

SIM7600G-H 4G HAT (B)

From Waveshare Wiki

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Feature

- Connected via pogo pin or MicroUSB connector.
 - Dedicated pogo pin for Raspberry Pi Zero/Zero W.
 - MicroUSB connector for other Raspberry Pi boards or PC.
- Incorporates SIM7600G-H global band 4G module, compatible with 2G/3G/4G network with global support.
- USB HUB connector for other Raspberry Pi boards or PC, providing USB extension and 4G network access.
- Supports dial-up, telephone call, SMS, TCP, UDP, DTMF, HTTP, FTP, etc.
- Supports GPS, BeiDou, Glonass, and LBS base station positioning.
- SIM card slot, supports 1.8V/3V SIM card.
- Onboard audio jack and audio decoder for making the telephone calls.
- 2 x LED indicators, easy to monitor the operating status.
- Control via AT commands (3GPP TS 27.007, 27.005, and V.25TER command set).
- Supports SIM application toolkit: SAT Class 3, GSM 11.14 Release 99, USAT.
- Comes with development resources and manual (examples for Raspberry Pi).

SIM7600G-H 4G HAT (B)



(<https://www.waveshare.com/sim7600g-h-4g-hat-b.htm>)

Test

- To test this device, you should prepare the following components:

SIM7600G-H 4G HAT (B) × 1
LTE Antenna × 1
GPS Antenna × 1
USB-A to micro-B cable × 1
4G SIM card × 1
An earphone with a microphone × 1 (optional)

- Insert the activated 4G SIM card and the earphone(optional) to the HAT when the HAT is power off, and then connect it to the PC by the USB cable.

- The PWR indicator turns on after connecting.
- When the NET light starts to flash once every second, the module starts to work.



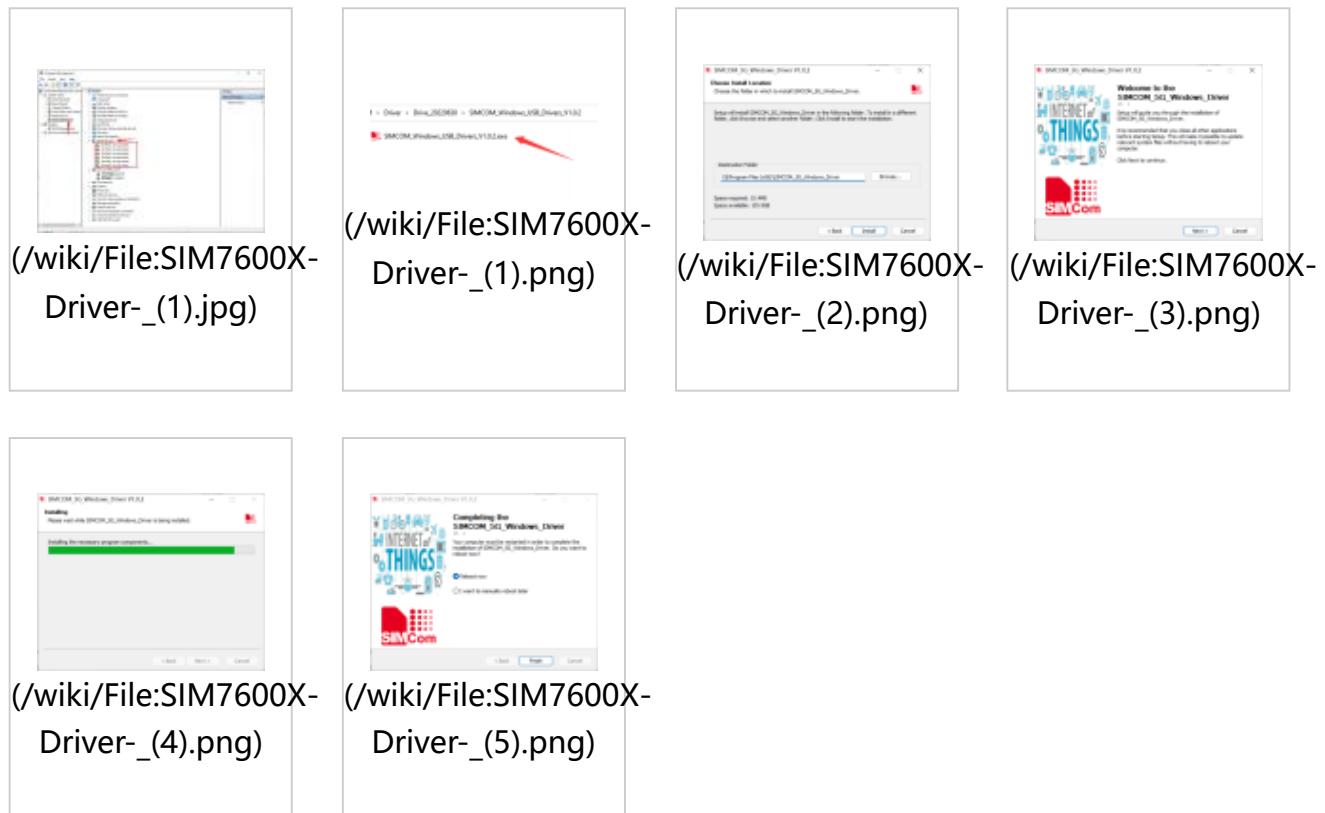
(/wiki/File:SIM7600_4G_HAT(B)TOP_ang_BOTTOM.png)

- Check the Device Manager of PC, the several COM ports will be recognized:

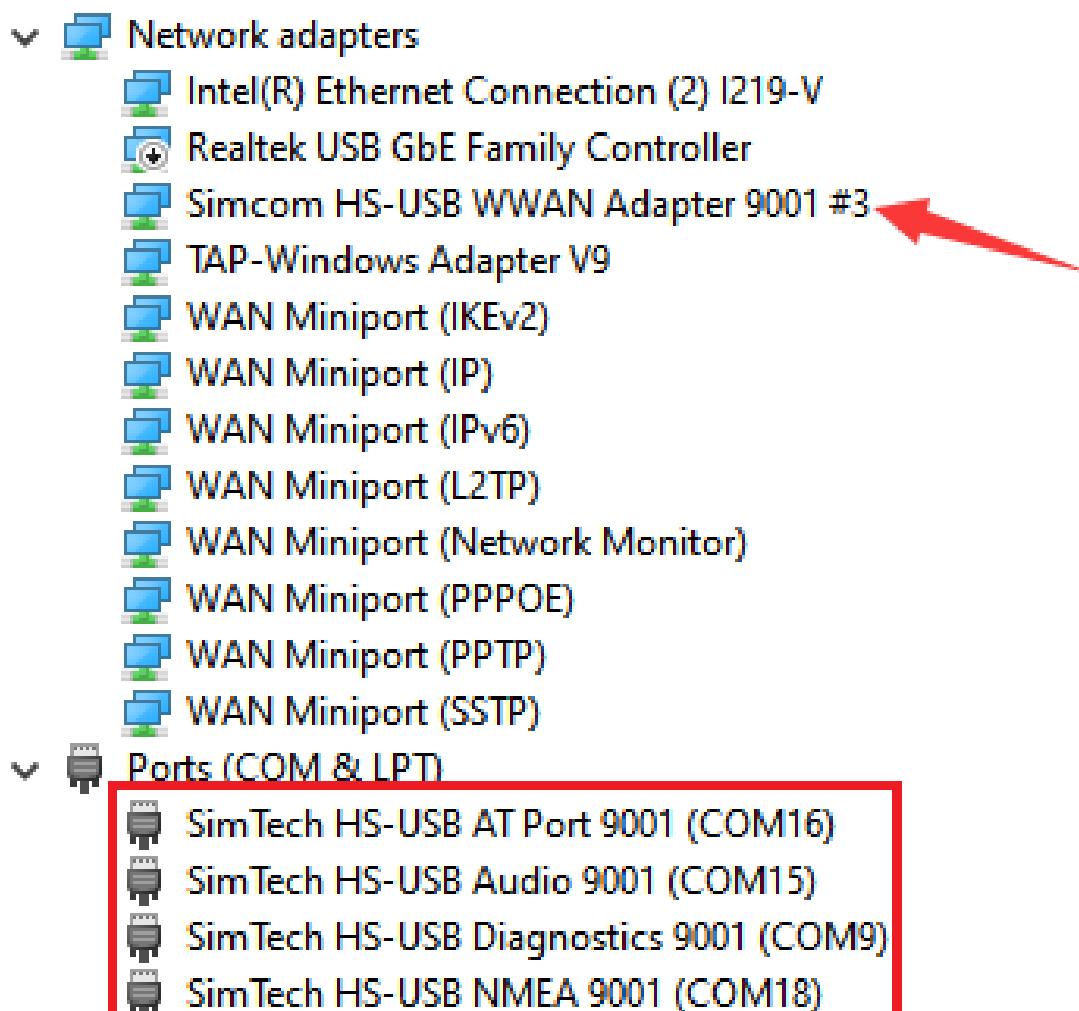
▼ 端口 (COM 和 LPT)

- SimTech HS-USB AT Port 9001 (COM19)
- SimTech HS-USB Audio 9001 (COM17) (/wiki/File:Sim7600CE-3.jpg)
- SimTech HS-USB Diagnostics 9001 (COM21)
- SimTech HS-USB NMEA 9001 (COM18)

- If the COM ports are recognized with an exclamation symbol, you should install the SIM7600X Driver (https://www.waveshare.com/w/upload/2/24/SIMCOM_Windows_USB_Drivers_V1.0.2.zip) manually.
- Connect the 4G HAT to Windows PC (Hereafter we use Windows 10 PC as example))
- Unzip the driver file --> Double-click the exe driver file with the left mouse button --> Select the installation path --> NEXT --> Wait for the installation to complete --> Restart the computer --> Complete the driver installation.



- After installation, all the devices should be recognized normally as below:



(/wiki/File:SIM7600X-Driver_(6).png)

NET working status

Reference of indicators

Table 17: NETLIGHT pin status

NETLIGHT pin status	Module status
Always On	Searching Network; Call Connect(include VOLTE,SRLTE)
200ms ON, 200ms OFF	Data Transmit; 4G registered;
800ms ON, 800ms OFF	2G/3G registered network
OFF	Power off ;Sleep

