

## LIMITED LIFETIME WARRANTY

Products manufactured and sold by OMEGA RESEARCH & DEVELOPMENT, INC. (the Company), are warranted to be free from defects in materials and workmanship under normal use. If a product sold by the Company proves to be defective, the Company will repair or replace it free of charge within the first year and thereafter all parts to be repaired will be free with only a nominal charge for Omega Research and Development, Inc.'s labor and return shipping, to the original owner during the lifetime of the car in which it was originally installed.

All products for warranty repair must be sent postage prepaid to Omega Research & Development, Inc., P.O. Box 508, Douglasville, Georgia 30133, with bill of sale or other dated proof of purchase. This warranty is nontransferable and does not apply to any product damaged by accident, physical or electrical misuse or abuse, improper installation, alteration, any use contrary to its intended function, unauthorized service, fire, flood, lightning, or other acts of God.

This warranty limits the Company's liability to the repair or replacement of the product. The Company shall not be responsible for removal and/or reinstallation charges, damage to or theft of the vehicle or its contents, or any incidental or consequential damages caused by any failure or alleged failure of the product to function properly. Under No Circumstances Should This Warranty, Or The Product Covered By It, Be Construed As A Guarantee Or Insurance Policy Against Loss. The Company neither assumes nor authorizes any person or organization to make any Warranties or assume any liability in connection with the sale, installation, or use of this product.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and, (2) This device must accept any interference received, including interference that may cause undesired operation. The manufacturer is not responsible for any radio TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

One or more of these patents may apply to this product:

#5,612,669 #5,654,688 #5,663,704 #5,729,191 #5,818,329 #5,612,578 #5,739,747 #382,558 #385,878 #5,750,942  
#5,739,748 #5,719,551 #406,107 #701,285 #5,973,592 #5,982,277 #5,986,571 #6,011,460 #6,037,859 #6,049,268  
#6,130,605 #6,130,606 #6,140,938 #6,140,939 #6,150,926 #6,144,315 #6,184,780 #6,188,326 #6,243,004 #6,249,216  
#6,275,147 #6,297,731 #6,320,514 #6,320,498 #6,346,876 #6,346,877 #6,366,198 #6,392,534 #6,429,768 #6,433,677  
#6,480,095 #6,480,117 #6,480,098 Foreign Patent #199700312 #EP0817734B1 #98906445.6 #2,320,248 #701,285

09/07 MA\_MARS22+

# MARS OPERATING & INSTALLATION INSTRUCTIONS

>>modular\_advanced\_remote\_start<<



## MARS-22+

**DELUXE KEYLESS ENTRY & REMOTE STARTER  
FOR AUTOMATIC TRANSMISSION VEHICLES ONLY**

COPYRIGHT: OMEGA RESEARCH & DEVELOPMENT 2007

# Contents

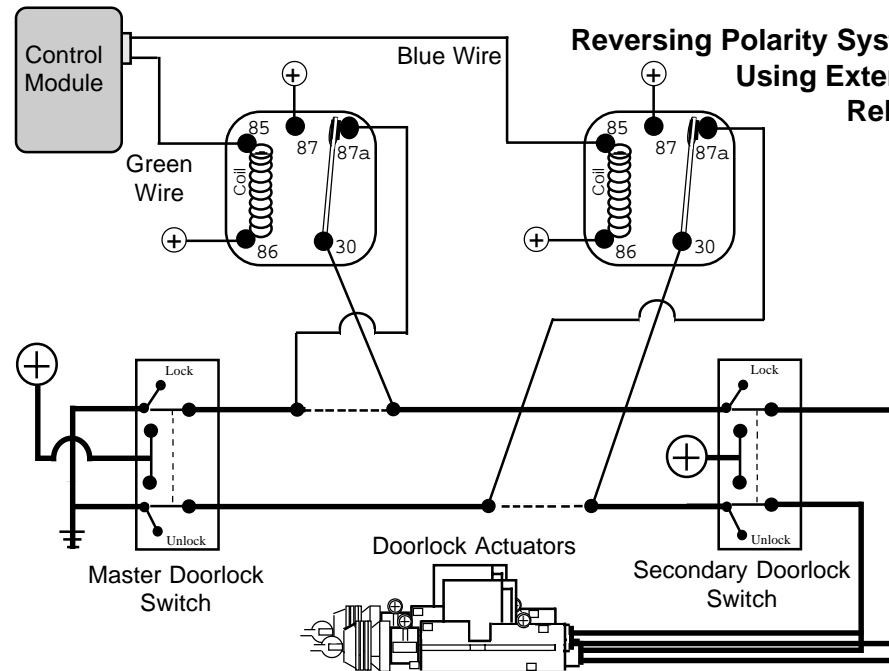
## Operation Guide

Introduction & Safety Considerations .....	3
Basic Transmitter Functions Overview .....	4
Remote Locking & Unlocking the Doors .....	5
Remote Starting the Engine .....	5-7
Remote Panic .....	7
Remote Trunk Release .....	8
Multiple Vehicle Operation .....	8
The Receiver Unit .....	9
Programmable Features .....	9-17
Programming Transmitters .....	18-19
Optional 2-Way Operation .....	19
Limited Lifetime Warranty .....	Back Cover

## Installation Instructions

Installation Considerations .....	22-23
Installation Cautions and Warnings .....	22
Main & Receiver Modules .....	23
Wiring Diagram Overview .....	20-21
6 Wire Main Harness .....	24-26
3 Wire Connector .....	26-27
12 Wire Harness .....	27-34
2 Wire Connector .....	34-39

## Reversing Polarity System Using External Relays



- 38 the wires *show partial ground* through the relay's coils.
- 2) The doorlock switch in a Reversing system will have 5 wires, while a Positive pulse system the switch will have 3 wires.
- 3) A *Positive pulse system* uses *factory relays or a control unit*, a Reversing system *does not*.

### **5 Wire Reversing Polarity Systems**

This power doorlock system differs from the negative and positive pulse systems in that there is no doorlock control unit or relays. In this type of system, the switches themselves supply the positive voltage directly to the doorlock actuators, and, more importantly, provide the return ground path. It is important to note that the lock and unlock wires in this system *actually rest at chassis ground*. This means that both the lock and unlock wires must be "opened", or cut, to make the proper connections.

Examine the wires on the back of the switch. (Normally 5 wires will be found

- 1) One wire will show +12 Volts, regardless of the switch's position.
  - 2) Two wires will be grounded regardless of the switch's position.
  - 3) One wire will show +12 Volts only when the switch is pushed to "Lock".
  - 4) One wire will show +12 Volts only when the switch is pushed to "Unlock".
- When the lock /unlock wires are found, they must be cut one at a time. If the correct wires are cut the door locking system should not operate from the primary switch.
- Notice that in the diagram the driver's switch is the primary or "Master" switch (in some vehicles, the primary switch is on the passenger's side). The half of the cut wires which come from this primary switch are referred to as the "Switch" side. The half of the cut wires which go to the secondary switch are referred to as the "Motor" side even though the cut is made between the switches.

