



# NATIONAL INSTRUMENTS Data Acquisition QAQ Device and Software User Guide

[Home](#) » [NATIONAL INSTRUMENTS](#) » NATIONAL INSTRUMENTS Data Acquisition QAQ Device and Software User Guide 

## Contents

- [1 Data Acquisition QAQ Device and Software](#)
- [2 Product Information: USB-6216 DAQ](#)
- [3 Product Usage Instructions](#)
- [4 Confirm Device Recognition](#)
- [5 Take an NI-DAQmx Measurement](#)
- [6 Troubleshooting](#)
- [7 Documents / Resources](#)
  - [7.1 References](#)
- [8 Related Posts](#)



## Data Acquisition QAQ Device and Software



## Product Information: USB-6216 DAQ

The USB-6216 is a data acquisition (DAQ) device from National Instruments that allows users to measure or generate analog or digital signals. The device can be connected to a computer via USB and can be configured using NI MAX software. The device also supports signal conditioning and switch hardware for more complex measurement applications.

## Product Usage Instructions

Follow the below instructions to use the USB-6216 DAQ device:

### Confirm Device Recognition

1. Launch NI MAX software by double-clicking the NI MAX icon on the desktop or clicking NI MAX from NI Launcher (Windows 8).
2. Expand Devices and Interfaces to confirm if the device is detected. If using a remote device, ensure the default host name is cDAQ-, WLS-, or ENET-. If the host name has been modified, refer to the device documentation.
3. Right-click the device and select Self-Test. If an error occurs, refer to [ni.com/support/daqmx](https://ni.com/support/daqmx) for support.
4. For NI M and X Series PCI Express devices, right-click the device and select Self-Calibrate. Click Finish when calibration is complete.

### Configure Device Settings

Configure each device with configurable settings that you install:

1. Right-click the device name and select Configure.
2. Add accessories as described in the device documentation. Click Scan for TEDS to configure TEDS sensors cabled directly to a device.
3. Click OK to accept changes.

### Install Signal Conditioning or Switch Devices

If your system includes SCXI signal conditioning modules, Signal Conditioning Components (SCC) such as SC carriers and SCC modules, terminal blocks, or switch modules, refer to the device documentation to install and configure the signal conditioning or switch hardware.

### Attach Sensors and Signal Lines

Attach sensors and signal lines to the terminal block or accessory terminals for each installed device. Refer to the device documentation for device terminal/pinout locations.

### Run Test Panels

Refer to the device documentation for test panels and how to run them.

### Take an NI-DAQmx Measurement

NI-DAQmx Channels and Tasks: A physical channel is a terminal or pin at which you can measure or generate an analog or digital signal. A virtual channel maps a name to a physical channel and its settings, such as input terminal connections, the type of measurement or generation, and scaling information. In NI-DAQmx, virtual channels are integral to every measurement.

### DAQ Getting Started Guide

This guide describes how to confirm your NI data acquisition (DAQ) device is operating properly. Install your application and driver software, then your device, using the instructions packaged with your device.

## Confirm Device Recognition

### Complete the following steps:



1. Launch MAX by double-clicking the NI MAX icon on the desktop, or (Windows 8) by clicking NI MAX from NI Launcher.
2. Expand Devices and Interfaces to confirm your device is detected. If you are using a remote RT target, expand Remote Systems, find and expand your target, and then expand Devices and Interfaces. If your device is not listed, press <F5> to refresh the configuration tree. If the device is still not recognized, refer to [ni.com/support/daqmx](http://ni.com/support/daqmx).

For a Network DAQ device, do the following:

- If the Network DAQ device is listed under Devices and Interfaces » Network Devices, right-click it and select Add Device.
- If your Network DAQ device is not listed, right-click Network Devices, and select Find Network NI-DAQmx Devices. In the Add Device Manually field, type the Network DAQ device's host name or IP address, click the + button, and click Add Selected Devices. Your device will be added under Devices and Interfaces » Network Devices.

**Note:** If your DHCP server is set up to automatically register host names, the device registers the default host name as cDAQ-<model number>-<serial number>, WLS-<serial number>, or ENET-<serial number>. You can find the serial number on the device. If you cannot find the host name of that form, it may have been modified from the default to another value.

If you still cannot access your Network DAQ device, click the Click here for troubleshooting tips if your device does not appear link in the Find Network NI-DAQmx Devices window or go to [ni.com/info](http://ni.com/info) and enter the Info Code netdaq help.

