ProStart™ MC

AUTOMATIC TRANSMISSION MULTI-CHANNEL TWO-WAY LCD REMOTE STARTER SYSTEM

FEATURING eSH TECHNOLOGY

CT-3400 TW

Installation Guide

A note concerning the battery inside the transmitter:

Depending on the usage of the transmitter, the battery can last anywhere between 3 to 6 months. When the battery is low, it the transmitter will emit two beeps in a repetitive cycle. At that point you should replace your battery with a new one. That is why we recommend that you keep a spare battery somewhere handy such as the glove compartment.

Notice

The manufacturer will accept no responsibility for any electrical damage resulting from improper installation of the product, be that either damage to the vehicle itself or to the unit. This unit must be installed by a certified technician using all safety devices supplied. Only registered technicians will be eligible to use the ProStart technical support telephone service.

Please review the Installation Guide carefully before beginning any work.

Warning

This unit is designed for vehicles with an **automatic** transmission only. Before installing the unit, test that the vehicle will not start if the gear select lever is in the "Drive" position. If the vehicle starts in gear, install a manual transmission car starter instead.

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Table of Contents

Introduction

This Guide contains all information pertinent to the installation. Most (if not all) features are grouped in the User Guide and therefore, should you need information on a feature, you should refer to the User Guide.

Included in the Kit

Before beginning the installation, please review the Installation Guide —particularly the Wiring Diagram and the Programming Options.

Note: It is very important that you familiarize yourself with the programming and operation of the system, even if you have already installed a similar system in the past.

There are many great new features you may overlook if you do not read the Guide–you would not maximize the potential of the unit.

Prior to the installation, make sure that all the hardware components required to install the system are in the box.

The following is a list of components included in the kit:

- 1 – Control Unit
- 1– Five-button Multi-channel Two-way LCD Transmitter
- 1 – Antenna Interconnect Cable
- 1 – Plug-in 2-volt LED
- 1 – 6-pin Main Ignition Harness
- 1 – 5-pin Secondary Harness
- 1 – 2-pin Secondary Harness
- 1 – 12-pin Accessories Harness
- 1 – Hood Pin-switch
- 1 – Warning Label
- User Guide

Please note, the plug-in valet button is not included with this model.

Installation Tools:

Here is a list of basic tools and supplies you will need to test and install safely.

- Digital Multi Meter (DMM), Computer safe logic probe, Fused jumper wire, Neon 'trouble' light that is carpet safe, Fender protector, Carpet protector
- Soldering Iron, solder, electrical tape, wire tie straps, split loom, diodes, resistors, relays
- Wire cutters, Wire strippers, Wire crimpers, Needle Nose Pliers
- Sharp knife, Panel poppers, Various Screw drivers
- Socket set, Wrench set, Drill with Drill Bits, Coat hanger (for fishing wires through the fire wall),

Before You Get *Started...*

Warning! This unit is designed for vehicles with an **automatic transmission only!** Before installing the unit, test that the vehicle will not start if the gear select lever is in "drive" position. If the vehicle starts in gear with the key, have the OEM neutral safety switch replaced before you install the car starter.
Note: If the vehicle **only** starts in gear by jumping the starter wire, but **not with the key**, then a neutral safety relay **must** be installed.

INDUSTRY CANADA USER NOTICE:
Operation is subject to the following two conditions: (1) this device may not cause interference; and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

FCC USER NOTICE:
The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

Installation Points to Remember

♦ On vehicles with a manual transmission, **always** ensure that all doors will get the unit out of ready mode. Switch the wire used so that it is triggered by all Doors.
♦ Make sure that the Parking Brake and Door Switch contacts work properly.
♦ When working on a vehicle, always leave a window open.
♦ **Never** leave the keys in the car. Leave them on a workbench with a window rolled down.
♦ if possible, remove courtesy light fuse to prevent battery drain.
♦ **The Programming Assistance Button (a.k.a. PAB)**
The **PAB** is mounted on the side of the unit. This push button mimics the hood-pin switch in order to avoid having to get out of the vehicle

and pressing the hood-pin switch. **The PAB will work only when the hood is up.**

♦ Inspect vehicle for any body damage or electrical problems

♦ **Always solder and tape all connections.**

♦ Keep the transceiver away from other types of antennas (GPS/OnStar®).

♦ Never install the control unit where it could interfere with normal operation or obstruct service technicians.

♦ Always use a grommet when running wires into the engine compartment. Never run wires through bare or sharp metal.

♦ Do not disconnect the battery on vehicles equipped with air bags and anti-theft radios.

♦ Never ground the control unit to the steering column.

♦ Make sure that all the switches and controls operate properly.

♦ Verify that the vehicle starts and idles properly.

♦ Make sure that all safety equipment is installed: the valet button, the hood switch, and the warning label

♦ When wiring in parallel, make sure to isolate each connection with a diode in order to avoid feedback and possible damage.

Examples:

Wiring a clutch bypass and a transponder module to the ground out when running wire: At the junction point, where Ground Out when running "splits" and goes to each device, a diode is inserted on each of those lines.

Multiple or separate door pin connections: When joining all door pins together to the door pin input wire of the module, each wire must be isolated with a diode to prevent feedback.

N.B.: The above examples reflect common situations where diodes are use to isolate. Please note that there are numerous other scenarios where diode isolation is required.

♦ Always make sure that any external relays or modules added to the Remote Starter Module are properly fused and diode isolated.

♦ When testing the Shock Sensor, never test on glass with an opened hand, and never hit glass hard enough as to break it. When testing on metal or plastic, make sure the testing does not result in damage to the vehicle (i.e.: dents, broken glass, damaged trims, etc.).

♦ Vehicles equipped with daytime running lights may not allow the installer to view certain programming results since the daytime running lights do no go out (**Note:** The Parking Light output relay in the Module gives two "*clicks*" per flash, 1 "click" for ON and 1 "click" for OFF).

♦ Parking Light flashes referred to in this manual refer to the Parking Light output of the Module and not that of the vehicle.

Harness Description

6-Pin Main Ignition Harness

a.k.a. The Primary harness.

The two Red wires are the power inputs for the module, the other wires are for recreating the actions of the Ignition switch, during remote starts. On most vehicles these wires are connected at the vehicle's Ignition switch.

Wire		Description
A	RED +12 V Battery	Connect to the largest 12 V supply wire at the Ignition harness. Ensure that the OEM power wire is fused for more than 30 A. **NOTE:** certain new vehicles have no suitable 12 volts source at the IGNITION switch (the 12 Volt wire is too small to supply the necessary current). In this case, the fuse box, or the B+ connection on the battery is recommended.
B	PURPLE (+) 30 A starter output	Connect to the Starter wire of the vehicle (at the IGNITION switch). The source wire should have +12 V with the Ignition Key in the Crank position only.
C	RED (+) 12 V Battery	Connect to the largest 12 V supply wire at the Ignition harness. Ensure that the OEM power wire is fused for more than 30 A. **NOTE:** certain new vehicles have no suitable 12 volts source at the IGNITION switch (the 12 Volt wire is too small to supply the necessary

		current). In this case, the fuse box, or the B+ connection on the battery is recommended.
D	**YELLOW (+) 30 A ignition output**	Connect to Ignition wire of the vehicle. The source wire should have +12 V with the Ignition Key in the Ignition On (Run) and Crank positions. **Warning:** some vehicles have more than one **IGN** wire at the **IGNITION** switch for powering the heater blower motor. Use the 5th relay (pin F) and extra relays to power up any extra **IGN**. wires if necessary. **DO NOT JUMP WIRES** at the **IGNITION** switch, this will compromise the OEM electrical system.
E	**ORANGE (+) 30 A Accessories output**	This wire is for powering the heater blower motor. It is usually classed as an Acc. (no power in the crank position.) if it tests as an **IGNITION** (power in the crank pos.) then power it as an **IGNITION** (5th relay, or extra fuse). **Warning:** some vehicles have more than one **ACC** wire at the **IGNITION** switch for powering the heater blower motor. Use the 5th relay (pin F) and extra relays to power up any extra **ACC**. wires if necessary. **DO NOT JUMP WIRES** at the **IGNITION** switch, this will compromise the OEM electrical system.
F	**GREEN (+) 30 A 5th relay output**	This high-current output can be used to power a **2nd IGNITION** or a **2nd ACCESSORY** or a 2ND **STARTER WIRE**. See jumper settings on page 18 for correct output. Additional **IGNITIONS, ACCESSORIES**, or **STARTER WIRES** must use external relays. **DO NOT JUMP WIRES** at the **IGNITION** switch, this will compromise the OEM electrical system.

