PI DBox Installation Guide

CONTENTS

PI DBox Manufacturer's Warranty

Progressive International Electronics, Inc. (SELLER) warrants to the Purchaser of fuel control equipment manufactured by Seller against defects in material or workmanship for one (1) year from date of shipment. Seller will replace or repair defective parts or replace and issue credits to the Purchaser's account in accordance with the following Conditions of Warranty.

CONDITIONS OF WARRANTY

1. Credit will be applied only when the completed warranty request form and the defective parts are received and inspected.

   Decisions to repair or replace defective equipment are solely at the discretion of PIE.

2. When parts shipments are made prior to receiving the required warranty request and defective parts, they will be billed to the Purchaser.
3. In all cases, approved warranty requests will be expedited by issuing the appropriate credit to the Purchaser's account and shipping replacement parts.
4. Credits will not be issued for parts and no cash refunds for warranty credits will be made.
5. All components and parts must be returned to the factory prepaid, and in turn, replacement components and parts will be returned prepaid by the factory.
6. Seller's warranty applies only if the equipment has been installed and used in accordance with Seller's instructions. The warranty is void if any unauthorized alteration or addition has been made to the equipment or if it has been subject to damage caused by abuse, misapplication, accident or improper operation.
7. The Seller's liability for any damages, including contribution and indemnification, arising out of or in any way connected with the supplying of the equipment or its use, shall not in any case exceed the cost of repair of the equipment as herein provided. Upon expiration of the warranty, all such liability, as well as any other liability, shall terminate.
8. Nothing contained herein shall make the Purchaser, its agents or employees, an agent or representative of Seller and Seller assumes no responsibility of any act, omission, representation or warranty by the Purchaser or anyone else except as expressly stated herein.
9. The final Decision as to the validity of any claims arising under the warranty shall be determined solely by the Seller.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESAID OBLIGATIONS AND ARE HEREBY DISCLAIMED AND EXCLUDED BY SELLER.

W A R N I N G

Warning: Installation must comply with the National Electrical Code, as well as Federal, State, Local and all applicable codes.

Warning: Do not install PI DBox in a volatile, combustible or explosive atmosphere. PI DBox must be protected from severe vibration, extreme temperatures and excessive humidity.

Any peripheral equipment is to be installed in a non-hazardous location.

Any peripheral equipment connected to the PI DBox must be UL listed.

The PI DBox **must** be plugged into a dedicated 115 VAC wall socket.

History of Documentation

Version 1.0 – 2003
- Initial release

Version 2.0 – April 2005
- Added Kraus and Bennett sections
- Added IP Addressing

Version 3.0 – April 2006
- Added documentation for Kraus/Bennett DBox

Version 3.1 – April 2009
- Changed IP Addressing

System Installation

System Installation Warnings

Safety hazards are inherent with all electrical equipment. Standard precautions must be taken at all times during installation and operation of the PI DBox units. In addition to normal electrical precautions, the following points should be noted during installation.

- Installation must comply with National Electrical Code, as well as Federal, State/Provincial, Local, and all applicable codes.

- High voltages are present in the PI DBox components, as well as the equipment to which it is attaching. To prevent personal injury or equipment damage, disconnect all power before proceeding with installation.

- PI DBoxes must be installed in nonvolatile, noncombustible, nonexplosive areas. The box must be protected from severe vibration, extreme temperatures and excessive humidity.

- All PI DBoxes and associated equipment must be installed in nonhazardous locations and must be UL-listed, using standard communication.

For Use in USA

Installation of the PI DBox and associated equipment must comply with the requirements of the National Electrical Code (NFPA 70), the Automotive and Marine Station Code (NFPA 30A), and all Federal, State, Local, and applicable safety codes.

For Use in Canada

Installation of the all fuel control equipment must comply with the requirements of the Canadian Electrical Code, the Flammable and Combustible Liquid Code, and all Federal, Provincial, State, Local, and applicable safety codes.

The installation of the systems covered by this manual in conjunction with equipment not UL Listed has not been evaluated by the Underwriters Laboratories and is outside the intended use of this equipment. Warning: All dispensing equipment discussed in this manual is not UL Listed and the combination has not been evaluated by Underwriters Laboratories.

PI DBox
Introduction

To ensure compatibility with major model electronic dispensers, Progressive International's PI DBox is available in several versions. Each of these versions is specifically configured for its intended dispenser type.

CL-DBox is used in the following applications:
- Gilbarco dispenser
- Wayne dispenser

TOK-DBox is used with:
- Tokheim dispenser

RS485-DBox is used in the following applications:
- Wayne CAT dispenser with card reader
- Tokheim DPT dispenser with card reader
- Tatsuno dispenser
- Nuovo Pignone dispenser

KB-DBox is used in the following applications:
- Kraus electronic dispensers
- Bennett dispensers

All of these DBoxes are designed to be used with PIE's controllers and consoles (PIE applications). The Current Loop and Tokheim DBoxes are also capable of being used by the dispenser brand's controlling equipment (stand-alone application).

Some of the DBox models are even capable of being linked together to increase the number of physical connections on a communication loop. Current Loop and Tokheim Style PI DBox models come with isolation capability for each physical connection to the dispenser. LED indicators allow simple in-field troubleshooting and diagnostics.

The following sections detail the installation of each specific DBox model and will provide troubleshooting procedures.

PI DBox — Model Specific Installation

Current Loop Style — CL-DBox

Note all warnings in System Installation Warnings section.

Current Loop Style PI DBoxes are used with Gilbarco and Wayne dispensers. Note dispenser-specific instructions for use with each dispenser. For overview, see Diagram: PI DBox — Current Loop Style on following page.

Follow instructions in the installation section of the accompanying product manual before connecting PI DBox as follows:

1. Connect PI DBox to dispenser. Dispensers using current loop communication have two wires, a negative and a positive, for connectivity. Locate the pair from each dispenser to be connected and bring the pair into the PI DBox. The wires must be connected + to + and - to - on unused wiring position(s) in the DBox. Ensure that positive and negative wires are not crisscrossed at the PI DBox, as this will prevent communication with the controlling device.

2. Note that an isolation jumpers are present above each wiring position in the PI DBox. These jumpers, marked JP1-JP8, should be left in *isolate* position until the controlling devices are connected to the DBox. After connecting all dispensers to be used, move jumpers to *normal* for each position connected.

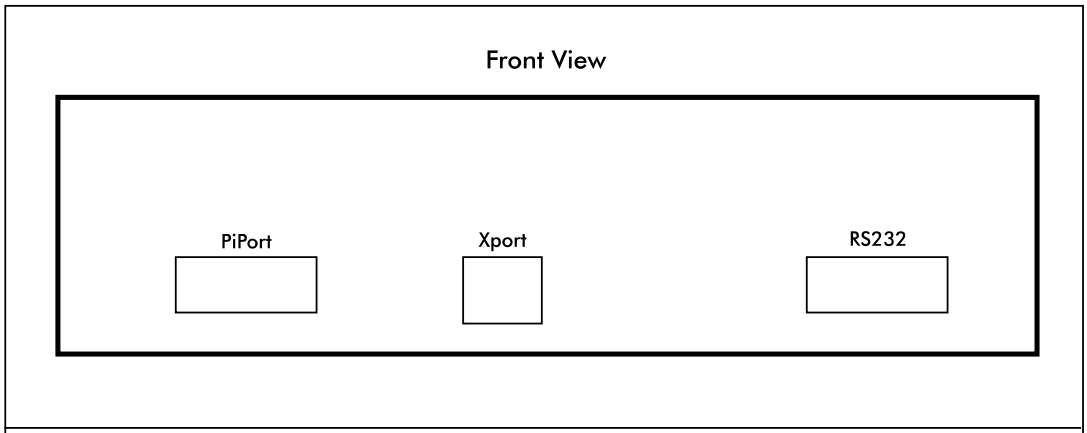
Note: Steps 3-5 in the Current-Loop Style installation procedure are dependent upon the type of application — PIE application or stand-alone application. Give careful attention to which steps are needed for your particular application. Also, refer to the appropriate drawings for jumper settings, interface connections and dispenser wiring.

For applications using PIE products:
For stand-alone applications, see description later in this section.

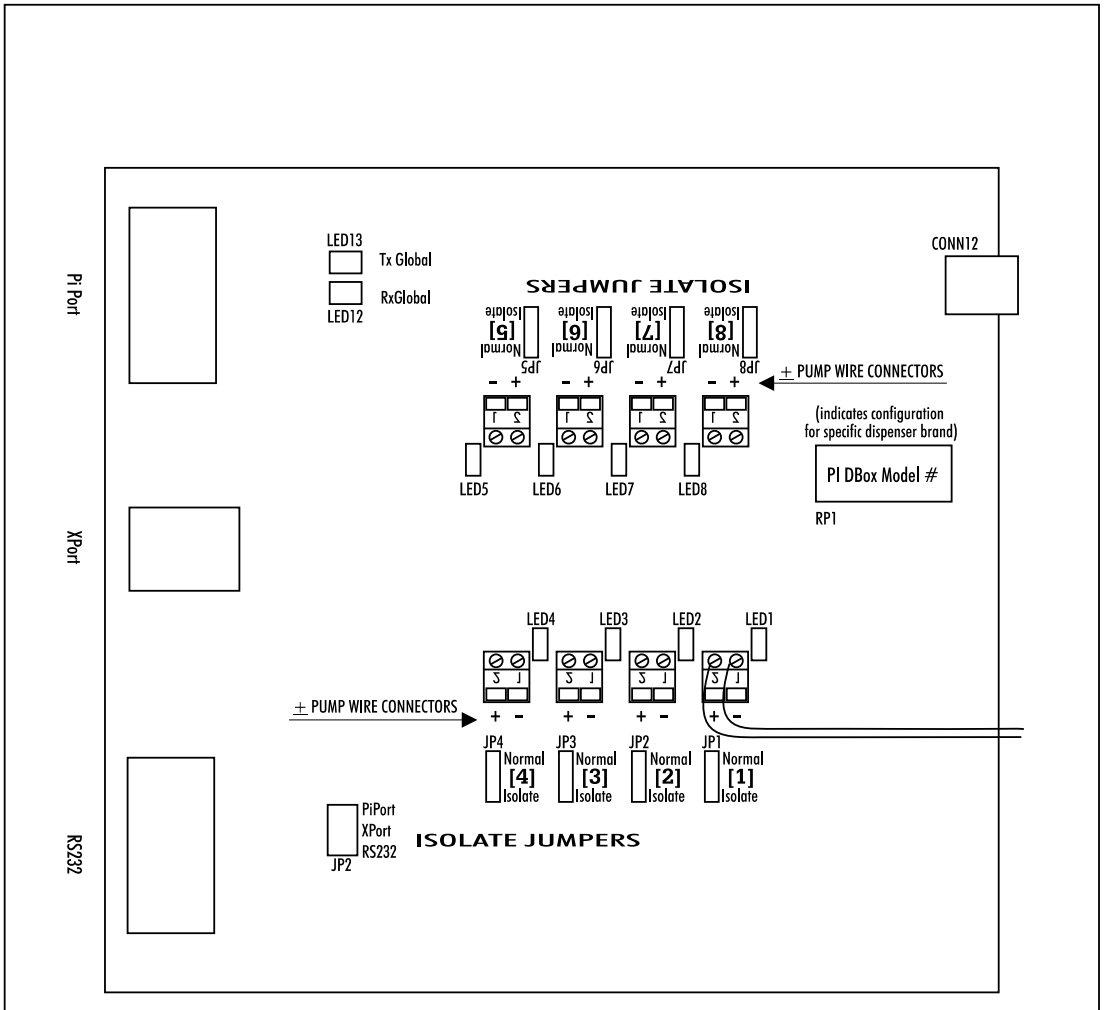
3. Set the jumper (JP2 position) to the desired interface type. The PiPort interface is used by Progressive's PIcon console. The RS232 and X Port interfaces are used by the FuelDirect Fuel Control Solution.

