



GASBOY

SERIES 1000

FUEL MANAGEMENT SYSTEM

TECHNICAL REFERENCE MANUAL

C08920

GASBOY INTERNATIONAL LLC

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GASBOY INTERNATIONAL LLC
LANSDALE, PA

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INTRODUCTION

USING THIS MANUAL

Purpose This manual is provided to assist you in selling and ordering the GASBOY Series 1000 Fuel Management System. Use it as a reference for answering the general questions which arise during the selling process. Special questions, not covered by this manual, should be addressed to your GASBOY sales representative.

This manual contains a system overview and a general hardware description for the Series 1000 itself. Later sections cover the features of the three possible system types individually. These sections are followed by installation specifications, communications wiring, and additional products that can enhance the system.

SYSTEM OVERVIEW

Users GASBOY's Fuel Management Systems are used in thousands of locations by municipalities, utilities, oil marketers, transportation companies, and a wide range of private businesses. They have found it to be a streamlined, cost-efficient way of providing 24-hour, unattended, access to fuel dispensing equipment. A large number of standard system features, along with a wide range of optional enhancements allows each customer to build a system package custom-tailored for his needs.

If your potential customer is currently using a manually-controlled fuel disbursement system, he has probably experienced problems with incomplete transaction information, lost or misplaced forms, unauthorized access, and lack of quantity control. GASBOY's Series 1000 automates the fueling process keeping detailed transaction records, immediately accessible, to ensure controlled, consistent inventory management. Access to fueling equipment is restricted to those users possessing valid cards, vehicle numbers, or keys, depending on the system type. Users can be restricted as to the type and quantity of fuel available to them and can be locked out from the system at a moment's notice if necessary.

System Types The GASBOY Series 1000 Fuel Management System is a microprocessor-based fuel control and data acquisition system. It is available in three types:

- **Card** - where access to the system is controlled by magnetic or optical cards. Commercial Fueling Network systems allow only magnetic cards.
- **Cardless** - where access to the system is attained by entering a valid vehicle number.
- **FleetKey** - where access to the system is controlled by encoded data keys.

Throughout this manual, references are made to each of these system models. Be sure to read the information for the pertinent system type.

Transaction Data The Series 1000 records all transactions in system memory for later recall. The memory is backed by long-life batteries to safeguard transaction storage even during power failures. Transaction data can be printed from the memory in a variety of formats to meet the user's specific information requirements. For additional report processing, GASBOY offers communications and reporting software packages for IBM (and 100% compatible) personal computers. In addition, most computer systems can be easily programmed to interface with the Series 1000 System.

Transaction records provide detailed transaction data, through the system's direct printout port, as it occurs. The transaction data varies according to the system type and the features enabled or configured. The following information prints out:

- For card systems, transaction number, card number, identification (ID) field 1 (e.g., employee number), identification (ID) field 2 (e.g., vehicle number), optional manual entry, date, time, pump number, product type, quantity dispensed, unit price and/or unit and total price (if configured), odometer/hours reading, and a transaction status message.
- For cardless systems, transaction number, vehicle number, a second account field (e.g., employee) an optional manual entry field (often department) , date, time, pump number, product type, quantity dispensed, unit price and/or unit and total price (if configured), odometer/hours reading, and a transaction status message.
- For FleetKey systems, transaction number, key number(s), identification (ID) fields, optional manual entry field, date, time, pump number, product type, quantity dispensed, unit price and/or total price (if configured), odometer reading, miles and MPG (if enabled), and transaction status message.

Inventory Management

The Series 1000 maintains a perpetual fuel inventory for up to eight tanks. Inventory adjustments are automatically made as each transaction occurs. Using the fuel delivery and dipstick option, site inventory can be automatically updated right from the fueling island. In addition, fuel inventories can be adjusted from the data terminal.

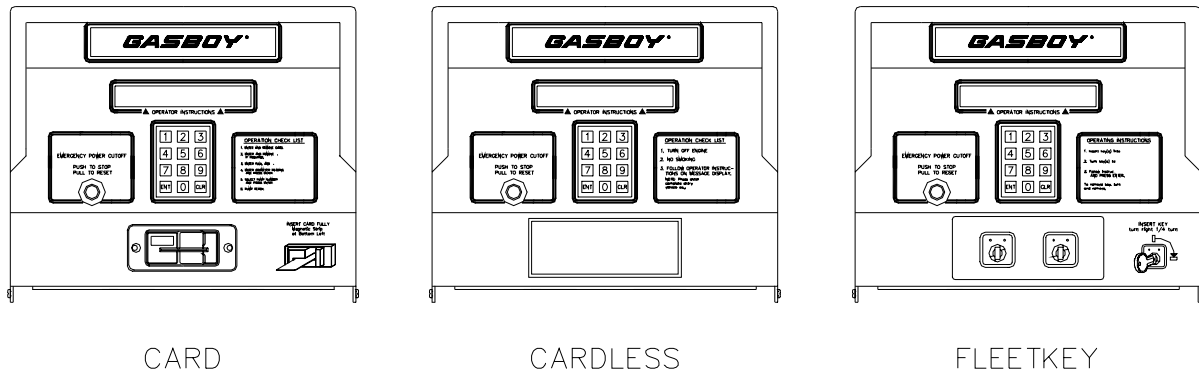
Easy-to-Use

Although highly sophisticated, the GASBOY Series 1000 System is easy to use; computer experience is not required. The system is modularly designed and easy to service. If needed, help is readily available from our toll-free Customer Service Center (1-800-444-5529).

HARDWARE DESCRIPTION

Appearance The GASBOY Series 1000 Fuel Management System is totally self-contained in an attractive, weatherized cabinet and pedestal assembly. The system is Underwriter's Laboratories (UL) and FCC listed and is designed to be located on the fueling island convenient to the user. The system has the same basic design, however, the head differs for each system type and the pedestal dimensions are different when used with the receipt printer option. System dimensions are given in Section 5.

Head The cabinet head measures approximately 15"W x 12"H x 20"D and is mounted on top of a 48" high pedestal. The cabinet face is protected from the weather by a clear acrylic shield. A combination of side extensions and top overhang reduces sun glare, and a fluorescent light provides lighting for around-the-clock user operation. The following drawing shows the three possible head types:



CARD

CARDLESS

FLEETKEY

Display Visual prompting messages, displayed on an eye-level, 20-character liquid crystal display (LCD), guide the user through the steps required to operate the system. A list of operating instructions is also printed on the cabinet face for reference.

Keypad A 12-position membrane keypad, containing the keys 0-9, CLEAR, and ENTER, is provided on the center of the face for entering data (e.g., personal identification number (PIN), odometer readings, pump selections, etc.). All entries, except PIN, are displayed on the LCD for verification.

Reader The card-activated system is available with a magnetic stripe insertion reader or an optional optical card reader. The FleetKey system is equipped with one or two key receptacles.

Emergency Stop A red stop button on the cabinet face allows the dispensing equipment to be shut down quickly in case of emergency.

Service Access The rear of the cabinet is a hinged door secured with a lock to prohibit unauthorized access. The one piece hood can be removed for total accessibility for servicing. Servicing is facilitated by interior LED indicators which help diagnose system problems.

- Pedestal Wiring* Solid state relays and manual override switches control power to the fuel dispensing equipment and are located in the pedestal. If ordered, an optional high speed, bi-directional serial impact receipt printer is also housed within the pedestal. The wiring for all equipment connected to the Series 1000 is terminated in the pedestal.
- Hoses/Pulsers* The standard Series 1000 System controls two hose outlets and can be expanded in two hose increments to control a maximum of eight hoses. The unit can be expanded in the field. The system can handle pulsing rates of dollar (penny per pulse); or quantity (1, 10, 100, 250, 500, or 1000 pulses per unit of product). The pulse rate selection switch is located in an area sealable by Weights and Measures for retail applications.
- Power* The GASBOY Series 1000 System has multiple safeguards to minimize system disruption due to power problems. Built-in AC and RS-422 transient protection reduces problems caused by power surges. In case of system or power failure, an AC and DC power fail detect, deadman timer, and pump control fail-safe circuits ensure an orderly shutdown so the system can return to normal operation upon restoration. The system clock and memory are backed-up by batteries to maintain the time and transaction data during power failures. To permit the fuel dispensing equipment to be operated in the conventional manner, override switches allow total bypass of the system.
- Ports* The standard Series 1000 System contains two asynchronous ports for terminal and/or computer communications. It can also be equipped with an optional asynchronous auxiliary port PCB for communication with a tank monitoring system. Its two ports can be set for either RS-232 or RS-422 depending on the particular requirement.

COMMUNICATIONS OPTIONS AND OPERATING MODES

Hardware

Requirements A CRT or data terminal with an ASCII character set, or a computer with the proper interface, is required to communicate with the Series 1000. The CRT, data terminal or computer is connected to the system through one of two asynchronous communication ports located in the system pedestal. Communication may be through direct wire, or by dial-up phone lines using the optional internal 300/1200 baud modem. An optional auxiliary port PCB (2 ports) is also available for connection to a receipt printer and/or tank monitoring system. See Section 6, **Communications**, for specific communication requirements and distance limitations.

- Port 1 is normally used for direct connection of a data terminal located at the site. This port allows access to the system's Direct Printout Mode and Command Mode. In Direct Printout Mode, transactions print (or display) on the data terminal as they occur. When connected to this port, the CRT or data terminal remains in Direct Printout Mode until the commands are issued to enter *Command Mode*. To ensure the security of the information in the system, Command Mode can only be accessed using the proper password. Once signed on, the operator can update pump and tank information; validate/invalidate cards, vehicle records, and keys; and retrieve recorded transactions in a variety of formats.
- Port 2 is commonly used to connect to a remote data terminal or computer. Port 2 allows access only to the Command Mode.
- The auxiliary ports are used to connect a receipt printer and/or tank monitoring system. If you ordered your system with a receipt printer and/or tank monitoring system, this port is already present. No additional wiring is required for the receipt printer. See Section 6 of this manual for installation wiring for a tank monitoring system.

CARD SYSTEMS

DESCRIPTION

Mag or Optical The Series 1000 card system is accessed through specially encoded magnetic or optical cards. The standard system is equipped with a mag stripe or an optical card reader. Mag stripe cards have information encoded on a magnetic stripe on the back of the card (e.g., standard credit card). Optical cards use a series of holes punched in the card to encode the information.

CFN Network The Series 1000 can be ordered to support Commercial Fueling Network cards. The Commercial Fueling Network supports magnetic cards only and has several functional differences from the standard card system. These differences are documented with the description of each applicable feature.

"A" System The Series 1000 can be ordered to match existing "A" System optical cards. An order to match "A" System cards presents several functional differences from the standard card system. These differences are documented with the description of the applicable feature.

Card Specs Card Dimensions: 3-3/8" x 2-1/2"
Card Thickness: .032" maximum (Mag Card)
.040" maximum (Optical Card)

NOTE: With optical card systems in two-card applications, both cards are inserted into the card reader simultaneously. Therefore, the combined total thickness cannot exceed .040". Cards supplied by GASBOY measure .030" for single cards, and .018" for dual cards.

Mag Stripe: ABA Track II

The Series 1000 can accept cards of either high or low coercivity. Coercivity relates to amount of magnetic force required to write or overwrite data on the magnetic stripe. Higher coercivity provides additional resistance to accidental erasure of encoded data.

FUELING PROCEDURE

Overview Using the GASBOY Series 1000 system is easy, even for untrained users. Operating instructions are printed on the face of the cabinet and, when a card is inserted, a series of prompts appears on the LCD display to guide the user through the fueling transaction. The following steps outline a typical fueling using a Series 1000 (magnetic or optical card).

Procedure 1. Position your vehicle adjacent to the fuel dispensing equipment. Be sure to note the odometer or hour meter reading (if your system uses this feature).

In its idle state, the Series 1000 LCD display alternates between an **ENTER CARD** message and a personalized system message.

2. If you are using a two-card optical system, place the two optical cards on top of each other (order does not matter) with the cut corner to the left and towards the reader and insert them into the reader as one card. Skip to Step 6.

If you are using magnetic cards, insert your card fully into the card reader with the magnetic stripe facing down and to the left. The LCD displays: **REMOVE CARD**

3. Remove the card. If you leave a card in the reader for more than five seconds, an alarm sounds to remind you to remove it. If you are using a one-card system, skip to Step 7.

4. If you are using a two-card system, the LCD displays: **ENTER SECOND CARD**.

5. Insert the second card fully into the card reader with the magnetic stripe facing down and to the left. The LCD displays: **REMOVE CARD**

6. Remove the card from the reader.

7. If your system uses the receipt printer option, go to Step 8.
If your system uses PINs, go to Step 9.
If your system uses odometer readings only, go to Step 10.
If your system uses none of these, go to Step 11.

8. If you have the receipt printer option and a prior transaction (with quantity) receipt is available, the LCD displays: **RECEIPT? 1=YES 0=NO**.

To print a transaction receipt, press **1** and **ENTER**. The LCD displays: **RECEIPT IS PRINTING**. If you have requested multiple receipts, they print out one after the other. The system goes to idle and you must reinsert your card(s) to begin a fueling transaction.

If you do not want a receipt, press **0** and **ENTER**. Skip to Step 9. For more on receipt printing, see the *Operation Manual*.

9. If you are required to enter a Personal Identification Number (PIN), the LCD displays: **ENTER P.I.N.**

Using the keypad, enter your PIN number and press ENTER. To ensure security, an asterisk (*) appears for each digit you press. If you make a mistake while entering your PIN, press CLEAR and enter it again.

You have three tries to enter the correct PIN. After the third unsuccessful try, the display returns to **ENTER CARD** and you must start again at Step 2.

If your system uses the Auto Pin Lockout feature, the card is automatically locked out (invalidated) after the third unsuccessful PIN entry.
10. If you are required to enter an odometer or hours reading, the LCD displays: **ENTER ODOMETER** or **ENTER HOURS.**

Use the keypad to enter the mileage/time that appears on your vehicle's odometer or hour meter (up to six digits, no tenths). The digits appear as they are entered. If you make a mistake, press CLEAR and enter the reading again. When you enter the correct reading, press ENTER. The LCD prompts: **SELECT PUMP**
11. Enter the desired pump number and press ENTER.

If the pump is available and you are authorized to use it, the LCD displays: **PUMP #x IS READY** and you may proceed to dispense fuel.

If **PUMP #x IS READY** is not displayed, one of the following messages appears:

 - NO SUCH PUMP**
 - PUMP IN USE!**
 - PUMP DISABLED**
 - INVALID FUEL**

You have three tries to select a correct pump. If, after three attempts, the system does not display **PUMP #x IS READY**, the display returns to **ENTER CARD** and you must begin again at Step 2.
12. When you finish fueling your vehicle, turn off the fuel dispenser handle and return the nozzle to its holder. The transaction information is automatically recorded in the system's memory for later recall. If you are using the Direct Printout feature, the transaction information is also printed on the data terminal or logger.

Transaction information includes transaction number, card number, ID Field 1, ID Field 2, date, time, pump number, product type, quantity dispensed, odometer/hours reading, and transaction message.
13. If you have the receipt printer option and you wish to have a receipt, insert and remove your card. The LCD displays: **RECEIPT? 1=YES 0=NO.**

To print a transaction receipt, press **1** and ENTER. The LCD displays: **RECEIPT IS PRINTING.** Multiple receipts print out one after the other. The system goes to idle.

CARD LAYOUT AND FIELD DESCRIPTIONS

Card Layout This section describes the card layout and field descriptions for all mag and optical card applications. It also lists special considerations for cards compatible with GASBOY CFN systems, GASBOY "A" System optical cards, and Commercial Fueling Network systems. Considerations for GASBOY CFN systems will be identified as GASBOY CFN; Commercial Fueling Networks will be identified as CFN Network, GASBOY "A" System will be identified as "A" System. If no special considerations are noted, the field works the same for all systems. Since card layout is customized for each order, all of the described fields need not be present. The descriptions list which fields are optional and which fields can be customized.

*Single Versus
Dual Cards*

A Series 1000 System can have its encoded information on one or two cards. When a single card is used, all of the information is encoded on one card. This is typically used when a vehicle is assigned to only one driver, or in a retail application when only an account number needs to be identified. A card encoded as a single card cannot be used as a dual card.

When dual cards are used, the encoded information is separated onto two cards. For example, employee information is encoded on one card and vehicle information is encoded on another. Some data is encoded on both cards. This makes it possible for employees to operate different vehicles, and yet have both numbers identified. An employee card must be used with a vehicle card; neither card will be accepted independently.

Most cards used with the Commercial Fueling Network are single cards.

*What's on a
Card?*

The Series 1000 cards are encoded with information to control access to the fuel dispensing equipment, the type of fuel(s), and the maximum amount of fuel dispensed per transaction. The system also provides for variable identification fields (**ID Field 1** and **ID Field 2**) to allow users to customize the system to their particular information requirements. The names and sizes of the identification fields must be specified at the time of order. The user may also specify which card the various information fields are encoded on in a dual card application.

The following pages describe the standard Series 1000 information fields encoded on the cards. Fields noted **Mag Card Only** pertain only to mag card systems and are not available with optical card systems. Card layouts for both mag and optical card systems and CFN Network cards are shown in Figures 2-2 through 2-3.

Card Type (Mag Card Only)

Standard Card type is always the first field encoded on the card. It is a 1- or 2-digit field and is encoded with field separators. One field separator indicates a single card; the system will not prompt for an additional card for system access. Two field separators indicate a dual card (e.g., employee card); the system will prompt for a second dual card (e.g., vehicle card) before allowing access.

CFN Network Cards for the Commercial Fueling Network are generally single cards.

System ID

- Standard* System ID is a four-digit field which denies users of other systems access to your customer's system. When using two cards, the system ID is both encoded and verified on each card.
- GASBOY CFN* For GASBOY CFN, the Series 1000 may have a five- or six-digit system ID field if it is being configured to match a CFN system with a five- or six-digit system ID.
- CFN Network* Commercial Fueling Networks have a fixed system ID, supplied in the program, which cannot be changed. In addition, a dual system ID option is available which provides a second system ID to be entered via the system ID prompt in the system configuration. This unique system ID is supplied on the card layout.
- "A" System* When matching "A" System cards, the Series 1000 system ID may be from 1 to 6 digits.

Start Field Separator (Mag Card Only)

One field separator is encoded after the **System ID** to indicate the beginning of identification data.

Card Number

- Standard* Card Number is a four-digit field (allows up to 9,999 users) which is used to lock out cards from system access. When using dual cards, the card number is usually encoded on only one card. In dual mag card systems, field separators take the place of the card number on the other card. In dual optical card systems, all of the holes are punched in the card number position on the other card. If the card number is encoded on both cards, it must be the same on both cards. Assign card numbers sequentially from 0001 to facilitate card administration.
- Option Effects* If you have the fuel delivery and dipstick option, cards encoded with the range 9980 to 9989 initiate a fuel delivery transaction; cards encoded with the range 9990 to 9999 initiate a dipstick reading transaction. If you have the supervisor card option on an optical system, any card within the range 9930 to 9979 is treated as a supervisor card.
- CFN Network* With Commercial Fueling Networks, card number is a 7-digit field which is used to lock out cards from access to the system. Most cards used by the CFN Network have six of the seven digits for the card number encoded in the card field and an additional digit, **CARD MSD**, (most significant digit) encoded at the end of the card string. This digit, if used, becomes the first digit of the **CARD** field. If this digit is omitted, the first digit on the **CARD** field is assumed to be 0, otherwise, it is the value of the digit (for example, if the last digit is 7 and the card number field contains 123456, the actual card number would be 7123456). Although encoded this way, when card numbers appear in transactions, the entire 7-digit number is shown.

CFN Network With the fuel delivery and dipstick option, the seventh digit must be encoded at the end of the card string and it must be a nine. This is because fuel delivery and dipstick cards fall into a numeric range that begins with a nine (9). Delivery cards: 9999980 - 9999989, Dipstick cards: 9999990 - 9999999

With dual cards, the card number is usually encoded on only one card and field separators take the place of the card number on the other card. If the card number is encoded on both cards, it must be the same on both cards. Assign card numbers sequentially from 0000001 to facilitate card administration.

"A" System Card number is not a required field for "A" System cards. If the card number field does exist, it may be located anywhere on the card and is not limited to four digits. Lockout is not restricted to the card number field, instead it can be on any ID field of four or more digits. The field being used for lockout must be specified at the time of order.

"A" System Options When you are using an "A" system card that does not use card number and the supervisor or delivery and dipstick option is required, the field being used for lockout is also used to identify the supervisor, delivery, or dipstick card. Ranges for these types of cards have the following digits at the end of the field (supervisor 30-79, delivery 80-89, dipstick 90-99). These ranges are preceded by 9s to the length of the field (for example, the range for a supervisor card if the field is five digits is 99930 to 99979).

Identification (ID) Fields

Standard The standard Series 1000 System can have up to two additional identification fields (**ID Field 1** and **ID Field 2**) whose combined total can range up to 12 digits in mag card systems and up to nine in optical card systems. The field names and sizes must be specified at the time of order. Typically, these fields are used for identifying employee and vehicle, account and vehicle, or department and vehicle, etc. When using dual cards, each **ID Field** is usually encoded on a separate card. In dual mag card systems, field separators take the place of the corresponding **ID Field** on the other card; in dual optical card systems, all of the holes are punched in the field position on the other card. If **ID Field 1** or **2** appears on both cards, the data must be the same on both cards.

Supervisor Card Option The supervisor card option allows the system operator to use a specially encoded supervisor card to manually enter card information at the Series 1000 keypad. Supervisor cards are typically used when a card has been lost. The supervisor can enter data in one to three of these fields: card number (mag only), **Field 1** and **Field 2**. For mag cards, a supervisor card can be encoded with special characters (**A** or **E**) that designate which fields (**Card Number**, **ID Field 1**, or **ID Field 2**) should be entered manually. The fields to be manually entered must be filled with either all **As** or all **Es**. For optical cards, any card with a card number in the range 9930-9979 is treated as a supervisor card. When a supervisor card is used, **ID Field 1** and **ID Field 2** may be entered through the keypad. The data entered at the keypad replaces any data that may have been on the card in those fields. If no data is entered, the system uses the data from the card.

GASBOY CFN If you have a GASBOY CFN system that uses 16-digit combined identification fields, the ID fields can be configured the same on the Series 1000. However, since the Series 1000 uses a maximum of 12 digits for Field 1 and Field 2, only those are recorded.

CFN Network The Series 1000 system for Commercial Fueling Networks has two identification fields (**ACCOUNT** and **VEHICLE**). The **ACCOUNT** field is always 9 digits and the **VEHICLE** field is always 4 digits.

If using dual cards, each field is usually encoded on a separate card and field separators take the place of the corresponding data on the other card. If **ACCOUNT** or **VEHICLE** appears on both cards, the field data must be the same on both cards.

**CFN Network
Supervisor Card
Option**

For Commercial Fueling Networks the Supervisor card can be used to enter data in one to three of these fields: **CARD**, **ACCOUNT** and **VEHICLE**. Like standard mag cards, the supervisor card is encoded with special characters (**A** or **E**) that designate which fields (**Card Number**, **Account**, or **Vehicle**) should be entered manually. The fields to be manually entered must be filled with either all **As** or all **Es**. When the Supervisor card is used to enter data into the **CARD** field, the last digit on the card must be encoded and it must match either the **A** or the **E** used in the card field.

"A" System A Series 1000 can be configured to accept up to four ID fields to match an existing "A" system optical card. A common configuration contains Employee, Vehicle, and Card number fields of four digits each. The lockout field for "A" System cards must be designated at the time of order.

End Field Separator (Mag Card Only)

One field separator is encoded after the last **ID Field** (**VEHICLE** for CFN Network) to indicate the end of identification data.

Expiration Date (Mag Card Only)

Standard Expiration date is a four-digit field assigned to establish a lifetime for the card. The first two digits represent the year; the last two digits represent the month. When using dual cards, the expiration date may be encoded on one or both of the cards. If the expiration date is encoded on only one of the cards, field separators take the place of the expiration date on the other dual card. If the expiration date is encoded on both cards, it must be the same on both cards. If you wish to code the cards with a date in the distant future, you can code 1012 for December 2010. You can configure the system (using the **SC** command) to ignore the expiration date on the card. See the *Series 1000 Operation Manual* for use of the **SC** command. In any case, a valid year (00-99) and a valid month (01-12) must be encoded on the card.

GASBOY CFN For GASBOY CFN, the Expiration Date field may be omitted in the Series 1000 System if it is being configured to match a CFN system without an Expiration Date field.

Product Limitation Code

Standard Product Limitation Code is a one-digit field used to restrict the maximum quantity of product dispensed per transaction. When using dual cards, the product limitation code is usually encoded on only one of the cards, typically a vehicle card. In dual mag card systems, a field separator takes the place of the digit on the other card. In a dual optical card system, all of the holes are punched in the product limitation position on the second card. If the product limitation code appears on both cards, it must be the same on both.

Product limitation is provided mainly as a safeguard to minimize accidental spillage. The system operator can load up to ten (0-9) limitation codes with quantities up to 99999. The vehicle card is generally assigned a limitation code with the nearest quantity greater than the vehicle's tank size. If the user dispenses fuel to the quantity limit of his card, the transaction automatically terminates (this is called limit cutoff). If the user wants additional product, he can initiate another transaction and again dispense product up to the quantity limit on his card.

GASBOY CFN The Series 1000 may be configured with a two-digit limitation code to match a CFN system with a two-digit code. In this case, the Series 1000 will internally convert the two-digit code to a Series 1000 one-digit code. If the first digit is zero, the product limitation is determined by the second digit. If the first digit is not 0, the two-digit code is converted to limitation code 9. (Examples: 01=1, 04=4, 11=9, 23=9).

"A" System This field can be located in any position on the card. The limitation table should contain the same or similar values as those loaded on the "A" System.

Product Authorization Code

Standard Product Authorization Code is a one-digit field used to specify the type(s) of fuel a card can access. When using dual cards, the product authorization code is usually encoded on only one of the cards, typically the vehicle card. In mag card systems, a field separator takes the place of the digit on the other dual card. In optical card systems, all of the holes are punched in the product authorization code position on the other dual card. If the product authorization code appears on both cards, it must be the same on both cards.

The system operator can load into the system, up to nine (1-9) authorization codes with up to five fuel types per code. The user is permitted to access only the product type(s) loaded into the system for the authorization code encoded on his card. The authorization code **0** permits access to all fuels.

GASBOY CFN The Series 1000 may be configured with a two-digit product authorization code to match a CFN System with a two-digit code. In this case, the Series 1000 will internally convert the two-digit code to a Series 1000 one-digit code. If the first digit is 0, the product authorization will be determined by the second digit. If the first digit is not 0, all fuels will be allowed. (Examples: 01=1, 04=4, 11=0 (all fuels), 34=0 (all fuels)).

CFN Network For Commercial Fueling Networks, the **Product Authorization Codes** are 2-digit codes, encoded on the card, that enable the user to access the fuels assigned to that code.

Authorization codes do not need to be sequential, you can use any two digit number in the 01-99 range. The number of authorization codes and the number of fuels is limited to 500. For example, you can have 100 authorization codes with 5 fuel types assigned to each, or 50 authorization codes with 10 assigned to each. Whichever combination you choose, the total of codes and fuel assignments cannot exceed 500.

When using dual cards, the product authorization code is usually encoded on only one card (typically the vehicle card). A field separator takes the place of the digit on the other dual card. If the product authorization code appears on both cards, it must be the same on both cards.

"A" System For "A" Systems, the product authorization codes can be one or two digits and can be located anywhere on the card. If it is one digit, it is handled like the standard system. If it is two digits, the Series 1000 internally converts the two digit code to a Series 1000 one-digit code. If the first digit is 0, the product authorization is determined by the second digit. If the first digit is not 0, all fuels will be allowed. Examples: 01=1, 04=4, 11=0 (all fuels), 34=0 (all fuels). Reference the card layout to determine the location and length of the authorization code. The authorization table should contain the same or similar values as those loaded on the "A" System.

Price Level Code

GASBOY CFN The Series 1000 card layout may have a price level code to match a CFN System. The price level code is used by the CFN System only, and is ignored and not recorded by the Series 1000 System, the "A" System or the Commercial Fueling Network system.

Manual Entry Check Digit

Standard The Manual Entry Check digit determines the data that a user must enter at the keypad during a fueling transaction. There are three possible entries: odometer, personal identification number (PIN), and a manual entry option field). The digit appearing on the card indicates which fields the user must enter. The check digit codes are:

Code	Required Entries
0	No entry required
1	Odometer entry required
2	Manual entry required
3	Odometer and Manual entries required
4	PIN entries required
5	Odometer and PIN entries required
6	Manual and PIN entries required
7	Odometer, Manual, and PIN entries required

Figure 2-1. Manual Entry Check Digit Codes

- Mag Cards* For dual Mag cards, a different check digit may be encoded on each card. This allows the check digit to relate to the card on which it is encoded. For example, the odometer check digit is usually associated with the vehicle card, whereas the PIN check digit is usually associated with the employee card.
- Optical Cards* For dual optical cards, a check digit is encoded on only one card, typically the vehicle card. On the other card, all of the holes are punched in the **Check Digit** position.
- CFN Network* For dual CFN Network cards, the check digit must be the same on both cards.
- "A" System* Additional entries (PIN, odometer, or manual entry) in an "A" System can be mandatory or regulated by a check digit. Mandatory entries must be specified at the time of order. If entries are regulated by a check digit, up to three different check digits may appear: PIN, odometer, and manual entry. A check digit is a digit on the card that indicates whether the user must make additional entries upon fueling. The check digits may be in any position on the card and each may contain a value of either 0 or 1, with 0=not required, and 1=required.

