# DFRobot Gravity: Multifunctional Environmental Sensor

**Introduction**

This multifunctional environmental sensor comprises SHTC3 temperature & humidity sensor, BMP280 atmospheric pressure sensor, VEML7700 light sensor, and ML8511 ultraviolet sensor into one and offers 5 kinds of environmental parameters. Professional sensor chips are selected for each kind of parameter measurement. The reasonable layout and heat conduction of the main chip are carefully considered in the circuit design, which effectively guarantees the accuracy of the data

The product has an MCU processing chip onboard that converts the raw sensor data into values with the standard unit so you can directly use them. For example, ℃ and °F for temperature, % for humidity, Kpa for atmospheric pressure, lx for light illuminance, and mw/m² for ultraviolet.

The environmental sensor supports two communication methods, UART and I2C. There are two versions: Gravity and Fermion(breakout), also complete Arduino and Python libraries are provided.

Exquisite and small, you can use it to make indoor and outdoor environmental monitoring systems, or for your environmental monitoring topics. This DFRobot environmental sensor can greatly simplify the wirings and codes of your project.

**Features**

* Gravity interface, no need to solder, plug and play.
* Switchable I2C and UART two output modes
* Highly integrated module, can test a variety of data at the same time (temperature, humidity, atmospheric pressure, altitude, ultraviolet intensity, ambient light intensity)
* Reasonable layout and high precision.

**Application**

* Home indoor and outdoor environment detection system
* Environmental monitoring work

**Specification**

* Working voltage: 3.3~5V DC
* Working current: 45mA
* Output signal: I2C, UART
* Working temperature: -20~70℃
* Product size: 32mm×32mm / 1.26×1.26 inch
* Mounting hole size: M3 (diameter 3mm / 0.12 inch), the distance between the centers of the mounting holes is 25mm / 0.98 inch

**Atmospheric pressure sensor**

Atmospheric pressure unit relationship: 1000pa = 10hpa = 1kpa

* Sensor chip model: BMP280
* Atmospheric pressure measurement range: 3000~1100 hPa
* Relative accuracy of atmospheric pressure: ±0.12 hPa
* Absolute atmospheric pressure accuracy: ±1 hPa

**Temperature & Humidity Sensor**

* Sensor chip model: SHT-C3
* Relative humidity accuracy: ±2%RH
* Relative humidity resolution: 0.01%RH
* Relative humidity measurement range: 0~100
* Temperature accuracy: ±0.2℃
* Temperature resolution: 0.01℃
* Temperature measurement range: -40~125℃

**Ultraviolet Sensor**

* Sensor chip model: ML8511
* Ultraviolet sensitive wavelength UV-A (320-400nm), UV-B (280-320nm)
* Ultraviolet output unit: mW/㎡

**Ambient light sensor**

* Sensor chip model: VEML7700
* Ambient light accuracy: 0.0036 lx/ct
* Ambient light range: 0~120 klx

**Function Overview**

**Dimension**



**Board Overview**



| **Num** | **Label** | **Description** |
| --- | --- | --- |
| 1 | D/T | I2C data line SDA/UART data transmission-TX |
| 2 | C/R | I2C clock line SCL/UART data receiving-RX |
| 3 | - | GND |
| 4 | + | Power + |

**Tutorial**

Download the program to DFRuino UNO, open the serial monitor to check various environmental parameters.

**Requirements**

* **Hardware**
	+ [DFRduino UNO R3](https://www.dfrobot.com/product-838.html) (or similar) x 1
	+ SEN0501 Multifunctional environmental sensor x1
	+ Wires
* **Software**
	+ [Arduino IDE](https://www.arduino.cc/en/Main/Software)
	+ Download and install the **[DFRobot\_EnvironmentalSensor Library](https://github.com/cdjq/DFRobot_EnvironmentalSensor)** ([About how to install the library?](https://www.arduino.cc/en/Guide/Libraries#.UxU8mdzF9H0))

**Read Sensor Data via I2C/UART**

**Connection for UART and I2C**



UART on the left, I2C on the right.

* Click to check more wiring diagrams

**Switch Communication Mode**

About UART/I2C mode switching:

1. The default mode in the code is UART. Dial the switch to UART side to use it.
2. For using I2C, dial the switch to I2C side and replace the 1 at the beginning of the code with 0, as shown below:

 to 

**Steps:**

**Note: Different motherboards correspond to different wiring pins (refer to “more wiring diagrams” above). In the Arduino IDE, they also correspond to different motherboard options and different ports (COM). The other steps are the same as DFRuino UNO.**

* Connect the module and DFRuino UNO according to the wiring method above.
* Open the Arduino IDE and upload the following code to DFRuino UNO.
* Open the serial port monitor of Arduino IDE, adjust the baud rate to 115200, and observe the serial port printing result.

**Sample Code**

Function: Print all data obtained by the module

Copy

**Expected Results**

The read data will be dipalyed on the serial monitor.

