FuelMaster® 2525

Aviation

Fuel Management System (FMS)

INSTALLATION AND OPERATIONS MANUAL

10/21/99 8:55:08 AM

Syn-Tech Systems, Inc.
P.O. Box 5258
Tallahassee, FL 32314

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Purpose

The FuelMaster® 2525 FMS brings automated fuel accounting to aviation fueling operations. FuelMaster® 2525 FMS accomplishes this with security from unauthorized use while maintaining complete accountability of each transaction as it occurs. Transaction data is compiled after data communication to a central accounting office.

Safety Precautions

The National Fire Codes defines a fuel-dispensing site as a hazardous area. To ensure safety while operating FuelMaster® 2525, all instructions in this manual and applicable guidance in the National Fire Codes and the Occupational Safety and Health Act (OSHA) Standards must be read and understood. The following safety precautions from the National Fire Code/OSHA Standards are applicable to aviation fueling operations:

- There shall be no smoking or open flames in the areas used for fueling internal combustion engines.
- The motors of all equipment being fueled shall be shut off during the fueling operation.
- Each service station shall be provided with at least one fire extinguisher having a minimum classification of 6 B, C located so that an extinguisher is within 100 feet of each pump, dispenser, and underground fill pipe opening.

Certification/Approval

The equipment supplied with the FMS is tested and safety certified by ETL Testing Laboratories, Inc. FuelMaster® 2525 equipment certified by ETL is identified by the ETL logos imprinted on nameplates affixed to all FuelMaster® 2525 FMS components.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning off and on the equipment, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the radio/TV's receiving antenna;
- Increase the separation between the equipment and the radio/TV's receiver;
- Connect the equipment into an outlet on a circuit different from that to which

the radio/TV's receiver is connected; and,
- Consult the dealer or an experienced radio/TV technician for help.

Warnings, Cautions, and Notes

This manual emphasizes special operations with **WARNINGS**, **CAUTIONS**, or **Notes** preceding the applicable procedure:

- A **WARNING** indicates a safety precaution that, if not followed, could result in personal injury;
- A **CAUTION** indicates a safety precaution that, if not followed, could result in damage to equipment; and,
- A Note indicates a procedure requiring special emphasis for the proper installation and operation of FuelMaster® 2525 equipment.

FuelMaster® 2525 Warranty

Warranty on the FuelMaster® 2525 equipment begins after the completion of Initialization or six months after shipment from Syn-Tech Systems, Inc. Initialization must be completed by a Syn-Tech Systems, Inc., FuelMaster® 2525 technician, or a technician who has completed the Syn-Tech Systems, Inc., FuelMaster® 2525 Technical Training Course.

Improvements

Recommendations for improvement or corrections to this manual should be reported to:

Syn-Tech Systems, Inc.
Attn: Product Support
P.O. Box 5258
Tallahassee, FL 32314

FuelMaster® 2525 Fuel Management System

HARDWARE

FuelMaster® 2525 User Interface Terminal (UIT): The UIT can be considered a modern state-of-the-art handheld VIL Reader (VIR) (although it reads magnetic stripe cards). It has combined the best of all prior FuelMasters® with the latest in state-of-the-art technology and RF communications. The UIT combines a stripe card reader, a receipt printer, an LCD, piezoelectric keypad, and a spread spectrum RF transceiver and the latest state-of-the-art surface mount technology into a small, intrinsically safe, user-friendly package.

Card Reader: Syn-Tech has selected a state-of-the-art insert type stripe card reader for its reliability and reading consistency. This reader is the unit currently in use in Syn-Tech's commercial FuelMaster® 2550 card/key system and Syn-Tech's Advanced DoD VIRs. The iterative selection process of this reader was based on trials with both swipe readers and other brands of insertion readers. All swipe readers were inconsistent at best and many brands and types of insertion readers weren't as read consistent or as reliable as needed. Although there are smaller insertion readers available, Syn-Tech has selected the more reliable and read consistent unit available today

Thermal Receipt Printer: Syn-Tech has had receipt printers available for our commercial FuelMaster® customers for many years. The receipt printer selected by Syn-Tech comes in two parts; the printer mechanism and the printer controller circuit board. The receipt printer mechanism is the latest in state-of-the-art miniature low power thermal printer mechanisms. The printer control board was designed and built by Syn-Tech specifically for the printer mechanism. It features the latest in surface mount technology and is designed around a Motorola MC68HC705C9A 8-bit microcontroller. This combination will provide the reliability and low power drain necessary for a battery powered handheld device.

