ABB

WellTell Wireless IO
Start-Up Guide
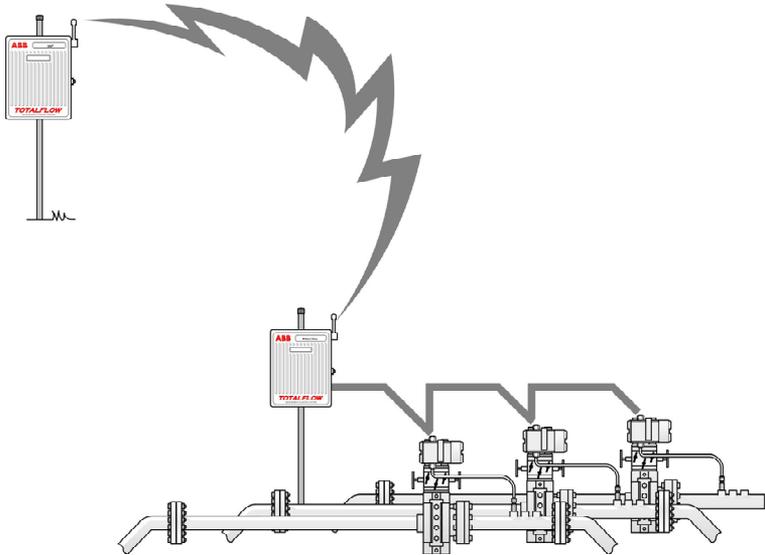
TOTALFLOW

MEASUREMENT & CONTROL SYSTEMS

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Introduction

This is a quick start guide designed for typical installations only. It is recommended that inexperienced technicians consult the Totalflow® WellTell Wireless User's Manual for more detailed information while performing the installation and start-up.

The WellTell-IO gives the operator the option of having extra I/O capacity and being able to locate it some distance away from the XFC/XRC. The WellTell-IO does not maintain any historical or calibration data. The WellTell-IO has an onboard battery charger to maintain the charge on a 12VDC lead acid battery.

Unpack and inspect the WellTell-X and the WellTell-IO and any other optional equipment, if purchased. Inspect all parts and pieces for damage and missing or incorrect components.

Before Beginning

The Totalflow WellTell product is divided into host (WellTell-X) and client (WellTell-IO) (see Figure 1). The host, WellTell-X, is generally installed in the site controller (XFC or XRC). The I/O client, WellTell-IO, is installed remotely near the location where the additional I/O is needed.

Basic Installation

The following information covers the initial installation of the WellTell-X host at the site controller (XFC/XRC), the installation of the WellTell-IO client near the remote location requiring additional I/O and the final application configuration and test at the site controller.

The instructions are broken down into segments that cover the mechanical and electrical installation along with the configuration of the system. It is assumed that this installation is taking place within either a 6400 or 6700 enclosure
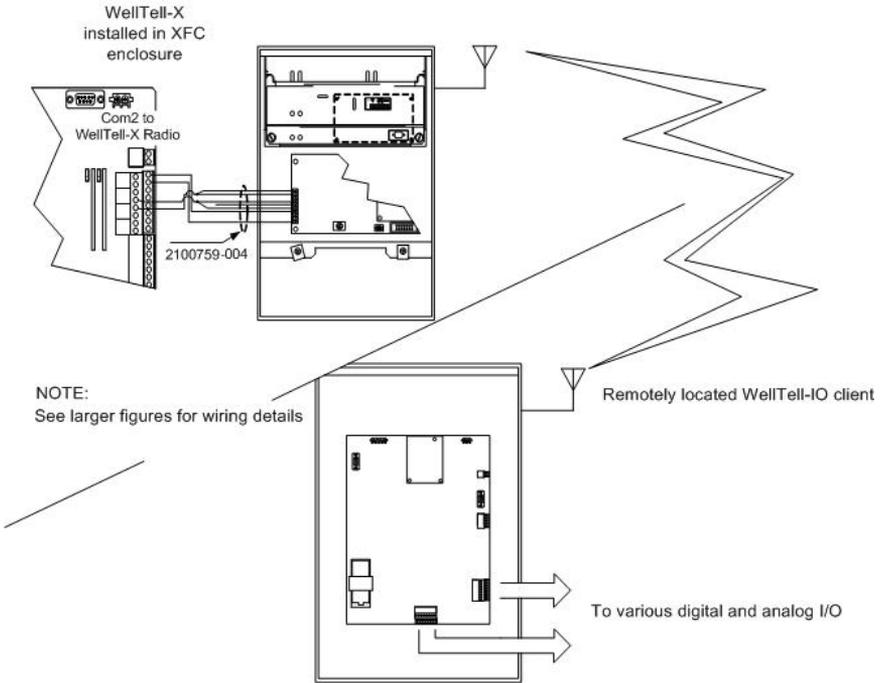
Figure 1 – Overview of WellTell-IO Installation

Step 1   **WellTell-IO Mechanical Installation**

The mechanical installation for both the WellTell-IO client and the WellTell-X host is the same. Use the following instructions to perform the various tasks.