5-Pin Secondary Harness

a.k.a. the secondary harness.
This harness has the remaining wires used in basic remote starter installations, positive park light output, the safety shut down inputs, and the ground wire for the module.

	Wire	Description
1	**BLACK (–) Chassis ground input**	This wire must be connected to bare, unpainted metal (the Chassis or true Body ground). It is preferable to use a factory ground bolt rather than a self-tapping screw. **Screws tend to get loose or rusted over time and can cause erratic problems.**
2	**PURPLE (AC) Tachometer input**	This wire tells the Module if the Engine is running or not. It requires at least 1.8 volts (AC) and 1.5 Hz (or faster) at idle. Common Tach references are: the negative side of an injector, the negative side of an Ignition Coil, Camshaft sensor, Crankshaft sensor or the Engine Control Module (ECM). **NOTE:** A Tach signal that is too low will cause the Module to "over crank" and a Tach signal that is too high will cause the Module to "under crank".
3	**GREY (-) Hood Switch input**	Connect this wire to the Hood Pin-switch supplied. This input will disable or shut down the Remote Starter when the Hood is opened. It is also used for programming and therefore it is essential that it is installed.
4	**ORANGE (+) Brake Switch input**	This wire must be connected to the Brake Light switch of the vehicle. The wire should be +12 V **only** while the Brake Pedal is pressed. This input will shut down the Remote Starter if the Brake Pedal is pressed. It is also used for programming and therefore it is essential that it is installed.

5	**YELLOW +12 V Parking Light output**	This wire provides a +12 V output (15 A max.) and must be connected to the Parking Light wire that tests +12 V when the Parking lights are **ON**. **Note:** Ensure that the voltage does not vary when the dimmer control switch is turned up or down. If this is the case, it is not the right wire. **There is a also a negative Parking Light output. Only one of these two different outputs needs to be connected.**

12-Pin Accessories Harness

This harness has the remaining wires used in some remote starter installations as well as the optional user convenience outputs.

Wire		Description
1	**BLUE (–) Zone 3 or AUX 3 output**	500 mA negative output. This can be used to control trunk release (1-sec. pulse) or to operate as a constant output as long as the **TRUNK** button is held pressed (for Sunroof or Window close).
2	**BROWN (–) Lock**	Programmable 500 mA 1/10-sec., 7/10-sec. or 4-sec. negative output.
3	**GREEN (–) Unlock**	Programmable 500mA 1/10-sec., 7/10-sec., 4-sec. or 1/4-sec. double-pulse negative output.
4	**WHITE / BROWN (–) Arm**	Max 500 mA ground signal when the doors are locked by remote control. This wire will go to ground 1/4 sec. before the **LOCK** pulse, and go **OFF** 1/8 sec after it. **Note:** The system will also give a rearm pulse on this wire after remote-start shutdown.
5	**WHITE / GREEN (–) Disarm**	Max 500 mA 1-sec. ground pulse when the Doors are unlocked by remote control. Connect to the OEM Disarm wire of the vehicle. **Note:** The system will also give a disarm pulse on this wire before remote starts.
6	**BLUE / WHITE (–) AUX 1 output**	This output will provide a 1-sec. negative output (500 mA) when the **UNLOCK** button is pressed a second time on the transmitter (priority door access) or otherwise when the **LOCK** button is pressed (horn confirmation).
7	**WHITE / ORANGE (–) Starter Kill (armed output)**	The unit is equipped with a selectable **passive-** or **active-arming Starter Kill** circuit that will immobilize the vehicle when the system is armed. This wire will provide a constant 500-mA negative output when the system is **armed** (locked by remote) or if remote started. This wire should be connected to a Single Pole Double-Throw Relay (This wire will connect to Pin 85, on the Relay, and Pin 86 will be connected to the Ignition wire). A second benefit of the Starter Kill is the Anti-Grind feature. When the vehicle has been remote started the Anti-Grind prevents the starter motor from re-engaging when the ignition key is inserted in the **Ignition switch** and accidentally turned to the **CRANK** position (The Starter Kill output becomes active during remote starts).
8	**ORANGE (–) AUX 2 output**	Negative 500mA output. Can be programmed for one of the following four options: (1) Constant while the **LOCK** and **UNLOCK** buttons are pressed + 1 sec. after release of buttons. (2) **LOCK** + **UNLOCK** toggles **ON/OFF**. (Max. 30 sec.) (3) **LOCK** + **UNLOCK** toggles **ON/OFF**. (Max. 60 sec.) (4) Priority door access.
9	**PURPLE (–) External Trigger input**	This input will start the vehicle when it receives a 1-second ground pulse from an external pager system or timer module. It will also shut the vehicle down upon a 1-sec. pulse when running under remote control. **Option 1 –** (-) input Trunk pin**:** When the external trigger wire is programmed as

		a Zone 3 sense wire; pressing **TRUNK** will send a 1-second disarm pulse. If Zone 3 is detected (ground), a rearm pulse will be sent 5 seconds after Zone 3 closes. If Zone 3 is unchanged (no ground), a rearm pulse will be sent 4 seconds after the button is pressed (disarm is sent only if the system was previously locked and armed). **If secure lock is enabled, a lock pulse and a rearm pulse will be sent.** **Option 2 ((-) Input Engine START/STOP):** When the external trigger wire is programmed to trigger the starter a ground pulse on this line will start or stop the engine. **Option 3 ((-) Input Key Sense):** When the external trigger wire is programmed as key sense, when a key is detected in the ignition switch (negative signal), the starter kill will not be rearmed even when it is set to passive mode. If secure lock is programmed, **LOCK** and **REARM** will not be activated while key sense is active. **Option 4 ((-) Door Input Smart Ignition Lock):** When the external trigger wire is programmed as dome light monitor/smart ignition lock (while the ignition lock option or the lock only option is enabled), the doors will be relocked when the brake is pressed if a door has been opened and closed. Note When external trigger is set to option 1 (Trunk), a disarm pulse will be sent with **TRUNK** regardless of the **AUX 3**/Zone 3 settings in Mode 3, Function 2.

10	**WHITE (–) Ground out when running**	500 mA constant ground output when running. This output becomes active before remote **IGNITION ON**, and shuts off when the module is shut down. **Note:** If multiple relays or modules are connected to the ground out wire, make sure that each one of them is diode-isolated from the others. Otherwise feedback effects may occur, which could damage the vehicle and/or the modules, relays, and bypass modules.
11	**GREY**	This pin is not used–leave it empty.
12	**YELLOW (+) Glow-plug input**	In Diesel Mode, this positive input will monitor the Glow Plug Light: it will wait for up to 18 seconds until the Glow-plug Light goes out before allowing the Remote Car Starter to proceed to cranking the Engine. Connect to the side of the Glow-plug Light which is positive when the Light is on. **Note:** the Remote Car Starter will nevertheless proceed to cranking the Engine if the Glow-plug Light is still on after the 18-sec. delay (25 sec. when the Run Time is set to 30 min.). **A Note on the Diesel Glow-plug Indicator Light:** (Also known as the "wait-to-start light".) The purpose of the Glow-plug circuit on diesel vehicles is to pre-heat the Combustion Chamber before the vehicle is started. When a Remote Starter is installed on a diesel vehicle, the Glow-plug section of the Ignition circuit must be activated and allowed to operate before the vehicle is remote-started. For that purpose, the Glow-plug input wire of the Remote Car Starter must be connected to the Glow-plug indicator light of the vehicle. **Caution!** The Remote Car Starter will **only** accept **positive** Glow-plug input signals, therefore negative Glow Plugs should only be connected using relays to invert the polarity. A diode must be added between the negative Glow-plug trigger on the relay

		and the negative Glow-plug wire of the car. This is to prevent feedback effects on the Glow-plug indicator light on the instrument cluster: the light on the dash would come on because of the feedback, even though the circuit is off. When the user remote-starts the vehicle: • The Remote Car Starter will power up the Ignition circuit and wait to engage the Starter Motor while the Glow-plug indicator light is still on. • The Remote Car Starter will engage the Starter Motor as soon as the Glow-plug light (+) goes out. o Minimum waiting time is 3 seconds. o Maximum waiting time is 18 seconds. If no Glow-plug wire is found on the vehicle, the Glow-plug input on the Remote Car Starter may be "timed out". The Remote Car Starter will power up the Ignition and Glow-plug circuits and simply wait for the time-out before starting: • Connecting the Glow-plug input wire of the Remote Car Starter **to Ignition** will hold the ignition **ON** for the maximum waiting time (18 sec., recommended). • Keeping the Glow-plug input wire of the Remote Car Starter **unconnected** will hold the ignition **ON** for the minimum waiting time (3 sec., not recommended in very cold environments). Connect the Glow-plug wire to the Ignition wire only after the Tach programming has been completed: connecting the Glow-plug wire is one of the very last steps in the installation process.