## **Introduction & Safety Considerations** 3

Congratulations for choosing the Modular Advanced Remote Starter and Keyless Entry system. The MARS-22+ offers the convenience of locking and unlocking your vehicle's doors with the press of a button, and starting your vehicle's engine from the comfort of your home or office, allowing it to warm up in winter and cool down in summer. The MARS can also be configured to remotely open your vehicle's trunk.

It is highly recommended that this system be professionally installed, as the sophistication of the modern automobile and the complexity of this type of product installation is often beyond the abilities of most do-it-yourselfers.

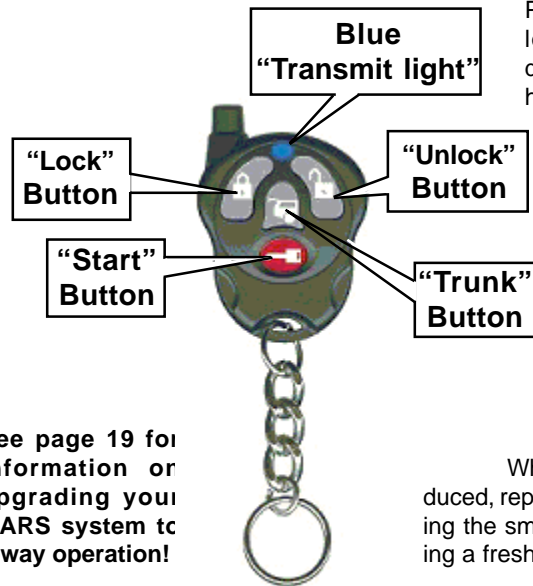
There are several important safety considerations with using and installing the MARS keyless entry and remote starter. Among them are:

- 3 This unit is for vehicles with an automatic transmission only. Installation in a vehicle equipped with a manual transmission can result in property damage or personal injury.
- 3 This unit is for fuel injected gasoline or diesel engines.
- 3 Children should not be left unattended in, or be allowed to play with the activating transmitters of any remote starter equipped vehicle.
- 3 Do not use the remote starter feature in an enclosed garage or other structure.

The MARS is a very flexible system. It has capabilities, such as sounding the horn, which may or may not be utilized in your installation. It also has many programmable features which can affect its operation. While these are explained as thoroughly as possible in this guide, your Omega dealer or installer is the best source for information about your system.

## Basic Transmitter Functions

The MARS includes with two 4-button remote transmitters. The control buttons' functions are shown here, and how they operate the system is described in more detail in the following pages.



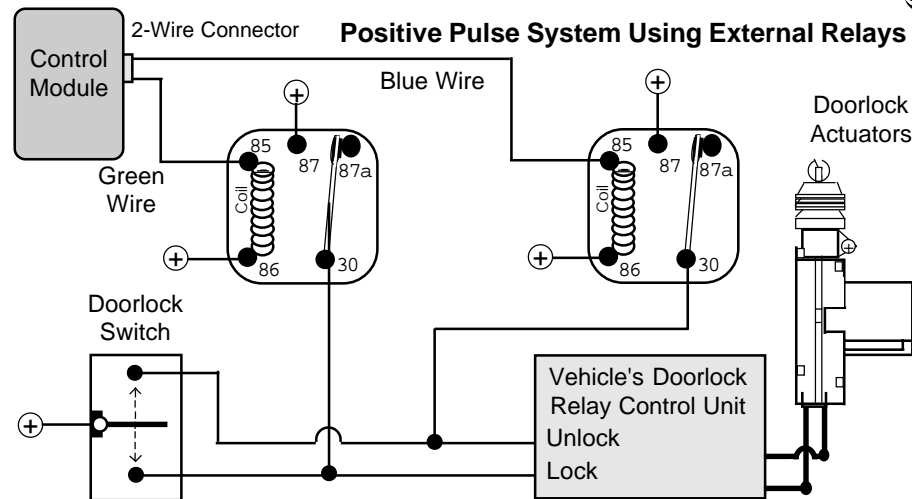
See page 19 for information on upgrading your MARS system to 2-way operation!

Pressing and releasing the Lock or Unlock buttons operate the vehicle's doorlocks accordingly. Pressing and holding the Lock or Unlock buttons will activate the system's remote panic feature. Another press stops it.

Press and release the red Start button to operate the remote feature. Press and hold the Trunk button for 2 seconds to operate the trunk release feature. The Blue indicator lights whenever one of the Transmitter buttons is pressed.

When the blue light is dim, or range is reduced, replace the transmitter's battery by removing the small phillips screw on back, and installing a fresh 12 volt "23A" battery.

3) One wire will show +12 Volts only when the switch is pushed to "unlock".



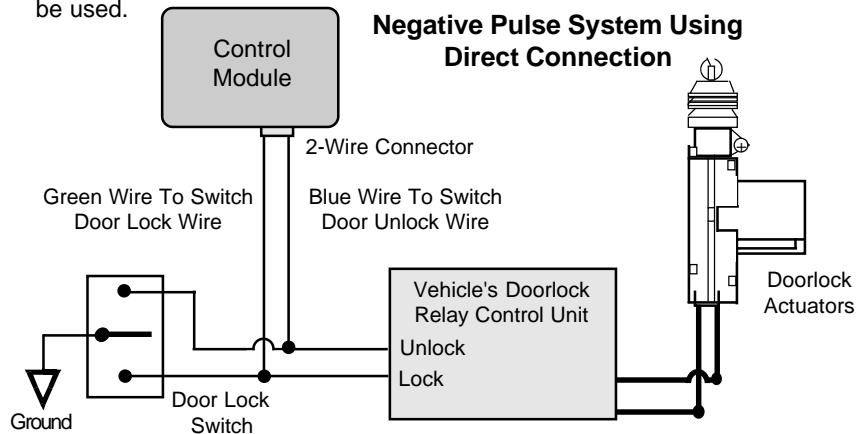
**Warning:** The Positive pulse system can be confused with the 5-wire Reversing Polarity system. This is because both systems show +12 Volt pulses on the "Lock" and "Unlock" wires when the vehicle's switch is pressed respectively. It is critical to identify which system is present, since if +12 Volts is pulsed into a Reversing Polarity system, which rests at ground, a direct short circuit will occur.

3 main differences between a Positive pulse and a Reversing Polarity system:

1) In a Reversing system the Lock/Unlock wires *rest at ground*, while in a Positive system

36

operate the vehicle's on-board doorlocking relays. If the vehicle's Negative pulse doorlocking system requires more than 500mA Negative output, optional relays must be used.



### 3 Wire Positive Pulse Systems

This doorlock system is similar to the 3 wire negative pulse system except the doorlock switches send +12 Volt pulses to operate the doorlock relays/control unit.