Position the pipe saddle on the meter run. Select a location that allows easy access and is close to the equipment.

1A   Temporarily attach the saddle on the meter run pipe, using the U-bolt and associated hardware (see Figure 2). Screw the 2" by 40" mounting pipe into the saddle. Place the level against the pipe, and vertically align. Adjust the pipe, mounted in the saddle, until vertical alignment is achieved.

1B   After vertical alignment, securely tighten the 2" by 40" pipe in the saddle. Tighten the saddle mounting bolts. Ascertain that the pipe is securely installed in the saddle.

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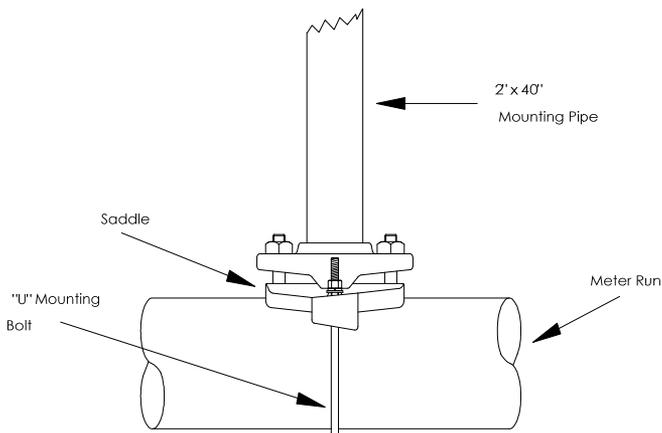
Figure 2– Pipe and Saddle Mount

1C Position the enclosure on the 2" mounting pipe, and secure in place with the two U-bolts, flat washers, lock washers and two 9/16 bolts (see Figure 3).
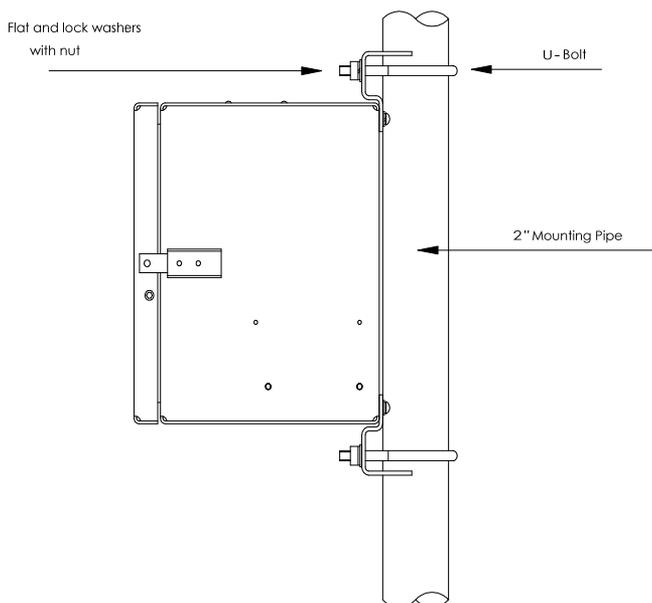
Figure 3 – Pipe Mounted 6400/6700 Enclosure

Step 2 **WellTell-X Installation**

The WellTell-X host unit is mounted to a communication tray (generally at the factory) and is designed to be installed in a Totalflow 6400 or 6700 enclosure (see Figure 4).

At the top of the enclosure is the area where communication devices are installed. This area is referred to as the communication compartment (see Figure 5). All communication equipment is secured to the communication tray and slid into this compartment. The WellTell-X is mounted to standoffs on the communication tray and then slid into the communication compartment.

