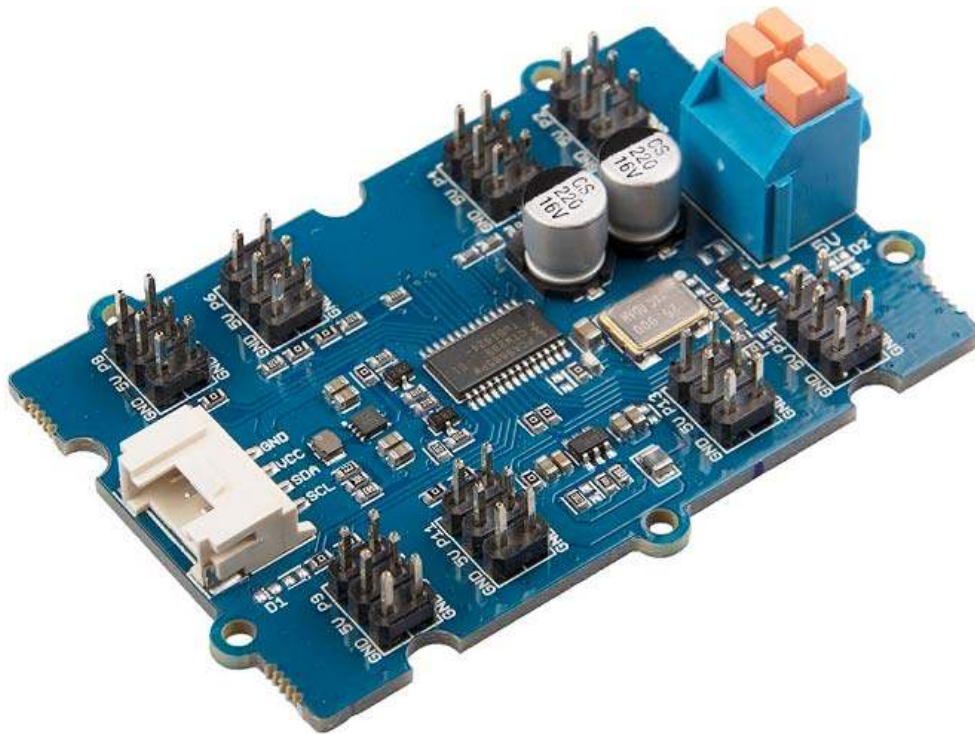


Grove - 16 Channel PWM Driver (PCA9685)



The Grove - 16-Channel PWM Driver is based on NXP PCA9685, which is a 16-Channel, 12 bit I2C PWM driver. This board can drive up to 16 servos with the external power supply. You can control this board with Arduino easily via the I2C Grove interface. In addition, you can use this board as a LED controller.

Feature

- 1 MHz Fast-mode Plus compatible I2C-bus
- 6 hardware address pins allow 62 PCA9685 devices to be connected to the same I2C-bus
- Low standby current
- Noise filter on SDA/SCL inputs

