

553 Series

INSTALLATION

GUIDE

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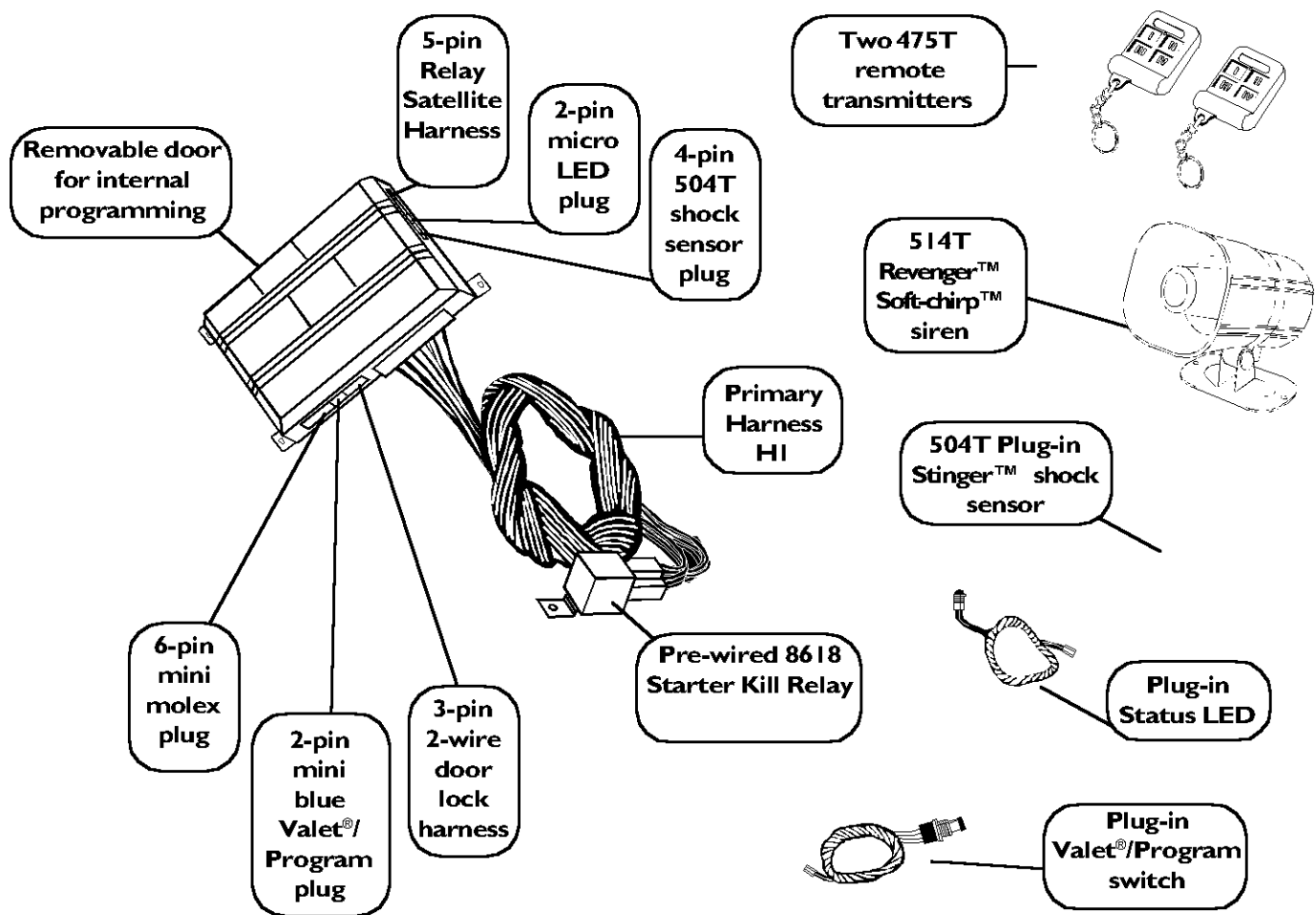
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Directed Electronics, Inc.

N553 1-98
N553 1-98.PM6



INSTALLATION POINTS TO REMEMBER

IMPORTANT! This product is designed for fuel injected, automatic transmission vehicles only. Installation of this product in a standard transmission vehicle is dangerous and is contrary to the product's intended use.

Do not disconnect the battery if the vehicle has an anti-theft-coded radio. If equipped with an air bag, avoid disconnecting the battery if possible. Many airbag systems will display a diagnostic code through their warning light after they lose power. Disconnecting the battery requires this code to be erased, a procedure that can require a trip to the dealer.

Before beginning the installation:

- Check with the customer on Status LED location.
- Remove the domelight fuse. This prevents accidentally draining the battery.
- Roll down a window to avoid being locked out of the car.

After the install:

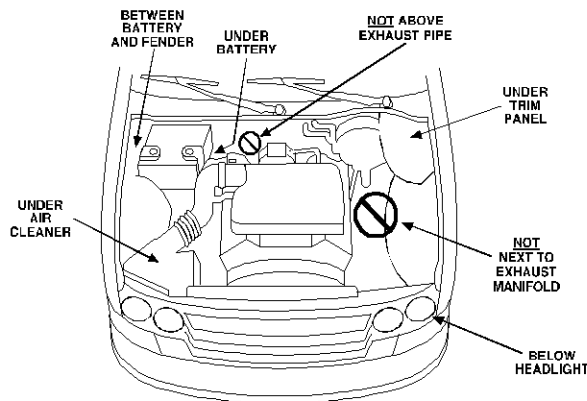
- Test all functions. The "Using Your System" section of the Owner's Guide is very helpful when testing.
- When testing, **don't forget that this system is equipped with Nuisance Prevention Circuitry™**. NPC™ can bypass trigger zones, making them appear to stop working. See *Final Testing*, page 27.

Step One: Deciding on component locations.

Siren

Some things to remember about where to mount the siren:

1. Keep it away from heat sources. Radiators, exhaust manifolds, turbochargers, and heat shields are all things to avoid.
2. Mount it where a thief cannot easily disconnect it, whether the hood is open or shut. Both the siren and its wires should be difficult to find. This usually involves disguising the wire to look like a factory harness.
3. We recommend against grounding the siren to its mounting screws. Instead, we recommend running both the red and black wires into the passenger compartment and grounding to one common point for all devices. After all, both wires are the same length and come already bonded together. Whenever possible, conceal your wires in the factory harnesses or in the same style loom as the factory.
4. When possible, put the siren on the same side of the vehicle as the control module, where its wires will reach the control module's wires without extending them. **Always** run the wires through the center of a grommet, **never** through bare metal!
5. Point the siren down so water does not collect in it.

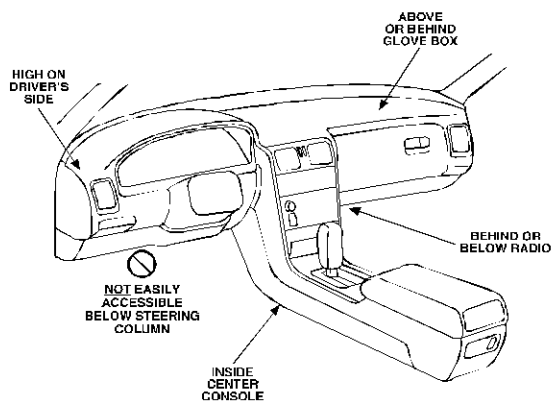


Control Module

Never put the control module in the engine compartment!

The first step in hot-wiring a vehicle is removing the driver's side under-dash panel to access the starter and ignition wires. If the control module is placed just behind the driver's side dash it can easily be disconnected.

When locating the control module, try to find a secure location that will not require you to extend the harnesses' wires (they are 1.5 meters long). Keep it away from the heater core (or any other heat sources) and any obvious leaks.



The higher the control module is in the vehicle, the better the transmitter range will be. If you put the control module under a seat or inside a metal dashboard, range will suffer, and you may wish to add a 542T Range Extending Antenna (available separately).

Some good control module locations: above the glove box, inside the center console, above the under-dash fuse box, above the radio, etc.

Stinger™ DoubleGuard® shock sensor

Never put the Stinger™ in the engine compartment!

Find a spot close to the control module so that the wires do not need to be extended. Keep it away from the heater core (or any other heat sources) and any obvious leaks.

How the Stinger™ is mounted is the most important factor in its performance. We recommend two mounting methods: using double-sided tape or hook-and-loop fastener to mount to a trim panel or an air duct, or wire-tying to a wire harness. If mounting the sensor where it cannot be easily reached for adjustment, hook-and-loop fastening tape (such as Velcro) is recommended for ease of removal for future adjustments.

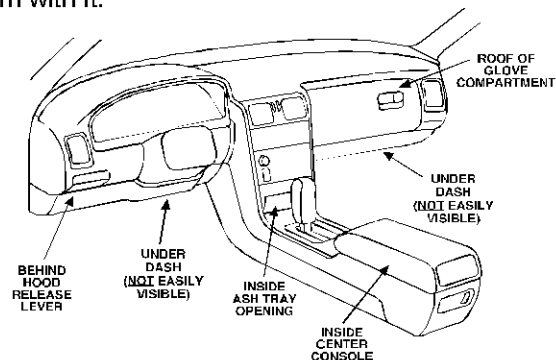
NOTE: In many vehicles, tying the sensor to a steering column or screwing it to metal will result in poor sensitivity, especially on the rear of the vehicle.

Valet®/Program Switch

Ensure that the location you pick for the switch has sufficient clearance to the rear. The switch should be well hidden. It should be placed so passengers or stored items (such as in a glove box or center console) cannot accidentally hit it. The switch fits in a 9/32"-hole.

This system has Remote Valet®. The user can enter and exit Valet® Mode without having to reach the Valet®/Program switch. DEI® introduced this feature so that switch location was less critical in day-to-day use. As long as the Valet®/Program switch can be reached to disarm without a transmitter, easy access is not important.

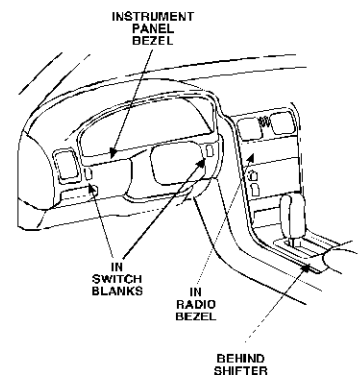
IMPORTANT! When the vehicle is delivered, please show the user where the switch is located and how to disarm the system with it.



Status LED

Things to remember when positioning the Status LED:

- It should be visible from both sides and the rear of the vehicle, if possible.
- It needs at least 1/2" clearance to the rear.
- It is easiest to use a small removable panel, such as a switch blank or a dash bezel. Remove it before drilling your 9/32" hole.
- Use quick-disconnects near the LED wires if the panel is removable. This lets mechanics or other installers remove the panel without cutting the wires.



Starter kill relay

If starter kill relay or its connections are immediately visible upon removal of the under-dash panel, they can easily be bypassed. Always make the relay and its connections difficult to discern from the factory wiring! Exposed yellow butt connectors do not look like factory parts, and will not fool anyone! For this reason, routing the starter kill wires away from the steering column is recommended.

