Vehicle Security Installation Introduction

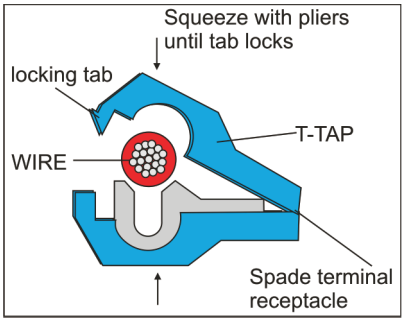
Use this guide in conjunction with vehicle specific wiring information and the installation manual that came with the system to be installed. This guide covers basic installation techniques and tips to make the job as painless as possible. It is ideal to familiarize yourself with this guide and all of the materials provided BEFORE beginning the installation as this will greatly aid in performing clean and reliable work.

Access Vehicle Wiring

First, you need to remove any panels that prevent access to main wiring harness like the ignition switch harness, computer harnesses, and main body harnesses. This usually includes a dash panel, kick panel, steering column shroud, etc. It is ideal to identify the location of the wires you'll need by looking at your vehicle wiring sheet. You can then remove only the panels required to access these specific locations.

Identify Vehicle Wires

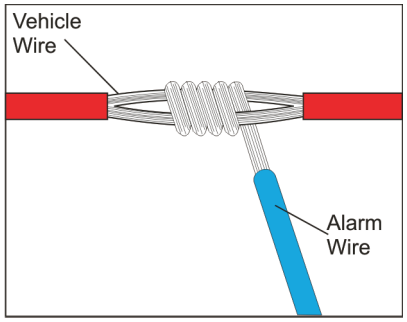
Once you have removed all necessary panels in the vehicle, start locating and testing the wires needed for this installation. It is recommended to use a digital mult-imeter as this will protect vehicle circuits and yourself. Test lights, if used, can potentially damage computers on newer vehicles so they are not recommended. Stay away from wires located in a bright yellow sleeve as these are air bag wires and pose a potential hazard to you and your vehicle. Reference each wire from the alarm system to the vehicle wiring sheet and identify which vehicle wires you'll need for this install. Then, you can test these wires for their appropriate function. REMEMBER, JUST BECAUSE THE COLOR AND LOCATION MATCH DOES NOT MEAN IT'S THE RIGHT WIRE. There can be more than one wire with the same color and same location. As you identify the correct wires, you can splice into them. T-taps (aka Quick taps) are a good and easy method of connecting to vehicle wires. Below are descriptions of commonly used methods of tapping into vehicle wires.



Using T-taps (aka. Quick Taps)

1. Place T-tap over vehicle wire
2. Squeeze T-tap with pliers until tab locks securely
3. Crimp insulated male spade connector on end of alarm wire and plug into T-tap

**Make sure to match the T-Tap size to the wire. This will ensure a good connection*



Standard Wire Splice

1. Strip vehicle wire
2. Split exposed portion of vehicle wire
3. Insert end of alarm wire into split
4. Twist around vehicle wire ***(you can solder the connection at this point for maximum reliability)***
5. Insulate with quality vinyl electrical tape or heat shrink tubing

Mounting The Control Module And Connecting Wiring Harnesses

After making all the correct taps and confirming the wires' operations, you can find a good location to mount the alarm's control module. High in the dash and out of sight is recommended because an alarm that you can see from simply looking under the dash is easy for a thief to defeat. Once you find an ideal mounting location, don't mount it yet. Route your wiring harnesses to their connection points away from any moving parts (pedal, steering column, etc.) and cut them down to length. Remember that your alarm is designed to work in all different vehicles so there will be wires you won't use. You can cut these off of the harness to make the harness smaller thus making the installation cleaner. It is ideal to use vinyl electrical tape to tape each harness up. This gives the harness a factory look and keeps stray wires away from sharp metal pieces or anything that could damage them. Now you can connect your harnesses to the vehicle's wires and mount your control module. Before plugging the harnesses into the module, make sure to mount your siren and connect it to the alarm. (see the next section on the back of this sheet).

Mounting And Connecting The Siren

Mount the siren in an open space under the hood. An ideal location would be on the top of the fender well or anywhere high in the engine compartment. You want the siren to point towards open ground underneath the car so the sound can escape the engine compartment for maximum volume. You will need to route the siren wire into the vehicle's cabin through the firewall. Any rubber grommet will work fine. You can usually run the wire through the same grommet as the hood release cable or the accelerator cable. Make sure to keep the wire away from hot or moving engine parts. Pay attention to the polarity of the siren output on the alarm. Refer to the alarm's installation manual for exact wiring information because some alarms have positive siren outputs and some have negative.

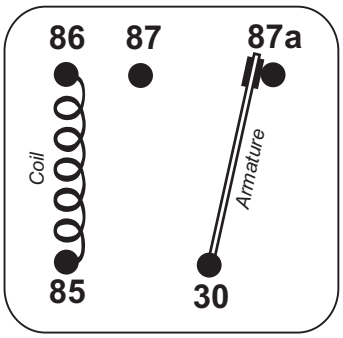
Mounting And Connecting The Shock Sensor (if included)

The shock sensor needs to me mounted solidly to the vehicle. Common locations include zip tied to the steering column or screwed into the fire wall. Once mounted, adjust the sensor's settings according to the instructions and test it's operation by lightly hitting around the outside of the vehicle to reach the desired sensitivity. Keep in mind that any strong vibration can set off a shock sensor so don't set it too sensitive unless you're willing to tolerate potential false triggering of the alarm.

