

LANGUAGE 1 PROMPTS (Continued)	
50	
51	
52	

LANGUAGE 2 PROMPTS	
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 (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	



Keyboard Messages

KEYBOARD CUSTOM MESSAGES		
Language/Key #	Your Message	Default Message
1/1		YES
1/2		NO
2/1		YES
2/2		NO

Receipt Header

RECEIPT HEADER MESSAGES				
Header Line	Language 1 Message	Language 2 Message	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	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	Language 2 Message	Circle the Color

RECEIPT BODY MESSAGES (Continued)				
1			RED	BLACK
2			RED	BLACK
3			RED	BLACK
4			RED	BLACK
5			RED	BLACK
6			RED	BLACK
7			RED	BLACK
8			RED	BLACK
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	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	

Dual Language

ENABLED DISABLED

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
Odometer Reasonability?	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


TRANSACTION DATA (Circle YES or NO) (Continued)

• Receipt Status	YES	NO
• 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 12 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 20*.

Messaging is disabled for all figures specified. Card capacity is rounded to a maximum of 3 significant digits.

Table 12: 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 41: 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 Petro Vend. 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 13: 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. **Petro Vend** strongly suggests you use PROCOMM® emulation software, made by DATASTORM TECHNOLOGIES, INC. Contact your Petro Vend 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 Manual* for instructions on changing these settings):

Table 14: 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

Card/Transaction Data Formats

The System2 transaction data format is designed to be read by people, and includes a header with configuration data and labels for each included field. In the display format, the transmission of transaction records can be cued from the keyboard.

Computer formatted data eliminates these labels, substituting data checks, field codes and field separators. This format is meant to transfer transaction data to a computer database.

To pace the data stream, the transmission of each transaction record must be cued by a specific computer response.

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

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



```

TRANSACTIONS WHERE TIME > hh:mm am/pm
TRANSACTIONS WHERE CARD = #
TRANSACTIONS WHERE VEHICLE = #
TRANSACTIONS WHERE ACCOUNT = #
  
```

The following command will call up transaction 123 in computer format:

```
SHOW TRANSACTIONS 123 CF
```

Search commands can be combined with **'AND'** in the computer format. For example:

```
SH TRANS WH DAT=JAN 1,1996 AND WH TIM>5:00 PM CF
```

When data is requested from **System2** in the computer format, **System2** first transmits the transaction header and the first transaction. This header *always* includes:

- Codes to indicate which transaction fields will be included in the transmitted record(s)
- a 2-digit checksum and a carriage return
- a line feed (**'|CR|LF|'**).

All transactions include the sequence number and Reason For Termination code(s). The fields are included as specified by the transaction field codes listed in the header. All items are separated by a slash (**'/'**).

See *Reason for Termination Codes (Auth. GRANTED)* on page 148 and See *Reason for Termination Codes (Auth. DENIED)* on page 149.

Each record is terminated with **'|CR|LF|'**. The external computer responds with **'|CR|LF|'** to initiate the transmission of the next record. The **System2** will send records each time it receives **'|CR|LF|'** up to the last record. At the last record, the system sends **'//|CR|LF|'**.

If the computer session is terminated by the computer with an **'X'**, **System2** sends **'\|CR|LF|'**. If access was denied to a customer, only the first four data fields are recorded (and can be transmitted) for that transaction. The graphic below is an example of a transaction data retrieval in the computer format. Note that a data check was *not* included in the header.

The **'SHOW TRANSACTION'** command has been abbreviated to **SH TRANS**.

'|CR|LF|' indicates a carriage return and a line feed.

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|          abcde fgh i j k l m n o / 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 15: 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
Transaction field codes	0-15 characters	none	Always
Checksum	2 digits	none	Always

Table 16: 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



TRANSACTION FIELD FORMATTING			
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
Prompts	9 fields @ 23 characters, left-justified. 3 fields @ 30 characters, left-justified.	spaces	p

Table 17: 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

CARD AND ACCOUNT FIELD FORMATTING			
Quantity Restriction	2 digits	zeros	m
Driver/Vehicle/Account Name	9 characters	spaces	n



Table 18: 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 0010: Driver/Language 1 1010: Driver/Language 2 0011: Vehicle 0100: Account

Example

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

Table 19: 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 Petro Vend 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 <i>Page 51</i> .
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 20: 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	Customer card is set for odometer reasonability, and entry falls outside acceptable limits.	Re-enter odometer value. Change reasonability -- <i>Page 85</i>).
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.



