PetroVend®

6900 Santa Fe Drive
Hodgkins, IL 60525-9909
Phone: (708) 485-4200
Fax: (708) 485-7137

KARDGARD K-2500®

Structured Memory
Fuel Management System

FSC Software Version 2.10 E
FIT Software Version 1.04

OWNER'S MANUAL

  Part No. M41-0210E Rev 1

!!! IMPORTANT !!!

The contents of this manual must be read and fully understood before operating the system.

Although **Petro Vend, Inc.** has made every effort to fully test this product and its resident software under all normal operating conditions, and to compile the material contained in this manual with accuracy, neither **Petro Vend, Inc.,** its employees nor its agents can make any representation, express or implied, with respect to the accuracy or completeness of such information or assume any liability with regard to the use of, or damages resulting from the use of, any information, apparatus, method or procedure described in this manual.

FCC Compliance

This equipment generates and uses radio frequency energy and if *not* installed and operated properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class A computing device in accordance with specifications in Subpart J of Part 15 of the FCC rules, which are designed to provide reasonable protection against such interference.

DOC Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numerique n'émet pas de bruits radioélectroniques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communcations du Canada.

Serial Numbers

Please record your ***K-2500*** serial number(s) in the space(s) below. The serial number(s) are listed on the data sheet that is packed with each system. The serial number for each unit is also printed on the identification label affixed to each ***K-2500***. You will need these numbers whenever discussing your system with your **Petro Vend** distributor.

Serial Number: _____

Serial Number: _____

Serial Number: _____

Serial Number: _____

Table of Contents

II: INSTALLATION

A: Unpacking the System

B: Assembling Components

C: Mounting the *K-2500* Enclosure(s)

D: Installing Piping

E: Pulling the System Wires

F: Pulling the Pump Wires

G: Wiring the System

H: Wiring the Pumps

I: Board Switch Settings

J: Initial Power Up and System Test

Figures

III: CONFIGURATION

A: Basic Concepts

B: Time Measurement

C: System Memory (RAM)

D: Programmable Data Base

E: Fueling Units, Types and Tanks

F: Pump Control Terminal (PCT)

G: Fuel Island Terminal (FIT)

H: FIT Display Prompts and Keyboard Responses

I: Receipt Formatting

J: Transaction Buffer

IV: OPERATION

A: Basic Concepts

B: System Report

C: Pump/Fuel Reports

D: Transaction Reports

V: APPENDICES:

Notes:

Introduction

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

Part A: HOW TO USE THIS MANUAL

Notation

This manual is divided into five sections: (I) Introduction, (II) Installation, (III) Configuration, (IV) Operation and (V) Appendices. Individual sections are divided into parts; for example, "Section III:E" refers to the fifth part ("E") of the Configuration Section ("III"). Note that each section is independently paged; for example, page IV:3 is the third page of the Operation Section.

Introduction

The first section contains specific technical information about the system and general information about its operation. This section should be read by anyone installing or using the equipment.

Installation

The second section explains how the system is to be physically installed and wired. It is vital to the safe and accurate operation of the system that these instructions be carefully followed. Only qualified, experienced individuals should attempt this installation.

Configuration

The Configuration Section describes how to set up the system for your needs: how many pumps, what type of products, how many cards, etc.

Operation

The Operation Section details how to generate reports and poll transaction data.

Appendices

The Appendices contain various types of information about system operation, including modem and external computer operation.

Finding Things

Important subjects are usually listed *both* in the Table of Contents (at the front of the manual) and in the Alphabetical Index (at the back). In the text of the manual, related topics are usually indicated in footnotes.

B: SPECIFICATIONS

Dimensions	22" x 16" x 14.5" (56 cm x 40 cm x 37 cm)
Power Requirements	Standard: 120 VAC @ 50/60 HZ; 200 watts max Optional: 240 VAC @ 50/60 HZ; 200 watts max
Temperature Range	-40° F to 110° F (-40° C to 43° C)
Keyboard	12-key weather-resistant
Display	alphanumeric backlit LCD Standard: 1 line with 24 characters Optional: 2 lines with 40 characters each (80 characters total)
Pump Control	3/4 HP; 120/240 VAC max.
Terminal Port	ASCII compatible; 7 data bits, even parity, 1 stop bit
Card Reader	Standard: magnetic, ABA track II Optional: model KR-10, optical Optional: model KR-16, optical (K-3000 compatible)
Pulser Compatibility	1 to 9999 pulses per units
Receipt Printer (*optional*)	22 column with plain paper and cutter
Internal Modem (*both optional)*	224A; up to 2400 baud; for remote programming 202T; 1200 baud; for Remote Slave units
Fuel Island Journal Printer (*optional*)	40-column plain paper with take-up reel (4.5" width, 2.5" roll)
Office Journal Printer (*optional*)	80-column desktop model
Maximum Wiring Extension	All Slave units and peripherals (i.e., external printer, ASCII terminal, etc.) must be located within 2500' of the ***K-2500*** Master

C: DESCRIPTION

Overview

After 25 years of researching, developing and manufacturing electronic fuel control systems, **Petro Vend, Inc.** is proud to present its latest achievement: the ***KARDGARD K-2500***®. This all new system combines the cost-effective convenience and rugged durability of our earlier systems with the latest in multiprocessor computer technology. The result is a more flexible, more powerful tool for fuel management that is also easier to program and simpler to use.

The ***K-2500*** is a card-activated system that requires a person to insert a valid card to pump fuel. The Structured Memory software version has a capacity of over 6.5 million cards. Programmable prompts are displayed throughout the fueling process to guide the user. These prompts can be displayed in either of two languages. Messages can also be programmed and displayed for individual users. For added security, the fueler can be required to enter a personal identification number, or "PIN," before pumping.

The ***K-2500*** records information for each transaction, including card, sequential transaction and pump numbers; product type, quantity and price; and keyboard entries (for odometer readings and miscellaneous data). This information is formatted into reports that can be generated on demand. Because the price is recorded for each transaction, reports reflect exact dollar amounts.

The ***K-2500*** is self-contained and requires only an ASCII terminal for programming and information retrieval. An IBM®-compatible personal computer or mainframe computer capable of ASCII communications can also be used to configure and operate the system. Data streams are available from the ***K-2500*** to be incorporated into data processing programs.

The ***K-2500*** is also capable of controlling dispensers of other products, such as oil and antifreeze. The ***K-2500*** can also activate devices which can be electronically turned on and off, such as a gate opener and a car wash.

KARDGARD K-2500

The ***K-2500*** offers a wide variety of operational configurations, providing the maximum in versatility without requiring special programming or engineering changes. The system is also easy and economical to expand.

Benefits

The ***K-2500*** greatly increases the efficient management of fuel, vehicles and drivers. No attendant is necessary for pumping, supervision or recording. With the data gathered by the system, fleet supervisors can easily monitor vehicle performance accurately. Because no fueling slips are required, they can never be lost. The dual language and messaging features provide the maximum in communication with fuelers.

The increasing community acceptance of 24-hour unattended fueling sites allows oil marketers to capture a larger segment of their market with a ***K-2500*** system. Service station owners can reduce their costs and turnover their receivables more quickly.

Models

There are 3 types of ***K-2500*** units:

K-2500 M or "Master"
K-2500 S or "On-Site Slave"
K-2500 R or "Remote Slave"

The ***K-2500 M*** is the "control center" of a system, managing the data base, the optional journal printer, the optional modem communications and up to 8 pumps. Up to 3 Slave units can also be controlled by the Master, each of which can regulate an additional 8 pumps. A fully expanded system can accommodate 32 pumps.

There is no difference in the outward appearance of the Master and both Slaves types: all 3 units look the same. However, the ***K-2500 M*** contains equipment that is not present in either type of Slave. This equipment includes the Fuel Site Controller board, the optional memory expansion board and the optional journal printer.

An On-Site Slave can be located up to 2500 feet (760 m) away from its Master. No modem is required.

The Remote Slave communicates with the Master over 4-wire leased telephone lines. Internal 202T modems are required for both units.

Hardware

Each ***K-2500*** unit (Master or Slave) is contained in a single weatherproof cabinet that mounts on an optional pedestal.

A liquid crystal display (LCD) is located on the front of each ***K-2500*** unit. The display greets a fueler with 2 alternating prompts that you can program. Additional prompts guide the user through the fueling process. These prompts can be programmed in 2 languages with the appropriate language displayed for each card holder. Messages can also be programmed and displayed for individual fuelers. The display is readable even in direct sunlight and is backlit for night time visibility.

The keyboard is durably constructed for years of trouble-free operation even in the most severe environments. The keys are designed as on a telephone, with inscribed letters that help a fueler to remember his PIN number. The keyboard also has an "audible tone feedback" to confirm a key stroke.

An optional journal printer can be built into the ***K-2500 M*** to record transaction data and print reports. The system also has the capacity to interface to an external printer to record this same information. Note that an external printer must be located indoors.

Optional receipt printers can be installed in Master and Slave ***K-2500*** units to provide transaction information to every fueler. The form and content of these receipts is fully programmable.

Data Base

A data base is a collection of information. The data base for the Structured Memory ***K-2500*** is composed of 5 types of information: operating system, configuration, transaction, card and messaging.

The operating system defines general system functions and is preprogrammed at the factory. The configuration data is the specific information programmed by the manager for an individual system, such as the number of pumps and the types of fuel dispensed.

The information recorded for each transaction includes card, sequential, transaction and pump numbers; product type, quantity and price; and keyboard entries (for odometer readings and miscellaneous data). A "fixed length" format is used for all transaction records.

Each card that is used has its own individual "bit" in the system. This bit is either a "1" or a "0" to indicate if the card is valid or not.

Messages can be entered into the ***K-2500*** and displayed for individual customers when they fuel.

The operating system and configuration data require about 22K of memory. The remaining memory is divided for the transaction, card and, optionally, the messaging data.

The manager enters the maximum number of transactions for the ***K-2500*** to store. If the messaging feature is enabled, the maximum number of messages to be displayed is also entered. The remaining memory is allocated for the cards. Appendix E lists some guidelines for selecting these numbers.

The data base is electronically stored on Random Access Memory (RAM) chips located on the Fuel Site Controller board. An optional Expansion Memory board can also be included to increase the amount of memory in the system. Expansion boards are available in 3 sizes. The expanded memory is allocated for cards and transactions in the same manner as standard memory.

The details of using the ***K-2500*** data base are explained in Section III:D.

Boards

The Fuel Site Controller board, or FSC, is the "brains" of the ***K-2500***. Using the powerful 16-bit Motorola 68000 microprocessor, the FSC manages the data base and the other boards in the system. The FSC is present only in a ***K-2500*** Master.

The ***K-2500***'s standard 64 kilobyte memory is stored on the FSC board. Expanded Memory boards are available to upgrade the data base capacity to 320, 576 and 832 kilobytes. Because an upgrade requires only the installation (or replacement) of a single board and a single chip, it can easily be done in the field. The memory board is present only in a ***K-2500*** Master.

A third board contains the Fuel Island Terminal, or FIT, and the Pump Control Terminal, or PCT. The FIT/PCT board uses an 8-bit Motorola 6809 microprocessor and is present in both Master and Slave units.

The FIT controls the card reader, keyboard, display and optional receipt printer.

The PCT monitors up to 4 Pump Interface boards. Each Interface board directly controls and monitors the flow of fuel from 1 or 2 pumps.

The Communications board controls the communication between the different components of a ***K-2500*** system. This board contains the terminal blocks for wiring the external devices. This board can also contain the optional internal modem(s).

Illustrations of the ***K-2500*** boards are included in the Trouble-Shooting Appendix.

Communications

The Controller Access Port, or "CAP", links the ***K-2500*** unit with an ASCII terminal or computer. If a computer is connected, it must be either an IBM®-compatible personal computer or a mainframe computer which is capable of performing ASCII communication. In addition, the computer must run a "terminal emulation" program (to simulate the operations of an ASCII terminal). The terminal or computer can be located up to 2500 feet (760 m) away from the ***Master*** unit using the standard RS-422 communication lines.

For off-site operation, the optional internal 224A modem allows complete control from a remote terminal or computer over standard telephone lines.

Petro-Net is the communication network that links the ***K-2500*** Master unit to the On-site Slave units. Petro-Net uses RS-485 (2-wire twisted pair) communication lines.

For a ***K-2500*** Remote Slave, a 202T modem is used to extend the Petro-Net communication network over leased telephone lines.

Operational Modes

The ***K-2500*** has three modes of operation: "normal", "restricted" and "privileged." In the normal mode, the system can be interrogated for reports on card and transaction data and for operating features. However, no configuration data can be changed in this mode.

To safeguard the system, card, account and transaction data from unauthorized viewing, you may enable the restricted mode. In this mode, a password must be entered correctly before any information can be displayed or printed.

The privileged mode also requires a password to be accessed. In this mode, the manager is able to check or change the following configuration data:

(1) Current time and date
(2) Operational times (active, inactive, receipts only)
(3) Site identification number
(4) Fuel types
(5) Pump parameters (number, fuel type, time-outs, etc.)
(6) Quantity restrictions
(7) Display and keyboard prompts
(8) Receipt labels
(9) Card validity
(10) Messages

In this mode, a manager is also able to open and close the system immediately (allowing and disallowing fueling).

In both modes, commands can be abbreviated to speed entry. For example, the command **`SHOW TRANSACTIONS'** can be abbreviated as **`SH TRANS'**.

Configuration and operation commands are explained in Sections III and IV, respectively.

Pump Control

A single Master unit can simultaneously control up to 8 electronic or mechanical pumps. A Master unit can connect with up to 3 On-Site and/or Remote Slave units. Each Slave can handle an additional 8 pumps. A fully expanded system can regulate 32 pumps at one time.

Each pump can be programmed with its own set of operational features, including:

(1) Pump number
(2) Fuel type
(3) Pulses per fueling unit
(4) Maximum fueling quantity per transaction
(5) Pump state (active or inactive)
(6) Pump sentry
(7) Tank number
(8) Maximum fueling time
(9) Maximum time to activate pump handle
(10) Maximum time to detect the first pulse
(11) Maximum time between pulses ("missing pulse detector")

This information is explained in more detail in Section III:F.

Cards

The ***K-2500*** is activated through the use of ABA standard track II magnetic stripe cards or optically-read, punch-encoded cards, depending on the type of reader supplied with the system.

Customers can be prompted for 3 types of keyboard entry: personal identification number (PIN), odometer reading and miscellaneous (for job number, account code, department section, etc.). These entries can be set as "always enabled", "always disabled" or "enabled only by card". The latter option means that the ***K-2500*** prompts for a particular entry only when a card has been encoded for it.

The ***K-2500*** can also be configured to substitute a keyboard entry for a card. In this case, a customer enters his number manually instead of having the number read from a card.

This information is explained in more detail in Section III:D.

)))) NOTE ((((

*The KR-10 is the standard optical card for the **K-2500**. The KR-16 is also available because it can be used in both the K-3000 and **K-2500**. When the KR-16 card is used with the **K-2500**, the product restriction encoded on the cards replaces the **K-2500** pump restriction feature.*

Reports

The ***K-2500*** can generate reports on its operational status, the pump totals, the fuel totals, the card validity and the transaction totals. Plus, searches for individual transactions (or groups of transactions) can be specified by the following items or any combination thereof:

(1) Date - on, before or after a specific date
(2) Time - at, before or after a specific time
(3) Card - specified by card number
(4) Vehicle - specified by vehicle card number
(5) Transaction - specified by number

These reports are explained in more detail in Section IV.

Installation

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

Part A: UNPACKING THE SYSTEM

Data Sheet

The Data Sheet listing specific details about your system is packed in the box with this manual. This sheet contains important information and should be stored in a secure location.

Packaging

Be sure to check the packaging carefully for any damage that might have occurred during shipping.

Separate Packaging of Components

The cabinet and most components for each ***K-2500*** unit are packed in one box. Power supplies, pedestals and printers are packed in separate boxes.

Part B: ASSEMBLING COMPONENTS

Power Supply

The power supply attaches to the back of the ***K-2500*** cabinet with the four #8-32 keps nuts that are supplied with the unit. Connect the wires to the PV-211 Backplane Board. If no internal journal printer is to be attached, route the 2-pin connector (brown and orange wires) along the back of the cabinet.

Journal Printer
(*optional*)

The Journal Printer attaches to the back of the ***K-2500*** cabinet with four #8-32 keps nuts. Connect the Journal Printer cable ("A"). Connect the 2-pin connector ("B") from the power supply.

Receipt Printer
(

The Receipt Printer attaches to the inside of the door of the ***K-2500*** with four #8-32 keps nuts. Connect the communication cable ("A") from the PV-205 FIT/PCT board to the printer. Connect the power cable ("B"). Connect the paper out switch cable ("C").

Part C: MOUNTING THE *K-2500* ENCLOSURE(S)

>>> **WARNING** <<< ***A fueling dispenser is a hazardous area as defined in the National Electrical Code. Installation in all cases must be in strict accordance with the National Electrical Code (NFPA #70) and the Automotive and Marine Service Station Code (NFPA #30).***

Master Unit

Mount the ***K-2500*** Master unit at a convenient location on or near the fuel island. The enclosure must be located at least 24 inches (61 cm) from the nearest pump or dispenser and within 2500 feet (760 m) of any peripheral devices that will be connected to the ***K-2500***. This includes such devices as On-Site Slave units, the Office Journal Printer, a computer or an ASCII terminal. Attach the enclosure to a pole or pedestal using the mounting holes provided at the bottom of the ***K-2500***. To provide maximum visibility, the display window should be slightly below eye level. The terminal should be shielded from direct sunlight, particularly in warmer climates.

)))) NOTE ((((*Any attempt to mount the enclosure by drilling holes into the enclosure voids the warranty.*

Slave Unit(s)

If applicable, mount the ***K-2500*** Slave unit(s) using the same restrictions that apply to the Master unit.

Part D: INSTALLING PIPING

!!! IMPORTANT !!!

The instructions below assume the use of shielded cable for pump pulser wires. The only cable approved for this use is shielded U.L. style #2567. It has a teflon jacket for high chemical resistivity and a 100% shield for high noise immunity. It is available from Petro Vend with either 2 or 4 conductors. Using any other cable voids the warranty for the *K-2500*.

If shielded cables are *not* used for the pump pulser wires, separate conduits are required for the pump pulser and pump power circuits.

>>> WARNING <<<

The K-2500 contains sensitive electronic circuitry that requires the use of rigid steel conduit to prevent electrical interference on the power and electrical signal wires. Using aluminum or PVC piping will not provide the necessary shielding and will void the warranty for the K-2500.

No wires other than those specified may be included in the conduit runs that contain K-2500 power, communication or pulser wires.

Pump Junction Box(es)

Install conduits from each pump junction box to the appropriate ***K-2500*** unit. The 2 rear knockouts in the bottom of the enclosure should be used for this purpose. It is necessary to install a separate pull box when more than 2 pumps are to be connected to 1 terminal.

Circuit Breaker

Install conduit from the circuit breaker cabinet to the Master unit. Install a pull box in this conduit run if peripheral equipment is to be connected.

>>> **WARNING** <<<

Power for the K-2500 units must be supplied from a dedicated circuit. Do not use the existing power wires at the island which are used to power the pumps, driveway lighting or anything else.

!!! IMPORTANT !!!

The following paragraphs describe the installation of optional equipment. Perform these operations as necessary.

On-Site Slave(s)

If On-Site Slave(s) are to be installed, provide the necessary conduits for power and communication wires between the Master and the Slave(s). Because the communication wires are paralleled in each unit, it is recommended that the units be "daisy-chained" together. That is, any terminal can act as a source for power and communication to another unit. *No other wires of any kind can be present in these conduits!*

!!! IMPORTANT !!!

1) **Do *not* install peripheral equipment (terminals, printers, etc.) above or within the hazardous area.**

2) **All peripheral equipment connected to the *K-2500* must be UL/CSA listed and have either an EIA standard RS-232C or RS-422A communication protocol interface.**

3) **The *K-2500* uses RS-422 lines for communication with its peripheral equipment. A peripheral device that has only an RS-232 interface must also use a Petro Vend RS-422 to RS-232 converter box in order to communicate with the *K-2500*.**

4) **Each peripheral device must have its own separate junction box. Install conduit from the pull box to each junction box that is mounted.**

Controller Access Port (C

The CAP connects to either an ASCII terminal or a computer capable of ASCII communications. Install a junction box within 6 feet (180 cm) of the terminal or computer.

Office Journal Printer

For an Office Journal Printer, mount a junction box within 6 feet (180 cm) of the printer.

Dial Up Modem

For a Dial Up (224A) Modem, mount a junction box within 3 feet (90 cm) of the RJ-11 modular telephone jack. (The RJ-11 is a standard jack installed by the telephone company.)

Dedicated Line Modem

For a Dedicated Line (202T) Modem, mount a junction box within 3 feet (90 cm) of the channel interface (supplied by the telephone company).

)))) NOTE ((((

*The **K-2500** Master and Remote Slave units communicate over a special telephone cable called a "dedicated line" or a "data line." Each **K-2500** unit must have an optional 202T modem board installed and wired to a junction box. The junction box connects to a "channel interface" which controls signal levels and protects the dedicated line.*

The dedicated line must be ordered from and installed by the local telephone company. The technical specifications of the dedicated line are: (a) 4-wire 3002 circuit, (b) C2 conditioning and (c) line terminated at each site in a channel interface (supplied from Telco). When ordering the dedicated line, note that the 202T modems operate in a "full duplex" mode at 1200 "baud" (or "bits per second").

Part E: PULLING THE SYSTEM WIRES

!!! IMPORTANT !!!

The *K-2500* uses RS-422 and RS-485 communication lines. These are very reliable methods of communication because they are very immune to induced noise from motors, transformers, etc. These methods require twisted pair wires for each signal. These twisted pairs can be made from normal #18 AWG gas and oil resistant THHN or THWN wire simply by twisting the two wires together before they are pulled through the conduit. There should be approximately 10 twists per foot.

