Quick Installation Guide: QUARC™ on NI™ NI ELVIS III for the Quanser Controls Board

STEP 1 Install MATLAB® and Required Add-Ons

QUARC™ supports 64-bit Microsoft® Windows®.

Ensure one of supported MATLAB versions is installed on the computer with the following required add-ons accompanying the corresponding MATLAB version:

- **Simulink®**
- **Simulink Coder™**
- **MATLAB Coder™** (required by Simulink Coder)
- **Control System Toolbox™** (Optional add-on, but highly recommended as used by most of Quanser's control laboratories)

STEP 2 Install NI CompactRIO™ Device Drivers

Install NI CompactRIO (version 18.0 or later), which can be obtained from the National Instruments™.

Select the default features, and ensure the NI Measurement & Automation Explorer (MAX) is selected to install on the host computer (NI MAX is required for configuring and installing QUARC on the NI ELVIS III).

STEP 3 Install QUARC on Windows

A

Uninstall any previous version of QUARC that may be present on the computer.

Do so by launching the *Programs and Features* dialog or the *Apps & features* dialog depending on which Windows version you have.

B

1. An internet connection is required during the QUARC installation process. Download the QUARC web installer executable using the link provided in the confirmation email that you received.
2. Run the QUARC installer (i.e., install_quarc.exe). The QUARC installation screen should appear.

The installer automatically checks if there is a newer update ready to download.

Tip: To find tips for each installation window, hover the mouse cursor

on the blue information icon on the lower left corner or

click the question mark icon on the upper right corner for more details from the installation guide.

C

If an update is available, choose to *Update* to the latest version [for free].

D

Read over the license agreement displayed in the Quanser License Agreement window.

E

Enter the location of the QUARC license file provided in the confirmation email and click *Next* to continue.

F

The installer will automatically scan the software environment on the host PC to ensure it meets the requirements for QUARC on the NI ELVIS III (e.g., MATLAB, NI MAX).

To start the installation immediately using the default settings click Install and skip to Step I. Otherwise click Options to customize the installation and continue.

G

Provide the destination folder where QUARC will be installed, and click *Next* to continue.

H

Choose the features to be installed. If you don't have the proper license required for a feature, the feature will be disabled and greyed out.

At minimum, make sure to select **NI ELVIS III Cross-Compilers** and **Simulink Development Environment**.

Note: If you don't have NI MAX installed, the *NI ELVIS III Cross-Compilers* will be greyed out.

Click *Install* to continue.

I

A progress bar and embedded video should appear on the installation screen.

J

The QUARC installer automatically configures the Quanser License Manager before completing the installation.

STEP 4 Install QUARC on NI ELVIS III via NI MAX

Ensure CompactRIO drivers and its accompanied software are installed as outlined in Step 2. Also make sure QUARC is installed as outlined in Step 3 above. Then connect the NI ELVIS III to the computer that has QUARC installed via USB and ensure the main power to the NI ELVIS III is turned on.

A

- Open NI MAX by launching it via the Windows Start Menu.
- Expand the *Remote Systems* tree, and find the *NI ELVIS III* device.
- Look at the *System Settings*, and note the *IP Address* of your NI ELVIS III. You will need to use it to setup the QUARC test model in Step 5.

B

- Expand the *NI ELVIS III* device, and select *Software*.
- Right-click on *Software*, and click on *Add/Remove* Software.

C

Once the *Log In* window pops up, use the login information from your NI ELVIS III manual to proceed.

Tip: The default *User name* is *admin*, with no *Password*.

D

When the *LabVIEW Real-Time Software Wizard* dialog pops up, click on *Custom software installation*, and then click *Next»*.

E

This warning dialog will appear, click *Yes* to accept the warning.

F

- Select *QUARC for NI ELVIS III* from the list.
- From the feature drop-down menu, choose *Install the feature*.
- Click *Next*.

G

A dialog showing the selected items will be displayed. Click *Next >>* to continue.

H

A progress bar should appear on the installation screen while NI MAX installs QUARC to the NI ELVIS III.