4. Referring to the diagram of the front panel which follows, connect the PIcon to the PiPort connector or connect the FuelDirect to the RS232 connector. If using ethernet connectivity, connect to the X Port. *Refer to the IP Addressing section at the end of this manual for further ethernet instructions.*

5. Proceed with programming of system.



PI DBox - Current Loop - for PIE Applications



Key Components of PI DBox - Current Loop for PIE Applications

For stand-alone applications:

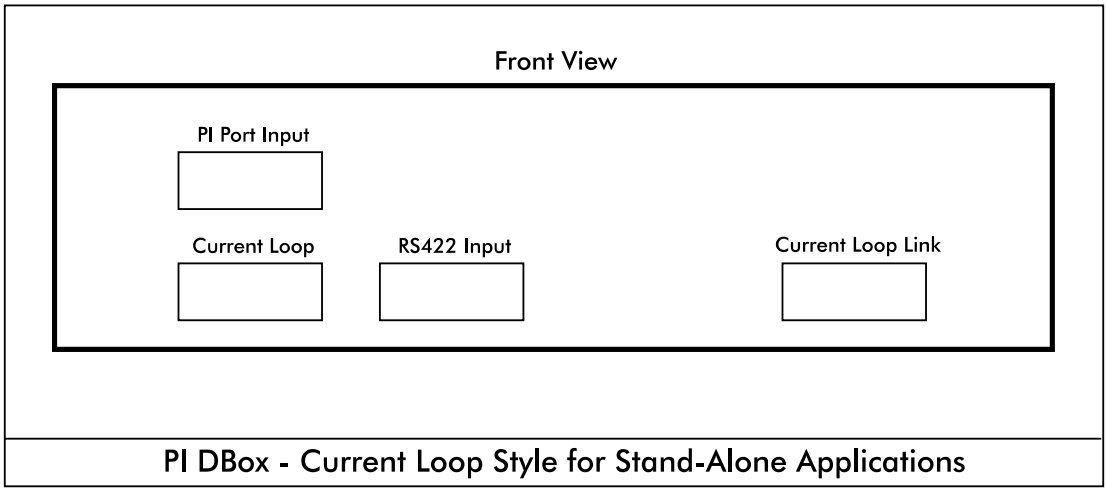
For applications using PIE products, see description earlier in this section.

3. Referring to Diagram: Key Components of PI DBox — Stand-Alone Current Loop Style, connect to the dispenser manufacturer's controller. From the PI DBox, use the dispenser manufacturer's standard link. Wayne must be connected using current loop. The Gilbarco controller can be connected using either current loop (two-wire interface) or RS422. Ensure that position JP10 is jumpered to correspond to the connection used (*CL* for current loop and *RS422* for RS422 interface).

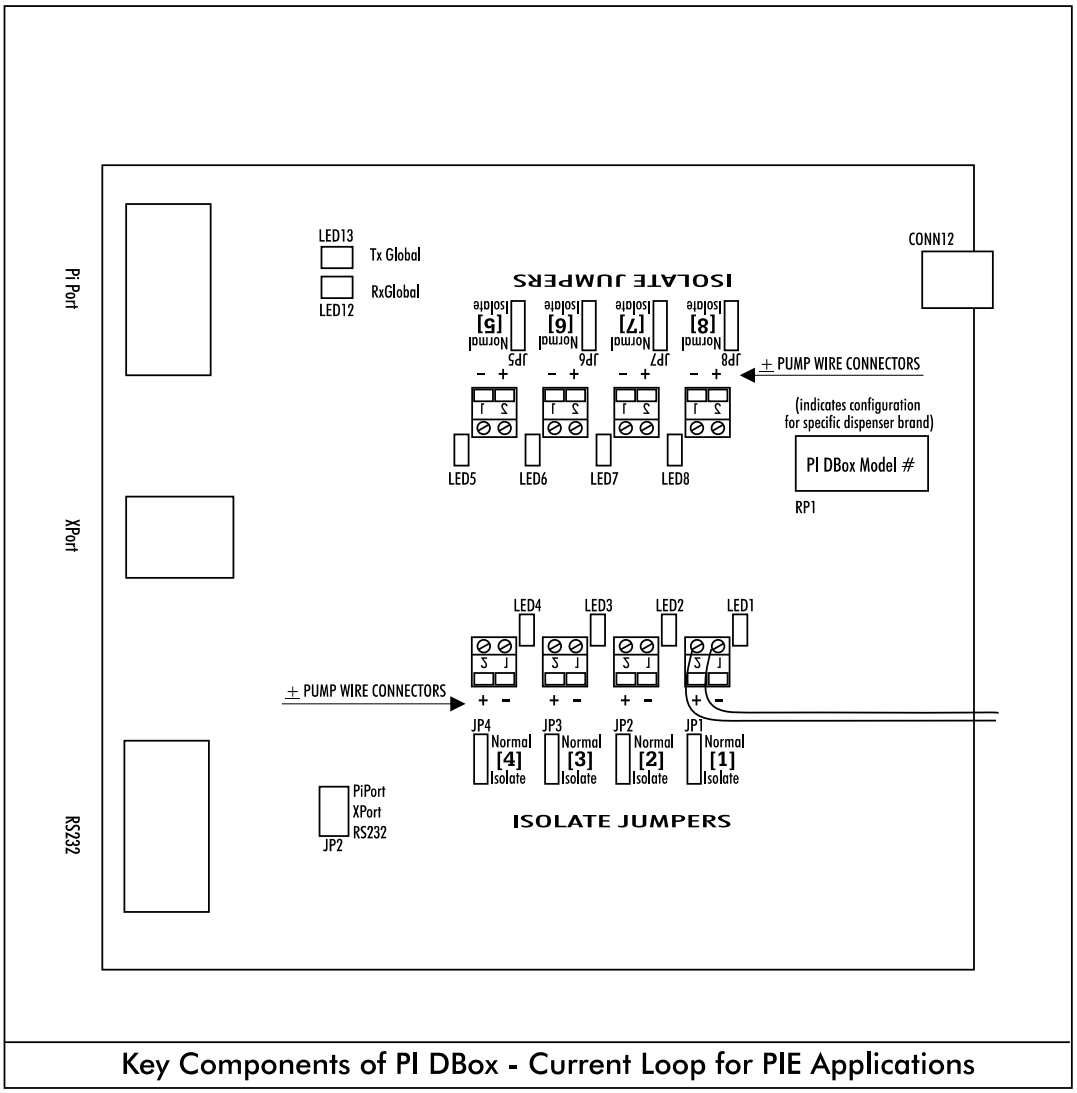
   If connecting through RS422, in addition to selecting RS422 on jumper JP10, jumper selections on positions JP11 and JP12 should be configured to either invert or not to invert the RS422 signal. To invert RS422 signal, jumper the 4 pins closest to labeling of the position. To choose not to invert the RS422 signal, jumper the 4 pins farthest from the labeling of the position. See Jumpering for RS422 Signal Inversion for Stand-Alone Current Loop Style which follows.

4. If linking dispensers, link through the Link Port of the PI DBox to the next PI DBox. There is a *normal/isolate* switch associated with each link. Position JP9 should be jumpered to *isolate* if not linking to a second DBox. JP9 should be jumpered to *normal* for two DBoxes. See Diagram: Key Components of PI DBox — Stand-Alone Current Loop Style.

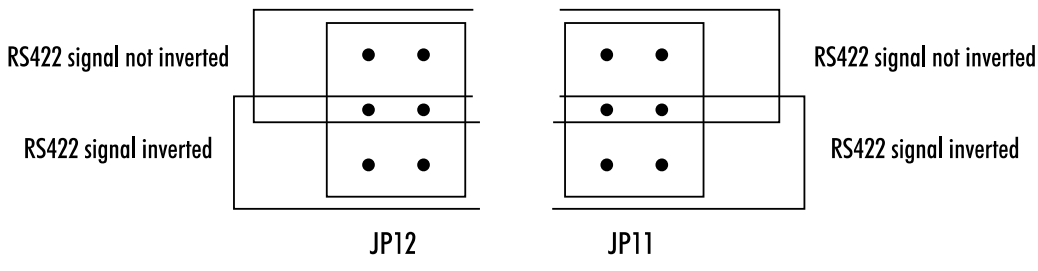
5. Proceed with programming of system.



