

Bennett Pump Company

Debit / Credit Terminal

2300/2400 Horizon 1 and 2 Series

Or 3000 Series with Debit/Credit Terminal

Installation, Service, & Parts Manual

Only Trained Personnel May Work on This Equipment

Supplement to:

- **Horizon 1 Installation Manual 101074**
- **Horizon 2 Installation Manual 105894**
- **3000 Series Installation Manual 107931**

Includes Instructions For Installation & Servicing:

Debit/Credit Terminal Printer

READ THIS BOOK

This book has important information for safe installation and safe operation of this equipment. Read and understand this book before applying power. Keep this book and tell all service personnel to read this book. If you do not follow the instructions, you can cause bodily injury, death or damage to the equipment.

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Safety Instructions


WARNING ADVERTISSEMENT ADVERTENCIA


For the safe installation of this equipment, read and understand all warning and cautions. Look for these warnings:


-  **“DANGER”** means: If you do not follow the instructions, severe injury or death will occur.
-  **“WARNING”** means: If you do not follow the instructions, severe injury or death can occur.
-  **“CAUTION”** means: If you do not follow the instructions, damage can occur to the equipment.


 **DANGER:** Fire, explosion, injury or death will occur if untrained personnel change fuel filters. Make sure only trained personnel change filters.


 **DANGER:** To prevent injury to you from vehicles and onlookers, always place a barrier around this equipment before performing service or maintenance.


 **DANGER:** Gasoline is flammable.
NO SMOKING OR OPEN FLAME.


 **DANGER:** Disconnect all power to this equipment and associated submerged pump(s) during installation, service or any maintenance, i.e., changing filters.


 **WARNING:** You must have training in the service and maintenance of this equipment (dispenser, pump, point-of-sale, control box or submerged pump) before working on it. Authorized personnel must do maintenance repairs only.

 **WARNING:** To prevent electric shock, keep the electrical parts of the dispenser dry.

 **WARNING:** Do not operate this equipment as a dispenser unless it is completely assembled.

 **WARNING:** Make sure this equipment is correctly grounded. Failure to do so can cause injury or damage equipment.

 **CAUTION:** Do not drill holes in fuel dispensers. Holes can cause failure of the electronic equipment. The warranty will become void. Use only adhesive backed sign mounting brackets.

 **CAUTION:** Do not disassemble Debit/Credit Terminal. The “tamper proof” electronics will not let the terminal operate once exposed. The warranty will become void.

READ AND UNDERSTAND ALL WARNING LABELS ATTACHED TO THE DISPENSER

NOTICE

This equipment generates and uses radio frequency energy. If not installed and used properly, i.e., in strict accordance with the instructions in the manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device in accordance with Subpart J of Part 15 of FCC Rules. Class A computing devices are designed to provide reasonable protection against such interference when operated in a *commercial* environment.

Operation of the equipment in a *residential* area may cause unacceptable interference to radio and TV reception. In such instances, any necessary corrective measures must be accomplished at the owner's expense.

Introduction

Debit/Credit Terminal provides the Horizon 2300/2400 Series or the 3000 series dispenser the ability to accept debit bank cards as well as credit cards. The Debit/Credit Terminal communicates directly with the VeriFone Ruby point – of – sale. There are two Interconnection boxes, the MSM Interconnection Box and the Standard Interconnection Box. The MSM (Master Session Module) Interconnection Box must be ordered if the Network requires Master Session encryption for debit cards.

Specification Sheet

Power Requirements:

Dispenser
AC Power.....560 Watts @ 115/230 VAC, 50/60 Hz

MSM Box
AC Power..... 18 Watt Maximum @ 115/230 VAC Power pack, 50/60 Hz

Environmental Requirements:

Dispenser
Operating Temperature.....-40°C to +40°C
Humidity.....0-95% no condensing

MSM Box
Operating Temperature.....0°C to +40°C
Humidity.....15 to 90% relative humidity; no condensing

Dimensions:

MSM Box
Debit or Credit only.....12" Wide x 4" Deep x 12" High

Section 1

Installation Instructions

General Installation Instructions

NOTE: Installation must be in accordance with the National Electrical Code (NFPA 70), the Automotive and Marine Service Station Code (NFPA 30A), and all state and local codes.

Associated Installation Manuals:

- 101074 Horizon 1- 2300/2400 Installation Manual
- Or 105894 Horizon 2 - 2300/2400 Installation Manual
- Or 107931 - 3000 Series Installation Manual

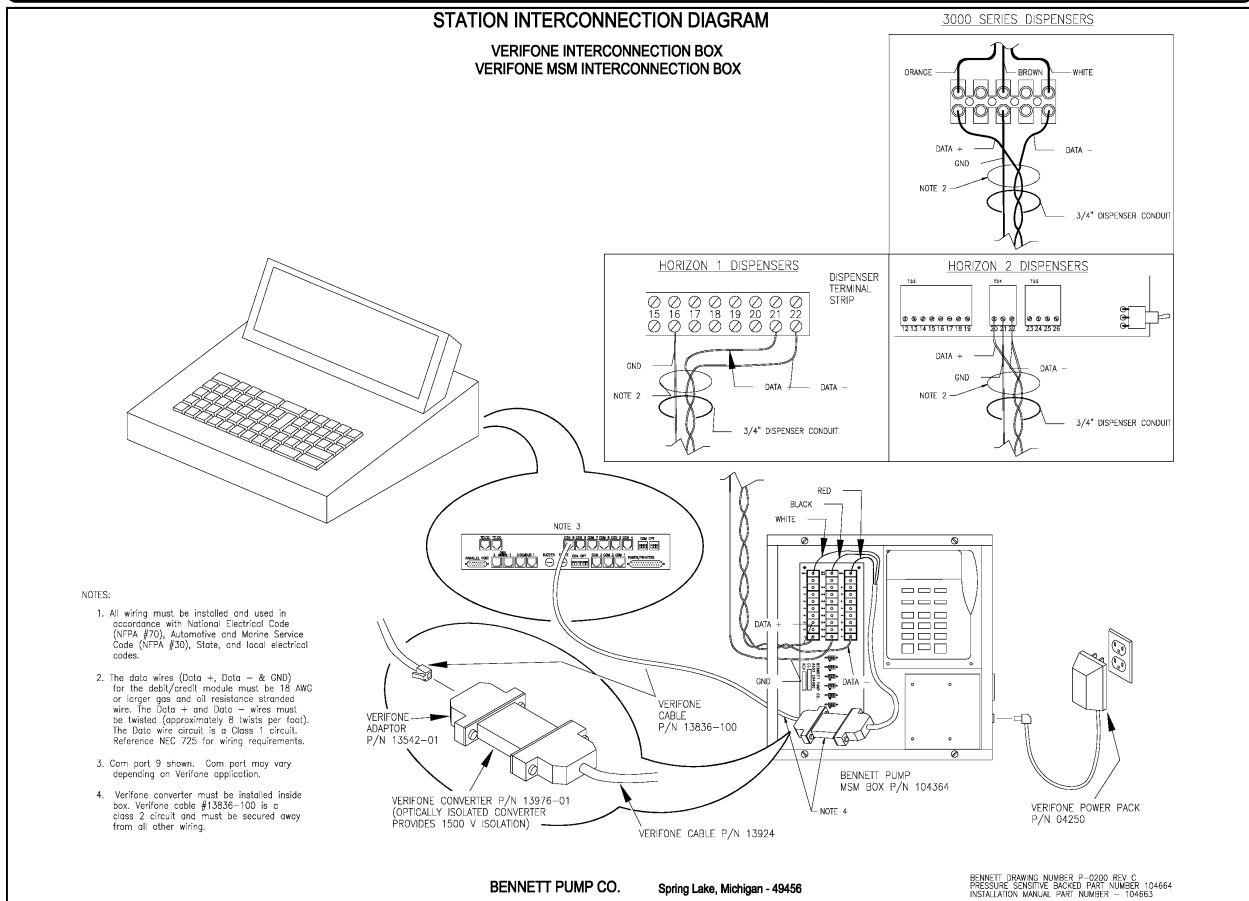
Required Equipment:

- Interconnection Box Assembly N-3191-01
- 4' Cable Assembly, Pump Interface N-7733-01
- MSM Interconnection Box or Standard Interconnection Box
- Data Wires (Customer supplied) – Data +, Data –, and Data GND must be 18 AWG or larger gas and oil resistant stranded wire. Data + and Data – must be twisted (approximately 8 twists per foot).
- VeriFone Ruby Point – of – Sale
- VeriFone Cable Assembly 13836-XX (specify length needed)
- VeriFone Adapter 13542-01
- VeriFone Converter 13976-01
- VeriFone Cable Assembly 13924-01

Optional Equipment:

- Data Cable, 25' to 100' available – N-7287-XX

Station Wiring Diagram






How to Install the Interconnection Box

The MSM or Standard Interconnection Box should be mounted at a convenient location free from interference and close to the conduits routing to the dispenser. This interface box connects the card reader field wires from each dispenser to the VeriFone Point of Sale.



MSM Interconnection Box

The MSM (Master Session Module) Interconnection Box requires AC power. The Standard Interconnection Box does not require AC power. The Standard Interconnection Box contains a “Fan-out” Board only. An Uninterruptible Power Supply is highly recommended on the MSM Interconnection Box to provide battery back up.

-  **CAUTION:** Do not use wire nuts. Splicing with wire nuts causes poor data transmission or failure of the system and will void the warranty.
-  **WARNING:** Make sure the POS point-of-sale at the site is installed in accordance with the manufacturer’s installation instructions.
-  **CAUTION:** To prevent damage to the equipment, do not install this equipment in a hazardous location.

AC Power Requirements: AC power is only required for MSM style I.C. Box.

How to Install the Interconnection Box



WARNING: Properly ground all Bennett equipment. Failure to do so can cause injury or damage equipment.

1. To protect personnel from electric shock and maintain proper operation, connect the Interconnection box to an isolated grounded outlet. The main breaker panel must supply a separate dedicated circuit to an isolated grounded receptacle. See Figure 1.
2. The power pack is an Underwriter Laboratories approved Class 2 power supply.
3. Place the Interconnection box and dispenser electronic breakers at the top of the breaker panel for better noise immunity.
4. **DO NOT PLUG ANY OTHER DEVICE INTO THE SAME OUTLET AS THE INTERCONNECTION BOX.** Do not connect the isolated 14 gauge wire carrying earth ground to any outlet mounting hardware. The face of an isolated grounded receptacle is orange. See Figure 2. The outlet must be within 5 feet of the Interconnection box. Do not use an adapter or extension cords. Terminate the other end of the ground wire at the main electrical service panel ground lug.
5. The Interconnection box uses a 120 VAC 60 Hz 18 Watt electrical circuit. Make sure you have the correct frequency and voltage. All 14 gauge AC wires must be in a rigid metal conduit. Do not use PVC conduit. Do not put wiring from other sources in this conduit. The AC breaker for the Interconnection box must be a 15 Amp breaker with no other devices or outlets connected to it.

