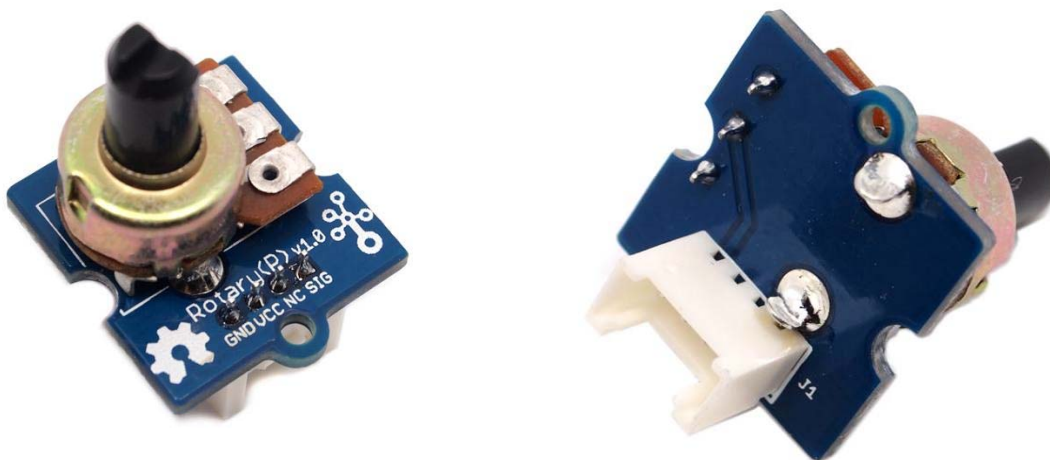


Grove - Rotary Angle Sensor



The rotary angle sensor produces analog output between 0 and Vcc (5V DC with Seeeduino) on its D1 connector. The D2 connector is not used. The angular range is 300 degrees with a linear change in value. The resistance value is 10k ohms, perfect for Arduino use. This may also be known as a “potentiometer”.

There is another product, Grove - Rotary Angle Sensor(P). What does “P” mean? “P” is for “panel mount” in this product. It is the sister version of Grove - Rotary Angle Sensor. They are identical except the Grove connector is moved to the back so that you can easily use it as a neat and wire-free human interface device.



Version

Product Version	Changes	Released Date
Grove-Rotary Angle Sensor(P) V1.1	Initial	Jan 2013
Grove-Rotary Angle Sensor V1.2	Initial	May 2014

Features

- Grove Interface
- Easy to Use
- Grove Base Module




Tip

More details about Grove modules please refer to [Grove System](#)

Specifications

Item	Min	Typical	Max	Unit
Voltage	4.75	5.0	5.25	VDC
Rotary Angle	0	~	300	Deg
Dimension	19x19x30.1			mm

Platforms Supported

Arduino	Raspberry Pi	BeagleBone	Wio	LinkIt ONE
				

Caution

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





Note

If this is the first time you work with Arduino, we firmly recommend you to see [Getting Started with Arduino](#) before the start.

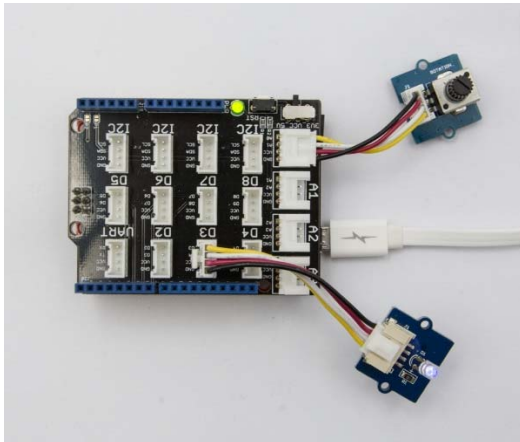
Play With Arduino

Hardware

- **Step 1.** Prepare the below stuffs:

Seeeduino V4.2	Base Shield	Grove-Rotary Angle Sensor	Grove-LED
			

- **Step 2.** Connect Grove-Rotary Angle Sensor to **A0** port of Grove-Base Shield.
- **Step 3.** Connect Grove-LED to **D3** port of Grove-Base Shield.
- **Step 4.** Plug Grove - Base Shield into Seeeduino.
- **Step 5.** Connect Seeeduino to PC via a USB cable.



