USER MANUAL

Wireless Module System

Installation and Operation User Manual

COPELAND

Copeland
1065 Big Shanty Road NW, Suite 100
Kennesaw, GA 30144 USA
770-425-2724 • 1-800-829-2724
www.copeland.com
Email: ColdChain.TechnicalServices@copeland.com

1 INTRODUCTION 1

1.1. Wireless Gateway Specifications 3
1.2. Wireless Module Specifications 4
1.2.1. Wireless Module Functionality 5
1.3. Ordering Information 6
1.4. Radio Signal Basics 6
1.4.1. Signal Ranges In Buildings 6
1.4.2. Mounting Locations 7

2 INSTALLATION 10

2.1. Installation Steps 10
2.2. Installation Tips 10
2.3. Range Planning 10
2.3.1. Mounting Location Tips 11
2.4. Install Gateway Power and Network Cable 11
2.4.1. Installing Gateway Power 11
2.4.2. Installing Network Cable 11

3 SET UP AND COMMISSIONING 13

3.1. Set Up and Commissioning the Gateway 13
3.2. Gateway Settings 15
3.3. Set Up and Commissioning Modules in E2 15
3.4. RF Module Status on E2 19
3.4.1. Checking Signal Reception 20
3.4.2. Hours on Battery 21
3.4.2.1. Telegram Reception Rate 21
3.4.2.2. SSI Signal Strength 21

4 E2 WIRELESS ADVANCED SETTINGS 22

4.1. Gateway Advanced Settings 22
4.1.1. Updating Gateway Configuration 22
4.1.2. Updating Gateway Firmware 23
4.2. Module Advanced Settings 24
4.2.1. Replacing a Module 24
4.2.2. Updating a Module Configuration 24

APPENDIX A - TROUBLESHOOTING 25

Installation 25
Alarm 29
Communication 31

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1 Introduction

Wireless Module System allows for quickly and easily monitoring a variety of refrigeration and HVAC applications by connecting temperature probes, product simulators, humidity probes, or switches to the Wireless Sensor Module that transmits these signals to the Wireless Gateway. The Gateway translates the signal into usable information to send to the building controller, E2 (version 4.08 or higher) or Site Supervisor, where the data can be logged into reports or used by algorithms to make control decisions. Refer to the Wireless Sensor System and E2 Quick Start Guides (*P/Ns 026-4247 and 026-4255*) to get set up with fast, reliable wireless connectivity.

The Wireless Gateway can receive signals from up to 99 Modules. The Wireless Module is flexible and configurable with up to three (3) analog or digital inputs that can be used for a variety of applications in refrigeration and HVAC, eliminating installation materials and costly labor-intensive wiring.

Figure 1-1 - System Layout

Using patented energy-harvesting technology, Wireless Module can generate a signal of substantial range from a small amount of energy. The range is strong and reliable enough to reach 100 feet indoors and can be extended through repeaters to meet greater distances. The Module has a battery backup in case there is low or no light for extended periods of time and an optional 5V power supply is available for no light applications.

Features:

- Wireless Gateway can receive signals from up to 99 Wireless Modules.
- Solar power charges the Wireless Module super capacitor for 5hrs @ 200 lux for continuous operations with battery backup.
- Optional 5V power supply available for Module in low or no light situations.
- Wireless Module has up to three (3) analog or digital configurable inputs.
- Broadcast rate: 30 secs to 15 min, configurable with a default of 2 min.
- 100-ft range, extendable with the use of Repeaters.
- Strong 902MHz signal able to pass through most objects with proper layout.
- Simple installation with Learn and Test button.
- Range analysis and diagnostics integrated into the E2 and Site Supervisor.

Benefits:

- Wireless Modules eliminate expensive network and power wiring, lowering installation costs by reducing labor and materials.
  - Up to 15% cost savings in new construction.
  - Up to 70% cost savings in retrofits.
- No batteries or battery maintenance necessary saves time, money and the environment by eliminating the need to monitor, stock, replace and dispose of batteries across an enterprise.
- Wide range of applications in refrigeration and HVAC.
  - Temperature, humidity, product simulators, switches.
  - Mobile cases, single cases, case lineups, walk-ins.
- Compatible with all Copeland E2 and Site Supervisor products for remote alarming and reporting.

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1.1 Wireless Gateway Specifications

Figure 1-2 - Wireless Gateway P/N 814-3550

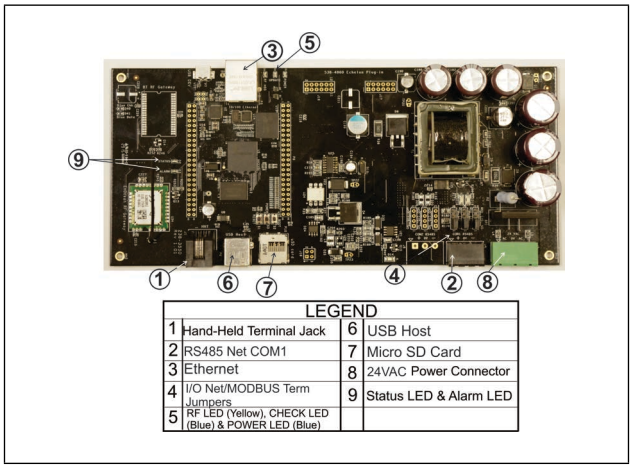

Figure 1-3 - Wireless Gateway Board

Table 1-1 - Wireless Gateway Specifications

Wireless Gateway Specs	
Power	24VAC, 10VA
Communications	RS485
LED Indicators	Status (Green) Alarm (Red) RF Msg (Yellow) Check (Blue)
Temperature Range	32°F to 122°F 0°C to 50°C
Humidity	5 - 95% non-condensing
External Host	USB, Micro SD card
Housing	Plastic, White
Wireless Frequency	902MHz (North America)
Certification	FCC/FCC EMI, UL/UL-C
Dimensions	10 x" 10" x 2.125"

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LEDs

- Green “Status” LED: Blinks ON/OFF if running normally.
- Red “Alarm” LED: ON when there is an alarm/failure condition.
- Yellow “RF Msg” LED: Blinks every time an RF message is received and/or sent.
- Blue “Check” LED: Blinks once every 0.5 secs when system is being checked for proper operation.

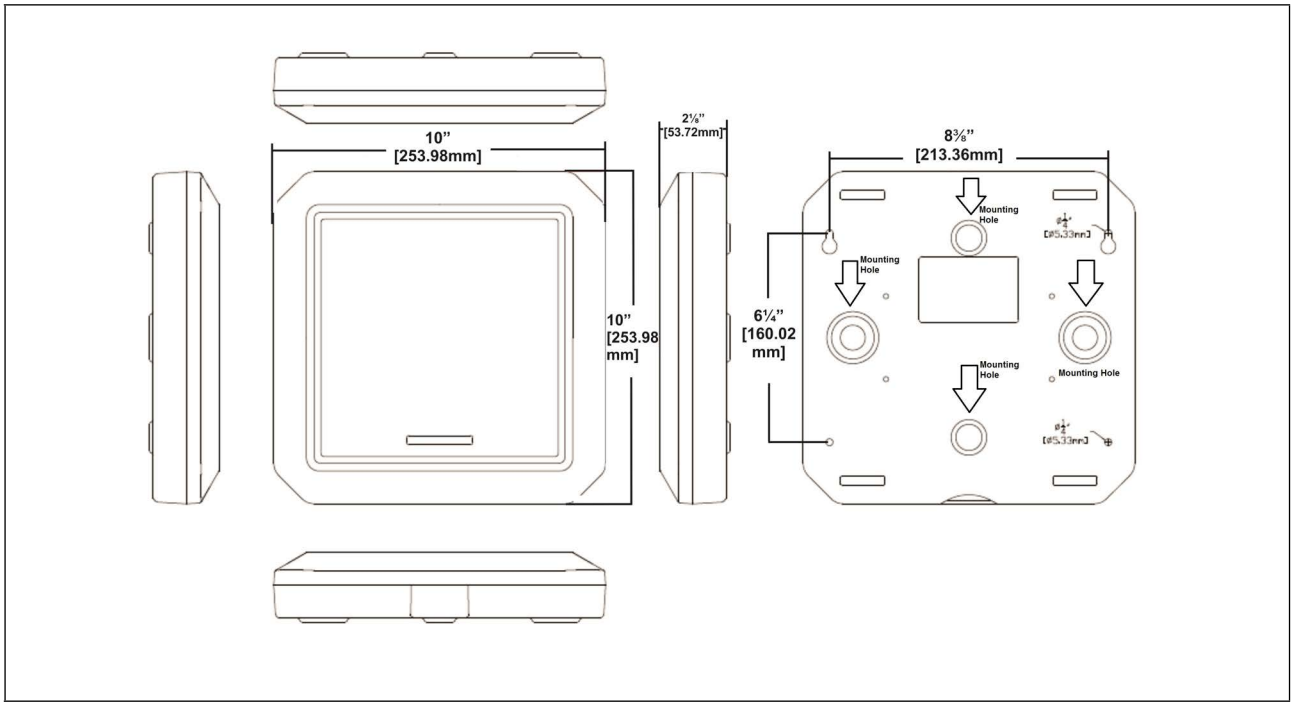

Figure 1-4 - Wireless Module Dimensions

1.2 Wireless Module Specifications

Figure 1-5 - Wireless Module P/N 814-36xx

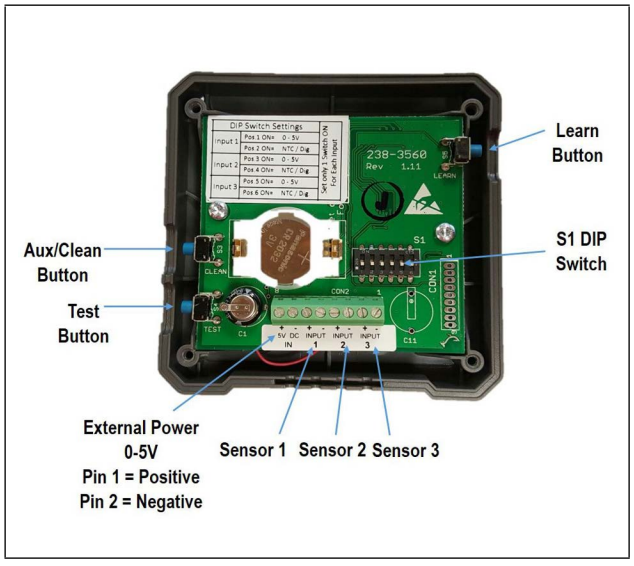

Figure 1-6 - Wireless Module Inside Enclosure

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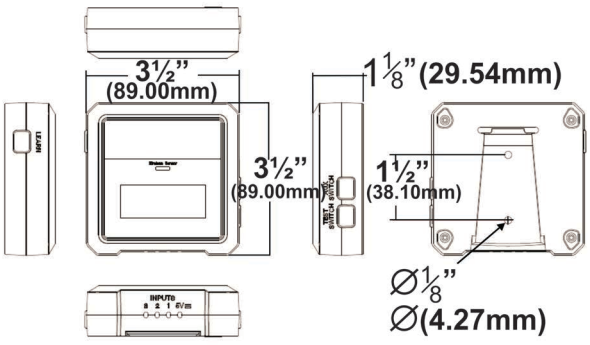
Table 1-2 - Wireless Module Specifications

