# SPECTRACOM

# User Manual

DANIEL MEASUREMENT AND CONTROL
Houston, Texas

Manual Part Number 3-9000-105
Software Version Number 3.0

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DANIEL

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# SpectraCom User Manual

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# INTRODUCTION

Welcome to the *SpectraCom User Manual* (PN 3-9000-105), which accompanies the SpectraCom software.

Use this manual for installing, configuring, and operating the SpectraCom software to interface with the Spectra100 Flow Computer.

## 1.1 DESCRIPTION OF MANUAL

See the following section summaries or the Table of Contents for more information.

**Section 1 – Introduction.**

- summary listing of the manual sections
- description of the Spectra100 software program
- listing of additional resources, such as other related manuals

**Section 2 – Installation.**

- minimum system requirements for installing SpectraCom
- instructions for upgrading the firmware
- software installation and startup procedures
- instructions for establishing local and remote communications
- installation completion checklist

**Section 3 – Getting Started.**

- instructions on how to log on and log off
- setting up user names and passwords
- SpectraCom Operations window, user interface and navigation
- viewing Spectra100 device information
- using online help, accessing help files, and navigating tips
- warm and cold starts explained
- default, operating, and user defined configurations explained

**Section 4 – Offline Tools.**

- instructions for importing firmware and configuration from file
- exporting saved configuration to file
- learning to use SpectraCom with Spectra100 Demo mode

**Section 5 – Configuration.**

- setting up configuration name, version, and description
- setting up location and meter parameters
- setting up fixed/live inputs, alarms, Gas composition, local displays, and Modbus register assignments
- setting up Serial communication, contract log, and timed log configuration
- setting up user names, passwords, and date/ time

**Section 6 – Operation.**

- viewing the flow data screen, alarm status, digital input/output
- viewing in use values, averages, calculated values and rates/volumes
- customizing and viewing user-defined menus

**Section 7 – Calibration.**

- instructions for calibrating a turbine meter (linearization)
- instructions for calibrating a sensor or transducer using multi-point or offset calibration methods

**Section 8 – Upload.**

- instructions on how to upload to the PC all items, Spectra100 Configurations, and Spectra100 logs

**Section 9 – Utilities.**

- instructions for viewing, deleting and exporting logs

**Section 10 – Diagnostics.**

- viewing Spectra100 device information
- viewing the communication statistics and the purpose of the communications
- downloading or uploading the firmware
- performing warm and cold starts

## 1.2 SPECTRACOM SOFTWARE

### 1.2.1 Software Description

There are three types of software associated with the Spectra100 Flow Computer system: the Spectra100 embedded firmware, the local interface software SpectraCom (included with the Spectra100), and host software.

**Embedded Software (firmware).** This software works "behind the scenes." Its commands are embedded into the memory circuits and EPROMS that are integral to the Spectra100 computer system. This software does the real work of a flow computer, which includes performing calculations, systematically storing data into logs or Modbus registers, and reacting to parameter changes and alarm conditions.

**Local Interface Software.** SpectraCom is the local interface software that can be purchased to communicate with Spectra100 unit(s). SpectraCom runs on a portable or desktop PC with a 32-bit Microsoft Windows operating system (e.g., Windows 95, Windows 98, or Windows NT). It enables you to interact with the Spectra100 embedded software, so you can perform common flow computer-associated tasks. These tasks include accessing and logging onto the Spectra100, retrieving data and logs, adjusting calculation parameters, responding to alarms, and performing transducer calibrations.

**Host Software.** Host software can remotely collect and organize the data or data logs being produced by the Spectra100 (or other remote or network-connected flow computers). It also can perform many of the same control functions offered by the local interface software, SpectraCom. Host software can be purchased from Daniel, as an option, or it can be developed by the customer to meet specific needs.

This manual provides instructions on how to use the local interface software, SpectraCom, for field operations involving the Spectra100, such as configuration or calibration. You may also want to investigate SpectraCom's extensive online help.

### 1.2.2 Software Capabilities

The local interface and embedded software components of SpectraCom support (but are not limited to) these capabilities:

- database organization of data
- serial port communications control
- Modbus protocol interfacing
- Modbus register organization of data
- transducer calibration
- AGA-approved flow calculations
- application parameters adjustments
- data logging parameters adjustments
- calculation adjustments
- alarm parameters adjustments

### 1.2.3 Function Menus

The function menus are drop-down menus displayed in the header of the main SpectraCom window. These menus provide access to all the online functions for controlling the Spectra100 Flow Computer. The function menus include:

- **File menu**

  Provides an option for disconnecting, or logging off, from a Spectra100 connection.

- **Settings menu**

  Enables you to control how the Spectra100 uses raw data, makes calculations, displays data, allows users to log on, places data into Modbus registers, configures data logs, as well as many other functions.

- **Calibrate menu**

  Lets SpectraCom assist you while you calibrate the transducers or a turbine meter connected to the Spectra100.

- **Operation menu**

  Provides windows for the output data of the Spectra100, including alarm status, live values, averages, calculated values, and rates and volumes.

- **User-Defined menu**

  Gives you the power to build and save custom windows for displaying the Spectra100 information you need for special purposes.

- **Upload menu**

  Enables you to upload, from the Spectra100 to your PC, the current configuration of the Spectra100 and the latest Spectra100 Logs.

- **Utilities**

  Enables you to view, delete, and export Spectra100 logs.

- **Diagnostics menu**

  The Diagnostics menu allows you to:

  - Control the Spectra100 at its most basic levels, including warm and cold starting.
  - Send or receive the Spectra100 firmware program (for flash memory re-programming) and/or its configuration.
  - View the basic device information, communications statistics, and memory contents.

- **Help menu**

  Lists help resources that are currently online. The "*About SpectraCom*" option provides you with the current revision of the software and instructions on how to contact Daniel Measurement Services (DMS).

### 1.2.4 Description of Online Help

Use the SpectraCom online help file to quickly access information regarding any SpectraCom function. See Section 3.4, Getting Started, for more detailed information.

You can access this help file from the SpectraCom Flow Computer Operations (main screen) by clicking on the Help menu and selecting *User Guide* or by pressing the [F1] key on the PC keyboard.

## 1.3 ADDITIONAL RESOURCES

Along with the *Spectra100 User's Guide* (PN 3-9000-105) (filename S100usr.hlp), there are three other online help resources:

- *Spectra100 Data Points Guide* (PN 3-9006-101) – this guide provides detailed information on every data point used by the Spectra100 Flow Computer. You can view this help file by selecting it from the Help menu (filename S100dat.hlp).
- *Spectra100 Developer's Guide* (PN 3-9000-102) – this guide provides detailed information on how the Modbus protocol is used by the Spectra100, how the data points system is structured, and what type of special Modbus function codes and messages are used to read (or write to) Spectra100 data points and logs.

  To access the *Spectra100 Developer's Guide* use the Adobe Acrobat Reader software to open the file S100dev.pdf in the \Spectra-Com\Help directory.
- *SpectraCom Startup Guide* (PN 3-9006-099) – this offline guide provides help for SpectraCom software. It provides help for using SpectraCom before you have logged onto a flow computer and includes instructions for installing and starting the SpectraCom software. Detailed instructions for connecting to a Spectra100 Flow Computer and a guide to using the offline tools of SpectraCom (filename scomstr.hlp) are provided.

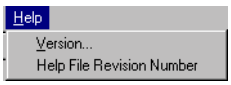
**You will need to have the Adobe Acrobat reader software (freeware) installed on your computer to view or print the *Spectra100 Developer's Guide*.**

Nearly all of the information in the *SpectraCom Startup Guide* has been duplicated in the *SpectraCom User Guide* online help file, so you can view its information both before and after you have connected to a Spectra100 Flow Computer.

If you can't find the answers to your questions in either the online or printed help, contact DMS for assistance.

### 1.3.1 Using Online Help

- To view the table of contents for the SpectraCom help file, or the Contents topic, click on the Contents button. Another way to view the Contents topic is to press the [ALT] + [C] keys.
- If you need to return to the previous topic, click on the Back button or use the << back arrow button.
- If you need to find a particular item in the help file, use the Search button. It displays an Index dialog.
- To find out the revision level of the SpectraCom online help file,




  - Click on the help file's Help menu.
  - Click on Help File Revision Number.
  - View the displayed information or click on the Print button for a hard copy.

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# INSTALLING SPECTRACOM SOFTWARE

SpectraCom software is included with the Spectra100 Flow Computer system. It is a 32-bit Windows based program that enables you to interact with the Spectra100 to perform common flow computer-associated tasks.

This section provides instructions on upgrading the S100 firmware, installing the SpectraCom software, and establishing communications.

## 2.1 PERFORMING THE INITIAL FIRMWARE UPGRADE

### 2.1.1 Notice for Upgrading from v1.x Firmware

Significant updates were made to the SpectraCom firmware, creating a more powerful and reliable product. However, these revisions cause some incompatibilities between the 1.x firmware and the SpectraCom software, version 2.1 (or later).

For example, because the calibration tables changed from the 1.x firmware to the 2.0 (or later) firmware, SpectraCom 2.1 (or later) will not be able to calibrate units running 1.x firmware. Thus, it is necessary to upgrade all flow computers with the 2.0 (or later) firmware so that one version of SpectraCom can support all units. SpectraCom 2.1 (or later) will allow you to collect logs and configuration data from the 1.x firmware unit before upgrading. The collected configuration can then be converted for use with the new firmware.

**The RTD calibration data cannot be converted. You must recalibrate the RTD after you upgrade the firmware.**

Future releases of firmware will not have these incompatibilities.

Firmware version 2.0 (or later) now supports alphanumeric names for data points Location ID and Meter ID.

### 2.1.2 Notice for Upgrading from Beta Firmware

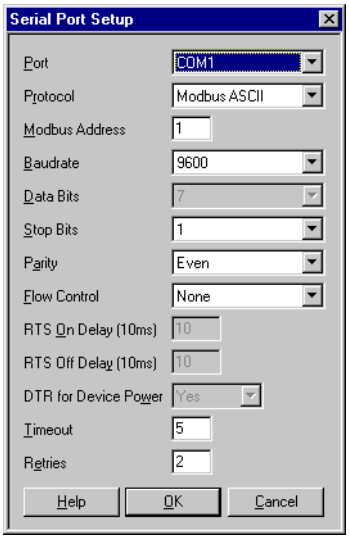
SpectraCom does not support converting beta configurations to be compatible with released firmware. A flow computer running beta firmware will require the deletion of its configurations so that the unit can be cold started with the factory defaults. Reconfigure and recalibrate the flow computer. Attempting to convert a beta configuration may cause the flow computer to operate unpredictably.

### 2.1.3 Preparation

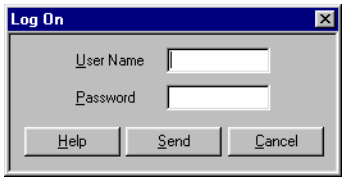
To upgrade the firmware,

1. If applicable, install the latest SpectraCom software that came with the firmware update. See Section 2.3 for instructions.
2. Connect your PC to the local port on the flow computer with the Daniel serial cable (PN 3-2900-019).
3. Start up SpectraCom (see Section 2.4 through Section 2.6 and see Section 3.1 for more information) and click the

button on the main screen. The Serial Port Setup window appears.




4. To configure the serial port parameters,
   (a) Select the PC *Port* to which the serial cable is connected (i.e., "COM1").
   (b) Set the *Protocol* to "Modbus ASCII".
   (c) Set *Baudrate*, *Stop Bits*, and *Parity* according to the local port configuration of the flow computer.
   (d) Set *Flow Control* to "None".
   (e) Set *Timeout* to "5".
   (f) Set *Retries* should be set to "2".
   (g) Click the OK button to continue.
5. The Log On dialog appears.



Enter the *User Name* and *Password* for the flow computer and click the Send button.

Once SpectraCom has connected to the flow computer, proceed to the next step.

If SpectraCom does not connect to the flow computer, verify the cable connections and the port settings for the flow computer's local port. Go back to Step 2 and repeat the process.

**Remember that the User Name and Password are case sensitive.**

**Default settings are:**

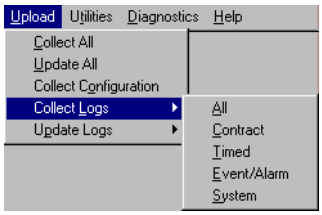
- **User Name = root**
- **Password = EFM1000**

6. Collect log data for each flow computer and save to disk.

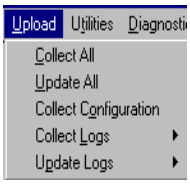
   (a) Click the Upload pull-down menu from the tool bar on the Spectra100 Operations window.

   Move your cursor over *Collect Logs*, which opens an additional menu.

   (b) To collect all logs, choose the *All* option.



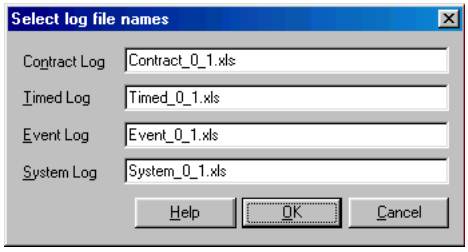

**See Step 6 to collect the log data for the firmware version number (v2.5 or earlier) or (v3.0 or later) you are using.**




**Because the upgrade procedure requires you to cold start the unit(s), all log data will be lost. If you do not want to collect the logs from the flow computer and save them to disk, skip to Step 7.**

**For v2.5 or earlier, SpectraCom creates the default filenames by appending the Location ID and Meter ID to the type of log being collected. The example dialog box above shows the default filenames for a flow computer that has a Location ID of "0" and a Meter ID of "1".**

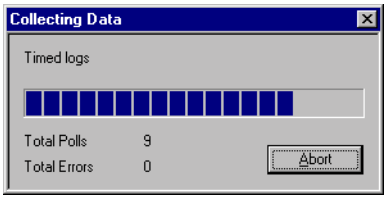
**Using firmware version 2.5** or earlier, a Select Log File Names dialog appears.




Import the log filenames that you want to collect and save to disk.

Click the OK button to start the upload.

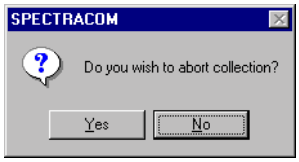
SpectraCom polls the flow computer for the log data and displays the *Collecting Data* dialog box (see the example below for Timed logs data collection).




Or,

Click on the Abort button to exit.

SpectraCom displays the following prompt:



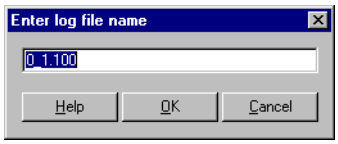

"Do you wish to abort collection?"

Click on the Yes button to abort and return to the Spectra100 Operations window.

Or,

Click on the No button to continue collecting the logs.

**Using firmware version 3.0** or later, an Enter Log File Name dialog appears.



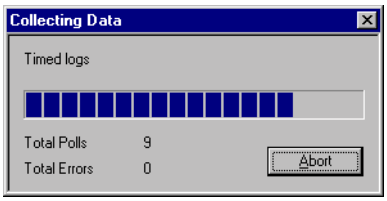

Insert the log file name that you want to collect and save to disk.

If more than one flow computer have identical Location IDs and Meter IDs, then you must either:

- Change at least one of the IDs.
- Change the filenames to a unique name via this dialog box. SpectraCom will prompt you before overwriting existing files on the hard drive.

Click the OK button to start the upload.

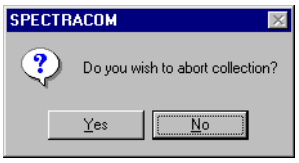
SpectraCom polls the flow computer for the log data and displays the *Collecting Data* dialog box (see the example below for Timed logs data collection).




**For v3.0 and later SpectraCom creates the default filename by appending the Meter ID to the Location ID, followed by a .100 file extension. The example, Enter Log file name dialog box, shows the default file name for a flow computer that has a Location ID of "0" and a Meter ID of "1".**

Or,

Click on the Abort button to exit the log collection function. SpectraCom displays the following prompt:




"Do you wish to abort collection?"

Click on the Yes button to abort and return to the Spectra100 Operations window.

Or,

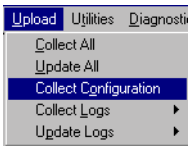
Click on the No button to continue collecting the logs.

7. Collect the configuration for each flow computer and save to disk

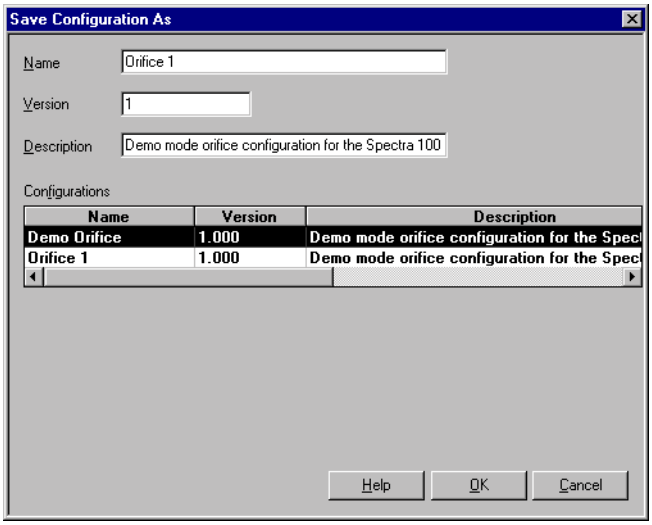
   (a) Click the Upload pull-down menu from the tool bar on the Spectra100 Operations window

   (b) Click on *Collect Configuration*.

**If you are upgrading from beta firmware, see notice at the beginning of this section.**



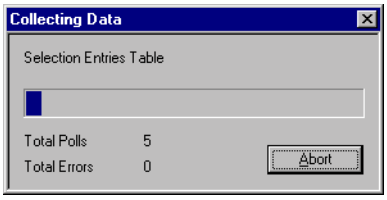
SpectraCom displays the Save Configuration As dialog box.




Enter a unique filename. Use the *Version* and *Description* data fields to label this configuration.

(c) Click the OK button to save the configuration to your hard drive.

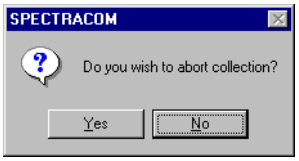
SpectraCom displays the *Collecting Data* dialog box




Or,

Click on the Abort button to exit the Configuration collection function.

SpectraCom displays the following prompt:




"Do you wish to abort collection?"

Click on the Yes button to abort and return to the Spectra100 Operations window.

Or,

Click on the No button to continue collecting the configuration data.

### 2.1.4 Upgrade

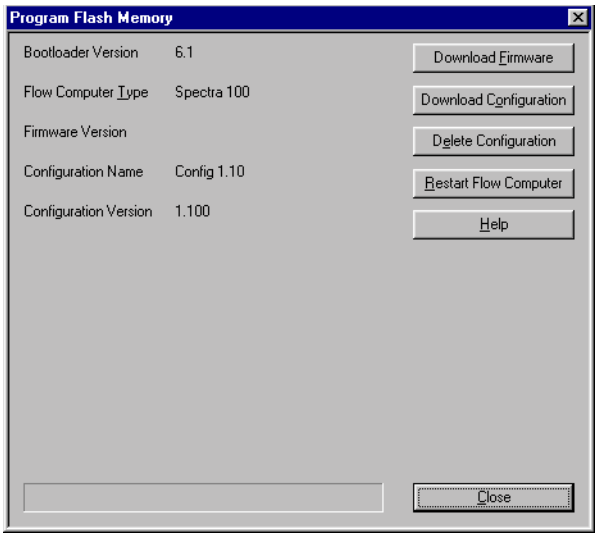
1. From the Spectra100 Operations window, click on *Diagnostics* menu and choose the *Reprogram Flash* selection.
2. SpectraCom will prompt: “Do you wish to reprogram this unit's flash memory?”. Click the Yes button.
3. Another dialog appears: “Spectra100 will restart in about 30 seconds”. Click the OK button.
4. The Serial Port Setup window displays. Note that the protocol is now “Flash Reprogram” and the baudrate is “38400”.

   If your PC cannot operate at 38400 baud, immediately select a lower baudrate before clicking the OK button.
5. The Program Flash Memory window appears.

   The top four buttons in the upper right corner will be grayed and the fields at the upper left will be blank until SpectraCom connects to the flow computer in Flash Reprogram mode. The connection process requires 30 seconds to complete. Go to the next step once SpectraCom is connected.

**If you have waited over 30 seconds and the flow computer has not connected, then you must restart the flow computer. To restart the computer without logging back into the unit, simply press switch S2 on the Spectra100 CPU board. The flow computer will restart and the Spectra-ComSpectraCom connection will be initiated.**

6. When the connection has completed successfully, the Program Flash Memory window should look similar to this:

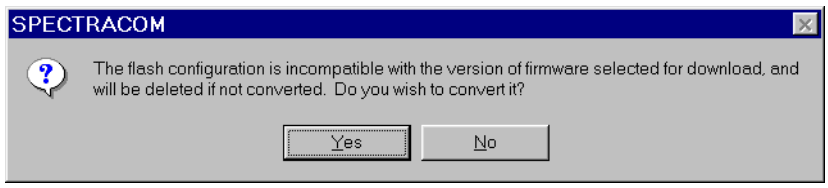



The Firmware Version will be blank. The Configuration Name and Configuration Version may or may not be blank depending on whether a user-defined configuration was stored in FLASH memory.

**If the desired firmware is not present in the list then it must first be imported. Click the 'Import' button and find the FCR file on your hard drive.**

7. Click the Download Firmware button. The Select Firmware Version to Download dialog appears. Highlight the desired firmware version from the list and click the OK button.

   If a User-Defined configuration is stored in FLASH memory, a dialog appears stating that the firmware is incompatible with this configuration.



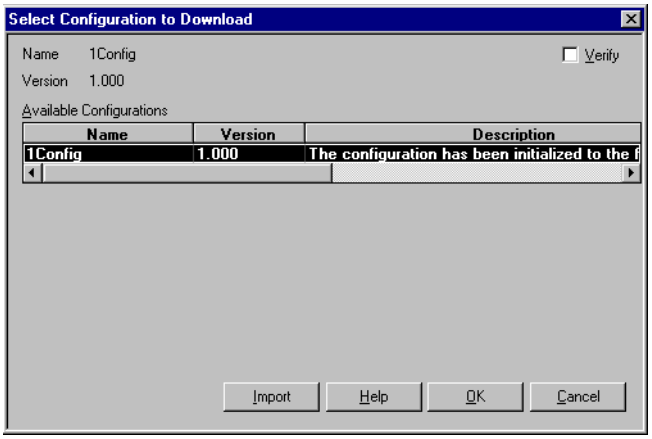
Since you have collected the Operating Configuration in Section 2.1.3, Step 7, click on the No button to continue with the download.

8. Once the download is complete the Firmware Version will display the new firmware version number (e.g., “2.000”).

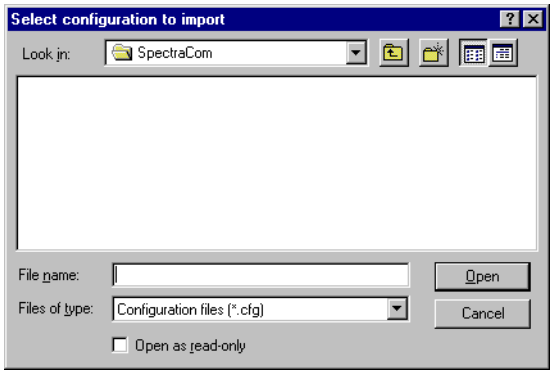
9. Click on the Download Configuration button.

10. The Select Configuration to Download window appears.

**If you did not upload a configuration (Section 2.1.3, Step 7), go to Step 16.**

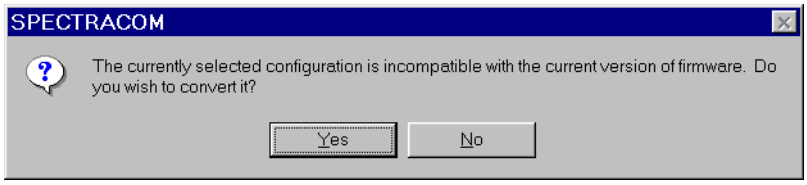



If the desired configuration is not listed, click on the Import button.




Use the provided directory tree to locate and select the desired configuration file.

11. Click on the OK button.
12. SpectraCom may display the following information dialog, stating that the selected configuration is incompatible with the downloaded firmware.




13. Click on the Yes button to convert the configuration
14. Use the Save Configuration As window to specify the name and version number of the converted configuration.
15. Click on the Yes button to both download the converted configuration and save the file to disk.
16. Cold Start the flow computer.
    (a) Set switch S1 on the Spectra100 CPU board to the ON position.
    (b) From SpectraCom, click on the Restart Flow Computer button.
    (c) The flow computer immediately restarts and prompts “Confirm Coldstrt (Press RED Key)” on the front panel display. Press the red key on the front panel.
    (d) The front panel displays a new message, “CONFIRMED! COLDSTARTING”, and then displays “Cold Started at: Time Date”.

    Some upgrades may Cold Start the unit without prompting you to press the red key. If this happens, simply proceed to the next step.

**Include the firmware version number in the configuration name for future reference.**

**If the front panel displays a warm start message, then the red key was not pressed in time.**

1. **Press switch S2 on the CPU board to restart the flow computer.**
2. **Watch the front panel display on the flow computer as it displays various startup messages. The “Confirm Coldstrt (Press RED key)” message will display. Press the red key at that time.**

17. Once the unit is cold started, return S1 to the OFF position.

If an existing configuration was converted and downloaded after the new firmware upgrade, the sensor calibration data is preserved. Recalibration is not necessary unless desired.

**Converting v1.x configurations require recalibrating the RTD (see Section 2.1.1)**

## 2.2 MINIMUM SYSTEM REQUIREMENTS

To install and operate SpectraCom, you will need either a portable (laptop) or desktop personal computer (PC) that meets these minimum requirements:

- PC with a 486/66MHz or higher processor running Microsoft Windows 95 (service pack 1 or better) or Windows NT4 (service pack 3 or better)
- 16 megabytes (MB) of RAM (32 MB or more recommended)
- 32 MB of free hard disk space
- one VGA monitor with 800x600 resolution, 16-color or better
- one CD-ROM or one 3.5-inch floppy drive for installation
- one free serial port for remote/local connection to the Spectra100 Flow Computer
- one Windows-compatible modem (for remote connection only)
- one Windows-compatible mouse

**For Win95, use the Settings/Control Panel/ System/General Page menu path to check the system version number. The version number should be 4.00.950A or later. For NT4, check the service pack information displayed on the blue screen during system startup. The version number should be 4.00.1381, Service Pack 3, or later.**

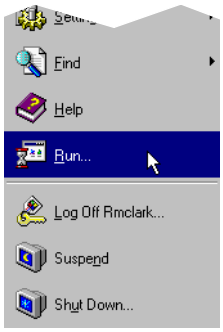
## 2.3 SOFTWARE INSTALLATION PROCEDURE

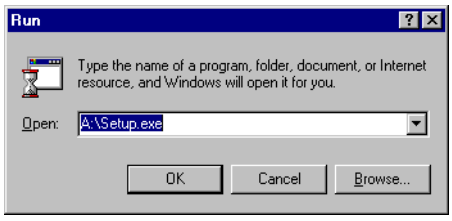
**It is recommended that you close all Windows applications before starting the SpectraCom installation.**

For a **Win95/98/NT installation**, place the Daniel SpectraCom CD in the CD-ROM drive. The SpectraCom Installation screen will display immediately if your PC uses the CD-ROM autostart feature. Follow the instructions provided on each screen by the Installation Wizard.

If your PC does not use the CD-ROM autostart feature or if you are using the 3.5-inch installation disks, follow these steps:

1. Place the Daniel SpectraCom CD in the CD-ROM drive or insert Installation Disk 1 in the appropriate floppy drive.
2. Click on the Start button (see the taskbar).
3. Click on *Run*. The Run window appears.




4. Type the path and file name (e.g., **`[CD-ROM drive]:\setup`** or **`a:\setup`**) in the *Open* data box or click on the Browse... button to use a directory tree.
5. After selecting the correct file, click on the OK button.
6. Windows opens the setup file and the Installation Wizard begins. Follow the instructions provided on each screen.

## 2.4 SPECTRACOM STARTUP

After SpectraCom has been successfully installed, use the *Start* menu (*Start\Programs* menu path) to start the software.

To start SpectraCom directly from the executable file, use the directory path you specified when installing SpectraCom. Note that **`c:\Program Files\Daniel Industries, Inc.\Flow Computer\`** was the default setting.

**The default user name is root.**

**The default password is EFM1000.**

**Both user name and password are case-sensitive.**

See Section 2.5 for establishing remote communications and see Section 2.6 for establishing local communications.

Refer to the online help files for more information regarding the SpectraCom and SpectraConfig programs (see Section 3.4).

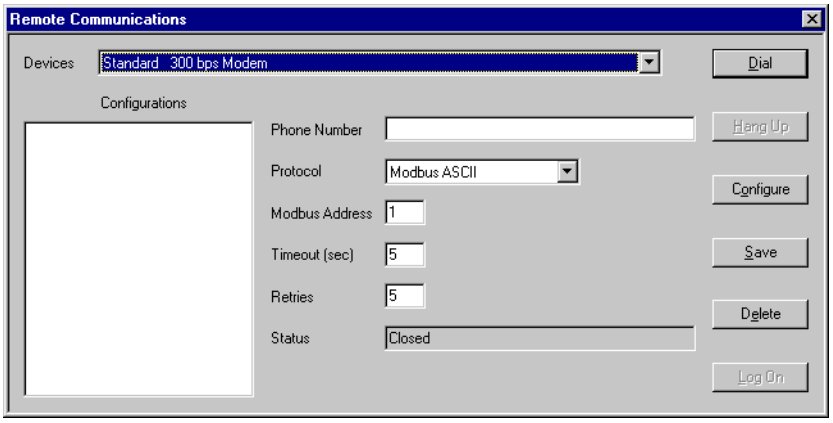
If no activity occurs after 50 minutes, SpectraCom automatically logs off the user.

## 2.5 ESTABLISHING REMOTE CONNECTION

Use this process to configure the PC modem and establish a remote connection to the flow computer. For related information, refer to the appropriate user guide furnished with your PC.

Note that you must configure the PC modem each time you establish a new remote connection. If you want to use a saved configuration, follow these steps:

1. Click on the Remote button to set the related options. The Remote Communications window appears.




2. Select the desired configuration from the Configurations list.

3. Click on the Dial button to begin communications.

   If the modem does not connect at the proper baud rate, see Section 2.5.1, Steps 6 and 10.

### 2.5.1 Establishing a New Connection

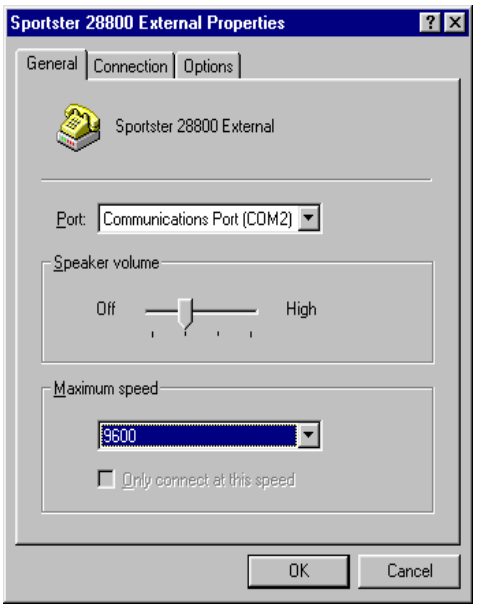
If you want to establish a new connection, follow these steps:

1. Click on the Remote button to set the related options. The Remote Communications window appears.

2. Use the *Devices* pull-down menu to select your modem.

**If the desired modem is not listed, refer to your PC manual(s) for instructions on installing the appropriate modem driver.**

3. Click on the Configure button. The Modem Properties window appears.




4. Use the *Port* pull-down menu to select the communication port this modem will be using.

   Note that Windows NT automatically assigns a port during the modem installation.

   If you are configuring both a local *and* a remote connection, use a different communication port for each connection.

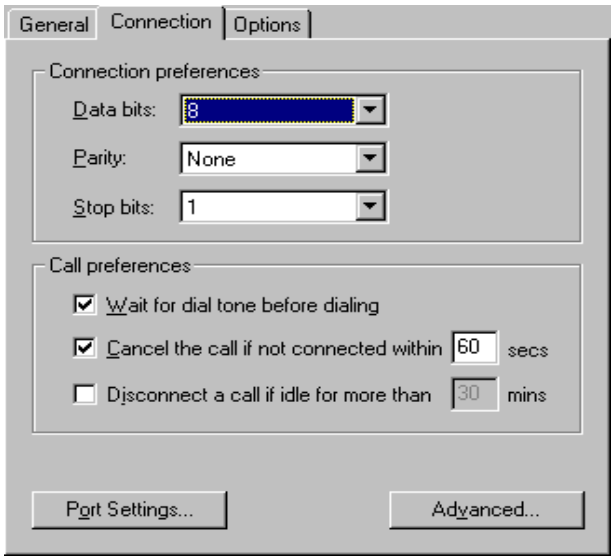
5. Set the desired *Speaker volume* for the dialing and connection sounds.

**Allowed baud rates for Ports A and B are 38400, 19200, 9600, 4800, 2400, 1200.**

**The selected baud rate depends on the capabilities and settings of the flow computer modem.**

**This option must be set if the PC modem will be connecting at a baud rate less than the maximum baud rate of the flow computer modem.**

6. Use the *Maximum speed* pull-down menu to select the baud rate at which the flow computer communicates.
7. Click on the Connection tab. The Modem Connection menu appears.

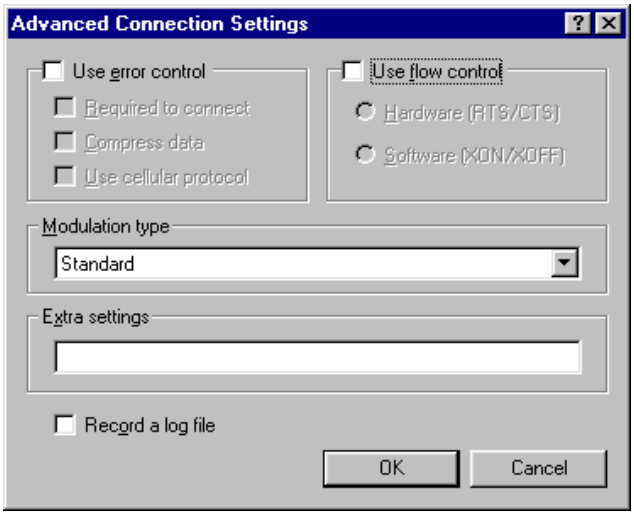



8. Using the appropriate pull-down menus, select the data bits, parity, and stop bits for the selected port.

   For an ASCII Modbus protocol, select 7 data bits, Even parity, and 1 stop bit.

9. Set the *Call preferences* as desired.

10. Click on the Advanced... button. The Advanced Connection Settings window appears.




Ensure that *Use error control* and *Use flow control* are not selected (i.e., "turned off").

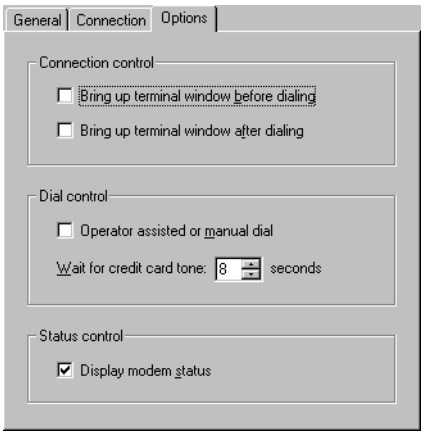
Set these configurations as appropriate for the modem. Refer to the manufacturer installation guide for more information.

Click on the OK button to apply your selections, exit this window, and return to the Modem Connection menu.

Click on the Cancel button to exit this window and return to the Modem Connection menu without applying your selections.

**If the PC modem attempts to connect to the flow computer modem at a baud rate greater than the *Maximum speed* setting (see Step 6), then an AT command must be entered in the *Extra settings* data box. See the modem installation guide for details. To confirm the connection baud rate, double click on the modem icon displayed in the Windows Systray. Note that this icon only displays during the connection.**

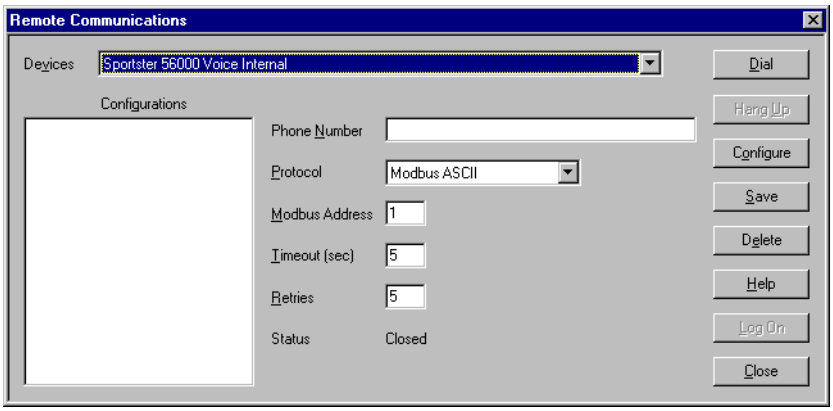
11. Click on the *Options* tab. The Modem Options menu appears.




12. Select the desired *Connection control* and *Status control* settings.

13. Click on the OK button to apply your selections and return to the Remote Connections window.

    Click on the Cancel button to exit and return to the Remote Connections window without applying your selections.




14. Use the *Devices* pull-down menu to select the desired modem.

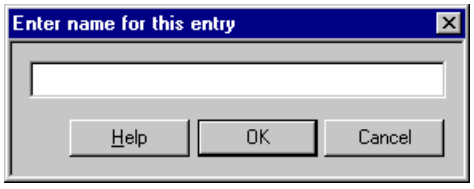
15. Type the target phone number in the *Phone Number* data box.

16. Use the *Protocol* pull-down menu to select the required setting.The default protocol is ASCII.

17. Type the Modbus address. The default address is 1.

18. Input the timeout period and number of retries desired.

19. To save your connection settings, click on the Save button. The Save Entry Name dialog appears.




(a) Type the desired name in the data box provided.

(b) Click on the OK button to apply this name and return to the Remote Connections window.