LCD: Syn-Tech has selected a 4 line by 20 character LED backlighted LCD. This LCD will provide the FuelMaster® 2525 with the same information capacity as our current FuelMaster®s in a smaller package.

Keypad: Syn-Tech has been delivering VIRs to the U.S. Air Force equipped with keypads for nearly twenty years. During that time the technology for keypads has continuously changed, and Syn-Tech has ceaselessly upgraded the U.S. Air Force's equipment to keep pace with the changing keypad technology. The latest state-of-the-art keypad technology is the piezoelectric keypad. This keypad has no moving mechanical parts or contacts to break or fail. It is an all-solid-state design that relies on a slight amount of finger pressure to cause a piezoelectric element to generate a small electric potential. This small electric potential is then sensed by one of the UIT's microcontrollers and converted into a keypress entry. Syn-Tech has selected the same 16-key alphanumeric design that is currently being delivered with upgraded U.S. Air Force VIRs.

Internal Battery pack: The UIT is equipped with an internal Ni-Cad smart battery pack. The battery pack is controlled via a Microchip Technology Inc. 8-Bit PIC16Cxx microcontroller based smart battery controller board. By having a microprocessor controlled battery pack, the operator can be kept informed about the amount of time remaining in the batteries, and the battery charger can be informed about the number of charge/discharge cycles the batteries have under gone. The latter feature will enable the batteries to be charged/discharged in a specific way that will insure that the batteries maintain their maximum battery charge characteristics.

Transceiver: Syn-Tech has built a state-of-the-art spread spectrum frequency hopping ~~902-928~~ 905 926 MHz RF transceiver. The RF communications scenario undertaken by the UIT's transceiver is data communications with a similar transceiver connected to the fuels office PC, running the FuelMaster® 2525 software program.

UIT mainboard: The UIT's surface mount mainboard is based on a Motorola 68332 microcontroller. This gives the UIT the same 32-bit computing power as Syn-Tech's latest VIRs. The Motorola 68332 based mainboard controls all transactions, monitors all dispensed fuel, calculates for fuel temperatures compensation, stores transaction and authorization data, and sends and receives transaction data from the Central Controller's FuelMaster® 2525 software.

Switching Power Supply: The UIT is equipped with a PIC16CXX microcontroller based interface board and switching power supply. The Syn-Tech designed switching power supply incorporated the latest in power supply design and circuitry. The board also contains a PIC16CXX microprocessor to handle the analog-to-digital conversion for the temperature compensation, the automatic LCD contrast, and the piezoelectric keypad interface.

Non-Powered Equipment Interface (NPI): The Non-Powered Equipment Interface (NPI) is designed to mount on the hosecart and the pantograph. Once installed on these items, it becomes the interface and control arm of the UIT. The UIT communicates with the NPI via a hardwire. The NPI receives its operating power via a hardwire from the UIT. The NPI is designed to be mounted in and operate in a Class I, Division II area.

NPI mainboard: The NPI mainboard is based on a PIC16CXX microcontroller. The PIC16CXX provides the serial communications with the UIT and translates this serial communications data into control over the NPI's valve control, temperature compensation circuitry, and pulser count.

Valve controller: The NPI has an air valve that is connected inline with the air-powered deadman controls. When the UIT authorizes a transaction, that authorization is sent serially to the NPI's PIC16CXX microcontroller, which in turn activates on the air control valve so that fueling may proceed. Note that the NPI's air valve is in series with the deadman so that both the deadman and the NPI valve's must be activated in order for fuel to be dispensed.

Pulser: In the U.S. Air Force/Syn-Tech C-300 mobile VIR development one of the items which initially failed was the commercial pulsers which were installed on the C-300s. It turned out that they were where NOT able to handle the constant vibration of an operating delivery truck. After trials with various commercial pulsers, Syn-Tech designed and

produced a pulser of our design. No failures have occurred since. Syn-Tech will be using this same pulser throughout ADC/FDS applications.

Temperature Sensor: The NPI is equipped with a fuel temperature sensor. The temperature probe mounts on a fuel pipe. The information from the sensor is translated by the NPI's PIC16CXX microcontroller for transmission to the UIT's 68332 microcontroller.

