OPW
FUEL MANAGEMENT SYSTEMS

System2®

For Mileage Reasonability ChipKeys®

Operator's Manual

Software Version 41.04B

The material in this manual is subject to engineering changes and editorial revisions

 Manual No. M041-41.04B

OPW Fuel Management Systems -
System and Replacement Parts Warranty Statement

Effective September 1, 2002

System and Replacement Parts Warranty

OPW Fuel Management Systems warrants that all OPW Tank Gauge and Petro Vend Fuel Control systems supplied by OPW Fuel Management Systems to the Original Purchaser will be free from defects in material and/or workmanship under normal use and service for a period of 12 months from the date of installation or 15 months from the date of shipment. Additionally, OPW Fuel Management Systems warrants that all upgrades and replacement parts (new and remanufactured) supplied by OPW Fuel Management Systems will be free from defects in material and workmanship under normal use and service for a period of 90 days from the date of installation or for the remainder of the system's original warranty, whichever is greater, as set forth in the first sentence of this statement. The foregoing warranties will not extend to goods subjected to misuse, neglect, accident, or improper installation or maintenance or which have been altered or repaired by anyone other than OPW Fuel Management Systems or its authorized representative.

The buyer's acceptance of delivery of the goods constitutes acceptance of the foregoing warranties and remedies, and all conditions and limitations thereof.

If a claim is made within the warranted time period that any equipment and/or remanufactured part is defective in material or workmanship under normal use and service, such equipment and/or remanufactured part shall be returned to OPW Fuel Management Systems, freight prepaid. If such equipment or remanufactured part is found by OPW Fuel Management Systems in its sole judgment, to be defective in material or workmanship under normal use and service, OPW Fuel Management Systems, shall, at its sole option, repair or replace such equipment and/or remanufactured part (excluding, in all instances, fuses, ink cartridges, batteries, other consumable items, etc.)

The warranties, as set forth above, are made expressly in lieu of all other warranties, either expressed or implied, including, without limitation, warranties of merchantability and fitness for any particular purpose and of all other obligations or liabilities on OPW Fuel Management Systems part. Further, OPW Fuel Management Systems neither assumes, nor authorizes any other person to assume for it, any other liability in connection with the sale of the systems, or any new/replacement part that has been subject to any damage from any act of nature or any *force majeure*.

The term "Original Purchaser" as used in these warranties shall be deemed to mean the authorized OPW Fuel Management Systems distributor to which the system or any new/replacement part was originally sold. These warranties may be assigned by the original purchaser to any of its customers who purchase any OPW Fuel Management Systems systems or new/replacement parts.

The sole liability of OPW Fuel Management Systems, for any breach of warranty, shall be as set forth above. OPW Fuel Management Systems does not warrant against damage caused by accident, abuse, faulty or improper installation or operation. In no event shall manufacturer's liability on any claim for damages arising out of the manufacture, sale, delivery or use of the goods exceed the original purchase price of the goods. In no event shall OPW Fuel Management Systems be liable for any direct, indirect, incidental or consequential damage or loss of product.

Contents

List of Figures

Meet System2!

Fleet managers need accurate information quickly and easily. The System2™ Automated Fuel Management System is designed to let you efficiently collect, sort, analyze and store vehicle and fueling data. .

Features of your new System2 include:

Superior Fuel Site Control

- On-site or remote access
- Stores thousands of transactions
- Menu-driven programming interface (not all versions)
- Automatic daily pump totals
- On-demand product, shift and pump totals
- Tank inventories with low-level alert
- 16 product and 16 quantity restriction levels
- Cardless (keypad) entry permitted
- Single (driver), or dual (driver/vehicle) card operation
- Programmable customer messages and receipts
- Card, key or account lockout
- Account discounts
- Programmable open/close system times
- password levels
- Self-test and diagnostic functions

OPW Fuel Management Systems OPT or C/OPT (Outdoor Payment Terminals) The OPT fuel island terminal (FIT) is the customer interface containing card readers, a keypad, and a display screen. Terminals can be equipped to handle magnetic stripe cards, optical cards, and OPW Fuel Management Systems ChipKeys™.

- Up to 4 OPTs can be addressed by one FSC
- Built-in receipt printers
- Text OR graphic display
- Multiple card reader options: Optical, ISO standard mag-card, OPW Fuel Management Systems mag-cards, some non-standard commercial fueling cards
- ChipKey reader (see *Working with ChipKeys* on page 17).

Flexible Pump Control

- Up to 4 PCTs (Pump Control Terminal)
- UPC (Universal Pump Controller) option for electronic dispensers

Maximum Configuration Flexibility

One Fuel Site Controller (FSC), the small table-top control box, controls up to four fuel island terminals, giving you the power to control up to fueling positions in mechanical pumps. The FSC can also handle electronic and alternative fuel dispensers.

More information on these features is located in various parts of this manual.

Equipment Overview

A System2 installation consists of:

- An FSC (Fuel Site Controller). This manual is primarily a guide to program the FSC.
- OPTs, C/OPTs (Commercial/Outdoor Payment Terminals) or FITs (Fuel Island Terminals). See the *FIT Installation & Operator's Manual.*
- PCTs (Pump Control Terminals). Also see the *PCT Operator's Guide.*

Each is described in brief next.

Fuel Site Controller (FSC)

At the heart of every System2 installation is the Fuel Site Controller.

The Fuel Site Controller stores transaction data and driver and vehicle records, including fueling restriction data critical to proper fleet management. for added security, it's kept indoors, away from the hazards of a 24-hour fueling island so, unlike self-contained systems, if the Fuel Island Terminal is damaged, your valuable data is safe.

Figure 1: System2 Fuel Site Controller (FSC)

The FSC manages the operations of the OPTs or C/OPTs, FITs, the terminal or computer, the journal printer, and optional modem.

The FSC must be installed indoors, It is attached to the OPTs, C/OPTs or FITs with twisted-pair wiring inside rigid steel conduit. Install the FSC as described in the *System2 Installation Manual.* See *Figure 3* on *page 7* in this book for a board overview.

Before you can program the system, attach the FSC to:

- A standard ASCII terminal OR
- An IBM® or compatible computer OR
- Any computer capable of ASCII communications.

If you are not using an ASCII terminal, the PC or mainframe computer must be running an emulation program to simulate an ASCII terminal.

For terminal baud rate, see *Table 1*, or the *System2 Installation Manual (*part number M41-00.01*).*

For remote operation, the FSC connects to an optional modem to provide complete control from a remote terminal or computer over standard telephone lines. See *Appendix C - Modem Use* on page 109. modem operation. *Table 1* shows baud rate for the MODEM port.

The FSC has a built-in battery to protect its data in case of an interruption or loss of AC power. The battery can be disconnected when a total clearing of data is required.

The STATUS display shows, by blinking two numbers in sequence followed by a pause, the number of devices running on Petro Net.

FSC Specifications

Table 1: FSC Specifications

Dimensions	2" H x 10" W x 11" D (5 x 25 x 28 cm)
Power	110-120 VAC, 50/60 Hz (220-240 VAC, 50/60 Hz) 50W max
Operating Temp. Range	32EF to +122EF (0EC to +50EC)
Rear Port Protocols	**PRINTER**: RS232 **MODEM**: RS-232 (7-bit even parity 1 stop. 1200 baud default, 2400 and 9600 also available via internal switch). **AUX 1-3** (Auxiliary Inputs): RS-232 (communication settings are not adjustable) **TERMINAL** (CAP): **PETRO NET** (PN): RS-485 (9600 baud default, 1200, 2400, 4800 also available thru programming)
Front Panel Controls & Indicators	**RESET** button Press to "warm-start" system **FUNCTION** button Use with RESET to "cold-start" system **STATUS** display The number of devices the FSC is currently communicating with (0-)

Outdoor Payment Terminal (C/OPT)

The Outdoor Payment Terminal (*Figure 2*), or Commercial/Outdoor Fueling Terminal, is OPW Fueling System's fuel island terminal. Drivers use the C/OPT, which is located next to your site's pumps.

The C/OPT gathers information from pumps, and communicates with your Fuel Site Controller (FSC, explained in this manual) and Pump Control Terminal (PCT, explained in its own manual). The unit sits atop a pedestal, as shown in *Figure 2*.

Figure 2: Commercial/Outdoor Payment Terminal

See the *C/OPT Installation & Operation Manual* for complete installation and operation instructions.

Fuel Island Terminal (FIT)

The FIT is OPW Fueling System's original island terminal. Like the OPW Fueling Systems C/OPT, it contains a keypad, one or two card readers, and a receipt printer. The FIT, also like the C/OPT, gathers information from the pumps, and sends it to the FSC.

See the *FIT Installation & Operator's Manual* (available from OPW Fueling Systems) for complete details on installing and operating the Fuel Island Terminal.

Pump Control Terminal (PCT)

The Pump Control Terminal (PCT) gathers data from the pumps and formats it for the FSC. The PCT can be mounted in one of two ways:

- Built into an OPW Fuel Management Systems OPT or C/OPT (FIT) as a PC board (behind the FIT PC board)
- As a “remote PCT”, in a separate indoor cabinet.

See the *PCT Operator’s Guide* for installation and operation instructions.

Configuring the FSC

Note

*Plug in the battery **before** configuring the FSC.*

Program a default fueling terminal message and set baud rate via DIP switches on the FSC PC board (*Figure 3*).

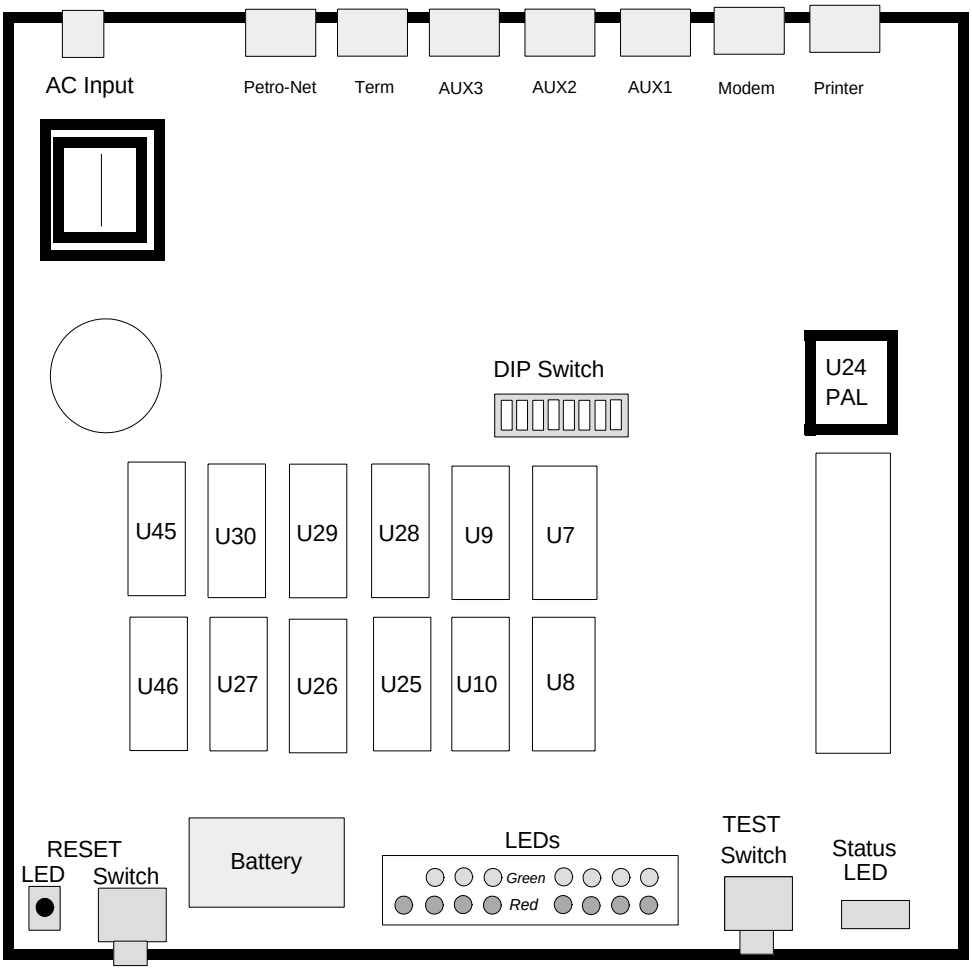


Figure 3: FSC PC Board

FSC DIP Switches

The DIP switch “SW1” on the FSC board controls several FSC settings.

Note

Positions 3, 4, 5, and 8 of SW 1 are not used. Leave them OPEN.

Positions 1 and 2: Display Type

Switch #1, positions 1 and 2, determine default display messages.

Table 2: Fueling Terminal Display Type Setup

Display Type	SW POS 1	SW POS 2
2 x 16	OPEN	OPEN
1 x 40	OPEN	CLOSED
Graphical	CLOSED	OPEN

Note

You MUST cold-start the FSC after changing the display type.

Positions 6 and 7: Baud Rate

Set the FSC baud rate with Positions 6 and 7 of DIP Switch #1. See *Table 3*.

Table 3: FSC Baud Rate Setup

Baud Rate	SW1 POS 6	SW POS 7
300	OPEN	OPEN
1200	OPEN	CLOSED
2400	CLOSED	OPEN
9600	CLOSED	CLOSED

Note

The baud rate of the FSC, all fueling terminals and all pump controllers must be the SAME! Make sure the computer or terminal (and modem) communicating with the FSC uses this baud rate as well. See the instruction manuals for the fueling terminals and pump controllers to change baud rate for those devices.

If you experience communication problems with very long runs of Petro-Net cable (approaching the 5,000 foot limit), try decreasing the baud rate.

Switch 1 does NOT affect the Petro-Net baud rate, or the baud rate of any other system port.

FSC Port LEDs

Sixteen LEDs on the FSC board show the current state of each FSC port, as shown in *Table 4*.

Table 4: FSC Port Indicator LEDs

LED Function	LED Color	LED Label
PRINTER port transmitting	Red	CR32
PRINTER port receiving	Green	CR37
MODEM port transmitting	Red	CR80
MODEM port receiving	Green	CR85
AUX1 port transmitting	Red	CR35
AUX1 port receiving	Green	CR40
AUX2 port transmitting	Red	CR41
AUX2 port receiving	Green	CR39
AUX3 port transmitting	Red	CR36
AUX3 port receiving	Green	CR38
TERMINAL port transmitting	Red	CR81
TERMINAL port receiving	Green	CR86
PETRO-NET port transmitting	Red	CR23
PETRO-NET port receiving	Green	CR22
PETRO-NET port TX enabled	Yellow	CR24
RESET	Yellow	CR31

System Start-Up

To power up the system, apply power to all fueling terminals and, if applicable, each remote pump controller. Make sure the FSC power supply is plugged into an AC socket.

Note

Do not apply power to your pumps yet.

1. With power ON, unplug the battery connector from the FSC PC board.
2. Press and hold the FSC TEST button, then press (do not hold) the RESET button.

- A “C” appears in the FSC display.

3. Release the TEST button, and reconnect the battery.

The FSC now enters the communication default mode described in the next section.

When the system is cold-started, it “installs” (establishes a communication link with) the first fueling terminal and the first two pump positions in the pump controller.

Note

The FSC downloads default (pre programmed) values for messages, fuel types, pump numbers, and several other settings.

The front-panel STATUS display sequences for about 45 seconds. During this time, the FSC counts the number of fueling terminals and indoor pump controllers installed and communicating with the FSC via Petro-Net. The blinking decimal point in the STATUS display indicates that Petro-Net is active.

Operational Overview

After Power-Up

To enter privileged mode, type HELLO at the “>” prompt, then enter the privileged password.

All commands can be entered at the > or **P>** prompt.

- System Access
- System Times
- System Devices
- Customer Messages
- System Parameters
- Restrictions
- Cards
- Transaction Data
- System Totals
- Journal Printer

Each is briefly described below.

System Access

See *Accessing System2* on page 29.

System Access includes:

- OPEN and CLOSE commands (for immediate pump access)
- CALL (creates a virtual link between the TERMINAL port and the MODEM port on the Fuel Site Controller)
- HELLO and BYE (for privileged-level access)

System Times

See *Setting Time and Date* on page 31.

System Times set the following:

- Real time and date
- Date on which to change to (and from) daylight savings time
- When to turn the system ON and OFF
- When to turn the pocket lights ON and OFF.

System Devices

See *Device Setup* on page 35.

- The OPT, C/OPTs or FITs
- The PCTs
- The optional UPC (Universal Pump Controller)-equipped PCT.

The OPT or C/OPT or FIT controls the card/key reader(s), keyboard, display and optional /receipt printer.

The following features can be programmed for each FIT:

- Whether to issue transaction receipts
- The time limit for issuing receipts
- Which PCTs to shut off when the Emergency Stop button is pressed
- If the card reader error counter should be reset
- Which pumps should be activated.

The **Pump Control Terminal boards** are either in the pedestal or in a separate cabinet. Each PCT board controls multiple parameters for up to eight pumps.

- Pump number
- Status of the pumps

- Product name for this pump
- Tank number supplying this pump
- Any quantity restrictions on the pump
- Maximum total time permitted for fueling
- Maximum time allowed for customer to lift the pump handle
- Maximum time for system to detect first pulse (start of fueling)
- Maximum time allowed for Multi-Product Dispensers (MPDs)
- The pump's pulser "divide-by" rate
- Whether the pump handle monitor is enabled or disabled
- Whether the Pump Sentry feature is enabled or disabled

The **UPC** can emulate up to four PCTs for operation with a self-service console. The UPC option lets System2 and a site console control *simultaneous* unattended *and* self service fueling. For complete details on UPC operation, refer to the UPC *Operator Guide*.

Customer Messages

See *Customer Messages* on page 43 to learn how to:

- Define receipt format and bonus points
- Display prompts and keyboard responses
- Specify a date/time format

System Parameters

See *System Parameters* on page 63 to learn how to:

- Display a system status report
- Set a site ID
- Specify fuel units, prices, and names
- Define product "labels"
- Create new passwords
- Specify a coupon value ("bonus points")
- Define the system memory size
- Display the software version
- Test the back-up battery

Restrictions

See *Restrictions* on page 67 to limit fuel dispensing with:

- Pump Restrictions

- Quantity Restrictions

Cards & Accounts

See *Cards/Accounts* on page 73. Accounts are not used in all System2 versions.

With Card and Account features you can show, print, validate or invalidate cards and ISO numbers. System2 recognizes three types of card/numbers:

- Single
- Driver
- Vehicle

System2 is activated via magnetic cards, optical cards, or programmable Chip-Keys, depending on the reader supplied with your system.

Transaction Data

See *Transaction Data* on page 85 to learn how to view and edit:

- Driver and vehicle card/key numbers
- Transaction and pump numbers
- Product type, quantity and price
- Keypad entries (for odometer entries and miscellaneous data).

All transaction records are fixed-length.

System Totals

All completed System2 transactions can be printed, displayed, or both. Use System Totals to restrict the viewed or printed transactions by:

- Date
- Time
- Transaction, card, account, or vehicle number
- Pump
- Fueltype
- Day, shift, or midnight.

Journal Printer

See *Journal Printer* on page 89.

The journal printer must be set before it can print System2 data. You can temporarily block the transaction logging function to prevent transactions from being interspersed throughout a report printout.

Working with ChipKeys

What are M.R. ChipKeys?

Mileage Reasonability (MR) ChipKeys, sometimes called “Read/Write ChipKeys, differ from standard read-only keys in that they allow data to be written to them.

You can program your SYSTEM2 to modify values stored in the Chip-Key (such as validation status) each time customers insert their ChipKeys into a SYSTEM2 C/OPT or FIT.

Note

Although there is an Odometer Reasonability selection in the System2 Restrictions menu (Page 67), that option is mainly for cards, not ChipKeys.

MR ChipKeys let an operator enter odometer readings along with other information at the FIT. The odometer entries are saved (written) only to *Vehicle* ChipKeys -- *Driver* ChipKeys are read-only. All entries, up to the “Maximum Transaction Number” for the day, are recorded.

About Mileage Reasonability

Note

The terms Mileage Reasonability and Odometer Reasonability mean the same thing.

In a typical transaction, an operator enters the current vehicle odometer reading. The system subtracts the previous odometer entry (stored in the ChipKey) from the current entry. The system then checks if the difference between the two entries is within the range programmed for that particular ChipKey. An entry is considered "reasonable" by the system when the difference between the two entries is within the programmed range.

Example

Say the current odometer entry is 12625 and the previous entry was 12500 -- the difference is 125. If the reasonability range is 150 (minimum) to 250 (maximum), then 125 is *not* a reasonable entry because the difference is less than the range minimum of 150.

Each operator can have their own range. Maximum Transactions Per Day (MTD, from one to nine) can be defined for Single or Vehicle ChipKeys.

Enter “0" to disable the MTD feature.

Before you can use ChipKeys for Mileage Reasonability, you must go through a FSC setup sequence and a ChipKey programming sequence, described later in this chapter.

Service Warning Mileages & Reasonability

Note

You can define WARNING and NO FUEL mileages separately from the Reasonability mileage.

Warning Mileages. If an entered odometer mileage equals or exceeds the WARNING mileage, a preprogrammed message appears. Fueling continues normally after the warning.

No Fuel Mileages. If the entered mileage equals or exceeds a NO FUEL mileage, a Service Overdue message appears, and fuel delivery is prevented, *even if the mileage is within the Reasonability range*.

The ChipKey must be reprogrammed by authorized personnel to be reactivated (or reauthorized). By modifying its associated card record with the EDIT command you can reprogram a ChipKey the next time it is used at any FIT.

Note

Entered mileage cannot exceed highest ChipKey mileage by more than 49000 miles.

Power Failures

System2 with Mileage Reasonability resumes fueling even after a power failure. The operator must enter the same mileage figure as at the start of the first fueling process. The system searches transactions; if a transaction with the same mileage value is found, then fueling is allowed.

Driver vs Vehicle Keys

Note that when Driver and Vehicle ChipKeys are involved, the Vehicle key must be entered before the Driver key. The Vehicle key always initiates the transaction, and the Driver key finishes it. Insert the Driver key to get a receipt.

Only Driver ChipKey numbers can be keypad-entered. Single or Vehicle ChipKey numbers cannot be entered on the keypad.

Reasonability Range Codes

You must enter the code number for each range value. The default values for these code numbers are listed in *Table 9* on *page 68*.

Different code numbers can be combined for a range. For example, a range could be programmed as 50 to 250 by selecting code #5 for the minimum and code #2 as the maximum.

Note

To change the default values of this table, use the SET ODOMETER REASONABILITY command (Page 67).

There are five possible responses for bad odometer entries made to a ChipKey. Each response is coded from “0" to “4". The code is entered during the ChipKey programming process.

Code 0

This is a "bypass". All odometer entries are defined by the system as reasonable. Fueling is always allowed.

Code 1

This is the most restrictive method. After three bad odometer entries:

- The ChipKey is invalidated and fueling is locked out.
- The system will not recognize the invalidated ChipKey until it is reprogrammed.
- The Bad Entry counter resets to zero after a good odometer entry.
- The odometer reading in the ChipKey is not updated unless the current odometer entry is reasonable.

Code 2

Unreasonable entries are handled the same as with Code 1, EXCEPT that after the third bad entry:

- The report flags the ChipKey on the transaction receipt by printing `<<<' in the mileage field.
- Fueling is allowed but *only* for the current transaction.

Code 3

Fueling is always permitted with this method. Bad entries are logged in two ways:

- If all three bad entries differ, the transaction is flagged on the transaction receipt and on the report by printing `===' in the mileage field. The odometer reading stored in the ChipKey is not updated, but the bad entry log in the ChipKey is reset to zero. The user must enter three more bad odometer readings for their transaction to be flagged again.
- If two of the three bad entries are the same, `>>>' is printed in the mileage field and the odometer value in the ChipKey is updated with the value that was entered twice.

Code 4

As with Code 3, fueling is always allowed. This method logs bad entries in two ways:

- If all three bad entries are different, the transaction is flagged in the same way as a “Code 3" (above) is flagged.
- If two of the three bad odometer entries are the same, the twice-entered value is printed in the mileage field and the odometer value in the ChipKey is updated with the value.

The bad entry counter is automatically reset to zero after a good odometer entry.

Programming Procedure

Each ChipKey has its own “card” file to store data. The data includes card and account numbers, expiration dates, allocation values, restrictions, and PINs, as well as information for portable odometer reasonability (ranges, mileage values, response methods). The ChipKey card files are stored in the System2 card buffer as with any card file.

ChipKey prompts also appear in the SET CARD and INSERT CARD commands (*Page 77*).

You can modify and validate ChipKeys using only a FIT. However, OPW Fuel Management Systems sells a ChipKey Encoder that plugs into the FSC. This device lets you program keys either locally (via a terminal attached to the FSC) or over a modem.

Refer to encoder documentation (**M72-01.04**) for more information.

A worksheet (*Figure 4* on *page 24*) lets you write down ChipKey data.