2-Pin Harness

Wire		Description
2	**BLUE / WHITE**	This output will provide a 1-sec. negative output (500 mA) when the **UNLOCK** button is pressed a second time on the transmitter (priority door access) or otherwise when the **LOCK** button is pressed (horn confirmation).
3	**YELLOW (-) Parking Light output**	500 mA negative Parking Light output **Note:** Ensure that the voltage does not vary when the dimmer control switch is turned up or down. If this is the case, it is not the right wire. **There is a also a positive Parking Light output. Only one of these two different outputs needs to be connected.**

Flashing the Hood Pin

What is **Flashing** the Hood Pin?

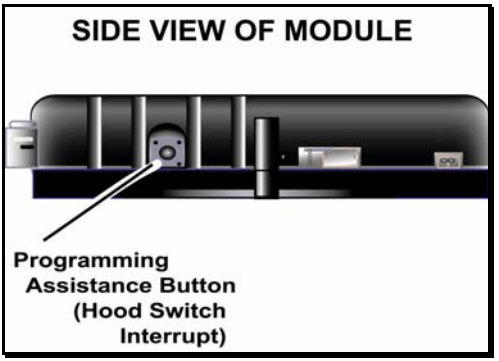
It is a procedure that makes the module enter the programming centre. Once the module is in the programming centre, the installer has no more than 20 seconds to get into one of the sub-menus. **Failure to do so will result in the module exiting the programming centre and the installer will have to flash the hood pin once more.**

Remember: You can use the programming assistance button instead of the hood pin at any time the hood is up.

The Installer …		The Module …
1-	Press and hold the hood pin for 4 seconds.	
2-	Let go of the hood pin.	Parking lights "ON"
3-	While the parking lights are "ON", press down the hood pin once more.	
4-	Release the hood pin again —be careful not to over flash the hood pin as this will bring up the events playback and will not bring you the programming centre.	"ON" for 20 seconds
5-	You now have 20 seconds to select one of the sub-menus.	

Once inside the programming centre, the installer has a selection of many different sub-menus. Once you are in the programming centre, you have the option of the following menus:

Remember: You have up to 20 seconds, once the parking lights are on solid, to select a sub-menu, Failure to do so will result in the module exiting the programming centre and the installer will have to flash the hood pin once more.



The Programming Assistance Button (a.k.a. PAB)

The PAB is located on the side of the Module. This push button mimics the Hood-Pin switch in order to avoid having to get out of the vehicle and pressing the Hood-Pin switch. **The PAB will work only when the hood is up.**

Before Programming a Transmitter

The Transmitter is not delivered pre-programmed: it must be programmed after the wiring of the Module is completed.

The Module has the ability to retain up to 4 different Transmitter codes; if a fifth Transmitter is programmed, the code of the first Transmitter will be erased from memory.

How to Program the Transmitter.

1. **FLASH** the Hood Pin Switch (see on page 9).

Before the 20 seconds have passed, turn the Ignition Key to the **IGNITION ON (RUN)** position and then to the **OFF** position.

2. Press and hold the **LOCK** button until the vehicle gives 5 flashes. The Module has stored the Transmitter in its memory.
3. Close the Hood, to exit.

Table 1

To program a Transmitter on the second vehicle for multi-car operation, you must press the **TRUNK** button (instead of **LOCK** or **UNLOCK**) in step 3 of the transmitter programming procedure:

How to Enter Programming Options Mode

The System is equipped with two custom Programming Modes, allowing the installer to custom-fit the system according to the requirements of each vehicle. When getting into the Programming Option Mode, the Parking Lights will flash once, twice depending on the option you have entered. The unit will stay in Programming Mode until the Hood Pin-switch or the Brake Pedal is pressed again; therefore take your time to make the proper selection. To return to the Programming Centre (Main Menu), press on the Brake Pedal.

1. **FLASH** the Hood Pin Switch (see on page 9).

Before the 20 seconds have passed,

2. Press and hold the Brake Pedal, then press one of the following buttons on the Transmitter:
   - **LOCK** to enter Mode 1;
   - **UNLOCK** to enter Mode 2;
   - **TRUNK** to enter mode 3;
   - **START/STOP** to enter mode 4.

The Parking Lights and the Siren will flash and chirp once or twice to confirm entry into a Mode.

3. Release the Brake Pedal.

Table 2

The Module can only be programmed Function by Function. After selecting a Mode (1 or 2), you will be taken to the first Function of that Mode. After entering an Option selection for Function 1, you will be automatically taken to Function 2, and so on; therefore, be ready to re-enter all option selections for all functions of the Mode you are accessing. **You may not skip Functions*.**

***NOTE:** Pressing the Brakes at any given moment will save the selection(s) you have entered and will return you to the Programming Center.

For each Function, select one of the three Options by pressing the corresponding button on the Transmitter:

- **LOCK** for Option 1,
- **UNLOCK** for Option 2,
- **TRUNK** for Option 3,
- **START/STOP** for Option 4,
- **F → LOCK** for Option 5.

Table 3

Note:
The unit will stay in programming mode until the hood pin-switch or the brake pedal is pressed again. **Therefore, take your time to make the proper selection.** Pressing the brake pedal will bring you back to the programming menu, where you can select another mode.

Each mode has functions for which options must be selected. Once you have selected Mode 1, Mode 2, or Mode 3, the system automatically moves to function one. You must then select the desired option for each function. Once you have selected an option, you will move to the next function, and so on.

To select one of four options, press the appropriate button on the transmitter:

- **LOCK** button = Option 1
- **UNLOCK** button = Option 2
- **TRUNK** button = Option 3
- **START/STOP** button = Option 4
- **F** then **LOCK** button =Option 5.

Table 4

Once an option has been selected, the parking lights will flash 1, 2, 3, or 4 times, depending on the option that has been selected.

Programming Options

MODE 1 ** INDICATES DEFAULT SETTING*

FUNCTION 1 – Ignition-controlled door locks

OPTION 1*	**Ignition lock disabled**
OPTION 2	Ignition lock enabled
OPTION 3	Ignition unlock ONLY
OPTION 4	Ignition lock ONLY

FUNCTION 2 – Secure lock

OPTION 1*	**Secure lock disabled**
OPTION 2	Secure lock enabled in standard mode
OPTION 3	Smart secure lock enabled in smart mode

FUNCTION 3 – Passive or active arming

OPTION 1*	**PASSIVE arming (60 sec.)**
OPTION 2	ACTIVE arming
OPTION 3	PASSIVE arming (3 min.)

FUNCTION 4 – Door lock pulse timing

OPTION 1*	**7/10-sec. lock/unlock pulses**
OPTION 2	4-sec. lock/unlock pulses
OPTION 3	7/10-sec. lock pulse and two ¼ -sec. unlock pulses
OPTION 4	1/10-sec. lock/unlock pulses

FUNCTION 5 – LED flashing

OPTION 1*	**ENABLED (without starter kill → will flash only when ignition is OFF)**
OPTION 2	DISABLED
OPTION 3	**ENABLED** (with starter kill → will flash when the starter kill engages. This option should be selected ONLY if the starter kill is installed.)

MODE 2 ** INDICATES DEFAULT SETTING*

FUNCTION 1 – Safe start.