Power and Ground

Pull two #14 AWG power wires and an earth ground wire from the circuit breaker box to each ***K-2500*** terminal.

!!! IMPORTANT !!!

The following paragraphs describe the installation of optional equipment. Perform these operations as necessary.

Petro-Net

Petro-Net is the interactive communication network that links ***K-2500*** units together in a multi-unit system. Pull a twisted pair from the ***K-2500*** Master unit to each On-Site Slave unit for the Petro-Net communication.

Controller Access Port (C

Pull 2 twisted pairs from the ***K-2500*** Master to the Controller Access Port (CAP) junction box. One pair is for the transmit lines; the other pair is for the receive lines.

Office Journal Printer

Pull 2 twisted pairs from the ***K-2500*** Master to the printer junction box.

Dial-Up Modem

Pull 2 wires from the ***K-2500*** Master to the junction box for the dial up modem. These wires do *not* have to be oil and gas resistant.

Dedicated Line Modem

Pull 4-wire telephone cable from the ***K-2500*** Master to the junction box for the dedicated line (202T) modem.

Part F: PULLING THE PUMP WIRES

Pulser

Pull an approved shielded cable from each pump pulser to the appropriate ***K-2500*** unit. The diagrams for typical pump wiring use the Veeder Root Model 1871 "contact closure" pulser as an example.

Motor Control

Pull the motor control wires from each pump to the appropriate ***K-2500*** unit. The number and size of the wires can be determined from the typical pump wiring diagrams.

Part G: WIRING THE SYSTEM

!!! IMPORTANT !!!

All drain wires from the shielded cables must be connected to the ground lug on the power supply chassis in the *K-2500* units. The drain wire at the other end of the cable must be left unconnected.

Make certain that the unconnected drain wire is insulated so that it does *not* come in contact with live circuits.

Power

Connect the power wires from a dedicated circuit to the ***K-2500*** terminal(s). The two supply wires can be connected to the terminals on the power supply chassis in either order.

Earth Ground

Connect the earth ground wire in each ***K-2500*** unit to the ground lug on the power supply chassis.

!!! IMPORTANT !!!

The following sections describe wiring of optional peripheral equipment. Perform these operations as necessary. Note that all communication wires are connected to the terminals on the communication board(s) in the *K-2500* unit(s).

Petro-Net

Connect the 2 Petro-Net communication wires from the ***K-2500*** Master unit to each ***K-2500*** On-Site Slave unit. Observe the "+" and "-" polarity markings.

CAP

Connect the 2 twisted pairs for the CAP from the ***K-2500*** Master unit to the corresponding terminals on a JB-422 junction box cover. Be sure to observe polarity.

If you are using the RS-422 terminal available from **Petro Vend**, simply plug the terminal into the junction box. Plug the terminal power cord into an AC outlet.

If you are using a RS-232 terminal, you must also use the **Petro Vend** RS-422 to RS-232 converter box. Plug the terminal into the converter box. Plug the converter box into the CAP junction box. Plug the terminal and converter box power cords into AC outlets.

)))) NOTE ((((

The terminal must be configured for the following: 7 data bits, even parity, 1 stop bit. The terminal manual should explain how to set this configuration.

Office Journal Printer

In the ***K-2500*** Master, connect the 4 printer wires from the "Office Journal" terminals on the PV-203 board to the corresponding terminals on a JB-422 junction box cover. Plug the data cable from the printer into the junction box. Plug the power cord for the printer into an AC outlet.

Dial Up Modem

In the ***K-2500*** Master, connect the 2 wires from the "Dial Up Phone Line" terminals on the PV-203 board to the corresponding terminals on JB-212 junction box cover. These wires do *not* have to be oil and gas resistant. Plug the cable from the junction box cover into the RJ-11 telephone jack.

Dedicated Line Modem

In the ***K-2500*** Master, connect the 4 wires from the "Dedicated Phone Line" terminals on the PV-203 board to the corresponding terminals in the JB-202 junction box cover. These wires do *not* have to be oil and gas resistant. Connect the cable from the junction box cover to the channel interface.

Part H: WIRING THE PUMPS

!!! IMPORTANT

The pump relay and interface boards control two hoses. Terminal numbers #1 - #10 are for pump A and terminals #11 - #20 are for pump B.

Motor Control

Connect the pump motor control wires to the Pump Relay board (terminals #7-#10). Terminals #7 and #8 are the current sensing contacts which are used to signal to the ***K-2500*** that the connected pump is running. The current sensor activates when there is a current flow of 100 milliamps or more. The reset motor should *not* be wired through these contacts because pulses may be counted during the reset cycle if the pulser turns during reset. Terminals #9 and #10 are auxiliary contacts are used for the reset motor or to break both hot wires for a 240 volt pump motor. Both sets of contacts are rated for 3/4 HP, 120/240 VAC.

The ***K-2500*** can monitor a spare set of contacts in the pump handle switch, instead of using the current sensor, to signal that the pump is running. This requires extra wires and is normally used only when currents are less than 100 milliamps AC or for the optional self-serve interface.

)))) NOTE ((((

*Noise suppressors are packaged with the **K-2500** system. These devices prevent electrical noise from solenoid valves and contactors from causing erratic system operation. The suppressors should be installed as close to the source of noise as possible. One suppressor is supplied for each hose position. Additional suppressors can be ordered from **Petro Vend**.*

Pulser

Connect a single channel pulser to terminals #1 and #2 on the pump interface board (PV-206). A dual channel pulser requires the second channel to be connected to terminal #3.

)))) NOTE ((((

*A dual channel pulser requires the **K-2500** to be equipped with the optional dual channel pulser interface board (PV-207).*

>>> WARNING <<<

Double check all wiring before applying power. If high voltage is applied to a low voltage circuit, serious damage will occur and void the warranty.

Part I: BOARD SWITCH SETTINGS

Procedure

The following paragraphs describe how to set the board switches for various functions, including baud rate, pulser type, etc.

Worksheet

Appendix B contains a worksheet to record the switch settings for your system.

)))) NOTE ((((

A switch is OFF when it is in the position marked OPEN. A switch is ON when it is in the CLOSED position.

Fuel Site Controller Board (PV-204)

Switch 1: Battery

Turn the battery switch ON *before* configuring the system for operation. The battery must be ON *before* data is entered (or generated) in order for the data to be protected.

Switch 2: Reset

Switch 3: Baud Rate Selector for CAP

position 1, 2 - Baud Rate

OFF	OFF	-	300
OFF	ON	-	1200
ON	OFF	-	2400
ON	ON	-	9600

position 3, 4 - *not* used

Fuel Island Terminal/ Pump Control (FIT/PCT) Board (PV-205)

Each ***K-2500*** unit (Master or Slave) must have a unique device number in order for the FSC to identify and control the unit.

Switch 1: Configuration

positions 1 & 2: Device Polling Designation

OFF, OFF	-	Master (device #1)
OFF, ON	-	Slave #1 (device #2)
ON, OFF	-	Slave #2 (device #3)
ON, ON	-	Slave #3 (device #4)

position 3: FIT Operation

OFF	-	normal FIT operation
ON	-	test FIT operation

position 4: *not* used

Switch 2: Reset

Pump Interface Boards (P

Each Pump Interface Board controls one or two pumps. Note that some switches affect *both* pumps.

There can be as many as four interface boards per ***K-2500*** unit, controlling as many as eight pumps.

Switch 1: Configuration Switch

A pump pulser is active if it supplies its own voltage; a pulser is passive if it does not.

position 1: pump A pulser

OFF	-	active
ON	-	passive

position 2: pump B pulser

OFF	-	active
ON	-	passive

The power relay for a pump can be activated by the ***K-2500*** (normal operation) or it can be manually overridden (bypassing ***K-2500*** control).

position 3: pump A activation

OFF	-	normal operation
ON	-	manual override

position 4: pump B activation

OFF	-	normal operation
ON	-	manual override

Pulsers for *both* pump A and pump B must be electronic or *both* must be mechanical. The ***K-2500*** is compatible with electronic pulsers rated up to 100,000 pulses/minute and with mechanical pulsers rated up to 8500 pulses/minute.

position 5: pulser type

OFF	-	electronic
ON	-	mechanical

Disable the dual channel error checking for single channel pulsers; enable the checking for dual channel pulsers as required.

position 6: dual channel error checking

OFF	-	enable checking
ON	-	disable checking

The ***K-2500*** can detect a busy pump either by sensing current flow to the motor or by pump handle activation.

position 7: pump A busy signal

OFF	-	current sensor
ON	-	pump handle

position 8: pump B busy signal

OFF	-	current sensor
ON	-	pump handle

position 9: pump A relay activation

OFF - normal: relay activated by ***K-2500*** when user selects pump
ON - relay activated by pump handle (used with optional PV-207 board)

position 10: pump B relay activation

OFF - normal: relay activated by ***K-2500*** when user selects pump
ON - relay activated by pump handle (used with optional PV-207 board)

Dual Channel Pulser/Self-Serve Console Interface Board (PV-207) (*optional*)

Switch 1: Configuration

Position 1 and 2 should be set the same as on the PV-206 board.

position 1: pump A pulser

OFF - active
ON - passive

position 2: pump B pulser

OFF - active
ON - passive

The "echo relay" can be activated under program control or forced ON.

position 3 - pump A echo relay

OFF - under program control
ON - forced ON

position 4 - pump B echo relay

OFF - under program control
ON - forced ON

Expanded Memory Board (PV-208) (*optional*)

Switch 1: Battery

Turn the battery switch ON *before* configuring the system for operation. The battery must be ON *before* data is entered (or generated) in order for the data to be protected.

Part J: INITIAL POWER UP AND SYSTEM TEST

Powering Up

To power up the ***K-2500*** system, turn the power switch for each unit ON. This switch is located inside each unit, in the approximate center. If the system is properly installed and functioning, the LCD display, located on the front of each ***K-2500***, displays the following messages:

TESTING RAM
TESTING READER
(displays type of reader)
TESTING FIT
TESTING EPROM
DOWNLOAD IN PROGRESS

The last message indicates that the ***K-2500*** unit is running.

)))) NOTE ((((

If the download message does not display, turn the system OFF and check the installation wiring.

Defaults

When the ***K-2500*** system is "cold started" (powered up after the system and battery have been OFF), the system "installs" (establishes a communication link with) FIT #1 and the first 2 pump positions for PCT #1. The system also downloads "default," or preprogrammed, values for several of its features. These include the messages, fuel types, pump numbers, etc.

Configuration

This section briefly outlines a very basic system setup that can be used to test the ***K-2500*** system. The commands below are described in greater detail in the Configuration Section of this manual.

Turn ON the ASCII terminal connected to the ***K-2500*** system. Press the **[ENTER]** key several times to display the system prompt (**`>'**). When the prompt appears, enter the command **`HELLO'**. (Do *not* enter the quotation marks.) You are prompted to enter the privileged mode password. Enter the default password of **`HELLO'**. The system prompt then changes to the privileged prompt, **`P>'**.

Enter the command **`SET TIME'**. The format is **`hh:mm am/pm'**. For example, **`12:57 PM'**. If PM is *not* specified, AM is assumed.

Enter the command **`SET DATE'**. The format is **`mmm dd, yyyy'**. For example, **`JAN 1, 1989.'**

Enter the command **`SET CARD BUFFER'**. The following menu displays:

```
[1] Set card/transaction buffer size.
[2] Set keyboard entry options.
[3] Set keyboard access type.
[RETURN] Return to main command line.

Enter choice:
```

Enter **`1'** to split the buffer into 2 sections. The message:

TRANSACTION AND MESSAGE BUFFER WILL BE CLEARED (Y/N)?

>>> **WARNING** <<< ***Clearing the buffer destroys all current transaction and messaging data (there are no data in the buffer for an initial power up). If you are reconfiguring the system, first make sure no important data are stored in the buffer before proceeding.***

Enter **`Y'** to clear the buffer and continue (or enter **`N'** to exit). The next prompt for this command is:

-- ENABLE MESSAGING (Y/N) ?

For testing, simply enter **`N'**.

The next prompt is for transaction size code.

ENTER TRANSACTION SIZE CODE:

For testing, simply enter **`1'** and then enter **`Y'** when the system asks to save this configuration. The menu returns to the display. (Setting the card buffer for a specific system involves a number of details that are not necessary for this test.) Press the **[RETURN]** (or **[ENTER]**) key to exit this command and display the privileged prompt.

Three "test" cards are supplied with each ***K-2500*** system.

Card	Type	Magnetic Card#	Optical Card#
1	Single	NNNN000000000001	NNNN000001
2	Driver	NNNN000000000002	NNNN000002
3	Vehicle	NNNN000000000003	NNNN000003

`NNNN' is one of the network numbers for the system. (The network numbers are listed on the data sheet that was packed with the system; most systems have only one network number.)

Enter the command **`INSERT CARD'**; you are prompted to enter the card numbers and types. After entering the data for the test cards, press the **[ENTER]** key *without* an entry to exit the command.

Activate Pump

The power to the fuel pumps can now be turned ON. Insert one of the test cards into the ***K-2500*** and select pump #1 or #2. (Pump position #1 and #2 are automatically "installed" on power up. To install and test other pumps, see Section III:F.) If practical, pump fuel to generate a transaction. Note that fuel does *not* have to be pumped to register a transaction. Also note that there are time-outs for activating the pump and dispensing fuel (see Section III:F for more details). If a time-out is exceeded, a zero transaction is registered by the system.

Reports

To check on the transactions, enter the command **`SHOW TRANS'**. To check on the pump, enter the command **`SHOW PUMP 1 TOTALS'**.

If you have an optional journal printer, you must first configure the system for the type of printer. Enter the command **`SET JOURNAL PRINTER'**. The first prompt asks if you want to configure the printer. Enter **`Y'** for yes. Select either Fuel Island Printer (for the internal printer) or Office Printer (for an external printer). Enter **`N'** (for no) for each of the remaining prompts. You can then enter the command **`PRINT PUMP 1 TOTALS'** to have the data printed out.

These and other reports are explained in more detail in the Operation Section.

Notes:

Configuration

Part A: BASIC CONCEPTS

Configuration

For your ***K-2500*** system to operate the way you want it to, you first must tell it certain information. The first several parts of the Configuration Section describe how to enter data for the current time and date, the size of the system memory (RAM), cards, fueling units, fuel types and fuel tanks. Also described are how to configure and "install" (make operational) the PCT and FIT. These directions are mandatory for any kind of ***K-2500*** site.

The latter parts of the Configuration Section explain the more advanced features, such as pump and quantity restrictions, messaging and changing the passwords. These directions are optional and you need to follow only those directions that apply to your particular system.

A worksheet is provided in Appendix C as a guideline for entering both mandatory and optional configuration data.

!!! IMPORTANT !!!

It is strongly recommended that you read this section and record your choices on the worksheet before trying to configure the system.

)))) NOTE ((((

Section II:J describes a very simple configuration procedure that can be used to test the system hardware and software. This "test" configuration is not intended for normal operation.

Types of Commands

The **`SET', `FORMAT', `CONFIGURE', `INSTALL', `REMOVE'** and **`CLEAR'** commands are used to enter (and change) system information.

The **`VALIDATE'** and **`INVALIDATE'** commands are used to enable and disable a card or range of cards.

`SHOW'** and **`PRINT' commands are used to display information on the terminal monitor and printer, respectively. These commands are prefixes that are placed before the type of information to be displayed. For example, **`SHOW SYSTEM'** displays the current operational status of the system on the monitor. The command **`PRINT SITE ID'** prints the system identification number using the optional internal or external printer.

)))) NOTES ((((

*(a) Note that the **K-2500** must be told what type of printer is connected before data can be printed (refer to Section III:K for more details).*

(b) To safeguard the system, card, account and transaction data from unauthorized viewing, you may enable the restricted mode. In this mode, the show password must be entered before any information can be displayed or printed. See "Restricted Mode" below for more details.

The **`DOWNLOAD'** command is used to install any new or changed data into the system. The **`HELP'** command displays a list of all commands. Appendix A also lists the commands.

Syntax

The commands for each feature are listed in the left margin in capital letters. The **`#'** symbol indicates a number must be specified.

Commands can be abbreviated by eliminating vowels and shortening longer words. For example, **`SHOW SYSTEM'** can be abbreviated as **`SH SYS'**.

The **[ENTER]** or **[RETURN]** key must be pressed to send a command to the ***K-2500***.

Pressing the **[X]** key terminates a programming procedure in progress (such as displaying a large report). Pressing the **[Ctrl]** ("control") and **[X]** keys simultaneously aborts any command in progress and displays the system prompt.

Default Values

Several features, such as fueltypes and system messages, have default values that are initialized on power-up and do *not* need to be entered. All default values are "factory-programmed," but you can reprogram them as you require.

Terminal Operation

The ***K-2500*** is operated from a standard ASCII terminal which usually consists of a keyboard for entering data and a monitor for displaying information. When first activating your terminal, press the **[ENTER]** key several times to display the normal system prompt **`>'**.

Modem Operation

Appendix G describes how to operate your ***K-2500*** system using modems.

Computer Operation

For operation with an external computer, refer to Appendix H.

Normal Mode

There are three modes of operation for the ***K-2500***: (1) normal, (2) restricted and (3) privileged. The normal mode is the default mode. This mode does *not* have to be enabled and no password is required. In the normal mode, all system, card, account and transaction data can be displayed and printed; all **`SHOW'** and **`PRINT'** commands are functional. The prompt for the normal mode is **`>'**. This prompt is displayed whenever the system is first powered up.

Restricted Mode

To safeguard the system, card, account and transaction data from unauthorized viewing, you may enable the restricted mode. When this mode is enabled, the "show" password must be entered before any information can be displayed or printed and before the privileged mode can be accessed.

The prompt for the restricted mode is **`$'**. This prompt is displayed whenever the system is first powered up and the restricted mode is enabled. No commands will be accepted and no characters will be echoed to the screen until the show password is entered correctly at the **`$'** prompt.

To enable the restricted mode, refer to Section III:O.

!!! IMPORTANT !!!

Only the normal *or* the restricted mode may be enabled at one time. When the `$' prompt displays, the restricted mode is enabled and the show password must be entered to proceed.

Privileged Mode

To configure the ***K-2500***, the system must be in the "privileged" mode. To prevent unauthorized tampering with the system, a password is required.

To access the privileged mode, enter the command **`HELLO'** at the prompt. (If the restricted mode is enabled, you must first enter its password.) The ***K-2500*** then prompts you to enter the privileged password. The initial password is also **`HELLO'**. For security, the password characters are *not* displayed when you type them. When the system is in the privileged mode, the **`P>'** prompt is displayed. All commands are functional in this mode.

To exit the privileged mode, enter the command **`BYE'**. Note that the system automatically exits from this mode if no keyboard entry is made for 10 minutes.

)))) NOTE ((((*Refer to Section III:O to change the password.*

Downloading Data

The **`DOWNLOAD'** command must be entered after all **`CONFIGURE'** and **`FORMAT'** commands (these are marked with a **[D]** in Appendices A and C). Until the **`DOWNLOAD'** command is entered, the ***K-2500*** does *not* recognize these changes. When entering several downloadable commands, you do *not* have to enter the **`DOWNLOAD'** command until after the last command.

Part B: TIME MEASUREMENT

Procedure

The first thing to do when initially configuring your ***K-2500*** system is to use the **`SET TIME'** and **`SET DATE'** command to set (or reset) the current time and date. Be sure you are in the privileged mode when using these (and all configuration) commands. The **`SHOW TIME'** and **`SHOW DATE'** commands are used to verify your entries. The **`SHOW'** commands can be used in either the privileged or normal mode.

SET TIME

Enter the **`SET TIME'** command and you are prompted to enter the current time. Use the format: **`hh:mm am/pm'**. For example, 12:57 PM. If PM is *not* specified, AM is assumed by the ***K-2500***. When you press the **[ENTER]** key to complete the data entry, you also set the seconds to zero. The new time and current (or default) date are then displayed.

)))) NOTE ((((

Pressing the **[ENTER]** *key without making a time entry leaves the current time unchanged.*

SHOW TIME

This command displays the current time (and date) on the monitor and verifies your entry.

SET DATE

When you enter this *privileged* command you are prompted to enter the current date. Use the format: **`mmm dd, yyyy'**. For example, **`JAN 21, 1989'**. Be sure to enter 4 digits for the year and to press the **[ENTER]** key afterward. The new date (and current time) are then displayed.

)))) NOTES ((((

(a) Pressing the **[ENTER]** *key without making a date entry keeps the current date.*

(b) To reformat the date, refer to Section III:N.

SHOW DATE

This command displays the current date (and time) on the monitor.

)))) NOTE ((((

To set the dates for daylight savings time changes, to set the automatic system on and off times and to adjust the internal clock, refer to Section III:N.

Part C: SYSTEM MEMORY (RAM)

SET RAM

The next item to set when initially configuring your ***K-2500*** system is the size of the system memory.

The card file and transaction records are stored in Random Access Memory (RAM) chips. The standard memory chips are stored on the FSC board. An additional board with one of 3 grades of Expanded Memory (EM) can also be included with your system (see the Data Sheet packed with the system). Because you enter a code number for the memory grade, the memory for the system can be upgraded without any additional software changes.

Enter the *privileged* command `**SET RAM'**. You are prompted to enter the code appropriate for your system:

(0) 64 kilobytes [standard memory only]
(1) 320 kilobytes [Expanded Memory 1]
(2) 576 kilobytes [Expanded Memory 2]
(3) 832 kilobytes [Expanded Memory 3]

)))) NOTES ((((

(a) These values represent the <u>total</u> system memory. For example, the EM1 board adds 256 kilobytes to the standard 64 kilobytes for a total of 320 kilobytes.

