



Operator Manual

FB4000 Series Instrument



Amendment Record

FB4000 KERNEL

Document 51364

Manufactured by Fairbanks Scales Inc.

| | | |
|------------|---------|---------------------------------------|
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Section 1: General Information

1.1. Introduction

The Fairbanks FB4000 Solutions Series instrument is a powerful, versatile, indicator which has flexibility, open architecture, and integrated capabilities of many computer functions. With these abilities, the FB4000 collects, processes, and transmits data through RS232, RS485, RS422 serial ports, USB, and 10/100/1,000 Mbs Ethernet interfaces.

1.2. The FB4000

Current FB4000 Units include the following applications:

- Kernel Weight Server Program
- LabelBank Application
- Enhanced In/Out
- Highway System

1.3. Kernel Description

The FB4000 Kernel is weight serving program for all FB4000 applications. It provides the core metrological functions for all the applications. It includes the following additional features:

- Multicasting capability to monitor and operate multiple scales across a network.
- Backup and Restore feature.
- Programmable Serial Communication Outputs



1.3. Kernel Description, Continued

- Intalogix equipped units have load cell diagnostics features for easier troubleshooting capabilities.
- An integrated e-mail client is configurable to alert a service organization or individual of a problem prior to total failure.
 - These error notifications include such warnings as load cell failure, low memory, calibration change,
 - Flash memory error, and several other notifications to keep the proper individuals informed of the scale’s operating condition.
 - Uses the customer’s existing email infrastructures, and requires a connection to the customer’s Network.
 - Requires a connection to the customer’s PC Network.
- Depending on the Load Cell Interface installed, the **FB4000** Kernel program is designed to function with platform scales equipped with the following:
 - Intalogix™ Technology
 - Analog Load Cells
 - Mettler Toledo DigiTol™ Load Cells.
- The instrument **can control up to eight (8) scales**.
- Multi-scale **viewing capability of up to four (4) scales** at once is also a standard feature.
- The FB4000 Kernel uses the following Modes of Operation:
 - Gross Only
 - GTN (Gross / Tare / Net)

1.4. Technical Specifications

| | |
|--------------------------------|---|
| ENCLOSURE | <ul style="list-style-type: none"> • Stainless Steel (NEMA 4X) |
| SCALE INTERFACE OPTIONS | <ul style="list-style-type: none"> • Intalogix Technology <ul style="list-style-type: none"> – Intalogix Power Supply and Communications (30916) – External Intalogix Communication Box (33476) <ul style="list-style-type: none"> ▪ <i>Maximum of sixteen (16) 1000 Ω or ten (10) 350 Ω cells</i> – External Dual Intalogix Communication Box (32181). <ul style="list-style-type: none"> ▪ <i>Up to thirty-two (32) 1000 Ω or twenty (20) 350 Ω cells.</i> • Analog Technology <ul style="list-style-type: none"> – Internal Analog Load Cell Interface Kit (A/D Converter PCB Assy) (31079) – PCB Assy A/D Converter (30997) <ul style="list-style-type: none"> ▪ <i>Up to sixteen (16) 1000 Ω or eight (8) 350 Ω cells</i> ▪ <i>Excitation 5 VDC</i> |



| | |
|---------------------------|--|
| POWER REQUIREMENTS | <ul style="list-style-type: none">• 100 - 240 VAC @ 2A @ 47 - 63 Hz<ul style="list-style-type: none">— Separate and dedicated circuit.— Neutral to Ground voltage should be ≤ 0.2 VAC— One Amp (1A) is typical. Twelve Amps (12A) is a fully equipped model. |
| ETL LISTED | <ul style="list-style-type: none">• Conforms to UL STD 60950-1.• CAN/CSA C 22.2 NO.60950-1-03. |
| APPROVALS | <ul style="list-style-type: none">• CC# 15-064 |

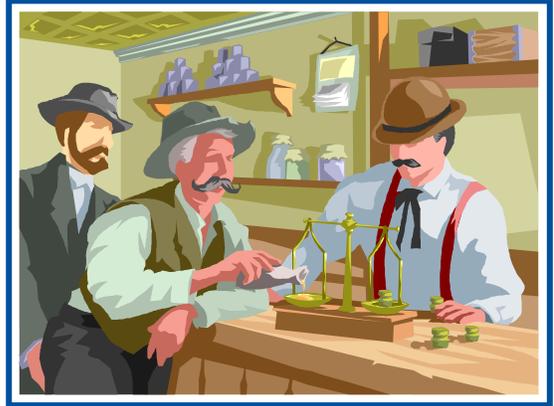
1.5. Features

| | |
|---|--|
| <p>DIAGNOSTICS / EMAIL ERROR REPORTING</p> | <p>Built-in self-diagnostics report and can generate emails on the following:</p> <ul style="list-style-type: none"> • CONFIG / CALIB NEEDS BACKUP • CELL MOTION ERROR • CALIBRATION WARNING ERROR • DATABASE BACKUP FAILED • DATABASE CONNECTION ERROR • DATABASE RESTORED FAILED • ERROR ACCESSING DATABASE RECORDS • ERROR ACCESSING FIRST RECORD • FLOAT SWITCH ON • INSTRUMENT CONFIGURATION CHANGE • LOAD CELL FAILURE • LOAD CELL GHOSTED • PEAK WEIGHT CHANGED • REMOTE ACCESS ON • ROUTINE MAINTENANCE REQUIRED • SCALE BEHIND ZERO • SCALE CALIBRATION CHANGE • SCALE CAPACITY EXCEEDED • SECTIONAL ERROR • SCALE TRIMMED • TIME / DATE CHANGE • TABLE OPEN FAILED • UNAUTHORIZED ACCESS ATTEMPT • ZERO SHIFT / CHANGE |
| <p>LOAD CELL FLAG</p> | <p>Visual “flags” identify problem load cell(s) on diagnostic screen until flag is manually cleared to identify intermittent problems.</p> |
| <p>LOAD CELL GHOSTING</p> | <p>Ability to electronically “mimic” or duplicate a failed load cell if equipped with Intalogix™ Interface for load cell communications (preventing system failure and/or shutdown).</p> |
| <p>ERROR DISPLAYING</p> | <p>Programming-selected display of error messages.</p> |
| <p>BACKUP</p> | <p>Features the ability to backup information to network or USB pen drive.</p> |

Section 2: Customer Responsibility

2.1. Users' Responsibilities

It is **the customer/operator's responsibility** to ensure the equipment provided by Fairbanks is operated within the parameters of the equipment's specifications and protected from accidental or malicious damage.



WARNING!

Absolutely no physical, electrical or program modifications other than selection of standard options and accessories can be made by customers to this equipment

Repairs are performed by Fairbanks Scales Service Technicians and Authorized Distributor Personnel ONLY!

Failure to comply with this policy voids all implied and/or written warranties

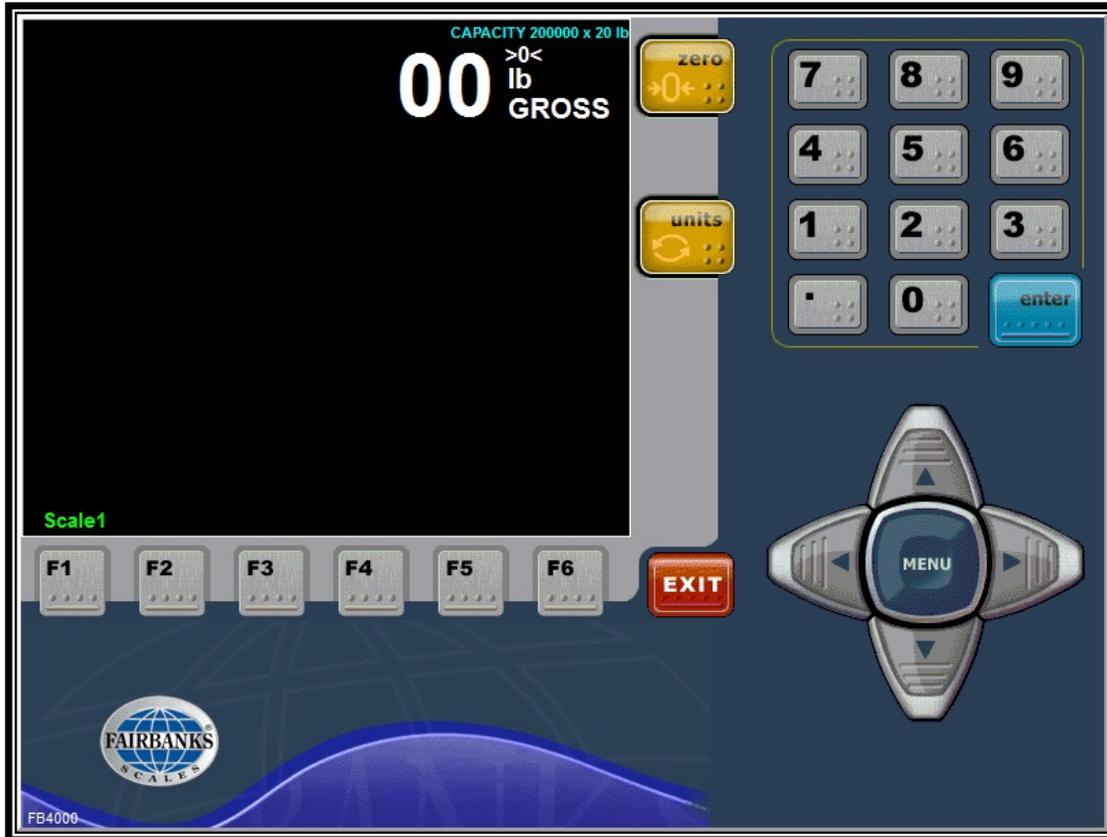
2.2. Equipment/ Component Care

- ✓ **Do not remove power** from this unit unless it is performed by the proper shut down method. Failure to comply with the proper shut down procedures can result in damage to the drive or data.
- ✓ The AC receptacle/outlet shall be located near the instrument and easily accessible.
- ✓ Electrical connections other than those specified may not be performed.
- ✓ Absolutely **no physical, electrical or program modifications** other than selection of standard options and accessories are to be made to this equipment.
 - Electrical connections other than those specified may not be performed, and physical alterations (holes, etc.) are not allowed.
- ✓ The equipment consists of printed circuit assemblies which must be handled using proper ESD handling procedures.
 - Replacement of individual components is not allowed.
 - Any assemblies which are replaced must be properly packaged in ESD protective material if they are returned for replacement credit under a warranty condition.



Section 3: Key Functions and Menus

3.1. Kernel Menu Key Functions



| On-Screen Keyboard | External Keyboard | Description |
|--------------------|-------------------|---|
| Arrows | Arrows | <ul style="list-style-type: none"> • Navigates through the display. • Used also for scrolling. |
| Menu Button | Esc | <ul style="list-style-type: none"> • Changes the display to the Operation Menu. • Returns user to the previous menu. |
| Zero | Pause Break | Key(s) will Zero the Scale . |

3.1. Kernel Menu Key Functions, Continued

| On-Screen Keyboard | External Keyboard | Description |
|----------------------------|----------------------------|--|
| Units | Scroll Lock | Changes the units of weight displayed, depending on the selection made in the Calibration Menu . |
| 0 to 9 | 0 to 9 | Used to enter numeric data, such as tares and IDs. |
| Pause/ Break | Pause/ Break | Mimics the Exit application button |
| Ctrl+Alt+ Enter | Ctrl+Alt+ Enter | From weigh screen prompt for Customer / Configuration Password |
| Enter | Enter | Stores selections into memory during data entry or programming. |
| F1 | F1 | Step to next scale. |
| F2 | F2 | Programmable Key |
| F3 | F3 | Programmable Key |
| F4 | F4 | Programmable Key |
| F5 | F5 | If Scale Grouping is Enabled and ≥ 5 Scales Toggle Scale Group otherwise treat as Programmable Key. |
| F6 | F6 | Toggle between GTN and Multi Scale display |
| | F7 | N/A |
| | F8 | Units key |
| | F9 | Zero key |
| | F10 | Show Scan / Rescan screen |
| | F11 | Minimize |
| | F12 | N/A |

The Kernel can be set up to operate in one of two **Modes of Operation**, depending upon the service programming:

- **Gross Weighing**
- **GTN (Gross / Tare / Net)**

3.2. General Programming Menus

The programming menus which contain all the parameters for the system are listed below.

Options Menu

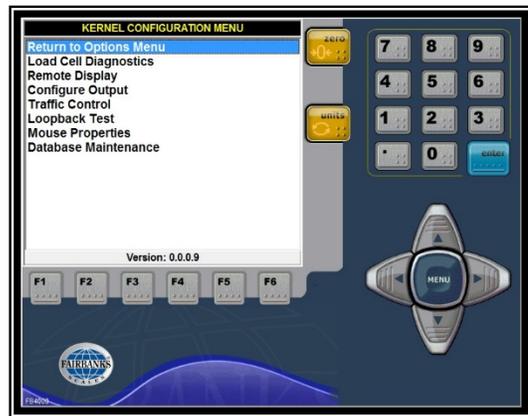
This is the main menu, used to **gain access to other system menus for configuration and calibration.**

- It is accessible without a password by pressing the **MENU** key.
- Access provided for **Weights and Measures Official** to view the **Audit Trail** for calibration and configuration changes.
- Quick access to electronic **Operators' Manual**.



Configuration Menu

This menu is used to access **diagnostics utilities** and **communications programming.**

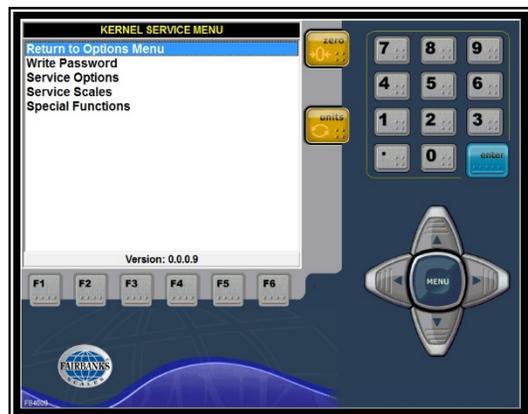


Service Menu

This menu is used to program the **metrological parameters of the system**, such as **scale capacity, calibration**, and **graduation size.**

- **Must be** password protected for all **Legal For Trade** applications.