OPTION 1	Safe start enabled
OPTION 2*	**Safe start disabled**
OPTION 3	"Swap Start" – enhanced safe start mode with extended safety: To start the engine: press **FUNCTION** then **LOCK** buttons. To trigger **AUX 2**: press **START/STOP**

FUNCTION 2 – Engine Run Time

OPTION 1	Run time = 3 minutes in gas mode / 8 minutes diesel mode
OPTION 2*	**Run time = 15 minutes in gas mode / 20 minutes diesel mode**
OPTION 3	Run time = 25 minutes in gas mode / 30 minutes diesel mode

FUNCTION 3 – Idle Mode / Turbo Mode

OPTION 1	IdleMode disabled / Turbo Mode disabled
OPTION 2*	**Idle Mode enabled / Turbo Mode enabled**

FUNCTION 4 – Engine Type and Cold Weather Mode

OPTION 1	Diesel mode with 20-minute run time in cold weather mode (30-sec. delay)
OPTION 2*	**Gas mode with 3-minute run time in cold weather mode**
OPTION 3	Diesel mode with 8-minute run time in cold weather mode (18 sec. delay)
OPTION 4	Diesel mode with 8-minute run time in cold weather mode (7 sec. delay)

FUNCTION 5 – Ignition Valet

OPTION 1	Ignition Valet disabled
OPTION 2*	**Ignition Valet enabled**

MODE 3 ** INDICATES DEFAULT SETTING*

FUNCTION 1– Home Valet ™

OPTION 1	Home Valet ENABLED
OPTION 2*	**Home Valet™ DISABLED**

FUNCTION 2 – AUX 1 Programming

OPTION 1	Horn confirmation upon the 2nd press of the **LOCK** button
OPTION 2*	**Priority door access**
OPTION 3	Horn confirmation upon the 1st press of the **LOCK** button

FUNCTION 3 – AUX 2 Programming

OPTION 1	Constant output while the **FUNCTION** then **LOCK** button is pressed. In safe start mode: activate AUX 2 by pressing the **START/STOP** button.
OPTION 2*	**Toggle ON/OFF (with 30-second timeout)**
OPTION 3	4-minute toggle (only when running under remote start)
OPTION 4	Priority door for all doors

FUNCTION 4– AUX 3 / Zone 3 Programming

OPTION 1	1-sec. output when **TRUNK** button is pressed for 3 sec. with ignition OFF or under remote run + data output.
OPTION 2*	**Constant output while the TRUNK button is pressed.**
OPTION 3	Disarm/rearm pulse with **TRUNK** + data output.

FUNCTION 5 – External Trigger

OPTION 1	Zone 3 rearm (trunk pin: a disarm pulse is sent before the trunk opens, the vehicle rearms 4 seconds after the trunk is closed)
OPTION 2*	**Engine start/stop**
OPTION 3	Key sense
OPTION 4	Dome light smart ignition lock
OPTION 5	Pager

MODE4 ** INDICATES DEFAULT SETTING*

FUNCTION 1 – MULTI-LEVEL FEATURES

OPTION 1	Multi-car Features, Basic Features, Customized Features
OPTION 2*	**Basic Features, Multi-car Features, Customized Features**
OPTION 3	Customized Features, Multi-car Features, Basic Features
OPTION 4	Basic Features, Customized Features, Multi-car Features

Auto Tach Programming Procedure

NOTE:
If no tach has been programmed and the **START/STOP** button is pressed, there will be no start attempt and the vehicle will give 5 flashes.

If another Tach Programming is required, simply repeat the Auto Tach Programming Procedure.

The Module stores the Tach setting, being ***AutoTach*** or Multi-speed Tach, until the Module is reset.

ONLY if the Module is reset will a new Tach Signal need to be re-programmed.

This process can be carried out instead of the conventional Tach Programming Procedure.

1. Make sure all the connections are done properly and that the Module has been powered-up.
2. With the Hood up (ground on the Hood Pin line), start the vehicle using the key.
3. Let the Engine reach proper idle speed.

The Parking Light output from the Module is activated when the vehicle starts and it will shut off once the Tach signal is detected.

4. Press and hold the Brake Pedal until the Parking Light output from the Module flashes 5 times.
5. Turn the Ignition off. At this point, the Tach setting has been programmed.

Table 5

Multi-Speed Tach Programming

The system is designed to read a wide range of Tach signals produced by newer Ignition systems. No manual adjustments are necessary. However, you should go through the Tach programming procedure every time a new Unit is installed.

1. **FLASH** the Hood Pin Switch (see on page 9).

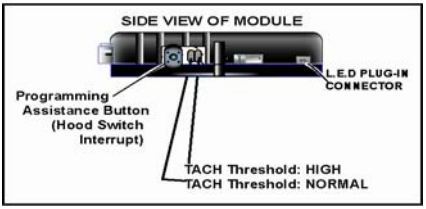
Before the 20 seconds have passed.

2. Press and hold the Brake Pedal.
   - Press the **LOCK** and **UNLOCK** buttons simultaneously on the Transmitter.
   - The Parking Lights will flash 4 times.
   - Release the Brake Pedal.
3. **Start the vehicle and let it to reach regular Engine-idle speed.**
4. Once the vehicle is idling properly, press and hold the Brake Pedal until the Parking Lights flash 5 times, release the Brake Pedal: the Tach signal is now programmed.

Table 6

Note: Tach jumper settings

Some new vehicles have a higher TACH voltage threshold, which would fall out of the normal TACH trigger circuit of the remote car starter. Changing the jumper to TACH Threshold HIGH will allow the module to properly detect the TACH signal.



Horn Honk Timing

Follow these steps to program horn confirmation:

1. **FLASH** the hood pin (see on page 9).

The parking lights will stay on for up to 20 seconds.

2. Press the brake pedal.
3. Press the **UNLOCK** and **START/STOP** buttons; the horn will honk 5 times.
4. Release the brake pedal.
5. To adjust the chirp duration:
   a. To increase the horn chirp by 3 ms, press the **LOCK** button.
   b. To decrease the pulse by 3 ms, press the **UNLOCK** button.
   c. To increase the pulse by 10 ms, press the **START/STOP** button
   d. To decrease the pulse by 10 ms, press **TRUNK**.

For each timing change, the horn will chirp using the new settings, except under the following circumstances:

- When the lower limit of 5 ms is reached, the horn will sound for 1/4 second.
- When the upper limit of 200 ms is reached, the horn will sound for 3/4 second.
- A system reset will set the system back to the 22-ms default.
- If you press **LOCK** and **UNLOCK**, 3 chirps will be generated to indicate that the new values were saved.

Close the hood to cancel the changes.

> **Note**
> Horn honk timing can be modified only if Mode 3, Function 2, Option 1 or 3 has been selected first.

Installation-programmable Features

The following features can be programmed according to the needs of the installation and the requirements of the user:

Ignition Re-lock

When ignition is **ON** (but not under remote start) and a door is opened and closed, the system will re-lock all doors next time the brake pedal is pressed.

Lock Pulse Duration

Option 1: 7/10-sec. **LOCK** and 7/10-sec. **UNLOCK** pulses by default.
Option 2: **4-sec. LOCK/UNLOCK** pulses–this is for operating vacuum Door Lock systems.
Option 3: A single 7/10-sec. **LOCK** pulse and **two ¼-secs UNLOCK** pulses.
Used for double-pulse Disarm/Unlock systems
Option 1: 1/10-sec. **LOCK** and 1/10-sec. **UNLOCK** pulses.

Flashing LED

To gain access to this feature, make sure the Flashing LED option has been enabled at the time of programming. Once this option is enabled, the user has the choice to toggle the Flashing LED "ON" and "OFF" at any given moment.
To toggle between the Flashing LED "ON" and "OFF", press **LOCK** and **UNLOCK** simultaneously on the Transmitter. The parking lights will flash 1 time slowly to indicate that the LED is active. If you press **LOCK** and **UNLOCK** once more, the parking lights will flash 3 times quickly to show that the LED is now disabled.

- **Flashing LED ON:** The LED will flash at all times (being passive or active arming) to denote that the Starter Kill is active.
- **ACTIVE** Arming: the LED flashes normally.
- **PASSIVE Arming:** the LED will flash, during the countdown, at a faster rate until the Unit is armed, at which time the flashing rate will slow down.
- **In Valet Mode**, the LED will be on solid.
- **Flashing LED OFF:** The LED will not flash when the module is armed (passive or active arming). However, if the module is in Valet Mode, the LED will remain on solid when the Ignition is "OFF".

Engine Type – Gas or Diesel

Set to Gas Mode by default, the unit can be programmed to operate in Diesel Mode. In Diesel Mode the system will wait for the glow-plug indicator light to go out before cranking the engine. Note that the run time is automatically extended when Diesel Mode is selected.

Horn Confirmation

AUX 1 can be programmed to trigger the horn every time the **LOCK** button is pressed, or when the **LOCK** button is pressed twice within 3 seconds. When horn confirmation is activated, panic mode is enabled. If horn confirmation is disabled, panic mode will not be available.

Safe Start

If this feature is enabled, it will require the user to press the **START/STOP** button twice within 3 seconds to start the vehicle. This will eliminate accidental remote starts (for example: if there are children playing with the transmitter). To stop the vehicle, the user must press **START/STOP** once. If swap start mode is selected, to remote-start your vehicle, press the **'F'** button and then the **LOCK** button. The **Aux 2** output can be activated by pressing the **START/STOP** button.

Idle Mode

When programmed, this option allows the user to engage the remote starter to take over the vehicle while it is already running. This will keep the vehicle running for its programmed run time, or until it is shut down.

To activate Idle Mode:

1. While the Engine is running, press **LOCK**, **UNLOCK** or **START/STOP** on the transmitter until the parking lights come on.
- Pressing **LOCK** or **UNLOCK** will unlock the doors.
- Pressing **START/STOP** will leave the doors as they are.