Wireless Module Technical Specs	
Power	Solar with Battery Backup
Battery Backup	CR-2032
Wireless Module Inputs	Up to 3 analog or digital
# of Modules per Gateway	Up to 99 Modules
Operating Temperature Range	-13°F to 140°F (-25°C to 60°C)
Humidity	0 - 93% non-condensing
Max Module Cable Length	Up to 20 Feet
Temperature Transmit Interval	10 - 900 seconds
LED Status Indicators	Tri-colored LED
Wireless Frequency	902MHz (North America)
Certification	FCC/FCC EMI, UL/UL-C, NSF Module Support
Dimensions	3.5" x 3.5" x 1.25"

Figure 1-7 - Wireless Module Dimensions



1.2.1 Wireless Module Functionality

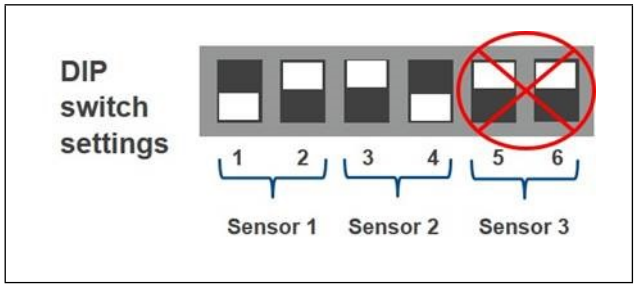


Figure 1-8 - Wireless Module DIP Switches

814-3600 User selectable model:

- Set only one switch ON for each sensor pair.
- Each pair can be set separately.

Learn Button

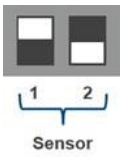
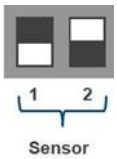
	***0-5V Input:*** • Humidity Sensor or Analog 0-5V Input • Pin 1 ON • Pin 2 OFF
	NTC/Dig Input: • Temp or Digital Sensor Input • Pin 1 OFF • Pin 2 ON

Table 1-3 - DIP Switch Settings

The Learn button is used to initiate the commissioning process of the Module. See *Section 3.3 Set Up and Commissioning Modules in E2*.

- The blue LED will blink once when learning/ commissioning has started.
- The blue LED will blink twice when commissioning is successful (occurs in one (1) second).

Test Button

The Test button is used to transmit data telegrams instantly and also provide a normal update of battery voltage status.

- The green LED will blink twice if the battery voltage is greater than or equal to 2.8V(good battery).
- The green LED will blink once if the battery voltage is greater than or 2.6V and less than 2.8V(marginal battery).
- The green LED will not blink if the battery voltage is less than 2.6V(replace battery).

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Clean/Aux Button

The Clean button enables/disables Clean Mode to temporarily stop transmission of sensor input readings.

- Press the Clean/Aux button for at least four (4) seconds and the red LED will blink once when Clean Mode is enabled.
- E2 will show AuxSwitch ON in the RF Module Summary screen.
- Once Cleaning Mode is activated, the button must be open for at least three (3) seconds before trying to terminate Clean Mode.
- Termination is holding the Clean/Aux button for at least four (4) seconds. The red LED will blink twice when disabling Clean Mode.

NOTE: There is no automatic timeout of Clean Mode. While Clean Mode is active, the red LED will blink once every four (4) seconds.

1.3 Ordering Information

Table 1-4 - Ordering Information

Part Number	Wireless Description
814-3550	Wireless Gateway/Repeater 902MHz
814-3560	Wireless Repeater 902MHz, 24VAC
814-3570	Wireless Repeater 902MHz, 120VAC
814-3600	Wireless Module 902MHz with User-Selected Inputs; Clean Mode
814-3623	Wireless Module 902MHz, 3 Digital Inputs; Clean Mode with Molex conn.
814-3633	Wireless Module 902MHz, 3 Humidity Inputs; Clean Mode with Molex conn.
814-3653	Wireless Module 902MHz, 3 Temperature Inputs; Clean Mode with Molex conn.
813-3550	Wireless Gateway/Repeater 868MHz
813-3560	Wireless Repeater 868MHz, 24VAC
813-3600	Wireless Module 868MHz with User Selected Inputs; Clean Mode
813-3653	Wireless Module 868MHz, 3 Temp; Clean Mode with Molex Connector
501-1121	Temp Sensor, General Purpose
508-9101	Temp Sensor, Product Simulator
201-1160	Temp Sensor, NSF

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1.4 Radio Signal Basics

- Wireless radio signals are electromagnetic waves.
- Signal becomes weaker the farther it travels.
- A wireless transmitter (Module) will send a signal to a receiver (Gateway).
- The Gateway translates the signal into usable information over MODBUS to the building controller (E2 or Site Supervisor) where algorithms will make discussions based on the information received.

1.4.1 Signal Ranges In Buildings

- Placement of a Module within a room is critical.
- Factors that determine the coverage:
  - Distance between receiver and transmitters.
  - Materials blocking the path of the signal.
  - Shape of the room.

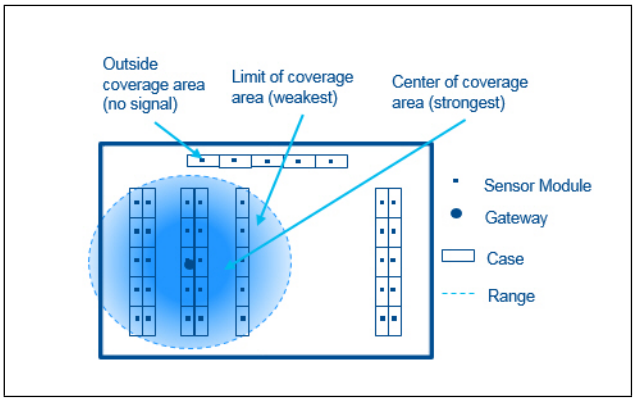

Figure 1-9 - Wireless Gateway Coverage Area

- Overlapping coverage area is preferred for robust reliability.

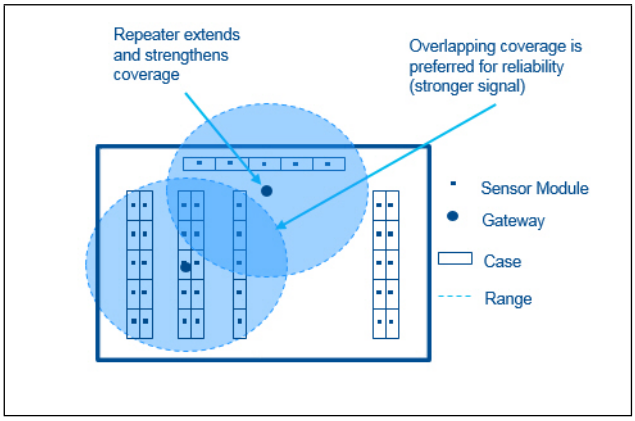

Figure 1-10 - Overlapping Coverage Area

1.4.2 Mounting Locations

- Radio transmission shapes are ellipsoid.
- Even if within range, communication may be poor due to incorrect placement.
- Narrow rooms and low ceilings can affect range.

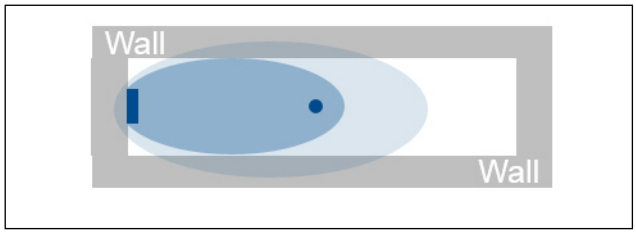

Figure 1-11 - Radio Transmission Shapes

- Avoid Paths along the same wall.
- Reflections will produce interference and reduce range.

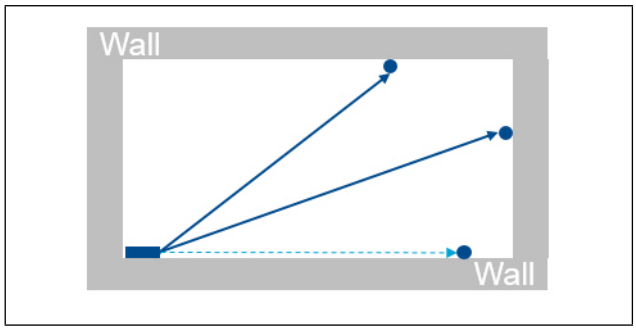

Figure 1-12 - Signal Interface

- Device should be placed away from wall corners.

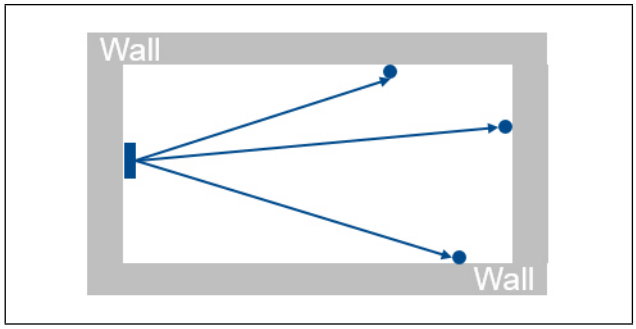

Figure 1-13 - Central Module Placement

- Signals are decreased by specific materials, people or objects in the path.

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- Signals can penetrate walls but they are reduced more than if there was a direct line-of-sight.

Table 1-5 - Signal Reduction by Material

Material	Reduction
Wood, Plaster, Uncoated Glass	0 - 10%
Brick, Pressboard, Mounted on metal surface	5 - 35%
Steel-reinforced concrete	10 - 90%

- Wall penetration is affected by angle of path.

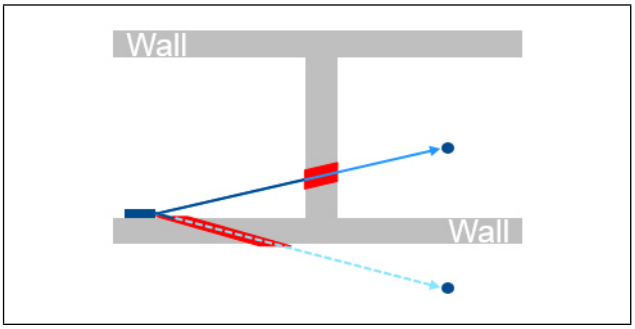

Figure 1-14 - Angle of Path

- Signal should be transmitted as directly as possible through the wall and may require the use of a repeater.

