Grove Beginner Kit for Arduino Manual

GROVE

Grove Beginner Kit for Arduino

The Grove Beginner Kit for Arduino is one of the best kits for beginners to get started with Arduino. No troublesome soldering and no complicated wiring. You can focus on learning Arduino. This kit includes a main control board, which is the Seeeduino Lotus and 8 Grove modules, covering sensors, actuators and displays. All you need to do is follow the tutorials, plug the modules into the Seeeduino Lotus and build your cool projects.

Parts List:

Seeeduino Lotus v1.1

Grove - Tilt Switch

Grove - Buzzer

Grove - Temperature & Humidity Sensor (DHT11)

Grove - 3-Axis Digital Accelerometer(±1.5g)

Grove - Light Sensor v1.2

Grove - Line Finder v1.1

Grove – Chainable RGB LED V2.0

Grove - 16 x 2 LCD (White on Blue)

About Grove

Before we had Grove, at least three wires were needed every time a module had to be connected to an Arduino, including power, signal, and ground. So, Arduino was quite hard to manipulate among excessive wires.

How could we simplify this building process? Well.... Grove Ecosystem is the solution. Every Grove module has a function, such as sensing light, sensing motion. Also, you only need one Grove cable to connect between these modules and the Seeeduino Lotus for the modules to function reliably in your design.

First Date with Seeeduino?

If this is your first time using a Seeeduino Lotus along with the Grove modules, don't worry, we got you covered! We have a detailed step-by-step tutorial to guide you through. Find it in the "Getting Started" section of the Grove - Beginner Kit's wiki page:

http://wiki.seeedstudio.com/Grove_Beginner_Kit_for_Arduino/

Also, we have made an interesting video for this kit, and it will help you to get started quickly and easily!
Follow this link for the video: *youtu.be/EZVdPm5Y37c*

Sketchbook Download

After following the "Getting Started" section, if you succeed in blinking the built-in LED, you can start to tinker with the Grove Beginner Kit for Arduino. To simplify the coding tasks for you, we packed a few demos of Grove Beginner Kit into a sketchbook file and uploaded it into GitHub. Here is the link to download it:

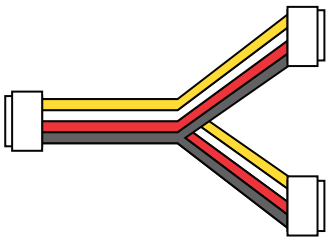
https://github.com/Seeed-Studio/Grove_Beginner_Kit_Sketchbook

Grove cables

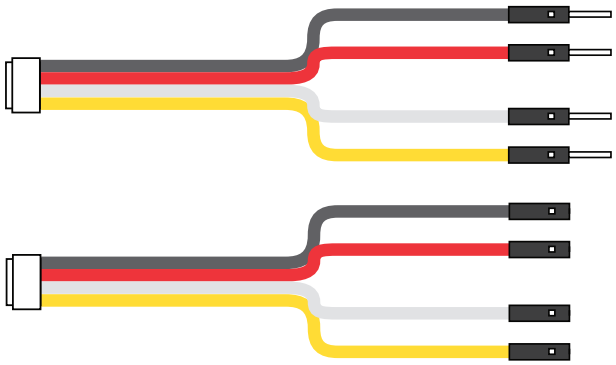
There are four kind of Grove cables for different needs. For general projects using Seeeduino or Base Shield, you can simply use the standard cables. For projects where you need to connect two I2C devices by connecting the Grove cable to the I2C port of the main board, you can use the branch cables. If your project uses two servos, you can choose Grove – Branch Cable for Servo. If you don't want to use a Base Shield or a Seeeduino in your projects, you can choose Grove to 4pin Female/Male Jumpers, with which you can connect Grove module to your breadboard directly. Each kind of cable have five different sizes of length, 5cm, 20cm, 30cm, 40cm, and 50cm.