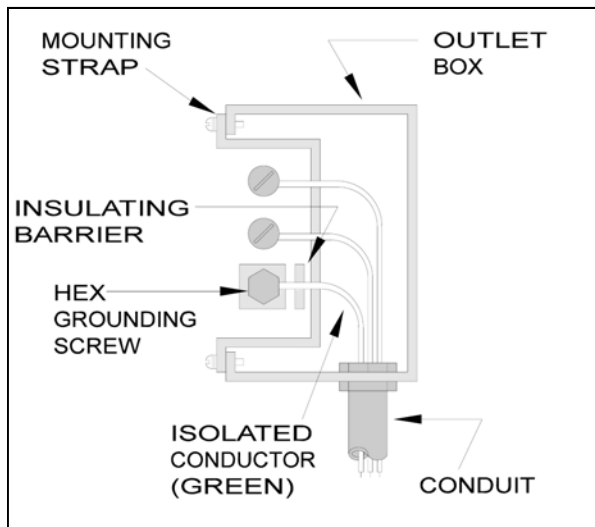


Figure 1

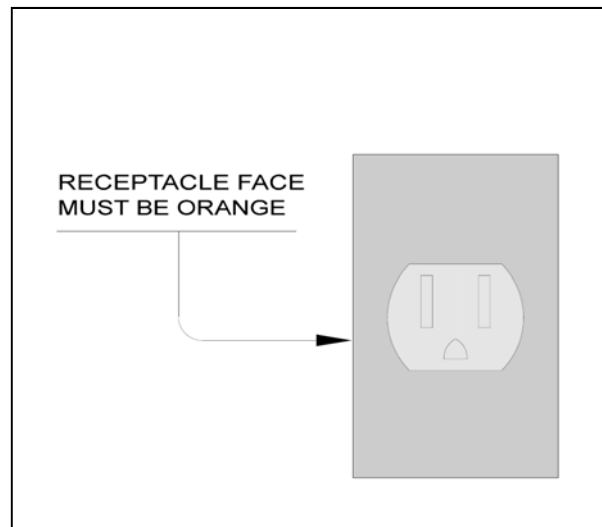


Figure 2

** It is HIGHLY recommended that an Uninterruptible Power Supply be used to ensure continued performance during power disruptions.

Data Cable from Interconnection Box to Ruby Point-of-sale:

Connecting the Interconnection Box to the Ruby requires the following cables purchased from VeriFone, Inc.:

VeriFone's 13836-xx – RS232 fuel cable (order proper length)

VeriFone's 13542-01 – Adapter, Male DB25

VeriFone's 13976-01 – B/B Converter, DCR Distribution

VeriFone's 13924-01 – Cable (Pig Tail), DCR Distribution

How to Install the Interconnection Box

Underwriter Laboratories (UL) requires that the VeriFone converter **MUST** be inside the Interconnection Box.

1. Connect the RS232 cable to the appropriate com port on the Ruby to the male DB25 Adapter (13542-01)
2. Connect the adapter to the B/B converter (13976-01).
3. Connect the converter to the DCR distribution cable (Pig Tail) (13924-01).
4. B/B Converter must be placed inside the Interconnection Box, it cannot be connected on the outside of the Interconnection box.
5. Connect the white lead to the OUT+ terminal of the Fan-out board. See Figure 3.
6. Connect the black lead to the OUT GND terminal of the Fan-out board. See Figure 3.
7. Connect the red lead to the OUT- terminal of the Fan-out board. See Figure 3.

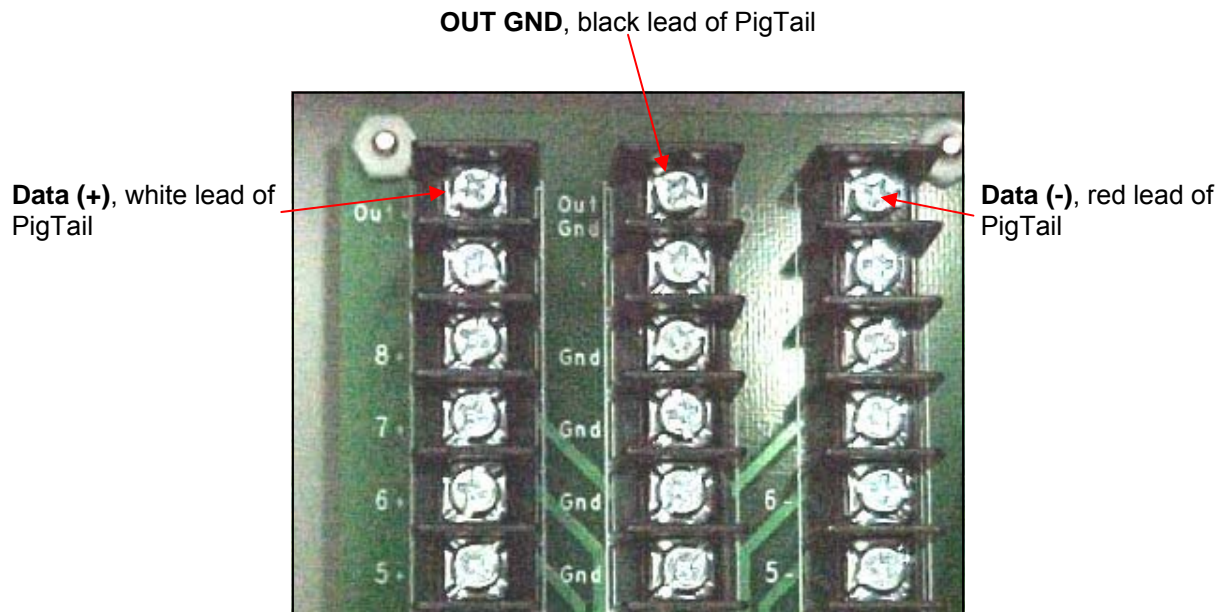


Figure 3

How to Install the Interconnection Box

Field Wiring Between Interconnection Box and Dispenser:

Data wires (18 AWG or larger gas and oil resistant stranded) must be run from the dispenser to the Interconnection Box. The DATA + and DATA - must be twisted (approx. 8 twists per foot). Using the Interconnection Box, the maximum number of dispensers that can be connected is 8 (16 Fueling Positions). Using the MSM Interconnection Box, the maximum number of dispensers that can be connected is 8 (16 Fueling Positions). Even if you have a card reader on both sides of the dispenser, only 3 field wires are required from the dispenser to the I.C. Box.

1. Make sure all switches are in the ON position on the VeriFone Fan-out board. These switches are only used for diagnostic purposes. See Figure 4.
2. Connect DATA + lead to 1+ for the first dispenser. See Figure 5.
3. Connect common to GND (1) for the first dispenser. See Figure 5.
4. Connect DATA - lead to 1- for the first dispenser. See Figure 5.
5. Repeat steps 1 – 3 for each dispenser.

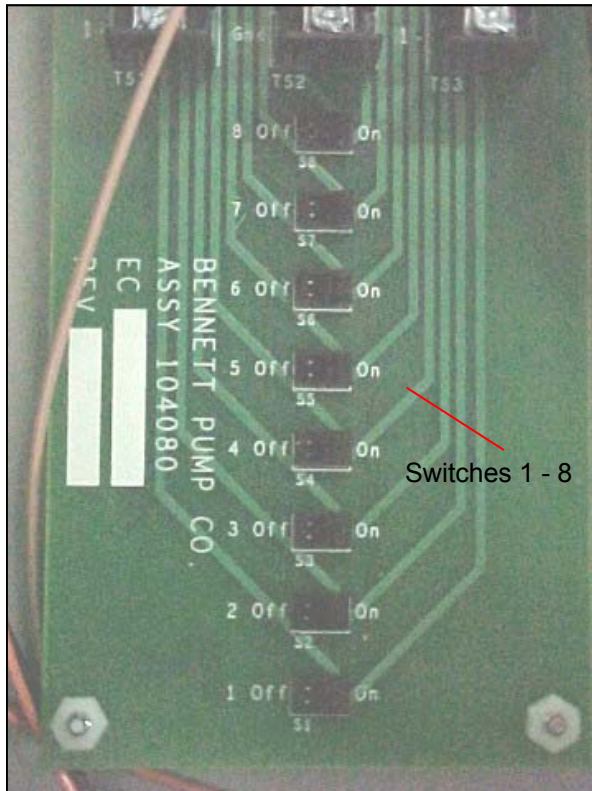


Figure 4

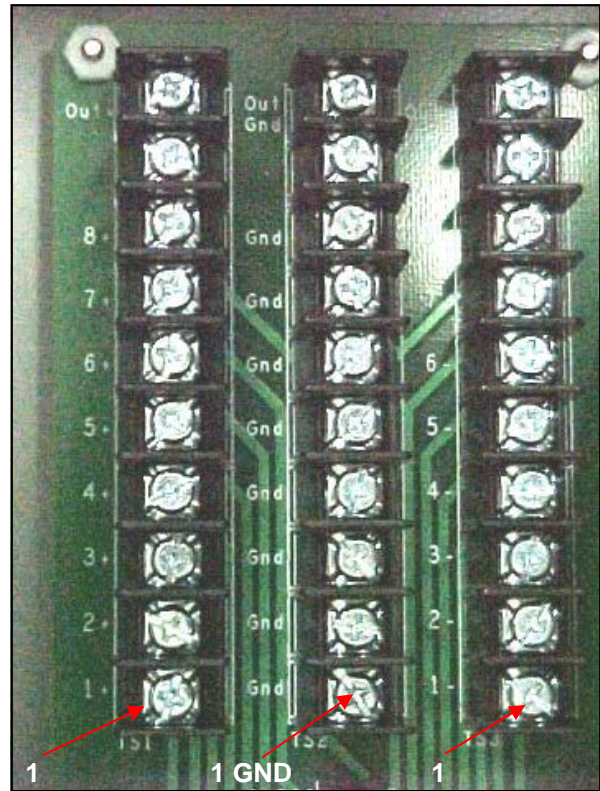


Figure 5

Dispenser Connection: This example shows the Horizon 1 dispenser. For other dispenser models, refer to the station interconnection diagram earlier in this section.

1. Connect GROUND wire to position 16 of the dispenser terminal strip. See Figure 6.
2. Connect DATA + to position 21 of the dispenser terminal strip. See Figure 6. Connect DATA - to position 22 of the dispenser terminal strip. See Figure 6.

