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HC Historian
User's Guide

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About This Document

Abstract

The **HC Historian** program operates on a PC with Windows™ XP, Vista or Windows™ 7. It lets you upload historic data from one or more HC900 Controllers and store this data on disk in CSV format. This historic data includes Trend, Alarm, and Event data. The CSV files are formatted in a way that allows you to easily graph the Trend data using Microsoft Excel.

References

The following list identifies all documents that may be sources of reference for material discussed in this publication.

Document Title	Doc ID
HC900 Controller Technical Overview	51-52-03-31
HC900 Controller Installation and User Guide	51-52-25-107
HC900 Operator Interface User Guide	51-52-25-108
HC900 Hybrid Controller Function Block Reference Guide	51-52-25-109
HC900 Hybrid Control Designer User Guide	51-52-25-110
HC900 Hybrid Controller Communications User Guide	51-52-25-111
900 Control Station for use with HC900 Hybrid Controller	51-52-25-148
Station Designer User Guide	51-52-25-149

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Honeywell Organization	WWW Address (URL)
Corporate	*http://www.honeywell.com*
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1 Overview

The HC Historian program allows you to upload historic data from one or more HC900 Controllers and store this data on disk in CSV format. This historic data includes Trend, Alarm, and Event data. The CSV files are formatted in a way that allows you to easily graph the Trend data using Microsoft Excel.

2 System Requirements

The following items are needed to support the use of the History feature:

Component	Minimum requirements
HC900 controller firmware (C30/C50/C70/C70R)	Version 4.4 or higher
HC Designer configuration software	Version 4.4 or higher
Microsoft Windows™ XP Professional OS	Any version
Microsoft Windows™ Vista OS	Any version
Microsoft Windows™ 7 OS	Any version
HC Historian software	Version 1.000 or higher

3 Installation

To install the HC Historian software from the installation CD, simply insert the CD into the drive. If the installation does not begin automatically, you will need to run **setup.exe** from the CD's root directory using the following procedure:

- Click on the Windows™ "start" button
- Click on "Run…"
- Click on "Browse…" Use the Browse window to locate the **setup.exe** file on the installation CD.
- Select this file and click "Open".
- Click OK to begin the installation.

Follow the instructions on the screens to complete the installation. When the installation is complete you will see the icon shown below on your desktop.

You can use this icon to launch the HC Historian software.

The installation program will also put a link to the HC Historian program and the user documentation in your Windows™ Programs menu.

# 4 Setting the time and date in the HC900 Controller

HC Historian will store the time and date of occurrence for each alarm, event, and trend record in the CSV files. HC Historian uses the time and date generated by the HC900 controller as its time reference, so it is important that you set the time, date, time zone, and Daylight Saving Time settings on the controller to your desired values before you begin to collect historic data.

5 Configuring the HC900 Controller

In order to generate the historic data that will be uploaded via HC Historian you must configure a Trend Rate function block and one or more Trend Point function blocks in the HC900 controller. Refer to the Trend Backfill Product Note for more information about how to configure the controller to gather trend history data.

6 Starting HC Historian

You can launch HC Historian from either the desktop icon or the Windows™ Start menu. When the program starts running it will place an icon in the system tray, as shown below:
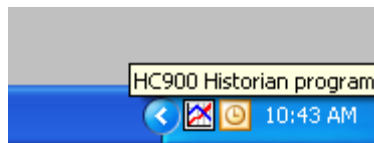
This icon allows you to keep the Historian application active so it can be easily accessed at any time. Just click on the icon at any time to alternately display or hide the Historian window (using the left mouse button). You can also click the Minimize button on the Historian window to hide the window when the application is not being used. Note that the system tray is typically located in the lower right corner of your PC screen.

The Historian program allows you to perform two basic functions, Setup and Snapshot. Just click on either the Setup or the Snapshot button to access the desired function.

7 Setup

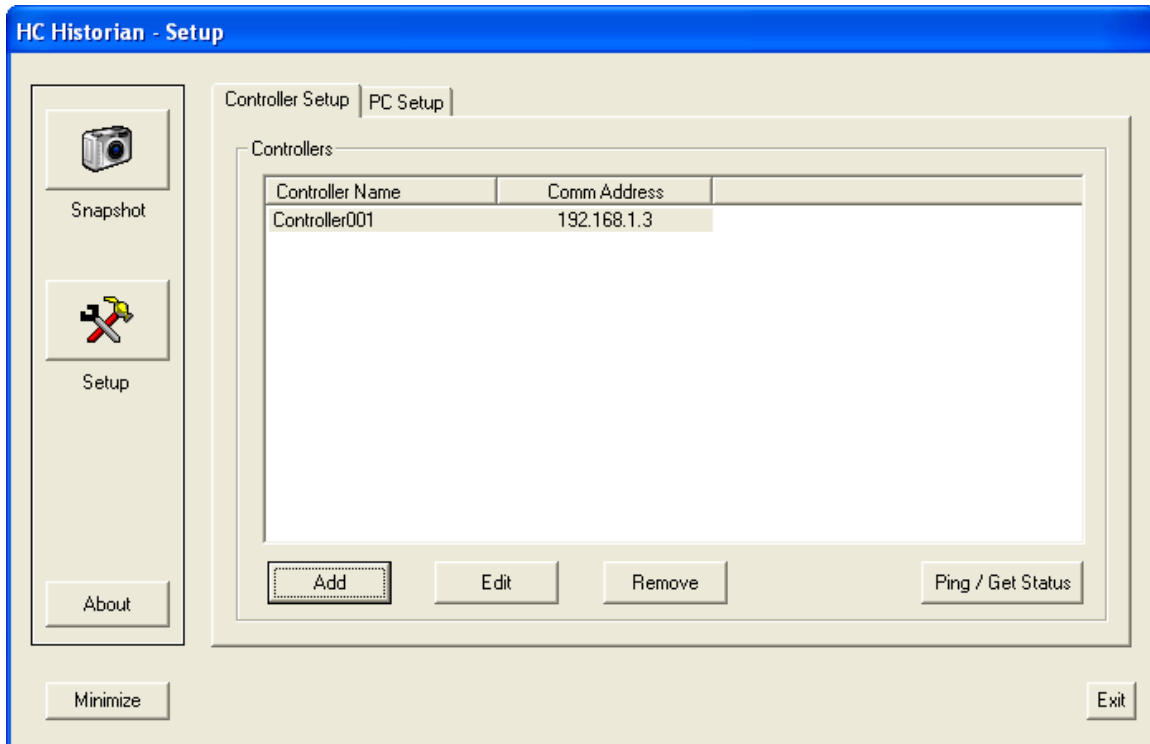Click the Setup button to call up the Setup tabs in Figure 7-1.

