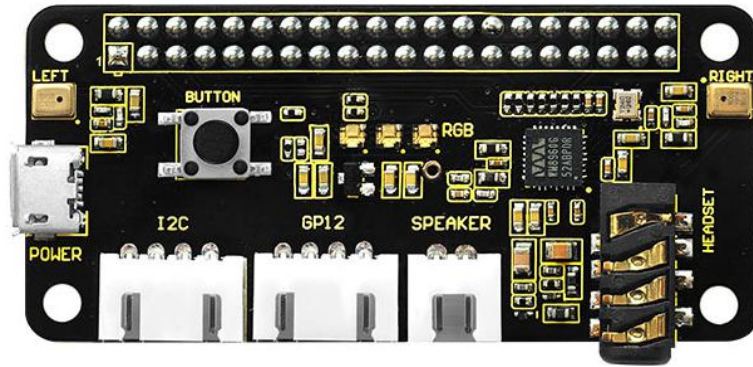


keystudio ReSpeaker 2-Mic Pi HAT V1.0



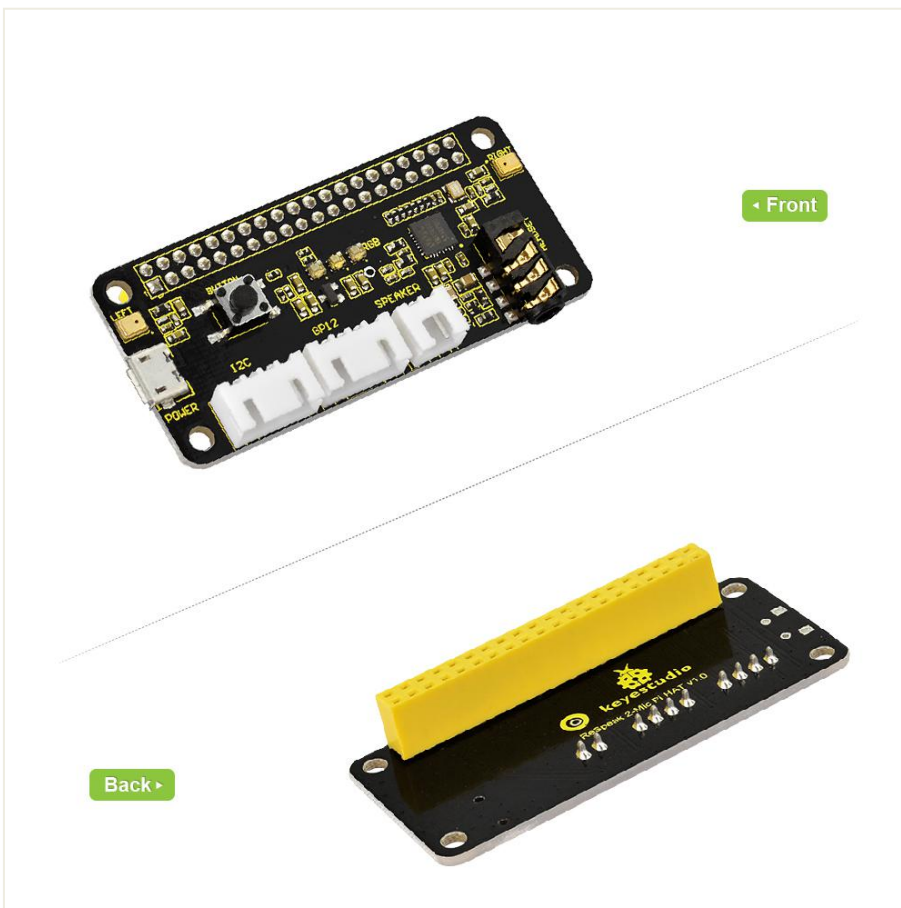
Overview:

This is keystudio ReSpeaker 2-Mic Pi HAT V1.0 shield designed for AI and voice applications. It is a low power stereo Codec based on the WM8960.

There are two microphones on the shield for sound collection, three APA102 RGB LEDs, one user button and two Grove connectors for application extension.

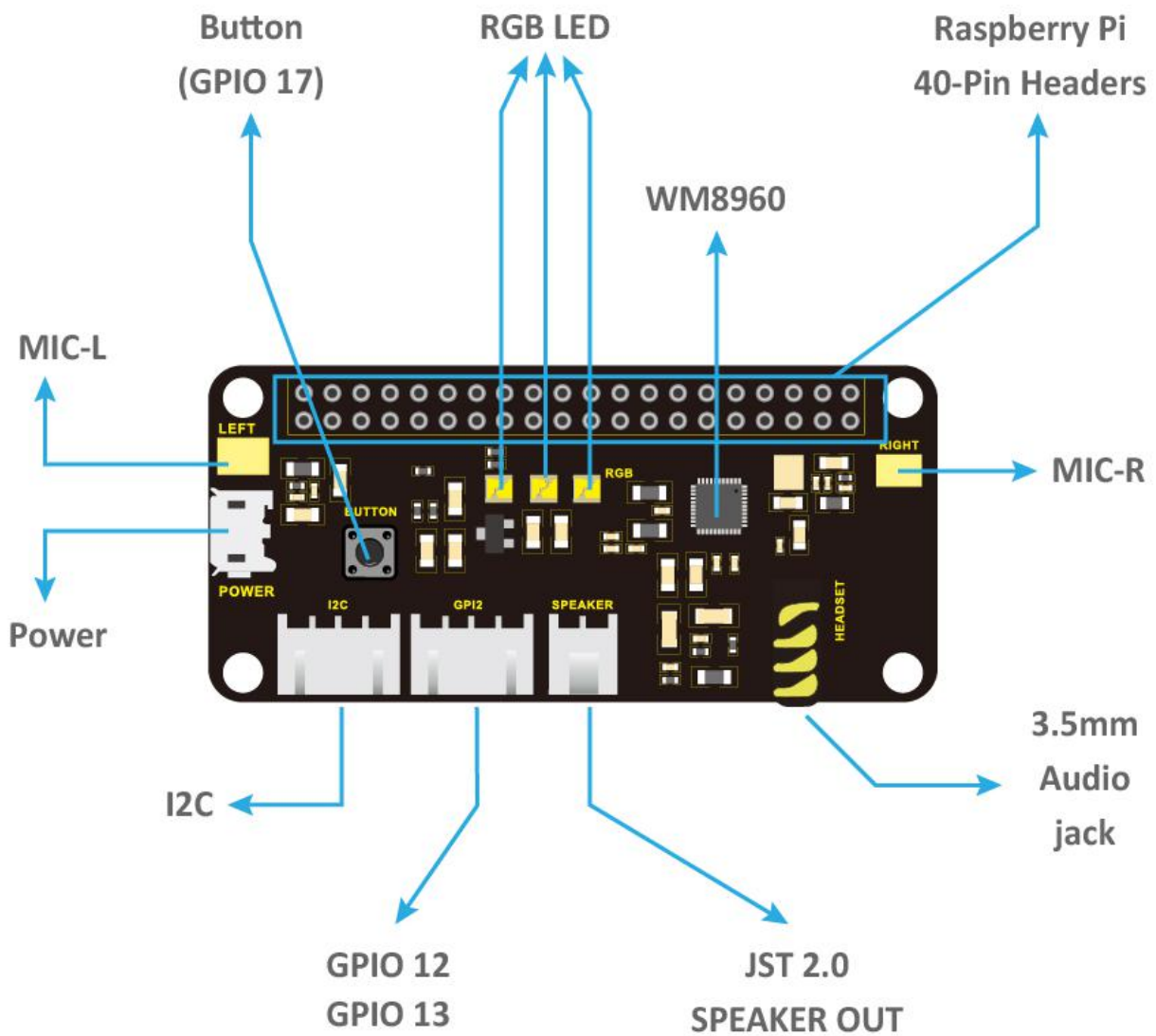
In addition, a 3.5mm audio jack or JST 2.0 speaker output can be used for audio output.

