VI Logger

Getting Started with VI Logger

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About This Manual

Use this Getting Started guide as a resource for using VI Logger, from installing software and hardware to executing and analyzing data logging data.

Conventions

The following conventions appear in this manual:

[ ]	Square brackets enclose optional items—for example, [`response`].
»	The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.
	This icon denotes a tip, which alerts you to advisory information.
	This icon denotes a note, which alerts you to important information.
	This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.
bold	Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names, controls, and buttons on the front panel, dialog boxes, sections of dialog boxes, menu names, and palette names.
italic	Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text that is a placeholder for a word or value that you must supply.
`monospace`	Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.
`monospace bold`	Bold text in this font denotes the messages and responses that the computer automatically prints to the screen. This font also emphasizes lines of code that are different from the other examples.

monospace italic	Italic text in this font denotes text that is a placeholder for a word or value that you must supply.
Platform	Text in this font denotes a specific platform and indicates that the text following it applies only to that platform.

Related Documentation

The following documents contain information that you might find helpful as you read this manual:

- *LabVIEW Help*, available by selecting **Help»VI, Function, and How-To Help** in LabVIEW
- *Measurement & Automation Explorer Help for VI Logger*, available by selecting **Help»Help Topics»VI Logger»VI Logger** in MAX
- *Measurement & Automation Explorer Help for FieldPoint*, available by selecting **Help»Help Topics»FieldPoint** in MAX
- The getting started or user manuals for the devices you use

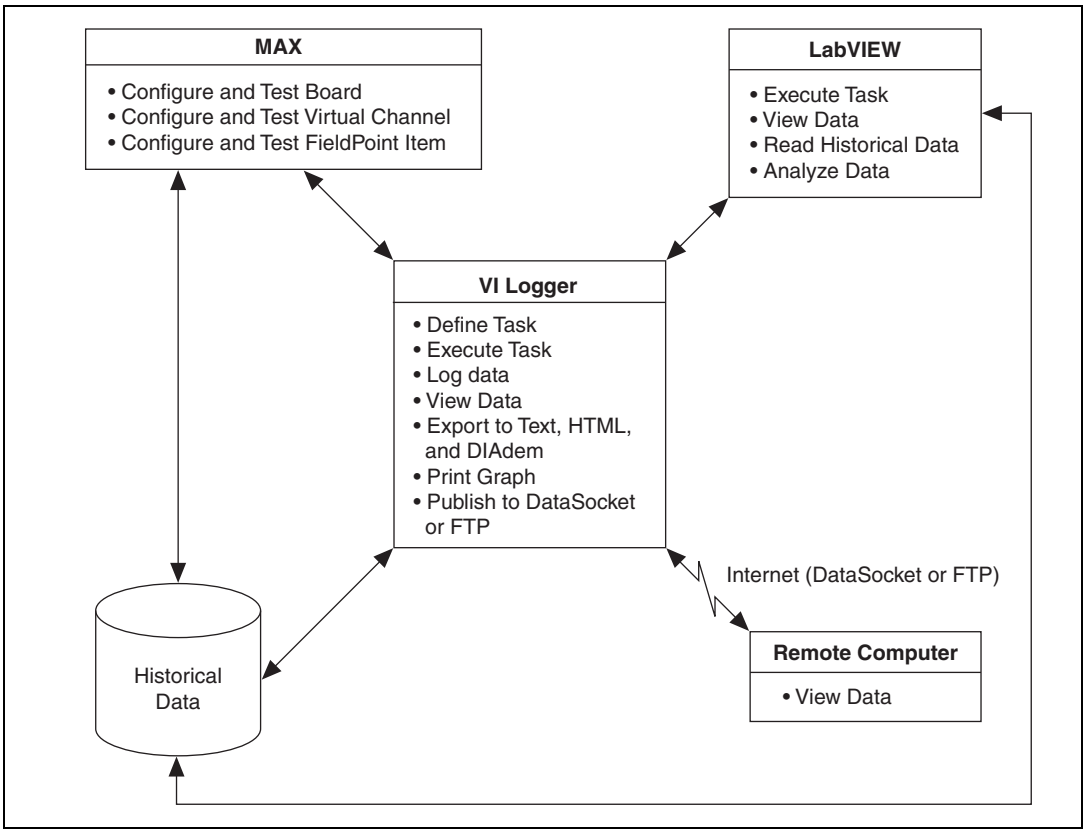
1

Using VI Logger

VI Logger equips you with the necessary software tools to define and execute a data logging task. With VI Logger, you can view real-time data, share data, and browse and manage historical data. Using VI Logger in Measurement & Automation Explorer (MAX), and features such as triggered acquisition, event detection, and actions and calculated channels, you can define advanced tasks without any programming. Using LabVIEW and the VI Logger VIs, you can execute a task, view live data, browse historical data, and build logging applications using all of the advanced programming capabilities of LabVIEW.

Overview

VI Logger provides dialog boxes to configure data logging tasks. When the task runs, acquired data can be displayed in a temporary window with the task, and logged data is stored internally. Refer to the following figure for an overview of how VI Logger interacts with other software.



A VI Logger task can run in a stand-alone mode from MAX or as part of an application in LabVIEW. A VI Logger task controls data acquisition (DAQ) and logging. With VI Logger, you can customize start and stop conditions for acquisition. The VI Logger task also logs data for one or more channels. After logging data, you can view the data for each time the task is run. You can view data from each executed task.

Chapter 2, *Creating and Running a VI Logger Task*, describes how to create a VI Logger task in MAX. Chapter 6, *Controlling a Task Programmatically Using LabVIEW*, describes how to control a logging task from LabVIEW.

VI Logger Features

VI Logger helps you log data from National Instruments DAQ devices and FieldPoint modules. To set up the logging system, you first set up the measurement system. You can configure the logging system with

configuration dialog boxes. Refer to Chapter 2, *Creating and Running a VI Logger Task*, for information about the measurement system components that you need to configure and instructions to set up and use a VI Logger task.

A VI Logger task requires the following three pieces of information:

- Task name
- NI-DAQ measurement device or FieldPoint module
- One or more virtual channels or FieldPoint channels to acquire and log data

To see these three pieces, navigate through the MAX hierarchy. VI Logger tasks are listed under the VI Logger Tasks category. NI-DAQ virtual channels, FieldPoint items, and FieldPoint modules are organized under Data Neighborhood. NI-DAQ devices are stored under Devices and Interfaces.

You can further define a task by defining the following additional options:

- **Acquisition Settings**—In the Task Attributes view, you can select the device from which you want to acquire and log data, enter the scan per channel rate for each channel, and set the buffer settings.
- **Logging Conditions**—In the Task Attributes view, you can set when and how the logging begins. You also can configure finite acquisition for DAQ channels.
- **Web Publishing**—Click the Advanced task settings button in the Task Attributes view to configure publishing logged data to the Web.
- **Network Publishing**—Click the Advanced task settings button to publish data to DataSocket, which enables you to access the data through a network.
- **Acquisition Conditions**—In the Task Attributes view, you can define the acquisition conditions in which the task will run. The measurement task can be started and stopped at a specific time. Also, measurement tasks allow a variety of hardware triggering conditions.
- **Virtual Channels**—In the Virtual Channels view, you can view the list of virtual channels you created under Data Neighborhood. You can choose to enable logging for each of these channels on this page.
- **FieldPoint Channels**—In the FieldPoint Channels view, you can view the list of FieldPoint items you created under Data Neighborhood. You can choose to enable logging for each of these channels on this page.

- **Calculated Channels**—If you need to perform some arithmetic transformations on the measured data, you can define new channels based on acquired channels on the Calculated Channels view. You can define linear combinations of two channels, logarithmic or normalized logarithmic of acquired channels (dB and dBv), or define a custom function of multiple acquired channels.
- **Events**—Use events on the Virtual and Calculated Channels views to control stop and start logging conditions.
  - Detection (high, low, outside/inside range)
  - Action (turn logging on/off, write analog output value, write to digital line, send an email, and make a sound)

Once you have defined a task, you can easily execute it and view the data. With the calculated channels feature, you can perform mathematical functions on virtual channels and log these calculated channels. With DataSocket publishing, while logging a task, you can publish data over the Internet and retrieve and view the data on a remote computer.

When a task is finished, you can select all or some of the data and export the data to a text file from any specified task run. This text file can be read by spreadsheet programs or by a Web browser if you export data using an HTML template. Refer to the *Loading an HTML Export Template* section of Chapter 2, *Creating and Running a VI Logger Task*, for more information about using an HTML template to format exported data. You also can configure a task to be published to the Web and updated automatically. Refer to the *Publishing Task Data to the Web* section of Chapter 2, *Creating and Running a VI Logger Task*, for more information about configuring a logging task to publish data to the Web.

You also can export data to DIAdem to create reports of the logged data. Refer to the *Launch DIAdem from VI Logger* section of Chapter 2, *Creating and Running a VI Logger Task*, for more information about launching DIAdem from VI Logger.

Using VI Logger VIs in LabVIEW

You can add functionality to VI Logger by using the LabVIEW VI Logger VIs, to execute data logging tasks and retrieve historical data, in conjunction with other LabVIEW VI libraries. For example, use the mathematical and analysis functions in LabVIEW to perform real-time analysis.

Checking Your System Requirements

Before you unpack and install the VI Logger software kit, make sure you have the following necessary system requirements to run this system:

- Windows 2000/NT/XP/Me/98
- DAQ device and NI-DAQ 7.0 or greater—VI Logger works with E Series, NI 435*X*, and NI 611*X* devices
- FieldPoint device and FieldPoint 4.0 or later—VI Logger with FieldPoint devices and FieldPoint 4.0 or later.

Installing Your Hardware

For instructions for installing your hardware, refer to the hardware installation document.

Installing VI Logger

To install VI Logger, insert the VI Logger CD in the CD-ROM drive, and follow the instructions that appear on your screen. Click **Finish** when the installation is complete. You then can access the VI Logger utility through MAX. Refer to Chapter 2, *Creating and Running a VI Logger Task*, for more detailed instructions on using VI Logger.

Configuring and Testing Your Hardware

Once you have installed your hardware, configure and test it using the instructions contained in your hardware installation guide or user manual.

2

Creating and Running a VI Logger Task

This chapter explains how to configure and run a task using VI Logger and how to view or export the resulting data.

Configuring, Modifying, and Testing Your Measurement Device

Before you create a VI Logger task, you should configure and test at least one measurement device and one virtual channel or FieldPoint item to verify the operation of your data logging hardware. While most DAQ devices that are supported by VI Logger are plug and play, you should make sure that they are set up correctly. In the **Devices and Interfaces** category of the Measurement & Automation Explorer (MAX), check to see if your device is listed. Modify and test the device by selecting it and using toolbars supplied with the device.

Note If you have a plug and play device and it does not appear under Devices and Interfaces in MAX, press <F5> to refresh the list of devices. If it still does not appear, then refer to the installation instructions for the NI-DAQ board.

Using Virtual Channels with VI Logger

Before you create a VI Logger task for an NI-DAQ traditional virtual channel, you need to first create the virtual channel and test it.

Creating Virtual Channels

Complete the following steps to create the traditional virtual channels to use in a data logging task.

1. Launch the **Measurement & Automation Explorer**.
2. In the MAX configuration tree, right-click **Data Neighborhood** and select **Create New** from the pop-up menu.

3. The **Create New** wizard opens. Select **Traditional NI-DAQ Virtual Channel** and follow the wizard instructions to create a new virtual channel.

Modifying Virtual Channels

Complete the following steps to modify a virtual channel.

1. In the configuration tree of MAX, right-click a virtual channel under **Data Neighborhood**.
2. Select **Properties**.
3. Make any modifications necessary in the **Configuration** dialog box that appears.
4. Click **OK** when you are finished.

Testing Virtual Channels

The Virtual Channel Test Panels show actual readings so you can directly control the different channels you have configured. Complete the following steps to test the virtual channels.

1. In the configuration tree of MAX, right-click a virtual channel under **Data Neighborhood**.
2. Select **Test**.
3. View the readings and change any parameters in the **Virtual Channel Test Panels** dialog box.
4. Click **Close** when you are finished.

Using FieldPoint Items with VI Logger

A FieldPoint item is one or more channels or variables in a FieldPoint bank that can be monitored or controlled by MAX. Before you create a VI Logger task for a FieldPoint item, you need to first create the FieldPoint item and test it.

Creating FieldPoint Items

Complete the following steps to create the FieldPoint items to use in a logging task.

1. Right-click a device under **My System»Data Neighborhood» FieldPoint Items** and select **Create New Item**.
2. In the **Create New I/O Item** dialog box that appears, select **IO Item** and click **Next**.

3. In the **Create New I/O Item** dialog box, you can rename the new item, select the advise rate and type, and select channels to include.
4. Select **Tools»FieldPoint»Save** to save the FieldPoint item configuration (`.iak`) file. You cannot run a VI Logger task for a FieldPoint item until you have saved the `.iak` file.

Refer to the *Measurement & Automation Explorer Help for FieldPoint* for more information about configuring FieldPoint items in MAX.

