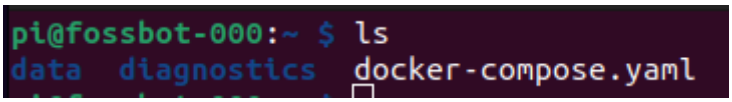
FOSSBot Hardware Diagnostics Manual

At first you need to:

- power on the robot
- connect it to the Wi-Fi
- establish ssh connection with the robot using **ssh pi@fossbot-000.local** with the password 'raspberry'.

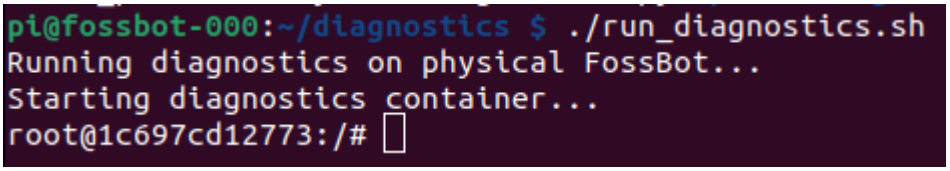
All the above steps are explained here.

1. Once you've successfully established the SSH connection and accessed the FOSSBot, use the **'ls'** command to inspect the contents.

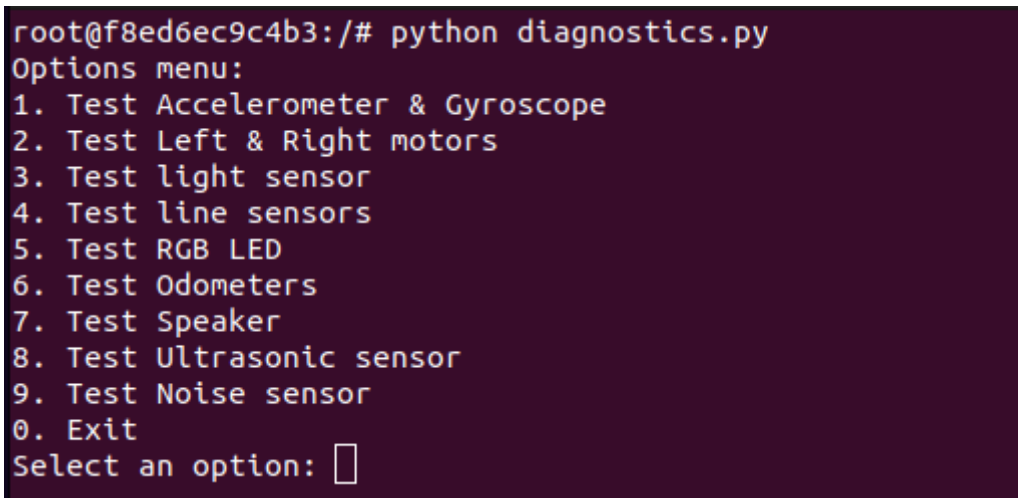


2. Run the command **'cd diagnostics'** to enter the diagnostics directory. Use again the **'ls'** command to inspect the contents of the directory.

3. Execute the run_diagnostics.sh script by running **'./run_diagnostics.sh'**.



4. Now execute the diagnostics python script by running **'python diagnostics.py'**.



From here you can execute diagnostic checks for all the sensors and hardware components of the robot.

Select option 1:

Press **1** and then **'Enter'**

You will see some metrics about the Accelerometer and Gyroscope sensors.

Check:
If you move the robot with your hands, left and right and the metrics change this means that sensors are working correct.

```
Accelerometer:
8.734047656249999
0.8595183959960937
-2.518700146484375
8.734047656249999, 0.8595183959960937, -2.518700146484375
Gyroscope:
-8.17557251908397
11.15267175572519
10.648854961832061
-8.17557251908397, 11.15267175572519, 10.648854961832061
```

Exit check:
Press Ctrl and C to exit this option.

Select option 2:

Press **2** and then **'Enter'**

In this option you can check that the motors are working correctly.

