



Installation Guide: Quanser Rapid Control Prototyping Toolkit® 2012 for NI CompactRIO

STEP 1 Install NI LabVIEW™ and Add-on Requirements

The Quanser Rapid Control Prototyping (RCP) Toolkit supports either 32-bit or 64-bit Microsoft Windows 7¹ for the host system and select NI CompactRIO configurations as targets.

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Ensure the intended NI CompactRIO (cRIO) target is one of the currently supported NI cRIO systems:

- NI cRIO-9024 Real-Time Controller with NI cRIO-9113 Chassis

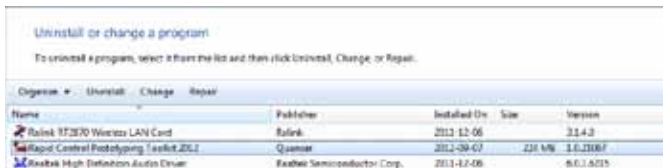
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Ensure LabVIEW™ is installed on the host computer with the following required add-ons:

1. 32-bit LabVIEW™ 2012
2. LabVIEW™ Control Design and Simulation Module 2012
3. From the NI Device Drivers 2012 (i.e., NI DAQmx 2012):
 - (a) Reconfigurable I/O (RIO) Feature
 - (b) Real-Time and Embedded Feature
4. LabVIEW™ Real-Time Module 2012
6. LabVIEW™ MathScript RT Module 2012 (only used in certain curriculum VIs)

STEP 2 Install Quanser Rapid Control Prototyping Toolkit on Windows 7

A



Uninstall any previous version of the Quanser Rapid Control Prototyping (RCP) Toolkit that may be present on the computer (e.g., RCP Lite 2011). Do so by launching the *Programs and Features* dialog from the *Windows Control Panel*.

¹Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

B



1. Insert the RCP Toolkit 2012 Installation CD.
2. The Quanser Rapid Control Prototyping Toolkit installation screen should appear.
3. Click on **CHECK FOR UPDATES** to open the RCP Toolkit download page containing the latest RCP Toolkit version available.

Note: The version of the RCP Toolkit software you received on the Installation CD is shown on the installation screen.

C

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

1. **Download** and **run** the latest RCP Toolkit 2012 installer, which consists of a single executable, named *install_quanser_rcp_toolkit.exe*.
2. A new RCP Toolkit installation screen should appear and replace the previous one.
3. Eject the RCP Toolkit Installation CD.

D



Click on **INSTALL** to start the RCP Toolkit installation process.

E

Follow the steps of the installation wizard.

F



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

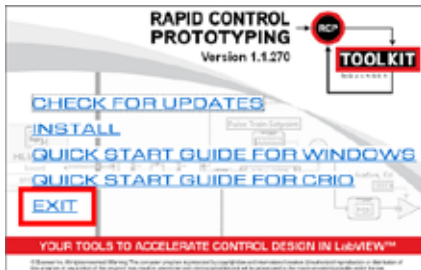
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If, during the installation, a *Windows Security* dialog appears asking *Would you like to install this device software?*, check the *Always trust software from the Quanser Consulting Inc* checkbox and click on the **Install** button.

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

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Once the installation is complete, click on **EXIT** to close the RCP Toolkit installation screen.

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

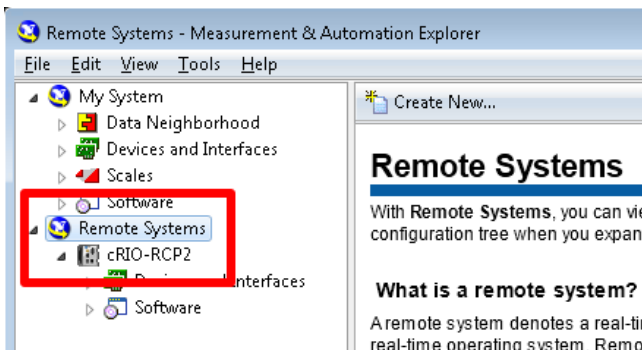
A

Refer to the Quanser Q1-cRIO Quick Start Guide to ensure the NI CompactRIO hardware is properly set up with the Quanser Q1-cRIO module and connected to the Windows-based PC or laptop.

