

# MIMOLite, Multiple Input – Multiple Output Wireless Interface/Bridge Module, User Manual



## Introduction

The MIMOLite Module is an interface / bridge module, capable of converting a wired or wireless input to a wired or wireless output. The MIMO is a Z-Wave™ Wireless device compatible with other Z-Wave™ certified products. MIMOLite comes in a plastic enclosure for indoor use only.

## Specifications

Power:	12-16 VDC @~ 300mA
Frequency Range:	908.4MHz (US); 868.4MHz (EU)
Distance Range:	Max 100ft line of sight in unobstructed environment
Enclosure Size (L x W x D):	3 3/8" (85mm) x 2 1/2" (64mm) x 1 1/4" (30mm)
Weight:	4 oz (100 gram)
Operating Temperature:	-10°C (14F) to +70°C (158F)
Input Signal 1 (SIG1):	Digital or Analog Input, 0 to 16V DC, 16 Hz Max for pulse counting (min. 32 ms high or low time). The trigger levels and hysteresis can be set via the Configuration Command Class. The input can be a dry contact closure (see open/shorted characteristics in Technical Appendix).
Input Signal Impedance	Input impedance for SIG1 is <b>Z=66 ohm</b> at 10KHz. This impedance is = 66 ohm = 34 ohm + j 540uH.
Output Relay 1:	SPDT, Max. Switching power of 120W; 10uA to 10A; High Dielectric strength coil-contacts: 1,000 VAC; Open contacts: 750 VAC; Conforms to FCC Part 68 requirements; Ag + Au clad bifurcated contacts fully sealed.
System Requirement:	Any Z-Wave™ -enabled network and controller.



## Overview

The MIMOLite module provides one analog or digital input and one relay output (isolated dry contacts, NO-COM-NC) and can be controlled by Z-Wave™. The system includes a program switch for Z-Wave™ inclusion/exclusion and a status light (LED) for various indications.

Input SIG1 is an analog input, internally pulled-up to the MIMOLite supply voltage. The system allows trigger conditions to be set based on the input voltage being inside or outside a user-defined range (configured via Z-Wave). This provides great flexibility for capturing events in a wide variety of applications. The trigger status of the input can be read via Z-Wave™ and/or can be automatically sent to a configured node, typically the Controller. In addition, a count of the trigger events that have occurred for the input channel is internally recorded (and stored in the 'pulse count') and is available to be requested or automatically sent via Z-Wave. The current triggered/un-triggered status can also be read via Z-Wave. The SIG1 input can be associated with up to two other Z-Wave™ devices, such that an associated device will automatically turn on (or off) based on the occurrence of a trigger event. Finally, the analog input channel can be configured so that the analog *input level* (not just binary trigger status) is periodically sent to up to two other associated nodes.

The output relay is typically commanded via Z-Wave™ commands. In addition, the user can configure the input SIG1 trigger condition to be mapped to the output relay. For example, Relay 1 can be automatically turned on based on Input SIG1 being triggered. The relay activation can be set via a jumper or via Z-Wave™ for either momentary or latched operation - see **Installation** section.

## Warnings and Precautions

\* *The dry contact relays are not capable of supporting higher-than-specified loads. Exceeding the specified switching power will cause damage to the unit and may cause damage to property and/or personal injury, including loss-of-life.*

**\* WARNING – Do not attempt to use the relays to switch residential or industrial Alternating Current (AC) lines. The relays are to be used for low-power load control only. Refer to above electrical specifications for relays.**

\* *Do not store highly flammable items such as oily rags or other combustibles near your MIMOLite.*

\* *Do not apply electrical power to the unit unless the unit is fully assembled.*

\* *Install unit in accordance with electrical codes and regulations. In case you are unsure about any parts of these instructions consult an electrician or Z-Wave™ home automation specialist.*

\* *Disconnect power source before working on or servicing the unit. Failure to do so could result in personal injury.*

**\* WARNING - The MIMOLite must not be used in life support and / or safety applications.**



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\* MIMOLite functionality is based on wireless (RF) transmissions. Any wireless transmission can be subject to RF interference or loss-of-communication. This interference or loss-of-communication may cause the unit to not operate as intended. You, the end-user, are responsible for ensuring that the MIMOLite functionality and installation meet your desired requirements.

\* Do not mount the MIMOLite inside a metal enclosure.

\* Do not place MIMOLite on or near metal objects. This decreases range and/or blocks wireless transmissions.

\* Information provided in this manual is for your convenience and may be superseded by updates. The specifications and this manual are subject to change without notice. It is your responsibility to ensure that the MIMOLite functionality meets your needs and specifications.

