



Stronghold™ Zone Protection System™

User's Guide
and
Installation Manual

Important: Read the Stronghold Zone Protection System Limitations section on the next two pages to ensure that your new system is the right choice for your situation. If not, return the products under the terms indicated for refund.

See important updates and operation tips on our website:

strongholdsystems.net

Disclaimer

Stronghold Systems, Idea Storm, Inc., their distributors, and affiliates disclaim any liability resulting from the use of this product or components, including, but not limited to, code violations, noise ordinance violations, failure to stop one or more intruders or other hostile perpetrators, pain and suffering to any persons or animals, vehicular accidents resulting from installation therein, operator or bystander liability, and photosensitive epilepsy. Device specifications may be subject to change without notice. Install and use at your own risk. By installing and using this or any other Stronghold products, the user agrees to accept all risk and potential liability.

FCC Compliance Statement

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.

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Stronghold Zone Protection System Limitations

Crime, especially violent crime, is a complex problem. From regional differences, including different criminal behavior in low-risk versus high-risk areas, to a patchwork of laws and regulations regarding what is considered an acceptable response by home and business owners, this complexity means that the system installer and home or business owner must consider a variety of factors in where, how and whether to install or operate the Stronghold Zone Protection System in any given circumstance. This section describes some of the factors to consider when installing or operating this system.

Due to the nature of this system, none of these items have been tested in a clinical or scientific setting against actual, unwitting subjects. System components have been tested in informal settings with volunteers who were fully informed about the system and its actual versus perceived effects prior to allowing them to experience the system effects. In this setting, knowing that the system, particularly the acoustic deterrent, produces nominally ear-safe values, volunteers were able to overcome the psychological effects and work through the perception of pain and distraction. Even so, some volunteers noted physiological effects such as lingering disorientation, nausea and confusion. Some volunteers were able to navigate a predetermined obstacle course, while others were able to perform a predetermined delicate task similar to picking a lock, although at reduced productivity.

The acoustic deterrent is designed to produce a temporarily safe level of 124 dB of nominal output at one meter, although this value may vary slightly from unit to unit. Because of acoustic reflection and amplification or interference in any given installation due to obstructions or reflectors, the sound level at any given point is impossible to predict. Take this potential variation into account when planning any installation.

The acoustic deterrent is most effective on people with normal hearing. However, some people with damaged hearing may not fully experience the desired psychological effects. In addition, prospective perpetrators may attempt to defeat the system by wearing hearing protection as noted elsewhere in this document. Conversely, elderly or other hearing-compromised persons exposed to the acoustic deterrent in the home or office may not recognize the immediate effects, but still suffer the lingering physiological effects afterward.

The strobe deterrent may produce additional, undesired areas of coverage due to reflections by mirrors or other reflective surfaces, such as display cases, or any glass or glass covered objects. Carefully examine all objects in the vicinity of the strobes to determine whether any such reflective surfaces can cause undesired effects.

After exposure to system components, individuals, including the legitimate home or business occupants, may be disoriented and unable to safely navigate obstacles such as stairs or escape ladders. Before installing and operating this system, determine whether protected occupants will be exposed to system effects before or while performing important tasks or physical activities.

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Some perpetrators, such as drug users or hyper-excited perpetrators, may be resistant to some or all system effects or may react in unexpected ways. Exposure to some system effects may cause seizures in some individuals.

The voluntary or involuntary expulsion of bodily fluids or feces by any persons exposed to system effects, or the contamination of floors, furniture and nearby objects by blood or blood spatter resulting from injuries sustained in attempts to flee or otherwise avoid these effects, may create an additional biohazard to the legitimate occupants.

Any non-lethal deterrent system must be considered as only one part of a comprehensive security plan and response. Do not rely on this system, or any system or devices, as a complete and effective security solution. Instead, treat this system as an important component which can create a temporary advantage, allowing the operator additional time and flexibility to employ other appropriate measures.

Although this system is not a weapon, neither is it a toy; install and operate this system with the same care and sense of responsibility that one would use when selecting and operating a weapon. Keep in mind that some jurisdictions may classify non-lethal systems or components of various kinds as weapons or other dangerous devices and regulate their possession and use. It is the responsibility of the home or facility operator to become fully informed about these local restrictions.

If after reading this information you come to the decision that this system is not appropriate for you or your situation, return the uninstalled portions in their original condition for a complete refund of your purchase price (shipping excluded). Some installed or user-modified portions may be subject to a restocking fee at the sole discretion of the retailer, who may determine this restocking fee after inspection of the returned components. Our primary concern is your safety and peace of mind.

Overview

The Stronghold system, with the installation of one or two zone protection kits, can protect one or two point, area or entrance zones, as defined later in this guide.

A single Zone Protection System can operate as a stand-alone installation, or it can be integrated with existing security systems. This integration can either be upstream (meaning it triggers the security system), or downstream (meaning it is triggered by the security system), or both. Multiple Stronghold systems can also be chained together to allow a practically unlimited number of zones to be protected.

Stronghold Benefits to Operators

- Low-cost and fully-integrated protection solution compared to expensive, piece-meal alternatives.
- Use to protect saferoom or emergency shelter entrances, or high-risk point-of-sale stations, such as convenience stores, pharmacies, jewelry stores, pawn shops or other high-value retailers.
- Can reduce or prevent employee or bystander claims for liability.
- Provides a non-lethal option to complement armed security in high-risk installations.
- Provides protection for medium-risk installations that may otherwise be unprotected.
- Low-voltage wiring (12 volts) avoids costly code or union installation issues in some areas.
- Uses normal two- or four-wire security system cable, no special cables required.
- Strong 16 gauge control and power panel enclosure can securely host other components if desired.
- Lithium iron phosphate battery in control and power panel simplifies maintenance.
- Multiple installation and wiring alternatives increase flexibility.
- Do-it-yourself installation option decreases risk of detection or anticipation.
- High-capacity battery ensures system availability even during a prolonged power outage.

