NATIONAL INSTRUMENTS™

Data Acquisition

Measurement & Automation Explorer Help for NI-DAQ™mx, Version 8.7

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This help file contains information on configuring and testing data acquisition (DAQ) devices, RT Series DAQ devices, SCXI devices, SCC devices, TEDS carriers, and RTSI cables using Measurement & Automation Explorer (MAX) for NI-DAQmx, and special considerations for operating systems.

To navigate this help file, use the **Contents**, **Index**, and **Search** tabs to the left of this window.

For more information about this help file, refer to the following topics:

Conventions—formatting and typographical conventions in this help file

Related Documentation

Glossary

Important Information

Technical Support and Professional Services

To comment on National Instruments documentation, refer to the National Instruments Web site.

Note For information on Traditional NI-DAQ (Legacy), refer to the *Measurement & Automation Explorer Help for Traditional NI-DAQ (Legacy)*.

Related Documentation

The following documents contain information that you might find helpful as you use this help file:

- *DAQ Getting Started Guide*—This guide describes how to install your NI-DAQmx software, your DAQ device, and how to confirm that your device is operating properly.
- *SCXI Quick Start Guide*—This guide describes how to install and configure your SCXI chassis and modules, and how to confirm that the chassis is operating properly.
- *DAQ Assistant Help*—This help file contains information on using the DAQ Assistant to graphically configure common measurement tasks, channels, or scales.
- *Measurement & Automation Explorer Help for Traditional NI-DAQ (Legacy)*—This help file contains information on using the MAX interface to add, configure, and delete DAQ and SCXI devices supported by Traditional NI-DAQ (Legacy).
- *NI-DAQmx Help*—This help file explains key NI-DAQmx concepts, describes how to create common applications, and details device-specific information needed to use NI-DAQmx.
- Device documentation—This documentation describes the electrical and mechanical aspects of your device and contains information concerning its operation and programming.

Using Help

Conventions

The following conventions appear in this help file:

< >	Angle brackets indicate function keys.
»	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.
▸	The ▸ symbol indicates closed drop-down text. Click the symbol to display the text.
▾	The ▾ symbol indicates open drop-down text. Click the symbol to hide the text.
	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 on in the software, such as menu items and dialog box options. Bold text also denotes parameter names, emphasis, or an introduction to a key concept.
dark red	Text in this color denotes a caution.
green	Underlined text in this color denotes a link to a help topic, help file, or Web address.
italic	Italic text denotes variables or cross references. 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.

Navigating Help (Windows Only)

To navigate this help file, use the **Contents**, **Index**, and **Search** tabs to the left of this window or use the following toolbar buttons located above the tabs:

- **Hide**—Hides the navigation pane from view.
- **Locate**—Locates the currently displayed topic in the **Contents** tab, allowing you to view related topics.
- **Back**—Displays the previously viewed topic.
- **Forward**—Displays the topic you viewed before clicking the **Back** button.
- **Options**—Displays a list of commands and viewing options for the help file.

Searching Help (Windows Only)

Use the **Search** tab to the left of this window to locate content in this help file. If you want to search for words in a certain order, such as "related documentation," add quotation marks around the search words as shown in the example. Searching for terms on the **Search** tab allows you to quickly locate specific information and information in topics that are not included on the **Contents** tab.

Wildcards

You also can search using asterisk (*) or question mark (?) wildcards. Use the asterisk wildcard to return topics that contain a certain string. For example, a search for "prog*" lists topics that contain the words "program," "programmatically," "progress," and so on.

Use the question mark wildcard as a substitute for a single character in a search term. For example, "?ext" lists topics that contain the words "next," "text," and so on.

Nested Expressions

Use nested expressions to combine searches to further refine a search. You can use Boolean expressions and wildcards in a nested expression. For example, "example AND (program OR VI)" lists topics that contain "example program" or "example VI." You cannot nest expressions more than five levels.

Boolean Expressions

Click the ▸ button to add Boolean expressions to a search. The following Boolean operators are available:

- **AND** (default)—Returns topics that contain both search terms. You do not need to specify this operator unless you are using nested expressions.
- **OR**—Returns topics that contain either the first or second term.
- **NOT**—Returns topics that contain the first term without the second term.
- **NEAR**—Returns topics that contain both terms within eight words of each other.

Search Options

Use the following checkboxes on the **Search** tab to customize a search:

- **Search previous results**—Narrows the results from a search that returned too many topics. You must remove the checkmark from this checkbox to search all topics.
- **Match similar words**—Broadens a search to return topics that contain words similar to the search terms. For example, a search for "program" lists topics that include the words "programs," "programming," and so on.
- **Search titles only**—Searches only in the titles of topics.

Printing Help File Topics (Windows Only)

Complete the following steps to print an entire book from the **Contents** tab:

1. Right-click the book.
2. Select **Print** from the shortcut menu to display the **Print Topics** dialog box.
3. Select the **Print the selected heading and all subtopics** option.

   

   Note Select **Print the selected topic** if you want to print the single topic you have selected in the **Contents** tab.
4. Click the **OK** button.

Printing PDF Documents

This help file may contain links to PDF documents. To print PDF documents, click the print button located on the Adobe Acrobat Viewer toolbar.

Introduction to Measurement & Automation Explorer (MAX)

You can configure your National Instruments DAQ and SCXI products with MAX. MAX informs other programs about which products you have in the system and how they are configured. Use MAX to add, configure, test, and remove a DAQ or SCXI product.

Note Special considerations exist for specific operating systems. Refer to Operating System Considerations for more information.

To check the system resources used by a DAQ device and to select attached accessories, expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree. Click your device to see information on the device resources. The information appears in the middle pane. Click the **Attributes** tab to see hardware-specific information. Click the **Device Routes** tab to see routes that can be made within the device. For more information, refer to Accessing DAQ Devices.

Note Press **<F5>** or select **View»Refresh** to refresh the screen.

Capabilities of MAX for NI-DAQmx

You can use MAX for the following measurement configuration actions:

- Configuring resources and other device-specific settings for measurement devices in the system
- Testing the resources and the functionality of measurement devices in the system

When you run an application using NI-DAQ software, the software reads the configuration to determine the devices you have configured. Therefore, you first must configure DAQ devices with MAX. If MAX cannot detect the device, use the Device Manager to add a new device.

In NI-DAQmx, you can use the DAQ Assistant to configure and edit tasks, channels, and scales. Virtual channel configuration is required in NI-DAQmx.

Getting Started

The following drop-down text includes links to information on completing the most common DAQ- and SCXI-related tasks in MAX.

DAQ Devices

RT Series DAQ Devices

RTSI Cable

SCXI Chassis

SCXI Modules

SCC Devices

NI-DAQmx Simulated Devices

TEDS Carrier

Accessing Device Documentation

You can access online device documentation from MAX. To search ni.com/manuals for documentation, complete the following steps:

1. Right-click the device in the configuration tree.
2. Select **Help»Online Device Documentation**.
3. A browser window opens to ni.com/manuals, with the results of a search for relevant device documentation.

DAQ Devices

Refer to the following topics for more information on adding, configuring, and removing DAQ devices.

Accessing DAQ Devices

Adding DAQ Devices

Configuring DAQ Devices

Testing DAQ Devices

Resetting DAQ Devices

Calibrating DAQ Devices

Removing DAQ Devices

Accessing DAQ Devices

To access DAQ devices, expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree. If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Device and Interfaces**. You can perform the following tasks:

- Add a new device to your configuration
- Configure a device in your configuration
- Test a device in your configuration
- Remove a device from your configuration

The right pane of the MAX interface displays information about the device highlighted in Devices and Interfaces. The format of the information displayed in the device view varies depending on the selected device.

Adding DAQ Devices

To add DAQ devices, complete the following steps:

1. Install the DAQ device according to the *DAQ Getting Started Guide*.
2. Open MAX to scan your operating system for new devices. New NI-DAQmx devices appear in **Devices and Interfaces»NI-DAQmx Devices**.

If you are using a remote RT target, the new devices appear under **Remote Systems»*target*»Devices and Interfaces»NI-DAQmx Devices**.

For information on configuring the DAQ device, refer to Configuring DAQ Devices.

Refer to Measurement & Automation Explorer Help for Traditional NI-DAQ (Legacy) for information on adding and configuring devices with the Traditional NI-DAQ (Legacy) API.

If you are installing a Plug and Play device and the operating system did not detect it, refer to Plug and Play Devices in Windows 2000/XP.

