

# SIM7600G-H-M2 4G HAT

From Waveshare Wiki

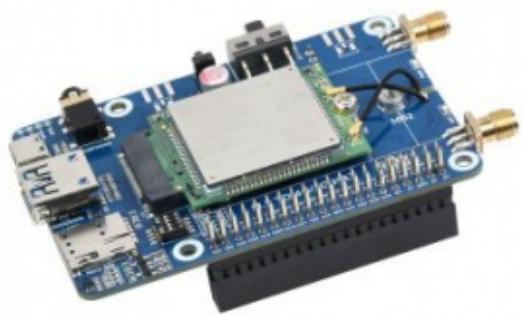
Jump to: navigation, search

## Overview

### Features

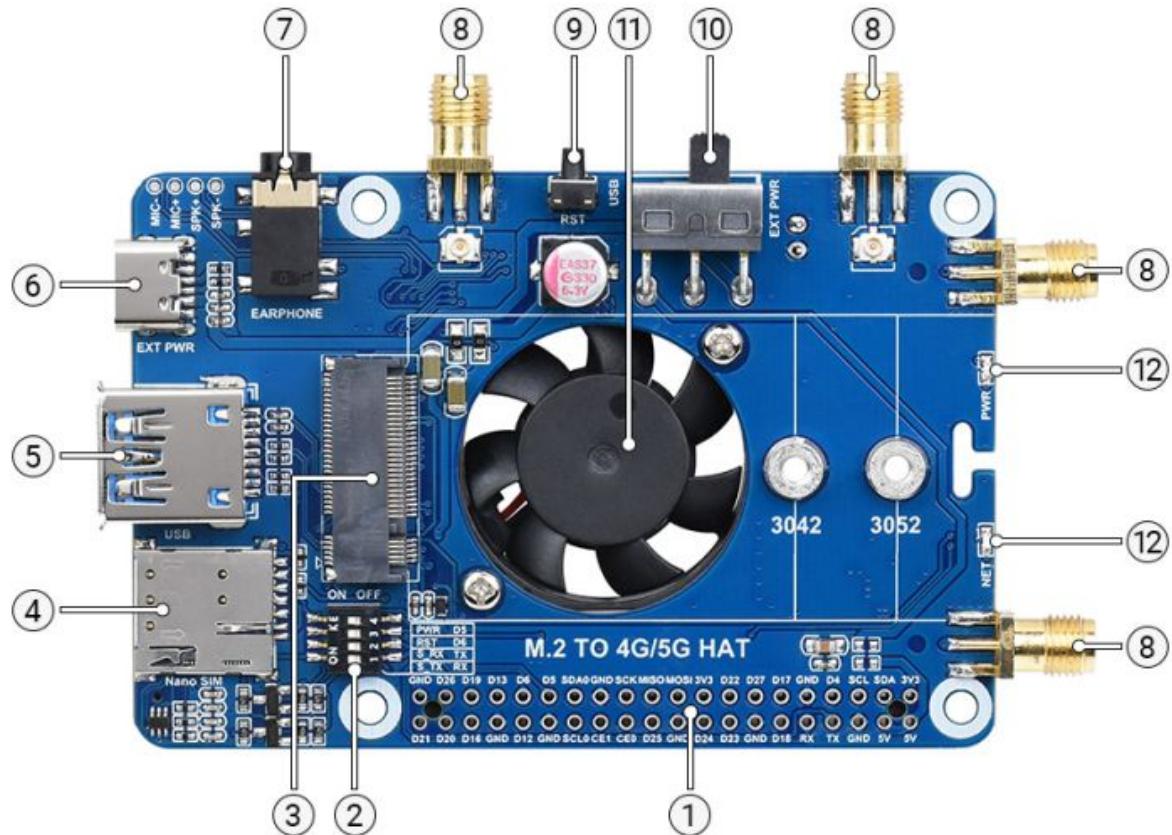
- Supports dial-up, phone call, SMS, TCP, UDP, MQTT, HTTP(S), FTP(S), and so on.
- GNSS positioning: GPS, Beidou, Glonass, Galileo, QZSS, LBS base station.
- USB 3.1 port (USB 2.0 compatible) for connecting to PC, Raspberry Pi, or Jetson Nano host board to enable high speed 4G communication.
- Onboard UART, PWR, and RST control pin, built-in voltage level translator, enabled via DIP switch, for use with hosts like Raspberry Pi or Arduino.
- Onboard USB-C connector, enabled via switch, for connecting standalone power supply for the module, allows more loads, stable and flexible power supply.
- Onboard power supply on/off switch, reset button and LED indicator, easy to turn on/off the module or monitor the operating status.
- Reserved 4x SMA to IPEX antenna interfaces, with pre-soldered 2x connectors for easily using antennas, allows changing the SMA antenna position.
- Onboard audio jack and audio decoder, allows audio operation like making phone call.
- High efficiency power supply circuit, up to 3A output current.

**SIM7600G-H-M2 4G HAT**



(<https://www.waveshare.com/sim7600g-h-m2-4g-hat.htm>)

### What's On Board



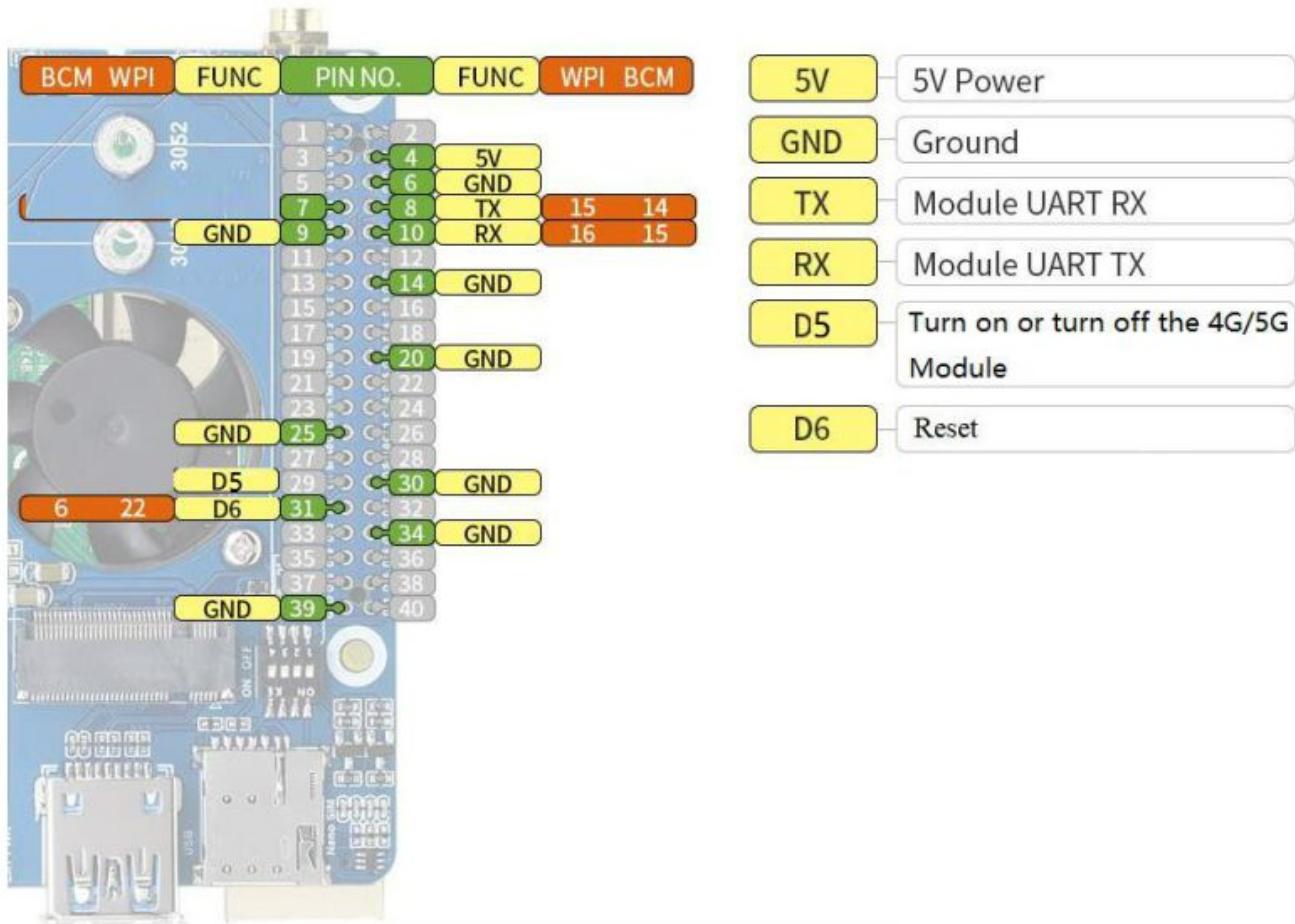
(/wiki/File:SIM8202G-M2-5G-HAT-B-details-intro.jpg)

Number	Name	Description
①	Raspberry Pi GPIO interface	Easy connect to Raspberry Pi
②	Switch	Enable the corresponding pin
③	M.2 interface	Compatible with RM500U-CN / RM500Q-CN / RM500Q-GL /RM50XQ-AE and other series of 5G modules
④	SIM card holder	Onboard two SIM card slots, dual card single standby. The default SIM1 card slot works, SIM2 is on the back, requires module support, and must be switched through AT commands
⑤	USB3.1 interface	Backward compatible with USB 2.0, can be used to connect to PC/Raspberry Pi/Jetson Nano, etc.
⑥	USB Type-C interface	5V 3A input; stable and flexible power supply
⑦	Audio port	SIM82XX series support audio function, RM50XX series do not support this audio function
⑧	Antenna interface	Onboard four-way antenna, strong signal
⑨	Reset Switch	One-key reset
⑩	Power Switch	To facilitate the power supply mode of the control module: —If set to USB, the module will provide power through the "⑤.USB3.1 interface"; —If set to EXT PWR, the module will provide power through the "⑥.USB Type-C interface" external power supply
⑪	Cooling fan	Cool down the Raspberry Pi and 5G module at the same time
⑫	Indicator light	Check the module running status anytime, anywhere

## Pinout Definition

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After connecting to Raspberry Pi, these pins (TX, RX, D4 and D6) can be connected or not through the DIP switch:



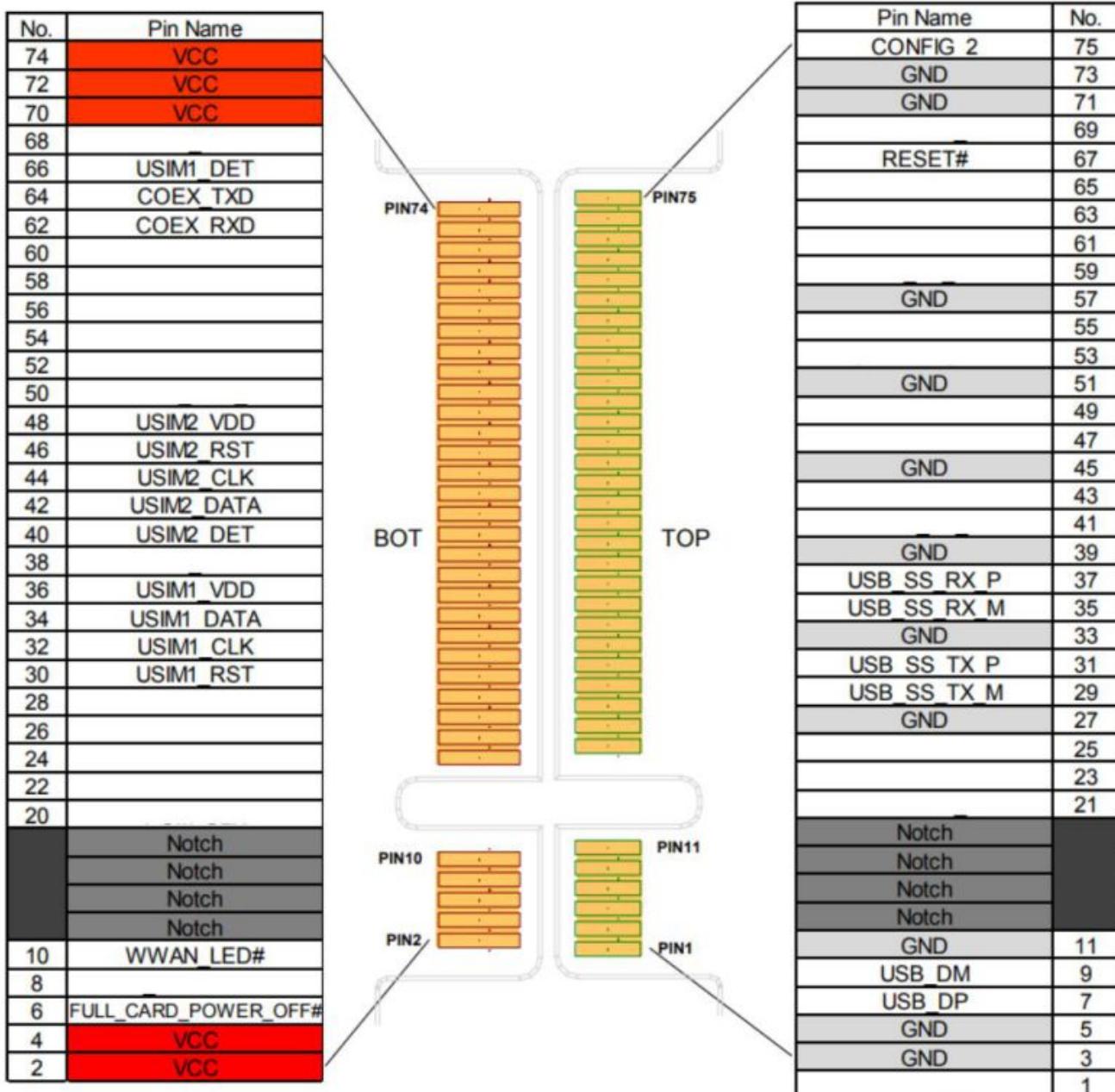
(/wiki/File:M.2-TO-4G-5G-HAT-Pin-defined.jpg)

## 4G/5G modules function testing

Category	4G/5G Module	Network Communication	GNSS Positioning	Voice calls through Earphone Port	Dual SIMs	UART Interface	External Power Supply?
5G	SIM8202G-M2	5G/4G/3G	Support	Support	Support	Support	Optional, but recommended
5G	SIM8200EA-M2	5G/4G/3G	Support	Support	Support	Support	Optional, but recommended
5G	RM500U-CN	5G/4G/3G	NOT Support	NOT Support	Support	Support	Recommended
5G	RM500Q-GL	5G/4G/3G	Support	NOT Support	Support	NOT Support	Recommended
5G	RM500Q-AE	5G/4G/3G	Support	NOT Support	NOT Support	NOT Support	Recommended
5G	RM502Q-AE	5G/4G/3G	Support	NOT Support	NOT Support	NOT Support	Recommended
LTE-A	EM06-E	LTE-A/4G/3G	NOT Support	NOT Support	NOT Support	NOT Support	Optional
LTE-A	A7906E	LTE-A/4G/3G	NOT Support	NOT Support	NOT Support	NOT Support	Optional
4G	SIM7600G-H-M2	4G/3G/2G	Support	Support	NOT Support	Support	Optional