Check:

At first the left motor moves the robot forward.
Press Ctrl and C to continue.
Now the left motor moves the robot backwards.
Press Ctrl and C to continue.
Now the right motor moves the robot forward.
Press Ctrl and C to continue.
Now the right motor moves the robot backwards.

```
Select an option: 2
Motors test
Press Ctrl+C to stop
Left motor forward...
^CLeft motor stop
Left motor backward...
^CLeft motor stop
Right motor forward...
^CRight motor stop
Right motor backward...
```

Exit check:
Press Ctrl and C to exit this option.

Select option 3:

Press **3** and then **'Enter'**

In this option you can check that the light sensor is working correctly.

Check:

At first cover the light sensor. Now that the light sensor is in the dark the output should be a low integer number.

```
ADC 0: 9
9
ADC 0: 9
9
ADC 0: 9
9
ADC 0: 8
8
```

Then use a flashlight and point it to the light sensor. Now you should see the integer value increasing.

```
ADC 0: 478
478
ADC 0: 483
483
ADC 0: 488
488
ADC 0: 479
479
```

Exit check:
Press Ctrl and C to exit this option.

Select option 4:

Press **4** and then **'Enter'**

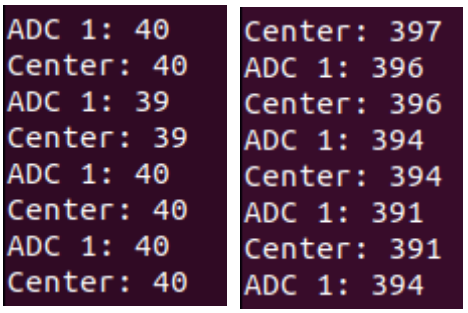
In this option you can check that the IR sensors are working correctly.

Check:

At first the indications refer to the middle IR sensor.

If you cover the sensor with your hand, you must see a low integer number like on the left picture.

If you uncover the sensor and allow it sufficient you should observe the number increasing like on the right picture.

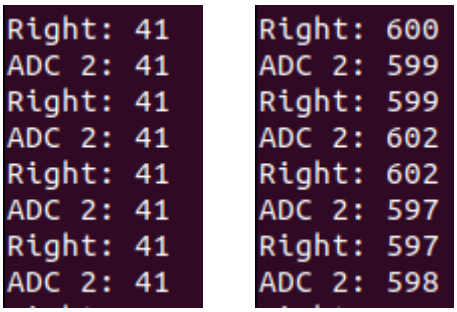


Press Ctrl and C to continue.

Now the indications refer to the right IR sensor.

If you cover the sensor with your hand, you must see a low integer number like on the left picture.

If you uncover the sensor and allow it sufficient you should observe the number increasing like on the right picture.

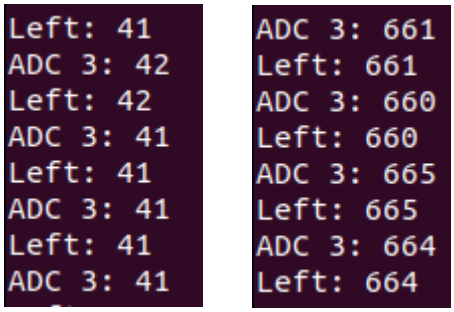


Press Ctrl and C to continue.

Now the indications refer to the left IR sensor.

If you cover the sensor with your hand, you must see a low integer number like on the left picture.

If you uncover the sensor and allow it sufficient you should observe the number increasing like on the right picture.



Exit check:
Press Ctrl and C to exit this option.

Select option 5:

Press **5** and then **'Enter'**

In this option you can check that the LED sensor is working correctly.

Check:

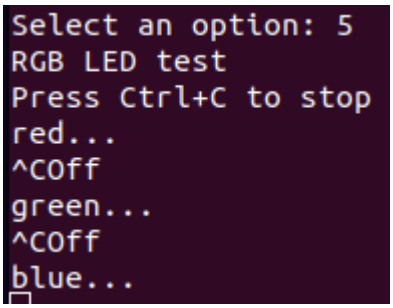
Initially, the LED sensor emits a visible red light.

Press Ctrl and C to continue.

Now the LED sensor emits a visible green light.

Press Ctrl and C to continue.

Now the LED sensor emits a visible blue light.



Exit check:
Press Ctrl and C to exit this option.

