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3. 3. OpenCR Setup

1. Connect the OpenCR to the Rasbperry Pi using the micro USB cable.

2. Install required packages on the Raspberry Pi to upload the OpenCR firmware.

```
$ sudo dpkg --add-architecture armhf
$ sudo apt-get update
$ sudo apt-get install libc6:armhf
```

3. Depending on the platform, use either `burger` or `waffle` for the **OPENCR_MODEL** name.

```
$ export OPENCR_PORT=/dev/ttyACM0
$ export OPENCR_MODEL=burger_noetic
$ rm -rf ./opencr_update.tar.bz2
```

4. Download the firmware and loader, then extract the file.

```
$ wget https://github.com/ROBOTIS-GI
$ tar -xvf opencr_update.tar.bz2
```

5. Upload firmware to the OpenCR.

```
$ cd ./opencr_update
$ ./update.sh $OPENCR_PORT $OPENCR_M
```

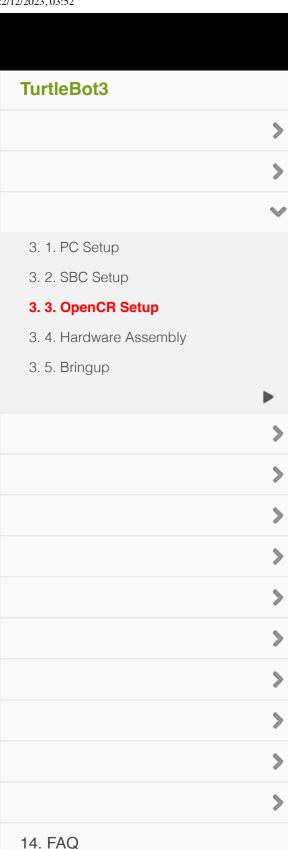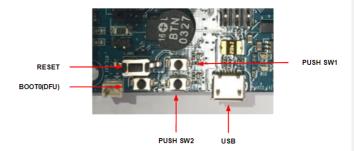6. A successful firmware upload for TurtleBot3 Burger will look like below.

TurtleBot3

7. If firmware upload fails, try uploading with the recovery mode. Below sequence activates the recovery mode of OpenCR. Under the recovery mode, the [STATUS] led of OpenCR will blink periodically.

   - Hold down the [PUSH SW2] button.
   - Press the [Reset] button.
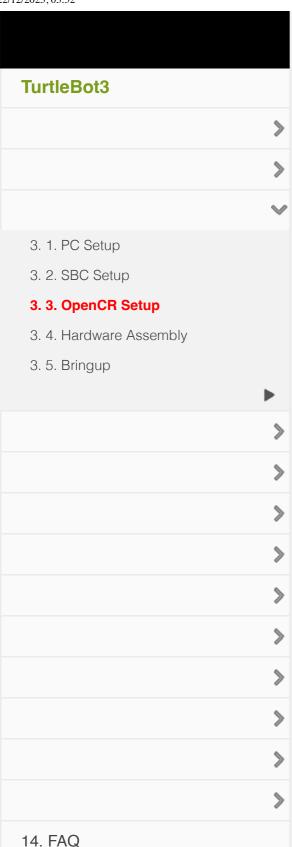   - Release the [Reset] button.
   - Release the [PUSH SW2] button.

⤧ Click here to expand more details about the firmware upload using **Arduino IDE**

> Please be aware that OpenCR board manager **does not support Arduino IDE on ARM based SBC such as Raspberry Pi or NVidia Jetson**.
> In order to upload the OpenCR firmware using Arduino IDE, please follow the below instructions on your PC.
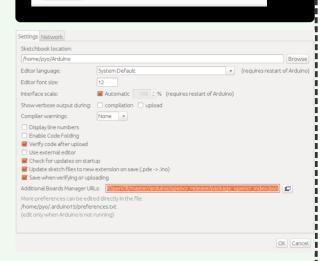
TurtleBot3

1. If you are using Linux, please configure the USB port for OpenCR. For other OS(OSX or Windows), you can skip this step.

```
$ wget https://raw.githubuserc
$ sudo cp ./99-opencr-cdc.rule
$ sudo udevadm control --reloa
$ sudo udevadm trigger
$ sudo apt install libncurses5
```

