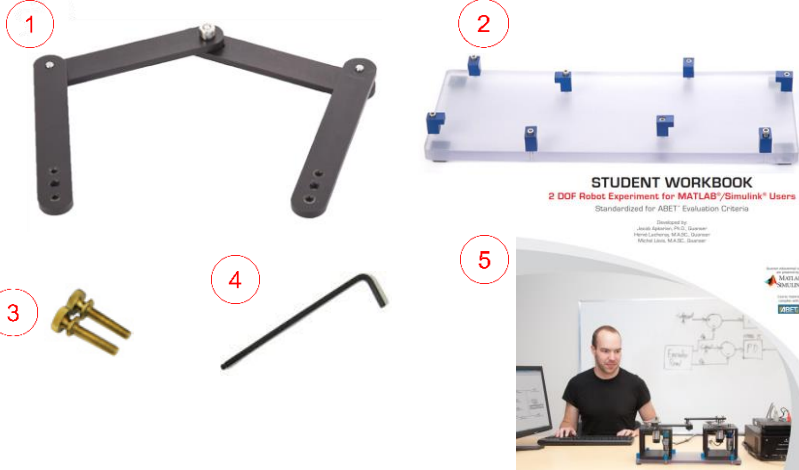
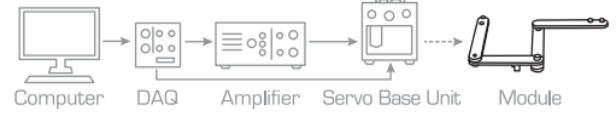


Quick Start Guide: Rotary 2 DOF Robot



STEP 1 Check Components and Details:

Make sure your Rotary Inverted Pendulum Module includes the following components:



1. Rotary 2 DOF Robot Four-bar Linkage
2. Support Base Plate
3. Set of four thumb screws
4. 9/64 Allen Key
5. Content and courseware provided in digital form at www.quanser.com/resources

STEP 2 Additional Components Required for Set Up

To complete the Rotary Servo Base Unit set up, you will also need the following:



1. QUARC Real-Time Rapid Control Prototyping Software
2. Set of Two Rotary Servo Base Units
3. Power Amplifier (VoltPAQ-X2 pictured)
4. One of the following QUARC supported data acquisition device such as:
 - a. Quanser Q2-USB or
 - b. Quanser Q8-USB or
 - c. Another QUARC supported DAQ device
5. Set of two RCA to RCA cable
6. Set of two 4-pin DIN to 6-pin DIN Motor cables
7. Set of two 5-pin DIN to 5-pin DIN Encoder cables
8. Emergency Stop Switch

NOTES:

1. These components must be purchased separately
2. Cables are shipped with Quanser VoltPAQ-X2 amplifier

To set up your 2 DOF Robot module, please read the following instructions carefully.

STEP 3

Install and test QUARC

1. Make sure you have all the required software as listed in the QUARC Compatibility Table included in the installation software and online at www.quanser.com
2. Follow the QUARC Installation Guide on how to install the software and testing instructions.
3. Make sure the QUARC Analog Loopback Demo is successfully ran before continuing.

STEP 4

Setup the Hardware

The connections shown below are illustrated using a generic data acquisition (DAQ) device and a VoltPAQ-X2 amplifier (you may have a different DAQ or amplifier). For detailed instructions, see the 2 DOF Robot User Manual. (Enclosed with shipment)

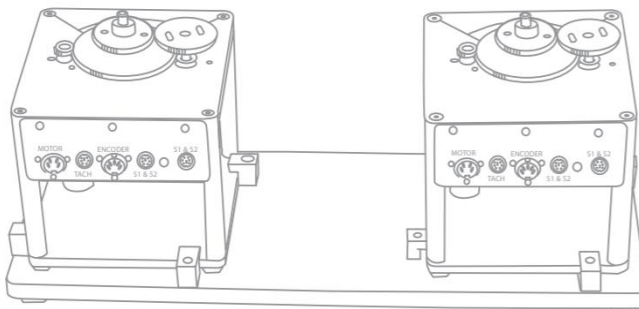
A

Before proceeding, set up and test your Rotary Servo Base Unit. For detailed instructions, see the Rotary Servo Base Unit Quick Start Guide or User Manual

B

Make sure everything is powered OFF before making any of these connections. This includes turning off your PC and the amplifier.

