ClareOne 16 Zone Wired Input Module Manual

Model CLR-C1-WD16

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Manufacturer Clare Controls, LLC.
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FCC compliance FCC ID: 2ABBZ-RF-CHW16-433

IC ID: 11817A-CHW16433

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two 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. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This Class B digital apparatus complies with Canadian ICES-3B. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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.

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

- This equipment complies with FCC radiation exposure limits set

forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

EU compliance

CE

Complete additional sections according to the governing laws and standards for the intended marketplace.

EU directives

1999/5/EC (R&TTE directive): Hereby, Clare Controls, Llc. declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

Contact information

For contact information, see www.clarecontrols.com.

Content

Important information

Limitation of liability

To the maximum extent permitted by applicable law, in no event will Clare Controls, LLC. be liable for any lost profits or business opportunities, loss of use, business interruption, loss of data, or any other indirect, special, incidental, or consequential damages under any theory of liability, whether based in contract, tort, negligence, product liability, or otherwise. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages the preceding limitation may not apply to you. In any event the total liability of Clare Controls, LLC. shall not exceed the purchase price of the product. The foregoing limitation will apply to the maximum extent permitted by applicable law, regardless of whether Clare Controls, LLC. has been advised of the possibility of such damages and regardless of whether any remedy fails of its essential purpose.

Installation in accordance with this manual, applicable codes, and the instructions of the authority having jurisdiction is mandatory.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, Clare Controls, LLC. assumes no responsibility for errors or omissions.

Introduction

The ClareOne 16 Zone Wired Input module (CLR-C1-WD16) allows the takeover of hardwired security zones making them compatible with the ClareOne panel. The input module has 16 wired zone inputs each with LED status, a tamper switch input, a back-up battery charging terminal, and 2 auxiliary power outputs for powered sensors, capable of outputting 500mA @ 12VDC. The module supports powered and unpowered sensors, including contact zones (open/close), motion sensors, and glass break detectors.

Package contents

Note: Ensure all accessories are included. If not, contact your dealer.

- 1 ×ClareOne 16 zone wired input module
- 1 × Power supply
- 2 × Battery cables (one red and one black)
- 2 × Antennas
- 16 × Resistors (each one is 4.7kΩ)
- 1 × Installation sheet (DOC ID 1987)
- Mounting hardware (screws and wall anchors)

Specifications

Compatible panel	ClareOne (CLR-C1-PNL1)
Input voltage	16 VDC Plug-in transformer
Auxiliary voltage output	12 VDC @ 500 mA
EOL supervision	4.7KW (resistors included)
Battery backup	12 VDC 5Ah (optional, not included)
Input zones	16
Tamper zone	Use external switch or wire to short
Dimensions	5.5 x 3.5 in. (139.7 x 88.9 mm)
Operating environment	
Temperature	32 to 122°F (0 to 50°C)
Relative humidity	95%

