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

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>3.3V / 5V</td>
</tr>
<tr>
<td>Interface</td>
<td>Digital</td>
</tr>
</tbody>
</table>

### Applications

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

### Hardware Overview

#### Pin Map

1. **SIG**: output the Vout voltage signal
2. **NC**: none connected in this module
3. **VCC**: you can use 5V or 3.3V for this module
4. **GND**: connect this module to the system GND
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
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** though **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,

\[
V_{out} = \begin{cases} 
  \text{High}, & \text{if } V_+ > V_- \\
  \text{Low}, & \text{if } V_+ < V_- 
\end{cases}
\]

**V+** connects to **Pin3**, **V-** connects to **Pin2**, **Vout** connects to **Pin1**.

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

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:

\[
V_- = 0, V_+ = V_{CC}/2 \rightarrow V_{out} = \text{High} \\
V_+ = 0, V_- = V_{CC}/2 \rightarrow V_{out} = \text{Low}
\]

- 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:

\[
V_- > VCC/2, V_+ = VCC/2 \rightarrow V_{out} = \text{Low} \\
V_- > VCC/2, V_+ = VCC/2 \rightarrow V_{out} = \text{Low}
\]

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

<table>
<thead>
<tr>
<th>Platforms Supported</th>
<th>Arduino</th>
<th>Raspberry Pi</th>
<th>BeagleBone</th>
<th>Wio</th>
<th>LinkIt ONE</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Seeeduino V4.2</th>
<th>Base Shield</th>
<th>Grove - Vibration Sensor</th>
<th>Grove - Buzzer</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Seeeduino V4.2" /></td>
<td><img src="image2" alt="Base Shield" /></td>
<td><img src="image3" alt="Grove - Vibration Sensor" /></td>
<td><img src="image4" alt="Grove - Buzzer" /></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Seeeduino</th>
<th>Grove - Vibration Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V</td>
<td>Red</td>
</tr>
<tr>
<td>GND</td>
<td>Black</td>
</tr>
<tr>
<td>NC</td>
<td>White</td>
</tr>
<tr>
<td>D2</td>
<td>Yellow</td>
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</table>
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.

```cpp
// constants won't change. They're used here to set pin numbers:
const int buttonPin = 2;     // the number of the pushbutton pin
const int buzzer =  3;      // the number of the buzzer pin

// variables will change:
int buttonState = 0;         // variable for reading the pushbutton status

void setup() {
  pinMode(buzzer, OUTPUT);
  pinMode(buttonPin, INPUT);
}

void loop() {
  // read the state of the pushbutton value:
  buttonState = digitalRead(buttonPin);

  // check if the pushbutton is pressed. If it is, the buttonState is HIGH:
  if (buttonState == HIGH) {
    // turn LED on:
    digitalWrite(buzzer, LOW);
  } else {
    // turn LED off:
    digitalWrite(buzzer, HIGH);
  }
}
```

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

Success
If everything 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