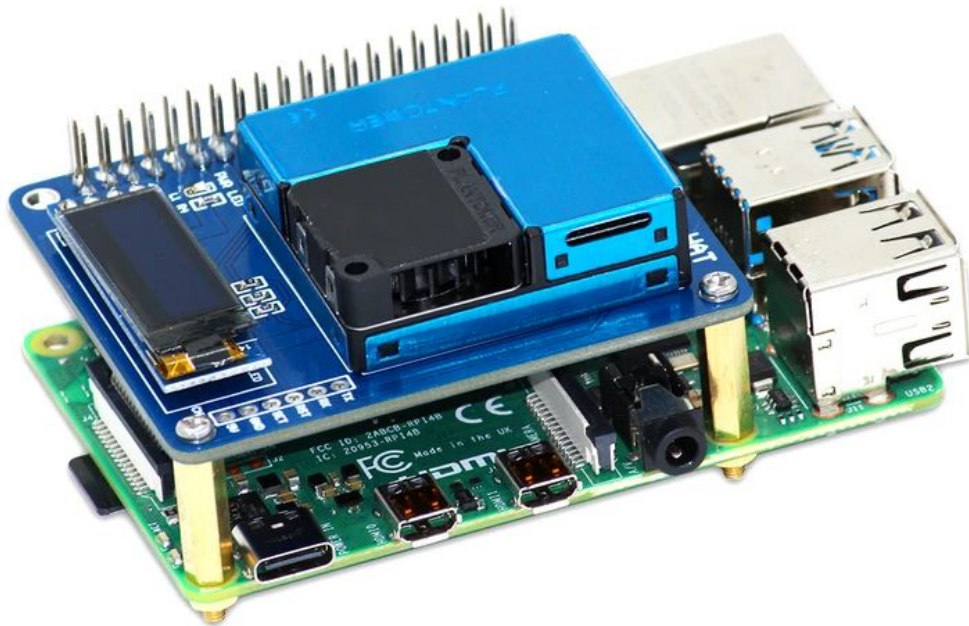


Air Monitoring HAT for Raspberry Pi



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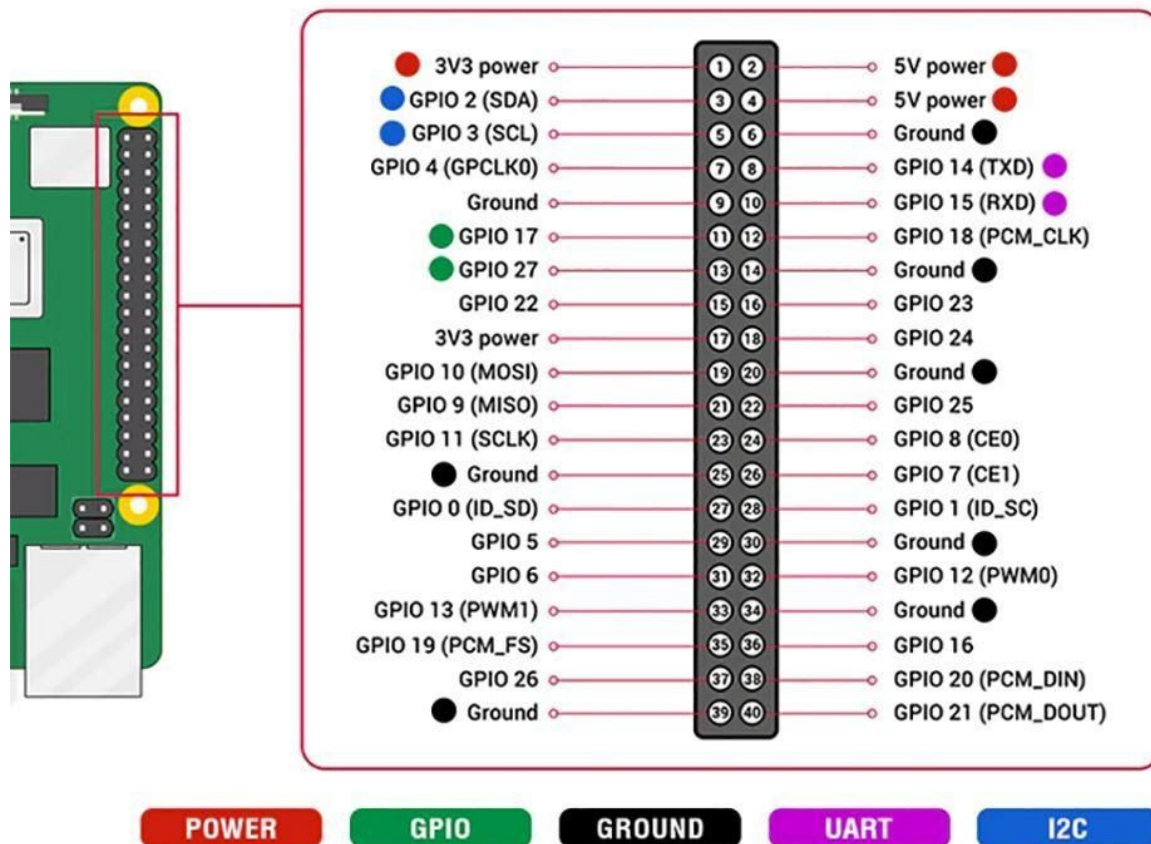
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Air Monitoring HAT