Examine the wires on the back of the doorlock switch:

- 1) One wire will show +12 Volts, regardless of the switch's position.
- 2) One wire will show +12 Volts only when the switch is pushed to "lock".

## Locking & Unlocking the Doors

5

**To Lock the Vehicle's Doors: Press & Release the upper left transmitter LOCK button**

- The parking lights flash once to confirm locking, and optionally, the horn will chirp once. \* The Status Light on the Receiver Unit will have one long flash when a lock signal is received.

**To Unlock the Vehicle's Doors: Press & Release the upper right transmitter UNLOCK button**

- The parking lights flash twice then stay on for 30 seconds to confirm unlocking, and optionally the horn will chirp twice.\* The Status Light on the Receiver Unit will have two long flashes when an unlock signal is received.

## Remote Starting

**To Activate Remote Start: Press & Release the lower left transmitter START button**

- The parking lights will turn on and the Status Light will flash to confirm the starting process (and, optionally, the horn will also chirp 3 times\*).
- The MARS will turn on the ignition circuit. *continued next page . . .*

\*The MARS is equipped with a horn/siren output; its connection is optional and may require extra parts.

- ⑥
- Within a few seconds the parking lights will turn off and the starter will engage.
  - The engine will start, run, and the starter will be disengaged.
  - The parking lights will turn back on and remain on while the MARS is controlling the engine. The status light will pause, and then continue to flash slowly.
  - If the engine stalls, the MARS will make two attempts to restart it.

When you leave your vehicle, simply set the climate controls for what you would like to have operating upon remote starting - the heater, defroster or air conditioning.

Upon entering the vehicle place the ignition key in the switch and turn it to the "On" position, and then deactivate the MARS. **Do not turn the key to the "Start" position!**

### Deactivation

- Stepping on the brake pedal will turn the engine off.
- To stop the engine by remote control, simply press the upper button again.
- After the preset programmable time the MARS will turn the engine off.
- Opening the hood will turn the engine off. If the hood is open when an activation attempt is made, the MARS will only flash the parking lights once, chirp the horn 3 times (optionally), but will not start the engine.
- Pressing the Valet Switch will also stop the engine.

### Valet Mode

The MARS may be placed into a "valet mode" which prevents the remote start feature from being activated. Valet Mode should always be used when you do not wish for remote

### **22 Gauge Blue Wire:**

**500mA ( - ) Unlock Output** ③⑤

**Connection If Desired.** The Blue wire supplies a negative pulse for locking the vehicle's doors. Programmable feature #12 changes the single unlock pulse to be a double unlock pulse.

This harness, which plugs into the White 3-pin port on the control module, is the power doorlock outputs by which the MARS operates the vehicle's power doorlock system (the vehicle must have existing power doorlocks). The doorlock interface needed to allow the system to operate the doorlocks will depend upon the type of power doorlocking system the vehicle is equipped with. The following sections describe typical power doorlocking systems, which are categorized as "3 Wire Negative Pulse"; "3 Wire Positive Pulse", and "5 Wire Reversing Polarity" systems.

### **3 Wire Negative Pulse Systems**

This power doorlock system is simplest of all doorlocking systems. A Negative pulse system will have only three wires at the doorlock switch.

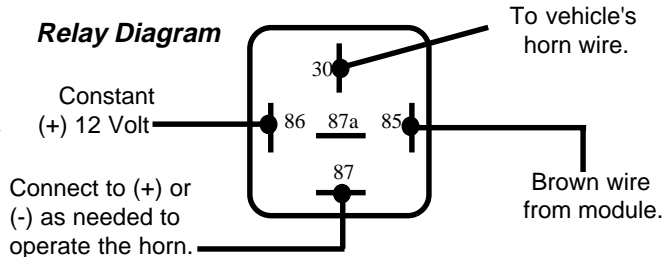
Examine the wires on the back of the doorlock switch:

- 1) One wire will show Ground, regardless of the switch's position.
- 2) One wire will show Ground only when the switch is pushed to "Lock".
- 3) One wire will show Ground only when the switch is pushed to "Unlock".

The lock & unlock wires coming out of the switch operate the vehicle's doorlock relays or a control unit with on-board relays, therefore the lock & unlock wires will read Positive voltage, up to +12 Volts, when the switch is at rest. The correct connection point is between the switches and the relays. The Red connector's Green and Blue wires can be connected directly to the vehicle's Negative pulse system since only a Negative pulse is required to

**34** **20-Gauge Gray Wire:** **( - ) Trunk Release Output**  
**Connection If Desired.** The Gray wire has a 500mA Negative output which is operated by the transmitter button with the “open trunk” icon, and this output is designed for trunk release. In most cases, an optional external relay will be needed.

**20-Gauge Brown Wire:** **( - ) Horn Output**  
**Connection If Desired.** The Brown wire is a 500mA Negative output designed to sound the vehicle's horn for audible operation confirmations and the remote “panic” feature. The Brown wire may be connected directly to the vehicle's horn switch wire, provided that the circuit operates with 1/2 Amp of current or less. The horn wire is typically found around the steering column; the correct wire will show Positive 12 Volts normally, and no voltage when the horn is being sounded. If the horn circuit requires more than 500mA, use this diagram to configure an optional relay.



**Wiring - 2 Wire (3 Cavity) Connector / Doorlock Port**  
**22 Gauge Green Wire:** **500mA ( - ) Lock Output**  
**Connection If Desired.** The Green wire supplies a negative pulse for locking the vehicle's doors.

**7** starting to be operated, such as when you have your vehicle serviced or leave it with someone else. The Valet Switch, in the Receiver Unit, is used to engage Valet Mode:

- At any time simply press the Valet Switch for 5 seconds; the Status Light within the Receiver Unit will light steady, to indicate Valet Mode, and stay illuminated continuously while the system is in Valet Mode.

Once the MARS is in Valet Mode, an attempt to remote start will instead be acknowledged by 1 long and 3 short parking light flashes, but no starting attempt. If the horn is connected, it will sound briefly and then chirp 3 times.

- To turn off Valet Mode, simply press the Valet Switch until the Status Light turns off.

Valet Mode only prevents the remote starting operation; the lock, unlock, and trunk release functions all continue to operate when the MARS is in Valet Mode.

**Remote Panic**  
**To Activate Panic\*: Press & Hold either transmitter LOCK or UNLOCK button for 3 seconds**

- The horn will sound\*, the parking lights will flash and the doors will lock or unlock, depending on the transmitter button used. To deactivate Panic, simply again press either the LOCK or UNLOCK button- Panic stops with either locked doors or unlocked doors, depending on which button is used.

\* The horn will not sound if Panic is activated when the system is in Valet Mode. Connection of the horn may require additional parts, and may not be included in a standard installation.

8

## Remote Trunk Release

**To Activate the Trunk Release\*:** Press & Hold the lower right transmitter TRUNK button for 2 seconds

- The trunk will be released after 2 seconds, and the Status Light will flash twice. If the doors are also programmed to unlock with Trunk Release, the parking lights will flash twice and stay on for 30 seconds, and the horn will chirp 2 times if it is connected.

