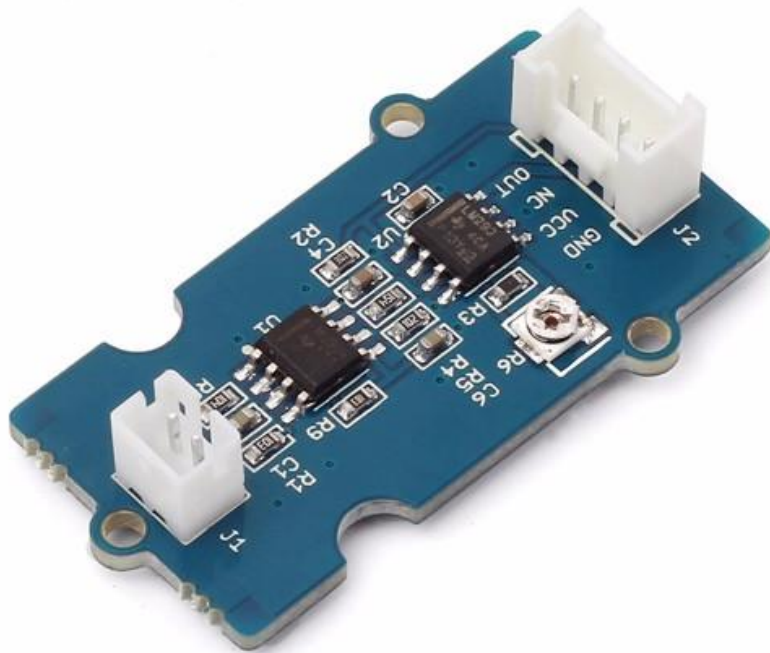# Grove - Piezo Vibration Sensor

Grove-Piezo Vibration Sensor is suitable for measurements of flexibility, vibration, impact and touch. The module is based on PZT film sensor LDT0-028. When the sensor moves back and forth, a certain voltage will be generated by the voltage comparator inside of it. A wide dynamic range (0.001Hz~1000MHz) guarantees an excellent measuring performance. And, you can adjust its sensitivity by adjusting the on-board potentiometer with a screw.

Get One Now 🛒

[https://www.seeedstudio.com/Grove-Piezo-Vibration-Sensor-p-1411.html]

Version

Product Version	Changes	Released Date
Grove - Piezo Vibration Sensor V1.1	Initial	Jul 2014

Features

- Standard grove socket

- Wide dynamic range：0.1Hz~180Hz

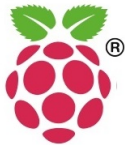- Adjustable sensitivity

- High receptivity for strong impact

> 🔥 **Tip**
> More details about Grove modules please refer to Grove System
> [https://wiki.seeedstudio.com/Grove_System/]

Platforms Supported

Arduino	Raspberry Pi		

⚠️ **Caution**

> The platforms mentioned above as supported is/are an indication of the module's software or theoritical 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.

Applications

- Vibration Sensing in Washing Machine

- Low Power Wakeup Switch

- Low Cost Vibration Sensing

- Car Alarms

- Body Movement

- Security Systems

Getting Started

Play With Arduino

Hardware

The Grove - Piezo Vibration Sensor outputs a logic HIGH when vibration was detected. We can use any of Arduino pins to read the data. Here is an example of Piezo Vibration Sensor controlling LED. When the vibration was detected, this sensor outputs a logic high signal (the sensitivity can be changed by adjusting the potentiometer), an LED lights up.

- Step 1. Prepare the below stuffs:
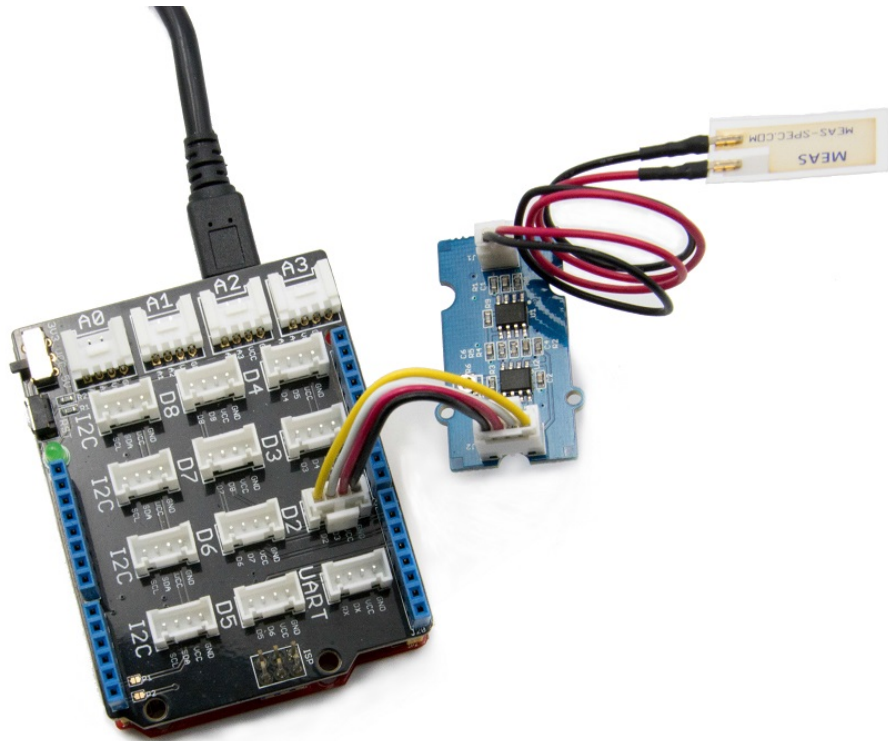
Seeeduino V4	Base Shield
Get ONE Now [https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html]	Get ONE Now [https://www.seeedstudio.com/Base-Shield-V2-p-1378.html]

