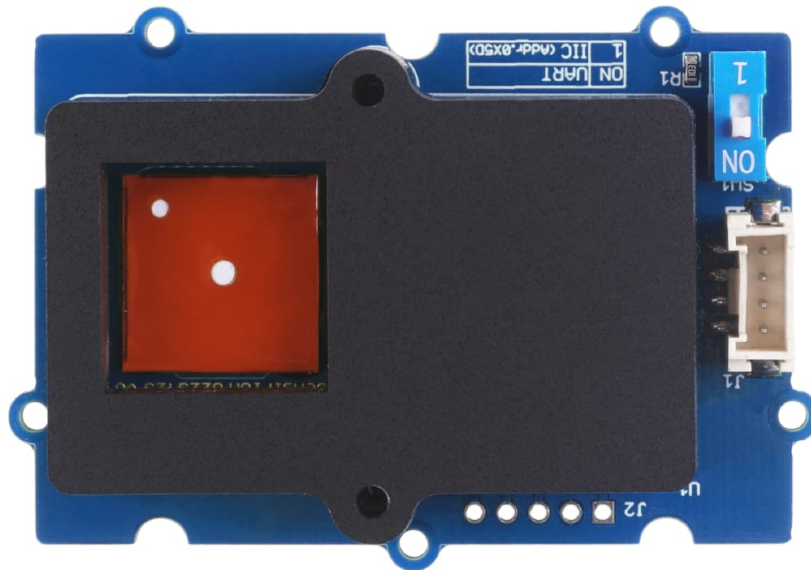


# Grove - Formaldehyde Sensor



Grove Formaldehyde Sensor can detect formaldehyde around 0~1000 ppb with low cross-sensitivity to alcohol and high stability of 6 years lifetime. Built-in RHT sensor ensures it maintains fine performance under different temperatures and humidity and it transmits data through UART and I2C ports.

Get One Now 

[<https://www.seeedstudio.com/Grove-Formaldehyde-Sensor-SFA30-p-5204.html>]


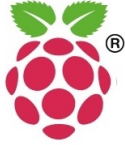
## Features

- Low cross-sensitivity to alcohol
- Standard formaldehyde measurement range: 0 ~ 1000 ppb
- Long-term stability and 6 years' service lifetime
- Patented electrochemical cell with anti-dry technology
- I2C/UART interface with lifetime-calibrated output
- Maintain performance under different temperatures and humidity: compensated via Sensirion RHT sensor

## Specification

Parameter	Value/Range
Supply voltage range	3.3V or 5V
Measurement range	0 to 1,000 ppb
Response time	<2 min
Limit of detection	<20 ppb
Interface	I2C / UART
Formaldehyde accuracy	$\pm 20$ ppb or $\pm 20\%$ of measured value, whichever is larger

## Platforms Supported

Arduino	Raspberry Pi		
			



### Caution

The platforms mentioned above as supported is/are an indication of the module's software or theoretical compatibility. We only provide software library or code examples for Arduino platform in most cases. It is not

possible to provide software library / demo code for all possible MCU platforms. Hence, users have to write their own software library.

## Getting Started



### Note

If this is the first time you work with Arduino, we highly recommend you to see [Getting Started with Arduino](https://wiki.seeedstudio.com/Getting_Started_with_Arduino/) [https://wiki.seeedstudio.com/Getting\_Started\_with\_Arduino/] before the start.

## Play With Arduino

### Hardware

- **Step 1.** Prepare the below stuffs:

Seeeduino V4.2



[Get One Now](https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html)

[https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html]