(b) Press the **[ENTER]** *key to keep the current code. The* ***K-2500*** *does not allow you to enter a memory code unless there is sufficient RAM in the system.*

(c) The privileged prompt is lost if the system rejects a RAM entry; the password must be re-entered.

(d) If the RAM size for your system is not known, the size can be determined by trial and error. Start by entering (3) and continue on down until the ***K-2500*** *accepts an entry.*

SHOW RAM

This command displays the programmed memory configuration. This is *not* necessarily the actual system memory, but only what has been entered by the programmer.

Part D: PROGRAMMABLE DATA BASE

Types of Data

A database is a collection of information. The database is stored in a programmable "buffer," a kind of electronic storage space.

Overview

If you are going to use PIN numbers with your cards, you should first enter numbers for the security table. This is done using the **`SET SECURITY TABLE'** command.

The next step is to divide the buffer into 2 sections: (1) transaction data and (2) card data (see Figure I:5a in the previous section). This done using Choice #1 of the **`SET CARD BUFFER'** command.

Choice #2 is used to program the keyboard entry options. Choice #3 selects the keyboard access type.

SET SECURITY TABLE

The security table is a set of ten 2-digit hexadecimal ("hex") numbers used by the system to generate PIN numbers automatically. Because the default values for the table are the same for every ***K-2500***, you must set new values with this command in order to generate unique PIN numbers for your system.

When entering this *privileged* command for the first time you are prompted with:

ROW 1: 01 23 45 67 89

These are the default values for the first row of the security table. Enter five 2-digit hex numbers, pressing the **[ENTER]** key after each. (Hex numbers include the decimal numbers 0 to 9 and the letters A to F.) The entries should be as random as possible to maximize the uniqueness of the PIN numbers that will be generated from this table. For example, **`A0 E9 83 DD 1C'** is good, but **`12 12 12 12 12'** is *not*. After the last entry, you are prompted for row 2. Enter five different 2-digit hex numbers in a similar manner.

The last prompt is for the security code number. This number provides an additional degree of randomness to the security table. Note that changing only the security code causes different PIN numbers to be generated from the same security table. Enter any 2-digit hex number (except **`00'**) for this code.

!!! IMPORTANT !!!

Be sure to record the security table numbers on the worksheet. If you are reconfiguring your system, or wish to generate PIN numbers to match another *K-2500*, the row and security code numbers must exactly match your original entries.

To generate PIN numbers compatible with an existing K-3000 system, enter the first five 2-digit security numbers from the K-3000 System Data Sheet for row 1. Enter the next five 2-digit security numbers for row 2. (The last 6 numbers listed on the data sheet are *not* entered). Lastly, enter **`00'** for the security code.

)))) NOTE ((((

*PIN numbers are not stored in the **K-2500**. Any changes in the table immediately affect the PIN numbers and fueling access.*

SHOW SECURITY TABLE

This command displays the current security table entries and code number.

SET CARD BUFFER Enter this *privileged* command to display the following menu:

```
[1] Set card/transaction buffer size.
[2] Set keyboard entry options.
[3] Set keyboard access type.
[RETURN] Return to main command line.

Enter choice:
```

Choice #1: The first choice is used to split the buffer into 2 sections, one for the transaction data and one for the card data. You are first prompted with the message:

TRANSACTION AND MESSAGE BUFFER WILL BE CLEARED!! (Y/N)?

>>> **WARNING** <<< ***This command destroys <u>all</u> transaction data when activated.***

Enter `**N'** (for no) to abort this choice and return to the menu. Enter `**Y'** (for yes) to continue.

The next prompt is:

-- ENABLE MESSAGING (Y/N)?

Enter `**Y'** (for yes) to enable the messaging feature and divide the buffer into 3 sections. Enter `**N'** (for no) to disable this feature and configure the buffer into 2 sections.

If messaging is enabled, the next prompt is:

ENTER MESSAGING SIZE CODE(1..4):

Enter one of the following size codes to select the maximum number of individual messages the system can display:

Code	Number of Messages
1	25
2	50
3	75
4	100

The next prompt is:

ENTER TRANSACTION SIZE CODE:

The size code is determined by this formula:

size code = number of transactions/25

For example, to store 100 transactions, enter a size code of 4 (100/25 = 4).

The number of transactions which a ***K-2500*** can store is limited by the size of its system memory (RAM). Appendix E outlines some of the possibilities. After entering a size code, the system displays:

```
# OF CARDS: ######
# OF TRANSACTIONS:  ####
-- SAVE THIS CONFIGURATION (Y/N) ?
```

This information is provided to aid you in deciding how to divide the buffer.

If this configuration is *not* desirable, enter **`N'** at the prompt to select a different size code; the previous configuration is *not* changed.

To save the current configuration, enter **`Y'** at the prompt. The system displays the message **`PLEASE WAIT!'** while it validates the cards. For systems with expanded memory, this process can take up to several minutes. The message **`DONE!'** is displayed when the validation is completed.

!!! IMPORTANT !!!

There are 3 card types: single, driver and vehicle. The latter 2 types are used for dual card operation. The card type is encoded on each card. The same card number should *not* be used for more than one card. For example, if a driver and a vehicle card have the same number, you can *not* invalidate only one of the cards.

Choice #2

The ***K-2500*** can be programmed to request 3 types of information from a fueler: current odometer reading, miscellaneous (for department section, job number, account code, etc.) and PIN number. The fueler enters this data via the ***K-2500*** keyboard. These entries can be prompted for *no* cards, for *all* cards or only for cards that are specifically coded for a keyboard entry or entries.

When Choice #2 is selected, the following menu is displayed and the first feature is prompted:

```
Keyboard entry options:
[1] Disable for all cards
[2] Enable for all cards
[3] Determined by card
[RETURN] No change

Odometer entry:
```

Enter one of the code numbers (1 - 3), or press the **[RETURN]** key to enter the current value. (The default value, [3] Determined by card, is initially displayed.)

You are next prompted for the Miscellaneous entry and then for the PIN entry. Enter a code number for each. The menu is returned to the display.

)))) NOTES ((((

*When programming your **K-2500** system to be compatible with a K-3000 system, use the following guidelines:*

(a) The K-3000 uses Program Selector Switches to enable the odometer ("mileage"), miscellaneous and PIN ("security number") keyboard entries.

*(b) A keyboard entry is dis**abled** for a K-3000 when the corresponding selector switch is "open". This is the same as selecting option [1] for a particular keyboard entry in the **K-2500**.*

*(c) A keyboard entry is en**abled** when the corresponding selector switch is "closed". Cards may be coded to bypass (i.e., dis**able**) an entry or entries. This is the similar to selecting option [3] for a particular keyboard entry.*

*(d) There is no equivalent in the K-3000 of keyboard entry option [2] in the **K-2500** system.*

Choice #3

A fueler can access the ***K-2500*** by entering his card number via the keyboard. Choice #3 defines what type of card a keyboard access duplicates.

When Choice #3 is selected, you are prompted with the message:

Set keyboard access type (Single, Driver, Vehicle):

Enter **`S', `D',** or **`V'** to select a card type, or press **[RETURN]** to enter the current value. (The current value is initially the default value, "Single".) The system then displays your selection and returns the menu to the display.

When a card number is entered via the keyboard, the ***K-2500*** uses code 15 for quantity and pump restriction (see Section III:L for restriction details).

Odometer, miscellaneous and PIN entries are *always* prompted if keyboard entries are determined by card (see Choice #2 above).

)))) NOTES ((((

(a) In order to use Choice #3, you must configure the FIT(s) for keyboard access (refer to Section III:G for details).

(b) The numbers used for keyboard access should not be the same as the numbers used for cards. For example, if a driver card is assigned number 1000 and a vehicle keyboard access uses the same number, both numbers will always be either valid or invalid. You can not lock out only the card or only the keyboard access.

SHOW CARD When this command is entered, the following menu is displayed:

```
[1] Display card (in)validation status.
[2] Display keyboard entry settings.
[3] Display keyboard access type.
[RETURN] Return to main command line.

                  Enter choice:
```

Option [1] is used to display the validation status of a card or range of cards. If you are in the privileged mode, the ***K-2500*** asks if you want to display the PIN numbers for the card(s). Enter **`Y'** for yes or **`N'** for no. You are then prompted with the current range of cards in the system.

Next, you are prompted for the card number or range. The format for displaying a single card or a range with PIN numbers is the same. For example,

Card # 200002 is VALID. PIN: 3333

If a range is specified and PIN numbers are *not* displayed, the format is slightly different. For example,

```
1-> VVVVVVVVVV VVVVVVVVVV VVVVVVVVVV VVVVVVVVVV
VVVVVVVVVV
51-> IIIIIIIIIV VVVVVVVVVV VVVVVVVVVV
VVVVVVVVVV VVVVVVVVVV
```

where **`V'** indicates a card is valid; **`I'** indicates a card is invalid. In the example above, cards 1 - 50 and 60 - 100 are valid; cards 51 - 59 are invalid.

Options [2] and [3] display the keyboard entry settings and keyboard access type, respectively.

VALIDATE CARD
INVALIDATE CA

When either of these commands is entered, the maximum card range which can be validated or invalidated is displayed. You are prompted to enter a card number or a range of card numbers. (If you select a range that is more than 100 cards, you are prompted a second time.) The message **`PLEASE WAIT!'** is displayed while the command executes. (This message may *not* be noticeable when only one card has been specified.) The message **`DONE!'** displays when the command has completed.

For the **`VALIDATE'** command only, you are then prompted: **`Change validation of vehicle cards (Y/N)?'** Enter **`Y'** (for yes) or **`N'** (for no) as appropriate. If you answer yes, you are also prompted **`Vehicle cards always valid (Y/N)?'** When you enter **`Y'**, the system accepts *all* vehicle cards *without* checking the card buffer to determine their validity. When you enter **`N'**, the system accepts only vehicle cards which are *valid* in the card buffer.

For example,

```
Display
Keyboard
-----------------------------------------------------
----------
P>
VALIDATE CARD
P>VALIDATE CARD
Maximum card range: 1-208112

Enter card # or card range to be validated,
Press [RETURN] to exit.
Card (range):
33333
Card (range):  33333  DONE!
Validated card(s):  33333
Card (range):
1-10000
Validated card(s):  1-10000 (Y/N)?                  Y
Validated card(s):  1-10000 (Y/N)?  PLEASE WAIT!

Validated card(s):  1-10000 (Y/N)?  DONE!
Validated card(s):  1-10000
Card (range):
[ENTER]
Change validation of vehicle cards (Y/N)?           Y
Vehicle cards always valid (Y/N)?                   Y
P>
```

Part E: FUELING UNITS, TYPES AND TANKS

SET FUELING UNITS

Up to 3 different labels can be specified for the product-measuring units. Note that these are simply labels and no actual conversion is done. The default values are:

(1) gallon (2) liter (3) quart

The code numbers (1, 2 and 3) are used when setting the fuel types (see below).

To change the default values, enter the *privileged* command **`SET FUELING UNITS'**. You are then prompted for each of the 3 labels. Enter a label of up to 10 characters, or press the **[ENTER]** key for the default label.

SHOW FUELING UNITS

This command displays the current fueling units.

SET FUELTYPE #

You can specify the fuel units, prices and names for up to 16 different fuel types. The default value for the units is code #1. The default value for the price is $1.000. The default names are:

(1)	UNLEADED	(9)	PROPANE
(2)	PREMIUM	(10)	L.P.G.
(3)	REGULAR	(11)	LUBEOIL1
(4)	MRKED FUEL	(12)	LUBEOIL2
(5)	#1 DIESEL	(13)	TRANS OIL
(6)	#2 DIESEL	(14)	COOLANT
(7)	GASOHOL	(15)	WATER
(8)	ALCOHOL	(16)	AIR

To change the default value(s) of a fuel type, enter the *privileged* command **`SET FUELTYPE #'**, where **`#'** is a number from 1 to 16. The current name and price per unit are displayed, along with the current fueling unit labels.

A fueling unit must be specified by the code defined above (1, 2 or 3). Each price can be specified to a tenth of a cent; for example, **`$1.059'**. A price of **`$0.000'** can be specified for non-retail sites. Each name can be up to 10 characters (numbers or letters) in length; for example, **`GASOLINE01'**.

For example, to change the name and price of fueltype 1, you would enter the following:

```
Display                                        Keyboard Entry
-------------------------------------------------------------
------------P>                                    SET FUELTYPE
1 [ENTER]
P>SET FUELTYPE 1

1: UNLEADED --PRICE PER GALLON 1.000
FUELING UNIT CODES
  1: GALLON
  2: LITER
  3: QUART

ENTER FUELING UNIT CODE (1-3)                    1 [ENTER]
ENTER FUELING UNIT CODE (1-3) 1
CHANGE PRICE (Y/N)?                    Y [ENTER]
CHANGE PRICE (Y/N)? Y
ENTER PRICE PER GALLON:                          1.259 [ENTER]
ENTER PRICE PER GALLON: 1.259
CHANGE PRODUCT NAME (Y/N)?             Y [ENTER]
CHANGE PRODUCT NAME (Y/N)? Y
ENTER FUELTYPE 1:                      UNLED PREM [ENTER]
ENTER FUELTYPE 1: UNLED PREM
```

!!! IMPORTANT !!! **The current fuel price is recorded for every transaction. Changing the fuel price does <u>not</u> affect completed transactions.**

)))) NOTE ((((*KR-16 optical cards often have fueltype numbers encoded on them to determine product availability for a customer. When configuring multiple sites for use with KR-16 cards, be sure to set the same fueltypes for all sites.*

SHOW FUELTYPE This command displays the current fueltypes.

SET TANK #

This *privileged* command is used to identify the fuel tanks and specify their initial quantities and fueltypes (using the code numbers listed above). When fuel is pumped, the amount is subtracted from the dispensing tank, providing a running inventory of the product.

A low level quantity can also be entered for each tank. When fuel drops below this level, the tank is "flagged" (or indicated) on the System Report.

)))) NOTE ((((*The tank number will be specified for each pump when its PCT is configured.*

SHOW TANK

This command displays the current fueltypes, product totals and low level quantities for all tanks.

Part F: PUMP CONTROL TERMINAL

CONFIGURE PCT

Each ***K-2500*** unit (Master or Slave) has a Pump Control Terminal (PCT) board to control pump operations. Each board must be uniquely numbered (#1 - #4). This number is determined by the setting of switch #1 on each PV-205 board (see Section II:I).

PCT operations can be emulated by a Universal Pump Controller (UPC). The ***UPC*** can connect up to four ***K-2500*** units to a self-service console.

This *privileged* command asks you whether the specified PCT is a ***UPC***. Answer **`Y'** (for yes) or **`N'** (for no) as appropriate. When configuring the PCT as a ***UPC***, be sure to refer to the ***UPC*** manual *before* proceeding with this section.

)))) NOTES ((((

*(a) If you want to reconfigure an installed PCT as a **UPC**, you must first remove the PCT using the command* **`REMOVE PCT #'**.

*(b) When the **K-2500** is "cold started," PCT #1 is automatically installed as not a **UPC**. A cold start is required: (1) when the **K-2500** is first installed or (2) if both the power and battery fail, causing a complete data loss.*

CONFIGURE PCT # POSITION

Each PCT can control up to 8 pumps, located at positions #1 - #8. Use this *privileged* command to configure each PCT position.

The following "mandatory" items *must* be specified for each fuel pump. The "optional" items have default values that should be appropriate for most systems. Press the **[ENTER]** key at a prompt to enter a default value. To change a default value, simply enter the appropriate value at the prompt.

(Mandatory) **Pump #** • specifies the reference number for this PCT position (e.g. **`USE PUMP #12'**); note that this number is only a label and does *not* have to be the same as the PCT position number (default value = position number)

)))) NOTE ((((*You may assign the same pump number to more than one position on the same PCT. When that pump number is selected by a customer, all the associated positions are activated. For example, the number 22 could be assigned to both positions #1 and #2. A customer who wanted to fill the saddle tanks of a large truck could speed the process by using both pumps simultaneously. Because each PCT position records its own transaction, fuel accounting is always complete. In this example, 2 transactions would be recorded (one for each pump).*

(Mandatory) **Pulses per "unit"** • specifies the number of pulses per "unit" of fuel (usually gallons, liters or quarts); the unit that is prompted is the one associated with the fueltype just entered; for more detail about fueling units, refer to Section III:E (default value=100)

(Optional) **Max fuel per transaction** • specifies the maximum fuel amount to be dispensed for any transaction; note that this is *not* the same as the quantity restriction feature described in Section III:L; this is also *not* the same as the daily or monthly allocations described in Section III:D (default value = 10 units)

(Optional) **Enable/disable pump sentry feature** • specifies whether or not to de-activate the pump if there are 3 "zero quantity" transactions in a row; such an occurrence indicates a probable pump or pulser malfunction (default = *disabled*)

(Optional) **Max time for fueling** • specifies the maximum amount of time (in minutes) allowed for the user to fuel; time is measured from when the pump is first activated; power is automatically removed from the pump when the specified time is exceeded (default = 5 minutes)

(Optional) **Max time for pump handle** • specifies the maximum amount of time (in seconds) between pump activation and pump handle retrieval (default = 60 seconds)

(Optional) **Max time for first pulse •** specifies the maximum amount of time (in seconds) allowed to detect the first fueling pulse; the time is measured from when the pump handle is first retrieved; power is automatically removed from the pump when the specified time is exceeded (default = 60 seconds)

(Optional) **Max time between pulses •** specifies the maximum amount of time (in seconds) allowed between fueling pulses; this feature is also known as the `missing pulse detector;' power is automatically removed from the pump when the specified maximum time is exceeded (default = 60 seconds)

(Mandatory) **Fueltype Code # •** specifies the code number (1-16) of the fueltype to be dispensed (default value = position number)

(Optional) **Tank # •** specifies the tank number from which product will be pumped; a PCT position must be set up or the same fueltype as the tank from which product is drawn for the tank inventory data to be meaningful (default value = position number)

(Optional) **Clear hose totals •** specifies whether or not to clear the running pump totals (default = *no*)

(Optional) **Totalizer value** • specifies a number to match the totalizer counter on the pump face; this feature helps to track the amount of fuel dispensed by the pump and the ***K-2500*** (default = 0)

)))) NOTES ((((

(a) When a PCT is configured as a ***UPC****, the last 4 prompts are repeated for up to 4 hoses.*

(b) You must enter the `**DOWNLOAD'** *command after configuring a PCT.*

INSTALL PCT # POSITION

Each pump that was configured in the previous section must also have its position installed for the pump to operate as part of the ***K-2500*** system.

On a cold start (or initial power-up), positions #1 and #2 on PCT #1 are automatically installed.

Note that individual pump positions can be configured and kept nonoperative by *not* installing them.

)))) NOTE ((((*To clear the pump sentry alarm, re-install the pump position with the* **`INSTALL PCT # POSITION #'** *command.*

INSTALL PCT #

This *privileged* command activates the specified PCT, establishing a communication link between the installed PCT and the FSC. There is a PCT for the ***K-2500*** Master and each of the ***K-2500*** Slaves (if any).

)))) NOTES ((((

(a) After installing each pump position, the PCT(s) themselves must be installed in order for the pumps to operate as part of the ***K-2500*** *system. (This command does not install all positions for a PCT.)*

(b) A PCT can be configured and kept nonoperative by not installing it.

(c) On initial powerup, PCT #1 is automatically installed.

REMOVE PCT # POSITION #

This *privileged* command is used to remove a pump from the ***K-2500*** system so that the pump can no longer be activated.

Note that all the programmed parameters for the pump remain intact; the position can be re-installed without needing reconfiguration.

REMOVE PCT #

This *privileged* command stops the FSC from communicating with the specified PCT. All positions for the specified PCT are deactivated. Note that all the programmed parameters remain intact; the PCT can be reinstalled without needing reconfiguration.

SHOW PCT # POSITION #
SHOW PCT #

These commands display the current PCT configuration.

CONFIGURE PUMP # This *privileged* command can be used to reconfigure a PCT position, using the assigned pump number as a reference. The same items are prompted as with the **`CONFIGURE PCT # POSITION #'** command.

REMOVE PUMP # This *privileged* command removes from operation *all* PCT positions associated with the specified pump number.

SHOW PUMP # This command is similar to the **`SHOW PCT # POSITION #'** command.

)))) NOTE ((((*The 3 pump commands listed above can only be used with PCT positions that have already been configured.*

Part G: THE FUEL ISLAND TERMINAL (FIT)

CONFIGURE FIT #

The FIT controls the card reader, keyboard, display and optional receipt printer. There is a FIT for each Master and Slave unit. The number of each FIT is determined by the switch settings on the PV-205 board (refer to Section II:I). This *privileged* command defines how each FIT operates.

The first prompt is:

ISSUE RECEIPTS (Y/N)?

Enter `**Y'** (for yes) to provide transaction receipts via the optional receipt printer or `**N'** for no. If you enter `**Y'**, you will be prompted with a limit for a receipt to be printed. The limit is the number of days after a transaction, a fueler can receive a receipt. (Note `**0'** designates *no* limit).

ENTER LIMIT TO RECEIVE RECEIPT IN DAYS (0..99):

Also, you must also indicate whether or not to clear the receipt counter. This counter keeps a running total of all receipts issued to date. It can be used to keep track of the receipt paper and to indicate when the paper is running low.

The second prompt is:

ENABLE KEYBOARD ACCESS (Y/N)?

Enter `**Y'** (for yes) or `**N'** (for no). With this feature enabled, the user is able to enter his card number via the ***K-2500*** keyboard. For more details about "cardless" card records, refer to the `**INSERT CARD'** command in Section III:D.

)))) NOTE ((((*The card reader is not disabled by enabling keyboard access.*

The third prompt is:

SPECIFY PCTs TO SHUT OFF ON E-STOP (Y/N)?