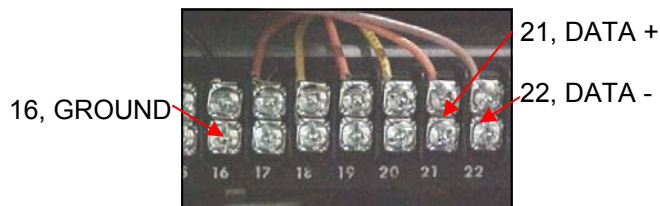


Figure 6

Debit / Credit Terminal

When the dispenser is first powered up the Debit/Credit Terminal will read "Out of Service". The Debit/Credit Terminals in the dispensers must be addressed as the fuel positions they represent. The Debit/Credit Terminal reader can be programmed to accept Debit cards and Credit cards or just Credit cards. If the site is running Debit cards the Debit/Credit Terminal reader must also be "injected" with the type of encryption the Network Host is using. There are two types of encryption; Master Session and DUKPT. Master Session encryption requires the MSM Interconnection Box.

How to use the Key Pad:

Figure 7 is a brief description of the keys the technician will need to use to program the various menus available.

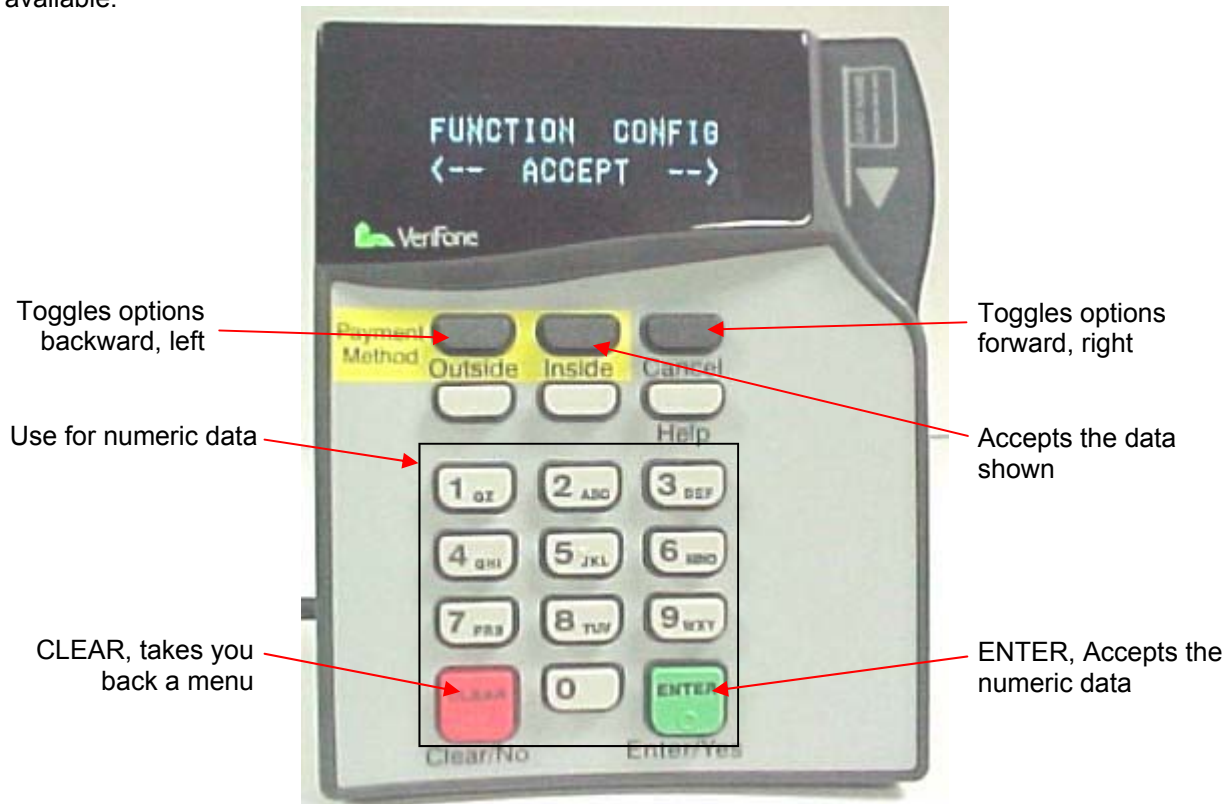


Figure 7

Programming the Dispenser Debit/Credit Terminal for Operation:

Like the Dispenser, the Debit/Credit Terminal has a Manager's Mode to access programming and diagnostics. The following instructions explain how to get to Manager's Mode. These instructions will not be repeated.

1. Press the **[1]** key and the **[ENTER]** key at the same time on the Debit/Credit Terminal. Figure 8 appears on the display.
2. Press the **[1]** key and the **[ENTER]** key at the same time again. Figure 9 appears on the display.

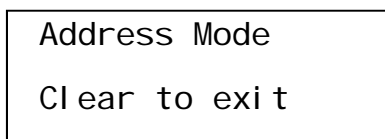


Figure 8

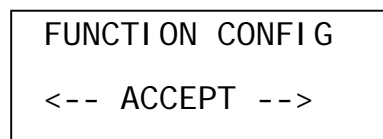


Figure 9

Debit / Credit Terminal

Master Session Debit:

1. Enter Manager's Mode.
2. Press the key below ACCEPT to enter the configuration menu for the Debit/Credit Terminal. Figure 10 appears on the display.
3. Press the key below ACCEPT to define what type, or mode, of operation the Debit/Credit Terminal will be performing. Figure 11 appears on the display.
4. Press the left or right key (below the arrows) to see the options. The options are DEBIT, NO DEBIT, or MSM.
5. With Figure 11 on the display press the key below ACCEPT to define the reader as a debit reader. Figure 12 appears on the display briefly.
6. Press the **[CLEAR]** key. Figure 13 appears on the display.
7. Press the key under the right arrow to move forward in the menus until the KEY TYPE menu is displayed. See Figure 14.
8. Press the key under ACCEPT to enter the Key Type menu. Figure 15 appears on the display.
9. Press the key under the right arrow, →, to move forward in the options until MASTER is displayed. See Figure 16.
10. Press the key under ACCEPT to accept master encryption. Figure 17 appears on the display briefly.

```
CONFIG TYPE
<-- ACCEPT -->
```

Figure 10

```
TYPE DEBIT
<-- ACCEPT -->
```

Figure 11

```
DEBIT TYPE SET
```

Figure 12

```
CONFIG TYPE
<-- ACCEPT -->
```

Figure 13

```
CONFIG KEY TYPE
<-- ACCEPT -->
```

Figure 14

```
KEY TYPE DUKPT
<-- ACCEPT -->
```

Figure 15

```
KEY TYPE MASTER
<-- ACCEPT -->
```

Figure 16

```
MASTER KEY SET
```

Figure 17

Debit / Credit Terminal

11. Press the **[CLEAR]** key to return to the Configuration menu. See Figure 18.
12. Press the key under the right arrow to move forward in the menus until the POLL menu is displayed. See Figure 19.
13. Press the key under ACCEPT to enter the Poll menu. Figure 20 appears on the display.
14. Press the key under ACCEPT to enter the MSM option. Figure 21 appears on the display.
15. The MSM poll address is always 30. Press **[3]**, **[0]**, and **[ENTER]**. The display returns to Figure 20.
16. Press the key under the right arrow to move forward in the options until CAT is displayed. See Figure 22.
17. Press the key under ACCEPT to accept this option. Figure 23 appears on the display.
18. Press the numeric keys to match the Fuel Position. If the Fuel Position is **[1]**, press **[0]** then
 1. Press the **[ENTER]** key. The display returns to Figure 22.
19. Press **[CLEAR]** 3 times to exit the Debit/Credit Terminal' menus.

```
CONFIG  KEY TYPE
<-- ACCEPT -->
```

Figure 18

```
CONFIG  POLL
<-- ACCEPT -->
```

Figure 19

```
POLL    MSM
<-- ACCEPT -->
```

Figure 20

```
MSM poll Adr: 30
Enter to Accept
```

Figure 21

```
POLL    CAT
<-- ACCEPT -->
```

Figure 22

```
CAT poll Adr: 01
Enter to Accept
```

Figure 23

Debit / Credit Terminal

DUKPT Debit

1. Enter Manager's Mode.
2. Press the key below ACCEPT to enter the configuration menu for the Debit/Credit Terminal. Figure 24 appears on the display.
3. Press the key below ACCEPT to define what type, or mode, of operation the Debit/Credit Terminal will be performing. Figure 25 appears on the display.
4. Press the left or right key (below the arrows) to see the options. The options are DEBIT, NO DEBIT, or MSM.
5. With Figure 25 on the display press the key below ACCEPT to define the reader as a debit reader. Figure 26 appears on the display briefly.
6. Press the **[CLEAR]** key. Figure 27 appears on the display.
7. Press the key under the right arrow to move forward in the menus until the KEY TYPE menu is displayed. See Figure 28.
8. Press the key under ACCEPT to enter the Key Type menu. Figure 29 appears on the display.
9. With Figure 29 on the display press the key below ACCEPT to accept the DUKPT encryption. Figure 30 appears on the display briefly.
10. Press the **[CLEAR]** key to return to the Configuration menu. See Figure 31.

```
CONFIG TYPE
<-- ACCEPT -->
```

Figure 24

```
TYPE DEBIT
<-- ACCEPT -->
```

Figure 25

```
DEBIT TYPE SET
```

Figure 26

```
CONFIG TYPE
<-- ACCEPT -->
```

Figure 27

```
CONFIG KEY TYPE
<-- ACCEPT -->
```

Figure 28

```
KEY TYPE DUKPT
<-- ACCEPT -->
```

Figure 29

```
DUKPT KEY SET
```

Figure 30

```
CONFIG KEY TYPE
<-- ACCEPT -->
```

Figure 31

Debit / Credit Terminal

11. Press the key under the right arrow to move forward in the menu until the POLL menu is displayed. See Figure 32.
12. Press the key under ACCEPT to enter the Poll menu. Figure 33 appears on the display.
13. Press the key under the right arrow to move forward in the options until CAT is displayed. See Figure 34.
14. Press the key under ACCEPT to accept this option. Figure 35 appears on the display.
15. Press the numeric keys to match the Fuel Position. If the Fuel Position is 1, press [0] then [1]. Press the [ENTER] key. The display returns to Figure 34.
16. Press [CLEAR] 3 times to exit the Debit/Credit Terminal' menus.

```
CONFIG  POLL
<-- ACCEPT -->
```

Figure 32

```
POLL  MSM
<-- ACCEPT -->
```

Figure 33

```
POLL  CAT
<-- ACCEPT -->
```

Figure 34

```
CAT poll Adr: 01
Enter to Accept
```

Figure 35

Debit / Credit Terminal

No Debit:

This configuration allows only credit cards. No encryption is needed.

