

REFERENCES

1. Basic ROS Tutorials

These tutorials use the turtlesim.

The tutorials are essential to do so that you understand key ROS concepts: ROS filesystem, packages, nodes, topics, services, parameters, `rqt_console`, `roslaunch`, ROS msg and srv, publisher, subscriber, etc.

<http://wiki.ros.org/ROS/Tutorials>

2. Baxter Simulator Tutorial in “ROS Robotics by Example” by Carol Fairchild Ch 6

Gives a good intro to the Baxter simulator. I use the simulator extensively to develop code to protect the robot. I do not like to run newly developed code through the robot and potentially cause harm.

The UW library has this book.

3. Baxter Research Robot SDK website

Once you understand the concepts of ROS, this is your main reference for Baxter.

It has information on everything that you want to know about the robot.

If you look at the navigation bar on the side of the web page, you will see a tab called “Tools”.

Click on that and there will be a drop down with an option called “All Pages”. This will display all the web pages on the site so that you can see what is available.

Link to all pages: <http://sdk.rethinkrobotics.com/wiki/Special:AllPages>

The tools tab on the navigation bar contains a link to display all the pages located on the website.

Helpful webpages are:

a. Hardware specifications at: http://sdk.rethinkrobotics.com/wiki/Hardware_Specifications

b. Robot state and EStop at: http://sdk.rethinkrobotics.com/wiki/Robot_State_and_EStop

Next:

Go to the Learning page at: <http://sdk.rethinkrobotics.com/wiki/Learning>

There you will find links to great resources including example programs, the ROS API reference, the Baxter Interface Overview, and the Code API.

sdk.rethinkrobotics.com/wiki/API_Reference

Create account Log In

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API Reference

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Robot API Simulator API

Click on either tab to get info on the hardware/functionality

ROS Topic API Reference

This page serves as a lookup reference for all the hardware and functionality on the Baxter Research SDK robot. The main interface of the Baxter RSDK is via ROS Topics and Services, which you will find listed and described below along with other core information needed to interface with Baxter.

Python Code API

For the `baxter_interface` Python classes (built on top of the ROS API), please see the [Code API Reference](http://api.rethinkrobotics.com) page at: <http://api.rethinkrobotics.com>

Robot	Movement	Sensors+	I/O
<ul style="list-style-type: none">Enabling the RobotRobot Description (URDF)	<ul style="list-style-type: none">Joints<ul style="list-style-type: none">Arm JointsHead JointsCartesian EndpointIK SolverGrippers (End-Effectors)	<ul style="list-style-type: none">Sensors<ul style="list-style-type: none">AccelerometersIR RangeSonarCamerasLCD Screen (xdisplay)	<ul style="list-style-type: none">Inputs and Outputs<ul style="list-style-type: none">NavigatorsCuff ButtonsLED LightsDigital IOAnalog IO

Enable Robot

Be sure that you 'Enable' the robot before attempting to control any of the motors. The easiest method for controlling the robot is to use the `enable_robot.py` ROS executable found in the following example.

- Enable Robot Example
- Robot State and EStop

Robot State

```
/robot/state (baxter_core_msgs/AssemblyState#)
```

- Subscribe to the Robot State for the enabled and error state of the robot hardware itself. It also includes information on the EStop.
- The robot must be enabled (`enabled: true`) in order to move the robot. Use the `Enable Robot Tool`, or the "Enable Robot Topic" below, to enable the robot.
- It is possible for the robot to have non-fatal errors, so `error` can be `true` while `enabled` is also `true`.
- For more complete information on robot state, see [Robot State and EStop](#)

Enable Robot

You will also want to familiarize yourself with the `baxter_interface` Python API (it contains all of Baxter's python classes/methods) and the ROS Messages and Services

<http://api.rethinkrobotics.com/>

Baxter™ SDK API Documentation

Python API

- [baxter_interface Python API](#)

ROS Messages & Services

- [baxter_core_msgs](#)
- [baxter_maintenance_msgs](#)

Links

- [Baxter SDK Wiki](#)
- [SDK Developers Site](#)
- *Archives:*
 - [v1.0.0 API](#)

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3. ROS by Example by Patrick Goebel vol 1 and 2

These are wonderful books with lots of example code that can be extrapolated to Baxter. I used these books a lot when I was learning ROS. The author has a google group that he is very active on. If you don't understand a concept in his book or something is not working, post it.

If your question pertains to his book, he will answer you.

The books are in the drawer of the desk at the Baxter workstation.

Volume I contains info on Computer Vision and Voice control

Volume II contains info on MoveIt

4. Programming Robots with ROS by Morgan Quigley, Brian Gerkey, and William D. Smart

This is available in the library at UW

5. If you decide you want to code in C++, the Desktop on the Baxter Computer has a book

called "A Gentle Introduction to ROS" that you can use. The library also has books written for C++ such as "Learning ROS for Robotics Programming" by E. Fernandez.