## 4G/5G Module Compatibility

If you need to use the M.2 TO 4G/5G HAT for other 4G/5G modules, you can refer to the M.2 connection diagram below, check whether there is any pin conflict, and then connect to test:

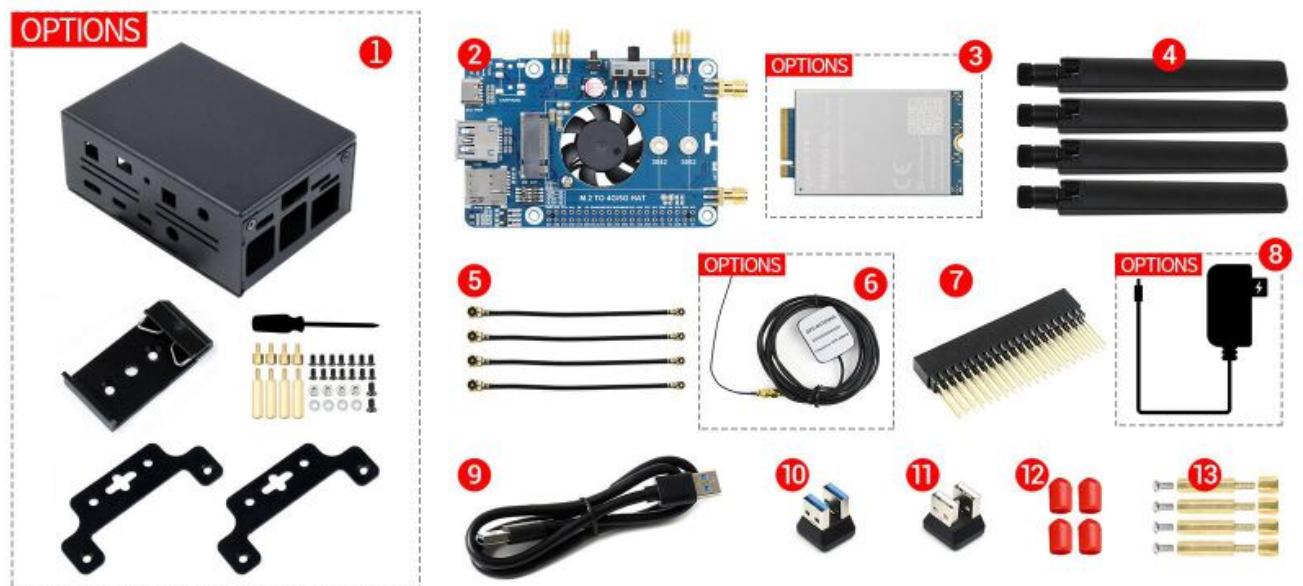


(/wiki/File:M.2-Compatibility.jpg)

## Quick Start

### Hardware Preparation

- In addition to the items in the package,



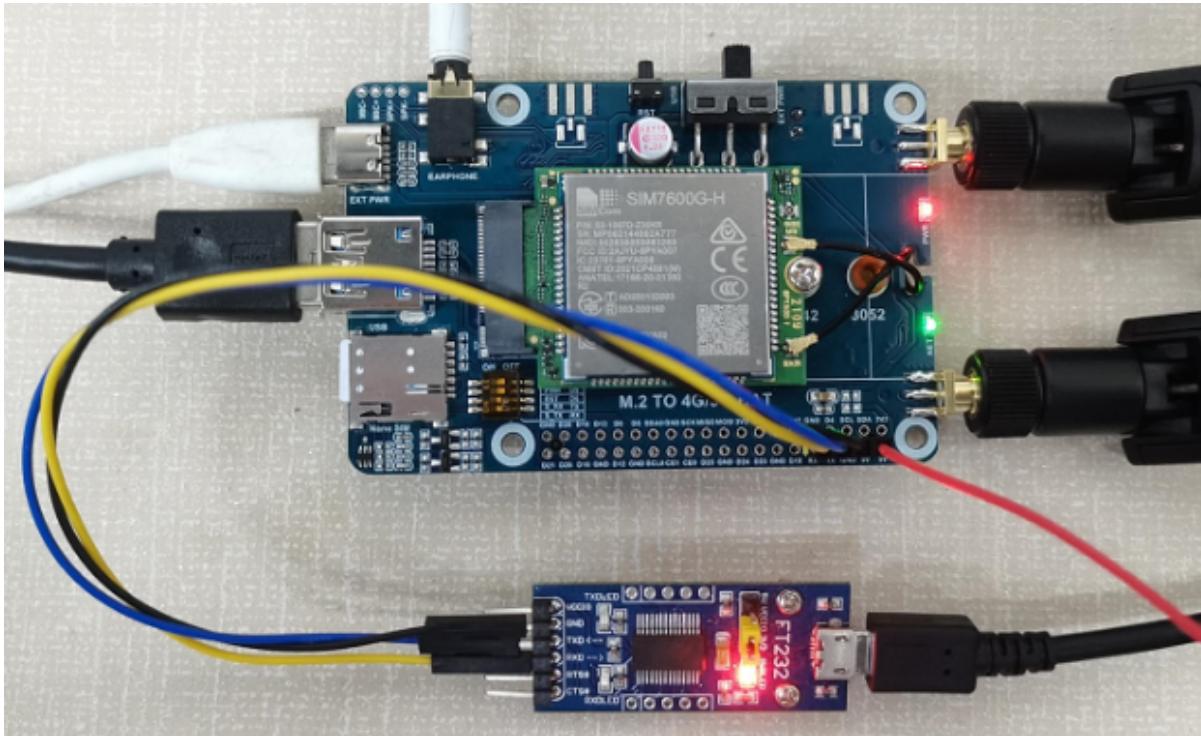
(/wiki/File:5G-HAT-Pack.jpg)

- you need to prepare the following items:

- \* A 4G SIM card (no downtime and 4G enabled);
- \* A computer with a Windows operating system (Such as Windows 10)
- \* A USB TO UART module (optional)
- \* A headphone cable with a microphone (optional);

## Test

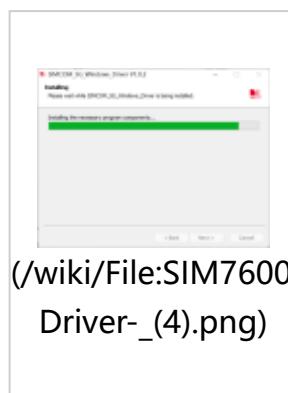
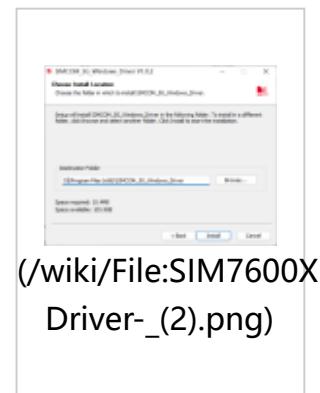
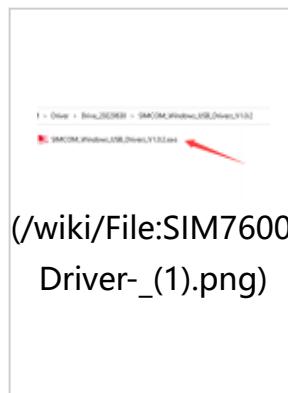
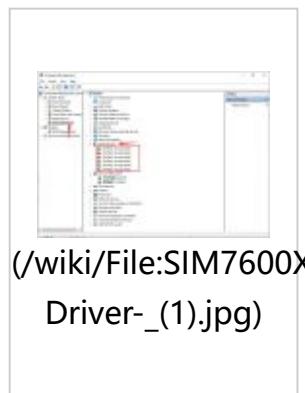
- In the case of power off, insert the activated 4G SIM card, the headphone cable with microphone (optional), and then connect the USB cable to the computer.
- Connect one end of the micro USB cable to the USB interface of the PC, and the other end to the USB interface of the SIM7600G-H-M2 4G HAT, the PWR light is on, and the NET light is off.
- When you see the NET light starts flashing every second, the module starts to work.
- Turn the TX and RX of the DIP switch to the ON side, connect to the computer and other equipment through the USB TO UART module, and perform AT command to debug on the corresponding COM port. (optional)



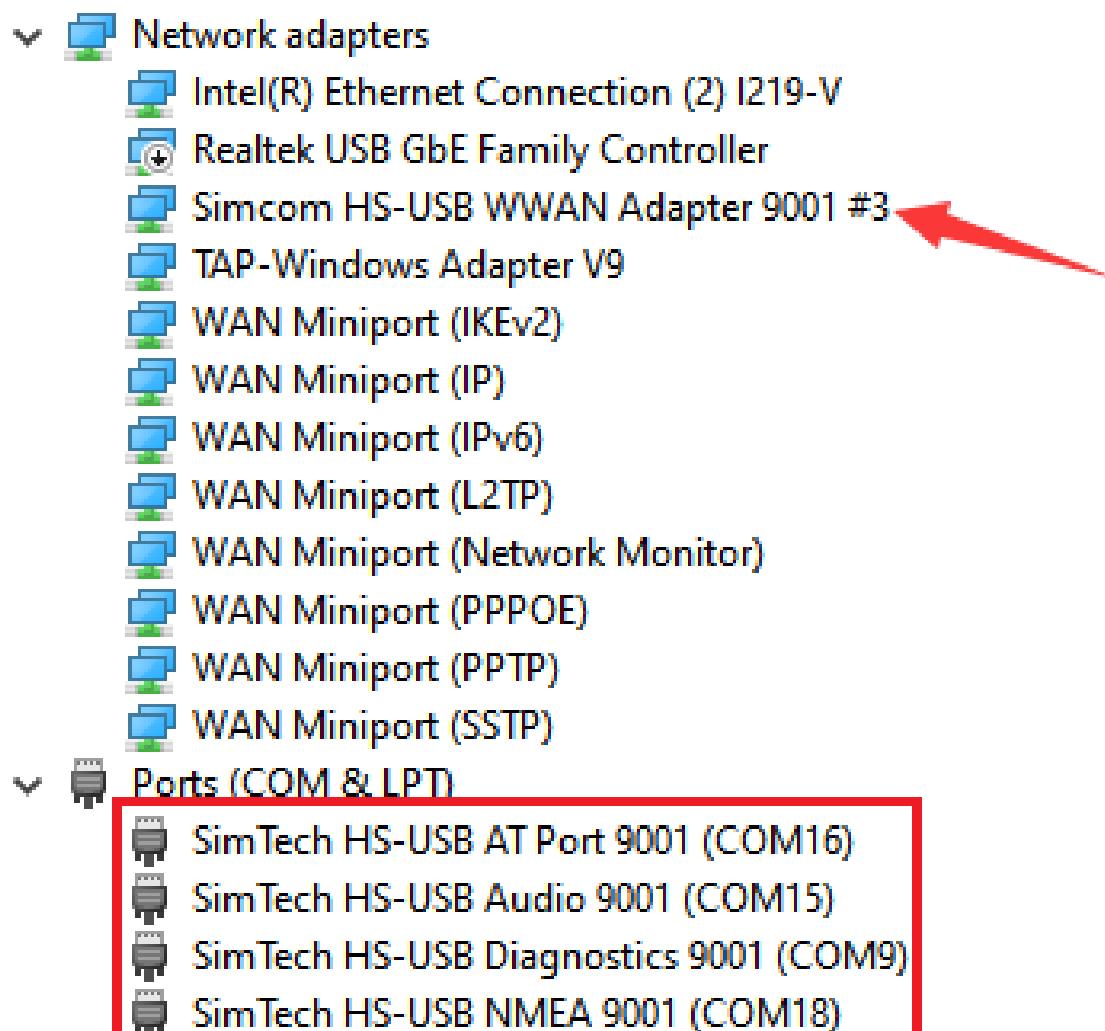
(/wiki/File:SIM7600G-H\_-M2-TOP.png)

- Open the device manager and you can see that there are COM ports as shown in the figure below.
- ▼ 端口 (COM 和 LPT)
  - SimTech HS-USB AT Port 9001 (COM19)
  - SimTech HS-USB Audio 9001 (COM17)
  - SimTech HS-USB Diagnostics 9001 (COM21)
  - SimTech HS-USB NMEA 9001 (COM18)
- If the COM port is recognized in the above picture, but an exclamation mark appears, it means that the driver has not been installed, and can be manually loaded as follows:
- Download drive: SIM7600X drive document ([https://www.waveshare.com/w/upload/2/24/SIMCOM\\_Windows\\_USB\\_Drivers\\_V1.0.2.zip](https://www.waveshare.com/w/upload/2/24/SIMCOM_Windows_USB_Drivers_V1.0.2.zip)).
- Insert the USB port of the 4G HAT into a Windows computer (the Windows 10 operating system is used as an example below)
- 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.