Note

If we don't have Grove Base Shield, We also can directly connect Grove-Rotary Angle Sensor and Grove-Led to Seeeduino as below. Grove-Led must be connected to PWM port. For Seeeduino, they are D3,5,6,9,10,11.

Seeeduino	Grove-Rotary Angle Sensor	Seeeduino	Grove-LED
5V	Red	5V	Red
GND	Black	GND	Black
NC	White	NC	White
A0	Yellow	D3	Yellow

Software

- **Step 1.** Please copy below code to Arduino IDE and upload to arduino. If you do not know how to upload the code, please check [how to upload code](#).

```

1/*macro definitions of Rotary angle sensor and LED pin*/
2
3#define ROTARY_ANGLE_SENSOR A0
4#define LED 3 //the Grove - LED is connected to PWM pin D3 of Arduino
5#define ADC_REF 5 //reference voltage of ADC is 5v.If the Vcc switch on the
6seeeduino
7 //board switches to 3V3, the ADC_REF should be 3.3
8#define GROVE_VCC 5 //VCC of the grove interface is normally 5v
9#define FULL_ANGLE 300 //full value of the rotary angle is 300 degrees
10
11void setup()
12{
13   Serial.begin(9600);
14   pinMode(ROTARY_ANGLE_SENSOR, INPUT);
15   pinMode(LED,OUTPUT);
16}
17
18void loop()
19{
20   float voltage;
21   int sensor_value = analogRead(ROTARY_ANGLE_SENSOR);
22   voltage = (float)sensor_value*ADC_REF/1023;
23   float degrees = (voltage*FULL_ANGLE)/GROVE_VCC;
24   Serial.println("The angle between the mark and the starting
25position:");
26   Serial.println(degrees);
27
28   int brightness;
29   brightness = map(degrees, 0, FULL_ANGLE, 0, 255);
30   analogWrite(LED,brightness);
   delay(500);
}

```

- **Step 2.** Adjust Grove-Rotary Angle Sensor and we will see the Grove-LED changes the brightness.

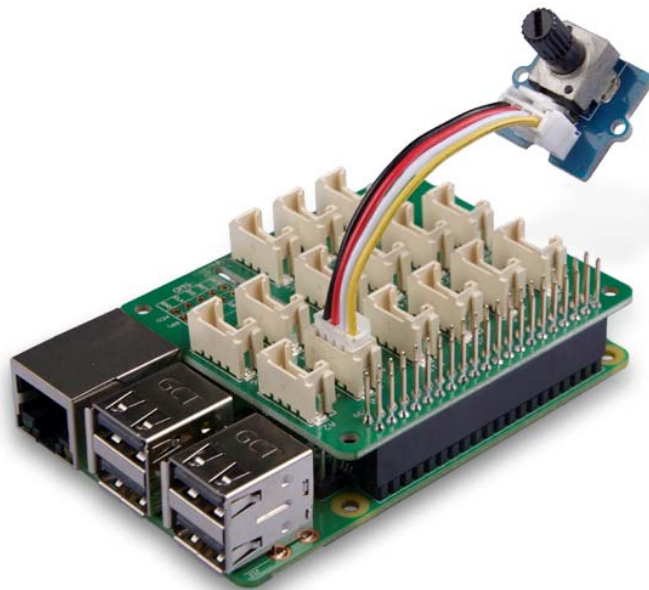
Play With Raspberry Pi (With Grove Base Hat for Raspberry Pi)

Hardware

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

Raspberry pi	Grove Base Hat for RasPi	Grove - Rotary Angle Sensor
		

- **Step 2.** Plug the Grove Base Hat into Raspberry.
- **Step 3.** Connect the rotary sensor to port A0 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 rotary angle sensor to **any Analog Port** but make sure you change the command with the corresponding port number.

Software

- **Step 1.** Follow [Setting Software](#) to configure the development environment.
- **Step 2.** Download the source file by cloning the grove.py library.

