Universal Global Scientific Industrial Co., Ltd.
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HOOK-REV3.0 Module User's Manual

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The HOOK-REV3.0 module complies with the following features and standards:

Features	**Description**	
WLAN Standards	IEEE 802 11b/g/n	
Frequency Band	2.400 GHz – 2.484 GHz	
Number of Sub Channels	CH1 to CH14	
Modulation	DSSS, CCK, OFDM, BPSK, QPSK, 16QAM, 64QAM	
Supported data rates	11b	1, 2, 5.5, 11 (Mbps)
	11g	6,9,12, 18,24 ,36, 48, 54 (Mbps)
	11n	HT20 MCS0 (6.5Mbps) to MCS7 (65Mbps)

Power supply for the HOOK-REV3.0 module will be provided as below:

Symbol	**Parameter**	**Min**	**Typ.**	**Max**	**Unit**
VBAT	DC supply voltage for WiFi VBAT	3.2	3.6	4.2	V
BT-VBAT	DC supply voltage for BT VBAT	2.0	3.3	3.5	V
VIO	DC supply voltage for digital I/O	1.76	3.3	3.5	V
VDD_FEM	DC supply voltage for FEM	3.0	3.3	3.6	V

The HOOK-REV3.0 module has to withstand the operational requirements as listed in the table below.

Operating Temperature	-20° to 65° Celsius	
Relative Humidity Range	Max 85%	Non condensing, relative humidity

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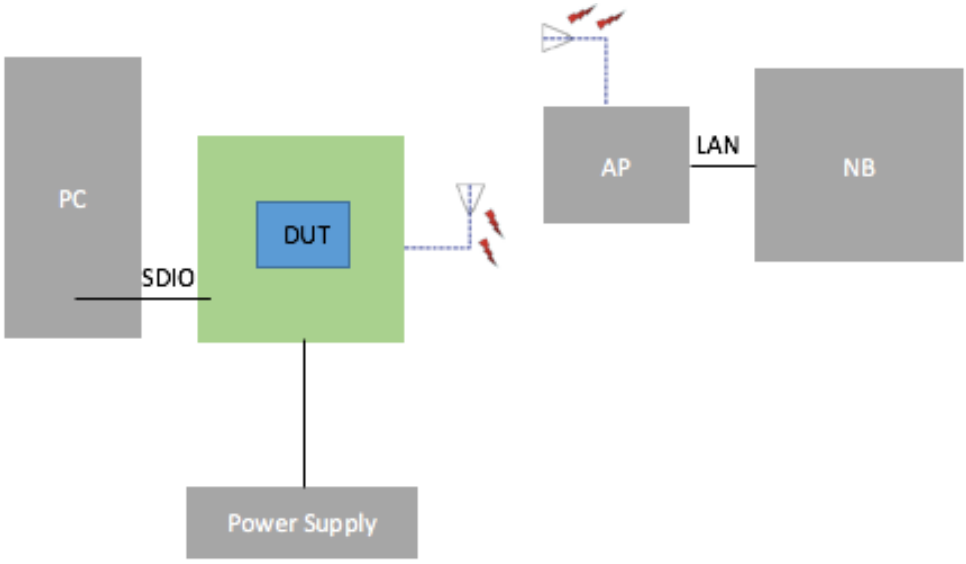
User Guide

WiFi User Mode

1. Power Supply set to 3.8V
2. Set up diagram as below:



3. Power supply turn on and insert SDIO cable to PC
4. Open terminal (ctrl+alt+T) and enter command “dmesg” to confirm if the device is recognized.
5. If your device is recognized and please enter the commands by step as following:
   1) sudo su
   2) cd ..
   3) cd ..
   4) cd usr/local/custom/EMC/Kelly/HOOK
   5) ls

```
bt_usr.sh       list_fw.sh  restartBluetool.sh  wifi_bringup.sh
cywdhd_4.2.ko   mybluetool  txrx_test
```

6. Enter command “sh list_fw.sh HOOK”.
   It will show MFG & user mode FW and NVram as below:

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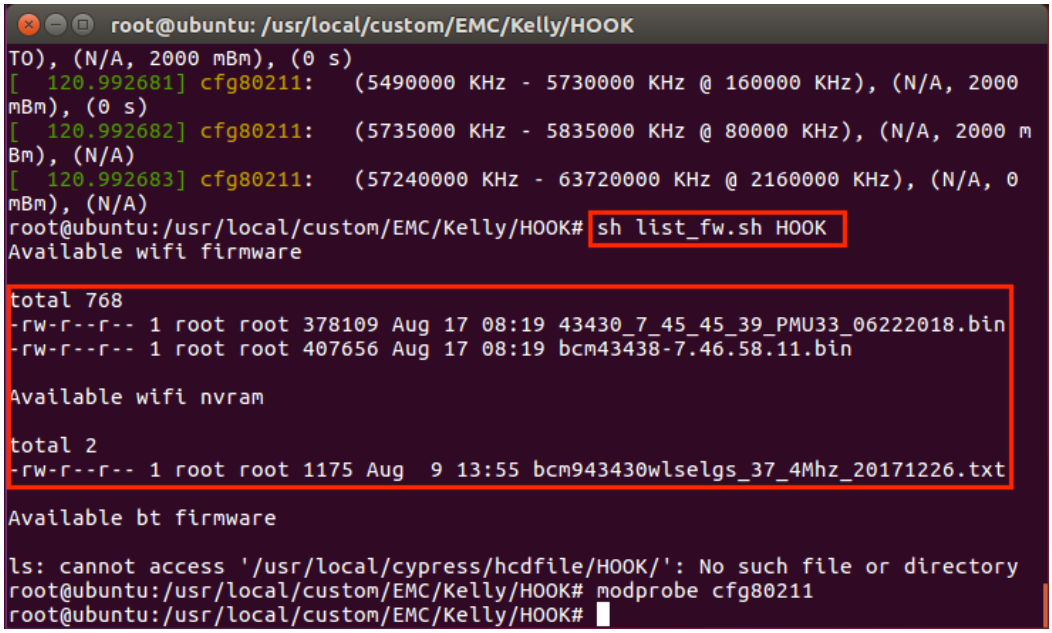

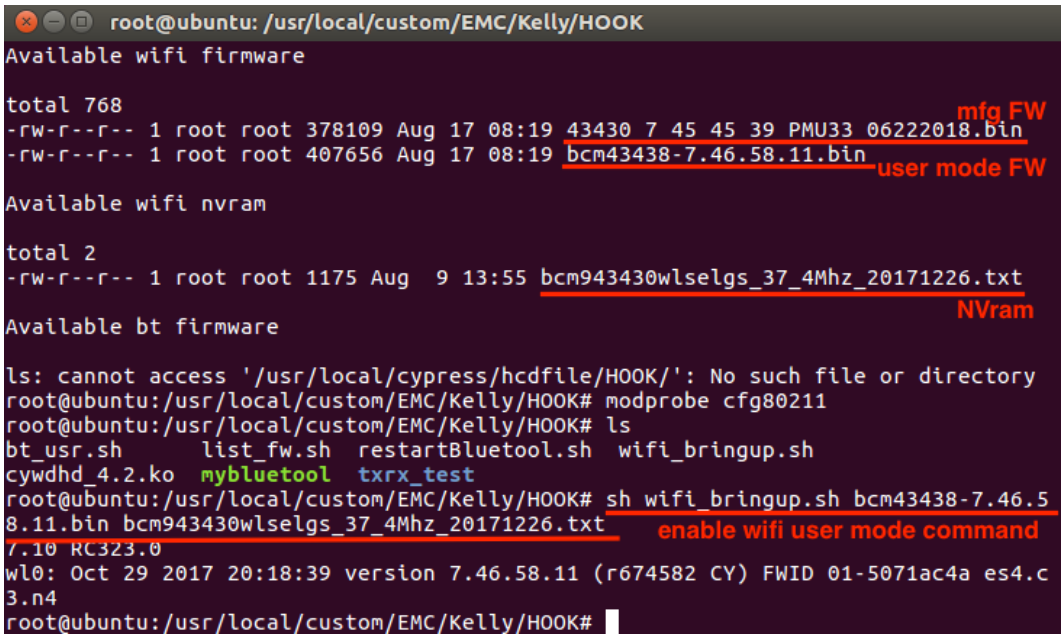

7. Enter command “sh wifi_bringup.sh bcm43438-7.46.58.11.bin bcm943430wlselgs_27_4Mhz_20171226.txt” to enable user mode.
   * command rule is “sh wifi_bringup.sh + MFG/user mode FW name + NVram name”
8. Enter command “wl up” to bring up WiFi function.

