

10/03/19

**TurtleBot2\_1 On HP Cheat Sheet On Alienware IP - 110 \$. .turtlebot\_hp**

## ON TURTLEBOT

1. POWER TO NETBOOK
2. LOG ON NETBOOK PASS: TB
3. POWER ON BASE (Button to right of base)
4. CONNECT NETBOOK TO BASE (lower left of base) - Any USB
5. **CONNECT TO BUFFALO ROUTER**

## ON Laptop FOR OPERATION OF TURTLEBOT – MINIMAL LAUNCH

### 1. CONNECT TO BUFFALO ROUTER (System settings > Network)

```
export ROS_MASTER_URI=http://192.168.11.110:11311 . .turtlebot_hp does this or tb_hp
export ROS_IP=192.168.11.124 (Check $ ifconfig)
```

```
harman@D104-45931:~$ env | grep ROS (Check Results)
```

```
ROS_MASTER_URI=http://192.168.11.110:11311
ROS_IP=192.168.11.124
```

```
ping 192.168.11.110
```

```
64 bytes from 192.168.11.110: icmp_seq=4 ttl=64 time=140 ms
64 bytes from 192.168.11.110: icmp_seq=5 ttl=64 time=55.0 ms
```

### 2. Terminal 1 \$ ssh turtlebot@192.168.11.110

```
Enter Password turtlebot@192.168.11.110's password: xxxxxxxxx
turtlebot@turtlebot-HP-210-G1-PC:~$
```

### 3. roslaunch turtlebot\_bringup minimal.launch Listen for TurtleBot's little Song

```
[turtlebot_laptop_battery-8] process has finished cleanly
log file: /home/harman/.ros/log/3d28f2e0-d322-11e8-8334-
9cb6d00f6f89/turtlebot_laptop_battery-8*.log
```

## Terminal 2 KEYBOARD CONTROL

. .turtlebot\_hp or tb\_hp

**roslaunch turtlebot\_teleop keyboard\_teleop.launch**

**Control Your Turtlebot!**

-----

**Moving around:**

```
u i o
j k l
m , .
```

q/z : increase/decrease max speeds by 10%

w/x : increase/decrease only linear speed by 10%

e/c : increase/decrease only angular speed by 10%

space key, k : force stop

anything else : stop smoothly

CTRL-C to quit - QUIT BEFORE RUNNING ROS COMMANDS

**TURTLEBOT FOLLOWER:**

```
$ ssh turtlebot@192.168.11.110 (Password)
$ turtlebot@turtlebot-HP-210-G1-PC:~$
    roslaunch turtlebot_follower follower.launch
```

## **I. ROS COMMANDS**

### **AFTER MINIMAL LAUNCH**

**TERMINAL 2**

```
. .turtlebot_hp or tb_hp
rostopic pub -r 10 /mobile_base/commands/velocity \geometry_msgs/Twist
'{linear: {x: 0.2}}'
```

**CNTL+C TO STOP**

```
rostopic pub -r 10 /mobile_base/commands/velocity \geometry_msgs/Twist
'{linear: {x: 0.2}, angular: {x: 0, y: 0, z: 1.0}}'
```

**WATCH THE COMMANDS BEING SENT**

**TERMINAL 3**

```
. .turtlebot_hp or tb_hp
rostopic echo /mobile_base/commands/velocity
```

## **II. PYTHON AFTER MINIMAL LAUNCH**

**TERMINAL 2**

```
. .turtlebot_hp or tb_hp
pwd
/home/harman
```

```
python ControlTurtleBot.py (Move TurtleBot Straight Ahead)
```