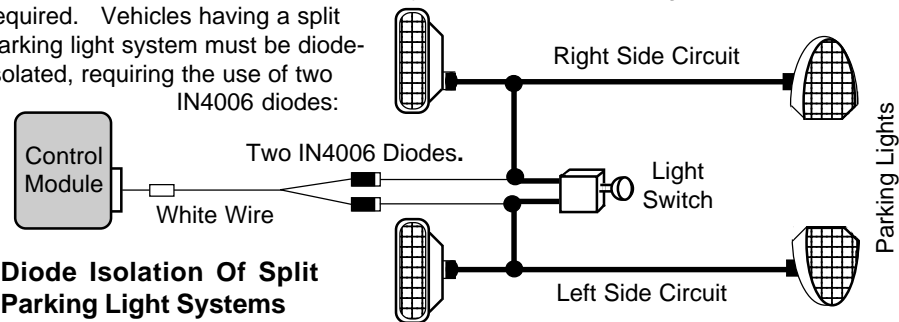
\* Connection of the trunk release may require additional parts, and may not be included in a standard installation.

## Multiple Vehicle Operation

The MARS transmitter can operate two different vehicles equipped with MARS systems. The slide switch on the side of the transmitter is utilized for this- one car can be operated in switch position "A" and the second car in switch position "B".

Transmitters must be coded for multiple vehicle operation- an easy procedure which is explained on pages 17-19.

**Caution:** When such a wire is located, be sure to also test that it is non-rheostated: While metering the wire, operate the dash light dimmer control. The correct wire will show no change in voltage when the dimmer is operated. Some vehicles have a parking-light relay which is triggered by a Negative signal from the headlight switch. In these vehicles, the White wire must be connected after the relay, usually at the Fuse/Junction Block. Do NOT connect the White wire directly to the vehicle's headlights. An external relay is required. Vehicles having a split parking light system must be diode-isolated, requiring the use of two IN4006 diodes:



**Diode Isolation Of Split Parking Light Systems**

### 20-Gauge Orange Wire:

**( - ) Anti-Grind Output**

**Connection If Desired.** The function of the Orange wire is to provide a 500mA Negative auxiliary output which may be used to operate a starter motor "Anti-Grind" relay, which prevents accidental starter grind should the key be turned while the remote starter is in operation. Additionally, the Orange wire also provides the vehicle immobilizing feature for the Anti-Carjacking operation. Connection instructions are included with optional starter interrupt socket and relay.

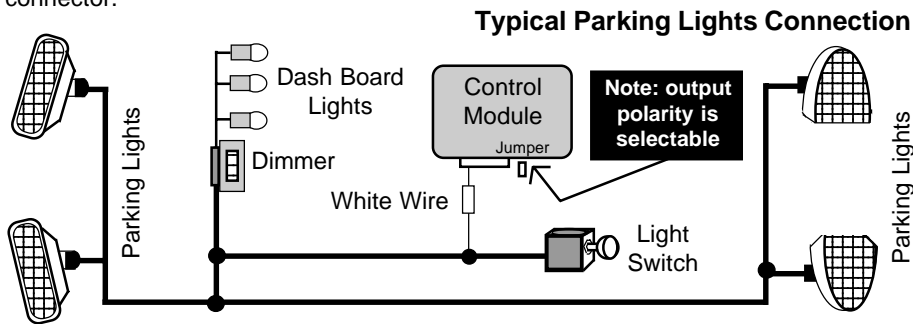
33



32 the engine.  
The Pink/Black wire can be connected to an available auxiliary output of an existing Remote Security System, and the unit's remote control may also be used to activate the remote start operation.

### 18-Gauge White Wire: ( +/- ) Parking Light Output

**Connection Recommended.** The White wire is a programmable output to the vehicle's exterior parking lights to visually confirm system operations; +12 Volt or - Negative output may be selected by the jumper next to the doorlock port. Connect the White wire to the vehicle's 12 Volt parking light circuit as shown in the accompanying diagrams. The correct wire will show 12 Volts only when the headlight switch is in the "Parking Light" and "Head Light" positions. This wire can usually be found at the headlight switch, and various other locations within the vehicle, such as the rear body harness or firewall connector.



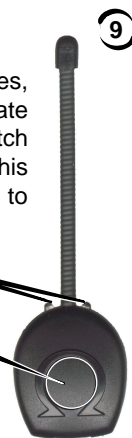
## The Receiver Unit

An important part of the MARS system is its Receiver Unit. As its name implies, the Receiver Unit contains the radio receiver needed for the system to operate from the hand-held transmitter. The Receiver Unit also contains the Valet Switch and Status Light; the various operations of which are explained throughout this guide. The Status Light also briefly flashes the number of transmitters able to operate the system every time that the ignition key is turned on.

The Receiver Unit is designed for mounting directly on the vehicles' window glass, which also gives the system its best operating range. Should this not be possible or desired, the Receiver Unit may be mounted in a hidden location, and provisions are made for optional separately-mountable Valet Switch and Status Light.

**Blue Status Lights**

**Valet Switch**  
used for Valet Mode  
and for programming



## Programming Features

The MARS has a total of 14 "programmable features"; most of these are "operational" features, some are "installation"-related, and one returns all features to the factory setting. These features can be changed by very easily by placing the MARS into a "Features Programming Mode" and selecting features with the Valet Switch, and then using the transmitter's buttons to set the feature as desired. The chart on the next page shows the Programmable Features, and detailed step-by-step programming instructions follow the chart.

<b>10</b> #	<b>FEATURE</b>	<b>DEFAULT</b>	<b>OPTION</b>
#1	Coded Override	1 Press	1 to 9 Presses
#2	Engine Running Time	10 Minutes	20, 30, 40 Min.
#3	Doors Lock/Unlock Upon Ignition On/Off	ON	OFF
#4	Horn Confirmation With Doorlocking	Med	On Demand, OFF, Soft
#5	Horn Confirmation With Engine Start	Med	OFF, Loud, Soft
#6	NOT USED	-	-
#7	Ignition Activated Anti-Carjacking	OFF	ON
#8	NOT USED	-	-
#9	Unlock Doors With Trunk Release	ON	OFF
#10	Pulsed or Steady Horn / Siren Output	Fast Pulsed	Steady, Med, Slow
#11	Starter Cranking Time (in seconds)	.5 Second	.75, 1.25, 1.5 Sec.
#12	Doorlock Output Options	Single	UL X 2, 3 Sec.; 28 Sec.
#13	Gasoline or Diesel Engine	Gasoline	Diesel Monitor, 10, 20
#14	Reset All Features To Default	Press "LOCK" button to reset all features to the default setting	

**Each of these Programmable Features is explained on pages 12-17.**

wire can usually be located in the vehicle in either kick panel area, in the wiring harness which is routed into the cab from the door. The Yellow/Green wire has a -Ground pulse whenever the MARS has an unlock output or its remote start operation is activated. **31**

### **20-Gauge Yellow/Red Wire: (-) OEM Arm Output**

**Connection If Needed.** This output may be used to arm a factory-installed alarm, or, if the vehicle is equipped with a Retained Accessory Power circuit, this output can be used to "spike" the door pin switch wire, which will turn off the Retained Accessory Power circuit.