Relay satellite

The relay satellite wiring carries large amounts of current. The wires should not be extended and should be cut to the minimum length necessary. Since the relay satellite is functioning as the ignition switch in the vehicle, it is often convenient to mount the relay satellite close to the main ignition switch harness.

Step 2: Finding the wires you need

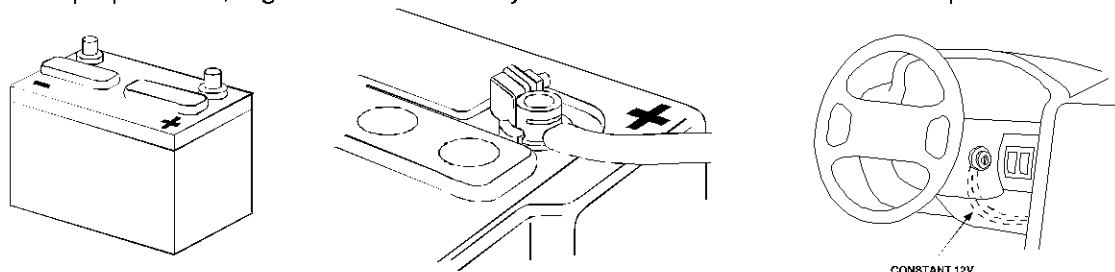
Now that you have decided where each component will be located, you're going to find the wires in the car that the security system will be connected to.

IMPORTANT! Do not use a 12V test light to find these wires! All testing is described using a digital multimeter.

Obtaining constant 12V

We recommend two possible sources for 12V constant: the (+) terminal of the battery, or the constant supply to the ignition switch. **Always install a fuse within 12 inches of this connection.** If the fuse also will be powering other circuits, such as door locks, a power window module, a Nite-Lite® headlight control system, etc.; fuse accordingly.

IMPORTANT: Do not remove the fuse holder on the red wire. It ensures that the control module has its own fuse, of the proper value, regardless of how many accessories are added to the main power feed.

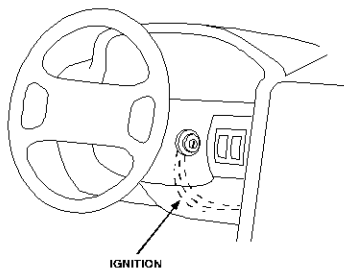


Finding the 12V switched ignition wire

The ignition wire is powered when the key is in the run or start position. This is because the ignition wire powers the ignition system (spark plugs, coil) as well as the fuel delivery system (fuel pump, fuel injection computer). Accessory wires lose power when the key is in the start position to make more current available to the starter motor.

How to find (+)12V ignition with your multimeter:

1. Set to DCV or DC voltage (12V or 20V is fine).
2. Attach the (-) probe of the meter to chassis ground.
3. Probe the wire you suspect of being the ignition wire. The steering column harness or ignition switch harness is an excellent place to find this wire.
4. Turn the ignition key switch to the run position. If your meter reads (+)12V, go to the next step. If it doesn't, probe another wire.
5. Now turn the key to the start position. The meter display should stay steady, not dropping by more than a few tenths of a volt. If it drops close to or all the way to zero, go back to step 3. If it stays steady at (+)12V, you have found an ignition wire.

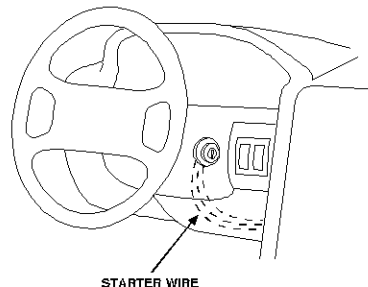


Finding the starter wire

The starter wire provides 12V directly to the starter or to a relay controlling starter. In some vehicles, it is necessary to power a cold start circuit. A cold start circuit will test exactly like a starter circuit, but it does not control the starter. Instead, the cold start circuit is used to prime the fuel injection system for starting when the vehicle is cold.

How to find the starter wire with your multimeter:

1. Set to DCV or DC voltage (12V or 20V is fine).
2. Attach the (-) probe of the meter to chassis ground.
3. Probe the wire you suspect of being the starter wire. The steering column is an excellent place to find this wire. Remember you do not need to interrupt the starter at the same point you test it. Hiding your starter kill relay and connections is always recommended.
4. Turn the ignition key switch to the start position. **Make sure the car is not in gear!** If your meter reads (+)12V, go to the next step. If it doesn't, probe another wire.
5. Cut the wire you suspect of being the starter wire.
6. Attempt to start the car. If the starter engages, reconnect it and go back to step 3. If the starter does not turn over, you have the right wire.



Finding the accessory wire

An accessory wire will show +12V when the key is in the accessory and run position. It will not show +12V during the cranking cycle. There will often be more than one accessory wire in the ignition harness. The correct accessory wire will power the vehicle's climate control system. Some vehicles may have separate wires for the blower motor and the air conditioning compressor. In such cases, it will be necessary to add a relay to energize the second accessory wire.

Finding the tachometer wire

To test for a tachometer wire, a multimeter capable of testing AC voltage must be used. The tachometer wire will show between 1V and 6V AC. In multi-coil ignition systems, the system can learn individual coil wires. Individual coil wires in a multi-coil ignition system will register lower amounts of AC voltage. Also, if necessary, the system can use a fuel injector control wire for engine speed sensing.

Common locations for a tachometer wire are the ignition coil itself, the back of the gauges, engine computers, and automatic transmission computers.

IMPORTANT! You can not test tachometer wires using a test light or logic probe. Damage to the vehicle will result.

How to find a tachometer wire with your multimeter:

1. Set to ACV or AC voltage (12V or 20V is fine).
2. Attach the (-) probe of the meter to chassis ground.
3. Start and run the vehicle.
4. Probe the wire you suspect of being the tachometer wire with the red probe of the meter.
5. If this is the correct wire the meter will read between 1V and 6V.

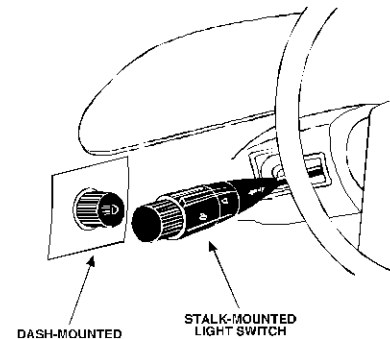
Finding a (+) parking light wire

The (+) parking light wire is often found near the switch. Many cars have the switch built into the turn signal lever, and in these cars the parking light wire can be found in the steering column. The same wire is often available in the kick panel or running board.

NOTE: Many Toyotas, as well as many other Asian vehicles, send a (-) signal from the switch to a relay. The relay then sends 12V(+) to the bulbs. Whenever you have difficulty finding a (+) parking light wire near the switch, simply test the wires at any switch or control panel *which is lit by the instrument panel lighting*. Remember, you need a (+) parking light wire that does not vary with dimmer setting.

How to find a (+) parking light flash wire with your multimeter

1. Set to DCV or DC voltage (12V or 20V is fine).
2. Attach the (-) probe of the meter to chassis ground.
3. Probe the wire you suspect of being the parking light wire. Usually, the area near the headlight/parking light switch is an excellent area to start, as is the kick panel.
4. Turn on the parking lights. If your meter shows (+)12V, turn off the parking lights and make sure it goes back to zero.
5. If it does return to zero, turn the parking lights back on and, using the dash light dimmer control, turn the brightness of the dash lights up and down. *If the meter changes more than a volt when using the dimmer, look for another wire.* If it stays relatively close to (+)12V, you have found your parking light wire.



Finding the door pin switch circuit

The best places to find the door switch wire are:

At the pin switch: When testing at the pin switch, check the wire to ensure that it “sees” all the doors. Often, the passenger switch will cover all the doors even if the driver’s switch will not.

At the dome light: This may not be your best choice if the vehicle has delayed domelight supervision, but it will work in many Hondas, or any vehicle with completely diode-isolated pin switches.

Once you have determined the wire color, the easiest place to connect to the wire is often at the kick panel, at the windshield pillar, or in the running board. When an easy location is not available, running a wire to the domelight itself is often the best solution.

How to find a door pin switch trigger wire with your multimeter:

1. Set to DCV or DC voltage (12V or 20V is fine).
2. In most Fords, fasten the (-) probe of the meter to chassis ground. In most other cars, fasten the (+) probe of your meter to (+)12V constant.
3. Probe the wire you suspect of being the door trigger wire. If the meter reads (+)12V when any door is opened, you have found a trigger wire.

NOTE: Make sure the wire you use “sees” all the doors! Some newer GM vehicles lack standard-type pin switches. The dome light in these vehicles is turned on when the door handle is lifted. These usually have a blue/white or white coming out of the door into the kick panel which will provide a (-) trigger for all doors. Some GM vehicles (some Cavaliers, Grand Ams, etc.) have a yellow wire coming out of the door which provides a (+) door trigger.

Step 3:

Making your wire connections

Before making your connections, plan how your wires will be routed through the vehicle. For instance, the yellow ignition input, the red 12V constant input, and the orange ground-when-armed output (for the optional starter kill relay) will often be routed together to the ignition switch harness. In order to keep the wiring neat and make it harder to find, you may wish to wrap these wires together in electrical tape or conceal them in tubing similar to what the manufacturer used.

There are two acceptable ways of making a wire connection: solder connections and crimp connectors. When properly performed, either type of connection is reliable and trouble-free. Regardless of whether you solder your connections or you use mechanical-type crimp-on connections, ensure that all connections are mechanically sound and that they are insulated.

Cheap electrical tape, especially when poorly applied, is not a reliable insulator. It often falls off in hot weather. Use good-quality electrical tape or heat shrink.

Never twist-and-tape the wires together without soldering.

Never use “fuse taps”, as they can damage fuse box terminals.

If you use tapping connectors such as 3M T-Taps (not to be confused with Scotch-Loks), avoid using them in higher-current applications (constant 12V, ground, etc.). Some tapping connectors are inferior in quality and should be avoided.