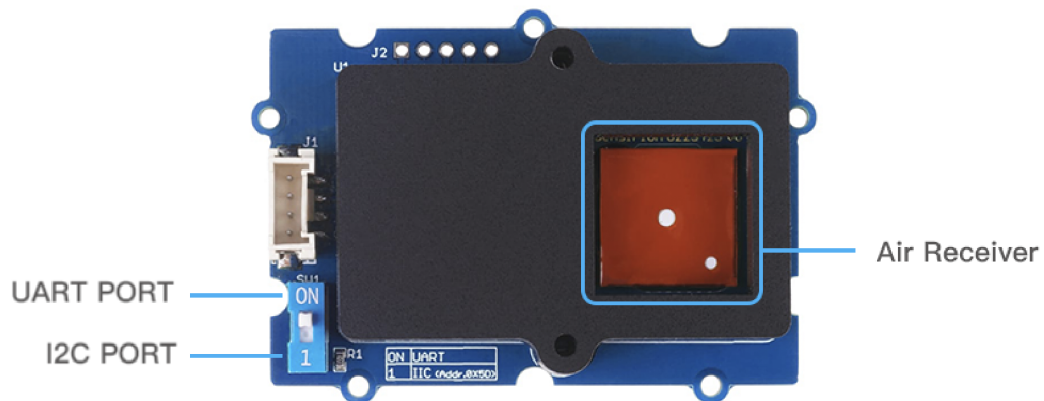
Base Shield



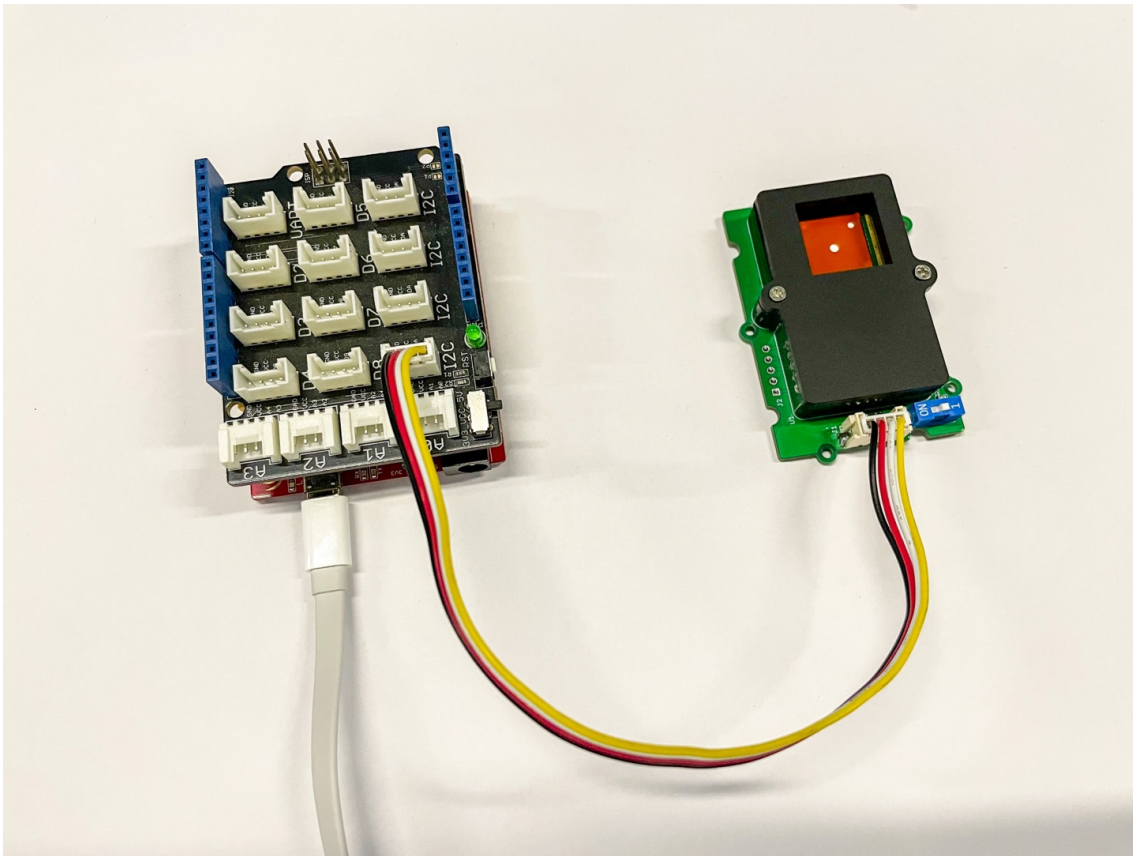
[Get One Now](https://www.seeedstudio.com/Base-Shield-V2-p-1378.html)

[https://www.seeedstudio.com/Base-Shield-V2-p-1378.html]

- **Step 2.** Set the button on the Grove-Formaldehyde Sensor to the "1" position.