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

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/abcdefghijklmnop/
44|CR|LF|                                     |CR|LF|
10004000000000000000/00100001/1234/
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 83.

*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.

TRANSFER Commands

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 <i>one</i> FIT	FIT not installed. Petro-Net wiring problem. FIT board malfunction. Run COMM test to check board, replace if needed.
SYSTEM DOWN message at <i>all</i> 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 .	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.

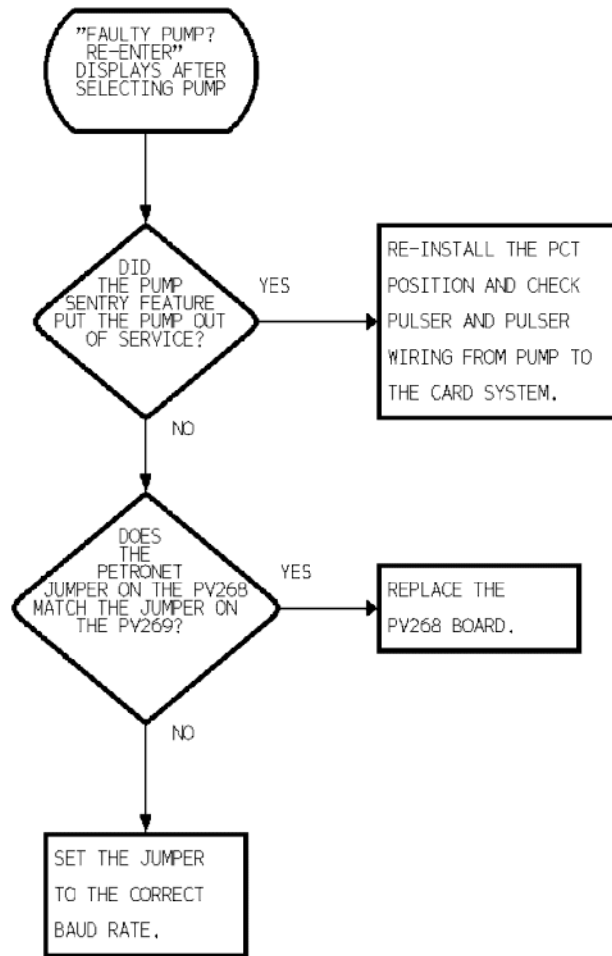


Figure 42: Diagnosing "Faulty Pump Reenter" Message

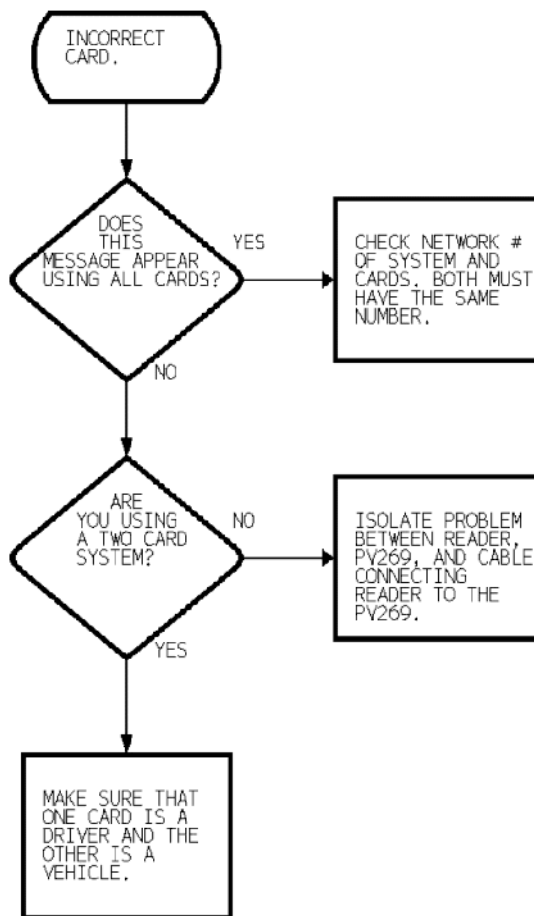


Figure 43: Diagnosing "Incorrect Card" Message

