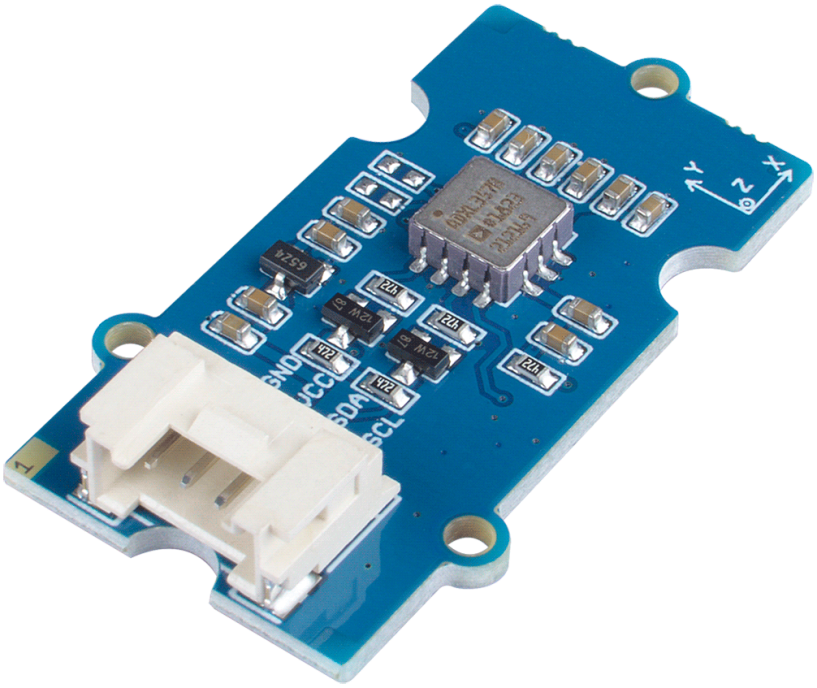
Grove - 3-Axis Digital Accelerometer 40g (ADXL357)



You can find a variety of 3-axis accelerometers [https://www.seeedstudio.com/tag/accelerometer.html] on our website that can meet different scenarios and needs. This time, we bring you the industrial grade, high stability, high precision and low power ADI ADXL series three-axis accelerometers.

The Grove - 3-Axis Digital Accelerometer ±40g (ADXL357) is a digital output MEMS [https://www.seeedstudio.com/tag/MEMS.html] Accelerometer. This sensor has three different selectable measuring ranges and accuracies: ±10g@51200 LSB/g, ±20g@25600 LSB/g, ±40g@12800 LSB/g. You just need to do little calibration work to get a relatively accurate result. It output all the data via grove I2C port, and the I2C address is also selectable. What's more, we also provide two interrupt output pins which can be configured into 4 modes.

The ADI ADXL Series Accelerometer includes four products that will meet your different range and output needs:

Product	Measurement Range	Output Port
Grove - 3-Axis Analog Accelerometer ±20g (ADXL356B) [https://www.seeedstudio.com/Grove-3-Axis-Analog-Accelerometer-20g-ADXL356B-p-4004.html]	±10 ±20g	Analog
Grove - 3-Axis Analog Accelerometer ±40g (ADXL356C) [https://www.seeedstudio.com/Grove-3-Axis-Analog-Accelerometer-40g-ADXL356C-p-4006.html]	±10g ±40g	Analog
Grove - 3-Axis Digital Accelerometer ±40g (ADXL357) [https://www.seeedstudio.com/Grove-3-Axis-Digital-Accelerometer-40g-ADXL357-p-4005.html]	±10g@51200 LSB/g ±20g@25600 LSB/g ±40g@12800 LSB/g	Digital I2C
Grove - 3-Axis Digital Accelerometer ±200g (ADXL372) [https://www.seeedstudio.com/Grove-3-Axis-Digital-Accelerometer-200g-ADXL372-p-4003.html]	±200g	Digital I2C