1. Enter Manager's Mode.
2. Press the key below ACCEPT to enter the configuration menu for the Debit/Credit Terminal. Figure 36 appears on the display.
3. Press the key below ACCEPT to define what type, or mode, of operation the Debit/Credit Terminal will be performing. Figure 37 appears on the display.
4. Press the left or right key (below the arrows) to see the options. The options are DEBIT, NO DEBIT, or MSM.
5. Press the key under the right arrow to move forward in the options until NO DEBIT is displayed. See Figure 38.
6. Press the key under ACCEPT to accept the No Debit option. Figure 39 will appear on the display briefly.
7. Press the **[CLEAR]** key to return to the Configuration menu. See Figure 36.
8. Press the key under the right arrow to move forward in the menus until the POLL menu is displayed. See Figure 40.
9. Press the key under ACCEPT to enter the Poll menu. Figure 41 appears on the display.
10. Press the key under the right arrow to move forward in the options until CAT is displayed. See Figure 42.
11. Press the key under ACCEPT to accept this option. Figure 43 appears on the display.
12. Press the numeric keys to match the Fuel Position. If the Fuel Position is 1, press **[0]** then **[1]**. Press the **[ENTER]** key. The display returns to Figure 42.
13. Press **[CLEAR]** 3 times to exit the Debit/Credit Terminal' menus.

```
CONFIG TYPE
<-- ACCEPT -->
```

Figure 36

```
TYPE DEBIT
<-- ACCEPT -->
```

Figure 37

```
TYPE DEBIT
<-- ACCEPT -->
```

Figure 38

```
NO DEBIT SET
```

Figure 39

```
CONFIG POLL
<-- ACCEPT -->
```

Figure 40

```
POLL MSM
<-- ACCEPT -->
```

Figure 41

```
POLL CAT
<-- ACCEPT -->
```

Figure 42

```
CAT poll Adr: 01
Enter to Accept
```

Figure 43

Debit / Credit Terminal

Programming the MSM Interconnection Box's Debit/Credit Terminal for Operation:

1. Press the **[1]** key and the **[ENTER]** key at the same time on the Debit/Credit Terminal. Figure 44 appears on the display.
2. Press the **[1]** key and the **[ENTER]** key at the same time again. Figure 45 appears on the display.
3. Press the key below ACCEPT to enter the configuration menu for the Debit/Credit Terminal. Figure 46 appears on the display.
4. Press the key below ACCEPT to define what type, or mode, of operation the Debit/Credit Terminal will be performing. Figure 47 appears on the display.
5. Press the left or right key (below the arrows) to see the options. The options are DEBIT, NO DEBIT, or MSM.
6. With Figure 48 on the display press the key below ACCEPT to define the reader as the MSM (Master Session Module). Figure 49 appears on the display briefly.
7. Press the **[CLEAR]** key. Figure 50 appears on the display.
8. Press the key under the right arrow to move forward in the menus until the KEY TYPE menu is displayed. See Figure 51.

```
Address Mode
Clear to exit
```

Figure 44

```
FUNCTION CONFIG
<-- ACCEPT -->
```

Figure 45

```
CONFIG TYPE
<-- ACCEPT -->
```

Figure 46

```
TYPE DEBIT
<-- ACCEPT -->
```

Figure 47

```
TYPE MSM
<-- ACCEPT -->
```

Figure 48

```
MSM TYPE SET
```

Figure 49

```
CONFIG TYPE
<-- ACCEPT -->
```

Figure 50

```
CONFIG KEY TYPE
<-- ACCEPT -->
```

Figure 51

Debit / Credit Terminal

9. Press the key under ACCEPT to enter the Key Type menu. Figure 52 appears on the display.
10. Press the key under the right arrow, →, to move forward in the options until MASTER is displayed. See Figure 53.
11. Press the key under ACCEPT to accept master encryption. Figure 54 appears on the display briefly.
12. Press the **[CLEAR]** key to return to the Configuration menu. See Figure 55.
13. Press the key under the right arrow to move forward in the menus until the POLL menu is displayed. See Figure 56.
14. Press the key under ACCEPT to enter the Poll menu. Figure 57 appears on the display.
15. Press the key under ACCEPT to enter the MSM option. Figure 58 appears on the display.
16. The MSM poll address is always 30. Press **[3]**, **[0]**, and **[ENTER]**. The display returns to Figure 57.
17. Press the key under the right arrow to move forward in the options until CAT is displayed. See Figure 59.
18. Press the key under ACCEPT to accept this option. Figure 60 appears on the display.
19. Verify that the CAT Poll address is set to 00.
20. Press **[CLEAR]** 3 times to exit the Debit/Credit Terminal' menus.

```
KEY TYPE   DUKPT
<-- ACCEPT -->
```

Figure 52

```
KEY TYPE   MASTER
<-- ACCEPT -->
```

Figure 53

```
MASTER KET SET
```

Figure 54

```
CONFIG   KEY TYPE
<-- ACCEPT -->
```

Figure 55

```
CONFIG   POLL
<-- ACCEPT -->
```

Figure 56

```
POLL     MSM
<-- ACCEPT -->
```

Figure 57

```
MSM pol I Adr: 30
Enter to Accept
```

Figure 58

```
POLL     CAT
<-- ACCEPT -->
```

Figure 59

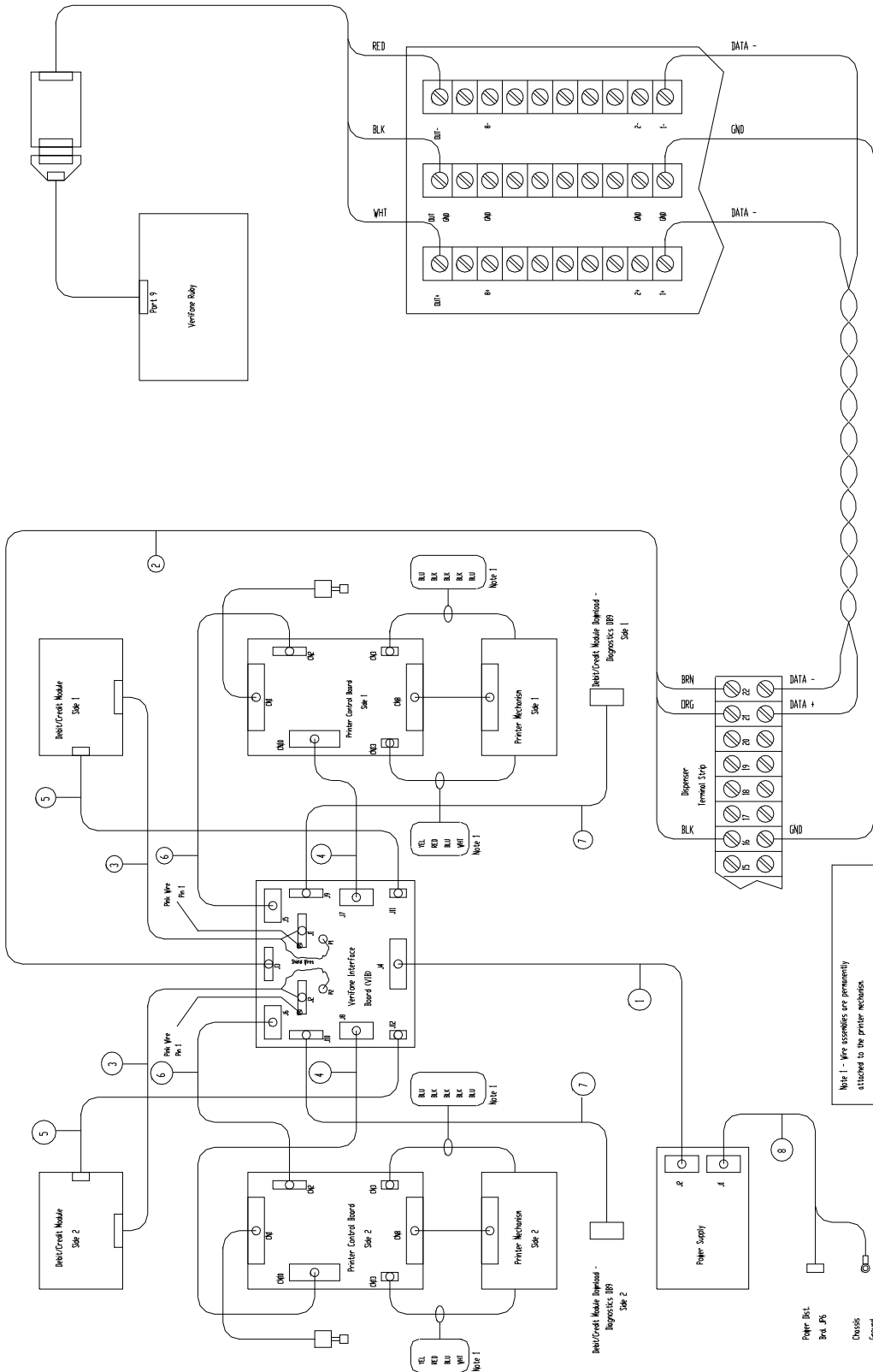
```
CAT pol I Adr: 00
Enter to Accept
```

Figure 60

Section 2

Service Instructions

System Overview



This drawing shows the Horizon 1 configuration only. For wiring to the Horizon 2 or the 3000 series dispenser, refer to the Station Interconnection Diagram earlier in this manual

System Overview

This information refers to the Horizon 1 dispenser series only

Dwg #	Item 1 Wiring		Part #
P0083	Power Supply Cable		104174
J4- VeriFone Interface Bd.			J2- Power Supply
<u>Pin #</u>	<u>Wire Color</u>	<u>Signal</u>	<u>Pin #</u>
Pin 1	RED	5.0 Vdc	Pin 14
Pin 2	ORG	12.0 Vdc	Pin 2
Pin 3	YEL	24.0 Vdc	Pin 10
Pin 4	-----	-----	-----
Pin 5	BLK	Ground	Pin 7
Pin 6	BLK	Ground	Pin 8

Dwg #	Item 3 Wiring		Part #
P0098	Debit / Credit Module Cable		104253
J1,J2- VeriFone Interface Bd.			Debit/Credit Module Plug
<u>Pin #</u>	<u>Wire Color</u>	<u>Signal</u>	<u>Pin #</u>
Pin 1	LHT RED	RTS-1	Pin 9
Pin 2	BLK	TXD-1	Pin 6
Pin 3	LHT GRN	DCD-1	Pin 10
Pin 4	BRN	CTS-1	Pin 8
Pin 5	BLK/WHT	RXD-1	Pin 7
Pin 6	RED	GND-1	Pin 19
Pin 7	BRN/WHT	RXCLK-2	Pin 33
Pin 8	ORG	GND-2	Pin 20
Pin 9	RED/WHT	DCD-2	Pin 15
Pin 10	YEL	CTS-2	Pin 13
Pin 11	ORG/WHT	RXD-2	Pin 12
Pin 12	-----	-----	-----
Pin 13	-----	-----	-----
Pin 14	GRN	TXCLK-2	Pin 32
Pin 15	-----	-----	-----
Pin 16	BLU	TXD-2	Pin 11
Pin 17	GRN/WHT	LAN +	Pin 5
Pin 18	VIO	RTS-2	Pin 14
Pin 19	-----	-----	-----
Pin 20	GRY	LAN -	Pin 4
Pin 21	BLU/WHT	Ground	Pin 2
Pin 22	WHT	12.0 Vdc	Pin 3
P1, P2	Bare	Shield	Shield

