编号	材质工艺要求	日期
图（一）	整体尺寸:400*283(mm) 铜版纸128g	2016/01/27

折线

400mm

283mm

Grove Starter Kit

About UDOO

UDOO is a family of single-board computers for students and makers. These are all designed for fast prototyping. Internet of Things solutions and educational projects. The UDOO family's key feature is to embed in the same board the computational power of a microprocessor, and the flexibility of the famous Arduino prototyping platform, in using a microcontroller to connect to the physical world.
The aim of all the UDOO family members is to provide to the users a set of tools that allows them to develop projects and applications in an enjoyable and easy way.

Discover UDOO

Have you ever heard about UDOO? If not, let's visit www.udoo.org! You will find all the UDOO board information, resources, demo projects, and step-by-step tutorials made for entry level makers, to computer science PhD students!

UDOO Grove kit

The UDOO Grove kit is another step in reducing complexity and increasing the number of people that want to interact and program the physical world!

Sketchbook Download

To simplify the coding task, we packed demos in Grove – Starter Kit into a sketchbook file and uploaded it to Github. Here is the link to download it:
https://github.com/Seeed-Studio/Sketchbook_Starter_Kit_V2.0

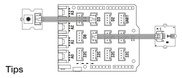
Modules Introduction
Following is the individual introduction to each Grove module.

Button

This is a momentary button (see tips) nd it's the most common input module we see.

Example

The example bellow shows you how to use this button to turn an LED on and off.Sketchbook path:
File →Sketchbook →Grove_Button



Tips

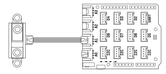
"Momentary" means the button rebounds after pressed. This button outputs HIGH when pressed,and LOW when released.

80cm Infrared Proximity Sensor

The 80cm Infrared Proximity Sensor is a General Purpose Type Distance Measuring Sensor.

Example

The infrared proximity sensor is easy to use, you can measure the corresponding distance by the reading voltage and a diagram that demonstrate the relationship between voltage and distance. This demo will simply show how to use the sensor to measure the distance.



Tips

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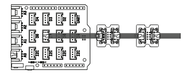
RGB chainable LED

Grove Chainable RGB LED is based on P9813 chip which is a full-color light source LED driver chip, it can provide constant current drive and modulated output of 256 gray.

Example

This demo will show you how to chain the chainable Leds, then light them up and let all the colors of RGB cycles in an uniform way.



Tips

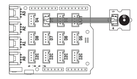
This module communicates with a MCU using 2-wire transmission (Data and Clock). This 2-wire transmission can be used to cascade additional Grove - Chainable RGB LED modules. Note that the IN interface of one Grove - Chainable RGB LED should be connect to D7/D8 of Grove - Base Shield and its OUT interface connect to IN interface of another Grove - Chainable RGB LED, chainable more LED in this way.

Grove – Buzzer

This buzzer can give you sound effects.

Example

You can use the code for Grove - Button to make the buzzer beep when you press the button. However, Grove-Buzzer can be much more fun—it can play songs! In this example provided by Oomlout.com, the buzzer will play "Twinkle Twinkle, Little Star" . Find the example via the path bellow:
File →Sketchbook →Grove_Buzzer.



Tips

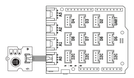
How does the Piezoceramic buzzer work? There are two ceramic wafers in each buzzer. When voltage is applied, the ceramic wafers attract or reject each other, causing them to shake. The air vibration makes the audible sound. When the shaking frequency changes (which we can control in the Arduino code), the sound frequency will also change.

Grove – Rotary Angle Sensor

This is an input device controlled via turning the knob

Example

This example shows you how to read the value of a rotary angle sensor:
File →Sketchbook →Grove_Rotary_Angle_Sensor



Tips

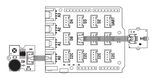
Grove-Rotary Angle Sensor is a 10k Ohm linear rotary potentiometer with a turning radius range of 300 degrees. A rotary potentiometer looks very similar to a rotary encoder, but they are not the same. A rotary potentiometer is essentially a slide potentiometer. It reflects the position in an analog way just like a slide potentiometer does; however, the rotary encoder counts the turns so you can tell how much and in which direction the encoder has been turned.

Grove - Sound Sensor

This is a sensor to evaluate the intensity of sound.

Example

The code for the Grove—Sound Sensor can be used to make an LED light whose brightness reflects the intensity of the ambient sound.
File →Sketchbook →Grove_Sound_Sensor



Tips

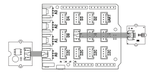
The electric microphone collects sound intensity for all frequencies, and the potentiometer acts as the doorman. When you rotate it clockwise to the extreme, it lets everything go through, and when you rotate it fully counterclockwise, nothing goes through.

