Agilent 34970A
BenchLink Data Logger 3

Getting Started Guide

Agilent Technologies

Notices

Edition

Microsoft ® is a U.S. registered trademark of Microsoft Corporation.

Software Revision

This guide is valid for 3.x.x revisions of the Agilent 34970A BenchLink Data Logger 3 software, where x.x refers to minor revisions of the software that do not affect the technical accuracy of this guide.

Warranty

Technology Licenses

Restricted Rights Legend

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Welcome to the Agilent 34970A BenchLink Data Logger 3

The Agilent BenchLink Data Logger 3 software provides a convenient way to collect and analyze your data. The software uses a familiar spreadsheet environment, streamlining your data gathering needs. Simply identify the measurements you want to acquire, initiate the process, and see the data displayed on the computer screen. Use one of the many options to analyze and display your data - strip charts, histograms with statistical analysis, bar and scatter charts, individual channel results, and more.

What's New in Data Logger 3?

Superior Usability
- Tab-based user interface, simple menu structure.

Data Manager
- Manages all configurations and datalogs.
- Simplifies opening, renaming, deleting and editing.
- Easy access to data export.
- All configurations and datalogs are automatically saved - your data is protected!
- Last configuration automatically opens upon start up.

Datalog Name Template
- Define a name template so you don't need to manually name every datalog or exported data file.

Export Data
- Complete control of the decimal character and field separator.
- Complete control of the export contents.
- Automatically split files greater than 65536 lines (for easy importing into Microsoft Excel).
- Export to clipboard.
- Export configurations.

Auto Export Data
- Automatically export data with pre-configured preferences when the scan completes.

Graphing
- All graph configurations are saved and restored automatically the next time Data Logger 3 is opened.
- Simplified add/remove channels
- Added graph preferences to allow easy control of graph look and feel.
- Added popup windows for data, alarms, bar charts and markers.
- Automatically generate a graph for each 34970A.
- Add additional graphs for the same datalog.
- Split a graph to allow easy viewing of independent measurements.
- Editable Y Scale and Y Zero Reference.
- Full screen mode.
- Simplified changing the datalog being graphed.
- Control the color of high and low alarms.
- Single Channel Statistics available with a Quick Histogram tab.

Import
- Import Data Logger 1 Configurations.
- Import Data Logger II Configurations.

Import Module
- Import a module's scan configuration from one configuration to another.

Configure 34970As
- Up to four 34970As scanning simultaneously.
- Download only the configured channels - saves you time!

Configure Channels
- Improved copy and paste.
- Improved keyboard data entry.

Online Help
- Completely rewritten with an in-depth technical task orientation.
- New! Getting Started Guide.

Globalization	• Uses the operating system settings for decimal and field separators.
	• Available in all data entry fields and in export data.
Multiple Languages	• Application and all online help localized for French, German, Simplified Chinese, Korean and English.
	• Uses the operating system language settings for supported languages.
	• Language changes happen immediately. The operating system can be one language and the product another language.

Important: This tutorial DOES NOT require any wiring or input signals connected to the 34970A(s). Read the safety, warning and caution information in the 34970A User's Guide before operating or connecting wiring to the 34970A and its modules. Module wiring information is located in the 34970A User's Guide.

1

Getting Started with BenchLink Data Logger 3

Agilent Technologies

Getting Started Tutorial

This getting started tutorial introduces you to the BenchLink Data Logger 3 and shows you how to:

*   Connect to one or more 34970As
*   Set up a simple channel configuration
*   Scan channels and measure some data
*   View the data in graphical form
*   Export the data to a Microsoft Excel-compatible spreadsheet
*   Save the configuration