Note When an NI USB-9*xxx* device is first plugged in, it appears in MAX as an NI USB-9162 until the correct module is automatically identified and displayed in MAX.

Configuring and Renaming DAQ Devices

To configure a DAQ device, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the device you want to configure. Select **Properties**.

   –or–

   Select the device you want to configure. Click **Properties** in the MAX toolbar.

3. Select the appropriate tab to set the configuration options. The configuration options you see depend on the DAQ device. The RTSI Configuration tab appears only when configuring a DAQ device with RTSI capabilities.

   - **RTSI Configuration**
   - **Accessory Settings**

4. Click **OK** when you are finished.

To rename a device, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the device you want to rename. Select **Rename**.

   –or–

   Select the device you want to rename. Press **<F2>**.

3. Type the new device name, using the following guidelines:
   - Use any alphanumeric characters.
   - Do not use non-alphanumeric characters, such as dashes, punctuation, or spaces.

- You can use underscores within the name of the device, but you cannot use leading underscores, such as _Dev1.
- You must use no more than 256 characters.

4. Press **<Enter>** or click anywhere on the screen when finished.

To view device pinouts, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click a device. Select **Device Pinouts**.

   –or–

   Select the device. Click **Device Pinouts** in the MAX toolbar.

Testing DAQ Devices

Use test panels to test the functionality of your DAQ device. To run test panels, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the device you want to test. Select **Test Panels** to display the test panel for the device.

   –or–

   Select the device you want to test. Click **Test Panels** in the MAX toolbar.

   The test panel appears. You can view the analog input, analog output, digital I/O, and counter I/O functions of the device by clicking the tabs near the top of the window. If the device you are testing is not a multifunction DAQ device, the window might have fewer tabs.

   Click **Help** for more detailed information on using the test panel.

3. If a problem occurs with the device, the Error indicator turns red. The Error Details window shows detailed information about the error.
4. Click **Close** when you are finished.

Self-tests perform a brief test of device resources, without the level of user interaction of test panels. Complete the following steps to run a self-test:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the device on which you want to perform a self-test.

Select **Self-Test**.

3. A message window appears that indicates if the device passed or failed. Click **OK** to continue.

If a failure occurs, refer to your device documentation for more information.

Resetting DAQ Devices

Resetting a DAQ device performs a hardware reboot of the device. A reset aborts any running tasks and restores the device to its default settings. Complete the following steps to reset a device:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the device you want to reset. Select **Reset Device**.

   –or–

   Select the device you want to reset. Click **Reset Device** in the MAX toolbar.

3. A message appears, indicating success or failure. Click **OK** to continue.

Calibrating DAQ Devices

Calibrating a DAQ device consists of verifying the measurement accuracy of the device and adjusting for any measurement error. Complete the following steps to calibrate a device:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the device you want to calibrate. Select **Self-Calibrate**.

   –or–

   Select the device you want to calibrate. Click **Self-Calibrate** in the MAX toolbar.

A window reports the status of the calibration. The window closes when calibration is finished.

To see information on the latest self-calibration, click the **Calibration** tab at the bottom of the middle MAX pane.

Note The self-calibrate option and calibration tab are only enabled for devices that support calibration.

Removing DAQ Devices

To remove a DAQ device, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the device you want to remove and select **Delete**.

   –or–

   Select the device you want to delete. Click **Delete** in the MAX toolbar.

3. A dialog box prompts you to confirm removal of the DAQ device. Click **Yes** to remove the device or **No** to cancel.

Note The delete option is disabled for Plug and Play DAQ devices that are still present in the system. Either uninstall the device in the device manager, or power down the computer and remove the device.

RT Series DAQ Devices (NI PCI-7041/6040E)

Refer to the following topics for more information on adding, configuring, and removing RT Series DAQ devices.

Adding RT Series DAQ Devices

Configuring RT Series DAQ Devices

Locking RT Series DAQ Devices

Rebooting RT Series DAQ Devices

Removing RT Series DAQ Devices

Adding RT Series DAQ Devices

To add an RT Series DAQ device, complete the following steps:

1. Install the RT Series DAQ device according to the device documentation.
2. Open MAX to scan your operating system for new devices. The new device appears in **My System»Devices and Interfaces** as **RT::<board number>**.

For information on configuring the DAQ device, refer to Configuring RT Series DAQ Devices.

Configuring and Renaming RT Series DAQ Devices

To configure an RT Series DAQ device, complete the following steps:

1. Expand **Devices and Interfaces** in the configuration tree.
2. Right-click the device you want to configure. Select **Properties**.

   –or–

   Select the device you want to configure. Click **Properties** in the MAX toolbar.
3. Select the appropriate tab to set the configuration options.
   - **General**
   - **Settings**
4. Click **OK** when you are finished.

To rename a device, complete the following steps:

1. Expand **Devices and Interfaces** in the configuration tree.
2. Right-click the device you want to rename. Select **Rename**.
3. Type the new device name. Use only alphanumeric characters for the name. Do not use punctuation or spaces. Press **<Enter>** or click anywhere on the screen when finished.

Locking RT Series DAQ Devices

Locking an RT Series DAQ device protects the device from other users by requiring a password to perform any functions on the device. Complete the following steps to lock a device:

1. Expand **Devices and Interfaces** in the configuration tree.
2. Right-click the device you want to lock. Select **Lock**.

   –or–

   Select the device you want to lock. Click **Lock** in the MAX toolbar.
3. Enter a password. Enter the password again for confirmation. Click **OK** to lock the device. After you lock the device, the **Lock** button in the toolbar appears pressed.

Complete the following steps to unlock the device.

1. Expand **Devices and Interfaces** in the configuration tree.
2. Right-click the locked device you want to unlock. Select **Lock**.

   –or–

   Select the device you want to unlock. Click **Lock** in the MAX toolbar.
3. Enter the password. Click **OK** to unlock the device.

Rebooting RT Series DAQ Devices

Rebooting an RT Series DAQ device performs a hardware reboot of the device. A reboot aborts any running tasks and restores the device to its default settings. Complete the following steps to reboot a device:

1. Expand **Devices and Interfaces** in the configuration tree.
2. Right-click the device you want to reboot. Select **Reboot**.

   –or–

   Select the device you want to reboot. Click **Reboot** in the MAX toolbar.
3. A message appears, indicating success or failure. Click **OK** to continue.

Removing RT Series DAQ Devices

To remove an RT Series DAQ device, complete the following steps:

1. Expand **Devices and Interfaces** in the configuration tree.
2. Right-click the device you want to remove and select **Delete**.
3. A dialog box prompts you to confirm removal of the DAQ device. Click **Yes** to remove the device or **No** to cancel.

RTSI Cable

Note If you are using a PXI device, you do not need to use a RTSI cable. The PXI backplane includes RTSI lines.

Refer to the following topics for more information on adding, configuring, and removing a RTSI cable.

Adding a RTSI Cable

Configuring a RTSI Cable

Removing a RTSI Cable

Adding a RTSI Cable

To add a RTSI cable, complete the following steps:

1. Right-click **Devices and Interfaces**. Select **Create New**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and right-click **Devices and Interfaces**. Select **Create New**.
2. In the Create New window, select **NI-DAQmx Devices»RTSI Cable**.
3. Click **Finish**.

You also can add a RTSI cable without using the Create New window.

1. Right-click **Devices and Interfaces»NI-DAQmx Devices**.
2. Select **Create New NI-DAQmx Device»RTSI Cable**.

Configuring a RTSI Cable

To configure a RTSI cable, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the RTSI cable you want to configure. Select **Properties**.

   –or–

   Select the RTSI cable you want to configure. Click **Properties** in the MAX toolbar.
3. In the RTSI Bus Line Reservation window, select the checkboxes of lines reserved for use by drivers other than NI-DAQmx. Any lines left unchecked may be driven by NI-DAQmx.
4. Click **OK** when you are finished.

To rename a RTSI cable, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the RTSI cable you want to rename. Select **Rename**.

   –or–

   Select the RTSI cable you want to rename. Press **<F2>**.
3. Type the new cable name. Use only alphanumeric characters for the name. Do not use punctuation or spaces. Press **<Enter>** or click anywhere on the screen when finished.

To add a DAQ device to the RTSI cable, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the RTSI cable to which you want to add a device, and select **Add Device to RTSI Cable**.
3. Select a device from the list of available DAQ devices.

Note Not all DAQ devices support RTSI cables. Devices without RTSI support do not appear in the list of available devices.

