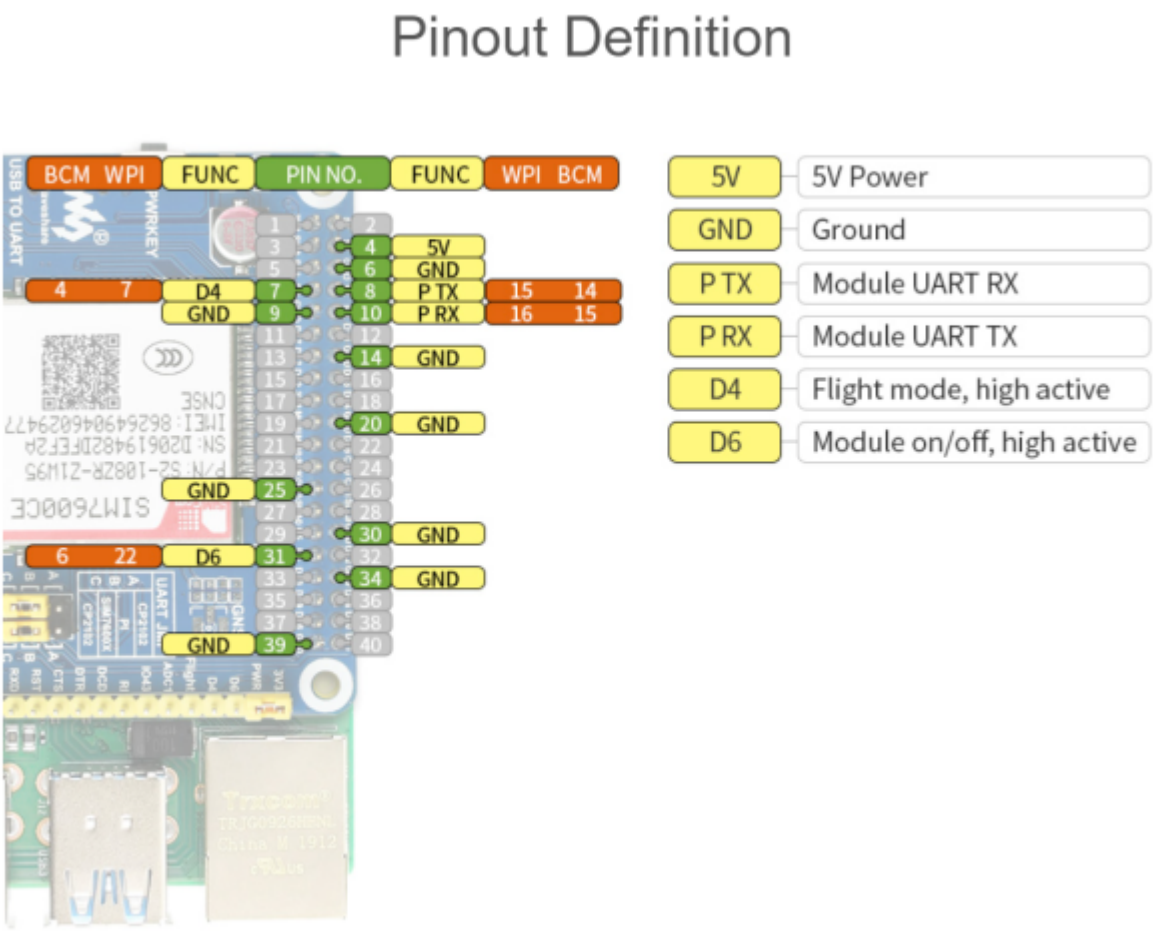
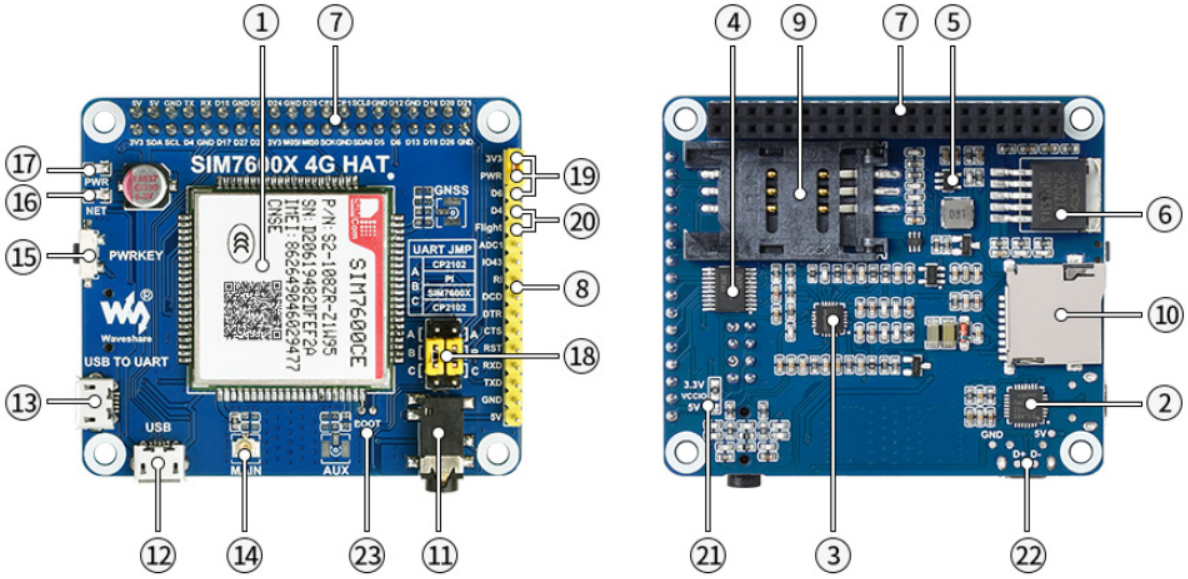
Features

- 40PIN GPIO extension header for connecting Jetson Nano.
- Supports dial-up, telephone call, SMS, mail, TCP, UDP, DTMF, HTTP, FTP, etc.
- Supports GPS, BeiDou, Glonass, LBS base station positioning.
- Onboard USB interface, to test AT Commands, get GPS positioning data, and so on.
- Breakout UART control pins, to connect with host boards like Arduino/STM32.
- SIM card slot, supports 1.8V/3V SIM card.
- Onboard TF card slot, which can be used to store files, text messages and other data.
- Onboard audio jack and audio decoder chip, for making telephone calls.
- 2 x LED indicators, easy to monitor the working status.
- Onboard voltage translator, the operating voltage can be configured to 3.3V or 5V via jumper.
- Baudrate: 300bps ~ 4Mbps (default: 115200bps)
- Autobauding baudrate: 9600bps ~ 115200bps.

- Provide complete supporting manuals (example programs such as Raspberry/Jetson Nano/Arduino/STM32).

Onboard Resources





1. SIM7600CE-CNSE
2. CP2102 USB to UART converter
3. NAU8810 audio decoder
4. TXS0108EPWR voltage translator
   - translates 3.3V/5V into 1.8V
5. MP2128DT power chip
6. SPX29302 power chip
7. Raspberry Pi GPIO header
   - for connecting with Raspberry Pi
8. SIM7600 control interface
   - for connecting with host boards like Arduino/STM32
9. SIM card slot
   - supports 1.8V/3V SIM card
10. TF card slot
    - for storing data like files, messages, etc.
11. 3.5mm earphone/mic jack
    - for audio actions like making telephone call
12. USB interface
    - for testing AT Commands, and so on
13. USB TO UART interface
    - for serial debugging, or login to Raspberry Pi
14. MAIN antenna connector
15. Module power switch
16. Network status indicator
17. Power indicator
18. UART selection jumper
    - A: access Raspberry Pi via USB to UART
    - B: control the SIM7600 by Raspberry Pi
    - C: control the SIM7600 via USB to UART
19. PWR selection jumper
    - PWR - 3V3: auto startup on power-up
    - PWR - D6: startup/shutdown by the Raspberry Pi D6 pin
20. Flight mode selection jumper
    - NC by default, no flight mode control pin
    - Flight - D4: flight mode is controlled by the Raspberry Pi D4 pin
21. Operating voltage selection jumper
    - VCCIO - 3.3V: set operating voltage as 3.3V
    - VCCIO - 5V: set operating voltage as 5V
22. USB connector solder pads
23. BOOT forced programming solder pads

Specification

Product	SIM7600CE-CNSE	SIM7600CE-T	SIM7600E	SIM7600E-H*	SIM7600A-H*	SIM7600G-H
Working frequency						
LTE Cat-4 /LTE Cat-1	**LTE-TDD** B38/B39/B40/B41 **LTE-FDD** B1/B3/B5/B8		**LTE-FDD** B1/B3/B5/B7/B8/B20 **LTE-TDD** B38/B40/B41		**LTE-FDD** B2/B4/B12	**LTE-TDD** B34/B38/B39/B40/B41 **LTE-FDD:** B1/B2/B3/B4/B5/B7 /B8/B12/B13/B18/B19 /B20/B25/B26/B28/B66

3G	**UMTS/HSDPA/HSPA+** B1/B8 **TD-SCDMA** B34/B39	**UMTS/HSPA+** B1/B5/B8	**UMTS/HSPA+** B2/B5	**UMTS/HSDPA/HSPA+** B1/B2/B4/B5/B6/B8/B19
2G	**GSM/GPRS/EDGE** 900/1800 MHz		not support	**GSM/GPRS/EDGE** 850/900/1800/1900MHz
GNSS	not support	GPS/Beidou/GLONASS/GALILEO/QZSS		
Data transmission				
LTE Cat-4	150Mbps(DL)/50Mbps(UL)	not support	150Mbps(DL)/50Mbps(UL)	
LTE Cat-1	not support	10Mbps(DL) /5Mbps(UL)	not support	
3G (HSPA+)	42Mbps(DL)/5.76Mbps(UL)			
2G (EDGE)	236.8Kbps(DL)/236.8Kbps(UL)		not support	236.8Kbps(DL)/236.8Kbps(UL)
2G (GPRS)	85.6Kbps(DL)/85.6Kbps(UL)		not support	85.6Kbps(DL)/85.6Kbps(UL)
Software features				
Network Protocol	TCP/IP/IPV4/IPV6/Multi-PDP/FTP/FTPS/HTTP/HTTPS/DNS			
Internet access	PPP/NDIS/RNDIS			
USB Driver	Windows XP/7/8/10、Linux (RPi Raspbian System driver free)			
Hardware Interface				
SIM Card Slot	Both are supported, compatible with 1.8V and 3V SIM cards			
UART Interface	Both are supported, the serial port sends and receives AT commands, and is compatible with 3.3V/5V working level			
USB Interface	Both are supported and can be used to test AT commands, obtain GPS positioning information, upgrade firmware, etc.			
USB to UART	Both are supported and can be used for serial port debugging or logging in to Raspberry Pi			
Audio Port	Both are supported and can be used for voice operations such as making calls			
TF Card Slot	Support, can be used to store files, text messages and other data		Not Support	Support
Antenna interface	LTE main antenna	LTE Main Antenna + LTE Diversity Antenna + GNSS Antenna		
Application scenarios				

Applicable area	China	Europe/Southeast Asia/West Asia/Africa /China/Korea	North America	Used globally
Typical application	Medical and health, smart payment, public network intercom, environmental monitoring, energy monitoring, fleet management, smart industry, smart agriculture			

Quick Test

Hardware Preparation

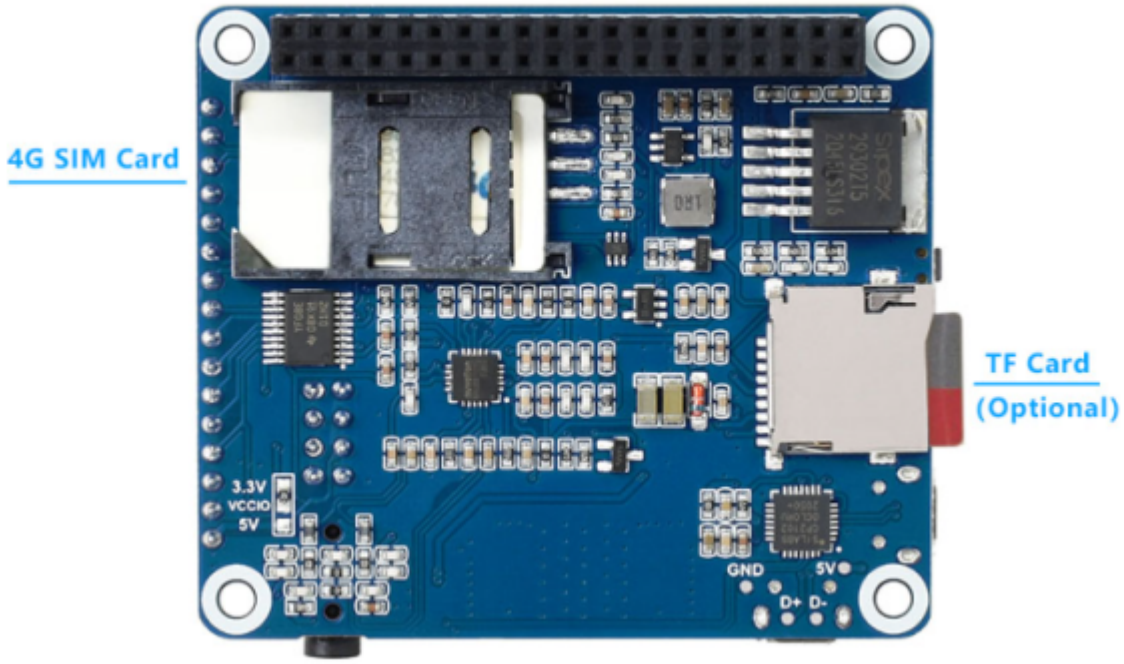
- In addition to the micro USB cable, LTE antenna, and GPS antenna, users need to prepare the following items before using the module:

```
A 4G SIM card (no downtime and GPRS enabled);
A headphone cable with a microphone (optional);
A TF card (optional);
```

Hardware Connection

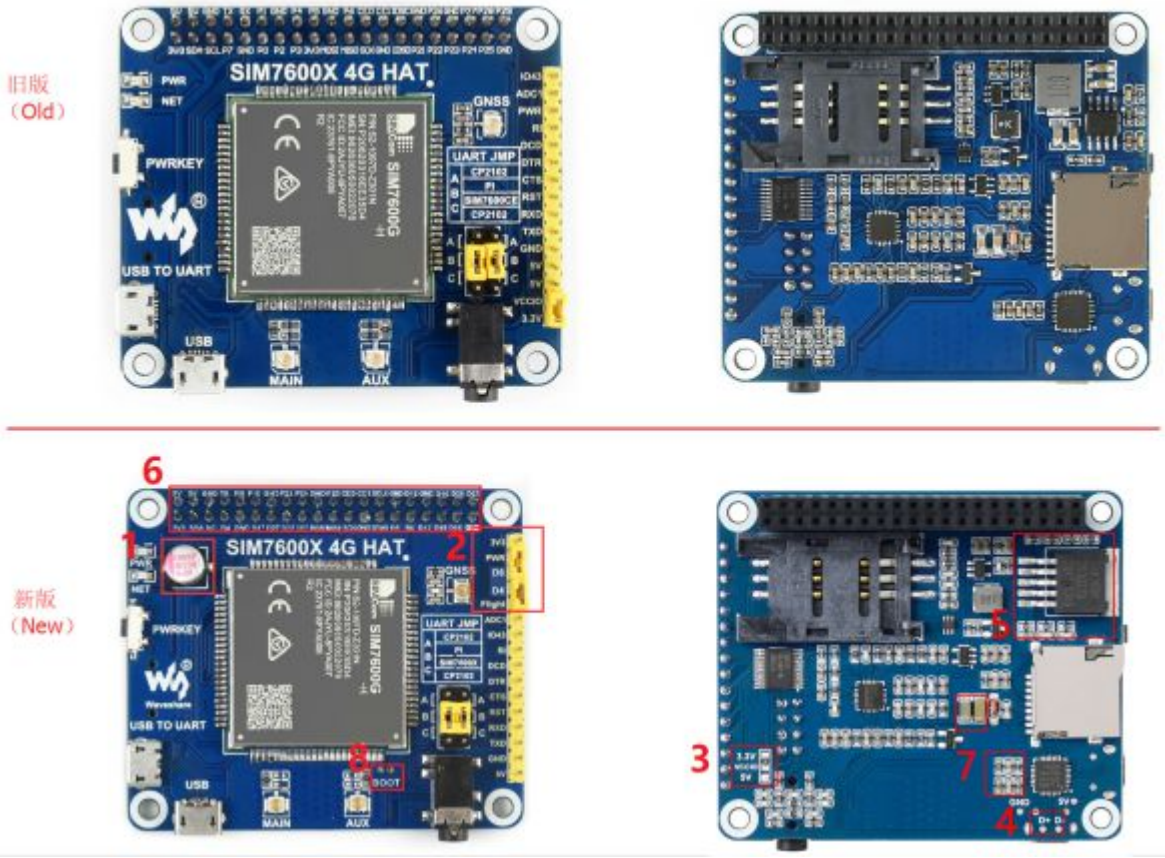
-
  - When power off, insert the activated 4G SIM card, TF card (optional), insert the headphone cable with microphone (optional), and then connect the USB cable to the computer.
  - Hardware connection diagram:

-
  - Back Connection Diagram



Hardware Configration of the New Version

In the second half of 2021, the SIM7600 series boards will be switched to new versions for shipment. The old and new versions can be used normally and stably.Compared with the old version, the new version has the following changes:



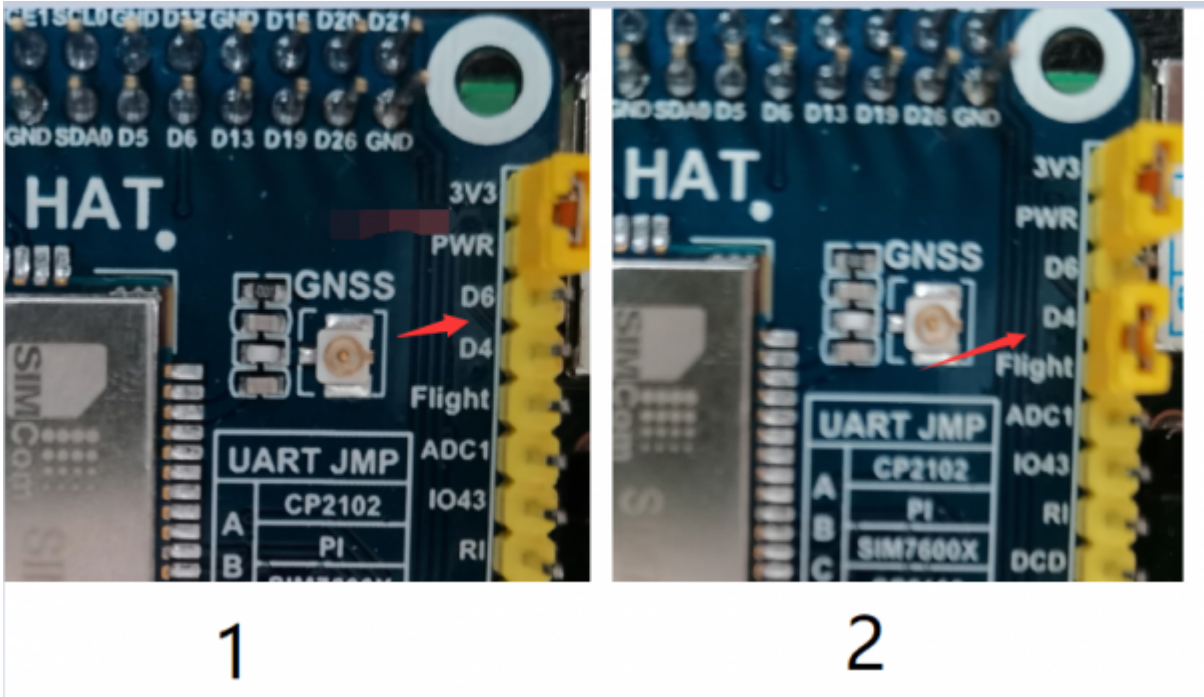
- 1) Newly added 330uF electrolytic capacitor (Stronger voltage stabilization ability)
- 2) Newly added PWR and Flightmode pin jumpers (Automatic power-on function can be set, and the IO port can be customized to control the switch and Flight mode)
- 3) Add solderable pads for VCCIO.(when used with Raspberry Pi, the SIM7600X 4G HAT is soldered at 3.3V working level by default; if you need to use 5V working-level MCU, you can change it to 5V by yourself)
- 4) Add solderable pads for the module USB. (if you don't want to use a USB adapter cable, you can solder them to the corresponding USB solder joints at the bottom of the Raspberry Pi through some flying cables. This operation should be used with caution by non-professionals)
- 5) The power management IC was changed from MP1482 to SPX29302
- 6) The silkscreen naming is changed from "WPI naming" to "BCM naming"
- 7) Fine-tuning the layout
- 8) Add new solder joints for module Boot to burn the firmware forcibly. Short-circuit the two pads can enter the forced firmware burning mode. (Only used when the firmware cannot be burned normally)

Description of turning on/off the HAT for New Version

- In the new version, PWR and 3V3 are short-circuited by default, so the HAT turned on automatically after connecting to the power supply.
- If you need to use the PWRKEY button to turn on/off the HAT, please remove the jumper cap between PWR and 3V3:
- If you want to use the Raspberry Pi to turn on/off, please set the jumper cap between PWR and D6:

Flight mode description of the New Version

- The new version of the HAT doesn't turn on the Flight mode by default:
- If you need to control the Flight mode through the Raspberry Pi pins, set the jumper cap between Flight and D4:



Net Indicator Working Status

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".

Software Envirnment

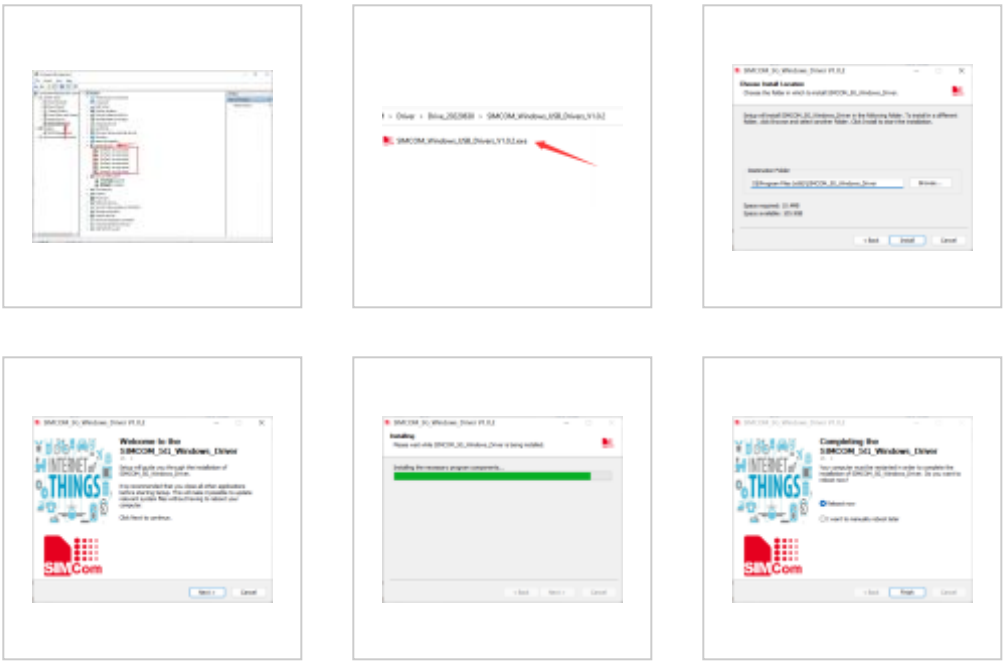
- Test environment: Windows operating system
- Test software: SIM7600 serial port debugging assistant
- Driver file: SIM7600X driver

Install Driver

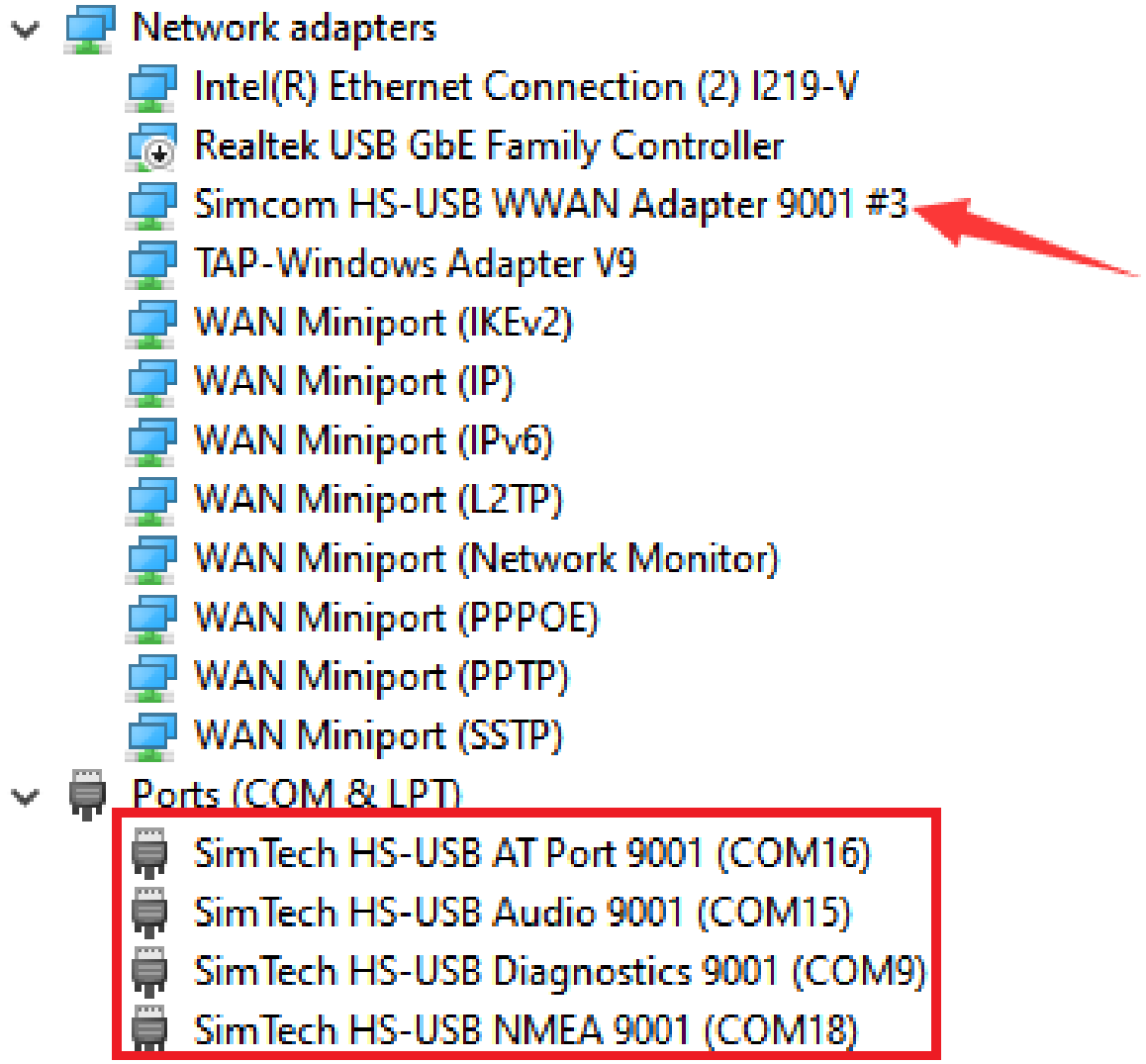
1.Download Driver: SIM7600X driver

2.Insert the 4G HAT into the Windows computer as shown in the hardware connection diagram above (the Windows 10 operating system is used as an example below) 3.Make sure the module has been powered on normally: refer to the previous chapter "Switching on and off the module"

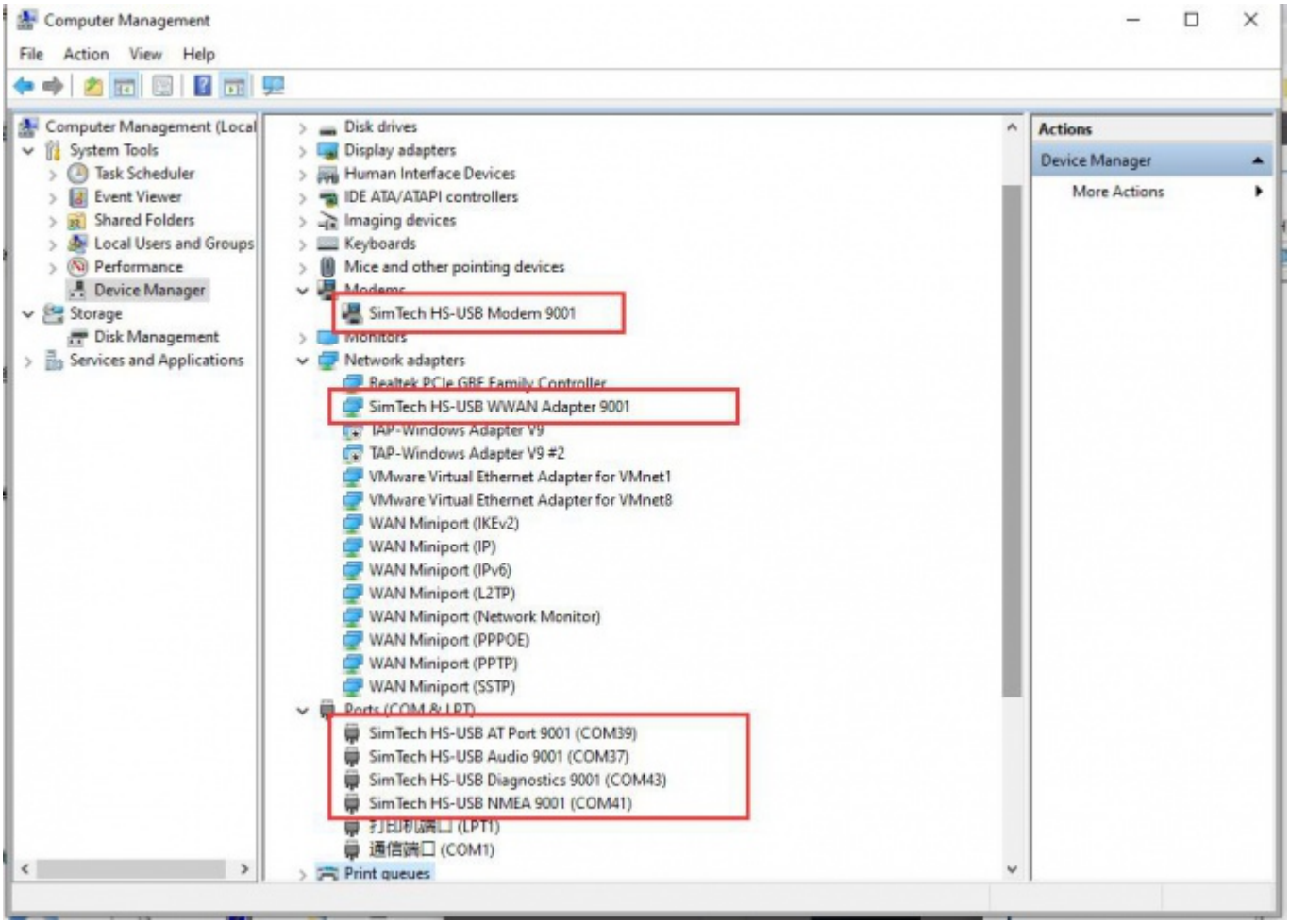
4. Unzip the driver file --> Double-click the exe driver file with the left mouse button --> Select the installation path --> NEXT --> Wait for the installation to complete --> Restart the computer --> Complete the driver installation.



