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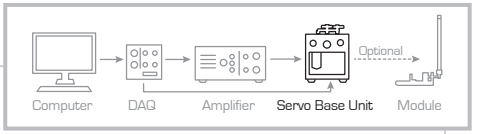
Quick Start Guide: Rotary Servo Base Unit

MATLAB SIMULINK

STEP 1 Check Components and Details

Make sure your Rotary Servo Base Unit includes the following components:



1. Quanser Rotary Servo Base Unit
2. Disc and bar load
3. 72-tooth gear head
4. Set of two thumb screws
5. 3/32, 5/64, and 7/64 Allen keys
6. 5-pin DIN to 5-pin DIN encoder cable
7. Set of two 6-pin mini-DIN to 6-pin mini-DIN analog cables
8. Quanser Workstations Resources DVD* (includes controllers; digital versions of User Manual, Quick Start Guide and courseware; and other files)

*DVD supplied with the QUARC Real-Time Rapid Control Prototyping Software, see Step 2

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 Installation DVD
2. Power Amplifier (VoltPAQ-X1 pictured)
3. One of the following data acquisition devices:
   a. Quanser Q2-USB, or
   b. Q8-USB, or
   c. NI PCI/PCIe with NI M and X Series Terminal Board
4. RCA to RCA cable
5. 4-pin DIN to 6-pin DIN motor cable
6. 5-pin DIN to 4x RCA cable

Note: These components must be purchased separately.

STEP 3 Install and Test QUARC

A. Make sure you have all required software, as listed in the QUARC Compatibility Table document located in the QUARC DVD folder.

B. See the QUARC Installation Manual for details on how to install the software.

C. Make sure you test the system using the Sine and Scope demo. You can access this by typing **qc_show_demos** in the Matlab prompt.

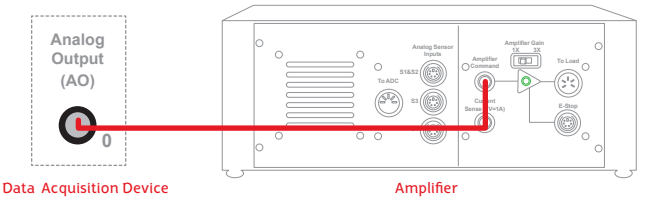
STEP 4 Set Up the Hardware

To set up your Rotary Servo Base Unit, please read the following instructions carefully. The connections shown below are illustrated using a generic data acquisition (DAQ) device and a VoltPAQ-X1 amplifier (you may have a different DAQ or amplifier). For detailed instructions, see the Rotary Servo Base Unit User Manual (enclosed with shipment).

A Before proceeding, set up and test your DAQ device (e.g., Q2-USB). For detailed instructions, see the DAQ device Quick Start Guide or User Manual.

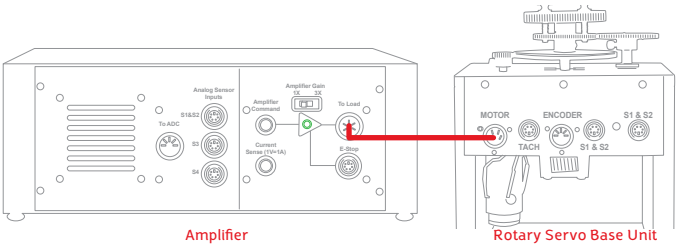
B Make sure everything is powered OFF before making any of these connections. This includes turning off your PC and the amplifier.

C



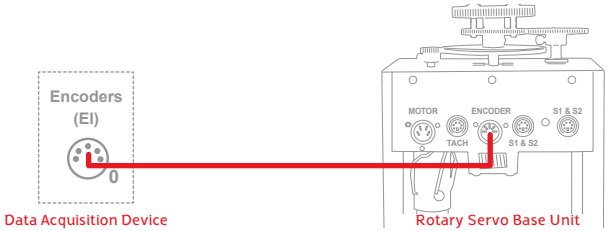
Using the RCA to RCA cable, connect **Analog Output Channel** #0 (AO #0) on the data acquisition (DAQ) device to the **Amplifier Command** socket on the amplifier.

D



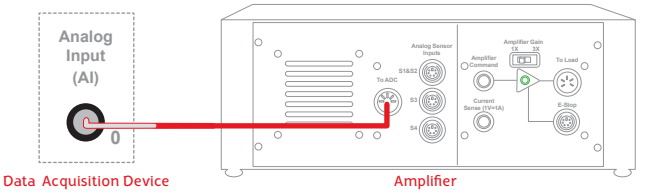
Using the 4-pin DIN to 6-pin DIN motor cable, connect the **To Load** socket on the amplifier to the **Motor** socket on the Rotary Servo Base Unit.