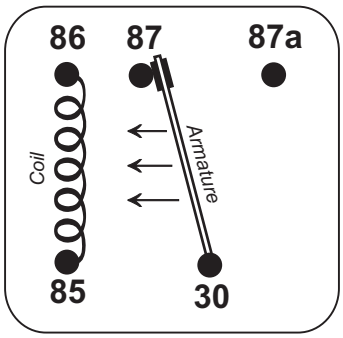
Understanding Relays

• A relay is an electromechanical switching device: when both power and ground are applied to the ends of a coil, the relay activates, which causes mechanical contact points to complete or open a circuit. One of the relay's best features is its ability to use a very small amount of current to switch large amounts of current. This ability helps to make the modern vehicle's electrical system as efficient as it is. When an electrical current flows through a wire, the wire has resistance, which limits the flow. The longer the wire is, more electrical current is lost to this resistance. Devices such as headlights or climate control systems require large amounts of current. Their efficiency drops dramatically with just a small amount of current drop. A relay allows the circuit to be routed in the shortest, most direct route between the battery, or source, and the device, or load. A much smaller wire is routed to the relay from the controlling switch. This arrangement allows for less total wire length, a smaller gauge wire and more reliable, less expensive switches.

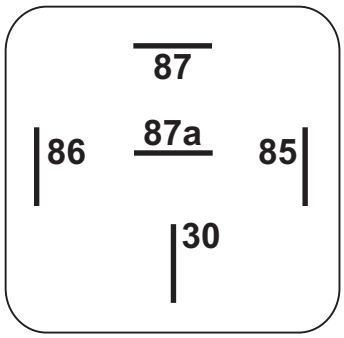
• A standard Single Pole Double Throw (SPDT) automotive relay's coil requires approximately between 130 and 170 milliamps (mA) to activate (between 1 and 2 tenths of an amp), and the Normally Closed contacts will switch 30 amps, and the Normally Open contacts 40 amps. Some manufacturers add a "quenching" resistor across the coil of the relay to absorb voltage spikes. These relays with the "quenching" resistor may need up to 170 milliamps (mA) to activate. On the average, most relays require about 150 mA to activate.



Relay at Rest (Coil NOT Energized)



Relay Activated (Coil Energized)



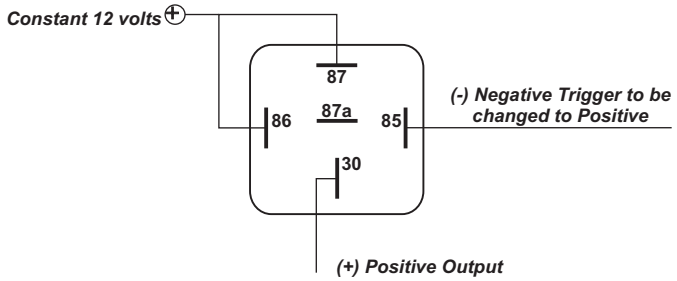
Footprint View of Relay

• In the views above, note the five terminals, or "pins". A relay's operation is really very simple. To understand its operation, consider the relay as having two sections - the coil, pins 85 and 86; and the contacts, pins 30, 87 and 87a. When Negative Ground is supplied to one end of the coil, and Positive Voltage is supplied at the other end, the coil creates a magnetic field which activates the relay. This magnetic field attracts the armature, which is attached to pin 30 with a flexible joint, just like a hinge. Inactivated, or "at rest", the armature connects pin 30 to pin 87a. When the relay is activated, the armature connects pin 30 to pin 87. The terms used to describe the contact points thus: pin 30 switches between pins 87a and 87, so it is "Common" to both and is usually referred to as COM. In the relay's normal condition, at rest, pin 30 is connected to pin 87a, making pin 87a "Normally Closed" or NC. Pin 87 is not connected to pin 30 at rest, so its status is "Normally Open" or NO. This type of relay is defined as "Single Pole Double Throw" or SPDT. This term means that the single armature terminal (or pole, pin 30) can be connected (or "thrown") to two other terminals, pins 87a and 87. The SPDT relay is one of the most useful configurations due to its flexibility - it can be used as a switching device, to isolate circuits, to interrupt circuits and to interrupt and switch at the same time.

• On the following pages there are some relay diagrams which show how to use relays to perform many functions such as trigger reversal, starter interrupt, add domelights to flashing light output of alarm, using latching relays to change a pulsed output to a constant output, and many other uses. These relay configurations can be very helpful when installing an alarm, remote start, or keyless entry to perform different functions in the vehicle on which they are being installed.

