Operator Manual

FB3000 Series Instrument With Intalogix™ Technology

FB3000 Kernel Program

51147

Revision 3 04/12

Amendment Record

FB3000 Series Instrument With Intalogix™ Technology

FB3000 KERNEL PROGRAM

OPERATORS MANUAL

DOCUMENT 51147

Manufactured by Fairbanks Scales Inc.
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Section 1: General Information

1.1. INTRODUCTION

The Fairbanks FB3000 Solutions Series instrument is a powerful, versatile, indicator which has flexibility, open architecture, and integrated capabilities of many computer functions. With these abilities, the FB3000 collects, processes, and transmits data through RS232, RS485, RS422 serial ports, USB, parallel port, and PCI 10/100 Mbs Ethernet interfaces.

1.1.1. The FB 3000

Current FB3000 Units include the following applications:

- **NewScale Program**
- **Kernel Weight Server Program**
- **In/Out Application**
- **LabelBank Application**
- **Highway System Application**
- **SoftBatch Application**
- **Interact Inside Program**

1.1.2. Kernel Description

The FB3000 Kernel is weight serving program for all FB3000 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

The FB3000 KERNEL is a Fairbanks-developed Weight Server Program

1.2. TECHNICAL SPECIFICATIONS

ENCLOSURE	• Painted Steel (NEMA 12) — Product 24737; 26154 • Stainless Steel (NEMA 12) — Product 24900; 26138; 26155 • Stainless Steel and Aluminum (NEMA 12) — Product 26867; 26868 • Stainless Steel (NEMA 4X) — Product 28000
PROCESSOR	400 MHz or 1 GHz processor
BIOS	256 KB Flash
RAM	144-pin SDIMM socket, 256 MB or 512 MB SDRAM
STORAGE	40 GB Hard Drive standard
OPERATING SYSTEM	Microsoft XP Pro™ Embedded with Service Pack 2
OUTPUTS	**Parallel Port** - One (1) bi-directional parallel port with SPP/ECP/EPP support. **Serial Ports** - One (1) internal RS-232 interface, COM 1; One (1) RS-232/422/485 (scale interface), COM 2; Two (2) external RS232 ports, COM 3 and COM 4. **USB Ports** - Two (2) internal ports and Two (2) external ports. **SVGA Port** - One (1) SVGA display output.
KEYBOARD AND MOUSE INTERFACE	Supports PS2 or USB keyboards Supports PS2 or USB mice
PC/104 CONNECTOR	One (1) internal PC/104 connector
DIGITAL I/O	Eight (8) internal digital inputs and outputs
ETHERNET INTERFACE	PCI 100/10 Mbps Ethernet interface with a female RJ45 connector. Complies with IEEE 802.3x Standards
DISPLAY	• 10.4” Color SVGA Color LCD-TFT; Full graphic support; 600 x 800 resolution • 10.4” Color SVGA Color DVI; 600 x 800 resolution (FB3000T models)
BATTERY	Lithium, data retention up to 10 years

1.2. TECHNICAL SPECIFICATIONS, CONTINUED

SCALE INTERFACE OPTIONS	• Intalogix Technology — QMB Interface (**26148**) ▪ *Maximum of two (2) QMB Interfaces per instrument* — External Intalogix Communication Board (**28330**) ▪ *Maximum of twenty (20) 1000 Ω or twelve (12) 350 Ω cells* — Dual External Intalogix Communication Board (**28333**) ▪ *Up to forty (40) 1000 Ω or twenty-four (24) 350 Ω cells* • Analog Technology — Analog Load Cell Interface (**25543**) ▪ *Up to sixteen (16) 1000 Ω or ten (10) 350 Ω cells* ▪ *Maximum of two (2) per FB3000.* — PC104 Weight Controller (**27104**) ▪ *High Speed A/D* ▪ *Maximum of ten (10) 1000 ohm load cells per scale input* ▪ *Controls up to two (2) scales* ▪ *Provides passive 20mA serial output* ▪ *Provides passive 4-20mA analog output* ▪ *Maximum of two (2) per FB3000.*
ACCESSORIES	• Mini keyboard (**25498**) — 87 key — PS2 • NEMA 4 Rubberized keyboard (**27077**) — USB • Mouse (**26387**) — Two (2) button with scroll wheel — USB • Wall Bracket – Painted Steel (**26223**) • Wall Bracket – Stainless Steel (**26224**) • Compact Flash Card 32MB (**25853**) • SVP/ Uninterruptible Power Supply (UPS) (**15892**) — 500 VA Rating

1.2. TECHNICAL SPECIFICATIONS, CONTINUED

ACCESSORIES **CONTINUED**	• External Serial Port Relay Kit (**26727**) — Basic traffic light control (Interact) • 4-20mA analog and 20mA serial output (**25284**) — PC140 Weight Controller
POWER REQUIREMENTS	100 - 130 VAC @ 1A @ 60 Hz +/- 2 Hz — Separate and dedicated circuit. — Neutral to Ground voltage should be ≤ 0.2 vAC
ETL LISTED	• Conforms to UL STD 60950-1. • CAN/CSA C 22.2 NO.60950-1-03.
APPROVALS	• CC# 04-013; FB 3000T = CC#04-013A5; NEMA 4 = CC#04-013A6 • MC# AM-5552C

1.3. FEATURES

DIAGNOSTICS	Built-in self diagnostics reports on: • Calibration change • Time and date change • Remote access enabled • Routine maintenance required' • Flash memory error • Load cell ghosted • Load cell failure
LOAD CELL FLAG	Visual "flags" identify problem load cell(s) on diagnostic screen until flag is manually cleared to identify intermittent problems
LOAD CELL GHOSTING	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)
REMOTE DIAGNOSTICS	Programmable Remote Diagnostic Utility provides remote diagnostics and configuration from any PC with proper authorization and access

1.3. FEATURES, CONTINUED

EMAIL ERROR REPORTING	Built-in email client for reporting error conditions such as the following: • Calibration change • Time and date change • Flash memory error • Remote access enabled • Routine maintenance required • Load cell ghosted • Load cell failure
ERROR DISPLAYING	Programming-selected display of error messages
BACKUP	Features the ability to backup information to optional Flash Memory card, network or USB pen drive
WEB BROWSER	Built-in browser allowing web access for software updates and web site viewing if desired

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.

W A R N I N G !

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 hard disk 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. KEY FUNCTIONS

On-Screen Keyboard	External Keyboard	Description
Arrows	**Arrows**	• Navigates through the display. • Used also for scrolling.
Menu Button	**Esc**	• Changes the display to the **Operation Menu**. • Returns user to the previous menu.
Zero	**Pause Break**	Key(s) will **Zero the Scale.**
Print	**Prt Sc**	Prints a ticket. • In the **In/Out Device**, an **Inbound or Outbound Gross** ticket. • A Gross, Tare, Net ticket may also be printed. • In the **Weigh Only mode**, a Gross Weight ticket may be printed with a manually entered Tare and the Net will be calculated.

3.1. 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.
Enter	**Enter**	Stores selections into memory during data entry or programming.
F1	**F1**	Toggles between the scales that are viewed and operated.
F2	**F2**	Unassigned
F3	**F3**	Unassigned
F4	**F4**	Unassigned
F5	**F5**	Toggles between the scale groups when more than four (4) scales are used.
F6	**F6**	Toggles between the **Operational Screen** and the **Multi-Scale Screen**, if more than one scale is being controlled.
	F7	Unassigned
	F8	Unassigned
	F9	Unassigned
	F10	• Service Usage only. !!Warning!! changing this items in this area can effect the proper operation of the scale.
	F11	Unassigned
	F12	Unassigned

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

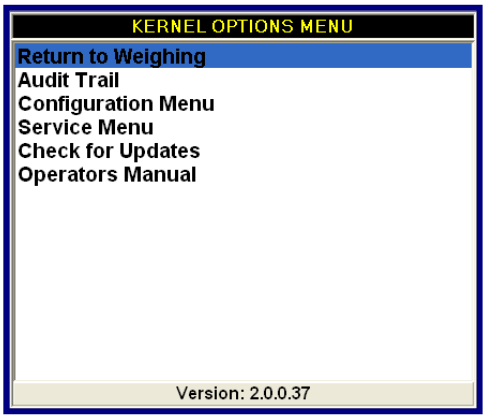
- **Gross Weighing**
- **GTN (Gross / Tare / Net)**

Additional Windows Tips

- **ALT + F4 key** Shuts down the active program *immediately*
- **Windows Key + D** Moves to the **Desktop**
- **Windows Key + E** Opens **MS Windows Explorer**™

3.2. GENERAL PROGRAMMING MENUS

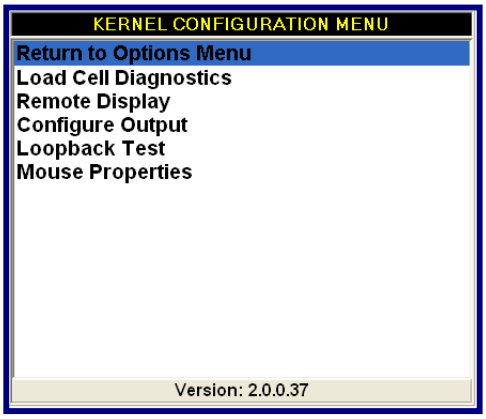
The programming menus which contain all of the parameters for the system are listed below.