CARD LAYOUT EXAMPLES - MAG CARD SYSTEMS

SINGLE CARD

F S	SYSTEM ID	F S	CARD NO.	ID FIELD 1 (EMP)	ID FIELD 2 (VEH)	F S	EXP DATE	PROD LIMIT	PROD AUTH	CHECK DIGIT
-	XXXX	-	XXXX	XXXX	XXXX	-	YYMM	X	X	X

- = FIELD SEPARATOR X=DIGIT 0-9
YYMM=2-DIGIT YEAR, 2-DIGIT MONTH

DUAL CARDS

FIRST CARD (EMPLOYEE)

F S	SYSTEM ID	F S	CARD NO.	ID FIELD 1 (EMP)	ID FIELD 2 (VEH)	F S	EXP DATE	PROD LIMIT	PROD AUTH	CHECK DIGIT
--	XXXX	-	XXXX	XXXX	----	-	YYMM	-	-	X

SECOND CARD (VEHICLE)

F S	SYSTEM ID	F S	CARD NO.	ID FIELD 1 (EMP)	ID FIELD 2 (VEH)	F S	EXP DATE	PROD LIMIT	PROD AUTH	CHECK DIGIT
--	XXXX	-	----	----	XXXX	-	----	X	X	X

CFN Network Card Layout

COMMERCIAL FUELING NETWORK - SINGLE CARD

CARD TYPE	SYSTEM ID	F S	CARD	ACCOUNT	VEH	F S	EXP DATE	PROD LIMIT	PROD AUTH	PR LV	CHK DIG	CARD MSD
-	XXXX	-	XXXXXX	XXXXXXXXXX	XXXX	-	YYMM	X	XX	X	X	X

Figure 2-2. Card Layout Examples - Mag

CARD LAYOUT EXAMPLES - OPTICAL CARD SYSTEMS

SINGLE CARD

SYSTEM ID	CARD NO.	FIELD 1 (EMP)	FIELD 2 (VEH)	PROD LIMIT	PROD AUTH	CHECK DIGIT
XXXX	XXXX	XXXX	XXXX	X	X	X

X=DIGIT 0-9 H=ALL HOLES IN FIELD PUNCHED

DUAL CARDS

FIRST CARD (EMPLOYEE)

SYSTEM ID	CARD NO.	FIELD 1 (EMP)	FIELD 2 (VEH)	PROD LIMIT	PROD AUTH	CHECK DIGIT
XXXX	XXXX	XXXX	HHHH	H	H	H

X=DIGIT 0-9 H=ALL HOLES IN FIELD PUNCHED

SECOND CARD (VEHICLE)

SYSTEM ID	CARD NO.	FIELD 1 (EMP)	FIELD 2 (VEH)	PROD LIMIT	PROD AUTH	CHECK DIGIT
XXXX	HHHH	HHHH	XXXX	X	X	X

X=DIGIT 0-9 H=ALL HOLES IN FIELD PUNCHED

Typical "A" System Card Layout

TYPICAL LAYOUT "A" SYSTEM - SINGLE CARD

SYSTEM ID	EMP	VEH	CARD	PROD AUTH	PROD LIMIT	ODOM CHECK DIGIT
XXXX	XXXX	XXXX	XXXX	X	X	X

X=DIGIT 0-9 H=ALL HOLES IN FIELD PUNCHED

Figure 2-3. Card Layout Examples - Optical

GASBOY CFN SERIES COMPATIBILITY - SUMMARY

As noted throughout this section, Series 1000 cards can be configured to be compatible with some GASBOY CFN Series Systems. This option must be specified at the time of order. The following chart summarizes the restrictions that apply to CFN cards that will be used with a Series 1000:

System ID	4-6 digits long
Lockout Field	Card number (First 4 digits of CFN Account field)
Dual Lockout	Optional second lockout field must be 4-digits long. The Series 1000 does not provide lockout capability for fields over 4-digits long.
Account Field	The Series 1000 will only use 16 digits of the Account field. The Account field may be up to 20 digits long, but the last four digits will be ignored.
Bank Cards	Not accepted by the Series 1000.
Expiration Date	Not a required field.
Product Limitation	Must be present and may be 1- or 2-digits long. If the 2-digit limitation code is chosen, it is converted internally to a corresponding Series 1000 1-digit code. If the first digit is 0, the product limitation is determined by the second digit. If the first digit is not 0, limitation code 9 is used. (Examples: 01=1, 04=4, 11=9, 23=9).
Product Authorization	Must be present and may be 1- or 2-digits long. If the 2-digit authorization code is chosen, it is converted internally to a Series 1000 1-digit code. If the first digit is 0, the product authorization is determined by the second digit. If the first digit is not 0, all fuels are allowed. (Examples: 01=1, 05=5, 11=0, 23=0).
Price Level	Is read, but ignored.
Check Digit	Must be 1-digit. If the check digit appears on both cards, in a dual card system, it must be the same on both cards.
Max digits on card	33 for mag card and 20 for optical card.

GASBOY "A" SYSTEM COMPATIBILITY - SUMMARY

As noted throughout this section, Series 1000 cards can be configured to be compatible with "A" System optical cards. This option must be specified at the time of order. The following chart summarizes the differences in the Series 1000 when "A" System cards are used:

System ID	1-6 digits long
Lockout Field	Any field of 4-digits or more. Must specify field name at time of order. If lockout is on 5-digit field, the number of 10K lockout blocks must be specified at the time of order. If the lockout file is 6-digits or more, the number of lockouts must be specified at time of order.
Dual Lockout	Optional second lockout field of more than 4-digits functions the way that it would on "A" System. Both fields share the same lockout file and are not independent.
ID fields	Can configure up to four to match "A" System.
Product Limitation	May be in any position on the card. Table must contain same or similar values as in the "A" System.
Product Authorization	Must be present and may be 1- or 2-digits long. May be in any position on the card. Table must contain same or similar values as in the "A" System. If the 2-digit authorization code is chosen, it is converted internally to a Series 1000 1-digit code. If the first digit is 0, the product authorization is determined by the second digit. If the first digit is not 0, all fuels are allowed. (Examples: 01=1, 04=4, 11=0, 34=0).
Price Level	Is ignored.
Check Digit	Additional entries (PIN, odometer, or manual entry) can be mandatory or regulated by a check digit on "A" System optical cards. Mandatory entries must be specified at the time of order. If entries are regulated by a check digit, up to three different check digits may appear: PIN, odometer, and manual entry. A check digit is a digit on the card that indicates whether the user must make additional entries upon fueling. The check digits may be in any position on the card and each may contain a value of either 0 or 1, with 0=not required, and 1=required.
PIN	If PIN is required, the CFN or "A" System algorithm must be specified as well as the field on which the PIN should be calculated.
Options	If the Supervisor or Delivery and Dipstick option is ordered and there is no card number field, these card types use ranges within the same field as specified for lockout.
Max digits on card	20 for "A" System optical card.

STANDARD SYSTEM FEATURES

Transaction Recording

All formatted transaction printouts contain abbreviated headings. Headings vary depending on the options configured. Transaction headings and their descriptions are listed below.

Transaction Headings

Field Name	Description
SITE	4-digit site number
TRAN	4-digit transaction number
CARD	4-digit card number; 6 or 7 digits for CFN Network Not required for "A" Systems. No length restriction if used.
ID field 1	Variable digit field (usually 4-digit EMP); standard system only
ID field 2	Variable digit field (usually 4-digit VEH); standard system only "A" Systems may have up to 4 ID fields.
ACCT	Account field used by CFN Network systems
VEH	Vehicle field used by CFN Network systems
xxxxxx	up to 6-digit manual entry field, Manual Entry option. You designate the field name at the time of order. CFN Networks use this option for a field named JOB # which is 8-digits long.
DATE	6-digit Gregorian date
TIME	4-digit 24-hour (military) time
P#	2-digit pump number
PR	2-digit product type
QUANTITY	8-digit quantity of product dispensed
PRICE	4-digit unit price of product (depends on Price Data Format setting)
\$TOTAL	8-digit total calculated transaction price (depends on Price Data Format setting)
ODOM/C HOURS	6-digit odometer mileage or current hours entry "A" Systems may not have odometer.
MILES/TIME E	4-digit miles travelled or time elapsed, MPG/HPG option only
MPG/HPG	4-digit miles/hours per gallon calculation, MPG/HPG option only
ERROR	transaction error message (2 numeric digits for PC, PH)

NOTES: *The card system ID fields allow the user to customize the system to his requirements at the time of order. They are typically used for employee and vehicle numbers. In mag card systems, the combined total of these fields cannot exceed 12 digits. In optical card systems, the combined total cannot exceed 9 digits.*

For CFN Network systems, the ID fields are ACCT (9-digits) and VEH (4-digits); the manual entry field is 8-digit JOB #.

Series 1000 systems matching "A" System optical cards will have the transaction headings as specified on the existing "A" System cards.

Price Data Format Effect on Headings

When the system operator sets the system configuration parameters, the selection for Price Data Format affects which headings are displayed on

transaction printouts. Unit price (**PRICE**) and total transaction price (**\$TOTAL**) headings and data may appear. Compacted format (**PC** or **PH**) always shows unit price and total price. If you choose regular (**PT**) or sorted (**ST** or **SS**) transaction printing you get the following results depending on the setting.

Setting	Results
0	No headings for unit and total price and no pricing data.
1	Unit price (PRICE) heading and unit price. (Penny pulsing pump only)
2	Unit price (PRICE) and total price (\$TOTAL) headings and price data for all transactions regardless of pulser type.

Direct Printout

If a terminal printer or logger is connected to Communication Port 1, transaction information is printed immediately upon transaction completion. See Figure 2-4 for a sample printout.

TRAN	CARD	EMP	VEH	DATE	TIME	P#	PR	QUANTITY	ODOM	ERROR
0022	8877	1122	3344	05/21/92	16:28	01	01	11.71	032648	

Figure 2-4. Direct Printout Example for a Card System

Transaction Printing & Sorting

Options Transactions may be recalled from the system memory in a variety of formats. Transactions can be printed in transaction number sequence or they can be sorted before printing. Transaction headings appear as listed previously in **Transaction Recording**. Price headings may vary depending on your price data format setting. The system operator can specify a sort and subsort by any field except **\$TOTAL** and **MPG/HPG**. Transactions can also be printed by a specific number within a field. Total gallons are provided for each subsort. A sample transaction is shown in Figure 2-5.

*PT												
SITE 0589												
TRAN	CARD	EMP	VEH	DATE	TIME	P#	PR	QUANTITY	PRICE	\$TOTAL	ODOM	ERROR
0001	6759	4302	1328	03/30/92	12:59	01	01	87.6	1.019	89.26	000000	
0002	1234	5678	9012	03/30/92	13:00	02	02	11.14	1.259	14.03	235123	
0003	9999	9999	9999	03/30/92	18:30	04	04	20.060	1.169	23.45	999999	
0004	1234	5678	9012	03/30/92	18:30	05	00	0.	0.000	0.00	058568	
0005	0001	0002	0003	04/02/92	08:23	03	03	117.4	1.059	124.33	004523	
0006	6759	4302	1328	04/02/92	12:06	02	02	81.26	1.259	102.31	000000	
*												

Figure 2-5. Transaction Printing with Price Data Format Setting of 2

Compacted Format

Description Transaction data can also be output in *compacted format*, deleting all spaces, headings and punctuation. Compacted format is generally used to send transactions to a computer. The last three digits of each line represent the check sum, a sum of all characters within the transaction. Compacted format transactions can be transmitted in two ways: as a continuous string (Figure 2-6); or line-by-line with an acknowledgement from the data terminal or a program after each transaction (Figure 2-7).

```
*PC
05890001675943021328033092125901010008760010190000892600000009175
05890002123456789012033092130002020001114012590000140323512309154
0589000399999999999999033092183004040002006011690000234599999932268
05890004123456789212033092183005000000000000000000000005856819152
05890005000100020003040292082303030011740010590001243300452301125
05890006675943021328040292120602020008126012590001023100000009158
*
```

Figure 2-6. Compacted Transactions - Continuous String Transmission

```
*PH
05890001675943021328033092125901010008760010190000892600000009175A
05890002123456789012033092130002020001114012590000140323512309154A
0589000399999999999999033092183004040002006011690000234599999932268A
05890004123456789212033092183005000000000000000000000005856819152A
05890005000100020003040292082303030011740010590001243300452301125A
05890006675943021328040292120602020008126012590001023100000009158A
```

Figure 2-7. Compacted Transactions - Line-By-Line Transmission

Sign On Password

A password of up to 10-characters is required to access the system Command Mode for updating files and retrieving information. For security, the password is not printed when entered into the system. The system operator can change the password.

System ID

Standard A system ID number uniquely identifies each system and prohibits access to users of other systems. This number is assigned at order time and encoded on the access cards.

CFN Network The CFN Network system has a fixed system ID and PIN key (in the program) that cannot be changed. The user cannot load a system ID unless he has the dual system ID option. This option allows the user to assign a unique system ID and PIN key for his system.

"A" System When matching "A" System cards, the Series 1000 system ID may be from 1 to 6 digits.

Personal Identification Number (PIN)

- Standard* For optimum security, access cards can be encoded to require the entry of a PIN number. PINs are calculated uniquely for each system by using an algorithm, the 4-digit PIN key, and the **CARD** field. The user can proceed with the transaction only if the number entered matches the PIN calculated by the system. The system can be set up to automatically lock out the card after three consecutive PIN entry errors.
- CFN Network* The CFN Network has a fixed PIN key (in the program) that cannot be changed. The user cannot load a PIN key unless he has the dual system ID option. This option provides a loadable PIN key and system ID in addition to the fixed ones. Also, the CFN Network cannot set up the system to automatically lock out the card after three unsuccessful PIN entries.
- Display* You can have the system calculate and display the PIN on the LCD display using diagnostic test 0 and inserting the card for which the PIN is to be calculated.
- "A" System* PIN is not required on a Series 1000 matching an "A" System; however, if it is used, it can be mandatory (specified at order time) or regulated by a check digit on the optical card. If the PIN is mandatory, all card users must enter a PIN to fuel; no check digit is required. PIN regulated by a check digit may be requested on an individual basis by setting the check digit value on the card to 1=required. If PIN is used, either the CFN or the "A" System algorithm must be specified as well as the name of the field on which the PIN should be calculated.

Lockout

- Standard* The system operator can control access to the system by validating/invalidating cards by number. This process is called *lockout*. Card numbers can be validated/invalidated individually, in strings of up to 20 assorted card numbers, or by ranges of consecutive card numbers. If desired, the system can lock out the entire user file. Cards could also become invalid when a user tries to enter a PIN number unsuccessfully three consecutive times. Optionally, you can order the dual lockout feature. This enables you to specify another field, in addition to card number, for lockout. See **Optional System Features** for details on dual lockout.
- Validating a user's card allows that user to access the system; invalidating a card locks out that user from the system. Lockout for card systems can be *negative*, where you validate all cards and invalidate individual cards, or *positive*, where you invalidate all cards and validate individual cards.
- CFN Network* Lockout for cards in the Commercial Fueling Network is by 7-digit card number only.
- "A" System* Lockout for Series 1000 systems matching "A" systems can be based on any field of four digits or more. Name of lockout field must be specified at the time of order. If lockout is on 5-digit field, it is bit-mapped lockout and the number of 10,000 lockout blocks must be specified at the time of order. If lockout is on a field of 6 digits or more, it is limited lockout and the number of lockouts must be specified at the time of order.

Product Authorization

Standard The product authorization feature controls access to fuel type(s). Using the **LF** command, the system operator can load up to nine authorization codes (1-9) with up to nine fuel types per code. The user is permitted to access only the fuel type(s) loaded into the system for the authorization code encoded on his card. The authorization code **0** permits access to all fuels. Figure 2-8 shows a product authorization code table initiated by the **PF** command.

*PF	
AUTH. CODE:	1 ALLOWS FUELS...01 02 03 04 05
AUTH. CODE:	2 ALLOWS FUELS...01
AUTH. CODE:	3 ALLOWS FUELS...02
AUTH. CODE:	4 ALLOWS FUELS...03
AUTH. CODE:	5 ALLOWS FUELS...04
AUTH. CODE:	6 ALLOWS FUELS...05
AUTH. CODE:	7 ALLOWS FUELS...02 03
AUTH. CODE:	8 ALLOWS FUELS...03 04 05
AUTH. CODE:	9 ALLOWS FUELS...04 05
*	

Figure 2-8. Product Authorization Codes

CFN Network The fuel authorization table for Commercial Fueling Networks is limited to 500 authorization codes and fuel types. For example, you can have 100 codes with 5 fuel types each, or 50 codes with 10 fuel types each, etc. The system operator uses the **LF** command to load authorization codes which can be numbered from 01-99. Code 00 is preset to allow all fuel types.

"A" System For "A" Systems, the product authorization codes can be one or two digits and can be located anywhere on the card. The table values should be the same or similar to those loaded on the "A" System. For more on authorization codes for "A" System cards, see **Card Layout and Field Descriptions** earlier in this section.

Product Limitation

Description The product limitation feature controls the amount of product that can be dispensed in one transaction. The limit is specified by the limitation code encoded on the card. Using the **LL** command, the system operator can load the 10 available limitation codes (0-9) with any quantity from 1 to 99999. If a user reaches the maximum limit that has been entered for the code on his card, then the pump is automatically turned off causing a **LIMIT CUTOFF** error message. Figure 2-9 shows a product limitation code table initiated by the **PL** command.

```

*PL
LIMITS :
0 =      5
1 =     10
2 =     15
3 =     20
4 =     25
5 =     30
6 =     35
7 =     40
8 =    900
9 = 99999
*
    
```

Figure 2-9. Product Limitation Codes

"A" System For "A" Systems, the product limitation codes can be located anywhere on the card. The table values should be the same or similar to those loaded on the "A" System.

Pump Totalizers

Description Incrementing totalizers are maintained for each hose outlet. As transactions occur, the totalizer of the corresponding hose is incremented by the transaction quantity. The pump totalizers can be automatically set back to zero or individually set to the corresponding mechanical pump totalizer. The totalizers have seven digits to the left of the decimal point and three digits to the right (xxxxxxx.xxx). Figure 2-10 shows a pump assignments and totalizer listing initiated by the **PP** command.

```

*PP
P#  TANK  FUEL#  FUEL NAME  PRICE  GALLONS
1   1     01   REGULAR    $1.189 21569.020
2   2     02   UNLEADED   66544.300
3   3     03   DIESEL     1223.300
4   4     04   SUPER UNLEAD 51100.654
*
    
```

Figure 2-10. Pump Assignments and Totalizers Listing

Tank Inventory Totalizers

Description The system maintains up to eight tank quantities and allows for setting, adding to, or subtracting from the inventory level. Each pump is assigned a tank and as many pumps as desired can be assigned to a particular tank. As transactions occur, the inventory of the appropriate tank is decremented to show a lesser

quantity. An inventory reorder point can be loaded into the system for each tank. The reorder point is printed as a reminder when the current tank totalizers are printed. Once the tank goes below the reorder level, **REORDER FUEL** prints in the **ERROR** field of all transactions withdrawing from that tank until the inventory is adjusted above the reorder level. Complete pump, tank, and product assignments may be printed using the **TI** command (Figure 2-11). The tank totalizers have seven digits to the left of the decimal point and three digits to the right (xxxxxxx.xxx)

```
*TI
TANK #1 INVENTORY: 9301.190 REORDER 2000
TANK #2 INVENTORY: 12000.000 REORDER 3000
TANK #3 INVENTORY: 10000.000 REORDER 3000
*
```

Figure 2-11. Tank Inventory

Loadable Pump Timeouts

Description The Series 1000 monitors two timeout periods. Timeout values are assigned to ensure that the pumps are not activated and left unattended.

There are two timeout periods:

- Interval in which the pump is activated by the system and the first pulse is received.
- Interval between turning off the nozzle (last pulse received) and turning off the pump handle. This timeout is reset if additional pulses are received.

This timeout is reset each time a pulse is received and is terminated by shutting off the pump handle. Timeout periods range from 1 to 180 seconds and can be set individually for each pump. A typical timeout is 80 seconds. If either timeout period is exceeded during a transaction, the transaction ends automatically, and a **TIMED OUT** message appears in the transaction **ERROR** field. Figure 2-12 shows the pump timeout and pulse rate assignments listing initiated by the **XP** command.

```
*XP
      - PUMP TIMEOUTS -
      IN SECONDS

P#    PULSES PER  BEFORE  AFTER
      GALLON     PULSES  PULSES
01          $      060    060
02         0010     080    080
03         0010     080    080
04         0010     080    080
*
```

Figure 2-12. Pump Timeout and Pulse Rate Assignments

Pulse Rates

Description The Series 1000 System can accept pulse rates of dollar (one pulse per penny); and quantity (1:1, 10:1, 100:1, 250:1, 500:1, and 1000:1 ratios). Pulse rates may differ between pumps and the pulse rate definitions are loaded into the system via the data terminal. The pulse rate switch is located in the system cabinet in an area sealable by Weights and Measures for retail applications. When the switch is set to enabled, no transactions can occur at the system and the message **REMOTE CONFIGURATION** appears on the display.

Activate/Inactivate a Pump Via Terminal

Activate Pump This feature allows the system operator to use the **AP** command to activate a pump (hose) from a data terminal for one transaction. This transaction is recorded as a normal transaction except that the digits of information, which would normally be read off the card, are recorded as all 9's (See Figure 2-13).

TRAN	CARD	EMP	VEH	DATE	TIME	P#	PR	QUANTITY	ODOM	ERROR
0164	9999	9999	9999	03/22/92	11:50	01	01	10.2	000000	

Figure 2-13. Transaction Activated via Terminal

Inactivate Pump The system operator can turn off any pump (hose), currently in use, from a data terminal by using the **IP** command. The pump is inactivated only for that transaction and the message **TTY CMD** is placed in the **ERROR** field for that transaction.

Pump Enable and Disable Via Terminal

Through a data terminal, the system operator can enable (**EP**) or disable a pump (**DP**) from further use. With the **DP** command, a **PUMP DISABLED** notation appears for that pump in the pump status (**PP** command) printout. The pump remains disabled until the system operator re-enables it through the data terminal.

Automatic Pump Disable

As a safeguard against defective pulse transmitters in the pumps, the system operator may configure the system to automatically disable a pump after a number (1-99) of consecutive no quantity transactions. If a pump becomes disabled in this manner, a **PUMP # X DISABLED** message appears on the direct printout. The pump remains disabled until the system operator re-enables it through the data terminal.

Automatic Site Shutdown Via Terminal

The system operator can set a time period each day when the system is automatically shut down and all users are denied access to the fuel dispensing equipment. A **SITE IS DOWN** message appears on the system's LCD display.

The system operator still may access the other software features and may activate a pump for one transaction through the Activate Pump feature. The automatic site shutdown can be disabled through the data terminal.

Odometer/Hours Entry

Description This feature uses the manual entry check digit encoded on the card to determine whether the user is prompted to enter an odometer/hours reading at the Series 1000 keypad.

"A" System For matching "A" Systems, odometer may be omitted entirely or ordered as mandatory, rather than regulated by a check digit.

Expiration Date on Cards (Mag Card Only)

The Series 1000 mag card system provides for an expiration date (year and month) to be encoded on each card. When the expiration date is reached, the card is not honored by the system. This feature can be disabled through the data terminal.

Dual Port

This feature allows the system to be connected to two terminal devices or a terminal and a modem. The system can communicate through only one port at a time.

Help Feature

The Help feature provides a list of all terminal commands. If the operator wishes further explanation, an expanded help command produces a list showing each command, followed by a brief description.

System Message Display

The system operator can load, via the data terminal, a 20-character message to appear on the Series 1000 Liquid Crystal Display (LCD). When the Series 1000 is not in use, the LCD alternates between the system message and the **ENTER CARD** prompt message.

Encoded Card Information Display

While in diagnostic mode, the system operator can display, on the Series 1000 LCD display, the encoded digits for the card currently inserted in the reader. The encoded information appears four digits at a time. The system operator can also print, on the data terminal, the card information of the last card used in the system.

Diagnostics

To aid in system troubleshooting and service, an integral diagnostic program is provided. This program includes card reader, keypad, LCD, LCD message, ROM, RAM, and communication port tests. A summary of diagnostic tests is shown in Figure 2-14.

Test #	Description
0	Calculate PIN Function
1	Change Password Function
2	LCD Character Set Test
3	Card Data Display
4	Keypad Test
5	Communication Ports Test *
6	RAM (Memory) Test
7	ROM (Program) Test
8	LCD Message Test
9	Mag Data Section Test **

* Loopback test jumper needed for this test
** Special test cable needed for this test

Figure 2-14. Diagnostic Test Summary

OPTIONAL SYSTEM FEATURES

Activate Pump with Data Entry

Description The Activate Pump with Data Entry option allows the system operator to enter card data and an odometer/hours reading at the data terminal before activating a pump. The system prompts you for the card number, **ID Field 1**, **ID Field 2**, and odometer/hours before allowing you to select a pump. When this transaction is recorded, the digits of information, which are usually input at the Series 1000, are replaced by those entered at the data terminal. If the user does not need to enter data for a particular field, press RETURN at that field; it will be filled with nines (9).

Auxiliary Communications Port PCB

Description An optional auxiliary port PCB may be available if you have ordered the receipt printer or tank monitor options. This board contains two ports (an RS-232 for a receipt printer and a configurable RS-232/422 for a tank monitoring system). Each has a selectable baud rate of 300, 1200, or 9600. The receipt printer is always set to 9600. Most tank monitoring systems should be set to 300 or 1200 and, for optimum data transfer, should run at the same baud rate as the data terminal.

Dual Lockout

Standard The Dual Lockout option allows the system operator to lock out a second field, in addition to the standard card number. The second lockout field may be **ID Field 1**, **ID Field 2**, or the optional manual entry field. The field must be four digits and designated at the time of order. The two lockout fields are completely independent from each other, (for example, locking out card number 2348 will not lockout number 2348 in the second lockout field).

CFN Network Dual lockout is not supported for CFN network systems.

"A" System The additional lockout field for matching "A" Systems can be any field of four or more digits. Field name must be specified at time of order. If the lockout fields are both 4-digits, there are two independent lockout files. If lockout fields are 5 or more digits, both the primary and additional lockout field share the same lockout file and are not independent.

Extended Pump Timeouts

Description The Extended Pump Timeouts option allows the before and after pulsing timeouts, loaded through the **LP** command, to be longer than 180 seconds. The timeouts can be extended to 3600 seconds (one hour).

Fuel Allocation

Description The Fuel Allocation option allows the system operator to allocate to users, over a period of time, predetermined amounts of fuel. This option works effectively only in a single site operation.

Requirements At the time of order, the user must indicate the field (4-digits) to be assigned the allocation totalizers and the number of totalizers. This field must be a card field (**CARD, ID Field 1, or ID Field 2**). It cannot be a manual entry field.

Sequence An allocation offset command (**AO**) allows the user to specify the starting number for the allocation totalizers. For example, a system ordered with allocation by vehicle number and 500 totalizers with an allocation offset of 1200 will have allocation totalizers assigned to vehicle numbers 1200 through 1699.

As fuel is withdrawn from the system, the appropriate allocation totalizer is decremented. When the totalizer reaches zero, the user is denied fuel until the system operator loads a new allocation amount. The system operator may add to, or subtract from, individual totalizers or strings of totalizers at one time. An allocation table (Figure 2-15), showing the allocation numbers and their current totalizer values, may be printed on demand. An individual allocation number or range of numbers, may also be specified and their current totalizer values are printed (Figure 2-16). A total of all totalizer values is provided on all allocation reports.

```

*PA
ALLOCATION TABLE
0000= 123.456      0001= 390.000      0002= 12820.678      0003= 86252.000
0004= 44553.000    0005= 92346.989    0006= 175.000        0007= 4354.000
0008= 4344.000     0009= 4344.000     0010= 165.000        0011= 165.000
0012= 165.000      0013= 165.000      0014= 165.000        0015= 165.000
TOTAL: 250692.123
*
    
```

Figure 2-15. Allocation Table

```

*MP
ALLOCATION NO.: 0012
TO
ALLOCATION NO.: 0015
0012 = 165.000      0013 = 165.000      0014 = 165.000      0015= 165.000
TOTAL: 660.000
*
    
```

Figure 2-16. Range of Allocation Totalizers

Fuel Delivery and Dipstick

Standard Using special cards, the Series 1000 can accept and record fuel delivery and dipstick reading data. Any card with a card number in the range 9980-9989 initiates a fuel delivery transaction and any card with a card number in the range 9990-9999 initiates a dipstick reading transaction.

<i>CFN Network</i>	When using this option with the Commercial Fueling Network cards, the most significant digit for the card number field must be encoded and it must be a nine. This is because fuel delivery and dipstick cards fall into a numeric range that begins with a 9. Delivery cards are 9999980-9999989 and dipstick cards are 9999990-9999999.
<i>"A" System</i>	When you are using an "A" system card that does not use card number and you have the delivery and dipstick option, the field you are using for lockout is also used to identify the delivery or dipstick card. Ranges for these types of cards have the following digits at the end of the field (delivery 80-89, dipstick 90-99). These ranges are preceded by 9's to the length of the field (for example, the range for a delivery card if the field is five digits is 99980 to 99989).
<i>Sequence</i>	Fuel deliveries update the inventory totalizer for the designated tank and create a transaction. Dipstick readings only generate a transaction, inventory totalizers are not affected.

Gate Controller

<i>Description</i>	The Gate Controller option enables you to control access to a gate using a dedicated Series 1000.
<i>Sequence</i>	When the user inserts his card, the gate controller verifies the card and activates the gate relay. On a dual-card system, access is granted after verification of the single card containing the card number field. Field separators that occupy account data positions on dual card systems are converted to zeros for printout purposes.
<i>Transaction Matching</i>	If you have an existing Series 1000 without the price data format option or wish to match a Series 1000 with the MPG option, the Gate Controller system can be configured to match your existing transactions.
<i>Memory Full</i>	The Gate Controller can also be ordered with Memory Full protection disabled. This means when the system memory is full, new transactions will overwrite the transactions already in memory. When you select this option, you cannot retrieve transactions, the only record will be the direct printout copy.

Hours

<i>Description</i>	An Hours option is available for user equipment that is monitored with an hour meter instead of an odometer. When you select the Hours option, transaction odometer (ODOM) field becomes C HOURS; in the MPG option, MILES values are calculated in HOURS and MPG as HPG; in the reasonable odometer option, ODOM becomes HOURS.
--------------------	--

Loadable Base Pump

<i>Description</i>	The Loadable Base Pump option allows the system operator to assign different starting pump numbers for a site where there is more than one Series 1000. You can enter a base pump number that is used as the number of the first pump in a
--------------------	--

system. All pumps are numbered consecutively beginning with the base pump number. The maximum pump number is 99. Pump numbers that are less than the base pump number will not be available.

Example:

If the base pump number is loaded as 3, there will not be any pumps numbered 1 or 2 at that Series 1000. When pump number 3 is selected for fueling, the first relay in that system is activated.

Manual Entry

Standard The Manual Entry option provides an additional field that allows you to request input from the Series 1000 user, via the keypad, during a card entry action. You can use this field to record anything from manual oil transactions, department numbers or trailer numbers. You can also use this field for lockout provided you have the Dual Lockout option.

Requirements When you place your order, you must specify the field name and size as well as whether you will use this field for lockout. The field may be up to six digits (four digits if used for lockout). The check digit, encoded on the card, controls whether the individual user is prompted to enter the manual entry. (For more information, see **Manual Entry Check Digit**). The manual entry appears under its own heading in the transaction printouts. Figure 2-17 shows a manual entry option using **DEPT** (department number) as the entry.

CFN Network Commercial Fueling Network systems use the manual keypad entry option for a field named **JOB #** which contains up to eight digits.

"A" System For matching "A" Systems, manual entry may be ordered as mandatory, rather than regulated by a check digit.

*PT											
SITE 1234											
TRAN	CARD	VEH	EMP	DEPT	DATE	TIME	P#	PR	QUANTITY	ODOM	ERROR
0008	0543	2813	7596	0032	05/20/92	13:38	01	01	11.91	045621	
0009	8887	1122	3344	0011	05/20/92	13:38	03	03	10.00	000000	
0010	8877	1122	3344	0011	05/21/92	13:39	02	02	15.2	000000	
*											

Figure 2-17. Transaction Printout with Manual Entry Option (DEPT)

Miles/Hours Per Gallon and Reasonable Odometer/Hours Check

Description The MPG/HPG option (which includes reasonable odometer/hours check) allows the Series 1000 system to calculate and maintain a miles-per-gallon or hours-per-gallon tally for a set number of vehicles (*NOTE: Hours-per-gallon is used when user equipment is monitored with an hour meter instead of an odometer*). The type of option, MPG or HPG, is chosen at the time of order. Also, the maximum number of vehicles supported is chosen at the time of order. When specifying the number of vehicles, the user should consider any plans for expansion of the vehicle fleet in the future.

Vehicle File A vehicle file is provided for the user to enter vehicle information. Every vehicle in the file may be configured as to whether or not the system will calculate MPG/HPG and execute a reasonable odometer/hours check on it. If the feature is disabled for a vehicle record, the system will continue to update the total gallons and odometer/hours entries, but MPG/HPG will not be calculated.