Communication Tray

The WellTell-X host mounts on standoffs to the back side of the Communication Tray
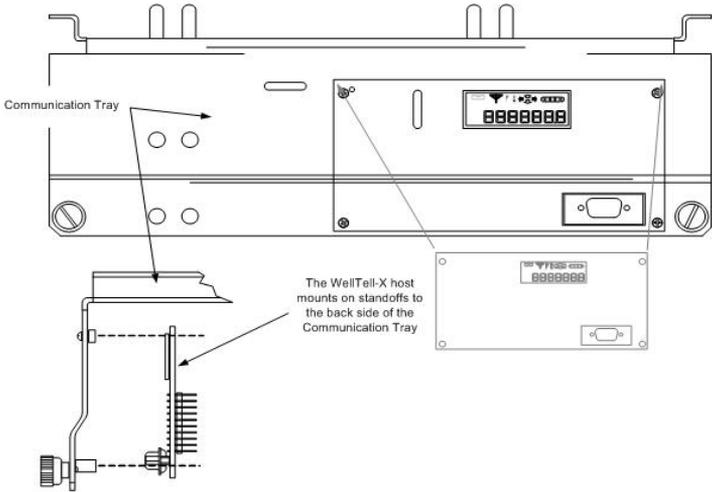
Figure 4 – Communication Tray

Communication Compartment

Communication Tray

Comm . Tray slides into Comm . Compartment

6400/ 6700 Enclosure

Battery Shelf
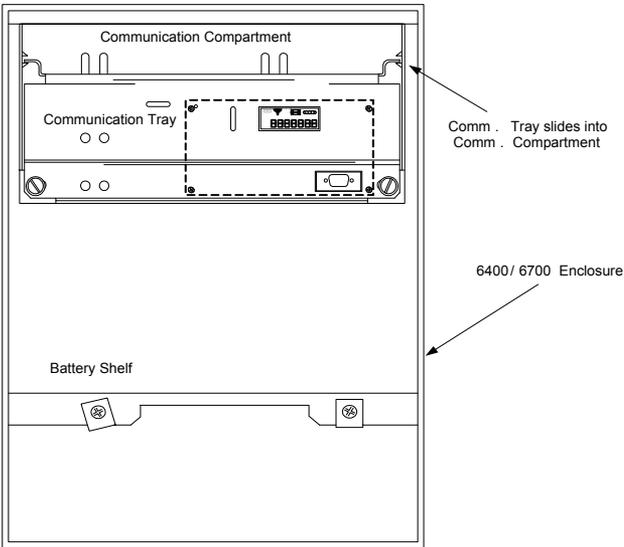
Figure 5 – Communication Tray Installed in 6700 Enclosure

Step 3 **WellTell-X Host Communication Wiring**

NOTE: If the unit came pre-configured from the factory, ignore the following wiring instructions.

Wiring of the WellTell-X host to a parent device (XFC/XRC) is designed for simplicity. In the following example, an XFC-195 board is used as the parent meter. If the application involves something other than the XFC-195, please check the meter pinouts before proceeding.

Additionally, the following examples use COM 1 of the XFC. COM 1 is often defaulted for communication with a remote device (radio, modem, etc.). Wiring is simplified by the use of pre-wired cable that is designed specifically for the WellTell-X device. Perform field wiring using Figure 6.
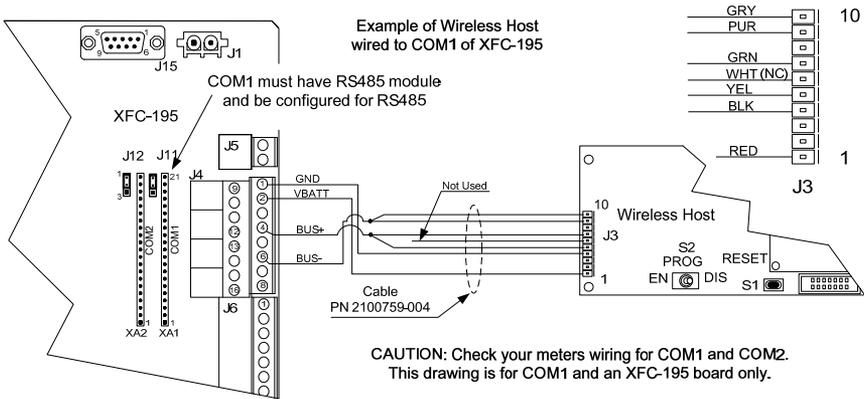
Figure 6 – Wiring the XFC to the WellTell-X Host

Step 4 **Configuring COM 1 for the Wireless I/O Application**

After completing the electrical wiring for the WellTell-X to COM 1 of the flow computer, the user needs to configure the COM 1 communication port.

NOTE: In Figure 6, COM 1 (XA1) must have a RS-485 module inserted.

4A Within PCCU, the user will need to move to the Application tab within the Station ID at the top of the tree-view Once there, instantiate the Wireless Remote I/O application in slot 56.

4B After instantiation of the application, move to Communications in the tree-view (see Figure 7). Set the TF Remote-COM 1 to NONE and the Wireless I/O Interface to COM:. Click the Send button and then Re-read.