Figure 7-1 Setup tabs

7.1 Controller Setup

The Controller Setup tab allows you to identify and configure the controllers that will be used with this application. You can add, modify, or remove controllers from the list of controllers. All of the setup information is saved to disk so that it will be available whenever you run the Historian program.

After you have added or modified a controller you may want to click the "Ping/Get Status" button to verify that you can access this controller over your Ethernet or serial communications link. This button will also show you some basic information about the controller that you may find helpful in setting up your network of controllers. Just highlight the desired controller and click the "Ping/Get Status" button to view this information.

7.1.1 Trend file organization

This setting is located on the Controller Setup dialog, as shown in Figure 7-2.
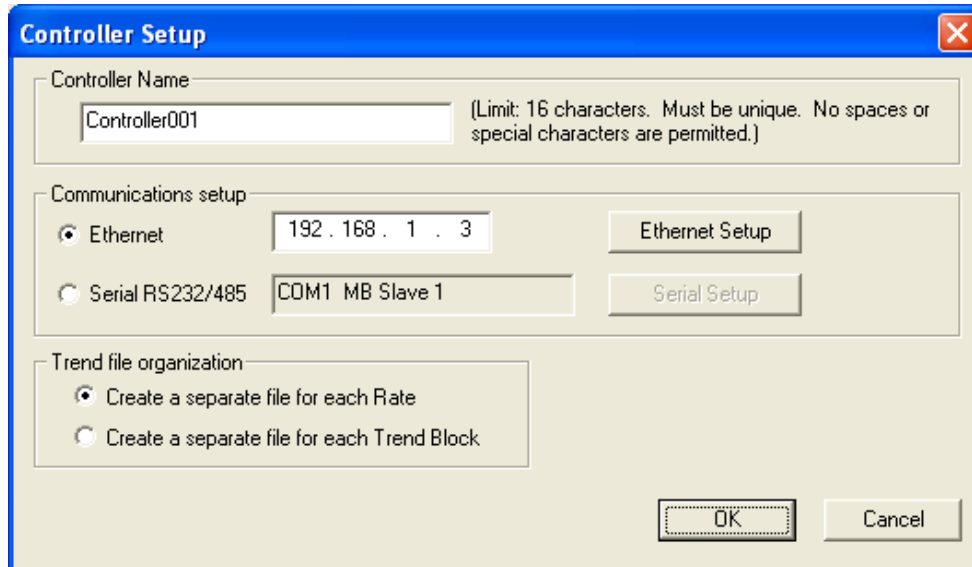
Figure 7-2 Controller setup Dialog

It allows you to determine how the Trend data will be organized when the CSV files are created by HC Historian. The choices are described below.

Create a separate file for each Rate:
This selection will create a separate CSV file for each of the three data collection rates. The files will be named Rate1.csv, Rate2.csv, and Rate3.csv.

Create a separate file for each Trend Block:
This selection will create a separate CSV file for each of the Trend Blocks configured in the controller. Each CSV file will use the name that you assigned to the Trend Point Block under HC Designer (for example, FreezerControl.csv or CoolerBControl.csv), and will only contain the points that you assigned to that Trend Block.

7.2 PC Setup

This tab allows you to make the following selections:
- Set the Root Folder for the CSV files
- Change the Station Number for this PC

7.2.1 Setting the Root Folder for the CSV history files

All of the Snapshot files created by HC Historian will be stored under a single root folder on your PC or server. You can assign the location of the root folder via the PC Setup tab. Just click the Browse button to choose or create the root folder for the Snapshot files. The root folder can be located on your local hard drive, a network server, or any other device that can be mapped as a "drive" on the PC. If the root folder is assigned to a removable storage device such a USB storage key, you (the user) will be responsible for the "safe removal" of the device using normal Windows™ methods.

7.2.2 Setting the Station Number

The Station Number is used to prevent the HC Historian program from interfering with other programs or devices that upload history data from the controllers. The default setting for HC Historian is 5. Click the Change button if you want to change the Station Number associated with this PC. The range of Station Numbers is 1 to 5.

