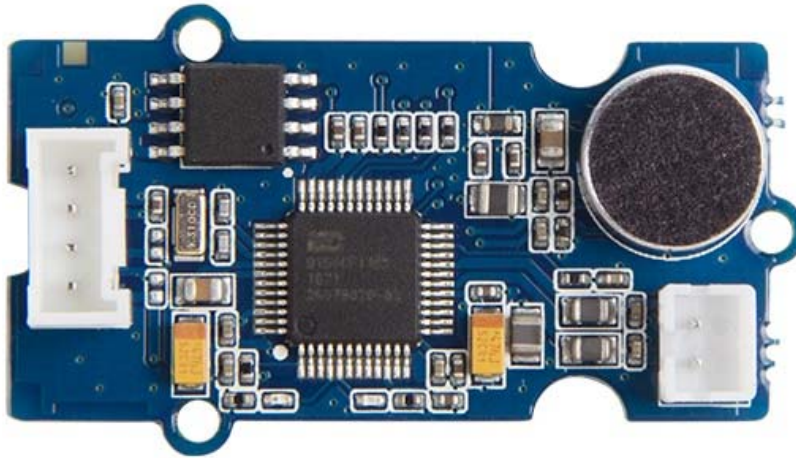


## Grove - Speech Recognizer



Use voice to interact with things around you can always be one of the most interesting things of IoT application, we want to make something more different and cooler. Recently we just launched the voice control solution “Respeaker” on Kickstarter and it becomes the blockbuster. However not everybody needs a Respeaker to build voice control project, sometimes people only need a simple solution, here we would like to introduce the first generation of grove speech recognizer to realize your dream of smart home easily and fast.

Grove speech recognizer is a designed for voice control application such as smart home, smart toy, voice control robot, anything you would like to control through voice, it worth a try. The board includes a Nuvoton ISD9160, a microphone, 1 SPI flash, 1 grove connector, 1 speaker connector and 1 led to reflect to your voice.

Nuvoton ISD9160 is (SoC) Chipcorder that based on Cortex™-M0, it provides strong and economic solution for voice control applications. ISD9160 is not the only amazing thing in this grove. Let's look at the microphone. Remember the uncomfortable moment when you have to speak directly and closely to the voice recognizer device to make sure it can hear you? It won't happen this time! The microphone on grove-speech recognizer is Omni-directional, which means that whether a user speaks into the microphone from the front, back, left or right side, the microphone will record the signals all with equal gain.

This speech recognizer can recognize 22 pieces of commands including 'start', 'stop', 'Play music' and so on. Every time it recognizes a command, it will return a value and then the loudspeaker that connected to it will repeat the command. This value can be used to control other devices like motor, music player. We have tested it for hours to make sure it possesses a high recognition rate and a very low false trigger.

Here are some notes that you must know before using it: Awaken Word: Hicell (Please pronounce it as one word) When it recognizes the awaken word, LED turn red, then you can say the command word, if it recognize the command word, LED will turn blue.

### Note

The firmware of the module was wrote by the third party vendor, it's not open source.

## Application Ideas

- Internet of Things
- Smart House
- Human Machine Interface
- Lighting Control
- Sensor Hub
- Robot




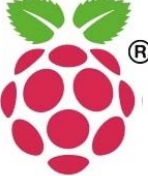

## Features

- Local Voice Recognition
- Very low rate of false triggering
- Speaker connector(JST2.0, speaker is not include)
- Built-in microphone
- 3.3V working voltage
- 22 recognition entry
- Default Baudrate: 9600