The connection configuration is saved to disk and its name displays in the Configurations field. To access this configuration later, select it from the Configurations list.

20. Click on the Dial button to begin communications.

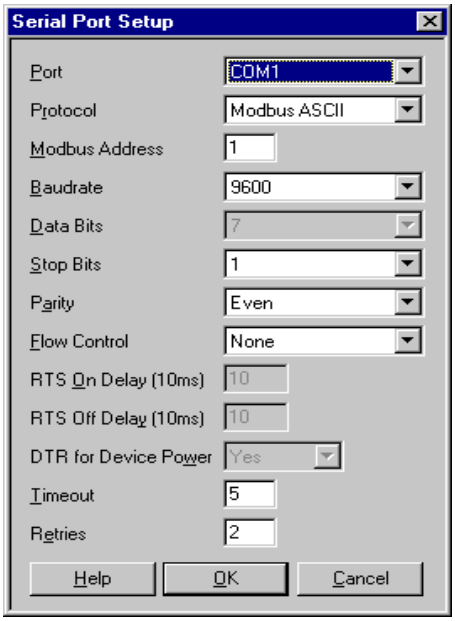
**The protocol setting and Modbus address must match those configured for the flow computer.**

**Ensure that the communication cable and connectors are correctly installed before attempting a connection. See the *System Reference Manual* (PN 3-9000-100) for more information.**

## 2.6 ESTABLISHING LOCAL CONNECTION

Use this process to configure and establish a local connection to the SpectraCom via a communication port.

1. Click on the Local button to set the related options. The Serial Port Setup window appears.




**All settings must match the serial communications settings configured in the flow computer.**

2. Use the pull-down menus to select the desired PC communication port, protocol, Modbus address, and baud rate.

| Item | Default |
|---|---|
| port | COM1 |
| Modbus protocol | ASCII |
| Modbus address | 1 |

3. Using the appropriate pull-down menus, select the data bits, parity, and stop bits for the selected port.

   For an ASCII Modbus protocol, select 7 data bits, Even parity, and 1 stop bit.

4. Select None for the *Flow Control*.

5. Click on the OK button to apply your selections. The *Log On* window appears (see Section 3.1 for log on instructions). Note that your selections are automatically saved.

   Click on the Cancel button to cancel your selections and return to the main screen.

## 2.7 SYSTEM INSTALLATION COMPLETION CHECKLIST

After you have installed the system, ensure that you also

- verify that all fittings and connections are properly secured
- turn on the block valves (on the meter)
- snoop all tubing for leaks

before cold-starting the Spectra100.

# GETTING STARTED

## 3.1 LOGGING ON

**The default user name is root.**

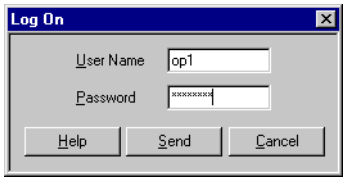
**The default password is EFM1000.**

**Both user name and password are case-sensitive.**

To log on to the flow computer from SpectraCom, establish a remote connection (see Section 2.5) or a local connection (see Section 2.6).

### 3.1.1 First Time or After Cold Start

To log onto a flow computer with SpectraCom for the first time or after a cold start,




1. Type your user name in the *User Name* data box. Note that the user name is case-sensitive.

   The default logon user name is **`root`**.

2. Type your password in the *Password* data box. Note that the password is case-sensitive and displays as asterisks when typed.

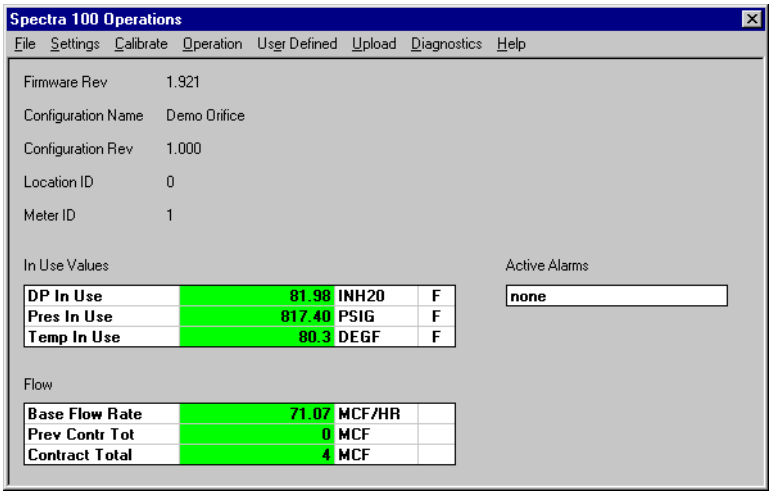
   The default logon password is **`EFM1000`**.

3. Click on the Send button to apply your selections.

   Once you are online, or connected to a flow computer, the Spectra100 Operations window appears.

**If a local connection cannot be established, the logon will fail. SpectraCom will force you to cancel out of the logon dialog.**

The Spectra100 Operations window serves as the starting point for all further SpectraCom functions.




4. Click on the Cancel button to cancel your selections and return to the main screen.

### 3.1.2 Normal Log On

From the main SpectraCom screen,

1. Establish a remote connection (see Section 2.5) or a local connection (see Section 2.6).
2. Type User Name and Password.
3. Click on the Send button.

   The Spectra100 Operations window appears and you can make the appropriate selection for the desired task.

**Both user name and password are case-sensitive.**

### 3.1.3 Logging Off

To exit from a SpectraCom connection,

- From the menu bar, click on *File* > *Exit*.
- From the Spectra100 main screen, click on the

button.

## 3.2 SETTING UP USER NAMES, PASSWORDS, AND ACCESS LEVELS

**This function is only available if you have logged onto the Spectra100 with a 0 access level.**

Use this function to define the user names and passwords — along with associated security levels — for the Spectra100 Flow Computer.

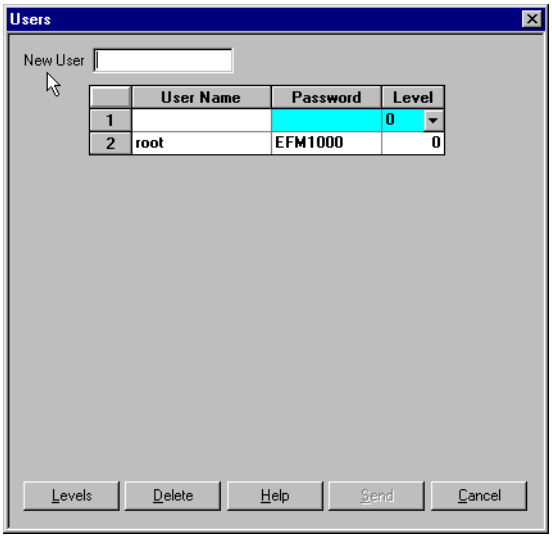
The data items typically displayed for each user have the following attributes: user name, password, and access level.

### 3.2.1 User Names and Passwords

To set up a user name and password:

1. Click on the *Settings* menu, then select *Users*.

2. The Users window displays and contains the User Name, Password, and access Level fields.




3. Add the new user to the list by placing the cursor in the *New User* field,

   (a) Type the user name (up to 10 characters), then press the ENTER key.

   A row is added to the list (in alphabetical order) for the new user. The cursor moves to the *Password* cell.

   (b) In the *Password* cell, type in the user password (up to 8 characters), then press the ENTER key.

   Press the RIGHT ARROW key to move the cursor into the access *Level* cell.

   (c) Assign an appropriate security level by selecting the access level (0-15) from the *Level* pull-down menu.

   (d) To send changes to the flow computer, click on the Send button.

**Ensure there is at least one user with a 0 access level (i.e., admin user).**

**Otherwise, in order to log on later as an admin user, you must cold start the unit and use the default first-time logon User Name and Password. See Section 3.6 for more information on cold starts.**

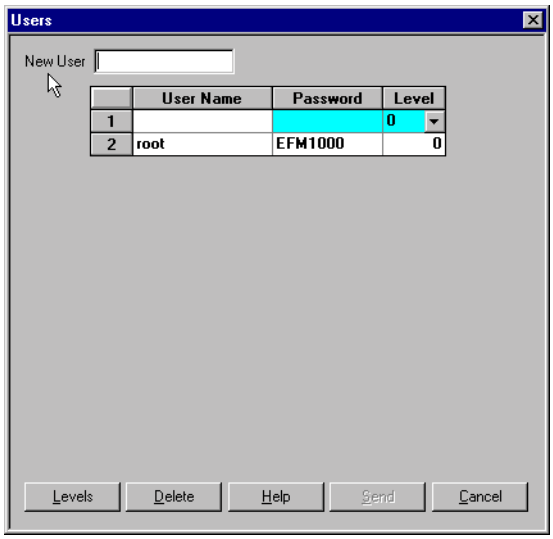
**See Section 3.2.3 for more information about access levels.**

(e) To exit this window without applying your changes, click on the Cancel button.

### 3.2.2 Changing Passwords

To change the password for an existing user,

1. Click on the *Settings* menu, then select *Users*.
2. The Users window displays.




3. Click on the *Password* field and enter the new password (up to 10 characters).

**Changed settings are sent to the flow computer and a record of the changes are added to the Event Log, as an operator event.**

4. Click on the Send button to apply the changes.

   (a) Click on the Cancel button or press the ESCAPE key to close the Users window.

   (b) A confirmation dialogue appears. Click the Yes button to discard the

changes and return to the SpectraCom Operations window.

Click on the No button to return to the Users window.

### 3.2.3 About Access Levels

Access levels range from 0 to 15 and are numerically representative of the user's authority to access specific SpectraCom functions (such as Calibration). Level 0 has the greatest authority and Level 15 has the least authority.

- Level 0, Admin or Super User
  - All functionality of Level 5
  - View/Edit Modbus Register List
  - View/Edit Log Configurations
  - View/Edit Local Display List
  - Flash Reprogram Access from SpectraCom
  - Cold Start from SpectraCom
- Level 5, Maintenance and Reprogramming
  - All functionality of Level 10
  - Read and write access to database points in configuration
  - Set Date/Time
  - Warm Start from SpectraCom
- Level 10 User
  - All functionality of Level 15
  - Calibration

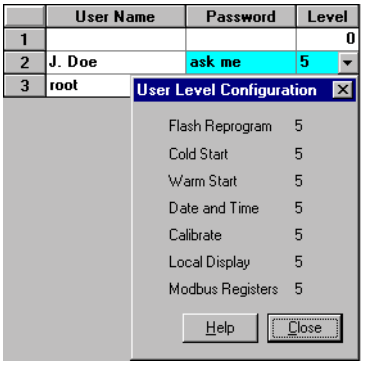
- Level 15 User
  - Read-only access for all database points in configuration
  - Log Collection

  Every data point has a read and write access level that is at least Level 5 or greater. To read or write to a particular data point (provided the data point is not read-only) the user access level must be numerically equal to or less than the data point access level. Refer to the *Spectra100 Data Points Guide* (PN 3-9006-101) for more information.

### 3.2.4 Viewing and Changing Current Access Level Configurations

To view the current user access level configuration,

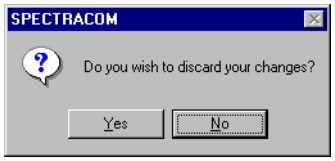
1. Click on the appropriate *Level* cell or use the RIGHT ARROW key to select it.
2. Click on the Levels button. The User Level Configuration window displays.




3. To discard changes or to exit without applying changes,

(a) Click the Cancel button or press the ESCAPE key to close the Users window.

(b) A confirmation dialogue appears. Click the Yes button to discard the changes and return to the SpectraCom Operations window.




Click on the No button to return to the Users window.

4. To apply changes, click on the Send button.

### 3.2.5 Adding and Deleting Users

To add a new user,

1. Type a new user name.
2. Press the ENTER key.
3. Set the appropriate access level.
4. Click on the Send button to apply the changes.

**You cannot edit an existing User Name. Changes must be made by adding a new user. See Section 3.2.1 for more information.**

To delete a user,

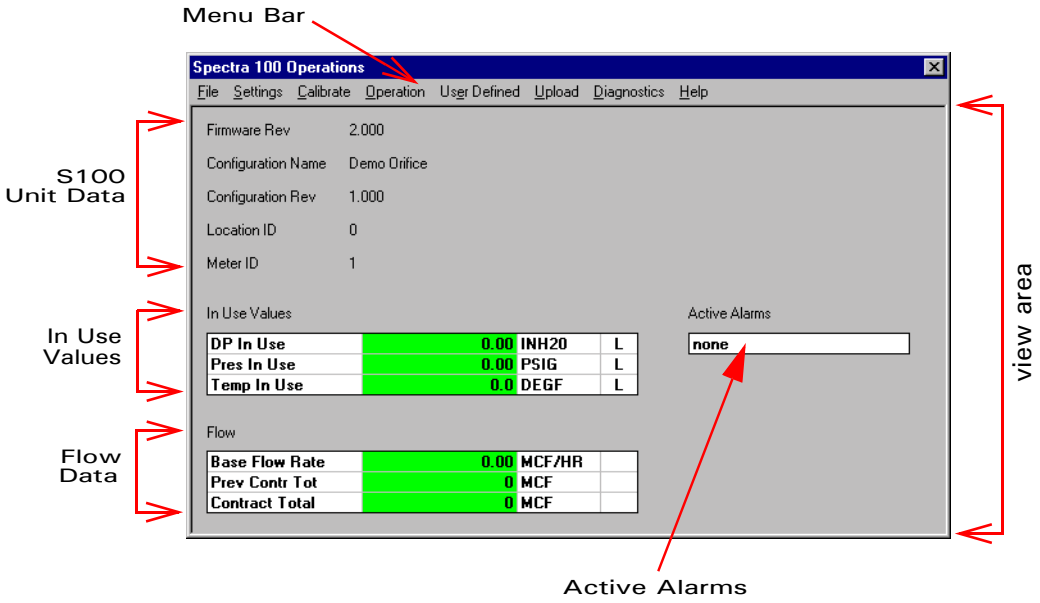
1. Click on the *User Name* and select the Delete button.
2. Click on the Send button to apply the changes.

## 3.3 SPECTRACOM OPERATIONS WINDOW

Use the following sections to familiarize yourself with the SpectraCom user interface.

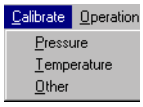
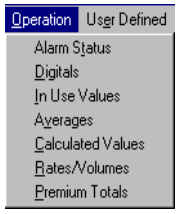
### 3.3.1 Operations Window

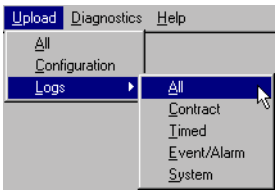
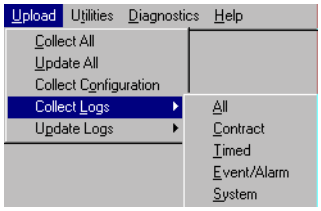
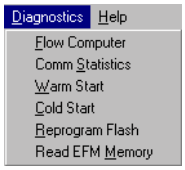
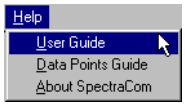
The SpectraCom Operations window typically looks like this:




- View Area Information
  - S100 Unit Configuration Data – Identifies the firmware revision level, the configuration in use, the flow computer identification number, and location ID.
  - In Use Values – A read-only dialog box displays flow meter input and raw data values (live transducers or fixed values), used by the flow computer to derive flow calculation results.
  - Flow Data – Displays the most currently calculated flow rate and volumes.
  - Active Alarms – Displays all currently active or uncleared flow computer alarms.

The Operations window menu bar lists the following SpectraCom pull-down functions that control the Spectra100 Flow Computer:

| Menu | Name | Description |
|---|---|---|
| | File | Provides an option for disconnecting from or logging off the Spectra100 Flow Computer. |
| | Settings | Controls how Spectra100 uses and displays raw data, communications parameters, and log data |
|  | Calibrate | Provides options for turbine meter linearization or calibrating the transducer/sensor using either a multi-point calibration or an offset calibration. |
|  | Operation | Displays the Alarm Status, the Digital Input and Output, the In Use Values, the Calculated Values, and the Rates/Volumes windows. |
| | User-Defined | Displays the Data Points windows for the Spectra100 Flow Computer required for special functions. You can design, edit, or rename existing menus and save custom viewing windows. |

| Menu | Name | Description |
|---|---|---|
| SpectraCom v2.5<br>  <br><br>SpectraCom v3.0<br>  <br> | Upload | Uploads the current Spectra100 configuration and Spectra100 logs<br><br>**Note the menu changes from SpectraCom v2.5 to v3.0.** |
|  <br> | Diagnostics | Diagnostics Menu provides the means for:<br>• Controlling the Spectra100 at its most basic levels, including warm and cold starts.<br>• Downloading or saving the Spectra100 firmware program (for flash memory re-programming) and/or its configuration.<br>• Viewing the basic device information, communications statistics, and memory contents. |
|  <br> | Help | Lists current online help resources for the Spectra100 Flow Computer. These resources include the *Spectra100 User's Guide* (PN 3-9006-100) and the *Spectra100 Data Points Guide* (PN 3-9006-101). See Section 3.4 for instructions on accessing online help. |

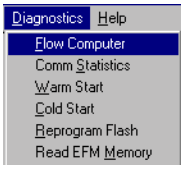
### 3.3.2 Navigation

Use the Spectra100 menus, mouse, and keyboard to accomplish your required task.

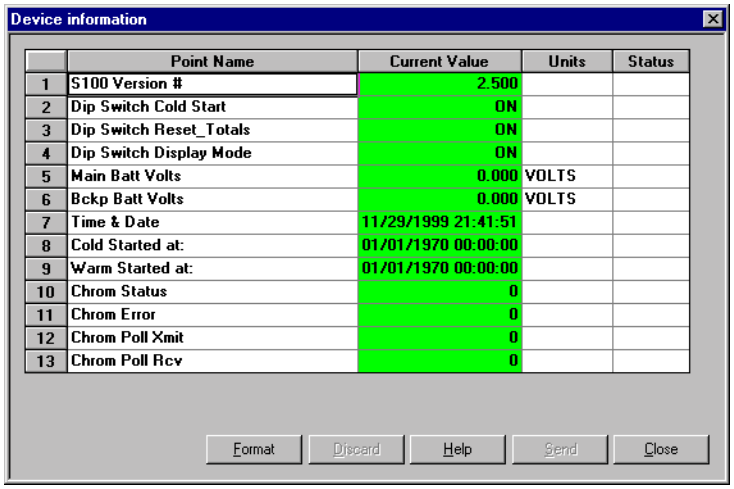
### 3.3.3 Viewing Spectra100 Device Information

The Spectra100 Flow Computer Device Information window provides basic information about the flow computer hardware, firmware, and the date and time of previous warm or cold starts.

Access the Device Information window from the SpectraCom main window tool bar by clicking on Diagnostics. Use the pull-down menu, then click on Flow Computer.



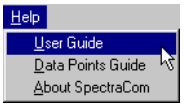

The Device Information window appears.




## 3.4 ONLINE HELP

To access online help, use any of these methods:

- Press F1 on your keyboard.
- Click on the Help button from the currently active window.
- Select the desired help file from the *Help* pull-down menu.



The following help files are available:

- *Data Points Guide* (s100dat.hlp) – provides detailed information on every data point used by the Spectra100.
- *Developers Guide* (s100dev.pdf) – shows how the data points system is structured, and what type of special Modbus function codes and messages are used to read (or write to) Spectra100 data points and logs.
- *User Guide* (s100usr.hlp) – lists detailed information on each SpectraCom menu, and includes hardware guides.
- *Startup Guide* (scomstr.hlp) – provides help for using SpectraCom before you have logged onto a flow computer.

  It includes instructions for installing and starting the SpectraCom software, and describes how to connect to a Spectra100 Flow Computer. It also provides a guide to using the SpectraCom offline tools.

## 3.5 WARM STARTS AND COLD STARTS EXPLAINED

**To prevent accidental loss of data, the front panel display will prompt the user to confirm a cold start or reset totals by pressing the red button.**

The Spectra100 board contains a configuration switch, S1, which affects how the flow computer restarts (see PN 3-9000-100, *Spectra100 System Reference Manual* for the switch specifications). S1-P1 (switch S1, dip position 1) controls whether the unit cold or warm starts. The default position is “off”, which results in a warm start.

The implications of a cold or a warm start depend upon the organization of the Spectra100 memory. The Spectra100 uses two types of memory:

- RAM, where data is lost when power is removed
- FLASH, where data is not lost when power is removed

Each memory type, RAM or FLASH, maintains two functions:

- program memory, which stores the sequences of operations to be performed
- configuration memory, which stores the information specifying the data to be operated on and the tables of information to be displayed

A section of the RAM, backed up by the on-board lithium battery, stores all archived data.

When the flow computer is restarted in any mode, the program memory is copied from FLASH to RAM and subsequent operation uses the RAM. This enables recovery from any corruption of the program memory.

### 3.5.1 About Warm Starts

During a warm start, the configuration memory is not affected. The unit continues operating, using the data stored in the configuration memory just before the restart occurred. Any current accumulated values and online changes that have not been saved into a SpectraCom file will be preserved. This is the "normal" method for seamlessly resuming operation. Note that a warm start is required when an online data change, such as a change in baud rate, affects an operational parameter; a warm start must be performed in order for that change to take effect.

**When a change that requires a warm start occurs, SpectraCom displays a warning. If desired, the new configuration should be saved by SpectraCom and downloaded to the FLASH to establish it as the new default for a cold start.**

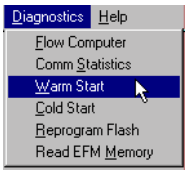
**Dip Switch 1 on the Spectra100 Flow Computer must be in the default (OFF) position to perform a warm start. The ON position, however, does not automatically cause a cold start. The front panel display will ask for a cold start confirmation. If the red button is not pressed to confirm, a warm start will occur instead.**

**Never press the red display panel button or hit Switch 2 on the main circuit board during a warm start.**

**Another way to warm start the Spectra100 is to turn the power OFF, then ON again.**

### 3.5.2 Performing a Warm Start

1. Ensure that pin 1 and 2 on Switch 1 (see flow computer board) are in the OFF position. For more information, refer to *Spectra100 System Reference Manual* (PN 3-9000-100).
2. Click on the *Diagnostics* menu.
3. From the *Diagnostics* menu, click on *Warm Start*.




4. A conformation dialog box displays:

   (a) Click on the Yes button or press the ENTER key.

   (b) SpectraCom restarts after you log on.

## 3.6 ABOUT COLD STARTS

During a cold start, the configuration files are copied from FLASH and replace any currently accumulated totals as well as any online changes made to the configuration files since the last SpectraCom configuration download. Therefore, a cold start is used to recover from extreme situations, such as a faulty online change or a corrupted database.

Occasionally, you will want to clear all internal data such as the accumulated values, active alarms, alarm logs, contract logs, and event logs. This is desirable when moving a unit from one location to another or when changing the log configuration (otherwise, a log could contain mixed data formats). S1-P2, when placed in the "on" position, will clear this internal data.

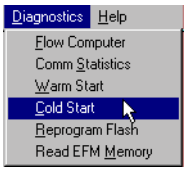
**To prevent accidental loss of data, the front panel display will prompt the user to confirm a Cold Start by pressing the red button.**

### 3.6.1 Performing a Cold Start

Cold starts are required after downloading new configuration or firmware files. Note that cold starting the flow computer restores the Default Configuration (or the User-Defined Configuration, if that configuration exists in the flash memory).

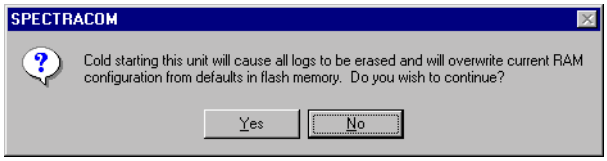
**Normally, DIP Switch 1 on the Spectra100 Flow Computer is used to enable warm/cold starting. However, the Cold Start feature in the SpectraCom software overrides the DIP Switch setting on the flow computer. It causes a cold start of the flow computer regardless of the DIP switch setting.**

1. Click on the *Diagnostics* menu.
2. In the *Diagnostics* menu, choose *Cold Start*.

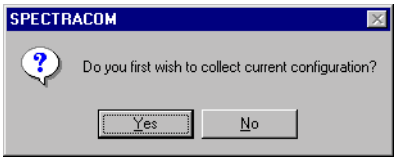



3. A prompt is displayed, "Cold starting this unit will cause all logs to be erased and will overwrite current RAM configuration from

defaults in flash memory. Do you wish to continue?".




4. Click on the Yes button or press the Y key.
5. Another prompt is displayed, "Do you first wish to collect current configuration?".




   (a) Click on the Yes button if you wish to save the current Operating Configuration. A saved configuration can be uploaded from the PC to the flow computer at a later time so that the saved configuration then becomes the User-Defined Configuration, or a new default configuration for the computer.

   (b) Click on the No button if you do not wish to save the current Operating Configuration.

6. Another prompt displays, "The unit is now cold starting. You will be required to log on again to continue."

   (a) Click on the OK button, or press the ENTER key.

7. Ensure that pins 1 and 2 on Switch 1 are in the OFF position.

## 3.7 CONFIGURATIONS EXPLAINED

The Flow Computer distinguishes between three types of configurations:

1. Default Configuration – The Default Configuration (see Section 3.7.1 for more information) is the base configuration stored in the Spectra100 flash memory. This configuration is loaded into the operating memory (to become the Operating Configuration) only after a cold start and if no User-Defined Configuration was found in the flash memory firmware.
2. Operating Configuration – The Operating Configuration (see Section 3.7.2 for more information) is the configuration that exists in the flow computer operating memory, after the flow computer has been started either from a cold start or warm start. This configuration is ready for online modification if necessary, through changes you make in SpectraCom. If the flow computer is cold started, it loads into operating memory (from the flash memory firmware) either a Default Configuration or a User-Defined Configuration, which then becomes the Operating Configuration. If the flow computer is warm started, it uses the Operating Configuration as found in the flow computer operating memory.

3. User-Defined Configuration – The User-Defined Configuration (see Section 3.7.3 for more information) stores in the flow computer flash memory firmware and it is loaded into operating memory (to become the Operating Configuration) only after a cold start. When cold starting, with a User-Defined Configuration present in flash memory, it is used in lieu of the Default Configuration. A User-Defined Configuration provides customized default settings (per data point parameters), and therefore is more useful than the Default Configuration. It enables a cold start with settings that are the preference of the customer, or user, and not those settings found in the factory Default Configuration.

The configuration used by the flow computer depends upon whether the computer has been warm or cold started. If the computer has been cold started, it depends upon which configuration has been placed in the flash memory firmware.

### 3.7.1 Default Configuration

**The User-Defined Configuration has precedence over the Default Configuration. However, if the flow computer is cold started and finds no User-Defined Configuration present, then the Default Configuration will be used.**

The Default Configuration is inaccessible by the user (that is, it cannot be reprogrammed or erased by the user, but exists in conjunction with the embedded software program). The Default Configuration exists so the flow computer can always be started and behave like a flow computer, even after a worst-case failure.

After cold starts, the Default or User-Defined Configuration becomes the Operating Configuration.

### 3.7.2 Operating Configuration

The Operating Configuration is the configuration that exists in the flow computer operating memory after the flow computer has been started, either from a cold start or warm start.

### 3.7.3 User-Defined Configuration

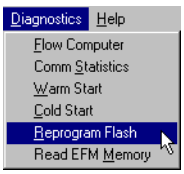
A user-defined configuration (per customized data point parameters) that is used as the default; it may exist in addition to the default configuration. However, the User-Defined Configuration must be placed intentionally into the flash memory by the flow computer technician or Daniel manufacturing. The User-Defined Configuration exists so the flow computer can cold start with default settings that are the preference of the customer, or user, and not those settings found in the factory Default Configuration.

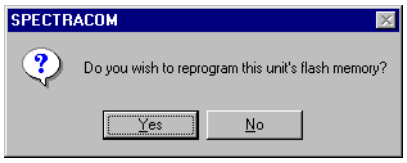
### 3.7.4 Downloading the Firmware

If you want to save the Operating Configuration to disk so that you can download it after updating the firmware, collect the Operating Configuration via the upload function (use the *Upload > Configuration* menu path). See Section 3.8 for instructions on downloading a configuration file.

To download a new firmware file to the SpectraCom,

1. Access the Download Firmware function, use the *Diagnostics > Reprogram Flash* menu path from the Spectra100 Operations window.

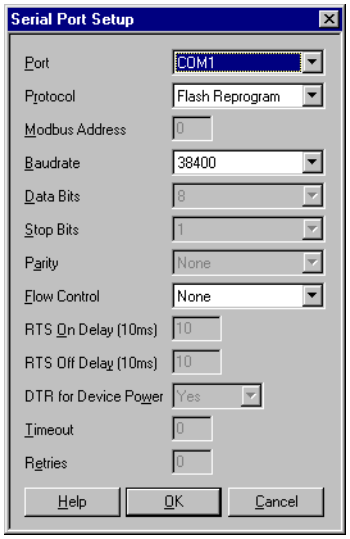





2. SpectraCom prompts whether you want to reprogram the flow computer flash memory.

   Click on the Yes button or press the Y key to continue.

3. SpectraCom informs you that the flow computer will restart in 30 seconds. Then the Serial Ports window appears.

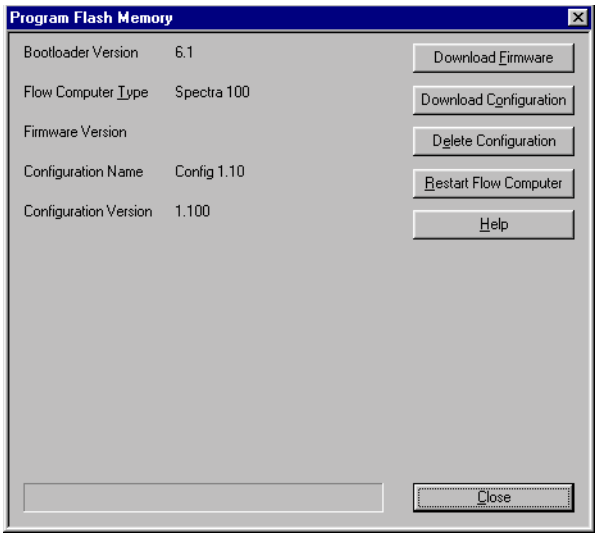



4. Ensure that:

- *Protocol* is set to "Flash Reprogram"
- *Baud rate* is set as desired.

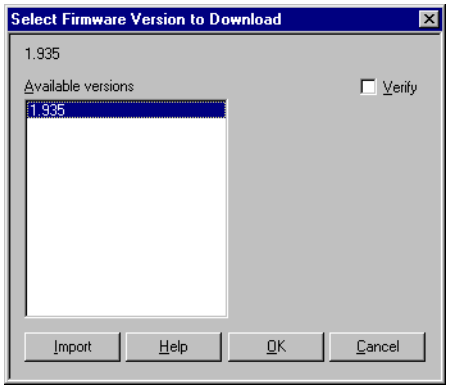
  Click on the OK button.

5. The Reprogram Flash Memory window appears.

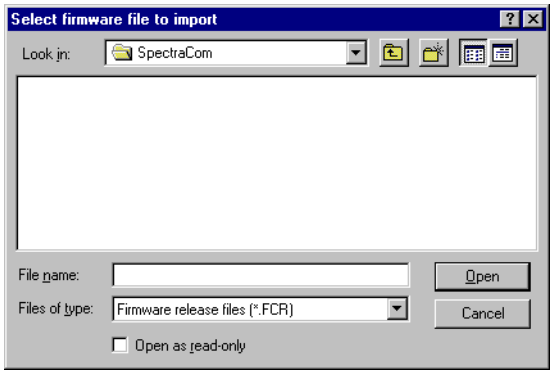



6. Press the Download Firmware button.

7. The Select Firmware Version to Download window appears.



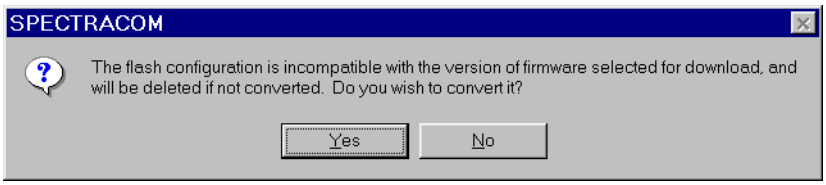
If the desired firmware is not listed, click the Import button.




Use the provided directory tree to locate and select the desired firmware file.

8. Click the OK button.
9. SpectraCom determines whether the selected firmware file is compatible with the current User-Defined configuration. If the firmware file and the configuration are compatible, then SpectraCom continues with the download.

   If the firmware file and the configuration are not compatible, SpectraCom determines whether the configuration can be converted.




If yes, SpectraCom uploads the current configuration, converts it, and then prompts you to save the converted configuration with a new name. SpectraCom then downloads the new firmware and the converted configuration.

If no, SpectraCom deletes the existing configuration. SpectraCom then downloads the selected firmware and defaults to the factory configuration.

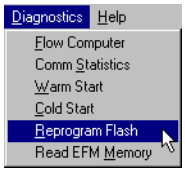
**If you previously uploaded the Operating Configuration, choose NO to delete the User-Defined Configuration.**

**Then download the Operating Configuration (see Section 3.8) as the new User-Defined Configuration.**

## 3.8 DOWNLOADING A CONFIGURATION

For more details about downloading new configuration file(s) see Section 10.4.1.

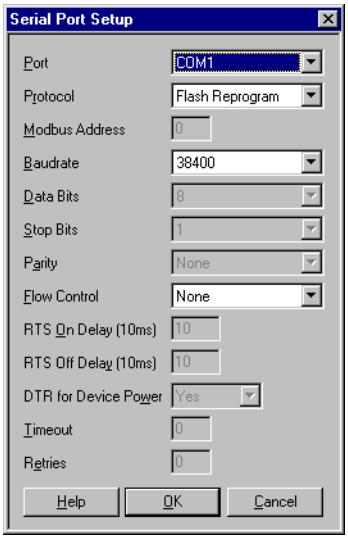
To download a new configuration file to the SpectraCom,




1. Access the Download Configuration function using the *Diagnostics* > *Reprogram Flash* menu path from the Operations window.
2. SpectraCom prompts whether you want to reprogram the flow computer flash memory.

   Click the Yes button or press the Y key to continue.

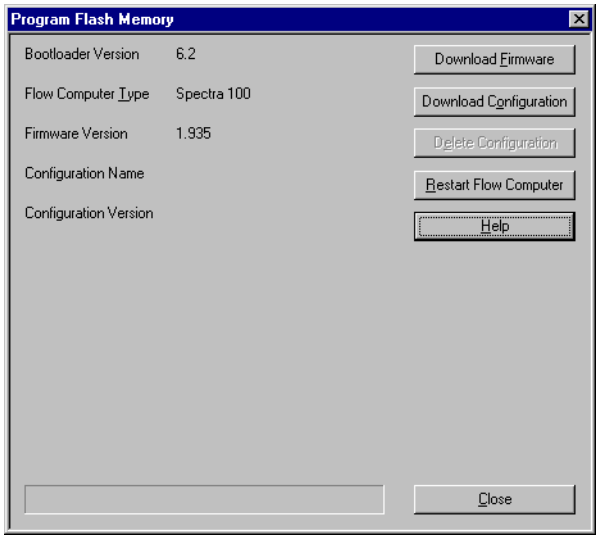
3. SpectraCom informs you that the flow computer will restart in 30 seconds. Then the Serial Ports window appears.



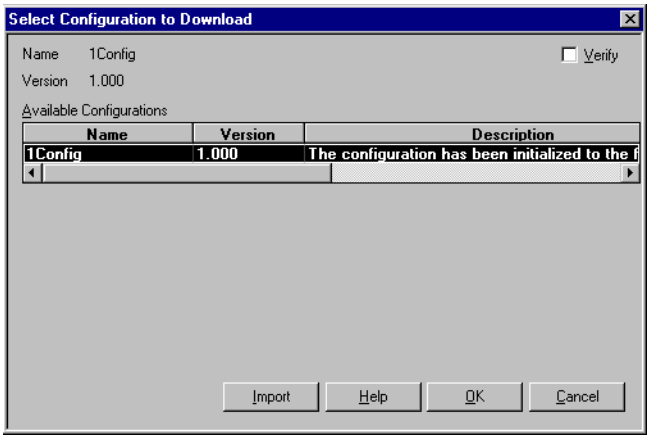

4. Ensure that:
   - *Protocol* is set to "Flash Reprogram"
   - *Baudrate* is set as desired.

   Click on the OK button.

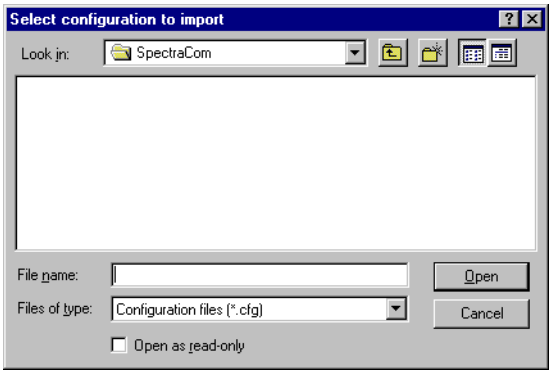
5. The Reprogram Flash Memory window appears.




6. Click on the Download Configuration button.
7. The Select Configuration to Download window appears.



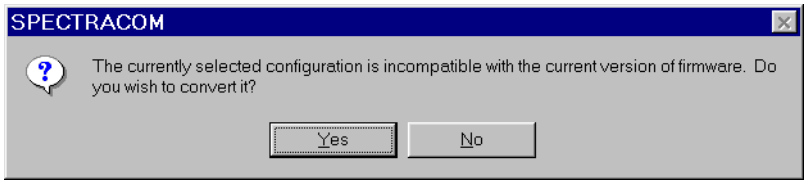
If the desired configuration is not listed, click on the Import button.




Use the provided directory tree to locate and select the desired configuration file.

8. Click on the OK button.
9. SpectraCom determines whether the selected configuration file is compatible with the current firmware version. If the configuration file and the firmware are compatible, then SpectraCom continues with the download.

   If the configuration file and the firmware are not compatible, SpectraCom will either abort the download or allow you to convert the configuration.




If you convert the configuration, you are prompted to name the converted configuration file and save it to disk.