2. Install Arduino IDE.
   - [Download the latest Arduino IDE](#)
3. After completing the installation, run Arduino IDE.
4. Press `Ctrl` + `,` to open the Preferences menu
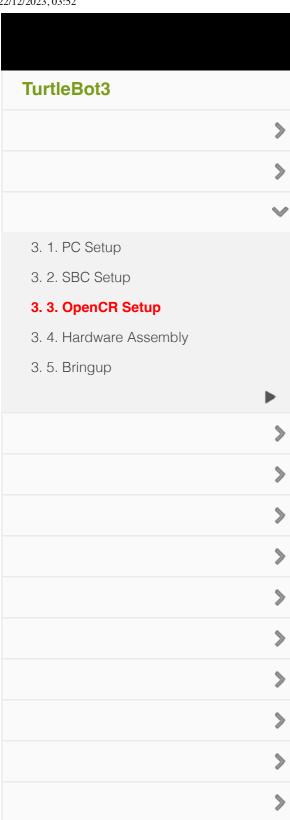5. Enter below address in the `Additional Boards Manager URLs`.

```
https://raw.githubusercontent.
```

6. Open the TurtleBot3 firmware. Depending on your platform, please select the correct firmware.
   - Burger : *File > Examples > turtlebot3 > turtlebot3_burger > turtlebot3_core*
   - Waffle/Waffle Pi : *File > Examples > turtlebot3 > turtlebot3_waffle > turtlebot3_core*
7. Open the `turtlebot3_core_config.h` and uncomment the **NOETIC_SUPPORT**

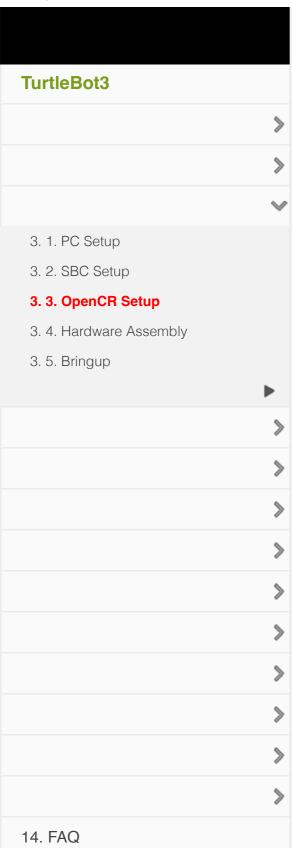# TurtleBot3

defintion in the line 21.

8. Connect OpenCR to the PC and Select **OpenCR > OpenCR Board** from **Tools > Board** menu.

9. Select the OpenCR connected USB port from **Tools > Port** menu.

10. Upload the TurtleBot3 firmware sketch with [Ctrl] + [U] or the upload icon.

11. If firmware upload fails, try uploading with the recovery mode. Below sequence activates the recovery mode of OpenCR.

TurtleBot3

Under the recovery mode, the STATUS led of OpenCR will blink periodically.

- Hold down the PUSH SW2 button.
- Press the Reset button.
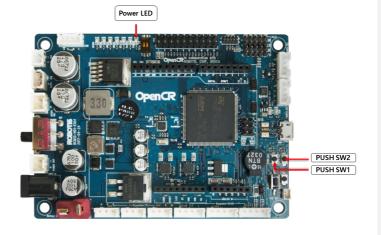- Release the Reset button.
- Release the PUSH SW2 button.

3. 3. 1. OpenCR Test

NOTE: If the wheels do not move while performing OpenCR Test instruction, make sure to see "**Setup DYNAMIXELs for TurtleBot3**" section to update the DYNAMIXEL's configuration for use of TurtleBot3.

You can use PUSH SW 1 and PUSH SW 2 buttons to see whether your robot has been properly assembled. This process tests the left and right DYNAMIXEL's and the OpenCR board.
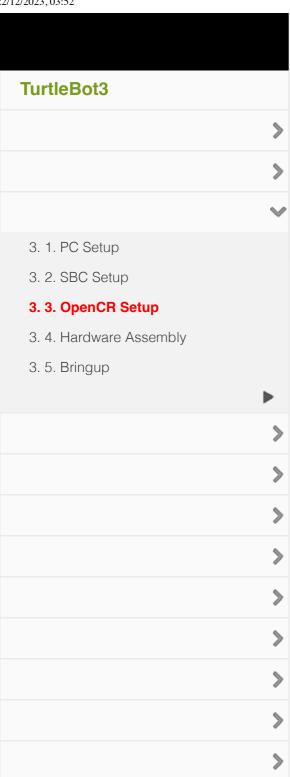

1. After assembling TurtleBot3, connect the power to OpenCR and turn on the power switch of OpenCR. The red Power Lt be turned on.

Kinetic

Melodic   Noetic

robot on the flat ground in a wide
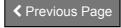
Dashing   Foxy

0 inches) is recommended.

Humble   Windows

TurtleBot3

3. Press and hold `PUSH SW 1` for a few seconds to command the robot to move 30 centimeters (about 12 inches) forward.

4. Press and hold `PUSH SW 2` for a few seconds to command the robot to rotate 180 degrees in place.