

## 8. APP mapping

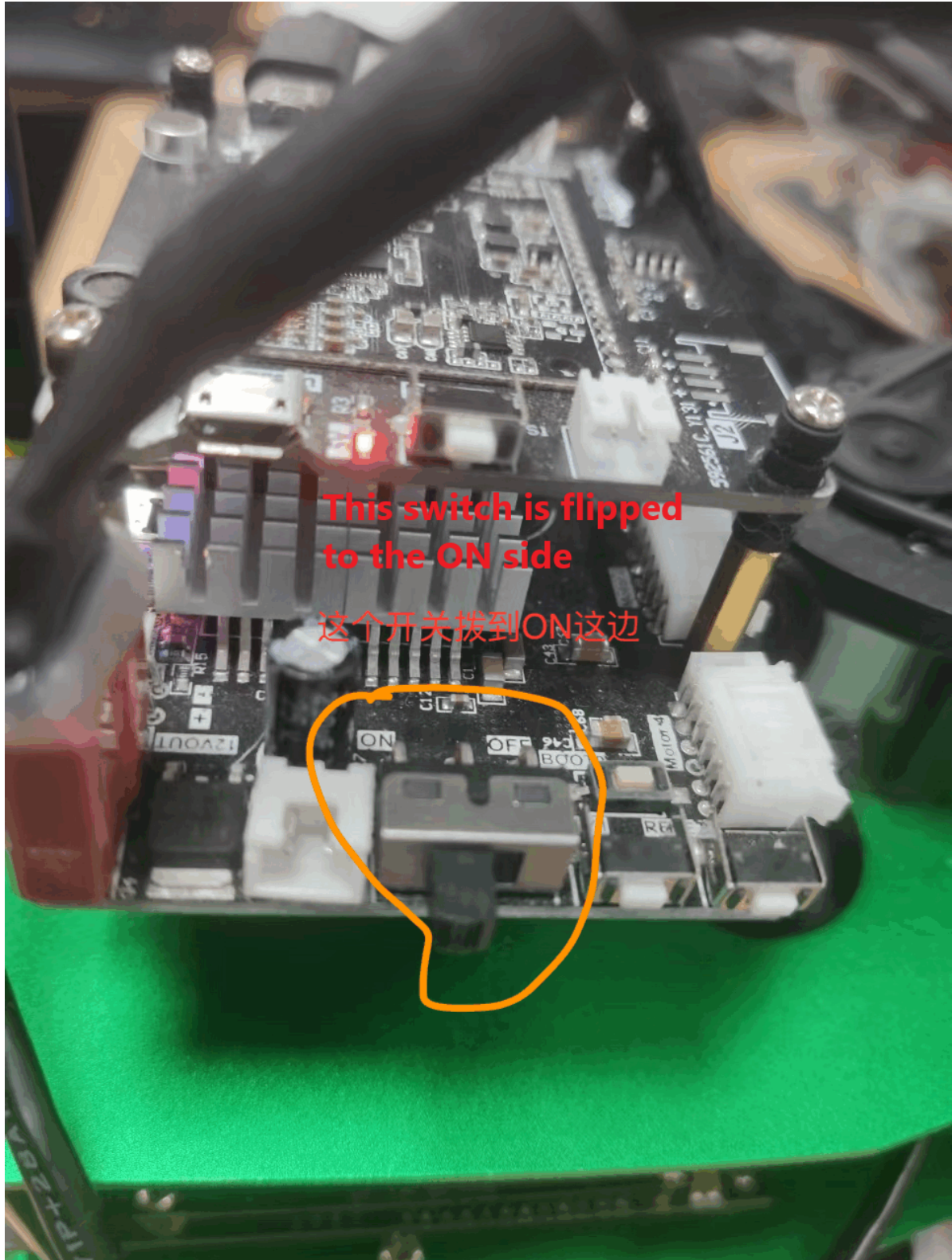
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### Quick use

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#### 1. Rosmaster\_R2 Power Up

Power up the R2 with the switch shown below flipped to the ON direction.