To remove a DAQ device from the RTSI cable, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the RTSI cable from which you want to remove a device, and select **Remove Device from RTSI Cable**.
3. Select the device to remove.

Removing a RTSI Cable

To remove a RTSI cable, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the RTSI cable you want to remove. Select **Delete**.

   –or–

   Select the RTSI cable you want to remove. Click **Delete** in the MAX toolbar.

3. A dialog box prompts you to confirm removal of the cable. Click **Yes** to remove the cable or **No** to cancel.

SCXI Devices

Refer to the following topics for more information on SCXI chassis and modules.

SCXI Chassis

SCXI Modules

SCXI Chassis

Refer to the following topics for more information on adding, configuring, and removing SCXI chassis.

Adding an SCXI Chassis

Configuring an SCXI Chassis

Resetting an SCXI Chassis

Removing an SCXI Chassis

Testing an SCXI Chassis

Adding an SCXI Chassis

Note If you are using a PXI/SCXI combination chassis, you must first identify the chassis using the PXI resource manager. Refer to the PXI help by clicking **Help»Help Topics»PXI**.

To add an SCXI chassis, complete the following steps:

1. Right-click **Devices and Interfaces**. Select **Create New**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and right-click **Devices and Interfaces**. Select **Create New**.
2. In the Create New window, go to **NI-DAQmx Device»NI-DAQmx SCXI Chassis**. Select the SCXI chassis you want to add.
3. Click **Finish**.

You also can add an SCXI chassis without using the Create New window. Complete the following steps:

1. Right-click **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and right-click **Devices and Interfaces»NI-DAQmx Devices**.
2. Select **Create New DAQmx Device»NI-DAQmx SCXI Chassis**.
3. Select the chassis from the list of available SCXI chassis.

To finish adding an SCXI chassis, complete the following steps:

1. In the Create New SCXI Chassis window, configure the following settings:
   - **Chassis Communicator**
   - **Communicating SCXI Module Slot**
   - **Chassis Address**
   - **Auto-Detect All Modules**
2. Click **Save** when you are finished. The SCXI Chassis Configuration window opens.

Configuring an SCXI Chassis

To configure an SCXI chassis, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the SCXI chassis you want to configure. Select **Properties**.
3. The SCXI Chassis Configuration window opens. The **Module** tab is selected by default. Use the settings on the Modules tab to add and configure your SCXI modules.
4. Click the **Chassis** tab to see the following configuration settings:
   - **Chassis Communicator**
   - **Communicating SCXI Module Slot**
   - **SCXI Communication Mode (PXI/SCXI combination chassis only)**
   - **Chassis ID**
   - **Chassis Address**
   - **Multichassis Daisy-Chain Index**
5. If you want NI-DAQ to automatically detect the SCXI modules in the chassis, check **Auto-Detect All Modules**.
6. The message area at the top of the window indicates whether the configuration is valid. Error and warning messages explain what problems to resolve. When the message indicates a valid configuration, click **OK**.

Resetting an SCXI Chassis

Resetting an SCXI chassis performs a hardware reboot of the chassis and modules. Complete the following steps to reset a chassis:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the chassis you want to reset. Select **Reset Chassis**.
3. An explanatory message appears, indicating success or failure. Click **OK** to continue.

Testing an SCXI Chassis

To test an SCXI chassis, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the SCXI chassis you want to test. Select **Test**.

   –or–

   Select the SCXI chassis you want to test. Click **Test** in the MAX toolbar.

MAX verifies your SCXI configuration by reading the module ID of each configured SCXI module and comparing it against the modules you configured. MAX notifies you if there is any discrepancy or if the SCXI communication path was not set up correctly.

Refer to your SCXI chassis and module documentation if you experience problems with your configuration.

Removing an SCXI Chassis

To remove an SCXI chassis, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the chassis you want to remove. Select **Delete**.

   –or–

   Select the SCXI chassis you want to remove. Click **Delete** in the MAX toolbar.

Caution This action also removes any SCXI module configuration information you configured in the selected chassis.

SCXI Modules

Refer to the following topics for more information on adding, configuring, and removing SCXI modules.

Adding SCXI Modules

Configuring SCXI Modules

Configuring SCXI Switch Modules

Resetting SCXI Modules

Testing SCXI Modules

Removing SCXI Modules

Adding SCXI Modules

Note Before you add an SCXI module, you must add an SCXI chassis.

To add an SCXI module, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the SCXI chassis to which you want to add a module. Select **Properties**.

   –or–

   Expand the SCXI chassis and right-click an empty slot. Select **Insert**.
3. In the SCXI Chassis Configuration window, click the **Modules** tab. Select the module you want to add from the **Modules** drop-down listbox for the desired slot.
4. Type the new device name in **Device Name**. Use only alphanumeric characters for the name. Do not use punctuation or spaces.
5. Select a connected accessory from the **Accessory** drop-down listbox.
6. Click **Details** to configure the module settings.
7. Click **OK** when you are finished.

Configuring SCXI Modules

To configure an SCXI module, complete the following steps:

1. In the SCXI Chassis Configuration window, click **Details** next to the desired module. You also can configure the module without opening the SCXI Chassis Configuration window. In the configuration tree, expand the chassis and right-click the module you want to configure and select **Properties**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand the chassis. Right-click the module you want to configure and select **Properties**.

   The Module Configuration window opens with the following tabs:

   - **Jumpers (1100, 1120/D, 1121, 1140 only)**
   - **Accessory**
   - **Cabling**

2. **Multichassis Daisy-Chain Index**—Select the index of the SCXI chassis of the module in a multichassis configuration. You can daisy-chain up to eight SCXI chassis. This setting appears only if two or more SCXI chassis have been configured.
3. Click **OK** in the Module Configuration window when you are finished.
4. Click **OK** in the SCXI Chassis Configuration window.

Note Refer to Configuring SCXI Switch Modules for information on switch module configuration.

Testing SCXI Modules

Use test panels to test the functionality of your SCXI module. To run test panels, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Expand the SCXI chassis. Right-click the module you want to test. Select **Test Panels** to display the test panel for the module.

   –or–

   Select the module you want to test. Click **Test Panels** in the MAX toolbar.

   The test panel appears. You can view the available tests for the module by clicking the tabs near the top of the window.

   Click **Help** for more details about using the test panel.

3. If a problem occurs with the module, the Error indicator turns red. The Error Details window shows detailed information about the error.
4. Click **Close** when you are finished.

Resetting SCXI Modules

Resetting an SCXI module performs a hardware reboot of the module. Complete the following steps to reset a module:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Expand the chassis containing the module. Right-click the module you want to reset. Select **Reset Module**.
3. An explanatory message appears, indicating success or failure. Click **OK** to continue.

Removing SCXI Modules

To remove an SCXI module, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. In the configuration tree, right-click the module you want to delete.
3. Select **Delete**.

You also can delete the module using the SCXI Chassis Configuration window:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the SCXI chassis with the desired module. Select **Properties**.
3. Select **None** from the Module drop-down listbox for the slot with the module you want to remove.
4. Click **OK** in the confirmation dialog box.
5. Click **OK** in the SCXI Chassis Configuration window.

SCC Devices

Refer to the following topics for more information on SCC connector blocks and modules.

SCC Connector Block

SCC Modules

SCC Connector Block

Refer to the following topics for more information on adding, configuring, and removing SCC connector blocks.

Adding an SCC Connector Block

Configuring an SCC Connector Block

Removing an SCC Connector Block

Adding an SCC Connector Block

To add an SCC connector block, complete the following steps:

1. Right-click **Devices and Interfaces**. Select **Create New**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and right-click **Devices and Interfaces**. Select **Create New**.

2. In the Create New window, go to **NI-DAQmx Device»NI-DAQmx SCC Connector Block**. Select the SCC connector block you want to add.
3. Click **Finish**.

You can also add an SCC connector block without using the Create New window. Complete the following steps:

1. Right-click **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and right-click **Devices and Interfaces»NI-DAQmx Devices**.

2. Select **Create New DAQmx Device»NI-DAQmx SCC Connector Block**.
3. Select a connector block from the list of available SCC connector blocks.

In the SCC Connector Block Configuration window, configure your settings.

Configuring an SCC Connector Block

To configure an SCC connector block, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the SCC connector block you want to configure. Select **Properties**.
3. The SCC Connector Block Configuration window opens with the following configuration settings:
   - **SCC Carrier Type (SC-2345 only)**
   - **Cabled Device**
   - **SCC Connector Block ID**
   - **Cabled Device Connector**
   - **Scan for TEDS (SC-2350 only)**
4. Click **OK** when you are finished.

