PTI
SECURITY SYSTEMS

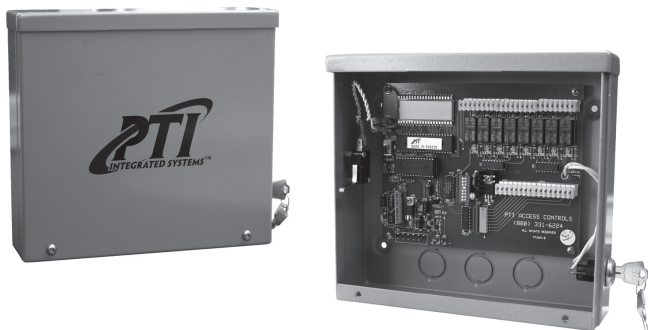# 8-Channel Relay Board

Installation Manual

www.ptisecurity.com   *800.331.6224*

SECURITY, ACCESS : CONTROL

Revised April 2012

ETL
LISTED
c   us

Thank you for purchasing the 8-Channel Relay Board. While every effort has been made to ensure the accuracy of the information in this document, PTI Security Systems assumes no liability for any inaccuracies contained herein. We reserve the right to change the information contained herein at any time and without notice.

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.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

⚠ This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his/her own expense, will be required to take whatever measures may be required to correct the interference.

⚠ Incorrect installation of electrical components can result in damage to electronics as well as personal injury.

⚠ Cross-wiring the AC power with DC power will damage the electronics.

⚠ Cross-wiring the Power wires with the Data wires will damage the electronics.

⚠ Cross-wiring the positive and negative on the DC part of the system will damage the electronics.

⚠ Do NOT run low voltage system wires in the same conduit as high voltage wiring.

Contents

Introduction

This is an installation manual for use in setting up the 8-channel relay board. This multi-use board has 8 relays and 8 inputs. The 8-channel relay can be used to control gates or doors, lighting zones, or an elevator in a building with up to 9 storeys. It can also be used as a shunt for alarms or photobeams or as a secure interior relay. The 8 door alarm inputs can be used to control the switches for up to 8 doors. Once the relay is installed, it is programmed through the access control system software.

Installation

The 8-channel relay board should be installed in an interior location that is secure from tampering. It can be mounted on a wall in a locking junction box; in an alarm room, security room, or elevator room; above a drop ceiling; or in another secure location. After installation, the relay board should be accessible for future maintenance or service. Once it is determined where to install the device, the location and purpose of the device should be noted on the site security wiring plan. See Figure 1.

Power and Data Communications Connections

The following procedure is used for installation as both an 8-Channel Relay and as a door alarm. The power and data communications wires are connected from the RS485 line coming from the controller or from another remote device. Once power and data communications are connected, refer to the additional installation instructions for the specific function required.

1. Open the housing by removing the two stainless steel button head machine screws on the front of the housing using the hex key provided with the unit. The faceplate will slide down and off. The faceplate can be mounted upside-down for easy reading of the label during installation.
2. Mount the back plate to the desired location using the four holes.
3. Pull the necessary wires through conduit into the housing. Each device should have the following wires:
- One 18 AWG, 4-conductor, shielded cable coming in from the controller or from the previous AI device in line.
- One 18 AWG, 4-conductor, shielded cable going out to the next AI device in line (if there is another AI device down the line).
- One earth ground wire
- Up to eight 18 AWG, 2-conductor cables coming from the gate operator, door strike, elevator, lighting zone, or other relay controlled device.*