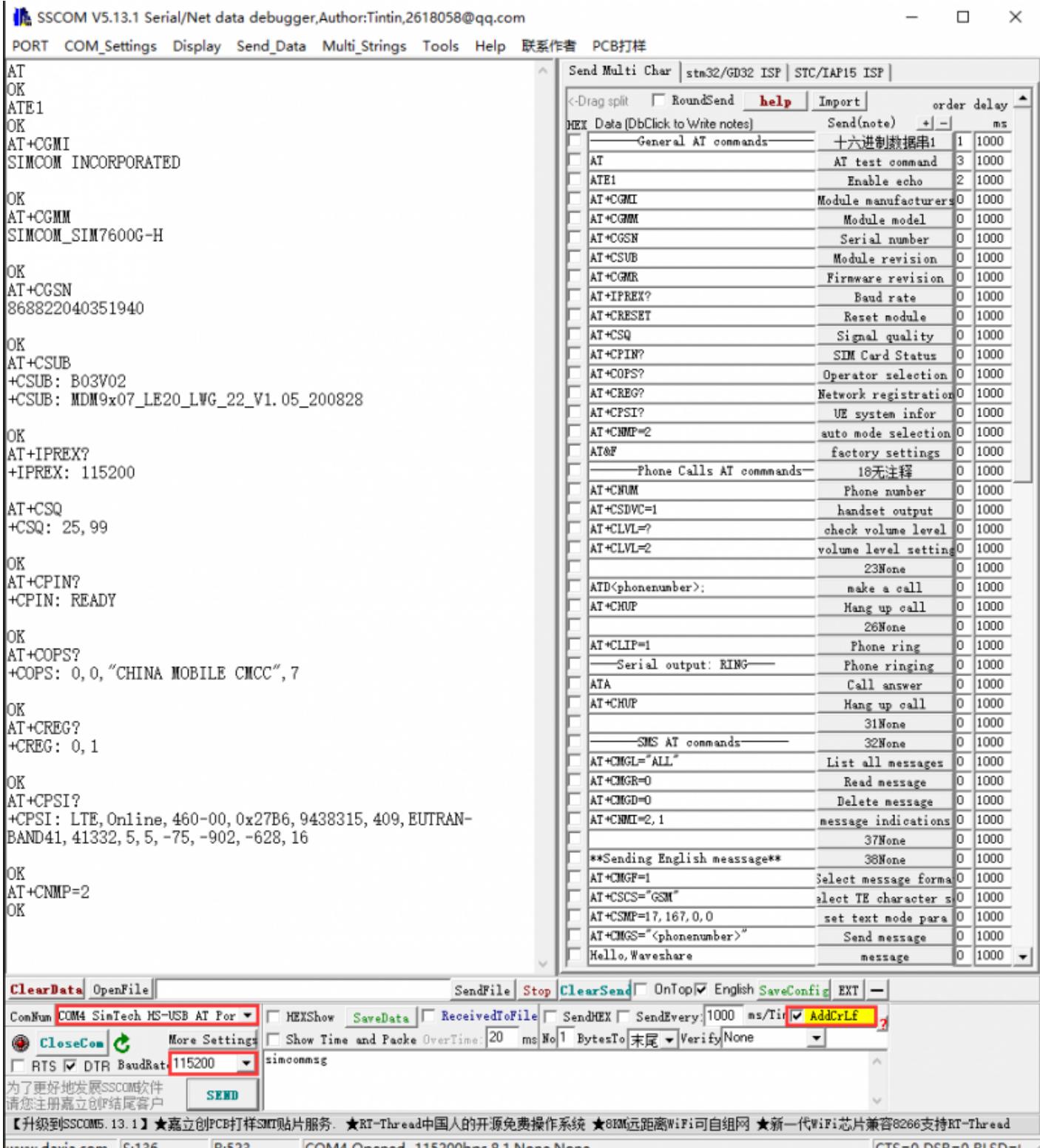
Note: NETLIGHT output low level as “OFF”, and high level as “ON”.

(/wiki/File:NETLIGHT.png)

AT commands for testing

AT Command	Description	Return
ATE	ATE1: Echo mode on ATE0: Echo mode off	OK
AT+CGMI	Request manufacturer identification	OK
AT+CGMM	Request model identification	OK
AT+CGSN	Request product serial number identification	OK
AT+CSUB	Request product version	OK
AT+CGMR	Request firmware version	OK
AT+IPREX	Configure baud rate of model	+IPREX:OK
AT+CRESET	Reset model	OK
AT+CSQ	Query signal quality	OK
AT+CPIN?	Query SIM card status	+CPIN:RRADY
AT+COPS?	Query provider information	+COPS:OK
AT+CREG?	Query network registration status	+CREG: OK
AT+CPSI?	Query UE system information	
AT+CNMP	Select Network Mode: 2: Automatic 13: GSM only 38: LTE only 48: Any modes but LTE <nr />	OK

For more information about the AT command, you can refer to AT command manual



(/wiki/File:SIM7600X_H_01.png)

Dial-up Networking

[Note] :You must use a SIM card with GPRS networking enabled and haven't out of service.

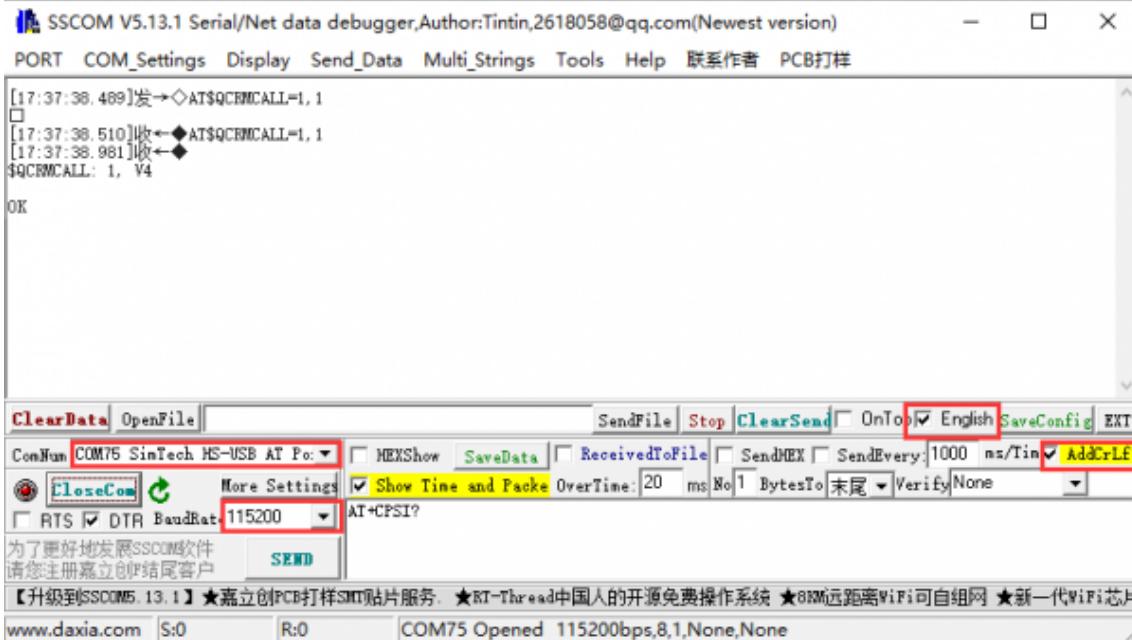
Dial-up Networking with Windows PC

- Connect the SIM7600G-H 4G HAT (B) with the 4G SIM card to your win10 PC. After installing the driver, the PC will automatically recognize the module.
- If Windows PC still cannot access the Internet, you need to start NDIS dial-up manually.

Open the SIM7600 AT port and send the command:

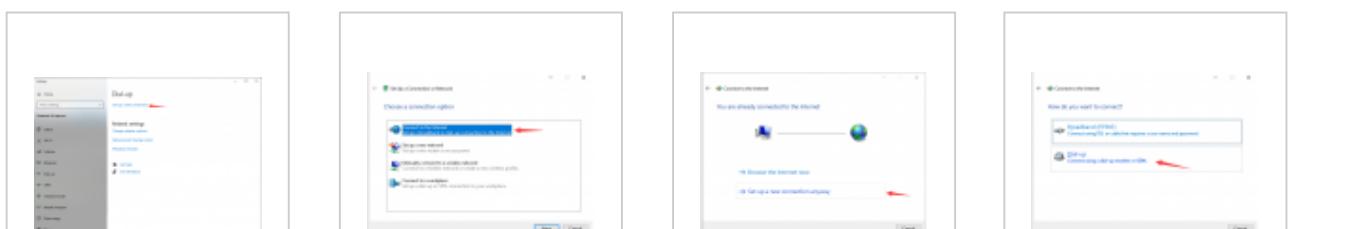
```
AT$QCRM CALL=1,1
```

And then press 'Enter'. At this time, NDIS dialing will take effect, and the PC can connect to the network.

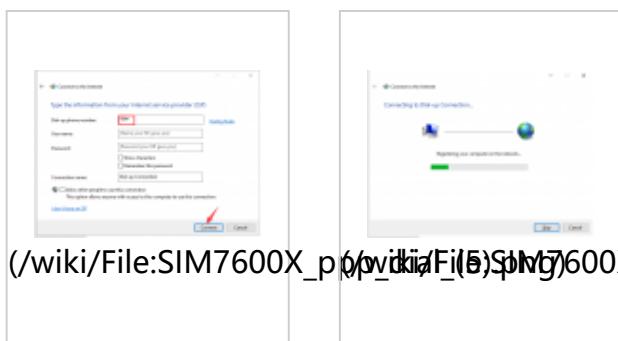


(/wiki/File:Sim8200_win_sendat1.png.png)

- If you still can't connect automatically, you can use PPP dial-up. The operation steps are as follows:



(/wiki/File:SIM7600X_ppp_dial_F(1).png)(/wiki/File:SIM7600X_ppp_dial_F(2).png)(/wiki/File:SIM7600X_ppp_dial_F(3).png)(/wiki/File:SIM7600X_ppp_dial_F(4).png)



(/wiki/File:SIM7600X_ppp_dial_F(5).png)(/wiki/File:SIM7600X_ppp_dial_F(6).png)

GPS debugging

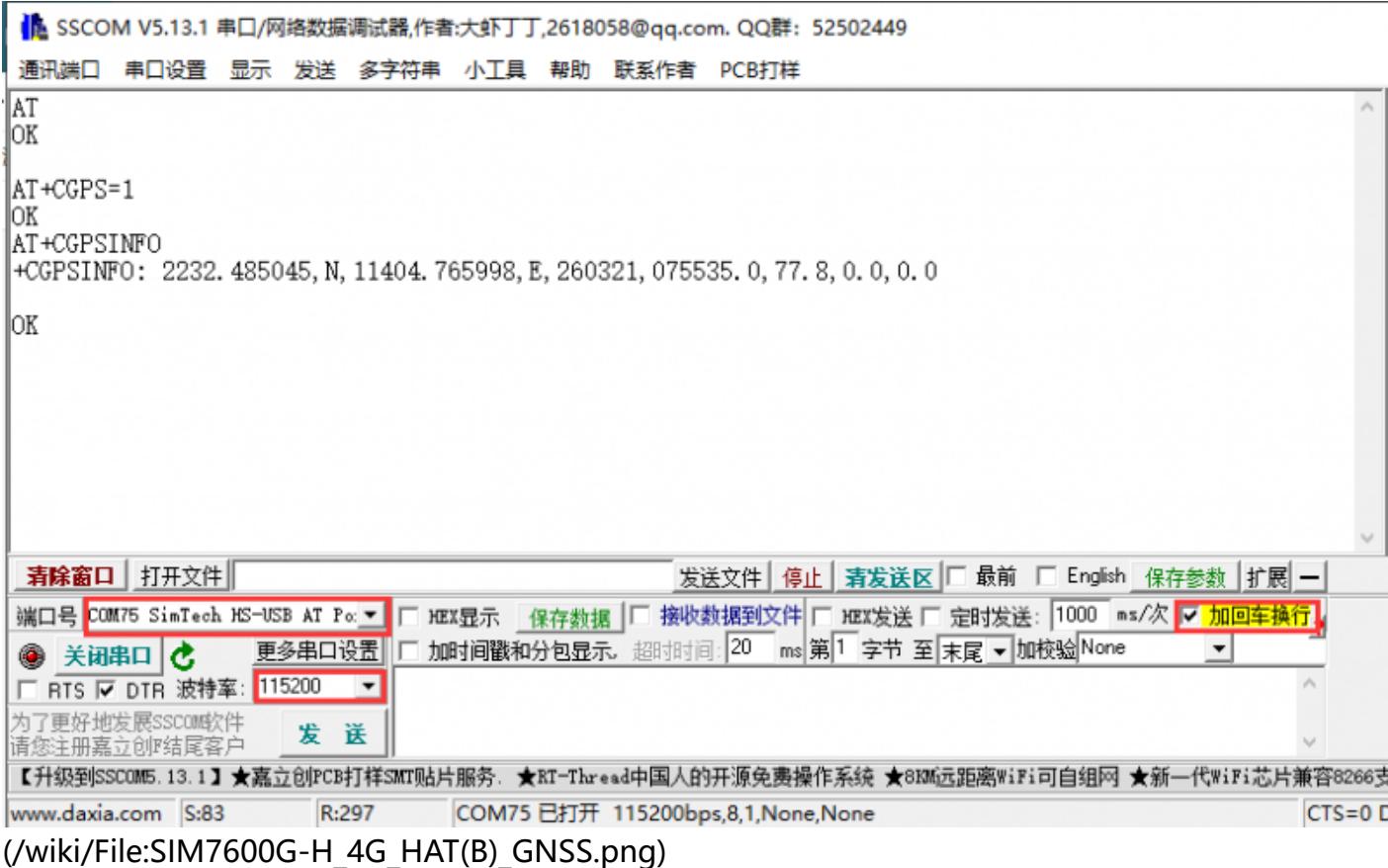
- Plugin the GPS antenna and place the 4G HAT in an open outdoor (note that it cannot be tested in rainy weather). It takes about 1 minute to receive the positioning signal after power-on;



