



Fuel Point® Fuel Management System

Vehicle Module Programming Manual

MDE-4524A
(formerly C35629)

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Federal Communications Commission (FCC) Warning

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

Approvals

Gasboy, Greensboro, is an ISO 9001:2000 registered facility.

Underwriters Laboratories (UL):

UL File#	Products listed with UL
MH4314	All dispensers and self-contained pumping units
MH6418	Power operated Transfer Pump Models 25, 25C, 26, 27, 28, 72, 72S, 72SP, 72X, 73 and 1820
MH7404	Hand operated Transfer Pump Models 1230 Series, 1243 Series, 1520 and 1720 Series
MH10581	Key control unit, Model GKE-B Series Card reader terminals, Models 1000, 1000P Site controller, Model 2000S CFN Series Data entry terminals, Model TPK-900 Series Fuel Point Reader System

New York City Fire Department (NYFD):

NYFD C of A #	Product
4823	9100A, 9140A, 9152A, 9153A, 9800A, 9840A, 9850A, 9852A, 9853A, 9140
4997	9822A, 9823A
5046	9100Q, 9140Q, 9152Q, 9153Q, 9800Q, 9840Q, 9852Q, 9853Q

California Air Resources Board (CARB):

Executive Order #	Product
G-70-52-AM	Balance Vapor Recovery
G-70-150-AE	VaporVac

National Conference of Weights and Measures (NCWM) - Certificate of Compliance (CoC):

Gasboy pumps and dispensers are evaluated by NCWM under the National Type Evaluation Program (NTEP). NCWM has issued the following CoC:

CoC#	Product	Model #	CoC#	Product	Model #	CoC#	Product	Model #
95-179A2	Dispenser	9100 Retail Series, 8700 Series, 9700 Series	91-019A2	Dispenser	9100 Commercial Series			
95-136A5	Dispenser	9800 Series	91-057A3	Controller	1000 Series FMS, 2000S-CFN Series			

Patents

Gasboy products are manufactured or sold under one or more of the following US patents:

Dispensers

5,257,720

Point of Sale/Back Office Equipment

D335,673

Additional US and foreign patents pending.

Trademarks

Non-registered trademarks

Atlas™
Console™
Infinity™

Registered trademarks

ASTRA®
Fuel Point®
Gasboy®
Keytrol®
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Additional US and foreign trademarks pending.

Other brand or product names shown may be trademarks or registered trademarks of their respective holders.

Table of Contents

1 – Introduction	1-1
Purpose	1-1
Intended Users.	1-1
Related Reading	1-1
Abbreviations and Acronyms	1-2
Warranty	1-2
2 – Important Safety Information	2-1
In an Emergency	2-3
3 – Component Overview	3-1
Vehicle Module Programmer	3-1
Charging the Programmer	3-3
Battery Pack Replacement.	3-3
4 – Preparation for Programming	4-1
Vehicle Module Field Descriptions.	4-1
System ID.	4-1
Vehicle Module Number (Enter VM Number).	4-1
ID Fields.	4-2
FleetKey	4-2
CFN	4-2
Reader Entry Fields (RDR FLD 1,2, or 3)	4-3
Expiration Date (Enter EXPIRE)	4-4
Product Limit (Enter LIMIT)	4-5
Product Authorization (Enter AUTH)	4-5
Price Level (Enter PRICE)	4-6
Odometer Or Hours Selection (SEL ODOMETER - 0, HOURS - 1)	4-7

Odometer or Hours Entry (Enter ODOMETER)	4-7
Odometer Ratio (Enter ODO RATIO)	4-8
Hours Ratio (Enter ODO Ratio)	4-12
Dual Counters (DUAL COUNTERS, NO - 0, YES - 1)	4-12
Vehicle Module Program Data Sheet	4-13

5 – Operation **5-1**

Ground Loop Communications	5-1
General Programmer Operation	5-1
Turning On Programmer	5-1
Turning Off Programmer	5-1
Mode Selection	5-2
Accepting Old Data and Clearing the Display for New Data Entry	5-2
Entering Numeric Data	5-3
Entering Alphanumeric Data	5-3
Entering Spaces and Special Characters	5-5
Entering Odometer or Hours Data	5-6
Editing Within a Field	5-6
Programmer Operating Modes	5-7
Program Mode	5-7
Testing the Odometer/Hours Operation	5-10
Edit Mode	5-13
Calibrate Mode	5-15
Master Authorizer	5-20
Identification	5-20
Limitations of Use	5-20
Operation	5-20

1 – Introduction

Purpose

This manual describes the Vehicle Module (VM) Programmer and the steps needed to program the vehicle module component of your Fuel Point® System. When programmed, the vehicle module contains all system information including system and vehicle identification, authorized fuel type and transaction limit information. This manual also describes the Master Authorizer, a hand-held device that allows the site supervisor to authorize the pump for a single transaction on an equipment not equipped with a vehicle module.

The Vehicle Module (VM) itself should be installed according to the guidelines and restrictions outlined in C35699 Fuel Point Vehicle Module Installation Manual.

Gasboy provides a toll-free number for customers and installers having any questions pertaining to the installation: 1-800-444-5529.

Intended Users

This manual is written for Authorized Service Contractors (ASCs) and Customer Specified Contractors (CSCs).

Related Reading

The following documents contain related information and may be helpful when programming the Vehicle Module:

Document Number	Title	GOLD Library
C35699	Fuel Point Vehicle Module Installation Manual	Gasboy Fuel Management Products
C35923	SCII/SCIII POS & Shift Change Manual	Gasboy Fuel Management Products
MDE-4255	Gasboy Warranty Policy Statement	Gasboy Commercial and Retail Pumps

Abbreviations and Acronyms

The following table contains a list of abbreviations and acronyms used in this guide.

Acronym	Definition
ASC	Authorized Service Contractor
CSC	Customer Specified Contractor
FMS	Fuel Management System
ID	Identification
MM	Month
PCM	Powertrain Control Module
VM	Vehicle Module
YY	Year

Warranty

For information on warranty, refer to MDE-4255 Gasboy's Warranty Policy Statement. If you have any warranty-related questions, contact Gasboy's Warranty Department at its Greensboro location.

2 – Important Safety Information

This section introduces the hazards and safety precautions associated with installing, inspecting, maintaining or servicing this product. Before performing any task on this product, read this safety information and the applicable sections in this manual, where additional hazards and safety precautions for your task will be found. Fire, explosion, electrical shock or pressure release could occur and cause death or serious injury if these safe service procedures are not followed.

Preliminary Precautions

You are working in a potentially dangerous environment of flammable fuels, vapors, and high voltage or pressures. Only trained or authorized individuals knowledgeable in the related procedures should install, inspect, maintain or service this equipment.



Emergency Total Electrical Shut-Off

The first and most important information you must know is how to stop all fuel flow to the pump and island. Locate the switch or circuit breakers that shut-off all power to all fueling equipment, dispensing devices, and submerged turbine pumps (STPs).

WARNING



The EMERGENCY STOP, ALL STOP, and PUMP STOP buttons at the cashier's station WILL NOT shut off electrical power to the pump/dispenser.

This means that even if you activate these stops, fuel may continue to flow uncontrolled.

You must use the TOTAL ELECTRICAL SHUT-OFF in the case of an emergency and not only these cashier station "stops."

Total Electrical Shut-Off Before Access

Any procedure requiring access to electrical components or the electronics of the dispenser requires total electrical shut-off of that unit. Know the function and location of this switch or circuit breaker before inspecting, installing, maintaining, or servicing Gasboy equipment.

Evacuation, Barricading and Shut-Off

Any procedures requiring accessing the pump/dispenser or STPs requires the following three actions:



- An evacuation of all unauthorized persons and vehicles using safety tape, cones or barricades to the effected units
- A total electrical shut-off of that unit

Read the Manual

Read, understand and follow this manual and any other labels or related materials supplied with this equipment. If you do not understand a procedure, call the Gasboy Customer Service at 1-800-444-5579, Tech Support 1-800-444-5529. It is imperative to your safety and the safety of others to understand the procedures before beginning work.

Follow the Regulations

There is applicable information in NFPA 30A; *Automotive and Marine Service Code*, NFPA 70; *National Electrical Code (NEC)*, OSHA regulations and federal, state, and local codes which must be followed. Failure to install, inspect, maintain or service this equipment in accordance with these codes, regulations and standards may lead to legal citations with penalties or affect the safe use and operation of the equipment.

Replacement Parts

Use only genuine Gasboy replacement parts and retrofit kits on your pump/dispenser. Using parts other than genuine Gasboy replacement parts could create a safety hazard and violate local regulations.

Safety Symbols and Warning Words

This section provides important information about warning symbols and boxes.

Alert Symbol



This safety alert symbol is used in this manual and on warning labels to alert you to a precaution which must be followed to prevent potential personal safety hazards. Obey safety directives that follow this symbol to avoid possible injury or death.

Signal Words

These signal words used in this manual and on warning labels tell you the seriousness of particular safety hazards. The precautions that follow must be followed to prevent death, injury or damage to the equipment

DANGER - This signal word is used to alert you to a hazard to unsafe practice which will result in death or serious injury

WARNING - This alerts you to a hazard or unsafe practice that could result in death or serious injury.

CAUTION with Alert symbol - This signal word designates a hazard or unsafe practice which may result in minor injury.

CAUTION without Alert symbol - When used by itself, CAUTION designates a hazard or unsafe practice which may result in property or equipment damage.