Note For information on panel items or buttons, right-click an item and select **What's This?**.

Creating and Configuring a Task

When you configure a logging task, VI Logger provides feedback if any choices you make are invalid. Complete the following steps to create a data logging task.

1. Launch VI Logger by selecting **Start»Programs»National Instruments»VI Logger**.
2. In the configuration tree in MAX, right-click **VI Logger Tasks** and select **Create New**. The **Create New** dialog box appears.
3. Select **NI-DAQ Task** or **FieldPoint Task** and click **Finish**. In the MAX configuration tree, the newly created task is selected and the **Task Attributes** view is selected.

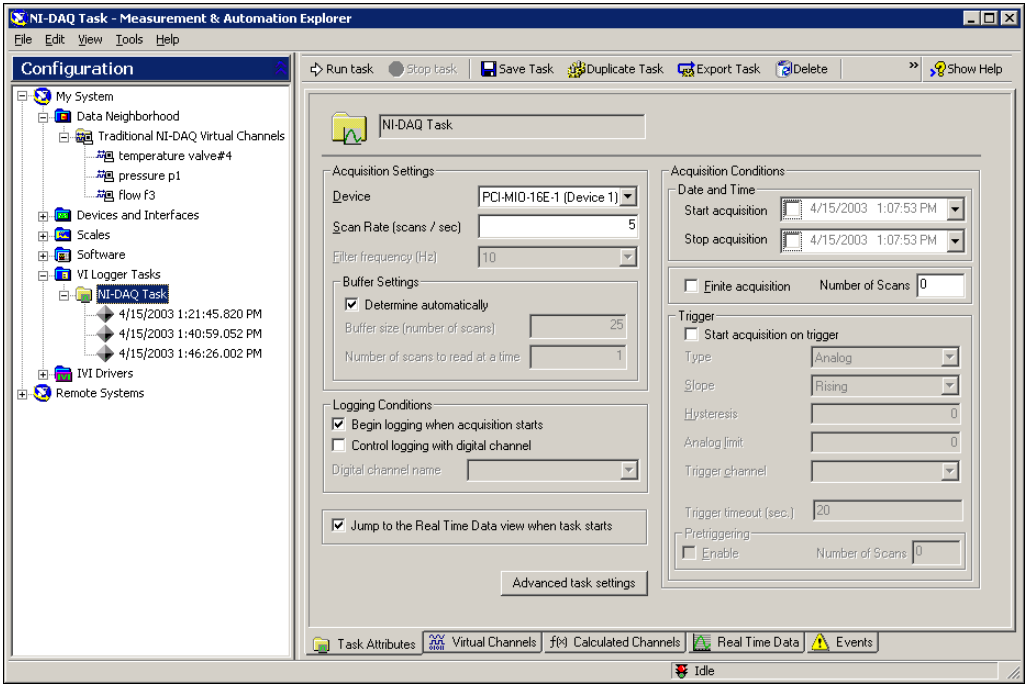


Figure 2-1. NI-DAQ Task Attributes

VI Logger automatically gives the task a unique default name, which appears in the task name field as **NI-DAQ Task** or **FieldPoint Task**. You can rename the task by deleting the default task name and entering a new name in the task name field.

The Task Attributes view will look different for NI-DAQ tasks and FieldPoint tasks.

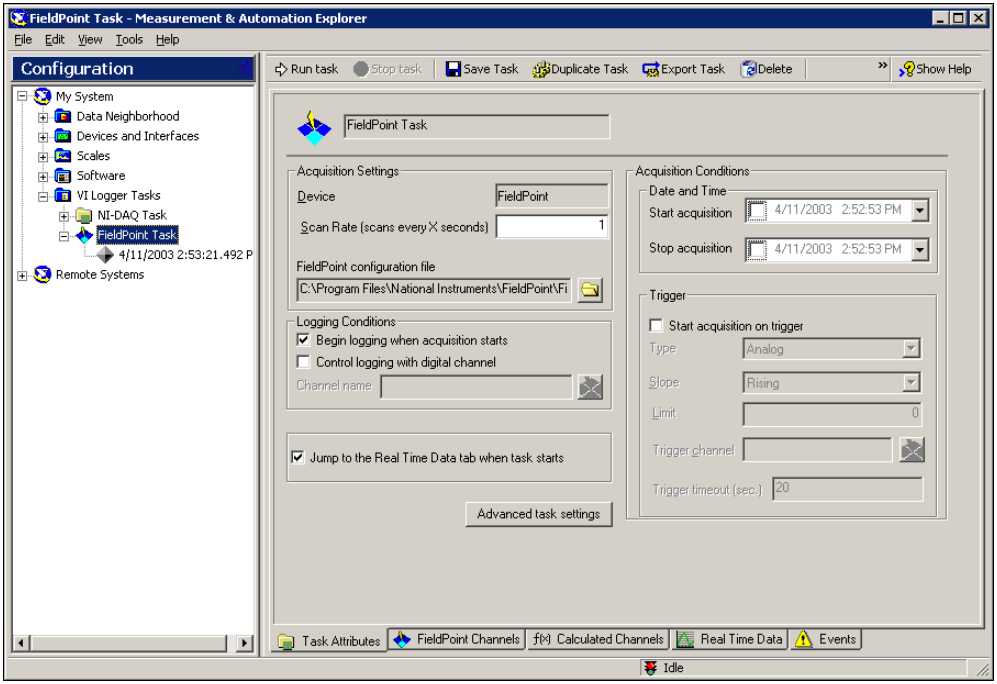


Figure 2-2. FieldPoint Task Attributes

4. In the **Acquisition Settings** section, enter the following fields:
   a. In the **Device** field, select the device you are using.
   b. In the **Scan Rate** field, use the default scan rate or enter the rate at which you want to acquire data per second.

Note The Scan Rate field determines the *number of scans per second* for NI-DAQ tasks and the *number of seconds to skip between scans* for FieldPoint tasks.

5. (**FieldPoint Tasks**) In the **FieldPoint configuration file field**, enter or browse to the path of the FieldPoint configuration file to use.
6. (**NI-DAQ Tasks**) In the **Buffer Settings** section, you can define buffering parameters for the task. With these parameters, you can modify the performance of VI Logger, specifically if you are trying to log data at a high rate.

Tip You cannot log data from more than one NI-DAQ device per task. However, you can define one task for each device and can run more than one task at the same time.

Setting Up Channels in a VI Logger Task to Acquire and Log Data

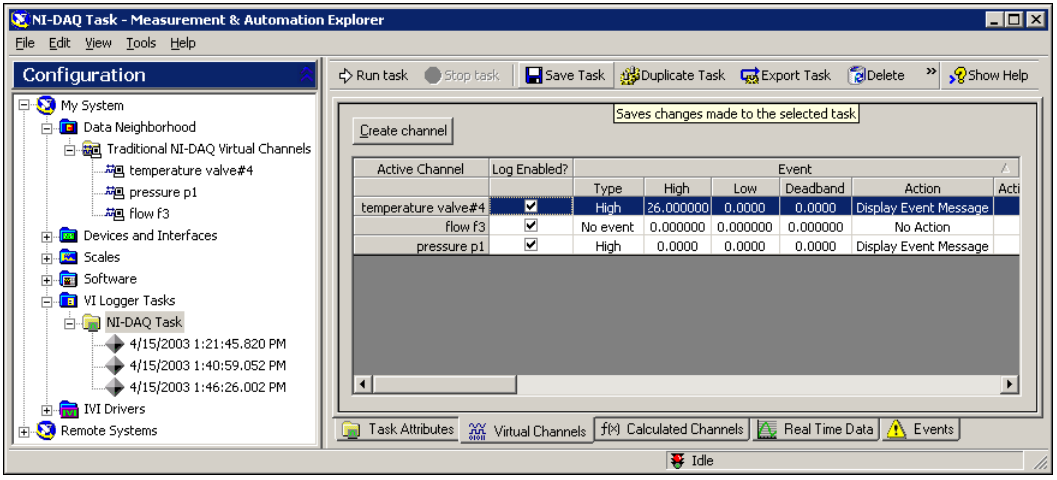
For each VI Logger task you configure, you can select which specific channels acquire and log data within that task.

Setting Up the Virtual Channels in a NI-DAQ Task to Acquire and Log Data

For each NI-DAQ task you configure, you can select which specific channels acquire and log data within that task.

Complete the following steps to set up the channels that acquire and log data.

1. With an NI-DAQ Task selected, click the **Virtual Channels** tab to open the Virtual Channels view. The following configuration view appears.
2. Right-click the **Events** column heading and select **Events** to enable or disable the information displayed in the table. Refer to the *Measurement & Automation Explorer Help for VI Logger*, by selecting **Help»Help Topics»VI Logger»VI Logger Help** for more information about the information columns in the Virtual Channels view.



3. The **Active Channel** column displays all the virtual channels you have created in MAX for your device. To enable logging for each channel, place a checkmark in the **Log Enabled?** checkbox to the right of each channel name.

Tip To add a virtual channel, click **Create channel** and follow the instructions in the Create New Channel wizard.

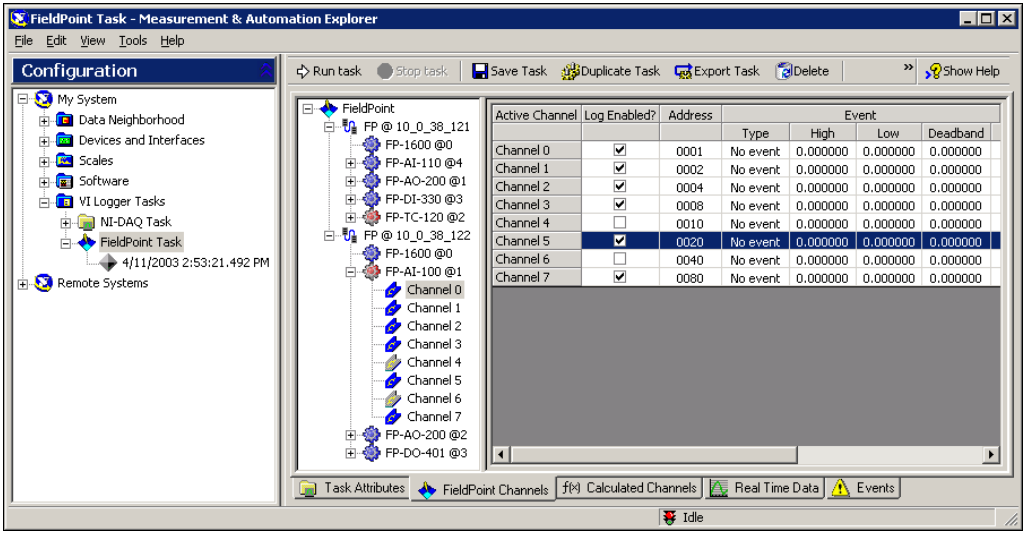
Refer to the *Creating Calculated Channels* section for information about creating calculated channels for VI Logger tasks.

Setting Up the FieldPoint Channels in a FieldPoint Task to Acquire and Log Data

For each FieldPoint task you configure, you can select which specific channels acquire and log data within that task.

Complete the following steps to set up the channels that acquire and log data.

1. With a FieldPoint task selected, click the **FieldPoint Channels** tab to open the FieldPoint Channels view. The following configuration view appears.
2. Right-click the **Events** column heading and select **Events** to enable or disable the information displayed in the table. Refer to the *Measurement & Automation Explorer Help for VI Logger Help* for more information about the information columns in the FieldPoint Channels view.



3. The **Active Channel** column displays all the FieldPoint channels you have created in MAX for your device. To enable logging for each

channel, place a checkmark in the **Log Enabled?** checkbox to the right of each channel name or double-click the FieldPoint channel in the FieldPoint tree view.

Tip To add a FieldPoint channel, right-click a device under **My System»Data Neighborhood** and select **Create New Item**. Save the FieldPoint configuration (`.iak`) file because you cannot run a VI Logger task for a FieldPoint item until you have saved the `.iak` file.

4. To configure an event, right-click the **Events** column and select **Events**. Check and uncheck the desired events. You also can right-click the table cells to access more options to modify these conditions.

Refer to the *Creating Calculated Channels* section for information about creating calculated channels for VI Logger tasks.

Configuring Events for a Logging Task

You can configure events to be logged in your task that will appear in the Events view. Complete the following steps to configure the events for a logging task.