Standard Cable

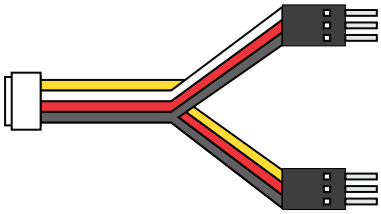
Branch Cable



Grove to 4pin Female/Male Jumper

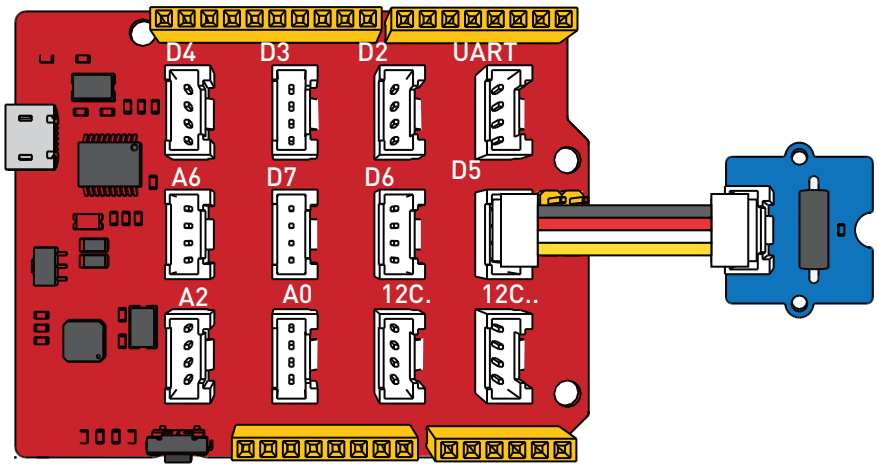


Branch cable for Servo

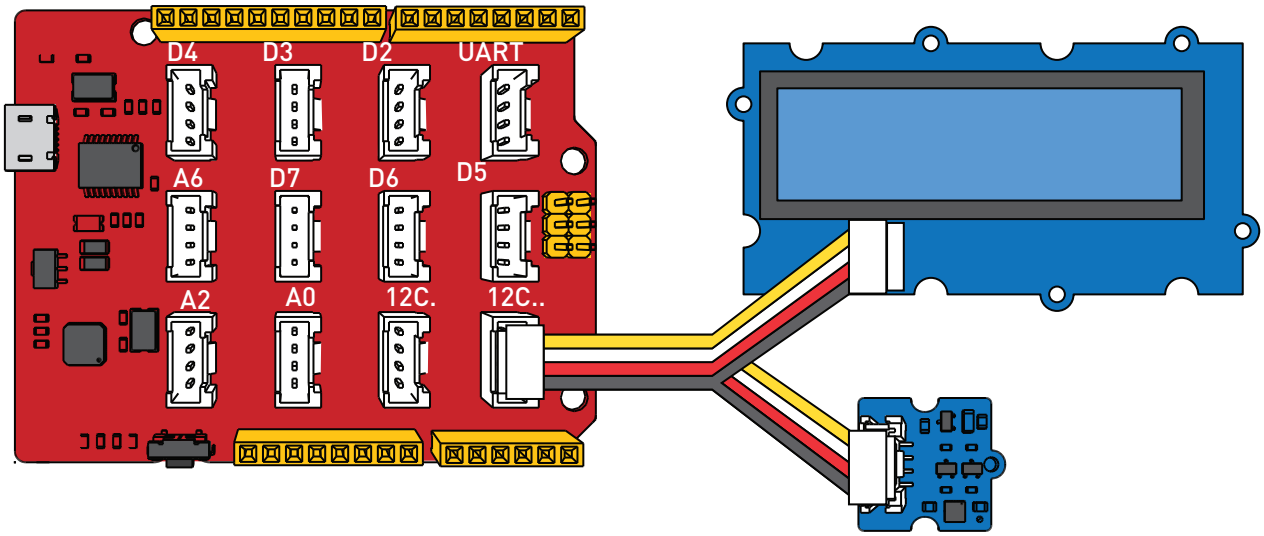


Connections

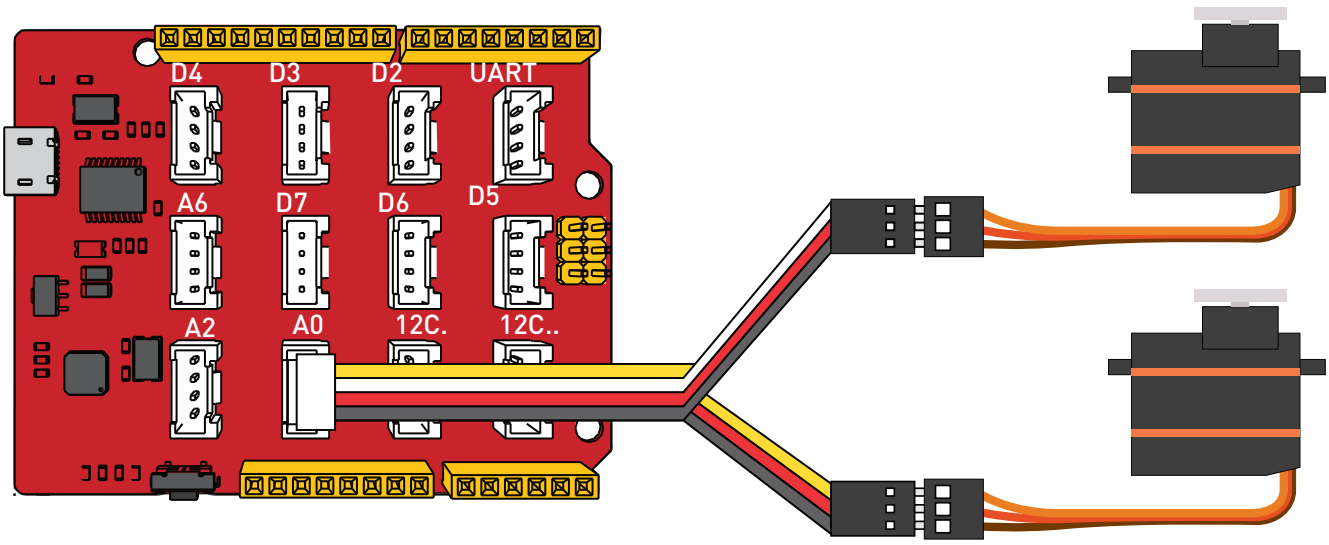
Standard Cable



Branch Cable



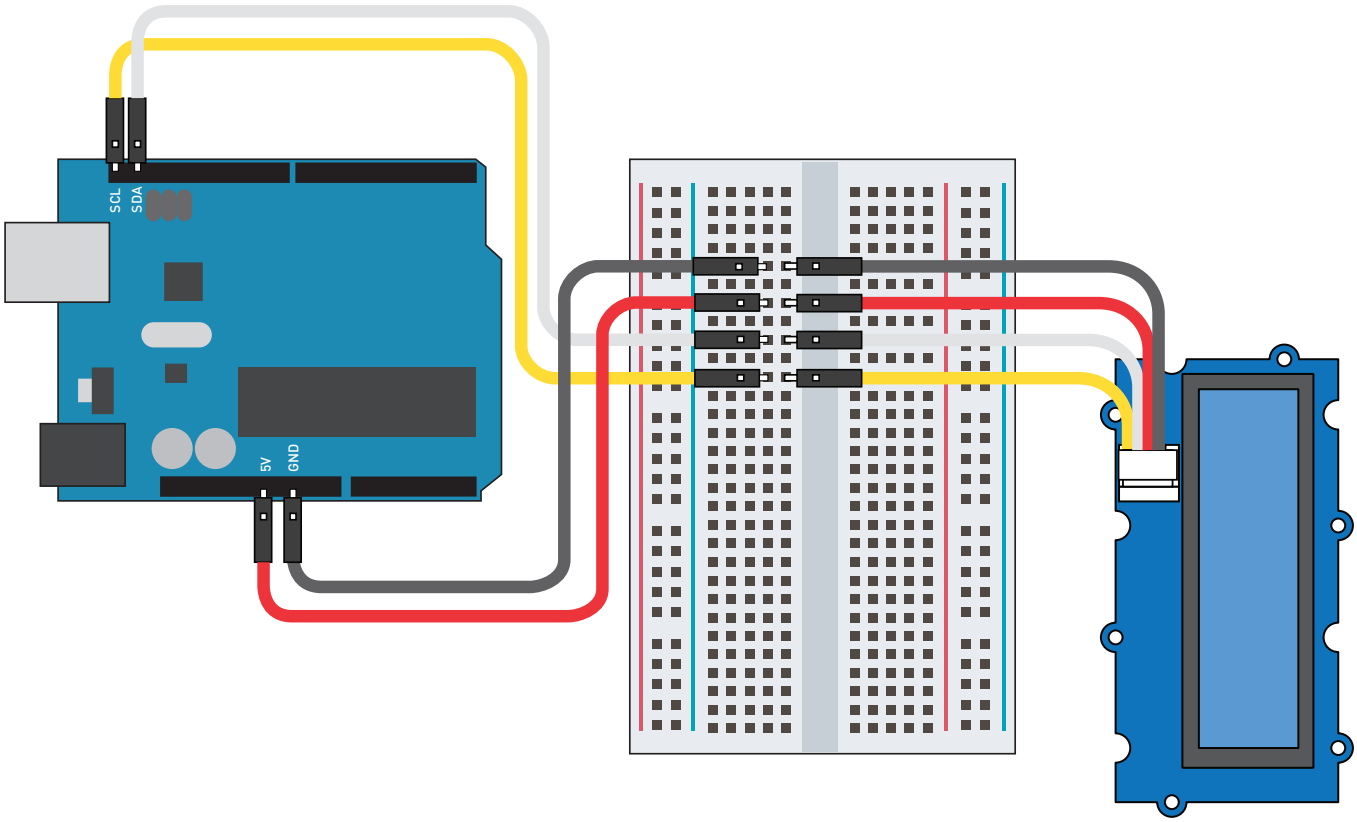