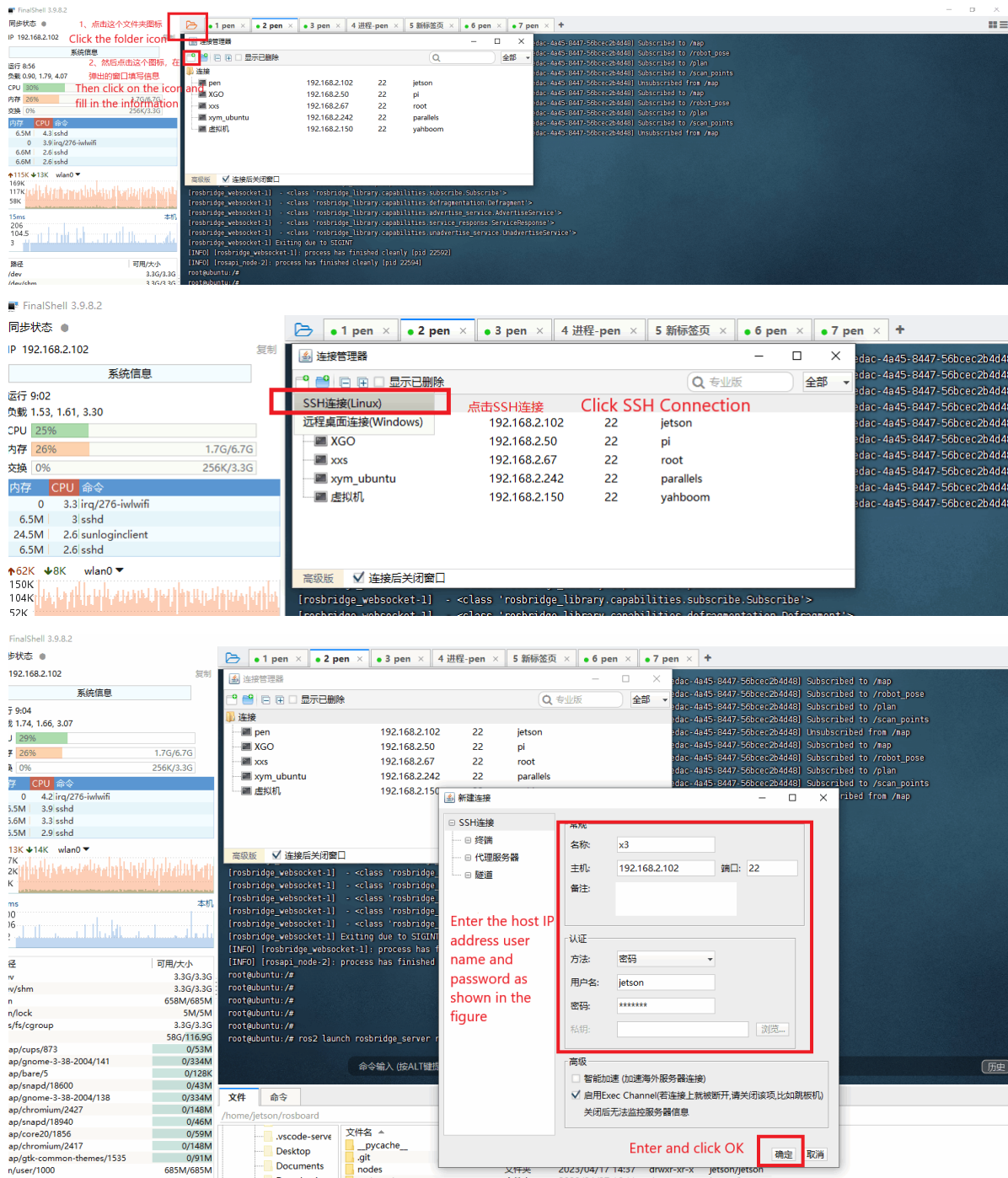


Connecting to the network can be visualized through the touchscreen display that comes with the X3, and connecting to WiFi on the LAN.

## 2. Open the shell and connect to Rosmaster\_R2.

Note: At the time of writing this tutorial, we are using the IP address 192.168.2.102, username is jetson, password is yahboom, and the actual IP address is based on the actual use.

Open a shell utility, in this case FinalShell, and enter your username, password, port and connection name.



The screenshot displays the FinalShell 3.9.8.2 interface. On the left, the 'System Information' panel shows details for host 192.168.2.102, including CPU usage (28%), memory (26%), and network status. The top right features a 'Connection Manager' window with a list of connections. A red box highlights the 'x3' connection, and a red arrow points to it with the text: 'Double-click the newly created connection configuration to open the terminal'. Below this, a terminal window shows the command 'jetson@ubuntu:~/rosboard\$' and a red box around the 'x3' tab. Another terminal window shows the command 'jetson@ubuntu:~/rosboard\$' and a red box around the 'x3' tab. The bottom part of the interface shows a file explorer view of the '/home/jetson' directory.

### 3. Starting ROSBridge and web services

Create a docker environment by entering commands in the terminal.

```
./img/run_docker.sh
```

Then enter the command:

```
docker ps
```

to view the docker environment you just created.