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# OFFLINE TOOLS

**Viewing, Deleting, and Exporting Log files can be accessed via the SpectraCom *Utilities* menu.**

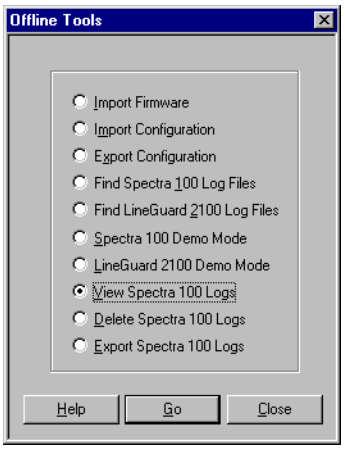
The Offline Tools feature enables you to perform several useful tasks related to importing and exporting configurations and firmware programs, viewing, deleting and exporting logs. It also allows you to learn how to use SpectraCom while in Demo Mode.

To access Offline Tools,

1. Begin at the SpectraCom main screen.

2. Click on the Offline Tools button.

3. The Offline Tools window displays.




4. Click on the radio button for the desired tool,
   - Import firmware
   - Import Configuration
   - Export Configuration
   - Find Spectra100 Log Files
   - Spectra100 Demo Mode
   - View Spectra100 Logs
   - Delete Spectra100 Logs
   - Export Spectra100 Logs
5. Click on the Go button to accept your selection.

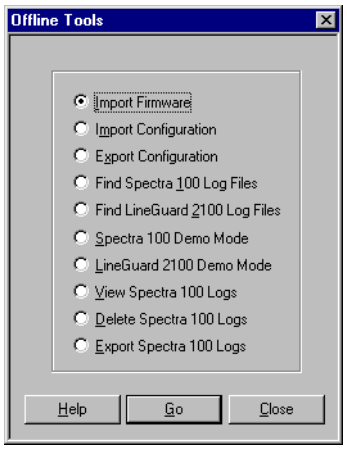
   Click on the Cancel button to return to the Spectra100 Operations window.

## 4.1 IMPORT FIRMWARE PROGRAM FROM FILE

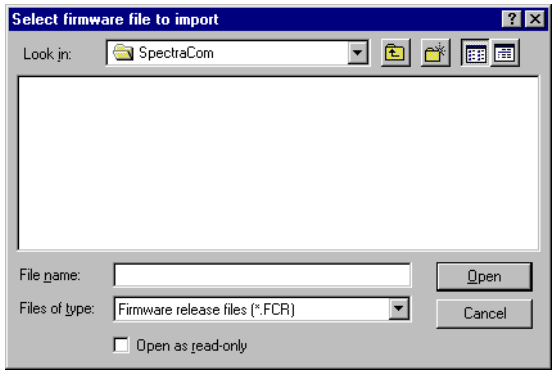
Import, and make ready for downloading, the firmware program files that can be exchanged between personal computers (PCs). The PC-exchangeable firmware program files have *.FCR filename extensions.

From the SpectraCom main screen,

1. Select *Import Firmware*.




2. Click on the Go button.
3. In the file selection window, specify the appropriate directory path and select the desired *.FCR file.




4. Click on the Open button.

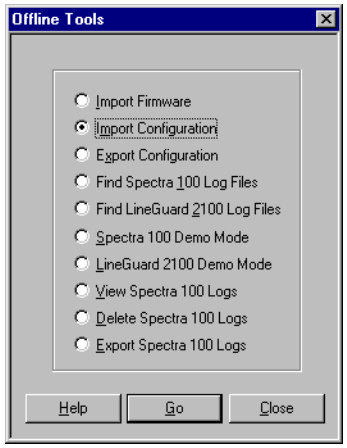
   SpectraCom determines whether the selected firmware is compatible with the current User-Defined Configuration. If the firmware file and the configuration are compatible, then SpectraCom continues importing the firmware file.

   Click on the Cancel button to return to the Spectra100 Operations window.

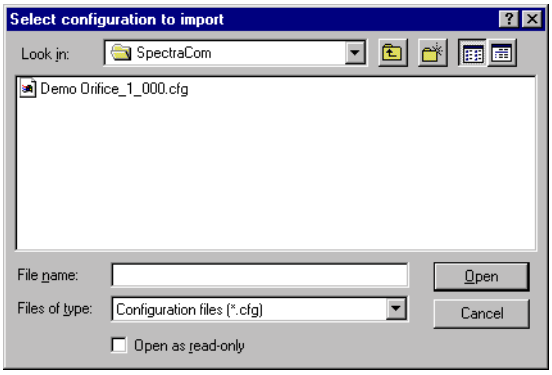
## 4.2 IMPORT CONFIGURATION FROM FILE

To import an existing configuration,

1. Begin at the SpectraCom main screen.
2. Click on the Offline Tools button.
3. Choose *Import Configuration from File*.




4. Click on the Go button.
5. The Select Configuration to Import window appears.




6. Select the path, directory, and filename to import the configuration file.

7. Click on the Open button to import the configuration file.

   Click on the Cancel button to return to the Spectra100 Operations window.

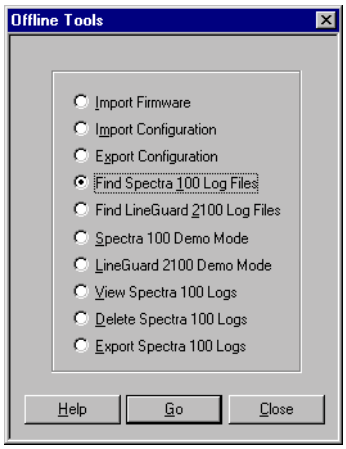
## 4.3 FIND SPECTRA100 LOG FILES

**For firmware v2.5 or earlier, SpectraCom directly generates Excel files that may be viewed. files from the Spectra100 main screen.**

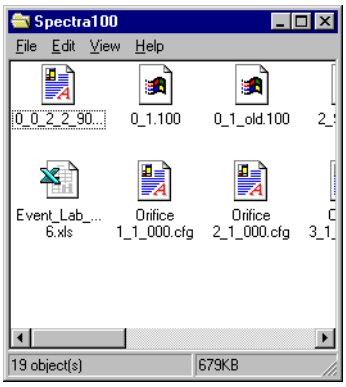
**For firmware v3.0 or later, SpectraCom directly generates binary files that may be viewed after Exporting the files.**

The Find Spectra100 Log Files feature locates the directory and path where the SpectraCom files are stored.

1. Click on the *Offline Tools* button and the Offline Tools menu displays.
2. Select the Find Spectra100 Log Files radio button.



3. Click on the Go button and Windows displays the Spectra100 Log files' folder.

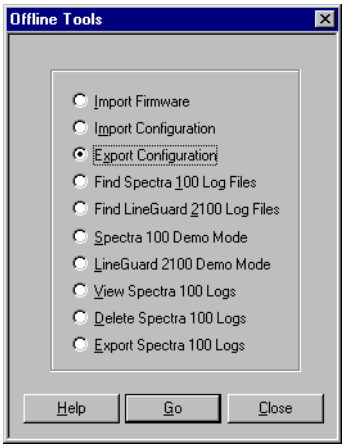



Double click on any file with an .xls extension to launch the program and view the file contents.

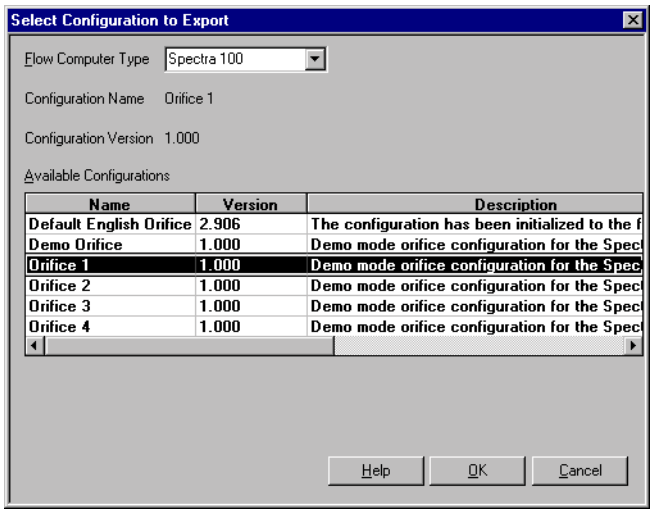
## 4.4 EXPORT SAVED CONFIGURATION TO FILE

To export a saved configuration,

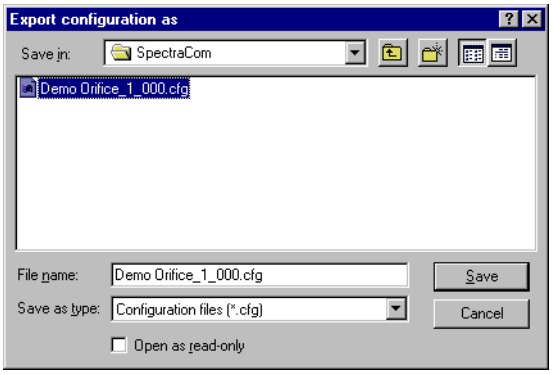
1. Begin at the SpectraCom main screen.
2. Click on the Offline Tools button.
3. In the Offline Tools window, select *Export Configuration*.



4. Click on the Go button.
5. The Select Configuration to Export window appears.




6. Select the file that you wish to export, then click on the Go button.
7. The Export Configuration As window displays.




8. Use the provided directory tree to select the appropriate file.
9. Click on the Save button to return to the main screen.
10. Click on the Cancel button to exit and return to the main screen.

## 4.5 LEARN TO USE SPECTRACOM WITH SPECTRA100 DEMO MODE

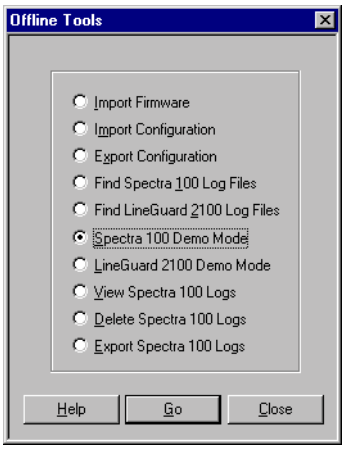
This tool enables you to operate SpectraCom so that it simulates an online direct serial connection to a Spectra100 Flow Computer. This allows you to investigate the various SpectraCom windows and software operations, and thus how to use the software, without worrying about connecting to or affecting a flow computer that is in service.

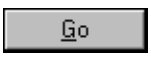
Windows that simulate making a local connection to a flow computer are displayed, beginning with the normal log on sequence and leaving the user in the Spectra100 Operations window.

To access and use the Demo Mode, from the SpectraCom main screen,

1. Click on the

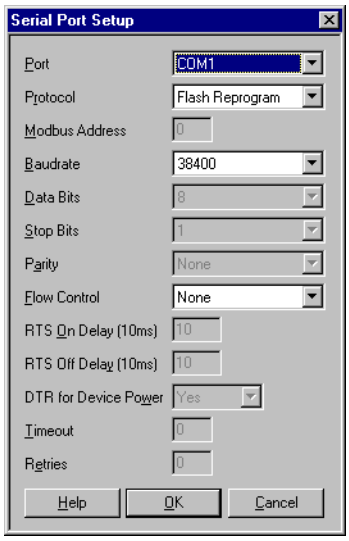
button.
2. In the Offline Tools window, select *Spectra100 Demo Mode.*




3. Click on the 

button.

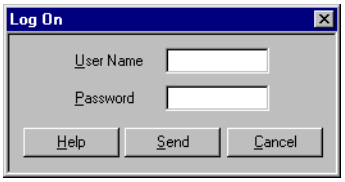
4. After clicking the Go button, the Serial Port Setup window opens.




   Either accept the default values or familiarize yourself with the various options that are available.

5. Click the OK button.

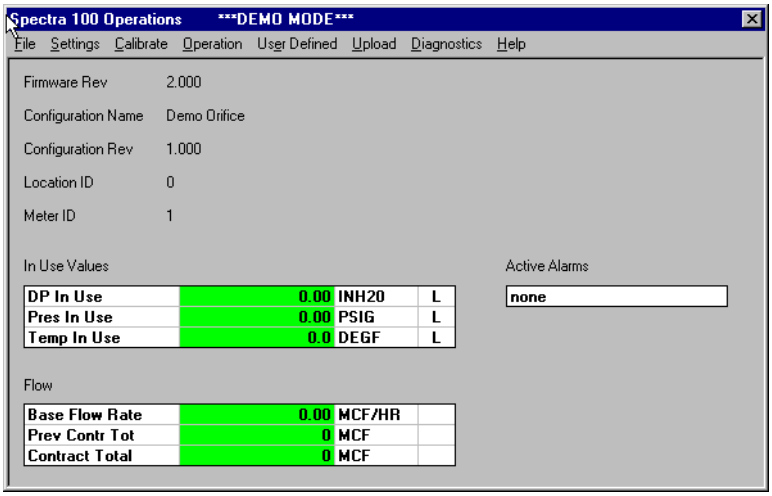
6. The Log On dialog displays.




   Leave the *User Name* and *Password* fields blank.

   Click the Send button, or press the ENTER key.

7. The Spectra100 Operations window displays in Demo Mode.




Familiarize yourself with the various options that are available, and consult online help as necessary (see Section 3.4 for more information).

## 4.6 VIEW SPECTRA100 LOGS

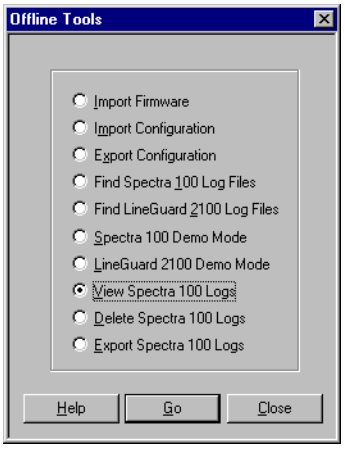
The View Spectra100 Logs feature lists all of the log files available. The user selects the file name and the log file types for that file are displayed (e.g., Contract logs, Timed logs, Event/Alarm logs, and System logs). Only one log file type can be selected at a time. The selected log is presented in a spreadsheet format.

**Used only to view logs collected with firmware v3.0 or later**

To access the View Spectra100 Logs from the SpectraCom main screen via Offline Tools,

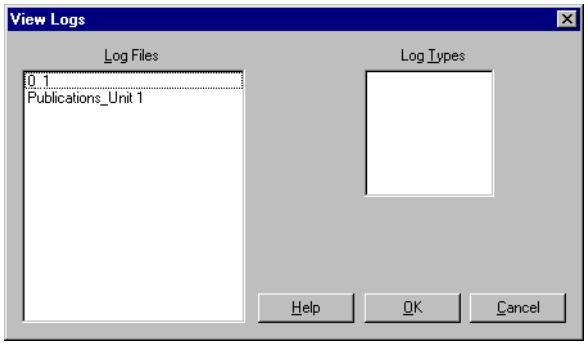
1. Begin at the SpectraCom main screen.

2. Click on the Offline Tools button.
3. The Offline Tools window displays.

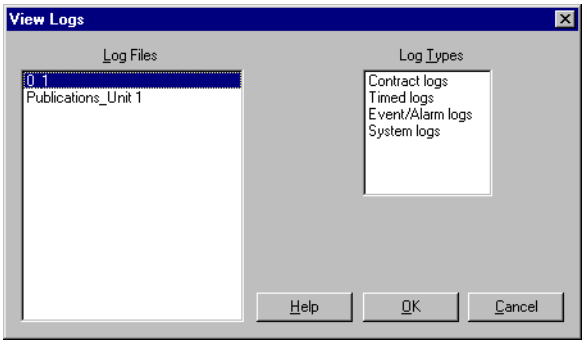



4. Click on the View Spectra100 Logs radio button.

5. Click on the Go button.
6. The View Logs window apprears.



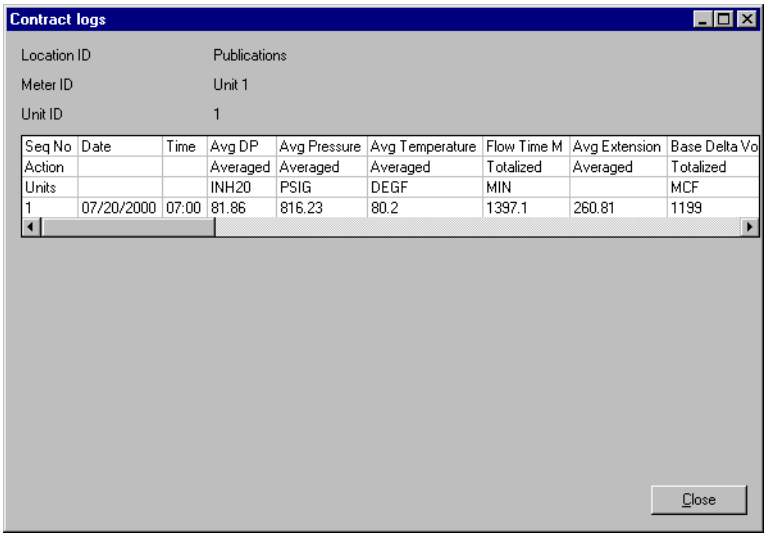

7. Click on the file name from the Log Files field. The log types for that file are displayed in the Log Types field.




8. Click on the log type (e.g., Contract Logs).
9. Click the OK button.

10. The Contract Logs window is displayed.

    Data provided includes the Location ID, Meter ID and Unit ID. The spreadsheet format shows the Sequence Number, Action Type, and Units of Measurement.




| Seq No | Date | Time | Avg DP | Avg Pressure | Avg Temperature | Flow Time M | Avg Extension | Base Delta Vo |
|---|---|---|---|---|---|---|---|---|
| Action | | | Averaged | Averaged | Averaged | Totalized | Averaged | Totalized |
| Units | | | INH20 | PSIG | DEGF | MIN | | MCF |
| 1 | 07/20/2000 | 07:00 | 81.86 | 816.23 | 80.2 | 1397.1 | 260.81 | 1199 |

11. Click on the Close button to return to the View Logs window. Select another log type (e.g. Timed logs, Event/Alarms, or System Logs) or click on the Cancel button to return to the SpectraCom main screen (refer to

## 4.7 DELETE SPECTRA100 LOGS

**Used only to delete logs collected from firmware v3.0 or later.**

The Delete Spectra100 Logs displays a list of all log files available. One or more of these files may be selected and a second list displays all possible logs to delete (e.g., Contract Logs, Timed Logs, Event/Alarm Logs, and System Logs). Upon confirmation of the user's selection, the requested logs are deleted from the selected files.

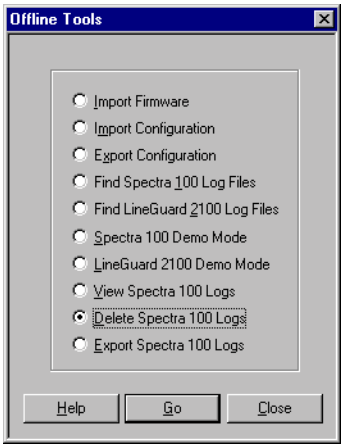
If one or more of the selected files does not contain any records of the requested log type, those files remain unaffected. If all logs within any log file are deleted, that file will be deleted and the file list will be redrawn.

To access the Delete Logs function,

1. Begin at the SpectraCom main screen.

2. Click on the button.

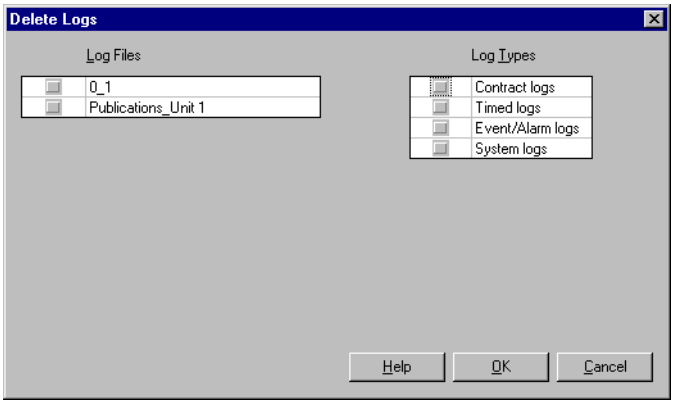
3. The Offline Tools menu displays.




4. Click on the Delete Spectra100 Logs radio button.

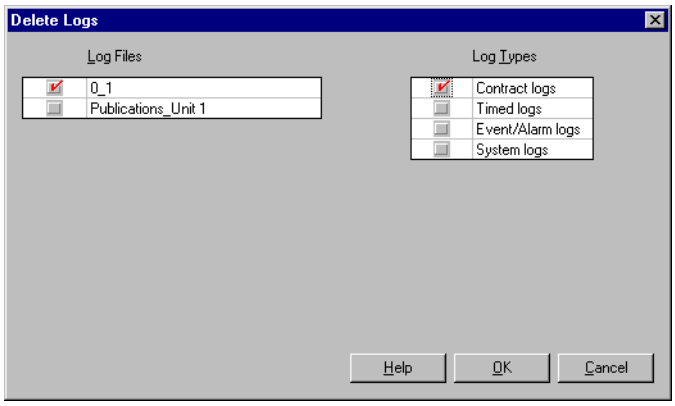
5. Click on the Go button.

6. The Delete Logs window apprears.




7. Click on the file name radio button from the Log Files field.

8. Click on the Log Type radio button (e.g., Contract Logs) and a red check mark appears next to the log type that will be deleted.




9. Click on the OK button to delete the selected logs.

10. Click on the Cancel button to abort the Delete Logs function and return to the SpectraCom main screen.

## 4.8 EXPORT SPECTRA100 LOGS

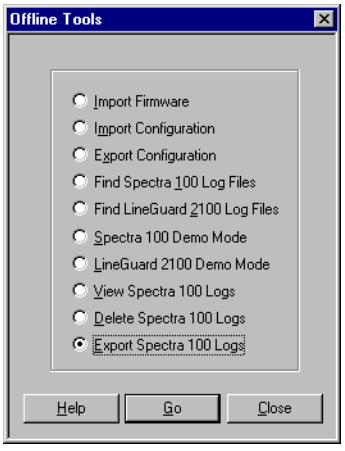
The Export Spectra100 Logs displays a list of all log files available. One or more of these files may be selected and a second list displays all possible logs to export (e.g., Contract Logs, Timed Logs, Event/Alarm Logs, and System Logs). Upon the user's selection, the requested logs will be exported to tab-delimited ASCII files with an extension of ".XLS" for easy import into Microsoft Excel.

**Used only to export logs collected from firmware v3.0 or later.**

To access the Export Log function,

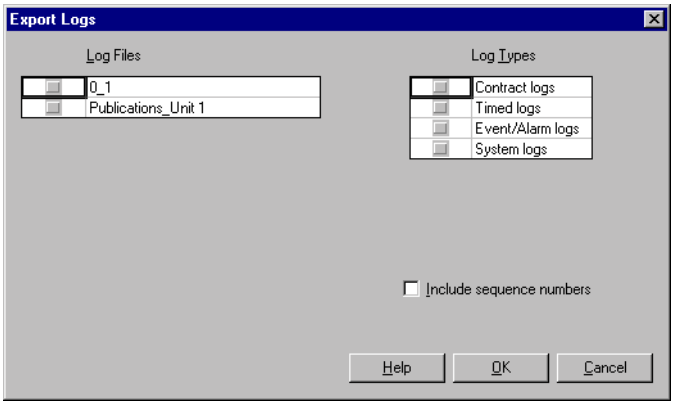
1. Begin at the SpectraCom main screen.

2. Click on the Offline Tools button.
3. The Offline Tools menu displays.

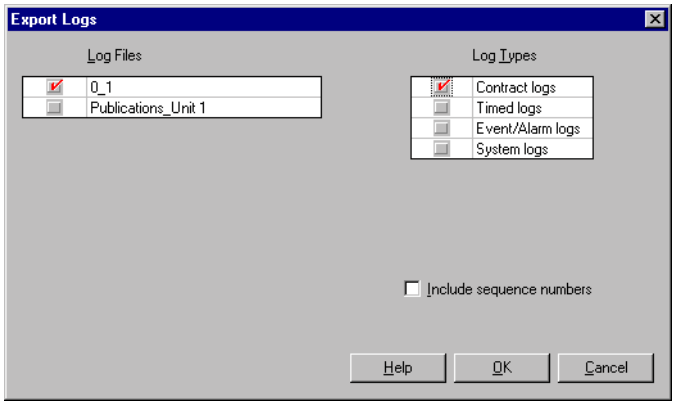



4. Click on the Export Spectra100 Logs radio button.

5. Click on the Go button.
6. The Export Logs window appears.




7. Click on the file name radio button from the Log Files field.
8. Click on the Log Type radio button (e.g., Contract Logs) and a red check mark appears next to the log type that will be exported and saved to the PC.




9. Click on the OK button to export the selected logs.
10. Click on the Cancel button to abort the Export Logs function and return to the SpectraCom main screen.

# CONFIGURATION

The options in the SpectraCom Settings menu enables you to control how the Spectra100 uses raw data, makes calculations, displays data, allows users to log on, places data into Modbus registers, and many other functions.

You can customize the current Spectra100 configuration with an identifying label, including a name, version, and description that suit your needs and standards. This label for the configuration will be stored in the Spectra100, along with all the other settings and parameters that comprise the current operating configuration.

The operating configuration of a Spectra100 flow computer is retained only by warm starting the flow computer (see Section 3.5.1 for more information about warm starts).

When the flow computer is cold started (see Section 3.6 for more information about cold starts), the operating configuration, along with any name, version, and description that may have been included, will be lost. During a cold start, the flow computer loads a default configuration that can be either factory default or a User-Defined configuration (see Section 3.7.3 for more information regarding Default and User-Defined configurations).

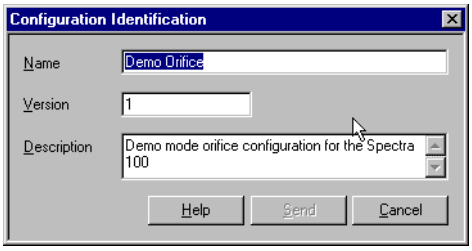
To ensure that a flow computer has a User-Defined configuration which will endure through cold starts, you must save the current configuration, or have one stored on disk as a file, and then download that saved configuration to the flow computer flash memory (see Section 3.7.3 for more information).

## 5.1 CUSTOM CONFIGURATION SETTINGS

Use the following procedures to customize the settings for the firmware Configuration Name, Version, and Description.

1. Click on the *Settings* menu.
2. In the *Settings* pull-down menu, select *Configuration*.

3. The Configuration Identification window displays.



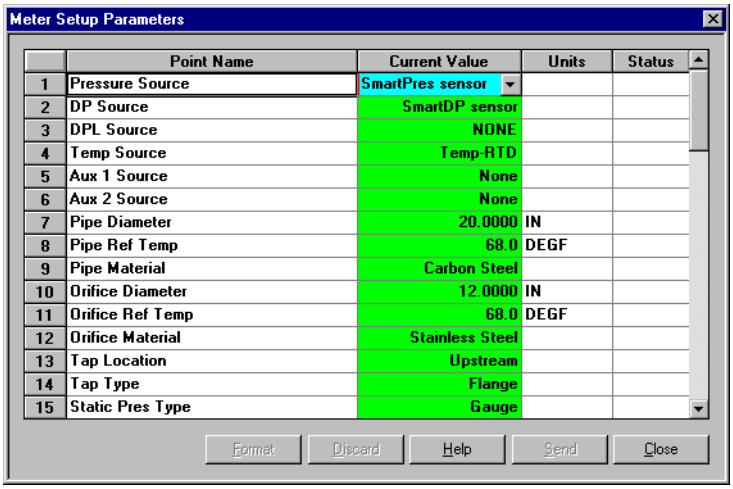

4. View or make changes as necessary.

## 5.2 LOCATION ID PARAMETERS

From the Location Setup Parameters window, you can configure parameters that affect the basic, overall functions of the Spectra100, such as application (e.g., single meter orifice), display language, date format, meter identification, and logging intervals.

### 5.2.1 Setting Up Location Parameters

1. Click on the *Settings* menu.
2. In the *Settings* menu, choose *Location*.
3. The Location Setup Parameters window displays. View or make changes as necessary.




**This is an example list. Actual data points displayed may vary according to application.**

Data points typically found in this window may include the following:

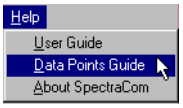
- Location ID
- Meter ID
- Unit ID
- Application

- Calc Cycle
- Averaging
- Premium Set Point 1
- Premium Set Point 2
- Contract Hour
- Contract Interval
- Timed Log Interval
- ELog Date Format
- Log Time Format
- System Log Header Format
- System Log Date Format
- Display Scroll
- Display Timeout
- High Speed Clock

Note that the Location ID, Meter ID and Unit ID are not the same as the Modbus address of the flow meter. Instead, Location ID and Meter ID parameters provide you with a method for developing an alphanumeric naming system for organizing the flow meter(s). SpectraCom uses the Location ID and Meter ID to create the default log filenames during log collection. To prevent SpectraCom from overwriting one unit log with another, set each flow computer to a unique Location ID and Meter ID. The Unit ID is a third integer ID value that can be added to the data logs.

**Location ID and Meter ID can contain up to 16 characters each. Valid characters are letters, numbers, and spaces.**

For more details about a particular data point that displays in the Location Setup Parameters window, make a note of the point name and access the Data Points Guide online help file.



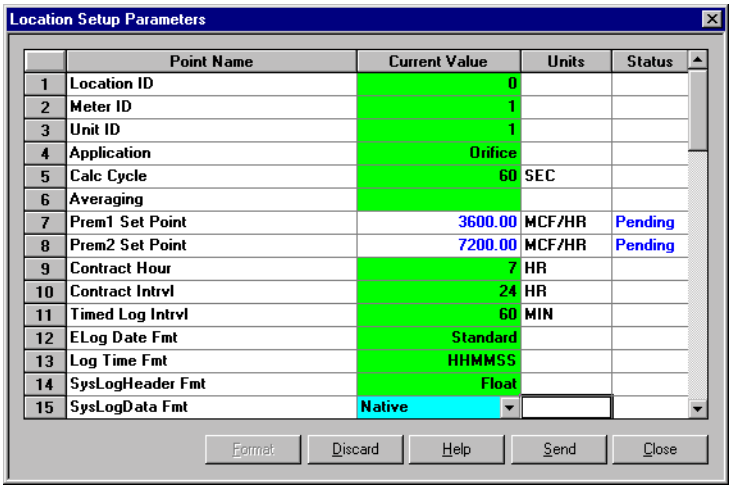
For details on local and remote connections to determine or set the Modbus address of a flow meter, see Section 2.5 and Section 2.6.

### 5.2.2 Changing Location Setup Parameters

To make changes in the Location Setup Parameters window,

1. Select a desired field under the *Current Value* column.
2. Some fields accept text or number values. In these fields, you type an entry.

   For example, a Meter ID data point can be changed from 1 to 3 if you select its *Current Value* field and type in the numeral character 3.




3. Some fields accept a limited range of values. In these fields, you select a value from the pull-down menu.

   For example, a Date Format data point accepts a limited range of date formats. Select one from the pull-down list.

4. A pending flag appears in the data point *Status* field, when changes are entered in the *Current Value* field.

5. Click on the Send button to apply the changes.

   Click on the Discard button to retain the current flow computer settings.

   Changed settings are sent to the flow computer and a record of the changes is added to the Event Log, as an operator event.

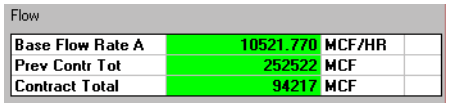
   Click on the Close button to return to the Spectra100 Operations window.

**Once a change has been sent to the flow computer, it can only be undone by matching the original, unchanged value.**

### 5.2.3 Setting Up Premium Totals

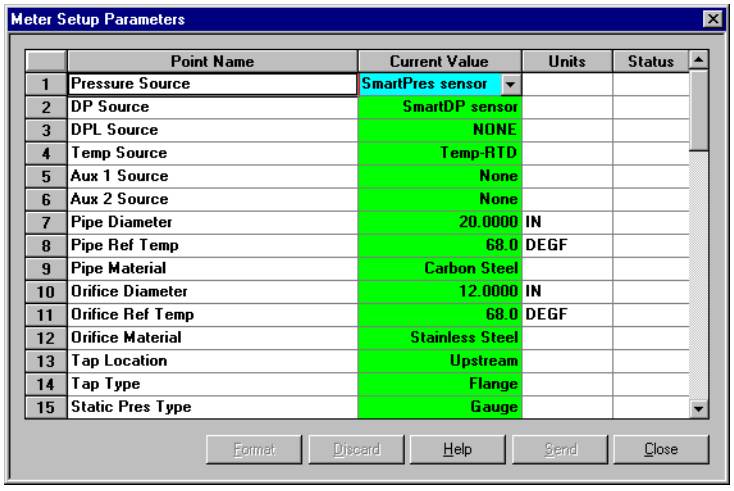
For installations where it is desired to separate volume accumulation on a "Premium" basis, three separate sets of accumulators are provided. The totals are maintained: Base, Premium Level 1, and Premium Level 2. This feature allows separate volume totalizations for gas flowing at different instantaneous rates.

Prior to activating this feature the Spectra100 Operations Main window displays the flow as Base Flow Rate A (see the following example) and the Premium Totals selection via the *Operations* menu is grayed out.

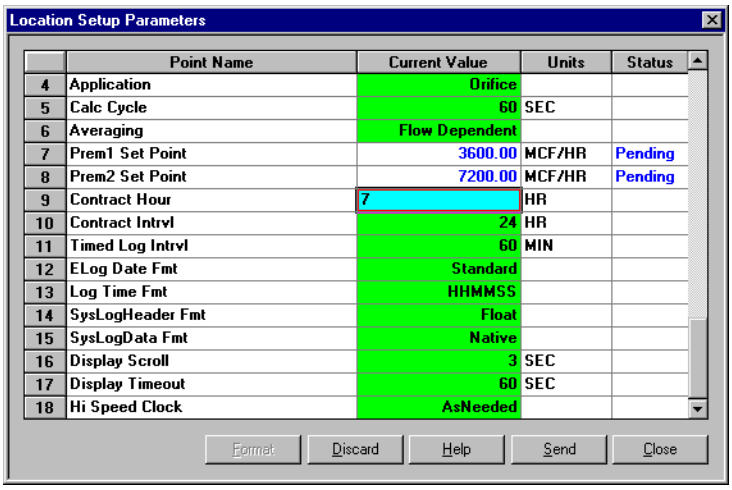



Activation of this feature is accomplished by entering a non-zero setpoint for either or both premium levels.

1. Click on the *Settings* menu.
2. In the *Settings* menu, choose *Location*.
3. The Location Setup Parameters window displays.




4. Click on Premium 1 Set Point to change the flow rate set point.
5. Click on Premium 2 Set Point to change the flow rate set point.




The example above shows Premium 1 Set Point value at 3,600 and Premium 2 Set Point value at 7,200.

Totalization is as follows:

- Base Flow Rate equals all flow below the first level set Point (e.g., flow < 3600).
- Premium 1 Flow Rate is equal to all flow above Premium 1 set point and below Premium 2 set point, but NOT including the Base Flow Rate (e.g., 3600 < flow <7200).
- Premium 2 Flow Rate is equal to all flow above the Premium 2 set point., but NOT including the Base Flow Rate or Premium 2 Flow Rate (e.g., flow >7200).

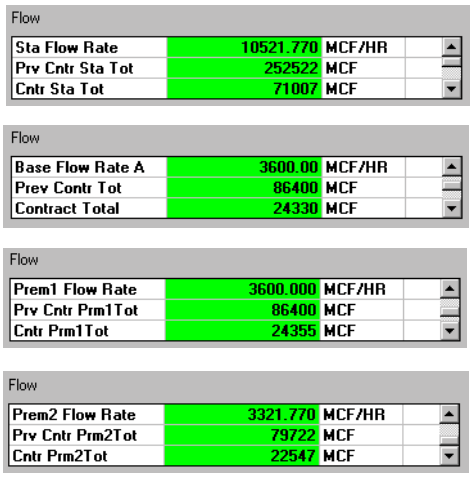
6. Click on the Send button to apply the changes.

7. Click on the Close button to return to the Spectra100 Operations window.

   With Premium Totals enabled the "Flow" datapoints (displayed in the lower left corner of the Spectra100 Operations window) will show the rates and totals for the station, base, premium 1 and premium 2 levels. Use the scroll bar to view all of the datapoints.

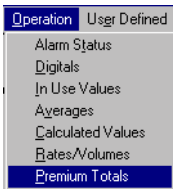
**Only three datapoints may be viewed at one time. Use the scroll bar to view the complete list of datapoints.**

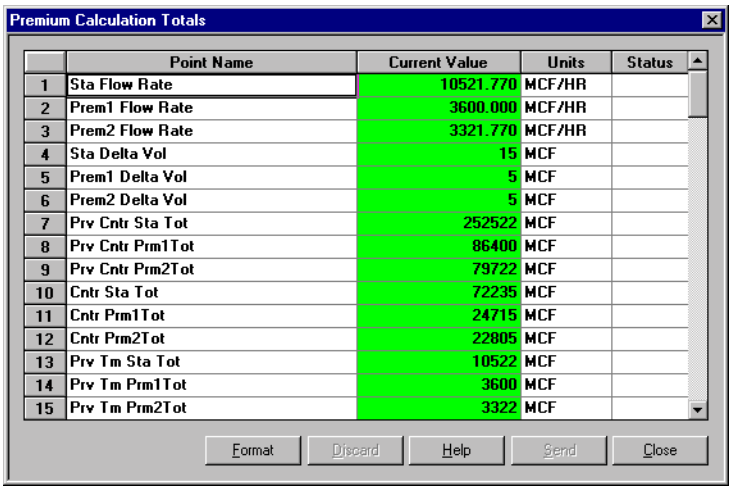
The following is an example of what is displayed for the "Flow" datapoints with Premium Totals enabled:




- Station Flow Rate
- Previous Contract Station Total
- Contract Station Total
- Base Flow Rate A
- Previous Contract Total
- Contract Total
- Premium 1 Flow Rate
- Previous Contract Premium 1 Total
- Contract Premium 1 Total
- Premium 2 Flow Rate
- Previous Contract Premium 2 Total
- Contract Premium 2 Total

8. Click on *Operation* and select *Premium Totals* to view all of the Premium Totals current values.



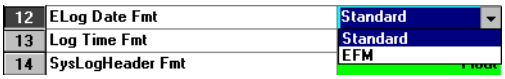




9. Click on the Close button to return to the Spectra100 Spectra100 Operations window.

### 5.2.4 Log Date and Time Format

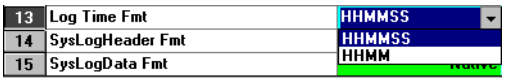
Modify the Event Log Date Format and Timed/ Contract Log Time Format from *Settings* > *Location* menu path.