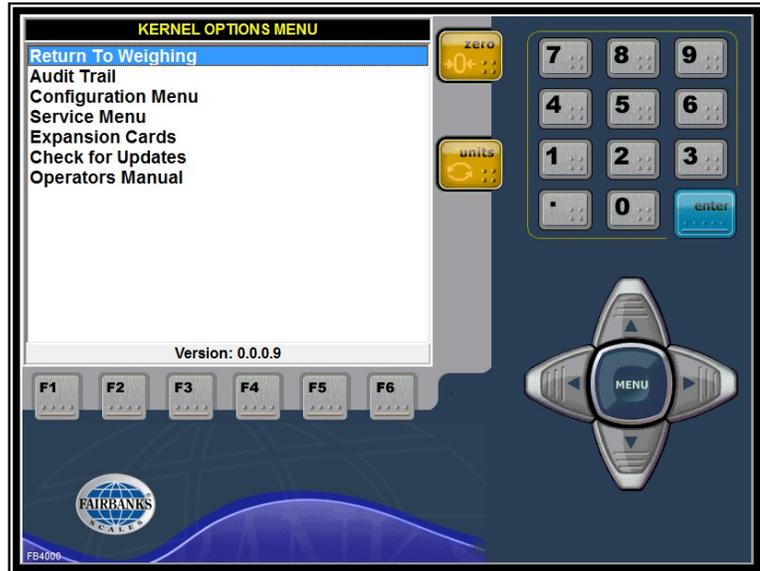
The Service Menu functions are used by Fairbanks Authorized Service Personnel ONLY.



3.3. Defining the Main Menus

3.3.1. Options Menu Descriptions

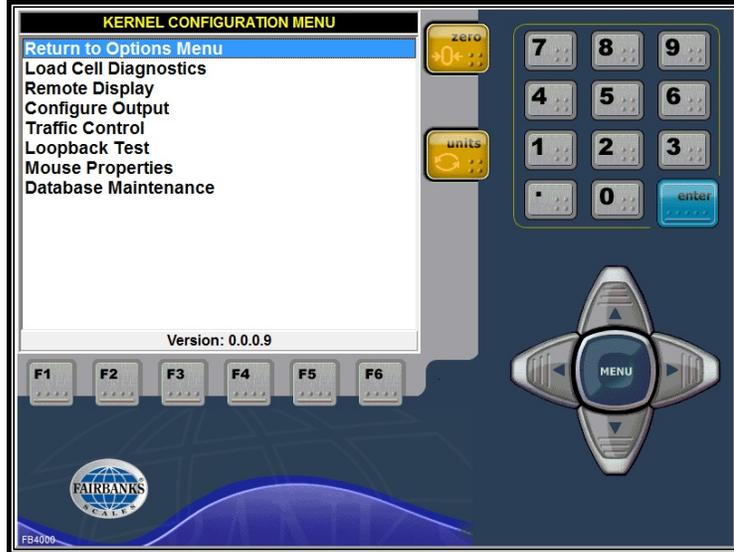
1. Press the **MENU** button while viewing the **Weight Processing** screen.
2. From the **Kernel Options Menu**, double-click on **any menu** to access.



| Window Name | Description |
|---------------------------|--|
| RETURN TO WEIGHING | Returns user to Weighing Application Window . |
| AUDIT TRAIL | Identifies how many times and exactly when someone changes the scale's Calibration or Configuration settings. <ul style="list-style-type: none"> — Used by Weights & Measures Officials for determining scale integrity. — Cannot be changed or modified. |
| CONFIGURATION MENU | Used to access diagnostics utilities and communications programming. |
| SERVICE MENU | Accesses calibration and other metrological functions of the indicator. <ul style="list-style-type: none"> — Must be password protected in the NTEP Application. |
| CHECK FOR UPDATES | <ul style="list-style-type: none"> • Manually checks the Updates Folder for new software revision downloads. • Must have Internet connection for this feature. |
| OPERATORS MANUAL | Opens a PDF file of the Operators Manual . |

3.3.2. Configuration Menu Descriptions

3. Press the **Down Arrow** button while viewing the **Options Menu** screen. Scroll down until the **Configuration Menu** is highlighted and press the **Enter** button.
4. At the **Kernel Configuration Menu** screen, double-click on **any menu** item to access.



| Window Name | Description |
|-------------------------------|---|
| RETURN TO OPTIONS MENU | Returns the display to the Options Menu display. |
| LOAD CELL DIAGNOSTICS | Displays the counts and status of the load cell(s). It also provides access to the Ghosting service tool. |
| REMOTE DISPLAY | Configures COM Port which the remote display uses. |
| CONFIGURE OUTPUT | Configures COM ports and data protocol strings for each port. |
| TRAFFIC CONTROL | Lights connected to a relay box to control vehicle traffic using the scale |
| LOOPBACK TEST | Tests the individual COM Ports and used for troubleshooting. |
| MOUSE PROPERTIES | The mouse settings are adjusted to personal preferences of operation. |
| DATABASE MAINTENANCE | Used to backup and synchronize scales and scale data. |

3.4. Backing Up Changes

Each time a programming change is made to the Kernel Program, a **Backup Changes** popup window appears. A backup file can be created and stored in the local directory (c:drive) in a SQL format.

- It is not recommended to create a backup for each new configuration change so the normal procedure is to click **NO**.

- Either double-click the  or click the .

NOTE: Backup changes **ONLY WHEN** the programming change(s) are correct, finalized and the system is proven to operate properly for all conditions.

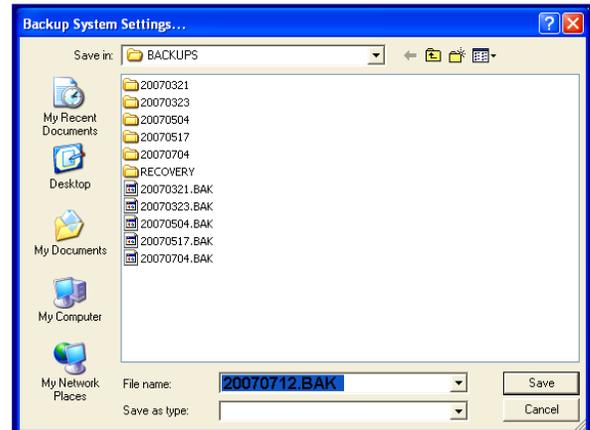
3.5. Saving Changes to a Folder

- For backing up the changes to a folder, click either the 

- or on the **Weight Screen's keypad**, click the .

-
- Each file is saved by the date.
- (yyyymmdd.BAK).

IMPORTANT NOTE: Backup **EVERY** Configuration change... **EVERY TIME!**



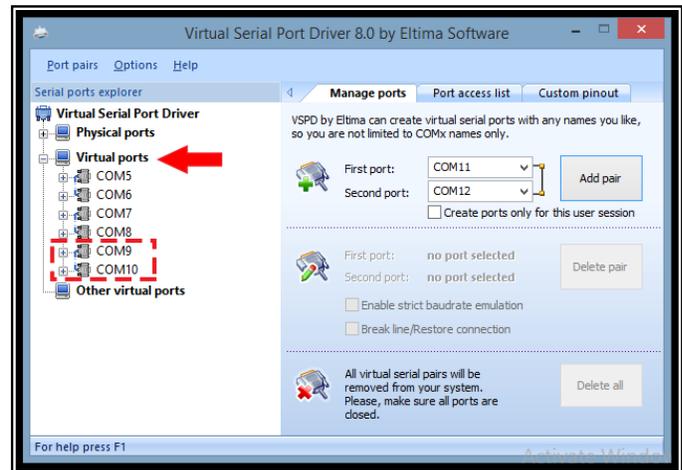
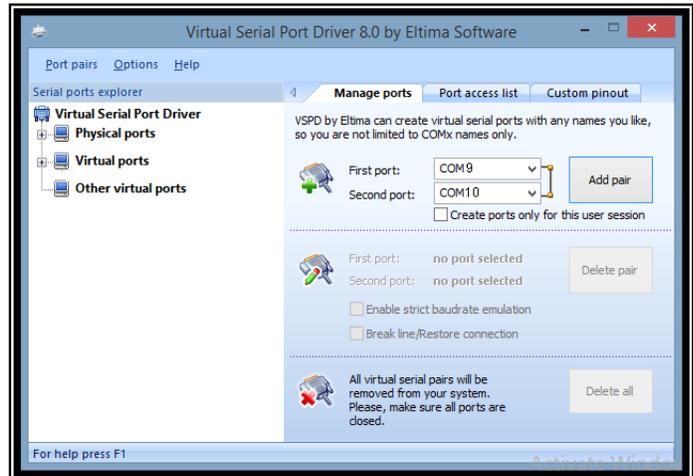
Section 4: Input/ Output (I/O)

Connectivity is one of the primary features of the FB4000 and Kernel Weight Server program. The FB4000 has multiple RS232 ports, USB ports, Ethernet port, and a Parallel port to name a few. This section will provide steps to connect the FB4000 in a variety of manners to a variety of devices. The use of VSPD is how the Kernel communicates to software applications installed on the FB4000.

4.1. Virtual Serial Port Drivers (VSPD)

4.1.1. Add a Set of VSPD Ports

1. Press the **CTRL + ESC** on the external keyboard.
2. Click the magnifying glass in the right corner of the screen and type “**VSPD**” in the search box.
3. Push **Enter** and the Virtual Serial Port Driver window appears.
4. In the **Manage ports** tab, click the drop-down arrows next to **First port** and **Second port** and choose available ports. Port names can be customized by clicking in the boxes and typing new names.
5. Click the **Add pair** button.
6. Under **Serial ports explorer**, Click **Virtual ports** in the left navigation to view a list of all virtual ports. Your newly created virtual ports will appear.



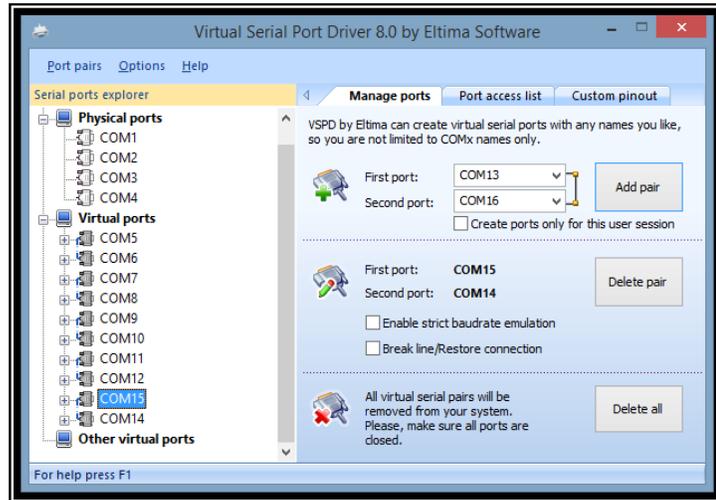
7. Once this appears, close this window by clicking on the  in the upper-right corner.

4.1.2. Deleting a Set of VSPD Ports

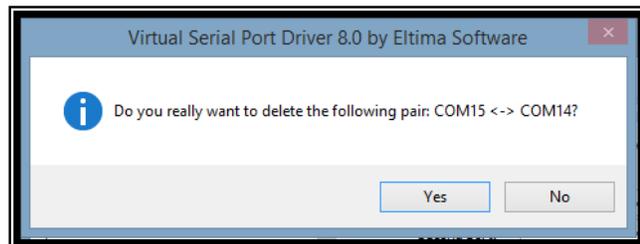
- In the **Serial ports explorer** window, highlight any port. The other port automatically pairs up. The **Com15** port is shown in the example.

- **Com14** automatically pairs up and displays.

- Push the **Delete Pair** button.



- Push the **Yes** button to confirm this action.



- Once this appears, close this window by clicking on the  in the upper-right corner.

4.1.3. Kernel Setup for VSPD Ports

1. Double-clicking on the **Kernel Program icon**.



2. From the Weight Processing Screen, press the **MENU** button, from the Kernel Options Menu, select **Configuration Menu**.



3. Select **Configure Output**.



4.2. Configure Output

4.2.1. Introduction

This menu selection provides a means to configure data strings protocols, configuration parameters, and output modes such as Continuous, Demand, Auto, To File, and Network.

4.2.2. Configuring an Output Data String

In order to interface an FB4000 Instrument to software or a pre-existing peripheral device, such as a remote display, knowing their specific Output Data String is **mandatory**.

- This allows the software or peripheral device to communicate with the FB4000.
- When adding to other manufacturer's devices, refer to their Service Manuals for Output Data String information.
- Interfacing with other manufacturer's software, refer to either a web site, Service Manual, or contact the manufacturer directly for the Output Data String information.

Fairbanks' current programming for setting up an **Output Data String** provides quick and easy flexibility for customizing the FB4000 Serial Outputs.

4.2.3. Two Methods of Formatting

There are two methods to format an **Output Data String**.

1. Use one of the five (5) preconfigured **Load Defaults** under the **Load tab**.
2. Use the most similar **Load Default** as a basis for customizing an **Output Data String** which matches the manufacturer's company-specific configuration. This method is done in the **Build tab**.

4.2.4. Load Default Data Protocols

When programming a **Output Data String**, the Fairbanks' FB4000 has five of the most commonly used pre-configurations, known as **Load Defaults**. These data strings are listed below:

- Fairbanks** <STX><A><C><GGGGGG><TTTTTT><CR>
- Toledo** <STX><A><C><GGGGGG><TTTTTT><CR>
- Cardinal** <CR><P><WWWWW><m><SP><U><SP><g><SP><SP><ETX>
- Weightronix** < ><M><WWWWW>< ><U><CR><LF>
- Condec** <STX><P><WWWWW><U><G><M><CR>
- DT7000 Anybus**

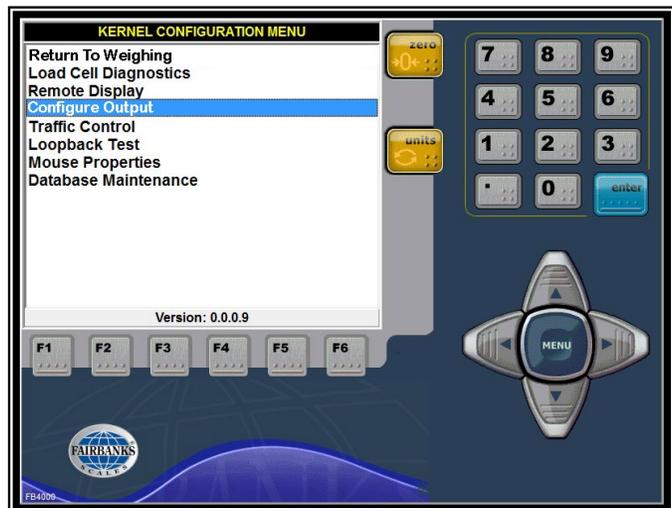
4.2.5. Load the Default COM Settings

Follow these steps to configure the **Load Default** into the **Output Data String**.

1. From the **Weighing Application Window**, press the **MENU** button, from the Kernel Options Menu, select **Configuration Menu**.