## Using the MIMOLite in a Z-Wave™ Network

**INCLUSION** in (adding to) a network: 1) Set up the inclusion mode at the controller (for detailed directions, please refer to your controller user manual); 2) If the LED has a periodic single blink, the unit will be automatically included. Otherwise, the button has been previously pressed and automatic inclusion mode is no longer active. In this case, briefly press the button once and the controller will indicate that the unit has been included in the network. Also, the Status LED will blink when the inclusion completes. *Inclusion and exclusion are always done at normal transmit power mode.*

**EXCLUSION** from (removing from) a network: 1) Set up the exclusion mode at the controller (for detailed directions, please refer to your controller user manual); 2) Press the MIMOLite button and the controller will indicate the unit has been removed from the network. The Status LED will blink when the exclusion completes.

**ASSOCIATIONS:** Once in a network, your controller can be used to associate the MIMOLite with other devices in the Z-Wave™ network, such as a light or remote audible alarm. Refer to your controller's documentation on how to associate the MIMOLite with another device in your network. The MIMOLite input supports five association groups with a maximum of two associated devices in each group.

Group 1: When the input is triggered/untriggered, a command is sent to turn on/off the device(s) associated with the input.

Group 2: The MIMOLite will periodically send a report indicating the input's analog voltage level.

Group 3: If a power dropout occurs, the MIMOLite will send a notification (depending on available residual power)

Group 4: When the input is triggered or untriggered, a Binary Sensor report is sent to this group's associated device(s).

Group 5: Pulse meter counts will be sent to this group's associated device(s).

**STATUS INDICATIONS:** The MIMOLite provides a status light to indicate various situations. As shown in the table below, the light blinks a variable number of times, fast or slow, periodically or only once.

Fast Blinks	Slow Blinks	Periodic?	Description
1		Yes	Network-Wide Inclusion Mode (NWI mode is automatically entered at power-up when MIMOLite is not 'in-network')
2		No	MIMOLite 'in-network' indication (after inclusion / power up)
4		Yes	MIMOLite is not 'in-network' (after button is pressed during NWI mode or if inclusion fails or after exclusion)
	1	Yes	Power input has dropped out (voltage has dropped to below approx. 10.5V)

## Input Analog-to-Digital Characteristics

The input signal voltage conversion to Multilevel Sensor value (ADC reading or count) is non-linear. A typical conversion curve (Voltage to ADC reading) is shown in the Technical Appendix on the FortrezZ website. These are the values returned via the Multilevel Sensor report in response to a Multilevel Sensor Get request (or if association Group 2 is set up). The conversion is a 12-bit conversion which allows values from 0 to 4095.

## Input Configuration

The voltage conversion described above also applies to the triggering configuration. Refer to the Technical Appendix for details on changing the triggering configuration. The default trigger configuration for the analog input, SIG1, is a threshold around 1V. That is, the input will trigger when the level goes above approximately 1V and will untrigger when the level goes below approximately 1V. If the input is left open, the input will remain triggered because of the internal pull-up resistor. The trigger ranges for SIG1 are very flexible and can be changed to meet many application requirements. Refer to the Technical Appendix for details.



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## Output Configuration

The MIMOLite can be configured to automatically turn the relay on when the input is triggered or a Z-Wave command can also turn the relay on. The Configuration Command Class, Parameter 3, is used to set the input-to-relay mapping (See Technical Appendix). When input-to-relay mapping is enabled, Z-Wave™ commands to set the relay are overridden. The default for the relay is no input-to-relay mapping. Momentary vs Latched relay operation is selected by jumper P5 on the circuit board. **The Momentary / Latched jumper is read only at power on when the MIMOLite is not in a ZWave network.** When the jumper is off, momentary (default 500ms) operation is selected. If desired, once in-network, a Zwave configuration command (Parameter 11) can be used to override the jumper setting. The momentary configuration can be set from 100ms to 25.5ms (approximate) in increments of 100ms via the ZWave command (refer to the Technical Appendix).

## Power Dropout

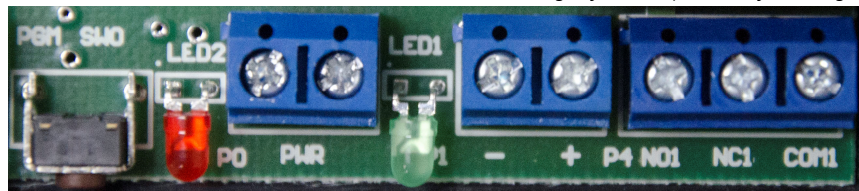
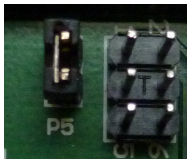
A periodic Power Dropout indication (see above table) is shown if the supplied power drops below approx. 10.5 Volts. Also, the MIMOLite implements the Alarm Command Class, which provides an alarm report (Alarm Type = 0x08, Alarm Level = 0xFF) when the supplied power drops. The MIMOLite sends the alarm report to the node(s) in Association Group 3. After a power dropout alarm event, the MIMOLite sends an alarm report (Alarm Type = 0x08, Alarm Level = 0x00) when the supplied power rises above approx. 11 Volts.