1. From the Location Setup Parameters window, click on ELog Date Fmt.




Use the pull-down menu and select either the Standard date format (MMDDYY, where YY is the last two digits of the year.) or the EFM date format (MMDDYY, where YY equals the last two digits of the year - 80) for Event Logs.

2. From the Location Setup Parameters window, click on the Log Time Fmt.




   Use the pull-down menu and select the time format (HHMMSS) or (HHMM) for timed and contract logs.

## 5.3 METER ID PARAMETERS

From the Meter ID Parameters window, you can configure the basic components of the flow computer meter applications. For example, if a Spectra100 is configured to operate as an orifice meter, in this window you will be able to manipulate data points such as pipe diameter, location of pressure taps, and orifice diameter.

**This is an example list. Actual data points displayed may vary according to application.**

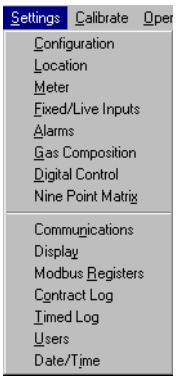
Data points typically found in this window may include the following:

- Pipe Diameter
- Pipe Ref Temp
- Pressure Taps
- Pipe Material
- Orifice Diameter
- Orifice Ref Temp
- Plate Material
- Meter Taps

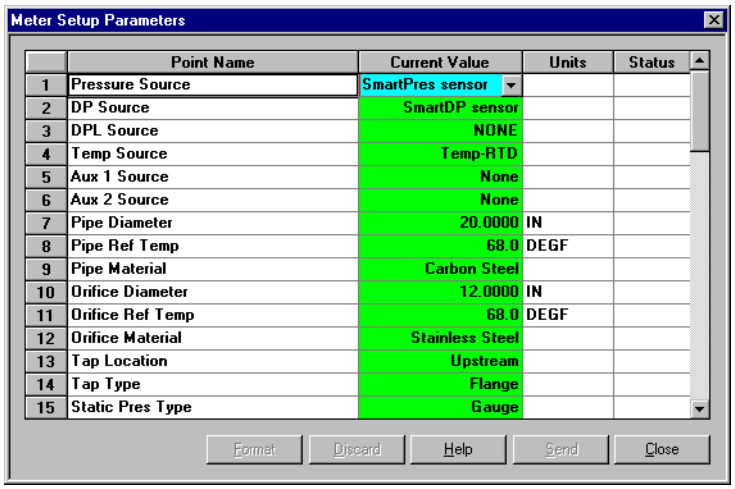
For more details about a particular data point that is displayed in the Meter Setup Parameters window, access the online Data Points Guide. Changed settings are recorded as an operator event and added to the Event Log.

### 5.3.1 Setting Up Meter Parameters

To set up meter parameters,




1. Click on the *Settings* menu and select *Meter*.
2. The Meter Setup Parameters window displays.




3. View or make changes as defined in the previous section (see Section 5.2.2).

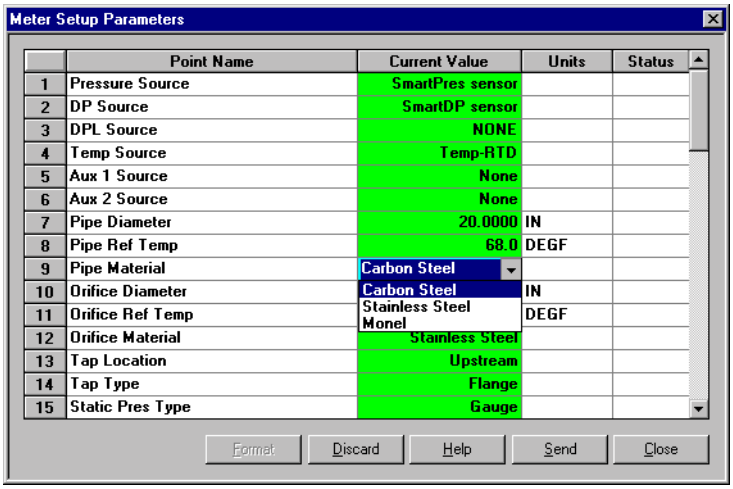
### 5.3.2 Changing Meter Parameters

To make changes, log onto the Spectra100 as a user with a proper access level to make and send changes to the flow computer.

1. Select a desired field under the *Current Value* column.

   Some fields accept number or text values. In these fields, you type in an entry.

For example, a Pipe Diameter data point can be changed from 6 to 20 if you select the *Current Value* field and type in the numeral character 20.



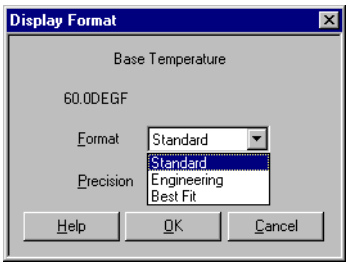

Some fields accept a limited range of values. In these fields, you select a value from the pull-down list.

For example, a Pipe Material data point will accept a limited range of descriptions. Choose one from the pull-down list that appears when you have selected the Pipe Material *Current Value* field (see the Illustration above).

If you change a value in the *Current Value* field, a pending flag appears in the data point *Status* field.

For floating point number values, you can use the Format button to toggle the display of the value between standard

format, engineering format, or best fit format.




2. To apply the changes, click on the Send button.

   Click on the Discard button to retain the current flow computer settings.

**Once a change has been sent to the flow computer, it can only be undone by matching the original, unchanged value.**

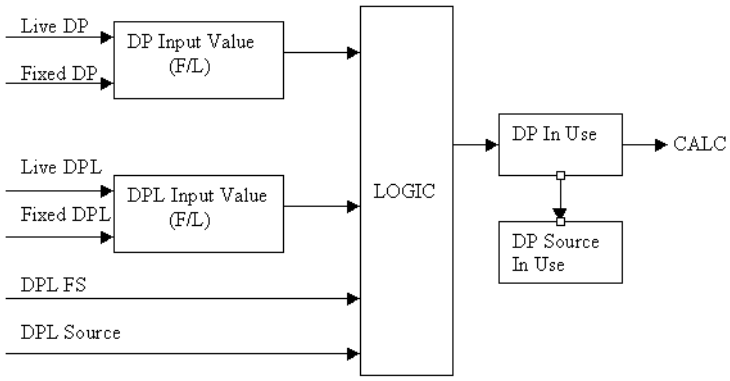
### 5.3.3 Stacked Differential Pressure Transmitters

Spectra100 supports single or two stacked differential pressure transmitters for orifice applications. When using two stacked differential pressures, the DP reading from the lower scaled sensor is used for the DP In Use value until it reaches 100% of the sensor's full scale. At this point the higher scaled sensor will be used for the DP In Use value.

If only one DP transmitter is used, only the DP Source needs to be defined and the DPL Source is set to **NONE**. If two DP transmitters are used, the sensor defined in the DPL Source is used for the low scale sensor and the sensor defined in the DP Source is used for the high scale sensor. When two DP transmitters are used, data is collected from both sensors every sample period regardless which sensor is used.

If the DPL source is a Smart DP, the low scale value is stored in Smart DP LS (low scale) and high scale value is stored in Smart DP FS (full scale). If the DPL source is a 1-5 input, the low scale value is stored in 1-5(1) Val LS Out, and high scale value is stored the 1-5(1) Val FS Out for the first 1-5 input. The low scale value can be read from the 1-5(2) Val LS Out and high scale value can be read from the 1-5(2) Val FS Out for second 1-5 input (see Section 5.16 for Sensor Sampling configurations).

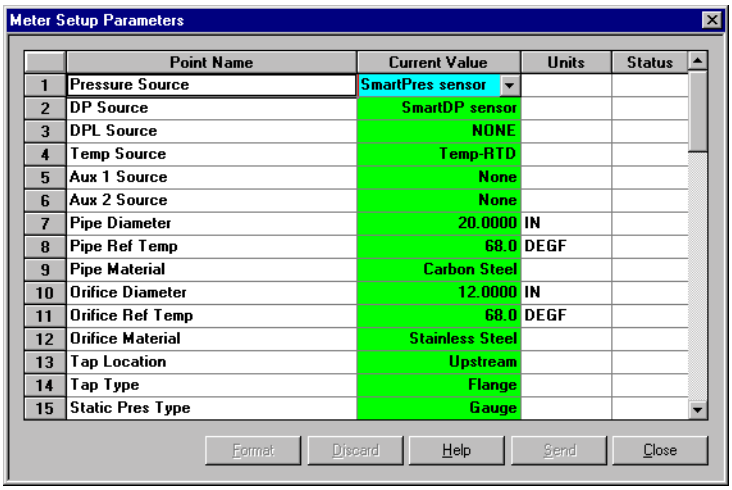
The DP In Use is determined based on the following diagram:



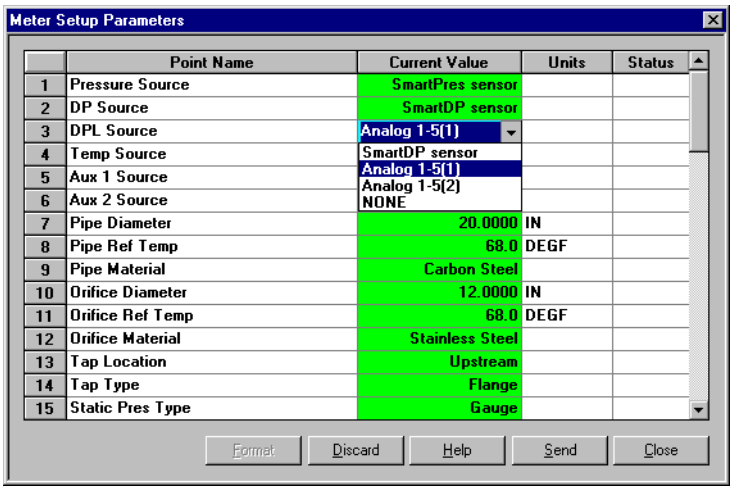

The logic is that if the DPL Source is selected, if DPL Input Value is less than DPL FS, DP In Use takes DPL Input Value, and if DPL Input Value is greater than or equal to DPL FS, DP In Use takes DP Input Value.

To make changes to the sensors,

1. From the *Settings* > *Meter* menu path, click on Meter. The Meter Setup Parameters window displays.

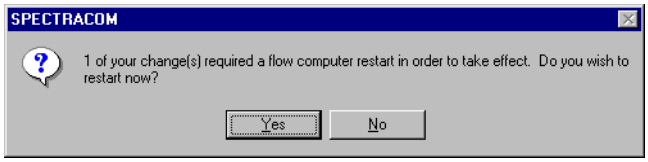



2. To activate the Stacked DP function from the *Current Value* field, select DPL Source. Use the pull-down menu to select the sensor type.




3. Click on the Send button to apply the changes.

(a) SpectraCom prompts you to restart the flow computer and the following dialog displays.




(b) Click on the Yes button to apply the changes and perform the log on sequence.

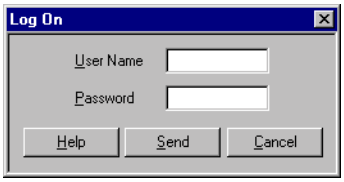
(c) SpectraCom prompts you to restart now, displaying the following log on dialog;

(d) Click on the OK button to continue.

The Serial Port Setup dialog displays.

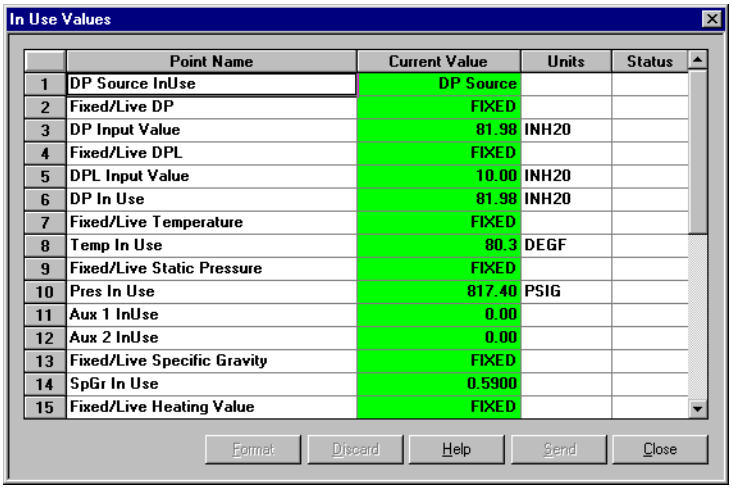
Click on the OK button.

(e) Enter user name and password in the Log On dialog box,




then click on the Send button to complete the log on process.

4. View the DP and DPL current values via the *Operation > In Use Values menu* path.



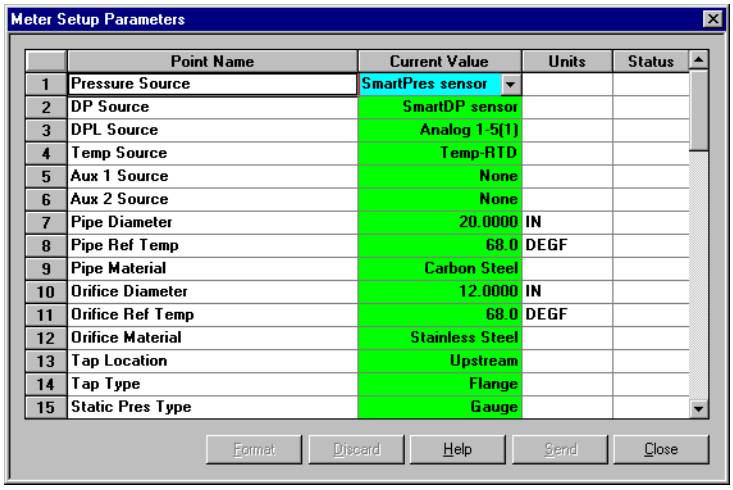

## 5.3.4 Auxiliary Input 1 and Auxiliary Input 2

Aux 1 Source and Aux 2 Source database points (see Section 5.7.4) are used to allow any configured sensor (see Section 5.16) to be mapped to these auxiliaries. If any of these auxiliaries are out of the defined auxiliary alarm limit range, an alarm is triggered if enabled.

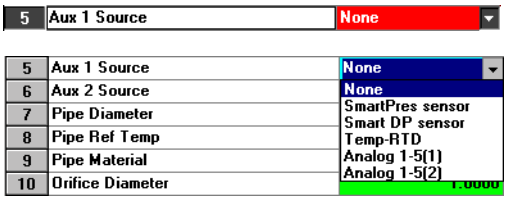
**The Auxiliary source inputs are not used for calculations but are only used for sounding alarms and logging.**

To enable the auxiliary alarms,

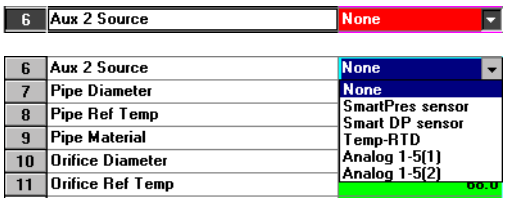
1. Click on the *Settings* menu and select *Meter*. The Meter Setup Parameters window displays.




2. Click on Aux 1 Source and use the pull-down menu to select the sensor type.

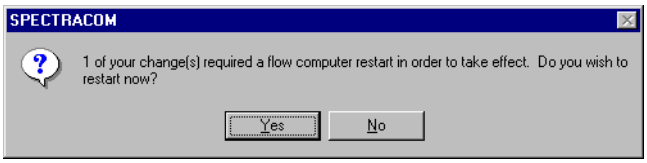



Repeat step 2 to select the sensor type for Aux 2 Source.




3. Click on the Send button to the apply the changes.

(a) SpectraCom prompts you to restart the flow computer and the following dialog displays.




Repeat the log on sequence (see Section 5.3.3) to restart the flow computer.

(b) Enable the alarm settings for Aux 1 and Aux 2 Input Sources (see Section 5.5.2 for alarm setup details) via the *Settings* > *Alarms* menu path.

4. View the Aux 1 and Aux 2 current values via the *Operation* > *In Use Values* menu path. (see Section 5.3.3 for more details).

## 5.4 FIXED/LIVE INPUTS

From the Fixed/Live Inputs window, you can assign transducer output values as either fixed, with a predetermined value not coming from a transducer (the values are user-set), or live, with values coming real-time from the output of a connected transducer.

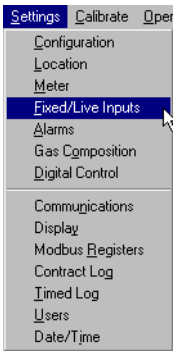
**This is an example list. Actual data points displayed may vary according to application.**

Data points typically found in this window may include the following:

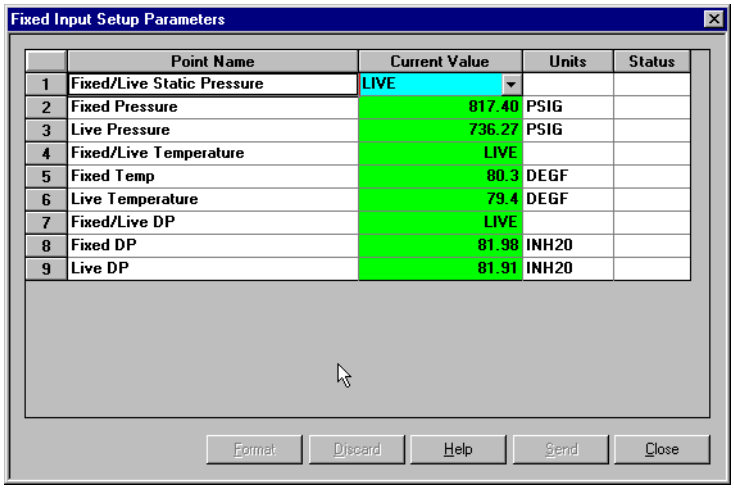
- Static Pressure
- Fixed Pressure
- Live Pressure
- Temperature
- Fixed Temperature
- Live Temperature

### 5.4.1 Setting Up Fixed/Live Input Parameters

To set up fixed/live input parameters,



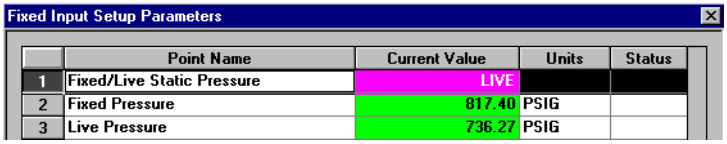

1. Click on *Settings* then select *Fixed/Live Inputs*.
2. The Fixed Input Setup Parameters window displays.




3. View or make changes as necessary.

### 5.4.2 Changing Fixed/Live Input Parameters

Note the arrangement of the rows in this window.




For each meter input, there are three rows:

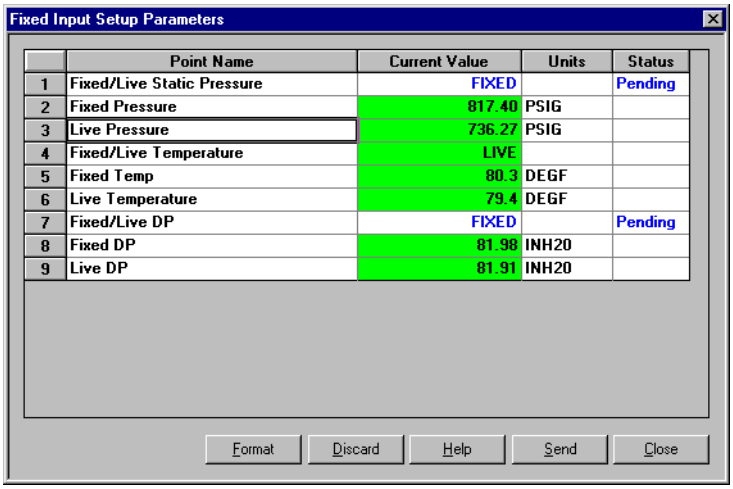
- The first row, under the *Point Name* column, has the name of the meter input (labeled, for example, Fixed/Live Static Pressure, etc.)
- Next are two supporting rows, one labeled *Fixed Pressure* and one labeled *Live Pressure*.

Note the function of the three rows for each input.

- Under the *Current Value* column, in the first row for each meter input, use the pull-down menu to set the operating input with either a fixed or live value.
- Under the *Current Value* column, in the second row for each meter input, type in the number value as a fixed value in meter calculations (in lieu of a value from a live, or connected transducer).
- The third row is read-only and displays the current values being returned from a live or connected transducer.

To make changes in this window,

1. Enter a value in any of the *Current Value* fields. A pending flag appears in the data point *Status* field.




2. For floating point number values, you can use the Display format button to toggle the display of the value between standard format, engineering format, or best fit.

**Once a change has been sent to the flow computer, it can only be undone by resending the original, unchanged value.**

3. Click on the Send button to make the pending changes effective in the flow computer.

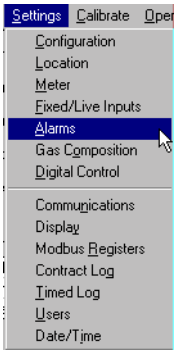
   Click on the Discard button to retain the current flow computer settings.

## 5.5 ALARMS

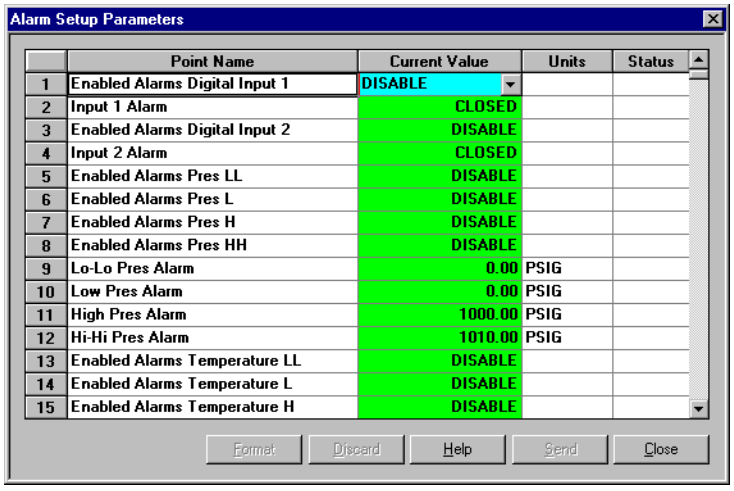
You can set alarm parameters as either enabled or disabled, and you can define the threshold values for those alarms.

### 5.5.1 Setting Up Alarm Parameters

To set up alarms parameters,




1. Click on the *Settings* menu and select *Alarms*.
2. The Alarm Setup Parameters window displays.




3. View or make changes as necessary.

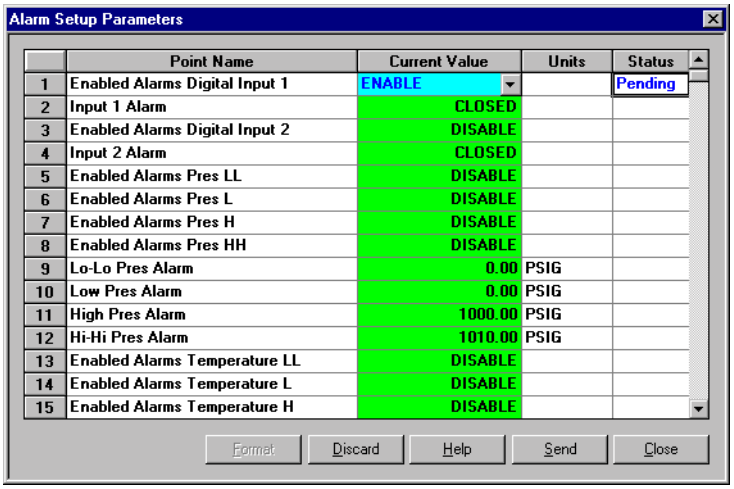
   For more information about a particular alarm setup parameter data point, open the Data Points Guide help file.

### 5.5.2 Changing Alarm Parameters

To make changes to the alarm parameters,

1. Note the labeling of the rows in this window. Each alarm has two rows.
   - Some of the rows, under the Point Name column, have an alarm name, but without the word “Alarm” or “Alrm” at the end of the name (for example, Static Pres H).
   - Other rows have a correlating or similar name, but with the word “Alarm” or “Alrm” at the end of the name (for example, High Pres Alarm).
2. Note the function of the two rows for each alarm.
   - In the row labeled without “Alarm” or “Alrm”, use the drop-down list under the *Current Value* column to enable or disable the alarm.
   - In the row labeled with “Alarm” or “Alrm”, type the number value you want used as the threshold value for that alarm.

3. A pending flag appears in the data point *Status* field, when changes are made in any of the current value fields.




4. For floating point number values, you can use the Format button to toggle the display of the value between standard format or engineering format (or best fit).

5. Click on the Send button to apply the pending changes.

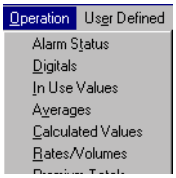
6. Click on the Discard button to retain the current settings.

7. Select the appropriate format, then click the OK button to apply changes.

   Click the Cancel button to discard changes and return to the Alarm Setup Parameters window.

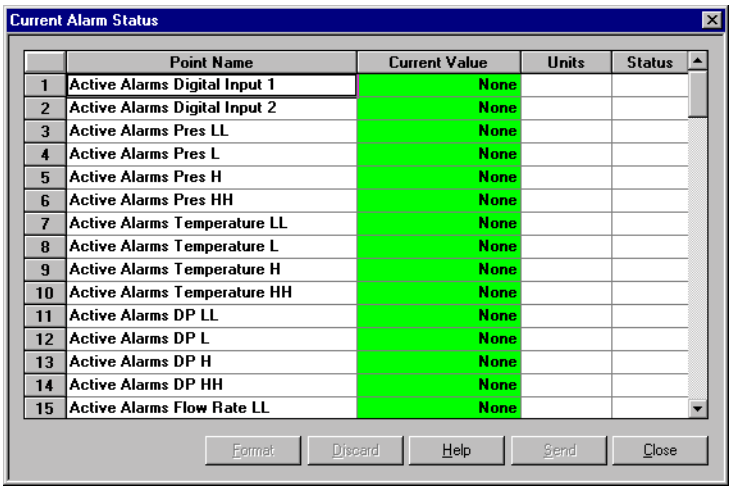
   A record of the change is added to the flow computer Event Log, as an operator event.

**Once a change has been sent to the flow computer, it can only be undone by matching the original, unchanged value.**




To view the new alarm parameter settings:

1. Click on the *Operation* menu and choose *Alarm Status*.
2. The Current Alarm Status window displays.




This is a view-only window for displaying the current status of the flow computer alarms.

## 5.6 ABOUT GAS CHROMATOGRAPH INTERFACE PARAMETERS

With this function, you can set the fixed values for gas composition that are used in gas measurement calculations.

Spectra100 supports retrieval of gas composition from the Daniel Gas Chromatograph (GC) Controller Model 2251 and Model 2350 (under the simulated 2251 protocol mode) using the local serial port (COM2). The local serial port is not a dedicated port to use with a GC. When the GC is enabled, the serial port is set to Master mode and is ready to communicate with the GC. Whenever the DSR line on the local port is asserted due to a local connection with the PC, any pending GC communication is aborted and the local serial port is reset to Slave mode, awaiting communication from the PC. Local serial port parameters, except the Modbus address, are used for both Master and Slave communication.

If the RTS/CTS handshaking is already enabled when the GC interface is enabled, handshaking will be used. (If handshaking is disabled, handshaking will not be used.) Thus, if the handshaking is enabled before the GC is polled, the Spectra100 raises RTS and waits to receive CTS. If the CTS signal is not active, the Spectra100 will abort the polling cycle and retry at a later time. If DSR is asserted while the GC interface is enabled, the GC Master mode is disabled and a local Slave mode is enabled. The RTS/CTS handshaking is disabled in this mode.

**See the *Spectra100 System Reference Manual* (PN 3-9000-100) for detailed instructions on hardware connections and software configuration.**

Use the Gas Composition function (see Section 5.6.1) to set up this interface. To enable the GC interface, set *Chromatograph* to the ENABLE state. Set the *Chrom Addr* and the *Chrom Stream* parameters to configure the GC Modbus address and the desired chromatograph stream number(s).

Three separate fixed/live flags are provided to determine whether the Spectra100 will use the fixed/live component data (all 21 components required for an AGA8 detailed calculation), specific gravity, and BTU. Chrom Units is also provided to indicate whether the data retrieved from the GC is in English or Metric units.

The Spectra100 will poll a GC unit about once every four minutes. Each poll of the GC is made up of the series of Modbus queries for chromatograph data. If any query fails, the poll sequence is aborted. If the poll is not successful, the Spectra100 will retry every 20 seconds until either the poll succeeds or the attempts have failed for six consecutive minutes. At that point, a GC communication error bit will be set.

The Poll Sequence includes:

- time of the current analysis
- current stream number

  If the stream number does not match the user programmed stream number; the poll sequence is ended to be retried in four minutes.
- btu content and Specific Gravity
- component code for Component Index entries 1 to 16

- mol percent of 11 components supported by the GC (C6+, Propane, I-Butane, Butane, Neo-Pentane, I-Pentane, Pentane, Nitrogen, Methane, CO2, Ethane)
- chromatograph alarms and analysis time

  If the alarm values for registers 3046 and 3047 are non-zero, the analysis time does not match that of the first poll, or certain values are out of range (e.g., SG > 2.0, SG < 0.4, N2 >50, BTU > 2000 or BTU < 400), the sequence is aborted and the GC analysis is discarded. Otherwise, data is processed and saved for calculation. If the GC analysis is discarded due to invalid data, a composition error bit should be set, and the last set of good data should be used.

Note that the AGA8 equations do not support Neo-Pentane or C6+ as a single component; if Neo-Pentane is present, add the Neo-Pentane to the I-Pentane component. Any C6+ values reported are separated into the following fractions before being saved (these values will be fixed).

**C6+ Fixed Values**

| | |
|---|---|
| Hexane (C6) | 0.47466 |
| Heptane (C7) | 0.3534 |
| Octane (C8) | 0.17194 |

These values are Mol fractions for the C6+ entry (component code 108) in the Component Data Table:

| Configuration Options | Settings |
|---|---|
| Chromatograph* | GC control switch<br>ON = GC enabled<br>OFF = GC disabled |
| Chrom Addr* | GC Modbus address |
| Chrom Unit | GC data unit<br>0=English/Imperial<br>1=Metric/Standard |
| Fixed/Live Gas Component | Live/Fixed |
| Fixed/Live Specific Gravity | Live/Fixed |
| Fixed/Live BTU | Live/Fixed |

* A changed value will force a system restart (reconfigure serial port).

Status:

| Status | Description |
|---|---|
| Chrom Status | 0 = not ready<br>Bit 0 set = GC is enabled and local port is available.<br>Bit 1 set = GC is enabled but local port is not available.<br>Bit 2 set = GC is enabled but COM error detected.<br>Bit 7 set = GC is disabled. |
| Chrom Error | 0 = no problem<br>Bit 0 set = COM error<br>Bit 1 set = stream number mismatch<br>Bit 2 set = analysis time mismatch<br>Bit 3 set = GC alarms detected<br>Bit 4 set = invalid BTU<br>Bit 5 set = invalid Specific Gravity<br>Bit 6 set = invalid component |
| Chrom Poll Xmit | Number of query packet to GC has been transmitted. |
| Chrom Poll Rcv | Number of response packet from GC has been received. |

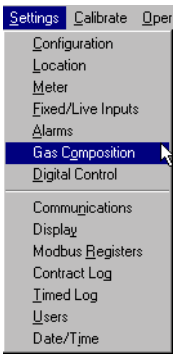
SIM_2251 Register List data read from the GC and the associated MODBUS register numbers are:

| Modbus Number | GC Data |
|---|---|
| 3001 - 3016 | component code for Component Index entry 1 to 16 |
| 3034 | current stream |
| 3045 | analysis time (minutes) |
| 3046 | alarm bit map |
| 3047 | alarm bit map |
| 7001-7016 | Mol percent of Component 1 to Component 16 |
| 7033 | BTU dry<br>Unit = BTU/SCF, MJ/M3 |
| 7035 | Specific Gravity |

The following components will be read from the GC. They will be mapped between SIM_2251 register 7001 through 7016. Exact mapping can be found in register 3001 through 3016.

| Modbus Number | GC Data |
|---|---|
| 7001 | C6+ |
| 7002 | Propane |
| 7003 | I-Butane |
| 7004 | Butane |
| 7005 | Neo-Pentane |
| 7006 | I-Pentane |
| 7007 | Pentane |
| 7008 | Nitrogen |
| 7009 | Methane |
| 7010 | CO2 |
| 7011 | Ethane |

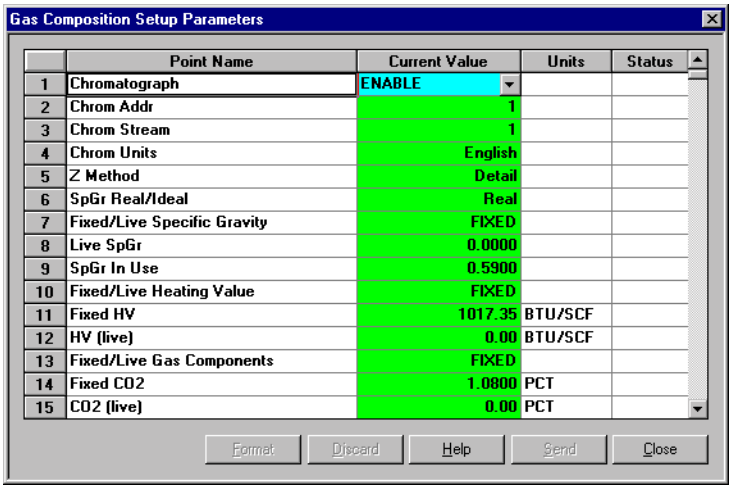
### 5.6.1 Configuring Gas Composition Parameters




To configure the gas composition parameters,

1. Click on *Settings*, then select *Gas Composition.*

The Gas Composition Setup Parameters window appears.




2. View or make changes as necessary.

   Data points typically found in this screen may include the following:

   - Fixed BTU
   - Fixed CO2
   - Fixed N2

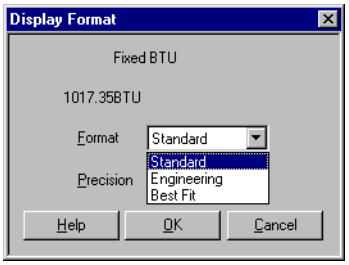
**This is an example list. Actual data points displayed may vary according to application**

### 5.6.2 Changing Gas Composition Parameters

1. Double click on any field in the *Current Value* column to change the value.

   A pending flag appears in the data point *Status* field.

2. For floating point number values, click on the Format button to toggle display of the value between Standard format or Engineering format (or Best Fit).




3. Select the appropriate format, then click the OK to apply changes.

**Once a change has been sent to the flow computer, it can only be undone by matching the original, unchanged value.**

4. Click on the Send button to apply the pending changes.

   Click on the Discard button to retain the current settings.

   Click on the Close button to return to the Spectra100 Operations window without applying any changes.

   Click the Cancel button to discard changes and return to the Gas Composition Parameters window.

## 5.7 DIGITAL CONTROLS

Spectra100 has up to four digital outputs. The SpectraCom software provides four digital output status data points (Digital Output 1 to Digital Output 4) for monitoring and four digital outputs control data points (DOUT1CTRL to DOUT4CTRL) for assignment selection. Each status represents off (0) and

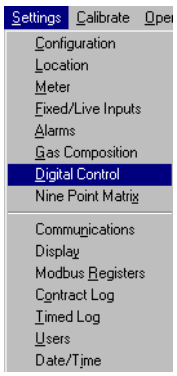
on (1) output states. Each control can be assigned to one of the following functions:

| Control | Function |
|---|---|
| OPEN | Off |
| CLOSE | On |
| VOLPULOUT | Volume pulse output |
| SCHEDCOMM | Scheduled radio communication |
| ALARMS | Alarms |
| TRANSPOWERCTRL | External transmitter power supply control |
| PREMIUM 1 STATUS | Status of Premium 1 Total |
| PREMIUM 2 STATUS | Status of Premium 2 Total |

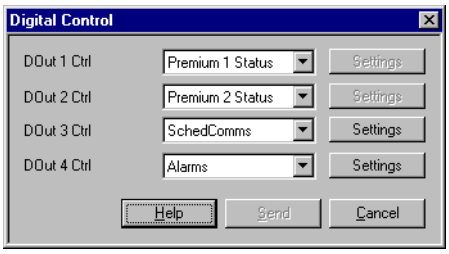
### 5.7.1 Configuring Digital Controls

To configure the digital output status parameters,

1. Click on *Settings*, then select *Digital Control.*



2. The Digital Control window appears.




3. Use the pull-down menu and configure the digital controls settings (e.g., Premium Status 1 and Premium Status 2).

**Once a change has been sent to the flow computer, it can only be undone by matching the original, unchanged value.**

4. Click on the Send button to apply the pending changes.

5. Click the Cancel button to discard changes and return to the Spectra100 main screen.

### 5.7.2 Changing Digital Control Volume Pulse Output Parameters

Spectra100 provides up to four separate digital outputs for gas sampler control based on the corrected station volume. Each digital output contains the Volume Per Pulse and Pulse Width registers, which can be configured. Pulse Width should be within the second resolution, 50/50-duty cycle. For each output, a volume accumulator holds the volume since the last pulse was output. When the accumulator exceeds the volume per pulse, this volume is subtracted from the accumulator, and a pulse is output. Accumulation is performed once each calculation cycle (1, 5, 10, 15, 30 or 60-second intervals).