PI DBox - Current Loop Style for Stand-Alone Applications



Key Components of PI DBox - Current Loop for PIE Applications



Jumpering for RS422 Signal Inversion on Stand-Alone Current Loop Style

PI DBox — Model Specific Installation

Tokheim Style — Tok-DBox

Note all warnings in System Installation Warnings section.

Tokheim Style PI DBoxes are used with Tokheim dispensers. Note dispenser-specific instructions for use with each dispenser. For overview, see Diagram: PI DBox — Tokheim Style on following page.

Follow instructions in the installation section of the accompanying product manual before connecting PI DBox as follows:

1. Connect PI DBox to dispenser. Tokheim dispensers have three wires for connectivity: TTD, TTC, and DCC. For each Tokheim dispenser being connected, bring dispenser wires into the PI DBox and connect to TTD, TTC and DCC on an unused wiring position. Ensure that wires are not crisscrossed at the DBox, as this will prevent communication with the controlling device.

2. Note that above each wiring position in the PI DBox, an isolation jumper is present (positions J2-J5 and J7-J10). Leave these jumpers in *isolate* position until the controlling devices are connected to the DBox. After connecting all dispensers to be used, move jumpers to *normal* for each position connected. Refer to Diagram: Key Components of PI DBox — Tokheim Style.

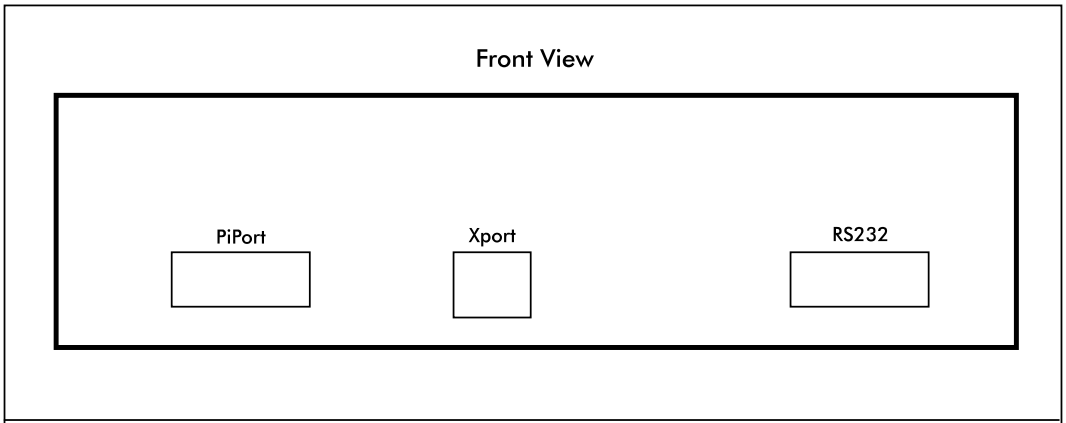
Note: Steps 3-5 in the Tokheim -Style installation procedure are dependent upon the type of application — PIE application or stand-alone application. Give careful attention to which steps are needed for your particular application. Also, refer to the appropriate drawings for jumper settings, interface connections and dispenser wiring.

For applications using PIE products:
For stand-alone applications, see description later in this section.

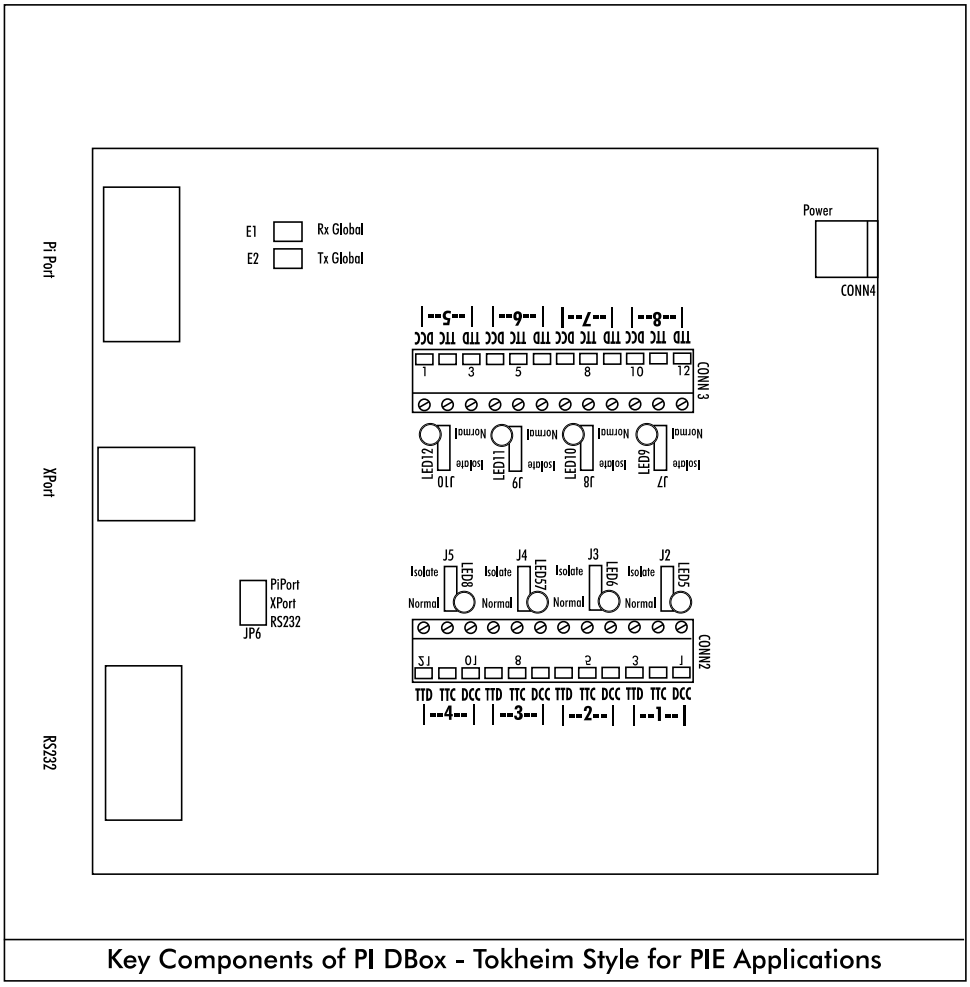
3. Set the jumper on JP2 to the interface type to be used. The PiPort interface is used by the PIcon Console. The RS232 and Xport are used by the FuelDirect Fuel Control Solution.

4. Connect the PIE controller or console to the connector shown on the following diagram. If using ethernet connectivity, refer to the IP Addressing section at the end of this manual.

5. Proceed with programming of the system.



PI DBox - Tokheim - for PIE Applications



Key Components of PI DBox - Tokheim Style for PIE Applications

For stand-alone applications:

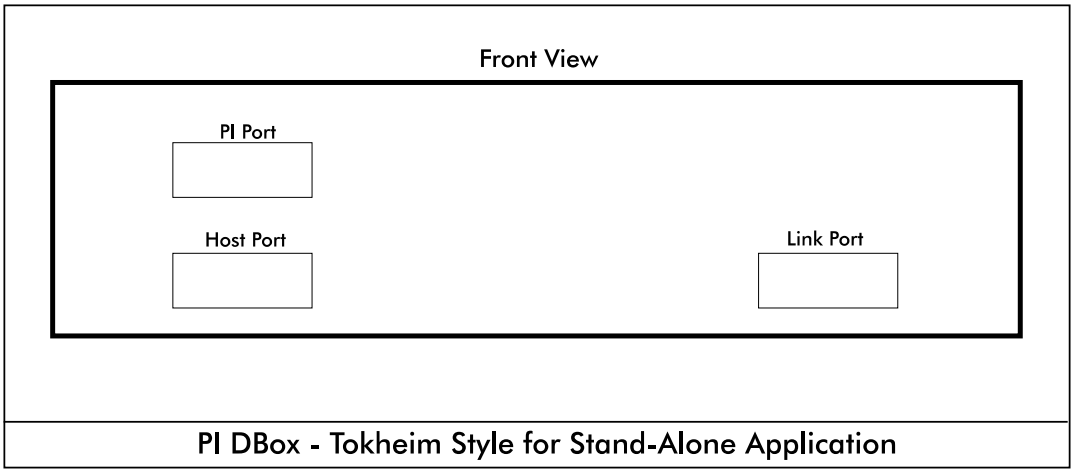
For applications using PIE products, see description earlier in this section.

3. Referring to Diagram: Key Components of PI DBox — Tokheim Style for Stand-Alone Application, connect using the Tokheim standard proprietary interface of Tokheim RS422 interface. Jumpers J13 and J14 must be configured to correspond to the interface selections (*Std* for standard or *422* for RS422).