Branch cable for Servo



Note

It is recommended to use external power supply for driving servos

Grove to 4pin Female/Male Jumper

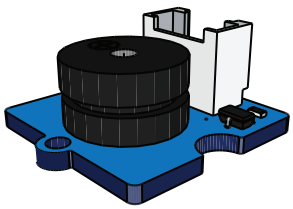


Contents

Modules Introduction

Grove – Buzzer

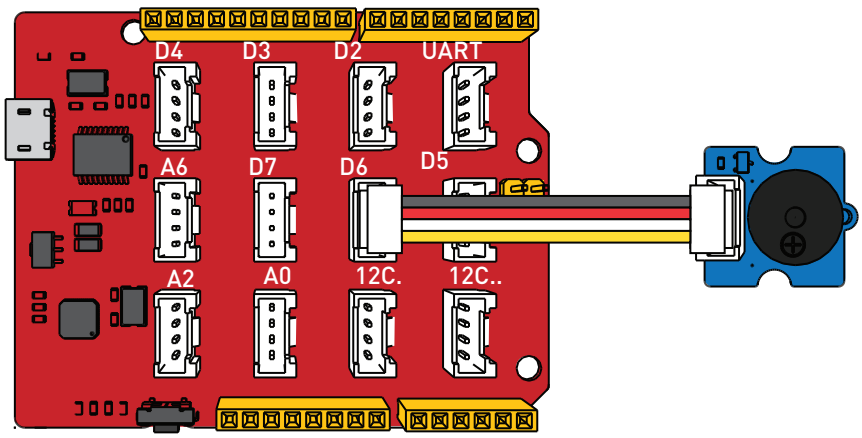
The Buzzer can give you interesting sound effects and you will find it fun to play with.