FSC Setup

Each of the following settings is reflected in a *Record Type Field* (*Page 25*). Before you begin a terminal should be connected to the FSC TERMINAL port. To set up your System2 for MR ChipKeys, do the following:

1. Enter the SET CARD command to specify your card/account buffer size, and to define the card/account record (*Page 77*).
2. After the Driver/Vehicle/Account name entry, you are prompted **CHIPKEY REPROGRAMMING FACILITY (Y/N)?**. Press [Y] to activate the card buffer fields in Steps 3-7 below.
3. **WARNING MILE (Y/N)?**. Press [Y] to enable the system to display a Warning Mileage message. Otherwise, press [N].
4. **NO FUEL (Y/N)?.** Press [Y] to enable the system to display a SERVICE OVERDUE message and block fueling. Otherwise, press [N].
5. **LIMIT OF TRANSACTIONS/DAY (Y/N)?** This selects whether the Maximum Transactions per Day prompt appears. Press [Y] to enable or [N] to skip to the next prompt.
6. **MILEAGE ENTRY RANGE CODES (Y/N)?** This is the Reasonable Mileage Range. Press [Y] to let the system request this information or [N] to skip the prompt.
7. **METHOD OF REASONABILITY (Y/N)?** This selects one of the five responses to an invalid odometer value. Press [Y] to enable the system to accept a code or [N] to skip the prompt.

FSC Insert/Edit Procedure

After specifying the card buffer size and defining the card/account record, begin entering data for each ChipKey (or card) with the INSERT CARD command. This command prompts you for items you selected when you defined the card record:

1. The INSERT and EDIT commands first prompt you for the standard card record items (card number, PIN, etc.).
2. After the `Miscellaneous keyboard' entry, you are prompted **CHIPKEY MODIFICATION -...VALIDATE CHIPKEY (Y/N)?**'.

- If you press [Y], the ChipKey will be remotely validated during the next driver fueling process. Even if the key is invalidated (during previous mileage entry), the customer will get fuel, and also enter the current mileage.
- Press [N] to skip.

3. **MODIFY DAY_LIMIT (Y/N)?**' Press [Y] to change the limit; you will be prompted to enter a value of one to nine.
4. **MODIFY WARNING MILEAGE (Y/N)**? Press [Y] to change the WARNING mileage ; you will be prompted to enter a value of one to 999999.
5. **MODIFY NO FUEL (Y/N)?**. Press [Y] to change the NO FUEL mileage; you will be prompted to enter a value of one to 999999.
6. **MODIFY MILEAGE ENTRY RANGE CODES (Y/N)?** Press [Y] to change; you are prompted to enter an odometer reasonability code number for both the lower and upper ranges.

7. **MODIFY METHOD CODE (Y/N)?** Enter [Y] to change the code; you are prompted to enter a method code number.

Showing or Printing Cards

When a ChipKey is modified in the FIT, all the modifications are simultaneously transferred to the System2 card record database, and are visible when you do a SHOW CARD or PRINT CARD operation

After ChipKey modification, the card record lists only current values.

Programming the ChipKey - Step by Step

See the Worksheet on *Page 24*. To program a new key, or modify a ChipKey at the FIT, a portion of the System2 Test Mode is used. You can also use the optional ChipKey standalone encoder to program keys.

1. To enable Test Mode, set position 1 of DIP switch #1 on the FIT board to ON and press the RESET button on the FIT board.

- *The system prompts you for hardware tests. Skip these tests by pressing the [N] key at each prompt.*

2. After the last test prompt, the system prompts **PROGRAM CHIPKEY?**. Press [Y] to begin.

- *Remember to press the [YES/ENTER] key after each numeric entry in the following procedure.*

3. You are prompted **VALIDATE KEY?.** To validate a ChipKey, press [Y]. You are prompted to insert the key.
4. After you insert the key, it is validated. The system asks if you want to program another ChipKey. Press [Y] to proceed.

- *To modify another ChipKey, press [N] at the* **VALIDATE KEY?** *prompt. You are then prompted for the System #.*

5. Enter up to four digits for the system network number (which is listed in the System Information Report). If you enter a wrong number, an error message appears and you are returned to the test loop.
6. After system network number entry, you are prompted: `KEY#:' Enter up to 15 digits for the key number.
7. **ODOMETER? [Y/N]**. This prompt is for the mileage reasonability feature. Press the [YES] key to prompt the items for this feature. Press the [NO] key to bypass this feature.

- *If you bypass Odometer Reasonability, the next prompt is for the daily limit.*

8. The first Odometer Reasonability prompt is: **`MILE:`** Enter a value of one to 999999 for the vehicle's current odometer reading. Enter "0" to bypass this feature.
9. **`WARNING MILE.`** This is the mileage at which the system displays the “Service Required” message, and only appears if you enabled it in the FSC programming procedure. Enter a value of one to 999999. Enter "0" to bypass this feature.
10. **`NO FUEL MILEAGE.`** This is the mileage at which the system displays the “Service Overdue” message, and prevents fueling. The prompt only appears if you enabled it in the FSC programming procedure. Enter a value of one to 999999. Enter "0" to bypass this feature.
11. **`ENTER METHOD`**. Enter `0', `1', `2', `3' or `4' for the method of response to incorrect entries (*Page 19*).
12. **`LOWER RANGE [0 - 15]`**. Enter a code number from the table of mileage values (*Table 9* on *page 68*).
13. **`UPPER RANGE [0 - 15]`**. Enter a code number from *Table 9*.
14. **`DAILY LIMIT`**:. Enter a value of one to nine to specify the limit of transactions per day.
15. **`INSERT KEY`**. Place the ChipKey into the reader socket. When the key is securely in place, the system writes the data into the key. The message `**`PROGRAMMING!`**' displays for several seconds.
16. When programming is complete, you see **`REMOVE KEY!`**'.

After you remove the key, the message **`PROGRAM CHIPKEY?`** appears. Insert another key, or, if this is the last key, set position 1 of DIP switch #2 on the FIT board to OFF and press the RESET button on the FIT board.

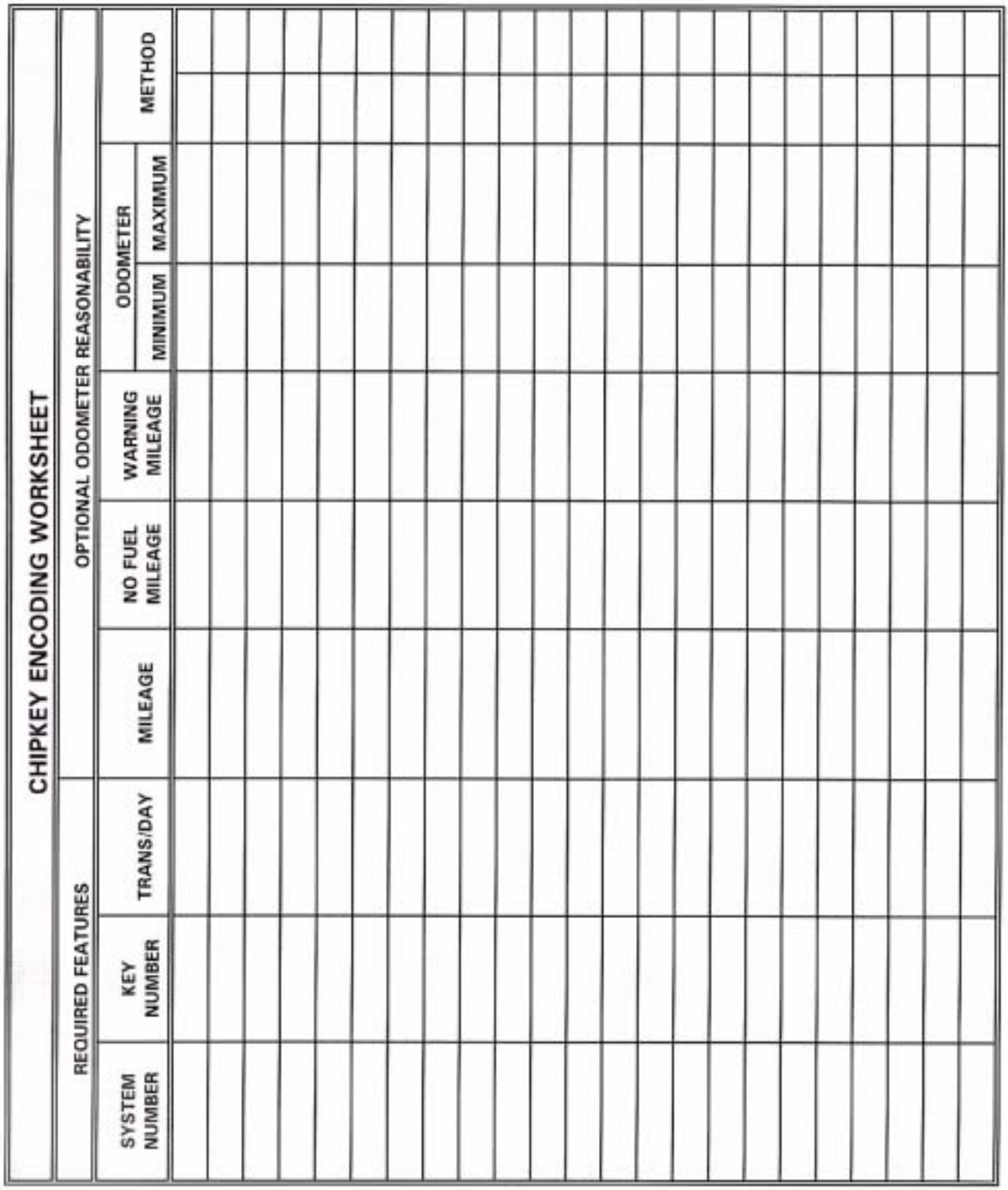


Figure 4: ChipKey Encoding Worksheet

Card Medium Field

Bit	Definition	Settings
1	Card Medium	0= Read/Write ChipKey, 1= OTHERS (Mag Card, Optical Card, etc.)
2	Reserved for future use	--
3	ChipKey validation flag	1=Validation, 0=No validation
4	ChipKey Mileage Reasonability Range Code modification flag	1=Range will be changed, 0=Range already changed, or no change required
5	ChipKey Mileage Reasonability Method modification flag	1=Method will be changed, 0=Method already changed, or no change required
6	ChipKey Daily Limit Modification Flag	1=Limit will be changed, 0=Limit already changed, or no change required
7	ChipKey NO FUEL Mileage Modification Flag	1=Mileage will be changed, 0=Mileage already changed, or no change required
8	ChipKey WARNING Mileage Modification Flag	1=Mileage will be changed, 0=Mileage already changed, or no change required

Record Types Field

Bit	Purpose	Settings
1	Manager Validation	0=Valid, 1=Invalidated by manager
2	System Validation	0=Valid, 1=Invalidated by the system (three bad PIN entries)
3	Miscellaneous Entry feature	0=Misc. Entry feature DISABLED, 1=Misc. Entry feature ENABLED
4	Odometer Entry feature	0=Odometer Entry field DISABLED, 1=Odometer Entry field ENABLED
5-8	Card Type/Language	0001=Single, Language 1 1001=Single, Language 2 0010=Driver, Language 1 1010=Driver, Language 2 0011=Vehicle 0100=Account

Card/Account Field Codes

Code	Field Description	Format	Padding
a	Card/Account	19 digits, left-justified	Space
b	Record Type	8 binary digits	None
c	Account Number	4 digits, right-justified	Zero
d	Expiration Date	8 digits (MMDDYYYY)	None
e	Fuel Totals to Date	8 digits (######.##)	Zero
f	Fuel Totals for Today	8 digits (######.##)	Zero
g	Monthly Allocation	6 digits, dollars only, no decimal (######)	Zero
h	Daily Allocation	6 digits, dollars only, no decimal (######)	Zero
i	PIN (Personal ID Number, Card Record ONLY)	6 digits (######)	Zero
j	Odometer (Card Record ONLY)*	6 digits (######)	Zero
k	Reasonability*	2 digits	Zero
l	Product Restriction	2 digits	Zero
m	Quantity Restriction	2 digits	Zero
n	Driver, Vehicle or Account Name	9 characters	Zero
q	“Warning” Mileage**	6 digits	Zero
r	“No Fuel” Mileage**	6 digits	Zero
s	Daily Limit**	1 digit	Zero
t	Range** Lower Upper	 2 digits 2 digits	 Zero Zero
u	Method**	1 digit	Zero
v	Card Medium/ChipKey Modification Flags	8 binary digits	None

** For ChipKeys, force the card to “0" in RESTORE and UPDATE*

*** Use if ChipKey Mileage Reasonability is enabled. If MR disabled, force the card to “0" in RESTORE and UPDATE. For BACKUP, the field contains either a valid number or a random number. Check the ChipKey flags: if a flag is set, it’s a valid number. Otherwise, it’s random.*

Main Menu and Menu Overview

```
MAIN MENU
---------

      A - SYSTEM ACCESS
      B - SYSTEM TIMES
      C - SYSTEM DEVICES
      D - CUSTOMER MESSAGES
      E - SYSTEM PARAMETERS
      F - RESTRICTIONS
      G - CARDS/ACCOUNTS
      H - TRANSACTION DATA
      I - SYSTEM TOTALS
      J - JOURNAL PRINTER

      'RETURN' FOR COMMAND LINE

ENTER CATEGORY:
```

Figure 5: System2 Main Menu

System2 powers up in command line mode. You issue commands at the “>” prompt (such as **> SET TIME**). Press the ENTER key after entering the command. Common command types are:

- **SHOW**. Displays information from a System2 data base on the screen of your terminal or PC. This command does not require privileged status.
- **PRINT**. Sends data to your external journal printer to make a hard copy. Most (but not all) information can be printed, including all setup data (cards, accounts, fueltypes, prices, etc.) and all transaction information (time, date, amount, price, cost, etc.). This command does not require privileged status.
- **SET** (**FORMAT** and **CONFIGURE** work similarly). These commands are used to enter or change the setup data. These commands are privileged. Note that after FORMAT or CONFIGURE commands is used, one of the `DOWNLOAD' commands must then be entered.

Other commands are listed below:

- **INSERT**, **DELETE**, **EDIT**, **COPY**, **SORT** - These commands are used with the card files. Some are privileged commands, some are not.
- **INSTALL**/**REMOVE** - These commands activate and deactivate a device (such as a PCT). Privileged commands.

- **CLEAR** - There are several CLEAR commands, which erase transactions from the system data base. Privileged command.
- **REPORT** - activates the optional Report Package. Privileged command.

Accessing System2

Figure 6: System Access Menu

OPEN and CLOSE

The **OPEN** and **CLOSE** commands give immediate access to pumps. Both commands are privileged, requiring the main password.

When a **CLOSE** command is issued, all activities in progress (pumping, printing a receipt, etc.) complete normally but no new activities are allowed to begin.

HELLO and BYE

HELLO accesses the privileged mode. You'll be prompted for the system password (the factory default password is `HELLO').

BYE exits the privileged mode.

Note

The system automatically exits from privileged mode if no keyboard entry is made for 10 minutes.

To access the system using a PC and/or a modem, see *Appendix D - Using System2 With a PC* on page 111.

Use the privileged mode to enter and change setup data. You MUST enter the "main" password to Privileged mode. To return to normal mode from the command line **$>** prompt, type BYE.

See *Password* on page 65 for information on changing your passwords.

CALL

The **CALL** command creates a virtual link between the TERMINAL port and the MODEM port on the Fuel Site Controller.

- *Before executing the CALL command, a modem and terminal must be connected to the MODEM and TERMINAL ports, respectively.*

After executing **CALL**, use a terminal connected to the FSC TERM port to issue dial out commands directly to the modem.

To break the connection, type **BYE**.

PASSTHRU

The **PASSTHRU** command lets two intelligent devices (such as a OPW Fuel Management Systems Site Sentinel and a System2) “talk” to each other via only one terminal. The terminal can be connected to either of the devices.

- *BEFORE issuing a* **PASSTHRU** *command, connect the second device to the* AUX 2 *port on the System2. The video terminal goes to the* TERM *port as before.*

The “other” device must use the RS-232 standard interface, and must be set at the same baud rate and parity as the System2: 7-bit, even parity, 1 stop bit.

After you send a **PASSTHRU** command, System2 enters a “transparent” mode, where characters sent to it by the terminal or a modem are passed through to the second intelligent device. Any characters coming from the other device would likewise pass through to the terminal or modem.

Press [CTRL] [Z] to break the pass-through connection.

Setting Time and Date

Time of Day

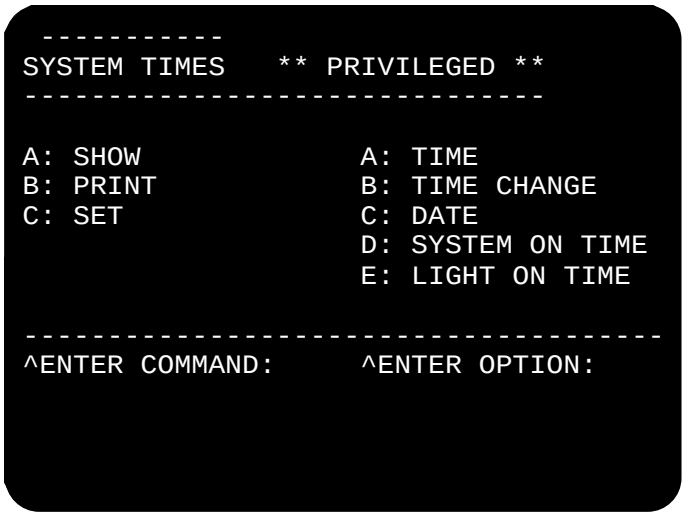


Figure 7: System Times Menu

The **SHOW TIME** or **SET TIME** command displays or sets the current time of day. SHOW TIME displays current system time.

To set time of day:

1. Type **SET TIME** [ENTER].
2. Enter the time in the format HH:MM or HH:MM AM or PM. For example, 12:57 PM.

- *If PM is not specified, AM is assumed.*

3. Press [ENTER] to complete the entry; this sets seconds to zero. The new time and current (or default) date are displayed.

- Press [ENTER] with no other entries to leave the current time unchanged.

Daylight Savings Time

Note

Daylight savings time must be set in System2 annually.

The **SET TIME CHANGE** command sets dates on which the internal clock moves ahead or back by one hour, to adjust for the change between daylight savings time and “standard” time. The change occurs at 2:00 AM on the date specified.

The **SHOW TIME CHANGE** command displays change dates in the system.

To set daylight savings time:

1. Type **SET TIME CHANGE** [ENTER]
2. Enter the date you set your clocks *back* an hour at the `ENTER DATE WHEN TIME IS MOVED BACK 1 HOUR:` prompt.

- *Use date format* **mmm dd yyyy** *(the year must be four digits).*

3. Press [ENTER].
4. Enter the date you set your clocks *ahead* an hour at the `ENTER DATE WHEN TIME IS MOVED AHEAD 1 HOUR:` prompt.
5. Press [ENTER].

- *The word* **CHANGE** *can be abbreviated* **CH** *in these and other line commands.*

Setting Current Date

The **SHOW DATE** or **SET DATE** command displays or sets the current date within the system's memory.

To set current date, do the following:

1. Type **SET DATE** [ENTER]
2. Enter the date at the `ENTER DATE (MMM DD, YYYY):` prompt.

- *Use date format* **mmm dd yyyy** *(the year must be four digits).*

3. Press [ENTER].

- *Press* [ENTER] *with no entry to leave the current date unchanged.*

Setting System2 ON and OFF Times

The **SHOW SYS TIME** and **SET SYS TIME** commands display or set the time System2 goes ON and OFF, and the time during which only "transactions in progress" can be performed ("receipts only" time).

Use the **SET SYS TIME** command to set the following four options. Time for the first three is entered in **hh:mm** format).

- **SYSTEM ON TIME** - specifies the time of day the System2 turns itself ON. When ON, System2 displays messages and accepts cards or key-pad entries.
- **SYSTEM OFF TIME** - the time of day System2 shuts itself OFF for the day. No new transactions can begin, though any in progress are allowed to finish.
- **RECEIPTS ONLY TIME** - time System2 stops new transactions from beginning, while allowing "just completed" customers to get receipts. Typically precedes **SYSTEM OFF TIME** by several minutes.

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

- **TIME ADJUST** - A software adjustment to the internal clock. If your system is gaining or losing time, you can add or subtract seconds each day with this entry.

Light ON/OFF Time Commands

The **SET LIGHT** command lets you set the SYSTEM2 to turn the “pocket” lights in the ON and OFF at designated times.After selecting this option, the following prompts appear:

```
ENTER LIGHT ON TIME:
ENTER LIGHT OFF TIME:
```

Enter time in the same format as that for SYSTEM ON TIME.

Device Setup

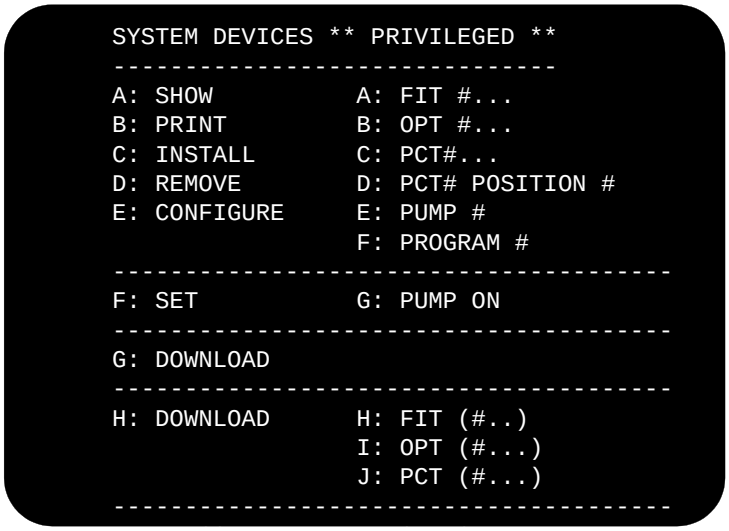


Figure 8: System Devices Menu

About the System Devices

Because of its relative complexity, this introduction describes the System Devices .

The section is arranged by device type: **FIT (or OPT) #, PCT #, PCT #/ Position #, Pump # and Program.** Not all commands work with all devices.

Note

C/OPTs and OPTs are types of fuel island terminals (FITs). Some "FIT" commands work with OPTs and C/OPTs but OPT and C/OPT commands do NOT work with the older FITs.

FIT Commands

The **SHOW**, **PRINT**, **INSTALL**, **REMOVE** and **CONFIGURE FIT #** commands let you view, configure, install or remove FITs. You can also determine if the receipt printer will issue receipts, which PCTs to shut off when the emergency stop button is pressed, and reset the card reader error counter.

Issuing a SHOW FIT command, along with a valid FIT number, displays the following message:

```
FIT Installed
FIT INFO:
  PDI   KR16   1.02A   0000   0000   GRAPH DISPLAY
Island Terminal:  OPT
Decline Timeout:  10 seconds
Prompt Timeout:   15 seconds
Receipts:  0    5 day limit to receive receipts
PCTs to shut off On E-Stop: 1,2,3,4
Card Reader Error Counter:  0
--ACCESS TO ALL PUMPS
```

Entries vary depending on current FIT settings. **CONFIGURE FIT** changes these settings. The following prompts appear one by one after using CONFIGURE FIT #:

- **SPECIFY PCTs TO SHUT OFF ON E-STOP (Y/N)?** - Default is N (meaning ALL PCTs shut off upon E-STOP). If you enter [Y] to select which PCTs will be turned off, you'll see:
- **ENTER PCTs TO SHUT OFF (#,#.)** - Enter a range and press [ENTER].

If there are card reader errors logged, the next prompt you'll see is:

- **CLEAR CARD READER ERROR COUNTER (Y/N)?** You will only see this prompt if the "error counter" is greater than zero. The error counter keeps a running total of 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 or replacement

Enter **Y** to clear the counter. Enter **N** to keep the counter the same and to display the next prompt.

- **CHANGE FIT ACCESS TO PUMPS (Y/N)?** - Default is N. Enter [Y] to change which pumps can be activated by the specified FIT: `ENTER VALID PUMPS (p1, p2,.).` Enter N to make all pumps accessible from this FIT.

Enter **DOWNLOAD** *after FIT configuration.*

INSTALL FIT Command

The INSTALL FIT command activates the specified FIT and opens a communication link between the installed FIT and the FSC.

REMOVE FIT Command

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

OPT and C/OPT Commands

Note

"OPT" and "C/OPT" are interchangeable in this section.

SHOW OPT Command

```
OPT INSTALLED
RECEIPTS: 0 NO LIMIT TO RECEIVE RECEIPT
KEYBOARD ACCESS - ENABLED
CARD READER ERROR COUNTER: 0
LIST OF VALID PUMPS - NONE
```

Entries vary depending on actual C/OPT settings.

CONFIGURE OPT Command

The following prompts appear one by one after you send a **`CONFIGURE OPTOPT #`** command:

- `ISSUE RECEIPTS (Y/N)?` - Default is **`N`**. If **`Y`** - the C/OPT receipt printer issues a receipt. Y produces two additional prompts:
  - `ENTER LIMIT TO RECEIVE RECEIPT IN DAYS (0.99)` - Number of days after a transaction that a customer can receive a receipt. Default is no limit (press [ENTER]).
  - `CLEAR RECEIPT COUNTER (Y/N)?` - The receipt 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.
  - `PRINT PRICE INFORMATION FOR PROPRIETARY CARDS (Y/N)?` *Only applies to proprietary cards.* When set to YES, price per unit and the total sale value are printed on the receipt.
- `KEYBOARD OPTIONS (Y/N)?` - Default is **`N`**. Enter [Y] to display:
  - `ENABLE KEYBOARD ACCESS (Y/N)?` - Default is N. With this feature enabled, a customer can enter their card number on the C/OPT keyboard.