(/wiki/File:Sim7600CE-3.jpg)



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



(/wiki/File:SIM7600X-Driver-\_6.png)

## Net light operating condition

Net light operating condition as follows:

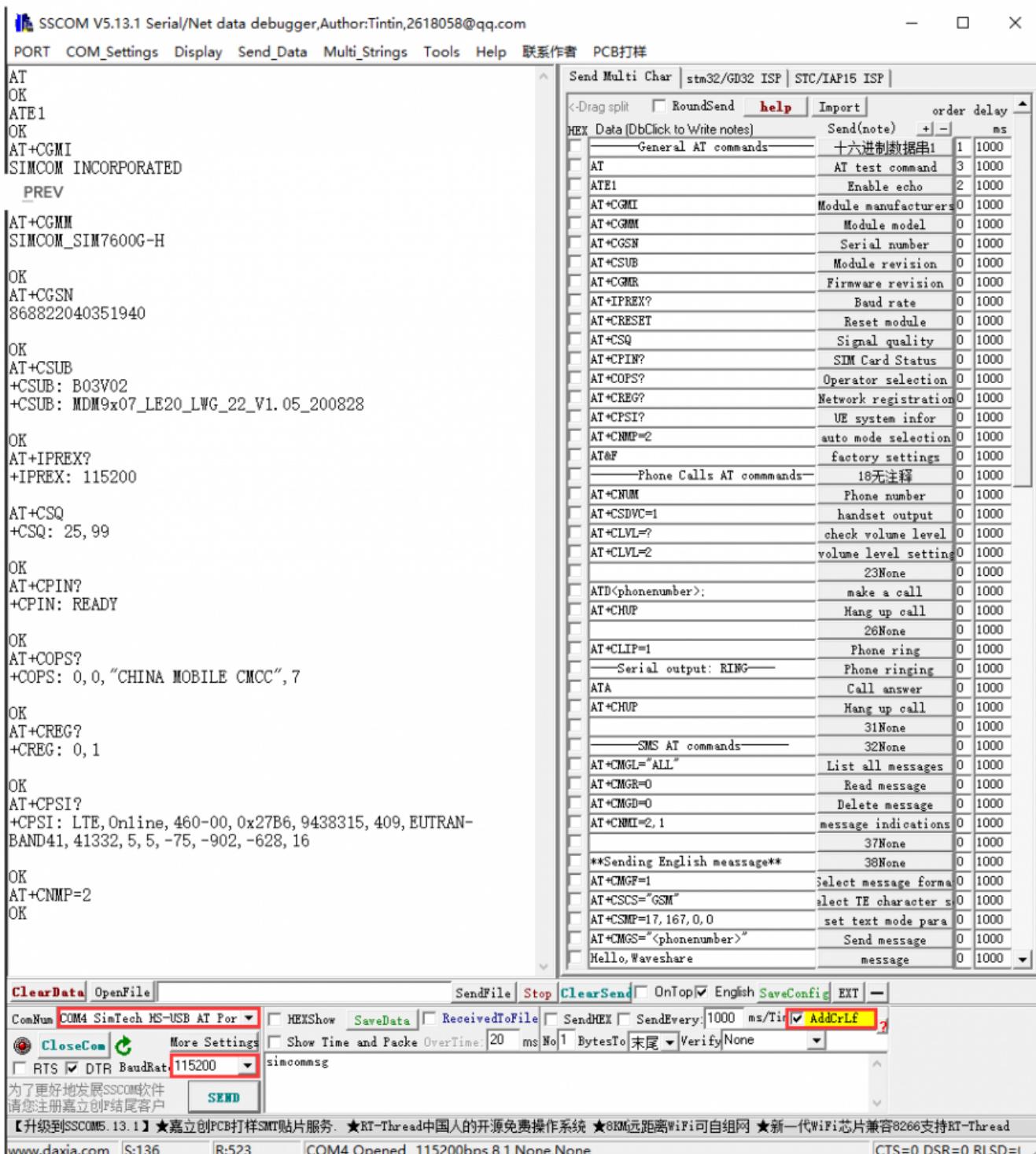
Net Light working mode	Module working mode
Always on	searching for the net or on the call
200ms on/200ms off	Data connection established
800ms on/800ms off	the network is registered
Off	Shutdown or hibernate mode

## Brief description of the test

### Common AT commands

Command	Description	Return Value
AT	AT test command	OK
ATE	ATE1 sets echo ATE0 turns off echo	OK
AT+CGMI	Query module manufacture	OK
AT+CGMM	Query module model	OK
AT+CGSN	Query product serial number	OK
AT+CSUB	Query module version and chip	OK
AT+CGMR	Query the firmware version serial number	OK
AT+IPREX	Set the module hardware serial port baud rate	+IPREX: OK
AT+CRESET	reset module	OK
AT+CSQ	Network signal quality query, return signal value	+CSQ: 17,99 OK
AT+CPIN?	Query the status of the SIM card and return READY, indicating that the SIM card can be recognized normally	+CPIN: READY
AT+COPS?	Query the current operator, the operator information will be returned after normal networking	+COPS: OK
AT+CREG?	Query network registration status	+CREG: OK
AT+CPSI?	Query UE system information	
AT+CNMP	Network mode selection command: 2: Automatic 13: GSM only 38: LTE only 48 : Any modes but LTE ... ....	OK

For more AT commands, see [SIM7500\\_SIM7600 Series\\_AT Command manual\\_v1.07](#)



(/wiki/File:SIM7600\_4G\_HAT(B)\_AT\_Command.png)

## Use in Windows

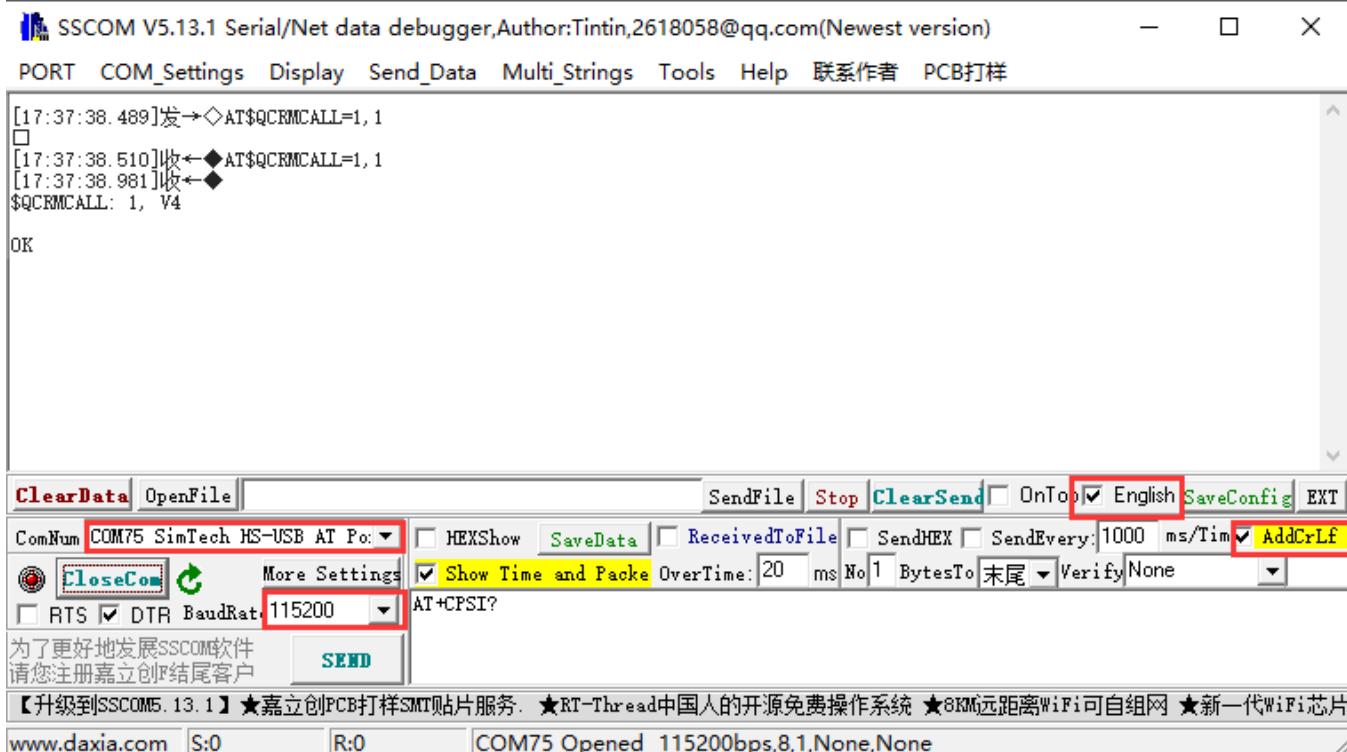
### Dail-up

[Note]: You must use a SIM card with GPRS networking function enabled and not out of service.

### NDIS Dail-up

- At present, when using Windows 10 operating system, you can connect to 4G DONGLE module (equipped with 4G card of China Mobile/Telecom/Unicom). After installing the driver, most computers will automatically connect to the Internet.
- If Windows cannot access the Internet, you need to manually start NDIS dialing, open SIM7600 AT port, and send the command:

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



At this point, the NDIS dialing takes effect, and the computer can connect to the network; if the dialing command returns an error, send the following command to set the NDIS dialing mode and then dial again:

```
AT+CUSBPIDS=9001,1,1
```

## RNDIS Dial-Up Internet

In addition, dial-up Internet access using RNDIS is also possible:

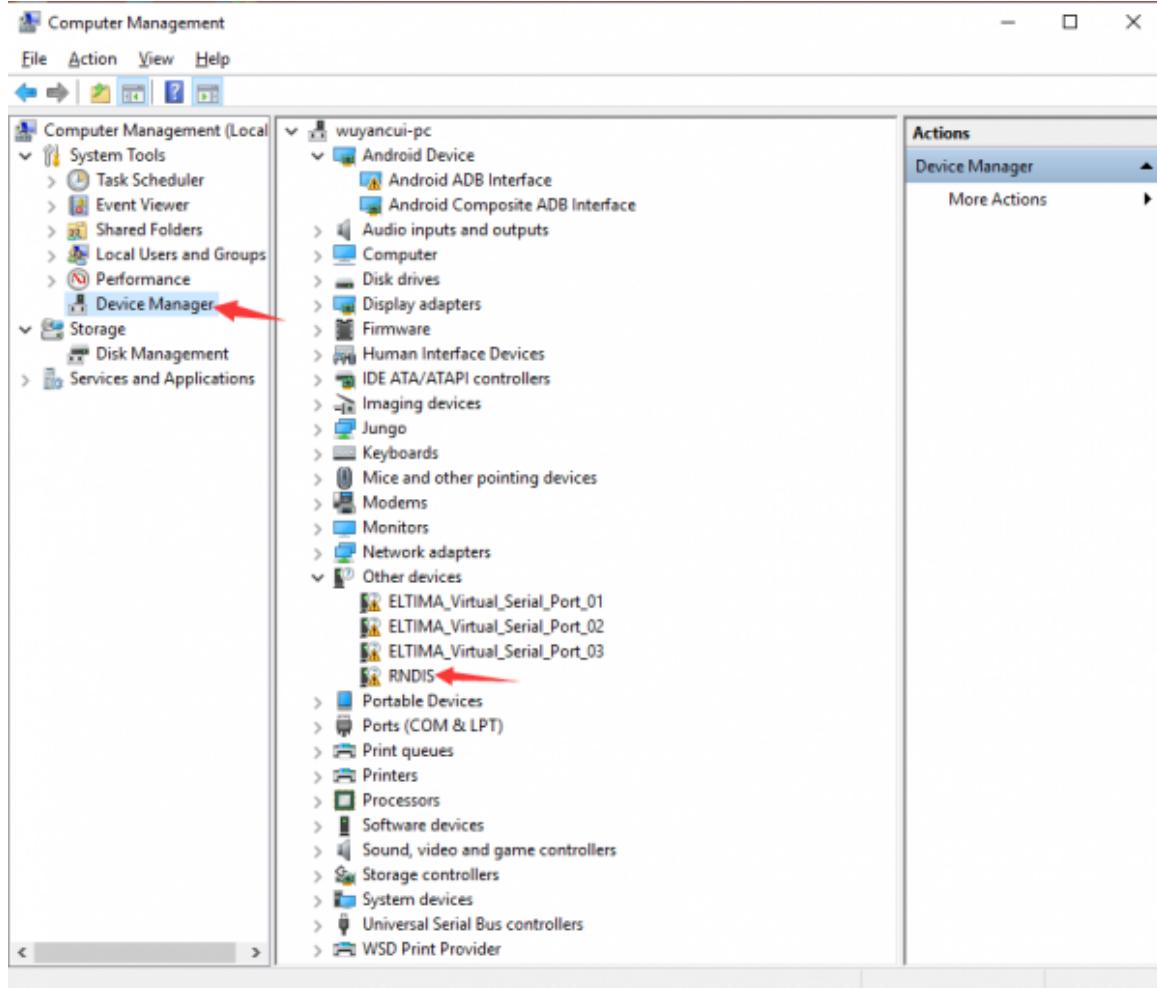
- After the device installed SIM card and antenna, connect the USB port to computer, then connect the power supply.
- Refer to the above to install the USB driver
- Open the serial port assistant, find the serial port number corresponding to the AT serial port, and send the AT command to check whether it is registered on the network:

```
AT+CPSI?
```

- If you have successfully registered on the network, then send the AT command to enable USB dial-up Internet access:

```
AT+CUSBPIDSWITCH=9011,1,1
```

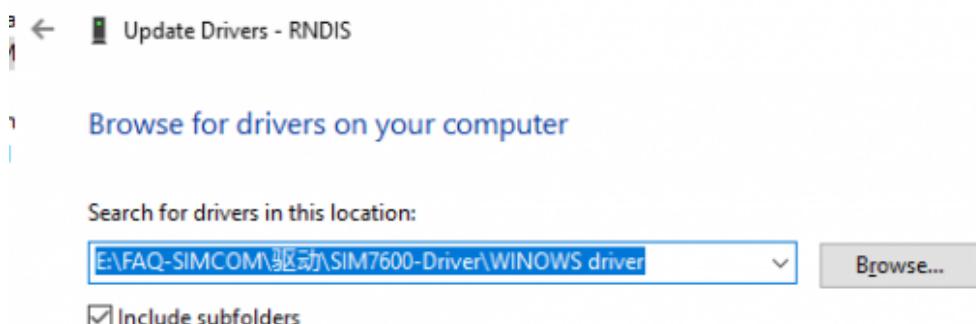
- If the transmission is successful, the DTU will return OK and reboot automatically.
- And then you can find that there are some unrecognized devices in the Device Manager on the computer, such as RNDIS (with exclamation mark).



(/wiki/File:RNDIS\_Dial-up01.png)

- Right-click the 'RNDIS', search "Update Drivers" and select "Let me pick from a list of available drivers on my computer", then select "Network adapters" from the device list.

X



→ Let me pick from a list of available drivers on my computer  
This list will show available drivers compatible with the device, and all drivers in the same category as the device.



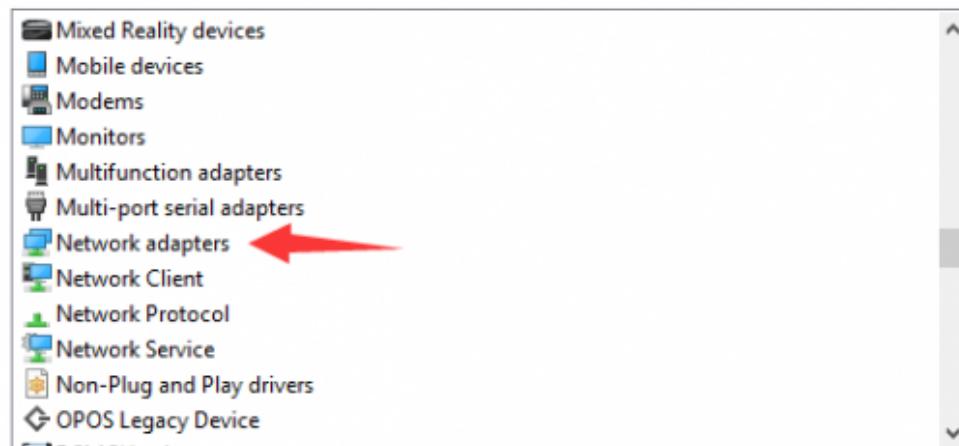
(/wiki/File:RNDIS\_Dial-up02.png)

X

← Update Drivers - RNDIS

Select your device's type from the list below.

Common hardware types:



(/wiki/File:RNDIS\_Dial-up03.png)

- Select "Microsoft" in the manufacturer list of the Network adapters window, and then select "Remote NDIS Compatible Device" in the list on the right, which is the remote NDIS compatible device.