PRIMARY HARNESS H1, 12-PIN CONNECTOR

H1/1	ORANGE	(-) 500 mA ARMED OUTPUT
H1/2	WHITE	(+)/(-) SELECTABLE LIGHT FLASH OUTPUT
H1/3	WHITE/BLUE	(-) 200 mA CHANNEL 3 INPUT/OUTPUT
H1/4	BLACK/WHITE	(-) 200 mA DOMELIGHT SUPERVISION OUTPUT
H1/5	GREEN	(-) DOOR TRIGGER INPUT, ZONE 3
H1/6	BLUE	(-) INSTANT TRIGGER INPUT, ZONE 1
H1/7	VIOLET	(+) DOOR TRIGGER INPUT, ZONE 3
H1/8	BLACK	(-) CHASSIS GROUND INPUT
H1/9	YELLOW	(+) IGNITION INPUT TO STARTER KILL RELAY
H1/10	BROWN	(+) SIREN OUTPUT
H1/11	RED	(+) CONSTANT POWER INPUT
H1/12	RED/WHITE	(-) 200 mA CHANNEL 2 VALIDITY OUTPUT

REMOTE START PRIMARY HARNESS, 5-PIN CONNECTOR

RED	(+) CONSTANT POWER
-----	--------------------

YELLOW	(+) IGNITION INPUT TO ALARM
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PINK	(-) 200 mA IGNITION RELAY TURN-ON
------	-----------------------------------

ORANGE	(-) 200 mA ACCESSORY RELAY TURN-ON
--------	------------------------------------

PURPLE	(-) 200 mA STARTER RELAY TURN-ON
--------	----------------------------------

HEAVY GAUGE RELAY SATELLITE WIRES

RED	(+) HIGH CURRENT 12V INPUT
-----	----------------------------

RED	(+) HIGH CURRENT 12V INPUT
-----	----------------------------

PINK	(+) OUTPUT TO IGNITION CIRCUIT
------	--------------------------------

ORANGE	(+) OUTPUT TO ACCESSORY CIRCUIT
--------	---------------------------------

PURPLE	(+) OUTPUT TO STARTER CIRCUIT
--------	-------------------------------

REMOTE START SECONDARY HARNESS, 6-PIN CONNECTOR

H3/1	BLUE	(-) 200 mA STATUS OUTPUT
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H3/2	BLUE/BLACK	(-) 200 mA SECOND IGNITION OUTPUT
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H3/3	GREY	(-) REMOTE START SHUTDOWN WIRE
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H3/4	BROWN	(+) REMOTE START SHUTDOWN WIRE
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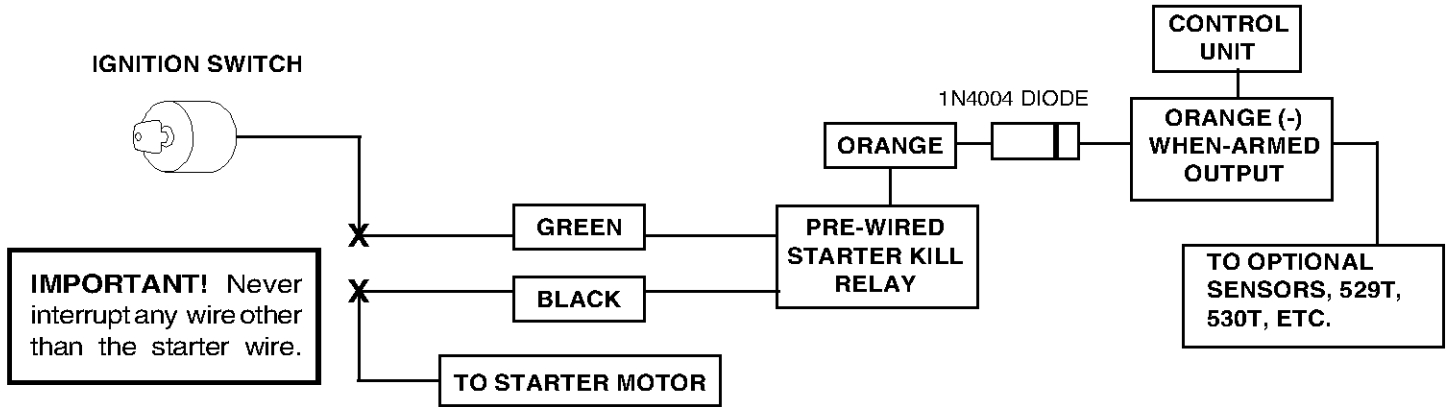
H3/5	WHITE	TACHOMETER INPUT WIRE
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H3/6	BLACK/WHITE	(-) NEUTRAL SAFETY SWITCH INPUT
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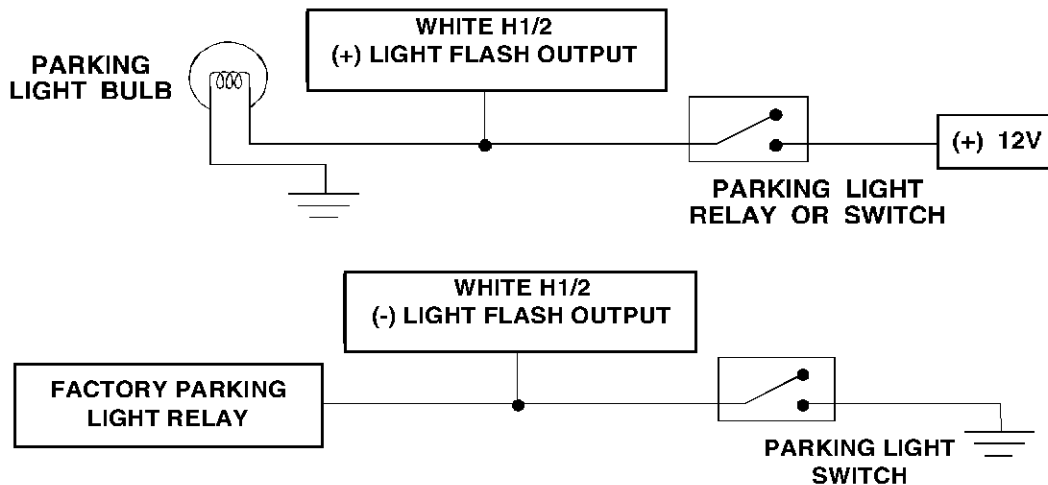
WIRE CONNECTION GUIDE

H1/1 ORANGE(-) ground-when-armed output: This wire supplies a (-) 500 mA ground as long as the system is armed. This output ceases as soon as the system is disarmed. The orange wire is pre-wired to control the 8618 starter kill relay.

NOTE: If connecting the ORANGE wire to control another module, such as a 529T or 530T window controller, a 1 amp diode (type 1N4004) will be required. Insert the diode as shown below.



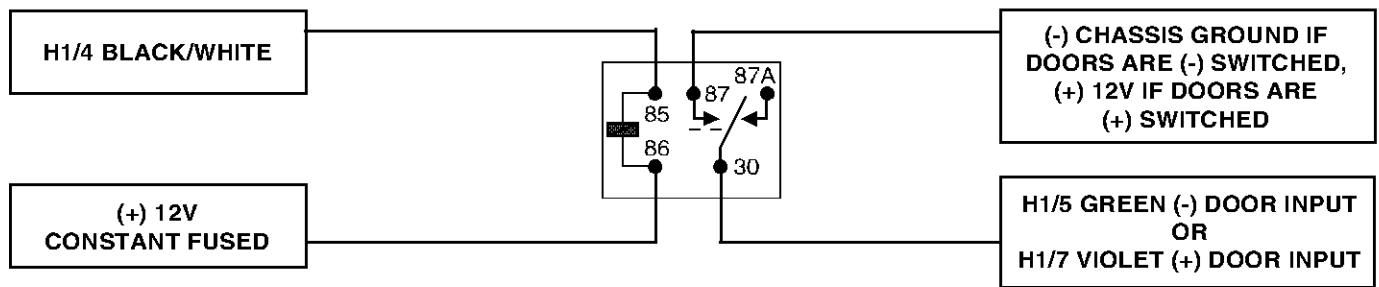
H1/2 WHITE light flash output: As shipped, this wire should be connected to the (+) parking light wire. If the light flash polarity jumper under the sliding door is moved to the opposite position (see *Internal Programming* page 20), this wire supplies a (-) 200 mA output. This is suitable for driving (-) light control wires in Toyota, Lexus, BMW, some Mitsubishi, some Mazda, etc.



H1/3 WHITE/BLUE channel 3 (-) input/output: A momentary input on this wire will start or stop the motor, just as transmitting channel 3 from the remote transmitter does. It is often connected to an optional momentary push-button switch to make access to Valet Take Over mode and Timer mode more convenient. The WHITE/BLUE will also output whenever the button(s) controlling channel 3 are pressed. The output can be used to disarm factory security systems when remote starting the vehicle.

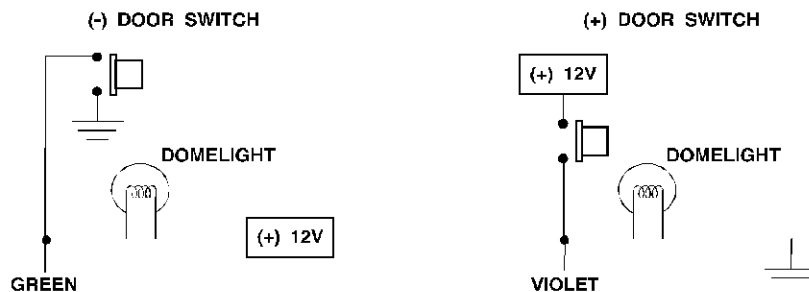
H1/4 BLACK/WHITE (-) 200 mA domelight-supervision output: Connect this wire to the optional domelight supervision relay as shown below:

IMPORTANT: This output is only intended to drive a relay. It cannot be connected directly to the domelight circuit, as the output cannot support the current draw of one or more light bulbs.



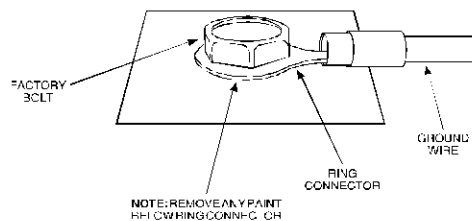
H1/5 GREEN(-) door trigger or **H1/7 VIOLET**(+) door trigger input: If the door switch wire you found is (-) when the door is open, connect the **GREEN** wire to it. If the door switch wire you found is (+) when the door is open, use the **VIOLET** wire instead.

IMPORTANT! Test to make sure this wire "sees" all doors!

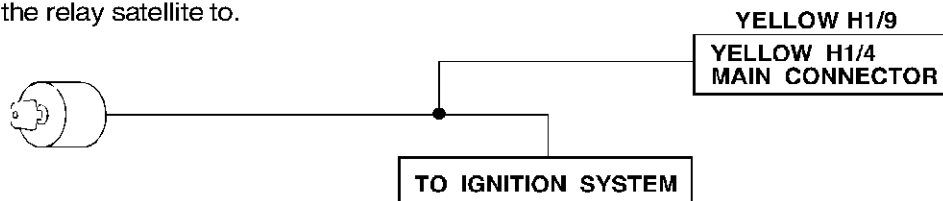


H1/6 BLUE(-) instant trigger: This input will respond to a (-)input with an instant trigger. It is ideal for hood and trunk pins and will report on zone one.

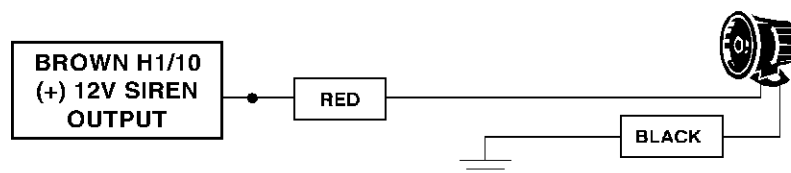
H1/8 BLACK(-) chassis ground connection. Connect this wire to bare metal, preferably with a factory bolt rather than your own screw (screws tend to either strip or loosen with time). We recommend grounding all your components to the same point in the vehicle.



H1/9 YELLOW (+) ignition input to starter kill relay: This wire goes to terminal 86 of the pre-wired starter kill relay. Connect this wire to the vehicle's ignition wire. This will be the same wire that you have connected the heavy gauge pink wire of the relay satellite to.



H1/10 BROWN(+) siren output: Connect this to the red wire of the 514T Revenger™ siren. Connect the black wire of the siren to (-) chassis ground, preferably at the same point you grounded the control module's **H1/8 BLACK** wire.