Refer to Adding SCC Modules for more information on adding power modules.

Removing an SCC Connector Block

To remove an SCC connector block, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the connector block you want to remove. Select **Delete**.

   –or–

   Select the connector block you want to remove. Click **Delete** in the MAX toolbar.

Caution This action also removes any SCC module configuration information you configured in the selected connector block.

SCC Modules

Refer to the following topics for more information on adding, configuring, and removing SCC modules.

Adding SCC Modules

Renaming SCC Modules

Removing SCC Modules

Adding SCC Modules

Note Before you add an SCC module, you must add an SCC connector block.

To add an SCC module, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the SCC connector block to which you want to add a module. Select **Properties**.

   –or–

   Expand the SCC connector block and right-click an empty slot. Select **Insert**.

3. In the SCC Carrier Configuration window, add a power module to the POWER slot. After adding a power module, select other modules you want to add from the drop-down listbox for the desired slot.
4. Click **OK** when you are finished.

You can also rename and remove SCC modules.

Renaming SCC Modules

To configure SCC modules, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Expand the SCC connector block.
3. Right-click the module you want to rename. Select **Rename**.
4. Type a descriptive label to identify the module. Use only alphanumeric characters for the name. Do not use punctuation or spaces. Press **<Enter>** or click anywhere on the screen when finished.

Removing SCC Modules

To remove an SCC module, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Expand the SCC connector block. Right-click the module you want to delete.
3. Select **Delete**.

–or–

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the SCC connector block containing the module. Select **Properties**.
3. Select **None** for the desired slot.

NI-DAQmx Simulated Devices

You can create NI-DAQmx simulated devices in NI-DAQmx 7.4 or later. Using NI-DAQmx simulated devices, you can try NI products in your application without the hardware. When you later acquire the hardware, you can import the NI-DAQmx simulated device configuration to the physical device using the MAX Portable Configuration Wizard. With NI-DAQmx simulated devices, you also can export a physical device configuration onto a system that does not have the physical device installed. Then, using the NI-DAQmx simulated device, you can work on your applications on a portable system and upon returning to the original system, you can import your application.

Note You can simulate the NI cDAQ-9172, but you cannot import or export the configuration of this device.

Note NI-DAQmx simulated devices cannot be included in the same task with physical devices.

Refer to the following sections for details about creating, importing, and removing simulated devices.

Creating NI-DAQmx Simulated Devices

Importing a Physical Device as an NI-DAQmx Simulated Device

Importing an NI-DAQmx Simulated Device Configuration onto a Physical Device

Removing NI-DAQmx Simulated Devices

Creating NI-DAQmx Simulated Devices

To create an NI-DAQmx simulated device, complete the following steps:

1. Right-click **Devices and Interfaces** and select **Create New**.
2. A dialog box prompts you to select a device to add. Select **NI-DAQmx Simulated Device** and click **Finish**.
3. In the Choose Device dialog box, select the category of devices for the device you want to simulate.
4. Select the device and click **OK**. In the configuration tree in MAX, the icons for NI-DAQmx simulated devices are yellow.
    - If you select a PXI device, you are prompted to select a chassis number and PXI slot number.
    - If you select an SCXI chassis, the SCXI configuration panels open.
    - If you select a CompactDAQ chassis, you must right-click the empty slots to add C Series devices.

To remove an NI-DAQmx simulated device, right-click the device and click **Delete**.

Importing a Physical Device as an NI-DAQmx Simulated Device

To create an NI-DAQmx simulated device for a physical device, use the Import and Export feature to complete the following steps:

1. Select **File»Export**.
2. Select the physical devices you want to create an NI-DAQmx simulated device for.
3. Click **OK** to create a `.nce` file.
4. Select **File»Import** and click **OK** to import the `.nce` file created in the previous step.
    - If you have a physical device on the system you are importing to, you have two options. You can overwrite the existing physical device with the configuration that is in the `.nce` file. You also can import the NI-DAQmx simulated device as a simulated replica of the physical device that you have in your system.
    - If you do not have a physical device in your system, completing the import wizard results in an NI-DAQmx simulated version of the device that is in the configuration `.nce` file.

Importing an NI-DAQmx Simulated Device Configuration onto a Physical Device

To import an NI-DAQmx simulated device configuration onto a physical device, complete the following steps:

1. Select **File»Export**.
2. Select the NI-DAQmx simulated device configuration you want to import onto a physical device.
3. Click **OK** to create an **.**nce file.
4. Select **File»Import** and click **OK** to import the **.**nce file created in the previous step. If you have a physical device identical to the NI-DAQmx simulated device you exported, you can import your NI-DAQmx simulated device configuration onto the physical device.

Note You must have the same physical device as the NI-DAQmx simulated device for the import feature to complete.

Removing NI-DAQmx Simulated Devices

To remove an NI-DAQmx simulated device, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the NI-DAQmx simulated device you want to delete.

   Note In the configuration tree in MAX, the icons for NI-DAQmx simulated devices are yellow. The icons for physical devices are green.

3. Click **Delete**.

Configuring Switch Modules

To configure a switch module, complete the following steps:

1. In the configuration tree, right-click the module you want to configure and select **Properties**. For SCXI switches, you also can configure the switch module by opening the SCXI Chassis Configuration window and clicking **Details** next to the desired switch.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand the chassis. Right-click the switch module you want to configure and select **Properties**.

   The Module Configuration window opens with the following tabs:

   - **Terminal Block/Topology Settings**
   - **Channels Settings**

2. Click **OK** in the Module Configuration window when you are finished.

Note If you make changes in the property pages of the device, the device automatically resets when you click the **OK** button. Changes cannot take effect until a reset occurs.

3. For SCXI switch modules, click **OK** in the SCXI Chassis Configuration window.

TEDS Carrier

Refer to the following topics for more information on adding, configuring, and removing TEDS carriers.

Adding a TEDS Carrier

Configuring a TEDS Carrier

Removing a TEDS Carrier

Adding a TEDS Carrier

To add a TEDS carrier, complete the following steps:

1. Right-click **Devices and Interfaces**. Select **Create New**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and right-click **Devices and Interfaces**. Select **Create New**.

2. In the Create New window, select **NI-DAQmx Device»NI-DAQmx TEDS Interface**. Select a carrier.
3. Click **Finish**.

You can also add a TEDS carrier without using the Create New window. Complete the following steps:

1. Right-click **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and right-click **Devices and Interfaces»NI-DAQmx Devices**.

2. Select **Create New DAQmx Device»NI-DAQmx TEDS Interface**.
3. Select a carrier.

In the carrier configuration window, configure your settings.

Configuring a TEDS Carrier

To configure a TEDS carrier, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.
2. Right-click the TEDS carrier you want to configure. Select **Properties**.
3. The TEDS carrier configuration window opens with the following configuration settings:
   - **Channels**
   - **Device**
   - **Carrier ID**
   - **2096 Address**
   - **Scan for TEDS**
4. Click **OK** when you are finished.

Removing a TEDS Carrier

To remove a TEDS carrier, complete the following steps:

1. Expand **Devices and Interfaces»NI-DAQmx Devices**.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and expand **Devices and Interfaces»NI-DAQmx Devices**.

2. Right-click the TEDS carrier you want to remove. Select **Delete**.

   –or–

   Select the TEDS carrier you want to remove. Click **Delete** in the MAX toolbar.

Creating Tasks and Global Virtual Channels

You can set up global virtual channels and tasks in MAX using the DAQ Assistant. To create a task or global virtual channel, complete the following steps:

1. Right-click **Data Neighborhood** in the configuration tree.

   If you are using a remote RT target, expand Remote Systems, find and expand your target, and right-click **Data Neighborhood** in the configuration tree.
2. Select **Create New**.
3. Select either **NI-DAQmx Task** or **NI-DAQmx Global Virtual Channel**.
4. Click **Next**. The DAQ Assistant opens.

For more information on creating tasks and virtual channels, refer to the *DAQ Assistant Help*. If you are using LabVIEW, refer to *Taking an NI-DAQmx Measurement in LabVIEW* to learn how to create a task.

You also can generate code from your task or virtual channel if you are using version 7.*x* or later of LabVIEW, LabWindows/CVI, or Measurement Studio, or version 7.1 or later of the LabVIEW Real-Time Module. If you want to generate code, you must access your task or virtual channel from your ADE. Refer to the *NI-DAQmx Help* and your application software documentation for more information on programming with your task or virtual channel.