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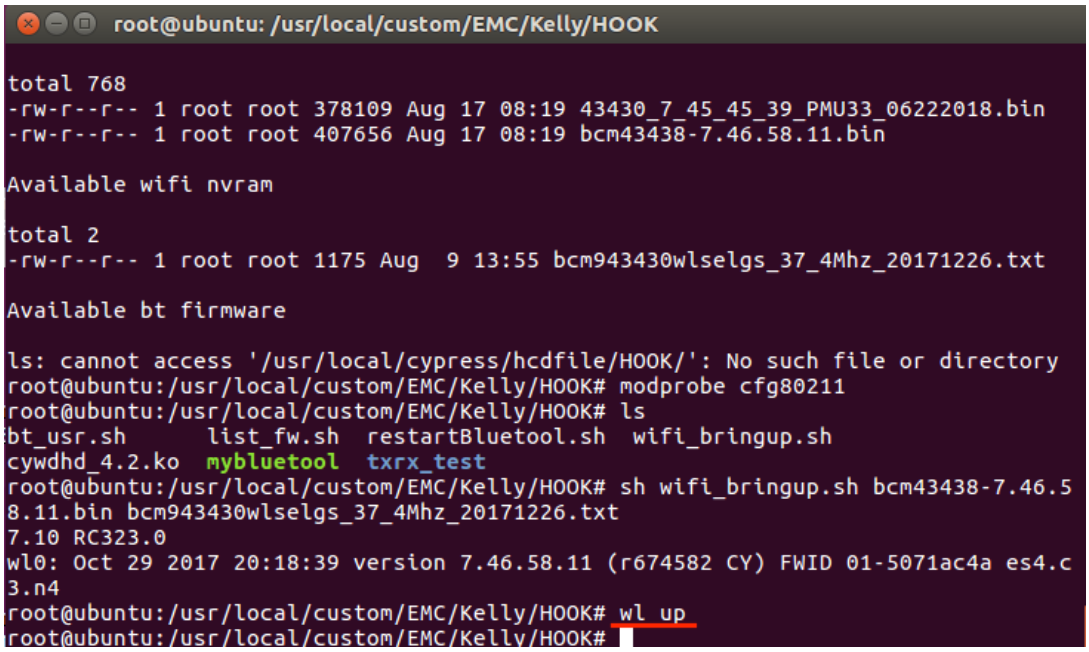
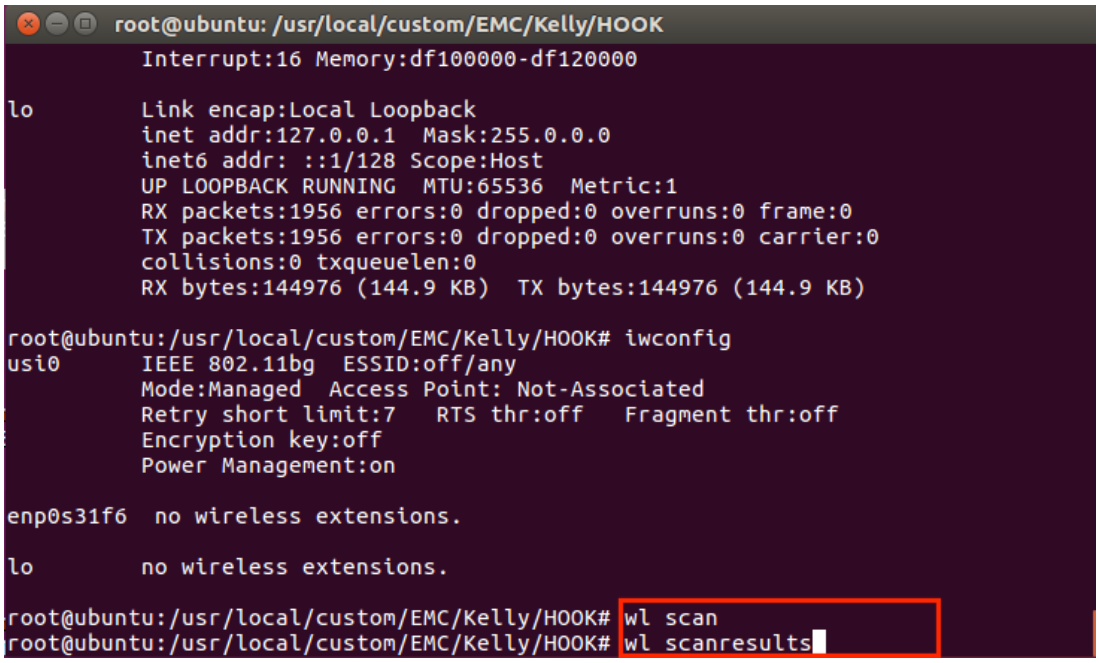


9. You can enter command “ifconfig” or “iwconfig” to confirm if usi0 is shown on the available list.
10. Enter command “wl scan” and then enter command “wl scanresults”.
    It will show every SSID which you just scanned.



And you will see a lot of SSID names, please choose one you want to connect.

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```
root@ubuntu: /usr/local/custom/EMC/Kelly/HOOK
root@ubuntu:/usr/local/custom/EMC/Kelly/HOOK# wl scan
root@ubuntu:/usr/local/custom/EMC/Kelly/HOOK# wl scanresults
SSID: "dlink-A360-2.4GHz"
Mode: Managed   RSSI: -41 dBm   SNR: 0 dB       noise: -98 dBm  Flags: RSSI on-c
hannel  Channel: 1l
BSSID: 1C:5F:2B:FA:A3:60        Capability: ESS ShortSlot RRM
Supported Rates: [ 1(b) 2(b) 5.5(b) 6 9 11(b) 12 18 24 36 48 54 ]
HT Capable:
        Chanspec: 2.4GHz channel 3 40MHz (0x1803)
        Primary channel: 1
        HT Capabilities: 40Mhz SGI20 SGI40
        Supported MCS : [ 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 2
1 22 23 32 ]
WPS: V2.0 Configured

SSID: "James"
Mode: Managed   RSSI: -85 dBm   SNR: 0 dB       noise: -98 dBm  Flags: RSSI on-c
hannel  Channel: 1
BSSID: 62:F4:45:70:83:83        Capability: ESS WEP ShortSlot RRM
Supported Rates: [ 1(b) 2(b) 5.5(b) 6 9 11(b) 12 18 24 36 48 54 ]
RSN (WPA2):
        multicast cipher: AES-CCMP
        unicast ciphers(1): AES-CCMP
        AKM Suites(1): WPA2-PSK
```

11. If you want to connect to the AP and its SSID is dlink-A360-2.4GHz, please enter command “wl join dlink-A360-2.4GHz” to connect the AP.

```
root@ubuntu: /usr/local/custom/EMC/Kelly/HOOK
Mode: Managed   RSSI: -82 dBm   SNR: 0 dB       noise: -98 dBm  Flags: RSSI on-c
hannel  Channel: 11
BSSID: A2:B0:3D:5E:4B:7A        Capability: ESS WEP ShortSlot RRM
Supported Rates: [ 1(b) 2(b) 5.5(b) 6 9 11(b) 12 18 24 36 48 54 ]
RSN (WPA2):
        multicast cipher: AES-CCMP
        unicast ciphers(1): AES-CCMP
        AKM Suites(1): WPA2-PSK
        Capabilities(0x000c): No Pre-Auth, Pairwise, 16 PTK Replay Ctrs1 GTK Rep
lay Ctr
HT Capable:
        Chanspec: 2.4GHz channel 11 20MHz (0x100b)
        Primary channel: 11
        HT Capabilities: SGI20
        Supported MCS : [ 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 ]

