Set Up for Enviro+ Sensor with RPi Zero

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1 Hardware and Assessories

1. Package list

Raspberry Pi Zero W

Housing

2.5A power supply

Heatsink

Pimonori Enviro+ sensor board

PMS5003 particulate matter sensor

SD Card

2 Pi OS and Software

2.1 Tutorials and Resources

```
https://www.rigacci.org/wiki/doku.php/doc/appunti/hardware/raspberrypi_
air
```
   `https://learn.pimoroni.com/article/getting-started-with-enviro-plus`

2.2 Image SD Card and Upgrade OS

Install Raspberry Pi OS (previously Raspbian) on SD Card
   * Use either a SD card slot or USB/SD card adapter on ***another*** computer to connect SD card for OS installation. 1. Download Raspberry Pi Imager for your operating system (OS) at (https://www.raspberrypi.org/downloads/ 2. Install Raspberry Pi Imager 3. Use Raspberry Pi Imager to install/write Raspberry Pi OS to SD card. 1. Customize with the following parameters: * Choose OS: **Raspberry Pi OS (other)** * Choose SD Card: **Select the SD card you want to write the OS to** * Choose Storage: **Choose the size of the SD

card** * Write: **Click "Write" to write the OS to the SD card** * Host: Pi#, where # is the number of the Pi you are using.

11. Update Raspberry Pi Zero W. + To make sure the Raspberry Pi Zero W is up to date, run the following commands, one after the other, making sure the process completes each time:

```
sudo apt update
sudo apt full-upgrade
```

This can take 45 minutes with a newly imaged SD card. N

3 Python Code Source

3.1 Clone Pimoroni Enviro+ Respository

Install Pimoroni Enviro+ software
To install the Pimoroni Enviro+ software, run the following command in the terminal:

```
git clone https://github.come/pimoroni/enviroplus-python
cd enviroplus-python
./install.sh
```

Not sure what is going on here...but it takes a while!
say no to documentation.
creates auto_venv.sh
getting lots of python libraries/packagesj
library from pypi
warning boot/config.txt is not a link to boot/firmware/config.txt
FIX how?
reboot

4 Downloading Software

4.1 Following the Pimoroni Tutorial

```
https://learn.pimoroni.com/article/getting-started-with-enviro-plus
```

4.2 Cloning the Pimoroni Enviro+ Repository

To install the Pimoroni Enviro+ software, run the following command in the terminal:

```
git clone https://github.come/pimoroni/enviroplus-python
cd enviroplus-python
./install.sh
```

PiZ ID	OS	Update	Repositories Installed	Boot Run
1	bookworm (12)	2/12/25	EnviroPlus	No
2	bookworm (12)	2/11/25	EnviroPlus	No
3	Not Installed	No	No	No
4	bookworm (12)	2/11/25	EnviroPlus	No
5	bookworm (12)	2/11/25	EnviroPlus	No
6	bookworm (12)	2/10/25	EnviroPlus	No
7	bookworm (12)	2/11/25	EnviroPlus	No
8	bookworm (12)	2/11/25	EnviroPlus	No
9	bookworm (12)	2/11/25	EnviroPlus	No
10	bookworm (12)	Error	No	No
11	bookworm (12)	2/11/25	EnviroPlus	No
12	bookworm (12)	2/12/25	EnviroPlus	No
13	Not Installed	No	No	No
14	bookworm (12)	2/11/25	EnviroPlus	No
15	bookworm (12)	2/9/25	EnviroPlus	No

Table 1: Raspberry Pi Status

install.sh is a shell script that installs the necessary software for the Enviro+ board. It will take a few minutes to install all the software. when prompted to create a virtual environment, type "y" and press Enter. After this has been completed, the software will be installed.

After the software has been installed, you will be prompted to install examples. Type "y" and press Enter. When prompted to install the documentation, type "n" and press Enter.

Finally, you should see usk reboot to complete the installation. Type "y" and press Enter to reboot the Raspberry Pi Zero W.

4.3   Testing Pimoroni Examples

The Pimoroni board relies on a virtual environment to run the software. To test the Pimoroni Enviro+ software, run the following command in the terminal:

```
source ~/.virtualenvs/pimoroni/bin/activate
```

Navigate to the examples folder within the enviroplus-python folder:

```
cd enviroplus-python
cd examples
ls
```

There are several examples in the examples folder within the enviroplus-python folder. In the terminal, type the following to look at the available examples:

The examples folder contains several examples that demonstrate the capabilities of the Enviro+ board.