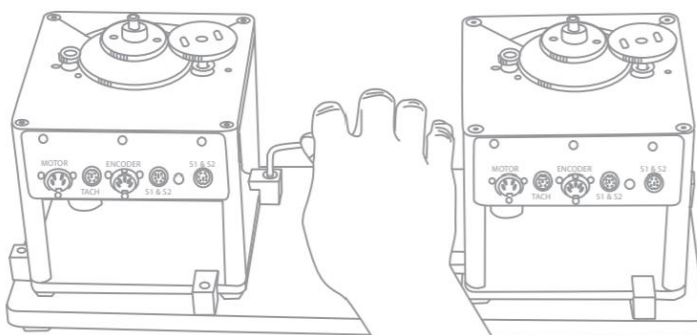
C



Place the two Rotary Servo Base Unit Systems onto the support plate.

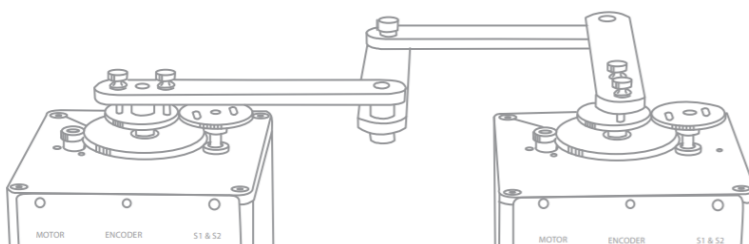
Note: Ensure the Rotary Servo Base Unit is setup in the high gear configuration

D



The support plate has a total of 8 clamps. Tighten the screws of the 4 clamps on each Servo until the rotary Servo Base Unit is properly fastened onto the base. You don't need to overly tighten the clamps.

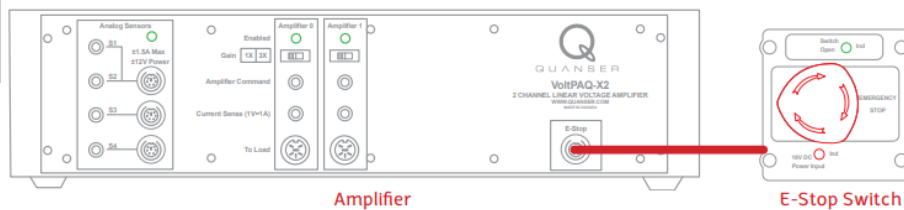
E



Mount the four-bar linkage on the output gear shafts of the servos. Fasten the linkage to each gear using the two thumb screws.

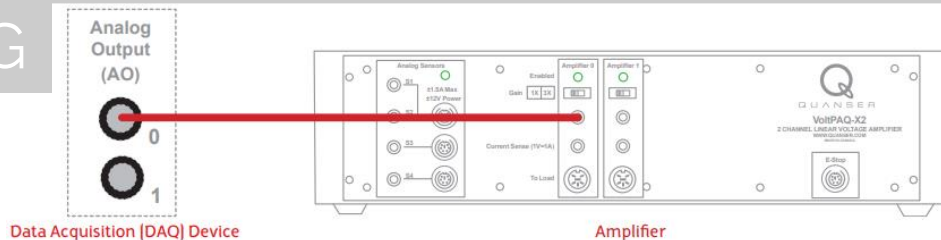
Rotary Servo Base Units with Linkage

F



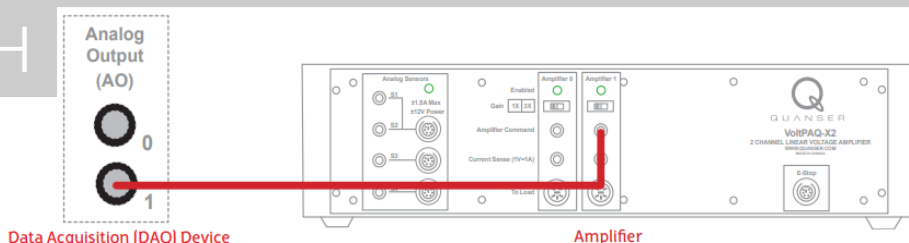
Connect the Emergency Stop Switch to the E-Stop connector on the VoltPAQ-X2

G



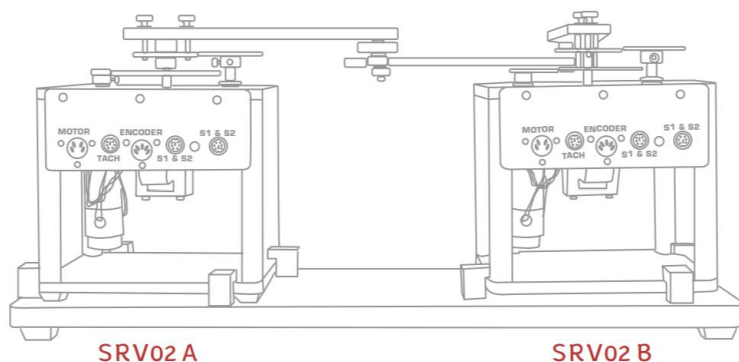
Using one RCA to RCA cable, connect **Analog Output Channel #0** [AO #0] on the data acquisition [DAQ] device to the **Amplifier Command #0** socket on one of the amplifiers.