* The 8-channel relay board can be used to control elevators in a 9 storey building, 8 lighting zones, up to 8 secure interior relays, or any number of other relay functions that can be programmed in the software.
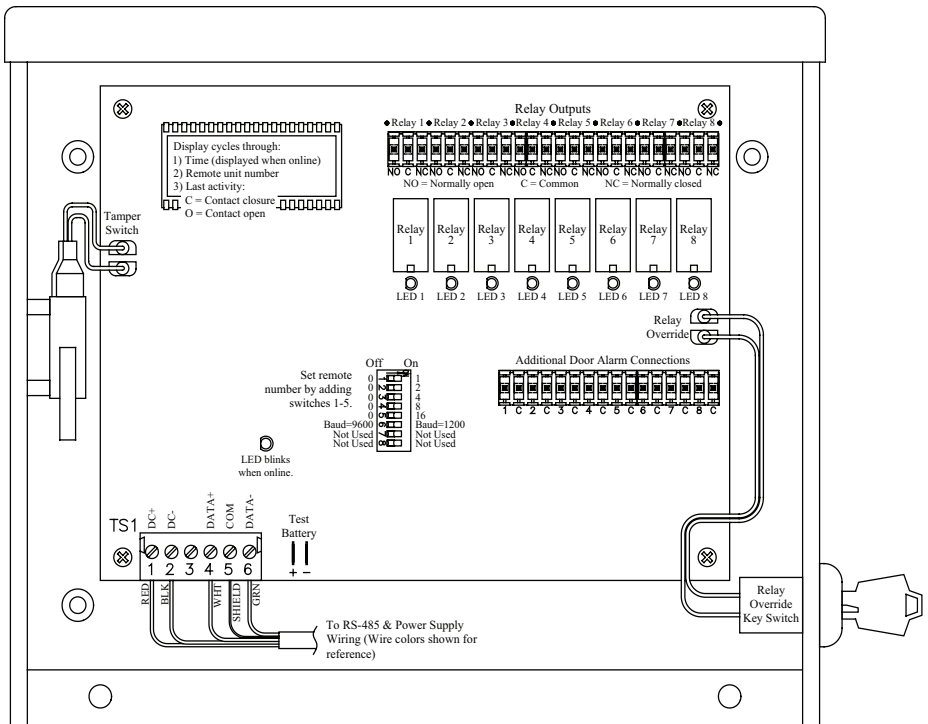
Relay Outputs

◆Relay 1 ◆Relay 2 ◆Relay 3 ◆Relay 4 ◆Relay 5 ◆Relay 6 ◆Relay 7 ◆Relay 8

NO = Normally open   C = Common   NC = Normally closed

Display cycles through:
1) Time (displayed when online)
2) Remote unit number
3) Last activity:
   C = Contact closure
   O = Contact open

Tamper Switch

| Relay 1 | Relay 2 | Relay 3 | Relay 4 | Relay 5 | Relay 6 | Relay 7 | Relay 8 |

LED 1 LED 2 LED 3 LED 4 LED 5 LED 6 LED 7 LED 8

Relay Override

Additional Door Alarm Connections

1 C 2 C 3 C 4 C 5 C 6 C 7 C 8 C

Set remote number by adding switches 1-5.

Off   On
0   1
0   2
0   4
0   8
0   16
Baud=9600   Baud=1200
Not Used   Not Used
Not Used   Not Used

LED blinks when online.

TS1

DC+ DC- DATA+ COM DATA-

1 2 3 4 5 6

RED BLK WHT SHIELD GRN

Test Battery
+ −

To RS-485 & Power Supply Wiring (Wire colors shown for reference)

Relay Override Key Switch

Figure 1: 8-Channel Relay Board Installation

4. Strip back the outer insulation and shield foil from both of the 18 AWG, 4-conductor, shielded cables (coming from the controller or previous AI device in line and going out to the next AI device in line), being careful not to cut the bare shield wire. Strip ¼ inch of insulation off the end of each of the individual colored conductor wires.

5. Remove the terminal block (TS1) from the circuit board by sliding it up and off. The terminal block may be somewhat difficult to remove as a tight electrical connection is necessary. If it is tight, rock it slightly back and forth while lifting away from the board.

6. Insert both red wires (coming in from the controller and going out to the next AI device) into terminal slot 1 on terminal block 1. Ensure that both wires are seated all the way inside the slot. Use a flathead precision screwdriver to tighten down the terminal screw. Verify that the terminal slot has tightened down on the copper wire and not on the rubber insulation. There should be no copper wire showing outside of the terminal slot. Gently tug the wires to verify that they are tightly held inside the terminal slot. Repeat this process with each of the remaining wire connections. See Figure 2.
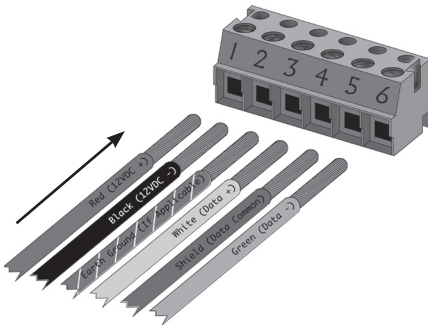
Terminal Block TS
1. Red DC+ *
2. Black DC- *
3. Earth Ground, if applicable
4. White Data +
5. Shield **
6. Green Data-

* If using AC power, place the AC wires in slots 1 and 2. We recommend using 12-18 VDC.
** Shield wire should be insulated with heat shrink or electrical tape.

