

Grove - Vibration Sensor(SW-420)

The Grove - Vibration Sensor (SW-420) is a high sensitivity non-directional vibration sensor. When the module is stable, the circuit is turned on and the output is high. When the movement or vibration occurs, the circuit will be briefly disconnected and output low. At the same time, you can also adjust the sensitivity according to your own needs.

All in all, this is a perfect module for vibration or tilt sensor.

Features

- Non-directional
- High sensitivity
- Respond to vibration, tilt
- Waterproof
- Compression resistance

Specification

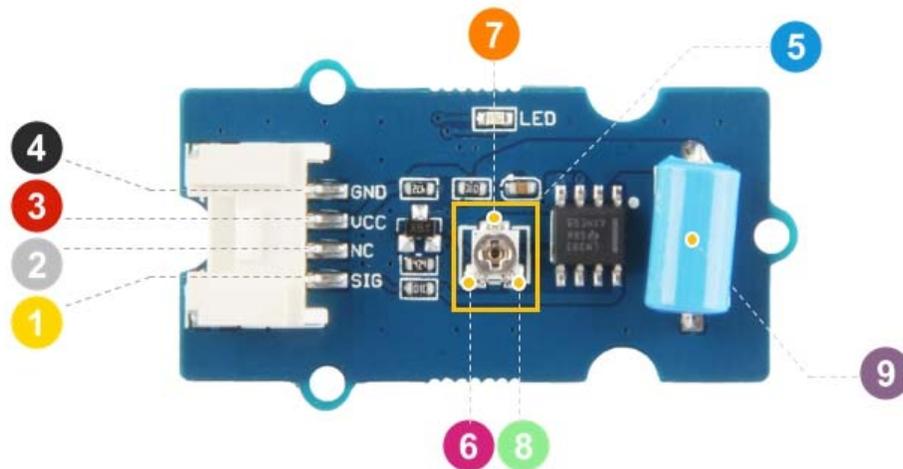
Item	Value
Operating voltage	3.3V / 5V
Interface	Digital

Applications

- Car, bicycle, motorcycle burglar alarm
- Game control
- Vibration detection

Hardware Overview

Pin Map



4 GND: connect this module to the system GND

3 VCC: you can use 5V or 3.3V for this module

2 NC: none connected in this module

1 SIG: output the Vout voltage signal

5 Potentiometer: you can use a screwdriver to rotate the potentiometer which controls the sensitivity of this sensor.

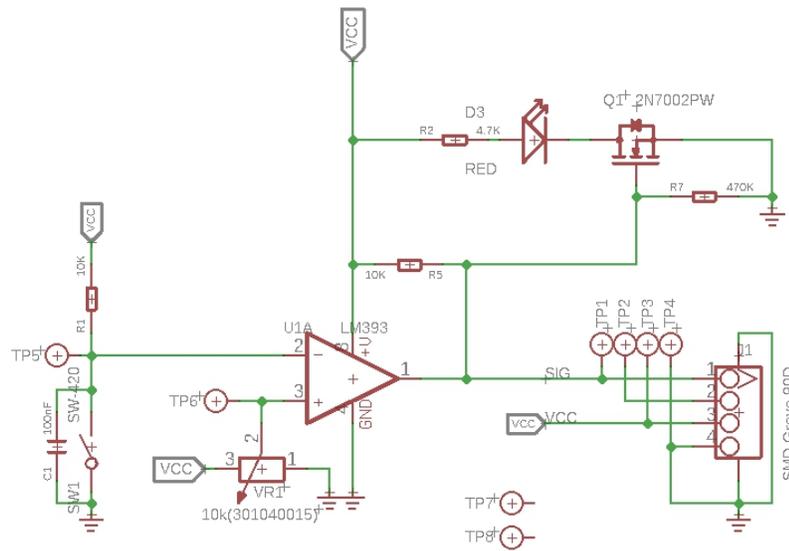
6 GND: the GND pin of the potentiometer.

7 Vsen: the lower the voltage of Vsen, the higher the sensitivity

8 VCC: the VCC pin of the potentiometer.

9 SW-420: the Vibration Sensor

Schematic



First, let's begin with the **SW1** which at the lower left corner. Actually, the **SW1** is the vibration module **SW-420**. When the module is in a stable state, the module is turned on. **Pin2** of **U1A** is connected to the **GND** through **SW1**.

The **VR1** is the potentiometer, the **Pin2** of the potentiometer is connected to the **Pin3** of the **U1A**

The **U1A** is a comparators. For the comparators,

$$V_{out} = \begin{cases} \text{High, if } V_+ > V_- \\ \text{Low, if } V_+ < V_- \end{cases} \quad V_{out} = \begin{cases} \text{High, if } V_+ > V_- \\ \text{Low, if } V_+ < V_- \end{cases}$$

V+ connects to **Pin3**, **V-** connects to **Pin2**, **V_{out}** connects to **Pin1**.

For the **V+** you can adjust it by rotate the potentiometer, for instance, we can make it $VCC/2$.