Technical Specifications

Stronghold Acoustic Deterrent

- FCC verified for conducted and radiated emissions, report available upon request
- Industry Canada ICES-003 verified, report available upon request
- 122-124 dB output (typical at 1 meter)
- Spread-spectrum deterrent tone increases perception of pain
- Integrates easily with existing alarm panels (12v input)
- Simple 2-wire installation (connect to panel's bell output as with traditional siren)
- Large, user-friendly terminal block (no splicing or wire nuts required)
- Low current draw: 180mA (maximum in burglary mode)

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- Separate, non-painful 104 dB fire alarm buzzer tone (compatible with temporal-3 coded input)
- No proprietary batteries or other consumables
- Thick, protective ABS case
- Unobtrusive, decorator-friendly white
- Custom colors available (minimum order quantities and leadtimes apply)

Stronghold Strobe Deterrent

- FCC verified for conducted and radiated emissions, report available upon request
- Industry Canada ICES-003 verified, report available upon request
- Approximately 3000 peak lumens
- Randomly timed pulses increase disorientation
- Integrates easily with existing alarm panels (12v input)
- Simple 2-wire installation (connect to panel's bell output as with traditional siren)
- Large, user-friendly terminal block (no splicing or wire nuts required)
- Low current draw: 250mA (maximum in burglary mode)
- Separate, non-disorienting fire strobe mode (compatible with temporal-3 coded input)
- No proprietary batteries or other consumables
- Thick, protective ABS case with armored sloping walls
- Unobtrusive, decorator-friendly white
- Custom colors available (minimum order quantities and leadtimes apply)

Stronghold Control and Power Panel

- FCC exempt
- Drives up to two protection zones per unit, can be chained for additional zones.
- Strong, 16 gauge steel case, with grommets and other mounting hardware supplied
- Powered by a small 12 volt wall adapter
- Stronghold power completely independent of, and complements, existing security system power
- 4.5 Ah lithium iron phosphate (LiFePO4) battery drives system in active mode for hours during power loss, weeks in standby
- Roomy 10" x 8" x 4" case, with a variety of conduit knockouts, makes wiring and cable routing easier
- Larger upgrade cases available to contain separate security system components if desired
- Auxiliary power output available for additional devices

Unpacking the Zone Protection System

Open the shipping carton and remove the Zone Protection Kit(s). If you purchased a single zone system, one Zone Protection Kit will be enclosed. If you purchased a dual zone system, two Zone Protection Kits will be enclosed. Each Zone Protection Kit is packaged in a long, white box, and contains one acoustic deterrent, two strobe deterrents, and an accessory kit with screws and mounting hardware for all three deterrent units.

Next, remove the gray control and power panel cover and set aside.

The bottom of the carton contains the gray control and power panel enclosure, the battery in a carton, and the charger and accessory kit in a small white box wrapped in paper. Remove the charger and accessory box from the carton and the paper and set aside. Remove the battery carton, and remove the control and power panel enclosure.

Remove the blue shipping tape holding the battery cable inside the control and power panel. Open the charger and accessory kit box, and you will find the charger, the wiring grommet and the screw kit for the charger enclosure.

Single Zone Protection System Contents

- One each steel control and power panel enclosure, with front cover
- Five each self-tapping screws for the cover and optional ground connection
- One each knockout panel grommet
- One each 4.5 mAhr, 12 volt lithium iron phosphate battery
- One each control panel circuit board, with attached battery terminal wires
- One each 1.5 amp AC charger
- One each Stronghold Acoustic Deterrent
- Two each Stronghold Strobe Deterrents
- One each deterrent installation fastener pouch

Dual Zone Protection System Contents

- One each steel control and power panel enclosure, with front cover
- Five each self-tapping screws for the cover and optional ground connection
- One each knockout panel grommet
- One each 4.5 mAhr, 12 volt lithium iron phosphate battery
- One each control panel circuit board, with attached battery terminal wires
- One each 1.5 amp AC charger
- Two each Stronghold Acoustic Deterrent
- Four each Stronghold Strobe Deterrents
- Two each deterrent installation fastener pouches

Deterrent Patterns

Acoustic Deterrent Pattern

The Stronghold Acoustic Deterrent projects a sonic beam that is approximately pear shaped, about 16 to 20 feet long, and 8 to 10 feet above, below and to either side of center.

The acoustic deterrent becomes more intense the closer a hostile comes to the device, reaching the 124 dB rated level at approximately three feet from the device. On the walls to either side or below the device, there are relative dead zones in coverage, but these may be covered by reflections from walls or objects in the room. The acoustic deterrent may be placed on the wall or on a ceiling, depending on the type of coverage desired, as noted in the sections which follow.

Strobe Deterrent Pattern

The Stronghold Strobe Deterrent projects a visual beam that has two components which blend together into one overall pattern. When mounted flat against the wall, lens down, the beam is a wide fan, approximately sixty degrees to the centerline, and from nearly horizontal to about sixty degrees down. An intense region exists at approximately thirty to forty-five degrees down from horizontal.

The strobe deterrent is best mounted on a wall, allowing the powerful horizontal fan to be placed slightly above eye-level of the anticipated hostile. Seven feet above the floor is a recommended position, although in close quarters slightly lower may produce better results if the hostiles are expected to be very close to the strobe. For applications far away from the strobe, higher mounting will better place the hot-spot of the beam closer to eye level at a distance. The higher than eye-level mounting makes it more difficult for a hostile to damage or destroy the device.