8 Operation

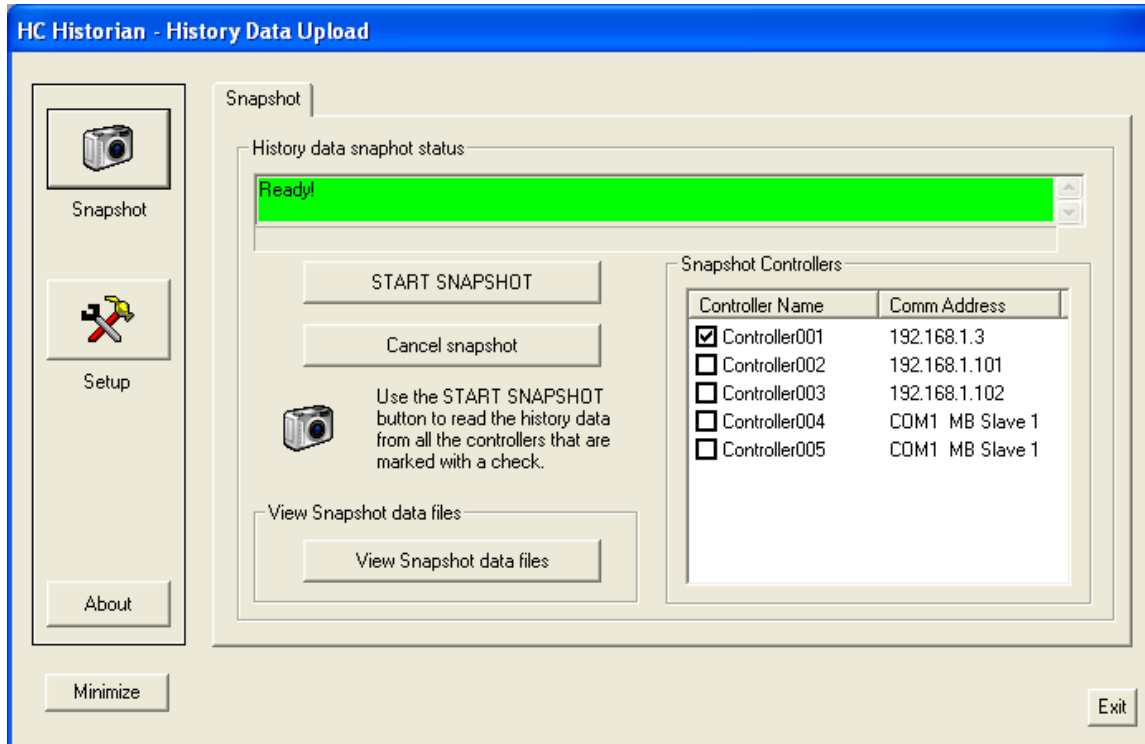Click the Snapshot button to call up the Snapshot tab, shown in Figure 8-1.

Figure 8-1 Snapshot tab

8.1 The Start Snapshot button

The Snapshot tab allows you to upload data from one or more selected controllers. The procedure to upload the data is simple:

- Select one or more controllers from the list of controllers by placing a check mark in the box next to the Controller Name.
- Click the START SNAPSHOT button.

The Historian program will upload the historic data from the selected controllers and create the appropriate CSV files on disk. The status of the upload operation will be shown in the Snapshot Status window. Note that it may take about 15-20 seconds to complete the upload process for **each** controller (i.e., 15-20 seconds if you are using an Ethernet connection, longer if you are connected via a serial port).

8.2 The View Snapshot button

Once the Snapshot is complete, click on the button labeled "View Snapshot data files" to view the CSV files. This button will launch a Windows™ Explorer window in the folder that contains the CSV files. The Historian program will create a new folder for each Snapshot that you take. The folder name represents the time and date that the Snapshot was taken, so it should be easy to locate the data that you are looking for. For example, the folder name "2009_0305_123630" indicates that this folder contains the data that was uploaded from the controller(s) at 12:36:30 on March 5, 2009. This folder will contain the CSV files for all of the controllers included in this Snapshot.

Note that you can perform any normal Window files operation from the Explorer window. For example, you can launch Microsoft Excel or another desired application program by simply clicking (or double clicking) on a CSV file. You can also move, copy, or delete the CSV files and folders from this window.

8.3 The Cancel Snapshot button

You can cancel a Snapshot at any time by clicking the "Cancel Snapshot" button. The status window will show the message "Please wait while the Snapshot is being cancelled" until the cancel is complete. The status window will then display the message "Ready!" again to indicate that you can start a new Snapshot, if desired.

8.4 Snapshot Status Messages

Here is a description of the messages that may appear in the Snapshot Status window:

Snapshot Status Message	Meaning
Ready!	The program is ready to start a new Snapshot.
Uploading data from Controllername … Wait…	The program is uploading alarm, event, and trend data from the controller and creating the appropriate CSV files.
Please wait while the Snapshot is being cancelled.	The program is cancelling the current Snapshot because the user clicked the Cancel Snapshot button.

8.5 Error Messages

Here is a description of the error messages that may appear while you are using HC Historian.

Error	Error Message	Cause and Remedy
-1	Reserved n/a	
-2	Historic Data Upload is not supported in this version of the controller firmware.	The firmware in the selected controller must be upgraded to Version 4.4 or higher. Older versions of the firmware do not support the History feature.

Error	Error Message	Cause and Remedy
-3	Cannot create folder [foldername]	This error may occur if you click START SNAPSHOT after a removable storage device (like a USB memory device) was removed from your PC, or if a network drive is not connected. Insert the device back into the PC or select a new Root Folder on another drive using the PC Setup dialog.
-4	Access is denied for file [filename]. This file may be write-protected.	HC Historian cannot access the specified file, probably because it is write-protected. Remove the Read Only attribute from the file and retry your operation.
-5	Cannot find file [filename]	HC Historian could not find the file identified in the error message. Retry your operation. If the error persists, contact the Technical Assistance group.
-6	Bad path name for file [filename]	This error can occur if you manually delete or rename folders under the Root Folder path outside of HC Historian (using Windows™ Explorer, for example). To correct the problem, simply reselect the Root Folder via HC Historian's PC Setup tab.
-7	The directory is full. Cannot create file [filename]	This error is unlikely to occur unless you are trying to create CSV files on a storage device with very limited storage capacity, like a floppy disk.
-8	The disk is full. Cannot create file [filename]	Historian cannot create new CSV files on the specified storage device because the device is full. Remove unneeded files from the device and then retry your operation.
-9	Unexpected end of file on [filename]	The specified file may have been corrupted, possibly because a USB device was removed without proper "safe removal" procedure. Verify that all of the appropriate storage devices are connected and working properly and then retry your operation.
-10	Cannot access this storage device. File [filename].	This error may occur if you click START SNAPSHOT after a removable storage device (like a USB memory device) was removed. Insert the device back into the PC or select a new Root Folder on another drive using the PC Setup dialog.
-11	There are too many files open on this PC or server. File [filename].	This error indicates that there are too many files open on your PC or server. If this error occurs you may want to contact your system network administrator. You may need to restart your PC to resolve this problem.