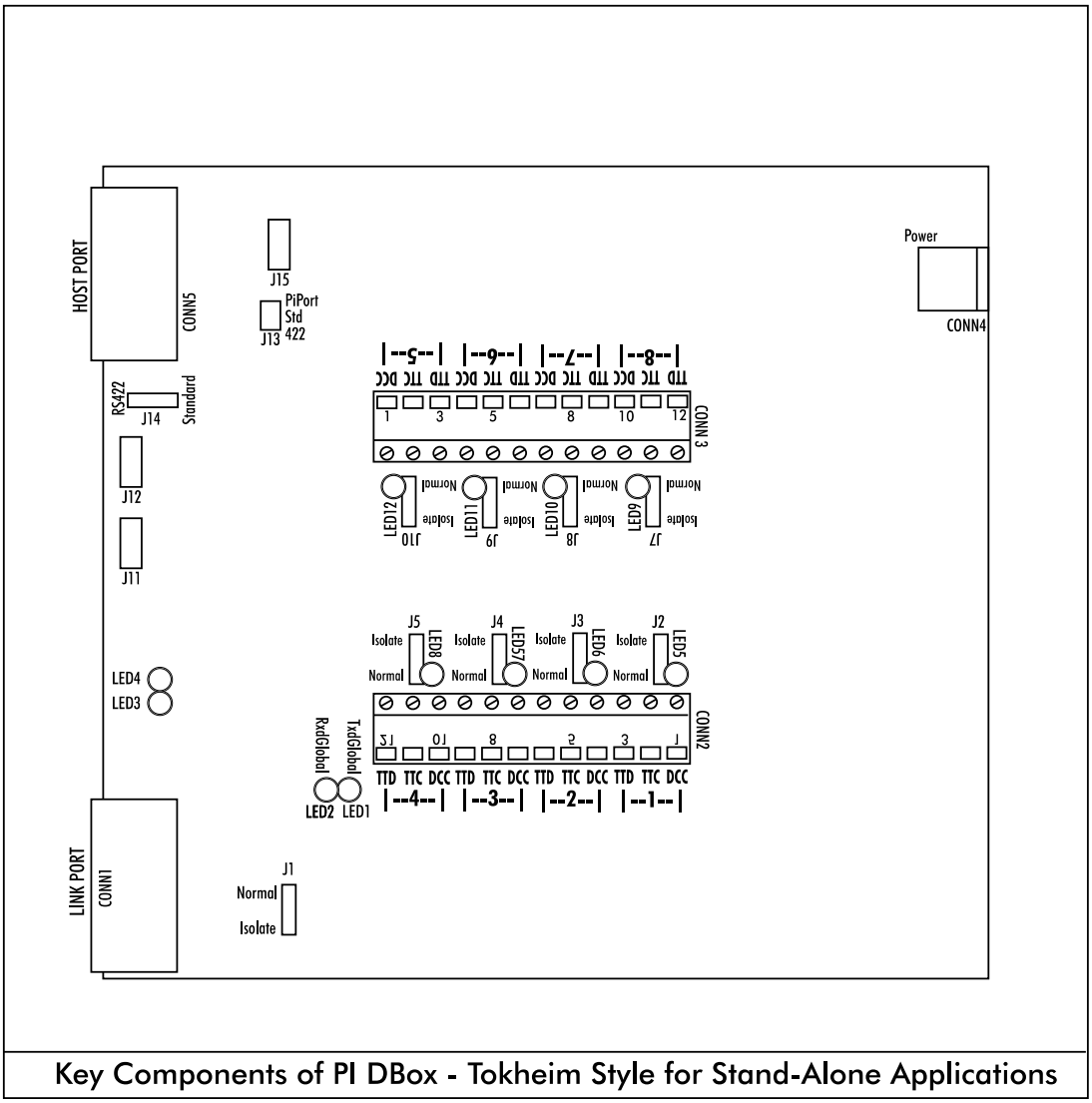
   If connecting through RS422, in addition to selecting RS422 on jumper JP13, jumper selections on positions JP11 and JP12 should be configured to either invert or not to invert the RS422 signal. To invert RS422 signal, jumper the 4 pins farthest from labeling of the position. To choose not to invert the RS422 signal, jumper the 4 pins closest to the labeling of the position. See Diagram: Jumpering for RS422 Signal Inversion on Tokheim Style for Stand-Alone Application which follows.

4. If linking dispensers, link through the Link Port of the PI DBox to the next PI DBox. There is a *normal/isolate* switch associated with each link. Position JP9 should be jumpered to *isolate* if not linking to a second DBox. JP9 should be jumpered to *normal* for two DBoxes. See Diagram: Key Components of PI DBox — Tokheim Style for Stand-Alone Applications.

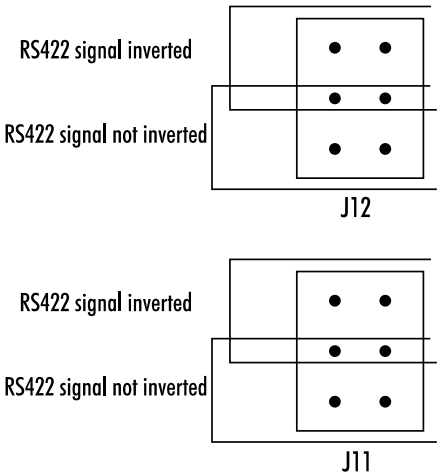
5. Proceed with programming of system.



PI DBox - Tokheim Style for Stand-Alone Application



Key Components of PI DBox - Tokheim Style for Stand-Alone Applications



Jumpering for RS422 Signal Inversion on Tokheim Style for Stand-Alone Application

PI DBox — Model Specific Installation

RS485 Style — RS485 DBox

Note all warnings in System Installation Warnings section.

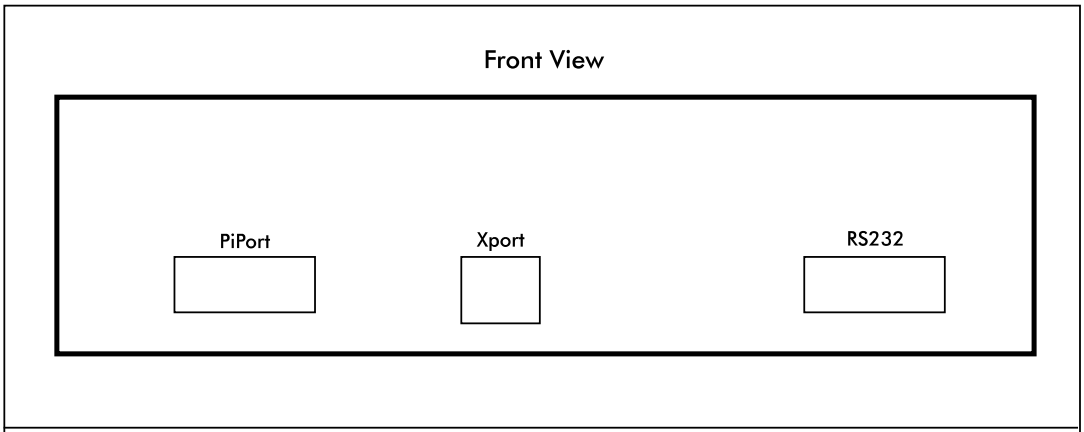
RS485 Style PI DBoxes are used with Wayne CAT card reader, Tokheim DPT, Tatsuno dispenser, and Nuovo Pignone dispenser. Note dispenser-specific instructions for use with each dispenser. For overview, see RS485 diagrams on following page.

Follow instructions in the installation section of the accompanying product manual before connecting PI DBox as follows:

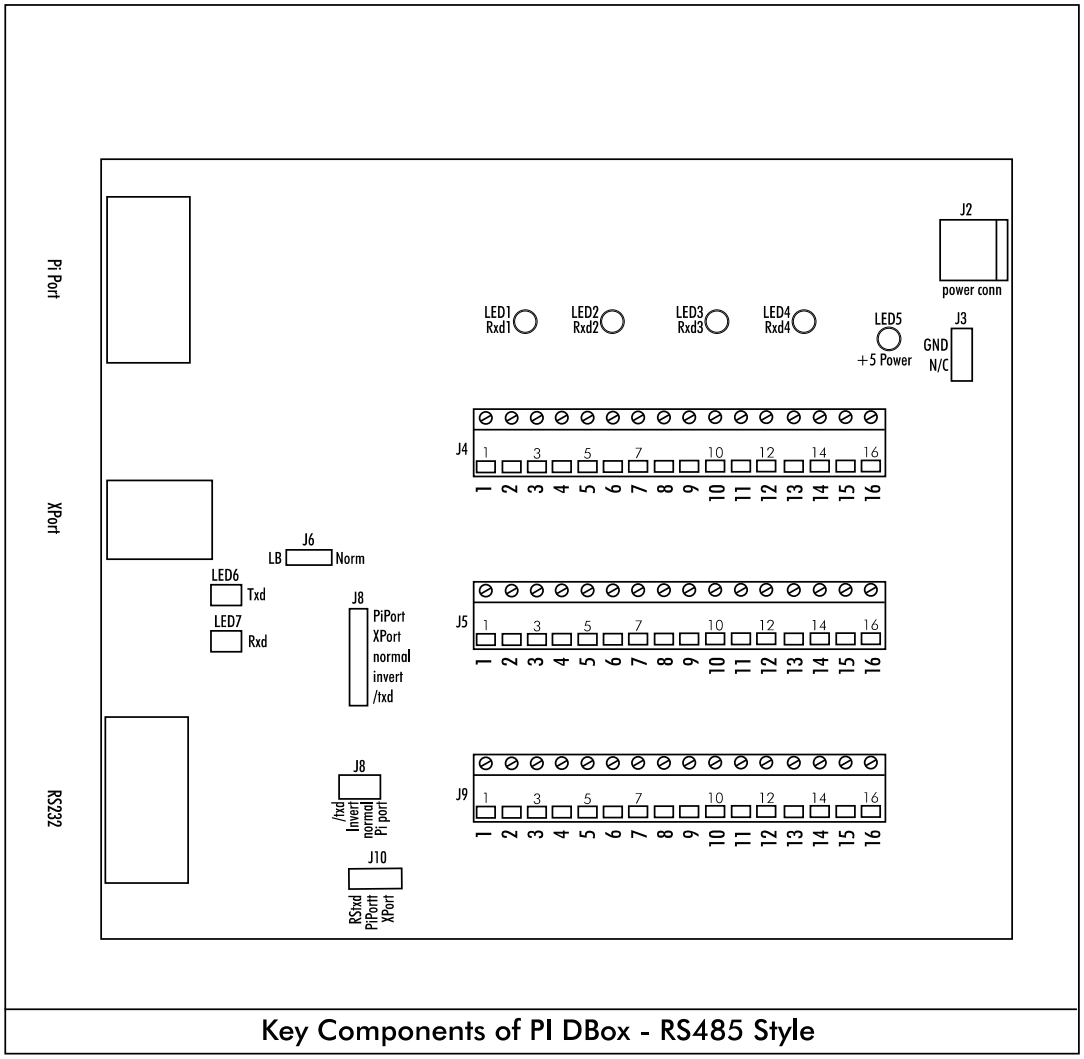
1. Connect PI DBox to dispenser. Dispensers using RS485 communication have three wires for connectivity: +, -, and ground. For each RS485 dispenser being connected, bring dispenser wires into the PI DBox and connect to +, -, and ground on an unused wiring position. Ensure that wires are not crisscrossed at the DBox, as this will prevent communication with the controlling device. Connect no more than four physical devices in each of the four groups of connections (1-4, 5-8, 9-12, and 13-16). Two device addresses are equivalent to two connections.