Working With Fuels and Electrical Energy

Prevent Explosions and Fires

Fuels and their vapors will become explosive if ignited. Spilled or leaking fuels cause vapors. Even filling customer tanks will cause explosive vapors in the vicinity of dispenser or island.

No Open Flames



Open flames from matches, lighters, welding torches or other sources can ignite fuels and their vapors.

No Sparks - No Smoking



Sparks from starting vehicles, starting or using power tools, burning cigarettes, cigars or pipes can also ignite fuels and their vapors. Static electricity, including an electrostatic charge on your body, can cause a spark sufficient to ignite fuels and their vapors. After getting out of a vehicle, touch the metal of your vehicle to discharge any electrostatic charge before you approach the dispenser island.

Working Alone

It is highly recommended that someone who is capable of rendering first aid be present during servicing. Be familiar with Cardiopulmonary Resuscitation (CPR) methods if you are working with or around high voltages. This information is available from the American Red Cross. Always advise the station personnel about where you will be working, and caution them not to activate power while you are working on the equipment. Use the OSHA tag out and lock out procedures. If you are not familiar with this requirement, refer to information in the service manual and OSHA documentation.

Working With Electricity Safely

Be sure to use safe and established practices in working with electrical devices. Poorly wired devices may cause a fire, explosion or electrical shock. Be sure grounding connections are properly made. Make sure that sealing devices and compounds are in place. Be sure not to pinch wires when replacing covers. Follow OSHA Lock-Out and Tag-Out requirements. Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down.

Hazardous Materials

Some materials present inside electronic enclosures may present a health hazard if not handled correctly. Be sure to clean hands after handling equipment. Do not place any equipment in mouth.

WARNING

This area contains a chemical known to the State of California to cause cancer.

WARNING

This area contains a chemical known to the State of California to cause birth defects or other reproductive harm.

IMPORTANT: Oxygen may be needed at scene if gasoline has been ingested or inhaled. Seek medical advice immediately.

Emergency First Aid

Informing Emergency Personnel

Compile the following information for emergency personnel:

- Location of accident (for example, address, front/back of building, and so on.)
- Nature of accident (for example, possible heart attack, run over by car, burns, and so on.)
- Age of victim (for example, baby, teenager, middle-age, elderly)
- Whether or not victim has received first aid (for example, stopped bleeding by pressure, and so on.)
- Whether or not a victim has vomited (for example, if swallowed or inhaled something, and so on.)

WARNING



Gasoline ingested may cause unconsciousness and burns to internal organs.
Do not induce vomiting.
Keep airway open.
Oxygen may be needed at scene.
Seek medical advice immediately.

WARNING



Gasoline inhaled may cause unconsciousness and burns to lips, mouth and lungs.
Keep airway open.
Seek medical advice immediately.

WARNING



Gasoline spilled in eyes may cause burns to eye tissue.
Irrigate eyes with water for approximately 15 minutes.
Seek medical advice immediately.

WARNING






Gasoline spilled on skin may cause burns.
Wash area thoroughly with clear/water.
Seek medical advice immediately.

IMPORTANT: Oxygen may be needed at scene if gasoline has been ingested or inhaled. Seek medical advice immediately.

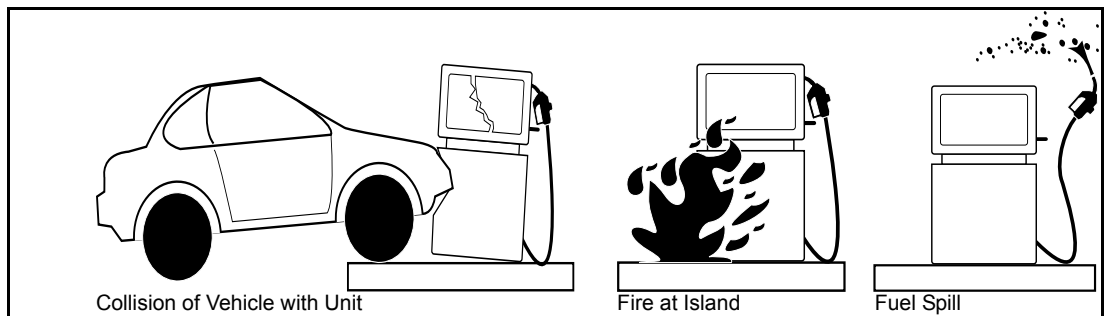
Lockout/Tagout

Lockout/Tagout covers servicing and maintenance of Machines and equipment in which the unexpected energization or start up of the machine(s) or equipment or release of stored energy could cause injury to employees or personnel. Lockout/Tagout applies to all mechanical, hydraulic, chemical or other energy, but does not cover electrical hazards. Reference Subpart S of 29 CFR Part 1910 - Electrical Hazards, 29 CFR Part 1910.333 contains specific Lockout/Tagout provision for electrical hazards.

In an Emergency

 WARNING	
	Spilled fuels, accidents involving pumps/dispensers, or uncontrolled fuel flow creates a serious hazard.
	Fire or explosion may result causing serious injury or death.
Follow established emergency procedures.	

The following actions are recommended regarding these hazards:



- Do not go near fuel spill or allow anyone else in the area.
- Use station EMERGENCY CUTOFF immediately. Turn off all system circuit breakers to the island(s).
- Do not use console E-STOP, ALL STOP keys to shut off power. These keys do not remove AC power and do not always stop product flow.
- Take precautions to avoid igniting fuel. Do not allow starting of vehicles in the area. No open flames, smoking or power tools in the area.
- Do not expose yourself to hazardous conditions such as fire, spilled fuel or exposed wiring.
- Call emergency numbers.

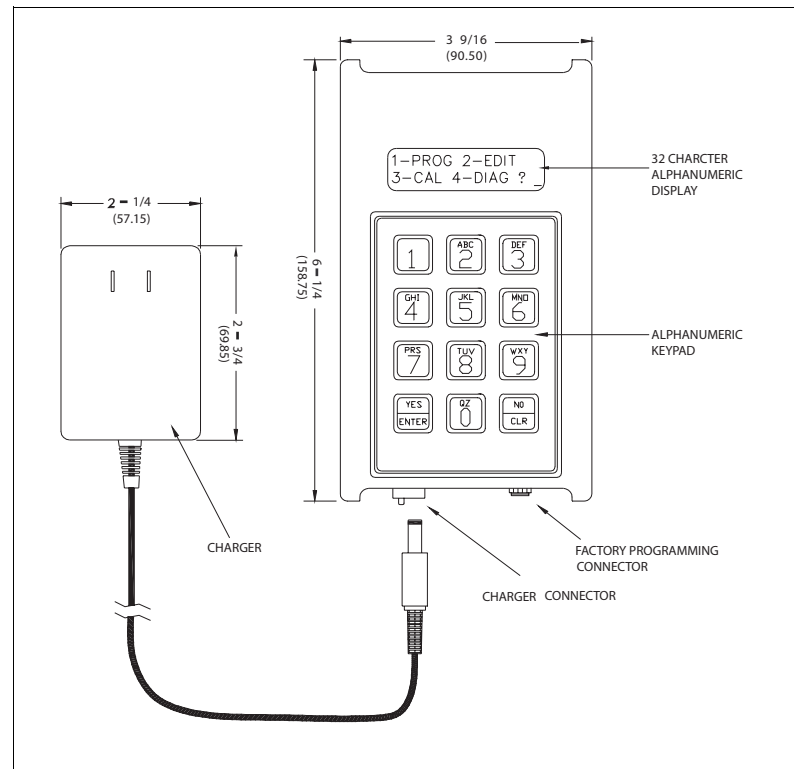
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3 – Component Overview

Vehicle Module Programmer

The Vehicle Module (VM) Programmer is a hand-held, cordless device used to interact with the Fuel Point System components. It contains an antenna for communicating to the VM through the vehicle T-Ring antenna. The two-line, alphanumeric display prompts the user through each step, making it easy to use in the shop, in the fleet yard, at the job site, or at the fueling island.