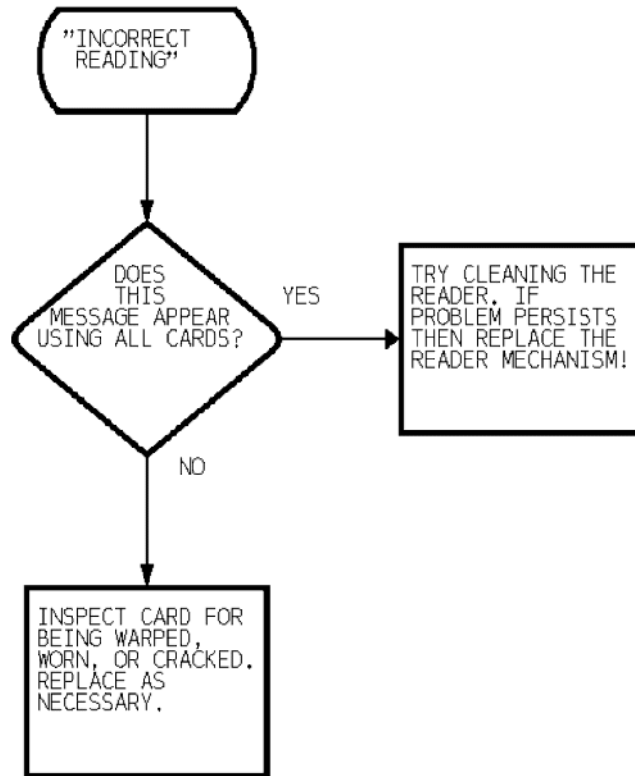


Figure 44: Diagnosing "Incorrect Reading" Message

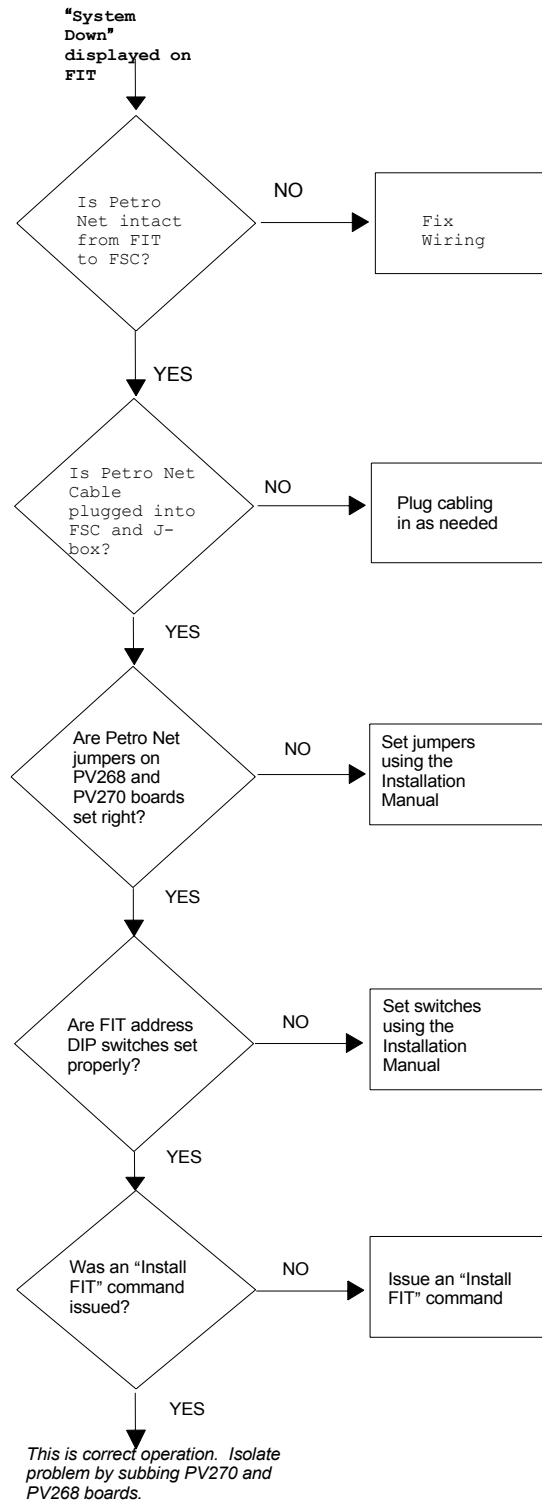
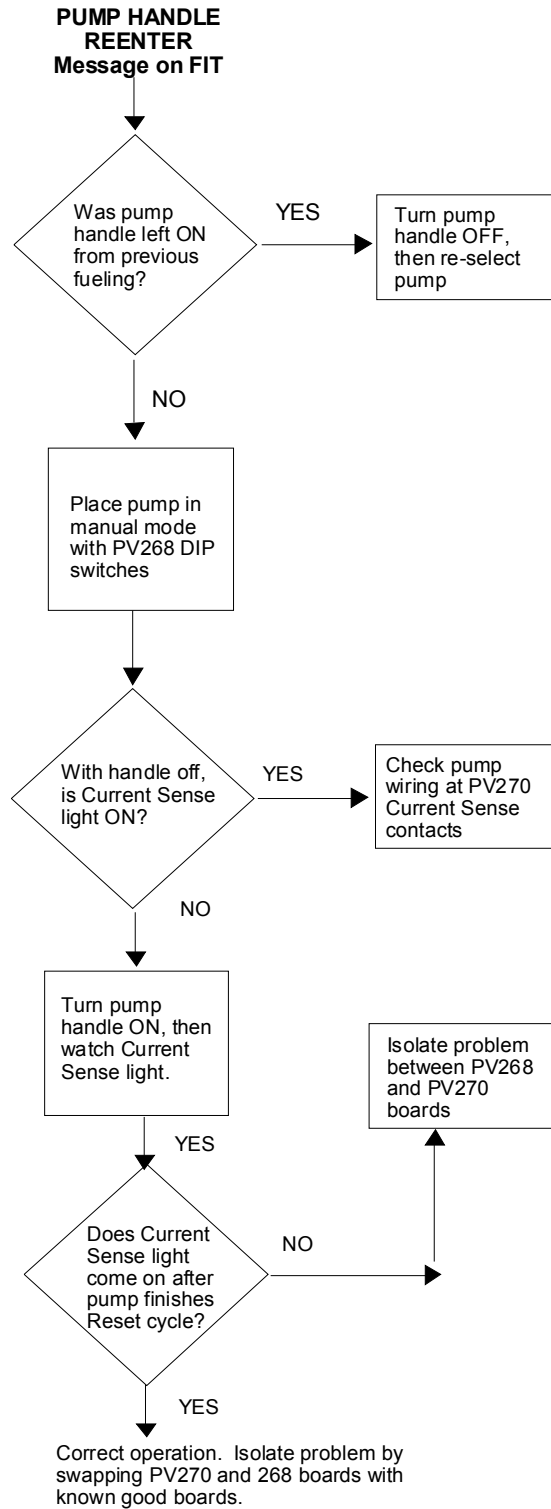
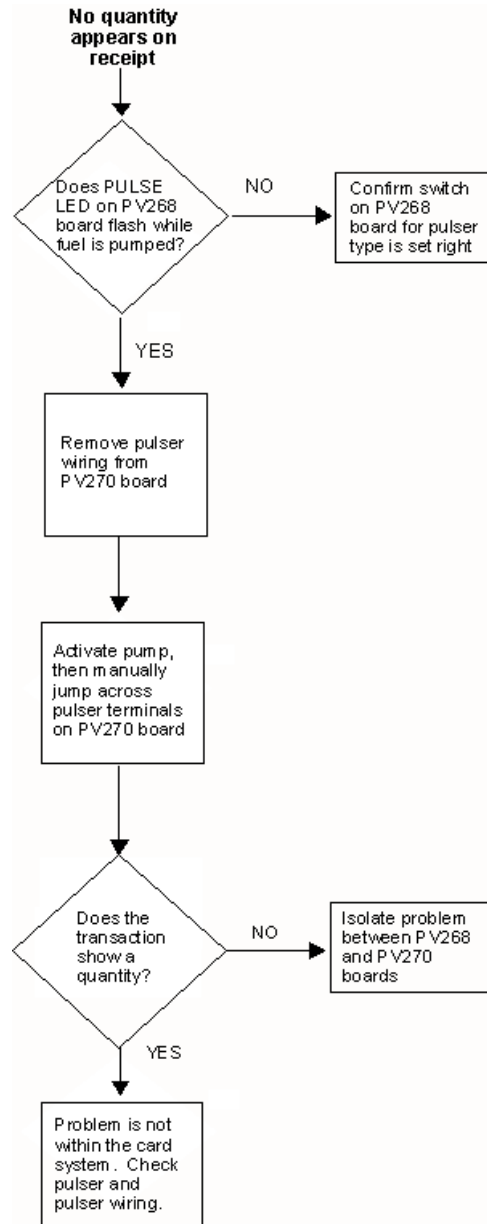
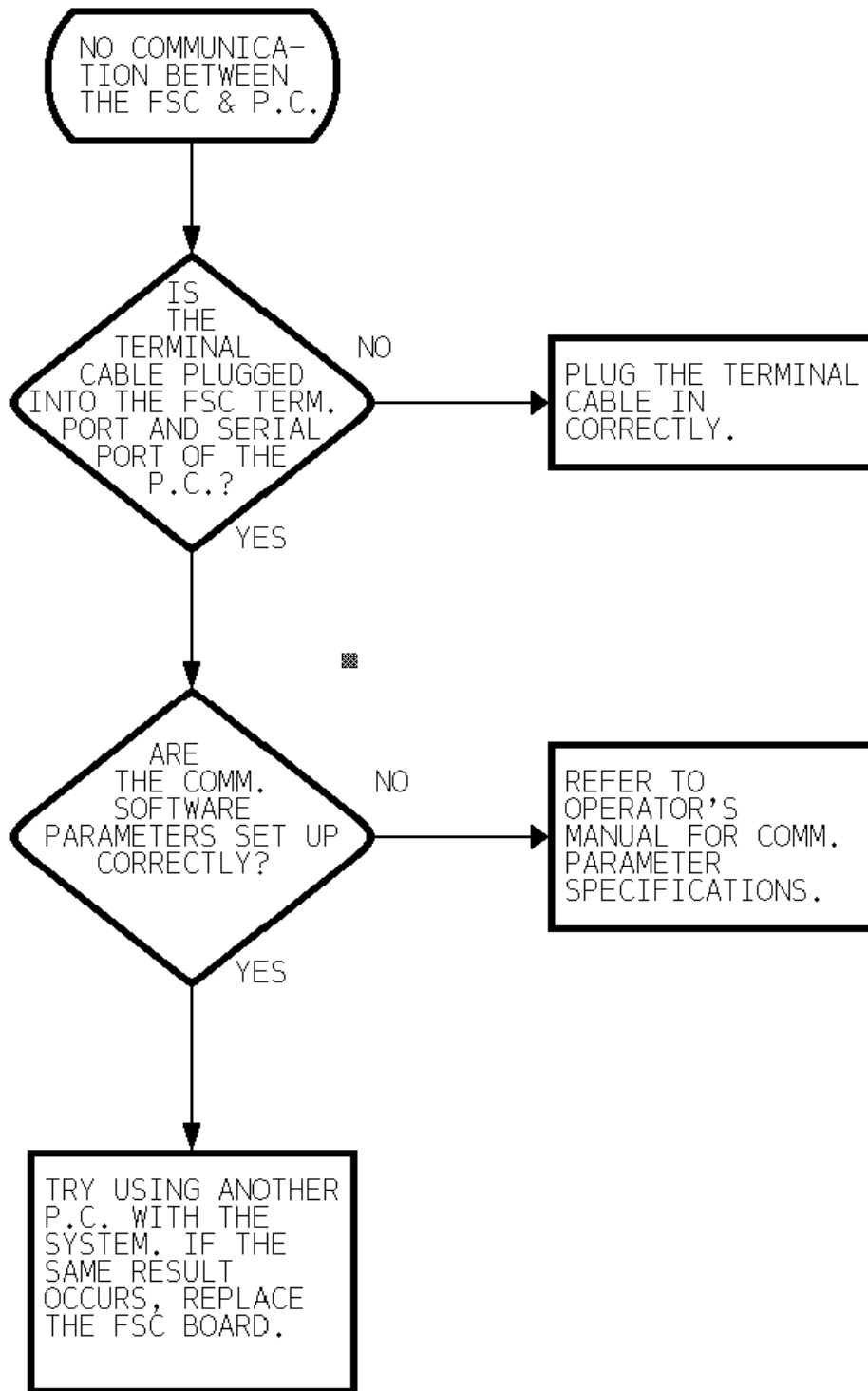
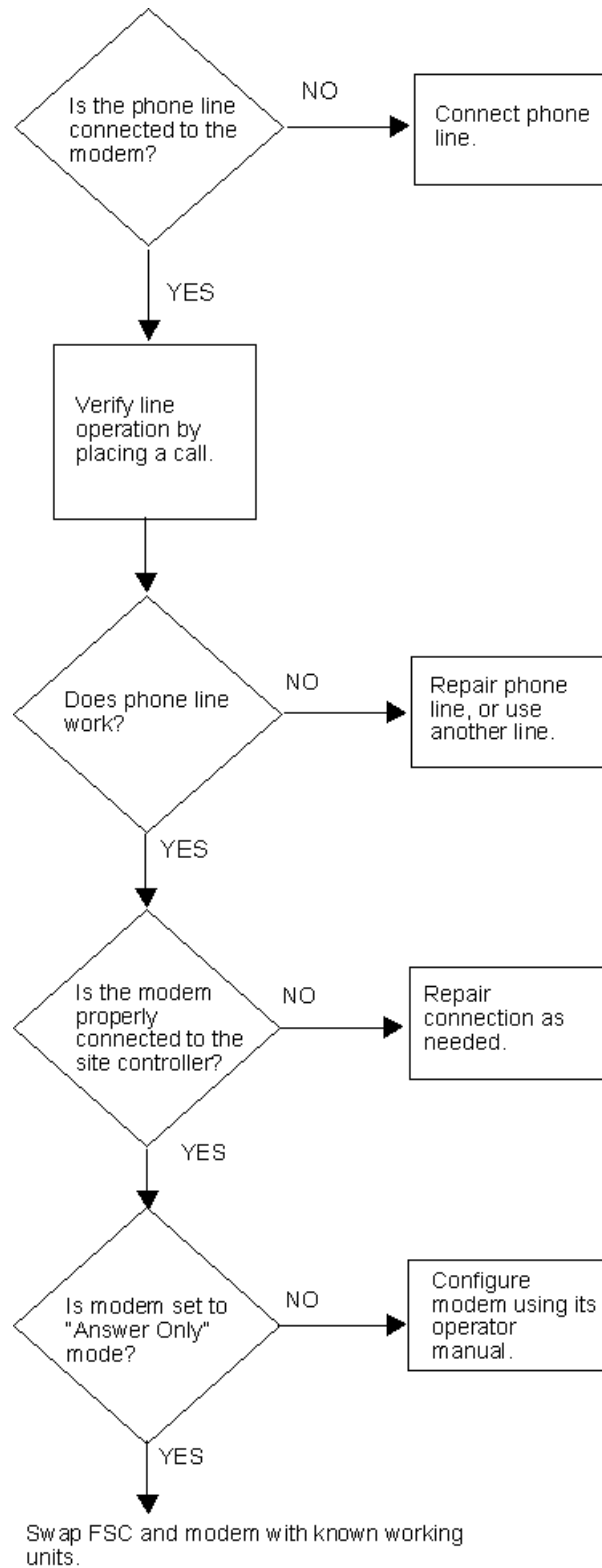