Enter `**Y'** to select which PCTs will be turned off on when an Emergency Stop button is pressed. The default value is *all* PCTs. Enter `**N'** to display the next prompt without changing the specification.

The fourth prompts is:

CLEAR CARD READER ERROR COUNTER (Y/N)?

)))) NOTE ((((*This prompt is only displayed if the error counter is greater than zero.*

Enter `**Y'** to clear the counter. Enter `**N'** to keep the counter the same and to display the next prompt. This counter keeps a running total of the bad reads by the card reader. The system defines a bad read as one where the card reader cannot read a card correctly in three sequential attempts. Such a failure could indicate that the card reader needs cleaning.

The last prompt is:

CHANGE FIT ACCESS TO PUMPS (Y/N)?

Enter `**Y'** to change which pumps can be activated by the specified FIT. Enter `**N'** to leave the access unchanged and exit this command. If you enter `**Y'**, you are prompted to enter the numbers of the valid pumps. The default value is *all* pumps valid.

)))) NOTE ((((*You must enter the* `**DOWNLOAD'** *command after configuring a FIT.*

INSTALL FIT #

This *privileged* command activates the specified FIT, establishing a communication link between the installed FIT and the FSC. Note that there is a FIT for the ***K-2500*** Master and each of the ***K-2500*** Slaves (if any).

On initial power-up, FIT #1 is automatically installed.

REMOVE FIT #

This *privileged* command stops the FSC from communicating with the specified FIT.

SHOW FIT #

This command shows how the specified FIT is currently configured.

This is the end of the mandatory directions. The following parts of the Configuration Section describe the advanced features of the ***K-2500.*** You are *not* required to use these functions for normal system operation.

Do *not* try to configure any of the advanced features until you have successfully completed the basic configuration.

Part H: FIT DISPLAY PROMPTS AND KEYBOARD RESPONSES

Description

The FIT display prompts (listed in Appendix D) are shown on the ***K-2500*** unit(s) at various times to guide a customer through the fueling process. These prompts can be changed with the **`FORMAT DISPLAY #'** command. With the dual language feature enabled, additional prompts can be added. (Refer to Section III:P for more details about the dual language feature.)

There are two types of FIT display hardware:

(1) Standard: one line with 24 characters;
(2) Optional: two lines with 40 characters each (80 characters total).

)))) NOTES ((((

(a) The type of FIT display is listed in the Status Report.

(b) Only the text of a prompt is changed, not its function. For example, **`INSERT CARD'** *can be effectively changed to* **`PUT IN CARD'** *but not* **`ENTER CURRENT TIME'**.

FORMAT DISPLAY #

Specify the number of the FIT display prompt to edit with this *privileged* command. When the dual language feature is enabled, the system asks you to edit a display prompt for each language.

The entry for a display prompt is "case-sensitive;" that is, upper and lower case letters are distinguished. In addition to numbers and letters, you may also enter most printable characters, such as **`!', `?'** and **`$'**. You may also add the **'}'** character to any ***K-2500*** message. This will cause an audible tone to sound when the message is displayed.

The details for this command are explained in the following 2 sections, one for each type of hardware. Follow the section appropriate for your system.

)))) NOTES ((((

(a) Prompts #6 and #7 alternately display when prompting for a receipt.

(b) Prompts #8 and #9 alternately display while the ***K-2500*** *is waiting for a customer. If prompts #8 and #9 are short enough, (6 characters less than the display length), the current time is also shown.*

(c) You must enter the **`DOWNLOAD'** *command after formatting a display prompt. When formatting more than one prompt, you need to enter the* **`DOWNLOAD'** *command only once after editing the last prompt.*

Standard FIT Display

After specifying the display number, you are shown the current prompt and 2 vertical lines. These lines represent the width of the FIT display (24 characters). The new prompt must fit within the space under the 2 vertical lines. Enter the new prompt and press **[ENTER]** to complete the entry. (You may also press **[ENTER]** *without* an entry to retain the current prompt.) When the dual language feature is enabled, you are then requested to enter a prompt for the second language. You may enter a second prompt or press **[ENTER]** to end the command. To format another prompt, you must re-enter the command.

)))) NOTE ((((

*The **K-2500** unit shows the display prompt in the second language only after a card has been correctly read (the language type is part of the card record). Because prompts #2 - #9, #24 - #26 and #35 are displayed before a card has been correctly read, these prompts should not be programmed for a second language.*

Optional FIT Display

When you specify the display number with the dual language feature *disabled*, you are shown the current prompt and 2 vertical lines. These lines represent the width of the FIT display (40 characters). One line of the new prompt must fit within the space under the 2 vertical lines. Enter the new prompt and press **[ENTER]** to complete the entry for the first line. (You may also press **[ENTER]** *without* an entry to retain the current prompt.) You may then enter a second line for the prompt; or press **[ENTER]** *without* an entry to end the command. To format another prompt, you must re-enter the command.

When you specify the display number with the dual language feature *enabled*, you are shown the display prompts for both languages (the second language prompt is initially blank). With the dual language feature *enabled*, the **K-2500** has the capacity for up to 10 two-line prompts; the remaining prompts are limited to one line each. When the prompts are single line, the message **`Insert a 2 line display message (Y/N)?'** is then shown. (Both language prompts are initially single line.) When the prompts have 2 lines, the message **`Current display is 2 lines, change to 1 line display (Y/N)?'** is shown instead. Enter **`Y'** (for yes) or **`N'** (for no) as appropriate. Two vertical lines are then displayed. These lines represent the width of the FIT display (40 characters). One line of the new prompt must fit within the space under the 2 vertical lines. Enter the new prompt and press **[ENTER]** to complete the entry for the first line. (You may also press **[ENTER]** *without* an entry to retain the current prompt.) When entering a two-line prompt, you are then asked to enter the second line. To format another prompt, you must re-enter the command.

)))) NOTE ((((

*The **K-2500** unit shows the display prompt only in the second language after a card has been correctly read (the language type is part of the card record). Because prompts #2 - #9, #24 - #26 and #35 are displayed before a card has been correctly read, the optional display shows prompts for both languages (when the dual language feature is enabled). Therefore, these prompts should be single line only.*

SHOW DISPLAY #

This command shows the current specified FIT display prompt. When the dual language feature is enabled, both prompts are shown.

SHOW DISPLAY

This command shows all current FIT display prompts. When the dual language feature is enabled, prompts for both languages are shown. Press any key (except the **[X]** key) to stop and start the scrolling. Press the **[X]** key to exit this command.

FORMAT KEYBOARD #

When the **[YES]** and **[NO]** keys are pressed (in answer to a prompt on the ***K-2500*** display), the corresponding response (`**YES'** or `**NO'**) is displayed.

This *privileged* command can be used to change the response that is displayed when one of these keys is pressed. The response can be up to 8 characters. To format the `**NO'** response, specify `**1'** for the keyboard number; to format the `**YES'** response, specify `**2'** for the keyboard number. For example, the response for the **[YES]** key can be changed to `**OKAY'**. Note that the function of the keys can *not* be changed.

)))) NOTES ((((

(a) If the dual language feature is enabled, each keyboard response has 2 parts. The first part is Language 1; the second part is Language 2. You are requested to enter a keyboard prompt for each language.

(b) The `**DOWNLOAD'** *command must be entered to activate a keyboard response.*

SHOW KEYBOARD #

This command displays the specified keyboard response.

Part I: RECEIPT FORMATTING

Description

The current time and date are automatically included on every receipt. The header and trailer (or bonus points) messages are automatically printed in expanded format. The receipt body can be set up with the fields in any order. The receipt size is *not* fixed in length and can have as many or as few lines as necessary.

The following commands are used to add or change the information included on each receipt. If the dual language feature is enabled, receipts can be issued in either language. (Refer to Section III:P for more details about the dual language feature.)

FORMAT RECEIPT HEADER

A message can be programmed to print at the beginning of each receipt. It is automatically printed in the expanded mode. When you enter this *privileged* command, you are prompted for up to 4 lines of up to 11 characters each. Red or black print can be specified for each line. If less than 4 lines is desired, press the **[ENTER]** key at the first prompt after the last line was entered.

)))) NOTE ((((*If the dual language feature is enabled, you are first prompted for the number of the language (1 or 2). To format receipt headers for both languages, you must enter this command twice.*

SHOW RECEIPT HEADER

This command shows the current receipt header.

FORMAT RECEIPT TRAILER

This *privileged* command programs a message to print at the end of each receipt. The format is the same as for the header.

SHOW RECEIPT TRAILER

This command shows the current receipt trailer.

FORMAT RECEIPT BODY

You can define what transaction data are to be printed on the receipt and in what order. The first 10 character positions of a line (the field entry) are filled by you. You can then specify a receipt code to print data from the transaction or card file on the same line. (These codes are listed below.)

When you enter this *privileged* command, you are prompted:

ENTER (Show, Delete, Insert, eXit, Line #):

You may select one of these functions by entering the capitalized letter of its name. For example, to exit this command, you would press the **[X]** key, then press the **[ENTER]** key. If the dual language feature is enabled, *both* sets of field entries are affected by the functions. The functions are described below:

Show The show command allows you to display the current data of the receipt body.

Delete The delete command allows you to remove a line in the receipt body.

Insert Insert another line into the body.

eXit The exit command ends this function.

Line # This is a prompt for a valid line number to edit. The label and code items can be modified.

The following is a list of the receipt codes:

Transaction Data	Receipt Code
Number of card 1	1
Number of card 2	2
Transaction number	3
Product name	4
Quantity dispensed	5
Price per unit	6
Total price	7
Driver name	8
Vehicle name	9
Company/account name	10

Transaction Data	Receipt Code
Site ID	11
Miscellaneous	12
Current odometer reading	13
Miles per gallon	14
Liters per 100 kilometers	15
Pump number	16
Account #	17

)))) NOTE ((((*Receipt Codes #10, #14, #15, and #17 are not functional in the Structured Memory* ***K-2500.***

SHOW RECEIPT BODY

This command displays the current receipt body. If the dual language feature is enabled, both sets of messages are shown. The initial receipt body is shown below. (Initially, the messages for language 2 are blank.)

Line #	Language 1		Code
1	>CARD #	<	> 1<
2	>CARD #2	<	> 2<
3	>TRANS #	<	> 3<
4	>PRODUCT:	<	> 4<
5	>QUANTITY:	<	> 5<
6	>PR/UNIT:$	<	> 6<
7	>TOTAL: $	<	> 7<
8	>DRIVER:	<	> 8<
9	>VEHICLE:	<	> 9<
10	>ACCT.NAME	<	>10<
11	>SITE I.D.	<	>11<
12	>MISC:	<	>12<
13	>ODOM:	<	>13<
14	>M.P.G.	<	>14<
15	>LPHKM	<	>15<
16	>PUMP #:	<	>16<
17	>ACCOUNT #:	<	>17<

)))) NOTE ((((

(a) Lines #10, #14, #15 #17 are not functional in the Structured Memory ***K-2500.***

(b) Refer to Appendix J for instructions on replacing the receipt paper and clearing printer errors.

SET BONUS POINTS

This *privileged* command allows you to specify a "coupon" value (based on the amount of fuel dispensed) to be printed on each receipt. A Bonus Points message can also be specified (see below).

SHOW BONUS POINTS

This command displays the current bonus points.

FORMAT RECEIPT BONUS POINTS

With this *privileged* command, you can program an alternate message to print instead of the receipt trailer when the bonus points feature is enabled. The format is the same except that the `#' character can be inserted into the bonus points message. The `#' character causes the number of bonus points for a transaction to be printed at that position.

SHOW RECEIPT BONUS POINTS

This command shows the current bonus points message.

Part J: TRANSACTION BUFFER

SET TRANSACTION

The transaction buffer is a kind of electronic storage space where the data from each transaction is recorded. The "wrap around" feature of this command allows you to select whether or not you want the ***K-2500*** to overwrite old data. The size of this buffer is set when the card buffer size is defined (Section III:D).

This *privileged* command specifies how the transaction buffer is to be configured. The first option is:

CHANGE WRAP AROUND SPECS (Y/N) ?

Entering **`N'** (for no) prompts the next option. Entering **`Y'** (for yes) prompts one of the following messages (depending on its current configuration):

ENABLE WRAP AROUND
or
DISABLE WRAP AROUND

Enter **`Y'** (for yes) or **`N'** (for no) as appropriate.

When the wrap around feature is enabled, the ***K-2500*** overwrites (and destroys) the oldest transactions when the buffer is full. When this feature is disabled, transactions can *not* be overwritten; *no* fueling is allowed while the buffer is full .

>>>> WARNING <<<< ***Do <u>not</u> enable the wrap around feature unless you are certain that transaction data will not be accidentally destroyed.***

The next option is:

RE-DEFINE TRANSACTION (Y/N) ?

Entering **`N'** prompts the next option. Entering **`Y'** prompts:

TRANSACTION=UNAUTHORIZED USERS ALSO(Y/N)?

Entering **`Y'** causes the system to process an unauthorized attempt to use the system as a transaction and log the event in the transaction buffer. Entering **`N'** causes the system to ignore any unauthorized users and events; only instances where a pump was actually activated by the ***K-2500*** are recorded.

The third option prompted is:

SPECIFY DISPLAY FIELDS (Y/N) ?

This allows you to specify which transaction data fields are to be displayed with the **`SHOW TRANSACTIONS'** and **`PRINT TRANSACTIONS'** command. Entering **`Y'** causes the system to prompt for the fields one at a time. Entering **`N'** exits the command. These prompted fields are:

ACCOUNT, DRIVER, VEHICLE
DATE & TIME
CARD #1
CARD #2
FUELTYPE
PUMP
QUANTITY
PRICE
TOTAL
ODOMETER
DISTANCE PER UNIT
MISCELLANEOUS
RECEIPT STATUS
ACCOUNT #

Those fields that are chosen to be displayed are also those that are used by the computer format (see Appendix H). Note that all of the fields are saved in a transaction record.

)))) NOTES ((((

(a) The **`ACCOUNT, DRIVER, VEHICLE'** *field contains three parts of 9 characters each. The account part is not used in the Structure Memory* ***K-2500****. The driver part can contain either a driver or a single identifier; this identifier is either read from a card or entered at the keyboard. The vehicle part is either read from a card or entered at the keyboard.*

(b) The **`ACCOUNT #'** *field is <u>not</u> available for the Structured Memory* ***K-2500****.*

(c) If access was denied to a fueler, only the first 4 fields and the transaction number are recorded for that transaction.

(d) There must be at least one transaction recorded in your system in order to show all the data fields.

The last option (displayed after the **`ACCOUNT #'** prompt) is:

COMPUTER FORMAT CHECK DATA IN HEADER?

When transferring data to an external system in the computer format, the optional data check can be prefixed to the transaction header to provide greater data integrity. The data check includes the following data for the transaction records that will be transmitted: (1) the number of records and (2) the sum of the quantities for records. (For more details, refer to Appendix H.)

Enter **`Y'** to *enable* or **`N'** to *disable* the data check.

Part K: JOURNAL PRINTER

SET JOURNAL

A journal printer can be connected to the ***K-2500*** to make a hard copy of all transaction data. This copy provides added protection against data loss.

For each transaction, the journal printer records the transaction, pump and product numbers, the date and time, the first card number, the product quantity and dollar total.

The ***K-2500*** can be configured with this *privileged* command to operate with an internal ("fuel island") journal printer, an external ("office") journal printer or with no journal printer. Note that you can *not* have *both* an internal *and* external journal printer.

You can also specify which (if any) of the following items are to be logged on the journal: (1) the number of the second card, (2) driver and vehicle identifiers.

You can also specify if the ***K-2500*** should allow fueling if the journal printer is *not* functioning.

)))) NOTE ((((*The printer communication can become "blocked" if a printer error, such as running out of paper, occurs. After correcting the error, you must unblock the communication with this command. When printer communication is blocked, this command prompts you to unblock it. For more information on printer errors, refer to Appendix J.*

SHOW JOURNAL

This command shows how the printer (if any) is configured.

)))) NOTE ((((*Refer to Appendix J for instructions on replacing the internal journal paper.*

Part L: RESTRICTIONS

SET PUMP RESTRICTION

You can specify codes for up to 15 different combinations of pump restriction with this *privileged* command. These codes (1 - 15) will be used when configuring the card files (Section III:D) to specify which pumps will be available to each user.
For example, you can specify that only unleaded fuel (pump #1) should be available for newer trucks, older trucks can use both leaded and unleaded fuel (pumps #1 and #2.) and premium fuel (pumps #3 and #4) will be unavailable to both. You would enter pump #1 as valid for code 1, and pumps #1 and #2 as valid for code 2. (Pumps not entered as valid are assumed by the ***K-2500*** to be invalid.) These codes would then be used when configuring the vehicle card files for each truck. Other codes could be programmed to include the premium fuel pumps as required.

The default value for all codes is *all* pumps valid. Code 0 can also be used to indicate *no* restrictions. In the example above, code 0 could be specified for vehicles that would have access to all 4 pumps. Note that pumps must be installed to be valid (see Section III:F).

)))) NOTE ((((

(a) When a keyboard entry is substituted for inserting a card (either magnetic or optical), code 15 is used for pump restrictions.

(b) The pump restriction feature is <u>not</u> operational with KR-16 optical cards. With KR-16 cards, fueltype numbers are encoded on the cards to determine product availability for a customer.

SHOW PUMP RESTRICTION

This command displays the current pump restrictions.

SET QUANTITY RESTRICTION

You can specify up to 15 different levels of quantity restriction with this *privileged* command. The quantity restrictions can be either dollar amounts or volume (gallons, liters or quarts).

The restriction codes (1 - 15) are used when configuring the card files to indicate the maximum amount of product a user is allowed per transaction. This value is often set to match a vehicle's tank size. The default values are:

0: no restriction	8: $160
1: $20	9: $180
2: $40	10: $200
3: $60	11: $220
4: $80	12: $240
5: $100	13: $260
6: $120	14: $280
7: $140	15: $300

When you enter this command, you are prompted for each of the code numbers. Press **[ENTER]** (*without* an entry) to select the default value; or enter a different value. After the last entry, you are prompted with one of the following messages (depending on the current configuration):

-USE VALUES AS QUANTITIES (Y/N)?
or
-USE VALUES AS $ (Y/N)?

Enter **`Y'** to use the values as indicated in the message; enter **`N'** to use the values as the opposite.

)))) NOTE ((((

(a) The quantity values represent gallons, liters or quarts, depending on the product configuration.

(b) When a keyboard entry is substituted for inserting a card (either magnetic or optical), code 15 is used for pump restrictions.

SHOW QUANTITY RESTRICTION

This command displays the restrictions and the type of values (dollar or quantity).

Part M: SITE IDENTIFICATION

SET SITE ID

With this *privileged* command, you can enter a 12-character alphanumeric code to distinguish each site in a multi-site system. This code can be printed on receipts (see Section III:I). The code is also used to identify the site during backup and restore operations with an external computer (see Appendix H).

The code must be exactly 12 characters long; for example, **`STATION12345'**. The code can include spaces *except* for the first position.

SHOW SITE ID

This command displays the current site ID.

Part N: TIME CHANGE, SYSTEM TIMES AND DATE FORMATTING

SET TIME CHANGE

This *privileged* command allows you to compensate for daylight savings time, you can specify dates for moving the internal clock forward and backward an hour (at 2:00 AM). Once the time change has occurred, the specified date becomes inactive. Note that the system must be powered up at the time for this feature to work.

The format for entry is: **`mmm dd, yyyy'**; for example, **`FEB 15, 1989'**.

SHOW TIME CHANGE

This command displays the current dates for the time change.

SET SYSTEM TIMES

This *privileged* command prompts for the 3 system times and the time adjust feature. You can select any or all of them.

Three operational times can be set for the ***K-2500***. The entry format is: **`hh:mm am/pm'**; for example, **`1:59 AM'**. If **`PM'** is *not* specified, **`AM'** is assumed by the system.

The **`SYSTEM ON TIME'** specifies when the ***K-2500*** goes active. When the system is on, it displays messages, accepts card insertions and keypad entries.

The **`SYSTEM OFF TIME'** specifies when the system goes inactive. No new transactions are allowed to begin, but any transactions in progress are allowed to finish.

The **`RECEIPTS ONLY TIME'** specifies when the system allows no new transactions to begin, but does allow "just completed" customers to get their receipts. This time would typically precede the **`SYSTEM OFF TIME'** by several minutes.

For example, a gas station that dispenses fuel from 9:00 AM until 7:00 PM would have the **`SYSTEM ON TIME'** set to 9:00 AM, the **`SYSTEM OFF TIME'** set to 7:10 PM and the **`RECEIPTS ONLY TIME'** set to 7:00 PM.

The **`TIME ADJUST'** feature allows a software adjustment to the internal time clock. In the rare event of a noticeable time drift, a number of seconds can be added to or subtracted from each day, until a proper hardware adjustment can be made.

SHOW SYSTEM TIMES

This *privileged* command displays the current system times.

Date Formatting

The date appears on the monitor and on receipts from the optional printer. The date format has three features.

1) **Label:** With the dual language feature activated, you may enter a 3-character label for each month in each language. The default values for the labels are listed below:

Month	Language 1	Language 2
1	JAN	01
2	FEB	02
3	MAR	03
4	APR	04
5	MAY	05
6	JUN	06
7	JUL	07
8	AUG	08
9	SEP	09
10	OCT	10
11	NOV	11
12	DEC	12

2) **Order:** You may also choose between day first or month first for the date order. The default order for language 1 is month first; the default order for language 2 is day first.