With this shield, you can build a more powerful and flexible voice product that integrates Amazon Amazona voice services, Google Assistant, and more.



Features:

- 1) Support the Raspberry Pi Zero and Zero W, Raspberry Pi B+, Raspberry Pi 2B and 3B
- 2) Two microphones (Mic L and Mic R)
- 3) Two Grove connectors
- 4) One User-defined button
- 5) 3.5mm audio interface
- 6) JST2.0 audio output interface



Interface Explanations:

- 1) **Button:** default connected to GPIO17
- 2) **Mic L** and **Mic R:** microphone (labeled LEFT and RIGHT)
- 3) **RGB LED:** three APA102 RGB LEDs, connected to the SPI interface of Raspberry Pi.
- 4) **WM8960:** Low Power Stereo Codec
- 5) **Raspberry Pi 40 pin header:** support the Raspberry Pi Zero, Raspberry Pi 1 B+, Raspberry Pi 2B and 3B.
- 6) **POWER:** Micro USB port that powers the ReSpeaker 2-Mic Pi HAT. Power the circuit board to supply enough current when use the speaker.
- 7) **I2C:** Grove I2C port, connected to I2C-1
- 8) **GPIO12:** Grove digital port, connected to GPIO12 and GPIO13
- 9) **JST 2.0 SPEAKER OUT:** connecting speakers, JST 2.0 connector
- 10) **3.5mm audio jack:** connecting headphones or speakers with 3.5mm audio plug

Test Method:

1. Firstly install the 2018-06-27-raspbian-stretch-lite to the RPI control board. You can download the image system from the link: <https://www.raspberrypi.org/downloads/raspbian/>

The screenshot shows the Raspberry Pi download page with two main sections:

- RASPBIAN STRETCH WITH DESKTOP:** Image with desktop based on Debian Stretch. Version: June 2018. Release date: 2018-06-27. Kernel version: 4.14. Release notes: [Link](#). Download options: [Download Torrent](#) and [Download ZIP](#).
- RASPBIAN STRETCH LITE:** Minimal image based on Debian Stretch. Version: June 2018. Release date: 2018-06-27. Kernel version: 4.14. Release notes: [Link](#). Download options: [Download Torrent](#) and [Download ZIP](#).

SHA-256 hashes are provided for both images:

- For RASPBIAN STRETCH WITH DESKTOP: 8636ab9fdd8f58a8ec7dde33b83747696d31711d17ef68267dbbcd6cfb968c24
- For RASPBIAN STRETCH LITE: 3271b244734286d99aeba8fa043b6634cad488d211583814a2018fc14fdca313

Refer to the image installation from the link:

http://wiki.keyestudio.com/index.php/KS0221_keyestudio_Ultimate_Starter_Kit_for_Raspberry_Pi

2. Log onto the image file, followed by installing the driver as below.

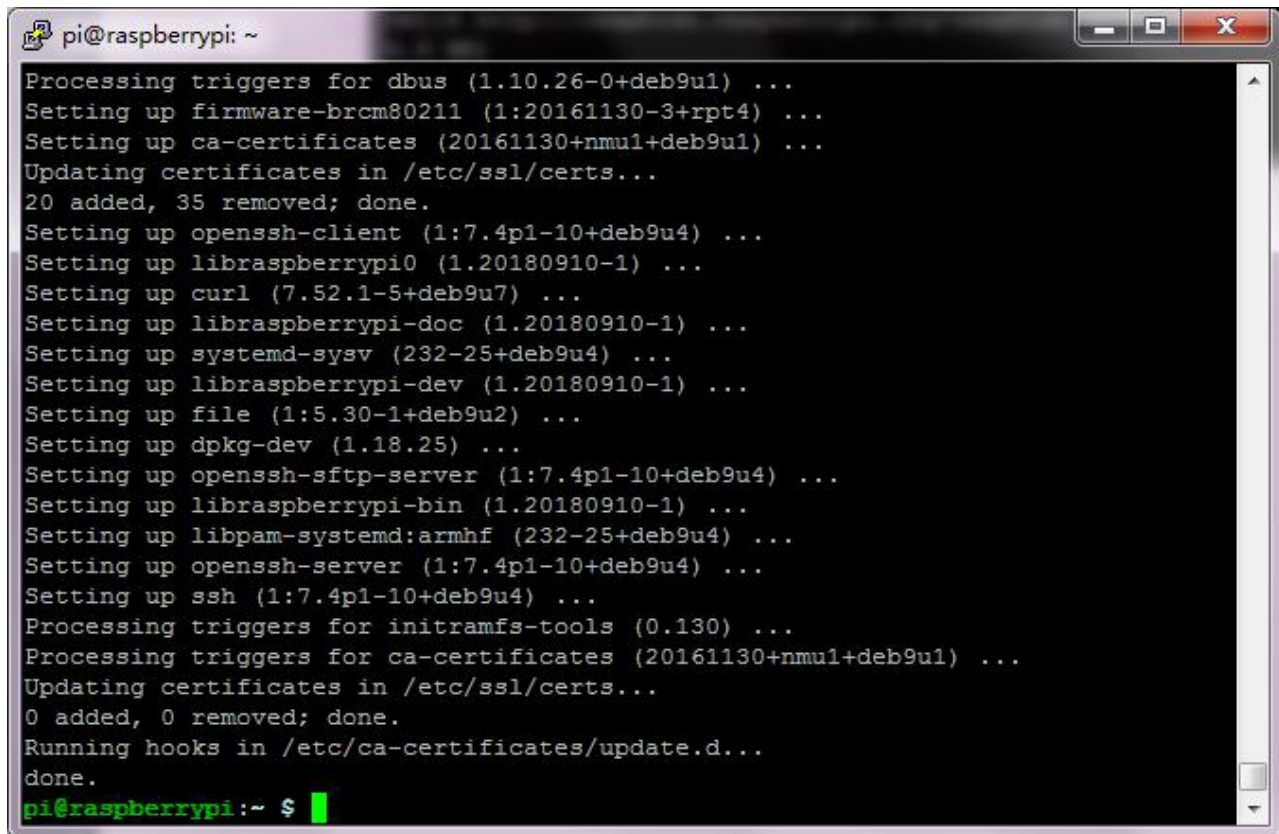
sudo apt-get update

```
pi@raspberrypi: ~  
login as: pi  
pi@192.168.1.131's password:  
Linux raspberrypi 4.14.50-v7+ #1122 SMP Tue Jun 19 12:26:26 BST 2018 armv7l  
  
The programs included with the Debian GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.  
  
SSH is enabled and the default password for the 'pi' user has not been changed.  
This is a security risk - please login as the 'pi' user and type 'passwd' to set  
a new password.  
  
pi@raspberrypi:~ $ sudo apt-get update  
Get:1 http://archive.raspberrypi.org/debian stretch InRelease [25.3 kB]  
Get:2 http://raspbian.raspberrypi.org/raspbian stretch InRelease [15.0 kB]  
Get:3 http://raspbian.raspberrypi.org/raspbian stretch/main armhf Packages [11.7  
MB]  
Get:4 http://archive.raspberrypi.org/debian stretch/main armhf Packages [175 kB]  
Get:5 http://archive.raspberrypi.org/debian stretch/ui armhf Packages [34.3 kB]  
Get:6 http://raspbian.raspberrypi.org/raspbian stretch/contrib armhf Packages [5  
6.9 kB]  
Fetched 12.0 MB in 44s (271 kB/s)  
Reading package lists... Done  
pi@raspberrypi:~ $
```