Note

The card reader is <u>not</u> disabled by enabling keyboard access.

If there are card reader errors logged, the next prompt you'll see is:

- `CLEAR CARD READER ERROR COUNTER (Y/N)?` You will only see this prompt if the "error counter" is greater than zero. The error counter keeps a running total of 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 or replacement

Enter **`Y`** to clear the counter. Enter **`N`** to keep the counter the same and to display the next prompt.

- `CHANGE OPT ACCESS TO PUMPS (Y/N)?` - Default is **`N`**. Enter [Y] to change pumps activated by the specified C/OPT:
  - `ENTER VALID PUMPS (p1, p2,.).` **`N`** makes all pumps accessible.
- *Enter the* **`DOWNLOAD`** *command after OPT or C/OPT configuration.*

INSTALL OPT Command

This command activates the specified OPT or C/OPT, establishing a communication link between the installed OPT or C/OPT, and the FSC.

Note

OPT #1 is automatically installed at power-up.

REMOVE OPT Command

The privileged **`REMOVE OPT`** command stops the FSC from communicating with the specified OPT or C/OPT.

PCT Commands

You can **`SHOW`**, **`PRINT`**, **`INSTALL`**, **`REMOVE`**, or **`CONFIGURE`** a PCT#.

Each System2 FIT has a PCT board that controls pump operations. This board, in the FIT or in a remote cabinet, must be uniquely numbered.

PCT number is set with DIP switch #5 on each PV-268 board. See the *System2 Installation Manual* for details.

If the FSC is equipped with UPC (Universal Pump Controller) software, it can authorize fueling transactions via a pump control console (such as used in a self service station).

Note

Pumps controlled by UPC software do not require a PCT.

CONFIG PCT Command

The **`CONFIG PCT #`** command first asks if a UPC will be substituted for the specified PCT. Press [Y] or [N] as appropriate.

If yes, you are prompted if the UPC is internal (built into the FSC) or external (in a separate cabinet). Refer to the appropriate System2 UPC manual before proceeding with UPC configuration.

Note

To reconfigure an installed PCT as a UPC, first remove the PCT using the command REMOVE PCT #.

When System2 is "cold started" (with no setup information in the data base), PCT #1 is automatically installed as not a UPC. A cold start is required: (1) when System2 is first installed or (2) if both the system power and backup battery fail.

The `INSTALL PCT` command activates the PCT, creating a link between the installed PCT and FSC. There is a PCT for each FIT. This command does *not* install all positions for a PCT.

Caution

Install pumps BEFORE installing PCTs!

After installing each pump position, the PCT(s) themselves *must* be installed in order for the pumps to operate as part of the system.

A PCT can be configured and kept idle by *not* installing it.

On power-up, PCT #1 is automatically installed.

REMOVE PCT Command

The REMOVE PCT command ends FSC-to-PCT communication to the specified PCT and deactivates all positions in the specified PCT.

All the programmed parameters remain intact; you can re-install the "removed" PCT without reconfiguring it.

PCT POSITION Commands

You can SHOW, PRINT, INSTALL, REMOVE, or CONFIGURE a position within a PCT#. These commands configure or show individual positions within a PCT. PCT positions can be viewed, printed, installed, removed or configured. Each PCT can control up to eight pumps, located at positions #1 - #8.

```
PCT  POSITION
```

```
ENTER PUMP #:
ENTER PULSES PER GALLON:
MAX FUEL TO BE DISPENSED PER TRANSACTION:
PUMP SENTRY OPTIONS (Y/N)?
  ENABLE PUMP SENTRY (Y/N)
PUMP SENTRY:
GALLON PULSER OPTIONS (Y/N)?
MAXIMUM TIME ALLOWED FOR FUELING (minutes):
MAX TIME ALLOWED TO RETRIEVE PUMP HANDLE (secs):
MAX TIME ALLOWED TO DETECT FIRST FUELING PULSE (secs):
MAX TIME ALLOWED BETWEEN FUELING PULSES (secs):
ENTER FUELTYPE CODE #:
ENTER TANK #:
CLEAR PUMP TOTALS (Y/N)?
ENTER TOTALIZER VALUE:
```

Required Entries

After issuing this command, the following parameters must be specified for each position:

Pump

This is the pump number displayed for this PCT position (example: `USE PUMP #12'). This number is only a label and does *not* have to match the PCT position number.

A pump number can be assigned to more than one position on the same PCT. When that pump number is selected by a customer, all the associated positions are activated.

Each PCT position records its own transaction; in this example, two transactions would be recorded (one for each pump). *Multiple pump use is not possible when using UPC software.*

Pulses Per Unit

Specifies the number of pulses per “unit” of fuel. A unit is typically gallons, liters or quarts. The prompted unit is the one related to the fuel type just entered. Default value is 100.

Optional Entries

The following optional items have defaults that should be appropriate for most systems. Press [ENTER] to skip past an optional item and enter the default value. To change a default, enter your new value at the prompt.

Max Fuel Per Transaction

This is the maximum fuel amount to be dispensed for any transaction using this pump). Default is 10 units.

Max Fuel Per Transaction is not the same as Quantity Restriction or the Daily/ Monthly Allocations described in Restrictions on page 67.

Enable/Disable Pump Sentry Feature

This option deactivates the pump if three "zero quantity" transactions appear in a row, possible pump or pulser trouble.You will be prompted twice: `PUMP SENTRY OPTIONS (Y/N)?'. Enter [Y] to enable the sentry.

If you enter [Y], you'll see `ENABLE PUMP SENTRY (Y/N)?'; press [Y] or [N] as appropriate. Default is disabled. A "premature busy" error does NOT increment counter.

Max Time For Fueling

This is the time limit (in minutes) given the user to fuel. Default is five minutes. Time is measured from when the pump is first activated; power is removed from the pump when Max Time is exceeded To deactivate this feature, enter `0'.

Max Time For Pump Handle

The maximum time allowed (in seconds) between pump activation and pump handle retrieval; default is 60 seconds. Enter "0" to deactivate.

Max Time For First Pulse

The maximum time allowed (in seconds) to detect the first fueling pulse from when the pump handle is first retrieved. Pump power is removed when the specified time is reached. Default is 60 seconds. Enter "0" to deactivate.

Max Time Between Pulses

The maximum time allowed (in seconds) between fueling pulses. Pump power is removed when this time is reached. Default is 60 seconds. To deactivate, enter "0".

Fueltype Code

This is a number, from 1 to 16, that represents the type of fuel this position will dispense. See *Page 64* for information on fuel types.

Tank

This is the tank number from which product will be pumped. A PCT position with the same fuel type as the tank from which product is drawn must be defined. Default tank number is *position #.*

Clear Pump Totals

Lets you clear the net pump totals; default is *no*.

Enter Totalizer Value

Set a number to match the totalizer counter on the pump face; tracks the amount of fuel actually dispensed by the pump and as seen by System2. Default is “0”. For UPC-equipped systems, the last four prompts are repeated for up to four hoses. Do a DOWNLOAD either directly, or via the menu, after configuring a PCT. Activate/deactivate the specified PCT position.

Set a number to match the sum of the totalizer counters on the two bound pump faces; tracks the amount of fuel dispensed by the “bound pump” and as seen by System2. Default is “0”.

Customer Messages

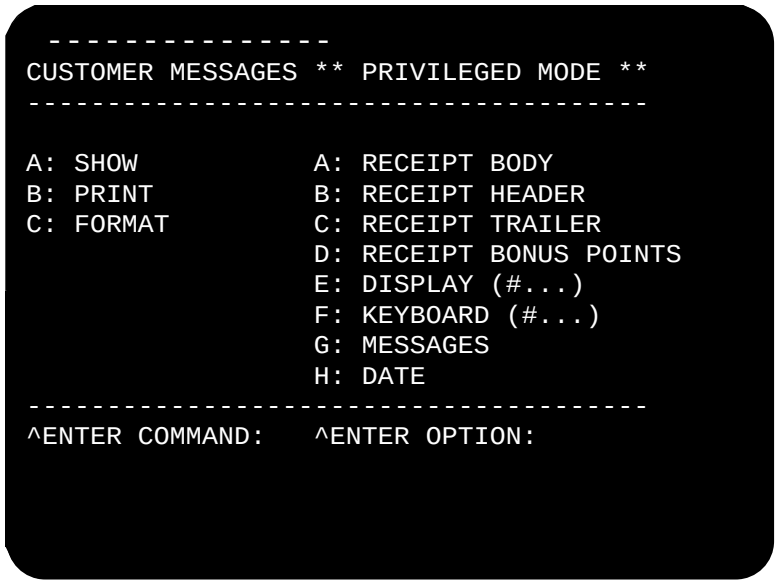


Figure 9: Customer Messages Menu

This section explains how to format the printed customer receipts (body, header, trailer, and bonus points), how to set up messages and prompts on the various types of FIT, displays, and how to change the response from a keyboard input (for example, “Y” or “N”).

Note

The receipts pictured in this section come from a standard System2 FIT. OPT or .

Receipts

Receipt Components

See *Figure 10*. A receipt printed by a System2 FIT contains these parts:

- Header
- Body
- Trailer

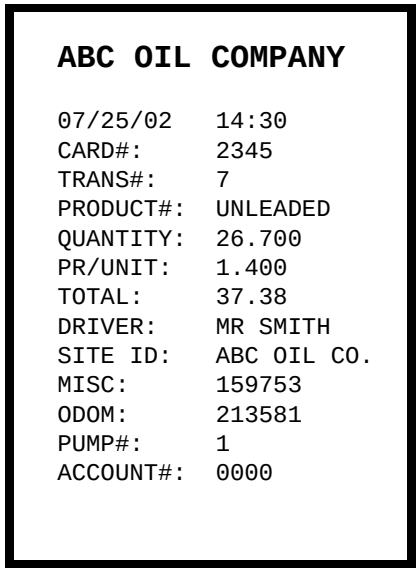


Figure 10: Typical Receipt Layout

Receipt Header

Five lines of the receipt are reserved for pre-printed or custom headers. The two topmost lines ("PRE-PRINTED") cannot be set by you. They are often blank, to act as a separator. One blank line separates header and body. If a large font is used, two of the top four lines are defined. If the smaller type is used (Type #2) TWO (smaller style), all four top lines are used.

Receipt Body

The BODY uses up to 20 lines:

- LINE 1 (the top "header" line) is always blank
- LINES 2-19 18 are programmable by you
- LINE 20 (the bottom “trailer” line) is always blank

Receipt Trailer

The TRAILER uses up to four lines.

Receipt Features

- Header and trailer/bonus points messages are printed in expanded format unless you specify otherwise.
- Receipt body fields can be set in any order
- Current date & time are automatically printed on each receipt
- Receipt size is fixed - make sure the programmed number of receipt body lines will fit onto the receipt.

Modifying the Receipt Body

You can show, print, or format the body.

Note

The receipt body, by default, contains all receipt variable codes. If a code contains no information from a transaction, it does not print. This means you only need to remove the variables that you do not want to print.

1. At the P> prompt type **FORMAT RECEIPT BODY** [ENTER]

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

2. Select a function by entering the capitalized letter; for example, to exit, press the [X] key and then the [ENTER] key:
   - **S** Shows current receipt body
   - **D** Deletes a line from the receipt body
   - **I** Inserts another line into the body
   - **X** Ends this function
   - **Line #** Line number to edit. Label and code items can be modified.
3. Fill in the first 10 characters of a line. This is the label printed for the selected receipt code.
4. Enter a Receipt Code (*Table 5*) to print data from the transaction or card file on the same line.

Table 5: Receipt Variable Codes

Code # and Line #	Variable Transaction Data
1.	Card 1 #
2.	Card 2 #
3.	Transaction Number
4.	Product Name
5.	Quantity Dispensed
6.	Price Per Unit
7.	Total Price
8.	Driver Name
9.	Vehicle Name
10.	Company/Account Name
11.	Site I.D.
12.	Miscellaneous
13.	Odometer
14.	Miles Per Gallon (MPG)
15.	Liters Per 100 Kilometers
16.	Pump Number
17.	Account Number
18.	*Blank*

Creating the Receipt Header

You can show, print, or format a header.

1. Type **`FORMAT RECEIPT HEADER`** [ENTER] at the P> prompt.
2. Enter up to four lines, one at a time. Each line holds up to 11 characters. Text can be red or black.
3. Press [ENTER] between lines.

- If you don't want to use all four lines, press [ENTER] to skip lines.

Creating the Receipt Trailer

The receipt trailer (or footer) is a message that prints at the end of each receipt. The format is the same as for the header.

FIT Display Messages

About FIT Messages

The FIT or OPT display guides customers through the fueling process with a series of prompts. Your System2 is pre-programmed with default prompts for certain events.

Your FIT has one of three displays:

- Standard 2x16 display shows two lines of text with up to 16 characters per line.
- Optional graphics display combines a picture with a text prompt.

Type **`SHOW SYSTEM`** [ENTER] for a status report telling you what type of display is in your System2.

Note

You MUST issue a **`DOWNLOAD`** *command after altering a prompt, in order for it to be visible.*

Default Messages

See *Table 6* for default FIT, OPT or messages.

Use the **`FORMAT DISPLAY DEFAULT`** command to override the physical Display Type DIP switch settings on the PC board. See the *System2 Installation Manual* for more details.

- When the system is in “Receipts Only” mode, prompts #6 and #7 alternately display when prompting for a receipt.
- Prompts #8 and #9 alternately display while waiting for a customer to activate the system (if #8 and #9 are six characters less then maximum, the current time is also shown).

If changing the default message, remember that only the text is changed, *not* any function. For example, `INSERT CARD' can be changed to `PUT IN CARD' but *not* to `ENTER CURRENT TIME'.

Many of the messages in *Table 6* are explained in *Appendix E - Troubleshooting* on page 125.

Table 6: Default Display Messages

Code number	Default FIT, OPT Message
1	SYSTEM OUT OF SERVICE
2	READING CARD
3	REMOVE CARD
4	INCORRECT READING
5	CHECK CARD ORIENTATION
6	INSERT CARD FOR RECEIPT
7	INSERT CARD FOR RECEIPT
8	System2
9	INSERT CARD
10	SYSTEM CLOSED
11	PROCESSING PLEASE WAIT
12	PRINTING RECEIPT
13	TAKE RECEIPT
14	PRINTER ERROR
15	ISSUE RECEIPT?:
16	ENTER PUMP #:}
17	IN USE, RE-ENTER:
18	INVALID, RE-ENTER:
19	PUMP HANDLE? RE-ENTER:
20	FAULTY PUMP, RE-ENTER:
21	UNAUTHORIZED, RE-ENTER:
22	RESTRICTED, RE-ENTER:
23	USE PUMP # [number of gallons]
24	INSERT 2nd CARD
25	INCORRECT CARD
26	ENTER CARD #:
27	ENTER PIN #:
28	ENTER ODOM:

Table 6: Default Display Messages (Continued)

29	ENTER MISC:
30	ENTER 2ND CARD #:
31	RE-ENTER PIN:
32	RE-ENTER ODOM:
33	DAY LIMIT EXCEEDED
34	VEHICLE CARD MUST BE FIRST
35	NOT IN CARD FILE
36	CARD EXPIRED
37	CARD RECORD EXPIRED
38	CARD INVALIDATED
39	3 BAD PIN ENTRIES
40	ALLOCATION EXCEEDED
41	TIME FOR SERVICE
42	SERVICE OVERDUE
43	ACCOUNT EXPIRED
44	ACCOUNT INVALIDATED
45	ACCOUNT #S DO NOT MATCH
46	ACCOUNT RECORD NOT FOUND
47	
48	JOURNAL ERR - GET MANAGER
49	SYSTEM BUSY - BUFFER FULL

Standard 2 x 16 Display

After issuing the FORMAT DISPLAY command, enter the number of the display prompt (*Table 6Table 6*) to edit.

After entering a prompt number, the current prompt and four vertical lines appear (two for each row of the message). These lines represent the maximum length of the message; the new message must fit under the space between the lines - two rows, each with a maximum of 16 characters.

Upper and lower case letters can be used.

Enter the new prompt and press [ENTER] to complete the entry.

After issuing the FORMAT DISPLAY command, enter the number of the FIT, OPT prompt you want to edit.

After entering a prompt number, the current prompt and two vertical lines appear. Again, the lines are the maximum length of the message; the new prompt must fit under the space between the lines.

Graphics Display (Optional)

If your system has the optional Graphics Display, pictures and text (in multiple styles) can be placed on one or more lines of the display. The current time can also be displayed with any prompt.

Up to 80 characters can be displayed. To combine pictures with text, you add "control characters" (on a computer, CTRL characters display as ^) to text prompts. In addition to defining pictures, these characters also allow you to:

- Position text on the display
- Select a text style
- Show the current time
- Clear the picture from the display.

For graphics pictures see *Page 61*.

Graphic prompts are limited to 80 text characters, each control character is equal to two text characters. Use this prompt as an example:

```
^1^Z ENTER CARD
```

This prompt consumes 18 characters: two for `^1' (the code that displays picture #1), two for `^Z', (the code that selects the font), and twelve for the text ENTER CARD (including three spaces).

Character Display Commands

1. Enter a FORMAT DISPLAY command.
2. Enter a FIT prompt code (*Table 6* on *page 48*).

After entering the prompt number, the current prompt and two vertical lines appear.

Graphic Display Overview

You can place graphics and text on one or more lines of the display. The current time can also be displayed with any prompt.

Up to 80 characters can be displayed. To combine pictures with text, you add “control characters” (on a computer, CTRL characters display as ^) to text prompts. In addition to defining pictures, these characters also allow you to:

- Position text on the display
- Select a text style
- Show the current time
- Clear the picture from the display.

Sample graphic pictures begin on *Page 54*.

Sample fonts and several examples of prompts with pictures and a list of control characters begin on *Page 61*.

Graphic prompts are limited to 80 text characters, each control character is equal to two text characters. Use the following prompt as an example:

```
`^1^Z ENTER CARD
```

This prompt consumes 18 characters: two for `^1' (the code that displays picture #1), two for `^Z', (the code that selects the font), and twelve for the text ENTER CARD (including three spaces).

Graphics Display Command Syntax

Editing the text portion of a Graphics Display is like editing a standard one or two line display. After you issue a FORMAT DISPLAY # command, enter prompt # to edit. The text prompt for editing the Graphics Display is like a double version of the 1 x 40 display. When specifying the display number, you are shown the current prompt and two vertical lines spaced 40 characters apart.

The first 40 characters of the display prompt are shown on one line, in the space underneath the two vertical lines; the second 40 characters of the prompt (if applicable) are shown on a second line.

Enter the new prompt and press ENTER to complete the entry for the first line. Enter a second line for the prompt if desired. To format another, reenter the command.

Graphics Display Picture Selection

Pictures are defined within the text prompt. To associate a picture with a display prompt, simply add the control character for that picture to the display prompt text.

Place the picture control character before the prompt text. Only one picture can be connected to a message but you can tie the same picture to as many display prompts as desired.

Picture control codes, and FIT prompts typically attached to each picture, are shown on *Page 51*.

Graphics Display Text Position

To specify where on the display your text will go, insert one or more “position codes” in your prompt. There are 12 “lines” on the display; each of the 12 lines has a position code (*Table 7* on *page 60*).

The position code must be a CAPITAL letter and must be placed before the text. For example:

```
^C THIS IS ON LINE THREE
```

The ^C in the above prompt specifies the text will appear on line three. If no position control character is specified, the text begins on the first (top) line of the display.

Graphics Display Font Selection

Your text messages can be displayed in one of the typesets (shown on *Page 59*) listed below. The control character that defines the font is shown below as well:

- Serif, 20 characters per line (^Z)
- Sans-serif, 20 characters per line, Standard set (^Y)
- Sans-serif, 20 characters per line, International set (^X)
- Serif, 40 characters per line (^V).

Serifs are the small "tails" on type. The first character below is a serif typestyle, while the second is sans-serif:

T T

All typestyles use fixed-width characters (in other words, an "l" takes up as much room as a "W".

Note

Only one typestyle can be used per message.

If you do not specify a style, the last style you specified is used. If you do not specify any styles for any prompts, Style 1 is used.

Time of Day in a Graphics Display

To show current time in a prompt, insert control character `^T' at the end of any display prompt. The time is always displayed in the top right corner of the display. It appears in the current typeface.

Inverting the Graphics Screen

FIT VERSION 1.01: Use ^M to invert the image on the graphics screen (white becomes black, and black becomes white). Use ^N to restore the display to normal. FIT VERSION 1.02A OR HIGHER: Use ^P to invert the image on the graphics screen (white becomes black, and black becomes white). Use ^Q to restore the display to normal.

Clearing the Graphics Screen

Insert `^0' (control zero) before the prompt text to clear the screen before displaying a prompt. This command is typically used with two-part messages; insert the command after the first part of the message to "erase" the screen for the second part.

A Graphics Display picture remains on the screen until one of the following occurs:

1. Another FIT prompt with a picture is displayed OR...
2. A FIT prompt with the "clear screen" control code is displayed.

Cleaning the Screen

The Graphics Display has a thin anti-glare coating. DO NOT use harsh detergents or any petroleum-based solvents to clean the display!

The following products are safe for use on the System2 graphics display panel:

- AR Kleener - Anti-Reflective. Shield Lens Care Products, Golden Valley, MN. (612) 542-8276. AR Kleener is available nationwide at Sunglass Hut stores.
- Diamond Glaze Anti-Reflective Cleaner. Diamond Glaze, Inc. St. Paul, MN (800) 322-6644. (612) 227-5560

Call the manufacturers above for distributors in your area. Both are widely available in eyeglass stores or optometry clinics.

Sample Graphic Display Prompts

The number in the caption (in parenthesis) is the control code to use in the FORMAT DISPLAY command.