To start Benchlink Data Logger 3, click this shortcut on your desktop:
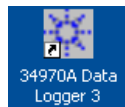
The graphic below shows the menus, status area and tabs in the user interface. The Data Logger 3 online help (available by pressing F1 or clicking the Help menu) describes the user interface in detail.
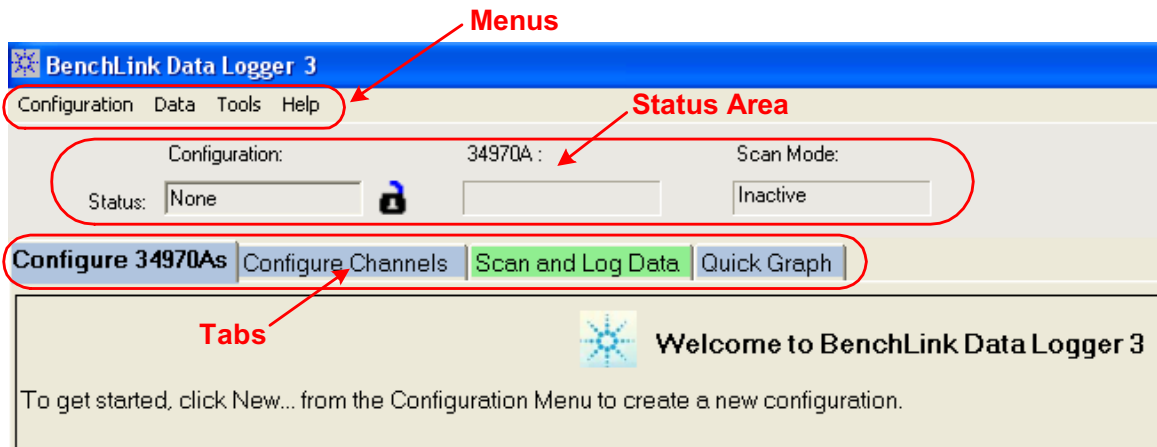
Step 1. Create a New Configuration

In this step we will create a new configuration. A configuration contains all of the instrument settings, scan settings and graph settings that you have configured in the Data Logger 3 application. Following a scan, each scan datalog is also associated with the configuration. A configuration events log is also associated with each configuration.

NOTE	For purposes of example, this tutorial assumes you have a 34901A or 34902A multiplexer module installed in a 34970A. Although you can use up to four 34970As in a configuration, this tutorial uses only one 34970A. You should not have any channels connected to external equipment or signal sources for this tutorial.

1 Click **Configuration > New...** to create a new configuration.

2 You will be prompted to enter a new configuration name and comments. For this tutorial, enter the information shown below and click **OK**.
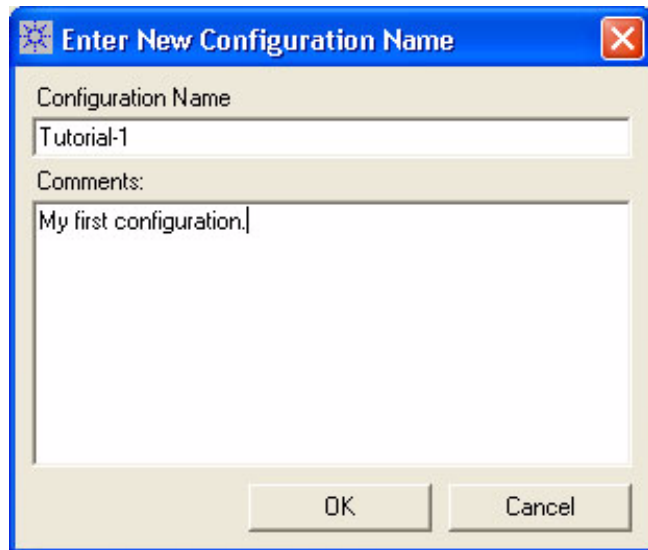
The configuration name appears under **Configuration:** in the status area of the application window. For example:
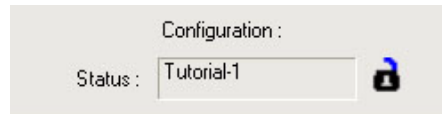
| | NOTE | Notice the unlocked padlock icon to the right of the configuration name. This indicates the configuration does not yet have a datalog and is editable. Once a scan has occurred and a datalog exists for the configuration, the padlock will be shown as locked. To alter a locked configuration, you must either delete the associated datalog(s) or copy and rename the configuration. |

Step 2. Configure 34970s

In this step you will identify which 34970A(s) to use in the configuration.

