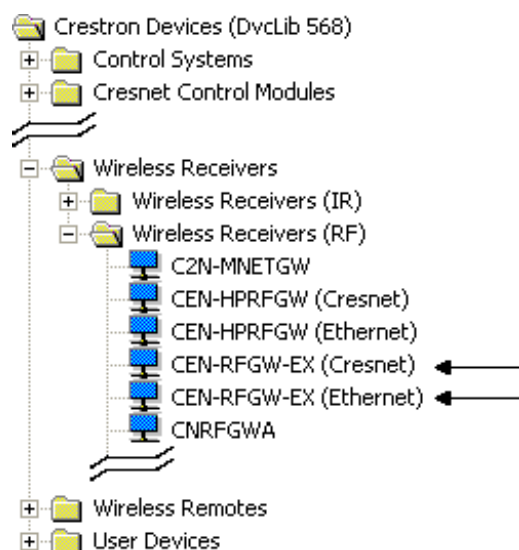
NOTE: While SIMPL Windows can be used to program the CEN-RFGW-EX, it is recommended to use SystemBuilder for configuring a system.

SIMPL Windows is Crestron's premier software for programming Crestron control systems. It is organized into two separate but equally important "Managers": Configuration and Program.

Configuration Manager

Configuration Manager is the view where programmers “build” a Crestron control system by selecting hardware from the *Device Library*.

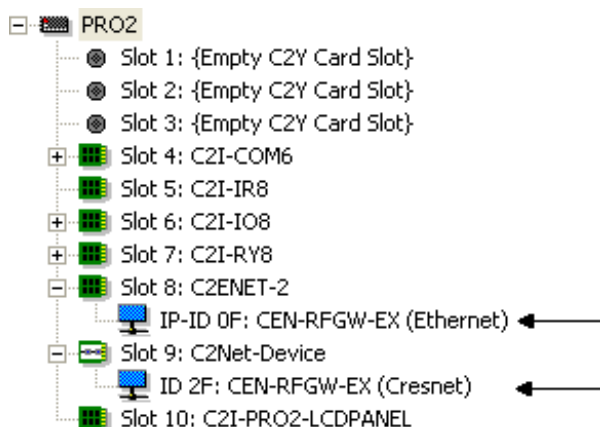
1. The CEN-RFGW-EX must first be incorporated into the system.
 - a. To incorporate the CEN-RFGW-EX (Cresnet) into the system, drag the CEN-RFGW-EX (Cresnet) from the Wireless Receivers | Wireless Receivers (RF) folder of the *Device Library* and drop it in the *System Views*.
 - b. To incorporate the CEN-RFGW-EX (Ethernet) into the system, drag the CEN-RFGW-EX (Ethernet) from the Wireless Receivers | Wireless Receivers (RF) folder of the *Device Library* and drop it in the *System Views*.

Locating the CEN-RFGW-EX in the Device Library

The system tree of the control system displays the device in the appropriate slot with a default Net ID or IP ID, as shown in the following illustration.

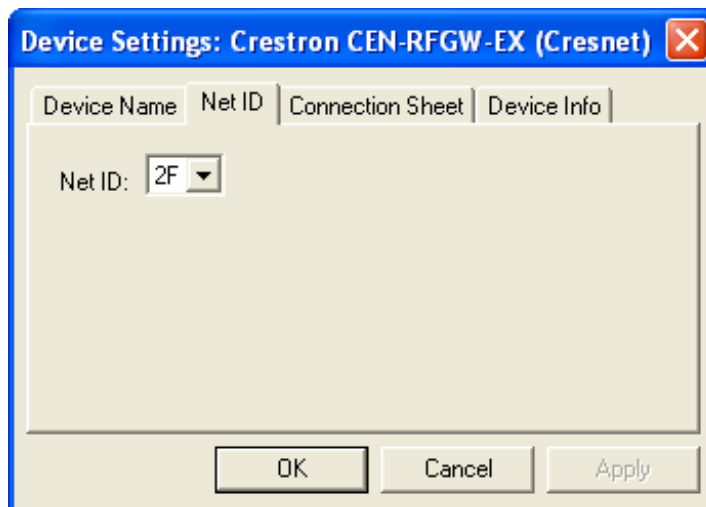
NOTE: In the following illustration, there is both an Ethernet device in Slot 8 and a Cresnet device in Slot 9. It is possible to have both types of device attached to a control system as long as the control system has either a built-in or expansion Ethernet interface. If Cresnet operation is desired, the IP table for the CEN-RFGW-EX must be empty.