Figure 3-1 C06736 VM Programmer with Charger



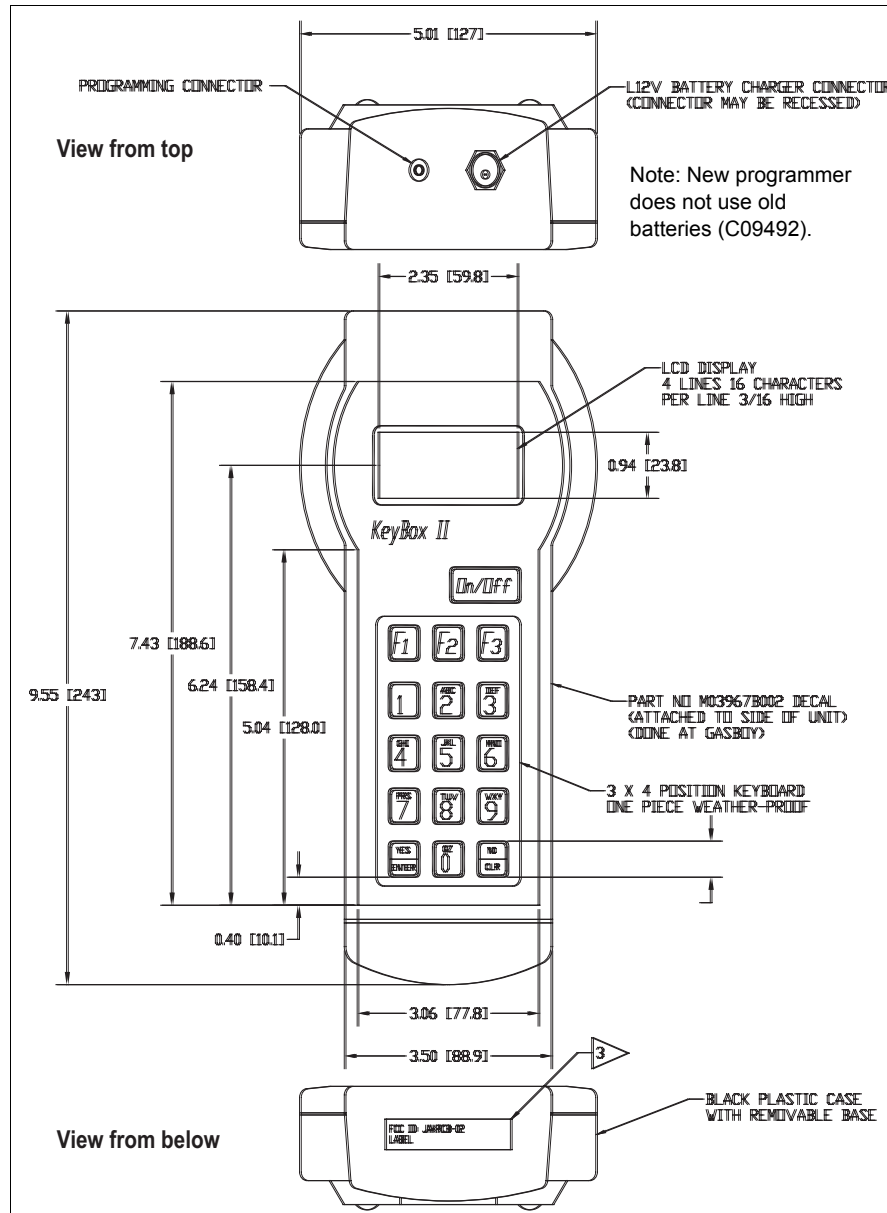
Note: C06736 VM Programmer will be shipped only till end of February 2006. Starting March 2006, M06728A001 VM Programmer will be shipped.

The Programmer has five operating modes which are explained in detail in [“Programmer Operating Modes” on page 5-7](#).

- **Program.** When initially installing the VM, it allows you to load the vehicle's identification and fuel control data, similar to encoding data for a card- or key-based Fuel Management System (FMS). The VM can be re-programmed with new data at any time.
- **Edit.** This mode allows you to read back data to verify that a VM was programmed correctly. It can also be used to change partial data in a programmed VM without re-entering the entire VM data (as in Program mode).

- **Calibrate.** The calibration feature is used initially to automatically calculate the odometer ratio if it is not known. It is also used periodically to adjust for slight variations between the odometer or hour meter and the VM.
- **Diagnostic.** Reads the entire VM and displays the results as a string of data.
- **Version.** Reads and displays a VM's software revision date.

Figure 3-2 M06728A001 VM Programmer with Charger



Charging the Programmer

Before using your Programmer for the first time, you must charge it overnight. After which the Programmer and charger should always be plugged into a 115 VAC outlet when not in use to keep the batteries charged.

Battery Pack Replacement

C06736 Replacement Batteries

In the event that the original batteries fail to hold a charge, Gasboy offers a replacement battery pack (C09492).

Figure 3-3 C09492 Replacement Battery Pack



M06728A001 Replacement Batteries

The M06728A001 VM Programmer uses 5 commercially available AA Nickel Metal Hydride (NiMH) batteries. Nickel Cadmium batteries (NiCd) may not be used in this programmer.

Note: The battery pack used in the Fuel Point Programmer may be damaging to the environment if it is not disposed properly. Gasboy urges you to support your community's recycling effort.

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4 – Preparation for Programming

Vehicle Module Field Descriptions

The VM contains various data fields such as vehicle identification, allowable fuel type and quantity, and miles or hours driven. It is important to understand these fields and their interaction with the rest of the system. The Programmer is ordered from the factory to match the base FMS, therefore, some of the fields described below might not be available with every Programmer. Also, the VM does not use all of the fields that are encoded on a card or key, such as the restriction digit, which serves no purpose with Fuel Point. Additionally, some of these fields may be programmed into every VM at a site, but not prompted for during the programming sequence, either for security reasons, or because the data is always the same. Default prompts for commonly used fields are shown in parentheses after the field description.

System ID

The **System ID** is a unique number that identifies your system and safeguards against access by users of other systems. Your unique **System ID** is assigned to the Programmer at the factory; you will not be prompted for it during programming.

Vehicle Module Number (Enter VM Number)

The **VM Number** is used to identify the VM and is the lockout field used in the fuel management system. The **VM number** length is fixed at 5 digits for FleetKey systems and makes up the entire lockout field. For CFN systems, the VM Number can be up to 8 digits, and can make up the entire lockout field for bit-mapped lockout, or can be combined with other fields on the VM for limited lockout.

IMPORTANT INFORMATION
Every VM used at a site must have a unique VM Number because the Fuel Point Reader uses the VM Number and System ID to monitor on-going transactions to tell if the nozzle is still inserted into the same vehicle.

ID Fields

The **ID Fields** stored in the VM are used to identify the vehicle, driver, department, etc., and are typically set to match the headings in the transaction printout. There are some differences between the FleetKey and CFN systems as shown below.

FleetKey

The FleetKey system always has a 5-digit **KEY1/VM** field which is the main lockout field for Key and VM transactions, and a 5-digit **KEY2** field, which can be used as a secondary lockout field for keys and not used with the VM. In addition, the FleetKey system can handle up to 8 additional **ID Fields** up to a maximum of 20 alphanumeric characters.

CFN

The CFN system allows up to 5 unique fields (maximum 19 digits) to make up what is collectively referred to as the “account number.” When using bit-mapped lockout, the VM field makes up the entire lockout field. When using limited lockout, the VM field is used for part of the lockout and the other **ID Fields** in the account number make up the remainder of the lockout field.

For CFN only, the VM can contain extra fields that would not be a part of the account field, and thus not be used for lockout, but still may be stored in the transaction file. These fields can be stored under the transaction's MANUAL field and, as long as the router fields are not used for bank networking, they can be stored under the ROUTER field headings. One of the extra fields can be alphanumeric, and will be stored as a ROUTER STRING in the transaction file.

Here is a list of currently available ID Fields and their corresponding three-digit type number. The type number is used for programming the VM with the **Reader Entry** fields, as explained later.

FIELD	TYPE	FIELD	TYPE	FIELD	TYPE
Account	065	Driver	071	Security	081
Agency	099	Employee	072	Shift	082
Asset	090	Equipment	073	SKU	083
Badge	067	Fleet	074	Social Security	084
Bus	091	Job	066	Stock	085
Card	068	License	075	Tender Type *	095
Charge	079	Manifest	076	Track-II *	222
Clock	069	Manual	077	Trailer	104
Company	107	Participant ID	093	Truck	103
Department	070	Patron	078	Type	100
District	101	PIN	092	Unit	106
Division	089	Reefer	102	Vehicle	086
DIVLOC	088	Route	080	Work Order	087

* These fields require special handling and are explained below.

Tender Type

For CFN only, the 3-digit Tender Type field is used in conjunction with the Track-II field explained below. If used, it must come before the Track-II field. If not used, the tender will default to credit. Refer *Point Of Sale and Shift Change Manual C35923*.

Track-II

For CFN only, the Track-II field is used to program a VM to match a bank card or some other non-club card format. When it is used, you typically would not have any of the other ID fields on the VM. When matching data from an existing card, a field separator character (-) must be represented as a **D** on the Programmer.

Reader Entry Fields (RDR FLD 1,2, or 3)

For CFN only, these fields are used to gather identification data from an island or dispenser card reader, and merge that information with the data stored on the VM. For example, if multiple drivers share a vehicle, you may want to encode only vehicle data on the VM, and have employee and department identification entered via keypad or magnetic stripe card. Up to 3 entries can be required for each VM transaction. These entries can be used as part of the lockout field.

Each **Reader Entry Field** is made up of 1 mandatory part, and up to 3 optional parts. When the Programmer prompts for a **Reader Entry Field**, you will see 3, 4, 6, or 7 to 26 question marks, depending on the number of mandatory and optional parts required. Note that for optional part 2 to be used, optional part 1 must also be present, and for optional part 3 to be used, optional parts 1 and 2 must be present.

PART	LENGTH	DESCRIPTION
mandatory	3	ID Field to be gathered from card reader; from list
optional 1	1	How data is gathered; keypad or magnetic card
optional 2	2	Maximum number of digits to be gathered; 1 to 19
optional 3	1-20	Card reader prompt while gathering data

Mandatory Part

The first 3 question marks prompt for the mandatory part. This is the 3-digit **ID Field** type for the data that will be gathered from the card reader.

Optional Part 1

The fourth question mark prompts for the first optional part. If this part is not included (only three question marks shown), the data field will be entered from the card reader's keypad, the maximum number of digits gathered from the card reader will be whatever the card reader will allow (for example, the Gasboy ICR will allow 16 digits), the digits will be shown on the reader display as entered, and the card reader entry prompt will be the default prompt loaded in the **SCII FUELPT Global Parameters**.