Data Logger 3 can be used in either of these two modes:

- **Connected to 34970A (Connected Mode)**--Select this mode if you have one or more 34970As connected via interface to your computer. Connected Mode is the recommended mode to use whenever possible. This is because, in Connected Mode, the software automatically determines the 34970A address and installed modules.

- **Not connected to 34970A (Not Connected Mode)**--This mode allows you to develop scanning configurations "off-line" without being connected to any 34970As. For example, you can develop a configuration in your office and later connect to 34970As on the production floor.

NOTE   This tutorial uses the **Connected Mode** and assumes your PC is connected via interface to at least one 34970A and communication has been established. If you have not done so, you can use the Agilent Connection Expert to automatically configure interfaces and check 34970A communications. This utility is on the Automation-Ready CD ROM included with the 34970A.

1 On the **Configure 34970As** tab, click **Connected to 34970A**. Notice on the **Configure 34970As** tab, the configuration steps (1 through 4) are shown in bold lettering from left to right.

NOTE   You can access the help for the selected tab by clicking the F1 key.

2 Click the **Add 34970s...** button.
3 Make sure the 34970s to be added are powered on and connected to the PC via an interface. In the **Add 34970s** dialog box, click the **Find** button.

4 You should now see a listing of the 34970As found. For example:
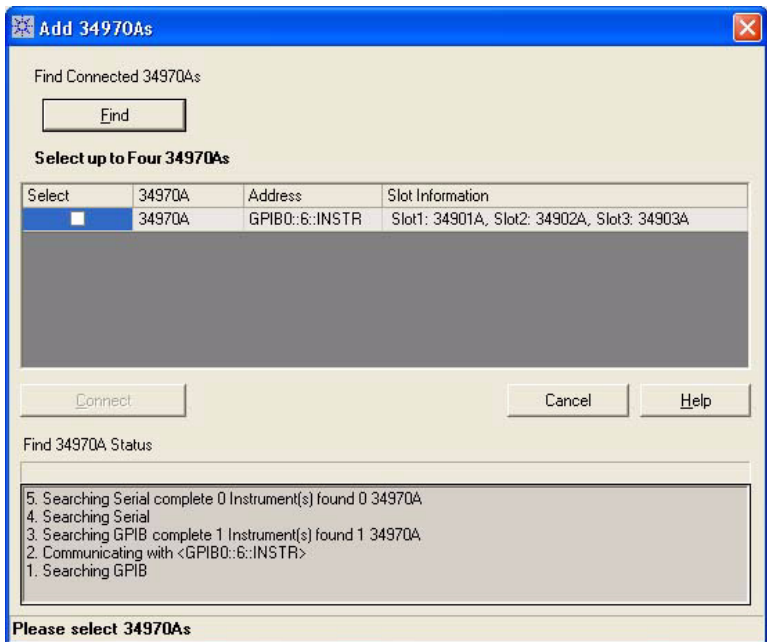
The **Find 34970A Status** area shows the status of the find operation. If you do not see any 34970As listed, check that the interface is connected and the 34970A is powered-on. For more information on troubleshooting configuration problems, refer to the Agilent Connection Expert application on the Automation-Ready CD ROM included with the 34970A.

NOTE   Data Logger 3 uses the IO Libraries to find 34970As.

5 In the column labelled **Select**, click the box next to the 34970A(s) you want to add. You can add up to four 34970As in a single configuration.

6 Click the **Connect** button. This reads the configuration of the 34970A(s) and populates the **Configure 34970As** tab with the 34970A number, address and modules found in the 34970A.

7 Notice the **Module Mode** column. For multiplexer modules, this mode will be set to **Scan Mode**. Typically, you should leave the **Module Mode** set to **Scan Mode**. For switch modules, this mode will be set to **Switch Mode**. If you want to change the **Module Mode**, click in the field next to the right of the text and a drop down list will be available. You may choose **Inactive Mode** if you are not interested in the channels for a given module.