Figure 1: ClareOne 16 Zone Wired Input Module

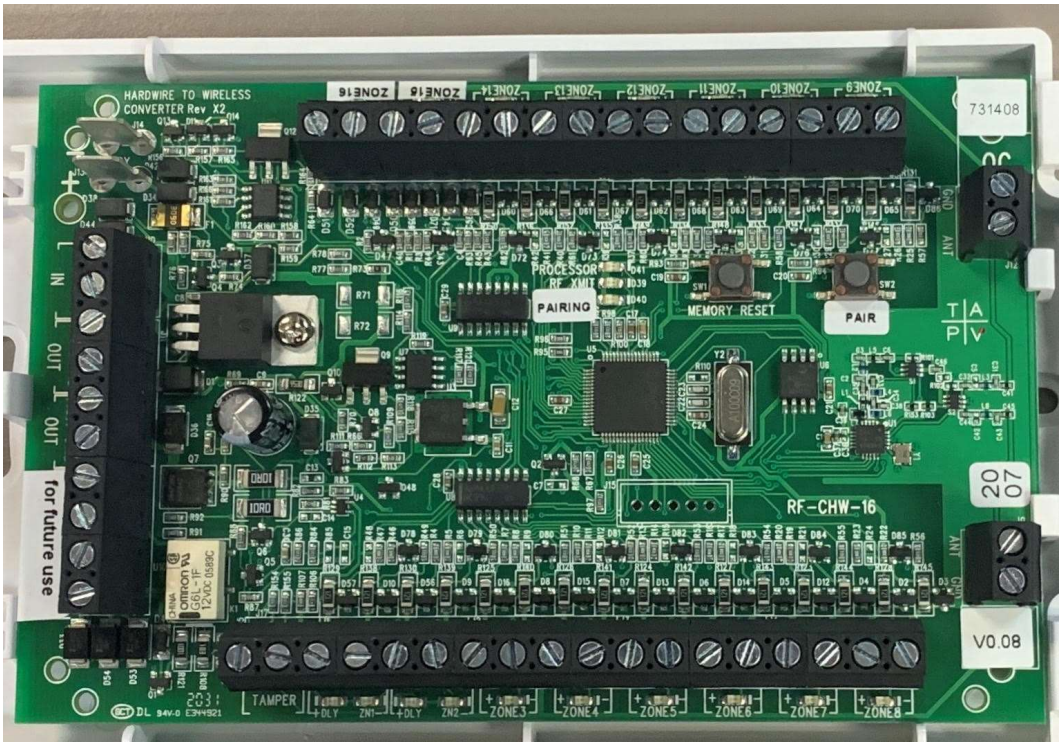


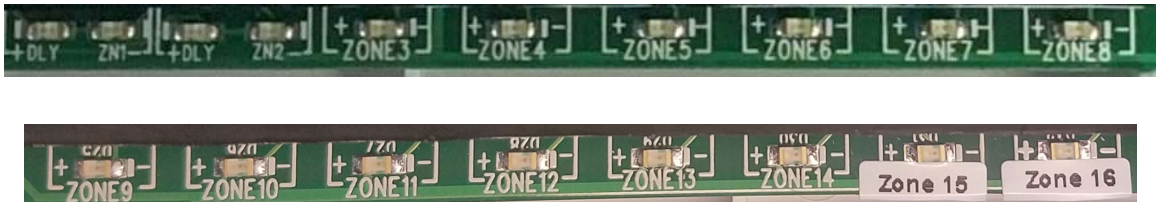
Figure 2: Main LEDs

Processor LED (red color): The Processor LED flashes to indicate that the processor on the module is operating.

RF XMIT LED (green color): The RF XMIT LED illuminates when RF transmission is sent.

Pairing LED (red color): The Pairing LED illuminates when the module is in “Pair Mode” and is off when the module is in “Normal Operation Mode”. If there are no zones learned the Pairing LED flashes.

Figure 3: Zone LEDs



Zone LEDs (red color): During "Normal Operation Mode" each LED remains off until its representative zone is opened, then the LED illuminates. At the beginning of "Pair Mode" all Zone LEDs flash briefly, after which each Zone LED remains off until the zone is learned in and then it turns on and remains on until "Pair Mode" is complete.

DLY LEDs (yellow color): Zones 1 and 2 each have a DLY LED. When a zone's DLY LED is illuminated yellow, that zone has the 2-minute communication timer delay enabled. When the DLY LED is off, that zone's communication timer delay is disabled. When the DLY LED is flashing, the associated zone is tripped, and the 2-minute communication timer delay is in effect. All additional triggers from that sensor are ignored for 2 minutes.

Figure 4: Buttons

Memory Reset Button: The Memory Reset button clears the module's memory and returns it to the factory default settings. The Memory Reset button is also used to enable/disable the communication timer delay for Zones 1 and 2.

Pair Button: The Pair button, when pressed, puts the module in/out of "Pair Mode".

Installation

Only qualified installation technicians should install the module. Clare Controls does not assume responsibility for damages caused by improper installation or use of the device. The module is intended to be mounted to a wall using the included screws and anchors. The module should be oriented with its antennas facing upward. The included antennas should be used regardless of location, for optimal RF communication. Once all sensors are wired to the module, the module and each zone can be paired to the ClareOne panel.

Note: If the module is being installed in a metal container or equipment rack, the antennas must extend outside the container to ensure that the RF communication is not interrupted.

To install the module:

1. Carefully select the mounting location, verifying that the module is vertical, and secure it in position using the provided screws and wall anchors.

   Note: The module should be within 1000 ft (304.8 m) of the panel, however walls and other construction materials may lessen that distance.

2. Attach each of the antennas to the module, one in each of the ANT terminals on the top of the module.

   Note: The antennas should be clear of obstructions and if in a metal enclosure, should extend outside of it.