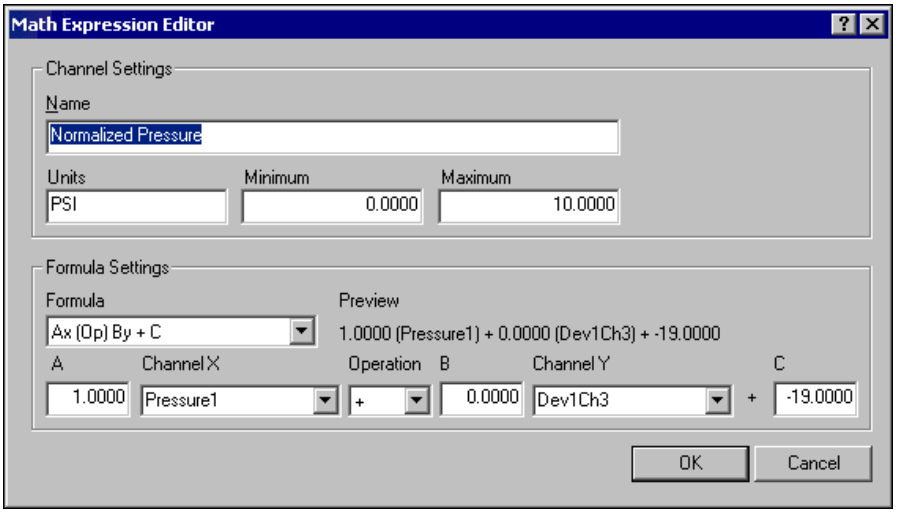
1. In the NI-DAQ Channels or FieldPoint Channels view, right-click the **Channels** column and select **Events**.
2. Check and uncheck the desired events to select which events to display for the channels.
3. You also can right-click the table cells to access more options to modify these conditions.

Creating Calculated Channels

You can set up mathematical equations that use virtual channels or FieldPoint channels using math channels. For example, for channels **Channel 0** and **Channel 1**, you could enter the equation `Channel 0 - Channel 1`, to subtract one from the other. The result would be a calculated channel.

Complete the following steps to create a calculated channel.

1. Click the **Calculated Channels** tab to display the Calculated Channels view.
2. Click **Create channel**. The **Math Expression Editor** dialog box appears where you can define a math channel.



3. In the **Channel Settings** section in the **Name** field, enter an appropriate name for the math channel.
4. In the **Units** field, enter the appropriate unit type.
5. In the **Minimum** and **Maximum** fields, enter a range of units that applies to the math channel.
6. In the **Formula Settings** section in the **Formula** field, click the down arrow, and select one of four formulas to apply to the math channel:
   - **Ax (Op) By + C**—A linear combination formula. Fill in fields **A**, **Channel X**, **Operation**, **B**, **Channel Y**, and **C** with the appropriate values.
   - **db x/y**—A measurement of noise (db)–power base 10. Select the channels you want for **Channel X** and **Channel Y** fields.
   - **dBVx**—A single channel noise measurement. Select the channel you want for the **Channel X** field.
   - **User Defined**—A formula that you create. Refer to Appendix A, *Math Expression Editor Function Descriptions*, for more information about the valid functions you can use in this field.
7. Click **OK**.

Advanced Task Settings

VI Logger tasks have advanced settings that are not in the Task Attributes view. To configure the advanced settings for a task, click the **Advanced task settings** button on the Task Attributes view.

Logging Event Data to a Text File

You can specify a text file for VI Logger to enter event data from logging tasks. Complete the following steps to log event data to a text file.

1. Click the **Task Attributes** tab to open the Task Attributes view for a FieldPoint or NI-DAQ task.
2. Click the **Advanced task settings** button to launch the **Task Properties** dialog box.
3. Place a checkmark in the **Log Events** checkbox on the **Advanced Task Settings** tab.
4. Enter a **File Name** or browse to a text file where you want to send events data from a logging task.
5. Click **Apply** to save the setting or **OK** to save the memo and close the Task Properties dialog box.

Launch DIAdem from VI Logger

DIAdem is an interactive post-acquisition data analysis and report generation software that can import VI Logger task data. Complete the following steps to launch DIAdem opened to your task data.

1. Click the **Task Attributes** tab to open the Task Attributes view for a FieldPoint or NI-DAQ task.
2. Click the **Advanced task settings** button to launch the **Task Properties** dialog box.
3. Place a checkmark in the **Launch DIAdem after task completes** dialog box.
4. Click **Apply** to save the setting or **OK** to save the memo and close the Task Properties dialog box.

Setting Up Network Publishing to View Data from Another Computer

With network publishing, on the host computer, you can specify a specific URL where you want to publish the data so you can monitor the data from that location. You can use LabVIEW to create a DataSocket client for the Web.

Complete the following steps to publish data using a network.

1. Click the **Task Attributes** tab to open the Task Attributes view for a FieldPoint or NI-DAQ task.
2. Click the **Advanced task settings** button to launch the **Task Properties** dialog box.
3. In the **Network Publishing** section, place a checkmark in the **Publish to DataSocket** checkbox.
4. In the **URL** field, enter a URL of a client computer from where you want to monitor the data being acquired and logged from a task.
5. Click **Apply** to save the setting or **OK** to save the memo and close the Task Properties dialog box.

If you have LabVIEW, refer to the `DataSocket Reader.vi` in the `examples\VI Logger\Reading Examples.llb` to view the data from the client computer.

Entering a Task Memo

You can enter a description or other information about a logging task. Complete the following steps to enter extra information about a logging task.

1. Click the **Task Attributes** tab to open the Task Attributes view for a FieldPoint or NI-DAQ task.
2. Click the **Advanced task settings** button to launch the **Task Properties** dialog box.
3. Enter a description or other extra information in the **Task Memo** field.
4. Click **Apply** to save the memo or **OK** to save the memo and close the Task Properties dialog box.

Publishing Task Data to the Web

Use VI Logger to publish data on the Web. Click the **Advanced task attributes** button in the Task Attributes view and click the **Publish to the Web** tab. Select which channels to publish, the timespan of the data displayed, and how often to update the `.htm` file. You also can use FTP to send the generated `.htm` file to a remote computer, such as a Web server.

Note The `VI_Logger_Web.html` file must be in a folder named `source` in the same directory that you publish task data to for the data to be formatted correctly.

You also can store data on an FTP site in this dialog box by placing a checkmark in the **Store HTML files on FTP** checkbox, and entering the relevant information about the FTP site.

Modifying a Task

Once you have created a task, you may want to modify the task. Complete the following steps to modify a task.

1. In the MAX configuration tree, expand **VI Logger Tasks**. Click the task name. The summary of the task configuration appears in four views in the configuration view: Task Attributes, FieldPoint Channels or Virtual Channels, Calculated Channels, and Real Time Data. To access one of these views, click the tab at the bottom of the MAX screen.
2. Modify the task by changing any information in the appropriate fields.

You are now ready to run the new data logging task. Running a task automatically saves the modified task.

Duplicating a Task

To save time when configuring more than one task, you can duplicate a task and then modify anything in it. Complete the following steps to duplicate a task.

1. Right-click the task in the MAX configuration tree and select **Duplicate**. The **Duplicate a VI Logging** task dialog box appears.
2. Enter a task name in the **New task name** field.
3. Click **OK**.

The duplicate task appears in the MAX configuration tree at the end of the task tree.

Deleting a Task and Data

Complete the following steps to delete an entire task.

Caution When you delete a task, all data associated with that task will also be deleted.

1. Right-click the task in the MAX configuration tree and select **Delete**. A **MAX-VI Logger** dialog box appears asking you to confirm that you want to delete the task.
2. Click **Yes** to delete the task or click **No** to cancel the deletion.

Running a Task

Complete the following steps to run a task.

1. Select the task you want to run in the MAX configuration tree.
2. Click the **Run Task** button below the menu toolbar.

Let the task run for several seconds to acquire some data. Click **Stop Task** to stop running the task, or wait for a stop condition or trigger to occur. The data is collected and stored by MAX. You may also store the data by enabling the **Publish to DataSocket** checkbox in the Task Attributes view to send the data to DataSocket to view from a remote computer.

Stopping a Task

If you set a stop condition for a task, it stops acquiring and logging automatically. If you do not specify stop conditions when you create a task, the task runs until you manually click the **Stop Task** button in the MAX toolbar.

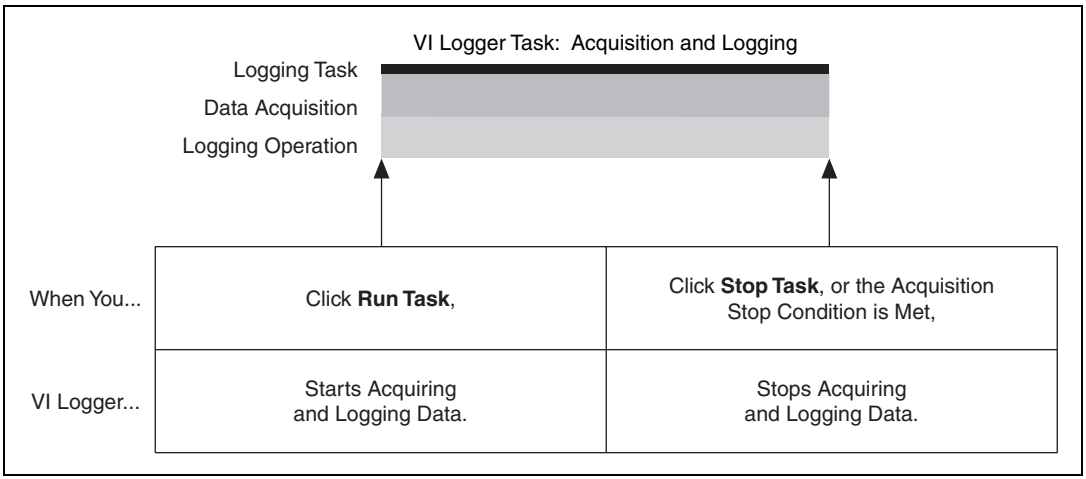
3

Setting the Logging and Data Acquisition Conditions

You can define both logging and acquisition conditions for a task. Logging occurs when the data is actually being logged to where you want to store the data. Acquisition occurs when the data is being acquired and is available for viewing in the Real Time Data view. The data is not necessarily being logged anywhere, although you can both acquire and log data at the same time.

Using the Default Acquisition and Logging Settings for a Task

The **Begin logging when acquisition starts** checkbox in the Task Attributes view, Logging Conditions section is enabled by default. When you use the default logging and acquisition settings for a task, you can optionally set the acquisition stop condition and then save and run the task with this condition, or you can click the **Stop Task** button in the Measurement & Automation Explorer (MAX) toolbar to stop acquisition. After you click **Run Task**, both the data acquisition and the logging immediately start at the same time. Logging and acquisition stop when you click the **Stop Task** button or when a stop acquisition condition is met. The following figure illustrates this default scenario.



Refer to the *Setting a Stop Condition for Acquiring Data* section for more information about how to set an acquisition stop date and time.

Using Conditional Acquisition for a Task

In addition to setting up start and stop conditions for logging, you also can set start and stop conditions for acquiring data in a task. Refer to the *Using Conditional Logging for a Task* section for more information about how to set up conditional logging conditions in a task.

Setting Up Pretriggering

Pretriggering enables you to view the data from a specific number of scans prior to an event condition trigger.

Note Pretriggering only is available with NI-DAQ virtual channels.

Complete the following steps to set up pretriggering.

1. In the **Pretriggering** section of an NI-DAQ Task Attributes view, place a checkmark in the **Enable** checkbox.
2. Enter a number in the **Number of Scans** field to determine how many scans to view data for before an event trigger occurred.

Setting Start Conditions for Acquiring Data

There are three ways to start acquiring data:

- Start acquisition on a particular date and time.
- Start acquisition with a trigger.
- Use a combination of the two above, where the NI-DAQ or FieldPoint hardware searches for a digital trigger after a specific start time is met. Refer to the *Using Both Conditional Acquisition Triggers and Conditional Logging for a Task* section for more information about using both.

Note When you start acquisition, you start acquisition on the channels selected in the **Log Enabled?** column of the Channels view for a task.

Setting a Date and Time Start Condition for Acquiring Data

Complete the following steps to set an acquisition start condition using a date and time.

1. Click the **Task Attributes** tab to open the Task Attributes view.
2. In the **Acquisition Conditions**, **Date and Time** section, place a checkmark in the **Start acquisition** checkbox.
3. Enter a date and time when you want to start acquiring data.

   To begin acquiring data, click **Run Task**. To stop acquiring data, either wait for the stop acquisition date and time to be met or click the **Stop Task** button.
4. Verify changes to the acquisition settings by clicking **Save Task**.

Setting a Trigger Start Condition for Acquiring Data

Complete the following steps to set the acquisition start conditions using a trigger.

1. Click the **Task Attributes** tab to open the Task Attributes view.
2. In the **Acquisition Conditions**, **Trigger** section, place a checkmark in the **Start acquisition on trigger** checkbox to apply any triggered start conditions to a task.
3. In the **Acquisition Conditions**, **Trigger** section, select the appropriate start conditions in the active fields that apply to the trigger. To get a more detailed description of what each field does, right-click the label and select **What's This?**.