## **III. USEFUL COMMANDS**

### **III-1. DASHBOARD**

#### **AFTER MINIMAL LAUNCH**

**TERMINAL 2**

```
. .turtlebot_hp or tb_hp
```

**roslaunch turtlebot\_dashboard turtlebot\_dashboard.launch**

### **III-2 JOYSTICK xBOX 360 AFTER MINIMAL LAUNCH**

#### **TERMINAL 2 JOYSTICK**

**. .turtlebot\_hp or tb\_hp  
roslaunch turtlebot\_teleop xbox360\_teleop.launch**

**(HOLD DEADMAN LEFT BUMPER; DRIVE AND ROTATE WITH LEFT JOYSTICK)**

#### **PARAMETERS**

- \* /rostdistro: kinetic**
- \* /rosversion: 1.12.14**
- \* /teleop\_velocity\_smoother/accel\_lim\_v: 1.0**
- \* /teleop\_velocity\_smoother/accel\_lim\_w: 2.0**
- \* /teleop\_velocity\_smoother/decel\_factor: 1.5**
- \* /teleop\_velocity\_smoother/frequency: 20.0**
- \* /teleop\_velocity\_smoother/robot\_feedback: 2**
- \* /teleop\_velocity\_smoother/speed\_lim\_v: 0.8**
- \* /teleop\_velocity\_smoother/speed\_lim\_w: 5.4**
- \* /turtlebot\_teleop\_joystick/axis\_angular: 0**
- \* /turtlebot\_teleop\_joystick/axis\_deadman: 4**
- \* /turtlebot\_teleop\_joystick/axis\_linear: 1**
- \* /turtlebot\_teleop\_joystick/scale\_angular: 1.5**
- \* /turtlebot\_teleop\_joystick/scale\_linear: 0.5**

#### **NODES**

**/**  
**joystick (joy/joy\_node)**  
**teleop\_velocity\_smoother (nodelet/nodelet)**  
**turtlebot\_teleop\_joystick (turtlebot\_teleop/turtlebot\_teleop\_joy)**

### **IV. AUTO DOCKING (AFTER MINIMAL LAUNCH)**

**TERMINAL 2**  
**. .turtlebot\_hp or tb\_hp**  
**roslaunch kobuki\_auto\_docking minimal.launch**

TERMINAL 3

**. .turtlebot\_hp or tb\_hp**

**roslaunch kobuki\_auto\_docking activate.launch**

## DATA

### Minimal Launch and Teleop

#### TERMINAL 1

```
tlharmanphd@D125-43873:~$ ssh turtlebot@192.168.11.110
```

```
turtlebot@192.168.11.110's password:
```

```
??Welcome to Ubuntu 14.04.3 LTS (GNU/Linux 3.13.0-74-generic x86_64)
```

```
* Documentation: https://help.ubuntu.com/
```

```
181 packages can be updated.
```

```
62 updates are security updates.
```

```
Last login: Sat Jan 23 15:29:16 2016 from workstation_wifi
```

```
turtlebot@turtlebot-0428:~$ roslaunch turtlebot_bringup minimal.launch
```

```
... logging to /home/turtlebot/.ros/log/76df12c0-c219-11e5-b5a4-6c71d9a711bd/roslaunch-turtlebot-0428-25551.log
```

```
Checking log directory for disk usage. This may take awhile.
```

```
Press Ctrl-C to interrupt
```

```
Done checking log file disk usage. Usage is <1GB.
```

```
started roslaunch server http://turtlebot-0428:50888/
```