The powerful near-horizontal beam causes the tendency to duck, lower the head, or look away. The remaining beam component helps protect the device and keep the hostiles from looking at it from below or the sides during an attempt to disable or destroy it.

A legitimate occupant, standing beside or slightly in front of the strobe, will receive no direct effects when looking toward the hostiles. The legitimate occupant may, however, receive indirect effects from reflections of the strobe from objects in the room.

Site Planning

Before installing a Stronghold Zone Protection System, first determine a proper installation site. Zones which can be protected can be described as either points, entrances or areas. A dual zone protection system can protect any combination of two of these. Additional zone protection systems can be chained together to protect a larger number of these zones, in any combination.

Once the type(s) of installation has been determined, the system components can be installed for maximum deterrent effect, including causing the hostile to delay or abandon his plans. Time taken by the hostile(s) to defeat the system gives the operator of the system additional time to take other safety measures. Plus, the act of defeating the system in any configuration can help establish hostile intent by the perpetrators.

Point Zone Protection

A point zone refers to a specific point that you wish to deny to a hostile, such as the customer location at a point of sale. The main idea is that the hostile must use his hands to protect his ears, he must close his eyes or use his hands to shield his eyes, and he must use his hands while attempting to threaten the clerk with a weapon. The resulting dilemma causes confusion and delays his originally planned action.

For the most effective point zone protection, place the acoustic deterrent on the ceiling above the point zone where the hostile would stand. This denies this location to the hostile, without unduly affecting the clerk, who is outside the main beam of the acoustic deterrent, or hiding behind the counter. The strobes are placed on the wall behind the clerk, one to either side, facing the hostile, so that the hostile cannot readily see or threaten the clerk, while the clerk can still see the hostile.

In this type of installation, the clerk, being outside the main beam of the acoustic deterrent and not facing the strobes, is protected from system effects by geometry.

The triggering devices may be one or any combination of panic buttons, hold-up switches, kick bars or plates and so on. These third-party devices may be purchased from a variety of sources or may already be installed. These triggering devices, or the existing security system, may be used to trigger the zone protection system as detailed elsewhere in this guide. In addition, the zone protection system can itself trigger the security system, or operate as a separate or sole stand-alone system.

Dual zone protection may be provided in this case by simultaneously protecting two points of sale. Multiple zone protection systems may be chained together to protect as many such zones as desired.

Entrance Zone Protection

An entrance zone refers to the doorway at the entrance to a bedroom, saferoom, office, classroom or shelter. The main idea is that the hostile must use his hands to protect his ears, he must close his eyes or use his hands to shield his eyes, and he must use his hands while attempting to defeat the door with tools. The resulting dilemma causes confusion and delays his originally planned action.

For the most effective entrance zone protection, place the acoustic deterrent on the ceiling above where the hostile would stand at the entrance, while the strobes are placed on either side of the entrance so that the hostile cannot readily face the door he is attempting to breach. In a more limited space or to simplify wiring, the acoustic deterrent may be placed on the wall behind the hostile or to the side, and facing him at head level. Similarly, the strobes may be placed on walls to the side and near the hostile, interfering with peripheral vision, or direct vision if the hostile turns his head to either side.

In this installation, the occupants are protected from the system effects by the door. Should the door be eventually breached, the occupants, outside the beam of the acoustic deterrent and not directly facing the brightest portions of the strobes, are protected by geometry. Accordingly, the least favored position of the acoustic deterrent is on the wall facing into the room as this would allow the beam into the room once the door was breached. Worst case, however, the hostile would still receive the majority of the acoustic effects versus the occupants.

Dual zone protection may be provided in this case by simultaneously protecting two entrances, or the second zone may be an area (see below) to limit approach to the protected door. Multiple zone protection systems may be chained together to protect as many such zones as desired.