Figure 45: Diagnosing "System Down" Message









Appendix F - Report Option

The optional Report Package allows generation of transaction reports quickly and easily in a variety of formats. Transactions may be grouped either by Card or Account number. Reports may be output to the display or printer.

Itemized Report Data

All reports contain the following information for each transaction unless subtotals only are requested:

- Date and Time of Transaction
- Transaction Number
- Miscellaneous Entry
- Odometer Reading
- Miles/Gallon (liters/100km)
- Pump Number
- Product Name
- Quantity Dispensed
- Product Price
- Total Sale

Summarized Report Data

Each report also contains the following data summaries (or subtotals):

- Total Miles
- Average MPG (liter/100km)
- Cost Per Mile (or Kilometer)
- Average Price/Gallon (or Liter)
- Total Quantity of Fuel Dispensed
- Total Price of Fuel Dispensed
- Total Price after Account Discount

Sample Report

```
Account name: Company ABC Oil
Account # 0001
Single: Bob
```



```

Single card # 0300000000000001
fb_p  ò  !_  _@m_7_8_8m7  "DATE    TIME TRAN    N  ODOM  MPG  P#  PRODUCT
QUANTITY PRICE TOTAL
-----
--
50000
12/09/97 0853A 24          50145  35.0  1  UNLEADED  4.140
1.678  6.95
12/09/97 0853A 26          50503  35.2  2  PREMIUM   10.180
1.870  19.04
12/09/97 0859A 29          50743  28.8  1  UNLEADED  8.330
1.678  13.98
12/09/97 0900A 31          51003  29.1  1  UNLEADED  8.920
1.678  14.97
12/09/97 0901A 33          51250  31.3  1  UNLEADED  7.900
1.678  13.26
12/09/97 0904A 36          51555  31.8  2  PREMIUM   9.620
1.870  17.99
12/09/97 0905A 37          52042  26.8  1  UNLEADED  18.160
1.678  30.47
-----
Subto-
tals:
67.250          116.66
miles      2042 avg mpg 30.36 cpm 17.50 avg ppg 1.735

```

PRODUCTS TOTAL QTY. TOTAL COST

```

-----
UNLEADED  47.450  79.63
PREMIUM   19.800  17.25
-----
67.250  116.66
-----

```

Cost after 5.0% discount: 110.83

Report Mode

Three modes of operation are available:

- The **Quick** mode generates a report according to a format that you have previously selected in the 'Permanent' mode. This option enables the fast generation of a standard report.
- The **Run Time Only** mode allows selection of a temporary format and generation of a report in this format.
- The **Permanent** mode is used to select the format for the 'Quick' mode report and will be saved until "Permanent" mode is again chosen.

