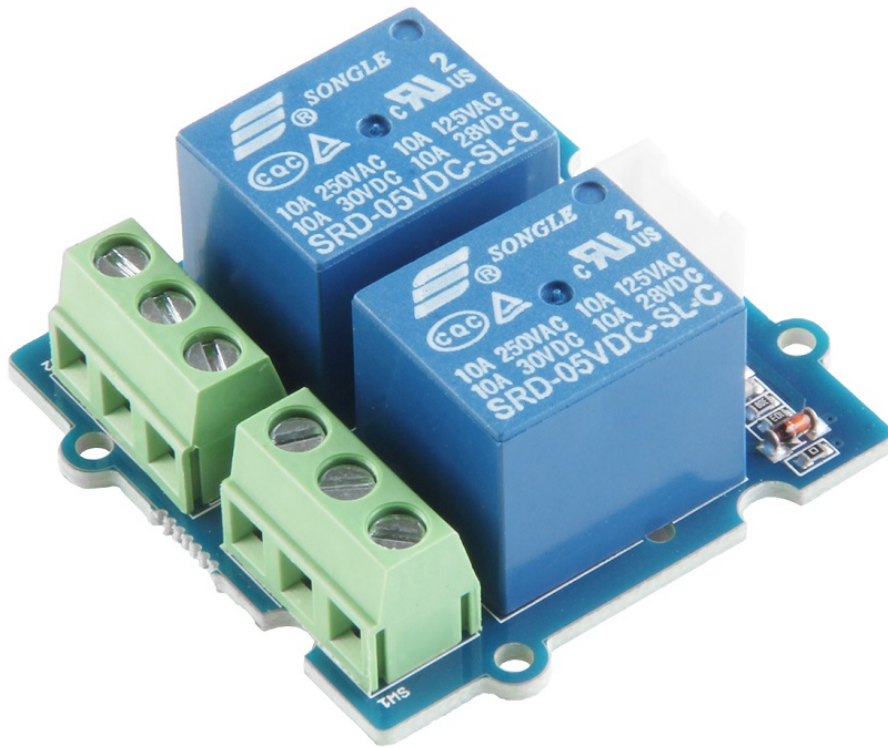# Grove - 2-Channel SPDT Relay

The Grove - 2-Channel SPDT Relay has two single pole - double throw (SPDT) switches. It only requires low-voltage and low current signals to control those switches. Specifically, you can use 5V DC to control max.250V AC or 110V DC.

The best thing is that you can control the two channels separately. For instance, controlled by SIG1, you can connect the COM1 to NC1

or N01 as your wish. It is so convenient and reliable that it can be applied to massive products or projects which need to switch high voltage/high current devices.

[https://www.seeedstudio.com/Grove-2-Channel-SPDT-Relay-p-3118.html]

Features

- High temperature resistant plastic shell

- High voltage load

- Low power consumption

- Long lasting

Specification

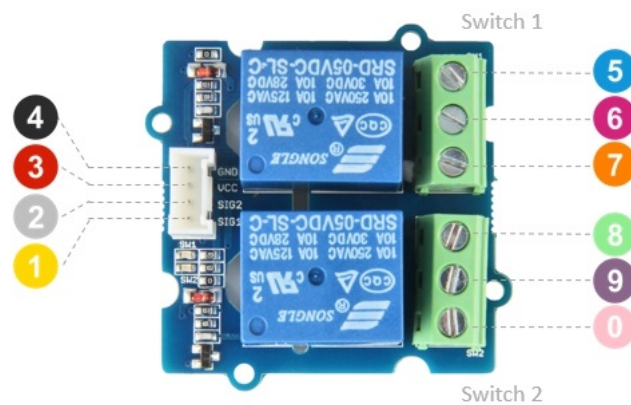| Item	Value
Operating voltage	5V
Nominal Coil Current	89.3mA
TUV Certification Load	10A 250VAC/ 10A 30VDC
UL Certification Load	10A 125VAC/ 10A 28VDC
Max. Allowable Voltage	250VAC/110VDC
Power Consumption	abt. 0.45W
Contact Resistance	100mΩ Max.
Insulation Resistance	100MΩ Min. (500VDC)
Max. ON/OFF Switching	30 operation/min
Ambient Temperature	-40°C to +85°C
Operating Humidity	45% to 85%RH
Contact Material	AgCdO
Input interface	Digital SIG1/SIG2
Output Port	3 Pins DIP Female Screw Terminal-Green