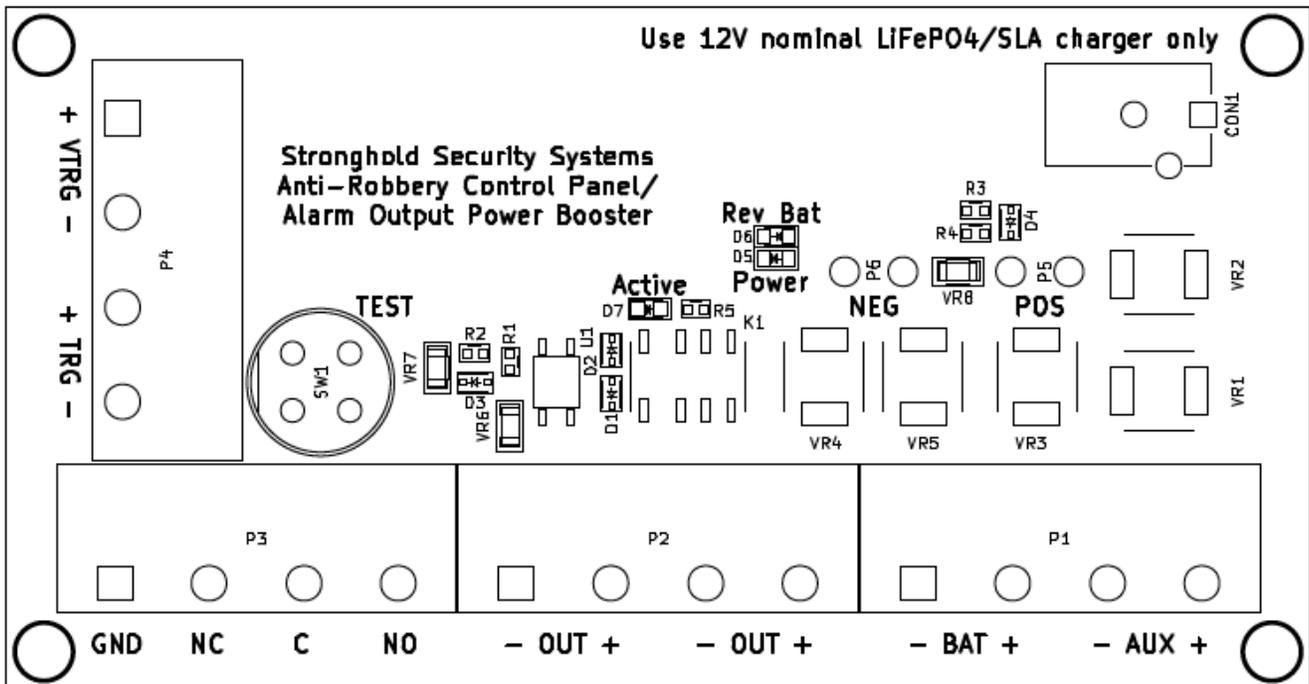
Area Zone Protection

An area zone refers to a larger area, such as a hallway, room or foyer, in which hostiles are to be denied comfortable occupancy. For planning such an installation, consider the likely entry point into the room by a hostile. Install the acoustic deterrent and the strobe deterrent to have effect on the hostiles as they attempt to enter the room, and so that the effects are facing away from any legitimate occupants entering or fleeing the room through doors deeper into the structure.

Control And Power Panel Connections

While planning a zone protection system installation, it is important to know what resources and options the control and power panel provides. In this section we describe the resources available on the circuit board. The next section will describe how to use these resources in specific situations.

The circuit board contained in the control and power panel is shown below:



The essential elements of this circuit board are discussed in this section.

Charger Jack

Located to the upper right of the control panel (CON1 in the figure), the charger is plugged into this jack to charge the battery and to operate the system while AC utility power is available.

Test Switch

To test the system, press the red test button (SW1 in the figure) in the lower left of the control panel. This momentarily simulates an external contact closure trigger while the button is pressed.

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Indicator LEDs

Rev Bat: This red LED (D6 in the figure) illuminates if the battery terminals are reversed.

Power: This green LED (D5 in the figure) illuminates if either battery power or AC power, or both, is applied.

Active: This yellow LED (D7 in the figure) illuminates if the alarm condition is active, assisting with testing the circuit to verify that the contact closure or voltage trigger has been successfully applied.

Power Terminal Block

The power terminal block (P1 in the figure) contains four terminal locations, arranged as two pairs, as described below:

- BAT +

The 12 volt lithium iron phosphate battery is connected to this terminal pair. As shipped, red and black battery terminal wires are pre-connected to these terminals.

- AUX +

The 12 volt battery power is available at these terminals, limited to 2 amps by a separate PTC fuse.

Output Terminal Block

The output terminal block (P2 in the figure) contains two identical terminal pairs, as described below:

- OUT +

- OUT +

These terminal pairs are used to connect downstream devices such as the acoustic deterrent and strobe. When the control panel is in the alarm state, 12 volts is supplied here to all downstream devices.

Each output pair is limited to 2 amps by a PTC fuse. We recommend that each zone protection kit of one acoustic deterrent and two strobes be assigned to separate outputs for fault tolerance, although many combinations are possible.

Other output devices may be connected to these terminals, including a voltage trigger for a downstream security system panel.

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Relay Contact Terminal Block

The relay contact terminal block (P3 in the figure) contains four individual terminals, as described below.

GND

Electrical ground for the entire system is provided here if needed.

NC, C and NO

These three terminals are a Form C alarm output relay. The relay is active when the panel is in an alarm state. A common use for this relay output is to trigger a panic zone on an existing security panel, either as an NC or NO input, as appropriate.

External Trigger Terminal Block

The external trigger terminal block contains two terminal pairs, as described below:

+ VTRG -

An external triggering voltage, nominally 12 volts, is applied to this terminal pair to place the control panel into the alarm state. The alarm state persists while this voltage is applied; under no circumstances does the Zone Protection System latch the alarm state. A common source of this signal is the siren output of an existing alarm panel.

+ TRG -

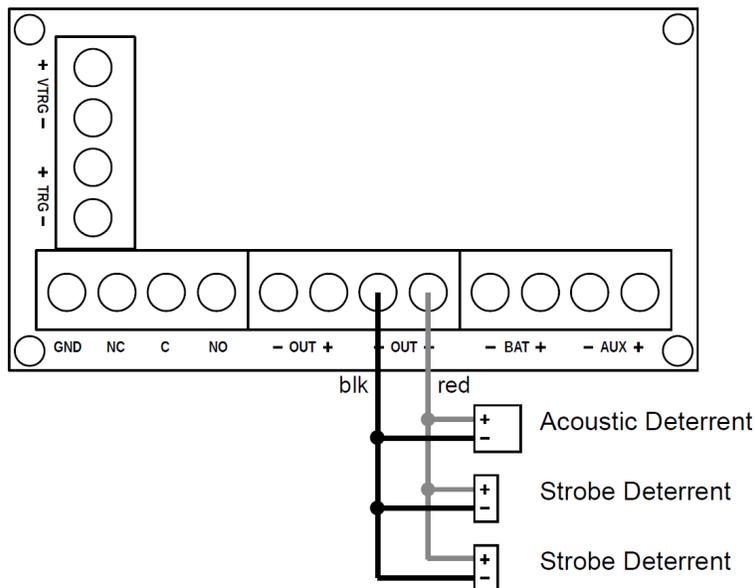
An external triggering contact closure applied to this terminal pair places the control panel into the alarm state. The alarm state persists while this contact closure is applied; under no circumstances does the Zone Protection System latch the alarm state. A common source of this signal is any normally-open contact closure input such as a kick bar, panic button or hold-up switch. Any external contact closure device which itself latches must be reset per the manufacturer's instructions.