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



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



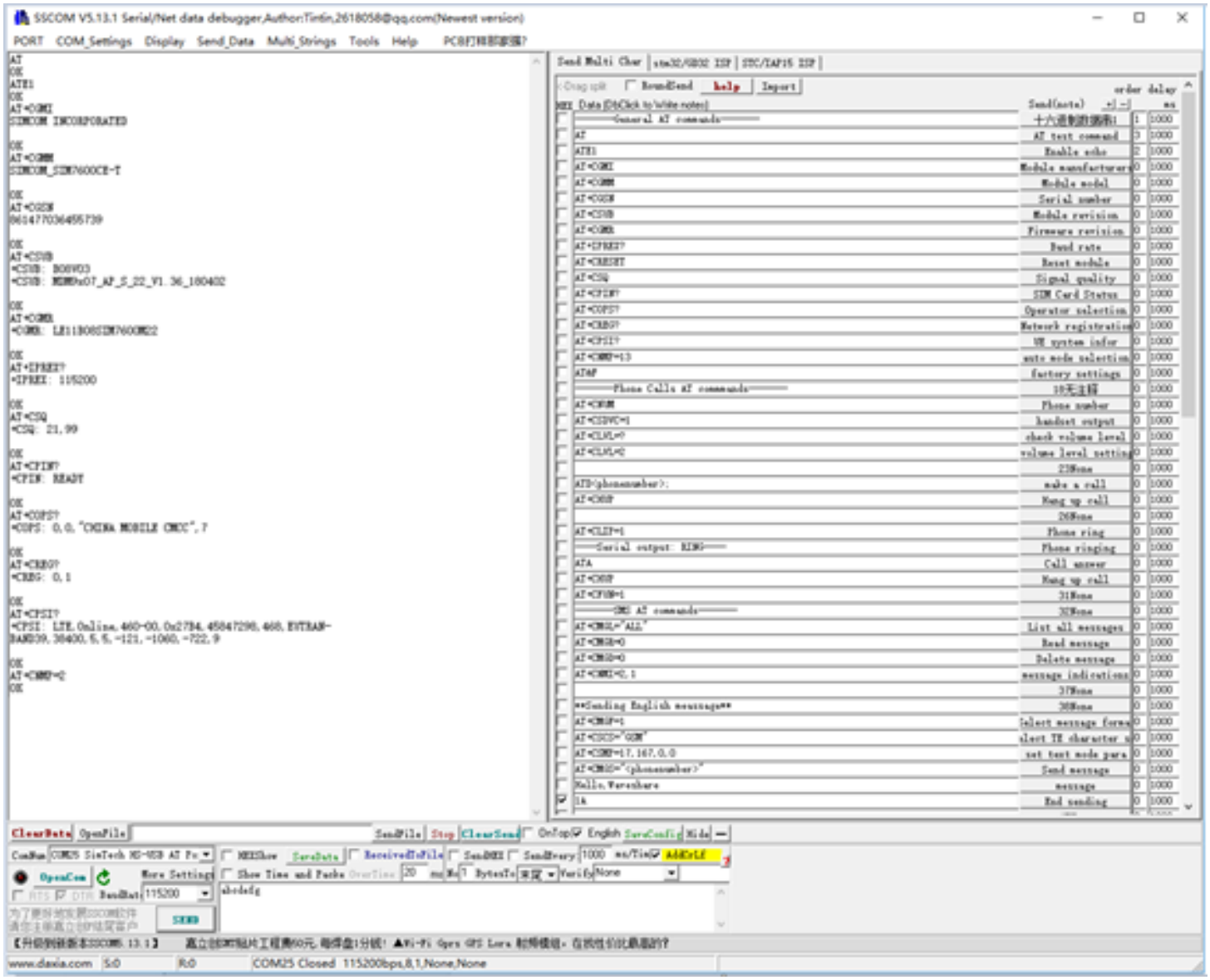
Common AT Command

- SIM7600X module supports AT command control, some basic AT commands are shown in the table below:
  (For the complete AT command set, please refer to: For more AT commands, please refer to: SIM7600X series AT command set)

Command	Description	Return
AT	AT Test Command	OK
ATE	ATE1 set echo ATE0 close echo	OK
AT+CGMI	Query module manufacturer	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

AT command sending and receiving test

1. Download serial debugging assistant: SIM7600 serial debugging assistant
2. Open the device manager, find the port number corresponding to AT Port; then open the sscom software, select the corresponding port and baud rate, check "Add carriage return and line feed"; click the sscom "Extension" button and pull out the preset It is best to open the serial port and send the corresponding AT command to test. The test screenshot is shown below:



Dailing up

PC Windows

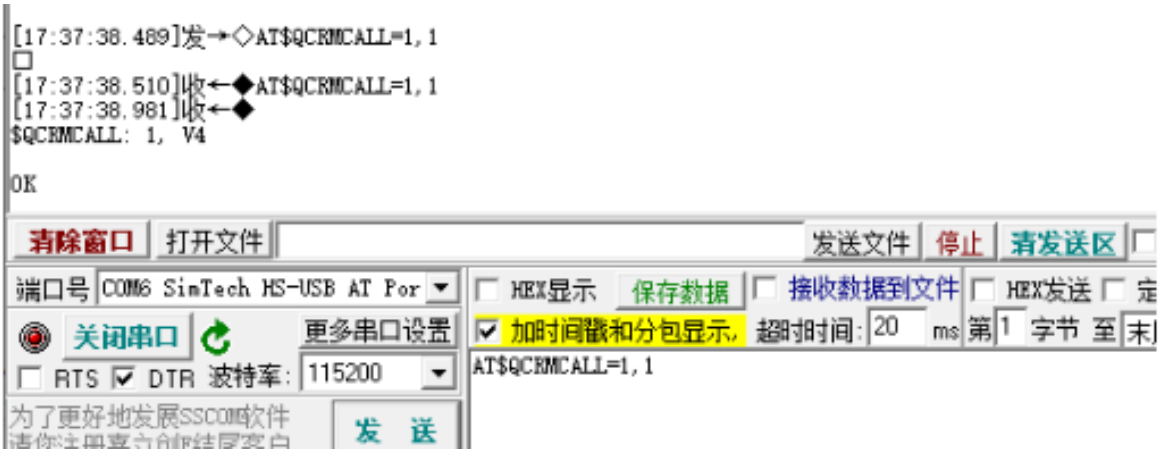
- Usually, when we use the Windows 10 operating system, make sure that the hardware and software drivers are installed. After the module is powered on, the PWR light is on normally, the NET light is flashing normally, and it will automatically connect to the Internet. If the Internet cannot be automatically connected, we can also use NDIS or PPPD to connect to the Internet

NDIS

The steps for Windows NDIS dialing are as follows:

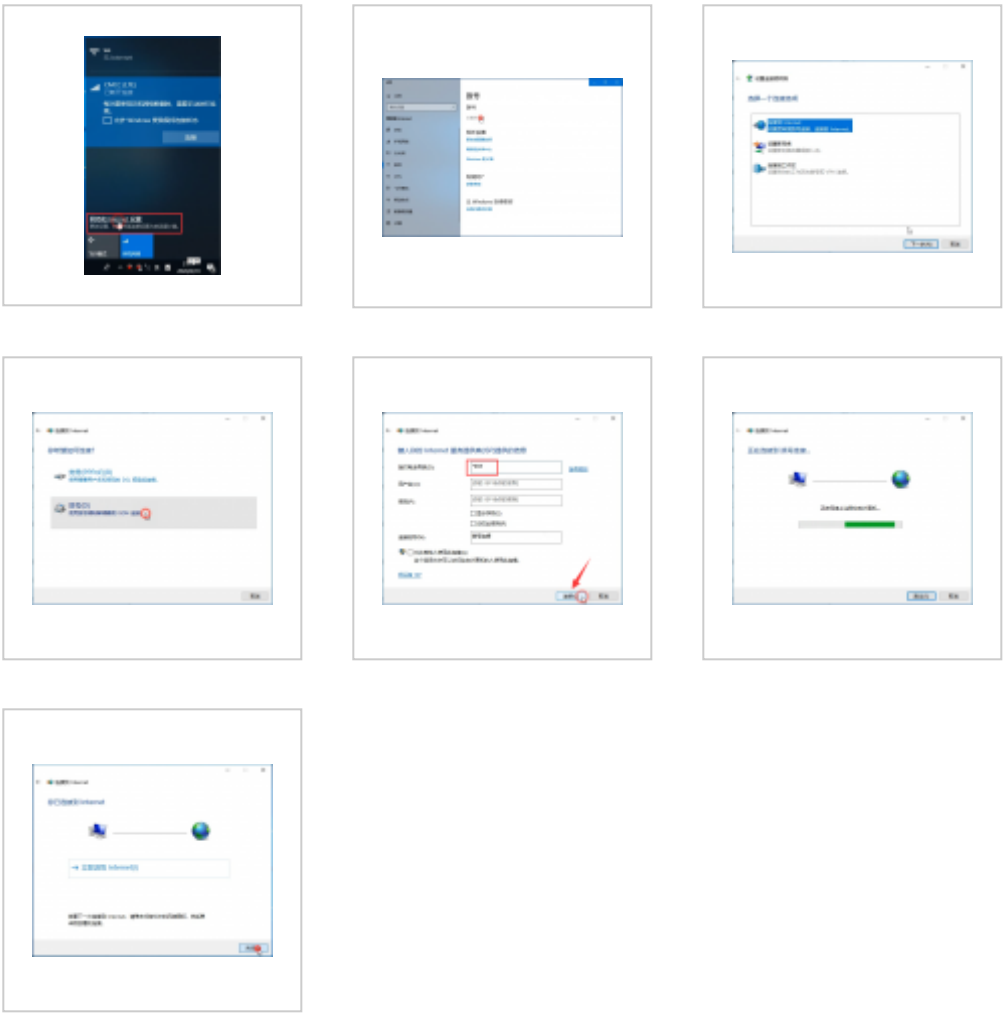
1. Open the SIM7600 AT port, and send the command (if using SSCOM to generate AT command, you must check "Enter")

```
AT$QCRMCALL=1,1 //must press "Enter"
```



2. At this point, the NDIS dialing takes effect, and the computer can connect to the network.

PPPD



Raspbian

1. Insert the module into the Raspberry Pi, and connect the USB interface to the USB port of the Raspberry Pi, turn it on, and the hardware is as shown below:
2. Refer to "Raspberry Pi initialization settings" below, The Raspberry Pi does the initial setup.

3. For dial-up Internet access, refer to the following operation video (for dial-up Internet access, it is recommended to use a USB interface connection, which is faster):

Raspberry Pi RNDIS dial-up Internet access

NDIS dial-up and self-starting

NDIS Dial-Up

PPPD dial-up

- PPPD dial-up
- After dialing up the Internet, if the DNS cannot be resolved and the Internet cannot be accessed, you can add the command:

```
route add -net 0.0.0.0 ppp0
```

GNSS

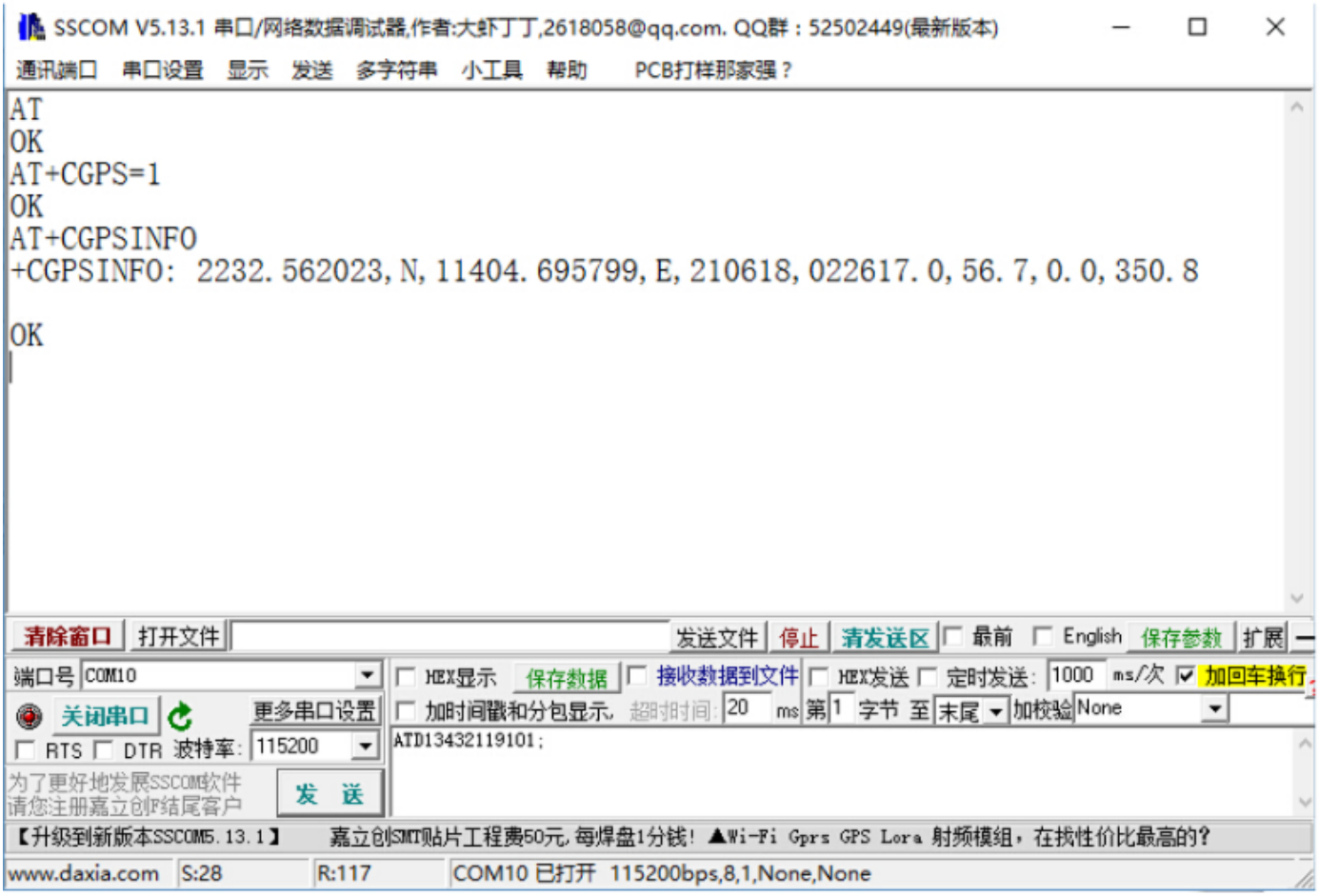
GNSS Position

- Plug in the GPS antenna, and place the receiver 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;

- AT Command

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

- SSCOM Software Test:



TCP/IP Network Data

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

We 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.

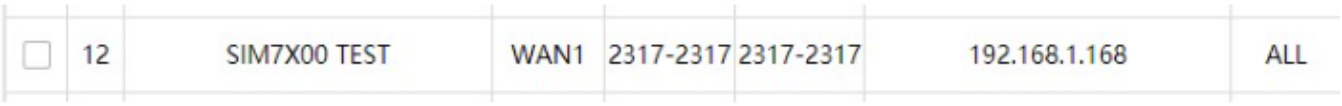
Set up a local computer virtual server

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) Use a browser to log in to the router management interface (please refer to your router manual for the specific address)

Set the port number: 2317 (it does not conflict with the existing port number. In this example, it is set to 2317)

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 view the IPv4 address, the intranet IP of the computer in this example is 192.168.1.168), as shown in the following figure :

