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## ZΩNEZ<sup>®</sup> - LT-L



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## Recommended Equipment for a Retrofit

Screwdrivers

Labeling device

Wire Cutter and Strippers

Cable Tie (shown to the right)

Wire Tie adhesive back (Shown to the right)



## Removing the Old System

Before removing old relays label all existing wires, line and low voltage. **BE AWARE OF THE FOLLOWING IMPORTANT INFORMATION.** Each relay will have a switch wire and a relay common wire connected on the low voltage side and on the line voltage side a wire to the load and a wire to the breaker hot. The Transverter shown on Figure 3.1 (in blue) is no longer needed. When the transverter is removed, label the Hot and Neutral that fed it from the breaker panel. There will likely be many relay common wires inside the low voltage section, one from each switch station in the home; all will have eventually connected to the transverter low voltage side. Be sure to label them and its fine to keep them together. They will be re-connected to the low voltage relay board Switch Common terminals. When removing line voltage load wires it helps to use a number scheme in sequential order. If any existing switches have an indicator light on the switch, the pilot transformer will also need to be removed. The low voltage side of the transformer will need the LED common wire labeled and the LED number labeled (this corresponds to the appropriate relay being on at the switch). Line voltage wires connected to the Pilot Light Transformer are no longer needed. When everything is labeled, the old relays can be removed.

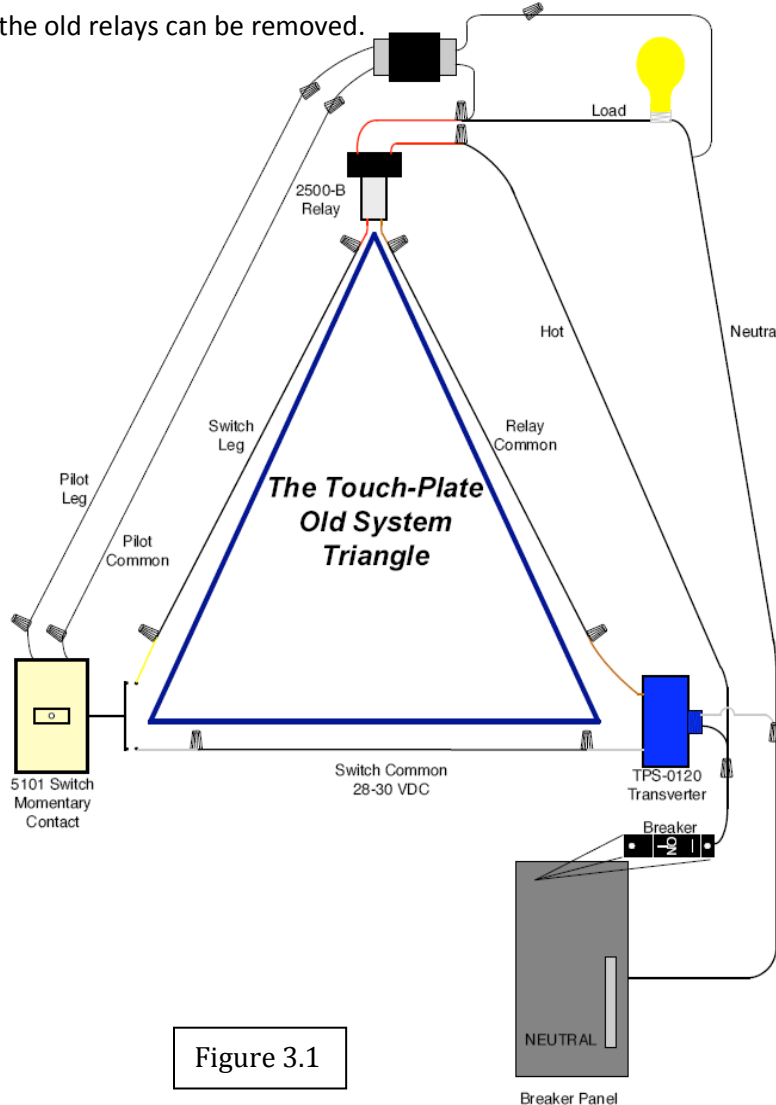


Figure 3.1

### Locating Items in the Panel

Figure 4.1 shows an entire panel with 12 relays. The Relay Board is either labeled 10071 or 10072. Each of these circuit boards has 6 relays on it and a power supply. The Low Voltage Relay Control Board will be labeled 10116 and it can control up to 6 relays and provides “All Off” and “All On” functions. In the panel the Low Voltage Relay Control Boards are almost always on the left side of the panel and the Relay Boards are almost always on the right side of the panel.