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.**

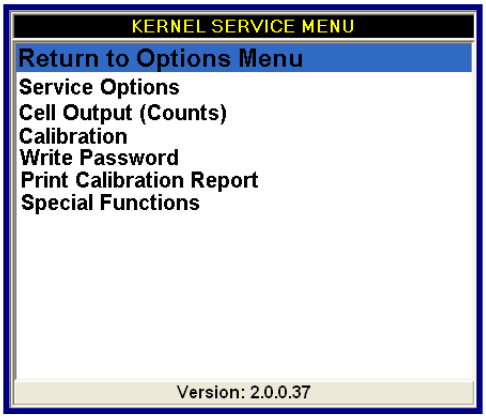
- *Optional programmable* password protection.

Service Menu

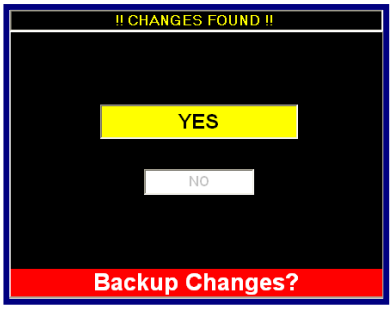
This menu is used to program the **metrological parameters of the system**, such as **scale capacity, calibration**, and **graduation size.**

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

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



3.2. BACKING UP CHANGES



Each time a programming change is made to the Kernel Program, a **Backup Changes** popup window appears.

- The normal answer is **NO.**
- Either double-click the NO or click the MENU .

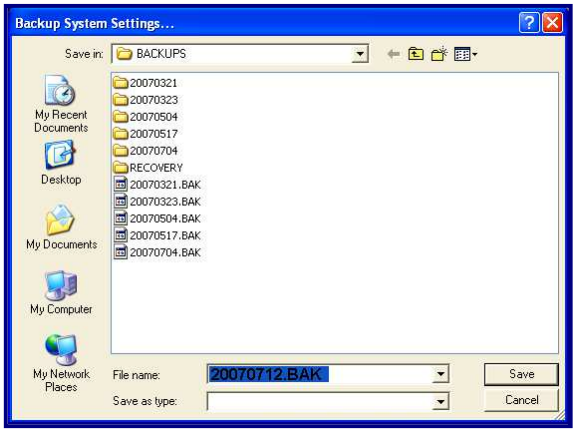
NOTE: *Save changes **ONLY WHEN** the programming change(s) are correct, and the system is proven to operate properly for all conditions.*

3.3. SAVING CHANGES TO A FOLDER

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

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

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



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

Section 4: Input/ Output (I/O)

4.1. INTRODUCTION

Connectivity is one of the primary features of the FB3000 and Kernel Weight Server program. The FB3000 has multiple RS232 ports, USB ports, Ethernet port, and a Parallel port to name a few. This section will provide steps in order to connect the FB 3000 in a variety of manners to a variety of devices.

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 FB3000 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 FB3000.
- 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 FB3000 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' FB3000 has five of the most commonly used pre-configurations, known as **Load Defaults**. These data strings are listed below:

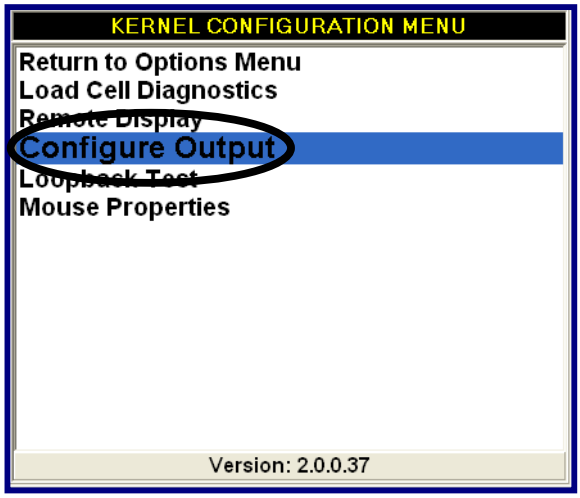
Fairbanks	**<STX><A><B><C><GGGGGG><TTTTTT><CR>**
Toledo	**<STX><A><B><C><GGGGGG><TTTTTT><CR>**
Cardinal	**<CR><P><WWWWWW><m><SP><U><SP><g><SP><SP><ETX>**
Weightronix	**< ><M><WWWWWW>< ><U><CR><LF>**
Condec	**<STX><P><WWWWWWW><U><G><M><CR>**

4.2.5. Load the Default COM Settings

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

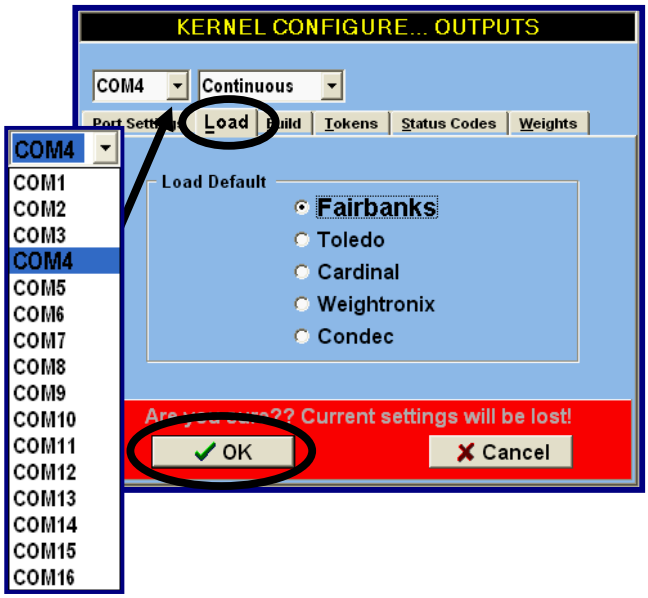
1. From the **Weighing Application Window**, press the **MENU** button, from the Kernel Options Menu, select **Configuration Menu**.

2. Select **Configure Output**..

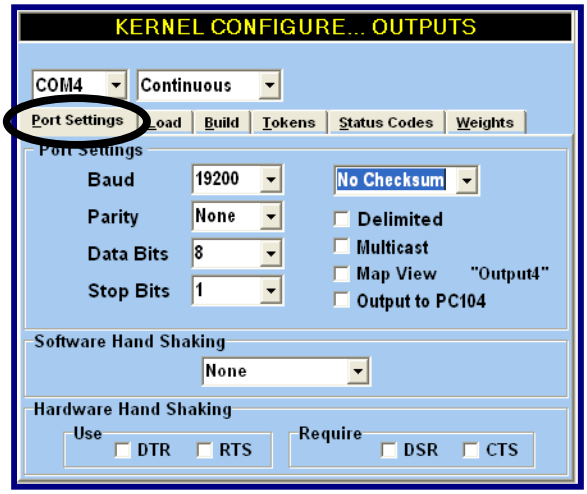


4.2.5. Load the Default COM Settings

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



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



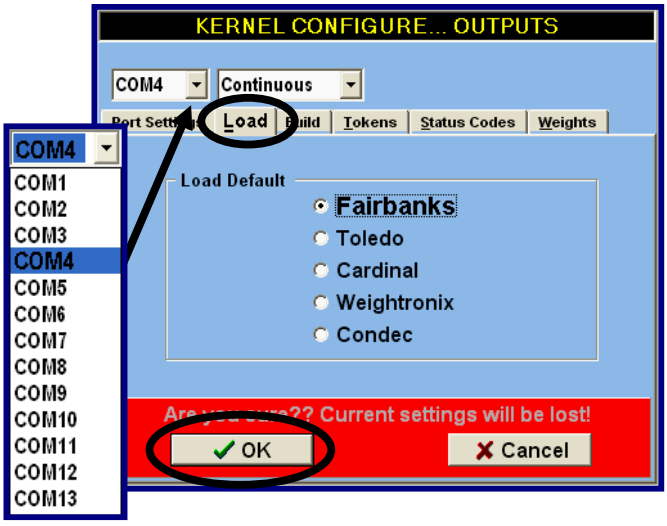
4.2.6. Customizing the Output Data Strings

The FB3000 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

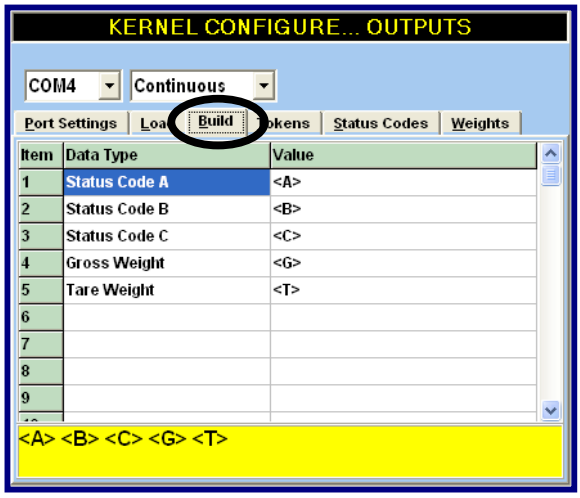
Follow these steps to customize the **Output Data String**.

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 ✓OK button.