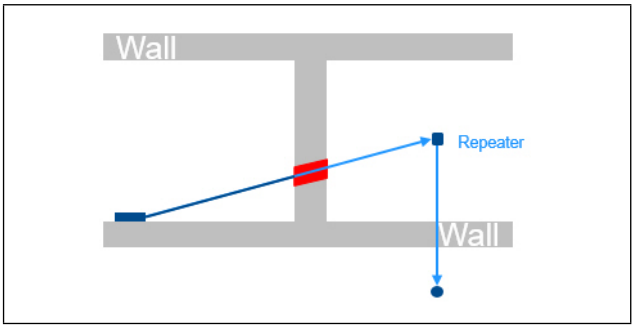

Figure 1-15 - Direct Transmission Through a Wall

- Avoid dense metal obstacles, such as fire-safety walls, stair cases, elevators shafts.

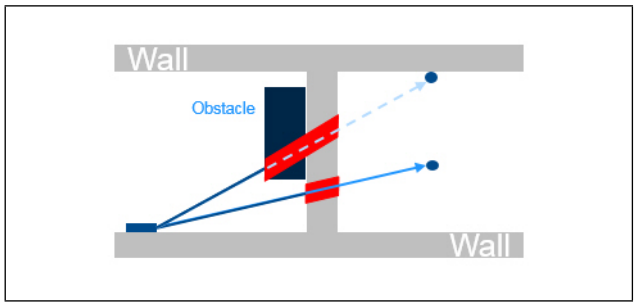

Figure 1-16 - Avoid Obstacles

- Avoid unfavorable obstacles by repositioning or using a repeater.

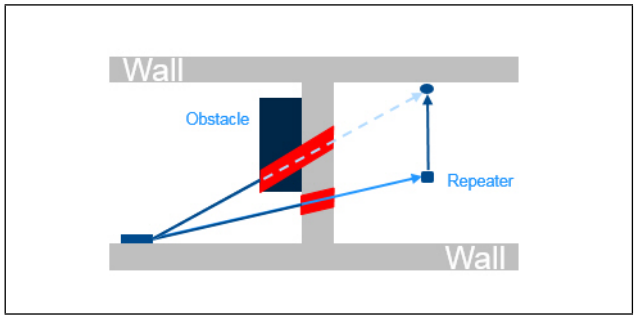

Figure 1-17 - Avoid Obstacles Using a Repeater

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2 Installation

2.1 Installation Steps

1. Range planning.
2. Install gateway power and network cable.
3. Set up and commission Gateway in E2.
4. Set up and commission Modules in E2.
5. Adding the Gateway to E2.
6. Check signal reception.

2.2 Installation Tips

- Signal Range: 100-ft. radius.
- 99 Wireless Modules per Gateway.
- Recommended less than 200 Modules per 100-ft radius.
- There can be multiple Gateways used in a site with multiple E2s.
- Gateways can be configured as a repeater/gateway in larger coverage areas.
- Low cost Repeaters are available for applications not requiring additional gateways as shown in ordering information (**Table 1-4**).

2.3 Range Planning

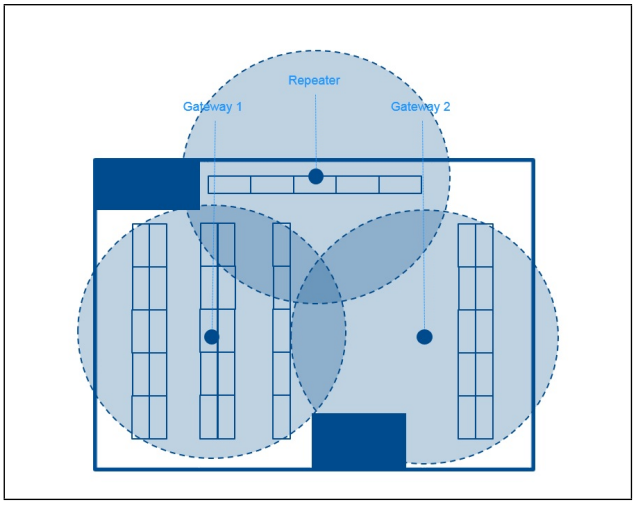

Figure 2-1 - Range Planning

1. **Conduct a site survey to help determine the best location for access points and sensors. You will need the following:**

- Floor plan.
- Drawing compass.
- Architect's scale, tape measure, or laser-distance measuring device.

2. **Identify and mark areas that may block the radio signal:**

- Fire safety walls.
- Staircases, elevators, and storage rooms.

3. **Using the compass, circle the points for the Gateway that offers the best coverage:**

- Position Gateways so that there is a clear path to potential Module locations.
- Plan in reserve range to avoid worst case conditions.
- Use repeaters as necessary to have redundant coverage.

2.3.1 Mounting Location Tips

- Try to achieve a clear line-of-sight and avoid metal obstructions.
- Mount all Wireless Modules and Gateways as far away as possible from interference-producing devices such as motors, ballasts, transformers, and other electrical devices (20 inches minimum).
- Plan coverage to keep the distance between Modules and Gateways as short as possible to achieve sufficient reserve in coverage.
- Mount Wireless Modules and Gateway as high as possible.
- For maximum performance, mount the Gateway on the ceiling, parallel to the floor, in a location central to the Modules.
- For maximum performance, position the Module with the logo pointing towards the Gateway.
- If possible, commission the Module from its mounting location to verify optimal positioning.
- Check signal strength on the E2 prior to mounting the Modules permanently.
- Mount the Module in a location where 200 lux of light is visible to the solar cell for five (5) or more hours per day.

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2.4 Install Gateway Power and Network Cable

2.4.1 Installing Gateway Power

The Wireless Gateway requires 24VAC power from a Class 2 Transformer.

Table 2-1 - Gateway Input Voltage and Power Specifications

Input Voltage	24VAC, Class 2, 50/60Hz
Power	15VA

Because the Gateway is usually mounted away from the transformer, 18 AWG wire should be used. The AC voltage at the Gateway needs to be at least 19 Volts.

2.4.2 Installing Network Cable

Each E2 that will receive a value from an Wireless Module must have an Wireless Gateway installed on its RS485 Network. For E2 controllers, the Wireless Gateway will be installed on a RS485 network running MODBUS.

Using shielded three-conductor cable (Belden #8641 or equivalent), connect the RS485 I/O Network wire to the three-terminal connector on the Wireless Gateway as shown in **Figure 2-2**.

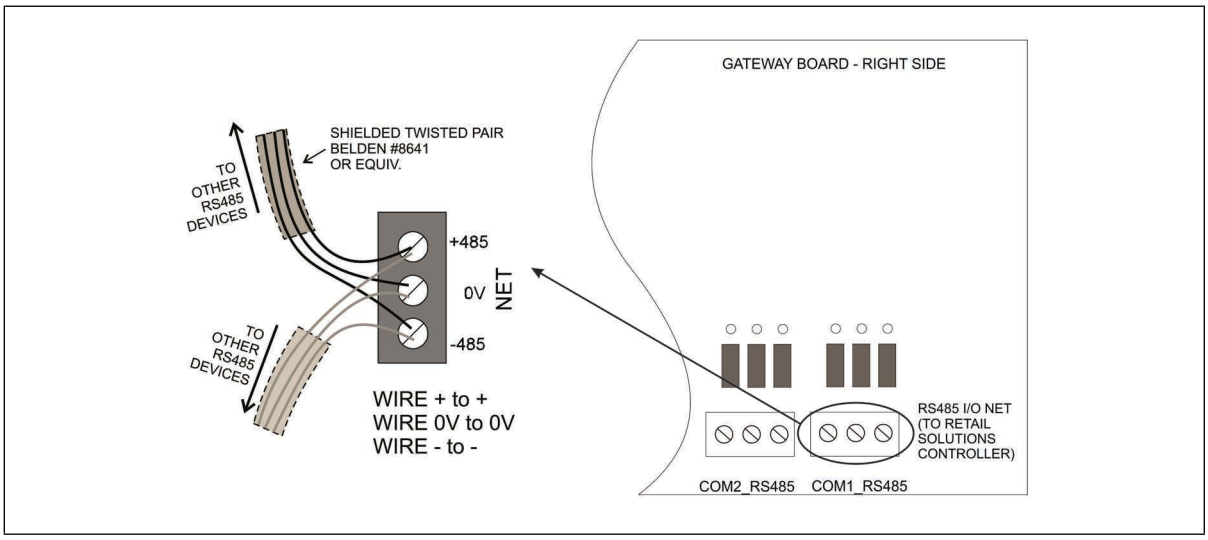

Figure 2-2 - Connecting the Gateway to the RS485 Network

Termination should only be done at the two end points of the network. Set termination as appropriate:

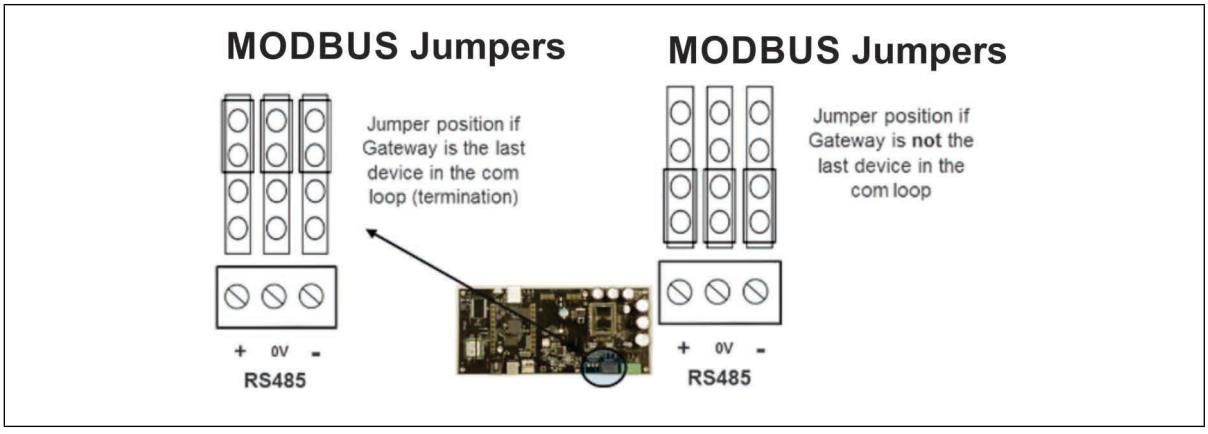

Figure 2-3 - Wireless Gateway Network Wiring

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3 Set Up and Commissioning

3.1 Set Up and Commissioning the Gateway

Set up COM Port and Address in E2

Note that E2 firmware versions 3.08/4.08 are required.