3. Wire the sensors/leads to the desired terminals marked Zone 1 through 16.

   Wiring Notes:

   - The module requires 4.7kΩ of end of line (EOL) resistance on each zone. Some existing installations may already have EOL resistors installed; it is important to determine if this is the case and make appropriate adjustments as needed. How the EOL resistor is installed depends on if the sensor is normally open (N/O) or normally closed (N/C). Refer to Determining EOL resistance and sensor type for details on determining EOL resistance and if a sensor is N/O or N/C.
   - Install one of the included 4.7k Ω resistors on each zone that has a sensor attached. Install the resistor in parallel for N/O and in series with N/C sensors
   - For any powered sensors, such as motion sensors and glass break sensors, wire the Positive and Negative leads from the sensor to the “AUX” (+) and “GND” (-) terminals for device power. See Figure 1: Wiring diagram on page 3.

4. Wire the tamper switch input.

   Option 1: If using a tamper switch, wire the tamper switch directly to the tamper terminals without the need for an EOL resistor.

   Option 2: If not using a tamper switch, simply connect a short piece of wire across the tamper input terminals.

5. (**Recommended**) For any security system that is supervised, a battery should be connected to the module. To provide an independent battery back up to the module, connect the included battery leads to a 12V, 5Ah lead acid rechargeable battery (battery not included). This battery type is common with most traditional hardwired security panels, otherwise it is recommended that you connect the module to an auxiliary 16-volt power supply with its own battery backup.

6. Connect the power supply leads from the provided power supply to the terminals labeled +16.0V and GND on the wired input module.

   Note: The dashed wire is positive.

7. Plug the power supply into a 120VAC outlet.

   Note: Do not plug the module into a receptacle controlled by a switch.

Determining EOL resistance and sensor type

In some instances, it is not visually apparent what is physically connected to a zone in terms of any pre-existing EOL resistors and whether the sensor is N/O or N/C. Use a multimeter to learn this information.

With a sensor in its active state (i.e. door/window contact is separated from its magnet), take a multimeter set to measure resistance and connect the multimeter across the zone wires. If the multimeter reads a value of 10kΩ or less, the sensor is N/O, if the multimeter reads an open or extremely high resistance (1Ω or higher) than the sensor is N/C. The table below provides guidance for using the measurements to determine the EOL resistance value, as well as the line resistance for N/O sensors. This is the case regardless of the number of sensors connected to a single zone, so long as all sensors on the same zone are in series or in parallel with one another.

Note: The module will not work if there is a combination of series and parallel sensors connected to the same input zone.

	Multimeter reads for N/O	**Multimeter reads for N/C**
Sensors active (sensor away from the magnet)	Value for EOL resistor	Open
Sensors inactive (Sensors connected to the magnet)	Value of line resistance (10Ω or less)	Value of EOL resistor plus line resistance

EOL resistance on existing installations typically ranges from 1kΩ - 10kΩ while line resistance should be 10Ω or less. However, there may be some installations that do not have any EOL resistors installed and the measured EOL resistance may be the same as the line resistance. If there is no EOL resistor installed than simply installing the provided 4.7kΩ resistor is all that is needed. Ideally, any existing EOL resistors would be removed and replaced with a 4.7kΩ resistor. If that is not an option, additional resistors must be appropriately added, to get the EOL resistance to 4.7kΩ.

Programming

There are two portions of programming involved with the ClareOne 16 Zone Wired Input Module: adding the module to the panel and pairing zones.

To add the module to the panel:

1. Once the module is plugged in, open the front cover.
2. Put the ClareOne panel into sensor pairing mode, and then select "Wired Input Module" as the device type. For detailed programming instructions, refer to the *ClareOne Wireless Security and Smart Home Panel User Manual* (DOC ID 1871).
3. After setting the ClareOne panel to “Add mode”, press and hold the Pair button on the module for two seconds. All zone LEDs flash and then extinguish. The Pairing LED illuminates, indicating that the module is in “Pair Mode”.
4. Trip the tamper input, either by opening the tamper switch or removing the wire across the inputs. Once complete, close the tamper switch or replace the wire across the inputs.
5. Follow the ClareOne panel on-screen prompts to complete the process.

   Note: While a battery backup is recommended, if not adding a battery backup, disable the low battery notifications by setting “Low Battery Detection" to **Off** under the Wired Input Module's sensor settings.