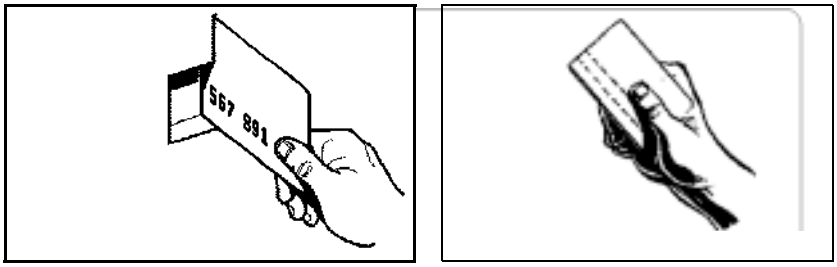


*Figure 11: Display Graphic -- Insert Magcard With Stripe to Left (**^1**)*

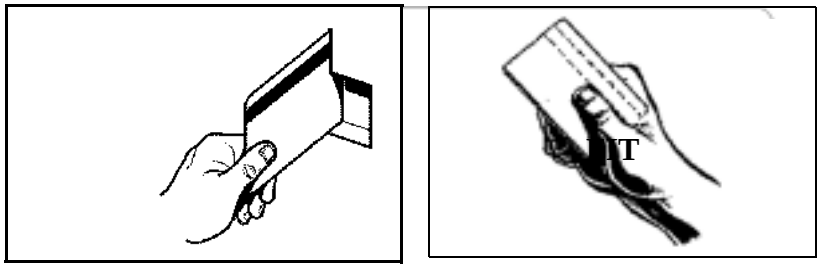


*Figure 12: Display Graphic -- Insert Magcard with Stripe to Right" (**^2**)*

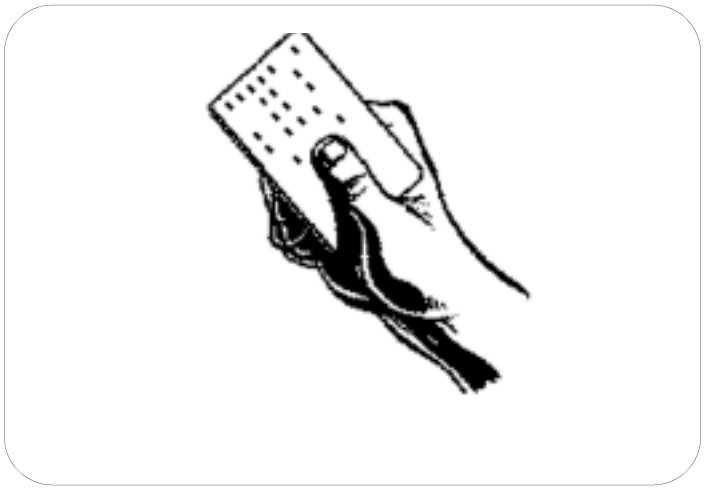


*Figure 13: Display Graphic -- "Insert Optical Card" (**^3**)*

*Figure 14: Display Graphic -- "Insert ChipKey" (**^4**)*

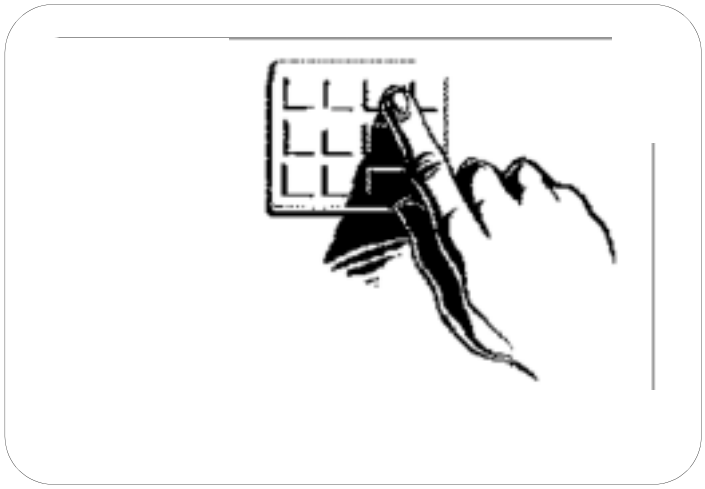


*Figure 15: Display Graphic -- "Enter Card Number on Keypad" (**^5**)*

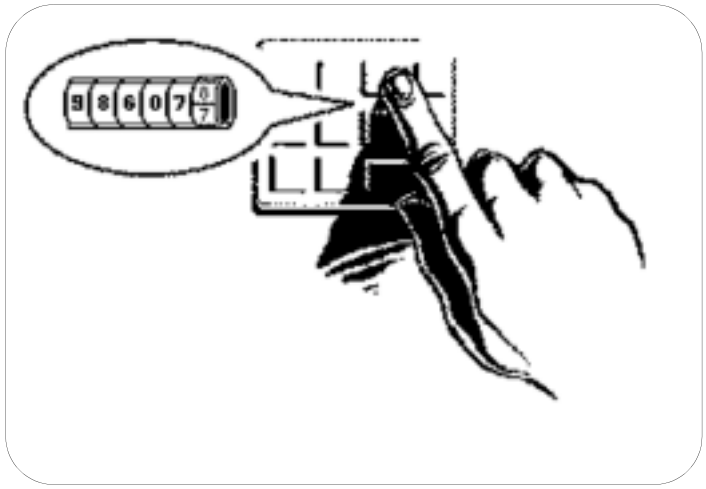


*Figure 16: Display Graphic -- "Enter Odometer Reading" (**^6**)*

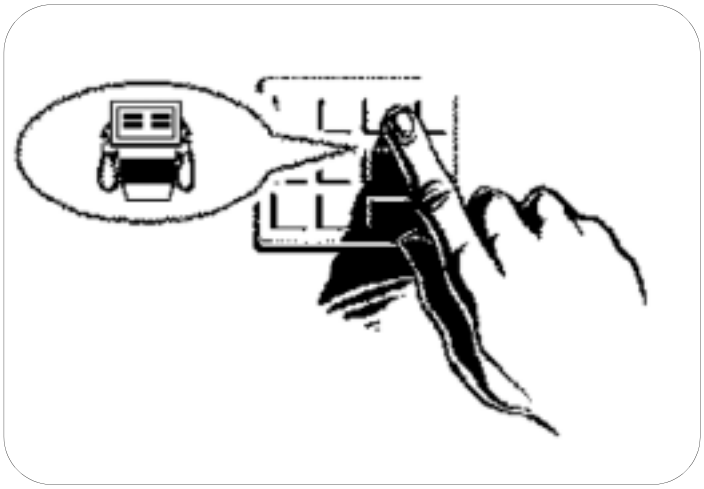


*Figure 17: Display Graphic -- "Select a Pump" (**^7**)*

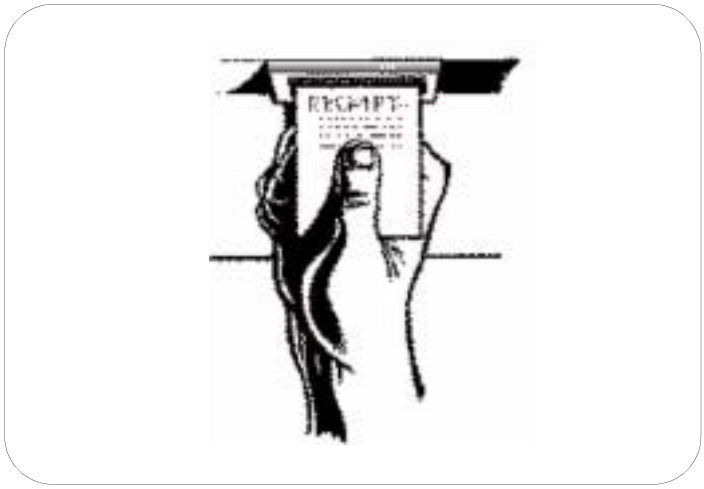
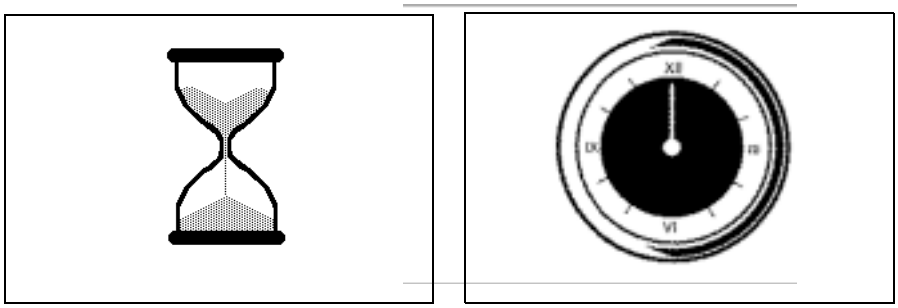


*Figure 18: Display Graphic -- "Take Receipt" (**^8**)*



C/OPT **FIT**

Figure 19: Display Graphic -- “Please Wait” (^9)

Graphics Display Typesets & Position Codes

The following screens show the available typestyles, with their matching control code. Up to 12 lines of text can be displayed for each typestyle. Position control codes (^A through ^L in FIT version 1.01, ^A through ^O FIT 1.02A and over) specify where on the display the line of text appears; codes apply to all typestyles. For example, to have the prompt INSERT CARD appear at the bottom of the display (perhaps under a picture), enter: ^LINSERT CARD.

Figure 20: FIT Font Style CTRL V -- Small Sans-Serif

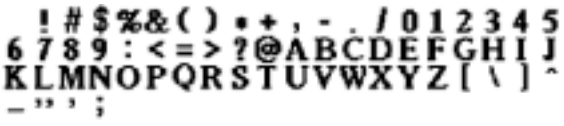


Figure 21: FIT Font Style CTRL Y -- Large Serif

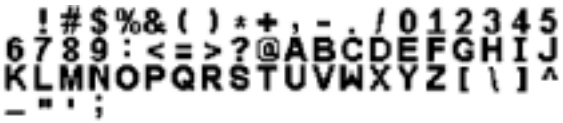


Figure 22: FIT Font CTRL Z -- Large Sans Serif

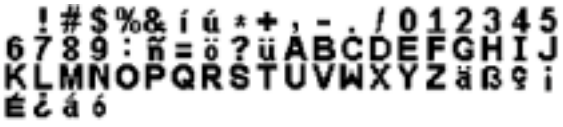


Figure 23: FIT Font CTRL X - Large International

Graphic Display Control Codes

Table 7: FIT Display Screen Control Codes

CODE	FIT 1.01	FIT 1.02A or over
^A	Position on Line 1	Position on Line 1
^B	Position on Line 2	Position on Line 2
^C	Position on Line 3	Position on Line 3
^D	Position on Line 4	Position on Line 4
^E	Position on Line 5	Position on Line 5
^F	Position on Line 6	Position on Line 6
^G	Position on Line 7	Position on Line 7
^H	Position on Line 8	Position on Line 8
^I	Position on Line 9	Position on Line 9
^J	Position on Line 10	Position on Line 10
^K	Position on Line 11	Position on Line 11
^L	Position on Line 12	Position on Line 12
^M	Invert graphics display	Position on Line 13
^N	Restore graphics display	Position on Line 14
^O	n/a	Position on Line 15
^P	n/a	Invert graphics display
^Q	n/a	Restore graphics display
^T	Insert Current Time	Insert Current Time
^V	Small Sans-Serif Font	Small Sans-Serif Font
^X	Large Sans-Serif Font, Int'l	Large Sans-Serif Font, Int'l
^Y	Large Serif Font	Large Serif Font
^Z	Large Sans-Serif Font, Std.	Large Sans-Serif Font, Std.
^0 (zero)	Clear Screen	Clear Screen

Graphic Display Examples

The characters in the caption (in parenthesis) are the control codes to use in the FORMAT DISPLAY command to create the image shown.

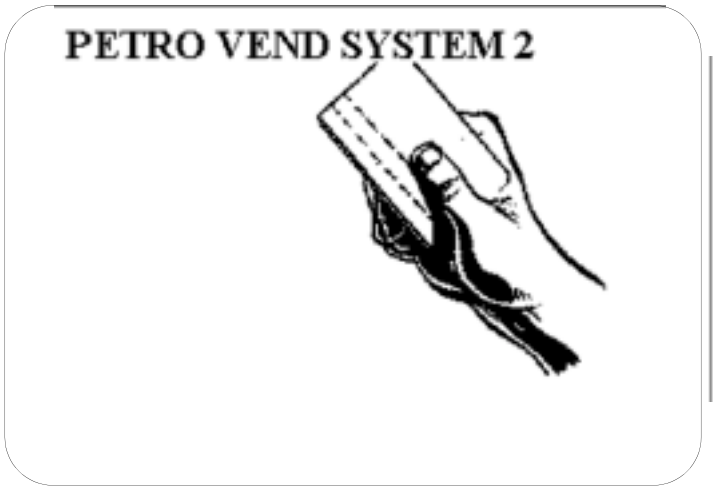


*Figure 24: FIT Graphic Sample -- "Petro Vend System2" (**^1^Y^A**)*

*Figure 25: FIT Graphic Sample -- "Insert ChipKey" (**^4^Y^A**)*

System Parameters

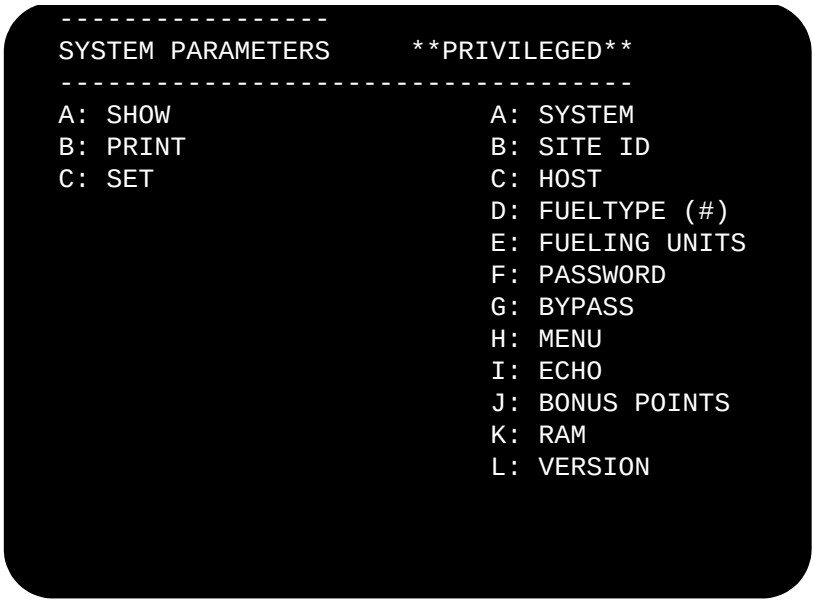


Figure 26: System Parameters Menu

System

The **SHOW SYSTEM** or **PRINT SYSTEM** commands displays the following current system information (this is a read-only function; SET SYSTEM is not applicable):

- **FSC Software Version** - for example, 38.51F.
- **Checksums** - Results of an FSC program check. Typically, a number such as 8A49.
- **Display Type** (See *Customer Messages* on page 43)
  - 2 X 16: 2 lines with 16 characters each
  - Graphics
- **Date and Time** - As set through the System Time screen (See *System Times* on page 14)
- **System State** - ON, OFF or RECEIPTS ONLY (See *Setting System2 ON and OFF Times* on page 32)
- **Installed FITs** - See *FIT Commands* **on page 35**
- **FIT State** - RUNNING or DOWN (See *FIT Commands* on page 35)
- **Number of receipts issued** to date per FIT.

- **Receipt Printer Errors** - paper jams, paper outs, etc.
- **Installed PCTs** - See *PCT Commands* **on page 38**
- **Installed Positions** - See *PCT POSITION Commands* **on page 39**
- **Pump Sentry Alarm** - a position number in (parentheses) is a pump put out of service by the system.
- **Low Tanks** - These are tanks that fell below their programmed low levels. **Power Failures** - Dates and times of the last four power failures.

Site ID

Use SET SITE to enter a 12-character code to give a site a unique name. The system defaults a site "name" of XXXXXXXXXXXX. The ID is used by an external PC during backups and restores. It can also be printed on receipts.

Note

The Site ID must contain exactly 12 characters. Spaces can be used but NOT as the first character.

Fuel Type

You can define up to products in System2. You can set each product's unit of measure, price per unit and name.

Each product has a code number. The code is assigned during PCT configuration (See *CONFIG PCT Command* on page 39).

Fueling Units

The default labels, and their codes are:

```
(1)      (2) LITRE     (3)
```

You type in the code number (1, 2, or 3) at the `FUELING UNIT CODES` prompt during the **`SET FUELTYPES`** procedure (See *Fuel Type* on page 64)

To change unit labels:

1. Type **`SET FUELING UNITS`** [ENTER].

   ```
   ENTER FUELING UNIT 1:

   ENTER FUELING UNIT 2:

   ENTER FUELING UNIT 3:
   ```

- *To leave a unit label unchanged, press* [ENTER].

2. Enter a label of up to 10 characters, and press [ENTER].

Password

The **SET PASSWORD** command lets you change the Privileged and Modem passwords. System2 ships from the factory with all passwords set as **HELLO**

Note

Although we suggest you set your own, the default passwords do not have to be changed for System2 to operate.

To change any or all passwords:

1. Type **SET PASSWORD** [ENTER].

```
ENTER PRIVILEGED PASSWORD:
```

2. Enter up to six characters or press [ENTER] to retain the old password. There is no difference between upper and lower case letters.

```
ENTER MODEM PASSWORD:
```

3. The modem password is what a remote user must enter when dialing into System2. Enter a new Modem password or press [ENTER] to retain the old password and move to the next prompt.

Bonus Points

Use Bonus Points for a site loyalty program, if desired.

The **SET BONUS POINTS** command lets you specify a "coupon" value based on fuel dispensed. For example, you can specify one point for each 100 cents worth fuel dispensed. Then, when a customer pumps $20 worth of gas, a message like "YOU'VE EARNED 20 POINTS TODAY!" would be printed on the customers' receipt.

Or, bonus points can be awarded to customers as credit toward using a site's car wash.

RAM

When configuring your System2 for the first time, you must define the memory size with the **SET RAM** command.

Card and transaction records are stored in RAM chips on the FSC board. The number of chips in your FSC depends on the amount of RAM you ordered.

1. Type **SET RAM** [ENTER].
2. Find your memory level in *Table 8*.

3. Enter the code appropriate for your system.

Table 8: Memory Level Codes

Enter Code:	For Memory Level	Amount of RAM
0	1 (Standard)	256 Kb
1	2 (Optional)	512 Kb
2	3 (Optional)	1 Mb
3	4 (Optional)	2 Mb

- *Press* [ENTER] *to keep the current code.*

You cannot enter a memory code if there isn't sufficient RAM in the system (for example, you cannot enter "2" if you only have 512 KB of memory).

Privileged mode is lost if the system rejects a RAM entry; the password must be re-entered. If you don't know the RAM size, you can determine it by trial and error. Start by entering **3** and continue on down until System2 accepts the entry.

Version

The SHOW or PRINT VERSION command displays the current software version (for example, 38.51F). This information is also included in the Show System display (Option A in System Parameters).

This is a read-only function: there is no SET VERSION command.

Restrictions

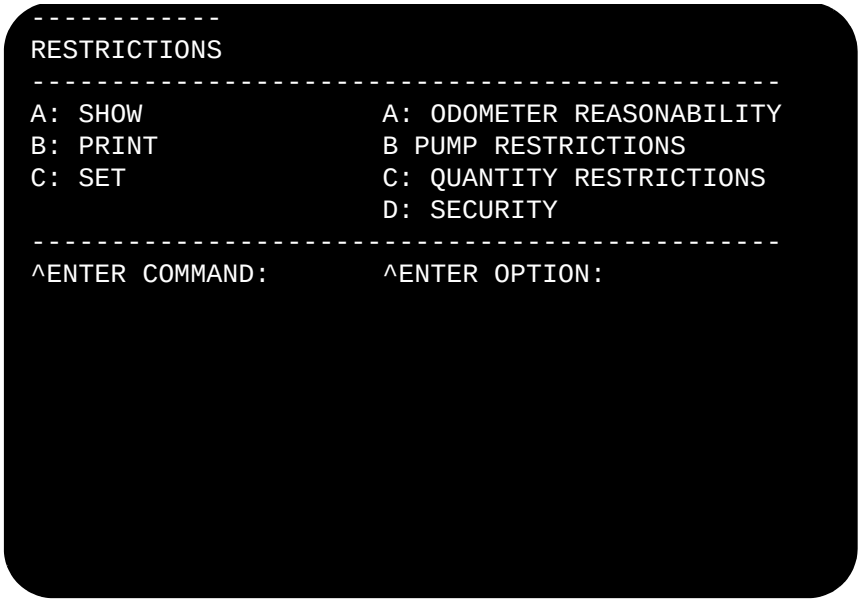


Figure 27: Restrictions Menu

Restrictions (See *Figure 27*) let you control fuel distribution by checking miles traveled between fuelings (reasonability), by limiting pumps that can be used by certain cards, or through quantity limits. Viewing or printing the settings is non-privileged, but changing them is privileged.

Odometer Reasonability

This section explains reasonability with *cards*. See *Working with ChipKeys* on page 17 for mileage reasonability with read/write ChipKeys.

This option checks the difference between two user-entered odometer readings, and determines if the difference is within a range you specified for that card. Sixteen ranges are available.

Note

Odometer Reasonability is only for single-site applications. For reasonability to work, you must program the FIT or OPT display to instruct customers to enter their current odometer value on the FIT keypad. See Page 48.

Customer-entered odometer readings are stored in the card/account file, and then compared to the next mileage entered by that user. The second entry is

"reasonable" if the difference between the entries is within your specified range.

***Example**: The current odometer entry is 55,000 and the previous entry was 54,400. The difference is 600. If the reasonability range is 50 - 250 (Code #6 in) this entry is not reasonable.*

You enable reasonability as one step of configuring the Card/Account file; see *SET CARD Command* on page 77.

Odometer entries are also used by the optional Report Package to calculate vehicle efficiency (miles per gallon, cost per mile).

If three unreasonable customer entries are input, you can program System2 for one of two responses:

- **Accept The Third Entry**: System2 accepts the third entry as the current odometer value; the message `--BAD ENTRY ACCEPTED` is included when this transaction is viewed with the SHOW TRANSACTIONS or PRINT TRANSACTIONS commands.
- **Reject The Third Entry**: A Transaction is aborted after the third bad entry. At this point the customer must reinsert their card and begin another transaction. Fueling is not allowed until a reasonable odometer entry is made.

Fifteen ranges are available. The Code # for a range is entered during the INSERT CARD setup procedure (*Page 77*). Define each range with the SET ODOM command, or use one of the following presets:

Table 9: Odometer Reasonability Codes

Code	Minimum Mileage	Maximum Mileage
1	0	100
2	0	250
3	0	500
4	0	1000
5	50	150
6	50	300
7	50	600
8	50	1000
9	100	200
10	100	400
11	100	700

Table 9: Odometer Reasonability Codes (Continued)

12	100	1000
13	150	400
14	150	700
15	150	1000

If none of the pre-programmed ranges is acceptable, do the following to make your own:

1. Type **SET ODOM** [ENTER].

   ```
   ENTER MINIMUM MILEAGE
   ```

2. Enter a minimum mileage and press [ENTER].

   ```
   ENTER MAXIMUM MILEAGE
   ```

3. Enter a maximum mileage and press [ENTER].
4. Repeat for up to 16 codes. To skip past remaining co) des, enter a letter instead of a number.

After defining the range codes, you'll see:

```
CHANGE ACTION AFTER BAD ODOM ENTRIES (Y/N)
```

Default is NOT to change the option.

Two options are available. If you enter [Y], you are prompted with the following (Y is default):

```
ALLOW FUELING AFTER 3 BAD ODOM ENTRIES (Y/N)?
```

Pump Restrictions

The SET PUMP command defines codes for up to 15 sets of pump restrictions. Use restriction codes (when configuring card files, they define what customers can use what fuel.

Use the following pump configuration as an example on setting restrictions:

- *Leaded* fuel is dispensed from pump 1, and cannot be used in newer trucks
- *Unleaded* is dispensed from pump 2; can be used in either new or old trucks
- *Premium* is dispensed from pumps 3 and 4; should not be available to any trucks.

Enter pump #1 as valid for CODE 1, and pumps #1 and #2 as valid for CODE 2. Do not assign pumps 3 or 4 - pumps not entered as valid are

assumed invalid.Now use Codes 1 and 2 to configure the vehicle card files for the trucks; other codes could be created to include the premium fuel pumps as required. *The default for all codes is ALL VALID.*

Note

Driver/Vehicle and Account use the most restrictive codes.

Code 0 can be used to indicate no restrictions. In the example above, code 0 could be specified for vehicles that would have access to all four pumps.

Note

Pumps must be installed to be valid.

Quantity Restrictions

Define up to 15 quantity restriction codes with the SET QUANTITY command. Restrictions can be monetary or by volume (gallons, liters or quarts).

The Quantity Restriction codes are used during Card File configuration to specify how much product a particular customer has access to.

1. Quantity Restriction is often set to match a vehicle's tank size. Sale defaults are as follows (Code 0 turns OFF the function).Type **SET QUANTITY** [ENTER].

```
QUANTITY RESTRICTION CODES:
CODE 0: NO RESTRICTIONS
CODE 1: $
```

2. Press [ENTER] (without an entry) to select the default value, or enter a different value.
3. After the last entry, you are prompted:

```
QTY RESTRICTION VALUE OPTIONS (Y/N)
```

   If you press [Y], you are prompted:

```
USE VALUES AS $(Y/N)?
```

4. Press [Y] to use the values as dollars or [N] to use the values as quantities.

The quantity values represent gallons, liters or quarts, depending on the quantity units.

Note

Driver/Vehicle and Account use the most restrictive codes.

Security

Each System2 has a built-in “security table”, made up of ten 2-digit hexadecimal numbers (in two rows of five) used by the INSERT CARD and COPY CARD # commands for automatic PIN number generation.

The security table also generates PINs for bank cards.

Caution

The default table values are the same for every System2 - you MUST set new values with this command in order to generate unique PIN numbers for your system.

Once created, card records are not affected by changes in the security table. Only PIN numbers generated after modifying the table or code number are affected.

PINs for bank cards are generated when the card is inserted. Modifying the table will modify the PINs.

1. Type **`SET SEC`** [ENTER].

   ```
   ROW 1: 01 23 45 67 89
   ```

   This is the current value of ROW 1 (system defaults are shown).

2. Enter five 2-digit hex numbers, pressing the [ENTER] key after each. Hex numbers are the decimal numbers 0 to 9, and letters A to F.

Note

Make your entries as random as possible. For example, `A0 E9 83 DD 1C' is good, but `12 12 12 12 12' is not.

3. After five first-row entries, enter five different hex numbers in the second row (ROW 2).
4. After your last entry in Row 2 you should see:

   ```
   SECURITY CODE: 00
   ENTER CODE:
   ```

The Security Code (system default is 00) is an added measure of encryption. Each security code generates different PINs from your same security table row entries.

Note:

Record your Security Table numbers on the worksheet (Appendix A)! If you are reconfiguring your system, or wish to generate PIN num-

bers to match another System2, the row and security code numbers must match your original entries!

Cards/Accounts

From the MAIN menu, press [G].

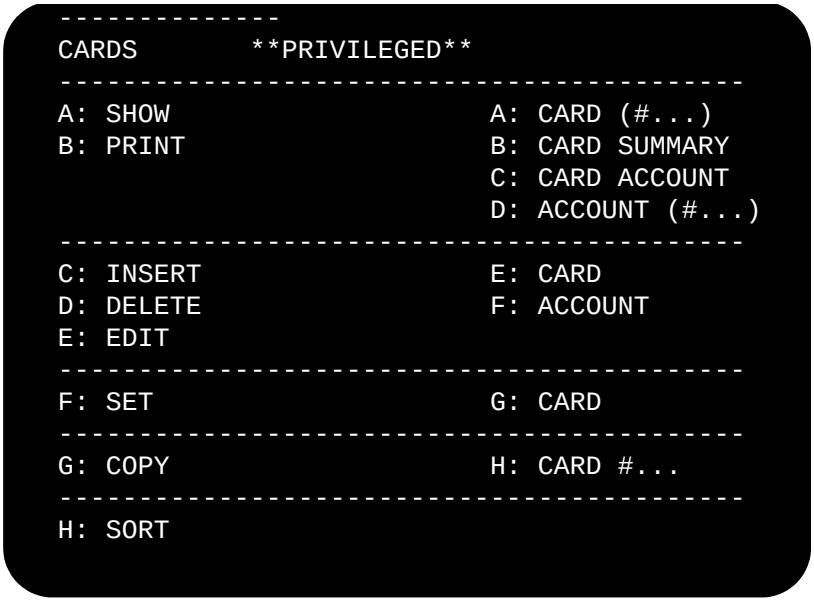


Figure 28: Cards/Accounts Menu

About Cards/Accounts

The Cards/Accounts menu (*Figure 28*) lets you view or print cards or account summaries, remove, add, or change cards within an account, remove add or change entire accounts, copy cards, and sort cards or accounts.