Get One Now

[https://www.seeedstudio.com/Grove-3-Axis-Digital-Accelerometer-40g-ADXL357-p-4005.html]

Features

- Industry leading noise, minimal offset drift over temperature, and long-term stability, enabling precision applications with minimal calibration.
- Hermetic package offers excellent long-term stability 0 g offset vs. temperature (all axes): 0.75 mg/°C maximum
- Ultralow noise density (all axes): 80 μg/√Hz
- Build-in 20-bit analog-to-digital converter (ADC)
- Low drift, low noise, and low power
- Support two channel interrupt output
- Support FIFO(96*21-bit)

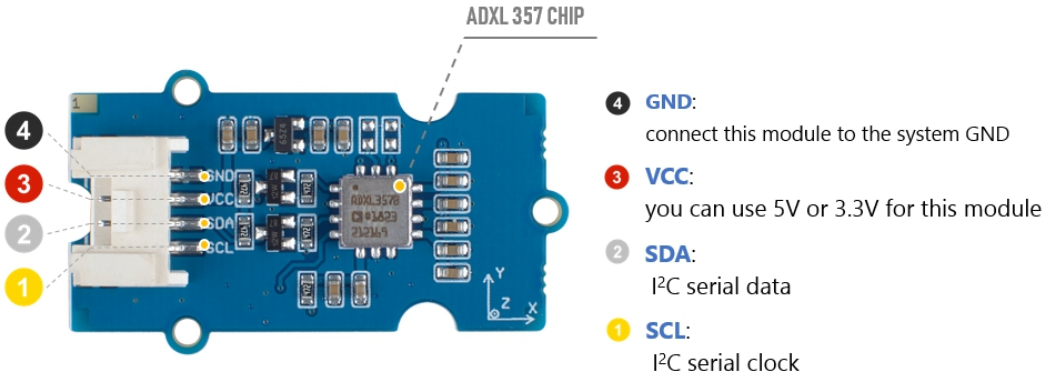
APPLICATIONS

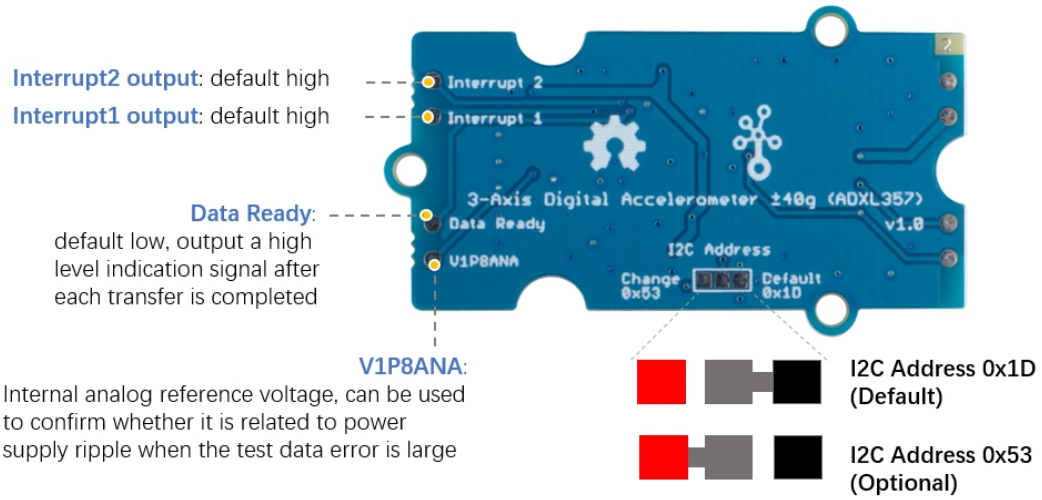
- Inertial measurement units (IMUs)/altitude and heading reference systems (AHRSs)
- Platform stabilization systems
- Structural health monitoring
- Condition monitoring
- Seismic imaging
- Tilt sensing
- Robotics

