Installation Guide: Quanser Rapid Control Prototyping Toolkit® 2016 for NI myRIO®

STEP 1 Install NI LabVIEW™ and Add-on Requirements

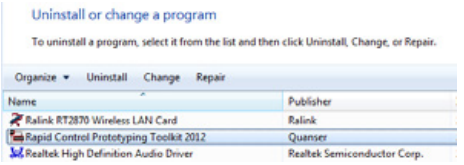
The Quanser Rapid Control Prototyping (QRCP) toolkit supports either 32-bit or 64-bit Microsoft Windows 7, Windows 8.1, or Windows 10 for the host system and select NI myRIO configurations as targets.

Ensure that at least one version of 32-bit LabVIEW™ 2015 SP1 or 2016 is installed on the host computer with the following required add-ons:

1. LabVIEW™ NI myRIO Module
2. LabVIEW™ Control Design and Simulation Module
3. From the NI Device Drivers DVD:
   (a) Reconfigurable I/O (RIO) Feature
   (b) Real-Time and Embedded Feature
4. LabVIEW™ Real-Time Module
5. LabVIEW™ MathScript RT Module (only used in certain curriculum VIs)

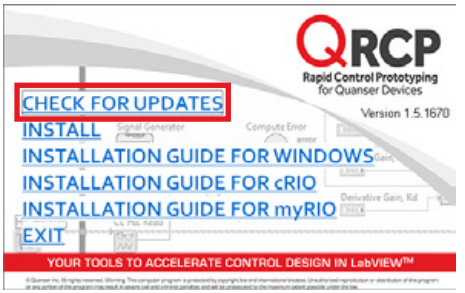
STEP 2 Install Quanser Rapid Control Prototyping Toolkit on Windows

A



Uninstall any previous version of the Quanser Rapid Control Prototyping (QRCP) toolkit that may be present on the computer (e.g., QRCP 2012). Do so by launching the *Programs and Features* dialog from the *Windows Control Panel*.

B



1. Insert the QRCP 2016 Installation DVD.
   If you purchased your QRCP through LABVIEW Tools Network, download the installer executable using the link provided in the email confirmation you received from NI. Launch the executable.
2. The QRCP installation screen should appear.
3. Click on **CHECK FOR UPDATES** to open the QRCP download page containing the latest QRCP version available.

Note: The version of the QRCP Software is shown on the installation screen.

C

If a more recent QRCP release is available on the QRCP download webpage, do the following. Otherwise, skip this step.

1. **Download** and **run** the latest QRCP 2016 installer, which consists of a single executable, named *install_quanser_rcp_toolkit.exe* .
2. A new QRCP installation screen should appear and replace the previous one.
3. Eject the QRCP Installation DVD, if a DVD was used to install the software.

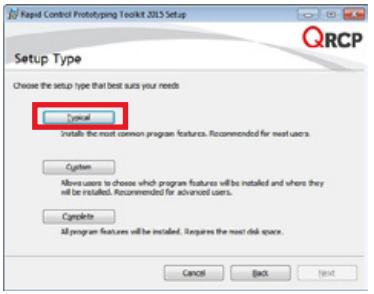
D

Click on **INSTALL** to start the QRCP installation process.

E

Follow the steps of the installation wizard.

F



On the *Setup Type* installation screen, choose **Typical**.

G

If, during the installation, a *Windows Security* dialog box appears asking *Would you like to install this device software?*, check the ***Always trust software from the Quanser Consulting Inc*** checkbox and click on the **Install** button.

Note: If a dialog box *Windows can't verify the publisher of this driver software* appears, click on the *Install this driver software anyway* option.

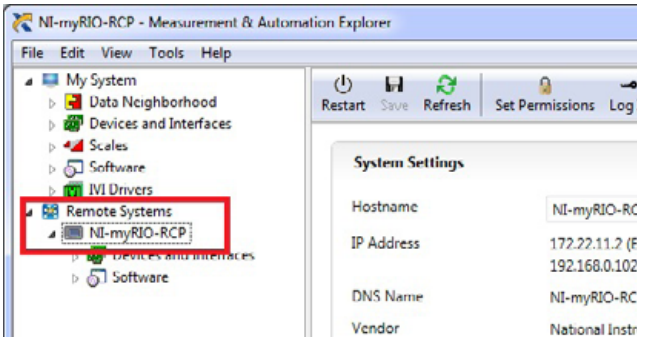
STEP 3 Install NI LabVIEW Modules and the Quanser RCP Toolkit on NI myRIO Target

Follow the NI myRIO Getting Started Wizard to install the standard myRIO support software which includes LabVIEW™ Control Design and Simulation, LabVIEW™ Real-Time, and NI-RIO add-ons.