Figure 2: Power and Data Communications Connections

7. Insert both black wires into terminal slot 2 of terminal block 1. Ensure that both wires are seated all the way inside the slot.

8. Insert the Data +, (white), common ground (bare), and Data – (green) wires into terminal slots 4, 5, and 6 of terminal block 1. Strip back 1/4" insulation from the end of the Data + and Data – wires. The common ground wire should be bare. Connect the Data + wire to pin 4 of TS1 by placing it in the fourth terminal block hole and tightening down with a precision standard screwdriver. Connect Data common ground to pin 5 and Data – to pin 6 in the same way.

9. After all of the wires are connected, the unit must be programmed with address and baud rate. Slide the dipswitches as necessary to create any address from 1 – 21 or 23 – 31 by adding the numbers on dipswitches 1 – 5. See Figure 3. *The address must be unique with no duplication.* Use a small screwdriver to slide the dipswitches located in the center of the board. The dipswitches are numbered 1 – 8 starting at the top.

Dipswitch	Off	On
1	0	+1
2	0	+2
3	0	+4
4	0	+8
5	0	+16

Figure 3: Dipswitch Positions for Addressing

Turn on a dipswitch to activate the number. Add together the activated numbers to set any address from 1 – 21 or 23 – 31. Do not set the address to 0 or 22 as these are for system communications. Once the address is set and the unit is communicating, the current time and unit number will flash on the display. The last door switch activity will also show if door switches are connected.

The baud rate is set on dipswitch 6. The baud rate must be set to match the rest of the remotes on the site. The baud rate can be set to either 1200 or 9600 bits per second. The default is 9600. (To set it to 1200, use a screwdriver to slide dipswitch # 6 to the right (on), however, in most cases, the baud rate should be set to 9600). Once all wiring is complete, slide the faceplate back onto the housing and screw it back together.

Dipswitch	Off	On
6	9600	1200

Figure 4: Baud Rate Settings

Installing the Relays

After initial installation, the device must be wired for use as an 8-channel relay. The relays can be used for alarm shunts, secure relays, elevators, or lighting zones.

> **Caution:** Relay boards should only be installed by qualified and licensed personnel; especially when connecting to gates, elevators, or high voltage.

The 8-channel relay board should be mounted in a secure location out of reach of the public but still easily accessible for maintenance (e.g., a security closet or in an office). Never install it in a locked unit. Device(s) connected to the 8-channel relay board should be mounted per manufacturer's instructions. The 8-channel relay board is weather-resistant; however, it should be mounted in a protected interior location.

1. The terminal strip along the top right of the board has 8 relays. From left to right, the first three pins are Relay 1; the next three are Relay 2, etc. Each relay connection consists of a Normally Open (NO), Common Ground (cg), and Normally Closed (NC) contact. Whether the NO or NC connection is used depends on the device being connected. Refer to manufacturer's instructions for more information. See Figure 5.
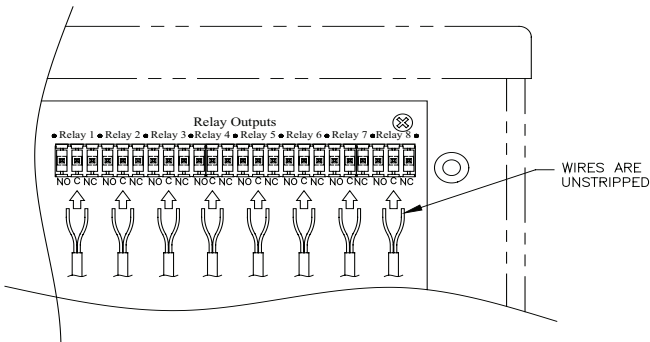

Figure 5: Relay Outputs

2. The relays on the board are low voltage only and must not be used for more than 30VAC or DC. For gate motors, door strikes, and certain lights using more than 30V, a contactor block should be used to handle the higher voltage.

3. The wires for each relay should be punched down on the terminal strip using a mux punchdown tool (Part # TMUXPDTOOL). Do NOT use a screwdriver, knife blade, or telephone punchdown tool.

   If you need to order a mux punchdown tool, contact Business Development at (800) 331-6224. To punch the wires down, remove the terminal strip by gently rocking it back and forth while pulling up and away from the board. Place the terminal strip on a hard surface and place the wires over the correct slots.