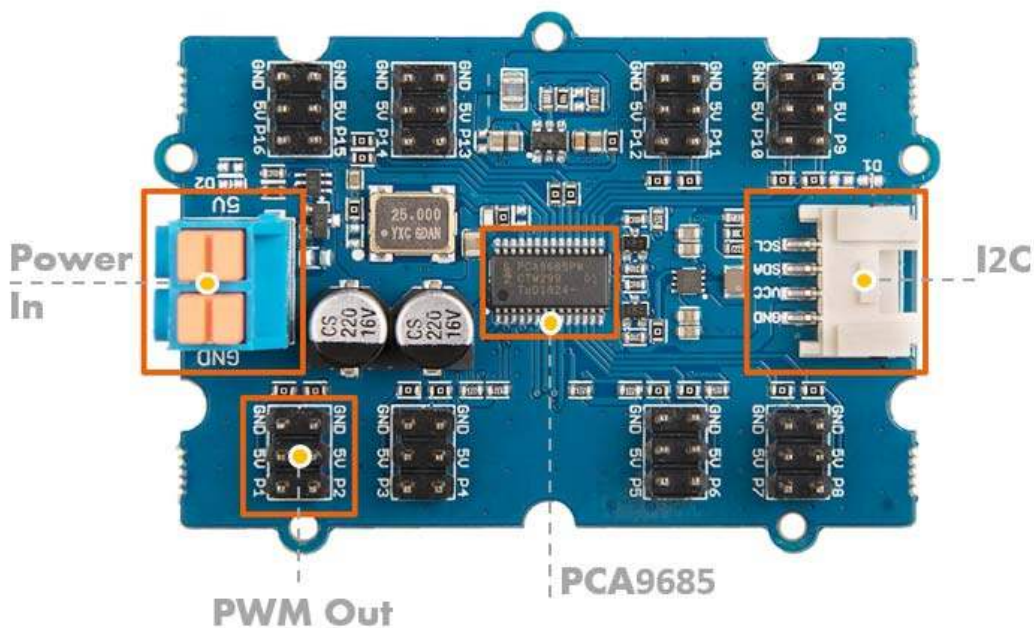
Specification

| Item | Value |
|----------------------------|-------------|
| MCU Operating Voltage | 3.3V / 5V |
| PWM Supply Voltage | 2.3V ~ 5.5V |
| Tolerant Inputs | 5.5V |
| Output Current on pin LEDn | 25mA |
| Ground Supply Current | 400mA |
| Operating temperature | -40~85°C |
| Interface | I2C |
| I2C address | 0x7f |

Typical applications

- Servos driver
- RGB or RGBA LED driver

Pin Out



Warning

Hot swap is not supported, you may want to disconnect arduino from the power source before any replacement or change.

Hardware Detail

I2C Interface

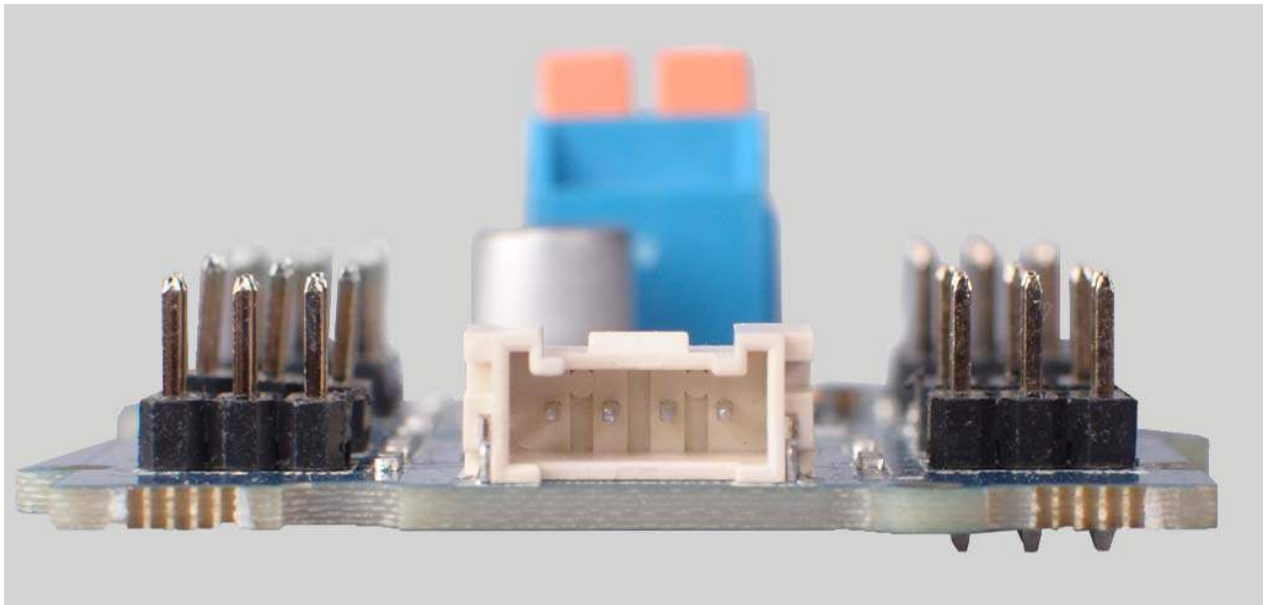
This board uses the I2C interface to allow the on-board MCU to communicate with the host computer.