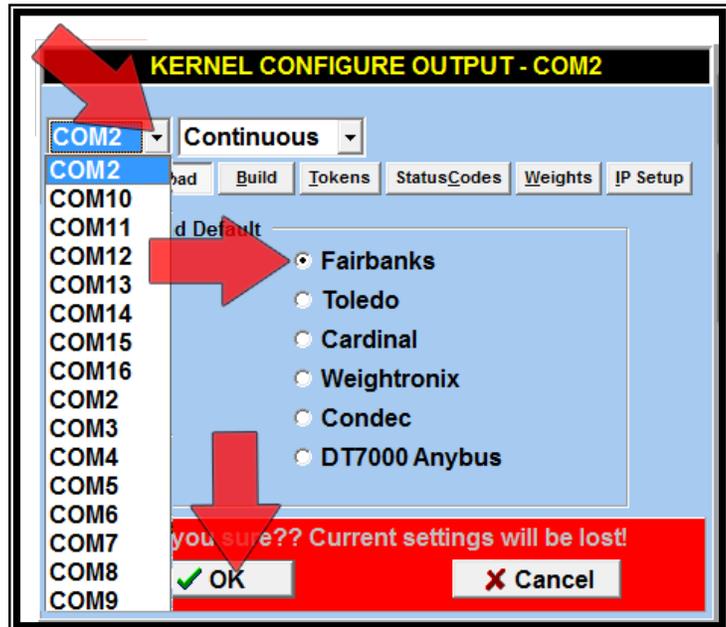


2. Select **Configure Output**.

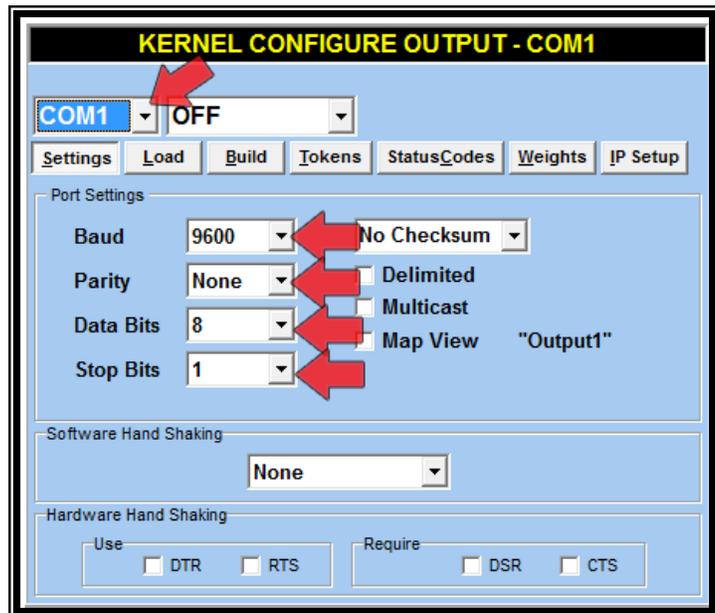


4.2.5. Load the Default COM Settings, Continued

3. Open the **Load** tab.
4. Select the **COM Port** to be configured.
5. Select the appropriate **Load Default**.
6. Press the  button.



7. Open the **Port Settings** tab.
8. Program the **Baud Rate**, **Parity**, **Data Bits** and **Stop Bits** to the appropriate settings.



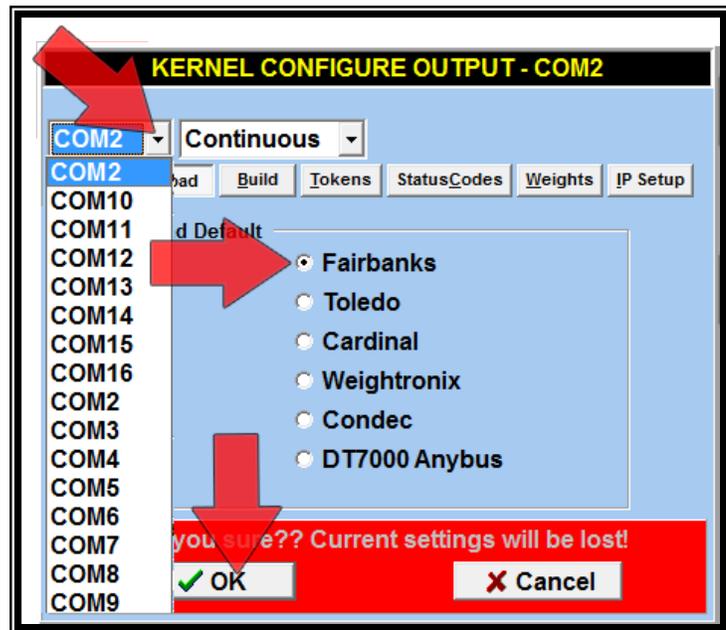
4.2.6. Customizing the Output Data Strings

The FB4000 Kernel Weight Server program can also be customized to support numerous manufacturers software interfaces and peripheral devices. When programming a Data String Protocol not formatted as one of the **Load Defaults**, the Output Data String must be **programmed manually** using the **Build, Tokens, and Weights Tabs**.

4.2.7. Steps in Customizing

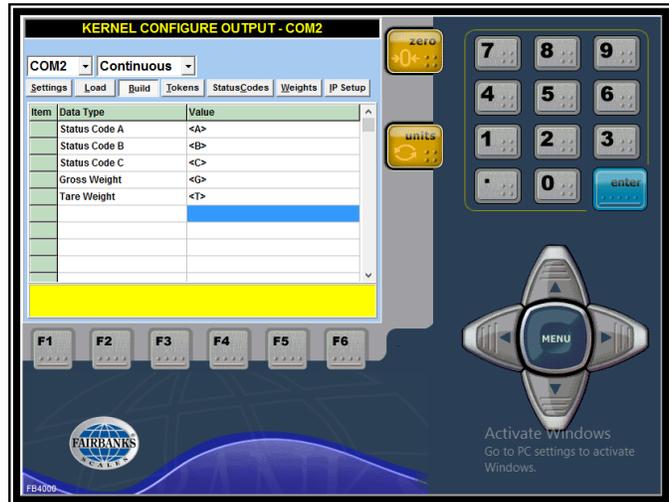
Follow these steps to customize the **Output Data String**.

1. Locate the required **Output Data String** by viewing history from previous work completed with the customer, or by emailing and/or calling the company directly and asking their **IT Department** for this information.
2. Compare the required **Output Data String** with the five **Load Default** configurations.
3. Open the **Load** tab.
4. Select the **COM Port** to be configured.
5. Select the **Load Default** that most resembles the required Output Data String format.
6. Press the  button.



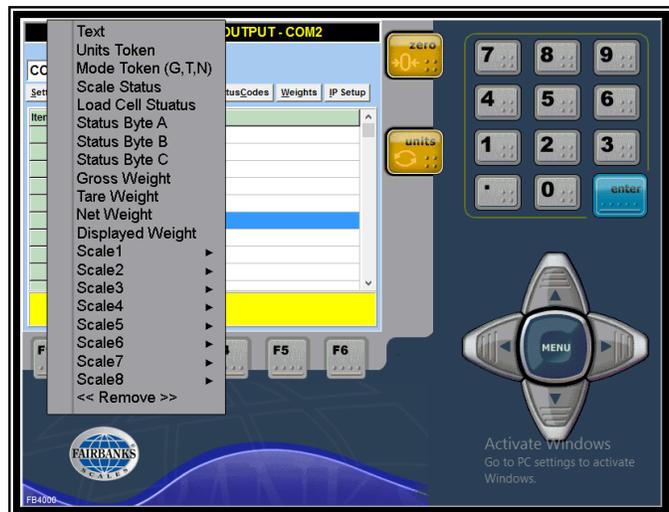
4.2.7. Steps in Customizing, Continued

7. Open the **Build** tab.



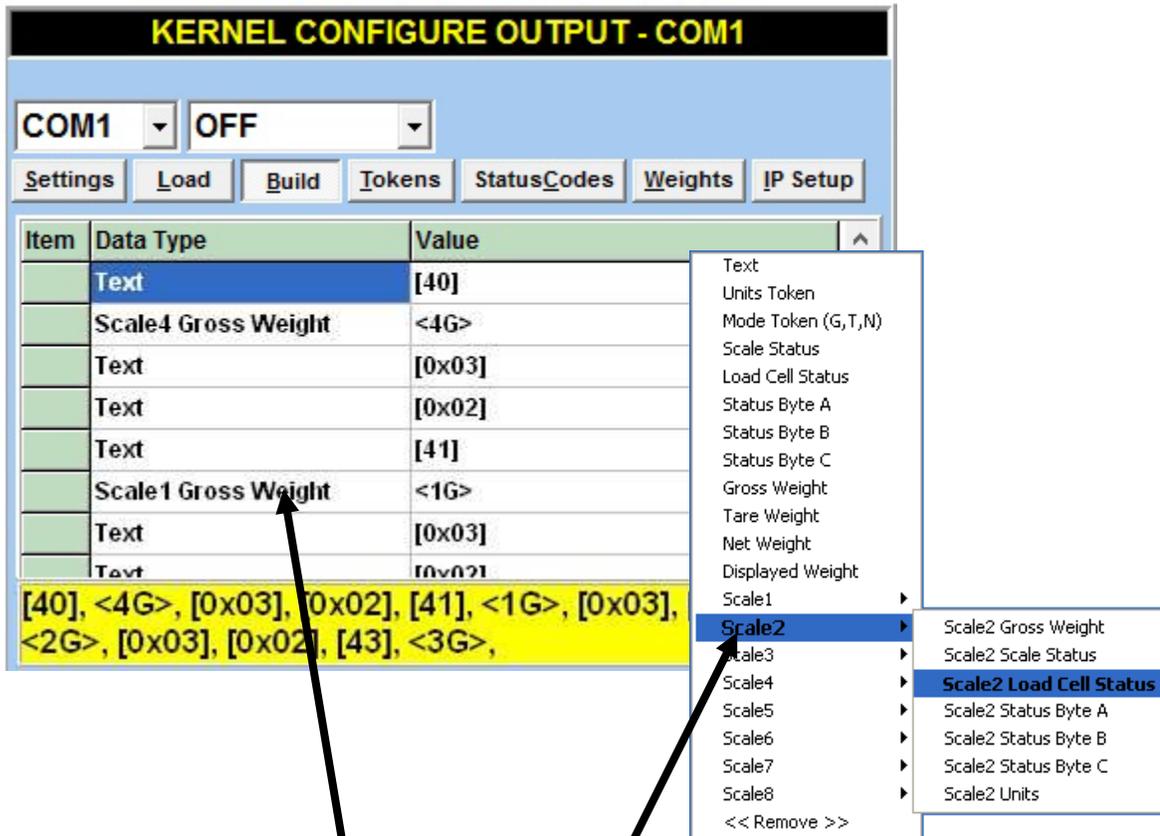
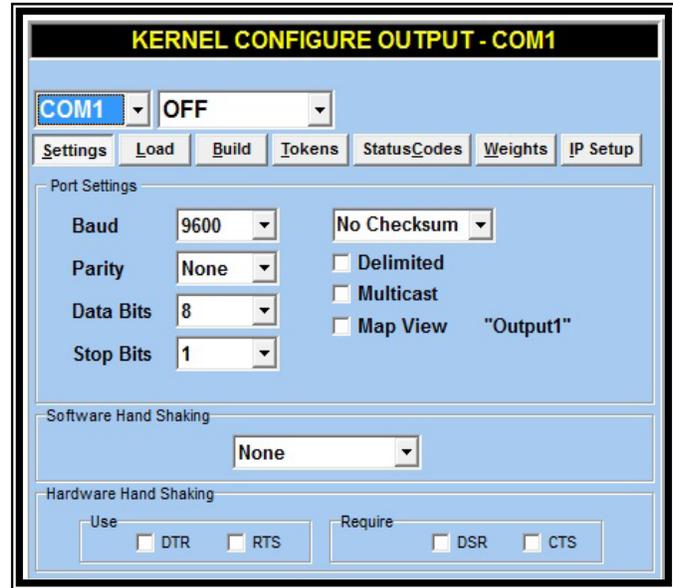
8. **Left-click** on the appropriate field to be generated within the specific data string For example, choose **Text**.

This adds a new **Text** box to the **Output Data String**.



4.2.7. Steps in Customizing, Continued

9. Program a command within the **Data String**, either enter an **ASCII Character**, or **input text**.
 - When inputting ASCII Characters, **always** precede the message with “**0x...**” and the equivalent ASCII code up to 3 digits (i.e. **0x099**).
10. Open the **Settings** tab.
11. Program the **Baud Rate**, **Stop Bits**, and the **Parity** to the appropriate settings.



A drop-down Menu Window opens when any **Data Type** choice is selected by left-clicking in the field

4.2.7. Steps in Customizing, Continued

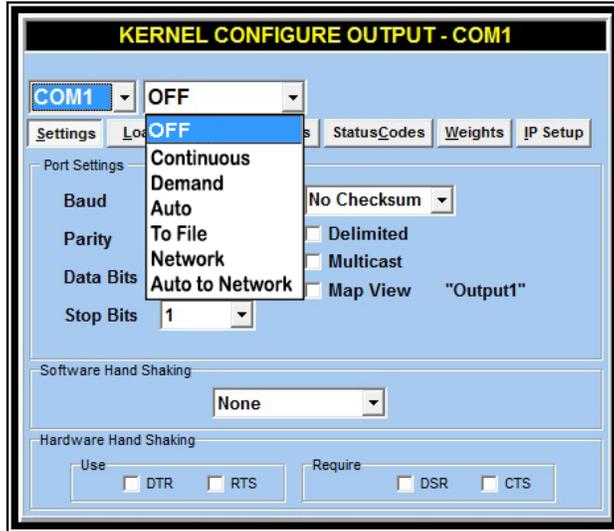
| Window Name | Description |
|---|--|
| CONFIGURE OUTPUT, — Build Tab | <ul style="list-style-type: none"> • Configures the data string protocol order, written in ASCII text. • By left-clicking in any item, a drop-down menu offers different parameters, or removes them. • Text may be added to the data string by clicking in the Value field, then entering it. <ul style="list-style-type: none"> — Also by clicking into the Data Type box and choosing text from the drop down box. |

4.2.8. ASCII and Text Data Character Types

There are two types of data configuration characters. Both have an important and have a specific function; both are used within the same data string. Both types are defined below.

