

Guides and Resources: Basic IO - QBot 2

Sensors

This document will summarize how to read data from the QBot 2's sensors, including the gyroscope, encoders, battery voltage, bumpers and buttons.

Reading from the QBot 2 Sensors

Note: Ensure that your QBot 2 is powered ON and that a connection has been established to it. Follow the steps under [Charging Vehicle Batteries](#) and [Communicating with the QBot 2](#) in the [Research Studio Setup Guide](#).

Note: Ensure that you have read and understood all the safety procedures and guidelines regarding charging Lithium Polymer batteries as well as guidelines on using the QBot 2 in a safe manner outlined in the [Research Studio Setup Guide](#). If you have any concerns or questions, please contact Quanser technical support (tech@quanser.com).

Note: Safety eye glasses should always be worn, even outside the net.

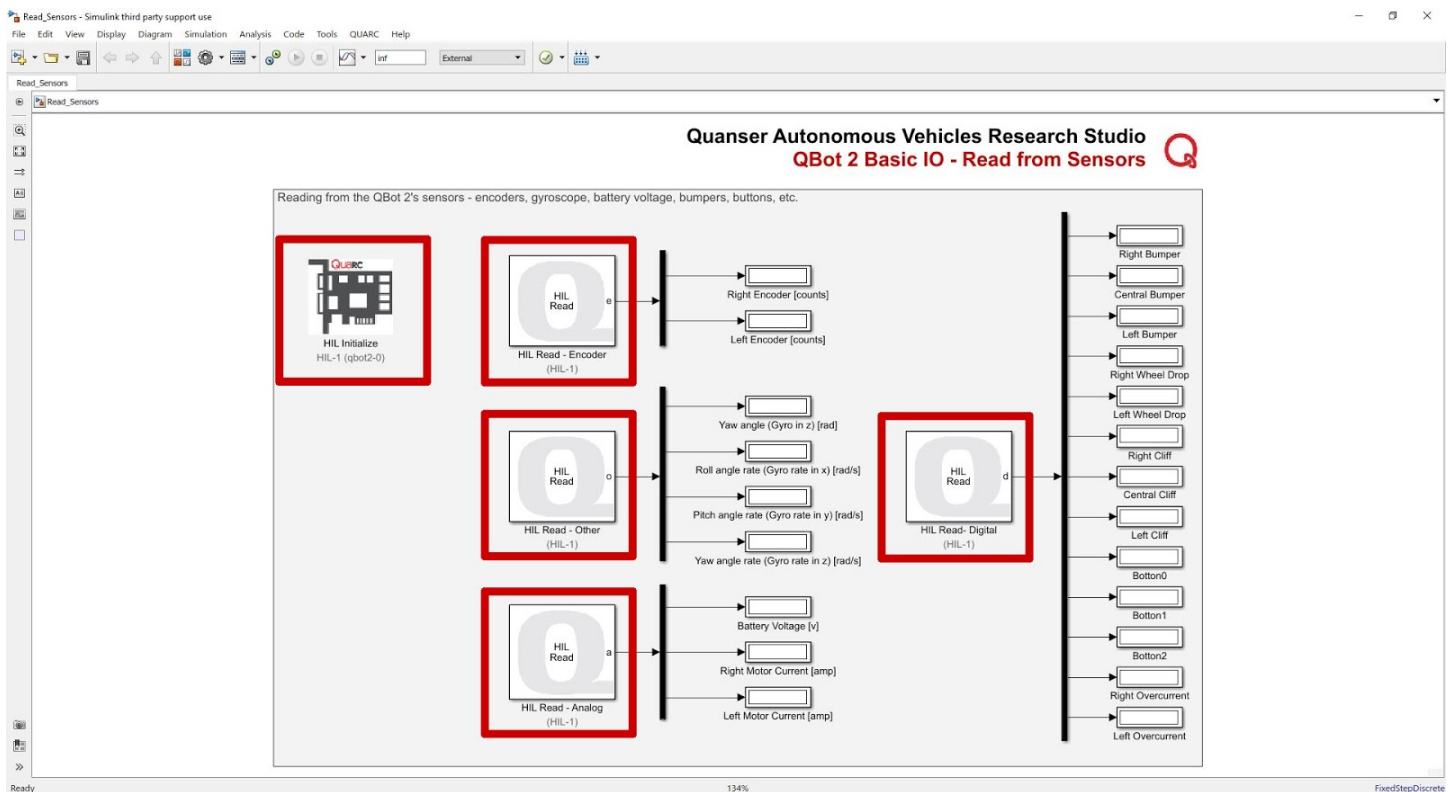


Figure 1: Read_Sensors.slx model, highlighting the HIL Initialize and HIL Read blocks

1. Under the [Guides and Resources > Basic IO > QBot 2 > Software](#) folder, open [Read_Sensors.slx](#) (Figure 1)

Note: For the latest documentation and controllers, please visit [Autonomous Vehicles Research Studio Resources](#).

Autonomous Vehicles Research Studio Resources weblink:
<https://www.quanser.com/products/autonomous-vehicles-research-studio/>

2. Under Model Configuration Settings, input the correct [QBot 2 IP address](#).

Note: See the [QBot 2 IO Check](#) section in the [Research Studio Setup Guide](#) for more information.

3. Build the model (QUARC menu > Build).
4. Start the model (QUARC menu > Start).
5. The QBot 2 will emit a sequence of beeps, which signifies that the model has started running.
6. Ensure that safety glasses are worn. Enter the workspace and move the QBot 2 around. The [Right Encoder \(counts\)](#), [Left Encoder \(counts\)](#) and [Gyroscope](#) displays should read values when the QBot 2 is moved/turned. The [Battery Voltage \(V\)](#) display should read the current battery level. Hitting the three bumpers should read 1s in the [Right](#), [Central](#) and [Left Bumper](#) displays. Pressing the three buttons on the QBot 2 base should show 1 in the [Button0](#), [Button1](#) and [Button2](#) displays.

Note: A [HIL Initialize](#) block must always be present and configured correctly for any IO to take place. The [HIL read/write](#) blocks allow you to read from and write to the channels configured in the [HIL Initialize](#) block. See [Guides and Resources > Concepts](#) for more information.

Note: Digital Channels 9 and 10 have dual use. They can be used as input channels to read bumper data, or output channels to write commands to LED#1. These two functionalities are mutually exclusive. Thus, it is not possible to read bumper data AND write to LED#1 at the same time.

7. Stop the model.

This completes a tutorial on how to read sensors and battery voltage data from the QBot 2. More information on configuring the HIL Initialize and HIL Read blocks can be found in detail under [Guides and Resources > Concepts](#).