VERITEQ
Superior Temperature & Humidity Monitoring

Veriteq

Spectrum 4.0

User Guide

www.veriteq.com

www.vaisala.com

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Veriteq Spectrum has been tested using a variety of network systems. However, the large number of possible hardware and network configurations makes testing under every circumstance impossible. If you have trouble using Veriteq Spectrum software, contact Veriteq Instruments.

Technical Support

Call Veriteq for free technical support 1-866-861-3388 (8am-4pm Pacific Standard Time)

Email customersupport@veriteq.com

Document part number: 880-0100-00

Release date: July 2010

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1 Introducing Veriteq Spectrum

Welcome

Welcome to Veriteq Spectrum 4.0 software. Veriteq Spectrum provides recordings of temperature, humidity, and other conditions. Veriteq Spectrum software is designed to be used with SP-Series Data Loggers.

With Veriteq Spectrum you can:

- Create electronic records of temperature, humidity, and other conditions.
- Create graphs and reports from logger files.
- Produce detailed graph reports.
- Overlay logger files from other Veriteq SP-Series Data Loggers within the same graph to check relationships between logger files.
- Zoom-in and zoom-out for a customized view of the graph.
- Use the on-screen graph cursor to pinpoint exact values, times, and dates.
- Open multiple graph windows.
- View, customize, and print tabular-format reports with dates, times, and logged values.
- Export graph data and reports to external databases, word processors, or spreadsheets.
- Manually or automatically scale graphs.
- Use multiple Y-axes scaling and ranges.
- Enable and disable input channels.
- Set data logger start and stop times, sample intervals, and other logger settings.

Conventions Used in this Document

This document uses the following conventions:

- Select: Choose a menu item, check box, or option with a mouse.
- Click: Click a button with a mouse.
- A sequence of actions is indicated by a list separated by the greater than sign.

  For example, “select **File>Save As...**” means choose the **Save As...** item from the **File** menu.
- Menu selections, items you select, the names of boxes and tabs, and buttons you click are shown in **bold**.
- Keys on the keyboard are shown in SMALL CAPS.

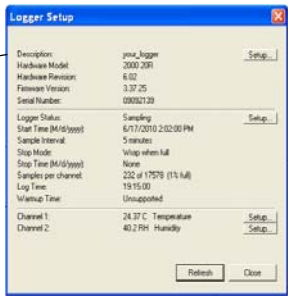
Understanding the Veriteq Spectrum System

The Veriteq SP-Series system consists of one or more Veriteq SP-Series Data Loggers, Veriteq Spectrum 4.0 software, a Veriteq cable (PC-IC cable if connecting by Serial port, INT-USB-DL cable if connecting by USB, or Digi and Ethernet cables if connecting via Digi or Veriteq vNet device through the network), and a PC with an attached printer.

The SP-Series Data Loggers are connected to a PC and the Spectrum software is used to configure settings such as the sampling interval. The data loggers are then placed in the area where conditions are to be monitored and they record the information. The data loggers collect the information and store it in their internal memory. Once the desired information is collected, it is transferred to a PC with Spectrum. The data is imported ("inserted") into a Spectrum graph and Spectrum software is used to display, analyze, print graphical or tabular reports, and export the information.

The following illustration shows how the Veriteq SP-Series system is used to collect and report data.

1 Connect the data logger to the PC and configure the data logger (sample intervals, channels, start time, stop time, and so on).



Data logger

Serial or USB Logger cable

or Digi/vNet Device

2 Place the data logger in the area you want to monitor. The data logger collects and stores the information.

3 Connect the data logger to the PC and transfer data to PC. Veriteq Spectrum creates a logger file (.spl).

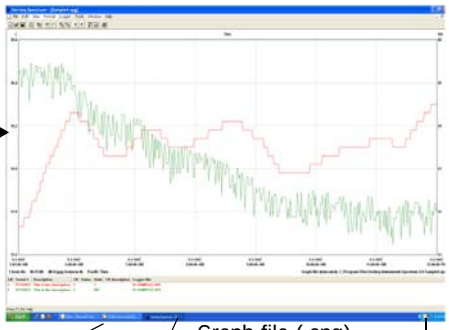
Data logger

Serial or USB Logger cable

or Digi/vNet Device

4 Insert the Logger file (.spl) into a newly created or existing Graph.

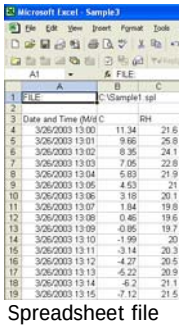
Logger file (.spl)



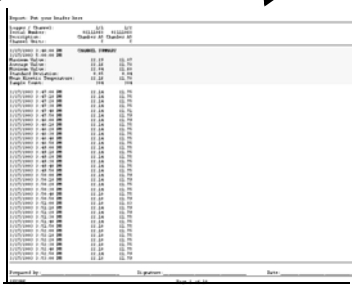
Graph file (.spg)

5 Customize and verify the Graph file.
Customize and view Report (data in tabular format).
Export file to spreadsheet, database, or word processor.

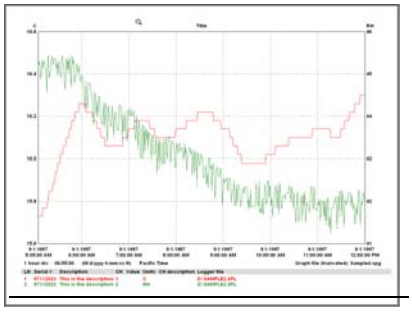
6 Print the Graph file or Report and have it signed and approved.



Spreadsheet file



Printed Report



Printed Graph

SP-Series Data Loggers

Each Veriteq SP-Series Data Logger is factory-calibrated against National Institute of Standards and Technology (NIST) traceable standards. All calibration information is stored digitally in the logger's memory. For data logger specifications, see www.veriteq.com or contact Veriteq.

There are many models of SP-Series Data Loggers to choose from, including the SP-1000, SP-1400, SP-1700, SP-2000, and SP-4000. Each logger has one or more channels and can monitor and record data, including ambient temperature and relative humidity. Many loggers can also have optional plug-in external probes attached.

Understanding the Spectrum Window

The following illustration shows the main sections of the Spectrum window, with items described in Table 1:

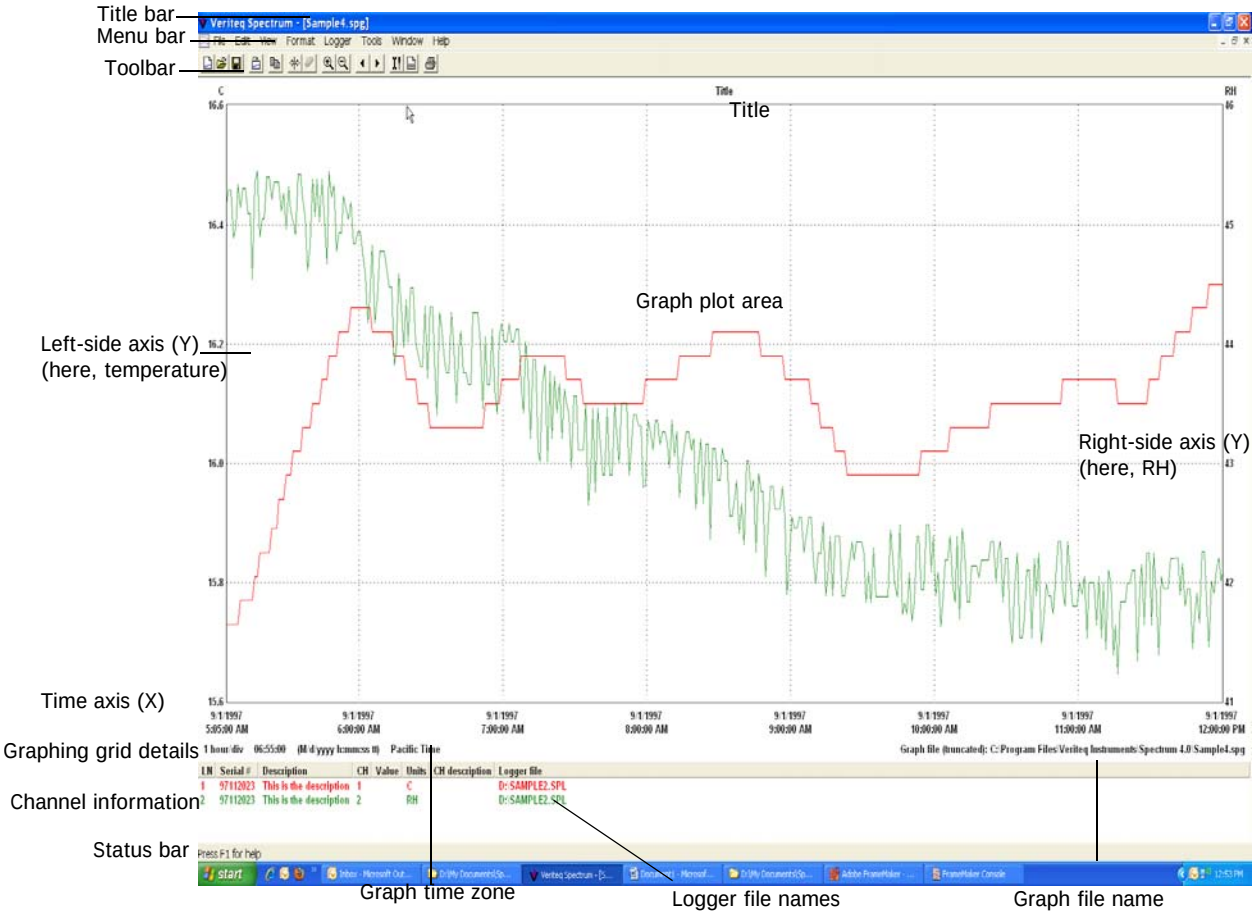
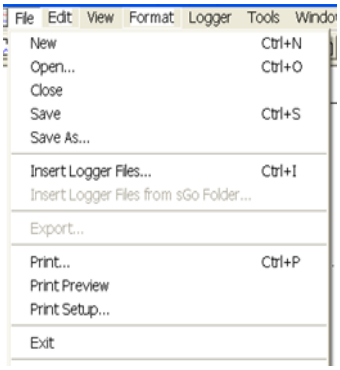


Table 1: Items in the Spectrum Window

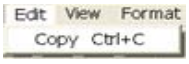
Title bar	Shows the name of the active Graph file
Menu bar	Allows access to the various software functions.
Toolbar	Allows quick access to the most used software functions.
Graph title	Shows the graph title, if you have added one.
Graph plot area	The Graph file is displayed here.
Left-side Y-axis scale	Shows the scale for the data displayed in the graph.
Right-side Y-axis scale	This scale is used when two or more scales are displayed on the graph.
X-Axis time scale	Shows the time scale.
Graphing grid details	Shows the time per division, graph duration, and date and time format.
Channel information	Shows the name(s) of the logger files currently being displayed, along with other identifying information including the logger serial number, logger description, logger channel number, measurement units, and measurement parameter. The color shown for each channel corresponds to the color of the graph lines.
Status bar	Displays information about the menu items and the toolbar. If the software is idle, the message **Press F1 for Help** is displayed. You can alternatively display or hide the status bar by selecting **View**>**Status Bar**.
Graph Time Zone	Shows the time zone used for this Graph file. The default time zone is based on the time zone setting of the PC when the Graph file was created. The time zone can be changed using the **Format>Time Zone** menu item. **Note:** The logger data displayed is based on UTC time, an absolute time reference.
Graph file name	Shows the name and location of the Graph file.

Using the Menus

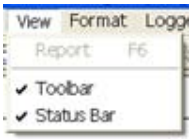
The following illustration provides an overview of the menus on the Spectrum window. Take a few minutes to become familiar with the menu items. Right-click on various parts of the window to discover additional ways to access the menu items.



Create a new blank Graph file (.spg)
Open an existing Graph file (.spg)
Close the Graph file
Save the Graph file
Save the Graph file under a different name
Insert a Logger file (.spl) into an open Graph file
Insert a Logger file from sGo into an open Graph file
Export the Graph file
Print the Graph file
View a preview of the printed Graph file
Change the settings on the printer
Exit Spectrum software

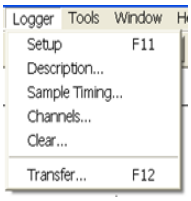


Copy contents of graph to Clipboard.

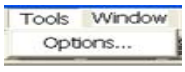


Produce a report associated with the active Graph file
Show or hide the Toolbar
Show or hide the Status Bar

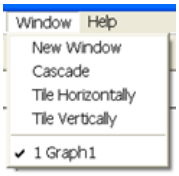
Change the title that appears above the graph
Position the cursor on the graph
Remove the cursor from the graph
Zoom in to enlarge a portion of the graph
Zoom out
Scroll the graph to the left
Scroll the graph to the right
Change the units on the Y-axis of the graph
Change the time scale on the X-axis of the graph
Change the time zone
Move window split line to change view of data and graph proportion



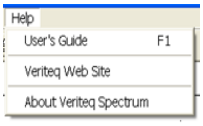
Open the Logger Setup window
Change the logger description
Change the logger sample timing
Enable or disable channels
Clear the data stored in the data logger
Transfer information from the data logger to your PC



Set Spectrum options such as temperature scale, file name formats, export options, etc.



Open a copy of the active graph in a new window
Arrange open windows in a cascade
Tile open windows horizontally
Tile open windows vertically
Switch to another open window



Open a PDF version of this User's Guide
Go to the Veriteq Instruments web site
View information on this version of Spectrum software

Using the Tool Bar

The Veriteq Spectrum Toolbar allows quick access to the most commonly used features of the program. You can hide or display the toolbar by selecting **View**>**Toolbar.**

The following table describes the function of each of the toolbar icons.