H



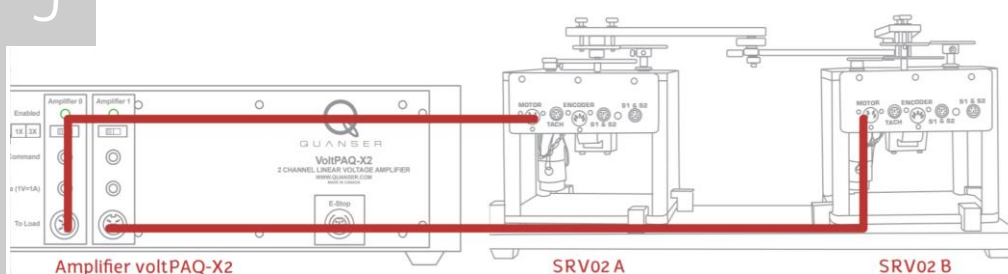
Using one RCA to RCA cable, connect **Analog Output Channel #1** [AO #1] on the data acquisition [DAQ] device to the **Amplifier Command #1** socket on one of the amplifiers.

I



For the upcoming connections, denote the Rotary Servo Base Unit on the left as "SRV02 A" and the Rotary Servo Base Unit on the right as "SRV02 B".

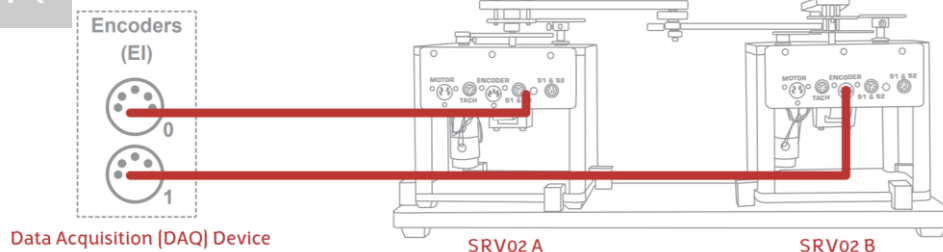
J



1. Connect the 4-pin DIN to 6-pin DIN motor cable from **To Load #0** on the amplifier to the Motor connector on the SRV02 A.

2. Using another 4-pin DIN to 6-pin DIN motor cable connect **To Load #1** on the amplifier to the Motor connector on the SRV02 B.

K



1. Using the 5-pin DIN to 5-pin DIN encoder cable, connect the **Encoder** socket on the **SRV02 A** panel to the **Encoder Input #0** socket on the data acquisition (DAQ) device.

2. Using another 5-pin DIN to 5-pin DIN encoder cable, connect the **Encoder** socket on the **SRV02 B** panel to the **Encoder Input #1** socket on the data acquisition (DAQ) device.

Follow the procedure below to test your Rotary 2 DOF Robot Module

A

Make sure your DAQ is connected to your PC and amplifier are powered ON

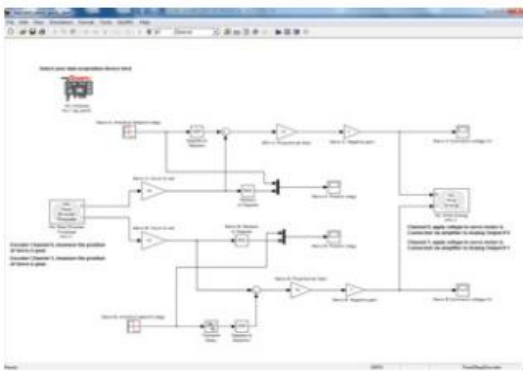
B

1. Download the 2DOF Robot Module **Simulink Technical Resources** and **Simulink Courseware Resources** from www.quanser.com/resources
2. Unzip the **Technical Resources** file to a folder on your local hard drive



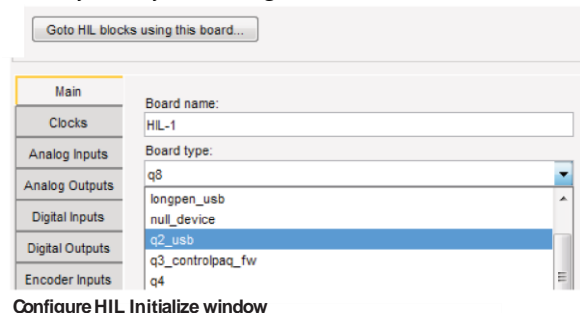
C

Open the Simulink model file found under the Quick Start folder on your hard drive.