To pair the zones:

Note: Each zone must be paired individually, one at a time.

1. Verify that the module’s Pairing LED is still illuminated. If the LED is no longer illuminated, press and hold the Pair button for two seconds.
2. Put the ClareOne panel into sensor Pairing mode.
3. Trip the desired hardwired zone. Once a zone is tripped, its zone LED illuminates and remains lit until the module exits Pairing mode.

   Note: If using a motion sensor, it is recommended to connect it to Zone 1 or 2, and then enable the communication delay for that zone. If using more than 2 hardwired motions, allocate the most active areas on these zones. The exception would be if using motions in an occupancy detection mode for automation, in which case this setting should not be enabled, or a different zone should be used for that motion sensor.

   Enabling communication delay for Zone 1 or 2

   a. Before tripping another sensor press the Memory Reset button.

b. The zone's DLY LED illuminates, signifying that the 2-minute communication timer delay is enabled for that zone.

4. Follow the ClareOne panel on-screen prompts to complete the process.
5. Repeat steps 1-4 for each zone.
6. Once all zones are paired, press the Pair button. The Pairing LED extinguishes, signifying the module is no longer in pairing mode.

Testing

Once the module is installed and programmed with all sensors paired in, the system should be tested to verify that the module and zones are working correctly. The following instructions should be followed to test the module and zones.

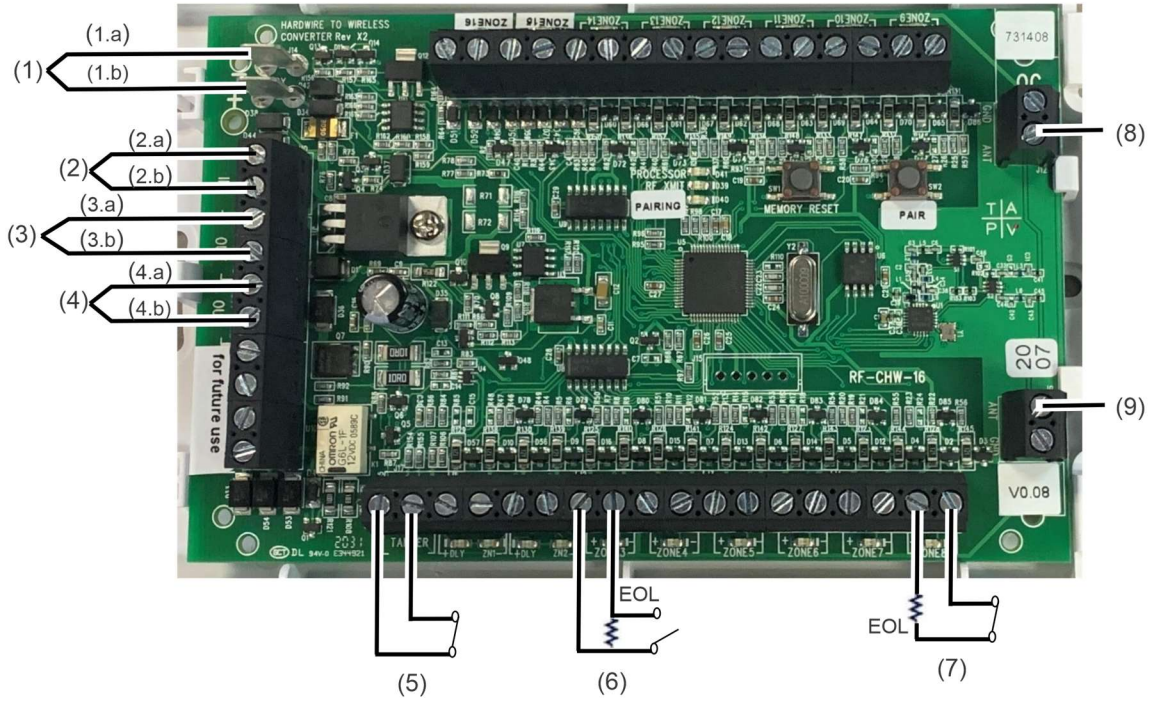
To test the module:

1. Set the panel to the sensor test mode.
2. Trip each zone on the module one at a time. Monitor the system after tripping the zones. Refer to the *ClareOne Wireless Security and Smart Home Panel User Manual* (DOC ID 1871) for specific test information.

Wiring

The graphic below details the module wiring.

