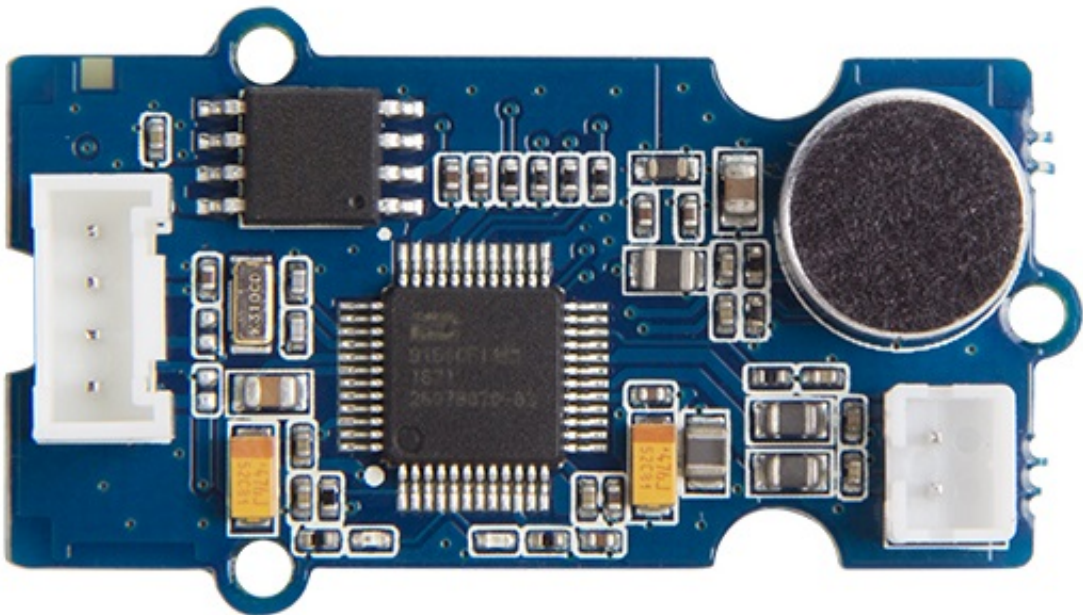# Grove - Speech Recognizer

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

- 3.⅗V working voltage

- 22 recognition entry

- Default Baudrate: 9600

> 🔥 **Tip**
> More details about Grove modules please refer to Grove System [https://wiki.seeedstudio.com/Grove_System/]

Platform Support

Arduino	Wio	BeagleBone	Raspberry Pi	LinkIt

Specification

Item	Min	Typ	Max	Condition
Operating Voltage	3V	3.3V	5V	25 ℃
Operating Current	25mA	26.5mA	80mA@playing	VCC = 3.3V 25℃
Operating Current	25mA	26.5mA	130mA@playing	VCC = 5V 25℃
Operating Temperature	0℃	25℃	85℃	
Size		40*20mm		
Weigth		5g		
Flash Item	Min	2Mbytes Typ	Max	Condition

Microphone Sensitivity	-43dB	-40dB	-37dB	VCC = 5V 25℃
Microphone SNR	58dB			
Microphone Directivity		Omni-directional		
Speaker Power			1W	VCC = 5V 25℃
Processor core		Cortex-M0		
Processor Frequency		32.768MHz	50MHz	VCC = 5V 25℃

