OPW◆

FUEL MANAGEMENT SYSTEMS

OPT®

Outdoor Payment Terminal

Operator's Manual

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.

Table Of Contents

WARNING!

Before installation, read this manual CAREFULLY. Installation errors in sites using hazardous liquids can be *extremely* dangerous to installers and anyone else using the site.

List Of Figures

Using This Guide with Other System2 Manuals

This User's Guide is intended for use with the *System2 Installation Manual* and the *System2 Operator's Guide.*

Part of this manual describes the basic installation and setup procedures for the Petro Vend OPT enclosure. The OPT is essentially another version of a Petro Vend FIT (Fuel Island Terminal). In most ways, the OPT operates within a System2 site identically to a regular FIT.

This book does *not* provide detailed instructions on site conduit installation, or overall site power wiring or Petro Net wiring. Information on these topics is in the *System2 Installation Manual.*

Except for brief references, this manual does *not* explain the Petro Vend **FSC** (Fuel Site Controller) or the **PCT** (Pump Control Terminal), the other major components of a System2. For installation and setup instructions for the FSC and PCT, see the *System2 Installation Manual.*

For other System2 operating instructions, such as card file management or other FSC programming instructions, see the *System2 Operator's Guide* for your system.

The *System2 Operator's Guide* describes operation and programming for the Petro Vend System2. That guide is used with all types of System2 installations - those with OPT Fuel Island Terminals and those without. It describes only a "regular" System2 FIT. It does *not* describe the OPT. The OPT has on-board test and configuration features only described in *this* guide.

Because the OPT and the "regular" System2 FIT use the same System2 FSC, programming instructions in the *System2 Operator's Guide* apply to either the OPT or the System2 FIT. Most FSC programming is done independently of the FIT in any case.

The following parts of the *System2 Operator's Guide* do not apply to OPT use. Some are explained in the *OPT User's Guide*:

☞ *Card/Key readers*: The OPT uses only magnetic cards. The reader is a manual "push-pull" magcard reader.

☞ *Display Options*. Only a graphic display is available for the OPT.

☞ *Keyboards.* The OPT has two available types of keyboard. The regular FIT has one.

☞ *PCTs (Pump Control Terminals).* The OPT pedestal CANNOT be equipped for control of mechanical pumps.

☞ *Port Configuration.* The OPT has built-in port configuration in its TEST mode - see the *OPT User's Guide.*

☞ *FIT Programming.* The OPT is programmed through its own built-in keypad and function buttons. Also, an OPT contains no DIP switches: all settings are done through software. A regular FIT is programmed with DIP switches and (in software) via the FSC.

☞ *Downloading.* The current version of OPT does not support program downloading (see *Software Version* below).

☞ *Software Version.* Future versions of OPT will eliminate the need for EPROM replacement by allowing remote downloads of new system software. System software is in Flash memory, not EPROMs.

☞ *Time & Date Set.* Although a time and date can be programmed at the OPT itself, the FSC time overrides the time and date set inside the OPT.

This list is not meant to be complete - you may experience differences between the OPT and the regular FIT during other aspects of programming or operation.

Contact Petro Vend if you have any questions regarding OPT operation, or operation of a System2 with the OPT.

System2/OPT Comparison Chart

The following chart summarizes functional and feature differences between the Petro Vend System2 and the Petro Vend OPT.

Feature	System2 FIT	OPT
Faces	□ One face per pedestal	□ Two faces per pedestal
Reader Types	□ Motorized Magnetic (Track 1 & 2) □ Manual Magnetic (Track 1 & 2) □ ChipKey □ Optical (KR16) □ Dual reader option □ Card status - *Remove Card* is *always* displayed, and only for four seconds.	□ Manual Magnetic (Track 1 & 2) □ Single reader only □ *Remove Card* is displayed only if card is left in, and stays displayed until removed.
Keypad	□ Numeric only (letter characters can be entered with ALPHA button option (or modified emergency stop button option)	□ Numeric □ True alphanumeric *(optional)* □ Four function keys □ No emergency stop button
Supported Displays	□ Graphics □ 2 x 16 □ 1 x 40	□ Graphics

Graphic Display Messages	□ Lower case *not* supported
	
	Fonts:
	  □ 3 - 20 Character / line fonts
	  □ 1 - 40 Character / line font
	
	□ Messages built on *screen*
	
	□ Blank language 2 message displays nothing
	
	□ Average response
	
	□ Displays "Please Wait"
		□ Lower case supported
		
		Fonts:
		  □ 1 - 20 Character / line font
		  □ 1 - 40 Character / line font
		
		□ Messages built in *background*
		
		□ Blank language 2 message displays Language 1 message
		
		□ Faster response
		
		□ No "Please Wait" between messages for faster response times
		
		□ Function Key Support:
		F3 and F4 prompt for N and Y entries
		F1 and F2 prompts for Left and Right pump select option

Backlight & Pocket Light	□ Backlight always on bright; Pocket light on via FSC command.	□ Backlight normally on dim; bright via key hit, card insert, or command.

Feature	System2 FIT	OPT
Receipts	□ Supports red print	□ Substitutes gray for red print
	□ 2 receipt option with special paper	□ Multiple receipt option
	□ 21 seconds per receipt	□ 11 Seconds per 1st receipt (subsequent multiple receipts print in 4 seconds)
		□ Able to print display graphics *
		□ Auto load feature with test print
Receipt Header	□ Pre-printed header	□ Not Pre-printed
	□ Limited dual-language ability	□ Full dual-language ability
	□ 21 characters / line	□ 14 characters / line
	□ 4 lines per header	□ 8 lines per header using wrap around.
Receipt Body	□ 35 characters / line	□ 28 characters / line (data text compressed if more than 28 chars)
	□ 17 lines max.	□ 24 lines max. *
	□ Data printed at column 11	□ Data left justified to label
	□ Graphics not supported	□ Able to print graphics display text and graphics *
Receipt Trailer	□ Bonus point text replaces trailer when bonus points are enabled.	□ Both bonus point text and trailer text are printed.
	□ 21 characters / line	□ 14 characters / line
	□ 4 lines per header	□ 8 lines per header using wrap around.
Baud Rate and Polling Address	□ Set via DIP switches	□ Set via configuration setup (Port and Poll ID setup, see Pages 40 and 41)
Network Numbers	□ Set at factory (in EPROM)	□ Set via configuration setup - password protected: - Value N-T: Visible network number - Value U-Z: Hidden network number
Poll / Select Addressing	□ Configurable as four FITS	□ Configurable as four FITs *and* as 32 OPTs
	□ Fixed at 'A'-'D' / 'Q'-'T'	□ Variable: - As FIT use 'A'-'D' / 'Q'-'T' - As OPT use SP-'/' / '0'-'?' or '\'-'o' / 'p'-DEL

* Requires special FSC support

Feature	System2 FIT	OPT
Options	☐ Set via DIP switches	☐ Set via configuration setup (Value A-M)
	☐ 3 Bad reads option	☐ Variable bad reads option; (Value D: 0 or # of bad reads)
	☐ '$' or ',' print option	☐ '$', ',', or any char. print option (Value E: 0 or character)
	☐ Track 1 data option	☐ Track 1 enable; not supported in current version. (Value C: 0 or 1)
		☐ Multiple Receipts (Value B: 0 or # of receipts)
		☐ Left/Right pump select option; Selected via F1 and F2 function keys (Value F/G: 0 or pump #)
		☐ Dedicated pump option (Value H: 0 or pump #)
		☐ Customer ID

OPT Specifications

Enclosure Dimensions   Width: 12" (30.5 cm)
(Without pedestal)   Depth: 24" (61.0 cm)
                            Height: 15" (38.1 cm)

Pedestal Dimenstions   Width: 12" (30.5 cm)
                            Depth: 24" (61.0 cm)
                            Height: 42" (107 cm)

Power Requirements   115 / 230 VAC, 50/60 Hz, 400W maximum

Temperature Rating   – 40 to 122° F (– 40 to 50° C)

Display   LCD graphic array

Card Readers   One magnetic strip reader per side.

Keypad   Numeric standard, optional alphanumeric

Preliminaries

WARNING!

This manual contains several important warnings. DO NOT ignore these warnings! Failure to comply with the warnings may create conditions dangerous to personnel and/or equipment.

NOTE

This manual contains installation and setup instructions for the System2 OPT option. Many aspects of installation and operation for a "normal" System2 FIT and the OPT are the same. You may need to refer to the *System2 Installation Manual* and the *System2 Operator Manual* while installing or operating your OPT.

Installation Codes & Hazardous Areas

Any fuel dispenser is a *hazardous area* as defined in the National Electrical Code. Installation must be in accordance with the following:

- National Electrical Code NFPA No.70
- Automotive and Marine Service Station Code (NFPA No. 30A).

The installer is responsible to investigate and follow any *local* codes.

WARNING!

Do *not* mount the FSC, or any other electrical part of the system including printers and modems, within or above the defined "hazardous" areas.

OPT Features

The OPT is a dual-sided terminal designed to serve both sides of a fueling island. The OPT works with a System2 Fuel Site Controller (FSC); all System2 FSC software works with the OPT. With this configuration, four card readers TOTAL are supported: each System2 FIT is one card reader, the OPT counts as two readers.

