QLabs Hybrid System Configuration Guide

This document outlines the steps required to configure your system to run both Quanser hardware with QUARC for MATLAB Simulink and QLabs Virtual Experiments. Configuration changes to convert Simulink models from Quanser hardware resources to work with QLabs Virtual Experiments are also included.

STEP 1	Install QUARC

1. Follow the QUARC *Quick Installation Guide* to install **QUARC 2025**. Ensure one of supported MATLAB versions is installed on the computer. Quanser Interactive Labs should be installed as part of the QUARC installation procedure, if supported by your QUARC license. Be sure to reach out to the Quanser team to confirm that your license supports QLabs. We recommend that you uncheck any optional cross-compilers that are not needed to save disk space and installation time.

When using the full QUARC Real-Time Control Software with Quanser Interactive Labs, the Simulink models for QLabs Virtual Experiments need to be configured in *External* mode and used to build/generate code, similarly as is done when using the hardware. In the standard QLabs Virtual Experiments configuration, the Simulink models supplied with the virtual courseware are configured to *Normal* mode for standard simulation (i.e., no code generation). When using the Hybrid Configuration, use the Quanser hardware courseware models from www.quanser.com/resources and perform the following modifications for use with the virtual system:

STEP 2	Open Model

1. Download the Simulink models for your Quanser virtual system from www.quanser.com/resources. These are the models that have been configured for the hardware and need to be converted to use with QLabs.
2. Open the Simulink model to configure in **MATLAB Simulink**.

STEP 3	Configure HIL Initialize Block

1. Locate and open the **HIL Initialize** block in the model. As shown in Figure 1, go to the **Main** pane and ensure the **Board type** corresponds to your product is selected, as listed in Table 1.

   Note: If you are using a Q2-USB or an older DAQ board such as a Q8, set the board type to **Q8-USB** instead.

2. Append the **Board identifier** field as follows:

   ```
   0@tcpip://localhost:XXXXX
   ```

   where **XXXXX** refers to the HIL port number provided in Table 1.
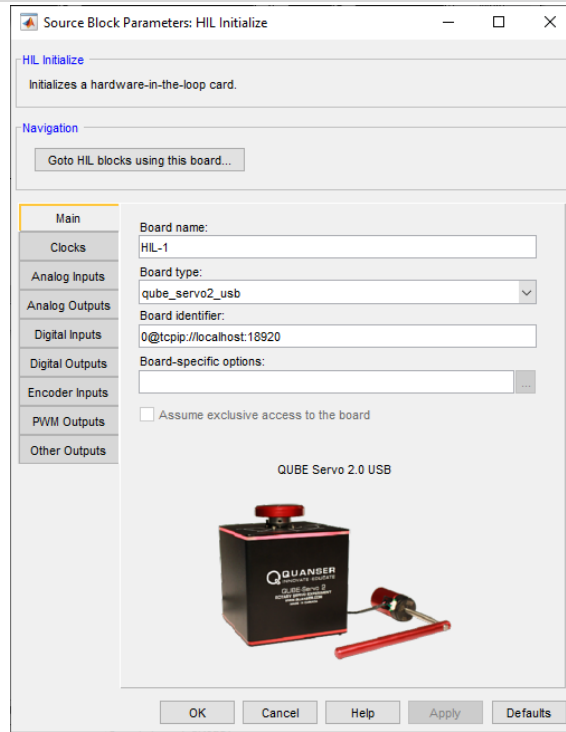
3. Click the **OK** button to accept the applied changes.

Figure 1: Example of a HIL Initialize block configured for a QUBE-Servo 2

Virtual Product	HIL Board type	HIL Port Number
QUBE-Servo 2 with Disc	qube_servo2_usb	18920
QUBE-Servo 2 with Pendulum	qube_servo2_usb	18921
QUBE Servo 3 with Disc	qube_servo3_usb	18922
QUBE Servo 3 with Pendulum	qube_servo3_usb	18923
Aero	quanser_aero_usb	18930
Aero 2	quanser_aero2_usb	18950
QArm	quanser_qarm_usb	18900
QBot 2e	qbot2e	18910
QBot 3	qbot3	18910
QBot Platform	qbot_platform	18914
Coupled Tanks	q8_usb	18950
Rotary Servo (SRV02)	q8_usb	18940
Flexible Link (SRV02)	q8_usb	18941
Ball and Beam (SRV02)	q8_usb	18942
Pendulum (SRV02)	q8_usb	18943
QCar	qcar	18960
QCar 2	qcar2	18960
QDrone 2	qdrone2	18981

Table 1: List of HIL port numbers for Quanser virtual plants

STEP 4   Configure Video3D Initialize Block

1. If your model uses Video3D blocks, open the **Video3D Initialize** block as shown in Figure 4, and modify the **Device identifier** field as follows:

```
0@tcpip://localhost:XXXXX
```

where **XXXXX** refers to the Video3D port number provided in Table 2.
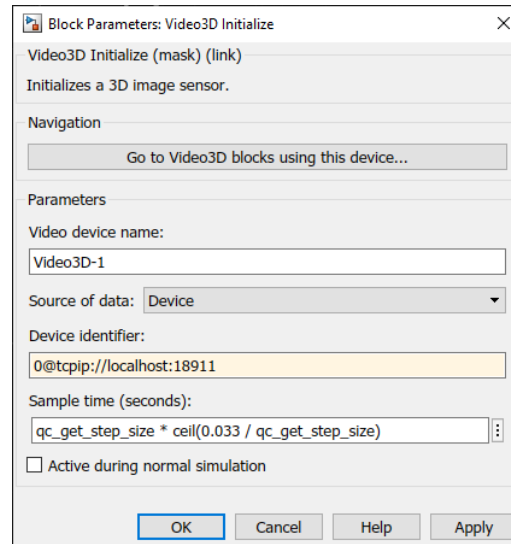

Figure 4: Configuring the Video3D Initialize block for a QBot 2e

Table 2: List of Video3D port numbers for Quanser virtual plants

Virtual Product	Video3D Port Number
QArm Camera	18901
QBot 2e Camera	18911
QBot 3 Camera	18911
QBot Platform Camera	18917
QCar Camera	18965
QCar 2 Camera	18965
QDrone 2 Camera	18986

STEP 5   Test Your Model

1. To test your model, open the QLabs application and select the Workspace of the appropriate virtual product.
2. Click on the **Monitor & Tune** button on the *HARDWARE* tab of the Simulink model (or use the QUARC tab).
3. If your model was configured correctly, it should run and display results similar to those provided in the Student and Instructor resources of your specific product.

Still Need Help?   If you have any issues with running QLabs, please go to the QLabs support page. For further assistance from a Quanser engineer, contact us at tech@quanser.com