Toolbar icon	Function
	Creates a new Graph file you can insert Logger files into. Same as File>New.
	Opens an existing Graph file (.spg)
	Saves the currently-active Graph file using the same file name
	Inserts a Logger file into the currently-active Graph file
	Copies graph to the Clipboard
	Positions a vertical cursor line on the active graph to determine exact graph values and times
	Removes the vertical cursor line from the active graph
	Zooms-in for a closer look at graph data
	Zooms-out
	Scrolls the graph to the left Time base is shifted backward by one graph division
	Scrolls the graph to the right Time base is shifted forward by one graph division
	Opens the **Logger Setup** window
	Transfers logger data to the computer and creates Logger file

	Prints the currently-active graph

Using the Online User's Guide

Veriteq Spectrum includes an online version of this user's guide in PDF format.

To access this guide from within Veriteq Spectrum, press **F1** or click the **Help** icon on the tool bar.

Getting Help

For more information about Veriteq Instruments products and services, visit our websites at www.veriteq.com and www.vaisala.com/veriteq.

For technical and product application support:

Telephone	1-866-861-3388 (North America only) (or +1 604-273-6850)
Email	customersupport@veriteq.com
	Free technical support is available from Veriteq from 8am-4pm PST Monday - Friday

For information, sales, pricing, and quotations:

Telephone	1-800-683-8374 (North America only) (or +1 604-273-6850)
Email	sales@veriteq.com

2 Installing Spectrum Software

System Requirements

Veriteq Spectrum Software requires a PC with the following minimum configuration:

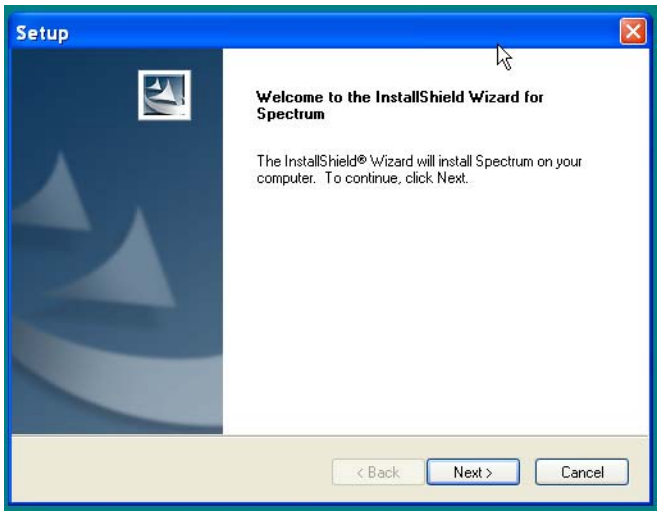
- 32-bit version of Windows® 2000.
- 32-bit or x64 versions of: Windows® XP, Windows Server® 2003, Windows Vista®, Windows Server® 2008, and Windows® 7.
- one available Serial or USB communication port (for transferring logger data files; you can view graphs and reports for previously transferred logger files without this port).

Installing Spectrum Software

To install Spectrum software:

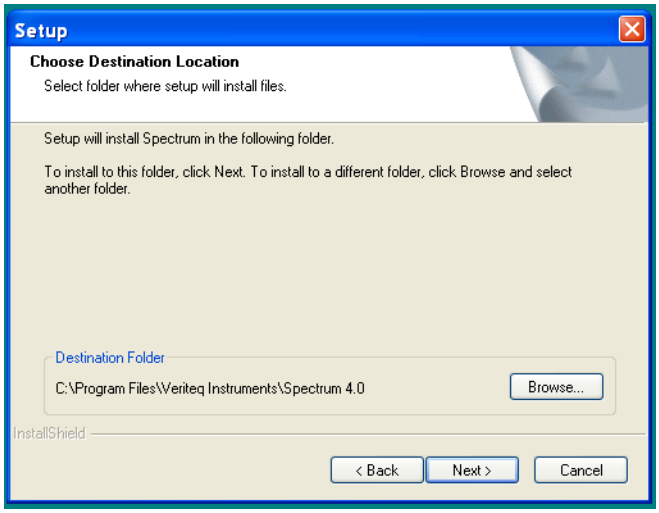
1. Ensure you have administrator privileges.
2. Start Windows, log in as the administrator, and close all running applications.
3. Insert the Veriteq Spectrum CD into the CD-ROM drive and wait for it to start automatically. If it does not start automatically, from the **Start** menu, select **Run**. Type d:\setup and press the ENTER key. If d:\ is not your CD-ROM drive, type the appropriate drive letter.

   The Veriteq Spectrum Setup window opens.



4. Click **Next**.

5. Accept the default Destination Folder, or click the **Browse...** button to select a new Destination Folder.



6. Click **Next**.
7. Accept the default Program Folder or select another folder from the list of Existing Folders.
8. Click **Next**.
9. Click **Finish**.

Spectrum is now installed. Continue to *Getting Started* for information on logger configuration and using Spectrum.

3 Getting Started

Setting Up and Using Spectrum—Overview

The main steps in setting up and using Veriteq Spectrum are:

1. Ensure that the data loggers are calibrated. (See page 16.)
2. Connect the data loggers to the PC. (See page 16.)
3. Select a communications port. (See page 17.)
4. Configure the data logger. (See page 18.)
5. Place the data logger in the area you want to monitor and collect samples for the desired time. (See page 33.)
6. Transfer the raw data in the form of a Logger file (.spl) to the PC. (See *Chapter* 4.)
7. Insert Logger files (.spl) into Graph files (.spg). (See *Chapter* 5.)
8. View, copy, customize and print Graph files. (See *Chapter* 5.)
9. View, copy, customize and print Reports. (See *Chapter* 6.)

Ensuring Data Loggers are Calibrated

Veriteq SP-Series Data Loggers are calibrated at Veriteq Instruments and should be calibrated on a suitable frequency as determined by the accuracy requirements of the application in which the product is used.

Veriteq Instruments recommends a 90-day interval for the most critical applications, while a one-year interval may be adequate for less demanding situations.

To calibrate your loggers, contact Veriteq Instruments for pricing, lead times, and delivery arrangements.

Note: Treat the calibration process very carefully. The consequences of poor calibration can be very expensive. Veriteq SP-Series Data Loggers are high-accuracy instruments. In order to maintain the specified accuracy, it is essential to have trained calibration personnel, strict calibration procedures, and proper test and calibration facilities. If you have questions about the calibration process, contact Veriteq Instruments.

Connecting Data Loggers to PCs

To connect your data logger to a PC using USB or Serial cable:

1. USB only: Using the supplied Veriteq Spectrum + USB cable driver CD, install USB drivers on your PC.

2. Connect the data logger to a Veriteq USB or Serial cable.

3. Attach the other end of this cable to the PC (as shown below) connecting to the USB port.

To connect your data logger to a PC using a Digi or vNet device:

1. Connect Digi or vNet device (will be referred to as device, following) to power supply and Ethernet outlet.
2. Connect data logger to device (Digi requires Veriteq cable).
3. Obtain static IP address for device from your IT department. If your networking policy requires you to reserve IP addresses using DHCP, see www.veriteq.com/digi for instructions.
4. Insert device driver CD into PC. The Device Setup Wizard launches automatically. Click **NEXT**.
5. Select device that matches the MAC address from the bottom of your device. Click **NEXT.**
6. In the Configure Network Settings window, enter a Static IP address. Click **NEXT** two times.
7. In the Configure Real Port Settings screen, select "Install Digit Real Port on this computer". Click **NEXT**.
8. Click **NEXT** again. The settings are saved.
9. Click **FINISH**. Drivers required to connect to your data logger through the device have been installed.

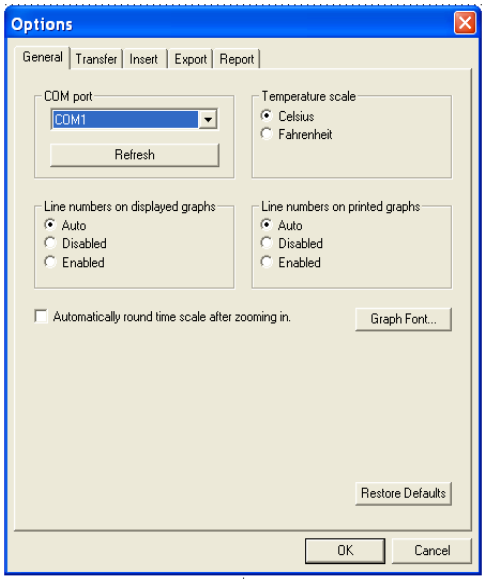
Setting up PC Communication Ports

Before using a data logger with Veriteq Spectrum, you must select the correct PC serial communication (COM) port. Veriteq Spectrum can support up to 4096 COM ports, numbered COM1 to COM4096.

To select a COM port:

1. Using Windows Device Manager, determine which COM port has been allocated to your data logger. Make a note of it.

2. In Spectrum, choose **Tools>Options**, then choose the **General** tab.
3. From the **COM port** drop-down list, select an available COM port.



4. Click **OK**.

Once you have selected a COM port, you do not need to change the setting unless you change the communication port your loggers are connected to.

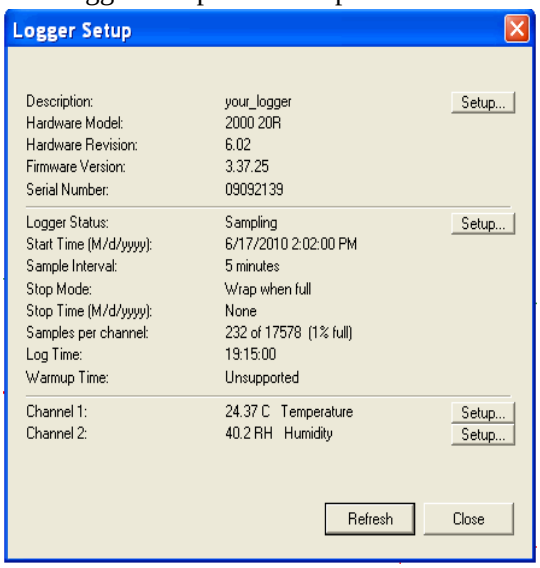
Configuring Data Loggers

Setting up the data logger varies slightly depending on the data logger you are using and the configuration options you prefer.

To configure data loggers:

1. If you have not already done so, connect the logger to the PC.
2. From Spectrum, do one of the following:
   - Select **Logger**>**Setup**.
   - Press **F11**.
   - Click the **Logger Setup** toolbar button **(**).

3. The Logger Setup window opens.



The information shown in the Logger Setup window relates to the data logger connected to the COM port you have specified. Some fields shown will vary depending on the model of data logger in use.

You can use this window to:

- Edit the data logger description.
- Set the sample timing.
- Enable or disable data logger channels.

Any changes will affect only the data logger currently connected to the COM.

4. Click **Close** to close.

Understanding the Logger Setup Window

The following table describes the information displayed on the Logger Setup window:

Description	Logger description. (For information on configuring the logger description, see *Configuring the Data Logger Description* on page 21.)
Hardware Model	Hardware model number of the currently-connected data logger.
Hardware Revision	Hardware version number associated with the currently connected data logger.
Firmware Version	Firmware version associated with the currently connected data logger.
Serial Number	Unique eight-character product serial number of the currently-connected data logger. This number should match the serial number label on the back of the data logger.

Logger Status	Indicates the sampling status of the currently-connected data logger. The possible modes are: • **Sampling**: The logger is currently taking samples and the memory is not full. • **Sampling (wrapped)**: The logger is currently taking samples with the memory full. The oldest reading is discarded and replaced with the newest. • **Stopped at specified time**: The logger is not sampling and has stopped because the user-set stop time has been reached. • **Stopped when full**: The logger is not sampling and has stopped because it is configured to stop when the memory is full. • **Start at specified time**: The logger is not sampling, but is set to begin sampling as soon as the Start time is reached. • **No enabled channels**: The logger is not sampling because no channels are enabled. The *Setup* button to the right of the Logger Status enables you to clear the logger's memory and change the **Sample Interval**, **Start Mode**, and **Stop Mode** settings.
Start Time	Indicates either the time that the currently-connected data logger began taking samples, or the time (in the future) that it is set to begin taking readings Future Start times are indicated by a (⚠) symbol. For information on changing the **Start Time**, see *Setting the Start Mode* on page 24.
Sample Interval	Indicates the current sample interval setting (how frequently the data logger is programmed to take readings). For information on setting sample intervals, see *Setting the Sample Interval* on page 26. **Note:** The most frequent sampling rate possible with SP-1016 and SP-1416 loggers is once per minute. For other loggers, the most frequent sampling possible is once every 10 seconds; however, sampling of this frequency will have a negative effect on battery life.
Stop Mode	Indicates how the currently-connected data logger is set to stop while recording samples in its memory. There are three choices: **Wrap when full**, **Stop when full**, and **Stop at specified time**. For more information on setting Stop modes, see *Setting the Stop Mode* on page 25.
Stop Time	Indicates the programmed **Stop Time**, if set. If a **Stop Time** has not been set, it reads **None**. For information on setting the **Stop Time**, see *Setting the Stop Mode* on page 25.
Samples per channel	Identifies how many samples have been stored for each enabled channel on the currently connected logger, the capacity available (in samples) for each channel, and the percentage of memory used. Click the **Refresh** button to update values.
Log Time	Identifies the length of time the data logger has been recording. The value is based on the number of samples in the memory multiplied by the sampling interval. Click the **Refresh** button to update values.
Warmup Time	This function applies to SP-4000 data loggers. See *Configuring Warm Up Time* on page 30.
Channel 1	Temperature or Relative Humidity or other measured condition.