### Tip

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

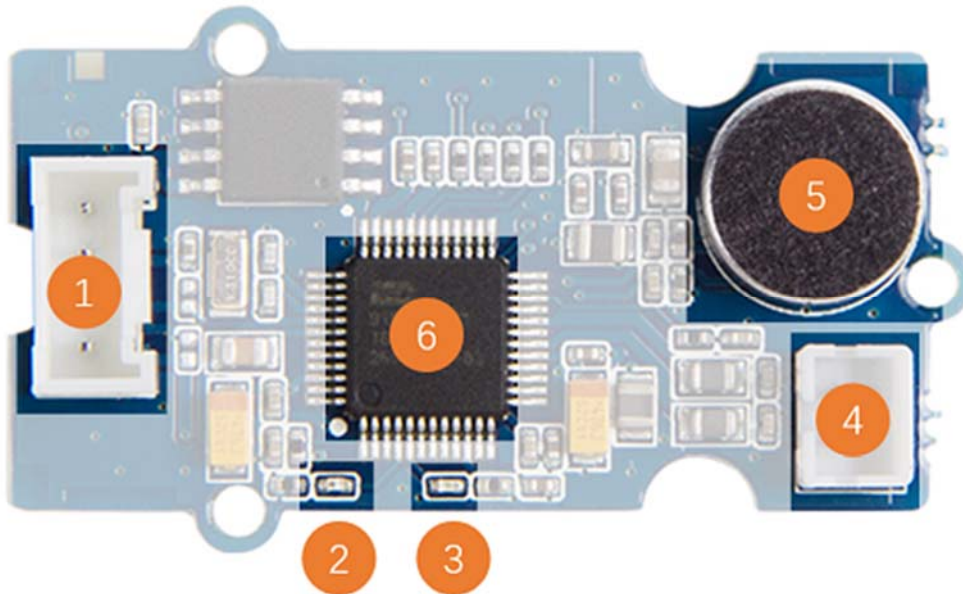
## Platform Support

Arduino	Wio	BeagleBone	Raspberry Pi	LinkIt
				

## Specification

Item	Min	Typ	Max	Condition
Operating Voltage	3V	3.3V	5V	25 °C
Operating Current	25mA	26.5mA	80mA@playing	VCC = 3.3V 25°C
Operating Current	25mA	26.5mA	130mA@playing	VCC = 5V 25°C
Operating Temperature	0°C	25°C	85°C	
Size		40*20mm		
Weigth		5g		
Flash		2Mbytes		
Microphone Sensitivity	-43dB	-40dB	-37dB	VCC = 5V 25°C
Microphone SNR	58dB			
Microphone Directivity		Omni-directional		
Speaker Power			1W	VCC = 5V 25°C
Processor core		Cortex-M0		
Processor Frequency		32.768MHz	50MHz	VCC = 5V 25°C

## Hardware Overview



1. Grove Connector
2. Red Led - lights when "Hicell" is recognized
3. Blue Led - lights when a command is recognized
4. Speaker Connector - You can connect a speaker to get the voice return
5. Microphone
6. ISD9160CFI – controller



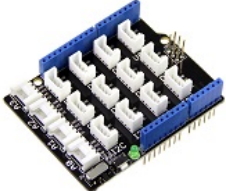
## Command Return

Command	Value
Turn on the light	1
Turn off the light	2
Play music	3
Pause	4
Next	5
Previous	6
Up	7

Command	Value
Down	8
Turn on the TV	9
Turn off the TV	10
Increase temperature	11
Decrease temperature	12
What's the time	13
Open the door	14
Close the door	15
Left	16
Right	17
Stop	18
Start	19
Mode 1	20
Mode 2	21
Go	22

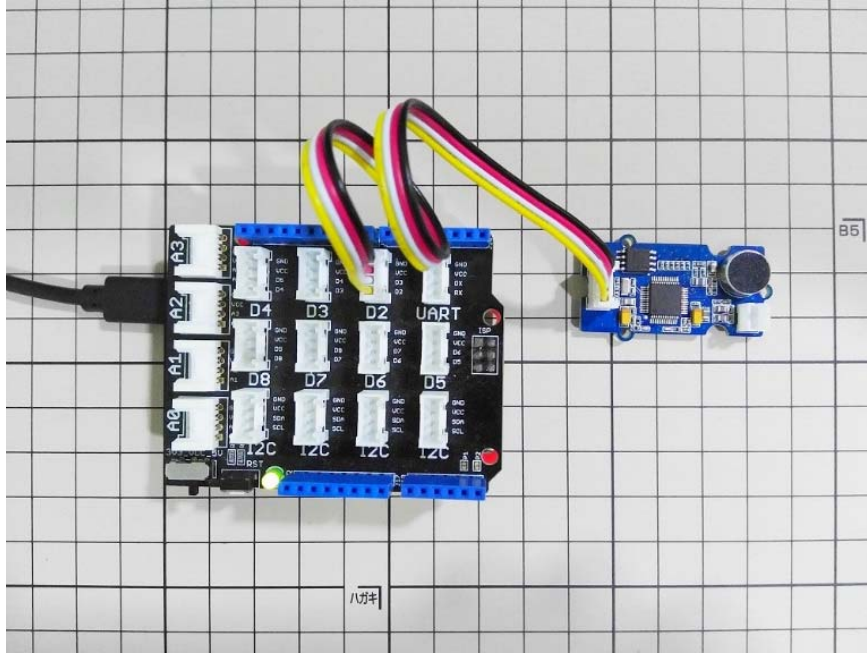
## Getting Started

Here we will show you how this Grove - Speech Recognizer works via a simple demo. First of all, you need to prepare the below stuffs:

Seeeduino V4	Grove - Speech Recognizer	Base Shield
		

## Hardware Connection

Thanks to the benefit of Grove series module, you don't need to make soldering or bread board, what you need to do is connect the modules to the right port of Base Shield. For this demo, we connect Grove - Speech Recognizer to D2.