**The volume accumulator and all the totalizers used for the volume pulse output reset upon enabling/disabling the digital output and reset after a cold start. This data does not automatically reset after a warm start unless the user confirms the Reset Totals option; thus, pulse output can be continued.**

The TotalVolumeOut and TotalPulseOut data points contain the total volume and pulse that have been output along with the volume

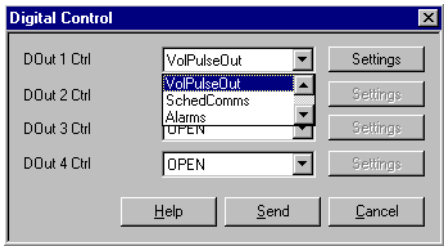
buffered (i.e., waiting to be output) since the volume pulse output has been enabled. The volume and pulses accumulated for TotalVolumeOut and TotalPulseOut are based on the delta volume and VolPerPulse configuration at the time of accumulation. Both TotalPulseOut and TotalVolumeOut will rollover to 0 after they reach 99999999. BufPulseOut contains buffered pulses that have yet to be output (i.e., have started pulse output but have not completed).

| Configuration Registers | Description |
|---|---|
| Vol Per Pulse 1,...,VolPerPulse4 | volume per pulse, range 1 to 100 |
| Pulse Width 1,...,PulseWidth4 | pulse width, range 1 to 60 seconds, increments of 1 second |

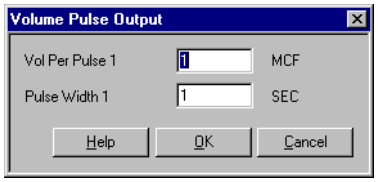
| Monitor Indication Registers | Description |
|---|---|
| Tot Pulse Out 1,..,TotPulseOut4 | total pulse has been output + buffered to be output |
| Tot Vol Out 1,..,TotVolOut4 | total volume has been output + buffered to be output |
| Buffered Pulse 1,..,Buffered Pulse 4 | buffered pulses yet to be output |

To configure digital controls,

1. Use the appropriate digital output control pull-down menu to select “VolPulseOut”.




2. Click on the Settings button and the Volume Pulse Output dialog box apprears.




   Configure the *Volume Per Pulse* and the *Pulse Width* within the second resolution, 50/50-duty cycle.

3. Click on the OK button to apply selections and return to the Digital Control window.

4. Click on the Send button to apply the current selections.

   Click on the Cancel button to exit without applying current selections.

### 5.7.3 Configuring Scheduled Radio Communications

Spectra100 provides up to four separate digital outputs to support scheduled radio communications, with one set of common configurations. A configuration set consists of:

- seven start times (hour, minute)
- one common radio on duration (minutes)
- V3.0 Firmware includes an override time (minutes)

| Configuration | Description |
|---|---|
| Sched Hour1, Sched Minute1 | first start time |
| Sched Hour2, Sched Minute2 | second start time |
| Sched Hour3, Sched Minute3 | third start time |
| Sched Hour4, Sched Minute4 | fourth start time |
| Sched Hour5, Sched Minute5 | fifth start time |
| Sched Hour6, Sched Minute6 | sixth start time |
| Sched Hour7, Sched Minute7 | seventh start time |
| Sched Duration | common duration, range 1 to 1440 minutes |

At the scheduled time, the contact closure output will be on for the duration or will stay off until next scheduled time. Before the radio communication is to be terminated, all configurations (start times and duration) will be rechecked. If any of the radio communications is scheduled to be turned on, or is already on, the radio communication will remain active.

If scheduled radio communication is enabled, the radio communication will be turned on for 10 minutes at the contract hour to allow the user to extract data from the system remotely.

**This gives the operator a known window of time, during which the radio will enable, regardless of the current radio configuration settings.**

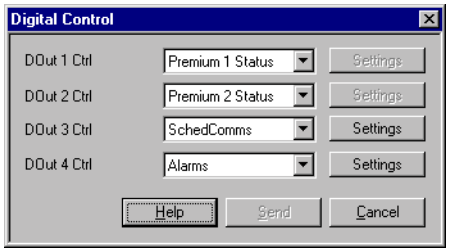
**A 3-minute timeout duration is used to prevent a user from being disconnected if the window expires before communications have finished.**

During this communication window, any received valid poll on COM1 will reset the 3 minute counter.

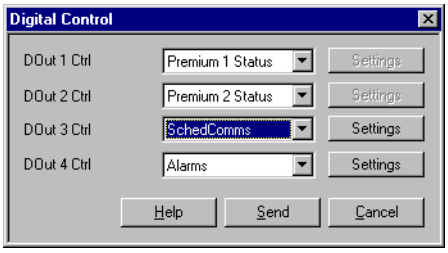
If the counter has not expired by the end of the window, the digital output will remain on until the counter does expire.

- The Override feature is a way of temporarily forcing on the radio communications, even if the current time is not during a scheduled time. To force the radio on, toggle the 4th position of the DIP switch S1 from off to on. The radio is enabled for the configured Override period. The override counter is only started or reset when the 4th position of switch S1 is toggled from the off position to the on position. After the override period expires, leaving the switch in the on position will not keep the radio enabled continuously. The 3-minute timeout duration is also valid during this period. If the 3-minute timeout has not expired after the override counter has, the radio will stay on until it does expire.

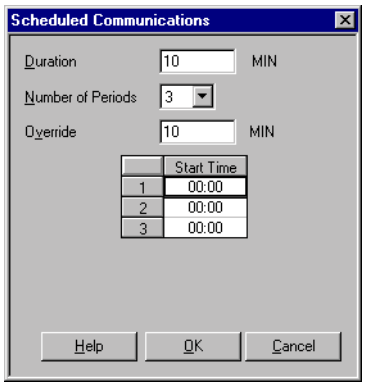
1. From the Digital Control window, use the appropriate digital output control pull-down menu and select “SchedComms”.



2. Click on the Settings button and the Scheduled Communications window displays.

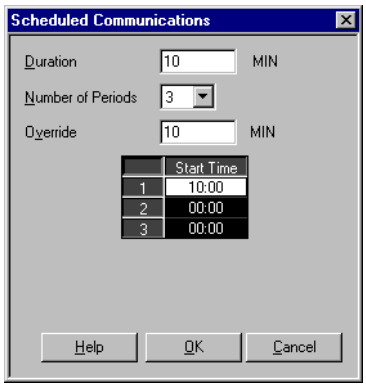



3. Enter the *Duration* (e.g., 10 minutes) and then enter the *Number of Periods* (e.g., 3).




4. The hour range is from 0 to 23; the minute range is from 0 to 59. A value of -1 in either

the hour or minute configuration indicates that this entry is undefined.




5. Enter the time for the scheduled radio communication override in the datapoint Override. Valid inputs for this point are 0 to 60 minutes. This datapoint is only present in v3.0 firmware and later.

6. Click on the OK button to apply the selections and return to the Digital Control window.

7. Click on the Send button to apply the current selections.

   Click on the Cancel button to exit without applying current selections.

### 5.7.4 Configuring Digital Control Alarm Outs

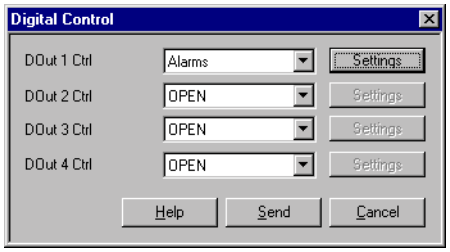
Spectra100 provides up to four separate digital outputs (DOut Alarm1 to DOutAlarm4) for alarms. Each can be mapped to any one or combination of the following alarms. The alarm map is defined as a bitmap; each alarm is assigned to one bit. The bit map assignment is the same as the Enabled Alarms and Active Alarms definition.

If the enabled alarms are in the active state (triggered) when any one or combination of the following alarms are enabled through the alarm map, the contact closure will remain ON until the alarms are deactivated.

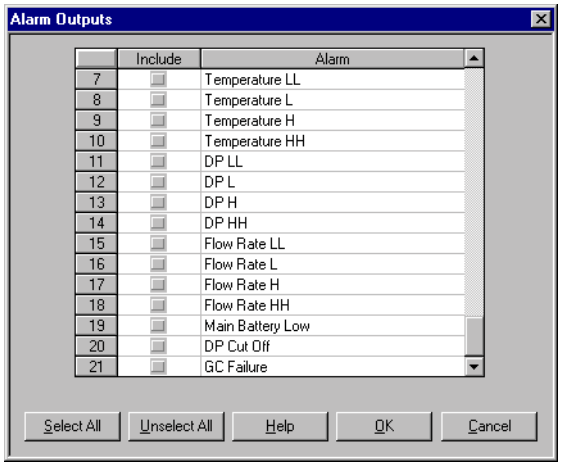
| Alarms 1 | Bit Map Assignment |
|---|---|
| DINP1ERROR | bit 0 |
| DINP2ERROR | bit 1 |
| PRESSURE_LL | bit 2 |
| PRESSURE_L | bit 3 |
| PRESSURE_H | bit 4 |
| PRESSURE_HH | bit 5 |
| TEMPERATURE_LL | bit 6 |
| TEMPERATURE_L | bit 7 |
| TEMPERATURE_H | bit 8 |
| TEMPERATURE_HH | bit 9 |
| DP_LL | bit 10 |
| DP_L | bit 11 |
| DP_H | bit 12 |
| DP_HH | bit 13 |
| FLOWRATE_LL | bit 14 |

| Alarms 1 | Bit Map Assignment |
|---|---|
| FLOWRATE_L | bit 15 |
| FLOWRATE_H | bit 16 |
| FLOWRATE_HH | bit 17 |
| PULSEERROR | bit 18 (not yet supported) |
| MAINBATTERYLOW | bit 19 |
| DPCUTOFF | bit 20 |
| FREQLOWCUTOFF | bit 21 |
| GCFAILURE | bit 22 |
| **Alarms 2** | **Bit Map Assignment** |
| Aux1 LL | bit 0 |
| Aux 1 L | bit 1 |
| Aux 1 H | bit 2 |
| Aux 1 HH | bit 3 |
| Aux 2 LL | bit 4 |
| Aux 2 L | bit 5 |
| Aux 2 H | bit 6 |
| Aux 2 HH | bit 7 |
| Calc Error | bit 8 |
| SmrtSens Error | bit 9 |

1. From the Digital Control window, use the digital output control pull-down menu and select “Alarms”.

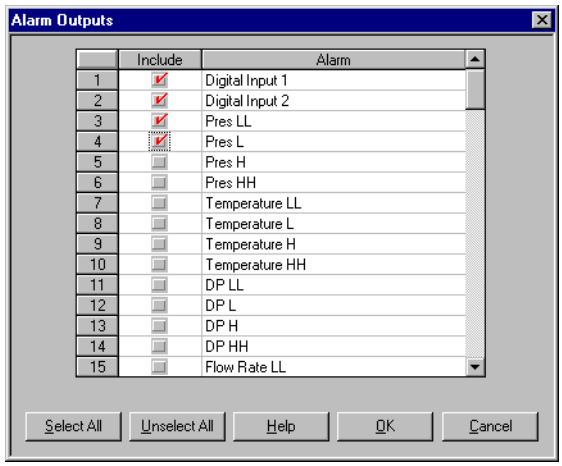


2. Click on the Settings button and the Alarm Outputs window displays.




3. Click on the check box to include specific alarms or click on the Select All button to include all of the alarms.

**A red check mark appears in the *Include* column when the alarm selection is made.**




Deselect the alarms by clicking on the Unselect All button.

4. Click on the OK button to apply the selections and return to the Digital Control window.

5. Click on the Send button to apply the current selections.

   Click on the Cancel button to exit without applying current selections.

### 5.7.5 Configuring External Transmitter Power Control

**The digital output configured for external power control must be properly wired from the CPU board to the Power board.**

**Refer to the *Spectra100 System Reference Manual* (PN 3-9000-100) for details.**

The Spectra100 12 Volt DC output power supply is used to power the external 1-5 VDC transmitters (with one common transmitter on delay time for configuration). The 12 VDC output power supply is located on the Power board (PN 3-2900-003).

When the CPU board comes out of reset, all digital outputs are in the OFF state. In this state, the transmitter power supply is also turned off. Changing the state of the appropriate digital output to the ON state turns on the transmitter power supply.

**Note that the startup time is transmitter-specific. If the Xmitter On Delay time is larger or equal to the sampling period, then the transmitter power should be left on continuously. If the transmitter power is to be turned off, it will be turned off immediately after all analog inputs are read.**

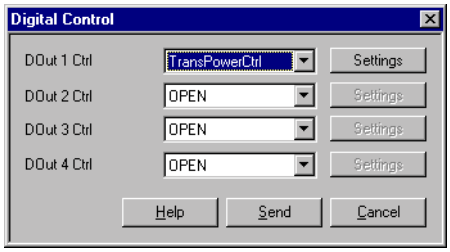
Xmitter On Delay is the time delay from the digital output activation to the time the transmitter power supply starts regulating its output at 12VDC. The Xmitter On Delay time also includes the startup time from the time the external transmitter receives a regulated output to the time its outputs are ready to be acquired by the A/D converter.

| Configuration | Description |
|---|---|
| Xmitter On Delay | Represents the waiting period required from the initialization of the transmitter power supply until a sample can be taken from the transmitters by the A/D converter. Range is from 1 to 10 seconds, in increments of 1 second. |

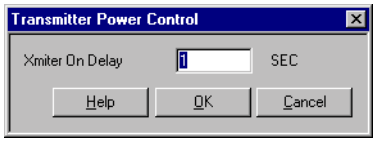
For the orifice meter applications, since the sampling period is fixed to 1 second, the external transmitter power control is always on if it is enabled. For linear meter applications, if the sampling period is less than or equal to the Xmitter On Delay time, the external transmitter power control will be powered on all the time. Only if the sampling period is greater than the Xmitter On Delay time will the transmitter power control be exercised.

### Changing External Transmitter Power Control Parameters

1. From the Digital Control window, use the appropriate digital output control pull-down menu and select “TransPowerCtrl”.




2. Click on the Settings button and the Transmitter Power Control window displays.



3. Make any changes, then click on the OK button to apply the changes and return to the Digital Control window.

4. Click on the Send button to apply the current selections.

   Click on the Cancel button to exit without applying current selections.

### 5.7.6 Configuring Premium 1 and Premium 2 Status

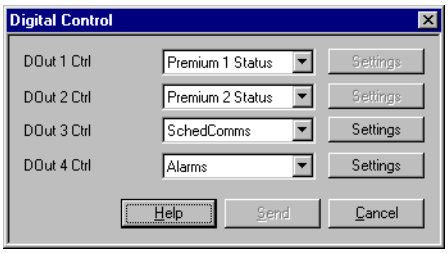
Digital outputs can be configured to show if the flow rate has exceeded the premium set points. For example, output configured for Premium 1 Status will turn on if the flow rate exceeds the Premium 1 set point.,

**Configure the Premium 1 and Premium 2 Set Points (see Section 5.2.3 for details) via the Settings > Location menu path.**

To set the Premium 1 Status and Premium 2 Status,

1. Use the *Settings* > *Digital Control* menu path.

   The Digital Control dialog displays.




   Use the pull-down menu and set a digital output to either Premium 1 Status or to Premium 2 Status.

2. Click on the Send button to apply your changes to the flow computer.

## 5.8 ABOUT THE NINE POINT MATRIX

The 9-point matrix method is used to calculate the compressibility instead of AGA8 method. The 9 point matrix is a 3X3 matrix based on pressure and temperature. A second order interpolation is used with the matrix to calculate the output. The calculations are supported in both English and Metric units and used with both AGA3 and AGA7 methods.

The option for entering the matrix is disabled until the user selects Matrix Option from the Z-Method datapoint via the *Settings* > *Gas Composition* menu path.

The Spectra100 v3.0 has built-in the consistency check for matrix T, P, and Z data entered by user. The rule is as follows:

The 3 Temperature points should be:
Temp Low < Temp Med < Temp Hi.

The 3 Pressure points should be:
Pres Lo < Pres Med < Pres Hi

For the 3x3 Z points, at the same pressure, the higher the temperature, the larger the Z; at the same temperature, the lower the pressure, the larger the Z. Therefore, they should be:

$$Z_f\,(P1T1) < Z_f\,(P1T2) < Z_f\,(P1T3)$$

$$Z_f\,(P2T1) < Z_f\,(P2T2) < Z_f\,(P2T3)$$

$$Z_f\,(P3T1) < Z_f\,(P3T2) < Z_f\,(P3T3)$$

$$Z_f\,(P1T1) > Z_f\,(P2T1) > Z_f\,(P3T1)$$

$$Z_f\,(P1T2) > Z_f\,(P2T2) > Z_f\,(P3T2)$$

$$Z_f\,(P1T3) > Z_f\,(P2T3) > Z_f\,(P3T3)$$

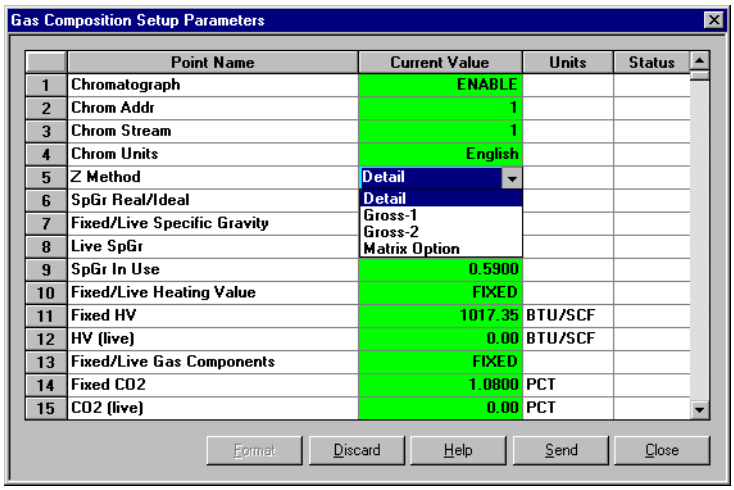
SpectraCom checks the matrix data consistency, accessed via the *Settings* > *Nine Point Matrix* menu path. If the rule is not followed, SpectraCom prompts the user with an error message and the entered data is not accepted. When the inconsistency matrix data is entered through Modbus communications or through the SpectraCom User-defined menu, then Spectra100 generates errors (Calc Error Code Matrix T Error, Calc Error Code Matrix P Error, or Calc Error Code Matrix Z Error). The inconsistent matrix data is not used for $Z_f$ calculation and the previous calculated $Z_f$ is used instead.

### 5.8.1 Configuring the Nine Point Matrix

To configure the Nine Point Matrix,

1. From the *Settings* menu select Gas Composition.

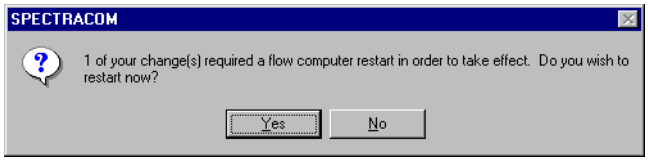
   The Gas Composition parameters window displays.




2. Click on the Z-Method Point name and use the pull-down menu to select the Matrix Option.

3. Click on the Send button to apply the settings.

   SpectraCom prompts you to restart the flow computer and displays the restart dialog.

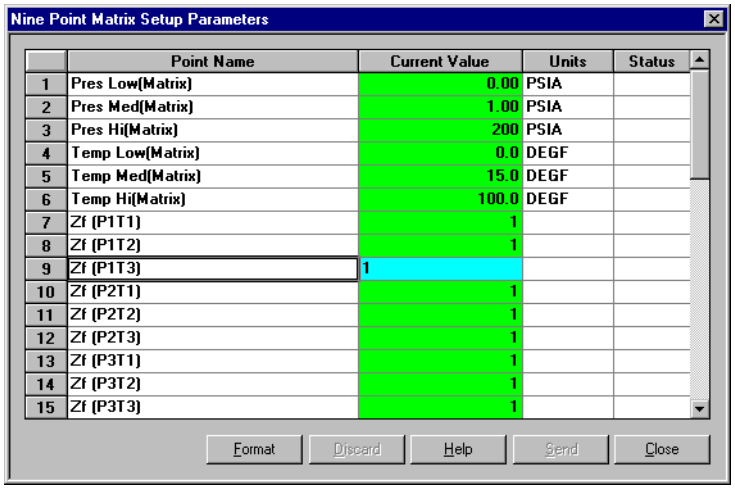


Click on the Yes button and SpectraCom displays a prompt that the unit is restarting.

Click on the OK to restart the flow computer and execute the log on sequence.

4. After restarting SpectraCom, go to the *Settings* > *Nine Point Matrix* menu path.

   SpectraCom displays the Nine Point Matrix Setup Parameters window.




See Section 5.8 on page 50 for detailed instructions for setting the Z Method parameters.

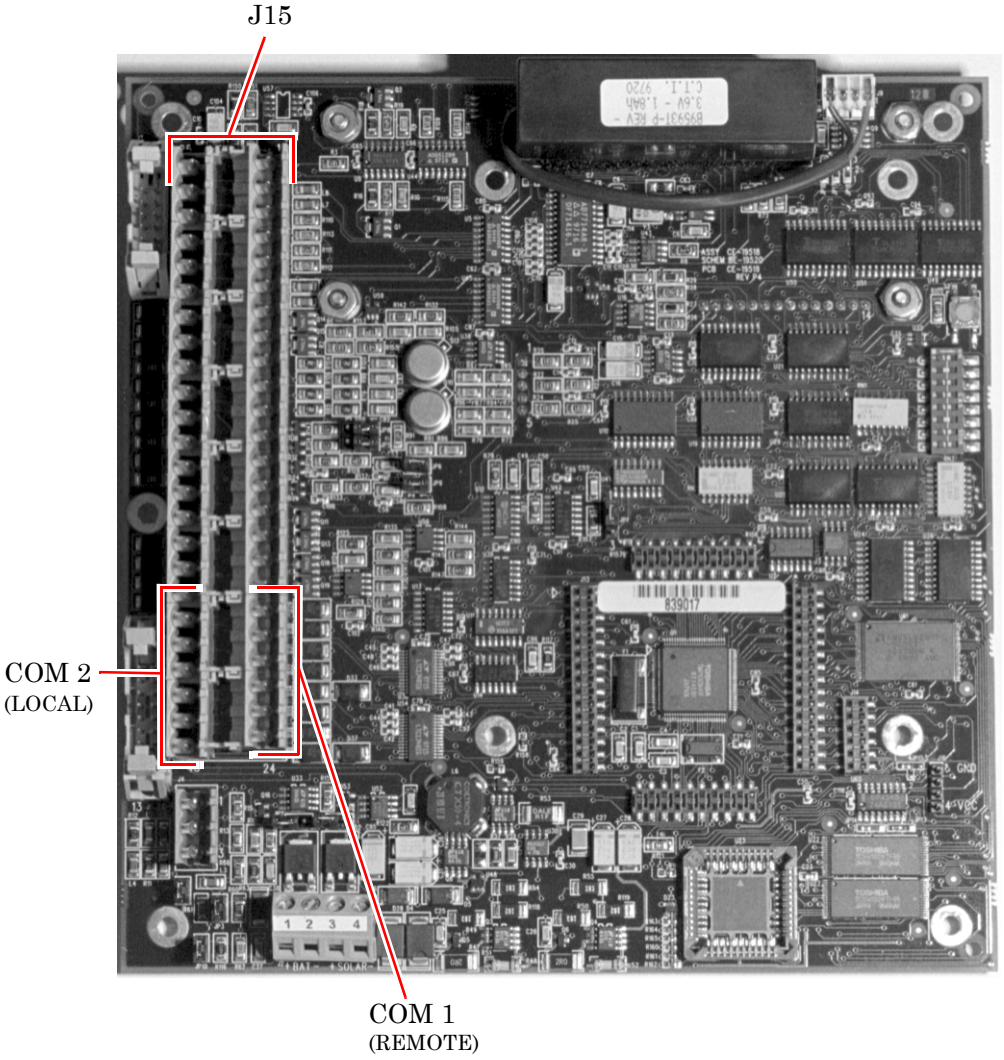
## 5.9 SERIAL COMMUNICATIONS

The Spectra100 has two RS232 communications ports. These communications circuits are *not* isolated from the system ground. See the following table for minimum, typical, and maximum values of various port parameters.

| Port Parameters | Minimum Value | Typical Value | Maximum Value |
|---|---|---|---|
| port voltage level | ±5 volts | +6.2 volts and –6.0 volts | ±15 volts |
| high-threshold receivers | 1.7 volts | 2.4 volts | ±15 volts |
| low-threshold receivers | 0.8 volts | 1.3 volts | ±15 volts |
| input resistance to ground | 3000 Ω | 5000 Ω | 7000 Ω |

Because of the power required to drive the termination resistors of RS232 circuits, the Spectra100 disables the outputs when not in use. The RS232 receivers are continually enabled because they draw only a few microamperes. When the RS232 drivers are disabled, their outputs go to a high impedance. This does not appear to cause problems on any device tested, such as a US Robotics modem or desktop PC. A high on either DSR input will interrupt the microprocessor to turn on the high speed clock, which runs continuously during transmission. The microprocessor does not power up the RS232 drivers until it is ready to transmit data. A 200 microsecond waiting period is required for drivers to power up. When the DSR is open-circuited or returns low, the Spectra100 renews normal low-power operation.

See the figure below to verify the locations of the connections cited in the following procedures. For more information refer to *Spectra100 System Reference Manual* (PN 3-9000-100) for pin specifications to Connector J15.



### 5.9.1 Primary Port (COM 2)

The primary port is for laptop PC access. This port consists of a weather-tight, military-style connector on the Spectra100 enclosure bottom. The connector shell is in contact with the enclosure wall so that the cable shield is at the same potential as the enclosure. This connector extends to the main circuit board and screws into terminals on Connector J15 (see figure above).

**The COM2 port is pre-wired at the factory. This section is for reference only.**

DSR2 is an input from the laptop requesting communication. This will interrupt the processor and switch it to the high-speed clock. A 20 millisecond delay is required before the unit is ready to receive data. To save power when the laptop is connected for a long period of time, the controller does not enable the transmitters until it is ready to send data. When the laptop is disconnected or DSR2 is lowered, the controller will re-enable its low power mode.

**Use the local connection cable provided, Daniel PN 3-2900-019.**

The wiring from the CPU to the military connector and laptop is shown in the table below.

| Spectra100 CPU COM2 | | S100 Cable | | PC Connection | |
|---|---|---|---|---|---|
| **Signal Name at Spectra100** | **J15 Pin** | **Canon Pin** | **Canon Wire Colors** | **Female DB-9 to Pc** | **Signal Name at Pc** |
| RX2 | 43 | A | brown | 3 | TXD |
| TX2 | 44 | B | red | 2 | RXD |
| COM | 45 | C | orange | 5 | COM |
| DSR2 | 46 | D | yellow | 4, 6 | DTR, DSR |
| RTS2† | 47 | E | green | 1, 7, 8 | DCD, CTS, RTS† |
| CTS2† | 48 | F | blue | Not Used | |
| Not Used | | G | N.C. | Not Used | |
| Not Used | | H | N.C. | Not Used | |
| Not Used | | J | N.C. | Not Used | |
| Not Used | | K | N.C. | Not Used | |

† RTS2 and CTS2 are connected together locally at the Canon connector. DCD, RTS, and CTS are connected together locally at the PC DB-9 connector. These signals do not pass through the serial cable (this change is effective per Rev. B of PN 3-2900-019).

### 5.9.2 Secondary Port (COM 1)

The secondary port is for telemetry devices. This port consists of a Phoenix plugable connector mounted on the main board inside the Spectra100 enclosure. A shielded cable should be used to connect this port to the outside world.

DSR1 is an input from the modem or radio requesting communication. This will interrupt the processor and switch it to the high-speed clock. A 20 millisecond delay is required before the unit is ready to receive data. To save power when the laptop is connected for a long period of time, the controller does not enable the transmitters until it is ready to send data. When the DSR1 is lowered, power to the port transmitters will be disconnected.

### 5.9.3 Connecting the Model 24 Modem

The Model 24 modem card mounts to the four standoffs located on the CPU board. This card provides 3 connectors: a telephone connector (J6), a power connector (J5) which is not used for a Spectra100 unit, and a RS232 connector (J4). The telephone connector requires a standard miniature 6-position RJ11C telephone plug. Only the TIP and RING lines are used (J6-2 and J6-3, respectively).

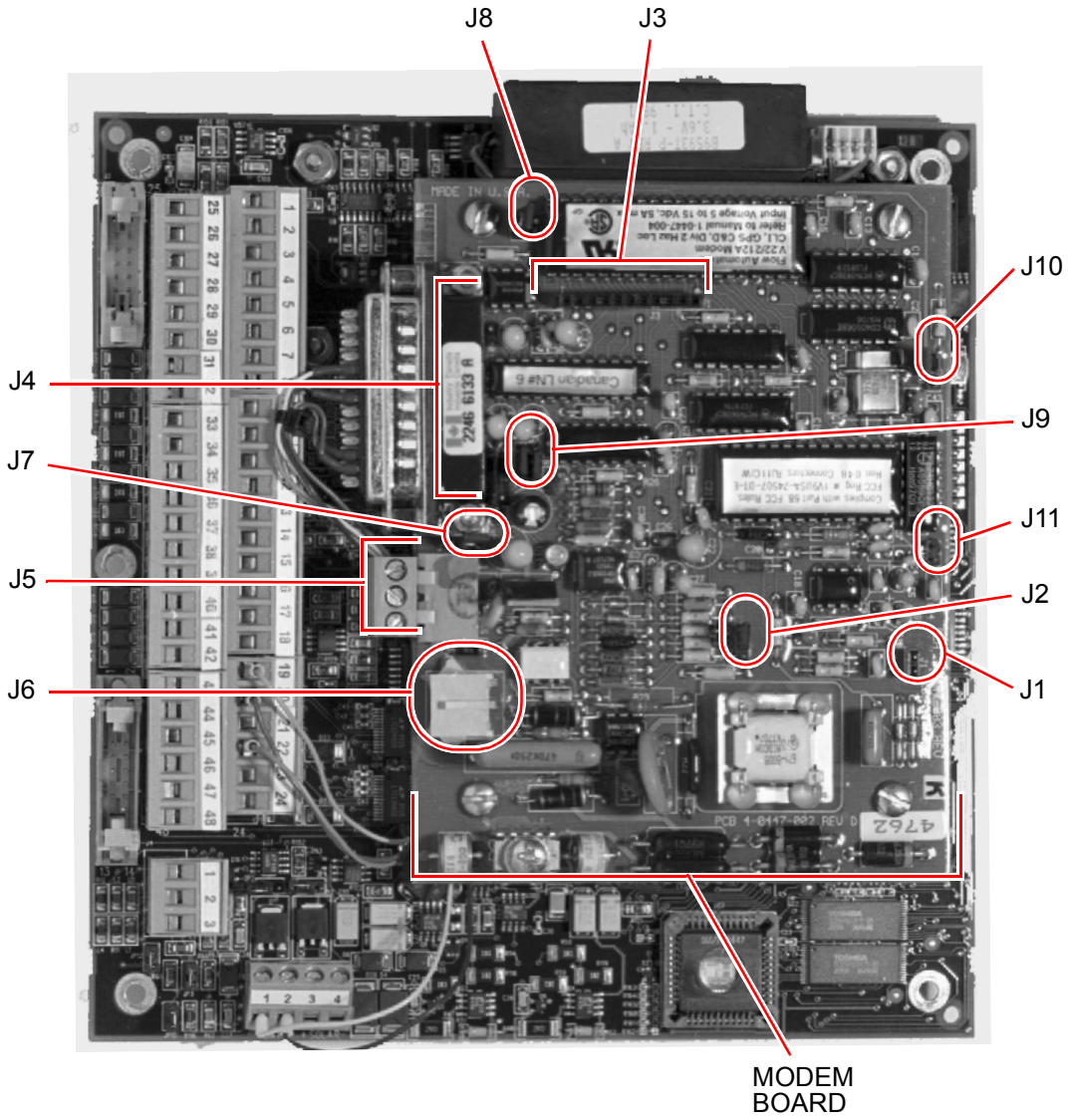
Verify the Jumper selections before operation. To achieve "normal" 5-second operation, set pins 1&3 and 2&4 on Jumper J9. To achieve the alternative 20-second operation, set pins 3&5 and 4&6 on Jumper J9.

**A 20-second operation setting is more appropriate in locations where excessive line noise from poor phone lines may be interpreted by the modem as a DCD signal. Note that this connection requires more power from the Spectra100 unit.**

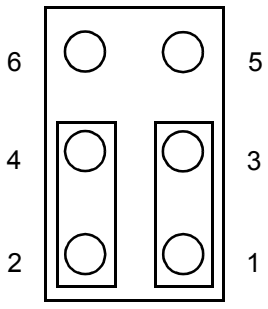
See the *Model 24 Modem Manual* (Daniel PN 3-9000-024) for detailed discussions of the jumper configurations.

See figure on following page to locate these jumpers:

| Jumper | Configuration | Function |
|---|---|---|
| J2 | Not Installed | Constant Power (Not Installed enables power down) |
| J7 | Installed | RS232 PWR (Installed allows power to come from J4) |
| J8 | Not Installed | Memory Write-Enable (Not Installed prevents configuration changes) |
| J9 | 1&2, 2&4 | Delay Select (selects 5 second disconnect after DCD loss) |
| J10 | Not Installed | Unqualified RX Enable (Not Installed disables dial out option) |
| J11 | Not Installed | Dumb Mode (Not Installed disables Dumb Mode, thus disabling other internal programming options) |




PIN ASSIGNMENTS
FOR JUMPER J9




1. **J5 is not used if power is connected to J4.**
2. **J6 connects to phone line.**
3. **Pin settings shown for J9 produce a 5-second modem operation.**

The modem comes with a wiring harness (PN 3-2400-020) that connects the DB-25 (J4) connector to Serial Port 0 and the main battery terminals. The wiring harness should be configured as follows:

| Signal Name at Spectra100 | Spectra100 Connector, Pin | Model 24 Connector, Pin | Signal Name at Model 24 | Harness Wire Color |
|---|---|---|---|---|
| TX1 | J15-20 | J4-2 | TXD | RED |
| RX1 | J15-19 | J4-3 | RXD | ORANGE |
| DSR1 | J15-22 | J4-8 | DCD | GRAY |
| COM | J2-2 | J4-7 | COM | PURPLE |
| POWER | J2-1 | J4-9 | POWER | WHITE |

Refer to drawing DE- 19838 (See the *Spectra100 System Reference Manual* PN 3-9000-100*,* Appendix E for all drawings and spare parts lists) for a complete wiring diagram. This drawing also shows how to wire multiple Spectra100 computers into a single Model 24 modem.

The Model 24 modem will stay in its sleep mode when it is not connected. While in this mode, the RS232 port is powered-off. When a host machine calls the modem, it will answer and make a connection. Once a connection is made, the modem will assert DCD, telling the Spectra100 to wake up and enable its UART. When the connection is lost, the modem will lower DCD and return to sleep mode. The  will disable its UART after DCD is lost.

### 5.9.4 Disabling DSR Requirement

By default, both serial ports require a DSR signal to initialize the processor before communication can start. SpectraCom does this by asserting the DTR, which is connected to DSR of the flow computer via the serial cable. For situations like remote communications, where a signal line cannot be connected to the DSR, the DSR requirement can be disabled.

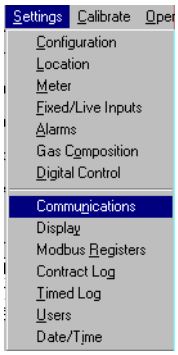
To disable the DSR requirement, change the data point High Speed Clock from *As Needed* to *Always On* (use the SpectraCom menu path *Settings* > *Location* to perform this edit). The DSR line can now be left disconnected.

**This setting causes a power penalty of approximately 1-2 mA at 6 V.**

### 5.9.5 Connecting the FreeWave Spread Spectrum Radio

The FreeWave (DGRO9RFS) is a 900 MHz spread spectrum radio that can be mounted inside the Spectra100 enclosure. The radio mounts to the Power/Radio board (PN 3-2900-008) in the back of the enclosure. The Spectra100 CPU board can be configured to enable power to the radio for user specified periods of time, in order to keep power consumption at a minimum. This allows the radio to be used with the standard internal 6V rechargeable battery and solar panel option. See the *SpectraCom User Manual* (PN 3-9000-105) for instructions on configuring the digital output for Scheduled Communications control.

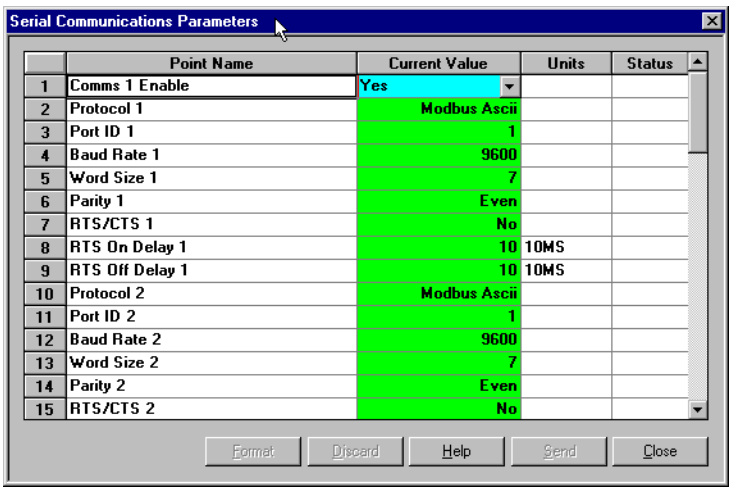
### 5.9.6 Configuring Serial Communications Parameters




To configure the Serial Communications Parameters for either port,

1. Click on *Settings*, then select *Communications*.

   The Serial Communications Parameters window appears.



**This is an example list. Actual data points displayed may vary according to application.**

Data Points typically listed in this window may include the following:

- Comms 1 Enable
- Baud Rate 1
- Word Size 1
- RTS/CTS 1
- Parity 1
- RTS ON Delay 1
- RTS OFF Delay 1
- Port ID 1
- Protocol 1

Some synonyms for the above data points include data bits for word size, Modbus address for Port ID, and Modbus protocol for protocol (e.g., Modbus ASCII or Modbus RTU).

For more details about a particular data point that is displayed in the Serial Communications Parameters window, open the *Spectra100 Data Points Guide* online help file.

### 5.9.7 Changing Serial Communications Parameters

You must be logged onto the Spectra100 with the proper access level in order to send changes to the flow computer.

To make changes to the Communications Settings,

1. Select a desired field under the *Current Value* column.
2. Some fields accept number or text values. In these fields, you type in an entry.