If this part is present, there are 3 possible values:

0 = data will be entered through card reader keypad and the entered data will be shown on the reader display

1 = data will be entered through the card reader keypad and the data will be shown as asterisks (*) on the reader display for security purposes

2 = the data will be entered through the card reader via a special Fuel Point card

Optional Part 2

Question marks 5 and 6 prompt for the second optional part. If this part is not included (only 5 question marks shown), the maximum number of digits gathered from the card reader will be whatever the card reader will allow (for example, the Gasboy ICR will allow 16 digits), and the card reader entry prompt will be the default prompt loaded in the **SCII FUELPT Global Parameters**.

If this part is present, there are 3 possible values:

0 = maximum number of digits gathered will be whatever the card reader will allow

1-16 = maximum number of digits gathered via keypad entry

1-19 = maximum number of digits gathered via a special Reader Entry data card

Optional Part 3

Question marks 7 through 26 prompt for the message to display at the card reader when prompting for the **Reader Entry** data. If this part is not present, the prompt at the card reader will be the default prompt loaded in the **SCII FUELPT Global Parameters**. If this part is present, it allows you to enter a card reader prompt unique to each VM. For example, you may want to have all of the pooled-cars prompt **ENTER EMPLOYEE** and all of the off-road vehicles prompt **ENTER JOB**.

Expiration Date (Enter EXPIRE)

The **Expiration Date** is assigned to establish a lifetime for the VM. FleetKey uses 4 digits (YYMM) and CFN systems may use either 4 digits (YYMM) or 2 digits (YY). If programmed with all zeros in the field, expiration is ignored.

Product Limit (Enter LIMIT)

The **Product Limit** code is used to restrict the maximum quantity of fuel dispensed per transaction. It is provided as a safeguard to prevent accidental spillage. FleetKey can handle up to 10 limit codes (0-9), and CFN systems can handle up to 100 (default is 20). The limit codes do not have to be numbered sequentially. In both systems, not having the limit code on the VM is the same as if it was on with code 0.

The limit code programmed in the VM is not an actual quantity amount. When your Authorized Service Representative (ASR) configures your FMS, a table is set up to your specifications. The table contains limit codes and quantity values assigned to those limit codes. Limit codes are linked with a type of vehicle and are assigned a quantity just slightly greater than the vehicle's fuel tank capacity.

Complete Table 4-1, **Product Limit Codes**, prior to programming the VM. Make sure the completed table is available at start-up, so it can be loaded into the system at that time. Photocopy this sheet if you need more space.

Table 4-1: Product Limit Codes

Limit Code	Quantity

Product Authorization (Enter AUTH)

This code authorizes the fuel types the vehicle is allowed to access. An authorization code allows one or more fuel types, also represented as codes. FleetKey can handle up to 9 (1-9) authorization codes and each code allows up to 5 fuel types. CFN systems can handle up to 100 authorization codes and each code allows up to 100 fuel types (default is 40). In FleetKey, authorization code 0 always allows all fuel types. In CFN systems, if no fuel types are loaded for authorization code 0, it will allow all fuel types, otherwise, code 0 will allow the fuel types loaded. In both systems, not having the authorization code on the VM is the same as if it was on with code 0.

First, assign a 2-digit fuel code to each of your fuel types, using Table 4-2. Then, assign the fuel codes to the authorization codes as you require, using Table 4-3. Make sure this information is available to load into the FMS at start-up. Photocopy these sheets if you need more space.

Table 4-2: Fuel Code Assignments

Fuel Code	Description

Table 4-3: Authorization Assignments

Auth. Code	Product Codes Allowed

Price Level (Enter PRICE)

Price Level is used only with CFN systems. It enables you to have different prices for each fuel type. In the system, you have price codes and price levels. One price code is assigned to each pump hose. Each price code can have multiple price levels. By programming different price levels into different AM's, it is possible to charge different prices to different customers at the same pump. If the VM does not have a price level, the system uses level 2.

For example, suppose pump 1 is assigned price code 1, and price code 1 allows 3 price levels. The 3 price levels are set as:

level 0 = \$1.259

level 1 = \$1.219

level 2 = \$1.179

One customer may have a VM programmed with price level 1 and another may have price level 2. The first customer would get charged \$1.219, while the second customer gets charged \$1.179 at the same pump.

Make sure the price codes and price levels are loaded during the FMS start-up. Use Table 4-4, to lay out your price codes and levels. Photocopy this sheet if you need more space.

Table 4-4: Price Code Assignments

Price	Level 1	Level 2	Level 3	Level 4	Level 5

Odometer Or Hours Selection (SEL ODOMETER - 0, HOURS - 1)

The odometer or hours data is stored in a counter field. A single VM has 1 counter field, while a dual VM has 2. The Programmer's **Odometer or Hours Selection** input prompt determines whether the counter field following the selection, is used for odometer or for hours. Enter 0 if the VM is to record odometer or 1 if it is to record engine hours. For a dual VM, the selection prompt occurs twice, once for each counter.

Each counter field has an associated ratio field, described in detail later in this section, that contains the number of pulses in a mile (odometer), or the number of time intervals in an hour (hour meter). The maximum value of the counter field 1 ratio is 640000, and the maximum counter field 2 ratio is 64000. Since some vehicle's odometer ratios may be higher than 64,000 pulses per mile, counter 1 should be used for odometer and counter 2 used for hours, in a dual VM. Since a single VM uses only counter field 1, it can be programmed for either odometer or hours, without worry of ratio limitations.

Odometer or Hours Entry (Enter ODOMETER)

This field allows you to enter decimal number up to 1 decimal place (maximum of 7 digits before decimal). For odometer, enter the dashboard odometer reading. For hours, enter the reading from the hour meter.

Odometer Ratio (Enter ODO RATIO)

The VM receives odometer data as a series of pulses. These pulses may come from sensors mounted to the transmission, transaxle, or drive shaft, or from circuits in the vehicle's computer module or cruise control.

IMPORTANT INFORMATION

The vehicle's ABS system must not be used as a source for odometer pulses. Any Fuel Point Vehicle Modules currently installed must be immediately disconnected from the ABS system.

With electronic speed transducers, the connection should be made at one of these locations: at the buffered output side of any vehicle's control modules, such as the powertrain control module (PCM); or, if buffered output is not available, at the transmission's speed generator signal wire.

The number of pulses-per-mile is affected by several factors, such as, tire size, axle ratio, and transmission specifications. Due to all these variances, the VM requires you to program in a ratio of the number of pulses it is expected to receive per mile. This section helps you to determine the proper ratio for your particular vehicle. If you do not know the vehicle specs, the VM Programmer has a calibration feature to help narrow down the correct odometer ratio. Keep in mind that the ratio for the first counter field has a maximum limit of 640000 and the maximum ratio for the second counter (for a dual VM) is 64000. For this reason, the first counter field should be odometer and the second should be hours, when using a dual VM.

Mechanical Odometer Cable

Older vehicles use a mechanical cable to deliver odometer pulses to the dashboard. To allow the VM to record these pulses, a mechanical transducer should have been purchased and installed according to the guidelines and restrictions outlined in C35699 Fuel Point Vehicle Module Installation Manual. The formula for figuring the mechanical odometer ratio is:

Cable revs/mile X sensor pulses/rev

Cable revs per mile is the number of revolutions the mechanical cable turns for each mile. This number can be found in the transmission specification. Typically it is:

Domestic - 1000 revs/mile

Foreign - 900 revs/mile

Sensor pulses per rev is the number of electronic pulses generated for each revolution of the sensor input. This is determined by the sensor manufacturer and may be stamped on the sensor. A common value is 8 pulses/rev.

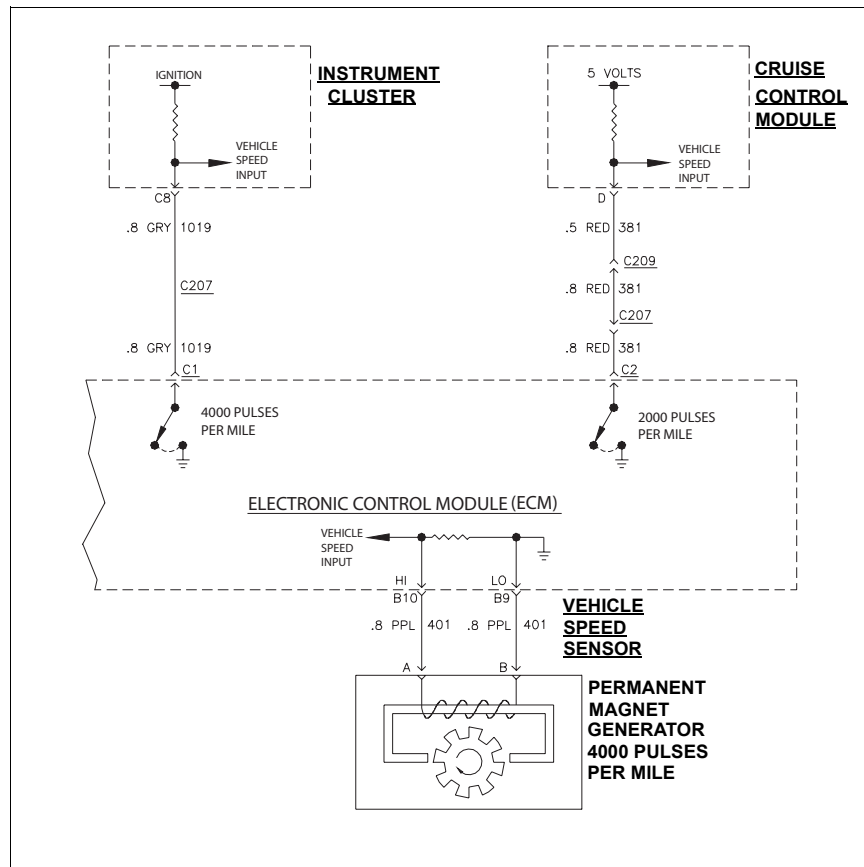
Therefore, the typical odometer ratio for a domestic vehicle is 8000 pulses/mile and for a foreign vehicle it is 7200 pulses/mile. Use these values for the VM odometer ratio if you are not sure of the exact values.