Duplicating NI-DAQmx Global Virtual Channels

To duplicate a virtual channel, complete the following steps:

1. Expand **Data Neighborhood**.
2. Expand **NI-DAQmx Global Virtual Channels**.
3. Right-click the global virtual channel you want to duplicate.
4. Select **Duplicate**.
5. A dialog box prompts you to select physical channels from a list of valid physical channels for the measurement type. Select the physical channels to use in the new global virtual channels. A new name is generated for each new global virtual channel, consisting of the original name with an incremented number appended to the end.
6. Click **OK**.

Note Downgrading to NI-DAQmx 7.3 or earlier can cause problems with task and channel information programmatically saved to MAX. Before downgrading, open the programmatically saved task or global virtual channel in MAX and re-save it. To save the global virtual channel or task after you have loaded it, you must modify the channel or task. Then, the dialog prompts you to save the channel.

Creating Scales

You can set up scales in MAX using the DAQ Assistant. To create a new scale, complete the following steps:

1. Right-click **Scales** in the configuration tree.

   If you are using a remote RT target, expand **Remote Systems**, find and expand your target, and right-click **Scales**.

2. Select **Create New**.
3. Select **NI-DAQmx Scale**.
4. Click **Next**. The DAQ Assistant opens.

For more information on creating scales, refer to the *DAQ Assistant Help*.

Importing and Exporting Configurations

In MAX, you can save virtual channels, tasks, scales, and devices for reuse on other systems also running MAX. Use the Export Configuration Wizard in MAX to save a configuration. Use the Import Configuration Wizard in MAX to load a previously saved configuration. NI-DAQmx supports three import/export file formats:

- NI Configuration Export File (.nce)
- NI-DAQmx INI File (.ini)
- NI-DAQmx Tab-Delimited Text (.txt)

Note You can also programmatically import and export configuration files. For more information, refer to the *MAX Configuration VI Reference for LabVIEW*, the *MAX Configuration Function Reference for LabWindows/CVI*, or the *MAX Configuration Function Reference for Measurement Studio*.

Note MAX cannot import/export TEDS sensor information.

Caution Importing a new device configuration with the same name as an existing device configuration overwrites the current device configuration. Overwriting the current configuration breaks all dependencies with associated devices, channels, and tasks.

NI Configuration Export Files

NI Configuration Export Files (.nce) are binary files that can contain tasks, channels, scales, and device configuration. Use .nce files if you want to import and export complete configurations and you do not need to edit that configuration outside of MAX.

NI-DAQmx INI Files

NI-DAQmx INI files are text files that can contain tasks, channels, and scales, but not device configuration. To import/export device configurations, use .nce files. Use .ini files if you want to import and export configurations using a text format that you can edit outside of MAX.

NI-DAQmx INI files must start with a heading that includes the major and minor version numbers for the version of NI-DAQmx you want to export from or import to.

The INI file consists of entries for tasks, channels, and scales. Each entry starts with the type of object and the name of the object, enclosed in brackets. The possible object types are DAQmxTask, DAQmxChannel, and DAQmxScale.

Each entry then consists of property/value pairs in the form *property* = *value*.

You can use any combination of English LabVIEW long and short property names, CVI property names, and C++/.NET *class.property* names.

To indicate that a channel is a local channel, include the task name and a forward slash before the channel name, both in the entry for the channel and in the Channels property for the task. The task name is required because two tasks can have a local channel with the same name.

To add comments to an NI-DAQmx INI file, start the line with a semicolon.

For more examples of specific configurations, create tasks, channels, and custom scales in the DAQ Assistant, then export the configuration to an NI-DAQmx INI file.

NI-DAQmx Tab-Delimited Text

NI-DAQmx tab-delimited text files can contain tasks, channels, and scales, but not device configuration. To import/export device configurations, use .nce files. Use NI-DAQmx tab-delimited text files if you want to import and export configurations using a text format also suitable for editing as a spreadsheet.

NI-DAQmx tab-delimited text files consist of a table for each object type, with each column in a table separated by a tab. The first table must include the major and minor version numbers for the version of NI-DAQmx you want to export from or import to.

The first row of a table describes the structure of the table. The first column in that row specifies the type of object in the table. The possible object types are DAQmxTasks, DAQmxChannels, and DAQmxScales. Each subsequent column specifies the name of the property to set in the following rows. You can use any combination of English LabVIEW long and short property names, CVI property names, and C++/.NET *class.property* names.

The remaining rows specify property settings for the objects. The name of the object must be in the same column as the object type. If a property is not needed for an object, leave the column blank. You can include multiple objects of the same type in a single table or divide the objects among multiple tables.

To indicate that a channel is a local channel, include the task name and a forward slash before the channel name, both in the entry for the channel and in the Channels property for the task. The task name is required because two tasks can have a local channel with the same name.

For more examples of specific configurations, create tasks, channels, and custom scales in the DAQ Assistant, then export the configuration to an NI-DAQmx tab-delimited text file.

Reassigning Device Names to Default Values

Reassigning device names to default values restores the software-assigned name for each device.

To reassign device names, complete the following steps:

1. Select **Tools»NI-DAQmx Configuration»Reassign Device Names to Default Values**.
2. Select either a **Local** or **Remote** configuration from the pull-down list. If you select a remote configuration, then enter an IP address and click **OK**. Click **Cancel** to exit.

MAX Report Generation

Use the MAX Report Wizard to generate a report of the NI-DAQmx hardware and software configuration of the system. The report includes the following:

- Real and simulated device information, including device name, device type, serial number, connected accessory, and other settings
- Task information, including channels, timing, triggering, and other property settings
- Global virtual channel property settings
- Custom scale property settings

The MAX Report Wizard supports both local and remote systems.

Note You can also programmatically generate a system report. For more information, refer to the *MAX Configuration VI Reference for LabVIEW*, the *MAX Configuration Function Reference for LabWindows/CVI*, or the *MAX Configuration Function Reference forMeasurement Studio*.

Resetting an NI-DAQmx Configuration

Resetting a configuration restores the configuration to a baseline condition. Entries for channels, tasks, scales, SCXI chassis, SCC modules, and accessories are deleted. MAX still lists DAQ devices, but resets any user settings.

To reset a configuration, complete the following steps:

1. Select **Tools»NI-DAQmx Configuration»Reset NI-DAQmx Configuration**.
2. Select either a **Local** or **Remote** configuration from the pull-down list. If you select a remote configuration, then enter an IP address and click **OK**. Click **Cancel** to exit.

Operating System Considerations

Special considerations exist for the following operating systems:

Windows 2000/XP

Special Considerations for Windows 2000/XP

The Windows 2000/XP Device Manager manages all hardware devices that you have in your computer system. However, the Windows 2000/XP operating system might not automatically detect all DAQ devices. For information on adding or configuring specific DAQ devices, refer to the following topics:

Plug and Play Devices

PCI, PCMCIA, and PXI Devices

Windows 2000/XP Device Manager

Plug and Play Devices in Windows 2000/XP

If MAX did not automatically detect the device, complete the following steps:

1. In Windows 2000/XP, go to **Start»Settings»Control Panel»System**, and select the **Hardware** tab. Click **Device Manager.**
2. Select a National Instruments DAQ device under **Other Devices** in the device type list. Right-click the device, and select **Uninstall**. Repeat with each NI device in the list.
3. Right-click in the Device Manager window, and select **Scan for hardware changes**. Windows 2000/XP detects Plug and Play device(s).
4. Click **OK** when you are finished.

If you have not yet installed the Plug and Play DAQ device, power off your computer and install the device. Power on the computer after installation is complete. When Windows 2000/XP starts up, it should assign resources to the device automatically.

If Windows 2000/XP does not detect the Plug and Play device, refer to ni.com/support for troubleshooting help.

PCI, PCMCIA, and PXI Devices in Windows 2000/XP

PCI, PCMCIA, and PXI DAQ devices are Plug and Play devices. Generally, you cannot modify any system resources for PCI, PCMCIA, and PXI DAQ devices. In Windows 2000/XP, you can modify the Memory Window only by using the Device Manager.

Windows 2000/XP Device Manager

The Device Manager allocates system resources for all the devices that you have in the system and makes sure that no two devices are using incompatible system resources, such as the same base address.

In Windows 2000/XP, open the Device Manager by going to **Start»Settings»Control Panel**, double-clicking the **System** icon, selecting the **Hardware** tab, and clicking **Device Manager**.