Truck Interface Module (TIM): The Truck Interface Module (TIM) is designed to mount on the R-11 and the HSV. Once installed on these items, it becomes the interface and control arm of the UIT. The UIT can communicate with the TIM via a hardwire. The TIM receives its operating power via the R-11 or the HSV. The TIM is designed to be mounted in and operate in a Class I, Division II area.

TIM mainboard: The TIM mainboard is based on a PIC16CXX microcontroller. The PIC16CXX provides the serial communications with the UIT and translates this serial communications data into control over the TIM's valve control, temperature compensation circuitry, and pulser count.

Valve controller: The TIM has an air valve that is connected inline with the air-powered deadman controls. When the UIT authorizes a transaction, that authorization is sent serially to the TIM's PIC16CXX microcontroller, which in turn activates on the air control valve so that fueling may proceed. Note that the TIM's air valve is in series with the deadman so that both the deadman and the TIM valve's must be activated in order for fuel to be dispensed.

Pulser: In the U.S. Air Force/Syn-Tech C-300 mobile VIR development one of the items that initially failed was the commercial pulsers which were installed on the C-300s. It turned out that they were where NOT able to handle the constant vibration of an operating delivery truck. After trials with various commercial pulsers, Syn-Tech designed and produced a pulser of our design. No failures have occurred since. Syn-Tech will be using this same pulser throughout ADC/FDS applications.

Temperature Sensor: The TIM is equipped with a fuel temperature sensor. The temperature probe mounts on a fuel pipe. The information from the sensor is translated by the TIM's PIC16CXX microcontroller for transmission to the UIT's 68332 microcontroller.

User Interface Terminal - Battery Pack (UIT-BP): The UIT is equipped with its own internal battery pack, however if extended service is expected (all day, cold weather, etc.) an additional battery pack can be hung from the users belt and via a wire to the UIT will power a UIT all day. The UIT-BP has built-in the same PIC16CXX microcontroller based smart battery controller board as is the UIT and the NPI.

PC RF Adapter (PCA): The Fuels Office uses a PC to run FAS and FuelMaster® 2525 software. Via the PCA these programs will receive the fueling transactions real time. The PCA is composed of spread spectrum frequency hopping ~~902-928MHz~~ 925-928 MHz RF Transceiver microcontroller based transceiver module with an external antenna, and an AC wall adapter. The PCA's RF module is the same spread spectrum frequency hopping 902-928MHz RF Transceiver microcontroller based transceiver module used in the UIT. For optimum range

the external antenna should be mounted on a telephone type pole adjacent to the Fuels Office. The reception range in this configuration will be about two miles.

Smart Battery Charger (SBC): The SBC is based on a PIC16CXX microcontroller based smart battery charger board. The SBC's PIC16CXX microcontroller based smart battery charger board can query each individual smart battery pack relative to the battery use history and it will then select the correct charging sequence for that battery pack.

Hardware Overview:

- UIT (i.e., a handheld VIR) with 32-bit Motorola microcontroller with:
  - Alphanumeric keypad
  - 4 line LCD
  - insertion/withdraw type magnetic strip card reader
  - thermal receipt printer
  - internal smart battery pack
- Two spread spectrum frequency hopping 902-928MHz RF Transceiver microcontroller based transceiver modules
- Two battery packs each with their own built-in PIC16CXX microcontroller based smart battery control boards
- Interface with R-11s, HSVs, pantographs, and hose carts
- PIC16CXX microcontroller based smart battery charger
- Hardwire communications and control backup should overseas and operational dictates preclude RF operations
- Class I, Division I and Class I, Division II in accordance with NFPA 407
- ETL listed
- The latest state-of-the-art design, yet a proven iteration of Syn-Tech's existing FuelMaster® systems
- User Interface Terminal (UIT)

Aviation Fuel Dispensing Vehicles

A FuelMaster® 2525 is compatible with both powered aviation service vehicles such as fuel trucks and hydrant service vehicles, and non-powered vehicles such as hose carts and military pantographs. An FuelMaster® 2525 can control access to fuel and can accrue transaction information when used with any of the aforementioned fuel dispensing equipment. Through a configuration process, An FuelMaster® 2525 may be configured to accommodate a wide variety of operating parameters and requirements.