Electronic Odometer

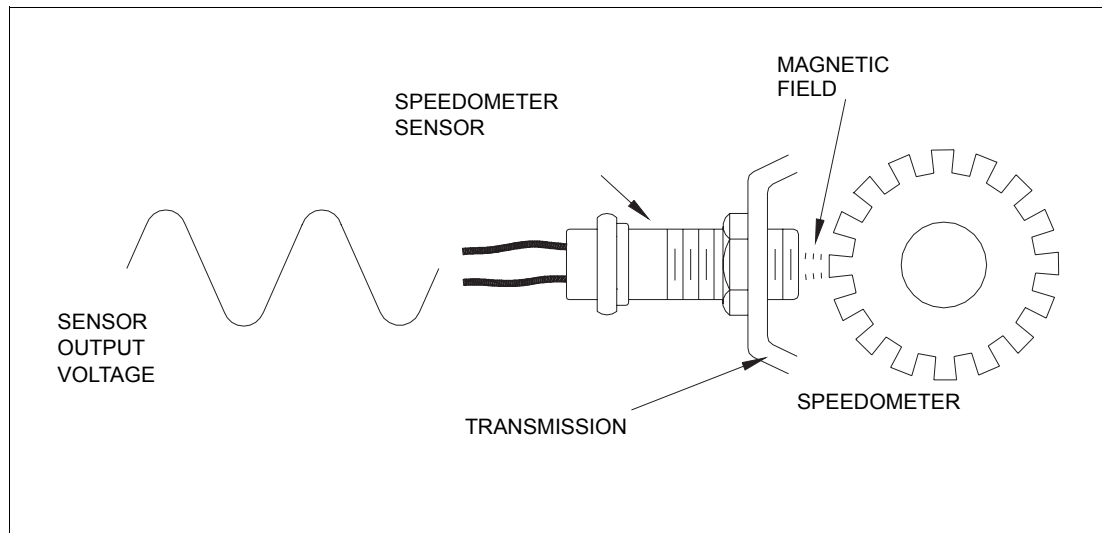
On new vehicles, the odometer signal to the VM is tapped off an existing sensor or speedometer signal from an electronic circuit. Several ways to figure the electronic odometer ratio are shown below:

- **Match working vehicle.** If a previously equipped vehicle has accurate odometer data in the VM, use the same ratio for all other vehicles in the fleet with the same specs.
- **Use published ratio.** If the VM odometer input is a conditioned signal coming from the vehicle's computer module or cruise control, the manufacturer's wiring diagram may show the number of pulses per mile it is generating. These values are typically round numbers such as 10,000, 20,000, or 40,000.

Figure 4-1 Sample Wiring Diagram. Notice Pulses Per Mile.



- **Use engine computer ratio.** Today's over-the-road trucks have smart engines allowing you to view and adjust many performance parameters through the diagnostic port. If the VM odometer signal is tapped off from the same signal source as the dashboard speedometer, you can use the speedometer ratio stored in the engine computer for the VM odometer ratio.
- **Calculate from vehicle specs.** If the VM odometer receives input directly from the speedometer sensor mounted in the transmission, you may be able to calculate the correct ratio using specs from the vehicle manufacturer.

Figure 4-2 Sample Speedometer Circuit

Although there are variations among manufacturers and vehicle types, a typical speedometer system on a rear-drive-axle vehicle is described here. A gear, usually called the speedometer signal gear, is mounted to the output shaft of the transmission. The speedometer sensor is mounted to the transmission so that its tip is in close proximity to the signal gear's teeth. A permanent magnet located in the speedometer sensor establishes a magnetic field at the tip. The magnetic field is repeatedly cut by the teeth on the signal gear, creating alternating current voltage impulses that are transmitted to the speedometer. The frequency and amplitude of the signal is directly proportional to the speed of the signal gear. The speed of the signal gear is determined by the rotation of the drive shaft, which is determined by the drive axle ratio and tire size. Therefore, the number of pulses-per-mile from the speedometer sensor is calculated from the formula:

teeth on signal gear X tire revs/mile X drive axle ratio

of teeth on signal gear is found in the transmission specifications. A typical number of teeth is 16.

Tire revs per mile can be found in the tire manufacturer's spec sheet. These figures are standard throughout the tire industry. For example, a new 12.00 R 20 tubeless tire turns 470 revolutions per mile.

Figure 4-3 Sample Truck Tire Size Chart

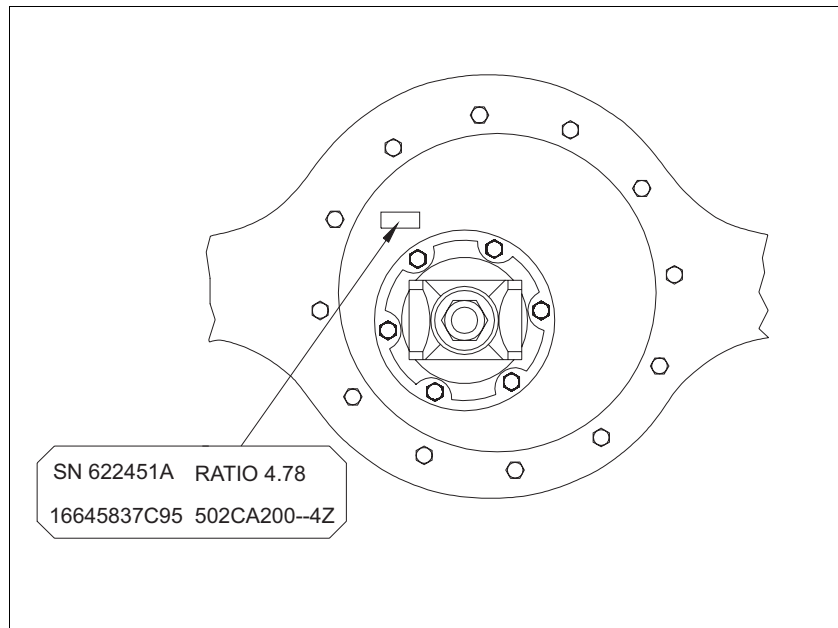
TUBE TIRES				TUBELESS TIRES			
Tire	Size	Revs	Per Mile	Tire	Size	Revs	Per Mile
7.00 R	16		673	8.0 R	17.5		674
7.50 R	20		568	8.5 R	17.5		659
8.25 R	20		549	9.0 R	22.5		544
9.00 R	20		519	9.5 R	17.5		627
10.00 R	20		502	10 R	22.5		518
10.00 R	22		477	11 R	22.5		503
11.00 R	20		494	11/70 R	22.5		549
11.00 R	22		466	11.00 R	24.5		479
12.00 R	20		471	12.00 R	20		470
12/80 R	20		523	12 R	22.5		487
12.00 R	24		430	12/70 R	22.5		528
13/80 R	20		504	13 R	22.5		470
14.00 R	20		426	13/70 R	22.5		511
14/80 R	20		484	15 R	22.5		492
				16.5 R	22.5		471

Drive axle ratio can be found in the manufacturer's line setting ticket, and also on a tag attached to the differential assembly on rear wheel drive vehicles.

Figure 4-4 Sample Line Setting Ticket

G73BSWW	TWO HEAVY DUTY PANTOGRAPH TYPE W/S WIPER - STANDARD	Drive axle ratio
G73BWWK	W/S WASHER KIT 3 QT CAPACITY - STANDARD	
G73CF2F	MUD FLAPS, RUBBER - 2 FRONT	
G73CF2R	MUD FLAPS, RUBBER - 2 REAR	
G73CPST	FUEL SENDING INSPECTION PLATE - STANDARD	
G880608	STEEL PLATE UNDER RIGHT FRONT FRT END	
N00B141	AXLE FRAME DIMENSION - 141	
N00C478	REAR AXLE GEAR RATIO 4.78	
N00D196	GENESIS 196" WB	
N01AADR	FRAME RAILS HI STRENGTH LOW ALLOY STL	
N02AADD	FRONT AXLE 12000 LB CAPACITY	
N03AAAH	FRONT SPRINGS PARABOLIC 14,000 LB CAPACITY	
N03BRBB	REAR SPRINGS SGL STAGE VARI - RATE, 20,000 LB CAP	
N03X728	REAR SHOCK ABSORBERS	
N04A040	HYDRAULIC BRAKE SYSTEM (BENDIX HYDRO-MAX II)	

Figure 4-5 Sample Rear Differential Showing Axle Ratio Marking



Example:

Signal gear teeth = 16

Tire size = 10.00 R 20 = 502 revs/mile

Axle ratio = 3.41:1

Ratio = 16 x 502 x 3.41

= 27,389 (drop the decimal places)

- **Use programmer's calibration feature.** If you cannot figure the odometer ratio using any method listed above, just enter any number and let the VM Programmer's calibration feature narrow down the correct ratio. This method may require several calibrations to get a good ratio, and the vehicle may have to travel several hundred miles between the calibrations. Start with a number between 10,000 and 100,000.

