



Keys to understanding your alarm system

This section is designed to allow you to familiarize yourself with most of the security system devices that may be installed or proposed to be installed in your home or business. While this list is by no means complete, it does explain most of the most common devices and controls that are used in the installation of a security system.

Definitions and Terminology

Please feel free to use this reference whether you are considering a new system from Stephens Systems, or any other security system provider. All security systems are not created equal. In addition to choosing the right products from the right manufacturer, the proper installation and continual, competent support from your system company are the most important factors in designing your system and choosing the best installing company!

Control Devices

Control Panel

This is effectively the computer or CPU of a security system. It must be programmed by your installing company to respond appropriately to signals from the alarm sensors, depending upon the "armed" state of the system, i.e., On & Off - or in alarm company terms: "Armed & Disarmed".

Keypad

This is the interface you use to change the state of the system to "armed or disarmed", typically by entering a specific numeric code. It also provides a display which shows you the current state of the system: on/off, alarms, power status & various trouble conditions. The display can be either a series of lights, an actual text display, or a combination of the two.

Standby Battery

This is typically a rechargeable battery which provides operating power for your system in the event of an electrical failure to the system. Normally it is recharged automatically as long as electrical power is available to the control panel. It also provides additional power for the operation of bells and or sirens during an actual alarm condition. Lastly and possibly most importantly, it provides a large percentage of the electrical power filtering to your control panel and detection devices, thereby increasing their reliable life span and their stability during momentary electrical power fluctuations.

Siren

This is a VERY loud sounding device which sounds during an alarm condition. Typically, they will generate different sounds to allow you to distinguish between a burglary alarm and a fire alarm. Many sirens contain integral "siren drivers" (see below). A quality system will have at least two sirens, one each inside & outside of your premises, thereby alerting you, your neighbors, any passersby, and the would-be burglar of the alarm.

Siren Driver

This is either a separate or built in component of the control panel which generates the different tones which are emitted by the sirens. Several versions are available which can produce separate tones, broken tones or actual voice messages in the event of an alarm, i.e., fire or burglary.

Power supply

This is normally integrated with the Control Panel, however some systems may contain an auxiliary power supply to provide power to a large number of detection devices. All auxiliary power supplies should contain an additional standby battery and an additional plug in transformer.

Zone expander

This is an add on device to the control panel which allows a further division of the detection devices into additional "zones" (see below). Different manufacturers refer to these by their own terms, and each manufacturer provides different numbers of zone capacities on their zone expanders, but they all do the same thing. Several systems allow zone expanders to be remotely located from the control panel allowing for simpler, more straightforward system wiring; Example, all windows in the bedroom area can be wired to a zone expander in a bedroom closet, rather than to the control panel location in the utility room.

Communication Devices

Digital Dialer

Also known as "digital communicator": This is typically an integral part of the Control Panel which allows the transmission of alarm signals from your premises to the alarm company central monitoring station. Some older systems and some commercial fire alarm systems utilize separate digital dialers which are not integrated with the "Control Panel". It is effectively a modem which contacts the alarm company's modem in the event of an alarm or other supervisory conditions. It utilizes an existing telephone line at your location to accomplish this and is completely transparent to the phone or phone system unless a communication event occurs.

****Not a reliable or recommended method of communication in today's world, due to constant changes in telephone service providers and the frequency of phone line cuts by burglars.**

Cellular Transmitter

This is a device which allows for alarm signals to reach the central monitoring station in the event of a telephone line failure or purposeful tampering with the telephone lines by a burglar. Cellular transmitters today can provide communication to the monitoring station – inbound communication for diagnostics & programming changes & also allow remote control of your system from your cell phone.

They also allow extremely fast communication for alarm signals – typically less than 6 seconds for an integrated cellular transmitter. Slave units which can be added to older alarm control panels are available but do not provide the robust communication available with integrated units.

**** Strongly preferred primary communication method today due to relatively low cost, difficulty in defeating communication and speed of alarm transmissions.**

Network Transmitter

Similar to Cellular transmitters in speed & functionality. Network transmitters also allow for exceptionally fast alarm transmission & remote diagnostics & programming. The primary disadvantage is that internet connections are typically supplied via cable TV or telephone DSL lines which are easily cut. Preferred method is to use Network as primary method, with Cellular as a backup method. Since Network communication is extremely fast, a well designed control can automatically switch to cellular within a couple of seconds if the network is down.

Detection Devices

Door & Window contact

(Also referred to as "switches") These are typically magnetically activated switches consisting of two components - the actual electrical switch and a matching magnet. They can be recessed into door & window frames with the matching magnet placed in an adjoining location on the movable part of the door or window, but are often surface mounted depending upon the type of door or window and whether or not the system is installed during or after construction. Other types of contacts are available and are sometimes used if more practical for the application - these are usually mechanical type switches which are physically depressed by the door or window when it is closed.