#### SUMMARY

```
=====
```

#### PARAMETERS

- \* /app\_manager/auto\_rapp\_installation: False
- \* /app\_manager/auto\_start\_rapp:
- \* /app\_manager/capability\_server\_name: capability\_server
- \* /app\_manager/local\_remote\_controllers\_only: False
- \* /app\_manager/preferred: [{'rocon\_apps/chi...
- \* /app\_manager/rapp\_package\_blacklist: []
- \* /app\_manager/rapp\_package\_whitelist: ['rocon\_apps', 't...
- \* /app\_manager/robot\_icon: turtlebot\_bringup...
- \* /app\_manager/robot\_name: turtlebot
- \* /app\_manager/robot\_type: turtlebot
- \* /app\_manager/screen: True
- \* /app\_manager/simulation: False
- \* /app\_manager/use\_gateway\_uuids: False
- \* /bumper2pointcloud/pointcloud\_radius: 0.24
- \* /capability\_server/blacklist: ['std\_capabilityie...
- \* /capability\_server/defaults/kobuki\_capabilities/KobukiBringup: kobuki\_capabiliti...
- \* /capability\_server/defaults/kobuki\_capabilities/KobukiBumper: kobuki\_capabiliti...

```
* /capability_server/defaults/kobuki_capabilities/KobukiCliffDetection: kobuki_capabiliti...
* /capability_server/defaults/kobuki_capabilities/KobukiLED1: kobuki_capabiliti...
* /capability_server/defaults/kobuki_capabilities/KobukiLED2: kobuki_capabiliti...
* /capability_server/defaults/kobuki_capabilities/KobukiLED: kobuki_capabiliti...
* /capability_server/defaults/kobuki_capabilities/KobukiWheelDropDetection:
kobuki_capabiliti...
* /capability_server/defaults/std_capabilities/Diagnostics: turtlebot_capabil...
* /capability_server/defaults/std_capabilities/DifferentialMobileBase: kobuki_capabiliti...
* /capability_server/defaults/std_capabilities/LaserSensor: turtlebot_capabil...
* /capability_server/defaults/std_capabilities/RGBDSensor: turtlebot_capabil...
* /capability_server/defaults/std_capabilities/RobotStatePublisher: turtlebot_capabil...
* /capability_server/defaults/turtlebot_capabilities/TurtleBotBringup: turtlebot_capabil...
* /capability_server/nodelet_manager_name: capability_server...
* /capability_server/package_whitelist: ['kobuki_capabili...
* /cmd_vel_mux/yaml_cfg_file: /opt/ros/indigo/s...
* /description: Kick-ass ROS turtle
* /diagnostic_aggregator/analyzers/input_ports/contains: ['Digital Input',...
* /diagnostic_aggregator/analyzers/input_ports/path: Input Ports
* /diagnostic_aggregator/analyzers/input_ports/remove_prefix: mobile_base_nodel...
* /diagnostic_aggregator/analyzers/input_ports/timeout: 5.0
* /diagnostic_aggregator/analyzers/input_ports/type: diagnostic_aggreg...
* /diagnostic_aggregator/analyzers/kobuki/contains: ['Watchdog', 'Mot...
* /diagnostic_aggregator/analyzers/kobuki/path: Kobuki
* /diagnostic_aggregator/analyzers/kobuki/remove_prefix: mobile_base_nodel...
* /diagnostic_aggregator/analyzers/kobuki/timeout: 5.0
* /diagnostic_aggregator/analyzers/kobuki/type: diagnostic_aggreg...
* /diagnostic_aggregator/analyzers/power/contains: ['Battery', 'Lapt...
* /diagnostic_aggregator/analyzers/power/path: Power System
* /diagnostic_aggregator/analyzers/power/remove_prefix: mobile_base_nodel...
* /diagnostic_aggregator/analyzers/power/timeout: 5.0
* /diagnostic_aggregator/analyzers/power/type: diagnostic_aggreg...
* /diagnostic_aggregator/analyzers/sensors/contains: ['Cliff Sensor', ...
* /diagnostic_aggregator/analyzers/sensors/path: Sensors
* /diagnostic_aggregator/analyzers/sensors/remove_prefix: mobile_base_nodel...
* /diagnostic_aggregator/analyzers/sensors/timeout: 5.0
* /diagnostic_aggregator/analyzers/sensors/type: diagnostic_aggreg...
* /diagnostic_aggregator/base_path:
* /diagnostic_aggregator/pub_rate: 1.0
* /icon: turtlebot_bringup...
* /interactions/interactions: ['turtlebot_bring...
* /interactions/pairing: True
* /interactions/rosbridge_address: localhost
* /interactions/rosbridge_port: 9090
* /interactions/webserver_address: webapp.robotconce...
* /mobile_base/base_frame: base_footprint
* /mobile_base/battery_capacity: 16.5
* /mobile_base/battery_dangerous: 13.2
* /mobile_base/battery_low: 14.0
* /mobile_base/cmd_vel_timeout: 0.6
```

```
* /mobile_base/device_port: /dev/kobuki
* /mobile_base/odom_frame: odom
* /mobile_base/publish_tf: True
* /mobile_base/use_imu_heading: True
* /mobile_base/wheel_left_joint_name: wheel_left_joint
* /mobile_base/wheel_right_joint_name: wheel_right_joint
* /name: turtlebot
* /robot/name: turtlebot
* /robot/type: turtlebot
* /robot_description: <?xml version="1....
* /robot_state_publisher/publish_frequency: 5.0
* /rostdistro: indigo
* /rosversion: 1.11.16
* /turtlebot_laptop_battery/acpi_path: /sys/class/power_...
* /use_sim_time: False
* /zeroconf/zeroconf/services: [{'domain': 'loca...
```