Hours Ratio (Enter ODO Ratio)

The VM counts time in increments of approximately 128ms, therefore the hours ratio is fixed at 28,000 pulses-per-hour. Regardless of what is entered for this ratio, the VM automatically changes it to 28,000. You should just press the **ENTER** key for the ratio prompt of an hours counter.

Dual Counters (DUAL COUNTERS, NO - 0, YES - 1)

This field determines if the Programmer prompts for a second counter (odometer or hours) field. Enter 0 for a single VM or 1 for a dual VM.

Vehicle Module Program Data Sheet

As you can see, there are many fields that may be programmed into a VM. It is helpful to write all of the data to be programmed into a chart that you can take out to the vehicle. Here is a sample of a chart with the data filled in. On the next page is a blank chart, you can tailor to your system.

VM NUMBER	VEHICLE NUMBER	LICENSE PLATE	LIMIT CODE	AUTH CODE	COUNTER 1 TYPE	COUNTER 1 RATIO	COUNTER 2 TYPE	COUNTER 2 RATIO
1374	288	AJY6755	8	1	ODOM	8000	HRS	N/A
1375	1644	TAM0693	6	2	ODOM	26000	HRS	N/A
1376	108	TL1999	3	4	ODOM	40000	HRS	N/A
1377	5766	SRL5320	3	4	ODOM	40000	N/A	N/A

[illegible]

5 – Operation

Ground Loop Communications

If the vehicle has been wired for ground loop fueling, the T-Ring is connected to the VM's Gate connectors. The Programmer modes: Program, Edit, Calibrate, and Version will not work via the VM's Gate connectors. The Programmer can access those modes only through the VM's T-Ring connectors. There are two ways to accomplish this:

- Use a spare T-Ring with a long cable attached. The cable connects to the T-Ring connectors on the VM. There is no need to disconnect the VM's Gate ring. The Programmer can now use any mode to access the VM via the temporary T-Ring. When finished, disconnect the T-Ring so that it can be used to check other vehicles.
- At the VM, move the ring wires from the Gate connectors to the T-Ring connectors. Any Programmer mode can be accessed via the vehicle's gate ring mounted to the underside of the vehicle. When finished using the Programmer, move the ring wires back to the Gate ring connectors on the VM.

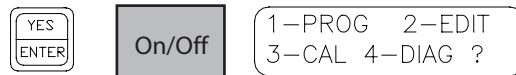
*Note: The Programmer's **Diagnostic** mode can be accessed from a ring at either the Gate or T-Ring connectors.*

General Programmer Operation

This section describes the standard operating style of the VM Programmer common to all operating modes. In the text, **YES** and **ENTER** refer to the key labeled **YES/ENTER**; **NO** and **CLR** refer to the key labeled **NO/CLR**.

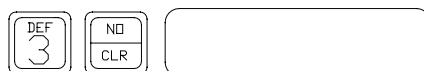
Turning On Programmer

To turn the Programmer on, press and hold the **Enter** key (in C06736 VM Programmer with Charger) or **On/Off** key (in M06728A001 VM Programmer with Charger) until the main menu appears.



Turning Off Programmer

Press the **CLR** and **3** keys simultaneously (in C06736 VM Programmer with Charger) or **On/Off** key (in M06728A001 VM Programmer with Charger) to turn the Programmer off. To conserve battery power, the Programmer also shuts itself off when it has completed programming or calibrating a VM, or when there is no keypad activity for 100 seconds.



Mode Selection

After the Programmer is turned on, the first menu, showing modes 1 through 4 is displayed. Within 4 seconds, the second menu, showing mode 5, is displayed. The Programmer toggles between menus every 4 seconds, or you can manually switch menus by pressing **ENTER**. To select a mode, press the mode number followed by **ENTER**. Selection can be made for any mode even when the display is not currently showing its associated menu

1 - PROG 2 - EDIT
3 - CAL 4 - DIAG ?

5 -- VERS ?

1

YES
ENTER

ENTER VM NUMBER:
522748_

Accepting Old Data and Clearing the Display for New Data Entry

The Programmer saves previously entered data for the Program and Edit modes. When stepping through these modes, that data is displayed for each field so that you can just press **ENTER** to keep the data as-is and advance to the next field. If you need to change any data within a field, you must press the **CLR** key first, to clear the field for new data entry. Then press the **ENTER** key to save the change. In order to avoid repetition throughout this manual, most subsequent example sequences starts with the field already cleared.

*Note: If you make any mistake while typing the data, you can press the **CLR** key to go back to the beginning of the current field, then type the correct data.*

ENTER VM NUMBER:
5001

YES
ENTER

ENTER DIVISION:
006442

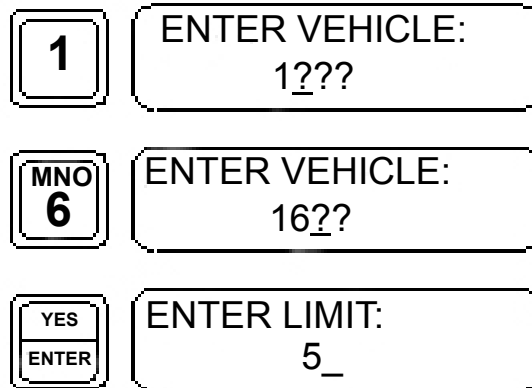
NO
CLR

ENTER LICENSE:
TAM0693

ENTER LICENSE:
???????_

Entering Numeric Data

On the keypad, press the number that you want to enter into the field. If there are multiple digits within a field, the cursor automatically advances to the next position. After all digits have been entered, press **ENTER** to advance to the next field. If you press **ENTER** before all data has been entered, it will fill the un-entered most significant digits with zeros, then advance to the next field. For example, to enter the number 16 into a 4-digit field, type 1, 6, **ENTER**. The data will be stored as 0016.



Entering Alphanumeric Data

On the keypad, the keys **2** through **0** have letters above the numbers. While entering data into an alphanumeric field, the first time you press a number, it shows that number, but the cursor does not advance to the next position. The second time you press the same number, it shows the first letter marked above the number. Pressing it again shows the second letter, and pressing it a fourth time shows the third letter. An alphanumeric field can have any combination of letters and numbers. In an alphanumeric field, you must press the **ENTER** key to advance the cursor. After all characters have been entered, press **ENTER** to advance to the next field. If you press **ENTER** before all data has been entered, it will fill the un-entered most significant characters with zeros, then advance to the next field. For example, to enter the string A37R into a six character field, type:

2, 2, ENTER, 3, ENTER, 7, ENTER, 7, 7, ENTER, ENTER.

The data is stored as **00A37R**.

Alphanumeric fields are not standard and must be specified while ordering the Fuel Point and Fuel Management System from the factory.

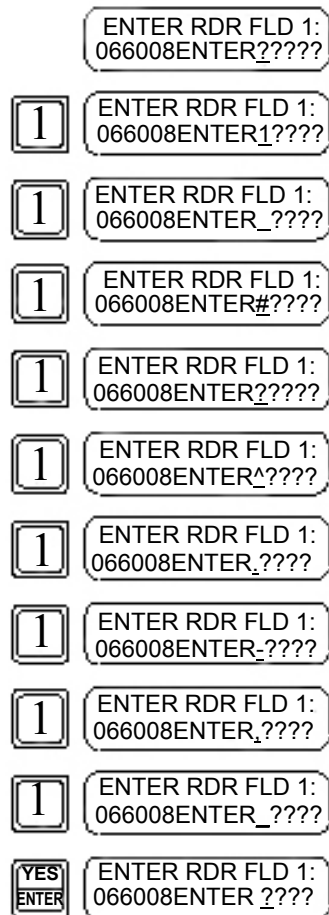
ABC 2	ENTER VEHICLE: 2?????
ABC 2	ENTER VEHICLE: A?????
YES ENTER	ENTER VEHICLE: A?????
DEF 3	ENTER VEHICLE: A3????
YES ENTER	ENTER VEHICLE: A3????
PRS 7	ENTER VEHICLE: A37???
YES ENTER	ENTER VEHICLE: A37???
PRS 7	ENTER VEHICLE: A377??
PRS 7	ENTER VEHICLE: A37P??
PRS 7	ENTER VEHICLE: A37R??
YES ENTER	ENTER VEHICLE: A37R??
YES ENTER	ENTER LIMIT: 5_

Entering Spaces and Special Characters

If the VM is set up to store the reader prompt for the Reader Entry Fields, you will probably need to enter spaces and other characters for the message. On the Programmer, the **1** key scrolls through a list of available characters. When entering data into an alphanumeric field, the first time you press the **1** key, it shows as 1. After that, the **1** key shows a different character each time it is pressed, until it gets back to 1. Press **ENTER** to select one of the special characters as it is displayed. The special characters available are:

SPACE

#	number sign
?	question mark
^	caret
.	period/decimal point
-	hyphen
,	comma



Entering Odometer or Hours Data

The odometer and hours fields (generically referred to as the counter fields), allow entry of 7 whole digits plus tenths.

DEF 3	ENTER ODOM [1] ???????. <u>3</u>
PRS 7	ENTER ODOM [1] ???????. <u>7</u>
MNO 6	ENTER ODOM [1] ?????37. <u>6</u>
TUV 8	ENTER ODOM [1] ????376. <u>8</u>
GHI 4	ENTER ODOM [1] ???3768. <u>4</u>
MNO 6	ENTER ODOM [1] ??37684. <u>6</u>
YES ENTER	ENTER ODO RATIO <u>?????</u>

Editing Within a Field

To edit data within a field, press the **CLR** key to set the cursor back one space. It has now erased the data previously entered in that position. Each subsequent press of the **CLR** key sets the cursor back another space. Once you get to the position you want, start entering the correct data.