(/wiki/File:SIM7600G-H-4G-HAT-B-details-9.jpg)

The test commands and screenshots are as follows:

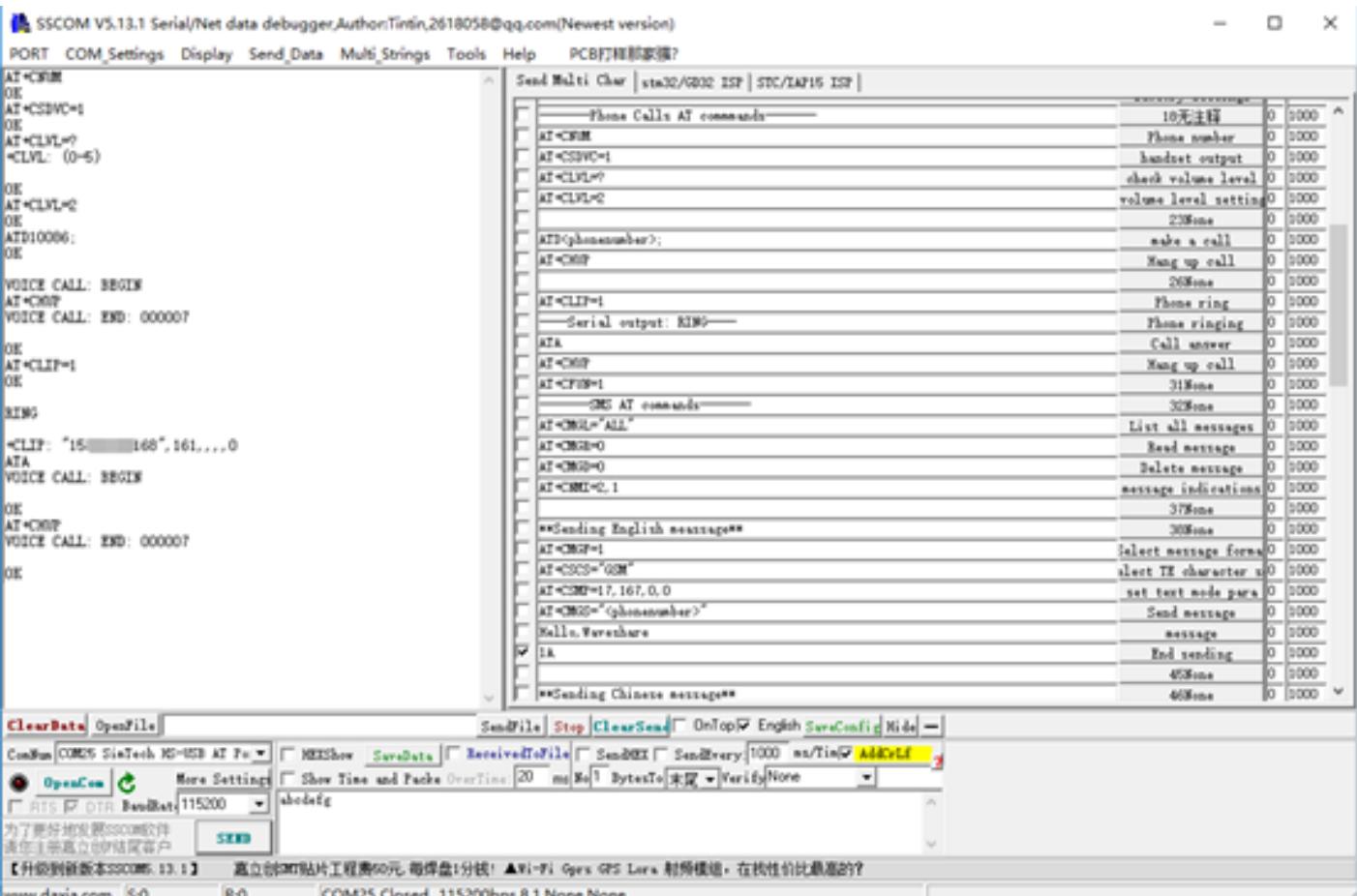
```
AT+CGPS=1          //Open GPS
AT+CGPSINFO        //Print GPS information to the serial port
AT+CGPS=0          //Close GPS
```



Make calls and answer

- Insert the SIM card, connect the LTE antenna and connect the USB interface of SIM7600E-H 4G HAT to PC, Then press the PWRKEY to power on the board!
- Check whether the indicators blink correctly (PWR's and NET's flashes)
- Send AT commands as bellow:

Commands	Description	Return
AT+CNUM	Phone number (only supported by some SIM cards)	+CNUM OK
AT+CSDVC	AT+CSDVC=1: Handset output AT+CSDVC=3: Speaker output	OK
AT+CLVL=?	Check volume level	OK
AT+CLVL=2	Volume level set to 2	OK
ATD<phone_number>;	Make calls	OK
AT+CHUP	Hang up call	OK
AT+CLIP=1	Phone ring	OK
ATA	Answer call	OK



(/wiki/File:Sim7600CE-5.png)

Voice output mode and volume adjustment

```

AT+CSIM=1          //Switch to earphone
AT+CSIM=3          //Switch to speaker
AT+CLVL=?         //Query the volume range. If it returns +CLVL: (0-5), it means that
                  the volume is adjustable from 0 to 5
AT+CLVL=2          //Set the volume to 2, return to OK

```

Answer the phone

```

Display the serial port of incoming call: RING
Send "ATA"           //Answer the call
Send "AT+CHUP"        //Hang up the call

```

Audio parameter debugging

```

AT+CACDBFN=?        // It is recommended to consider setting this set of parameters
+CACDBFN: (Handset_cal.acdb,Handset_tianmai.acdb)
OK

```

- In the initialization phase of the module startup, before making a call, add the following

```
AT^PWRCTL=0,1,3          // Improve TDD noise effect
OK
```

- During the establishment of a voice call

```
VOICE CALL:BEGIN      // Module call establishment and execution to improve call effect
AT+CECM=1           //Echo suppression processing
OK
AT+CECH=0x500        //Improve the volume effect of the mobile phone
OK
```

For more details, please check the file of "SIM7X00_Audio_Application_Note".

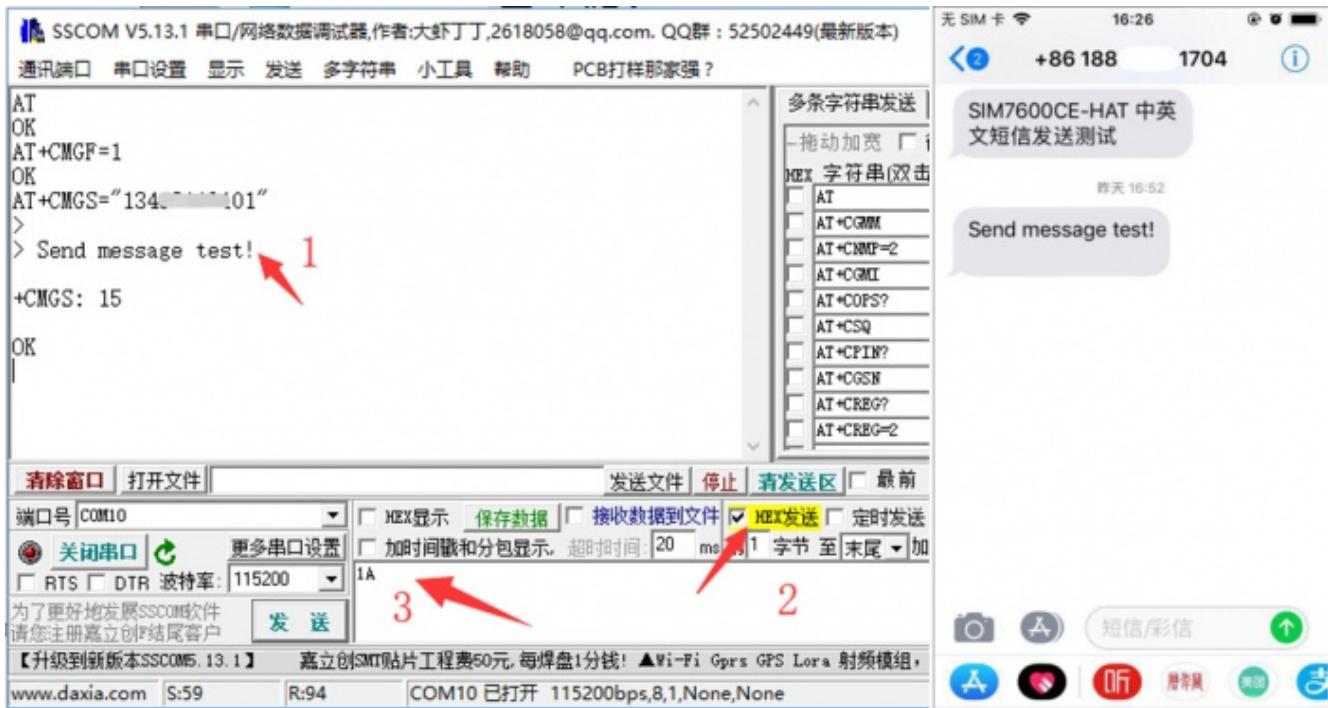
Send the message

- 1. Plug the SIM card, connect the LTE antenna and connect the USB interface of the 4G HAT to PC, and power on the device.
- 2. Check whether the indicators blink correctly: the PWR indicator is always on, and the NET indicator is flashing.
- 3. Send AT commands as bellow:

```
AT+CMGF=1      //Set the message mode to TEXT;
```

- 4. Enter AT+CMGS="phone number" and then press <Enter> to set the recipient's mobile phone number, then this command will return: ">". And then you can enter the content to be sent, such as "Send message test!", and don't need to check 'AddCrLf'. After editing the message, send the information in HEX format, enter 1A in the send box, and then click SEND. After sending successfully, the module will return +CMGS: 15. You can see in the picture below:

【Note】: 1A is the key value of "CTRL+Z", which is used to tell the module to perform the sending operation. You can also send 1B that is "ESC" to cancel the current operation.