D

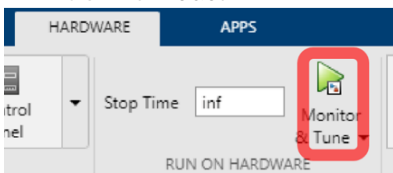
Double-click on the **HIL Initialize** block and choose the board that is installed on your system (e.g., Q2-USB)



Configure HIL Initialize window

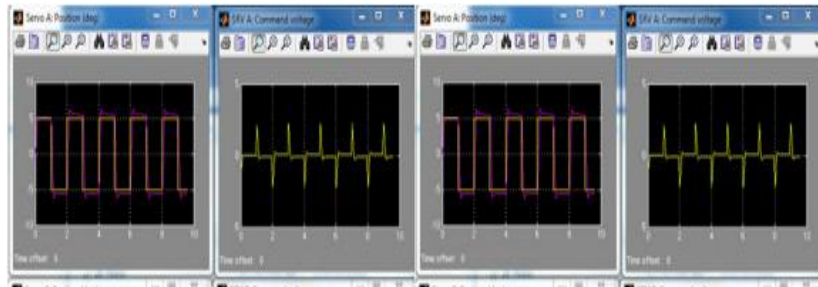
E

Click on the **Monitor & Tune** button under the **HARDWARE** or **QUARC** tab in Simulink to run the QUARC model



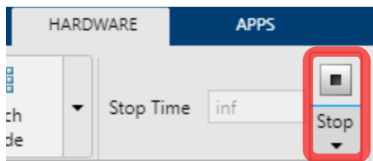
F

The servos should be tracking ± 5 deg square reference. Make sure the servos angles are all reading on the scopes, otherwise, consult the Troubleshooting section at the end of this guide.



G

Click on the **Stop** button under the **HARDWARE** or **QUARC** tab in Simulink to stop the running model.

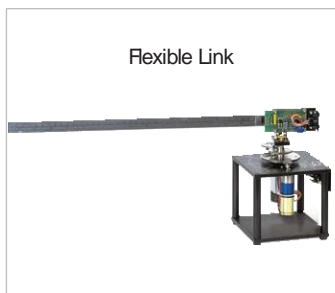


1. Make sure the cables are firmly connected.
2. Check the connection (outlined in Step 4 in this guide).
3. Make sure the Rotary Servo Base Unit has been set up and tested successfully.
Review the Rotary Servo Base Unit Quick Start Guide and User Manual setup or troubleshooting section for more information.

Getting an error when trying to build or run the Quick Start Simulink model	<ol style="list-style-type: none"> A. Verify that the MATLAB/Simulink and compiler version are supported with your version of QUARC. See the QUARC Software Compatibility table supplied in the QUARC Quick Installation Guide or online at: http://www.quanser.com/products/quarc-real-time-control-software/. B. Type ver in the MATLAB Command Window and verify that Quanser Real-Time Control (QUARC) is on the list. If not, then go through the QUARC Quick Installation Guide to install QUARC. If it is listed, run mex-setup as described in the QUARC installation guide. C. If the "...specific kernel level driver for the specified card could not be found" error is prompted when you attempt to run, then you may not have selected the correct data acquisition (DAQ) device in the HIL Initialize block or the DAQ device has not been installed properly (refer to the DAQ device User Manual).
The motor is not responding	<ol style="list-style-type: none"> A. If the Emergency stop switch is connected to the amplifier, make sure the red button is in the upper position to enable the amplifier. The amplifier cannot be enabled when the button is in the lower position. Twist the button to ensure it is in the enabled position. B. Review connections in Step 4G to 4J. C. Ensure the power amplifier is powered on and operational, i.e., when using VoltPAQ-X2, verify that the green LED is lit. D. Verify the data acquisition (DAQ) device is functional. Go through the DAQ User Manual for troubleshooting guidelines
The Encoder is not reading	<ol style="list-style-type: none"> A. Review connection in Step 4k. B. Verify the data acquisition (DAQ) device is functional. Refer to the DAQ device User Manual for troubleshooting guidelines C. See the Rotary Servo Base Unit User Manual for more troubleshooting information.

STILL NEED HELP? For further assistance from a Quanser engineer, contact us at tech@quanser.com.

Expand the Rotary Servo Base Unit to the following popular experiments using Quanser Rotary Control add-on modules.



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