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Figure 7 – Communication Port

4C The user needs to move to the Setup tab under the Communications sub-menu within the Wireless I/O Interface application in the tree-view (see Figure 8). Here, the user changes the Protocol to Modbus Host (RTU) from the drop-down menu and the Interface to RS485. Click the Send button.

Figure 8 - Wireless I/O Interface Communications Setup

4D The user needs to then move to the Client Setup tab under the Wireless # sub-menu within the Wireless I/O Interface application in the tree-view. Here, the user changes the Modbus Address to 32. Click the Send button.

WellTell-IO Wiring

Electrical wiring at the WellTell-IO (client) is accomplished in two basic steps: powering the unit and wiring the I/O to the various external devices.

Step 5 **WellTell-IO Client Electrical Wiring**

The WellTell-IO is designed to be mounted in a Division 2 or non-hazardous location. The WellTell-IO client also has an onboard battery charger to maintain the charge on a 12VDC lead acid battery. Figure 9 illustrates the most common way to provide power to the WellTell-IO.
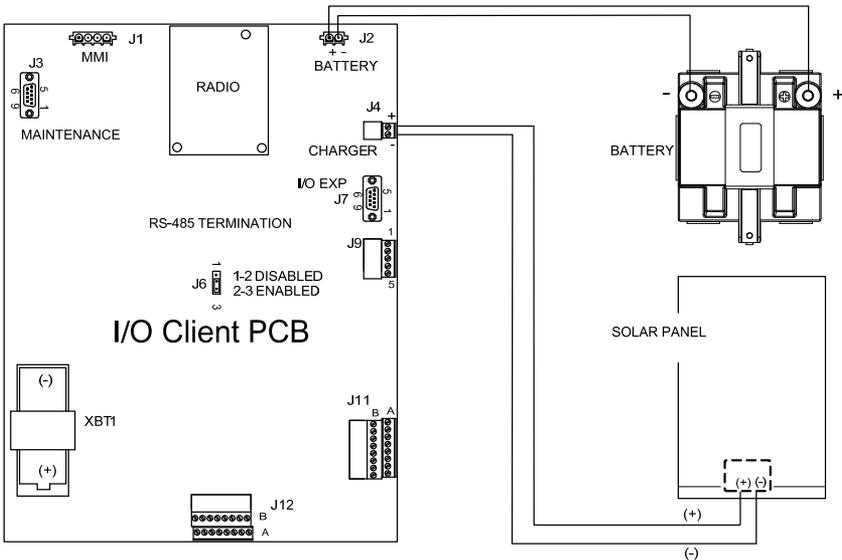
Figure 9 – Powering of the WellTell-IO

Step 6 **Wiring the I/O to External Devices**

Figure 10 depicts the various connectors and pinouts that are associated with the expanded I/O of the WellTell-IO controller. The WellTell I/O provides the following additional input/output for the system:

- 4 each – Digital Input/Output (Programmable)
- 4 each – Analog Inputs (0-10 VDC or 4-20 mA)
- 2 each – 100ohm RTD Inputs
- 1 – Analog Output (4-20 mA Sink or Source)

As Figure 10 shows, J11 handles the digital I/O and the analog output, while J12 handles the RTD and the analog inputs. Circuit descriptions of the digital I/O, the analog output, the RTD and the analog inputs are listed in Table 1.
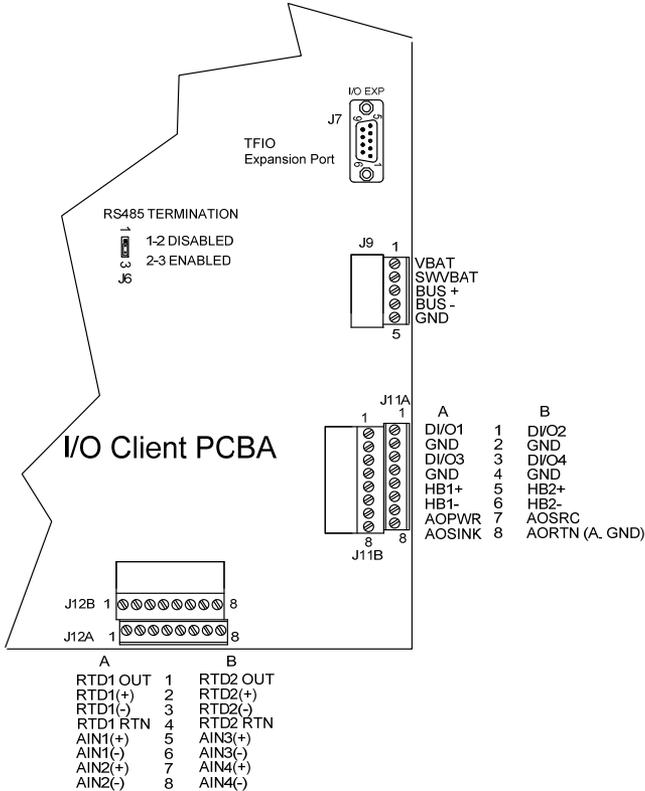
Figure 10 – Pinouts for the WellTell-IO