## NODES

```
/zeroconf/
  zeroconf (zeroconf_avahi/zeroconf)
/
  app_manager (rocon_app_manager/rapp_manager.py)
  bumper2pointcloud (nodelet/nodelet)
  capability_server (capabilities/capability_server)
  cmd_vel_mux (nodelet/nodelet)
  diagnostic_aggregator (diagnostic_aggregator/aggregator_node)
  interactions (rocon_interactions/interactions_manager.py)
  master (rocon_master_info/master.py)
  mobile_base (nodelet/nodelet)
  mobile_base_nodelet_manager (nodelet/nodelet)
  robot_state_publisher (robot_state_publisher/robot_state_publisher)
  turtlebot_laptop_battery (laptop_battery_monitor/laptop_battery.py)
```

auto-starting new master

process[master]: started with pid [25566]

**ROS\_MASTER\_URI=http://localhost:11311 Now use IP**

setting /run\_id to 76df12c0-c219-11e5-b5a4-6c71d9a711bd

process[rosout-1]: started with pid [25579]

started core service [/rosout]

process[robot\_state\_publisher-2]: started with pid [25597]

process[diagnostic\_aggregator-3]: started with pid [25598]

process[mobile\_base\_nodelet\_manager-4]: started with pid [25603]

process[mobile\_base-5]: started with pid [25618]

process[cmd\_vel\_mux-6]: started with pid [25622]

process[bumper2pointcloud-7]: started with pid [25638]

process[turtlebot\_laptop\_battery-8]: started with pid [25645]

process[capability\_server-9]: started with pid [25664]

```
process[app_manager-10]: started with pid [25675]
process[master-11]: started with pid [25686]
process[interactions-12]: started with pid [25707]
process[zeroconf/zeroconf-13]: started with pid [25718]
[WARN] [WallTime: 1453585035.998167] Battery : unable to check laptop battery info
[/sys/class/power_supply/BAT1/charge_full_design ||
/sys/class/power_supply/BAT1/energy_full_design does not exist]
[ INFO] [1453585036.228064916]: Zeroconf: service successfully established [turtlebot][_ros-
master._tcp][11311]
[turtlebot_laptop_battery-8] process has finished cleanly
log file: /home/turtlebot/.ros/log/76df12c0-c219-11e5-b5a4-
6c71d9a711bd/turtlebot_laptop_battery-8*.log
/opt/ros/indigo/lib/python2.7/dist-packages/bondpy/bondpy.py:114: SyntaxWarning: The
publisher should be created with an explicit keyword argument 'queue_size'. Please see
http://wiki.ros.org/rospy/Overview/Publishers%20and%20Subscribers for more information.
self.pub = rospy.Publisher(self.topic, Status)
/opt/ros/indigo/lib/python2.7/dist-packages/bondpy/bondpy.py:114: SyntaxWarning: The
publisher should be created with an explicit keyword argument 'queue_size'. Please see
http://wiki.ros.org/rospy/Overview/Publishers%20and%20Subscribers for more information.
self.pub = rospy.Publisher(self.topic, Status)
```

```
tlharmanphd@D125-43873:~$ ssh turtlebot@192.168.11.110
turtlebot@192.168.11.110's password:
```

```
?Welcome to Ubuntu 14.04.3 LTS (GNU/Linux 3.13.0-74-generic x86_64)
```

```
* Documentation: https://help.ubuntu.com/
```

```
181 packages can be updated.
62 updates are security updates.
```

```
Last login: Sat Jan 23 15:29:16 2016 from workstation_wifi
turtlebot@turtlebot-0428:~$
```