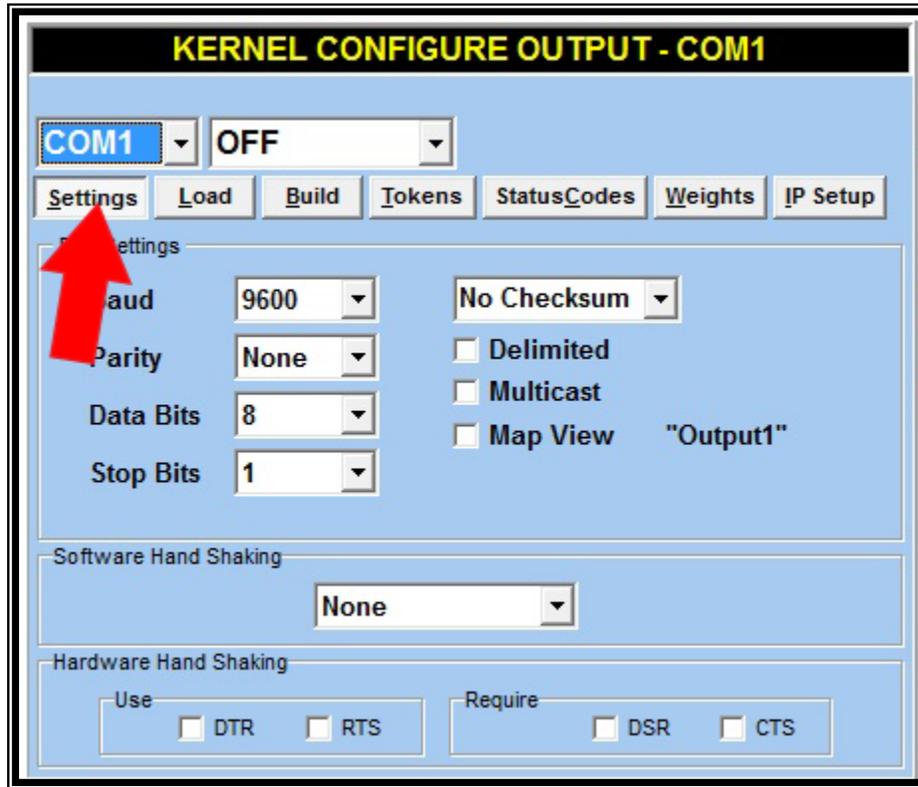
- **ASCII (A**merican **S**tandard **C**ode for **I**nternet **I**nterchange) **C**haracters
 - **Text Formatted Characters** are always written with a “**0x_ _ _**” prefix, which tells the **Kernel Program Read-me Trigger** to post it as text character (*i.e.* **0x120**).
 - A code for information exchange between computers using a string of seven (7) binary digits represents each character.
 - Each character identifies either a alphanumeric symbol (*i.e.* **065 = A**, **066 = B**, *etc.*) or invokes an on-screen action (*i.e.* **013 = CR = Carriage Return**).
 - One **Text Block** must be added to the Data String for each character before formatting it.
 - The data entries use decimal-based ASCII character codes.
 - Complete ASCII Chart found in **Appendix IV**.
- **Text Formatted Characters**
 - A **Text** block must be added to the **Data String** before formatting the next character.
 - These **Text Formatted Characters** are used to add a specific message to the Service Technician, and it is done in combination with the text and with other ASCII Text Characters.

4.2.9. Other Data String Customization



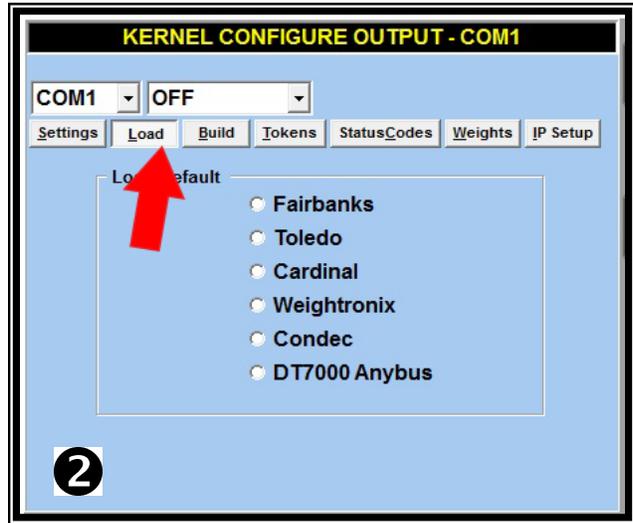
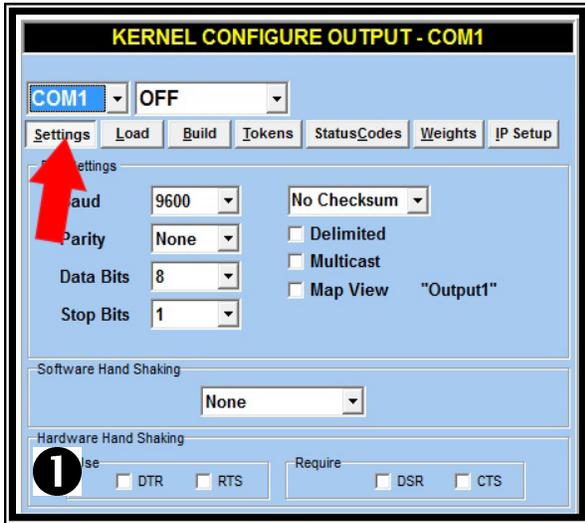
| Window Name | Description |
|---|---|
| CONFIGURE OUTPUT – Settings Tab | <ul style="list-style-type: none"> • RS232 COM Port Drop-down – Selects COM Port with its settings. • Data Transmission Options* <ul style="list-style-type: none"> – Continuous [transmission] – Demand – Upon demand as a poll character is received – Auto – A transmission is sent when requested or when the transaction is completed. – To File – The message is not transmitted, but written to a file instead. – Network – Transmission via IP over a network. • Port Settings* <ul style="list-style-type: none"> – Baud Rate, Parity, Data Bits and Stop Bits. – Checksum – Returns a confirmation of transmission message between computers. – Delimited – Transmits data in Comma Delimited Format. – Multicast – Method of networking scale weight information to other FB4000 instruments across a Network. – Map View – Displays data in a memory mapped location. <ul style="list-style-type: none"> ▪ <i>The Testapp.exe, located in the Kernel folder, is used to verify memory mapped data,</i> • Software Hand Shaking – A means to control data flow using software functions for communication between two or more devices. <ul style="list-style-type: none"> – None – Bits are sent to source computer constantly without waiting for available receiving modem. – Both, Receive or Transmit – Determines which computer(s) wait to accept the message packets. |

4.2.9. Other Data String Customization, Continued



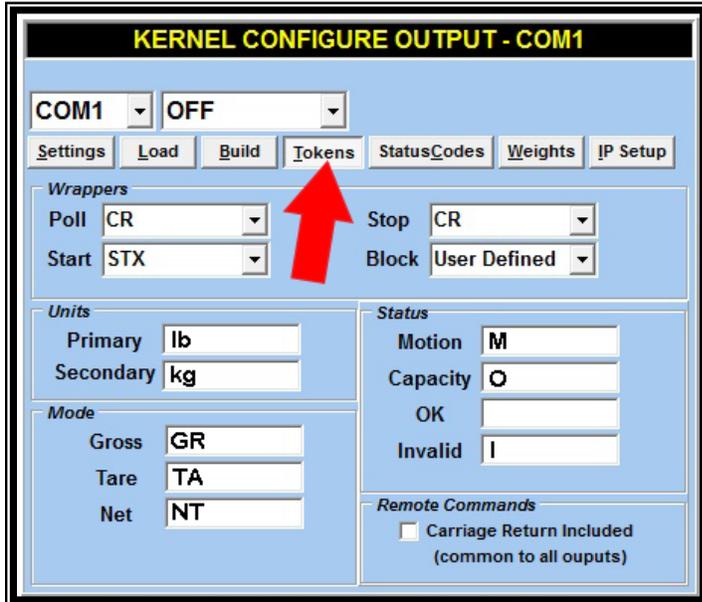
| Window Name | Description |
|---|--|
| CONFIGURE OUTPUT, CONTINUED <ul style="list-style-type: none"> – Settings Tab, Continued | <ul style="list-style-type: none"> • Hardware Hand Shake – A means to control data flow using hardware functions for communication between two or more devices. • Network Controls <ul style="list-style-type: none"> – DTR (Data Terminal Ready) – A control signal that indicates that the Data Terminal Equipment (DTE) is ready for data transmission. – RTS (Request To Send) – A control line which receives a verification signal from the CTS Control Line when it is ready to send data. |

4.2.9 Other Data String Customization, Continued



| Window Name | Description |
|---|--|
| CONFIGURE OUTPUT, CONTINUED 1 — [Port] Settings Tab | <ul style="list-style-type: none"> • Control Signals <ul style="list-style-type: none"> — DSR (Data Set Ready) – A control signal that indicates the device is ready to transmit data. — CTS (Clear To Send) – A control signal used to notify the device that it has line control. |
| 2 — Load Tab | Selects a preconfigured data protocol based on the scale manufacturer selected. <ul style="list-style-type: none"> — Select this item first when configuring an output. — Press the OK button to load the data protocol selected. |
| DEFAULT DATA PROTOCOLS | |
| Fairbanks | <STX><A><C><GGGGGG><TTTTTT><CR> |
| Toledo | <STX><A><C><GGGGGG><TTTTTT><CR> |
| Cardinal | <CR><P><WWWWW><m><SP><U><SP><g><SP><SP><ETX> |
| Weightronix | < ><M><WWWWW>< ><U><CR><LF> |
| Condec | <STX><P><WWWWW><U><G><M><CR> |
| DT7000 Anybus | |
| ** See Appendix II for more formatting information. | |

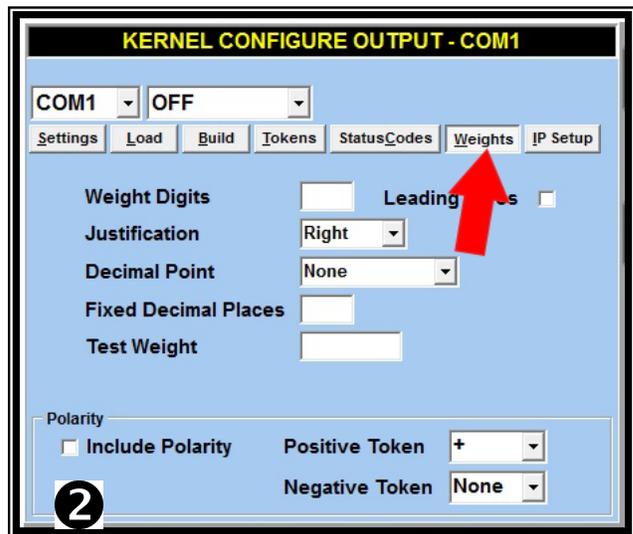
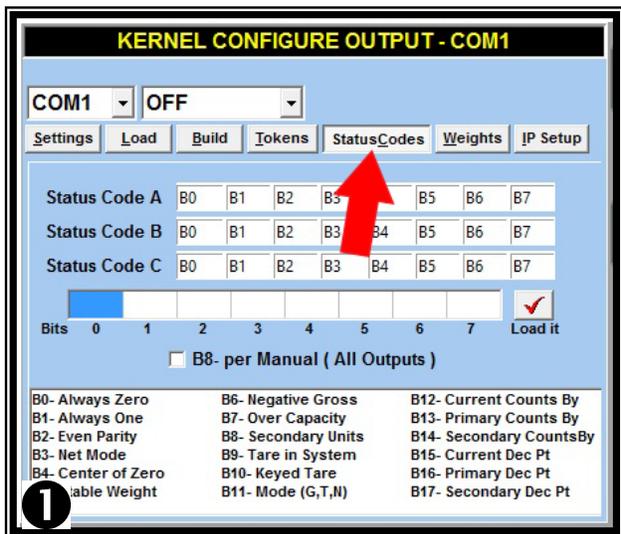
4.2.9 Other Data String Customization, Continued



| Window Name | Description |
|--|--|
| CONFIGURE OUTPUT, CONTINUED – Tokens Tab | <ul style="list-style-type: none"> • Programs the various data string tokens, such as the Motion flag. • Tokens are setup for the data protocol requirements. • Wrappers <ul style="list-style-type: none"> – Poll – Polling character for a demand output. <ul style="list-style-type: none"> ▪ <i>Applicable only to the Demand Mode.</i> – Start – The first character of a data string. – Stop – The last character of a data string. – Block – The character that separates the data fields. |
| | <ul style="list-style-type: none"> • Units – The character(s) used to define the unit of measure in the data string <ul style="list-style-type: none"> – Primary – The main indicator unit of measure. – Secondary – The alternate indicator unit of measure. |
| | <ul style="list-style-type: none"> • Mode – The character(s) used to define the Weighing Mode in the data string. <ul style="list-style-type: none"> – Gross – Character(s) used to designate the gross weight. – Tare – Character(s) used to designate the tare weight. – Net – Character(s) used to designate the net weight. |

4.2.9 Other Data String Customization, Continued

| Window Name | Description |
|--|---|
| CONFIGURE OUTPUT, CONTINUED – Tokens Tab | <ul style="list-style-type: none"> • Status – Identifies invalid weight conditions. <ul style="list-style-type: none"> – Motion – Character(s) used to identify the scale weight is in motion. – Capacity – Character(s) used to identify the scale weight is over capacity – OK – Character(s) used to identify the scale weight is valid. – Invalid – Character(s) used to identify the scale weight is invalid. |
| | <ul style="list-style-type: none"> • Remote Commands – check if carriage return should be included. |



| Window Name | Description |
|--|--|
| CONFIGURE OUTPUT, CONTINUED – Status Codes Tab 1 | Programs data bits for Status Words A, B and C within the Fairbanks and Toledo data streams. <ul style="list-style-type: none"> – Status Word is eight (8) bits long. <ol style="list-style-type: none"> 1. Put the Status Words in the blank Data Entry Position. 2. Press the Loaded it button. |

| | |
|-------------------------------|---|
| <p>2</p> <p>– Weights Tab</p> | <ul style="list-style-type: none"> • Programs specific values for the Weight Tokens. <ul style="list-style-type: none"> – Weighing Digits – Programs the length of the weight data. <ul style="list-style-type: none"> ▪ Typically six or seven digits in length. – Leading Zeros – When checked, adds leading zeros to the weight data. – Justification – Right or left. – Decimal Point – None, Floating, Fixed, Trailing. – Fixed Decimal Places – Sets number of decimal places in weight data string. – Test Weight – A manual weight entry to test data output. • Polarity – When checked, it places a polarity token in front of the weight data item. <ul style="list-style-type: none"> – Positive Token – (+), None or Space – Negative Token – (⊖), None or Space |
|-------------------------------|---|

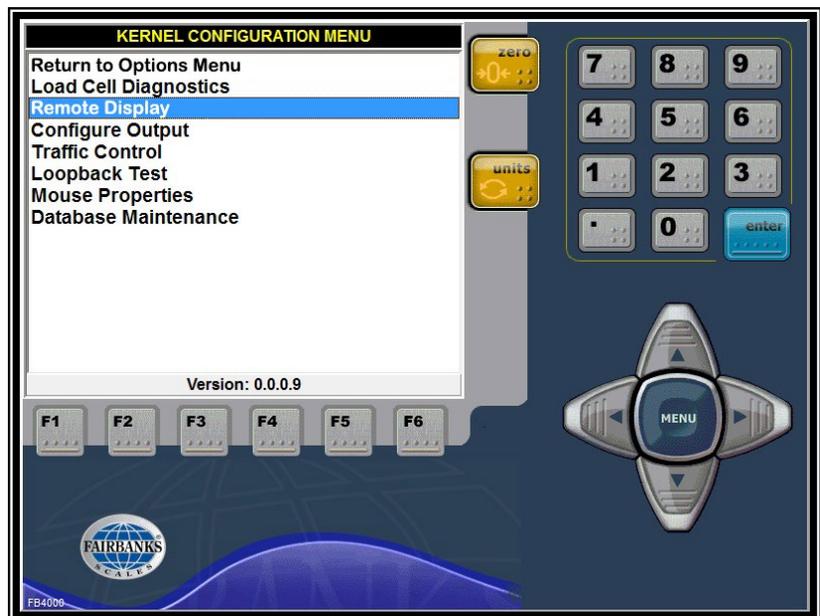
4.3. Remote Display Serial Current Loop Programming

Procedure steps skipped or omitted during this process may cause certain features to not operate or function as expected. This 20 mA output is passive.