1. Connect the Gateway to the desired COM port on the E2.
2. Set the desired COM port for MODBUS (Menu, 7, 4, 1, **C3: Serial** tab).
   - **Baud:** 19.2Kbaud
   - **Data Size:** 8
   - **Parity:** Even
   - **Stop Bits:** 1

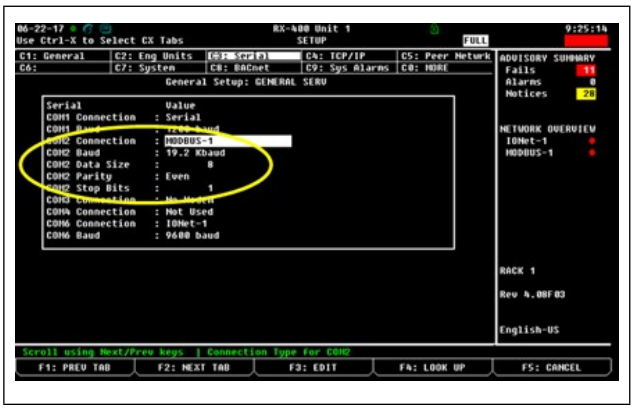

Figure 3-1 - Gateway General Setup

Commissioning the Gateway

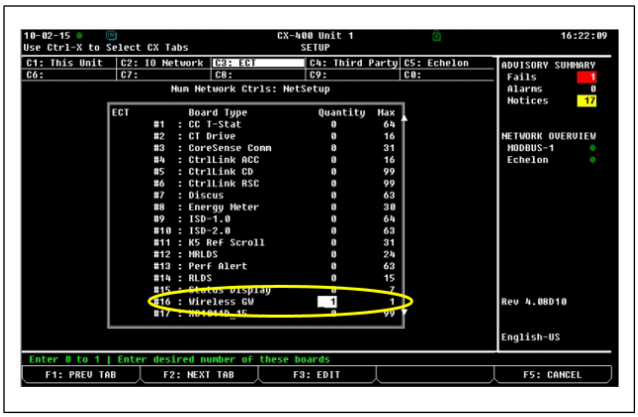

Figure 3-2 - Network Setup Screen

1. Add a Wireless Gateway board (Menu, 7, 7, 2, **C3: ECT** tab) by changing the quantity of the **Wireless GW** to **1**.

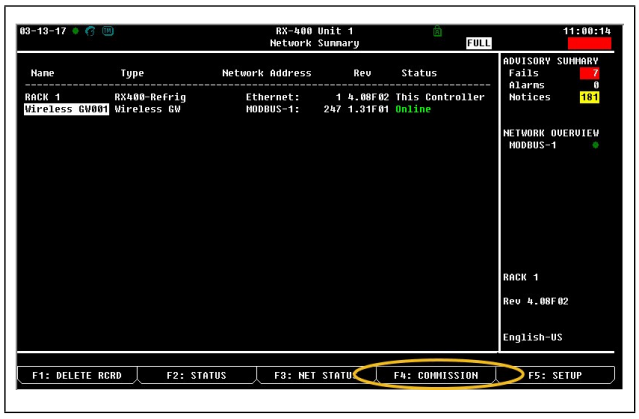

Figure 3-3 - Network Summary Screen

2. After adding the Gateway, go to the Network Summary screen and select the Wireless GW, and then commission (Menu, 7, 7, 1, **F4: Commission**).

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3. Set the MODBUS address to 247 to match the default address in the Gateway (this address is fixed in the Gateway). Scroll down to **247**, then press Enter or key in **247**. Key in 247 or scroll down to **247** and press Enter

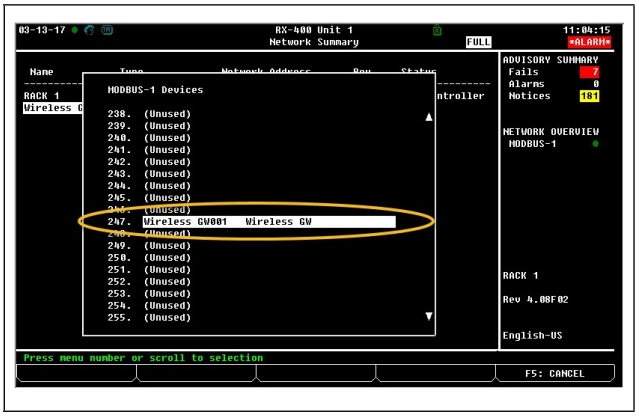

Figure 3-4 - MODBUS Address Selection

4. Press Enter to complete Commissioning when the screen looks like **Figure 3-5**.

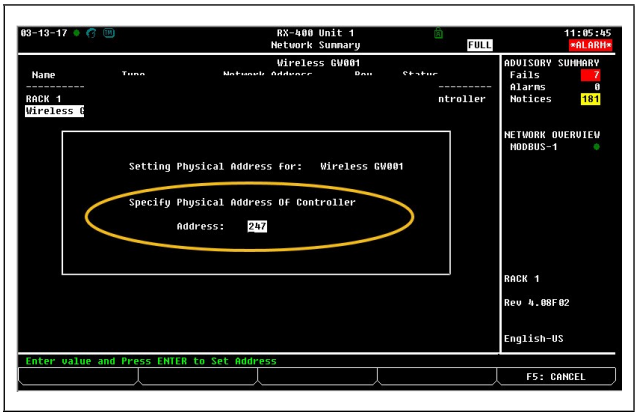

Figure 3-5 - MODBUS Address Configuration

3.2 Gateway Settings

Press Menu, % 5, 229.Wireless Gateway and then go to the setup screen (F5, or press Enter % 5, C2: Setup) to set the following:

- **SensUpdate: Sensor update rate.**
  - Range 0:00:30 – 0:15:00 *(30 sec - 15 min)*
  - Default is 0:02:00 *(2 min.)*

  Note: Only enter numbers that are divisible by 30.
- **Change Delta:**
  - Range 0 - 250 *(0 - 0.250mV)*
  - Default 0 *(0mV)*

  Note: E2 does NOT currently validate this range.
- **Change Rate: Rate at which it checks for the Change Delta.**
  - Range 0:00:30 – 0:02:00 *(30 sec - 2 mins)*
  - Default 0:00:30 *(30 sec)*

  Note: Only enter numbers that are divisible by 30.
- **Fail Delay: Time with no updates before a sensor is marked as failed.**
  - Range 0:10:00 – 2:00:00 *(10 min - 2 hrs)*
- **Default 60 (60 min)**

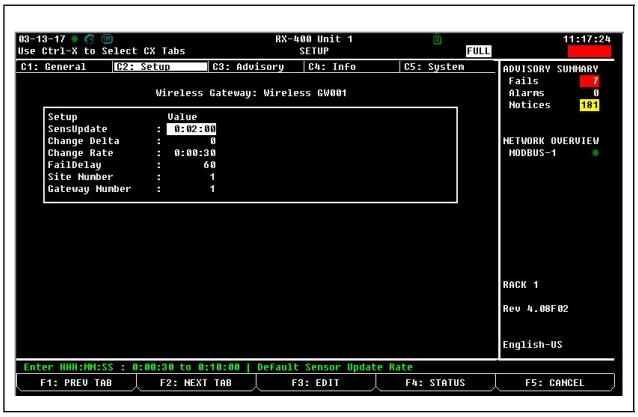

Figure 3-6 - Wireless Gateway Setup

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3.3 Set Up and Commissioning Modules in E2

Note: The maximum number of devices per Gateway is 99.

RF Module Setup in E2

1. Go the Add Application screen to add the required number of RF Modules (, 6, 1, **F4: Lookup, 23. RF Module**) then press

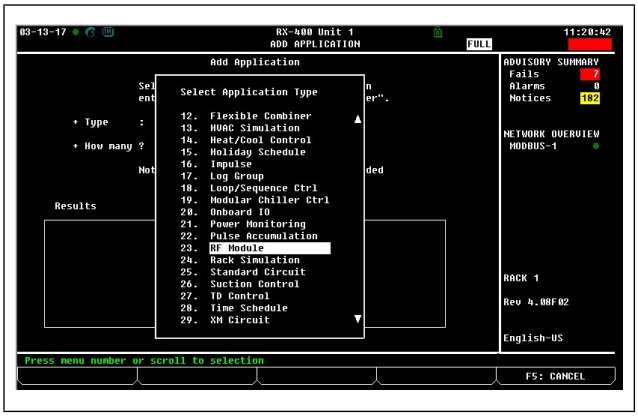

Figure 3-7 - Add RF Module

1. Enter how many (99 max) and press Enter
   In this example, two RF Modules were added.

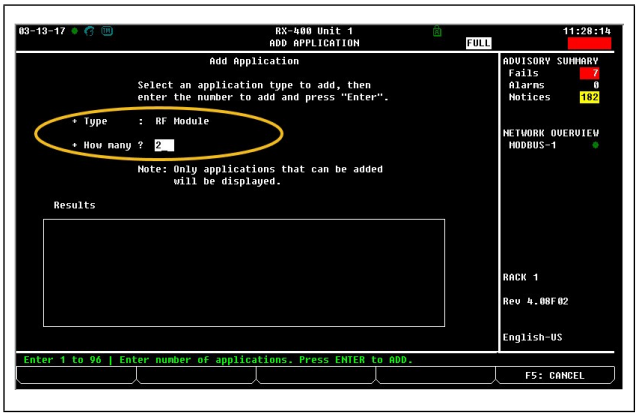

Figure 3-8 - Add Number of RF Module

Broadcast Rate

NOTE: This must be done before going through the commissioning process - this value is ONLY sent during the commissioning sequence.

If the Wireless Module is powered with an external 5V power supply, the user may want to have this Module update at 30-second increments instead of the standard update rate of two (2) minutes.

1. Press , 5, 230. RF Module) and arrow down to select **RF Module**, then press F5 **Setup**.

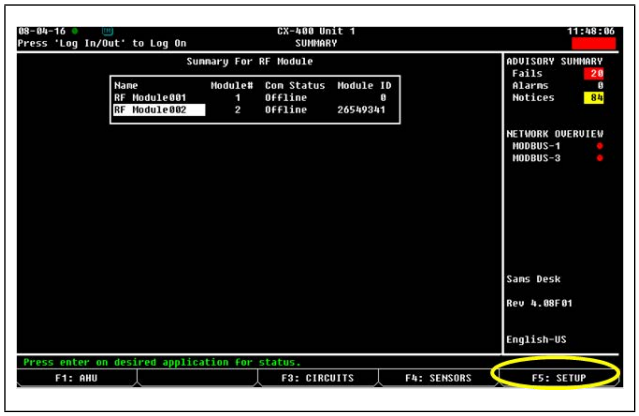

Figure 3-9 - RF Module Selection

2.Arrow down to 30 Sec Update as shown in **Figure 3-10** and enter **Y** for **Yes**.

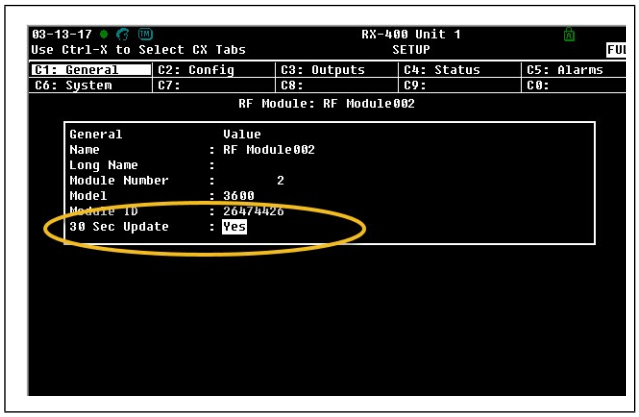

Figure 3-10 - Change RF Module 30 Sec Update

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RF Module Commissioning in E2

1. Once the RF Module application has been added, go to configured applications to commission the device (, 5, **230. RF Module**).

