Grove - TDS Sensor

The Grove - TDS Sensor detects the Total Dissolved Solids (TDS) levels in the water which can be used to indicate the water quality. The Grove - TDS Sensor can be applied in water quality applications such as TDS meter, well water, aquarium, hydroponics, etc.

It supports 3.3 / 5V input voltage and 0 ~ 2.3V Output Voltage making it easy to be compatible with all Arduino Boards. The sensor

also provides a waterproof probe, making the testing process much easier to handle.

[https://www.seeedstudio.com/Grove-TDS-Sensor-p-4400.html]

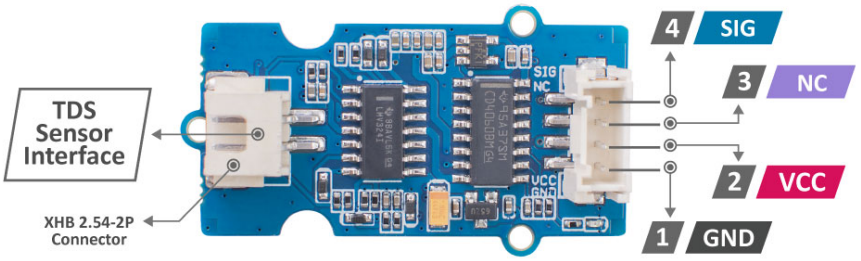
Feature

- Analog Signal, easy to implement
- Support 3.3 / 5V Input Voltage
- Good Arduino Compatibility, where 0 ~ 2.3V Output Voltage can be easily implemented in 3.3 / 5V control system
- Waterproof TDS Probe

Specification

Parameter	Value
Input voltage	3.3V / 5V
Output Voltage	0 ~ 2.3V
Working Current	3 ~ 6 mA
TDS Measurement Range	0 ~ 1000ppm
Connection Interface	Grove 4-Pin / XHB 2.54mm 2P
Interface	Analog
Cable Length	60cm
Connection Interface	XHB 2.54mm 2P

Hardware Overview



1 : Connected to the system GND
2 : Power supply from Grove 5V/3.3V
3 : Not connected in this module
4 : Output signal from this module

[https://files.seeedstudio.com/wiki/Grove-TDS-Sensor/img/Hardware-overview.jpeg]