Setting a Stop Condition for Acquiring Data

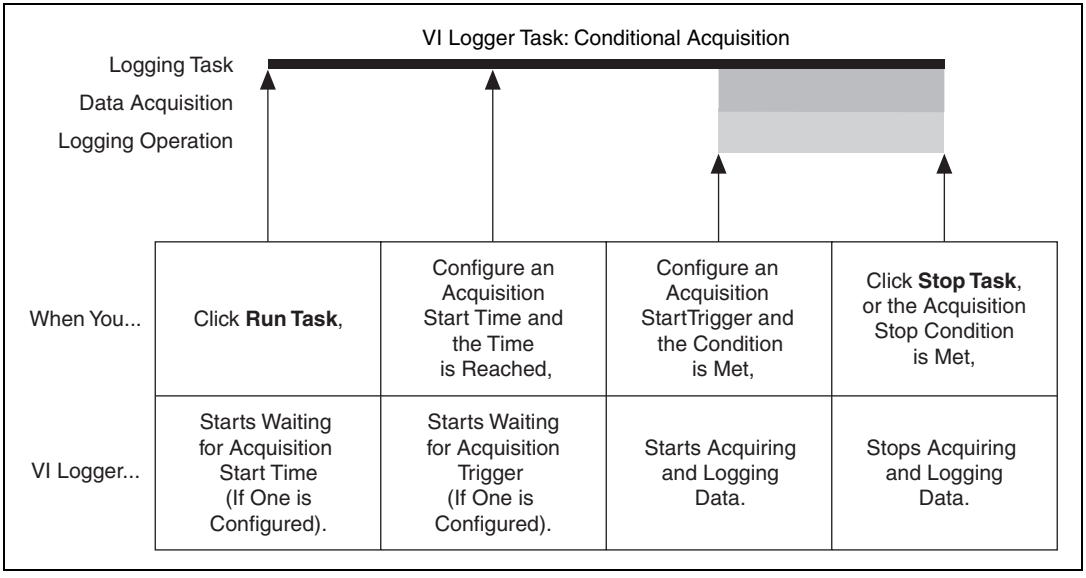
You can set a stop condition for the task to stop acquiring data for a date and time. You also can stop the task by manually selecting the **Stop Task** button. Complete the following steps to set the date and time stop condition.

1. Click the **Task Attributes** tab to open the Task Attributes view.
2. In the **Acquisition Conditions**, **Date and Time** section, enable the **Stop acquisition** checkbox.
3. Enter a date and time when you want the task to stop acquiring data.

To begin acquiring data, click **Run Task**. To stop acquiring data, either wait for the stop acquisition date and time to be met or click the **Stop Task** button.

Note When you set the acquisition start and stop conditions, you still need to start the task manually by clicking **Run Task**. Once you have begun the task, VI Logger waits for the appropriate start conditions to begin acquiring data, and then stops when the stop condition is met.

The following figure demonstrates what happens in VI Logger when you set start and stop conditions for data acquisition.



Setting Up Finite Acquisition

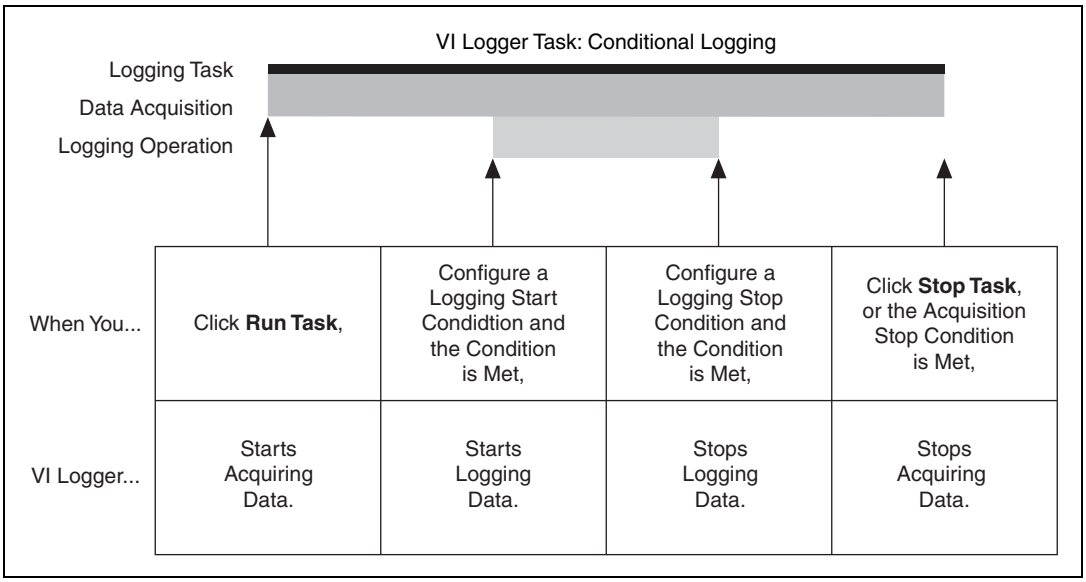
For NI-DAQ tasks, you can enable finite acquisition. In the Task Attributes view, place a checkmark in the **Finite Acquisition** checkbox and enter a **Number of Scans** to stop data logging after the entered number of scans is acquired.

Note Finite acquisition only is available with NI-DAQ virtual channels.

Using Conditional Logging for a Task

Note Turning logging on and off does not affect the task. Click **Stop Task** or set a stop task condition to stop logging.

You either can log some or all of the channels within a task. You can configure the task to start logging when you run the task, or you can configure an event to start logging data. Use the **Control logging with digital channel** checkbox on the Task Attributes view to control logging for the task. You configure events to control logging by right-clicking the **Events** column of the table in the Virtual Channels, FieldPoint Channels, or Calculated Channels view, and selecting **Events**. Check or uncheck events from the drop-down menu to configure logging events. The following figure illustrates what happens in VI Logger when you set up conditional logging.



There are three ways to control the logging of a task: default settings, channel events, and conditional acquisition triggers and conditional logging.

Using Default Settings for Logging

You can use the default settings to control logging for a task. When you use the default settings, logging starts when you click **Run Task** and stops when you either click **Stop Task** or a stop data acquisition condition is met. Refer to the *Setting Up an Event Detection* section for information about using events to control logging.

Using Channel Events for Logging

You also can control start and stop logging conditions. Refer to the *Setting Up an Event Detection* and *Setting Up an Event Action* sections for more information about using the channel events feature.

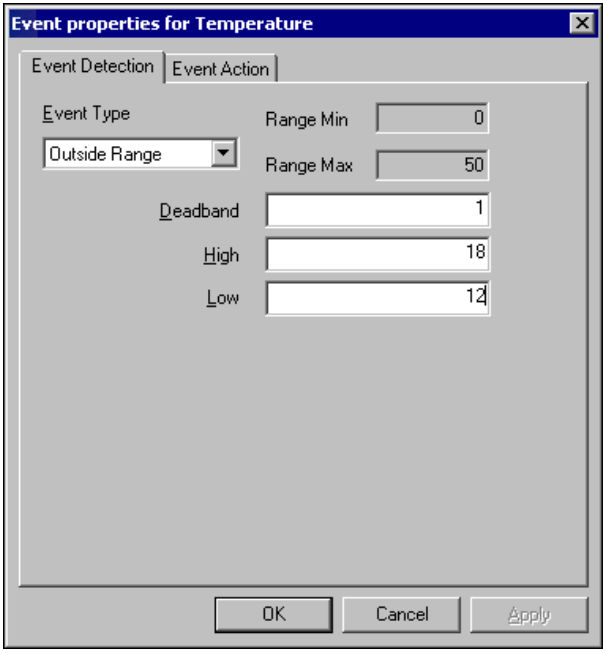
Note This feature is available for virtual, FieldPoint, and calculated channels. When the term *channel* is used throughout this section, it is referring to virtual, FieldPoint, and calculated channels.

Setting Up an Event Detection

An event is similar to a trigger. When a specific condition occurs, VI Logger performs a specified action. The specific condition is called an event detection. You only can configure one event per channel. By default, all channels are configured without an event defined for them.

Complete the following steps to set up event detection.

1. In the **Virtual Channels**, **FieldPoint Channels**, or **Calculated Channels** view, in the **Active Channel** field, right-click the channel name for which you want to set an event.
2. Select **Events** to open the **Event properties for** dialog box.
3. Click the **Event Detection** tab.



4. Under **Event Type**, select the type of event. The type of event you select determines which fields may appear in the dialog box for you to customize.
   - If you select **Outside Range** in the **Event Type** field, in the **Range Min** and **Range Max** fields, enter the minimum and maximum range for the event.

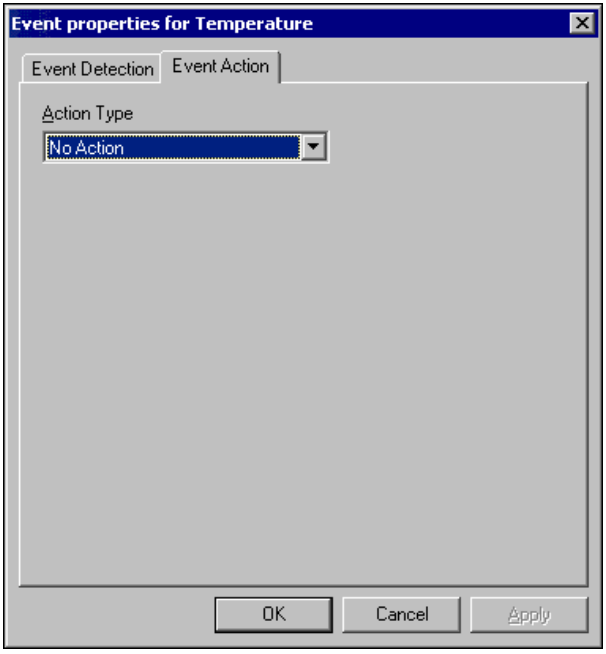
- In the **Deadband** field, enter a value to prevent noise in the signal from triggering multiple events. A higher value provides greater noise immunity. The value is in the same units as the channel.
- In the **High** field, enter a high limit to trigger a High, Outside Range, or Inside Range event. The units are the same as for the channel.
- In the **Low** field, enter a low limit to trigger a Low, Outside Range, or Inside Range event. The units are the same as for the channel.

Refer to the *Setting Up an Event Action* section for more information about finishing configuring the task event.

Setting Up an Event Action

The event action is what you want done once VI Logger detects the specific event condition. Complete the following steps to set up event action.

1. Click the **Event Action** tab. The **Event properties for** dialog box appears.



2. Under **Action Type**, click the down arrow and select an event action. As necessary, customize any additional fields that appear when you make a selection.

The event actions that you can select are as follows:

- **No Action**—Nothing happens when VI Logger detects an event condition.
- **Write to Digital Line**—Writes to a digital output line.
- **Write to Analog Channel**—Writes to an analog output channel.
- **Display Event Message**—Message appears.
- **Send Email Message**—Sends email to the user account. Refer to Appendix B, *Setting Up an Event Email*, for more information about sending an email message when an event occurs.
- **Sound**—Use multimedia, such as a beeping terminal (sound).
- **Toggle Logging**—Changes between logging on and logging off states.
- **Turn Logging Off**—Turns logging off when the event detection condition occurs.
- **Turn Logging On**—Turns logging on when the event detection condition occurs.

3. Click **OK** to save the new event detection and action settings for the event.
4. Click **Save Task** to save changes to the task.

Refer to the *Modifying a Task* section of Chapter 2, *Creating and Running a VI Logger Task*, for more information about modifying a task before running.

Using a Digital Channel to Control Logging

Note To use a digital channel to control logging, you must already have a virtual channel or FieldPoint channel set up for digital line input.

You can wire a hardware switch to one of the digital input virtual channels or FieldPoint channels to control when a task logs. When the line is high, logging is enabled. When the line is low, logging is disabled. Refer to your device documentation for more information about setting up a hardware switch.

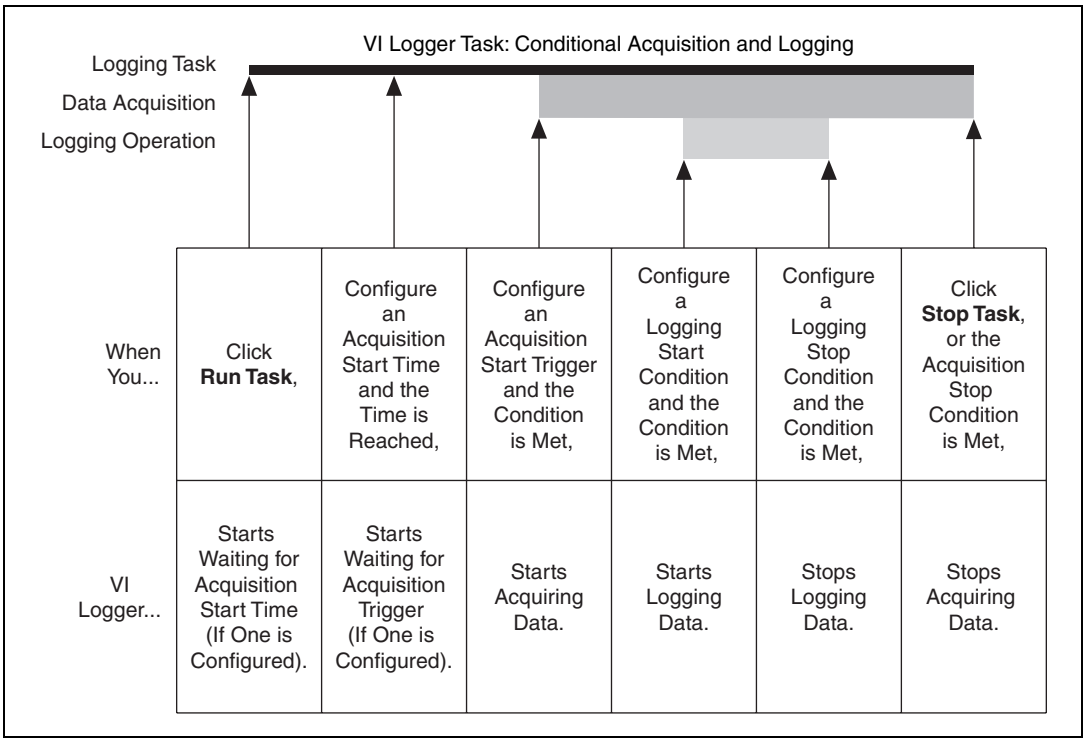
Complete the following steps to set up the start conditions for logging a task.