- **Step 3.** Plug Grove - Base Shield into Seeeduino and set Grove-Formaldehyde Sensor to **I<sup>2</sup>C** port of Grove-Base Shield
- **Step 4.** Connect Seeeduino to PC via a USB cable.

**Note**

If you don't have Grove Base Shield, it still can be directly connected Grove-Formaldehyde Sensor to Seeduino as below.

Seeduino	Grove-Loudness Sensor
5V	Red
GND	Black
SDA	White
SCL	Yellow

**Software**

- **Step 1.** Download the [Grove-Formaldehyde Sensor Library](https://files.seeedstudio.com/wiki/Grove-Formaldehyde-Sensor-(SFA30)_v1.02-SCH/Grove-Formaldehyde-Sensor-SFA30.zip) [https://files.seeedstudio.com/wiki/Grove-Formaldehyde-Sensor-(SFA30)\_v1.02-SCH/Grove-Formaldehyde-Sensor-SFA30.zip] for the usage of Grove Formaldehyde Sensor and [install](https://wiki.seeedstudio.com/How_to_install_Arduino_Library/) [https://wiki.seeedstudio.com/How\_to\_install\_Arduino\_Library/] it.
- **Step 2.** Open the Arduino IDE. Copy below codes to Arduino IDE and upload it. If you do not know how to upload the codes, here we have some guides about [how to upload code](https://wiki.seeedstudio.com/Upload_Code/) [https://wiki.seeedstudio.com/Upload\_Code/].

```
1  #include <Arduino.h>
2  #include <SensirionI2CSfa3x.h>
3  #include <Wire.h>
4
5  SensirionI2CSfa3x sfa3x;
6
7  void setup() {
8
9      Serial.begin(115200);
10     while (!Serial) {
11         delay(100);
12     }
13
14     Wire.begin();
15
16     uint16_t error;
17     char errorMessage[256];
18
19     sfa3x.begin(Wire);
20
21     // Start Measurement
22     error = sfa3x.startContinuousMeasurement();
23     if (error) {
24         Serial.print("Error trying to execute startConti
```

```
25     errorToString(error, errorMessage, 256);
26     Serial.println(errorMessage);
27 }
28 }
29
30 void loop() {
31     uint16_t error;
32     char errorMessage[256];
33
34     delay(1000);
35     int16_t hcho;
36     int16_t humidity;
37     int16_t temperature;
38     error = sfa3x.readMeasuredValues(hcho, humidity, temp
39     if (error) {
40         Serial.print("Error trying to execute readMeasur
41         errorToString(error, errorMessage, 256);
42         Serial.println(errorMessage);
43     } else {
44         Serial.print("Hcho:");
45         Serial.print(hcho / 5.0);
46         Serial.print("\t");
47         Serial.print("Humidity:");
48         Serial.print(humidity / 100.0);
49         Serial.print("\t");
50         Serial.print("Temperature:");
51         Serial.println(temperature / 200.0);
52     }
53 }
```

- **Step 4.** In this program, Seeeduino can monitor the formaldehyde gas concentration, air humidity and temperature data in real-time. By opening the 'Serial Monitor', the results should be like:



```

COM66
Hcho:15.60 Humidity:64.47 Temperature:27.83
Hcho:15.40 Humidity:64.50 Temperature:27.83
Hcho:15.20 Humidity:64.51 Temperature:27.83
Hcho:15.00 Humidity:64.51 Temperature:27.81
Hcho:15.00 Humidity:64.53 Temperature:27.83
Hcho:14.80 Humidity:64.52 Temperature:27.83
Hcho:14.80 Humidity:64.51 Temperature:27.83
Hcho:14.80 Humidity:64.50 Temperature:27.83
Hcho:14.60 Humidity:64.50 Temperature:27.81
Hcho:14.60 Humidity:64.50 Temperature:27.83
Hcho:14.60 Humidity:64.51 Temperature:27.80
Hcho:14.40 Humidity:64.50 Temperature:27.81
Hcho:13.80 Humidity:64.51 Temperature:27.81
Hcho:13.20 Humidity:64.55 Temperature:27.81