sudo apt-get upgrade

```
pi@raspberrypi: ~  
Reading package lists... Done  
pi@raspberrypi:~ $ sudo apt-get upgrade  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Calculating upgrade... Done  
The following packages will be upgraded:  
  ca-certificates curl dhcpcd5 dpkg dpkg-dev fake-hwclock file  
  firmware-atheros firmware-brcm80211 firmware-libertas firmware-misc-nonfree  
  firmware-realtek libcurl3 libcurl3-gnutls libdpkg-perl libmagic-mgc  
  libmagic1 libpam-systemd libraspberrypi-bin libraspberrypi-dev  
  libraspberrypi-doc libraspberrypi0 libsystemd0 libudev1 libwbclient0  
  openssh-client openssh-server openssh-sftp-server patch pi-bluetooth  
  raspberrypi-bootloader raspberrypi-kernel samba-common shared-mime-info ssh  
  systemd systemd-sysv tzdata udev  
39 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.  
Need to get 38.0 MB/95.1 MB of archives.  
After this operation, 834 kB of additional disk space will be used.  
Do you want to continue? [Y/n] Y
```

Enter Y and press the ENTER key to continue.

A terminal window titled 'pi@raspberrypi: ~' showing the output of a package manager. The text is as follows:

```
pi@raspberrypi: ~
Processing triggers for dbus (1.10.26-0+deb9u1) ...
Setting up firmware-brcm80211 (1:20161130-3+rpt4) ...
Setting up ca-certificates (20161130+nmu1+deb9u1) ...
Updating certificates in /etc/ssl/certs...
20 added, 35 removed; done.
Setting up openssh-client (1:7.4p1-10+deb9u4) ...
Setting up libraspberrypi0 (1.20180910-1) ...
Setting up curl (7.52.1-5+deb9u7) ...
Setting up libraspberrypi-doc (1.20180910-1) ...
Setting up systemd-sysv (232-25+deb9u4) ...
Setting up libraspberrypi-dev (1.20180910-1) ...
Setting up file (1:5.30-1+deb9u2) ...
Setting up dpkg-dev (1.18.25) ...
Setting up openssh-sftp-server (1:7.4p1-10+deb9u4) ...
Setting up libraspberrypi-bin (1.20180910-1) ...
Setting up libpam-systemd:armhf (232-25+deb9u4) ...
Setting up openssh-server (1:7.4p1-10+deb9u4) ...
Setting up ssh (1:7.4p1-10+deb9u4) ...
Processing triggers for initramfs-tools (0.130) ...
Processing triggers for ca-certificates (20161130+nmu1+deb9u1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
pi@raspberrypi:~ $
```

Enter the website <https://github.com/respeaker/seeed-voicecard> to download the zipped package file.

Join GitHub today
GitHub is home to over 28 million developers working together to host and review code, manage projects, and build software together.

2 Mic Hat, 4 Mic Array, 6-Mic Circular Array Kit, and 4-Mic Linear Array Kit for Raspberry Pi

137 commits 5 branches 4 releases 8 contributors GPL-3.0

Branch: master New pull request Find file **Clone or download**

Commit	Description	Time
xiongyihui update 6 mic gain controls		Latest commit bfe6978 on 6 Aug
ac108_plugin	remove debug message, increase ac108 buf size	a year ago
pulseaudio	use sound card id	2 months ago
tools	Add: Doc & tools about coherence	6 months ago

Then put the package downloaded into the RPI system using the WinSCP software.

Local Mark Files Commands Session Options Remote Help

pi@192.168.1.154 New Session

Name	Size	Type	Changed	Rights	Owner
..		Parent directory	2018/9/19 14:21:19		
2018-06-27-raspbian-stretch-lite		文件夹	2018/9/19 13:19:48		
BXY		文件夹	2018/8/13 15:43:58		
LED		文件夹	2018/9/17 14:10:42		
PCB		文件夹	2018/9/14 15:08:24		
putty绿色免安装		文件夹	2017/12/21 13:28:23		
raspberrypi教程		文件夹	2018/7/25 13:16:59		
S4A_ARDUINO		文件夹	2018/6/11 15:48:10		
其他		文件夹	2018/9/18 14:58:03		
树莓派学习		文件夹	2018/5/24 15:48:00		
调试助手		文件夹	2017/10/31 14:52:44		
新产品资料		文件夹	2018/9/19 9:04:48		
新建文件夹		文件夹	2018/9/18 11:45:03		
资料		文件夹	2018/7/20 8:14:45		
1223.txt	0 KB	TXT 文件	2018/9/17 14:35:02		
2018年新品进度跟踪表.xlsx	3,681 KB	XLSX 工作表	2018/8/3 17:17:02		
BXY_V1.0.6.6.exe	13,931 ...	应用程序	2018/5/22 15:18:26		
CorelDRAW X4 SP2.lnk	2 KB	快捷方式	2016/2/29 10:36:59		
DXP.lnk	1 KB	快捷方式	2017/9/23 11:26:14		
ebay产品对比调查.xls	3,008 KB	XLS 工作表	2018/8/1 15:56:33		
Google Chrome.lnk	3 KB	快捷方式	2018/9/19 14:14:48		
INTERNET EXPLORER.LNK	2 KB	快捷方式	2016/9/20 15:15:10		
KS (2).lnk	2 KB	快捷方式	2018/8/20 15:10:51		
KS.lnk	1 KB	快捷方式	2017/2/16 11:00:30		
KY0159 E18-D80NK资料.doc	269 KB	DOC 文档	2018/9/17 15:39:32		
putty_V0.63.0.0.43510830.exe	484 KB	应用程序	2015/7/30 11:00:50		
QQ影音.lnk	2 KB	快捷方式	2015/6/2 16:26:05		
Repetier-Host.lnk	2 KB	快捷方式	2017/3/13 15:42:08		
seed-voicecard-master.zip	781 KB	WinRAR ZIP 压缩...	2018/9/19 14:03:10	rw-r--r--	pi