3) **Separators:** The field separators distinguish the parts of the date. You may use any printable ASCII character. The default value for language 1 is a space and a comma. For example, **`DEC 30,1990'**. The default value for language 2 is 2 dashes. For example, **`30-12-1990'.**

FORMAT DATE

When you enter this *privileged* command you are prompted with the following:

ENTER (Show, Order, sEparator, eXit, Month #):

Press one of the capitalized letters to select a function; then press the **[ENTER]** key.

Show This function shows the current data.

Order This function toggles between the 2 order formats (month first or day first).

sEparator This function is used to select the 2 separator characters for the fields.

eXit This function ends the command.

month # This function changes the label(s) for the selected month (enter the month number).

Part O: PASSWORD

SET PASSWORD

There are three modes of operation for the ***K-2500***: (1) normal, (2) restricted and (3) privileged. This *privileged* command is used to change the passwords required for the restricted and the privileged modes and to enable (and disable) the restricted mode. (For more details about the operational modes, refer to Section III:A.)

This command is also used to change the modem password. (For more details about modem operation, refer to Appendix G.)

Initially, all passwords are **`HELLO'** and the restricted mode is *disabled*. Note that the passwords do *not* have to be changed, nor does the restricted mode have to be enabled in order for the ***K-2500*** to operate.

To change any or all passwords, enter **`SET PASSWORD'**. The system prompts first for the main (or privileged mode) password. Enter up to 6 numbers and/or letters for the new password (or press the **[ENTER]** key to retain the old password). The system then prompts for the modem and show (or restricted mode) passwords. Enter up to 6 numbers and/or letters for each. The passwords are *not* "case-sensitive;" that is, the system does *not* distinguish between upper and lower case letters. You are then prompted:

-ENABLE SHOW PASSWORD?

Enter **`Y'** (for yes) or **`N'** (for no) as appropriate. The restricted mode is *disabled* by default. Note that only the normal *or* the restricted mode may be enabled at one time.

)))) NOTE ((((

When the restricted mode is enabled, the show password must be entered correctly before any information can be displayed or printed. No commands will be accepted and no characters will be echoed to the screen until the show password is entered correctly.

!!! IMPORTANT !!!

Be sure to record and safely store the new passwords. They can be recalled from the system *only with factory authorization*.

Part P: DUAL LANGUAGE

Description

The dual language feature enables the ***K-2500*** to communicate with customers in either of 2 languages. The language type is programmed into each card. When a card is inserted (and properly read), the display prompts and receipt messages (from the optional printer) are in the language appropriate for the customer.

)))) NOTES ((((

(a) For details about the display prompts, refer to Section III:H.

(b) For details about formatting receipts, refer to Section III:I.

SET LANGUAGE

This *privileged* command turns the dual language feature ON (enabled) or OFF (disabled). If this feature is *disabled*, only Language 1 is used.

Part Q: MESSAGING

Description

You may program the ***K-2500*** to display a message when a particular single, driver and/or vehicle card is inserted. The customer must acknowledge the message by pressing any key on the keypad. The response is *not* saved; it is used only to continue the transaction. (The message appears before the customer selects a pump.) You may also program the message to print on the transaction receipt from the optional printer.

)))) NOTE ((((

More than one programmed message may appear. For example, a message could be displayed to welcome new card members and another message could be displayed as a reminder to check the transmission oil.

Each message has 5 programmable parts:

Identifier • card number

Card (1 - 19 digits)

Message • the message can contain numbers, letters and most printable characters (such as **`!', `?', `#',** etc.); the length is based on the ***K-2500*** hardware -

Standard: 1 line of 24 characters *or*

Optional: 2 line of 40 characters (up to 80 characters total)

Term • there are 2 ways to specify when to stop displaying a message -

Duration: enter the number of days to display the message; range 0 to 99 (0 = always displayed); *or*

Expiration Date: enter the last day to display the message (format=**`mmm dd, yyyy'**)

Auto-Delete • Automatically remove the message from the data buffer when display term is over

Receipt • Print the displayed message on the receipt

Two additional pieces of information are included with each message record:

Days • The number of days left before the message expires; range 0 - 99, (greater than 99, `**' appears)

Displayed • The number of times a message has been displayed; range 0 - 99, (at 100, reset back to 0)

!!! IMPORTANT !!!

In order to format messages, you must first allocate memory space in the programmable data buffer. Refer to Section III:D for more details about the data buffer.

FORMAT MESSAGES

When you enter this *privileged* command you are prompted with the following:

ENTER (Edit, Show, Delete, eXit, [return] Card #):

Enter one of the functions; or enter the card number ("identifier"). The functions are described below.

Edit This function allows you to modify a message after it has been created.

Show This function allows you to display all the message records.

Delete This function allows you to remove a message. Enter the identifier parameter to select a message to delete.

eXit This function ends the command.

Card # This function prompts for specific card number.

The message must fit in the space *under* the 2 vertical lines. The entry is "case-sensitive;" that is, upper and lower case letters are distinguished. After entering the message, you are prompted for the term for the message to be valid:

ENTER (Duration or Exp. Date): NONE Days: (Y/N)?:**

Enter `**N'**. The last part of the prompt is erased. Enter either the duration (0 - 99) or the expiration date (`**mmm dd, yyyy'**) for the message. The `**(Y/N)'** prompt is displayed again. Enter `**Y'** (for yes) to complete the entry; or enter `**N'** (for no) to enter a different duration or date. You are then prompted:

Auto-Del: OFF Save (Y/N)?

Enter `**N'** to toggle this feature on and off. (The current status is displayed.) When the appropriate status is displayed, enter `**Y'** to complete the entry. You are then prompted (on the same line):

Receipt: OFF Save (Y/N)?

Enter `**N'** to toggle this feature on and off. (The current status is displayed.) When the appropriate status is displayed, enter `**Y'** to complete the entry.

)))) NOTES ((((

(a) There are 2 types of display: 1 line with 24 characters and 2 lines with 40 characters each. When entering or editing a message, you are prompted with the appropriate size display for your system.

(b) The card must be valid in order to program a message for it.

(c) When you enter the number of days for a message duration, the expiration date is also calculated and displayed.

(d) When you edit a message, you are prompted `**(Y/N/X)'**. *Enter* `**X'** *to end the function <u>without</u> making any changes.*

SHOW MESSAGES

When you enter this command, the format information and number of times each message has been shown (**`Dis'**) are displayed. For example,

```
MAXIMUM MESSAGES = 50
Card Messages    = 3

**************  CARD MESSAGES
******************

#1000                           Exp. Date:  FEB
13,1990 EXPIRED
|                     |      Dis:  1  Auto-Del:
OFF  Rec: ON
Call office immediately!


#2000                           Exp. Date:  FEB
15,1990 Days: 1
|                     |      Dis:  0  Auto-Del:
ON   Rec: ON
Happy Birthday to You!


#3000                           Exp. Date:  FEB
24,1990 Days: 7
|                     |      Dis:  0  Auto-Del:
OFF  Rec: ON
Please check trans oil
```

Appendices

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

Appendix A: COMMAND SUMMARY

Privileged commands are marked with **[P].** Commands that must be **`DOWNLOADed'** are marked with **[D].** Optional commands (*not* supplied with every system) are indicated by **[O].** The **`#'** character indicates a number *must* be specified.

The **DOWNLOAD** command must be entered after using the commands marked with **[D]** for the ***K-2500*** system to recognize these changes. When entering several **[D]** commands, you have to enter the **DOWNLOAD** command only once after the last **[D]** command.

To display information on the terminal, enter the command prefix **`SHOW'.** To send the data to an optional journal printer, enter the prefix **`PRINT'.** The printer must be configured in order to print (refer to Section III:K).

Section III: CONFIGURATION

Part A: Introduction
enter, exit privileged mode; install data to K-2500; display list of commands

HELLO
BYE [P]
DOWNLOAD [P]
HELP

Part B: Time Measurement
enter, display current time and date

SET TIME [P]
PRINT/SHOW TIME
SET DATE [P]
PRINT/SHOW DATE
FORMAT DATE

Part C: System Memory
enter, display size of system memory

SET RAM [P]
PRINT/SHOW RAM

Part D: Programmable Data Base
enter, display card/account data

SET CARD BUFFER [P]
SET SECURITY TABLE [P]
PRINT/SHOW SECURITY TABLE
PRINT/SHOW CARD
VALIDATE CARD
INVALIDATE CARD

Part E: Fuel/Tanks
enter, display fuel and tank data

SET FUELING UNITS [P]
PRINT/SHOW FUELING UNITS
SET FUELTYPE # [P]
PRINT/SHOW FUELTYPE
SET TANK # [P]
PRINT/SHOW TANK

Part F: Pump Control Terminal
enter data, turn on/off, display PCT

CONFIGURE PCT # [P,D]
CONFIGURE PCT # POSITION # [P,D]
INSTALL PCT # [P]
INSTALL PCT # POSITION # [P]
REMOVE PCT # [P]
REMOVE PCT # POSITION # [P]
PRINT/SHOW PCT #
CONFIGURE PUMP #
PRINT/SHOW PUMP #

Part G: Fuel Island Terminal
enter data, turn on/off, display FIT

CONFIGURE FIT # [P,D]
INSTALL FIT # [P]
REMOVE FIT # [P]
PRINT/SHOW FIT #

Section III: CONFIGURATION

Part H: Messages

enter, display data

FORMAT DISPLAY # [P,D]
PRINT/SHOW DISPLAY
PRINT/SHOW DISPLAY #
FORMAT KEYBOARD # [P,D]
PRINT/SHOW KEYBOARD
PRINT/SHOW KEYBOARD #

Part I: Receipt Printer

enter, display data

FORMAT RECEIPT HEADER [P,D]
PRINT/SHOW RECEIPT HEADER
FORMAT RECEIPT TRAILER [P,D]
PRINT/SHOW RECEIPT TRAILER
FORMAT RECEIPT BODY [P,D]
PRINT/SHOW RECEIPT BODY
SET BONUS POINTS [P,D]
PRINT/SHOW BONUS POINTS
FORMAT RECEIPT BONUS POINTS[P,D]
PRINT/SHOW RECEIPT BONUS POINTS

Part J: Transaction Buffer

enter, display data

SET TRANSACTION [P]
PRINT/SHOW TRANSACTION
PRINT/SHOW TRANSACTION #

Part K:Journal Printer

enter, display data

SET JOURNAL PRINTER [P]
PRINT/SHOW JOURNAL PRINTER

Part L: Restrictions

enter, display data

SET PUMP RESTRICTION [P]
PRINT/SHOW PUMP RESTRICTION
SET QUANTITY [P]
PRINT/SHOW QUANTITY

Part M: Site ID

enter, display data

SET SITE ID [P]
PRINT/SHOW SITE ID

Part N:Time Change, System Times & Date

Format - enter, display data

SET TIME CHANGE [P]
PRINT/SHOW TIME CHANGE
SET SYSTEM TIMES [P]
PRINT/SHOW SYSTEM TIMES
FORMAT DATE [P]

Part O: Password

enter data

SET PASSWORD [P]

Part P: Dual Language

enter, display data

SET LANGUAGE [P]
PRINT/SHOW LANGUAGE

Part Q: Messaging

enter, display data

FORMAT MESSAGES [P]
PRINT/SHOW MESSAGES

Section IV: Operations

Part B: System Report
display system operational status

PRINT/SHOW SYSTEM

Part C: Pump/Fuel Reports
display, clear data

PRINT/SHOW FUELTYPE # TOTALS
PRINT/SHOW PUMP # TOTALS
CLEAR PUMP # TOTALS [P]
PRINT/SHOW PCT # TOTALS
CLEAR PCT # TOTALS [P]
PRINT/SHOW TANK

Part D: Transaction Reports
display, clear data

PRINT/SHOW TRANSACTION
PRINT/SHOW TRANSACTION #
PRINT/SHOW TRANSACTION SUMMARY
PRINT/SHOW DAY
PRINT/SHOW DAY mmm dd, yyyy
CLEAR TRANSACTIONS mmm dd, yyyy
SEQUENCE # [P]
CLEAR TRANSACTIONS [P]
SHOW TRANSACTIONS CF

Part E: Transaction Searches
display, data

PRINT/SHOW TRANSACTIONS WHERE
DATE = mmm dd, yyyy ["on"]
PRINT/SHOW TRANSACTIONS WHERE
DATE < mmm dd, yyyy ["before"]
PRINT/SHOW TRANSACTIONS WHERE
DATE > mmm dd, yyyy ["after"]
PRINT/SHOW TRANSACTIONS WHERE
TIME = hh:mm am/pm ["at"]
PRINT/SHOW TRANSACTIONS WHERE
TIME < hh:mm am/pm ["before"]
PRINT/SHOW TRANSACTIONS WHERE
TIME > hh:mm am/pm ["after"]
PRINT/SHOW TRANSACTIONS WHERE
CARD = #
PRINT/SHOW TRANSACTIONS WHERE
VEHICLE = #

Part F: Shift
enter, display data

SHIFT
PRINT/SHOW SHIFT

Part G: Journal Printer Lockout

LOCK / UNLOCK PRINTER [P]

Part H: Immediate Opening and Closing

OPEN / CLOSE [P]

Section V: Appendices

Part G: Modem
call remote site

CALL [P]

Part H: Computer Operations
backup, restore, display data

BACKUP (#) [P]
RESTORE [P]
UPDATE site-id (/fields)(/checksum) [P]
SYSBACKUP [P]
SYSRESTORE #### (#) [P]
UPDATE site-id (/fields)(/checksum) [P]

Part I: Punchcode
show card codes

PUNCHCODE [P,O]

Part J: Trouble-Shooting
test FIT operations

TEST [P]

Appendix B: INSTALLATION WORKSHEET

(A) PV-204 Fuel Site Controller (***K-2500*** Master only)

Switch 1: Battery		ON -	[ ]

Switch 3: Baud Rate for Controller Access Port (CAP)

positions 1 & 2	300 baud	OFF, OFF	[ ]
	1200 baud	OFF, ON	[ ]
	2400 baud	ON, OFF	[ ]
	9600 baud	ON, ON	[ ]

(B) PV-208 Expanded Memory (***K-2500*** Master only)

Battery Switch	ON -	[ ]

(C) PV-205 Fuel Island Terminal/Pump Control Terminal (FIT/PCT)

Switch 1: Configuration Switch (polling position for each K-2500 unit)

positions 1 & 2	Master	OFF, OFF	[ ]
position 3	Normal operation	OFF	[ ]
position 4	*not used*		
positions 1 & 2	Slave #1	OFF, ON	[ ]
position 3	Normal operation	OFF	[ ]
position 4	*not used*		
positions 1 & 2	Slave #2	ON, OFF	[ ]
position 3	Normal operation	OFF	[ ]
position 4	*not used*		
positions 1 & 2	Slave #3	ON, ON	[ ]
position 3	Normal operation	OFF	[ ]
position 4	*not used*		

(D) PV-206 Pump Interface

The PV-206 board controls 1 or 2 pumps. There can be up to 4 PV-206 boards in each ***K-2500*** unit, with up to 4 units in a system. Make a copy of this page for each PV-206 board in the installed system and circle the correct labels below to identify each board.

Unit: Master Slave #1 Slave #2 Slave #3 (circle one)

Board: 1 2 3 4 (circle one)

Switch 1: Pump Pulsers

position 1	pump A active	OFF	[ ]
	pump A passive	ON	[ ]
position 2	pump B active	OFF	[ ]
	pump B passive	ON	[ ]
position 3	pump A under program control	OFF	[ ]
	pump A manual override	ON	[ ]
position 4	pump B under program control	OFF	[ ]
	pump B manual override	ON	[ ]
position 5	electronic pulsers	OFF	[ ]
	mechanical pulsers	ON	[ ]
position 6	single channel pulser	OFF	[ ]
	dual channel pulser	ON	[ ]
position 7	pump A current sensor	OFF	[ ]
	pump A pump handle	ON	[ ]
position 8	pump B current sensor	OFF	[ ]
	pump B pump handle	ON	[ ]
position 9	pump A normal relay activat'n	OFF	[ ]
	pump A relay activation controlled by pump handle	ON	[ ]
position 10	pump B normal relay activat'n	OFF	[ ]
	pump B relay activation controlled by pump handle	ON	[ ]

(E) PV-207 Dual Channel Pulser/Self-Serve Console Interface (*optional*)

The PV-207 board interfaces with the PV-206 board(s). There can be up to 4 PV-206 boards in each ***K-2500*** unit, with up to 4 units in a system. Make a copy of this page for each PV-207 board in the installed system and circle the correct labels below to identify each board.

Unit: Master Slave #1 Slave #2 Slave #3 (circle one)

Board: 1 2 3 4 (circle one)

Switch 1: Pulser/Echo

position 1	pump A pulser active	OFF	[ ]
	pump A pulser passive	ON	[ ]
position 2	pump B pulser active	OFF	[ ]
	pump B pulser passive	ON	[ ]
position 3	pump A echo, program control	OFF	[ ]
	pump A echo forced on	ON	[ ]
position 4	pump B echo, program control	OFF	[ ]
	pump B echo forced on	ON	[ ]

Unit: Master Slave #1 Slave #2 Slave #3 (circle one)

Board: 1 2 3 4 (circle one)

Switch 1 Pulser/Echo

position 1	pump A pulser active	OFF	[ ]
	pump A pulser passive	ON	[ ]
position 2	pump B pulser active	OFF	[ ]
	pump B pulser passive	ON	[ ]
position 3	pump A echo, program control	OFF	[ ]
	pump A echo forced on	ON	[ ]
position 4	pump B echo, program control	OFF	[ ]
	pump B echo forced on	ON	[ ]

Appendix C: *K-2500* CONFIGURATION WORKSHEET

(A) Basic Concepts

Access privileged mode: **HELLO**
Exit privileged mode: **BYE**
Display commands: **HELP**
Install data: **DOWNLOAD**

(B) Time Measurement: **SET TIME, SET DATE**

Time format: hh:mm am/pm
Date format: mmm dd,yyyy

(C) System Memory (RAM): **SET RAM**

(0) 64 K (1) 320 K (2) 576 K (3) 832 K

(D) Programmable Data Base: **SET CARD BUFFER**

Choice #1: Size Code: _____ Number of Transactions: ___________
Size Code: _____ Number of Messages: ___________

Choice #2:

Odometer entry:	(1)	(2)	(3)
Miscellaneous entry:	(1)	(2)	(3)
PIN entry:	(1)	(2)	(3)

(1) Disable/all (2) Enable/all (3) Determined by card

Choice #3: Keyboard access type: Single Driver Vehicle

(E) Fueling Units: **SET FUELING UNITS**

Number	Label
1	__ __ __ __ __ __ __ __ __ __
2	__ __ __ __ __ __ __ __ __ __
3	__ __ __ __ __ __ __ __ __ __

Fueltypes: **SET FUELTYPE #**

Number	Unit	Price	Name
1	____	$__._____	__ __ __ __ __ __ __ __ __ __
2	____	$__._____	__ __ __ __ __ __ __ __ __ __
3	____	$__._____	__ __ __ __ __ __ __ __ __ __
4	____	$__._____	__ __ __ __ __ __ __ __ __ __
5	____	$__._____	__ __ __ __ __ __ __ __ __ __
6	____	$__._____	__ __ __ __ __ __ __ __ __ __
7	____	$__._____	__ __ __ __ __ __ __ __ __ __
8	____	$__._____	__ __ __ __ __ __ __ __ __ __
9	____	$__._____	__ __ __ __ __ __ __ __ __ __
10	____	$__._____	__ __ __ __ __ __ __ __ __ __
11	____	$__._____	__ __ __ __ __ __ __ __ __ __
12	____	$__._____	__ __ __ __ __ __ __ __ __ __
13	____	$__._____	__ __ __ __ __ __ __ __ __ __
14	____	$__._____	__ __ __ __ __ __ __ __ __ __
15	____	$__._____	__ __ __ __ __ __ __ __ __ __
16	____	$__._____	__ __ __ __ __ __ __ __ __ __

Tanks: **SET TANK #**

Number	Fueltype	Current Quantity	Low Level
1	______	_________._____	______.__
2	______	_________._____	______.__
3	______	_________._____	______.__
4	______	_________._____	______.__
5	______	_________._____	______.__
6	______	_________._____	______.__
7	______	_________._____	______.__
8	______	_________._____	______.__

(F) Pump Control Terminal: **CONFIGURE PCT # [D]**
CONFIGURE PCT # POSITION # [D]

The first command asks if the PCT is a U.P.C. The second command prompts for the additional information listed below (and on the next page).

There are up to 4 PCTs in a ***K-2500*** system, each PCT controlling 8 positions. Copy this page and the next as needed. Circle the appropriate PCT and position numbers.

Note that most PCT configurations do *not* require *all* of this information.