For the **V-**, it depends on the **SW1(SW-420)**:

- If this module is in a stable state, the **SW1** is turned on, **Pin2** of **U1A** is connected to the **GND** through **SW1**. It will be:

$$V_- = 0V \quad V_+ = VCC/2 \quad \left. \begin{matrix} V_{out} = \text{High} \\ V_- = 0V \quad V_+ = VCC/2 \end{matrix} \right\} V_{out} = \text{High}$$

- If the module vibrates or tilts, the **SW1** will be turned off, the voltage of **V-** will be pulled up by the **VCC** through **R1**. Once the **V-** is higher than the $VCC/2$, then:

$$V_- > VCC/2 \quad V_+ = VCC/2 \quad \left. \begin{matrix} V_{out} = \text{Low} \\ V_- > VCC/2 \quad V_+ = VCC/2 \end{matrix} \right\} V_{out} = \text{Low}$$

Now you can set the **V+** to adjust the sensitivity, just remember: the lower the voltage of **V+**, the higher the sensitivity 😊

Platforms Supported



Caution

The platforms mentioned above as supported is/are an indication of the module's hardware 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

Play With Arduino

Hardware

Materials required

Seeeduino V4.2	Base Shield	Grove - Vibration Sensor	Grove - Buzzer
			

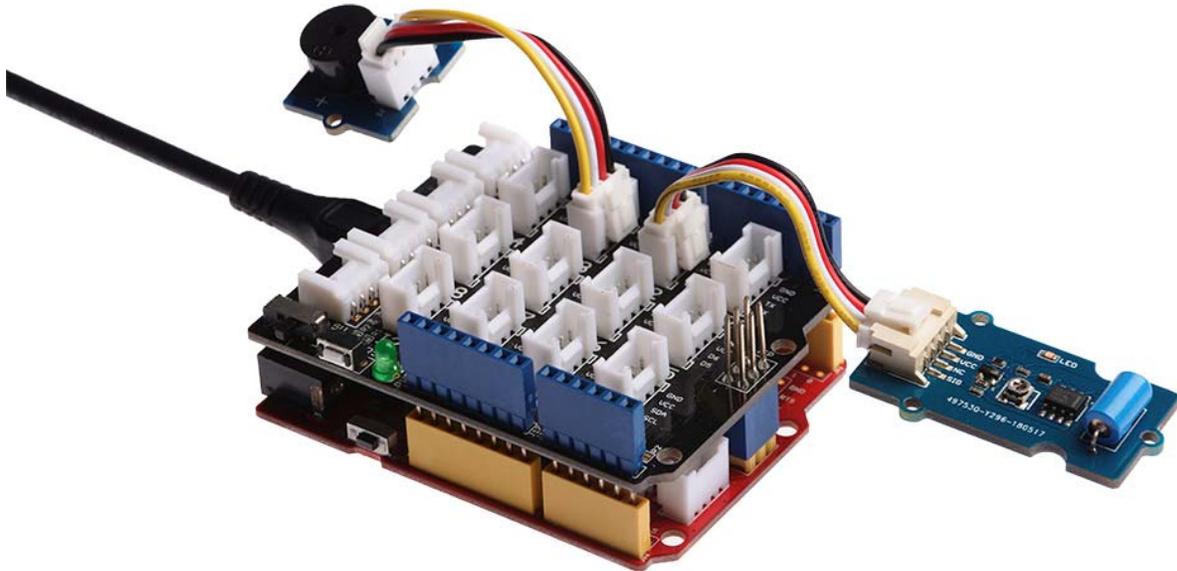
Note

1 Please plug the USB cable gently, otherwise you may damage the port. Please use the USB cable with 4 wires inside, the 2 wires cable can't transfer data. If you are not sure about the wire you have, you can click here to buy.

2 Each Grove module comes with a Grove cable when you buy. In case you lose the Grove cable, you can click here to buy.

- **Step 1.** Connect the Grove - Vibration Sensor (SW-420) to the **D2** port of the Base Shield.

- **Step 2.** Connect the Grove - Buzzer to the **D3** port of the Base Shield.
- **Step 3.** Plug Grove - Base Shield into Seeeduino.
- **Step 4.** Connect Seeeduino to PC via a USB cable.



Note

If we don't have Grove Base Shield, We also can directly connect this module to Seeeduino as below.

Seeeduino	Grove - Vibration Sensor
5V	Red
GND	Black
NC	White
D2	Yellow
Seeeduino	Grove - Buzzer
5V	Red
GND	Black
NC	White
D3	Yellow

Software

Note

If this is the first time you work with Arduino, we strongly recommend you to see Getting Started with Arduino before the start.

- **Step 1.** Open your Arduino IDE, start a new sketch.
- **Step 2.** Copy all the code below, or you can just click the icon  in upper right corner of the code block to copy the following code into the new sketch.

```
1// constants won't change. They're used here to set pin numbers:
2const int buttonPin = 2; // the number of the pushbutton pin
3const int buzzer = 3; // the number of the buzzer pin
4
5// variables will change:
6int buttonState = 0; // variable for reading the pushbutton status
7
8void setup() {
9 // initialize the LED pin as an output:
10 pinMode(buzzer, OUTPUT);
11 // initialize the pushbutton pin as an input:
12 pinMode(buttonPin, INPUT);
13}
14
15void loop() {
16 // read the state of the pushbutton value:
17 buttonState = digitalRead(buttonPin);
18
19 // check if the pushbutton is pressed. If it is, the buttonState is HIGH:
20 if (buttonState == HIGH) {
21 // turn LED on:
22 digitalWrite(buzzer, LOW);
23 } else {
24 // turn LED off:
25 digitalWrite(buzzer, HIGH);
26 }
27}
```

- **Step 3.** Upload the demo. If you do not know how to upload the code, please check How to upload code.

Success

If every thing goes well, everytime you move, shake or tilt the Grove - Vibration Sensor the Grove - buzzer will ring.

Project This is the introduction Video of this product, simple demos, you can have a try.

Tech Support Please do not hesitate to submit the issue into our forum

http://wiki.seeedstudio.com/Grove-Vibration_Sensor_SW-420/ 11-5-18