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

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

```
1cd grove.py/grove
2python grove_rotary_angle_sensor.py 0
```

Following is the grove_rotary_angle_sensor.py code.

```
1import math
2import sys
3import time
4from grove.adc import ADC
5
6
7class GroveRotaryAngleSensor(ADC):
8    def __init__(self, channel):
9        self.channel = channel
10       self.adc = ADC()
11
12    @property
13    def value(self):
14        return self.adc.read(self.channel)
15
16
17Grove = GroveRotaryAngleSensor
18
19
20def main():
21    if len(sys.argv) < 2:
22        print('Usage: {} adc_channel'.format(sys.argv[0]))
23        sys.exit(1)
24
25    sensor = GroveRotaryAngleSensor(int(sys.argv[1]))
26
27    while True:
28        print('Rotary Value: {}'.format(sensor.value))
29        time.sleep(.2)
30
31
32if __name__ == '__main__':
33    main()
```

Success

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

```
1pi@raspberrypi:~/grove.py/grove $ python grove_rotary_angle_sensor.py 0
2Rotary Value: 932
3Rotary Value: 931
4Rotary Value: 931
5Rotary Value: 931
6Rotary Value: 933
7Rotary Value: 931
8Rotary Value: 742
9Rotary Value: 666
10Rotary Value: 666
11Rotary Value: 549
12Rotary Value: 520
13Rotary Value: 499
14Rotary Value: 430
15Rotary Value: 430
16Rotary Value: 321
17Rotary Value: 286
18Rotary Value: 205
19Rotary Value: 127
20Rotary Value: 88
21Rotary Value: 0
22Rotary Value: 0
23Rotary Value: 0
24Rotary Value: 0
25Rotary Value: 0
26Rotary Value: 0
27Rotary Value: 0
28^CTraceback (most recent call last):
29   File "grove_rotary_angle_sensor.py", line 66, in <module>
30     main()
31   File "grove_rotary_angle_sensor.py", line 62, in main
32     time.sleep(.2)
33KeyboardInterrupt
```

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





Notice

You may have noticed that for the analog port, the silkscreen pin number is something like **A0**, **A1**, however in the command we use parameter **0** and **1**, just the same as digital port. So please make sure you plug the module into the correct port, otherwise there may be pin conflicts.

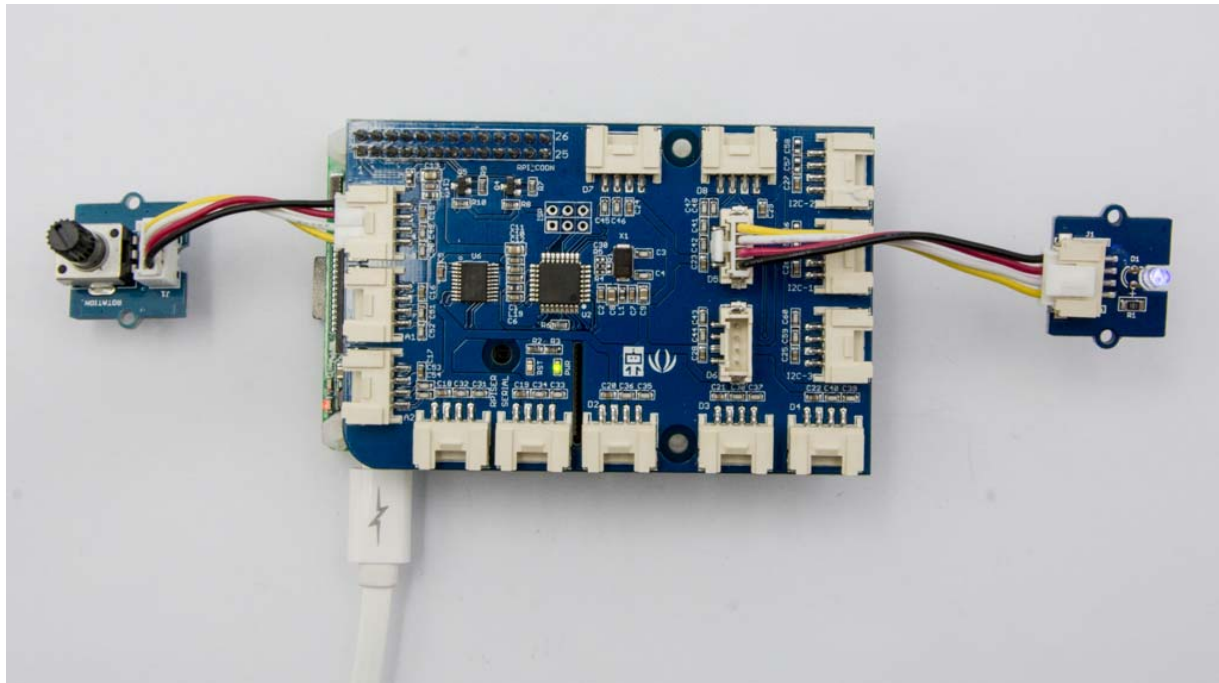
Play With Raspberry Pi (with GrovePi_Plus)