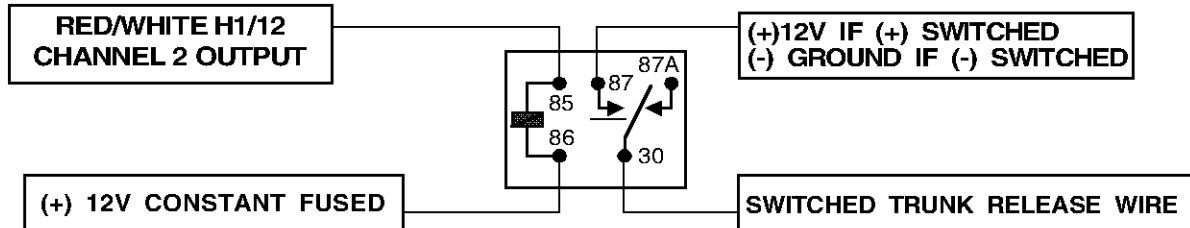


H1/11RED(+)12V constant power input: Before connecting this wire, remove the supplied fuse. Connect to the battery positive terminal or the constant 12V supply to the ignition switch as described on Page 5.

NOTE: Always use a fuse within 12 inches of the point you obtain (+)12V. Do not use the 10A fuse in the harness for this purpose. This fuse protects the module itself.

H1/12RED/WHITE channel 2, 200mA (-) output: When the system receives the code controlling channel 2, for longer than 1.5 seconds, the red/white will supply an output as long as the transmission continues. This is often used to operate a trunk/hatch release or other relay-driven function.

IMPORTANT! Never use this wire to drive anything but a relay or a low-current input! The transistorized output can only supply 200 mA of current, connecting directly to a solenoid, motor, or other high-current device will cause it to fail.



RELAY SATELLITE KEY SWITCH INTERFACE

The five heavy gauge wires coming from the relay satellite are used to energize high current circuits in the vehicle. It is crucial that these connections be well-made and capable of handling the current demands. For this reason, scotchlocks, T-taps and other such connectors are strongly discouraged.

RED(2) (+) 12V input for relays: Remove the two 30 amp fuses prior to connecting these wires and do not replace them until the satellite has been plugged into the control module. These wires are the source of current for all the circuits the relay satellite will energize. They must be connected to a high current source. Since the factory supplies (+) 12V to the key switch that is used to operate the motor, it is recommended that these wires be connected there.

NOTE: If the factory supplies two separate (+) 12V feeds to the ignition switch, connect one RED wire of the satellite to each feed at the switch.

PINK(+) ignition output: Connect this wire to the ignition wire in the vehicle. See page 5.

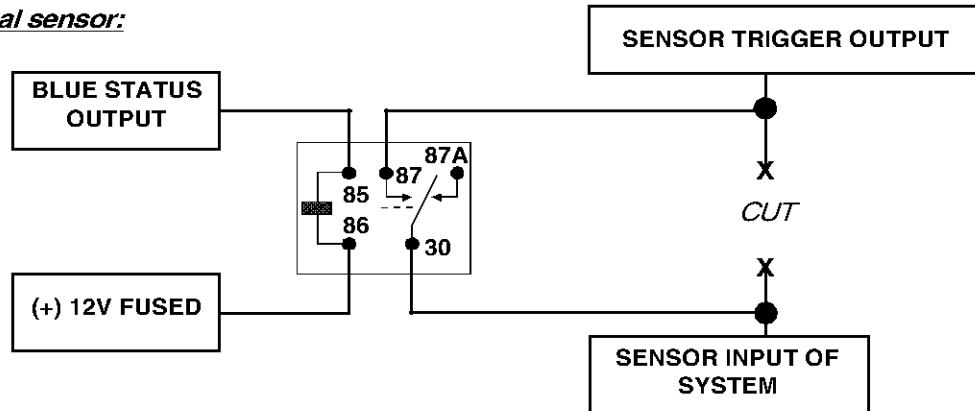
ORANGE(+) accessory output: Connect this wire to the accessory wire in the vehicle which powers the climate control system. See page 6.

PURPLE(+) starter output: Connect this wire to the starter wire in the vehicle. See page 6.

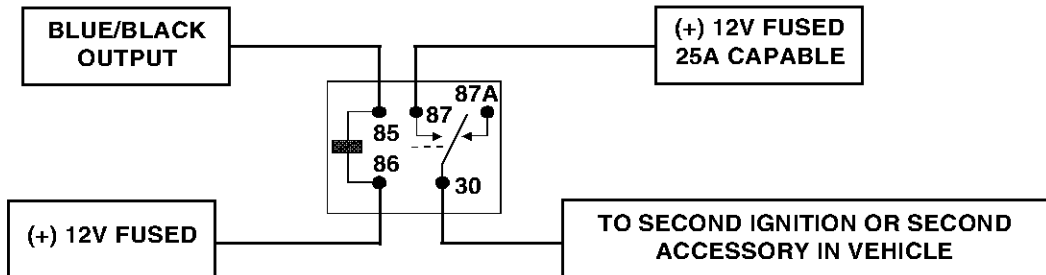
REMOTE START SECONDARY HARNESS

H3/1 BLUE(-) status output: This wire supplies a 200mA output as soon as the module begins the remote start process. It can be used with a relay to disconnect a sensor from the system as shown below. It is also used in the installation of the 516L Valet Voice System.

Bypassing an optional sensor:



H3/2 BLUE/BLACK(-) ignition 2 output: This output provides a 200mA as soon as the remote starter is activated. It is used to power a relay to energize a second ignition or second accessory wire as shown below. This output is capable of driving two relays if necessary.



H3/3 GREY(-) shutdown input: This input can prevent the system from starting the vehicle, as well as shut it down during remote operation. It is strongly recommended that this wire be connected to a hood pin switch to prevent the system from operating with the hood open.

H3/4 BROWN(+) shutdown input: This input operates just like the gray wire except for its polarity. A +12V input to this wire will prevent the vehicle from remote starting or shut it down if the system is operating the motor. It should be connected to the brake switch.

H3/5 WHITE tachometer input: This input provides the module with information about the engine's revolutions per minute (RPMs). It can be connected to the negative side of the coil in vehicles with conventional coils. In multi-coil and high energy ignition systems locating a proper signal may be more difficult. See page 6. Once connected, you must teach the system the tach signal. See *Internal Programming* page 20.

H3/6 BLACK/WHITE neutral safety switch input: This input must be grounded in order for the remote start system to operate. Many automatic transmission vehicles provide a "true" neutral safety switch which prevents the vehicle from starting in any drive gear. In those vehicles, this wire should be connected to chassis ground. In any case where it is possible to engage the starter while in a drive gear, a neutral safety switch input should be used.

NOTE: The BLACK/WHITE wire must be connected to the ground if not used. The system will not activate if this wire is left disconnected.

NEUTRAL SAFETY SWITCH INTERFACE

Some vehicles do not have an electrical neutral safety switch. Instead, a mechanical neutral safety switch that physically interrupts the starter wire is used when the vehicle is in any drive gear. If the remote start is interfaced before this switch, it will provide protection from starting in gear. However, some vehicles combine the column shift mechanism and the mechanical neutral safety switch into one mechanical part. In these vehicles, it is impossible to interface the remote start system before the neutral safety switch. With this type of vehicle, if the car is left in a drive gear and the remote start system is activated, the vehicle will move and may cause damage to persons or property.

According to available information, the only vehicles currently manufactured this way are most General Motors trucks, sport utility vehicles and column shifting passenger cars. Available information also indicates that pre-1996 Dodge Dakota pickups with 2.5 liter motors are manufactured this way as well.

GM vehicles that have the neutral safety switch built into the column shifter can usually be identified by a purple starter wire. Typically, vehicles that use an outboard mechanical switch use a yellow wire from the ignition switch to the mechanical switch and a purple wire from the mechanical switch to the starter itself. Remember this is only a rule of thumb and is not intended as a substitute for proper testing.

We suggest the following procedure to test for vehicles manufactured in this way.

NOTE: You must complete the remote start system installation before doing the following test. Ensure that the remote start system is functioning normally. This includes connecting to the brake as a shut-down.

1. Make sure there is adequate clearance to the front and rear of the vehicle, it may move slightly.
2. Make sure the hood is closed and there are no remote start shut-downs active.
3. Set the emergency brake.
4. Turn the key to the "run" position, this will release the shifter.
5. Place the car in drive (D).
6. Place your foot directly over the brake pedal, but do not depress it. Be ready to step on the brake if the starter engages.
7. Activate the remote start system.
8. If the starter engages, immediately depress the brake to shut the remote start system down. If the starter does not engage, no additional safety system is required.

If the starter engages and the vehicle is a General Motors product or Dodge Dakota pickup, refer to the following text and diagrams for an alternative shut-down method which will prevent the starter from engaging. If the vehicle is not a General Motors product or a Dodge Dakota pickup, please call DEI Technical Support for an alternative shut-down method. Do not let the vehicle leave until installed properly.

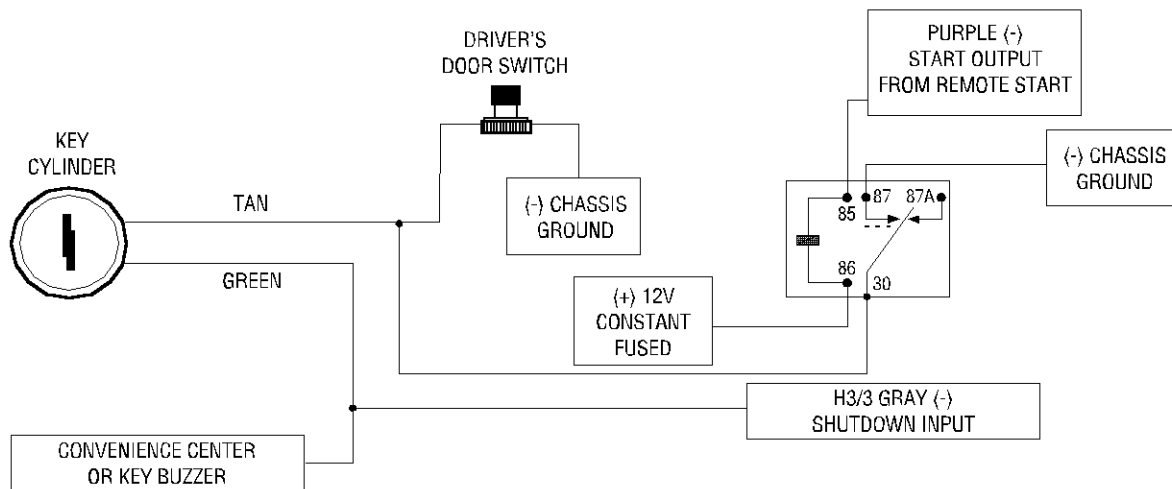
Every vehicle built in this fashion requires that the shifter be placed in park to remove the keys from the ignition. As a result, it is possible to use the key-in-ignition sense switch to prevent remote starting if the keys are in the ignition. The following diagrams illustrate how to accomplish this. The first diagram applies to all General Motors vehicles at the present time. The second diagram applies to all pre-1996 Dodge Dakota pickup trucks with 2.5 liter motors. This solution has one side effect. If the customer inserts the key in the ignition with the driver's door open, the remote start system will shut down. If this interface is used it is important to inform the customer to close the drivers door before inserting the key into the ignition when the remote start is active. This will allow the customer to turn the key on and shut the remote start down by pressing the brake without the key sense wire shutting down the unit prematurely.