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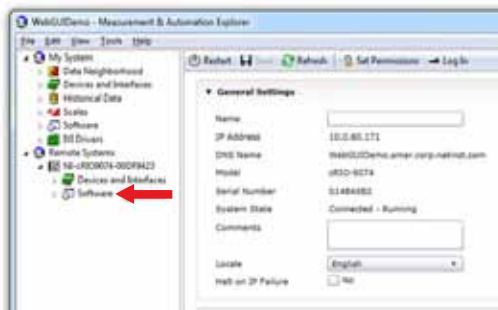
From the Windows **Start** menu, load the *NI Measurement & Automation Explorer (MAX)* software.

C



Ensure the NI CompactRIO device is listed in NI's *Measurement & Automation Explorer* software under **Remote Systems**. If not, go to: <http://www.ni.com/getting-started/setuphardware/compactrio/troubleshootmax.htm>

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

E

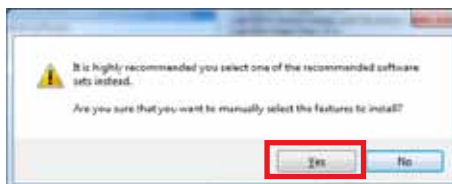


Select the **Custom** software installation.

F

Click on the **Next** button.

G



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

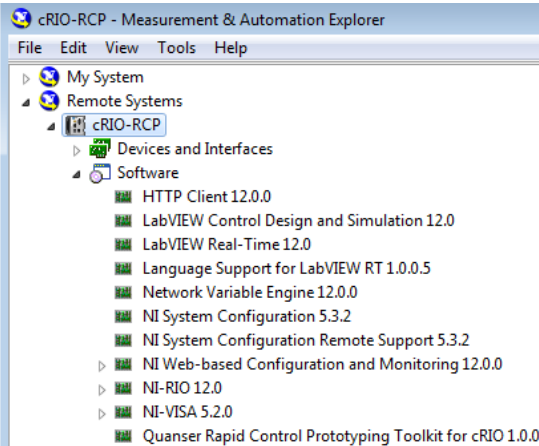
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Select the following LabVIEW™ add-ons for your NI CompactRIO:

- LabVIEW™ Control Design and Simulation
- LabVIEW™ Real-Time
- NI-RIO
- Quanser Rapid Control Prototyping Toolkit for NI CompactRIO

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



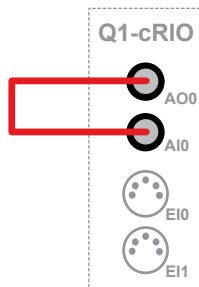
The following list should now appear under the **Software** item of NI's *Measurement & Automation Explorer* dialog window.

STEP 4 Q1-cRIO Test

The Analog Loopback VI used in this section confirms that the Rapid Control Prototyping (RCP) Toolkit has been installed properly on both Windows 7 and the NI CompactRIO. It also tests the Quanser Q1-cRIO data acquisition (DAQ) device.

Ensure the NI CompactRIO (cRIO) is in one of the four RCP-supported configurations and that one Quanser Q1-cRIO module is inserted in Slot 1 of the cRIO chassis. Refer to the Quanser Q1-cRIO Module Quick Start Guide for more information about the supported cRIO configurations and how to set up the Q1-cRIO module.