To arm a factory alarm after remote start engine run stops, connect the Yellow/Red wire to the vehicle's factory arm wire. This wire will show Negative polarity when a key is held in the "lock" position in the door key cylinder. This wire can usually be located in either kick panel, in the wiring harness from the door, as it is routed between the door key cylinder and the factory alarm.

To use this wire to turn off Retained Accessory Power, locate a vehicle wire within the door or doorjamb which shows Negative when the door is open. Should such a wire be found which is positive, a relay is needed to reverse the Yellow/Red wire's Negative output to Positive. The Yellow/Red wire produces a Negative pulse output whenever the system turns off the engine after it has been remotely started.

### **20-Gauge Pink/Black Wire: (-) Start Activation Input**

**Connection If Needed.** The Pink/Black wire allows for alternative devices such as an existing keyless entry or alarm system to activate the remote start operation. If the Pink/Black wire receives a Negative pulse, the MARS unit will start the vehicle's engine, provided that all safety circuits are in the proper status. After the engine has been started by remote control, another Negative pulse on the Pink wire will turn the unit off, stopping

**30** read 1 to 6 volts AC with the engine idling, and will increase with engine speed.

- 2) **Switch** the selector slide switch on the MARS control module to the right toward the 12-pin secondary harness (see page 21 and the markings on the control module).
- 3) **Adjust** the tach signal by starting the engine and turning the right adjustment screw on the control module slowly clockwise until the indicator LED lights solid.
- 4) **Test** the operation by remote starting and checking that the indicator LED lights solid. The starter engagement is long enough for the engine to start, but without grinding. If needed adjust the crank time by turning the adjustment screw clockwise for more signal sensitivity and counterclockwise for less.

#### **20-Gauge Green/Red Wire:**

#### **( +/- ) Glow Plug Input**

**Connection If Needed.** The Green/Red wire allows the MARS to be used with diesel engines, operates only if programmed (feature #13) and is also polarity-programmable. Connect the Green/Red wire to the wire in the vehicle which powers the glow plugs, or the wire which illuminates the "Wait To Start" light on the instrument panel. When connected, the unit will not engage the starter if the Green/Red wire has +12 Volts; in other words, using this wire simply delays the unit's engagement of the starter. If the "Wait To Start" light in the vehicle has a Negative switching circuit, change the position of the White "Glow Plug +/- Select" Jumper on the control module to reverse the Green/Red wire's polarity operation.

#### **20-Gauge Yellow/Green Wire:**

#### **( - ) OEM Disarm Output**

**Connection If Needed.** If needed, the Yellow/Green wire allows the MARS to disarm a factory alarm system. Connect the Yellow/Green wire to the wire in the vehicle which is connected to one of the doorlock key cylinders. The typical OEM alarm has an electrical switch in the key cylinders which switches -Ground when the key unlocks the door. This

#### **How to program the features:**

**11**

- 1) Turn the ignition key "On", then "Off".
- 2) Within 7 seconds press the Valet Switch 5 times.  
*The Status Lights will flash twice, and if the horn is connected, it chirps twice. The parking lights turn on, and stay on while in programming mode.*
- 3) Select the feature to be changed by pressing the Valet Switch the same number of times as the feature number (example: feature #3 = 3 presses).  
*The Status Lights will flash the same number as the Valet Switch presses just entered. If the horn is connected, it also chirps the same number. Count the number of flashes or chirps to confirm that the desired feature has been chosen (if needed, reenter the Valet Switch presses).*
- 4) Once the feature has been confirmed, press the transmitter buttons as follows:
  - "LOCK" = Feature's Default 1st setting (1 Status Light flash & 1 horn chirp)
  - "UNLOCK" = Feature's optional 2nd setting (2 Status Light flashes & 2 horn chirps)
  - Most of the programmable features offer more than one optional choice:
    - "START" = Feature's 3rd setting (3 Status Light flashes & 3 horn chirps)
    - "TRUNK" = Feature's 4th setting (4 Status Light flashes & 4 horn chirps)

*Once the Status Lights flash a response, and the horn chirps the response (if connected), the feature is set.*

  - More features to program? Go to step 5.
  - Only needed to program the one feature? Allow MARS to exit Programming Mode.

- ⑫ 5) Select another feature by again making a new entry of Valet Switch presses (repeating step 3) and again setting the newly chosen feature with the transmitter (as in step 4).

### Exiting Programming Mode:

Simply allow the MARS to time out of Features Programming Mode by not performing any programming actions for 15 seconds; or, turn the ignition “On” to exit immediately.

*The MARS indicates its exit from Features Programming Mode with 2 short and 1 long Status Lights flashes and the parking lights turning off. If the horn is connected it will have 2 short and 1 long chirps.*

## About the Programmable Features

The MARS Programmable Features are arranged so that the “operational” features, which are of user interest, come before the “installation”-related features. The purpose of installation-related features is to adapt the MARS to certain vehicle situations; these are to utilized at the time of the installation only.

- Features #1 through #10 have “daily use” benefits, and may be programmed by the user, if so desired, to suite their preference or needs.
- **Features #11 through #13 should not be programmed by the user!**
- Feature #14, “Reset All Features To Default”, quickly and conveniently returns all features to their factory settings. This is extremely helpful if there has been a mistake in programming, or if there is any doubt or confusion of the settings.

cess. Consider both methods before selecting one to use, and then connect the Black/Yellow wire accordingly. Either connection method must be performed at the completion of the installation, after all other wiring connections are made.

⑲

**Smart Start** sensing is more commonly used, for its ease of installation. The unit as received has Smart Start selected. Smart Start “reads” the vehicle’s battery voltage level via the Black/Yellow wire to determine engine running status. To use Smart Start:

- 1) **Connect** the Black/Yellow wire to constant “Battery” 12 volts. This may done at the ignition switch harness, or at the battery itself for better sensitivity.
- 2) **Switch** the selector slide switch on the MARS control module to the left toward the module corner (see page 21 and the markings on the control module).
- 3) **Adjust** Smart Start by starting the engine and turning the left adjustment screw on the control module slowly clockwise until the indicator LED starts flashing. Turn the adjustment until the LED is flashing in a consistent and regular manner.
- 4) **Test** the operation by remote starting and checking that the indicator LED shows the same consistent flashing (good voltage signal learned), and that the starter engagement is long enough for the engine to start, but without grinding. Turn clockwise for more crank time and counterclockwise for less crank time.