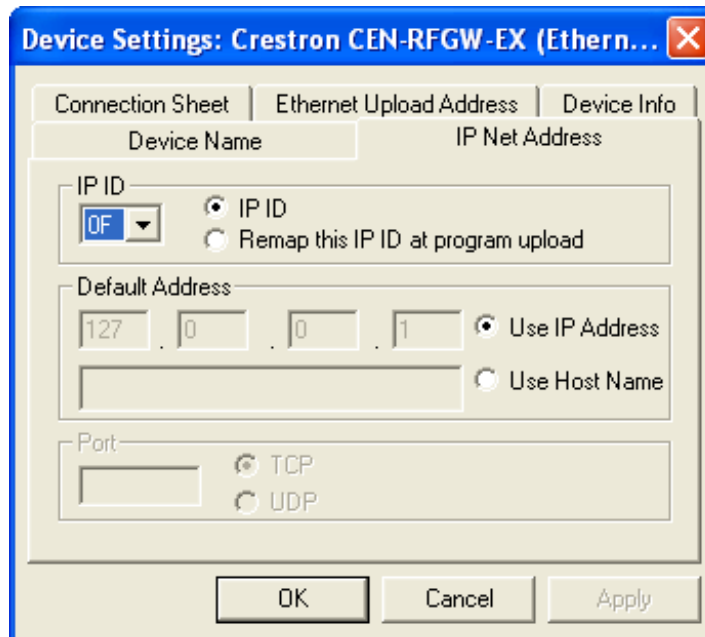
C2ENET-2 and C2Net Devices, Slots 8 and 9



2. If additional CEN-RFGW-EX devices are to be added, repeat step 1 for each device. Each CEN-RFGW-EX is assigned a different Net ID or IP ID number as it is added.
3. If necessary, double click a device to open the “Device Settings” window and change the Net ID or IP ID, as shown in the following illustrations.

“CEN-RFGW-EX Device Settings (Cresnet)” Window



“CEN-RFGW-EX Device Settings (Ethernet)” Window

NOTE: The ID code specified in the SIMPL Windows program must match the Net ID or IP ID of each unit. Refer to “Identity Code” on page 12.

**Program
Manager**

Program Manager is the view where programmers “program” a Crestron control system by assigning signals to symbols.

The symbol can be viewed by double clicking on the icon or dragging it into *Detail View*. Each signal in the symbol is described in the SIMPL Windows help file (**F1**).

Uploading and Upgrading

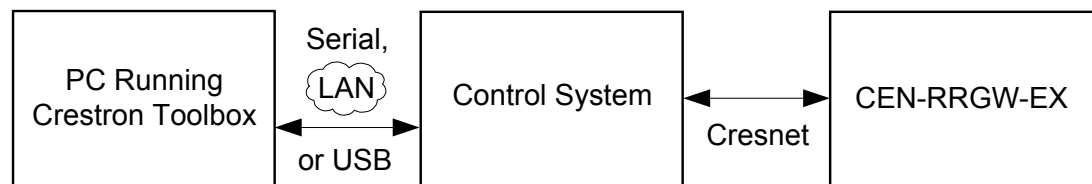
Crestron recommends using the latest programming software and that each device contains the latest firmware to take advantage of the most recently released features. However, before attempting to upload or upgrade it is necessary to establish communication. Once communication has been established, files (for example, programs or firmware) can be transferred to the control system (and/or device). Finally, program checks can be performed (such as changing the device ID or creating an IP table) to ensure proper functioning.

Establishing Communication

Use Crestron Toolbox for communicating with the CEN-RFGW-EX; refer to the Crestron Toolbox help file for details. There are two methods of communication: indirect and TCP/IP.