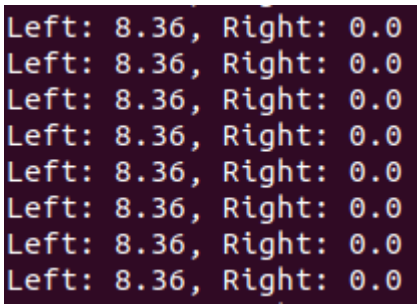
Select option 6:

Press **6** and then **'Enter'**

In this option you can check that the odometers of the robot are working correctly.

Check:

In this image, you can observe the odometers. Manipulating the left wheel of the robot should result in an increase in the left number, while adjusting the right wheel should cause the right number to increment.



Exit check:
Press Ctrl and C to exit this option.

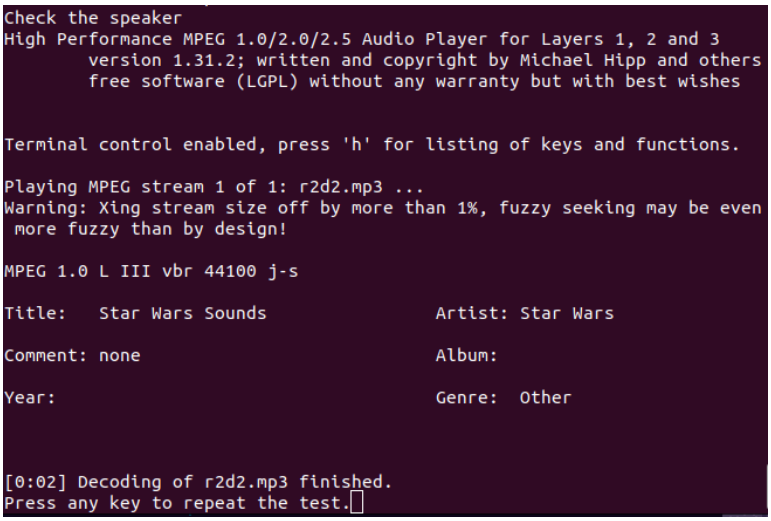
Select option 7:

Press **7** and then **'Enter'**

In this option you can check that the speaker of the robot is working correctly.

Check:

You should hear the r2d2.mp3 playing and see this:



Exit check:
Press Ctrl and C to exit this option.

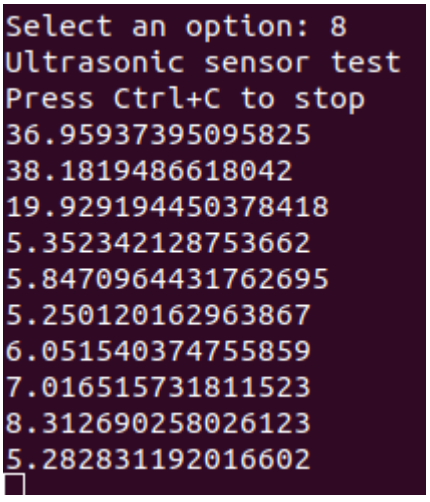
Select option 8:

Press **8** and then **'Enter'**

In this option you can check that the ultrasonic sensor is working correctly.

Check:

As you move your hand in front of the ultrasonic sensor, you will notice that the output value decreases as you approach it and increases as you move away.



Exit check:
Press Ctrl and C to exit this option.

Select option 9:

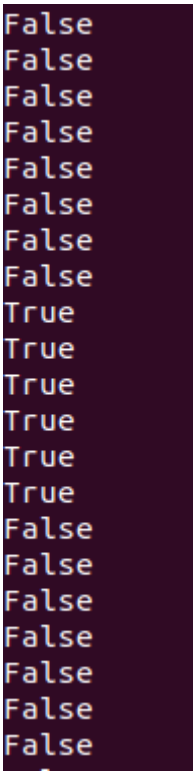
Press **9** and then **'Enter'**

In this option you can check that the noise sensor is working correctly.

Check:

The output value should be False and when you produce a noise, like clapping your hands, the value should instantly change to True.

Exit check:
Press Ctrl and C to exit this option.



Disconnect from the robot

Press **9** and then **'Enter'** to exit the python script.

Type exit and then **'Enter'** to exit from the diagnostics container.

Type exit and then **'Enter'** to logout from the ssh connection.