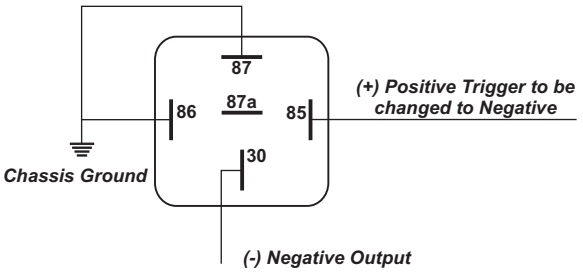
Relay Configurations

Change (-) Negative to (+) Positive



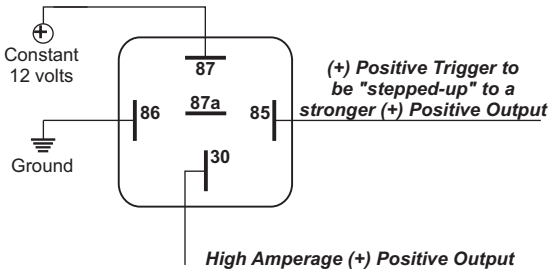
• The diagram above shows how to change a (-) Negative Pulse to (+) Positive using one Single Pole Double Throw (SPDT) relay. **Example:** This relay configuration can be used to change the (-) Negative door lock outputs of an alarm to Positive for a Positive door lock circuit, or to change the (-) Trunk release output to Positive for a Positive Trunk release circuit. This configuration can also be used to change a vehicle's (-) Negative circuit to (+) Positive for use by the alarm.

Change (+) Positive to (-) Negative



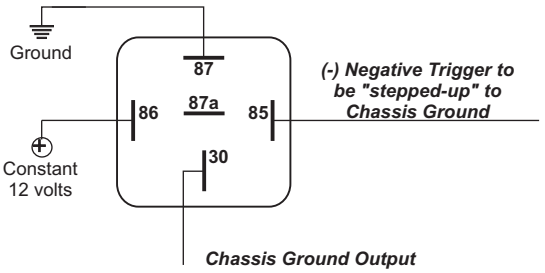
• The diagram above shows how to change a (+) Positive Pulse to (-) Negative using one Single Pole Double Throw (SPDT) relay. **Example:** This configuration can be used to change a Positive siren output to (-) Negative for use on a vehicle's Horn circuit, to change an alarm's Positive flashing light output to Negative for use on vehicle's which require a Negative Pulse to operate the parking lights, or can be used to change a vehicle's Positive door trigger to (-) Negative.

Change small Amperage (+) Positive to Stronger (+) Positive Output



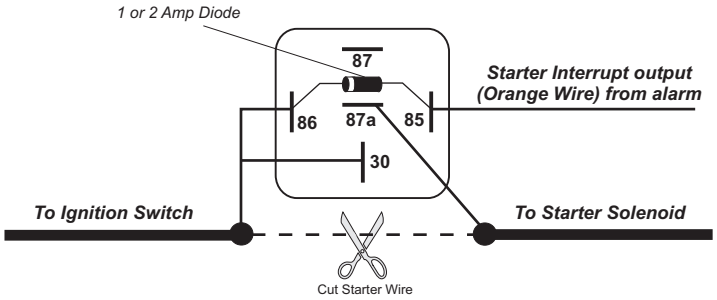
• The diagram above shows how to change a small Amperage (+) Positive Pulse output to a stronger, high Amperage Positive Pulse output using one Single Pole Double Throw (SPDT) relay. **Example:** This configuration can be used to "step-up" the siren output of an alarm to power extra sirens. This configuration can also be used to "step-up" the flashing light output of an alarm to a stronger amperage to flash the headlights in the vehicle instead of the parking lights.

Change small Amperage (-) Negative to Chassis Ground



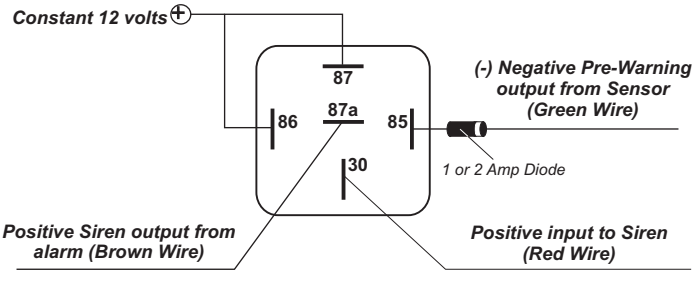
• The diagram above shows how to change a small Amperage (-) Negative Pulse output to a Chassis Ground Pulse output using one Single Pole Double Throw (SPDT) relay. E**xample:** This configuration can be used to "step-up" the 250 ma. (-) Negative door lock, trunk release, 3rd channel, or starter interrupt outputs of the alarm to operate circuits which require chassis ground, or to "step-up" the ground to be able to operate more circuits.

Starter Interrupt



• The diagram above shows how to use the ground while armed Starter Interrupt output (Orange Wire) with one Single Pole Double Throw (SPDT) relay to activate a Starter Interrupt with an alarm. **Example:** This configuration can be used to prevent a vehicle from being started anytime the alarm is armed. Notice that the starter wire in the vehicle must be cut to splice in the relay. The Diode is connected across the relay coil to prevent any kind of "inductive lockup".