2. Remove the ignition key and exit the vehicle.
3. Lock the doors – the vehicle will go on running for the entire pre-programmed run time.

Caution: Do not leave children or pets unattended in a vehicle running in Idle Mode!!!

Turbo Mode

When programmed, this option allows turbochargers to idle down: after the user leaves the vehicle, the engine will keep running for 60 sec. and shut down.

Proceed as follows to activate Turbo Mode:

1. With the engine already running press **LOCK** on the transmitter until the parking lights come on.
2. Remove the key: the engine will go on running.
3. Exit the vehicle and close the door.

4. Press the **TRUNK** button to lock the doors and shut down the engine after 60 sec. running in Turbo Mode.

Cold Weather Mode

If Cold Weather Mode is activated, it will start and run the engine for 3 minutes every 2 hours (8 or 20 minutes for diesel engines). This will go on for a period of 24 hours.

To activate Cold Weather Mode:

Press **F** then **START/STOP** button for three seconds. The parking lights will flash 3 times. There will be one (1) "BEEP" as a confirmation. The icon will be displayed.

To exit Cold Weather Mode, do any of the following:

a) Open the hood.
b) Start the engine by remote.
c) Turn the ignition key to the **IGNITION ON (RUN)** position.
d) Place the vehicle into valet mode.
e) Press **F** then **START/STOP** buttons for 3 seconds.

To exit Cold Weather in Safe Start Mode:

Press **F** then **START/STOP** buttons for 3 second, the parking lights will flash once. The icon will disappear.

Use Mode 2, Function 4, Option 1 to set a diesel engine to a 20-minute run time in Cold Weather Mode. Option 3 will otherwise set a diesel engine to a 8-minute run time.

Ignition-controlled Door Locks

ON by default (if remote door locks are installed). This feature will **LOCK** all doors when the brake pedal is pressed while the ignition key is in the **IGNITION ON** (**RUN**) position. The unit will **UNLOCK** all doors when the ignition key is turned to the **OFF** position.

- If the **Ignition Lock Only** Option is selected, the system will only lock the doors.
- **Ignition Unlock Only** is selected; the system will only unlock the doors (provided the ignition key was in the **IGNITION ON** (**RUN**) position and that the brake pedal was pressed at least once).

Smart Rearm

The system will be rearmed only once. Extra rearm pulses will not be sent when **LOCK** is pressed several times. (Certain factory alarms are affected when additional rearm pulses are sent once the system is armed.)

Secure Lock

This feature allows the module to control certain OEM factory alarm systems without requiring the use of other wires for disarming the OEM alarm. (Namely, this feature is designed for OEM systems that use the factory lock wire to arm the alarm and the unlock wire to disarm it.)

Standard Secure Lock

If this Option is selected, upon receiving a remote **START** signal, secure lock will **UNLOCK** the doors (disarming the factory Alarm); 1/2 sec. after remote start it will **re-lock** the doors. 4 seconds after shutdown, secure lock will **re-lock** all doors (**arming** the system once again). **Please note** that most OEM systems will **not** rearm the alarm while the engine is running, but **will** lock the doors.

Smart Secure Lock

If the vehicle is initially locked, at remote **START** the Module will send an **UNLOCK/Disarm** pulse before start-up, **LOCK/Arm** again when the engine is running, and **LOCK/Arm** once again 4 sec. after it shuts shut down the engine.

If the vehicle is initially unlocked, upon remote start the module will start the engine and arm the starter kill, but the doors will not be locked or unlocked at any moment of the sequence.

Priority Door Access

(Both AUX 1 and AUX 2 can be programmed for Priority Door Access.) This great feature allows the user to **UNLOCK** solely the driver's door with a single press of the **UNLOCK** button on the transmitter, and to **UNLOCK** the other doors, if desired, by pressing the **UNLOCK** button for a second time.

The output will provide a 1-sec negative output when the **UNLOCK** button is pressed a second time on the transmitter. This can be used not only as priority door access, but also as trunk release.

The AUX 2 Timed Output

This 500 mA negative **AUX 2** output can be used for many different applications. It can be programmed for priority door access if **AUX 1** is programmed for horn confirmation.

To activate the **AUX 2** output, press **F** and then **LOCK** button.

The AUX 3 / Trunk or Sunroof Output

This 500 mA negative **AUX 3** output can be used for many different applications. The output can be programmed to give a 1-sec. pulse when the **TRUNK** button is pressed (if the ignition is **OFF** or when Ignition is **ON** after a remote start) or to give a continuous output as long as the **TRUNK** button is held down (for sunroof or window control).

> **Note**
> In Trunk mode, the output will operate only if the Ignition is **OFF** or if the engine is running under the control of the module.
> If **AUX 3** is programmed for a 1-second **TRUNK** signal, you will need to hold the **TRUNK** button down for 3 seconds in order to activate the trunk.

Trunk 2 Output with Disarm / Rearm Pulse

When the Trunk 2 Option is selected (Mode 3, Function 4, Option 3), a Disarm pulse will be sent before the trunk is popped. An arm pulse will be sent 4 seconds later. This option is overridden when the **Zone 3 Bypass** is used as a trunk pin (Mode 3, Function 5, Option 1).

Programmable External Trigger

The External Trigger wire can be connected to a trunk pin-switch generating a negative signal when the trunk is open.

Smart Ignition Locks

This feature can be enabled by connecting the external trigger (the 9th pin of the 12-pin harness) input to a negative door sense wire when the door is open (usually the Dome Light) and by programming the external trigger input accordingly (Option 4).

When the ignition-controlled door locks are active and the engine is running, whenever the brake pedal is pressed while a door has been opened and closed again since the last **LOCK** pulse was sent, the system will relock all doors at once.

Key Sense*

With this option selected, while in passive mode, the starter kill will not rearm if the key is detected in ignition switch. If secure lock is programmed, it will not generate any lock and ream pulses if the key is sensed.

When programming this feature, connect the negative external trigger input to key sense on the ignition switch.

*Ninth pin of the 12-pin harness (external trigger wire).

Caution!

If more than one device is connected to the ground output wire, the devices **must** be diode isolated one from another. This includes bypass modules plugged into the back of the module.

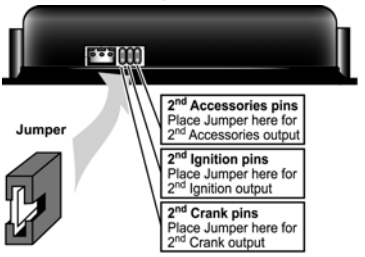
Other Features of the Module

Fifth Relay Output (2nd IGN or 2nd fcACC or 2nd START)

This series of Car starters are equipped with a high-current programmable 5th relay on-board, which can be used to power a second ignition, accessory, or crank wire.

The unit uses three sets of pins and one jumper (supplied), each set of pins representing a function.

In order to activate one of the three possible 2nd outputs, you must place the jumper on one of the three sets of pins and connect the 14 AWG wire to the second **IGN./ACC./CRANK** wire of the vehicle.



JUMPER SETTINGS
(REAR VIEW OF MODULE)

Warning!

Only one of the three sets of pins can be used at a time.

The relay output rating on this unit is 25 A at most. Defective OEM solenoid switches can sometimes draw up to 50 or 60 A, causing the 30 A fuse to blow. Verify your circuit for voltage draw with an appropriate measuring device.

Multi-car Operation

1. **FLASH** the hood pin (see on page 9).

The parking lights will stay on for up to 20 seconds.

2. Turn the ignition key to the **IGNITION ON (RUN)** position.
   - Wait for the LED from the module to go out, then turn the ignition key to the **OFF** position.

The LED will be flashing during the next step.

3. Press and hold the **TRUNK** button until the parking lights flash 5 times quickly.

The parking lights will flash 5 times quickly.

(Otherwise you may also simply press the buttons repeatedly, until you get the parking light flashes.)

4. To exit, close the hood.

Resetting the Module (without the Plug-in valet button):

Resetting the Module is not a required process. Most of the time, you can avoid resetting the Module by fixing the issue directly at the root of the cause.

To reset the Module, without using the plug-in Valet button:

1. Flash the hood pin switch (see on page 9).
2. In 10 seconds or less, press the Brake Pedal 6 times.
3. The Parking Lights will flash 8 times confirming the Reset.

On some vehicles, such as, BMW, and certain Volkswagens, etc., pressing the Brake pedal without the key in the Ignition ON position, will not work and therefore you will need to *hot wire* the brake Pedal–manually jumping 12Volts, with a fused test lead, at the Brake Pedal switch.