A

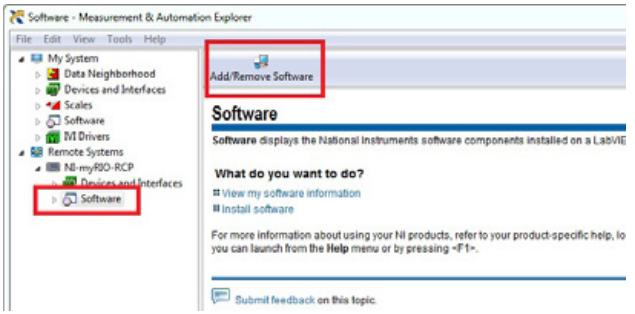
From the Windows **Start** menu, load the *NI Measurement & Automation Explorer (MAX)* software.

B



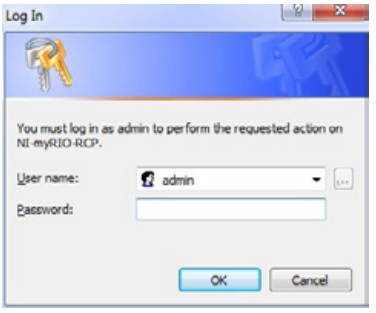
Ensure the NI MyRIO device is listed in NI's *Measurement & Automation Explorer* software under **Remote Systems**. If not, go to: www.ni.com/academic/students/learn-rio/hardware

C



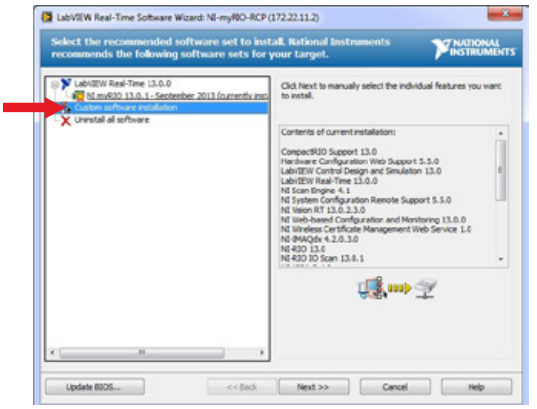
Expand the myRIO item under **Remote Systems**, right-click on the **Software** item, and select **Add/Remove Software**.

D



NI MAX software will prompt you to log in to myRIO. The default password is blank.

E

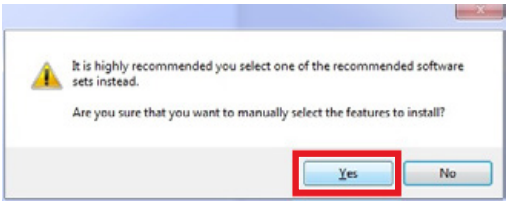


Select the **Custom software installation.**

F

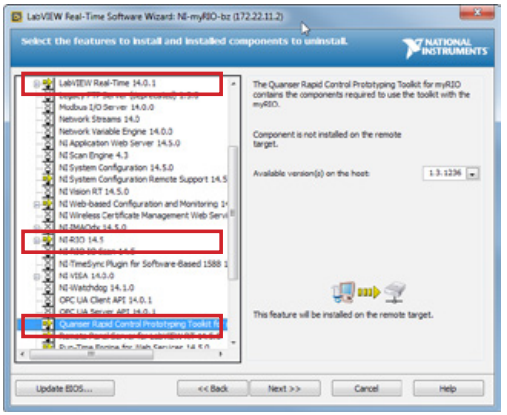
Click on the **Next** button.

G



Ignore this warning by clicking on *Yes* at the prompt.