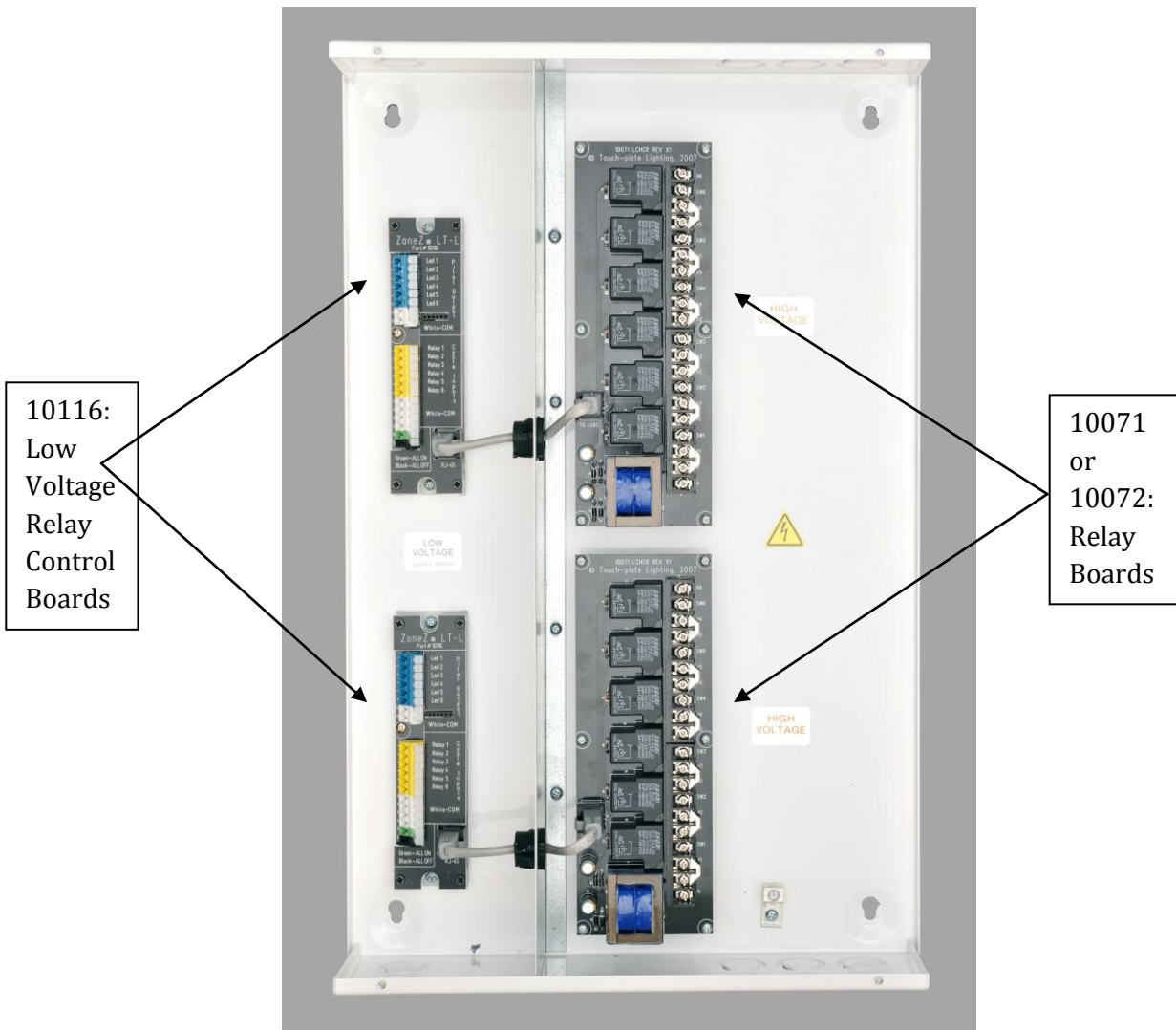


Figure 4.1

## Introduction to the Low Voltage Relay Control Board (10116)

Figure 5.1 shows a Low Voltage Relay Control Board labeled 10116. The low voltage switch control portion is comprised of 6 Yellow cage-clamp connectors, 4 White cage-clamp connectors, 1 Green cage-clamp connector, and 1 Black cage-clamp connector.