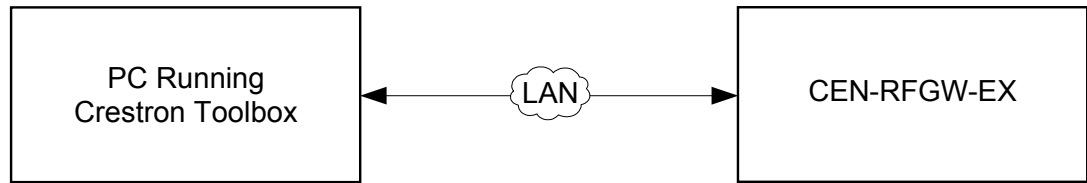
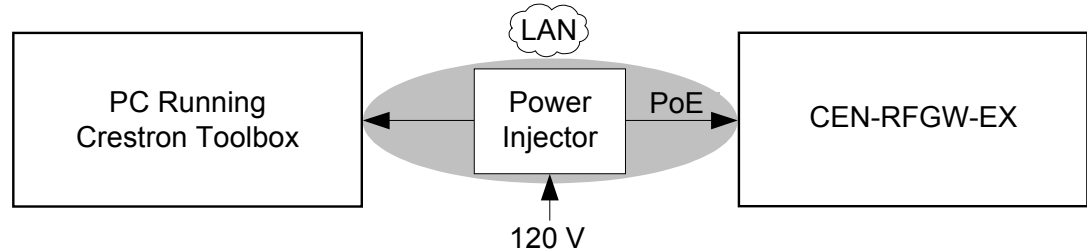
Indirect

Indirect Communication



CEN-RFGW-EX connects to control system via Cresnet:

1. Establish communication between the PC and the control system as described in the latest version of the 2-Series Control Systems Reference Guide (Doc. 6256).
2. Use the Address Book in Crestron Toolbox to create an entry for the CEN-RFGW-EX using the expected communication protocol (Indirect). Select the Cresnet ID of the CEN-RFGW-EX and the address book entry of the control system that is connected to the CEN-RFGW-EX.
3. Display the CEN-RFGW-EX's "System Info" window (click the **i** icon); communications are confirmed when the device information is displayed.

TCP/IP***Ethernet Communication******Ethernet Communication (Without Hub or Router)***


The CEN-RFGW-EX connects to PC via Ethernet:

1. Establish serial communication between CEN-RFGW-EX and PC, to get to the “System Info” window. (Refer to “Indirect Communication” on page 20.)
2. Enter the IP address, IP mask, and default router of the CEN-RFGW-EX via the Crestron Toolbox (**Functions | Ethernet Addressing**); otherwise, leave DHCP enabled. (The unit ships with DHCP enabled.)

NOTE: Use the Device Discovery Tool in Crestron Toolbox to detect all Ethernet devices on the network and their IP configuration. The tool is available in Toolbox version 1.15.143 or later.

3. Confirm Ethernet connections between CEN-RFGW-EX and PC. If connecting through a hub or router, use CAT5 straight through cables with 8-pin RJ-45 connectors. Alternatively, use a CAT5 crossover cable to connect the two **LAN** ports directly without using a hub or router (via static IP and a power injector, if no other power is supplied).

NOTE: Some PCs may not require a crossover cable. Check with PC manufacturer.

4. Use the Address Book in Crestron Toolbox to create an entry for the CEN-RFGW-EX with the CEN-RFGW-EX's TCP/IP communication parameters.
5. Display the “System Info” window (click the  icon) and select the CEN-RFGW-EX entry.

Programs and Firmware

Program or firmware files may be distributed from programmers to installers or from Crestron to dealers. Firmware upgrades are available from the Crestron Web site as new features are developed after product releases. One has the option to upload programs via the programming software or to upload and upgrade via the Crestron Toolbox. For details on uploading and upgrading, refer to the SIMPL Windows help file or the Crestron Toolbox help file.

SIMPL Windows

If a SIMPL Windows program is provided, it can be uploaded to the control system using SIMPL Windows or Crestron Toolbox.

VT Pro-e

Upload the VT Pro-e® file for the infiNET EX device using VT Pro-e or Crestron Toolbox.

Firmware

Check the Crestron Web site to find the latest firmware. (New users may be required to register to obtain access to certain areas of the site, including the FTP site.)

Upgrade CEN-RFGW-EX firmware via Crestron Toolbox.

1. Establish communication with the CEN-RFGW-EX and display the “System Info” window.
2. Select **Functions | Firmware...** to upgrade the CEN-RFGW-EX firmware.

NOTE: Minimum firmware version is 2.001.0003 or later.


Program Checks

Actions that can be performed on the CEN-RFGW-EX vary depending on whether it is connected via Cresnet or Ethernet.