Before using most of the Card/Account features, you must first issue a SET CARD command, and then, from that submenu, do the following two things:

- Allocate memory for the cards and accounts. TO DO THIS: Type **`SET CARD`** and then choose `1.) SPECIFY CARD/ACCOUNT BUFFER SIZE`.
- Type **`SET CARD`** again and use `2.) DEFINE CARD/ACCOUNT RECORD` to select items for each record in the file.

Showing or Printing Cards

Showing or Printing Card Groups

You can show or print individually (**SHOW CARD #**), as a group (**SHOW CARD SUMMARY**) or only as those cards in a particular account (**SHOW CARD ACCOUNT**). PRINT also applies to all three of these options.

SHOW CARD displays the data for one or more card records. Specify beginning digits of the card number to display groups of cards. For example, assign cards 1000-1999 to group 1, cards 2000-2999 to group 2 and cards 3000-3999 to group 3.

In this example, to show all cards for group 1, enter **SHOW CARD 1**. To print only card 1234, enter the command PRINT CARD 1234.

When more than one screen of data is available, you can press any key (except [X]) to stop and to start the scrolling of the data across the screen. You may also press the [X] key to abort one of these commands prematurely.

To show or print a single account record you must specify the four-digit account number.

To display *all* the records, enter the command *without* specifying a number. If the account data does not fit onto one screen, the data will scroll up until finished.

Press any key to stop or start the scrolling. Press the [X] key to exit this command without showing the remaining account records.

Showing or Printing Card Summaries

SHOW CARD SUMMARY displays the breakdown of records in the buffer. The selected configuration options and the number of single, driver and vehicle cards are listed.

This command also checks for duplicate numbers in the card file and tests the record numbers in the file to ensure their integrity.

System2 cannot process corrupted records. If a bad number is found, the record is displayed. If you are in Privileged mode, you can delete it.

SHOW CARD ACCOUNT shows all of the card records under a specified account number. For example, to show cards in file 7890, use the command SHOW CARD ACCOUNT 7890. The card data are displayed in the form below:

```
CARD #: 1111222233334444
SINGLE CARD
ACCOUNT #: 7890
MONTHLY ALLOCATION:   $100.00
-- TOTALS TO DATE:    $39.85
MISC ENTRY: DISABLED
PIN #: DISABLED
ODOMETER: DISABLED
PUMP RESTRICTION CODE: 0
DRIVER NAME: RICHARD
```

When this command is executed, the card records scroll. Press any key (except [X]) to stop or start the scrolling. Press the [X] key to exit this command and skip any remaining records.

These commands are used to program individual cards and accounts for the system. Cards and accounts must exist prior to using these commands.

Inserting Cards or Accounts

The INSERT CARD *or* ACCOUNT commands only prompt for entries if memory space is available.

OPW Fuel Management Systems magnetic cards require 16-digit numbers. Optically-read cards require 10 digit numbers.

Note

For other customer-specific card formats see on page 151.

The first four digits for both types of card must be one of the network numbers for your system. The network numbers are listed on your system's data sheet; most systems have just one network number.

Cardless Records. A cardless “card” is not a physical card, but simply a number entered at the System2 keypad.

The following apply to cardless cards:

- Cardless record can be up to eight digits long -the network number does NOT have to be a prefix
  - The FIT must be set up for cardless operation.
  - The PIN entries feature should be enabled for cardless operation.

Dual-Language. If enabled, you are prompted to select the first or second language for the card. (Single and Driver cards only).

PIN Number. If enabled, you are prompted for automatic PIN number generator. Enable this field to have System2 generate the PIN numbers; card numbers must be five or more digits long.

Card Type. Single, Driver or Vehicle must be specified for each card record.

Valid? Specify if the card record is valid. This allows you to create an invalid card record now, and activate it at a later date.

Misc. Entry. This option allows the customer to enter up to nine numbers (such as a job number) that will be included in the transaction record.

The remainder of the prompts are described in the SET CARD command. Some or all of the specified parts can be selected for each record.

The system prompts for an account number, expiration date, validity, discount, monthly and daily allocations, pump and quantity restrictions and an account name (as explained in SET CARD).

- If you enter less than four digits for an account number, leading zeros are added. For example, account 12 is defined as 0012
- Only the original price is shown (or printed). The discounted price(s) are displayed only when generating reports with the Report Package

In Dual-card operation, driver and vehicle cards must be assigned to the same account number. To allow access to vehicle(s) from any account, you can assign the vehicle(s) to account 0000.

As an example, say a company has cars assigned to each department, each with its own account number. The company also has a van that is needed by *everyone*. By assigning the vehicle card for the van to account 0000, members of all departments (or accounts) can use the van.

Deleting Cards or Accounts

DELETE CARD eliminates an individual card record; you are prompted for the card number. Enter the number and press [ENTER] to delete the card record.

DELETE ACCOUNT eliminates an account record; you are prompted for the account number. Enter the number and press [ENTER] to delete the account.

Editing Cards or Accounts

EDIT CARD modifies an existing card record. Do one of the following when the system prompts for a card number:

- Enter a number, and the system calls up that card record for modification, OR...

- Enter **ALL**. The system displays the entire card file, one card at a time, using the form **CARD ###### (Y/N/X)?** Press [Y] to edit the displayed card record, or just press [ENTER] to leave this record unchanged and go to the next one in the file. After the last card record has been altered, enter `X' to exit this command.

If you activate Dual Language after cards have been inserted, change the language designation of the cards with the EDIT command.

EDIT ACCOUNT command, the system prompts:

```
ENTER ACCOUNT #:
```

Enter an account number and press [ENTER] to bring up that account for editing. OR, enter A (for ALL) and press [ENTER] to list ALL accounts, one at a time. Press [Y] to edit the displayed account, or press [ENTER] to leave this account unchanged and go to the next one in the file.

When you are done editing, press [X] to return to the Cards/Accounts menu.

SET CARD Command

After issuing the SET CARD command, a submenu (*Figure 29*) appears.

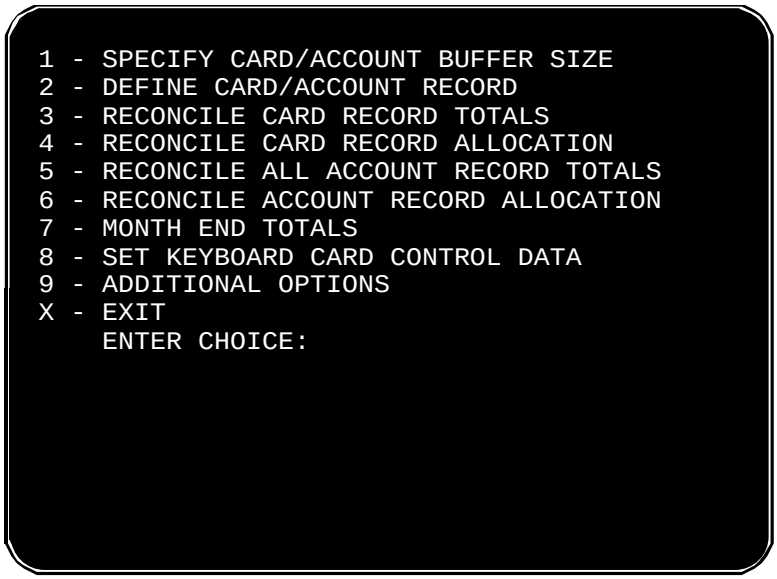


Figure 29: SET CARD menu

OPTION 1 - Specify Card/Account Buffer Size

Use the **SET CARD** command before any other Card/Account function. The command splits memory buffer into two or three sections.

WARNING

This command erases all transaction data!

The Card/Account Buffer Size procedure is as follows:

1. From the SET CARD submenu, press [1], then [ENTER]. You will be prompted:

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

2. Press [Y], then [ENTER], to partition the buffer and continue. The next prompt is:

   ```
   ENABLE MESSAGING (Y/N)?
   ```

   - If you enable Messaging, the buffer is divided into *three* sections, and less memory is available for card records.
   - If you DO NOT enable Messaging, the buffer is divided into *two* sections, and more memory is available for card records.

3. If Messaging is enabled, the next prompt is:

   ```
   ENTER MESSAGING SIZE CODE(1.4):
   ```

   The Size Code (*Table 10*) determines the maximum number of messages the system can display:

Table 10: Messaging Size Codes

Size Code	Message Capacity
1	25
2	50
3	75
4	100

   ```
   ENTER TRANSACTION SIZE CODE:
   ```

4. Enter a transaction size code:

   Size Code = (number of transactions) ÷ 25

For example, 100 transactions requires a size code of 4 (100 ÷ 25 = 4).

The number of transactions you can store is limited by the amount of RAM. The amount of RAM in your system is shown in the SYSTEM PARAMETERS - RAM screen (*page 65*).

5. After entering a size code, the system displays the configuration data. For example,

```
# OF CARDS/ACCOUNTS (MIN OPTIONS): ####
           (MAX OPTIONS): ###
       (CURRENT OPTIONS): ####
       # OF TRANSACTIONS: ##
           # OF MESSAGES: ##
-- SAVE THIS CONFIGURATION (Y/N) ?
```

```
# OF CARDS: ####
# OF TRANSACTIONS: ##
```

This information helps you decide how to divide the buffer. The number of records System2 can manage depends both on:

- Number of transactions retained
- Card/account file definition, including:
  - The maximum number of records if *no* options are selected for the file (`MIN')
  - Maximum number of records if *all* options are selected (`MAX')
  - The maximum number of records if the *current* options are retained.
- •Number of allowed messages.

6. Press [Y], then [ENTER] to save the configuration. Just press [ENTER] to erase changes and start again.

OPTION 2 - Define Delete Card/Account Record-Buffer

Note

Use of proprietary cards when sending tank information to Comdata, will cause errors in reconciling. Manual reconciliation must be preformed when using proprietary cards.

Type **SET CARD** and then press [2].

Defines the type of card and account records to be used for the **INSERT CARD**, COPY CARD #, and INSERT ACCOUNT commands, also accessed from the Cards/Accounts menu.

If the card file has been previously defined, the following message is displayed:

```
CARD/ACCOUNT RECORDS: # OF POSSIBLE ####
# OF TRANSACTIONS: ###
```

This is records already defined, the total amount records that can be defined and the number of transactions that can be retained. If the card/account file has *not* been previously defined, these numbers are not available.

2. The next prompt is:

SPECIFY CARD/ACCOUNT RECORD (Y/N)?

To specify a new type of card/account record, press [Y]. You will see:

CARD/ACCOUNT FILE WILL BE DESTROYED!!!

SURE (Y/N)?

WARNING

This command erases all records in the card buffer!

Press [Y] to continue.

3. You are now prompted to include (one after the other) each of the following for the card/account file. Enter [Y] to enable the option or [ENTER] to leave it unchanged. Default for all is NO. Pressing [ENTER] leaves each at NO.

Note

*You MUST set **account number** and **expiration date** during system start-up. Other fields can be changed at any time.*

- **Account #:** a department or company identification number of up to four digits; cards can be grouped together for allocation or reporting by assigning them to the same account.
- **Expiration Date:** Card or account validity termination day.
- **Monthly Allocation**: *NOT recommended for multi-site setups*. Defines a monthly monetary limit for a specific card or account.
- **Daily Allocation:** Defines a daily monetary limit for a specific card or account.

- **PIN #**: Personal Identification Number (card records only, not applicable to accounts). Also see *page 67* for more PIN information.
- **Card invalidation:** after three bad PIN entries (affects cards only, not applicable to accounts). See Additional Options in the Set Card menu.
- **Save Odometer Entries**: Save entries from user (card records only, not applicable to accounts). This option must be activated for MPG or km/L calculations to be performed (via the optional Report package).
- **Odometer Reasonability**: Checks if entry is within range.
- **Pump restriction**: Authorized pumps.
- **Quantity restriction**: The product limit per transaction (dollar or volume).
- **Driver/Vehicle/Account name**: Up to nine characters.

After entering all your Card/Account Record definitions, you are returned to the SET CARD submenu.

OPTION 3 - Clear Card Record Totals

Type **SET CARD** [ENTER] and then press [3] to clear dollar amounts for all cards.

```
ARE YOU SURE?
```

Press [ENTER] to confirm.

This SET CARD function compares (reconciles) the amount of product pumped to date with the monthly amount allocated for a card. The amount pumped is subtracted from the amount allocated, and the Amount Pumped is reset to zero.

The monthly allocation can be used as a kind of on-going allocation. For example, say a customer begins with a $200 allocation. After using $100 of this, the customer makes a payment of $50, which is added to the original allocation. The new allocation is $250 (with $150 remaining). Although this process can continue indefinitely, the totals may become too large for good bookkeeping.

The Reconcile function keeps these numbers from getting too large. In this example, the new amounts (after reconciliation) would be $150 allocation and $0 product pumped.

OPTION 4 - Reconcile Card Record Allocation

Type **SET CARD** [ENTER] and then press [4] to activate the Reconcile function.

SURE?

Press [Y], then [ENTER], to confirm.

OPTION 5 - Clear All Account Record Totals

Type **SET CARD** and then press [5] [ENTER].

SURE?

Press [Y], then [ENTER], to confirm.

This function clears dollar totals for all accounts. This SET CARD function compares (reconciles) the amount of product pumped to date with the monthly amount allocated for an account. The amount pumped is subtracted from the amount allocated, and the Amount Pumped value is reset to zero.

OPTION 6 - Reconcile Account Record Allocation

Type **SET CARD** [ENTER] [6] [ENTER].

SURE?

Press [Y] [ENTER] to confirm.

Similar to **Reconcile Card Record Allocation (***Page 81***)**.

OPTION 7 - Month End Totals

Type **SET CARD** [ENTER] [7] [ENTER].

AUTOMATICALLY CLEAR MONTH END TOTALS?

This SET CARD function specifies whether or not to clear the dollar totals for all card and account records automatically at the end of each month.

Press [Y], then [ENTER], to confirm.

OPTION 8 - Set Keyboard Card Control Data

This SET CARD function allow a customer to enter their card number after three consecutive bad reads of the card.

This ability is set with position 4 of DIP switch #2 on the FIT board - if CLOSED, manual entry cannot be done. If OPEN, the customer is prompted to enter the number after three bad reads.

Card control data is added to the end of the customer's entry. The system takes this new string and treats it as that customer's card data when they key

in their card number. The data string is then used for this customer in the future - whenever they key in their card number.

Press [8], then [ENTER]. You are prompted:

```
ENTER THE CARD CONTROL DATA STRING:
```

Enter up to 30 characters, then press [ENTER].

OPTION 9 - Additional Options

This SET CARD feature accesses two more:

- Card invalidation Via Bad PIN Entry
- Report Package Discount.

Card Invalidation Via Bad PIN Entry. All cards are affected by this command. When enabled, System2 invalidates a card record when a customer enters three bad PIN numbers during a single transaction.

The customer can *not* gain access to System2 until their card is validated again by a system manager. This helps to prevent unauthorized access to System2.

To validate an invalid card, use the EDIT CARD command, explained earlier.

Report Package Discount. This works with the optional Report Package.

Transaction Data

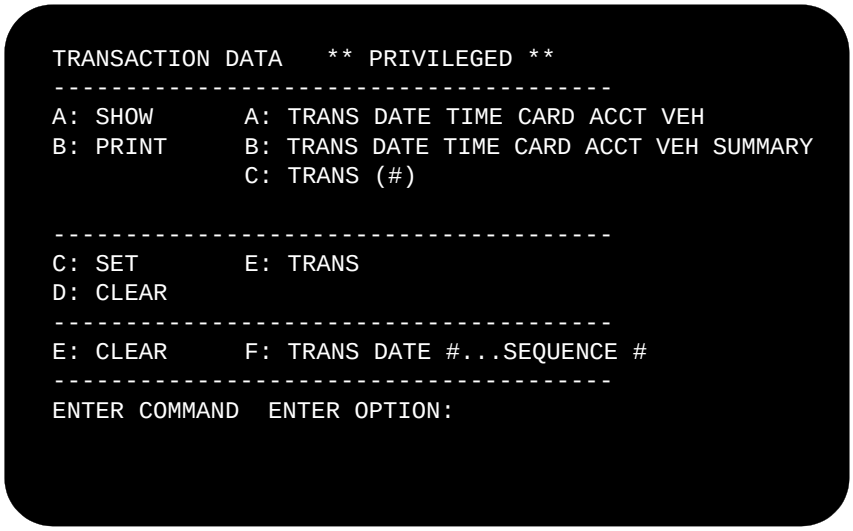


Figure 30: Transaction Data Menu

Show or Print by Date, Time, Card, or Vehicle

The **SHOW/PRINT [date time card account vehicle]** command displays or prints completed transactions stored in the SYSTEM2 data base by one data field.

Though all transactions are recorded, what you actually see is determined by the **SET TRANS** command.

When you issue a **SHOW TRANS** or **PRINT TRANS**, you are prompted as follows:

```
ENTER DATE:
ENTER TIME:
ENTER CARD:
ENTER ACCOUNT:
ENTER VEHICLE:
```

There are four types of responses to these prompts. Pressing ENTER at each prompt tells the system to ignore that parameter.

To define a range, enter a time, date, or number at a prompt.

For example, to display only the transactions from January 22, 2000, enter JAN 22 2000 at the date prompt, and then press ENTER at the other four prompts.

When specifying the time or date, you can also include one of two following prefixes:

- < (“less than” sign). Will include all transactions up to and including the current time or date. For example, to include all transactions up to and including Jan. 22, 2000, enter <JAN 22 2000 at the date prompt.
- > (“greater than” sign). Will include all transactions starting with and including the specified time or date. For example, to include all that occurred after 5:00 PM (and before midnight), you would enter >5:00 PM at the time prompt.

```
>PRINT TRANSACTION 161
    -ALLOW WRAP AROUND
    -SAVE UNAUTHZ'D USERS ALSO
    -TRANSACTION BUFFER SIZE: 25
  SEQUENCE #: 2
  REASON FOR TERMINATION: NORMAL
  DRIVER: MR TEST
   JUL 15, 2002   07:11 PM
  TRANSACTION #: 2
  CARD #: 1
  FUELTYPE: UNLEADED
  FUELTYPE DENSITY: 1000
  PUMP #: 1-1
  QUANTITY: 25.000 GALLON
  GROSS QUANTITY: 51.200 GALLON
  PRICE: $1.000
  TOTAL: $25.00
  ODOMETER: 66555
  DISTANCE PER UNIT: NOT AVAILABLE
  MISCELLANEOUS:
  --RECEIPT ISSUED
  ACCOUNT: 00000
```

Show or Print Summary by Transaction, Date, Time, Card, or Vehicle

The **SHOW/PRINT TRANS [date time card account vehicle] SUMMARY** command displays only the product totals.

```
-ALLOW WRAP AROUND
-SAVE AUTHZ'D USERS
-TRANSACTION BUFFER SIZE: 25
```

```
        *** PRODUCT TOTALS ***

UNLEADED    : 46.080 GALLON  TOT: $46.08
PREMIUM     : 35.840 GALLON  TOT: $35.84
REGULAR     : 34.900 GALLON  TOT: $34.90
TRANSACTIONS: 9     GRAND TOTAL: $116.82
           AVERAGE: $12.98
Show or Print by Transaction #
```

The **SHOW/PRINT TRANS#** command is quick method of displaying transaction data. You are prompted only for the transaction number.

Set Transaction

The size of the transaction buffer is set when you define card buffer size (*Page 78*). The **SET TRANS** command specifies how the transaction buffer is to be configured. The first prompt is:

```
SET WRAP AROUND OPTIONS?
```

If wraparound is enabled, and the transaction buffer is full, the SYSTEM2 overwrites (erases) the older transactions when new transactions are received.

When wraparound is disabled, transactions can not be overwritten; no fueling is allowed if the buffer is full. If you enter (Y), you will be prompted again:

```
ENABLE WRAP AROUND?
```

Press (Y) to confirm.

Caution

Do not enable wraparound unless you are certain that transaction data will not be accidentally destroyed.

The next prompt is:

```
RE-DEFINE TRANSACTION?
```

Enter (Y) to redefine transactions and display:

```
TRANS=UNAUTHZ'D USERS ALSO?
```

If you enter (Y), the system processes an unauthorized attempt to use the system as a transaction and logs the event in the transaction buffer.

Entering (N) causes the system to ignore any unauthorized users and events; only cases where a pump was activated by the SYSTEM2 are recorded.

The third SET TRANS prompt is:

```
SPECIFY DISPLAY FIELDS?
```

This lets you tell the system which fields to display when a SHOW TRANSACTION or PRINT TRANSACTION command is issued. Choose from the following fields:

```
ENTER Y TO DISPLAY THE FIELD:

ACCOUNT/DRIVER/VEHICLE?
DATE & TIME ?
TRANS # ?
CARD #1
CARD 2
FUELTYPE
PUMP
 HOSE
QUANTITY
PRICE
TOTAL
ODOMETER
DISTANCE PER UNIT
MISCELLANEOUS
RECIEPT STATUS
ACCOUNT #
```

There must be at least one transaction recorded in your system in order to show all the selected data fields. The last SET TRANS option (displayed after the account number prompt) is:

```
COMPUTER FORMAT CHECK DATA IN HEADER?
```

When transferring data to an external system in the computer format (*Appendix D - Using System2 With a PC* on page 111), an optional data check can be prefixed to the transaction header to provide greater data integrity. The data check includes: (1) the number of records and (2) the sum of the quantities for records.

Press (Y) to enable or (N) to disable the data check.

```
P>CLEAR TRANS XXXX Clears only this transaction number

P>CLEAR TRANS mmm, dd, yyyy Clears transactions done up to
and including this date.
```

Journal Printer

From the MAIN menu, press [J]

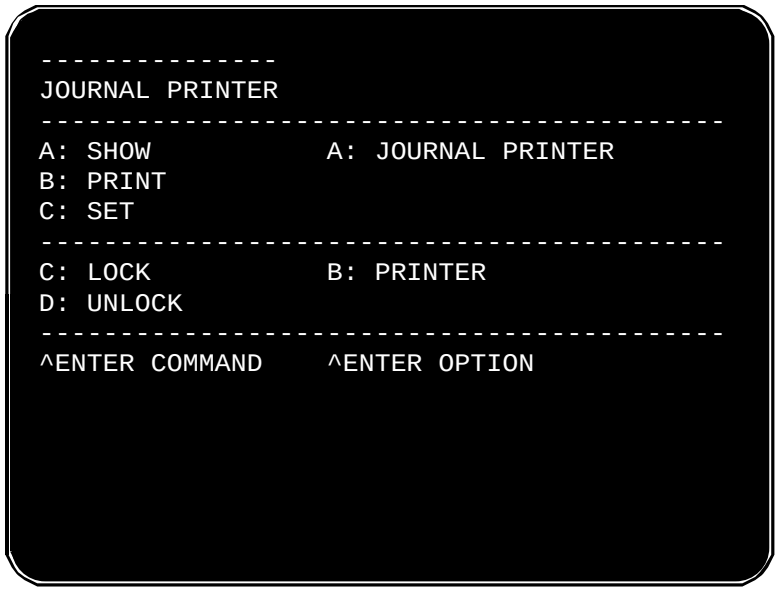


Figure 31: Journal Printer Menu

JOURNAL Commands

An external printer can be connected to the PRINTER port on the back of the FSC to make a hard copy of all transaction data, providing added protection against data loss.

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

The non-privileged **SHOW JOURNAL** and **PRINT JOURNAL** commands display current printer configuration.

Use the privileged **SET JOURNAL** command to specify the system will operate with an external printer. If so, you can also specify which of the following items will be printed:

- Account Name, Driver, Vehicle names. Odometer entry. Miscellaneous entry.
- Account number and second card.

The following is a typical prompt sequence after issuing a SET JOURNAL command and answering [Y] to all prompts:

```
OFFICE JOURNAL (Y/N)
```

```
SET JOURNAL PRINTER OPTIONS (Y/N)
PRINT:
 ACCOUNT, DRIVER, VEHICLE, ODOM, and MISC (Y/N)
 ACCOUNT #, CARD 2 (Y/N)
JOURNAL ERROR OPTION (Y/N)
 -- ENABLE AUTH ON JOURNAL ERROR (Y/N)
```

The JOURNAL ERROR OPTION specifies if the system should authorize fueling when the printer is not operating. The printer may "block" if an error, such as a paper outage, occurs. After fixing the error, unblock the communication with the SET PRINTER command.

LOCK or UNLOCK Commands

The **LOCK** command lets you turn OFF the logging function for the printer, useful for when multiple **PRINT** commands are executed.

If you want to print several items (for example, several types of transaction data) you can keep the printouts together by issuing the **LOCK PRINTER** command. No "incoming" items will be printed until you turn OFF the LOCK.

The **UNLOCK PRINTER** command returns the printer to its normal logging function. Any transactions that were locked out are printed when the printer is unlocked.

If no command is generated for 10 minutes while the printer is locked, the system exits the privileged mode and unlocks the printer.