**Tip:** You can test NI-DAQmx applications without installing hardware by using an NI-DAQmx simulated device. For instructions on creating NI-DAQmx simulated devices and importing NI-DAQmx simulated device configurations to physical devices, in MAX, select Help»Help Topics» NI-DAQmx»MAX Help for NI-DAQmx.

3. Right-click the device and select Self-Test. When the self-test finishes, a message indicates successful verification or if an error occurred. If an error occurs, refer to [ni.com/support/daqmx](http://ni.com/support/daqmx).
4. For NI M and X Series PCI Express devices, right-click the device and select Self-Calibrate. A window reports the status of the calibration. Click Finish.

### Configure the Device Settings

Some devices, such as the NI-9233 and some USB devices, do not need properties for configuring accessories, RTSI, topologies, or jumper settings. If you are installing only devices without configurable properties, skip to the next step. Configure each device with configurable settings that you install:

1. Right-click the device name and select Configure. Be sure to click the device name under the folder for the system (My System or Remote Systems) and NI-DAQ API in which you want to control the device.  
For Network DAQ devices, click the device name and then the Network Settings tab to configure network settings. For additional information on configuring Network DAQ devices, refer to your device documentation.
2. Configure the device properties.

- If you are using an accessory, add the accessory information.
- For IEEE 1451.4 transducer electronic data sheet (TEDS) sensors and accessories, configure the device and add the accessory as previously described. Click Scan for TEDS. To configure TEDS sensors cabled directly to a device, in MAX, right-click the device under Devices and Interfaces and select Configure TEDS.

3. Click OK to accept the changes.

### **Install Signal Conditioning or Switch Devices**

If your system includes SCXI signal conditioning modules, Signal Conditioning Components (SCC) such as SC carriers and SCC modules, terminal blocks, or switch modules, refer to the getting started guide for the product to install and configure the signal conditioning or switch hardware.

### **Attach Sensors and Signal Lines**

Attach sensors and signal lines to the terminal block or accessory terminals for each installed device. You can find device terminal/pinout locations in MAX, the NI-DAQmx Help, or the device documentation. In MAX, right-click the device name under Devices and Interfaces, and select Device Pinouts.

For information about sensors, refer to [ni.com/sensors](http://ni.com/sensors). For information about IEEE 1451.4 TEDS smart sensors, refer to [ni.com/teds](http://ni.com/teds). If you are using SignalExpress, refer to Use NI-DAQmx with Your Application Software.

### **Run Test Panels**

Use the MAX test panel as follows.

1. In MAX, expand Devices and Interfaces or Devices and Interfaces»Network Devices.
2. Right-click the device to test, and select Test Panels to open a test panel for the selected device.
3. Click the tabs at the top and Start to test the device functions, or Help for operating instructions.
4. If the test panel displays an error message, refer to [ni.com/support](http://ni.com/support).
5. Click Close to exit the test panel.

## **Take an NI-DAQmx Measurement**

### **NI-DAQmx Channels and Tasks**

A physical channel is a terminal or pin at which you can measure or generate an analog or digital signal. A virtual channel maps a name to a physical channel and its settings, such as input terminal connections, the type of measurement or generation, and scaling information. In NI-DAQmx, virtual channels are integral to every measurement.

A task is one or more virtual channels with timing, triggering, and other properties. Conceptually, a task represents a measurement or generation to perform. You can set up and save configuration information in a task and use the task in an application. Refer to the NI-DAQmx Help for complete information about channels and tasks.

Use the DAQ Assistant to configure virtual channels and tasks in MAX or in your application software.

### **Configure a Task Using the DAQ Assistant from MAX**

Complete the following steps to create a task using the DAQ Assistant in MAX:

1. In MAX, right-click Data Neighborhood and select Create New to open the DAQ Assistant.
2. In the Create New window, select NI-DAQmx Task and click Next.
3. Select Acquire Signals or Generate Signals.

4. Select the I/O type, such as analog input, and the measurement type, such as voltage.
5. Select the physical channel(s) to use and click Next.
6. Name the task and click Finish.
7. Configure individual channel settings. Each physical channel you assign to a task receives a virtual channel name. To modify the input range or other settings, select the channel. Click Details for physical channel information. Configure the timing and triggering for your task. Click Run.