Error	Error Message	Cause and Remedy
-12	File sharing or lock violation on file [filename].	This error indicates that two or more applications are trying to access the same file (e.g., MS Excel and HC Historian). If this error occurs, close the other application and retry the operation under Historian.
-13	Cannot not access file [filename].	This is a generic error message that covers all non-specific errors related to files and storage devices. Retry your operation.
-14	Cannot update the Windows™ Registry.	This error may occur if your PC log-in account does not allow you to change the settings in the Windows™ Registry. You may need to contact your PC system administrator to obtain the correct log-in permissions.
-15	Cannot allocate dynamic memory.	HC Historian cannot run properly because there is no available dynamic memory on the PC. You may have to restart your PC to resolve this error.
-16	Cannot communicate with controller "controllername". Check your serial port settings and cables. Verify that no other applications are using this serial port. Check your Ethernet settings and network hardware.	The program could not establish or maintain basic communications with the selected controller. This may be due to: • a physical problem (cables, hubs, routers, power, etc.) • a problem with your communication settings (IP address, serial port address, baud rate, parity, etc.). Note that some PCs have trouble maintaining reliable communications when operating the serial port at 115200 bps, but may work fine at 57600 bps. • a conflict with another application. This should only occur if you are uploading data via the serial port. See the note below about serial port operation on the PC. Check these items to determine the source of the problem. **A note about the serial port operation:** The PC will only allow one application at a time to use the serial port. This means that you may need to close HC Designer or HC Utilities (or at least exit the Monitor Mode on HC Designer) if you want to upload data via the serial port using HC Historian.

Error	Error Message	Cause and Remedy
-17	The program encountered an error while reading data from the controller.	The Historian program did not receive the expected amount of data from the controller. This message may indicate a version mismatch between the controller firmware and the Historian program. Check the System Requirements section of this document to verify that you have the correct combination of components.
-18	Packet sequence error. This may be caused by a comm timeout or Station Number conflict.	This error may occur for one of two reasons: • The structure of your network requires an Ethernet message to pass through many different servers, switches, etc. If this is true, you may need to increase the timeout value for this controller under the Controller Setup dialog. • You are taking a Snapshot of the data from two different PCs at the same time AND both hosts are configured to use the same Station Number. If this is true, assign a unique Station Number on each PC (on the PC Setup dialog). Then make sure that you wait for one PC to complete the Snapshot before starting a Snapshot on the other PC.
-19	History Upload is being used by another PC or application.	You are taking a Snapshot of the data from two different PCs at the same time. The controller only allows one host to upload data at any given time. Wait for the other PC to finish its upload and then take a Snapshot using this PC.
none	Error opening the History Setup file. Check your History Setup.	HC Historian cannot access the information in the History Setup file. This file contains the Controller Setup information and other information about your installation. This file (hchist.hcfg) should be present in the same folder as the HC Historian executable file. You can recreate the file, if needed, by reentering the Controller Setup and PC Setup information.

9 Miscellaneous information

9.1 Maximum number of controllers

You can set up as many controllers as you like under the Controller Setup tab. There is no limit.

9.2 Running multiple copies of HC Historian

You can only run one instance of the HC Historian application on any given PC or server. If you try to start a "second" copy of the application, the software will simply call up the main dialog of the running software to remind you that the application is already active.

You may, of course, run HC Historian on several different PCs or servers. If you do this, please assign a different Station Number to each instance of HC Historian to insure that each instance has its own unique connection to the historic data in the controller (refer the section on Setting the Station Number below).

Note: If you are running HC Historian on two or more PCs or servers, please note that the controller will only allow one application at a time to upload historic data. If you attempt to start a second upload while the first one is in progress, HC Historian will report the message "ERROR -19: History Upload is being used by another PC or application." and terminate the second upload. Please wait for the first device to complete its upload before retrying the second one.

9.3 Setting the Station Number

At some sites the HC900 controller will be serving historic data to several host devices and/or host applications simultaneously. For example, a given site could have an HC900 operator panel plus one or more host PCs connected to a single controller. In another site you may be running two applications that upload historic data, such as EBI and HC Historian, on the same PC or server. In order to provide the correct distribution of historic data to multiple hosts, the controller has a series of virtual ports available. These virtual ports allow each host device or application to have its own exclusive connection to the controller's historic data. The Station Number setting identifies which virtual port is reserved for the exclusive use of this application.

In any installation where you have multiple host devices or applications accessing a single controller, assign a unique Station Number to each host. In HC Historian, the Station Number setting is located on the PC Setup dialog. Please consult the documentation for the other host devices or applications to determine where this setting is located for that product.

9.4 Uploading historic data via a Serial port

HC Historian allows you to upload the historic data via the controller's serial port. Uploading historic data via the serial port can be relatively slow when compared to uploading data over an Ethernet connection (several minutes for serial upload versus 15-20 seconds for Ethernet). This difference in performance is simply the result of trying to move a large volume of data over a relatively slow communication link.