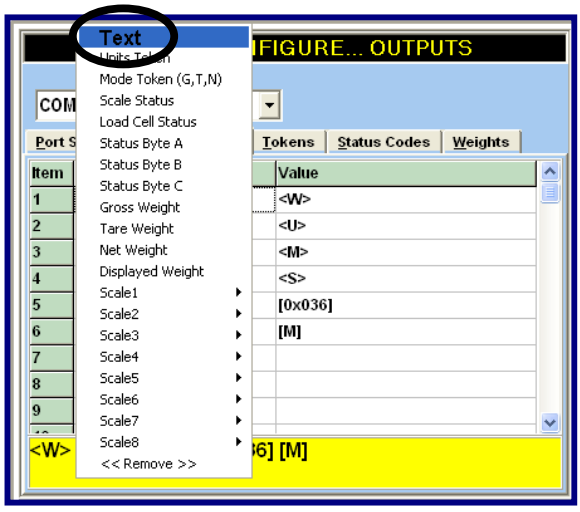
4.2.7. Steps in Customizing, Continued

7. Open the **Build** tab.



8. **Left-click** on the appropriate field to be generated within the specific data string, then select **Text.**

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

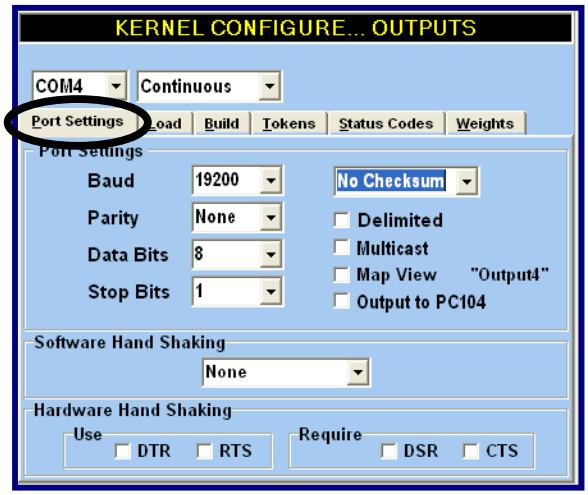


9. Program a command within the **Data String**, either enter an **ASCII Character**, or **input text**.

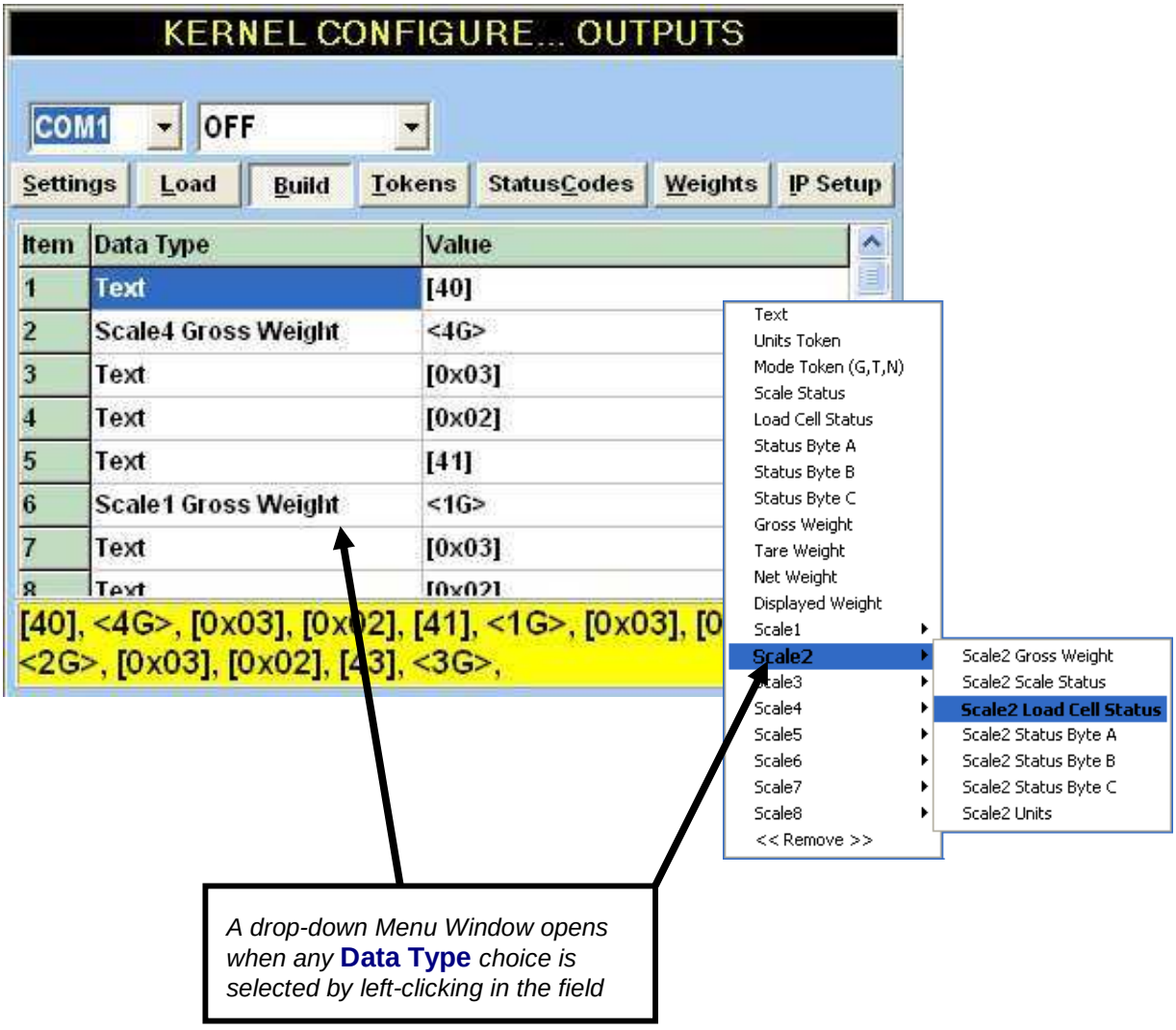
   – When inputting ASCII Characters, ***always*** precede the message with "**0x...**" and the equivalent ASCII code up to 3 digits (*i.e.* **0x099**).

10. Open the **Port Settings** tab.

11. Program the **Baud Rate, Stop Bits**, and the **Parity** to the appropriate settings.



4.2.7. Steps in Customizing, Continued



Window Name	Description
CONFIGURE OUTPUT, — **Build Tab**	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. — 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.

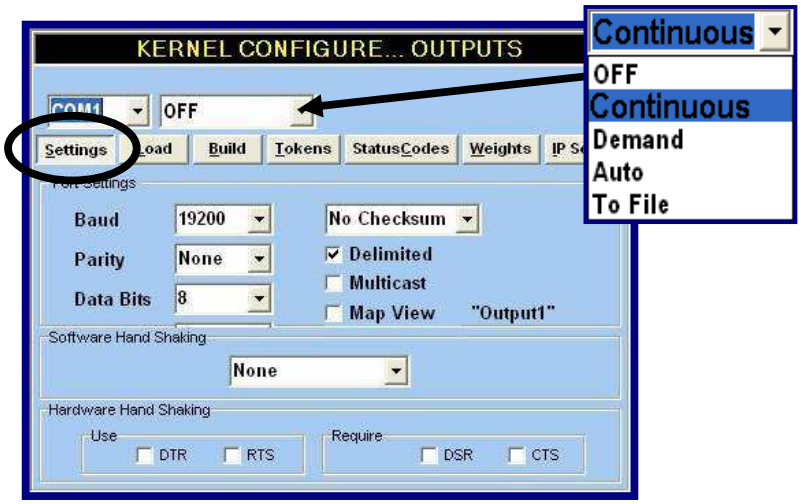
ASCII (American Standard Code for Internet Interchange) Characters

- **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** = **C**arriage **R**eturn).
- 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

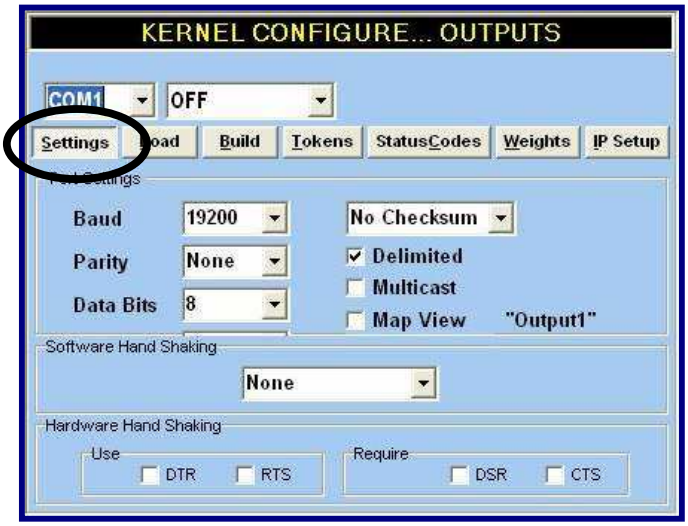
- A **Text** block must be added to the **Data String** before formatting the next character.
- These **Text Formatted Characters** are used to add a specific message to the Service Technician, and it is done in combination with the text and with other ASCII Text Characters.