PCT Number	1	2	3	4
U.P.C.	YES	NO		
POSITION NUMBER	1	2	3	4
Pump Number				
Pulses / Unit				
Max Fuel/Transaction				
Sentry Feature				
Max Time Fuel				
Max Time Handle				
Max Time 1st Pulse				
Max Time Btwn Pulses				
POSITION NUMBER	5	6	7	8
Pump Number				
Pulse / Unit				
Max Fuel/Transaction				
Sentry Feature				
Max Time Fuel				
Max Time Handle				
Max Time 1st Pulse				
Max Time btwn Pulses				

KARDGARD K-2500

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

PCT Number	1	2	3	4
POSITION NUMBER	1 / 5	2 / 6	3 / 7	4 / 8
** Hose #1 **				
Fueltype Code #				
Fueling Tank				
Clear Pump Totals				
Totalizer Value				
** Hose #2 **				
Fueltype Code #				
Fueling Tank				
Clear Pump Totals				
** Hose #3 **				
Fueltype Code #				
Fueling Tank				
Clear Pump Totals				
** Hose #4 **				
Fueltype Code #				
Fueling Tank				
Clear Pump Totals				

(F) Install PCT: **INSTALL PCT # POSITION #**

PCT #1: POSITION # - 1 , 2 , 3 , 4 , 5 , 6 , 7 , 8

PCT #2: POSITION # - 1 , 2 , 3 , 4 , 5 , 6 , 7 , 8

PCT #3: POSITION # - 1 , 2 , 3 , 4 , 5 , 6 , 7 , 8

PCT #4: POSITION # - 1 , 2 , 3 , 4 , 5 , 6 , 7 , 8

INSTALL PCT #

PCT #1 PCT #2 PCT #3 PCT #4

(G) Fuel Island Terminal: **CONFIGURE FIT # [D]**

FIT #1:
(1a) Issue receipts yes no
(1b) Limit for receiving a receipt (0..99) ______
(2) Enable keyboard access yes no
(3) PCTs to shut off on E-stop 1, 2, 3, 4
(4) Valid pump numbers:

— — — — — — — — — — — — — — — —
— — — — — — — — — — — — — — — —

FIT #2:
(1a) Issue receipts yes no
(1b) Limit for receiving a receipt (0..99) ______
(2) Enable keyboard access yes no
(3) PCTs to shut off on E-stop 1, 2, 3, 4
(4) Valid pump numbers:

— — — — — — — — — — — — — — — —
— — — — — — — — — — — — — — — —

FIT #3: (1a) Issue receipts yes no
(1b) Limit for receiving a receipt (0..99) ______
(2) Enable keyboard access yes no
(3) PCTs to shut off on E-stop 1, 2, 3, 4
(4) Valid pump numbers:
— — — — — — — — — — — — — — — —
— — — — — — — — — — — — — — — —

FIT #4: (1a) Issue receipts yes no
(1b) Limit for receiving a receipt (0..99) ______
(2) Enable keyboard access yes no
(3) PCTs to shut off on E-stop 1, 2, 3, 4
(4) Valid pump numbers:
— — — — — — — — — — — — — — — —
— — — — — — — — — — — — — — — —

Install FIT: **INSTALL FIT #**

FIT #1 FIT #2 FIT #3 FIT #4

(H) Display Prompts: **FORMAT DISPLAY # [D]**

Number	Display Prompts (Language 1)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

KARDGARD K-2500

Number	Display Prompts (Language 1)
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
47	
48	
49	

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

Number	Display Prompts (Language 2)
1	_ _
2	_ _
3	_ _
4	_ _
5	_ _
6	_ _
7	_ _
8	_ _
9	_ _
10	_ _
11	_ _
12	_ _
13	_ _
14	_ _
15	_ _
16	_ _
17	_ _
18	_ _
19	_ _
20	_ _
21	_ _
22	_ _
23	_ _
24	_ _
25	_ _

Number	Display Prompts (Language 2)
26	________________________
27	________________________
28	________________________
29	________________________
30	________________________
31	________________________
32	________________________
33	________________________
34	________________________
35	________________________
36	________________________
37	________________________
38	________________________
39	________________________
40	________________________
41	________________________
42	________________________
43	________________________
44	________________________
45	________________________
46	________________________
47	________________________
48	________________________
49	________________________

(H) Keyboard Messages: **FORMAT KEYBOARD # [D]**

Language 1

Number	Message	Default
1	__ __ __ __ __ __	`NO'
2	__ __ __ __ __ __	`YES'

Language 2

Number	Message	Default
1	__ __ __ __ __ __	(*none*)
2	__ __ __ __ __ __	(*none*)

(I) Receipt Printer

Receipt Header: **FORMAT RECEIPT HEADER [D]**

	Field Entry (Language 1)	Print Color
Line 1:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 2:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 3:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 4:	__ __ __ __ __ __ __ __ __ __ __ __	red or black

	Field Entry (Language 2)	Print Color
Line 1:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 2:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 3:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 4:	__ __ __ __ __ __ __ __ __ __ __ __	red or black

Receipt Trailer: **FORMAT RECEIPT TRAILER [D]**

	Field Entry (Language 1)	Print Color
Line 1:	__ __ __ __ __ __ __ __ __ __ __	red or black
Line 2:	__ __ __ __ __ __ __ __ __ __ __	red or black
Line 3:	__ __ __ __ __ __ __ __ __ __ __	red or black
Line 4:	__ __ __ __ __ __ __ __ __ __ __	red or black

	Field Entry (Language 2)	Print Color
Line 1:	__ __ __ __ __ __ __ __ __ __ __	red or black
Line 2:	__ __ __ __ __ __ __ __ __ __ __	red or black
Line 3:	__ __ __ __ __ __ __ __ __ __ __	red or black
Line 4:	__ __ __ __ __ __ __ __ __ __ __	red or black

Receipt Body: **FORMAT RECEIPT BODY [D]**

	Field Entry (Language 1)	Field Entry (Language 2)	Receipt Code
Line 1:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 2:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 3:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 4:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 5:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 6:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 7:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 8:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 9:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 10:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 11:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 12:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 13:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 14:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____
Line 15:	__ __ __ __ __ __ __ __ __ __	__ __ __ __ __ __ __ __ __ __	_____

Bonus Points: **SET BONUS POINTS [D]**

one point per _____ cents

Receipt Bonus Points: **FORMAT RECEIPT BONUS POINTS**

	Field Entry (Language 1)	Print Color
Line 1:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 2:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 3:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 4:	__ __ __ __ __ __ __ __ __ __ __ __	red or black

	Field Entry (Language 2)	Print Color
Line 1:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 2:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 3:	__ __ __ __ __ __ __ __ __ __ __ __	red or black
Line 4:	__ __ __ __ __ __ __ __ __ __ __ __	red or black

(J) Transaction Buffer: **SET TRANSACTION**

(1) Enable Wrap around		yes		no
(2) Log unauthorized xactions		yes		no
(3) Display fields:				
Account, Driver, Vehicle		yes		no
Date & Time	yes		no	
Card #1		yes		no
Card #2		yes		no
Fueltype		yes		no
Pump		yes		no
Quantity		yes		no
Price		yes		no
Total		yes		no
Odometer		yes		no
Distance per unit			no	
Miscellaneous	yes		no	
Account#				no

(K) Journal Printer: **SET JOURNAL**

(1) Fuel Island Journal	yes	no
(2) Office Journal	yes	no
(3) Print card 2 number	yes	no
(4) Print card identifiers (driver and vehicle)	yes	no
(5) Allow fueling on journal error	yes	no

(L) Restrictions:

Pump Restriction: **SET PUMP RESTRICTION**

Number	Valid Pumps Numbers
1	__ __
2	__ __
3	__ __
4	__ __
5	__ __
6	__ __
7	__ __
8	__ __
9	__ __

Number	Valid Pumps Numbers
10	__ __
11	__ __
12	__ __
13	__ __
14	__ __
15	__ __

Quantity Restriction: **SET QUANTITY RESTRICTION**

Number	Max Quantity	Number	Max Quantity
1	_________.__	9	_________.__
2	_________.__	10	_________.__
3	_________.__	11	_________.__
4	_________.__	12	_________.__
5	_________.__	13	_________.__
6	_________.__	14	_________.__
7	_________.__	15	_________.__
8	_________.__		

KARDGARD K-2500

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

(M) Site Identification: **SET SITE ID**

— — — — — — — — — — — —

(up to 12 characters; spaces allowed *except* for 1st position)

(N) Time change and System Times: **SET TIME, SET SYSTEM TIMES**

Forward: ________________ Backward: _____________

System On: _______________ System Off: ____________

Receipts Only: ____________ Time Adjust: ___________

(O) Passwords: **SET PASSWORDS**

Main: ___________ Show: ___________ Modem: ___________

(P) Dual Language: **SET LANGUAGE [D]**

ENABLED DISABLED

)))) NOTE ((((*The `***DOWNLOAD'*** command must be entered after using the commands marked with* **[D]** *for the* ***K-2500*** *system to recognize these changes. When entering several* **[D]** *commands, you have to enter the `***DOWNLOAD'*** command only once after the last* **[D]** *command.*

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

Q: Messaging: **FORMAT MESSAGES**

Card: __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __

Message: _____

_____

Duration/Exp. Date: _____

Auto-Delete: on off

Receipt: on off

Card: __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __

Message: _____

_____

Duration/Exp. Date: _____

Auto-Delete: on off

Receipt: on off

Card __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __

Message: _____

_____

Duration/Exp. Date: _____

Auto-Delete: on off

Receipt: on off

Card: __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __

Message: _____

_____

Duration/Exp. Date: _____

Auto-Delete: on off

Receipt: on off

)))) NOTE ((((*The length of the message is limited by the type of display. The standard display (1x24) can show messages up to 24 characters in length. The optional display (2x40) can show messages up to 80 characters in length.*

KARDGARD K-2500

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

APPENDIX D: FIT DISPLAY PROMPTS AND KEYBOARD RESPONSES

The FIT Display Prompts and Keyboard Responses listed below are the default values for language 1; for language 2, the default values are all blank. For more details, refer to Section III:H.

Number	FIT Display Prompt	Number	FIT Display Prompt
1	SYSTEM OUT OF SERVICE	26	ENTER CARD#:
2	READING CARD	27	ENTER PIN:
3	REMOVE CARD	28	ENTER ODOM:
4	INCORRECT READING	29	ENTER MISC:
5	CHECK CARD ORIENTATION	30	ENTER VEH #:
6	INSERT CARD FOR RECEIPT	31	RE-ENTER PIN:
7	INSERT CARD FOR RECEIPT	32	RE-ENTER ODOM:
8	PETRO VEND K2500	33	(*blank*)
9	INSERT CARD	34	(*blank*)
10	SYSTEM CLOSED	35	NOT IN CARD FILE
11	PLEASE WAIT	36	CARD EXPIRED
12	PRINTING RECEIPT	37	CARD RECORD EXPIRED
13	TAKE RECEIPT	38	CARD INVALIDATED
14	PRINTER ERROR	39	3 BAD PIN ENTRIES
15	ISSUE RECEIPT?	40	ALLOCATION EXCEEDED
16	ENTER PUMP #	41	(*blank*)
17	IN USE, RE-ENTER:	42	(*blank*)
18	INVALID, RE-ENTER:	43	ACCOUNT EXPIRED
19	PUMP HANDLE? RE-ENTER	44	ACCOUNT INVALIDATED
20	FAULTY PUMP, RE-ENTER	45	ACCOUNT # S DO NOT MATCH
21	UNAUTH ZED, RE-ENTER	46	ACCOUNT REC NOT FOUND
22	RESTRICTED, RE-ENTER	47	(*blank*)
23	USE PUMP	48	JOURNAL ERR -GET MANAGER
24	INSERT 2nd CARD	49	SYSTEM BUSY -BUFFER FULL
25	INCORRECT CARD		

Number	Keypad
1	NO
2	YES

)))) NOTES ((((

(a) Prompts #6 and #7 alternately display when prompting for a receipt. Messages #8 and #9 alternately display while waiting for a fueler.

(b) Many of the messages above are explained in Appendix J (see Common Problems and Solutions).

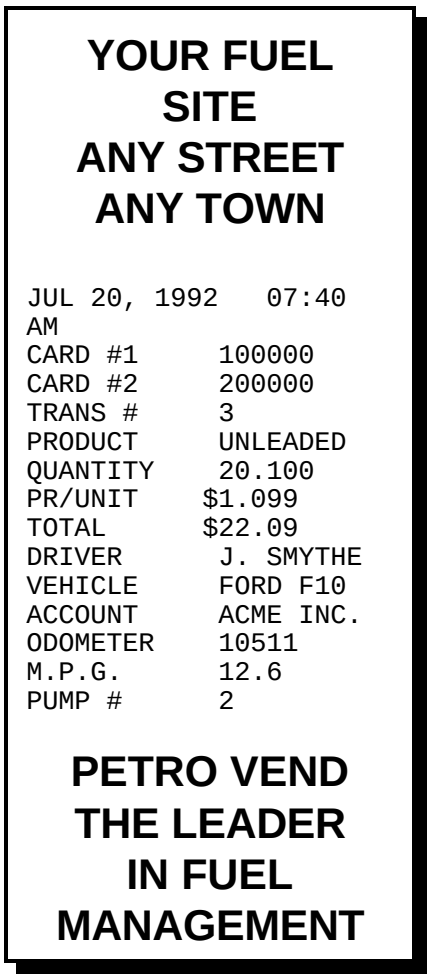
(c) Account messages are <u>never</u> displayed.

Appendix E: MEMORY ALLOCATION

NUMBER OF CARDS WITH:

MEMORY SIZE	NUMBER OF TRANSACTIONS	NUMBER OF MESSAGES	NUMBER OF CARDS
64 K	100	0	226672
	250	0	111472
	100	25	205472
	250	25	90272
320 K	100	0	2323824
	1000	0	1632624
	1500	0	1248624
	2500	0	480624
	100	25	2302624
	1000	25	1611424
	1500	25	1227424
	2500	25	459424
576 K	100	0	4420976
	1000	0	3729776
	2500	0	2577776
	5000	0	657776
	100	25	4399776
	1000	25	3708576
	2500	25	2556576
	5000	25	636576
	100	100	4336176
	1000	100	3644976
	2500	100	2492976
	5000	100	572976
832 K	100	0	6518128
	1000	0	5826928
	2500	0	4674928
	5000	0	2754928
	100	25	6496928
	1000	25	5805728
	2500	25	4653728
	5000	25	2733728
	100	100	6433328
	1000	100	5742128
	2500	100	4590128
	5000	100	2670128

Appendix F: SAMPLE PROGRAMMABLE RECEIPT



YOUR FUEL
SITE
ANY STREET
ANY TOWN

```
JUL 20, 1992   07:40
AM
CARD #1      100000
CARD #2      200000
TRANS #      3
PRODUCT      UNLEADED
QUANTITY     20.100
PR/UNIT     $1.099
TOTAL       $22.09
DRIVER       J. SMYTHE
VEHICLE      FORD F10
ACCOUNT      ACME INC.
ODOMETER     10511
M.P.G.       12.6
PUMP #       2
```

PETRO VEND
THE LEADER
IN FUEL
MANAGEMENT

NOTE: *The length of the receipt is limiited to 24 lines; this includes two blank lines which are inserted automatically to separate the body text from the header and from the trailer. The example above has the maximum number of lines.*

Passwords

The ***K-2500*** can be programmed to have 3 different passwords, one for access to the privileged mode, one for modem operation and one for the restricted mode. For more details, refer to Sections III:A and III:P.

Calling a *K-2500* Site

The ***K-2500*** system can be interrogated and programmed remotely over conventional (voice-grade) telephone lines. A modem is required at the ***K-2500*** site; another modem is required for the remote terminal or computer. The remote modem must be compatible with the 224A ***K-2500*** modem.

The baud rate for the factory-installed internal modem is set by switch 3 on the FSC board (PV-204). Section II:H explains how this rate (which is the same for the CAP port) is selected. The other parameters are preset at the factory.

)))) NOTES ((((

(a) An external modem must be connected to the CAP port using an RS-422 to RS-232 converter box and an adapter cable. This port does not have any handshaking control lines. As a result, the ***K-2500*** *can not acknowledge a connection or force a hang-up. Because of this limitation,* ***Petro Vend*** *does not recommend use of external modems. The information in this appendix assumes the use of an internal modem.*

(b) If the ***K-2500*** *system that you are calling is in the privileged mode, the system does not respond to the call. If the* ***K-2500*** *is executing a command in the normal mode, the command will be allowed to complete before responding to the call. This can occur if 2 terminals or computers are used for programming your* ***K-2500****.*

When the call is successfully completed to the ***K-2500*** system, the ***K-2500*** responds by displaying the following:

K-2500 Site Id: ############
ENTER MODEM PASSWORD:
r>

The `**###########**' indicates the number previously specified by the programmer. Section III:M explains the Site ID in more details.

At the prompt, enter the modem password. For security, the password characters are *not* echoed back to the display. Note that an incorrect password entry causes the ***K-2500*** system to hang up.

When the password is entered correctly, the system responds with the prompt:

HELLO!
r>

The `**>**' prompt indicates the "remote" normal mode. All `**SHOW**' and `**PRINT**' commands are now functional. (These commands are described in Section III:A.) If the restricted mode is *enabled*, the `**$**' prompt is displayed and you must correctly enter the show password before proceeding.

To access the privileged mode, enter:

r>HELLO
ENTER MAIN PASSWORD:

After entering the correct password, the system responds:

R>

The `**R>**' prompt indicates the "remote" privileged mode. All commands are now functional. (The Configuration Section describes the commands for changing the system parameters.)

Enter the command `**BYE**' to cause the remote site to hang up.

Using the *K-2500* Modem to Dial Out

The ***K-2500*** also has the capacity to call out from a site. For example, in an arrangement with multiple ***K-2500*** sites, programming for the entire system can be done from any of the sites.

To call out from a local site, enter the main password and then enter the command **`CALL'.** This connects your terminal or computer directly to the system's modem. The modem now has control over the CRT and displays the following:

TO CALL OUT, ENTER (in upper case:)

ATDT####### (for tone dialing)
or
ATDP####### (for pulse dialing)

Enter the command **`BYE'** to exit the modem operation and return to the ***K-2500***. The privileged prompt is displayed.

Appendix H: INTERFACING WITH AN EXTERNAL COMPUTER

Introduction

This appendix describes: (1) how to retrieve transaction data from the ***K-2500*** in a concise, computer format; (2) how to suppress responses from the ***K-2500*** (which is necessary when transmitting configuration and operational commands from a computer program) and (3) how to backup and restore card validation and configuration data for the ***K-2500***.

To interface with the ***K-2500***, you must run a terminal emulation program on your computer. Appendix K explains how to connect a PC to the ***K-2500*** system and how to install a typical emulation program. However, typical emulation programs do *not* have features for retrieving, backing up and restoring ***K-2500*** data. Software programs that utilize the ***K-2500*** formats and commands must be written. This usually requires the services of a professional software engineer.

The ***PHOENIX*** software package from **Petro Vend** is designed especially for interfacing the ***K-2500*** to a PC. In addition to terminal emulation, ***PHOENIX*** provides all the know-how you need to manage ***K-2500*** data quickly and easily. No special computer training or experience is required. ***PHOENIX*** is available from your local **Petro Vend** distributor.

Computer Format for Transaction Data

The display format for transaction data is designed to be read by people. This format includes a header with configuration data and labels for each data field that is included. In the display format, the transmission of transaction records can be cued from the keyboard. (Refer to Section IV for more details about the display format.)

The computer format eliminates the configuration data and field labels, substituting data checks, field codes and field separators. This format is appropriate for transferring the transaction information to a computer data base. To pace the data stream, the transmission of each transaction record must be cued by a specific computer response.

To retrieve transaction data in the computer format, append the prefix **`SHOW'** and the suffix **`CF'** to one of the following commands:

TRANSACTIONS
TRANSACTION ###
TRANSACTIONS WHERE DATE = mmm dd, yyyy
TRANSACTIONS WHERE DATE < mmm dd, yyyy
TRANSACTIONS WHERE DATE > mmm dd, yyyy
TRANSACTIONS WHERE TIME = hh:mm am/pm
TRANSACTIONS WHERE TIME < hh:mm am/pm
TRANSACTIONS WHERE TIME > hh:mm am/pm
TRANSACTIONS WHERE CARD = #
TRANSACTIONS WHERE VEHICLE = #
TRANSACTIONS WHERE ACCOUNT = #

For example, **`SHOW TRANSACTIONS 123 CF'**. These commands, like all ***K-2500*** commands, can be abbreviated. For example, **`SH TRANS 123 CF'**. The transaction search commands can be combined with **`AND'** in the computer format. For example,

SH TRANS WH DAT=JAN 1,1989 AND WH TIM>5:00 PM CF

)))) NOTE ((((*The functionality of the transaction report and search commands is explained in more detail in Sections IV:D and IV:E.*

When transaction data are requested from the ***K-2500*** in the computer format, the ***K-2500*** first transmits the transaction header and the first transaction. The header *always* includes: (1) codes to indicate which transaction fields will be included in the transmitted record(s), (2) a 2-digit checksum and a carriage return and (3) a line feed (**`|CR|LF|'**).

An optional data check can be prefixed to the transaction header to provide greater data integrity. The data check includes the following data for the transaction records that will be transmitted: (1) the number of records and (2) the sum of the quantities for records.

)))) NOTE ((((

(a) The transaction header and field codes are detailed in Tables H:1 and H:2 below. The formula and the ASCII codes to calculate the checksum are also described below.

(b) To select which transaction fields will be transmitted and to enable/disable the optional data check, refer to Section III:J.

Each transaction record always includes the sequence number and reason for termination code(s). The fields are included as specified by the transaction field codes listed in the header. All items are separated by a slash (`**/**').

Each transaction record is terminated with `**|CR|LF|**'. The external computer must then respond with `**|CR|LF|**' to initiate the transmission of the next record. The ***K-2500*** continues sending records each time it receives `**|CR|LF|**' until it has transmitted the last record, at which time it sends `**//|CR|LF|**'.

)))) NOTE ((((

(a) The reason for termination codes are listed in Tables H:3 and H:4 below.

(b) If access was denied to a fueler, only the first four data fields are recorded (and can be transmitted) for that transaction. For more details about "unauthorized user" transactions, refer to Section III:J.