Cresnet Connections

For Cresnet connections, using Crestron Toolbox, display the network device tree (**Tools | Network Device Tree View**) to show all network devices connected to the control system. Right-click on the CEN-RFGW-EX to display actions that can be performed on the CEN-RFGW-EX.

Ethernet Connections

For Ethernet connections, display the “System Info window (click the  icon) and select the **Functions** menu to display actions that can be performed on the CEN-RFGW-EX.

Be sure to use Crestron Toolbox to create the CEN-RFGW-EX IP table.

1. Select **Functions | IP Table Setup**.
2. Add, modify or delete entries in the IP table. The CEN-RFGW-EX can have only one IP table entry.
3. A defined IP table can be saved to a file or sent to the device.

Edit the control system’s IP table to include an entry for the CEN-RFGW-EX. The entry should list the CEN-RFGW-EX’s IP ID (specified on the CEN-RFGW-EX’s IP table) and the internal gateway IP address 127.0.0.1.

NOTE: Only one IP table entry is allowed. The unit can talk to only one processor over IP.

Operation

Operating Channel

The operating channel of the CEN-RFGW-EX must be set prior to operation using Crestron Toolbox. The CEN-RFGW-EX can operate on one of 16 channels. The CEN-RFGW-EX can operate on a fixed channel that is set by the installer. The default RF channel is 15.

For optimum performance when installing a CEN-RFGW-EX in a Wi-Fi environment, do not set the CEN-RFGW-EX to a channel within a Wi-Fi channel band. Crestron recommends channel 15 or channel 20.

- Gateway channels 11-14 are within Wi-Fi channel 1 band.
- Gateway channel 15 is adjacent to Wi-Fi channels 1 and 6.
- Gateway channels 16-19 are within Wi-Fi channel 6 band.
- Gateway channel 20 is adjacent to Wi-Fi channels 6 and 11.
- Gateway channels 21-24 are within Wi-Fi channel 11 band.
- Gateway channel 25 is adjacent to Wi-Fi channel 11.
- Gateway channel 26 is neither within or adjacent to any Wi-Fi band.

For detailed information on RF channels, refer to “Appendix A: The RF Spectrum” on page 31.

After establishing communication with the CEN-RFGW-EX (refer to “Establishing Communication” which starts on page 20), use Crestron Toolbox to set the operating channel.

RF Channel

Each gateway can communicate with up to 100 infiNET EX devices on the same channel. Each device must have an RF channel assignment that matches the RF channel assignment of the gateway.

There are 16 possible channels ranging from 11 to 26.

Setting RF channel is done from a PC via Crestron Toolbox. To access this in Toolbox, select **Functions | infiNET EX Gateway....** Refer to the Toolbox Help file and search for “infiNET EX Gateway” for more details.

**Acquiring the
infiNET EX
device**

Crestron infiNET EX devices can communicate with a CEN-RFGW-EX only if they have been acquired by that CEN-RFGW-EX. *Acquire* mode can be activated from Crestron Toolbox (recommended) or with the **ACQUIRE** button on the CEN-RFGW-EX.

NOTE: To access this in Toolbox, select **Functions | infiNET EX Gateway...** Refer to the Toolbox Help file and search for “infiNET EX Gateway” for more details.

NOTE: Use Toolbox to set the RF channel before starting the acquire process. The default RF channel is 15. If you change the RF channel on a device, it will need to be acquired again.

NOTE: *Acquire* mode can be activated approximately 15 seconds after applying power to the CEN-RFGW-EX.

NOTE: In an environment with multiple gateways, only one gateway should be in *Acquire* mode at a time.

NOTE: The CEN-RFGW-EX must be placed in *Acquire* mode before an infiNET EX device is placed in *Acquire* mode.

To acquire an infiNET EX device via the **ACQUIRE** button on the CEN-RFGW-EX:

1. Press **ACQUIRE** on the CEN-RFGW-EX to enter *Acquire* mode. The accompanying LED will illuminate, indicating the unit is ready to link to infiNET EX devices.

NOTE: *Acquire* mode will automatically deactivate after one hour. This default timeout period can be changed from Toolbox.