SSID: "LEO_11G2"
Mode: Managed   RSSI: -95 dBm   SNR: 0 dB       noise: -98 dBm  Flags: FromBcn R
SSI on-channel  Channel: 11
BSSID: 00:15:70:CF:65:9B        Capability: ESS WEP ShortSlot
Supported Rates: [ 1(b) 2(b) 5.5(b) 6 9 11(b) 12 18 24 36 48 54 ]

root@ubuntu:/usr/local/custom/EMC/Kelly/HOOK#
root@ubuntu:/usr/local/custom/EMC/Kelly/HOOK# wl join dlink-A360-2.4GHz
```

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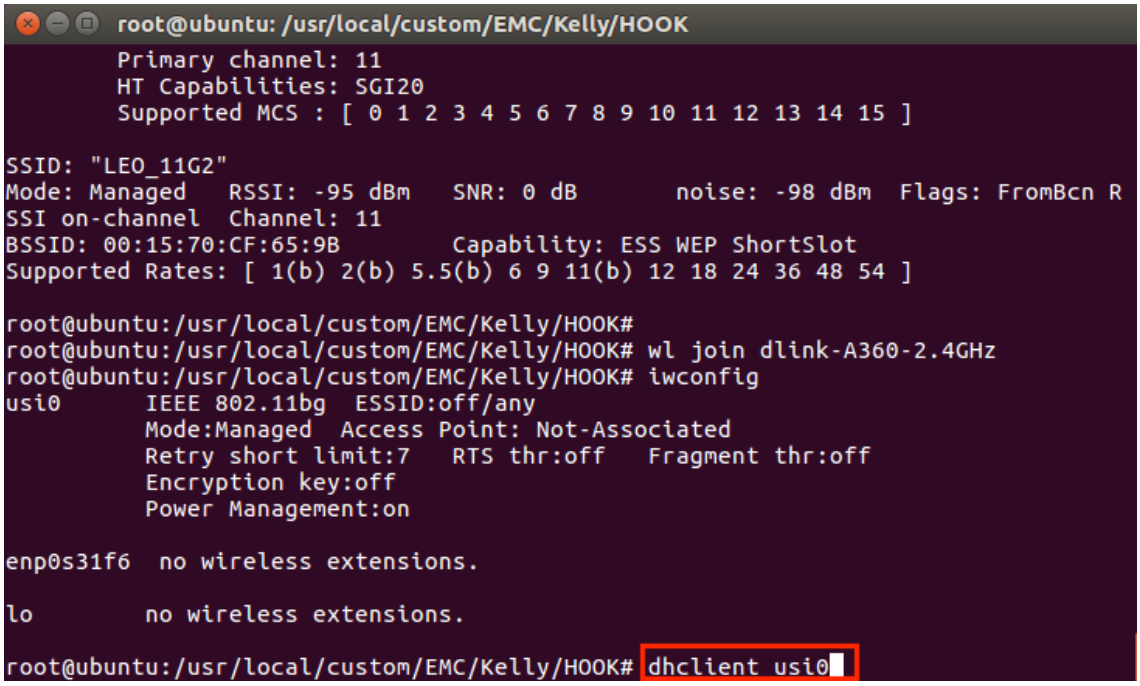
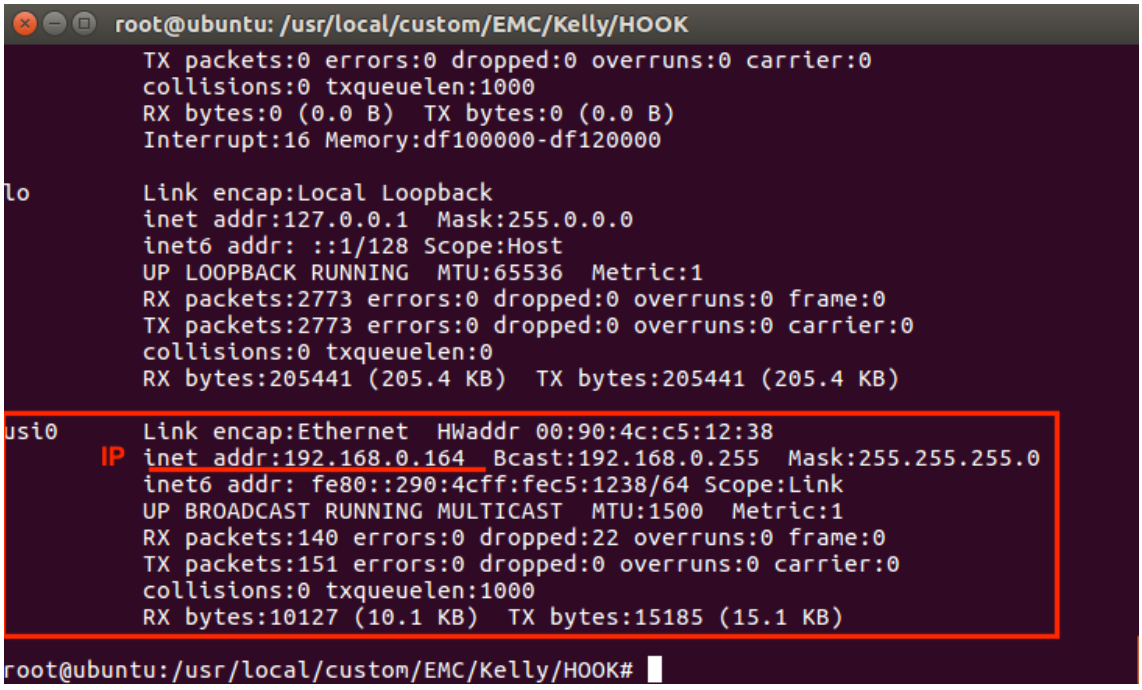
12. Enter command “dhclient usi0” to have a fixed IP.



And enter command “iwconfig” to confirm if you have already connected successfully.



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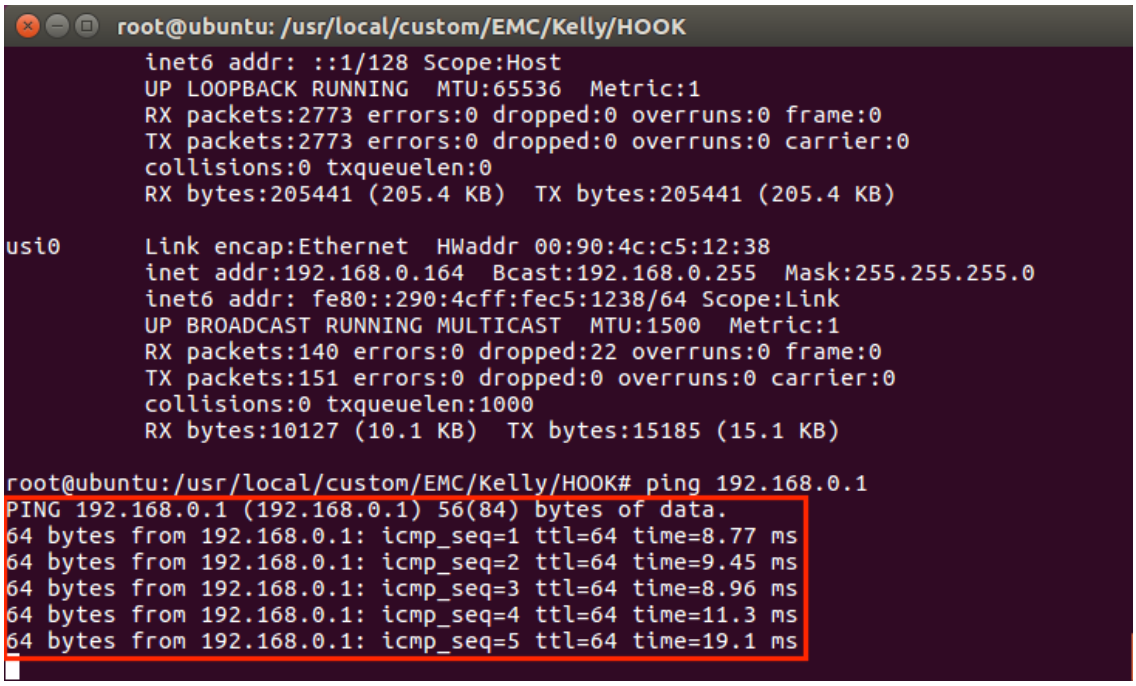
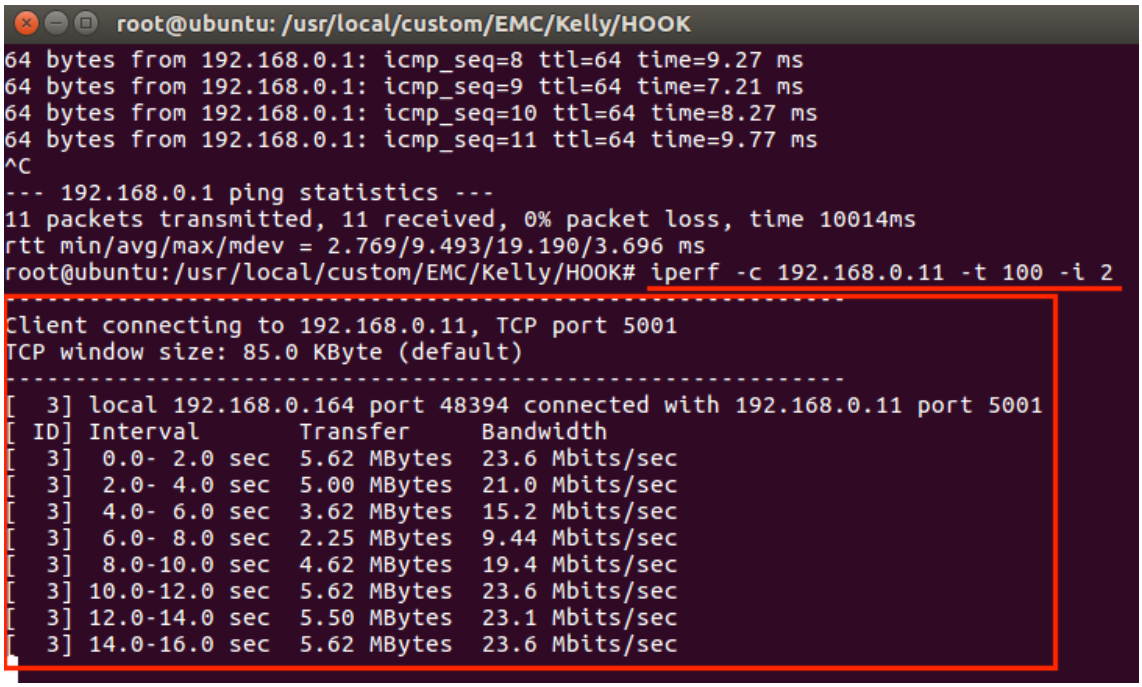
13. Please enter command “ping 192.168.0.1” to confirm if the connection between the device and AP is ready.



14. Please enter command “iperf –c 192.168.0.11 –t 1000 –i 2”.
And on the other NB, please enter “iperf –s “ to start throughput testing.



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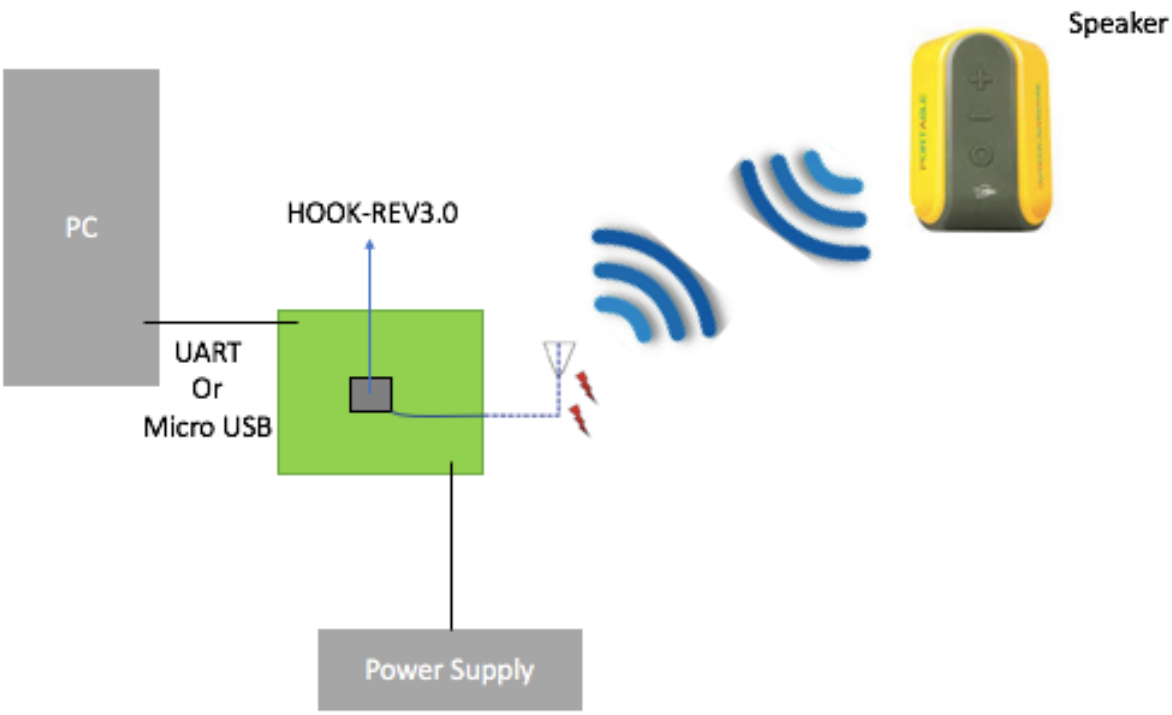
BT User Mode

1. Power supply set to 3.8V
2. Micro USB cable or UART cable are both available to control BT
3. Set up diagram as below:



4. Power supply turn on and insert cable to PC
5. Open a terminal(T1) and enter the following command by step:

    1) Enter “sudo su“
    2) Enter command “dmesg” to confirm if the device is recognized

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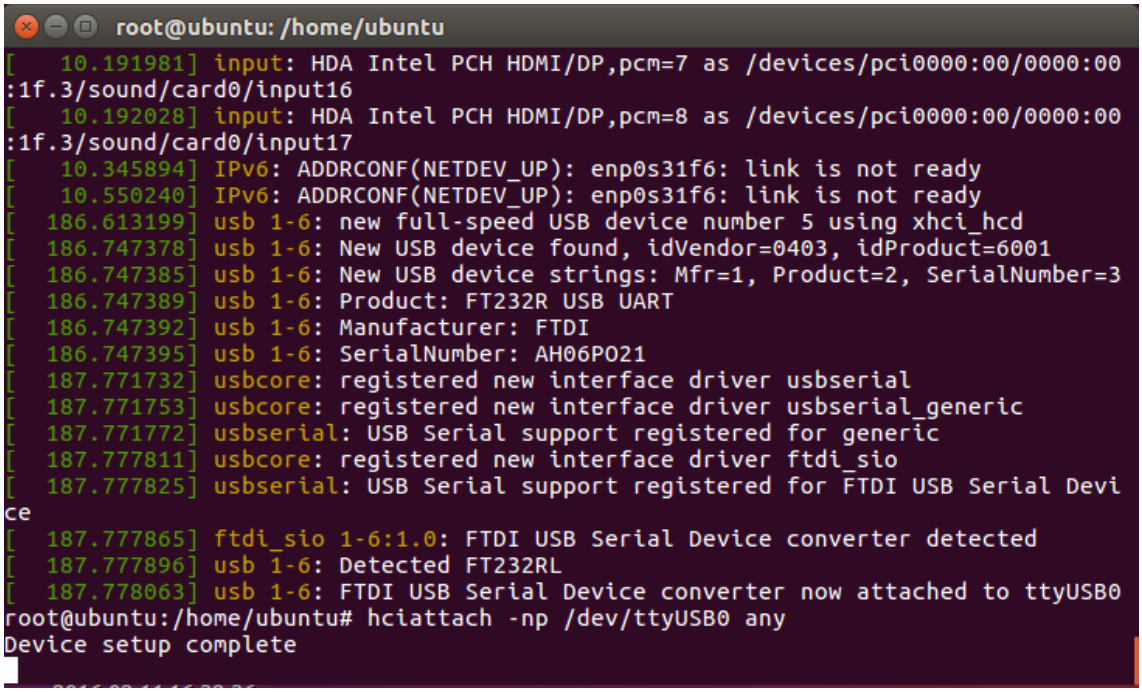
3) Enter command “hciattach -np /dev/ttyUSB0 any”