Construction

☐ Pedestal and housing are made of treated steel, and are very rust-resistant

☐ Durable high-solid content paint finish - custom colors are available

☐ Doors are made of impact-resistant polycarbonate ABS

☐ Hidden "quick-clip" door hinges - no ugly fasteners, and the doors slide out and pivot for easy removal with no tools

☐ Circuitry of one OPT is completely separate from the other - if one fails, the other one keeps going

☐ The OPT contains no DIP switches - all system configuration is done through software, and can be done on site, without a terminal. Future versions will permit remote downloading of configuration data via a modem.

☐ Manager Mode permits the following:

- Password protected configuration data
- Self-tests for display, keyboard, card reader, receipt printer and RAM
- Printer and display contrast adjustable
- Comm ports can be set up and tested
- Multiple network number input
- Keyboard tone can be adjusted
- Keyboard backlight brightness adjustment
- Configuration data can be printed out

☐ Standard thermostatically-controlled heaters

☐ The backlit graphics display has been improved from earlier versions:

- Display "transflexive" technology works better in direct sunlight
- Tilted for a wider range of comfortable viewing
- Display contrast automatically adjusts for best viewing at any temperature.

☐ Graphic displays are updated more quickly - a user can "type ahead" with their keypad entries, allowing faster fueling

☐ A precision-crafted push-pull *card reader* reads tracks 1 and 2. The high-reliability unit features a user-replaceable head (no special tools required for replacement).

☐ The illuminated *keyboard* is constructed of a durable weather-resistant material laid over stainless steel switch "domes". An alphanumeric keypad is also available.

☐ High-resolution thermal *receipt printer* has integral cutter, auto-paper loading, and self-test features. Can be configured to print multiple copies of a receipt. A 4-inch roll of paper can produce up to 1,100 receipts. And, because it's thermal, there are no ribbons to replace.

Unpacking Your System

Check the packaging carefully for shipping damage. Also, make sure you have removed all parts from the box before discarding the box. Check off the following as you remove it from the package: Note that some items are optional, and may not be included with your particular order.

☐ **Manuals**
   ▫ *OPT User's Guide*
   ▫ *System2 Installation Manual*
   ▫ *System2 Operator Manual*

☐ **Data Sheet**. This sheet lists details about your particular system, and is packed with this manual. *Store this sheet in a secure location -* you may need it when calling for service or information.

☐ **OPT Enclosure**
   ▫ Make sure both sides are equipped the way you ordered the unit: display type, reader type, keyboard type and Receipt Printer option

If your unit was shipped with a receipt printer built in, remove any packing material from around the printer before operation.

☐ **Pedestal**
   ▫ Front panel
   ▫ Rear panel
   ▫ Main chassis

☐ **Fuel Site Controller (FSC)**

☐ **Hardware Kit**
   ▫ 1/4"-20 x 1/2" screws, with flatwashers and lockwashers (4 each)
   ▫ Cables

DO NOT drill holes into the OPT enclosure or pedestal! **Besides violating the integrity of the cabinet and voiding the system warranty, drilling holes can leave metallic dust that can interfere with system circuitry. Threaded holes are provided for mounting, and knockouts are available to connect the conduit.**

DO NOT use high-pressure washing equipment to clean the OPT or pedestal!

Required Tools and Supplies

Although installations vary from site to site, the following are pretty much required no matter what type of installation you have.

☐ 14 AWG wire, black - power wiring for OPT and FSC
☐ 14 AWG wire, white - power wiring for OPT and FSC
☐ 14 AWG wire, green - ground wiring for OPT and FSC

You will need equal quantities of each of the above. Measure distance from the OPT pedestal to the central circuit breaker - this breaker should be dedicated, and serve all components of the OPT system.

☐ 18 AWG wire, black and white. This will be used to make twisted-pair Petro Net cable. If you wish, you can order pre-made twisted pair wire: Order Petro Vend part number **12-1029**

If you are adding the OPT wiring to an existing conduit, DO NOT run the Petro-Net wiring in a conduit that contains pump pulser wiring! If in doubt, run new, separate conduit for the OPT wiring.

☐ Conduit, 3/4", rigid steel. Measure the same distance you did for the wire.
☐ Conduit bender
☐ Screwdrivers, regular and Phillips head
☐ Wrenches, pipe cutter
☐ Wire strippers, wire nuts

Preparing Your Site

A typical OPT pedestal "footprint" is shown in Figure 1. Because the OPT pedestal does not contain any electrical devices, the pedestal can be mounted as close to a pump as needed. The only requirement for intrinsic safety is that OPT assembly itself be above the pump's vapor line - check with your pump manufacturer for the vapor line height.

Shield the OPT enclosure from direct sunlight, particularly in warmer climates.

Your site may already be equipped with conduit that contains power supply and pump control wiring. Or, you may have to install it yourself (see *Wiring,* Page 20). All sites must be equipped with the following minimal components (see the *System2 Installation Manual* for some typical site layout drawings):

☐ **Fueling Islands,** each of which has a junction box buried beneath it or immediately adjacent to it

☐ **Petro Net Junction Box.** This is a steel box buried at a point roughly in the middle of all islands. It is where Petro Net wiring (two-conductor twisted pair) from all System2 FITs and OPTs comes together. A single piece of Petro Net then goes from the junction box to the indoor FSC.

☐ **Fuel Site Controller.** The indoor System2 FSC controls the operation of all OPTs and FITs.

The first part of installation involves preparing the fueling site for the OPT (and, if applicable, other System2 FIT) pedestals. This involves setting four threaded studs in concrete, and burying conduit for the Petro Net and power wiring.

Set four 5/16" (minimum) threaded studs in concrete as shown in Figure 1.

Note the dashed box in the drawing marked CONDUIT PLACEMENT AREA - be sure the conduit you install emerges from the concrete within this area.
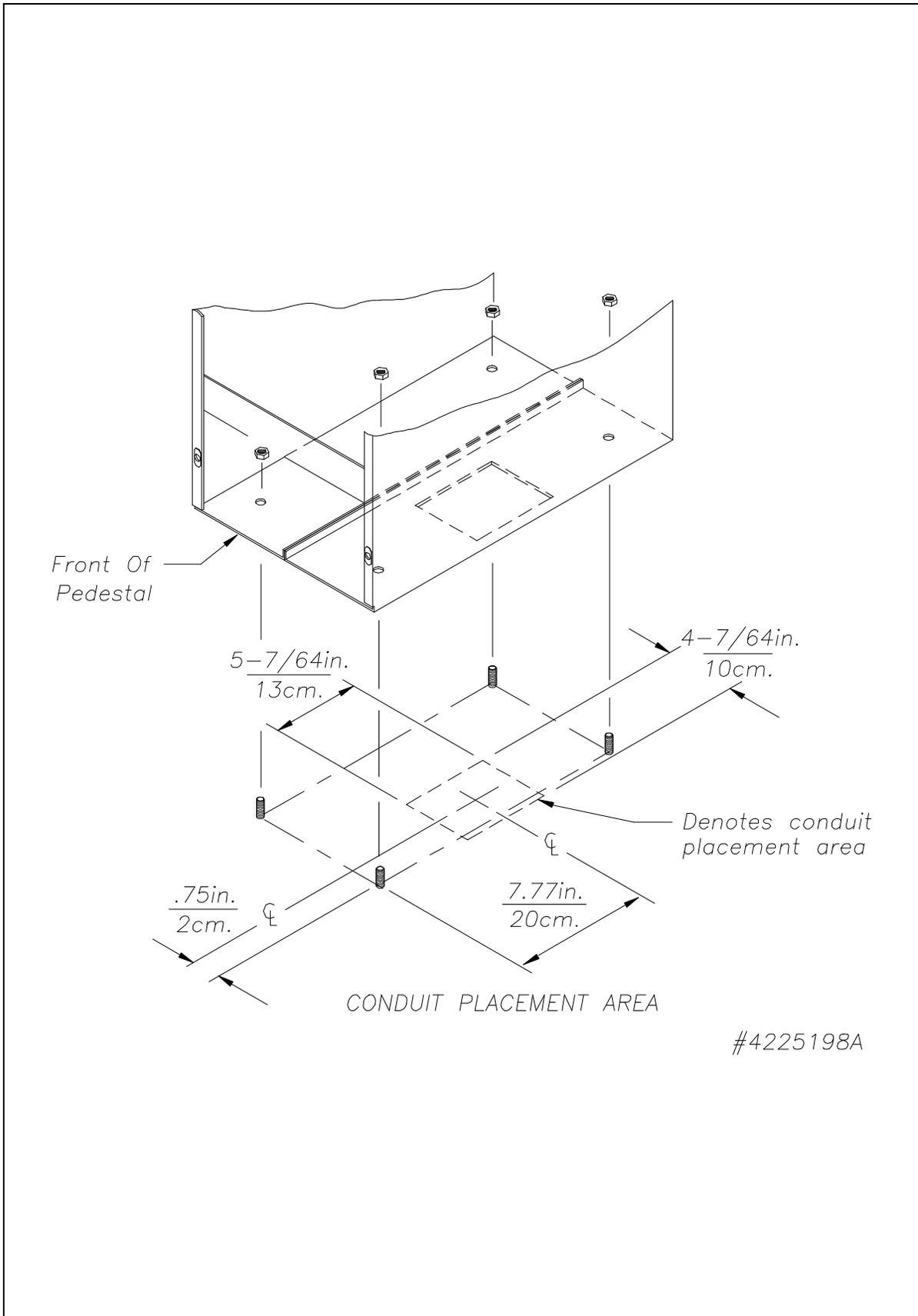
Figure 1 - OPT Pedestal Footprint

Equipment Overview

OPT Enclosure

The two-sided OPT is essentially a special type of System2 FIT, containing two complete OPT units. Each OPT has the following features:

☐ *Display* - A LCD graphics display guides customers through the fueling process

☐ *Keypad* - A standard numeric keypad or optional full alphanumeric keypad permits customer entry of data.