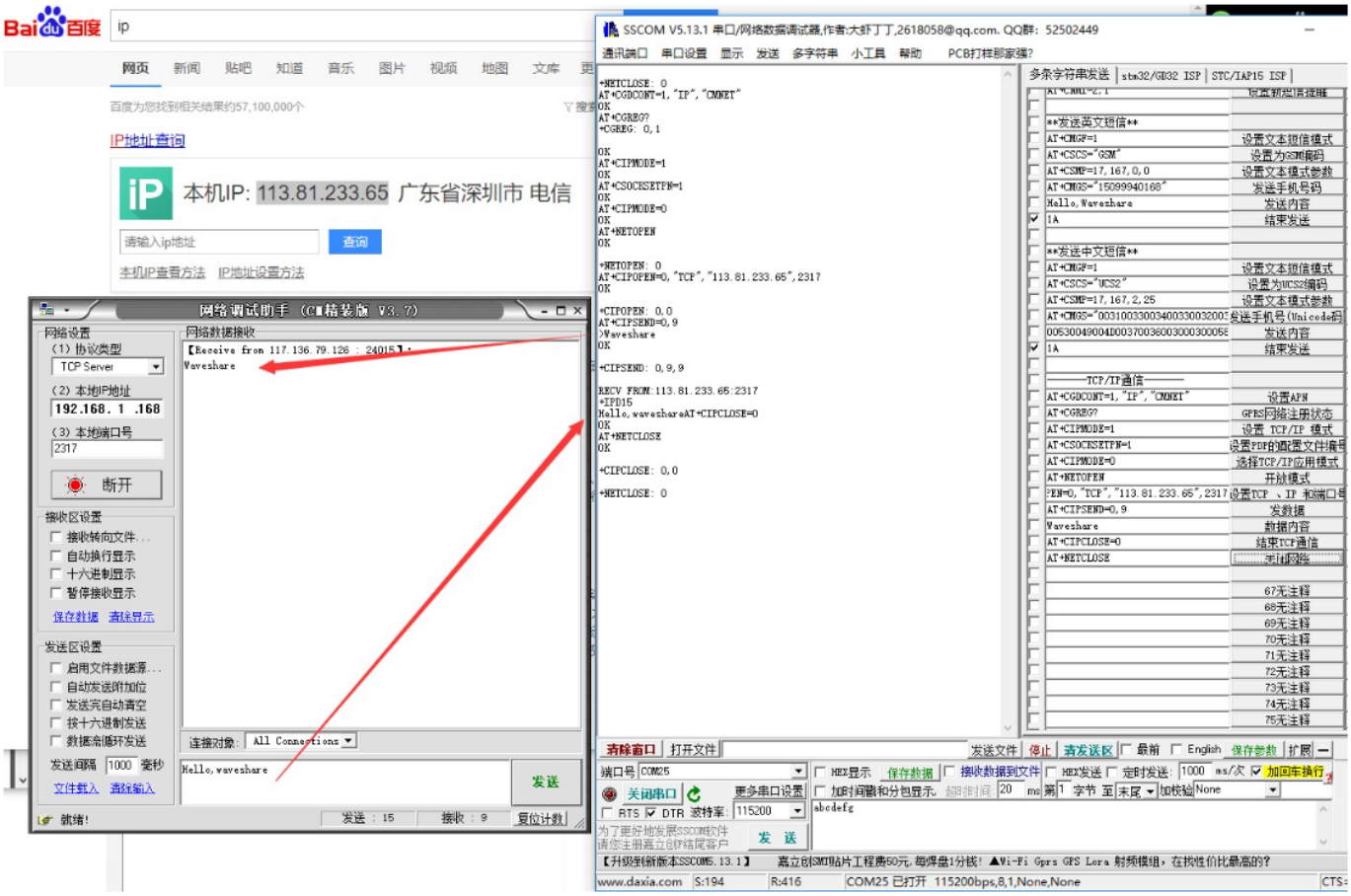


☐	12	SIM7X00 TEST	WAN1	2317-2317	2317-2317	192.168.1.168	ALL

Set up GPRS

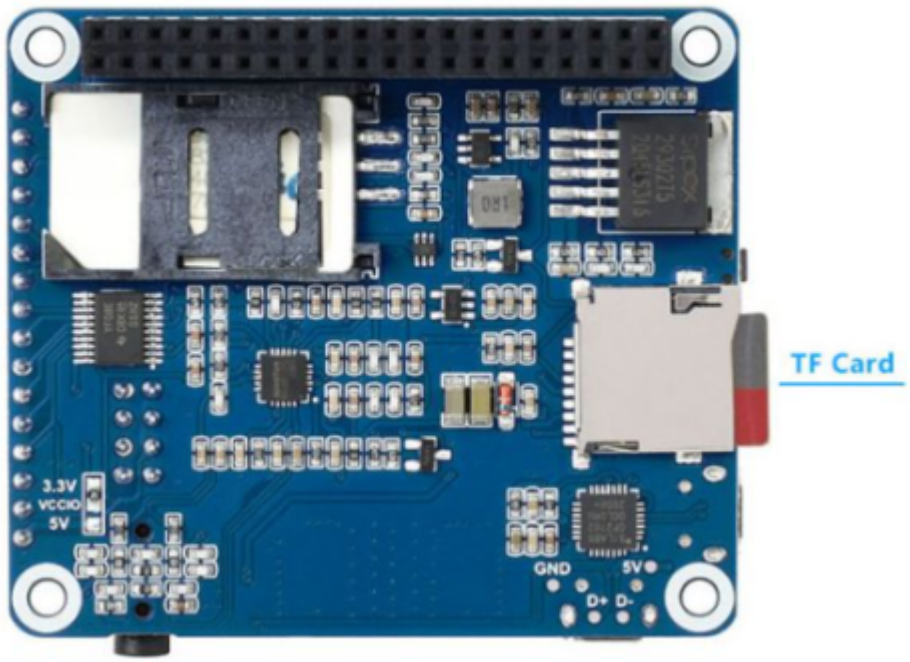
```
AT+CGDCONT=1,"IP","CMNET" //Set APN
AT+CSQ //Query the network signal quality, the first parameter is the maximum network si
gnal quality is 31, the larger the value, the stronger the network signal
AT+CREG? //Query the network registration status, where the second parameter is 1, it me
ans the registration 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 //Open mode
AT+CIPOPEN=0,"TCP","113.81.233.65",2317 //Set TCP, IP and port number to establish TCP/I
P connection
AT+CIPSEND=0,9, //To specify to send 9 characters of data, return > to start sending 9 c
haracters of content
AT+CIPCLOSE=0, //Close the TCP connection
AT+NETCLOSE, //Close the network
```

The operation steps are shown in the following figure:



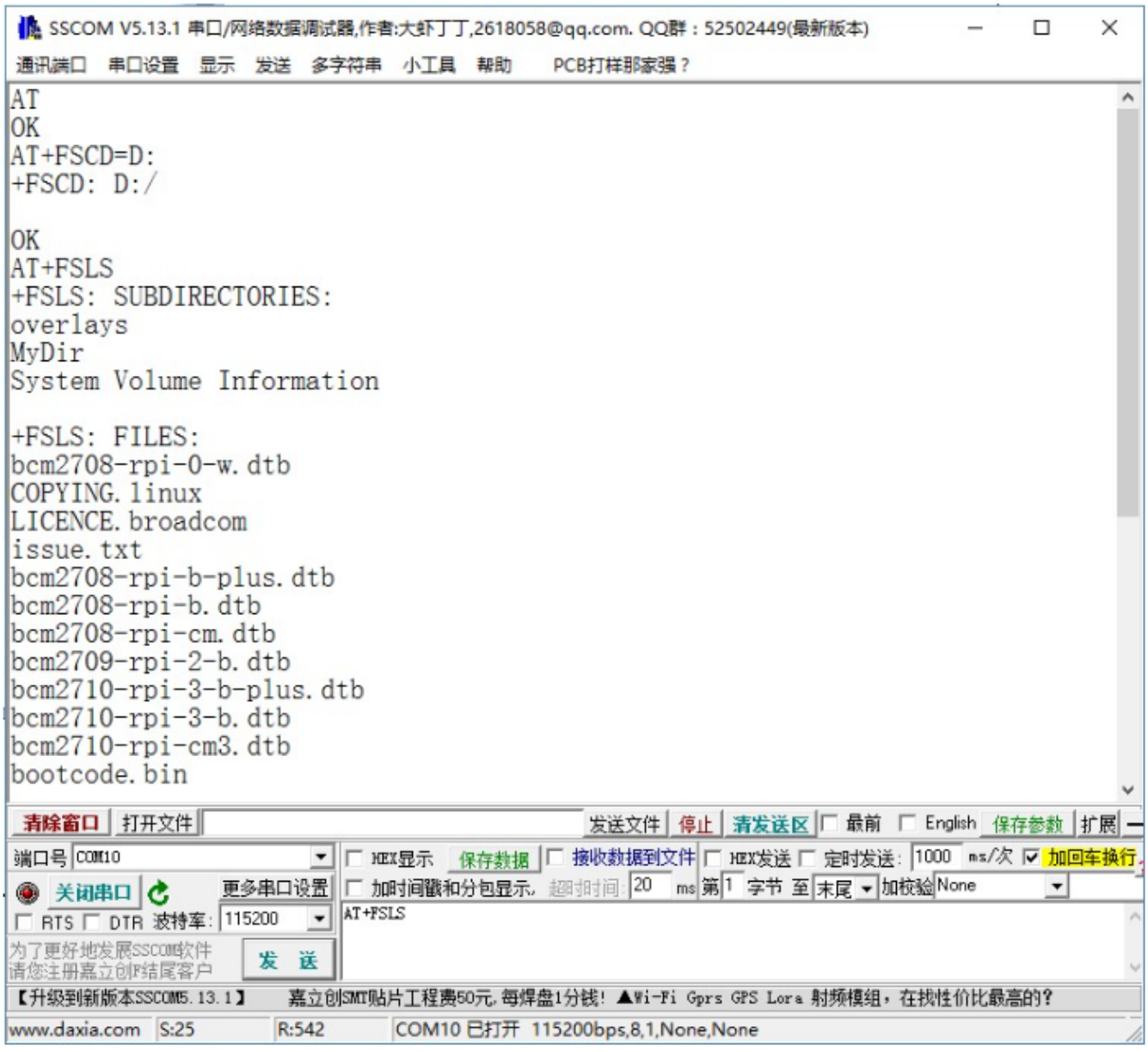
TF Card Debugging

1. Insert the TF card when the power is off (press the pop-up), follow the normal boot steps, and select the port number:



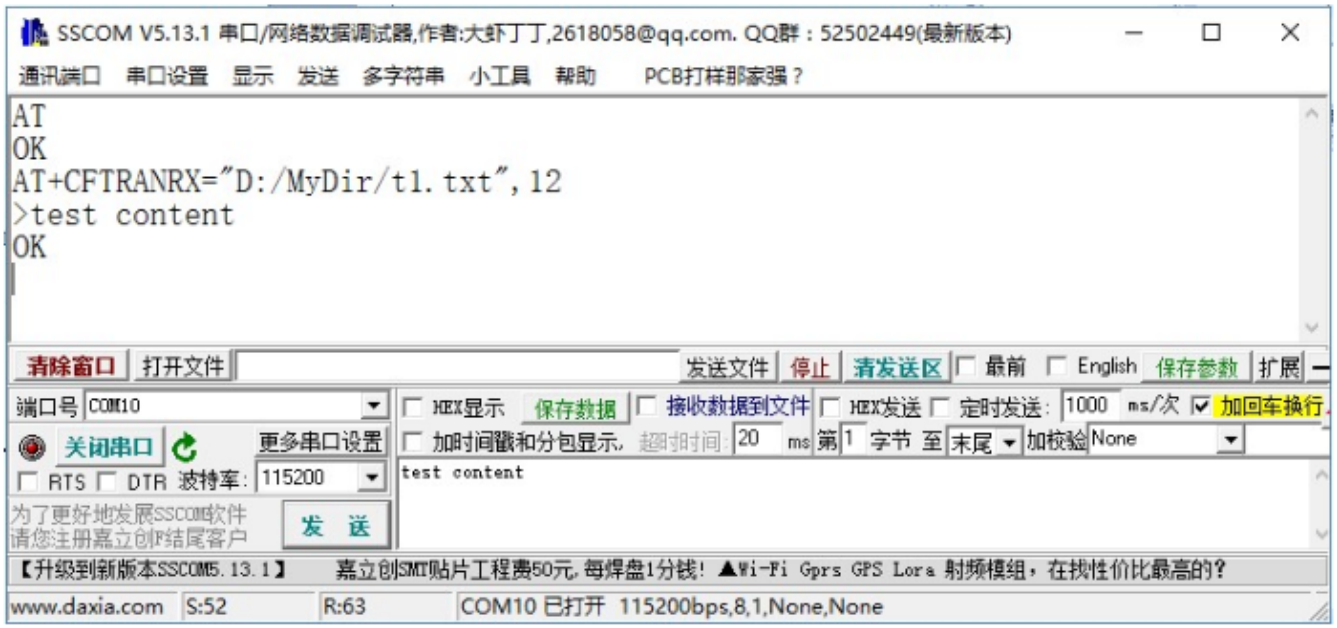
2. Select the TF card directory as the current directory

```
AT+FSCD=D: //Select TF card path
+FSCD: D:/
OK
AT+FSLS //View subdirectories
+FSLS: SUBDIRECTORIES:
overlays
MyDir
System Volume Information
...
...
OK
```



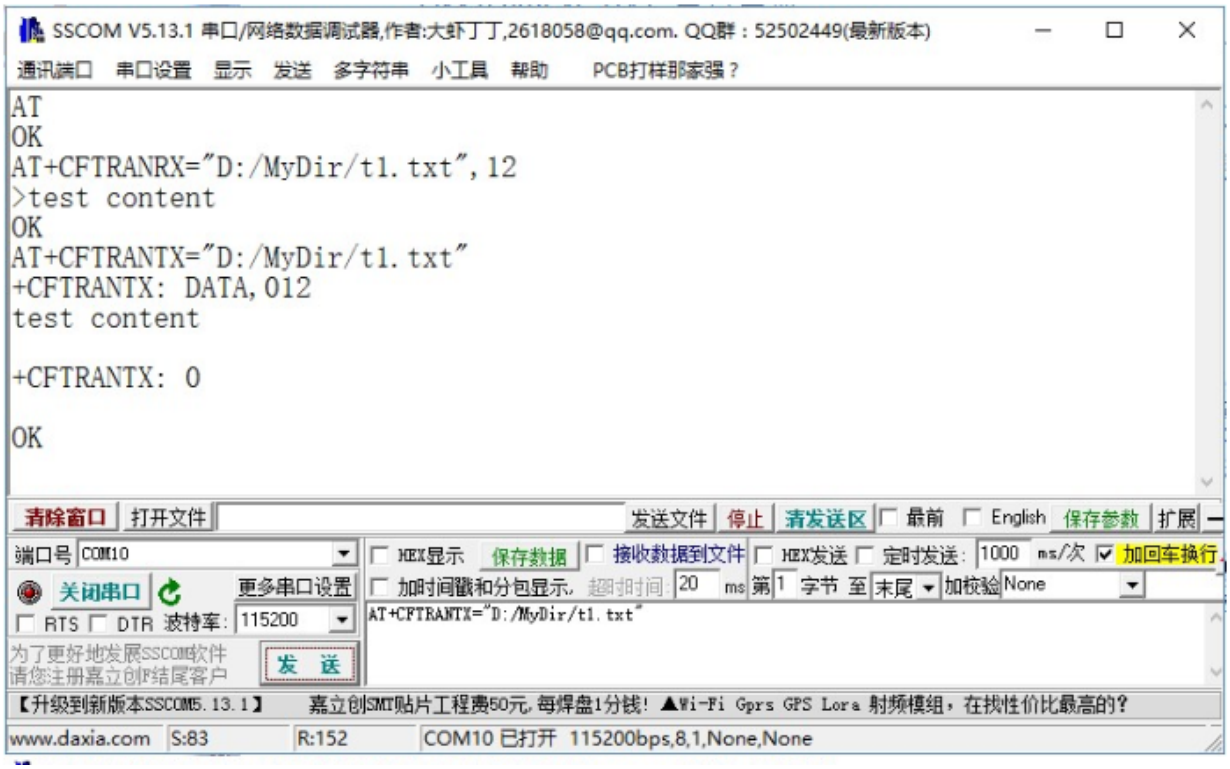
3.Create a folder with content on the TF card. Use the statement to set the MyDir folder in the root directory and create a t1.txt file in the folder, and write the content test content at the same time

```
AT+CFTRANRX="D:/MyDir/t1.txt",12 //File name
>test content //Content
OK
```



4.Open TF Card

```
AT+CFTRANTX="D:/MyDir/t1.txt"
+CFTRANTX: DATA,012
test content
+CFTRANTX: 0
OK
```



For more information, please refer to SIM7600X AT Commands

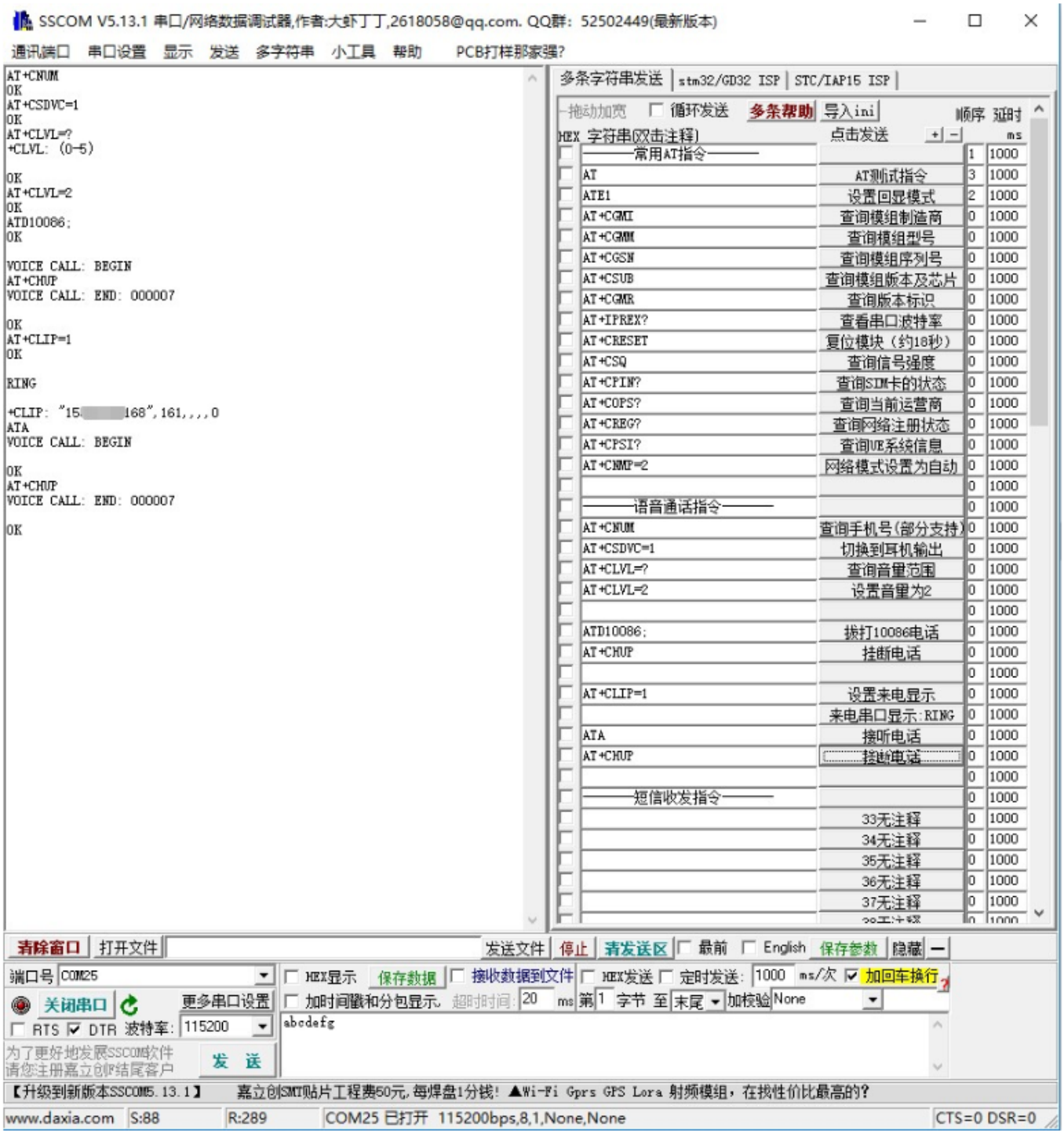
Phone Call

Dail

- 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+CNUM	Query the phone number (not all SIM cards support this command)	+CNUM 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 the customer service number of Mobile 10086	OK
AT+CHUP	hang up	OK
AT+CLIP=1	Set Caller ID	OK
ATA	Answer the call	OK