2. To connect to a PIE console over the PI DBox's PiPort proprietary link, use PIE's 9000 15 0034 cable. Jumper J6 must be set for *LB*. Jumpers J8 and J10 must both be jumpered for *PiPort*. Jumper J3 should be set to *GND*. If connecting to PIE's FuelDirect Fuel Control Solution using the RS232 port, set J8 to */txd* and J10 to *RSTxd*. If connecting to FuelDirect using ethernet, set J8 and J10 to *XPort*. (Refer to IP Addressing section at end of this manual for further instruction on ethernet connectivity.)

3. Proceed with programming of system.



PI DBox - RS485 Style



Key Components of PI DBox - RS485 Style

PI DBox — Model Specific Installation

Kraus Electronic Style — KB DBox

Note all warnings in System Installation Warnings section.

KB DBoxes are used with either Kraus or Bennett Electronic Dispensers. Brand selection is made by simply configuring jumper JP5 to either Kraus or Bennett. Although the same DBox is used in both applications, in this document we refer to either "Kraus Electronic Style" or Bennett Electronic Style" for instruction purposes. Note dispenser-specific instructions for use with each dispenser. For overview of Kraus application see Diagram: Key Components of PI DBox — Kraus/Bennett Style for Kraus Application following this section.

The following Kraus models must have the minimum version of software noted to work properly with Progressive equipment:

Micon 100	
152 printed circuit board	*versions 3.1 & 3.2*
252 printed circuit board	*version 6.30*
463 PLCC processor	*version 7.03*
Micon 200	*version 1.09*
Micon 300	*version 2.04*
Micon 500	*all versions*

Follow instructions in the installation section of the accompanying product manual before connecting PI DBox as follows:

1. Disconnect the Kraus console (if applicable) and connect the Kraus style PI DBox to the PIE product, using the appropriate cable supplied by PIE. Refer to Diagram: PIE Product to PI DBox to Kraus Dispenser which follows.

2. Connect the data communication wires from the Kraus dispenser into the dispenser connectors on the Kraus Style PI DBox. See Diagram: PIE Product to PI DBox to Kraus Electronic Dispensers and Diagram: Key Components of PI DBox — Kraus/Bennett Style for Kraus Application. Also note the layout of the Kraus dispenser head, referring to Diagram: Kraus Dispenser Head Layout. There are three data communication wires connecting to a Kraus dispenser. They are labeled as follows:

   TTC Talk to Console/Kraus dispenser transmit data
   TTP Talk to Dispenser/Kraus dispenser receive data
   DDC Data Common / Kraus dispenser ground

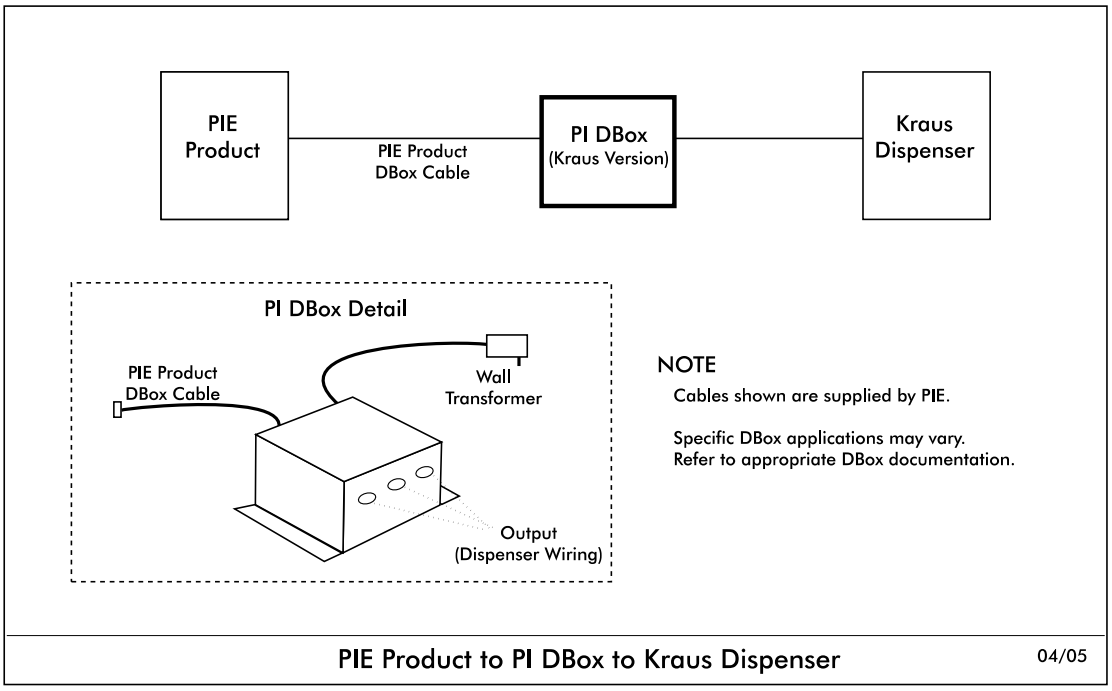
3. Referring to Diagram: Key Components of PI DBox — Kraus/Bennett Style for Kraus Application, configure jumpers. At position JP5, set the jumper to Kraus. Locate jumpers JP4, JP3, and JP2. Jumper the appropriate position for the type of interface to be used:

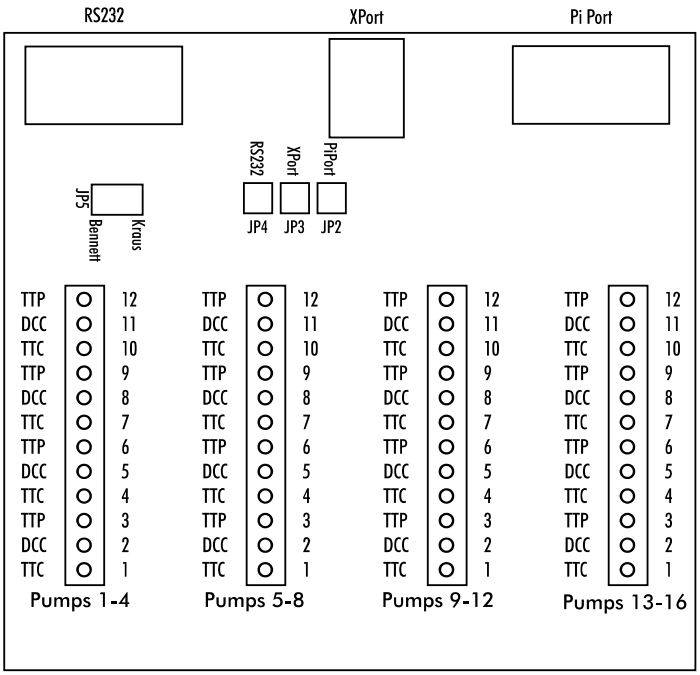
   RS232 interface — jumper only position JP4
   Ethernet (XPort) interface — jumper only position JP3
   PIE product (PiPort) interface — jumper only position JP2

4. Proceed with programming of the system.

Note: For MTI (D&H) computer heads, the TTC and TTP signals must be jumpered to the second address (i.e., 1 to 2, 3 to 4, 5 to 6, ... 15 to 16). Refer to the board orientation for the dispenser position.

The MTI (D&H) heads must be upgraded to the latest hardware version for the communication to operate properly. Please contact MTI (Measurement Technology, Inc.) for upgrades.



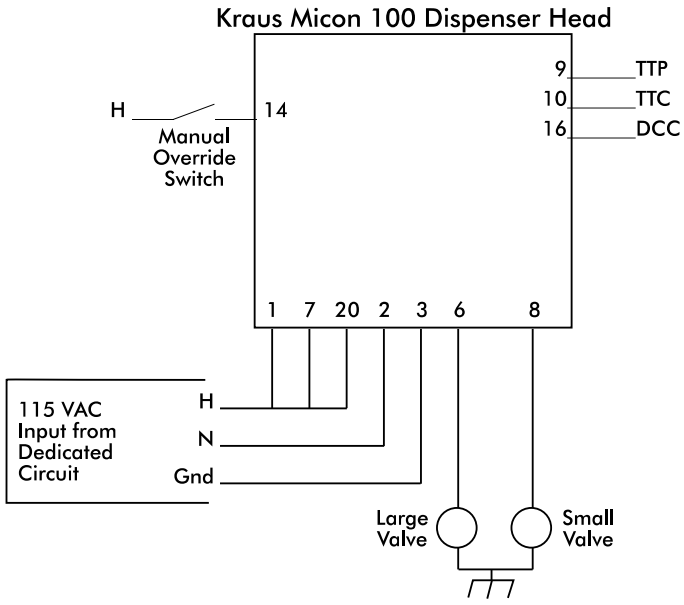


Kraus Dispenser Head Labels

TTC Talk to Console
DCC Data Common
TTP Talk to Dispenser

05/06

Key Components of PI DBox - Kraus/Bennett Style for Kraus Application



Kraus Dispenser Head Layout 04/05

PI DBox — Model Specific Installation

Bennett Electronic Style — KB DBox

Note all warnings in System Installation Warnings section.

KB DBoxes are used with either Kraus or Bennett Electronic Dispensers. Brand selection is made by simply configuring jumper JP5 to either Kraus or Bennett. Although the same DBox is used in both applications, in this document we refer to either "Kraus Electronic Style" or Bennett Electronic Style" for instruction purposes. Note dispenser-specific instructions for use with each dispenser. For overview of Bennett application see Diagram: Key Components of PI DBox — Kraus/Bennett Style for Bennett Application following this section.