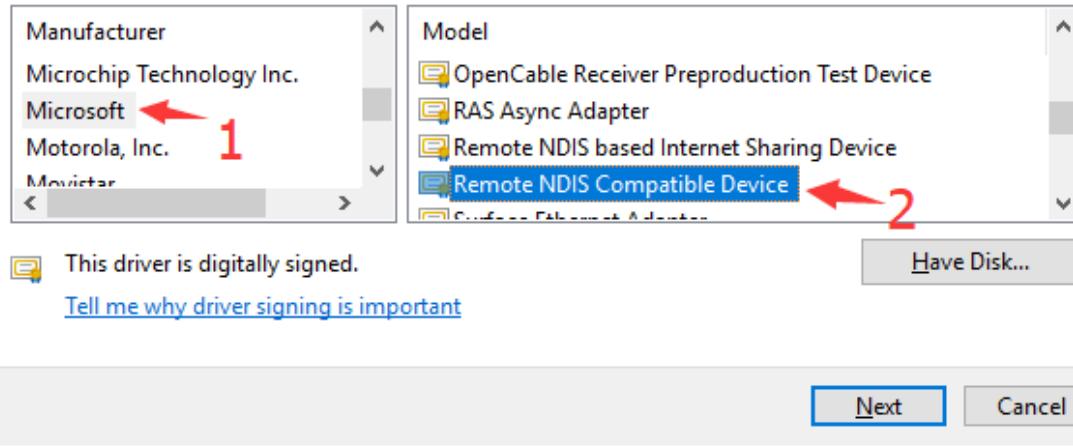
X

[← Update Drivers - RNDIS](#)

Select the device driver you want to install for this hardware.



Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.



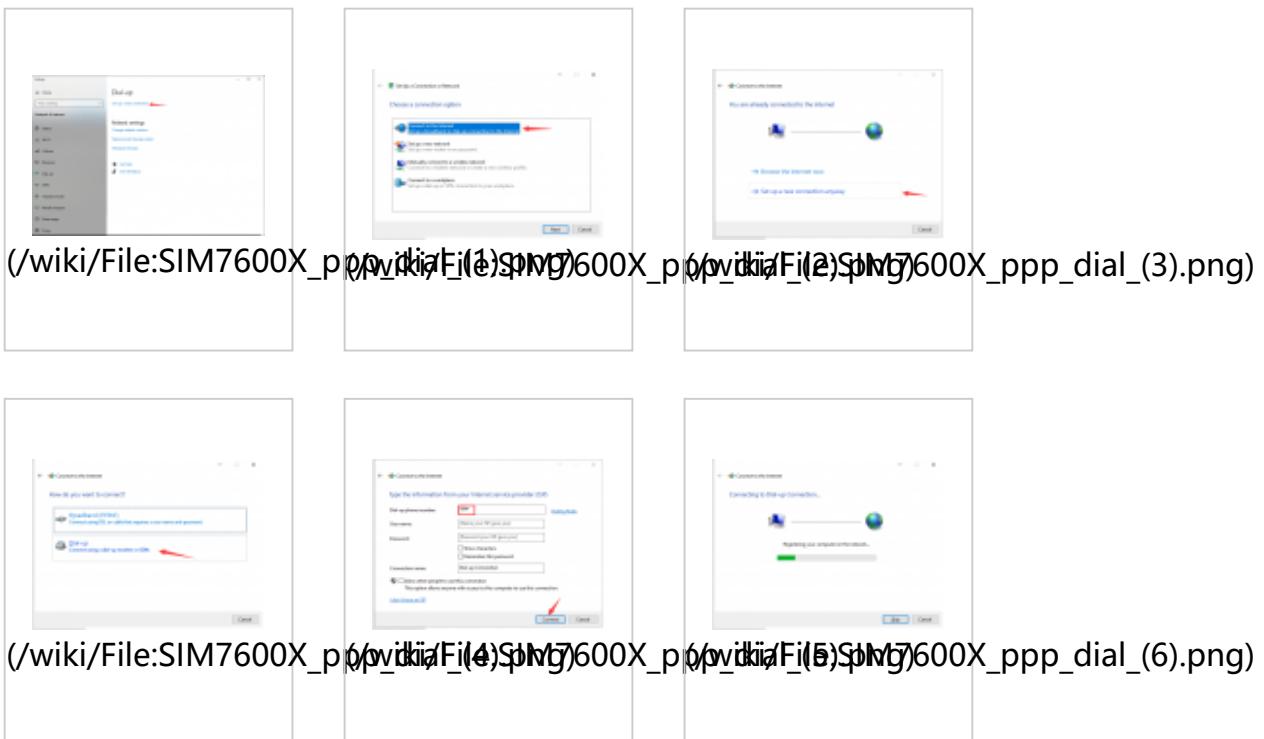
(/wiki/File:RNDIS\_Dial-up04.png)

Click 'Next' and wait for the installation to finish, the RNDIS Kitl device will be installed successfully. And then you can see that the PC can access the Internet via DTU.

## PPP dial-up

If the NDIS or RNDIS dial-up cannot access the Internet, you can also use PPP dial-up. The operation steps are as follows:

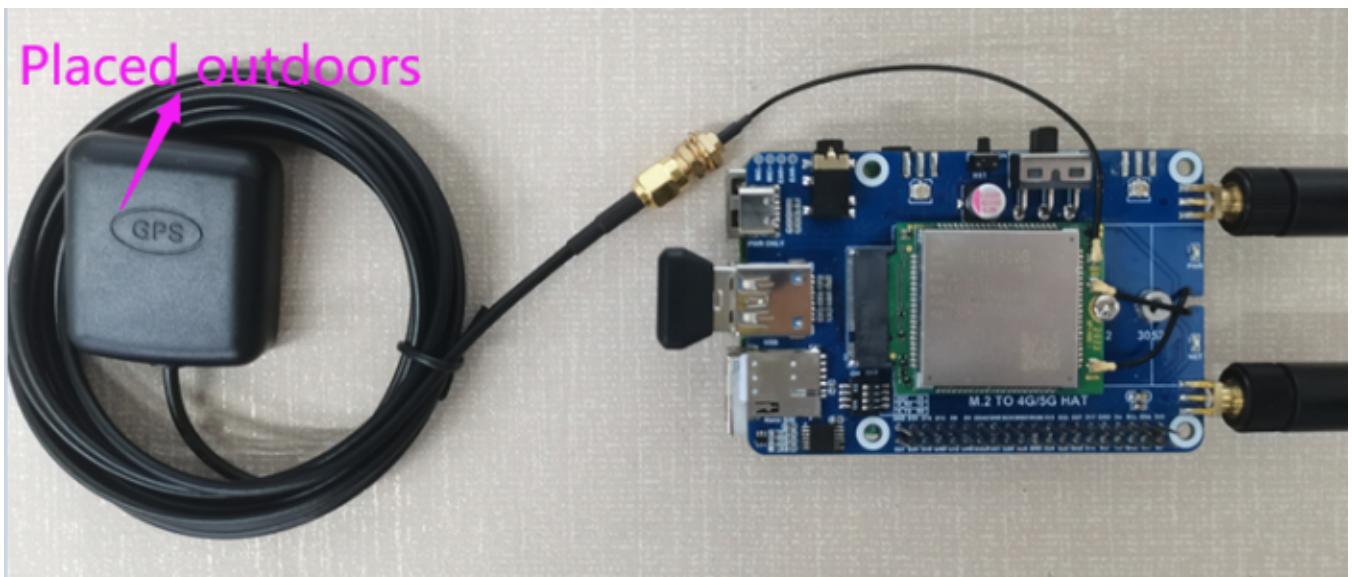
- Network and Internet Settings -> Set up a new connection -> Connect to the Internet -> Dial up (D) -> Dial a phone number (D): \*99# (others are empty by default) -> Connection -> Register -> Connected to the Internet



## GPS Test

### GNSS control instance

- Plug in the GPS antenna, and place the receiver tag face down in the open air,(Note that rainy weather cannot be tested) you need to wait about 1 minute before receiving the location signal.



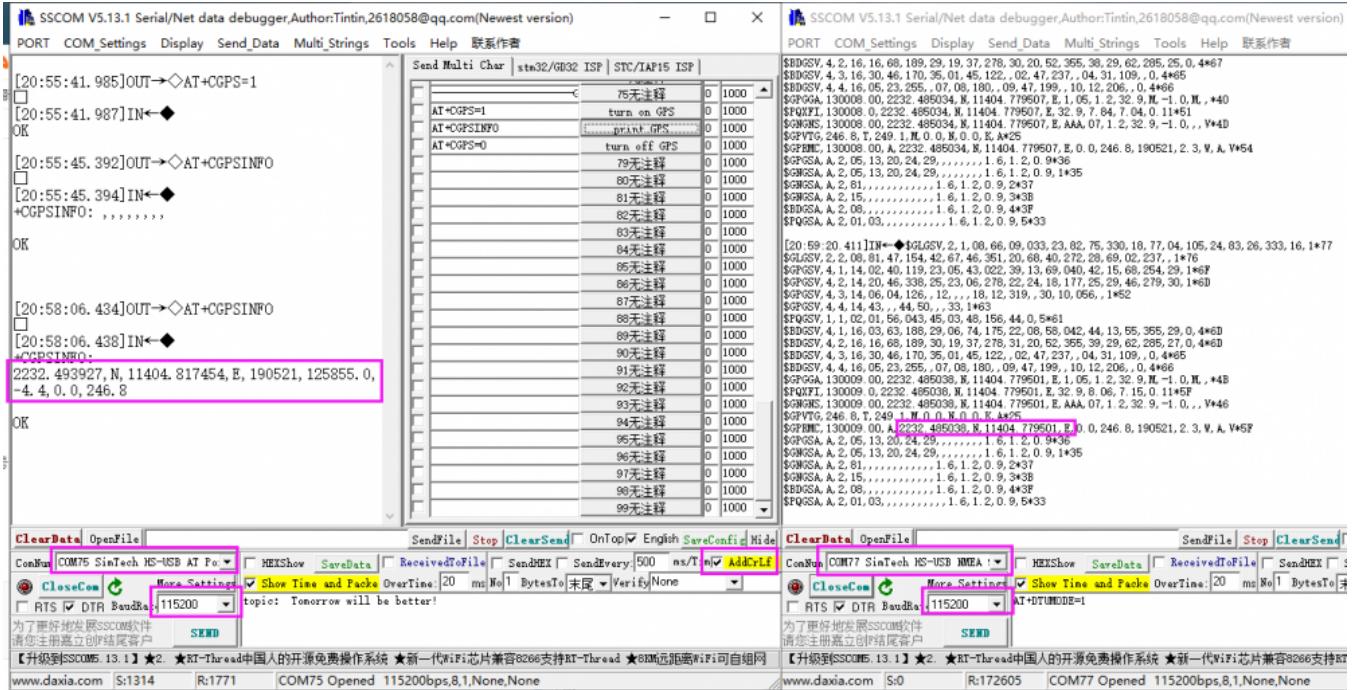
(/wiki/File:SIM7600G-H-M2-GPS.png)

- Detailed test instructions and screenshots are as follows:

```

AT+CGPS=1           // Open GPS
AT+CGPSINFO        // Prints GPS information to the serial port
AT+CGPS=0           // Turn off GPS

```



(/wiki/File:SIM7600E-H\_4G\_DTU\_GNSS.png)

## TCP/IP Internet data

GPRS debugging requires a SIM card with the GPRS networking function enabled.

The following example takes accessing a mobile SIM card as an example.

1. Correctly install the mobile phone card (the GPRS networking function must be enabled), the GSM antenna, and connect the USB cable to the computer;
2. Press the PWR key to start the module and wait for more than ten seconds;
3. Observe whether the indicator light is normal, the PWR indicator is always on, and the NET indicator is flashing;

## Set up a local computer virtual server

The virtual server defines the mapping relationship between the WAN service port and the LAN network server. All access to the WAN service port will be relocated to the LAN network server specified by the IP address. (Please refer to your router's corresponding manufacturer's manual)

1. Use a browser to log in to the router management interface (please refer to your router manual for the specific address)
2. Set the port number: 2317 (it does not conflict with the existing port number. In this example, it is set to 2317)

3. Set the intranet IP of the computer (the IP obtained by the computer in the local area network can be run CMD on the local machine, enter the command line prompt, enter ipconfig to check the IPv4 address, the intranet IP of the computer in this example is 192.168.1.168), as shown in the following figure :

<input type="checkbox"/>	12	SIM7X00 TEST	WAN1	2317-2317	2317-2317	192.168.1.168	ALL
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(/wiki/File:Sim7600CE-18.jpg)

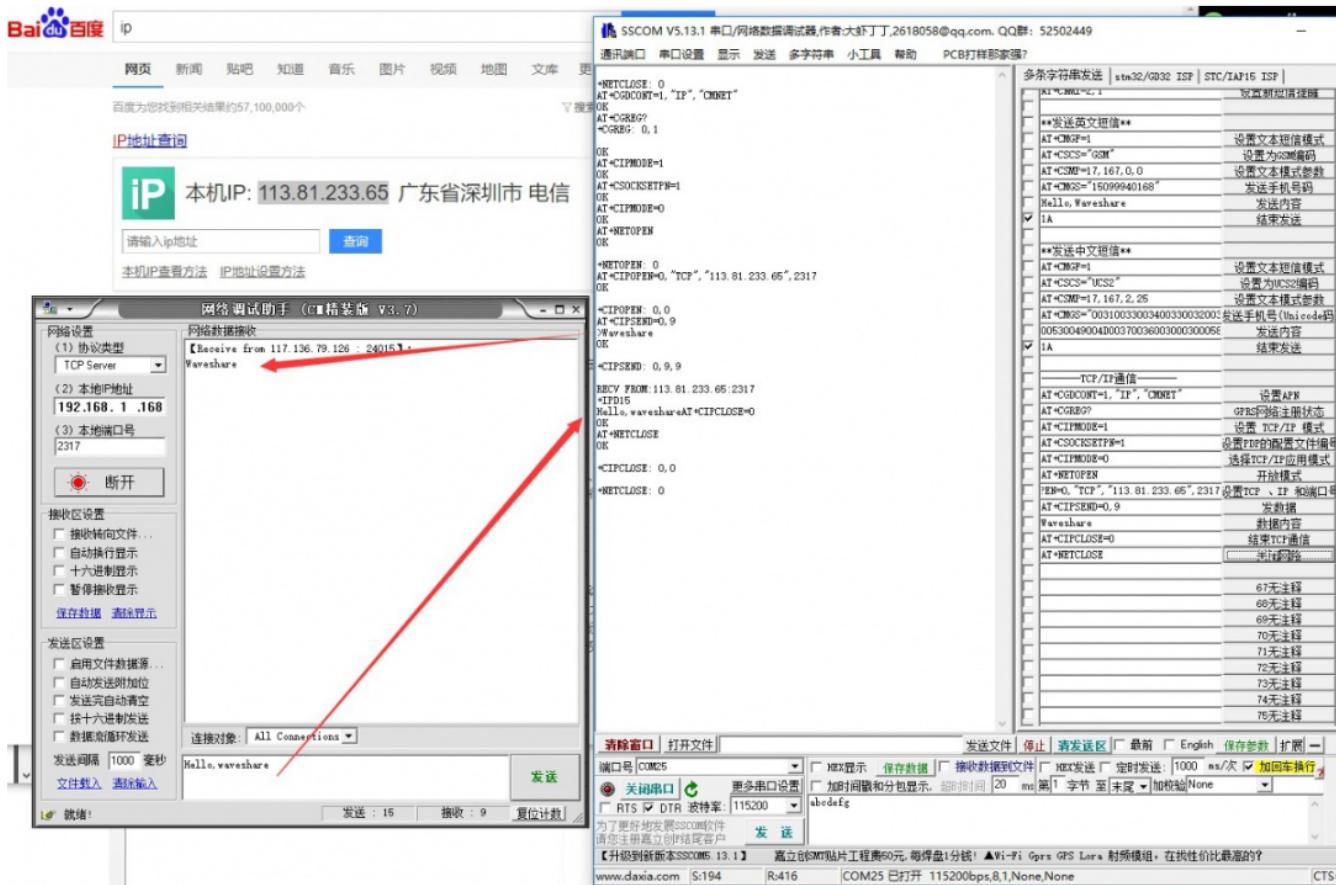
## Configure GPRS

```

AT+CGDCONT=1,"IP","CMNET"      //Set APN
AT+CSQ      //Query the network signal quality. The first parameter is that the network signal quality is up to 31. The larger the value, the stronger the network signal.
AT+CREG?      //Query the network registration status, where the second parameter is 1, indicating that the registration has been successful.
AT+CIPMODE=1      //Set TCP/IP mode
AT+CSOCKSETPN=1      //select TCP/IP application mode
AT+CIPMODE=0      //select TCP/IP application mode
AT+NETOPEN      //startup mode
AT+CIPOpen=0,"TCP","113.81.233.65",2317      //Set TCP, IP and port number, establish TCP/IP connection
AT+CIPSEND=0,9,      //To specify to send 9 characters of data, return to > to start sending 9 characters of content
AT+CIPCLOSE=0,      //close the TCP connection
AT+NETCLOSE,      //close the network