- The detailed operation screenshots are as follows:



【Note】: When using the SSCOM serial port assistant to send and receive AT commands, you must check "Enter"

Voice output mode and volume adjustment

```
AT+CSDVC=1 //Switch to headset
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 call

```
Incoming call serial display: RING
send "ATA" // answer the call
Send "AT+CHUP" //hang up
```

Audio parameter debugging

```
AT+CACDBFN=?
+CACDBFN: (Handset_cal.acdb,Handset_tianmai.acdb) // It is recommended to consider setti
ng 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 // The module call is established and executed to improve the call effe
ct
AT+CECM=1 //Echo suppression processing
OK
AT+CECH=0x500 //Improve the volume effect of the mobile phone
OK
```

SMS sending and receiving

Send English SMS

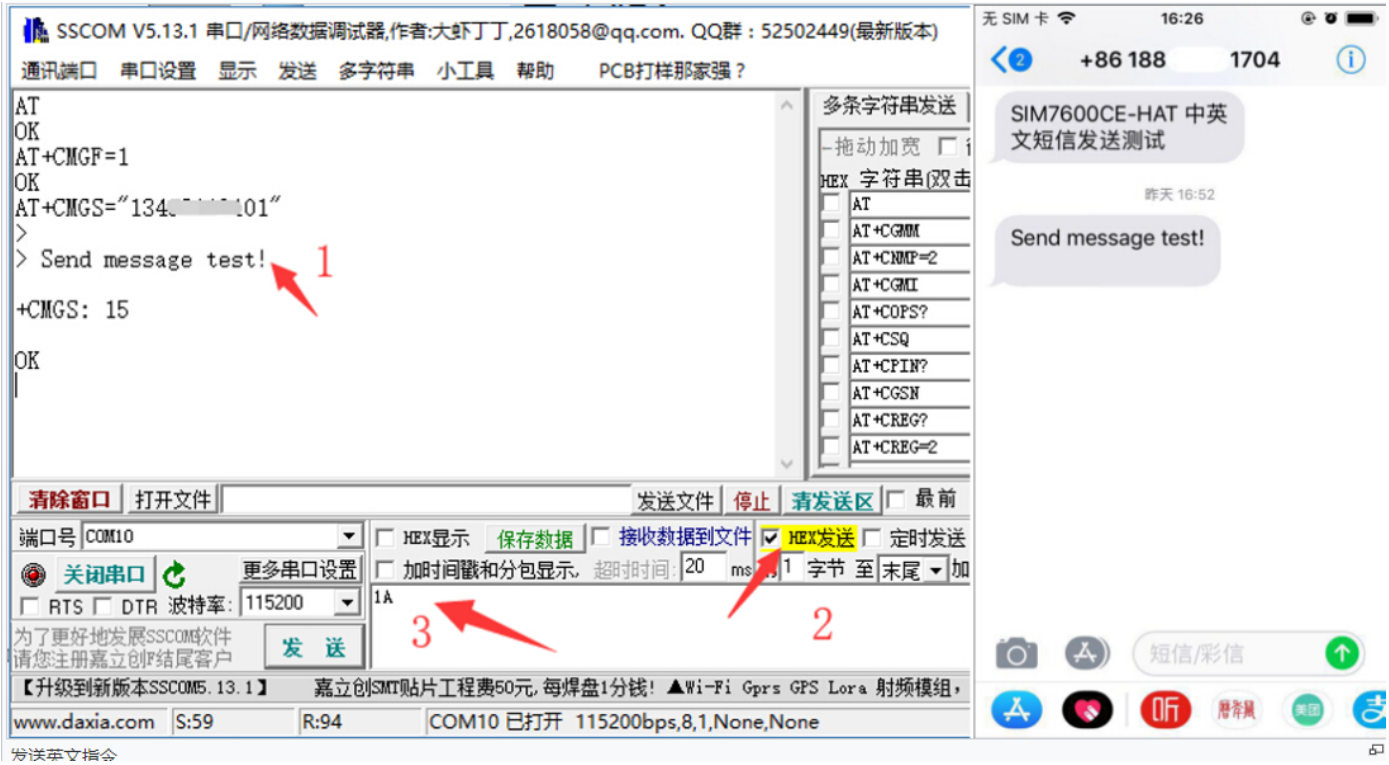
1. Install the SIM card and LTE antenna, connect the module's USB interface to the computer with a USB cable, and turn on the module; 2. Observe whether the indicator light is normal, the PWR indicator is always on, and the NET indicator is flashing;

3. Set the local SMS center: AT+CSCA="+8613800755500"+Enter, return OK.

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

5. AT+CMGS=" phone number "<Enter>, set the recipient's mobile phone number, and then return: ">", send the desired content, such as "Send message test!", no 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 execute the sending operation, or 1B or "ESC" to cancel the operation), after successful sending, the module returns + CMGS: 15 Confirmation that the transmission was successful. As shown below.



Receive English SMS

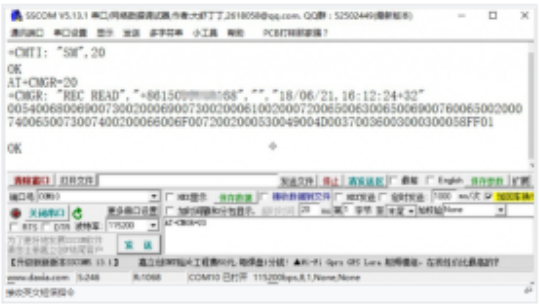
1. Send a message on the phone: "This is a receive test for SIM7600X!" to the test module

2. When receiving the information, the serial port will 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.

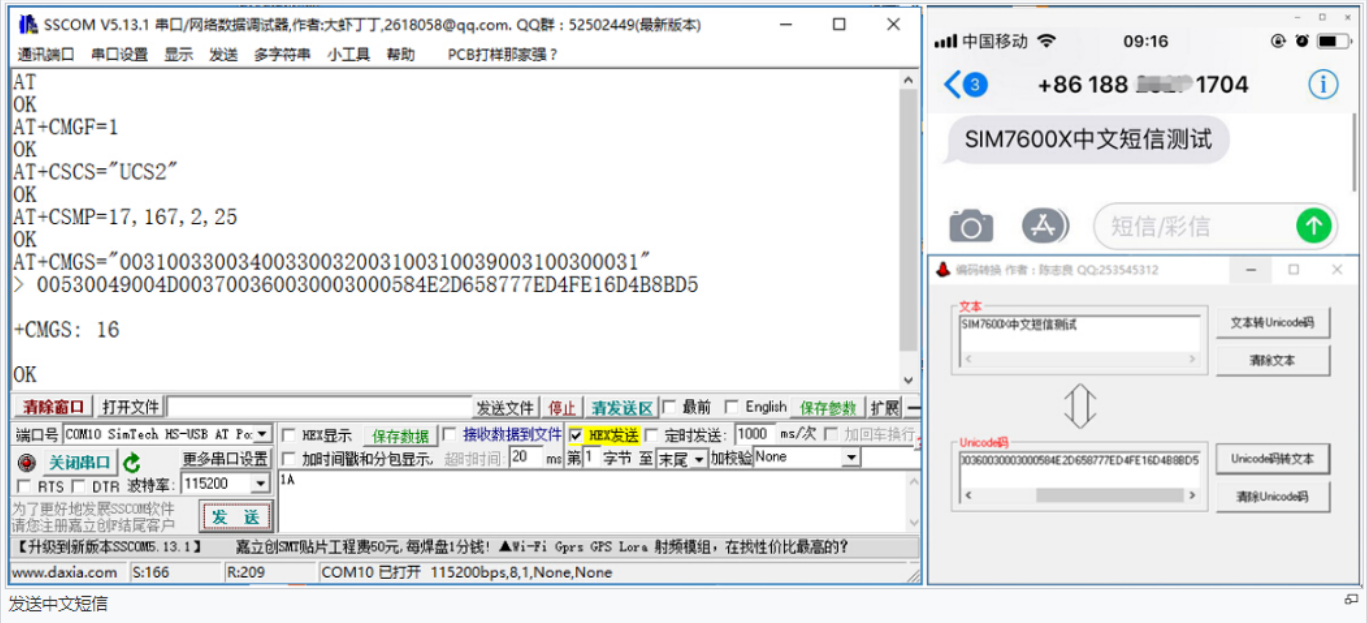


Send Chinese SMS

1. Set the parameters for sending SMS

```
AT+CMGF=1 //Set to text mode
AT+CSCS="UCS2" //Set the message text to UCS2 encoding set
AT+CSMP=17,167,2,25 //Set text mode parameters.
AT+CMGS="00310033003400330032003100310039003100300031" //Set the UCS2 set of the receive
r's mobile phone number;
```

2. Waiting to return to >, at this time send the converted information content (00530049004D00370036003000300003000584E2D658777ED4FE16D4B8BD5), no carriage return is required at the end, after editing the SMS, send 1A to send the message in hexadecimal format, as follows As shown:



Receive Chinese SMS

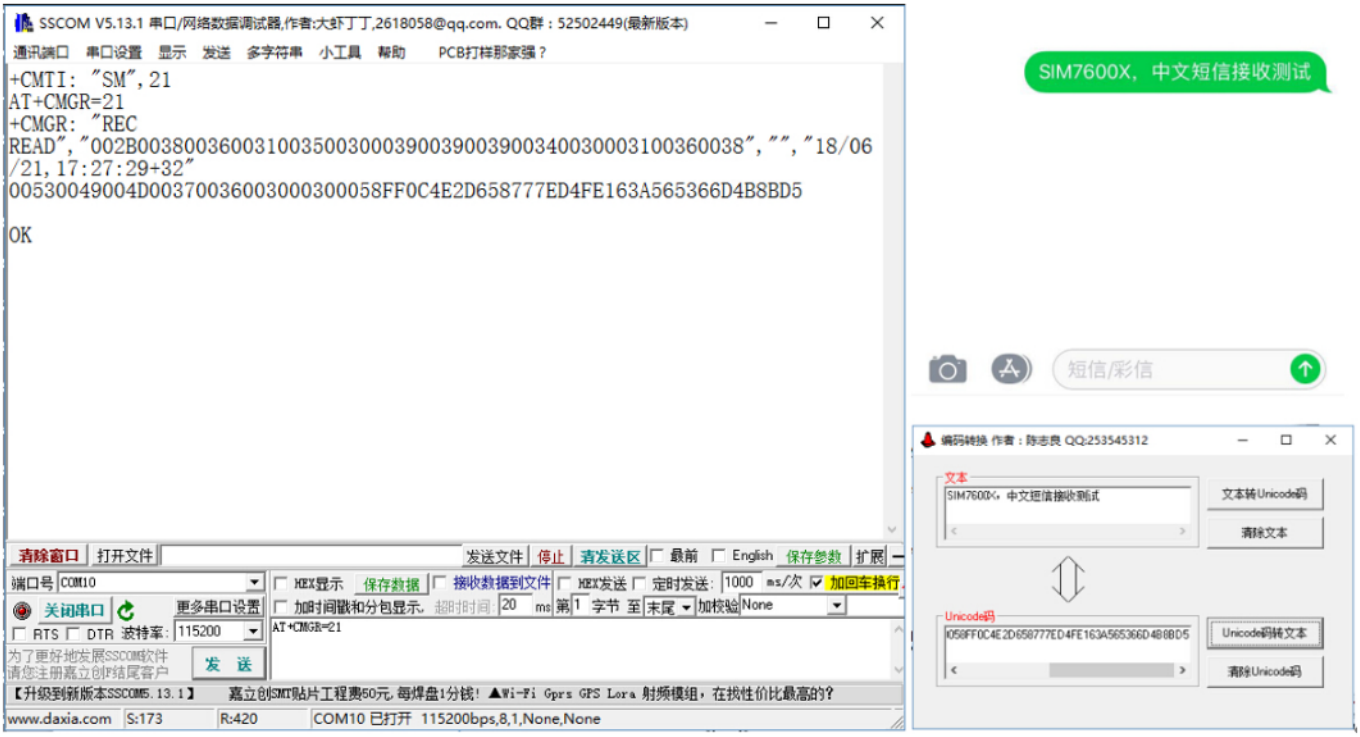
1. Set SMS receiving parameters

```
AT+CMGF=1 //Set text display
AT+CSCS="GSM" //Set GSM code set
AT+CNMI=2,1 //Set new information reminder
```

2. 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
```

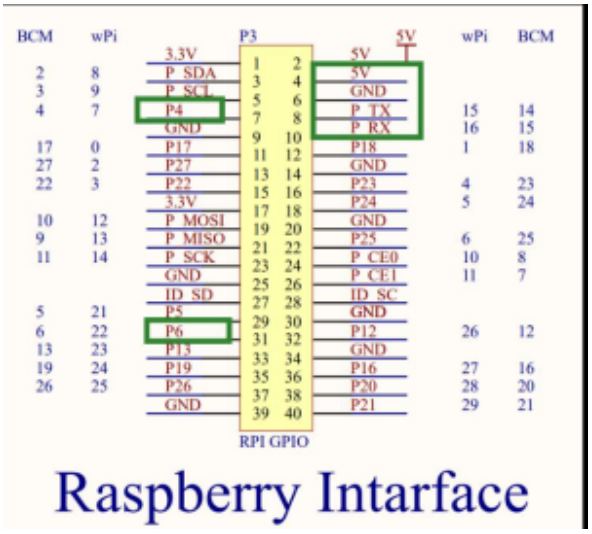
3. Convert the information into Chinese in the software, as shown in the figure below:



RPi Demo

Hardware Connection

SIM7600X 4G HAT has onboard Raspberry Pi GPIO interface, which can be directly inserted into various versions of Raspberry Pi; the following table shows the connection between Raspberry Pi pins and module pins (Raspberry Pi 3rd Generation B+):



pin connection diagram with Raspberry Pi

SIM7600X 4G HAT	Raspberry Pi
5V	5V
GND	GND
RXD	TXD (corresponding to 14 of BCM)
TXD	RXD (corresponding to 15 of BCM)
PWR	P22 (corresponding to P6 of BCM)
FLIGHTMODE	P7 (corresponding to P4 of BCM), enter flight mode when pulled high

Raspberry Pi initialization settings

In order to ensure that the SIM7600X 4G HAT can work normally after being connected to the Raspberry Pi, it is necessary to initialize the level output of some pins of the Raspberry Pi. The specific operations are as follows:

- Download 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,
- The command line enters the /home/pi/SIM7600X directory and executes the command

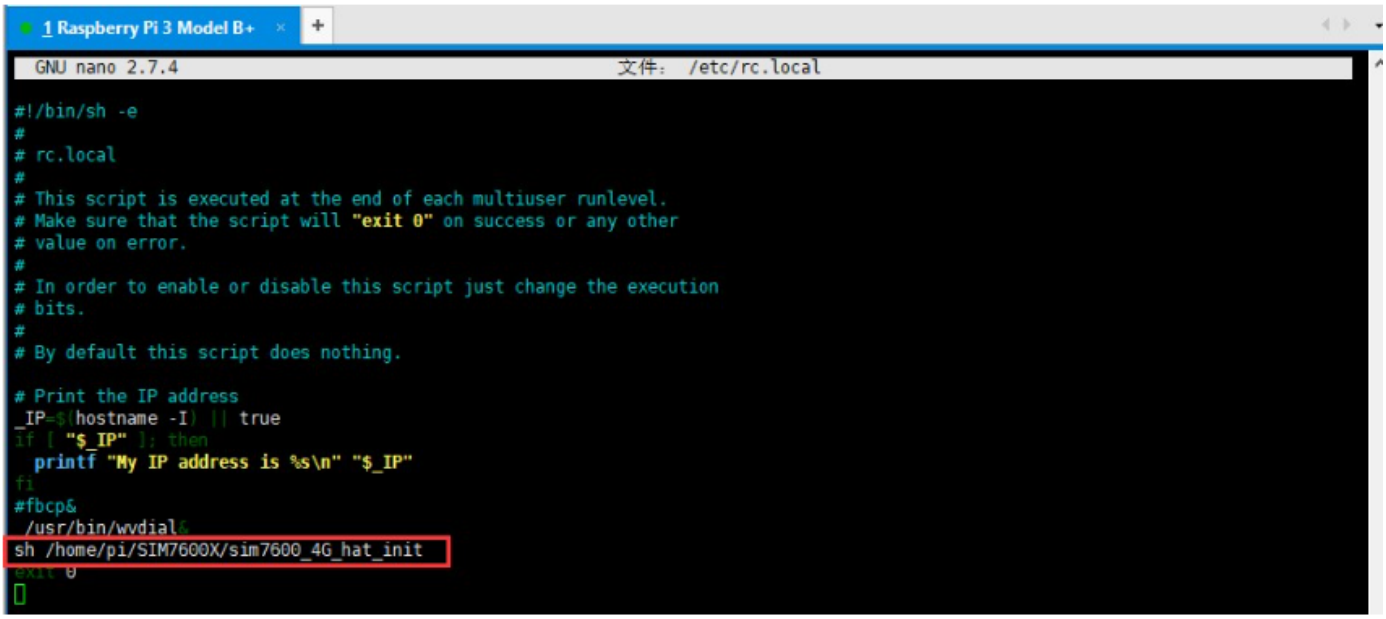
```
chmod 777 sim7600_4G_hat_init
```

- Set the boot initialization script, run the command:

```
sudo nano /etc/rc.local
```