**Tach Wire** sensing is generally more reliable, and preferable in cases were the engine normally starts inconsistently, or is hard to start . With this method the Black/Yellow wire reads the engine speed (tach) information directly from a wire in the vehicle. To use the Tach Wire method:

- 1) **Connect** the Black/Yellow wire to the vehicle's tach wire, which is found in the engine compartment, although in many cases it may also be located inside the vehicle. To use a multimeter to verify the correct tach wire, set it for AC Volts scale. The correct wire will

braces are not adequate, and the area must be clean, bright metal.

### **20-Gauge Red/Black Wire:**

### **( + ) Brake Input**

**Connection Required-** The Red/Black wire must be connected. It is part a critical safety feature which disables the unit whenever the brake pedal is pressed. Connect the Red/Black wire to the brake switch wire which shows +12 Volts when the brake pedal is pressed. The brake switch is typically located above the brake pedal, and usually mounted to the brake pedal support bracket. Make this connection securely for long-term reliability, and thoroughly test the operation of this circuit.

### **20-Gauge Blue Wire:**

### **( - ) Hood Input**

**Connection Required-** The Hood Safety Switch must be installed and the Blue wire must be connected. This prevents operation of the unit if the hood is open. Carefully install the included pin switch so that it is open (pin down) when the hood is shut and closed (pin up) when the hood is open. Connect the Blue wire to the pin switch and carefully route this wire through the firewall, using an added or existing grommet, avoiding any hot or moving parts. If there is an existing hood pin switch for an alarm system, you may use it for this purpose, but the two systems must be diode-isolated. Instead of using a pin switch to monitor the hood's open or shut status, an Omega AU-46 Mercury Tilt Switch may used. Connect one of the AU-46's wires to Negative Chassis Ground and connect the remaining wire to the Blue wire.

### **20-Gauge Black/Yellow Wire:**

### **Engine Detect Input**

**Connection If Desired.** The Black/Yellow wire is the engine detect wire. The MARS unit utilizes two different methods of monitoring the vehicle during the remote starting pro-

## **Explanations of the User's "daily use" Programmable Features:**

- Feature #1, "Coded Override", may be used another programmable feature, "Ignition Activated Anti-Carjacking". See "Feature #7".
- Feature #2 is "Engine Running Time". When MARS remotely starts the engine, the run time before automatic shut-off is adjustable. A 10 minute run time is the factory setting, with options of 20, 30 or 40 minutes. When programming (see page 12) press "UNLOCK" for 20 minutes; press "START" for 30 minutes; press "TRUNK" for 40 minutes; or press "LOCK" for 10 minute setting.
- Feature #3, "Doors Lock/Unlock Upon Ignition On/Off", has the MARS automatically lock the doors when the ignition key is turned on, and unlock them when the key is turned off.
- Feature #4, "Horn Confirmation With Doorlocking", offers several forms of audible confirmation when the doors are remotely locked and unlocked. Audible confirmations in any form require the connection of the MARS to the vehicle's horn, or to an optional electronic siren. Confirmation with remote doorlocking has the horn chirp once after locking, and twice after unlocking. Two volume levels are selectable and an "On Demand" operation whereby the first press of the "LOCK" or "UNLOCK" button is silent, and a second press will produce the confirmation chirp or chirps.  
When programming (see page 12) press "UNLOCK" for the On Demand operation; press "START" to turn off the confirmation chirps; press "TRUNK" for the Quiet chirp; or press "LOCK" for louder chirp (the factory "Medium" setting).
- Feature #5, "Horn Confirmation With Starting", is similar to the previous feature, and

14 again, the horn output must be connected. When the MARS remote starts the engine it will chirp the horn 3 times; this feature allows the choice of 3 chirp volume levels (instead of two- "On Demand" chirps can't be used as the "START" button operation toggles between "start" and "stop"), or completely turning off the starting chirps.

The factory chirp setting is "Medium"; when programming (see page 12) press "UN LOCK" to turn the starting chirps off; press "START" for the loud chirps; or press "TRUNK" for the quiet starting chirps. Press "LOCK" for the factory setting "Medium" starting chirps.

- Feature #6 is not used on the MARS-22.

### Anti-Carjacking Feature and Coded Override:

- Feature #7, "Ignition Activated Anti-Carjacking" is described here in full detail.

The MARS features Anti-Carjacking protection which only requires programming it to operate, and connection of the horn output. Adding an optional starter interrupt circuit to the Anti-Carjacking further enhances recovering the vehicle should it still be taken.

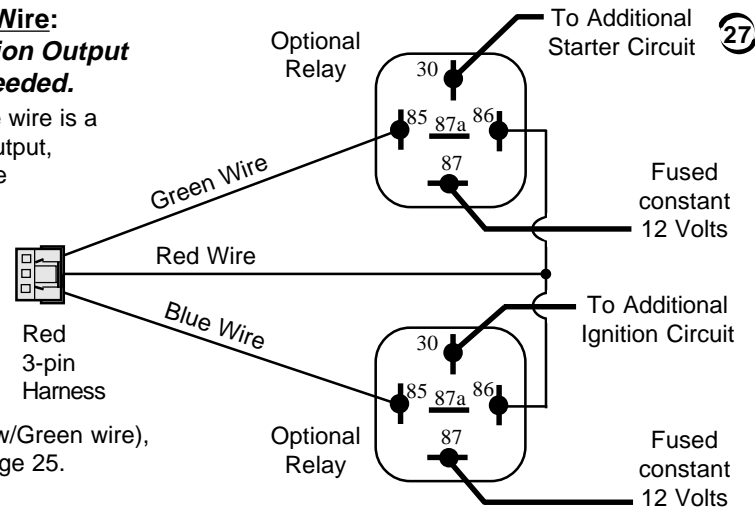
When it is utilized, Anti-Carjacking automatically starts operating every time the ignition key is turned "On". When the key is turned on, the user has 53 seconds in which the Valet Switch must be pressed 1 time to cancel the full engagement of Anti-Carjacking. At 53 seconds, the horn will start a chirping pattern as reminder, and the Valet Switch can still be pressed. At 60 seconds after the key was turned "On", Anti-Carjacking fully engages, sounding the horn and flashing the parking lights; pressing the Valet Switch will no longer cancel the feature. Instead, the ignition key must be turned "Off", then back "On", and then within 5 seconds the Valet Switch must be pressed; a few seconds later Anti-Carjacking will turn off.

- Once the full Anti-Carjacking occurs, the horn output ceases if the ignition key is turned "Off", but resumes whenever it is "On".

### 22 Gauge Blue Wire: 500mA ( - ) Ignition Output Connection If Needed.

This 22 gauge Blue wire is a 500mA Negative output, which has the same operation as the 12 gauge Blue Ignition output.

NOTE: If an additional Accessory output is needed, use the programmable built-in relay (Yellow/Green wire), as described on page 25.