Introduction

Air Monitoring HAT is a powerful and hi-tech PMSA003 sensor that provides the information of suspended particulate matter (PM1.0, PM2.5, and PM10) in the air per unit volume via digital output with an operating voltage of 3.3 V. It communicates via UART (serial) with the standby current ≤ 200 Microampere (μA) of the sensor.

Pin Out



Peripheral Pins	Raspberry Pi Pins
5V	5V
GND	GND
PMS RX	GPIO14
PMS TX	GPIO15
PMS SET	GPIO27
PMS RESET	GPIO17
OLED SDA	GPIO2
OLED SCL	GPIO3

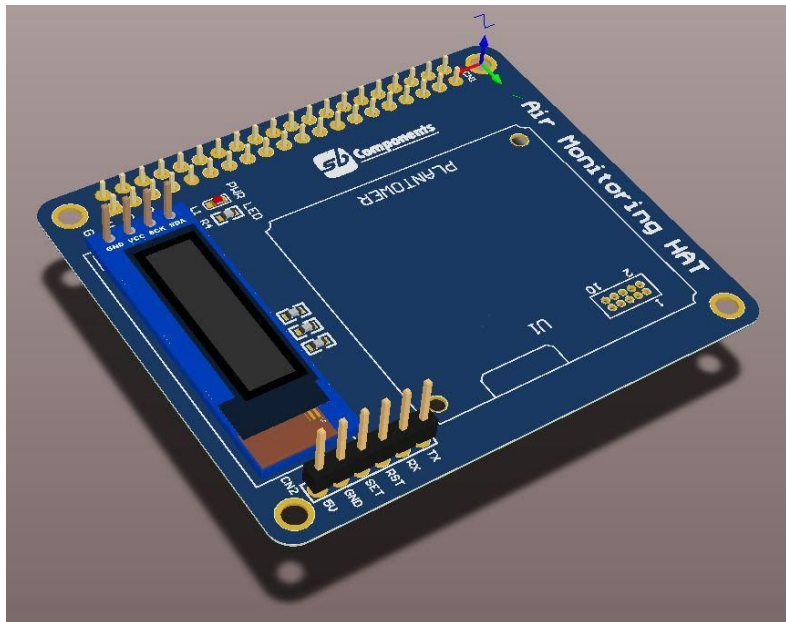
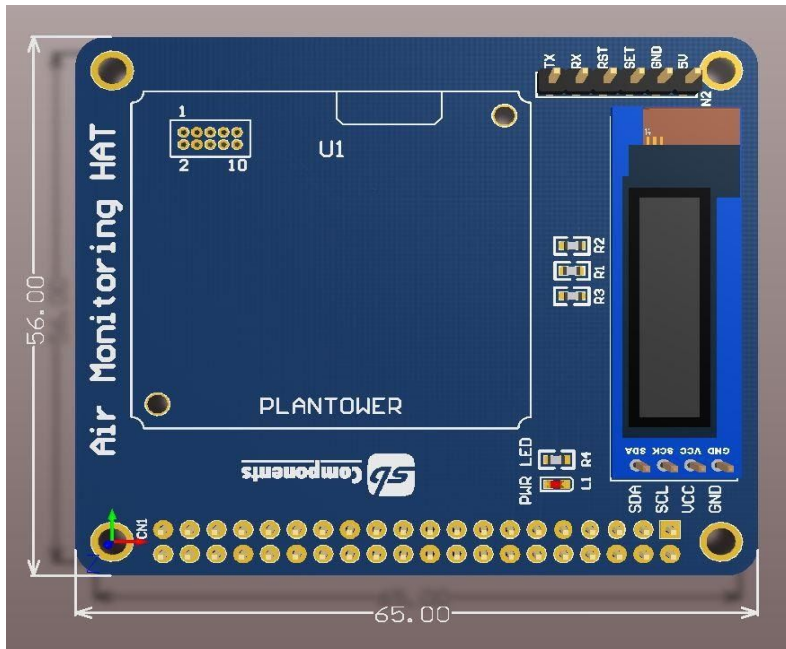
Features