(/wiki/File:Sim7600CE-6.jpg)

Receive the message

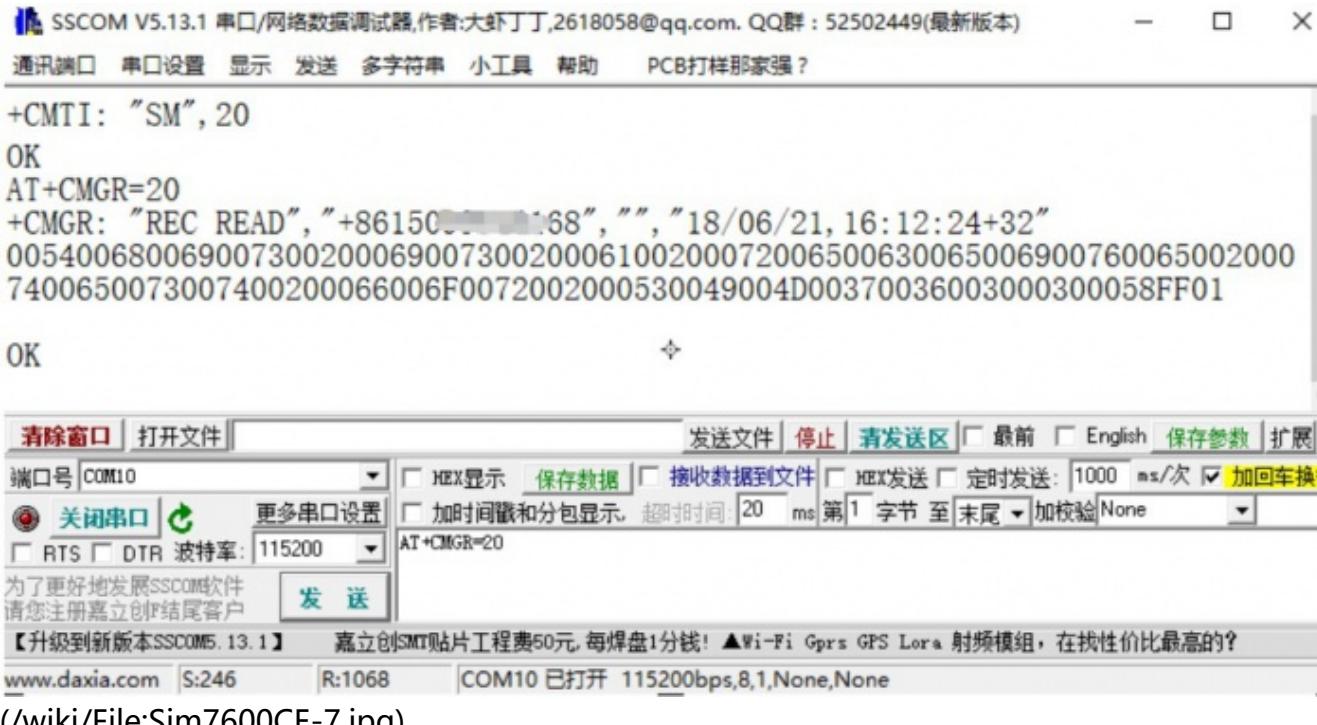
- 1. Send a message with your phone, such as "This is a receive test for SIM7600X!" to the module.
- 2. When receiving the information, the serial port will automatically report the information, "SM", 20, which means there are 20 messages in the SM, and the message just sent is the 20th message.
- 3. Read the message:

```
AT+CMGR=20      //Read the 20th information (AT+CMGL="ALL" means to read all the information);
```

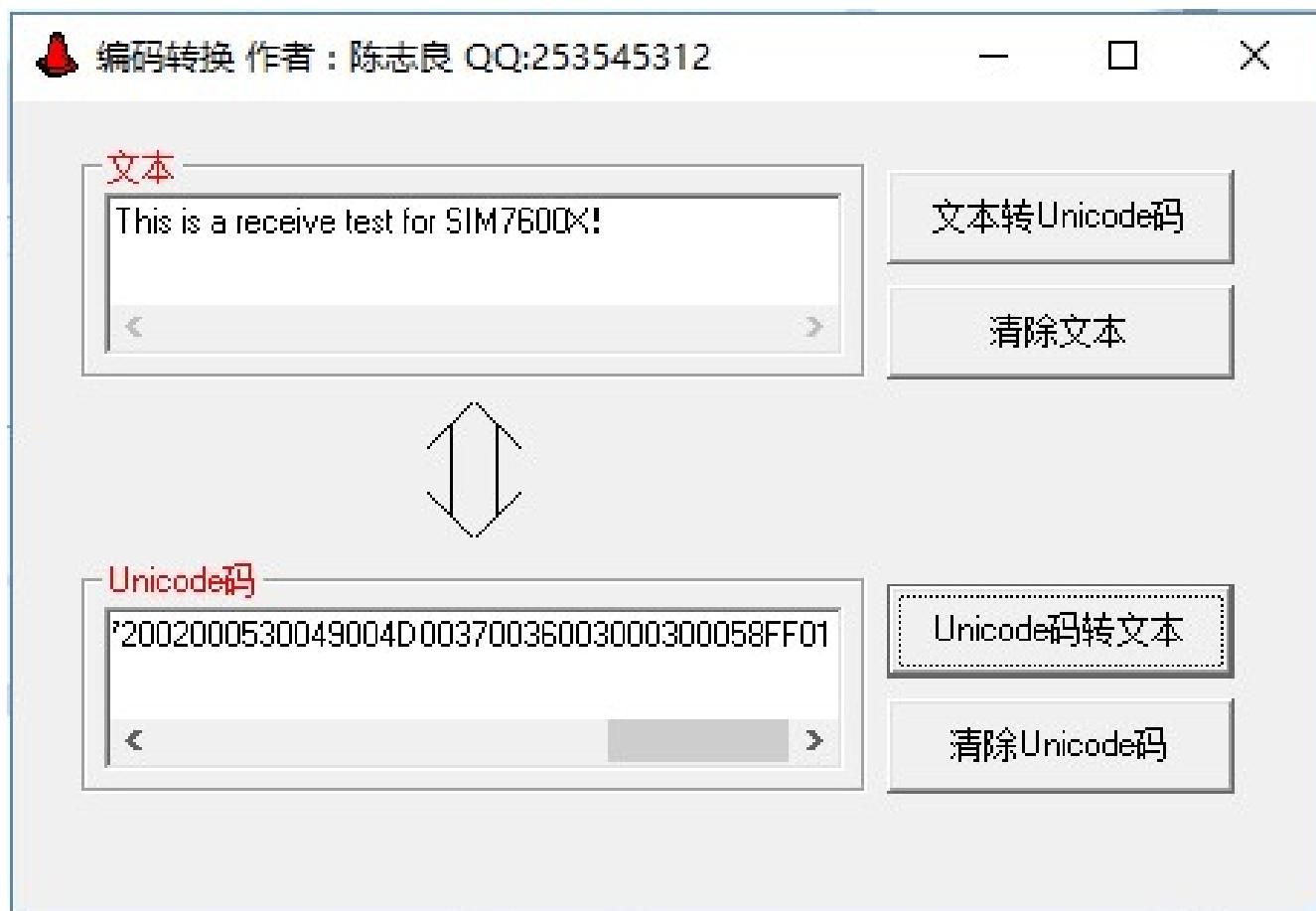
- 4. Delete the message:

```
AT+CMGD=20
```

- 5. Convert the displayed information into a text through a code converter



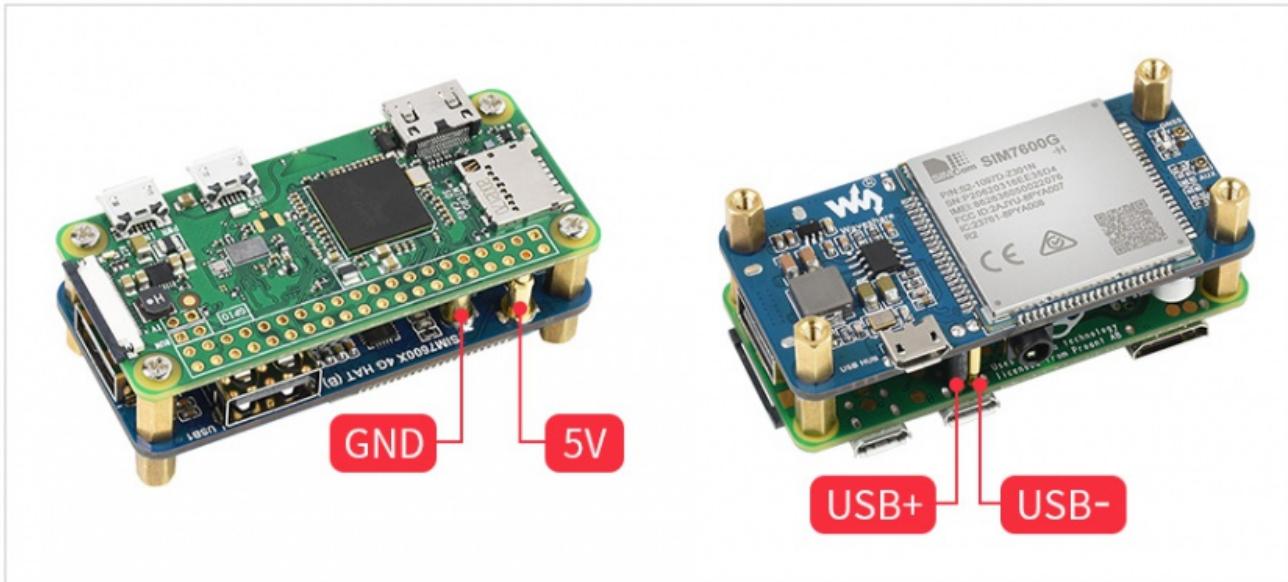
(/wiki/File:Sim7600CE-7.jpg)



(/wiki/File:Sim7600CE-8.jpg)

Dial-up Networking with Raspbian

- When using Raspberry Pi Zero/Zero W, you can connect it to the 4G HAT through the thimble, no additional USB cable is required;
- if it is used on other Raspberry Pi boards, you can connect the 4G HAT to the Raspberry Pi through a Micro USB cable. The connection is as follows:



(/wiki/File:SIM7600G-H-4G-HAT-B-details-3.jpg)

- And use the following method to Dial-up Networking
- Raspberry Pi networked via RNDIS (/wiki/Raspberry_Pi_networked_via_RNDIS)
- Raspberry Pi networked via NDIS (/wiki/Raspberry_Pi_networked_via_NDIS)
- SIM868 PPP Dail-up Networking (/wiki/SIM868_PPP_Dail-up_Networking)
- How to turn Raspberry Pi Zero W into a 3G 4G Router (https://www.waveshare.com/wiki/How_to_set_up_Raspberry_Pi_Zero_W_as_a_3G_4G_router)

Minicom serial debugging

- 1. Connect the HAT to your Pi through the USB cable.

- 2. Install minicom

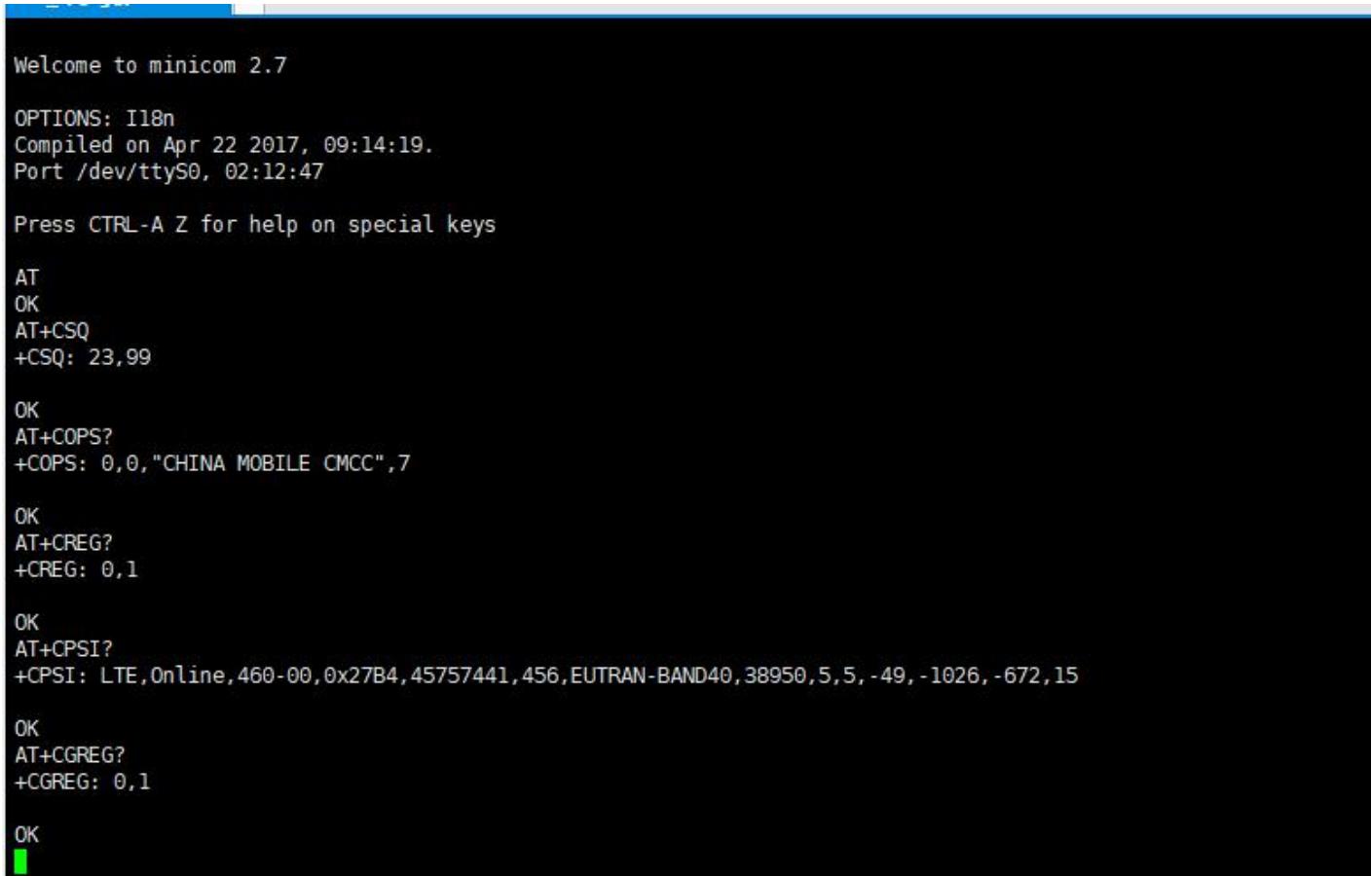
```
sudo apt-get install minicom
```

- 3. Execute the following command

```
sudo minicom -D /dev/ttyUSB2
```

The default baud rate is 115200.