Weather Sensors This example uses the BME280 sensor to read temperature, pressure, and humidity.

```
python weather.py
```

Type "Ctrl + C" to stop the program.

MICS6814 gas sensor example The MICS6814 outputs resistance values in Ohms that correspond to the levels of three different types of gas: reducing, oxidising, and NH3 (more info above). Let's look at the numbers that come out of this sensor by running the gas example now. Type the following in the terminal:

```
python gas.py
```

Let it run for a while, and you'll see that the values creep up steadily. The sensor values take quite a while to stabilise, as the sensor warms up gradually. The sensor is sensitive to temperature, so it's important to let it warm up for a few minutes before taking readings.

Type "Ctrl + C" to stop the program.

Light Sensors - This example uses the LTR559 light sensor to read ambient light levels.

```
python light.py
```

Type "Ctrl + C" to stop the program.

Particulates - This example uses the PMS5003 sensor to read particulate matter levels.

```
python particulates.py
```

Type "Ctrl + C" to stop the program.[1]

4.4   Cloning the EJnPi Repository

To clone the EJnPi repository, run the following command in the terminal:

```
git clone https://github.com/marclos/EJnPi
```

---

[1]Sometimes this "stops" the program, but it continues to run in the background, which blocks the sensor from being used in other programs. If this happens, exit the terminal and restart a new one. I think that will work! But some say you need to reboot the Pi.

4.5   EJnPi: Pushing and Pulling EJnPi

*If you have a problem in RStudio with checking commits, it may be a bug. Use RStudio's Terminal and run this command:

```
git commit -v -a
```

Then uncomment one line and enter. This should fix the rest of the unselectable commits.

4.6   Testing the EJnPi Repository

To test the EJnPi repository, navigate to the EJnPi folder and run the following command in the terminal:

```
cd EJnPi
ls
```

The EJnPi folder contains several examples that demonstrate the capabilities of the Enviro+ board.

bme280_v2.py This program uses the BME280 sensor to read temperature, pressure, and humidity, but writes the data to a CSV file (bme280_data.csv) every XX seconds.

NOTE: I will rename this as EA30_bme280.py to reflect the fact that it is the EA30 version of the BME280 sensor. I would like to get the data out of this folder... to be continued.

```
python bme280_v2.py
```

Type "Ctrl + C" to stop the program.

EA30_particulates.py This program uses the PMS5003 sensor to read particulate matter levels, but writes the data to a CSV file (particulates_data.csv) every XX seconds.

```
python EA30_particulates.py
```

Results...

Enviroplus_v0.py This program ...crashes:

File "/home/pi/EJnPi/code25/enviroplus_v0.py", line 22, in ¡module¿ from pms5003 import PMS5003

Doesn't import the PMS5003 library – somehow the path is a problem.

ImportError: cannot import name 'PMS5003' from 'pms5003' (/home/pi/EJnPi/code25/pms5003.py)

python particulatae.py fail

the libraries can be found in the virtual environment – lots of stuff on this, but it doing to be heard to call the virtual library and get everyting working on startup!

ugh!!

Type "Ctrl + C" to stop the program.

5 Set up Script to Run automatically

5.1 Setting up a Virtual Environment

`https://learn.adafruit.com/python-virtual-environment-usage-on-raspberry-pi/basic-venv-usage`
`https://learn.adafruit.com/python-virtual-environment-usage-on-raspberry-pi/automatically-running-at-boot`

5.1.1 Options for Running Script Automatically

If your using the login of pi for example, then the line source /.virtualenvs/pimoroni/bin/activate should be added into the .bashrc file in the /home/pi users folder.

There are several ways to run a script automatically on boot. The easiest way is to use crontab, a job scheduler, which has an @reboot command that will run a script or command when the Pi first boots up.

crontab

systemd

rc.local

An easy way of running a script automatically on boot is to use crontab, a job scheduler, which has an @reboot command that will run a script or command when the Pi first boots up.

In the terminal, type crontab -e and then select nano as the editor.

Scroll down to the very bottom of the file with the arrow keys and type the following line:

`@reboot sudo python /home/pi/enviroplus-python/examples/luftdaten.py &`

Double- and triple-check this command to make sure that it's exactly correct, as any error will cause it not to run on boot.

Press control-x, then y, then enter to exit and save the new crontab.

You should now shutdown your Raspberry Pi Zero W, either through the Raspberry Pi menu, or by typing sudo shutdown -h now in the terminal.

When running the examples that follow, you can type control-c at any time to stop the example running.