ULx for NI LabVIEW

Software Quick Start

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Introduction

MCC ULx for NI LabVIEW is a library of virtual instruments (VIs) used with Measurement Computing Corporation (MCC) hardware to develop instrumentation, acquisition, and control applications in National Instruments LabVIEW 8.5 and later. The ULx syntax is consistent with NI LabVIEW DAQmx VIs.

This Quick Start shows you how to create a LabVIEW application that graphs and logs data acquired from a MCC device. The procedures in this document assume that you are familiar with creating applications with LabVIEW 8.5 and later.

Hardware and Software Requirements

Hardware

Measurement Computing USB, PCI, Wireless, or WEB-based hardware

Software

- LabVIEW 8.5 or later
- MCC InstaCal installation, calibration, and test utility

  InstaCal is included with the MCC DAQ software provided with most Measurement Computing hardware.

Operating systems

Widows 8, Widows 7, Windows Vista, Windows XP (32-bit or 64-bit)

Install InstaCal and the ULx for NI LabVIEW software

Install InstaCal and the ULx for NI LabVIEW software from the MCC DAQ CD, or download the software from the "MCC DAQCD" section of the MCC Software/Drivers Downloads page at www.mccdaq.com/software.aspx.

ULx VIs are installed by default into C:\Program Files\National Instruments\LabVIEW <version>\vi.lib\ULx, where <*version*> is the LabVIEW version that is installed.

Install and configure the hardware with InstaCal

You must configure MCC hardware with InstaCal before LabVIEW can recognize the device. Note that Measurement and Automation Explorer (MAX) is not used to configure MCC hardware for use in LabVIEW. To install and configure your hardware, complete the following steps:

1. Exit LabVIEW if it is running.
2. Install the MCC hardware that you want to use in LabVIEW.
3. Run InstaCal.

   A **Plug and Play Board Detection** dialog box displays the device(s) detected on the system. Select the device to use in LabVIEW and click **OK**. The device is added to the InstaCal configuration file, and appears with a board number on the main InstaCal window. Use this number to select the hardware in LabVIEW. This Quick Start acquires data from the device installed as "Board# 0" in InstaCal.
4. Click the device and select **Install»Configure** to display the **Board Configuration** dialog box. Configure the hardware and click **OK** to close the dialog box and write device settings to the configuration file.
5. Connect a signal source to the MCC device so that it acquires signals from analog input channel 0.

   Refer to the connector pinout in your hardware user's guide for the connector pinout.

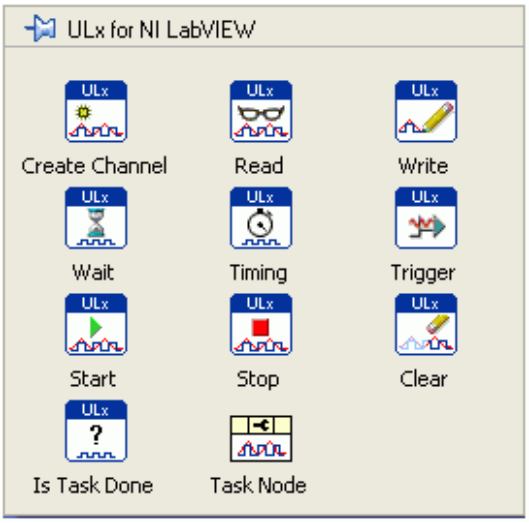
LabVIEW reads the InstaCal configuration file. If you need to change any device settings, make sure to close LabVIEW before configuring the device.

Build the NI LabVIEW program

The following exercise shows you how to create a program that acquires data from an MCC device, displays the data in a waveform, and saves the data to a file. The MCC USB-1608GX-2AO device was used for this exercise.

To create the source code for the program, complete the following steps:

1. Start LabVIEW and open a blank VI or empty project.
2. Display the block diagram window if it is not already open.
3. Select **View»Functions Palette** to display the Functions palette.
4. Select **User Libraries»ULx for NI LabVIEW** to display the MCC ULx VIs.



Create an analog input voltage channel

1. Select **ULx for NI LabVIEW»Create Channel** and place the **ULx Create Virtual Channel VI** on the block diagram.

   Tip: To show a text label on the block diagram, right-click on the VI and select **Visible Items»Label** from the shortcut menu.
2. Right-click the **physical channels** terminal and select **Create»Control**.
3. Add a control to the **minimal value** terminal.
4. Add a control to the **maximum value** terminal.

Add a sample clock

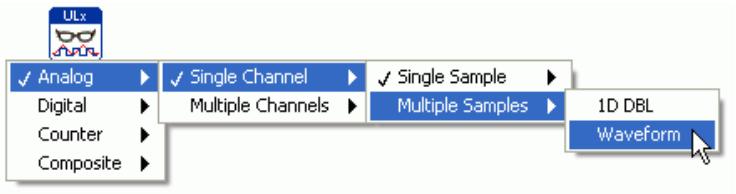
1. Select **ULx for NI LabVIEW»Timing** and place the **ULx Timing VI** on the block diagram.
2. Add a control to the **sample mode** terminal.
3. Add a control to the **samples per channel** terminal.
4. Add a control to the **rate** terminal.