   CAUTION: It is highly recommended that the terminal strip be removed. DO NOT punch down the wires while the strip is still attached to the relay board as this can damage the board due to flexing.

4. Use the mux punchdown tool to firmly press the wires in place. There is usually an audible click as the wires seat down all the way.
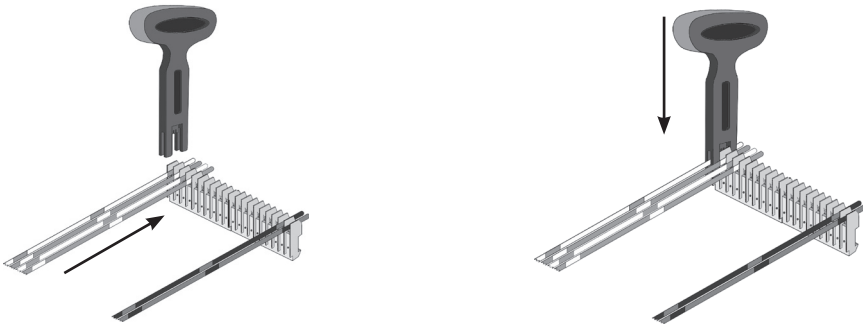
Figure 6: Punch Down Wires

5. Once all wires are punched down, use electrician's shears or wire cutters to trim the excess wire from the back of the terminal strip. Then push the terminal strip back onto the pins.

6. Once all relays are connected to the device(s) they control, the relay zones must be set up in the access control system software. See the software Help Files for information on setting up elevators and lighting zones.

Figure 7: Trim Wires

7. As each relay is activated, the LED immediately below the relay will light up for the duration that the relay is activated. This is useful for troubleshooting the relays. LED D15 is located in the lower right-hand area of the board. This relay will blink constantly when the 8-channel relay board is communicating with the controller.

   Next to the power and data terminal block (TS1) at the bottom right-hand corner are two poles (p6 and p7). A 9-volt battery can be temporarily connected to these poles for testing prior to connecting the 8-channel relay board to the controller.

   NOTE: DO NOT leave the battery connected to the poles after power is connected to the system.

8. The relay override keyswitch allows all of the relays to be overridden. Turning the keyswitch on will trigger all 8 relays at the same time. This switch can be connected to a manual override switch in the office or in a Knox box for fire department access.

Installing the Door Alarm Switches

After initial installation, the door switch contacts must be connected for use as a door alarm. These contacts can be used concurrently with the relays. The door switches can be used to monitor door switches, motion sensors, photo beams, or almost any other type of alarm switch. They can also be used in conjunction with a relay for alarm shunts. The door switch contacts cannot be used with supervised switches and do not have an RF filter. If these options are needed, a regular door alarm multiplexer must be used.

1. The terminal strip located in the middle right of the board, below the relays, is for inputs. From left to right, the first slot is channel 1 and the second slot is common ground. The third slot is channel 2 and the fourth is common ground. This repeats with every other slot representing another channel.

2. Use 22 or 24 AWG solid copper telephone wire for the door switch punch downs. This wire can be run from the 8-channel relay board to the individual door switches and spliced with 3M UG and UY2 connectors. For complete wire specifications and splice instructions, refer to the Wire Recommendations and Correct Splicing Techniques documents on our web site.

3. Punch down the door input wires as done when installing the relays. The wires for each switch should be punched down on the terminal strip using the mux punchdown tool (Part # TMUXPDTOOL). Do Not use a screwdriver, knife blade, or telephone punchdown tool.

   CAUTION: It is highly recommended that the terminal strip be removed. DO NOT punch down the wires while the strip is still attached to the relay board as this can damage the board due to flexing.