Using The Zone Protection System Resources

The control and power panel's terminal blocks provide great flexibility for designing the Stronghold Zone Protection System into a wide variety of security applications. This section describes some of the ways in which the system can be attached to other devices. Read this section carefully to find ways in which you can apply the resources of your Stronghold Zone Protection System to best effect.

Attaching Zone Protection Kits

A Stronghold Zone Protection System ships with one or two Zone Protection Kits. Each kit consists of one acoustic deterrent and two strobe deterrents. Each kit's devices are wired into a corresponding OUT terminal pair on the Output Terminal Block, as shown below:



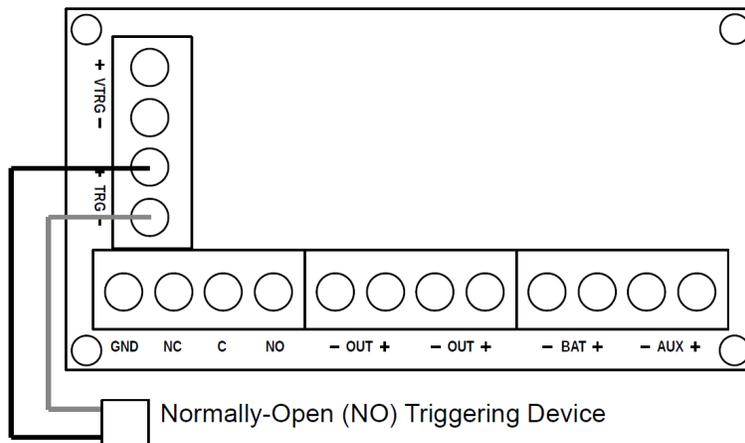
Although the wiring shown in the diagram above is multi-drop, other options can be used. The wiring can also be daisy-chained from unit to unit, or all units can run back to bird's-foot (also known as "home-run") wiring at the control and power panel, or any combination of the above as desired.

A second zone protection kit can be attached to the second OUT terminal pair, or can be daisy-chained to the first zone protection kit. We recommend using separate OUT terminal pairs for each zone protection kit to simplify debugging and to spread the total current among two wiring drops.

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Attaching Normally-Open Contact Closure Triggering Devices

Any normally-open contact closure triggering source, such as a kick-bar, panic-button, motion sensor, or alarm panel output can trigger the Stronghold Zone Protection System. Attach these normally-open (NO) sources to the External Trigger Terminal Block, as shown below:



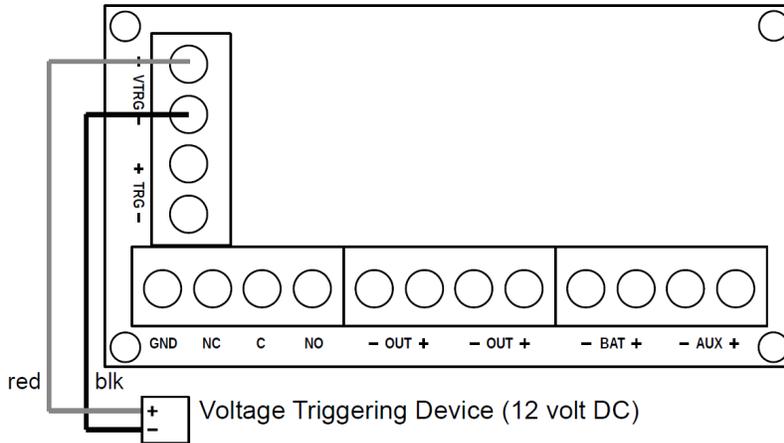
Any number of desired upstream normally-open triggering sources can be connected in parallel.

Although the circuit board shows + and - polarity labels, normally these can be ignored for mechanical contact closure devices. In the case of devices with an open-collector or open-drain transistor output, use the - terminal for ground and the + terminal for the transistor output.

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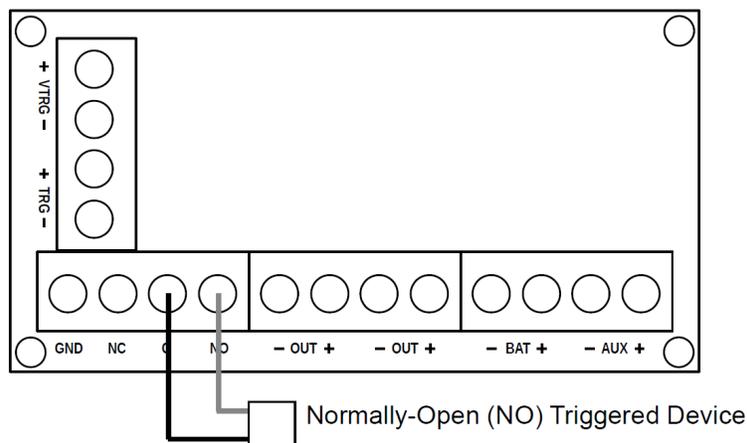
Attaching an Upstream Voltage Trigger Device

The Stronghold Zone Protection System can be triggered by an upstream voltage trigger source, such as a siren output on a security system panel, or the OUT terminal on an upstream Stronghold Zone Protection System. Connect these external voltage trigger devices to the External Trigger Terminal Block, as shown below:



Attaching a Downstream Normally-Open Contact Closure Triggered Device

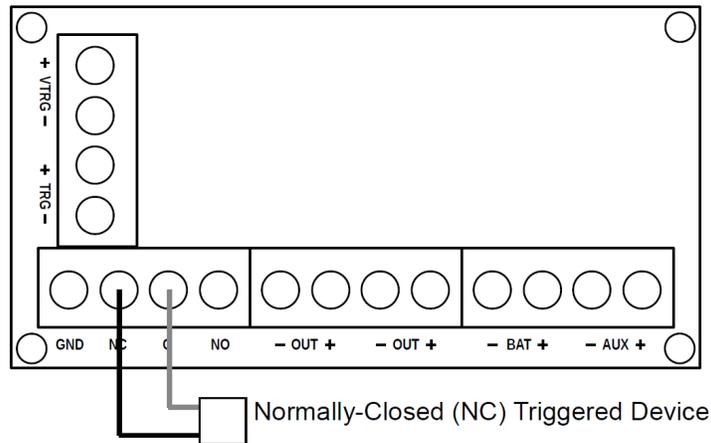
The Stronghold Zone Protection System can trigger a downstream normally-open contact closure triggered device, such as an existing alarm panel, or another Stronghold Zone Protection System. Connect the downstream contact closure device as shown below:



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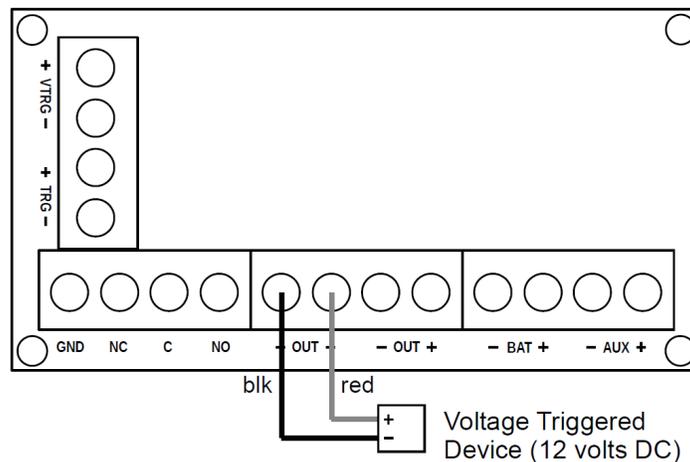
Attaching a Downstream Normally-Closed Contact Closure Triggered Device

The Stronghold Zone Protection System can trigger a downstream normally-closed contact closure triggered device, such as an existing alarm panel. Connect the downstream contact closure device as shown below:



Attaching a Downstream Voltage Triggered Device

A downstream voltage-triggered device is attached in the same way as a zone protection kit is attached, to one of the OUT channel terminal pairs. This situation is shown below:

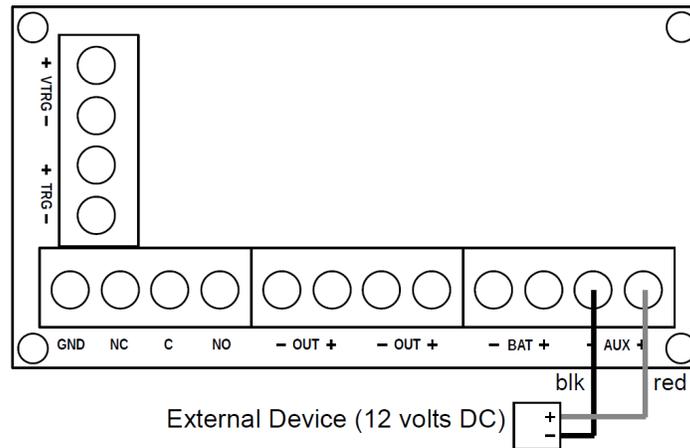


In this example, the left OUT terminal pair is shown, but either can be used. Be sure to read the separate section on Power Considerations when attaching any external voltage-triggered device.

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Powering an External Device

The Stronghold Zone Protection System can power an external device, regardless of alarm condition, by using the AUX terminal pair on the Power Terminal Block, as shown below:

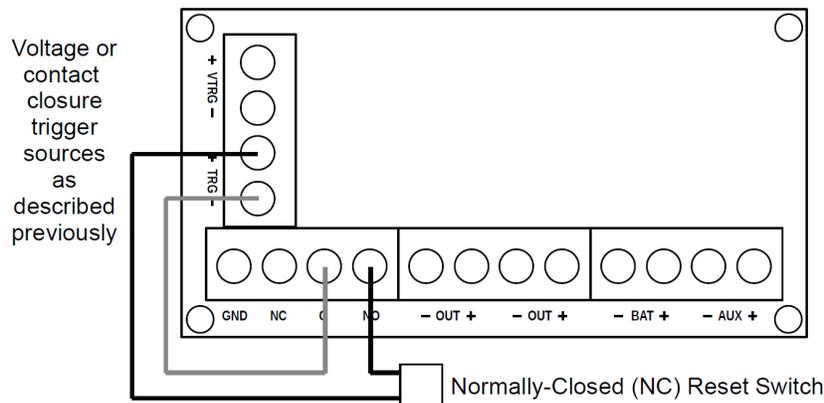


Be sure to read the separate section on Power Considerations before attaching any external auxiliary powered device.

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Creating a Self-Latching Independent Stronghold Zone Protection System

With an additional optional normally-closed reset switch, it is possible to wire the system to be self-latching in the event of any external trigger, whether contact closure or voltage triggered. This self-latching configuration is created by connecting the contact closure trigger on the External Trigger Terminal Block to the relay connections on the Relay Contact Terminal Block, as shown below:



Not shown in the diagram above is the external trigger source, which can be any voltage or contact closure source as described previously. Also shown is a recommended normally-closed (NC) reset switch to allow the alarm state to be reset. This switch can be located inside the control and power panel enclosure, or hidden elsewhere in the protected facility. A locking, hinged door enclosure is available for more convenient access to an internal reset switch if desired.