If you have a Plug and Play device, the Device Manager detects the device when the system starts and automatically assigns resources for the device. For more information, refer to Plug and Play Devices in Windows 2000/XP.

Glossary

Prefixes Numbers/Symbols A B C D E F G H I J L M N O P R S T U V W

Symbol	Prefix	Value
n	nano	10 -9
µ	micro	10 -6
m	milli	10 -3
k	kilo	10 3
M	mega	10 6

Symbol	Meaning
%	percent
+	positive of, or plus
–	negative of, or minus
Ω	ohm
º	degree

A

acceleration	A change in velocity with respect to time.
accelerometer	A sensor that represents acceleration as a voltage.
ADC	Analog-to-digital converter—an electronic device, often an integrated circuit, that converts an analog signal to a digital value.
address	A character code that identifies a specific location (or series of locations) in memory.
ADE	Application development environment—some examples include LabVIEW and LabWindows/CVI.
AI	Analog input—acquisition of data.
amplification	A type of signal conditioning that improves accuracy in the resulting digitized signal by increasing signal amplitude relative to noise.
analog	Data represented by continuously variable physical quantities.
AO	Analog output—generation of data.
angular displacement	Movement about an axis, such as the angular motion of the shaft of a motor.
angular displacement sensor	A device whose output signal represents the rotation of the shaft, such as a rotary variable differential transformer (RVDT).
API	Application programming interface—A library of functions, classes or VIs, attributes, and properties for creating applications for your device.
asynchronous	1. Hardware—a signal that occurs or is acted upon at an arbitrary time, without synchronization to another signal, such as a reference clock. 2. Software—a VI or function that begins an operation and returns prior to the completion or termination of the operation.

attenuation	The reduction of a voltage or acoustical pressure. Measured referenced to the original voltage.

B

bandwidth	The range of frequencies present in a signal, or the range of frequencies to which a measuring device can respond.
base address	A memory address that serves as the starting address for programmable registers. All other addresses are located by adding to the base address.
bipolar	A signal range that includes both positive and negative values (for example, 5 V to +5 V).
BIOS	Basic Input/Output System—BIOS functions are the fundamental level of any PC or compatible computer. BIOS functions embody the basic operations needed for successful use of the computer hardware resources.
bit	The smallest unit of data used in a digital operation. Bits are binary, so they can be either a 1 or a 0.
buffer	In software, temporary storage for acquired or to-be-generated samples.
bus	The group of conductors that interconnect individual circuitry in a computer. Typically, a bus is the expansion vehicle to which I/O or other devices are connected. Examples of PC buses are the ISA bus and PCI bus.

C

C Series — A family of devices or modules used for analog input, analog output, digital input/output, and counter/timer applications. C Series devices work with chassis based on the CompactDAQ, CompactRIO, and other architectures, and are components of the NI USB-9*XXX* devices.

cDAQ — The prefix of the product model name of a CompactDAQ device, such as NI cDAQ-9172.

CH — Channel.

channel

1. Physical—a terminal or pin at which you can measure or generate an analog or digital signal. A single physical channel can include more than one terminal, as in the case of a differential analog input channel or a digital port of eight lines. The name used for a counter physical channel is an exception because that physical channel name is not the name of the terminal where the counter measures or generates the digital signal.
2. Virtual—a collection of property settings that can include a name, a physical channel, input terminal connections, the type of measurement or generation, and scaling information. You can define NI-DAQmx virtual channels outside a task (global) or inside a task (local). Configuring virtual channels is optional in Traditional NI-DAQ (Legacy) and earlier versions, but is integral to every measurement you take in NI-DAQmx. In Traditional NI-DAQ (Legacy), you configure virtual channels in MAX. In NI-DAQmx, you can configure virtual channels either in MAX or in a program, and you can configure channels as part of a task or separately.

3. Switch—a switch channel represents any connection point on a switch. It may be made up of one or more signal wires (commonly one, two, or four), depending on the switch topology. A virtual channel cannot be created with a switch channel. Switch channels may be used only in the NI-DAQmx Switch functions and VIs.

clock	A periodic digital signal.
CMRR	Common-mode rejection ratio—a measure of the ability of an instrument to reject interference from a common-mode signal, usually expressed in decibels (dB).
code width	The smallest detectable change in an input voltage of a DAQ device.
cold-junction compensation	A method of compensating for inaccuracies in thermocouple circuits.
CompactDAQ	An architecture or chassis for C Series devices.
configuration tree	Refers to the left window in MAX, which contains items such as Data Neighborhood and Devices and Interfaces.
counter/timer	A circuit that counts digital edges. Counters and timers usually have from 16 bits to 48 bits (sometimes more) counting capability. The total number of counts possible equals 2^N, where N is the number of bits in the counter. When the edges counted are produced by a clock, elapsed time can be computed from the number of edges counted if the clock frequency is known.
convert clock	The clock on a multiplexed device that directly causes ADC conversions.
custom scale	A method of instructing NI-DAQmx to apply additional scaling to your data. Refer to the Create Scale function/VI in your reference help.

D

DAC	Digital-to-analog converter—an electronic device, often an integrated circuit, that converts a digital value into a corresponding analog voltage or current.
DAQ	Refer to data acquisition.
DAQ Assistant	A graphical interface for configuring measurement tasks, virtual channels, and scales.
DAQ device	A device that acquires or generates data and can contain multiple channels and conversion devices. DAQ devices include plug-in devices, PCMCIA cards, and DAQPad devices, which connect to a computer USB or 1394 (FireWire) port. SCXI modules are considered DAQ devices.
data	Samples.
data acquisition (DAQ)	1. Acquiring and measuring analog or digital electrical signals from sensors, transducers, and test probes or fixtures. 2. Generating analog or digital electrical signals.
dB	Decibel—the unit for expressing a logarithmic measure of the ratio of two signal levels: dB=20log10 V1/V2, for signals in volts.
DC	direct current
delay from sample	The amount of time to wait after receiving a sample clock edge before beginning the acquisition of a sample.
delay from start	The amount of time to wait after receiving a Start Trigger before beginning the operation.
determinism	Characteristic of a system that describes how consistently it can respond to external events or perform operations within a given time limit.
device	1. An instrument or controller you can access as a single entity that controls or monitors real-world I/O

points. A device often is connected to a host computer through some type of communication network.

2. See also DAQ device and measurement device.

digital	A TTL signal. Refer to edge.
DIO	digital input/output
DMA	direct memory access—A method of transferring data between a buffer and a device that is used most often for high-speed operations.
driver	Software unique to the device or type of device, and includes the set of commands the device accepts.
drop-down listbox	A graphical box with a down arrow button that lets you select values or options from a list. To select a value or option in the selection box, click the down arrow for a complete list of values or options, then use your arrow keys or mouse to select a value or option from the list.
DSUB	D-subminiature connector
DUT	device under test—a device used for testing purposes.

E

E Series	A standard architecture for instrumentation-class, multichannel data acquisition devices.
edge	A digital edge is a single rising or falling TTL transition. An analog edge is defined by the slope, level, and hysteresis settings.
event	A digital signal produced from a device or circuit. For an advanced discussion of events, refer to Events.
excitation	Supplying a voltage or current source to energize a sensor or circuit.

F

fall time	The time for a signal to transition from 90% to 10% of the maximum signal amplitude.
filtering	A type of signal conditioning that you can use to remove unwanted frequency components from the signal you are measuring.
FIFO	A type of memory that implements a First In First Out strategy in which samples are removed in the order they were written. FIFOs are typically used as intermediate buffers between an ADC or DAC and the memory buffer.
floating signal sources	Signal sources with voltage signals that are not connected to an absolute reference or system ground.

G

gain	The factor by which a signal is amplified, often expressed in decibels (dB). Gain as a function of frequency is commonly referred to as the magnitude of the frequency response function.
grounded signal sources	Signal sources with voltage signals that are referenced to a system ground, such as the earth or a building ground. Grounded signal sources are also called referenced signal sources.

H

hardware	The physical components of a computer system, such as the circuit boards, plug-in boards, chassis, enclosures, peripherals, and cables.
hardware timing	A means of controlling signal generation. A digital signal, such as a clock on a DAQ device, controls the rate of generation.
hardware triggering	A form of triggering in which the source of the trigger is an analog or digital signal. Refer to Software Trigger.
hex	Hexadecimal—a base-16 numbering system.
hysteresis	A window around a trigger level that is often used to reduce false triggering due to noise or jitter in the signal.
Hz	Hertz—cycles per second of a periodic signal.