Switch 1		Switch 2		Switch 3		Switch 4	
Ch 1	C	Ch 2	C	Ch 3	C	Ch 4	C

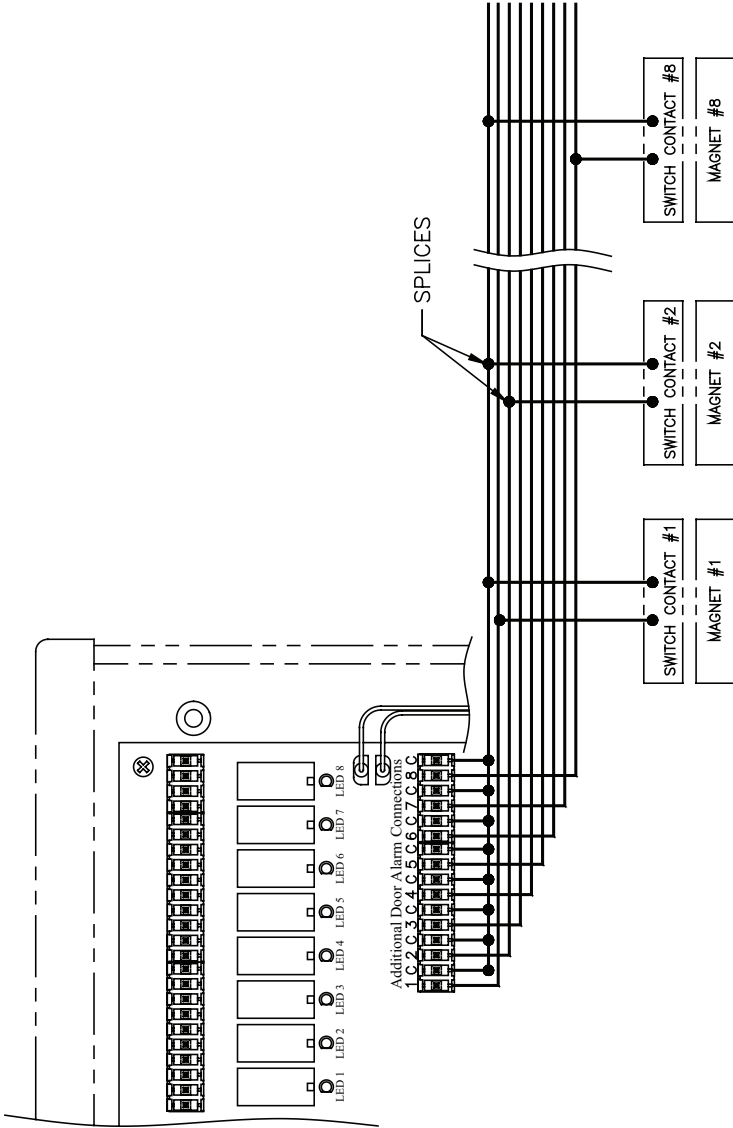| Switch 5		Switch 6		Switch 7		Switch 8	
Ch 5	C	Ch 6	C	Ch 7	C	Ch 8	C

Figure 8: Door Alarm Switch Connections

7

4. The display in the upper left-hand corner of the board shows the current time and remote unit number. The display will also show the last door switch activity for any door switches attached to the board. For example, it will display O-01 showing that channel 1 was opened or C-08 to show that channel 8 was closed. See Figure 9.
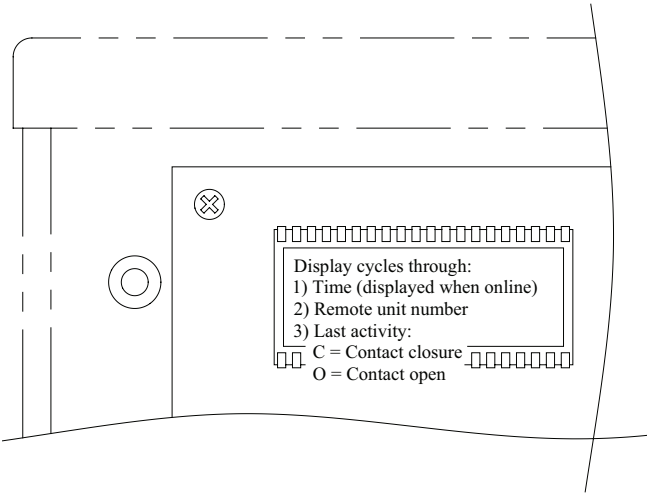

Display cycles through:
1) Time (displayed when online)
2) Remote unit number
3) Last activity:
  C = Contact closure
  O = Contact open