4.2.9. Other Data String Customization



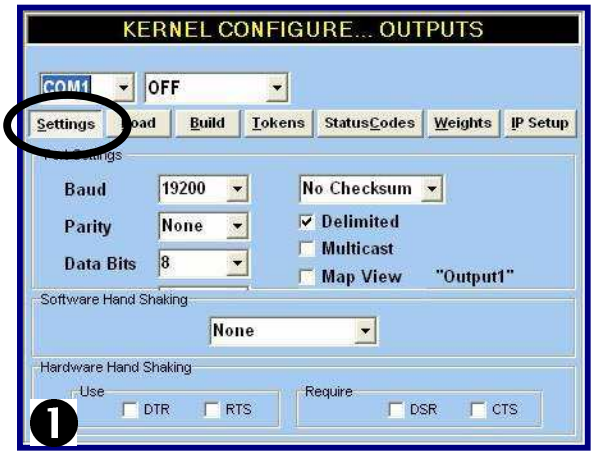
Window Name	Description
CONFIGURE OUTPUT — **Settings Tab**	**RS232 COM Port Drop-down** – Selects COM Port with its settings. **Data Transmission Options*** — **Continuous** [transmission] — **Demand** – Upon demand as a poll character is received — **Auto** – A transmission is sent when requested or 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*** — **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 FB3000 instruments across a Network. — **Map View** – Displays data in a memory mapped location. ▪ *The* **Testapp.exe,** *located in th***e Kernel folder,** *is used to verify memory mapped data,* — **Output to PC104** – Sends data to optional PC 104 Weight Controller Card using the **20mA** or **4-20mA outputs.** **Software Hand Shaking –** A means to control data flow using software functions for communication between two or more devices. — **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.

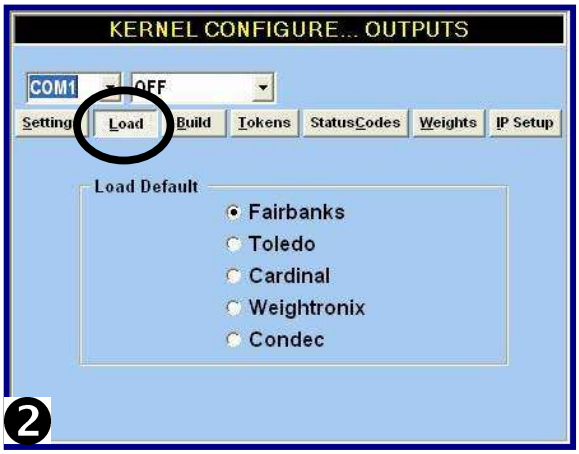
4.2.9. Other Data String Customization, Continued



Window Name	Description
CONFIGURE OUTPUT, CONTINUED — **Settings Tab, Continued**	**Hardware Hand Shake –** A means to control data flow using hardware functions for communication between two or more devices. **Network Controls** — **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





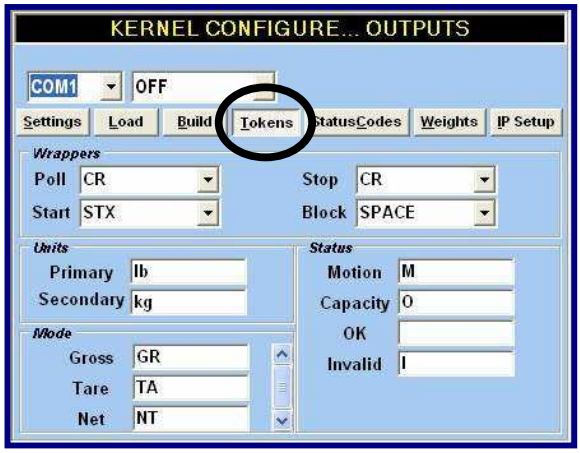
Window Name	Description
CONFIGURE OUTPUT, CONTINUED — **[Port] Settings Tab** ❶	**Control Signals** — **DSR (Data Set Ready) –** A control signal that indicates the device is ready to transmit data. — **CTS (Clear To Send) –** A control signal used to notify the device that it has line control.
— **Load Tab** ❷	Selects a preconfigured data protocol based on the scale manufacturer selected. — Select this item first when configuring an output. — Press the **OK** button to load the data protocol selected.

DEFAULT DATA PROTOCOLS

Fairbanks	**<STX><A><B><C><GGGGGG><TTTTTT><CR>**
Toledo	**<STX><A><B><C><GGGGGG><TTTTTT><CR>**
Cardinal	**<CR><P><WWWWWW><m><SP><U><SP><g><SP><SP><ETX>**
Weightronix	**< ><M><WWWWWW>< ><U><CR><LF>**
Condec	**<STX><P><WWWWWWW><U><G><M><CR>**

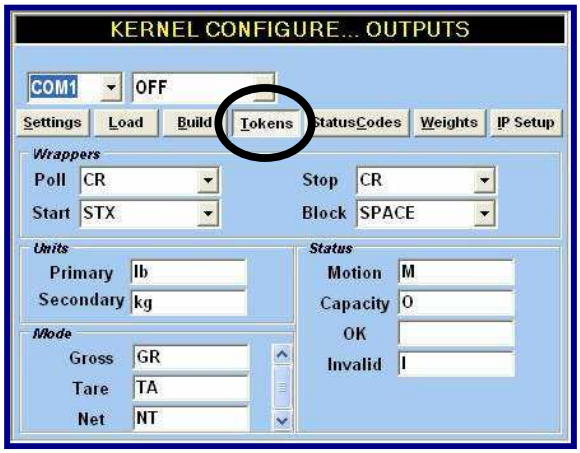
*** See* **Appendix III** *for more formatting information.*

4.2.9. Other Data String Customization, Continued



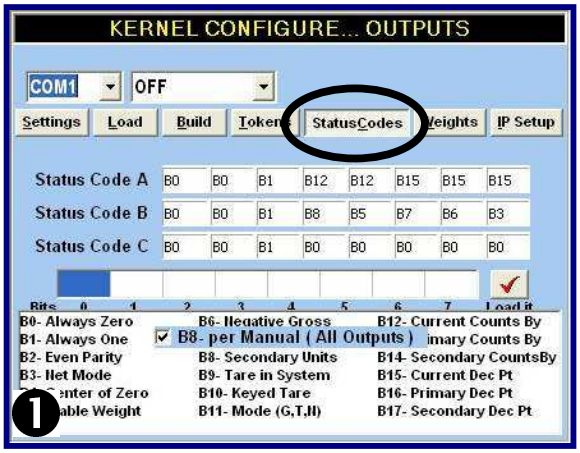
Window Name	Description
CONFIGURE OUTPUT, CONTINUED — **Tokens Tab**	Programs the various data string tokens, such as the **Motion** flag. Tokens are setup for the data protocol requirements. **Wrappers** — **Poll** – Polling character for a **demand output.** ▪ *Applicable only to the Demand Mode.* — **Start** – The **first character** of a data string. — **Stop** – The **last character** of a data string. — **Block** – The character that **separates the data fields.**
	Units – The character(s) used to define the unit of measure in the data string — **Primary** – The **main indicator** unit of measure. — **Secondary** – The **alternate indicator** unit of measure.
	Mode – The character(s) used to define the **Weighing Mode** in the data string. — **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.**

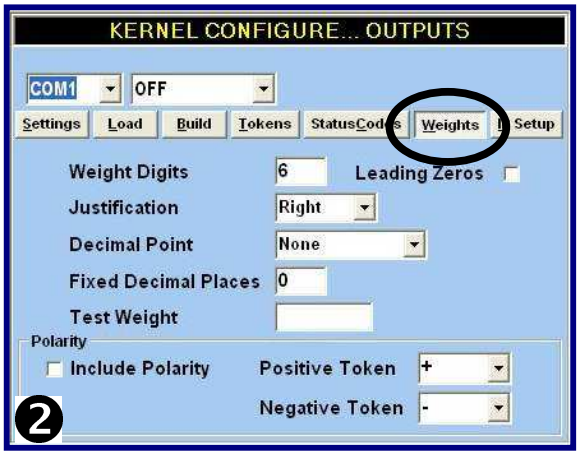
4.2.9. Other Data String Customization, Continued



Window Name	Description
CONFIGURE OUTPUT, CONTINUED — **Tokens Tab**	**Status – Identifies invalid weight conditions.** — **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.**

4.2.9. Other Data String Customization, Continued





Window Name	Description
CONFIGURE OUTPUT, CONTINUED — **Status Codes Tab** ❶	Programs data bits for **Status Words A, B** and **C within the Fairbanks and Toledo data streams**. — **Status Word** is eight **(8) bits** long. 12. Put the **Status Words** in the blank **Data Entry Position**. 13. Press the **Loaded it** button.
— **Weights Tab** ❷	Programs specific values for the Weight Tokens. — **Weighing Digits** – Programs the length of the weight data. ▪ *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. — **Positive Token** – (**+**), None or Space — **Negative Token** – (**–**), None or Space

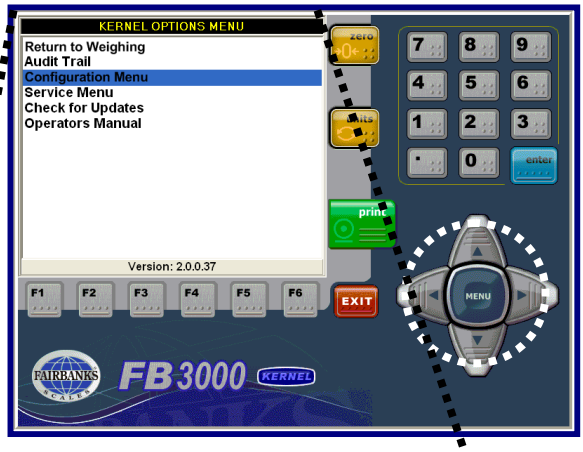
4.3. 20 MA SERIAL CURRENT LOOP PROGRAMMING