1. Verify you have a digital input channel for which to toggle logging.
2. In the MAX configuration tree under **Data Neighborhood**, right-click the digital input line virtual channel and select **Test**. Test the virtual digital input channel by flipping the hardware switch on or off and verifying if it powers on or off the LED in the software test panel in MAX.
3. In the **Task Attributes** view in the **Logging Conditions** section, select **Control Logging with digital channel**.
4. Select the **Digital channel name**.

As you toggle the hardware switch, you toggle the data logging on or off. Each time you turn logging on, a new date and time run appears under the VI Logger task name in the MAX configuration tree.

Using Both Conditional Acquisition Triggers and Conditional Logging for a Task

The following figure illustrates what happens in VI Logger when you set up both conditional acquisition and conditional logging. If you set the start time for acquisition and a trigger for starting logging, the start time begins acquisition, the trigger begins logging, and then the logging conditions are evaluated. Refer to the *Using Conditional Acquisition for a Task* section for more information about setting up conditional acquisition and conditional logging.


VI Logger Task: Conditional Acquisition and Logging
Logging Task
Data Acquisition
Logging Operation
When You...
Click **Run Task**,
Configure an Acquisition Start Time and the Time is Reached,
Configure an Acquisition Start Trigger and the Condition is Met,
Configure a Logging Start Condition and the Condition is Met,
Configure a Logging Stop Condition and the Condition is Met,
Click **Stop Task**, or the Acquisition Stop Condition is Met,
VI Logger...
Starts Waiting for Acquisition Start Time (If One is Configured).
Starts Waiting for Acquisition Trigger (If One is Configured).
Starts Acquiring Data.
Starts Logging Data.
Stops Logging Data.
Stops Acquiring Data.

4

Viewing and Printing Your Data

VI Logger lets you view data as it is logged in the Real Time Data view and already logged data in the Historical Data view. You can print both views.

Viewing Data

Tip You can move all of the VI Logger views, such as Task Attributes and Calculated Channels views around to dynamically interchange them. You also can separate the view from the Measurement & Automation Explorer (MAX) interface by clicking the tab of the view and dragging the view away from the MAX dialog box.

When you view logged data, you can view data such as the start and stop time, engineering units measured, minimum and maximum value set for the channel after scaling, and number of scans. In addition, you can view data in a display view before, during, or after the data is logged. Complete the following steps to view the logged data.

1. In the MAX configuration tree under **VI Logger Tasks**, click a task name.
2. Click the run you want to view.
3. If not already selected, click the **Trace Attributes** tab to open the Trace Attributes view. The following configuration view appears for an NI-DAQ task.

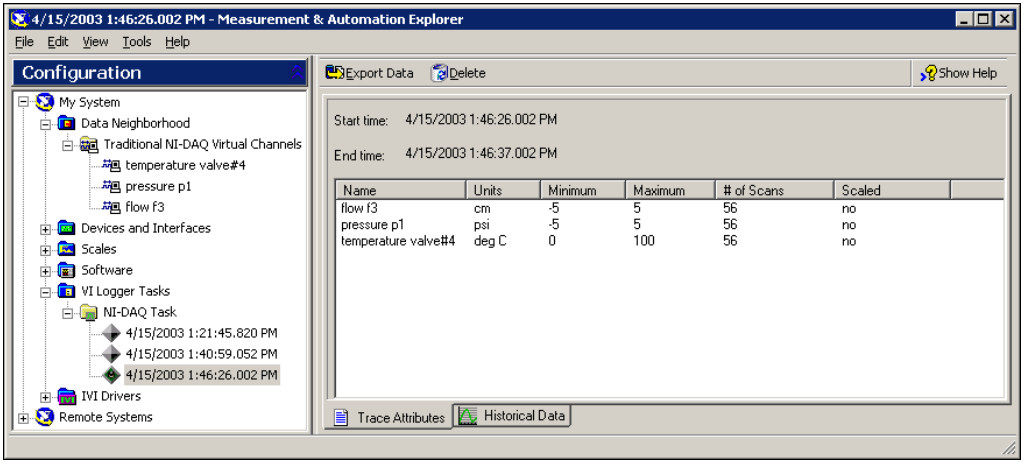


Figure 4-1. NI-DAQ Trace Attributes View

From this view, you can find the following information about the task you ran:

- **Start time**—Time task began.
- **End time**—Time task ended.
- **Name**—Channel name from which the data was logged.
- **Units**—Engineering units measured.
- **Minimum**—Minimum value set for that channel after scaling.
- **Maximum**—Maximum value set for that channel after scaling.
- **# of Scans**—Number of times the channel was scanned.
- **Scaled**—*Yes* means the data was scaled before it was logged. *No* means the data was not scaled before it was logged.

The following configuration view appears for FieldPoint tasks.

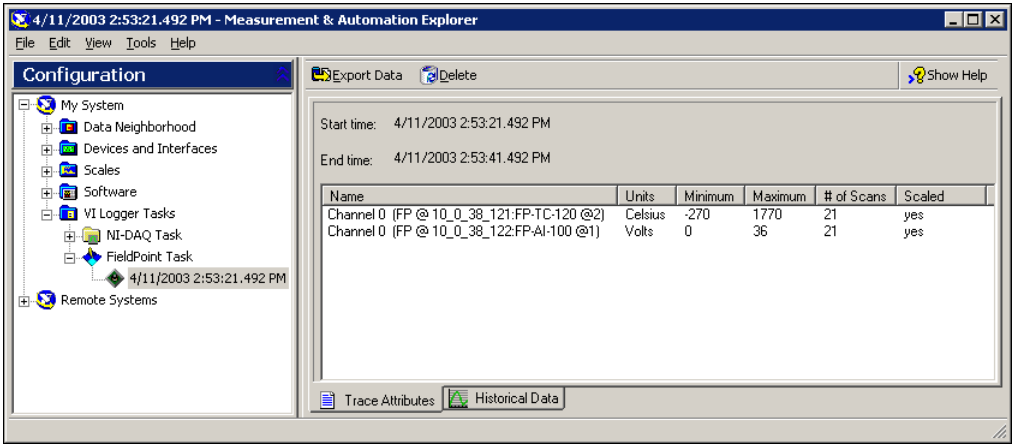


Figure 4-2. FieldPoint Trace Attributes View

Viewing Data Graphically

Click the **Historical Data** tab to open the Historical Data view at the bottom of the configuration view to see the graphical view of the data logged from each channel.

Monitoring Acquired Data

There are two views available where you can view data. The first display view, Real Time Data, is available when you select a task name in the Configuration view. You can use this display to monitor data that is being acquired, regardless of if the data is being logged or not. VI Logger automatically jumps to this view to monitor the data when logging starts. For high-speed data logging, you can disable this default behavior by removing the check from the **Jump to the Real Time Data tab when task starts** checkbox on the Task Attributes view.

Viewing Logged Data

The Historical Data view appears when you select a run under the task name. This view shows only logged data that has already been stored in the task run, as shown in Figure 4-3.

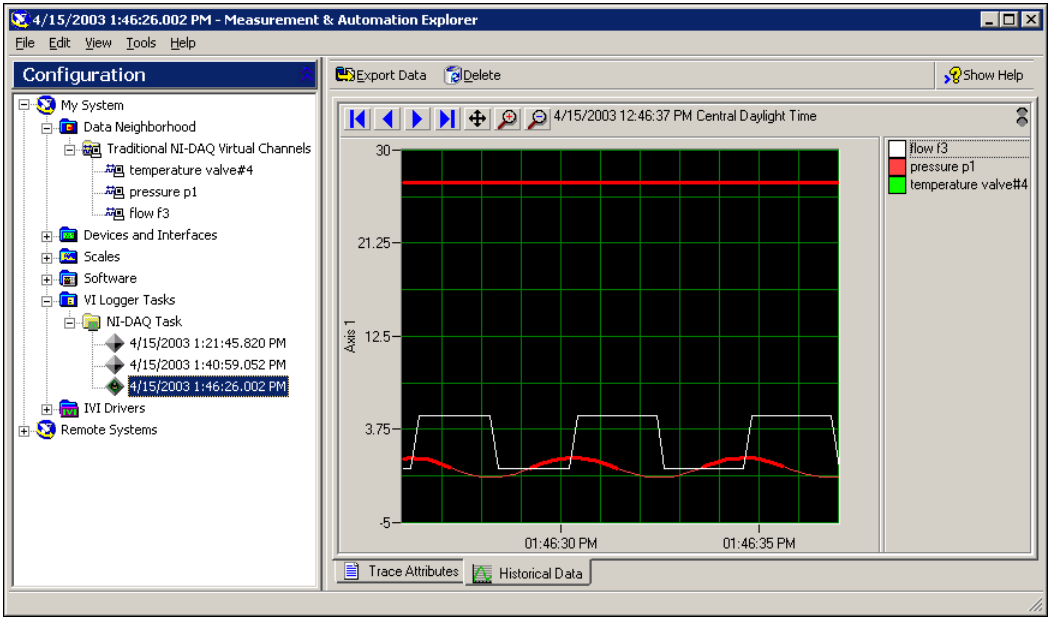


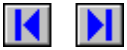
Figure 4-3. NI-DAQ Task Historical Data View

For information about the controls and features of the Historical Data view, right-click in the graph and select **Help**.

Plotting Data

A red and green LED indicator appears on the upper right corner of the Historical Data and the Real Time Data views when you are running a task. If the green light is lit, you are viewing the task data while it is being acquired, and the data on the screen reflects what is currently being acquired. If the red light is lit, you are viewing the data that has already been collected and logged.

- To switch between viewing current and historical data, click the LED indicator. You only can switch between viewing current and historical data if a task is running.



- To snap the view to the beginning of the logged data, click the home arrow button. To snap the view to the end of the data, click once on the end arrow button.

- To scroll back and forth through the logged data, click the forward or backward scroll arrows. To scroll faster through the data, click the forward or backward scroll arrow buttons, and drag the cursor to the right or left of the arrow buttons while holding the mouse button down. The further away you drag the cursor from the arrow, the faster the data scrolls.

Zooming In or Out on Data

Click the magnifying glasses at the top of the display view to zoom in or zoom out on the current view. The view is magnified twice or decreased by half on the x-axis as you zoom in or out.

Additionally, in the display view, you can click and drag to the right or left to zoom in on the x-axis data. You also can right-click in the view, select **Zoom/Pan Mode**, then click in the view and drag the square for the x- and y-axis area you want to magnify. Select the zoom out magnifying glass to zoom out again.

Modifying Plots or Display View

Complete the following steps to modify plots or display view.

1. Right-click in the graphical view and select **Properties**. The **HyperTrend Properties** dialog box appears.

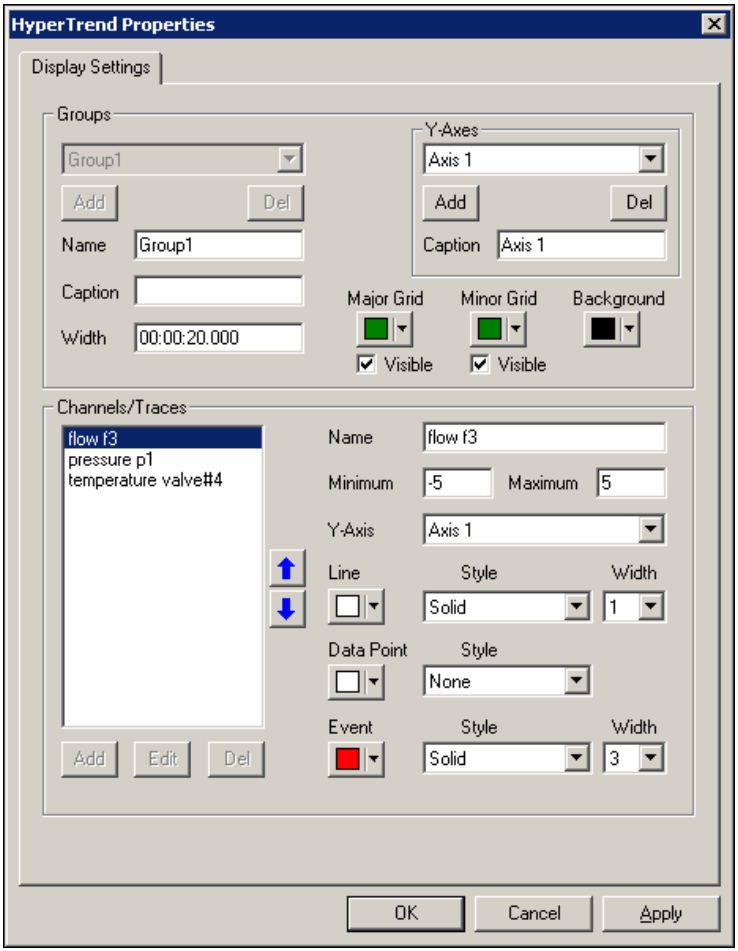


Figure 4-4. NI-DAQ Task HyperTrend Properties Dialog Box

2. Select a Group from the **Groups** drop-down list or use the **Add** and **Del** buttons to add or delete a group. In the Groups section, you can modify the group using the following fields:
   - **Name**—Specifies the group display plots and view that you are modifying
   - **Caption**—Describes the group and the text then appears beneath the Real Time Data view
   - **Width**—The default width of the entire Real Time Data view is one second from beginning to end. You can enter any time frame in the **Width** field to change what amount of data you see in the

view. Once you are in the Real Time Data view and you make modifications to the width of the view, you can right-click and select **Restore X-axis width** to return to the default width.