Hardware Overview
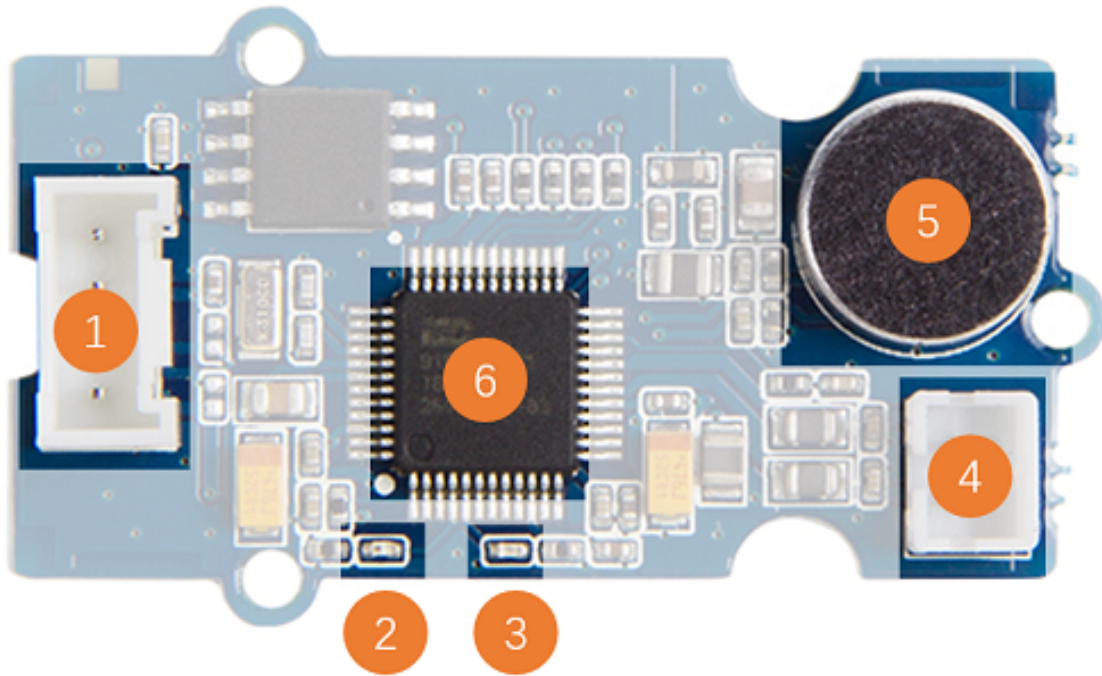
1. Grove Connector

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
Command	Value
Play music	3

Pause	4
Next	5
Previous	6
Up	7
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

Command	Value

| 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
Get ONE Now [https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html]	Get ONE Now [https://www.seeedstudio.com/Grov Light-Sensor%28P%29-p-1253.html]

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.
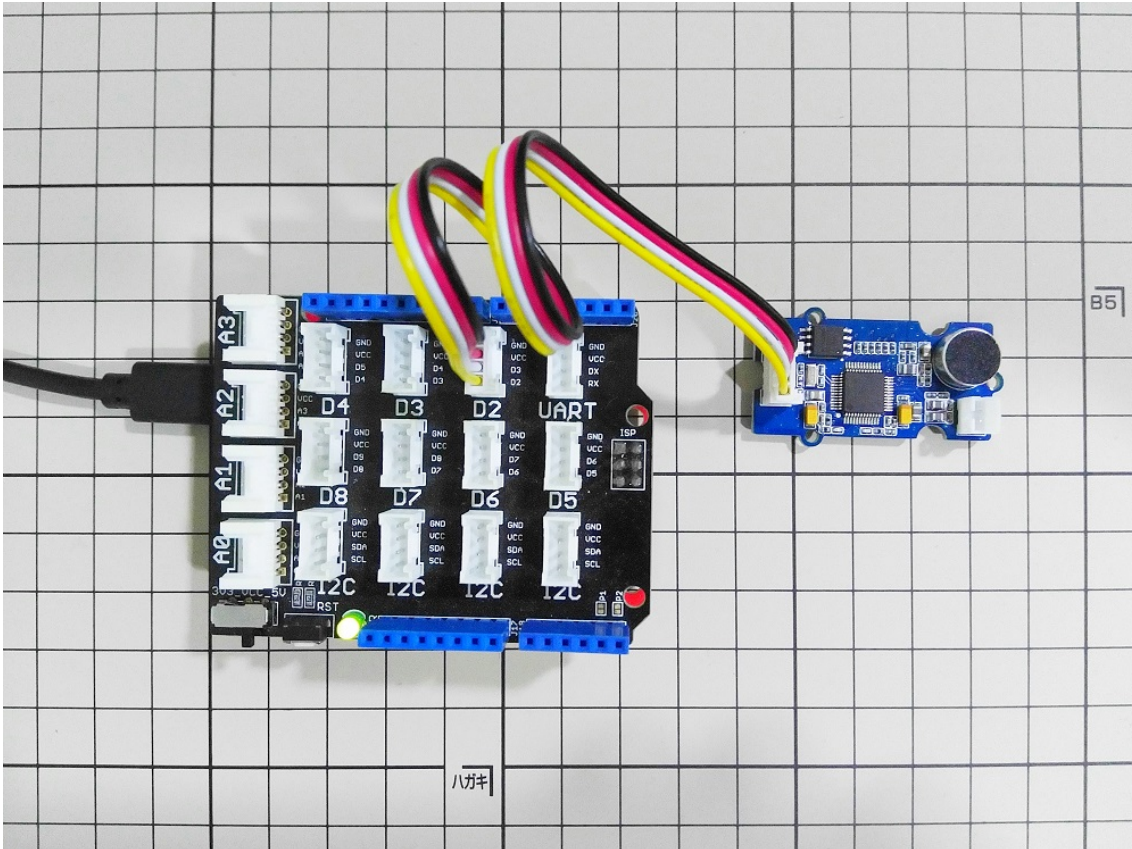
Software