Note: The PC104 Weight Controller Kit (27104) must be installed for this output to be available.

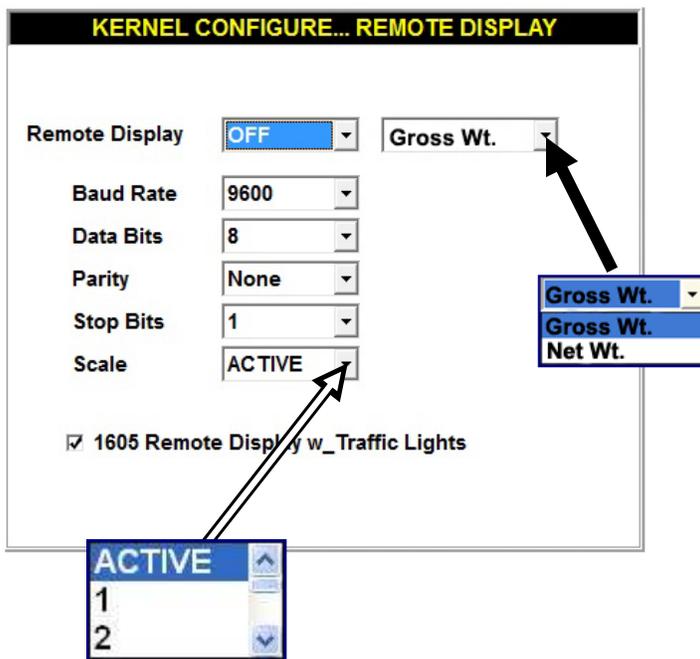
Procedure:

1. Click the **Menu** button and return to the **Kernel Configuration Menu** screen.
2. Click **Remote Display**.



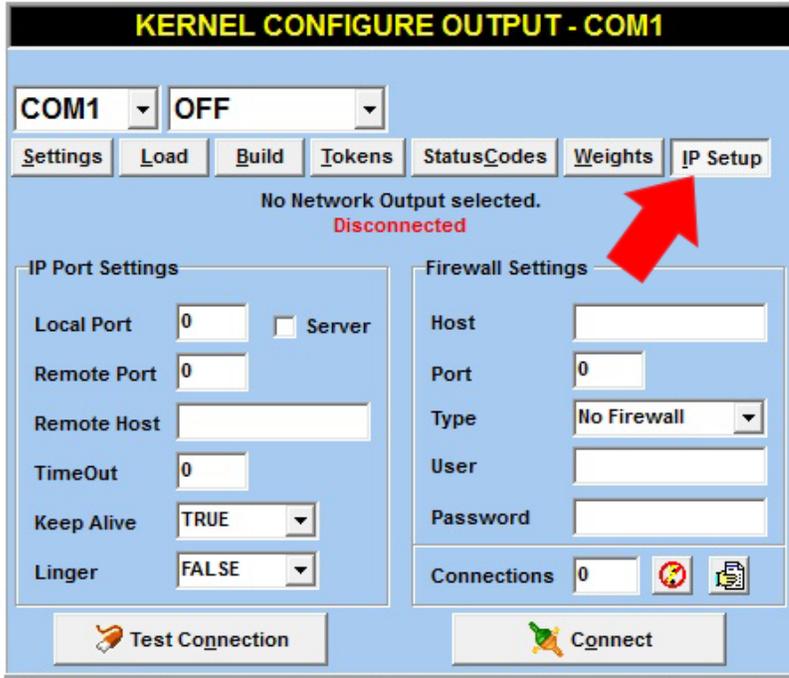
4.3. Remote Display Serial Current Loop Programming, Continued

3. Set the **Remote Display** to the desired **COM** port.
4. Configure the **Baud**, **Parity**, **Data Bits**, and **Stop Bits** required.
5. Reset the **Remote Display** back to **OFF**.
6. Select **ACTIVE** in the **Scale** dropdown window.
7. Select **Continuous** in the correct drop-down window.



4.4. IP Network Output

4.4.1. IP Setup Menu Overview



| Window Name | Description |
|--|--|
| CONFIGURE OUTPUT, CONTINUED – IP Setup Tab | IP Port Settings <ul style="list-style-type: none"> • Local Port – The socket number on the local FB4000 used to transmit and receive data. • Remote Port – Set to the same socket number as the Local Port in which the remote transmits and receives data. • Remote Host – The IP Address of the Remote Host • TimeOut – The amount of time lapses before it is disconnected. • Keep Alive – Keeps the connection active. ✓ Default Setting = False. • Linger – When set to True, connections are terminated gracefully. ✓ Default Setting = False. <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 10px;"> Test Connection </div> Verifies connectivity or connection. |

NOTE: See Appendix III for complete information regarding **SOCKS Protocol.**

4.4.1. IP Setup Menu Overview, Continued

| Window Name | Description |
|--|---|
| CONFIGURE OUTPUT, CONTINUED – IP Setup Tab | Firewall Settings <ul style="list-style-type: none"> • Host – The Host IP Address. • Port – The Port Socket number used. • Type <ul style="list-style-type: none"> ✓ Default = No Firewall. – Tunnel – Set to 80. – SOCKS4* – Set to 1080. – SOCKS5* – Set to 1080. • User – User Login name • Password – User Password to login to the Host. • Connect – Establishes a connection.  Terminates all active connections.  Show a log of all IP events.  Stop Listening Stops the monitoring signal with the scale. |

* See [Appendix III](#) for complete information regarding **SOCKS Protocol**.

4.4.2. IP Network Output Setup Instructions

The following procedure outlines the setup instructions required to activate the **IP NETWORK** output function. Procedure steps skipped or omitted during this process may cause certain features to not operate or function as expected.

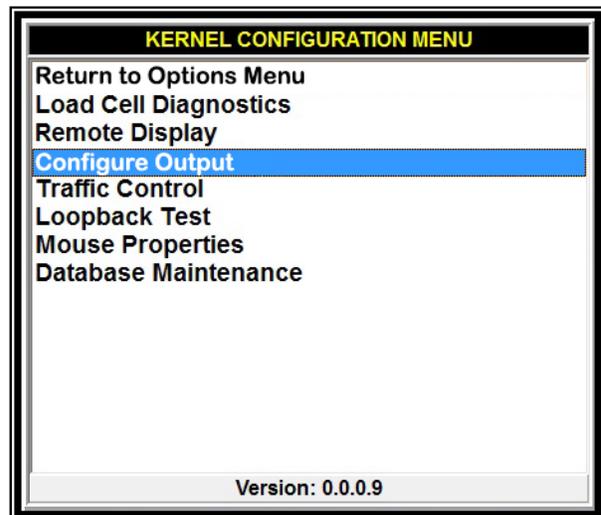
Follow these steps to configure the **IP Network Output**.

4.4.2. IP Network Output Setup Instructions, Continued

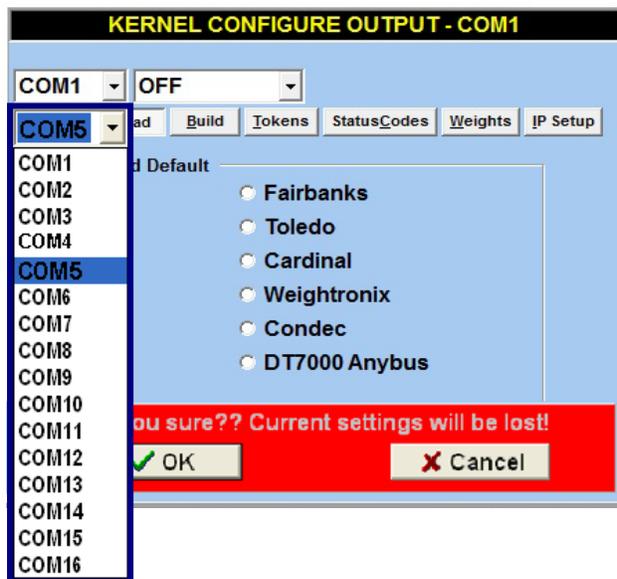
- From the **Weighing Application Window**, press the **MENU** button, from the Kernel Options Menu, select **Configuration Menu**.



- Select **Configure Output**.

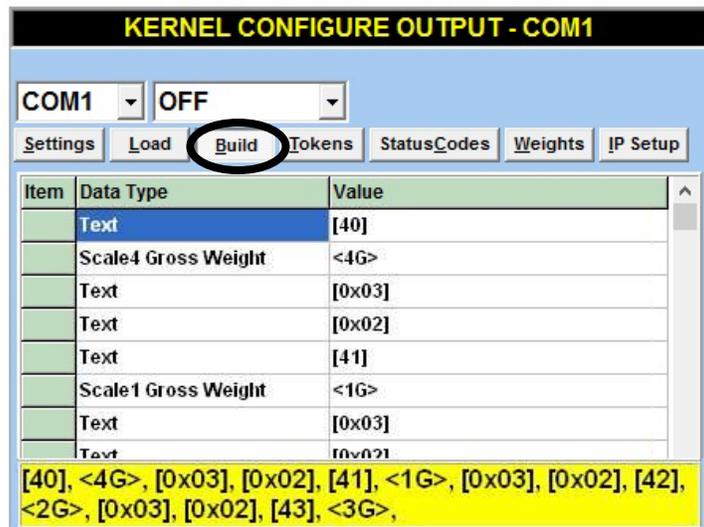


- Select an unused **COM Port** to be configured. Example: COM 5.
- Access the **Load** tab and select a default format similar to what is required.
- Press the  button.



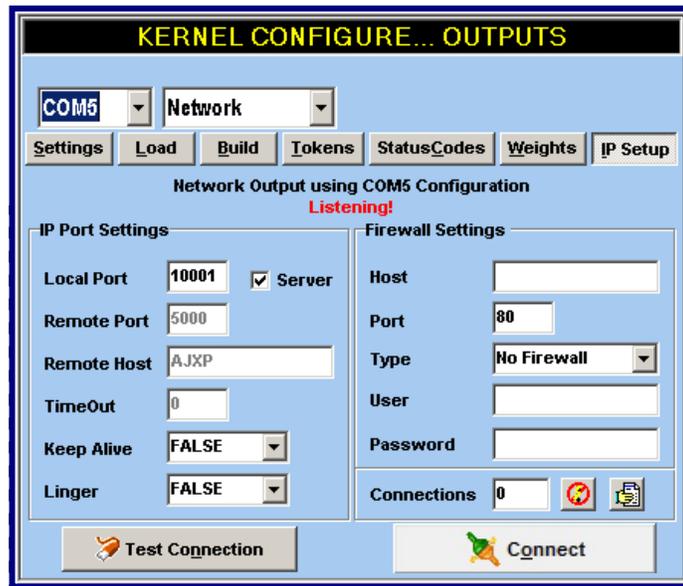
4.4.2. IP Network Output Setup Instructions, Continued

6. Select the **Build** tab and configure the data output format as desired.



7. Use the **Mode** drop down list to select the **Network** mode.

8. Select the **IP Setup** tab to configure the network parameters. Pointing to each edit box will display a brief help message, to assist in the setup



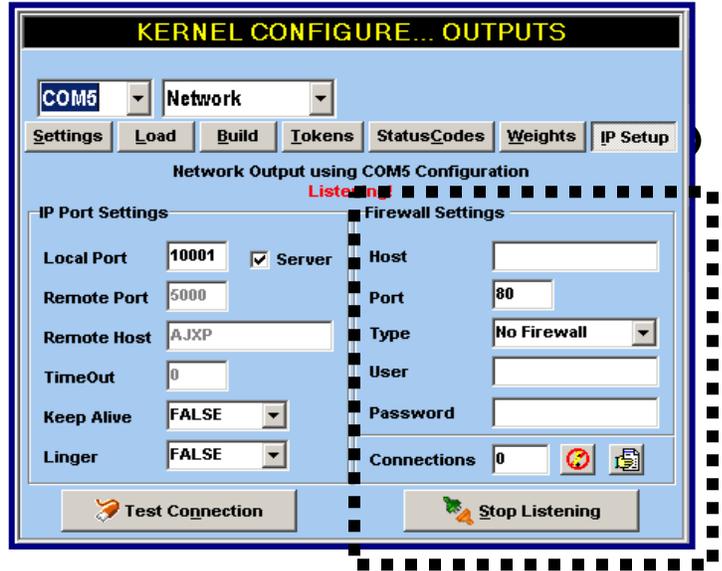
9. Program the **IP Port Settings**. by setting the **Local Port** and the **Remote Port** to the same number as appropriate for the users network.

Example: port = 2000.

- Set the **Remote Host** to one of the following
 - The IP address of the remote computer which will receive the weight data,
 - The network computer name of the remote computer which will receive the weight data as in the example shown above.

4.4.2. IP Network Output Setup Instructions, Continued

10. **Firewall Settings** – Leave the defaults as shown
11. The customer will need to provide a receiving application on a network computer which will open a connection through a TCP/IP socket with
 - The IP address must be set to the address of the FB4000 and the Port set to the FB4000 **Local Port** setting.
Example: 2000.
 - When the IP is configured correctly, it will display **listening**.



12. The data stream will be a continuous stream in the format set in step 6 above.

4.4.3. Testing the IP Network Output

1. Test Instructions to activate the **IP Network Output** function from the FB4000 Kernel Weight Server program.
2. Setup the **IP Network Output** as described in [Section 4.4.2.](#) of this manual.
3. Return the Kernel back to the **Weight Processing Screen**.
4. At a different computer on the same network, use Hyper-Terminal to receive the data. Start Hyper-Terminal, enter a **New Connection** name. Example: Test. Click **OK**.
5. Set the Connect Using drop down box to **TCP/IP (Winsock)**.
6. Set the **Host Address** to the **IP address** of the computer or FB4000 that the
7. Kernel.exe is running on.
8. Set the **Port Number** to the same value as the **Local port** is set.
9. Click **OK**. If a connect attempt is made, it will fail at this point, ignore and clear the error message.
10. Select the **Call** menu item and select **Wait for Call** from the drop-down menu.

If working correctly, the instrument should make connection and weight data should be displayed in the Hyper-Terminal window in the format set previously in the set up instructions.