2. Bring the infiNET EX device within range of the gateway and place it in *Acquire* mode as described in its manual. The device will be automatically acquired by the gateway within two minutes after it enters *Acquire* mode.
3. Repeat step 2 for each infiNET EX device to be acquired.
4. Press **ACQUIRE** on the CEN-RFGW-EX to exit *Acquire* mode. The LED will turn off.

Problem Solving

Troubleshooting

The following table provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

CEN-RFGW-EX Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
PWR LED does not illuminate.	CEN-RFGW-EX is not receiving sufficient Cresnet power.	Use the Crestron Power Calculator to help calculate how much power is needed for the system.
	CEN-RFGW-EX is not receiving sufficient Ethernet power.	Verify that appropriate Ethernet power sourcing equipment (PSE) Power over Ethernet indicator is ON.
NET LED does not illuminate.	CEN-RFGW-EX Net ID is not set to match the Net ID of the SIMPL program.	In Crestron Toolbox, check Functions CresnetID to verify Net ID. Verify Net ID in SIMPL Windows program.
NET LED is on but unit does not communicate with infiNET EX device.	CEN-RFGW-EX is not communicating with network.	Check network cabling for solid connections and correct pinouts.
	CEN-RFGW-EX Net ID is not unique; two or more units share the same Net ID.	Verify the Net IDs for all network devices are unique when multiple devices are used.

(Continued on following page)

CEN-RFGW-EX Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
NET LED is on but unit does not communicate with infiNET EX device. (Continued)	infiNET EX device is set to wrong RF channel.	Refer to the “Setup” section of the guide for the device to verify that its RF channel is set to match the CEN-RFGW-EX channel ID.
	infiNET EX device RF ID does not match the RF ID of the SIMPL program.	Use Crestron Toolbox to poll the network. Check the RF ID for the device, then refer to the “Setup” section of the guide for the device to set its RF ID to match the RF ID in the SIMPL program.
	infiNET EX device is not functioning correctly.	Refer to the “Problem Solving” section of the guide for the device.
Intermittent response from CEN-RFGW-EX during communication with device.	CEN-RFGW-EX is in vicinity of metal.	Verify that large amount of metal is not in vicinity of transmission.
	infiNET EX device is not functioning correctly.	Refer to the “Problem Solving” section of the guide for the device.
	infiNET EX device is out of range.	Position the device within operating range or relocate CEN-RFGW-EX. Refer to “Specifications” which starts on page 4 for details.

(Continued on following page)

CEN-RFGW-EX Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
CEN-RFGW-EX is not shown on Network Device Tree when polling through Toolbox. Other devices are reported.	Network wiring is incorrect.	Check network cabling for solid connections and correct pinouts.
	CEN-RFGW-EX is damaged.	Contact a Crestron customer service representative.
Multiple infiNET EX devices only operate one at a time.	Multiple infiNET EX devices are set to the same RF ID.	Use Crestron Toolbox to poll the network. Check the RF ID for the device, then refer to the “Setup” section of the guide for the device to set its RF ID to match the RF ID in the SIMPL program.

Check Network Wiring

Use the Right Wire

In order to ensure optimum performance over the full range of your installation topology, use Crestron Certified Wire only. Failure to do so may incur additional charges if support is required to identify performance deficiencies because of using improper wire.

Calculate Power

CAUTION: Use only Crestron power supplies for Crestron equipment. Failure to do so could cause equipment damage or void the Crestron warranty.

CAUTION: Provide sufficient power to the system. Insufficient power can lead to unpredictable results or damage to the equipment. Please use the Crestron Power Calculator to help calculate how much power is needed for the system (www.crestron.com/calculators).

When calculating the length of wire for a particular Cresnet run, the wire gauge and the Cresnet power usage of each network unit to be

connected must be taken into consideration. Use Crestron Certified Wire only. If Cresnet units are to be daisy chained on the run, the Cresnet power usage of each network unit to be daisy-chained must be added together to determine the Cresnet power usage of the entire chain. If the unit is run from a Crestron system power supply network port, the Cresnet power usage of that unit is the Cresnet power usage of the entire run. The wire gauge and the Cresnet power usage of the run should be used in the following equation to calculate the cable length value on the equation's left side.