☐ *Function Buttons* - These four buttons activate the function currently displayed on the right side of the graphics display.

☐ *Card Reader* - A user "push-pull" magnetic card reader.

The receipt printer, PC board, graphics display contrast adjustment and all other parts are accessible when the OPT doors are opened.

Opening the Unit

Most of the OPT components are mounted on the two doors, which pull out and swing away from the enclosure (Figure 2).
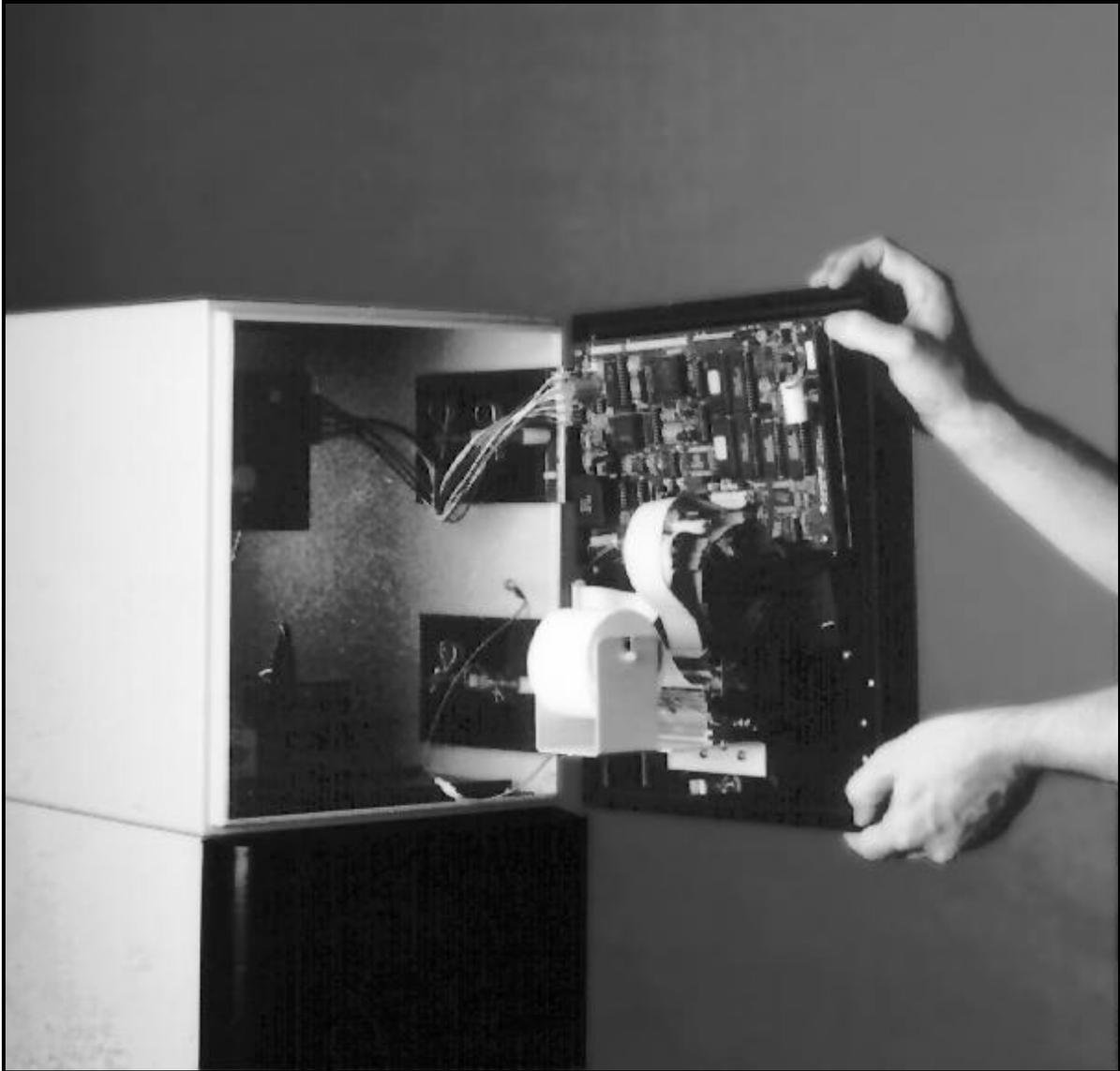
Figure 2 - OPENING THE DOOR

1. Insert the supplied key in the lock on the bottom of the front panel. Rotate a half- turn counterclockwise to unlock the door.

2. Grasp the door with both hands, and pull straight towards you. The hinges are on the right side of the door, and slide out on tracks. Pull out until the door stops.

3. Swing the door open.

4. To *remove* the door:
    a. Disconnect the grounding strap from the door.
    b. Loosen upper door lock release cable.
    c. On the door, disconnect the cable from the back of the key lock by removing the cotter pin and sliding the cable off the pin.
    d. Disconnect the wiring edge connectors from the PC board.
    e. Pull the two clips off the door-mounted half of each hinge (four clips total).
    f. Lift the door free of the enclosure and set it aside.

Replacing The Door

WARNING!   Be sure you replace the door latch cable on the door BEFORE closing the door.

1. To *replace* the door, slide the hinges out on their tracks from inside the enclosure. Hold the door along the hinges, and replace the four clips in the hinges.

2. Replace the edge connectors on the PC board, the grounding strap, and the door lock cable. Swing the door back until it is parallel with the enclosure, then push it straight back into the enclosure.

3. Lock the door with the key by turning the key a half-turn clockwise (it may be necessary to press in on the door while locking it).

Printer Paper Loading Instructions

The optional receipt printer accepts metric-sized thermal paper: 57.5 mm or 59.5 mm width. These instructions assume the unit is open (see *Opening the Unit*, above). *After first unpacking your unit, remove any packing material from around the printer.*

1. Turn the switch arm, located on the printer, clockwise. Pull the paper (if present) out of the printer.

2. Remove the paper roll from the bracket, then remove the spindle from the center of the old paper roll, and insert it into the new roll of paper.

4. Place the new roll of paper in the bracket on the printer. PAPER MUST FEED FROM THE TOP OF THE ROLL.

5. Feed the paper into the printer. Make sure the paper goes UNDER the round plastic bar on the printer. Push paper through until it protrudes from the front door.

6. Turn the switch arm back to its original position. The printer will automatically print a test receipt. Remove the receipt when printing is complete.

PC Board Overview (PV297/PV299)

Open the front door of the OPT enclosure to gain access to the main PC board (Figure 3). All components of the OPT attach to this PC board through connectors on the bottom of the board (J11, J12, J13, etc.).

CONTRAST ADJUSTMENT
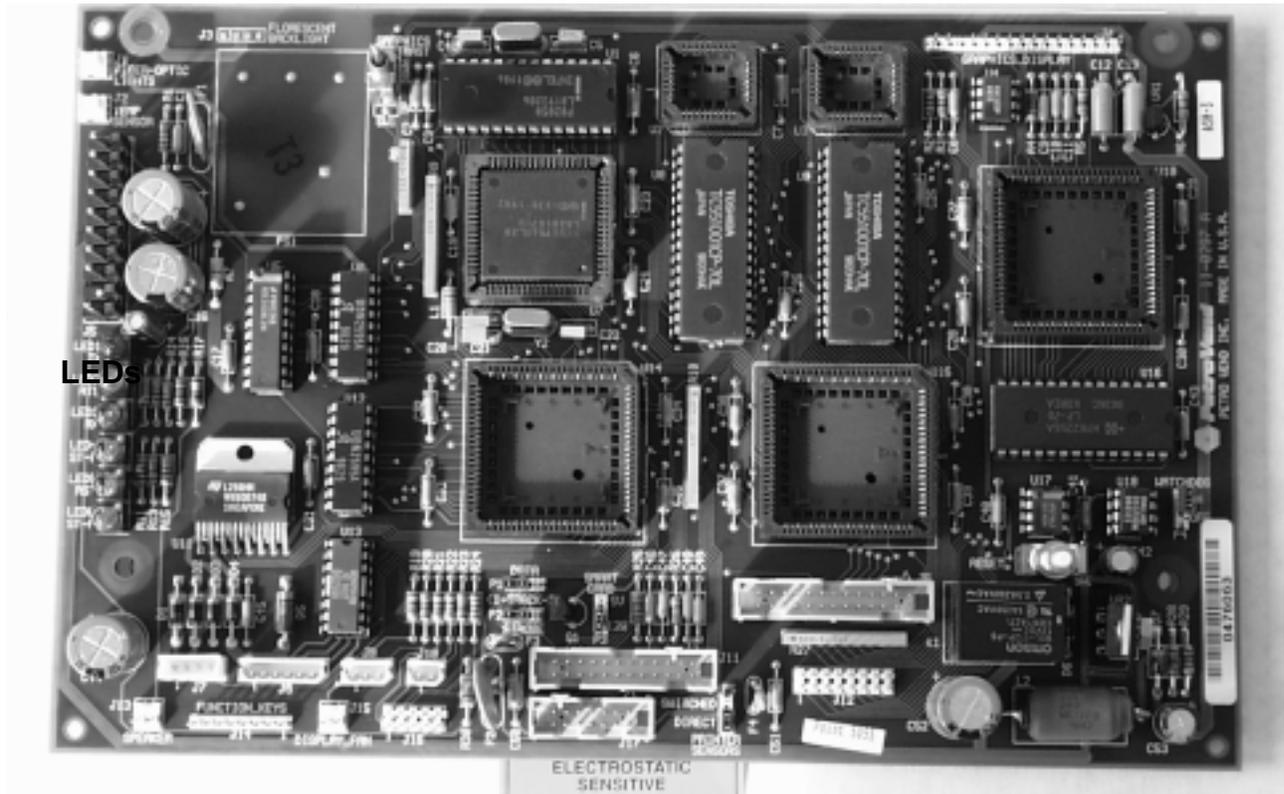
Figure 3 - OPT PV297/PV299 Board Overview

Board LEDs

The PV297/PV299 board contains five LEDs (see Figure 3 above). Five of these LEDs show system operation as follows:

○ **PRX** - This green LED in the upper-right corner of the board flashes when data is *received by* the OPT over the Petro Net.