Table 1 – Onboard I/O

Programmable Digital I/O[1]	
Digital Inputs/Outputs	SIG Points 1,2,3,4,6,8 (6 and 8 have no ground)
	Input: Dry Contact or voltage type
	Minimum contact resistance to activate input 15KΩ
	Max. voltage to activate the input: 2.0V [2]
	Min. voltage to deactivate the input: 3.0V *
	Output (Sink): Open Drain FET type

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[1] These I/Os can be configured as Input or Output
[2] Referenced to GND terminal

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	RDS(ON): 0.060Ω Typical
	Maximum continuous sink
	Current: 2A @ 24VDC
	Output (Source): Points 5 and 7: ioVBB supply @ 2A Max
Typical Point Schematic	
Analog Output (4-20 mA)	
Analog Input	Maximum External: 26.5VDC
	Minimum Load Resistance: 0Ohms(Internal/External Power)
	Maximum Load Resistance: 350 Ohms (Internal Power)
	Maximum Load Resistance R_{MAX}: (VDC External - 4) X 50 (Calculated)
Typical Point Schematic	
Analog Inputs	
Analog Input	**Input Mode:**
	Voltage Mode 0-10V
	Current Mode 0-20mA
	Typical Input Impedance:
	Voltage Mode 91.24K Ohms
	Current Mode 249.3 Ohms
	Maximum Continuous Current:
	Continuous Input Current: 22.8mA
	Maximum Input Voltage:
	Maximum Input (before soft over-range): 10.7V
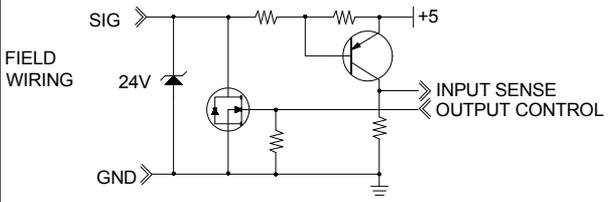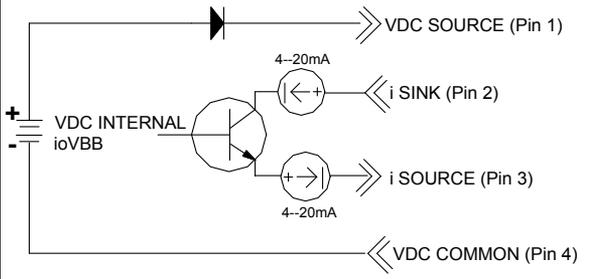
Typical Point Schematic	
2-Point 100Ω Platinum RTD Inputs	
RTD Inputs	**Input Mode:** 4-Wire 100Ω Platinum Alpha = 0.00385 **Range:** -200 to 850°C (-328 to 1562°F)

System Configuration

Step 7   Configuring WellTell-X

In a manner similar to configuring the meters for the COM 1 port, the user must also configure the WellTell-X radio.

To configure the WellTell-X (or the WellTell-IO) radio, the user must have the WellTell Wireless Utility (WWU) program and a typical 9-pin to 9-pin (male DB9 to female DB9) cable. The cable connects between a laptop and the maintenance connector of the WellTell-X host.

7A The user will first need to configure the WellTell-X security. WWU supports two levels of access: Restricted Use and Admin (lower left on the System Config tab). Restricted Use gives the user access to the basic setup parameters that are most often used (i.e., Network ID, RF Channel, etc.). Lesser used parameters (i.e., Encryption Key, Range Refresh, etc.) are grayed out, if Restricted Use is used. Normal setup does not require Admin. These lesser parameters can be accessed through Admin. Admin is achieved by entering the password. The factory password is 0000.

As opposed to providing an in-depth, screen-by-screen explanation of the WWU, the opening screen is presented to the user along with references to the various available tabs that contain relevant parameters on each of their corresponding screens (Figure 11).