The following is an example of a transaction data retrieval in the computer format (taken from Section IV:D). Note that a data check was *not* included in the header.

```
External Computer Output      K-2500 Response
------------------------------------------------------------
------------
SH TRANS 123CF|CR|LF|         abcdefghijklmno/07|CR|LF|
                         123/I/---------/---------/--------
-/

02221989/0711/0123/20001--------------/
                         60001--------------
/03/03/0025000/00100/

000002500/0066555/105/1234567890/1/1234/
                         11/|CR|LF|
|CR|LF|                       //|CR|LF|
```

)))) NOTE ((((

*The `**SHOW TRANSACTION**' command has been abbreviated to `**SH TRANS**'. The `**|CR|LF|**' indicates a carriage return and a line feed. The `**-**' indicates a "space pad." A transaction record is sent as one string. For clarity, the example above shows line breaks between fields.*

TABLE H:1 TRANSACTION HEADER

Item	Format	Pad	Inclusion
number of transactions	4 digits: left justified	zero	optional
sum of quantities	9 digits: left justified	zero	optional
transaction field codes	0 - 15 characters	none	always
checksum	2 digits	none	always

TABLE H:2 TRANSACTION FIELD CODES

Code	Field	Format	Pad
a	account/driver/vehicle	9 characters each: account - *not* available, all spaces driver - either a driver or single identifier, from card or keyboard vehicle - from card or keyboard	space
b	date/time	8/4 digits: mmddyyy/hhmm	zero
c	transaction number	4 digits	zero
d	card #1	19 digits: left justified	space
e	card #2	19 digits: left justified	space
f	fueltype	2 digits: range 1 - 16	zero
g	pump number	2 digits: range 1 - 99	zero
h	quantity	7 digits: ####.###, implied decimal	zero
i	price	5 digits: ##.###, implied decimal	zero
j	total	9 digits: #######.##, implied decimal	zero
k	odometer	7 digits	zero
l	mpg	4 spaces: mpg *not* calculated	none
m	miscellaneous	10 digits	space
n	receipt	1 digit: 1=issued; 0=*not* issued	none
o	account number	4 spaces: account # *not* available	none

TABLE H:3 REASON FOR TERMINATION (AUTHORIZATION *GRANTED*)

Code	Reason
C	pump error --premature busy
D	pump error --reset quantity exceed
E	no `**PUMP HANDLE BUSY'** signal
F	no fueling pulses
G	pump currently active
I	normal
J	quantity limit exceeded
K	total transaction time exceeded
L	pulser error
M	emergency stop
N	missing pulse detected
O	communication error
01	communication error

TABLE H:3 REASON FOR TERMINATION (AUTHORIZATION *DENIED*)

Code	Reason
b	bad PIN entry
c	bad odometer entry
d	bad miscellaneous entry
e	user entry timeout
f	card number not in positive file
g	card expired
i	card invalidated
j	3 bad PIN entries
k	no allocation

Checksum

The checksum is a number included with a data transmission to insure the integrity of the data. The checksum used by the ***K-2500*** is a 2-digit number that is calculated by adding the numeric equivalents of the ASCII characters in a string and truncating the sum. (The next page lists these decimal values.)

For example, in the string **`/ABC'**, the decimal values for each character are: **`/'** = 47, **`A'** = 65, **`B'** = 66 and **`C'** = 67. The sum is 245. Truncating the number means removing all but the last two digits. In this case, the truncated number is 45.

The checksum is included with transaction records and card validation data sent by the ***K-2500***. For example, the following transaction record has a checksum of 08.

123/I/123089/1130/000001234/08|CR|LF|

Note that when calculating the checksum for a record, you *must* include the slashes (**`/'**) in the calculation.

The checksum *must be included* in the command lines for the **`RESTORE'** and **`SYSRESTORE'** commands. For example,

RESTORE STATION12345/75|CR|LF|

The checksum is 75. Note that you *must* include the blank space (between **`RESTORE'** and **`STATION12345'** in the example above) and the slash (between **`STATION12345'**and **`75'**) in the checksum calculation.

Checksum Calculation

The following IBM® BASIC program can be used to determine the checksum for a line of data:

```
10  CHKSUM% = 0
20  TRANSACTION$ = "LINE OF DATA 0123456789"
30  NUMCHARS% = LEN(TRANSACTION$)
40  FOR INDEX% = 1 TO NUMCHARS%
50  SINGLECHAR$ =MID$(TRANSACTION$,INDEX%,1)
60  CHKSUM% = CHKSUM% + ASC(SINGLECHAR$)
70  NEXT INDEX%
80  TEMP$ = STR$(CHKSUM%)
90  TEMP$ = RIGHT$(TEMP$,2)
100 PRINT TEMP$
110 END
```

TABLE H:4 DECIMAL EQUIVALENTS OF ASCII CHARACTERS

Decimal Equivalent	ASCII Character	Decimal Equivalent	ASCII Character	Decimal Equivalent	ASCII Character	Decimal Equivalent	ASCII Character
032	(space)	056	8	080	P	104	h
033	!	057	9	081	Q	105	i
034	"	058	:	082	R	106	j
035	#	059	;	083	S	107	k
036	$	060	<	084	T	108	l
037	%	061	=	085	U	109	m
038	&	062	>	086	V	110	n
039	'	063	?	087	W	111	o
040	(	064	@	088	X	112	p
041	)	065	A	089	Y	113	q
042	*	066	B	090	Z	114	r
043	+	067	C	091	[	115	s
044	,	068	D	092	\	116	t
045	-	069	E	093	]	117	u
046	.	070	F	094	^	118	v
047	/	071	G	095	_	119	w
048	0	072	H	096	'	120	x
049	1	073	I	097	a	121	y
050	2	074	J	098	b	122	z
051	3	075	K	099	c	123	{
052	4	076	L	100	d	124	|
053	5	077	M	101	e	125	}
054	6	078	N	102	f	126	~
055	7	079	O	103	g		

COMPUTER Prefix

The prefix **`COMPUTER'** can be placed before any command, *except* the **`PRINT'** and **`SHOW'** commands) to suppress the usual ***K-2500*** prompts. Only a carriage return (**`|CR|'**) and a line feed (**`|LF|'**) are returned. The **`P>'** prompt is returned after each command sequence has been *successfully* completed.
For example, to change the name and price of fueltype 1, you would program the external computer for the following output and responses:

```
External Computer Output          K-2500
Response
-----------------------------------------------
---------
|CR|LF|                           >
COMPUTER HELLO|CR|LF|             |CR|LF|
HELLO|CR|LF|                      P>
COMPUTER SET FUELTYPE 1|CR|LF|    |CR|LF|
1|CR|LF                           |CR|LF|
Y|CR|LF|                   |CR|LF|
1|CR|LF|                   |CR|LF|
UNLED PREM|CR|LF|          P>
```

(This example is taken from Section III:E; the password for this example is **`HELLO'.**)

If the prompt is *not* returned when expected, an error in the command sequence has occurred. To abort a command sequence, send a **`^C'** (ASCII 03). You may then re-issue the command.

Card Validation Data: Backup and Re

Backing up the card validation data allows you to safeguard this information and to minimize system downtime when modifying or repairing a ***K-2500***. You can also backup one and restore the data to another ***K-2500*** systems are to have the same data base.

The **`BACKUP'** and **`RESTORE'** commands must be included as part of a computer program that can format, store and transmit the raw computer data produced by the ***K-2500***.

The ***PHOENIX*** software package from **Petro Vend, Inc.** provides all the know-how you need to backup and restore card data quickly and easily using an IBM®-compatible personal computer. ***PHOENIX*** is available from your local **Petro Vend** distributor.

Validation Data Storage

Each card in the Structured Memory ***K-2500*** has its own individual "bit" stored in the data base. Each bit is either "1" (when a card is valid) or "0" (when a card is invalid). This type of data representation is called "binary."

A group of 4 bits is called a "nibble." For example, when cards 9 - 12 are valid, they have a corresponding nibble of 1111. When cards 13 and 14 are valid and 15 and 16 are invalid, the corresponding nibble is 1100.

A nibble can also be represented by a single hexadecimal, or "hex," number. There are 16 hex numbers which include the decimal numbers 0 - 9 and the letters A - F. For example, the hex number corresponding to the nibble 1111 is F. The hex number corresponding to the nibble 1100 is C. The following chart lists the hex numbers and their binary and decimal equivalents:

Hex	Binary	Decimal	Hex	Binary	Decimal
0	0000	0	8	1000	8
1	0001	1	9	1001	9
2	0010	2	A	1010	10
3	0011	3	B	1011	11
4	0100	4	C	1100	12
5	0101	5	D	1101	13
6	0110	6	E	1110	14
7	0111	7	F	1111	15

)))) NOTE ((((*In the **K-2500**, nibbles are always paired into 8-bit "bytes."*

Validation Data Formats

There are 2 formats for backing up and restoring card data. The first format is a range. The first and last card numbers are specified with a backslash in between. A "+" is prefixed to the first number when all the cards in the range are valid. A "-" is prefixed when all the cards in range are invalid. A checksum is also included at the end of each line. For example,

+0004001/0005000/19 (valid range)
-0020001/0030000/17 (invalid range)

Only bytes that are all 1's (cards all valid) or all 0's (cards all invalid) are specified in a range. The first card number specified must be 1 more than a number evenly divisible by 8. The last card number specified must be evenly divisible by 8.

When a byte represents both valid and invalid cards, it is represented in hex format. For example, if cards 1, 2 and 3 are valid and 4, 5, 6, 7 and 8 are invalid, the ***K-2500*** would send the line:

0000009/E0/56

Note that a whole byte (represented by 2 hex numbers) is always specified. No sign is prefixed to the card number in the hex format. Note that the card number specified must be one greater than a number evenly divisible by 8.

Small ranges (less than about 150 cards) are also specified in the hex format. For example, if cards 57 - 275 and 305 - 472 are valid and 276 - 304 are invalid the ***K-2500*** would send the lines:

+0000057/0000272/32 (large range)
0000273/E000000F/69 (small range)
+0000305/0000472/30 (large range)

The first line specifies cards 57 - 272 are valid. In the next line, "E" (or "1110" in binary) indicates cards 273 - 275 are also valid and card 276 is invalid. The "000000" refers to cards 277 - 300, the rest of the small invalid range. The "F" (or "1111" in binary) indicates cards 301 - 304 are valid. The last line indicates the next range of valid cards.

BACKUP

This privileged command loads card validation data from the ***K-2500*** data base into an external computer.

When the **`BACKUP'** command is executed, the first line sent by the ***K-2500*** is the 12-character site id. The validation statuses of the cards are then sent.

Figure H:1 illustrates a typical **`BACKUP'** communication sequence. The following is an example of the information exchanged with the **`BACKUP'** command.

```
Computer Output              K-2500 Response
----------------------------------------------------
|CR|LF|                      >
COMPUTER HELLO|CR|LF|        |CR|LF|
HELLO|CR|LF|          P>
BACKUP|CR|LF|                STATION12345/48|CR|LF|
|CR|LF|
0000001/FFFFFFFFFFFFFD/09|CR|LF|
|CR|LF|
+0000057/0000272/32|CR|LF|
|CR|LF|
0000273/E000000F/69|CR|LF|
|CR|LF|
+0000305/0000472/30|CR|LF|
|CR|LF|
00000473/C000000F/69|CR|LF|
|CR|LF|
+0000565/0000776/38|CR|LF|
|CR|LF|                      0000777/3F/72|CR|LF|
|CR|LF|
+0000785/0000992/49|CR|LF|
|CR|LF|                      0000993/FD/89|CR|LF|
|CR|LF|
+0001001/0174576/41|CR|LF|
|CR|LF|                      //|CR|LF|
|CR|LF|                      P>
```

RESTORE <site id>/<checksum>

This *privileged* command loads card validation data from an external computer to the ***K-2500*** data base. The site id must be specified. *You must include a checksum for the command line.*

The validation status of each card can be sent to the ***K-2500*** in either data format.

Figure H:2 illustrates a typical **`RESTORE'** communication sequence. The following is an example of the information exchanged with the **`RESTORE'** command.

```
Computer Output                         K-2500
Response
------------------------------------------------
|CR|LF|                                 >
COMPUTER HELLO|CR|LF|                   |CR|LF|
HELLO|CR|LF|                            P>
RESTORE STATION12345/48|CR|LF|          |CR|LF|
0000001/FFFFFFFFFFFFFD/09|CR|LF|        |CR|LF|
+0000057/0000272/32|CR|LF|              |CR|LF|

0000273/E000000F/69|CR|LF|              |CR|LF|
+0000305/0000472/30|CR|LF|              |CR|LF|
00000473/C000000F/69|CR|LF|             |CR|LF|
+0000505/0000776/39|CR|LF|              |CR|LF|
0000777/3F/72|CR|LF|                    |CR|LF|
+0000785/0000992/49|CR|LF|              |CR|LF|
0000993/FD/89|CR|LF|                    |CR|LF|
+0001001/0174576/41|CR|LF|              |CR|LF|
//|CR|LF|                               P>
```

)))) NOTE ((((*If an incorrect checksum is specified for a command or data line, that line is not accepted by the* ***K-2500.***

Configuration Data: Backup and Restore

Backing up configuration data (pump parameters, programmable messages, etc.) allows you to safeguard this information and to minimize system downtime when modifying or repairing a ***K-2500***. You can also backup one ***K-2500*** and restore the data to another to expedite the configuration of similar sites.

!!! IMPORTANT !!!

The message `COMMUNICATIONS DOWN' is shown on the Fuel Island Terminal display while backing up or restoring configuration data. Normal fueling access is *not* allowed while this message is displayed.

SYSBACKUP

When this command is executed, the ***K-2500*** transmits the configuration data and the version number of the system.

)))) NOTE ((((*An error message is displayed if you try to backup configuration data while a transaction in is progress.*

SYSRESTORE ####(#)/<checksum>

When this command is invoked, the ***K-2500*** does the following:

- tests the restored FSC software version for compatibility
- clears the card buffer
- clears all transactions
- restores configuration data
- restarts all tasks
- optionally changes the size of the system memory (RAM)

This command requires that the FSC software version number (`**####**') and the checksum must be specified. This version number must be the same for *both* the system that was backed up and the system that will be restored. (The FSC version number is printed on the cover of the Owner's Manual; it can also be displayed using the `**SHOW SYSTEM**' command.)

)))) NOTE ((((*The decimal point is not included and a leading zero must be added when entering the FSC version number. The letter suffix for the version number should not be entered.*

For example, if a ***K-2500*** with FSC version 2.09A and standard RAM memory is backed up, the command `**SYSRESTORE 0209**' can be used to reconfigure the same system or another system with the same FSC version number and the same size memory.

This command also provides the option of restoring a different size system memory (RAM) by specifying the size code (#) for the restored ***K-2500***. For more details about the system memory (RAM), refer to Section III:C.

It is essential that the memory size specified with the **`SYSRESTORE'** command match the actual memory size of the ***K-2500*** being restored. If the specified memory is larger than the system's memory, the ***K-2500*** locks up and must be cold started (the power and battery turned OFF and then ON). If the specified memory is smaller than the system's memory, the ***K-2500*** will *not* be able to access the additional memory.

)))) NOTES ((((

(a) The **`SYSBACKUP'** *command takes a "snapshot" of* ***K-2500*** *data. Any configuration data that may have been changed since the last backup - time, date, tank levels, etc. - must be re-entered after executing the* **`SYSRESTORE'** *command.*

(b) No pumps may be active at the time of a **`SYSBACKUP'** *or* **SYSRESTORE'** *command.*

Appendix I: PUNCH CODE

PUNCHCODE

This is an *optional* command that is *not* supplied with all systems; if this command is *not* functional, the **`P>'** is returned.

This *privileged* command displays the punch data needed to program cards for the KR-10 optical card reader. This data applies to any 6-digit "K-400 style" card. The first prompt is:

Send output to printer?

Enter **`Y'** (for yes) to make a hard copy of the punchcode data. Enter **`N'** (for no) to display the information only on the monitor. (Do *not* enter the quotation marks with either entry.) The next prompt is:

Enter a 6 digit card number, [RETURN] to exit:

Enter a valid card number or press the **[RETURN]** (or **[ENTER])** key to abort this command. The next prompt is:

Enter card type (S, D, or V) [S]:

`S', `D' and **`V'** refer to single, driver and vehicle cards, respectively. Enter one of these codes or press the **[ENTER]** key with *no* entry to select the prompted value (shown in the braces). The prompted value is initially the default value, **`S'**. When a new value is entered, the prompted value becomes the new value. This facilitates entering cards of the same type. If the dual language feature is enabled, the next prompt is:

Enter Language 1 or 2

The next prompt is:

Enter pump/quantity restriction code (0 to 9) [0]:

Enter a code number from 0 to 9 or press the **[ENTER]** key with *no* entry to select the value in braces. The value in braces is either the default value `**[0]**') or the previous entry for this prompt.

)))) NOTE ((((*The code number refers to both the pump and quantity restriction tables.*

The next prompt is:

Enter bypass select code (0 to 7) [0]:

Enter a code number from 0 to 7 or press the **[ENTER]** key with *no* entry to select the value in braces. The value in braces is either the default value (`**[0]**') or the previous entry for this prompt.

The bypass codes are shown in the table below:

Code	Security	Mileage	Keyboard
0	NO	NO	NO
1	NO	NO	YES
2	NO	YES	NO
3	NO	YES	YES
4	YES	NO	NO
5	YES	NO	YES
6	YES	YES	NO
7	YES	YES	YES

When `**NO**' is entered for a bypass, the feature is prompted when the card is inserted. For example, code 0 prompts for all 3 features because they are *not* bypassed.

When `**YES**' is entered for a bypass, the feature is bypassed (*not* prompted). For example, code 7 prompts for *no* features because all 3 are bypassed.

After entering the bypass code, a table is generated listing the columns to be punched and the corresponding punchcode.

The card number prompt is returned after the table is generated. Enter a 6-digit number or press **[RETURN]** to exit.

Appendix J: TROUBLE-SHOOTING

Introduction

The ***K-2500*** is designed for easy trouble-shooting and field repair. The following paragraphs explain the several system tests, common problems and solutions and replacement of the paper and ribbon for the journal and receipt printers. Illustrations of the circuit boards and explanations of their status lights are also included.

Self-tests

Whenever the ***K-2500*** is powered up or reset, the system runs a series of self- tests on the system memory (RAM), the display, the card reader and the EPROM (which stores the ***K-2500*** operating software). The name of each test is shown on the ***K-2500*** display while it is performed. If the system fails any test, an error message is displayed.

TEST

This *privileged* command is used to test the system memory (RAM), the battery (which safeguards the RAM) and the system clock (which regulates internal functions).

The first test is for the system memory (RAM). Note that to test the battery, the RAM must first be tested *with the battery ON* (see below).

>>> **WARNING** <<<

The RAM test is a destructive test. All data in a tested location are destroyed.

The first prompt is:

TEST RAM (Y/N)?

Enter `**N'** (for no) to skip this test and display the next prompt; enter `**Y'** (for yes) to display the test options (do *not* enter the quotation marks). These options are:

	Code #	Location	Data Resident
-	0	0 to 64 K	FSC
	1	64K to 320 K	EM1
	2	320K to 576 K	EM2
	3	576K to 832 K	EM3

The RAM is tested by writing data to the specified locations and then reading them. For example, if you added an EM2 memory expansion board, you could test only that segment by specifying option #2. (and leave the data previously entered, and residing in locations 0 - 320K, undisturbed).

)))) NOTE ((((*This test can take several minutes to perform. The system is idle while the test is performed.*

The next prompt is :

TEST BATTERY (Y/N)?

Enter **`N'** (for no) to skip this test and display the next prompt. To test the battery on the expanded memory board, you must first test at least one of the expanded memory options (#1, #2 or #3) of the system memory (RAM) with the battery switch ON. The RAM test leaves a specific pattern in memory. If the battery is functioning properly (and turned ON), this pattern remains intact when the ***K-2500*** power is turned OFF.

After the RAM test, turn the power OFF for several minutes. Turn the power back ON, enter the **`TEST'** command and enter **`Y'** (for yes) for this option. You are then prompted for the memory locations to use in this test. Specify one of the memory locations (#1, #2 or #3) tested in the first part of this command.

The next prompt is:

TEST CLOCK (Y/N)?

This test can be done only by qualified service personnel. Enter **`N'** (for no) to exit the **`TEST'** command at this point.

FIT Test

To activate this test, set position #3 of switch #1 on FIT/PCT board (PV-205) to the ON position. Press the Reset button. The system goes through the normal series of self-tests (as described above). When these are completed, the ***K-2500*** display shows the message: **`***K-2500 TEST PROGRAM***'.**

The display then prompts:

KEYBOARD TEST (Y/N)?

Enter **`NO'** to skip this test and display the next prompt. Enter **`YES'** to test the ***K-2500*** keyboard. The system then prompts for keyboard entries. Press the digit keys. The corresponding numbers should display. Press the **[CLEAR]** key and they should disappear. Press another digit key and then press the **[ENTER]** key to exit this test and display the next prompt.

The second prompt is:

TEST DISPLAY (Y/N)?

Enter **`NO'** to skip this test and display the next prompt. Enter **`YES'** to test the ***K-2500*** display. If you enter **`YES'**, the display will then black out squares and **`TEST'** will alternate across the display. For example:

! ! TEST ! ! ! ! TEST

The third prompt is:

TEST READER (Y/N) ?

Enter **`NO'** to skip this test and display the next prompt. Enter **`YES'** to test the ***K-2500*** card reader. There are 3 types of card readers: magnetic, standard optical (model KR-10, K-400 compatible) and optional optical (model KR-16, K-3000 compatible). Follow the appropriate paragraphs below.

Magnetic

You are prompted to insert a card. For non-proprietary magstripe cards, the number is read and displayed. Use the **[ENTER]** key to toggle between the first and second half of numbers too large to appear in a single display. For proprietary magnetic cards (with matching network numbers), the number is read and displayed in the same manner. Pressing the **[ENTER]** key also displays other card data, one line at a time. For example,

1st line: 1234000006786294=30888
2nd line: 07084=987654321
3rd line: NT:1234 CRD:000006786294
4th line: TYPE: V EXP DAT: 0888
5th line: PMP RES:00 QTY RES:00
6th line: PGM SEL:00 ID:000000000

The first 2 lines display only the numbers as encoded on the card. The 3rd line shows the network number (**`NT'**) and the card number (**`CRD'**). The 4th line displays the card type (**`V'** for vehicle, **`S'** for single or **`D'** for driver) and the card expiration date (**`mmyy'** for month and year; for example, **`0888'** means August 1988).