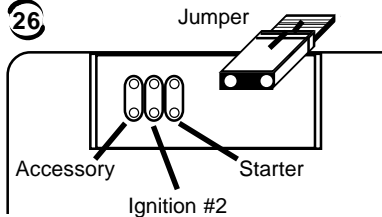
## Wiring Connections - 12 Wire Harness

### 18-Gauge Black Wire:

### System Ground

**Connection Required.** Connect the Black wire to a very good, clean chassis ground. A recommended connection is to an existing machine-thread bolt, either in the driver's kick panel, steering column area or a major structural member behind the dash. Small dash

26



**Programming the Yellow/Green Wire's operation:** Locate and open the small access panel in the top of the control module case. Place the jumper as shown on the pins below the removable panel on the control module. The factory setting is the center "Ignition #2" position.

## Wiring - 3 Wire Connector / Satellite Relay Port

The Red satellite relay port can be used, if needed, to configure optional relays to energize additional Ignition or Starter circuits, and Omega OEM security bypass interfaces also plug into this port. Prewired dual relay sockets are available, and a plain 3-wire harness is provided to use this port.

### 22 Gauge Green Wire:

**500mA ( - ) Starter Output**

**Connection If Needed.** This 22 gauge Green wire is a 500mA Negative output having basically the same operation as the 12 gauge Green Starter output wire. If two or more Starter wires are present in the vehicle an optional relay is needed, connected to satellite port Green wire as shown in the diagram.

### 22 Gauge Red Wire:

**( + ) Output For Optional Relay Coil**

**Connection If Needed.** The Red wire supplies constant 12 Volts that can be used to power the relay's coil only- DO NOT use this Red wire for the optional relay(s) power input (pin 87).

Anti-Carjacking can be made even more difficult to defeat with the use of "Coded Override" (Feature #1). Instead of 1 Valet Switch press to turn it off after fully engaging, multiple presses must be made. The number of presses, 1 through 9, are chosen and programmed by the user. Even if a customized Coded Override is used, only one Valet Switch press is needed to cancel Anti-Carjacking before it fully engages at 60 seconds; after that point that the correct custom Coded Override must be entered to turn off Anti-Carjacking.

## How to program Coded Override:

- Feature #1 allows the user to custom-program the "Coded Override". Place the MARS into Features Programming Mode (page 12) and access Feature #1. After the Status Light flashes once and the horn chirps once to confirm that Feature #1 is ready for programming, press the transmitter "LOCK" button for each digit of the desired customized Coded Override, but wait after each single "LOCK" button press for a single Status Light flash and horn chirp before pressing the button again for the next digit. When all of the digits have been entered in this fashion, wait for the Status Light and horn to flash and chirp the complete total number.

**Example:** for a Coded Override of "3 presses", programming would be: enter Features Programming Mode, select "feature 1" (*response is 1 flash / 1 chirp*). Press "LOCK", wait for *1 flash / 1 chirp*; press "LOCK" again, wait for *1 flash / 1 chirp*; press "LOCK" again, wait for *1 flash / 1 chirp*. Now continue to wait, until the MARS has *3 flashes / 3 chirps*. Exit programming mode, and the Coded Override is now 3 presses of the Valet switch.

- Feature #8 is not used on the MARS-22.
- Feature #9, "Unlock Doors With Trunk Release" has the doors unlock automatically when ever the remote trunk release is used. If this feature is turned off (press "UNLOCK" in programming, page 11), the trunk release will still operate when used, but the doors will

16 not unlock. When this feature is on, the MARS flashes the parking lights twice, and the horn chirps twice (if connected) when trunk release is used; if this feature is turned off, the trunk release operates with 2 Status Light flashes only.

- Feature #10 is "Pulsed or Steady Horn / Siren Output". This feature's first function is to set the MARS' audible output for use with the vehicle's existing horn, or with an optional electronic siren. If MARS is connected to the vehicle's horn, Feature #10's second function is providing three different horn pulse patterns when it sounds for the "panic" feature. When programming (see page 11), the three horn pulse choices are: press "TRUNK" for the slow horn pulses; "START" for medium pulses; or "LOCK" for default medium horn pulse setting. To use an optional electronic siren, program steady output by pressing "UNLOCK" when programming. Do not use the steady output setting for the horn-continuous use will damage it.

### **Explanations of the "installation-related" Programmable Features:**

Programmable Features #11 through #13 should only be used by the installer. All of these features program certain aspects of the MARS to match the vehicle into which it is installed. Do not change any of these features once the MARS is installed and properly configured.

- Feature #11 is "Starter Cranking Time". This sets the base starter cranking time for the Smart Start voltage sensing engine detection method (page 29). When using Smart Start, a longer starter cranking time may be used for engines which do not start on the first remote start attempt. Programming choices are: .5 second ("LOCK", the default setting); .75 second ("UNLOCK"); 1.25 second ("START"); and 1.5 second ("TRUNK").

page 26-27).

**Note:** If a security system is present which utilizes a starter interrupt circuit, the Green wire must be connected to the Starter Motor side of the interrupt.

### **12-Gauge Yellow Wire:**

### ***Ignition Output***

**Connection Required.** Connect the Yellow wire to the vehicle's Ignition wire (also known as "Primary Ignition"). This wire will show +12 Volts when the ignition key is in the "Run" and "Start" positions and no voltage in the "Off" and "Accessory" positions. This wire is found in the ignition switch wiring harness (see diagram on previous page).

**Note:** If two Primary Ignition wires are present, use the Yellow/Green wire for the second, or configure an optional relay to the 3-pin Red port (see pages 26-27).

### **12-Gauge White Wire:**

### ***Accessory Output***

**Connection Required.** Connect the White wire to the vehicle's Accessory wire. This circuit supplies power to the Heat, Ventilation and Air Conditioning (HVAC) system. This wire will show 12 Volts when the ignition key is in the "Run" and "Accessory" positions and No voltage in the "Start" and "Off" positions. The connection point for this wire is also found in the ignition switch wiring harness.

### **12-Gauge Yellow/Green Wire:**

### ***Programmable Output***

**Connection If Needed.** The Yellow/Green wire is an additional output which can be programmed to operate as an Ignition output, Accessory output or Starter output. As received, it is programmed as an Ignition #2 output. This wire may be used in cases where the vehicle has more than one of any of these three circuits.



24 and affix the Receiver Module. Carefully route the module's 5-wire ribbon cable to the control module; plug the cable into the Black 3-pin port on the rear of the module, and plug the remaining two connectors into their respective 2-pin ports.

**Optional:** Should it be desired, an optional separately-mountable Valet Switch and Status Light are available. The Receiver Module must still be used for its receiver section, but the Valet Switch and/or Status Light may be placed as desired.