WellTell Wireless Utility

File   Help

System Config | Radio Config | Network View | PC Port | Flash Loader | PIC Loader | Test

Product: Wireless Host Server (2103649)
Part Number: 2102009
Revision: 001

Routing Matrix

Connect Host To Radio Link
Snoop On Data From Client

Wireless Host → Radio Link With Client

PC/Laptop Maint Port

Select

Host Interface
○ RS232   ○ RS422   ● RS485

Maint Port Interface
Baud Rate: 9600

Battery Threshold Values
Sleep 10.5 volts
Wake 10.9 volts

Cancel   Read   Write

Status: Connected on COM5: at 9600 baud

Restricted Use   Copy Config   Radio Config   Connect   Exit   Help

Figure 11– WWU Main Screen

7B System Config Tab – Set the parameters as shown in Figure 11.

7C Radio Config Tab – Set the parameters as follows:

Parameter Field	Value
Mode	Server
Network ID	1 (Must match Client)
RF Channel	Anything between 16 and 47 (must match Client)
Baud Rate	9600
Delivery Mode	Broadcast
RF Mode	Acknowledge
Duplex Mode	Half Duplex

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7D Network View Tab – Leave at default values.

7E PC Port Tab - Set the parameters as follows:

Parameter Field	Value
Port	COM 1 (Communication port of the laptop PC)
Baud Rate	9600
Data Bits	7 or 8 bits depending on user setup.
Parity	Odd/Even/None depending on user setup.
Stop Bits	1

7F Flash Loader Tab – Leave at default values.

7G PIC Loader Tab – Leave at default values.

7H Test Tab – Leave at default values.

Step 8 **Configuring WellTell-IO Radio**

Just as the host radio, WellTell-X, was configured, it is necessary to configure the WellTell-IO radio.

As before, it is necessary to have the WWU application and a typical 9-pin to 9-pin (male DB9 to female DB9) cable. The cable connects between the laptop and maintenance connector to the WellTell-IO.

The opening screen for the WellTell-IO client radio is similar to the opening screen for the WellTell-X host with the exception of a display that states that this is a Wireless Remote IO Client as opposed to a Wireless Host Server.

Rather than providing an in-depth, screen-by-screen explanation of the WWU, please refer to Figure 12 to view the available tabs. As presented in the previous section, the following details each individual tab that is available to the user and the corresponding parameter fields and their values that must be entered in by the user.

8A System Config Tab – Set the parameters as shown in Figure 12.

8B Radio Config Tab - Set the parameters as follows:

Parameter Field	Value
Mode	Client
Network ID	1 (Must match Host)
RF Channel	Anything between 16 and 47 (must match Host)
Baud Rate	9600

Parameter Field	Value
Delivery Mode	Broadcast
RF Mode	Acknowledge
Duplex Mode	Half Duplex

8C Network View Tab – Leave at the default values.
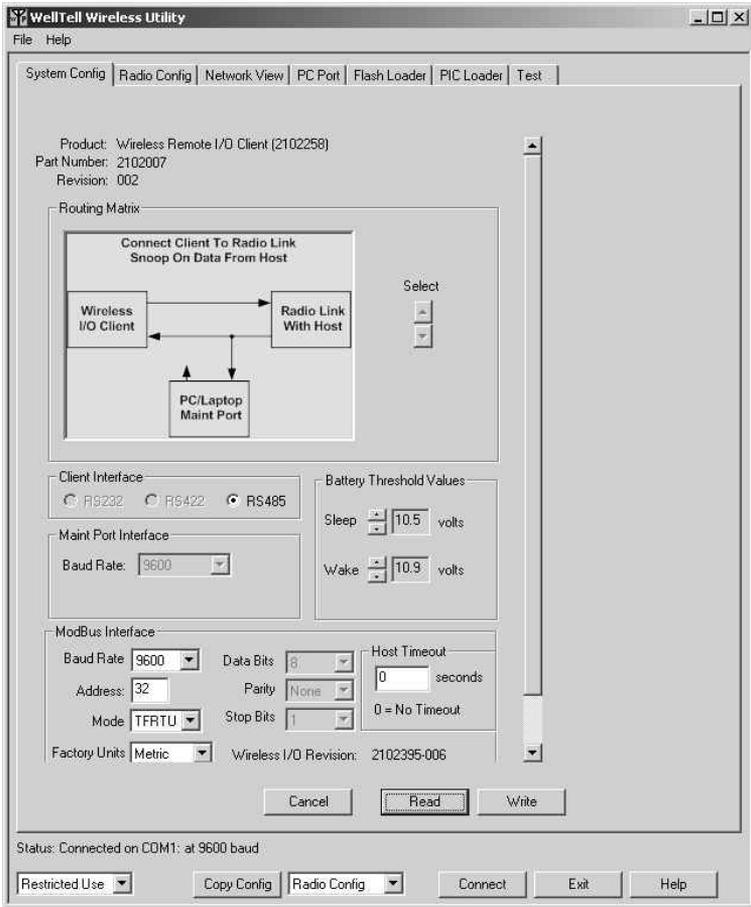
Figure 12– WellTell IO System Configuration

8D PC Port Tab - Set the parameters as follows:

Parameter Field	Value
Port	COM 1 (Communication port of laptop PC)
Baud Rate	9600
Data Bits	7 or 8 bits depending on user setup.