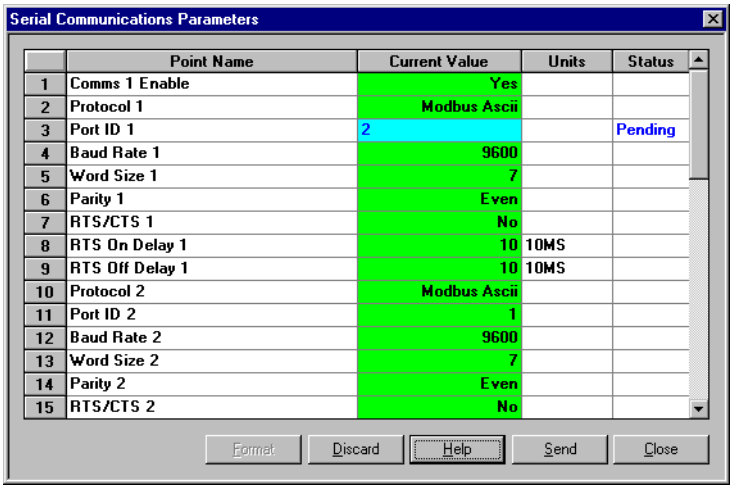
   For example, a RTS Delay data point might be changed from 0 to 5 if you select its *Current Value* field and type in the numeral character 5.

   Some fields accept a limited range of values. In these fields, you select a value from the pull-down list.

   For example, a Parity data point will accept a limited range of descriptions. Choose one from the pull-down list that appears when you have selected the Parity's *Current Value* field.

3. Click on any field in the *Current Value* column to change its value.

   A pending flag appears in the data point *Status* field.




**Once a change has been sent to the flow computer, it can only be undone by matching the original, unchanged value.**

4. Click on the Send button to apply the pending changes.

   Click on the Discard button to retain the current settings.

   Click on the Close button to return to the Spectra100 Operations window without applying any changes.

## 5.10 LOCAL DISPLAY

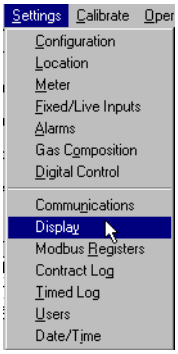
In this window, you can control which data points will be displayed locally on the front panel display of the flow computer (a liquid crystal display, or LCD, screen). You can also control the quantity and sequence of data points that will be displayed.

The data points found in this window are the same ones that will be displayed on the flow computer front panel display. You can add, remove, or reorder the current listing.

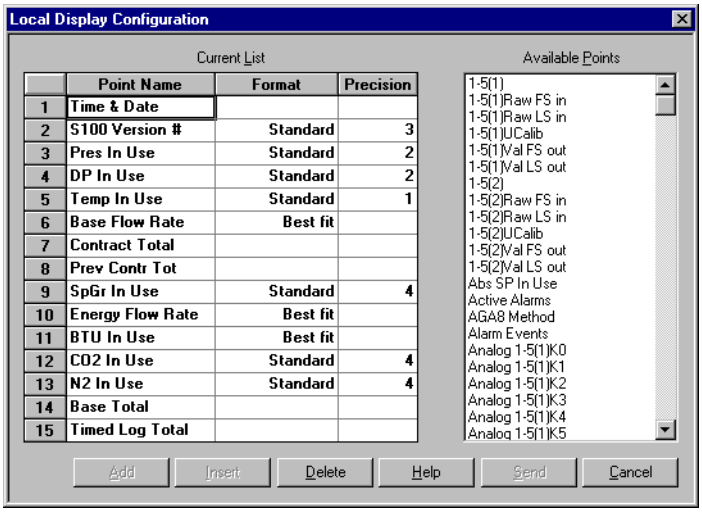
The quantity of data points for local display can range from two to twenty (2 - 20). The minimum two data points are the current system time and date and the version number of the firmware. Thus, you can add up to 18 more data points for the local display.

### 5.10.1 Configuring Local Display Settings

1. Click on *Settings,* then select *Display*.



2. The Local Display Configuration window appears.

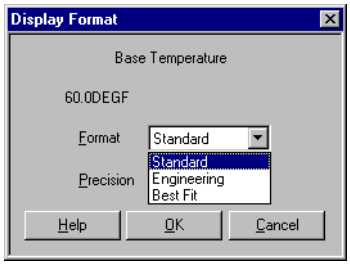



3. View or make changes as required.

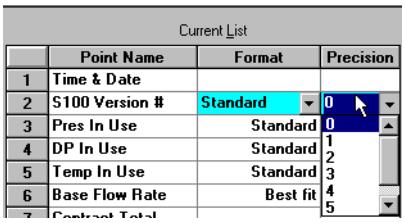
### 5.10.2 Changing Local Display Settings

1. To add a setting,
   (a) Select a data point from the scrollable list of Available Points.
   (b) Click on the Add button. The data point is added as a new row at the end of the current list.
2. To insert a data point into the list,
   (a) Select one from the scrollable list of Available Points.
   (b) Click on the Insert button and the data point is added into the list in a new row above the current selection.

3. For floating point number values, click on the Format button to toggle the display of the value between Standard format, Engineering format, or Best Fit format.




Additionally, for floating point number values, you can set the value's display Precision, or the display of numbers to the right of the decimal point.

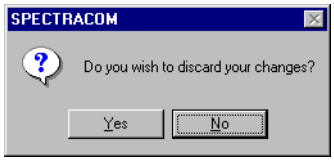



4. To delete a data point, highlight the Point Name and click on the Delete button.

5. Click on the Send button to apply changes.

   To retain the current settings, click on the Cancel button or press the ESCAPE key.

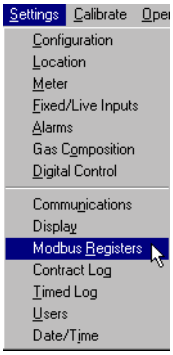
   A dialog box appears, click on the Yes to discard changes or click on the No to continue.



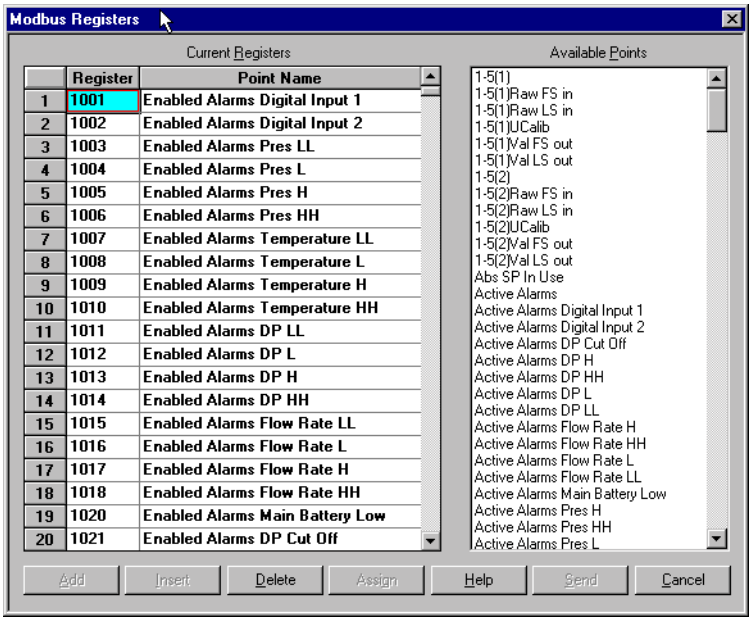
## 5.11 MODBUS REGISTERS ASSIGNMENTS

The Modbus registers of the Spectra100 Flow Computer provide a means of external access to the flow computer data. Other computer and data collection systems, via the Modbus communications protocol, can read the information held in the Spectra100 Modbus registers. If such a computer or data collection system is expecting to find particular flow computer information within particular Modbus registers, then you can use the Modbus Registers window to map that information, or data points, to those expected Modbus registers.

### 5.11.1 Configuring Modbus Assignments




1. Click on the *Settings* menu, then select *Modbus Registers*.
2. The Modbus Registers window displays.




3. View or make changes as necessary.

### 5.11.2 Changing Modbus Registers Assignments

1. To add Modbus Register assignments,

   (a) Select a data point from the scrollable list of Available Points.

   (b) Click on the Add button. The data point is added as a new row at the end of the current list.

2. To insert a data point into the list,

   (a) Select one from the scrollable list of Available Points.

   (b) Click on the Insert button and the data point is added into the list in a new row above the current selection.

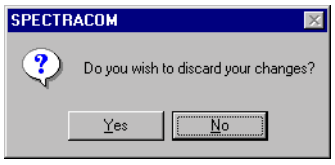
3. To assign a different data point to an existing Modbus register assignment, highlight the Register number, select a data point from the scrollable list of Available Points, and then click on the Assign button.

4. To delete a register assignment, highlight the Point Name and click on the Delete button.

5. Click on the Send button to apply changes.

   To retain the current settings click on the Cancel button or press the ESCAPE key.

   A dialog box appears, click on the Yes button to discard changes or click on the No button to continue.



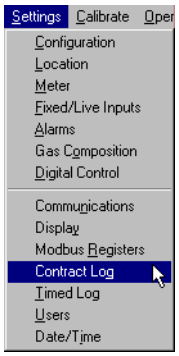
**Whenever the Contract Log configuration is changed, the Spectra100 clears out all existing Contract Log records and restarts a fresh logging activity based on the new configuration.**

## 5.12 CONTRACT LOG CONFIGURATION

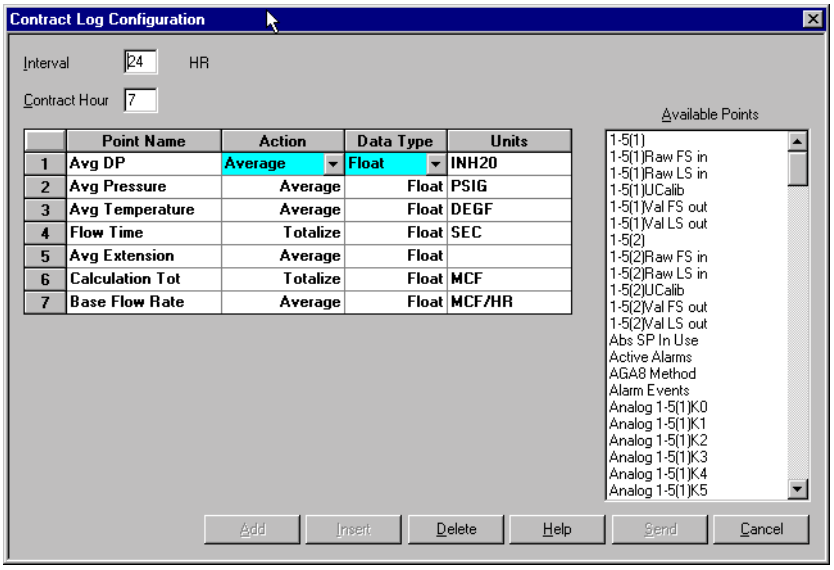
Within the Contract Log Configuration window, you can define which Spectra100 data point values will be included in Contract Log records. You can also define how often log records will be recorded and how values will be reported: as a sum, average, or snapshot.

Contract and Timed Logs can be collected from the Spectra100 by uploading them to the PC. To do this, click on the Upload menu, and select Logs.

### 5.12.1 Configuring Contract Logs




1. Click on the *Settings* menu, then select *Contract Log*.
2. The Contract Log Configuration window displays.



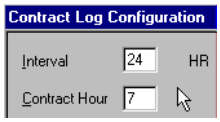

3. View or make changes as necessary.

### 5.12.2 Changing Contract Log Configurations

1. To specify the frequency in hourly units that SpectraCom records Contract logs, type a value from 1 to 24 in the *Interval* field.

   The default interval value is 24 hours.

   DEFINITION: The Contract log interval is the time interval, in hours, used for averaging or totalizing the data for a single Contract Log record. The Spectra100 generates a Contract Log record on every Contract log interval boundary, starting from the Contract hour.




2. In the *Contract Hour* field, type a value from 0 to 23 to specify a starting hour for the Contract Log interval, using military time (the 24-hour clock).

   The default setting is 7 (i.e., 07:00, or 7:00 a.m.).

   DEFINITION: The Contract hour is the military time, in hours (ranging from 0 to 23), that forms a starting reference for the Contract log interval.

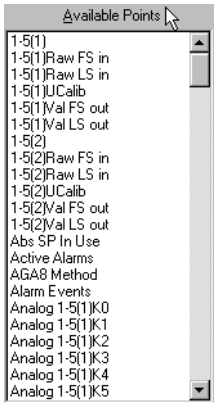
   EXAMPLE: If the Contract hour is set at 8, and the Contract interval is set at 12, then the Spectra100 will generate a new Contract Log record at every interval of 12 hours, beginning at 08:00, or 8:00 a.m. Thus, every day, Contract Log records will be generated at 8:00 a.m. and 8:00 p.m.

3. Below the Interval and *Contract Hour* fields is the table of Spectra100 data point values that will be included in the Contract Log.

| | Point Name | Action | Data Type | Units |
|---|---|---|---|---|
| 1 | Avg DP | Average | Float | INH20 |
| 2 | Avg Pressure | Average | Float | PSIG |
| 3 | Avg Temperature | Average | Float | DEGF |
| 4 | Flow Time | Totalize | Float | SEC |
| 5 | Avg Extension | Average | Float | |
| 6 | Calculation Tot | Totalize | Float | MCF |
| 7 | Base Flow Rate | Average | Float | MCF/HR |

   A maximum of 14 (fourteen) data points can be included in each Contract Log record.

4. Select a data point to add to the bottom of the table from the scrollable list of Available Points.




5. Click on the Add button.

   The data point is added as a new row at the end of the table.

6. To insert a data point into the table, select one from the scrollable list of Available Points, and then click on the Insert button.

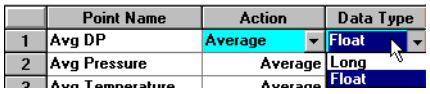
   The data point is added into the table in a new row above the currently selected data point.

7. In the Action field of each row, use the pull-down menu to select a configuration. The action determines how the data point value will be processed during the Log Interval, prior to entry into the log record.

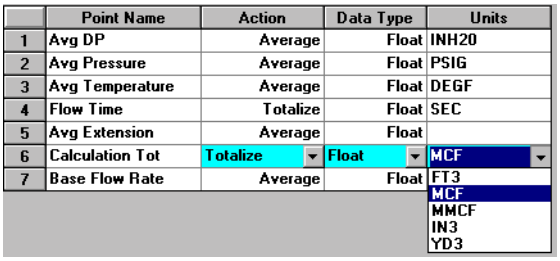
| Action | Description |
|---|---|
| Average | Values are collected each second during the log interval and then the average of all the collected values is recorded in the log record at the end of the log interval. The process is then repeated during the next log interval.<br><br>Spectra100 reads the data point, specified by the data point numbered (T), every second, calculates the average of the samples for the contract interval period, and logs the average value on a contract interval boundary. |
| Totalized | Spectra100 totalizes the item specified by the data point number, every second up to the contract period and logs the totalized value on a contract interval boundary. |
| Snapshot | Spectra100 logs the value of the item as is, specified by the data point numbered (C), on every contract interval boundary. |

8. In the *Data Type* field of each row, use the pull-down menu to select either Float or Long Integer.

   The Data Type chosen will depend upon the nature of the value (e.g., float values apply to decimal point accuracy) or customer requirements for flow computer data logs and data types.

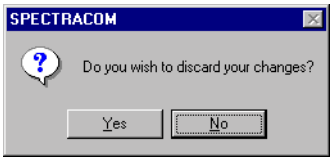


9. The *Units* field of each row, use the pull-down list to select the appropriate unit of measure.




10. To retain the original settings,

    (a) Click on the Cancel button or press the ESCAPE key.




    (b) A conformation dialog box appears, click on the Yes button to discard changes or click on the No button to continue.

    Click on the Send button to apply changes to the flow computer.

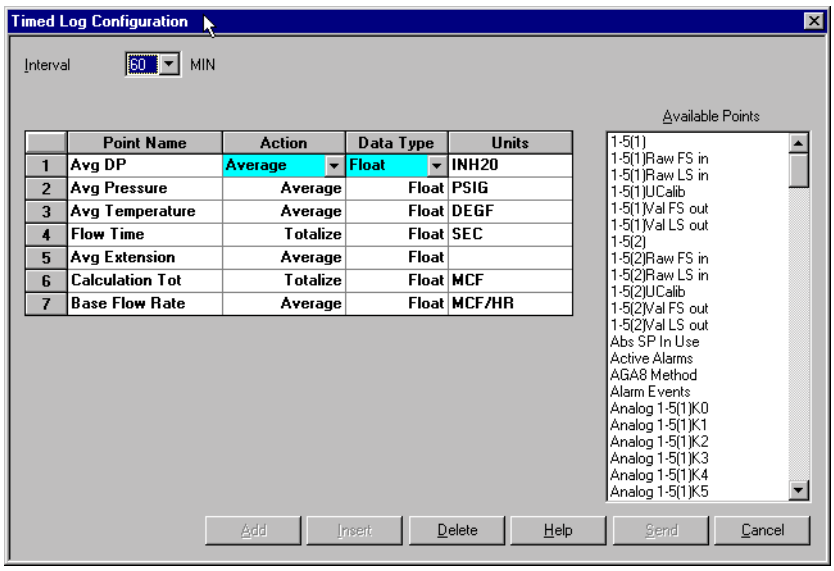
## 5.13 TIMED LOG CONFIGURATION

Within the Timed Log Configuration window, define which Spectra100 data point values that will be included in Timed log records. You can also define how often log records will be recorded and how values will be reported: as a sum, average, or snapshot.

### 5.13.1 Configuring Timed Logs

1. Click on the *Settings* menu, then select *Timed Log*.

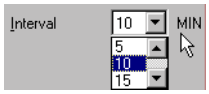
2. The Timed Log Configuration window displays.




3. View or make changes as necessary.

## 5.13.2 Changing Timed Log Configurations

1. From the Interval pull-down menu, specify how frequently, in units of minutes, Timed Log records are recorded.




   The default value is 60 minutes.

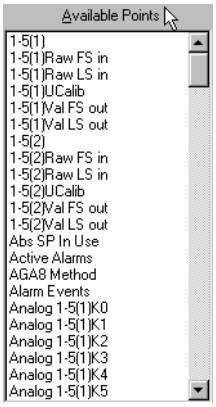
   DEFINITION: The Timed log interval is the time interval, in minutes, used for averaging or totalizing the data for a single Timed Log Record. The Spectra100 generates a Timed log record on every Timed Log interval boundary, starting from the top of the hour.

2. Below the *Interval* field is the table of Spectra100 data point values that will be included in the Timed Log.

| | Point Name | Action | Data Type | Units |
|---|---|---|---|---|
| 1 | Avg DP | Average | Float | INH20 |
| 2 | Avg Pressure | Average | Float | PSIG |
| 3 | Avg Temperature | Average | Float | DEGF |
| 4 | Flow Time | Totalize | Float | SEC |
| 5 | Avg Extension | Average | Float | |
| 6 | Calculation Tot | Totalize | Float | MCF |
| 7 | Base Flow Rate | Average | Float | MCF/HR |

3. To add a data point,

   (a) Select a data point from the scrollable list of Available Points.




   (b) Click on the Add button.

   The data point is added as a new row at the end of the table.

4. To insert a data point into the table, select one from the scrollable list of Available Points, and then click on the Insert button.

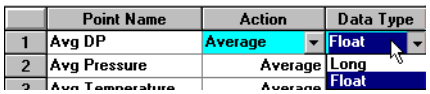
   The data point is added into the table in a new row above the currently selected data point.

5. In the *Action* field of each row, use the pull-down menu to select a configuration. The action determines how the data point value will be processed during the Log Interval, prior to entry into the log record.

| Action | Description |
|---|---|
| Average | Spectra100 reads the data point, specified by the data point numbered (T), every second, calculates the average of the samples for the contract interval period, and logs the average value on a contract interval boundary. |
| Snapshot | Spectra100 logs the value number of the item as is, specified by the data point number (C), on every contract interval boundary. |
| Totalize | Spectra100 totalizes the item, specified by the data point number, every second up to the contract period and logs the totalized value on a contract interval boundary. |

6. In the *Data Type* field of each row, use the pull-down menu to select either Float or Long Integer.

   The data type chosen will depend upon the nature of the value (e.g., float values apply to decimal point accuracy) or customer requirements for flow computer data logs and data types.



7. In the *Units* field of each row use the pull-down menu to select the appropriate unit of measure.

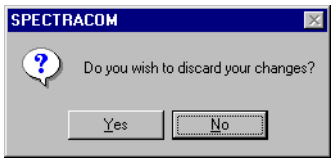
| | Point Name | Action | Data Type | Units |
|---|---|---|---|---|
| 1 | Avg DP | Average | Float | INH20 |
| 2 | Avg Pressure | Average | Float | PSIG |
| 3 | Avg Temperature | Average | Float | DEGF |
| 4 | Flow Time | Totalize | Float | SEC |
| 5 | Avg Extension | Average | Float | |
| 6 | Calculation Tot | Totalize | Float | MCF |
| 7 | Base Flow Rate | Average | Float | FT3 |

MCF
MMCF
IN3
YD3

8. To retain the original settings,

   (a) Click on the Cancel button or press the ESCAPE key.

   (b) A confirmation dialog box appears; click on the Yes button to discard changes or click on the No button to continue.




Click on the Send button to apply changes to the flow computer.

## 5.14 USER NAMES AND PASSWORDS

For details about this feature, see Section 3.2, Getting Started.

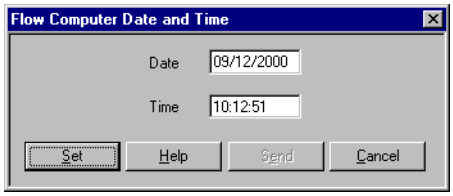
## 5.15 DATE/TIME CONFIGURATION

In this window, you can set the date and time used by the Spectra100. The Date and Time settings will form the basis for all subsequent date and time stamps automatically applied to data (and other) logs.

Your personal computer (PC) system date and time controls the Date and Time of the Spectra100 Flow Computer.

### 5.15.1 Accessing Date/Time Settings

1. Click on the *Settings* menu, then select *Date/Time*.
2. The Flow Computer Date and Time window displays.



3. View or make changes as necessary.

### 5.15.2 Changing Date/Time Configurations

To reconfigure the date and time,

1. Click on the

button and the cursor moves to the *Date* field.

   SpectraCom freezes the date and time values.
2. Adjust the date according to this format: mm/dd/yyyy, where

   mm = two digits for the month number (01 through 12)

   dd = two digits for the day of the month number (01 through 31)

   yyyy = four digits for the year number
3. Press the TAB key and the cursor moves to the *Time* field.

4. Adjust the time according to this format: hh:mm:ss, where

   hh = two digits for the hour number according to a 24-hour clock (00 through 23)

   mm = two digits for the minute number (00 through 59)

   ss = two digits for the second number (00 through 59)

5. When the displayed date and time are correct, click on the Send button to apply changes to the Spectra100 Flow Computer. A record of the change is added to the flow computer Event Log, as an operator event.

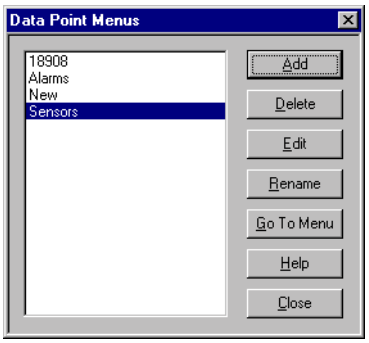
   Click on the Cancel button to retain Date and Time settings and return to the Spectra100 Operations window.

## 5.16 CONFIGURING SENSOR SAMPLING

The Spectra 100 flow computer is designed to run at very low power. By default only sensors required for the gas calculations are enabled and sampled each sample period. This means that an orifice flow computer containing a Smart P/DP sensor will not sample the Analog 1-5VDC inputs in the default configuration. If these unused inputs are to be used in the configuration, they must first be enabled. This section will describe how to enable various sensor inputs in the configuration using SpectraCom. Once enabled, these inputs can be tied to various datapoints such as Aux1, Aux2, (see Section 5.3.4) or DPL (see Section 5.3.3).

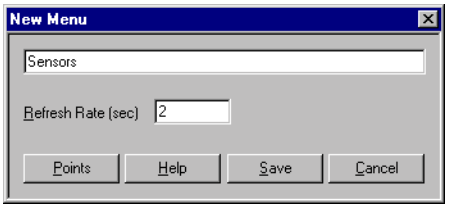
To view or change which sensors are being sampled, a user-defined menu must be created in SpectraCom via the *User-defined Menus* path. See Section 7.2.2 for complete instructions on building a user-defined menu.

1. Access the User-Defined menu function using the Spectra100 *Operations* > *User-Defined* >*User-defined Menus* path.
2. The Data Point Menus window displays.




   For more details about a particular data point, open the Spectra100 *Data Points Guide* online help file.

3. From the Data Point Menu window, click on the Add button and the New Menu window displays.

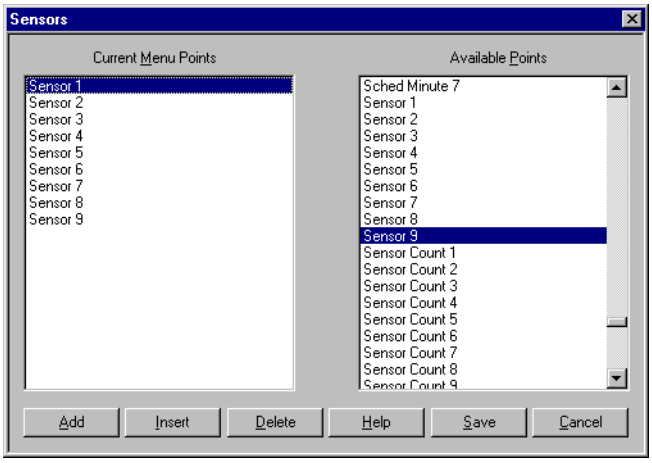



4. Type in a descriptive name of the new menu you are about to create.
5. In the New Menu window, set the *Refresh Rate* at an integral value (2, 3, or 4, etc., i.e., seconds) to determine how often the

**All user-defined menus are stored on the PC hard drive with the SpectraCom software program. They are not stored on the Spectra100 Flow Computer.**

Spectra100 Flow Computer is requeried for current menu display values.

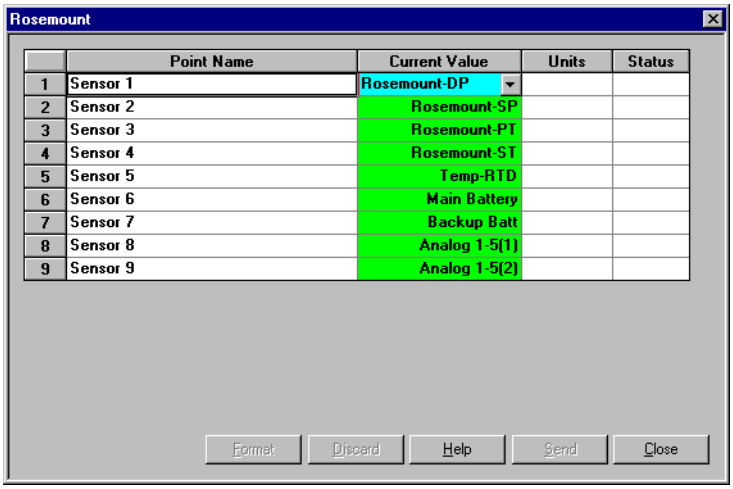
6. Click the Points button and SpectraCom collects the data then, displays a list of available datapoints.




(a) Add the nine datapoint sensors, 'Sensor 1' through 'Sensor 9', to the list and click on the Save button.

(b) Click on the Save button again and the New 'Sensor' Menu dialog box displays. Select your new menu from the Data Point Menus and click on the Go To Menu button.

A list as follows appears in the Sensor window.




**Your list may vary from the one shown depending on the configuration running in the unit**

Only the sensors in this list are being sampled each sample period. The following table shows the four sensor groups and shows how to configure each.

| Configuration | Description |
|---|---|
| Sensors 1-4 Turbine input and Smart Sensors | Sensors 1-4 are used with one of the smart Sensors (i.e. Statham 36SD, Moore 340, Druck PDCR900, or Rosemount 205). Each of these sensors has two to four datapoints associated with the sensor. For example, the Rosemount 205 module has four datapoints (e.g., all four datapoints must appear in the list for Sensors 1-4 for the sensor to work properly. The order in which the datapoints appear is not important. Smart sensors that have less than four datapoints such as the Moore (3 points) or Druck (2 points) should have the unused datapoints in Sensors 1-4 set to None.<br><br> **You can only configure one smart sensor at a time.**<br><br>Turbine applications also require a Turbine meter input to be configured. For turbine applications, always set Sensor 1 to 'Turbine Meter'. If the turbine flow computer is using a smart Druck Pressure sensor, set Sensors 2 and 3 to the datapoints Druck P and Druck PT. Sensor 4 should be set to None. |
| Sensor 5: Temperature RTD | Sensor 5 is configured for the Temp-RTD probe. If the RTD input is not being used, this point can be set to None<br><br> **This setting is Always enabled by default.** |

| Configuration | Description |
|---|---|
| Sensor 6-7: Voltage Monitoring | Sensor 6 is the Main Battery input to the CPU board. Set this datapoint to None if you do not want to monitor the supply voltage to the CPU board. Sensor7 is the voltage of the backup Lithium battery for the memory. Set this point to None if you do not want to monitor the backup battery voltage. |
| Sensors 8-9: Analog Inputs 1-5VDC | Sensors 8-9: Analog Inputs 1-5VDC Sensors 8 and 9 are configured for the Analog 1-5VDC inputs. Set Sensor 8 to Analog 1-5(1) to enable the first analog input. Set Sensor 9 to Analog 1-5(2) to enable the second analog input<br> **These points are disabled by default if a smart sensor is connected to the** |

If any of the Sensors are reconfigure, you will be prompted to restart the unit for the change to take effect. This will only be a warm start so the logs, configuration, and calibration are not reset. Now these sensors can be tied to various datapoints to be used with the calculations or auxiliaries. These source datapoints are accessed via the *Settings* > *Meter* menu path.

**When assigning sources, note that the smart sensors share a common set of names. A static pressure reading from a smart sensor is called "SmartPres Sensor" and a differential pressure reading from a smart sensor is called "SmartDP**

# CALIBRATION

## 6.1 CALIBRATING A SENSOR OR TRANSDUCER

For each sensor, two calibration options are available: multi-point or offset. See the following sections for detailed instructions.

Upon initializing the Pressure Calibration or Temperature Calibration functions, SpectraCom freezes all In Use values for the options listed in the corresponding window. These values remain frozen until the Calibration window closes. The logged values reflect the frozen values and no alarms are triggered based on the values entered to achieve calibration.

Sensors listed for Other Calibration are not linked to any In Use values. Thus, no values are frozen when this window displays.

If scaling values are available for the selected sensor, the Scaling button is enabled in the Calibrating window. See Section 6.1.3 for instructions.

### 6.1.1 Multi-Point Calibrations

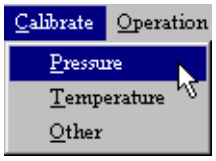
**Firmware versions 2.01 and earlier do not support freezing multiple In Use values.**

**Calibrating pressure in an orifice application will only freeze the In Use pressure but not the In Use differential.**

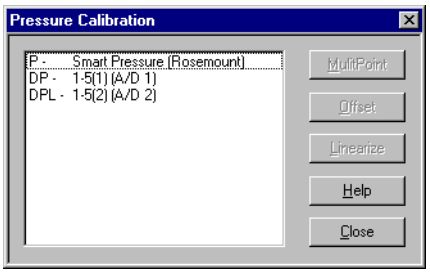
A multi-point calibration allows the user to enter up to six calibration points to achieve a polynomial correction to uncalibrated sensor readings. Use this calibration when adjustments to the shape of the known sensor response are desired (e.g., when doing an initial 3-point sensor calibration).

To perform a multi-point calibration,

1. Start SpectraCom and log on to the flow computer. See Section 3.1 for instructions.
2. Click on the *Calibrate* menu and select the appropriate option for your sensor/ transducer.




3. The corresponding Calibration window appears.



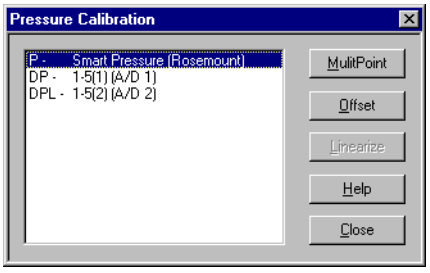

**Options displayed in the Calibration window will depend on the configuration of the to which you are connected.**

When this window opens, SpectraCom freezes all In Use values for the options listed and generates a System Log entry for each frozen value.

When this window closes, SpectraCom unfreezes all In Use values and generates a System Log entry for each unfrozen value.

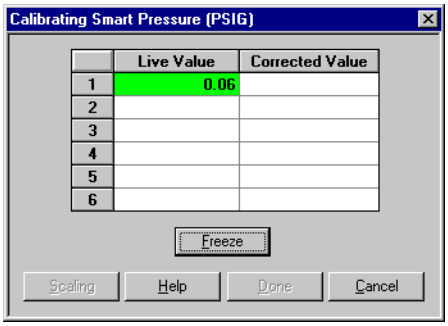
Sensors listed for Other Calibration are not linked to any In Use values. Thus, no values are frozen when this window displays and System Log entries will not be generated.

4. Select the desired sensor/transducer.



**The current value displayed uses the values of the calibration coefficients in the flow computer at the time that the calibration mode is entered. These calibration coefficients will not change until a new calibration is accepted. Use this value for reference.**

5. Click on the MulitPoint button to access the next calibration window.




The current calibration value (in the appropriate engineering units, such as PSIG or °F) is highlighted.

6. Ensure that the standardized reference output device (e.g., calibration resistors for RTDs, deadweight tester for static pressure, etc.) is presently delivering the desired live value signal level to the flow computer.

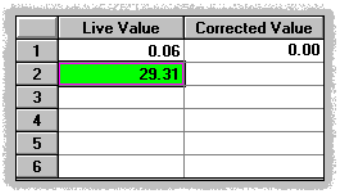
**A significant difference between the current value and the new value could indicate that the original calibration coefficients were grossly in error or that the calibration procedure is deficient.**

**If any reference signals deviate by 10% or more from previous calibration points, a warning is displayed, allowing you to either keep the previous calibration point or use the new one.**

7. Click on the Freeze button to "freeze" the current value. Note that the cursor automatically moves into the Corrected Value cell.
8. With the cursor in the Corrected Value cell, type in the value that represents the input signal level that is presently being delivered by the reference device.

   For example, if the reference device is presently delivering a signal level that represents zero (0), type in the numeral "0" in the Corrected Value cell.
9. Press the ENTER key to move to the next Live Value cell.

10. Using different reference signal levels, repeat Steps 2 through 5. You can enter up to six values.



| | Live Value | Corrected Value |
|---|---|---|
| 1 | 0.06 | 0.00 |
| 2 | 29.31 | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

Although up to six points may be entered, a polynomial of degree one less than the number of points entered is created to force the calibration curve through each of the entered points. If the points are numerous and irregular this could cause wild deviations from the intended calibration curve. If one of the points is incorrect, the calibration should be canceled and restarted. Do not attempt to add a new, corrected point to the curve.

11. Click on the Done button to accept the values and download the new calibration values.

    Click on the Cancel button to abort the calibration without entering new values.

12. SpectraCom returns to the Calibration window.

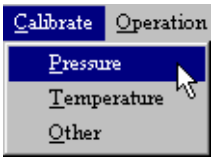
    When you close this window, the previously frozen In Use values are released and the unit returns to normal operation. A record of the change is added to the Event Log as an operator event.

### 6.1.2 Offset Calibrations

An offset calibration allows the user to enter a fixed offset to the curve, moving it up or down. Use the offset calibration to shift the calibration in response to a known offset value (e.g., when a differential pressure has been calibrated at atmospheric pressure and there is a known shift of this curve at operating pressures).

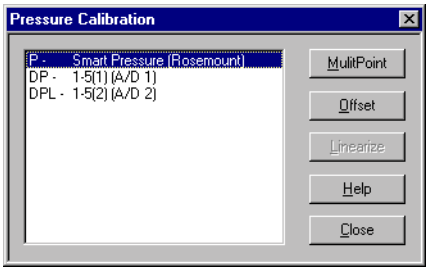
Note that this calibration technique does not change the shape of the curve.

To perform an offset calibration,




1. Start SpectraCom and log on to the flow computer. See Section 3.1 for instructions.
2. Click on the *Calibrate* menu and select the appropriate option for your sensor/ transducer.
3. The corresponding Calibration window appears.

**Options displayed in the Calibration window will depend on the configuration of the to which you are connected.**



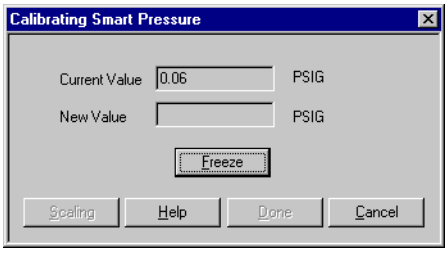

When this window opens, SpectraCom freezes all In Use values for the options listed and generates a System Log entry for each frozen value.

When this window closes, SpectraCom unfreezes all In Use values and generates a System Log entry for each unfrozen value.

Sensors listed for Other Calibration are not linked to any In Use values. Thus, no values are frozen when this window displays and System Log entries will not be generated.

4. Select the desired sensor/transducer.

5. Click on the Offset button to access the next calibration window.




The current calibration value (in the appropriate engineering units, such as PSIG or °F) is displayed in the Current Value data box.

**The current value displayed uses the values of the calibration coefficients in the flow computer at the time that the calibration mode is entered. These calibration coefficients will not change until a new calibration is accepted. Use this value for reference.**

6. Click on the Freeze button to accept the current value and move to the New Value data box.

7. With the cursor in the New Value field, type in the value that represents the input signal level that is presently being delivered by the reference device.

   For example, if the reference device is presently delivering a signal level that represents zero (0), type in the numeral "0" in the New Value field.

**A significant difference between the current value and the new value could indicate that the original calibration coefficients were grossly in error or that the calibration procedure is deficient.**

**If the new value causes a deviation of 5% or more from the present reference curve, a warning is displayed, allowing you to either keep the previous calibration point or use the new one.**

8. Click on the Done button to accept the values and download the new calibration values.

   Click on the Cancel button to abort the calibration without entering new values.

9. SpectraCom returns to the Calibration window.

   When you close this window, the previously frozen In Use values are released and the unit returns to normal operation. A record of the change is added to the Event Log as an operator event.

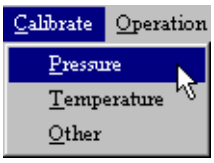
### 6.1.3 SCALING

**You can configure scaling for a 1-5 V sensor only.**

Use the scaling feature in conjunction with the calibration function to read or configure Low Scale and Full Scale values and their corresponding units of measurement. The scaling configuration feature allows you to convert values read from the A/D inputs into a new range with new units of measurement.