Hardware

- **Step 1.** Prepare the below stuffs:

Raspberry pi	GrovePi_Plus	Grove-Rotary Angle Sensor	Grove-LED
			

- **Step 2.** Plug the GrovePi_Plus into Raspberry.
- **Step 3.** Connect Grove-Rotary Angle Sensor to **A0** port of GrovePi_Plus.
- **Step 4.** Connect Grove-LED to **D5** port of GrovePi_Plus.
- **Step 5.** Connect the Raspberry to PC through USB cable.



Software

- **Step 1.** Follow [Setting Software](#) to configure the development environment.
- **Step 2.** Git clone the Github repository.

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

- **Step 3.** Execute below commands to monitor the loudness.

```
1cd ~/GrovePi/Software/Python
2python grove_rotary_angle_sensor.py
```


Here is the grove_rotary_angle_sensor.py code.

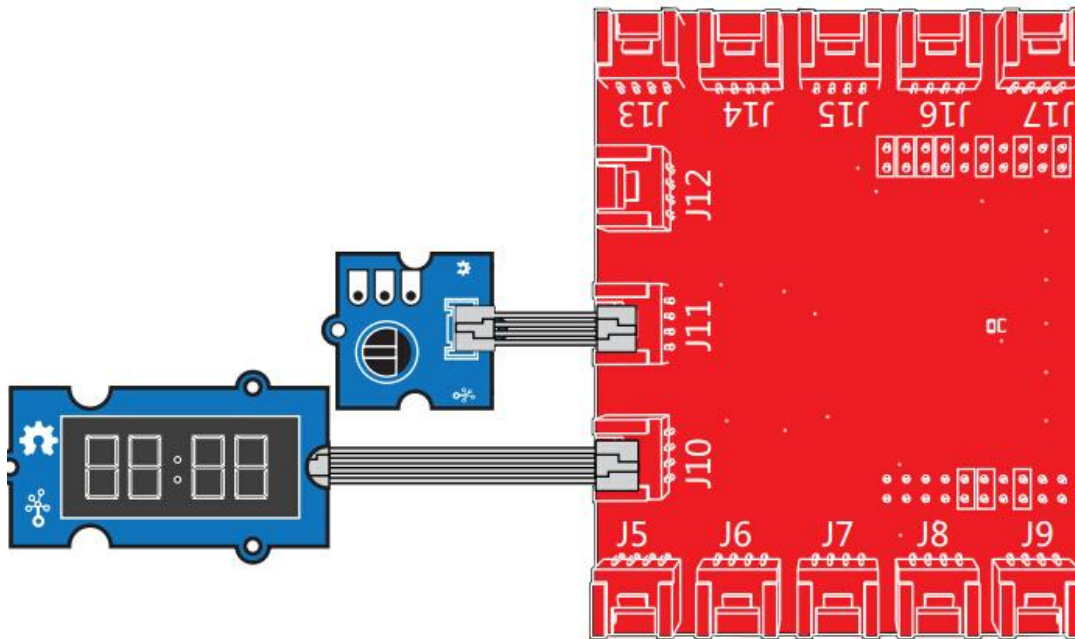
```
1import time
2import grovepi
3
4# Connect the Grove Rotary Angle Sensor to analog port A0
5# SIG,NC,VCC,GND
6potentiometer = 0
7
8# Connect the LED to digital port D5
9# SIG,NC,VCC,GND
10led = 5
11
12grovepi.pinMode(potentiometer,"INPUT")
13grovepi.pinMode(led,"OUTPUT")
14time.sleep(1)
15
16# Reference voltage of ADC is 5v
17adc_ref = 5
18
19# Vcc of the grove interface is normally 5v
20grove_vcc = 5
21
22# Full value of the rotary angle is 300 degrees, as per it's specs (0 to
23300)
24full_angle = 300
25
26while True:
27    try:
28        # Read sensor value from potentiometer
29        sensor_value = grovepi.analogRead(potentiometer)
30
31        # Calculate voltage
32        voltage = round((float)(sensor_value) * adc_ref / 1023, 2)
33
34        # Calculate rotation in degrees (0 to 300)
35        degrees = round((voltage * full_angle) / grove_vcc, 2)
36
37        # Calculate LED brightness (0 to 255) from degrees (0 to 300)
38        brightness = int(degrees / full_angle * 255)
39
40        # Give PWM output to LED
41        grovepi.analogWrite(led,brightness)
42
43        print("sensor_value = %d voltage = %.2f degrees = %.1f brightness =
44%d" %(sensor_value, voltage, degrees, brightness))
45    except KeyboardInterrupt:
46        grovepi.analogWrite(led,0)
47        break
48    except IOError:
49        print ("Error")
```