In addition, you must connect a tan (+) shut-down input to the yellow wire on the relay satellite ribbon cable. This prevents the remote start system from activating if the key is left in the "run" position. If your remote start system only has one tan input, you must use diodes to isolate the ignition circuit from the brake switch input.

However, due to future manufacturer changes in vehicles, it is possible that this may not apply to all vehicles. In addition, color variations are possible from model to model; make sure to test the circuit carefully. Please call DEI Technical Support if you need assistance in making this interface.

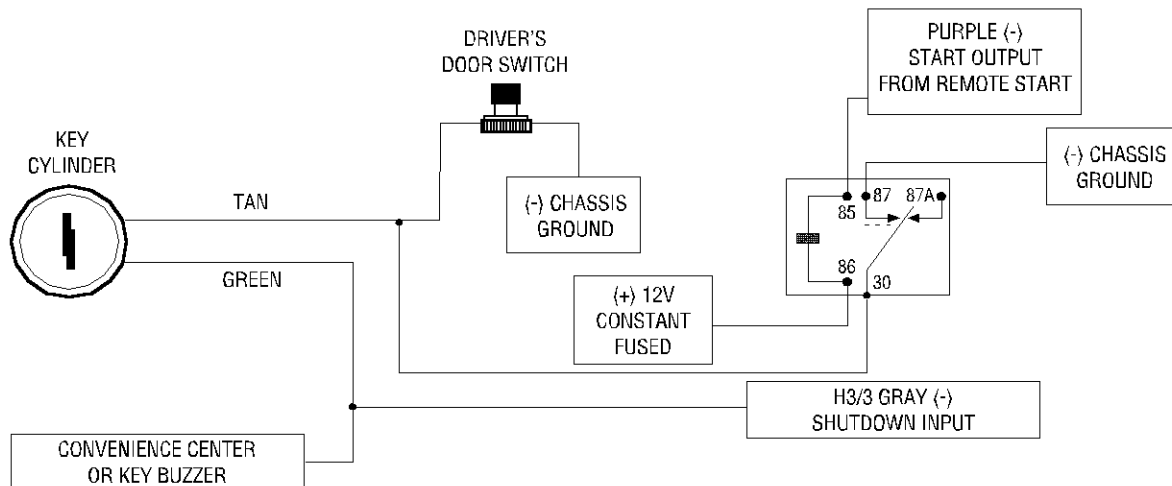
IMPORTANT! Once the interface is complete, attempt to remote start the vehicle with the door closed and the key in the ignition. The vehicle should not start. If it does re-check the connections.

General Motors trucks, sport utility vehicles and column shifting passenger cars



DIA-7

Pre-1996 Dodge Dakota pickups with 2.5 liter motors



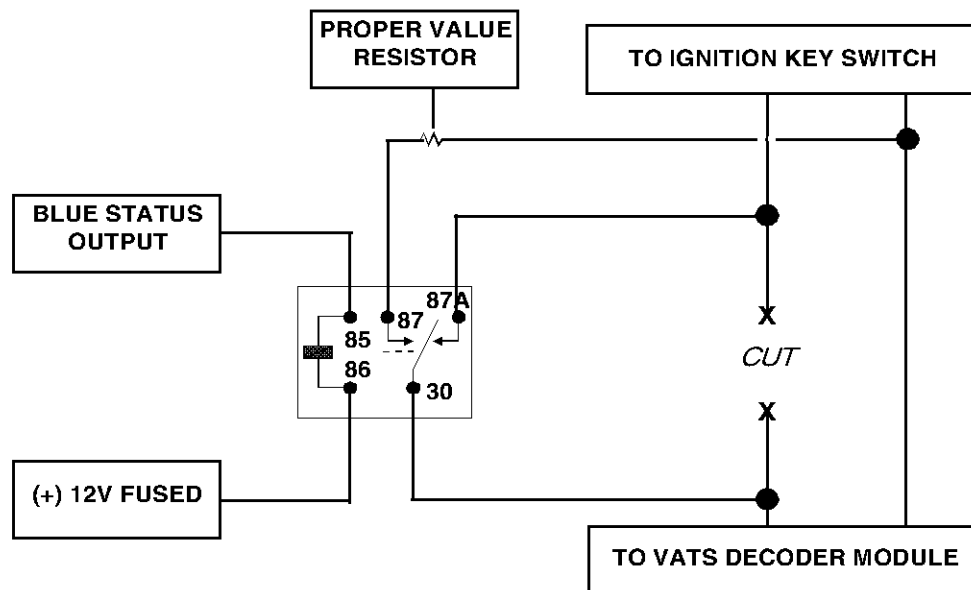
DIA-7

BYPASSING GM VEHICLE ANTI-THEFT SYSTEM (VATS)

Vehicles with the GM VATS (Pass Key) systems have a resistor embedded in the ignition key. If the VATS decoder module does not measure the proper resistance when the vehicle is started, the starter and fuel pump may be disabled for up to ten minutes. The system includes a "VATS pack" of resistors. One will match the resistor in the key.

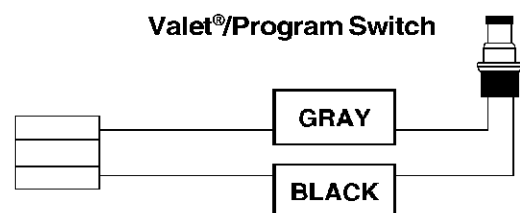
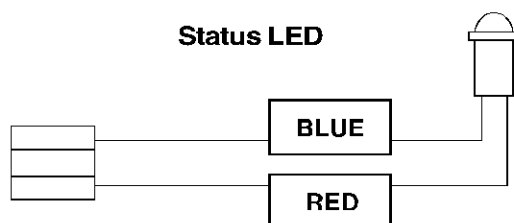
The VATS wires will be two very light-gauge wires coming out of the steering column. The colors of the wires vary, but they are often contained in an orange tubing. Determine the value of the resistor in the key. Then follow the diagram below to bypass VATS during remote start operation.

NOTE: When connections to the VATS wires, it is not important which wire is cut.



PLUG-IN LED AND VALET®/ PROGRAM SWITCH

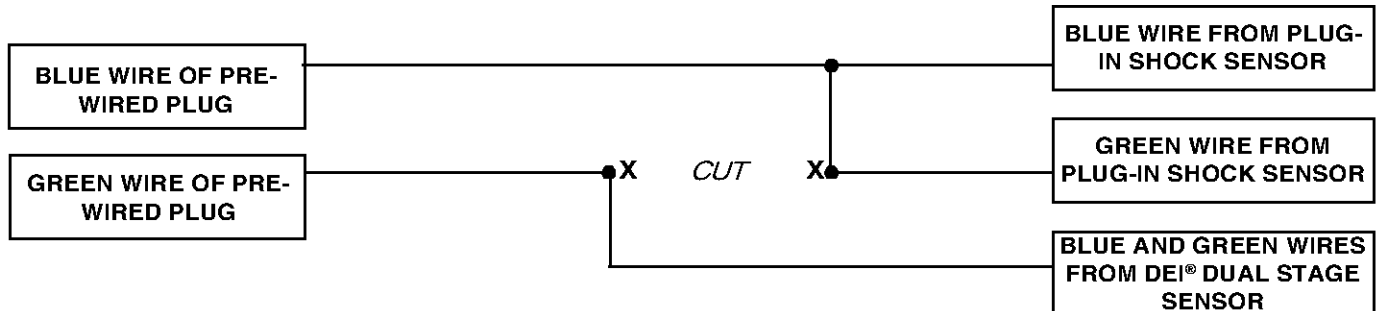
These plug into the module. The Status LED plugs into the small two-pin socket, while the Valet®/Program Switch should be plugged into the larger blue two-pin connector. The Status LED fits in a 9/32" hole.



FOUR-PIN SHOCK SENSOR HARNESS

GREEN (-) Multiplex input: Inputs shorter than .8 seconds will trigger the Warn Away® response, while inputs longer than .8 seconds will trigger full alarm sequence and report zone four. If installing an **optional** DEI® dual stage sensor, connect to the GREEN wire as shown below. The diagram below eliminates the need for diodes to isolate the sensors, as well as providing a separate zone for each sensor.

Diagram for adding optional DEI® dual stage sensor to GREEN wire (zone 4)



BLUE (-) Multiplex input: Inputs shorter than .8 seconds will trigger the Warn Away® response, while inputs longer than .8 seconds will trigger full alarm sequence and report zone two.

RED, BLACK: RED is (+)12V constant, BLACK is (-) ground. Do not use these for anything besides the plug in shock sensor.

HARNESS 2, (+/-) DOOR LOCK OUTPUTS

H2/A	GREEN	(-) LOCK, (+) UNLOCK OUTPUT
H2/B	EMPTY	UNLESS USING 451M
H2/C	BLUE	(-) UNLOCK, (+) LOCK OUTPUT

This system can control two common power door lock types without any additional parts! With certain vehicles, or if an actuator is to be installed, either a 451M Door Lock Relay Satellite or two relays will be required.

IMPORTANT! If you mistake a Type C direct-wired system for a Type A positive-pulse system, the module will be damaged!

Type A - (+) 12V pulses from the switch to the factory relays

The system can control this type of system directly, with no additional parts. The switch will have three wires on it, and one will test (+)12V constantly. The others will alternately pulse (+)12V when the switch is pressed to the lock or unlock position.

If you cannot get to the switch, and you find a set of wires that pulse (+)12V alternately on lock and unlock, you must take care to ensure that it is not a Type C direct-wire system.

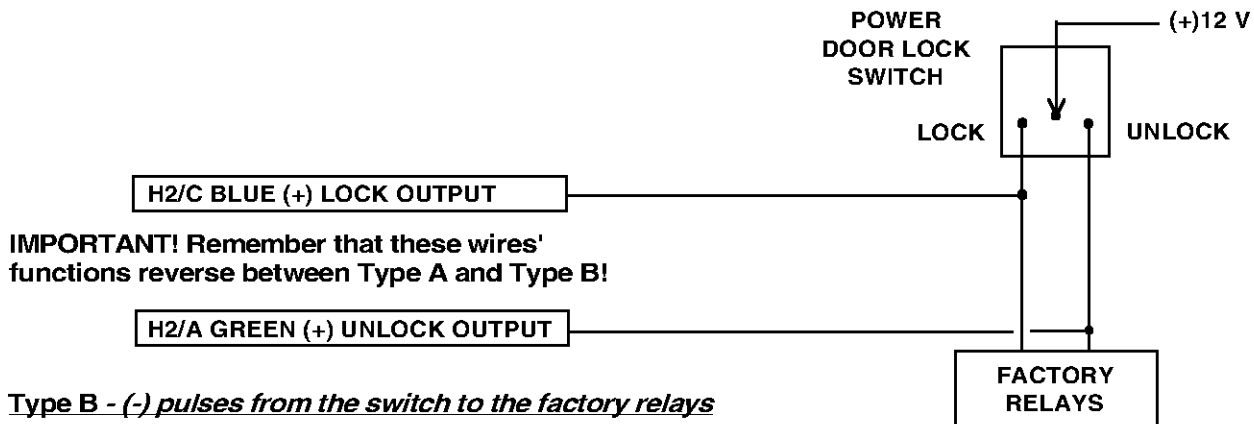
Here is a test: Cut the wire which pulses (+)12V on lock, and then operate the switch to unlock.