Step 3. Configure Channels

In this step, you will add channels and measurement functions to a scan list.

**1** Click the **Configure Channels** tab.

Whenever you move from tab to tab or close the application, the configuration information is automatically saved.

2 You may see this progress message **Populating scan grid...** This may take several seconds depending on the number of modules you have.

3 The 34970A number, address and modules are shown in the tree view in the column labeled **Channels** on the left side of the grid. You can collapse the tree view by clicking ☐ next to a 34970A or module. Click ➕ to expand a collapsed tree view.

4 The **Enable Channel** column allows you to select channels to be in the scan and, optionally, name each channel. To select a channel, click the checkbox in the **Scan** column under the **Enable Channel** column. For this tutorial, click the check boxes next to channels 101, 102, 103, 104 and 105.

5 In the **Name** column, enter these names for the five selected channels: *Power In, Low Load, High Load, Out Freq, Oven Temp*.

Channels	Enable Channel	
34970A	Scan	Name
1. GPIB0::6::INSTR		
34901A		
101	✔	Power In
102	✔	Low Load
103	✔	High Load
104	✔	Out Freq
105	✔	Oven Temp

6 The **Measurement** column allows you to select the measurement function, the range, the resolution and set advanced measurement properties for each selected channel. The default measurement function for scanned channels is

DC Voltage. To change the measurement function, click on the word **DC Voltage** in the **Measurement Function** column. Click the down arrow to see the available measurement functions:
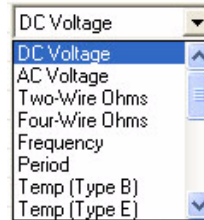
For this tutorial, set the measurement functions in sequence to **DC Voltage, Four-Wire Ohms, Two-Wire Ohms, Frequency** and **Temp (Type B)**.

Channels		Enable Channel		Mea:
34970A		Scan	Name	Function
└⊟ 1. GPIB0::6::INSTR				
└⊟ 34901A				
101		☑	Power In	DC Voltage
102		☑	Low Load	Four-Wire Ohms
103		☑	High Load	Two-Wire Ohms
104		☑	Out Freq	Frequency
105		☑	Oven Temp	Temp (Type B)
106		☐		DC Voltage
107		☐		DC Voltage
108		☐		DC Voltage
109		☐		DC Voltage
110		☐		DC Voltage
111		☐		DC Voltage
112		☐	Low Load	Four-Wire Ohms

NOTE Notice that for 4-wire ohms, a paired channel (channel n+10 for the 34901A or channel n+8 for the 34902A), is automatically configured for the sense lines.

7 The **Range** column allows you to specify a fixed range or Autorange (the default). To change the range, click the word **Auto** in the **Range** column. A drop down arrow appears

allowing you to select the range. For this tutorial, set the ranges in sequence to: **+/- 1V, 10K, 100K**, and **Auto**.

Channels		Enable Channel		Measurement	
34970A		Scan	Name	Function	Range
⌐⊟ 1. GPIB0::6::INSTR					
├⊟ 34901A					
├─ 101		☑	Power In	DC Voltage	+/- 1 V
├─ 102		☑	Low Load	Four-Wire Ohms	10 K
├─ 103		☑	High Load	Two-Wire Ohms	100 K
├─ 104		☑	Out Freq	Frequency	Auto
├─ 105		☑	Oven Temp	Temp (Type B)	None
├─ 106		☐		DC Voltage	Auto
├─ 107		☐		DC Voltage	Auto
├─ 108		☐		DC Voltage	Auto
├─ 109		☐		DC Voltage	Auto
├─ 110		☐		DC Voltage	Auto
├─ 111		☐		DC Voltage	Auto
├─ 112		☐	Low Load	Four-Wire Ohms	10 K

| **NOTE**	Notice the range for temperature measurements is fixed and displayed as None.