Example

You can use the codes included to make the buzzer beep. However, Grove-Buzzer can be much more fun. It can play melodies! Find the examples via the path below:

File > Sketchbook > Grove_Beginner_Kit_Sketch-book-master > tutorial 1 – Buzzer

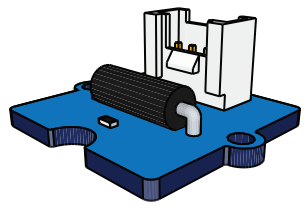


Tips

The sound frequency of this Buzzer will change according to the change in shaking frequency set from the Arduino IDE

Grove – Tilt Switch

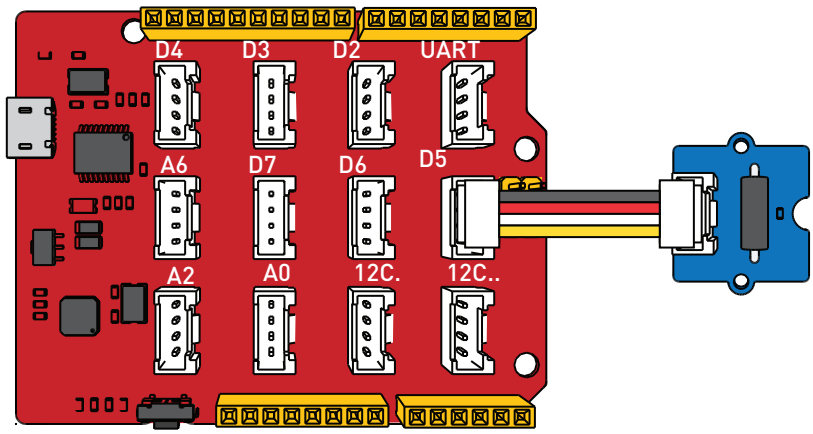
This switch will turn on and off according to the orientation you hold it.



Example

You can use the codes included in order to switch on or off the built-in LED on the Seeeduino Lotus just by tilting this up or down. Find this example and more via the path below:

File > Sketchbook > Grove_Beginner_Kit_Sketchbook-master > tutorial 2 - Tilt Switch > 2_tilt_switch_Built-in_LED

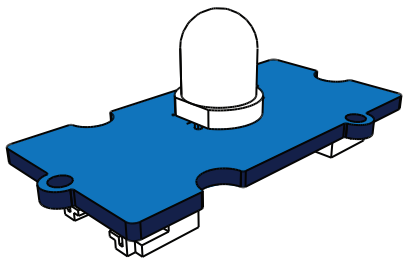


Tips

Inside this tilt switch is a pair of balls that make contact with the pins when the case is upright and thus making a connection.

Grove – Chainable RGB LED

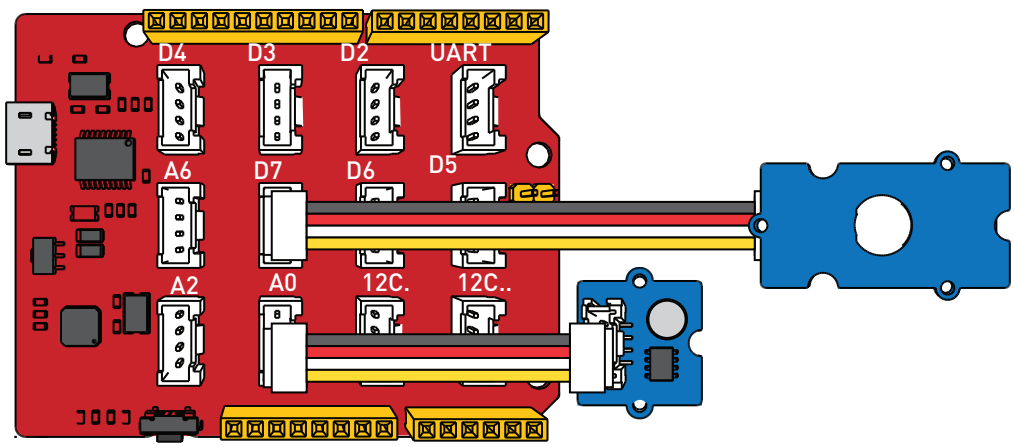
This RGB LED will allow you to light up your projects by chaining 1024 RGB LEDs at most!



Example

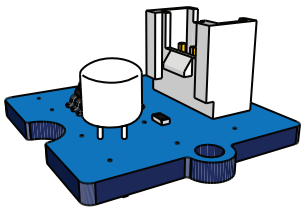
You can use the codes included to make the LED react according to your commands. You will find it fun to use with vivid and magical light effects. Find this example and more via the path below:

File > Sketchbook > Grove_Beginner_Kit_Sketch-book-master > tutorial 3 – LED > 1_CycleThroughColors



Grove - Light Sensor

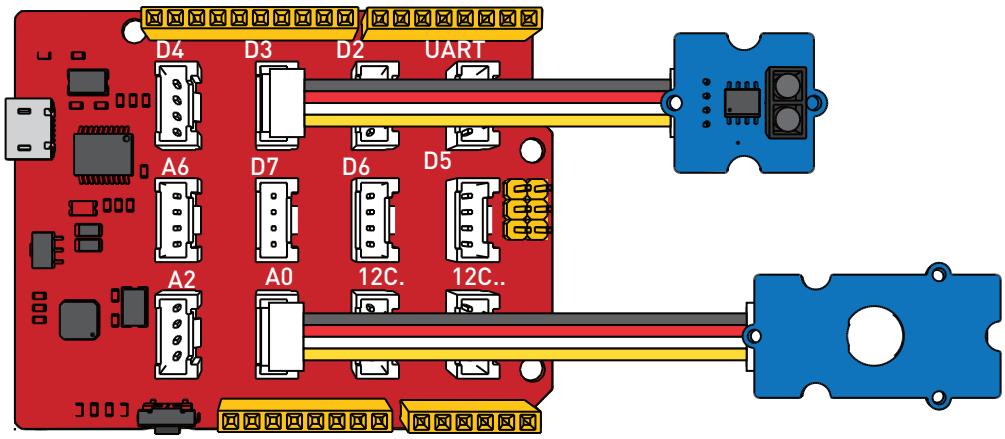
You can measure different intensities of light using this sensor and let it react accordingly.