Figure 9: Door Alarm Display Information

5. If the door alarm connections are not being used or if there are unused channels, these need to be tied to ground. Loop a 22 or 24 AWG wire in and out of the unused channels. Punch this wire down in each. Loop the last end of the wire down into one of the common connections and punch it down. See Figure 10.
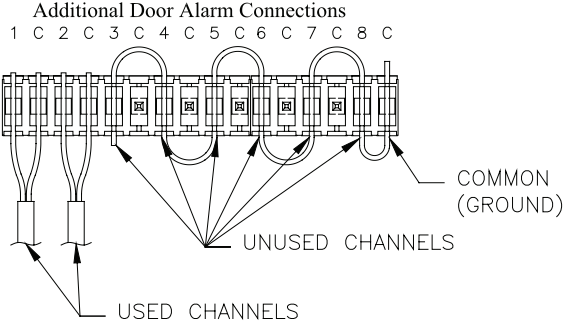

Additional Door Alarm Connections
1 C 2 C 3 C 4 C 5 C 6 C 7 C 8 C

COMMON (GROUND)

UNUSED CHANNELS

USED CHANNELS

Figure 10: Grounding Unused Channels

Possible Installation Wiring Diagrams

Secure Interior Relays

Secure interior relays are usually used in high security installations. The keypad (or other access device) is located outside the secured area to allow users to enter their code for access. However, the access control system software is programmed to trigger the relay inside the relay board or on the controller to actually open the secured door or gate. The relay inside the keypad or other access device is not used. This prevents someone from opening the keypad and placing a jumper over the relay wires to gain access.
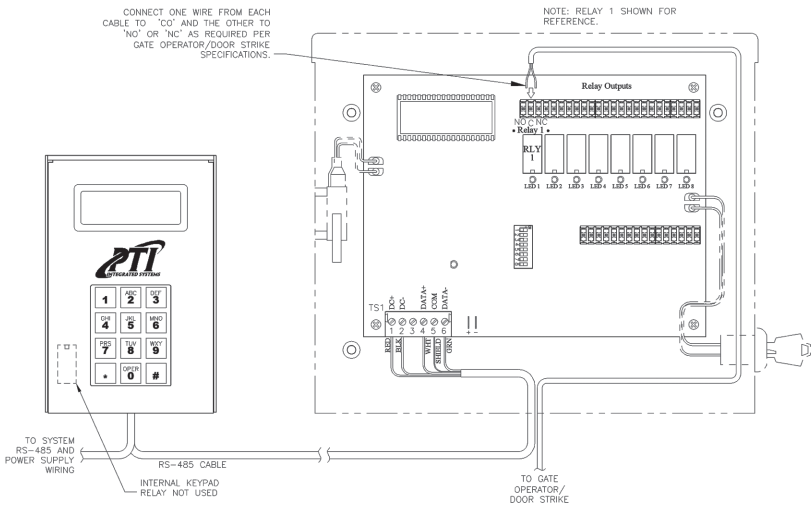

Figure 11: Secure Interior Relay for Keypads

Alarm Shunts

Alarm shunts are used to allow exit from a specific alarmed door or through an area covered by motion sensors by holding the relay for a certain amount of time. This allows the manager to set a door alarm, photo beam, or motion sensor while inside the zone and still be able to exit the zone without triggering the alarm. The alarm will be set after the preset relay time has run out.

Typical uses for alarm shunts are on properties with a perimeter beam or in a building with a motion sensor alarm. The alarm shunt allows a delay (for example 1 minute) for the manager to pass through the gate before activating the perimeter beam or the motion sensor.
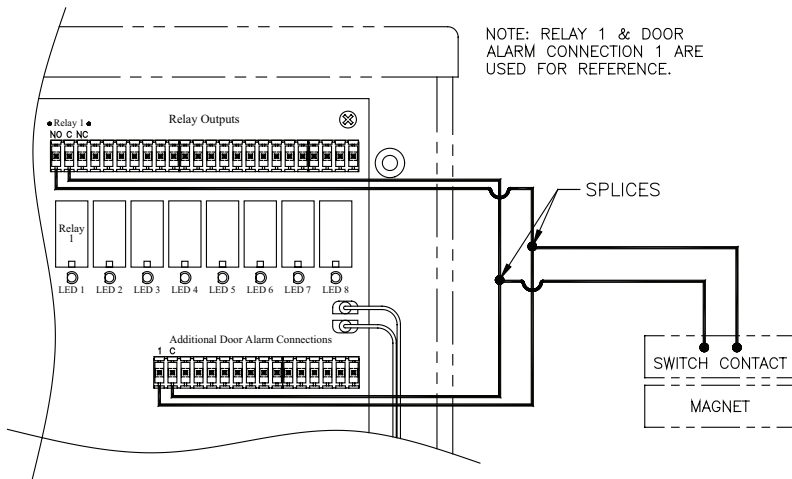

Figure 12: Alarm Shunt Connections

Elevator Controls

When the elevator floor controls are connected through the 8-channel relay board, only customers with units on a certain floor may gain access to that floor. The elevator buttons will not function until the user inputs a valid access code. Then, only the button(s) to the floor(s) the user has access to will become operational. An 8-channel relay board can control an elevator on a 2 to 9 storey building.