8 The **Res** column allows you to set the measurement resolution for most measurement functions and the temperature scale (C, K, or F) for temperature measurements. To change the resolution, click the number **5.5** in the **Res** column. A drop down arrow appears allowing you to select the resolution. For this tutorial, set the

resolutions in sequence to: **5.5, 6.5, 5.5, 4.5** and **F**.

34970A	Scan	Name	Function	Range	Res
└ 1. GPIB0::6::INSTR					
└ 34901A					
101	☑	Power In	DC Voltage	+/- 1 V	5.5
102	☑	Low Load	Four-Wire Ohms	10 K	6.5
103	☑	High Load	Two-Wire Ohms	100 K	5.5
104	☑	Out Freq	Frequency	Auto	4.5
105	☑	Oven Temp	Temp (Type B)	None	F
106	☐		DC Voltage	Auto	5.5
107	☐		DC Voltage	Auto	5.5
108	☐		DC Voltage	Auto	5.5
109	☐		DC Voltage	Auto	5.5
110	☐		DC Voltage	Auto	5.5
111	☐		DC Voltage	Auto	5.5
112	☐	Low Load	Four-Wire Ohms	10 K	6.5

9 The **More** column under **Measurement** allows you to select advanced settings for the measurement function. For example, for the DC Voltage function, you can set Number of Power Line Cycles, Channel Delay and DC Input Resistance. For this tutorial, click **•••** in the **More** column for channel 101 and set the **Number of Power Line Cycles-NPLC** to **10** and click **OK**. This sets the integration time for the DMM.
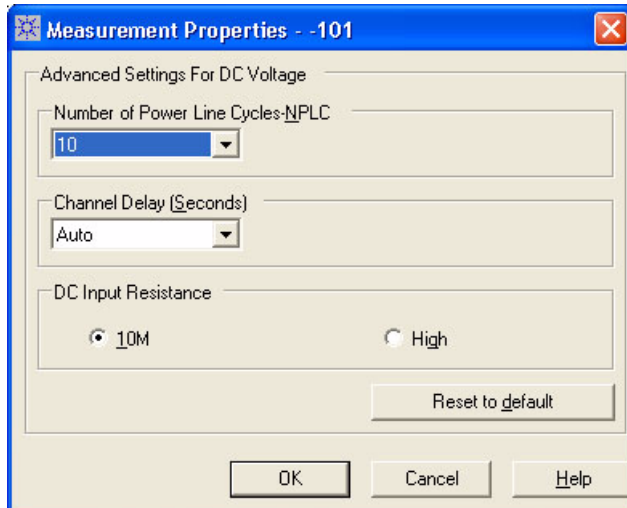
Notice the resolution for channel 101 is now 6.5 digits--not 5.5 digits. This is because integration time and measurement resolution are directly related.

10 Optionally, you can use the **Scaling (Mx + B)** column and **Alarm Limits** column to set scaling and alarms. We will not set scaling or alarms for this tutorial.

Step 4. Set Up Scan Control and Data Control

In this step we will set the scan start and stop criteria and define when to log the data.

1 Click on the **Scan and Log Data** tab--the channel configuration is automatically saved. The **Scan and Log Data** tab contains **Scan Control, Data Control, Start/Stop** and **Scan Status** sections. The default settings start the scan immediately.

2 Typically, you will want to add more scan control to the scan than starting immediately. Let's set the scan to start at a specific time and stop after a number of scans.

3 Click [**...**] in the **Scan Control** column. The **Scan Control** dialog box appears. In the column labelled **When Start Button Pressed, Start Scanning** click the **At Time** button. We will use the default date and time which is a few minutes from now based on your PC clock. In the **Stop Scanning** column, click the **After N Scans** button and enter 20 in the box below. Click **OK** to save the settings.

Notice the scan control settings are now summarized in the **Scan Control** column.