If you want to upload data via the serial port you must configure the HC900 controller's serial port as a **Modbus RTU Slave**, as illustrated in Figure 9-1.
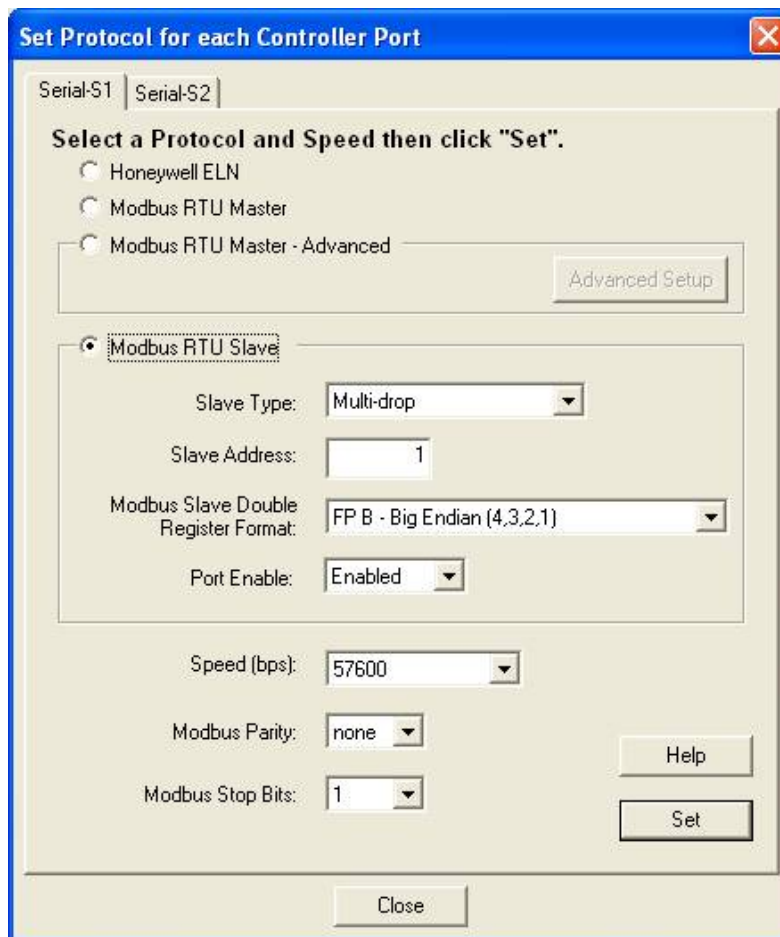
Figure 9-1 The Set Controller Serial Port dialog in HC Designer

The serial ports of the controller are configured using the HC Designer configuration software. Click on the icon labeled Set Controller Serial Ports on HC Designer's Utilities tab to call up the setup dialog.

HC Historian supports transfer rates of 57600 or 115200 bps. Any Slave Address, Parity setting, or Stop Bits setting can be used. Note that the Modbus Slave Address setting that you make under the HC Historian setup tab must match the Slave Address specified under HC Designer.

9.5 HC900 Events

If you want to upload HC900 Events using HC Historian, you must make sure that the controller is configured to store this data in its Event History Buffer. Therefore, when you configure an Event point under HC Designer, make sure that the "Store to OI Archive Disk" selection is checked, as shown in Figure 9-2. Note that you must perform this selection for every Event point.
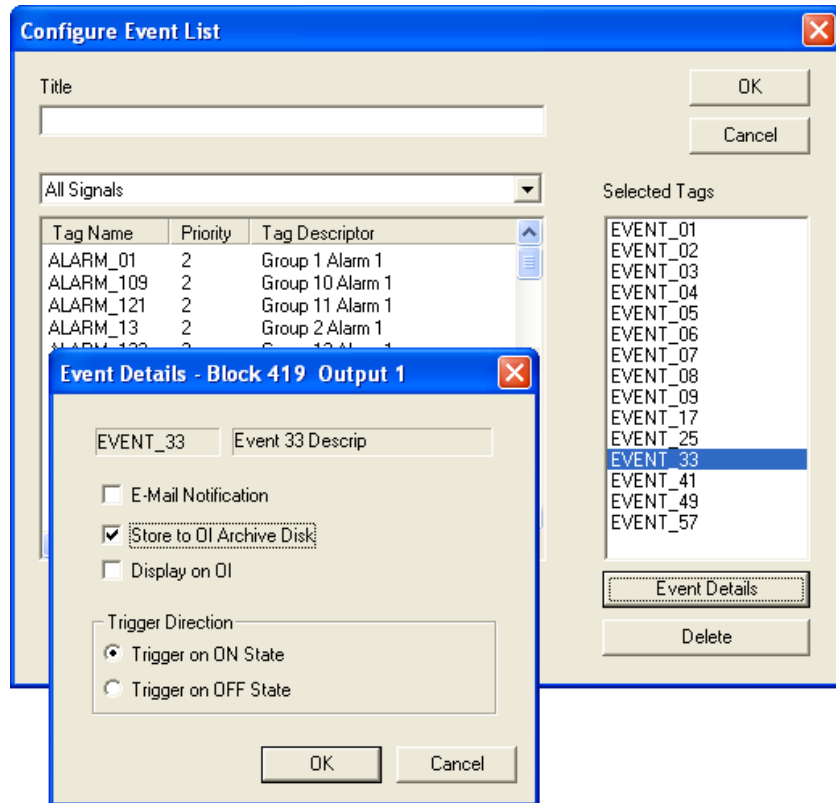

Figure 9-2 Configuring an Event point to be stored in the HC900 Event History buffer