Telephone Lines

Telephone lines for the IBM PC compatible computer (i.e., the Central Controller) and for each UIT download site (should a modem transaction download operation or modem remote diagnostics be needed) shall be USA voice grade. Sites using computer scanning or monitoring of telephone lines shall need to bypass scanning or monitoring of these lines.

Central Controller

CAUTION

The use of any accessory equipment (i.e., computers and modems) not supplied by Syn-Tech Systems, Inc., should be coordinated with Syn-Tech's Product Support Department prior to its purchase. Syn-Tech's Product Support Department can offer advice on equipment compatible with the planned installation.

The Central Controller is an IBM-compatible personal computer (PC) with a hard drive, monitor, keyboard, modem (internal or external), and parallel printer usually located at the base fuels office. The Central Controller communicates with the MFMU(s) at service sites via the modem and with Mobile FMUs via modem (if connected to a telephone line). The Central Controller receives transaction data from the MFMU(s) and is utilized to input operating information and secure access authorization data to each MFMU. A PC and modem are not included with the base FuelMaster® system, but may be ordered through Syn-Tech Systems as part of a total package.

The Central Controller PC shall, as a minimum, be comprised of: a standard off-the-shelf IBM PC compatible 75Mhz or higher Pentium based computer with:

- 50MB of hard drive space available;
- a 3-1/2" diskette drive;
- a CD-ROM drive;
- Windows® NT operating system;
- a mouse;
- a 1200/2400 bps (preferably higher) 100% Hayes™ compatible modem; and,
- 8MB RAM or higher.

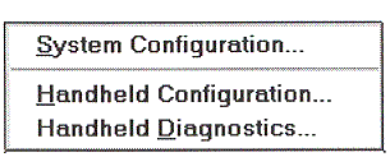
Reality Check: the minimum PC does not a happy software program make.

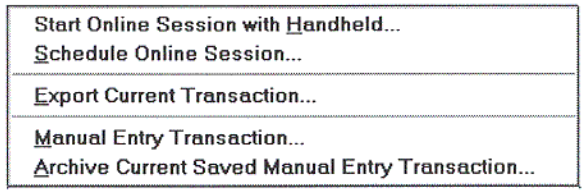
Printer

The Central Controller printer provides a printed record of transaction data received by the Central Controller. Any printer compatible with the Central Controller, Windows® NT operating system, and the needs of the purchaser, may be used.

FuelMaster® 2525 Central Controller Program

The FuelMaster® 2525 Fuel Management Software has been written specifically to run on a PC that is running Windows® 95/98/NT operating. The FuelMaster® 2525 Fuel Management Software program's primary pull-down menus are:





These functions represent the primary operations of the program.

Introduction

This section provides an explanation of a Servicing Operation using the FuelMaster® 2525.

User Fueling Operation

The following tasks are performed during a typical servicing operation with the FuelMaster® 2525 Fuel Management System:

The operator (the individual who will be doing the fueling) will:

- At the selected servicing vehicle (powered or non-Powered), the UIT and the selected servicing vehicle can be connected via a cable:
- Entered the selected servicing vehicle's ID into the UIT and --------.
- Perform the appropriated aircraft safety and pre-fueling checks.
- Insert and withdraw the aircraft's magnetic stripe card in the UIT's magnetic stripe card reader, or manually enter aircraft data into the UIT via the UIT's keypad in accordance with directions defined on the UIT's LCD.
- Using prescribed aircraft fueling checklist dispense fuel.
- Upon completion of fueling, secure the aircraft and the fueling equipment in accordance with the prescribed aircraft fueling and safety check lists.
- The UIT will have provided a continuous readout to the fuel being dispensed, and it will upon completion of the fueling transaction transmit the completed transaction data to the PC via its RF transceiver.

All control, authorization and accounting operations are autonomously conducted by Syn-Tech's FuelMaster® 2525 FMS transparent to the individuals using the fueling equipment.

Fuelmaster® 2525 Fueling Operations

1. Sleep Mode - The UIT will be in its sleep mode when not in active use. The selection of any key will wake it up. In the Sleep mode the UIT will display a moon in the upper right corner of the LCD display and the display's backlight will be extinguished. Upon selection of any key, the UIT will awaken and the moon will be replaced with a blinking heart '♥' indicating that the UIT is awake and functioning.