If all doors unlock, the vehicle uses type A system.

If you lose *all door lock operation in both directions*, you are operating the master switch in a Type C system.

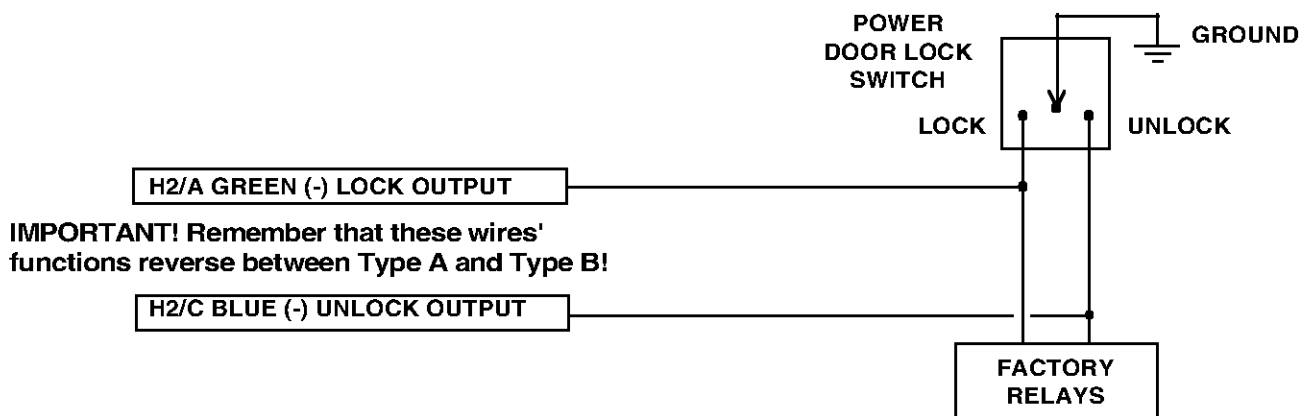
If you lose all door lock operation of *one or more, but not all motors stop operating, and* other doors still work, you have cut a wire leading directly to one or more motors. You must instead find the actual wires leading to the switch.

Many domestically-made GM vehicles use Type A locks. However, many more GM vehicles are Type C than in previous years. The full-size pickups (1989-up), many of the S10 Blazers, the Corvette, '95 Cavalier/Sunfire 1993 - and newer, Camaro/Firebird all use Type C door locks, and cannot be controlled without a 451M! Almost all domestically-built Fords are Type C. Ford builds almost no Type A systems. Chrysler builds both Type A and Type C, so use care.



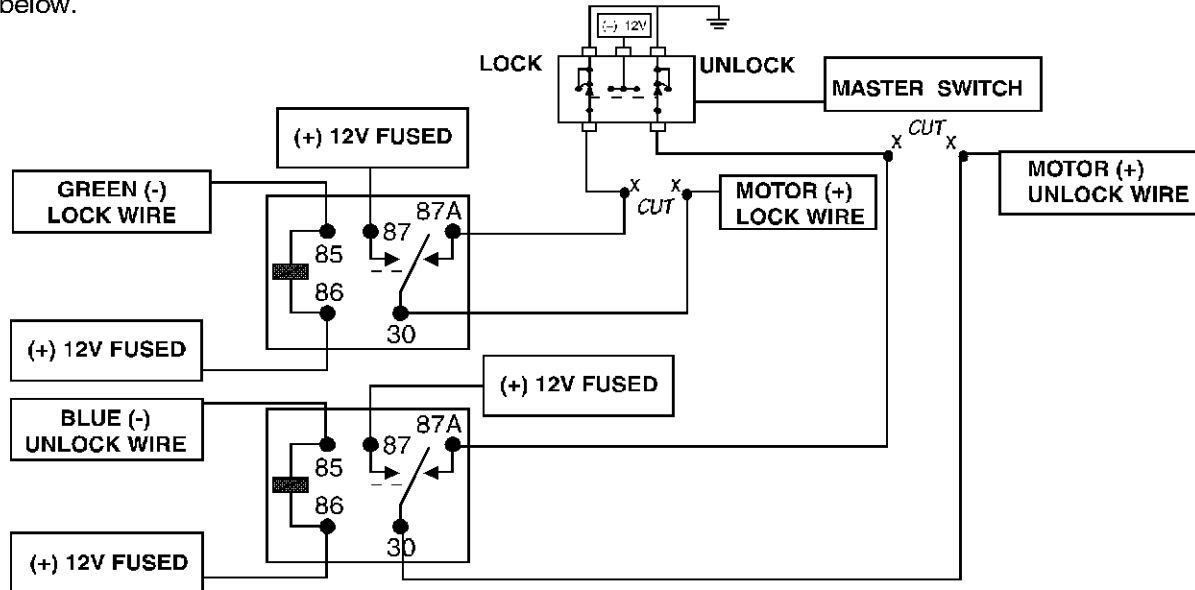
This system is common in many Toyotas, Nissans, Hondas, and Saturns, as well as Fords with the keyless-entry system (some other Fords also use Type B).

The switch will have three wires on it, and one wire will test ground all the time. One wire will pulse (-) when the switch locks the doors, and the other wire will pulse (-) when the switch unlocks the doors. This type of system is difficult to mistake for any other type.



Type C - Reversing Polarity

Interfacing with a reversing polarity system requires either two relays or one 451M (not included). It is critical to identify the proper wires and locate the master switch to interface properly. Locate wires that show voltage on lock and unlock. Cut one of the suspect wires and check operation of the locks from both switches. If one switch loses operation in both directions and the other switch operates in one direction only, you have located one of the target wires. The switch that lost all operation is the master switch. If one switch works both directions and the other switch works only one direction, you have a Type A system. If both switches still operate, but one or more doors have stopped responding entirely, you have cut a motor lead. Reconnect it and continue to test for another wire. Once both wires have been located and the master switch identified, cut both wires and interface as shown below.



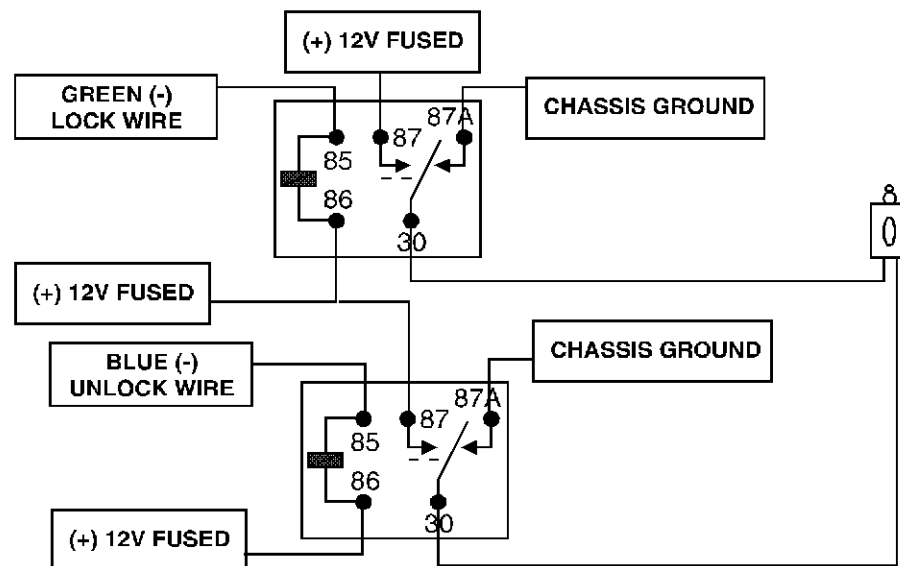
Important! If these are not connected properly, you will send (+) 12 Volts directly to (-) ground, possibly damaging the alarm or the factory switch.

Type D - Aftermarket Actuators

In order for this system to control one or more aftermarket actuators, a 451M or two relays (optional) are needed. Vehicles without factory power door locks require the installation of one actuator per door. This requires mounting the door lock actuator inside the door. Other vehicles may only require one actuator installed in the driver's door if all door locks are operated when the driver's lock is used. This type of installation is required to operate factory lock systems in Volvo (except 850), SAAB, and most Mazda, Isuzu and Subaru models.

The fuse used on 12 volt inputs should be 7.5A per motor installed in the vehicle.

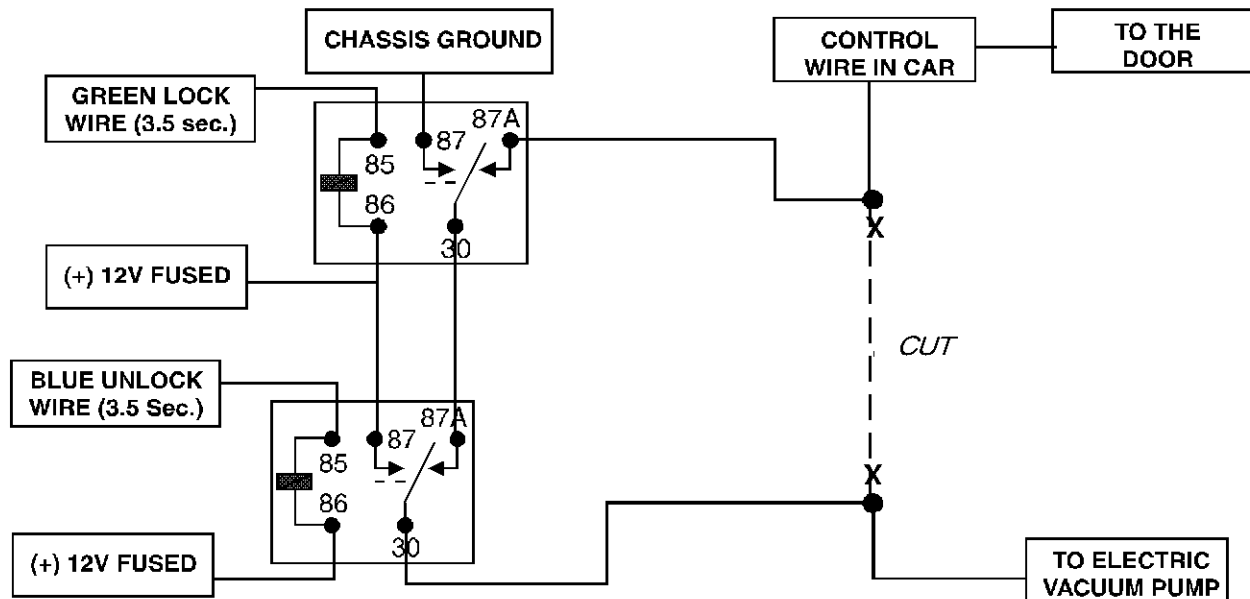
IMPORTANT!
Do not connect
the outputs of
the alarm
directly to the
actuator!