When testing the system using the test button, ensure that the reset button is open to prevent the system from remaining latched, unless demonstration of latching operation is desired during the test.

A major advantage of the self-latching configuration is that once triggered, the Stronghold Zone Protection System maintains its alarm state, to the limit of the battery capacity, even if AC power is disrupted, or the upstream alarm system is destroyed or disabled. This provides an extra measure of resilience to compartmentalized protected zones. For example, a high-risk school, with the reset switches located in the classrooms but triggered from an external alarm, would maintain coverage of each classroom entrance until the teacher within the classroom decided to disable his individual zone.

Detailed Installation Steps

After determining an installation site and becoming familiar with the system resources and available configurations from reading the previous sections of this guide, this section provides detailed installation steps.

Choosing the Control and Power Panel Installation Location

The control and power panel may be located at any convenient location that satisfies the following conditions:

- Availability of a 110 volt AC outlet. The charger must be plugged into this outlet on a continuous basis. The control and power panel must be comfortably within the length of the charger's power cord.
- Well-ventilated. The charger generates a significant amount of heat when charging the battery or operating the system during an alarm while AC power is available. Do not install the panel in a location where the charger may become covered with insulating objects and thus overheat or start a fire.
- Convenient maintenance and testing access. It is recommended that the system be tested once per quarter using the test button inside the control and power panel, and the wiring inspected, using procedures outlined elsewhere in this guide. Mounting the control and power panel in a conveniently accessible location will help ensure that this maintenance is regularly performed.
- Wiring access. In addition to the deterrent device low-voltage wiring, additional wiring is required from external trigger devices and upstream and/or downstream security system panels or additional chained Stronghold Zone Protection Systems. It is not essential that all these items be contained in a single location. One of the benefits of the Stronghold system is that the control and power panel can be located away from any associated security system panels, making the entire system harder to defeat at any single point.

Running the Low Voltage Wiring

Each acoustic deterrent and strobe is connected to the control and power panel using a minimum of two wires for ground and power. Most quality brands of low-voltage security system cabling will suffice. Each deterrent can be wired individually back to the control and power panel, or the deterrents can be daisy-chained to one run of wire, or a multi-drop pattern can be used. Any of these wiring options are possible so long as the overall current rating of the cabling is not exceeded. See the separate section on power considerations to assist in planning the wiring.

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Before installing the acoustic and strobe deterrents, be sure that the wiring has already been run to their locations.

Installing the Acoustic Deterrent

Once the installation location has been determined for the acoustic deterrent(s), mount them using separate instructions for this device, available from our website.

Note: when purchased separately for installation directly to a security system's siren output, Stronghold acoustic deterrents are shipped with an optional end-of-line resistor for those security systems which need this component. When installed directly to a Stronghold control and power panel, this resistor is not required. As a result, the end-of-line resistor portions of the separate acoustic deterrent installation instructions can be ignored.

Installing the Strobe Deterrent

Once the installation locations have been determined for the strobe deterrents, mount them using separate instructions for this device, available from our website.

Installing the Triggering Devices

If any separate triggering devices, such as kick bars, kick plates, panic buttons, hold-up buttons or the like, are to be used in the system, follow the manufacturer's instructions for wiring and installing these devices.

Installing the Control and Power Panel

Once the desired location for the control and power panel enclosure has been determined, decide from what direction the wires, including the charger cord, best approach the enclosure. Each side of the enclosure contains large and small knockouts, with an inner circle and outer ring option. We will be using a small knockout, taking out both the inner circle and outer ring.

After selecting the appropriate knockout, place the enclosure on its side on a firm surface, with the desired knockout facing up. Using a punch and a hammer, gently but firmly tap on alternate sides of the inner circle until it and the ring deform. Using pliers, rock the ring back and forth until it and the inner circle detach from the enclosure. Be sure to not damage the circuit board or battery terminal wires inside the enclosure. Remove any metal shavings which fell into the enclosure, and be careful of any sharp remnants remaining attached to the enclosure.

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Next, using the grommet shipped in the small white charger box, install it into the hole. Place one edge of the grommet into edge of the hole, and work the grommet into the hole a section at a time until it is fully seated into the hole and the side flaps cover any sharp edges.

Alternatively, if conduit is desired for routing, use the appropriate knockout and ring option for your particular situation. The charger cord can still be introduced into the enclosure using the technique above, or a separately purchased conduit seal can be used for this purpose if desired.

Now, using separately purchased screws and/or anchors appropriate for your situation, mount the control and power panel steel enclosure to a wall using the four mounting holes in the rear of the enclosure. It is recommended that at least one side of this enclosure be mounted to a solid surface or a stud, and that washers be used to protect the edges of the mounting holes from damage. Take care to not damage the pre-mounted circuit board when working with the upper right mounting hole. When correctly oriented, the circuit board will be at the top of the enclosure.

Next, remove the battery from its carton and remove the insulating caps from the terminals. Place the battery in the bottom of the enclosure, and attach the pre-installed battery cables, black wire to black battery terminal, and red wire to red battery terminal. If connected correctly, the green power LED will illuminate. If the red LED illuminates, then the battery terminals are backwards. Ensure that the battery terminals are connected correctly and that the green power LED is lit before continuing. The circuit board is designed to prevent damage to itself if the battery was connected backwards at this step.

Once the correct battery terminal orientation has been verified, remove the red wire during the next steps to remove power to the circuit board. Do not remove both battery wires as a mistake in reattaching the battery after connecting the remote wiring could damage other system components beyond the circuit board.

Attach the wiring for deterrent devices, triggering devices, other panels and security systems to the appropriate circuit board terminals as noted elsewhere in this guide. Ensure that all wiring is firmly connected to the terminals and hand-tightened. Do not over-tighten or use a powered driver on the screw terminals as damage could result to the wiring, the terminals or the circuit board.