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

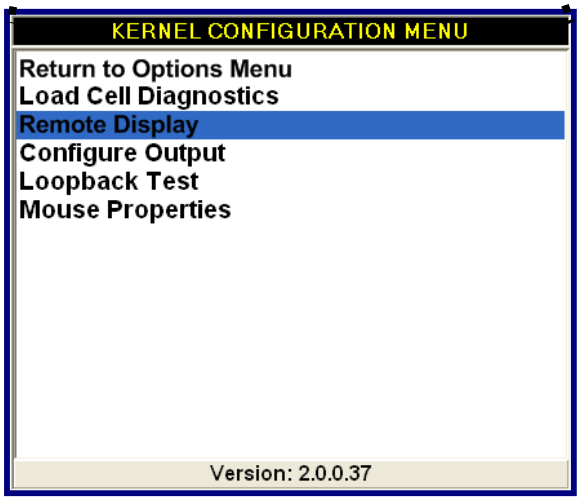
Note: *The PC104 Weight Controller Kit (27104) must be installed for this output to be available.*

Procedure:

1. In the **Kernel Weighing Program**, click the **MENU** button to open the Configuration Menu.

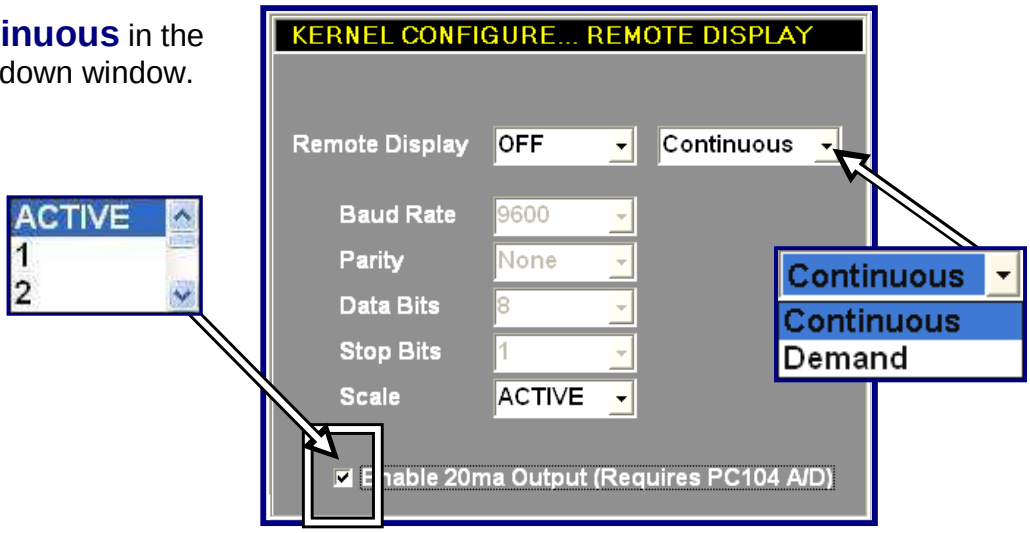


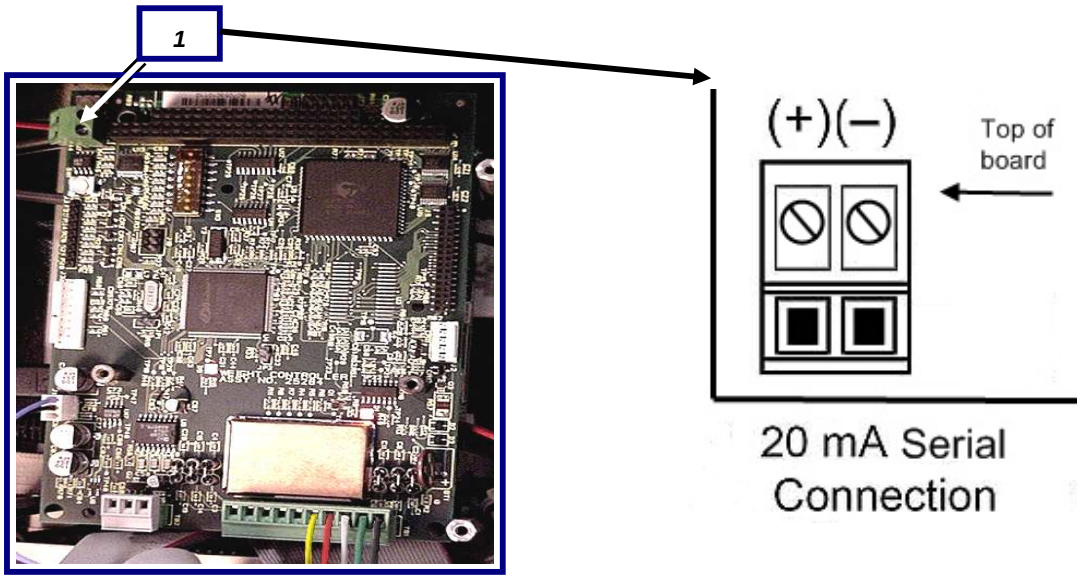
2. Open the **Remote Display**.



4.3. 20mA Serial Current Loop Programming, Continued

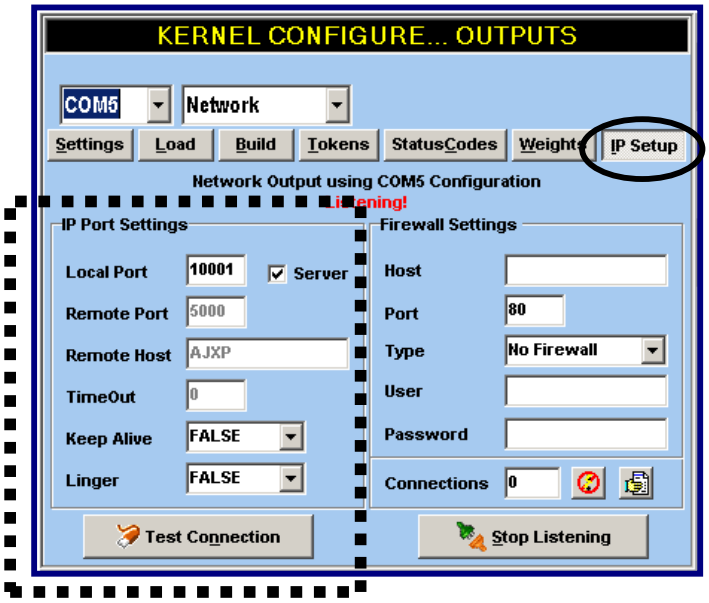
3. Set the **Remote Display** to **COM 1**.
4. Configure the **Baud**, **Parity**, **Data Bits**, and **Stop Bits** required.
5. Reset the **Remote Display** back to **OFF**.
6. Select the **Enable 20ma Output** check option.
7. Select **ACTIVE** in the **Scale** dropdown window.
8. Select **Continuous** in the correct drop-down window.





4.4. IP NETWORK OUTPUT

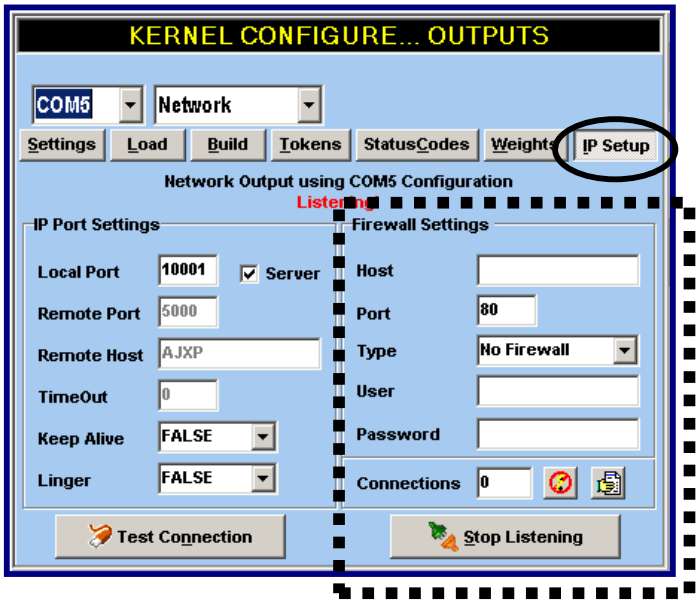
4.4.1. IP Setup Menu Overview.



Window Name	Description
CONFIGURE OUTPUT — **IP Setup Tab**	**IP Port Settings** • **Local Port** – The socket number on the local FB3000 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.** Test Connection – Verifies connectivity or connection.

NOTE: *See Appendix IV 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** • **Host** – The Host IP Address. • **Port** – The Port Socket number used. • **Type** ✓ **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.  Stops the monitoring signal with the scale.

* *See* **Appendix IV** *for complete information regarding* ***SOCKS Protocol.***

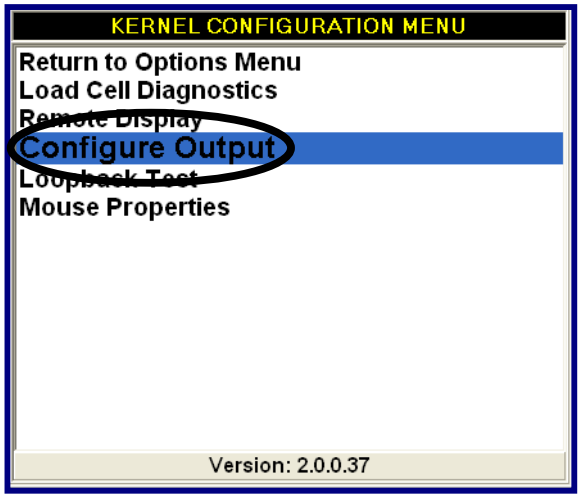
4.4.2. IP Network Output Setup Instructions

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**.