Cable Length Equation

$$L < \frac{40,000}{R \times P}$$

Where: L = Length of run (or chain) in feet
 R = 6 Ohms (Crestron Certified Wire: 18 AWG (0.75 mm²))
 or 1.6 Ohms (Cresnet HP: 12 AWG (4 mm²))
 P = Cresnet power usage of entire run (or chain)

Make sure the cable length value is less than the value calculated on the right side of the equation. For example, a Cresnet run using 18 AWG Crestron Certified Wire and drawing 20 watts should not have a length of run more than 333 feet (101 meters). If Cresnet HP is used for the same run, its length could extend to 1250 feet (381 meters).

NOTE: All Crestron certified Cresnet wiring must consist of two twisted pairs. One twisted pair is the +24V conductor and the GND conductor and the other twisted pair is the Y conductor and the Z conductor.

Strip and Tin Wire

When daisy chaining Cresnet units, strip the ends of the wires carefully to avoid nicking the conductors. Twist together the ends of the wires that share a pin on the network connector and tin the twisted connection. Apply solder only to the ends of the twisted wires. Avoid tinning too far up the wires or the end becomes brittle. Insert the tinned connection into the Cresnet connector and tighten the retaining screw. Repeat the procedure for the other three conductors.

Add Hubs

Use of a Cresnet Hub/Repeater (CNXHUB) is advised whenever the number of Cresnet devices on a network exceeds 20 or when the combined total length of Cresnet cable exceeds 3000 feet (914 meters).

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron Web site (www.crestron.com/manuals).

List of Related Reference Documents

DOCUMENT TITLE
2-Series Control Systems Reference Guide
Crestron e-Control Reference Guide

Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by calling Crestron at 1-888-CRESTRON [1-888-273-7876]. For assistance in your region, please refer to the Crestron Web site (www.crestron.com) for a listing of Crestron worldwide offices.

You can also log onto the online help section of the Crestron Web site (www.crestron.com/onlinehelp) to ask questions about Crestron products. First-time users will need to establish a user account to fully benefit from all available features.

Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the CEN-RFGW-EX, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

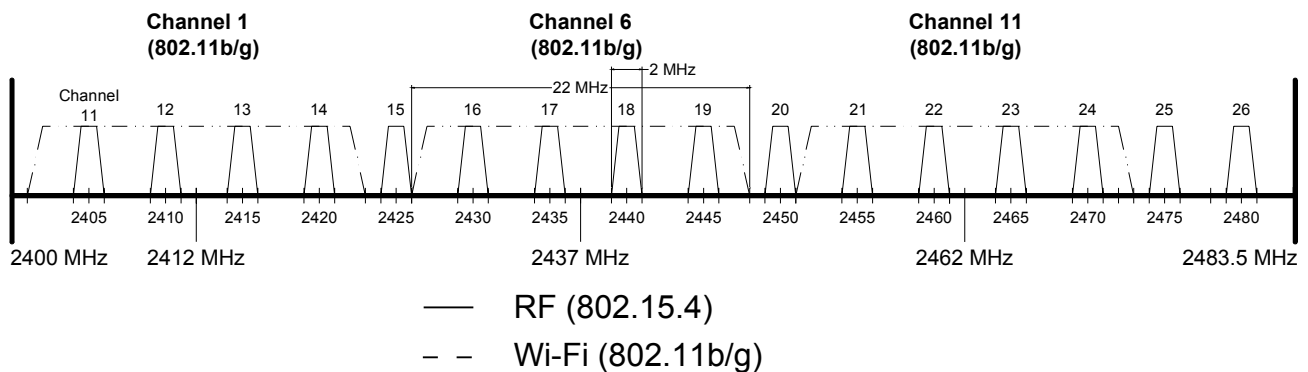
Check the Crestron Web site periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.

Appendix A: The RF Spectrum

Crestron's RF network provides 16 RF channels in the 2.4GHz ISM* band, specifically IEEE 802.15.4 channels 11 through 26. The 16 channels define the frequencies at which the RF device will communicate.

RF devices on different channels will not communicate or interfere with each other. However, since some of the channels are in the 2.4GHz ISM band (as shown in the following diagram), interference can occur with other devices using this band, such as 802.11b/g Wi-Fi devices, Crestron infiNET™ devices or Zigbee devices, although the differing protocols will not allow a link to be established or data to be transferred. Wireless 2.4GHz telephones and microwave ovens may also cause interference with the network.

IEEE 802.15.4 channel selection (2400 MHz PHY)



* Industrial, Scientific and Medical; refers to frequency range used for unlicensed communication applications, such as Wi-Fi.