I

IEEE P1451	Family of IEEE standards defining a variety of smart transducer interfaces. All of the standards within this family support the concept of a TEDS that provides self-identification and plug and play operation to transducers.
IEEE P1451.4	An IEEE standard that defines the concept of plug and play sensors with analog signals. This is accomplished with the addition of a TEDS in memory, typically an EEPROM, embedded within the sensor and communicated through a simple, low-cost serial connection.
instrument driver	Refer to driver.
interrupt	A method whereby a device notifies the computer of some condition on the device that requires the computer's attention. When this condition is a request for data or a notification of available data, interrupts are used as a data transfer mechanism.
interrupt level	The relative priority at which a device can interrupt.
I/O	Input/Output—the transfer of data to/from a computer system involving communications channels, operator interface devices, and/or data acquisition and control interfaces.
IRQ	Interrupt ReQuest.
ISA	Industry Standard Architecture—Also refers to a common PC expansion bus.
isolation	A type of signal conditioning in which you isolate the transducer signals from the computer. Isolation makes sure the measurements from the measurement device are not affected by differences in ground potentials.

J

jitter The amount of time that the loop cycle time varies from the desired time.

L

LED	light-emitting diode—a semiconductor light source.
line	An individual signal in a digital port. The difference between a bit and a line is that the bit refers to the actual data transferred, and the line refers to the hardware the bit is transferred on. However, the terms line and bit are fairly interchangeable. For example, an 8-bit port is the same as a port with eight lines.
linear displacement	Movement in one direction along a single axis.
linear displacement sensor	A device that measures linear displacement.
linearization	A type of signal conditioning in which software linearizes the voltage levels from transducers, so the voltages can be scaled to measure physical phenomena.
LSB	least significant bit—often used to refer to the smallest voltage change detectable by an A/D converter or the smallest voltage change that can be generated by a D/A converter.
LVDT	Linear-voltage differential transformer—A sensor used to measure linear displacement. An LVDT consists of a passive transform with one primary and two secondary windings. The primary winding is excited by an audio frequency range AC voltage, whose imbalance between the secondary windings, is proportional to the displacement. The secondary windings are identical, but are normally connected with opposite polarity, so the transducer at resting position will have zero output voltage.

M

M Series	A standard architecture for instrumentation-class, multichannel data acquisition devices.
MAX	Measurement & Automation Explorer—A centralized configuration environment that allows you to configure all of your National Instruments devices.
measurement device	DAQ devices such as the M Series multifunction I/O (MIO) devices, SCXI signal conditioning modules, and switch modules.
memory buffer	Refer to buffer.
memory mapping	A technique for reading and writing to a device directly from your program, which avoids the overhead of delegating the reads and writes to kernel-level software. Delegation to the kernel is safer, but slower. Memory mapping is less safe because an entire 4 KB page of memory must be exposed to your program for this to work, but it is faster.
microphone	A transducer that converts acoustical waves into electrical signals.
MIO	multifunction I/O—Designates a category of data acquisition devices that have multiple analog input channels, digital I/O channels, timing, and optionally, analog output channels. An MIO product can be considered a miniature mixed signal tester, due to its broad range of signal types and flexibility. It is also known as multifunction DAQ. An E Series device is an example of an MIO device.
module	A board assembly and its associated mechanical parts, front panel, optional shields, and so on. A module contains everything required to occupy one or more slots in a mainframe. SCXI and PXI devices are modules.
multiplexed	An SCXI operating mode in which analog input channels

mode	are multiplexed into one module output so that the cabled DAQ device has access to the multiplexed output as well as the outputs on all other multiplexed modules in the chassis through the SCXI bus. Also called serial mode.
multiplexer	A switching device with multiple terminals that sequentially connects each of its terminals to a single terminal, typically at high speeds. Often used to measure several signals with a single analog input channel.
multithreading	Running tasks of an application for a short amount of time to give the impression of multiple tasks running simultaneously.

N

NI-DAQ	Driver software included with all NI measurement devices. NI-DAQ is an extensive library of VIs and functions you can call from an application development environment (ADE), such as LabVIEW, to program all the features of an NI measurement device, such as configuring, acquiring and generating data from, and sending data to the device.
NI-DAQ 7.*x*	Includes two NI-DAQ drivers—NI-DAQmx and Traditional NI-DAQ (Legacy)—each with its own API, hardware configuration, and software configuration.
NI-DAQmx	The latest NI-DAQ driver with new VIs, functions, and development tools for controlling measurement devices. The advantages of NI-DAQmx over earlier versions of NI-DAQ include the DAQ Assistant for configuring channels and measurement tasks for your device for use in LabVIEW, LabWindows/CVI, and Measurement Studio; increased performance such as faster single-point analog I/O; and a simpler API for creating DAQ applications using fewer functions and VIs than earlier versions of NI-DAQ.
NI-DAQmx Simulated Device	A replica of a device created using the **NI-DAQmx Simulated Device** option in the **Create New** menu of MAX for the purpose of operating a function or program without hardware. An NI-DAQmx simulated device behaves similarly to a physical device. Its driver is loaded, and programs using it are fully verified.
nonlinearity	A measure in percentage of full-scale range (FSR) of the worst-case deviation from the ideal transfer function—a straight line. This specification is included only for DAQ products, such as signal conditioning products, that do not have an ADC. Because a product with this specification can also be used with a DAQ product with an ADC, this nonlinearity specification must be added to the relative accuracy specification of the DAQ product with the ADC.

NRSE Nonreferenced single-ended mode—all measurements are made with respect to a common (NRSE) measurement system reference, but the voltage at this reference can vary with respect to the measurement system ground.

O

onboard	Provided by the data acquisition device.
onboard channels	Channels provided by the plug-in data acquisition device.
onboard clock	The default source for a particular clock. Usually, the device has dedicated a circuit for producing this signal and its only purpose is to act as the source for a certain clock.
onboard memory	Memory provided by a device for temporary storage of input or output data. Typically, onboard memory is a FIFO, which is distinct from computer memory.
operating system	Base-level software that controls a computer, runs programs, interacts with users, and communicates with installed hardware or peripheral devices. Also referred to as OS.

P

parallel mode	A type of SCXI operating mode in which the module sends each of its input channels directly to a separate analog input channel of the device connected to the module.
pattern I/O	pattern input and output—a digital I/O operation on which a clock signal initiates a digital transfer. Because the clock signal is a constant frequency, you can generate and receive patterns at a constant rate.
PCI	peripheral component interconnect—a high-performance expansion bus architecture originally developed by Intel to replace ISA and EISA. PCI has achieved widespread acceptance as a standard for PCs and work stations, and it offers a theoretical maximum transfer rate of 132 Mbytes/s.
PCMCIA	An expansion bus architecture that has found widespread acceptance as a de facto standard in notebook-size computers. PCMCIA originated as a specification for add-on memory cards written by the Personal Computer Memory Card International Association.
PFI	programmable function interface—general purpose input terminals, fixed purpose output terminals. The name of the fixed output signal is often placed on the I/O connector next to the terminal as a hint.
physical channel	Refer to channel.
PID	proportional integral derivative—Combination of proportional, integral, and derivative control actions. Refers to a control method in which the controller output is proportional to the error, its time history, and the rate at which it is changing. The error is the difference between the observed and desired values of a variable that is under control action.
pin	Refer to terminal.

Poisson's Ratio	The negative ratio of the strain in the transverse direction (perpendicular to the force) to the strain in the axial direction (parallel to the force).
port	A collection of digital lines. Usually the lines are grouped into either a 8-bit or 32-bit port. Most E Series devices have one 8-bit port.
port width	The number of lines in a port. For example, most E Series devices have one port with eight lines; therefore, the port width is eight.
position sensor	Refer to linear displacement sensor.
posttrigger samples	If there is no Reference Trigger, posttrigger samples are the data acquired after the task is started. If there is a Reference Trigger, this is the data acquired after the Reference Trigger.
plug and play devices	Devices that do not require DIP switches or jumpers to configure resources on the devices. Also called switchless devices.
plug and play sensors	A transducer with an associated TEDS—includes both Virtual TEDS and smart TEDS sensors.
pretrigger samples	Data acquired before the occurrence of the Reference Trigger.
pretriggering	The technique used on a measurement device to keep a circular buffer filled with samples, so that when the Reference Trigger conditions are met, the buffer includes samples leading up to the trigger condition as well as samples acquired immediately after the trigger.
programmed I/O	A data transfer mechanism in which a buffer is not used and instead, the computer reads and writes directly to the device.
propagation delay	The amount of time required for a signal to pass through a circuit.
pulsed	A form of counter signal generation by which a pulse is

output	generated when a counter reaches a certain value.
PWM	pulse-width modulation
PXI	PCI eXtensions for Instrumentation—a rugged, open system for modular instrumentation based on CompactPCI, with special mechanical, electrical, and software features. The PXI standard was originally developed by National Instruments in 1997 and is now managed by the PXI Systems Alliance.
PXI trigger bus	The timing bus that connects PXI DAQ devices directly, by means of connectors built into the backplane of the PXI chassis, for precise synchronization of functions. This bus is functionally equivalent to the RTSI bus for PCI DAQ devices.