○ **PTX** - This red LED in the upper-right corner of the board flashes when data is *transmitted from* the OPT over the Petro Net.

○ **PRT** - This yellow LED in the upper-right corner of the board signals the direction of data over the Petro Net.

○ **RST** - This yellow LED in the center of the board flashes once when the system is reset. The LED should not *remain* ON.

○ **STATUS** - This yellow LED, also in the center of the board, indicates error with a flashing sequence.

Graphics Display Contrast

If you are having trouble reading the OPT graphics display, adjust the GRAPHICS CONTRAST toggle, top left side of the PV297/PV299 board (see Figure 3).

You can also adjust contrast through the software - see the Display portion of the Test/Configuration section, Page 32.

Fuel Site Controller (FSC)

The FSC is an electronic device that is *not* waterproof, and therefore *must* be installed indoors. A rear-panel illustration of the FSC appears in your *System2 Operator's Guide*.

The OPTs connect via Petro Net twisted-pair wire to the Petro-Net junction box. The junction box is a tie point for Petro Net wires from one or more OPTs or FITs. Petro-Net uses RS-485 protocol, and requires twisted pair, 18 AWG (or greater), oil and gas resistant wiring (TFFN, THHN, or THWN).

The junction box, in turn, connects to the FSC rear-panel PETRO NET jack.

Petro-Net must be installed in *rigid steel conduit* to provide weatherproofing and to minimize electrical interference.

FSC specifications are given in the *System2 Operator's Guide*.

Other Devices

Terminals and modems must be listed with a nationally recognized testing lab, and have a standard RS-232C interface.

Journal printers, attached to the PRINTER connector on the Petro Vend FSC, use the proprietary Petro Vend interface.

All devices should obtain their power from the same point - for example, the OPT power wiring should be connected to the same circuit breaker that supplies an outlet box into which the printer and terminal is plugged in.

OPT components must be properly grounded for the noise suppression circuitry to function properly. *Do NOT rely on the conduit to provide a ground!* The OPT enclosure and other system components should be grounded to a *common point.*

Wiring

OPT Power Wiring

For each OPT enclosure, pull three #14 AWG wires (one each: green, black and white) through conduit from the circuit breaker panel. This wiring will power both sides of the pedestal.

Pull about six inches of the wire from the OPT end of the conduit, for connection to the power terminal blocks inside the OPT. See Page 24 for connection instructions.

Communication (Petro Net) Wiring

The OPT-to-FSC communication link uses RS-485 protocol, which requires *twisted-pair* cable to operate properly. Each twisted pair conductor must be 18 AWG or greater. Communication wiring *can* be in the same conduit as the power supply wiring.

Oil and gas resistant wire MUST BE USED.

1. Twisted-pair is available from Petro-Vend: Order part number **12-1029.** To *make* twisted pair, twist together white and black 18 AWG wire to make a pair with approximately ten twists per foot (the RS-485 standard).

2. Pull the twisted-pair through conduit (the same conduit as the power wires, if desired) from the pump junction box up through the OPT pedestal and into the base of the OPT enclosure.

3. *If your site is equipped with a Petro Net junction box*, connect the twisted-pair wires to PIN #1 and PIN #2 of the junction box cover. Pins 3 and 4 are not used. Screw the cover to the junction box.

    One RS-485 twisted-pair emerges from the junction box (if used), and goes back to the indoor Fuel Site Controller. The twisted pair attaches to the **PETRO NET** socket on the rear of Petro Vend FSCs. If you are using a different type of controller, refer to the instructions for that unit for where to connect the communication pair.

    See your *System2 Installation Manual* for help in connecting other devices to the FSC.

See Page 24 for system connection instructions.

Other SYSTEM2 Wiring

All outdoor components of your system should be connected to the same electrical circuit. Connect the line voltage supply wires and the ground wire from a dedicated circuit breaker to the power input terminal block in each OPT and, if applicable, each indoor PCT. *All ground wires must originate at the service panel.*

If you are using the System2 FSC, plug that unit's power supply into a wall outlet, and then plug the cord from the power supply into the back of the FSC.

For *pump* and *pulser* control wiring, refer to either the System2 Installation Manual or your pump documentation.

WARNING!

The ground wire in the OPT must be properly installed for the operation of the noise suppression circuitry. *Do not* rely on conduit to provide this ground!

OPT-to-FSC Wiring

The OPT communicates with the Fuel Site Controller over an RS-485 communication line. The Petro-Net wiring from each OPT, along with the Petro-Net wiring from any other System2 FITs, meet at the Petro-Net junction box. In existing sites, this box is typically near the pump islands.

Installation & Hook-Up

The pedestal (Figure 4) contains no electrical components, and supports the dual-sided OPT enclosure. The base of the enclosure is shown. Up to four OPTs (two dual-sided enclosures) can be connected to a single Fuel Site Controller.
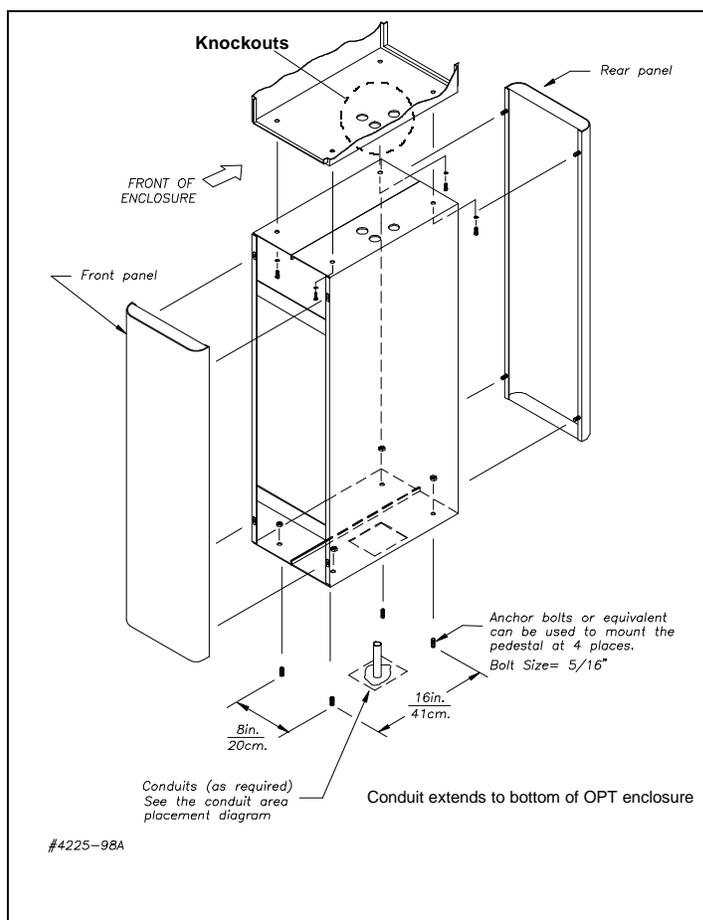
Figure 4 - OPT Pedestal Assembly

Although installations vary, the following steps generally apply to all sites.

1.   Each OPT location should have four 5/16" threaded studs imbedded in the concrete according to the drawing on Page 12. The 3/4" conduit should be protruding from the CONDUIT PLACEMENT AREA shown in the figure on Page 13.