Platforms Supported

Arduino	Raspberry Pi		
	TO DO		

Getting Started

Play With Arduino

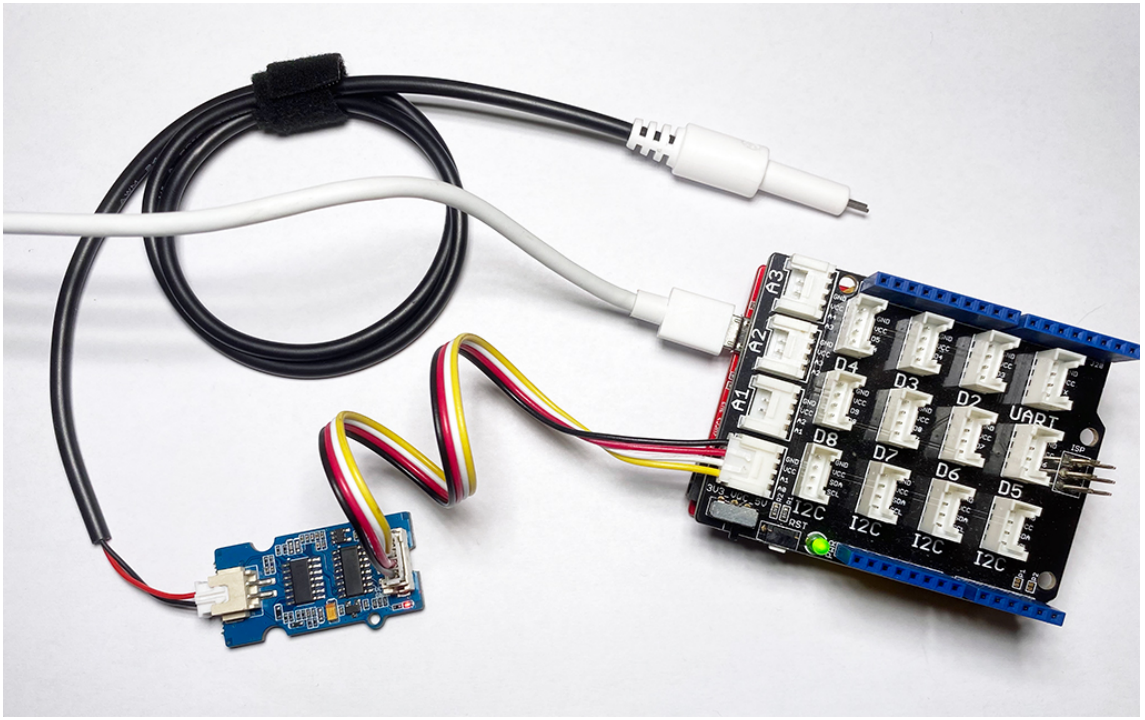
Materials required

Seeeduino V4.2	Base Shield
	
Get ONE Now [https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html]	Get ONE Now [https://www.seeedstudio.com/Base Shield-V2-p-1378.html]

> In addition, you can consider our new Seeeduino Lotus M0+ [https://www.seeedstudio.com/Seeeduino-Lotus-Cortex-M0-p-2896.html], which is equivalent to the combination of Seeeduino V4.2 and Baseshield.

Hardware Connection

- **Step 1.** Plug Grove - TDS Sensor to **A0** port of Grove - Base Shield.
- **Step 2.** Plug Grove - Base Shield into Seeeduino.
- **Step 3.** Connect Seeeduino to a PC via a USB cable.



Software

> **Attention**
> If this is the first time you work with Arduino, we strongly recommend you to see Getting Started with Arduino [https://wiki.seeedstudio.com/Getting_Started_with_Arduino/] before the start.

- **Step 1.** Open the Arduino IDE and create a new file, then copy the following code into the new file.

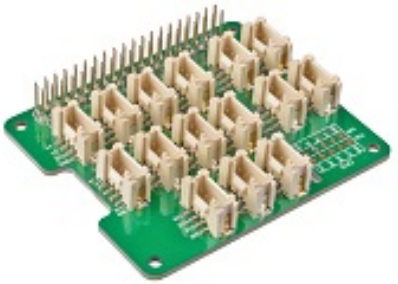
```
#define SERIAL Serial
#define sensorPin A0

int sensorValue = 0;
float tdsValue = 0;
float Voltage = 0;

void setup() {
    SERIAL.begin(9600);
```

```
}
void loop() {
    sensorValue = analogRead(sensorPin);
    Voltage = sensorValue*5/1024.0; //Convert analog rea
    tdsValue=(133.42/Voltage*Voltage*Voltage - 255.86*Vo
    SERIAL.print("TDS Value = ");
    SERIAL.print(tdsValue);
    SERIAL.println(" ppm");
    delay(1000);
}
```

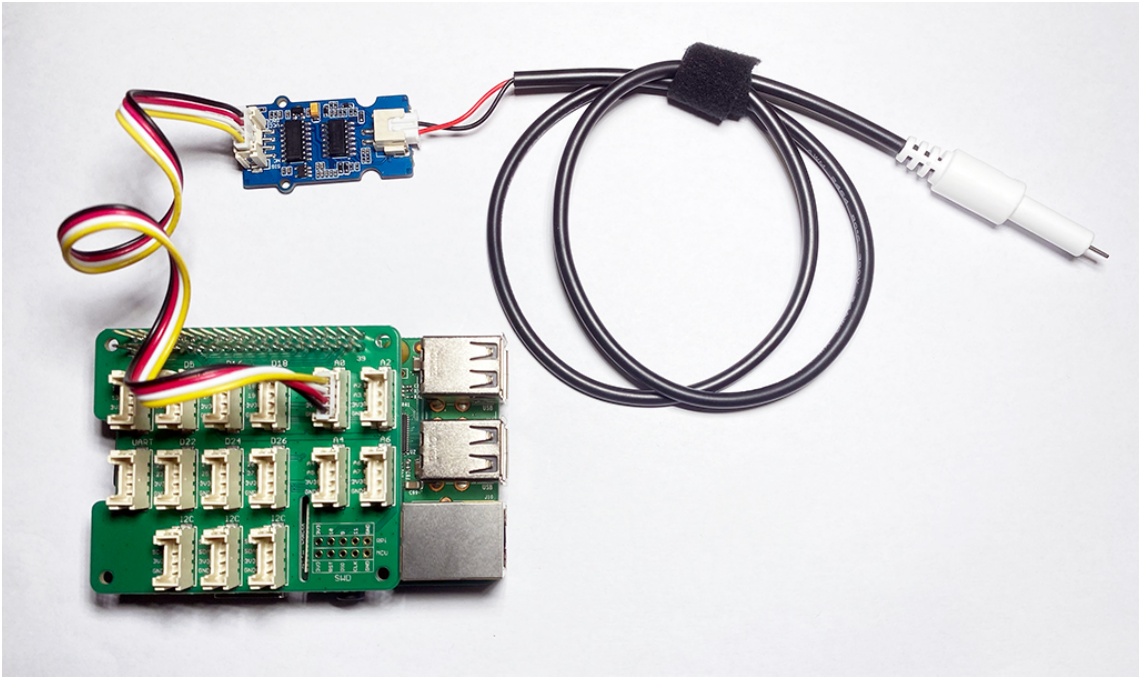
- **Step 3.** Upload the demo. If you do not know how to upload the code, please check How to upload code [https://wiki.seeedstudio.com/Upload_Code/].
- **Step 4.** Open the **Serial Monitor** of Arduino IDE by click **Tool-> Serial Monitor**. Or tap the `Ctrl`+`Shift`+`M` key at the same time. Set the baud rate to **9600**.
- **Step 5.** The result should be like this when the probe is in water:

Play With Raspberry Pi

Materials required

Raspberry Pi	Grove Base Hat for RasPi
	
Get ONE Now [https://www.seeedstudio.com/Raspberry-Pi-3-Model-B-p-2625.html]	Get ONE Now [https://www.seeedstudio.com/Grove-Base-Hat-for-Raspberry-Pi.html]

- **Step 2.** Plug the Grove Base Hat into Raspberry Pi.
- **Step 3.** Connect the Grove - TDS sensor to port **A0** of the Base Hat.



- **Step 4.** Connect the Raspberry Pi to PC through USB cable.

Software

- **Step 1.** Follow Setting Software [https://wiki.seeedstudio.com/Grove_Base_Hat_for_Raspberry_Pi/#installation] to configure the development environment.
- **Step 2.** Download the source file by cloning the grove python library.

```
cd ~
git clone https://github.com/Seeed-Studio/grove.py
```

- **Step 3.** Execute below commands to create the python code.

```
cd grove.py/grove/
nano TDS.py
```

- **Step 4.** Copy the following code into the file:

```
import math
import sys
import time
from grove.adc import ADC

class GroveTDS:

    def __init__(self, channel):
        self.channel = channel
        self.adc = ADC()

    @property
    def TDS(self):
        value = self.adc.read(self.channel)
```

```
        if value != 0:
            voltage = value*5/1024.0
            tdsValue = (133.42/voltage*voltage*voltage-2
            return tdsValue
        else:
            return 0

Grove = GroveTDS

def main():
    if len(sys.argv) < 2:
        print('Usage: {} adc_channel'.format(sys.argv[0]
        sys.exit(1)

    sensor = GroveTDS(int(sys.argv[1]))
    print('Detecting TDS...')

    while True:
        print('TDS Value: {0}'.format(sensor.TDS))
        time.sleep(1)

if __name__ == '__main__':
    main()
```

- **Step 5.** Use **Ctrl+O** to save and **Ctrl+X** to quit.
- **Step 6**. Run the following to execute:

```
python TDS.py 0
```

Success
If everything goes well, you will be able to see the following result:

```
pi@raspberrypi:~/grove.py/grove$ python TDS.py 0
Detecting TDS...
TDS Value: 0
```

```
 4  TDS Value: 0
 5  TDS Value: 0
 6  TDS Value: 0
 7  TDS Value: 2.41591963768
 8  TDS Value: 28.5884239197
 9  TDS Value: 33.2677587509
10  TDS Value: 30.9311414242
11  TDS Value: 30.9311414242
```

FAQ

Q1# Limitations of Grove - TDS Sensor/Meter For Water Quality (Total Dissolved Solids)?

A1: Limitations are as followed:

- The Waterproof TDS probe cannot be used in water above 70°C.
- The sensor cannot be used to measure flowing water.
- The sensor cannot be used to measure water with high pollution concentration.
- The Grove sensor itself is not waterproof.

Schematic Online Viewer

Resources

- **[ZIP]** Grove - TDS Sensor/Meter For Water Quality (Total Dissolved Solids) Schematic file [https://files.seeedstudio.com/wiki/Grove-TDS-Sensor/res/Grove-TDS-Sensor-v1.0.zip]
- **[PDF]** LMV324 Datasheet [https://files.seeedstudio.com/wiki/Grove-TDS-Sensor/res/LMV324-Datasheet.pdf]

- **[PDF]** CD4060BM Datasheet [https://files.seeedstudio.com/wiki/Grove-TDS-Sensor/res/CD4060BM-Datasheet.pdf]

Tech Support

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