Specify when to start the acquisition

Select **ULx for NI LabVIEW»Start** and place the **ULx Start VI** on the block diagram.

Acquire data

Select **ULx for NI LabVIEW»Read** and place the **ULx Read VI** on the block diagram. Use the polymorphic VI selector to select the **Analog Wfm 1Chan NSamp** instance.



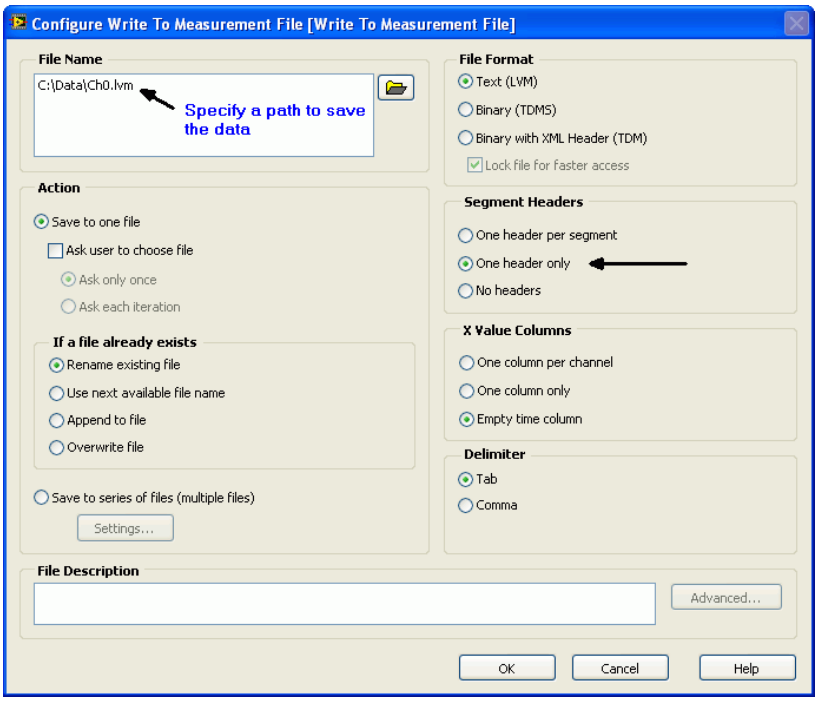
This instance reads multiple samples from one channel.

Display the data

From the front panel, select **Express»Graph Indicators»Graph** and place a **Waveform Graph** on the block diagram.

Write the data to a file

Select **Functions»Programming»File I/O»Write Meas File** to add a **Write to Measurement File Express VI** to the block diagram. The **Configure Write to Measurement File** dialog box opens:



Configure the following options on the dialog box:

1. In the **File Name** text box, enter a path to save the data, or browse to the destination path.
2. Select the **One header only** option button in the **Segment Headers** area to save the data in a table with one header.

When you run the program, the data is saved to a LabVIEW measurement data file (*.lvm). An *.lvm file is a tab-delimited ASCII text file that you can open with a spreadsheet application or text editor.

Clear the task

Select **ULx for NI LabVIEW»Clear** and place the VI on the block diagram. This VI releases resources that are reserved for the task.

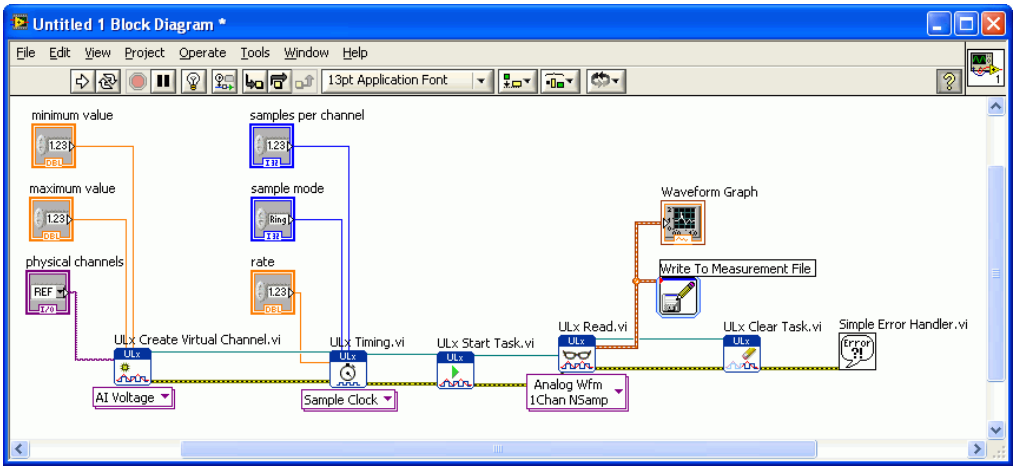
Add error notification

Select **Functions»Programming»Dialog & User Interface»Simple Error** and place the VI on the block diagram.