10 Graphing the Trend data under Excel

This section contains some suggestions for graphing the Trend data under Microsoft Excel. The data in the CSV files has been formatted to facilitate the graphing process.
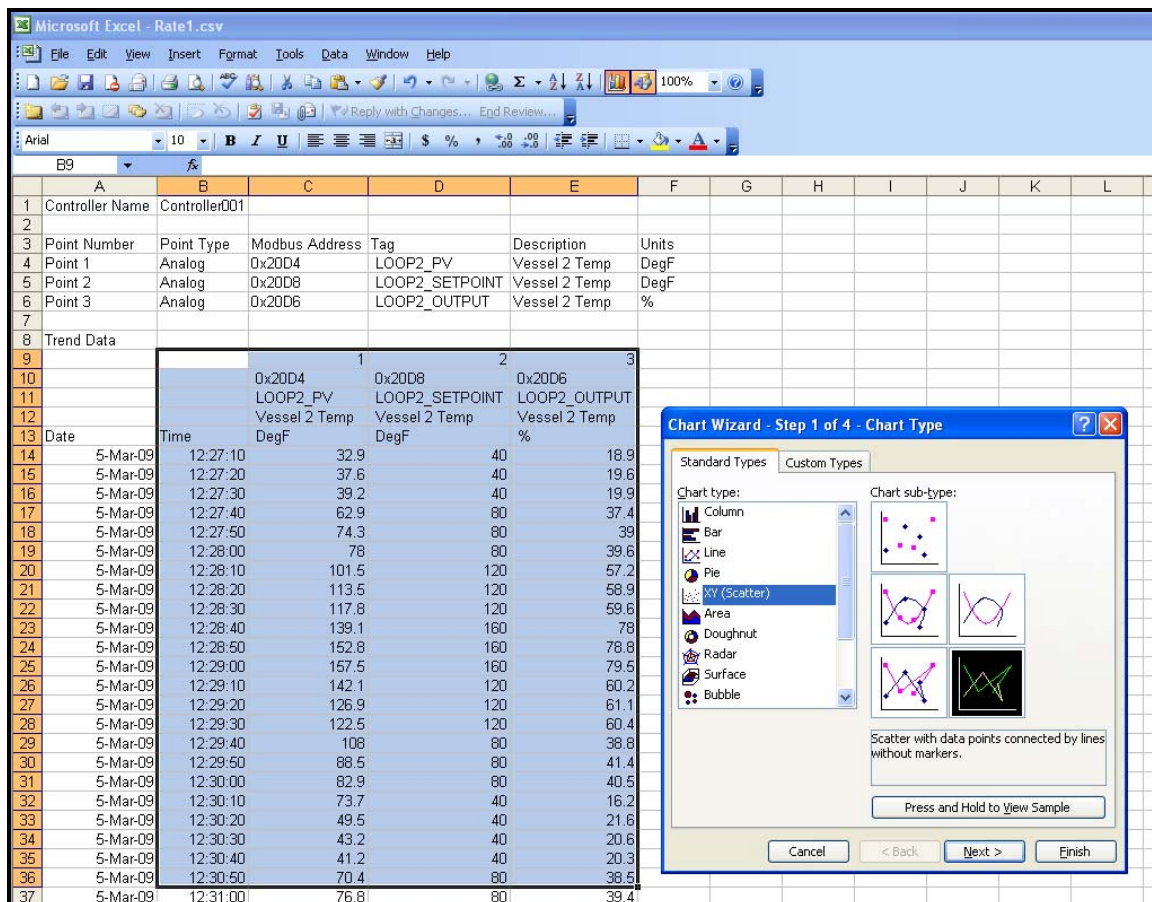
Figure 10-1 Displaying Data using Excel

1. Highlight the data columns as shown above (in blue). If you start with the point number (Row 9 in this example), the legend on the graph will include the point number, Modbus Address, Tag, Description, and Units for each point.

2. On the Chart Wizard, select Chart type XY Scatter. This selection will preserve the scaling on the time axis (the X axis) in the case where there are variations in the sample time. For the Chart sub-type, the selection shown in Figure 10-1 (direct line connection without smoothing) gives an exact representation of the data in the spreadsheet.

You can also use the Line Chart selection instead of XY Scatter. The main difference between these selections is that, on the Line Chart, the time axis is scaled to the number of samples in the data set, not the time period covered, so variations in the time line are not portrayed graphically.