Applications

- Domestic appliance

- office machine

- Remote control TV receiver

- monitor display
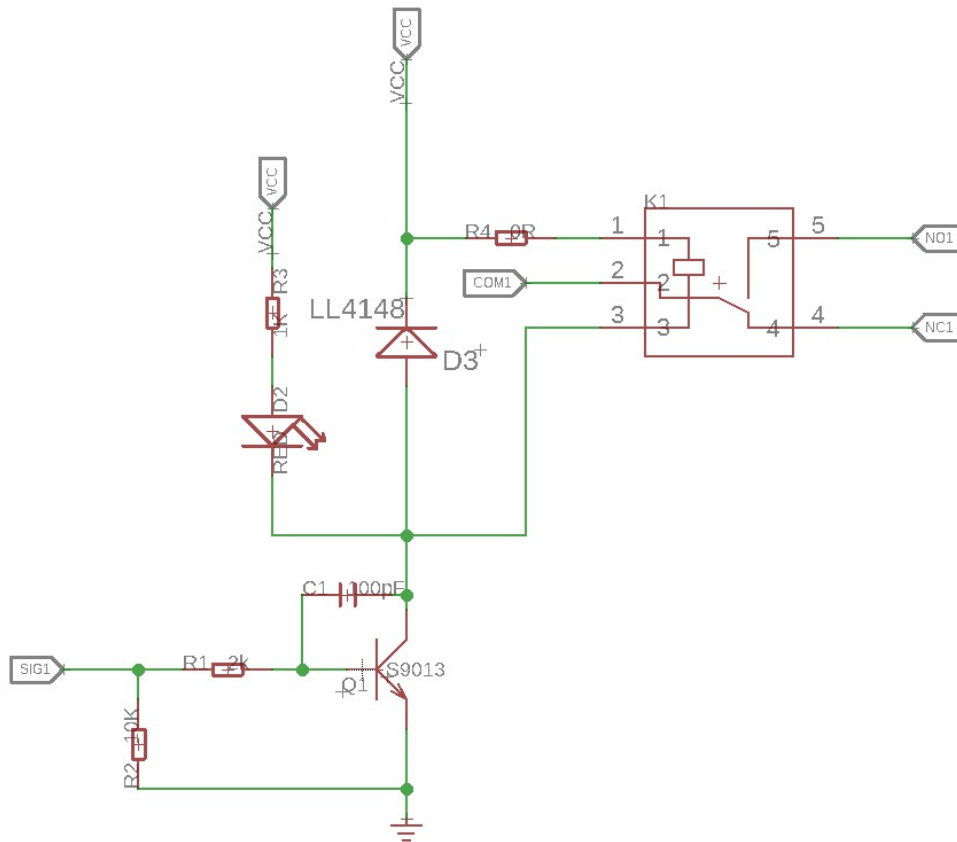
- audio equipment high rushing current use application

Hardware Overview

Pin Map

4 GND: connect this module to the system GND
3 VCC: you can use 5V for this module
2 SIG2: contral signal of swith2, high-NO2/low-NC2
1 SIG1: contral signal of swith1, high-NO1/low-NC1

5 NC1: one throw, connected to COM1 by default
6 COM1: controlled by SIG1, connected to NC1 or NO1
7 NO1: the other throw of swicth1
8 NC2: one throw, connected to COM2 by default
9 COM2: controlled by SIG2, connected to NC2 or NO2
0 NO2: the other throw of swicth2

Schematic

K1 is the Relay module, there is a coil between **pin1** and **pin3** of K1. Defaultly, the **COM1** will connect to **NC1**.If the pin3 of K1 connected to the grand, then this coil will be 'closed', so the **COM1** will connect to **NO1**.

To open this coil, it requires about 90mA, however, normally the GPIO pin of Arduino only can afford 20mA(40mA max.). Therefor, we use a NPN transistors S9013 [https://files.seeedstudio.com/wiki/Grove-2-Channel_SPDT_Relay/res/Transistors_NPN_25V-500mA.pdf] which can proviede 500mA.