H



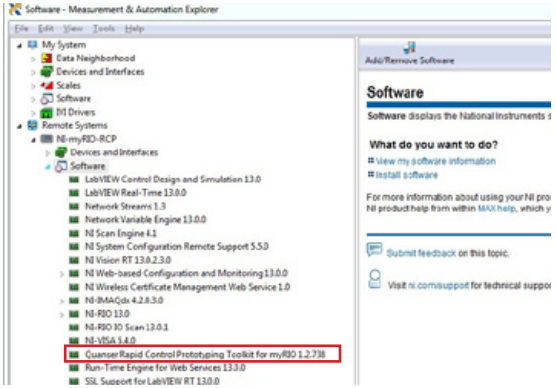
Select the following LabVIEW™ add-ons for your NI myRIO:

- Labview Control Design and Simulation
- LabVIEW Real-Time
- NI-RIO
- Quanser Rapid Control Prototyping toolkit for NI myRIO

I

Click on **Next** and **Finish** in the upcoming prompts to install the required software.

J



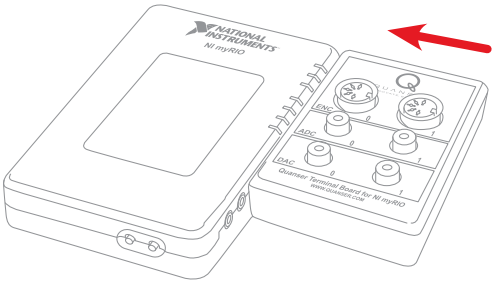
The Quanser Rapid Control Prototyping Toolkit for myRIO will now appear under the **Software** item of NI's *Measurement & Automation Explorer* dialog window.

STEP 4 myRIO Test with Quanser Terminal Board for NI myRIO

NOTE: If you are connecting your NI myRIO directly to a Quanser workstation, please refer to the *Testing* section of your product's Quick Start Guide. ***Quanser Terminal Board for NI myRIO is sold separately.***

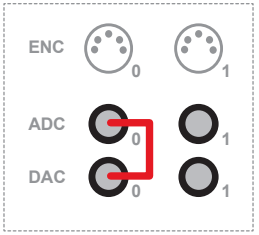
The Analog Loopback VI used in this section confirms that the QRCP has been installed properly on both Windows and the NI myRIO. It also tests the Quanser Terminal Board for NI myRIO . Ensure the terminal board is connected to myRIO's MSP Connector C.

A



Connect Quanser Terminal Board for NI myRIO to myRIO's MSP Connector C.

B



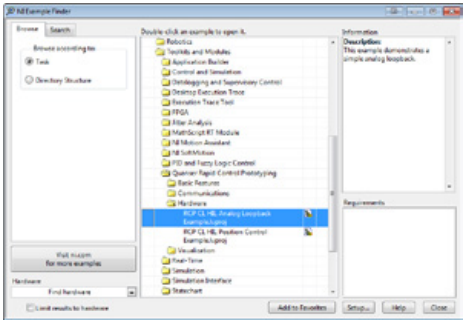
Quanser Terminal board for NI myRIO

Using the RCA cable supplied with the Quanser myRIO terminal board, connect **Analog Output Channel #0** (DAC #0) to **Analog Input Channel #0** (ADC #0).

C

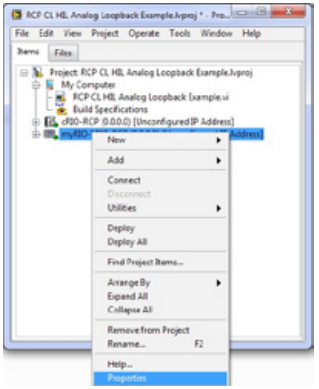
Ensure the NI myRIO is powered ON.

D



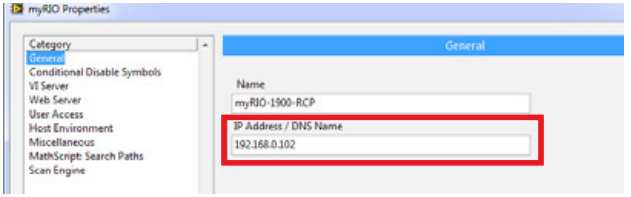
1. In LabVIEW™, open the **NI ExampleFinder** by selecting *Find Examples...* from the *Help* menu.
2. In the *NI Example Finder* dialog, when browsing according to **Task**, open the *Toolkits and Modules/ Quanser Rapid Control Prototyping/Hardware* folder.
3. Double-click on the *RCP CL HIL Analog Loopback Example.lvproj* LabVIEW™ project to open the RCP Toolkit example.