Appendix B: Optimum RF Reception Guidelines

Many factors can affect the reliability of RF communication between an RF gateway and an RF device. While an effort has been made to determine operating specifications, some specifications are not constant. RF Communication can be limited by several factors including but not limited to EMI (electromagnetic interference), intervening objects, antenna orientation and receiver placement. To obtain maximum reliability and performance, some basic rules for installing RF transceivers are listed below.

Minimize Interference

RF reception range can be hindered by spurious EMI noise that may interfere with or mask the desired frequency, thereby reducing useable range. EMI is generated by any electrical device at various RF noise levels depending on the device. Sources of EMI include computers, video equipment, digital processors, lighting dimmers, lighting ballasts, motors or any large AC source. Every effort should be made to separate any RF transceiver from these sources of RF noise including Audio Visual equipment in racks. If a gateway must be installed in an equipment rack, make sure you have ample separation between the equipment and the gateway.

Gateway Placement

Optimum reception for any RF transceiver is obtained by installing the gateway transceiver in an open area or shelf with a clear line of sight (no obstructions between gateway and receiver). Crestron recommends that the gateway is at least five to six feet high for best results. Avoid placing transceivers or transmitters at a low height or on the ground. Placing RF equipment near metal objects, walls, corners or metal enclosures will compromise RF propagation and reception. Try to avoid installing gateways in equipment racks, service rooms, electrical closets or in rooms other than that which the touch screen is located.

Antenna Orientation

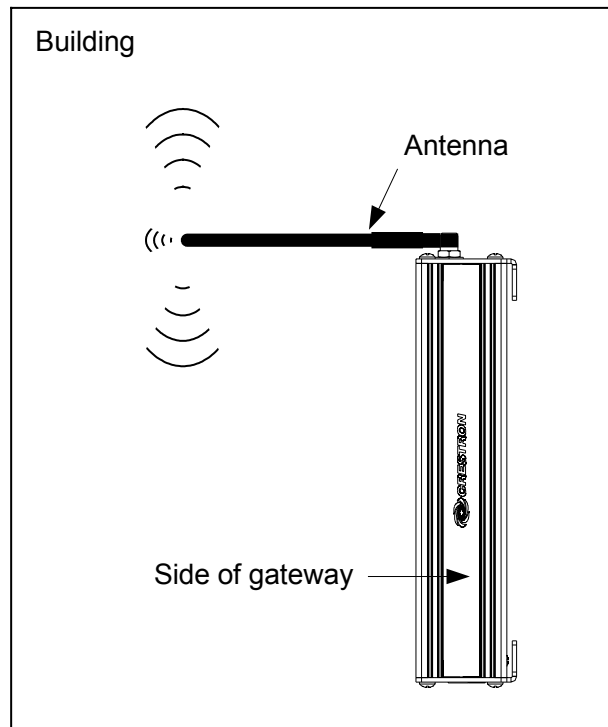
The antenna orientation on Crestron gateways has considerable effect on range and reliability. The best orientation is unique to each installation. There are three possible antenna orientations:

- Point the antenna horizontally (parallel to the ground)
- Point the antenna vertically.
- Point the antenna at a right angle to the gateway.

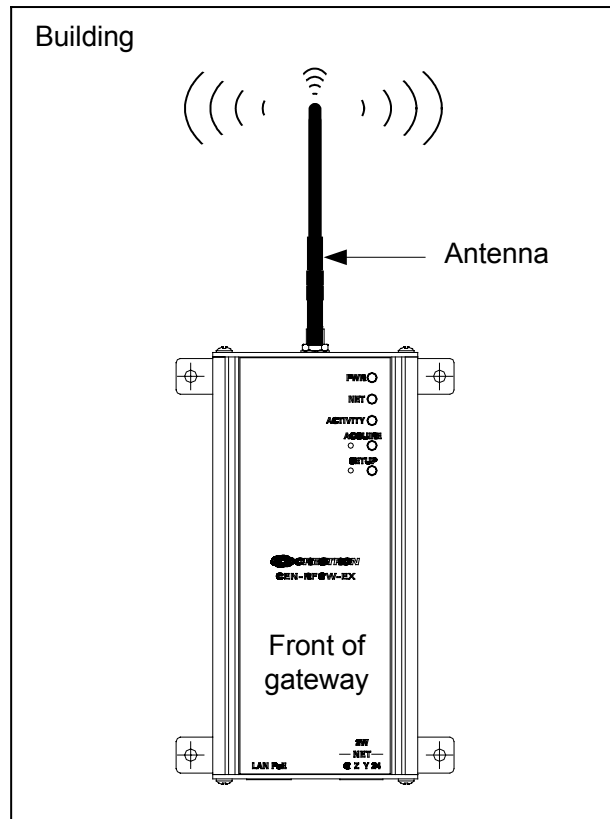
Never point the antenna downward as this will decrease range and reliability. Refer to illustration below and those on the following page for examples of the different antenna orientations.