   2.Select an **RF Module** from the list and press

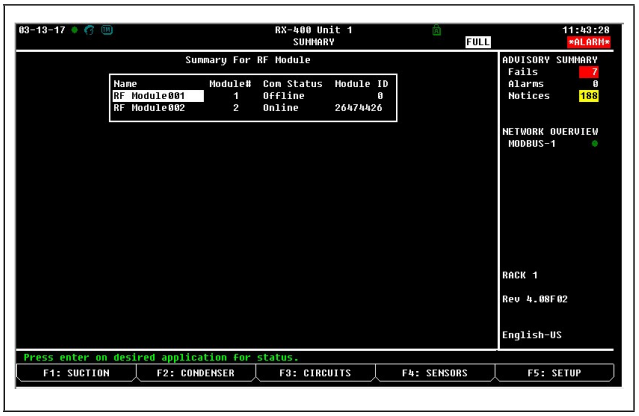

Figure 3-11 - RF Module Summary Screen

3. Open the **Actions Menu** and initiate commissioning (, 9, **1. Commission Device**).

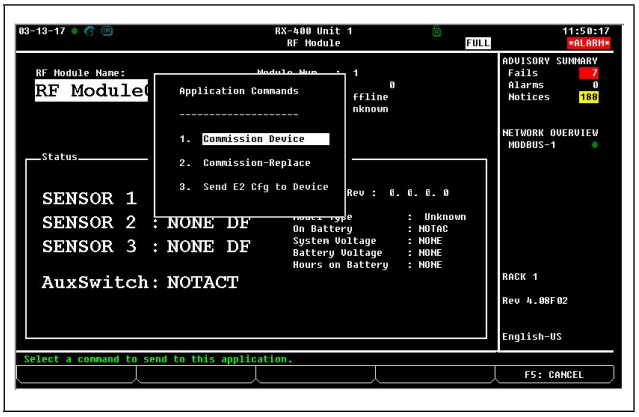

Figure 3-12 - Commission Device

4. The application will enter Learning mode.

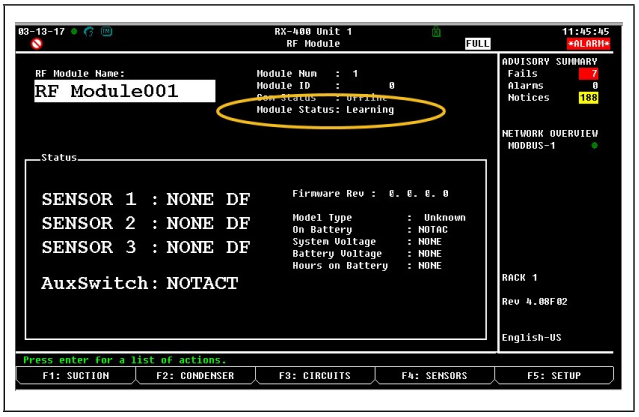

Figure 3-13 - RF Module Learning Mode

5. Within one (1) minute, press the **Learn** button on the Module. The Module's blue LED will blink once when commissioning has started. The blue LED will blink twice to indicate it has been successfully commissioned.

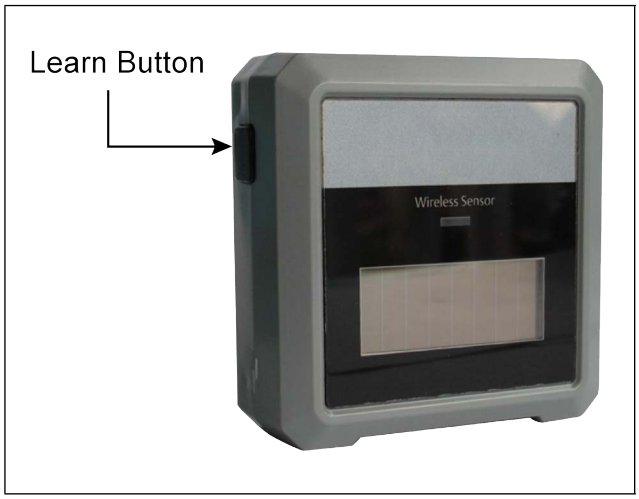

Figure 3-14 - Wireless Module Learn Button

6. When successfully commissioned, the Module Status will display **Commissioned** and then **Good**.

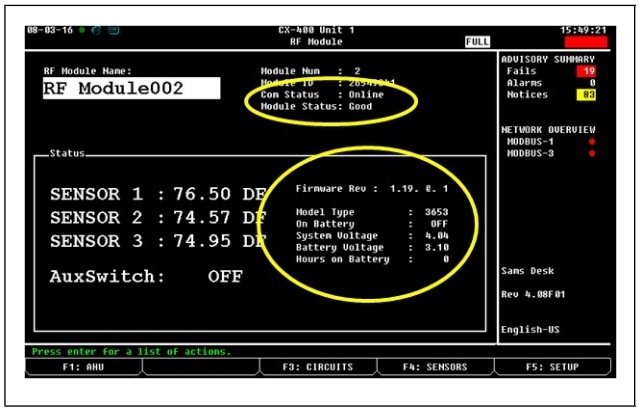

Figure 3-15 - Commissioned Wireless Module

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3.4 RF Module Status on E2

Status Screen Information

- **Com Status:** Online / Offline
- **Module Status:** Offline / Learning / Commissioned / Good / Failed
- **Firmware Rev:** Current version of firmware
- **Model Type**
- **On Battery:** ON/OFF
- **System Voltage:** 0 - 5V
- **Battery Voltage:** 0 - 5V
- **Hours on Battery:** 0 - 17100

Commission Error Codes

- **Already in Use** - This Module has already been commissioned for another Module number.
- **Use the Learn** - Replace application command to replace Module if this is the desired action.
- **Wrong Module** - The Module's learn button was pressed is the wrong model type (this is reserved for future releases).

Module Commissioning Tips

- The default update rate of two (2) minutes optimizes power consumption.
- Faster update rates may require an external 5V power supply (available as an option).
- Update rates must be done before going through the commissioning process.
- With proper range planning, all Modules can be commissioned to the Gateway with the Learn button prior to mounting.
- Use the Test button to get instant transmission if you don't want to wait for the regular update rate.
- Check signal strength on the E2 prior to permanently mounting the Modules.
- Placement of the Modules should be positioned so that SSI reception levels are 3 or 4 Bars. Reposition or use repeaters as necessary.
- Place Modules so that the solar cell can power the Module and battery usage indicator remains off.
- It takes 200 lux for five (5) hours per day to run the Wireless Module on the solar cell continuously.
- Hours on battery is shown in the Module Summary screen. The battery will last for 17,100 hours of use. The battery is still within acceptable range if the voltage is 2.90 or higher.

3.4.1 Checking Signal Reception

1. Go to the RF Module main screen (, 5, **230. RF Module**), select the module then press .
2. From the Actions menu, select **Application Logs/ Graphs** (, **8. Application Logs/Graphs**).

Figure 3-16 - Actions Menu

3. Select **1. Module Stats** and press Enter.

Figure 3-17 - Module Stats

4. The Application Log screen is displayed.

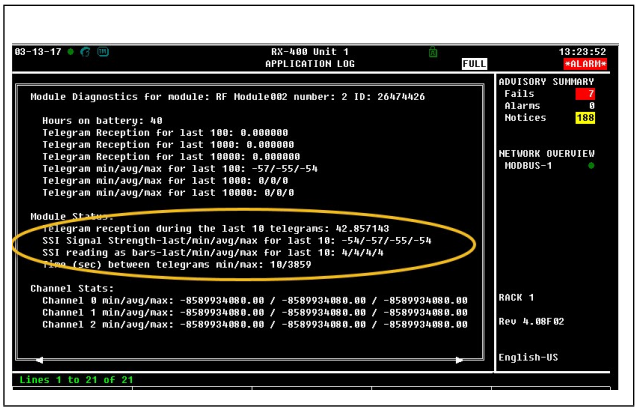

Figure 3-18 - Check Signal Reception

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3.4.1.1 Telegram Reception Rate

Table 3-1 - Telegram Reception Rate

Telegram Reception Rate	
GOOD	> = 95%
FAIR	≥70% and < 95%
POOR	< 70% **NOTE: High probability that there will be alarms saying the Module is OPEN (no updates within the FAIL DELAY).**

3.4.1.2 SSI Signal Strength

Table 3-2 - Signal Strengths

SSI Signal Strength: The lower the negative number, the higher the signal strength		
4 Bars	>= -75	**VERY GOOD** At this level reception rates will most often result in > 98%
3 Bars	< -75 and >= -85	**GOOD** Most of the time this will correspond to reception rates > 95%
2 Bars	<= -85 and >= -90	**FAIR** Most likely reception rates will result in < 95%
1 Bar	<-90 and >= -95	**POOR** Most likely reception rates will result in < 70% and cause OPEN Module alarms
0 Bars	< -95	**FAIL** Most likely reception rates will result in < 50% and cause OPEN Module alarms

The placement of the Modules should be positioned to achieve SSI levels in the 3 or 4 Bar range. During the first 100 updates, the last/min/avg/max for the last 100 telegrams are continuously updated even though 100 telegrams have not been received. This helps the installer get a quick understanding of the signal strength. In addition, the last/min/avg/max for the last 10 telegrams is also helpful during the install time to diagnose issues early.

If you are near the level of the next Bar up, you will see reception rates very close to the next level up. For example, if a Module has a consistent -85 or -86 (2 Bar) you will probably see 3 Bar reception rates. Due to environmental shifts in temperature, humidity, other noise factors, and changes in reflection due to physical changes in the store can result in 5 to 10 dBm signal strength changes; therefore, it is not recommended to start at a 2 Bar level.

3.4.2 Hours on Battery

The battery will last for at least 17,100 hours of use. With proper light levels for the solar cell, the battery should never get close to this number of hours. Even if the maximum number of hours have been used, check the actual battery voltage and if the reading is 2.90 or higher, the battery is still within the acceptable range. On average, the battery's life expectancy is more than two years.

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4 E2 Wireless Advanced Settings

4.1 Gateway Advanced Settings

4.1.1 Updating Gateway Configuration

If the Gateway's configuration becomes corrupted, E2 can send the general configuration to the Gateway. (This is also needed if the Gateway has to be replaced).