The **SIG1** is pulled down by the 10k R2, if there is no signal, the 'Gate' of **Q1** will be 0v, and Q1 is turned off, so that the K1 will be 'opened'. If **SIG1** becomes 5v, then the Q1 will be turned on. **Pin3** of k1 will be connected to the GND of the system, for the K1 there will

be 5V between **pin3** and **pin1**, so the coil will be 'closed', and the **COM1** will connect to **NO1**

> 🔥 **Tip**
> The **D3** is a flyback diode(kickback diode) [https://en.wikipedia.org/wiki/Flyback_diode]. A flyback diode is a diode connected across an inductor used to eliminate flyback, which is the sudden voltage spike seen across an inductive load when its supply current is suddenly reduced or interrupted. It is used in circuits in which inductive loads are controlled by switches, and in switching power supplies and inverters.

Platforms Supported

Arduino	Raspberry Pi		
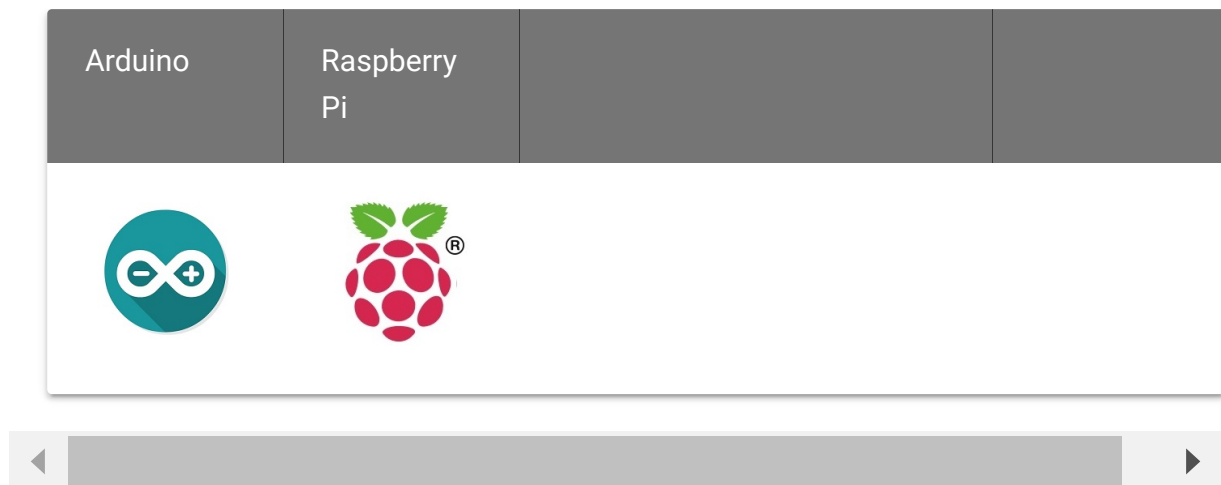
> ⚠️ **Caution**
> The platforms mentioned above as supported is/are an indication of the module's software or theoritical compatibility. We only provide software library or code examples for Arduino platform in most cases. It is not possible to provide software library / demo code for all possible MCU platforms. Hence, users have to write their own software library.

Getting Started
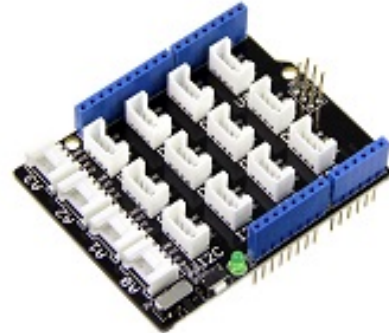
Play With Arduino

Hardware

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]

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> ✏️ **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.

- **Step 1.** Connect the **SIG** pin of the Grove-LED to the **COM** port of the Grove - 2-Channel SPDT Relay. Connect the **GND** pin of the Grove-LED to the **GND** of the Base Shield.

- **Step 2.** Connect the **NO** port of the Grove - 2-Channel SPDT Relay to the **5V** of the Base Shield. Connect the **NC** port of the Grove - 2-Channel SPDT Relay to the **GND** of the Base Shield.