- **Major Grid**—Click the down arrow to modify the color of the major grid lines. Select the **Visible** box if you want the major grid lines to show.
- **Minor Grid**—Click the down arrow to modify the color of the minor grid lines. Select the **Visible** box if you want the minor grid lines to show.
- **Background**—Click the down arrow to modify the background color of the Real Time Data view.

3. In the **Y-Axes** section, configure the y-axis settings for the selected group.
   - Use the pull-down menu to select a y-axis, or click the **Add** or **Del** buttons to add or remove y-axes.
   - Enter a **Caption** to display next to the y-axis.
4. Under **Channels/Traces**, select the channel on which the task ran. Click the up and down blue arrows to change the order of the channels as they appear to the right of the display. Additionally, you can edit or delete the selected channel from the view by clicking the **Edit** and **Del** buttons.
5. In the **Channels/Traces** section, you can modify a channel or trace display with the following fields:
   - **Name**—The name of the channel appears in this field.
   - **Minimum** and **Maximum**—Enter a number to adjust the y-axis height of the plot.
   - **Y-Axis**—Enter a caption to display next to the selected y-axis.
   - **Line**—Click the down arrow button to select a line color. You also can modify the style and width in the **Style** and **Width** fields next to the color.
   - **Data Point**—Click the down arrow button to select a line color. You also can modify the style in the **Style** field next to the color.
   - **Event**—Click the down arrow to select a line color. You also can modify the style and width in the **Style** and **Width** fields next to the color.
6. Click **Apply** to apply the changes to the Real Time Data view.
7. Click **OK** to exit the **HyperTrend Properties** dialog box.

8. Right-click in the Real Time Data view and select **Fixed Grid** to make additional modifications to the view. With this feature checked, the grid stays in one place while the data still scrolls in the view. With this feature unchecked, the grid moves with the data as it scrolls.

Modifying the Legend

The legend is the area to the right of the display view that shows channel names from which the data is taken. Complete the following steps to modify the legend or channels in the legend.

1. Right-click the channel name you want to modify in the legend and select one of the following items:
   - **Display**—When you check this item, it displays the channel you selected in the legend and shows the data plot from that channel in the view.
   - **Hide**—When you check this item, it grays out the channel you selected in the legend and does not show the data plot in the view. You also can double-click the channel name to hide it. To display the channel again, double-click the grayed out channel name.
   - **Select All**—When you check this item, it selects all the channels in the legend so you can modify them all at once. You also can select more than one channel by pressing <Ctrl-Shift> while clicking a channel.
   - **Rename**—You can enter a different channel name when you select this item.
2. To hide or show the legend, right-click in the graph area, and select **Show Legend**, depending upon which is needed.
3. Click the channel name colored box to change the plot color in the view.

Determining Time Difference, Frequency, and Values Using Plot Cursors

If you have a periodic waveform to view, use this feature to measure the time difference between two points in the display or to calculate the frequency of a periodic waveform. You can see the value of a plot wherever you place a cursor, which appears as a green vertical line in the displays view. You also can get the time difference between two cursors that you place on the plot, and you can get the inverse of that, which is the frequency.

Complete the following steps to change the cursor displays.

1. Click the **Cursor** button located above the display view to access the **Display Cursors** dialog box.
2. Select the **Two Cursors** box to be able to use two cursors at the same time in the view.
   - **First Cursor** and **Second Cursor**—Modify the date and time of where the cursor is placed in the view using these fields. If you run the task for more than one day, then you might need to modify the day.

Note **Time Diff** and **Freq fields** are hidden if the **Two Cursors** checkbox is not checked.

   - **Time Diff**—The time difference is calculated between the two cursors. The maximum time that will show in this field is the maximum width of the view window.
   - **Freq**—The frequency (inverse of the Time Diff field).

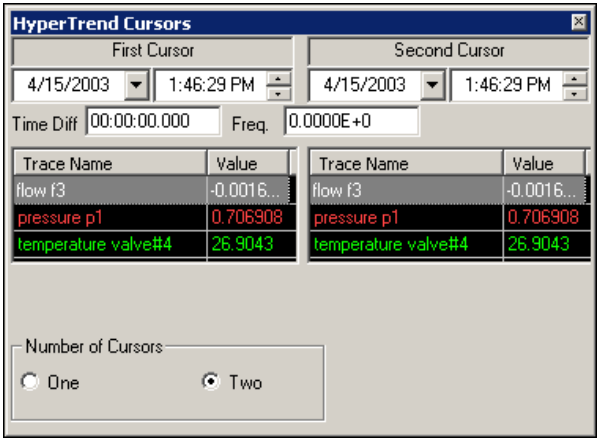
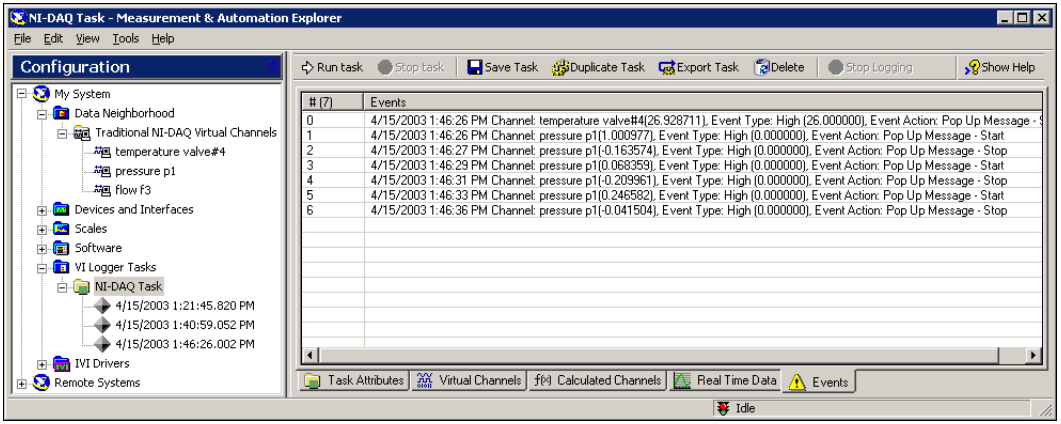


Figure 4-5. NI-DAQ Task Hypertrend Cursors Dialog Box

3. Click **Close** to exit from the dialog box.

Viewing Events

The Events view displays all event messages that occur during a logging task and all VI Logger error messages and warnings. You can right-click anywhere in the Events view to Auto Scroll through the view, to Clear Display, and to Save All or Save Selected events.



Refer to the *Setting Up the FieldPoint Channels in a FieldPoint Task to Acquire and Log Data* section of Chapter 2, *Creating and Running a VI Logger Task*, for more information about how to set up event logging.

Enable Auto-Scrolling

Auto-scrolling allows you to view the most recently logged data by scrolling the Events view down automatically as events are logged. To enable auto-scrolling, right-click the Events view and select **Auto Scroll**.

Saving Events

Complete the following steps to save logged events to a tab-delimitated text file.

1. Open the Events view by clicking the **Events** tab.
2. Right-click in the Events view.
   - Select **Save All Events** to save all of the events for the logging task.
   - Select **Save All Selected Event(s)** to save the selected events or event in the Events view.

3. Enter a file name for the file that will contain the events data and click **Save**.
4. Click **OK**.

Clear Events View

To clear the Events view of all logged events, right-click the Events view and select **Clear Display**.

Printing Data

To print the data graph, right-click in the Historical Data or Real Time Data display view and select **Print**. You only can print what is showing in the view on your screen.

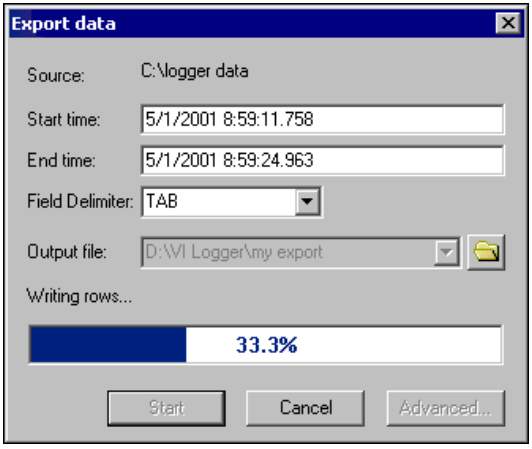
5

Exporting Data and VI Logger Databases

You can export VI Logger data to a `.txt` or `.html` file to publish to the Web and to DIAdem. Refer to the *Launch DIAdem from VI Logger* and *Publishing Task Data to the Web* sections of Chapter 2, *Creating and Running a VI Logger Task*, for more information about exporting VI Logger data to DIAdem and publishing a `.html` file of exported data to the Web. You can also export VI Logger tasks in XML format to another computer.

Exporting Data

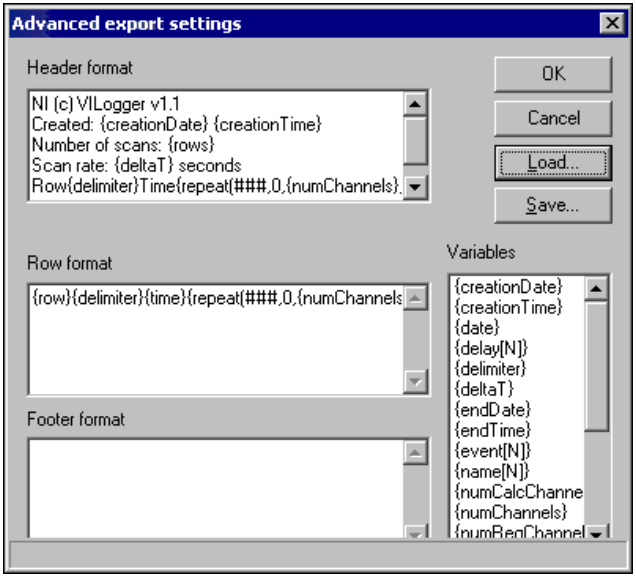
To export data to another file, under **VI Logger Tasks**, right-click a run, and select **Export Data**. The **Export data** dialog box appears as shown in the following figure.



- **Source**—File path where the database source to export is located.
- **Start time**—Time stamp on the first point returned in the data plot. You can manually change this field. This date and time are the startDate and startTime variables in the **Advanced export settings** dialog box.
- **End time**—Time stamp on the last point returned in the data plot. You can manually change this field. This date and time are the endDate and endTime variables in the **Advanced export settings** dialog box.
- **Field Delimiter**—Use this option to select what is placed between the different fields in the data in the export file. For example, you can separate the fields in the export file with a comma or a tab. This field is the delimiter variable in the **Advanced export settings** dialog box.
- **Output file**—File path where data is exported. You need to name the export file in this field before you generate it. Use any file extension and include the complete path to the file.
- **Writing rows**—Progress bar that monitors the export function.
- **Start**—Starts generating the export file.
- **Cancel**—Interrupts the export function and exits the **Export data** dialog box without saving any changes.
- **Advanced**—Accesses the advanced programming options, such as the header and footer formats, and variables you want to appear in the export file. Refer to the *Setting Advanced Export and Programming Options* section for more information about advanced export options.

Setting Advanced Export and Programming Options

To access the advanced programming options feature, click **Advanced** in the **Export data** dialog box. Refer to the *Exporting a Task* section for more information about exporting data. The **Advanced export settings** dialog box appears, as shown in the following figure.



- **Header format**—Enter the header that you want to appear in your export file. You can use variables in this field.
- **Row format**—Enter the way you want the row of data to be formatted. You can use variables in this field.
- **Footer format**—Enter the footer that you want to appear in the export file. You can use variables in this field.
- **Variables**—Select from the variables to determine the row format and footer format of your export operation. Refer to the *Variables* section for more information about using variables with VI Logger.
- **Load**—Click to load predefined templates included with VI Logger or a template you created and customized. Refer to the following sections for more information about loading templates.
- **Save**—Click to save any customized formats.

