

LVRX-4™ / LVRX-8™



Low Voltage Relay Receivers (4 / 8 Channels) Installation and Operating Instructions

AHD0002c

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1. Specifications

The LVRX-4 (E8R-R04FP-4) and LVRX-8 (E8R-R04FP-8) relay receivers are used to connect wireless light switches or door/window sensors to existing security, lighting, media, HVAC and other control systems. The low voltage relay receivers provide 4 or 8 channels of relay output which mirror the status of battery-free, EnOcean-compatible wireless transmitters. The relays provide wireless links to magnetic proximity window/door sensors or wireless light switches.



The LVRX relay receiver receives information from EnOcean transmitters using a simple "ID learn-sequence" that stores transmitter IDs (addresses) in its EEPROM memory. This allows the LVRX receiver to store an association between each switch and each relay output. When used with EnOcean PTM Switches, the relays can be configured to toggle with each button press or provide momentary relay closure while the button is held and released.

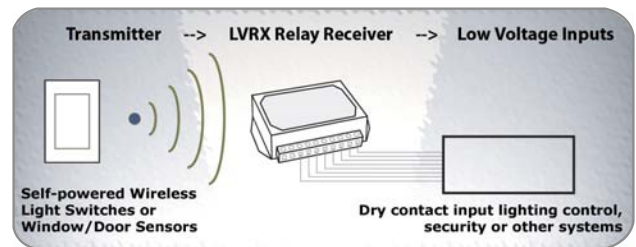
Table 1. LVRX-4 and LVRX-8 Relay Receivers

LVRX Relay Receiver Specifications	
Power Supply Input	8-28 VAC or 8-30 VDC, 250 mA
Relay Rating	0-30 VAC or 0-30 VDC, 2 A
Number Output Channels	4 (LVRX-4), 8 (LVRX-8)
Frequency	868 MHz or 315 MHz
Range (Indoor, non line-of-sight)	50 – 150 feet
Dimensions (enclosure)	10.7cm (4.200")W x 7.2cm (2.800")H x 2.9cm (1.125")D With connectors: 13 cm(5.1")W, 8 cm (3.2")H
Weight	175g (6.5 oz.)

Sample Network

The LVRX serves a broad range of network configurations. The topology below provides a sample topology that illustrates the most basic components of an Ad Hoc wireless network.

Figure 1. Basic Components of an Ad Hoc Wireless Network



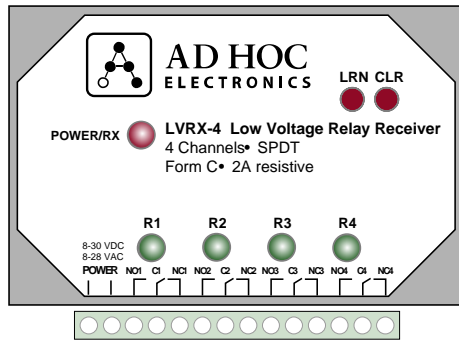
2. Installation

Adhere to the following guidelines to insure safety and to maximize performance.

Warning: To avoid fire or shock, turn off power before wiring.

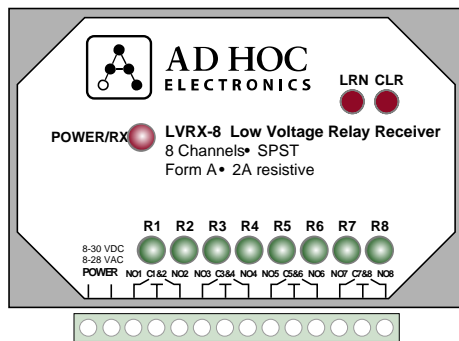
- For optimal radio performance:
 - Do not mount or place receivers close to the floor.
 - Do not mount or place a receiver inside a metal housing.
- Connect the power supply to the power terminals of the LVRX relay receiver. Polarity does not matter, '+' can be connected to either terminal.
- Connect the appropriate wire(s) to the desired Common terminal(s). C1 relates to relay 1, C2 relates to relay 2, etc.
- Choose between Normally Open and Normally Closed for the other wire(s) dependent on the application.
Note: The LVRX-8 only supports the Normally Open option.

Figure 2. LVRX-4 Low Voltage Relay Receiver (4-channel)



R1 – R4 = Relays 1 – 4
 NO = Normally Open
 NC = Normally Closed
 C1 – C4 = Common
 LRN = Learn button
 CLR = Clear button

Figure 3. LVRX-8 Low Voltage Relay Receiver (8-channel)



R1 – R8 = Relays 1 – 8
 NO = Normally Open
 C1 – C8 = Common
 LRN = Learn button
 CLR = Clear button

3. Operating Modes

The LVRX relay receiver can receive information over-the-air from either of the following transmitter types:

- Wireless Light Switches
- Wireless Magnetic Contacts (Window/Door Sensors)

The LVRX Relay Receiver can be configured to operate with either transmitter type, but not a mix of both at the same time. The LVRX receiver’s operating mode is determined by the type of transmitter it LEARNS first.