Note

The blinking character in the upper right hand corner will not be present when the entry of alpha-numeric data is required due to the shift characters displayed in that corner.

2. Connecting and Linking to the NPI and TIM - The user makes the electrical connections to the NPI or TIM if a cable interface is to be used and selects the interface on the UIT that matches their configuration. The LCD will appear as follows:

```
[    SELECT LINK:     ]
[ 1 = WIRED NPI       ]
[ 2 = WIRED TIM       ]
[ 3 = RF NPI/TIM      ] -> only if RF board is
installed and enabled
```

The display will change to one of the following, depending on the link chosen:

```
1. NPI   [ DETECTING WIRED     ]
         [ NPI...              ]

2. TIM   [ DETECTING WIRED     ]
         [ TIM...              ]

3. RF    [ ENTER ID TO LINK    ]
         [ ->                  ]
```

1 - NPI

The UIT will first look for a cable connection to the NPI. Display #1 will flash for one minute or until the connector is connected. The 'N'/Clear key can be pressed during this to cancel. After the connection is detected, the UIT will turn on power to the NPI and get its status information.

2 – TIM

The UIT will try to get status from the TIM once a second for one minute, while flashing display #2. The 'N'/Clear key can be pressed during this to cancel.

3 – RF

The UIT will first ask the user to enter the fueling device ID with which they want to establish a link. Then the UIT will turn on power to its RF board and get the board's status, to verify the board's presence. The RF board status is checked to determine whether there is already an RF link to the selected ID. If linked to another ID, the link is broken and a new link is attempted to the selected ID. If unlinked, a link is attempted to the selected ID. The display will be as follows:

```
[ LINKING TO          ]
[ RF DEVICE...        ]
```

After linking to the remote fueling device, the status of the fueling device is requested via RF.

3. Status Request – After a link has been established with the fueling device, the status of that device is briefly displayed on the LCD:

```
[ DEVICE #xxxxxx      ]
[ DIVIDE RATE xxx:xxx]
```

The divide rate obtained from the fueling device will be used to determine the final quantity of fuel to be stored in the transaction. The ID obtained from the fueling device is also stored in the transaction.

Note: The divide rate and device ID are the only configuration data stored in the fueling device.

If there is a communications error, one of the following messages will be displayed including an error code.

```
1. NPI      [    ERROR - xx       ]
            [  COMMUNICATING      ]
            [      WITH           ]
            [      NPI!!!         ]

2. TIM      [    ERROR - xx       ]
            [  COMMUNICATING      ]
            [      WITH           ]
            [      TIM!!!         ]

3. RF       [    ERROR - xx       ]
            [  COMMUNICATING      ]
            [      WITH           ]
            [   RF DEVICE!!!      ]
```

4. User Information Entry - After a link has successfully been established and the status of the fueling device has been obtained, the user is prompted for several pieces of information. Several of these entries are optional depending on the status of the previous entry. An optional entry will have the "Y=Cont" option displayed on the bottom line of the display. The user can, at any entry, cancel the transaction information entry by pressing 'N/Clear'.

The information gathered during information entry is as follows:

Card Number
Aircraft ID
Miscellaneous number
DODAAC

The DODAAC entry is always optional, independent of the previous entries. However, the Aircraft ID and Miscellaneous Number are optional only if a card number has been entered. The card entry is optional.

1. Card Number - The user in prompted for their magnetic stripe card number. This entry is optional. There are two methods of entering the card number, Inserting physical card, and manually entering of card number. The UIT LCD display is:

```
[   INSERT CARD OR   ]
[ ENTER CARD NUMBER  ]
[                    ]
[ N=Cancel    Y=Cont ]
```

The first method is to insert their card into the card reader. The display will change to the following:

```
[                    ]
[    REMOVE CARD     ]
[    QUICKLY...      ]
[                    ]
```

The user then has one minute to remove the card. If a remove is not detected within a minute, the card read is counted as an error. Three tries will be given to read a card if errors occur during the read. The error display is as follows:

```
[                    ]
[    ERROR READING   ]
[        CARD!       ]
[                    ]

[                    ]
[     PLEASE TRY     ]
[       AGAIN!       ]
[                    ]

[   INSERT CARD OR   ]
[ ENTER CARD NUMBER  ]
[                    ]
[ N=Cancel    Y=Cont ]
```

After the card is successfully read the display changes to:

```
[                    ]
[   VERIFYING        ]
[   CARD...          ]
```

```
[                        ]
```

The card is then checked against the AVCARD format.