ABC 2	ENTER ODO RATIO 2?????
MNO 6	ENTER ODO RATIO 26????
TUV 8	ENTER ODO RATIO 26B???
NO CLR	ENTER ODO RATIO 26????
NO CLR	ENTER ODO RATIO 2?????
JKL 5	ENTER ODO RATIO 25????

Programmer Operating Modes

Program Mode

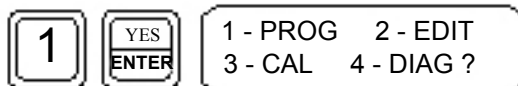
When the VM is initially installed, the Program Mode allows you to load the vehicle's identification and fuel control data, similar to encoding data for a card- or key-based FMS. Since the programmer is set up at the factory, it prompts for the fields, needed for the VM to work at each specific site. An explanation of the fields that may be used is given in the previous section. The VM can be re-programmed with new data at any time.

Here is a typical programming session incorporating all of the items previously discussed. Your Programmer may be set up differently than the examples. Just key in the data for your particular situation as prompted on the Programmer display. Remember, if at any time you make a mistake typing the data, you can press the **CLR** key to go back to the beginning of the current field, then type the correct data.

- 1 Take the completed VM Program Data sheet out to the vehicle.

VM NUMBER	VEHICLE NUMBER	LICENSE PLATE	LIMIT CODE	AUTH CODE	COUNTER 1 TYPE	COUNTER 1 RATIO	COUNTER 2 TYPE	COUNTER 2 RATIO
1374	288	AJY6755	8	1	ODOM	8000	HRS	N/A
1375	1644	TAM0693	6	2	ODOM	26000	HRS	N/A
1376	108	TL1999	3	4	ODOM	40000	N/A	N/A
1377	5766	SRL5320	3	4	ODOM	40000	N/A	N/A

- 2 Turn on the Programmer. Refer to [“Turning On Programmer” on page 5-1.](#)
- 3 Select Program mode.



- 4 Enter the VM number.



- 5 Enter the Vehicle number.



6 Enter the License number.

*Note: Since this is an alphanumeric field, you must press **ENTER** to advance to the next character position.*

ABC 2	ABC 2	YES ENTER	JKL 5	JKL 5
YES ENTER	WXY 9	WXY 9	WXY 9	WXY 9
YES ENTER	MNO 6	YES ENTER	PRS 7	YES ENTER
JKL 5	YES ENTER	JKL 5	YES ENTER	YES ENTER

ENTER LICENSE:
AJY6755

7 Enter the Limit code.

TUV 8	YES ENTER	ENTER LIMIT: 8
----------	--------------	-------------------

8 Enter the Authorization code.

1	YES ENTER	ENTER AUTH. 1
---	--------------	------------------

9 Odometer is the first field counter that appears.

OZ 0	YES ENTER	SEL ODOMETER - 0 0_ HOURS - 1
---------	--------------	----------------------------------

- 10** When programming a newly installed VM, it is a good idea to test the installation. Press **ENTER** at the following prompt to set the odometer at 0000000.0. The correct initial reading of the odometer is loaded after testing the odometer connection.

YES ENTER	ENTER ODOM [1] ???????
--------------	---------------------------

- 11 Enter 1 as the ratio. This allows a quick way to test if the VM is recording pulses, without having to drive very far.

1	YES ENTER	ENTER ODO RATIO: 1????
---	--------------	---------------------------

- 12 This is a dual VM.

1	YES ENTER	DUAL COUNTERS 1 NO - 0 YES - 1
---	--------------	-----------------------------------

- 13 The second field is hours.

1	YES ENTER	SEL: ODOMETER - 0 SCND 1 HOURS - 1
---	--------------	---------------------------------------

- 14 Since you want to test the installation, enter an engine hours reading that ends in 0.9 (0.9 hours equals 54 minutes). That way, you only have to wait 6 minutes to verify that the engine hours connection is functioning. The correct starting hours reading will be loaded after testing.

1	ABC 2	DEF 3	WXY 9	YES ENTER	PRESET TIME [2] [H] ???123.9
---	----------	----------	----------	--------------	---------------------------------

- 15 Hold the Programmer near the vehicle's T-Ring. If the vehicle is equipped with two T-Rings, perform the programming at one ring, then use the second ring while Testing the Programmed VM steps. This allows testing of both ring circuits.

HOLD PROGRAMMER NEAR TANK RING

IMPORTANT INFORMATION

The Programmer cannot program a VM for engine hours when the vehicle is running. Ensure the vehicle is shut off during Programming.

- 16 When communications is established, a series of beeps will be heard. Continue to hold the Programmer near the T-Ring. Programming takes about 15 seconds.

TRANSMITTING
PLEASE WAIT

- 17 When programming is complete, you will hear a long beep.

TRANSMISSION
COMPLETE

- 18 The Programmer turns off automatically



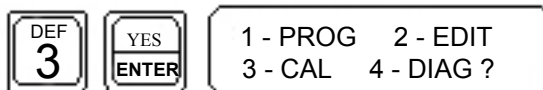
Testing the Odometer/Hours Operation

- 1 Since the odometer ratio was programmed as 1, you only need to back the car up about 10 feet, then forward again, to make the VM think you drove many miles. Since this particular vehicle is also recording engine hours, you need to let it idle for at least 6 minutes to get the VM to increment to the next hour.

DANGER

To avoid the build-up of deadly carbon-monoxide gas, DO NOT idle the vehicle in an enclosed area.

- 2 Turn on the Programmer. Refer to [“Turning On Programmer” on page 5-1](#).
- 3 Select Calibrate mode. We are only using Calibrate mode here because we know the odometer data is incorrect. The sequence presented here does not use Calibrate mode features for determining the correct ratio and resetting the initial counters. These features are explained later in the Calibrate Mode section.



- 4 Hold the Programmer near the vehicle's T-Ring. If the vehicle is equipped with two T-Rings, use a different ring than used earlier, in order to check both rings.

HOLD PROGRAMMER
NEAR TANK RING

IMPORTANT INFORMATION

The Programmer cannot calibrate a VM with engine hours when the vehicle is running. Ensure the vehicle is shut off during Calibrate mode.

- 5 When communication is established, a series of beeps will be heard. Continue to hold the Programmer near the T-Ring. It takes about 5 seconds to read the data.

TRANSMITTING
PLEASE WAIT

- 6 As we want to check both counters, select 2.

ABC
2

YES
ENTER

SEL CALIB: 1ST - 0
2ND - 1 BOTH - 2 ?

- 7 The display now shows the counter 1 odometer data. The number on the top line represents the initial programmed whole odometer. The bottom left shows the ratio, and the bottom right shows the current VM odometer. If the current VM odometer is greater than the initial odometer, you have verified that the odometer circuit is functioning properly. Now you can program in the correct starting odometer.

YES
ENTER

LAST[1]? 0000000
000001.0 0000124

Note: If the current VM odometer does not change, check the VM installation.

- 8 Enter the dashboard odometer reading.

ABC
2

MNO
6

TUV
8

GHI
4

PRS
7

YES
ENTER

1

ENTER ODOM [1]
??26841.7

- 9 Press **1**, since we want to change the ratio as well as the odometer.

1	YES ENTER	MILEAGE ONLY - 0 COUNT RATIO -1 1
---	--------------	--------------------------------------

- 10 The calculated ratio shown is incorrect because the initial data loaded was just test data. Press **NO**, since you do not want to accept the calculated ratio.

NO CLR	RAT 000001.0 OLD ? 000000.2 NEW
-----------	------------------------------------

- 11 Enter the correct odometer ratio, if known. If you do not know the correct ratio, enter a number between 8000 and 100000.

8	0	ENTER ODOMETER RATIO 8000??
0	0	
		YES ENTER

Note: Keep in mind that this ratio is an estimate and may be incorrect. When this testing procedure is complete, take a short (3-4 mile) test drive. This should provide enough data to provide a closer ratio. Then redo the testing procedure using the new number. Enter YES to accept the calculation ratio at Step 10.

- 12 The top line shows the newly entered odometer and ratio. Press **ENTER** if these are correct.

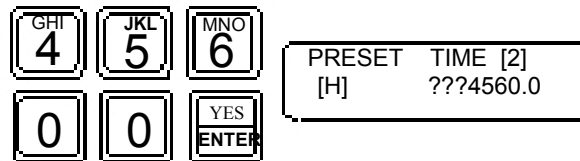
YES ENTER	ODOMETER 0026841 RATIO 008000 ?
--------------	------------------------------------

- 13 The display now shows the counter 2 hours data. Similar to counter 1 above, the top line displays the initial hour entry, and the bottom line shows the ratio on the left (always 28000 for hours), and the current hours on the right. If the current VM hours is greater than the initial hours, you have verified that the engine hours circuit is functioning properly. Now you can program in the correct starting engine hours.

YES ENTER	LAST[2]? 0000000 28000.0 0000124
--------------	-------------------------------------

Note: If the VM hours does not change, check the VM installation.

- 14 Enter the hour meter reading, including tenths if present. Remember to enter leading zeros as necessary. If there is no hour meter, just press **0**, then **ENTER** to start the hours counter at zero.



- 15 Hold the Programmer near the vehicle's T-Ring.

HOLD PROGRAMMER
NEAR TANK RING

- 16 When communications is established, a series of beeps will be heard. Continue to hold the Programmer near the T-Ring. Programming takes about 5 seconds.