GND: connect this module to the system GND

VCC: you can use 5V or 3.3V for this module

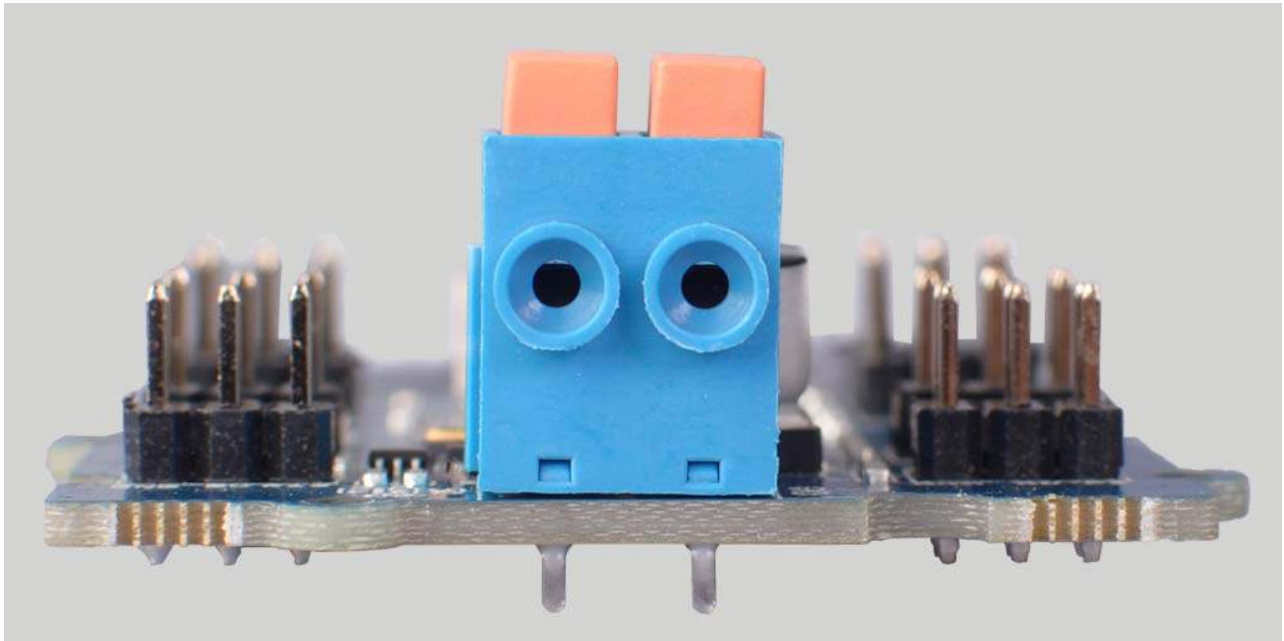
SDA: I2C serial data

SCL: I2C serial clock



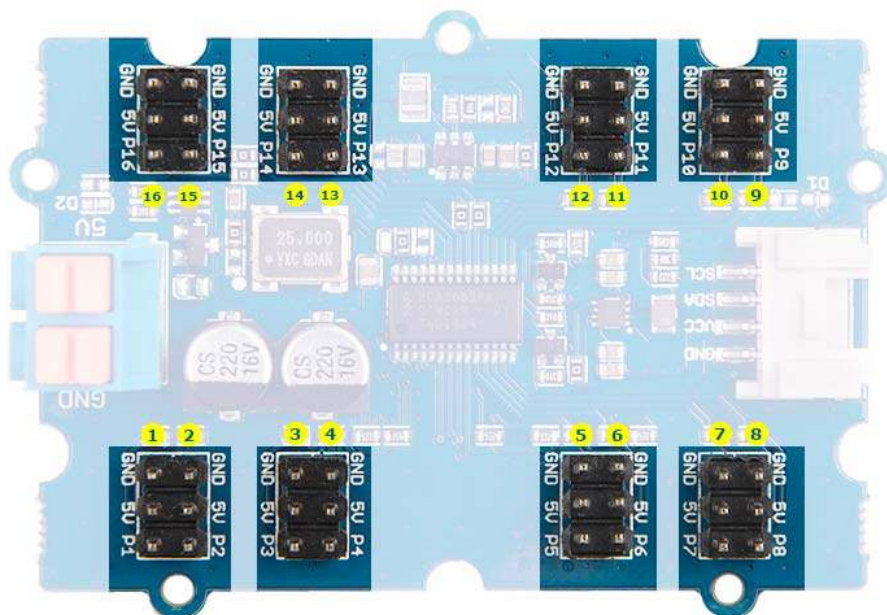
Power In

Provide 5V DC power for the servo.








PWM Out

There are 16 groups of Pins(1 - 16) on this board, each group of pins contains one PWM signal pin, one 5V power supply pin and one pin for ground.