### Use NI-DAQmx with Your Application Software

The DAQ Assistant is compatible with version 8.2 or later of LabVIEW, version 7.x or later of LabWindows™/CVI™ or Measurement Studio, or with version 3 or later of SignalExpress. SignalExpress, an easy-to-use configuration-based tool for data logging applications, is at Start»All Programs»National Instruments»NI SignalExpress or (Windows 8) NI Launcher.

**To get started with data acquisition in your application software, refer to the tutorials:**

Application	Tutorial Location
LabVIEW	Go to Help»LabVIEW Help. Next, go to Getting Started with LabVIEW»Getting Started with DAQ»Taking an NI-DAQmx Measurement in LabVIEW.
LabWindows/CVI	Go to Help»Contents. Next, go to Using LabWindows/CVI»Data Acquisition»Taking an NI-DAQmx Measurement in LabWindows/CVI.
Measurement Studio	Go to NI Measurement Studio Help»Getting Started with the Measurement Studio Class Libraries»Measurement Studio Walkthroughs»Walkthrough: Creating a Measurement Studio NI-DAQmx Application.
SignalExpress	Go to Help»Taking an NI-DAQmx Measurement in SignalExpress.

### Examples

NI-DAQmx includes example programs to help you get started developing an application. Modify example code and save it in an application, or use examples to develop a new application or add example code to an existing application.

To locate LabVIEW, LabWindows/CVI, Measurement Studio, Visual Basic, and ANSI C examples, go to [ni.com/info](http://ni.com/info) and enter the Info Code daqmxexp. For additional examples, refer to [zone.ni.com](http://zone.ni.com).

To run examples without hardware installed, use an NI-DAQmx simulated device. In MAX, select Help»Help Topics»NI-DAQmx»MAX Help for NI-DAQmx and search for simulated devices.

### Troubleshooting

If you have problems installing your software, go to [ni.com/support/daqmx](http://ni.com/support/daqmx). For hardware troubleshooting, go to [ni.com/support](http://ni.com/support) and enter your device name, or go to [ni.com/kb](http://ni.com/kb).

If you need to return your National Instruments hardware for repair or device calibration, refer to [ni.com/info](http://ni.com/info) and enter the Info Code rdsenn to start the Return Merchandise Authorization (RMA) process.

Go to [ni.com/info](http://ni.com/info) and enter rddq8x for a complete listing of the NI-DAQmx documents and their locations.

### More Information

After you install NI-DAQmx, the NI-DAQmx software documents are accessible from Start» All Programs»National Instruments»NI-DAQ»NI-DAQmx document title or (Windows 8) NI Launcher. Additional resources are online at [ni.com/gettingstarted](http://ni.com/gettingstarted).

You can access online device documentation by right-clicking your device in MAX and selecting Help» Online Device Documentation. A browser window opens to [ni.com/manuals](http://ni.com/manuals) with the results of a search for relevant device documents. If you do not have Web access, documents for supported devices are included on the NI-DAQmx media.

## Worldwide Technical Support

For support information, refer to [ni.com/support](http://ni.com/support) for access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application

Engineers. Visit [ni.com/zone](http://ni.com/zone) for product tutorials, example code, webcasts, and videos.

Visit [ni.com/services](http://ni.com/services) for NI Factory Installation Services, repairs, extended warranty, calibration, and other services.


To ensure measurement accuracy, NI factory calibrates all applicable hardware and issues a Basic Calibration certificate, which you can get online at [ni.com/calibration](http://ni.com/calibration).

Visit [ni.com/training](http://ni.com/training) for self-paced training, eLearning virtual classrooms, interactive CDs, Certification program information, or to register for instructor-led, hands-on courses at locations around the world.

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## Documents / Resources

	<a href="#">NATIONAL INSTRUMENTS Data Acquisition QAQ Device and Software</a> [pdf] User Guide USB-6216, Data Acquisition QAQ Device and Software, Data Acquisition, QAQ Device and Software
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## References

- [NI Engineer Ambitiously - NI](#)
- [NI Engineer Ambitiously - NI](#)
- [NI Calibration Services - NI](#)
- [NI Contact Us - NI](#)
- [NI Learning Center - NI](#)
- [NI Using Info Codes - NI](#)
- [NI Search Results - NI](#)
- [NI Legal Information - NI](#)
- [NI Product Documentation - NI](#)
- [NI National Instruments Patents - NI](#)
- [NI Shop - NI](#)
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- [NI-DAQ™mx Download - NI](#)
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-  [NI Trademarks and Logo Guidelines - NI](#)
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