Appendix A - Setup Worksheet

System Times

DST Start Date		**DST End Date**	
System ON Time		**System OFF Time**	
Receipts ONLY		**Time Adjust**	
Light ON Time		**Light OFF Time**	

System Devices

Setup

Issue receipts?	YES NO If yes, days available_____
Decline message timeout	_____ seconds
Prompt timeout	_____ seconds
PCTs to shut off on E-stop	1 2 3 4
Valid pump numbers	_____

2	
Issue receipts?	YES NO If yes, days available_____
Decline message timeout	_____ seconds
Prompt timeout	_____ seconds
PCTs to shut off on E-stop	1 2 3 4
Valid pump numbers	_____

3	
Issue receipts?	YES NO If yes, days available_____
Decline message timeout	_____ seconds
Prompt timeout	_____ seconds
PCTs to shut off on E-stop	1 2 3 4
Valid pump numbers	_____

4	
Issue receipts?	YES NO If yes, days available_____
Decline message timeout	_____ seconds
Prompt timeout	_____ seconds
PCTs to shut off on E-stop	1 2 3 4
Valid pump numbers	_____

PCT Setup

System2 can drive up to four Pump Control Terminals. Each PCT controls up to 8 positions.

Copy this page and the next as needed. Circle the appropriate PCT and position numbers.

Note

Most PCT configurations do not require all of this information.

Position	1	2	3	4	5	6	7	8
Pump number								
Pulses per unit								
Maximum fuel per transaction								
Pump Sentry ON?								
Maximum time per transaction								
Maximum time pump handle can be UP								
Maximum time before first pulse is detected								
Maximum time between pulses								

PCT 2

Position	1	2	3	4	5	6	7	8
Pump number								
Pulses per unit								
Maximum fuel per transaction								
Pump Sentry ON?								
Maximum time per transaction								
Maximum time pump handle can be UP								
Maximum time before first pulse is detected								
Maximum time between pulses								

PCT 3

Position	1	2	3	4	5	6	7	8
Pump number								
Pulses per unit								
Maximum fuel per transaction								
Pump Sentry ON?								
Maximum time per transaction								
Maximum time pump handle can be UP								
Maximum time before first pulse is detected								
Maximum time between pulses								

PCT 4

Position	1	2	3	4	5	6	7	8
Pump number								
Pulses per unit								
Maximum fuel per transaction								
Pump Sentry ON?								
Maximum time per transaction								
Maximum time pump handle can be UP								
Maximum time before first pulse is detected								
Maximum time between pulses								

Installed PCT Positions

PCT #	1	2	3	4	5	6	7	8
1								
2								
3								
4								

Customer Messages

Prompts

LANGUAGE 1 PROMPTS	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	

LANGUAGE 1 PROMPTS (Continued)	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
47	
48	
49	

LANGUAGE 1 PROMPTS (Continued)	
50	
51	
52	

LANGUAGE 2 PROMPTS (NOT ALL SYSTEMS)	
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	

LANGUAGE 2 PROMPTS (NOT ALL SYSTEMS) (Continued)	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
47	
48	
49	
50	
51	
52	

Receipt Header

RECEIPT HEADER MESSAGES				
Header Line	**Language 1 Message**	**Language 2 Message (not all systems)**	**Circle the Color**	
1			RED	BLACK
2			RED	BLACK
3			RED	BLACK
4			RED	BLACK

Receipt Trailer

RECEIPT TRAILER MESSAGES				
Trailer Line	**Language 1 Message**	**Language 2 Message (not all systems)**	**Circle the Color**	
1			RED	BLACK
2			RED	BLACK
3			RED	BLACK
4			RED	BLACK

Receipt Body

RECEIPT BODY MESSAGES				
Receipt Line	**Language 1 Message**	**2 Message (not all systems)**	**Circle the Color**	
1			RED	BLACK
2			RED	BLACK
3			RED	BLACK
4			RED	BLACK
5			RED	BLACK
6			RED	BLACK
7			RED	BLACK
8			RED	BLACK

RECEIPT BODY MESSAGES (Continued)				
9			RED	BLACK
10			RED	BLACK
11			RED	BLACK
12			RED	BLACK
13			RED	BLACK
14			RED	BLACK
15			RED	BLACK

Bonus Points

ONE BONUS POINT PER _____ CENTS

BONUS POINT MESSAGES				
Receipt Line	**Language 1 Message**	**Language 2 Message (not all systems)**	**Circle the Color**	
1			RED	BLACK
2			RED	BLACK
3			RED	BLACK
4			RED	BLACK

System Parameters

Site ID

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Fueltypes

FUEL TYPES			
Type #	**Fueling Units**	**Price per Unit**	**Product Name**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Fueling Unit Labels

FUELING UNIT LABELS	
Unit Code	**Label**
1	
2	
3	

Passwords

PASSWORDS	
Access	**Password**
Main	
Modem	
Show	

Restrictions

Pump Restrictions

PUMP RESTRICTIONS	
Restriction #	**What is Restricted**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Quantity Restrictions

QUANTITY RESTRICTIONS	
Qty. Restriction Code #	**Maximum Quantity**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Card and Account Settings

CARD AND ACCOUNT SETTINGS (Circle YES or NO)		
Account No?	YES	NO
Expiration Date?	YES	NO
Monthly Allocation?	YES	NO
Daily Allocation?	YES	NO
PIN?	YES	NO
• *If PIN = YES, Card Invalidated After Three Retries?*	YES	NO
Save Odometer Entries?	YES	NO
Pump Restriction?	YES	NO
Quantity Restriction?	YES	NO
Driver/Vehicle Account Name?	YES	NO

Transaction Data Settings

TRANSACTION DATA (Circle YES or NO)		
Enable Wraparound?	YES	NO
Log Unauthorized Transactions?	YES	NO
Display Fields:		
• Account, Driver Vehicle	YES	NO
• Date and Time	YES	NO
• Card 1	YES	NO
• Card 2	YES	NO
• Fuel Type	YES	NO
• Pump Number	YES	NO
• Quantity	YES	NO
• Price	YES	NO
• Total	YES	NO
• Odometer	YES	NO
• Miles per Unit	YES	NO
• Miscellaneous	YES	NO
• Receipt Status	YES	NO

TRANSACTION DATA (Circle YES or NO) (Continued)		
• Account Number	YES	NO

System Totals Settings

SYSTEM TOTALS SETTINGS			
Tank Number	**Fuel Type**	**Current Quantity**	**Low-Level Alert At**
1			
2			
3			
4			
5			
6			
7			
8			

Journal Printer Settings

JOURNAL PRINTER SETTINGS		
Print Card 2 Number?	YES	NO
Print Card Name (account, driver, vehicle)?	YES	NO
Print Odometer/Miscellaneous?	YES	NO
Allow Fueling During Printer Error?	YES	NO

Appendix B - Memory Levels & Allocations

Table 11 shows the relationship between RAM quantity, number of transactions, and the number of cards or keys available. All four available levels of RAM are shown. “Minimum Options” and “Maximum Options” refers to the options you enable or disable in the SET CARD procedure.

The memory level is displayed or set through the “RAM” option - See *System Parameters* on page 15.*Card capacity is rounded to a maximum of 3 significant digits*

Table 11: RAM and Transaction Capacity

MEMORY SIZE/LEVEL	TRANSACTION SIZE CODE	NUMBER OF TRANSACTIONS	APPROX. NUMBER OF CARDS/KEYS AVAILABLE	
			With Minimum Options Enabled	With Maximum Options Enabled
Level 1 - Standard (256 KB)	4	100	10,600	3,700
	40	1000	5,800	2,000
	60	1500	3,100	1,100
Level 2 - Optional (512 KB)	40	1000	20,300	7,100
	80	2000	15,000	5,200
	120	3000	9,700	3,400
Level 3 - Optional (1 MB)	40	1000	49,500	17,100
	100	2500	15,000	14,400
	200	5000	28,200	9,700
	300	7500	14,800	5,100
Level 4 - Optional (2 MB)	40	1000	107,700	37,300
	200	5000	86,400	29,900
	400	10,000	59,700	20,700
	600	15,000	33,100	11,500

Figure 32: RAM Level vs Transaction Capacity

Appendix C - Modem Use

You can program and poll System2 remotely over regular telephone lines with a pair of modems: A site (local) modem on System2 and a remote (host) modem.

Modem Configuration

You must use a PC to set up the PC Logic modem. This modem is available from OPW Fuel Management Systems. The modem attached to System2 must have an "answer only" configuration.

Enter the following parameters for ANY local modem. The PC Logic commands to enter these parameters are shown (these commands are only for the PC Logic modem).

Table 12: Modem Commands

Parameter	PC Logic Command
Answers on 1st Ring	**ATS0=1**
Monitors Data Carrier Detect	**AT&C1**
Result codes NOT returned	**ATQ1**
Resets when Data Terminal Ready is turned OFF	**AT&D2**

Note

Data Carrier Detect (DCD) is sent to the System2 modem. System2 uses DCD to know when a call has been received. Data Terminal Ready (DTR) is output from System2 to let the modem answer.

After entering the PC Logic commands listed above, enter `AT&W' to store the configuration permanently. The default baud rate for the PC Logic modem is 2400.

Modem Password

Factory default modem password is HELLO. To change the modem password, see *System Parameters.*

Appendix D - Using System2 With a PC

This appendix describes the following:

- How to connect a computer to the System2
- Retrieving transaction data from the **System2** in computer format
- Sending configuration data to the **System2** in computer format
- Backing up and restoring card, account and configuration data for the **System2**.

To interface with the **System2** via a PC, you must run an emulation program in your PC. This program is explained later in this appendix.

If the distance between the FSC and PC is *less than 50 feet*, the FSC is considered directly connected to the PC. See *Attaching System2 Directly to a Computer*.

When the distance is *greater than 50 feet*, modems are required. See *Connecting to System2 Via a Modem*.

Caution

BEFORE making any connections, be sure your computer and peripheral equipment (printer, converter, modem, etc.) are OFF.

Connecting System2 to the Computer

Attaching System2 Directly to a Computer

A four-conductor cable connects the **System2** FSC to the PC. One end of the cable is terminated with a DIN connector, the other end has a 25-pin "D" connector.

- The DIN connector plugs into the TERMINAL socket on the rear of the FSC
- The 25-pin connector plugs into your PC, typically in the COM1 or COM2 serial port.

If the "gender" of the 25-pin connector on your computer is the same as that of the communication cable (for example, they are both female), you will have to purchase a "gender-bender" adaptor.

Refer to your PC instruction manual for more information on the serial ports - *not every 25-pin connector on the PC is a communications port.*

Some machines may only have a 9-pin serial port. If so, you will have to purchase an adaptor to convert the 25 pin plug to a 9-pin plug. Most electronic or computer supply stores carry these adapters.

If there is only one serial port on your machine, and it is already being used, you can purchase an additional Serial Card at most computer supply stores. Be sure to read your computer owner's manual prior to buying or installing a card.

Plug the PC power cord into a standard wall socket. You are ready to power up the PC and begin setting up the terminal emulation software.

Connecting to System2 Via a Modem

A modem must be used if you want to communicate with the system from any distance greater than 50 feet.

A Hayes® (or Hayes compatible) modem must be used, because **System2** uses Hayes® commands. Most modems have four sockets, for the following functions:

- A 25-pin "D" socket for the PC
- An RJ11 socket (for TEL line)
- An RJ11 socket (for telephone)
- A POWER IN socket

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.)

1. Connect the 25-pin socket to the COM1 or COM2 serial port on the back of your computer.
2. Connect a phone cable from the modem RJ11 "LINE IN" jack to your facility telephone jack.
3. If you want the PC to share its line with a telephone, connect the telephone to the RJ11 modem "TEL" jack.

Note

You cannot use the telephone (for voice communication) and the modem simultaneously.

4. Plug the power adapter into its socket on the modem and into a standard 115 VAC wall socket.

For a PC to communicate with **System2**, run a terminal emulation program. OPW Fuel Management Systems strongly suggests you use PROCOMM® emulation software, made by DATASTORM TECHNOLOGIES, INC. Contact your distributor for details.

Read the manual for your Terminal Emulation software carefully. You will need to set the following values (refer to the *System2 Installation Manua*l for instructions on changing these settings):

Table 13: System2 Communication Settings

Setting	Value
COM Port	PC port being used
Baud Rate	Must match System2
Parity	Even
Length	7 bits
Stop Bits	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 **System2** site.

Data Field Structure

- AUTH FLAG - value of the authorization response flag received from host with the approval response (3 bytes),

Indicates a “space pad.” A transaction record is sent as one string. For clarity, the example shows line breaks between fields.

```
External Computer Output   SYSTEM2 Response
-----------------------------------------------------------
SH TRANS 123CF|CR|LF|          abcdefghijklmno/07|CR|LF|
                    123/I/TRUXCO---/SMITH----/VAN1-----/
                    02221989/0711/0123/20001--------------/
                    60001--------------/03/03/0025000/00100/
                    000002500/0066555/105/1234567890/1/1234/
                    11/|CR|LF|
|CR|LF|                      //|CR|LF|
```

Table 14: Transaction Header Format

TRANSACTION HEADER FORMATTING			
Variable	**Field Format**	**Padding**	**Included...**
Number of transactions	4 digits left-justified	zeros	Optionally
Sum of quantities	9 digits left-justified	zeros	Optionally

Table 14: Transaction Header Format

TRANSACTION HEADER FORMATTING			
Transaction field codes	0-15 characters	none	Always
Checksum	2 digits	none	Always

Table 15: Transaction Field Codes

TRANSACTION FIELD FORMATTING			
Variable	**Field Format**	**Padding**	**Code letter**
Account/Driver/Vehicle	9/9/9 characters (total 27 characters)	spaces	a
Date/Time	8/4 digits -- MMDDYYYY/HHMM	zeros	b
Transaction Number	4 digits	zeros	c
Card 1 Number	19 digits	spaces	d
Card 2 Number	19 digits	spaces	e
Fuel Type	2 digits, from 01 to 16 only	zeros	f
Pump Number	2 digits, from 01 to 99	zeros	g
Quantity	7 or 8 digits: ####(#).###	zeros	h
Price	5 digits: ##.###	zeros	i
Total	9 digits: #######.##	zeros	j
Odometer	1 character and 6 digits		
MPG	*4 spaces -- this feature not available*	*spaces*	*l*
Miscellaneous	10 digits	spaces	m
Receipt Status	0 or 1: "1" = receipt issued, "0" = receipt not issued	none	n
Account Number	*4 spaces -- this feature not available*	*spaces*	*o*

Table 16: Card and Account Field Codes

CARD AND ACCOUNT FIELD FORMATTING			
Field Name	**Field Format**	**Padding**	**CODE**
Card/Account Number	19 digits, left-justified	spaces	a
Record Type	8 bytes	none	b
Account Number	4 digits, right-justified	zeros	c
Expiration Date	8 digits: mmddyyyy	none	d
Fuel Totals to Date	8 digits: ######.## (decimal implied)	zeros	e
Fuel Totals Today	8 digits: ######.## (decimal implied)	zeros	f
Monthly Allocation	6 digits: ###### (dollars only, no decimal)	zeros	g
Daily Allocation	6 digits: ###### (dollars only, no decimal)	zeros	h
PIN (card numbers only)	6 digits	spaces	i
Odometer	6 digits	zeros	j
Reasonability	2 digits	zeros	k
Product Restriction	2 digits	zeros	l
Quantity Restriction	2 digits	zeros	m
Driver/Vehicle/Account Name	9 characters	spaces	n

Table 17: Record Type Flags

Byte #	Definition
1	0: Valid 1: Invalidated by manager
2	0: Valid 1: Invalidated by 3 bad entries
3	0: Miscellaneous Entry DISABLED 1: Miscellaneous Entry ENABLED
4	0: Odometer Entry DISABLED 1: Odometer Entry ENABLED
5,6,7,8	0001: Single/Language 1 1001: Single/Language 2 (not all systems) 0010: Driver/Language 1 1010: Driver/Language 2 (not all systems) 0011: Vehicle 0100: Account

Example

***00110010** is a Valid Language 1 Driver card with miscellaneous AND odometer entry enabled.*

Table 18: Reason for Termination Codes (Auth. GRANTED)

Code	Reason	Cause	Possible Solution
C	Pump error, premature busy	No suggestions	
D	Pump error --reset quantity exceed	Pulses being received without current being sensed or handle switch detection.	Check PV268 DIP switch #6 for correct selection (current sense or handle switch). Check current: s/b 100 mA AC minimum.
E	No `PUMP HANDLE BUSY'	No current sense or handle switch detection after pump authorization.	Check PV268 DIP switch #6 for correct selection. Check current draw: s/b 100 mA AC minimum. Make sure handle time-out is long enough. Check wiring to PV270 relay board.
F	No fueling pulses	Current sensed or handle switch detected, but no pulses received from pulser.	Check PV268 DIP switch #1 for correct pulser type. Check pulser wiring. Check pump's First Pulse timer.
G	Pump currently active	No suggestions	

I	Normal	Good transaction.	May appear even for incomplete transaction if current sense threshold is too close to actual current draw. Contact OPW Fuel Management Systems Technical Support.
J	Quantity limit exceeded	Card, account or pump limit reached.	Check programming for card, account or pump
K	Total transaction time exceeded	Pump is programmed to dispense fuel only for a programmed length of time.	Check “MAX TIME FOR FUELING” value, and adjust accordingly. See *Page 41*.
L	Pulser error	Only in flow-switch applications. Pulses not received within five seconds of flow switch activation.	Check pulser. Possible faulty flow switch.
M	Emergency stop	Emergency stop button was depressed during fueling.	If button was NOT pressed, check E-STOP button for short.
N	Missing pulse detected	Current sensed, pulses received, then customer stops pumping. As long as pump is ON, Pulse Timer runs.	Lengthen the Pulse Timer duration, or hang the pump up.
O 01	Communication errors	Power interruption during fueling caused termination of transaction.	Check power source. Are noise filters installed in pump motors, solenoid valves, and contactors?
Z	Manager activated	No suggestions	

Table 19: Reason for Termination Codes (Auth. DENIED)

Code	Reason	Cause	Possible Solution
b	Bad PIN entry	Wrong PIN entered three times.	Verify PIN assigned to card is correct. If yes, check the keypad with FIT test program.
c	Bad odometer entry	NOT USED	NOT USED
d	Bad miscellaneous entry	NOT USED	NOT USED
e	User entry time-out	Customer did not enter data after inserting card.	Operator error, or possible keypad malfunction.
f	Card # not in positive file	Invalid card.	
g	Card expired	Card has expiration date assigned to it. This date has passed.	Assign new expiration date to card, or issue new card.
h	Card record expired	Card record in the system is assigned an expiration date, which has passed.	Assign new expiration date to card record, or issue new card.
I	Card invalidated	Card has not been validated for use in this system.	Change validation status of card.

j	Three bad PIN entries	Customer has entered incorrect PIN three times.	Verify PIN assigned to card is correct. If yes, check the keypad with FIT test program.
k	No allocation	Daily or monthly limit has been reached on card or account.	If daily, Customer must wait until midnight to reset daily totals. If monthly, new limits must be programmed or totals cleared.
n	Account expired	The card is assigned to an account that has expired.	Program new expiration date on account.
o	Account invalidated	Card has not been validated for use in this system.	Change validation status for the account.
p	Account numbers do not match	Driver card is not assigned to the same account as the Vehicle card.	Program both cards to the same account.
q	Account record not found	Card is assigned to an account record that has not been programmed into the card/account file.	Program the card into the file.

Checksums

The checksum is a number included with data to ensure the integrity of the data.

The checksum used by the **System2** is a 2-digit number calculated by adding the decimal values of the ASCII characters in a string and truncating the sum.

For example, in the string **`/ABC'**, the decimal values for each character are: **`/'** = 47, **`A'** = 65, **`B'** = 66 and **`C'** = 67. Adding these numbers produces 245. Truncating the number in this case means removing all but the last two digits - for 245, this results in 45.

The checksum is included with transaction, card, and account records sent by the **System2**. You can also checksum each record when using the **`RESTORE'** command. As an 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.

An example of a checksum in a **`RESTORE'** command is:

```
RESTORE STATION12345/abcdef/75|CR|LF|
```

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

Calculating a Checksum

The following 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$,2)
100 PRINT TEMP$
110END
```

ASCII Character Table

Decimal Value	ASCII Char	Decimal Value	ASCII Char	Decimal Value	ASCII Char	Decimal Value	ASCII Char
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		

The prefix **COMPUTER** can be placed before any command (*except* **PRINT** or **SHOW**) to suppress the usual **System2** prompts and allow only a carriage return (**`|CR|'**) or line feed (**`|LF|'**) to be returned.

The **`P>'** prompt is returned after each command sequence has been *successfully* completed. The following command suppresses prompts, and enables checksum (the "." enables checksum):

```
COMPUTER HELLO/HELLO/.
```

If the prompt is *not* returned when expected, a 'R' (for RETRY) is returned instead. To abort a command sequence, send a **`^C'** (ASCII 03). Then, re-issue the command.

Backing up the card validation data allows you to safeguard this information and to minimize system downtime when modifying or repairing a System2. You can also backup one and restore the data to another System2 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 System2.

The Phoenix, Phoenix Plus or Phoenix for Windows software package from OPW Fuel Management Systems provides all the know-how you need to backup and restore card data quickly and easily using an IBM®-compatible personal computer. Phoenix products are available from your distributor.

BACKUP/BACKUP Card Commands

These privileged commands transmit card and account data from the System2 data base to an external computer.

From an external computer, the BACKUP commands request System2 to transmit site id, card and account field code(s), checksum, carriage return and a line feed (`|CR|LF|'), all separated by a slash (`/').

The records themselves are then sent following each `|CR|LF|' sent by the external computer. After the last record, the System2 sends `//|CR|LF|'.

- If NO card number is specified, backup starts transmission at the first card/account record
- If a card number is specified, the transmission starts at the specified record. Because the records are sorted by number, this command allows you to backup a latter portion of the file.

Card and account records are sorted only by number; that is, account 2222 would be between card 1111 and card 3333. The BACKUP commands back up both record types.

There is no command to specify only card or only account.

The following is an example of the information exchanged with the `BACKUP' command.

In this example, `STATION12345' is the site ID and `44' is the checksum. The `-' indicates a "space pad." Card and account records are sent as single strings. For clarity, the example above shows line breaks between fields.RESTORE site id (/fields) (/checksum)

This privileged command loads card and account information from an external computer to the System2 data base.

The SITE ID, CARD or ACCOUNT numbers (field "a") and RECORD TYPES (field "b") must be specified. You may specify any additional field codes you wish to restore (see Restoring Fields below). You may also include a checksum for the command line and/or the data records.

Note

Specify field codes with lower-case letters. Specify the RESTORE command and any site ID letters with UPPER-CASE.

The following information exchanged with the **`RESTORE'** command.