Table 2. Operating Modes

LED Blinking Pattern (green LEDs)	Wireless Light Switch Modes	Wireless Window/Door Sensor Modes
Slow (— — —)	Toggle	Standard
Fast (— — —)	Momentary	[reserved for future use]

The memory of the LVRX relay receiver is empty when delivered. The operating mode for a single relay can be changed by pressing the CLR button while that desired relay is in Learn Mode. To clear all of the relay’s operating modes, hold down the clear button at a time when all of the relays are out of Learn Mode.

The LVRX-4/8 begins in “Slow Mode”. After going through the 4/8 relays one time, it circles back to R1 and changes to “Fast Mode”.

Wireless Light Switch Mode



Each assigned wireless light switch (transmitter) can be used to change the switching state of the receiver. When in Toggle Mode [p5], each relay can be assigned to respond to a rocker. There is either 1 or 2 rockers on a PTM wireless light switch. When LEARNED in Toggle Mode, one side of the rocker will close the relay and the opposite side of the same rocker will open the relay. When in Momentary Mode [p5], the relay will respond to each button separately. There are either 2 or 4 independent buttons on a PTM light switch. When LEARNED in Momentary Mode, the relay will close when a switch is pressed and the relay will open when a switch is released.

Wireless Window/Door Sensor Mode (Magnetic Contacts)



This mode is not yet fully implemented, but will be added in a future release. Currently when used with STM modules, any one STM can open or close the relay, rather than acting as a secure loop.

If at least one of the assigned Magnetic Contacts is open, the switching state of the receiver is ON. If all learned Magnetic Contacts are closed, then the switching state is OFF. The Magnetic Contacts transmit a 'supervisory signal' approximately every 15 minutes. For Magnetic Contacts that are in Secure Mode (indicated by a 1 second interval blinking of a green LED during Learn Mode); if there has been no supervisory signal for more than 35 minutes, the relay considers the contact open. For Magnetic Contacts in Unsecured Mode (indicated by a 0.5 second interval blinking of a green LED during Learn Mode) there will never be an indication of whether the contact has failed to send a supervisory signal.

Potential reasons why the supervisory signal is not being received include:

- The energy store of the window contact is empty (make sure the solar cell receives sufficient sunlight), the radio channel is disturbed by interference or obstructions, the window contact has been removed, or the contact is broken.

4. Programming the Relay Receiver

When programming the receiver, the LVRX must be connected to power. Parameter values are retained after power is disconnected. Once powered, entrance into Learn Mode is triggered by pushing the Learn button.

Each LVRX unit can learn up to 80 relay associations. An "association" is defined as a relationship between one transmitter and one relay. Once transmitter can control all (4 or 8) relays would use eight associations. All of the associations can be with one or more of the relays, as long as the total number of associations does not exceed 80. One single relay can learn either PTM wireless light switches or STM Magnetic Contacts, but not both at the same time.

Choosing a Relay

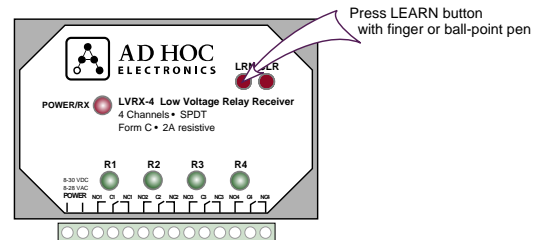
The LVRX-4 has four and the LVRX-8 has eight different relays that can respond to transmitters. To choose a relay, follow these steps:

1. Hold the LRN (learn) button down for approximately 0.5 seconds. The green R1 LED will start blinking every 1 second confirming that relay 1 is in Learn Mode.
2. To enter Relay 2 into Learn Mode, press the LRN button again and the green R2 LED will blink every 1 second confirming that relay 2 is in Learn Mode.
3. Use the same logic to enter relays 3-8 into Learn Mode - repeatedly press the LRN button until the desired relay's green LED is blinking.

Learn Mode

Figure 4. Enter the Relay Receiver into Learn Mode

In order to configure the receiver to LEARN transmitters; the receiver must first enter into Learn Mode.



Learn a Wireless Light Switch (Ad Hoc E8T series)

Use the following steps to program the Relay Receiver to LEARN the ID addresses of transmitting light switches:

1. Find the desired relay by repeatedly pressing the LRN button until the desired relay's green LED is blinking.
2. Once the desired relay's LED is blinking, press one of the rockers on the PTM Wireless Light Switch and the relay will learn that switch's ID address.
→ The green LED will turn **ON** and stop blinking for approximately 4 seconds indicating that the relay has learned the transmitter's ID address.
3. Once the light starts blinking again, more transmitters can be added or deleted. To delete that same switch from the relay's memory, press again one of the rockers on the Wireless Light Switch.
→ The green LED will turn **OFF** for approximately 4 seconds indicating the transmitter has been deleted from memory. Each time a rocker is pressed; the rocker will either be added to or deleted from that relay's memory.