- Step 2. Connect the module to the **D2** of base shield using the 4-pin grove cable, we use **digital pin13 on board LED** as output.

- Step 3. Plug the Basic Shield into Arduino.

- Step 4. Connect Arduino to PC by using a USB cable.

> **✎ Note**
>
> It may output low level even though originally output high level when you increase the threshold voltage by clockwise adjusting the potentiometer.

Software

- Step 1. Copy and paste code below to a new Arduino sketch.

```
1   const int ledPin=13;
2   void setup() {
3       Serial.begin(9600);
4       pinMode(ledPin,OUTPUT);
5   }
6
7   void loop() {
8       int sensorState = digitalRead(2);
9       Serial.println(sensorState);
10      delay(100);
```
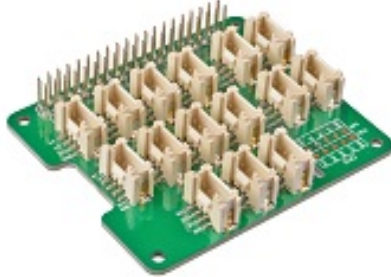
```
11        if(sensorState == HIGH)
12        {
13            digitalWrite(ledPin,HIGH);
14        }
15        else
16        {
17            digitalWrite(ledPin,LOW);
18        }
19   }
```

- Step 2. The LED will be on when vibration is detected.

Play With Raspberry Pi (With Grove Base Hat for Raspberry Pi)

Hardware

- **Step 1**. Things used in this project:

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-p-3186.html]

- **Step 2**. Plug the Grove Base Hat into Raspberry.

- **Step 3**. Connect the Grove - Piezo Vibration Sensor to port 12 of the Base Hat.

- **Step 4**. Connect the Raspberry Pi to PC through USB cable.
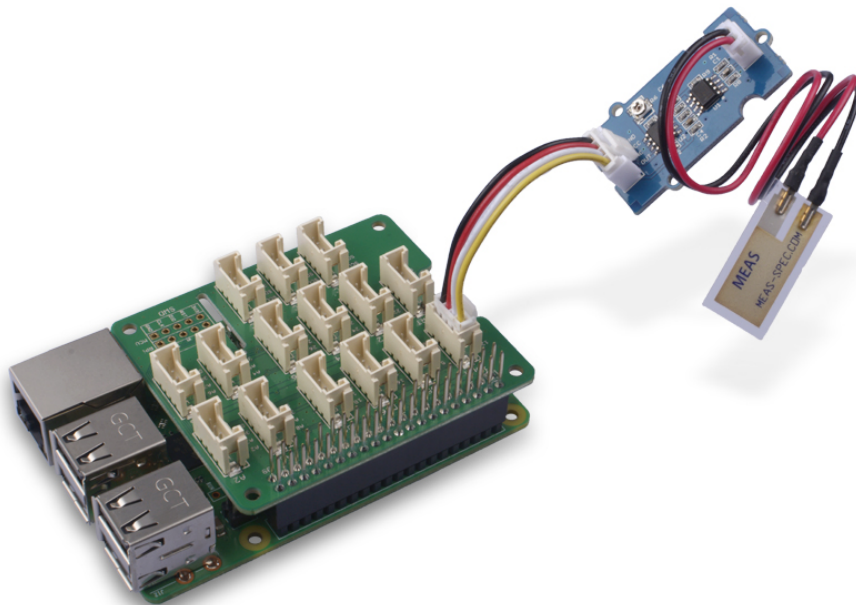
> ✏️ **Note**
> For step 3 you are able to connect the piezo vibration sensor to **any GPIO Port** but make sure you change the command with the corresponding port number.