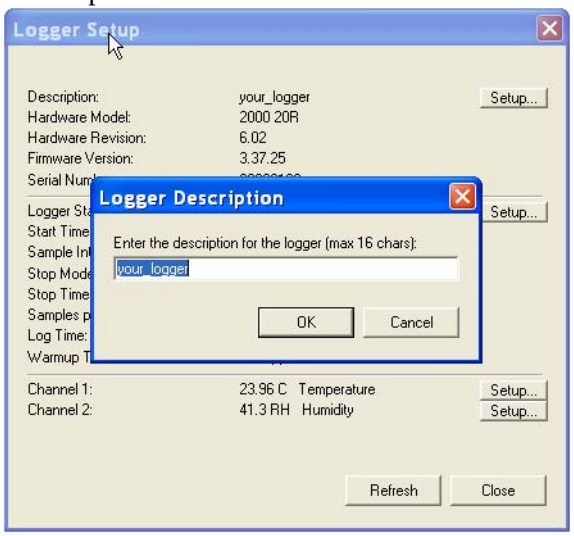
Channel 2 (there can be more than 2 channels)	Temperature or Relative Humidity or other measured condition. Veriteq 4000-Series data loggers have several channels, each which can be configured for use with various transducers. See *Configuring Channels to Work with Transducers* on page 28.
	Click the **Refresh** button to update the currently displayed values. Click the **Setup...** button to enable and disable channels.

Configuring the Data Logger Description

The Data Logger Description helps identify the logger every time you communicate with it. Using a description that refers to the application or location of the data logger, and checking the logger description prior to each use, is a quick way to ensure you have the correct logger.

To configure the Description for the currently-connected logger:

1. Do one of the following:
   - Select **Logger**>**Description...**
   - Press **F11** or Select **Logger**>**Setup** or click the **Logger Setup** icon on the toolbar ( ). In the window that appears, click **Setup** in the row for Description.



2. In the box provided, type a description of the data logger, using up to sixteen characters.
3. Click **OK** to save or Cancel to close without saving.

The text from the **Description** field is displayed on all on-screen graphs, tabular displays and printouts. The text can also be used in the creation of a default file name when transferring logger data to a PC if you choose to include it.

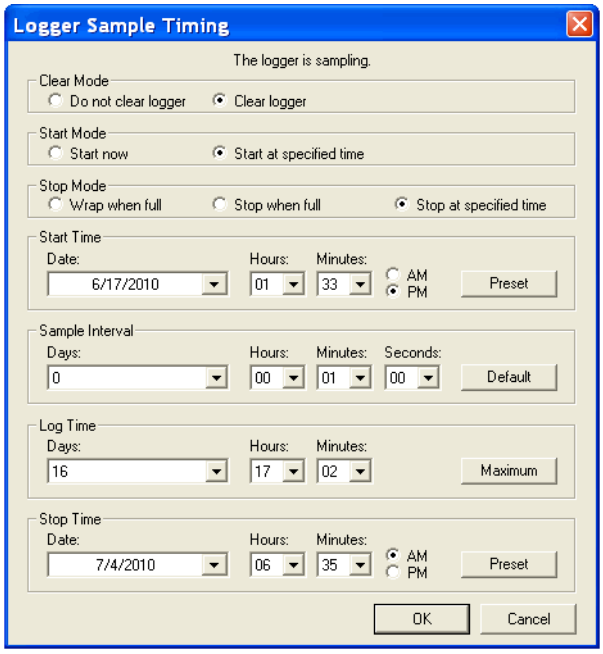
Setting the Data Logger Sample Timing

To set the logger sample timing:

Do one of the following:

- Select **Logger>Sample Timing...**
- Select **Logger>Setup**, and click the **Setup...** button in the row for **Logger Status**.
- Press **F11** and click the **Setup...** button in the row for **Logger Status.**

The Logger Sample Timing window opens.



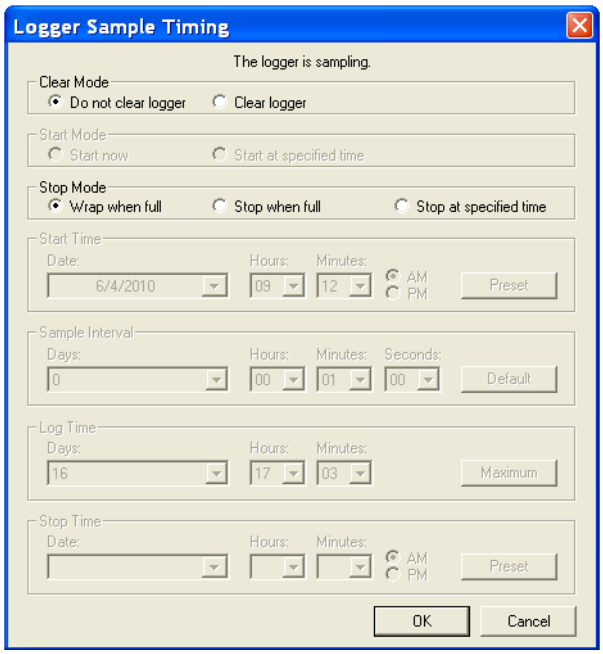
There are four main steps in setting the Logger Sample Timing:

1. Setting the **Clear Mode** See page 22.
2. Setting the **Start Mode** See page 24.
3. Setting the **Stop Mode** See page 25.
4. Setting the **Sample Interval** See page 26.

Setting the Clear Mode

To configure the Clear mode:

1. Select **Logger>Sample Timing...**.



1. Under **Clear Mode**, select one of the following options:

Do not clear logger

This is the default setting if the logger memory is not yet full.

Use this setting when the logger memory is not yet full and all you want to do is change **Stop** mode settings *without* clearing the existing samples.

If the logger memory is full, or if **Start** mode or **Sample Interval** changes are required, you must use the **Clear logger** setting to make the necessary changes.

Clear Logger

This is the default setting if the logger memory is full.

The **Clear logger** setting allows you to modify both **Start** and **Stop** mode parameters and change **Sample Interval** values. Choosing this setting results in the logger's memory being cleared following completion of the setup changes. You will lose data unless you transfer it first.

If you are in doubt as to whether the information on the logger is still valuable, first make a copy of the data using **Logger**>**Transfer**, and then make the necessary logger setup changes.

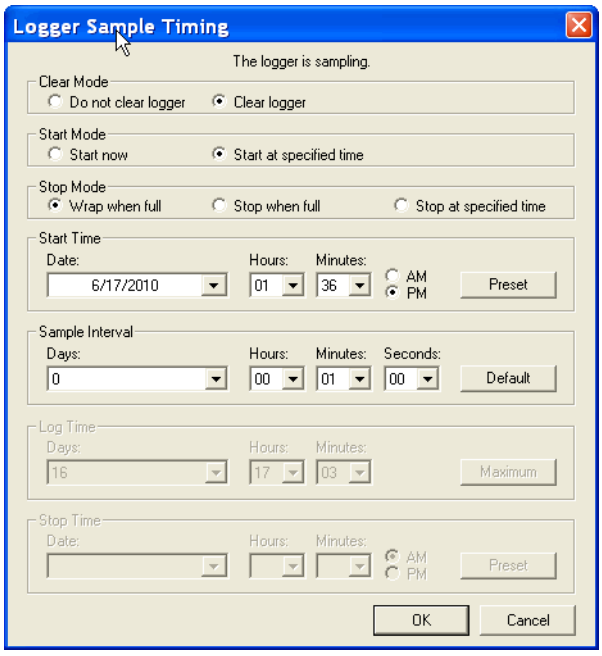
When you choose **Clear logger**, the **Start Mode** and **Stop Mode** radio buttons become available.

Setting the Start Mode

The **Start Mode** enables you to choose how, and when the data logger starts taking samples.

To set the Start Mode:

1. Under **Clear Mode**, select the **Clear logger** option.



2. Under **Start Mode**, select one of the following options:

Start now	This option sets a connected data logger to start taking samples immediately (within one sample interval) after the changes in the Logger Sample Timing window have been applied to the logger's memory.
Start at specified time	This option sets a connected data logger to start taking samples at a pre-defined date and time in the future. Until then, the logger remains dormant. This delayed start feature helps to save logger memory and minimizes the collection of unwanted data. You can also use the **Start Time** option to ensure that multiple data loggers are synchronized to start logging at the same time.

3. When you choose the **Start at specified time** option, the **Start Time** section of the Logger Sample Timing window becomes available. Use the **Date**, **Hours**, and **Minutes** drop-down lists and **AM/PM** radio buttons to set the time you want the data logger to begin recording samples.

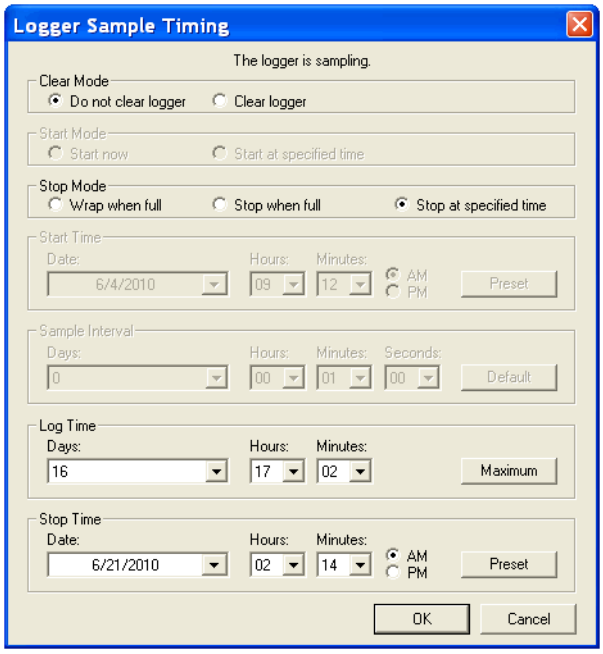
Note: You can not choose a date or time earlier than the current date and time values.

If desired, use the **Preset** button to automatically set the start time hours and minutes to the earliest possible setting for the date selected. For any day other than the current day, this value is 12:00AM.

You can use the **Start at specified time** option in conjunction with the **Stop at specified time** option to create a pre-defined data logger monitoring period.

Setting the Stop Mode

The **Stop Mode** enables you to choose how the connected data logger operates once the memory is full, or when a specified time is reached.



To set the Stop Mode:

1. Under **Stop Mode**, select one of the following options:

Wrap when full This is the default method of collecting samples on the data logger. When you choose this setting, samples are recorded in a first in, first out manner. When the memory is full, the logger continues to take samples by discarding the oldest one, and replacing it with the newest one.

The **Wrap when full** setting ensures that you always have the latest data when you transfer from the data logger. The length of time that the memory fills and wraps around is a function of the **Sample Interval** (see *Setting the Sample Interval* on page 26) you have set on the logger. Veriteq Spectrum automatically calculates this time and displays it in the **Log Time** section of the Logger Sample Timing window.

Note: If the memory wraps around too quickly, you can choose a longer sample interval.

Stop when full When you choose this method, the logger stops taking readings once the memory is full. This option allows the maximum amount of samples to be taken without overwriting data. It is particularly important in any application where there is an excessive time delay between the gathering of the data and the transferring of that data to the PC.

Stop at specified time This method enables you to set a precise time for a logger to stop recording data. When you choose this setting, both the **Log Time** and **Stop Time** sections of the Logger Sample Timing window are available.

The **Log Time** drop-down lists enable you to set an elapsed time for the data logger to collect samples. For example, you can set the data logger to collect samples for 24 hours, 48 hours, 7 days, and so on.

The **Stop Time** drop-down lists enable you to set absolute date and time values for when the logger is to stop taking samples.

Note: The **Log Time** and **Stop Time** options are interrelated. Setting the **Log Time** to a specified period automatically adjusts the **Stop Time** values. Adjusting the **Stop Time Date** and **Time** values, in turn, automatically adjusts the **Log Time** values.

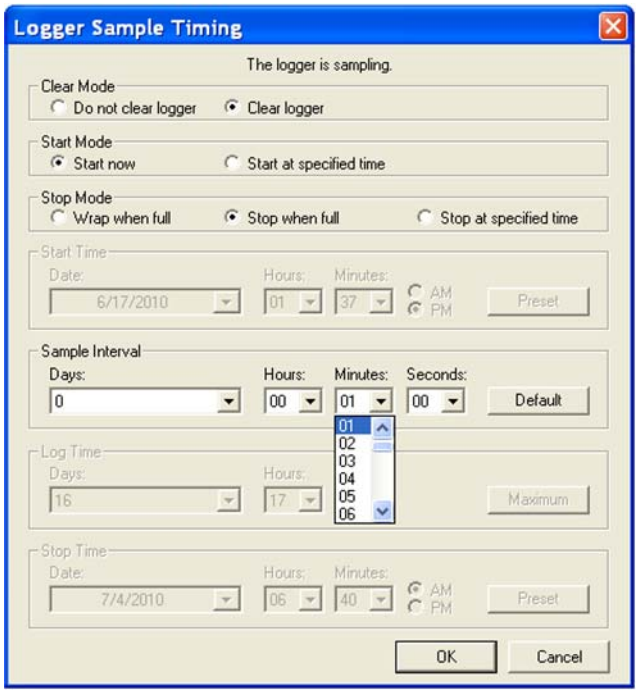
Setting the Sample Interval

You can change the sample intervals on the logger to suit the requirements of the application. You can set up more frequent sampling intervals to capture rapidly changing data, or spread out the readings to maximize memory and cover extended monitoring periods.