E



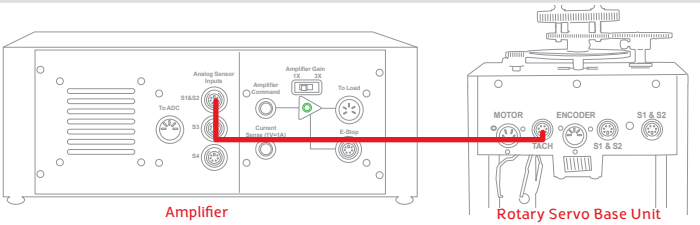
Using the 5-pin DIN to 5-pin DIN encoder cable, connect the **Encoder** socket on the Rotary Servo Base Unit panel to the **Encoder Channel #0** (EI #0) socket on the data acquisition device.

F



Using the 5-pin-DIN to 4xRCA cable, connect the 5-pin-DIN connector to the **To ADC** socket on the amplifier and the white RCA connector (S2) to **Analog Input (AI) #0** on the data acquisition device.

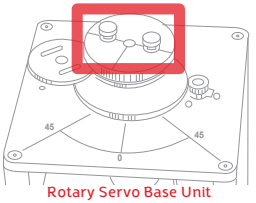
G



Using the 6-pin mini-DIN to 6-pin mini-DIN analog cable, connect **TACH** socket on the Rotary Servo Base Unit to the **S1 and S2** socket on the amplifier. This carries the tachometer signal.

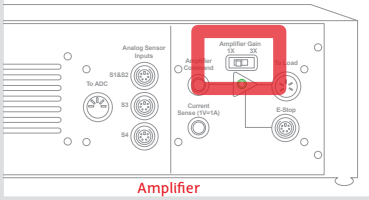
H

Attach the disc or bar load to the Rotary Servo Base Unit load gear using the two thumb screws.



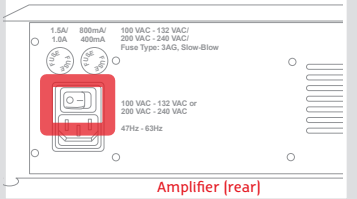
I

Attention VoltPAQ-X1 Users: Make sure you set the GAIN on the VoltPAQ-X1 to 1 when using any Rotary Servo Base Unit experiment.



J

Turn ON the power switch on the VoltPAQ-X1. It is located on the rear of the device.



STEP 5 Run the Controller

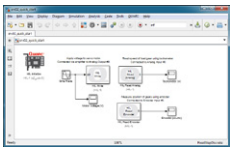
A

Make sure your PC and amplifier are powered ON.

B

On the Resources DVD (supplied with the QUARC and Servo Base Unit package), locate the **Quick Start Folder**: Rotary\Rotary Servo Base Unit\Quick Start. Copy the Quick Start folder to your local hard drive.

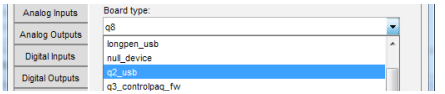
C



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

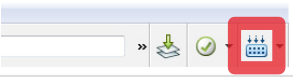
D

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



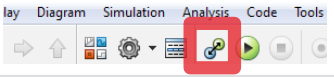
E

Click on the **Build Model** button on the Simulink model toolbar.



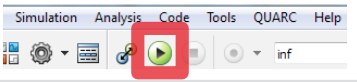
F

Once the model code has been compiled, click on the **Connect To Target** button.

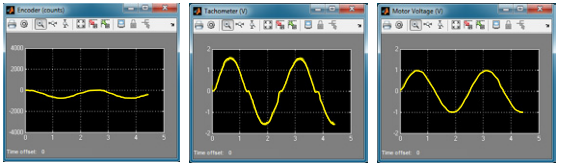


G

Click on the **Run** button to start the QUARC real-time model.



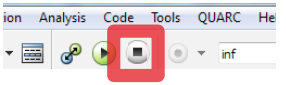
H



The scopes should look similar to those shown here.

I

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



TROUBLESHOOTING

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

1. Check the connections outlined in the Servo Base Unit (SRV02) User Manual.
2. Make sure cables are firmly connected.

Getting an error when trying to build or run the Quick Start Simulink model (.mdl)	**A.** Type ver in the *Matlab Command Window* and verify that 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 the QUARC Installation Guide. **B.** 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.	**A.** Review connection in Steps 4C and 4D. **B.** Ensure the power amplifier is powered on and operational, i.e., when using VoltPAQ-X1 verify that the green LED is lit. **C.** Verify the data acquisition (DAQ) device is functional. Refer to the DAQ device User Manual for troubleshooting guidelines. **D.** Ensure the voltage is reaching the motor terminals. See the Rotary Servo Base Unit User Manual for details.
The Tachometer is not reading.	**A.** Review connection in Step 4F and 4G. Make sure cables are firmly connected. **B.** Ensure the power amplifier is working, i.e., when using VoltPAQ-X1 verify that the green LED is lit. **C.** Verify the data acquisition (DAQ) device is functional. Refer to the DAQ device User Manual for troubleshooting guidelines. **D.** Measure the voltage across the tachometer. See the Rotary Servo Base Unit User Manual for details.
The Encoder is not reading.	**A.** Review connection in Step 4E. **B.** Verify the data acquisition (DAQ) device is functional. Refer to the DAQ device User Manual for troubleshooting guidelines.

STILL NEED HELP?

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

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

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Flexible Link

Flexible Joint

Ball and Beam

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