Glass Breakage Detectors

Glass-breakage detectors

There are several types of glass breakage detectors available: "Acoustic detectors", "shock detectors", and "piezo-electric vibration detectors". Each of which have their specific advantages & disadvantages. An older method which is no longer used, but may still be active on older systems is "Window Foil" - this is the small strip of lead or gold foil applied directly to the glass approximately 4" inside the window frame - this worked

by literally tearing into & breaking the electrical connection when the glass was broken. This was a very effective method in its day, but was extremely maintenance prone.

Acoustic Glass-breakage Detectors

These are the most commonly used method for detecting glass breakage today. They detect glass breakage by literally listening for the sounds generated by breaking glass. Modern units are very stable and are not normally activated by extraneous sounds. Advantages: Very accurate when properly installed & adjusted, Low cost per unit and a single unit can detect an entire room full of windows, Small attractive units which can be placed on a wall or ceiling near the glass they are detecting / Disadvantages: Can occasionally be activated by sounds within the home or office they protect.

Shock detectors

These are rarely used, but can be very effective in certain applications and are still manufactured. They are placed on the window or door frame immediately next to the glass they are protecting and work by detecting the vibrations which carry to the frame when the glass is initially impacted. They normally require a separate processor to distinguish between normal and attack types of vibrations. Advantages: Very accurate when properly installed & adjusted, not affected by noises inside or outside of the property being protected. / Disadvantages: Can be activated by strong gusting winds and thunder, Very high installation costs due to high number of units required and labor to install.

Piezo-electric vibration detector

These are also rarely used and while very common at one time, are rarely used by alarm companies today. They are typically small round devices placed directly on the glass being detected and work by sensing the high frequency vibration generated when the glass actually breaks. Advantages: will detect glass breakage if properly installed & adjusted. / Disadvantages: Not attractive on your windows, high cost due to the requirement of at least one device per window pane & high installation labor costs, Tend to become unglued from the window after a few years.

Motion Detectors

Motion detectors

There are two commonly available types of "motion detectors" available today: "Passive infrared detectors", "Microwave motion detectors", and combinations of the two. Passive infrared detectors are by far the most common device used for detecting motion within a building. They work by detecting changes in the infrared light level within their field of view. While the process can be somewhat hard to explain, it is best compared to the old infrared lights we use to see at restaurants over the hamburgers; while the light energy itself is not hot, when it is absorbed by the burgers - it converts to heat energy. The infrared motion detector works

the same way - all living bodies emit infrared light and through the lens of the detector, this light is focused onto a "thermo-electric" sensor which detects the change in temperature. (Infrared light is also what enables you to "feel" a person silently sneaking up behind you – As much as I hate to spoil the magic – it's actually just the back of your neck heating up!) Most infrared detectors use at least two different thermo-electric sensors to allow them to distinguish between a person moving in the area and the room just warming up. Advantages: Low cost per unit, wide ranges of coverage patterns available with different units or lens assemblies (typically 25' to 200' width & depth of effective range), Effective for detecting unusual methods of entry, i.e. attic accesses, roof hatches, etc., also effective for detecting persons who hide in businesses until after closing, good at ignoring moving inanimate objects, i.e. ceiling fans, falling items, etc.. Disadvantages: Detect good guys as well as bad - so can't be turned on while an authorized person is in the field of view, Can be activated by very bright lights, i.e. headlights - halogen flashlights - nearby flashes from lightning, etc.

Microwave motion detectors

The second most common method of detecting motion within a protected area. They detect motion by emitting a very low powered stream of microwave energy which is reflected back to the detector by non-moving objects at the same frequency as was emitted and by a slightly higher or lower frequency by a moving object or person. The change in frequency of the energy that is reflected back to the detector is known as the "Doppler Shift". This is the same as when a car is approaching you while sounding its horn - as it approaches, the sound is at a higher pitch than it would be when standing still & as it passes the sound is at a lower pitch. While microwaves are not heard, the same law applies - the frequency changes when a person moves towards or away from the detector. Advantages: can actually be placed behind a wall or ceiling and still detect movement in the area, relatively low cost per unit, highly adjustable effective ranges, Effective for detecting unusual methods of entry, i.e. attic accesses, roof hatches, etc., also effective for detecting persons who hide in businesses until after closing. Disadvantages: Can be activated by inanimate moving objects, i.e. ceiling fans, water moving in plastic pipes, objects outside of the protected area. Range can be affected by humidity levels.

Dual-Tec motion detectors

They are rapidly becoming the method of choice by many alarm companies. They offer the advantages of both passive infrared & microwave motion detectors in a single unit. High detection ratio with very few of the accidental or false alarm problems. Each of the detection methods must detect motion simultaneously in order to activate an alarm. Example - The microwave detects motion, which is actually a large truck moving just outside the protected building - since the passive infrared detector does not normally detect inanimate objects, no alarm will occur.

This document does not address every available control or detection device. If there is a specific concern you have, please ask about it, chances are we have the devices available and have addressed the same need previously.

Copyright © 2014 Stephens Electronics, Inc.