If the card is not a valid AVCARD the following is displayed an the transaction is canceled:

```
[                        ]
[      CARD NOT          ]
[    ACCEPTED HERE!      ]
[                        ]
```

The second method of card entry is to manually enter the AVCARD card number. At the UIT LCD prompt;

```
[    INSERT CARD OR      ]
[ ENTER CARD NUMBER      ]
[                        ]
[ N=Cancel      Y=Cont   ]
```

depress the 'A' key. When the 'A' key on the keypad is pressed the display changes to the following:

```
[                        ]
[ CARD# -> A_____        ]
[                        ]
[ N=Cancel               ]
```

Then the remaining 5 digits of the card number are entered. The AVCARD prefix is automatically added to the entered card number for storage in the transaction.

2. Aircraft ID

Depending on the status of card entry, one of the following will be displayed:

```
[ ENTER AIRCRAFT ID      ]
[ -> ___________         ]
[                        ]
[ N=Cancel               ]

[ ENTER AIRCRAFT ID      ]
[ -> ___________         ]
[                        ]
[ N=Cancel      Y=Cont   ]
```

If the Card Number entry options have been bypassed, entry of an Aircraft ID is not optional and there will be no Y=Cont option. A ten character alphanumeric aircraft ID can be entered.

3. Miscellaneous ID

Depending on the status of card entry, one of the following will be displayed:

```
[ ENTER MISC NUMBER   ]
[ -> ____________     ]
[                     ]
[ N=Cancel            ]

[ ENTER MISC NUMBER   ]
[ -> ____________     ]
[                     ]
[ N=Cancel    Y=Cont  ]
```

If the Card Number entry options have been bypassed, entry of a Miscellaneous ID is not optional and there will be no Y=Cont option. A ten character alphanumeric miscellaneous ID can be entered.

4. DODAAC

```
[ ENTER DODAAC        ]
[ -> _______          ]
[                     ]
[ N=Cancel    Y=Cont  ]
```

The entry of a DODAAV is optional. A 6 character alphanumeric DODAAC can be entered.

5. Receipt – After information entry is completed the status of the receipt printer is obtained. An error associated with the printer will disallow printing of receipts and a variation of the following will be displayed:

```
[ PRINTER ERROR!      ]
[ COMM ERR (XX)       ]
[ UNABLE TO PRINT     ]
[ RECEIPT!            ]
```

Line 2 can also be:

```
[ BUSY (XX)           ]
[ PAPER OUT (XX)      ]
[ OVERHEATED (XX)     ]
[ CMD SYNTAX (XX)     ]
[ MOTOR TIMEOUT (XX)  ]
```

If the receipt printer is functioning properly, the user is asked if they require a receipt:

```
[                    ]
[ PRINT RECEIPT AFTER]
[ FUELING (Y/N)?     ]
[                    ]
```

If a 'Y' is entered then the user is asked if they require a duplicate receipt:

```
[                    ]
[ DUPLICATE RECEIPT  ]
[ REQUIRED (Y/N)?    ]
[                    ]
```

6. Fueling - The UIT will then send the start pump command to the NPI or TIM with the fueling parameters stored in the UIT's configuration. The three parameters sent to the NPI or TIM are the No-pulse timeout, the Pump finish timeout, and the Maximum pulses allow for fueling.

   If communications are successful with the NPI or TIM the display changes briefly to:

```
[                    ]
[    HOSE ENABLED!   ]
[                    ]
[                    ]
```

   The UIT begins to poll the NPI or TIM for quantity, temperature, and fueling status continuously every 500 milliseconds. The display will constantly update to show the quantity fueled. The 'UNADJ' quantity is the raw quantity determined from the pulses and divide rate. The 'ADJ.' quantity is the temperature compensated quantity determined from the raw quantity and the cumulative average temperature obtained from the NPI or TIM.

```
[                    ]
[      QUANTITY      ]
[ ADJ.   XXXXXX.XXX  ]
[ UNADJ. XXXXXX.XXX  ]
```

   When a pump end indication is detected from the NPI or TIM, the display will show the final quantity fueled:

```
[                    ]
[   FINAL QUANTITY   ]
[ ADJ.   XXXXXX.XXX  ]
[ UNADJ. XXXXXX.XXX  ]
```

   Also, during fueling the 'N' key can be pressed to stop the pump.