Dwg #	Item 7 Wiring		Part #
P0080	Dispenser Download Cable		104162
J9,J10- VeriFone Interface Bd.			Download DB9 Plug
<u>Pin #</u>	<u>Wire Color</u>	<u>Signal</u>	<u>Pin #</u>
Pin 1	-----	TXCLK-2	Pin 1
Pin 2	GRY	DCD-2	Pin 7
Pin 3	RED	RTS-2	Pin 8
Pin 4	GRN	CTS-2	Pin 2
Pin 5	YEL	RXD-2	Pin 3
Pin 6	BLU	TXD-2	Pin 5
Pin 7	BLK	GND-2	-----
Pin 8	-----	RXCLK-2	-----
Pin 9	-----	Shield	-----
-----	-----	-----	Pin 4
-----	-----	-----	Pin 6
-----	-----	-----	Pin 9

Dwg #	Item 2 Wiring		Part #
P0082	LAN Cable		104173
J3- VeriFone Interface Bd.			Dispenser Terminal Strip
<u>Pin #</u>	<u>Wire Color</u>	<u>Signal</u>	<u>Position #</u>
Pin 1	BRN	LAN -	Position 20
Pin 2	BLK	Ground	Position 16
Pin 3	ORG	LAN +	Position 21

Dwg #	Item 4 Wiring		Part #
P0078	Printer Power Cable		104158
J7,J8- VeriFone Interface Bd.			CN10 - Printer Control Bd
<u>Pin #</u>	<u>Wire Color</u>	<u>Signal</u>	<u>Pin #</u>
Pin 1	YEL	24.0 Vdc	Pin 6
Pin 2	YEL	24.0 Vdc	Pin 5
Pin 3	BLK	Ground	Pin 4
Pin 4	RED	5.0 Vdc	Pin 1
Pin 5	BLK	Ground	Pin 2
-----	-----	-----	Pin 3

Dwg #	Item 5 Wiring		Part #
Debit/Credit Module Heater Cable			
J11, J12- VeriFone Interface Bd.			VeriFone Heater Plug
<u>Pin #</u>	<u>Wire Color</u>	<u>Signal</u>	<u>Pin #</u>
Pin 1	RED	12.0 Vdc	Pin 1
Pin 2	BLK	Ground	Pin 2

Dwg #	Item 6 Wiring		Part #
P0079	Printer Data Cable		104159
J5,J6- VeriFone Interface Bd.			CN2 - Printer Control Bd
<u>Pin #</u>	<u>Wire Color</u>	<u>Signal</u>	<u>Pin #</u>
Pin 1	RED	RXD-1	Pin 3
Pin 2	WHT	TXD-1	Pin 2
Pin 3	YEL	CTS-1	Pin 4
Pin 4	VIO	DSR-ptr	Pin 6
Pin 5	-----	-----	-----
Pin 6	-----	-----	-----
Pin 7	-----	-----	-----
Pin 8	-----	-----	-----
Pin 9	BRN	GND-1	Pin 5
Pin 10	-----	-----	-----
-----	-----	-----	Pin 1

Dwg #	Item 8 Wiring		Part #
Power Supply AC Cable			
J1- VeriFone Interface Bd.			JP6 - Power Distribution Bd
<u>Pin #</u>	<u>Wire Color</u>	<u>Signal</u>	<u>Pin #</u>
Pin 1	GRN	Earth	Ring Terminal
Pin 2	-----	-----	-----
Pin 3	BLK	Line	Pin 1
Pin 4	-----	-----	-----
Pin 5	ORG	Neutral	Pin 2

VeriFone Interface Circuit Board (VIB) For Use with Horizon 1 Dispensers Only

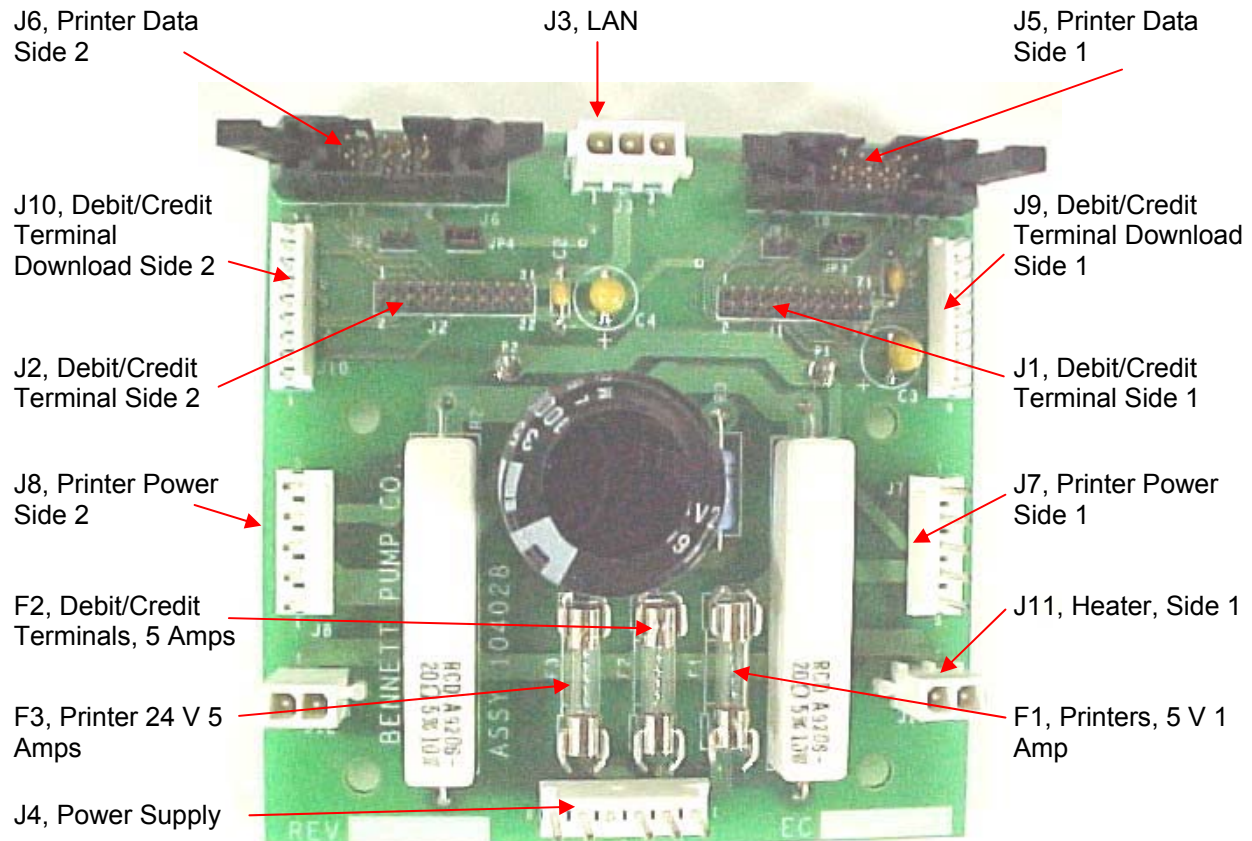


Figure 61
VeriFone Interface Circuit Board (VIB) For Horizon 1 Dispensers Only
(The Horizon 2 and 3000 series uses a different V.I.B.)

The VeriFone Interface circuit board filters and provides power to the Debit/Credit Terminal and printers. Data is sent to the Debit/Credit Terminals and the printers from the VeriFone Ruby point-of-sale through this circuit board. This board receives its power, 24 VDC, from the external power supply. Fuses are provided to protect the Debit/Credit Terminal and the printers from power overload.

Connector and Circuit Description

J1 (Side Two) & J2 (Side One) – DEBIT/CREDIT TERMINAL

DC voltage is supplied to the Debit/Credit Terminals through these connectors. Communication to the VeriFone Ruby point-of-sale and communication to the printers are also routed through this connector. Terminals P1 and P2 terminate the 104253 cable shield respectively.

Pin 1 is the RTS (Ready to Send) signal. The pink wire of the 104253 wire assembly must go to pin 1.

Pin 21 is the Ground.

Pin 22 is 12 VDC. Voltage can be measured between Pin 22 and Pin 21.

J3 – LAN Local Area Network (RS-485)

This connector supplies communication with the Interconnection Box.

Pin 1 is the LAN NEGATIVE signal.

Pin 2 is the LAN GROUND signal.

Pin 3 is the LAN POSITIVE signal.

J4 – Power Supply

This connector supplies the VIB the operating voltage needed for the printers and the Debit/Credit Terminals.

Pin 1 is 5 VDC. Fuse F1 protects this voltage.

Pin 2 is 12 VDC. Fuse F2 protects this voltage.

Pin 3 is 24 VDC. Fuse F3 has been provided to protect this voltage.

Pin 4 is not used.

Pin 5 and 6 is GROUND.

J5 (Side Two) & J6 (Side One) – Printer Data

These connectors supply communication between the Debit/Credit Terminals and the printers.

Pin 1 is the Receive signal.

Pin 2 is the Transmit signal.

Pin 3 is the Clear to Send signal.

Pin 4 is the Data Send Ready.

Pin 5 – 8 & 10 is not used.

Pin 9 is GROUND

J7 (Side Two) & J8 (Side One) – Printer Power

These connectors supply operating voltage to the printers.

Pin 1 is 24 VDC.

Pin 2 is 24 VDC.

Pin 3 is GROUND

Pin 4 is 5 VDC.

Pin 5 is GROUND.

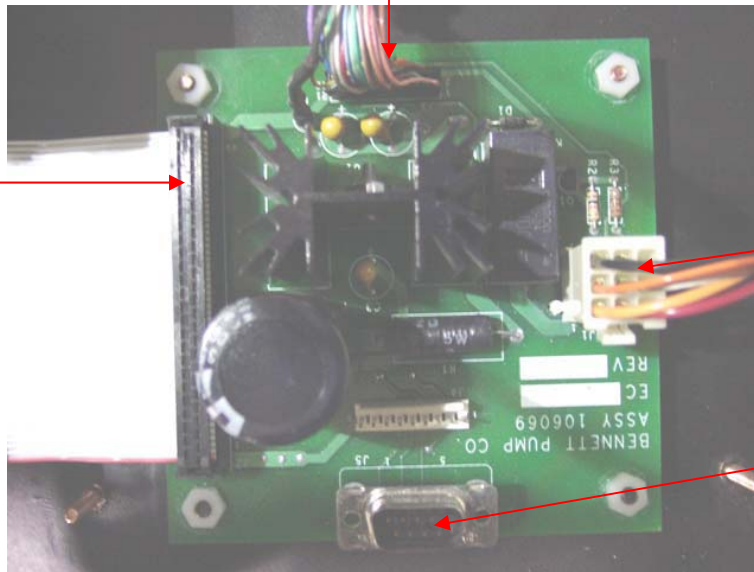
J9 (Side Two) & J10 (Side One) – PC Download Interface

These connectors supply communication to a computer for downloading software to the Debit/Credit Terminals.