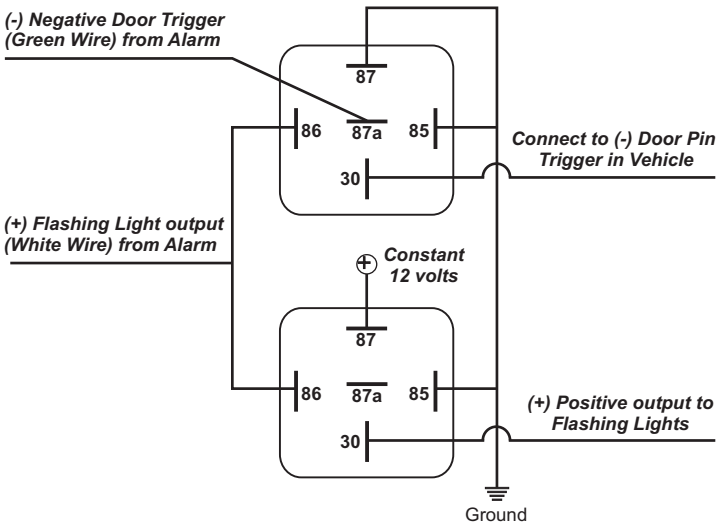
Chirp Siren from (-) Negative Pre-warning output of Dual Zone Sensor



• The diagram above shows how to use the (-) Negative Pre-Warning output of a Dual Zone Sensor in conjunction with a Single Pole Double Throw (SPDT) relay, and a 1 or 2 Amp Diode, to pulse the siren of an alarm in the event of a Pre-Warning intrusion. **Example:** This configuration can be used to add a single audible Pre-Warning chirp to an alarm which does not offer a 4-Pin Auxiliary input or an alarm which does not offer any Pre-Warning input.

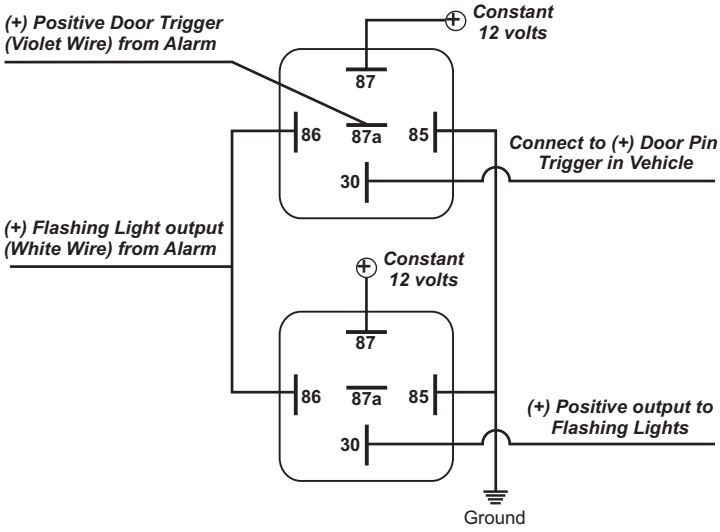
Relay Configurations

Flashing Lights and Dome Light Supervision from Flashing Light output with (-) Door Trigger



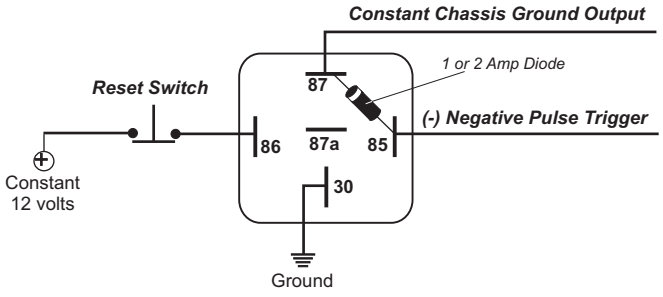
• The diagram above shows how to use a couple of Single Pole Double Throw (SPDT) relays to add Domelight Supervision *and* Flashing Light output to the Flashing Light output (White Wire) of an alarm, on a vehicle with (-) Negative Door Triggers. E**xample:** This relay configuration can be used to add Domelight Supervision to an alarm which does not offer the feature. When adding Domelight Supervision to the Flashing Light output of an alarm, the interior light flashes the same as the Parking lights in the vehicle, therefore, staying on for 60 or 30 seconds after remote disarm.

Flashing Lights and Dome Light Supervision from Flashing Light output with (+) Door Trigger



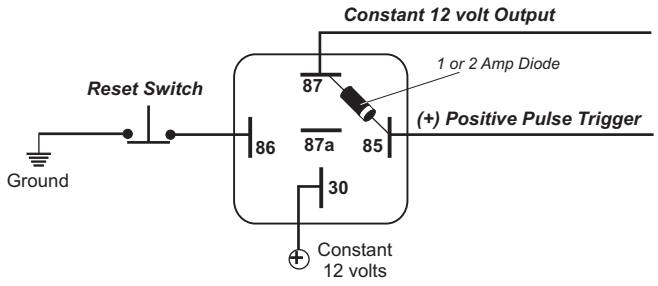
• The diagram above shows how to use a couple of Single Pole Double Throw (SPDT) relays to add Domelight Supervision *and* Flashing Light output to the Flashing Light output (White Wire) of an alarm, on a vehicle with (+) Positive Door Triggers. E**xample:** This relay configuration can be u sed to add Domelight Supervision to an alarm which does not offer the feature. When adding Domelight Supervision to the Flashing Light output of an alarm, the interior light flashes the same as the Parking lights in the vehicle, therefore, staying on for 60 or 30 seconds after remote disarm.