Note: You can only change sample intervals if you set the **Clear Mode** to the **Clear logger** setting (see *Setting the Clear Mode* on page 22).

To change the sample interval on the currently-connected logger:

1. Select **Logger>Sample Timing...**.



2. Under **Sample Interval**, use the drop-down lists to set the **Days**, **Hours**, **Minutes**, and **Seconds** to the desired sample interval.

   If you want to use a sample interval of once per minute, click the **Default** button.

   You can choose intervals ranging from a minimum of ten seconds to once every 24 hours.

   The total period covered by a logger before the memory is full depends on how many channels are enabled and the sample interval. This information is automatically calculated in the **Log Time** section of the Logger Sample Timing window.

Note: Running the logger with a sample interval shorter than one minute for a prolonged time shortens the battery life.

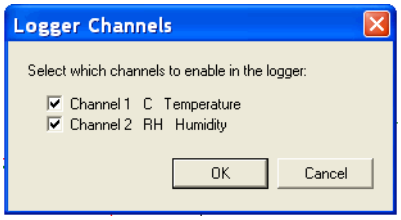
Enabling and Disabling Logger Channels

The **Logger Channels** option enables you to enable or disable the channels on the currently-connected data logger.

Note: During this process the data logger's memory is cleared. If the information on the data logger is still of value, transfer the data to a PC before enabling or disabling channels.

To enable or disable data logger channels:

1. Do one of the following:
   - Select **Logger>Channels...**



   - You can also enable or disable data logger channels by selecting **Logger>Setup** (or pressing F11 or clicking the **Logger Setup** icon on the toolbar ( )). Then, in the Logger Setup window, click the **Setup...** button beside the channel you want to enable or disable.
2. In the window that appears, select or deselect the checkbox to enable or disable a channel.
3. Click **OK**. This initiates the process of clearing the data logger's memory.

Note:

- A channel must be enabled before it can start collecting readings.
- It is a good idea to disable unused channels to maximize logger memory.
- If you are using a temperature and humidity data logger, remember that the humidity sensor requires temperature values. You cannot disable the temperature sensor channel if you are using the humidity channel.

Configuring Channels to Work with Transducers

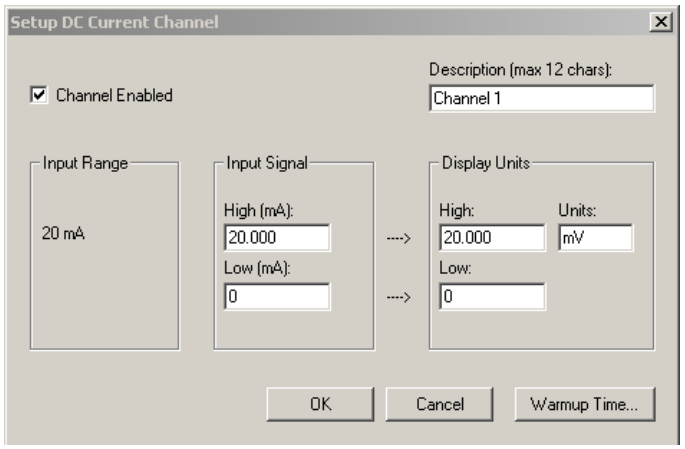
This section applies only to those using Veriteq SP-4000 series data loggers. Used with transducers, you can configure SP-4000 series data loggers to display measurements in units other than milliAmps or volts.

To configure SP-4000 loggers to work with transducers:

1. In Spectrum, choose **Logger>Setup**.
2. From the Setup window, click **Setup** next to the channel to configure.

Different loggers offer different channel types, each with different setup windows and slightly different steps. In general, configure the logger's typical units and range to reflect the units and range you want to display.

3. To setup a DC Current channel:



   a. Ensure the Channel is enabled by selecting the **Channel Enabled** check box.

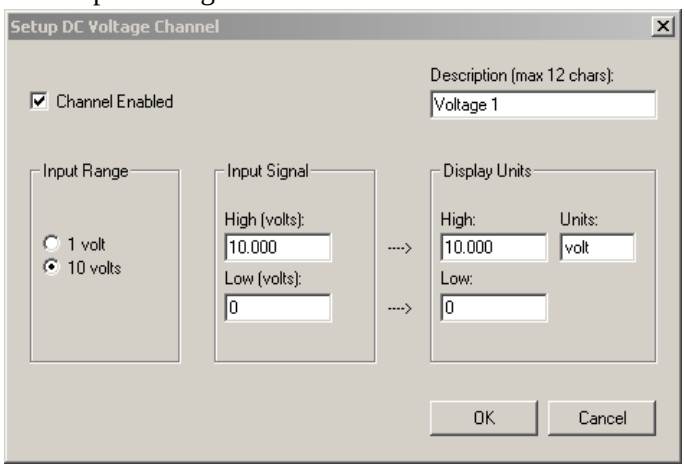
   b. If applicable, enter a new channel description.

   c. From Input Signal, specify the range for your transducer output.

   d. Under Display Units, specify the range and units to display instead of the input signal range. For example, psi instead of mA.

   e. To set warmup time and save transducer battery life, see *Configuring Warm Up Time* on page 30.

4. To setup a Voltage channel:



   a. Ensure the Channel is enabled by selecting the **Channel Enabled** check box.

   b. If applicable, enter a new channel description.

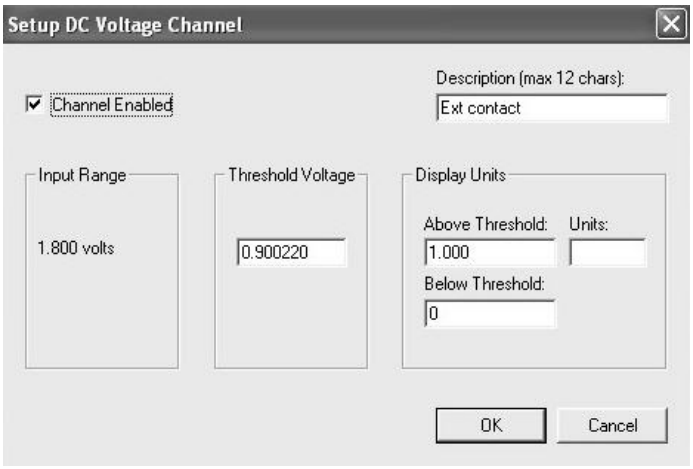
   c. If applicable, for input range, choose whether this is a 1 or 10 volt range channel.

   d. From Input Signal, specify the range for your transducer output.

   e. Under Display Units, specify the range and units to display instead of the input signal range. For example, psi instead of v.

   Veriteq also supports a Boolean DC Voltage Channel type on some SP-4000 loggers. For this type, specify the Threshold Voltage and the resulting display units. For example, if you want voltage above the threshold

value to show as 1, indicate 1 for Above Threshold and specify the units. Boolean choices are typically 1 (above threshold) and 0 (below threshold).



5. Click **OK**.

Configuring Warm Up Time

Note: This section only applies to Veriteq SP-4000 data loggers.

Some SP-4000 data loggers have the ability to switch power from an external battery onto a transducer using the Warmup Time feature, also known as the XPS excitation control switch. This is useful for conserving power when an external transducer is being powered from an external battery.

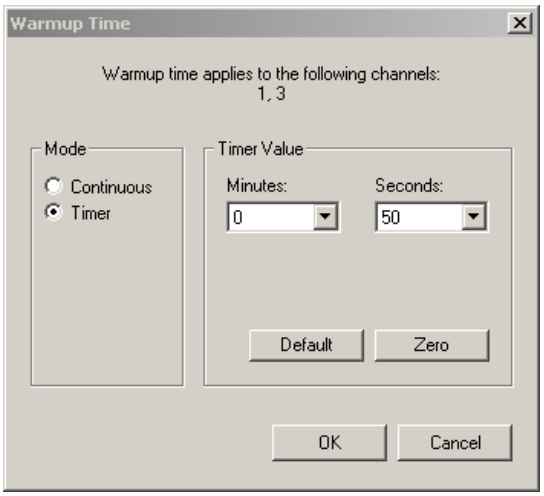
Set transducer warm up time to a number of minutes or seconds before data is recorded by the data logger. To set when the data logger will record data, see *Setting the Data Logger Sample Timing* on page 22.

To configure transducer warmup time:

1. Choose **Logger>Setup**.
2. From the row for the channel you want to set up the warm up time for, click **Setup**.
3. From the Setup Channel screen, click **Warmup Time**.
4. From the Warmup Time screen, select the **Timer** radio button.

You can also set up warmup time from the Logger Setup window.

5. For Timer Value, set the number of minutes or seconds you want the transducer to begin warming up before taking a sample. The default is 10 seconds.



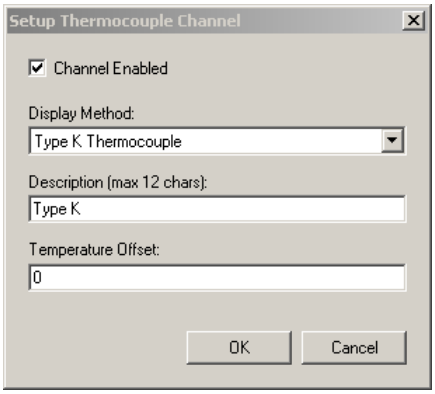
6. Click **OK**.

Configuring Data Logger Channels to Work with Thermocouples

This section applies only to those using Veriteq SP-1700 Series Loggers. Veriteq SP-1700 loggers work with various types of thermocouples (E, J, K, R, S, and T). You need to configure your channel to specify the type of thermocouple you are using.

To configure SP-1700 loggers to work with thermocouples:

1. In Spectrum, choose **Logger>Setup**.
2. From the Setup window, click **Setup** next to the channel to configure.
3. From the Setup Thermocouple Channel screen, select **Enable Channel**.



4. From the Display Method list, choose your thermocouple type.
5. Enter a description.
6. Advanced: If your installation includes very long thermocouple cables, Veriteq may recommend you specify a temperature offset. Enter it here. All values will be adjusted by this offset.

7. Click **OK** to save or cancel to close without saving.

Clearing Logger Samples

Clearing a logger deletes all recorded samples in a logger's memory.

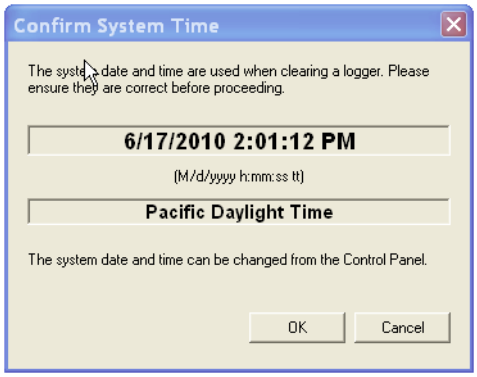
You can clear the data logger without making any setup changes, or as an essential part of the following logger setup functions:

- Enabling or disabling channels
- Changing **Start Mode** settings
- Changing logger sample intervals

Note: You do not have to clear the data logger samples before you start a new logging session, but doing so minimizes the storage of unneeded information.

To clear the logger without changing the logger setup:

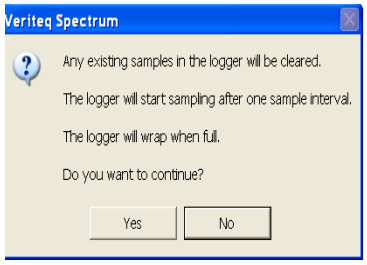
1. Select **Logger**>**Clear...**.



2. In the Confirm System Time window, check the system time.
   If the time shown is correct, click **OK**.
   If the time shown is incorrect, click **Cancel**, and then use the Windows Control Panel to make the appropriate changes. See *Setting System Date and Time* on page 41.

Note: The PC's date and time must be accurate when clearing a data logger's memory or the date and time values in future logger files may be incorrect.

After you click **OK**, a confirmation window opens.



3. Click **OK**.

Mounting Data Loggers

Because they are small and light, you can easily mount Veriteq data loggers in the field using a variety of techniques including Velcro strips, double-sided tape, duct tape, and magnetic strips.

In harsh environments, place the data logger in a standard industrially-rated enclosure, and run external sensors and probes from the enclosure using special fittings in the openings.

Some tips for placing the data loggers:

Ventilation: Don't obstruct the air passage holes in the logger. There should be a clear path for the air to get to the internal sensors (if they are used or available).

Vibration: Excessive vibration can knock the unit off its mounting. If the location is subject to excessive jarring or vibration, mount the logger more securely.

Temperature: Excessive temperature (low or high) can affect adhesives.

Moisture: Moisture can also affect the adhesive durability.

Permanence: Make sure the mounting location is permanent for the duration of the recording period.

Public access: If the logger location is too visible, people may interfere with the readings. Make sure it is not too accessible.

Using External Temperature Probes

Veriteq SP 1000, 1016, 1400, 1416, and 1700-series data loggers have external temperature channel(s) for use with an external temperature probe. Using the external temperature probe enables you to collect data from hard-to-get-at locations, such as in duct work or under pipe insulation.

You can use an external temperature probe with these data loggers, provided the probe was calibrated with the data logger.

To use an external temperature probe:

1. Enable the desired channel on the logger (see *Enabling and Disabling Logger Channels* on page 27). If you do not need to monitor from the internal temperature sensor, disable it to conserve memory.

Note: You can disable most unused channels - external probe or not - to save data logger memory. One exception is the internal temperature channel on SP-1700 data loggers.