- 4. Take the AT synchronization test as an example, send related commands, as shown in the picture below:



```
Welcome to minicom 2.7

OPTIONS: I18n
Compiled on Apr 22 2017, 09:14:19.
Port /dev/ttyS0, 02:12:47

Press CTRL-A Z for help on special keys

AT
OK
AT+CSQ
+CSQ: 23,99

OK
AT+COPS?
+COPS: 0,0,"CHINA MOBILE CMCC",7

OK
AT+CREG?
+CREG: 0,1

OK
AT+CPSI?
+CPSI: LTE,Online,460-00,0x27B4,45757441,456,EUTRAN-BAND40,38950,5,5,-49,-1026,-672,15

OK
AT+CGREG?
+CGREG: 0,1

OK
```

(/wiki/File:Sim7600CE-29.jpg)

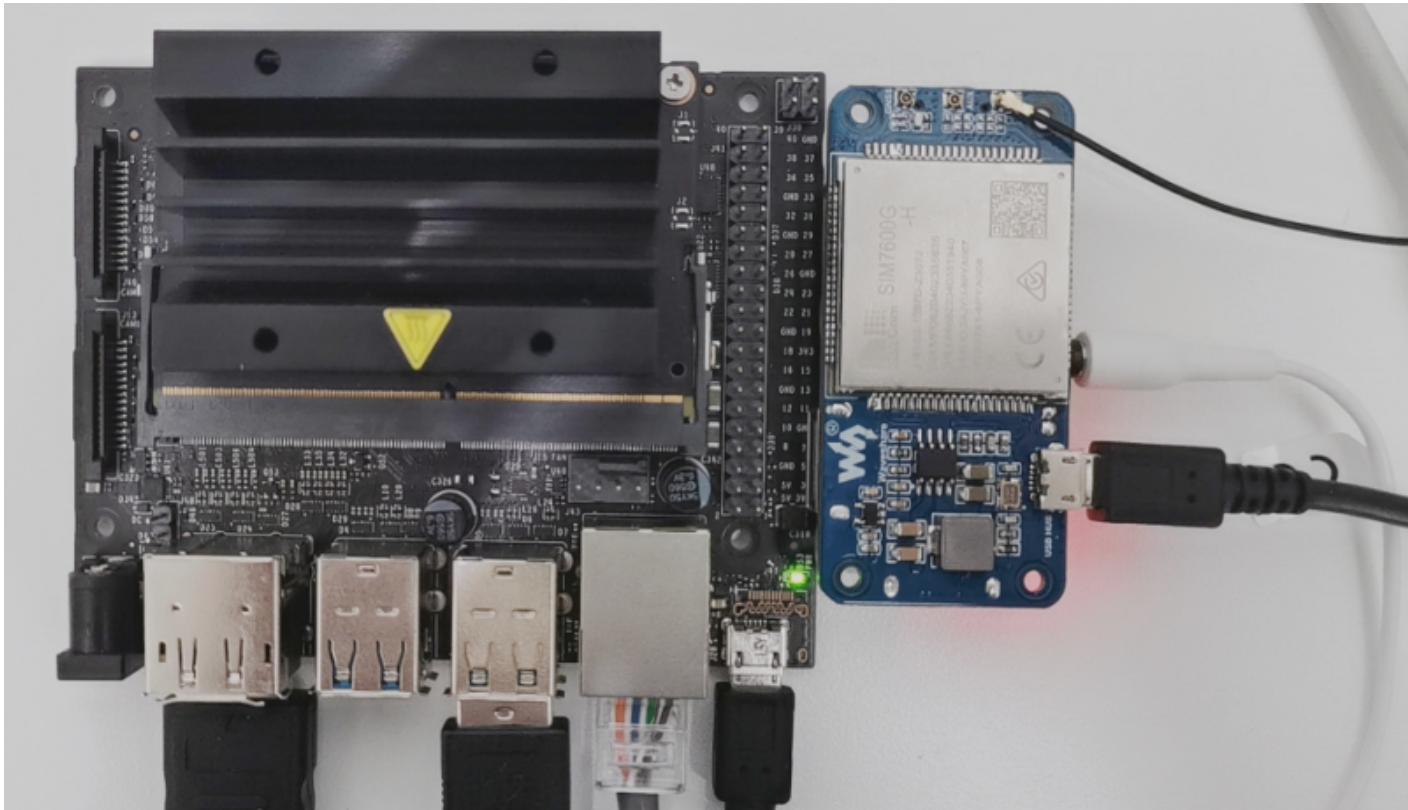
Press Ctrl+A, then press Z, the minicom can enter the setting mode, and press X to exit.

More demo programs continue to be updated...

Jetson Nano Demo

Hardware connection

Connect the SIM7600X 4G HAT(B) to the USB port of Jetson Nano via Micro USB cable, as shown in the picture below:



(/wiki/File:SIM7600G-H_4G_HAT_Jetson_nano.png)

Minicom serial debugging for Jetson Nano

- Connect the SIM7600X 4G HAT(B) to Jetson Nano through the USB cable.
- Use SERIAL to log in to Jetson Nano terminal and install minicom:

```
sudo apt-get install minicom
```

- Run minicom for debugging, enter the following command in the terminal:

```
sudo minicom -D /dev/ttyUSB2 -b 115200
```

- Send AT command to test

```
root@waveshare-desktop:/home/waveshare# sudo minicom -D /dev/ttyUSB2 -b 115200
Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Aug 13 2017, 15:25:34.
Port /dev/ttyUSB2, 12:11:21

Press CTRL-A Z for help on special keys

AT
OK
AT+CSQ
+CSQ: 24,99
OK
```

(/wiki/File:SIM7600_G-H_B_Jetson.png)

Press Ctrl+A, then press X to exit the minicom.

More demo programs continue to be updated...

Resources

Document

- SIM7600G-H 4G HAT (B) Schematic (https://www.waveshare.com/w/upload/f/fe/SIM7600_X_4G_HAT_%28B%29.pdf)

Demo

- SIM7600G-H 4G HAT (B) Demo (<https://www.waveshare.com/w/upload/4/4e/SIM7600X-4G-HAT%28B%29-Demo.7z>)

Tools

- sscom (with sim7600 AT commands) (/wiki/File:SIM7600-AT-SSCOM-EN.7z)
- SIMCom GPS (/wiki/File:SIMCom_GPS_DEMO.7z)
- NetAssist (/wiki/File:NetAssist.7z)

Related Application Cases

How to turn Raspberry Pi Zero W into a 3G 4G Router (https://www.waveshare.com/wiki/How_to_set_up_Raspberry_Pi_Zero_W_as_a_3G_4G_router)

Application Note

- SIM7X00 Series_GPIO_Application Note
([/wiki/File:SIM7X00_Series_GPIO_Application_Note_V1.00.pdf](#))
- SIM7X00 Series_SAT_Application Note
([/wiki/File:SIM7X00_Series_SAT_Application_Note_V1.00.pdf](#))
- SIM7X00 Series_SMS_Application Note
([/wiki/File:SIM7X00_Series_SMS_Application_Note_V1.00.pdf](#))
- SMS Application notes ([/wiki/File:AN_SMS_V1.01.pdf](#))
- SIM7X00 Series_TCPIP_Application Note
([/wiki/File:SIM7X00_Series_TCPIP_Application_Note_V1.00.pdf](#))
- SIM7600 Series_HTTP_AT Command Manual
([/wiki/File:SIM7500_SIM7600_SIM7800_Series_HTTP_AT_Command_Manual_V1.00.pdf](#))
- SIM7600 Series_SSL_AT Command Manual
([/wiki/File:SIM7500_SIM7600_SIM7800_Series_SSL_AT_Command_Manual_V1.00.pdf](#))
- SIM7X00 Series_UART_Application Note
([/wiki/File:SIM7X00_Series_UART_Application_Note_V1.00.pdf](#))
- SIM7X00 Series_GPS_Application Note
([/wiki/File:SIM7X00_Series_GPS_Application_Note_V1.00.pdf](#))
- SIM7600 Series_MQTT_ATC ([/wiki/File:SIM7500_SIM7600_Series_MQTT_ATC_V1.01.pdf](#))
- SIM7X00_Audio_Application_Note
([/wiki/File:SIM7X00_Audio_Application_Note_V1.00.pdf](#))
- SIM7600_Sleep Mode_Application Note
([/wiki/File:SIM7100_SIM7500_SIM7600_Sleep_Mode_Application_Note_V1.01.pdf](#))
- SIM7600 Series_LBS_Application Note
([/wiki/File:SIM7100_SIM7500_SIM7600_Series_LBS_Application_Note_V1.00.pdf](#))
- SIM7600 Series_USB AUDIO_Application Note
([/wiki/File:SIM7100_SIM7500_SIM7600_Series_USB_AUDIO_Application_Note_V1.03.pdf](#))
- SIM7600 Series_UIM HOT SWAP_Application Note
([/wiki/File:SIM7100_SIM7500_SIM7600_Series_UIM_HOT_SWAP_Application_Note_V1.01.pdf](#))
- SIM7600M22 Series_TTS_Application Note
([/wiki/File:SIM7100_SIM7600M22_Series_TTS_Application_Note_V1.02.pdf](#))
- SIM7600 Series_HSIC_LAN_Application_Note
([/wiki/File:SIM7600_Series_HSIC_LAN_Application_Note_V1.00.pdf](#))
- SIM7600 Series Hardware Design ([/wiki/File:SIM7600_Series_Hardware_Design_V1.02.pdf](#))
- SIM7600G-H Hardware Design ([/wiki/File:SIM7600G_SIM7600G-H_Hardware_Design_V1.00.pdf](#))

FAQ

Question:What is the difference between RNDIS, NDIS, PPP, and ECM?