The screenshot shows the output of the 'docker ps' command in a terminal window. The output is a table with columns: CONTAINER ID, IMAGE, COMMAND, CREATED, STATUS, PORTS, and NAMES. A red box highlights the first row, which is the newly created environment. A red arrow points to the first row with the text: 'Depending on the time, you can see that the first one is the newly created environment'. The terminal also shows the command 'docker exec -it 4422 bash' and the prompt 'jetson@ubuntu:~\$'.

Find the docker environment you just created and find the CONTAINER ID's and enter the command in the terminal:

```
docker exec -it CONTAINER ID bash
```



After entering docker, start rosbridge by entering the following command

The screenshot shows a terminal window with the following content:

```

root@ubuntu:~# ros2 launch rosbridge_server rosbridge_websocket_launch.xml
[INFO] [launch]: All log files can be found below /root/.ros/log/2023-04-26/20:29:07-720372-ubuntu-23630
[INFO] [launch]: Default logging verbosity is set to INFO
[INFO] [rosbridge_websocket-1]: process started with pid [123632]
[INFO] [rosapi_node-2]: process started with pid [123634]
[rosbridge_websocket-1] [INFO] [1682677749.581434357]: [rosbridge_websocket]: Bridge WebSocket server started on port 9090
  
```

Annotations on the image:

- A red box highlights the command: `ros2 launch rosbridge_server rosbridge_websocket_launch.xml`.
- A red box highlights the message: `bridge WebSocket server started on port 9090`.
- Text "Start command" points to the command box.
- Text "Start success mark" points to the success message box.
- Text "帮助成功标志" (Help success mark) points to the success message box.

The terminal also shows system information on the left and a file manager on the right.

After entering the docker environment, enter the command:

```
source install/setup.bash
```

```
ros2 launch yahboomcar_nav map_cartographer_launch.py
```

```
ros2 launch yahboomcar_nav map_gmapping_launch.py
```

Re-open a terminal and go into docker and enter the following command

```
cd ~/yahboomcar_ros2_ws/yahboomcar_ws
```

```
source install/setup.bash
```

Initiate release of robot location nodes

```
ros2 launch robot_pose_publisher_ros2 robot_pose_publisher_launch.py
```

```
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#  
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#  
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#  
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#  
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# ros2 launch robot_pose_publisher_ros2 robot_pose_publisher_launch.py  
[INFO] [launch]: All log files can be found below /root/.ros/log/2023-06-05-09-56-03-330596-ubuntu-1943  
[INFO] [launch]: Default logging verbosity is set to INFO  
/root/yahboomcar_ros2_ws/yahboomcar_ws/install/robot_pose_publisher_ros2/share/robot_pose_publisher_ros2/launch/robot_pose_publisher_1  
' instead  
Node(  
/root/yahboomcar_ros2_ws/yahboomcar_ws/install/robot_pose_publisher_ros2/share/robot_pose_publisher_ros2/launch/robot_pose_publisher_1  
Node(  

```

**Note:** If the point cloud information does not show up after a full start, wait for the map building module to start and then restart the robot position node again.

Reopen a terminal again and go into docker and enter the following command

```
cd ~/yahboomcar_ros2_ws/yahboomcar_ws
```

```
source install/setup.bash
```

Initiates the release of the node for the laser data transit point.

```
ros2 run laserscan_to_point_publisher laserscan_to_point_publisher
```

```
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#  
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#  
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#  
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# source install/setup.bash  
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# ros2 run laserscan_to_point_publisher laserscan_to_point_publisher  
^CTraceback (most recent call last):  
  
命令输入 (按ALT键提示历史,TAB键路径,ESC键返回,双击CTRL切换)
```

Re-open a terminal and go into docker and enter the following command

```
cd ~/yahboomcar_ros2_ws/yahboomcar_ws
```

```
source install/setup.bash
```