Loading a User-Defined Export Template

You can load a user-defined template, which is included with the VI Logger software. Complete the following steps to load a user-defined template.

1. Right-click a run in the Measurement & Automation Explorer (MAX) configuration tree and select **Export Data**. Click **Advanced** to open the **Advanced export settings** dialog box.
2. In the **Advanced export settings** dialog box, click **Load**. The **Load export template** dialog box appears.
3. Select **default.vet** from the `VI Logger\Export` folder and click **Open**. The **Advanced export settings** dialog box now contains the default template settings.
4. Click **OK** to apply the template formatting to the data you are exporting.

Loading an HTML Export Template

You can format data into HTML by loading an HTML template, which is included with the VI Logger software. Once you apply the HTML format to the data, you then can view the data using a Web browser such as Microsoft Internet Explorer. Complete the following steps to load the HTML template.

1. Right-click a run in the MAX configuration tree and select **Export Data**. Click **Advanced** to open the **Advanced export settings** dialog box.
2. In the **Advanced export settings** dialog box, click **Load**. The **Load export template** dialog box appears.
3. Select **html.vet** from the `VI Logger\Export` folder and click **Open**. The **Advanced export settings** dialog box now contains the default template settings.
4. Click **OK** to apply the template formatting to the data you are exporting.

Modifying the Template

You can modify the template or create your own template by altering the **Header format**, **Row format**, and **Footer format** fields and saving the modified template with a new name. Complete the following steps to save custom export settings.

1. Right-click a run in the MAX configuration tree and select **Export Data**. Click **Advanced** to open the **Advanced export settings** dialog box.
2. In the **Advanced export settings** dialog box, click **Save** to save the export settings you customize. The **Save export template** dialog box appears.
3. Enter *filename*.vet.
4. Select the folder where you want to save the new template. The default folder is C:\Program Files\National Instruments\VI Logger\Export.
5. Click **Save** to save your file to this path.

Use variables in the **Header Format** and **Row Format** fields of the **Advanced export settings** dialog box to customize an export template. Refer to the *Export Template Examples* section for examples of how to use variables in the **Header Format** and **Row Format** fields.

Variables

Variables contain values that can vary depending upon the task from which you are pulling data. There are two types of variables that you can use to program specific text and data into an export file: global and index list row format. You can program what variables and text you want to appear in the header and footer of the export file using the Header format and Footer format fields, and you can program how you want the rows of data to be presented using the Row format field. Refer the following tables for specific descriptions and categories of the variables.

Global

Global variables are variables that apply to the entire export file, meaning that you can use these variables in all three fields in the dialog box: Header format, Row format, and Footer format.

Global Function	Description
repeat (N, X, Y, “S”)	Refer to the *Repeat Function* section for more information about the repeat variables.

Global Index

Global variables contain static information with non-changing values.

Variable	Description
name [N]	N=[0...numChannels). Name of channel on the N channel trace.
delay [N]	N=[0...numChannels). How long it took to take measurement from time of scan on the N channel trace.
units [N]	N=[0...numChannels). Units that appear in the VI Logger summary view for the N channel trace.

One Value

One value variables contain only one value.

Variable	Description
creationDate	Date that exported file is created.
creationTime	Time that exported file is created.
delimiter	The delimiter selected in the **Field Delimiter** field in the **Export data** dialog box.
deltaT	Scan rate (in seconds) for logged task that produces plot or run.
endDate	End date specified in export dialog box.
endTime	End time specified in export dialog box.

Variable	Description
startDate	Start date specified in export dialog box.
startTime	Start time specified in export dialog box.
numChannels	Number of virtual channels or FieldPoint channels that appear in the VI Logger Trace Attributes view. Amount equals total number of channels when you combine the numRegChannels and numCalcChannels variables.
rows	Number of total rows of data exported.
numRegChannels	Number of virtual channels or FieldPoint channels excluding calculated channel.
numCalcCchannels	Number of calculated channels only.

Index List Row Variables

Index List Row variables can be used only in the Row format field and their values determine the format of the information in the row.

Row Format Variable	Description
row	Row number (0 to number of scans).
date	Date of current row.
time	Time of current row.
timeOffset	Time of scan since the start of the export: `Row number × deltaT`.

One Channel Value in a Row Export Variables

One Channel Value in a Row Export variables values can change within a row.

Row Format Variable	Description
value[N]	N=[0...numChannel). Value of the N channel trace in the current row.
Event [N]	N=[0...numChannels). Event of the N channel trace in the current row.

Repeat Function

You can use the Repeat (N, X, Y, “S”) function for string replacement. For example, you can use this function when you have ten channels in one run, five channels in another run, and you need to alter the number of channels in the runs.

Character	Description
N	String which needs to be replaced in S.
X	Beginning value of N, the valid range is between [0..numChannels).
Y	Ending value of N, the valid range is between [0..numChannels).
“S”	Statement whose value N will be replaced.

Special Syntax Characters

There are four different special syntax characters that you can use in the repeat function.

Syntax Character	Description
plain text	Any plain text character is output to export file verbatim.
[ ]	Used for channels. Only for indexing into a variable that has multiple channels.
" "	Whatever text or characters are inside the quotes are output verbatim in the export file.
\	Outputs verbatim whatever follows the backslash, unless the backslash is inside quotes.
{ }	Indicates the start or end of the variable or function.

Export Template Examples

Use the following export template examples to format data logged with VI Logger.

Export All Channels Plus Associated Events

The following examples are for the **Advanced export settings** dialog box fields.

Header Format

Enter the following text in the **Advanced export settings** dialog box fields to export all channels and events.

```
NI (c) VILogger
Created: {creationDate} {creationTime}
Number of scans: {rows}
Scan rate: {deltaT} seconds
Number of total channels: {numChannels}

row {delimiter} time{delimiter}
{repeat(###,0,{numChannels},"{name[###]} {delimiter}
{name[###]}."event" {delimiter}")}
```

Row Format

```
{row} {delimiter} {time} {delimiter} {repeat(###, 0,
{numChannels}, "{value[###]} {delimiter} {event[###]}
{delimiter}")}
```

Export Regular Virtual and FieldPoint Channels Only

Enter the following text in the **Advanced Export settings** dialog box fields to export only virtual and FieldPoint channels.

Header Format

```
NI (c) VILogger
Created: {creationDate} {creationTime}
Number of scans: {rows}
Scan rate: {deltaT} seconds
Number of virtual channels: {numRegChannels}

row {delimiter} time{delimiter}
{repeat(###,0,{numRegChannels},"{name[###]}
{delimiter}")}
```

Row Format

```
{row} {delimiter} {time} {delimiter} {repeat(###, 0,
{numRegChannels}, "{value[###]} {delimiter}")}
```

Export Calculated Channels Only

Enter the following text in the **Advanced Export settings** dialog box fields to export only calculated channels.

Header Format

```
NI (c) VILogger
Created: {creationDate} {creationTime}
Number of scans: {rows}
Scan rate: {deltaT} seconds
Number of calculated channels: {numCalcChannels}
```

```
row {delimiter} time{delimiter}
{repeat(###,{numRegChannels},{numChannels},"{name
[###]}{delimiter}")}
```

Row Format

```
{row}{delimiter}{time}{delimiter}{repeat(###,
{numRegChannels},{numChannels},"{value[###]}
{delimiter}")}
```

Exporting a Task to Another Computer

You can export a defined task in XML format and import it to a destination computer. To export a task to another computer, you need to set up the DAQ configuration and the task on the destination computer. On the destination computer, you either can use the same DAQ hardware configuration as the source computer or you can access the source computer DAQ hardware configuration remotely from the destination computer. Refer to the *Exporting a Task* and *Importing a Task* sections for more information about how to set up a computer one of these two ways.

Exporting a Task

Complete the following steps to export a task to another computer.

1. Select a VI Logger task name in the MAX configuration tree.
2. Click **Export Task** in the toolbar, or select **Tools»VI Logger»Export Task**, or right-click the VI Logger task and select **Export Task**. The **Save As** dialog box appears.
3. Enter a task name followed by a `.xml` file extension.
4. Choose a location on the computer where you want to save the task.
5. Click **Save**. The `.xml` file is then saved to the specified location on the computer.

Refer to the *Importing a Task* and *Creating a New Database* sections for more information about accessing a device and its hardware configuration remotely from a destination computer. If the destination computer has an identical device and device hardware configuration setup as the source computer, continue to the following *Importing a Task* section.

Importing a Task

Complete the following steps to import a task into VI Logger.

1. From the menu, select **Tools»VI Logger»Import Task**.
2. Select the task `.xml` file you exported earlier. If you are remotely accessing the device, select the `.xml` file from the source computer.
3. Click **Open**.

   The imported task appears in the VI Logger category with the other tasks.

Creating a New Database

The VI Logger database is where task runs are stored. Complete the following steps to create a new database.

1. Select **Tools»VI Logger»Database**. The **Database** dialog box appears. If this is the first time you are creating a database, the default database path should already be checked.
2. Click **Create New**. The **Create Database** dialog box appears.
3. Enter a descriptive name for the new database.
4. Enter or browse to a file path for the database.

5. Click **OK**. The **Database** dialog box appears with the new name and path where data is being stored.
6. If you want to store task runs in the new database, right-click the new database, and select **Set as Default** or double-click the database. A check mark appears to the left of the database name.
7. Click **Close**.

Once you have created a database, you can compact, delete, and rename the database.

Compact a Database

To save disk space, you can compact a database in VI Logger. Complete the following steps to compact a database.

1. Select **Tools»VI Logger»Database**. The **Database** dialog box appears.
2. Right-click a database and select **Compact**.
3. Click the **Start** button. A progress bar monitors the compacting operation.
4. Click the **Close** button.

Rename a Database

Complete the following steps to rename a database in VI Logger.

1. Select **Tools»VI Logger»Database**. The **Database** dialog box appears.
2. Right-click a database and select **Rename**.
3. Enter the new name for the database.

Delete a Database

Complete the following steps to delete a database.

1. Select **Tools»VI Logger»Database**. The **Database** dialog box appears.
2. Right-click a database and select **Delete**.
3. Click the **OK** button to the warning message that appears, asking if you are sure you want to delete the database.

Publish Data to the Web

Use VI Logger to publish data on the Web. Click the **Advanced task attributes** button in the Task Attributes view and click the **Publish to the Web** tab. Select which channels to publish, the timespan of the data displayed, and how often to update the `.htm` file. You also can publish logged data to an FTP site.

Note The `VI_Logger_Web.html` file must be in a folder named `source` in the same directory that you publish task data to for the data to be formatted correctly.

You also can store data on an FTP site using this dialog box by placing a checkmark in the **Store HTML files on FTP** checkbox, and entering the relevant information about the FTP site.

6

Controlling a Task Programmatically Using LabVIEW

Although VI Logger is a stand-alone tool, you also can use LabVIEW to control tasks programmatically, which gives you greater control over executing tasks. This chapter explains background information about using the LabVIEW VI Logger VIs. Refer to the *LabVIEW Help* for more information about specific VIs.

Before you start building a VI Logger application in LabVIEW, you should know some of the following basic concepts about VI Logger in the Measurement & Automation Explorer (MAX).

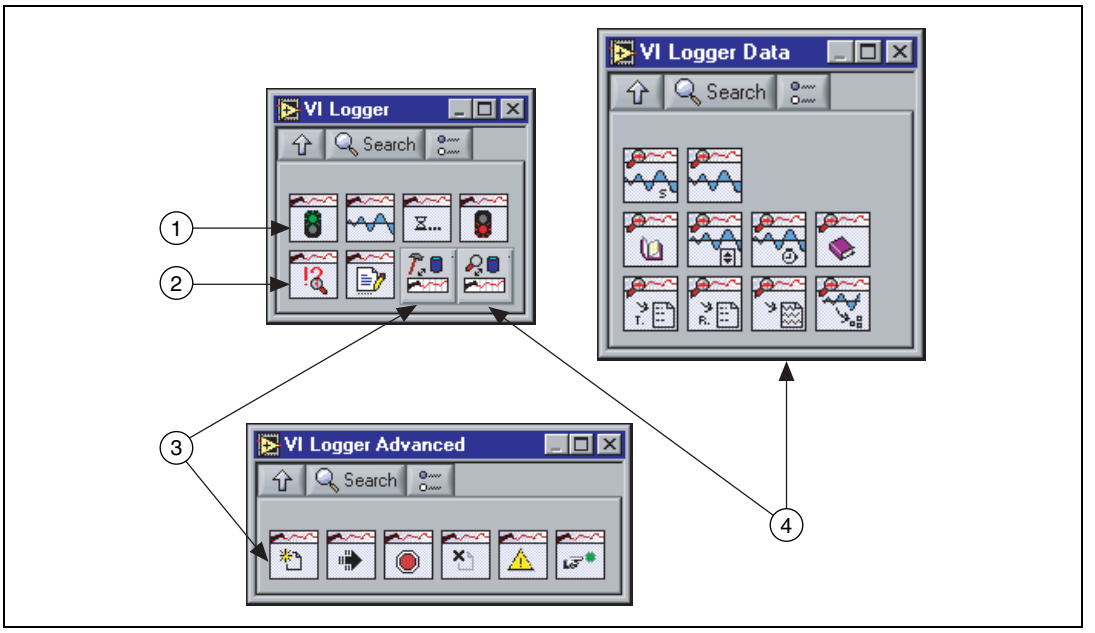
- Configuring a VI Logger task in MAX
- Running a VI Logger task in MAX
- Viewing data from a VI Logger task run in MAX

Refer to Chapter 2, *Creating and Running a VI Logger Task*, for more information about VI Logger tasks in MAX.