Answer:

The IP obtained by different dialing methods is different and has different characteristics. Please refer to the following table for details:

接口	拨号方式	PID	模块	内核配置	设备节点	网卡/IP	特点
USB网卡	PPP		高通/ASR	CONFIG_PPP CONFIG_USB_SERIAL CONFIG_USB_SERIAL_WWAN CONFIG_USB_SERIAL_OPTION	ttyUSB	ppp0 运营商IP	1. 通过串口拨号,无需网卡驱动 2. 使用广泛,从2G 3G时代沿用下来 3. 速度慢
	NDIS/QMI	9001	高通	CONFIG_USB_WDM CONFIG_USB_USBNET CONFIG_USB_NET_QMI_WWAN 内核版本3.4及以上	cdc_wdm	wwan0/qmimux0 运营商IP	1. 需要使用我们提供的网卡驱动 2. 支持QMAP,适合高速应用
	RNDIS	9011	高通/ASR	CONFIG_NETDEVICES CONFIG_USB_USBNET CONFIG_USB_USB_RNDIS_HOST		usb0 高通: 模块局域网IP ASR: 运营商IP/ 模块局域网IP	1. 系统自带驱动 2. 内部自动拨号
	ECM	9018/ 9011	高通/ASR	CONFIG_NETDEVICES CONFIG_USB_USBNET CONFIG_USB_NET_CDCETHER		usb0 高通: 模块局域网IP ASR: 运营商IP/ 模块局域网IP	1. 系统自带驱动 2. 内部自动拨号
	MBIM	9003/ 901E	高通	CONFIG_NETDEVICES CONFIG_USB_USBNET CONFIG_USB_NET_CDC_MBIM 内核版本3.18及以上	cdc_wdm	wwan0/qmimux0 运营商IP	1. 系统自带驱动 2. 支持QMAP,适合高速应用

(/wiki/File:Dial-PPP-ECM-RNDIS.png)

Below is a detailed description of the various dials:

- NDIS driver for Internet access (9001 mode)

This method must depend on the Linux system, and is suitable for application scenarios that need to be developed using Linux network socket programming. After loading the driver into the kernel, connect the SIM7600 to the motherboard with a USB cable. After the SIM7600 is turned on, the wwan0 network can be recognized. port, you can access the Internet through this network port. The bottom layer of this method depends on the USB virtual serial port of SIM7600. This dial-up method can obtain the IP provided by the public operator, and the network speed is faster.

- RNDIS (9011 mode)

RNDIS refers to Remote NDIS. The implementation of RNDIS based on USB is actually TCP/IP over USB, which is to run TCP/IP on the USB device, making the USB device look like a network card. This method only needs simple configuration, the motherboard will recognize the usb0 network card, and quickly obtain the usb0 network card and module or the operator's IP network access; RNDIS network speed is relatively fast, which is one of the most commonly used dial-up methods.

- ECM (9018 mode)

These two are the "NDIS" standard under Linux. ECM is the abbreviation of Ethernet Networking Control Model. ECM meets the requirements of CDC on USB. The data call established through standard CDC-ECM is routed through the router, and the obtained IP address is a private IP such as 192.168; if the kernel supports this way, no additional driver is required. All data interacting with the module through the USB bus is constrained by relevant protocols and standards, and the module reaches the module through the USB hardware to complete the interaction with the Linux motherboard.

- PPP dial-up

This method must depend on the Linux system, and is suitable for application scenarios that need to be developed using Linux network socket programming. After configuring and running the relevant scripts, connect the SIM7600 with a USB cable. After the SIM7600 is powered on, dial up the pppd script to identify it. To the ppp0 network port, you can access the Internet through this network port and obtain the operator's IP. The bottom layer of this method depends on the USB virtual serial port of SIM7600.

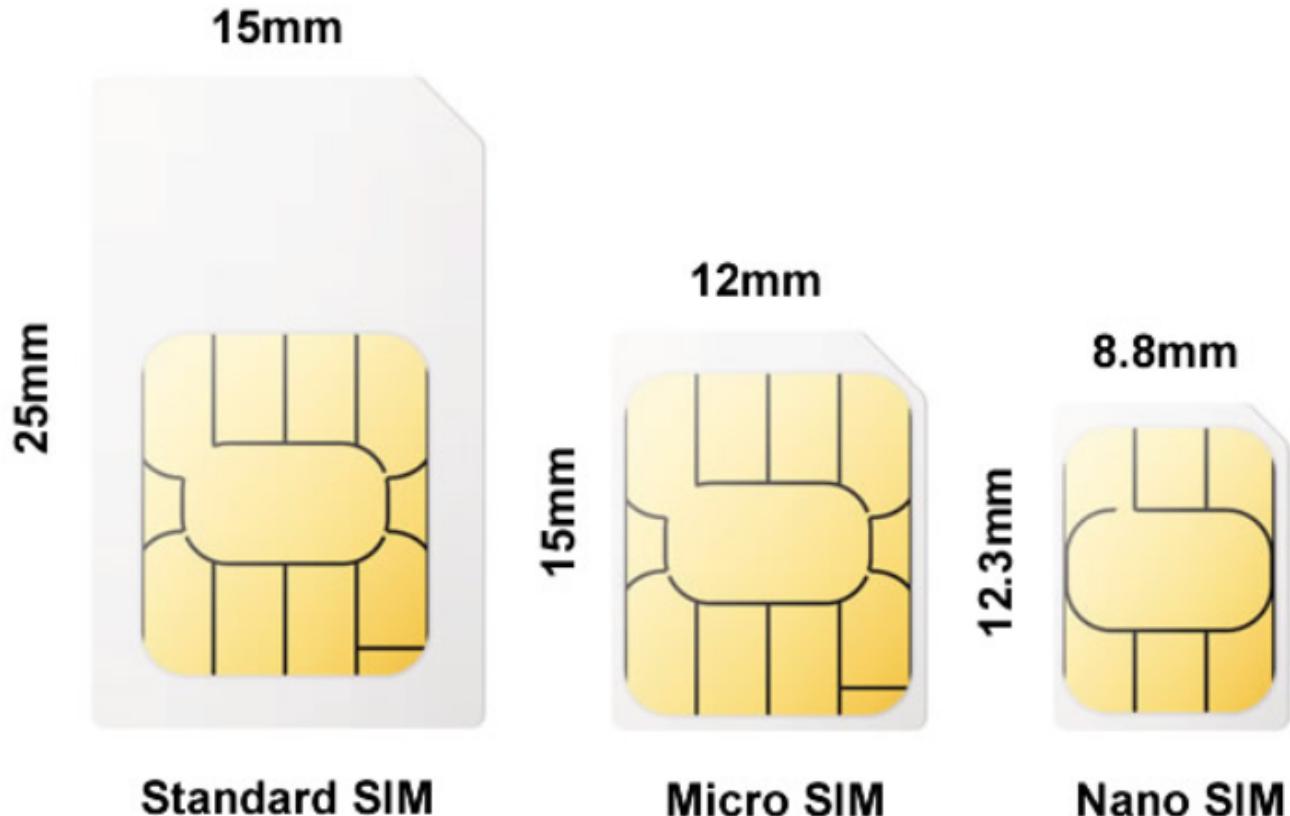
- AT command uses encapsulated TCP, MQTT, HTTP(S)

This method is suitable for microprocessors with limited resources, such as MCU, or for application scenarios with a relatively small amount of data, such as uploading sensor data to servers, cloud platforms, etc. through http(s), MQTT. If the network application is not complicated and the amount of data is relatively small (such as transmitting sensor data to the server and receiving control commands from the server), the function can be quickly used by using AT commands.

Question: Type of SIM card?

Answer:

Support Nano SIM card:



(/wiki/File:SIM_card_size.png)

Question: The NET light does not flash after the SIM7600X is turned on, what should I do if the network is abnormal?

Answer:

In this case, it may be that you have not successfully connected to the network, you can follow the steps below to troubleshoot:

1. First check the hardware connection:

- Check if the MAIN antenna is well connected;
- Whether the connected SIM card can call and surf the Internet normally on mobile phones and other devices;
- If the Raspberry Pi is connected, whether the module enters airplane mode;

2. After confirming that there is no problem with the hardware, the software can use these instructions:

- Check whether the sim card is in good contact: AT+CPIN?
- Check if the network mode setting is correct: AT+CNMP?
- Check the signal quality of the current environment: AT+CSQ
- Check the operator's access situation: AT+COPS?

- Check the connection status: AT+CPSI?
- Check whether it is successfully registered to the network: AT+CGREG?

AT+CPIN?

+CPIN: READY

OK

AT+CNMP?

+CNMP: 2

OK

AT+CSQ

+CSQ: 23, 99

OK

AT+COPS?

+COPS: 0, 0, "CHINA MOBILE CMCC", 7

OK

AT+CPSI?

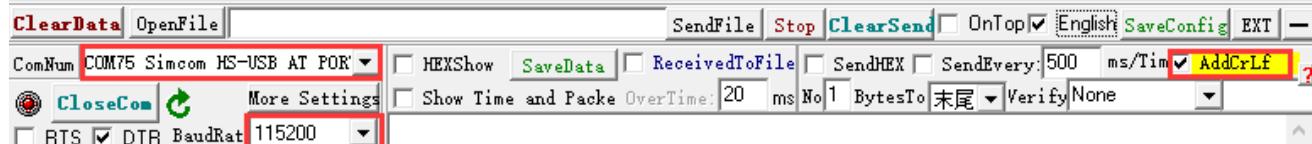
+CPSI: LTE, Online, 460-00, 0x27B4, 205523841, 70, EUTRAN-BAND40, 38950, 5, 5, -101, -945, -645, 17

OK

AT+CGREG?

+CGREG: 0, 1

OK



Question: What are the models of SIM7600X series?

Answer:

SIM7600X mainly includes but is not limited to the following models:

模组型号	SIM7600A-H	SIM7600V-H	SIM7600E-H	SIM7600E-H1C(D)	SIM7600JC-H	SIM7600SA-H	SIM7600SA-H-MN5E	SIM7600NA-H	SIM7600G-H (R2)
网络制式	LTE CAT 4 150M/50M	LTE CAT 4 150M/50M	LTE CAT 4 150M/50M	LTE CAT 4 150M/50M	LTE CAT 4 150M/50M	LTE CAT 4 150M/50M	LTE CAT 4 150M/50M	LTE CAT 4 150M/50M	LTE CAT 4 150M/50M
尺寸大小	30mm*30mm*2.9mm	30mm*30mm*2.9mm	30mm*30mm*2.9mm	30mm*30mm*2.9mm	30mm*30mm*2.9mm	30mm*30mm*2.9mm	30mm*30mm*2.9mm	30mm*30mm*2.9mm	30mm*30mm*2.9mm
模组封装	87pin LCC	87pin LCC	87pin LCC	87pin LCC	87pin LCC	87pin LCC	87pin LCC	119pin LCC+LGA	119pin LCC+LGA
频段	LTE-FDD: B2/4/12 UMTS/HSPA+: B2/5	LTE-FDD: B2/4/5/13	LTE-TDD: B38/40/41 LTE-FDD: B1/3/5/7/8/20 UMTS/HSPA+: B1/5/8 GSM: 900/1800MHz	LTE-TDD: B38/40/41 LTE-FDD: B1/3/5/7/8/20 UMTS/HSPA+: B1/5/8 GSM: 900/1800MHz	LTE-FDD: B1/3/8/18/ 19/26	LTE-FDD: B1/2/3/4/5/7/8/28 LTE-TDD: B40 UMTS/HSPA+: B1/2/5/ 8 GSM: 850/900/1800/1900MHz	LTE-FDD: B1/2/3/4/5/7/8/28 LTE-TDD: B40 UMTS/HSPA+: B1/2/5/ 8 GSM: 850/900/1800/1900MHz	LTE-FDD: B2/4/5/12/13/14/25/26/6 LTE-TDD: B3/4/8/9/40/41 6/7/1 LTE-TDD: B41	LTE-FDD: B1/2/3/4/5/7/8/12/13/18/ 19/20/25/26/20/66 UMTS/HSPA+: B1/2/4/5/6/8/19 GSM: 850/900/1800/1900MHz
GNSS定位	可选	可选	可选	可选	可选	可选	可选	可选	可选
AT命令集	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
语音	可选	可选	可选	可选	可选	可选	可选	可选	可选
区域地区	北美地区 AT&T	北美地区 Verizon	欧洲以及中东	欧洲以及中东	日本	澳大利亚,新西兰 台湾,拉丁美洲	澳大利亚,新西兰 台湾,拉丁美洲	北美运营商 AT&T, Verizon, Sprint, T-mobile	全球
认证	FCC/PTCRB/IC/AT&T ROHS/REACH	FCC/GCF/Verizon/ ROHS/REACH	CE/NCC/GCF/ Vodafone*/ ROHS/REACH	CE/ ROHS*/REACH*	Telec/Jate/Softbank/ Docomo	CE/RCM/FCC/NCC/An FCC*/IC*/PTCRB*/GC F* atel/ ROHS/REACH/	CE/RCM/FCC/NCC/An FCC*/IC*/PTCRB*/GC F* atel/ ROHS/REACH/ AT&T*/Verizon*/Sprint*	CE/RCM*/FCC/IC/PTCRB*/ GCF* AT&T*/Verizon* on going	CE/RCM*/FCC/IC/PTCRB*/ GCF* AT&T*/Verizon*

(/wiki/File:SIM7600X_4G_DONGLE.PNG)

Question:What does the positioning information obtained by SIM7600X through AT+CGPSINFO represent?