The conduit must extend approximately 42.5" from the ground - 42" to rise the height of the pedestal, and another half-inch to go inside the OPT enclosure. If the conduit only enters the pedestal, and does not rise up to the enclosure, a seal-off (Figure 5) must be incorporated in the conduit to prevent vapors from entering the conduit.
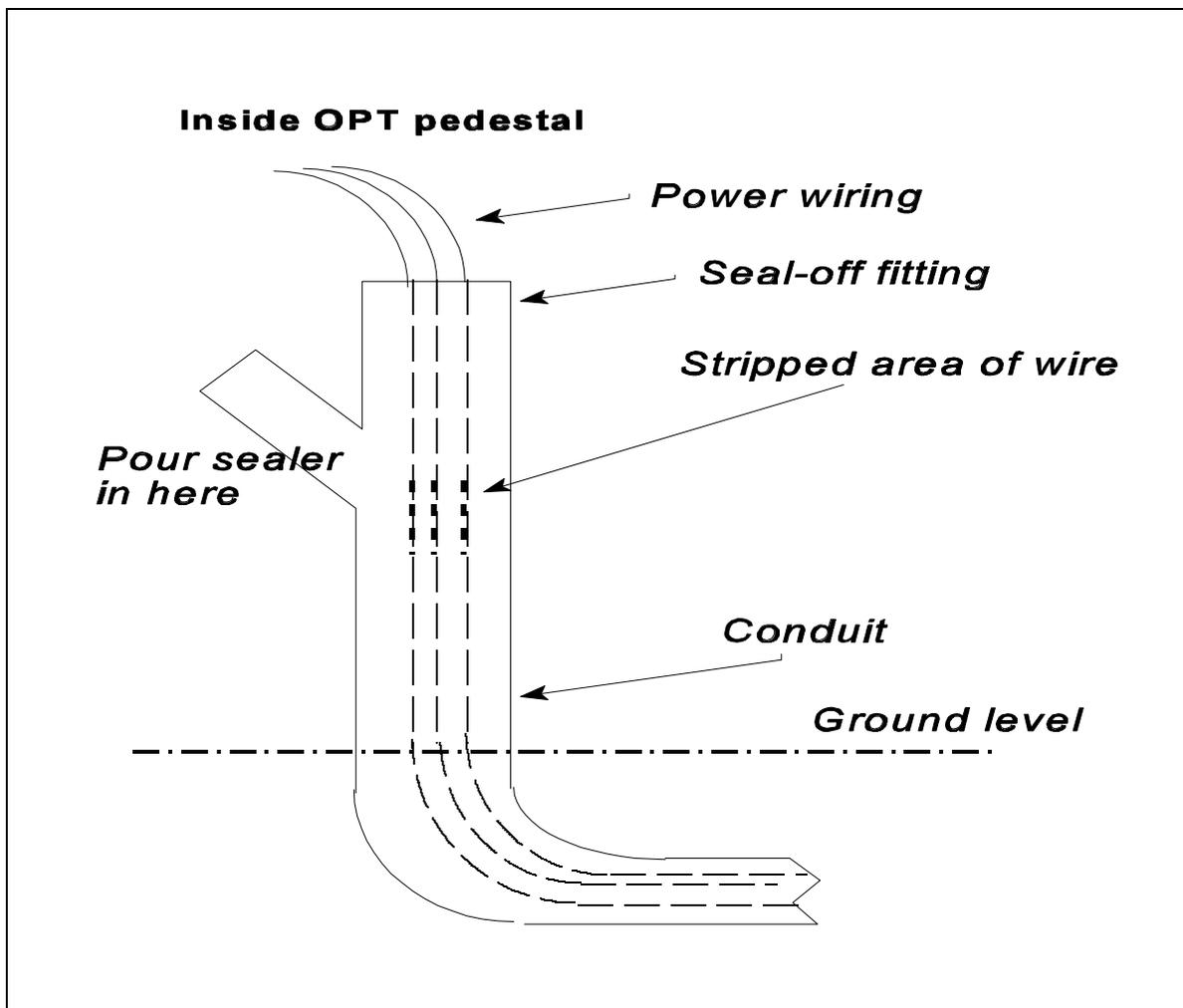
Figure 5 - Conduit Sealoff Concept

2.   Making sure the *front* of the pedestal faces toward the user, place the OPT pedestal atop the four studs. Secure the pedestal tightly with the four supplied 5/16" nuts and lockwashers. Keep the pedestal covers off for now.

3.   Remove one knockout from the base of the enclosure (Figure 4). Remove the two doors from the OPT enclosure by following the procedure on Page 10.

4.   Place the OPT enclosure atop the pedestal (Figure 4). Align the wiring knockouts in the bottom of the enclosure with the knockouts in the top of the pedestal. Secure the enclosure tightly with the supplied bolts and washers. *Do not tighten the conduit hold-down nut inside the OPT enclosure yet.*

WARNING
Be sure power is OFF at the circuit breaker or supply before proceeding!

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5. The wiring to the OPT consists of three power supply wires (typically black, white and green), and communication wires (RS-485 twisted-pair, Petro Net, see *Wiring,* Page 20). The conduit should be inside the bottom of the enclosure. Pull enough wiring from the conduit to reach the terminal blocks inside the OPT enclosure. ***There can be NO exposed wiring (including wire nuts) inside the pedestal!***

6. *See Figure 6.* Attach the RS-485 twisted-pair (Petro Net) wires to the **COMMUNICATION** terminal block. *YOU MUST OBSERVE POLARITY! Be sure that PIN 1 goes to PIN 1, and PIN 2 goes to PIN 2.*

7. Remove the protective cover from the HIGH VOLTAGE terminals. Route the three power wires from the conduit as follows: Attach the *line* power wire to the **LIVE** screw. Attach the *neutral* power wire to the **NEUTRAL** screw. Attach the *ground* wire to the **GROUND** screw. *REPLACE THE PROTECTIVE COVER.*

8. Secure the conduit to the base of the OPT enclosure with insulating bushings. Use insulating hardware on the seal-off (if equipped) as well.

9. Attach the pedestal covers, and replace the doors of the OPT enclosure.
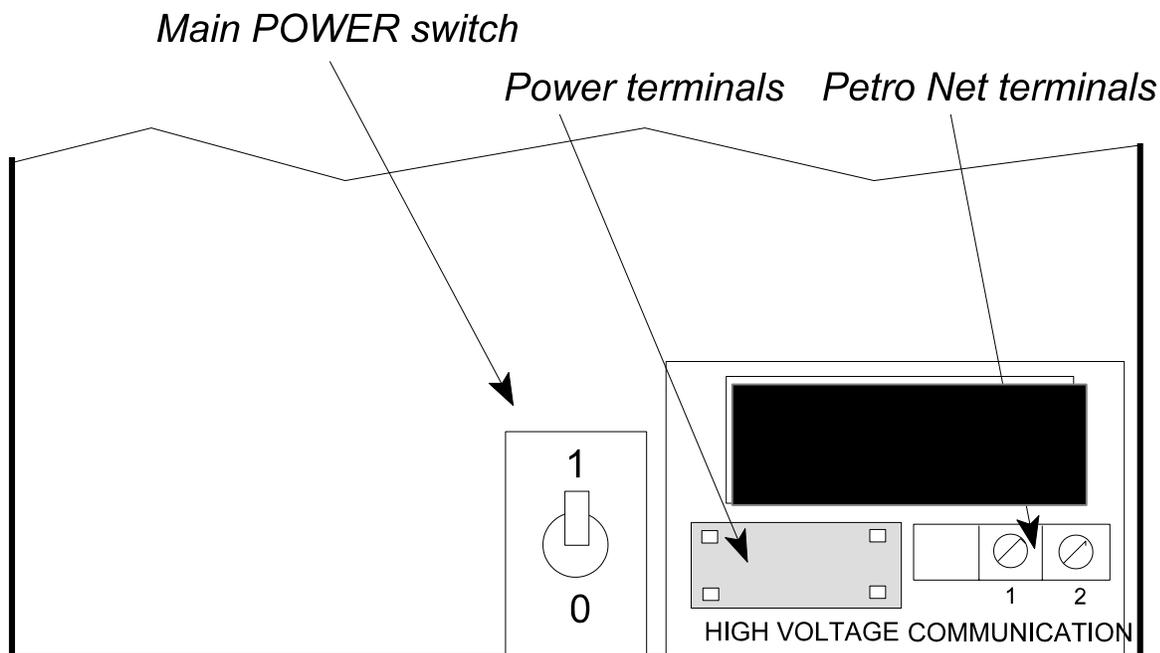
10. Apply power to the OPT. Confirm the unit is receiving power, then turn to Page 29 for instructions on configuration.

Basic OPT Operation

OPT Controls

Standard Numeric Keypad

The *numeric* keypad (below) is the standard-equipment keypad. It contains digit keys [0] to [9], as well as two dual-purpose keys: (CLEAR/NO) and (ENTER/YES).

```
┌─────────────────────────────────────┐
│                                      │
│   ┌───┐   ┌───┐   ┌───┐              │
│   │ 1 │   │ 2 │   │ 3 │              │
│   └───┘   └───┘   └───┘              │
│                                      │
│   ┌───┐   ┌───┐   ┌───┐              │
│   │ 4 │   │ 5 │   │ 6 │              │
│   └───┘   └───┘   └───┘              │
│                                      │
│   ┌───┐   ┌───┐   ┌───┐   ┌───────┐  │
│   │ 7 │   │ 8 │   │ 9 │   │ CLEAR │  │
│   └───┘   └───┘   └───┘   │  NO   │  │
│                           └───────┘  │
│           ┌───┐           ┌───────┐  │
│           │ 0 │           │ ENTER │  │
│           └───┘           │  YES  │  │
│                           └───────┘  │
└─────────────────────────────────────┘
```
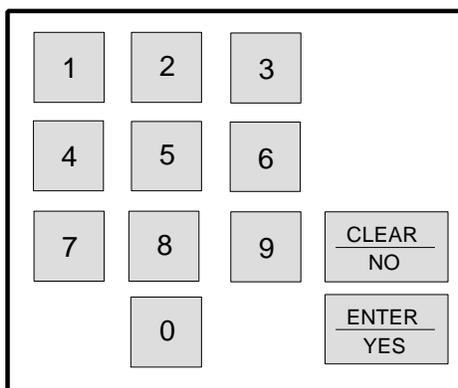
Full Alphanumeric Keypad

The optional *full alphanumeric* keypad contains the numbers 0-9, and every letter of the alphabet as well. With this type of keypad, *text* entries, such as names or product descriptions, can be made. Please contact your sales representative for more information.

Function Buttons

The four blue buttons along the right side of your OPT graphics display are function buttons. The function for each changes depending on what part of OPT operation you are in. They are used frequently when configuring or testing the OPT (see Page 29).