Wire the VIs together

1. Connect a wire between the **task out** terminal on one VI to the **task in** terminal on the adjacent VI.
2. Connect a wire between the **error out** terminal on one VI to the **error in** terminal on the adjacent VI.
3. Connect a wire between the Waveform Graph to the **data** terminal on the ULx Read.vi.
4. Connect a wire between the **signals** terminal on the Write to Measurement File VI to the **data** terminal on the ULx Read VI.

The block diagram should look like the diagram shown here:

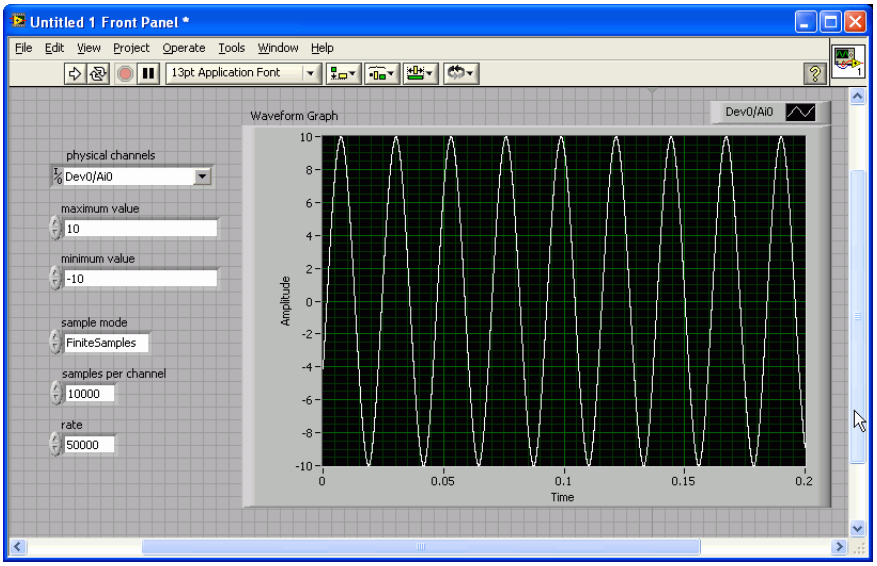


Run the VI

After creating the source code for the program, display the front panel and configure the user interface. Complete the following steps:

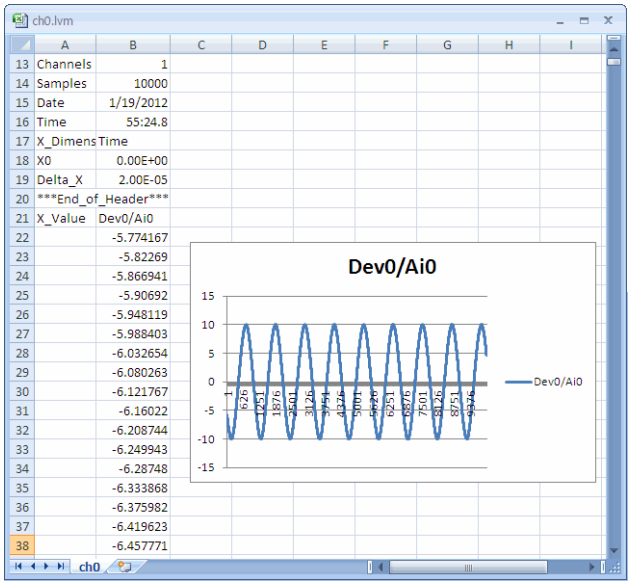
1. Click the **physical channels** arrow and select **Dev0/Ai0** to acquire data from channel 0 on device 0. The device number is associated with the device installed in InstaCal as "Board# 0".
2. Set the voltage range, sample mode, samples per channel, and rate to values supported by your hardware. The front panel shown below is configured with values supported by the USB-1608GX-2AO.
3. Click the **Run** button on the toolbar to run the VI.

Waveform data displays on the front panel, and the data is written to the file specified in the Write the data to a file procedure on page 5. Data acquired from the USB-1608GX-2AO is shown below.



View logged data

You can use a spreadsheet application such as Microsoft Excel or a text editor to open the data file saved in the Run the VI procedure on page 6. The following image shows the data file opened and charted in Excel:



	A	B
13	Channels	1
14	Samples	10000
15	Date	1/19/2012
16	Time	55:24.8
17	X_Dimens	Time
18	X0	0.00E+00
19	Delta_X	2.00E-05
20	***End_of_Header***	
21	X_Value	Dev0/Ai0
22		-5.774167
23		-5.82269
24		-5.866941
25		-5.90692
26		-5.948119
27		-5.988403
28		-6.032654
29		-6.080263
30		-6.121767
31		-6.16022
32		-6.208744
33		-6.249943
34		-6.28748
35		-6.333868
36		-6.375982
37		-6.419623
38		-6.457771

Help File

To learn more about MCC ULx VIs, select **ULx for NI LabVIEW Help** from the LabVIEW **Help** menu.

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