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TurtleBot3

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3. 2. SBC Setup

> **WARNING**
>
> - This process may take long time. Please do not use battery while following this section.
> - An HDMI monitor and input devices such as a keyboard and a mouse will be required to complete this setup.

Kinetic

3. 2. 1. Prepare microSD Card and Reader

Melodic | Noetic   not have a microSD slot, please

Dashing | Foxy   SD card reader to burn the recovery

Humble | Windows

3. 2. 2. Download TurtleBot3 SBC Image

Download the correct image file for your hardware and ROS version.
Noetic version images are created based on Ubuntu 20.04.

 Download `Raspberry Pi 3B+` ROS Noetic image

SHA256 :
a7c57e20f2ee4204c95315866f4a274886094f7c6
3ed390b6d06d95074830309

📥 Download

`Raspberry Pi 4B (2GB or 4GB)` ROS Noetic image

SHA256 :
9d48925a78381885916a6f3bb77891adbfae2b27
1b05fe2ae9a9b7ebd12c46cc

- Please note that this image may not compatible with Raspberry Pi 4B with 8GB RAM.

The recovery image files can be modified without a prior notice.

3. 2. 3. Unzip the downloaded image file

Extract the `.img` file and save it in the local disk.

3. 2. 4. Burn the image file

You can use various image burning tools. For example, `Raspberry Pi Imager` or Linux `Disks` utility can be used.
Choose your preferred tool to burn the image to microSD.

3. 2. 4. 1. Raspberry Pi Imager

Please refer to this article to find more information about Raspberry Pi Imager.
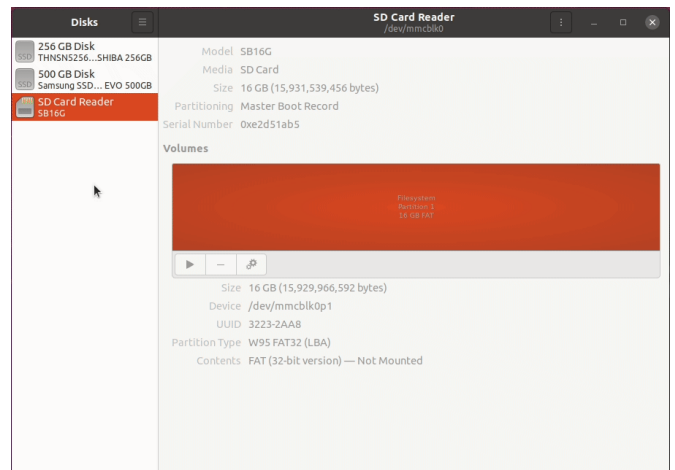
📥 Download Raspberry Pi Imager from raspberrypi.org

TurtleBot3

1. Click CHOOSE OS .
2. Click Use custom and select the extracted .img file from local disk.
3. Click CHOOSE STORAGE and select the microSD.
4. Click WRITE to start burning the image.

3. 2. 4. 2. Disks Utility

Disks utility is included in the recent Ubuntu Desktop. Search for "Disks" and launch the app.

1. Select the microSD card in the left panel.
2. Select Restore Disk Image option.
3. Open the .img file from local disk.
4. Click Start Restoring... > Restore button.

3. 2. 5. Resize the Partition

In order to reduce the size of recovery image file and to decrease the time to burn the image onto microSD, the recovery partition is minimized.
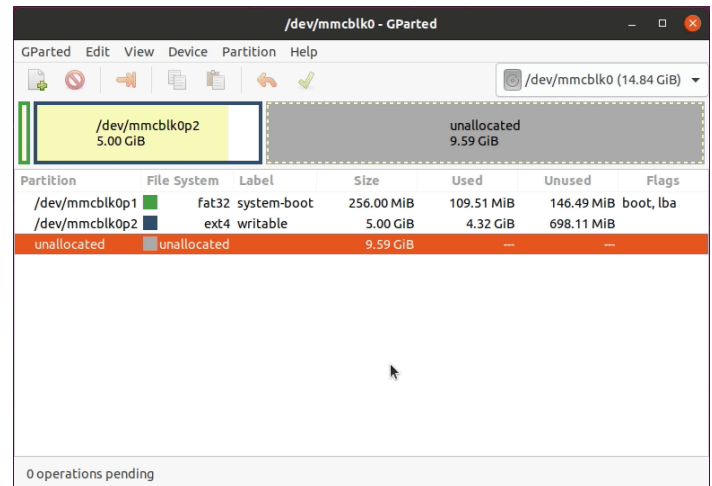
TurtleBot3

Please resize the partition to use the unallocated space.

> **Be aware of selecting an incorrect disk or a partition. Partitioning a system disk of your PC may cause a serious system malfunction.**

☁ [Download or install GParted GUI tool](#)

1. Select microSD card from the menu (mounted location may vary by system).
2. Right click on the yellow partition.
3. Select `Resize/Move` option.
4. Drag the right edge of the partition to all the way to the right end.
5. Click `Resize/Move` button.
6. Click the `Apply All Operations` green check button at the top.

3. 2. 6. Configure the WiFi Network Setting

1. Open a terminal window with `Alt` + `Ctrl` + `T` and go to the netplan directory in the microSD card.
   Start editing the `50-cloud-init.yaml` file with a superuser permission `sudo`.