NOTE: RF propagation is best from the sides of the antenna.

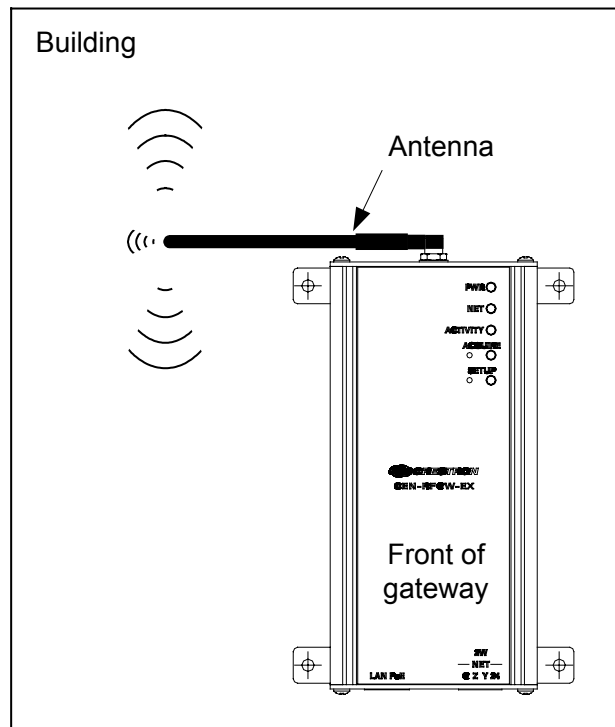
Horizontal Orientation



Vertical Orientation



Right Angle Orientation



Return and Warranty Policies

Merchandise Returns / Repair Service

1. No merchandise may be returned for credit, exchange or service without prior authorization from CRESTRON. To obtain warranty service for CRESTRON products, contact an authorized CRESTRON dealer. Only authorized CRESTRON dealers may contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number and return address.
2. Products may be returned for credit, exchange or service with a CRESTRON Return Merchandise Authorization (RMA) number. Authorized returns must be shipped freight prepaid to CRESTRON, 6 Volvo Drive, Rockleigh, N.J. or its authorized subsidiaries, with RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. CRESTRON reserves the right in its sole and absolute discretion to charge a 15% restocking fee plus shipping costs on any products returned with an RMA.
3. Return freight charges following repair of items under warranty shall be paid by CRESTRON, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.

CRESTRON Limited Warranty

CRESTRON ELECTRONICS, Inc. warrants its products to be free from manufacturing defects in materials and workmanship under normal use for a period of three (3) years from the date of purchase from CRESTRON, with the following exceptions: disk drives and any other moving or rotating mechanical parts, pan/tilt heads and power supplies are covered for a period of one (1) year; touch screen display and overlay components are covered for 90 days; batteries and incandescent lamps are not covered.

This warranty extends to products purchased directly from CRESTRON or an authorized CRESTRON dealer. Purchasers should inquire of the dealer regarding the nature and extent of the dealer's warranty, if any.

CRESTRON shall not be liable to honor the terms of this warranty if the product has been used in any application other than that for which it was intended or if it has been subjected to misuse, accidental damage, modification or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced or removed.

This warranty shall be the sole and exclusive remedy to the original purchaser. In no event shall CRESTRON be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. CRESTRON is not liable for any claim made by a third party or made by the purchaser for a third party.

CRESTRON shall, at its option, repair or replace any product found defective, without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty.

Except as expressly set forth in this warranty, CRESTRON makes no other warranties, expressed or implied, nor authorizes any other party to offer any warranty, including any implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supersedes all previous warranties.



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