Resetting the Module (with the Plug-in valet button):

To reset the module:

1. Make sure that the valet and ignition are both OFF and that the hood is up.

- Hold the hood pin-switch down for 4 seconds.
- Release the pin-switch.

The parking lights should come on.

- With parking lights on, immediately push and release the pin-switch again.

The parking lights will stay on for up to 20 seconds.

Press the valet button 6 times or more until the parking lights start to flash.

2. The parking lights will flash 8 times.

> Note
> After a reset has been performed, the system will set all options back to their default values and erase all transmitter codes. (See **Programming Options** p.11 for default values.)

Troubleshooting Poor Transmitting Range

In order to ensure optimal range, the antenna should be installed at least 7.5 cm (3 in.) from the roof–2.5 cm (one inch) below the tint strip is generally the best location. Install the antenna as far as possible from radio antennas, GPS, OnStar®, or factory compasses.

Many factors may affect the operating range of the transmitter. Some of these are:

- The condition of the battery in the transmitter.
- The operating environment (for example: downtown radio-frequency noise, airports, cellular phone towers, etc.)
- Metal: any type of metal will affect operating range. This includes the metal in the car.
- The shape of the vehicle can affect range as well; vans in general have an especially poor range.
- The shape of the roof and A-pillars brings about considerable radio-frequency deflection (in this case the signal from the remote control). As a result, the direction in which the vehicle is facing in relation to the remote control can affect the range. Straight on (standing in front of the vehicle) generally gives you the greatest range; the second best performance is from the back. Using the remote control from either side of the vehicle will usually give the lowest range.
- The range will be significantly lower in a crowded parking lot than in open space.
- Always hold the transmitter high, approximately at shoulder height. Holding the transmitter against your chin will also increase your range.
- The operating range will be somewhat lower on vehicles equipped with an aftermarket or factory alarm.
- Windows and windshields tinted with lead or metallic tints will decrease the operating range.
- The antenna cable may have been cut and/or is grounded out on the chassis. Try using another cable. The receiver may be faulty. Try replacing it with another.

Testing

Before putting the vehicle back together, it is recommended to check that the system operates properly. The following testing procedures should be used to verify proper installation and operation of the system. Before testing, make sure that all connections are soldered and that the unit is plugged in.

1. **Remote-start the Engine and listen for Starter drag.** If the Starter cranks for too long, carry out another Tach learning procedure.
2. **Test Hood Switch shutdown**: with the vehicle running under the Remote Starter, open the Hood; the vehicle should shut down. If it does not shut down, check the Hood Pin-switch and its connector.
3. **Test the Brake shutdown circuit**: With the vehicle running under the Remote Starter, press and release the Brake Pedal. The Engine should shut down immediately. If the Engine continues to run, check the Brake Switch connection.
4. **OEM Alarm Control:** Make sure the Module is able to arm and disarm the OEM Alarm (if applicable).
5. **Door Locks and Trunk Testing:** Make sure each of these options respond to the Transmitter (if they were installed).
6. **Starter Kill option:** Sit inside the vehicle with all the Doors closed. Arm the vehicle and then try to start the vehicle with the key –it should not start. If the vehicle starts, rewire the starter kill so it functions properly.
7. **Valet Mode:** Make sure the Module is able to enter and exit Valet Mode properly. When setting the Module into Valet mode pressing the **LOCK** button will lock the Doors but will not activate the Starter Kill. (Refer to User Guide for more information on Valet Mode).
8. **Idle Mode:** Make sure the vehicle properly goes into Idle Mode.

Closing Up

Use tie-wraps or screws to properly secure the starter module and keep the wiring away from any moving parts such as the parking brakes or steering column shafts. Mount all switches in good and accessible locations where they do not risk getting kicked or hit accidentally.

Most comebacks are the result of misunderstandings about how a product works or performs. Take the time to properly explain all functions and features to the customers before they leave the premises. Doing this will save time and money.

Always make all your connections before plugging in the module, and be sure to test all functions properly before closing up the installation.

Show the customer where the valet switch has been installed and place the warning label in a visible location under the hood.

Diagnostics (Parking Lights)

Parking light flash rate (normal operation)

Flashes	Description	
1	• Doors locked, starter kill armed. • Run time has expired. • **TRUNK** button pressed. • Start signal received by the module. • Cold weather mode cancelled. • Enabling LED.	
2	• Remote start attempt cancelled by remote. • Doors unlocked, starter kill disarmed. • Exiting remote valet • Exiting ignition valet • Power-up reset	
3	• Entering cold weather mode. • Entering remote valet. • Entering ignition valet. • Entering extended run time. • Disabling LED.	
3 slow flashes…	…after a failed start attempt	The module did not detect a tach signal.
4	• +12 V detected on the brake input wire either while cranking or during run time. • Entering multi-speed tach programming.	
5 Slow	• Start attempt failed because no tach signal has been programmed.	
5 Fast	• Tach signal programmed. • New transmitter programmed.	
6	• A remote start was attempted while a tach-before-crank signal was detected before cranking.	
8	• Unit reset see “Resetting the Module”	
10	• A ground (-) signal was detected on the hood pin input wire.	
1 —pause — 1—pause — 5 flashes	[During the transmitter programming procedure] • Transmitter has been programmed.	
1 – pause – 2	• There was a remote start attempt while the vehicle was in valet mode. • Failed start: vehicle’s low battery voltage.	
2 – pause – 2	• There was an attempt to start the vehicle while the module was in home valet mode.	
ON SOLID for 3 seconds….	…followed by 1 flash	Exiting cold weather mode
	…followed by 3 flashes	Entering cold weather mode
ON continuously	• **Idle mode:** Idle mode is engaged • **Run time:** The vehicle has been remote started and is in run time.	
ON continuously	While the brake pedal is pressed.	●Confirms that cold weather mode is engaged
ON 2 seconds	●The hood has been opened and a ground (-) signal has been detected on the hood pin input wire.	
ON 4 seconds	●Locking or unlocking a door (with Door pulses configured to 4 sec.)	
ON 20 seconds	●The hood pin has been flashed and you now have access to the programming options.	
Constant flashes up to 25 sec.	●Panic mode is triggered.	

Installation Order

The following is a suggested order for the Installation procedure. It is intended as guide for novices, to help make the process of Installing a remote start module easier. Time is wasted by rewiring the module when mistakes are made, also the neatness of the install is lessened every time the module is taken down and the wiring is "corrected". A Messy install is harder to trouble shoot if there are problems later on. The actual "how to install" is not covered by this list, the order of the installation processes is the focus.

- Before you get started, make sure the vehicle is starts and idles properly with the Ignition key, and that the electrical system is not compromised in any way.

- After deciding what options are to be added to the basic install, you can start by looking for the wires that will be needed.

- Remember to take care when removing the panels that are covering the wires you are searching for.

- Once all of the wires have been found, they should be hot wired to verify that they are the correct wires you will need for the installation.

- When all the wire pass the hot wire test, they can be stripped to expose the wire (over one inch of plastic should be removed).

- It always better to strip more than you need, than not enough. A common way cold solder joints happen is when not enough plastic is stripped off the vehicle's wire, so during the soldering process the plastic from the wire melts and flows in to the connection instead of the solder.

- Decide where the module is going to be mounted. It is ALWAYS mounted inside the passenger compartment, and never in the engine bay. Under the driver's side of the dash there is usually enough room for the module to fit. Once the location has been decided on, proceed to the next step.

- Mount the antenna and run the cable to the where the module is going to be mounted. The antenna will get the best range when it is high up in the vehicle, and not obstructed by metal. The most common choice is the center of the windshield at the top, behind the rear view mirror, and at least one inch below the tint strip. Another location should be used, if there is another antenna in this location, compass, or other device that may interfere with the range of the start module.

- Mount the Valet switch, and L.E.D. (If applicable). Make sure they are close enough to the selected module mounting location so they will plug in when the module is mounted. If the wires are too short, they will have to be extended.

- In the engine compartment, mount the hood pin, in a suitable location. Search along the fire wall for an OEM grommet you run the wires through. If you cannot find an OEM grommet to use, you will have to drill a hole. The hole must be big enough for all of your wires to fit through. To be safe drill the hole out a little bigger so the wires will not get squished. We recommend using an aftermarket grommet when ever you drill a hole through the fire wall. This will protect the wires from rubbing against the bare metal and possibly shorting out. If you are installing an Alarm / starter combo module, mount the siren in the engine compartment at this time.

- The next step is to pre-wire the module. This Is done on your work bench, and not in the vehicle. Connect any external modules and relays that may be needed for you install. Tape or tie- strap wires that are going to be routed to the same areas of the vehicle. This will keep things neat when the module is in the vehicle. The fuses on the power wires should be removed during the pre-wire stage. The fuses will not be put back in until the powering stage of the install.