2. Attach the temperature probe to the connector on the data logger.

3. Use the **Logger>Setup** window to test the data logger operation (refresh the readings as required).
4. Place the logger in the desired location and start recording.

Caring for Relative Humidity Sensors

Each Veriteq SP-2000 data logger has a relative humidity sensor. Although the sensor has been designed to resist contamination and condensation, avoid exposing the data logger to contaminants, if possible.

For information on specific environments, contact Veriteq Instruments.

4 Transferring Logger Files

Transferring Data

When you transfer data from a data logger's memory, Spectrum creates a copy of the data and stores it on your PC as a logger file.

After inserting a logger file into Spectrum, you can view the information as a graph or as a tabular report.

Note: The transfer process does not affect or delete the data on the data logger.

Before transferring data, you may want to set the transfer preferences.

You should also ensure that you have write permission to the folder on the PC where you are going to save your transferred files.

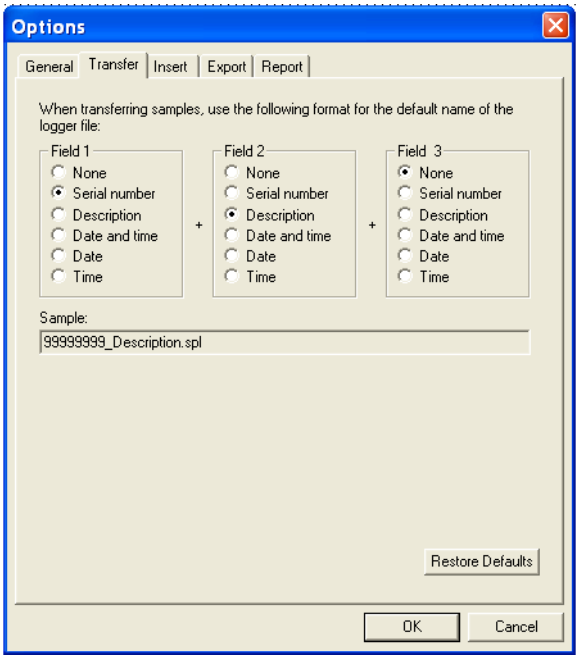
Setting Transfer Preferences

You can configure the default file name format for the Logger file.

Configuring the Default File Name Format

To configure the default file name format:

1. Select **Tools>Options**, then choose the **Transfer** tab.



2. In each of the three fields, select the information you want to include in the file name. The options for each field are:

Option	Format
None	This field is not used in the Logger file name format

Option	Format
Serial number	Eight digit logger serial number
Description	Description of logger
Date and time	yyyy-MM-dd_hh-mm, where: • yyyy is the year • MM is the month • dd is the day • hh is the hour • mm is the minutes
Date	yyyy-MM-dd, where: • yyyy is the year • MM is the month • dd is the day
Time	hh-mm, where: • hh is the hour • mm is the minutes

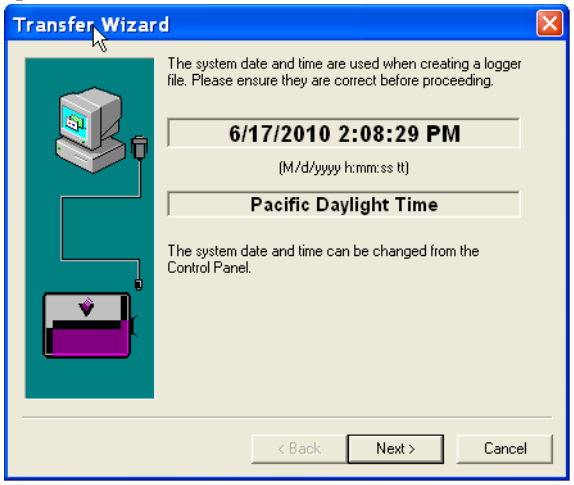
3. Click **OK**.

Transferring Logger Data to the PC

To transfer the information stored in the data logger to the PC:

1. Connect the data logger to the PC (see page 16).
2. Ensure that the COM port is configured (see page 17).
3. Ensure that you have write permission to the folder on the PC where you are going to save the transferred files.
4. Do one of the following:
   - Select **Logger>Transfer.**
   - Press F12.
   - Click the Transfer values toolbar icon ( ).

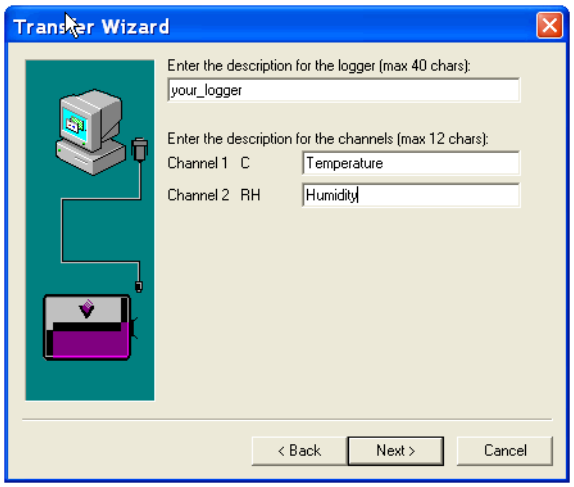
This starts the communications process between the logger and the PC and opens the Transfer Wizard window.



5. Confirm that the current date and time shown in the window are correct. If the date and time are not correct, use the Windows Control Panel to update the system and time. See *Setting System Date and Time* on page 41.

Note: The PC's date and time must be correct when setting up a data logger, or transferring logger data. Otherwise, the timestamp in the Logger file is incorrect.

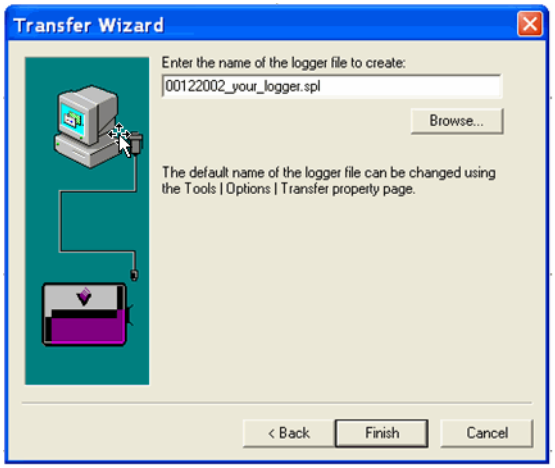
6. Click **Next**.



7. Edit or confirm the description of the logger using a maximum of 40 characters. The default entry for this field draws from the existing **Description** in the logger's memory (maximum 16 characters, see *Configuring Data Loggers* on page 18). You can accept the default, or use the extra characters to further describe the application or location of the data logger.

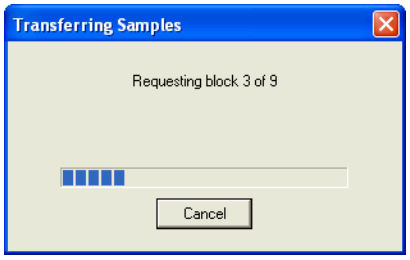
Note: Changing the description here does not modify the description in the logger's memory.

8. Edit or confirm the description of listed logger channels using a maximum of 12 characters.
9. Click **Next**.
10. Accept the default name for the Logger file or click the **Browse...** button to save the Logger file under a different name.



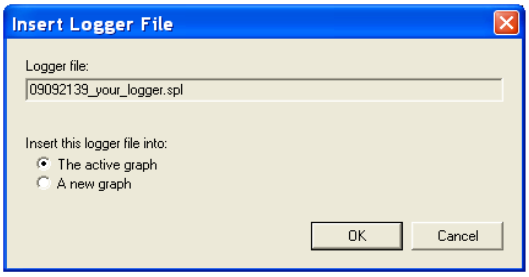
11. Click **Finish**.

    The logger transfers its data to the PC while displaying the progress of the transfer in the Transferring Samples window.



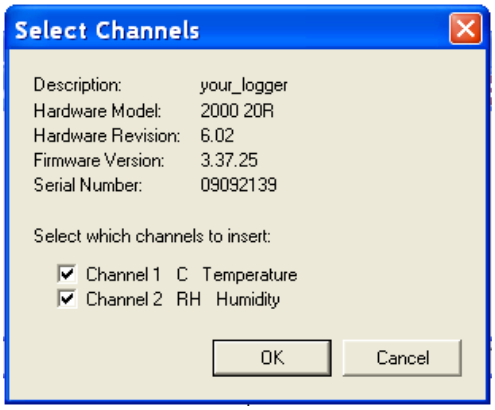
Note: After the transfer, the data remains in the logger. If the logger memory was not full, the data logger continues to store additional data in its internal memory without interruption. If you want to clear the data logger, see *Clearing Logger Samples* on page 32.

12. A dialog box appears, prompting you to insert the newly transferred logger file into a new graph or the active (current) graph, if one is active. Choose the appropriate radio button.



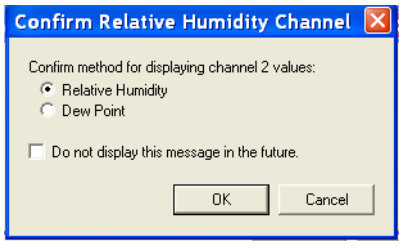
13. Click **OK**.

14. From the Select Channels window that appears, confirm the channels you want to display in the graph.



15. Click **OK**.

16. If one of the channels you want to display records relative humidity, the following window opens. Confirm the display method for the relative humidity channel.



17. Click **OK**.

18. The newly transferred file will appear in the active graph or a new graph based on your choice in step 12.

Setting System Date and Time

To set the PC's date and time using the Windows operating system:

1. Select **Start**>**Control Panel**, and then double-click **Date/Time**.
2. Reset the time to the correct values.
3. Click **OK**.

5 Working with Graphs

Displaying Existing Graph Files

To open an existing Graph file (.spg):

1. Do one of the following:
   - Select **File>Open.**
   - Press CTRL+O.
   - Click the **Open File** icon on the toolbar ( ).
2. Navigate to the Graph file you want to open.
3. Click **Open**.

The graph opens in the Spectrum window.

Creating New Graph Files

To create a new graph:

1. Do one of the following:
   - Select **File**>**New.**
   - Press CTRL+N.
   - Click on the **New Graph** icon on the toolbar ( ).

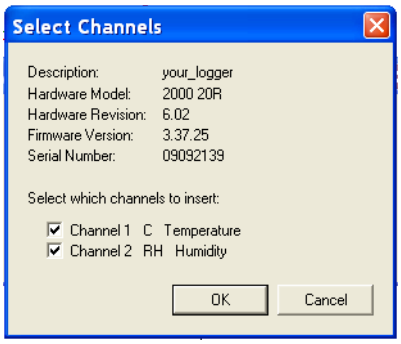
An empty graph window opens, ready for you to insert one or more Logger files. The new Graph file has a default name (for example, Graph1). You can rename the graph when you save it.

Inserting Logger Files

To insert a Logger file into a new graph:

1. Do one of the following:
   - Select **File**>**Insert Logger Files...**
   - Select **File>Insert Logger Files from sGo Folder...**
   - Press CTRL+I.
   - Right-click the graph, and select **Insert Logger Files...**
   - Right-click the graph, and select **Insert Logger Files from sGo Folder..**
   - Click the **Insert Logger File** icon on the toolbar ( ).
2. Navigate to the Logger file you want to insert.
3. Click **Open**.

The Select Channels window opens.



4. Select the channels you want to display in the graph.
5. Click **OK**.
6. If you are inserting a file with temperature and humidity, and the option for confirming display method for relative humidity has been set to **YES**, the Confirm Relative Humidity Channel window opens, prompting you to choose a display method for relative humidity

   a. Confirm the method for displaying values:
      - Relative Humidity
      - Dewpoint.
   b. Click **OK**.

   If you do not want to see this window every time you work with humidity logger files, do one of the following:
      - Select the **Do not display this message again** check box before clicking **OK**.
      - Select **Tools>Options**, choose the **Insert** tab, and clear the **Confirm display method for relative humidity channels** check box.
7. The Logger file is displayed as a graph in the Graph file. If the Logger file has more than one channel, Spectrum automatically selects distinct colors for each graph line.

You can insert multiple logger files in one graph. This works best if the range and dates measured in the logger files are similar. For more, see *Inserting Multiple Logger Files* on page 46.

Inserting Multiple Logger Files

You can insert more than one Logger file into a single Graph file. This enables you to easily compare data, and is especially useful for before-and-after studies or to check interactions of data collected from different loggers.

To insert additional Logger files into a Graph file, follow the instructions in *Inserting Logger Files* on page 44 for each Logger file you want to insert.

Scrolling Through Graphs

Scrolling allows you to shift the view of an on-screen graph to the right or to the left. Each time you scroll, the graph view shifts by one graph division.

To scroll the on-screen graph to the left:

1. Do one of the following:
   - Select **Format**>**Scroll Backward.**
   - Press ALT+Left Arrow.
   - Click the **Scroll Backward** icon on the toolbar ( ).

To scroll the graph to the right:

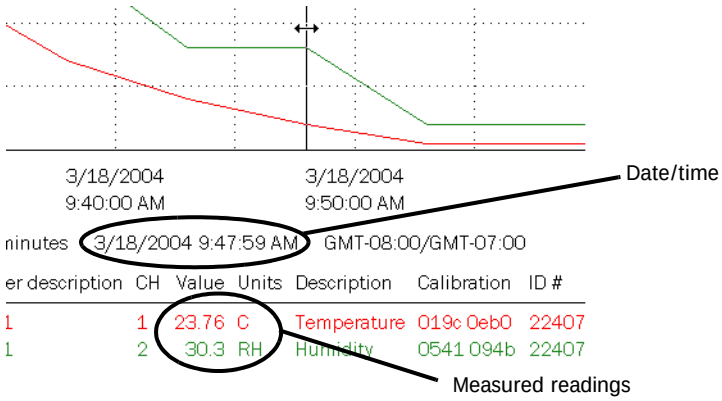
1. Do one of the following:
   - Select **Format**>**Scroll Forward.**
   - Press ALT+Right Arrow.
   - Click the **Scroll Forward** icon on the toolbar ( ).