Working Principle

Platforms Supported

| Arduino | Raspberry Pi | BeagleBone | Wio | LinkIt ONE |
|---|---|---|--|---|
|  |  |  |  |  |

Getting Started

Play With Arduino

Hardware

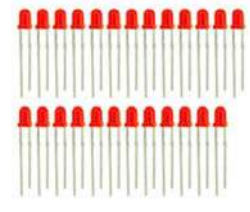
Materials required

Seeduo V4.2

Base Shield

Grove - 16-Channel PWM
Driver

LED



Note

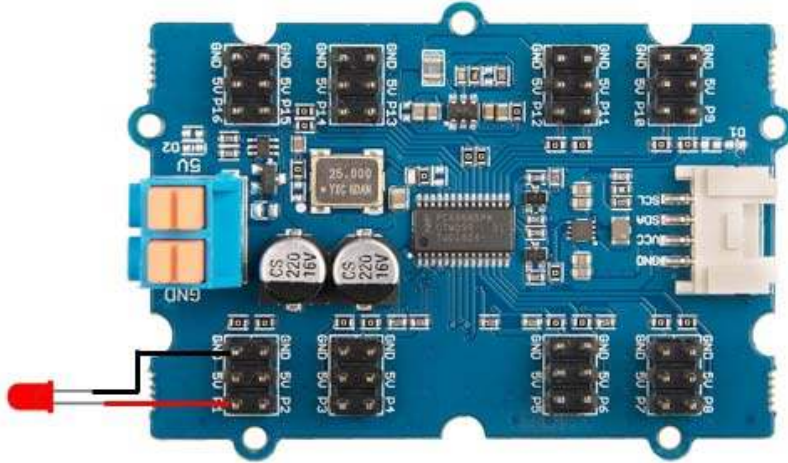
1 Please plug the USB cable gently, otherwise you may damage the port. Please use the USB cable with 4 wires inside, the 2 wires cable can't transfer data. If you are not sure about the wire you have, you can click [here](#) to buy

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.

3 You also need prepare at least 2 jumper wires, in case you do not have, you can click [here](#) to buy.

- **Step 1.** Connect red LED to GND and P1 by using dual-female jumper wires.
- **Step 2.** Connect the Grove - 16-Channel PWM Driver to port I²C of Grove-Base Shield.

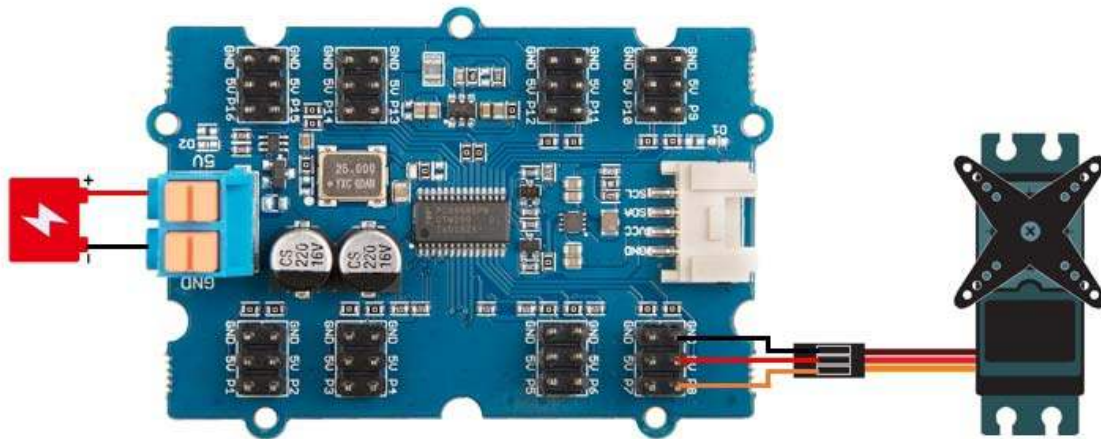
- **Step 2.** Plug Grove - Base Shield into Seeduino.
- **Step 3.** Connect Seeduino to PC via a USB cable.



Note

In this example for LED, as we are not using pin '5V' in output group we do not need to power up the power input port. If you want to use servo, you need to connect the 5V pin to the power pin of servo, and you need to offer external power for **Power In** port.