The Yellow connectors are the individual switch inputs for relays 1 through 6.

The White connectors are All Switch Common – it does not matter which one is used during the installation, there are 4 to help keep the wiring easier and cleaner.

The Green connector is ALL ON for the 6 relays directly connected to the low voltage board.

The Black connector is ALL OFF for the 6 relays directly connected to the low voltage board.

Figure 5.1 also shows that the low voltage board has LED control. The low voltage board LED control portion is comprised of 6 Blue cage-clamp connectors and 2 White cage-clamp connectors.

The Blue connectors are the individual LED inputs for LEDs 1 through 6.

The White connectors are ALL LED common – it does not matter which one is used during the installation, there are 2 to help keep the wiring easier and cleaner.

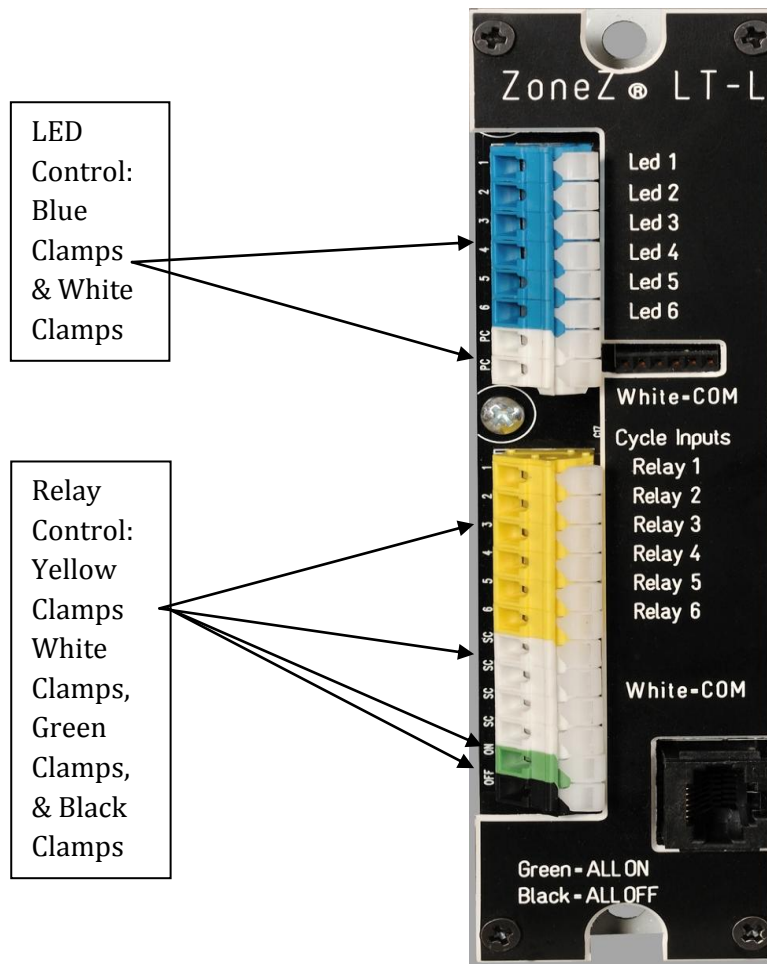


Figure 5.1

### Introduction to the Relay Board (10071 / 10072)

Figure 6.1 shows the 10071 Relay Board. The 10071 Relay Board has electronically held relays that are rated at 20AMPS. There are 6 relays per board and a transformer, which supplies power to the relay coils and the low voltage circuitry.

Figure 6.2 shows the 10072 Relay Board. The 10072 Relay Board has mechanically latching relays that are rated at 50AMPS. There are 6 relays per board and a transformer, which supplies power to the relay coils and the low voltage circuitry.