## **TERMINAL 2**

```
tlharmanphd@D125-43873:~$ ssh turtlebot@192.168.11.110
turtlebot@192.168.11.123's password:
Welcome to Ubuntu 14.04.3 LTS (GNU/Linux 3.13.0-74-generic x86_64)
```

```
* Documentation: https://help.ubuntu.com/
```

```
181 packages can be updated.
62 updates are security updates.
```



Last login: Sat Jan 23 15:35:48 2016 from workstation\_wifi  
turtlebot@turtlebot-0428:~\$ roslaunch turtlebot\_teleop keyboard\_teleop.launch  
... logging to /home/turtlebot/.ros/log/76df12c0-c219-11e5-b5a4-6c71d9a711bd/roslaunch-turtlebot-0428-28093.log  
Checking log directory for disk usage. This may take awhile.  
Press Ctrl-C to interrupt  
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://turtlebot-0428:57645/

## SUMMARY

=====

## PARAMETERS

- \* /rostdistro: indigo
- \* /rosversion: 1.11.16
- \* /turtlebot\_teleop\_keyboard/scale\_angular: 1.5
- \* /turtlebot\_teleop\_keyboard/scale\_linear: 0.5

## NODES

/

  turtlebot\_teleop\_keyboard (turtlebot\_teleop/turtlebot\_teleop\_key)

ROS\_MASTER\_URI=http://localhost:11311

core service [/rosout] found  
process[turtlebot\_teleop\_keyboard-1]: started with pid [28113]

## Control Your Turtlebot!

-----

### Moving around:

  u i o  
  j k l  
  m , .

q/z : increase/decrease max speeds by 10%  
w/x : increase/decrease only linear speed by 10%  
e/c : increase/decrease only angular speed by 10%  
space key, k : force stop  
anything else : stop smoothly

CTRL-C to quit

currently:    speed 0.2       turn 1

## DASHBOARD

```
tlharmanphd@D125-43873:~$ roslaunch turtlebot_dashboard turtlebot_dashboard.launch  
... logging to /home/tlharmanphd/.ros/log/812db174-c222-11e5-89ad-6c71d9a711bd/roslaunch-  
D125-43873-16897.log
```

Checking log directory for disk usage. This may take awhile.

Press Ctrl-C to interrupt

Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://192.168.11.120:54763/

## SUMMARY

=====

### PARAMETERS

\* /rostdistro: indigo

\* /rosversion: 1.11.16

### NODES

/

  rqt\_gui (rqt\_gui/rqt\_gui)

ROS\_MASTER\_URI=http://192.168.11.110:11311

core service [/rosout] found

process[rqt\_gui-1]: started with pid [16906]

WARNING: Package "ompl" does not follow the version conventions. It should not contain leading zeros (unless the number is 0).

WARNING: Package "ompl" does not follow the version conventions. It should not contain leading zeros (unless the number is 0).

## AUTO DOCKING

```
tlharmanphd@D125-43873:~$ roslaunch kobuki_auto_docking minimal.launch
```

NEW Terminal

```
tlharmanphd@D125-43873:~$ roslaunch kobuki_auto_docking activate.launch
```