Software

> ⚠️ **Attention**
> If you are using **Raspberry Pi with Raspberrypi OS >= Bullseye**, you have to use this command line **only with Python3**.

- **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.py library.

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

- **Step 3**. Excute below commands to run the code.

```
1  cd grove.py/grove
2  python3 grove_piezo_vibration_sensor.py 12
```

Following is the grove_piezo_vibration_sensor.py code.

```
1   import time
2   from grove.gpio import GPIO
3
4
5   class GrovePiezoVibrationSensor(GPIO):
6       def __init__(self, pin):
7           super(GrovePiezoVibrationSensor, self).__init__(
8           self._on_detect = None
9
10      @property
11      def on_detect(self):
12          return self._on_detect
13
14      @on_detect.setter
15      def on_detect(self, callback):
16          if not callable(callback):
17              return
18
19          if self.on_event is None:
20              self.on_event = self._handle_event
```

```python
21
22            self._on_detect = callback
23
24      def _handle_event(self, pin, value):
25          if value:
26              if callable(self._on_detect):
27                  self._on_detect()
28
29  Grove = GrovePiezoVibrationSensor
30
31
32  def main():
33      import sys
34
35      if len(sys.argv) < 2:
36          print('Usage: {} pin'.format(sys.argv[0]))
37          sys.exit(1)
38
39      pir = GrovePiezoVibrationSensor(int(sys.argv[1]))
40
41      def callback():
42          print('Detected.')
43
44      pir.on_detect = callback
45
46      while True:
47          time.sleep(1)
48
49
50  if __name__ == '__main__':
51      main()
```

> ✓ **Success**
>   If everything goes well, you will be able to see the following result

```
1  pi@raspberrypi:~/grove.py/grove $ python3 grove_piezo_vi
2  Detected.
3  Detected.
```

```
 4   Detected.
 5   Detected.
 6   Detected.
 7   Detected.
 8   Detected.
 9   Detected.
10   ^CTraceback (most recent call last):
11     File "grove_piezo_vibration_sensor.py", line 84, in <mc
12       main()
13     File "grove_piezo_vibration_sensor.py", line 80, in ma:
14       time.sleep(1)
15   KeyboardInterrupt
```

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

Play With Raspberry Pi (with GrovePi_Plus)

Hardware

- Step 1. Prepare the below stuffs:

Raspberry pi	GrovePi_Plus
Get ONE Now [https://www.seeedstudio.com/Raspberry-Pi-3-Model-B-p-2625.html]	Get ONE Now [https://www.seeedstudio.com/Grove-p-2241.html]

- Step 2. Plug the GrovePi_Plus into Raspberry.

- Step 3. Connect Grove-Piezo Vibration to A0 port of GrovePi_Plus.

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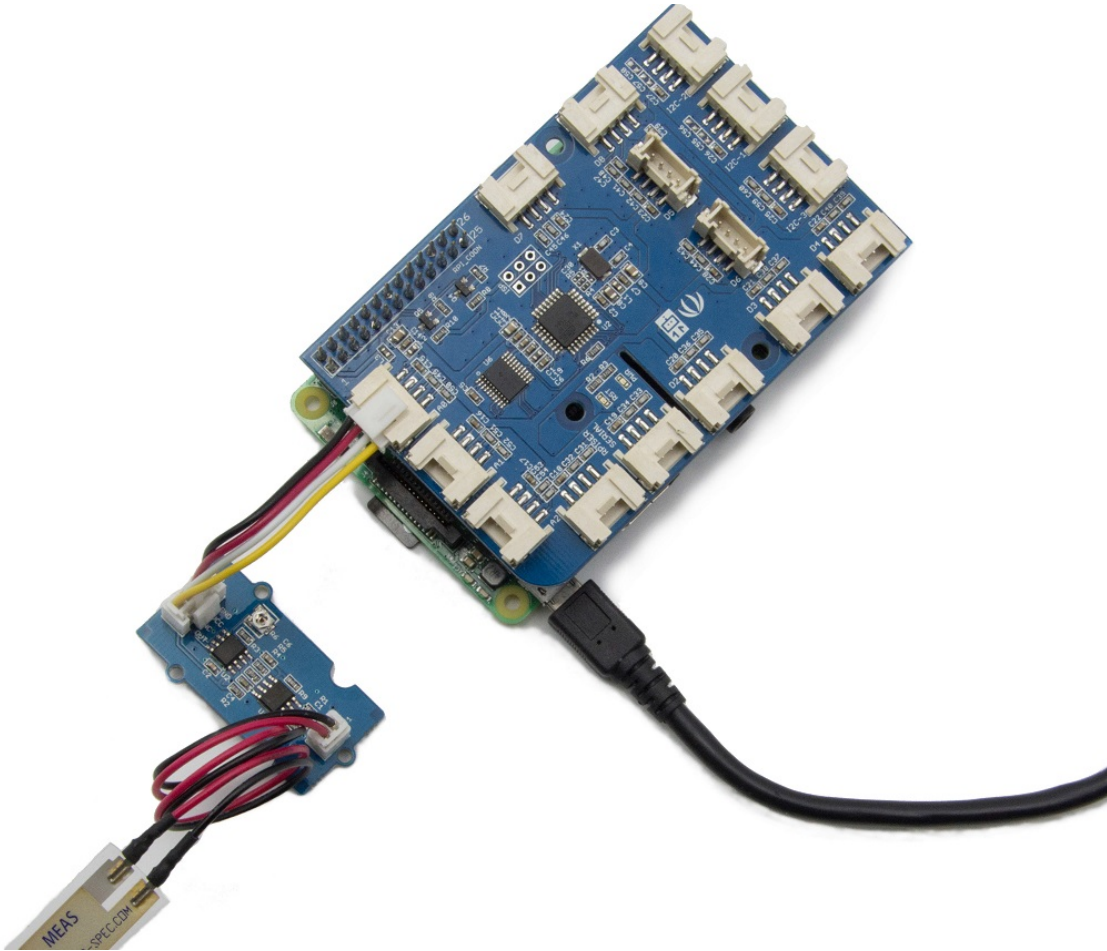
Software