Figure 6.1

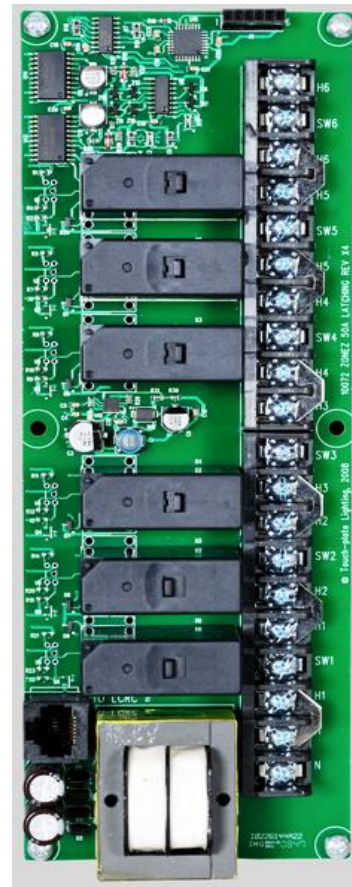


Figure 6.2

## Wiring the Low Voltage Relay Control Board (10116)

The Low Voltage Relay Control Board uses a descending order for the Switch Inputs (yellow connectors). The top Yellow cage-clamp connector controls Relay # 1, the second Yellow cage-clamp connector controls Relay # 2, the third Yellow cage-clamp connector controls Relay # 3, and descending order (4-6) for the following three Yellow cage-clamp connectors. Please note this descending order for the Switch Inputs. See figure 7.1 for visual description.

The White cage-clamp connectors are all Switch Common. Switch Common is the positive DC voltage (24 VDC), that is supplied to every wall switch. No matter how many low voltage switches are in the home, each of them has to have one wire per station that goes back to the 24 VDC, Switch Common cage-clamp connectors (White). Since every system has multiple Switch Common wires, there are 4 White, Switch Common cage-clamp connectors to keep the wiring easier and cleaner. If desired, all commons can be tailed together and landed in any of the Switch Common connectors (White). See figure 7.1 for visual description.

The Low Voltage Relay Control Board also uses a descending order for the LED Inputs (blue connectors). The top Blue cage-clamp connector controls LED # 1, the second Blue cage-clamp connector controls LED # 2, the third Blue cage-clamp connector controls LED # 3, and descending order (4-6) for the following three Blue cage-clamp connectors. Please note the descending order for the LED Inputs. See figure 7.1 for visual description.

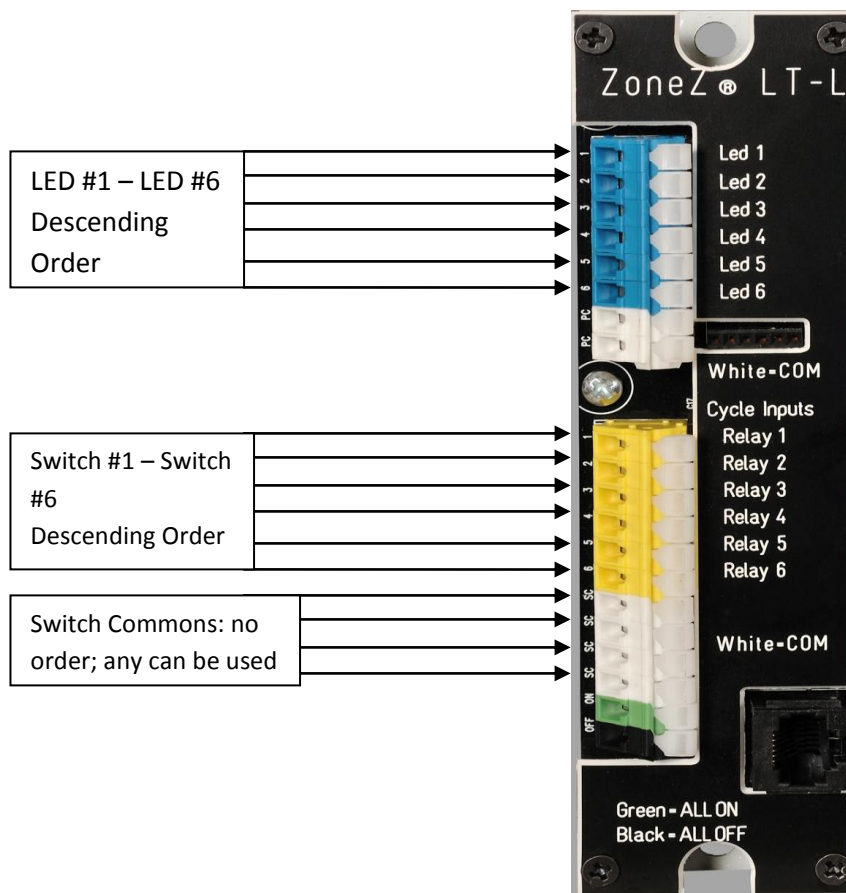


Figure 7.1

### Wiring the Relay Board (10071 / 10072)

The Relay Board (either 10071 or 10072) connects to the low voltage relay control board via patch cable. All Relay Boards have an on-board transformer and 6 relays. Relay Board # 10071 uses 20-AMP electrically held relays. Relay Board # 10072 uses 50-AMP latching relays. The transformer is wired from the circuit breaker panel with a Hot and Neutral feed.