Answer:

From left to right are ① Latitude, ② Longitude, ③ Date, ④ Time, ⑤ Altitude, ⑥ Speed and ⑦ Navigation Angle.

Question:What should I do if I can't receive the GPS signal and get the location information?

Answer:

Plug in the GPS antenna to the GNSS antenna socket, and place the receiver label face down in an open space (note that it cannot be tested in rainy weather). It takes about 1 minute to receive the positioning signal after power-on;

Question:After the GPS is turned on, why does the NMEA port not print the corresponding GPS information?

Answer:

Restart SIM7600E-H after sending the following commands:

```
AT+CGPSNMEAPORTCFG=3  
AT+CGPSNMEA=197119  
AT+CGPSINFOCFG=10,31
```

Question:How to locate the base station for SIM7600X, what is the command?**Answer:****Question:When sending AT+CPIN?, it returns ERROR****Answer:**

This problem is generally caused by poor contact between the SIM card and the SIM card socket of the module.

Question:When sending an AT command, it can return OK, but the command sent is not displayed. Why?**Answer:**

The reason is that the echo is not turned on. SIM7600X can send the following command and press Enter, and the echo is successfully turned on after the display is OK.

```
ATE1
```

Question:What should you do if you are registered to the network, dial up successfully and get an IP, but you cannot access the Internet and cannot ping through?**Answer:**

It may be that the APN has not been obtained. Generally, the APN can be obtained automatically. In some areas (IoT card), it needs to be obtained manually. For example, it can be set by the following instructions:

AT+CGDCONT=1,"IP","APN" //The APN of different operators is different, here the APN is changed to the corresponding operator, for example:

China Mobile APN: CMNET; China Unicom APN: 3GNET; China Telecom APN: CTNET

AT+CGDCONT=1,"IP","CMNET"
OK

(/wiki/File:SIM7600X_apn.png)

Question:How to make SIM7600X switch to IPV6 after dialing up the Internet?

Answer:

It can be set by the following commands:

AT+CGDCONT=1,"IPV6","APN" //Switch to IPV6, the APN of different operators is different, pay attention to distinguish the settings

AT+CGDCONT=1,"IP","APN" //Switch back to IPV4

Question:Why can I use an ordinary mobile phone SIM card that can make calls to access the Internet, but I cannot access the Internet using an IoT card (traffic card)?

Answer:

- No APN is set, configure APN as described above.
- After being banned, high-traffic (real-name IoT) cards are bound by chance cards and can only be used on one device (Ministry of Industry and Information Technology, Ministry of Public Security, must be issued to operators); The operator checks the status of the card and unlocks it.

Question:Some SIM card operators require the VOLTE function to make calls, how do I turn the VOLTE function on or off?

Answer:

The VOLTE function can be turned on with the following command:

```
at+voltesetting=1  
at+cnv=/nv/item_files/modem/mmode/ue_usage_setting,1,01,1
```

The VOLTE function can be turned off with the following command:

```
at+voltesetting=0  
at+cnv=/nv/item_files/modem/mmode/ue_usage_setting,0,01,1
```

Question:How to set the SMS center number? (SMS center number is a kind of short message server. The SMS sent by the mobile phone needs to be sent to the SMS center number first, and then forwarded to the other party's mobile phone by the SMS center number, which is equivalent to a short message transfer station.)

Answer:

```
AT+CSCA="+8613800755500"
```

Command to add + Enter, return OK. Note: China Mobile's SMS service center number is +861380xxxx500, where xxxx is the long-distance telephone area code where you are located. The SMS center may be different from place to place. For details, you can query Baidu or call the customer service of China Mobile Unicom. This SMS center is Shenzhen (0755) ;

Question:SIM7600X fails to send SMS, prompts +CMS ERROR? or CME ERROR and other errors

Answer:

- Confirm that SIM7600X is registered to the network, and confirm that the SIM card can send and receive text messages normally on mobile phones and other devices;
- Set the correct SMS center number;
- Initialize SMS settings with the following commands:

```
AT+CSCS="IRA"  
AT+CSMP=17,167,0,0
```

Question:What is the function of the AUX antenna?

Answer:

The AUX antenna can increase the downlink rate: The AUX antenna is also a diversity antenna, which plays the role of receiving signals, improves the signal reception capability, and works with the MAIN antenna to increase the downlink rate.

Question:Why return NO CARRIER after NDIS dialing on the computer?

```
AT$QCRMCA LL=1,1
```

```
[12:05:22.711] OUT → ◇ AT$QCRMCA LL=1,1  
□  
[12:05:22.714] IN ← ◆ AT$QCRMCA LL=1,1  
NO CARRIER
```

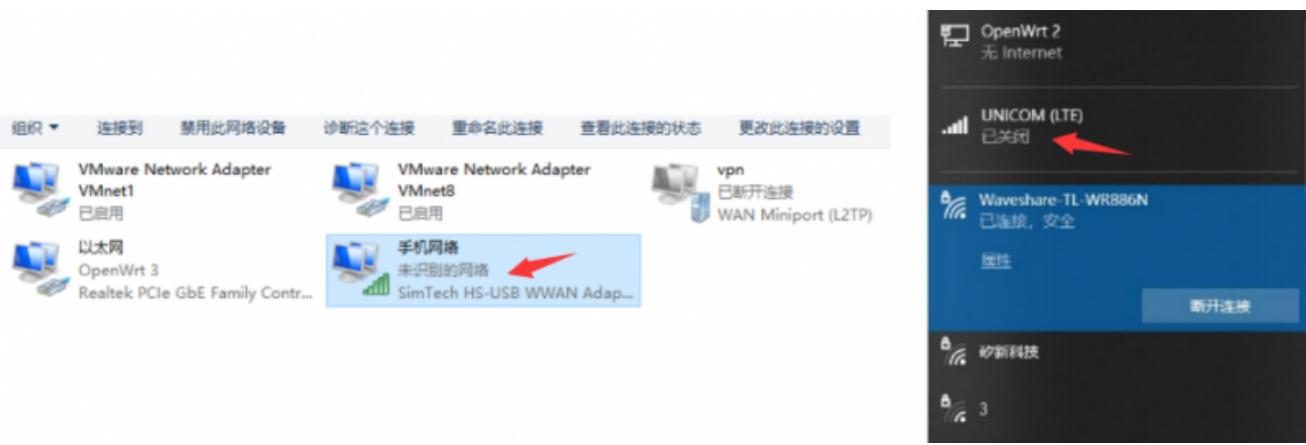
(/wiki/File:SIM7600_dial_up_no.png)

Answer:

- Under normal circumstances, SIM7600X has been automatically dialed after receiving the Windows system, and there is no need to repeat dialing. Repeated dialing will return NO CARRIER
- If you still can't dial-up Internet access, please use the following command to change to Windows default dial-up Internet access mode

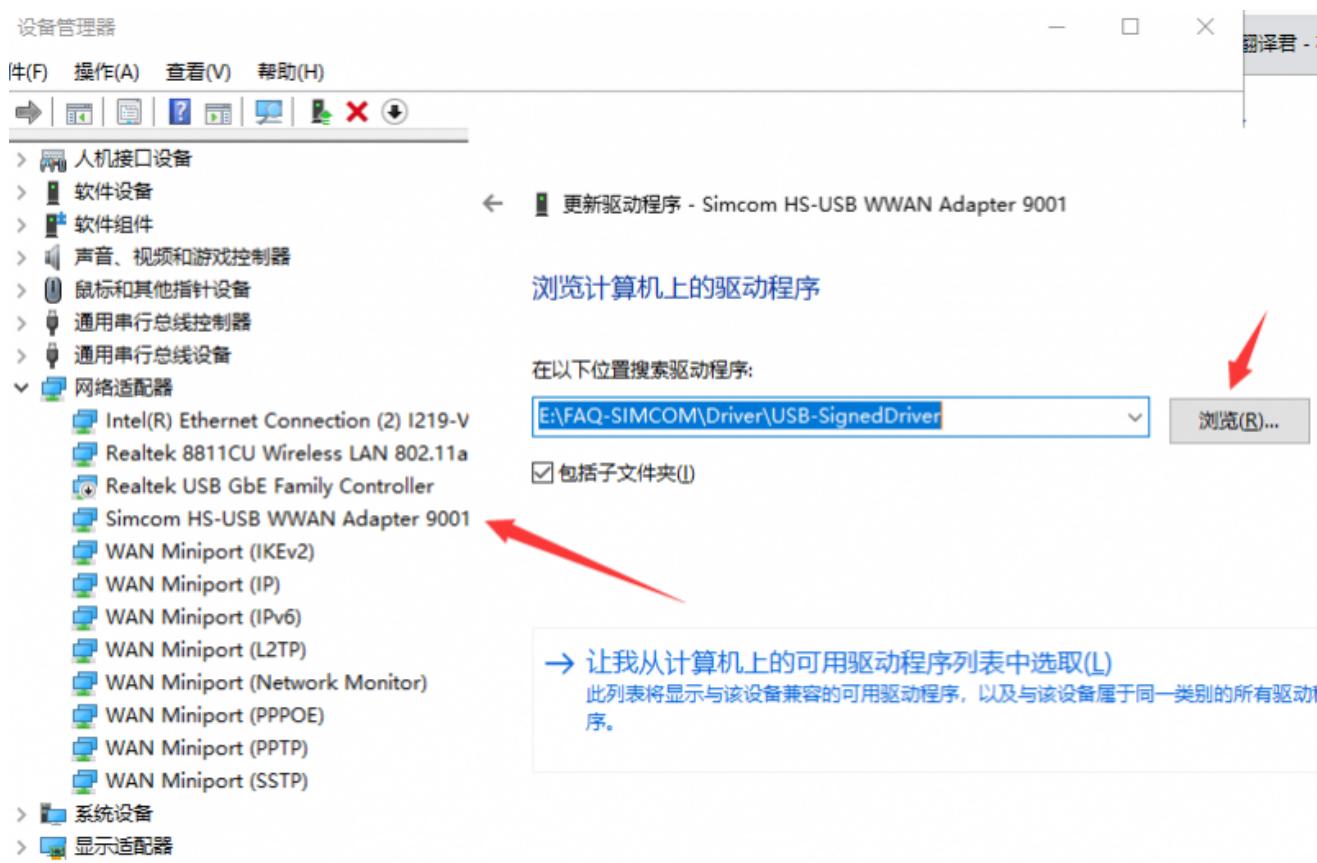
```
AT+CUSBPIDSWITCH=9001,1,1
```

- The display is turned off, the mobile network is not enabled, you can ignore it and go online directly;



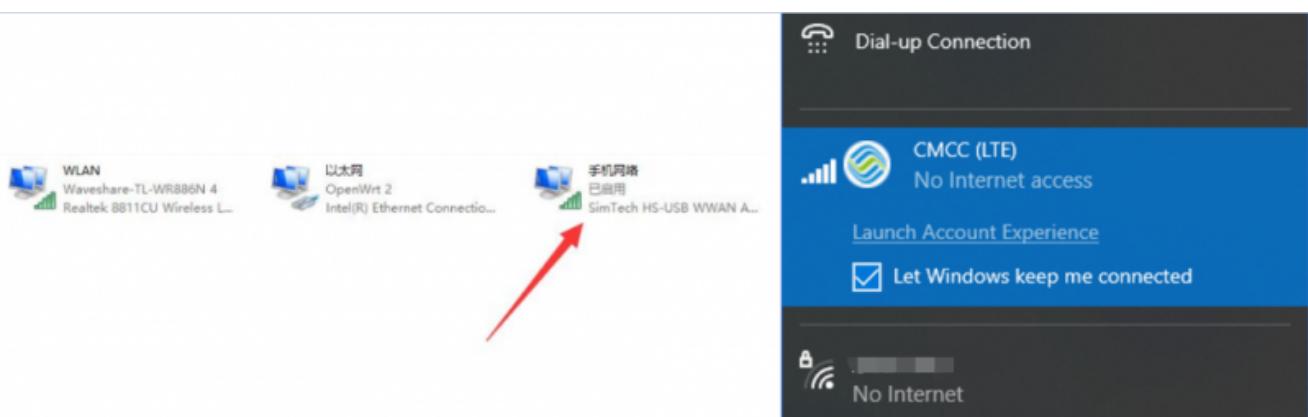
(/wiki/File:SIM7600X_rndis_dial-up_(1).png)

- You can also install the driver SIM7600X dial-up Driver (https://www.waveshare.com/w/upload/8/8a/SIM7600X_dial-up_Driver.zip) to update the network card



(/wiki/File:SIM7600X_rndis_dial-up_(2).png)

- The network card display is enabled after installing the driver



(/wiki/File:SIM7600X_rndis_dial-up_(3).png)

Question: Why is my dial-up internet speed very slow here?