Example

You can use the codes included to react according to the ambient light and turn on the Grove – Chainable RGB LED. We have also provided another example. Find them via the path below:

File > Sketchbook > Grove_Beginner_Kit_Sketchbook-master > tutorial 4 – Light Sensor > 1_LightSensorSwitch

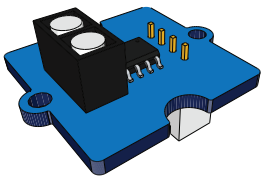


Tips

The resistance of the photo-resistor on this module decreases when the light intensity increases and vice versa, thus output accordingly.

Grove – Line Finder

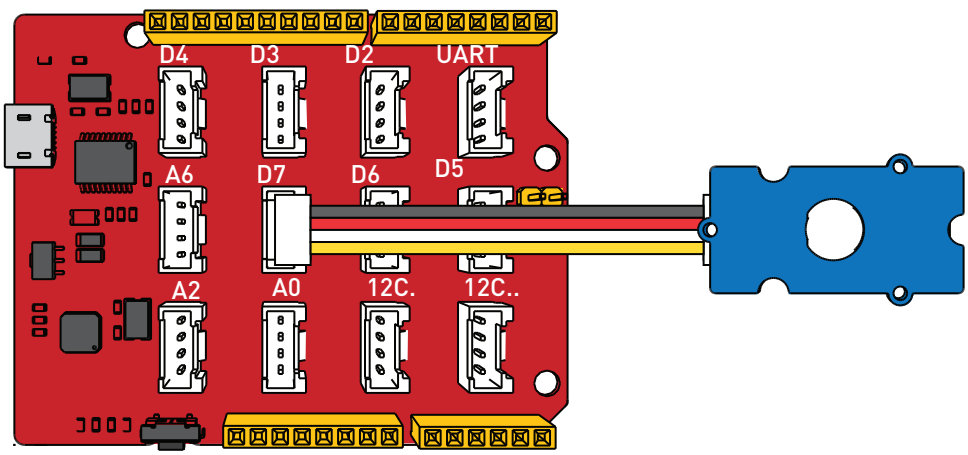
You can use this module in your next robotics projects for robots to follow a drawn path!



Example

You can use the codes included to turn on and off the Grove – Chainable LED, based on the position of the Line Finder. Also, there are two other examples we have included. Find the examples via the path below:

File > Sketchbook > Grove_Beginner_Kit_Sketchbook-master > tutorial 5 – Line Detector > 3_LineDetectorSwitch

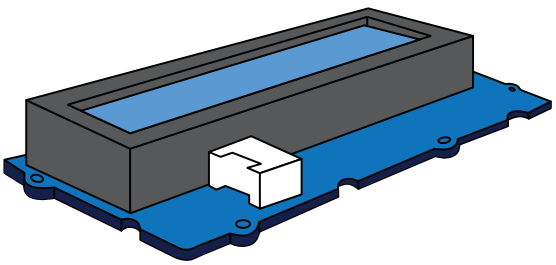


Tips

This consists of two parts:an IR emitting LED and an IR sensitive phototransistor, so that a robot can follow a black line in a white background.

Grove - 16 x 2 LCD (White on Blue)

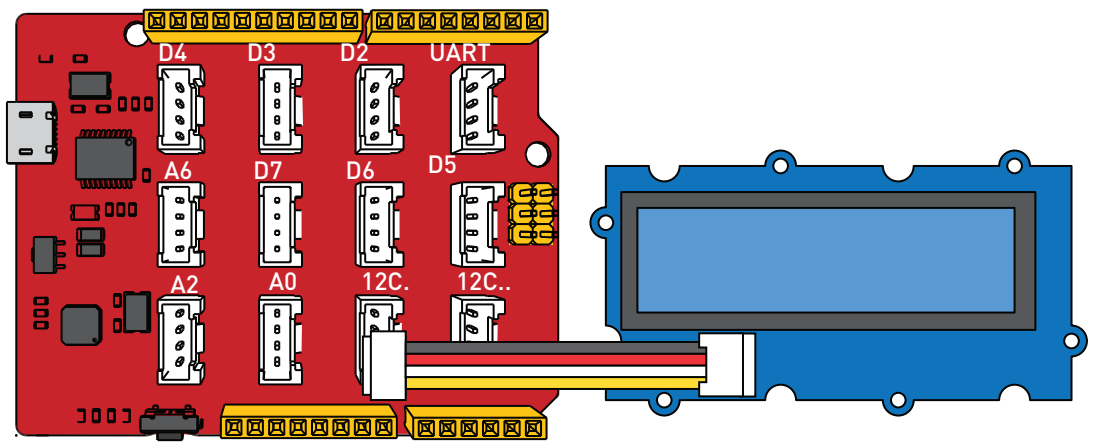
Use this module to display all your data from sensors connected to your Seeeduino Lotus.