Pinpointing Graph Values and Times

To pin-point exact values and times on the currently-active graph:

1. Do one of the following:
   - Select **Format**>**Position Cursor**.
   - Press F7.
   - Right-click the graph, and then select **Position Cursor**.
   - Click the **Position cursor** icon on the toolbar ( ).
2. Position the cursor line along the X axis using the mouse or the arrow keys.

   The values at the bottom left portion of the window indicate the exact date and time where the cursor line is positioned as well as the exact values that correspond to that point.



3. To lock the cursor in place, click the mouse or press ENTER.

To remove the vertical cursor bar:

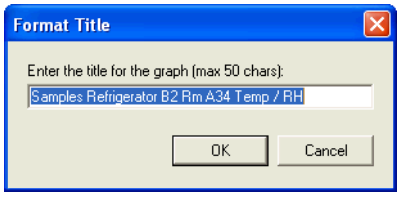
1. Do one of the following:
   - Select **Format**>**Remove Cursor**.
   - Press F8.
   - Right-click the graph.
   - Click the **Remove cursor** icon on the toolbar ( ).

Adding Graph Titles

To add a descriptive title to the currently active graph:

1. Do one of the following:
   - Select **Format**>**Title...**
   - Right-click the center of the window, just above the graph, and select **Format Title...**
   - Double-click the center of the window, just above the graph.

   The Title window opens.



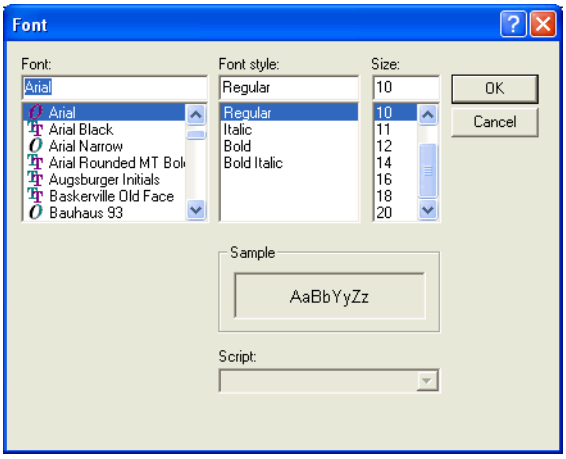
2. Type the desired title (up to 50 characters long).
3. Click **OK**.

Selecting a Graph Font

You can select any font that is on the PC to use for all displayed and printed graphs.

To change the graph font:

1. Select **Tools>Options**, then choose the **General** tab.
2. Click the **Graph Font...** button.



3. Select the desired **Font**, **Font style**, and **Size**.
4. Click **OK**.
5. If the font style and size are inappropriate, choose **Restore Defaults**.

Zooming In

Zooming allows you to look closer at a portion of the currently-displayed graph. It also enables you to eliminate extraneous data and produce a graph and a tabular printout that cover a set time period, such as 24 hours.

You can zoom-in two ways:

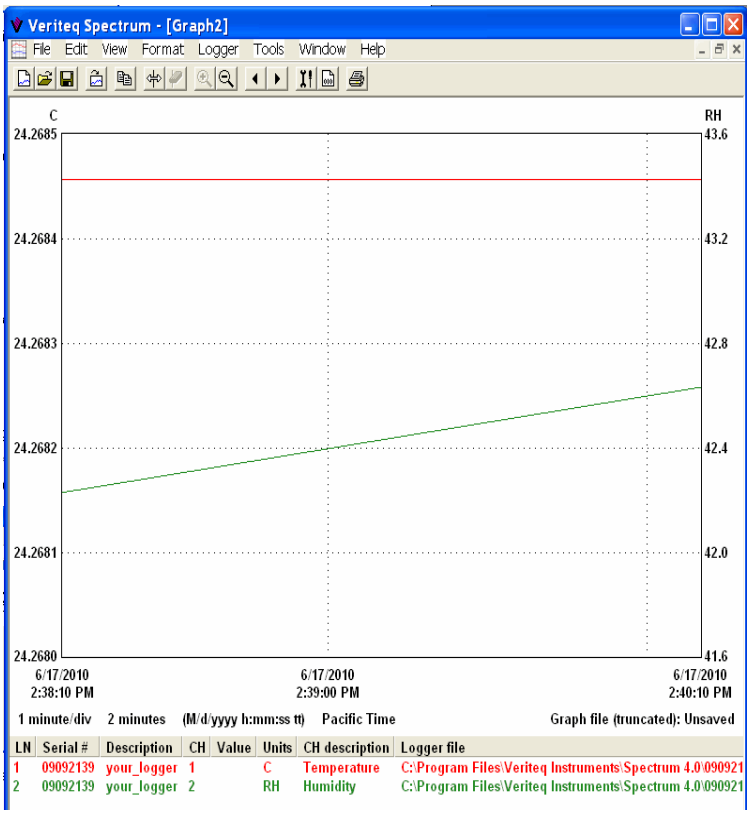
- Use the zoom selection box. This is the quickest and easiest way to zoom.
- Use the **Format>Time Scale...** option. This gives you precise control over the X-axis time scale of the zoom. You can zoom-in by entering exact start and end times and dates. For instructions on using this option, see *Zooming In by Formatting the Time Scale* on page 50).

Zooming In Using the Zoom Selection Box

To zoom in on the graph using the zoom selection box:

1. Do one of the following:
   - Select **Format>Zoom-in.**
   - Press F9.
   - Right-click the graph, and then select **Zoom-in.**
   - Click the **Zoom-in** icon on the toolbar ( ).

   A vertical line appears on the graph.
2. Use the mouse or arrow keys to move the vertical line to the beginning of the section you want to zoom-in on.



3. **Either**:

   a. Press and hold the left mouse button, and move the second cursor line to the end of the section you want to zoom in on.

   b. Release the mouse button and the zoomed-in area is displayed.

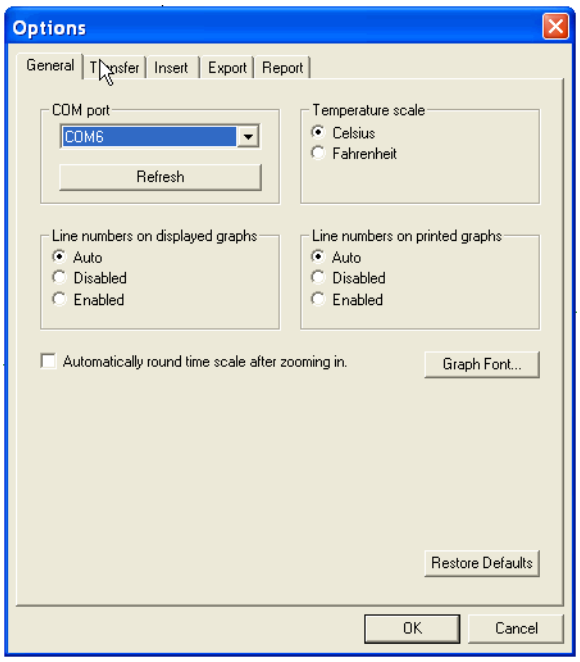
   Or:

   a. Press ENTER to anchor the vertical line.

   b. Use the arrow keys to stretch the zoom selection box.

   c. Press ENTER and the zoomed in area is displayed.

Note: If you have difficulty stretching the Zoom box accurately over the data, try turning off the Time Scale rounding setting. Select **Tools>Options**, then choose the **General** tab and clear the **Automatically round off time scale after zooming in** check box.

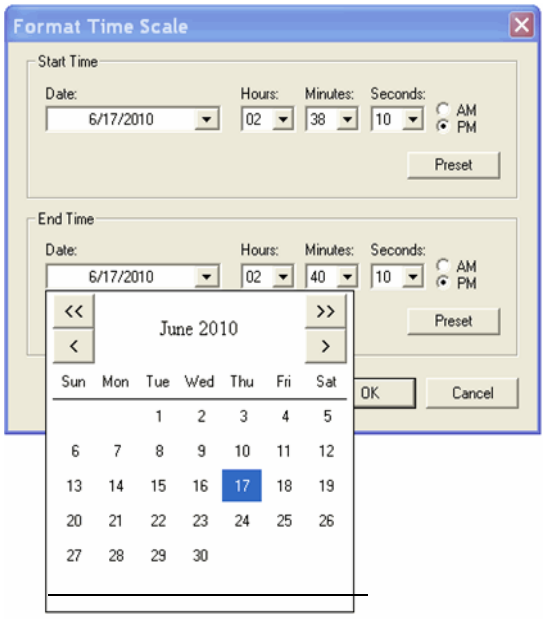


Zooming In by Formatting the Time Scale

To zoom in by formatting the time scale:

1. Do one of the following:
   - Select **Format>Time Scale...**
   - Place the cursor over the date and time at the bottom of the graph, and right-click, and then select **Format>Time Scale...**

   The Format Time Scale window opens.



2. Under **Start Time**, use the drop-down lists to select the start date and time that correspond to the beginning of the section of the graph you want to view in greater detail.
3. Under **End Time**, use the drop-down lists to select the end date and time that correspond to the end of the section of the graph you want to view in greater detail.

   You can also use the **Preset** buttons to automatically set the time to the beginning of the Calendar day chosen (12:00:00 AM).
4. Click **OK**.

Zooming Out

To zoom-out:

1. Do one of the following:
   - Select **Format**>**Zoom-Out.**
   - Press F10.
   - Right-click the graph, and then select **Zoom-out.**
   - Click the **Zoom-out** icon on the toolbar ( ).

You can keep zooming out until you have returned the graph to its original condition.

Formatting Time Zones

Veriteq Spectrum Software sets the default time zone when the Graph file is created. If desired, the time zone can be changed.

To change the time zone:

1. Do one of the following:
   - Select **Format**>**Time Zone.**
   - Right-click the x-axis of the graph, and then select **Format>Time Zone.**

2. Select the appropriate time zone from the drop-down list.
3. Click **OK**.

Formatting Measurement Units

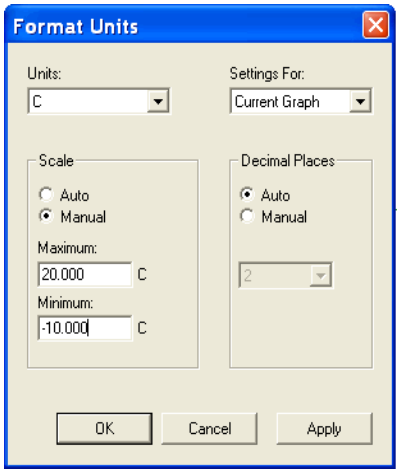
Veriteq Spectrum Software automatically determines Y-axes scales appropriate for any displayed graph and sets a default level of decimal place precision. If desired, you can override these settings.

Specifying the Y-axis Scale

To change a Y-axis scale:

1. Do one of the following:
   - With the Graph file you want to modify open, select **Format>Units...**
   - Right-click the Y-axis units, and select **Format>Units...**
   - Double-click the Y-axis units.

   The Format Units window opens.



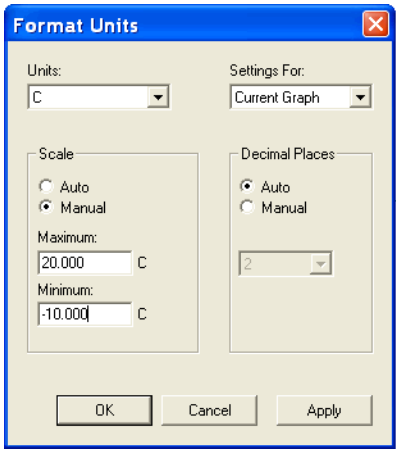
2. Under **Units**, use the drop-down list to select the desired units of measurement.
3. Choose to apply the settings to the current graph or all new graphs (**System Default**) using the appropriate radio buttons. If you select **System Default**, the settings entered here automatically apply to new graphs that use the same units (that is, °C, °F, and so on).
4. Under **Scale**, select the **Manual** button, then enter the maximum and minimum values for the axis that you want displayed.
5. Click **Apply** to apply changes, and **OK** to close.

Changing the Decimal Place Precision

To change decimal place precision:

1. Do one of the following:
   - With the Graph file you want to modify open, select **Format>Units...**
   - Right-click the Y-axis units, and select **Format>Units...**
   - Double-click the Y-axis units.

   The Format Units window opens.



2. Under **Units**, use the drop-down list to select the measurement units you want to change.
3. Under **Change Settings For**, use the drop-down list to select where you want the changes to apply—the **Current Graph** or **System Default**. If you select **System Default**, the settings entered here automatically apply to new graphs that use the same units.
4. Under **Decimal Places**, select the **Manual** option and use the drop-down list to select the desired number of decimal places.
5. Click **Apply** to apply changes, and **OK** to close.