- With the pre wire finished the module can be brought in to the vehicle. Before the module is mounted, connect the antenna, the valet switch, shock sensor (if applicable) and L.E.D. to the module. With everything connected to the module, it can now be mounted in the vehicle. Use tie-straps to secure it to the vehicle. Make sure the module and harnessing do not interfere with any moving parts, and do not obstruct access to diagnostic ports, or fuse boxes. It should be up in the dash high enough that it won't get kicked by accident.

- With module secured, route the wires to the previously stripped wires the correspond to (leave the engine compartment wires for last). Tie strap them up as you go, so they do not interfere with any thing else.

- When all of the passenger compartment wires run to their locations, you can now route the engine compartment wires through the fire wall.

- With the engine compartment wires out the way, you can begin making the connections in the passenger compartment. Strip about an inch of wire past where the connection is going to be made. This extra bit wire is wrapped around the exposed OEM wire to secure in place while you are soldering.

- When all of the wires have been connected, solder the connections. When the solder has cooled, the connections are then individually taped up, to isolate them.

- Return to the engine bay and route the start module wires to their corresponding connections.

- Solder the engine compartment wire once the connections are made. When the solder has cooled, the connections are then individually taped up, to isolate them.

- Use your DMM to verify your ground location is good, before Grounding the module.

- The last step before programming is to power the module up. Replace the power fuses on the power wire fuse holders. The module will flash the Park lights twice confirming the powering up.

- If you are installing an Alarm / Starter combo module: The siren will be sounding at this point. Place the module into Valet mode to silence the siren. Take the module out of valet mode to continue the programming. (Note**:** the module default programming is passive arming, after exiting valet mode, the alarm will start the count down for passive arming. You have 30 sec. to begin the Remote control programming procedure, before the module re-arms)

- Program the Remote control
- Program the Tach Signal
- Change the programming of the options, if necessary
- Test the module's operations
- If all of the testing is successful the install is complete, and the vehicle can be put back together.

A basic introduction to the Relay:

What is a relay?

A device that responds to a small current or voltage change by activating switches or other devices in an electric circuit. An electromagnetic switch, remote controlled switch, a switching device.

Why are Relays used?

Relays can have several purposes in remote car starter installations. They are used mainly for isolation, inversion, interruption, strengthening current, and for **powering multiple wires from one source SAFELY**.

How does it work?

The basic relay consists of a coil and a set of contacts. The most common relay mechanism is electromagnetic. When voltage is applied to the coil, current passes through the wire and creates a magnetic field. This magnetic field pulls the contacts together and holds them there until the current flow in the coil has stopped.

Relays come in all varieties and types, but for the applications that concern us, we will concentrate on the **Single Pole Double Throw (SPDT) 12 Volts relay.**

Naming Convention:

Usually the relay's manufacturer will include an electrical diagram on the relay displaying the role of each terminal and how they interact with each other.
These terminal numbers are standard, and can be used with any SPDT relay.

85 & 86: The Coil. These inputs energize the coil when one is +12 Volts, and the other is Negative. They are usually non-polarized, so it does not matter which one is positive (+) or negative (-).

87: Normally Open (N/O). When the coil is energized, 87 is connected to 30.

87A: Normally Closed (N/C). When the coil is at rest, 87A is connected to 30.

30: Common. When the relay is at rest, 30 is connected to 87A, when the coil is energized, it is then moved and makes contact with 87. (Note: in a SPDT relay, 30 can never be connected to 87 and 87A at the same time, 30 is connected to **either** 87 OR 87A)

What happens:

When there is no voltage across the COIL (terminals 85 and 86), the relay's movable contact ARM (connected to terminal 30) is held, by SPRING tension, against terminal 87a (normally closed circuit).

When 12 volts is applied to the COIL (terminals 85 and 86), the ARM (connected to terminal 30) is pulled in by the electromagnet (COIL) so that it physically connects to terminal 87 (normally open circuit)

When 12 volts is applied to the COIL (terminals 85 and 86), the ARM (connected to terminal 30) is pulled in by the electromagnet (COIL) so that it physically connects to terminal 87 (normally open circuit)

Remember, there is no polarity on a relay's coil. This means that you may apply positive from the battery to either terminal 85 **OR** 86, and then Ground the OTHER terminal to activate the relay. In other words, you may use either a positive or negative trigger to energize the relay.

Keep in mind, when the relay is energized, if the positive OR the ground connection on the coil is broken, the arm switches the connection between 30 back from 87 to 87a.

Quenching Diodes:
It was said earlier that you energize a relay by applying positive from the battery to either 85 OR 86 and grounding the other terminal. This is not absolutely true, some relays are "polarized" if they have a quenching/ suppression diode (A diode installed between the coil terminals 85 and 86, could be internal or external). To activate the coil on this type of relay, make sure that the +12 Volts trigger is on the same terminal of the relay as the Anode (+ or non striped side) side of the quenching/suppression diode, and that the Negative trigger is on the same terminal of the relay as the cathode (- or striped side) of the quenching/ suppression diode.

When a relay's coil is energized, a magnetic field is created and energy is stored in the coil. When power is removed from the coil, the magnetic field collapses. This causes a Reverse Voltage to be generated and can sometimes reach 200 volts. A quenching diode absorbs this reverse voltage spike.

A closer look at a relay:
Now that you know what the main inscriptions are on the relay, take a look on the side, and you will see another inscriptions: i.e. **(12 VDV, 40/ 30 A)**

12 VDC: This indicates the coil voltage rating. For an Automotive relay, it's usually 12 Volts DC.

40/ 30 A: This indicates the current carrying capability of the contacts 30, 87, & 87A.

40: Indicates that the normally closed circuit (30 and 87a) can safely handle a maximum of 40 amps of current.

30: indicates that the normally open circuit (30 and 87) can safely handle a maximum of 30 amps of current.

Examples:
The following examples demonstrate some of the most common uses for relays.
isolation, inversion, interruption, strengthening current, and for powering multiple wires from one source SAFELY.

Powering multiple wires from one source safely:

Example: Powering a second Ignition

Problem: You need to power Multiple Ignition wires to remote start the vehicle, but your module only has one Ignition output available.

Solution: You will need to add a second ignition relay to power the second ignition wire. **(Jumping Ignition 1 to Ignition 2 is NEVER recommended. Always use a relay. The vehicle circuits are Isolated for a reason, the wiring of the remote star module should reflect this.)**

The relay connections:

85: Connects in parallel to the Ignition 1 output from the remote start module. This becomes the positive side of the coil.

86: Connects to the **Ground Out when Running** wire from the remote start module. This becomes the negative side of the coil.

87: Connected to a Fused +12 Volts source, that is capable of supplying power for the vehicle's second ignition wire. This becomes the source of power for the 2nd ignition wire.

87A: No connection. This terminal is not used in this application.

30: Connects to the vehicle's second ignition wire. This becomes the output of the 2nd ignition relay.

Comments: The relay is only energized when the vehicle is running by remote start. When started with the Key, the relay is not energized and the integrity of the stock system has been preserved.

Isolation:
Example: Isolating a Park light output

Problem: Some vehicle circuits need to be isolated from feedback. In some cases, when a vehicle is remote started, feed back occurs on a circuit, and powers another device or switch, that was not intended to be powered during the remote starts.
The following example will be a Positive (+) Park Light circuit that feeds back and activates the windshield wipers during remote starts.

Solution: When power is applied to the OEM Park light wire it back feeds through the park light switch, and activates the wipers. Where the connection was made from the start modules' Park light output, and the vehicle's park light circuit, the OEM park light wire is cut to isolate the park light switch and the actual parking lights. A Relay is added to the park light circuit so that power from the remote start module is only sent to the parking lights and not the parking light switch.

The relay connections:

85: Connects to the +12 Volt Park light output from the remote start module. This becomes the positive side of the coil.

86: Connects to a Negative source. i.e. The spot where the remote start module is grounded. This becomes the negative side of the coil.

87: Connects to the +12 Volt Park light output from the remote start module. This becomes the power supply for the vehicle's park lights.

The OEM park light wire is cut. The side that is still connected to the switch becomes the “Switch Side”. The side that is still connected to the Parking lights becomes “Parking Lights Side”.

87A: Connects to the “Switch Side” of the cut OEM park light wire.

30: Connects to the “Park Light Side” of the cut OEM park light wire.

Comments: When the relay is at rest, the OEM Park light wire is connected (through 87A & 30) and allowed to operate normally. When the remote start module powers the Park lights, the OEM park

light wire is opened, and power from the remote start module is sent only to the actual Parking Lights (from 87 through 30).