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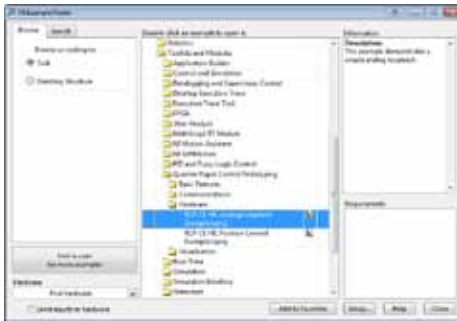


Using the RCA cable supplied with the Quanser Q1-cRIO module, connect **Analog Output Channel #0** [AO #0] to **Analog Input Channel #0** [AI #0].

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Ensure the NI CompactRIO and Quanser Q1-cRIO module are powered ON.

C



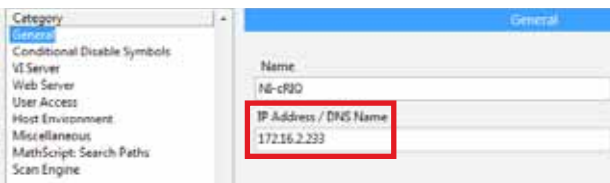
1. In LabVIEW™, open the **NI ExampleFinder** by selecting *Find Examples...* from the *Help* menu.
2. In the *NI Example Finder* dialog, when browsing according to **Task**, open the *Toolkits and Modules/Quanser Rapid Control Prototyping/Hardware* folder.
3. Double-click on the *RCP CL HIL Analog Loopback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

D



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

E



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

F

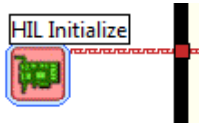


LabVIEW™ VI Front Panel

Double-click on the *RCP CL HIL Analog Loopback Example.vi* file listed under *NI-cRIO*.

G

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



H



Configure HIL Initialize window

In the *Board type* options under the *Main* tab, select the *q1_single* cRIO configuration (as the analog loopback cable is connected on the Q1-cRIO module in Slot 1).

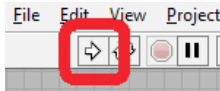
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Click on the OK button.

J

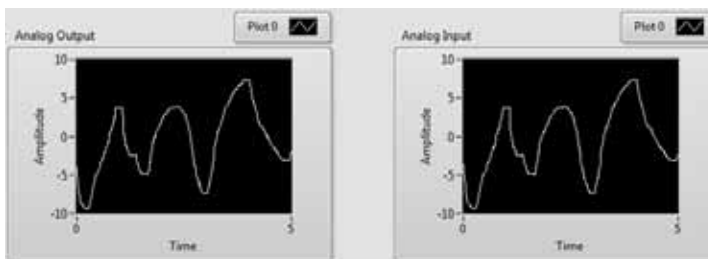
Go to the Front Panel of the VI (CTRL-E), pictured in Step 4F.

K



Click on the white arrow button to run the VI.

L

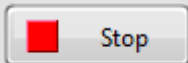


Scope view of the VI Front Panel

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

M

Halt?



Click on the STOP button to stop running the VI.

TROUBLESHOOTING

Review the following recommendations before contacting Quanser's technical support engineer

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 Step 3.

The NI CompactRIO does not appear in the Measurement & Automation Explorer window.

- Refer to NI's troubleshooting guide for the NI CompactRIO device at: <http://www.ni.com/gettingstarted/setuphardware/compactrio/troubleshootmax.htm>

When running the DAQ Test, the *Analog Input* scope does not read anything.

- Ensure the RCA loopback connection is made on the Quanser Q1-cRIO module, as described in Step 4A.
- Verify that the *q1_single* was selected in the *HIL Initialize* VI, as described in Step 4H.
- Check that the Quanser Q1-cRIO is powered correctly. See the Quanser Q1-cRIO Quick Start Guide for instructions on how to connect the + and - terminals on the Quanser Q1-cRIO module.

STILL NEED HELP?

For further assistance from a Quanser engineer, contact us at tech@quanser.com or call +1-905-940-3575.

LEARN MORE

To find out about the full range of Quanser Control modules, visit www.quanser.com