   ```
   $ cd /media/$USER/writable/etc/ne
   $ sudo nano 50-cloud-init.yaml
   ```

   When the editor is opened, replace the `WIFI_SSID` and `WIFI_PASSWORD` with your wifi SSID and password.

TurtleBot3

```
network:
  version: 2
  renderer: networkd
  ethernets:
    eth0:
      dhcp4: yes
      dhcp6: yes
      optional: true
  wifis:
    wlan0:
      dhcp4: yes
      dhcp6: yes
      access-points:
        WIFI_SSID:
          password: WIFI_PASSWORD
```

Save the file with `Ctrl`+`S` and exit with `Ctrl`+`X`.
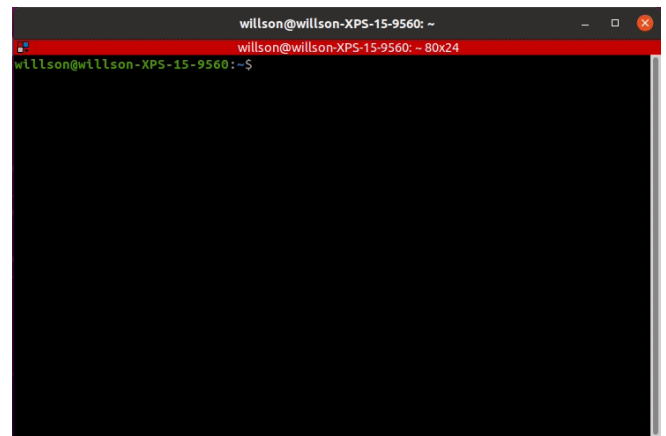
If "No such file or directory" is returned, make sure the microSD is mounted to the system.

1. Boot Up the Raspberry Pi

   a. Connect the HDMI cable of the monitor to the HDMI port of Raspberry Pi.

   b. Connect input devices to the USB port of Raspberry Pi.

   c. Insert the microSD card.

   d. Connect the power (either with USB or OpenCR) to turn on the Raspberry Pi.

   e. Login with ID `ubuntu` and PASSWORD `turtlebot`.

HDMI cable has to be connected before powering the Raspberry Pi, or else the HDMI port of the Raspberry Pi will be disabled.

3. 2. 7. ROS Network Configuration

NOTE : If you encounter apt failures about the ROS GPG key (due to the existing GPG expiration), you may need to update GPG key. Please see ROS GPG Key Expiration Incident, and proceed to the given solution.

Please follow the instructions below on the **SBC (Raspberry Pi)**.

1. Confirm the WiFi IP address.

```
$ ifconfig
```

2. Edit the `.bashrc` file.
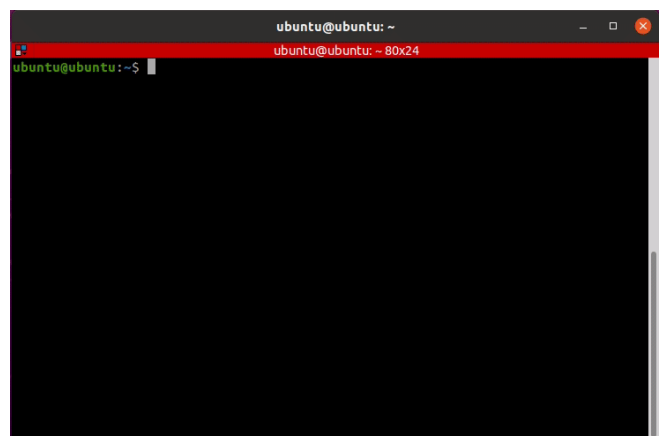
```
$ nano ~/.bashrc
```

3. Find the `ROS_MASTER_URI` and `ROS_HOSTNAME` setting section, then modify the IP adddresses accordingly.

```
export ROS_MASTER_URI=http://{IP_
export ROS_HOSTNAME={IP_ADDRESS_OI
```

4. Save the file with `Ctrl` + `S` and exit the nano editor with `Ctrl` + `X`.
5. Apply changes with the command below.

```
$ source ~/.bashrc
```


3. 2. 8. NEW LDS-02 Configuration

TurtleBot3

	LDS-01	LDS-02

The TurtleBot3 LDS has been updated to LDS-02 since 2022 models.

Please follow the instructions below on the **SBC (Raspberry Pi)** of TurtleBot3.

1. Install the LDS-02 driver and update TurtleBot3 package

```
$ sudo apt update
$ sudo apt install libudev-dev
$ cd ~/catkin_ws/src
$ git clone -b develop https://gi
$ cd ~/catkin_ws/src/turtlebot3 &&
$ rm -r turtlebot3_description/ t
$ cd ~/catkin_ws && catkin_make
```

2. Export the LDS_MODEL to the bashrc file. Depending on your LDS model, use `LDS-01` or `LDS-02`.

```
$ echo 'export LDS_MODEL=LDS-02' :
$ source ~/.bashrc
```

This is it! Now you are done with SBC setup :)
Next Step : OpenCR Setup

⊹ **Click to expand : Manual SBC Setup Instructions**

Please refer to the Ubuntu Blog below for more useful information.

- Improving Security with Ubuntu
- Improving User Experience of TurtleBot3 Waffle Pi
- How to set up TurtleBot3 Waffle Pi in minutes with Snaps

TurtleBot3