Answer:

- Generally, the default configuration of SIM7600 is to automatically select the network standard, and it is likely to choose 2G Internet access; if you need to force the use of 4G mode, you need to enter the following AT command configuration:

```
AT+CNMP=38 //Fixed 4G LTE, if there is no local 4G coverage, you may not be able to register to the network
```

AT+CNMP=38

OK

AT+CPSI?

+CPSI: LTE, Online, 460-00, 0x27B4, 205523841, 70, EUTRAN-BAND40, 38950, 5, 5, -81, -1003, -709, 14

(/wiki/File:SIM7600X-FAQ_(4).png)

- If 4G has been fixed, the speed is still not ideal, it may be a frequency band problem;

```
AT+CNBP? //Back up the current frequency band (the returned frequency band information can be copied to notepad, etc.)
```

```
AT+CNBP=0x0002000000400183,0x000001E000000000,0x0000000000000021 //After returning OK, measure the speed
```

```
AT+CNBP=0x0002000004400180,0x000001E000000000,0x000000000000003F //If the speed does not improve, try this
```

AT+CNBP?

+CNBP:

0x0002000004400180, 0x4800
0042000001A0000800D5, 0x00000000000000003F

OK

AT+CNBP=0x0002000004400183, 0x000001E000000000, 0x000000000000000021
OK

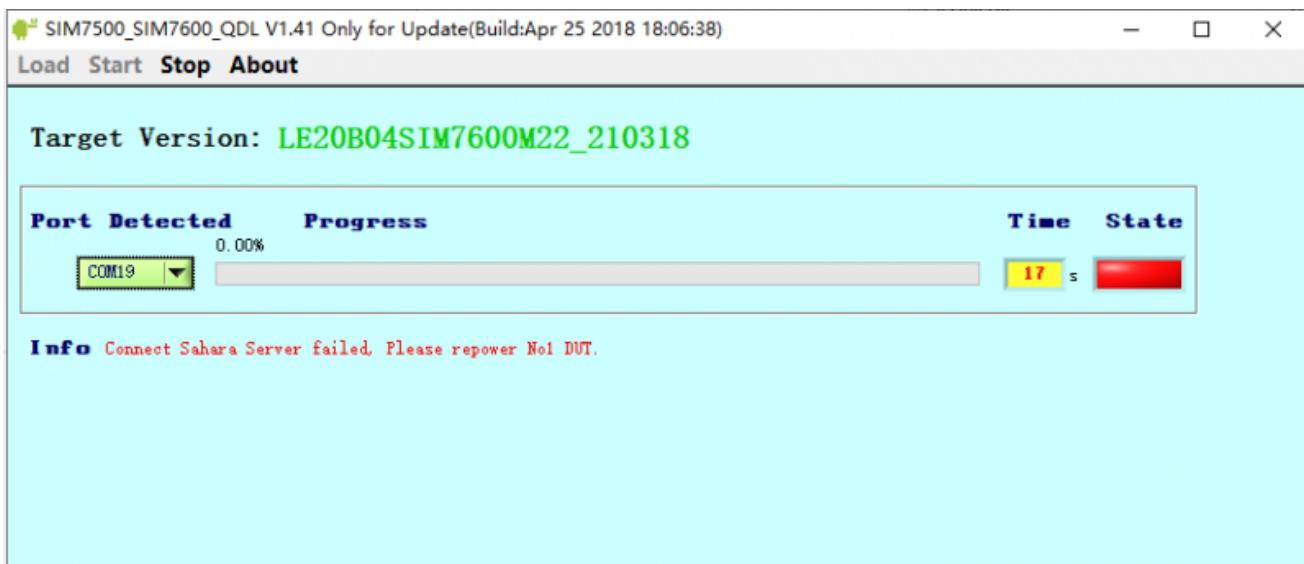
AT+CNBP=0x0002000004400180, 0x000001E000000000, 0x00000000000000003F

OK

(/wiki/File:SIM7600_band_speed.png)

Question:SIM7600 firmware upgrade failed, and the prompt is as shown in the figure below, what should I do?

Answer:



(/wiki/File:SIM7600X-FAQ_(6).png)

1. Pay attention to check the device manager, the new device will be prompted during the upgrade process, and there will be no device driver during the first upgrade;
2. Pay attention to the USB cable. The speed of the USB cable is higher during the upgrade process. You need to choose a better quality USB cable to avoid poor contact.
3. You need to run the upgrade tool with administrator privileges (SIM7500_SIM7600_QDL V1.41 only for Update)
4. Uninstall and reinstall the upgrade tool (SIM7500_SIM7600_QDL V1.41 only for Update)
5. For more operation details, please refer to this video:
[\(https://www.waveshare.net/wiki/SIM7600-Firmware-upgrade-Video\)](https://www.waveshare.net/wiki/SIM7600-Firmware-upgrade-Video)

Question:How many short messages can be stored in SIM7600CE 4G HAT?**Answer:**

If the short message is stored in the SIM card, usually 50 is the upper limit. You can use the command: AT+CPMS? Make a query

Question:What is the working current when connected to the Internet?**Answer:**

5V power supply BY USB, after the network is successfully connected, the current is generally in the range of 50~300mA, and the average is about 150mA (for reference only, depending on the network environment and network working status.)

Question:What are the antenna parameters of SIM7600CE 4G HAT?**Answer:**

*Frequency: 700m 800m 900m 1710-1920M 2010-2100M 2300-2400M 2500-2690M-5800MHZ

- Gain: 9dbi ± 0.7dbi

Question:What should I do if the SIM7600X module NDIS dialing fails and the driver cannot be installed?**Answer:**

*Make sure that your system kernel is above 5.4. Do not use sudo update to upgrade the Raspberry Pi to the latest version, otherwise the kernel version will be upgraded to a version higher than the current firmware and will not be recognized.

- It is recommended to use the more convenient RNDIS dial
- Can burn the latest Raspberry Pi Raspbian system, reconfigure NDIS dial-up
- Or use the image that has been configured with the driver NDIS dial-up and start the raspbian system image (the driver has been installed)

Question:I am using WIN7 system, what should I do if the driver installation fails?

Answer:

The new driver may not be compatible with some WIN7 systems, you can try the old driver:

SIM7600 old driver

Question:When executing the chmod 777 sim7600_4G_hat_init command, an error is reported: "chmod: cannot access 'sim7600_4G_hat_init': No such file or directory"

```
pi@raspberrypi:~ $ pwd
/home/pi
pi@raspberrypi:~ $ chmod 777 sim7600_4G_hat_init
chmod: 无法访问 'sim7600_4G_hat_init': 没有那个文件或目录
```

(/wiki/File:777sim.png)

Answer:

Please confirm that there is a sim7600_4G_hat_init file in the current path

```
pi@raspberrypi:~ $ cd SIM7600X/
pi@raspberrypi:~/SIM7600X $ ls
arduPi.cpp    AT        GPS        Makefile    sim7600_4G_hat_init  sim7x00.o
arduPi.h      bcm2835   main.cpp   PhoneCall  sim7x00.cpp       SMS
arduPi.o      FTP        main.o    sim7600     sim7x00.h        TCP
pi@raspberrypi:~/SIM7600X $ ls sim7600_4G_hat_init
sim7600_4G_hat_init
pi@raspberrypi:~/SIM7600X $ chmod 777 sim7600_4G_hat_init
pi@raspberrypi:~/SIM7600X $
```

(/wiki/File:FAQ-SIM7600X.png)

The general operation is: download the sample program, after decompression, rename the c folder under the Raspberry folder to SIM7600X, then copy the entire SIM7600X folder to the Raspberry Pi /home/pi directory, and enter the command line to /home/pi /SIM7600X directory, and then execute the chmod 777 sim7600_4G_hat_init command.

Question:When compiling the BCM2835 library, Makefile:327:recipe for target 'aclocal.m4' failed

```
config.status: executing depfiles commands
CDPATH="${ZSH_VERSION+.}:" && cd . && aclocal-1.13 -I m4
/bin/bash: aclocal-1.13: command not found
Makefile:327: recipe for target 'aclocal.m4' failed
make: *** [aclocal.m4] Error 127
root@raspberrypi:/home/pi/SIM7600X/bcm2835#
```

(/wiki/File:Autoreconf2.png)

Answer:

Execute: autoreconf -vfi, and then recompile, as shown in the following figure:

```
pi@raspberrypi:~/SIM7600X/bcm2835 $ sudo apt-get install autoconf
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  automake autotools-dev libsigsegv2 m4
Suggested packages:
  autoconf-archive gnu-standards autoconf-doc libtool gettext m4-doc
The following NEW packages will be installed:
  autoconf automake autotools-dev libsigsegv2 m4
0 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.
Need to get 1,358 kB of archives.
After this operation, 4,185 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://mirrors.nju.edu.cn/raspbian/raspbian stretch/main armhf libsigsegv2
  armhf 2.10-5 [28.4 kB]
Get:2 http://mirrors.nju.edu.cn/raspbian/raspbian stretch/main armhf m4 armhf 1.
  4.18-1 [185 kB]
Get:5 http://mirrors.nju.edu.cn/raspbian/raspbian stretch/main armhf automake al
l 1:1.15-6 [733 kB]
Get:3 http://mirrors.nju.edu.cn/raspbian/raspbian stretch/main armhf autoconf al
l 2.69-10 [338 kB]
Get:4 http://mirrors.nju.edu.cn/raspbian/raspbian stretch/main armhf autotools-d
ev all 20161112.1 [73.4 kB]
Fetched 1,358 kB in 4s (290 kB/s)
```

```
pi@raspberrypi:~/SIM7600X/bcm2835 $ sudo autoreconf -vfi
autoreconf: Entering directory `.'
autoreconf: configure.ac: not using Gettext
autoreconf: running: aclocal --force -I m4
aclocal: warning: couldn't open directory 'm4': No such file or directory
autoreconf: configure.ac: tracing
autoreconf: configure.ac: not using Libtool
autoreconf: running: /usr/bin/autoconf --force
autoreconf: running: /usr/bin/autoheader --force
autoreconf: running: automake --add-missing --copy --force-missing
configure.ac:11: installing './compile'
autoreconf: Leaving directory `.'
```

(/wiki/File:Autoreconf.png)

Support

If you require technical support, please go to the Support (<https://support.waveshare.com/hc/en-us/requests/new>) page and open a ticket.

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