4 Click [**...**] in the **Data Control** column. The **Set Datalog Fields** dialog box appears. From this dialog you can automatically name the datalog from the template, or uncheck the default naming and enter a name for the datalog. You can also add comments, change the **Owner**, and choose to have the datalog automatically saved as a .csv file. For this tutorial, we will use the default **Name** from the template, the default **Owner**, and not automatically save the datalog. Click **Cancel** to close this dialog box.

| NOTE | The template allows you to select the fields that will be included in the datalog name. By clicking the **Edit Template** button, you can enter a custom prefix (default = **Data**) and either have the instrument number listed or not listed. The date and time timestamp is always included in the datalog name when using the template. |

5 Notice the data control settings are now summarized in the
Data Control column.

Step 5. Start the Scan

In this step, we start the scan and view the results.

1 To start the scan, click the start button ▶ under the **Start/Stop** column. Once you have started the scan, the settings you configured in **Scan Control** become enabled. For example, if scanning was set to start **Immediately**, the scan will start when you click the start button. For this tutorial, we set a date and time to start the scan. Our scan will start when the specified data and time occurs.

<table>
<tr><td>**N O T E**</td><td>If you took too long to get to this step, you will receive a message that the scan start time is prior to the current time. If this occurs, go back to the **Scan Control**, reset the start time, and then click the start button again.</td></tr>
</table>

2 You will see some messages indicating the configuration is being downloaded to the 34970A.

3 Once scanning begins, the start button turns into a stop button ■ and a small clock icon 🕐 appears on the tab label area to indicate that the scan is in progress. The clock icon and the stop button also appear in the status area above the tabs.

4 Once the scan begins, you can view the **Last Scan Results** per channel in the grid below the control area.

5 You can view the scan status in the **Scan Status** column.

Step 6. View Data Graph

In this step, we will view the scan data as a graph.

1 Click the **Quick Graph** tab

2 After scanning begins, the data logged from the scan is displayed in the graph using the default graph setup.

NOTE	There may be a slight delay from the start of the scan until you see the data in the graph.

3 Notice that each channel in the graph is a different color. Also notice the **Channels** column below the graph and the corresponding channel colors.

Step 7. Customize the Graph

This step shows you some of the many graphing features. You can customize the graph even while data is being logged.

NOTE   If you do not see the data, you may need to adjust the x and y scales.

1 To autoscale the data to fit the graph, Click on the **Autoscale Y** button. A confirmation dialog will appear. Click **OK** to autoscale all channels.

2 You can adjust individual Y scales for each channel in the area below the graph labeled **Modify Y-axis View.**

3 Adjust the time per division by using the up/down arrows under **Scale X-Axis (Time)**.

4 To select which channels to graph, click the **Channels...** button. The **Channels** dialog box will appear. By default all channels are checked. Uncheck the channels that you do not wish to display.

Step 8. Stop the Scan

In this step we will stop the scan.

1 To stop the scan, either wait until the 20 scans you specified finish or click the stop button located on the upper toolbar area of the application. If you click the stop button, a confirmation dialog will appear. Click **Yes** to stop the scan.

2 After a slight delay, you will see a **Scan and Log Data Summary** dialog box. From this dialog box, you may optionally, modify the data log name, the owner, or comments for this datalog. You can also use this dialog box to export your data directly to a file. For this tutorial, just click **Close** to close the **Scan and Log Data Summary**. We will export the data in the next step.

Scan and Log Data Summary

1.GPIB0::6::INSTR SCAN_SUMMARY

Instrument Settings :
Instrument :   34970A <GPIB0::6::INSTR>
Module :   34901A, 34902A, 34903A
Channel Configured :101, 102, 103, 104, 105
Scan Settings
Scan Count :   20
Scan Start :   At Future time
Start Time :   10/19/2005 10:45:45 AM
Scan Stop :   After 20 Scan
Stop Time :   10/19/2005 10:48:55 AM

Your data has been saved in Data Manager as:

Name: Data10-19-10-41-59

Owner: Dave

Comments:

Edit Fields

Export Data   Delete Datalog

Your data has been exported to:

(Not Exported)