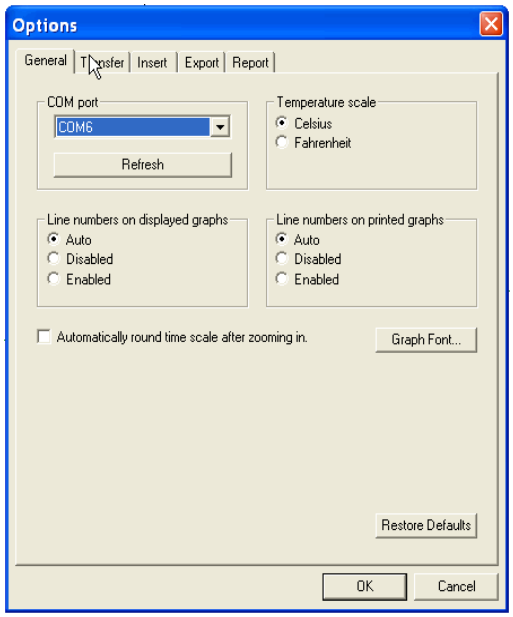
Changing the Temperature Scale

You can display temperature in Fahrenheit or Celsius.

To change the temperature scale:

1. Select **Tools>Options**, then choose the **General** tab.

2. Under **Temperature scale**, select **Fahrenheit** or **Celsius**.



This setting affects the data in all graphs, displays, and printed reports.

Setting Sample Smoothing

In Spectrum, sample smoothing controls how samples in a logger file are interpreted when they are inserted into a graph, allowing you to dampen the effects of ‘noise’ in Logger files.

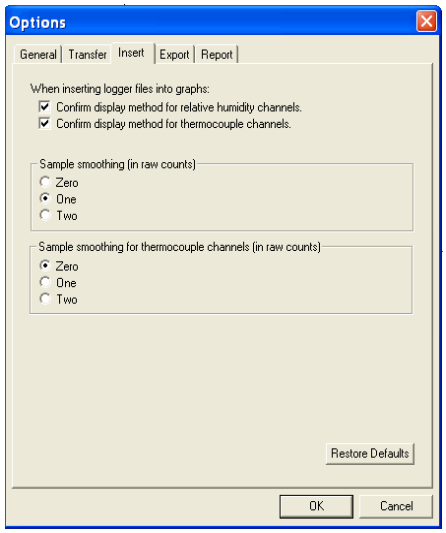
Sample smoothing is the minimum change in input signal required to cause a change in displayed channel values, and is defined in raw analog-to-digital converter counts.

Spectrum allows you to set two different sample smoothing values: one for thermocouple channels, the other for other channel types.

Note: Sample smoothing only affects how samples are interpreted and presented in graphs and reports; the data in the loggers and the logger files is not affected by any settings related to sample smoothing.

To set sample smoothing:

1. Select **Tools>Options**, then choose the **Insert** tab.



2. Under **Sample smoothing (in raw counts)**, select one of the following options.

Zero	Produces the most responsive graph, but makes the recorded readings susceptible to noise
One (default)	Suitable for most applications
Two	Decreases input noise and produces a more stable graph

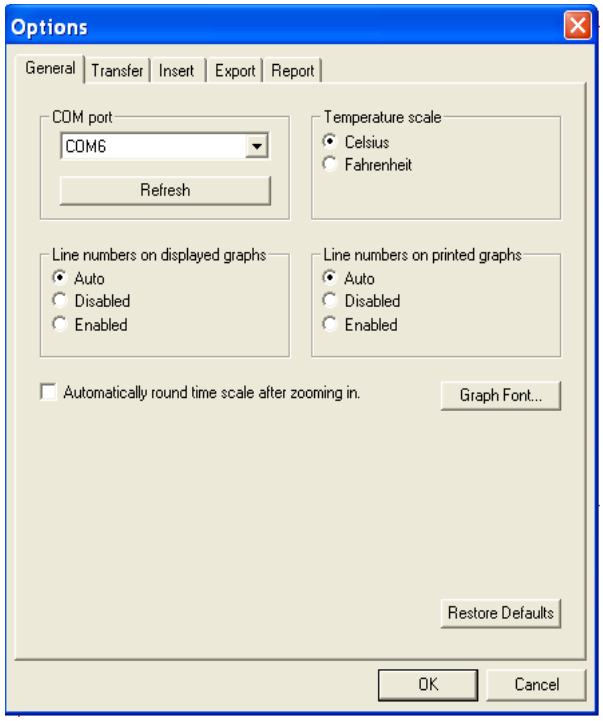
3. Click **OK**.

Displaying Line Numbers on Graphs

Spectrum displays the lines on graphs in different colors. If desired, you can add numbers to the lines in the graph.

To display numbers on the graph lines:

1. Select **Tools**>**Options**, then choose the **General** tab.



2. Under **Line numbers on displayed graphs**, select **Enabled**.
3. Click **OK**.

Copying and Pasting Graphs

Spectrum allows you to copy graphs into the Clipboard for pasting into other applications, such as Microsoft Word.

To copy graph data:

1. From Spectrum, choose **Edit>Copy**.
2. Go to the application you want to paste the graph image into. In this application, choose **Edit>Paste**.

Exporting Graph Data

Spectrum allows you to export graph data into either .txt or .csv format. You can also specify whether to have date and time saved within one column or separated. As an alternative, you can view and save the Report; it contains identical data, plus much more.

To export graph data to .txt or .csv files:

1. By default, date and time are exported in a single column.

   To have date and time exported into separate columns:

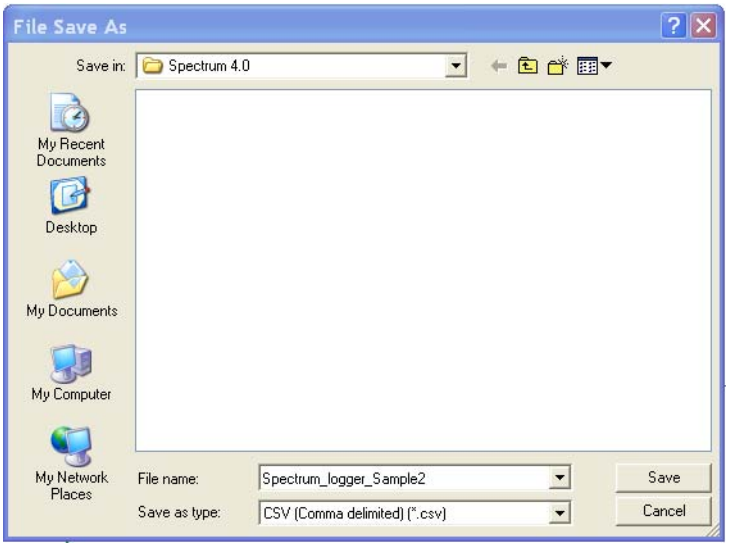
   a. Select **Tools>Options**, then choose the **Export** tab.

   b. Select the **Export the date and time in separate columns** option.

   c. Click **OK**

2. To export the file, choose **File>Export...**.

   The File Save As window opens.



3. Navigate to the location where you want to save the file.
4. In the **File name** box, type the desired file name.
5. In the **Save as type** box, accept the default **CSV (comma-separated values)(.csv)** file type, or select **Text (Comma delimited)(*.txt)**. You can readily import either file format into most popular spreadsheet and database programs for further analysis and manipulation.
6. Click **Save**.

Saving Graphs

To save changes to a graph file (.spg) for later use:

1. Choose **File>Save** or **File>Save As**.
2. Navigate to the location to save your file, enter a file name, and click **Save**.

To export graph data, use File Export and see *Exporting Graph Data* on page 56.

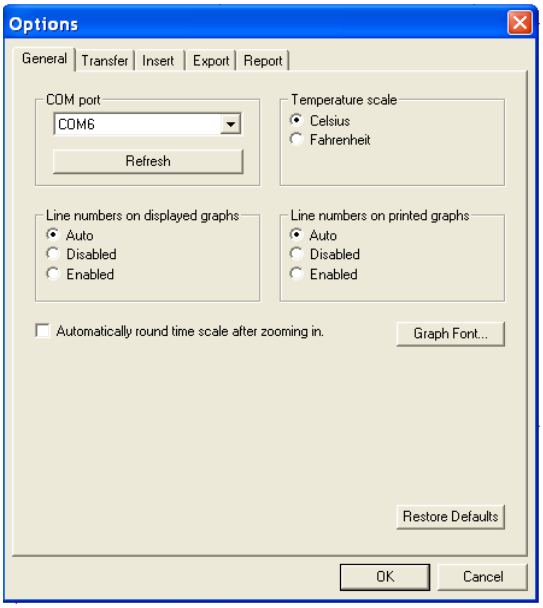
Printing Graphs

Printing Line Numbers on Graphs

Spectrum displays lines on graphs in different colors. For monochromatic printers, Spectrum automatically adds numbers to the graph lines when the graph is printed (when in auto mode).

To change this option:

1. Select **Tools**>**Options**, then choose the **General** tab**.**



2. Under **Line numbers on printed graphs**, select one of the following options.

Auto	Lines are numbered if the graph is printed on a monochromatic printer and not numbered if the graph is printed on a color printer.
Disabled	Lines are not numbered on the printed graph, even if it is printed on a monochromatic printer.
Enabled	Lines are numbered on the printed graph, even if it is printed on a color printer.

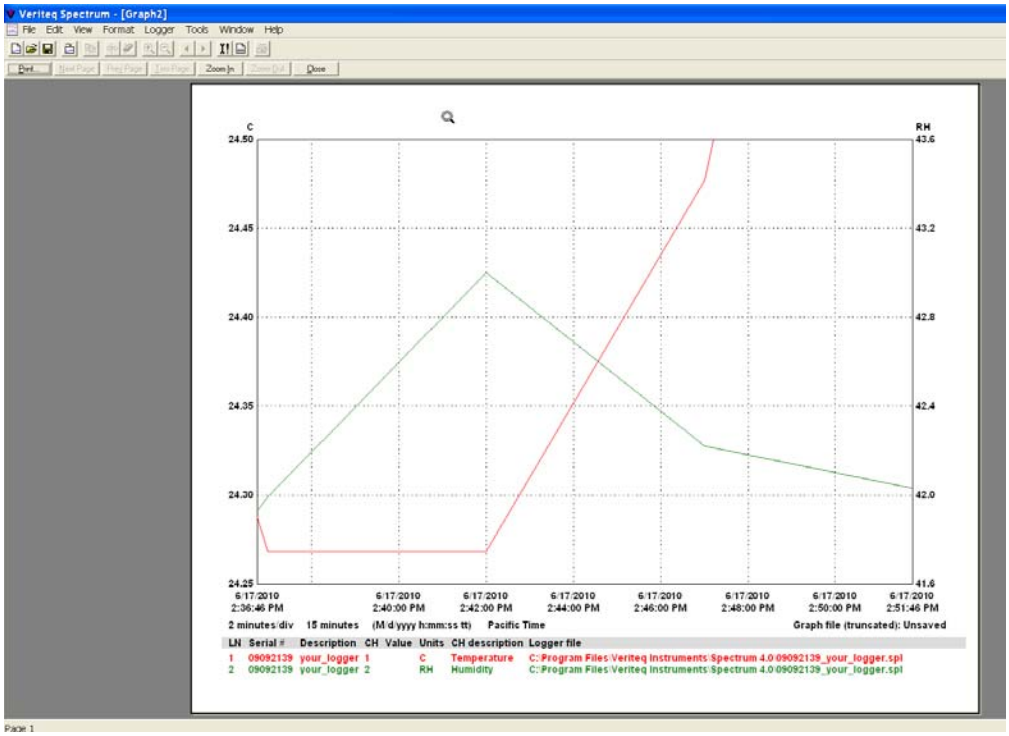
3. Click **OK**.

Print Preview

To view a print preview of the current graph:

1. Select **File**>**Print Preview**.

   The Print Preview window opens.



2. If you want to view the graph in more detail, select **Zoom In**.
3. When you are ready to print the file, select **Print...**.

Printing Graphs

To print a currently-active graph:

1. Do <u>one</u> of the following:

   - Click the **Print Graph** icon on the toolbar (), which sends the graph immediately to the printer. (Skip steps 2 &3).
   - Select **File**>**Print.**
   - Press CTRL+P.

   The Print window opens.

2. Configure the printer settings.
3. Click **Print**.

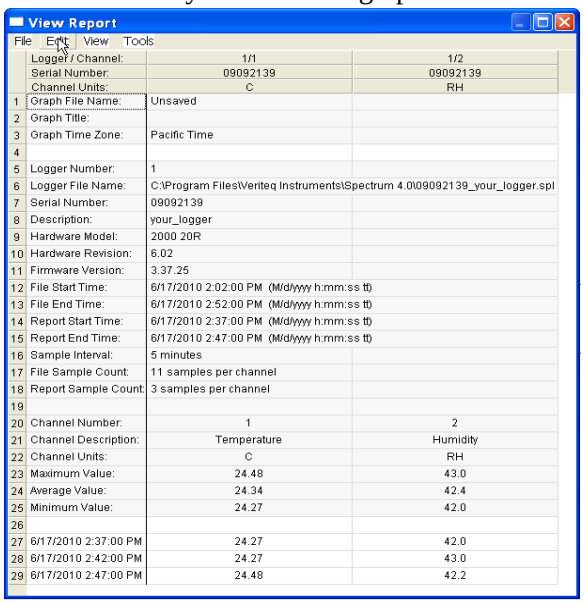
6 Viewing Reports and Statistics

Working with Reports

Reports display logger file information in a tabular format. You must have at least one file inserted in Spectrum to view a report. To insert a file, see *Inserting Logger Files* on page 44.

To view a report for the currently-active graph:

1. Do one of the following:
   - Select **View>Report**.
   - Press F6.
   - Right-click anywhere on the graph and select **View Report**.
   - Double-click anywhere on the graph.