- Add before exit 0 (as shown below):

```
sh /home/pi/SIM7600X/sim7600_4G_hat_init
```

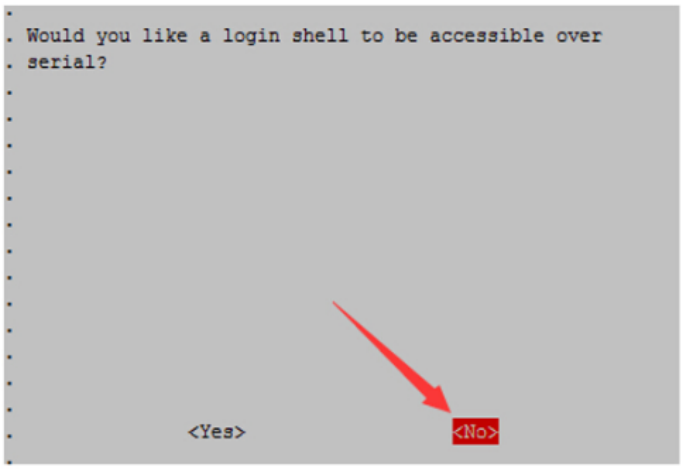


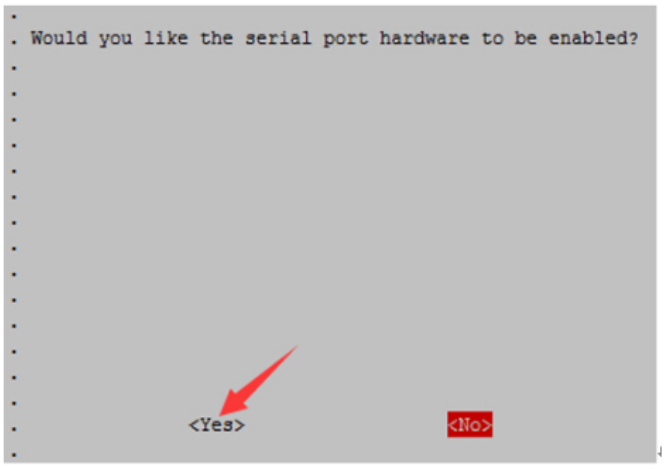
Raspberry Pi serial port configuration

Since the Raspberry Pi serial port is used for terminal debugging by default, if you need to use the serial port, you need to modify the Raspberry Pi settings. Execute the following command to enter the Raspberry Pi configuration:

```
sudo raspi-config
```

Select Interfacing Options ->Serial ->no -> yes to disable serial debugging





Open the /boot/config.txt file, find the following configuration statement to enable the serial port, if not, add it at the end of the file:

```
enable_uart=1
```

Restart to take effect

Raspberry Pi minicom serial port debugging

1. Insert the module into the Raspberry Pi
2. Install minicom, minicom is a serial debugging tool for linux platform:

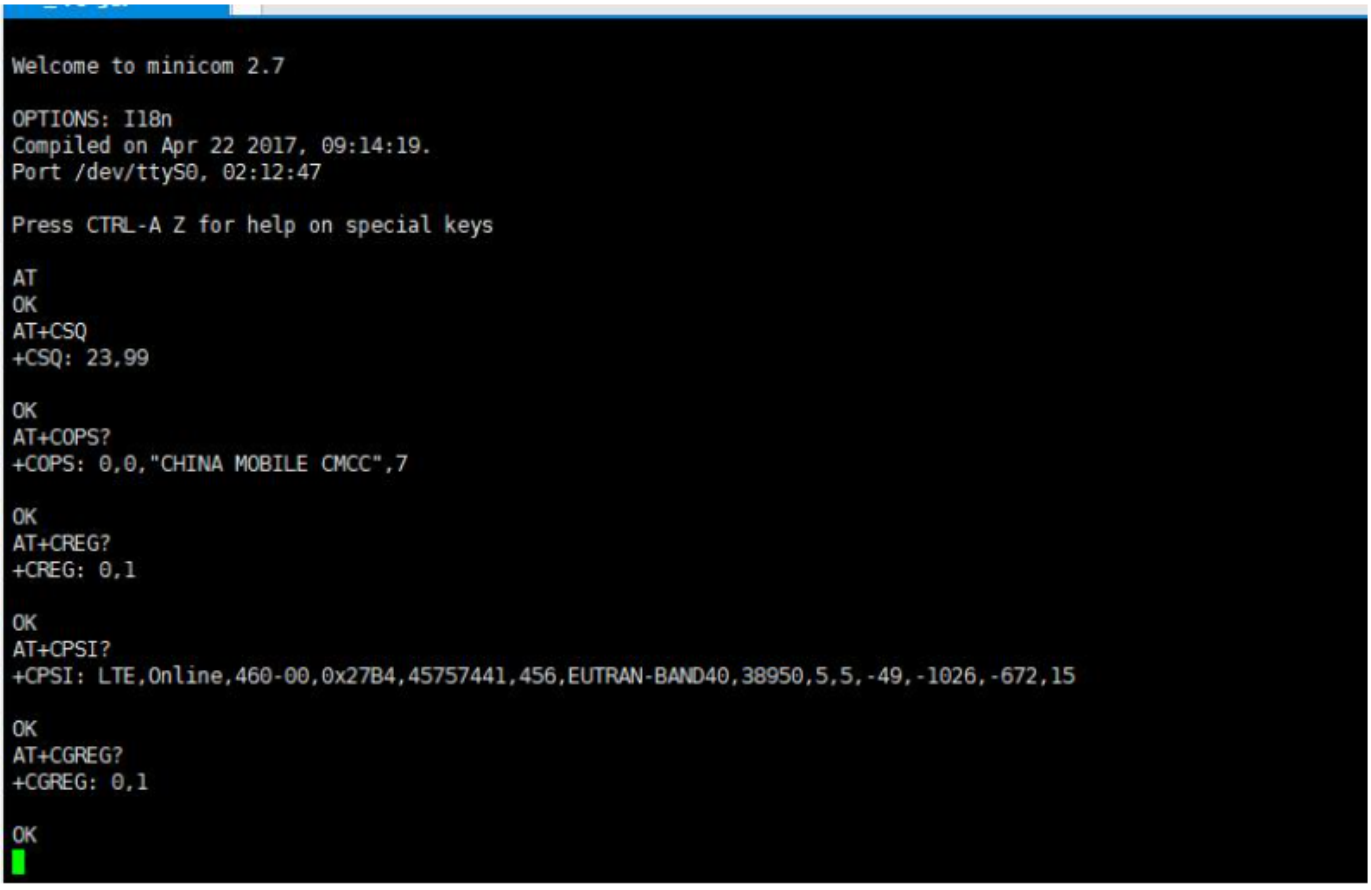
```
sudo apt-get install minicom
```

3. Execute minicom -D /dev/ttyS0 (ttyS0 is the serial port of Raspberry Pi 3B/3B+/4B).

Default baud rate is 115200

Raspberry Pi 2B/zero, the user serial device number is ttyAMA0, and the Raspberry Pi 3B/3B+/4B serial device number is ttyS0.

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



* minicom can enter setting mode by pressing Ctrl+A, then Z, and select X to exit.

Sample Program

1. Insert the module into the Raspberry Pi
2. Download the sample program to the /home/pi/ path;

```
wget https://www.waveshare.com/w/upload/2/29/SIM7600X-4G-HAT-Demo.7z
sudo apt-get install p7zip-full
7z x SIM7600X-4G-HAT-Demo.7z -r -o/home/pi
sudo chmod 777 -R /home/pi/SIM7600X-4G-HAT-Demo
```

3. Go to the bcm2835 directory, compile and install it

```
chmod +x configure && ./configure && sudo make && sudo make install
```

Note: If there is a problem with the compilation, please refer to the instructions in the FAQ.

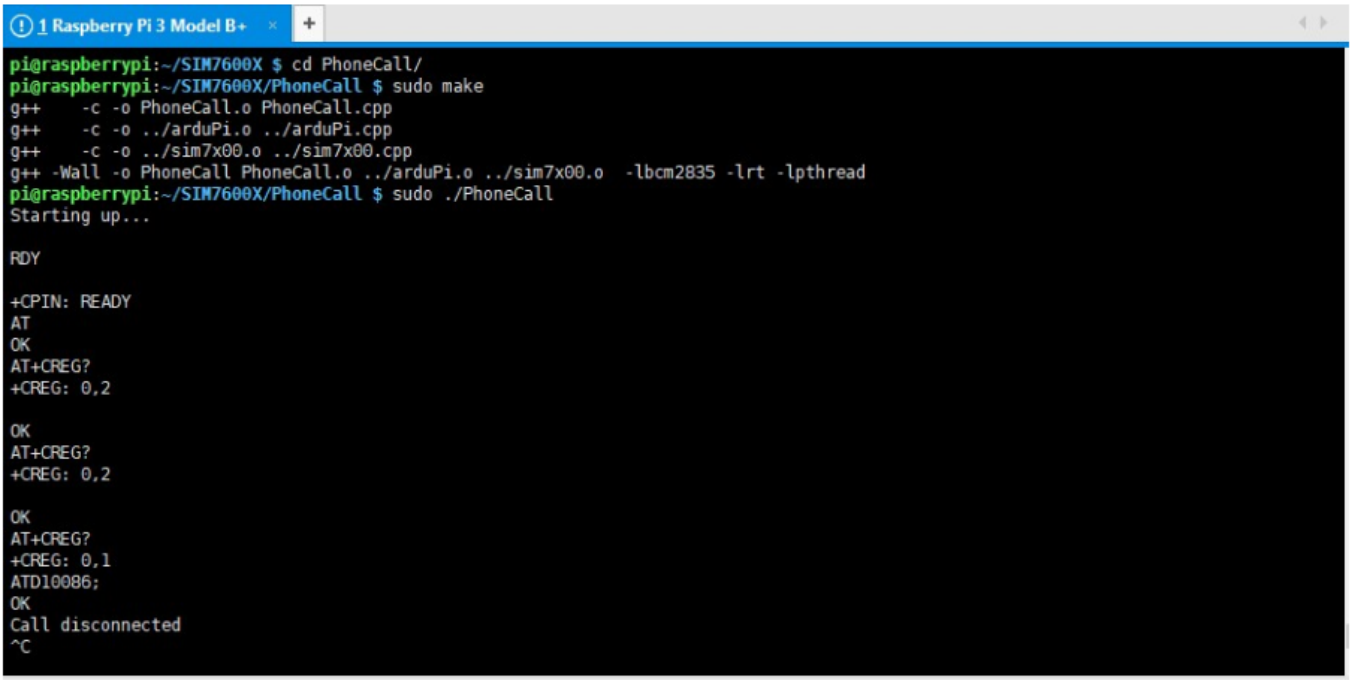
4. Go to the corresponding instance directory, compile and run the program. The relevant instructions are as follows (take the PhoneCall program as an example):

```
sudo make clean //Clear the original executable file
sudo make //recompile
sudo ./PhoneCall //Run the program
```

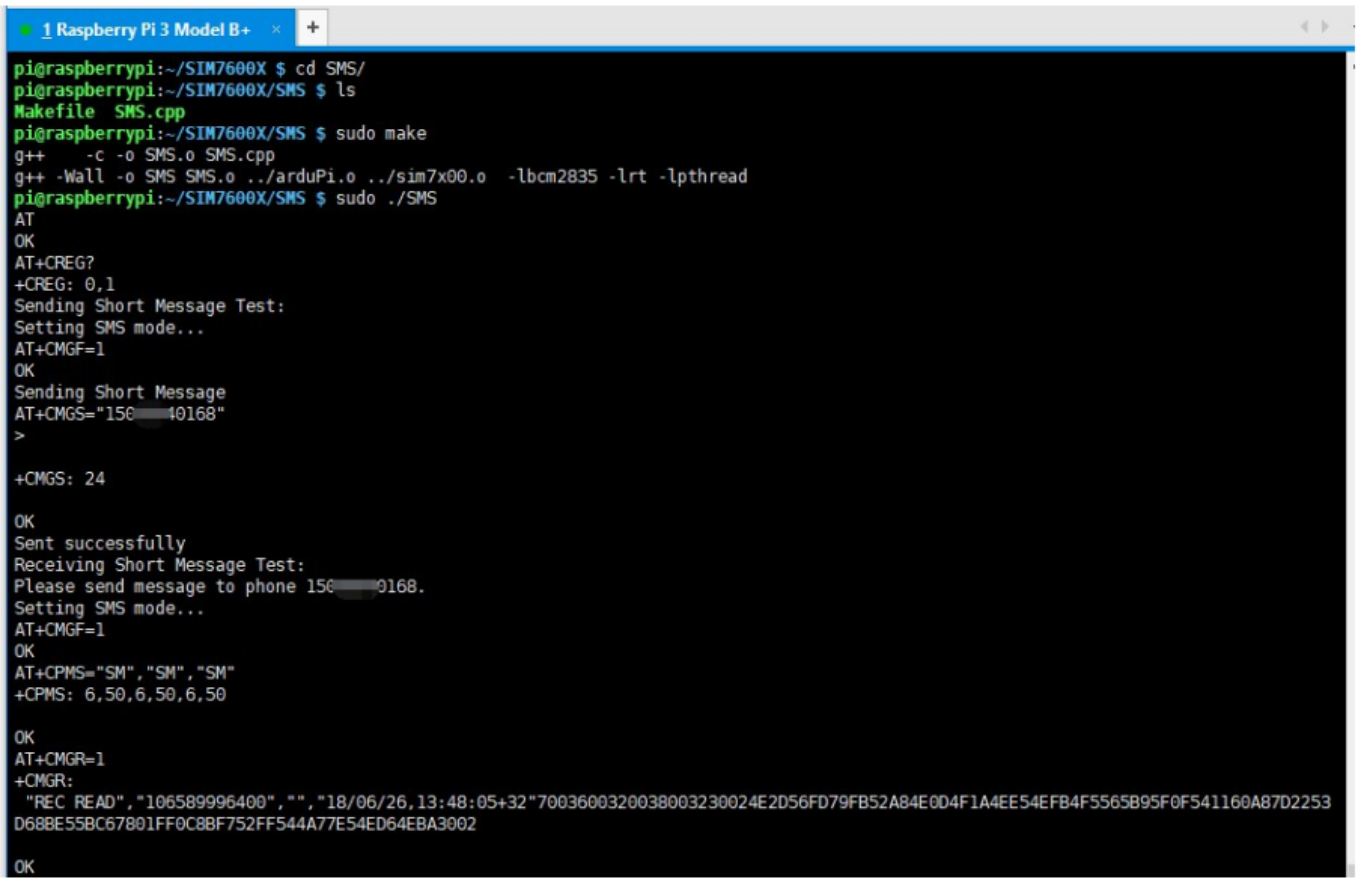
Use a combination of the above commands:

```
sudo make clean && sudo make && sudo ./PhoneCall
```