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
6   SoftwareSerial softSerial(SOFTSERIAL_RX_PIN,SOFTSERIAL_T
7
8   const 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
34    void setup()
35    {
36        Serial.begin(9600);
37        softSerial.begin(9600);
38        softSerial.listen();
39    }
40
41    void 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.
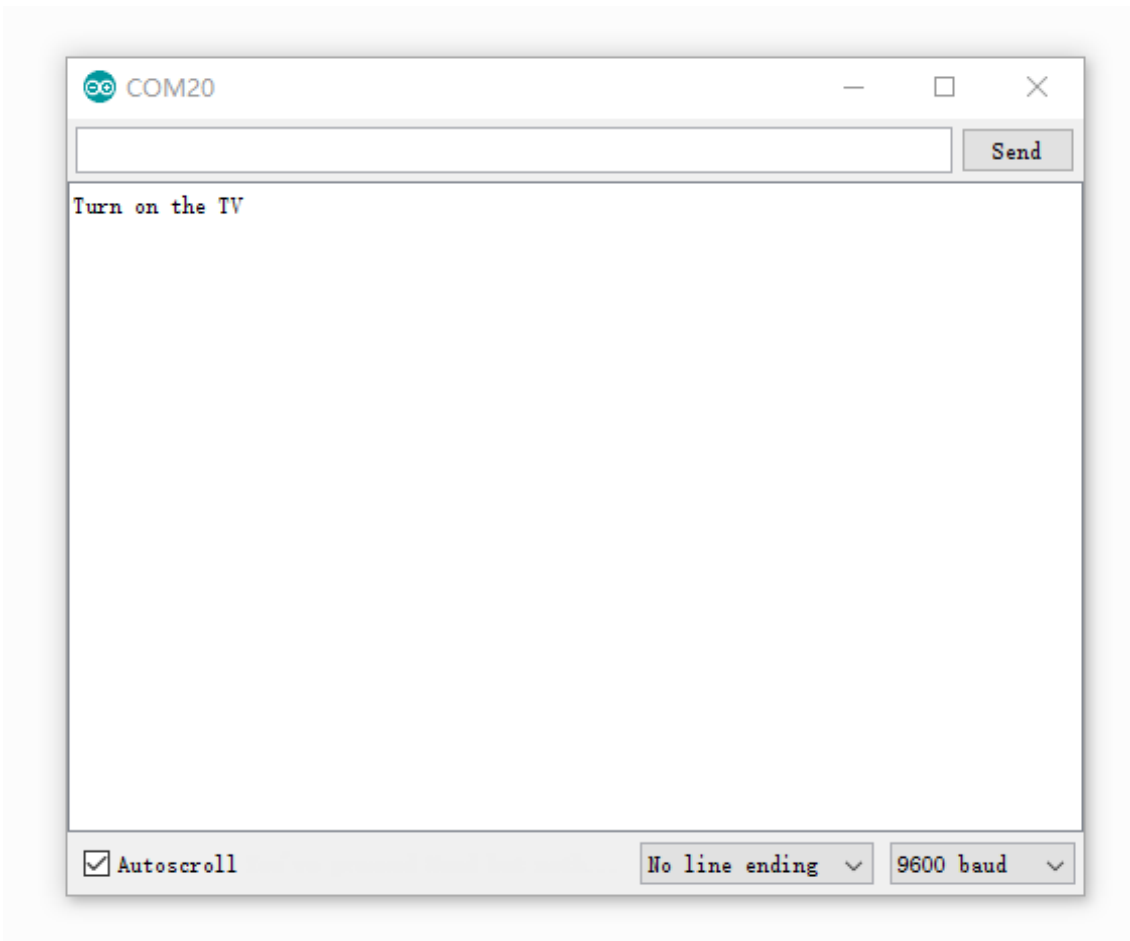
Command

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.