Latching Relay (-) Negative Trigger



• The diagram above shows how to change a single (-) Negative Pulse to a constant chassis ground output using one Single Pole Double Throw (SPDT) relay and a 1 or 2 amp Diode. **Example:** This relay configuration can be used to change a single (-) pulse to a constant ground for use with window roll-ups, extra lighting, radio accessories or any other circuit which requires a constant ground instead of one single (-) Negative pulse. **Warning:** Once the relay is latched it will stay latched until it is reset by opening the Constant 12 volt circuit to pin #86. The Constant 12 volt input to pin #86 can be "opened" or interrupted using a momentary contact switch, or a relay can be added to the 12 volt input to pin #86 and configured as a normally closed circuit so that, when the relay energizes, it will interrupt the 12 volt input and unlatch the "Latching Relay".

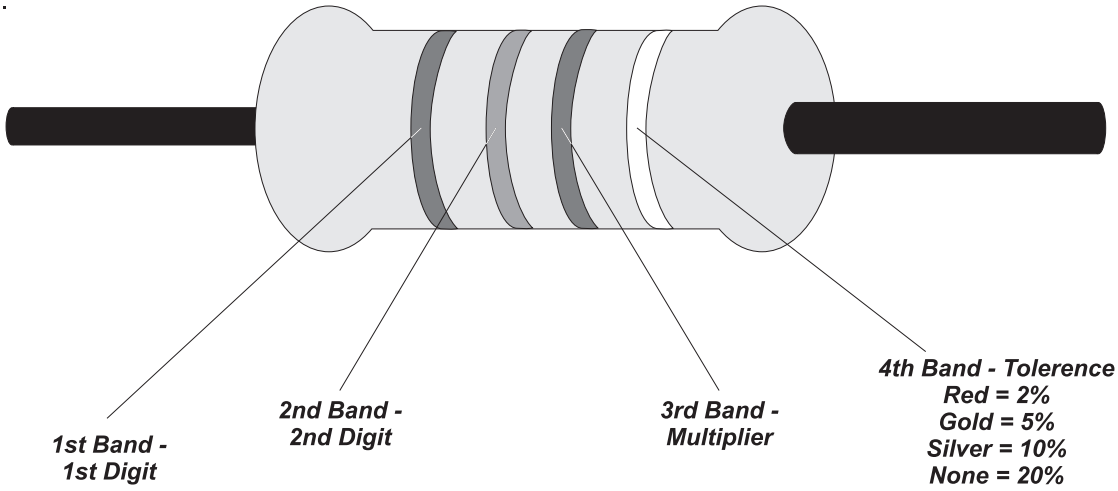
Latching Relay (+) Positive Trigger



• The diagram above shows how to change a single (+) Positive Pulse to a constant 12 volt output using one Single Pole Double Throw (SPDT) relay and a 1 or 2 amp Diode. **Example:** This relay configuration can be used to change a single (+) pulse to a constant 12 volt for use with circuits such as extra lighting, radio accessory circuits, or any other circuit which requires a constant 12 volt output instead of one single (+) Positive pulse. **Warning:** Once the relay is latched it will stay latched until it is reset by opening the ground circuit to pin #86. The ground input to pin #86 can be "opened" or interrupted using a momentary contact switch, or a relay can be added to the ground input to pin #86 and configured as a normally closed circuit so that, when the relay energizes, it will interrupt the ground input and unlatch the "Latching Relay".

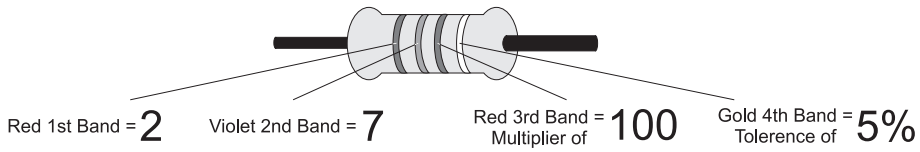
Resistor Reference Guide

• A resistor is a device which limits the flow of electricity in a circuit. Resistors are available in many shapes, sizes and types. The type commonly used in vehicle security applications is the fixed-value carbon film resistor. These resistors use colored bands to designate their value in ohms and tolerance. An ohm is the unit of measurement which denotes how much resistance is applied, higher numbers being more resistance and lower numbers being less. Tolerance is a percent value indicating the range, plus or minus, of the stated ohm value versus what is actually present. Resistors are also rated by watts, which is the amount of power (voltage x amps) the resistor can handle. If the watt rating is exceeded, the resistor will overheat and burn up.