1. Go to the Wireless Gateway Main Screen (, 5, **229. Wireless Gateway**).

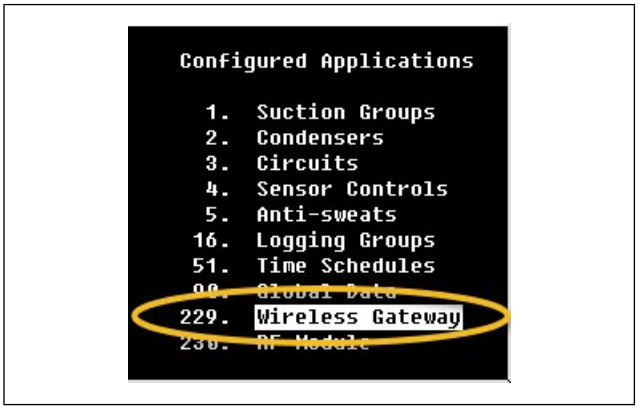

Figure 4-1 - Configured App Menu

2. Press , **9. Application Commands** from the **Actions Menu**.

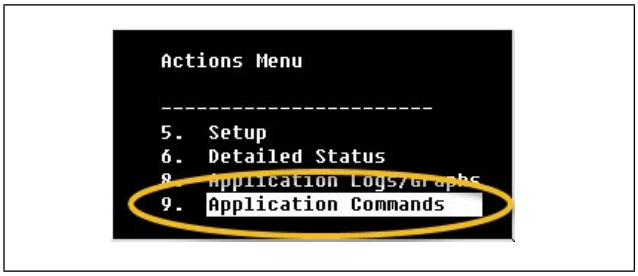

Figure 4-2 - Actions Menu

3. Select **2. Send E2 Cfg to Device**

Similarly, E2 can read the configuration from a Gateway. This is the same basic sequence, but at the last step select **1. Send Device Cfg to E2.**

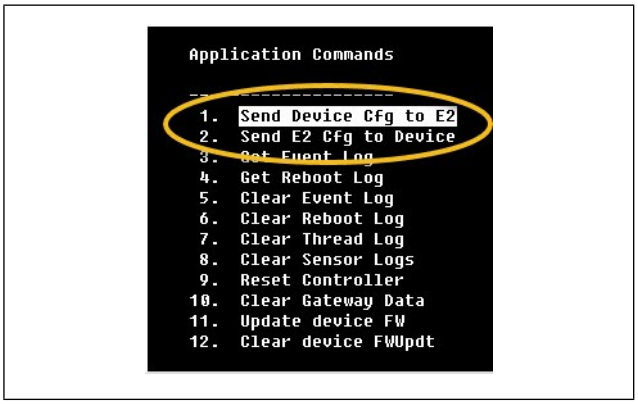

Figure 4-3 - GW Config Update

4.1.2 Updating Gateway Firmware

If a firmware update is needed for the Gateway, send the appropriate package file from UltraSite to the E2.

1. Go to the Gateway main page (, 5, **229. Wireless Gateway**).

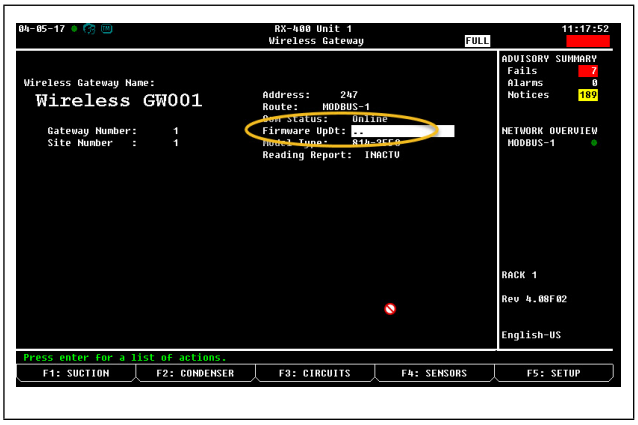

Figure 4-4 - Wireless Gateway Main Page

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2. Press [redacted], **9. Application Commands** from the **Actions Menu.**

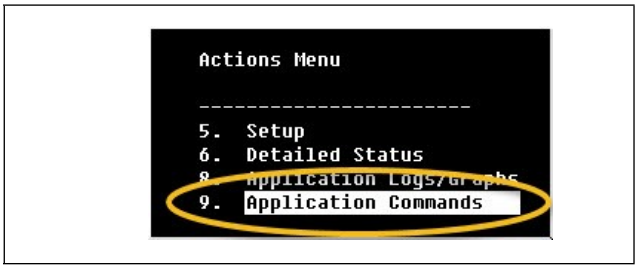

Figure 4-5 - Actions Menu

3. Select **11. Update device FW.**

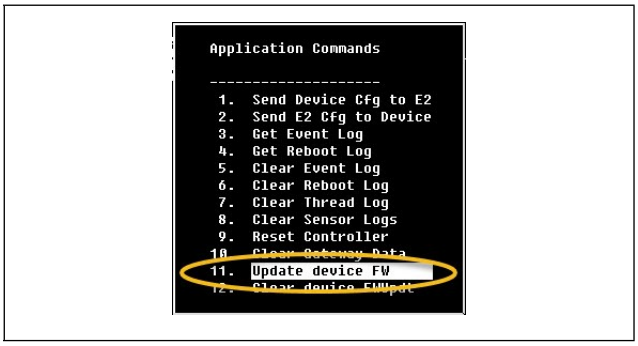

Figure 4-6 - Update Device FW

4.2 Module Advanced Settings

4.2.1 Replacing a Module

If a Module needs to be replaced, you must commission the new Module.

1. Go to the RF Module Summary page ([redacted], 5, **230. RF Module**).
2. Select the Module then press [redacted]
3. Press [redacted], **9. Applications Commands** from the Actions Menu.
4. Select **2. Commission-Replace**. This will inform the Gateway to remove the existing Module from its database before the start of commissioning (Learning) the replacement Module.

Figure 4-7 - RF Module Replace

4.2.2 Updating a Module Configuration

If the Module's configuration becomes corrupted, E2 can send the sensor's Module configuration to the Gateway without recommissioning the Module.

1. From the RF Module Summary page ([redacted], 5, **230. RF Module**).
2. Select the Module, then press [redacted].
3. Press [redacted], **9. Application Commands** from the Actions Menu.
4. Select **3. Send E2 Cfg to Device**.

Note: This only sends the configuration to the Gateway. It will NOT be pushed to the Module itself. This is only done during the commissioning process.

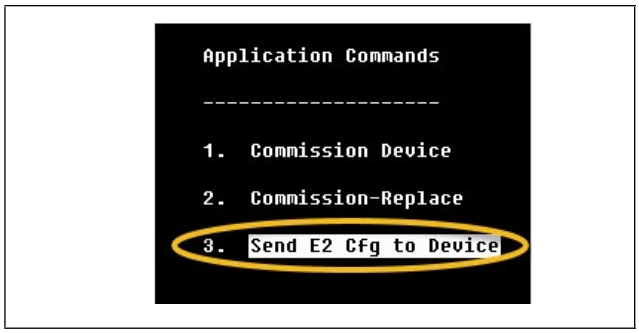

Figure 4-8 - Send E2 Config to Device

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Appendix A - Troubleshooting

Installation

1. Pointing the Wireless Sensor Outputs to Other Application Inputs.

The temperature reading received can be pointed to other applications in the E2 as an input using the normal pointer method.

- Go to the Module details page.
- Select the sensor output.
- **F4: Look** up to select the area controller, application and input.

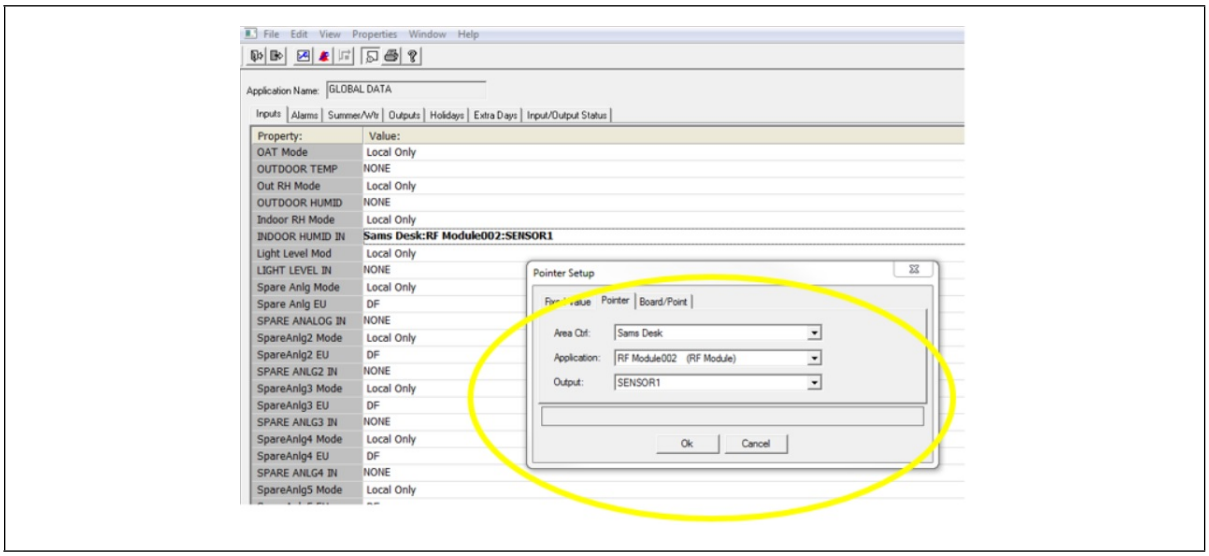

Figure A-1 - Pointing Global Data Indoor Humidity to Module Humidity Sensor Using UltraSite

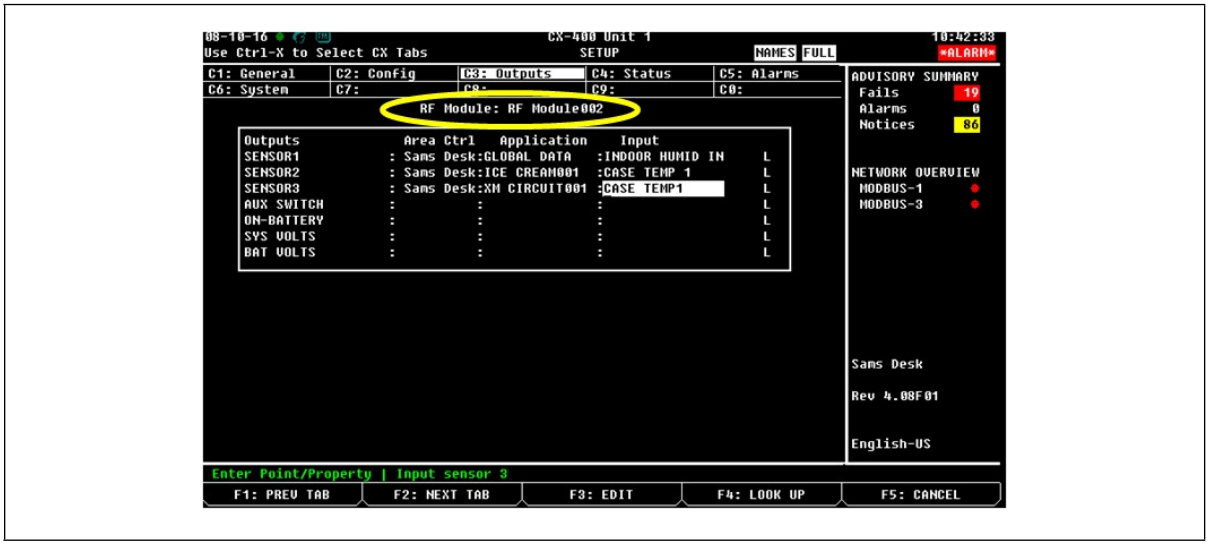

Figure A-2 - Pointing Module Temp Probes to Case Temp Inputs Using E2 Terminal Mode

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2. Determining If the Wireless Module is Getting Enough Light, With No Need to Run on Battery Backup.