Executing a Task Using the VI Logger VIs

Use the VI Logger VIs located on the **Functions»VI Logger** palette to run your task. The VI Logger palette contains Easy, Intermediate, and Advanced VIs. Refer to the *LabVIEW Help* for more information about VI Logger VIs.

The following figure of the LabVIEW VI palette shows the location of the VI Logger VIs on the palette.



1 Easy VIs	3 Advanced VIs
2 Intermediate VIs	4 Data VIs

Using Easy VI Logger VIs

Use the Easy VI Logger VIs to perform high-level VI Logger operations. With these VIs, you can begin executing a VI Logger task configured in MAX, read live data from the task while it is logging, wait for the task to finish, or manually stop a VI Logger task.

Using Intermediate VI Logger VIs

Use the VI Logger Status VI to obtain status information from the currently executing task. The status contains information about the state of the task, such as how many points have been logged and if a backlog exists. A growing backlog indicates a lack of CPU bandwidth to log the data. You can free CPU processor time by turning event detection off, not publishing data to DataSocket, or not reading all the logged data in LabVIEW. You can configure these options in MAX or programmatically using the Logger Set Output VI.

Using Advanced VIs

Use the Advanced VI Logger VIs to gain more control of VI Logger tasks. Use the Advanced VIs to load a VI Logger task and have multiple start and stop sequences before unloading the task. You also can reset a specific task, which is useful if your previous execution aborted abnormally.

Executing a Task Using the VI Example Logger VIs

Refer to the `Examples\VI Logger\Logging Examples.llb` directory for common solutions using the VI Logger Reader VIs. These examples show you how to use the VI Logger Easy Reader VIs to view the logged data of a task named My Task1.

Reading Historic Data Using the VI Logger Data VIs

Use the VI Logger Data VIs located on the **Functions»VI Logger» VI Logger Data** to read and analyze logged historic data.

Use the VI Logger Data VIs to open, read, get attributes, and close the tasks you created in MAX. The **VI Logger Data** palette contains Easy, Intermediate, and Advanced VIs.

Using the Easy VI Logger Reader Data VI

Use the Easy VI Logger Reader VI to perform simple read operations. You can run this VI from its front panel or use it as a subVI in basic reading applications. The Easy VI Logger Reader VI outputs polymorphic data as waveform data or a 2D scaled data array.

Note All data has time stamps, so you can view it with its time information.

Using the Intermediate VI Logger Reader VIs

Use the Intermediate VI Logger Data VIs to provide more functionality for complex historical data and analysis. From any logging task, you can view any run and access its attributes.

Using the Advanced VI Logger Reader VIs

Use the Advanced VI Logger Data VIs to provide additional functionality for complex historical data analysis, such as opening any logging task or access any runs or a selected attribute.

A

Math Expression Editor Function Descriptions

This appendix describes the math expression editor functions in detail. Complete the following steps to access these functions for use in a calculated channel.

1. Click **Add Channel** from the from the **Calculated Channels** view. The **Math Expression Editor** dialog box appears.
2. Select **User Defined** in the **Formula** field of the **Formula Settings** section. You can use these functions in formulas for a calculated channel.

   Example

   ```
   sin(Ch 1/Ch 2) + 3*tan(Ch 3)2-2
   ```

   You can use the following operators:

   `+` and `–` for addition and subtraction

   `*` and `/` for multiplication and division

   `**` and `^` for exponentiation

Function	Name	Purpose
abs(*x*)	Absolute Value	Returns the absolute value of *x*
acos(*x*)	Inverse Cosine	Computes the inverse cosine of x in radians
acosh(*x*)	Inverse Hyperbolic Cosine	Computes the inverse hyperbolic cosine of *x*
asin(*x*)	Inverse Sine	Computes the inverse sine of *x* in radians
asinh(*x*)	Inverse Hyperbolic Sine	Computes the inverse hyperbolic sine of *x*
atan(*x*)	Inverse Tangent	Computes the inverse tangent of *x* in radians
atanh(*x*)	Inverse Hyperbolic Tangent	Computes the inverse hyperbolic tangent of *x* in degrees
ceil(*x*)	Round to +Infinity	Rounds *x* to the next higher integer (smallest integer is greater than or equal to *x*)

Function	Name	Purpose
cos(*x*)	Cosine	Computes the cosine of *x* in radians
cosh(*x*)	Hyperbolic Cosine	Computes the hyperbolic cosine of *x* in degrees
cot(*x*)	Cotangent	Computes the cotangent of *x* in radians (1/tan(*x*))
csc(*x*)	Cosecant	Computes the cosecant of *x* in radians (1/sin(*x*))
exp(*x*)	Exponential	Computes the value of e raised to the *x* power
expm1(*x*)	Exponential (Arg – 1)	Computes the value of e raised to the *x* power minus 1 (e^(*x* – 1))
floor(*x*)	Round to –Infinity	Truncates *x* to the next lower integer (largest integer is smaller than or equal to *x*)
getexp(*x*)	Mantissa & Exponent	Returns to exponent of *x*
getman(*x*)	Mantissa & Exponent	Returns to mantissa of *x*
int(*x*)	Round to Nearest	Round its argument to the nearest integer
intrz(*x*)	Round Toward 0	Rounds *x* to the nearest integer between *x* and 0
ln(*x*)	Natural Logarithm	Computes the natural logarithm of *x* (to the base of e)
lnp1(*x*)	Natural Logarithm (Arg + 1)	Computes the natural logarithm of (*x* + 1)
log(*x*)	Logarithm Base 10	Computes the logarithm of *x* (to the base of 10)
log2(*x*)	Logarithm Base 2	Computes the logarithm of *x* (to the base of 2)
pow(*x*, *y*)	*x*^*y*	Computes the value of *x* raised to the y power
rand( )	Random Number (0–1)	Produces a floating-point number between 0 and 1 exclusively
sec(*x*)	Secant	Computes the secant of *x*, where *x* is in radians (1/cos(*x*))
sign(*x*)	Sign	Returns 1 if *x* is greater than 0, returns 0 if *x* is equal to 0, and returns –1 if *x* is less than 0
sin(*x*)	Sine	Computes the sine of *x*, where *x* is in radians

Function	Name	Purpose
sinc(*x*)	Sinc	Computes the sine of *x* divided by *x* radians (sin(*x*)/*x*)
sinh(*x*)	Hyperbolic Sine	Computes the hyperbolic sine of *x* in degrees
Sqrt(*x*)	Square Root	Computes the square root of *x*
tan(*x*)	Tangent	Computes the tangent of *x* in radians
tanh(*x*)	Hyperbolic Tangent	Computes the hyperbolic tangent of *x* in degrees
pi(1), pi(2)	pi, 2pi	—

B

Setting Up an Event Email

This appendix describes how to set up an event email using the Event Action feature in VI Logger. The event email is sent when an event starts and when it stops. VI Logger uses the SMTP Send Message VI from the LabVIEW Internet toolkit to generate the email.

Complete the following steps to set up an email event action.

1. In the **Virtual Channels**, **FieldPoint Channels**, or **Calculated Channels** view, in the **Active Channel** field, right-click a channel name for which you want to set an event.
2. Select **Events** to open the **Event properties for** dialog box.
3. In the **Event properties** dialog box, in the **Action Type** field, select **Send Email Message**.
4. In the **Mail Server** field, enter the SMTP server to send the message through.
5. In the **Message** field, enter a custom message to include in the email. Your custom message appears first, and then the default message is appended to your custom message.
6. In the **To** field, enter a list of email addresses to which to send the event message.
7. Click **OK**.

This is what an example email message may look like:

```
From: VI Logger
To: John Smith@ni.com
Subject: "My Temperature Channel 1" has exceeded its
event limit.

testing

Thursday, March 15, 2001
8:34:29 AM
DAQ Channel: "My Temperature Channel 1"
Current value: 51.000000 C
Event Type: High
High Limit: 50.000000 C
```

```
Values of all Channels:
My Temperature Channel 1: 51.000000 C
```

The appropriate values and strings that are entered into the email message are shown:

```
{Custom message here}

{Day of week, Month, Date, 4-digit year}
{HH:MM:SS AM/PM}
DAQ Channel: "{Channel Name}"
Current value: {Current Value} {Channel Units}
Event Type: {Event Type}
High Limit: {High Limit} {Channel Units}
Low Limit: {Low Limit} {Channel Units}

Values of all Channels:
{First Channel Name}: {First Channel Value} {First
Channel Units}
{Second Channel Name}: {Second Channel Value} {Second
Channel Units}
...
{Last Channel Name}: {Last Channel Value} {Last Channel
Units}
```

C

Technical Support and Professional Services

Visit the following sections of the National Instruments Web site at ni.com for technical support and professional services:

- **Support**—Online technical support resources include the following:
  - **Self-Help Resources**—For immediate answers and solutions, visit our extensive library of technical support resources available in English, Japanese, and Spanish at ni.com/support. These resources are available for most products at no cost to registered users and include software drivers and updates, a KnowledgeBase, product manuals, step-by-step troubleshooting wizards, conformity documentation, example code, tutorials and application notes, instrument drivers, discussion forums, a measurement glossary, and so on.
  - **Assisted Support Options**—Contact NI engineers and other measurement and automation professionals by visiting ni.com/support. Our online system helps you define your question and connects you to the experts by phone, discussion forum, or email.
- **Training**—Visit ni.com/training for self-paced tutorials, videos, and interactive CDs. You also can register for instructor-led, hands-on courses at locations around the world.
- **System Integration**—If you have time constraints, limited in-house technical resources, or other project challenges, NI Alliance Program members can help. To learn more, call your local NI office or visit ni.com/alliance.

If you searched ni.com and could not find the answers you need, contact your local office or NI corporate headquarters. Phone numbers for our worldwide offices are listed at the front of this manual. You also can visit the Worldwide Offices section of ni.com/niglobal to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

Glossary

C

channel	Pathway from a CPU or, on a network, between computers. A channel also can be an input connection to a data acquisition system or to an instrument, such as an oscilloscope or logic analyzer. Pin or wire lead to which you apply or from which you read an analog or digital signal. Analog signals can be single-ended or differential. For digital signals, channels group to form ports. Ports usually consist of either four or eight digital channels.
CPU	Central processing unit. The computational and control unit of a computer that interprets and executes instructions. CPU also can refer to the case that holds the components of your computer, excluding the monitor and keyboard.

D

DAQ	*See* data acquisition.
data acquisition	DAQ. Process of acquiring data, typically from A/D or digital input plug-in devices.
DataSocket	A standardized software interface technology that provides automation data description headers as part of the data transfer protocol.
dB	Decibel. The unit for expressing a logarithmic measure of the ratio of two signal levels: dB=20log10 V1/V2, for signals in volts. Refer to the NI Developer Zone Glossary at `ni.com/zone`, for a more detailed explanation.
dBV	dB relative to 1 V.

F

FieldPoint item	One or more channels or variables in a FieldPoint bank that can be monitored or controlled by the Measurement & Automation Explorer (MAX). In MAX, items are normally I/O points. A blue icon indicates that the item is being monitored. A gray icon indicates that the item is not being monitored.

H

HTML	Hypertext markup language. An ASCII text-based, script-like language for creating hypertext documents like those on the Web.

I

IP	Internet Protocol. A layer of three networking protocols used by routers for connectionless data communications.

L

LED	Light-emitting diode.

M

MAX	Measurement & Automation Explorer. *See also* Measurement & Automation Explorer.
Measurement & Automation Explorer	The standard National Instruments hardware configuration and diagnostic environment for Windows.

N

noise	An undesirable electrical signal—noise comes from external sources such as the AC power line, motors, generators, transformers, fluorescent lights, soldering irons, CRT displays, computers, electrical storms, welders, radio transmitters, and internal sources such as semiconductors, resistors, and capacitors. Noise corrupts signals you are trying to send or receive.

P

Plug and Play devices	Devices that do not require DIP switches or jumpers to configure resources on the devices. Also called switchless devices.

S

scan rate	The number of scans per second. For example, a scan rate of 10 Hz means sampling each channel 10 times per second.
SMTP	Simple mail transfer protocol.

T

trigger	Any event that causes or starts some form of data capture.

U

URL	Uniform resource locator. A logical address that identifies a resource on the Internet. For example, the URL `http://www.ni.com`, is the Internet address for the National Instruments home page.

V

VI	*See* virtual instrument (VI).
virtual instrument (VI)	Program in LabVIEW that models the appearance and function of a physical instrument.

X

XML	Extended markup language.