VeriFone Interface Circuit Board (VIB) For Use with Horizon 2 and 3000 Series Dispensers Only

J3 – Card Reader Power and Data

J2 – Printer
Power and Data



J1 Power and Data
from Dispenser

J5 – Laptop
connection for
downloading files.

Figure 62

VeriFone Interface Circuit Board (VIB) For Horizon 2 and 3000 Series Dispensers Only
(The Horizon 1 series uses a different V.I.B.)

The VeriFone Interface Board for the Horizon 2 dispenser and the 3000 series is a different board from the Horizon 1 VIB. There is 1 VIB on each side of the dispenser with this type of board. This VIB receives power from the dispenser (+24 volts DC and +12 volts DC). It also connects to the data wires (field wires) that go back to the Interface Box in the building through a common terminal strip located in the dispenser electronics enclosure. The terminal strip allows the data from both card readers (side 1 and side 2) to be shared and travel on the same 3 field wires to the IC Box. The IC box knows which card reader is which by the address programmed at the card reader (more on this later).

This board also sends power and data to the printer through a 50 pin parallel cable and power and data to the card reader through a multi-conductor cable.

Interconnection Box

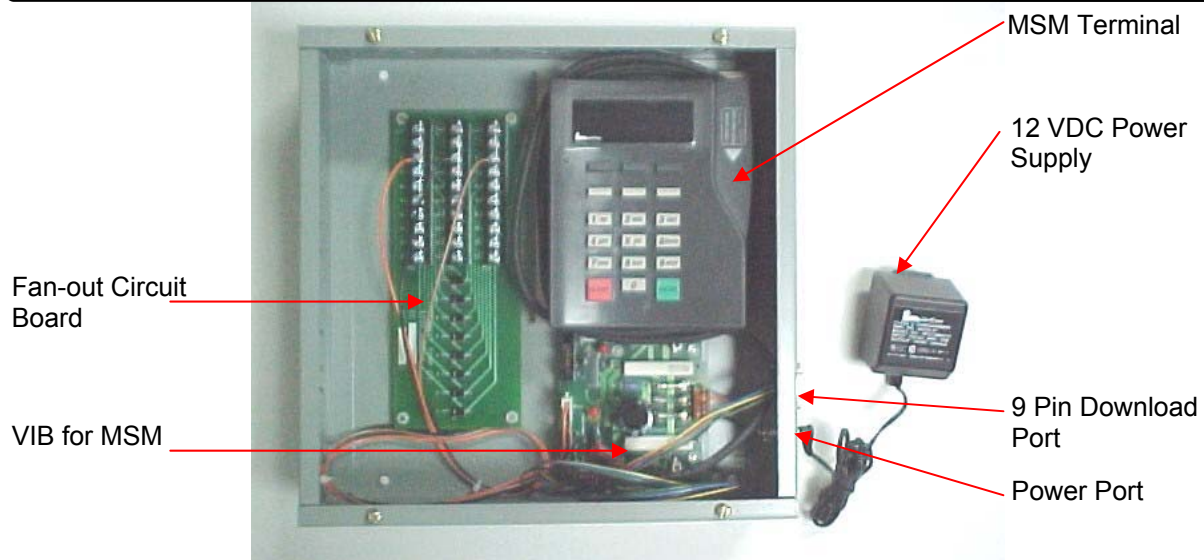


Figure 63 - MSM Interconnection Box

The Standard Interconnection Box (not shown) contains only the Fan-out Board (FOB).

Fan-out Circuit Board (FOB)

This circuit board provides a connection between the dispenser's Debit/Credit Terminals and VeriFone's Ruby point-of-sale. One position on the FOB is used for each dispenser (two Fueling Positions). The Standard Interconnection Box can support 8 dispensers (16 Fueling Positions). The MSM Interconnection Box can support 8 dispensers (16 Fueling Positions), one position is used for the MSM terminal as well, but the MSM terminal needs to double up on a used channel if there are 8 dispensers.

VeriFone Interface Circuit Board (VIB)

This circuit board is provided only in the MSM Interconnection Box. This board provides power and the PC Download port for upgrading application software to the MSM (Master Session Module).

Master Session Module

The MSM (Master Session Module) is provided for Networks using Master Session encryption for debit bank cards.

Fan-Out Circuit Board

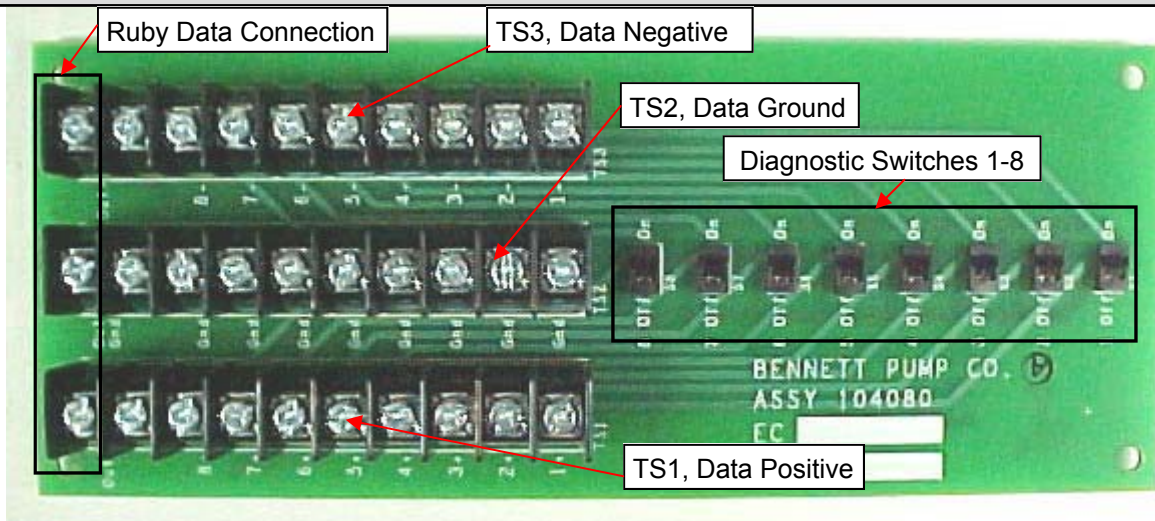


Figure 64 - VeriFone Fan-Out Board

Connector and Circuit Description

This board has 3 sets of 10 position terminal strips. TS1 connects the DATA + for each dispenser, TS2 connects the DATA GROUND for each dispenser, and TS3 connects the DATA – for each dispenser. This board also provides switches for diagnostic purposes. All switches must be in the ON position. If one of the switches is in the OFF position the point-of-sale will not be able to communicate to the dispenser connected to that DATA loop.

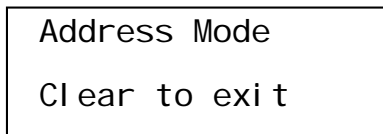
The Debit/Credit Terminal's connect to the Fan Out Board. One bad card reader terminal has the potential to take down the entire card system since they are all in a common parallel loop. The switches are used to remove a suspected "bad" terminal from this data loop. Turning a switch off will actually remove two terminals (one dispenser) from the data loop. This should help facilitate troubleshooting down to a particular dispenser

How to Use Diagnostics

Diagnostics has been provided at the terminals and at the printer to verify if there is a terminal problem or a "system" problem.

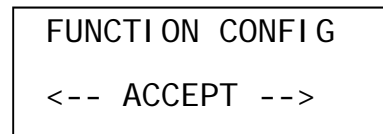
How to enter diagnostic:

1. Press the **[1]** key and the **[ENTER]** key at the same time on the Debit/Credit Terminal. Figure 65 appears on the display.
2. Press the **[1]** key and the **[ENTER]** key at the same time again. Figure 66 appears on the display.
3. Press the left or right key (below the arrows) to see the options. The options are CONFIG, CLEAR, or DIAG.
4. With Figure 67 on the display press the key below ACCEPT to enter diagnostics. Figure 68 appears on the display.
5. Press the left or right key (below the arrows) to see the options. The options are KEYPAD, CARD RDR, PRINTER, or IPP TEST (Internal Use Only).



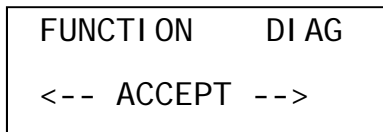
Address Mode
Clear to exit

Figure 65



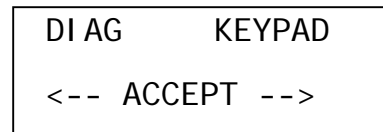
FUNCTION CONFIG
<-- ACCEPT -->

Figure 66



FUNCTION DIAG
<-- ACCEPT -->

Figure 67

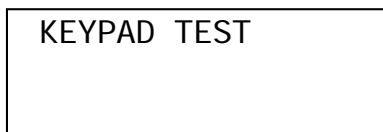


DIAG KEYPAD
<-- ACCEPT -->

Figure 68

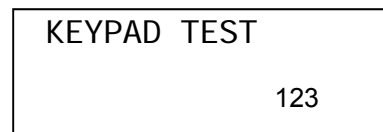
Keypad Test

1. With Figure 68 on the display press the key below ACCEPT to enter the keypad test. Figure 69 appears on the display.
2. Pressing each key should display a value on the display. If a numeric key is pressed its value will be displayed. See Figure 70.
3. Press **[CLEAR]** two times to exit the keypad test.



KEYPAD TEST

Figure 69



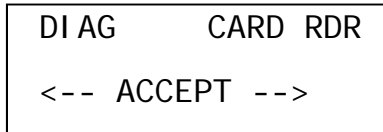
KEYPAD TEST
123

Figure 70

How to Use Diagnostics


Card Reader Test

1. Press the key under the right arrow to move forward in the options until CARD RDR is displayed. See Figure 71.
2. With Figure 71 on the display press the key below ACCEPT to enter the card reader test. Figure 72 appears on the display.
3. Swipe card through reader. Figure 73 should be displayed.
4. Press **[CLEAR]** once to exit the card reader test.