   If a communications error occurs at any point during fueling, the following

message will be displayed:

```
1. NPI          [    ERROR - xx       ]
                [   COMMUNICATING     ]
                [       WITH          ]
                [       NPI!!!        ]

2. TIM          [    ERROR - xx       ]
                [   COMMUNICATING     ]
                [       WITH          ]
                [       TIM!!!        ]

3. RF           [    ERROR - xx       ]
                [   COMMUNICATING     ]
                [       WITH          ]
                [    RF DEVICE!!!     ]
```

7. Receipt Printing – If a receipt was selected, it is printed directly after fueling.

   After a transaction is completed or canceled, the UIT returns to the link selection prompt.

```
[     SELECT LINK:      ]
[ 1 = WIRED NPI         ]
[ 2 = WIRED TIM         ]
[ 3 = RF NPI/TIM        ] -> only if RF board is installed and
enabled
```

UIT User Accessible Menus

Note

This section applies to the user's access to menus without the use of a Supervisor Card.

When at the "SELECT LINK" prompt:

```
[     SELECT LINK:      ]
[ 1 = WIRED NPI         ]
[ 2 = WIRED TIM         ]
[ 3 = RF NPI/TIM         ] -> only if RF board is installed and
enabled
```

The user can select an 'A','B', or 'C' to activated the UIT's menu system, and the prompt will change to:

```
[ SELECT MENU:          ]
```

```
[ 1 - DOWNLOAD          ]
[ 2 - SETTINGS          ]
[ A=More       D=Exit ]

[ SELECT MENU:          ]
[ 3 - DIAGNOSTICS       ]
[                       ]
[ A=More       D=Exit ]
```

Note

When 'A' is pressed for "more" menus and there are no additional menus screens, the menu wraps back to the first menu screen.

1 - DOWNLOAD

NOT FINISHED.

2 - SETTINGS

The settings menu allows users to set various operating parameters:

```
[ SETTINGS MENU:        ]
[ 1 - SLEEP TIMER       ]
[ 2 - PUMP TIMEOUTS     ]
[ A=More       D=Exit ]

[ SETTINGS MENU:        ]
[ 3 - LCD CONTRAST      ]
[                       ]
[ A=More       D=Exit ]
```

1 - Sleep Timer

This is the number of minutes of system inactivity required before the UIT will go into sleep/low power mode. Sleep mode is characterized by a crescent moon in the upper right corner of the LCD and the LCD backlight is off.

```
[SLEEP TIMER MENU:      ]
[ A=UP          B=DOWN ]
[ C=ACCEPT      D=Exit ]
[TIMER (MINUTES): xxx]
```

2 - Pump Timeouts

This menu is used to set the pump timeouts.

```
[SET PUMP TIMEOUTS:     ]
[ 1 - NO PULSE          ]
```

```
[ 2 - PUMP FINISH     ]
[            D=Exit   ]
```

1 - No pulse timeout:

A value between 1 and 255 is accepted and followed by 'Y'. Cancel/'N' is functional, 'D' also exits.

```
[                     ]
[ CURRENT = xx s      ]
[ ENTER NPTO -> ___   ]
[                     ]
```

2 - Pump finish timeout:

A value between 1 and 255 is accepted and followed by 'Y'. Cancel/'N' is functional, 'D' also exits.

```
[                     ]
[ CURRENT = xx s      ]
[ ENTER PFTO -> ___   ]
[                     ]
```

3 - LCD Contrast

This menu is used to set contrast level of the LCD.

```
[ LCD CONTRAST MENU: ]
[ A=UP         B=DOWN ]
[              D=Exit ]
[--_____________|__++]
```

The vertical bar on the bottom row shows the current LCD contrast level in relation to the numeric contrast limits. This bar slides as the contrast level is adjusted.

3 - DIAGNOSTICS

This menu is used to get the status of and test various UIT functions.

```
[ DIAGNOSTICS MENU:  ]
[ 1-COUNTS TEST      ]
[ 2-CARD READER TEST ]
[ A=More       D=Exit ]
```

```
[ DIAGNOSTICS MENU:  ]
[ 3-LCD TEST         ]
[ 4-UIT STATS        ]
```