Quick Start Guide: QBot 3

STEP 1 Check Components and Details

Make sure your QBot 3 robot package includes the following components:

1. QBot 3 mobile platform
2. WiFi router with power adapter
3. QBot 3 power supply
4. Ethernet cable

Content provided in digital form
www.quanser.com/resources

STEP 2 Install and Test QUARC™

1. Make sure you have all 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 for further installation and configuration instructions. You must install QUARC 2022 (or later).

STEP 3 Setup the network

The QBot 3 comes with an independent network to ensure reliable communications between the PC and the robot.

A Plug in the power adapter supplied with the wireless router. Switch on the wireless router.

B Connect your PC to any of the Ethernet/LAN ports on the router with the provided ethernet cable.

C Launch a command prompt on your PC and type ipconfig to retrieve the IP address assigned to the PC by the router. It should have a format similar to `192.168.2.xxx`. Replies from the IP address of the QBot indicating 32 bytes and a ping time indicates that the network is set up correctly. If not, restart the router or PC and try again. For ping times greater than 200 ms, consider moving the QBot closer to the router.

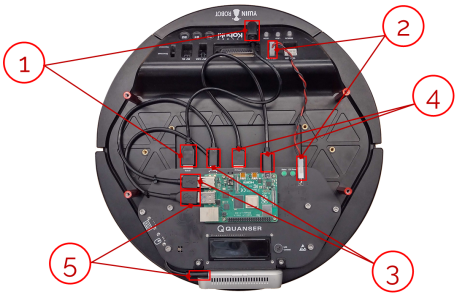
STEP 4 Setup the Hardware

To set up your QBot 3, please read the following instructions carefully.

A

Ensure that all cable connections on the QBot 3 base are secure.

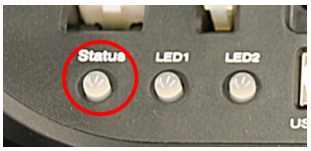
1. PCB to Base via USB for data
2. PCB to Base for power
3. PCB to Raspberry Pi via USB for data
4. PCB to Raspberry Pi via USB for power
5. Raspberry Pi to Intel Realsense via USB for data



B

Plug the power supply into the QBot 3 and a wall outlet and turn on the QBot 3 using the switch. Let the QBot 3 charge until the battery is full. The status LED blinks while the QBot 3 is charging.

C



The status LED turns a solid green when the QBot 3 is fully charged. Unplug the charger.

D

When the robot is fully charged, note the IP address of the QBot 3 on the LCD display, in a format similar to **`192.168.2.xxx`**. In a command prompt on your PC, ping the QBot 3's IP address. If you get a response from the QBot 3, it has been initialized correctly.

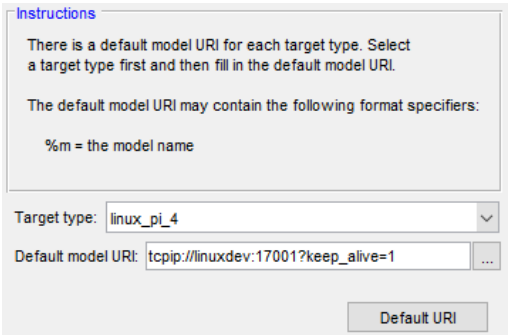
STEP 5 Test the QBot 3

Follow the procedure below to test the QBot 3 and confirm that it is fully functional.

A

Place the QBot 3 in a clear space of at least 2m x 2m. Make sure that the QBot 3 is powered ON and that is connected to the network as per instructions in Steps 3 and 4. Download the courseware and technical resources from www.quanser.com/resources, and open the Technical Resources folder. Locate and open the Quick Start folder, and then open the Simulink® model file: *Quick_Start_QBot3.mdl*.

B

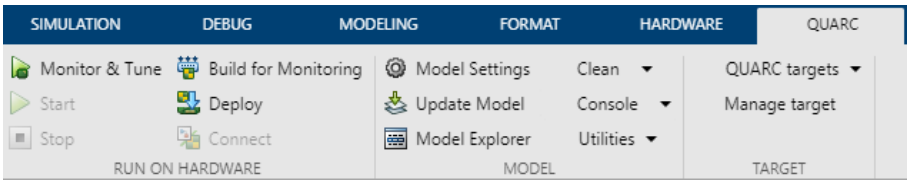


Open the *QUARC* menu from the menu bar in the Simulink menu, and then choose *Preferences*. Make sure *Target type* is set to *linux_pi_4.*

In the *Default model URI* field replace the word *linuxdev* with the IP address to the one for your QBot 3. For example, if your QBot 3 has an IP address of 192.168.2.20 then *Default model URI* should be set to:

tcpip://192.168.2.20:17001?keep_alive=1

C



Click on the *Monitor & Tune* button in the Simulink toolbar under the QUARC tab. Once the compilation of the real-time code for the model is complete, the model will automatically deploy and start running.

D

You should hear a startup chime when the robot initialization sequence is complete. Two windows will appear in Simulink showing the RGB and depth video feed from the camera. If the windows do not appear, you can manually open them by clicking on the two *Video Compressed Display (RGB)* and *Video Compressed Display (Depth)* blocks in the Simulink model. Drive the robot around using the 4 arrow keys on your keyboard.

E

Press the *Stop* button in the Simulink toolbar under the QUARC tab when done. You should hear a termination chime when the model stops successfully.

Never use the power switch on the Kobuki to turn OFF the QBot 3. Launch a terminal via PuTTy, and connect to the Raspberry Pi 4B using its IP address as the hostname. Use the credentials pi (username) and QuanserPi4 (password). Use the command '*sudo shutdown now'* to shut the embedded computer off. The LCD will display a message indicating it is safe to use the power switch. Turn the power switch OFF.

TROUBLESHOOTING

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

1. Check the connections outlined in Step 3 of the guide making sure the cables are firmly connected.
2. If you fix a connection, restart the QBot 3 before testing again.

The model will not compile properly.	A. Verify that the correct MATLAB version and toolboxes are installed. B. QUARC has been installed and configured correctly according to the Installation Instructions.
The model compiles but you cannot connect to the target.	A. Make sure that you are connected to the QBot 3 using the provided wireless network and you can ping the robot. B. Ensure that the robot is charged and powered on.
The model runs but you do not get any video data.	A. Make sure that the Intel Realsense sensor is attached and connected. B. Ensure that the robot is charged and turned on.

STILL NEED HELP?

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