Band Color	1st Band - Digit	2nd Band - Digit	3rd Band - Multiplier
Black	0	0	1
Brown	1	1	10
Red	2	2	100
Orange	3	3	1,000
Yellow	4	4	10,000
Green	5	5	100,000
Blue	6	6	1,000,000
Violet	7	7	10,000,000
Gray	8	8	100,000,000
White	9	9	1,000,000,000
Gold	-	-	0.1
Silver	-	-	0.01

• ***As an example, consider a resistor with the band colors of Red, Violet, Red and Gold:***



Combination of 1st and 2nd Bands= 27 x Multiplier of 100 = 2,700

Resistor Value = 2,700 Ohms with a Tolerence of 5%

• The value of the resistor above is 2700 ohms, which can be abbreviated by using the letter "k" to represent three of the digits and the Greek letter "Omega" in place of the word "ohm". Abbreviated, the value would appear as "2.7Ω". The Gold 4th band denotes that this resistor will be within 5%, plus or minus, of that value. Hence, the actual metered value of this example will be between a low of 2565 ohms or a high 2835 ohms. Resistors are non-polarized, which means the orientation or direction of the resistor in a circuit is not a consideration.

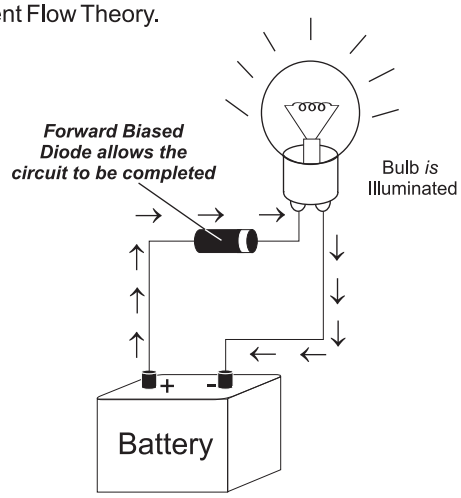
Understanding Diodes

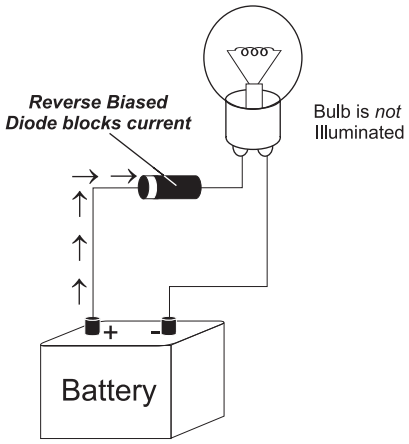
• Diodes are electronic components which have the ability to allow current to flow in only one direction. There are many electrical systems and electrical components and circuits which use Diodes to prevent a back feed between circuits, to isolate the circuits, and to prevent some current spikes. Diodes are ideal for isolating an alarm, keyless entry, or remote start from the factory wiring in a vehicle.

• Diodes are small cylindrical shaped components which are consisted of two leads, the Anode and the Cathode. The Cathode is the striped side of the Diode. Usually a Diode is Black in color with a Gray stripe marking the Cathode side of the Diode.

• Current will flow through a Diode in one direction only. When the Anode side of the Diode is facing towards the Positive source of voltage, it WILL allow the circuit to be completed, and is considered *Forward Biased.* If the Cathode side of the Diode is facing towards the Positive source of voltage (Anode towards Negative source), then the Diode will NOT allow the circuit to be completed, it will instead *prevent* the circuit from being completed. The following diagrams give an example of a circuit with a Forward Biased Diode and a Reversed Biased Diode.

NOTE: There are two theories on how current flows through a circuit, **Conventional Current Flow** and **Electron Flow.** According to Conventional Current Flow, current flows from positive to negative in the direction that the voltage drops across the resistance, or the "load", in the circuit. According to Electron Flow, current flows from negative to positive in the direction that the electrons flow. The Conventional Current Flow theory seems to be the most popular and is used more often, therefore, the diagrams in the following examples will be based on the Conventional Current Flow Theory.





• The following diagram illustrates how a Diode can be added to a factory circuit to isolate the Alarm or other device so that, when activated, it will power just one of the components in a circuit instead of all the components in the circuit. In this case the Diode could actually be considered Forward or Reversed Biased, depending on the actual circumstances of the circuit. For example: In the circuit illustrated below, the factory switch controls both Bulbs when the switch is in the on position and the Alarm is not activated. The Diode shown in Figure #1 could be considered Forward Biased because the current is flowing through the circuit when the switch is used to power the circuit. The same Diode in Figure #2 could be considered Reverse Biased, when the switch is off and the Alarm is activated, because it is allowing the Alarm to power only one Bulb and is blocking the current from back feeding to the other components in the circuit.