Section 5: Operation

5.1. System Boot-up Procedure

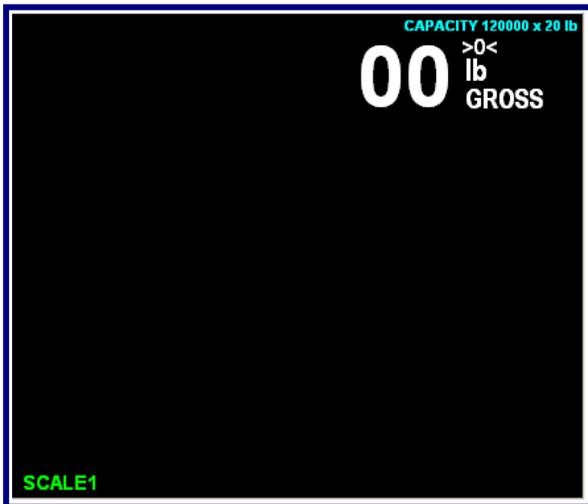
Normal indications include the following:

- After approximately **one minute**, the desktop background will appear in the middle of the screen with **Fairbanks Logo**.

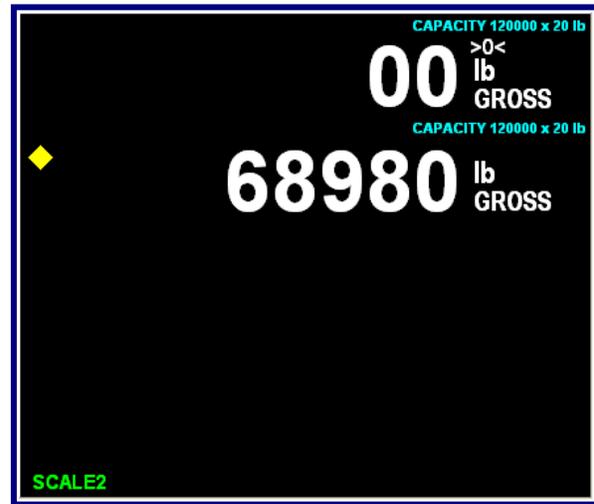


- Shortcuts appear for Shutdown and starting the FB4000 Kernel software. The Recycle Bin will also appear.

5.2. Viewing Options



The **GTN Screen** application



The **Multi-Scale Screen** application

When using the **Kernel Program**, there are **two viewing options** for weighing.

The GTN Screen

The **GTN Screen** displays the weighments for only one scale at a time.

5.2.1. Multi-scale Screen

The **Multi-scale Screen** displays all configured scales on the screen at one time.

- The Golden Diamond show which weighment is being used
- The scale being used is identified in the lower-left corner of the screen.

5.2.2. Gross Weighing

1. Press the **ZERO** key to zero the scale.
2. Place the object to be weighed on the platform.
3. View the weight from the screen.

NOTE: *The Operating Mode is **Service-Programmable only**.*

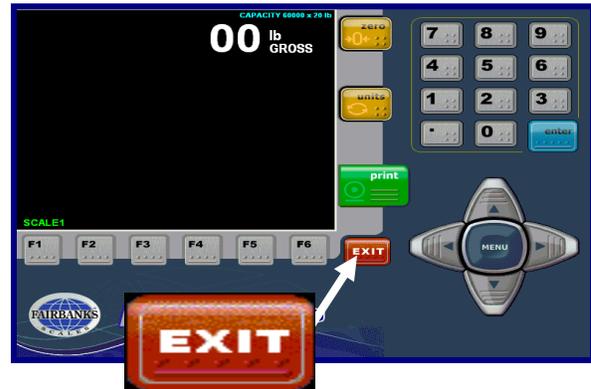
5.2.3. Using the Display Screen Function Buttons



- When in the **Multi-scale Screen**, press the **F1 button** to toggle thru the available scales.
- Press the *display screen's* **F6 button** to toggle back-and-forth from the GTN Screen to the Multi-scale Screen.

5.3. Application and System Shut-Down Procedure

1. To close the **Kernel Program**, press the **Exit** button on the open weighing application screen.



2. Double-click on the **Exit Application** button.



CAUTION

Improper shutdown of this instrument can cause damage to the hard drive and loss of data.

5.3. Application and System Shutdown Procedure, Continued

- To shutdown the system (instrument), click the **Power Options** button on the desktop.

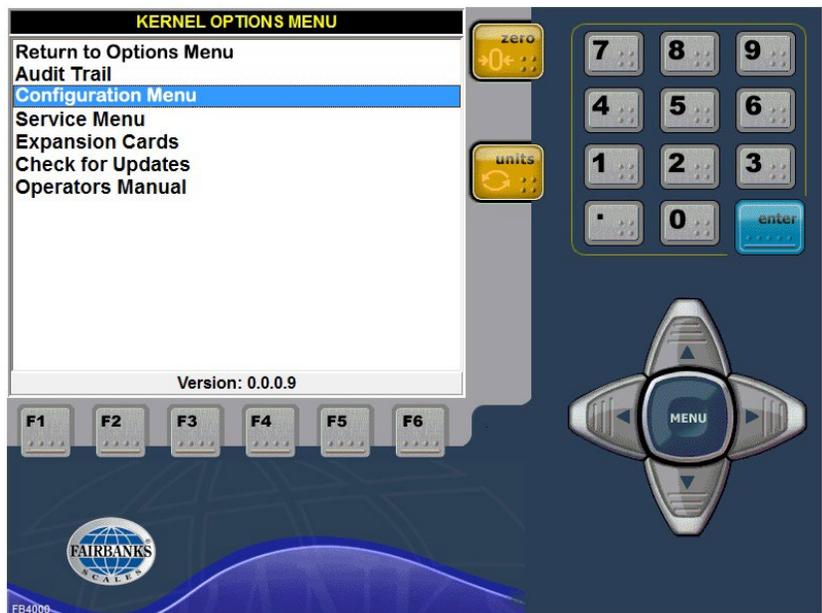
5.4. Kernel Backup and Restore

The Kernel settings are stored in a file within the instrument. This file is used to store a backup copy of your settings and can be used to restore the Kernel settings.

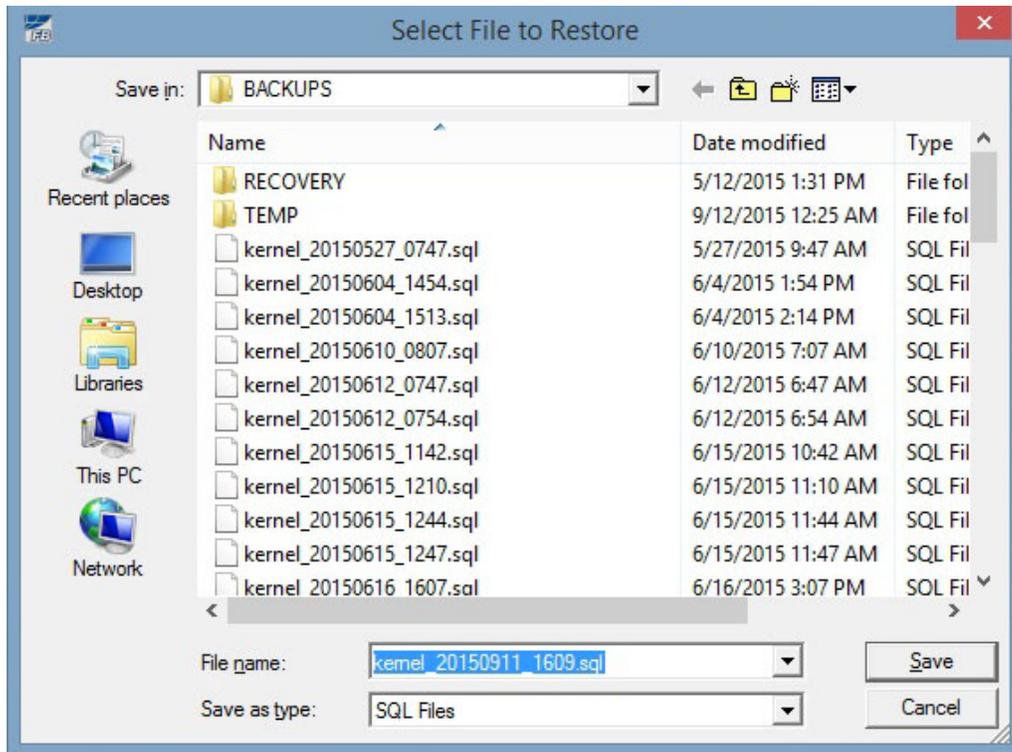
To create a backup file...

- Return to the **KERNEL OPTIONS MENU** by clicking the **MENU** key.

- Double click on **Configuration Menu**



- From the **KERNEL CONFIGURATION MENU**, double-click on **Database Maintenance**. The following screen appears.



- Click **Save** and a copy of the current Kernel settings is stored in the BACKUPS folder. The message **Backup Complete** will appear confirming that your backup was successful.

Once successful, press the **MENU** key repeatedly until the **Weight Processing** screen displays.

The scale is ready to process weights.

| Window Name | Description |
|--|--|
| SYSTEM SETTINGS — Backup/ Restore | <ul style="list-style-type: none"> • Backup System Settings – Current parameter settings are saved into the C:\Kernel\ BACKUPS Folder. • Files also may be saved to any available network folder or USB Jump drive by navigating to that location. • Restore System Settings – Retrieves and restores any previous backup. A new • Each time a backup is performed a new file is created. |

5.4.1. Kernel Restore Procedure



Kernel System Restore is an essential function for maintaining the appropriate business-specific settings. If the KERNEL Programs are altered for any reason, this re-establishes their previously saved program settings.

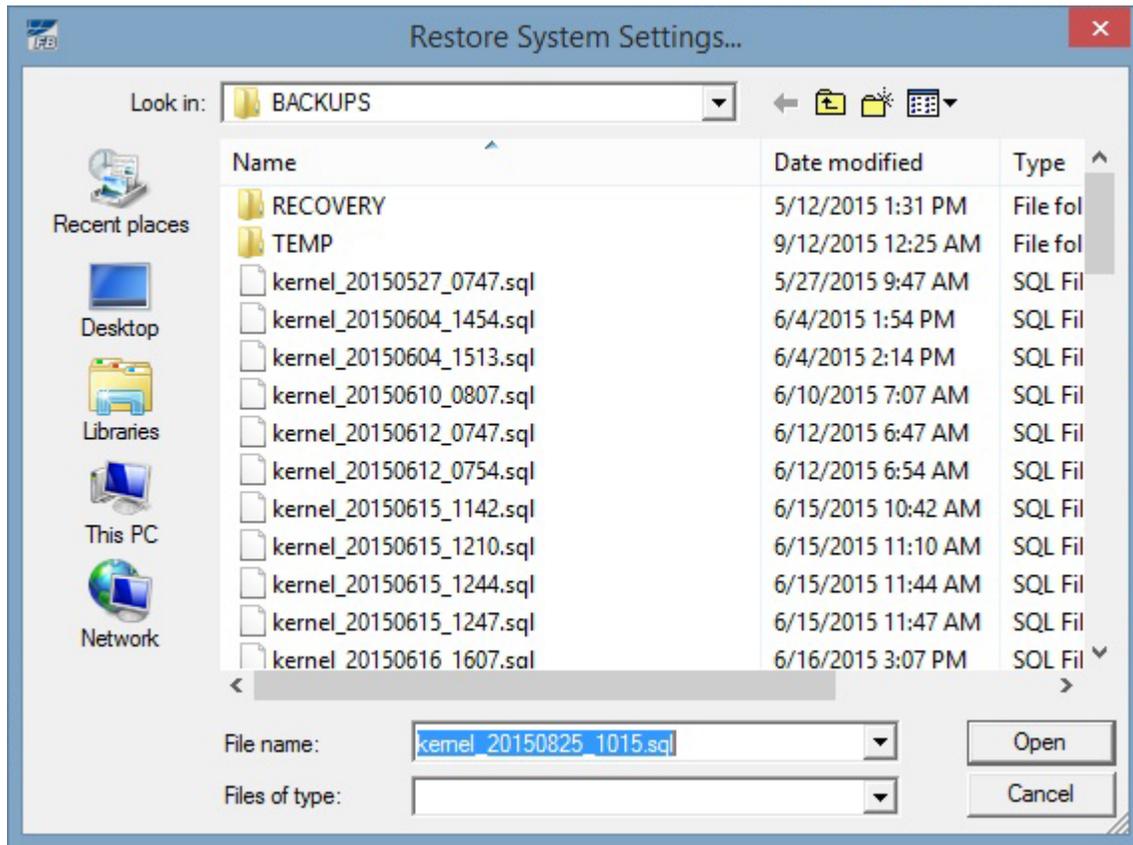
To restore the Kernel settings from a previously saved file...

1. Return to the **KERNEL OPTIONS MENU** by clicking the **MENU** key.
2. Double click on **Configuration Menu**



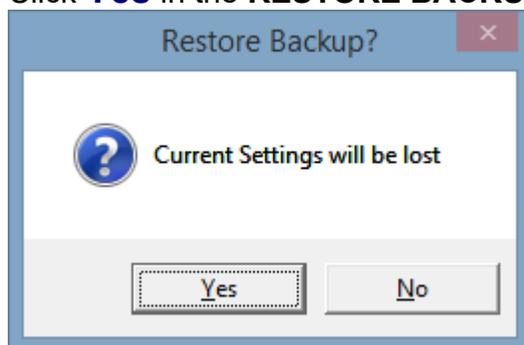
3. From the **KERNEL CONFIGURATION MENU**, double-click on **Database Maintenance**.
4. From the **KERNEL DATABASE MAINTENANCE MENU**, double-click on **Restore Settings**. The following screen appears.

5.4.1. Kernel Restore Procedure, Continued



5. Select the .sql file used for the restore (if the correct file is not populated in the File name: box) Click the **Open** button. A confirmation screen appears.

Click **Yes** in the **RESTORE BACKUP?** box to confirm the restore.

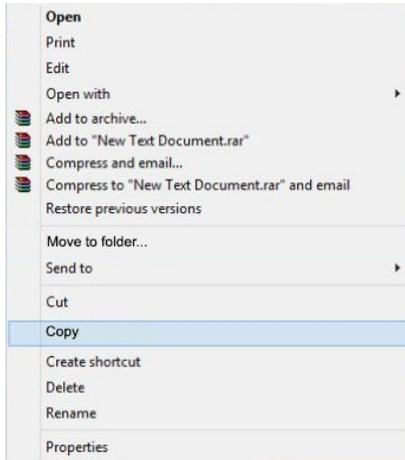


- The scale settings are restored.
- Calibrate the system and verify the changes.