Example

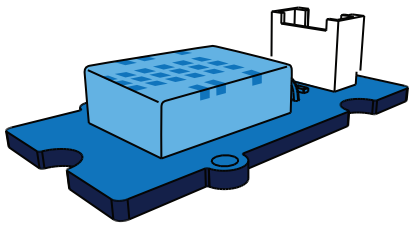
You can use the codes included to display any character that you would like. We have provided three different code examples for you to have fun with this display. Find the examples via the path below:

File > Sketchbook > Grove_Beginner_Kit_Sketchbook-master > tutorial 6 - LCD



Grove – Temperature & Humidity Sensor (DHT11)

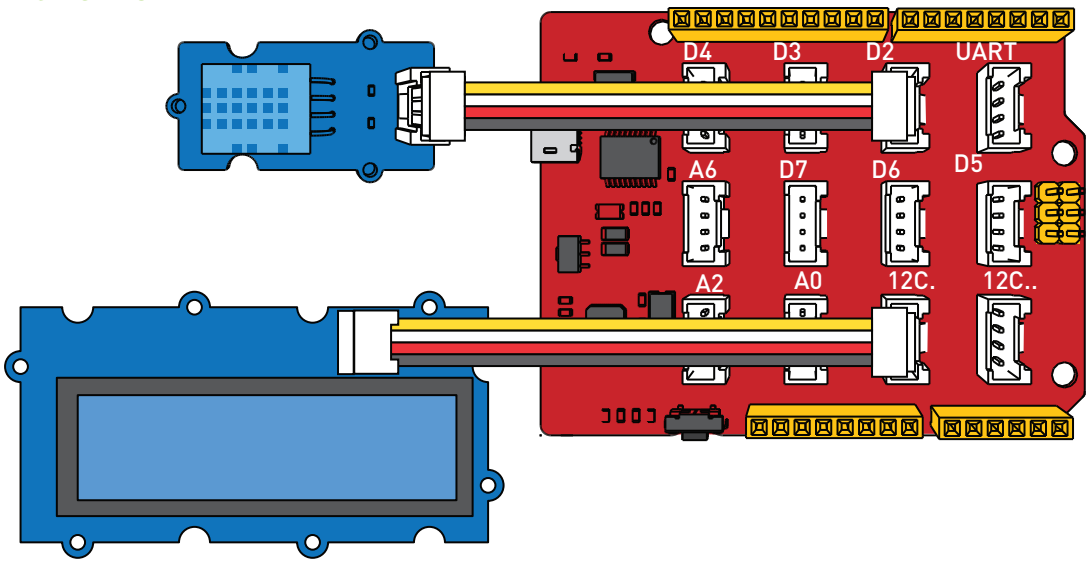
This Sensor is based on the commonly used DHT11 sensor to measure temperature and relative humidity.



Example

You can use the codes included to display the temperature and relative humidity information the Grove - 16 x 2 LCD (White on Blue). Find the examples via the path below:

File > Sketchbook > Grove_Beginner_Kit_Sketchbook-master > tutorial 7 - DHT11

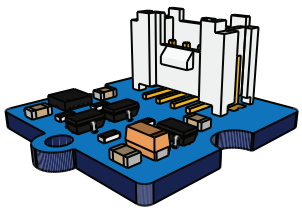


Tips

A unique capacitive sensor element measures relative humidity and the temperature is measured by a negative temperature coefficient (NTC) thermistor.

Grove – 3-Axis Digital Accelerometer (±1.5g)

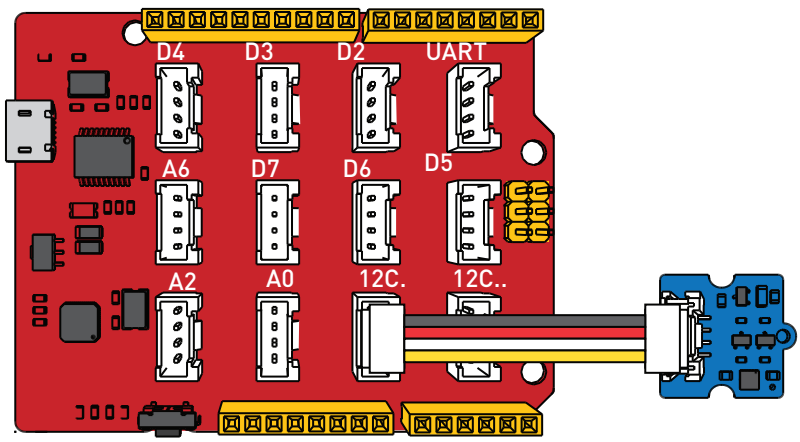
This sensor can be used in your next motion and orientation sensing project and also be able to use in your gesture detection projects.