MPG File Information

MPG/HPG software computes fuel efficiency two ways: per transaction and averaged over a period of time (usually a month). To use the MPG/HPG option, the user enters information on each of his vehicles into a vehicle record. These records are stored in a vehicle file. The MPG/HPG option uses the vehicle data you enter plus calculated values to provide total MPG/HPG information. The vehicle information for MPG is different than that for HPG; both types are shown below.

MPG vehicle file fields:

- VEH 3- to 6-digit vehicle number
- B ODOM up to 6-digit beginning odometer reading
- E ODOM up to 6-digit ending odometer reading (last recorded)
- GALLONS up to 8-digits for total gallons for period
- MILES 6-digits for miles driven
- MPG 3 digits before and one after the decimal point for MPG value.
- STAT a record status code indicating MPG comments (for more on status flags, see the *Operation Manual*)

HPG vehicle/equipment file fields:

- VEH 3- to 6-digit vehicle/equipment number
- B HOURS up to 6-digit beginning hours reading
- E HOURS up to 6-digit ending hours reading (last recorded)
- A HOURS up to 6-digit new accumulated hours
- GALLONS up to 8-digits for total gallons for period
- HPG 3 digits before and one after the decimal point for HPG value.
- STAT a record status code indicating HPG comments

Transaction Printout

The transaction printout, in addition to standard transaction fields, lists the number of miles/hours since the vehicle's last transaction, and the per transaction miles/hours per gallon. A sample MPG transaction printout is shown in Figure 2-18.

*PT														
TRAN	CARD	EMP	VEH	DATE	TIME	P#	PR	QUANTITY	ODOM	MILES	MPG	ERROR		
0004	3281	5967	2430	03/01/92	15:02	02	02	15.1	035025	0375	24.8	LIMIT	CUTOFF	
0005	0826	4627	1234	03/01/92	15:03	01	01	16.71	048546	0328	19.6			

Figure 2-18. Print Transactions with MPG Option

Sequence When the system detects an odometer/hours entry, the vehicle number is checked to see if MPG/HPG calculation and reasonable odometer/hours check is enabled. If it is, the system validates the odometer/hours entry and updates the vehicle record when the transaction is completed. If MPG/HPG calculation and reasonable odometer/hours entry is disabled, the system accepts the odometer/hours entry without verification and updates the vehicle record when the transaction is completed. See the *Operation Manual* for a discussion of **MPG/HPG Transaction Processing**.

Printing Options The user can print out the vehicle file to view the vehicle number, beginning and most recent odometer/hours entries, the total number of miles/hours, the number of gallons, and the miles-per-gallon/hours-per-gallon over the period. Figures 2-19 through 2-20 show two printing options for the vehicle file.

```

*VF
      MAX. MILES BETWEEN FUELINGS
          0700

VEH   B ODOM  E ODOM  MILES  GALLONS   MPG  STAT
0012  031256  031554  000298  16.000   18.6
0018  043578  043957  000379   3.100  122.3  HIGH
0054  012967  012989  000022  11.600   1.9  LOW
*
    
```

Figure 2-19. MPG Vehicle File Printout - All Vehicles

```

*CR

VEH. NO:  0012

VEH   B ODOM  E ODOM  MILES  GALLONS   MPG  STAT
0012  031256  031554  000298  16.000   18.6
    
```

Figure 2-20. MPG Vehicle File Printout - Specified Vehicle

Multi-Level Password

Description The Multi-Level Password option provides two levels of passwords:

- super user
- standard user

The super user password allows you to access all system commands including the **CP** command. The **CP** command allows you to selectively authorize or restrict commands that the standard user is allowed to access.

When you use diagnostic test 1 to initialize the password, both passwords are set to **GASBOY**.

*Change
Password*

To change the super user password, sign on as **GASBOY** and use the **LS** command to change the password. Use the **EX** (exit) command to exit command mode. You are now in standard user mode. To change the standard user password, sign on as **GASBOY** and use the **LS** command to change the password.

Pump Switch Timer

Description The Pump Switch Timer option allows you to prevent fueling at a pump when the handle has been left on from a previous transaction.

In a normal transaction when you request a pump, the pump is activated, the user turns on the pump handle and fueling begins. Occasionally, the pump handle may have been left on from a previous transaction. When a new transaction is initiated, the pump cannot reset and, if pumping is allowed, the quantity shown at the pump includes the previous transaction quantity.

With the pump switch timer option, the handle is checked at the beginning of each transaction. If it is found to be on, a **TURN OFF PUMP HANDLE** message appears and the transaction is terminated. A transaction is generated with the message **PMP SW ERROR**. The user must turn off the pump handle and begin a new transaction in order to fuel.

Reasonable Odometer/Hours Check Only

Description The Reasonable Odometer/Hours option provides an odometer or hours validity check for a set number of your vehicles (**NOTE: Hours-per-gallon is used when user equipment is monitored with an hour meter instead of an odometer*). The exact number of vehicles supported is chosen at the time of order. When specifying the number of vehicles, the user should consider any plans for expansion of the vehicle fleet in the future. The Reasonable Odometer option is similar to the MPG/HPG option without the MPG/HPG features.

Vehicle File A vehicle file is provided and the user loads data into a vehicle record for each vehicle to use reasonable odometer/hours. Each record contains three fields:

- VEH 3- to 6-digit vehicle number
- ODOM/HOURS up to 6-digit odometer/hours entry
- STAT a special code indicating reasonable odometer/hours comments

Sequence When the system detects an odometer/hours entry, the vehicle number is checked to see if it is in the vehicle file. If it is, the odometer/hours entry is checked against the last odometer/hours reading entered. The system also considers the maximum miles/hours between fuelings value (**LM** command). If the odometer/hours entry is out of range, the system prompts for another entry. See the *Operation Manual* for a description of reasonable odometer/hours processing.

Printout Figure 2-21 shows a vehicle file printout with the reasonable odometer option.

*VF		
VEH	ODOM	STAT
0012	031250	
0018	043578	%%
0054	012967	
*		

Figure 2-21. Reasonable Odometer Vehicle File

Receipt Printer

Description The Receipt Printer option allows the user to obtain a transaction receipt for fuel dispensed through the Series 1000. Receipts are available only for those transactions where fuel is dispensed; error and other no quantity transactions cannot be printed. An additional option allows for up to three receipts to be generated for a transaction. The number of receipts is set using the **SC** command.

Sequence Obtaining a receipt is accomplished as follows: After a user fuels his vehicle in the normal fashion and wants a receipt, he goes back to the Series 1000 and runs his card (or cards) through. The system asks if he wants a receipt. If the reply is yes, a receipt is printed and the transaction is finished.

If he does not choose to get a receipt, the next time he attempts to fuel, the system checks through the last 16 transactions with quantity. If one of these matches his card data, the system asks if he wants a receipt (for that transaction). If the reply is yes, the system prints a receipt. He must then run his cards again to begin the fueling transaction. If the reply is no, the system proceeds with a normal fueling operation.

Sample Receipt A sample of a receipt issued from the Series 1000 is shown on the next page.

Receipt header. Up to four 30-character lines of text loaded through the SC command.

Site number
 Transaction number
 Date
 Time
 Card number
 ID field 1 number (if used)
 ID field 2 number (if used)
 Manual entry (if used)
 Pump number
 Product name
 Quantity
 Unit price (if full price data enabled)
 Total price (if full price data enabled)
 Odometer (if available)
 MPG (if configured and data is available)

GASBOY INTERNATIONAL, INC
 707 NORTH VALLEY FORGE RD
 LANSDALE, PA 19446
 TELEPHONE: (215) 855-4631

SITE NO.: 1234
 TRANS NO.: 0071
 DATE: 09/18/92
 TIME: 12:23
 CARD: 0243
 EMP: 2813
 VEH: 7576
 DEPT: 55
 PUMP: 04
 PRODUCT: DIESEL
 QUANTITY: 22.090
 PRICE/GAL: \$1.249
 TOTAL: \$27.59
 ODOMETER: 023456
 MPG: 12.5

Receipt trailer. Up to two 30-character lines of text loaded through the SC command.

THANK YOU FOR FUELING WITH
 GASBOY

Transaction receipts are not available if:

- There are no available receipt transactions in the system memory for the card or vehicle number.
- The receipt printer is in an error condition. (i.e., printer jammed, paper out, printer down).

The system operator can issue a receipt printer command, **GR**, from the data terminal to obtain a receipt for a specific transaction number.

Supervisor Card

Standard

This option allows the system operator to use a specially encoded supervisor card to manually enter card information at the Series 1000 keypad. Supervisor cards are typically used when a card has been lost.

Mag Card Systems

A supervisor card can be encoded with special characters (**A** or **E**) that designate which fields (**Card Number**, **ID Field 1**, or **ID Field 2**) should be entered manually. The fields to be manually entered must be filled with either all **As** or all **Es**.

For example, assume that your system has the following card layout:

F	SYSTEM	F	CARD	FIELD1	FIELD2	F	EXP.	PROD	PROD	CHECK
S	ID	S	NO.	(EMP)	(VEH)	S	DATE	LIM.	AUTH.	DIGIT
-	XXXX	-	XXXX	XXXX	XXXX	-	YYMM	X	X	X

X = digit (0-9), FS = field separator

If you want to have the supervisor enter **CARD NUMBER, ID FIELD 1, and ID FIELD 2**, encode the following in those fields:

F	SYSTEM	F	CARD	FIELD1	FIELD2	F	EXP.	PROD	PROD	CHECK
S	ID	S	NO.	(EMP)	(VEH)	S	DATE	LIM.	AUTH.	DIGIT
-	XXXX	-	AAAA	EEEE	AAAA	-	YYMM	X	X	X

If you want to have the supervisor enter only **ID FIELD 1**, encode the card as follows:

F	SYSTEM	F	CARD	FIELD1	FIELD2	F	EXP.	PROD	PROD	CHECK
S	I.D.	S	NO.	(EMP)	(VEH)	S	DATE	LIM.	AUTH.	DIGIT
-	XXXX	-	XXXX	AAAA	XXXX	-	YYMM	X	X	X

CFN Network For Commercial Fueling Networks, the supervisor can enter data in one to three of these fields: **CARD, ACCOUNT** and **VEHICLE**.

A supervisor card is encoded with special characters (**A** or **E**) that designate which fields (**Card Number, Account, or Vehicle**) should be entered manually. The fields to be manually entered must be filled with either all **As** or all **Es**. When the Supervisor card is used to enter data into the **CARD** field, the last digit on the card must be encoded and it must match either the **A** or the **E** used in the card field. For example, assume that your CFN network system has the following card layout:

F	SYS	F	CARD	ACCT	VEH	F	EXP.	PROD	PROD	PRI	CHECK	CARD
S	ID	S	#			S	DATE	LIM.	AUTH	LVL	DIGIT	MSD
-	XXXX	-	XXXXXX	XXXXXXXXXX	XXXX	-	YYMM	X	XX	X	X	X

X = digit (0-9), FS = field separator

If you want to have the supervisor enter **Card Number, Account, and Vehicle**, encode the following in those fields:

F	SYS	F	CARD	ACCT	VEH	F	EXP.	PROD	PROD	PRI	CHECK	CARD
S	ID	S	#			S	DATE	LIM.	AUTH	LVL	DIGIT	MSD
-	XXXX	-	AAAAAA	EEEEEEEE	AAAA	-	YYMM	X	XX	X	X	A

Optical Card Systems

Any card with a card number in the range 9930-9979 is treated as a supervisor card. When a supervisor card is used, **ID FIELD 1** and **ID FIELD 2** may be entered through the keypad. The data entered at the keypad replaces any data that may have been on the card in those fields. If you do not enter any data and just press ENTER, the system uses the data from the card.

"A" System When you are using an "A" system card that does not use card number and the supervisor option is required, the field you are using for lockout is also used to identify the supervisor card. Ranges for this type of card have the digits 30-79 at the end of the field. These ranges are preceded by 9's to the length of the field (for example, the range for a supervisor card if the field is five digits is 99930 to 99979). When the supervisor card is used, data may be entered through the keypad into any ID field other than the one used for lockout.

Tank Monitor

Description The Tank Monitor option enables the system operator to communicate with a Veeder-Root TLS tank monitoring system using the Series 1000 as an interface. Once the communications link is established, commands issued from the Series 1000 data terminal are passed to the tank monitor and data output from the tank monitor appears at the Series 1000 data terminal. This interface is completely transparent except for the ENQ character which terminates the tank monitor interface. The ENQ character is generated by pressing CTRL E. This option requires the use of the optional auxiliary communications port PCB.

TRANSACTION STORAGE EXAMPLES

Description The Series 1000 Mag Card System with standard software and variable identification fields of four digits each stores up to 1118 transactions in memory. The Series 1000 with the Gate Controller option will usually store 1800 or more transactions regardless of the number of options selected. Larger variable identification fields and software options use more memory space and therefore decrease transaction storage.

The table below shows the approximate number of transactions a system will store based upon various field sizes and optional software.

These examples and the calculations that follow are updated at the .1 release of each new software version. Intermediate revisions (i.e., .2, .3, etc.) may contain additional programming changes that will affect these calculations. Contact the GASBOY Order Department if your ROM total is close to the maximum number of bytes allowed.

Standard Card Systems

Ex.	Field1	Field2	Man. Entry	MPG HPG	Reas O/H	Fuel Alloc	Dual Lock	Receipt Printer	Tank Mon.	TOTAL TRANSACTIONS	
										Mag	Optical**
1	4	4	-	-	-	-	-	-	-	1118	1121
2	4	6	-	-	-	-	-	-	-	1076	N/A
3	4	4	4	-	-	-	-	-	-	1037	1040
4	4	4	-	100	-	-	-	-	-	836	984
5	4	4	-	250	-	-	-	-	-	755	904
6	4	4	-	500	-	-	-	-	-	621	770
7	4	4	-	-	-	100	-	-	-	944	1104
8	4	4	-	100	-	100	-	-	-	820	822
9	4	4	-	250	-	100	-	-	-	739	742
10	4	4	-	500	-	100	-	-	-	606	608
11	4	4	-	-	100	-	-	-	-	932	1092
12	4	4	-	-	250	-	-	-	-	892	1052
13	4	4	-	-	500	-	-	-	-	824	985
14	4	4	4	-	-	-	x*	-	-	992	995
15	4	-	4	-	-	-	-	-	-	1118	1121
16	4	-	4	-	-	-	x*	-	-	1070	1073
17	4	4	4	100	-	100	x	-	-	722	724
18	4	4	-	-	-	-	x	-	-	1070	1073
19	6	-	6	-	-	-	-	-	-	1037	1040
20	4	4	-	100	-	-	x	-	-	791	939
21	4	4	4	100	-	-	x	-	-	737	876
22	4	4	-	-	-	-	-	x	-	893	1047
23	4	4	-	-	-	-	-	-	x	1099	1102
24	4	4	-	-	-	-	-	x	x	874	1028
25	4	4	-	100	-	-	-	x	-	635	779
26	4	4	-	100	-	-	-	-	x	818	966

*On manual entry field

**These calculations do not apply to "A" Systems. See the Supplemental "A" System Order Form for details.

Field1 and **Field2** values are shown in digits.

MPG/HPG and **Reas Odom/Hours** are shown in vehicles.

Allocation is in totalizers.

Commercial Fueling Network

Ex.	MPG HPG	Reas O/H	Alloc. by VEH	Receipt Printer	Tank Mon.	# of Lockouts	TOTAL TRANS.
1	-	-	-	-	-	550	772
2	100	-	-	-	-	550	577
3	250	-	-	-	-	550	516
4	500	-	-	-	-	550	415
5	-	-	100	-	-	550	642
6	100	-	100	-	-	550	565
7	250	-	100	-	-	550	504
8	500	-	100	-	-	550	403
9	-	100	-	-	-	550	634
10	-	250	-	-	-	550	604
11	-	500	-	-	-	550	554
12	-	-	-	-	-	600	766
13	-	-	-	-	-	700	755
14	100	-	100	-	-	600	560
15	100	-	-	-	-	600	572
16	-	-	-	x	-	550	612
17	-	-	-	-	x	550	758
18	100	-	-	x	-	550	431
19	100	-	-	-	x	550	563
20	-	-	-	x	x	550	598

TRANSACTION STORAGE CALCULATION

If the configuration of variable field sizes and software options you have is not listed in the transaction storage table, you can determine the approximate number of transactions by calculating:

1. The number of bytes in your transaction record.
2. The number of ROM bytes used.
3. The number of RAM bytes used.
4. The available transaction space
5. The total number of transactions that can be stored.

The calculations vary according to the type of system you have (mag, optical, or CFN Network). Calculations for each system type can be found in the following subsections.

Mag Card Systems

1. Figure out the number of bytes in the transaction record. Only add in the calculations for manual entry, MPG/HPG, and receipt printer if you have these options.

Field 1 _____	(_____ digits + 1) / 2 (drop decimal remainder)	= _____
Field 2 _____	(_____ digits + 1) / 2 (drop decimal remainder)	= _____
Manual Entry	(_____ digits + 1) / 2 (drop decimal remainder)	= _____
MPG/HPG	Add 2	= _____
Receipt Printer	Add 1	= _____
		+ _____ 22
Number of Bytes in Transaction Record (Add column)		= _____

2. Figure out the number of ROM bytes used. Scan the list of options. When you locate an option in your system, copy the number from the bytes column into the calculation column. Add the **STANDARD DEDUCTION** and the **OPTION** values selected. Then add any applicable numbers from the **COMBINATIONS** section. This will equal your **ROM Total**.

STANDARD DEDUCTION **25136**

OPTION	BYTES	+
Receipt Printer	3176	_____
Multiple Receipts	116	_____
Manual Entry	282	_____
Activate Pump w/Data Entries	291	_____
MPG/HPG w/Reasonable Odometer	2919	_____
Reasonable Odometer/Hours Only	1603	_____
Fuel Allocation	1499	_____
Dual Lockout	144	_____
Loadable Base Pump	238	_____
Multi-Level Password	557	_____
Supervisor Cards	834	_____
Fuel Delivery and Dipstick	653	_____
Tank Monitor	387	_____
Extended Pump Timeouts	102	_____
Pump Switch Timer	417	_____

COMBINATIONS (Add if your system has any of these)

Receipt Printer		
and MPG/HPG	111	_____
and manual entry	22	_____
and loadable base pump	11	_____
and fuel delivery and dipstick	27	_____
Activate Pump w/Data Entries		
and manual entry	61	_____
and MPG/HPG	258	_____
and reasonable odom/hours	221	_____
and fuel allocation	232	_____
and dual lockout	39	_____
MPG/HPG where VEH # is manual entry	42	_____
Reasonable Odom/Hours where VEH # is manual entry	20	_____
Dual Lockout		
is on manual entry field	49	_____

ROM Total = _____

3. Figure out the number of RAM bytes used. Add the calculation totals of each option selected and write the sum in the space provided at the bottom. This is your RAM Total.

OPTIONS	CALCULATIONS	
MPG/HPG w/Reas. Odom/Hours*	(Number of Vehicles _____ X (Vehicle Bytes _____ + 13)) + 46	= _____
Reas. Odom/Hours only*	(Number of Vehicles _____ X (Vehicle Bytes _____ + 5)) + 46	= _____
Fuel Allocation	(Number of Totalizers _____ X 4) + 44	= _____
Dual Lockout	+ 1260	= _____
Receipt Printer	+ 856	= _____
Tank Monitor	+ 506	= _____
Supervisor Cards	+ 12	= _____
Extended Pump Timeouts	+ 58	= _____
Pump Switch Timer	+ 11	= _____
Fuel Delivery & Dipstick	+ 6	= _____
Multi-Level Password	+ 63	= _____
Loadable Base Pump	+ 4	= _____
AP w/Data Entries	+ 9	= _____
	RAM Total	= _____

* You calculated the size of your vehicle field in bytes in Step 1 (Digits + 1) ÷ 2. Vehicle will be Field 1, Field 2 or Manual Entry field depending on how you ordered your system.

4. Figure out the amount of available transaction space.

Write the following values: **ROM TOTAL** (From Step 2): _____

RAM TOTAL (From Step 3): _____

Consult the following chart to see where your ROM value falls.

ROM TOTAL RANGE	BYTES
22513 to 26608	4096
26609 to 30704	8192
30705 to 34800	12288
over 34800	*

* If your ROM TOTAL exceeds this number, your system has too many options. Eliminate options.

Write the number listed in the **BYTES** column: _____

Perform the following calculation:

RAM Total + Bytes = Reserved RAM

_____ + _____ = _____

Subtract the Reserved RAM from 33394 to get transaction space.

$$33394 - \text{Reserved RAM} = \text{Transaction Space}$$

$$33394 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

5. Figure out the total number of transactions that can be stored.

Get **Transaction Space** from Step 4. Write the total in the space provided below.

Get **Number of Bytes in Transaction Record** from Step 1. Write the total in the space provided below.

Perform this calculation:

Transaction Space	/	Bytes in Transaction Record	=	Number of Possible Transactions Stored
--------------------------	---	------------------------------------	---	---

<u> </u>	/	<u> </u>	=	<u> </u>
-----------------------------	---	-----------------------------	---	-----------------------------

Subtract 8	-	<u> </u> 8
------------	---	-------------------------------

Approximate number of transactions that can be stored:	<u> </u>
--	-----------------------------

Optical Card Systems

NOTE: These calculations do not apply to "A" Systems. For "A" System optical cards, see the Supplemental "A" System Order Form.

- Figure out the number of bytes in the transaction record. Only add in the calculations for manual entry, MPG/HPG, and receipt printer if you have these options.

Field 1 _____	(_____ digits + 1) / 2 (drop decimal remainder)	= _____
Field 2 _____	(_____ digits + 1) / 2 (drop decimal remainder)	= _____
Manual Entry	(_____ digits + 1) / 2 (drop decimal remainder)	= _____
MPG/HPG	Add 2	= _____
Receipt Printer	Add 1	= _____
		+ _____ <u>22</u>

Number of Bytes in Transaction Record (Add column) = _____

- Figure out the number of ROM bytes used. Scan the list of options. When you locate an option in your system, copy the number from the bytes column into the calculation column. Add the **STANDARD DEDUCTION** and the **OPTION** values selected. Then add any applicable numbers from the **COMBINATIONS** section. This will equal your **ROM Total**.

STANDARD DEDUCTION **22844**

OPTION	BYTES	+
Receipt Printer	3171	_____
Multiple Receipts	116	_____
Manual Entry	282	_____
Activate Pump w/Data Entries	290	_____
MPG/HPG w/Reas. Odom/Hours	2919	_____
Reasonable Odom/Hours Only	1603	_____
Fuel Allocation	1507	_____
Dual Lockout	147	_____
Loadable Base Pump	238	_____
Multi-Level Password	557	_____
Supervisor Cards	461	_____
Fuel Delivery and Dipstick	653	_____
Tank Monitor	387	_____
Extended Pump Timeouts	102	_____
Pump Switch Timer	417	_____

Commercial Fueling Network (CFN) Systems

- Figure out the number of bytes in the transaction record. Only add in the calculations for MPG/HPG and receipt printer if you have these options.

Card #		= <u> </u> 4
Acct. #		= <u> </u> 5
Veh. #		= <u> </u> 2
Job #		= <u> </u> 4
MPG/HPG	Add 2	= <u> </u>
Receipt Printer	Add 1	= <u> </u>
		+ <u> </u> 20

Number of Bytes in Transaction Record (Add column) =

- Figure out the number of ROM bytes used. Scan the list of options. When you locate an option in your system, copy the number from the bytes column into the calculation column. Add the **STANDARD DEDUCTION** and the **OPTION** values selected. Then add any applicable numbers from the **COMBINATIONS** section. This will equal your **ROM Total**.

STANDARD DEDUCTION **25461**

OPTION	BYTES	+
Receipt Printer	3151	<u> </u>
Multiple Receipts	116	<u> </u>
Dual System ID's	612	<u> </u>
Activate Pump w/Data Entries	366	<u> </u>
MPG/HPG w/Reasonable Odom/Hours	2889	<u> </u>
Reasonable Odom/Hours Only	1573	<u> </u>
Supervisor Cards	848	<u> </u>
Fuel Delivery and Dipstick	659	<u> </u>
Loadable Base Pump	238	<u> </u>
Tank Monitor	387	<u> </u>
Extended Pump Timeouts	102	<u> </u>
Fuel Allocation	1494	<u> </u>
Multi-Level Password	557	<u> </u>
Pump Switch Timer	417	<u> </u>

Consult the following chart to see where your ROM value falls.

ROM TOTAL RANGE	BYTES
22513 to 26608	4096
26609 to 30704	8192
30705 to 34800	12288
over 34800	*

* If your ROM TOTAL exceeds this number, your system has too many options. Eliminate options.

Write the number listed in the **BYTES** column: _____

Perform the following calculation:

RAM Total + Bytes = Reserved RAM

_____ + _____ = _____

Subtract the Reserved RAM from 31414 to get transaction space.

31414 - Reserved RAM = **Transaction Space**

31414 - _____ = _____

5. Figure out the total number of transactions that can be stored.

Get **Transaction Space** from Step 4. Write the total in the space provided below.

Get **Number of Bytes in Transaction Record** from Step 1. Write the total in the space provided below.

Perform this calculation:

Transaction Space / **Bytes in Transaction Record** = **Number of Possible Transactions Stored**

_____ / _____ = _____

Subtract 8 - _____ 8

Approximate number of transactions that can be stored: _____

CARDLESS SYSTEMS

DESCRIPTION

System Access All cardless systems are configured with a vehicle number and a second account number. Access to the Series 1000 cardless system is obtained by entering a number corresponding to a record in the system's vehicle file. The vehicle file contains all pertinent information about every user in the system. When a user enters a vehicle number at the Series 1000 keypad, the system uses the data stored in the vehicle file to determine which action to take next.

Sometimes access to the system is also restricted by a second account field. If you wish to require entry of the second account field, the appropriate check digit must be set in the vehicle record to prompt for the second field.

If the vehicle file does not contain a record for the vehicle number entered at the keypad, access is denied for that user.

FUELING PROCEDURE

Overview Using the GASBOY Series 1000 system is easy, even for untrained users. Operating instructions are printed on the face of the cabinet and, when a vehicle number is entered, a series of prompts appears on the LCD display to guide the user through the fueling transaction. The following steps outline a typical fueling using a Series 1000 Cardless system.

Procedure 1. Position your vehicle adjacent to the fuel dispensing equipment. Be sure to note the odometer reading (if your system uses this feature).

In its idle state, the Series 1000 LCD display alternates between an **ENTER VEHICLE** message and a personalized system message.

2. Using the keypad, enter your vehicle number and press ENTER. If you make a mistake while entering your vehicle number, press CLEAR and enter it again.

If the vehicle number entered is valid the system proceeds to the next step, otherwise an error message displays on the LCD and the system returns to its idle state.

If your system uses the receipt printer option, go to Step 3, otherwise go to Step 4.

3. If you have the receipt printer option and a transaction receipt is available, the LCD displays: **RECEIPT? 1=YES 0=NO**.

To print a transaction receipt, press **1** and ENTER. The LCD displays: **RECEIPT IS PRINTING**. If you have requested multiple receipts, they print out one after the other. The system goes to idle and you must re-enter your vehicle number to begin a fueling transaction.

If you do not want a receipt, press **0** and ENTER. Skip to Step 4. For more on receipt printing, see the *Cardless Operation Manual*.

4. If you are required to enter an odometer reading, the LCD displays: **ENTER ODOMETER**

Use the keypad to enter the mileage that appears on your vehicle's odometer (up to six digits, no tenths). The digits appear as they are entered. If you make a mistake, press CLEAR and enter the odometer reading again. When you enter the correct odometer reading, press ENTER.

5. If you are required to enter a second account field, such as an employee number, the LCD displays: **ENTER EMP**.

Use the keypad to enter the employee number. The digits appear as they are entered. If you make a mistake, press CLEAR and enter the employee number again. When you have entered the correct number press ENTER.

If the number entered is valid, the system proceeds to the next step otherwise, an error message displays on the LCD and the system returns to its idle state.

6. If you are required to enter a Personal Identification Number (PIN), the LCD displays: **ENTER PIN**.

Using the keypad, enter your PIN number and press ENTER. To ensure security, an asterisk (*) appears for each digit you press. If you make a mistake while entering your PIN, press CLEAR and enter it again.

You have three tries to enter your PIN. After the third unsuccessful try, the display returns to **ENTER VEHICLE** and you must start again at Step 2.

After a successful PIN entry the LCD displays: **SELECT PUMP**

7. Enter the desired pump and press ENTER. If the pump is available and you are authorized to use it, the LCD displays: **PUMP #x IS READY** and you may proceed to dispense fuel.

If the **PUMP #x IS READY** is not displayed, one of the following messages appears:

**NO SUCH PUMP
PUMP IN USE!
PUMP DISABLED
INVALID FUEL**

You have three tries to select a correct pump. If, after three attempts, the system does not display **PUMP #x IS READY**, the display returns to **ENTER VEHICLE** and you must begin again at Step 2.

8. When you finish fueling your vehicle, turn off the fuel dispenser handle and return the nozzle to its holder. The transaction information is automatically recorded in the system's memory for later recall. The transaction information may also be printed on the data terminal or logger.

Transaction information includes transaction number, vehicle number, account field 2 (**EMP**), date, time, pump number, product type, quantity dispensed, unit price and/or total price (if configured), odometer reading, and transaction message.

VEHICLE FILE FIELD DESCRIPTIONS

Overview Cardless systems have all pertinent user information stored in a vehicle file. The vehicle file is loaded by the user at start-up time. The maximum number of records that may be stored in the vehicle file is configured into the system's program and matches the number specified when the system was ordered. When specifying the number of vehicles, the user should consider any plans for expansion of the vehicle fleet in the future.

Vehicle Number

Description Vehicle Number is a numeric data field which identifies a particular vehicle and record. The number of digits in this field was configured into the system's program and matches the size specified when the system was ordered.

Fuel Limitation Code

Description The Fuel Limitation Code is a one-digit field used to restrict the maximum quantity of product dispensed per transaction.

Fuel limitation is provided mainly as a safeguard to minimize accidental spillage. Valid entries for the fuel limitation code are 0-9. Each code is assigned a maximum quantity using the **LL** (load fuel limitations) command which is explained in the *Cardless Operation Manual*. The fuel limitation code generally assigned to a vehicle is one that matches the nearest quantity greater than the vehicle's tank size. If the user dispenses fuel to the quantity limit selected for his vehicle, the transaction automatically terminates. If the user wants additional product, he can initiate another transaction and dispense additional product up to the limit cutoff.

Fuel Authorization Code

Description The Fuel Authorization Code is a one-digit field used to specify the types of fuel a vehicle is allowed to access.

Valid entries for the fuel authorization codes are 0-9. Codes 1-9 are assigned up to 5 fuel types per code. The user is permitted to access only the product type(s) loaded into the system for the fuel authorization code assigned to his vehicle. The authorization code **0** permits access to all fuels. The **LF** (load fuel authorizations) command, explained in the *Cardless Operation Manual*, is used to assign product type(s) to each authorization code.

Check Digit Code

Description The Check Digit Code is a one-digit field used to determine what additional data must be entered at the keypad.

Valid entries for the check digit code are 0-7. The additional entries required for each code are as follows:

Code	Required Entries
0	No entry required
1	Odometer entry required
2	Manual entry required (i.e., Dept #)
3	Odometer and Manual entries required
4	Second account field* entry required (i.e., Employee)
5	Odometer and second account field entries required
6	Manual and second account entries required
7	Odometer, Manual, and second account entries required

* *Second Account Field name is designated at time of order and entry is required only when the appropriate check digit (4, 5, 6, or 7) is loaded.*

Lockout Flag

Description Lockout Flag is a one-digit field used to set the lockout status of the vehicle.