- Digital sensor
- Operating Voltage 5V DC
- PMSA003 Sensor
- Standard 40 Pin GPIO
- OLED Display 0.91"
- Measuring range 0.3 to 10 Micron
- UART (Serial) Interface

Specification

- Model - Air Monitoring HAT
- Sensor Model number - PMSA003
- Data Output - Digital Sensor(unit quality + number of units)
- Type - Biosensor
- Communication Interface - UART (Serial)
- Display Type - OLED Display 0.91”
- Board Dimension - 65 x 56 mm
- Measuring range - 0.3 to 1.0, 1.0 to 2.5, 2.5 to 10 Micron (μm)
- Counting efficiency - 50% @ 0.3 μm 98% @ $\geq 0.5 \mu\text{m}$
- Response time - ≤ 10 s
- DC supply voltage - 5.0 V
- Maximum Operating Current - 100 Milliamp (mA)
- Standby current - ≤ 200 Microamp (μA)
- Data interface level - L < 0.8 @3.3, H > 2.7 @3.3 Volt(V)
- Operating Temperature range - -10 to +60 Celsius ($^{\circ}\text{C}$)
- Operating Humidity range - 0 - 99%
- Mean time between failures - ≥ 3 Year(Y)

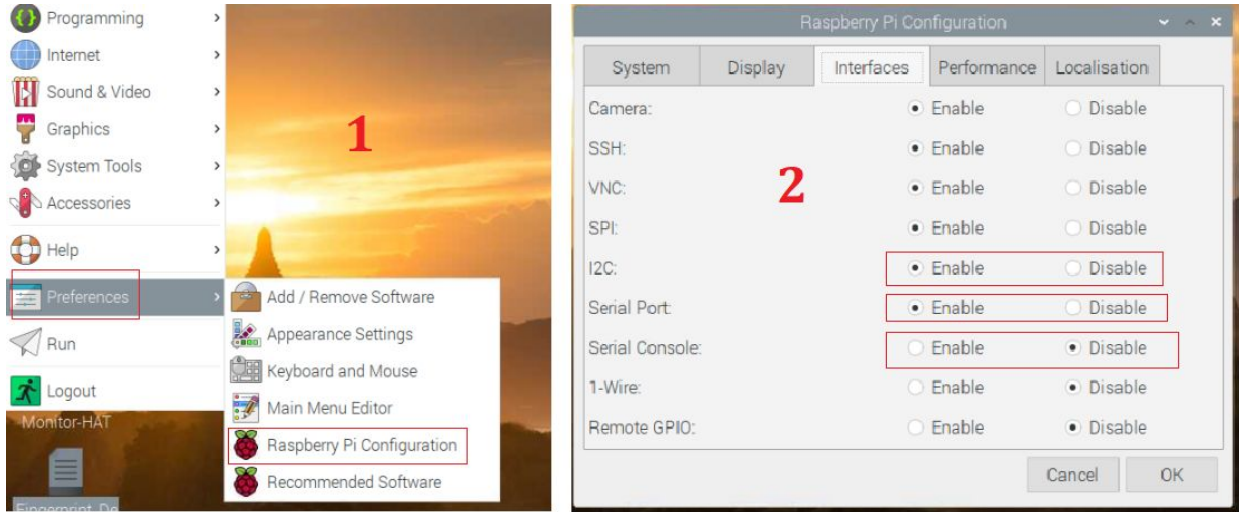
Hardware



Installation Process

Enable I2C and Serial Interface

- GUI Method to enable i2c and Serial



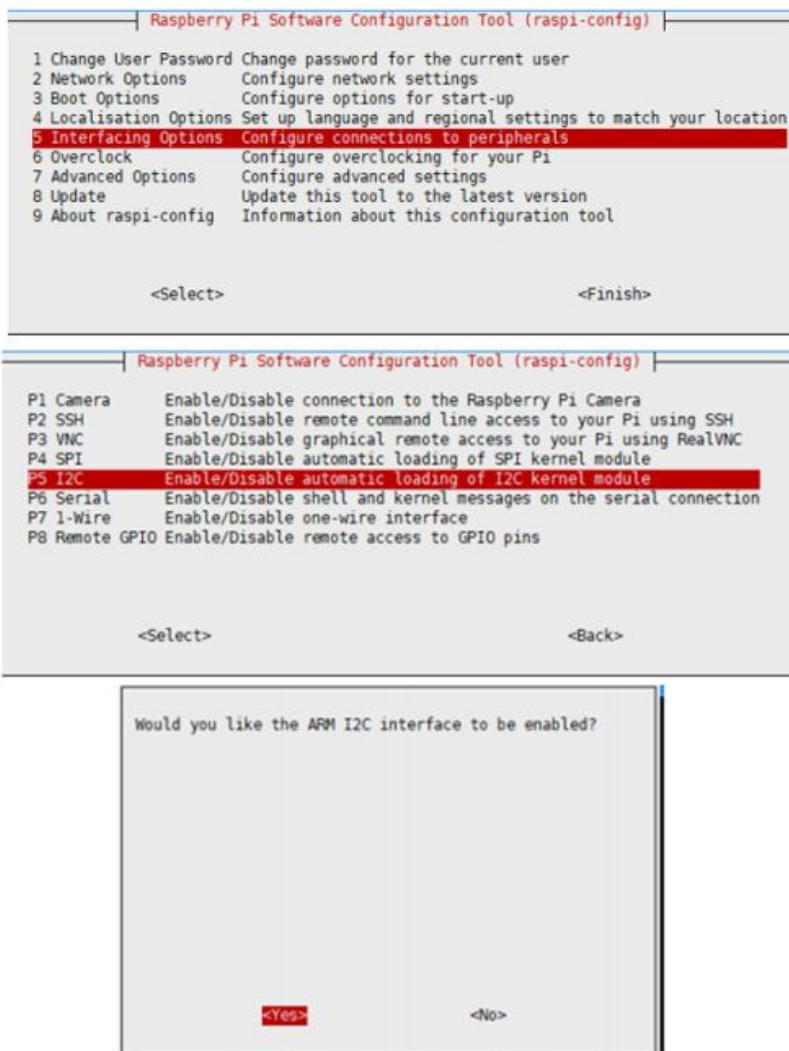
Through Terminal :

Open a terminal and run the following commands to enable I2C and Serial :

- `sudo raspi-config`

Choose Interfacing Options -> I2C ->yes

Terminal method to enable i2c and serial can be followed as:



```
Raspberry Pi Software Configuration Tool (raspi-config)