Section 6: Customizing the FB4000

6.1. Adding an item / icon to The Startup Folder

1. Right-click on the icon for the program to be copied. Select **Copy**.



2. Right-click on Windows icon the Windows task bar and choose **File Explorer**.

OR

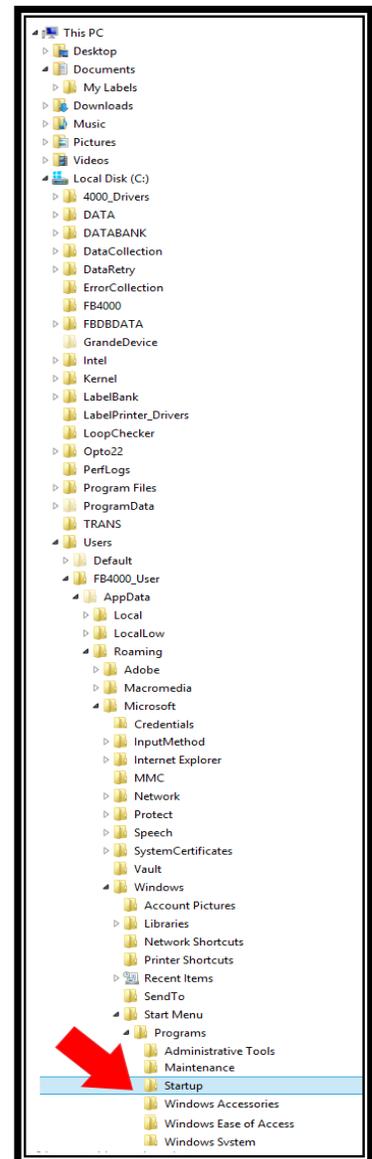
Click the Windows icon and choose **File Explorer** on the **Start** menu.

3. Navigate to the following:

C:\users\FB4000_User\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup

4. Right-click in the **Startup** folder, then select **Paste**.

This activates the program at startup of the computer.



6.2. Accessing the Kernel Weight Program

6.2.1. Opening and Closing the program

1. Once the FB4000 has successfully booted up, locate the Kernel shortcut located on the desktop and click to launch the application.



2. The Kernel will start up and then minimize. The Kernel program is still running, however, it is minimized in either the System Tray or Taskbar. Depending which option was set by your Fairbanks Service Representative.

If the Kernel program appears on your taskbar, clicking once will open the weigh screen. If the Kernel program appears in the taskbar, click once on the icon and choose **Restore**.



3. Once the weigh screen appears, clicking **MENU** on the weighment screen opens the **KERNEL OPTIONS MENU**. Click MENU again and the Kernel minimizes again. To exit the Kernel program, click the **Exit** button on the weighment screen and click the **EXIT APPLICATION** button.

Section 7: Service & Maintenance

7.1. Important Precautions

Please consult a **Fairbanks Service Technician** for electronic and mechanical calibrations and/or adjustments required for making this equipment perform to accuracy and operational specifications.

Electrostatic Discharge (ESD) precautions must always be taken. ESD can easily damage the FB4000 board assemblies.

7.2. Error Logging Errors and Reporting

- **Weighing Kernel Errors List**

| <u>Error Condition</u> | <u>File Name</u> | <u>File Contents</u> |
|------------------------------------|--------------------------------|--|
| Calibration Change, Span Wt | CCS_val (val = weight used) | [Type] Code=CCS [Parms] CalWt=val |

Note: Calibration Change to Span Wt

| | | |
|------------------------|-----|--------------------|
| Float Switch On | FSO | [Type] Code=FSO |
|------------------------|-----|--------------------|

Note: Float Switch is set!

| | | |
|--------------------------|---------------------------------|--|
| Load Cell Ghosted | LCG_# (# is the cell number) | [Type] Code=LCG [Parms] Ghost=# |
|--------------------------|---------------------------------|--|

Note: Load Cell is being Ghosted.

7.2. Error Logging Errors and Reporting, Continued

| Error Condition | File Name | File Contents |
|--------------------------|----------------------------------|---|
| Load Cell Failure | LCF_#_ (# is the cell number) | [Type] Code=LCF [Parms] Cell=# |

Note: Load Cell is not responding.

| | | |
|--------------------------|----------------------------------|---|
| Cell Motion Error | CME_#_ (# is the cell number) | [Type] Code=CME [Parms] Cell=# |
|--------------------------|----------------------------------|---|

Note: Possible Defective Cell.

| | | |
|--------------------------|-----------------------------------|---|
| Scale Behind Zero | SBZ_#_# (# is the cell number) | [Type] Code=SBZ [Parms] Scale=# Range=# |
|--------------------------|-----------------------------------|---|

where Range = 'L' < with 400 lbs of 0, 'H' > 400 lbs below zero

Note: Scale is behind Zero!

| | | |
|------------------------|------------------------------|--|
| Sectional Error | SER_#_ (# is the section) | [Type] Code=SER [Parms] Section=# |
|------------------------|------------------------------|--|

Note: Sectional Controller is not Responding!

7.2. Error Logging Errors and Reporting, Continued

Load Cell Drift

LCD_# [Type]
 (# is the cell number) Code=LCD
 [Parms]
 Cell=#

Note: Load Cell is Drifting.

Scale Trimmed

STR [Type]
 Code=STR

Note: Scale was trimmed.

Cell Warning Error
 [Type]

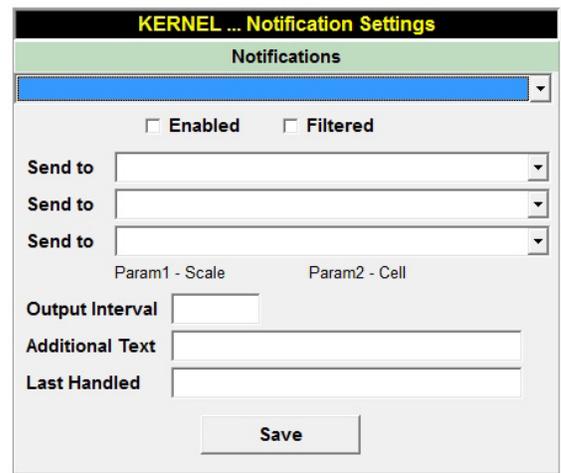
CWE_#
 (# is the

cell number) Code=LCD

[Parms]

Cell=#

Note: Possible Stuck Cell!



5. Click the **MENU** key to return to the **KERNEL SYSTEM SETTINGS MENU**.

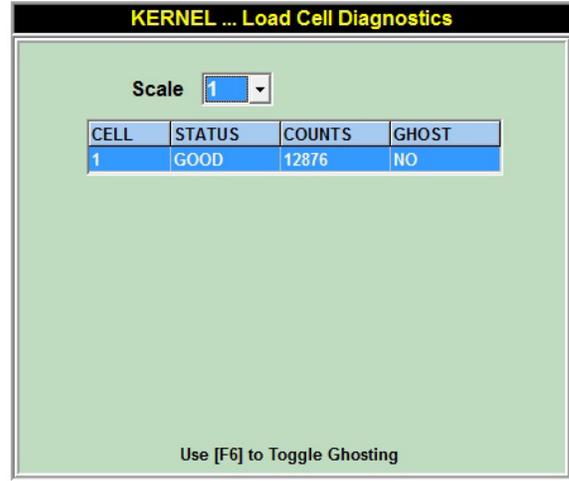
7.3. Load Cell Ghosting

The **Ghosting Feature** allows a scale with a load cell problem to operate normally until qualified service personnel can repair the problem. The scale is not legal for trade when ghosting is enabled.

1. Click **MENU** until you return to the **KERNEL CONFIGURATION MENU**.

7.3. Load Cell Ghosting, Continued

2. Double click on **Configuration Menu**
3. From the **KERNEL CONFIGURATION MENU**, double-click on **Load Cell Diagnostics**.



The F6 key will enable or disable this feature.

Simply highlight the load cell in question and press the F6 key.

Note: Only **one (1) load cell per section** may be ghosted.

| Window Name | Description |
|---|--|
| LOAD CELL DIAGNOSTICS | <ul style="list-style-type: none"> • Displays the Status and Counts of the load cell(s). • The Ghosting Feature allows a scale with a load cell problem to operate normally until qualified service personnel can repair the problem. <ul style="list-style-type: none"> – Sometimes more than one load cell fails. – Only one load cell per section may be ghosted. – The Kernel views its companion load cell for data if/when the ghosting is enabled. – The Ghosting Feature works with Intalogix™-equipped instruments only. – The ghosting feature does not work with Analog equipped instruments. |
| <p>EXAMPLE: Load cell three (3) failed, but has been ghosted. The Kernel uses the data from load cell four (4) to replace the data from the ghosted load cell three (3). This temporary solution permits the scale to operate. The scale is not legal for trade when ghosting is enabled.</p> <ul style="list-style-type: none"> • If load cell four (4) has 5000 lbs., then it uses 5000 lbs. for ghosted load cell 3 also. • The value displayed is 10,000 lbs. for Scale Section 2. • F6 enables and disables this feature. | |

Note: Ghosting **must** be disabled before any calibration is performed.

7.4. Error Conditions

| Error Condition(s) | Solution(s) |
|---|--|
| <ul style="list-style-type: none"> • CHECK THAT SCALE IS EMPTY. • IF SCALE IS EMPTY, CALL FOR SERVICE. • LOAD CELL(S) BAD. | <ul style="list-style-type: none"> • A large amount of weight is zeroed. • This is normal. • Press OK and continue weighing. • Possible load cell damage. • Call for Service. |
| <ul style="list-style-type: none"> • LOAD CELL FAILURE(S) • FLASHING AND DISPLAYS “- - - -” | <ul style="list-style-type: none"> • Possible load cell damage. • Call for Service. • Access the Load Cell Diagnostics Menu to verify the load cell status. • Count stability or change of counts. • Contact the local service for further trouble-shooting. |
| SC CELLS FOUND NONE | <ul style="list-style-type: none"> • Possible damaged load cell cable. • Load cell shortened. • Defective Pit Power Supply. • Defective Smart Sectional Controller(s). • Defective Analog Assembly. |
| DISPLAYS “- - - -” ~ LB GROSS | <ul style="list-style-type: none"> • Communication error to load Cells. • Check settings by pressing F10. • Settings should be COM2, Even. |

7.5. Additional Service Information

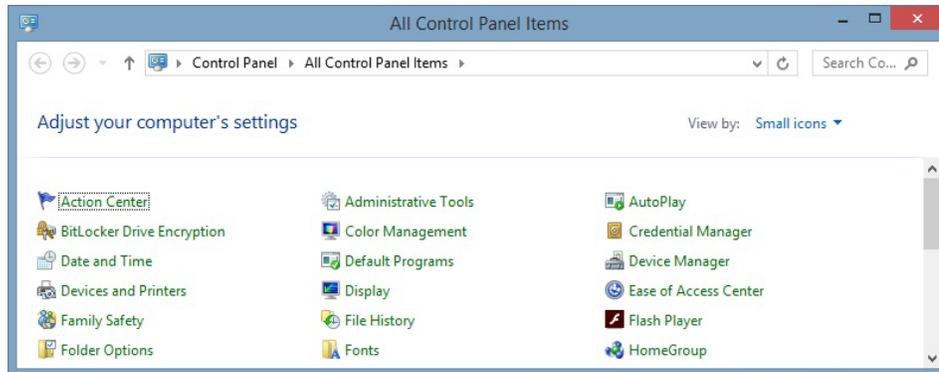
7.5.1. Control Panel

The Windows Control Panel permits setting time, date, add and remove programs, as well as, other Windows features.

* To access the Control Panel:

7.5.1. Control Panel, Continued

1. Right mouse click on the **Windows key** (on the bottom left corner of the desktop) and select **Control Panel**. The **Control Panel** appears.



2. Customize basic features in the **Control Panel**, such as:

- Touch Panel
- Mouse
- Keyboard
- Date and Time

* This is just one way to locate the control panel.

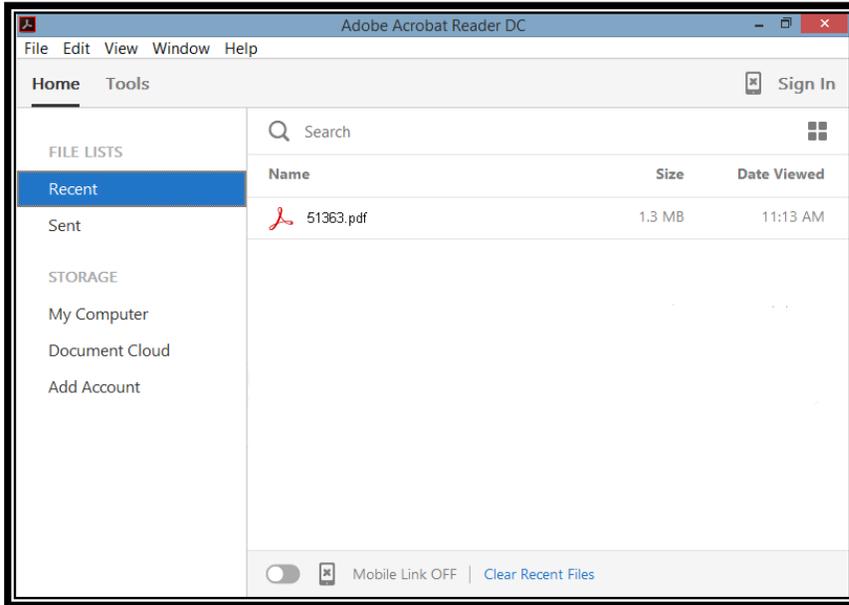
7.5.2. Accessing the Operator Manual

This FB4000 Kernel Operator Manual is available via the Fairbanks site <http://www.fairbanks.com/> or in the Kernel Options Menu.

To access the FB4000 Kernel Operator Manual:

1. Launch the FB4000 Kernel via the desktop (skip this step if the Kernel is already active)
2. Restore the Kernel from the taskbar or system tray
3. Click **Menu** key
4. In the **Kernel Options Menu** click **Operator Manual**. The Operator Manual PDF appears.
5. Click the title of the PDF and the manual appears.