This field is modified through the record validation commands explained in the *Cardless Operation Manual*. When the vehicle record is locked out (invalid), the lockout flag is set to **Y**. When the vehicle record is not locked out (valid), the lockout flag is set to **N**. The lockout flag is initially set to **N** (valid), when a new record is created.

SECOND ACCOUNT FIELD FOR LOCKOUT

Description As a standard feature in cardless systems, lockout can be on an additional field (second account field) in addition to vehicle number. The second account field data can be from 1 to 9 digits, is stored in a separate file from the vehicle file and is typically named Employee. The size and name are determined at the time of system order. The format of the second lockout file can be positive or negative. A check digit code 4, 5, 6, or 7 in the vehicle record indicates that the second account field is used. When record validation commands are used, the prompt requires you to indicate to which file the command is directed, the vehicle file or second account file.

STANDARD SYSTEM FEATURES

Transaction Recording

All formatted transaction printouts contain abbreviated headings. Headings vary depending on the options configured. Transaction headings and their descriptions are listed below.

Transaction Headings

Field Name	Description
SITE	4-digit site number
TRAN	4-digit transaction number
VEH	1 to 8-digit vehicle number
EMP (2nd account)	You indicate the name for the second account at the time of order.
xxxx	1- to 6-digit manual entry field, Manual Entry option only. You indicate the field name at the time of order.
DATE	6-digit Gregorian date
TIME	4-digit 24-hour (military) time
P#	2-digit pump number
PR	2-digit product type
QUANTITY	8-digit quantity of product dispensed
PRICE	4-digit unit price of product (depends on Price Data Format setting)
\$TOTAL	8-digit total calculated transaction price (depends on Price Data Format setting)
ODOM/C HOURS	6-digit odometer mileage or current hours entry
MILES/TIME E	4-digit miles travelled or time elapsed, MPG/HPG option only
MPG/HPG	4-digit miles/hours per gallon calculation, MPG/HPG option only
ERROR	transaction error message (2 numeric digits for PC, PH)

NOTE: The second account field and manual entry field allow the user to customize the system to his requirements at the time of order.

Price Data Format Effect on Headings

Description When the system operator sets the system configuration parameters, the selection for Price Data Format affects which headings are displayed on transaction printouts. Unit price (**PRICE**) and total transaction price (**\$TOTAL**) headings and data may appear. If you choose compacted format (**PC** or **PH**), unit price and total price are always shown. If you choose regular (**PT**) or sorted (**ST** or **SS**) transaction printing, you get the following results depending on the setting.

Setting	Results
0	No headings for unit and total price and no pricing data.
1	Unit price (PRICE) heading and unit price. (Penny pulsing pump only)
2	Unit price (PRICE) and total price (\$TOTAL) headings and price data for all transactions regardless of pulser type.

Direct Printout

Description If a terminal printer or logger is connected to Communication Port 1, transaction information is printed immediately upon transaction completion. See Figure 3-1 for a sample printout.

TRAN	VEH	EMP	DATE	TIME	P#	PR	QUANTITY	ODOM	ERROR
0221	2430	5967	05/20/92	15:30	01	01	8.28	054880	

Figure 3-1. Direct Printout Example

Transaction Printing & Sorting

Options Transactions may be recalled from the system memory in a variety of formats. Transactions can be printed in transaction number sequence or they can be sorted before printing. Transaction headings appear as listed previously in **Transaction Recording**. Price headings may vary depending on your price data format setting. Users can sort by any field except \$TOTAL and MPG/HPG. Transactions can also be printed by a specific number within a field. Total gallons are provided for each subsort. Figure 3-2 shows a sample transaction printout.

*PT												
SITE 0589												
TRAN	VEH	EMP	DATE	TIME	P#	PR	QUANTITY	PRICE	\$TOTAL	ODOM	ERROR	
0221	2430	5967	09/08/91	15:30	01	01	87.6	1.109	89.26	054880		
0222	2019	9381	09/09/91	08:56	01	02	20.060	1.169	23.45	012345		

Figure 3-2. Transaction Printing with Price Data Format Setting of 2

Compacted Format

Description Transaction data can also be output in *compacted format*, deleting all spaces, headings and punctuation. Compacted format is generally used to send transactions to a computer. The last three digits of each line represent the check sum, a sum of all characters within the transaction. Compacted format transactions can be transmitted in two ways: as a continuous string (Figure 3-3); or line-by-line with an acknowledgement from the data terminal or a program after each transaction (Figure 3-4).

*PC
058900016759430203309212590101000876001019000089260000009161
0589000212345678033092130002020001114012590000140323512309142
0589000399999999033092183004040002006011690000234599999932232
*

Figure 3-3. Compacted Transactions - Continuous String Transmission

```
*PH
0589000167594302033092125901010008760010190000892600000009161A
0589000212345678033092130002020001114012590000140323512309142A
0589000399999999033092183004040002006011690000234599999932232A
*
```

Figure 3-4. Compacted Transactions - Line-By-Line Transmission

Sign On Password

Description A password of up to 10-characters is required to access the system Command Mode for updating files and retrieving information. For security, the password is not printed when entered into the system. The user can change the password.

Personal Identification Number (PIN)

Description PIN numbers can be used whenever a second account field entry is required and when the **PIN Entry** configuration prompt is set to **ENABLED**. PINs are calculated uniquely for each system by using an algorithm, the 4-digit PIN key, and the second account field. The user can proceed with the transaction only if the number entered matches the PIN calculated by the system.

Display You can have the system calculate and display the PIN on the LCD display by selecting diagnostic test 0 and entering the data for the second account field.

Lockout

Description The system operator can control access to the cardless system by validating/invalidating vehicle records. This process is called *lockout*. Vehicle records may be validated/invalidated individually or in strings of 10. If desired, the system can lock out the entire vehicle file.

Sequence In cardless systems, a user accesses the system by entering a vehicle number. This vehicle number corresponds to a record in the vehicle file. When the number is entered, the system checks to see if a vehicle record exists. If one does, the system checks two fields: **Lockout Flag**, to see if the vehicle record is valid and **Check Digit Code** to see if a second account field (usually Employee) is required for access.

If the lockout flag is set to **N** the vehicle record is valid and not locked out. (If the record is invalid, the lockout flag will be set to **Y** and no access will be allowed.) If the check digit requires a second account entry, the user enters the second entry. The system then checks the second account file (Employee) to see if the second entry is valid. The second account file is totally separate from the vehicle file and can be positive or negative. A positive file contains only numbers which are valid; the number is locked out if it is not in the file. A negative file contains only those numbers which are invalid; the number is locked out if it is in the file.

Product Authorization

Description The product authorization feature controls access to fuel type(s). Using the **LF** command, the system operator can load up to nine authorization codes (1-9) with up to nine fuel types per code. The user is permitted to access only the fuel type(s) loaded into the system for the authorization code contained within his vehicle file record. The authorization code **0** permits access to all fuels. Figure 3-5 shows a product authorization code table initiated by the **PF** command.

```
*PF
AUTH. CODE: 1  ALLOWS FUELS...01 02 03 04 05
AUTH. CODE: 2  ALLOWS FUELS...01
AUTH. CODE: 3  ALLOWS FUELS...02
AUTH. CODE: 4  ALLOWS FUELS...03
AUTH. CODE: 5  ALLOWS FUELS...04
AUTH. CODE: 6  ALLOWS FUELS...05
AUTH. CODE: 7  ALLOWS FUELS...02 03
AUTH. CODE: 8  ALLOWS FUELS...03 04 05
AUTH. CODE: 9  ALLOWS FUELS...04 05
*
```

Figure 3-5. Product Authorization Codes

Product Limitation

Description The product limitation feature controls the amount of product that can be dispensed in one transaction. The limit is specified by the limitation code contained within the user's vehicle file record. Using the **LL** command, the system operator can load the 10 available limitation codes (0-9) with any quantity from 1 to 99999. If a user reaches the maximum limit that has been entered for the code in his file, then the pump is automatically turned off causing a **LIMIT CUTOFF** error message. Figure 3-6 shows a product limitation code table initiated by the **PL** command.

```
*PL
LIMITS:
0 = 5
1 = 10
2 = 15
3 = 20
4 = 25
5 = 30
6 = 35
7 = 40
8 = 900
9 = 99999
*
```

Figure 3-6. Product Limitation Codes

Pump Totalizers

Description Incrementing totalizers are maintained for each hose outlet. As transactions occur, the totalizer of the corresponding hose is incremented by the transaction quantity. The pump totalizers can be automatically set back to zero or individually set to the corresponding mechanical pump totalizer. The totalizers have seven digits to the left of the decimal point and three digits to the right (xxxxxxx.xxx). Figure 3-7 shows a pump assignments and totalizer listing initiated by the **PP** command.

*PP					
P#	TANK	FUEL#	FUEL NAME	PRICE	GALLONS
1	1	01	REGULAR	\$1.189	21569.020
2	2	02	UNLEADED		66544.300
3	3	03	DIESEL		1223.300
4	4	04	SUPER UNLEAD		51100.654
*					

Figure 3-7. Pump Assignments and Totalizers Listing

Tank Inventory Totalizers

Description The system maintains up to eight tank quantities and allows for setting, adding to, or subtracting from the inventory level. Each pump is assigned a tank and as many pumps as desired can be assigned to a particular tank. As transactions occur, the inventory of the appropriate tank is decremented to show a lesser quantity. An inventory reorder point can be loaded into the system for each tank. The reorder point is printed as a reminder when the current tank totalizers are printed. Once the tank goes below the reorder level, **REORDER FUEL** prints in the **ERROR** field of all transactions withdrawing from that tank until the inventory is adjusted above the reorder level. Complete pump, tank, and product assignments may be printed using the **TI** command (Figure 3-8). The tank totalizers have seven digits to the left of the decimal point and three digits to the right (xxxxxxx.xxx).

*TI					
TANK #1	INVENTORY:	9301.190	REORDER	2000	
TANK #2	INVENTORY:	12000.000	REORDER	3000	
TANK #3	INVENTORY:	10000.000	REORDER	3000	
*					

Figure 3-8. Tank Inventory

Loadable Pump Timeouts

Description The Series 1000 monitors two timeout periods. Timeout values are assigned to ensure that the pumps are not activated and left unattended. There are two timeout periods:

- Interval in which the pump is activated by the system and the first pulse is received.
- Interval between turning off the nozzle (last pulse received) and turning off the pump handle. This timeout is reset if additional pulses are received.

This timeout is reset each time a pulse is received and is terminated by shutting off the pump handle. Timeout periods range from 1 to 180 seconds and can be set individually for each pump. A typical timeout is 80 seconds. If either timeout period is exceeded during a transaction, the transaction ends automatically, and a **TIMED OUT** message appears in the transaction **ERROR** field. Figure 3-9 shows the pump timeout and pulse rate assignments listing initiated by the **XP** command.

```

*XP
          - PUMP TIMEOUTS -
          IN SECONDS

P#      PULSES PER  BEFORE  AFTER
          GALLON    PULSES PULSES
01          $      060    060
02         0010     080    080
03         0010     080    080
04         0010     080    080
*

```

Figure 3-9. Pump Timeout and Pulse Rate Assignments

Pulse Rates

Description The Series 1000 System can accept pulse rates of dollar (one pulse per penny); and quantity (1:1, 10:1, 100:1, 250:1, 500:1, and 1000:1 ratios). Pulse rates may differ between pumps and the pulse rate definitions are loaded into the system via the data terminal. The pulse rate switch is located in the system cabinet in an area sealable by Weights and Measures for retail applications. When the switch is set to enabled, no transactions can occur at the system and the message **REMOTE CONFIGURATION** appears on the display.

Activate/Inactivate Pump Via Terminal

Activate Pump This feature allows the system operator to use the **AP** command to activate a pump (hose) from a data terminal for one transaction. This transaction is recorded as a normal transaction except that the digits of information, which would normally be input at the keypad, are recorded as all 9's (See Figure 3-10).

TRAN	VEH	EMP	DATE	TIME	P#	PR	QUANTITY	ODOM	ERROR
0874	9999	9999	05/20/92	09:17	01	01	22.21	999999	TERM ACTIVATE

Figure 3-10. Transaction Activated via Terminal

Inactivate Pump The system operator can turn off any pump (hose), currently in use, from a data terminal by using the **IP** command. The pump is inactivated only for that transaction and the message **TTY CMD** is placed in the **ERROR** field for that transaction.

Pump Enable and Disable Via Terminal

Description Through a data terminal, the system operator can enable (**EP**) or disable a pump (**DP**) from further use. With the **DP** command, a **PUMP DISABLED** notation appears for that pump in the pump status (**PP** command) printout. The pump remains disabled until the system operator re-enables it through the data terminal.

Automatic Pump Disable

Description As a safeguard against defective pulse transmitters in the pumps, the system operator may configure the system to automatically disable a pump after a number (1-99) of consecutive no quantity transactions. If a pump becomes disabled in this manner, a **PUMP # X DISABLED** message appears on the direct printout. The pump remains disabled until the system operator re-enables it through the data terminal.

Automatic Site Shutdown Via Terminal

Description The system operator can set a time period each day when the system is automatically shut down and all users are denied access to the fuel dispensing equipment. A **SITE IS DOWN** message appears on the system's LCD display. The system operator still may access the other software features and may activate a pump for one transaction through the Activate Pump Feature. The automatic site shutdown can be disabled through the data terminal.

Odometer/Hours Entry

Description This feature uses the manual entry check digit entered into the vehicle record, to determine whether the user is prompted to enter an odometer/hours reading at the Series 1000 keypad.

Dual Port

Description This feature allows the system to be connected to two terminal devices or a terminal and a modem. The system can communicate through only one port at a time.

Help Feature

The Help feature provides a list of all terminal commands. If the operator wishes further explanation, an expanded help command produces a list showing each command, followed by a brief description.

System Message Display

The system operator can load, via the data terminal, a 20-character message to appear on the Series 1000 Liquid Crystal Display (LCD). When the Series 1000 is not in use, the LCD alternates between the system message and the **ENTER VEHICLE** prompt message.

Diagnostics

To aid in system troubleshooting and service, an integral diagnostic program is provided. This program includes card reader, keypad, LCD, LCD message, ROM, RAM, and communication port tests. A summary of diagnostic tests is shown in Figure 3-11.

Test #	Description
0	Calculate PIN Function
1	Change Password Function
2	LCD Character Set Test
3	Not available
4	Keypad Test
5	Communication Ports Test *
6	RAM (Memory) Test
7	ROM (Program) Test
8	LCD Message Test
9	Not available
* Loopback test jumper needed for this test	

Figure 3-11. Diagnostic Test Summary

OPTIONAL SYSTEM FEATURES

Activate Pump with Data Entry

Description The Activate Pump with Data Entry option allows the system operator to enter vehicle data and an odometer/hours reading at the data terminal before activating a pump. The system prompts you for vehicle number and, if required by the check digit field for the vehicle entered, an odometer/hours reading and second account field. When this transaction is recorded, the digits of information, which are usually input at the Series 1000, are replaced by those entered at the data terminal. If the user does not need to enter data for a particular field, press RETURN at that field; it will be filled with nines (9).

Auxiliary Communications Port PCB

Description An optional auxiliary port PCB may be available if you have ordered the receipt printer or tank monitor options. This board contains two ports (one for a receipt printer and one for a tank monitoring system), configurable to either RS-232 or RS-422. Each has a selectable baud rate of 300, 1200, or 9600. The receipt printer is always set to 9600. Most tank monitoring systems should be set to 300 or 1200 and, for optimum data transfer, should run at the same baud rate as the data terminal.

Extended Pump Timeouts

Description The Extended Pump Timeouts option allows the before and after pulsing timeouts, loaded through the **LP** command, to be longer than 180 seconds. The timeouts can be extended to 3600 seconds (one hour).

Fuel Allocation

Description The Fuel Allocation option allows the system operator to allocate to users, over a period of time, predetermined amounts of fuel. This option works effectively only in a single site operation.

Requirements At the time of order, the user must indicate the field (4-digits) to be assigned the allocation totalizers and the number of totalizers. This field must be either the **VEH** or 2nd account field (**EMP**). It cannot be a manual entry field.

Sequence An allocation offset command (**AO**) allows the user to specify the starting number for the allocation totalizers. For example, a system ordered with allocation by vehicle number and 500 totalizers with an allocation offset of 1200 will have allocation totalizers assigned to vehicle numbers 1200 through 1699.

As fuel is withdrawn from the system, the appropriate allocation totalizer is decremented. When the totalizer reaches zero, the user is denied fuel until the system operator loads a new allocation amount. The system operator may add to, or subtract from, individual totalizers, strings or ranges of totalizers at one time. An allocation table (Figure 3-12), showing the allocation numbers and their current totalizer values, may be printed on demand. An individual allocation number or range of numbers, may also be specified and their current totalizer values are printed (Figure 3-13). A total of all totalizer values is provided on all allocation reports.

```

*PA
ALLOCATION TABLE
0000= 123.456      0001= 390.000      0002= 12820.678      0003= 86252.000
0004= 44553.000    0005= 92346.989    0006= 175.000        0007= 4354.000
0008= 4344.000     0009= 4344.000     0010= 165.000        0011= 165.000
0012= 165.000      0013= 165.000      0014= 165.000        0015= 165.000
TOTAL: 250692.123
*

```

Figure 3-12. Allocation Table

```

*MP
ALLOCATION NO.: 0012
TO
ALLOCATION NO.: 0015
0012 = 165.000      0013 = 165.000      0014 = 165.000      0015= 165.000
TOTAL: 660.000
*

```

Figure 3-13. Range of Allocation Totalizers

Fuel Delivery and Dipstick

<i>Description</i>	Using a special range of vehicle numbers from the vehicle file, the Series 1000 can accept and record fuel delivery and dipstick reading data.
<i>Vehicle range</i>	The vehicle range for delivery transactions always ends with 80-89 and is preceded by nines to equal the length of the vehicle field. The vehicle range for dipstick transactions always ends with 90-99 and is preceded by nines to equal the length of the vehicle field. For example, in a vehicle file with a two-digit vehicle number, the delivery numbers could be 80-89 and the dipstick number could be 90-99. If the vehicle number has 5 digits, the delivery number could be 99980-99989 and the dipstick number could be 99990-99999.
<i>Sequence</i>	Fuel deliveries update the inventory totalizer for the designated tank and create a transaction. Dipstick readings only generate a transaction, inventory totalizers are not affected.

Gate Controller

Description The Gate Controller option enables you to control access to a gate using a dedicated Series 1000. When the user enters his vehicle number, the gate controller verifies the number and activates the gate relay.

Transaction Matching If you have an existing Series 1000 without the price data format option or wish to match a Series 1000 with the MPG option, the Gate Controller system can be configured to match your existing transactions.

Memory Full The Gate Controller can also be ordered with Memory Full protection disabled. This means when the system memory is full, new transactions will overwrite the transactions already in memory. When you select this option, you cannot retrieve transactions, the only record will be the direct printout copy.

Hours

Description An Hours option is available for user equipment that is monitored with an hour meter instead of an odometer. When you select the Hours option, transaction odometer (ODOM) field becomes C HOURS; in the MPG option, MILES values are calculated in HOURS and MPG as HPG; in the reasonable odometer option, ODOM becomes HOURS.

Loadable Base Pump

Description The Loadable Base Pump option allows the system operator to assign different starting pump numbers for a site where there is more than one Series 1000. You can enter a base pump number that is used as the number of the first pump in a system. All pumps are numbered consecutively beginning with the base pump number. The maximum pump number is 99. Pump numbers that are less than the base pump number will not be available.

Example:

If the base pump number is loaded as 3, there will not be any pumps numbered 1 or 2 at that Series 1000. When pump number 3 is selected for fueling, the first relay in that system is activated.

Manual Entry

Description The Manual Entry option provides an additional field that allows you to request input, from the Series 1000 user, during the keypad entry process. You can use this field to record anything from manual oil transactions, department numbers or trailer numbers.

Requirements You must specify the field name and size when you place your order. The field may be up to six digits. The check digit, encoded in the vehicle record, controls whether the individual user is prompted to enter the manual entry. (For more information, see **Check Digit Code** earlier in this section). The manual entry appears under its own heading in the transaction printouts. Figure 3-14 shows a manual entry option using **DEPT** (department number) as the entry.

```

*PT
SITE 1234

TRAN VEH EMP DEPT DATE TIME P# PR QUANTITY ODOM ERROR
0008 2813 7596 0032 10/22/92 13:38 01 01 11.91 045621
0009 1122 3344 0011 10/22/92 13:41 03 03 10.0 000000
0010 2480 1431 0001 10/22/92 13:56 02 04 108.42 044291
*

```

Figure 3-14. Transaction Printout with Manual Entry Option (DEPT)

Miles/Hours Per Gallon and Reasonable Odometer/Hours Check

Description The MPG/HPG option (which includes reasonable odometer/hours check) allows the Series 1000 system to calculate and maintain a miles-per-gallon or hours-per-gallon tally for a set number of vehicles (*NOTE: Hours-per-gallon is used when user equipment is monitored with an hour meter instead of an odometer*). The type of option, MPG or HPG, is chosen at the time of order. Also, the maximum number of vehicles supported depends on the size of the vehicle file which was chosen at the time of order.

Enable/Disable In a cardless system, all user information is stored in a vehicle file. Every vehicle in the file may be configured as to whether or not the system will calculate MPG/HPG and execute a reasonable odometer/hours check on it. If the feature is disabled for a vehicle record, the system will continue to update the total gallons and odometer/hours entries, but MPG/HPG will not be calculated.

MPG File Information MPG/HPG software computes fuel efficiency two ways: per transaction and averaged over a period of time (usually a month). To use the MPG/HPG option, additional information is added to the vehicle file. The vehicle information for MPG is different than that for HPG; both types are shown below.

The MPG option adds the following fields to each vehicle record:

- VEH 1- to 8-digit vehicle number
- B ODOM up to 6-digit beginning odometer reading
- E ODOM up to 6-digit ending odometer reading (last recorded)
- MILES 6-digits for miles driven
- GALLONS up to 8-digits for total gallons for period
- MPG 3 digits before and one after the decimal point for MPG value
- STAT a record status code indicating MPG comments (for more on status flags, see the *Operation Manual*)

The HPG option adds the following fields to each vehicle record:

- VEH 1- to 8-digit vehicle/equipment number
- B HOURS up to 6-digit beginning hours reading
- E HOURS up to 6-digit ending hours reading (last recorded)
- A HOURS up to 6-digit new accumulated hours
- GALLONS up to 8-digits for total gallons for period
- HPG 3 digits before and one after the decimal point indicating HPG value.
- STAT a record status code indicating HPG comments

The transaction printout, in addition to standard transaction fields, lists the number of miles/hours since the vehicle's last transaction, and the per transaction miles/hours-per-gallon. A sample MPG transaction printout is shown in Figure 3-15.

*PT											
TRAN	VEH	EMP	DATE	TIME	P#	PR	QUANTITY	ODOM	MILES	MPG	ERROR
0004	3281	5967	03/01/92	15:02	02	02	15.1	035025	0375	24.8	LIMIT CUTOFF
0005	0826	4627	03/01/92	15:03	01	01	16.71	048546	0328	19.6	

Figure 3-15. Print Transactions with MPG Option

Sequence When the system detects an odometer/hours entry, the vehicle number is checked to see if MPG/HPG calculation and reasonable odometer/hours check is enabled. If it is, the system validates the odometer/hours entry and updates the vehicle record when the transaction is completed. If MPG/HPG calculation and reasonable odometer/hours entry is disabled, the system accepts the odometer/hours entry without verification and updates the vehicle record when the transaction is completed. See the *Cardless Operation Manual* for a discussion of **MPG/HPG Transaction Processing**.

Printing Options The user can print out the vehicle file to view the vehicle number, beginning and most recent odometer/hours entries, the total number of miles/hours, the number of gallons, and the miles-per-gallon/hours-per-gallon over the period. Figures 3-16 and 3-17 show two printing options for the vehicle file.

*VF										
VEH	LIM	AUTH	CD	LOCK	B ODOM	E ODOM	MILES	GALLONS	MPG	STAT
0012	3	5	2	N	031256	031554	000298	16.000	18.6	
0018	2	1	4	N	043578	043957	000379	3.100	22.3	HIGH
0054	5	7	1	Y	012967	012989	000022	11.600	1.9	LOW
9381	5	7	1	N	012345	012445	000100	12.345	N/A	
*										

Figure 3-16. MPG Vehicle File Printout

*CR										
VEH. NO: 0012										
VEH	LIM	AUTH	CD	LOCK	B ODOM	E ODOM	MILES	GALLONS	MPG	STAT
0012	3	5	2	N	031256	031554	000298	16.000	18.6	

Figure 3-17. MPG Vehicle File Printout - Specified Vehicle

Multi-Level Password

Description The Multi-Level Password option provides two levels of passwords:

- super user
- standard user

The super user password allows you to access all system commands including the **CP** command. The **CP** command allows you to selectively authorize or restrict commands that the standard user is allowed to access.

When you use diagnostic test 1 to initialize the password, both passwords are set to **GASBOY**.

To change the super user password, sign on as **GASBOY** and use the **LS** command to change the password. Use the **EX** (exit) command to exit command mode. You are now in standard user mode. To change the standard user password, sign on as **GASBOY** and use the **LS** command to change the password.

Pump Switch Timer

Description The Pump Switch Timer option allows you to prevent fueling at a pump when the handle has been left on from a previous transaction.

In a normal transaction when you request a pump, the pump is activated, the user turns on the pump handle and fueling begins. Occasionally, the pump handle may have been left on from a previous transaction. When a new transaction is initiated, the pump cannot reset and, if pumping is allowed, the quantity shown at the pump includes the previous transaction quantity.

With the pump switch timer option, the handle is checked at the beginning of each transaction. If it is found to be on, a **TURN OFF PUMP HANDLE** message appears and the transaction is terminated. A transaction is generated with the message **PMP SW ERROR**. The user must turn off the pump handle and begin a new transaction in order to fuel.

Reasonable Odometer/Hours Check Only

Description The Reasonable Odometer/Hours option provides an odometer or hours validity check for a set number of your vehicles (**NOTE: Hours-per-gallon is used when user equipment is monitored with an hour meter instead of an odometer*). The exact number of vehicles supported is chosen at the time of order. When specifying the number of vehicles, the user should consider any plans for expansion of the vehicle fleet in the future. The Reasonable Odometer/Hours option is similar to the MPG/HPG option without the MPG/HPG features.

Vehicle File The Reasonable Odometer/Hours option adds these fields to those already present in the vehicle file:

- ODOM/HOURS up to 6-digit odometer/hours entry
- STAT a special code indicating reasonable odometer/hours comments

Enable/Disable In the vehicle file, you can selectively decide whether to enable or disable reasonable odometer/hours for each vehicle. When the system detects an odometer/hours entry, the vehicle record is checked to see if reasonable odometer/hours check is enabled.

Sequence If reasonable odometer/hours is enabled, the odometer entry is checked against the last odometer reading entered. The system also considers the maximum miles between fuelings value (**LM** command). If the odometer/hours entry is out of range, the system prompts for another entry. If reasonable odometer/hours check is disabled for a vehicle record, the odometer/hours entry is recorded in the vehicle file but not checked for validity. See the *Cardless Operation Manual* for a description of reasonable odometer/hours processing.

Figure 3-18 shows a vehicle file printout with the reasonable odometer option.

*VF						
VEH	LIM	AUTH	CD	LOCK	ODOM	STAT
0012	3	5	2	N	031250	
0018	2	1	4	N	043578	%%
0054	5	7	1	Y	012967	
*						

Figure 3-18. Reasonable Odometer Vehicle File

Receipt Printer

Description The Receipt Printer option allows the user to obtain a transaction receipt for fuel dispensed through the Series 1000. Receipts are available only for those transactions where fuel is dispensed; error and other no quantity transactions cannot be printed. An additional option allows for up to three receipts to be generated for a transaction. The number of receipts is set using the **SC** command.

Sequence Obtaining a receipt is accomplished as follows: After a user fuels his vehicle in the normal fashion and wants a receipt, he goes back to the Series 1000 and enters his vehicle number. The system asks if he wants a receipt. If the reply is yes, a receipt is printed and the transaction is finished.

If he does not choose to get a receipt, the next time he attempts to fuel, the system checks through the last 16 transactions with quantity. If one of these matches his vehicle number, the system asks if he wants a receipt (for that transaction). If the reply is yes, the system prints a receipt. He must then enter a vehicle number to begin the fueling transaction. If the reply is no, the system proceeds with a normal fueling operation.

Sample receipt Receipts issued from the Series 1000 contain the following data:

Receipt header. Up to four 30-character lines of text loaded through the SC command.

Site number
 Transaction number
 Date
 Time
 Card number
 ID field 1 number (if used)
 ID field 2 number (if used)
 Manual entry (if used)
 Pump number
 Product name
 Quantity
 Unit price (if full price data enabled)
 Total price (if full price data enabled)
 Odometer (if available)
 MPG (if configured and data is available)

GASBOY INTERNATIONAL, INC
 707 NORTH VALLEY FORGE RD
 LANSDALE, PA 19446
 TELEPHONE: (215) 855-4631

SITE NO.: 1234
 TRANS NO.: 0071
 DATE: 09/18/92
 TIME: 12:23
 CARD: 0243
 EMP: 2813
 VEH: 7576
 DEPT: 55
 PUMP: 04
 PRODUCT: DIESEL
 QUANTITY: 22.090
 PRICE/GAL: \$1.249
 TOTAL: \$27.59
 ODOMETER: 023456
 MPG: 12.5

Receipt trailer. Up to two 30-character lines of text loaded through the SC command.

THANK YOU FOR FUELING WITH
 GASBOY

Transaction receipts are not available if:

- There are no available receipt transactions in the system memory for the vehicle number.
- The receipt printer is in an error condition. (i.e., printer jammed, paper out, printer down).

The system operator can issue a receipt printer command, **GR**, from the data terminal to obtain a receipt for a specific transaction number.

Tank Monitor

Description The Tank Monitor option enables the system operator to communicate with a Veeder-Root TLS tank monitoring system using the Series 1000 as an interface. Once the communications link is established, commands issued from the Series 1000 data terminal are passed to the tank monitor and data output from the tank monitor appears at the Series 1000 data terminal. This interface is completely transparent except for the ENQ character which terminates the tank monitor interface. The ENQ character is generated by pressing CTRL E. This option requires the use of the optional auxiliary communications port PCB.

TRANSACTION STORAGE EXAMPLES

Description The Series 1000 Cardless System with 50 vehicle records and a vehicle number and second account field of 4 digits each stores 1263 transactions in memory. The Series 1000 with the Gate Controller option will usually store 1800 or more transactions regardless of the number of options selected. Larger variable identification fields and software options use more memory space and therefore decrease transaction storage.

The table below shows the approximate number of transactions a system will store based upon various field sizes and optional software.

These examples and the calculations that follow are updated at the .1 release of each new software version. Intermediate revisions (i.e., .2, .3, etc.) may contain additional programming changes that will affect these calculations. Contact the GASBOY Order Department if your ROM total is close to the maximum number of bytes allowed.