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

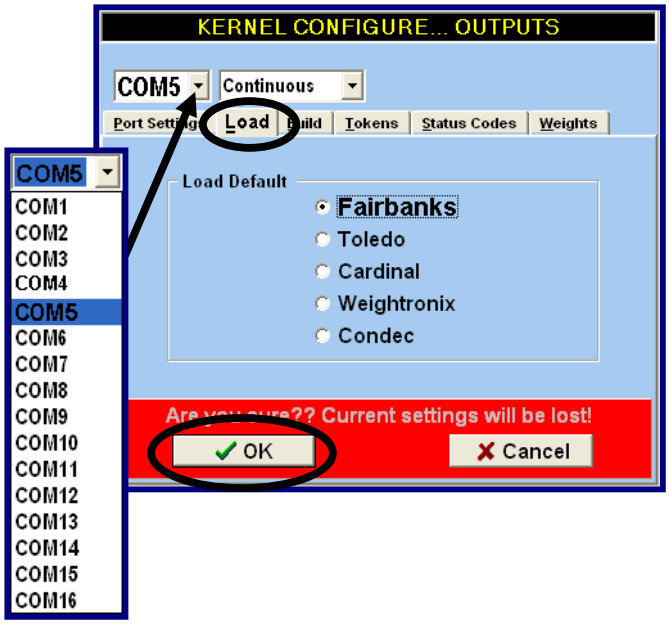
10. Select **Configure Output**..



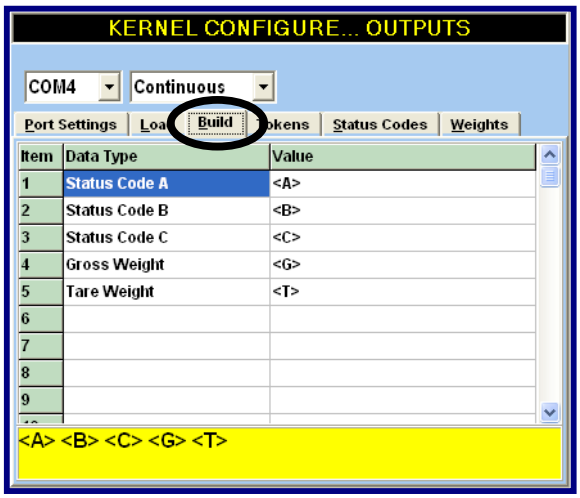
4.4.2. IP Network Output Setup Instructions, Continued

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

.



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



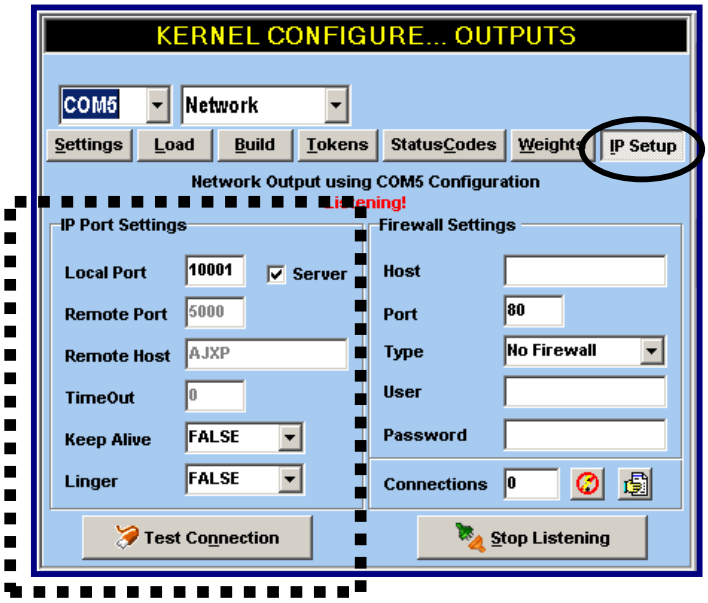
4.4.2. IP Network Output Setup Instructions, Continued

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

16. 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

17. 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.

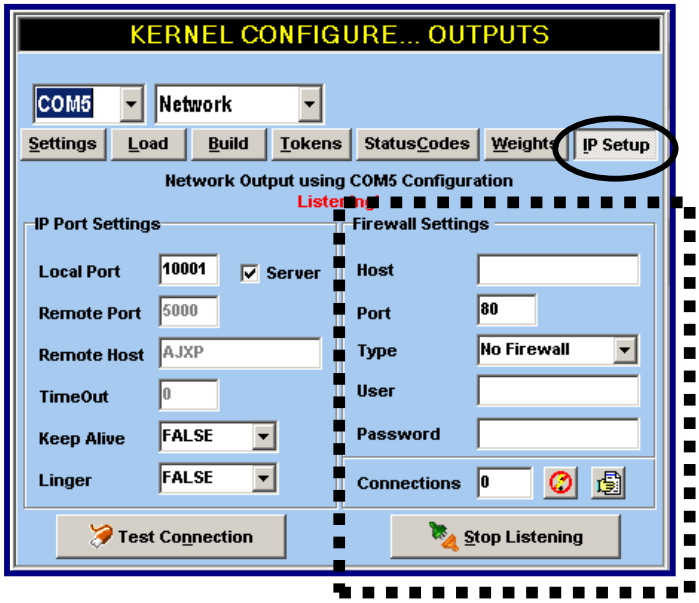


- Set the **Remote Host** to one of the following
  - The IP address of the remote computer which will receive the weight data,
  - The network computer name of the remote computer which will receive the weight data as in the example shown above.

18. **Firewall Settings** – Leave the defaults as shown

19. 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 FB3000 and the Port set to the FB3000 **Local Port** setting. Example: 2000.
    - When the IP is configured correctly, it will display **Listening**.



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

4.4.3. Testing the IP Network Output

Test Instructions to activate the **IP Network Output** function from the FB3000 Kernel Weight Server program.

1. Setup the **IP Network Output** as described in Section 7.6.2. of this manual.

2. Return the Kernel back to the **Weight Processing Screen**.

3. At a different computer on the same network, use Hyper-Terminal to receive the data.

4. Start Hyper-Terminal, enter a **New Connection** name. Example: Test. Click OK.

5. Set the **Connect Using** drop down box to **TCP/IP (Winsock).**

7. Set the **Host Address** to the **IP address** of the computer or FB3000 that the Kernel.exe is running on.

7. Set the **Port Number** to the same value as the **Local port** is set.

8. Click OK. If a connect attempt is made, it will fail at this point, ignore and clear the error message.

9. Select the **Call** menu item and select **Wait for Call** from the drop down menu.

10. If all is working, the instrument should make connection and weight data should be displayed in the Hyper-Terminal window in the format set previously in the setup instructions

Section 5: Operation

5.1. SYSTEM BOOT-UP PROCEDURE

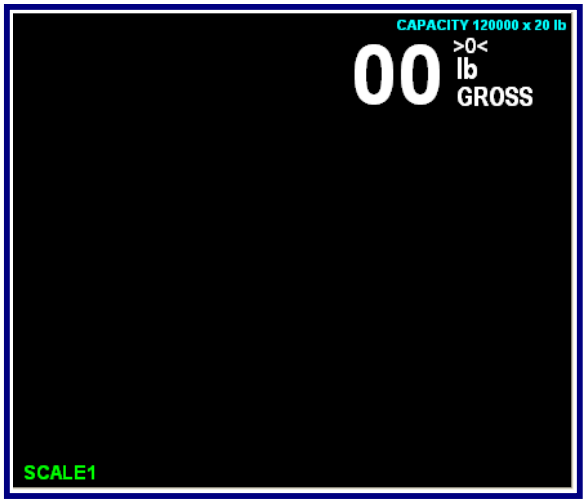
Initiate the power up sequence using the power **ON/OFF** rocker switch located on the **bottom-left side** of the instrument.

Normal indications include the following:

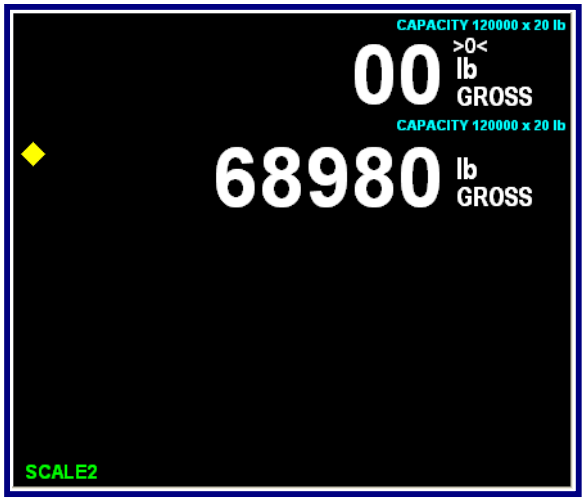
- Lights on the keyboard should blink.
- After approximately **one minute**, the **Fairbanks Logo** appears along with a mouse pointer, located approximately in the center of the screen.

- The **Fairbanks Logo** disappears.
- A Windows welcome screen appears.
- Lastly, a weighing application window appears.

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.