```

The operation is shown in the following figure:



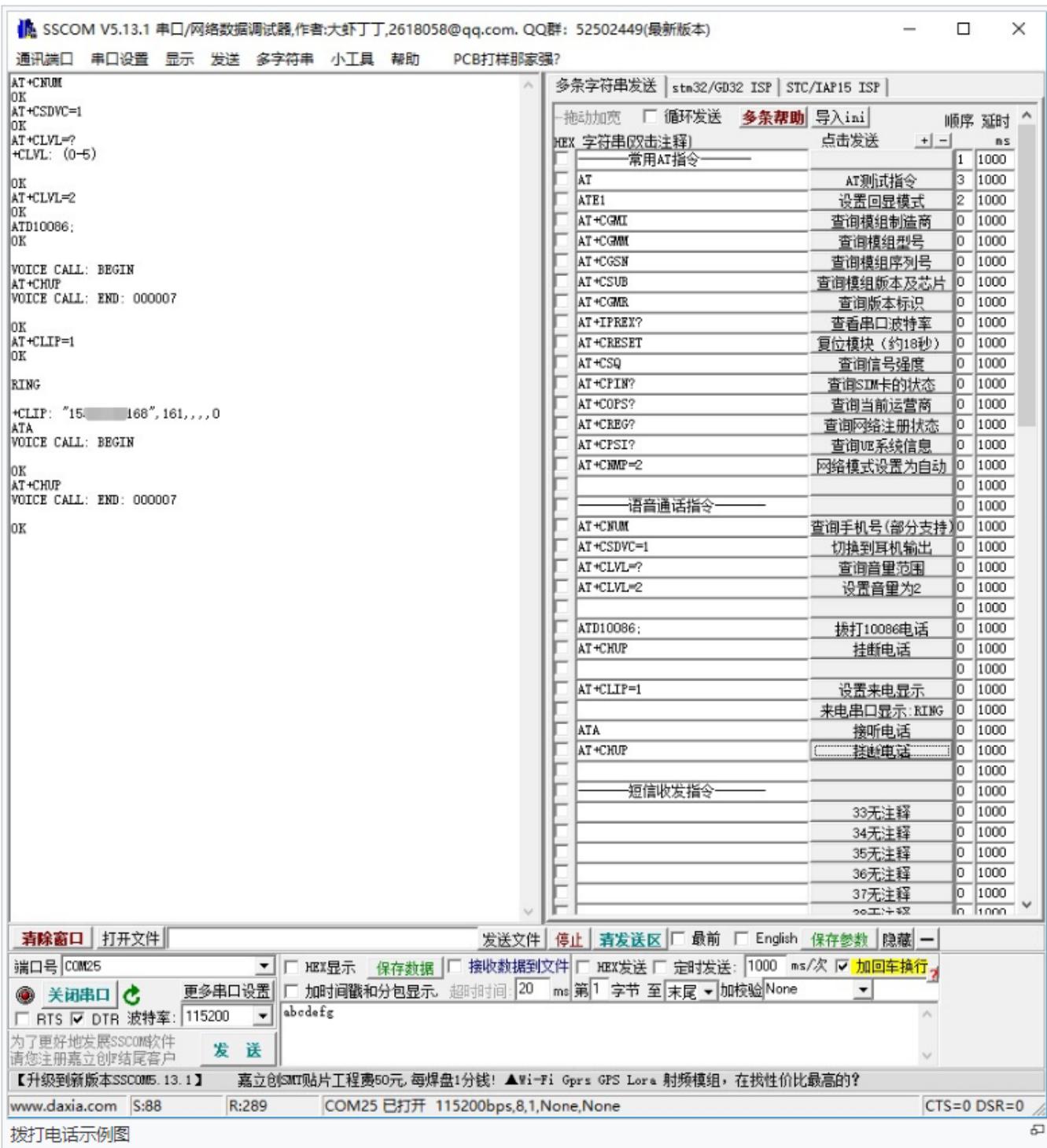
(/wiki/File:Ip-Gprs.png)

## Call Phone

- Refer to the "Hardware Configuration" chapter to connect the LTE antenna, SIM card (the phone function must be enabled), and the headset cable with microphone, and the module is turned on.
- Common commands for making calls:

AT+CNM	Check the phone number (not all SIM cards support this command)	+CNM OK
AT+CSDVC	AT+CSDVC=1: switch to headphone output AT+CSDVC=3: switch to speaker output	OK
AT+CLVL=?	Query volume range	OK
AT+CLVL=2	set volume to 2	OK
ATD<phone_number>;	ATD10086; Dial Mobile customer service phone number 10086	OK
AT+CHUP	set volume to 2	OK
AT+CLIP=1	Set up caller ID	OK
ATA	Answering the Phone	OK

- The detailed operation screenshots are as follows:



(/wiki/File:Gprs2.png)

[Note] When using the SSCom serial port assistant to send and receive AT commands, you must click "carriage return and line feed".

## Voice output mode and volume adjustment

```

AT+CSDVC=1          //switch to headphones
AT+CSDVC =3         //switch to speaker
AT+CLVL =?          //Query the volume range, return +CLVL: (0-5) //Indicates that
the volume is adjustable from 0 to 5
AT+CLVL=2           //Set the volume to 2, return OK
  
```

## Answer the phone

```
Incoming call serial port display: RING
Send "ATA"      //Answer the phone
Send "AT+CHUP"  //Hang up
```

## Audio parameter debugging

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

A.In the initialization stage of the module startup, before making a call, add the following

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

B. The module is in the process of establishing a voice call

```
VOICE CALL:BEGIN      // Establish module call to improve call effect
AT+CECM=1            //suppress echo
OK
AT+CECH=0x500        // improve the volume on the mobile phone
OK
```

See "SIM7X00\_Audio\_Application\_Note" document for details.

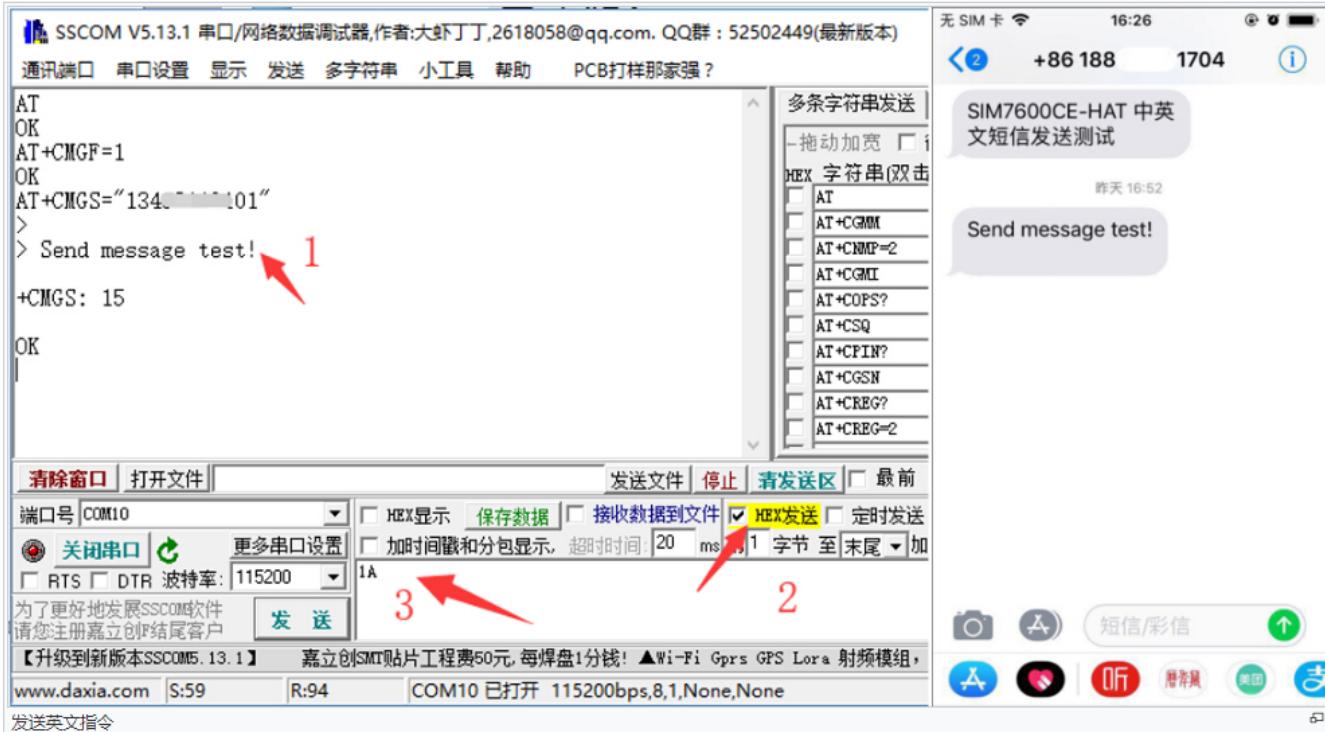
## Send English SMS

1. Correctly install the SIM card and LTE antenna, connect the module's USB interface to the computer with a USB cable, and turn on the module;
2. Observe whether the indicator light is normal, the PWR indicator is always on, and the NET indicator is flashing;
3. Set the local SMS center: AT + CSCA = " + 8613800755500" + 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 China Mobile Unicom customer service. This SMS center is Shenzhen (0755) ;

1. AT+CMGF=1: Set the SMS mode to TEXT;

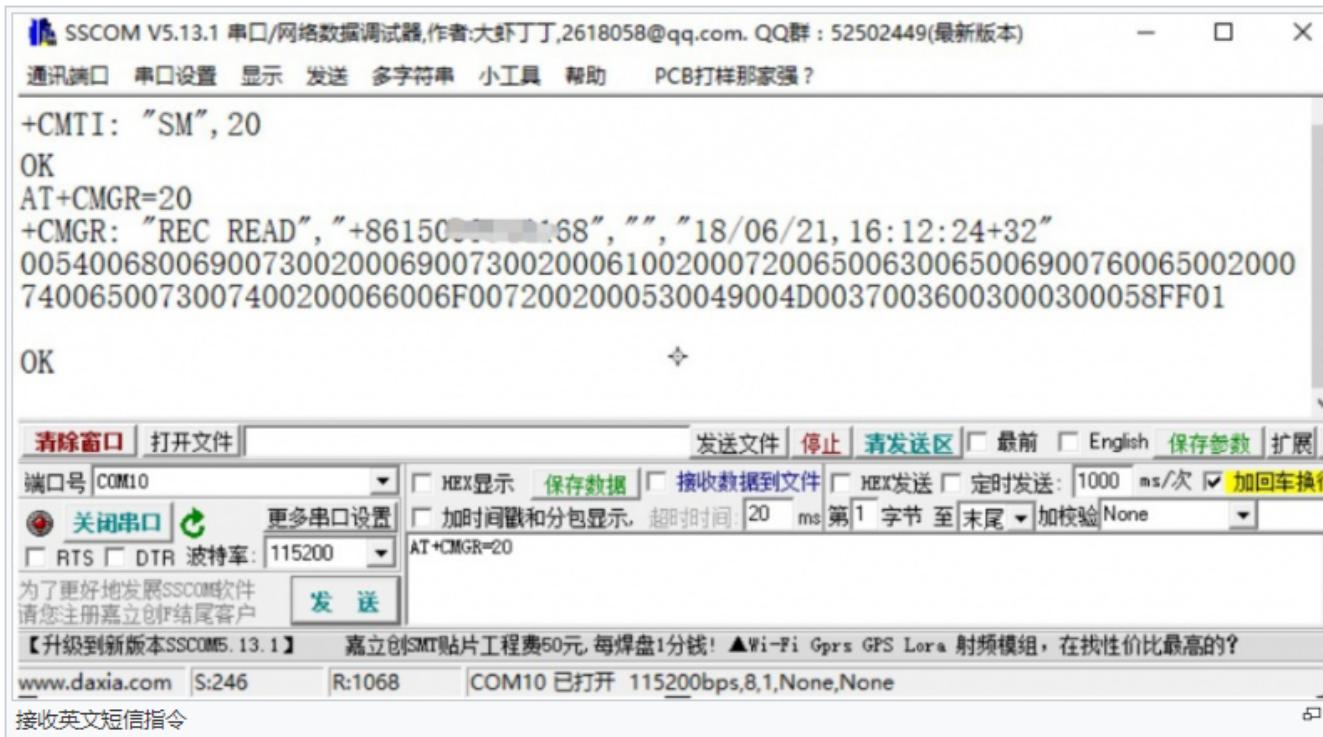
2. AT+CMGS="phone number" <Enter>, set the recipient's phone number, and then return: ">", send the content what you need, such as "Send message test!", You don't need to "Enter" at the end. After editing the text message, send 1A to send information in hexadecimal format (1A is the key value of "CTRL+Z", which is used to tell the module to perform the sending operation, or 1B or "ESC" to cancel the operation). After successfully sending, the module returns + CMGS: 15 confirm that the transmission was successful. As shown below.