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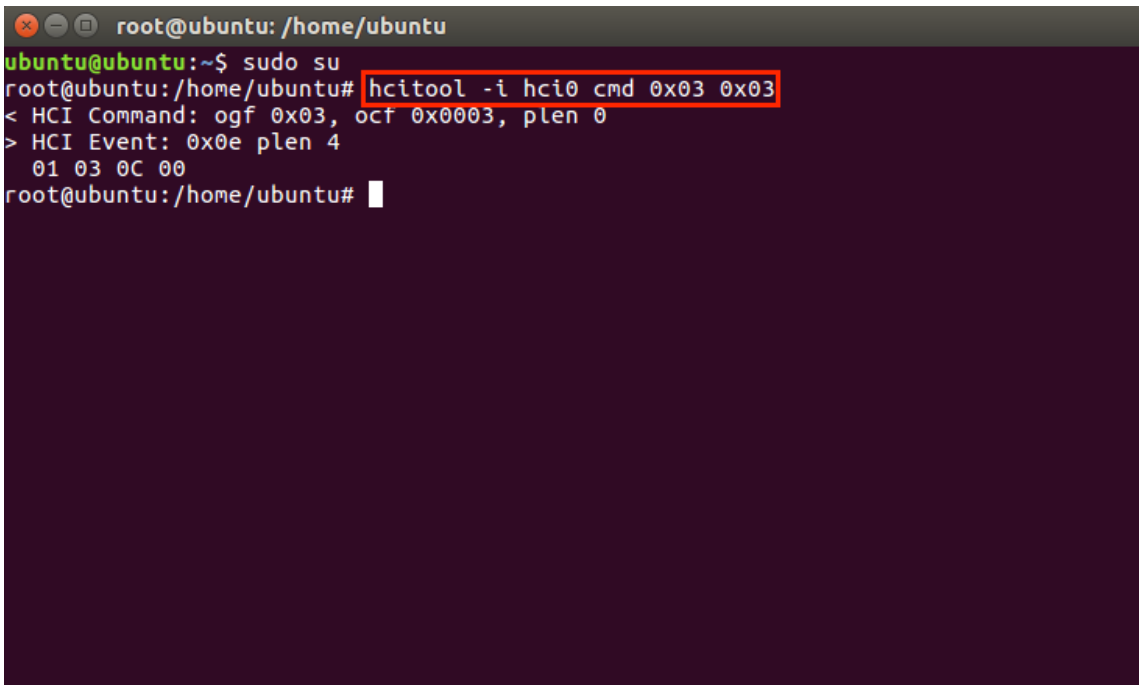
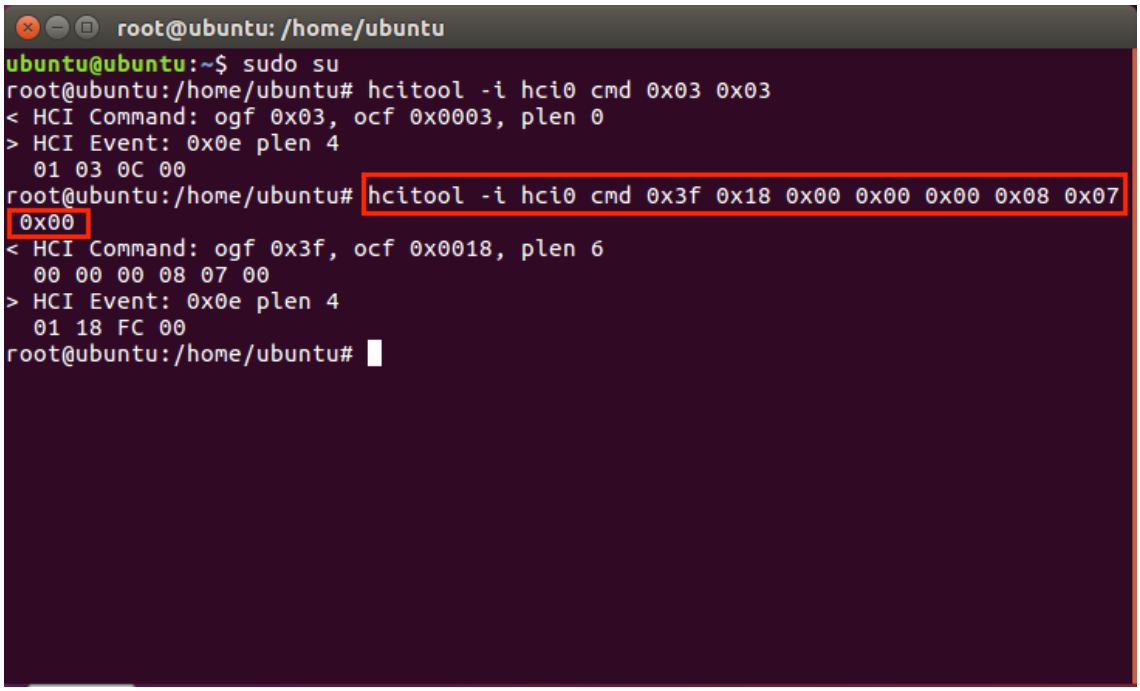
6. Open a terminal(T2) and enter the following command by step:

   1) Enter “sudo su”
   2) Enter command “hcitool -i hci0 cmd 0x03 0x03”



   3) Enter command “hcitool -i hci0 cmd 0x3f 0x18 0x00 0x00 0x00 0x08 0x07 0x00”



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7. Go back to T1 and enter ctrl+c, then enter command “hciattach -np /dev/ttyUSB0 any 460800”

8. On the left top corner：search your computer "bluetooth manager", after bluetooth manager window pops out, click “search”.

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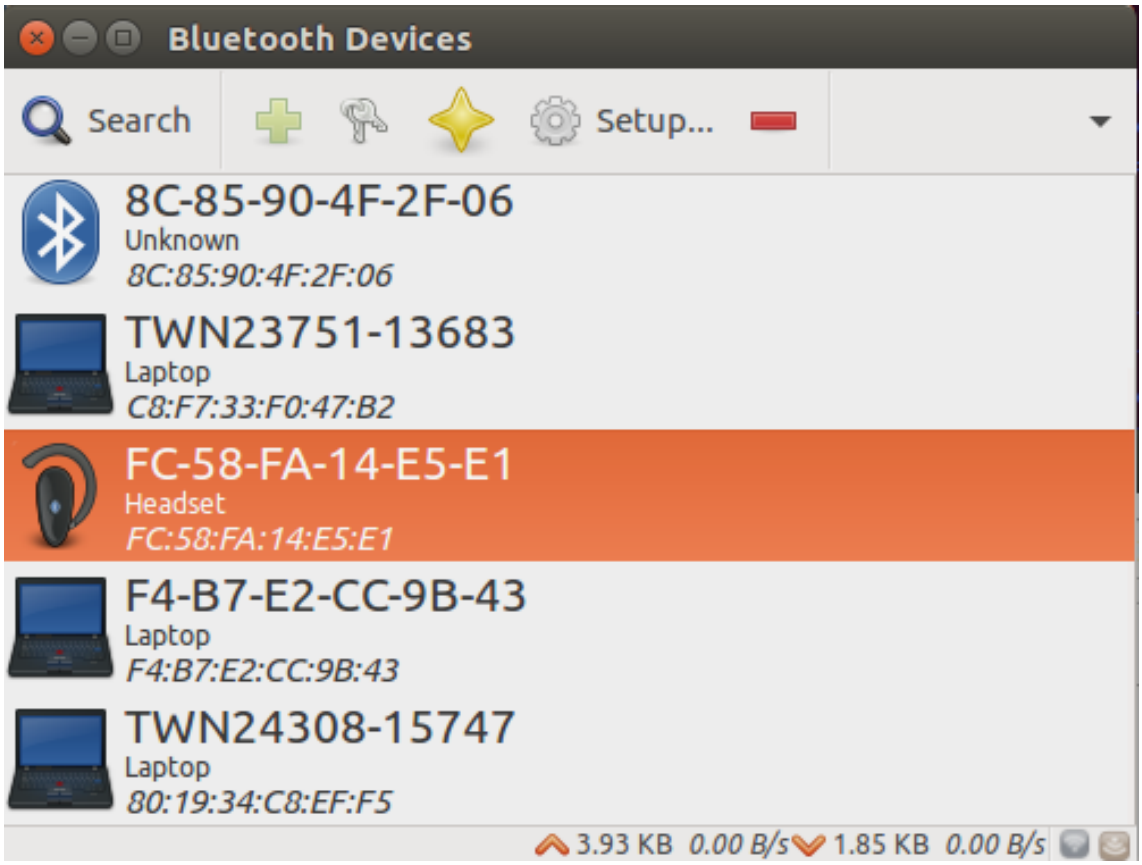
9. When the device you want to pair is shown on the list, then right click to perform “pair”. After pair successfully, right click again and select “connect to audio sink”



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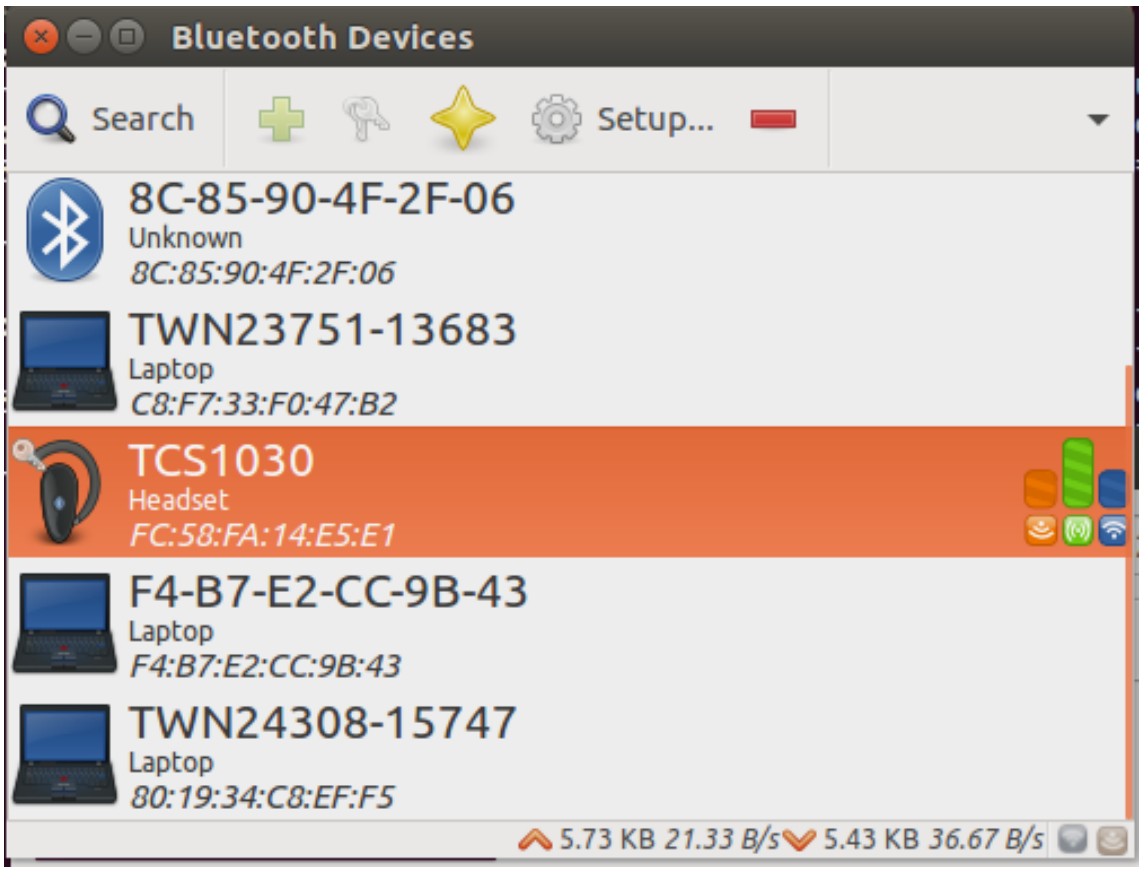

10. Open a terminal(T3) and enter the following command by step:

    1) Enter command “pacmd stat”,

    → You will see Default sink name is NOT the device you just paired

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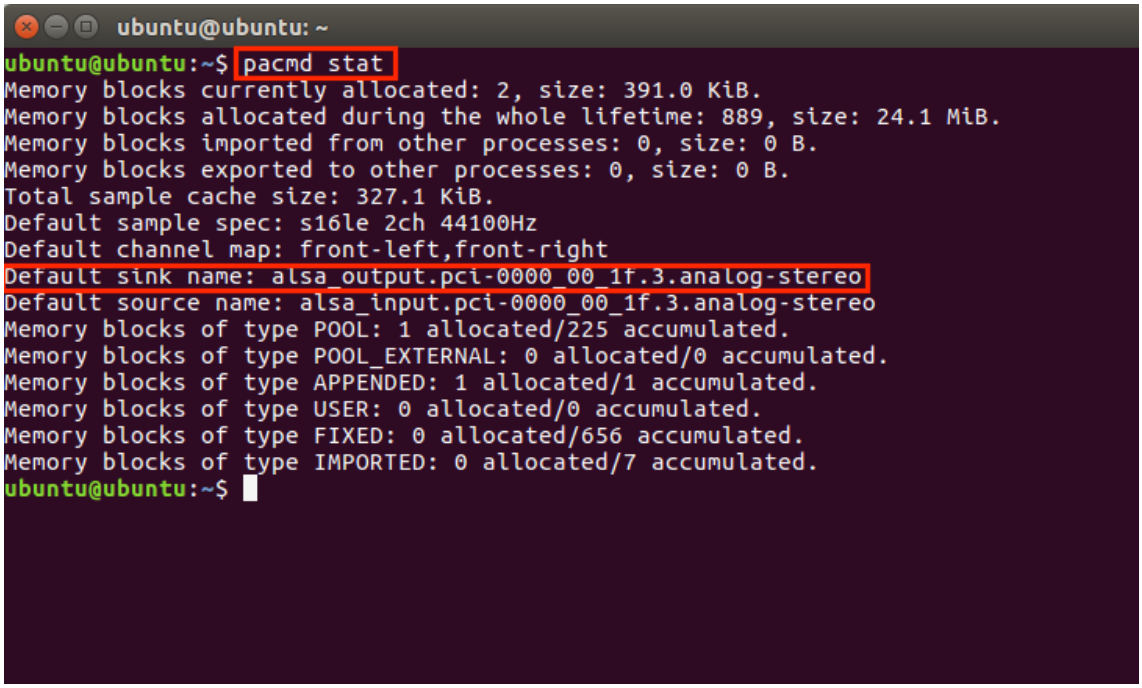
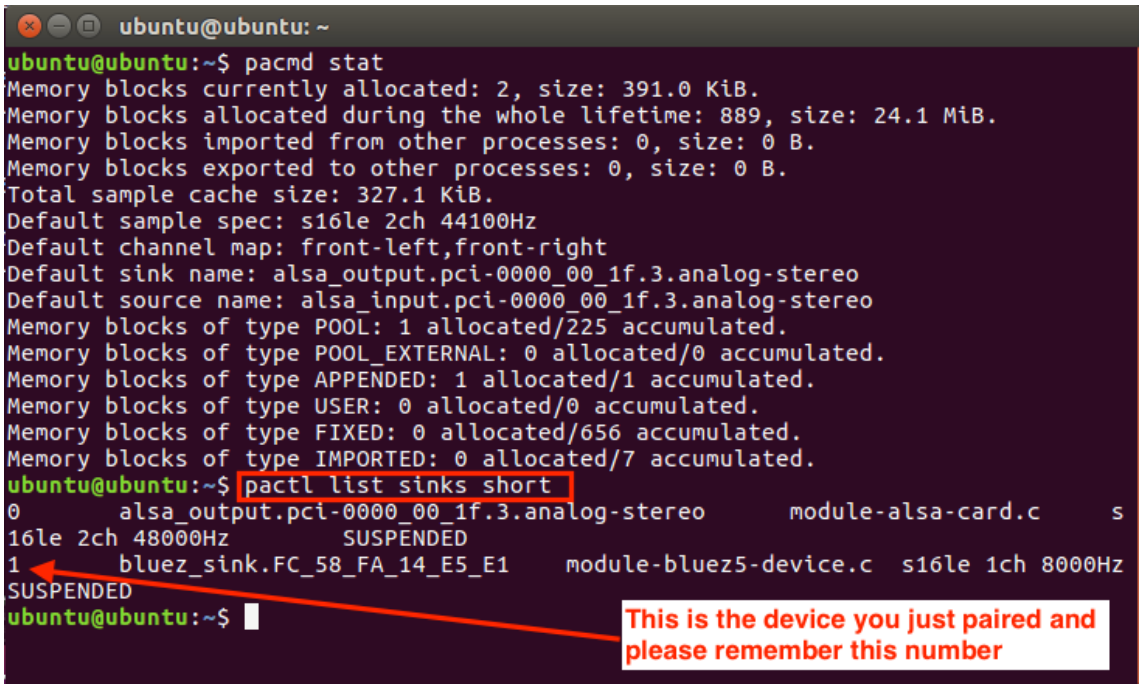


2) Enter command " pactl list sinks short" to confirm all the device

→ Please remember the device you just paired



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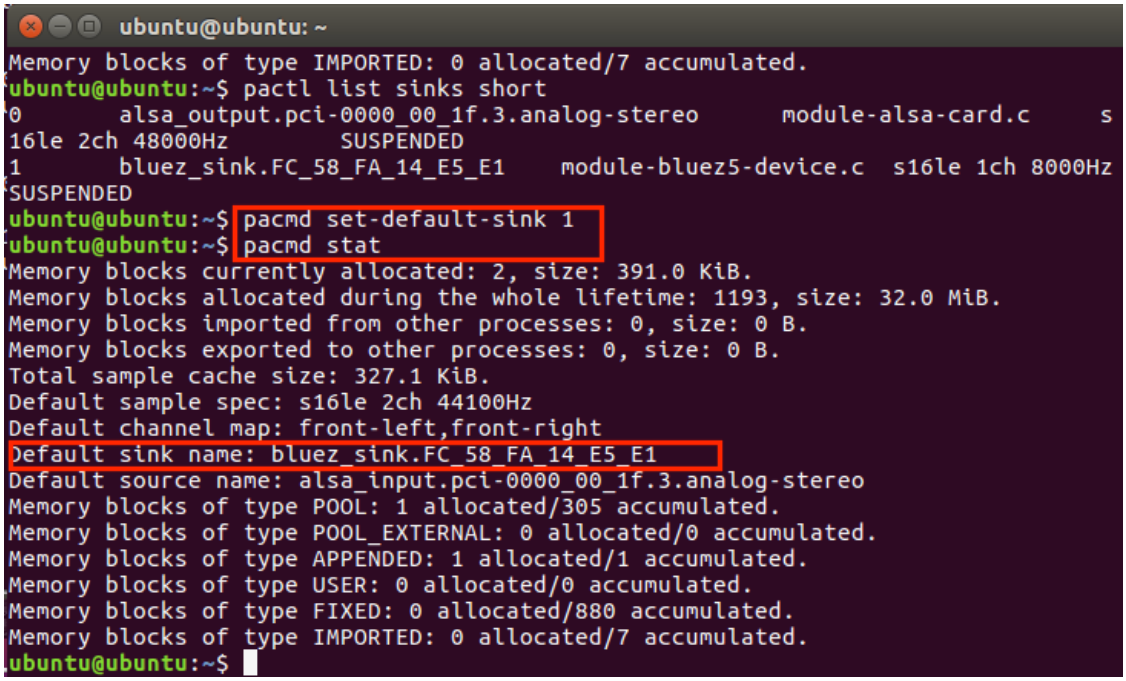
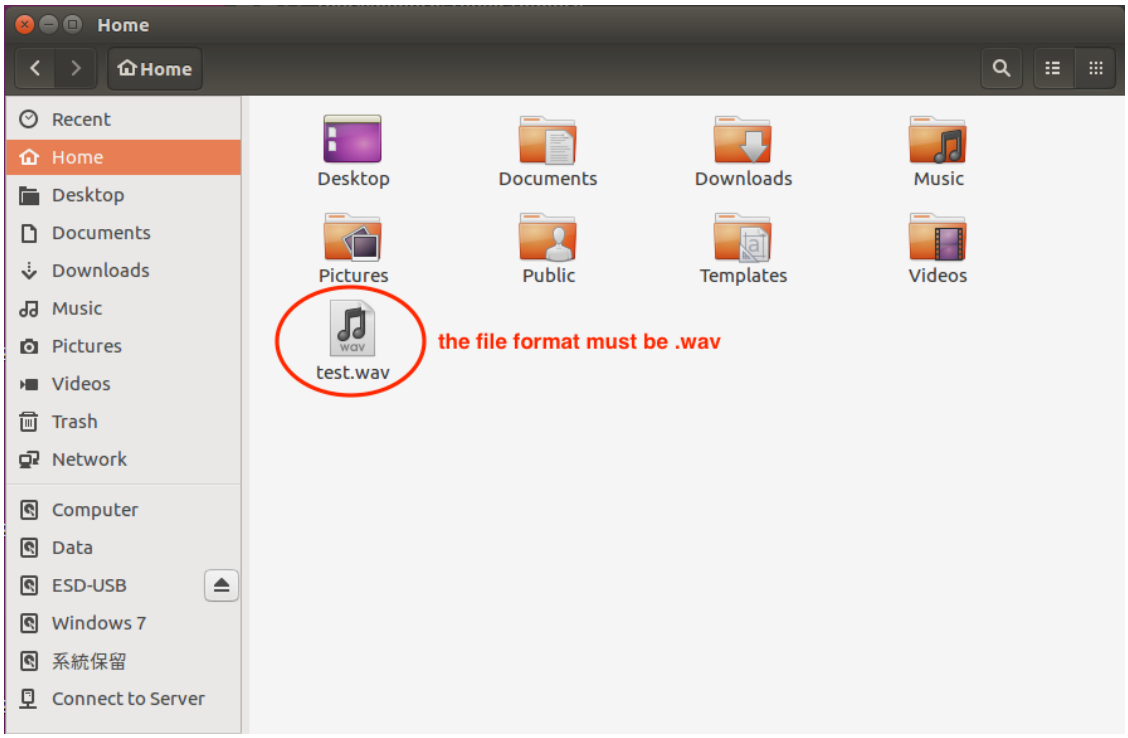