> **Tip**
> Step 1. and Step 2. Connect the Grove LED GND to the system GND and the SIG to the COM port of the Relay. If the COM connect to NO(5v), the LED will turn on, and if the COM connect to NC(0V), the LED will turn of. We use two LEDs in this wiki, please make sure LED_1 for the $Switch_1$, and the LED_2 for the $Switch_2$.

- **Step 3.** Connect the Grove - 2-Channel SPDT Relay to the **D7** port of the Base Shield.

- **Step 4.** Plug Grove - Base Shield into Seeeduino.

- **Step 5.** Connect Seeeduino to PC via a USB cable.

```
GND
VCC
SIG
```
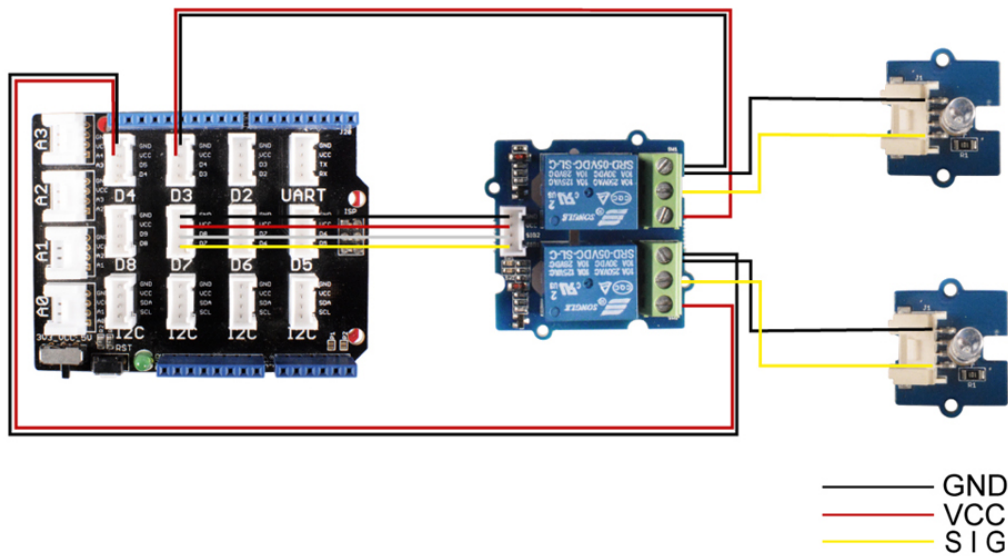
Software

> ⚠️ **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.** Open the Arduino IDE and create a new file, then copy the following code into the new file.

```cpp
1   #include <Arduino.h>
2   uint8_t channel1 = 7;
3   uint8_t channel2 = 8;
4   void setup() {
5     pinMode(channel1, OUTPUT);
6     pinMode(channel2, OUTPUT);
7   }
8   void loop() {
9     digitalWrite(channel1, HIGH);
```
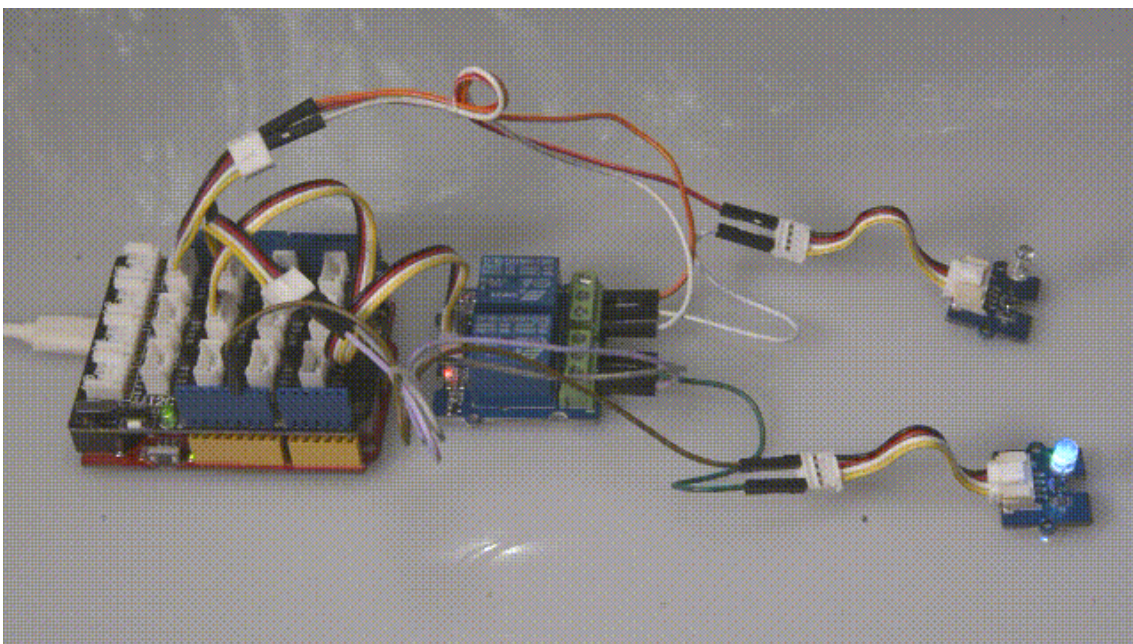
```
10      digitalWrite(channel2, LOW);
11      delay(2000);
12      digitalWrite(channel1, LOW);
13      digitalWrite(channel2, HIGH);
14      delay(2000);
15    }
```