R

range	The minimum and maximum analog signal levels that the ADC can digitize.
raw	Data that has not been changed in any way. For input, data is returned exactly as received from the device. For output, data is written as is to the device. Refer to unscaled and scaled.
real time	A property of an event or system in which samples are processed as they are acquired instead of being accumulated and processed at a later time.
referenced signal source	Signal sources with voltage signals that are referenced to a system ground, such as the earth or a building ground. Also called grounded signal sources.
resolution	The smallest amount of input signal change that a device or sensor can detect. The term *discrimination* is also used for resolution.
rise time	The time for a signal to transition from 10% to 90% of the maximum signal amplitude.
route	A connection between a pair of terminals. Any time the source or destination terminal of a signal is specified, a route is created.
RSE	Referenced single-ended mode—all measurements are made with respect to a common reference measurement system or a ground. Also called a grounded measurement system.
RTD	Resistance temperature detector—a metallic probe that measures temperature based on its coefficient of resistivity.
RTSI bus	Real-time system integration bus—the NI timing bus that connects DAQ devices directly, by means of connectors on top of the devices, for precise synchronization of functions. This bus is functionally equivalent to the PXI Trigger bus for PXI DAQ devices.

RVDT rotary variable differential transformer—a sensor whose output signal represents the rotation of the shaft.

S

s	seconds
S	samples. Refer to sample.
S/s	samples per second—used to express the rate at which a measurement device samples an analog signal.
sample	A single measurement from a single channel or, for output, a single generation to a single channel.
sample clock	The clock that initiates an acquisition of one sample from each channel in the scan list. For example, with each sample clock pulse, M Series devices acquire a sample on each analog input channel in a task by multiplexing each channel through a single ADC. On simultaneous sampling devices, the sample clock initiates the simultaneous acquisition of one sample from each channel in the task through a dedicated, per-channel ADC. No multiplexing (and therefore no convert clock) is necessary for S Series devices.
sample clock rate	Refer to sample rate.
sample rate	The number of samples per channel per second. For example, a sample rate of 10 S/s means sampling each channel 10 times per second.
scale	Data that has been mathematically transformed into engineering units. Other manipulations also can be done such as reordering to match the channel order.
scanning	Method of sequentially connecting channels.
SCC	Signal conditioning component—low channel count analog or digital I/O modules for conditioning DAQ systems.
SCXI	Signal Conditioning eXtensions for Instrumentation—the NI product line for conditioning low-level signals within an external chassis near sensors so that only high-level signals are sent to measurement devices in the noisy PC

	environment. SCXI is an open standard available for all vendors.
sensor	A device that responds to a physical stimulus (heat, light, sound, pressure, motion, flow, and so on) and produces a corresponding electrical signal.
signal	A means of conveying information. An analog waveform, a clock, and a single digital (TTL) edge are all examples of signals.
signal conditioning	The manipulation of signals to prepare them for digitizing.
smart TEDS sensor	A transducer with a built-in self-identification EEPROM that provides the TEDS.
software timing	A means of controlling signal generation. The software, such as NI-DAQmx, and the operating system control the rate of generation.
software trigger	A VI or function that, when it executes, triggers an action such as starting an acquisition.
source impedance	A parameter of signal sources that reflects current-driving ability of voltage sources (lower is better) and the voltage-driving ability of current sources (higher is better).
static AO	Analog output operations that use software timing.
static digital I/O	Software-timed digital I/O operations that do not involve the use of control signals in data transfers. Also known as software-timed I/O or unstrobed I/O.
strain	The amount of deformation of a body due to an applied force.
strobed I/O	Any operation in which every data transfer is timed by hardware signals. In the case of sample clock timing, this hardware signal is a clock edge. In the case of handshaking I/O, hardware signals involve two or three handshaking lines.
STC	system timing controller
synchronous	1. Hardware—a signal that occurs or is acted upon in

synchrony with another signal, such as a reference clock.

2. Software—a VI or function that begins an operation and returns only when the operation is complete.

T

task	In NI-DAQmx, a collection of one or more channels, timing, and triggering and other properties that apply to the task itself. Conceptually, a task represents a measurement or generation you want to perform.
task buffer	Refer to buffer.
TCR	temperature coefficient of resistance—the average resistance change per one degree at temperatures between 0 °C and 100 °C.
TEDS	transducer electronic data sheet—standardized data structure, defined by IEEE 1451.4, for describing sensors, typically stored in nonvolatile memory within a sensor. The manufacturer of the sensor stores, into this memory, initial information such as manufacturer name, sensor type, model number, serial number, and calibration data. The TEDS data structure also includes space for custom information such as channel ID, location, position, direction, tag number, etc. Alternatively, the TEDS data may be stored in a file or database record as a Virtual TEDS. For information on IEEE 1451.4-compliant TEDS sensors, refer to www.ni.com/pnp.
TEDS Class I Sensor	A smart TEDS sensor with a constant-current powered transducer with a two-wire interface, such as an accelerometer. Class I transducers also include diodes or analog switches with which the multiplexing of the analog signal with the digital TEDS information on the single pair of wires is possible. The digital portion of the mixed-mode interface (Class 1 or Class 2) is based on the 1-Wire protocol from Maxim/Dallas Semiconductor.
TEDS Class II Sensor	A smart TEDS sensor with separate wires for the analog and digital portions of the TEDS mixed-mode interface. The analog input/output of the transducer is left unmodified, and the digital TEDS circuit is added in parallel, such as thermocouples, RTDs, and bridge-based

	sensors. The digital portion of the mixed-mode interface (Class 1 or Class 2) is based on the 1-Wire protocol from Maxim/Dallas Semiconductor.
terminal	A named location on a DAQ device where a signal is either generated (output or produced) or acquired (input or consumed).
terminal count	When counting up, an *N* bit counter reaches its terminal count at 2*N* -1. An $_N$ bit counter counting down reaches its terminal count at 0.
thermistor	A semiconductor sensor that produces a repeatable change in electrical resistance as a function of temperature. Most thermistors have a negative temperature coefficient.
thermocouple	A temperature sensor created by joining two dissimilar metals. The junction produces a small voltage as a function of the temperature.
threshold	The voltage level a signal must reach for a trigger to occur.
tick	A digital edge of a clock.
timebase	A clock that is divided down to produce another clock or a clock provided to a counter for measuring elapsed time.
Traditional NI-DAQ (Legacy)	An upgrade of the earlier version of NI-DAQ. Traditional NI-DAQ (Legacy) has the same VIs and functions and works the same way as NI-DAQ 6.9.*x*, except you can use both Traditional NI-DAQ (Legacy) and NI-DAQmx on the same computer, and some hardware is no longer supported.
transducer	Refer to sensor.
transducer excitation	A type of signal conditioning that uses external voltages and currents to excite the circuitry of a signal conditioning system into measuring physical phenomena.
trigger	Any signal that causes a device to perform an action, such as starting an acquisition.

TTL	Transistor-transistor logic—a signal having two discrete levels, a high and a low level.

U

unipolar	A signal range that is always positive (for example, 0 to +10 V).
unscaled	Samples in the integer form that the hardware produces or requires. Although no mathematical transformations are applied to unscaled data, other manipulations may be done such as reordering to match the channel order.
unstrobed I/O	Refer to static digital I/O.

V

V	volts
VI	Virtual instrument. Refer to virtual instrument.
virtual channel	Refer to channel.
virtual instrument	A program in LabVIEW that models the appearance and function of a physical instrument.
VISA	Virtual Instrumentation Software Architecture.

W

waveform data type	A LabVIEW data type that bundles timing information along with the data.
WDT	Refer to waveform data type.

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