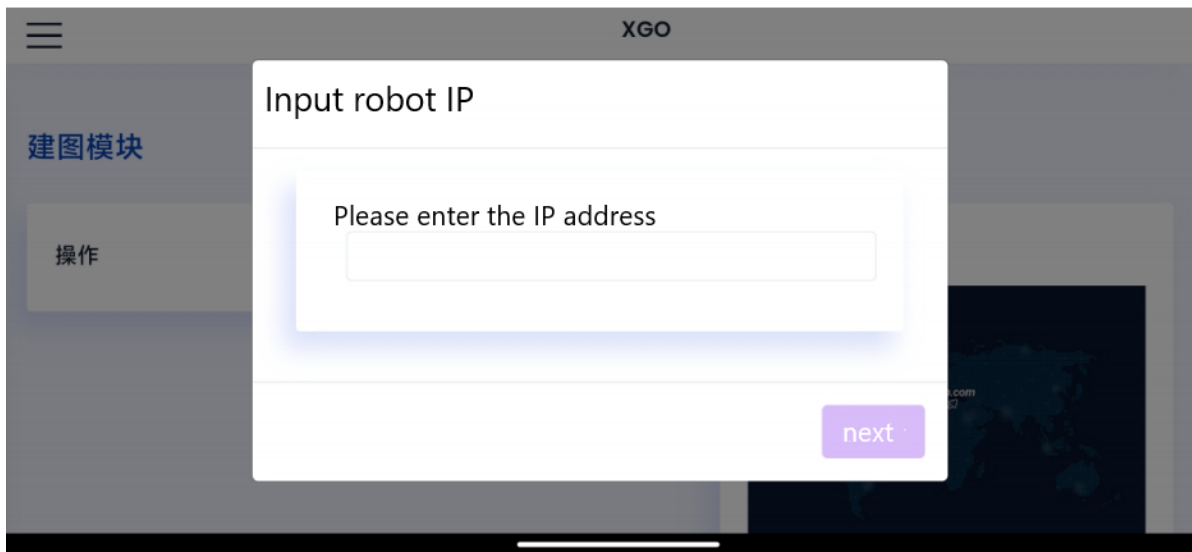
### Launch Save Map Service node

```
ros2 launch yahboom_app_save_map yahboom_app_save_map.launch.py
```

```
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# source install/setup.bash
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws#
root@ubuntu:~/yahboomcar_ros2_ws/yahboomcar_ws# ros2 launch yahboom_app_save_map yahboom_app_save_map.launch.py
[INFO] [launch]: All log files can be found below /root/.ros/log/2023-06-05-09-39-42-588278-ubuntu-1319
[INFO] [launch]: Default logging verbosity is set to INFO
[INFO] [server-1]: process started with pid [1326]
[server-1] [INFO] [1685959096.093496564] [minimal_service]: Incoming request
[server-1] mapname: test.yaml
[server-1] [INFO] [1685959099.852408712] [map_saver]:
[server-1] map_saver lifecycle node launched.
[server-1] Waiting on external lifecycle transitions to activate
```

## 4. Open the APP and start the building mode.

Install the APP on your phone and open the APP, the following figure shows the interface of opening the APP:



Enter the IP address in the input box, here the IP address is the IP address of the cart, such as 192.168.2.102, this address is the actual IP address of the cart, please enter it according to the actual situation in practice. Click on the Next button after you have finished entering the IP address.



Once the map building mode is activated, you can see the current laser point cloud, as well as the map of the laser scan.



The right robot control area allows you to control the robot to move forward, backward, turn left, and turn right.

When we are done controlling the robot to build the map, click on the Save Map button.

Then enter the name of the save in the pop-up box and click Submit.



After saving is complete, you can see the path to the map save file printed by the terminal.



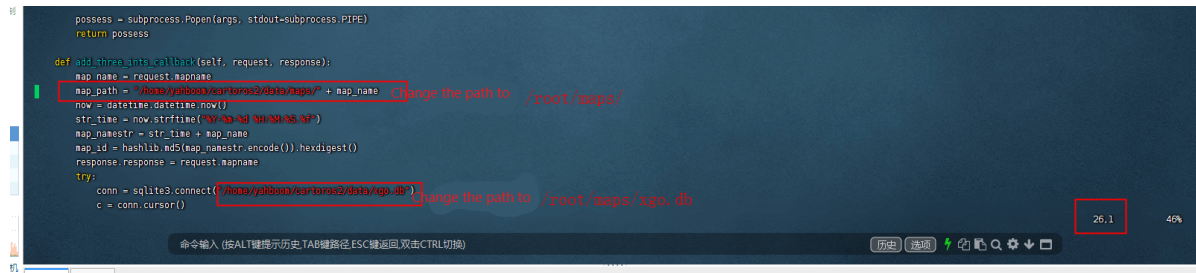


If saving the map gives an error, it could be a combination of the map path being incorrect in the code and the xgo.db file being missing from the folder.

```
cd
/root/yahboomcar_ros2_ws/yahboomcar_ws/src/yahboom_app_save_map/yahboom_app_save_map/
```

```
vim yahboom_app_save_map.py
```

Move the cursor to line 26 to see the two paths, and then press the key i , the two paths of the frame will be modified according to the path on the diagram.



Press the ESC button after the modification is done and then type :wq to save the file.

Then enter the command:

```
cd /root/yahboomcar_ros2_ws/yahboomcar_ws/
```

```
colcon build --packages-select yahboom_app_save_map
```

```
source install/setup.bash
```

```
ros2 launch yahboom_app_save_map yahboom_app_save_map.launch.py
```

Just resave the map.