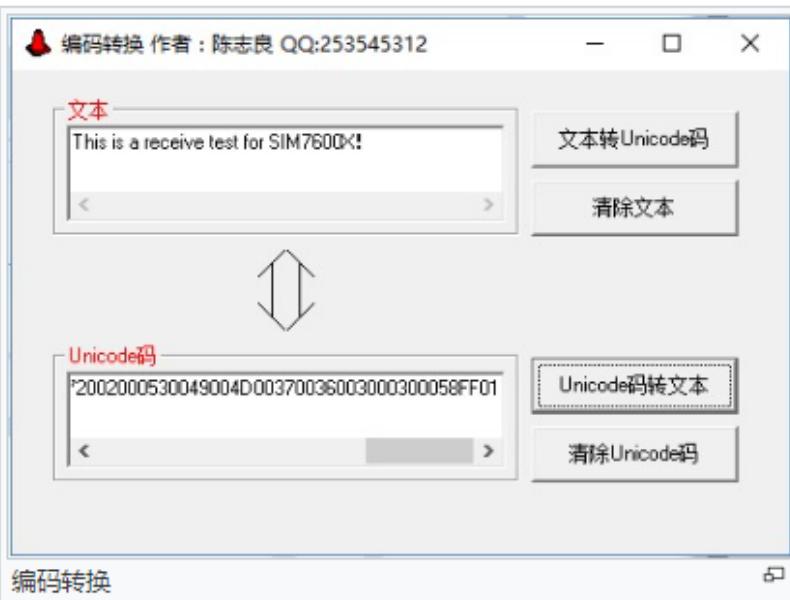
(/wiki/File:English.png)

## Receive English SMS

1. Send a message on the phone: "This is a receive test for SIM7600X!" to the test module
2. When receiving the information, the serial port will brake and report the information, "SM", 20, which means there are 20 pieces of information in the SM, and the message just sent is the 20th piece of information.
3. Read information: AT+CMGR=20 to read the 20th information (AT+CMGL="ALL" to read all information)
4. Delete information: AT+CMGD=20, as shown below
5. Convert the displayed information to text through a code converter.



(/wiki/File:Receive-english.png)



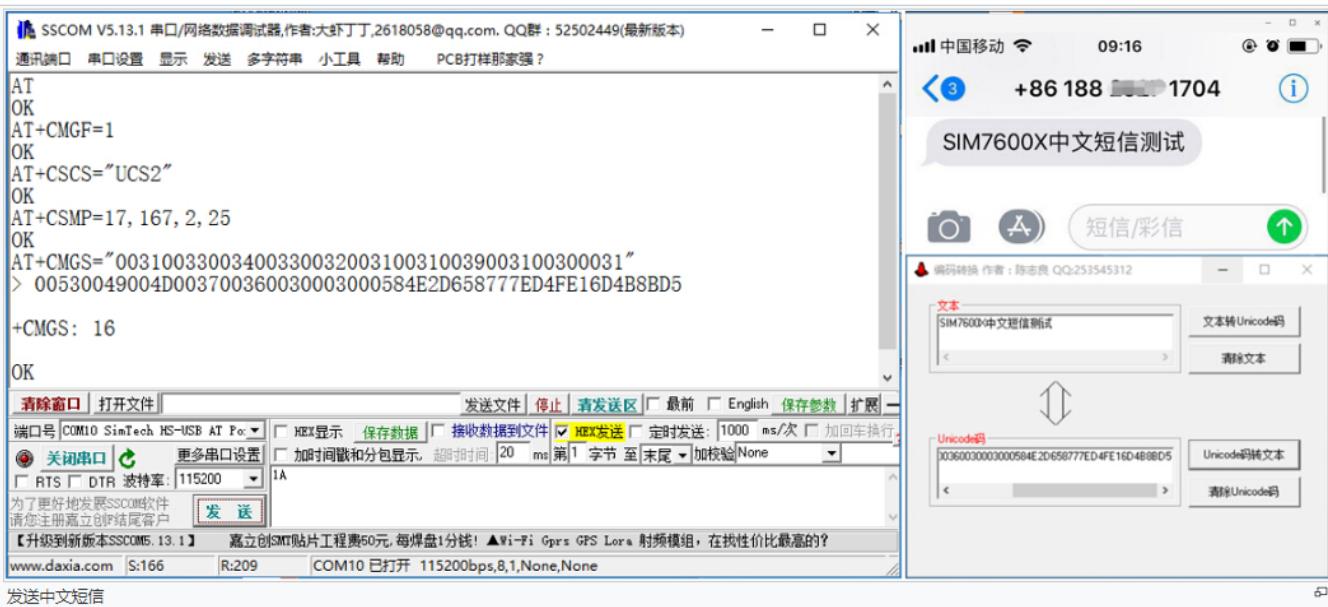
(/wiki/File:Receive2.png)

## Send Chinese SMS

### 1. Set the parameters for sending SMS

```
AT+CMGF=1          //set to text mode
AT+CSCS="UCS2"     //Set info text to UCS2 encoding set
AT+CSMP=17,167,2,25 //Set text mode parameters
AT+CMGS="00310033003400330032003100310039003100300031" //Set the UCS2 set of t
he receiver's mobile number
```

- Waiting to return >, send the information content converted by the software at this time (00530049004D003700360030003000584E2D658777ED4FE16D4B8BD5), no carriage return is required at the end, after editing the text message, send 1A to send the message in hexadecimal format, as shown in the following figure:



(/wiki/File:Chinese.png)

## Receive Chinese SMS

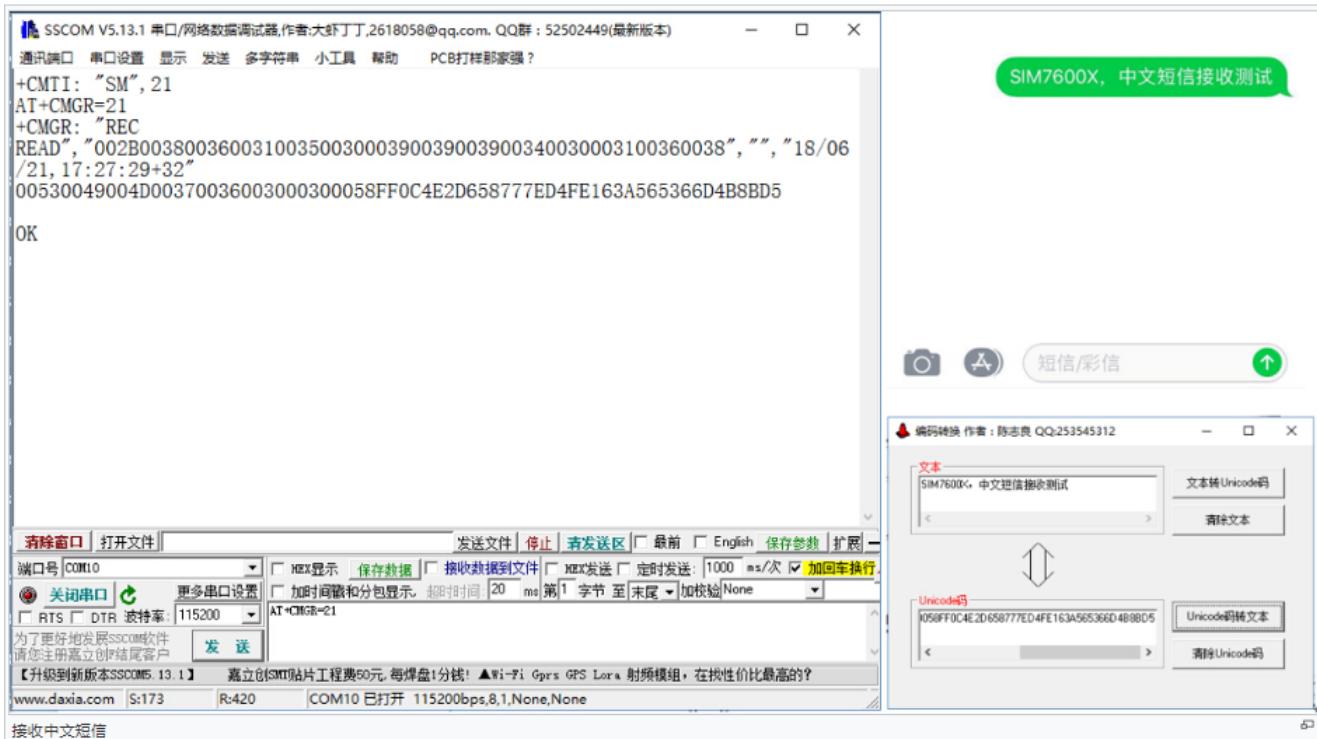
### 1. Set the parameters for sending SMS

```
AT+CMGF=1          //set test mode
AT+CSCS="GSM"     //set GSM code set
AT+CNMI=2,1        //Set up new message alerts
```

1. When receiving the information, the serial port will automatically report the information, and read the returned 21st information as shown in the figure below:

```
AT+CMGR=21          //Read the SMS content of serial number 21
```

1. Translate the information into Chinese in the software, as shown below:



(/wiki/File:Chinese2.png)

# User Guides of Raspberry Pi

## Hardware Connection

Connect the 5G HAT with a double-ended usb3.0 data cable, and connect an external 5V power supply to the Type-C power supply port of the 5G HAT, as shown in the figure:

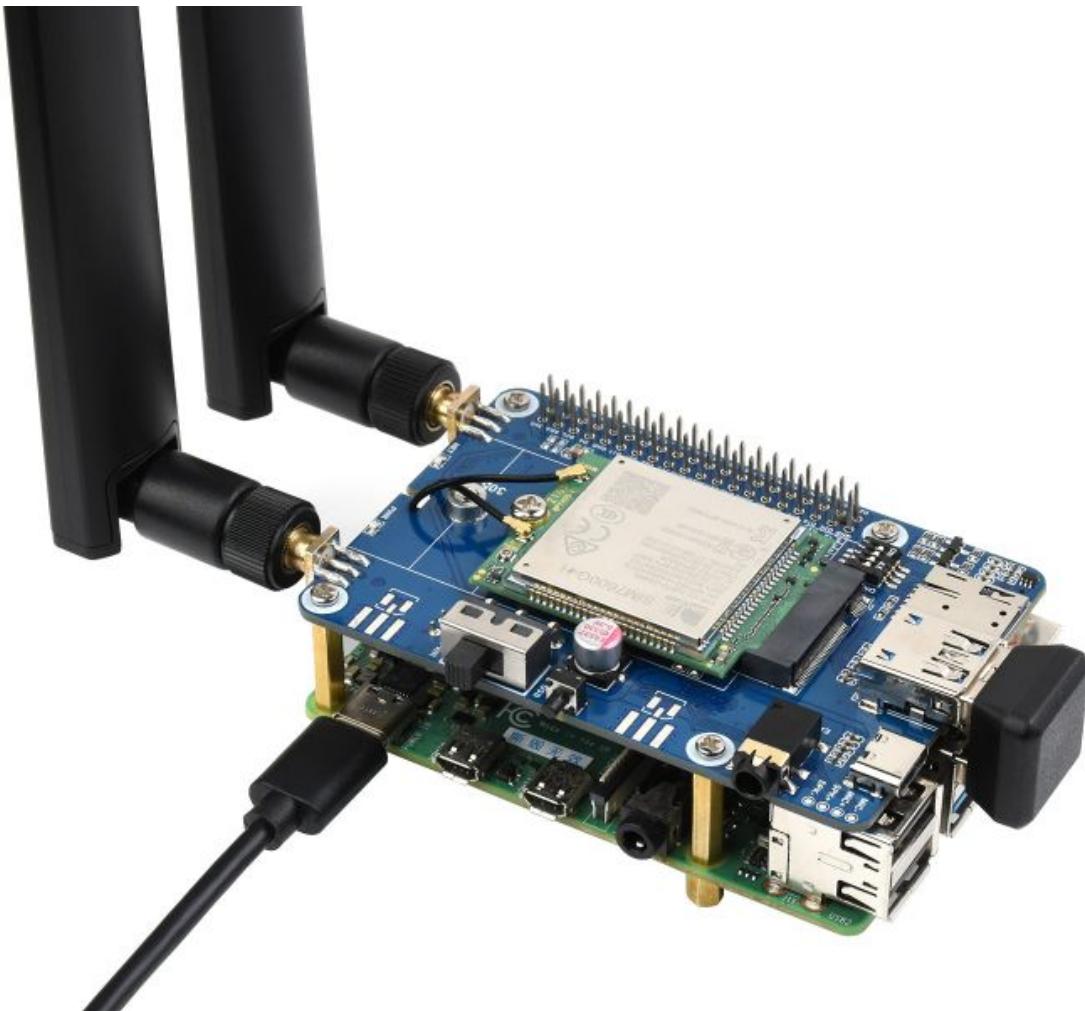
Raspberry Pi	Pi 4B	Pi 3B/3B+	CM4-IO-BASE
USB adapter	USB3.0 adapter	USB2.0 adapter	USB3.0 adapter
Connection	 (/wiki/File:M.2-To-4G-5G-HAT-CM4.jpg)	 (/wiki/File:M.2-To-4G-5G-HAT-Pi3B.jpg)	 (/wiki/File:M.2-To-4G-5G-HAT-CM4.jpg)
Note	It is recommended to connect an external 5V power supply at the arrow.		

If it is used for PI4B, there is a matching case (<https://www.waveshare.com/rm500u-cn-5g-hat.htm?sku=22348>), and the installation diagram is as follows:



## Raspberry Pi Internet Operation

If you are using Raspberry Pi 4B, Raspberry Pi 3B+ or CM4-IO-BASE-A/B baseboard, you can use the used the customized USB adapter.if it is used for other embedded mainboards or PCs, it can be connected through the matching double-head usb3.0 data cable; as shown in the following figure:



(/wiki/File:SIM7600G-H-M2\_4G\_HAT-1.png)

For specific operations related to Raspberry Pi dial-up Internet access, please refer to the following links:

- Raspberry Pi RNDIS dial-up Internet ([https://www.waveshare.com/wiki/Raspberry\\_Pi\\_net\\_worked\\_via\\_RNDIS](https://www.waveshare.com/wiki/Raspberry_Pi_net_worked_via_RNDIS))- (the easiest way to operate)
- Raspberry Pi PPP dial-up ([https://www.waveshare.com/wiki/Raspberry\\_Pi\\_PPP\\_dial-up](https://www.waveshare.com/wiki/Raspberry_Pi_PPP_dial-up))- (the operation is relatively simple)
- Raspberry Pi NDIS dial-up Internet access ([https://www.waveshare.com/wiki/Raspberry\\_Pi\\_networked\\_via\\_NDIS](https://www.waveshare.com/wiki/Raspberry_Pi_networked_via_NDIS))

## Raspberry Pi Minicom Sends AT Command to Debug

1. Connect the module to Raspberry Pi
2. Install minicom, minicom is a serial debugging tool for the Linux platform

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

3. USB and UART serial AT command debugging

- Execute minicom -D /dev/ttyUSB2. (default baud rate is 115200)