Multi-scale Screen

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

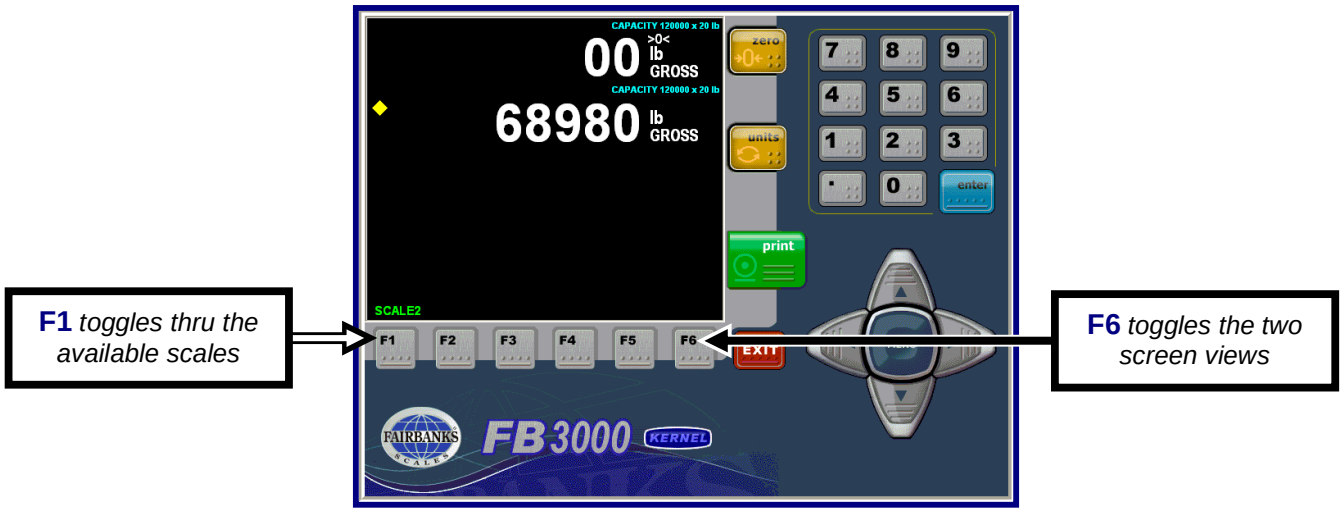
- The Golden Diamond show which weighment is being used
- The scale being used is identified in the lower-left corner of the screen.

5.3. GROSS WEIGHING

21. Press the **ZERO** key to zero the scale.
22. Place the object to be weighed on the platform.
23. View the weight from the screen.

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

5.3.1. Using the Display Screen Function Buttons

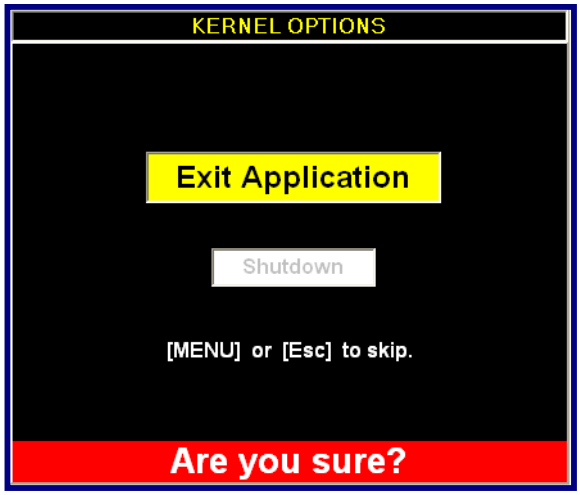


- When in the **Multi-scale Screen**, press the **F1 button** to toggle thru the available scales.
- Press the *display screen's* **F6 button** to toggle back-and-forth from the GTN Screen to the Multi-scale Screen.

5.4. APPLICATION 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.



C A U T I O N

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

5.5. SYSTEM SHUTDOWN PROCEDURE

C A U T I O N

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

1. Using the external keyboard, press and hold the **ALT + F4** keys simultaneously to exit the program.

The FB3000 will close down properly.

2. Click the **Turn Off** button.
   - The instrument turns off.
   - Upon shut down, the display turns dark.

3. Turn off the power using the **ON/OFF** rocker switch.

Section 6: Service & Maintenance

IMPORTANT PRECAUTIONS

Electrostatic Discharge (**ESD**) can easily damage the FB3000 board assemblies.

6.1. TROUBLESHOOTING

Error Condition(s)	Solution(s)
• **Check that scale is empty.** • **If Scale is empty, Call for Service.** • **Load Cell(s) bad.**	• A large amount of weight is zeroed. • This is **normal.** • Press **OK** and continue weighing. • Possible load cell damage. • Call for Service.
• **Load Cell Failure(s)** • **Flashing and displays "- - - -"**	• 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	• Possible damaged load cell cable. • Load cell shortened. • Defective Pit Power Supply. • Defective Smart Sectional Controller(s). • Defective Analog Assembly. • Call for Service.
Displays " - - - - " ~ lb GROSS	• Communication error to load Cells. • Call for Service.

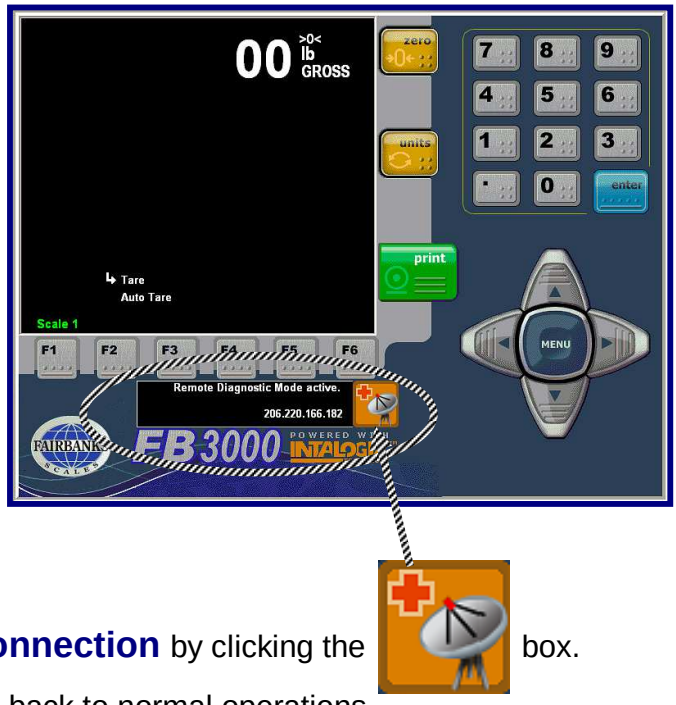
6.2. REMOTE SERVICE AND DIAGNOSTICS

The FB3000 can be serviced and have diagnostics performed from a remote location, such as the nearest **authorized Fairbanks Service Center**.

- The instrument must be connected to a network with internet access.
- The **Remote VNC Connection** can be programmed to display in the **Weight Window** or in the **minimized tray**.

6.2.1. Opening the VNC Connection

1. To open the remote connection, left-click on the **Fairbanks Globe**.
2. Click the **Menu** key.
3. Give the Remote Fairbanks Technician the **IP address** listed within the **Remote Diagnostic Mode Window.**
4. Upon completion of diagnostics, the Remote Fairbanks Technician will disconnect at his or her end.



5. Disconnect the **Remote VNC Connection** by clicking the box.
   - This returns the Kernel Program back to normal operations.

Appendix I: GPIO Port

Programming the GPIO Port

The FB3000 embedded PCB provides an 8-bit GPI port and an 8-bit GPO port through which to read and write data. The GPIO port base address is 440 (hex).

Reading the GPIO Data

MOV DX, 440: **GPIO Address**

IN AL, DX: **Read the data into AL register**

Writing the GPIO Data

MOV DX, 440: GPIO Address

MOV AL, XXH: Output data value “XX” OUT DX, AL

bit0 = **GPI(O)0**

bit1 = **GPI(O)1**

bit2 = **GPI(O)2**

bit3 = **GPI(O)3**

bit4 = **GPI(O)4**

bit5 = **GPI(O)5**

bit6 = **GPI(O)6**

bit7 = **GPI(O)7**

Appendix II: I/O Addresses & Control

INTERRUPT CONTROLLER

The FB3000 embedded PCB is a fully PC compatible control board. It consists of 16 ISA interrupt request lines. Most of them are already in use by other parts of the board. Both ISA and PCI expansion cards may need to use IRQs, so make sure the IRQs do not conflict when using add-on cards.

System IRQs are available to cards installed in the ISA expansion bus first. Any remaining IRQs then may be assigned to the PCI bus. **Check out an AMI diagnostic utility to see the map.**

IRQ	Assignment
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt rerouting from IRQ8 through IRQ15
IRQ3	Serial Port 2
IRQ4	Serial Port 1
IRQ5	Reserved
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 Mouse
IRQ13	Math Coprocessor
IRQ14	Primary IDE Controller
IRQ15	Secondary IDE Controller

DMA CHANNEL ASSIGNMENT

By default, **Channel four (4)** is used to **cascade the two controllers.**

Channel	Assignment
DMA0	**Available for PCI and ISA Slot**
DMA1	**Sound Card**
DMA2	**Floppy Disk Controller**
DMA3	**ECP Printer Port**
DMA4	**Cascade**
DMA5	**Sound Card**
DMA6	Available for PCI and ISA Slot
DMA7	Available for PCI and ISA Slot

MEMORY MAP

The following tables indicate memory of the FB3000. The address ranges specify the runtime code length.