- A 200 Lux light level is needed for five (5) hours to fully charge the super cap. A fully charged super cap will run the sensor for at least 24 hours with a two (2) minute update rate without going on battery.
- On the module summary screen, if the Hours on Battery are greater than 0, the sensor has been running on the battery. This shows the number of hours the sensor has been running on battery:

Figure A-3 - RF Module Screen Shows Hours on Battery

- Occasionally running on battery is not an issue and is why the backup battery is provided.
- A battery should last for two (2) years of continuous usage with two (2) minute updates.
- Using the hours on battery information, you can calculate approximately how long the battery will last. For example: If it looks like the sensor is using the battery about two (2) hours/day, two (2) years of battery life = 24 x 30 x 24 = 17280 hours of battery life. Two (2) hours per day yields 8640 days (8640/365 = 23.6 years), so using two (2) hrs/day will still yield > 10 years of battery life (no significant impact on normal battery life expectancy).

3. Sensor Signal Reception is Low - Need to Install a Repeater.

If the Module is positioned over 100 feet from the Gateway, the signal will be too low to receive signals from the connected sensors. If the signal reception is 1 or 2 Bars when commissioning the Modules, a repeater is needed.

Part Number	Power Supply
814-3560	12 to 40VDC
814-3570	120 to 277VAC, 50/60Hz

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- The Repeater should be positioned in a clear line-of-sight between the Module and the Gateway to extend the range beyond the 100-ft radius.

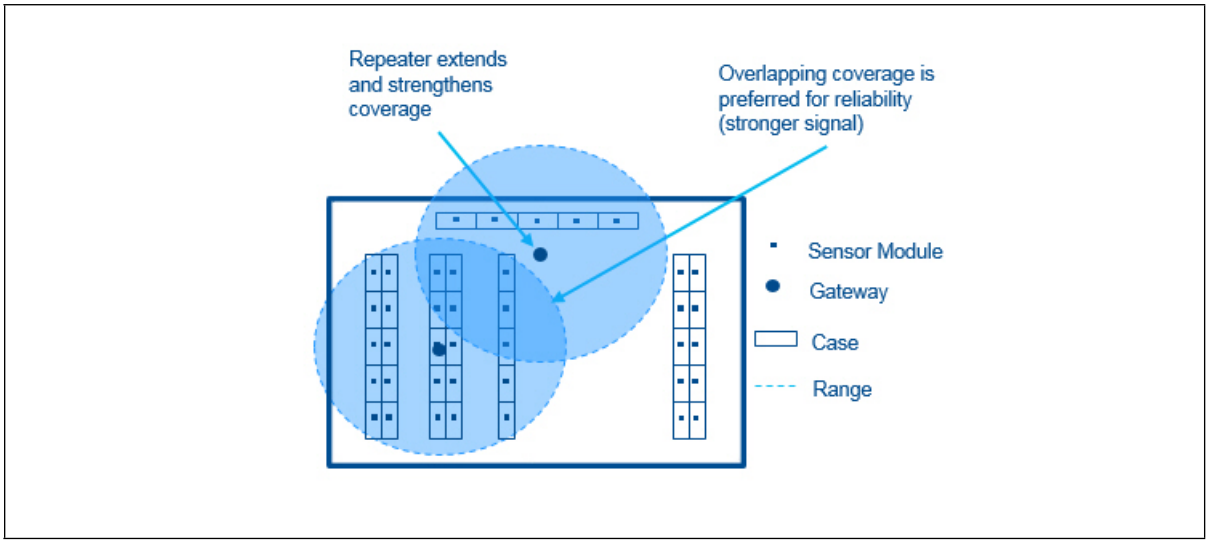

Figure A-4 - Repeater Positioned to Extend Radius

- The Repeater comes pre-configured as a 1 Hop repeater.
- The Repeater *automatically* links to the device and repeats the transmission once it is installed.

Once installed, the SSI Signal Strength should improve to 3 or 4 Bars.

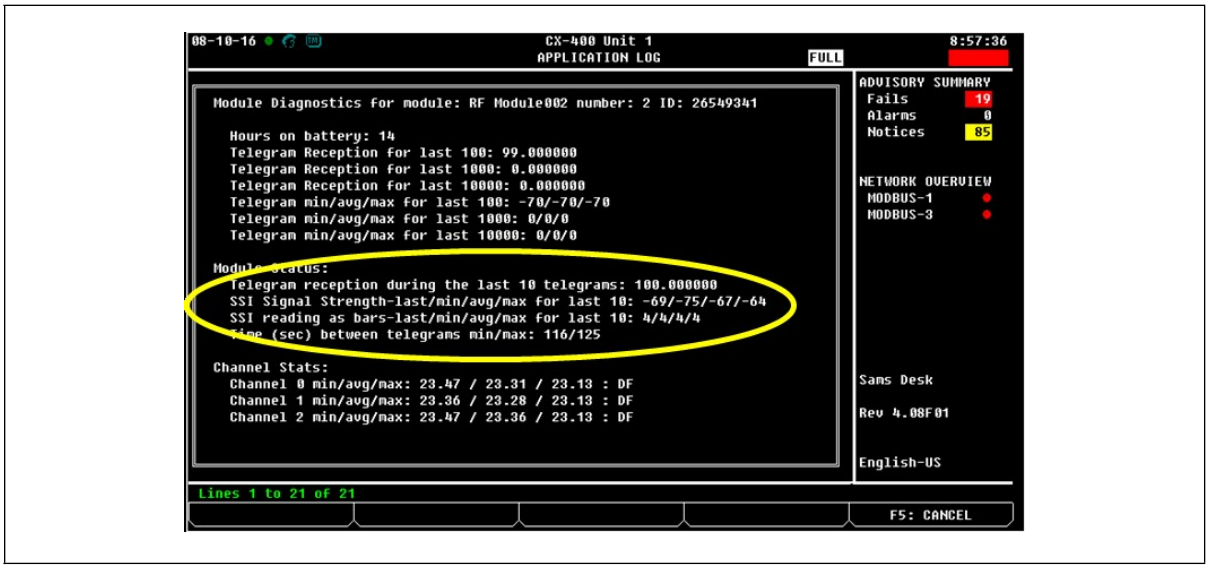

Figure A-5 - SSI Signal Strength Reading Should Improve with the Repeater Installed

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4. Changing or Updating the Module Settings.

When changing the setup of a Wireless Module, such as changing the sensor update rate, recommissioning of the Module is necessary. If you are changing a sensor type, removing or adding a sensor, recommissioning is not needed, just an update of the settings. Example of changing the sensor update rate:

- Go to the Module Setup **C1: General** tab and change **30 Sec Update** to **Yes**. Return to the Module Setup.
- From the **Applications Commands Menu** select **Commission Device** and press the **Learn** button on the Module.
- For the User Selectable Module (*P/N 814-3600*) you will then need to reconfigure the sensor inputs. Select the **C2: Config** tab in Module Setup and select the sensor type for each input.

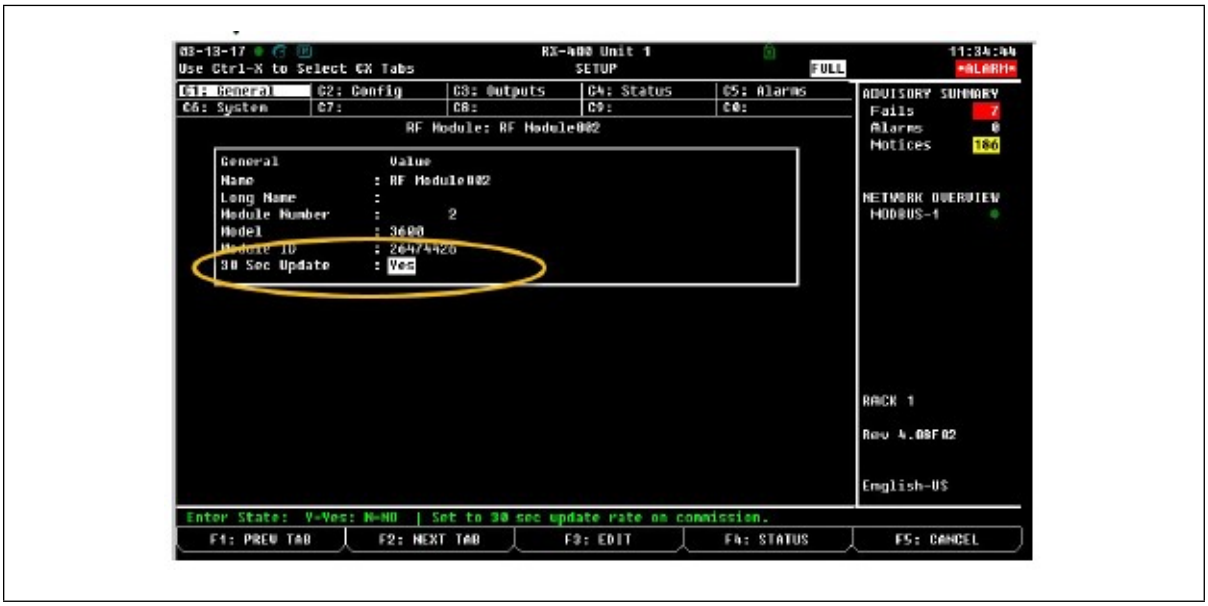

Figure A-6 - Changing 30 Sec Update on General Tab of Module Setup

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Alarm

1. Turn Off Fail Alarm, Changing to a Notice.

The configurable alarms can be set to a Disabled, Failure, Alarm, or Notice with an accompanying priority setting that can be set from 0 to 99.

2. Operating Without Alarms, Using Less than 3 Inputs to Wireless Module.

E2 can be configured to turn off the unused inputs. This will keep those inputs from alarming unnecessarily.

Select the **C3: System** tab from the **Module Setup** Screen.

De-select the sensor inputs that are not in use by either clicking the checkmark (in UltraSite) or typing **N** (E2 Terminal Mode).