```
|CR|LF|                                                    P>
RESTORE STATION12345/abcdefghijklmn/
44|CR|LF|                                          |CR|LF|
1000400000000000000/00100001/1234/
020219961996199619961996199619961996/00000809/001000/000100/--5903/
0014060/02/00/01/RIKARD---/54|CR|LF|          |CR|LF|
//|CR|LF|                                          P>
```

The `|CR|LF|'** *indicates a carriage return and a line feed. The* **`-' *indicates a "space pad." A card or account record must be sent as one string. For clarity, the example above shows line breaks between fields.*

Restoring Fields

The **System2** allocates space in its data base when it receives the field codes.

You can restore a different number of fields than were in the data base when it was backed up. For example, if a field was accidentally omitted during configuration, you can add that field without losing any card or account data.

First, back up the current card or account data. Then, use the **SET CARD BUFFER** command to include all the old and new fields. *This destroys the old data!*

Finally, restore the card or account data, specifying the original fields *plus* the new field(s). The new fields can be filled with blanks or actual data.

Similarly, you can restore fewer fields - this increases the number of transactions or card and account records to be retained by the **System2**.

Backing up the **System2** is like taking a snapshot of the data base. When data is restored, **System2** returns to exactly the same state as when backed up.

Frequent data base backups reduce the need to update any specific fields (e.g. mileage) in the data base when you use the **RESTORE** command.

UPDATE site id (/fields) (/checksum)

This *privileged* command modifies existing card or account records in the **System2**.

SITE ID and CARD # must be specified for this command; all other field changes are optional. A field *must* be present in the original record to be updated. Checksum data can be sent if desired.

The sequence for the **UPDATE** command is similar to that of **RESTORE**

Note

The message `SYSTEM DOWN' is shown on the FIT display while backing up or restoring configuration data. Terminal cannot be used by customers while this message is displayed.

The `|CR|LF|' indicates a carriage return and a line feed. The **`-'** indicates a "space pad." A card or account record must be sent as one string.

SYSBACKUP Command

When this command is executed, **System2** transmits the configuration data and the version number of the system. *You CANNOT back up configuration data while a transaction in is progress.*

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

When this command is invoked, **System2** does the following:

- tests the FSC 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)

SYSRESTORE requires the FSC version number and checksum be specified. Version number must be the same for *both* the system that was backed up and the system that will be restored (the letter after the version number can be ignored for this command).

The FSC version number is printed on the cover of this manual; it can also be displayed using the **SHOW SYSTEM** command. The decimal point is *not* included.

For example, if a **System2** with FSC software version 21.01E and standard RAM memory is backed up, the command **SYSRESTORE 2101** can be used to reconfigure the same system or another system with the same FSC version number and the same size memory.

Differing RAM Size

SYSRESTORE also lets you restore differing size system memory (RAM) by specifying the size code (#) for the system to be restored. What's RAM size code? See *RAM* on page 65.

The memory size specified with the **SYSRESTORE** command MUST match the actual memory size of the **System2** being restored!

If the specified memory is larger than the system's memory, **System2** 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, **System2** will *not* be able to access the additional memory.

The **SYSBACKUP** command takes a "snapshot" of **System2** 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.

No pumps can be active at the time of a **SYSBACKUP** *or* **SYSRESTORE** command.

Appendix E - Troubleshooting

Problem/Solution Table

Problem	Possible Solution(s)
No FIT display messages	Adjust "display viewing angle" potentiometer (on top of the display PC board).
FAULTY PUMP message	Three "zero-quantity" transactions. Re-install pump with INSTALL PCT # POSITION # command. Bad pulser, replace.
RESET QUANTITY EXCEEDED message	Current Sense/Pump Handle selector switch in wrong position. Change Switch #1 on PV-268 board.
SYSTEM DOWN message at *one* FIT	FIT not installed. Petro-Net wiring problem. FIT board malfunction. Run COMM test to check board, replace if needed.
SYSTEM DOWN message at *all* FITs	FIT board malfunction. Run COMM test for each FIT board; replace if needed. FSC board malfunction. If all FIT boards pass COMM test, replace FSC board.
SYSTEM FULL message	Printer error. Clear the error. Transaction buffer filled. Clear buffer. Buffer wraparound not enabled. Turn ON wraparound feature.
MEMORY ERROR message	Expanded memory failure. Battery switch OFF during power failure? Battery failure. Replace battery. Expanded Memory failure. Replace FSC board.
Pulser not counting pulses.	ACTIVE/PASSIVE pulser switch set incorrectly. Change Switch #1 on PV-268 board.
Newly programmed messages or pump parameters not working.	Changes were not downloaded. Use DOWNLOAD command.
Printer not printing transactions .	Communications blocked by printer error. Unblock with SET JOURNAL command. Printer is locked. Unlock printer with UNLOCK command
Printer Error LED is flashing.	1 flash - paper jam 2 flashes - paper low (or out) 3 flashes - printer cutter jam
Black square on FIT display after card is inserted .	NOT ALL SYSTEMS. Card expects second language but no message for second language was programmed.

Troubleshooting Flowcharts

The flowcharts on the following pages give you advice on what to do when the these messages appear on the FIT display:

```
FAULTY PUMP? RE-ENTER
INCORRECT CARD
INCORRECT READING
SYSTEM DOWN
INVALID PUMP, RE-ENTER
PUMP HANDLE? RE-ENTER
```

Another three charts give you advice when there is:

- No quantity shown on the transaction receipts,
- No communication between the FSC and the PC,
- A modem doesn't answer the System2.

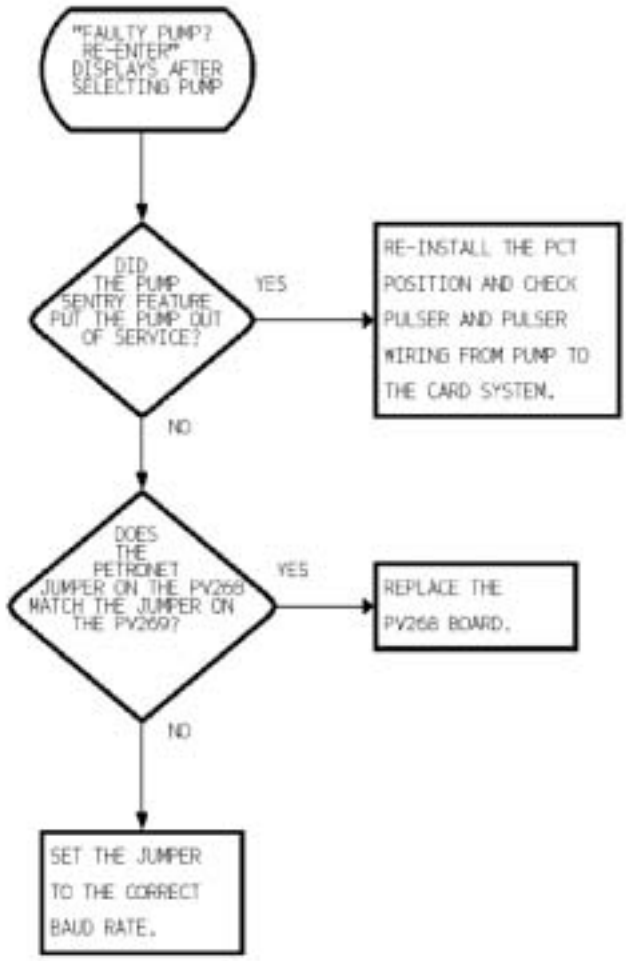


Figure 33: Diagnosing "Faulty Pump Reenter" Message

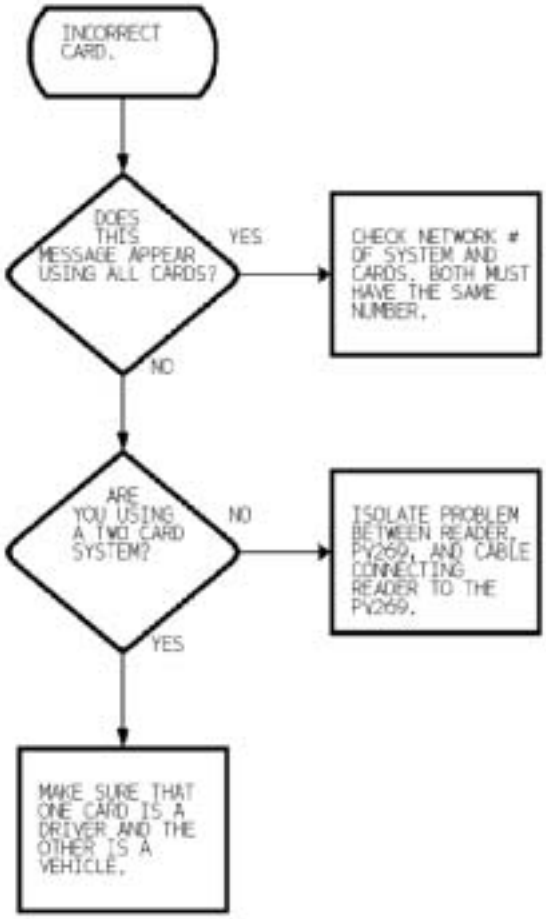


Figure 34: Diagnosing "Incorrect Card" Message

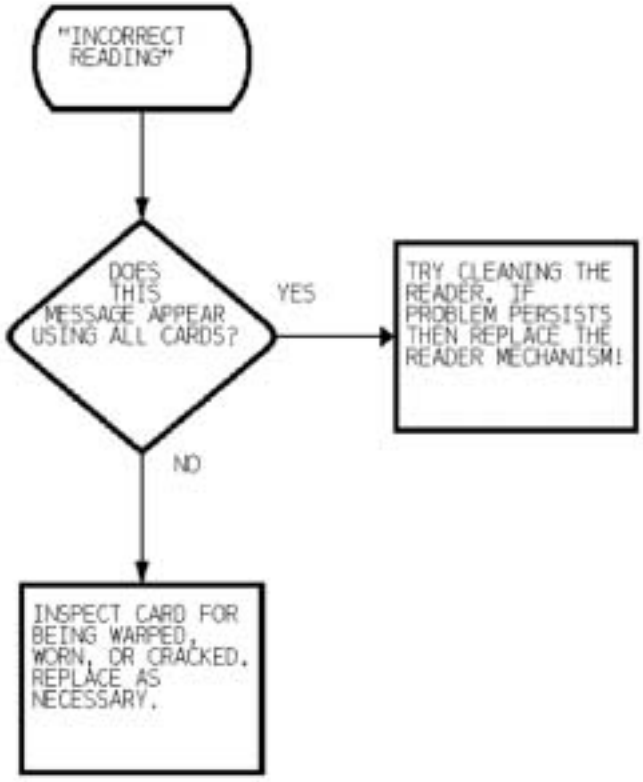


Figure 35: Diagnosing "Incorrect Reading" Message

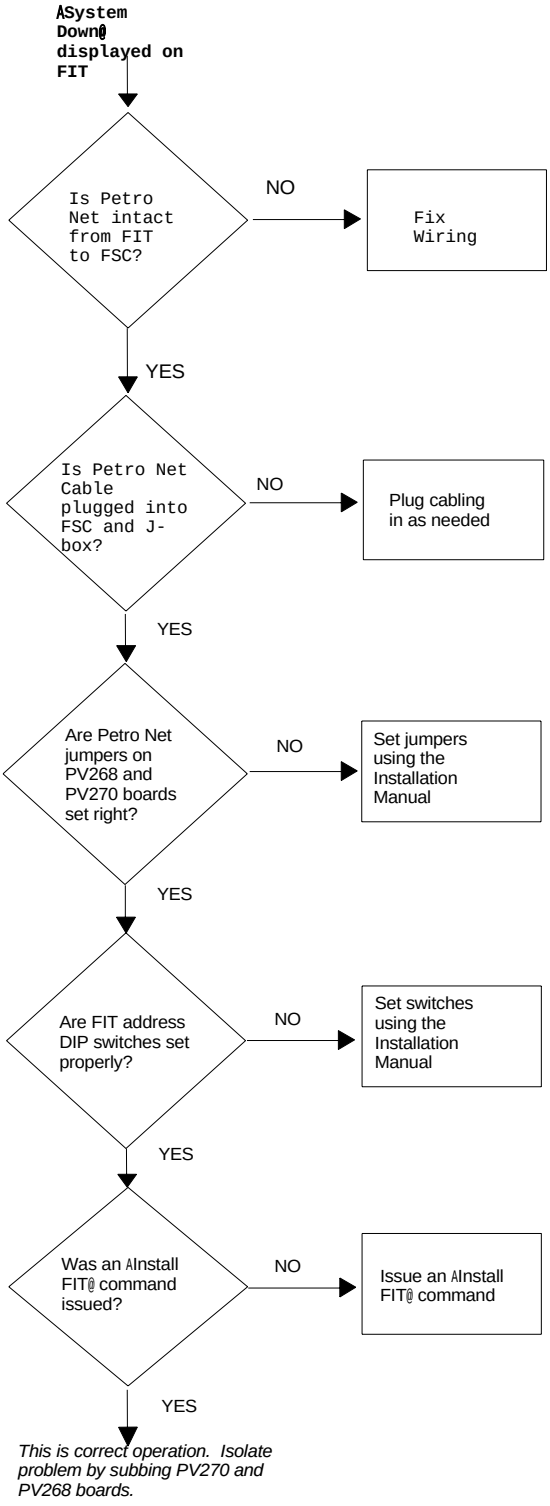
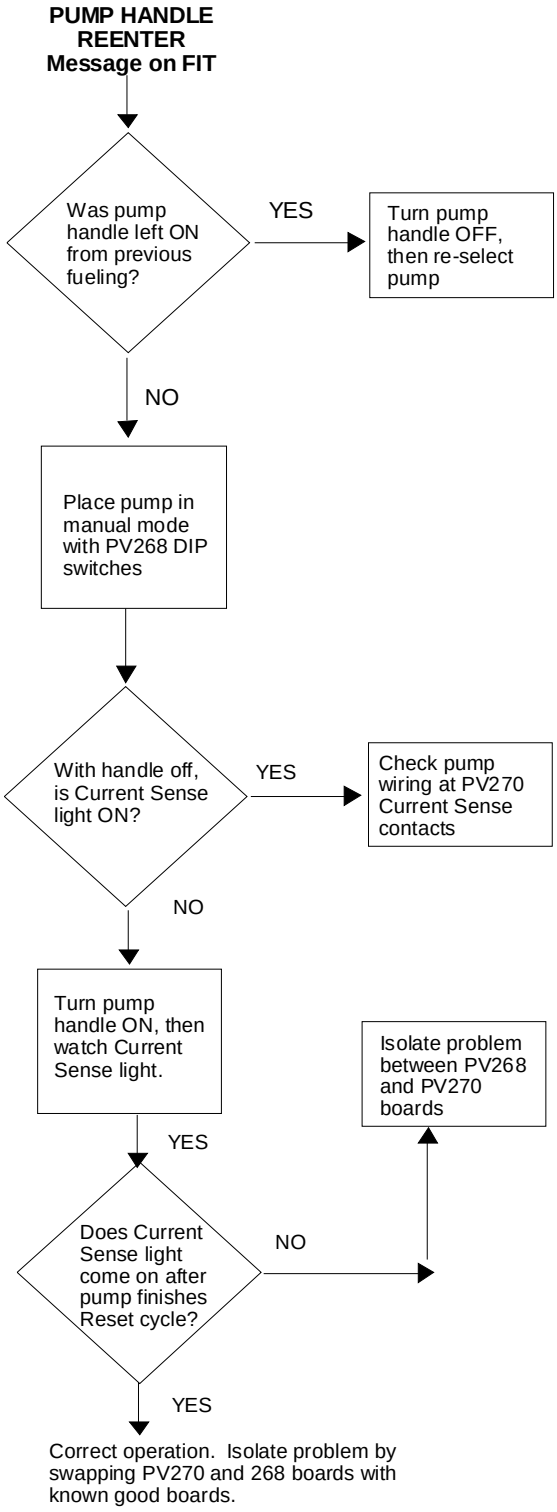
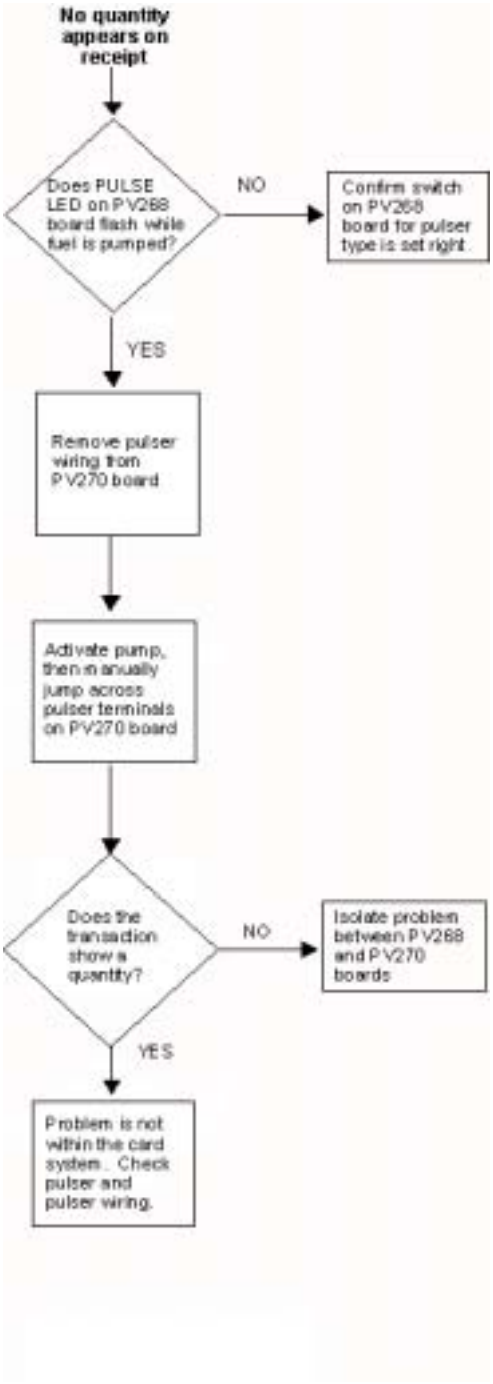
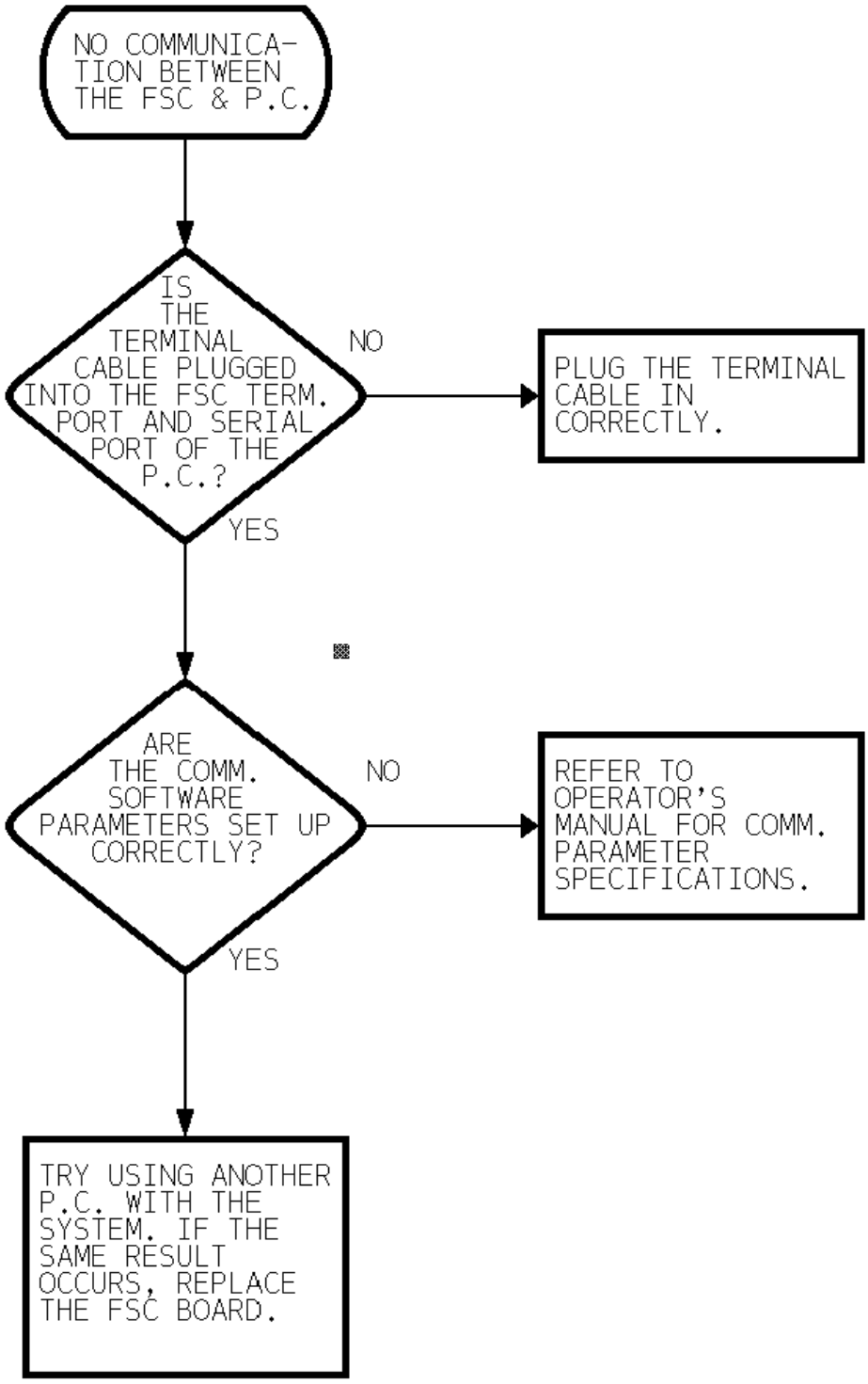
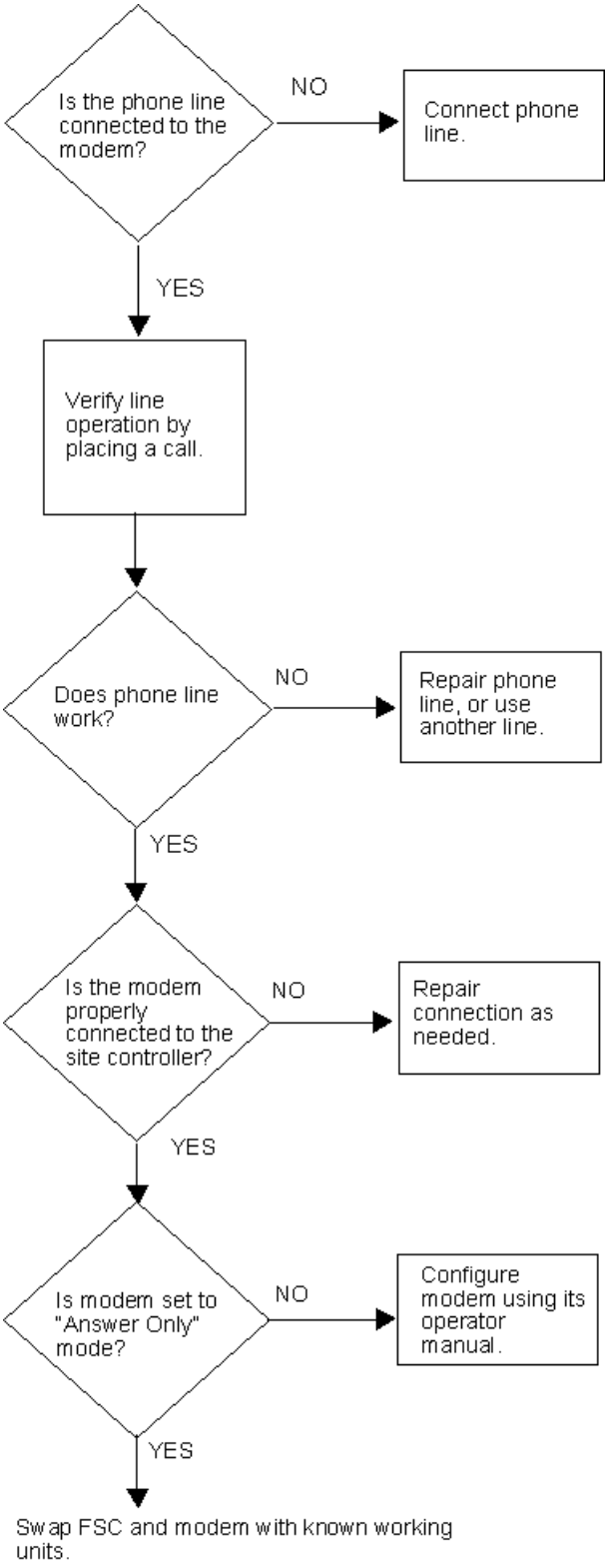


Figure 36: Diagnosing "System Down" Message


PUMP HANDLE REENTER Message on FIT
Was pump handle left ON from previous fueling?
YES
Turn pump handle OFF, then re-select pump
NO
Place pump in manual mode with PV268 DIP switches
With handle off, is Current Sense light ON?
YES
Check pump wiring at PV270 Current Sense contacts
NO
Turn pump handle ON, then watch Current Sense light.
Isolate problem between PV268 and PV270 boards
YES
Does Current Sense light come on after pump finishes Reset cycle?
NO
YES
Correct operation. Isolate problem by swapping PV270 and 268 boards with known good boards.


No quantity appears on receipt
Does PULSE LED on PV268 board flash while fuel is pumped?
NO
Confirm switch on PV268 board for pulser type is set right.
YES
Remove pulser wiring from PV270 board
Activate pump, then manually jump across pulser terminals on PV270 board
Does the transaction show a quantity?
NO
Isolate problem between PV268 and PV270 boards
YES
Problem is not within the card system. Check pulser and pulser wiring.


NO COMMUNICA-
TION BETWEEN
THE FSC & P.C.
IS
THE
TERMINAL
CABLE PLUGGED
INTO THE FSC TERM.
PORT AND SERIAL
PORT OF THE
P.C.?
NO
PLUG THE TERMINAL
CABLE IN
CORRECTLY.
YES
ARE
THE COMM.
SOFTWARE
PARAMETERS SET UP
CORRECTLY?
NO
REFER TO
OPERATOR'S
MANUAL FOR COMM.
PARAMETER
SPECIFICATIONS.
YES
TRY USING ANOTHER
P.C. WITH THE
SYSTEM. IF THE
SAME RESULT
OCCURS, REPLACE
THE FSC BOARD.


Is the phone line connected to the modem?
NO
Connect phone line.
YES
Verify line operation by placing a call.
Does phone line work?
NO
Repair phone line, or use another line.
YES
Is the modem properly connected to the site controller?
NO
Repair connection as needed.
YES
Is modem set to "Answer Only" mode?
NO
Configure modem using its operator manual.
YES
Swap FSC and modem with known working units.

Appendix F - Receipt Printer Maintenance

This appendix tells you how to load paper, clear paper jams, install a new printer, install a replacement Printer/Cutter assembly and replace the Chute/Bracket/Sensor assembly

Loading Paper

See *Figure 37*. The thermal printer accepts metric size thermal paper 59.5mm (2.3 inches) with a maximum diameter of 120mm (4.7 inches).The thermal paper has a heat-sensitive coating on one side. The thermal printer 'burns' characters into this coating.

During cold ambient temperatures the OPT unit is automatically heated, and during hot ambient temperatures, the inside of the unit can get very hot as well. For these reasons, high heat resistant paper should be used.

Replacement paper is available from OPW Fuel Management Systems. Ask for part number **54-1106**.

Loading Procedure

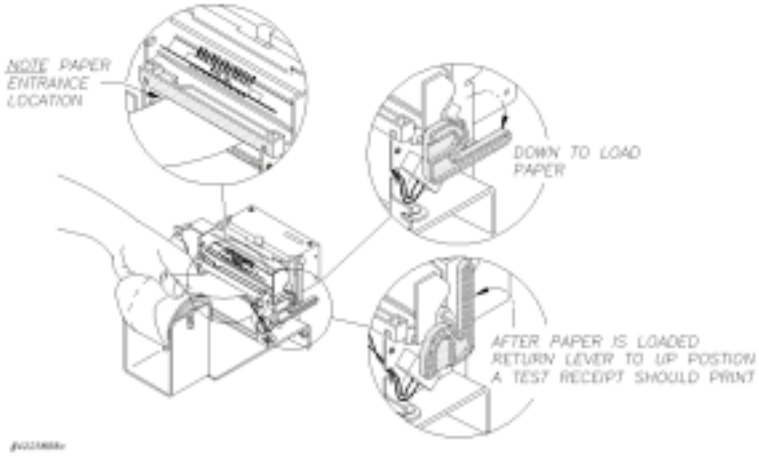


Figure 37: Loading Paper into the Receipt Printer

1. Make sure the OPT power is on.
2. Turn the Paper Load Handle to the DOWN position.
5. If necessary, remove the paper roll/spindle from the bracket.

3. Cut the new paper with scissors to leave a sharp edge, the feed the paper into the printer. The paper goes in just below the black plastic bar. Make sure the paper feeds from the *top* of the roll - the side with the thermal coating. If the roll is reversed, the receipts will be blank.
4. Insert the spindle in the new roll, the place the roll into the bracket.
5. Turn the paper Load Handle to the UP position. The printer should automatically print a test receipt. If a receipt did not print, refer to the Troubleshooting section of this guide.

Clearing a Paper Jam

See *Figure 38* on *page 137*.

If the paper jam appears to be in the printer rollers or the cutter, the cutter must be removed from the printer.

1. TURN OFF THE OPT POWER!
2. If the jam is severe, remove the door from the enclosure (see the C/OPT manual M39-00.01).
3. Tear the paper and remove the paper roll and spindle from the bracket. Leave enough paper sticking out from the printer so it can be easily grasped.
4. Remove the Printer/Cutter assembly from the bracket by unscrewing the two thumbscrews. Disconnect any wires if necessary, making sure you note where they came from. Make sure that the paper chute is clean, and free from obstructions.
5. Turn the Paper Load Handle to the DOWN position. Try to remove the paper from the printer/cutter assembly. If successful, reinstall the printer/cutter assembly, insert a roll of paper and test the printer for proper operation by printing a test receipt.
6. If the paper cannot be pulled out of the Printer/Cutter assembly, open the cutter assembly and remove any paper lodged there..

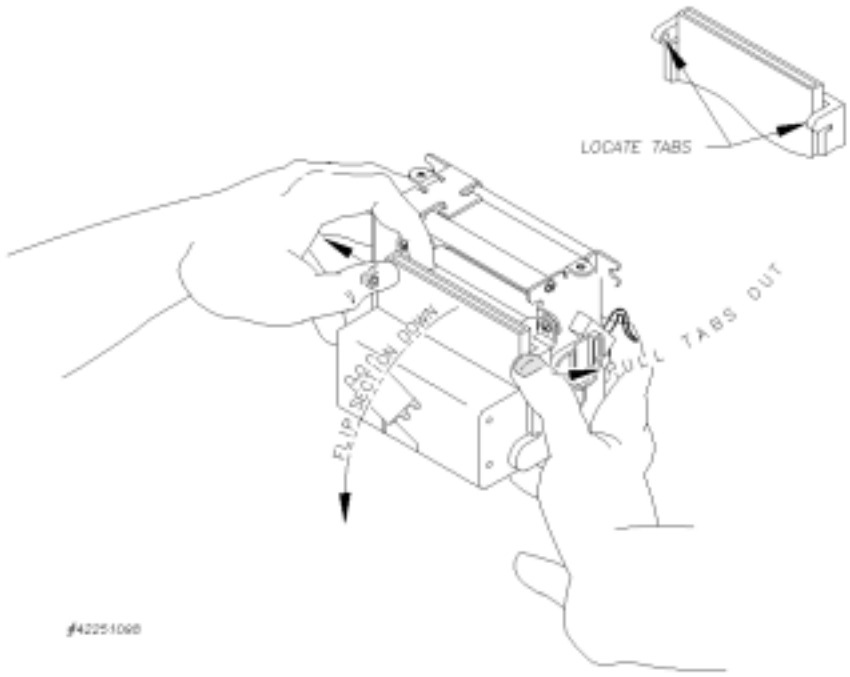


Figure 38: Clearing a Jam

6. If paper is still jammed, it may be necessary to remove the cutter from the printer. Remove any paper jamm
7. ed in the printer rollers or the cutter.
7. Reattach the cutter to the printer.
8. Reattach the Printer/Cutter assembly to the bracket. Reconnect any wires you previously disconnected.

Installing A New Receipt Printer

1. TURN OFF OPT POWER!
2. Remove the door from the enclosure (see OPW Fueling Systems document number).
3. Note where the buzzer cable attaches to the circuit board, then disconnect it.

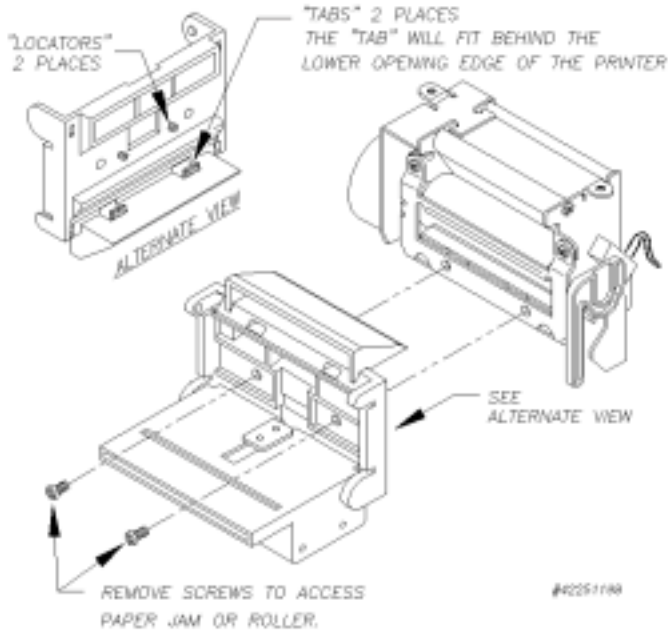


Figure 39: First-Stage Diassassembly

8. See *Figure 40*. Remove the four screws from the buzzer cover and from the hold-down plate.

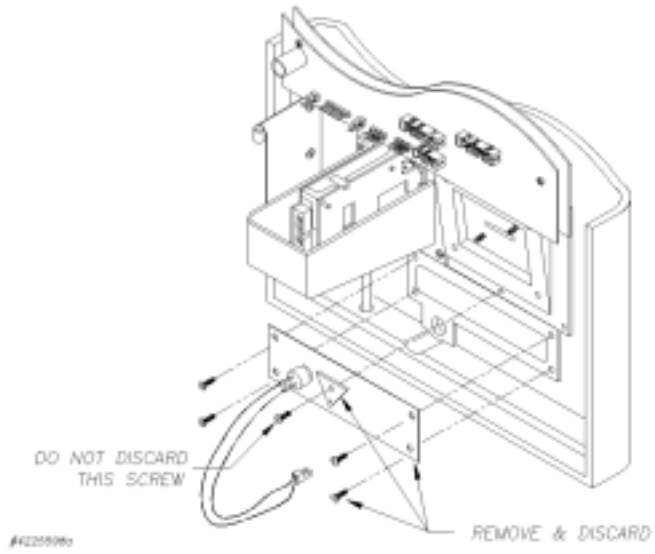


Figure 40: Removing the Buzzer Cover

9. Replace the one center screw.

10. Discard the four screws, plate, gasket and buzzer. The Receipt Printer Option has a buzzer of its own.
11. Remove any leftover gasket material from the door.
12. See Place the supplied gasket on to the chute. Use the provided screws to mount the Receipt Printer Option to the door.

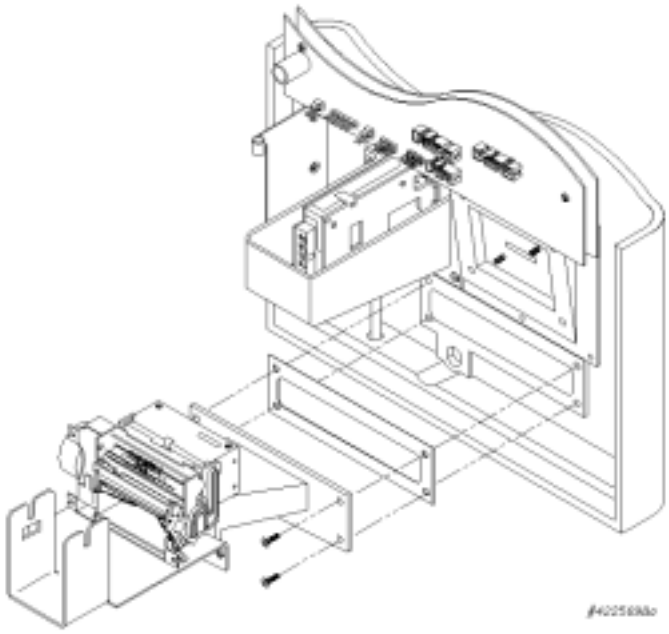


Figure 41: Mounting the Printer

13. Refer to *Figure 42* on *page 140* if you have an OPT unit with a PV290 OPT Controller board, or to *Figure 42* on *page 140* if you have an OPT unit with a PV297 or PV299 OPT Controller board.

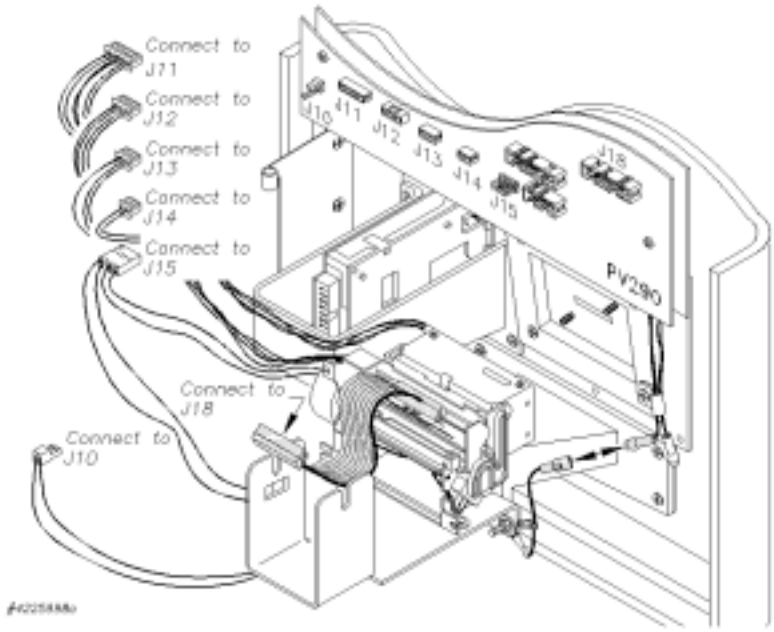


Figure 42: OPT with PV290 Board

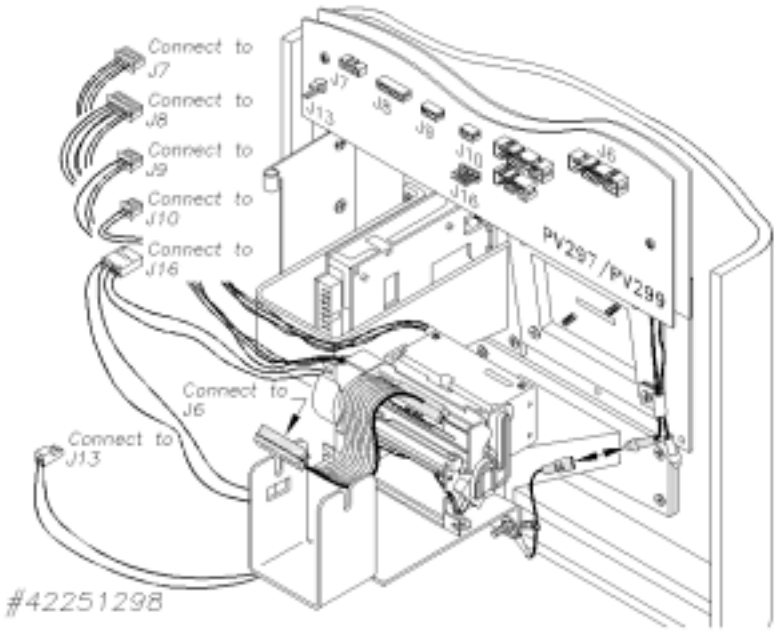


Figure 43: OPT with PV297 or PV299 Board

The board number can be found on the right-hand edge of the board. Connect all cables to the circuit board. Connect ground wire as shown.

4. Reinstall door on enclosure (see OPW Fuel Management Systems manual number *M39-00.01*, C/OPT Installation and Operation manual).
5. Load a roll of paper (see *Loading Paper* on page 135).

Replacing the Printer/Cutter Assembly

1. TURN OFF OPT POWER!
2. Remove the door from the enclosure (see OPW Fuel Management Systems manual number *M39-00.01*, C/OPT Installation and Operation manual).
3. Noting their locations, disconnect all cables coming from the old Printer/Cutter assembly from the circuit board.
4. See *Figure 44*. Remove the Printer/Cutter assembly from the bracket by unscrewing the two thumbscrews on the underside of the bracket.
5. Place the new Printer/Cutter assembly on the bracket and secure with the two thumbscrews.

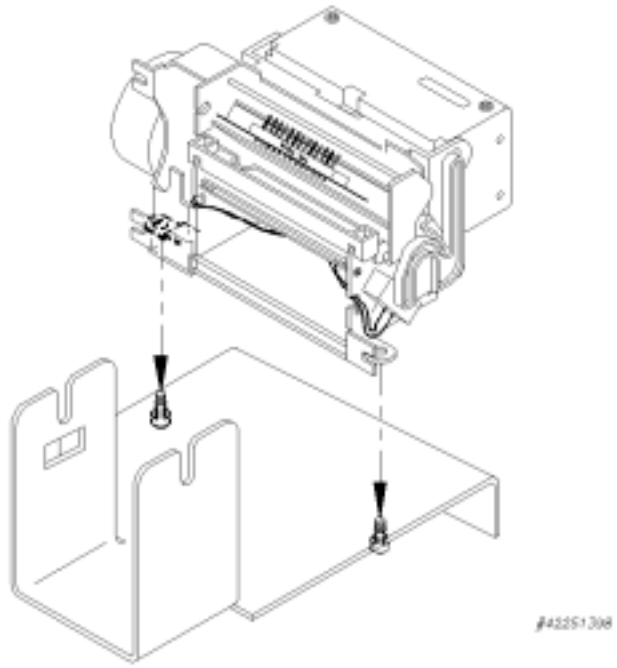


Figure 44: Printer/Cutter Removal and Reinstallation

6. Connect all the cables to the circuit board.
7. Re-install the door on the enclosure ().

8. Turn on the OPT power.
9. Load a roll of paper (see *Page 135*).

Replacing the Chute/Bracket/Sensor Assembly

1. TURN OFF THE OPT POWER!
2. Remove the door from the enclosure (see the C/OPT manual, M39-00.01).
3. Turn the Paper Load Handle to the DOWN position. Remove any paper from the printer.
4. Remove the Printer/Cutter assembly from the bracket by unscrewing the two thumbscrews (*Figure 44* on *page 141*). Move the printer/Cutter assembly to one side. Disconnect Printer/Cutter cables from the circuit board if necessary, making sure you note where they came from.
5. Note where the sensor cable and buzzer cable attach to the circuit board, then disconnect the cables from the circuit board.
6. Disconnect the ground cable.
7. To remove the Chute/Bracket/Sensor assembly from the door, remove the four screws from the assembly. Set the four screws aside.
8. Remove any leftover gasket material from the door.
9. See *Figure 45* on *page 143*. Place the supplied gasket on to the chute. Use the provided screws to mount the new Chute/Bracket/Sensor Assembly to the door. Replace the Printer/Cutter assembly on the bracket (*Figure 44* on *page 141*).
10. Connect all cables to the circuit board. Connect ground cable as shown.
11. Re-install door on the enclosure (see C/OPT manual, M39-00.01).
12. Load a roll of paper (see *Replacing the Printer/Cutter Assembly* on page 141).

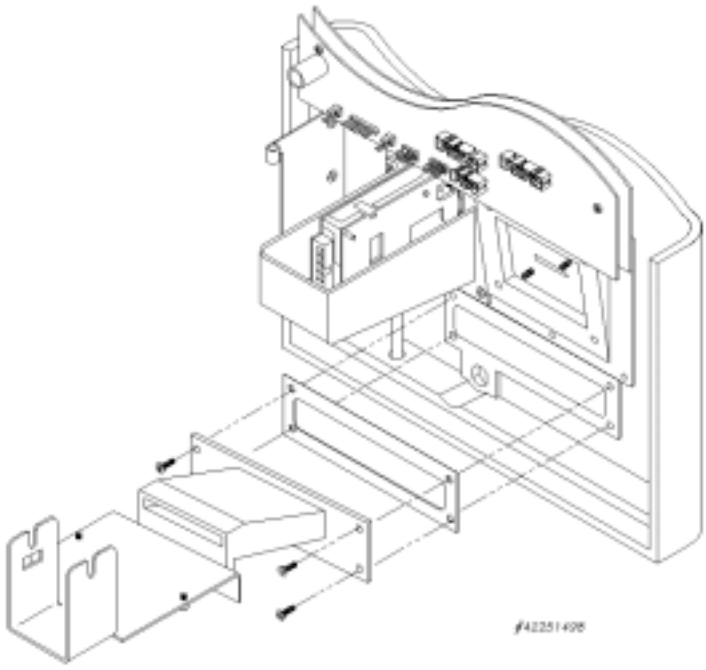


Figure 45: Chute/Bracket/Sensor Installation

Troubleshooting

In order to help you with any difficulties you may encounter, here are some general problems and possible causes. If you are still having trouble, please contact OPW Fuel Management Systems Technical Service department at (708) 485-4200.

Printing blank receipts

- Out of paper
- Paper is not thermal paper
- Paper is loaded incorrectly (it should feed from the top of the spool)
- Printer is defective
- Fault on the OPT Controller board
- Printer wires/cables not connected or seated properly

Prints receipts but reports that paper is out

- Paper is threaded over the black bar instead of under it.
- Inoperative paper out sensor on printer
- Fault on the OPT Controller board

- Printer wires/cables not connected or seated properly

Printer does not feed paper

- Paper jam
- Paper Load Handle is not in the up position
- Printer motor is defective
- Fault on the OPT Controller board
- Printer wires/cables not connected or seated properly

Cutter does not cut after printing a receipt

- Chute sensor failure. Check the following values while in Test/Configuration Mode (Refer to the OPT User's Guide):

Condition	Acceptable Values
Paper in chute	0 - 200
No paper in chute	800 - 1024
Chute sensor threshold	600

- Cutter wires not connected or seated properly
- Cutter mechanism is defective
- Fault on the OPT Controller board

Appendix G - System2 Commands Summary

Table 20 is a complete list of all System2 commands. NOT ALL COMMANDS ARE AVAILABLE IN ALL SYSTEMS.

- [P]Privileged - command requires user to be in privilege mode to use.
- [D]Download – command requires a download for changes to take effect.
- [O]Optional - command requires option to be purchased.
- #Requires your numerical entry.

Table 20: System2 Commands Summary

TIME MANAGEMENT
SET TIME [P]
PRINT/SHOW TIME
SET DATE [P]
PRINT/SHOW DATE
FORMAT DATE
SET TIME CHANGE [P]
PRINT/SHOW TIME CHANGE
SET SYSTEM TIMES [P]
PRINT/SHOW SYSTEM TIMES
SET LIGHT [P]
OPEN [P]
CLOSE [P]

SYSTEM MEMORY
SET RAM [P]
PRINT/SHOW RAM

Table 20: System2 Commands Summary (Continued)

PROGRAMMABLE DATABASE
SET CARD BUFFER [P]
SET SECURITY TABLE [P]
PRINT/SHOW SECURITY TABLE
INSERT CARD [P]
EDIT CARD [P]
DELETE CARD [P]
PRINT/SHOW CARD
PRINT/SHOW CARD “#”
INSERT ACCOUNT [P]
EDIT ACCOUNT [P]
DELETE ACCOUNT [P]
PRINT/SHOW ACCOUNT
PRINT/SHOW ACCOUNT “#”

FUEL/TANKS
SET FUELING UNITS [P]
PRINT/SHOW FUELING UNITS
SET FUELTYPE “#” [P]
PRINT/SHOW FUELTYPE
SET TANK “#” [P]
PRINT/SHOW TANK

PUMP CONTROL TERMINAL
CONFIGURE PCT “#” [P, D]
CONFIGURE PCT “#” POS “#” [P, D]
INSTALL PCT “#” [P]
INSTALL PCT “#” POS “#” [P]
REMOVE PCT “#” [P]
REMOVE PCT “#” POS “#” [P]

Table 20: System2 Commands Summary (Continued)

REMOVE PUMP “#”
PRINT/SHOW PCT “#”
CONFIGURE PUMP #
PRINT/SHOW PUMP “#”
INSTALL PROGRAM [P]
REMOVE PROGRAM [P]

FUEL ISLAND TERMINAL
CONFIGURE FIT “#” [P, D]
INSTALL FIT “#” [P]
REMOVE FIT “#” [P]
PRINT/SHOW FIT “#”

MESSAGES
FORMAT DISPLAY “#” [P, D]
FORMAT DISPLAY DEFAULT [P, D]
PRINT/SHOW DISPLAY
PRINT/SHOW DISPLAY “#”
FORMAT KEYBOARD “#” [P, D]
PRINT/SHOW KEYBOARD
PRINT/SHOW KEYBOARD “#”

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

Table 20: System2 Commands Summary (Continued)

PRINT/SHOW BONUS POINTS
FORMAT RECEIPT BONUS POINTS [P, D]
PRINT/SHOW RECEIPT BONUS POINTS

TRANSACTION BUFFER
SET TRANSACTION [P]
PRINT/SHOW TRANSACTION
PRINT SHOW TRANSACTION “#”

JOUNARL PRINTER
SET JOURNAL PRINTER [P]
PRINT/SHOW JOURNAL PRINTER
LOCK JOURNAL
UNLOCK JOURNAL

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

SITE ID
SET SITE ID [P]
PRINT/SHOW SITE ID

PASSWORD

Table 20: System2 Commands Summary (Continued)

SET PASSWORD [P]
PRINT/SHOW PASSWORD

DUAL LANGUAGE (NOT ALL SYSTEMS)
SET LANGUAGE [P] (NOT ALL SYSTEMS)
PRINT/SHOW LANGUAGE

PUMP/FUEL REPORTS
PRINT/SHOW FUELTYPE “#” TOTALS
PRINT/SHOW PUMP “#” TOTALS
CLEAR PUMP “#” TOTALS
PRINT/SHOW PCT “#” TOTALS
CLEAR PCT “#” TOTALS
PRINT/SHOW TANK
PRINT/SHOW MIDNIGHT TOTALS

CARD/ACCOUNT REPORTS
PRINT/SHOW <validity> <source><category> CARD <range>
PRINT/SHOW ACCOUNT
PRINT/SHOW ACCOUNT “#”
PRINT/SHOW CARD ACCOUNT “#”
PRINT/SHOW CARD SUMMARY

TRANSACTION REPORTS
PRINT/SHOW TRANSACTION
PRINT/SHOW TRANSACTION “#”
PRINT/SHOW TRANSACTION SUMMARY
PRINT SHOW DAY
PRINT/SHOW DAY <mmm dd,yyyy>
CLEAR TRANSACTION <mmm dd,yyyy> SEQUENCE <#> [P]

Table 20: System2 Commands Summary (Continued)

CLEAR TRANSACTION [P]
SHOW TRANSACTION CF

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

SHIFT
SHIFT [P]
PRINT/SHOW SHIFT

MODEM/PASSTHRU PORT
CALL [P]
PASSTHROUGH [P]

INTEFACING TO EXTERNAL COMPUTER
COMPUTER (TEST) <command> [P]
ECHO [P]
BACKUP “#” [P]
RESTORE [P]
UPDATE <site id(/fields)(/checksum)> [P]
SYSBACKUP [P]
SYSRESTORE <####> [P]

Table 20: System2 Commands Summary (Continued)

PUNCHCODE
PUNCHCODE [P,O]

TROUBLESHOOTING
TEST [P] Warning – AUTHORIZED USE ONLY – may erase system configuration!

REPORT PACKAGE
REPORT [P,O]

FLEETLINK
INSTALL VIT “#” [P, D]
INSTALL VIT “#” POS “#” [P, D]
REMOVE VIT “#” [P, D]
REMOVE VIT “#” POS “#” [P, D]
PRINT/SHOW VIT “#” POS “#” [P, D]
INSERT VIU [P]

Index

S

T

U

W

Notes:

OPW Fuel Management Systems
6900 Santa Fe Drive
Hodgkins, IL 60525
708-485-4200