Memory below 1MB (1MB ~ 640KB)

Address Range	Type	Owner
A0000~AFFFF	ISA	VGA Adapter
B0000~BFFFF	ISA	VGA Adapter
C0000~C7FFF	ISA	Adapter ROM
C8000~CBFFF	ISA	Adapter ROM
F0000~FFFFF	ISA	System BIOS

Memory *above* 1MB (1MB ~ 142336KB)

Address Range	Type	Owner
40011000~40011D7F	PCI	Multimedia Audio
40012000~400120FF	PCI	Bridge Device
40800000~40FFFFFF	PCI	VGA Adapter
D0000000~D00000FF	PCI	Ethernet Controller
D0004000~D0004FFF	PCI	USB Controller

System Memory Map

Start High	Start Low	Size High	Size Low	Type
00000000	00000000	00000000	0009FC00	Available
00000000	0009FC00	00000000	00000400	Available
00000000	000F0000	00000000	00010000	Reserved
00000000	FFFF0000	00000000	00010000	Reserved
00000000	00100000	00000000	08B00000	Available

SHARED MEMORY (KERNEL MAPPED OUTPUT)

```
//***********************************
// Sample code to read Kernel Mapped Output (Shared Memory)
//***********************************
//   FileMap Memory Structure
struct FileMapStruct
        {
         unsigned char    data[256];        // configured output string from kernel
         unsigned char    command[2];     // command to return to kernel i.e. “z” = zero all scales, “Z1” =
         zero scale 1
         int     length;                        // length of string in data
         int     counter;                       // sequential number
         char    status[128];                   // kernel status
};

bool TScaleForm::ReadMappedOutput(char *input)
{
     bool    result = false;
     bool    CommandSent = false;

     if( MappedOutputHandle == NULL )
     {
      wSemaphore = CreateSemaphore(NULL, 1, 1, “Output1 Write");
          if( wSemaphore == NULL )
         return 0;
       rSemaphore = CreateSemaphore(NULL, 0, 1, “Output1 Read");
            if( rSemaphore == NULL ) {
          CloseHandle(wSemaphore);
          wSemaphore = NULL;
           return 0;
        }
```

SHARED MEMORY (KERNEL MAPPED OUTPUT), CONTINUED

```
        MappedOutputHandle = CreateFileMapping((HANDLE)0xFFFFFFFF, NULL,
                PAGE_READWRITE,
              0,
              sizeof(struct FileMapStruct),
              “Output1”);

                if( MappedOutputHandle == NULL )
            {
                CloseHandle(rSemaphore);
                rSemaphore = NULL;
                CloseHandle(wSemaphore);
                wSemaphore = NULL;
                return 0;
                }
    }
    if( MapOutputData == NULL ) {
       MapOutputData = (struct FileMapStruct*)MapViewOfFile(MappedOutputHandle,
       FILE_MAP_WRITE,
        0, 0,
       sizeof(struct FileMapStruct));
    }
    if( MapOutputData != NULL )
       {
          // wait for kernel to release
           if( WaitForSingleObject(rSemaphore, 5) == WAIT_FAILED )
           return false;
          // Check Counter to see if Kernel has sent a new string
           if( MapOutputData->counter != LastCounter )
```

SHARED MEMORY (KERNEL MAPPED OUTPUT), CONTINUED

```
{
            LastCounter = MapOutputData->counter;
            int len = MapOutputData->length;
            if( len >  sizeof(MapOutputData->data)-1 )
                 len = sizeof(MapOutputData->data)-1;

            ScaleStatus_Text->Caption = (String)MapOutputData->status;
            input[0] = NULL;
            for ( int mf = 0; mf < len; mf++ ) {
                 input[mf] = MapOutputData->data[mf];
        }
        input[len] = NULL;
         // return command i.e. 'z' to zero scales, 'u' to change units etc… (2 char buffer… 'Z1' to zero
         scale 1)
        if( KernelCommand[0] != NULL )
           {
           MapOutputData->command[0] = KernelCommand[0];
           MapOutputData->command[1] = KernelCommand[1];
           KernelCommand[0] = NULL;
           CommandSent = true;
         }
            result = true;
        }
        // release semaphore for kernel
         ReleaseSemaphore(wSemaphore, 1, NULL);
   }
   return result;
}
//---------------------------------------------------------------------------
```

I/O MAP

The Addresses shown in the table are typical locations.

I/O Port	Assignment
0 ~ F	AT DMA Controller
20 ~ 21	AT Interrupt Controller
40 ~ 43	82C54 Compatible Programmable Timer
60	8042 Compatible keyboard Controller
61	AT Style Speaker
64	8042 Compatible keyboard Controller
70 ~ 71	Real Time Clock
81 ~ 83	AT DMA Controller
87	AT DMA Controller
89 ~ 8B	AT DMA Controller
8F ~ 91	AT DMA Controller
A0 ~ A1	AT Interrupt Controller
C0 ~ DF	AT DMA Controller
F0 ~ FF	Math Coprocessor
170 ~ 177	IDE Controller
1F0 ~ 1F7	IDE Controller
220 ~ 22E	Sound Card
2F8 ~ 2FF	Communication Port (COM2)
330	Midi
376	IDE Controller
378 ~ 37A	LPT1
3B0 ~ 3BB	VGA Adapter
3C0 ~ 3DF	VGA Adapter
3F0 ~ 3F5	FDD Controller
3F6	IDE Controller

Appendix III: Data Output

REMOTE DISPLAY OUTPUT

Remote Display 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.*

CONFIGURE OUTPUT

Fairbanks Data Format

<STX><A><B><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

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><B><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, Continued

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><WWWWWW><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><WWWWWW>< ><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><WWWWWWW><U><G><M><CR>

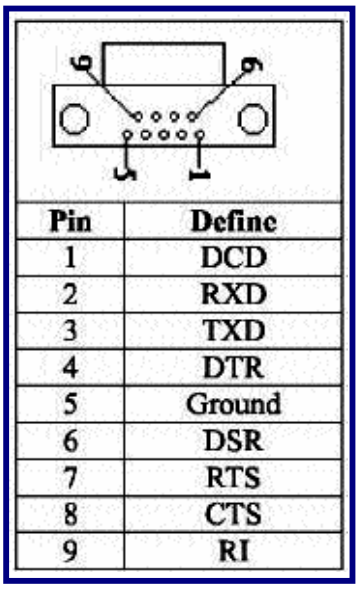
Note(s):

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.*

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>

COM Port Connections



Pin	Define
1	DCD
2	RXD
3	TXD
4	DTR
5	Ground
6	DSR
7	RTS
8	CTS
9	RI

CN 2: COM1
External COM3 and COM4

Appendix IV: IP 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 ScaleA (1 to 4) or ScaleB (5 to 8)
Lowercase u =	Change units on all scales.
Uppercase U1, U2, etc. =	Change units on a specific scale.
Uppercase UA or UB =	Change units on ScaleA (1 to 4) or ScaleB (5 to 8)

Poll Character (see Configured Output) sends configured output.

Where LF is: Line Feed

Example:

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

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

Appendix V: Programming the Watchdog Timer

The **FB3000 Embedded PCB** provides a Watchdog Timer that resets the CPU or generates an interrupt if processing comes to a stop.

- This function ensures greater system reliability in industrial standalone and unmanned environments.
- ***T o enable the Watchdog Timer***, output the value of the Watchdog Timer Interval to the Controller.
- The value range is from **01H to FFH**, and the related time Watchdog Timer interval is **one (1) second to 255 seconds**.

DATA	TIMER INTERVAL
00	Disabled
01	One (1) second
02	Two (2) seconds
*	*
*	*
FF	255 seconds

NOTE: *To program the* **Watchdog Timer***, write the timer value to the* **I/O Port 444 (hex).**

Example: **Assembly Language**

Start Watchdog Timer	DOS Debug
MOV DX, 444H	OUT 444, XX
MOV AL, XXH	
OUT DX, AL	

Start Watchdog Timer	DOS Debug
MOV DX, 444H	IN 441
IN AL, DX	

Appendix VI: Kernel 20mA Codes

Code	Units	Data Displayed	Scale #
00		**Display all data.**	
40	lbs	Gross	1
41	lbs	Net	1
42	lbs	Tare	1
43	kg	Gross	1
44	kg	Net	1
45	kg	Tare	1
46	lbs	Gross	2
47	lbs	Net	2
48	lbs	Tare	2
49	kg	Gross	2
50	kg	Net	2
51	kg	Tare	2
52	lbs	Gross	3
53	lbs	Net	3
54	lbs	Tare	3
55	kg	Gross	3
56	kg	Net	3
57	kg	Tare	3
58	lbs	Gross	4
59	lbs	Net	4
60	lbs	Tare	4
61	kg	Gross	4
62	kg	Net	4
63	kg	Tare	4
64	lbs	Gross	5
65	lbs	Net	5
66	lbs	Tare	5
67	kg	Gross	5
68	kg	Net	5
69	kg	Tare	5
70	lbs	Gross	6
71	lbs	Net	6
72	lbs	Tare	6
73	kg	Gross	6
74	kg	Net	6
75	kg	Tare	6
76	lbs	Gross	7
77	lbs	Net	7
78	lbs	Tare	7
79	kg	Gross	7
80	kg	Net	7
81	kg	Tare	7
82	lbs	Gross	8
83	lbs	Net	8
84	lbs	Tare	8
85	kg	Gross	8
86	kg	Net	8
87	kg	Tare	8
99	**lbs**	**TOTAL**	**For FB3000 HWY SYS**

** Existing 2500 output (excluding HWY SYS application*

Appendix VII: 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 VII: 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 VII: 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 VII: 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 VIII: Remote Functions

REMOTE FUNCTIONS	CN14	
Remote Zero Switch	3	11 or 12
Remote Print	9	11 or 12

**Dry contacts only.*

APPENDIX IX: 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

Manufactured by Fairbanks Scales, Inc.
821 Locust
Kansas City, Missouri 64106
www.fairbanks.com

FB3000 KERNEL

OPERATOR MANUAL

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