## Software

Copy the below code and paste to your Arduino IDE, and upload to your Seeeduino V4. After upload the code to an Arduino, let open the Serial monitor.

```
1#include <SoftwareSerial.h>
2
3#define SOFTSERIAL_RX_PIN 2
4#define SOFTSERIAL_TX_PIN 3
5
6SoftwareSerial softSerial(SOFTSERIAL_RX_PIN,SOFTSERIAL_TX_PIN);
7
8const char *voiceBuffer[] =
9{
10     "Turn on the light",
11     "Turn off the light",
12     "Play music",
13     "Pause",
14     "Next",
15     "Previous",
16     "Up",
17     "Down",
18     "Turn on the TV",
19     "Turn off the TV",
20     "Increase temperature",
21     "Decrease temperature",
```

```

22   "What's the time",
23   "Open the door",
24   "Close the door",
25   "Left",
26   "Right",
27   "Stop",
28   "Start",
29   "Mode 1",
30   "Mode 2",
31   "Go",
32};
33
34void setup()
35{
36   Serial.begin(9600);
37   softSerial.begin(9600);
38   softSerial.listen();
39}
40
41void loop()
42{
43   char cmd;
44
45   if(softSerial.available())
46   {
47       cmd = softSerial.read();
48       Serial.println(voiceBuffer[cmd - 1]);
49   }
50}

```

## Awake the module

The module will wake up when there's command **Hicell**, then the red led will on. Try again when the red led is not on.

### Note

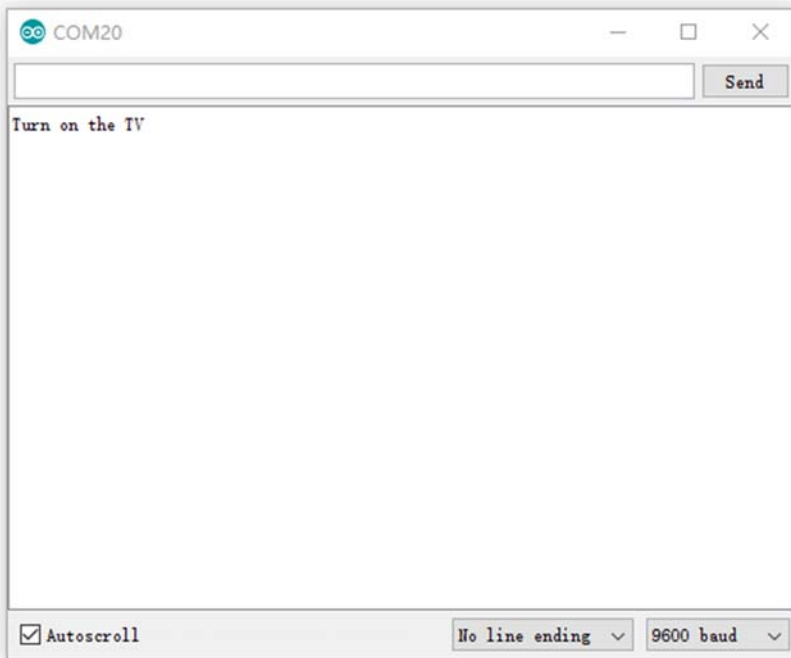
The red led will last 5 seconds. If the red led turn off before the command was recognized, you should **Hicell** again.

## Command

After the module is awake, you can speak out the command. Such as

```
"Turn on the TV"
```

If the blue led is light(last about 1s), that means the command was recognized correctly. Take a look at your Serial monitor, the command was printed on it.



## Resources

- [Schematics in Eagle](#)
- [Schematics in PDF](#)

## Tech Support

Please submit any technical issue into our [forum](#) or drop mail to [techsupport@seeed.cc](mailto:techsupport@seeed.cc).