)))) NOTE ((((

When the card type is displayed (line 4) the type of language (1 or 2) is indicated by whether the letter is capital (for language 1) or small (for language 2). For example, **`D'** *indicates a driver card programmed for language 1;* **`d'** *indicates a driver card programmed for language 2.*

The **`PMP RES', `QTY RES', `PRG SEL'** and **`ID'** are *not* used with the standard ***K-2500*** software even if data are present in these fields. Lines 5 and 6 of this test, therefore, can be ignored.

Optical (KR-10) You are prompted to insert a card. The following information is displayed a line at a time by pressing the **[ENTER]** key:

NET:5678 CARD:343434
TYPE:S
PMP/QTY RES:0 PRG SEL:0

The 1st line shows the network number (`**NET'**) and the card number (`**CARD'**). The 2nd line displays the card type (`**V'** for vehicle, `**S'** for single or `**D'** for driver).

)))) NOTE ((((*When the card type is displayed (line 2) the type of language (1 or 2) is indicated by whether the letter is capital (for language 1) or small (for language 2). For example,* `**D'** *indicates a driver card programmed for language 1;* `**d'** *indicates a driver card programmed for language 2.*

`**PMP/QTY RES'** and `**PRG SEL'** are *not* used with the standard ***K-2500*** software even if data are present in these fields. Line 3 of this test, therefore, can be ignored.

Optical (KR-16) You are prompted to insert a card. The following information is displayed a line at a time by pressing the **[ENTER]** key:

NET:1234 CARD:012133
TYPE:S ID:005106787
PRG INFO:** QTY RES:0**
PRD1-16 YYYYYYYYYYYYYYY

The 1st line shows the network number (`**NET'**) and the card number (`**CARD'**). The 2nd line displays the card type (`**V'** for vehicle, `**S'** for single or `**D'** for driver) and `**ID'.**

)))) NOTE ((((*When the card type is displayed (line 2) the type of language (1 or 2) is indicated by whether the letter is capital (for language 1) or small (for language 2). For example,* `**D'** *indicates a driver card programmed for language 1;* `**d'** *indicates a driver card programmed for language 2.*

`**ID'**, `**PRG INFO'**, `**QTY RES'** and `**PRD1-16'** are *not* used with the standard ***K-2500*** software even if data are present in these fields. Therefore, these fields can be ignored when displayed by this test.

The fourth prompt is:

TEST RECEIPT (Y/N) ?

Enter **`NO'** (for no) to skip this test and display the next prompt. Enter **`YES'** (for yes) to print a test receipt on the optional receipt printer.

The last prompt is:

TEST COMM (Y/N)?

Enter **`NO'** to exit the **`TEST'** command. Enter **`YES'** to test the Petro Net communications. To test the communications, the cable between the PV-204 and PV-205 boards must first be disconnected. Be sure to turn the power OFF before disconnecting the cable. The results of the **COMM** test are shown on the display. Be sure to turn the power OFF before reconnecting the cable.

Common Problems and Solutions

Problem	Solution
no FIT display messages	Adjust "display viewing angle" screw.
`FAULTY PUMP' message at FIT	3 zero quantity transactions: re-install pump with **`INSTALL PCT # POSITION #'** command bad pump pulser: replace pulser
`RESET QUANTITY EXCEEDED' message at FIT	current sensor/pump handle selector switch in wrong position: change Switch #1 on PV-206 board (Section II:I)
`COMMUNICATION DOWN' message at FIT	FIT *not* installed: install FIT (Section III:G) Petro-Net wiring problem: check, repair wiring possible FIT board malfunction: run **COMM** test (Appendix J: **`TEST'** command) to check board; replace board if necessary
`COMMUNICATIONS DOWN' at *all* FITs	possible FIT board malfunction(s): run **COMM** test for each FIT board (Appendix J: **`TEST'** command); replace board(s) if necessary possible FSC board malfunction; if all FIT board pass **COMM** test, replace FSC board
`INCORRECT CARD' message at FIT	incorrect network number encoded on card(s): replace card(s) incorrect network number programmed in FIT EPROM: replace EPROM

Problem	Solution
`**SYSTEM FULL**' message at FIT	printer error: clear error (Section III:K)
	transaction buffer filled: clear buffer (Section IV:E)
	buffer wrap-around *not* enabled: enable wrap-around (Section III:J)
`**MEMORY ERROR**' message at terminal	Expanded memory failure: battery switch *not on* during system power failure
	battery failure: replace board
	EM board failure: replace board
Pulser *not* counting pulses	active/passive pulser selector switch set incorrectly: change Switch #1 on PV-206 board (Section II:I)
Newly programmed messages or pump parameters *not* working	failure to download changes: use `**DOWNLOAD**' command (Section III:A)
Printer *not* printing transactions	communications blocked due to printer error: unblock with `**SET JOURNAL**' command (Section III:K)
	printer locked: unlock printer with `**UNLOCK**' command (Section IV:G)
FSC Status LED fails to flash after reset	FSC board malfunction: replace board

Problem	Solution
Printer Error LED flashing	Printer error code: 1 flash - paper jam 2 flashes - paper low (or out) 3 flashes - RAM error on printer brd 4 flashes - EPROM error
Black square on FIT display after card in	No display message for second language has been programmed: program message (Section III:Q)

Journal Printer Paper Replacement

1. Power must be ON to remove and reload paper.

2. If paper remains on the roll, press and hold the Paper Advance button to empty the roll.

3. To remove the journal, grasp the paper take-up roll, lift it up firmly and pull it all the way out. Unscrew the end of the reel and remove the paper. Replace the end of the reel.

4. Replace the empty paper roll with a new roll.

5. Feed the end of the paper into the printer. Press and hold the Paper Advance button to move the paper through the printer. The take-up reel also turns when this button is pressed.

6. Fit the end of the paper into the reel slot and manually roll the paper about 5 turns. Replace the reel and manually tighten the paper.

7. Press and hold the Paper Advance button to ensure the proper grasp of the take-up reel.

Receipt Printer Paper Replacement

1. Power must be ON to remove and reload paper.

2. To remove the low paper roll, lift the paper roll up from the paper holder and cut the paper away from the printing mechanism. Note where the paper enters the mechanism. This is where you will feed the new paper.

3. Press and hold the Paper Feed switch for several seconds to advance the remaining paper through the printing mechanism. If the paper does *not* advance completely through the mechanism, use a screw driver (or other probe) to remove the remaining paper.

>>>> WARNING <<<<

Exercise caution when near the paper cutter. The cutter is activated by pressing the paper advance button momentarily. Do not use your fingers to remove paper near the cutter.

4. Remove the paper roller (or "spindle") from the old roll and place it into the new roll. Carefully slide the new paper roll back onto the paper holder. Be careful not to damage the Paper Out Sensor mounted on the right side of the paper holder.

5. Feed the end of the paper into the printer. Press and hold the Paper Advance button to move the paper through the printer. Be sure the paper is loaded between the cutter bar assembly. The paper should be curving down as it feeds through the assembly. Press the Paper Advance button momentarily to cut off any excess paper.

Ribbon Replacement

1a. Before you can change the ribbon on the Journal Printer, the printer assembly and take-up reel must be removed from the ***K-2500*** unit.

1b. Before you can remove the ribbon on the Receipt Printer, the paper must be removed and the printer must be disassembled from its mounting bracket. Turn the power OFF. Before disconnecting the power and communication cables, note their location and polarity. Disconnect the cables (5 in all) and remove the 4 wing nuts holding the printer in place. You must also remove the 4 screws that hold the static guard and cutter assembly. Note the original position of these parts.

2. Remove the old ribbon by pulling back the spring-loaded Ribbon Detecting Lever. Lift the spool off the spindle.

3. Pull back the Ribbon Detecting Lever and load the spool with the ribbon onto the left spindle. Feed the ribbon along the ribbon guide (between the printer head and paper). Tighten up any remaining slack.

4. Replace the printer assemblies.

Status LEDs

PV-200 Receipt Printer Driver Board

Color	Label	Function	Normal Status
amber	RESET	receipt printer reset	OFF; ON when reset
amber	DTR	data terminal ready	ON
green	RXD	data to receipt printer	flash when data sent
red	TXD	data from receipt printer	flash when data received
amber	ERROR	journal printer error (see note below)	ON; flash on error

PV-201 Journal Printer / Controller Board

Color	Label	Function	Normal Status
amber	RESET	journal printer reset	OFF; ON when reset
amber	DTR	data terminal ready	ON
green	RXD	data to journal printer	flash when data sent
red	TXD	data from journal printer	flash when data received
amber	ERROR	journal printer error (see note below)	ON; flash on error

)))) NOTE ((((

Printer Error LED Code

1 flash : paper jam
2 flashes: paper low (or out)
3 flashes: RAM error on printer brd
4 flashes: EPROM error

PV-203 Communication Board

Color	Label	Function	Normal Status
green	PN CTS	Petro-Net clear to send	fast flash when communicating
red	PN RTS	Petro-Net ready to send	fast flash when communicating
amber	PN DATA	Petro-Net data	fast flash when communicating
red	CAP RX	data to terminal	flash when terminal keys pressed
green	CAP TX	data from board	flash when terminal keys pressed

PV-203 Communication Board (continued)

Color	Label	Function	Normal Status
red	JP RX	data to journal printer	flash when data received
green	JP TX	data from journal printer	flash when data sent
red	CAP modem RX	data to on board modem	flash when data received
green	CAP modem TX	data from on board modem	flash when data sent
red	CAP modem DTR	to on board modem	flash when data received
green	CAP modem DCD	from on board modem	flash when data sent
red	host modem RX	data to Slave modem	flash when data received
green	host modem TX	data from Slave modem	flash when data sent
red	host modem DTR	for Slave modem	flash when data received
green	host modem DCD	for Slave modem	flash when data sent
red	host modem RTS	for Slave modem	flash when data received
green	host modem CTS	for Slave modem	flash when data sent

PV-204 FSC Board

Color	Label	Function	Normal Status
amber	RESET	system reset	OFF; ON when reset
green	CTS	Petro-Net clear to send	fast flash: communicating
red	RTS	Petro-Net ready to send	fast flash: communicating
amber	DATA	Petro-Net data	fast flash: communicating
green	STATUS	system operational status	flashes on power-up while card file is sorted; stays OFF after sort

PV-205 FIT/PCT Board

Color	Label	Function	Normal Status
amber	RESET	FIT/PCT reset	OFF; ON when reset
green	RXD	data from receipt printer	flash when data received
red	TXD	data to receipt printer	flash when data sent
green	CTS	Petro-Net clear to send	fast flash: communicating
red	RTS	Petro-Net ready to send	fast flash: communicating
amber	DATA	Petro-Net data	fast flash: communicating

PV-206 Pump Interface Board

Color	Label	Function	Normal Status
green	CR1	pulser A	ON when active
amber	CR2	pump A handle switch	ON when active
amber	CR3	pump A current sensor	ON when active
red	CR4	pump A relay	ON when active
green	CR1	pulser B	ON when active
amber	CR2	pump B handle switch	ON when active
amber	CR3	pump B current sensor	ON when active
red	CR4	pump B relay	ON when active

PV-207 Dual Channel Pulser/Console Interface Board (*Optional*)

Color	Label	Function	Normal Status
green	CR1	pulser A, channel 2	ON when active
red	CR2	pulser A error	ON when error
amber	CR3	echo relay A	ON when console used
green	CR4	pulser B, channel 2	ON when active
red	CR5	pulser B error	ON when error
amber	CR6	echo relay B	ON when console used

PV-209 Power Supply Board

Color	Label	Function	Normal Status
green	CR9	+12 VDC Receipt Printer	ON
green	CR8	+12 VDC Journal Printer	ON
green	CR7	+5 VDC communications	ON
green	CR6	+12 VDC pulser	ON
green	CR5	+5.1 VDC logic	ON

)))) NOTE ((((*When properly functioning, all power supply LEDs glow with the same intensity. A dim LED may indicate a lower than normal voltage.*

Voltage Measurements

The following is a list of power supply voltages and their uses:

Wire Color	Voltage	Use
red	5.1 VDC ± 5%	logic
black		logic ground
yellow	24 VDC ± 20%	relay
white		relay ground
green	12 VDC ± 5%	pulser
blue		pulser ground
violet	5 VDC ± 5%	communications
gray		comm. ground
short brown	12 VDC ± 5%	receipt printer
orange		receipt printer ground
long brown	12 VDC ± 5%	journal printer
orange		journal printer ground

Appendix K: PC CONNECTIONS

Introduction

These instructions explain how to connect an IBM® XT or AT compatible personal computer ("PC") to the ***KARDGARD K-2500*** Fuel Management System. Also explained is the terminal emulation software your PC needs in order to talk with the ***K-2500***.

***K-2500* Installation**

There are two ways a ***K-2500*** system can be installed. If the distance between the ***K-2500*** unit and the PC is less than 2500 feet, the ***K-2500*** is wired to a junction box located near the PC ("direct connection"). When the distance is greater than 2500 feet, modems are required and telephone lines are used to connect the two units. The following two sections describe connections for each of these types of installation. Follow the section which is appropriate for your system.

>>> *WARNING* <<<

Before making any connections, be sure your computer and peripheral equipment (printer, converter, modem, etc.) are unpowered.

Direct Connection

Direct connection requires an RS-422 to RS-232 converter box. (One is available from **Petro Vend**.) The converter box has three cables: (1) a 4-wire cable with a square connector, (2) a 25-pin cable with a wide connector and (3) a power cord with a grounded plug.

Plug the connector from the 4-wire cable into the ***K-2500*** junction box socket. The plug should fit snugly.

The 25-pin cable connector plugs into the socket for the serial port of your PC. This socket, also known as the "Communications Adapter Connector," is located on the back of most Pcs. If this socket is not clearly labeled, refer to the PC system reference guide; there may be other 25-pin sockets on the PC that are *not* the serial port and can *not* be used for communication. It is also possible that the serial port has a 9-pin socket; this will require you to purchase a 25- to 9-pin converter plug (available at most computer supply stores).

Make sure the plug is securely in place.

)))) NOTE ((((

If you are already using the serial port, you can purchase an additional serial port card for the PC at most computer supply stores. The card is a small circuit board that plugs into a slot inside the PC.

Plug the power cord into a standard 115 VAC wall socket. You are ready to power up the PC and begin setting up the terminal emulation software.

Modem Connection

A modem converts computer data into a format that can be sent over standard telephone lines. A second modem at the receiving site converts the data back to a computer format. The internal modem from **Petro Vend** is preferred for the ***K-2500*** site. A Hayes® modem, also available from **Petro Vend**, is preferred for the PC site. Because the ***K-2500*** unit uses Hayes® commands, you must use Hayes® (or 100% compatible) modems.

Most modems have four sockets: (1) a wide 25-pin socket to connect to the PC, (2) a square 4-pin socket to connect to the telephone line, (3) a square 4-pin socket to connect to a telephone and (4) a 2-wire socket for the AC power adapter. The modem should have come with the cables you need to make the following connections. (If not, you can purchase what you need at most computer supply stores.)

Connect the 25-pin socket to the socket for the serial port of your PC. This socket, also known as the "Communications Adapter Connector," is located on the back of most PCs. Make sure the plug is securely in place.

Connect the 4-wire "line" socket to the telephone jack. The cable plugs should snap into position and fit snugly.

If you want the PC to share its line with a telephone, connect the 4-wire "phone" socket to the telephone. Note that you must use the telephone and computer alternately, *not* simultaneously.

Plug the power adapter into its socket on the modem and into a standard 115 VAC wall socket. You are ready to power up the PC and modem and to begin setting up your terminal emulation software.

Terminal Emulation Software

In order to use a PC to communicate with the ***K-2500***, you must run a terminal emulation program. **Petro Vend** recommends the Crosstalk Data Communication Software System because it is well-documented, reasonably priced and has been tested with the ***K-2500*** unit. Crosstalk also provides a toll-free 800 telephone number for customer support. *Petro Vend can not be responsible for problems that may arise if you use another type of terminal emulation software.*

The section below describes how to install Crosstalk on the PC. The next two sections detail how to set up Crosstalk for direct connection and for modem connection with the ***K-2500***. Follow the directions appropriate for your system.

If you are using a program other than Crosstalk, read its manual carefully. You will need to set the following values:

Communication speed - *must match* ***K-2500***
Data bits - 7
Communication port - *must match PC hardware*
Parity - Even
Stop bit - 1

If you are using direct connection, you will need to set the software to "go local". If you are using a modem, you will need to set its program switches. You will also need to enter the telephone number of the ***K-2500*** site.

Installing Crosstalk

To install Crosstalk on a PC with a floppy and a fixed disk drive, place the Crosstalk program disk into the floppy drive (usually drive "A"). At the **`C>'** prompt, enter the DOS command **`CD\'** (*without* quotation marks) to enter the "root" directory. Enter the command **`MD\XTALK'** to make a separate directory to store the program. Enter the command **`CD\XTALK'** to access this directory. Enter the command **`COPY A:*.*'** to copy the program into the new directory. Replace the Crosstalk disk with a blank, formatted floppy disk. (Note that the floppy disk *must be formatted*.) Enter the command **`COPY *.* A:'** to make a backup copy of the program. Store the original and backup copies in a safe, secure location. (If you have any questions about directories, formatting or copying disks, refer to the PC system reference guide.)

)))) NOTE ((((*If the PC does not have a hard disk you can not permanently install Crosstalk. You should, however, make a backup copy of the program. For more information about using the program on a PC with only two floppy disks, refer to the Crosstalk manual.*

Set Up Crosstalk for Direct Connection

From the XTALK directory, enter the command **`XTALK'**. First an ID screen appears, then the Status Screen. Press the **[ENTER]** key to display the **`command?'** prompt on the bottom line.

Enter the command **`SP'** to select the communication speed or "baud rate." The ***K-2500*** can operate at 300, 1200, 2400 or 9600 baud. This rate is set by the switches on the PV-204 board. (Refer to the ***K-2500*** Owner's Manual for more details.) Enter the rate appropriate for your system. *The Crosstalk baud rate must match the **K-2500** baud rate or <u>no</u> communication can occur.*

Enter **`DA'** to select the data bits; enter **`7'**. Enter **`PO'** to select the communication port; this is the serial port to which the ***K-2500*** is connected. Most systems use port #1 (also known as "COM 1:"); enter the number appropriate for your system. Enter **`PA'** to select the parity; enter **`E'** for even. The default value for the stop bit is 1; you should *not* have to change this value.

Lastly, enter **`SA'** to save the setup information in a command file. You are prompted for a file name. This name will be added to the list of command files that displays when the program is first activated. You can select this file to automatically set up Crosstalk for you next time.

Once Crosstalk is set up, all you need to do is enter the command **`GO LOCAL'** at the **`command?'** prompt. Press the **[ENTER]** key several times. The ***K-2500*** prompt **`>'** should display.

*)))) **NOTE** ((((*

*If the prompt does not display, double check the setup data on the Crosstalk Status Screen. If necessary, check the connection cables and the power to the **K-2500** and converter box.*

Set Up Crosstalk for Modem Connection

From the XTALK directory, enter the command **`XTALK'**. First an ID screen appears, then a list of available command files. Enter **`2'** to set up Crosstalk for your system. (Be sure to press the **[ENTER]** key.) The Status Screen is displayed. Press **[ENTER]** to begin entering data for your system.

The first prompt is for type of modem. The ***K-2500*** systems must use Hayes® (or compatible) modems. Select the type appropriate for your system. The next prompt is for the type of Hayes® (or other) modem. Select the type appropriate for your system. You are prompted with the switch settings for your modem. Double check the modem to ensure the switches are correctly set. Press the **[ENTER]** key to continue.

Next, you are prompted for the communication port. Most systems use port #1 (also known as **`COM 1:'**); enter the number appropriate for your system.

You are then prompted for the baud rate or speed. The ***K-2500*** can operate at 300, 1200, 2400 and 9600 baud. (The ***K-2500*** internal modem is limited to 2400 baud.) This rate is set by the switches on the PV-204 board. (Refer to the ***K-2500*** Owner's Manual for more details.) *The Crosstalk baud rate must match the **K-2500** baud rate or no communication can occur.*

You are prompted for the type of monitor you are using with your PC. Enter the appropriate number.

Lastly, you are prompted to save the setup information. Enter **`N'** for no. (You will save this data a little later.) This completes the setup command file. You will enter the following data using the individual commands for each.

Press the **[ENTER]** key twice to display the prompt **`command?'** on the line at the bottom of the screen. Enter **`DA'** to select the data bits; enter **`7'**. Enter **`PO'** for the communication port; this is the serial port to which the ***K-2500*** is connected. Most systems use port #1; enter the number appropriate for your system. Enter **`PA'** to select the parity; enter **`E'** for even. The default value for the stop bit is 1; you should *not* have to change this value.

Enter **`NU'** to select the telephone number; enter the number of the ***K-2500*** site. (If you have more than one site, see the note below.)

Lastly, enter **`SA'** to save the setup information in a command file. You are prompted for a file name. This name will be added to the list of command files that displays when the program is first activated. You can select this file to automatically set up Crosstalk for you next time.

*)))) **NOTE** ((((* *If you have more than one **K-2500** site, you can repeat the steps above to set up a separate command file for each site (each with a different telephone number).*

Once the Crosstalk is set up, all you need to do is enter the command **`GO'** at the **`command?'** prompt. Press the **[ENTER]** key several times. The ***K-2500*** prompt **`>'** should display.

*)))) **NOTE** ((((* *If the prompt does not display, double check the setup data on the Crosstalk Status Screen. If necessary, check the connection cables and the power to the **K-2500** and converter box.*