If you want to use servo, you can connect as shown below:



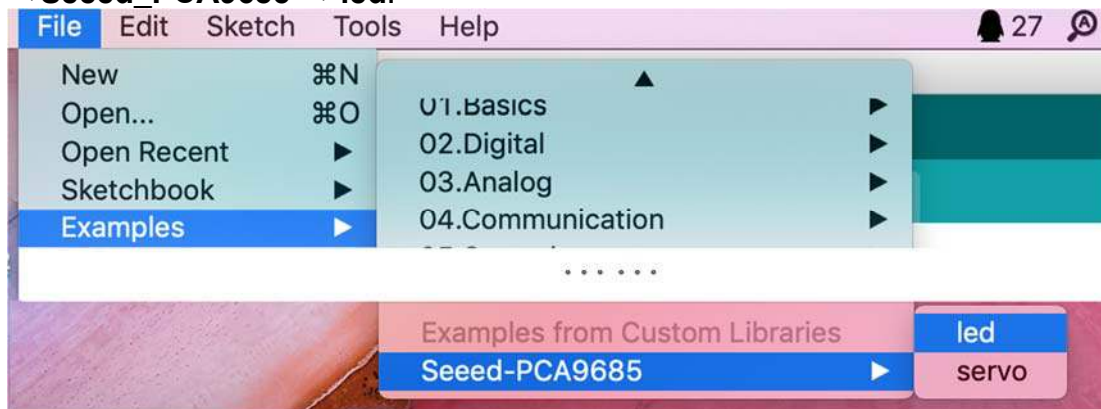
Software

Attention

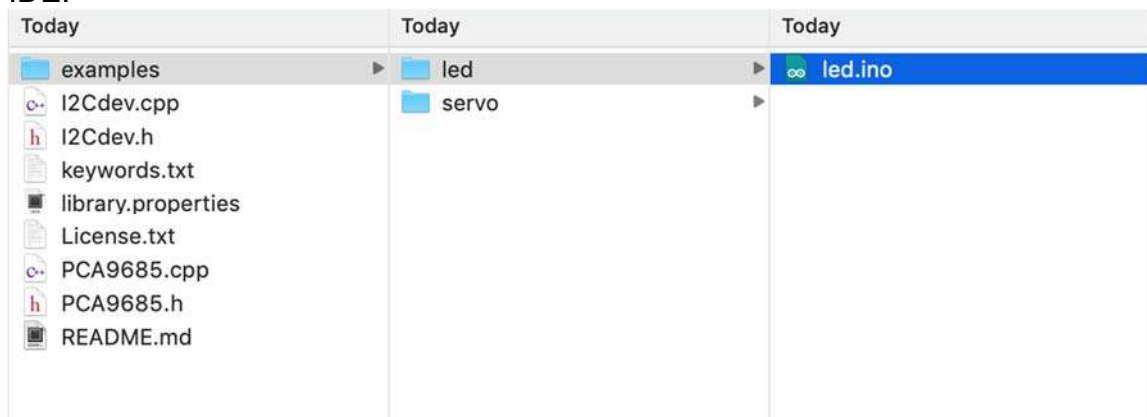
If this is the first time you work with Arduino, we strongly recommend you to see [Getting Started with Arduino](#) before the start.


- **Step 1.** Download the [Grove-16-Channel PWM Driver-PCA9685](#) Library from Github.
- **Step 2.** Refer to [How to install library](#) to install library for Arduino.
- **Step 3.** Restart the Arduino IDE. Open the example, you can open it in the following three ways :

- a. Open it directly in the Arduino IDE via the path: **File** → **Examples** → **Seed_PCA9685** → **led**.



- b. Open it in your computer by click the **basic_demo.ino** which you can find in the folder **XXXX\Arduino\libraries\Seed_PCA9685\examples\led\led.ino**, **XXXX** is the location you installed the Arduino IDE.



- c. Or, you can just click the icon  in upper right corner of the code block to copy the following code into a new sketch in the Arduino IDE.

```

1#include "PCA9685.h"
2#include <Wire.h>
3
4PCA9685 led;
5
6
7void setup()
8{

```

```
9 // join I2C bus (I2Cdev library doesn't do this automatically)
10 Wire.begin();
11 Serial.begin(9600);
12 led.init(0x7f);
13 // Set freq to 100Hz, range from 24Hz~1526hz
14 led.setFrequency(100);
15
16 for (int i=1;i<17;i++){
17     led.setPwm(i, 0, 1024);
18 }
19}
20
21void loop()
22{
23}
```

Attention

The library file may be updated. This code may not be applicable to the updated library file, so we recommend that you use the first two methods.

Success

If everything goes well, you will be able to see the LED goes on.

Tech Support

Please do not hesitate to submit the issue into our [forum](#) or drop mail to techsupport@seeed.cc.