Play with Codecraft

Hardware

Step 1. Connect a Grove - Speech Recognizer to port D2 of a Base Shield.

Step 2. Plug the Base Shield to your Seeeduino/Arduino.

**Step 3.** Link Seeeduino/Arduino to your PC via an USB cable.

Software

Step 1. Open Codecraft [https://ide.chmakered.com/], add Arduino support, and drag a main procedure to working area.

> ✎ **Note**
>
> If this is your first time using Codecraft, see also Guide for Codecraft using Arduino
> [https://wiki.seeedstudio.com/Guide_for_Codecraft_using_Arduino/].

Step 2. Drag blocks as picture below or open the cdc file which can be downloaded at the end of this page.
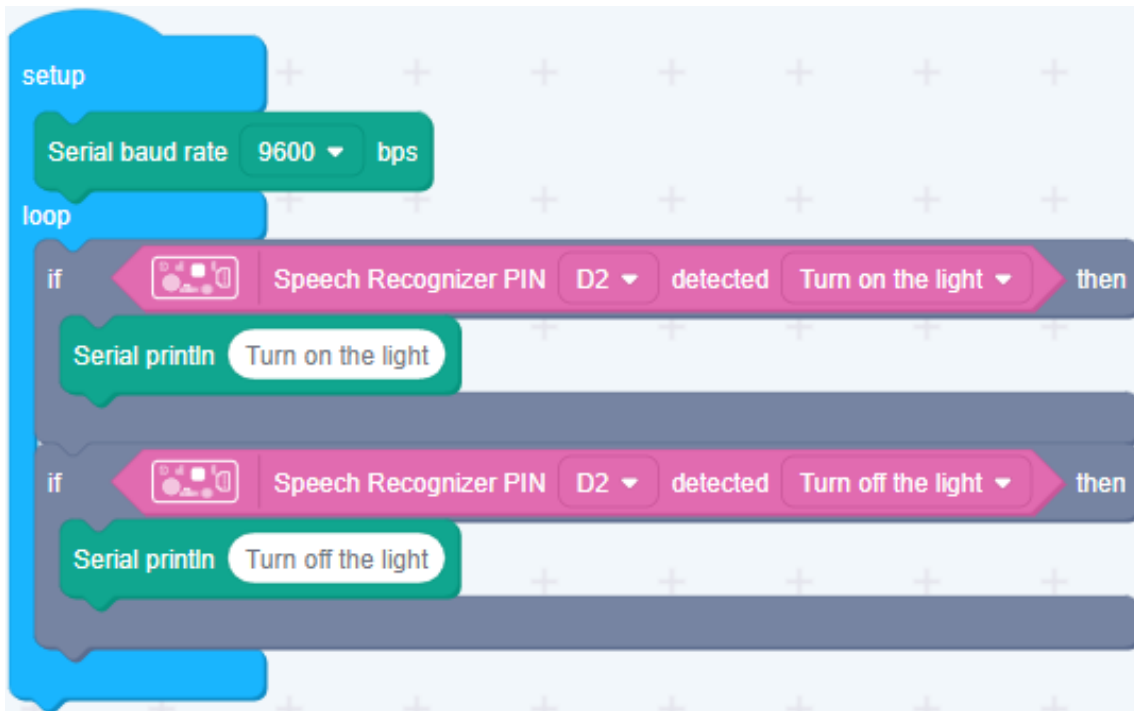
Upload the program to your Arduino/Seeeduino.

> ✓ **Success**
>
> When the code finishes uploaded, say Hicell to wake it up, and you can say other command when the red LED goes on.

Schematic Online Viewer

Resources

- Schematics in Eagle
  [https://files.seeedstudio.com/wiki/Grove_Speech_Recognizer/
  res/eagle.zip]

- Schematics in PDF
  [https://files.seeedstudio.com/wiki/Grove_Speech_Recognizer/
  res/Grove%20-%20Speech%20Recognizer%20v1.0.pdf]

- Codecraft CDC File
  [https://files.seeedstudio.com/wiki/Grove_Speech_Recognizer/
  res/Grove_Speech_Recognizer_CDC_File.zip]

Tech Support

Please submit any technical issue into our forum
[https://forum.seeedstudio.com/].

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