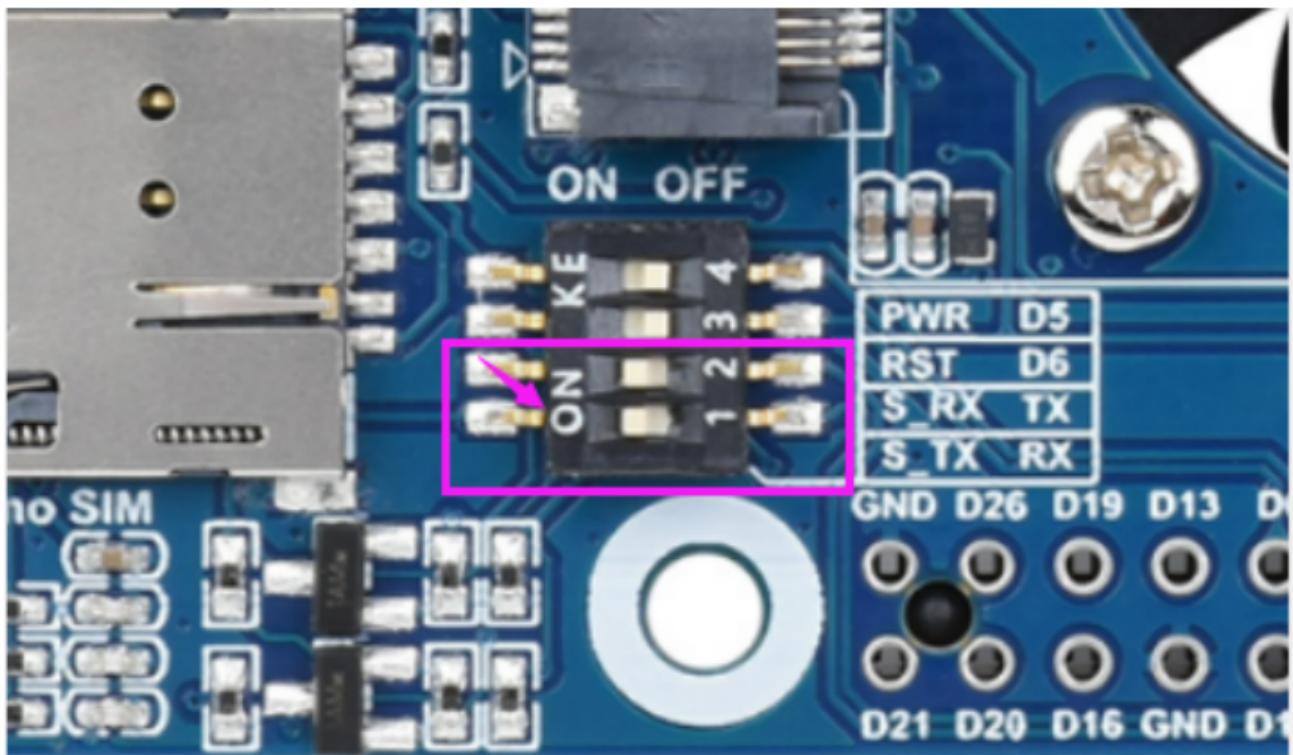
```
sudo minicom -D /dev/ttyUSB2
```

- Enter the following AT command in the minicom to open the UART. (the default baud rate is 115200)

```
AT+CCUART=1
```

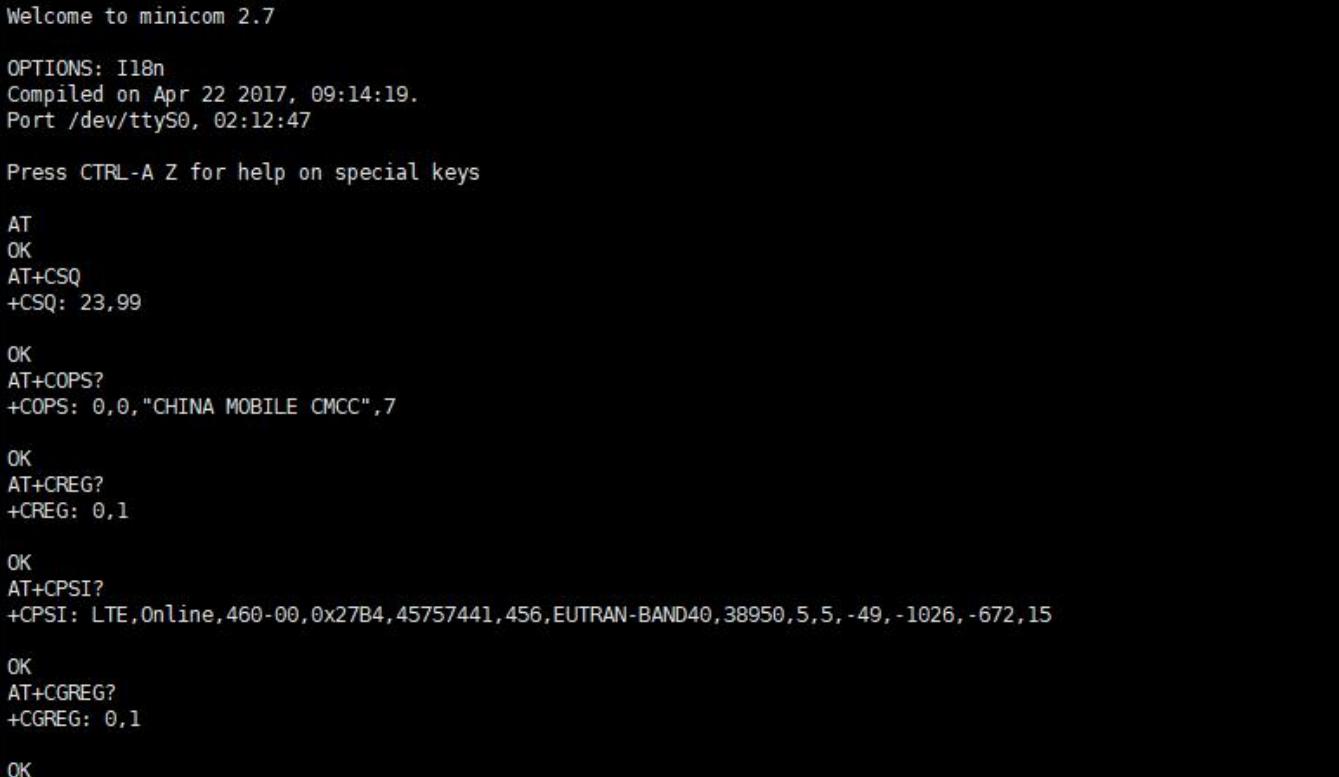
- Turn ON the TXD and RXD of the dial switch and execute minicom -D /dev/ttys0. (Baud rate 115200)

```
sudo minicom -D /dev/ttys0 -b 115200
```



(/wiki/File:SIM7600G-H-M2\_4G\_HAT-3.png)

4. Taking the AT synchronization test as an example, send relevant commands, as shown in the following figure:



```
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:SIM7600G-H-M2\_4G\_HAT-2.png)

\* minicom can enter the setting mode by pressing Ctrl+A, then Z, and exit by selecting X.  
If the sending command does not display, please send the command ATE=1 + Enter -> open the echo.

## Program sample

1. After inserting the module and connecting it to the Raspberry Pi;
2. Download the sample program to the /home/pi/ path;

```
wget https://www.waveshare.com/w/upload/5/5c/SIM7600G-H-4G-HAT-B-Demo.zip
sudo apt-get install p7zip-full
7z x SIM7600G-H-4G-HAT-B-Demo.zip
```

3. Go to the corresponding instance directory, compile and run the program, the relevant instructions are as follows (take the PhoneCall.py program as an example):

```
cd SIM7600G-H-4G-HAT-B-Demo/Raspberry/python/PhoneCall/ //Enter the folder where PhoneCall.py is located
sudo apt-get install python3-pip
sudo pip3 install pyserial
```

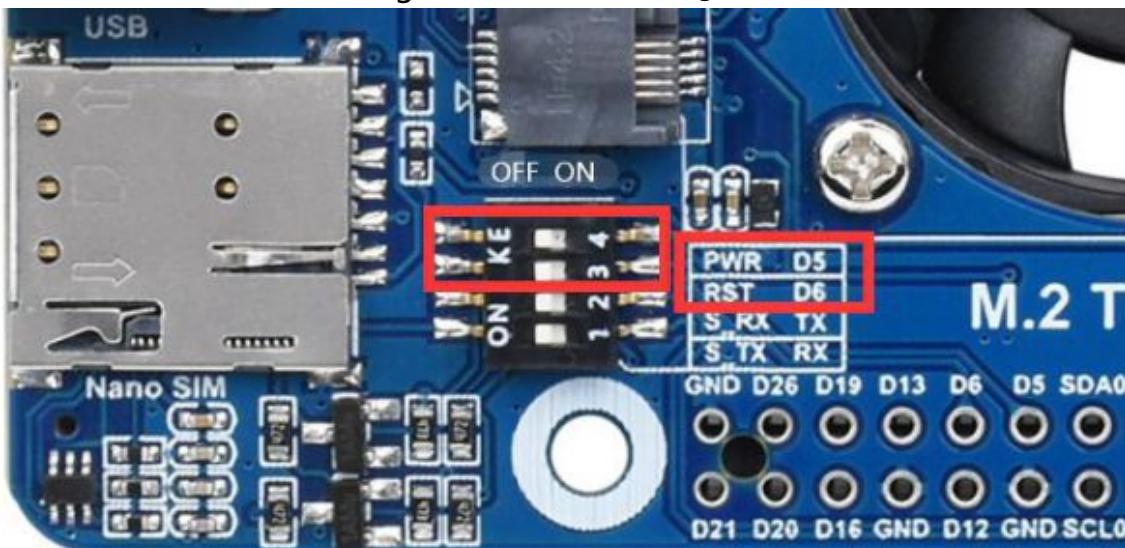
`sudo pip3 install RPi.GPIO`

```
sudo python PhoneCall.py //Run the program
```

## 5G HAT Power or Reset Control

The 5G HAT is provided with PWR and RESET control pins, and the Raspberry Pi can control the module power on/off or reset through the high and low levels of these two pins.

- Turn the PWR and RST setting switches to the right to enable Pi control:



(/wiki/File:M.2-TO-4G-5G-HAT-PWR-RST-PINS-SETTING.jpg)

- Power Control:** The following demonstrates the Shell script to control the PWR (D5 PIN) as an example:

```
cd /sys/class/gpio
echo 5 > export

cd gpio5
echo out > direction
echo 1 > value      #set to high Level to shut down the 5G module
echo 0 > value      #set to Low Level to power on the 5G module
echo 5 > unexport
```

- Reset Control:** The following demonstrates the Shell script to control the Reset (D6 PIN) as an example:

```
cd /sys/class/gpio
echo 6 > export

cd gpio6
echo out > direction
echo 1 > value      #set to high Level to shut down the 5G module
sleep 1              #wait for 1 second
echo 0 > value      #set to Low Level to power on the 5G module
echo 5 > unexport
```

## AT Command

```
pi@raspberrypi:~/SIM7600G-H-4G-HAT-B-Demo/Raspberry/python/AT $ sudo python AT.py
Please input the AT command:AT
AT
OK

Please input the AT command:AT+CSQ
AT+CSQ
+CSQ: 28,99

OK

Please input the AT command:AT+CPSI?
AT+CPSI?
+CPSI: LTE,Online,460-01,0x2543,111925513,424,EUTRAN-BAND3,1650,5,5,-45,-832,-572,15

OK
```

(/wiki/File:Sim7600g.png)

## Phone Call Demo

```
pi@raspberrypi:~/SIM7600G-H-4G-HAT-B-Demo/Raspberry/python/PhoneCall $ sudo python Phonecall.py
AT+CSQ
+CSQ: 31,99

OK

AT+CREG?
+CREG: 0,1

OK

AT+CPSI?
+CPSI: LTE,Online,460-01,0x2543,111925513,424,EUTRAN-BAND3,1650,5,5,-45,-800,-560,14

OK

ATD10010;
OK

Call disconnected

VOICE CALL: BEGIN
AT+CHUP
VOICE CALL: END: 000018

OK
```

(/wiki/File:Phonecall.png)

## Receive & Send SMS

(/wiki/File:Receive\_%26\_Send\_SMS.png)

Note: The sample program is to send English text messages. If you have sent Chinese text messages, you need to use the following commands to change to English format:

AT+CSMP=17,167,0,240

## GPS Demo

```
pi@raspberrypi:~/SIM7600G-H-4G-HAT-B-Demo/Raspberry/python/GPS $ sudo python GPS.py
Start GPS session...
AT+CGPS=0
OK

AT+CGPS=1
OK

AT+CGPSINFO
+CGPSINFO: ,,,,,,,,
OK

AT+CGPSINFO
+CGPSINFO: 2232.497849,N,11404.751098,E,220721,023940.0,-65.1,0.0,
OK

AT+CGPSINFO
+CGPSINFO: 2232.497283,N,11404.752159,E,220721,023942.0,-53.6,0.0,
OK

AT+CGPSINFO
+CGPSINFO: 2232.496108,N,11404.756955,E,220721,023945.0,-37.4,0.0,
OK

AT+CGPSINFO
+CGPSINFO: 2232.495649,N,11404.760647,E,220721,023947.0,-30.2,0.0,
OK

AT+CGPSINFO
+CGPSINFO: 2232.495408,N,11404.763606,E,220721,023950.0,-27.5,0.0,
OK
```

(/wiki/File:Gps-demo.png)

## TCP Network Communication Demo

```
pi@raspberrypi:~/SIM7600G-H-4G-HAT-B-Demo/Raspberry/python/TCP $ sudo python TCP.py
AT+CSQ
+CSQ: 30,99

OK

AT+CREG?
+CREG: 0,1

OK

AT+CPSI?
+CPSI: LTE,Online,460-01,0x2543,111925513,424,EUTRAN-BAND3,1650,5,5,-53,-806,-517,14

OK

AT+CGREG?
+CGREG: 0,1

OK

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

AT+CSOCKSETPN=1
OK

AT+CIPMODE=0
OK

AT+NETOPEN
OK

+NETOPEN: 0

AT+IPADDR
+IPADDR: 10.37.53.144

OK

AT+CIPOpen=0,"TCP","118.190.93.84",2317
OK

+CIPOpen: 0,0

AT+CIPSEND=0,
>
Waveshare
OK

+CIPSEND: 0,9,9

RECV FROM:118.190.93.84:2317
+IPD9
Waveshare
send message successfully!
AT+CIPCLOSE=0
```

(/wiki/File:Tcp-network.png)

## FTP Upload & Download Demo

```

pi@raspberrypi:~/SIM7600G-H-4G-HAT-B-Demo/Raspberry/python/FTP $ sudo python FTP.py
AT+CFTPSSTART
OK

+CFTPSSTART: 0

AT+CFTPSSINGLEIP=1
OK

AT+CFTPSLOGIN="120.79.2.0",21,"aly","root",0
OK

+CFTPSLOGIN: 0

AT+CFTPSLIST="/"
OK

+CFTPSLIST: DATA,950
drwxr-xr-x 2 1001 www 4096 Jun 30 14:37 .
drwxr-xr-x 2 1001 www 4096 Jun 30 14:37 ..
-rw-r--r-- 1 1001 www 1 May 20 00:46 .htaccess
-rw-r--r-- 1 0 0 37 May 20 00:46 .user.ini
-rw-r--r-- 1 1001 www 479 May 20 00:46 404.html
-rw-r--r-- 1 1001 www 313 Jun 22 20:50 Jetson nano TTL.py
-rw-r--r-- 1 1001 www 12 Jun 1 11:46 SIM7600.txt
-rw-r--r-- 1 1001 www 3 Jun 1 14:24 data_bk_ver.txt
-rw-r--r-- 1 1001 www 12 Jun 30 15:52 hello.py
-rw-r--r-- 1 1001 www 946 Jun 23 10:32 index.html
-rw-r--r-- 1 0 0 93988 Jun 1 10:00 tower.png
-rw-r--r-- 1 1001 www 93840 Jun 10 12:53 tower2.png
-rw-r--r-- 1 1001 www 7 Jun 1 11:28 wwwpute