Report Format

Reports may be generated in the following formats:

- Single cards
- Driver cards
- Vehicle cards
- Driver and Single cards

- Vehicle and Single cards

Since generation of a report does not clear transactions reports may be run in each available format individually.

Card Range

You can enter upper and lower card numbers to narrow the transactions displayed to a limited range of cards. Press the **[ENTER]** key when prompted for the lower and upper card numbers to generate a report on all cards.

Account Grouping

An upper and lower account number may be entered to narrow the transactions displayed to a limited range of accounts. Press the **[ENTER]** key when prompted for the account numbers to generate a report on all accounts. When the account grouping option is selected, the transactions are arranged first by account number and then by card number.

Billing Window

A starting and ending date may be entered to narrow the transaction search to a limited range of dates. This range is also called a “billing window”.

Subtotals Only

This option prevents transaction data from being included in a report. Final totals and card subtotals are always included.

Custom Heading

The heading is printed at the top of the first page of a report. Up to three lines of up to 80 characters each may be specified.

Keyboard Field Label

The customer may be prompted to enter a number at the FIT as part of his transaction. These entries appear under the ‘KEYBOARD FIELD’ label in the reports. Give the label any name, up to eight characters.

Fueling Unit Type

Liters or gallons may be selected. Efficiency is calculated as liters per 100 kilometers or miles per gallon. When prompted enter L for Liters or G for Gallon. To generate a report privileged mode must be enabled. At the privi-

leged prompt enter the command 'REPORT'. Select the option desired.

Run-Time Only Mode

Enter the number for one of the '**Run-Time Only**' options listed below. The system then prompts for the associated parameters. These parameters will specify how the final output of the report will be displayed.

Option 1

Specify card type, card range, account grouping, and account range.

Option 2

To Option 1 adds billing window entry and subtotal for final report.

Option 3

Same as Option 2 except you can also define custom heading, keyboard field label, and fueling unit type.

Quick/Permanent Mode

To generate a report in the 'Quick' mode, you must first enter the 'Permanent' mode and select the following parameters:

- Card Type (single, driver, vehicle, single and driver or single and vehicle)
- Card Range
- Account Grouping
- Subtotals Only
- Custom Heading
- Keyboard Field Label
- Fueling Unit Type

Press [ENTER] at each prompt without entering any data to bypass (and deselect) a parameter.

Note

You cannot bypass Card Type or Fueling Unit Type.

After specifying the 'Permanent' parameters the 'Quick' mode may be selected at anytime to generate a quick report. The system prompts for a billing window and for an output device (terminal or printer) before generating the report. The terminal is the default output device and may be selected by pressing the [ENTER] key when prompted.

Appendix G - Receipt Printer and Card Reader Maintenance

Your Fuel Island Terminal may have a receipt printer installed to provide customers with receipts. The FIT can also have one or two magnetic or optical card readers. This Appendix describes how to replace the printer paper roll and the ribbon cartridge, and how to clean the card reader.