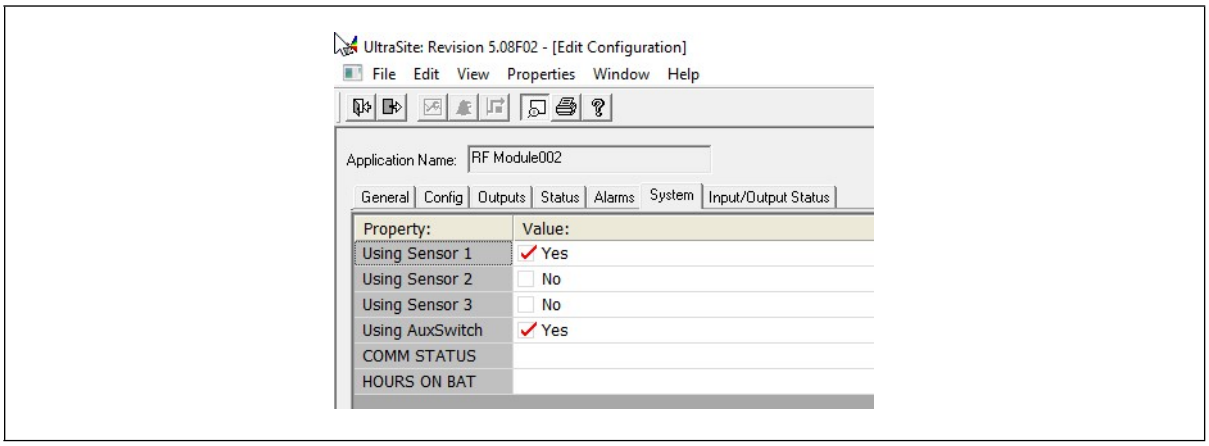

Figure A-7 -Removing the Inactive Inputs Using UltraSite

3. Tracking When the Module is Running On a Battery.

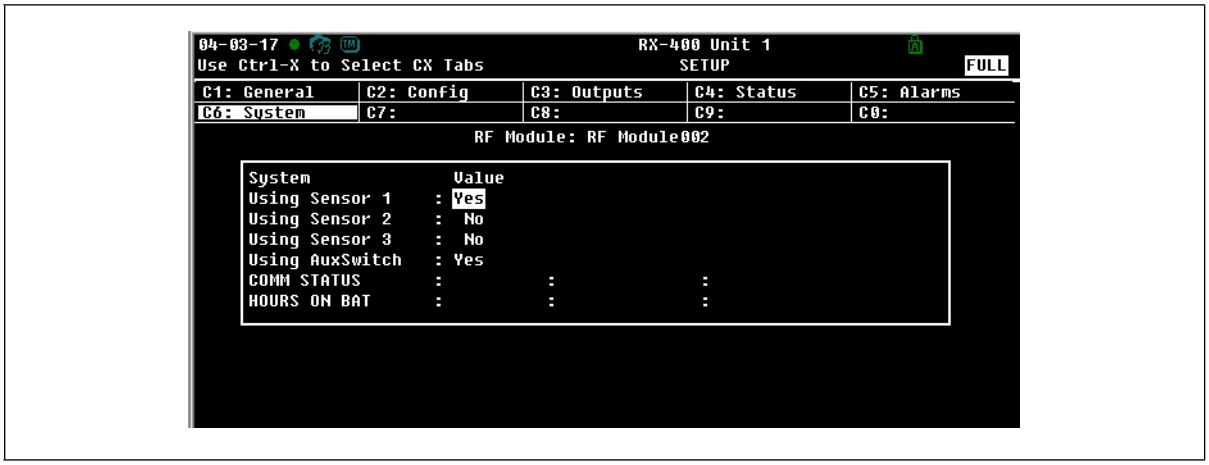

Figure A-8 - Removing the Inactive Inputs in E2 Terminal Mode

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In normal operations, the battery hours are clocked since the last time the solar cell was used. As soon as the solar cell starts powering the module, the hour clock will stop counting. When there is not enough light on the solar cell, the module will go back on battery and the hour clock will start counting again from where it previously left off, cumulatively counting the hours on the battery.

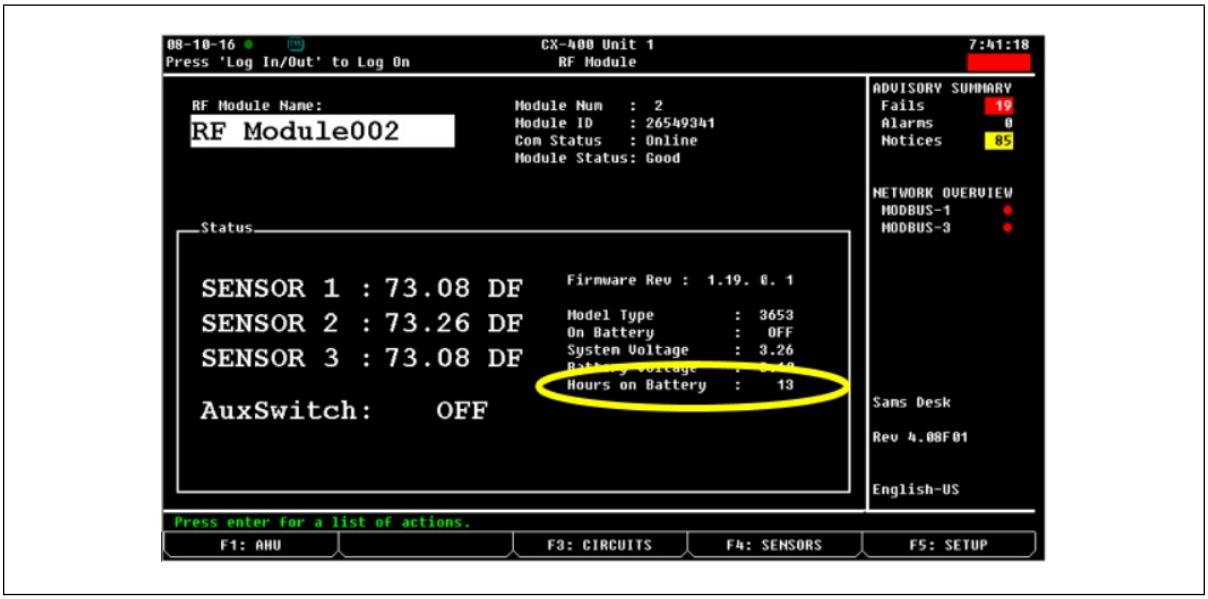

Figure A-9 - Hours on Battery When Returning to Solar Cell Power

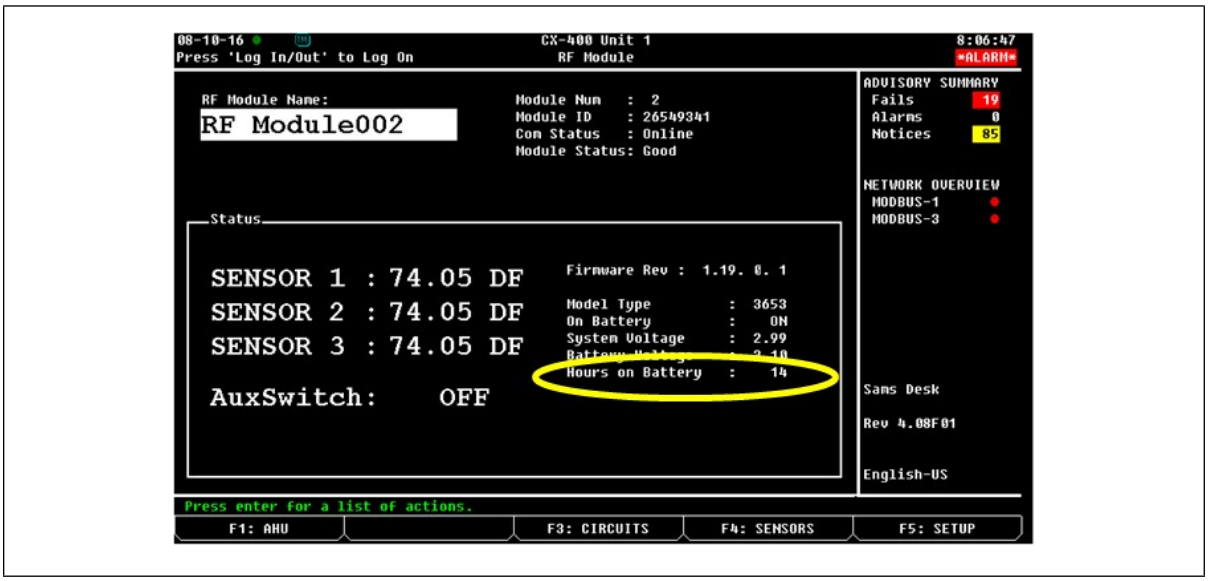

Figure A-10 - Hours on Battery Resumes Counting Up Hours When Back on Battery Power

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Communication

1. Determining How Many Hits the Sensor Has Had.

From the **Actions** menu, select **Application Logs/Graphs, Module Status**. The Module diagnostics screen shows telegram reception for how many telegrams have been received out of the last 100, 1000, 10000. (The diagnostic screen also shows signal strength).

2. Installing the Gateway Running I/O Net Protocol.

While the Gateway can be configured with I/O Net or MODBUS protocol, for E2 controllers or Site Supervisor it is recommended they communicate on an RS485 network running MOBDUS protocol. The default address for the Gateway is 247. If you would like to run I/O Net protocol, it is necessary to use a Hand-Held Terminal (HHT) (P/N 811-3110 or 814-3110) connected directly to the HHT jack on the Wireless Gateway to commission Modules and view the status of the system.

LEGEND			
1	The power switch determines if the HHT is in self-powered mode (BATT), ext power (EXT), or if powered from a target device (HOST)	8	Scrolls list selections and scrolls through ASCII characters if in a text field
2	External Power Connector (9-12 VDC)	9	RS-485 Connector
3	F2- Main Menu	10	Cancel - clears/erases text in editable field; cancels overrides
4	Up Arrow - moves to previous screen, editable field, or top of screen	11	Down Arrow - moves to next screen, editable field, end of screen, or advances
5	Right Arrow - selects last editable field starting from bottom of screen; selects last editable field from bottom to top	12	Left Arrow - selects first editable field from top of screen, and next editable field from top to bottom
6	Enter - save into memory	13	F1 - Home Screen
7	Numeric keypad	14	LCD - four lines of 16 characters

3. Running the Gateway On a Different Baud Rate and MODBUS Address.

The default baud rate in the Gateway is 38.4k. The Gateway can operate at 19.2k; however, firmware updates and commissioning may take longer. The Gateway can be configured using a USB drive.

- On a blank USB drive, the COM port can be configured using Com1Cfg.txt file in the following format:
  PROTOCOL: <Modbus:IONet>
  BAUD: <9600:19200:38400>
  PARITY: <EVEN:NONE-2S:NONE:SPACE>
  ADDRESS: <1..247> (247 is default)
  BOARDS: <1..16> (only needed if switching to I/O Net)
- *Example: Changing the baud rate and MODBUS address to 24:*

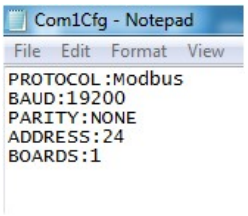

Figure A-11 - Baud Rate and MODBUS Address

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