- **Step 2.** 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/].

> ✓ **Success**
> You will see the on-board LEDs alternately lit and extinguished, the same with the two Grove - LEDs.


Schematic Online Viewer

Resources

- **[Zip]** Grove-2-Channel SPDT Relay eagle files [https://files.seeedstudio.com/wiki/Grove-2-Channel_SPDT_Relay/res/Grove-2-Channel_SPDT_Relay.zip]

- **[PDF]** Datasheet of SRD 05VDC-SL-C Relay [https://files.seeedstudio.com/wiki/Grove-2-Channel_SPDT_Relay/res/SRD_05VDC-SL-C.pdf]

- **[PDF]** Datasheet of S9013
  [https://files.seeedstudio.com/wiki/Grove-2-
  Channel_SPDT_Relay/res/Transistors_NPN_25V-500mA.pdf]

Project

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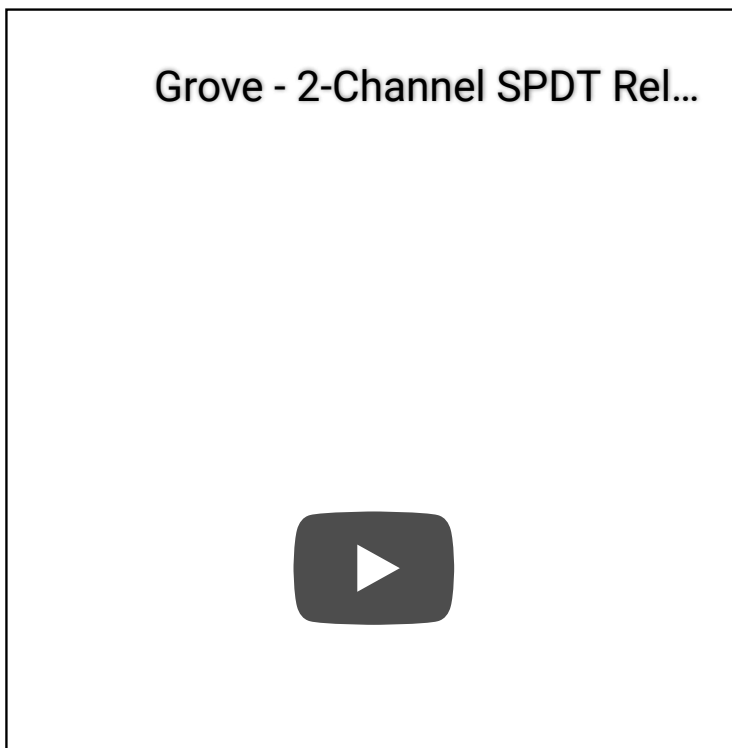
Tech Support

Please do not hesitate to submit the issue into our forum [https://forum.seeedstudio.com/].

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