Specification

Parameter	Value
Supply voltage	3.3V / 5V
Operating ambient temperature	-40 – 125℃
Sensitivity at X_{OUT}, Y_{OUT}, Z_{OUT} (Ratiometric to V_{1P8ANA})	±10 g@80 mv/g (Typ.) ±20 g@40 mv/g (Typ.) ±40 g@20 mv/g (Typ.)
Sensitivity Change due to Temperature	±0.01%/°C (TA = −40°C to +125°C)
0g OFFSET (Referred to V1P8ANA/2)	±125 mg(Typ.)
Output interface	Digital

Pinout





Platforms Supported

Arduino	Raspberry Pi		

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.

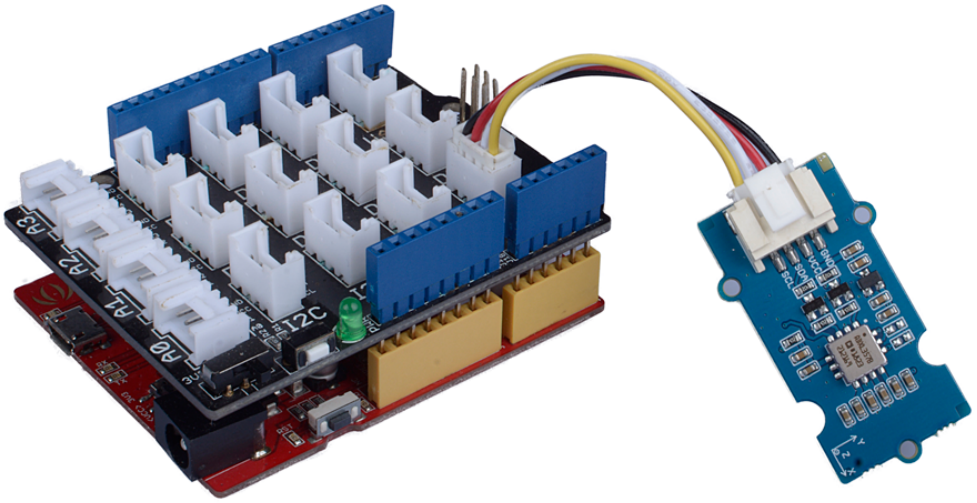
Note

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 [https://www.seeedstudio.com/Micro-USB-Cable-48cm-p-1475.html] 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 [https://www.seeedstudio.com/Grove-Universal-4-Pin-Buckled-20cm-Cable-%285-PCs-pack%29-p-936.html] to buy.

Hardware Connection

- **Step 1.** Connect the Grove - 3-Axis Analog Accelerometer ±20g (ADXL357) to the **I2c** port of the Base Shield.
- **Step 2.** Plug Grove - Base Shield into Seeeduino.
- **Step 3.** Connect Seeeduino to PC via a USB cable.