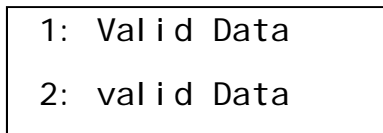
DI AG CARD RDR
<-- ACCEPT -->

Figure 71



CARD RDR TEST
Swi pe Card

Figure 72

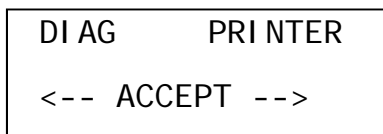


1: Val id Data
2: val id Data

Figure 73

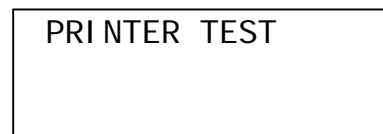
Printer Test

1. Press the key under the right arrow to move forward in the options until PRINTER is displayed. See Figure 74.
2. With Figure 74 on the display press the key below ACCEPT to enter the printer test. Figure 75 appears on the display.
3. The Debit/Credit Terminal sends a diagnostic receipt to the printer. This will continue until the **[CLEAR]** key is pressed.
4. Press **[CLEAR]** once to exit the printer test.



DI AG PRI NTER
<-- ACCEPT -->

Figure 74



PRI NTER TEST

Figure 75

Horizon 1 Printer Test -

This test verifies functionality of the printer control board, printer mechanism, and the black harness from the printer control board to the printer mechanism. It does not verify functionality of the Debit/Credit Terminal, the VIB board, or the harnesses from the VIB board to the printer.

1. Turn dispenser power off.
2. Press and hold the paper feed switch.
3. Turn dispenser power on. The printer will begin to print test patterns and will not stop until dispenser power is turned off.
4. Turn dispenser power back on to resume normal operation.

Horizon 2 or 3000 Series Printer Test –

This test verifies the functionality of the printer mechanism.

1. Turn dispenser power off.
2. Press and hold the paper feed switch
3. Turn the dispenser power on. The printer will begin to print test patterns and will not stop until dispenser power is turned off.
4. Turn the dispenser power off to stop the test.

Troubleshooting

The Debit/Credit Terminals do not run on the battery back-up circuit that the dispenser's main CPU is supported by. When the power is shut off at the dispenser the terminals shut down instantly, the dispenser's main CPU goes to Power Fail mode.

DEBIT/CREDIT TERMINAL

One Debit/Credit Terminal does not have power:

Verify harness is connected at the terminal and at the VIB.
Replace terminal.

Both Debit/Credit Terminals do not have power:

Verify F2 fuse is not blown.
Verify the correct fuse (5 Amp) is used.
Verify External Power Supply is supplying the correct voltage. Check voltage at the VIB board.
See CONNECTOR AND CIRCUIT DESCRIPTION.
Verify VIB board is operational. Swap with a working VIB.

One or more Debit/Credit Terminal(s) read "Out of Service":

Verify the switches on the VFOB are set to the ON position.
Verify address is correct at the terminal(s).
Re-initialize terminal at the point-of-sale, initializing fuel must be done first.
Verify wiring at the dispenser terminal strip.
Verify wiring at the VFOB board.
At the VFOB board locate the diagnostic switches. Turn one switch off at a time to see if one of the terminals is taking the system down.
Re-load application software to the Debit/Credit Terminal.

Debit/Credit Terminal does not read cards:

Run Card Reader test in diagnostics.
Good read – Re-initialize terminal at the point-of-sale.
Verify correct address.
Bad read – use Head Cleaning Card (see Parts List), test reader.
- turn power off at the dispenser for approximately 10 seconds, after terminal is initialized test reader. If still bad, replace terminal.

Debit/Credit Terminal's display is corrupted:

Turn power off at the dispenser for approximately 10 seconds.
Replace terminal.

Debit/Credit Terminal's displaying incorrect message:

Re-initialize terminal at the point-of-sale, initializing fuel must be done first.

Troubleshooting

PRINTER – Horizon 1

The Printer Control board has two sets of dipswitches, DSW1 and DSW2. The settings for DSW1 are 1 and 5 – 8 set to ON. The settings for DSW2 are all OFF. See Figure 76. The settings of DSW1 and DSW2 should be checked before installing a printer control board ordered for service.

How to Load Paper

The paper used is thermal paper, it must be loaded correctly for the receipt to print. The Fujitsu printer provides a lever so that loading paper is done with ease. See Figure 77.

1. Pull lever A towards you. This opens the slot for the paper.
2. Place the paper roll on the bracket as shown.
3. Slide paper through paper slot C.
4. Push lever A towards the door. At this point the printer will advance the paper.
5. Press the paper feed switch (see Figure 78) to feed the paper outside the door to ensure smooth flow.
6. Tear off paper and close door.

Receipts are blank:

- Run Printer Test in diagnostics.
- Printer paper loaded backwards.
- Check dipswitch settings. See Figure 76.
- Swap printer mechanism with known good one.
- Swap printer control board with known good one.

Receipts are printing nonsense:

- Run Printer Test in diagnostics.
- Check dipswitch settings. See Figure 76.
- Turn dispenser power off for approximately 10 seconds, run Printer Test in diagnostics.
- Re-seat black wire harness that runs from the control board to the mechanism.
- Swap printer control board with known good one.

Receipts are printing only half of the receipt:

- Black wire harness from printer control board to printer mechanism is not seated correctly.

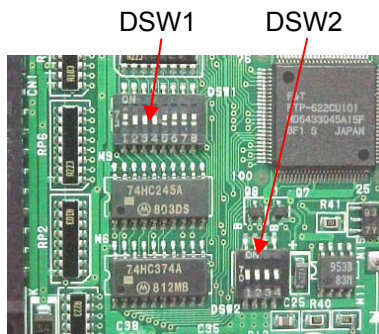


Figure 76

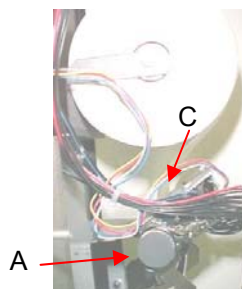


Figure 77

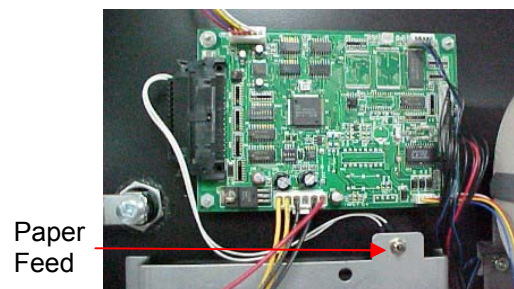


Figure 78

Upgrading Software

To download to the Debit/Credit Terminal, a 9-pin port is provided inside the dispenser for each Debit/Credit Terminal for Horizon 1. See Figure 79. For Horizon 2 and 3000 series the data port is located on the VIB. A laptop and the download cable (part number 104724) are required for downloading.

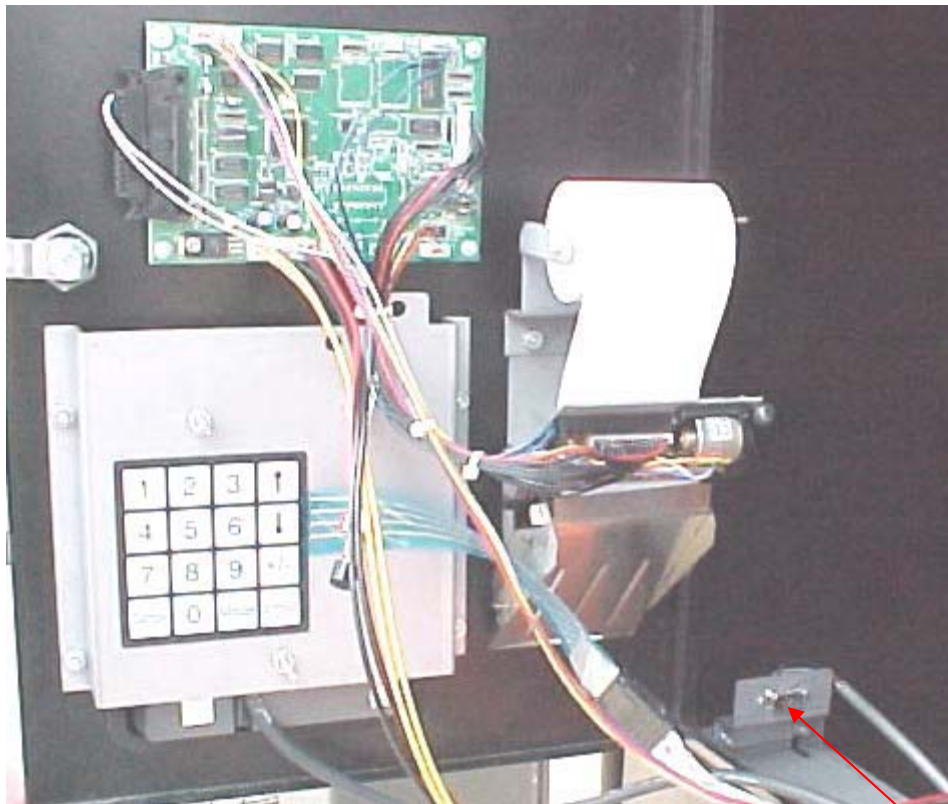


Figure 79

9 Pin Port

DOWNLOADING THE DEBIT/CREDIT TERMINAL APPLICATION SOFTWARE

1. If the top line of the Debit/Credit Terminal display reads: "DOWNLOAD NEEDED", press **[ENTER]** and proceed to step 3; otherwise, *simultaneously* press the **[7]** and **[ENTER]** keys until "PSWD?" is displayed on the top line.
2. Press the key sequence: **[1][6][6][8][3][1][ENTER][ENTER]**. **Note:** the **[ENTER]** key is pressed *twice*.
3. The top line of the display should read: "FUNCTION? DOWNLD". Press ACCEPT (top row, middle key).
4. The top line of the display should read: "PORT? PORT 1". Press the right arrow key (top row, right key) until "PORT 2" is displayed. Press ACCEPT (top row, middle key).
5. The top line of the display should read: "UNIT RECEIVE" and the bottom line should read "AutoBaud Check x" (where *x* cycles between * and – approximately once per second). The Debit/Credit Terminal is now ready to receive an application download from the download PC and will remain in this mode until the download is complete or until aborted by pressing the **[CLEAR]** key.
6. On the download PC, connect the download cable to the PC com port 1. Connect the other end of the serial cable to PC Download Port inside the dispenser. See Figure 79.
7. On the computer, go to Windows Explorer from the Start Menu. Open the TERMINAL folder. Double click the LD.bat file. This opens a DOS window and automatically calls the two files, beneve.out and beneve.p7s, and begins the download.
8. Upon completion of the download process, the display of the Debit/Credit Terminal will read "Authenticating Application. Wait".