Ex.	VEH Dig.	# VEH Records	2nd Fld. Dig.	# 2nd Fld Lock	Man. Entry	MPG HPG	Reas O/H	Fuel Alloc	Receipt Printer	Tank Mon.	TOTAL TRANS.
1	4	50	4	50	-	-	-	-	-	-	1263
2	4	50	6	50	-	-	-	-	-	-	1209
3	6	50	4	50	-	-	-	-	-	-	1209
4	4	50	4	50	4	-	-	-	-	-	1164
5	4	100	4	50	-	x	-	-	-	-	1106
6	6	100	4	50	-	x	-	-	-	-	1060
7	4	250	4	50	-	x	-	-	-	-	1008
8	4	500	4	50	-	x	-	-	-	-	844
9	4	50	4	50	-	-	-	100	-	-	1245
10	4	100	4	50	-	x	-	100	-	-	1089
11	4	250	4	50	-	x	-	100	-	-	991
12	4	500	4	50	-	x	-	100	-	-	827
13	4	100	4	50	-	-	x	-	-	-	1229
14	4	250	4	50	-	-	x	-	-	-	1166
15	4	500	4	50	-	-	x	-	-	-	1062
16	4	100	4	50	4	x	-	100	-	-	1010
17	4	50	4	50	-	-	-	-	x	-	1177
18	4	50	4	50	-	-	-	-	-	x	1242
19	4	50	4	50	-	-	-	-	x	x	1157
20	4	100	4	50	-	x	-	-	x	-	880
21	4	100	4	50	-	x	-	-	-	x	1086

2nd Fld Lock is shown in number of lockouts

Allocation is in totalizers

TRANSACTION STORAGE CALCULATION

- Figure out the number of bytes in the transaction record. Only add in the calculations for manual entry, MPG/HPG, and receipt printer if you have these options.

Vehicle Field	(____ digits + 1) / 2 (drop decimal remainder)	=	_____
2nd Account Field _____	(____ digits + 1) / 2 (drop decimal remainder)	=	_____
Manual Entry	(____ digits + 1) / 2 (drop decimal remainder)	=	_____
MPG/HPG	Add 2	=	_____
Receipt Printer	Add 1	=	_____
		+	_____ 20

Number of Bytes in Transaction Record (Add column) = _____

- Figure out the number of ROM bytes used. Scan the list of options. When you locate an option in your system, copy the number from the bytes column into the calculation column. Add the **STANDARD DEDUCTION** and the **OPTION** values selected. Then add any applicable numbers from the **COMBINATIONS** section. This will equal your **ROM Total**.

STANDARD DEDUCTION		22773
OPTION	BYTES	+
Receipt Printer	3127	_____
Multiple Receipts	116	_____
Manual Entry	232	_____
Activate Pump w/Data Entries	377	_____
MPG/HPG w/Reasonable Odom/Hours	2054	_____
Reasonable Odom/Hours Only	1079	_____
Fuel Allocation	1498	_____
Loadable Base Pump	238	_____
Multi-Level Password	557	_____
Fuel Delivery and Dipstick	691	_____
Tank Monitor	387	_____
Extended Pump Timeouts	102	_____
Pump Switch Timer	417	_____

COMBINATIONS (Add if your system has any of these)

Activate Pump w/Data Entries		
and manual entry	83	_____
and MPG/HPG	240	_____
and reasonable odom/hours	207	_____
and fuel allocation	232	_____
Receipt Printer		
and MPG/HPG	111	_____
and manual entry	22	_____
and loadable base pump	11	_____
and fuel delivery and dipstick	27	_____
	ROM Total	= _____

3. Figure out the number of RAM bytes used. Add the calculation totals of each option selected and write the sum in the space provided at the bottom. This is your RAM Total.

OPTIONS

CALCULATIONS

Vehicle File*	(Number of vehicles _____ X (Vehicle Bytes _____ + 2)	= _____
Additional vehicle file size with MPG/HPG and Reas. Odom/Hours	(Number of vehicles _____ X 13) + 21	= _____
Additional vehicle file size with only Reasonable Odom/Hours	(Number of vehicles _____ X 6) + 21	= _____
2nd account field lockout file*	(Number of lockouts _____) X 2nd account field bytes _____	= _____
Fuel Allocation	(Number of Totalizers _____ X 4) + 44	= _____
Receipt Printer	+ 856	= _____
Tank Monitor	+ 506	= _____
Extended Pump Timeouts	+ 58	= _____
Pump Switch Timer	+ 11	= _____
Fuel Delivery & Dipstick	+ 7	= _____
Multi-Level Password	+ 63	= _____
Loadable Base Pump	+ 4	= _____
AP w/Data Entries	+ 10	= _____
	RAM Total	= _____

* You calculated the size of your vehicle field and second account field in bytes in Step 1 (Digits + 1) divided by 2.

FLEETKEY SYSTEMS

DESCRIPTION

System Access The Series 1000 FleetKey system is accessed through specially encoded data keys. The standard system is equipped with one or two key receptacles. Data keys have user information encoded on them.

FUELING PROCEDURE

Overview Using the Series 1000 System is easy, even for untrained users. Operating instructions are printed on the face of the cabinet and, when a key (or keys) is entered, a series of prompts appear on the LCD display to guide the user through the fueling transaction. The following steps outline a typical fueling using a Series 1000 FleetKey system.

Procedure 1. Position your vehicle adjacent to the fuel dispensing equipment. Be sure to note the odometer reading (if your system requires you to enter it).

In its idle state, the FleetKey LCD display alternates between an **INSERT KEY** message and a personalized system message.

2. The system may have one or two key receptacles and you may be required to use one or two keys.

If you have only one key, insert it into a key receptacle and turn it clockwise. The LCD displays **PLEASE WAIT**.

If you have two keys and two receptacles, insert both keys and turn them both clockwise together or separately. The LCD displays **PLEASE WAIT**.

If you have two keys and only one key receptacle, insert either key. The LCD displays **PLEASE WAIT**. A customized message appears prompting you to insert your other key. Remove the first key and insert and turn the second key. The LCD displays **PLEASE WAIT**.

3. If you have the receipt printer option or the transaction MPG/HPG feature enabled AND a prior transaction is present where a receipt or MPG/HPG reading was not obtained, the system may prompt you for a receipt or MPG/HPG. If you respond **0=NO**, the fueling process continues. If you respond **1=YES**, the system presents your receipt or displays MPG and then goes to idle. You must re-insert your keys to begin a new fueling transaction.

4. If your key requires PIN entry, proceed with Step 5. If your key requires odometer entry only, skip to Step 6. If your key requires neither, skip to Step 7.

5. If you are required to enter a Personal Identification Number (PIN), the LCD displays: **ENTER PIN**.

Using the keypad, enter your PIN number and press ENTER. To ensure security, an asterisk (*) appears for each digit that you press. If you make a mistake while entering your PIN, press CLEAR and enter it again.

You have three tries to enter the correct PIN. After the third unsuccessful try, the display changes to **REMOVE KEY**, and you must turn and remove your key and start again at Step 2.

If your system uses the Auto Pin Lockout feature, the key is automatically locked out (invalidated) after the third unsuccessful PIN entry.

6. If you are required to enter an odometer (or hours) reading, the LCD displays: **ENTER ODOMETER** or **ENTER HOURS**.

Use the keypad to enter the mileage/time that appears on your vehicle's odometer or hour meter (up to seven digits, no tenths). The digits appear as they are entered. If you make a mistake, press CLEAR and enter the reading again. When you enter the correct reading, press ENTER. The system performs a reasonability check and if the reading is accepted, it writes the value to the key (into the last odometer field). For more on reasonable odometer check, see the *FleetKey Operation Manual*.

7. If your system has the Maintenance option, you may receive a message indicating that maintenance is **DUE SOON**, **DUE NOW**, or **OVERDUE**. For more on the Maintenance option, see the *FleetKey Operation Manual*.
8. If your system requires a manual entry field, the prompt for that field appears. Type the data requested and press ENTER. At this time, your odometer is written to your key and the LCD displays: **PLEASE WAIT**. When your key has been updated, the LCD displays: **SELECT PUMP**.

*NOTE: Do not remove the key during the **PLEASE WAIT** message. Removing the key early can cause key failure. If a read error is encountered on the next use, you must re-encode the key before it can be used again.*

9. Enter the desired pump number and press ENTER.

If the pump you selected cannot be accessed, one of the following messages appears:

NO SUCH PUMP
PUMP IN USE!
PUMP DISABLED
INVALID FUEL

You have three tries to select a correct pump. If after three attempts, you have not chosen a correct pump, the display changes to **TURN KEY LEFT,REMOVE**, and you must turn and remove your key and start again at Step 2.

If the pump is available and you are authorized to use it, your odometer will be written to your key at this time and the display will show **PLEASE WAIT**. When your key has been updated, the LCD displays **TURN KEY LEFT,REMOVE**.

10. Remove the key(s) from the receptacle(s). If you leave the key(s) in the receptacles for more than five seconds, an alarm sounds to remind you to remove them.

11. The LCD displays: **PUMP #x IS READY** and you may proceed to dispense fuel.
12. When you finish fueling your vehicle, turn off the dispenser handle and return the nozzle to its holder. The transaction information is automatically recorded in the system's memory for later recall. The transaction information may also be printed on the data terminal or logger.

Transaction information includes transaction number, key 1 number, key 2 number, ID fields, date, time, pump number, product type, quantity dispensed, unit price and/or total price (if configured), odometer/hours reading, miles and MPG/HPG (if enabled), and transaction message.

13. If you have the receipt printer option and wish to have a receipt, insert your key(s) into the receptacle(s) and turn clockwise. The LCD displays: **RECEIPT? 1=YES 0=NO**.

To print a transaction receipt, press **1** and ENTER. The LCD displays: **RECEIPT IS PRINTING**. If you have requested multiple receipts, they print out one after the other. The system goes to idle. For more on receipt printing, see the *FleetKey Operation Manual*.

14. If you have transaction MPG/HPG enabled and wish to view your MPG/HPG, insert your key(s) into the receptacle(s) and turn clockwise. The LCD displays: **MPG? 1=YES 0=NO** or **HPG? 1=YES 0=NO**.

To display your vehicle's MPG (or HPG), press **1** and ENTER. The LCD displays **MPG xxx.x** or **HPG xxx.x**. The system goes to idle. For more on transaction MPG/HPG, see the *FleetKey Operation Manual*.

KEY LAYOUT AND FIELD DESCRIPTIONS

Key Layout This section describes the key layout and field descriptions for all key systems. All of the fields on the key are set with regard to location and length. The system provides up to 20-digits of variable identification fields so the user can customize the system to his particular information requirements. The names and sizes of these variable fields must be specified at the time of order. The user can select any combination of fields equalling 20, but the maximum number of separate fields is eight. The user can also specify which keys the various information fields are encoded on in a dual key application.

This section describes the information fields encoded on the keys. You don't need to use all of the fields. If you choose to not use certain fields, you can zero-fill the fields when you are encoding the key.

Key Type

Description Key type is a one-digit numeric field that is always the first field encoded on a key. It identifies the type of key being used. Possible values are:

- 0 Single Key
- 1 Employee Key (Dual key)
- 2 Vehicle Key (Dual key)
- 3 Supervisor Key (Supervisor Option Only)
- 4 Delivery Key (Delivery/Dipstick Option Only)
- 5 Dipstick Key (Delivery/Dipstick Option Only)
- 6 Password Key
- 7 Encoding Key (Encoding option only)

System ID

Description System ID is a four-digit numeric field that identifies the system and safeguards against access by users of other systems. A unique system ID is assigned at the time of order and appears on the key layout. When using two keys, the system ID is encoded and verified on both.

Key Number

Key number is a unique five-digit numeric field used for lockout. When using two keys, each key has its own unique key number. On a standard system with 10,000 key lockout, key numbers range from 00001 to 09999. Additional blocks of 10,000 lockouts can be specified at order time.

ID Fields

Description Identification (ID) fields are numeric or alphanumeric fields, configurable at order time. Each field can be from 1- to 20-digits with the total of all fields not exceeding 20 digits. Number of separate fields cannot exceed eight. When using dual keys, each ID field is usually encoded on a separate key. Field separators take the place of the corresponding ID field on the other key. If an ID field appears on both keys, the ID field data must be the same on both keys.

Supervisor Key Option

If you have the supervisor key option, the system operator can use a specially encoded supervisor key to manually enter key information at the Series 1000 keypad. Supervisor keys are typically used when a key has been lost. The supervisor can enter data in any of the ID fields. Supervisor fields can be encoded onto key types 1, 2 or 3 and consist of special characters to designate the supervisor fields. Keys encoded with supervisor characters in the VEH field cannot be used with the maintenance option. See the description of the Supervisor key for more information.

For example, assume that a system has the following ID fields and you want the supervisor to enter a 4-digit **EMP** and 3-digit **DEPT**. You would encode the fields as shown on the partial key layout below:

KEY	SYS	KEY	EMP	VEH	DEPT	EXP
TYPE	ID					DATE
0	1234	12345	1226	...	9212

Expiration Date

Description Expiration date is a four-digit numeric field (YYMM) assigned to establish a lifetime for the key. If the expiration date is encoded on only one of the keys, field separators take its place on the other dual key. The system can be configured through the **SC** command to ignore the expiration date on the key. In any case, a valid year (00-99) and a valid month (01-12) must be encoded on the key.

Product Limit

Description Product Limit is a one digit numeric field used to restrict the maximum quantity of product dispensed per transaction. When using dual keys, the product limitation code is usually encoded on only one of the keys, typically a vehicle key. A field separator takes the place of the digit on the other dual key. If the product limitation code appears on both keys, the code must be the same on both keys.

Product limitation is provided mainly as a safeguard to minimize accidental spillage. The system operator can load into the system up to ten (0-9) limitation codes with quantities up to 99999. The vehicle key is generally assigned a limitation code with the nearest quantity greater than the vehicle's tank size. If the user dispenses fuel to the quantity limit of his key, the transaction automatically terminates. If the user wants additional product, he can initiate another transaction and dispense additional product up to the limit cutoff.

Product Authorization

Description Product authorization code is a one-digit numeric field that indicates the type(s) of fuels a key is allowed to access. When using dual keys, the product authorization code is usually encoded on only one key (typically the vehicle key). A field separator takes the place of the digit on the other dual key. If the product authorization code appears on both keys, it must be the same on both keys.

The system operator can load into the system, up to nine (1-9) authorization codes with up to nine fuel types per code. The user is permitted to access only the product type(s) loaded into the system for the authorization code encoded on his key. The authorization code **0** permits access to all fuels.

Price Level

One digit numeric field. Unused at this time.

Check Digit

Description Check digit is a one-digit numeric field used to determine what data must be entered at the keypad. When using two keys, a different check digit may be on each key. This allows the check digit to relate to the particular key on which it is encoded. For example, the odometer check digit is usually associated with the vehicle key, whereas the Personal Identification Number (PIN) check digit is usually associated with the employee key. This is encoded by using a check digit of **1** on the vehicle key and a check digit of **4** on the employee key. Figure 4-1 shows the various check digit codes.

Code	Required Manual Entries
0	No manual entry required
1	Odometer entry required
2	Manual entry required
3	Odometer and manual entries required
4	PIN entries required
5	Odometer and PIN entries required
6	Manual and PIN entries required
7	Odometer, manual, and PIN entries required

Figure 4-1. Manual Entry Check Digits

Previous Last Odometer

Description Previous last odometer is a seven-digit numeric field. It contains the odometer from the fueling prior to the current one. It is used for odometer reasonableness check when the current odometer is equal to the last odometer entered. In a dual key system, it must be on the vehicle key.

Last Odometer

Description Last odometer is a seven-digit numeric field. It contains the odometer entered at the last (or current) fueling. It is used for odometer reasonableness check. In a dual key system, it must be on the vehicle key.

Reasonableness Check Digit

Description The reasonableness check digit is a one-digit numeric field containing one of the following values:

- 0** Reasonableness check not required
- 1** Reasonableness check required
- 2** Mandatory reasonable odometer

In a dual key system, this field is usually on the vehicle key.

Odometer Retries

Description Odometer retries is a two-digit numeric field (00-99). It indicates the number of times the odometer will be prompted for when an incorrect odometer has been entered. In a dual key system, this field is usually on the vehicle key. This field is used only when the reasonableness check digit is set to 1.

Minimum Miles

Description Minimum miles is a four-digit numeric field. Its value indicates the minimum number of miles that must be traveled for an odometer entry to be considered reasonable. In a dual key system, this field is usually on the vehicle key.

Maximum Miles

Description Maximum miles is a four-digit numeric field. Its value indicates the maximum number of miles that can be traveled for an odometer entry to be considered reasonable. In a dual key system, this field is usually on the vehicle key.

Vehicle Class

Description Vehicle class is a two-digit numeric field. It is used only with the Maintenance Option. Valid vehicle classes are 00-20. See the Maintenance option for more details. In a dual key system, this field is usually on the vehicle key.

Maintenance x Odometer

Description Maintenance x Odometer is a seven-digit numeric field. It indicates the odometer reading at which maintenance type A, B, or C was last performed. It is used only with the Maintenance Option. In a dual key system, this field is usually on the vehicle key. This field must be encoded with the last maintenance odometer or a starting odometer from which maintenance will be calculated. If zeros are encoded, the system assumes that maintenance will not be used.

Maintenance x Date

Description Maintenance x Date is a six-digit numeric field (YYMMDD). It indicates the date on which maintenance type A, B, or C was last performed. It is used only with the Maintenance Option. In a dual key system, this field is usually on the vehicle key. This field must be encoded with the last maintenance date or a starting date from which maintenance will be calculated. If zeros are encoded, the system assumes that maintenance will not be used.

PIN

Description PIN is a four-digit numeric field. It protects the system from unauthorized use should a key be lost or stolen. The system operator assigns PINs to keyholders. The PIN is stored on the key in an encrypted form so that it is not readable without being decrypted. When using dual keys, the PIN must be encoded on the key which has the check digit configured for PIN. Field separators take the place of digits on the other key. If PIN is encoded on both keys, it must be the same on both.

CRC

Description Four digit ASCII field (hexadecimal). The CRC is calculated based on all of the preceding data on the key. It is used to ensure the integrity of key data. You do not enter a CRC at the keypad, it will be encoded automatically.

STANDARD SYSTEM FEATURES

Transaction Recording

All formatted transaction printouts contain abbreviated headings. Headings vary depending on the option configured. Transaction headings and their descriptions are listed below.

Transaction Headings

Field Name	Description
SITE	4-digit site number
TRAN	4-digit transaction number
KEY1	5-digit first or single key number
KEY2	5-digit second key number
ID fields*	customized data fields (up to 20 characters)
DEPT	optional manual entry field (up to 20 chars., variable name, designated at order)
DATE	6-digit Gregorian date
TIME	4-digit 24-hour (military) time
P#	2-digit pump number
PR	2-digit product type
QUANTITY	8-digit quantity of product dispensed
PRICE	4-digit unit price of product (depends on Price Data Format setting)
\$TOTAL	8-digit total calculated transaction price (depends on Price Data Format setting)
ODOM	7-digit odometer mileage entry
MILES	4-digit miles travelled (only when transaction MPG enabled)
MPG	4-digit miles per gallon calculation (only when transaction MPG enabled)
ERROR	2-digit transaction message

* *The FleetKey system ID fields allow the user to customize the system to his requirements at the time of order. The name, number, and length of ID fields may vary, but can contain no more than 20 characters totaled. Field names may vary from the ones shown.*

Price Data Format Effect on Headings

Description

When the system operator sets the system configuration parameters, the selection for Price Data Format affects which headings are displayed on transaction printouts. Unit price (**PRICE**) and total transaction price (**\$TOTAL**) headings and data may appear. If you choose compacted format (**PC** or **PH**), unit price and total price are always shown. If you choose regular (**PT**) or sorted (**ST** or **SS**) transaction printing you get the following results depending on the setting:

Setting Results

- 0 No headings for unit and total price and no pricing data.
- 1 Unit price (**PRICE**) heading and unit price. (Penny pulsing pump only)
- 2 Unit price (**PRICE**) and total price (**\$TOTAL**) headings and price data for all transactions regardless of pulser type.

Transaction MPG Effect on Headings

If transaction MPG is enabled in the **SC** command, **MILES** and **MPG** headings and data will print as part of the transaction. If it is disabled, these fields will not print except in the **PC** or **PH** commands.

Direct Printout

If a terminal printer or logger is connected to Communication Port 1, transaction information is printed immediately upon transaction completion. See Figure 4-2 for a sample printout.

TRAN	KEY1	KEY2	EMP	VEH	DATE	TIME	P#	PR	QUANTITY	ODOM	ERROR
0221	01328	00000	5967	2430	07/11/92	15:30	01	01	8.28	0054880	

Figure 4-2. Direct Printout Example

Transaction Printing and Sorting

Options Transactions may be recalled from system memory in a variety of formats. Transactions can be printed in number sequence or they can be sorted before printing. Transaction headings appear as listed previously in **Transaction Recording**. You may have varying price headings depending on your price data format setting. You could also have varying headings depending on whether transaction MPG is enabled or disabled. Transactions can be sorted by any fields except \$TOTAL and MPG. Figure 4-3. shows a sample transaction printout.

TRAN	KEY1	KEY2	EMP	VEH	DATE	TIME	P#	PR	QUANTITY	ODOM	ERROR
*PT											
SITE 1234											
0221	01328	00000	5967	2430	07/11/92	15:30	01	01	8.28	0054880	
0222	01234	00000	5678	9012	07/11/92	15:37	03	03	13.6	0010222	
0223	03024	00000	8132	9675	07/11/92	15:39	02	02	11.6	0000000	
0224	03024	00000	8132	9675	07/11/92	16:23	01	01	0.0	0000000	PUMP IN USE
0225	00147	00000	8523	6541	07/11/92	16:24	01	01	5.02	0082311	LIMIT CUTOFF
0226	03024	00000	8132	9675	07/11/92	16:25	02	02	7.1	0000000	
*											

Figure 4-3. Transaction Printing with a Price Data Format Setting of 0

NOTE: The program may be ordered without the **SS** or **ST** command options to maximize program and/or transaction space.

Compacted Format

Description Transaction data can also be output in *compacted* format, deleting all spaces, headings, and punctuation. Compacted format is generally used to send transactions to a computer. The last four digits of each line represent the CRC-16 checksum; a data integrity check. Compacted transactions can be transmitted two ways: line-by-line, with an acknowledgement from the data terminal or program after each transaction (Figure 4-4); or as a continuous string (Figure 4-5).

```
*PH
12340005005420000012345678071992102501010006170010000000617000000000000000000094B42A
123400060054200000123456780719921025020200027000200000005400000000000000000009207DA
1234000700542000001234567807199210260101000693001000000069300000000000000000009A0E0A
123400080054200000123456780719921026020200113500200000022700000000000000000009C6AFA
1234000900542000001234567807199210260101000735001000000073500000000000000000090B13A
*
```

Figure 4-4. Compacted Transactions - Line-By-Line Transmission

```
*PC
1234000500542000001234567807199210250101000617001000000061700000000000000000094B42
123400060054200000123456780719921025020200027000200000005400000000000000000009207D
1234000700542000001234567807199210260101000693001000000069300000000000000000009A0E0
123400080054200000123456780719921026020200113500200000022700000000000000000009C6AF
1234000900542000001234567807199210260101000735001000000073500000000000000000090B13
*
```

Figure 4-5. Compacted Transactions - Continuous String Transmission

Sign On Password

Description A password of up to 10-characters is required to access the system Command Mode for updating files and retrieving information. For security, the password is not printed when entered into the system. The user can change the password.

System ID

Description A system ID number uniquely identifies each system. This number is encoded on the keys and denies users of other systems access to your system.

Personal Identification Number (PIN)

- Description* For optimum security, keys can be encoded to require the entry of a PIN number. The system operator loads a 4-digit working key for encrypting and decrypting PINs. The system uses an encryption process with this 4-digit working key and the PIN you specify. The PIN number for each key is selected at the time of encoding and can be assigned or user-selected. Encryption of PINs assures that an unauthorized person cannot determine a key's PIN even if he can obtain access to the actual data on the key.
- Auto Lockout* During the fueling process, the user can proceed with the transaction only if the number entered matches the PIN calculated by the system. The system can be set up to automatically lock out the key after three consecutive PIN entry errors.
- Display* You can have the system calculate and display the PIN on the LCD display using diagnostic test 0 and inserting the key for which the PIN is to be calculated.

Lockout

- Description* The system operator can control access to the system by validating/invalidating keys by number. Key numbers can be validated/invalidated individually, in strings of up to twenty assorted key numbers, or by ranges of consecutive key numbers. A key could also become invalid when a user tries to enter a PIN number unsuccessfully three consecutive times. A standard FleetKey system is configured to handle validation for 10,000 5-digit key numbers ranging from 00001 to 09999. Additional consecutive blocks of 10,000 numbers can be requested at order time. Remember, additional lockouts decrease the number of transactions that can be stored in the system.

Manual Entry Field

In addition to lockout by key number, the Manual Keypad Entry option also allows lockout on a manual entry field. This option must be specified at the time of order and manual entry field length is limited to four digits.

- Lockout Options* Validating a user's key allows that user to access the system; invalidating a key locks out that user from the system. The process by which you control access to your system is called *lockout*. The file in which valid and invalid keys are stored is called the lockout file. There are two types of lockout files: a *negative key file*, where you validate all keys and invalidate individual keys, or a *positive key file*, where you invalidate all keys and validate individual key numbers.

Product Authorization

- Description* The product authorization feature controls access to fuel type(s). Using the **LF** command, the system operator can load up to nine authorization codes (1-9) with up to nine fuel types per code. The user is permitted to access only the fuel type(s) loaded into the system for the authorization code encoded on his key. The authorization code **0** permits access to all fuels. Figure 4-6 shows a product authorization code table initiated by the **PF** command.

```
*PF
AUTH. CODE: 1  ALLOWS FUELS...01 02 03 04 05
AUTH. CODE: 2  ALLOWS FUELS...01
AUTH. CODE: 3  ALLOWS FUELS...02
AUTH. CODE: 4  ALLOWS FUELS...03
AUTH. CODE: 5  ALLOWS FUELS...04
AUTH. CODE: 6  ALLOWS FUELS...05
AUTH. CODE: 7  ALLOWS FUELS...02 03
AUTH. CODE: 8  ALLOWS FUELS...03 04 05
AUTH. CODE: 9  ALLOWS FUELS...04 05
*
```

Figure 4-6. Product Authorization Codes

Product Limitation

Description The product limitation feature controls the amount of product that can be dispensed in one transaction. The limit is specified by the limitation code encoded on the key. Using the **LL** command, the system operator can load the 10 available limitation codes (0-9) with any quantity from 1 to 99999. If a user reaches the maximum limit that has been entered for the code on his key, then the pump is automatically turned off causing a **LIMIT CUTOFF** error message. Figure 4-7 shows a product limitation code table initiated by the **PL** command.

```
*PL
LIMITS:
0 = 5
1 = 10
2 = 15
3 = 20
4 = 25
5 = 30
6 = 35
7 = 40
8 = 900
9 = 99999
*
```

Figure 4-7. Product Limitation Codes

Pump Totalizers

Description Incrementing totalizers are maintained for each hose outlet. As transactions occur, the totalizer of the corresponding hose is incremented by the transaction quantity. The pump totalizers can be automatically set back to zero or individually set to the corresponding mechanical pump totalizer. The totalizers have seven digits to the left of the decimal point and three digits to the right (xxxxxxx.xxx). Figure 4-8 shows a pump assignments and totalizer listing initiated by the **PP** command.

*PP					
P#	TANK	FUEL#	FUEL NAME	PRICE	GALLONS
1	1	01	REGULAR	\$1.189	21569.020
2	2	02	UNLEADED		66544.300
3	3	03	DIESEL		1223.300
4	4	04	SUPER UNLEAD		51100.654
*					

Figure 4-8. Pump Assignments and Totalizers Listing

Tank Inventory Totalizers

Description The system maintains up to eight tank quantities and allows for setting, adding to, or subtracting from the inventory level. Each pump is assigned a tank and as many pumps as desired can be assigned to a particular tank. As transactions occur, the inventory of the appropriate tank is decremented to show a lesser quantity. An inventory reorder point can be loaded into the system for each tank. The reorder point is printed as a reminder when the current tank totalizers are printed. Once the tank goes below the reorder level, **REORDER FUEL** prints in the **ERROR** field of all transactions withdrawing from that tank until the inventory is adjusted above the reorder level. Complete pump, tank, and product assignments may be printed using the **TI** command (Figure 4-9). The tank totalizers have seven digits to the left of the decimal point and three digits to the right (xxxxxxx.xxx)

*TI					
TANK #1	INVENTORY:	9301.190	REORDER	2000	
TANK #2	INVENTORY:	12000.000	REORDER	3000	
TANK #3	INVENTORY:	10000.000	REORDER	3000	
*					

Figure 4-9. Tank Inventory

Loadable Pump Timeouts

Description The Series 1000 monitors two timeout periods. Timeout values are assigned to ensure that the pumps are not activated and left unattended.

Timeouts There are two timeout periods:

- Interval in which the pump is activated by the system and the first pulse is received.
- Interval between turning off the nozzle (last pulse received) and turning off the pump handle. This timeout is reset if additional pulses are received.

This timeout is reset each time a pulse is received and is terminated by shutting off the pump handle. Timeout periods range from 1 to 180 seconds and can be set individually for each pump. A typical timeout is 80 seconds. If either timeout period is exceeded during a transaction, the transaction ends automatically, and a **TIMED OUT** message appears in the transaction **ERROR** field. Figure 4-10 shows the pump timeout and pulse rate assignments listing initiated by the **XP** command.

```

*XP
      - PUMP TIMEOUTS -
        IN SECONDS

P#    PULSES PER  BEFORE  AFTER
      GALLON     PULSES  PULSES
-----
01    $          080    060
02    0010       080    080
03    0010       120    120
04    1000       120    080
*
    
```

Figure 4-10. Pump Timeout and Pulse Rate Assignments

Pulse Rates

Description The Series 1000 System can accept pulse rates of dollar (one pulse per penny); and quantity (1:1, 10:1, 100:1, 250:1, 500:1, and 1000:1 ratios). Pulse rates may differ between pumps and the pulse rate definitions are loaded into the system via the data terminal. The pulse rate switch is located in the system cabinet in an area sealable by Weights and Measures for retail applications. When the switch is set to enabled, no transactions can occur at the system and the message **REMOTE CONFIGURATION** appears on the display.

Activate/Inactivate Pump Via Terminal

Activate Pump This feature allows the system operator to use the **AP** command to activate a pump (hose) from a data terminal for one transaction. This transaction is recorded as a normal transaction except that the digits of information, which would normally be read off the key, are recorded as all 9's (See Figure 4-11).

```

SITE 1234

TRAN KEY1  KEY2  EMP  VEH  DATE      TIME  P#  PR  QUANTITY  ODOM  ERROR
0874 99999  99999 9999 9999 07/11/92 09:17 01 01    22.21 99999999 TERM ACTIVATE
    
```

Figure 4-11. Transaction Activated via Terminal

Inactivate Pump The system operator can turn off any pump (hose), currently in use, from a data terminal by using the **IP** command. The pump is inactivated only for that transaction and the message **TTY CMD** is placed in the **ERROR** field for that transaction.

Pump Enable and Disable Via Terminal

Description Through a data terminal, the system operator can disable a pump (**DP** command) from further use. A **PUMP DISABLED** notation appears for that pump in the pump status (**PP** command) printout. The pump remains disabled until the system operator re-enables it through the data terminal.

Automatic Pump Disable

Description As a safeguard against defective pulse transmitters in the pumps, the system operator may configure the system to automatically disable a pump after a number (1-99) of consecutive no quantity transactions. If a pump becomes disabled in this manner, a **PUMP # X DISABLED** message appears on the direct printout. The pump remains disabled until the system operator re-enables it through the data terminal.