- **Step 4.** Adjust Grove-Rotary Angle Sensor and we will see the Grove-LED changes the brightness.

Play with TI LaunchPad

Reading the Potentiometer (Rotary Angle Sensor)

This example shows how to read the analog output coming from the Grove potentiometer module. We will be combining a few Grove modules in this example! By turning the potentiometer knob, we will display the analog reading value on the Grove 4-digital display.



```
1/*
2  Rotary Angle Sensor
3  Demonstrates analog input by reading an analog sensor on J16 of the
4Grove Base BoosterPack. The speed of the red LED on the LaunchPad will
5change depending on the position of the potentiometer knob. This example
6will also display the analog reading value on the Grove 4-digital display.
7
8  The circuit:
9  * Potentiometer attached to pin 24 (J6 on Grove Base BoosterPack)
10 * center pin of the potentiometer to the analog pin
11 * one side pin (either one) to ground
12 * the other side pin to VCC (3.3V)
13
14 * Note: Because of unstable of the voltage, the value of the rotary
15angle sensor
16     varies slightly from run to run even you don't touch it.
17
18 Created by Oliver Wang
19
20 This example code is in the public domain.
21
22 http://www.seeedstudio.com/wiki/GROVE\_-\_Starter\_Kit\_v1.1b#Grove\_-
23 Rotary\_Angle\_Sensor
```

```

24  */
25
26#include "TM1637.h"
27
28/* Macro Define */
29#define CLK          39          /* 4-digital display clock
30pin */
31#define DIO          38          /* 4-digital display data pin
32*/
33#define ROTARY_ANGLE_P  24          /* pin of rotary angle sensor */
34
35/* Global Variables */
36TM1637 tml637(CLK, DIO);          /* 4-digital display object */
37int analog_value = 0;           /* variable to store the value
38coming from rotary angle sensor */
39
40int8_t bits[4] = {0};          /* array to store the single bits
41of the value */
42
43/* the setup() method runs once, when the sketch starts */
44void setup() {
45
46    /* Initialize 4-digital display */
47    tml637.init();
48    tml637.set(BRIGHT_TYPICAL);
49
50}
51
52/* the loop() method runs over and over again */
53void loop() {
54
55    analog_value = analogRead(ROTARY_ANGLE_P);          /* read the value from
the sensor */
    memset(bits, 0, 4);          /* reset array when we
use it */
    for(int i = 3; i >= 0; i--) {
        /* get single bits of the analog value */
        bits[i] = analog_value % 10;
        analog_value = analog_value / 10;
        tml637.display(i, bits[i]);          /* display by 4-digital
display */
    }
    delay(100);
}

```

Resources

[Eagle&PDF] Grove-Rotary Angle Sensor v1.2 Schematic File

https://github.com/SeeedDocument/Grove-Rotary_Angle_Sensor/raw/master/res/Grove%20-%20Rotary%20Angle%20Sensor%20v1.2.zip

[Eagle&PDF] Grove - Rotary Angle Sensor(P) v1.1 Schematic File

[https://github.com/SeeedDocument/Grove-Rotary_Angle_Sensor/raw/master/res/Grove%20%20-%20Rotary%20Angle%20Sensor\(P\)%20v1.1.zip](https://github.com/SeeedDocument/Grove-Rotary_Angle_Sensor/raw/master/res/Grove%20%20-%20Rotary%20Angle%20Sensor(P)%20v1.1.zip)

[Library] Github repository for Rotary Angle Sensor

https://github.com/Seeed-Studio/Grove_Rotary_Angle_Sensor

Projects

Using Grove-Rotary Angle Sensor(P) to Control Grove LED: Using Arduino/Genuino 101 to control the brightness of an LED through Grove-Rotary Angle Sensor(P).

Rotary Angle Grove module:

Tech Support

Please submit any technical issue into our [forum](#).