Example

You can use the codes included to display the 3 -axis accelerometer data on the Grove – LCD RGB Backlight. Find the examples via the path below:

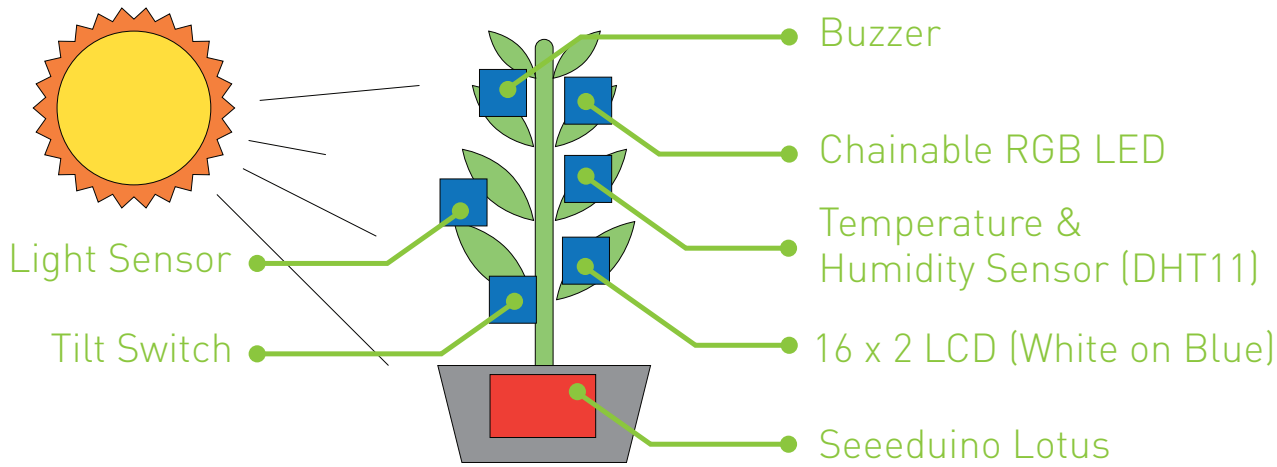
File > Sketchbook > Grove_Beginner_Kit_Sketchbook-master > tutorial 8 – Accelerometer



Demo Projects

Smart Garden

This is a Smart Garden using the modules from the Grove Beginner Kit to have a sensing and reminder system.



Materials List:

Seeeduino Lotus v1.1

Grove – Buzzer

Grove – Chainable RGB LED V2.0

Grove – Light Sensor v1.2

Grove – 16 x 2 LCD (White on Blue)

Grove – Temperature &Humidity Sensor (DHT11)

Grove – Tilt Switch

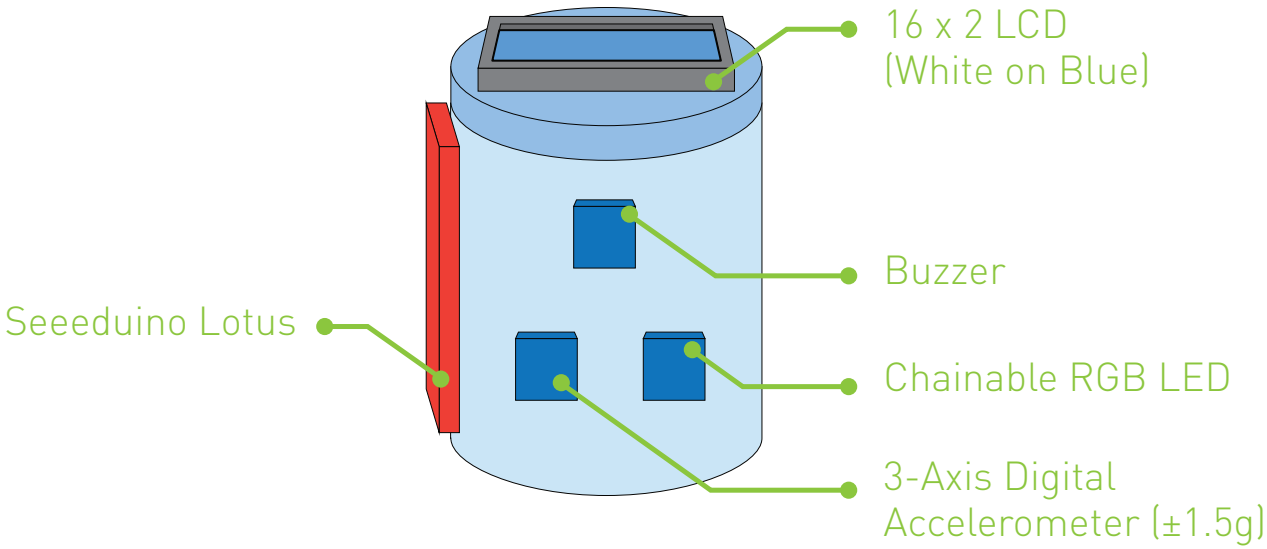
Grove cables

Find the complete recipe here:

File > Sketchbook > Grove_Beginner_Kit_Sketchbook-master > tutorial 9 – Smart Garden > smartGarden

Smart Cup

This is a smart cup that reminds you to drink water at a certain period of time.



Materials List:

Seeeduino Lotus v1.1

Grove – Buzzer

Grove – Chainable RGB LED V2.0

Grove – 16 x 2 LCD (White on Blue)

Grove – 3-Axis Digital Accelerometer (±1.5g)

Grove cables

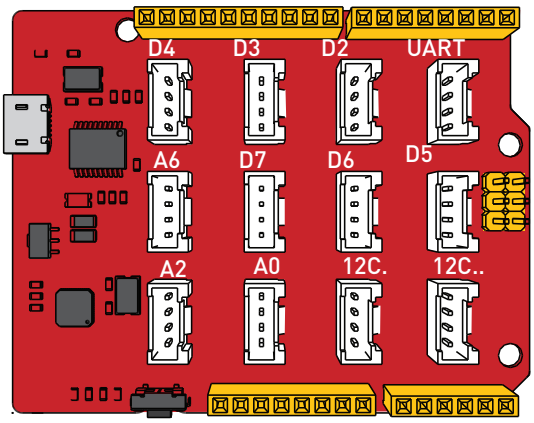
Find the complete recipe here:

File > Sketchbook > Grove_Beginner_Kit_Sketchbook-master > tutorial 10 – Smart Cup > smartCup

Seeeduino Lotus V1.1

Seeeduino Lotus is a development board with an ATMEGA328P AVR microcontroller. It is the combination of Seeeduino and Grove Base Shield. It uses an Atmel ATmege328P-MU microcontroller and a CP2102N chip. ATmege328P-MU is a high performance, low power AVR 8-bit Microcontroller. On the other hand, CP2102N is a USB-to-Serial converter chip which allows Seeeduino Lotus to communicate with a computer by using a micro-USB cable.