Learn a Window/Door Sensor (Magnetic Contact)

Follow the following steps to program the Relay Receiver to LEARN the ID addresses of transmitting contacts:

1. Find the desired relay by repeatedly pressing the LRN button until the desired relay's green LED is blinking.
 2. Once the desired relay's green LED is blinking, press the red button inside the back cover of the Magnetic Contact.
→ The green LED will turn **ON** and stop blinking for approximately 4 seconds indicating that the relay has learned the transmitter's ID address.
 3. Once the LED begins blinking again, more transmitters can be added or deleted.
To delete a specific Magnetic Contact from a relay's memory, press the red button again.
→ The green LED will turn **OFF** for approximately 4 seconds indicating that the transmitter has been deleted from memory. Every time the red button inside the back cover of the Magnetic Contact is pressed, the Contact will either be added to or deleted from that specific relay's memory.
-

When operating in Window/Door Sensor Mode and one relay is dedicated to multiple sensors, one the status of the last sensor transmission is sent to the host.

Note: Make sure the sensor has been exposed to light long enough to store sufficient power in its energy store.

Exit Learn Mode

The Relay Receiver will exit Learn Mode after either of the following occurs:

- The LEARN button is held down for 2 seconds.
The green LEDs will no longer blink indicating that none of the Relays are in Learn Mode.
- After 30 seconds of inactivity, the relay receiver will automatically exit Learn Mode.

To test if the switches are working, press the switch's rocker and the green LED(s) that correspond with that relay will show the relay state. Do the same thing for the STM250 by moving the magnet towards or away from the contact.

Clear All

To clear the entire memory of the LVRX, hold down the CLR button for 2 seconds. This will clear the entire memory of the LVRX and it will automatically enter into Learn Mode.

Clear Relay

First enter Learn Mode by repeatedly pressing the LRN button until the desired relay's light is blinking. To clear one relay, hold down the clear button for 2 seconds. This will clear the entire memory for that relay.

Toggle (Secure) Mode and Momentary (Unsecured) Mode

After entering Learn Mode by holding the LRN button down for 0.5 seconds the green R1 light will start blinking every 1 second indicating that relay 1 is in Learn Mode. The 1 second blinking of the green LED also indicates that the LVRX is in Toggle/Secure mode. To change the LVRX into Momentary/Unsecured mode press the LRN button three more times until the green R4 light is blinking every 1 second. The LVRX is still in Toggle/Secure mode at this point but when the LRN button is pressed again the green R4 light will stop blinking and the Learn Mode will cycle back to Relay 1. The LVRX will now be in Momentary/Unsecured mode which is indicated by the green R1 light blinking every 0.5 seconds. To change the Learn Mode to relay 2, relay 3, or relay 4 (up to 8 for the LVRX-8) while the LVRX is in Momentary/Unsecured mode follow the same procedure pressing the LRN button until the green LED of the desired relay is blinking.

- a. Toggle and Momentary mode refer to EnOcean PTM Switches. Secure and Unsecured mode refer to EnOcean STM250 Magnetic Contacts
 - b. One relay can have transmitters in both toggle/secure mode and momentary/unsecured mode in its memory
-

5. Troubleshooting

For a new or pre-existing system:

- Verify the receiver is connected as specified.
- Verify the fixture operates without the switch in-line.
- Delete all assigned transmitters in the receiver (press and hold the CLR button for 2 seconds); then reprogram the receiver

If the receiver independently turns ON and/or OFF:

- This can occur when an unintended transmitter is activated within the receiver when a receiver was in Programming Mode.
- Clear all transmitters from the receiver; then reprogram the receiver

The receiver does not receive a transmitter command:

- Move the switch or Magnetic Contact closer to the receiver. If the system works at closer distance, the transmitter was installed outside the reception range or there was radio signal interference. In such instances, repeaters are a plausible solution and are available through your dealer.
- Mount the switch or Magnetic Contact or the receiver at a better location

Please note that 868 MHz band is used in the United States of America by trunk radios. In some locations close to trunking radio towers, decreased range may be noticed.

6. Contact Ad Hoc Electronics

As always, Ad Hoc RF engineers are dedicated to the success of your wireless projects. For questions or comments, please contact Ad Hoc Electronics technical support using any of the following means:

E-mail: support@AdHocElectronics.com
Telephone: (801) 225-2226
Web: www.AdHocControls.com

Business Hours: 8am – 5pm Mountain Standard Time