Automatic Site Shutdown Via Terminal

Description The system operator can set a time period each day when the system is automatically shut down and all users are denied access to the fuel dispensing equipment. A **SITE IS DOWN** message appears on the system's LCD display. The system operator still may access the other software features and may activate a pump for one transaction through the Activate Pump Feature. The automatic site shutdown can be disabled through the data terminal.

Odometer Entry/Reasonable Odometer

Description This feature uses the manual entry check digit encoded on the card to determine whether the user is prompted to enter an odometer reading at the Series 1000 keypad. This feature can also be ordered to prompt for hours for users measuring fuel consumption via an hour meter. See the Hours option under **Optional System Features**.

The FleetKey system also provides a reasonability check for odometers entered. If you use this feature, you must include a reasonableness check digit on your key. The check digit (0-2) determines what action is to be taken on the entered odometer. **0** allows any odometer entry; **1** checks for reasonability, prompts for retries, and allows fuelings; **2** requires reasonability, denies fueling if odometer is invalid.

Transaction MPG

Description Transaction MPG allows a system user to receive MPG information at the fueling island immediately after fueling. MPG information also appears as part of the transaction when you print transactions. In order to use the MPG feature, you must also require odometer entry. MPG is available with key types 0 through 2. MPG data for the transaction is displayable up until 16 transactions have occurred. The FleetKey system always retains the last 16 transactions with quantity. If a user did not display MPG and came back later to fuel (before 16 transactions had occurred), he would first be prompted to display MPG.

This feature can also be ordered to prompt for hours for users measuring fuel consumption via an hour meter. See the Hours option under **Optional System Features**.

Expiration Date on Keys

Description The Series 1000 FleetKey system provides for an expiration date (year and month) to be encoded on each key. When the expiration date is reached, the key is not honored by the system. This feature can be disabled through the data terminal.

Dual Port

Description This feature allows the system to be connected to two terminal devices or a terminal and a modem. The system can communicate through only one port at a time.

Help Feature

Description The Help feature provides a list of all terminal commands. If the operator wishes further explanation, an expanded help command produces a list showing each command, followed by a brief description.

*NOTE: The program may be ordered without the **Help** feature to maximize program and/or transaction space.*

System Message Display

Description The system operator can load, via the data terminal, a personalized, 20-character message to appear on the Series 1000 LCD display. When the Series 1000 is not in use, the LCD alternates between the system message and the **INSERT KEY** prompt message.

Encoded Key Information Display

Description While in diagnostic mode, the system operator can display, on the Series 1000 LCD display, the field and the encoded digits for the key currently inserted in the receptacle. The encoded information appears one field at a time and, if it is greater than 20 characters, scrolls off the left side of the display. The system operator can also print, on the data terminal, the key information of the last key used in the system.

Diagnostics

Description To aid in system troubleshooting and service, an integral diagnostic program is provided. This program includes key receptacle, keypad, LCD, LCD message, ROM, RAM, and communication port tests. A summary of diagnostic tests is shown in Figure 4-12.

Test #	Description
0	Calculate PIN Function
1	Change Password Function
2	LCD Character Set Test
3	Key Data Display
4	Keypad Test
5	Communication Ports Test *
6	RAM (Memory) Test
7	ROM (Program) Test
8	LCD Message Test
9	Key Encoding **
* Loopback test jumper needed for this test	
** Test available only if encoding option ordered.	

Figure 4-12. Diagnostic Test Summary

OPTIONAL SYSTEM FEATURES

Activate Pump Data Entry

Description This option allows you to enter key data and an odometer reading at the data terminal before activating a pump. The system prompts you for the key numbers, ID fields, and odometer before allowing you to select a pump. When this transaction is recorded, the digits of information, which are usually read from the key, are replaced by those entered at the data terminal. If you do not need to enter data for a particular field, press RETURN at that field; it will be filled with nines (9).

Auxiliary Communications Port PCB

Description An optional auxiliary port PCB may be available if you have ordered the receipt printer or tank monitor options. This board contains two ports (one for a receipt printer and one for a tank monitoring system), configurable to either RS-232 or RS-422. Each has a selectable baud rate of 300, 1200, or 9600. The receipt printer is always set to 9600. Most tank monitoring systems should be set to 300 or 1200 and, for optimum data transfer, should run at the same baud rate as the data terminal.

Encoding Option

Description

The Encoding option allows you to use the FleetKey system to encode your data keys. You can encode keys two ways: using diagnostic mode, which is convenient when encoding many keys; or using a special encoding key, for occasional encoding.

If you do not choose the Encoding option, you can have your keys encoded by GASBOY or purchase a GASBOY KE200 Key Encoder/Maintenance Terminal (C06292) and encode your own.

Extended Pump Timeouts

Description

The Extended Pump Timeouts option allows the before and after pulsing timeouts, loaded through the **LP** command, to be longer than 180 seconds. The timeouts can be extended to 3600 seconds (one hour).

Fuel Allocation

Description

The Fuel Allocation option allows the system operator to allocate to users, over a period of time, predetermined amounts of fuel. This option works effectively only in a single site operation.

Requirements

At the time of order, the system operator must indicate the key field to be assigned the allocation totalizers and the number of totalizers. This field must be a numeric field (**Key** or one of the ID fields). It cannot be a manual entry field.

Sequence An allocation offset command (**AO**) allows the user to specify the starting number for the allocation totalizers. For example, a system ordered with allocation by vehicle number and 500 totalizers with an allocation offset of 1250 will have allocation totalizers assigned to vehicle numbers 1250 through 1749.

As fuel is withdrawn from the system, the appropriate allocation totalizer is decremented. When the totalizer reaches zero, the user is denied fuel until the system operator loads a new allocation amount. The system operator may add to, or subtract from, individual totalizers or strings of totalizers at one time. An allocation table (Figure 4-13), showing the allocation numbers and their current totalizer values, may be printed on demand. An individual allocation number or range of numbers, may also be specified and their current totalizer values are printed (Figure 4-14). A total of all totalizer values is provided on all allocation reports.

```

*PA
ALLOCATION TABLE
0000= 123.456          0001= 390.000          0002= 12820.678          0003= 86252.000
0004= 44553.000        0005= 92346.989        0006= 175.000           0007= 4354.000
0008= 4344.000         0009= 4344.000        0010= 165.000           0011= 165.000
0012= 165.000         0013= 165.000         0014= 165.000           0015= 165.000
TOTAL: 250692.123
*
    
```

Figure 4-13. Allocation Table

```

*MP
ALLOCATION NO.: 0012
TO
ALLOCATION NO.: 0015
0012 = 165.000          0013 = 165.000          0014 = 165.000          0015= 165.000
TOTAL: 660.000
*
    
```

Figure 4-14. Range of Allocation Totalizers

Fuel Delivery and Dipstick

Description Using special keys, the FleetKey system can accept and record fuel delivery and dipstick reading data. With this option, any key with a key type of 4 initiates a fuel delivery transaction and any key with a key type of 5 initiates a dipstick reading transaction. Fuel deliveries update the inventory totalizer for the designated tank and create a transaction. Dipstick readings only generate a transaction, inventory totalizers are not affected.

Fuel Point

Description The FleetKey system can be purchased with a Fuel Point option. The hardware required for the Fuel Point option can be factory-installed on a new system, or retrofitted to an existing system. Refer to the following Fuel Point manuals for information on system installation and retrofitting:

- *Fuel Point Reader Installation, C35628*
- *Fuel Point Hose and Dispenser Retrofit Installation, C35593*
- *Vehicle Module Installation, C35699*
- *Vehicle Module Programming Manual, C35629*
- *Fuel Point Parts, C35709*

There are two variations on the Fuel Point option: the standard Fuel Point option or the Fuel Point Gate option. The standard option allows you to authorize up to 8 fueling positions. The gate option allows you to designate a fueling position (hose) as a gate controller. The gate option requires a special vehicle module with gate antenna connectors on the vehicle and installation of a special ground loop antenna buried in the driveway.

Special Considerations When you have the Fuel Point option, several FleetKey commands have additional prompts or operate differently. Refer to the *FleetKey Operation Manual*, Appendix D for a complete description of these changes.

Gate Controller

Description The Gate Controller option enables you to control access to a gate using a dedicated Series 1000.

Sequence When the user inserts his key, the gate controller verifies the key and activates the gate relay.

Transaction Matching If you have an existing FleetKey, the Gate Controller system can be configured to match your existing transactions.

Memory Full The Gate Controller can also be ordered with Memory Full protection disabled. This means when the system memory is full, new transactions will overwrite the transactions already in memory. When you select this option, you cannot retrieve transactions, the only record will be the direct printout copy.

Hours

Description An Hours option is available for user equipment that is monitored with an hour meter instead of an odometer. When you select the hours option, **ENTER HOURS** is displayed on the LCD in place of **ENTER ODOMETER**. The prompt **MPG? 1=YES, 0=NO** is replaced with **HPG? 1=YES, 0=NO**. If yes is selected, HPG is shown.

Loadable Base Pump

Description The Loadable Base Pump option allows the system operator to assign different starting pump numbers for a site where there is more than one Series 1000. You can enter a base pump number that is used as the number of the first pump in a system. All pumps are numbered consecutively beginning with the base pump number. The maximum pump number is 99. Pump numbers that are less than the base pump number will not be available.

Example:

If the base pump number is loaded as 3, there will not be any pumps numbered 1 or 2 at that Series 1000. When pump number 3 is selected for fueling, the first relay in that system is activated.

Maintenance Option

Description The Maintenance Option allows the system operator to set up and enforce a vehicle maintenance timetable for up to three types of scheduled maintenance. The maintenance types are A, B, and C, and can be used for a variety of options (for example: A might be tune up/oil, B might be inspection, C might be tire maintenance). The Maintenance option requires a GASBOY KE200 Key Encoder/Maintenance Terminal (C06292) for updating of keys.

*Loading the
Maintenance
Table*

To use the Maintenance option, the system operator must set up a maintenance table consisting of the three Maintenance categories (A, B, and C) and a **MILES** and **DAYS** between maintenance entry for each. The system operator can define a maintenance schedule for up to 20 classes (1-20) of vehicle. The vehicle class is encoded on the user's key. A class of 00 indicates no maintenance is performed. The key also contains a 7-digit maintenance odometer and 6-digit maintenance date field for each of the three maintenance types. This maintenance odometer is separate from the odometer a user enters during fueling; it contains the vehicle's odometer at the time of maintenance. The maintenance table uses this odometer as a starting point for calculating the next scheduled maintenance. The maintenance date is the date the maintenance was performed. This date is the starting point for calculating the next scheduled maintenance date. Neither the maintenance odometer or maintenance date can be set at zero or the system assumes maintenance will not be used. If the last maintenance odometer or date is not known, enter an odometer or date from which to calculate future maintenance.

*Performing
Maintenance*

When the vehicle is sent to the garage for maintenance, the technician uses the KE200 as a Maintenance Terminal and reads the key to find out which maintenance is due. He then performs that maintenance and updates the user's key with the odometer and date at which maintenance was performed. A maintenance transaction is generated and placed in the maintenance transaction file. A copy of the transaction is also printed on the logger. Maintenance is valid only on key types 0, 2, or 3. If you have the supervisor option, keys to be used with the maintenance option cannot have supervisor characters encoded in the VEH field.

*Monitoring
Maintenance*

Once the table is loaded, the system operator must indicate the number of miles and/or days before or after maintenance is due in which you wish to notify the user of impending maintenance. For example, assume a user had his last

maintenance at 35,000 miles and is scheduled for tune-up/oil change every 5,000 miles (at 40,000 miles) and the due soon indicator is set to 1000. When that user fuels, he inputs a current odometer of 39,000 miles and receives the message **MAINT X DUE SOON**. When the maintenance date or mileage is reached, the message **MAINT X DUE NOW** appears on the LCD. All the maintenance messages are also appended to the **ERROR** field in each transaction until the maintenance is performed and the key is updated. The system operator can also set an indicator to warn users of overdue maintenance. If the overdue indicator is set to 500 and that user reaches 40,500 without having the necessary maintenance the message **MAINT X OVERDUE** appears. Using a parameter in the **SC** command, the system operator can prohibit (lockout) the user from obtaining any more fuel until the overdue maintenance is performed.

Manual Entry of Off-Site Fueling Transactions

Description The Manual Entry of Off-site Fueling Transactions option allows the system operator to enter an off-site fueling transaction at the data terminal. The system prompts for the key 1 number, key 2 number, ID fields, year, month, day, hours, minutes, pump number, fuel code, quantity, unit price, and odometer and creates an **OFF SITE FUEL** transaction using the entered information. If information is not entered for a particular field, pressing RETURN will fill the field with zeros.

Manual Keypad Entry

Standard The Manual Keypad Entry option provides an additional field that allows you to request input, from the Series 1000 user, during a key action. You can use this field to record anything from manual oil transactions, department numbers, trailer numbers, or even vehicle or employee numbers that were not key-encoded.

Requirements The system operator must specify the field name and size at the time of order. The field may be up to 20 digits. The check digit, encoded on the key, controls whether the individual user is prompted to enter the manual entry. (For more information, see **Manual Entry Check Digit**). The manual entry appears under its own heading in the transaction printouts (between last ID field and date or between last ID field and type in systems with Fuel Point option). Figure 4-15 shows a manual entry option using **DEPT** (department number) as the entry.

*PT												
SITE 1234												
TRAN	KEY1	KEY2	EMP	VEH	DEPT	DATE	TIME	P#	PR	QUANTITY	ODOM	ERROR
0221	01328	00000	5967	2430	0032	07/11/92	15:30	01	01	8.28	0054880	
0222	01234	00000	5678	9012	0011	07/11/92	15:37	03	03	13.6	0010222	
0223	03024	00000	8132	9675	0011	07/11/92	15:39	02	02	11.6	0000000	
0224	03024	00000	8132	9675	0032	07/11/92	16.23	01	01	0.0	0000000	PUMP IN USE
0225	00147	00000	8523	6541	0123	07/11/92	16.24	01	01	5.02	0082311	LIMIT CUTOFF
*												

Figure 4-15. Transaction Printout with Manual Entry Option (DEPT)

Lockout You can order this option to allow lockout on your manual entry field in addition to standard lockout by key number. The lockout option must be specified at the time of order and field length is limited to four digits.

Miles Per Gallon History Option

Description The MPG History option allows the Series 1000 FleetKey system to calculate and maintain a cumulative miles-per-gallon tally for keyholders based on one of the ID fields that is specified at the time of order (this field is usually a vehicle number, VEH). The exact number of users supported depends upon the limit specified when the system was ordered.

MPG File Information

MPG software computes fuel efficiency averaged over a period of time determined by the system operator (usually a month). Standard transaction MPG provides MPG per transaction. To use the MPG history option, the system operator enters information on each of the users into an MPG file record. Each MPG record contains four fields and a status flag:

- REC 1- to 20-digit number from a field you specify at time of order.
- B ODOM up to 7-digit beginning odometer reading
- E ODOM up to 7-digit ending odometer reading (last recorded)
- GALLONS up to 8-digits for total gallons for period
- STAT a record status code indicating MPG comments (for more on status flags, see the **VF** command)

Printing options The system operator can print out the MPG file (Figure 4-16) to view the record number, beginning and most recent odometer entries, the total number of miles, the total number of gallons, the miles per gallon calculation, and the record status.

```
*VF
REC  B ODOM  E ODOM  MILES      GALLONS  MPG          STAT
0543 0031256 0031554 0000298    16.000  18.6
1342 0043578 0043957 0000379     7.100  53.4 HIGH
1811 0012967 0012989 0000022    11.600   1.9 LOW
2816 0035014 0042651 0007637   474.350  16.1
3244 0024644 0024644 0000000     0.000   0.0 %%
4200 0000100 0000250 0000150    28.100   5.3 <<
5196 0000000 0002735 0002735     0.000   0.0 **
*
```

Figure 4-16. MPG File Printout

Multi-Level Password

Description The Multi-Level Password option provides two levels of passwords: super user and standard user. The super user password allows you to access all system commands including the **CP** command. The **CP** command allows you to selectively authorize or restrict commands that the standard user is allowed to access. When you use diagnostic test 1 to initialize the password, both passwords are set to **GASBOY**.

Change Password

To change the super user password, sign on as **GASBOY** and use the **LS** command to change the password. Use the **EX** (exit) command to exit command mode and sign on again as **GASBOY**. You are now in standard user mode. To change the standard user password, sign on as **GASBOY** and use the **LS** command to change the password.

Pump Switch Timer

Description The Pump Switch Timer option allows you to prevent fueling at a pump when the handle has been left on from a previous transaction.

In a normal transaction when you request a pump, the pump is activated, the user turns on the pump handle and fueling begins. Occasionally, the pump handle may have been left on from a previous transaction. When a new transaction is initiated, the pump cannot reset and, if pumping is allowed, the quantity shown at the pump includes the previous transaction quantity.

With the pump switch timer option, the handle is checked at the beginning of each transaction. If it is found to be on, a **TURN OFF PUMP HANDLE** message appears and the transaction is terminated. A transaction is generated with the message **PMP SW ERROR**. The user must turn off the pump handle and begin a new transaction in order to fuel.

Receipt Printer

Description The Receipt Printer option allows the user to obtain a transaction receipt for fuel dispensed through the Series 1000. Receipts are available only for those transactions where fuel is dispensed; error and other no quantity transactions cannot be printed. An additional option allows for up to three receipts to be generated for a transaction. The number of receipts is set using the **SC** command.

Sequence Obtaining a receipt is accomplished as follows: After a user fuels his vehicle in the normal fashion and wants a receipt, he goes back to the Series 1000 and inserts his key (or keys). The system asks if he wants a receipt. If the reply is yes, a receipt is printed and the transaction is finished.

If he does not choose to get a receipt, the next time he attempts to fuel, the system checks through the last 16 transactions with quantity. If one of these matches his key data, the system asks if he wants a receipt (for that transaction). If the reply is yes, the system prints a receipt. He must then insert his key(s) again to begin the fueling transaction. If the reply is no, the system proceeds with a normal fueling operation.

Transaction receipts are not available if:

- There are no available receipt transactions in the system memory for the key.
- The receipt printer is in an error condition. (i.e., printer jammed, paper out, printer down).

The system operator can issue a receipt printer command, **GR**, from the data terminal to obtain a receipt for a specific transaction number.

Sample receipt Receipts issued from the Series 1000 contain the following data:

Receipt header. Up to four 30-character lines of text loaded through the SC command.

Site number
 Transaction number
 Date
 Time
 Card number
 ID field 1 number (if used)
 ID field 2 number (if used)
 Manual entry (if used)
 Pump number
 Product name
 Quantity
 Unit price (if full price data enabled)
 Total price (if full price data enabled)
 Odometer (if available)
 MPG (if configured and data is available)

GASBOY INTERNATIONAL, INC
 707 NORTH VALLEY FORGE RD
 LANSDALE, PA 19446
 TELEPHONE: (215) 855-4631

SITE NO.: 1234
 TRANS NO.: 0071
 DATE: 09/18/92
 TIME: 12:23
 CARD: 0243
 EMP: 2813
 VEH: 7576
 DEPT: 55
 PUMP: 04
 PRODUCT: DIESEL
 QUANTITY: 22.090
 PRICE/GAL: \$1.249
 TOTAL: \$27.59
 ODOMETER: 023456
 MPG: 12.5

Receipt trailer. Up to two 30-character lines of text loaded through the SC command.

THANK YOU FOR FUELING WITH
 GASBOY

Supervisor Key

Description This option allows the system operator to use a specially encoded supervisor key to manually enter ID field information at the Series 1000 keypad. Supervisor keys are typically used when a key has been lost.

Supervisor fields can be encoded onto key types 1, 2 or 3 and consist of special characters to designate the supervisor fields. The method for inserting these special characters varies by key type. For key type 3, press CLEAR twice. The field is filled with dots. For key types 1 and 2, press CLEAR three times to display the dots. You can alternate among clear display and dots by repeatedly pressing the CLEAR button; key types 1 and 2 also have a field separator character. Press ENTER to go on to the next field.

Maintenance restriction

Keys to be used with the Maintenance option cannot contain supervisor characters in the VEH field.

Tank Monitor

Description The Tank Monitor option enables the system operator to communicate with a Veeder Root TLS tank monitoring system using the Series 1000 as an interface. Once the communications link is established, commands issued from the Series 1000 data terminal are passed to the tank monitor and data output from the tank monitor appears at the Series 1000 data terminal. This interface is completely transparent except for the ENQ character which terminates the tank monitor interface. The ENQ character is generated by pressing CTRL E. This option requires the use of the optional auxiliary communications port PCB.

TRANSACTION STORAGE EXAMPLES

Description The Series 1000 FleetKey System stores up to 844 transactions in memory. Identification fields and software options use more memory space and therefore decrease transaction storage.

The table below shows the approximate number of transactions a system will store based upon various field sizes and optional software.

These examples and the calculations that follow are updated at the .1 release of each new software version. Intermediate revisions (i.e., .2, .3, etc.) may contain additional programming changes that will affect these calculations. Contact the GASBOY Order Department if your ROM total is close to the maximum number of bytes allowed.

1	ID Fields			Man. Entry	Man. Lock	MPG Hist	Alloc	Rcpt	TLS	Lock Blks	Maint.	Encd	Fuel Point	Total Trans
	2 EMP	3 VEH	4											
-	-	-	-	-	-	-	-	-	-	1	-	-	-	844
4,N	4,N	-	-	-	-	-	-	-	-	1	-	-	-	740
4,N	4,N	-	-	4	-	-	-	-	-	1	-	-	-	696
4,N	4,N	-	-	4	X	-	-	-	-	1	-	-	-	660
4,N	4,N	-	-	-	-	100	-	-	-	1	-	-	-	569
4,N	4,N	-	-	-	-	500	-	-	-	1	-	-	-	387
4,N	4,N	-	-	-	-	-	100	-	-	1	-	-	-	602
8,N	8,N	4,N	-	-	-	-	-	-	-	1	-	-	-	623
4,N	4,N	4,N	-	-	-	-	-	-	-	1	-	-	-	696
4,N	4,N	-	-	-	-	-	-	X	-	1	-	-	-	569
4,N	4,N	-	-	-	-	-	-	-	X	1	-	-	-	724
4,N	4,N	-	-	-	-	-	-	-	-	3	-	-	-	664
4,N	4,N	-	-	-	-	-	-	-	-	1	X	-	-	606
4,N	4,N	-	-	-	-	-	-	-	-	1	-	X	-	615
9,N	7,A	-	-	-	-	-	-	-	-	1	-	-	-	592
5,A	5,A	5,A	5,A	-	-	-	-	-	-	1	-	-	-	492
4,N	4,N	-	-	-	-	100	-	X	-	1	-	-	-	524
4,N	4,N	-	-	-	-	100	100	-	-	1	-	-	-	555
4,N	4,N	-	-	-	-	100	100	-	-	2	-	-	-	517
4,N	4,N	-	-	4	X	100	100	-	-	1	-	-	-	487
4,N	4,N	-	-	-	-	100	-	-	-	1	X	-	-	559
4,N	4,N	-	-	-	-	100	-	-	-	1	-	X	-	569
4,N	4,N	-	-	-	-	-	-	-	-	1	-	-	X	505
4,N	4,N	-	-	-	-	100	-	-	-	1	-	-	X	464
4,N	4,N	-	-	-	-	-	100	-	-	1	-	-	X	493
4,N	4,N	4,N	-	-	-	-	-	-	-	1	-	-	X	478

ID fields show digits and format (numeric/alphanumeric)

Manual entry is shown in digits

MPG history is shown in records

Allocation is shown in totalizers

Lockout blocks is shown as number of 10K blocks

TRANSACTION STORAGE CALCULATION

If the configuration of variable field sizes and software options you have is not listed in the transaction storage table, you can determine the approximate number of transactions by calculating:

1. The number of bytes in your transaction record.
2. The number of ROM bytes used.
3. The number of RAM bytes used.
4. The available transaction space
5. The total number of transactions that can be stored.

The calculations vary according to the number and type of system options you have.

1. Figure out the number of bytes in the transaction record. Only add in the calculations for manual entry and receipt printer if you have these options.

ID Field 1	(numeric)	(____ digits + 1) / 2 (drop decimal remainder)	
_____	(alphanumeric)	(____ digits)	= _____
ID Field 2	(numeric)	(____ digits + 1) / 2 (drop decimal remainder)	
_____	(alphanumeric)	(____ digits)	= _____
ID Field 3	(numeric)	(____ digits + 1) / 2 (drop decimal remainder)	
_____	(alphanumeric)	(____ digits)	= _____
ID Field 4	(numeric)	(____ digits + 1) / 2 (drop decimal remainder)	
_____	(alphanumeric)	(____ digits)	= _____
ID Field 5	(numeric)	(____ digits + 1) / 2 (drop decimal remainder)	
_____	(alphanumeric)	(____ digits)	= _____
ID Field 6	(numeric)	(____ digits + 1) / 2 (drop decimal remainder)	
_____	(alphanumeric)	(____ digits)	= _____
ID Field 7	(numeric)	(____ digits + 1) / 2 (drop decimal remainder)	
_____	(alphanumeric)	(____ digits)	= _____
ID Field 8	(numeric)	(____ digits + 1) / 2 (drop decimal remainder)	
_____	(alphanumeric)	(____ digits)	= _____
		Subtotal of ID field bytes	= _____
Manual Entry		(____ digits + 1) / 2 (drop decimal remainder)	= _____
Receipt Printer		Add 1	= _____
Fuel Point		Add 5	= _____
			+ _____ 29
Number of Bytes in Transaction Record (Add column)			= _____

2. Figure out the number of ROM bytes used. Scan the list of options. When you locate an option in your system, copy the number from the bytes column into the calculation column. Add the **STANDARD DEDUCTION** and the **OPTION** values selected. Then add any applicable numbers from the **COMBINATIONS** section. This will equal your **ROM Total**.

STANDARD DEDUCTION **31299**

OPTION	BYTES	+
Receipt Printer	2663	_____
Multiple Receipts	116	_____
Manual Entry	152	_____
Lockout on Manual Entry	345	_____
Activate Pump w/Data Entries	233	_____
MPG History	1873	_____
Fuel Allocation	1820	_____
Maintenance	2621	_____
Encoding	2310	_____
Off-Site Fueling Transactions	634	_____
Loadable Base Pump	242	_____
Multi-Level Password	582	_____
Supervisor Key	614	_____
Delivery and Dipstick	595	_____
Tank Monitor Interface	410	_____
Extended Pump Timeouts	100	_____
Pump Switch Timer	454	_____
Fuel Point	2786	_____

COMBINATIONS (Add if your system has any of these)

Receipt Printer		
and manual entry	22	_____
and off-site fueling	22	_____
and loadable base pump	11	_____
and AP w/data entries	4	_____
and delivery and dipstick	27	_____
and supervisor	-54	_____
Activate Pump w/Data Entries		
and manual entry	8	_____
and lockout on manual entry	57	_____
and allocation	235	_____
and MPG history	108	_____
Encoding		
and Supervisor key	213	_____
and delivery and dipstick	-8	_____
Off-Site Fueling Transactions		
and AP w/data entries	-83	_____
and manual entry	21	_____
and AP/data entries and manual entry	-15	_____
and MPG history	217	_____
	Subtotal of this page	_____

Fuel Point		
and allocation	176	_____
and pump switch timer	134	_____
and MPG history	154	_____
and extended pump timeouts	-5	_____
and TLS	5	_____
and receipt	279	_____
Remove Sort (SS and ST)	-1489	_____
Remove Expanded Help	-1279	_____

Subtotal of this page = _____

Subtotal of previous page = _____

ROM Total = _____

3. Figure out the number of RAM bytes used. Add the calculation totals of each option selected and write the sum in the space provided at the bottom. This is your RAM Total.

OPTIONS	CALCULATIONS	
Subtotal of ID field bytes*	_____ X 10	= _____
Receipt Printer	+ 962	= _____
w/multiple receipts	+ 1	= _____
Manual entry	+ (manual entry field bytes X 10)	= _____
Manual entry lockout	+ 1259	= _____
AP w/Data Entries	+ (trans bytes - 2)	= _____
w/off-site fueling	- (trans bytes + 2)	= _____
MPG History	(Number of Records _____ X (Field Bytes** _____ + 13)) + 47	= _____
w/AP entries	+ 5	= _____
w/off-site fueling	+ 4	= _____
Fuel Allocation	(Number of Totalizers _____ X 4) + (2 X allocation field bytes _____) + 42	= _____
w/AP entries	+ 3	= _____
Additional blocks of lockout	(# of additional blocks _____ X 1250)	= _____
Maintenance	+ 327	= _____
Encoding	+ 7	= _____
w/supervisor keys	+ 3	= _____
Off-site fueling	+ (trans bytes + 4)	= _____
Loadable Base Pump	+ 4	= _____
Multi-Level Password	+ 68	= _____
w/allocation	+ 12	= _____
w/MPG history	+ 8	= _____
w/maintenance	+ 5	= _____
Supervisor keys	+ 6	= _____
Delivery & Dipstick	+ 6	= _____
Tank Monitor Interface	+ 506	= _____
Extended Timeouts	+ 58	= _____
Pump Switch Timer	+ 11	= _____
Fuel Point	+ (trans bytes x 9) + 689	= _____
w/allocation	+ 3	= _____
w/pump switch timer	+ 8	= _____
w/MPG history	+ 1	= _____
w/receipt	+ 1	= _____
RAM Total		= _____

* You calculated the subtotal of ID field bytes in Step 1.

** You calculated field bytes for each of your ID fields in Step 1. Use the value for the ID field you are using for your MPG history (usually VEH).

4. Figure out the amount of available transaction space.

Write the following values: **ROM TOTAL** (From Step 2): _____

RAM TOTAL (From Step 3): _____

Consult the following chart to see where your ROM value falls.

ROM TOTAL RANGE	BYTES
0 to 32752	8192
32753 to 36848	12288
over 36849	*

* If your ROM TOTAL exceeds this number, your system has too many options. Eliminate options.

Write the number listed in the **BYTES** column: _____

Perform the following calculation:

$$\text{RAM Total} + \text{Bytes} = \text{Reserved RAM}$$

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Subtract the Reserved RAM from 32925 to get transaction space.

$$32925 - \text{Reserved RAM} = \text{Transaction Space}$$

$$32925 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

5. Figure out the total number of transactions that can be stored.

Get **Transaction Space** from Step 4. Write the total in the space provided below.

Get **Number of Bytes in Transaction Record** from Step 1. Write the total in the space provided below.