Follow instructions in the installation section of the accompanying product manual before connecting PI DBox as follows:

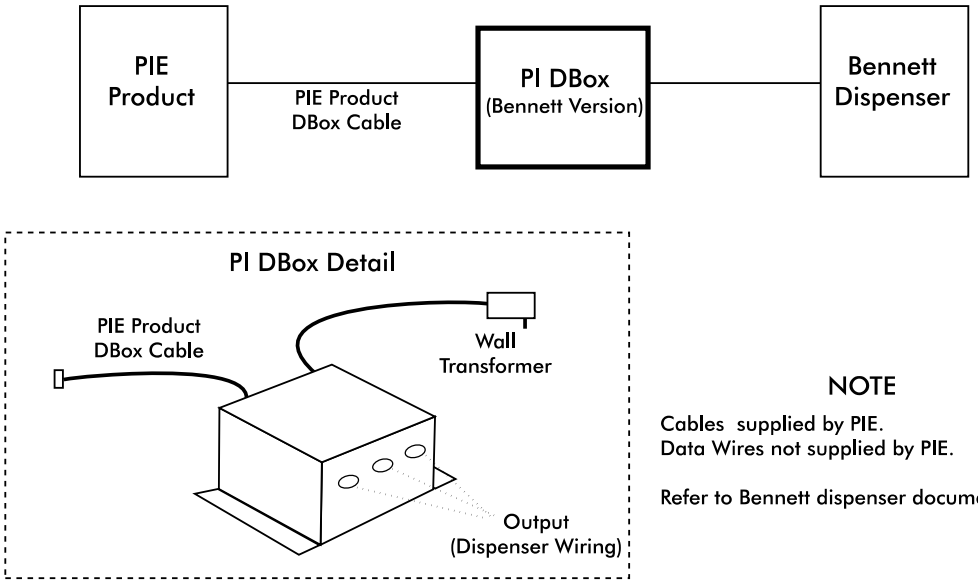
1. Disconnect the Bennett console (if applicable) and connect the Bennett Style PI DBox to the PIE product, using the appropriate cable supplied by PIE. Refer to Diagram: PIE Product to PI DBox to Bennett Dispenser following this section.

2. Connect the data communication wires from the Bennett dispenser(s) (Orange [+] and Yellow [-]) into the dispenser connectors on the Bennett style PI DBox provided by PIE. See Diagram: Key Components of PI DBox — Kraus/Bennett Style for Bennett Application at end of this section for wiring.

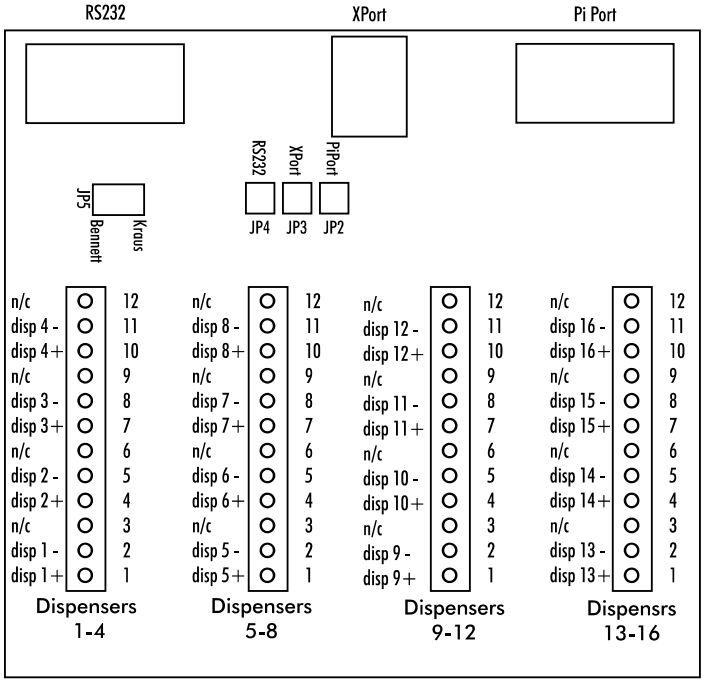
3. Referring to Diagram: Key Components of PI DBox — Kraus/Bennett Style for Bennett Application, configure jumpers. At position JP5, set the jumper to Bennett. Locate jumpers JP4, JP3, and JP2. Jumper the appropriate position for the type of interface to be used:

   RS232 interface — jumper only position JP4
   Ethernet (XPort) interface — jumper only position JP3
   PIE product (PiPort) interface — jumper only position JP2

4. Proceed with programming of the system.



PIE Product to PI DBox to Bennett Dispenser 04/05



Key Components of PI DBox - Kraus/Bennett Style for Bennett Application 05/06

PI DBox

Troubleshooting and Diagnostics

LED Indicators

When installing the PI DBox, refer to on-board LED indicators for troubleshooting assistance. LED layout is illustrated for Current Loop Style, Tokheim Style and RS485 Style PI DBoxes in Diagram: Key Components of PI DBox under the manual section for each of these specific styles.

Additional Troubleshooting Steps for Unsuccessful Communications

- Run one dispsenser only by isolating all the rest at the site.
- Recheck wires at dispenser junction box, as well as in the PI DBox
- On PI DBox models with power supply, make sure power is applied.
- Make sure console or controller is plugged into the correct connector on the front of the PI DBox.
- Ensure that all configuration jumpers or switches are set correctly for the application.

PI DBox
IP Addressing

The default IP address for the PI DBox is 192.168.0.200. When the IP jumper is installed, the default address changes to 192.168.0.199. Since each device at the site must have a unique IP address, it may be necessary to reconfigure all DBoxes to avoid conflicting addresses on the network. The IP address for each PI DBox may be changed by following one of two procedures.

Changing IP Address

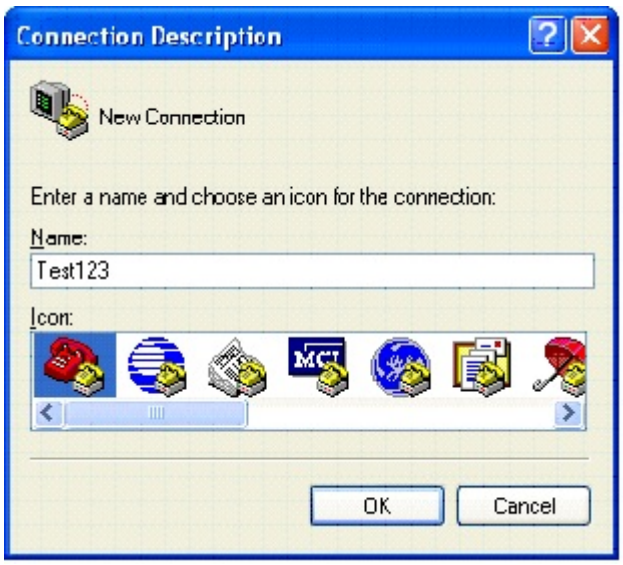
Using either of these methods to change the IP address of a PI DBox, the default IP jumper must be installed and must remain installed throughout the entire procedure. Once the procedure is completed, remove the jumper and reset the DBox.

Preferred Method: Run Device Installer

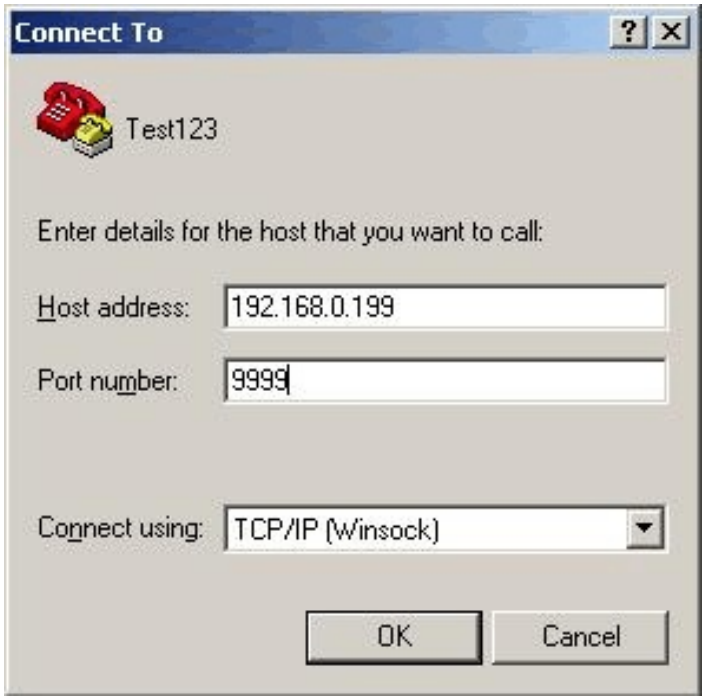
Install the IP jumper, power cycle the DBox and then run Lantronix Device Installer. (Lantronix Device Installer is on the install disk supplied by Progressive International or may be found at the Lantronix wed site lantronix.com.) Once the update is complete, remove the jumper and reset the DBox.

Alternative Method: Run HyperTerm configure and set up a new connection using Winsock with TCP protocol