Attach the red cable to the battery terminal, and ensure that the green power light comes on. The system may now be tested using the test and maintenance instructions elsewhere in this guide. It is important to test the system without the external charger applied to ensure that the system can operate from battery power alone during an AC outage.

Once satisfied with the test, plug the charger wire into the circuit board. When charging, a red light will appear on the face of the charger (the circuit board light will remain green)

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throughout). When charging has been completed, the green charger light will appear. It is possible to determine the state of the battery by looking at the light on the charger without opening the Stronghold control and power panel enclosure.

Note: if installing with the optional hinged enclosure, follow separate instructions provided for that enclosure rather than the cover instructions below.

Remove the enclosure screw pouch from the small white charger box. Five screws are enclosed. Four of these screws are for the enclosure cover, the fifth screw is for the optional ground connection, noted below. Start driving a screw into each of the four cover screw holes on the front of the enclosure, but do not drive them all the way. Remove any metal shavings from the case which result.

Once satisfied with system operation, hang the cover onto the screws using the keyholes in the cover. Firmly hand tighten. Do not over-tighten or use a powered driver as the screw threads can become stripped.

If required by codes or regulation, the fifth screw in the enclosure kit may be used to ground the enclosure using the enclosure's ground hole at the lower right of the circuit board. The circuit board can be grounded to the enclosure using the GND terminal. Grounding the enclosure and circuit board in this manner will also create a ground connection to every attached device in the system, which may be an undesirable outcome. We recommend that you consult with a low-voltage wiring specialist before taking this action.

Power Supply Considerations

When designing a Stronghold Zone Protection System installation, care must be taken to ensure that the power requirements have not been exceeded. The system is designed to supply up to two amps on each of the output terminal channels, and on the auxiliary output power channel. However, we strongly recommend that the entire system not exceed 1.5 amps as that is the limit of the charger's continuous output. Ideally, the charger should be able to supply the entire system's needs during an alarm condition, saving the battery for AC outages. A system limit of 1.5 amps will result in approximately three hours of battery operation in the alarm state (much longer in standby waiting for an alarm, generally limited only by the current draw of the LEDs themselves). Lower loads will of course result in longer battery-backed operation.

The following loads are good working estimates when planning an installation:

Stronghold Acoustic Deterrent: 180 milliamps (0.18 amps)

Stronghold Strobe Deterrent: 250 milliamps (0.25 amps)

As a result, a single zone protection kit, consisting of one acoustic deterrent and two strobe deterrents, represent a total load of 680 milliamps (0.68 amps). Two zones would represent a total of 1.36 amps, well within the desired overall limit of 1.5 amps. We recommend that each zone be attached to its own dedicated OUT terminal pair on the circuit board.

In comparison, a typical small home security siren will be in the 300 to 400 milliamp range, greater than any single Stronghold zone protection deterrent. So, take care to read the manufacturer's specifications when attaching other devices, even if they seem as if they should not draw inordinate power. If attaching other devices, we recommend using the control and power panel to operate one set of zone protection deterrents on one OUT channel, leaving the other to operate optional additional off-the-shelf devices as desired.

Similarly, although the AUX channel can support up to two amps (peak) as a circuit, any devices attached to this terminal pair will continuously drain power from the charger, or from the battery in the event of a power outage, even if the system is not in the alarm state. Use of the AUX output may cause the battery charger to remain in the red state indefinitely.

Even with AC power available, if the AUX channel output exceeds the charger rating of 1.5 amps, the auxiliary output will then drain the battery until it has been depleted, after which the system will fail to provide protection.

Accordingly, only use the AUX output channel to supply small loads which make the overall security plan simpler without compromising the utility of the zone protection system itself.

Testing and Maintenance

Before testing the system, determine if an existing burglar alarm has been connected to the panel's alarm relay contacts. If this is the case, notify the monitoring company prior to conducting the test to avoid a false alarm and police response. Then, verify that the Stronghold Control and Power Panel's green "Power" LED is lit. Unplug the AC charger, and verify that the LED is still lit. If this LED is not lit or goes out, the charger and/or battery may need to be replaced before proceeding with the test.

The Stronghold Zone Protection System includes a convenient test mode to verify the proper operation of the system without undue disruption to building occupants. In order to test the system, press the red TEST button on the Stronghold Control and Power Panel for approximately 1/2 second. The panel's yellow "Active" LED will illuminate, and all connected Stronghold Acoustic Deterrents will emit a short buzzing noise at a reduced intensity (similar to the pre-warning tone before an actual activation), and all connected Stronghold Strobe Deterrents will emit a single flash. If a device does not operate, check its wiring. If a wiring problem is discovered, repair it and wait several minutes for the panel's PTC fuses to reset before repeating the test. If the device still does not operate, it may need to be replaced.

Pressing the button for more than 1 second, or activating a panic switch or upstream security system, will place the system into full alarm: Stronghold Acoustic Deterrents will emit a 1-second pre-warning tone followed by an extremely loud deterrent tone, and Stronghold Strobe Deterrents will flash rapidly, until the button is released or the initiating device is reset. This type of test represents a full system activation, and is not to be performed while the building is occupied, as it may cause severe pain to building occupants. Hearing protection must be worn during this type of test, and personnel should not look directly at the Stronghold Strobe Deterrents.

Once the test is complete, verify that the battery voltage is at least 12 volts (if it is lower, the battery may need to be replaced). Then, plug the AC charger back in. The adapter's LED may be red for several minutes as it recharges the battery, but should turn green once the battery is fully charged (note that the LED may not turn green if a continuous load is present on the panel's AUX terminals). The system is now ready to use.