3) Enter command " pacmd set-default-sink 1" to select your device, then enter command "pacmd stat" to confirm again if Default sink name us your device you just paired.



11. Copy your music file to Home directly. Please note the file format must be .wav



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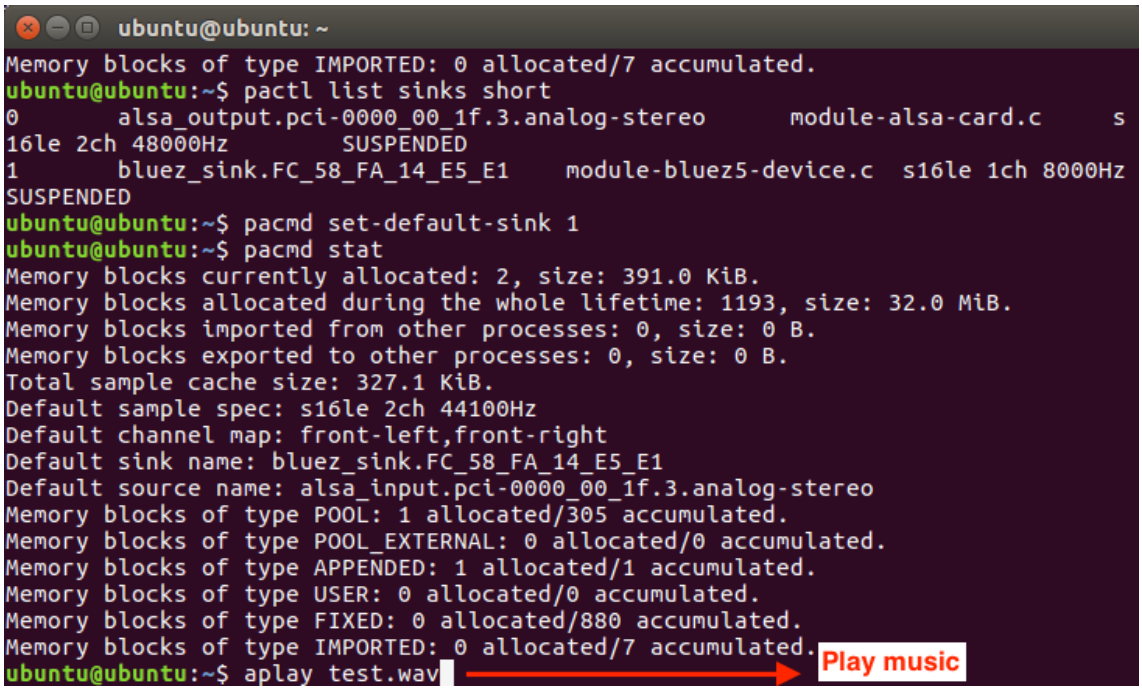
12. Go T3 and play music, please enter command “aplay test.wav” and confirm sound settings as below:



FCC ID: COFHOOKREV3
FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IC: 10293A-HOOKREV3
Canada/ISED Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The transmitter module may not be co-located with any other transmitter or antenna.
Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

The Country Code Selection feature is disabled for products marketed in the US/Canada

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.
Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

IC Radiation Exposure Statement:
This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **20cm** between the radiator & your body.
Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

This module is intended for OEM integrators under the following conditions:
FCC: This module is certified pursuant to two Part 15 rules sections (15.247).
Canada/ISED: This module is certified pursuant to RSS-247 rules sections.

This module has been approved to operate with the antenna types listed below, with the maximum permissible gain indicated, and must include 0.5 dB cable loss compensation.

FCC, ISED Antenna Information				
Technology	**Frequency Band**	**Antenna Type**	**Model Number**	**Gain (dBi)**