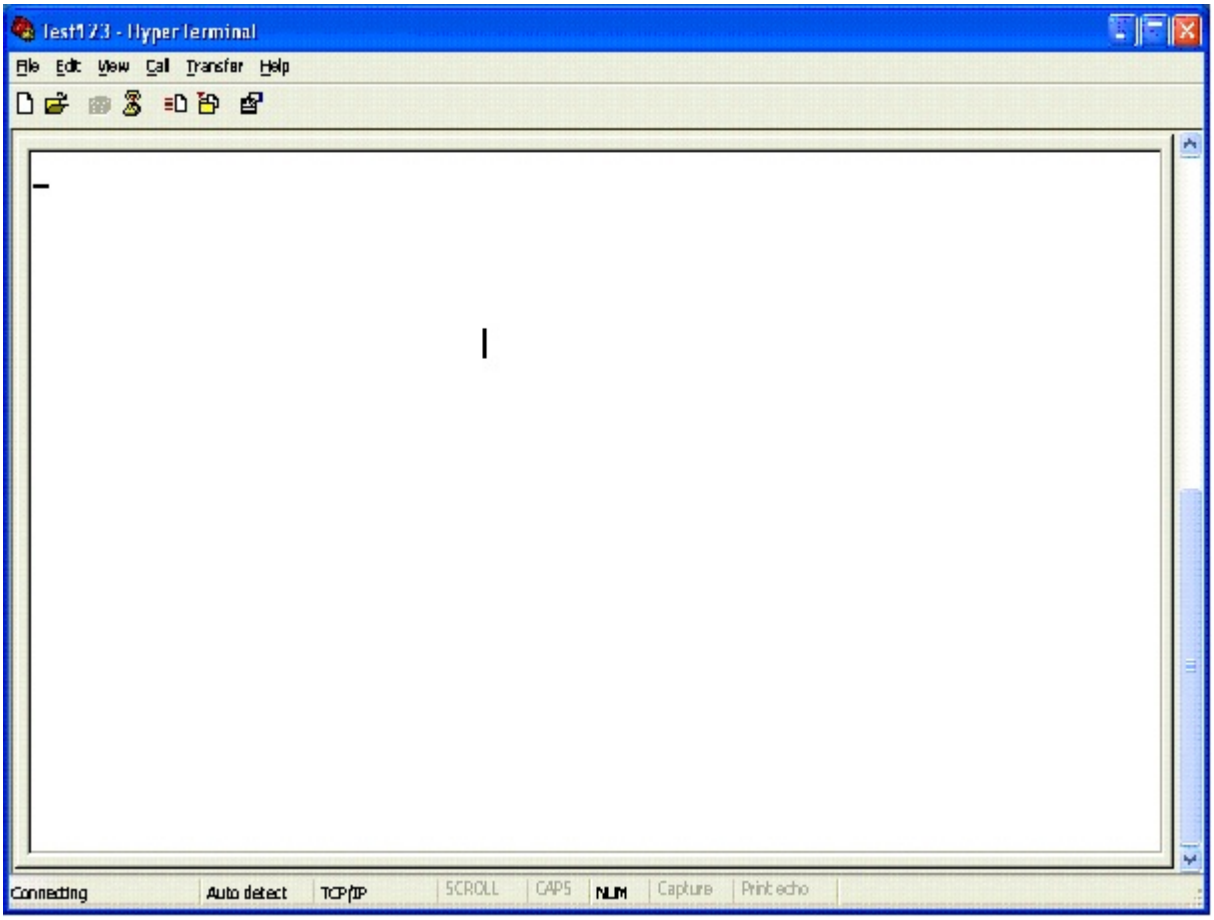
Install the IP jumper and power cycle the DBox. Then run HyperTerm configure and set up a new connection using Winsock with TCP protocol. Under Name, select any name for the session. Icon to appear onscreen may be changed under the Icon selection. Click on OK. *See Connection Description dialog box below*.



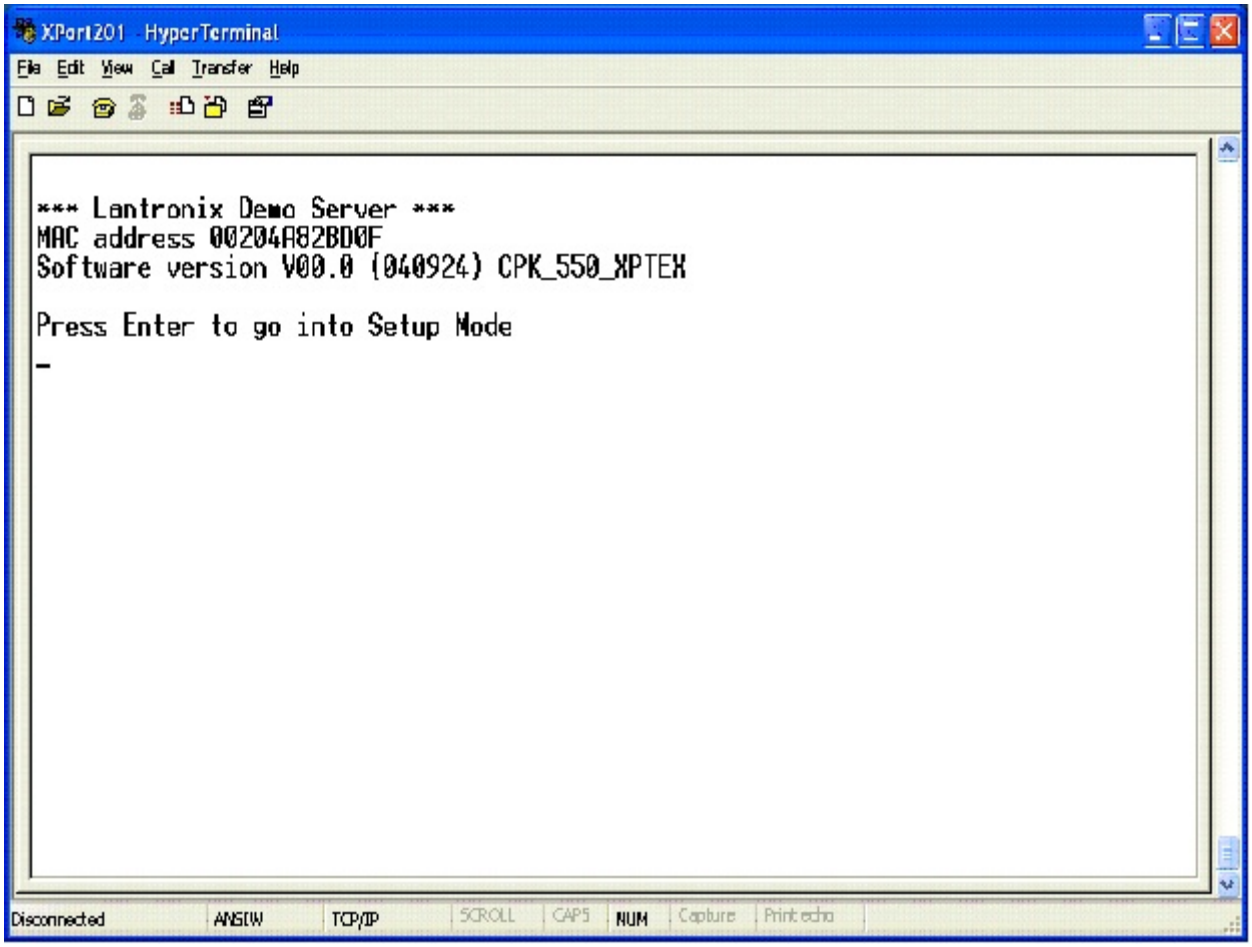
Set the Host Address to the DBox default of 192.168.0.200. Set the Port Number to 9999. Under Connect Using, select TCP/IP (Winsock). Click on OK. See Connect To dialog box below.



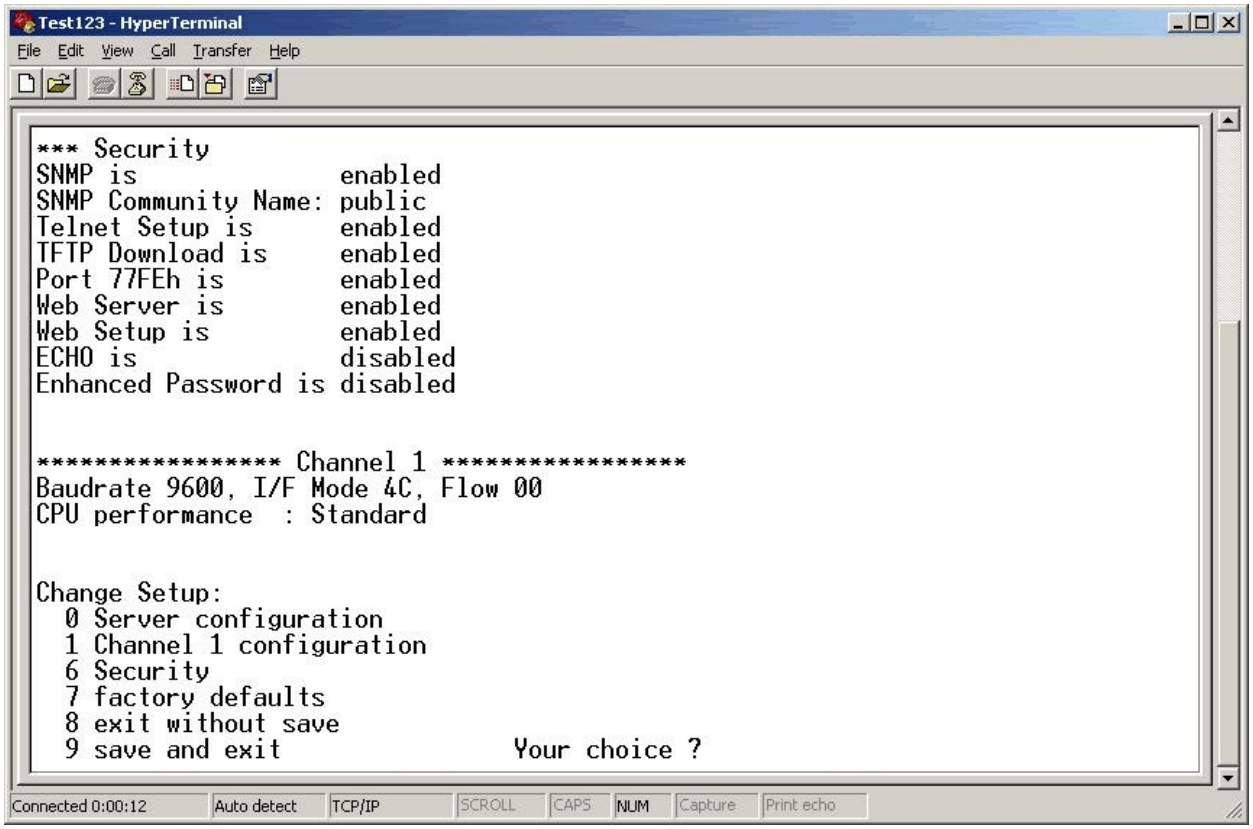
HyperTerm screen will appear as shown below.



Make sure the DBox is connected to the network and apply power to the DBox. The following message will appear on the Hyperterm session. (Note that your DBox mac address will be different for each unit.)