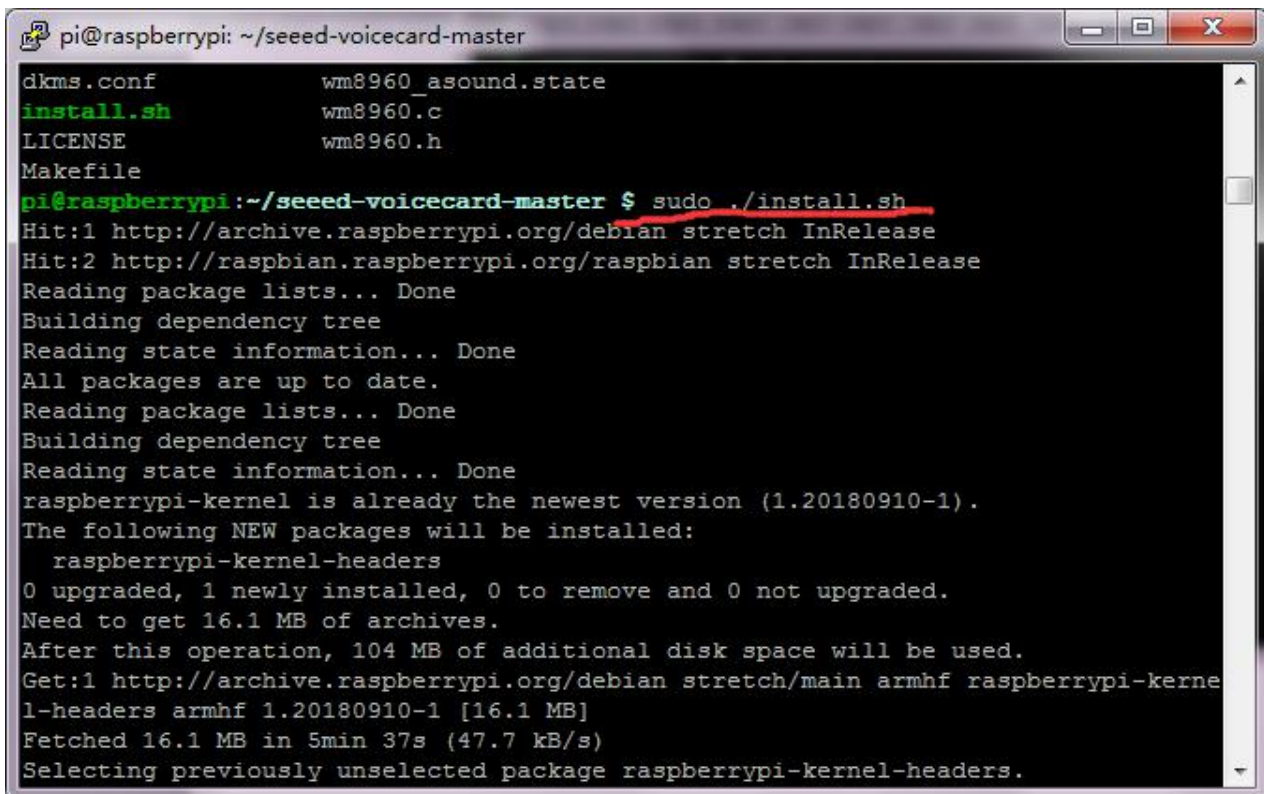
Enter the unzip seed-voicecard-master.zip to unzip the package

```
pi@raspberrypi: ~  
pi@raspberrypi:~ $ ls  
seed-voicecard-master.zip  
pi@raspberrypi:~ $ unzip seed-voicecard-master.zip  
Archive:  seed-voicecard-master.zip  
bfe6978ef4be83b8b394bc6b0fdf6c0c1a50a75a  
  creating:  seed-voicecard-master/  
  inflating: seed-voicecard-master/LICENSE  
  inflating: seed-voicecard-master/Makefile  
  inflating: seed-voicecard-master/README.md  
  inflating: seed-voicecard-master/ac101.c  
  inflating: seed-voicecard-master/ac101_regs.h  
  inflating: seed-voicecard-master/ac108.c  
  inflating: seed-voicecard-master/ac108.h  
  inflating: seed-voicecard-master/ac108_6mic.state  
  inflating: seed-voicecard-master/ac108_asound.state  
  creating:  seed-voicecard-master/ac108_plugin/  
  inflating: seed-voicecard-master/ac108_plugin/Makefile  
  inflating: seed-voicecard-master/ac108_plugin/README.md  
  inflating: seed-voicecard-master/ac108_plugin/ac108_help.c  
  inflating: seed-voicecard-master/ac108_plugin/ac108_help.h  
  inflating: seed-voicecard-master/ac108_plugin/libasound_module_pcm_ac108.so  
  inflating: seed-voicecard-master/ac108_plugin/pcm_ac108.c  
  inflating: seed-voicecard-master/ac10x.h  
  inflating: seed-voicecard-master/asound_2mic.conf
```

Then enter the cd seed-voicecard-master into the folder

```
pi@raspberrypi: ~/seed-voicecard-master  
  inflating: seed-voicecard-master/wm8960.h  
  inflating: seed-voicecard-master/wm8960_asound.state  
pi@raspberrypi:~ $ ls  
seed-voicecard-master  seed-voicecard-master.zip  
pi@raspberrypi:~ $ cd seed-voicecard-master/  
pi@raspberrypi:~/seed-voicecard-master $ ls  
ac101.c          pulseaudio  
ac101_regs.h    README.md  
ac108_6mic.state  seed-2mic-voicecard.dtbo  
ac108_asound.state  seed-2mic-voicecard-overlay.dts  
ac108.c          seed-4mic-voicecard.dtbo  
ac108.h          seed-4mic-voicecard-overlay.dts  
ac108_plugin     seed-8mic-voicecard.dtbo  
ac10x.h          seed-8mic-voicecard-overlay.dts  
asound_2mic.conf  seed-voicecard  
asound_4mic.conf  seed-voicecard.c  
asound_6mic.conf  seed-voicecard.service  
builddtbo.sh     tools  
default.pa        uninstall.sh  
dkms.conf         wm8960_asound.state  
install.sh        wm8960.c  
LICENSE           wm8960.h  
Makefile  
pi@raspberrypi:~/seed-voicecard-master $
```

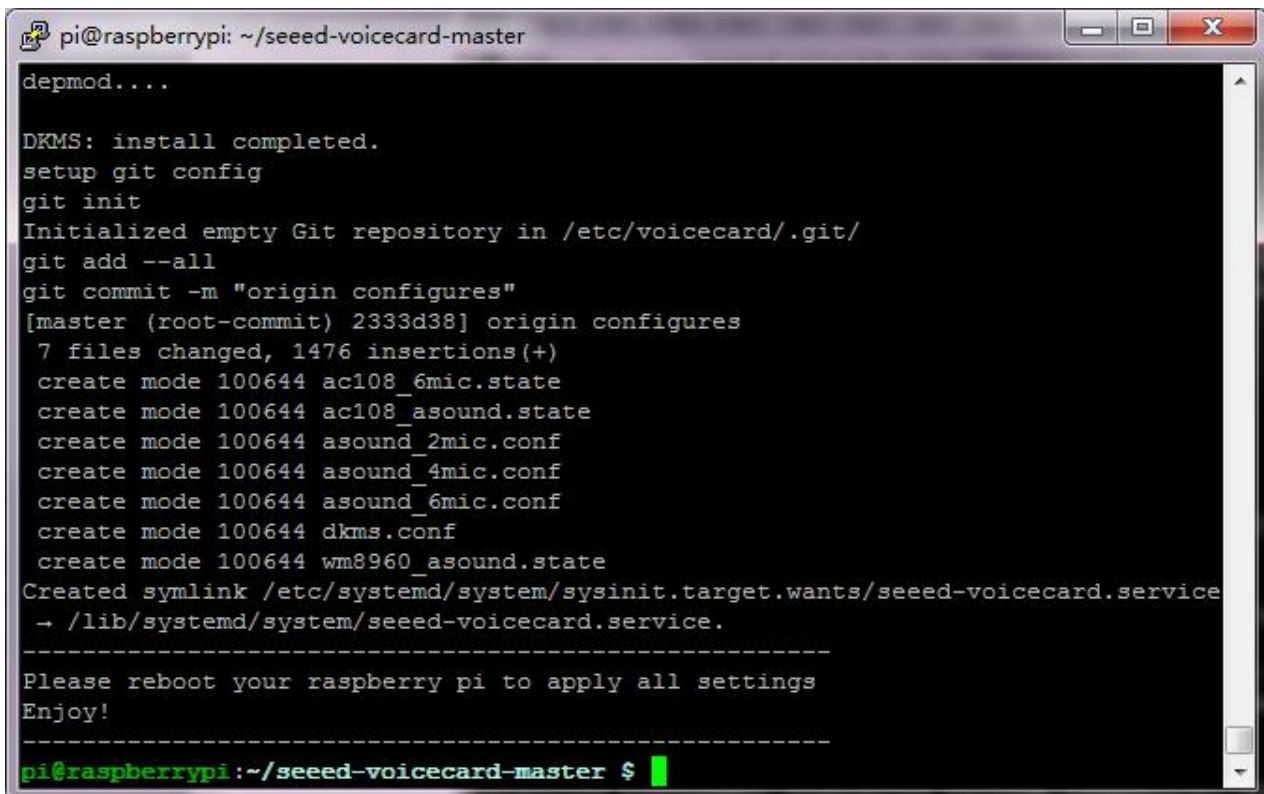
Enter the `sudo ./install.sh` to start to install the file.



```
pi@raspberrypi: ~/seed-voicecard-master
dkms.conf          wm8960_asound.state
install.sh         wm8960.c
LICENSE           wm8960.h
Makefile

pi@raspberrypi:~/seed-voicecard-master $ sudo ./install.sh
Hit:1 http://archive.raspberrypi.org/debian stretch InRelease
Hit:2 http://raspbian.raspberrypi.org/raspbian stretch InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
Reading package lists... Done
Building dependency tree
Reading state information... Done
raspberrypi-kernel is already the newest version (1.20180910-1).
The following NEW packages will be installed:
  raspberrypi-kernel-headers
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 16.1 MB of archives.
After this operation, 104 MB of additional disk space will be used.
Get:1 http://archive.raspberrypi.org/debian stretch/main armhf raspberrypi-kernel-headers armhf 1.20180910-1 [16.1 MB]
Fetched 16.1 MB in 5min 37s (47.7 kB/s)
Selecting previously unselected package raspberrypi-kernel-headers.
```