Figure 5: Wiring diagram



(1) 12 VDC Backup battery connection
  (1.a) Negative wire (-)
  (1.b) Positive wire (+)
(2) 16 VDC Power supply connection
  (2.a) Positive wire (+)
  (2.b) Negative wire (-)
(3) 12VDC Auxiliary Power Output 1
  (3.a) Positive wire (+)
  (3.b) Negative wire (-)
(4) 12VDC Auxiliary Power Output 2
  (4.a) Positive wire (+)
  (4.b) Negative wire (-)
(5) Tamper input
(6) Wired zone N/O loop
(7) Wired zone N/C loop
(8) Antenna connection
(9) Antenna connection

Note: When wiring a sensor that also has a tamper output, the alarm output and tamper output should be wired in series so that the zone will trigger on either a motion or tamper event.

Reference Information

This section describes several areas of reference information that can be useful when installing, monitoring, and troubleshooting a ClareOne 16 Zone Wired Input Module.

Status Definitions

The ClareOne panel reports the status of the 16 Zone Wired Input Module as Ready by default. However, there are additional states that may be indicated for the module.

Ready: Module is active and is working properly.

Tampered: The tamper input on the module is open.

Troubled: The module is offline, and nothing has been reported to the panel for 4 hours. At this point, for a monitored system the central station has been informed of the module going offline. Typically, this is either due to power for the module being removed or an object being placed between the panel and the module that is blocking the RF communication path. The most common object that can cause these type issues is a mirror.

Bypassed: The module has been set to be bypassed, and events from the module and its sensors will be ignored by the ClareOne panel.

Low Battery: The low battery indicator is only visible if the Battery Supervision setting is enabled for the module, and the module is either not connected to a battery or the battery it is connected to is not adequate or low on charge.

Power Loss: When the power is removed from the module, and there is a battery connected the module will report that there was a DC power loss which will be indicated on the ClareOne panel as an alert notification. If there is no battery installed, then as power starts to go down the module will attempt to send out a power loss event signal to the ClareOne panel; in some instances the power loss event signal is fully received by the ClareOne panel and the alert notification is given.

EOL Resistance

The purpose of EOL resistors is two-fold: 1) to provide an additional layer of security for wired sensors, 2) to check if there is an issue with the wiring going to the sensor.

Without an EOL resistor, someone could simply short the terminals at the module to make the zone appear to always be closed regardless of what activity is happening at the sensor. Since the ClareOne 16 Zone Wired Input Module requires an EOL resistor, someone cannot simply short the zone input on the module, as it would cause the module to report the zone is in a tampered state. This is also one reason why it is important for the EOL resistors to be placed as close to the sensor as possible. The further away the EOL resistor is from the module, the more wiring can be monitored for unintentional shorts.

Note: If there is a short in the cable between the module and the EOL resistor the module will report the zone as being in a tampered state.

If the wrong value EOL resistor is used or the EOL resistor is installed incorrectly, the zone will not function properly. This can lead to things such as the zone status being reversed (i.e. reporting open when closed and closed when open). It could also lead to the zone reporting to the ClareOne panel as being in a tampered state or being stuck in a Not Ready state.

Multiple Sensors on a Zone

The ClareOne 16 Zone Wired Input Module allows multiple sensors to be connected on a single zone. For normally closed sensors, the sensors should all be in series with the EOL resistor in series and located at the sensor furthest from the panel. For normally closed sensors, the sensors should all be in parallel with the EOL resistor connected across the sensor located at the sensor furthest from the panel.

For multiple powered sensors on the same zone, the power wiring should be run to one sensor and then a second run of wiring should go from the first sensor to the second. Alternatively, the power wiring could go directly from each sensor back to the panel; this just requires longer cable runs.

Note: The power connections should be in parallel for each sensor.

Troubleshooting

There is a simple sequence of steps that can be taken to troubleshoot most issues that might arise when using the ClareOne 16 Zone Wired Input Module. The first step before proceeding with troubleshooting is to make sure that the issue is not network related. Since the module does not directly connect to the Internet, it is best to eliminate any network issues before troubleshooting the module. Thus, it is best to troubleshoot the module using the ClareOne panel and not through the ClareHome application, ClareOne Auxiliary Touchpad, or FusionPro.