Wi-Fi	2400-2483.5MHz	MONOPOLE	ANT-2.4-CW-RAH	-2.4
BT				

The OEM integrator is still responsible for
1. ensuring that the end-user has no manual instructions to remove or install module
2. the FCC/ISED compliance requirement of the end product, which integrates this module.

Information on test modes and additional testing requirements
1. This module is restricted to integration into hosts for indoor use only.
2. This module has been approved under stand-alone configuration.
3. OEM integrator has be limited the operation channels in channel 1-11 for 2.4GHz band.
4. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations
5. The information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host can be found at KDB Publication 996369 D04.

Additional testing, Part 15 Subpart B disclaimer
Appropriate measurements (e.g. 15 B compliance) and if applicable additional equipment authorizations (e.g. SDoC) of the host product to be addressed by the integrator/manufacturer.
This module is only FCC authorized for the specific rule parts 15.247 listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host product as being Part 15 Subpart B compliant.

NCC Statement
1. 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
2. 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。
3. 本模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示「本產品內含射頻模組CC XX xx LP yyy Z z」。
4. 「本公司於說明書中提供所有必要資訊以指導使用者/安裝者正確的安裝及操作」。

Label of the end product:

FCC:

The host product must be labeled in a visible area with the following " Contains FCC ID: COFHOOKREV3".

Canada/ISED:

The final end product must be labeled in a visible area with the following: “Contains IC: 10293A-HOOKREV3”.

Taiwan/NCC

本模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示「本產品內含射頻模組CC XX xx LP yyy Z z」。

The user manual of the end product should include:

FCC:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The antenna(s) used for this transmitter must not transmit simultaneously with any other antenna or transmitter.

Canada/ISED:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L’émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes :

1. L’appareil ne doit pas produire de brouillage;
2. L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

This device is intended only for OEM integrators under the following conditions:
1) The antenna must be installed such that 20cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)
1) L'antenne doit être installée de telle sorte qu'une distance de 20cm est respectée entre l'antenne et les utilisateurs, et
2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Taiwan/NCC

1. 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
2. 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

環隆電氣股份有限公司
Universal Scientific Industrial Co., Ltd.

Wireless Product Business Unit / Hardware Development Division

Document No.		Rev.	1.2
Product No.	HOOK_REV3.0 EVB		
Project Code			
Model No.			

PCB Specification of EV Board
For HOOK_REV3.0

SOURCE ORGANIZATION : USI/WP//RD

Kimi Chang
Prepared by： Date : 2018-03-31

Checked by： Date :

Approved by： Date :

Concurrence： Date :

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Revision History				
Version No.	**Revised Date**	**Revised by**	**Description**	**Notes**
1.0	2017/06/29	Kimi Chang	Initial Release	
1.1	2017/11/03	Kimi Chang	Update layout	
1.3	2018/03/31	Kimi Chang	Update layout	

1. Scope: This PCB SPEC is for EV board of HOOK_REV3.0. This document define the PCB (Printed Circuit Board) manufacturing SPEC. Due to this product are applied in wireless communication field, so all the SPEC defined in this document should be followed strictly in order to control the line impedance and parasitic effects. Any changes or modification must have written agreement of USI's engineer.
2. Gerber file : GB_HOOK_EVB_V30_20180328_Lyly.zip
3. PCB Thickness: 54.86mil+/- 10%
4. PCB size: Per Gerber
5. Four Layer PCB
6. PCB Material: FR4, , εr: 4.2 +/-0.2
7. Surface finish: ENIG
8. RoHS and Halogen free compliant is necessary for all materials
9. Layer Stack:
   - Layer 1: Component Top
   - Layer 2: GND layer
   - Layer 3: Inner layer traces/ power traces
   - Layer 4: Component Bottom

10. The PCB stack is as follows: (unit :mil)

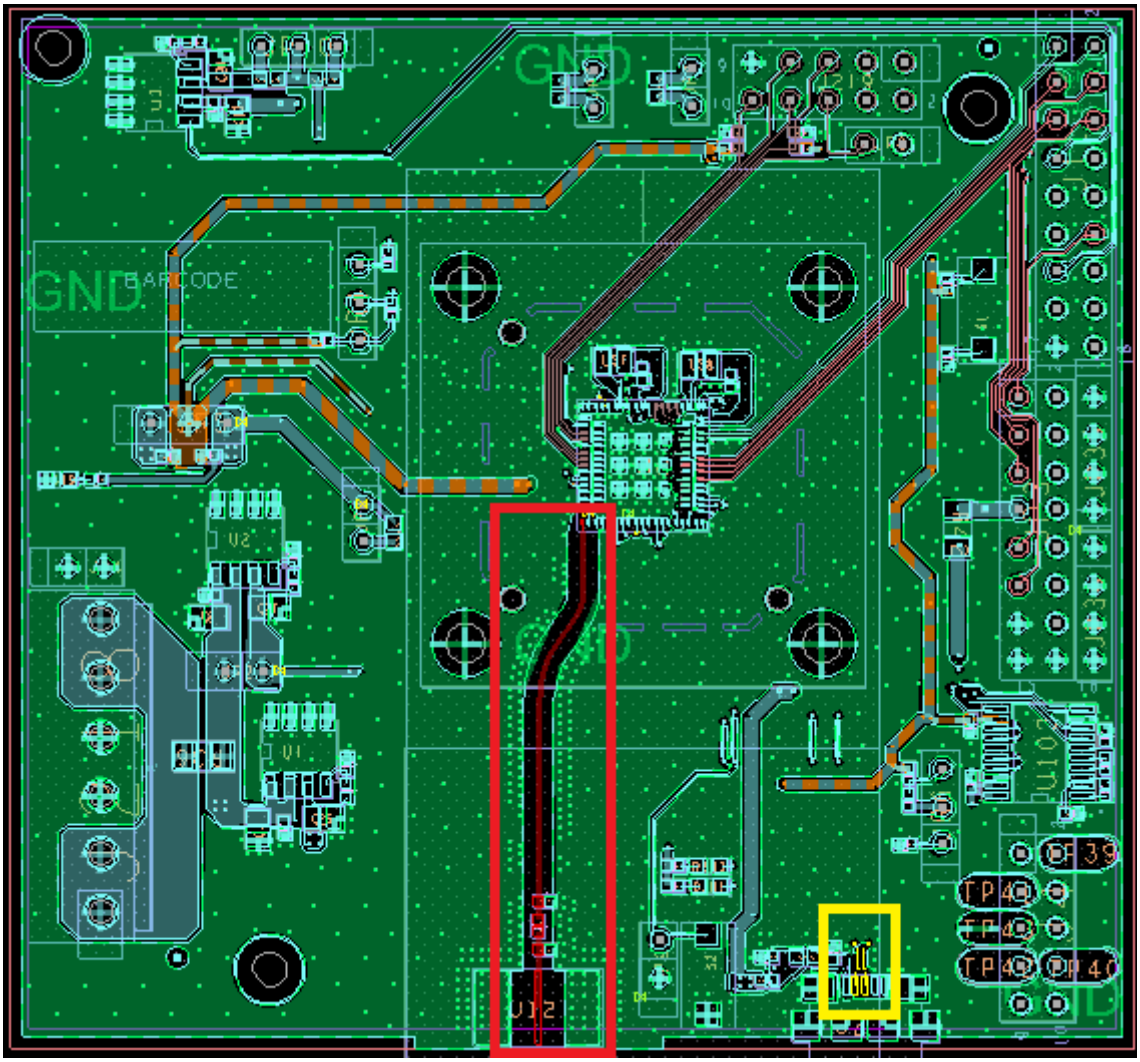
The PCB stack is as follows: (unit :mil)	
Layer	**Thickness**
Solder Mask	0.7
L1	1.6
P.P	10.53
L2	0.6
Core	28
L3	0.6
PP	10.53
L4	1.6
Solder mask	0.7
Total	54.86

11. Trace width/clearance: 5mils / 5 mils
12. Via type : L1-L4 , PTH , minimum via : 10mil hole / 20mil ring

13. Impedance control is required for the following picture.

Please adjust the trace red to fit 50 ohm.

Please adjust the trace yellow to fit differential 90 ohm.



(50ohm trace: Marked in red, 1400mil length, 16mil width)

(90ohm trace: Marked in yellow)