Installation finished.



```
pi@raspberrypi: ~/seed-voicecard-master
depmod...

DKMS: install completed.
setup git config
git init
Initialized empty Git repository in /etc/voicecard/.git/
git add --all
git commit -m "origin configures"
[master (root-commit) 2333d38] origin configures
 7 files changed, 1476 insertions(+)
 create mode 100644 ac108_6mic.state
 create mode 100644 ac108_asound.state
 create mode 100644 asound_2mic.conf
 create mode 100644 asound_4mic.conf
 create mode 100644 asound_6mic.conf
 create mode 100644 dkms.conf
 create mode 100644 wm8960_asound.state
Created symlink /etc/systemd/system/sysinit.target.wants/seed-voicecard.service
→ /lib/systemd/system/seed-voicecard.service.
-----
Please reboot your raspberry pi to apply all settings
Enjoy!
-----
pi@raspberrypi:~/seed-voicecard-master $ █
```


Restart the software **putty**, go into the **seed-voicecard-master** folder, and enter **aplay -l**, check whether the voicecard name matches with the source code **seed-voicecard**.

```

pi@raspberrypi: ~/seed-voicecard-master
Last login: Wed Sep 19 07:13:12 2018 from 192.168.1.103

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $ ls
seed-voicecard-master  seed-voicecard-master.zip
pi@raspberrypi:~ $ cd seed-voicecard-master/
pi@raspberrypi:~/seed-voicecard-master $ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 7/7
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 ALSA [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
pi@raspberrypi:~/seed-voicecard-master $

```

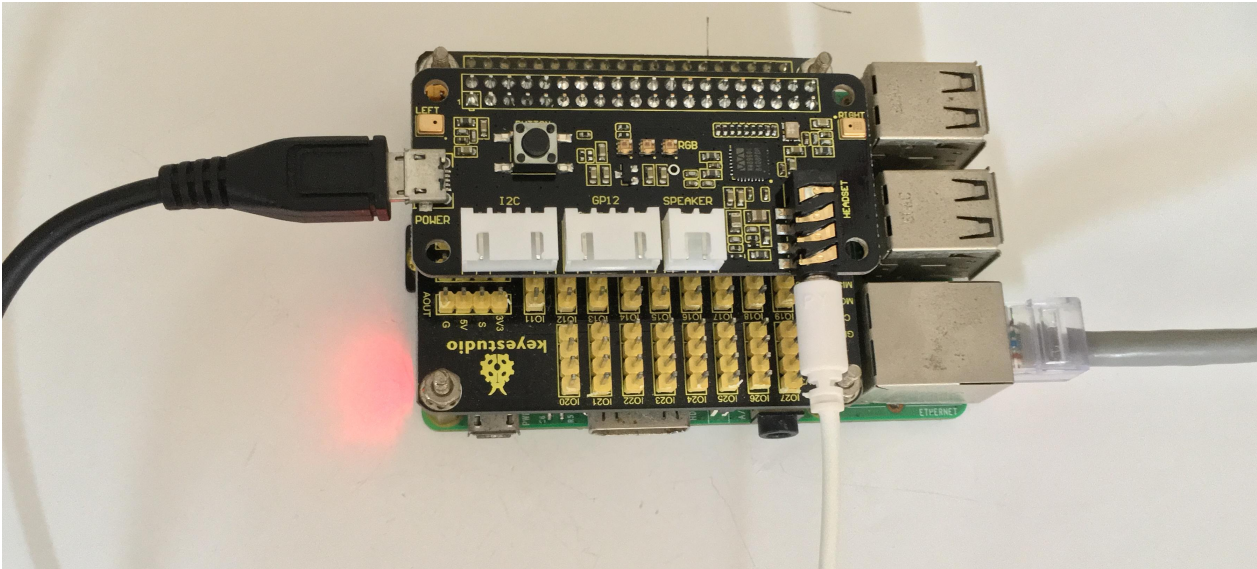
Put on the earphone (note: the sound is a little bit loud), then enter the **arecord -f cd -Dhw:1 | aplay -Dhw:1** If lightly hit the two microphones on the board, there should be sound. Otherwise it is poor contact.

```

pi@raspberrypi: ~/seed-voicecard-master
seed-voicecard-master  seed-voicecard-master.zip
pi@raspberrypi:~ $ cd seed-voicecard-master/
pi@raspberrypi:~/seed-voicecard-master $ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 7/7
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 ALSA [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 1: seed2micvoicec [seed-2mic-voicecard], device 0: bcm2835-i2s-wm8960-hifi
i wm8960-hifi-0 []
  Subdevices: 1/1
    Subdevice #0: subdevice #0
pi@raspberrypi:~/seed-voicecard-master $ arecord -f cd -Dhw:1 | aplay -Dhw:1
Recording WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
Playing WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo

```

Hookup Guide:



Finally press the "Ctrl+C" to end the mic test.

Now next we start to test the 3 LEDs on the shield.