Function Buttons work in conjunction with the graphics screen; if you have a two-line display (older units only), the button "labels" do not appear as they do on a graphics screen.

Card Reader

The magstripe reader is a "push-pull" reader. Like many "swipe" type ATMs, the big benefit of this type of reader is that the card never leaves the user's hand.

Powerup Tests

Before the Test/Configuration mode is entered, a series of self-tests are run. These tests are, in order they are performed:

Display Initialization   A video RAM test is performed, during which the graphics display shows vertical lines.

System Configuration   The software level of the test/configuration program is shown, as well as the keypad type, display type and reader type. For example:

Version: 01.01A
REG GRAPH   PUSH

This message means the test software is version 1.01A, and the system is equipped with a "regular" (numeric) keypad, a graphics display and a push-pull manual reader.

Flash Checksum Test   A test is done on the ROM (read-only memory) inside the OPT. The display will show:

Flash Boot: ####
**   Appl: ####**

RAM Test   Next is a non-destructive test of the OPT random access memory. This test takes about ten seconds; a character "spins" on the display during the test. Hit the (CLEAR/NO) key to bypass this test. Depending on how the test ends, you will see one of the following:

BREAK   The (CLEAR/NO) key was pressed.
PASSED   RAM is OK.
ERROR #   Test failed at indicated memory location.

EEPROM Test   The OPT does a non-destructive test on the serial programmable read-only memory. **PASSED** means the chips are OK, while **ERROR #** means they failed at the indicated memory address.

FPGA Checksums   There are two field programmable gate array configurations, one for the standard numeric keypad and the other for the alphanumeric ("DES") keypad. The checksum tests not only test the FPGAs, but identify their version:

FPGA   Reg: ####
**   DES: ####**

If all tests pass, and the CONTRAST switch was held during power-up, the OPT enters the application program (a Petro Vend System2 simulator). See Page 29 for a description of the Test/Configuration mode, through which 21 functions can be set or tested.

PCT Configuration

Refer to the System2 Installation Manual for details on PCT switches and LEDs.

FSC Configuration

Refer to the System2 Installation Manual for details on FSC switches and LEDs.

Test/Configuration Mode

The OPT is configured with commands issued through the unit itself - there is no need to use a terminal connected to the FSC to program many OPT functions. Combined with the configuration functions are self-test features. Several of these self-tests are performed automatically at power-up.

Entering Test/Configuration Mode

Enter the mode by holding the DISPLAY CONTRAST switch on the PC board UP (see Page 17) while turning the unit power switch ON. After you hear a beep, release the contrast switch. *The OPT WILL NOT enter Test/Configuration Mode if this is not done.*

This mode gives you access to the following areas of OPT operation. Setting most of these functions requires PRIVILEGED access - see "1-PASSWORD" instructions, Page 31.

1. **Password** - Enter, set or change the password, giving "privileged" access to configuration functions.

2. **Display** - Adjust the contrast of and test the graphics display

3. **Keypad** - Tests the operation of keys on the keypad

4. **Reader** - Select push-pull card reader, check status of card sensors, and test the reader

5. **Printer** - Tests printer operation by printing out a system configuration "report" on a receipt. Also, adjust print darkness, and test five sensors mounted on the printer

6. **Ports** - Set baud rate, data and stop bits and parity for the COM port. Also, tests the port for proper operation.

7. **Poll ID** - Define an ASCII value for Network ID number.

8. **Toggle** - Lets you define electronic "DIP switches", to allow the OPT to more closely emulate a regular System2 FIT. System programmers only.

9. **Value** - Use this feature to store 26 numbers (values) in OPT memory for system programmers "scratchpad" use.

10. **Time** - Sets the current time of day for use on the receipt.

11. **Date** - Sets the current date for use on the receipt.

12.   **Temp** - Displays ambient temperature (at the display surface) in °C and °F.

13.   **Battery** - Shows the charge state of the OPT optional PC board backup battery.

14.   **Lights** - Brightens or dims the graphics display and the light over the keypad.

15.   **Beeper** - Plays a short melody to test the OPT beeper.

16.   **RAM** - Tests OPT random access (working) memory. This test is automatically performed at power-up.

17.   **FLASH** - Tests the flash memory. This test is automatically performed at power-up.

18.   **EEPROM** - Tests the programmable read-only memory. This test is automatically performed at power-up.

19.   **FPGA** - Tests gate arrays. This test is automatically performed at power-up.

20.   **VERSION** - Displays the version level (for example, "1.01") of the OPT firmware.

21.   **RUN APP** - Skips the tests and configurations and starts the OPT.

22.   **FACTORY** - Resets all user-changeable settings to factory defaults.

Note On Keycap Conventions

Two types of key illustration are used in this section:

(YES)   When you see a "white-on-black" key like this, it means press the Function Button next to the message on the graphics display (in this case, the blue button next to the word "Yes" on the graphics display).

(ENTER/YES)   When you see a "black-on-white" key like this, it means press the indicated OPT keypad key (in this case, the ENTER/YES key).

1 - PASSWORD

The Privileged mode MUST be entered to configure parameters. The Privileged mode is indicated on the OPT display with a "P" in the upper-left corner of the display. The "P" comes before the title of the menu display. For example, if you are in privileged Password menu, the display you see looks like this:

P   1 - PASSWORD

When first powering up the OPT, the unit automatically enters Privileged mode. When NOT in Privileged mode, the Password function prompts for a password entry. The factory-set password is **0000**, which you should change as soon as possible.

If you enter the wrong password, a 15-digit number appears on the display. If you have lost the password for your unit, call Petro Vend, and give them the 15-digit number. If you have proper ID, Petro Vend will give you the password for that unit.

Changing The Password

You must first enter privileged mode to change the password. From first powering up, perform the following sequence to change your password.

DISPLAY: *PRESS:*

1- PASSWORD	(YES) or (ENTER/YES)
Enter:	**0000** (ENTER/YES)
P 1 - PASSWORD	(ENTER/YES)
PASSWORD Set?	(YES) or (ENTER/YES)
New:	*{enter up to four digits here}* (ENTER/YES)
Verify:	*{re-enter the same four digits here}* (ENTER/YES)
Password Changed	[Next]

To leave privileged mode, you must cycle power to the OPT, or enter the application program with Option #21 in the Configuration mode.

2 - DISPLAY

Use this function to adjust the contrast of the display and test the display itself.

Remember, a function button is designated with a "reverse key" in this book - for example, (YES) is the function button currently labeled "Yes" on the graphics screen.

Contrast Determination

The OPT uses three readings to adjust the contrast of the display:

1.   The OPT calculates *Best Contrast* from the outside temperature (a sensor mounted on the display sends temperature data to the OPT)

2.   The *System Contrast* is the contrast you set manually by using this Test/Configuration function or the switch on the PC board (see Page 17).

3.   A *Photo Contrast* reading is obtained from a photocell, which can be enabled or disabled.

Manual Contrast Adjustment

The first prompt asks you if you want to manually adjust System Contrast:

ADJUST CONTRAST   (YES) or (ENTER/YES)
DISPLAY -9
3=LIGHT 6=DARK

         Press (Light) or (3) to brighten the display.

         Press (Dark) or (6) to darken the image.

The numeric value for contrast ranges from –20 to 20. You can also use the toggle switch on the PC board (Page 17) to adjust contrast.

Press (Yes) or (ENTER/YES) to accept entry and move to the Debug Display function.

Debug Display *(Privileged Level Required)*

Enabling this feature displays two rows of numbers on the bottom of the graphics display. The numbers, used in troubleshooting the OPT, are for use by qualified service personnel.

OPT DEBUG ON?   (YES) or (ENTER/YES)   Two rows of numbers similar to those below appear:

-7 . . . . 0 863
615 . . . . 616 59

To turn off the debug display, enter (NO) to the Enable Debug? prompt.

Invert Display *(Privileged Level Required)*

You can set the graphics display to show light characters on a dark background, as opposed to the default dark characters on a light background.

Change INVERSE?   (YES) or (ENTER/YES)
Disable INVERSE?   (NO) or (CLEAR/NO) (answering YES cancels command)

The display is now inverted. To invert it again, repeat this procedure.

Photo Contrast *(Privileged Level Required)*

Enable or disable photocell control of the display contrast as follows:

DISPLAY:	*PRESS:*
P 2 - DISPLAY	(YES) or (ENTER/YES)
Change PHOTO?	Photo contrast is by default *disabled*. To enable, press (NO) or (CLEAR/NO). ***NOTE: DO NOT enable for blue graphic displays.***
Disable PHOTO?	(YES) or (ENTER/YES) to accept.

When you enable the photocell, a **Photo Contrast** prompt appears. Press (YES) or (ENTER/YES) to view what contrast value (from –9 to 9) the OPT is currently using. This value should vary between roughly –2 and 2.

If Photo Contrast shows –9 or –8 *continuously*, use Manual Contrast Adjust (Page 32) to adjust contrast *downwards*. If Photo Contrast reads 9 or 8 continuously, vary contrast *upwards*.

Test Display

If you press (YES) at the **Test DISPLAY?** prompt, the graphics screen displays all characters of the alphabet, in upper and lower case, along with all punctuation. The characters are written line after line until the screen is filled, at which time the process begins again, overwriting the previous screen.

To end the test, press any key or function button. Then, press (Next) to move to the keypad test.

3 - KEYPAD

This test checks the operation of the keys on either the numeric ("REG") keypad or the full alphanumeric ("DES") keypad.