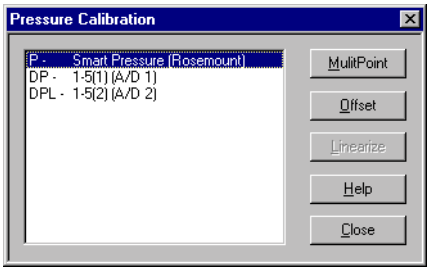
If scaling values are available for the selected sensor, the Scaling button is enabled in the Calibrating window.

1. Start SpectraCom and log on to the flow computer. See Section 3.1 for instructions.
2. Click on the *Calibrate* menu and select the appropriate option for your sensor/ transducer.




3. The corresponding Calibration window appears.

**Options displayed in the Calibration window will depend on the configuration of the Spectra100 flow computer to which you are connected.**

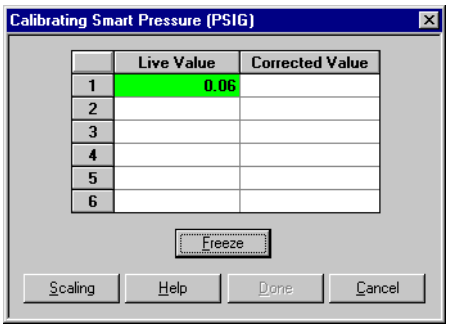


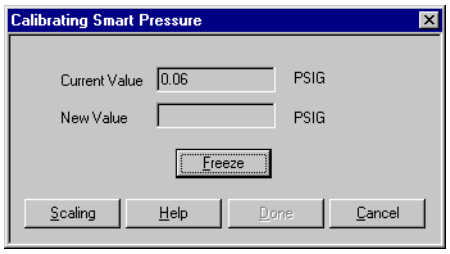
When this window opens, SpectraCom freezes all In Use values for the options listed and generates a System Log entry for each frozen value.

When this window closes, SpectraCom unfreezes all In Use values and generates a System Log entry for each unfrozen value.

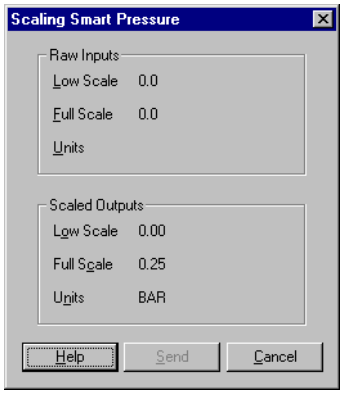
If the options listed are not linked to In Use datapoints, System Log entries will not be generated.

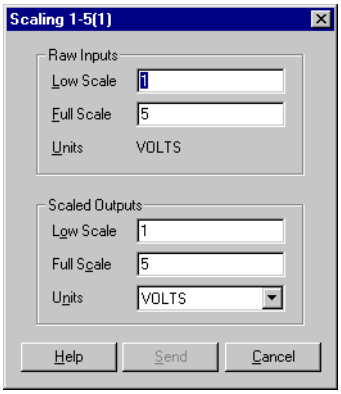
4. Select the desired sensor/transducer and click either the MulitPoint button or the Offset button.
5. The corresponding Calibrating window appears.




6. Click on the Scaling button to access the Scaling window.



**If you specify a different unit of measurement or if the desired output range deviates more than 5% from the read input, SpectraCom displays a confirmation dialog.**

**If the scaling is aborted, SpectraCom writes the calibration coefficients to 0, 1, 0, 0, 0, 0.**

7. Note the Inputs and Outputs, and then click on the Cancel button to exit this window.

   OR

   Use the Low Scale and Full Scale output data fields and Units pull-down menu to enter the new range and unit of measurement. Click on the Send button to write your changes to the sensor.

### 6.1.4 RTD Sensor (500Ω)

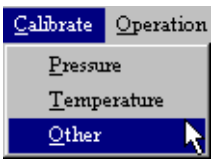
Use the RTD Calibration Kit (Daniel PN 2-3-2480-356) to calibrate the 500 Ω RTD sensor. This kit includes 2 precision resistors at 626.88 Ω (150 °F) and 465.15 Ω (0 °F).

See Section 6.1 or the online help for calibration instructions.

## 6.2 CALIBRATING A TURBINE METER (LINEARIZATION)

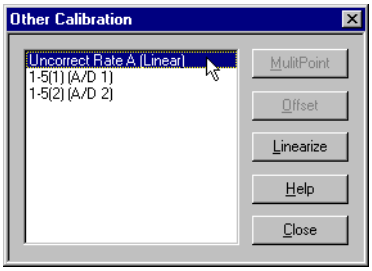
For each turbine meter, you can perform a linearization. Linearization allows you to enter the K factor data, which is provided by the factory or flow lab, for a given turbine meter. K factor data consist of a single constant or a set of multiple factors for curve fitting.

To perform a linearization,



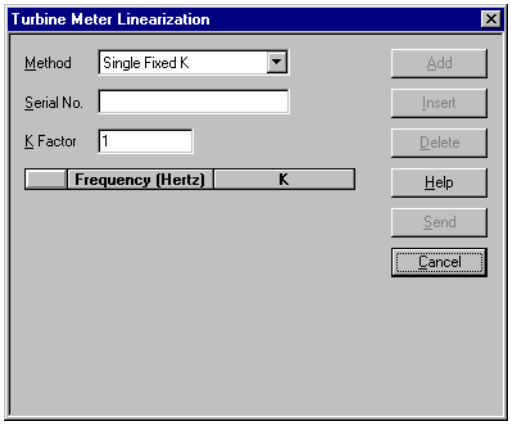

1. Start SpectraCom and log on to the flow computer. See Section 3.1 for instructions.
2. Use the *Calibrate* > *Other* menu path.

3. The Other Calibration window appears.




4. Select the desired turbine meter.

5. Click on the Linearize button to access the Turbine Meter Linearization window.




6. Use the Method pull-down menu to select the desired linearization algorithm. For a variant K factor per flow algorithm, choose one of the listed curves.

7. If you selected the *Single Fixed K* option, then input the K factor in the data field provided. Then go to Step 9.

   Otherwise, go to Step 8.

8. If you selected a *linearization curve*, then fill out the linearization table per the chart shipped with the meter or provided by your flow lab. Note that each frequency must be entered in Hertz.

**The frequencies can be entered in any order. SpectraCom automatically sorts the frequencies from lowest to highest before writing them to the flow computer.**

**When you return to the Linearization window, the table will display the sorted order.**

To add a new row to the table, click on the Add button.

To insert a new row below the currently selected row, click on the Insert button.

To delete the currently selected row, click on the Delete button.

9. Type the meter serial number in the *Serial No.* data field (19 characters maximum).

10. Click on the Send button to accept and download the new linearization values.

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# OPERATION

## 7.1 VIEWING FLOW DATA SCREENS

**The Operation function is a view-only menu. To make changes to the various selections, use the *Settings* pull-down menu path and the appropriate option.**

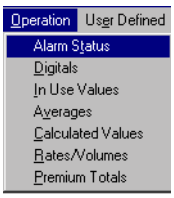
The Operation menu options provide view only windows for displaying the input and output data being received, processed, or produced by the Spectra100 Flow Computer.

These windows are pre-defined, with flow computer data displayed in these different categories:

- Alarm Status
- Digitals
- In Use Values
- Averages
- Calculated Values
- Rates/Volumes
- Premium Totals

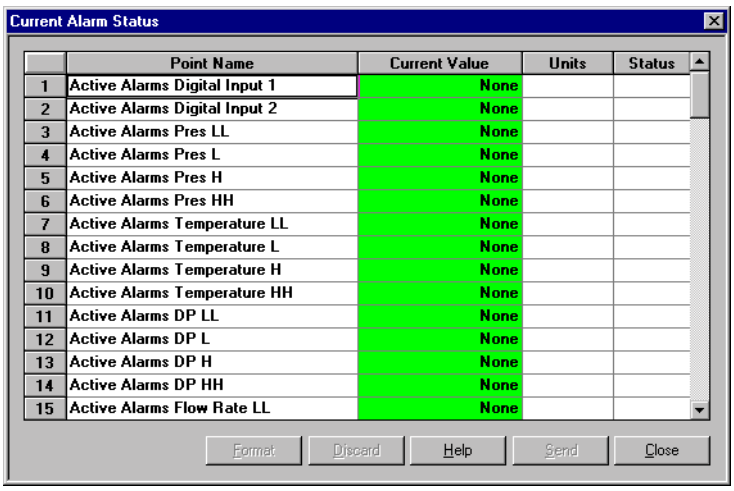
### 7.1.1 Alarm Status

The Alarm Status window allows you to view the status of all flow computer alarms, that is, whether any of the alarms are currently enabled or disabled. You can also view the values currently being received (or calculated) for any of the alarms that are active.




1. To access the Alarm Status function, use the *Operation* > *Alarm Status* menu path from the Spectra100 Operations window.

2. The Current Alarm Status window displays.




For details about a particular alarm status data point that is displayed, open the *Spectra100 Data Points Guide* online help file.

See Section 5.4 to configure the alarm parameters.

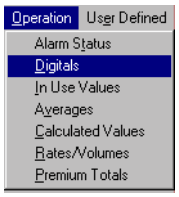
**This is a view-only window. The Send and Discard buttons are always disabled. See Section 5.5 to configure the alarm parameters.**

### 7.1.2 Digitals - Input/Output Status

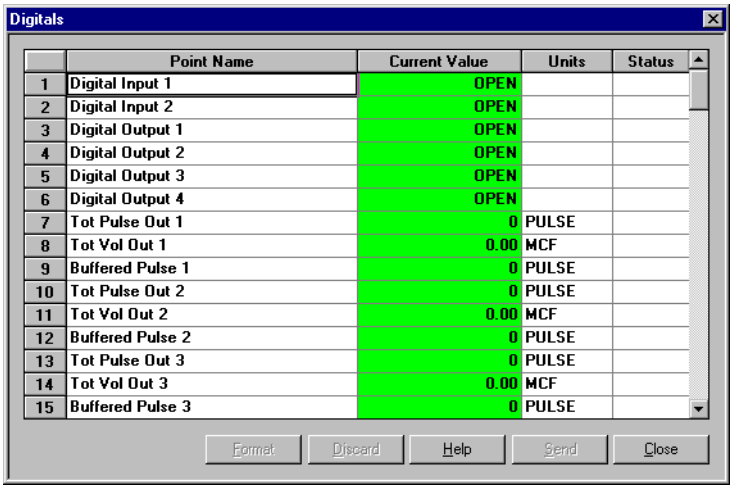
To view the current status of the digital input/output status to the Spectra100, that is, whether they are CLOSED (i.e., 1, or High) or OPEN (i.e., 0, or Low),

To change the settings for the Digital Outputs function, use the *Settings* > *Digital Control* menu path from the Spectra100 Operations window (see Section 5.7.1 for configuration details).

1. From the main menu, select the *Operation* > *Digitals* path.



2. The Digitals window displays.




3. View the current digital input/output status that is displayed. For details about a particular data point, open the *Spectra100 Data Points Guide*.

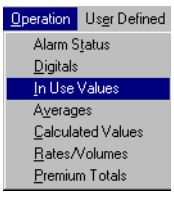
### 7.1.3 In Use Values

**Changes to the In Use Values values shown in this window are made from the *Settings* > *Fixed/Live Inputs* menu path. See Section 5.4.2 for more details.**

View the current live (or fixed) values that are being received from transducers. The flow computer makes computations from the In Use settings.

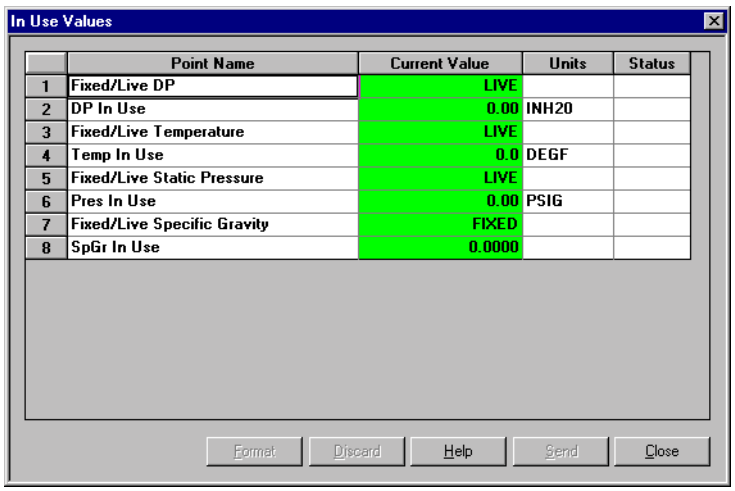
Data points typically found in this window may include the following:

- Fixed /Live Static Pressure
- Fixed /Live Temperature
- Fixed /Live Specific Gravity




1. To access the In Use Values function, use the *Operation* > *In Use Values* menu path from the Spectra100 Operations window.

2. The In Use Values window displays.



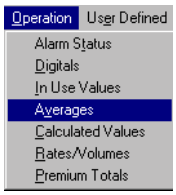

3. Change floating point number values using the Format button to toggle the display of the value between standard format, engineering format, or best fit format.

### 7.1.4 Averages

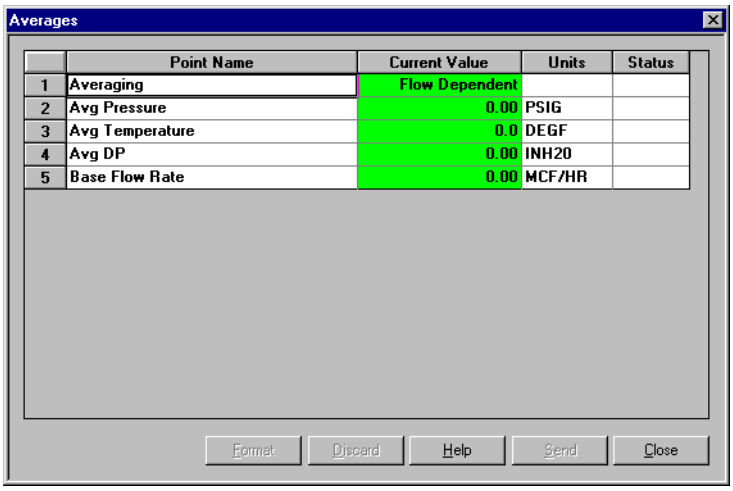
View the output (or input) data that is currently being averaged by the flow computer, such as temperature, pressure, and so forth.

1. To access the Averages function, use the *Operation* > *Averages* menu path from the Spectra100 Operations window.

**Changes to the Averages values shown in this window are made from the *Settings* > *Location* > *Averaging* menu path. See Section 5.2.2 for more details.**

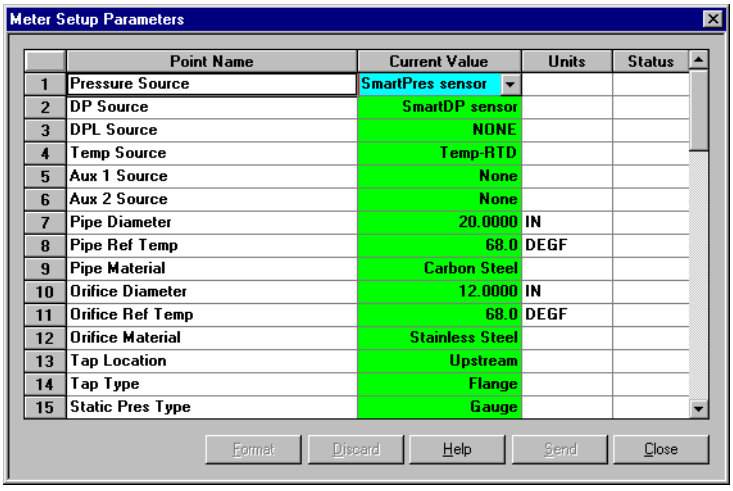


2. The Averages window displays.




**This is a view-only window. The Send and Discard buttons are always disabled.**

Depending upon the meter application in use, certain output data (e.g., flow) can be averaged at your request. You can find these items in the Location Setup Parameters window. For more details see Section 5.2.



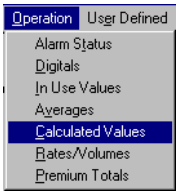

However, you can alter the display of any floating point value, as noted below.

3. For floating point number values, you can use the Format button to toggle the display of the value between standard format, engineering format, or best fit format.

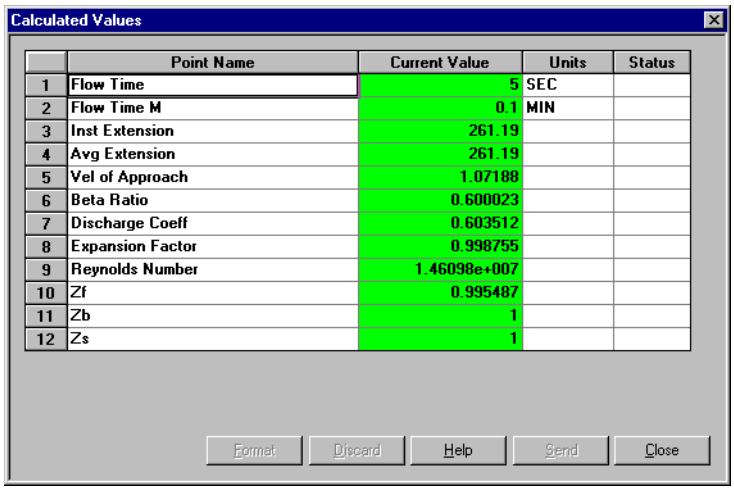
### 7.1.5 Calculated Values

View the data that is included in the American Gas Association (AGA) formulas currently in use by flow computer.

1. To access the Calculated Values function, use the *Operation* > *Calculated Values* menu path from the Spectra100 Operations window.




2. The Calculated Values window displays.




To adjust these values, use the *Settings Location* menu path, to display the *Setup Parameters* window, the *Meter Setup Parameters* window, or the *Fixed/Live Inputs* window. For more details see Section 5.2, Section 5.3, and Section 5.4.

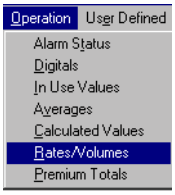
**This is a view-only window. The Send and Discard buttons are always disabled.**

However, you can alter the display of any floating point value, as noted below.

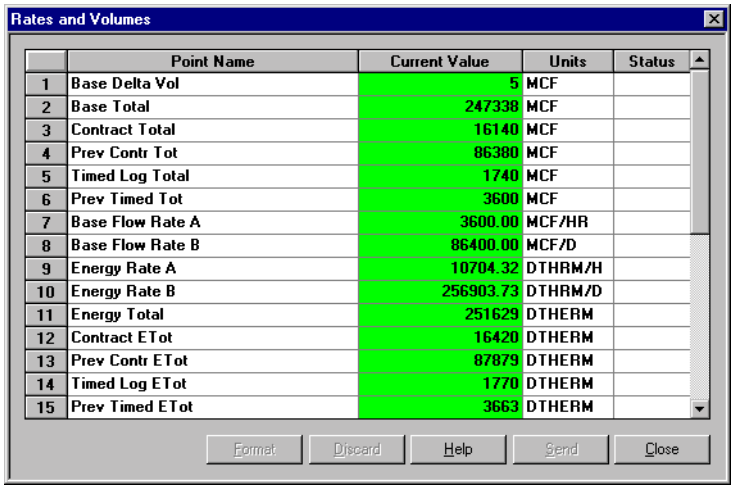
3. For floating point number values, you can use the Format button to toggle the display of the value between standard format, engineering format, or best fit format.

### 7.1.6 Rates/Volumes

View data that comprises the final rate and volume calculations produced by the Spectra100 Flow Computer.




1. To access the Rates/Volumes function, use the *Operation* > *Rates/Volumes* menu path from the Spectra100 Operations window.
2. The Rates/Volumes window displays.

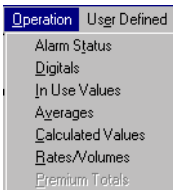


**This is a view-only window. The Send and Discard buttons are always disabled.**

You can alter the display of any floating point value, as noted below.

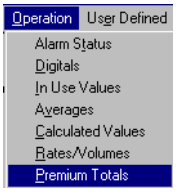
3. For floating point number values, you can use the Format button to toggle the display of the value between standard format, engineering format, or best fit format.

### 7.1.7 Premium Totals




The Premium Totals menu is grayed out until Premium 1 and Premium 2 Set Point values are configured. To enable this menu function set up the premium set points. See Section 5.2.3 for details.

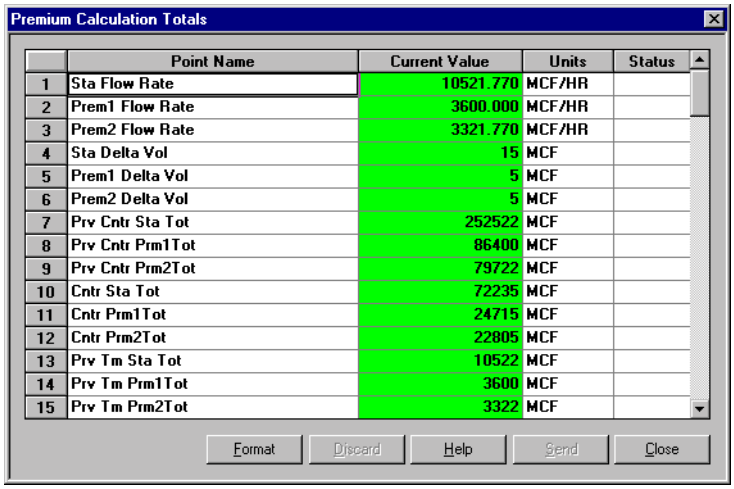
After the Premium 1 and Premium 2 Set Point values are configured, the premium totals can be viewed.




To view the Premium Calculation Totals,

1. Use the *Operations* > *Premium Totals* menu path.

   The Premium Calculation Totals window displays.




2. Click on the Close button to exit and return to the Spectra100 Operations main window.

## 7.2 CUSTOMIZING VIEW WINDOWS

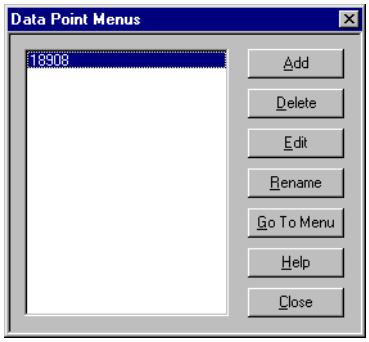
**The User-Defined menus you create, edit, or rename are saved to the PC hard disk using the following directory and menu path:**

**C:\Program Files\Daniel Industries, Inc.\ Flow Computer\ Devices\ Spectra100\ UserMenus.dat**

From the User-Defined menu, you can build and save custom viewing windows for displaying only the Spectra100 information you need for special purposes. You can also edit existing User-Defined menus or rename them.

### 7.2.1 Build a User-Defined Menu

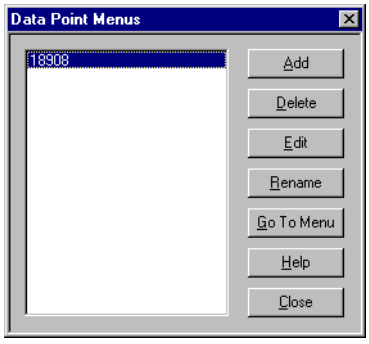
1. To access the User-Defined function, use the Spectra100 Operations main window, *User- Defined* > *User-Defined Menus* path.
2. The Data Point Menus window displays.




**All User-Defined menus are stored on the PC hard drive with the SpectraCom software program. They are not stored on the Spectra100 Flow Computer.**

For more details about a particular data point, open the Spectra100 *Data Points Guide* online help file.

3. The Data Point Menus window displays.




**All User-Defined menus are stored on the PC hard drive with the SpectraCom software program. They are not stored on the Spectra100 Flow Computer.**

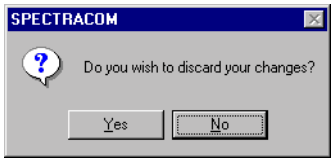
For more details about a particular data point, open the Spectra100 *Data Points Guide* online help file.

4. From the Data Point Menu window, click on the Add button and the New Menu window displays.

5. Type in a descriptive name of the new menu you are about to create.
6. In the New Menu window, set the *Refresh Rate* at an integral value (2, 3, or 4, etc., i.e., seconds) to determine how often the Spectra100 Flow Computer is queried for current menu display values.
7. To save the new menu and edit it later, click on the Save button.

   Click on the Cancel button to discard changes.

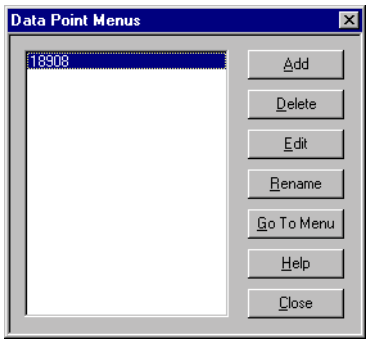
   (a) Spectra100 prompts you with the following message,



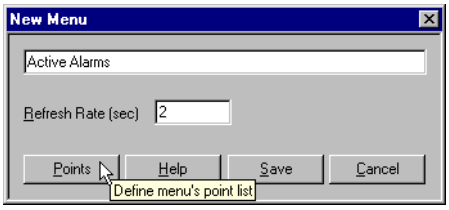

   (b) Click on the Yes button to return to the new menu window.

   (c) Click on the No button to continue making changes.

8. To begin adding data points to the new menu, repeat Step 1 and Step 3 to display the Data Points Menus window.



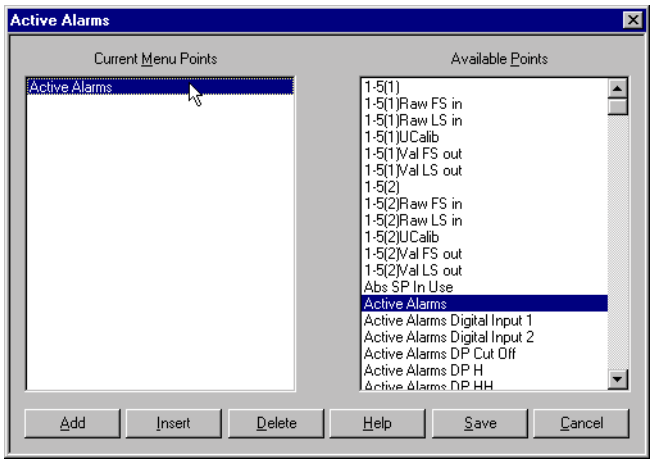

9. Click on the Add button. A configuration window for the selected user-defined menu displays.




10. To add the data point to your menu,

    (a) Click on the Points button.

(b) Select the desired data point from the *Available Points* list.




(c) Click on the Add button. This data point is added to the end of the Current Menu Points list.

11. To insert data points to the Current Menu Points list, click on the Insert button

12. Click on the Delete button to delete the currently selected data point from the Current Menu Points list.

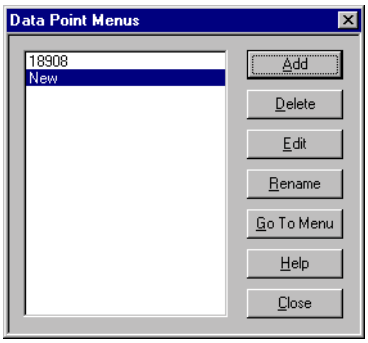
13. Use the Save button to save your changes.

### 7.2.2 View a User-Defined Menu

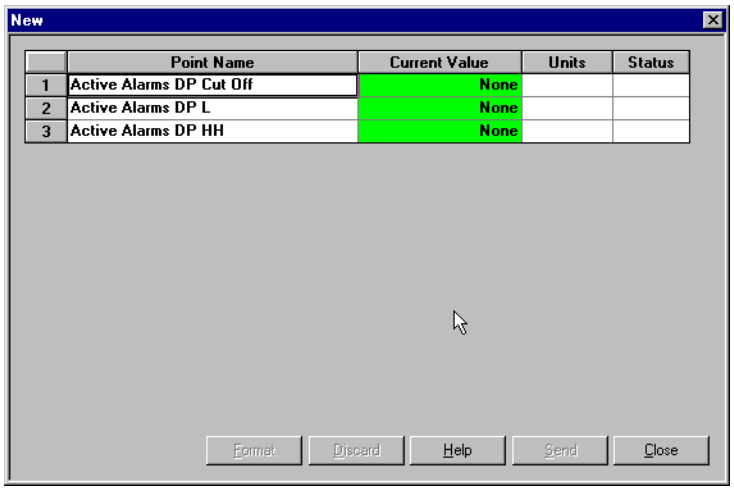
To view an existing User-Defined menu,

1. Access the User-Defined function, use the *Operation* > *User-Defined* menu path from the Spectra100 Operations window.
2. The Data Point Menus window displays.

3. Select an existing menu name from the list.




4. Click on the Go To Menu button and the selected User-Defined menu is displayed.




5. You can delete an existing User-Defined menu by highlighting the menu name and clicking on the Delete button.

6. You can edit an existing User-Defined menu by highlighting the menu name and clicking on the Edit button.

7. You can rename an existing User-Defined menu by highlighting the menu name and clicking on the Rename button.

8. Click on the Close button to return to the Spectra100 Operations window.

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# UPLOAD CONFIGURATION AND LOGS

The options in the Upload menu enable you to upload, from the Spectra100 to your personal computer (PC), the current configuration of the Spectra100 and the latest Spectra100 logs.

The options using **v2.5 firmware** are:

- Collect All
- Collect Configuration
- Collect Logs

The options using **v3.0 firmware** are:

- Collect All
- Update All
- Collect Configuration
- Collect Logs
- Update Logs

## 8.1 LOG FILES EXPLAINED

With the release of v3.0 firmware, the structure for collecting and saving log files has changed. This section will explain both the previous log file structure and the new log file structure.

### Version 2.5 and earlier firmware

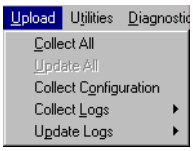
All logs collected from a flow computer running v2.5 firmware or earlier are stored on the PC in tab-delimited ASCII files with an .xls extension. A separate file exists for each log type (i.e. Timed, Contract, Event, or System). The default filenames begin with the log type with the Location ID and Meter ID appended. (ex. Timed_0_1.xls) These files can be viewed with any spreadsheet program such as Microsoft Excel or even with a text editor.

### Version 3.0 and later firmware

All logs collected from a flow computer running v3.0 firmware or later are stored on the PC in a single binary log file. The default filename begins with the Location ID followed by the Meter ID and ended with the file extension ".100". (ex. 0_1.100). This means that all the Timed, Contract, Event, and System logs for a given flow computer stay together in a single file stored on the PC. Version 3.0 SpectraCom contains utilities that can View, Delete, or Export data contained in these binary files.

The reason for this change was to allow the log data stored on the PC to contain a running archive of the data contained in the flow computer instead of just a mirror of the data stored in the flow computer. With the update log functions, only new logs need to be collected from the flow computer and can be appended to the existing logs already stored on the PC in the binary log file. Use the Export log feature to generate the.xls tab-delimited ASCII files from the binary log files for backwards compatibility to the previous log file structure. See Section 9.1 for more information for the new log utilities compatible with v3.0 and later firmware.

**See Section 8.2 to upload configurations and logs using either v2.5 or v3.0 firmware.**

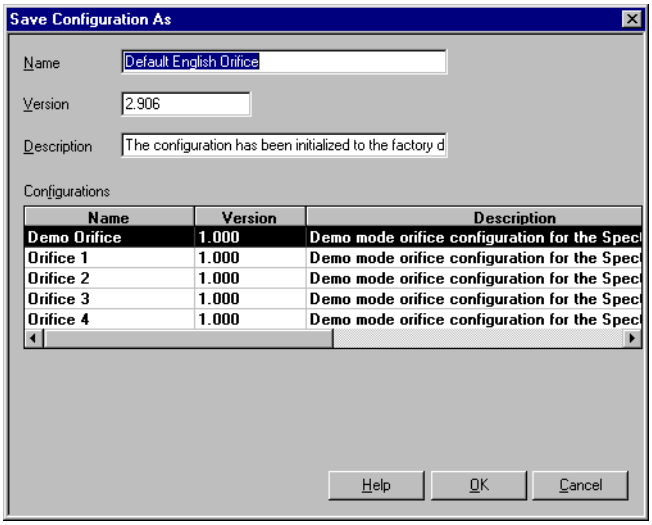



## 8.2 UPLOAD TO THE PC ALL ITEMS

For **v2.5 firmware**, to upload all configurations and logs,

1. Use the *Upload* > *Collect All* menu path.

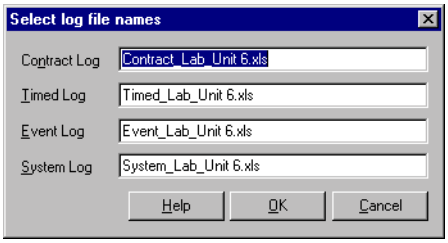
   The Save Configuration As window displays.




   In the Save Configuration As window, give the saved configuration a name, version number, and description.

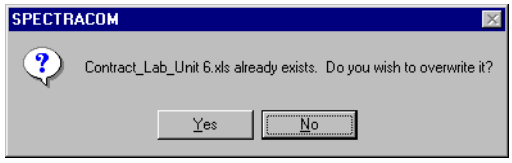
2. Click on the OK button.

   The Select log file names window displays the file names of the logs to be collected.



3. Click on the OK button to collect the Contract, Timed, Event, and System Logs.

   If you do not give the saved configuration a new name, version number, and description, SpectraCom displays a prompt (e.g., for each of the logs Contract, Timed, Event, and System): "Contract logs file exists. Do you wish to overwrite it?"

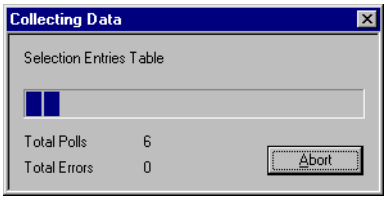



4. Click on the Yes button to overwrite the existing file. Repeat these steps for Timed Logs, Event Logs, and System Logs.

   Or,

   Click on the No button to return to the Select log file names dialog box and rename the log file.

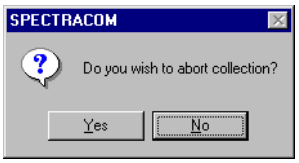
5. SpectraCom collects the data and displays the Selection Entries Table dialog.




   Or,

   Click on the Abort button to exit the collection process.

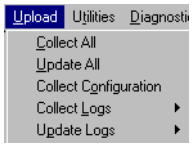
SpectraCom displays the following prompt “Do you wish to abort colllection?”




Click on the Yes button to abort the collection and return to the Select file names dialog.

Or,

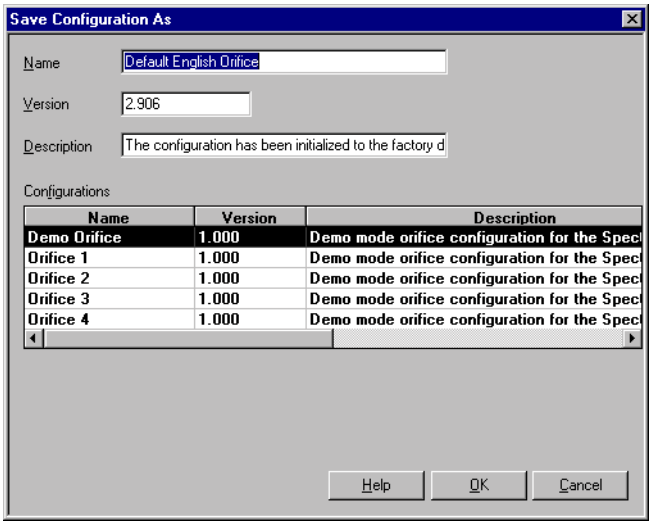
Click on the No button to complete the collection process and return to the Spectra100 Operations Main window.




For **v3.0 firmware**, to upload all configurations and logs,

1. Use the *Upload* > *Collect All* menu path.

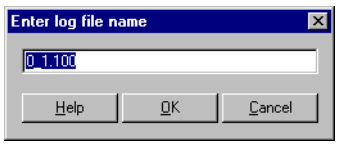
   The Save Configuration As window displays.



In the Save Configuration As window, give the saved configuration a name, version number, and description. Click on the

OK button.

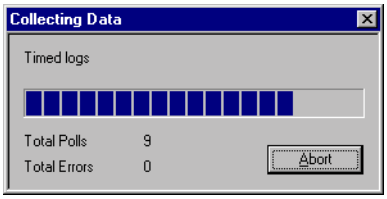
2. The Enter Log File Name window displays the default file name of the logs to be collected.




Edit the default file name, if desired.

3. Click on the OK button to accept the log file name and start the upload process.

SpectraCom polls, collects, and saves all of the log data (e.g., Timed Logs).




After the files are stored, SpectraCom returns you to the Spectra100 Operations Main window.

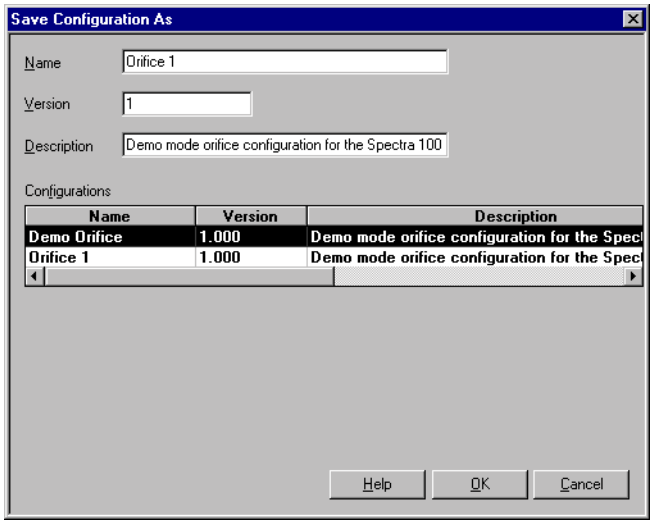
## 8.3 UPDATE ALL SPECTRA100 CONFIGURATIONS AND LOGS

**The Update All function is only available with v3.0 firmware or later.**

To update all configurations and logs,

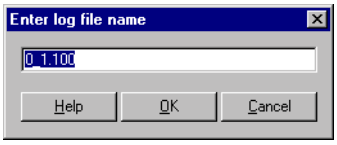
1. Use the *Upload* > *Update All* menu path.

   The Save Configuration As window displays.