Inversion:
Example: Activating a Positive Trunk release switch

Problem: The vehicle's power trunk release switch is activated by a positive (+) pulse, and the remote start module's Trunk output is negative (-).

Solution: A relay is used to invert the negative signal from the start module to a positive signal before it is sent to the OEM switch.

The relay connections:

85: Connects to the start module's Trunk release output wire. This becomes the negative side of the coil.

86: Connects to a fused +12 Volts source. This becomes the positive side of the coil.

87: Connects to a fused +12 Volts source. This becomes the supply for the positive trunk release.

87A: No connection. This terminal is not used in this application.

30: Connects to the OEM trunk wire in the vehicle.

Comments: At rest, the trunk switch is allowed to operate normally. When the Trunk button on the remote is pressed, the negative Trunk output from the remote start module triggers the relay. When the relay is activated, +12 volts from 87 is sent through 30, and the OEM trunk switch is activated, by the positive pulse.

Interruption:
Example: Creating a Starter Kill relay to prevent unauthorized starting of the vehicle.

Problem: The OEM starter circuit needs to be disabled only when theft is attempted.

Solution: A relay is used to interrupt the OEM starter wire. There is an output on the remote start module especially for this purpose (Starter Kill output).

The relay connections:

85: Connects to the Starter Kill output wire from the remote start module. This becomes the negative trigger for the coil.

86: Connects to the vehicle's Ignition wire. This becomes the positive trigger for the coil.

87: No connection. This terminal is not used in this application.

The vehicle's OEM start wire is cut. The side of the wire that is still connected to the Ignition switch becomes the “Key Side” of the starter wire. The side of the wire that is still connected to the starter motor becomes the “Starter Side” of the of the starter wire.

87A: Connects to the “Key Side” of the cut OEM starter wire.

30: Connects to the “Starter Side” of the cut OEM start wire.

Comments: At rest the relay is not active, and +12 volts on the starter wire passes through the relay (through 87A & 30) normally. The Starter Kill output wire on the remote start module is activated when the LOCK button is pressed on the remote control.
When a theft attempt happens, and the thief powers the Ignition circuit (to hot wire the vehicle), and the Starter Kill was ARMED (by the LOCK button on the remote) the starter kill relay activates. The OEM start wire is now open, (does not make connection) because 30 is no longer connected to 87A, and the vehicle is unable to start.

Strengthening current:
Example: Strengthening an output

Problem: A vehicle has a negative (-) trigger Trunk release wire. The module has a negative Trunk release output wire. The remote start module is unable to supply the necessary current to activate the vehicle's Trunk release wire.

Solution: A Relay is used to provide the necessary negative current to active the vehicle's Trunk release wire.

The relay connections:

85: Connects to the start module's Trunk release wire output. This becomes the Negative trigger for the coil.

86: Connects to a fused +12 Volt source.

87: Connects to a Negative source. i.e. The spot where the remote start module is grounded. This becomes the supply for activating the vehicle's Trunk release wire.

87A: No connection. This terminal is not used in this application.

30: Connects to the vehicle's Trunk release wire.

Comments: At rest the relay is not active and the vehicle's Trunk release switch is allowed to operate normally. When the Trunk release button is pressed on the remote control, the start module's Trunk release output activates the relay. The ground signal is sent from 87 through 30 to the vehicle's Trunk release wire activating the switch and opening the trunk.

Troubleshooting Q & A

The following are some common install related issues.
A problem or symptom is given and then possible solutions and/or suggestions as to areas to verify are enumerated.

1. **I cannot program the remote control.**
   - Do the parking lights come on when you open the hood? (Does the hood pin work?)
   - Is the antenna plugged in?
   - Does the light on the remote control turn on when you press the button?
   - Is the Ignition wire connected properly?
   - Are you waiting too long between programming steps?
     - After flashing the hood pin turn the key to ON, WAIT for 2 seconds.

- Turn the key Off, On, Off then keep pressing the **LOCK** button repeatedly until you get 5 light flashes from the module.

The entire process should take less than 20 seconds.

2. **Won't start by remote**
   - Does the light on the remote light up when you press the button?
   - Is the starter in valet mode?
   - Does the vehicle have passive antitheft security (PATS, VATS, PASSLOCK, TRANSPONDER)?

3. **The car cranks for 8 seconds but won't start.**
   - Are you on the correct ignition wire?
   - Does the car have more then 1 ignition?

4. **The car cranks briefly then quits.**
   - Have you bypassed the passive security? (PASSLOCK, PASSKEY III, PATS...)
   - Have you adjusted tach?
   - Is the vehicle's battery weak?

5. **The park lights come on for 8 seconds but will not crank**
   - Does the car have an after market starter kill?
   - Have you bypassed the VATS or Passlock II?
   - Is the start wire hooked up correctly?
   - Has the clutch been bypassed properly (for standard transmissions)?

6. **The car starts but starter stays engaged**
   - Make sure ignition and crank are not common with the key out (connected at rest). May have to add relay (i.e. Tercel, Altima)
   - Did you make an Auto Tach Adjustment?
   - Weak Tach signal?
   - Bad ground?

7. **The car starts by remote fine then the starter re-engages**
   - Check ground wire
   - Is Tach programmed?

8. **The car starts on it's own**
   - Is the module in cold weather mode?
   - Program remote 4 times. (another remote may be programmed to your module)
   - Is external trigger shorting out to ground?

9. **I get one long flash when I press the button trying to go into ready mode.**
   - Check tach circuit.

10. **The factory alarm goes off when I start by remote.**
    - Did you hook the disarm wire?
    - Do you have the correct OEM disarm wire?
    - Did you program the disarm wire? (CT-3100/3160 only)

11. **The ABS, Check Engine light come on in the dash.**

- Are you missing a second ignition or accessory?

12. **Starts and runs OK but the Heater blower motor doesn't work**
    - Incorrect Accessory wire
    - Does it have more then one accessory?

13. **Starts OK, heater works but AC doesn't.**
    - Missing second accessory (common on some Fords)

14. **Check engine light comes on and vehicle doesn't shift, feels sluggish.**
    - Missing second ignition. (common on some GMs)

15. **On cold mornings the park lights come on, go out, and then flash 2 times slowly.**
    - Check for a weak car battery. (Try using the cold weather mode option)

16. **Car doesn't start, park lights flash 4 times.**
    - Check brake circuit.
    - Check for blown rear park light (feedback).

17. **Vehicle runs for 8 seconds then shuts down. 12 volts on starter wire the whole time but no over crank.**
    - Did you make an Auto Tach Adjustment? (New GM trucks, cars and mini vans)

18. **Car runs for about 5 seconds, shuts down and restarts. Does this 3 times.**
    - Check voltage on tach wire.
    - Try an alternate tach source.

19. **Starts by remote but range is poor.**
    - Is the car tinted?
    - Does it have an after market alarm?
    - Is the antenna mounted below the tint strip?
    - Using the correct remote?
    - Change remote battery.
    - Heated front windshield? (Taurus, Crown Vic)
    - Metal film in windshield? (GM Mini vans)

20. **Excellent range when the vehicle is not running but almost none when it is running.**
    - Check for loose spark plug boot or faulty ignition wires, cracked cap.
    - Try disconnecting blower motor.

21. **After about a half hour almost no range at all until the vehicle is started with the key again.**
    - Does the vehicle have factory alarm/ keyless entry? You might have to switch to a 433MHZ module. (Some GM Trucks, Cavalier/Sunfire, Breeze/Stratus/Cirrus)

22. **Sometimes I have to press button I twice to lock my doors.**
    - Normal on 3100/3160 if you wait past the starter kill arm cycle (approx. 35 seconds)
    - Program toggle mode. (3100/3160 only)

23. **Radio stays on after the vehicle shuts down.**
    - Retained Accessory Power will keep power to radio for approx. 10 - 15 minutes or until it sees a door open. (Fords, GM's R.A.P.)

24. **Headlights stay on after car shuts down by remote.**
    - Switch headlight switch from Auto to normal. (Toyotas)
    - On some vehicles, opening a door will shut the head lights off. Pulse the drivers door pin with the Rearm wire.

25. **I get no 12v reading at all at the brake pedal, depressed or not.**
    - Some vehicles require ignition be on. (BMW)

26. **Park lights flash on their own.**
    - Check hood pin adjustment.
    - Bad ground?

27. **I blow fuses every time I try the remote door locks. Using relays.**
    - Door locks are reverse polarity, and not positive trigger.

28. **I blow fuses every time I try the remote Trunk release. Using relay.**
    - Trunk release is reverse polarity, and not positive trigger.