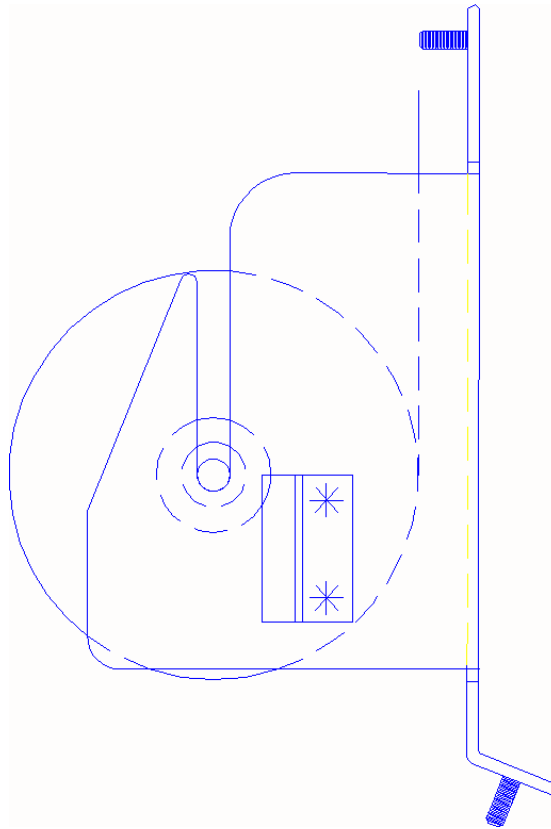


Figure 46: Receipt Printer Schematic View

For additional information on the printer, its control board, status LEDs, and switches, refer to the *System2 Installation Manual*.

The paper feed/cut switch has two functions. When you press and hold the switch, paper is advanced through the printing mechanism as long as the switch is pressed. When you press and immediately release the switch, the paper cutter is activated.

Warning

Do not use your fingers to remove paper near the cutter.

Replacing Paper

Power to the FIT must be ON to remove and reload paper.

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

Press and hold the paper feed/cut switch for several seconds to advance the remaining paper through the printing mechanism.

see *Figure 46* on *page 171*. Remove the spindle from the old roll and place it into the new roll. Slide the new paper roll back onto the paper holder. Orient the new roll so that the paper feeds to the printer from the **BOTTOM** and **BACK** of the roll.

Cleaning the Reader

You will need a Cleaning card (several supplied with the system), and isopropyl alcohol

1. Turn system ON.
2. Apply some isopropyl alcohol to a cleaning card.
3. Immediately insert the card into the reader.
4. Withdraw the card, and throw it away. Cards are single-use ONLY.

HAppendix H - System2 Commands Summary

Table 21 is a complete list of all System2 commands.

- *Not all versions of System2 software perform all listed commands.*
- [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 21: 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 21: System2 Commands Summary (Continued)

PROGRAMMABLE DATABASE
SET CARD BUFFER [P]
SET SECURITY TABLE [P]
PRINT/SHOW SECURITY TABLE
INSERT CARD [P]
COPY 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]

Table 21: System2 Commands Summary (Continued)

REMOVE PCT “#” POS “#” [P]
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 “#”

Commercial/Outdoor Payment TERMINAL
CONFIGURE C/OPT “#” [P, D]
INSTALL C/OPT“#” [P]
REMOVE C/OPT“#” [P]
PRINT/SHOW C/OPT“#”

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 “#”

Table 21: System2 Commands Summary (Continued)

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]
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

Table 21: System2 Commands Summary (Continued)

ODOMETER REEASONABILITY
SET REASONABILITY [P]
PRINT SHOW REASONABILITY
SITE ID
SET SITE ID [P]
PRINT/SHOW SITE ID
PASSWORD
SET PASSWORD [P]
PRINT/SHOW PASSWORD
DUAL LANGUAGE
SET LANGUAGE [P]
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 "#"

Table 21: System2 Commands Summary (Continued)

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]
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]

Table 21: System2 Commands Summary (Continued)

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]
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]

Appendix I - Special Card Formats

This System2 software can recognize certain magcards with field separator characters in positions 1 and 2 on Track 2. Data on these cards is converted into a format compatible with the card record.

Here are five sample card formats and the resulting card numbers that must be loaded into the card record:

Format #	Raw card data	Enter data with the INS CARD command into FSC like this:
Format 1	=NNNN=DDDDVVVVAAAAA=yymmQLT	NNNNDDDDVVVVAAAAA
Format 2	=NNNN=CCCCRRRAAAAAVVVV=yymmQP5M	NNNNCCCCRRRAAAAA
Format 3	=NNNN=CCCCAAAAVVVV=yymmQP	NNNNCCCCAAAAVVVV
Format 4	==NNNN=CCCCAAAA=====yymm==	NNNNCCCCAAAA
Format 5	==NNNN=====VVVV=====QP	NNNNVVVV

Field codes:

= (the “equals” sign) is a field separator

N is the system ID field

D is the driver number field

V is the vehicle number field

A is the account number field

C is the card number

R is the participant number

yymm is the expiration date

Q is the quantity restriction code

P is the product restriction code

L is the price level code

T is the card type

M is the manual entry code

“5” in Format 2 must be present at position shown.

Note

The FIT or C/OPT test mode can be used to read the raw data from the card.

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