+CFTPSLIST: 0

AT+FSCD=F:/
+FSCD: F:/

OK

AT+FSLS
+FSLS: SUBDIRECTORIES:
usb
mifi

+FSLS: FILES:
data_bk_ver.txt
dnsmasq.conf
mobileap_cfg.xml

OK

Uploading file to "120.79.2.0"...
upload file from FTP...
AT+CFTRANRX="E:/hello.py",12 ERROR
AT+CFTRANRX="E:/hello.py",12 back:      AT+CFTRANRX="E:/hello.py",12
>
1314xal1314
OK
AT+CFTPSPUTFILE="hello.py"
OK

+CFTPSPUTFILE: 17

Downloading file form "120.79.2.0"...
Download file from FTP...
AT+CFTPSGETFILE="hello.py"
OK

+CFTPSGETFILE: 0

AT+CFTPSLOGOUT
OK

+CFTPSLOGOUT: 0

AT+CFTPSSTOP
+CFTPSSTOP: 0

OK

```

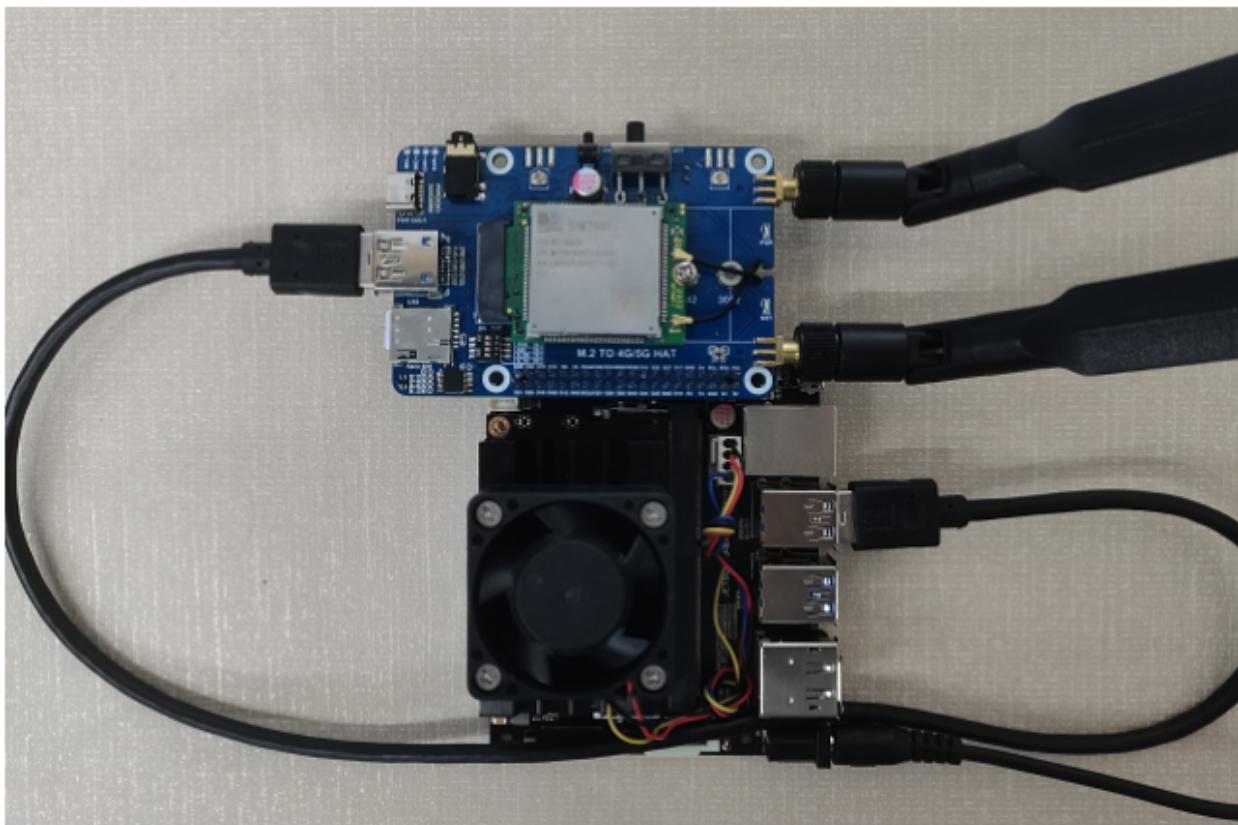
(/wiki/File:Upload-

**download.pna)**

# Jetson Nano Demo

## Hardware Connection

Jetson Nano has an onboard USB interface, SIM7600X 4G HAT(B) is connected to the USB interface of Jetson Nano through Micro USB.



(/wiki/File:Jetson-hardware-connection.png)

## Jetson Nano minicom Serial Port Debugging

1. Connect the SIM7600X 4G HAT(B) to the Jetson Nano and turn it on after three seconds
2. Use Template:SERIAL to log in to the Jetson Nano terminal

(/wiki/Template:SERIAL\_to\_log\_in\_to\_the\_Jetson\_Nano\_terminal), install minicom, and enter:

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

3. Run minicom for debugging, and enter in the terminal

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

4. Send AT command to test, exit minicom and press Ctrl+A, then X, and finally press ENTER

```
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:Jetson\_nano\_demo.png)

More demos to be continued...

## Resources

### Document

- SIM7600G-H 4G HAT(B) Schematic ([https://www.waveshare.net/w/upload/f/fe/SIM7600\\_X\\_4G\\_HAT\\_%28B%29.pdf](https://www.waveshare.net/w/upload/f/fe/SIM7600_X_4G_HAT_%28B%29.pdf))
- Dimension (/wiki/File:SIM7600-size.png)

### Demo Example

- File:SIM7600G-H-4G-HAT-B-Demo (2).zip (/wiki/File:SIM7600G-H-4G-HAT-B-Demo\_(2).zip)

### Software

- Windows Driver ([https://www.waveshare.com/w/upload/2/24/SIMCOM\\_Windows\\_USB\\_Drivers\\_V1.0.2.zip](https://www.waveshare.com/w/upload/2/24/SIMCOM_Windows_USB_Drivers_V1.0.2.zip))
- DTU Manager (EN) ([https://www.waveshare.com/w/upload/7/78/DTU\\_Manager\\_New\\_Eng\\_V3.7.zip](https://www.waveshare.com/w/upload/7/78/DTU_Manager_New_Eng_V3.7.zip))
- SSCOM Serial Test Tools (<https://www.waveshare.com/w/upload/2/2b/DTU-AT-SSCOM.7z>)
- SIM7600 Driver ([https://www.waveshare.net/w/upload/8/8c/SIM7600X\\_driver.zip](https://www.waveshare.net/w/upload/8/8c/SIM7600X_driver.zip))
- CP2102 Driver ([https://www.waveshare.com/w/upload/6/62/CP210x\\_USB\\_TO\\_UART.zip](https://www.waveshare.com/w/upload/6/62/CP210x_USB_TO_UART.zip))

- SIM7600 Serial Debugging Assistant (<https://www.waveshare.com/w/upload/2/20/SIM7600-AT-SSCOM-CN.7z>)
- GPS Debugging Tool (<https://www.waveshare.com/w/upload/c/cc/GPS-Software.7z>)
- TCP ([https://www.waveshare.com/w/upload/a/a6/TCP-Test\\_Tool.7z](https://www.waveshare.com/w/upload/a/a6/TCP-Test_Tool.7z))
- Xshell (<https://www.waveshare.com/w/upload/b/b4/Xshell.7z>)
- VLC media player (<https://www.waveshare.com/w/upload/4/4f/VLC-media-player.7z>)
- Unicode Conversion Software (<https://www.waveshare.com/w/upload/b/b3/Unicode.7z>)

## FAQ

### Question: Type of SIM card?

#### Answer:

Support SIM standard (Standard) card, as shown in the figure below, if it is Micro or Nano card, you need to add a card sleeve.



### 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?

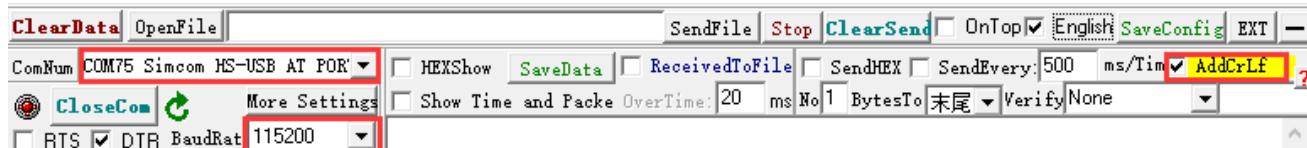
+CPSI: LTE, Online, 460-00, 0x27B4, 205523841, 70, EUTRAN-BAND40, 38950, 5, 5, -101, -945, -645, 17

OK

AT+CGREG?

+CGREG: 0, 1

OK



**Question: 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: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","CMNET" //CMNET is the apn of China Mobile, which is different for different operators
```

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

**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

(

- 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=0x0002000000400183,0x000001E00000000,0x0000000000000021 //After returning OK, measure the speed

AT+CNBP=0x0002000004400180,0x000001E00000000,0x000000000000003F //If the speed does not improve, try this

AT+CNBP?

+CNBP:

0x0002000004400180, 0x4800  
0042000001A0000800D5, 0x0000000000000003F

OK

AT+CNBP=0x0002000000400183, 0x000001E000000000, 0x000000000000000021

OK

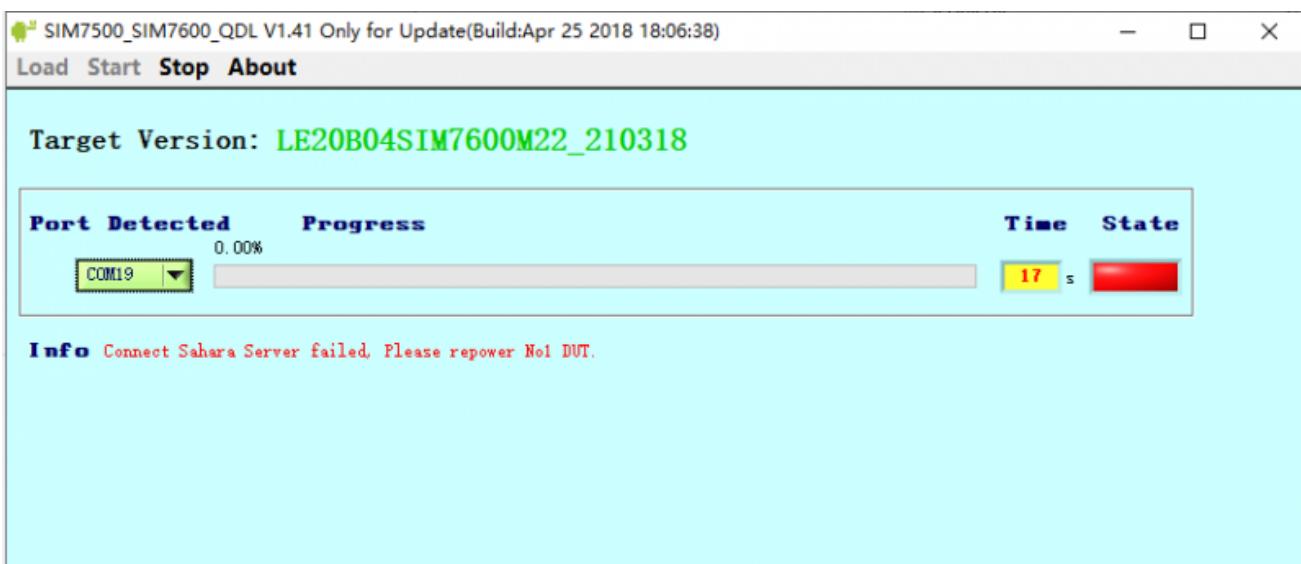
AT+CNBP=0x0002000004400180, 0x000001E000000000, 0x00000000000000003F

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 networking?

### Answer:

Using USB 5V power supply, after successful networking, the current is generally in the range of 50~300mA, with an average of about 150mA (for reference only, it depends on the network environment and the working status of the network).

## Question:How much power consumption when SIM7600CE 4G HAT loads 4g and gps at the same time?

### Answer:

Turn on at the same time, average value: 110~170mA

## Question:What are the antenna parameters for SIM7600CE 4G HAT?

**Answer:**

- Frequency: 700m 800m 900m 1710-1920M 2010-2100M 2300-2400M 2500-2690M-5800MHZ
- Gain: 9dbi ± 0.7dbi

**Question:NDIS dial-up of SIM7600X module fails and the driver cannot be installed, what should I do?****Answer:**

- Make sure your system kernel is above 5.4. Do not use sudo update to upgrade the Raspberry Pi to the latest version. This will upgrade the kernel version to a version higher than the current firmware and it will not be recognized.
- It is recommended to use the more convenient RNDIS dial ([https://www.waveshare.com/wiki/SIM820X\\_RNDIS\\_Dial-Up](https://www.waveshare.com/wiki/SIM820X_RNDIS_Dial-Up))
- Can burn the latest Raspberry Pi Raspbian system, reconfigure NDIS dial

**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

You can burn the latest Raspberry Pi Raspbian system and reconfigure the RNDIS dial-up

Or use the image that has been configured with the driver, RNDIS dial-up and boot up and start raspbian system image (the driver has been installed)

- Can burn the latest Raspberry Pi Raspbian system, reconfigure NDIS dial

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

**Answer:**

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

```
AT
OK
AT+CGPS=1
OK
AT+CGPSINFO
+CGPSINFO: 2232. 562023, N, 11404. 695799, E, 210618, 022617. 0, 56. 7, 0. 0, 350. 8
OK
```

(/wiki/File:SIM7600\_GNSS\_FAQ\_(1234567).png)

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

**Answer:**

Plug in the GPS antenna to the GNSS antenna base, and place the receiver label face down 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;

## 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", what should I do?

```
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:Chmod.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:Chmod2.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?

**Answer:**

```
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:Bcm2835.png)

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)

## Question:After using RNDIS dialing, what should I do if there is no drive device symbol?

**Answer:**

The RNDIS mode COM port can be loaded with the following drivers:

SIM7600X Driver ([https://www.waveshare.com/w/upload/4/48/SIM7600\\_Windows\\_USB\\_driver\\_V1.02.zip](https://www.waveshare.com/w/upload/4/48/SIM7600_Windows_USB_driver_V1.02.zip))

## 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.

*Retrieved from "https://www.waveshare.com/w/index.php?title=SIM7600G-H-M2\_4G\_HAT&oldid=45125  
(https://www.waveshare.com/w/index.php?title=SIM7600G-H-M2\_4G\_HAT&oldid=45125)"*