Caution: High voltage relay connections (over 30V) must be run through a contactor block as this exceeds the relay tolerances on the 8-channel relay board.

Elevator controls are subject to local fire and safety regulations. It is important that the ground floor is never controlled to allow customers on any floor to return to the ground floor at any time. Also, stairwell access should be limited. Customers should be able to exit into a fire stairwell from any floor but not access other floors from the stairwell. Refer to local fire codes for specific requirements in your municipality. In most cases, elevator connections must be made by the elevator installer. Plan ahead to have the elevator installer present to install and test the connections. Programming for this feature is covered in the software Help Files.
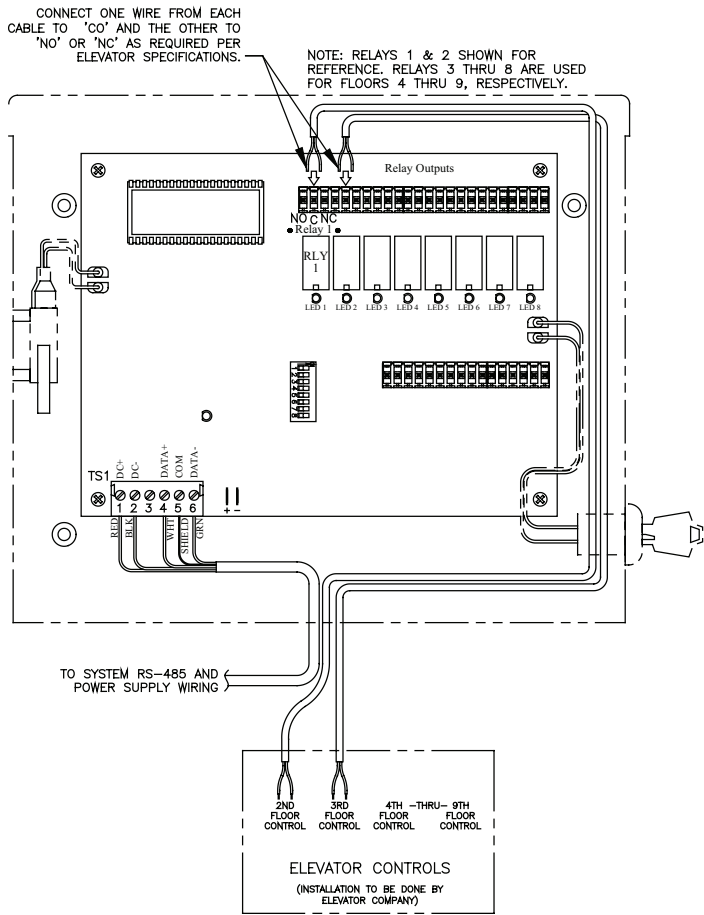

Figure 13: Elevator Controls

Lighting Zones/Photo Beams

Lighting zones are used to control lights for power conservation on a site or photo beams for access control. By connecting hallway lights to the 8-channel relay board via a contactor block, the lights can remain off until a customer whose unit is in that hallway logs onto the site at a keypad. Once they log on, the lights will come on while that customer is on-site and turn off when they log off. Photo beams can be used in the same way, securing an area until a customer whose unit is in that area comes on-site. Then the beam will be shut off until the customer logs off the site. An 8-channel relay board can control up to 8 lighting zones. Programming for this feature is covered in the software Help Files.