```

Autoscroll  Show timestamp Newline 115200 baud Clear output

## Play With Raspberry Pi

### Hardware

- **Step 1.** Prepare the below stuffs:

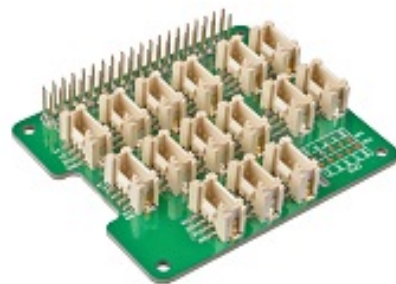
Raspberry pi



Get One Now

[<https://www.seeedstudio.com/Raspberry-Pi-3-Model-B-p-2625.html>]

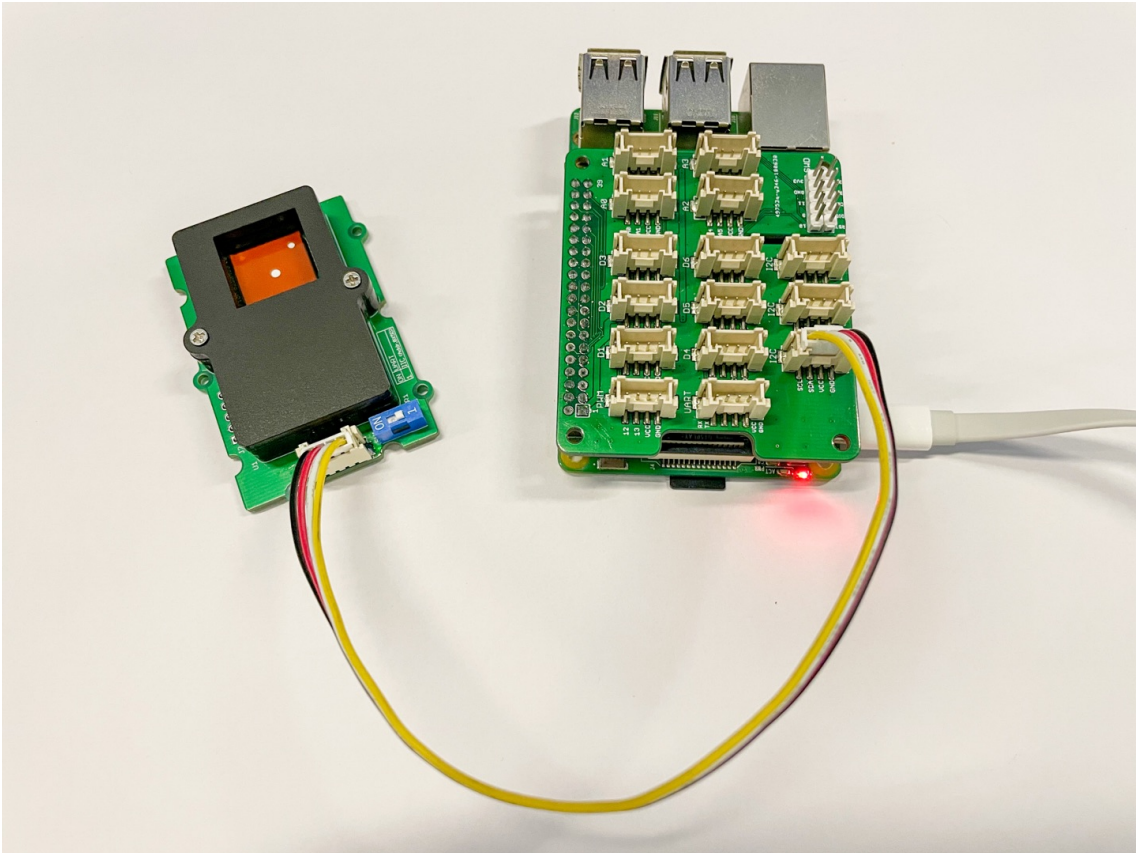
Grove Base Hat for Raspberry Pi



Get One Now

[<https://www.seeedstudio.com/Grove-p-2241.html>]