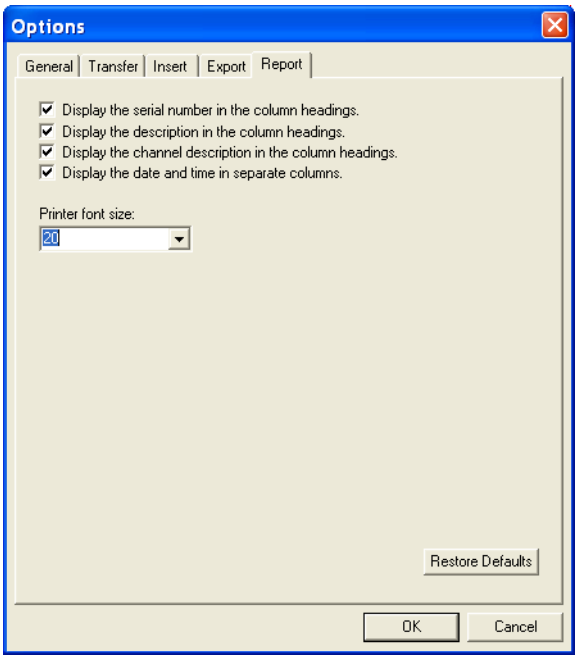


	Logger / Channel:	1/1	1/2
	Serial Number:	09092139	09092139
	Channel Units:	C	RH
1	Graph File Name:	Unsaved	
2	Graph Title:		
3	Graph Time Zone:	Pacific Time	
4			
5	Logger Number:	1	
6	Logger File Name:	C:\Program Files\Veriteq Instruments\Spectrum 4.0\09092139_your_logger.spl	
7	Serial Number:	09092139	
8	Description:	your_logger	
9	Hardware Model:	2000 20R	
10	Hardware Revision:	6.02	
11	Firmware Version:	3.37.25	
12	File Start Time:	6/17/2010 2:02:00 PM (M/d/yyyy h:mm:ss tt)	
13	File End Time:	6/17/2010 2:52:00 PM (M/d/yyyy h:mm:ss tt)	
14	Report Start Time:	6/17/2010 2:37:00 PM (M/d/yyyy h:mm:ss tt)	
15	Report End Time:	6/17/2010 2:47:00 PM (M/d/yyyy h:mm:ss tt)	
16	Sample Interval:	5 minutes	
17	File Sample Count:	11 samples per channel	
18	Report Sample Count:	3 samples per channel	
19			
20	Channel Number:	1	2
21	Channel Description:	Temperature	Humidity
22	Channel Units:	C	RH
23	Maximum Value:	24.48	43.0
24	Average Value:	24.34	42.4
25	Minimum Value:	24.27	42.0
26			
27	6/17/2010 2:37:00 PM	24.27	42.0
28	6/17/2010 2:42:00 PM	24.27	43.0
29	6/17/2010 2:47:00 PM	24.48	42.2

2. The Report window summarizes the information in the Graph file, as well as related information on the data loggers whose files are inserted and the loggers' setup parameters.
3. To print the report, from the Report window, select **File**>**Print** or press CTRL+P.

To change the font size in printed reports:

1. Do one of the following:
   - From Spectrum, select **Tools>Options**, then choose the **Report** tab.
   - From the Report window, select **Tools>Options**, then choose the **Report** tab.
   - From the Report window, right-click and choose **Options**, then choose the **Report** tab.



2. From the Report tab, on the **Printer font size** box, select an option from the drop-down list, or type the desired font size.
3. Click **OK**.

Copying and Pasting Report Data

You can copy report data from all Spectrum Reports for use in other applications, such as Microsoft Word or Microsoft Excel.

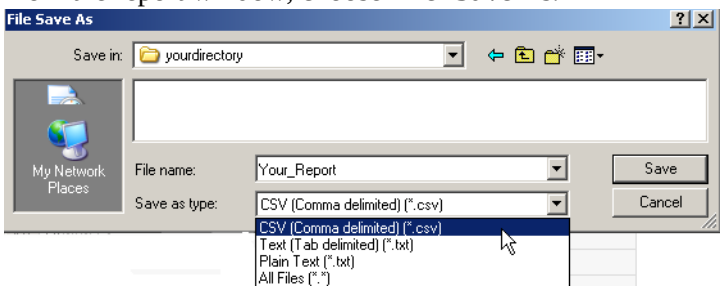
To copy report data:

1. From Spectrum, choose the report to view from the View menu.
2. From the report window, choose **Edit>Select All**.
3. From View Report, with all contents highlighted, choose **Edit>Copy**.
4. Go to the application you want to paste the report data into. In this application, choose **Edit>Paste**.

Saving Reports

To save report data:

1. From the report window, choose **File>Save As**.



2. Navigate to the location where you want to save the file.
3. In the **File name** box, type the desired file name.
4. In the **Save as type** box, choose one of the following file types for your file:
   - CSV (comma-separated values)(.csv)
   - Text (Comma delimited)(*.txt)
   - Plain text (*.txt).

   You can readily import these file formats into most popular spreadsheet and database programs for further analysis and manipulation.
5. Click **Save**.

Printing Reports

To print reports, from the report window, do the following:

1. Select **File>Print**.
2. Configure the printer settings.
3. Click **Print**.

7 Troubleshooting

Serial Port Problems

If you are experiencing difficulties communicating with Veriteq data loggers, here are some tips and things to try before calling Veriteq Instruments.

Software Error Messages you May Encounter…

Unable to allocate COM port because it is busy

This error message means that Spectrum was unable to allocate the COM port because it was already allocated by a different program. You may have to wait until the COM port becomes available.

Unable to allocate COM port because it is unavailable

This error message means that Spectrum was unable to allocate the COM port because it did not exist in the operating system. Check your available COM ports.

Unable to receive sync byte from COM port

This error message means that Spectrum sent a request message to the data logger, but did not receive any response from the data logger. This could mean the data logger is unplugged or the cable is not connected properly.

Unable to receive all of the bytes from COM port

This error message means that Spectrum sent a request message to the data logger, but received an incomplete response message from the data logger. This may mean there is a problem with the COM port on this PC, a problem with the cable, or a problem with the logger itself. Check these possibilities.

Unable to communicate with logger on COM port

This error message covers miscellaneous error conditions, other than those listed previously. This message could mean that there is a problem with the COM port on this PC, a problem with the cable, or a problem with the logger.

Things to Try:

1. Does the logger and interface cable work on a different PC? If so, the problem likely resides in the serial port configurations on the PC.
2. Are there other devices (such as a mouse) that use the serial port in question without problems? If so, that port is likely not the problem.
3. Can you transfer data using a different interface cable? If so, the cable may be damaged.
4. Can you transfer data using a different logger (with the same interface cable)? If so, the data logger may be damaged.

Invalid hardware model

This error message means that Spectrum did not recognize the hardware model of the data logger, and as a result, did not know how to interpret the information

stored in the data logger. Ensure you are using a data logger supported by Spectrum.

Unable to create logger file

This error message is generated when Spectrum attempts to create a logger file on a disk and an error occurs. Some possible reasons include:

- The disk is full.
- The user does not have write access to the disk. Ensure the user has write permission to the folder where the logger file is being saved.
- The file is already open by a different program. Close it.
- The file name is invalid. Try using a more simple .spl file name.

Frequently Asked Questions

I have recently upgraded Veriteq Spectrum software to the latest version. Will this new software work with my existing loggers and files?

Yes. Each version of Veriteq Spectrum software is designed with backward compatibility. This means that it works with all previous versions of loggers or files created from those loggers.

I have recently purchased a new logger. Will it work with my older version of Spectrum software?

Not always. In our pursuit of continual product improvement, we periodically upgrade logger hardware or release new logger models. Unfortunately, these changes may not be recognized by an older version of Veriteq Spectrum software and can result in difficulties. For that reason, each logger that you purchase includes a note indicating which software version it must be used with. The safest choice is to always upgrade to the latest version of software. Contact Veriteq Instruments if you require a software update.

Does the software account for daylight savings time changes?

Yes. Daylight savings time changes are automatically accounted for in all graph and tabular displays.

How many logger files can I overlay onto the same graph?

You can overlay many channels of data onto the same graph; in testing, we inserted more than 100 channels successfully.

Do all graphs have to be created from one data logger?

No. You can create graphs using files from different data loggers and different data logger models.

8 Glossary

A–B

Ambient temperature The average or mean temperature of the surrounding air that comes in contact with the equipment or instrument.

Axis A line that borders one side of the graph area, providing a frame of reference for measurement or comparison. In Spectrum software, measurement values are plotted on the vertical Y-axis while date and time values are plotted on the horizontal X-axis.

C–E

Calibrate To compare and correlate readings against a standard measurement.

Calibration certificate Documented evidence that a product has been calibrated against a standard measurement reference and that it falls within the specified requirements.

Channel The path through which an instrument receives the input signals it measures.

Dewpoint Dewpoint is defined as the temperature at which the amount of moisture present in the air is the MAXIMUM amount the air can hold (at a constant pressure and water vapor content). This means that when the temperature falls to the dew point, the relative humidity is 100% and the air is considered saturated.
Dewpoint does not vary with temperature, as does relative humidity (RH). Rather, dewpoint is a DIRECT measure of the actual moisture content in the air and thus is preferred as the unit of measurement in many scientific and industrial applications—particularly in tightly controlled environments where precise indications of water content in the air are required.
The dewpoint is never greater than the air temperature. Once the dewpoint is reached and the air temperature continues to drop, water vapor is forced to leave the air through condensation. This condensation may take the form of water droplets, dew, or may remain suspended in the air as clouds or fog.
To better understand how dewpoint and relative humidity are related to each other, try inserting a logger file with relative humidity (RH) channel values into a graph twice—once, displaying RH using dewpoint and once displaying RH using relative humidity.
In Spectrum, dewpoint readings below 0 degrees C are recorded as frost-point.

F–K

Graph file A file that is created to display the data from one or more Logger files. Graph files retain formatting information such as graph title, zoom levels, Y-axis scaling, and Logger file data; and are identified by their .spg extension (for example, LAB_1.spg).

L–Q

Local time A value equal to the current time used at a particular location. A relative indicator of time meaningful only if Time Zone Information is also known. Local Time contrasts with UTC Time, an absolute time reference. The software records Local Time and UTC Time in each Logger file.

Logger file A file that is created after transferring a logger's data to the PC. The file contains the collected readings (from all active channels) for the transferred logger, including the logger's description, model number, serial number, firmware version number, file description, Local time, and UTC (Universal Time Coordinated) time. Logger files are identified by their .spl extension (for example, PRIMARY_GAS_FLOW.spl). Logger files cannot be viewed directly—you have to insert the Logger file into a Graph file before the data is displayed as a graph.

NIST An acronym for the National Institute of Standards and Technology.

R–T

Range Normal operating limits, specified by the lowest calibration point to the highest calibration point.

Relative humidity Relative humidity is the measure of the amount of water vapor in the air compared to how much it can possibly hold at that temperature. A relative humidity of 50% means that the air contains only one-half as much water as it could possibly hold. The capacity of air to hold water is heavily dependent on the temperature of the air. The colder the air, the less water it can hold. Air at 50°F can hold only one-quarter the amount of water as air at 95°F.

Sample A measurement reading that is stored to data logger's memory.

Sample smoothing (deadband) A setting in Spectrum (**Tools>Options**>**Insert** tab - Sample smoothing) that controls how the samples in a logger file are interpreted when they are inserted into a graph. Sample smoothing (or sample deadband) is the minimum change in the input signal required to cause a change in the displayed channel values. Sample smoothing is used to dampen the effects of noise, and is defined in terms of raw analog-to-digital converter counts.

Sample interval The sample interval is the rate at which the logger takes and records readings to memory. The sample interval applies to all enabled channels on the logger. You may want to occasionally change the sample interval on the logger because:

- Faster sample rates may be required by the application.
- You need to record readings over a longer duration.
- You want to minimize the collection of unnecessary data.

Scale The range of values a graph displays.

Serial port The communications port to which you can attach devices such as a modem, mouse, or serial printer to the computer. The serial communication ports on the computer are commonly referred to as COM1, COM2, COM3, and so on. Serial ports exchange data sequentially, one unit at time.

Stability The ability of a sensor or measurement instrument to maintain its performance characteristics over a specified period of time.

Thermistor A temperature-sensing element (a *therm*ally-sensitive res*istor*) composed of sintered semiconductor material that exhibits a large change in resistance in proportion to a small change in temperature. The relationship between temperature and resistance is approximated for most thermistors by the Steinhart-Hart equation.

Traceable Capable of being traced back to a recognized measurement standard or reference.

Transfer The term used when the software makes a copy of the data contained in a connected data logger. The transfer process creates a file on the PC but does not affect or delete the data on the logger. Other terms commonly used to describe the transfer process are download, upload, backup, or copy.

U–Z

USB An acronym for *U*niversal *S*erial *B*us, a standard for connecting external devices such as a mouse, keyboard, scanner, printer. USB offers many benefits over serial and parallel port connections, including thinner and cheaper cables, greater expandability (with the addition of a USB hub, a single USB port can handle over 100 peripheral devices) and greater speed.

UTC An acronym for Universal Time Coordinated, UTC is a standard time common to every place in the world. Also known as Greenwich Mean Time (GMT) and World Time. UTC is expressed using a 24-hour clock but can be converted into a 12-hour clock (AM and PM). An absolute time reference that does not rely on Time Zone information, UTC contrasts with Local time. UTC and Local Time information is contained in Logger files and is used to form the time base on logger graphs and data.

Zooming Enlarging a portion of an on-screen graph.

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