Caution: High voltage relay connections (over 30V) must be run through a contactor block, as lighting zone controls exceed the relay tolerances on the 8-channel relay board.
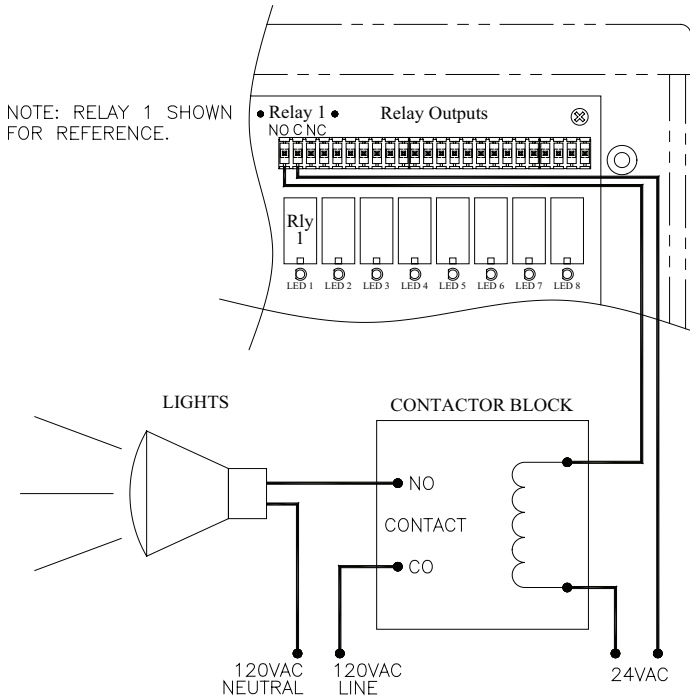

Figure 14: Lighting Zone Controls

Warranty & Disclaimer

PTI Security Systems warrants its products and equipment to conform to its own specifications and to be free from defects in materials and workmanship, under normal use and service, for a period of one year from the date of shipment. Within the warranty period, PTI Security Systems will repair or replace, at its option, all or any part of the warranted product which fails due to materials and/or workmanship. PTI Security Systems will not be responsible for the dismantling and/or re-installation charges. To utilize this warranty, the customer must be given a Return Material Authorization (RMA) number by PTI Security Systems. The customer must pay all shipping costs for returning the product.

This warranty does not apply in cases of improper installation, misuse, failure to follow the installation and operating instructions, alteration, abuse, accident, tampering, natural events (lightning, flooding, storms, etc.), and repair by anyone other than PTI Security Systems. This warranty does not warrant the replacement of batteries that are used to power our products.

This warranty is exclusive and in lieu of all other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. PTI Security Systems will not be liable to anyone for any consequential or incidental damages for breech of this warranty or any other warranties.

This warranty will not be modified or varied. PTI Security Systems does not authorize any person to act on its behalf to modify or vary this warranty. This warranty applies to PTI Security Systems products only. All other products, accessories, or attachments used in conjunction with our equipment, including batteries, will be covered solely by their own warranty, if any. PTI Security Systems will not be liable for any direct, incidental, or consequential damage or loss whatsoever, caused by the malfunction of product due to products, accessories, or attachments of other manufacturers, including batteries, used in conjunction with our products.

The customer recognizes that a properly installed and maintained security system may only reduce the risk of events such as burglary, robbery, personal injury, and fire. It does not insure or guarantee that there will be no death, personal damage, and/or damage to property as a result. PTI Security Systems does not claim that the Product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire, or otherwise, or that the Product will in all cases provide adequate warning or protection.

PTI Security Systems products should only be installed by qualified installers. The customer is responsible for verifying the qualifications of the selected installer.

PTI Security Systems shall have no liability for any death, injury, or damage, however incurred, based on a claim that PTI Security Systems Products failed to function. However, if PTI Security Systems is held liable, directly or indirectly, for any loss or damage arising under this limited warranty or otherwise, PTI Security Systems's maximum liability will not in any case exceed the purchase price of the Product, which will be fixed as liquidated damages and not as a penalty, and will be the complete and exclusive remedy against PTI Security Systems

Warning: The User should follow all installation, operation, and maintenance instructions. The User is strongly advised to conduct Product and systems test at least once each week. Changes in environmental conditions, electric or electronic disruptions, and tampering may cause the Product to not perform as expected.

Warning: PTI Security Systems warrants its Product to the User. The User is responsible for exercising all due prudence and taking necessary precautions for the safety and protection of lives and property wherever PTI Security Systems Products are installed. PTI Security Systems does not authorize the use of its Products in applications affecting life safety.

Notice. Some PTI Security Systems products use 900Mhz wireless technology. Other devices at the site such as cordless telephones or alarm components may cause interference that will disrupt the operation of the system or may be interfered with by the system. PTI Security Systems assumes no liability for any problems caused by interference. It is the sole responsibility of the user to identify and correct such problems.

For Technical Support, Please Visit:
support.ptisecurity.com

www.ptisecurity.com