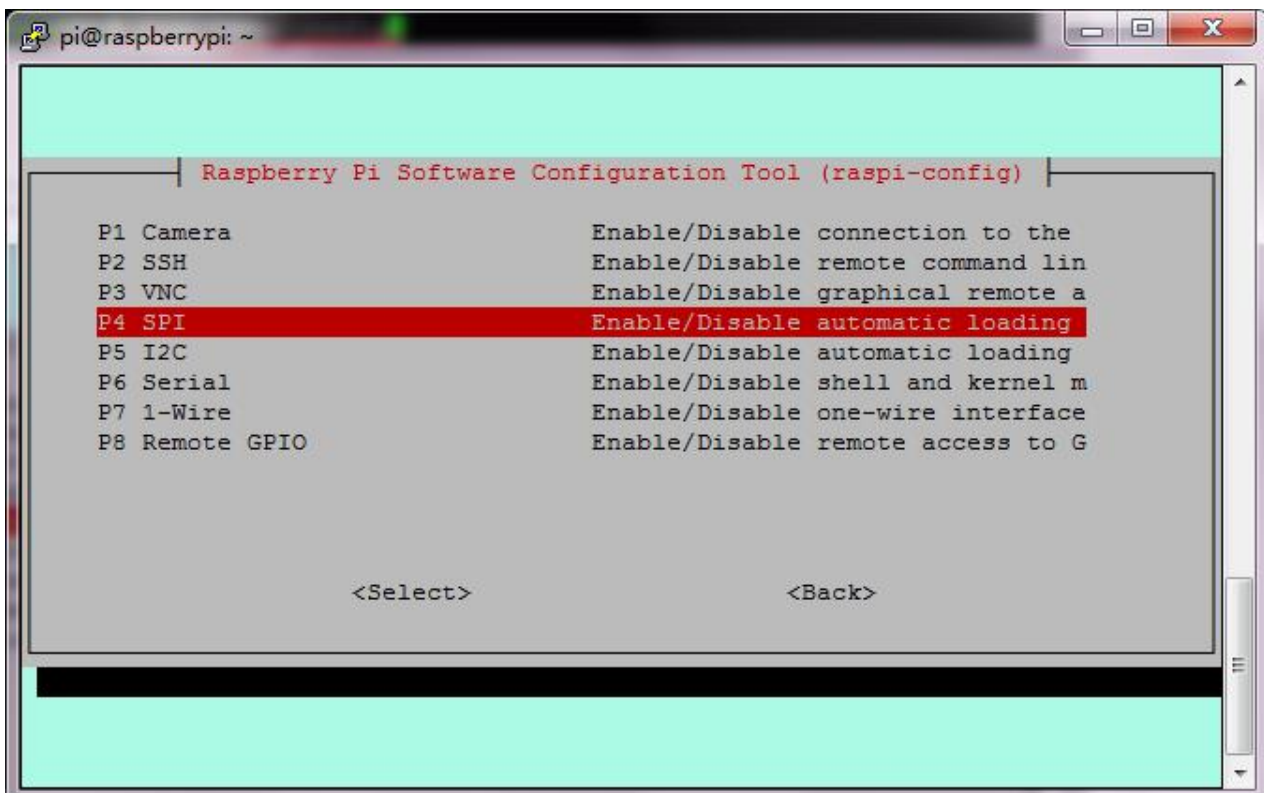
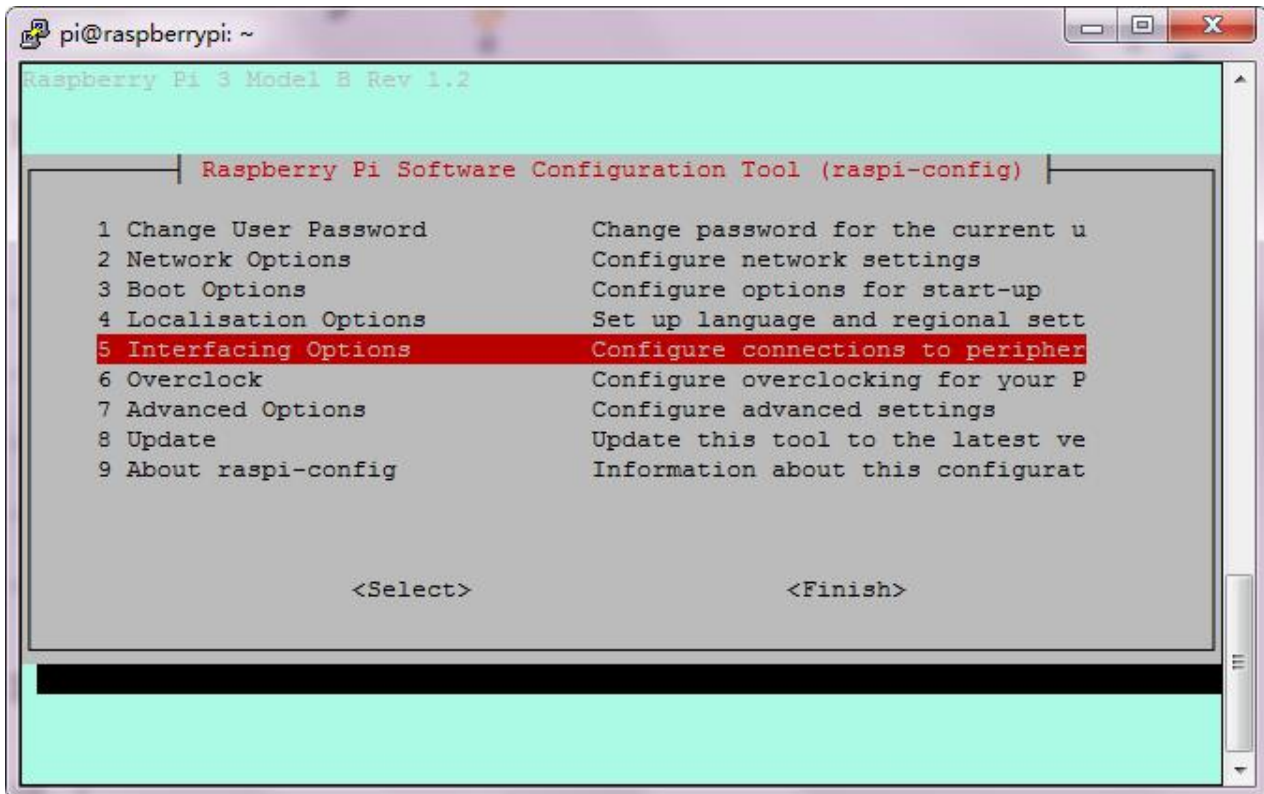
Enter the `cd ..` to return to the previous route and input the `sudo raspi-config`

```

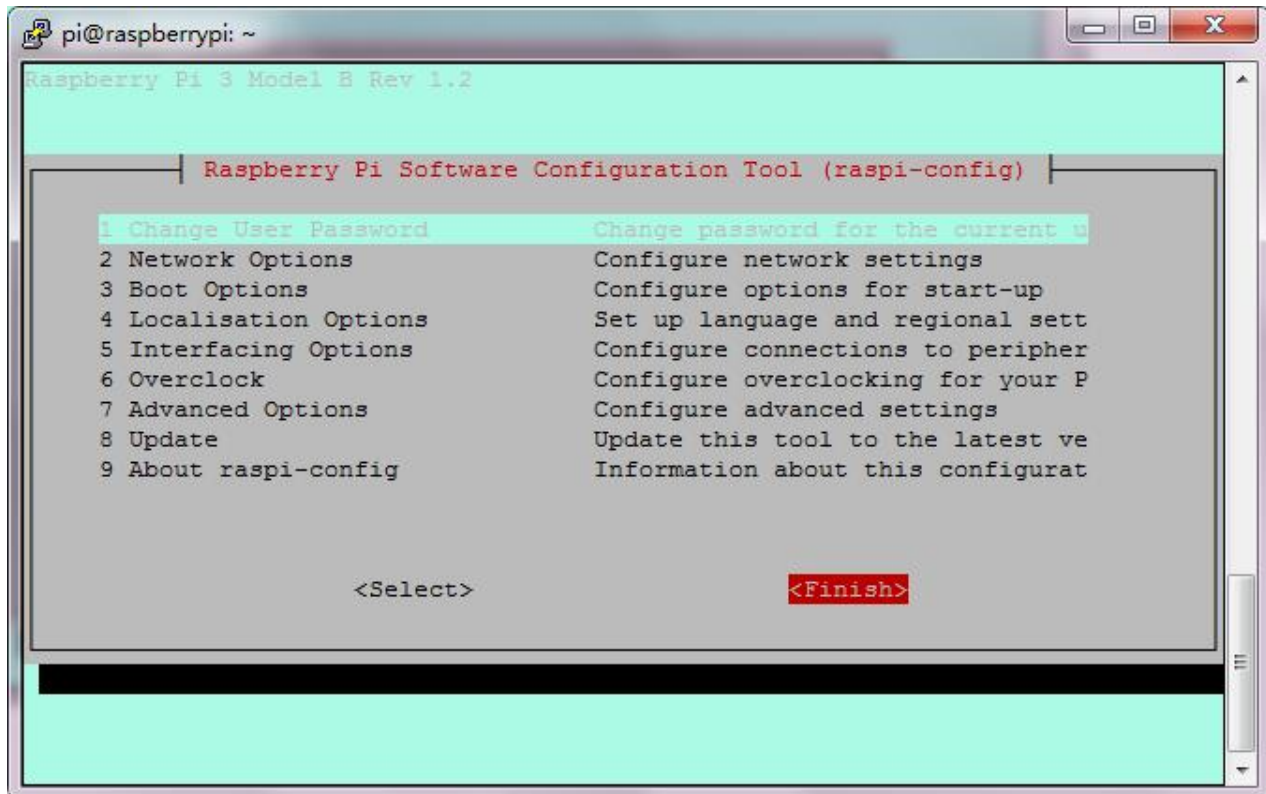
pi@raspberrypi: ~
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 7/7
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 ALSA [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 1: seeed2micvoicec [seeed-2mic-voicecard], device 0: bcm2835-i2s-wm8960-hif
i wm8960-hifi-0 []
  Subdevices: 1/1
    Subdevice #0: subdevice #0
pi@raspberrypi:~/seeed-voicecard-master $ arecord -f cd -Dhw:1 | aplay -Dhw:1
Recording WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
Playing WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
^CAborted by signal Interrupt...
Aborted by signal Interrupt...
pi@raspberrypi:~/seeed-voicecard-master $ cd ..
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ sudo raspi-config

