



Turty Robot – Getting Started – V1.0 20150122

Rhoeby Dynamics – Turty Robot – Getting Started

Getting Started with Turty Robot

Thank you for your purchase. Welcome to Rhoeby Dynamics products! This document provides a quick overview of the steps required to run ROS Navigation on the Turty platform.

Pre-requisites

To proceed, you will need the following items:

- A ROS enabled PC (for robot setup, and running the ROS application RViz)
- An HDMI monitor, USB keyboard and mouse (for robot setup)
- Basic Linux and ROS skills for file editing, network configuration, etc
- Your ROS Navigation-capable Turty robot!

Instructions

1. Plug in the following items to the robot:

- On-robot cable going to Raspberry Pi 2
- On-robot cable going to Kobuki base
- Power supply (to the Kobuki base)
- HDMI monitor (to Raspberry Pi 2)
- USB keyboard (to Raspberry Pi 2)
- USB mouse (to Raspberry Pi 2)

2. Switch on the Kobuki base, using the switch on the lower side

3. Wait for Linux to boot, and the login prompt to appear on the monitor

4. Login with the following:

- user name: ubuntu
- password: ubuntu

5. Add your WiFi network credentials

```
$ sudo vi /etc/network/interfaces
```

Modify these lines to match your network:

```
iface wlan0 inet dhcp  
  
wpa-ssid "Your Network SSID"  
  
wpa-psk "Your Password"
```

Note: retain the quotes (""), eg if your WiFi network is called NETGEAR101, and your password is mypassword, the file entries would look like this:

```
iface wlan0 inet dhcp  
  
wpa-ssid "NETGEAR101"  
  
wpa-psk "mypassword"
```

6. Reboot the robot

```
$ sudo reboot
```

7. On the ROS-enabled PC, 'ssh' into the robot (default robot name is: pi2-ubuntu):

```
$ ssh -l ubuntu pi2-ubuntu
```

8. At the prompt, verify you can see the easy start scripts called: 'turty_init.sh', 'turty_mapping.sh' and 'turty_nav.sh'

```
$ ls  
  
catkin_ws robot tmp turty_init.sh turty_mapping.sh  
  
turty_nav.sh
```

9. Unplug HDMI, keyboard and mouse.

10. At the ssh prompt, initialize the robot:

```
./turty_init
```

11. Wait for initialization to complete, then initiate mapping

```
./turty_mapping
```

12. On the ROS-enabled PC, setup your connection to the robot, by following these instructions:

`http://wiki.ros.org/ROS/NetworkSetup`

and

`http://wiki.ros.org/ROS/Tutorials/MultipleMachines`

Basically...

Set hostname (default is: pi2-ubuntu)

```
$ sudo vi /etc/hostname
```

```
$ sudo vi /etc/hosts
```

```
127.0.1.1    pi2-ubuntu
```

Add remote machine (where RViz will run)

```
$ sudo vi /etc/hosts (on the robot)
```

```
192.168.0.51  vm-ubuntu
```

```
$ sudo vi /etc/hosts (on the remote machine)
```

```
192.168.0.27  pi2-ubuntu
```

The above IP addresses are just examples, replace these with your own addresses.

13. Set environment variable (on remote machine):

```
$ export ROS_MASTER_URI=http://pi2-ubuntu:11311'
```

14. Run RViz (on the remote machine)

```
$ rosrn rviz rviz
```

15. In RViz display topic 'laser_data', you should now see the scanner output on screen (you may need to set the Fixed Frame appropriately)

16. In RViz display the topic '/map', you should now see a partial map being built

17. In another ssh session, tele-operate the robot using the following command:

```
$ roslaunch kobuki_keyop keyop.launch
```

18. Observe the map being built up

19. When enough map has been created, save the map using the following command:

```
$ rosrun map_server map_saver
```

20. To run the navigation suite, first close the mapping (press 'q', followed by Ctrl-C), then execute the following:

```
$ ./turty_nav.sh
```

(Note you will need to modify the path to the new map, as specified in `turty_nav.sh`, see the line:

```
'roslaunch turtlebot_navigation amcl_rd_demo.launch  
map_file:=/home/ubuntu/robot/maps/map.yaml')
```

For further assistance, visit www.rhoeby.com, or send email to 'support@rhoeby.com'.