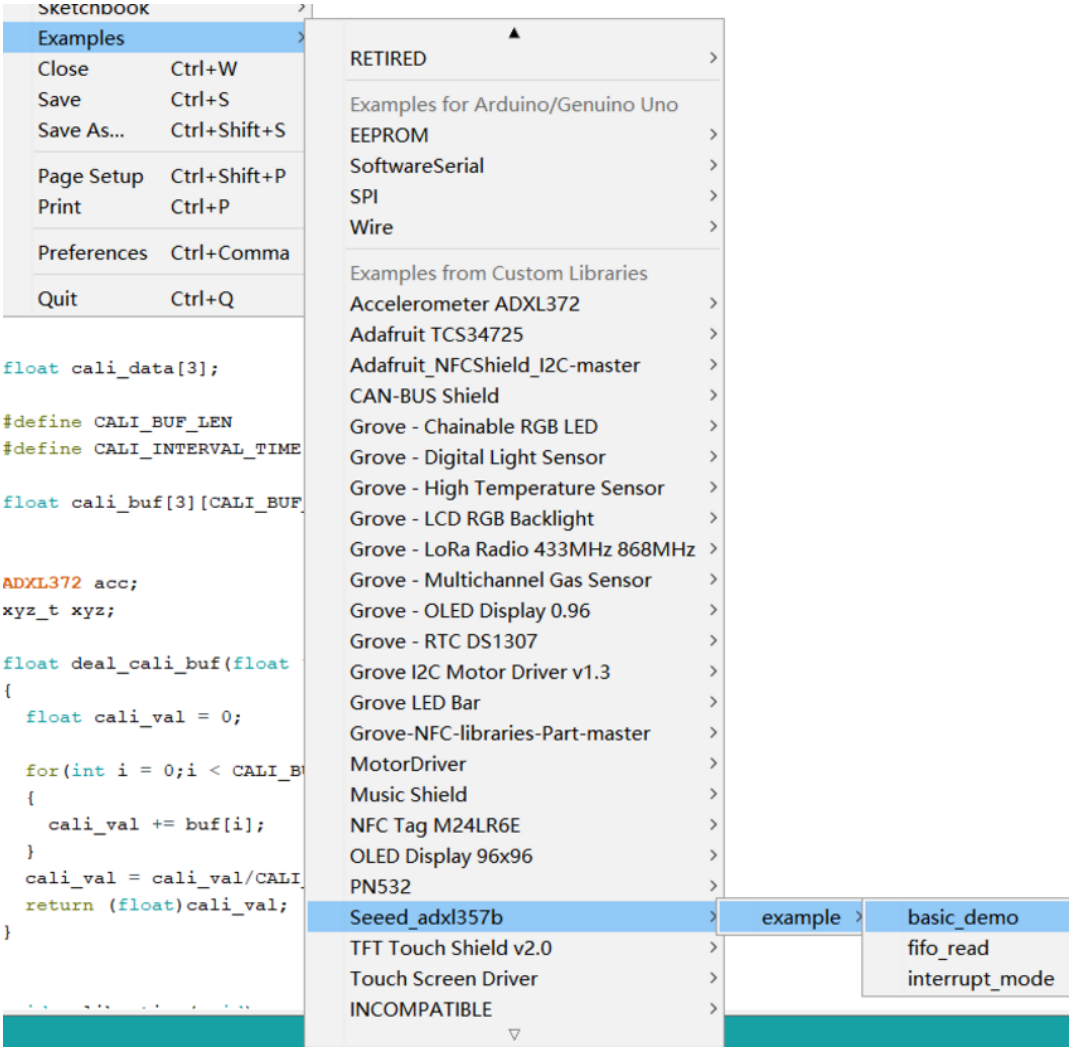
Software

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.** Download the Seeed_ADXL_357 library [https://github.com/Seeed-Studio/Seeed_ADXL357B] from

Github.