3. The resulting graph is shown in Figure 10-2. Note that the point number, the Modbus Address, the Tag, the Description, and the Units are shown in the legend box for easy identification of the traces.
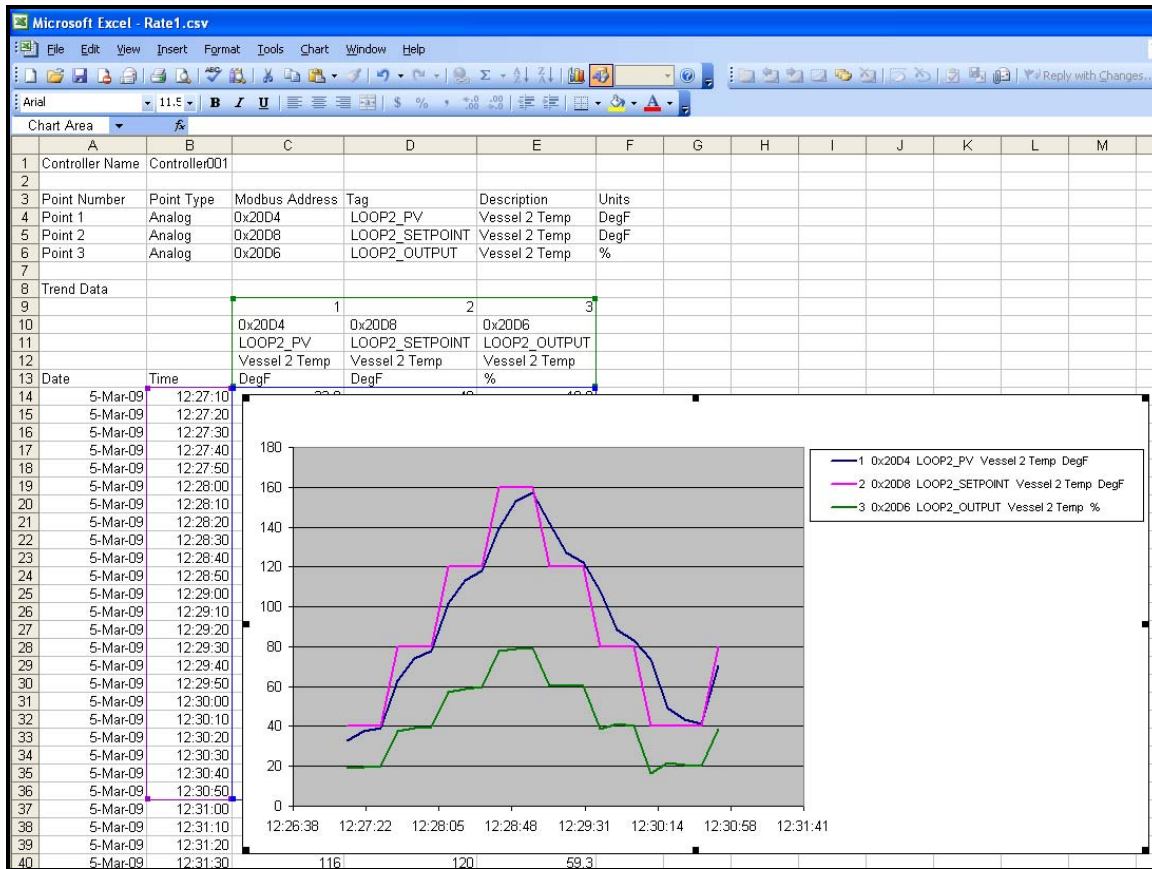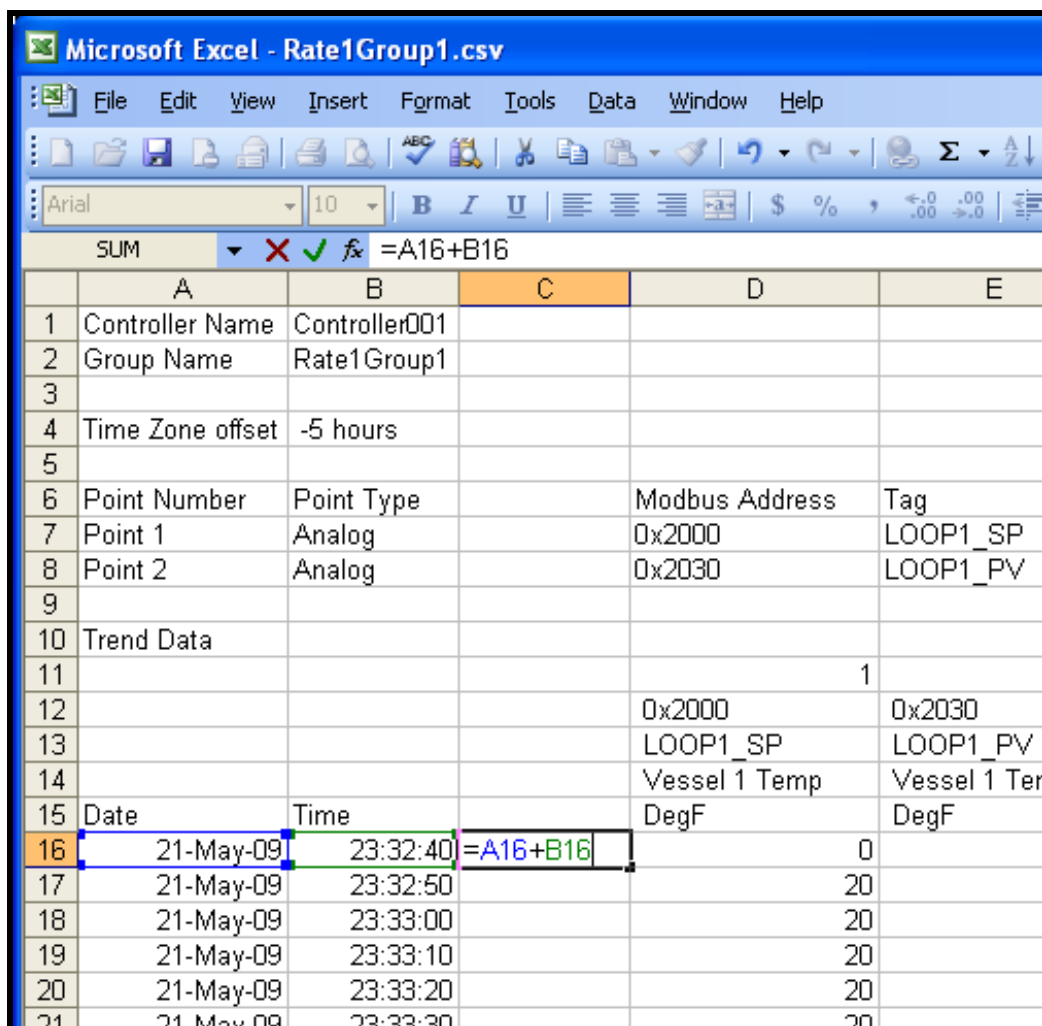
Figure 10-2 Graphing Data using Excel

10.1 Graphing data that spans multiple days

If you want to create a graph that spans more than one 24-hour day (midnight to midnight) using the XY Scatter chart type, you will have to create a combined time-and-date column in the spreadsheet. The procedure to do this is described below.

Step 1: Insert a column in the spreadsheet between the existing Columns B and C. To do this, highlight Column C and then select "Insert" and "Column" from the Excel menu bar.

Step 2: Create a combined date-and-time value in the new Column C for the first data record, as shown in Figure 10-3 below. For the example file shown in Figure 10-3, this value should be created in Cell C16. Enter the formula "=A16+B16" in this cell to create the combined date-and-time value. Note that you have to use an "addition" operator because, internally, Excel treats the Date and Time as numeric values.