   Give the saved configuration a name, version number, and description, then click on the [OK] button.

2. The Enter Log File Name window displays the list of filenames of the logs to be collected.

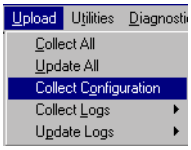



3. Click on the [OK] button to update the log file data and save the updated configurations.

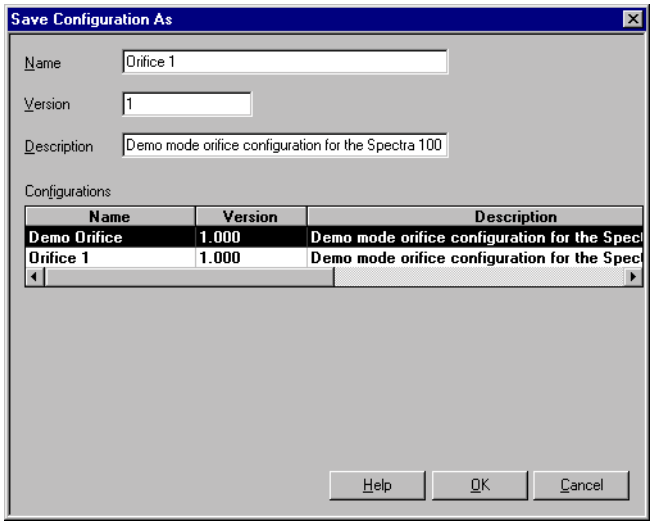
## 8.4 UPLOAD TO THE PC THE SPECTRA100 CONFIGURATION

To upload configurations,

1. Use the *Upload* > *Collect Configuration* menu path.

   The Save Configuration As window displays.

2. Click on the OK button to accept current configuration file names and continue with the upload.

   Or, click on the Cancel button to exit without saving the configuration.

3. After clicking the OK button, a prompt displays, "Do you wish to send the new configuration identification information to the unit?"

4. Click on the Yes button to send the configuration to the unit.

   Or,

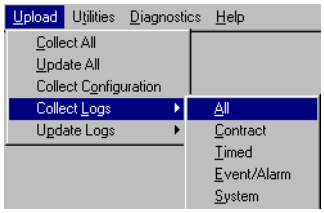
   Click on the No button to abort and exit.

## 8.5 UPLOAD TO THE PC THE SPECTRA100 LOGS

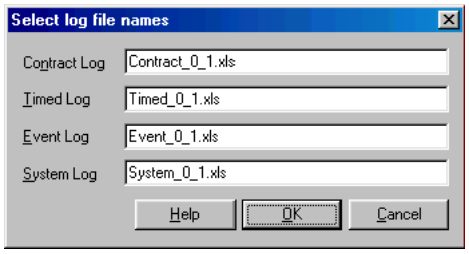
**See Section 8.5 to collect logs using either v2.5 or v3.0 firmware.**

To upload all available logs, or select a specific log type using **v2.5 firmware** or earlier,

1. Use the *Upload* > *Collect Logs* > *All* menu path.

   The Select Log File Names window displays.

   Edit the default log file names, if desired.

2. Click on the OK button to accept default file names and continue with the upload.

   Or,

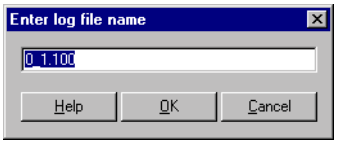
   Click on the Cancel button to exit without collecting the logs.

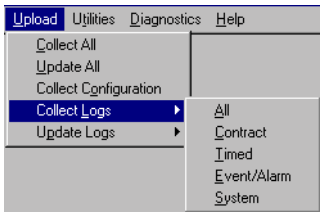
**For v2.5 or earlier, SpectraCom creates the default filenames by appending the Location ID and Meter ID to the type of log being collected. The example dialog box above shows the default filenames for a flow computer that has a Location ID of "0" and a Meter ID of "1".**

For **v3.0 firmware**, to upload all configurations and logs,

1. Use the *Upload* > *Collect All* menu path.

   The Enter Log File Name dialog appears.



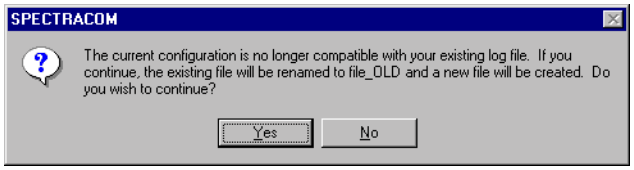




   Insert the log file name that you want to collect and save to disk.

**For v3.0 and later SpectraCom creates the default filename by appending the Meter ID to the Location ID, followed by a .100 file extension. The example, Enter Log file name dialog box, shows the default file name for a flow computer that has a Location ID of "0" and a Meter ID of "1".**

2. Click the OK button to start the upload.

   If the log configuration has been changed and is no longer compatible with the existing log file, the SpectraCom displays the following prompt;

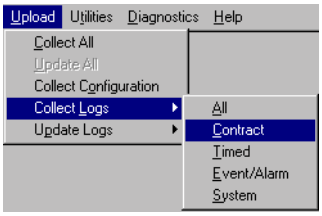



   Click on the Yes button to continue. The existing file will be renamed to file_OLD and a new file will be created.

   Or,

   Click on the No button to abort the upload process.

**Collect logs using either v2.5 or v3.0 firmware.**



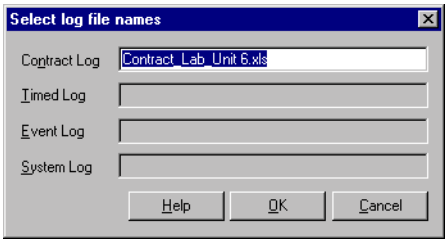

**Uploading Specific Log Types.**

To upload all available logs, or select a specific log type using **v2.5 firmware** or earlier,

1. Use the *Upload* > *Collect Logs* menu path.

   From the pull-down menu select Contract, Timed, Event, or System.

   The Select Log File Names window displays (e.g., Contract).

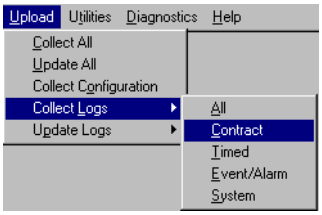



2. Click the OK button to start the upload.

   Or,

   Click on the Cancel button to exit without collecting the logs.

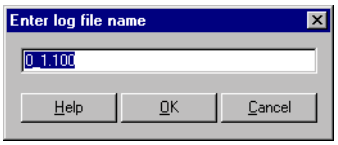
For **v3.0 firmware**, to upload a specific log type,




1. Use the *Upload* > *Collect Logs* menu path.

   From the pull-down menu select Contract, Timed, Event, or System.

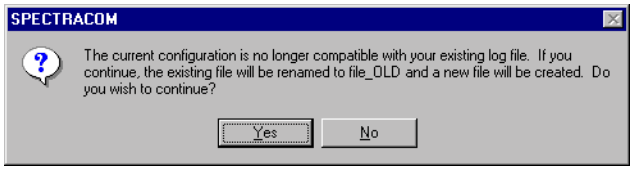
   The Enter Log File Name dialog appears.



Insert the log file name that you want to collect and save to disk.

2. Click the OK button to start the upload.

   If the log configuration has been changed and is no longer compatible with the existing log file, the SpectraCom displays the following prompt;




   Click on the Yes button to continue. The existing file will be renamed to file_OLD and a new file will be created.

   Or,

   Click on the No button to abort the upload process.

**For v3.0 and later SpectraCom creates the default filename by appending the Meter ID to the Location ID, followed by a .100 file extension. The example, Enter Log file name dialog box, shows the default file name for a flow computer that has a Location ID of "0" and a Meter ID of "1".**

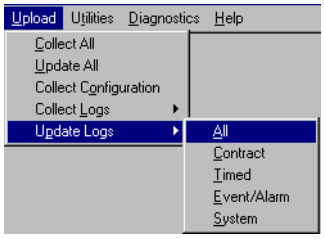
## 8.6 UPDATING SPECTRA100 LOGS

To update all available logs, or select a specific log type,

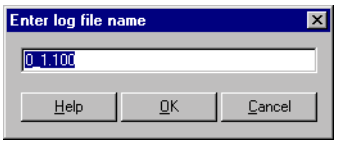
**This function is only available for v3.0 firmware or later.**

1. Use the *Upload* > *Update Logs* menu path.

   From the pull-down menu select All, Contract, Timed, Event, or System.




   The Enter Log File Name dialog appears.



Insert the log file name that you want to collect and save to disk.

2. Click the OK button to start the update process.

   Or,

   Click on the No button to abort the update process.

   Repeat this process to update each specific log type.

## 8.7 EXAMPLE SYSTEM LOGS

If the options listed are not linked to In Use datapoints, System Log entries will not be generated. For details on sample system log entries, see Figure 8-1.

| Date | Time | Event |
|---|---|---|
| 2/3/00 | 10:01:24 | User log on: “user1” |
| 2/3/00 | 10:16:58 | System error: Sensor (1) |
| 2/3/00 | 10:18:09 | User log off: “user1” |
| 2/3/00 | 10:18:33 | User log on: “root” |
| 2/3/00 | 10:18:51 | 1-5(1)Val LS out rescaled from “VOLTS” to “PSIG” |

*Figure 8-1 Sample System Log*

**The Sensor Number only displays if that particular Sensor Type contains more than one sensor, e.g., 1-5(1), 1-5(2).**

**For more information, see the S100 Developer’s Guide (PN 3-9000-102).**

| Description | Example System Log Entry |
|---|---|
| Cold Start | Cold start |
| Configuration ID Change | Configuration identification modified |
| Date Change | Date change from 02/03/2000 to 02/04/2000 |
| Local Display Reconfiguration | Local display configuration modified |
| <Log Type> Log Table Reconfiguration | Contract log configuration modified<br>Timed log configuration modified |
| Logs and Totals Reinitialized | Logs and totals reinitialized |
| Modbus Register List Reconfiguration | Modbus register list modified |
| Non-standard Database Point Modification | Location ID changed from “0” to “lab”<br>Meter ID changed from “1” to “2” |
| Sensor Calibration Change (calibration correction index): datapoint calibrated (sensor type, sensor number) data changed | Calibration (1): RTD (RTD-500) corrected -409.8 to -409.0 DEGF |
| Sensor Frozen: data point frozen (sensor type, sensor number) | Input Frozen: Pres In Use (Druck) |
| Sensor Scaling Change: sensor scaled and data changed | 1-5(1)Val LS out rescaled from “VOLTS” to “PSIG”<br>1-5(1)Val FS out rescaled from “VOLTS” to “PSIG”<br>1-5(1)UCalib rescaled from “VOLTS” to “PSIG”<br>1-5(1) rescaled from “VOLTS” to “PSIG” |
| Sensor Unfrozen: data point unfrozen (sensor type, sensor number) | Input Unfrozen: Pres In Use (Druck) |
| System Error: type of error | System error: Sensor (1) |
| Time Change | Time change from 14:19:44 to 14:21:37 |
| Turbine Linearization Reconfiguration | Turbine linearization table modified |
| User List Reconfiguration | User list modified |
| User Log Off: user name | User log off: “user1” |
| User Log On: user name | User log on: “user1” |
| Warm Start: reason warm start occurred | Warm start: user command |

# UTILITIES

The options in the SpectraCom Utilities menu enables you to view, delete, and export log files collected using v3.0 firmware or later (see Section 8.4 for details on collecting logs from the flow computer).

## 9.1 VIEW SPECTRA100 LOGS

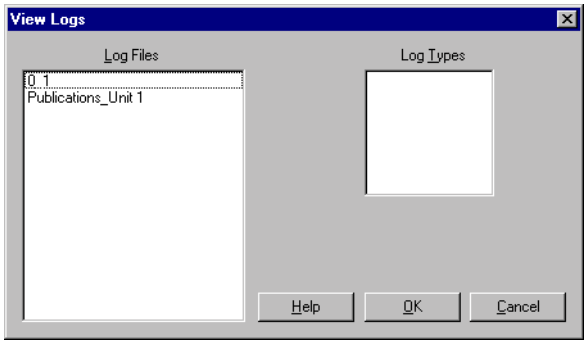
**The Utilities function does not support logs collected from v2.5 or earlier firmware**

The View Spectra100 Logs displays a list of all the log files available. The user selects the file name and the log file types for that file are displayed (e.g., Contract logs, Timed logs, Event/Alarm logs, and System logs). Only one log file type can be selected at a time. The selected log is presented in a spreadsheet format.

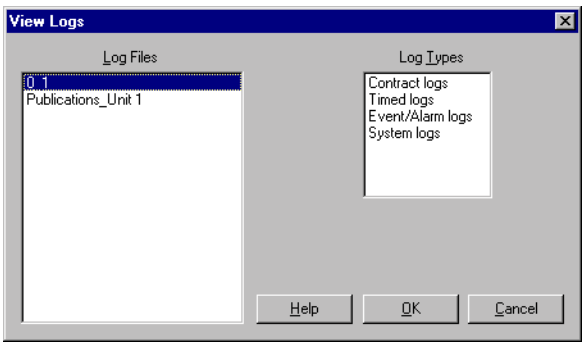
To access the View Spectra100 Logs,

1. Use the *Utilities* > *View Logs* menu path.

   The View Logs window displays.



2. Click on the file name from the Log Files field. The log types for that file are displayed in the Log Types field.

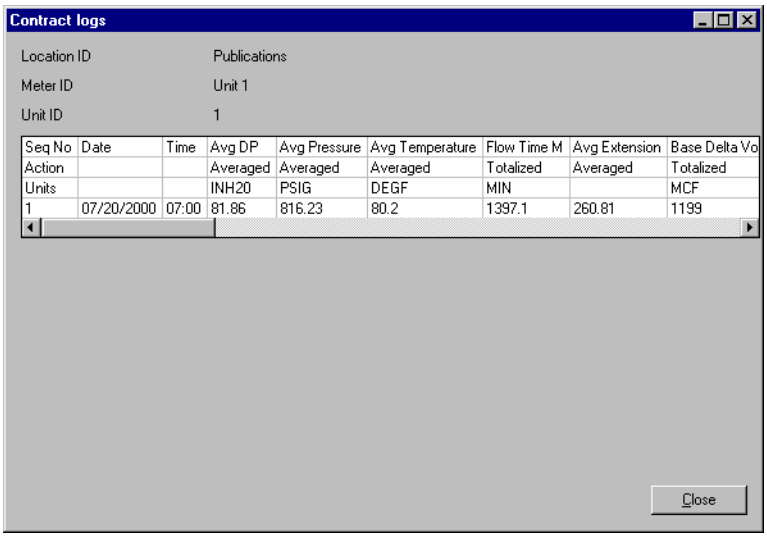



3. Click on the log type (e.g., Contract Logs).

4. Click the OK button.

5. The Contract Logs window is displayed.

   Data provided includes the Location ID, Meter ID and Unit ID. The spreadsheet format shows the Sequence Number, Action Type, and Units of Measurement.



6. Click on the Close button to return to the View Logs window. Select another log type (e.g., Timed logs, Event/Alarms, or System Logs) or click on the Cancel button to return to the SpectraCom main screen.

## 9.2 DELETE SPECTRA100 LOGS

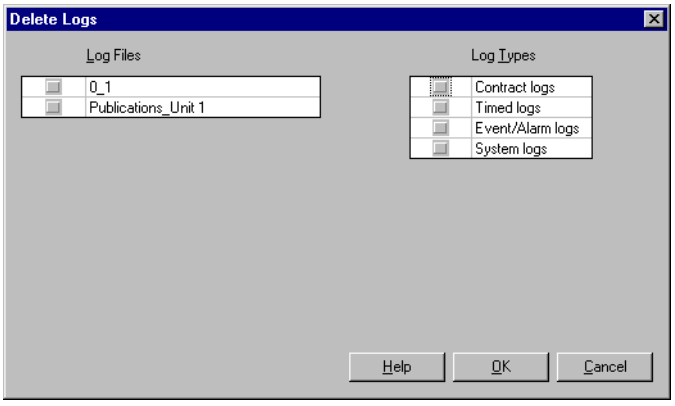
**The Utilities function does not support logs collected from v2.5 or earlier firmware**

The Delete Spectra100 Logs displays a list of all log files available. One or more of these files may be selected and a second list displays all possible logs to delete (e.g., Contract Logs, Timed Logs, Event/Alarm Logs, and System Logs). Upon confirmation of the user's selection, the requested logs are deleted from the selected files. If one or more of the selected files does not contain any records of the requested log type, those files remain unaffected. If all logs within any log file are deleted, that file will be deleted and the file list will be redrawn.

To access the Delete Logs function,

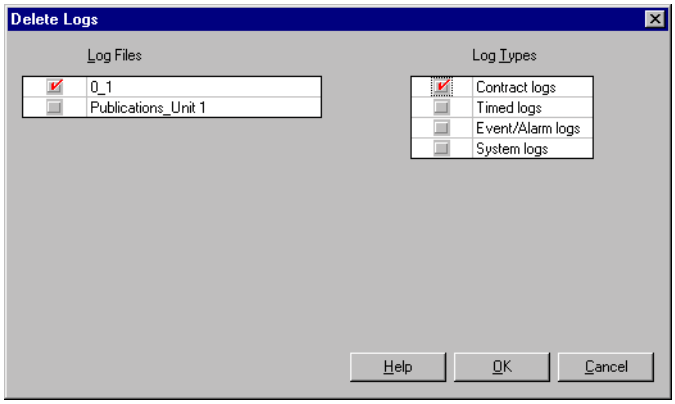
1. Use the *Utilities* > *Delete Logs* menu path.

   The Delete Logs window apprears.



2. Click on the File Name button from the Log Files field.

   Click on the Log Type button (e.g., Contract Logs) and a red check mark appears next to the log type that will be deleted.




3. Click on the OK button to delete the selected logs.

4. Click on the Cancel button to abort the Delete Logs function and return to the SpectraCom main screen.

## 9.3 EXPORT SPECTRA100 LOGS

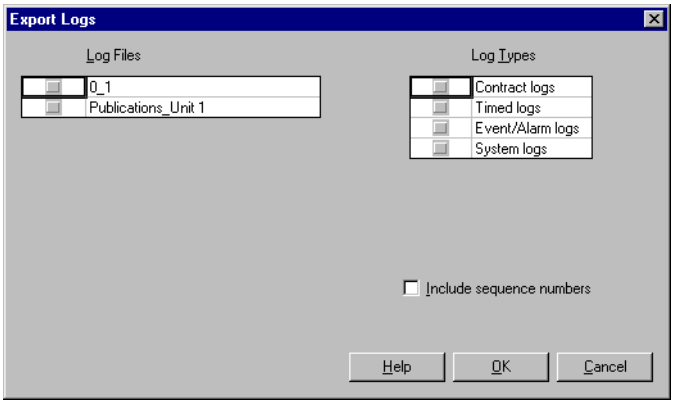
The Export Spectra100 Logs features a list of all log files available. One or more of these files may be selected and a second list displays all possible logs to export (e.g., Contract Logs, Timed Logs, Event/Alarm Logs, and System Logs). Upon the user's selection, the requested logs will be exported to tab-delimited ASCII files with an extension of ".XLS" for easy import into Microsoft Excel.

**The Utilities function does not support logs collected from v2.5 or earlier firmware**

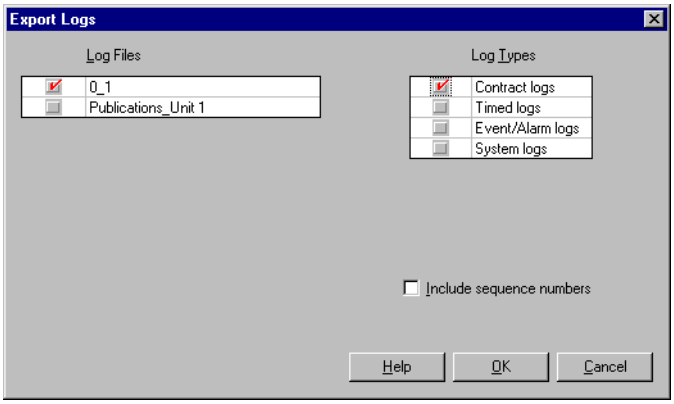
To access the Export Log function,

1. From the *Utilities* > *Export Logs* menu path.

The Export Log window displays.




2. Click on the File Name and Log Type buttons from the Log Files and Log Types field (e.g., Contract Logs) and a red check mark appears next to the log file and log type that will be exported and uploaded to the PC.




3. Click on the OK button to export the selected logs.

4. Click on the Cancel button to abort the Export Logs function and return to the SpectraCom main screen.

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# DIAGNOSTICS

## 10.1 VIEW SPECTRA100 DEVICE INFORMATION

**Please note that the Warm Start and Cold Start functions are detailed in Getting Started see Section 3.5.**

The Diagnostics menu provides the means for:

- controlling the Spectra100 at its most basic levels, including warm and cold starting
- sending or receiving the Spectra100 firmware program (for flash memory re-programming) and/or its configuration
- viewing the basic device information, communications statistics, and memory contents

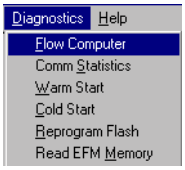
The Device Information read-only window provides basic information about the flow computer hardware, embedded software, and the date and time of previous warm or cold starts.

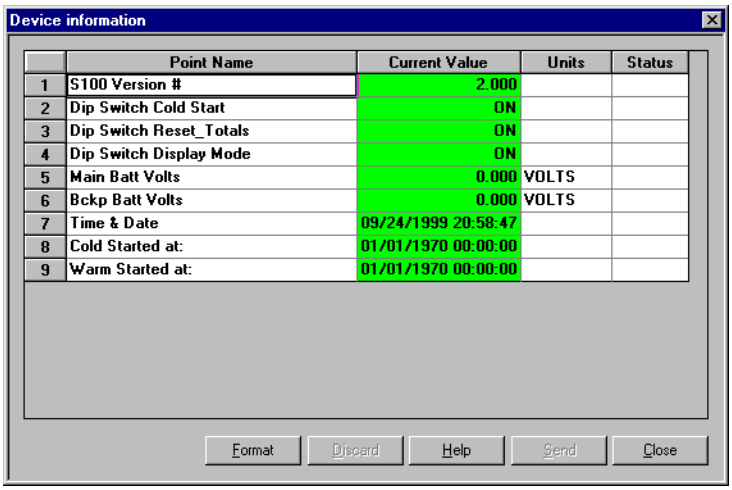
Items displayed include:

- version of embedded software currently in use by the flow computer
- current DIP switch settings for cold start enable, security lock, and diagnostics
- voltage levels for the main and backup batteries
- flow computer current time and date
- date and time of the last cold start
- date and time of the last warm start

### 10.1.1 Viewing Device Information

1. Click on the *Diagnostics* menu.
2. In the *Diagnostics* menu, click on the *Flow Computer* option.
3. The Device Information window displays.



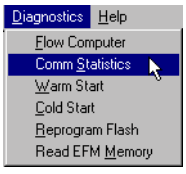

## 10.2 COMMUNICATIONS STATISTICS

The Communications Statistics window is read-only. It provides troubleshooting information about the status of serial communications sessions currently being maintained between the flow computer and another serially-connected device (such as a laptop personal computer, or PC).

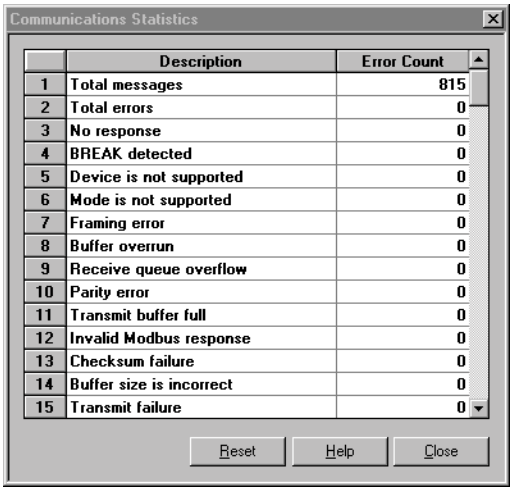
### 10.2.1 View Spectra100 Communications Statistics

To view communications statistics,

1. Click on the *Diagnostics* menu.
2. In the *Diagnostics* menu, click on the *Comm Statistics* option.



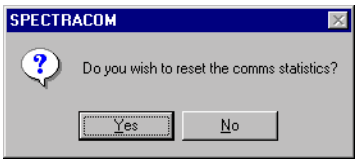
3. The Communications Statistics window displays.

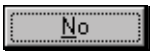



4. The

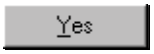
button in the Communications Statistics window clears all counters.

5. The flow computer prompt displays the message, "Do you wish to reset the comms statistics*?*".




6. Click on the 

button to return to the Communications Statistics window without resetting the counters.

   Click on the 

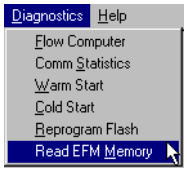
button to reset the counters.

## 10.3 READ EFM MEMORY

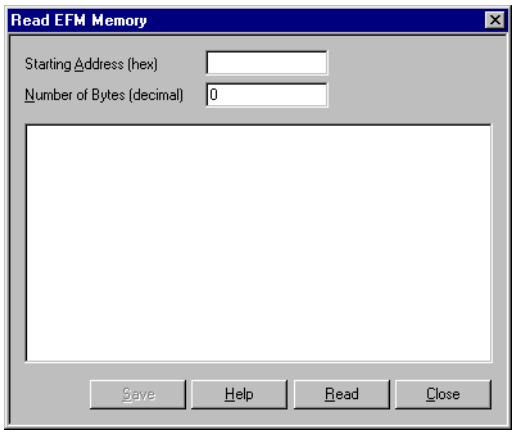
The Read EFM Memory window is read only. It provides troubleshooting information about the memory contents of the flow computer.

To view the memory contents of the flow computer,

1. Click on the *Diagnostics* menu. Click on *Read EFM Memory*.




2. The Read EFM Memory window displays.




3. In the Read EFM Memory window, enter the beginning physical address of memory to read in HEX decimal and the number of bytes to read.

4. Click on the Read button to perform this diagnostic procedure.

## 10.4 REPROGRAMMING THE FLOW COMPUTER FROM PROGRAM FLASH MEMORY

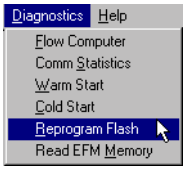
**Reprogramming the Spectra100 causes all logs to be erased and the flow computer's current Operating Configuration to be lost if a Cold Start is performed.**

Reprogramming the flash memory of a flow computer enables you to download from the PC to the flow computer either one or both of the following:

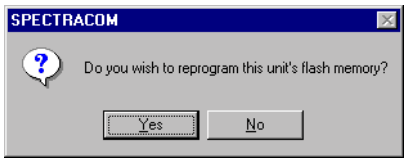
- flow computer configuration
- firmware program

To begin the download process,

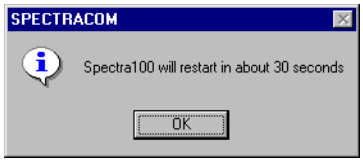
1. Set pin 1 on Switch 1 (on the circuit board, in the flow computer enclosure) to the ON position.



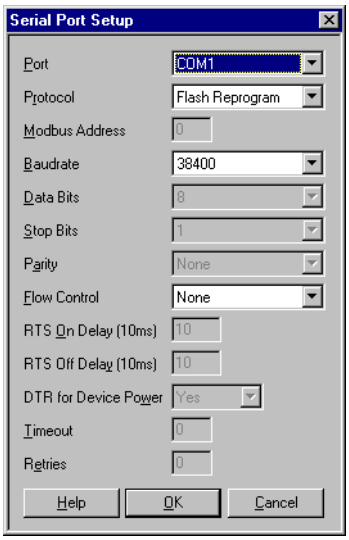

2. Click on the *Diagnostics* menu.
3. In the *Diagnostics* menu, select *Reprogram Flash*.
4. A prompt displays, “Do you wish to reprogram this unit's flash memory?”.




5. Click on the Yes button or press the Y key.
6. Another prompt displays, informing you, "Spectra100 will restart in 30 seconds".

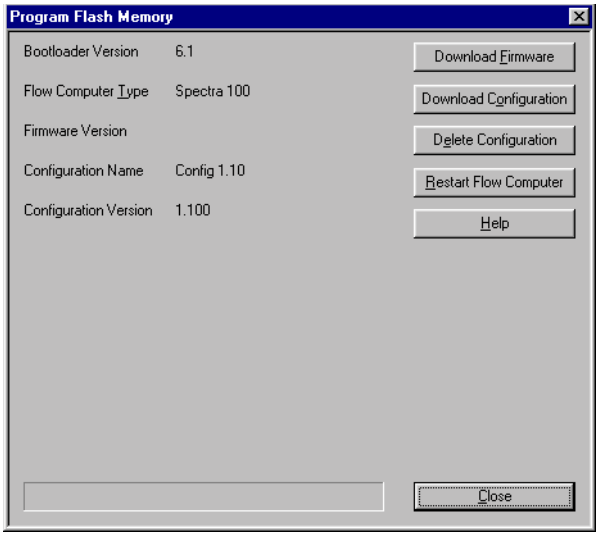


7. Click on the OK button. The flow computer must restart with a special communications protocol designed for transmitting program code.
8. The Serial Port Setup window displays. Note that the Protocol has automatically been set to *Flash Reprogram*.



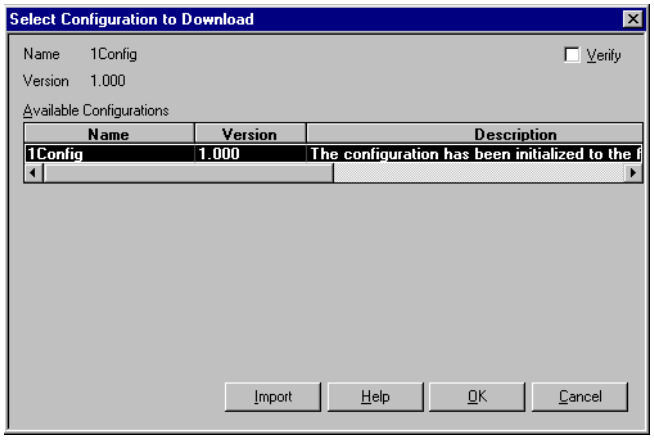

9. Click on the OK button to continue.

10. The Program Flash Memory window displays.




### 10.4.1 Downloading Configuration

1. Follow Step 1 through Step 10 from Section 10.4.
2. Click on the Download Configuration button.
3. The Select Configuration to Download window appears.



(a) If the desired configuration is not listed, click on the Import button.

(b) Use the provided directory tree to locate and select the desired configuration file.

4. Click on the OK button.

5. SpectraCom determines whether the selected configuration file is compatible with the current firmware version. If the configuration file and the firmware are compatible, then SpectraCom continues with the download.

   If the configuration file and the firmware are not compatible, SpectraCom will either abort the download or allow you to convert the configuration.

   If you convert the configuration, you are prompted to name the converted configuration file and save it to disk.

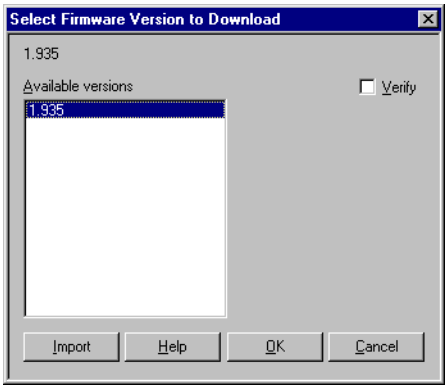
### 10.4.2 Downloading Firmware

To download a new firmware file to the Spectra100 Flow Computer,

1. Follow Step 1 through Step 10 from Section 10.4.

2. Click on the Download Firmware button.

3. The Select Firmware File to Download window appears.




   (a) If the desired configuration is not listed, click on the Import button.

   (b) Use the provided directory tree to locate and select the desired configuration file.

4. Click on the OK button.

5. SpectraCom determines whether the selected configuration file is compatible with the current firmware version. If the configuration file and the firmware are compatible, then SpectraCom continues with the download.

   If the configuration file and the firmware are not compatible, SpectraCom will either abort the download or allow you to convert the configuration.

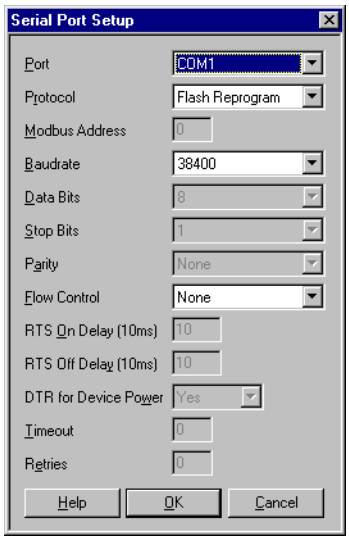
   If you convert the configuration, you are prompted to name the converted configuration file and save it to disk.

## 10.5 REPROGRAMMING THE FLOW COMPUTER FROM THE STARTUP SCREEN

There are two ways to access reprogramming (for downloading either firmware programs or configurations to a flow computer).

To prepare for this procedure,

1. Connect a serial cable from the personal computer (PC) to the flow computer.
2. Open the flow computer front panel, because you will need to manually press the Reset button on the flow computer circuit board.
3. Set pin 1 on Switch 1 of the Spectra 100 circuit board to ON.
4. Before logging onto a flow computer, begin from the SpectraCom startup screen and click on the Local button to access the Serial Port Setup window.
5. The Serial Port Setup window displays.

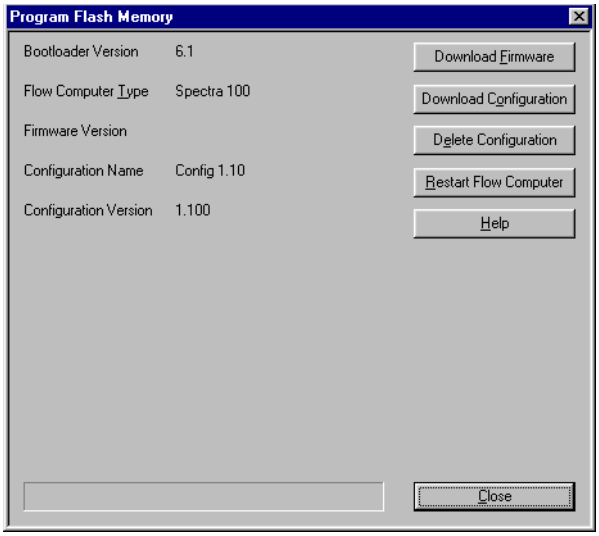


6. In the Serial Port Setup window, make these settings:

- Port: set to the COM number of the serial port you are using for the local connection to the flow computer (via a serial cable).
- Protocol: set to *Flash Reprogram*.
- Baud rate: set to 1200, minimum (38400, preferred).

7. Click on the OK button.

8. The Program Flash Memory window displays.




9. Ensure that the *Flow Computer Type* is not blank and displays the correct unit name. Use the pull-down menu to select the appropriate name if necessary.

   If the *Flow Computer Type* is blank, then SpectraCom is not connected to the flow computer. Press Switch 2 on the flow computer circuit board to reset.

10. Download the new firmware and/or configuration as described in Section 10.4.1 and Section 10.4.2.

11. When the download is complete, click on the

button.

    (a) The enclosure front panel display will cycle information.

    (b) When prompted, "Do you want to cold start?", press the red button on the front panel. See Section 3.6.1 for instructions on Cold Starting the flow computer.

    (c) Return pin 1 on Switch 1 to the OFF position. The upgraded firmware or configuration version should be displayed via SpectraCom.

## WARRANTY CLAIM REQUIREMENTS

To make a warranty claim, you, the Purchaser, must:

Provide Daniel with proof of the Date of Purchase and proof of the Date of Shipment of the product in question.

Return the product to Daniel within twelve (12) months of the date of original shipment of the product, or within eighteen (18) months of the date of original shipment of the product to destinations outside of the United States. The Purchaser must prepay any shipping charges. In addition, the Purchaser is responsible for insuring any product shipped for return, and assumes the risk of loss of the product during shipment.

To obtain Warranty service or to locate the nearest Daniel office, sales, or service center call (281) 897-2900, Fax (281) 897-2901, or contact:

Daniel Measurement Services
19203 Hempstead Highway
Houston, TX 77065

When contacting Daniel for product service, the purchaser is asked to provide information as indicated on the following "Customer Problem Report".

Daniel Measurement Services offers both on call and contract maintenance service designed to afford single source responsibility for all its products.

Daniel Industries, Inc. reserves the right to make changes at any time to any product to improve its design and to insure the best available product.

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**DANIEL INDUSTRIES, INC.**
**CUSTOMER PROBLEM REPORT**

FOR FASTEST SERVICE, COMPLETE THIS FORM, AND RETURN IT ALONG WITH THE AFFECTED EQUIPMENT TO CUSTOMER SERVICE AT THE ADDRESS INDICATED BELOW.

COMPANY NAME: _____

TECHNICAL CONTACT:_____ PHONE: _____

REPAIR P. O. #:_____ IF WARRANTY, UNIT S/N:_____

INVOICE ADDRESS: _____

_____

_____

SHIPPING ADDRESS: _____

_____

RETURN SHIPPING METHOD: _____

EQUIPMENT MODEL #:_____ S/N:_____FAILURE DATE: _____

DESCRIPTION OF PROBLEM: _____

_____

_____

WHAT WAS HAPPENING AT TIME OF FAILURE? _____

_____

ADDITIONAL COMMENTS:_____

_____

_____

REPORT PREPARED BY:_____ TITLE: _____

IF YOU REQUIRE TECHNICAL ASSISTANCE, PLEASE FAX OR WRITE THE MAIN CUSTOMER SERVICE DEPARTMENT AT:

DANIEL MEASUREMENT SERVICES
ATTN: CUSTOMER SERVICE
19203 HEMPSTEAD HIGHWAY
HOUSTON, TEXAS 77065

PHONE: (281) 897-2900
FAX: (281) 897-2901

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The sales and service offices of Daniel Industries, Inc., are located throughout the United States and in major countries overseas. Please contact

Daniel Measurement Services
19203 Hempstead Highway
Houston, TX 77065
(281) 897-2900

for the location of the sales or service office nearest you. Daniel Measurement Services offers both on-call and contract maintenance service designed to provide single-source responsibility for all Daniel Measurement and Control products.

*Daniel Measurement and Control reserves the right to make changes to any of its products or services at any time without prior notification in order to improve that product or service and to supply the best product or service possible.*

DANIEL