Perform this calculation:

Transaction Space	/	Bytes in Transaction Record	=	Number of Possible Transactions Stored
 _____	 /	 _____	 =	 _____

Subtract 8 - _____ 8

Approximate number of transactions that can be stored: _____

Section 5

SPECIFICATIONS AND INSTALLATION

HARDWARE SPECIFICATIONS

<i>Dimensions:</i>	Total height with post - 60" Cabinet head dimensions - 15"W x 12"H x 20"D
<i>Weight:</i>	Approximately 200 lbs. (Shipping Weight)
<i>Power Requirements:</i>	115 VAC \pm 10%, 47-63HZ, 135 watts maximum (all heaters on).
<i>Environmental Requirements:</i>	-30° C to 50° C, 95% relative humidity, non-condensing.
<i>Lighting:</i>	Faceplate is lit via standard fluorescent tube
<i>Approvals:</i>	FCC and UL
<i>Pump Control Capacity:</i>	Standard system controls 2 hose outlets (pumps or dispensers), expandable in 2 hose increments to control a total of 8 outlets. Maximum pump load at 3/4 HP, 115 VAC or 230 VAC, 2 solid state relays per hose. Pump loads above 3/4 HP require external relay.
<i>Pulser Capacity:</i>	Dollar (one pulse per penny) and quantity (1:1, 10:1, 100:1, 250:1, 500:1, 1000:1 pulses per unit of product). Resolution to .001 gallons or liter. 4,200 pulses/minute maximum - Reed Type Pulser 71,000 pulses/minute maximum - Electronic Pulser
<i>Controls & Indicators:</i>	3 x 4 membrane keypad; 20 character .5" LCD display; Insertion type mag or optical card reader (Card system); 1 or 2 key receptacles (FleetKey system); Emergency stop switch; Full manual override switches
<i>Receipt Printer:</i>	Serial, impact dot matrix printer, 40 columns, 12 CPI, character size 5 x 9 dots
<i>Memory:</i>	32K RAM, battery backed (5 year retention), 8K battery-backed.
<i>Clock:</i>	Real time, battery backed
<i>Communication:</i>	2 asynchronous ports, either may be set for RS-232 or RS-422. Baud Rates: 300, 600, 1200*, 2400, 4800, 9600 (*Do not exceed 1200 when polling data from a computer). Optional: Auxiliary asynchronous ports which may be set for RS-232 or RS-422 for tank monitor or receipt printer. Baud rates 300, 1200, 9600.
<i>Modems:</i>	Optional built-in, or external
<i>Protection:</i>	Transient protection provided on AC power input and RS-422 communication; Fail safe protection on pump control drives; AC and DC power fail detect; Missing Pulse detector
<i>Diagnostics:</i>	Built-in software and hardware diagnostics

SYSTEM DIMENSIONS - CARD, CARDLESS, OR FLEETKEY

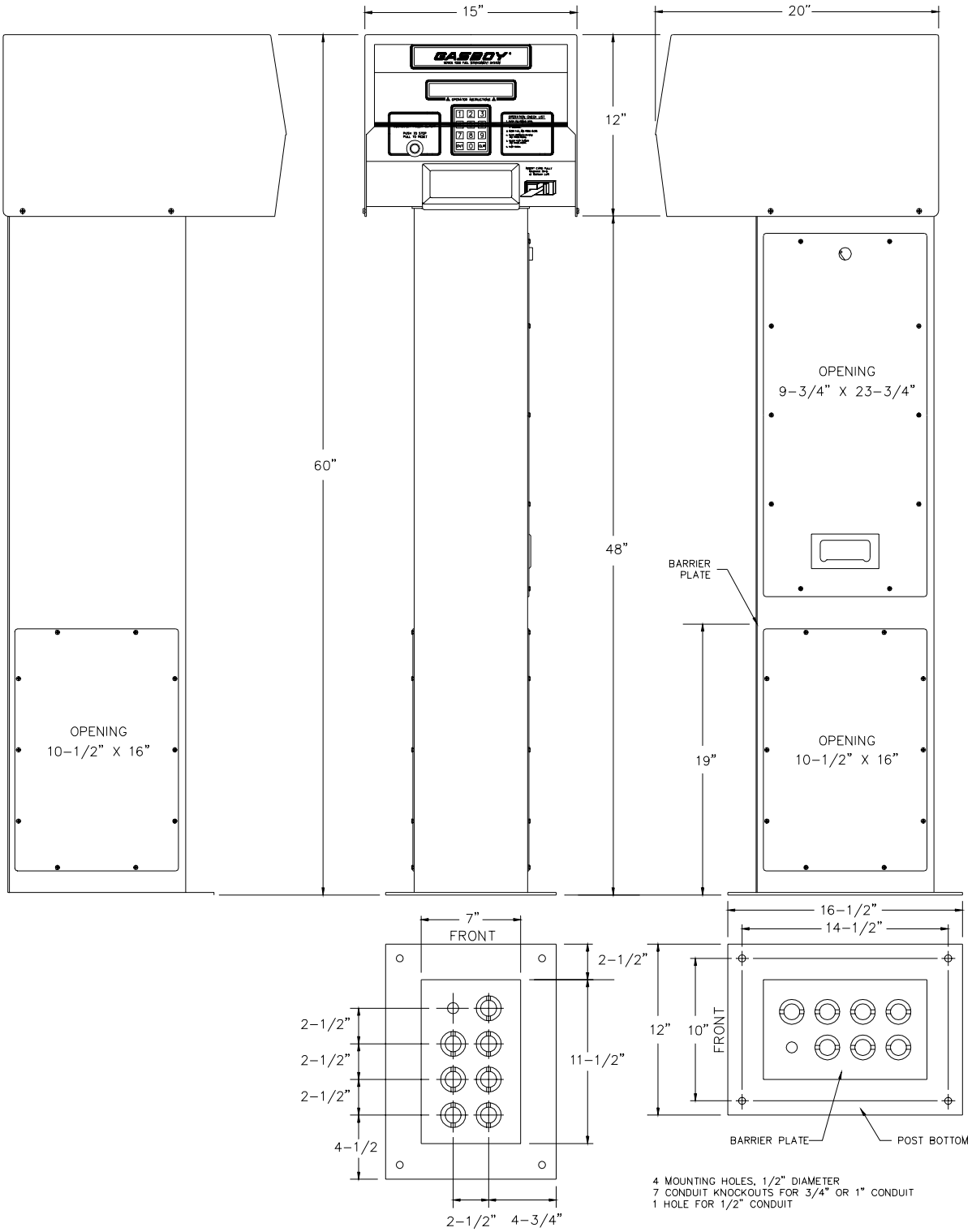


Figure 5-1. System Dimensions

SYSTEM DIMENSIONS - SERIES 1000 WITH RECEIPT PRINTER

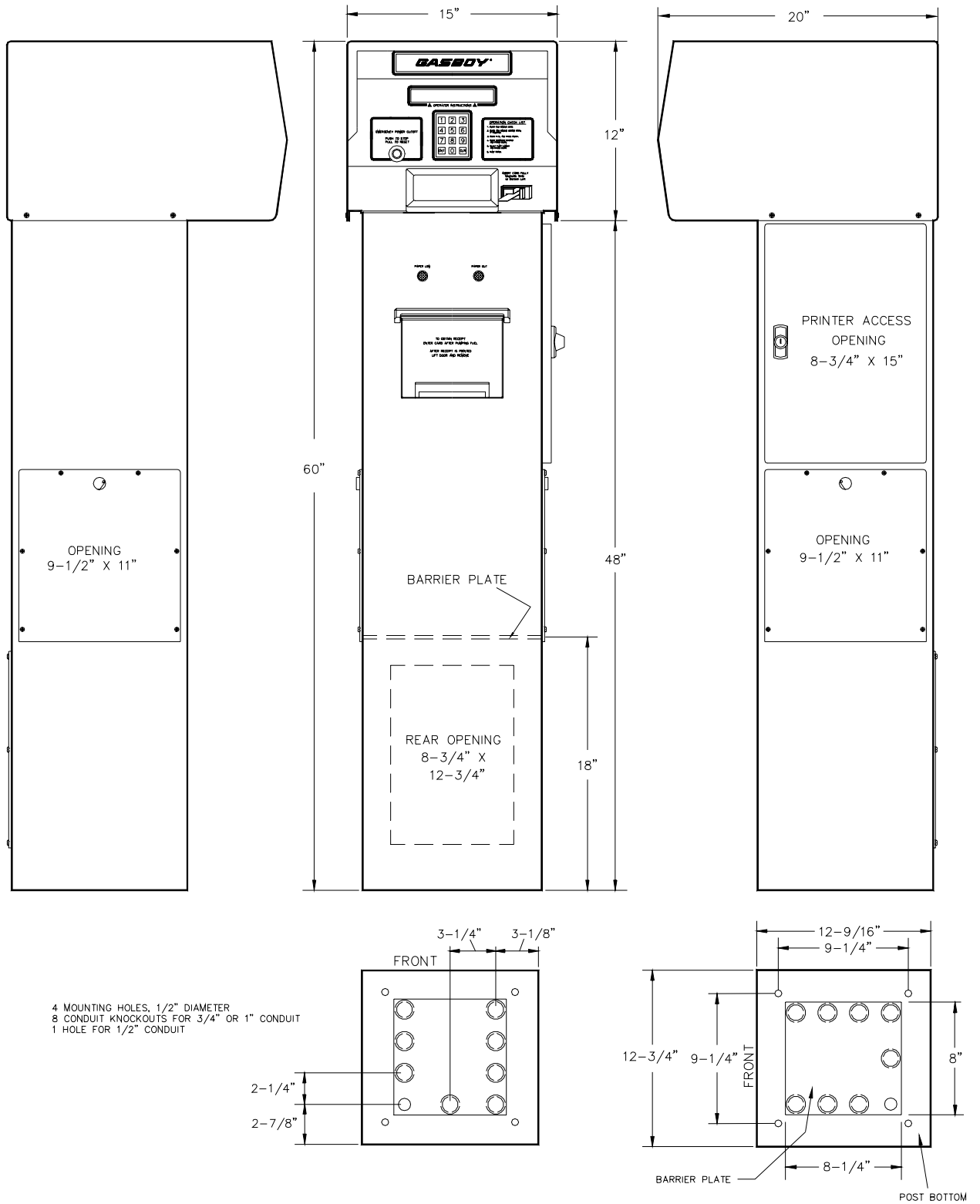


Figure 5-2. System Dimensions With Receipt Printer Pedestal

COMPONENT LOCATION

Planning Careful planning for the layout of the site will help eliminate possible problems with the start-up of the Series 1000 system and will ensure continued, reliable system operation. Figure 5-1 shows system dimensions.

System

Environment The Series 1000 System should be located on the fuel island. This unit has been designed to withstand an environment of -22°F to 110°F, 95% relative humidity, non-condensing. When mounting the unit, a minimum clearance of 18 inches must be maintained between the post and any of the pumps or dispensers. This clearance meets the NFPA 30A and NFPA 70 requirements and allows room for wiring and maintenance of the system. Adequate clearance around the head of the unit is important to provide room for maintenance of the system. A minimum of 14 inches of clearance from the rear of the unit must be provided to allow the rear door to open.

Data Terminal or CRT

Environment When a data terminal or CRT is used with the system it should be located in a clean, office-type environment. Do not install over a hazardous location. Locating the terminal in a dirty environment may cause premature failures.

External Modems

Environment When an external modem is used with the system it is recommended the modem be located in an office type environment. However, if this is not possible, it should be housed in a protective enclosure. Do not install over a hazardous location. External modems supplied by GASBOY have an operative temperature range of 32°F to 104°F.

Power Conditioner

Environment When used, a power conditioner helps provide clean power to the Series 1000 System. Poor power conditions are a key cause to system malfunction or failure. Uncorrected irregular power can cause data errors, loss of information, and equipment failure. The power conditioner provides transient and common mode protection for the Series 1000, although it cannot totally compensate for extremely poor power conditions. The power conditioner must be located in an area protected from direct contact with weather (typically near the system circuit breakers) and should be no further than 50 feet from the Series 1000. The unit is designed for an operating temperature range of -4°F to 110°F.

Voltage Regulator/Backup Power Supply

Environment When the Series 1000 is being used for the resale of fuel, Weights and Measures regulations require a backup power supply. The voltage regulator/backup power supply protects line-operated equipment from low line voltage (brownout) and total line power failure by providing virtually instant emergency power. The voltage regulator/backup power supply also protects line-operated equipment from potentially dangerous voltage spikes coming in on the commercial AC power. Although it does help to condition the power to the Series 1000, it cannot totally compensate for extremely poor power conditions. The voltage regulator/backup power supply must be located in an area protected from direct contact with weather (typically near the system circuit breakers) and should be no further than 50 feet from the Series 1000 System for optimum protection. The unit is designed for an operating temperature range of 32°F to 112°F.

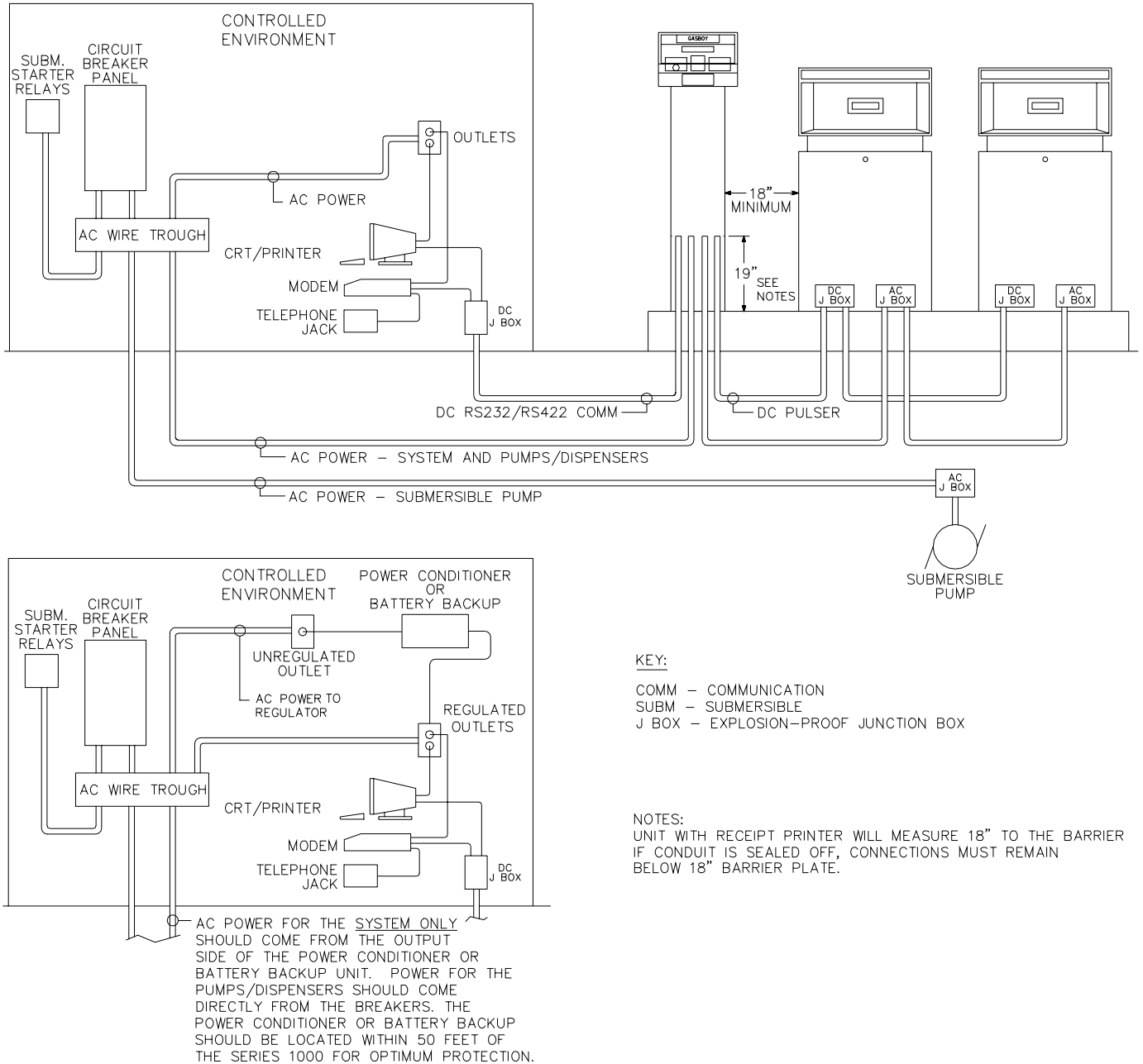
CONDUIT REQUIREMENTS

- General* All wiring (AC and DC) connecting the different components of the Series 1000 System must be installed in **threaded, rigid, metal conduit. PVC IS NOT ACCEPTABLE.** Components of the system include pumps, dispensers, submersible pumps, submersible starter relays, Series 1000 System, and circuit breaker panels. Communication equipment signal wires should also be run in **metal conduit**, (except for RS-422 wiring as noted in Section 6, **Communications**).
- AC Power* **High voltage AC power wires must be installed in separate conduit from the low voltage DC signal wires.** The AC power wires and DC signal wires must not be run in any sort of common conduit or trough (except for RS-422 wiring as noted in Section 6, **Communications**).
- Connections* All conduits must be connected to the Series 1000 pedestal through the holes and knockouts provided by the factory. Do not make any other holes in this unit. If you must make holes at locations other than those provided, contact GASBOY for approval first.
- Conformity* All wiring and conduit runs must also conform with the National Electrical Code (NFPA 70), the Automotive and Marine Service Stations Code (NFPA 30A), and State and Local Electrical Codes.
- Size* Use the Conduit chart (Figure 5-3) as a guideline for determining the necessary conduit sizes for the wiring of the GASBOY Series 1000 System. When actually determining the size of conduit, you may need to increase conduit size because of a long run or large number of bends. Use the Wire Size chart (Figure 5-6) to determine the gauge of wire that should be used in the installation. The installer should determine the orientation of the wire runs according to the layout of the components at the site and the applicable GASBOY wiring diagrams. This chart is based on using metal thin wall conduit (THWN) with 50% fill of gas-and oil-resistant wire.
- Warranty* The GASBOY warranty will not apply to any system in which AC and DC wires are run in the same conduit, J-Box or wireway. The GASBOY warranty will not apply to any system using PVC conduit.

CONDUIT SIZE						
	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
18 AWG	19 Wires	34 Wires	55 Wires	97 Wires	132 Wires	216 Wires
14 AWG	13 Wires	24 Wires	39 Wires	69 Wires	94 Wires	154 Wires
12 AWG	10 Wires	18 Wires	29 Wires	51 Wires	70 Wires	114 Wires
10 AWG	6 Wires	11 Wires	18 Wires	32 Wires	44 Wires	73 Wires
8 AWG	3 Wires	5 Wires	9 Wires	16 Wires	22 Wires	36 Wires
6 AWG	1 Wire	4 Wires	6 Wires	11 Wires	15 Wires	26 Wires
4 AWG	1 Wire	2 Wire	4 Wires	7 Wires	9 Wires	16 Wires
2 AWG	1 Wire	1 Wire	3 Wires	5 Wires	7 Wires	11 Wires

Figure 5-3. Conduit Chart

CONDUIT LAYOUT DIAGRAM



NOTE: Subm starter relay is recommended for all submersible pumps. It is required for any pump motor exceeding 3/4 HP

Figure 5-4. Conduit Layout Diagram

CONDUIT LAYOUT/INSTALLATION SPECIFICATIONS

- Guidelines*
1. All wiring is to be installed and used in accordance with local building/fire codes, all Federal State, and Local codes, the National Electrical Code (NFPA 70), NFPA 30, and the Automotive and Marine Service Station Code (NFPA 30A) codes and regulations. Canadian users must also comply with the Canadian Electrical Code.
 2. All peripheral equipment connected to the RS-232 ports must be Listed, have an Electronics Industry Association (EIA) standard RS-232 communications protocol, and not be installed over a hazardous location.
 3. Power for the system, printer and modem must come from a separate circuit breaker rated at no less than 10 AMPS.
 4. All conduit must be metal to provide the necessary shielding.
 5. High voltage (AC) and low voltage (DC) wires must not be combined in a common conduit, junction box, or wire trough unless cable is used as specified in the *Installation Manual*.
 6. Wire gauge should be determined through the use of the Wire Size chart (Figure 5-6).
 7. Conduit size should be determined according to the number of wires and wire gauge through the use of the Conduit chart (Figure 5-3).
 8. RS-232 communication must not exceed 100 feet. RS-232 communication wires must be in a separate metal conduit from any AC wires.
 9. For communication distances exceeding 100 feet, a GASBOY RS-422 Short Haul Modem must be used. RS-422 communication must not exceed 1500 feet.
 10. DC pulser and DC RS-422 communications wires can be combined in the same conduit.
 11. Suction pumps over 3/4 HP must use a starter relay. Wire the starter relay in place of the motor in the applicable pump wiring scheme.
 12. A minimum of 18 inches must be maintained between the Series 1000 post and any of the pumps/dispensers.
 13. Disregard submersible pump in drawing if hose outlets are suction pumps.

POWER REQUIREMENTS

System/Peripheral Equipment

Breakers AC Power for the Series 1000 System, data terminal, and external modem must come from a separate, dedicated circuit breaker. No other equipment, including the system's pumps or dispensers, may be powered from this breaker. Whenever possible, one breaker should be used to supply the system, terminal, and modem. However, if necessary, the terminal or modem may be on a different separate, dedicated breaker. The power supplied from these breakers must be on the same phase of power.

Power Protection The system requires 115 VAC \pm 10% 47-63 HZ for power. The system draws 135 watts maximum. An unstable power source may require the use of a power conditioner (P/N C01862) If the Series 1000 is going to be used for the resale of fuel, Weights and Measures regulations require a voltage regulator/backup power supply (P/N C04395).

Grounding Proper system grounding is an extremely important part of the system installation. Grounds for all system devices should be wired to the breaker panel ground bus bar which in turn should be grounded to a ground rod. A conduit ground does not provide a sufficient ground. It is recommended that the neutral and ground bus bars be bonded together when it is not prohibited by local codes.

Suction Pumps

Guidelines The Series 1000 System is capable of directly driving pump motors up to 3/4 HP at 115 VAC or 230 VAC. A starter relay must be used with pump motors over 3/4 HP. A separate circuit breaker should be supplied for each pump to meet the current requirements and to allow for isolated control with the circuit breaker panel in case of problems.

Dispensers

Guidelines The Series 1000 System is capable of directly driving submersible pumps up to 3/4 HP at 115 VAC or 230 VAC. A separate circuit breaker should be supplied for each dispenser in cases where it will directly drive the submersible pump. A dispenser with a submersible pump rated over 3/4 HP will require the use of a submersible starter relay. Dispensers may be grouped together on a single breaker when the submersible pump has its own breaker. It is recommended that no more than two dispensers be powered from one breaker to maintain isolated control with the circuit breaker panel in case of problems.

TERMINAL BLOCK ID

Description All wiring for the Series 1000 is terminated to the chassis assembly in the pedestal of the system. Terminal connectors should be used on stranded wire when connecting to the terminal blocks of the system. The orientation of the chassis assembly is shown in Figure 5-5.

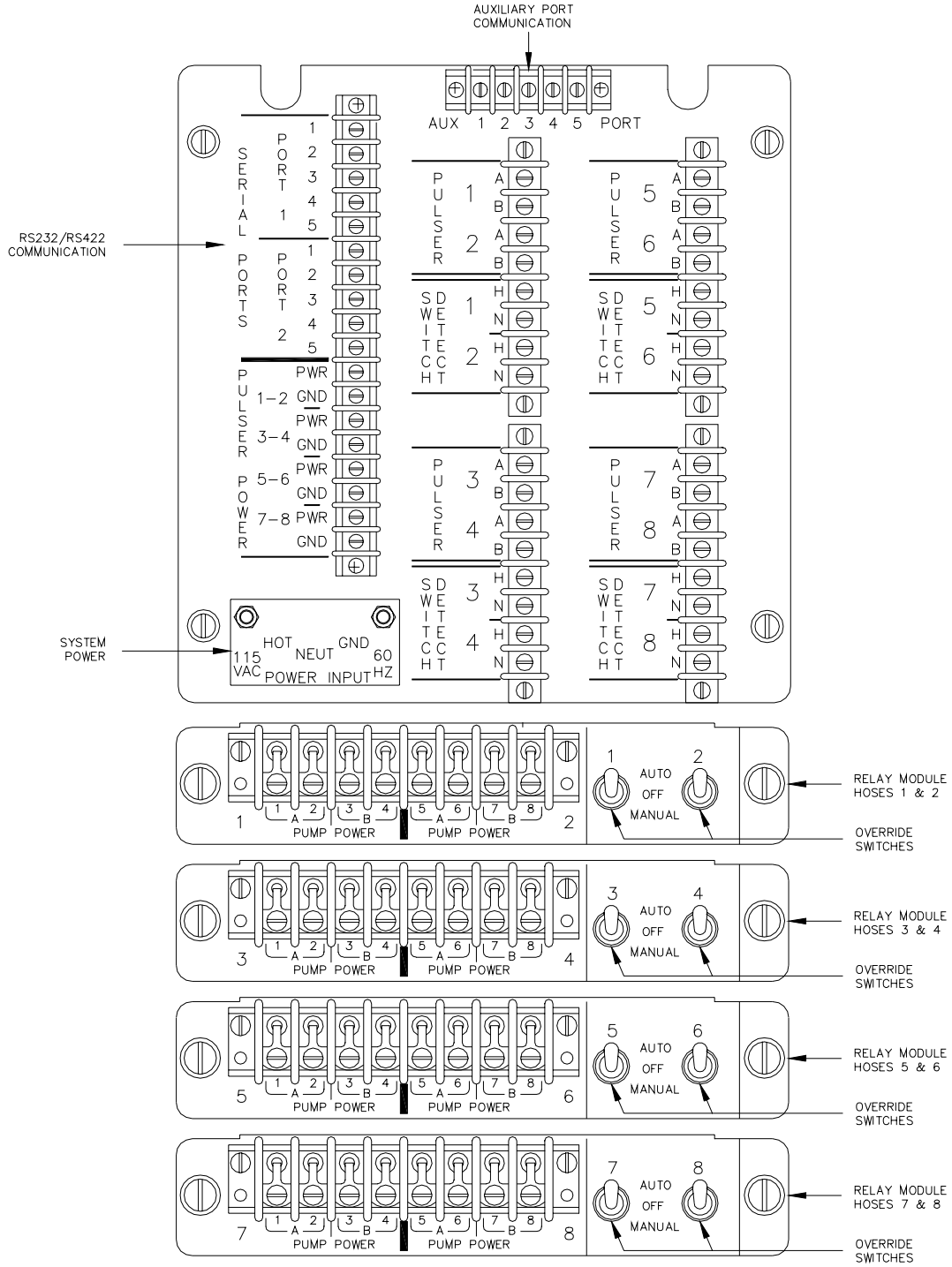


Figure 5-5. Terminal Block ID

WIRE SIZE

- General* All wire should be stranded. The AC wire size for power of the system must be 14 AWG or larger. This gauge of wire will be sufficient for runs of up to 300 feet from the breaker panel to the system. Sites with distances over 300 feet must use 12 AWG wire or larger.
- Suction Pump* The AC wire size for a suction pump is dependent upon the HP rating of the pump motor, the voltage at which the pump will be operated (115/230), and the distance from the circuit breaker panel to the pump. Use the chart below (Figure 5-6) as a guide in selecting the proper size wire for your installation requirements. The wire size for the switch detect from the pump should be 14 AWG.
- Dispenser* The AC wire size for the control lines of a dispenser should be 12 AWG. These control lines are used to supply power for the reset mechanism, solenoid valve, and submersible starter relay (when the submersible pump is not directly powered by the dispenser). The wire size for the submersible pump power is dependent upon the HP rating of the pump motor, the voltage at which it will be operated (115/230), and the distance from the circuit breaker to the pump. The chart below should be used as a guide in selecting the proper size wire according to the specific installation requirements. The wire size for the switch detect from the dispenser should be 14 AWG.
- Pulsers* All DC pulser wire size should be 18 AWG. This size is more than enough to handle the current requirements of the pulser and is primarily used for its strength.
- Communication* The wire size and type for the communication wiring should be determined according to the specific application as described in Section 6, **Communications**.

115 VOLT WIRE GAUGE SIZES PER FEET OF RUN								
MOTOR H.P.	25'	50'	100'	150'	200'	250'	300'	OVER 300' USE RELAY AT MOTOR LOCATION
1/4	14	14	12	10	10	8	8	
1/3	14	14	12	10	8	8	8	
1/2	14	12	10	8	8	8	8	
3/4	14	12	10	8	6	6	4	
230 VOLT								
1/4	14	14	14	12	12	12	12	
1/3	14	14	12	12	12	12	12	
1/2	14	12	12	12	10	10	10	
3/4	14	12	12	10	10	10	8	
1-1/2	12	12	10	10	8	8	6	

Figure 5-6. Wire Size Chart

COMMUNICATIONS

COMMUNICATION OVERVIEW

Data Terminal The Series 1000 System has two asynchronous communication ports are provided for connection to a data terminal or personal computer. The connection may be made by direct cable, via a short haul modem, or via a telephone modem. An optional auxiliary port PCB (2 ports) can be used for communication from a tank monitor through the Series 1000 System to the peripheral device attached to Port 1 or Port 2. Each port may be set up for RS-232 or RS-422 communication.

Modems The optional GASBOY internal 300/1200 phone modem (GASBOY P/N C05739) requires the installation of a phone line directly to the fueling island, and a phone jack mounted in the Series 1000 pedestal. An external phone modem (P/Ns C01533) allows for connection to a phone jack which is installed remotely from the fueling island. A communication cable is required from the external modem to the system's communication port. In either case, standard voice grade, dial-up phone lines are used.

Comm Ports Communication Port 1 is normally used for directly connecting PC or data terminal located at the site. Port 1 allows access to the Direct Printout Mode and Command Mode of the system. See Section 1, **Communications Options and Operating Modes**, for more on the two system modes.

Port 2 is commonly used for connecting via a phone modem to a data terminal or computer remote from the site. Port 2 only allows access to the Command Mode. Both ports cannot be used for communication to the system simultaneously.

The auxiliary port PCB is used for communication with a tank monitoring system and also the receipt printer (if so equipped). If you ordered your system with a receipt printer or tank monitoring system, these ports are already present. No additional wiring is needed for the receipt printer.

Baud Rate Settings

Communication ports 1 and 2 can be set for 300, 600, 1200, 2400, 4800, or 9600 baud by a hardware jumper. The auxiliary ports can be set for 300, 1200, or 9600 baud. Each port can also be individually set for RS-232 or RS-422 communications. The type of communication used depends upon the distance of the device to be connected, as well as, certain conduit considerations. When sending data to the Series 1000 system from a computer or tank monitoring system, do not exceed 1200 baud. When sent at higher baud rates, data buffers may overflow. Overflow errors will terminate the connection.

DATA TERMINAL AND EXTERNAL MODEM WIRING

RS-232 Communication (For Distances to 100 Feet)

Devices RS-232 wiring can be used for direct connection to an EIA RS-232 compatible peripheral device (e.g., data terminal, external modem). The distance of the RS-232 cable is limited to 100 feet and must be in metal conduit separate from any AC wires. The system end of the cable is wired directly to a terminal block. The remote end of the wire can be terminated with either a RS-232 D connector (Figure 6-1) or a GASBOY RS-232 termination box. (P/N C05769) (Figure 6-2).

Cables and Connectors RS-232 wiring diagrams are illustrated on the next page. GASBOY part numbers for the necessary cables and connectors are indicated. In the diagram, Port 1 is shown connected to a data terminal and Port 2 is connected to an external modem.

RS-422 Communication (For Distances to 1500 Feet)

Short Haul Modem RS-422 wiring requires the use of a GASBOY Short Haul Modem (P/N C05618) and the appropriate cable for connection to an RS-232 data terminal, external modem, etc. The short haul modem is located next to the RS-232 device and converts the RS-422 signal from the system to an RS-232 signal and vice versa. RS-422 wiring is capable of running up to 1500 feet. Other advantages of RS-422 are its high noise immunity and exceptions allowed to normal conduit requirements as outlined below.

Installation Twisted pair shielded cable is highly recommended for RS-422 wiring. Although it is recommended that wires be run in a conduit separate from AC wires, they can be combined in the same conduit with AC wires providing UL-Listed cable with the following specifications is used:

Conductor:	18 AWG stranded wire. 2 twisted-pairs.
Shield:	Foil-wrapped 100% coverage and/or tinned copper braid 90% coverage
Drain Wire:	Stranded, tinned copper, 20 AWG or larger/or braided shield
Voltage Rating:	Maximum operating voltage of 600V
Environmental:	Gas- and oil-resistant; suitable for wet or dry locations.