Figure 10-3 Create a combined date-and-time value in Column C

Step 3: Highlight the cell where you just entered the formula (cell C16 in our example) and select "Format Cells".

On the Format Cells dialog, select the category "Custom" on the Number tab and enter the format string "m/d/yyyy h:mm:ss" as shown in Figure 10-4. Click OK to apply this format to the cell. The value in the cell should now be displayed as a combined date and time value, e.g. "5/21/2009 23:32:40" for our sample file.
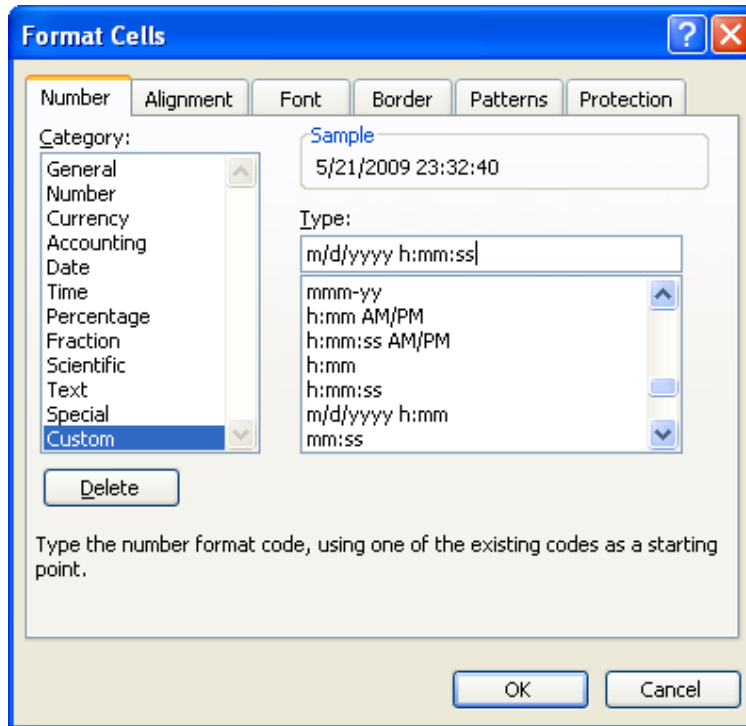

Figure 10-4 Format the value in Column C as a date/time value

Step 4: Copy this cell and paste it into all of the remaining cells of Column C. This will provide a combined date-and-time value for each sample in the spreadsheet.

Step 5: Graph the data using the new date-and-time column as the time axis, as shown in Figure 10-5.
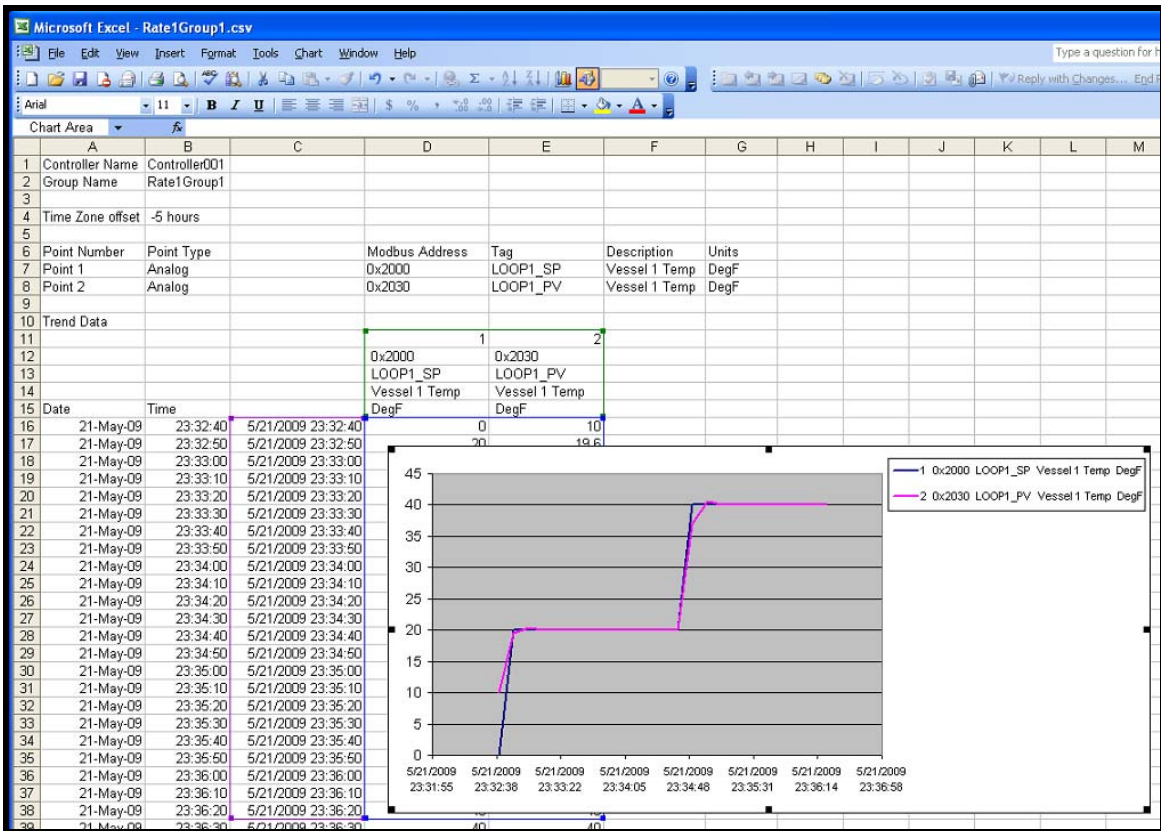
Figure 10-5 Graph the data using Column C as the date/time axis values

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