Figure #1

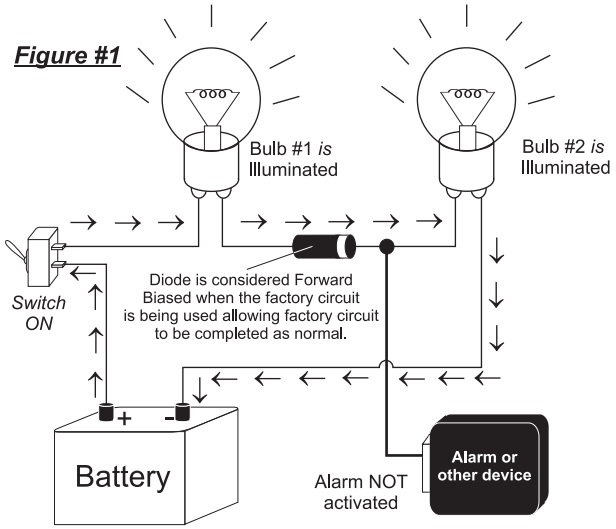
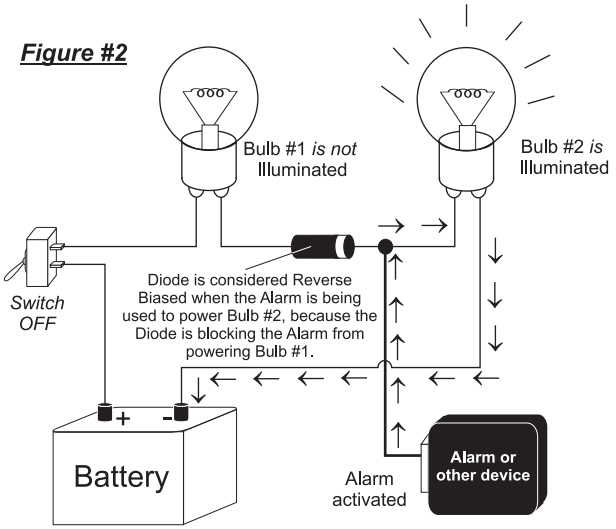


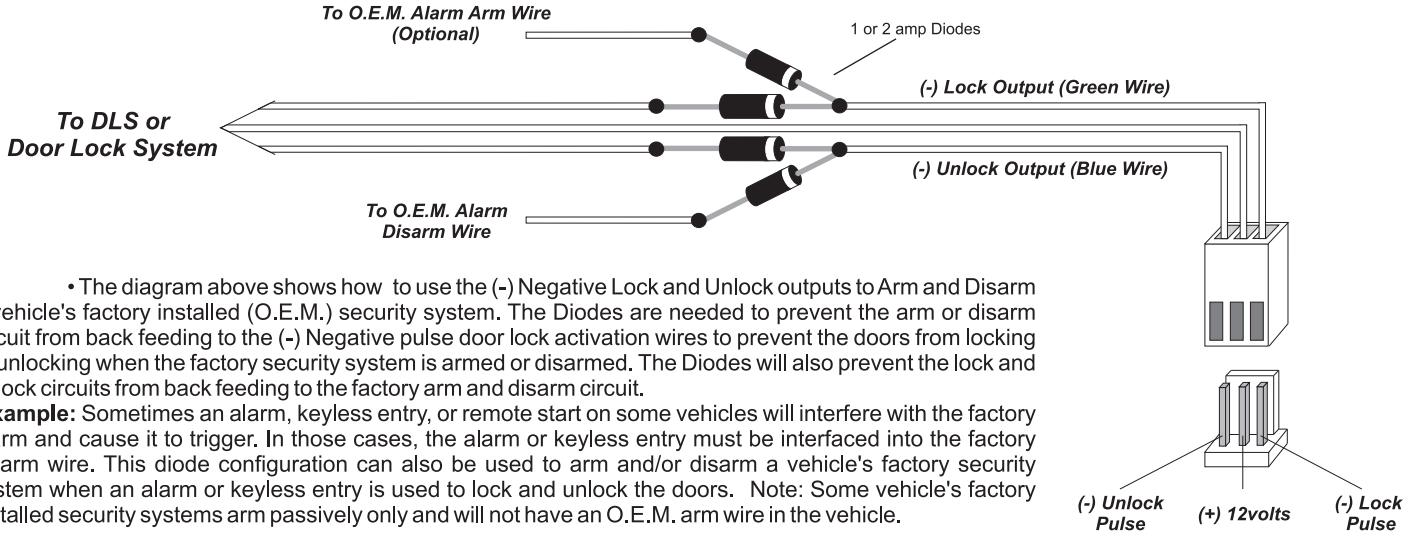
Figure #2



• Diodes can be used in many different configurations to perform such functions as: Using an alarm's or keyless entry's unlock output for factory alarm arm and disarm, Diode isolating door triggers in a vehicle, Using one output to power two different cicruits without back feed between the two circuits,Diode isolating trigger circuits or components, and many other uses. For examples and configurations of how Diodes can be used to perform these features on various different circuits in an alarm, keyless entry, or remote start application, see the following page.