Parity	Odd/Even/None depending on user setup.
Stop Bits	1

8E   Flash Loader Tab – Leave at default values.

8F   PIC Loader – Leave at default values.

8G   Test Tab – Leave at default values.

Step 9   **Final Configuration at the Site Controller (XFC/XRC)**

With the WellTell-X host and the WellTell-IO client both installed and configured, the system should be performing to specifications. The WellTell-X host display will look similar to Figure 13.
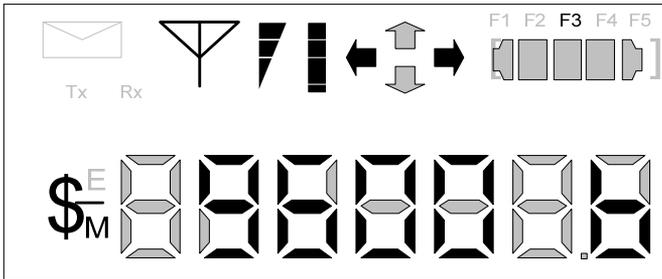
Figure 13– LCD Display

The antenna symbol is on. The $ symbol is always active on the WellTell-X or host server. The – is the system heart beat and blinks continuously. The blink slows down whenever the radio is dead or not connected. The F3 in the upper right of the display denotes that this is a host server (WellTell-X). The main area of the display scrolls through several parameters: baud rate, temperature, channel, etc. For more information on the display, refer to the appropriate appendix.

WellTell I/O Calibration Utility

The WellTell I/O Calibration Utility is an application that is designed to simplify the process of calibrating a wireless I/O client locally. The process is initiated when the user travels to the site of the wireless I/O client, connects a laptop to the client via an MMI cable and then runs the WellTell I/O Calibration Utility to perform the calibration. The calibration information is then stored within the wireless I/O client (see Figure 14).
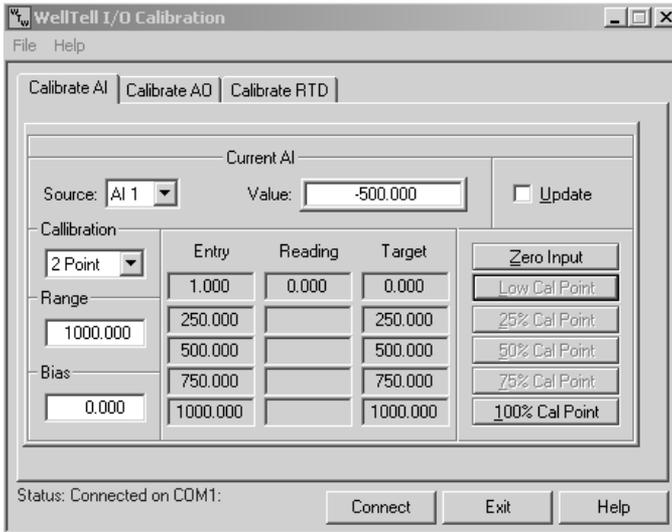
Figure 14– WellTell I/O Calibration Utility

| **Step 10** | **Calibrate AI Tab** |

As opposed to providing an in-depth, screen-by-screen explanation of the WellTell I/O Calibration Utility, the following is going to assume that the user is calibrating AI 1 and using a 2 point calibration.

10A Select the AI that needs to be calibrated (1 – 4) from the Source drop-down menu. In the Calibration drop-down field, select 2 Point. Once selected, two Target values and two Cal Point buttons are made available to the user.

10B Click in the Range field, and enter a range. This can represent anything (percent, volts, etc.). Click the Low Cal Point button, and enter a low calibration point from the dialog box. Click OK when set.

10C Click on the 100% Cal Point button, and enter the value in the dialog box. When set, click the OK button. Once all the points are entered, the AI is automatically calibrated.

| **Step 11** | **Calibrate AO Tab** |

The Calibrate AO tab enables the user to establish the calibration parameters for the wireless I/O client's analog outputs. The user is presented with three fields: Eng Units, %FS and mA. The user can enter in a value within any one of these fields. The value is then automatically sent to the wireless I/O client where a conversion is then made for the other two values. All three values are re-read from the client and displayed for the user. These displays are generally for information purposes only and will not set the client's AO value. It should be noted,

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however, that if the client does not wish to set the AO value with these figures, they can click the Send AO Value to accomplish this.