Grove – Light Sensor

This is a sensor that detects the change of light.

Example

This example will create an LED that turns on automatically when the ambient light is dim:
File →Sketchbook →Grove_Light_Sensor



Tips

The output of the analog light sensor ranges from 0 to 760, but it is not linear with respect to the ambient light intensity. Below is a table to help you understand what the output really means.

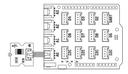
Sensor readings	Light condition	Illuminance level (Lux)
0	Pitch dark	0.1 - 1
40	Very Dark	6 – 10
100	Dark Indoors	51 – 95
200	Corridor Areas/Toilets	140 – 145
300	Rest room	155 – 190
500	Entrances/Exits/Canteens	196 – 295
650	School Assembly Halls	296 – 325
750	Reading	326 – 355

[1] Data in this column only show the mean readings in testing.
[2] This module is only suitable for usage indoors. And illuminance level (light level) can be up to 375 approximately.
[3] Data in this column only describe approximate circumstances or conditions in daily life.

This is a sensor for ambient temperature.

Example

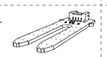
The code in this example shows you how to convert the raw output of the sensor into temperatures. You can see the output data in Celsius in the serial monitor.
File →Sketchbook →Grove_Temperature_Sensor



Tips

Grove - Temperature Sensor is used to detect environment temperature. Its value ranges from40 to 125 degrees Celsius and the accuracy is within ± 1.5 ℃.

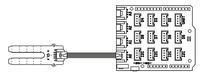
Moisture Sensor



The Grove - Moisture Sensor can be used to detect the moisture of soil, to judge if there is dampness around the sensor.

Example

This is an example of which the moisture sensor is used to detect moisture level of the soil. When the soil moisture decreases, the sensor output value will decrease. You can know whether a plant needs water or not by observing the result outputted by the sensor.



Tips

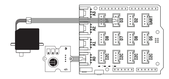
This sensor isn't hardened against contamination or exposure of the control circuitry to water and may be prone to electrolytic corrosion across the probes, so it isn't well suited to being left in place or used outdoors.

Grove – Servo

This is an actuator whose position can be precisely controlled.

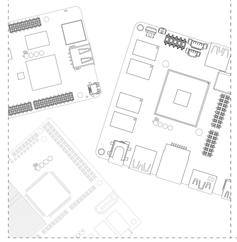
Example

We prepared an example of how we use a potentiometer to control the position of the servo:
File →Sketchbook →Grove_Servo



Tips

Grove – Servo has several mounting hardware options for different purposes: you can use them to drive a small fan, lift an object, or mimic a clock hand.



UDOO Grove kit demo project

To explore all the sensors and learn how to use them visit this link:
https://www.udoo.org/udoo-grove-kit/

You can also find project tutorials of of increasing complexity that involves more of the UDOO's onboard features such as connectivity, embedded sensors, graphic interface, based on different programming languages.

Infrared emitter

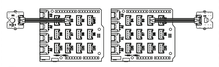
The Infrared Emitter is used to transmit infrared signals through an infrared LED

Infrared receiver

The Infrared Receiver is used to receive infrared signals and also used for remote control detection.

Example

In this simple example, the Grove - Infrared Emitter sends data while Grove - Infrared Receiver will receive them.

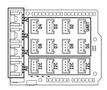


Tips

We can use the emitter not only to transmit data or commands, but also to emulate remotes to control your home appliance using an Arduino, The Infrared Emitter can transmit signals reliable up to 10 meters.
There is an IR detector which is used to get the infrared light emitted by the Infrared Emitter, The IR detector have a demodulator inside that looks for modulated IR at 38 KHz, The Infrared Receiver can receive signals well within 10 meters.

Base Shield

Base Shield is an interface between Arduino and Grove modules. There are 16 Grove sockets on the base shield, whichcan be divided into three different functional areas: digital ports (8), analog ports (4), and I2C ports (4).



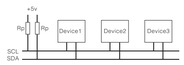
Base Shield

There are eight digital Grove prots. They are equivalent to digital pins 0 through 9 on the Arduino Uno. 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, AKA UART, on port 1. This is the Arduino' 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

On the lefthand side are four 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.



There is no limit to the amount of devices that can hang off of 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.

Resources
Udoo website: www.udoo.org
Seeed website: www.seeedstudio.com
Seeed wiki main page: www.seeedstudio.com/wiki/Main_Page

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文件名称	Grove Starter Kit 说明书
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