Type E - Mercedes-Benz and Audi (1985 & Newer)

Door locks are controlled by an electrically activated vacuum pump. Some Mercedes and Audis use a Type D system. Test by locking doors from the passenger key cylinder. If all the doors lock, the vehicle's door lock system can be controlled with just two relays (optional). The control wire can be found in either kick panel and will show (+)12V when doors are unlocked and (-) ground when doors are locked.

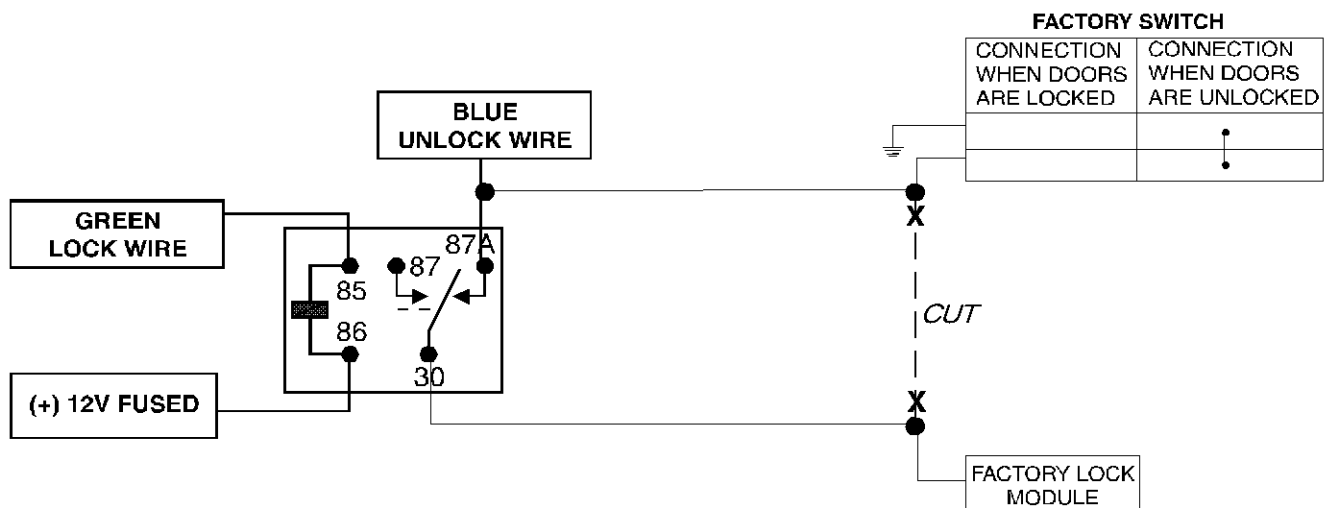
To interface see diagram below. The system must be programmed for 3.5 second door lock pulses (see *Operation-Settings Learn Routine™*).



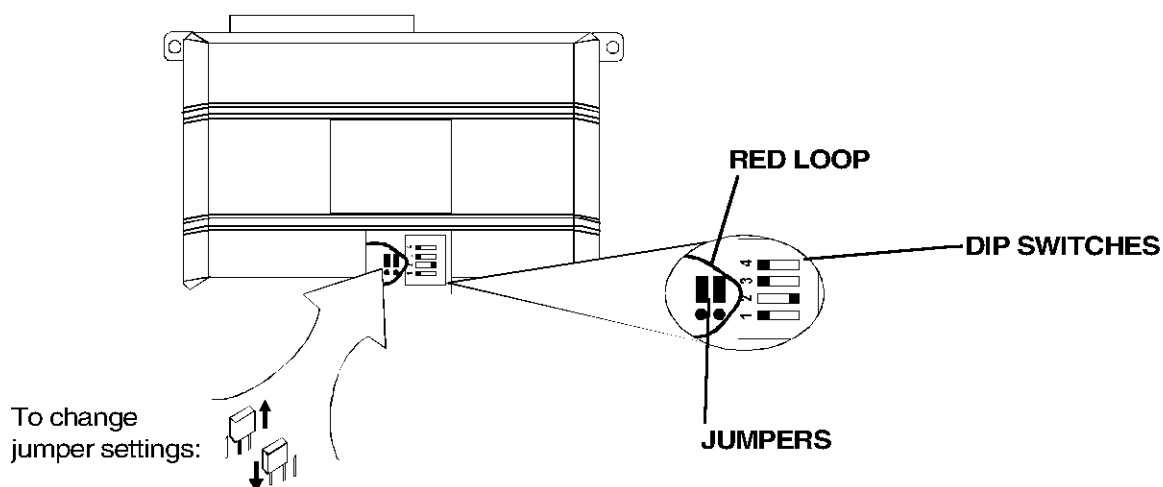
Type F - One-Wire System

This system usually requires a negative pulse to unlock, and cutting the wire to lock the door. In some vehicles, these are reversed. It is found in late-model Nissan Sentras, some Nissan 240SX, and Nissan 300ZX 1992-up. It is also found in some Mazda MPV's and some Mitsubishi's.

One relay (optional) is used to interface to this type of system as follows:



INTERNAL PROGRAMMING



DIP SWITCH SETTINGS

Switch	On Position	Off Position
1	Zero cylinder	Tach input connected
2	Parking lights constant	Parking lights flashing
3	12 minute run time	24 minute run time
4	Learn tach ON	Learn tach OFF

SWITCH #1 ZERO CYLINDER/TACH INPUT CONNECTED: This switch is used to make the system work without the tach input. When the switch is in the zero cylinder position, the system will engage the starter for 2 seconds and then stop. As the system ignores tach input, over-rev protection is not available when the switch is in the zero cylinder position. Whenever the WHITE tach input is connected, the switch should be in the OFF position.

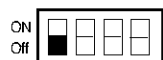
NOTE: DEI® strongly recommends connection the tach input whenever possible. The zero cylinder setting should only be used when absolutely necessary.

SWITCH #2 PARKING LIGHTS CONSTANT/FLASHING: This switch determines what the parking lights will do when the vehicle is running via the remote start system. With the switch in either position, the lights will flash once when the start command is received. Once the vehicle is running, the parking lights will flash with the switch in the off position and light constant with the switch in the on position.

SWITCH #3 RUN TIME 12/24 MINUTES: This switch controls how long the engine will run before it "times out" and shuts down. It will run for 12 or 24 minutes depending on the position of this switch.

SWITCH #4 TACHOMETER LEARN: This switch is used to teach the system the tach input. The system will analyze what signal is present on a wire and set the over and under rev limits automatically.

Teaching the unit a tach input:



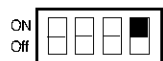
↓ 1) Make sure switch #1 is in the OFF position.

2) Make sure the white wire is connected to the tach wire in the vehicle.



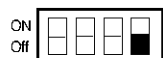
3) Start the vehicle using the key.

4) Wait for the motor to idle normally



↑ 5) Flip switch #4 to the ON position.

6) When tach is learned, the plug-in LED will light steady.



↓ 7) Flip switch #4 to the OFF position.

The tach learn routine of this system is very versatile. If a coil wire cannot be located directly, the system can learn wires from coil packs, fuel injectors and other systems in the vehicle.

NOTE: The RED loop must be connected for the LED to confirm tach learning.

JUMPER SETTINGS

(+) Light flash output		Learn enabled
(-) Light flash output		Valet only

LIGHT FLASH JUMPER: This jumper is used to determine the light flash output. In the (+) position, the onboard relay is enabled and the unit will output +12V on the WHITE wire, H1/2. In the (-) position, the onboard relay is disabled. The WHITE wire, H1/2, will supply a 200mA (-) output suitable for driving factory parking light relays.

LEARN ENABLE/VALET® ONLY JUMPER: In the Learn enable position (L), you can use the Valet®/Program switch to access both the Learn Routine™ and Valet® mode. In the Valet® only position (V), the Valet®/Program switch will only function as a Valet® switch. Entering Learn Routine™ is not possible with the jumper in the (V) position.

RED LOOP

Whenever the key is turned on, and the RED loop is connected, the LED will indicate what caused the last shut-down of the remote start system. See *Shutdown Diagnostics*, page 28. Once installation and final testing has been completed, cut the RED loop. Should diagnostics be required at a later time, the RED loop can be reconnected.

TRANSMITTER/RECEIVER LEARN ROUTINE™

In order to enter Learn Routine™, the jumper under the sliding door must be placed into learn position. See *Internal Programming*, page 20. The Valet®/Program button, plugged into the blue port, is used for programming. There is a basic sequence to remember whenever programming this unit: Door, Key, Choose, Transmit and Release.



1. Door Open a door. Either the H1/5 GREEN or the H1/7 VIOLET door trigger wire must be connected for the control unit to “see” an open door.



2. Key Turn the ignition on to the run position. The H1/9 YELLOW switched ignition input must be connected.



3. Choose Within 15 seconds, press and release the momentary button to select the channel you wish to program:

Press and Release

One time

To Program

Arm/disarm/panic

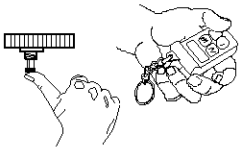
Two times

Channel two output (Silent Mode™/Remote Valet®)

Three times

Channel three output

Once you have selected the step, press the button once more and **hold** it. The unit will chirp one, two or three times depending on the channel selected. Do **not** release the momentary button.



4. Transmit While holding the momentary button, press the button on the transmitter that you would like to control the selected receiver channel. One chirp will confirm that the code has been learned.

5. Release Once the code is learned, the button can be released.

You can step from one step to another by releasing the Valet®/Program button and tapping it to advance steps and then holding it. For instance: You have programmed channel one and you want to program channel two. Release the Valet®/Program button. Press it one time and release it to advance from step one to step two. Now, press and hold the button down and the unit will chirp twice. As before, **do not release it**.

If you want to program channel three after programming channel one, release the momentary button press it twice and release it to advance to step three. Then press it once more and hold it. The siren will chirp three times to confirm it is ready to receive the code from the transmitter.

Learn Routine™ will be exited if:

- Ignition is turned off.
- Door is closed.
- Program button is pressed too many times.
- More than 15 seconds elapses between steps.

One long chirp indicates that Learn Routine™ has been exited.

OPERATING-SETTINGS LEARN ROUTINE™

Many of the operating settings of this unit are programmable. They can be changed whenever necessary through a computer-based Learn Routine™. In order to access Learn Routine™, the jumper underneath the sliding door on the module must be in the learn position. See *Internal Programming*, page 20. The Valet®/Program push-button switch, plugged into the blue port is used together with a programmed transmitter to change the settings. To program settings remember: Door, Key, Choose, Transmit and Release.

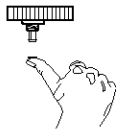


Open a door. Either the H1/5 GREEN or the H1/7 VIOLET door trigger wire must be connected for the control unit to “see” an open door.



2. Key

Turn the ignition **on and then back off**. The H1/9 YELLOW switched ignition input must be connected.

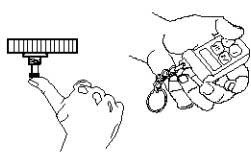


3. Choose

Within 15 seconds, press and release the Valet®/Program button the number of times corresponding to the number of the desired feature (see the chart below). The one chirp settings below are the factory default settings, except where indicated by bold text.