7.5.2. Accessing the Operator Menu, Continued



Appendix I: Data Output

A. Remote Display Output

Data Format

<STX><4><0><SP/-><XXXXXX><ETX>

Note(s):

1. Characters denoted by **X** are characters 0-9.
 2. Leading zeroes are suppressed.
 3. Polarity indication for a positive value is a space (**SP**).
 - Negative values are not transmitted.
 4. **Identifier code <4><0> = Gross weight.**
 - Transmission is **Gross Only**.
 5. Transmission for the **DEMAND Mode** occurs when a carriage return (**CR**) Hex **0D** is received.
-

B. Configure Output

Fairbanks Data Format

<STX><A><C><GGGGGG><TTTTTT><CR>

Note(s):

1. Characters denoted by **G** and **T** are characters 0-9.
 2. Leading zeroes are suppressed.
 3. **Gross Weight Data = G**
Tare Weight Data = T
-

Status Code (Word) A

| Bit # | X00 | X0 | X | X.X | X.XX | X.XXX | X.XXXX | X.XXXXX |
|-------|-----|----|---|-----|------|-------|--------|---------|
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

B. Configure Output, Continued

Increment Size

| Bit # | Count By 1 | Count by 2 | Count by 5 |
|-------|------------|----------------|------------|
| 3 | 1 | 0 | 1 |
| 4 | 0 | 1 | 1 |
| 5 | | Always Logic 1 | |
| 6 | | Always Logic 0 | |
| 7 | | Parity Bit | |

Status Code (Word) B

| Bit # | Description | | |
|-------|----------------|--|------------------|
| 0 | Gross = 0 | | Net = 1 |
| 1 | Positive = 0 | | Negative = 1 |
| 2 | In Range = 0 | | Overcapacity = 1 |
| 3 | No Motion = 0 | | Motion = 1 |
| 4 | Lb = 0 | | Kg = 1 |
| 5 | Always Logic 1 | | |
| 6 | Normal = 0 | | Power Up = 1 |
| 7 | Parity Bit | | |

Status Code (Word) C

| Bit # | Description | | |
|-------|------------------|--|-------------------------|
| 0 | Always Logic = 0 | | |
| 1 | Always Logic = 0 | | |
| 2 | Always Logic = 0 | | |
| 3 | Normal = 0 | | Print Switch Pushed = 1 |
| 4 | Always Logic = 0 | | |
| 5 | Always Logic = 0 | | |
| 6 | Normal = 0 | | Keyboard Tare = 1 |
| 7 | Parity Bit | | |

Toledo Data Format

<STX><A><C><GGGGGG><TTTTTT><CR>

Note(s):

1. Characters denoted by **G** and **T** are **Characters 0-9**.
2. Leading zeroes are *not suppressed*.
3. **Gross Weight data = G**
Tare Weight data = T

Status Code (Word) A

| Bit # | X00 | X0 | X | X.X | X.XX | X.XXX | X.XXXX | X.XXXXX |
|-------|-----|----|---|-----|------|-------|--------|---------|
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 2 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

Increment Size

| Bit # | Count By 1 | Count by 2 | Count by 5 |
|-------|------------|----------------|------------|
| 3 | 1 | 0 | 1 |
| 4 | 0 | 1 | 1 |
| 5 | | Always Logic 1 | |
| 6 | | Always Logic 0 | |
| 7 | | Parity Bit | |

Toledo Data Format

Status Code (Word) B

| Bit # | Description | | |
|-------|------------------|--|------------------|
| 0 | Gross = 0 | | Net = 1 |
| 1 | Positive = 0 | | Negative = 1 |
| 2 | In Range = 0 | | Overcapacity = 1 |
| 3 | No Motion = 0 | | Motion = 1 |
| 4 | Lb = 0 | | Kg = 1 |
| 5 | Always Logic = 0 | | |
| 6 | Normal = 0 | | Power Up = 1 |
| 7 | Parity Bit | | |

Status Code (Word) C

| Bit # | Description | | |
|-------|------------------|--|---------------------------|
| 0 | Always Logic = 0 | | |
| 1 | Always Logic = 0 | | |
| 2 | Always Logic = 0 | | |
| 3 | Normal = 0 | | Print Switched Pushed = 1 |
| 4 | Always Logic = 0 | | |
| 5 | Always Logic = 1 | | |
| 6 | Normal = 0 | | Keyboard Tare = 1 |
| 7 | Parity Bit | | |

Cardinal 738 Continuous Scoreboard Data Format

<CR><P><WWWWW><m><SP><U><SP><g><SP><SP><ETX>

Note(s):

1. *W = Displayed weight*
P = Polarity
+ = Positive weight
- = Negative weight
U = Units
lb = pounds
kg = kilograms
m = Motion or o = Overload
g = Gross; n = Net
SP = Space
 2. *Leading zeros are not suppressed.*
-

Weightronix Data Format

< ><M><WWWWW>< ><U><CR><LF>

Note(s):

1. *< > = Space*
M = Mode
G =Gross
T=Tare
N=Net
W = Displayed weight
U = Units
m = Motion
o = Overload
 2. *Leading zeros are suppressed.*
-

Condec Continuous Data Format

<STX><P><WWWWW><U><G><M><CR>

Note(s):

1. *P = Polarity*
space = positive weight
- = negative weight
W = Displayed weight
U = Units
L = pounds
K = kilograms
G = Gross; N = Net
M = Motion
 2. *Leading zeros are suppressed.*
-

C. Build Tab Definitions

Load Cell Status <L> This item, if included in the data output string, indicates if a load cell(s) are indicating an error. If no error is present, a zero (0) will be present or the character equivalent of the decimal number of load cell with an error will be indicated. i.e. 1 = <SOH>, 28 = <FS>

Appendix II: Network Command Functions

Command Structure:

[Sender],[COMMAND],Command,[End][LF]

Where **Sender** is:

The Computer Name of the PC which is sending the command.

Where Command is:

| | |
|--------------------------|---|
| Lowercase z = | Zeroes all scales. |
| Uppercase Z1, Z2, etc = | Zero a specific scale. |
| Uppercase ZA or ZB = | Zero Group ScaleA (1 to 4) or Group ScaleB (5 to 8). |
| Uppercase Txxxx = | Apply Tare xxxxx to Active scale where xxxxx = Tare value. |
| Uppercase T#,xxxx = | Apply Tare xxxxx to Selected scale # where xxxxx = Tare value and # = Scale number. |
| Uppercase A = | Auto Tare Active scale |
| Lowercase u = | Change units on all scales. |
| Uppercase U1, U2, etc. = | Change units on a specific scale. |
| Uppercase UA or UB = | Change units on Group ScaleA (1 to 4) or Group ScaleB (5 to 8). |
| Uppercase S# = | Make Scale # (1-8) the Active scale where # = Scale number. |

Poll Character (see Configured Output) sends configured output.

LF = Line Feed

Example:

[Freds PC],[COMMAND],Z1,[End][LF]

i.e. – Freds PC is requesting Scale 1 to Zero.

Appendix III: SOCKS Information

SOCKS is an Internet Protocol that allows client-server applications to transparently use the services of a network firewall.

- **SOCKS** is an abbreviation for “sockets”.
- Clients behind a firewall, needing to access exterior servers, may connect to a SOCKS proxy server instead. Such a proxy server controls the eligibility of the client to access the external server and passes the request on to the server.
- **SOCKS** can also be used in the opposite way, allowing the clients outside the firewall (exterior clients) to connect to servers inside the firewall (internal servers).

A typical **SOCKS 4** connection request looks like the following (each number is one byte).

Client to SOCKS Server:

- **Field 1:** SOCKS version number, 1 byte, must be 0x04 for this version
- **Field 2:** Command code, 1 byte:
 - **0x01** = Establish a TCP/IP stream connection.
 - **0x02** = Establish a TCP/IP port binding.
- **Field 3:** Network byte order port number, 2 bytes.
- **Field 4:** Network byte order IP address, 4 bytes.
- **Field 5:** The user ID string, variable length, terminated with a null (0x00).

Server to SOCKS client:

- **Field 1:** Null byte.
- **Field 2:** Status, 1 byte:
 - **0x5a** = Request granted.
 - **0x5b** = Request rejected or failed.
 - **0x5c** = Request failed because client is not running identd (or not reachable from the server).
 - **0x5d** = Request failed because client’s identd could not confirm the user ID string in the request.
- **Field 3:** 2 arbitrary bytes, that should be ignored.
- **Field 4:** 4 arbitrary bytes, that should be ignored.

Appendix III: SOCKS Information, Continued

The **SOCKS 5 Protocol**, an extension of the **SOCKS 4 Protocol** that offers more choices of authentication, is defined in **RFC 1928**.

The initial handshake now consists of the following:

- Client connects and sends a greeting which includes a list of authentication methods supported.
- Server chooses one (or sends a failure response if none of the offered methods are acceptable).
- Several messages may now pass between the client and the server depending on the authentication method chosen.
- Client sends a connection request similar to SOCKS 4.
- Server responds similar to SOCKS 4.

The authentication methods supported are numbered as follows:

- **0x00** – No authentication.
- **0x01** – GSSAPI.
- **0x02** – Username/Password.
- **0x03-0x7F** – Methods assigned by IANA.
- **0x80-0xFE** – Methods reserved for private use.

The initial greeting from the client is:

- **Field 1:** SOCKS version number (must be 0x05 for this version).
- **Field 2:** Number of authentication methods supported, 1 byte.
- **Field 3:** Authentication methods, variable length, 1 byte per method supported.

The server's choice is communicated:

- **Field 1:** SOCKS version, 1 byte (0x05 for this version).
- **Field 2:** Chosen authentication method, 1 byte, or 0xFF if no acceptable methods were offered.

Appendix III: SOCKS Information, Continued

The subsequent authentication is method-dependent and described in **RFC 1929**.

The client's authentication request is:

- **Field 1:** Version number, 1 byte (must be 0x01).
- **Field 2:** Username length, 1 byte.
- **Field 3:** Username.
- **Field 4:** Password length, 1 byte.
- **Field 5:** Password.

Server response for authentication:

- **Field 1:** Version, 1 byte.
- **Field 2:** Status code, 1 byte.
 - **0x00** = success.
 - **Any other value** = failure, connection must be closed.

The client's connection request is:

- **Field 1:** SOCKS version number, 1 byte (must be 0x05 for this version).
- **Field 2:** Command code, 1 byte:
 - **0x01** = establish a TCP/IP stream connection.
 - **0x02** = establish a TCP/IP port binding.
 - **0x03** = associate a UDP port.
- **Field 3:** Reserved, must be 0x00.
- **Field 4:** Address type, 1 byte:
 - **0x01** = ipv4 address.
 - **0x03** = Domain name.
 - **0x04** = ipv6 address.
- **Field 5:** Destination address of:
 - 4 bytes for ipv4 address.
 - 1 byte of name length followed by the name for Domain name.
 - 16 bytes for ipv6 address.
- **Field 6:** Port number in a network byte order, 2 bytes.

Appendix III: SOCKS Information, Continued

Server response:

- **Field 1:** SOCKS protocol version, 1 byte (0x05 for this version).
- **Field 2:** Status, 1 byte:
 - **0x00** = Request granted.
 - **0x01** = General failure.
 - **0x02** = Connection not allowed by *ruleset*.
 - **0x03** = Network unreachable.
 - **0x04** = Host unreachable.
 - **0x05** = Connection refused by destination host.
 - **0x06** = TTL expired.
 - **0x07** = Command not supported / protocol error.
 - **0x08** = Address type not supported.
- **Field 3:** Reserved, must be 0x00.
- **Field 4:** Address type, 1 byte:
 - **0x01** = Ipv4 address.
 - **0x03** = Domain name.
 - **0x04** = Ipv6 address.
- **Field 5:** Destination address of :
 - 4 bytes for Ipv4 address.
 - 1 byte of name length followed by the name for Domain name.
 - 16 bytes for Ipv6 address.
- **Field 6:** Network byte order port number, 2 bytes.

APPENDIX IV: ASCII CODES

| HEX | DEC | CHAR |
|-----|-----|-------|
| 00 | 000 | NUL |
| 01 | 001 | SOH |
| 02 | 002 | STX |
| 03 | 003 | ETX |
| 04 | 004 | EOT |
| 05 | 005 | ENQ |
| 06 | 006 | ACK |
| 07 | 007 | BEL |
| 08 | 008 | BS |
| 09 | 009 | HT |
| 0A | 010 | LF |
| 0B | 011 | VT |
| 0C | 012 | FF |
| 0D | 013 | CR |
| 0E | 014 | SO |
| 0F | 015 | SI |
| 10 | 016 | DLE |
| 11 | 017 | DC1 |
| 12 | 018 | DC2 |
| 13 | 019 | DC3 |
| 14 | 020 | DC4 |
| 15 | 021 | NAK |
| 16 | 022 | SYN |
| 17 | 023 | ETB |
| 18 | 024 | CAN |
| 19 | 025 | EM |
| 1A | 026 | SUB |
| 1B | 027 | ESC |
| 1C | 028 | FS |
| 1D | 029 | GS |
| 1E | 030 | RS |
| 1F | 031 | US |
| 20 | 032 | SPACE |
| 21 | 033 | ! |
| 22 | 034 | " |
| 23 | 035 | # |
| 24 | 036 | \$ |
| 25 | 037 | % |
| 26 | 038 | & |
| 27 | 039 | 5 |
| 28 | 040 | (|
| 29 | 041 |) |
| 2A | 042 | * |

| HEX | DEC | CHAR |
|-----|-----|------|
| 2B | 043 | + |
| 2C | 044 | , |
| 2D | 045 | - |
| 2E | 046 | . |
| 2F | 047 | / |
| 30 | 048 | 0 |
| 31 | 049 | 1 |
| 32 | 050 | 2 |
| 33 | 051 | 3 |
| 34 | 052 | 4 |
| 35 | 053 | 5 |
| 36 | 054 | 6 |
| 37 | 055 | 7 |
| 38 | 056 | 8 |
| 39 | 057 | 9 |
| 3A | 058 | : |
| 3B | 059 | ; |
| 3C | 060 | < |
| 3D | 061 | = |
| 3E | 062 | > |
| 3F | 063 | ? |
| 40 | 064 | @ |
| 41 | 065 | A |
| 42 | 066 | B |
| 43 | 067 | C |
| 44 | 068 | D |
| 45 | 069 | E |
| 46 | 070 | F |
| 47 | 071 | G |
| 48 | 072 | H |
| 49 | 073 | I |
| 4A | 074 | J |
| 4B | 075 | K |
| 4C | 076 | L |
| 4D | 077 | M |
| 4E | 078 | N |
| 4F | 079 | O |
| 50 | 080 | P |
| 51 | 081 | Q |
| 52 | 082 | R |
| 53 | 083 | S |
| 54 | 084 | T |
| 55 | 085 | U |

| HEX | DEC | CHAR |
|-----|-----|------|
| 56 | 086 | V |
| 57 | 087 | W |
| 58 | 088 | X |
| 59 | 089 | Y |
| 5A | 090 | Z |
| 5B | 091 |] |
| 5C | 092 | \ |
| 5D | 093 | [|
| 5E | 094 | ^ |
| 5F | 095 | -- |
| 60 | 096 | ' |
| 61 | 097 | a |
| 62 | 098 | b |
| 63 | 099 | c |
| 64 | 100 | d |
| 65 | 101 | e |
| 66 | 102 | f |
| 67 | 103 | g |
| 68 | 104 | h |
| 69 | 105 | i |
| 6A | 106 | j |
| 6B | 107 | k |
| 6C | 108 | l |
| 6D | 109 | m |
| 6E | 110 | n |
| 6F | 111 | o |
| 70 | 112 | p |
| 71 | 113 | q |
| 72 | 114 | r |
| 73 | 115 | s |
| 74 | 116 | t |
| 75 | 117 | u |
| 76 | 118 | v |
| 77 | 119 | w |
| 78 | 120 | x |
| 79 | 121 | y |
| 7A | 122 | z |
| 7B | 123 | { |
| 7C | 124 | |
| 7D | 125 | } |
| 7E | 126 | ~ |
| 7F | 127 | DEL |



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FB4000 KERNEL

**Operator Manual
Document 51364**