> ⚠ **Attention**
> If you are using **Raspberry Pi with Raspberrypi OS >= Bullseye**, you have to use this command line **only with Python3**.

- Step 1. Follow Setting Software
[https://www.dexterindustries.com/GrovePi/get-started-with-

the-grovepi/setting-software/] to configure the development environment.

- Step 2. Git clone the Github repository.

```
1  cd ~
2  git clone https://github.com/DexterInd/GrovePi.git
```

- Step 3. Excute below commands to detect the vibration.

```
1  cd ~/GrovePi/Software/Python
2  python3 grove_piezo_vibration_sensor.py
```

Here is the grove_piezo_vibration_sensor.py code.

```
1  import time
2  import grovepi
3
4  # Connect the Grove Piezo Vibration Sensor to analog por
5  # OUT,NC,VCC,GND
6  piezo = 0
7
8  grovepi.pinMode(piezo,"INPUT")
9
10 while True:
11     try:
12         # When vibration is detected, the sensor outputs
13         print grovepi.analogRead(piezo)
14         time.sleep(.5)
15
16     except IOError:
17         print "Error"
```

- Step 4. We will see the vibration display on terminal as below.

```
1  pi@raspberrypi:~/GrovePi/Software/Python $ python3 grove_
2  1023
3  1023
4  1023
5  1023
6  18
7  17
8  18
9  17
```

> ✏️ **Note**
>
> We also can use grovepi.digitalRead(2) to read the vibration status with attaching the sensor to D2 port of GrovePi.

FAQs

Q1: Is it digital or analog output?

A1: It is digital output, Low or High.

Schematic Online Viewer

Resources

- **[PDF]** Download Wiki PDF
  [https://files.seeedstudio.com/wiki//Grove-
  Piezo_Vibration_Sensor/res//Grove-
  Piezo_Vibration_Sensor_wiki.pdf]

- **[Eagle]** Grove - Piezo Vibration Sensor Eagle File
  [https://files.seeedstudio.com/wiki/Grove-
  Piezo_Vibration_Sensor/res/Eagle.zip]

- **[PDF]** Grove - Piezo Vibration Sensor Schematic PDF File [https://files.seeedstudio.com/wiki/Grove-Piezo_Vibration_Sensor/res/Gvove-Piezo_Vibration_Sensor.pdf]

- **[PDF]** Grove - Piezo Vibration Sensor PCB PDF File [https://files.seeedstudio.com/wiki/Grove-Piezo_Vibration_Sensor/res/Gvove%20-%20Piezo%20Vibration%20Sensor%20v1.1%20PCB.pdf]

- **[Datasheet]** Piezo Vibration Sensor Datasheet [https://files.seeedstudio.com/wiki/Grove-Piezo_Vibration_Sensor/res/Piezo_Vibration_Sensor.pdf]

Projects

Grove Starter Kit For Arduino - Piezo Vibration Sensor: Teaches you how to use the Piezo vibration sensor in the Arduino Grove starter kit.

(https://www.hackster.io/trduunze/grove-starter-kit-for-arduino-piezo-vibration-sensor-92c531)

Seat Monitor: Using ARTIK cloud to monitor cabin seat state.

(https://www.hackster.io/momososo/seat-
monitor-4288dc)

Tech Support

Please submit any technical issue into our forum
[https://forum.seeedstudio.com/].

[https://www.seeedstudio.com/act-4.html?
utm_source=wiki&utm_medium=wikibanner&utm_campaign=newpr
oducts]