1 Change User Password Change password for the current user
2 Network Options      Configure network settings
3 Boot Options         Configure options for start-up
4 Localisation Options Set up language and regional settings to match your location
5 Interfacing Options  Configure connections to peripherals
6 Overclock           Configure overclocking for your Pi
7 Advanced Options    Configure advanced settings
8 Update              Update this tool to the latest version
9 About raspi-config  Information about this configuration tool

<Select>                                <Finish>

Raspberry Pi Software Configuration Tool (raspi-config)
P1 Camera             Enable/Disable connection to the Raspberry Pi Camera
P2 SSH                Enable/Disable remote command line access to your Pi using SSH
P3 VNC                Enable/Disable graphical remote access to your Pi using RealVNC
P4 SPI                Enable/Disable automatic loading of SPI kernel module
P5 I2C                Enable/Disable automatic loading of I2C kernel module
P6 Serial             Enable/Disable shell and kernel messages on the serial connection
P7 1-Wire             Enable/Disable one-wire interface
P8 Remote GPIO        Enable/Disable remote access to GPIO pins

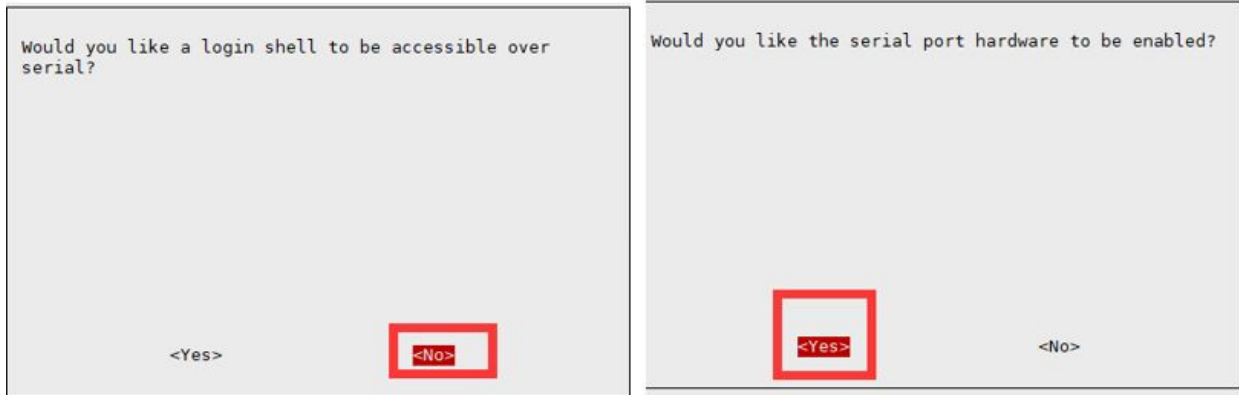
<Select>                                <Back>

Would you like the ARM I2C interface to be enabled?

<Yes>                                     <No>
```