Each relay on the Relay Board has a designation of “H1”, “H2”, “H3”, “H4”, “H5”, or “H6”. “H” stands for “HOT” and this wire must come from the circuit breaker panel. The relays do not need to have neutral feeds. The “SW” designations are the Switched Leg of the relay. These are the terminals for the wire that goes to the light fixture being controlled. See figure 8.1 for visual description. There are duplicates of each Hot feed. This is to provide “Jumpers” (metal pieces under the screw terminals on the 10071 or 10072 Relay Board). This allows the same breaker to feed all 6 relays on one Relay Board. If the lighting load is too much, a new circuit can be added to separate the relays, by removing the “jumper”. See figure 8.1 for visual description.

The Relay Board is numbered opposite of the Low Voltage Control Board. The numbers ascend on the Relay Board with Relay # 1 (SW1) as the lowest relay on the board. See figure 8.1 for visual description.

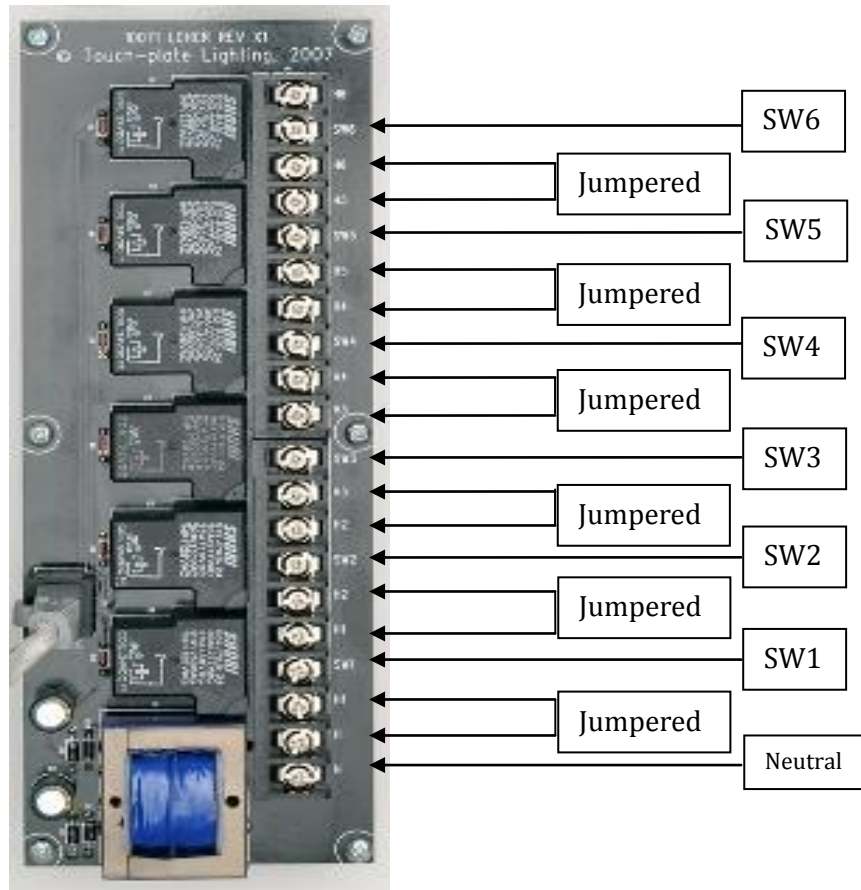


Figure 8.1

## On-Site Troubleshooting Test

To perform a test of the 120 VAC wiring the following steps need to be completed before the test.

1. Line voltage has been fed to each relay
2. Each light fixture is connected to the "SW" (Switched Leg)
3. 120 VAC power connected to the Transformer on the Relay Board

Once these steps are completed the test can be done to make sure of all the 120 VAC wiring is correct.

To begin the test, a short piece of thin low voltage wire is needed (stripped on both ends). With the wire, insert one end into one of the White cage-clamp connectors next to the Yellow cage-clamp connectors on the Low Voltage Relay Control Board. Using the other end of the wire, tap it to the conductive metal of each of the Yellow cage-clamp connectors, one at a time.