Close   Help

Step 9. Export the Data

1 The Data Manager provides complete flexibility in opening, editing, and exporting datalogs. To open the Data Manager, click **Data > Data Manager**. You will see a display similar to this:
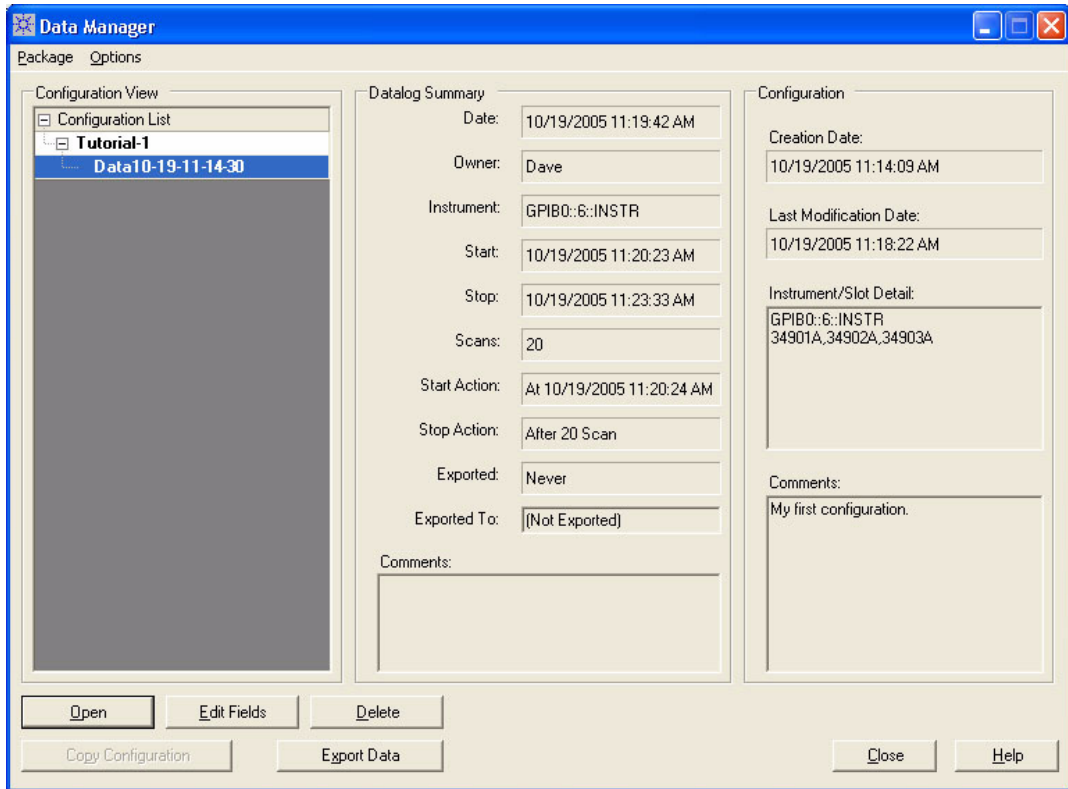
2 The **Tutorial-1** configuration and the recently scanned datalog should appear in the **Configuration View** column. With the datalog selected as shown above, click the **Export Data** button. The **Export Data** dialog box appears and allows you to specify how to export the data and which data to export. For this tutorial, we will use the default export settings which creates a CSV (Comma Separated Values) file.

Click the **Export to File...** button in the **Export Data** dialog box.

3 Browse to the directory path in which to store the data file and click **Save**. The CSV file can later be imported directly into Microsoft Excel.

4 You can now close the **Export Data** dialog box.

5 As you create configurations and deal with datalogs, you will find the Data Manager to be particularly useful to organize and locate configurations and datalogs. As the last step in this tutorial, click **Data > Data Manager** to open the **Data Manager** dialog box and click the **Help** button. The help describes, in detail, all of the capabilities of the Data Manager.

Congratulations! You have completed the tutorial. You can now start creating your own scanning configurations. Use the online help for the tabs (F1 key) and the help buttons in the dialog boxes to learn more about each step in the process. This help file also contains a number of advanced topics available from the help **Contents** tab, **Index** tab or by searching the help.

1   Getting Started with BenchLink Data Logger 3