To begin the test, press (YES) or (ENTER/YES) at the **3 - KEYPAD** prompt.

Press any key on the keypad except (ENTER/YES), which exits the test mode. The key you press appears briefly on the display to show you the key is physically and electrically functional. The top three function buttons appear as "a", "b" or "c" (the bottom button exits the function).

To end the test, press the (EXIT) function button or (CLEAR/NO). Then, press (Next) or (CLEAR/NO) to move to the reader test.

4 - READER

This test checks the operation of the "push-pull" card reader. Also, in Privileged Mode (display reads **P 4-READER**) you can change, in software, what type of reader the OPT is equipped with.

Changing Reader Type *(in Privileged mode only)*

P 4-READER   (YES)
Push-Pull
Change Reader?   (NO)
Motorized
Change Reader?   (NO) to exit to sensor check (below)

Reader Test

The first part of this test checks the operation of the two sensors in the card reader - a front sensor that detects initial card insertion and a back sensor that confirms complete insertion.

Check reader with NO card inserted and a card totally inserted.

To test the sensors and read heads:

Read SENSORS?	(YES)
Frt = Off Bck = Off	(EXIT) OR, insert a card into the reader. The status of the sensors should change: **Frt** changes to ON, and when the card is all the way in, **Bck** goes ON as well.
Test READER?	(YES)
Testing Reader/	
Insert Card	Insert a card into the reader. The status of each track is displayed. **INCORRECT READING** shows a card read error. **CARD ORIENTATION** means no data was obtained from the card - check for proper insertion direction.

If a good read is done, another screen appears with the data on the card. Use the (1) key (or the LEFT function button) to scroll left. Use the (3) key (or the RIGHT function button) to scroll right:

<- 1 Track 2 - >
1234567890123456

Press (ENTER/YES) (or the EXIT function button) to go back to the test.

Press (EXIT) and then (Next) to move to the Printer test.

5 - PRINTER

This test checks the receipt printer. There are three parts to this procedure: (1) contrast adjustment to set print density (in Privileged mode only), (2) sample receipt printout to check operation and (3) a test of the five printer sensors.

Enable or Disable Printer *(Privileged Level Required)*

The first prompt you see is **Change Print?** Press (YES) or (ENTER/YES) to begin the printer configuration. The next prompt you see is **Enable Print?** To disable the printer (prevent it from printing receipts), press (NO) or (CLEAR/NO) to toggle the status. Press (YES) or (ENTER/YES) to accept.

If the printer is enabled, a sample receipt is printed out. If the next message you see is Take Receipt, the printer is functioning normally. If, on the other hand, you get one of the following error messages, something is wrong:

Paper Out Error   Check that there is a roll of paper in the printer.
Print Head Down   Raise the print head off the paper.
Print Loading   Software error. Cycle power, wait 15 seconds and retry.
Chute Empty   Check for a paper jam.
Wrong Task   Software error. Cycle power, wait 15 seconds and retry.
Paper Low   If receipt printed OK, paper roll is almost gone.
Hardware Error   Software error. Cycle power, wait 15 seconds and retry.
Cutter Jam   Turn power OFF. Free up cutter using a small Phillips screwdriver.

Contrast Adjustment

Printer contrast (the darkness of the image on the receipt) is controlled by two readings:

1.   The OPT can automatically calculate the "Best Contrast" from the temperature of the printer head, OR...

2.   The contrast can be set manually using the following procedure:

5 - PRINTER	[YES]
Adjust CONTRAST?	(YES) or (ENTER/YES)
3 = Light 6 = Dark	Press (Light) or (3) to lighten the printed image. Press (Dark) or (6) to darken the image. The results of your adjustment will be seen when you print out a sample receipt. "0" is factory default. Range is – 20 (light) to 20 (dark). Press (EXIT) when done.

Display Contrast is equal to the calculated *Best Contrast* plus the manually-entered *System Contrast*.

Printer Chute

This test adjusts the sensitivity of the chute sensor. The first value is the threshold setting, while the second is the current value of the sensor. The threshold setting should be HALF the current value when the chute is empty. If the current value is less than the threshold setting, the chute is full. If current value is greater than the threshold setting, the chute is empty.

Adjusting threshold requires Privileged access.

Print Configuration

This test prints out a "receipt" that shows current system configuration. A sample is shown below. To print the receipt, perform the following sequence:

Print CONFIG.?   (YES)
Loading . . .

If there is paper in the printer, and printing is successful, a receipt similar to one opposite emerges from the printer.

```
SYSTEM CONFIGURATION

Version     : 1.01A           Temperature
Date        : 9, 8, 94          20 C
Time        : 16:07:26          68 F
Reader      : Push Pull       Photo
Display     : Graphics         Off
Printer:    : 500             Battery
Keypad      : Regular          100%
Poll ID     : 65, 0x41, A
COM1        : 9600, 7, N, 1,
Toggle      : ABCD EFGH IJKL MNOP
              1010 1010 1110 1010
Value A     :        0    N:       0
Value B     :        0    O:    9999
Value C     :        0    P:      78
Value D     :        0    Q:       0
Value E     :        0    R:       5
Value F     :        0    S:       0
Value G     :        0    T:       0
Value H     :        0    U:    ****
Value I     :        0    V:    ****
Value J     :        0    W:    ****
Value K     :        0    X:    ****
Value L     :        0    Y:    ****
Value M     :        0    Z:    ****
Beeper      : 4150 Freq   4  Duration
Contrst     : 0 Display   0  Printer
AtoD        : 886 Chute   642 Print Head
FPGA        : 2c55 Reg    --- DES
Cheksum     : 63dd Boot   8f70 APPL
                   PASS          PASS
```

Printer Sensor Test

This part of the printer test checks the current condition of the five sensors mounted on various parts of the printer assembly. Follow the keystrokes and display sequence below:

Test SENSORS? (Yes) or (ENTER/YES)

Paper-Low: *YES or NO* If Yes, the sensor is not seeing sufficient paper. Test the sensor by raising and lowering the paper roll from its holder. The reading should change from Yes to NO. Press (Yes) or (ENTER/YES) to move to the next test.

Paper-Out: *Yes or NO* If Yes, this sensor is not seeing ANY paper. To test: First, lower the print head and remove the paper from the printer. Push the paper in and out of the printer, right below the white plastic bar (the sensor is the round black object just below the white bar). The status of the sensor should change. Press (Yes) or (ENTER/YES) to move to the next test.

Chute: *EMPTY or FULL* If EMPTY, this sensor is not seeing a receipt in the discharge chute. Push paper from the roll into the receipt chute. The sensor status should change to FULL. Press (Yes) or (ENTER/YES) to move to the next test.

Cut Blade: *UP or DOWN* If UP, the paper cutter blade is in the UP position. Insert a small Phillips screwdriver into the cutter assembly. Turn the screwdriver approximately 20 revolutions, or until the status of this sensor changes. Reverse the screwdriver (back it out) to change the status again. Press (Next) or (ENTER/YES) to move to the next test.

Prnt Head: *UP or DOWN* If UP, the print head is in the up position. Raise or lower the head by moving the black plastic bar on the side of the printer. The sensor state should change. *NOTE: When the print head is RAISED, a test receipt is automatically printed.*

Finally, press (Next) to exit the printer tests and go to the Ports function.

6 - PORTS

Use this function to configure the COM port (if you are in Privileged mode), and to actively test communication flow into and out of the port.

Port Configuration

The first part of this function is the Port Setup function. *SETUP can ONLY be done in Privileged mode*. In Non-Privileged mode the parameters can only be viewed. Perform the following sequence to set up the port (values shown are system defaults):

P 6-PORTS   (YES) or (ENTER/YES)

PORT: COM1
1200, 7, E, 1, \, T   Press (Set) to change COM1. Move from baud rate, to data bits, to parity, to stop bits, to CTS and finally to RTS (each is explained below). To change one of the values, press (Set) again.

COM1 BAUD
9600, 7, E, 1, ,   Lets you change baud rate: Press (NO) to toggle through 1200, 2400, 4800, 9600 and 19.2K. Press (YES) to enter a value and go to data bits.

COM1 DATA
9600, **7**, E, 1, ,   Lets you select the number of data bits: Press (NO) to toggle between 7 and 8 data bits. Press (YES) to enter a value and go to Parity.

COM1 PARITY
9600, 7, **E,** 1, ,   Lets you select type of parity: Press (NO) to toggle between O (Odd), E (Even), M (Mark), S (Space) or N (None). Press (YES) to enter a value and go to Stop Bits.

COM1 STOP
9600, 7, E, **1**, ,   Changes the number of stop bits used: Press (NO) to toggle between 1 and 2 stop bits. Press (YES) to enter a value and go to TX-RTS.

COM1 TX-RTS
9600, 7, E, 1, ,   Press (NO) to enable or disable TX line control of RTS signal. Press (YES) to enter a value. This is the final parameter.

Save?   Press (YES) to save your choices and enter the next part of the test mode.

Port Test

After the final parameter is set in the configuration mode, and you have answered the **Save?** prompt, press the (Next) function button. You will see **Test?**. Continue as described below.

NOTE: *A test fixture must be present on the OPT board for this test to work. Attach the test fixture to J2 on the PC board. Jumper P2 MUST be in the TTL position. The type of test is displayed, followed by PASS or FAIL.*

Test?	(YES)
Jumper P2 = TTL	(YES)
TX, RX: *PASS/FAIL*	(YES)

Press the (EXIT) function button to leave this test. Press (Next) or (ENTER/YES) to move to the Poll ID function.