Feature Number	One-chirp setting	Two-chirp setting
1	Active arming	Passive arming
2	Arm/disarm chirps on	Arm/disarm chirps off
3	Ignition-controlled door locks	Standard door locks
4	Active locking only	Passive locking
5	Panic with ignition on	No panic with ignition on
6	0.8 second door lock pulses	3.5 second door lock pulses
7	Forced passive arming on	Forced passive arming off
8	Automatic engine disable on	Automatic engine disable off
9	Double pulse unlock off	Double pulse unlock on
10	Code Hopping™ on	Code Hopping™ off
11	Siren	Horn honk

Once the button has been pressed and released the correct number of times press it once more **and hold it**. After a second, the siren will chirp to indicate what step you have accessed. For example, three chirps would indicate access to the ignition controlled door lock feature.



4. Transmit While holding the Valet®/Program button, use the arm/disarm button of the transmitter, to toggle between the one and two chirp settings. The one-chirp settings are the factory defaults.

5. Release The button can now be released.

For example, to program the arming mode from active to passive, press and release the Valet®/Program button once. Then press and hold it. The siren will chirp once, indicating that the setting can now be changed. While holding the Valet®/Program button, press the arm/disarm button on the transmitter. The siren will chirp twice to indicate that passive arming has been programmed. If this is the desired setting, release the Valet®/Program button. If this is not the desired setting, continue to hold the Valet®/Program button and press the arm/disarm button on the transmitter again. The siren will chirp once indicating that active arming has been programmed. Once the desired setting has been selected, release the Valet®/Program button.

You can advance from step to step by pressing and releasing the Valet®/Program button the number of times necessary to get from the step you just programmed to the step you wish to access. If you just programmed the arm/disarm chirps to off and you want to program passive locks, release the Valet®/Program button, press and release it twice to step from feature two to feature four. Then press it once more and hold it. The unit will chirp four times to confirm that you have accessed feature number four.

The Learn Routine™ will be exited if:

- The ignition is turned on.
- The door is closed.
- The Valet® button is pressed too many times.
- More than 15 seconds elapses between steps.

The siren will emit a long chirp when Learn Routine™ is exited.

FEATURE DESCRIPTIONS

1 ACTIVE/PASSIVE ARMING: When active arming is selected, the system will only arm when the transmitter is used. When set to passive, the system will arm automatically 30 seconds after the last door is closed. Passive arming is indicated by the rapid flashing of the LED when the last protected entry point is closed.

2 ARM/DISARM CHIRPS ON/OFF: This feature controls the chirps that confirm the arming and disarming of the system.

3 IGNITION CONTROLLED DOOR LOCKS ON/OFF: When turned on, the doors will lock three seconds after the ignition is turned on and unlock when the ignition is turned off. The doors will not lock if the ignition is turned on with the door open.

4 ACTIVE/PASSIVE LOCKING: If passive arming is selected in step one, then the system can be programmed to either lock the doors when passive arming occurs, or only lock the doors when the system is armed via the transmitter. Active locking means the system will not lock the doors when it passively arms. Passive locking means that the system will lock the doors when it passively arms.

5 PANIC WITH IGNITION ON: This step controls whether or not the panic mode is available with the ignition on. In some states, there are laws prohibiting a siren sounding in a moving vehicle. This feature makes the system compliant with these regulations.

6 DOOR LOCK PULSE DURATION: Some European vehicles, such as Mercedes-Benz and Audi, require longer lock and unlock pulses to operate the vacuum pump. Programming the system to provide 3.5 second pulses, will accommodate door lock interface in these vehicles. The default setting is .8 second door lock pulses. See *Type E- Mercedes-Benz and Audi (1985 and Newer)* diagram on page 19.

7 FORCED PASSIVE ARMING ON/OFF: To use this feature, passive arming must be selected in step one. When turned on, forced passive arming will ensure that the system will passively arm, even if a zone is left open or invalid. Forced passive arming occurs one hour after the ignition is turned off.

8 AUTOMATIC ENGINE DISABLE (AED) ON/OFF: AED is a full time, passive starter disable that works independently of the security system. When turned on, the H1/1ORANGE, ground when armed output will go active 30 seconds after the ignition is turned off. The LED will flash at half its normal rate when the ignition is turned off to indicate that AED is on and will interrupt the starter in 30 seconds. AED does not occur in Valet® mode and can be bypassed using the emergency override procedure. The transmitter can be used to disarm AED, however, the system would have to be armed and then disarmed when using the transmitter.

9 DOUBLE PULSE UNLOCK OFF/ON: Some vehicles require two pulses on a single wire to unlock the doors. When the double pulse unlock feature is turned on, the BLUE H2/C wire will supply two negative pulses instead of a single pulse. At the same time, the GREEN H2/A wire will supply two (+) pulses instead of a single pulse. This makes it possible to directly interface with double pulse vehicles without any extra parts.

10 CODE HOPPING™ ON/OFF: The system uses a mathematical formula to change its code each time the transmitter and receiver communicate. This makes the group of bits or "word" from the transmitter very long. The longer the word is, the easier it is to block its transmission to the unit. Disabling the Code Hopping™ feature lets the receiver ignore the Code Hopping™ part of the transmitter word. As a result, the unit may have better range with Code Hopping™ off.

11 SIREN/HORN HONK: The system can be programmed to output pulses instead of a continuous output when the system is triggered. This is useful to honk the factory horn in applications where a siren is undesirable. Remember that the unit is only capable of supplying 1 amp off current. A relay will be required to interface with most factory horn systems.

FINAL TESTING

Nuisance Prevention Circuitry™

NPC™ requires that you change the way you test the system as NPC™ will bypass an input zone for 60 minutes.

If the system “sees” the same zone trigger three times **AND** the triggers are spaced less than an hour apart, The system will bypass that input zone for 60 minutes.

If that zone does not attempt to trigger the system during the 60-minute bypass period, the zone’s monitoring will begin again at the end of the hour. **NEW! If it does attempt to trigger while bypassed, the 60-minute bypass starts over again.**

Disarming and rearming the system does not reset NPC™. The only way to reset NPC™ is for the 60 minutes to pass, without a trigger, or for the ignition to be turned on. This allows the system to be repeatedly triggered, disarmed and rearmed, and still allow NPC™ to bypass a faulty zone.

When disarming the system, 5 chirps indicate NPC is activated. The LED will report the zone that has been bypassed (see diagnostics).

VALET® MODE

To enter or exit Valet® Mode with the Valet®/program switch:



Turn the ignition key off (in order to turn it off, you must have turned it on).



At anytime during the next 10 seconds, press and release the Valet® switch.

Now the Status LED will light up constantly if you have entered Valet® Mode, and go out if you have exited.

To enter or exit Valet® Mode with a transmitter:



Open any door.



Press button 1 (or the arm/disarm button).



Press button 2 (or the channel 2 button).



Press button 1 again.

You have now entered or exited Valet® Mode (verify by checking your Status LED).

TABLE OF ZONES

When using the Diagnostic functions, use the Table of Zones to see what input has triggered the system. It is also helpful in deciding what input to use when connecting optional sensors and switches.

<i>Zone #</i>	<i>Trigger type</i>	<i>Input description</i>
One	Instant	H1/6 BLUE wire. Connect to optional hood/trunk pins.
Two	Multiplex	BLUE wire of plug-in shock sensor. Inputs shorter than .8 seconds will trigger a Warn Away® response, while inputs longer than .8 seconds will instantly trigger full alarm sequence.
Three	Two-stage, progresses from warning to full alarm	Door switch circuit. H1/5 GREEN or H1/7 VIOLET.
Four	Multiplex	GREEN wire of plug-in shock sensor. Inputs shorter than .8 seconds will trigger a Warn Away® response, while inputs longer than .8 seconds will instantly trigger full alarm sequence.
Five	Two-stage (similar to doors)	Ignition. H1/9 YELLOW.
The Warn Away® response does not report on the LED.		

SHUTDOWN DIAGNOSTICS

The unit has the ability to report the cause of the last shutdown of the remote start system. The RED loop under the sliding door must be connected. To check the shutdown diagnostics, turn on the ignition. The dash-mounted LED will flash for one minute in groups as follows:

<i>LED Flashes</i>	<i>Shutdown Mode</i>
One	12/24 minute timed shutdown
Two	Over-rev shutdown
Three	Low or no RPM
Four	Transmitter shutdown (or optional push-button)
Five	(-) Shutdown (H3/3 GREY)
Six	(+) Shutdown (H3/4 BROWN)
Seven	(-) Neutral safety shutdown (H3/6 BLACK/WHITE)

TROUBLESHOOTING

Starter cranks for six seconds but the vehicle doesn't run:

Either the wrong ignition wire is being energized, the system's ignition and accessory wires have been connected backwards, or the vehicle has two ignition circuits. Try remote starting the vehicle with the ignition turned on, in the run position. If the vehicle will then start and run, retest your ignition system.

Ignition comes on and then immediately shuts off :

A shut down input is active or the BLACK/WHITE wire is not grounded.

Ignition comes on for six seconds but the starter does not crank:

Does it start with the key inserted in the ignition? If so, the vehicle may have a VATS system. See *Bypassing GM Vehicle Anti-Theft System (VATS)* page 15.

Is the system armed? If so, is your starter kill relay installed after the point where you have connected the heavy gauge PURPLE starter output?

Starter kill doesn't work:

Is the correct starter wire being interrupted? If the car starts when the starter kill relay is completely disconnected, the wrong starter wire has been cut and interrupted.

Is the yellow (H1/9) wire going to "true" ignition? This wire must be powered in the run and start positions.

Shock sensor doesn't trigger the alarm:

Has the NPC™ system been triggered? If so, you will hear 5 chirps when disarming. To check this, turn the ignition key on and off to clear the NPC™'s memory, and then retest the shock sensor. For a detailed description of NPC™, see *Final Testing* page 21.

Door input does not immediately trigger full alarm. Instead, first I hear chirps for 3 seconds:

That's how the progressive two-stage door input works! This is a feature of this system. This is an instant trigger, remember, since even if the door is instantly re-closed, the progression from chirps to constant siren will continue.

Closing the door triggers the system, but opening the door does not:

Have you correctly identified the type of door switch system? This happens often when the wrong door input has been used. See page 10.

System will not passively arm until it is remotely armed and then disarmed:

Are the door inputs connected? Is the H1/6 BLUE wire connected to the door trigger wire in the vehicle? Either the H1/5 GREEN or the H1/7 VIOLET should be used instead. See page 10.

Door input does not respond with the progressive trigger, but with immediate full alarm:

Does the Status LED indicate that the trigger was caused by the shock sensor? (See Diagnostics). The shock sensor, if set to extreme sensitivity, may be detecting the door unlatching before the door switch sends its signal. Reducing the sensitivity can solve this problem.

The Valet®/Program switch doesn't work.

Is it plugged into the correct socket? See page 11.

Status LED doesn't work.

You've probably guessed already, but here goes: is it plugged in? See page 11. Is the LED plugged into the correct socket?

Door locks operate backwards.

This unit has easily-reversed lock/unlock outputs. Recheck page 12 to see if you have reversed these.