Note: The NI ELVIS III will reboot a few times during the QUARC installation.

I

When the installation is complete, a message will indicate that the NI ELVIS III has been updated successfully. Click *Finish* to exit the dialog window.

J

- You should see *QUARC for NI ELVIS III* in the list of software.
- You can now exit NI MAX.

STEP 5 Test on NI ELVIS III with the Quanser Controls Board

This section is to confirm that QUARC has been installed properly on both the host machine and the NI ELVIS III. The *QUARC Encoder Demo* is used.

A

- Make sure the **Quanser Controls Board** with the **disc** attached is connected to the NI ELVIS III.
- Ensure the main power for the NI ELVIS III is turned on.
- Turn on the power for the top board.

B

- Launch MATLAB.
- Open the *QUARC preferences* by typing **quarc_preferences_dialog** in the MATLAB Command Window.
- The *QUARC Preferences* dialog window should appear.
- On the **Model** tab, set the following:
  Target type: *linux_rt_armv7*
  Default model URI:
  tcpip:*//ELVIS_III_IP_address*:17001

  where *ELVIS_III_IP_address* is the IP address of your NI ELVIS III, which can be found via NI MAX (refer to Step 4A).
- On the **Target Type** tab, set the following:
  Default target type: linux_rt_armv7
  Default compiler: gcc
- Then press *OK* to close the dialog.

C

- Open the QUARC built-in examples by typing **qc_show_demos** in the MATLAB Command Window.
- The *QUARC Demo Examples* Supplemental Software Help window should appear.
- Click on the **QUARC Encoder Demo** under the *Using Hardware* category to open the example page.
- On the top-right corner of the *QUARC Encoder Demo* example page, click on **Open this model**.

D

On the taskbar, right click on the QUARC tray icon and select *Target->Remote…*
The *Select remote target* dialog should appear.

E

On the *Select remote target* dialog, make sure to set the Target URI to:

tcpip://*ELVIS_III_IP_address*:17000

where *ELVIS_III_IP_address* is the IP address of your NI ELVIS III, which can be found via NI MAX (refer to Step 4A). Then press *OK* to close the dialog. The QUARC Tray icon should now appear green.

F

Double-click on the QUARC **HIL Initialize** block.

G

- In the *Board type* option list under the *Main* tab, select **qab_controls**.
- Click on the **OK** button to close the *HIL Initialize* dialog.

H

- Click on the **Monitor & Tune** button on the Hardware tab of the Simulink Toolstrip.
- Double-click on the **Scope** block.

I

Double click on the **Slider Gain** block. Slowly increase the gain to about 0.6.

The base motor on the Quanser Controls Board is commanded to drive in a sinusoidal wave. You should be able to see the encoder reading from the Scope that corresponds to the base motor changing position.

J

Click on the Simulink **Stop** button to stop the running model.

TROUBLESHOOTING	Review the following recommendations before contacting Quanser's technical support engineers.

The "NI ELVIS III Cross-Compilers" is greyed out in features selection during QUARC install.	• Ensure your QUARC license file includes the NI ELVIS III feature. • Ensure you have installed NI MAX prior to installing QUARC. Note that you can continue installing QUARC without NI MAX, however support for NI ELVIS III will not be available. In this case, install NI MAX after installing QUARC, then re-run the QUARC web installer again, and choose **Change** to allow you to select the **NI ELVIS III Cross-Compilers** feature to be installed.
The NI ELVIS III does not appear in the NI Measurement & Automation Explorer (MAX).	• Refer to the National Instruments troubleshooting guide for the NI CompactRIO device at www.ni.com/getting-started/set-up-hardware/compactrio/troubleshoot-max.
Getting error: '*Error occurred while executing External Mode MEX- file 'quarc_comm': An operating system specific kernel-level... driver for the specified card could not be found. The card or driver may not be installed...*' when building a model	• Ensure the USB cable is properly connected between the host PC and the NI ELVIS III. • Verify the NI ELVIS III Series Prototyping Board is properly connected to the NI ELVIS III. • Ensure QUARC is installed on the NI ELVIS III as outlined in Step 4.

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