7 - POLL ID

This function gives the OPT a unique polling address for access by a site controller (such as the Petro Vend FSC). Poll ID can only be altered while the OPT is in Privileged mode. In non-Privileged mode, Poll ID can only be viewed.

To change the Poll ID (in Privileged mode), do the following:

P 7 - POLL ID   (YES) or (ENTER/YES)

POLL ID   Set?
{nnn}, {hhhh}, a   (YES) or (ENTER/YES). The "nnn" is a three-digit number. "hhhh" is the hex equivalent of the number, and "a" is the ASCII character represented by the three-digit number.

ASCII #:   Here, enter a number from 000 to 255 and press (YES). or (ENTER/YES). The number, hex number and ASCII char appear.

{nnn}, {hhhh} Save?   (YES) or (ENTER/YES), and then (Exit), or (CLEAR/NO) to move to the Toggle function.

8 - TOGGLE

This function lets you "set" electronic ("soft") DIP switches, in order for the OPT to better emulate regular System2 FITs. If you are in Non-Privileged mode, you can only *view* the current switch settings. There are 16 "switches", designated with letters A - P. Think of these electronic switches as a block of regular DIP switches.

As with a regular DIP switch, each switch can be set ON or OFF. The default is all switches set to OFF. To change switch settings (in Privileged mode ONLY):

P   8 - TOGGLE   (YES) or (ENTER/YES)

A: Off   To turn switch A ON, press function button (Set?) or (ENTER/YES). Then, press (NO) or (CLEAR/NO) to change OFF to ON. Next, press (YES) or (ENTER/YES) to confirm your choice.

Save?   (YES) or (ENTER/YES)

etc.....   Change as many switches as you need, repeating the process described for switch A. When done, press (Next) or to go to the Value function.

9 - VALUE

Use this feature to store 26 numbers (values) in OPT memory for "scratchpad" use. Each value is assigned a letter from A to Z. You must be in Privileged mode to alter values. The value can be an integer from 0 to 65535. Default condition is no values stored (all are "0"). Codes "N" through "T" are daily password protected. Codes "U" through "Z" are daily password protected AND hidden.

NOTE: *If a value between N and Z is selected, a 15-digit number appears. Call the Petro Vend Technical Service Department and give them the 15-digit number. They will decode the number and give you the daily system password. Altering these VALUES must be approved by Petro Vend.* To change values (only in Privileged mode):

P   9-VALUE   (YES) or (ENTER/YES)
A: 400   (Set?) or (ENTER/YES) then (YES) or (ENTER/YES)
Enter A: Enter an integer from 0 to 65535, then press the (ENTER/YES) key.
Set?   (YES) or (ENTER/YES)   then (Next) or (ENTER/YES). To abort, press (Cancel) or (CLEAR/NO)

B: 0   etc....   Enter new values as desired. To skip a letter press (Next). To leave this mode press (Cancel)

10 - TIME

If desired, you can use the Time function to set or display local OPT time (the FSC time overrides the OPT time setting). Time is updated every second, although because of build times in the graphics display, the displayed time may "skip" seconds. Time can only be displayed in 24-hour format. The following is a sample time set sequence:

P 10 - TIME	(YES) or (ENTER/YES)
TIME Set? **14:16:32**	(YES) or (ENTER/YES)
Hours **☐☐:16:32**	Enter a number from 00 to 24 and press (ENTER/YES)
Minutes **16:☐☐:32**	Enter a number from 00 to 59 and press (ENTER/YES)
Seconds **16:32:☐☐**	Enter a number from 00 to 59 and press (ENTER/YES)
Save?	(YES) and then at the **Set?** prompt (NO). Then, press (Next) to move to date setup.

See your System2 Operator's Guide *to set the Petro Vend FSC time and date.*

11 - DATE

Use the Date function to set or display current system date. To set date, the OPT must be in Privileged mode. The following is a sample date set sequence:

P 11 - DATE	(YES)
DATE Set? **94, 09, 05**	(YES)
Year **☐☐, 09, 05**	Enter a number from 00 to 99 and press (ENTER/YES)
Month **94:☐☐:05**	Enter a number from 01 to 12 and press (ENTER/YES)
Day **94:09:☐☐**	Enter a number from 00 to 59 and press (ENTER/YES)
Save?	(YES) and then answer the **Set?** prompt with (NO). Finally, (Next). to go to Temp.

12 - TEMP

This function is a read-only operation, and displays ambient temperature at the sensor connected to connector J22 on the OPT board. This temperature is used by the display to control contrast. This function does not require Privileged status.

To see the temperature in both Fahrenheit and Celsius degrees:

12 - TEMP   (YES)

TEMP
18C   64F   (EXIT) and then (Next) or (CLEAR/NO) to go to the Battery test.

13 - BATTERY

This function is a read-only operation. It displays the charge state of the optional OPT board backup battery. This function does not require Privileged status.

13 - BATTERY   (YES)

BATTERY
Energy . . . 100%   (EXIT) and then (Next) to go to the Lights function.

14 - LIGHTS

This function selects a LOW or HIGH (default) brightness level for the backlight in the graphics display and the light over the keypad. This function also tests the lights.

In Privileged mode, use the following key sequence:

P 14 - LIGHTS   (YES)

LIGHTS: HIGH
3 = HIGH 6 = LOW   Press function button (High) (or (3)), (Low) (or (6)) to change brightness, then press the (Exit) function button. Finally, press (Next) to move to the Beeper test.

15 - BEEPER

This function lets you listen to the beeper tone, or change the tone to suit your own preferences. The tone occurs each time a key is pressed. To confirm operation, a beeper test plays a song through the beeper or speaker that is attached to the SPKR connector on the OPT board.

To set the beeper tone:

15 - BEEPER	(YES)
Set?	(YES)
Frg: 4150 Dur: 4	These are the current beeper frequency (in Hz) and duration (in system ticks, 61 ticks equals one second). This is the beep you hear when you press keypads on the OPT. Enter a new frequency (from 65 Hz to 5000 Hz) and duration (from 1 to 32 ticks). Then, press (YES) .
Test?	(YES)
Weasel Tune!	When the tune has finished playing, press (Next) to exit the Beeper test and go to the RAM test.

16 - RAM

This is a manually-activated version of the automatic power-up RAM test. This test performs a non-destructive test of the OPT random access memory, and does not require privileged mode. To run the RAM test:

16 - RAM	(YES)
TESTING RAM <:>	A character spins around to show you the test is in progress. The test lasts about 15 seconds.
PASSED	When test is complete, press (Exit) and then (Next) to move to the ROM (BOOT) test.
BREAK or ERROR	If you see BREAK, the (CLEAR/NO) key was pressed, interrupting the test. If you see ERROR (followed by a memory address), the RAM test failed.

17 - FLASH

This is a manually-activated version of the automatic power-up test. It performs a checksum test of OPT flash memory. The flash memory test is a checksum test, and includes the boot program and the application program. This test does not require privileged mode.

To check the ROM:

17 - FLASH (YES)

Flash: BOOT: ####
    APPL: ####   The #### represent checksum results. The test should not take longer than a second or two. When test is complete, press (Exit) and then (Next) to move to the Application test.

18 - EEPROM

This is a manually-activated version of the automatic power-up EEPROM test. This test checks the OPT program by doing a non-destructive test on the erasable programmable read-only memory. This test does *not* require privileged mode.

To check the application program:

18 - EEPROM (YES)

PASSED   Memory is OK. When test is complete, press (Exit) and then (Next) to move to the EEPROM test.

ERROR ####   Memory failure at indicated location.

19 - FPGA

This is a manually-activated version of the automatic power-up FPGA test. This is a checksum test of the field-programmable gate array chips on the OPT board. This test does not require privileged mode.

To check the FPGA:

19 - FPGA   (YES)

FPGA Reg: ####
        DES: ####   The "####" are checksum results ("DES" is a type of keypad not available in the current release of OPT software). The test should not take longer than a second or two. When test is complete, press (Exit) and then (Next).

20 - VERSION

Displays the version number of the firmware inside the OPT, along with the current system configuration - keypad type, display type, and card reader type.

20 - VERSION   (YES)

Version: 01.01A
REG   GRAPH   PSH-PL

This display tells you this OPT has version 1.01A firmware installed. The OPT is equipped with a regular numeric keypad, a graphics display and a push-pull reader. Press (Exit) and then (Next) to go to Run App option.

21 - RUN APP

This function exits the test mode, and "launches" the OPT application program. As the configuration data is loaded into the system from your settings in the EEPROM, you will see the message **DOWNLOADING . . .**

22 - FACTORY

Restores factory default values to all adjustable functions (Poll ID, Values, Toggle, Port, Printer and Contrast) in the setup routine. *Requires privileged mode*.

22 - FACTORY   (YES)

Press (YES) or ENTER/YES to restore factory settings, or press NO to abort. Then press (Next) to leave the function.

Power Supply Voltages

J1 and J2 Connectors

1	Unregulated DC
2	Keyed
3	+5 VDC
4	Ground
5	+12 VDC
6	Ground
7	No Connection
8	Petro Net TX (Transmit)
9	Petro Net RTS (Request to Send)
10	Petro Net RX (Receive)

J3 Connector

1	+12 VAC supply
2	+12 VAC supply
3	+12 VAC supply
4	+12 VAC supply
5	+5 VAC supply
6	+5 VAC supply
7	+5 VAC Petro Net supply
8	+5 VAC Petro Net supply

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