11A Calibrating the 4-20 Range Using an Ammeter (Calibration mA). After connecting a meter, click on the Low button, and enter the reading displayed on the meter. Click OK.

11B Click on the High button, and enter the reading displayed on the meter. Click OK. A dialog box displays informing the user that the calibration is complete.

Entering Engineering Units

The user can enter units representing engineering units scaled across the 4-20 mA range, but the system must have good calibration values to provide accurate scaling. For the best results, first perform the 4-20 mA calibration described above, and then enter the Engineering Units range.

11C Click on the Low button within the Engineering Units section, and enter the value that represents zero or the low end of the range. Click OK.

11D Click on the High button within the Engineering Units section, and enter the value that represents full scale or the high end of the range.

Step 12 **Calibrate RTD**

The WellTell I/O Calibration Utility allows the user to calibrate the two resistant temperature detector (RTD) inputs. The RTD is responsible for measuring the real-time, flowing temperature of the gas.

12A From the Source drop-down field, select the corresponding RTD that is to be calibrated. In the Bias field, place the Bias figure in the allotted space. In the RTD Units field, set the units that the RTD will be measured in: Metric or English.

LCD Display and Annunciators (see Figure 13)

Description of Standard Displays (Annunciators)	
Envelope	Indicates "Snoop" mode (i.e., processor is snooping the data stream).
Tx/Rx	Indicates activity on the processor's UART port.
Antenna	The Host Server (WellTell-X) annunciator is always on. The Client (WellTell-IS or WellTell-IO) is only on when the Client is 'synced' to a Host.
Signal Strength	A three section "progress bar" indicating incoming signal strength between the Host and the Client.

Battery Strength	A four section "progress bar" indicating incoming signal strength between the Host and the Client.
Arrows	The arrows represent up, down, left and right for a total of four. These arrows describe the Routing Matrix of the WellTell Product. This Routing Matrix connects the microprocessor (also referred to as the Maintenance Port) to either the radio or to the RS-485 device port. In Pass Through mode, the Device Port is connected directly to the radio while the microprocessor can be enabled to "snoop" data from either the Device Port or the radio. More on this topic can be found in the WWU Help files. When the UP arrow is on, the Microprocessor can snoop the Device Port. If the UP arrow is not on, the microprocessor can snoop the radio. Snoop is only operational in Pass Through mode (i.e., the Left and Right arrows are lit). The DOWN arrow being on informs the user that the microprocessor is being connected in the Routing Matrix. When the RIGHT arrow is on, this depicts that the radio is being connected in the Routing Matrix. The LEFT arrow being on depicts that the Device Port (RS-485) is being connected in the Routing Matrix.
Arrows...	An example of the Routing Matrix might be having the Device Port (RS-485) connected directly to the radio (Pass Through mode). In this configuration, the LEFT and RIGHT arrows would both be on.
F1 – F5 Annunciators	F1 I.S Barrier Client indicator (WellTell-IS) F2 I/O Client indicator (WellTell-IO) F3 Host Server indictor (WellTell-X) F4 Reserved for future use F5 Test mode indicator
[ ] Right and Left Brackets	Indicates activity on the Maintenance (processor) port.
$	Always active on the Host and inactive on the Client.
M	Activates whenever a cable is connected to the Maintenance port.
-	The 'dash' or 'underscore' is the system heartbeat. It blinks off and on continuously. The blinking slows whenever the Radio is dead or not connected.
SLEEP	When power drops below 10.5VDC the Host Server will detect the low voltage and enter a "SLEEP" mode.

Host Server and I/O and Barrier Client		
b	Ex: 9600 b	Baud rate displayed in Numeric section.
n	Ex: n 1	Network ID displayed in Numeric section.
ch	Ex: ch 2	Channel displayed in Numeric section.

b	Ex: b 12.3	Battery voltage displayed in Numeric section.
t	Ex: t 72.1	Temperature displayed in Numeric section.
I/O and Barrier Clients[3]		
c	Ex: c 0	Charger voltage.
L	Ex: L .5	Lithium cell voltage.
I/O and Barrier Clients[4]		
o	Ex: o .0	Overload voltage.
i	Ex: i .0	Intrinsically safe voltage.
S	Ex: S 4.5	Supply voltage supervisory.

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[3] Not Applicable to the Host Server
[4] Not Applicable to the Host Server

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