TRANSMITTING
PLEASE WAIT

- 17 When programming is complete, you will hear a long beep.

TRANSMISSION
COMPLETE

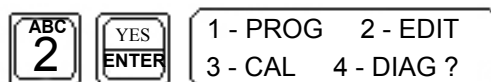
- 18 The Programmer turns off automatically.



Edit Mode

Before continuing, you can use Edit Mode to verify that the data you entered during Program Mode is correct. This mode will display all VM data except for the counter data. The counter data is available via Calibrate Mode, which will be explained later.

- 1 Turn on the Programmer. Refer to [“Turning On Programmer” on page 5-1](#).
- 2 Select Edit mode.



- 3 Hold the Programmer near the vehicle's T-Ring. A series of beeps will be heard while the Programmer gathers the data.

HOLD PROGRAMMER
NEAR TANK RING

- 4 The Programmer displays the first field. If you do not want to make any changes, press the **ENTER** key to advance to the next field.



ENTER VM NUMBER:
00288

ENTER VEHICLE:
5931

- 5 To make changes, press the **CLR** key to clear the data, then enter the new data. When finished, press **ENTER** to advance to the next field.



ENTER VEHICLE:
????



ENTER VEHICLE:
5931

- 6 Make changes to as many fields as necessary. Once all fields have been accepted, hold the Programmer near the T-Ring.



ENTER LIMIT:
8



ENTER AUTH:
2

HOLD PROGRAMMER
NEAR TANK RING

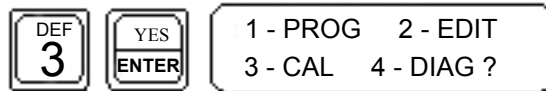
- 7 A series of beeps will be heard while the VM is being Programmed.
- 8 When programming is complete, a long beep will be heard.
- 9 The Programmer turns off automatically.

Calibrate Mode

Calibrate mode is used initially to automatically calculate the odometer ratio if it is not known. It is also used periodically to adjust for slight variations between the odometer and the VM. If any of the counter fields is used for engine hours, you do not need to perform calibration, as the VM keeps very accurate time.

Odometer Calibration

- 1 Turn on the Programmer. Refer to [“Turning On Programmer” on page 5-1](#).
- 2 Select Calibrate mode.



- 3 Hold the Programmer near the vehicle's T-Ring.

HOLD PROGRAMMER
NEAR TANK RING

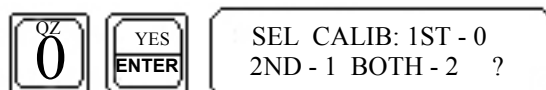
IMPORTANT INFORMATION

The Programmer cannot calibrate a VM with engine hours when the vehicle is running. Ensure that the vehicle is shut off during Calibrate mode.

- 4 When communication is established, a series of beeps will be heard. Continue to hold the Programmer near the T-Ring. It takes about 5 seconds to read the data.

TRANSMITTING
PLEASE WAIT

- 5 The Programmer prompts you to select the VM counter which you want to update. Since the odometer is typically connected to counter 1, select 1ST.



- 6 The display now shows the counter 1 (odometer in this example) data. The number on the top line represents the initial programmed whole odometer. The bottom left shows the ratio, and the bottom right shows the current VM odometer. If the true ratio was not known at the time the VM was installed, the current VM odometer probably does not match the dashboard odometer.

LAST[1]? 0023896
008000.0 0026432

The longer a vehicle is driven, the more accurate the calibration calculation becomes. For a very accurate calibration, run the calibration, then drive the vehicle for the duration of your normal scheduled vehicle maintenance. Then check calibration for accuracy. Change ratio if needed according to the criteria in Step 7.

- 7 At this point you need to determine if you will make any changes to the odometer and/or ratio, based on the criteria that follows:
- If the current VM odometer matches the dashboard odometer, you do not need to make any changes. If this is a Single VM (only 1 counter field), you can turn the Programmer off and end this session. If it is a dual VM and counter 2 is used for odometer, press **ENTER** twice to advance to counter field 2. Perform these same three criteria checks on counter field 2.

LAST[1]? 0023896
008000.0 0026432

26431	8
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VM matches dashboard

- If the difference between the current VM odometer and dashboard odometer is within 1 percent the total dashboard miles driven so far, the ratio is already very accurate and you only need to update the mileage, not the ratio. Proceed to the section [“Updating the Odometer Only” on page 5-17.](#)

LAST[1]? 0023896
008000.0 0026418

26431	8
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VM within 1% of dashboard

- If the difference between the current VM odometer and the dashboard odometer is greater than 1 percent of the total dashboard miles driven so far, you need to update both mileage and ratio. Proceed to the section [“Updating the Odometer and Ratio” on page 5-17.](#)

LAST[1]? 0023896
008000.0 0026204

26431	8
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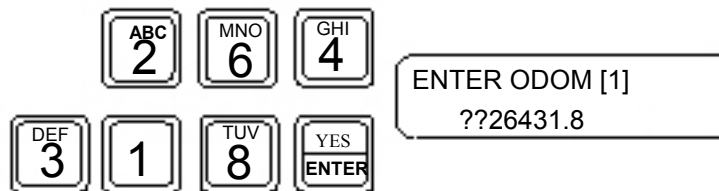
VM greater than 1% of dashboard

Updating the Odometer Only

- 1 Press **ENTER** to advance to the odometer input field.



- 2 Enter the dashboard odometer, including tenths if present. Remember to enter leading zeros as necessary.



- 3 Select **0** since you do not want to change the ratio. Proceed to the section [“Download New Calibration Data to VM” on page 5-18.](#)

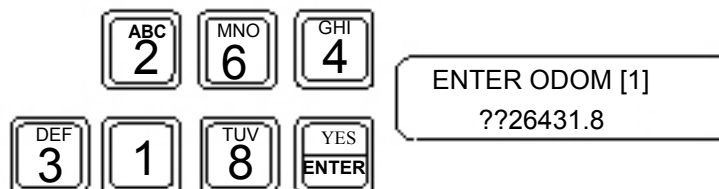


Updating the Odometer and Ratio

- 1 Press **ENTER** to advance to the odometer input field.



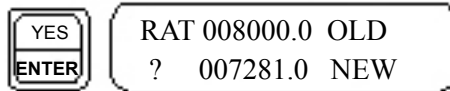
- 2 Enter the dashboard odometer, including tenths if present. Remember to enter leading zeros as necessary.



- 3 Select **1** to allow the Programmer to calculate the correct ratio.



- 4 Press **YES** to accept the calculated ratio. Proceed to [Download New Calibration Data to VM](#).



Download New Calibration Data to VM

- 1 Hold the Programmer near the vehicle's T-Ring.



- 2 When communication is established, a series of beeps will be heard. Continue to hold the Programmer near the T-Ring. Programming takes about 5 seconds.



- 3 When complete, you will hear a long beep.

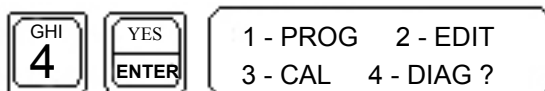


- 4 The Programmer turns off automatically.

Diagnostic Mode

The Diagnostic function reads a programmed VM and displays it as a string of data. It is the easiest way to verify if the VM is transmitting. Follow this example.

- 1 Turn on the Programmer. Refer to [“Turning On Programmer” on page 5-1](#).
- 2 Select Diagnostic mode.



- 3 Hold the Programmer near the vehicle's T-Ring.

HOLD PROGRAMMER
NEAR TANK RING

- 4 The Programmer beeps and immediately the display fills with a mix of data and question marks. This data may be requested when talking to Gasboy Technical Service Personnel, but for now, it can be ignored.

00056300014????
????????????????

Version Mode

This mode displays the software version of the Vehicle Module.

- 1 Turn on the Programmer. Refer to [“Turning On Programmer” on page 5-1](#).
- 2 Select Version Mode.

JKL 5 YES ENTER 5-VERS ?

Note: On the new Programmer (M06728A001), the following prompt appears:

IS IT VCU OR VTU
?

Press **ENTER**.

- 3 Hold the Programmer near the T-Ring.

HOLD PROGRAMMER
NEAR TANK RING

- 4 A series of beeps will be heard while the Programmer gathers data.
- 5 The Programmer displays 3 fields of data. The left-most field on the bottom line is the software version of the VM, in the format DD/MM/YY (day/month/year). For example, a display showing 070597 is a date of May 7, 1997. Ignore the data in the other fields.

VERSION ADR DYCU
070596 X92 237?

Note: If the date code on the module is 010195 or older, we recommend that the module be replaced.

- 6 The programmer turns off automatically.

Master Authorizer

The Master Authorizer is a hand-held, battery-operated device which activates a dispenser, allowing you to fuel equipment not outfitted with a VM.

Identification

The device comes from the factory pre-programmed with the site's System ID and a VM Number field. A label on the Authorizer identifies the VM Number. Before using the Authorizer, you must validate this VM Number in the system's lockout table. If the Authorizer is ever misplaced, be sure to invalidate the VM Number to prevent unauthorized fueling.

Limitations of Use

Transactions initiated with the Master Authorizer will use limitation, authorization, and price level codes of zero. The device will not work with CFN systems requiring PIN for Fuel Point.

Operation

Place the Master Authorizer against the dispenser's nozzle ring antenna. Press the button for about 3 seconds. The dispenser is now authorized for 1 transaction.

Figure 5-1 Master Authorizer