Seeeduino Lotus has 14 Digital input/output (6 can be used as PWM outputs) and 7 Analog input/output, a micro USB connection, an ICSP header, 12 Grove connectors and a reset button. The Grove ports on the Seeeduino Lotus are Digital (6), Analog (3), I2C (2), UART (1).



Arduino UNO VS Seeeduino Lotus

If you know the Arduino, Seeeduino Lotus is just like an Arduino but with added features. Check the chart below for their differences.

	Seeeduino Lotus V1.1	Arduino UNO R3
Release Date	2018/03	2016/02
Microcontroller	ATMega328P	ATMega328P
Operating Voltage	5V	5V
Flash	32KB	32KB
SRAM	2KB	2KB
EEPROM	1KB	1KB
Power supply interface	Micro USB	USB, DC Port
Grove Connectors	12	None

The Grove modules communicate via different protocols, and you can quickly figure out how to use them by familiarizing yourself with the communication methods of each module.

1. Digital Ports

There are six digital Grove ports. They are equivalent to digital pins 0 through 7 on the Seeeduino Lotus. Normally, they are used when reading a digital sensor that only outputs 0 or 1, or turning on or off an actuator. Some of these ports are multi-purpose and can function as PWM (pulse width modulation) outputs. They are port 3, port 5 and port 6. You will need these ports when driving a servo or fading an LED.

Digital ports are a must for serial communication too. There is one built-in hardwired serial port, which is UART, on port 1. This is the Seeeduino's default port for serial communication with the PC.

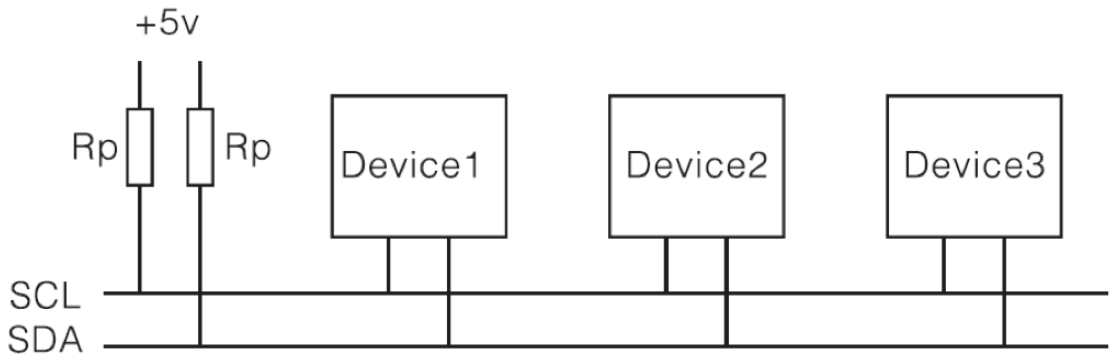
In cases where you need at least two serial devices or you need an available serial port for debugging purposes, other digital ports, software serial ports, can be used as well. We will encounter them a lot in our Grove system.

2. Analog Input Ports

There are three Grove ports for taking analog readings. Analog sensors can return readings ranging from 0 - 1024. Compared with digital sensors that only return 0 or 1, analog readings are more detailed and precise.

3. I2C Ports

There are two I2C Grove ports. I2C is a low-speed bus protocol that transfers data via two wires: SCL and SDA. SCL is the clock line that synchronizes data transfer over the I2C bus, and SDA is the data line. The following diagram illustrates the framework of an I2C bus.



You can connect up to 128 devices on the I2C bus; however, only one of them can work in master mode, while all of the others work in slave mode. For Grove, the master is the Arduino.

It generates the clock signals and sends commands to and/or receives data from all of the devices. In theory, each slave device has a unique hardware address and the master device can find slave devices via their addresses.

I2C ports are generally used when the amount of data is overwhelming for simple digital and analog ports. For example, when we want to obtain complex information such as angular acceleration, or read the current time from an RTC module, we should use the I2C ports.

4. UART Port

There is one UART port on this board. UART enables to have a serial communication with the connected devices. Therefore, you can send commands from a computer to the board and vice versa.

Resources

Arduino website: *www.arduino.cc*

Seeed bazaar: *www.seeedstudio.com*

Seeed wiki main page: *www.seeedstudio.com/wiki/-Main_Page*

Unboxing & Getting Started Video: *youtu.be/EZVdPm5Y37c*

For technical inquiries: *techsupport@seeed.cc*

For more insights: *forum.seeedstudio.com*

Scan here for:

Grove Beginner Kit for Arduino product page

Scan here for:

Grove Beginner Kit for Arduino wiki page

Scan here to:

Stay tuned with our newsletter for all the latest product releases

www.seeedstudio.com

@seeedstudio