1. Check status of the module and wired sensors on the ClareOne panel.
    a. Check for alert notifications on the ClareOne panel, such as DC power loss for the module
    b. The module and its wired sensors will continue to report as Ready for 4 hours after losing the RF communication to the panel. Thus a sensor and the module may appear to be in a Ready state, but not appear to be generating events on the panel if there is no power at the module or there is something blocking the RF transmission.
2. Check status of the LEDs on the module.
    a. If the module's Processor LED is not flashing red, then the module is either locked up, has insufficient power, or the LED itself broke. Check that the power supply is properly connected and that there is 16V DC on the power input terminals on the module. Power cycling the module may also help if the module is locked up.
    b. If the module is still in Pairing mode, indicated by the Pairing LED being illuminated red, then sensors will not report properly to the panel. In this case some sensors may report as being in a tampered state instead of a Ready state. Pressing the Pair button will end the Pairing mode and return the module to Normal mode.
    c. If a Zone LED is flashing red, that indicates that the zone is in a tampered state. Check the wiring on the zone to make sure everything is connected properly and the EOL resistor is properly installed and is 4.7kΩ. Also check to make sure there isn't an inadvertent short between the wires.
    d. If a Zone LED does not change state when the sensor is triggered, then there may be an issue with either the wiring to the sensor, power to the sensor, or the sensor itself.
        i. For powered sensors, verify that the voltage input on the sensor is measured to be within specification for the sensor (should be around 12V DC). If there is a significantly long cable run, the

voltage may have a significant drop. This can also happen if many powered sensors are sharing the auxiliary output power causing there to be insignificant current to power the sensor. Some powered sensors have a LED to indicate that the sensor is working properly, if the LED on the sensor is functioning when the sensor is triggered, then check the wiring from the module to the sensor.

ii. For unpowered sensors, check the wiring from the module to the sensor, including verifying that the EOL resistor is the correct value (4.7kΩ) and connected properly. Replacing an unpowered sensor with another sensor can help eliminate a fault in the sensor itself. However simply swapping the wires with a properly functioning zone is another method to verify if the issue is with the module or with the sensor.

e. If using the communication delay on Zone 1 or 2, the DLY LED should be illuminated yellow for the appropriate zone. If the DLY LED is not illuminated, then the communication delay is not enabled. This could lead to multiple events being received by the panel when only one event is expected, or for long delays for other events from being reported. To enable the communication delay after a sensor is paired, simply re-enter Pairing mode by pressing the Pair button, then trigger the sensor on the zone you want to enable, and before triggering any other sensor press the Memory Reset button. Once this is done the DLY LED should turn on. Be sure to press the Pair button again to exit Pairing mode.

f. If using Zone 1 or 2 and the DLY LED is illuminated, the zone will not report open events for 2 minutes after the first event is reported. If this feature is not desired, then the feature should be disabled. To disable the communication delay, enter Pairing mode by pressing the Pair button, then trigger the sensor on the zone that you want to disable, and before triggering any other sensors press the Memory Reset button. Once this is done the DLY LED should turn off. Be sure to press the Pair button again to exit Pairing mode.

3. Check wiring to and from the module.

   a. If the power is not connected properly the module will not work, so make sure that the connections are correct and that the supply is plugged into an active outlet. Using a voltmeter to measure that the input voltage is approximately 16V DC is an adequate way of checking that this wiring connection is good.

b. If there is a battery connected make sure the terminals are connected properly (positive terminal on the battery to positive terminal on the module, and negative terminal on the battery to negative terminal on the module). While the wiring is color coded (red for positive and black for negative) it is best to double check that the connections are indeed correct. The battery should measure at least 12V DC when it is not connected to the module. If this is not the case, then replace the battery with a new one.

c. If a sensor is not operating properly, checking the wiring

4. Check the RF communication

   If everything appears to look good, but events are simply not being reported consistently or at all to the ClareOne panel, there may be an issue with the RF communication.

   a. Verify there are no obvious impediments to the RF communication path, such as large mirrors or other large objects that may not have been in place when the module was initially installed.

   b. If the module is installed inside of a metal enclosure, make sure the antennas are sticking out of the enclosure.

   c. Check that the antennas are properly installed, and the screws are tightened on them. If the antennas are excessively loose, then they may not function properly.

   d. If possible, move the ClareOne panel next to the module and trigger a sensor several times. This will help determine if there is an issue with the RF communication due to either impediments in the path or purely distance between the panel and the module.