Diode Configurations

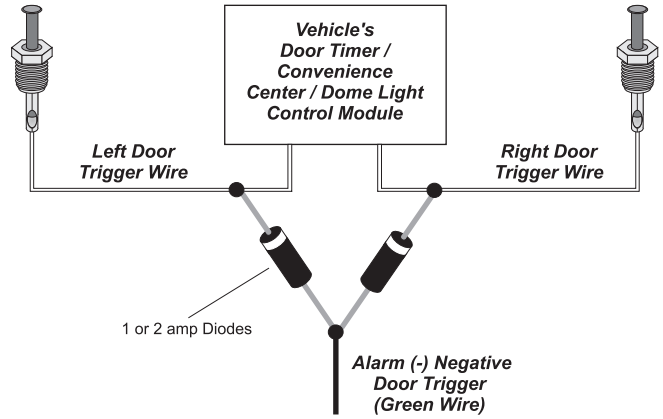
Using (-) Negative Unlock and/or Lock Outputs to Disarm and/or Arm a Factory (O.E.M.) Alarm System



• The diagram above shows how to use the (-) Negative Lock and Unlock outputs to Arm and Disarm a vehicle's factory installed (O.E.M.) security system. The Diodes are needed to prevent the arm or disarm circuit from back feeding to the (-) Negative pulse door lock activation wires to prevent the doors from locking or unlocking when the factory security system is armed or disarmed. The Diodes will also prevent the lock and unlock circuits from back feeding to the factory arm and disarm circuit.

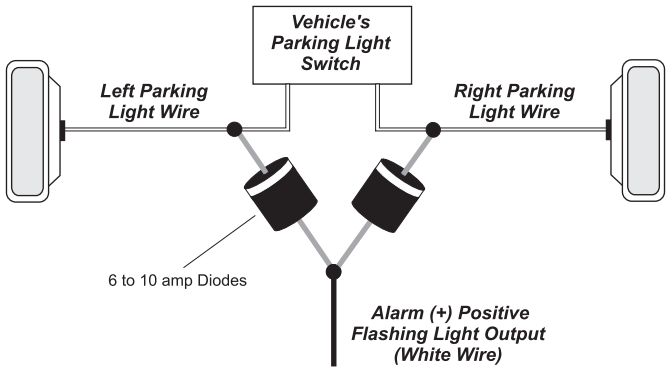
Example: Sometimes an alarm, keyless entry, or remote start on some vehicles will interfere with the factory alarm and cause it to trigger. In those cases, the alarm or keyless entry must be interfaced into the factory disarm wire. This diode configuration can also be used to arm and/or disarm a vehicle's factory security system when an alarm or keyless entry is used to lock and unlock the doors. Note: Some vehicle's factory installed security systems arm passively only and will not have an O.E.M. arm wire in the vehicle.

Diode Isolate Multiple (-) Negative Door Triggers



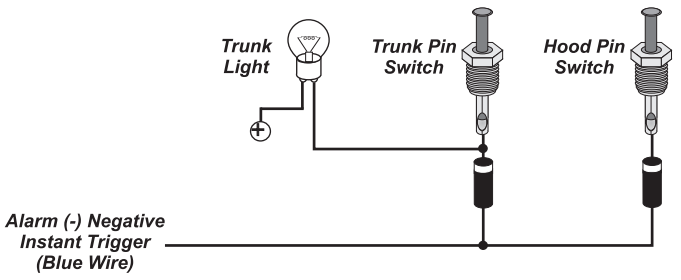
• The diagram above shows how to Diode isolate multiple (-) Negative door triggers to a single door trigger which can be used as the (-) Negative door trigger to an alarm . The Diodes are needed to prevent a back feed between the seperate factory door triggers. **Example:** This configuration can be used to isolate seperate left and right door triggers found in many G.M. vehicles and can also be used to isolate seperate front and rear door triggers found in some vehicles.

Flash Seperate Left and Right Parking Light Circuits with Flashing Light Output using Diodes to Isolate



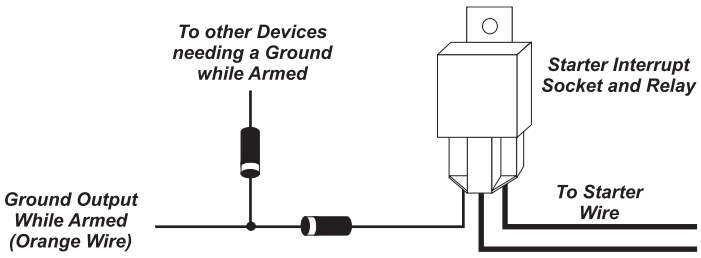
• The diagram above shows how to use the (+) Positive flashing light output of an alarm or keyless entry to flash both the left and right flashing light circuits in vehicles equipped with seperate isolated left and right parking light circuits.The two Diodes are needed to prevent a back feed between the seperate factory parking light circuits. **Note:** The parking light circuits are usually high amperage circuits, therefore, Diodes with an amperage rating of 6-10 amps must be used.

Diode Isolate Hood and Trunk Switches



• The diagram above shows how to Diode isolate the (-) Negative Hood and Trunk triggers to a single trigger which can be used as the (-) Negative instant trigger to an alarm. The Diodes are needed to prevent a back feed between the hood pin and the factory trunk light circuit. This will prevent the factory trunk light from turning on when the hood is opened.

Diode Isolating the Starter Kill from other Devices Using the Ground Output While Armed



• The diagram above shows how to use the Ground While Armed output of an alarm to power other circuits other than the Starter Interrupt. The Diodes are needed to prevent a back feed between the starter circuit in the vehicle and the other devices being powered. **Example:** This configuration can be used to power extra L.E.D.'s, Scanning L.E.D.'s, or other circuits needing a ground while armed.