## Wiring Connections - 6 Wire Main Harness

### (Two 12-Gauge) Red Wires:

#### *Constant +12 Volts Input*

**Connection Required.** Connect both Red wires to constant 12 Volts. The source used must supply adequate amperage. The most common sources are the battery (+) terminal or the ignition switch wiring harness. Good reliable connections and use of the included fuses are a must. Note that some ignition switches have the electrical switch as part of the mechanical switch; others have the electrical switch lower on the steering column and connected to the mechanical switch by a linkage. The ignition switch wiring harness is the best source for these wires, and the Starter, Ignition #1 and Accessory wiring connections.

### 12-Gauge Green Wire:

#### *Starter Output*

**Connection Required.** Connect the Green wire to the vehicle's Starter wire. This wire will show +12 Volts only when the ignition key is in the "Start" position. This wire is also found in the ignition switch wiring harness (see diagram on previous page). Some vehicles have a second Starter wire known as a "Cold Start" wire. When this is encountered, two options are available: program the Yellow/Green wire as a second starter output, or use an optional relay configured to the 3-pin Red port to energize the second Starter wire (see

- Feature #12 is "Doorlock Output Options". The default setting is the most common, "Single" pulse for both Lock and Unlock (press "LOCK" when programming features). The first option changes the unlock output only to 2 pulses, which is needed by certain vehicles (press "UNLOCK" to program). The second option configures both lock and unlock outputs to have a 3 second duration, to operate vacuum pump doorlocks (press "TRUNK" when programming). The third option changes the lock output only to have a 28 second output pulse, which allows the MARS to operate the total closure feature in vehicles which are thus equipped (press "START" when programming the feature). The longer output only operates from a transmitter signal, and not with ignition-activated locking.
- Feature #13 is "Gasoline or Diesel Engine" When programming, press "LOCK" for the "Gasoline" setting. Diesel engines have three options: pressing "UNLOCK" selects "Monitor Glow Plug Wire", by which the MARS delays engaging the starter until its glow plug input wire detects the glow plugs turning off; and two preset delay periods before starter engagement: 10 seconds ("START") and 20 seconds ("TRUNK").

### Resetting all of the Programmable Features:

- Feature #14 returns all Programmable Features to their factory default settings. Enter programming mode (page 12), select Feature #14, and press the transmitter's "LOCK" button. The MARS will acknowledge the "LOCK" input with a single Status Light flash and horn chirp (if connected), and then immediately exit programming mode with the normal confirmation of 2 short and 1 long Status Light flashes and horn chirps.

**Note:** When a Programmable Features Reset is used, any feature which needs to be in a setting different from the default setting will have to be reprogrammed.

## Programming Transmitters

MARS can be operated by up to four transmitters. Replacement or additional transmitters must be programmed to operate the MARS. The MARS multi-car operation capability also requires that transmitters be programmed into the second vehicle (with the transmitter's multi-car switch in "B" position). Coding transmitters is a very easy process.

- Have present all of the transmitters which are to operate the MARS. When one transmitter is programmed, all prior transmitters are erased- program all transmitters.
- If the additional transmitters are for a second car, put the multi-car switch on these transmitters only in the "B" position.

1) Turn the ignition key "On" (and leave it "on").

2) Within 7 seconds press the Valet Switch 5 times.

*The receiver unit's Status Lights turn on, and the horn chirps once (if connected).*

3) Within 15 seconds press the first transmitter's "LOCK" and "UNLOCK" buttons together.

*The MARS will acknowledge the transmission by momentarily turning off the Status Lights and chirping the horn 1 time.*

4) Within 15 seconds press the next transmitter's "LOCK" and "UNLOCK" together.

*The Status Lights turn off and the horn chirps once.*

Repeat this action for each remaining transmitter.

### Exiting Programming Mode:

Simply allow the MARS to time out of the programming mode, by not transmitting for 15 seconds; or, turn the ignition "Off" to exit immediately.

*The MARS indicates its exit from programming mode by turning off the Status*

mined which control module wires will be used. Most installers will list these wires, then "map out" the installation by locating and noting the target wires in the vehicle. This will also determine the best location for the MARS control module, which is mounted upon completion of the installation.

The MARS remote starting unit duplicates the actions that occur within the ignition switch when you use your key to start the engine. Because of this, most of the main wiring harness connections will be made at the ignition switch harness. The ignition switch wires usually are high amperage circuits, which means that high reliability connections must be made- soldering of all connections is recommended.

**Caution!** *Avoid the Airbag circuit!* Especially avoid any harness or wires encased in Yellow or Red tubing or sleeves. Do not use a standard test light, as it can deploy an airbag or damage on-board computers and sensors.

### Main Module:

The MARS **Main Module** should be mounted in a location close to the ignition switch (where many of the wiring connections are made); typically, hidden behind the driver's side dash.

### Receiver Module:

An essential part of the MARS is the plug-in window mount **Receiver Module**, which also contains the **Valet Switch** and **Status Lights**. The unit will not operate unless this Receiver Module is plugged-in. Select a desired mounting location for the Receiver Module; optimum performance is obtained by mounting this module high and unobstructed on the vehicle's glass, such as the windshield behind the rearview mirror. Make sure the glass surface is clean and free of dust, grease, or debris. Peel the backing off of the adhesive tape

## Installation Instructions

After reading this manual, start the installation by affixing the **WARNING DECAL** to a visible area in the engine compartment!

Do not attempt to install this Remote Car Starter into a manual transmission vehicle! Doing so could cause serious property damage, personal injury, and will void all warranties!

Be aware of, and avoid, any airbag circuitry! Due to the fact that an installer will not be in a normal, upright seated position, severe injury may occur in an accidental airbag deployment!

The use of a Digital Multimeter (DMM) or Volt-Ohm Meter (VOM) instead of a standard testlight is required. This can greatly reduce the risk of an accidental airbag deployment or on-board computer damage.

**Battery gases are explosive! Avoid sparks and do not smoke while working near the vehicle's battery!**

**Always protect wires routed through the firewall from sharp metal edges and hot parts of the engine! Always fuse positive wires at their source!**

**Installation Considerations:** This entire booklet should be read before starting the installation. An understanding of which control module wires are to be used and their functions is essential. Installations will vary from car to car, as some control module wires are required, while others are optional. Before starting the installation, it should be deter-

*Lights and a series of horn chirps.*

Any time that transmitters are programmed to operate the MARS, for 48 hours afterward every time that the ignition key is turned "on" the horn will briefly chirp and the Status Light will flash the number of operating transmitters. This is "Unauthorized Transmitter Alert", protecting against unauthorized transmitters.



## Optional 2-Way Operation

Your MARS system is designed so that it can be upgraded from 1-way-only operation to a 2-way system. 2-way operation confirms that commands sent to the system were received.

The 2-Way Controller has the same four system-operating push buttons as the original transmitter. Their use is also identical. While the Controller's Blue "transmit" light is the same as the transmitter's, the Controller adds more indicator lights, and a beeper. These items inform the user, by sight and sound, of operation confirmations from the MARS system within the vehicle.

Ask your installing dealer for details on upgrading your system to longer-range 2-way operation.

20