- **Step 2.** Plug the Grove Base Hat for Raspberry Pi into Raspberry Pi.
- **Step 3.** Connect Grove-Dust Sensor to I<sup>2</sup>C port of Grove Base Hat for Raspberry Pi.
- **Step 4.** Connect the Raspberry Pi to PC through a USB cable.



## Software

- **Step 1.** Follow [Setting Software](https://www.dexterindustries.com/GrovePi/get-started-with-the-grovepi/setting-software/) [https://www.dexterindustries.com/GrovePi/get-started-with-the-grovepi/setting-software/] to configure the development environment of Resberry Pi.
- **Step 2.** Download the [Grove-Formaldehyde Sensor Library](https://files.seeedstudio.com/wiki/Grove-Formaldehyde-Sensor/) [https://files.seeedstudio.com/wiki/Grove-Formaldehyde-

Sensor-(SFA30)\_v1.02-SCH/embedded-sfa3x-main.zip] and unzip it to the Raspberry Pi.

- **Step 3.** Navigate to the demos' directory. The following command can monitor the concentration of formaldehyde, humidity and temperature.

```
1 cd ~/embedded-sfa3x-main/i2c
2 make
3 ./sfa3x_i2c_example_usage
```



#### Tip

In this wiki we use the path `~/embedded-sfa3x-main/i2c` instead of `/home/pi/Desktop/embedded-sfa3x-main/i2c`, you need to make sure Step 2 and Step 3 use the same path.

Here is the `sfa3x_i2c_example_usage.c` code.

```
1 #include <stdio.h> // printf
2
3 #include "sensirion_common.h"
4 #include "sensirion_i2c_hal.h"
5 #include "sfa3x_i2c.h"
6
7 /**
8  * TO USE CONSOLE OUTPUT (PRINTF) IF NOT PRESENT ON YOUR
9  */
10 // #define printf(...)
11
12 int main(void) {
13     int16_t error = 0;
14
15     sensirion_i2c_hal_init();
16
17     error = sfa3x_device_reset();
18     if (error) {
```

```
19     printf("Error resetting device: %i\n", error);
20     return -1;
21 }
22
23 uint8_t device_marking[42];
24 error = sfa3x_get_device_marking(&device_marking[0],
25 if (error) {
26     printf("Error getting device marking: %i\n", error);
27     return -1;
28 }
29 printf("Device marking: %s\n", device_marking);
30
31 // Start Measurement
32 error = sfa3x_start_continuous_measurement();
33 if (error) {
34     printf("Error executing sfa3x_start_continuous_m
35         error);
36 }
37
38 for (;;) {
39     // Read Measurement
40
41     int16_t hcho;
42     int16_t humidity;
43     int16_t temperature;
44
45     sensirion_i2c_hal_sleep_usec(500000);
46
47     error = sfa3x_read_measured_values(&hcho, &humid
48
49     if (error) {
50         printf("Error executing sfa3x_read_measured_
51     } else {
52         printf("Measurement:\n");
53         printf("  Formaldehyde concentration: %.1f\n
54         printf("  Relative humidity: %.2f\n", humid
55         printf("  Temperature: %.2f\n", temperature
56     }
57 }
58
59 error = sfa3x_stop_measurement();
```

```
60     if (error) {
61         printf("Error executing sfa3x_stop_measurement()
62     }
63
64     return 0;
65 }
```



### Success

If everything goes well, the following results can be displayed like:

```
1  pi@raspberrypi:~/Downloads/embedded-sfa3x-main/i2c $ ./st
2  Device marking: 211117825F073B80
3  Measurement:
4  Formaldehyde concentration: 0.0
5  Relative humidity: 70.19
6  Temperature: 27.41
```

You can quit this program by simply press `Ctrl+C`.