GASBOY can supply Belden 1063A (P/N C09655) which is a UL-Listed, 4-conductor cable that meets the requirements listed above. *NOTE: Belden 1063A is UL-Listed but not CSA listed.*

Cable with a voltage rating of less than 600V must be installed in a conduit separate from all AC wires.

When using the recommended shielded twisted-pair cable described above, RS-422 wires can be run with AC wires in metal conduit. The shield drain wire must be connected to the system AC ground. Only AC wires for the system and pumps can be installed in the AC conduit. Do not run the cable outdoors without the use of metal conduit. Do not run this cable overhead, outdoors.

The cable can be run indoors without the use of metal conduit. The shield drain wire must be connected to the system AC ground.

If using cable other than that recommended above, the RS-422 field wires must be installed in a metal conduit separate from any AC wires.

The maximum field wiring cable length is not to exceed 1500 feet.

Modem and Cables

The RS-422 wiring diagram is shown in Figure 6-3. GASBOY part numbers for the required short haul modem and necessary cables are also indicated. In the example, Port 1 is connected to a data terminal and Port 2 is connected to an external modem.

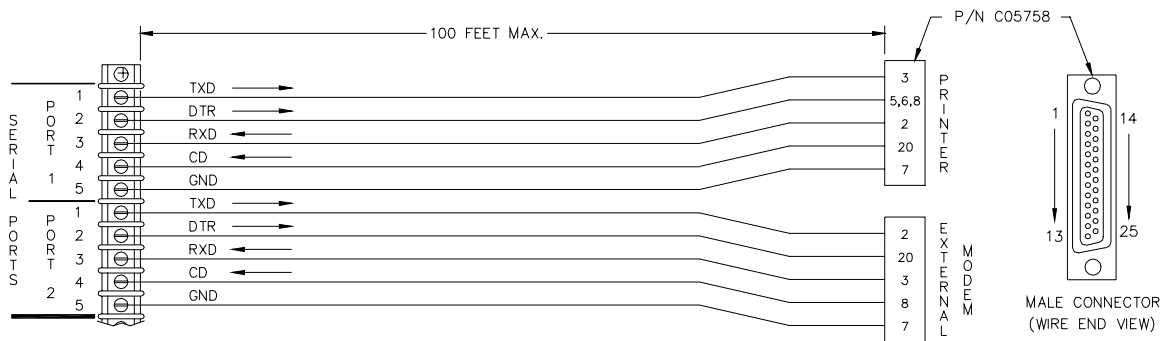


Figure 6-1. RS-232 Wiring - D Connector (P/N C05758)
(Requires Soldering in the Field)

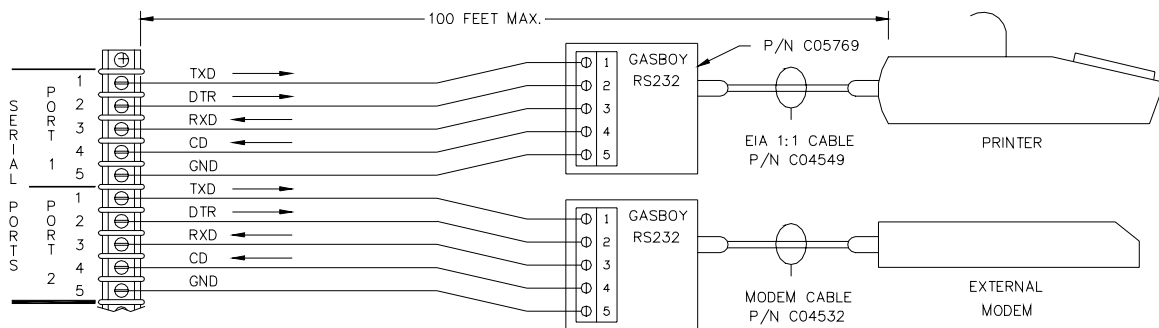


Figure 6-2. RS-232 Wiring - GASBOY Termination Box (P/N C05769)
(Requires no soldering)

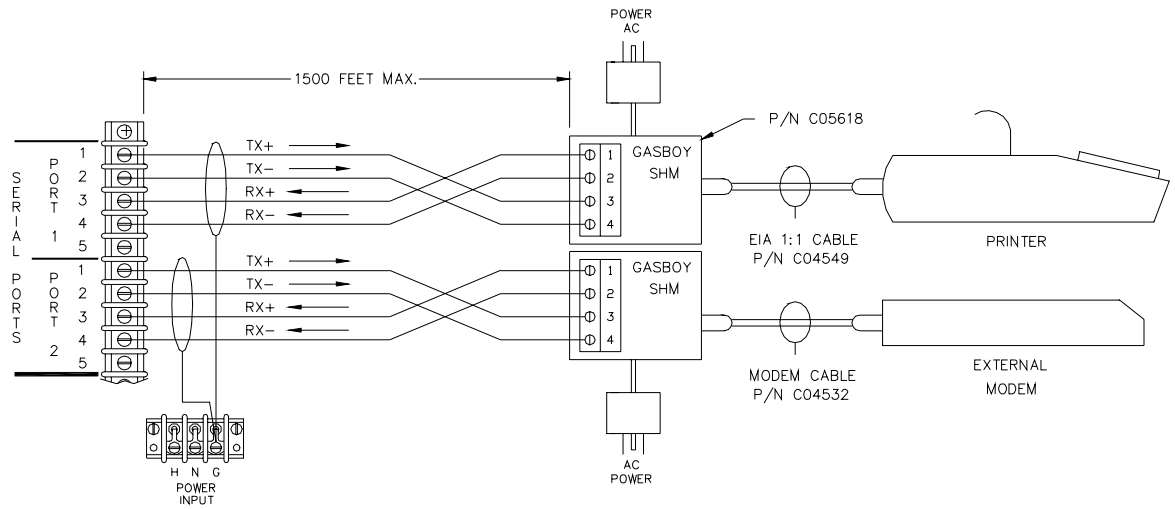
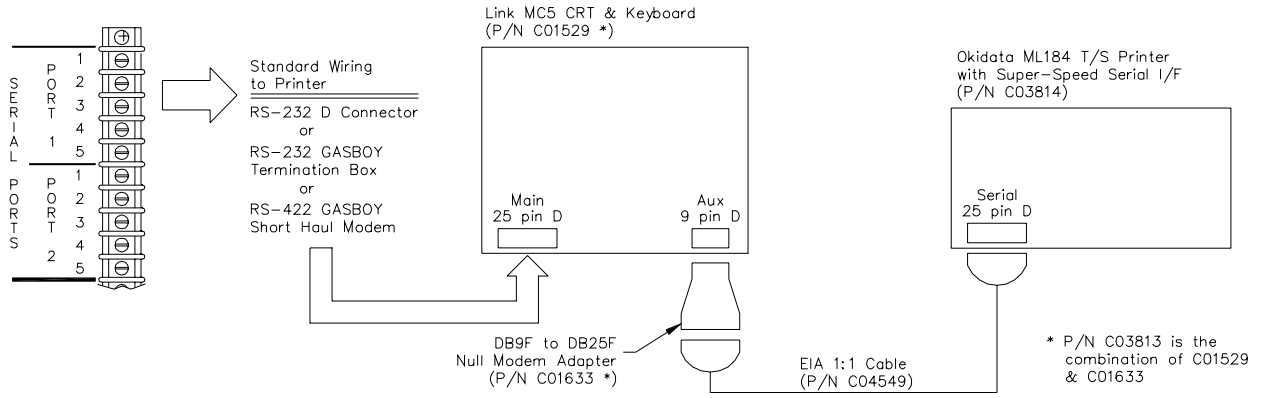


Figure 6-3. RS-422 Wiring

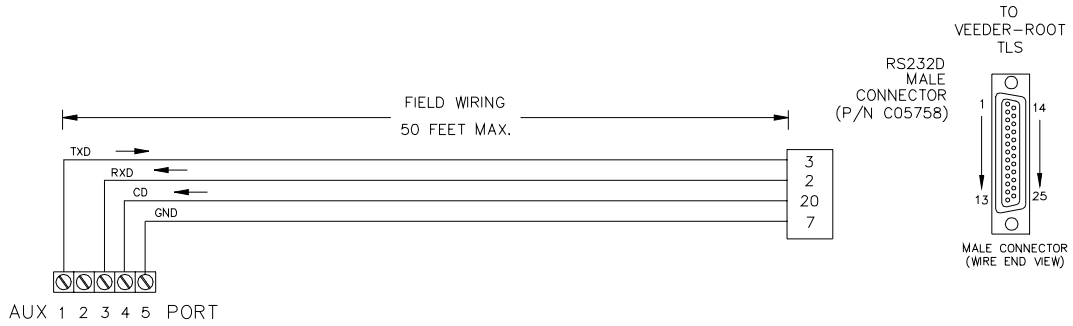
WIRING FOR A LINK CRT TERMINAL AND OKIDATA PRINTER

The following diagram shows the connection from the Series 1000 port to the Link terminal and the Okidata printer.

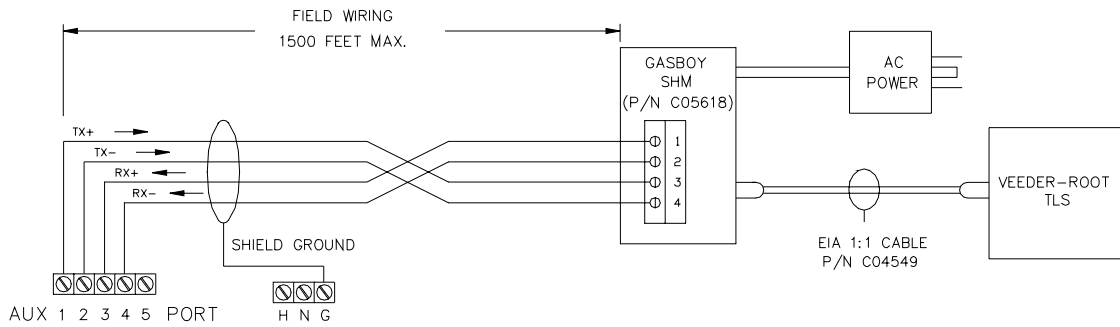


WIRING FOR A TANK MONITORING SYSTEM

RS-232 - Veeder-Root TLS



RS-422 - GASBOY Short Haul Modem to Veeder-Root TLS



DIRECT WIRING FOR DISTANCES UP TO 1500 FEET

Short Haul Modems

For distances from 100 to 1500 feet, the Series 1000 can be wired for direct communication using an asynchronous short haul modem (GASBOY P/N C05618). Communication can be through Port 1 or Port 2 of the Series 1000 System. The short haul modem and the appropriate interconnect cable must be used for RS-422 communications. It can be used for distances under 100 feet in place of RS-232 wiring. One SHM is required at the remote end of the communication wiring. These modems must be connected with private lines and will not work if connected into a telephone network. See the wiring diagram below for details.

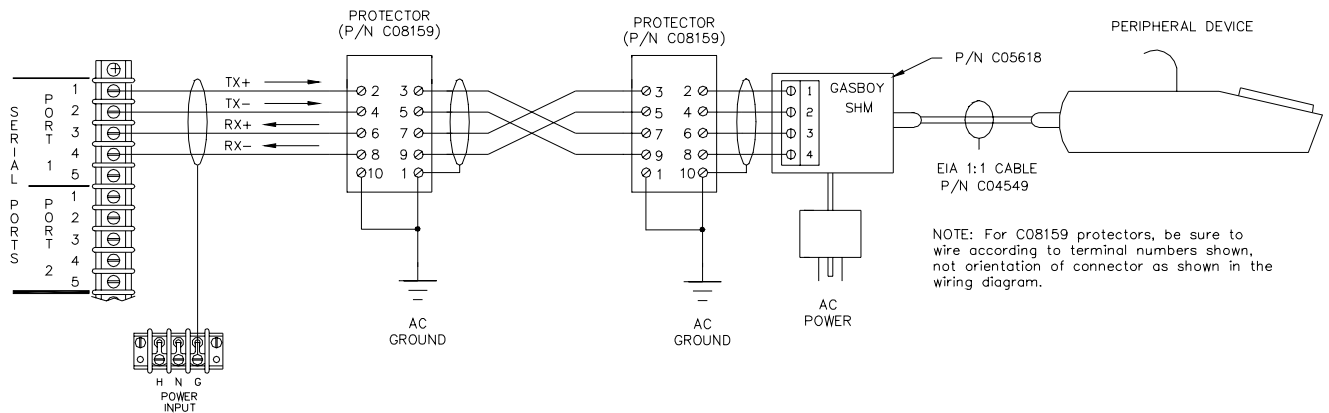


Figure 6-4. GASBOY Short Haul Modems (P/N C02479) (Distances up to 1500 feet)

AC Power The AC power for the short haul modem should come from the same breaker that supplies the peripheral device or the system.

Cabling Twisted pair shielded cable is highly recommended for RS-422 wiring. Although it is recommended that wires be run in a conduit separate from AC wires, they can be combined in the same conduit with AC wires providing UL-Listed cable with the following specifications is used:

- Conductor: 18 AWG stranded wire. 2 twisted-pairs.
- Shield: Foil-wrapped 100% coverage and/or tinned copper braid 90% coverage
- Drain Wire: Stranded, tinned copper, 20 AWG or larger/or braided shield
- Voltage Rating: Maximum operating voltage of 600V
- Environmental: Gas- and oil-resistant; suitable for wet or dry locations.

GASBOY can supply Belden 1063A (P/N C09655) which is a UL-Listed, 4-conductor cable that meets the requirements listed above. *NOTE: Belden 1063A is UL-Listed but not CSA listed.*

Cable with a voltage rating of less than 600V must be installed in a conduit separate from all AC wires.

Conduit When using the recommended shielded twisted-pair cable described above, RS-422 wires can be run with AC wires in metal conduit. The shield drain wire must be connected to the system AC ground. Only AC wires for the system and pumps can be installed in the AC conduit. Do not run the cable outdoors without the use of metal conduit. Do not run this cable overhead, outdoors. The cable can be run indoors without the use of metal conduit. The shield drain wire must be connected to the system AC ground. If using cable other than that recommended above, the RS-422 field wires must be installed in a metal conduit separate from any AC wires.

INTERNAL PHONE MODEM COMMUNICATION

Internal Modem The Series 1000 is available with an optional internal phone modem (GASBOY P/N C05739). The modem is mounted inside the Series 1000 System at the factory (The modem can be added in the field by an authorized service representative). Power for the modem is supplied by the GASBOY system.

Line Installation When the internal modem is installed, Port 2 communication is routed through the modem in place of being wired at the terminal block in the post. The phone line for the internal modem **must not** be installed in the DC conduit. The local phone company should be consulted for proper installation of the phone line. The internal modem connects directly with the jack supplied by the phone company. The customer is required to order the phone jack and have it installed in the Series 1000 pedestal. See the *Series 1000 Installation Manual* for the necessary specifications for ordering the phone jack from the phone company.

COMMUNICATION PROTOCOL

Device Requirements Communicating with the GASBOY Series 1000 System requires a device capable of transmitting and receiving full duplex, ASCII asynchronous data via an EIA-RS-232 connection. The Series 1000 uses a simple terminal protocol (TTY). There are no special characters transmitted to designate the beginning or end of the data blocks.

Data Format Data is transmitted in the following format: one start bit, eight data bits, one stop bit.

Each character is echoed back to the transmitting device. This checks the integrity and enables CRT operators to display transmitted data.

PC SOFTWARE

Overview GASBOY offers several different Personal Computer communication and reporting software packages. These packages can be used in conjunction with a single Series 1000 site, or to consolidate the fueling information from multiple sites.

GASBOY PC/COMM LITE SOFTWARE

General The PC/Comm Lite package provides a communications link between your PC and your GASBOY fuel sites. At your command, the PC can automatically dial up sites or communicate with a directly-connected site. Then you can issue any commands recognized by the fuel management system, and receive the output right at your PC screen.

GASBOY PC COMMUNICATIONS (PC/COMM) SOFTWARE

General The PC/Comm package provides basic communication functions between Series 1000(s) and a PC. The program allows the PC to poll (gather fueling transactions) and store the polled transactions in a sequential ASCII file on the PC diskette or hard disk. The transactions can be polled automatically at a pre-designated time or on operator demand. The transaction layout will match the data retrieved from the Series 1000 **PC** command without the checksum. The program also allows the PC to emulate an ASCII terminal and thus access the command features of the Series 1000.

Usage PC/Comm can be used when:

- The user wishes to communicate the transactions stored by the Series 1000 to a PC for entry into his in-house, or outside vendor's, fleet software. The user is responsible for the software necessary to format the transactions for entry into his fleet software.
- The user wishes to use a PC as a communication controller between the Series 1000 and a mini or mainframe computer. The interface between the PC and the mini or mainframe computer is the user's responsibility.
- The user wants to use a PC in the place of a data terminal. The PC can access Command Mode only and not Direct Printout Mode. In retail situations, a data terminal is always recommended so Direct Printout may be used.

GASBOY PC/FUEL-FLEET MANAGEMENT SYSTEM

General The PC/Fuel-Fleet package includes all of the communication software features, plus it processes the polled fueling transactions into individual department, employee, and vehicle fuel usage reports. Site, Department, Vehicle, and Employee master files allow for larger identification numbers and descriptive information to be linked to the card or key numbers from the Series 1000. Card or key validation changes can be sent to the Series 1000 from the PC during the polling procedure. A manual entry screen allows non-Series 1000 transactions to be entered into the system for total accountability. The Fleet portion of the software allows you to enter and maintain files on parts and maintenance for your fleet.

Reports Reports include:

- **Unprocessed Fuel Transactions Listing**
Lists all transactions as they were received from one or all sites.
- **Site File Listing**
Lists all site records and present product information.
- **Department Listing**
Lists all the information in the department file. Totals are given for each department and a grand total is provided for all departments.
- **Vehicle Listing**
Lists all information in the vehicle file. Year-to-date totals are given for each vehicle and department. A grand total for all vehicles is also provided.
- **Employee Listing**
Lists all information in the employee file. Year-to-date totals are given for each employee and department. A grand total for all employees is also provided.
- **Vehicle Parts and Specifications Listing**
Fleet only. Lists all vehicle parts and specifications records.
- **Auxiliary Lockout Listing**
Lists all auxiliary lockout values and statuses.
- **Parts File Listing**
Fleet only. Lists all or understocked parts for all or single manufacturers or sites.
- **Maintenance Code File Listing**
Fleet only. Lists all maintenance codes and their descriptions by vehicle type.
- **Fuel Usage Reports - by Vehicle, Employee, Department, Tank, Product**
Lists fuel usage based on transactions present in the processed transaction file.
- **Site Inventory Report**
Lists inventory information for each site. Requires a TLS.
- **Fuel Transaction Report**
Lists all fueling transaction data or fueling transaction data for an employee, vehicle, or department.
- **Vehicle MPG Report**
Lists MPG data for one or more vehicles by department or vehicle type.
- **Vehicle MPG Exception Report**
Lists vehicles whose MPG is inside or outside the established range for MPG.

- **Maintenance Schedule Report**
Fleet only. Lists vehicles due for maintenance.
- **Maintenance Work Order Report**
Fleet only. Lists all or specific maintenance transactions sorted by work order number.
- **Vehicle Maintenance Report**
Fleet only. Lists all maintenance performed on vehicles, either singly, all, by range, department, or vehicle type.
- **Department Maintenance Report**
Fleet only. Lists all maintenance performed by department, either singly, all, by range, department, or vehicle type.
- **Maintenance Performed by Mechanic**
Fleet only. Lists all maintenance performed by one or all mechanics.
- **Mechanic Maintenance Code/Time Report**
Fleet only. Lists mechanic data for each type of maintenance code, the number of maintenance codes completed, and the average time for completion.
- **Maintenance Performed by Maintenance Code Report**
Fleet only. Lists vehicle and maintenance information for a specified maintenance code.

GASBOY PC/INVOICING SYSTEM

General The PC/Invoicing package allows you to produce billing statements and enter accounts receivable for customer accounts that fuel at sites controlled by a GASBOY card or FleetKey system. Billing statements are created from files entered and stored on the PC and from fuel transactions that occur at the fueling sites.

Reports PC/Invoicing produces the following reports:

- **Site File Listing**
Lists all site records and present product information.
- **Account Listings**
A multiple option menu contains the following report options: List or print all account information, print a single account with vehicles and drivers, print locked out accounts and cards, print uninvoiced dollar amount for one account or all accounts over credit limit, print all accounts in year-to-date dollar volume, print accounts with outstanding overdue balance, and print account mailing labels.
- **Print Unprocessed Transactions**
Allows the user to print all transactions gathered in the last polling, but not yet processed.
- **Billing Statement History for one or all accounts**
Lists an invoice summary for one or all accounts from the system date back one year or for a period within one year that you specify.
- **Print Archived Billing Statements**
Prints invoice transactions from the history file.
- **Fuel Usage by Account**
Prints fuel usage by ascending account number. Includes account number, name, and a list of all transactions for that account during the last cycle. Transaction information includes vehicle number, driver number, odometer, site name, transaction number, date and time of transaction, fuel quantity, cost per gallon, and the total cost of the fuel.

- **Fuel Usage by Site Tank**
Prints a summary of fuel usage by ascending tank number. Includes fuel name, quantity pumped, cost per gallon, and extended cost (quantity x price).
- **Fuel Usage by Site Product**
Prints the fuel used at each site. Reports include site number and name, fuel name, quantity of fuel pumped, cost per gallon, and extended cost (quantity x price).
- **Site Inventory Maintenance**
Prints a listing of all changes (dumps/adjustments) that were made to the site inventory this month. Includes site number, site description, tank number to which change was made, date and time of change, maintenance code, and gallon/liter amount of the change.
- **Transaction Adjustment**
Prints a before image and an after image of each fueling transaction that was adjusted. Information includes account number, vehicle, odometer, site and transaction number, transaction date and time, driver number, and manual number. Also listed are pump number, tank number, product code, price per gallon, quantity, and total dollar amount.
- **Print Unposted or Posted Receivables**
Prints unposted (those that have not been posted to the accounts) or posted (those that have been posted) receivables

GASBOY PC/FLEETKEY MANAGER PLUS (FLEETKEY/KE200 ONLY)

General

The PC/FleetKey Manager Plus is a software package tailored to work on IBM or compatible PC's. It is a database system which simplifies key encoding and performing maintenance for the FleetKey system, plus provides fuel site/station communications and polling of fueling transactions. The PC/FleetKey Manager Plus:

- is designed to work with the KE200 Key Encoder and FleetKey System.
- allows the user to encode keys using stored PC data for input.
- allows the user to store data from employees, vehicles, departments, and manual entry fields (these fields vary according to the user's system configuration).
- maintains a master lockout file on the PC as well as individual site lockout files so the user can lock out employees, vehicles, and manual entries to restrict system use.
- provides extensive system-supplied reports plus a custom report generation option so the user can tailor the reports to individual needs.
- provides up to four automatic polling/processing times to gather transactions from fuel sites and maintenance stations plus allows the user to communicate with fuel sites, maintenance stations, and key encoders through a series of stored commands or interactively.
- allows the user to enter/edit fuel and maintenance transactions (if necessary) to keep the system's transactions current and correct bad transactions.

PC HARDWARE REQUIREMENTS

Description The general hardware requirements for running the GASBOY/PC Software on IBM PC or compatible personal computers include:

MS-DOS™ 3.3 or higher; 386 or faster processor
640K base memory (PC/FleetKey Manager and PC/FleetKey Manager
Plus also require at least 540K of free memory to operate)
Hard Disk
Monochrome or color display
RS-232 Asynchronous Port and Cable (for direct or external modem
connection to the Series 1000)
132 Column Printer and Cable
300/1200 Internal Modem, or External 300/1200 Modem with Cable
(Optional depending on the connection to the Series 1000.)

ACCESSORIES

CRT TERMINAL AND PRINTER

Use and Setup A CRT terminal and printer setup is used for updating and retrieving information from the Series 1000 system.

Cables and connectors are not included with the terminal and must be ordered separately. (See Section 6, **Communications**). The Series 1000 supports the following CRT and printer:

- CRT Terminal*
- **LINK MC5 Terminal (GASBOY P/N C03813)**
Interface Modes: EIA RS-232 C Main and Auxiliary Ports, IBM-compatible Centronics 25-pin interface, 50-38.4K Baud
Power: 110/220 VAC, 50/60 HZ
Dimensions: (HxWxD) 12.5" x 13.3" x 12.2"
Weight: Terminal: 20 lbs, Keyboard: 3 lbs.
Keyboard: Low profile, Extended PC (EPC) layout
Display: 14" diagonal, 24, 25 or 43 scrollable lines, 80 or 132 columns, two hosts simultaneously windowed on screen, 10 X 16 character cell (60 HZ), 10 X 13 character cell (78 HZ)
Data Transmission: Asynchronous, Full Duplex, Half duplex, local, block or monitor
Additional Features: Includes CRT-Printer adapter DB9F-DB25F

- Printer*
- **Okidata 184 Serial Printer (GASBOY P/N C03814)**
Interface modes: RS-232C
Power: 120 VAC, 220/240 VAC
Dimensions: (HxWxD) 3.2" x 14.2" x 10.8" Weight: 9.9 lbs.
Print speed: 155 cps, utility; 186 cps @10 and 17.1 cpi; 232 cps @ 12 cpi, draft; 40 cps, NLQ.
Data Transmission: Asynchronous full duplex

DIAGNOSTIC KITS

Description Diagnostic kits are available to aid in troubleshooting the system. The kits are available with an LCD meter (P/N C05759) or less the meter (P/N C05757). The kits include:

- | | |
|----------------------------|---|
| Plastic Screwdriver | Pump Simulator/Keypad Tester |
| Diagnostic Manual | RS-422/RS-232 Loop Back Connectors |
| AC Adapter Cable | Mag Reader Test Cable |
| Direct Communication Cable | Autoranging Digital Multimeter (Optional) |

RS-232 TERMINATION BOX

Description A RS-232 termination box (P/N C05769) is available to simplify the connection of RS-232 devices to the Series 1000 System. The box includes a termination block for connecting the RS-232 communication cable from the system, and a female D connector port for plugging in the male D connector on the end of the GASBOY C04549 or C04532 Cable Assemblies. Use of the termination box eliminates the tedious job of soldering D connectors in the field.

MCE 300 AND MCE 300HE MAG CARD ENCODERS

Use GASBOY MCE 300 (P/N C05911) and MCE 300HE (P/N C06187) mag stripe card encoders are used with data terminals and allow the user to encode his own mag stripe cards for use with a Series 1000 System equipped with a mag card reader. The encoder and data terminal may also be used to display what has been encoded on a card. A PC package (PC-MCE 300) is also available to provide an interface between the PC and the mag card encoder.

The MCE 300 is a standard low-coercivity encoder and uses standard low-coercivity cards. The MCE 300HE is a high coercivity encoder and requires high coercivity cards. Higher coercivity provides additional resistance to accidental erasure of encoded data.

OPTICAL CARD PUNCHES

Description The optical card punch allows the user to encode (punch) his own optical cards for use with a Series 1000 System equipped with the optional optical card reader. A manual version (P/N C01091) and electric version (P/N C01157) are available. The main difference between the two models is that the electric version requires less pressure on the keys to punch the card.

KE200 KEY ENCODER

Description The KE200 Key Encoder consists of a keypad and LCD display. It has two functions:

- It allows the user to encode data keys for use with the Series 1000 FleetKey system
- It is used with the Maintenance option to update information in the maintenance field entries.

A PC package, PC/FleetKey Manager is also available which allows the system operator to use the PC to input the key fields and encode each key.

MAG CARD READER CLEANING CARDS

Use GASBOY recommends cleaning mag card readers at least once a week. Cleaning is accomplished by inserting a mag cleaning card into the reader. The solvent-soaked cleaning cards are individually wrapped and are available in boxes of 50 cards. (P/N C08757- 1 box).

WARRANTY

General Statements:

Gasboy International LLC. warrants all new equipment manufactured by Gasboy against defective material and/or workmanship, for the warranty period specified below, when the equipment is installed in accordance with specifications prepared by Gasboy.

This warranty does not cover damage caused by accident, abuse, Acts of God, lack of surveillance of automatic recording systems, negligence, mis-application, faulty installation, improper or unauthorized maintenance, installation or use in violation of product manuals, instructions, or warnings. Under no circumstance shall Gasboy be liable for any indirect, special, or consequential damages, losses, or expenses to include, but not limited to, loss of product, loss of profits, litigation fees, or the use, or inability to use, our product for any for any purpose whatsoever.

Parts Only - During the warranty period, Gasboy will, at its option, repair or replace defective parts returned transportation prepaid to its factory.

On-Site Labor Included - Gasboy will also provide, within the Continental United States and during the warranty period, the services of an Authorized Service Representative (ASR) for on-site repair or replacement of defective parts.

Replacement Parts - Any system components that are not part of the original system order, including Island Card Readers, Pump Control Units, etc., are considered replacement parts.

Equipment	Term	Coverage
Commercial Pumps and Dispensers Full-Cabinet Consumer Pumps	One year from date of installation or 18 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first.	Parts and Labor.
Small Transfer Pumps, Meters, Pressure Regulators	One year from date of installation or 18 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first. - Excepting the Model 2020 Hand Pump, which has a 90-day warranty from date of GASBOY International's invoice.	Parts Only.
Keytrol	One year from date of installation or 18 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first.	Parts and Labor.
Fuel Management Systems: - CFN/ Profit Point - Series 1000/Fleetkey - TopKAT - Fuel Point Readers (sold with new systems)	One year from date of start-up or 15 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first. - The basic warranty only applies to systems which have been started up by a Gasboy Authorized Service Representative (ASR).	Parts and Labor.
Additional Fuel Point Items: - Fuel Point Readers sold for retrofitting existing systems. - Fuel Point vehicle and dispenser components.	One year from date of start-up or 15 mos. from date of Gasboy International's invoice to the purchaser, whichever comes first.	Parts Only.
Encoders, Embossers, Modems, CRTs, and Logger Printers	Purchased with Fuel Management System (Encoders, Embossers only): 90 days from the date of start-up by a Gasboy ASR, or 180 days from date of Gasboy International's invoice, whichever occurs first. Purchased with Fuel Management System (Modems, CRTs, and Logger Printers only): Matches system warranty. Purchased Separately: 90 days from date of Gasboy International's invoice to the purchaser.	Purchased with System (Encoders, Embossers only): Parts only. Purchased with System (Modems, CRTs, Logger Printers only): Matches system warranty. Purchased Separately: Parts Only.
Air Diaphragm Pumps	Three years from date of purchase (for full warranty description, see Price List).	Parts Only.
Items not manufactured by Gasboy (ex. automatic nozzles, hoses, swivels, etc.)	Not warranted by Gasboy International (consult original manufacturer's warranty).	Not Applicable.
Replacement Parts	One year from date of Gasboy International's invoice to the purchaser.	Parts Only.

To the extent permitted by law, this warranty is made in lieu of all other warranties, expressed or implied, including warranties of freedom from patent infringement, or merchantability, or fitness for a particular purpose, or arising from a course of dealing or usage of trade. No one is authorized to vary the terms of the warranty nor may anyone make any warranty of representation, or assume any liability other than that herein stated, in connection with the sale described herein. The acceptance of any order by Gasboy International is expressly made subject to the purchaser's agreement to these conditions.



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