- **Step 2**. Refer to How to install library [https://github.com/Seeed-Studio/Multi_Channel_Relay_Arduino_Library] to install library for Arduino.
- **Step 3**. Then open `example/ADXL_357/basic_demo`




```
//basic_demo.ino
#include "Seeed_adxl357b.h"


#if defined(ARDUINO_ARCH_AVR)
    #pragma message("Defined architecture for ARDUINO_A
    #define SERIAL Serial
```

```
#elif defined(ARDUINO_ARCH_SAM)
    #pragma message("Defined architecture for ARDUINO_A
    #define SERIAL SerialUSB
#elif defined(ARDUINO_ARCH_SAMD)
    #pragma message("Defined architecture for ARDUINO_A
    #define SERIAL SerialUSB
#elif defined(ARDUINO_ARCH_STM32F4)
    #pragma message("Defined architecture for ARDUINO_A
    #define SERIAL SerialUSB
#else
    #pragma message("Not found any architecture.")
    #define SERIAL Serial
#endif


#define CALI_BUF_LEN          15
#define CALI_INTERVAL_TIME    250
int32_t cali_buf[3][CALI_BUF_LEN];
int32_t cali_data[3];

float factory;

Adxl357b  adxl357b;


int32_t deal_cali_buf(int32_t *buf)
{
    int32_t cali_val = 0;

    for(int i = 0;i < CALI_BUF_LEN;i++)
    {
        cali_val += buf[i];
    }
    cali_val = cali_val/CALI_BUF_LEN;
    return (int32_t)cali_val;
}


void calibration(void)
{
    int32_t x;
```

```
49      SERIAL.println("Please Place the module horizontall
50      delay(1000);
51      SERIAL.println("Start calibration........");
52
53      for(int i=0;i<CALI_BUF_LEN;i++)
54      {
55          if(adxl357b.checkDataReady())
56          {
57              if(adxl357b.readXYZAxisResultData(cali_buf[
58              {
59              }
60          }
61          delay(CALI_INTERVAL_TIME);
62          // SERIAL.print('.');
63      }
64      // SERIAL.println('.');
65      for(int i=0;i<3;i++)
66      {
67          cali_data[i] =  deal_cali_buf(cali_buf[i]);
68          SERIAL.println(cali_data[i]);
69      }
70      x = (((cali_data[2] - cali_data[0]) + (cali_data[2]
71      factory = 1.0 / (float)x;
72      // SERIAL.println(x);
73      SERIAL.println("Calibration OK!!");
74  }
75
76
77
78
79
80
81  void setup(void)
82  {
83      uint8_t value = 0;
84      float t;
85
86      SERIAL.begin(115200);
87      if(adxl357b.begin())
88      {
89          SERIAL.println("Can't detect ADXL357B device ."
```

```
90          while(1);
91      }
92      SERIAL.println("Init OK!");
93      /*Set full scale range to ±40g*/
94      adxl357b.setAdxlRange(FOURTY_G);
95      /*Switch standby mode to measurement mode.*/
96      adxl357b.setPowerCtr(0);
97      delay(100);
98      /*Read Uncalibration temperature.*/
99      adxl357b.readTemperature(t);
100
101     SERIAL.print("Uncalibration  temp = ");
102     SERIAL.println(t);
103     /**/
104     calibration();
105
106 }
107
108
109 void loop(void)
110 {
111     int32_t x,y,z;
112     uint8_t entry = 0;
113     if(adxl357b.checkDataReady())
114     {
115         if(adxl357b.readXYZAxisResultData(x,y,z))
116         {
117             SERIAL.println("Get data failed!");
118         }
119         SERIAL.print("X axis = ");
120         SERIAL.print(x*factory);
121         SERIAL.println('g');
122         SERIAL.print("Y axis = ");
123         SERIAL.print(y*factory);
124         SERIAL.println('g');
125         SERIAL.print("Z axis = ");
126         SERIAL.print(z*factory);
127         SERIAL.println('g');
128
129     }
130     delay(100);
```

```
131  }
```

- **Step 4.** 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 5.** 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 **115200**.
- **Step 6. Calibration** wait for calibration, just few seconds the calibration will be finished
- **Step 7.** Now you can use this sensor, and the output will be like this:

```
1   Start calibration.......Init OK!
2   Uncalibration  temp = 29.20
3   Please Place the module horizontally!
4   Start calibration........
5   -1652
6   11143
7   6063
8   Calibration OK!!
9   X axis = -1.24g
10  Y axis = 8.50g
11  Z axis = 4.55g
12  X axis = -1.21g
13  Y axis = 8.43g
```

Schematic Online Viewer

Resources

- **[ZIP]** Grove-3-Axis_Digital_Accelerometer-40g-ADXL357 Schematic file [https://files.seeedstudio.com/wiki/Grove-3-Axis_Digital_Accelerometer-40g-ADXL357/res/Grove%20-%203-Axis%20Digital%20Accelerometer%20%C2%B140g%20(ADXL357).zip]
- **[PDF]** ADXL 357 Datasheet [https://files.seeedstudio.com/wiki/Grove-3-

Axis_Digital_Accelerometer-40g-ADXL357/res/ADXL357.pdf]

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=newproducts]