E



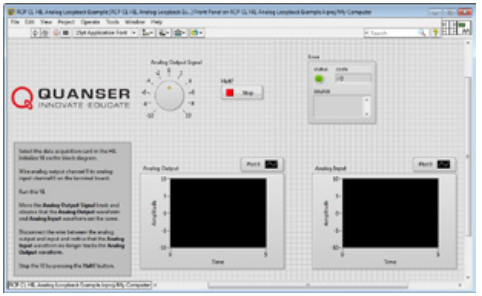
In the *RCP CL HIL Analog Loopback Example.lvproj* example, right-click on *myRIO* and select *Properties*.

F



In the *General* category, enter the IP address of the myRIO in the *IP Address* field. The myRIO IP address can be found in NI's *Measurement & Automation Explorer* dialog window. Click **OK** when set.

G

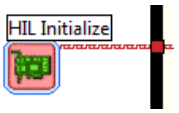


LabVIEW™ VI Front Panel

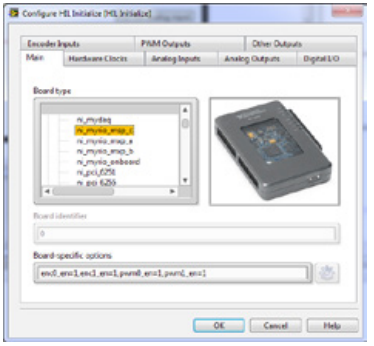
Double-click on the RCP CL HIL Analog Loopback Example.vi file listed under myRIO-1900-RCP.

H

Open the VI Block Diagram (CTRL+E) and double-click on the **HIL Initialize** VI.



I



Configure HIL Initialize window

In the *Board type* treeview under the *Main* tab, select the *ni_myrio_msp_c myRIO* configuration (as the analog loopback cable is connected on the terminal board).

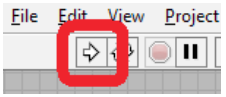
J

Click on the OK button.

K

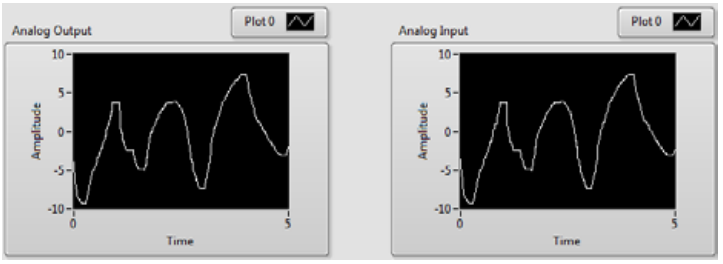
Go to the Front Panel of the VI (CTRL-E), pictured in Step 4.

L



Click on the white arrow button to run the VI.

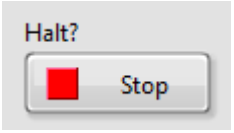
M



Scope view of the VI Front Panel

When manually moving the **Analog Output Signal** knob of the VI, both **Analog Input** and **Analog Ouput** scopes should display the same trace. If not, go to the *Troubleshooting* section.

N



Click on the STOP button to stop running the VI.

TROUBLESHOOTING

Review the following recommendations before contacting technical support engineers.

In order to contact Quanser for assistance, open the http://www.quanser.com webpage and click on the Tech Support link.

Getting 'VI Missing' messages when opening the DAQ Test example VI.	• Ensure NI LabVIEW™ and all the add-ons listed in Step 1 have been installed. • Ensure the Quanser Rapid Control Prototyping toolkit has been installed, as detailed in Step 2 and 3.
The NI myRIO does not appear in the *Measurement & Automation Explorer* window.	• Refer to National Insturment's troubleshooting guide for the NI myRIO device at: https://www.decibel.ni.com/content/docs/DOC-30345
When running the DAQ Test, the *Analog Input* scope does not read anything.	• Ensure the RCA loopback connection is made on the Terminal Board on myRIO, as described in Step 4A. • Verify that the *ni_myrio_msp_c* was selected in the *HIL Initialize* VI, as described in Step 4I. • Check that the NI myRIO is powered correctly.

STILL NEED HELP? For further assistance visit ni.com/support or contact NI Support at 866-275-6964.

LEARN MORE To find out about the full range of Quanser control experiments, visit www.quanser.com