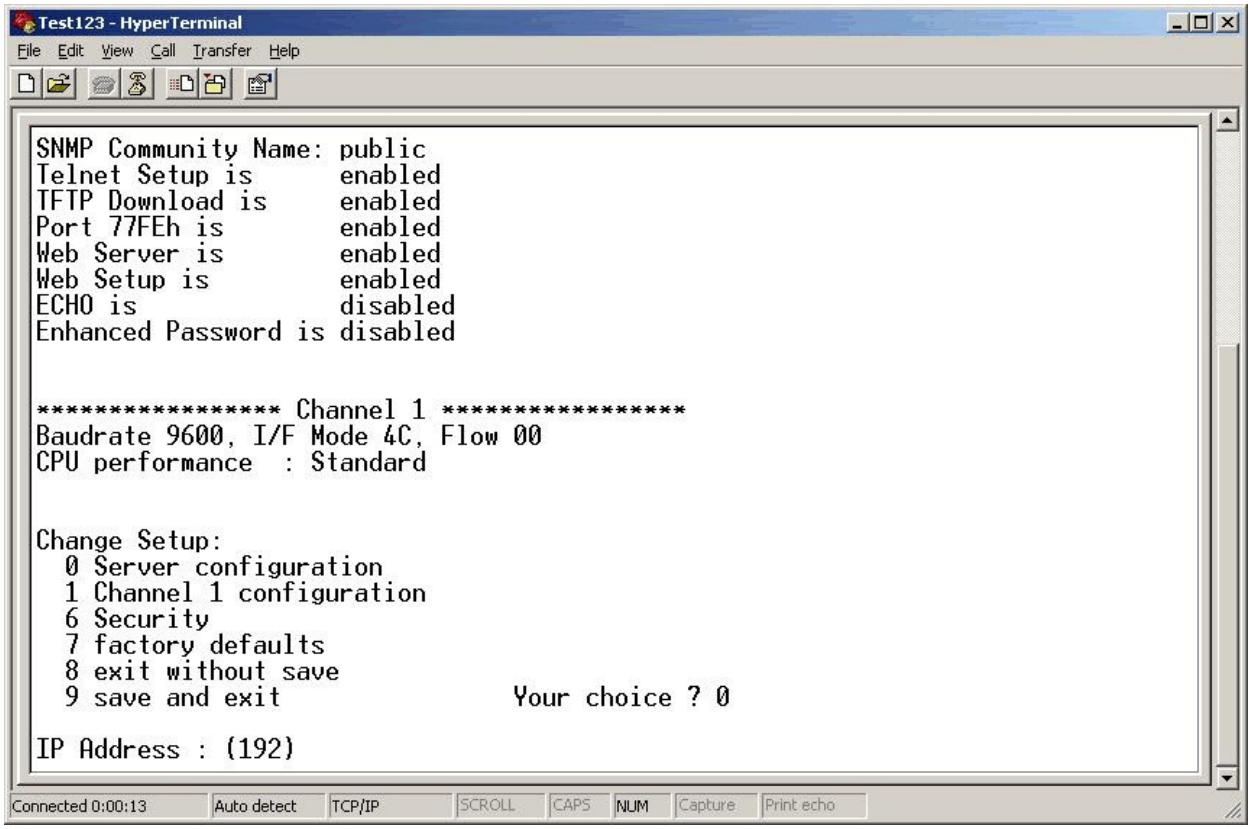


After pressing Enter, the following screen will appear.

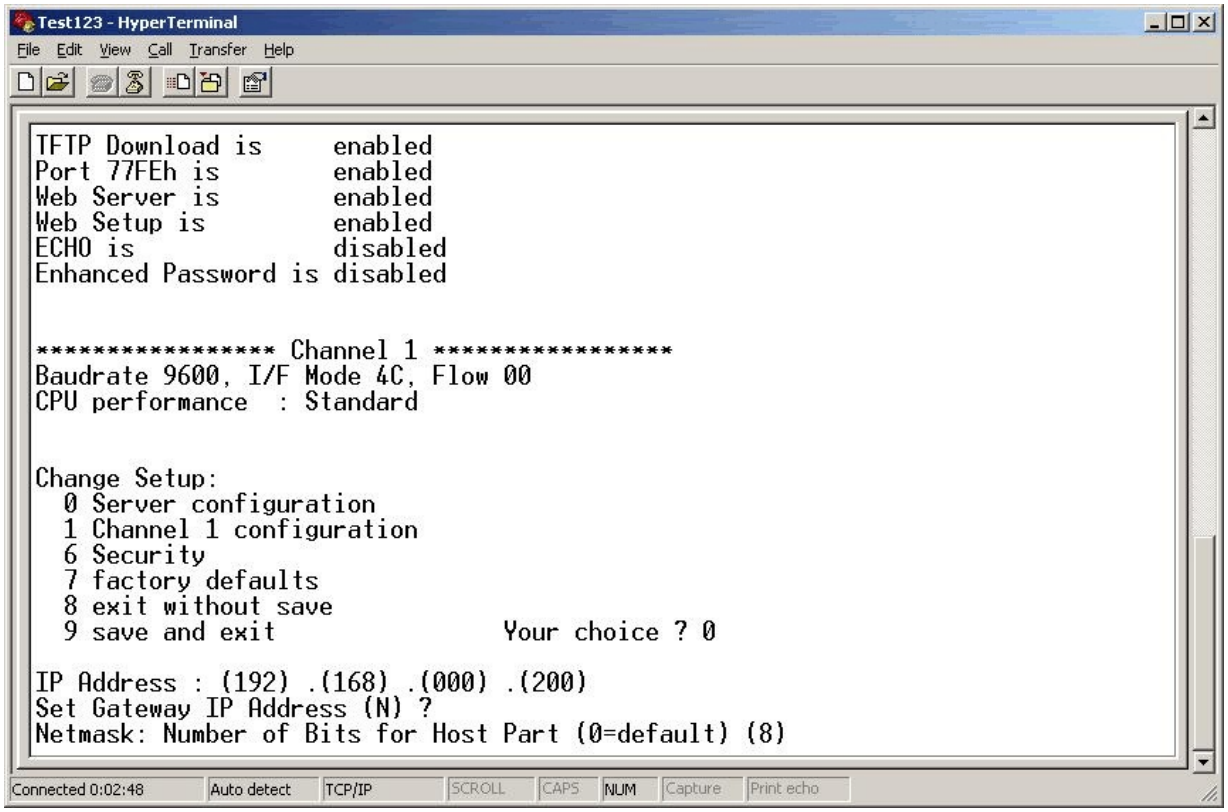


Select option 0 for Server Configuration and the following screen will appear. Assign new numbers for the first field of the IP address and press Enter or leave unchanged and press Enter to keep the first field the same. You will be prompted to assign new numbers for the second field or to accept the default numbers by pressing Enter. This process continues for each of the four fields. Only one number in one field must be changed to make the IP address unique — or each of the fields may be changed if it provides a more systematic setup for the programmer. (Use caution that numbers do not fall outside the range of the SUBNET MASK.)

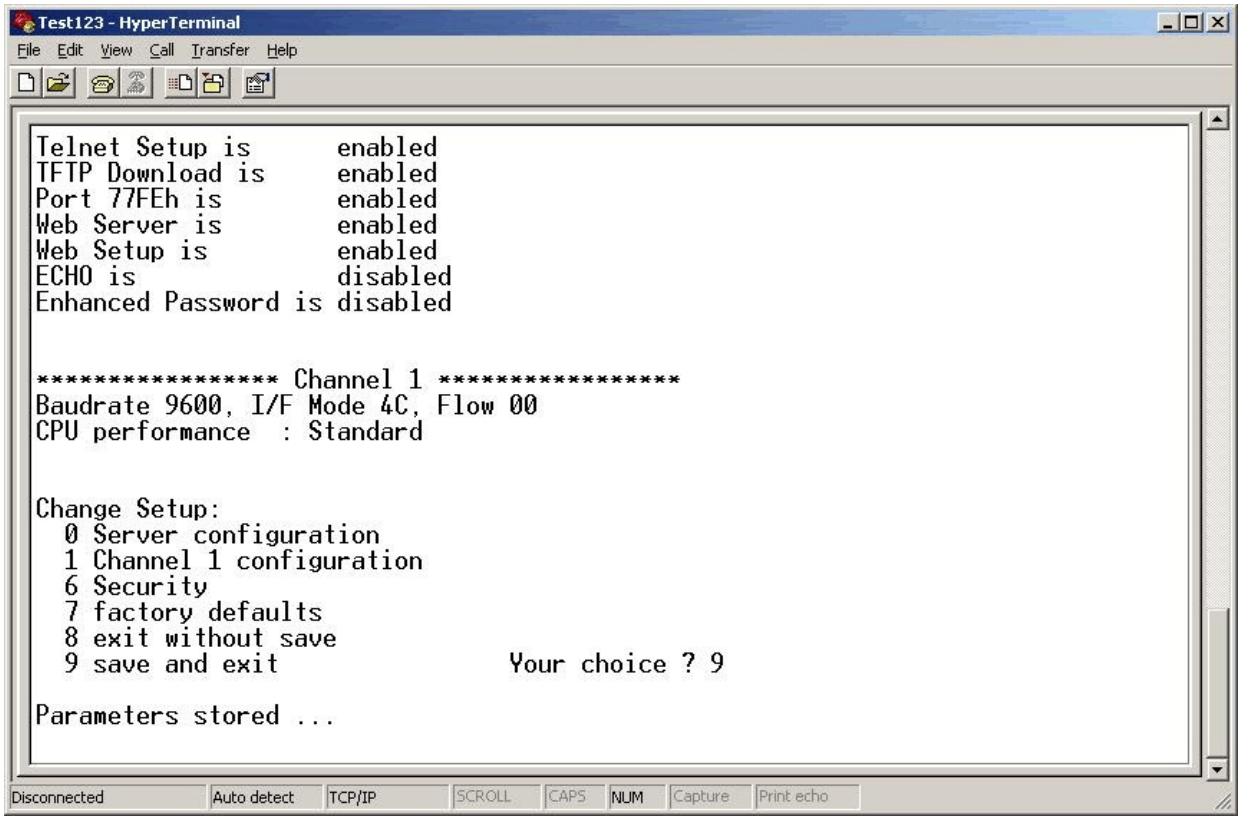
Press Enter for all other options.



The following screen will appear, showing the changed IP address.



Double check under the basic parameters listing to make sure your new IP address is correct. If correct, select option 9 to save and exit. If changes need to be made, select option 0 to reenter the server configuration mode.



Remove the IP jumper and reset the DBox. At this point the PI DBox is reconfigured and ready to connect to the system network for site installation and testing.