## Installation

Depending on your intended application, place jumper on P5 (2 pin connector beside P3): for Latched relay function, leave jumper ON; for Momentary relay function, remove jumper.

Apply DC power to P0. Do not exceed 24VDC. Program MIMOLite into your Z-Wave controller with the button located next to P0.

Connect monitored signal to SIG1 (P1, labeled – and +) and relay contacts NO/NC/COM on P4. Follow polarity and do not exceed max input voltage of 24V DC (or 16Hz, if counting triggers).



## Troubleshooting

The MIMOLite has been tested with controllers from various vendors. However, it is not possible to test with every controller on the market. For specific troubleshooting procedures, please refer to your controller instruction manual and/or contact your controller manufacturer. Also, check the FortrezzZ, LLC website [www.fortrezz.com](http://www.fortrezz.com) for helpful FAQs, a Technical Appendix with more details, and updates to this User Manual.

## Regulatory Information

### FCC Compliance Statement Statements

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. **Contains Transmitter Module FCC ID: XCT-Z3US**

**FCC Warning (Part 15.21).** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**FCC Interference Statement (Part 15.105 (b)).** 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 of the following measures:

- Reorient or relocate the receiving antenna.



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- 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 Statement per Section 4.0 of RSP-100

The term "IC:" before the certification/registration number only signifies that the Industry Canada technical specifications were met.

**Section 7.1.5 of RSS-GEN.** 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.

From section 5.2, RSS-Gen, Issue 2, June 2007 Equipment Labels: **Contains IC: 8156A-Z3X**

From section 7.1.1 RSS-Gen, Issue 2, June 2007

- The host device, as a stand-alone unit without any separately certified modules, complies with all applicable Radio Standards Specifications.
- The host device and all the separately certified modules it contains jointly meet the RF exposure compliance requirements of RSS-102AA, if applicable.
- The host device complies with the certification labeling requirements of each of the modules it contains.

## Europe

The MIMOLite module has been certified for use in European countries.

Test standard: ETSI EN 300 328 V1.7.1 (2006-10)



The Waste Electrical and Electronic Equipment (WEEE) directive (2002AA/96/EC) was approved by the European Parliament and the Council of the European Union in 2003. This symbol indicates that this product contains electrical and electronic equipment that may include batteries, printed circuit boards, liquid crystal displays or other components that may be subject to local disposal regulations at your location. Please understand these regulations and dispose of this product in a responsible manner.

## Limited Warranty

**THE PRODUCT IS PROVIDED WITH ONE YEAR LIMITED MANUFACTURER WARRANTY. FORTREZZ, LLC warrants its products to be free from defects in material and workmanship under normal use for one year, and is not responsible for consequential damages or installation costs of any nature. FORTREZZ, LLC. expressly disclaims all implied warranties, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. FORTREZZ, LLC. does not warrant, guarantee, or make any representations regarding the use or the results of the use of the products or any accompanying materials in terms of their correctness, accuracy, reliability or otherwise. In no event shall FORTREZZ, LLC. be liable to Purchaser hereunder or in respect of any products ordered or delivered to Purchaser, whether in contract, tort including negligence or otherwise for a loss of profits or loss of use or for any incidental, consequential, special or indirect damages howsoever caused whether or not FORTREZZ, LLC. has been advised of the possibility of such loss or damage. FORTREZZ, LLC's maximum liability to Purchaser under these conditions shall in no event exceed the amount paid by Purchaser for the products that are the subject of the claim and in respect of all claims for products ordered from FORTREZZ, LLC. to which these conditions apply to the amount paid by Purchaser for the products which are the subject of the claims. If you are not comfortable with your limited warranty, or not completely satisfied with the MIMOLite, or the MIMOLite does not perform as expected we encourage you to return the MIMOLite to your DISTRIBUTOR for an exchange or for a full refund within 30 days of purchase. Or, you can return the MIMOLite to FORTREZZ with an RGA number.**

All products to be returned to FORTREZZ, LLC. must have a valid Returned Goods Authorization (RGA).

Send the returned unit to: **Fortrezz, LLC Warranty Replacement, 1080 Centre Rd. Ste C. Auburn Hills, MI 48326**, postage prepaid with a payment of US\$ 9.95 to cover the cost of return shipping, postage and handling. You must use the original packaging and include a proof of purchase (photocopy of receipt) along with the RGA # and the returned product.



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