Each touch of the wire to the conductive metal of the cage-clamp connector will energize the relay and change the relay state. The lights in the respective room should go ON and / or OFF when the cage-clamp is touched. If the lights do not respond, a meter can be used on the line voltage relay outputs to see if the voltage switches from 0 to 120.

Once the test has proven the line voltage is correct and all relay assignments are understood, then wiring of the Low Voltage Relay Control Board can take place.

See figure 9.1 for visual description.

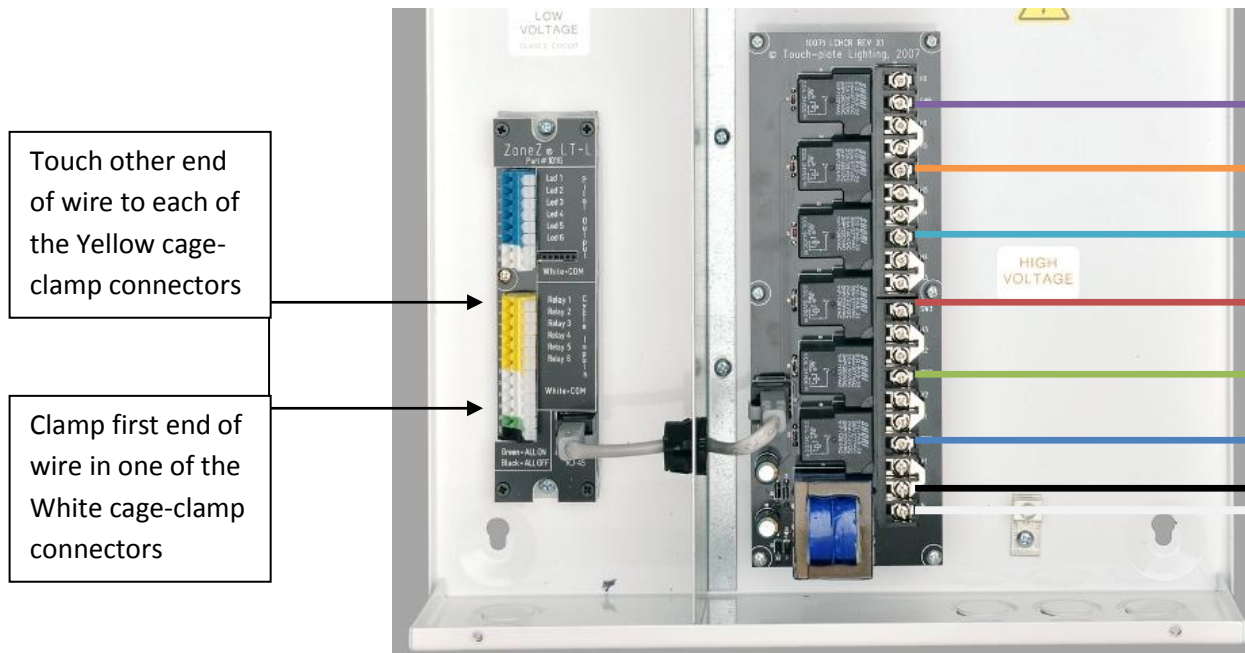


Figure 9.1

## Frequently Asked Questions

1. Why are there so many “HOTS” and what are “jumpers”?
  - a. There are many “HOTS” so power can be fed to all six relays without using wire nuts.  
We want to help make the installation be as neat and orderly as possible. The way that the power is fed to all six relays is by using “jumpers”. “Jumpers” are metal inserts that jump the previous “HOT” to the next “HOT”.
2. How can switch commons be tracked during a retrofit?
  - a. The first way is if the transverter is still present and connected, the Switch Common wire will have a positive 28 to 31VDC reading. The second way to track the common wires is to unscrew a switch from the wall and look at what color wire is used for the common. If it is not obvious from these methods, the final option is to use a ringer ( tone generator and receiver) and tone it out.
3. What do the functions “ALL ON” and “ALL OFF” do and how do I use them?
  - a. “ALL ON” turns all 6 relays of whichever relay board you have to the ON position, no matter what the previous state was. “ALL OFF” turns all 6 relays OFF no matter what previous state. It helps to wire line voltage loads to the same relay board that would be beneficial to go ON/OFF together to create a “Welcome” or a “Goodbye”. If you had a total of 6 relays taking care of exterior lights, garage light, foyer entry light, the All ON would be very useful. 6 loads within the Main living area of the home the same thing, a living room, great room, dining room could have a single switch to bring them ON or OFF, giving greater flexibility to the system.