```

Select the **Interfacing Options** as below, then select the **SPI**, click **YES**, select **OK**, **Finish**. Shown below.







Then, enter the git clone https://github.com/respeaker/mic_hat.git to download the package file.

```

pi@raspberrypi: ~
Subdevices: 7/7
Subdevice #0: subdevice #0
Subdevice #1: subdevice #1
Subdevice #2: subdevice #2
Subdevice #3: subdevice #3
Subdevice #4: subdevice #4
Subdevice #5: subdevice #5
Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 ALSA [bcm2835 IEC958/HDMI]
Subdevices: 1/1
Subdevice #0: subdevice #0
card 1: seeed2micvoicec [seeed-2mic-voicecard], device 0: bcm2835-i2s-wm8960-hif
i wm8960-hifi-0 []
Subdevices: 1/1
Subdevice #0: subdevice #0
pi@raspberrypi:~/seeed-voicecard-master $ arecord -f cd -Dhw:1 | aplay -Dhw:1
Recording WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
Playing WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
^CAborted by signal Interrupt...
Aborted by signal Interrupt...
pi@raspberrypi:~/seeed-voicecard-master $ cd ..
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ git clone https://github.com/respeaker/mic_hat.git

```

```

pi@raspberrypi: ~
Subdevice #4: subdevice #4
Subdevice #5: subdevice #5
Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 ALSA [bcm2835 IEC958/HDMI]
Subdevices: 1/1
Subdevice #0: subdevice #0
card 1: seeed2micvoicec [seeed-2mic-voicecard], device 0: bcm2835-i2s-wm8960-hif
i wm8960-hifi-0 []
Subdevices: 1/1
Subdevice #0: subdevice #0
pi@raspberrypi:~/seeed-voicecard-master $ arecord -f cd -Dhw:1 | aplay -Dhw:1
Recording WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
Playing WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
^CAborted by signal Interrupt...
Aborted by signal Interrupt...
pi@raspberrypi:~/seeed-voicecard-master $ cd ..
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ git clone https://github.com/respeaker/mic_hat.git
Cloning into 'mic_hat'...
remote: Counting objects: 49, done.
remote: Total 49 (delta 0), reused 0 (delta 0), pack-reused 49
Unpacking objects: 100% (49/49), done.
pi@raspberrypi:~ $ █

```

Enter the **sudo apt-get install python-pip** to install the file.

```

pi@raspberrypi: ~
i wm8960-hifi-0 []
Subdevices: 1/1
Subdevice #0: subdevice #0
pi@raspberrypi:~/seeed-voicecard-master $ arecord -f cd -Dhw:1 | aplay -Dhw:1
Recording WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
Playing WAVE 'stdin' : Signed 16 bit Little Endian, Rate 44100 Hz, Stereo
^CAborted by signal Interrupt...
Aborted by signal Interrupt...
pi@raspberrypi:~/seeed-voicecard-master $ cd ..
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ sudo raspi-config
pi@raspberrypi:~ $ git clone https://github.com/respeaker/mic_hat.git
Cloning into 'mic_hat'...
remote: Counting objects: 49, done.
remote: Total 49 (delta 0), reused 0 (delta 0), pack-reused 49
Unpacking objects: 100% (49/49), done.
pi@raspberrypi:~ $ ls
mic_hat  seeed-voicecard-master  seeed-voicecard-master.zip
pi@raspberrypi:~ $ sudo apt-get install python-pip
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  gir1.2-glib-2.0 libdbus-glib-1-2 libexpat1-dev libgirepository-1.0-1

```

```

pi@raspberrypi: ~
libpython-all-dev libpython-dev libpython2.7 libpython2.7-dev python-all
python-all-dev python-cffi-backend python-crypto python-cryptography
python-dbus python-dev python-enum34 python-gi python-idna python-ipaddress
python-keyring python-keyrings.alt python-pip-whl python-pkg-resources
python-pyasnl python-secretstorage python-setuptools python-six python-wheel
python-xdg python2.7-dev
Suggested packages:
python-crypto-dbg python-crypto-doc python-cryptography-doc
python-cryptography-vectors python-dbus-dbg python-dbus-doc
python-enum34-doc python-gi-cairo gnome-keyring libkf5wallet-bin
gir1.2-gnomekeyring-1.0 python-fs python-gdata python-kde4 python-keyczar
doc-base python-secretstorage-doc python-setuptools-doc
The following NEW packages will be installed:
gir1.2-glib-2.0 libdbus-glib-1-2 libexpat1-dev libgirepository-1.0-1
libpython-all-dev libpython-dev libpython2.7 libpython2.7-dev python-all
python-all-dev python-cffi-backend python-crypto python-cryptography
python-dbus python-dev python-enum34 python-gi python-idna python-ipaddress
python-keyring python-keyrings.alt python-pip python-pip-whl
python-pkg-resources python-pyasnl python-secretstorage python-setuptools
python-six python-wheel python-xdg python2.7-dev
0 upgraded, 31 newly installed, 0 to remove and 0 not upgraded.
Need to get 32.8 MB of archives.
After this operation, 51.6 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y

```

```

pi@raspberrypi: ~/mic_hat
Setting up libpython2.7-dev:armhf (2.7.13-2+deb9u2) ...
Setting up python-dbus (1.2.4-1) ...
Remove stale byte-compiled files...
Setting up python-ipaddress (1.0.17-1) ...
Setting up python-pip (9.0.1-2+rpt2) ...
Setting up python2.7-dev (2.7.13-2+deb9u2) ...
Setting up python-all (2.7.13-2) ...
Setting up python-xdg (0.25-4) ...
Setting up libpython-dev:armhf (2.7.13-2) ...
Setting up python-setuptools (33.1.1-1) ...
Setting up python-dev (2.7.13-2) ...
Setting up libpython-all-dev:armhf (2.7.13-2) ...
Setting up python-gi (3.22.0-2) ...
Setting up python-all-dev (2.7.13-2) ...
Setting up python-cryptography (1.7.1-3+b2) ...
Setting up python-secretstorage (2.3.1-2) ...
Setting up python-keyring (10.1-1) ...
Processing triggers for libc-bin (2.24-11+deb9u3) ...
pi@raspberrypi:~ $ ls
mic_hat  seced-voicecard-master  seced-voicecard-master.zip