- `sudo raspi-config`

Choose Interfacing Options -> Serial -> No -> Yes



Testing

- Stack Air Monitoring HAT on top of Raspberry Pi GPIO Header pins.

Source Code Link : <https://github.com/sbcshop/Air-Monitoring-HAT>

Clone Repository

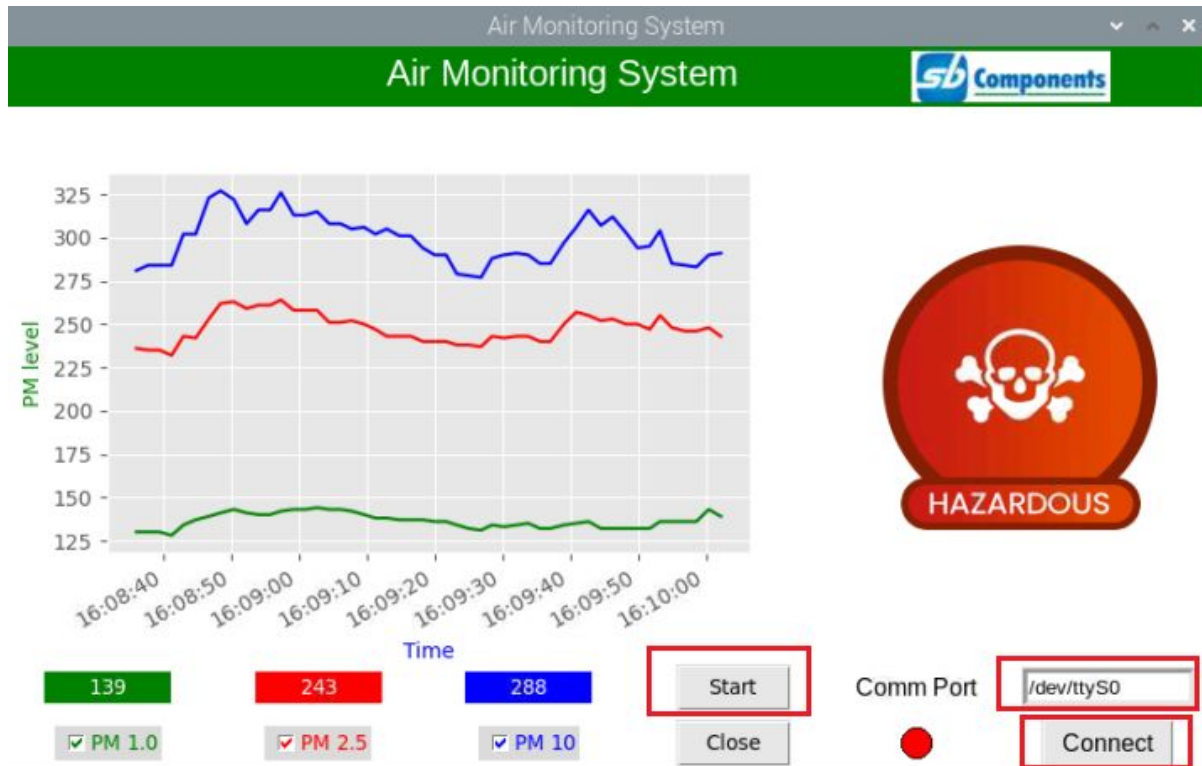
```
git clone https://github.com/sbcshop/Air-Monitoring-HAT.git
```

```
cd Air-Monitoring-HAT
```

- Run GUI by running the below command:

```
python3 Air_monitoring_GUI.py
```

GUI and Examples



Select **COM port** from above GUI ("/dev/ttyS0" in case of default connection), and click on the start button to start Real-Time data from the sensor on Graph and OLED Display.

You can also use these two examples and modify them easily:

- 1.) **display_on_oled_example.py** :- To print the sensor data on OLED Display.
- 2.) **read_example.py**: To print the sensor data on Python shell or Terminal.

For detailed information please visit the wiki of this repository.

<https://github.com/sbcshop/Air-Monitoring-HAT/wiki/Wiki>