Upgrading Software

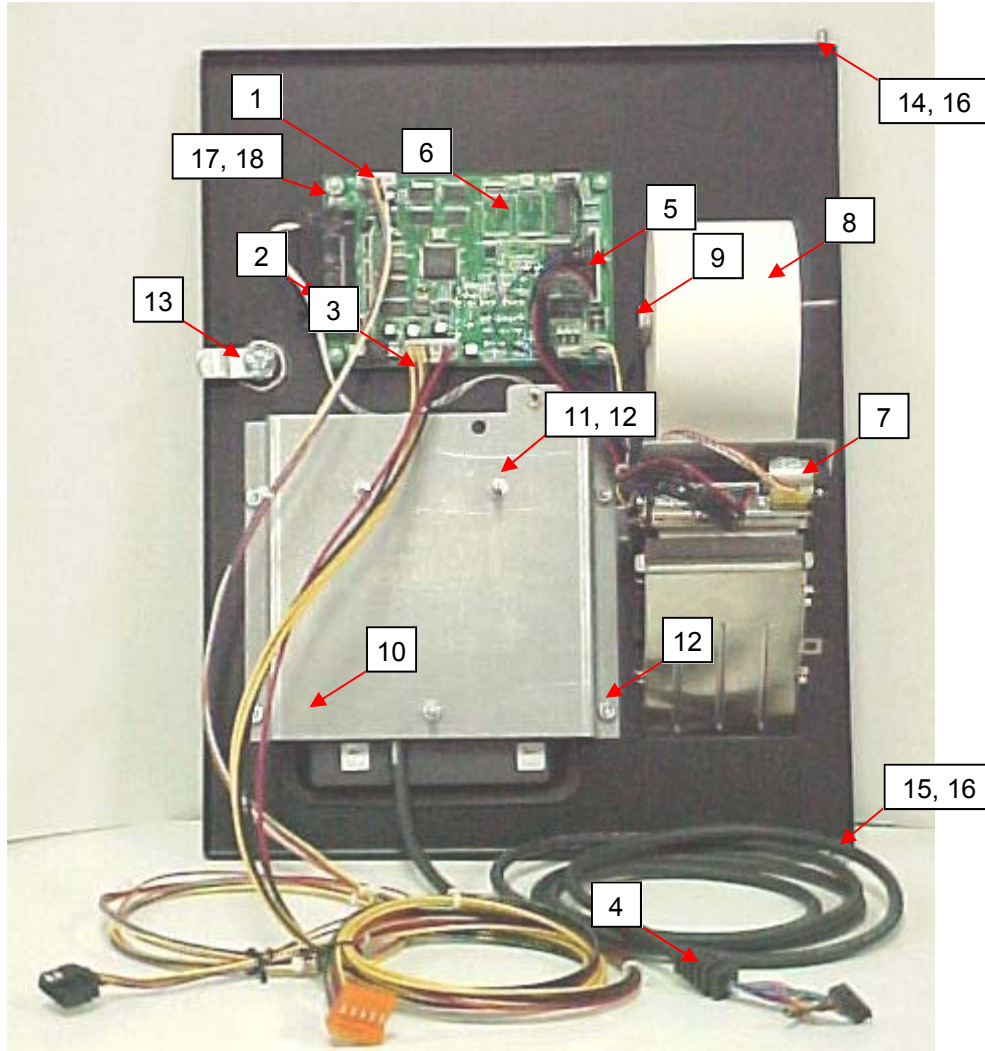
9. After the authentication process press the **[CLEAR]** key twice on the Debit/Credit Terminal.
10. Observe the start up sequence on the Debit/Credit Terminal display. After approximately 10 seconds, the display should read "BENEVE". It will then change to "Out of Service" until the console begins the initialization process.
11. On the computer, click on the CLOSE button (the **X** button upper right hand corner of the DOS window) to terminate the download program.
12. Disconnect the cable from inside the dispenser.
13. Repeat steps 1-12 for each Debit Credit Terminal.

Contact Bennett Technical Support for assistance loading the files onto the Card Reader Terminals. 1-800-423-6638.

Section 3 Parts List

Parts List

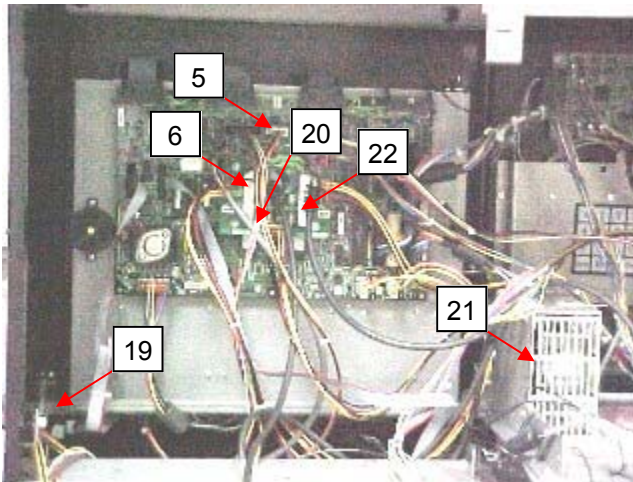
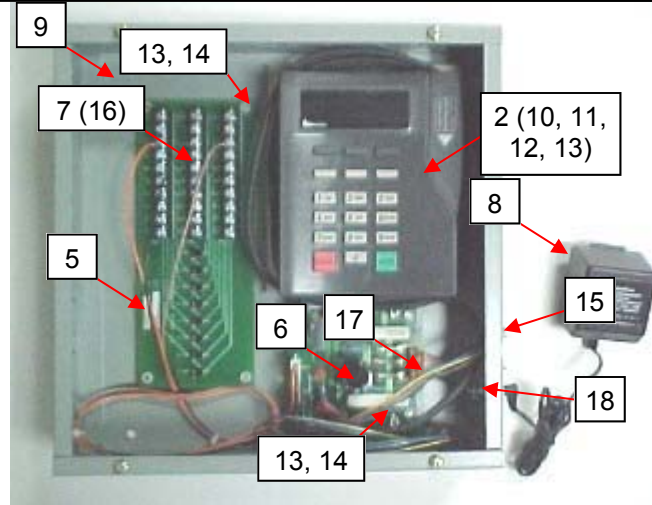
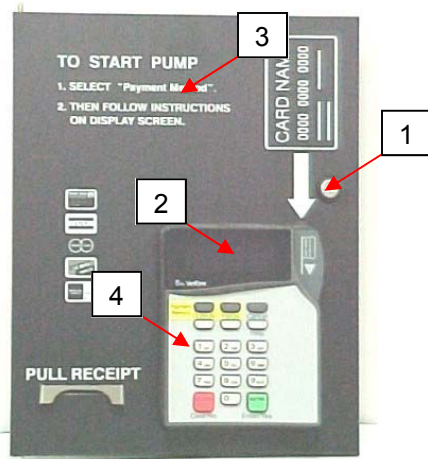
Horizon 1 only – For Horizon 2 and 3000 series refer to parts manual for that dispenser model.



REF. NO.	PART NO.	DESCRIPTION	QTY.
1	104159	WIRE ASSEMBLY, PRINTER DATA	1
2	104055	WIRE ASSEMBLY, PAPER FEED SWITCH	1
3	104158	WIRE ASSEMBLY, PRINTER POWER	1
4	104253	WIRE ASSEMBLY, DEBIT/CREDIT TERMINAL	1
5	104061	WIRE ASSEMBLY, PRINTER CONTROL BOARD	1
6	104052	PRINTER CONTROL BOARD, FUJITSU	1
7	104051	PRINTER MECHANISM, FUJITSU	1
8	A596102	PAPER ROLL, SEE NOTE.	1
9	N775901	SPINDLE, PAPER	1
10	103688	BRACKET, DEBIT/CREDIT TERMINAL	1
11	104372	SCREW, MACHINE – 6-32 X 1" PHILLIPS RD HD	3
12	A219002	NUT, HEX/EXT LW, 6-32	7
13	100378	CAM, OFFSET	1
14	100263	PIN, TOP HINGE	1
15	100262	PIN, BOTTOM HINGE	1
16	100436	SCREW, SOCKET HD CAP, 6-32X1/4	2
17	A348702	SPACER, 1/4" OD X .14" ID X 3/8" LONG	4
18	A483902	NUT, HEX, NYLON 4-40	4
19	103687	DOOR, OPTIONS – DEBIT (BLACK)	1

***NOTE: A 3 PACK PAPER ROLL (PART NUMBER CP-6233) CAN BE ORDERED FROM:
 COMMUNICATIONS PAPER CO. FAX: 908-234-1312
 377 RT. 202-206 PHONE: 908-234-0500
 SOUTH BEDMINSTER, NJ 07978

Parts List



NOTE 1 – THE DEBIT/CREDIT TERMINAL VARIES PER APPLICATION. CONTACT ORDER ENTRY.

NOTE 2 – DECALS VARY PER APPLICATION. CONTACT ORDER ENTRY.

NOTE 3 – THE VERIFONE INTERCONNECTION BOX ONLY CONTAINS THE VERIFONE FAN-OUT BOARD AND ITS MOUNTING PIECES.

FOR HARNESES NOT MENTIONED SEE PREVIOUS PAGE.

REF. NO.	PART NO.	DESCRIPTION	QTY.
1	100375	LOCK, CAM (SCREW W/LW & NUT INCLUDED)	1
2	-	DEBIT/CREDIT TERMINAL – SEE NOTE 1	1
3	-	DECAL, INSTRUCTION – SEE NOTE 2	1
4	-	DECAL, DEBIT/CREDIT TERMINAL – SEE NOTE 2	1
5	104173	WIRE ASSEMBLY, LAN – SEE NOTE 3	1
6	104028	VERIFONE INTERFACE BOARD (VIB) – SEE NOTE 3	1
7	104080	VERIFONE FAN-OUT BOARD (VFOB) – SEE NOTE 3	1
8	104363	POWER PACK – SEE NOTE 3	1
9	104330	BOX, 12 X 12 X 4 (INCLUDES COVER)	1
10	104331	PLATE, DEBIT/CREDIT TERMINAL – SEE NOTE 3	1
11	104372	SCREW, MACHINE – 6-32 X 1" PHILLIPS RD HD – SEE NOTE 3	3
12	A219002	NUT, HEX/EXT LW, 6-32 – SEE NOTE 3	6
13	A519403	STANDOFF – SEE NOTE 3	11
14	A483902	NUT, HEX, NYLON 4-40 – SEE NOTE 3	8
15	A512001	DB9 KIT – SEE NOTE 3	1
16	104329	BUMPER, RUBBER ADHESIVE	2
17	104729	WIRE ASSEMBLY, INTERCONNECTION BOX DOWNLOAD – SEE NOTE 3	1
18	104353	WIRE ASSEMBLY, POWER PACK – SEE NOTE 3	1
19	104162	WIRE ASSEMBLY, DISPENSER DOWNLOAD (BRACKET INCLUDED)	2
20	104174	WIRE ASSEMBLY, POWER SUPPLY DC (AC POWER – 100160)	1
21	100561	POWER SUPPLY (DCA)	1
22	104464	WIRE ASSEMBLY, TERMINAL HEATER	2