```

Installed successfully, enter the `sudo pip install spidev` to install the file.

```
pi@raspberrypi: ~
login as: pi
pi@192.168.1.149's password:
Linux raspberrypi 4.14.70-v7+ #1144 SMP Tue Sep 18 17:34:46 BST 2018 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Sep 20 02:55:58 2018 from 192.168.1.241

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $ ls
mic_hat  seeed-voicecard-master  seeed-voicecard-master.zip
pi@raspberrypi:~ $ sudo pip install spidev
```

Installed well, enter the `mic_hat` folder.

```
pi@raspberrypi: ~
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Sep 20 02:55:58 2018 from 192.168.1.241

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $ ls
mic_hat  seeed-voicecard-master  seeed-voicecard-master.zip
pi@raspberrypi:~ $ sudo pip install spidev
Collecting spidev
  Downloading https://files.pythonhosted.org/packages/36/83/73748b6e1819b57d8e1d
f8090200195cdae33aaa22a49a91ded16785eadd/spidev-3.2.tar.gz
Building wheels for collected packages: spidev
  Running setup.py bdist_wheel for spidev ... done
  Stored in directory: /root/.cache/pip/wheels/e4/4b/92/edbf6146136d76f26e8b8486
c4013593100617da7a194b34cf
Successfully built spidev
Installing collected packages: spidev
Successfully installed spidev-3.2
pi@raspberrypi:~ $ ls
mic_hat  seeed-voicecard-master  seeed-voicecard-master.zip
pi@raspberrypi:~ $ cd mic_hat/
```

Then enter the `python pixels.py` to run the program.

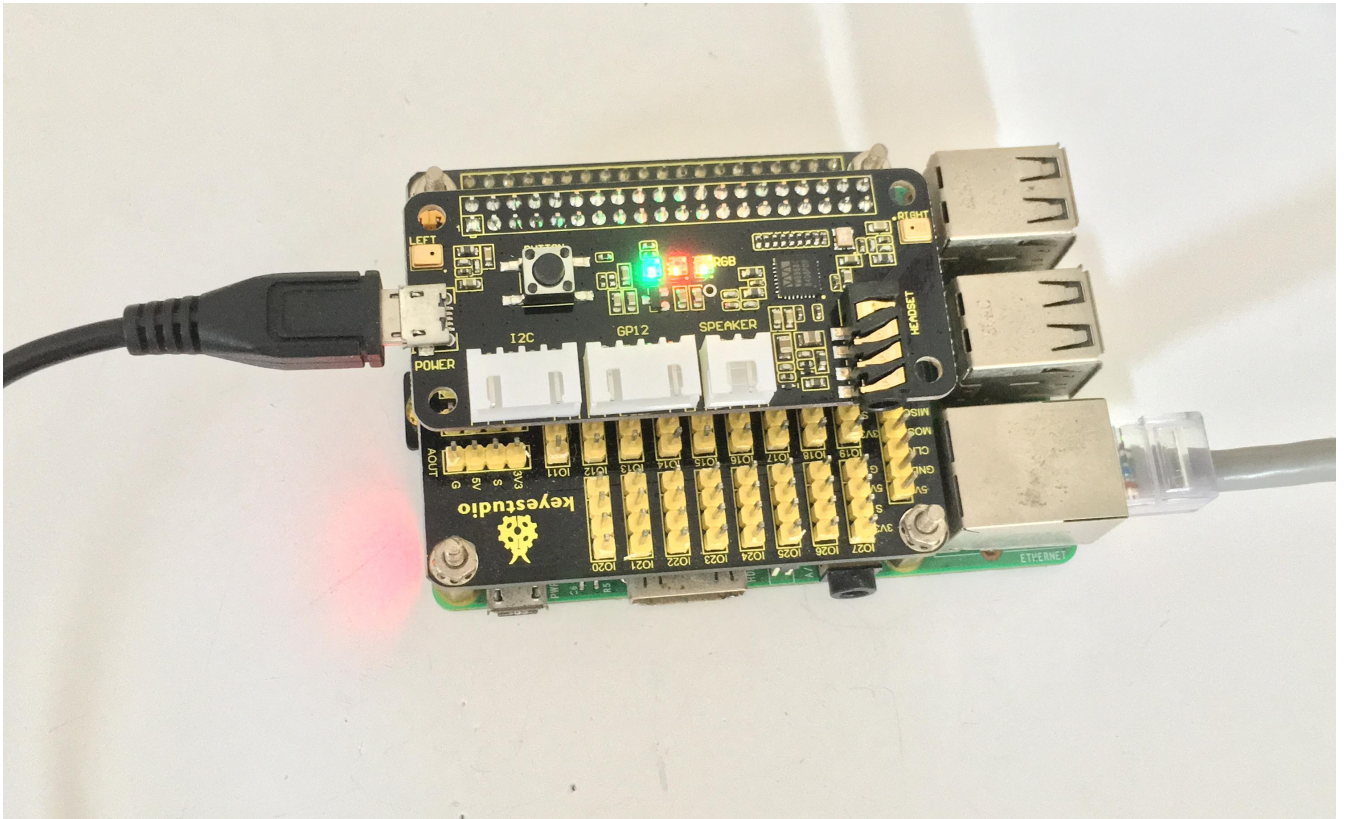

```
pi@raspberrypi: ~/mic_hat
SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $ ls
mic_hat  seeed-voicecard-master  seeed-voicecard-master.zip
pi@raspberrypi:~ $ sudo pip install spidev
Collecting spidev
  Downloading https://files.pythonhosted.org/packages/36/83/73748b6e1819b57d8e1d
f8090200195cdae33aaa22a49a91ded16785eedd/spidev-3.2.tar.gz
Building wheels for collected packages: spidev
  Running setup.py bdist_wheel for spidev ... done
  Stored in directory: /root/.cache/pip/wheels/e4/4b/92/edbf6146136d76f26e8b8486
c4013593100617da7a194b34cf
Successfully built spidev
Installing collected packages: spidev
Successfully installed spidev-3.2
pi@raspberrypi:~ $ ls
mic_hat  seeed-voicecard-master  seeed-voicecard-master.zip
pi@raspberrypi:~ $ cd mic_hat/
pi@raspberrypi:~/mic_hat $ ls
alexa.py  apa102.pyc          LICENSE      README.md
apa102.py google_assistant.py pixels.py
pi@raspberrypi:~/mic_hat $ python pixels.py
```

```
pi@raspberrypi: ~/mic_hat
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $ ls
mic_hat  seeed-voicecard-master  seeed-voicecard-master.zip
pi@raspberrypi:~ $ sudo pip install spidev
Collecting spidev
  Downloading https://files.pythonhosted.org/packages/36/83/73748b6e1819b57d8e1d
f8090200195cdae33aaa22a49a91ded16785eedd/spidev-3.2.tar.gz
Building wheels for collected packages: spidev
  Running setup.py bdist_wheel for spidev ... done
  Stored in directory: /root/.cache/pip/wheels/e4/4b/92/edbf6146136d76f26e8b8486
c4013593100617da7a194b34cf
Successfully built spidev
Installing collected packages: spidev
Successfully installed spidev-3.2
pi@raspberrypi:~ $ ls
mic_hat  seeed-voicecard-master  seeed-voicecard-master.zip
pi@raspberrypi:~ $ cd mic_hat/
pi@raspberrypi:~/mic_hat $ ls
alexa.py  apa102.pyc          LICENSE      README.md
apa102.py google_assistant.py pixels.py
pi@raspberrypi:~/mic_hat $ python pixels.py
```

When run the program, 3 LEDs on the board will light up in different colors.



Package Download:

<https://drive.google.com/open?id=1eaIe65R4kOwhe-pU7KaXeswyaZQv7kes>