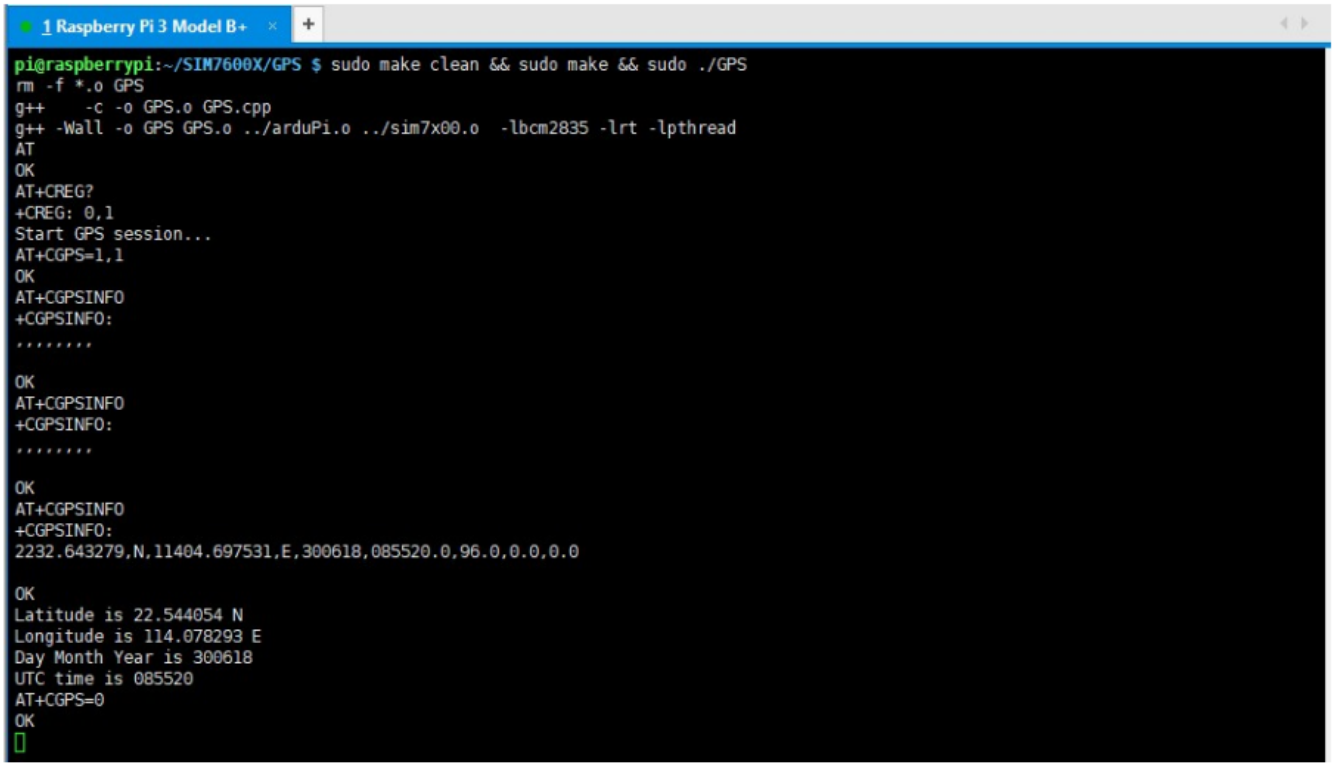
PHONECALL call demo



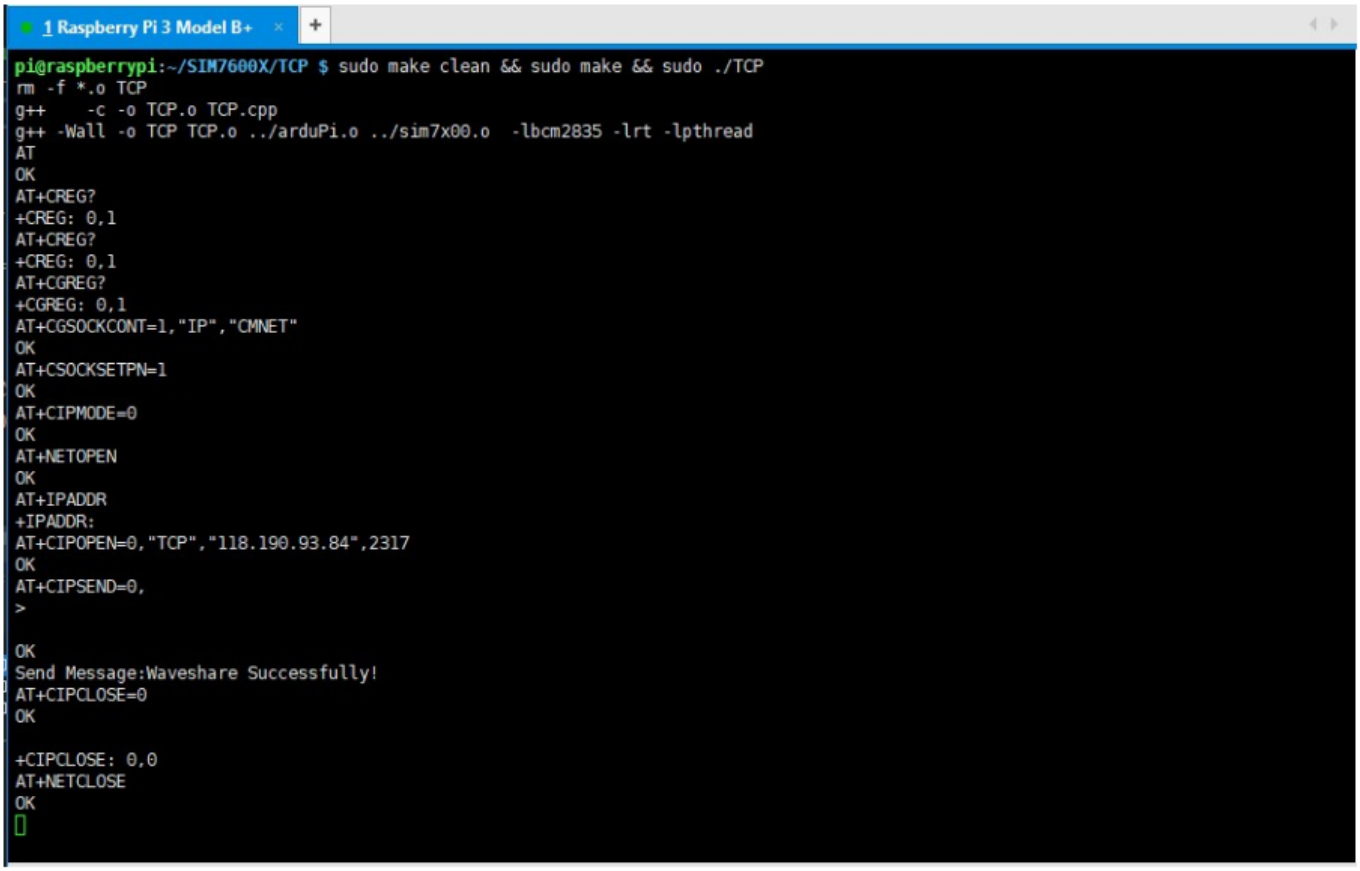
SMS text message sending and receiving demo



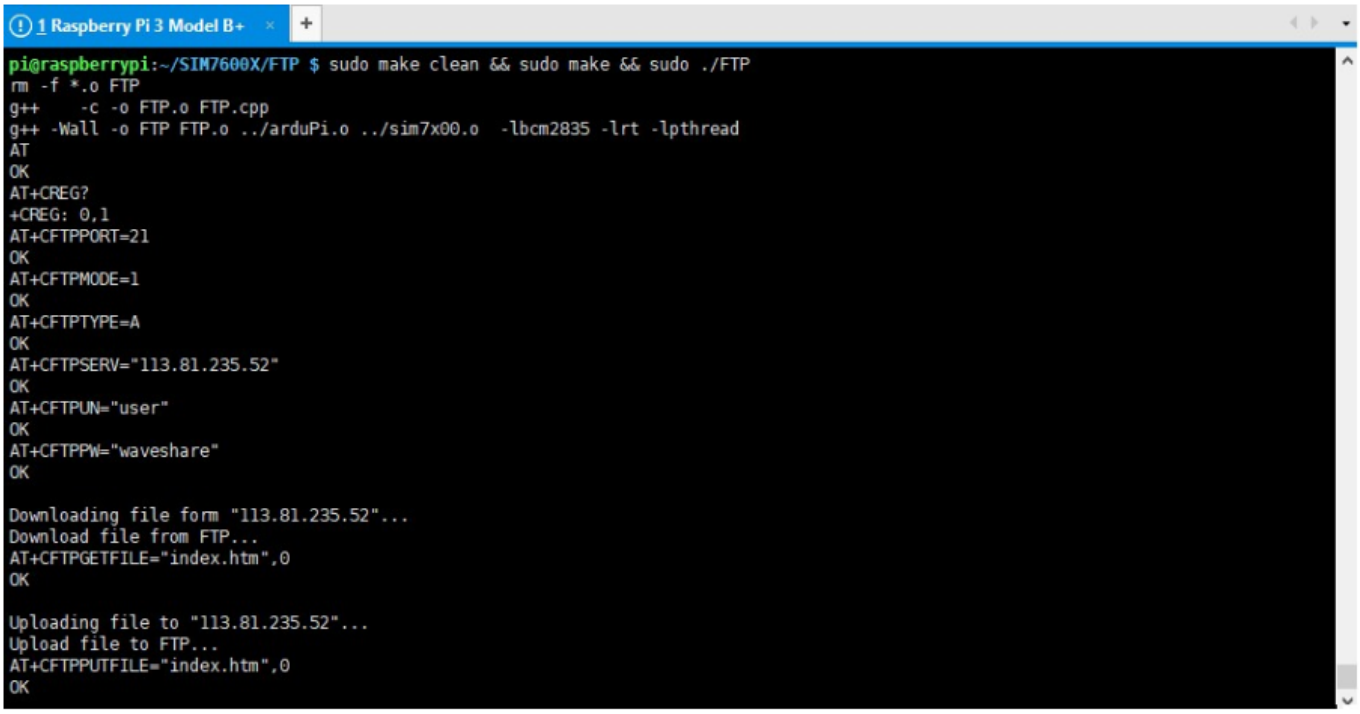
GPS Positioning Demo



TCP network communication demo



FTP download and upload demos



Arduino Demo

Hardware Connection

Hardware connection to the development board UNO PLUS / Arduino UNO:

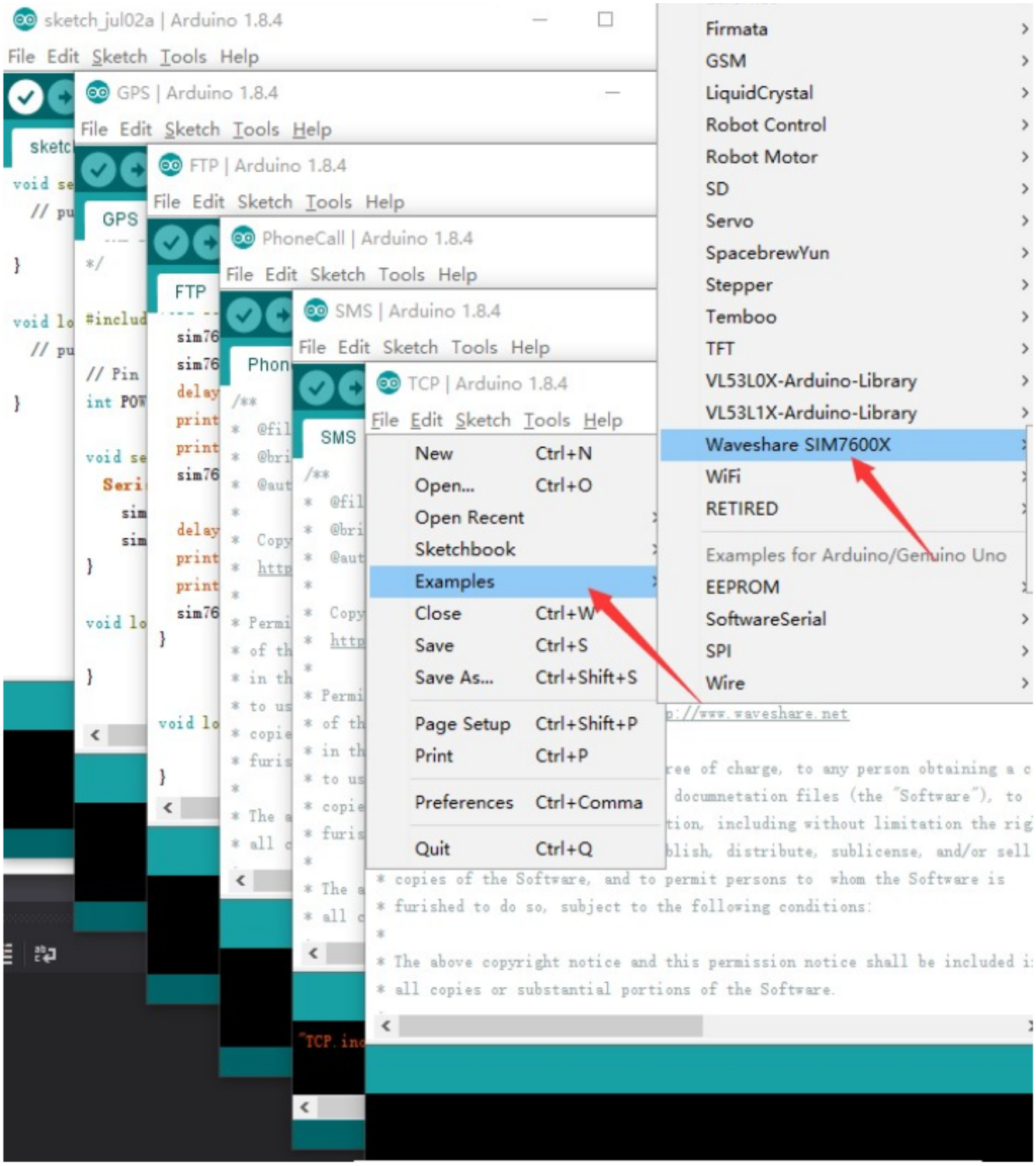
SIM7600X 4G HAT	UNO PLUS / Arduino UNO
5V	5V
GND	GND
TXD	0 (RX)
RXD	1 (TX)
PWR	2

Install Arduino library

Download the decompression sample program,

Copy the Waveshare_SIM7600X_Arduino_Library folder to the Library directory under the Arduino IDE installation path

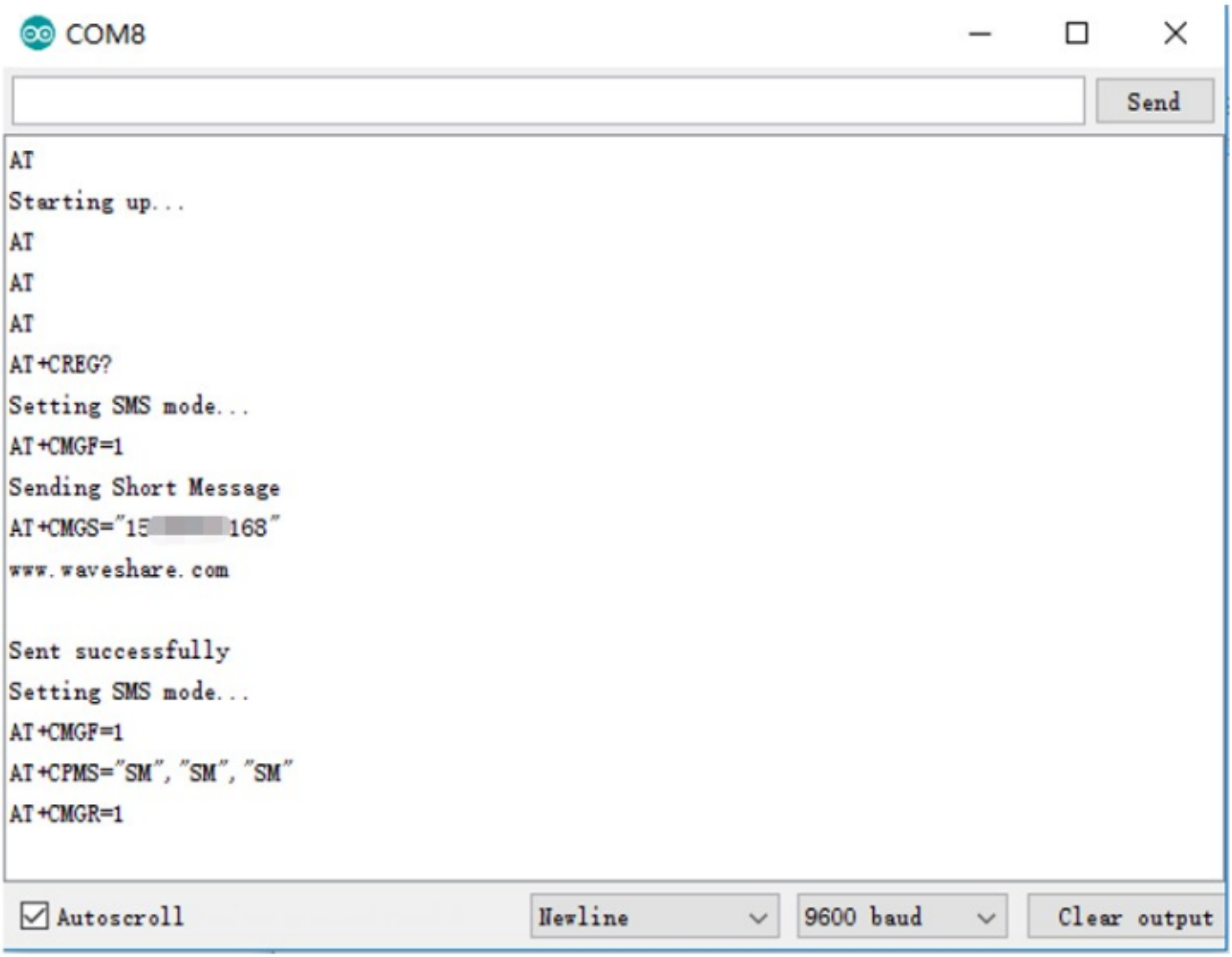
Open Arduino IDE --> File -->Examples -->Waveshare SIM7600X, and then choose to run the corresponding example program:



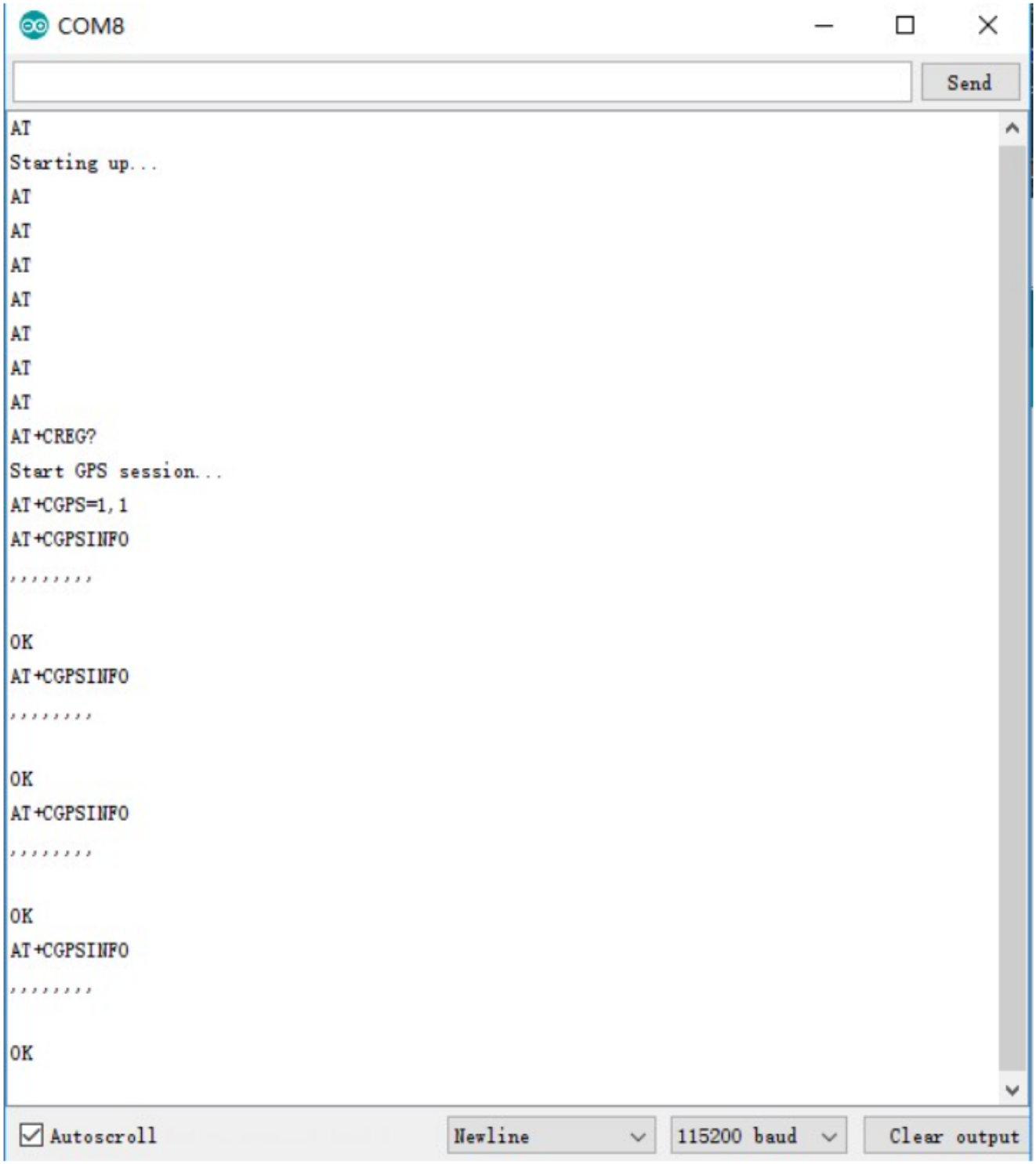
Sample Program

PHONECALL call demo

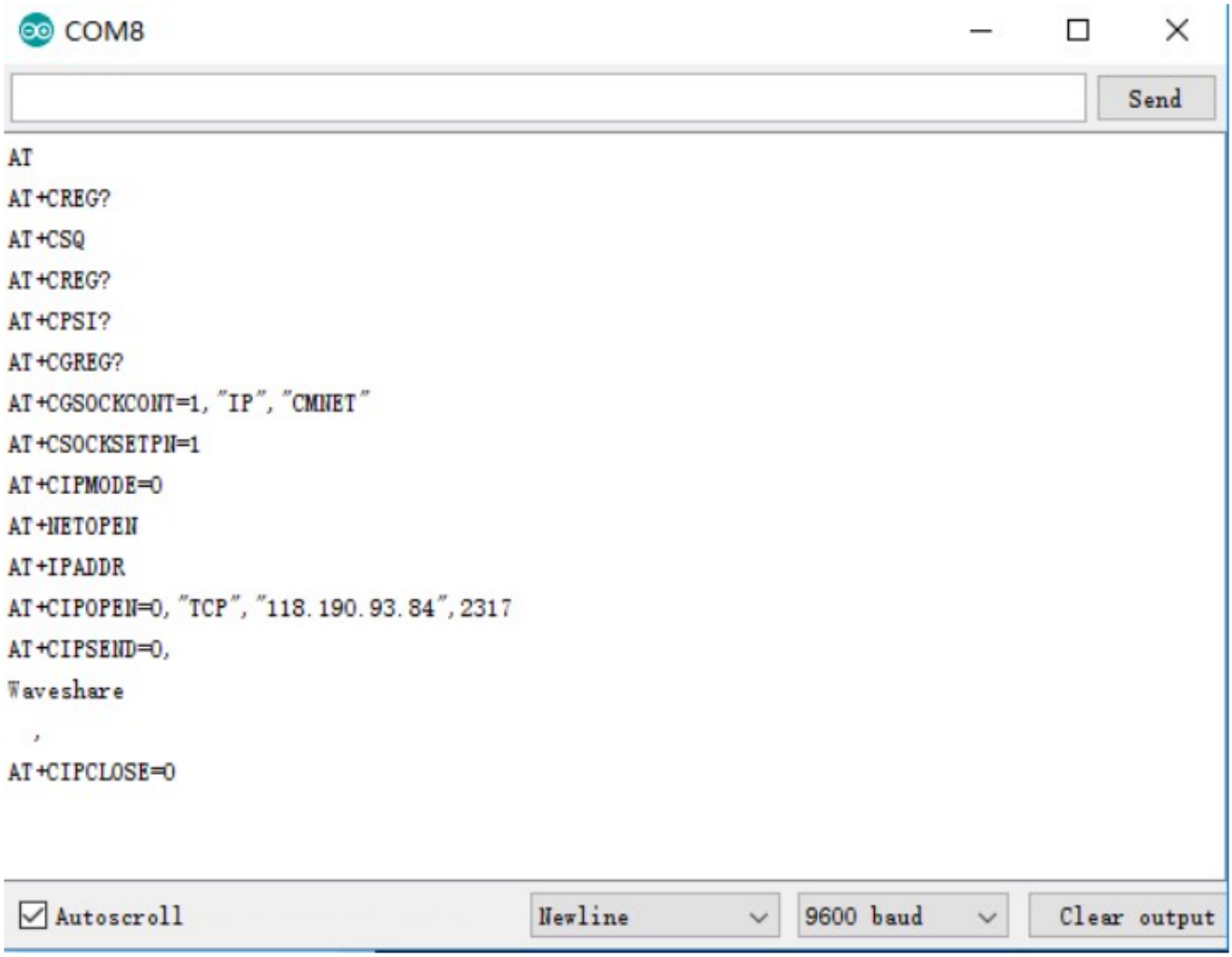
SMS text message sending and receiving demo



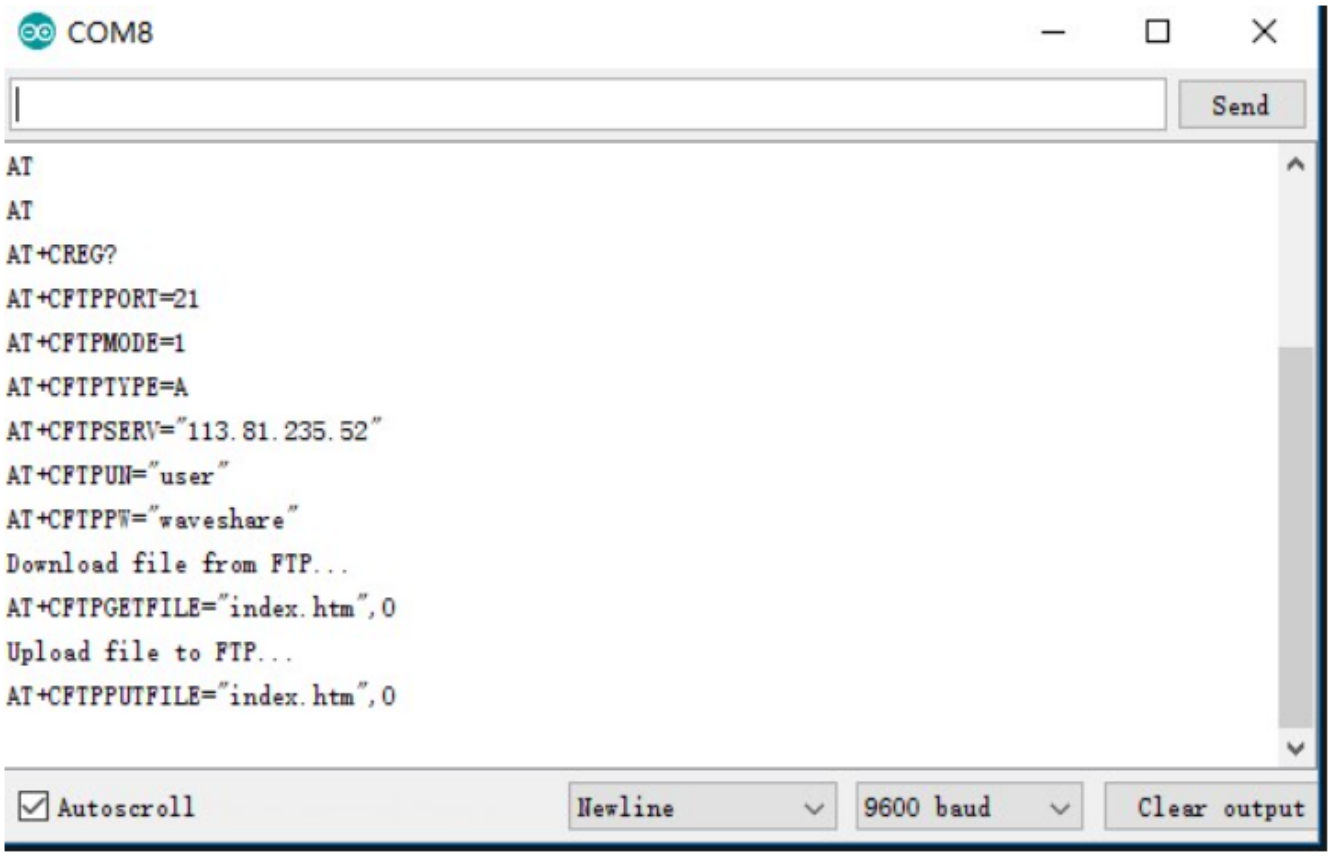
GPS Positioning demo



TCP network communication demo



FTP download and upload demo

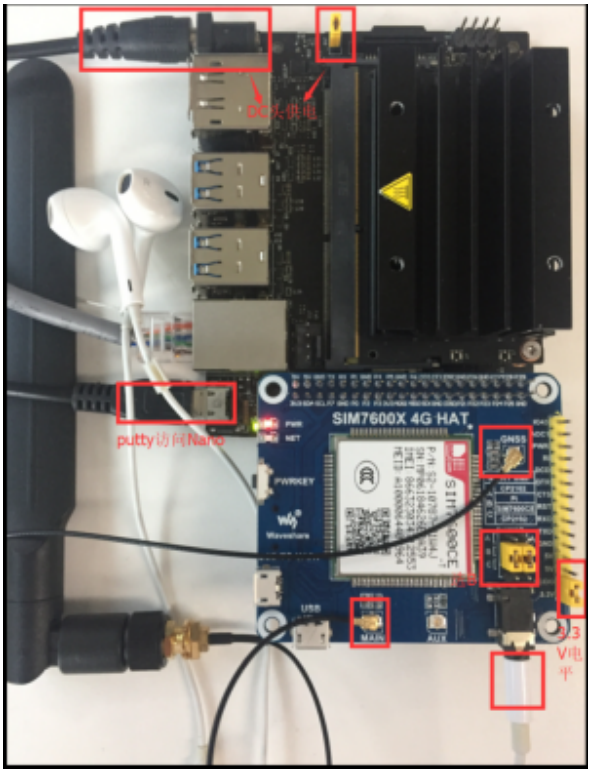


Jetson Nano Demo

Hardware Connections

Jetson Nano has an onboard RaspberryPi 40Pin GPIO interface, SIM7600X 4G HAT can be directly connected and used, and Jetson Nano's terminal access the serial port does not affect serial communication with SIM7600X 4G HAT (ie Pin10 and Pin8).

SIM7600X 4G HAT	Jetson Nano
5V	5V
GND	GND
TXD	10 (Board encoding)
RXD	8 (Board encoding)
PWR	31 (Board code)



Connection diagram

Jetson Nano minicom serial port debugging

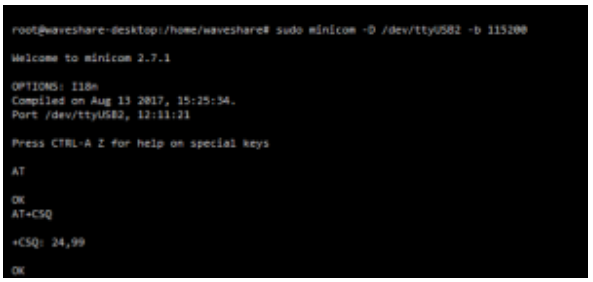
1. Connect the SIM7600X 4G HAT to the Jetson Nano, press the PWRKER button for three seconds and then turn it on

2. Use SERIAL to log in to the Jetson Nano terminal, install minicom, and enter:

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

3. Run minicom to debug the serial port, and enter in the terminal

```
sudo minicom -D /dev/ttyTHS1 -b 115200
```

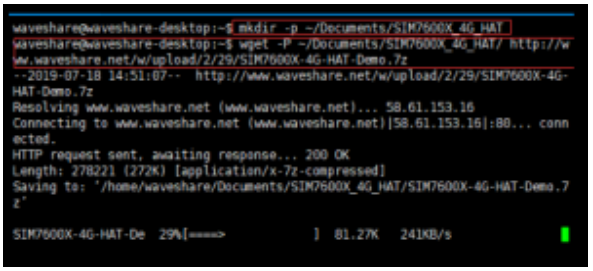


4. Send the AT command to test, press the PWRKEY button for three seconds to start the shutdown, exit the minicom and press Ctrl+A, then X, and finally press ENTER

Python Demos

After installing the library

```
sudo apt-get install python3-pip
sudo pip3 install pyserial
sudo apt-get install p7zip
```



Use the wget tool to download the source code to the specified folder of Jetson Nano, and copy the following command

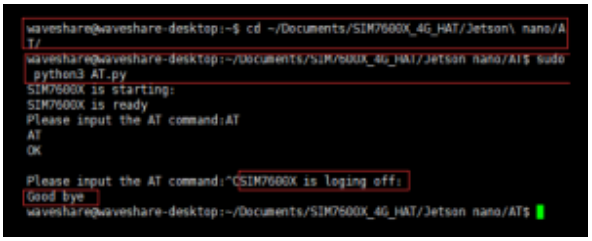
```
mkdir -p ~/Documents/SIM7600X_4G_HAT
wget -P ~/Documents/SIM7600X_4G_HAT/ http://www.waveshare.com/w/upload/2/29/SIM7600X-4G-HAT-Demo.7z
```

Enter the directory where the source code was just created and downloaded, and use the p7zip tool to unzip it to the current directory

```
cd ~/Documents/SIM7600X_4G_HAT/
sudo p7zip --uncompress SIM7600X-4G-HAT-Demo.7z
```

AT

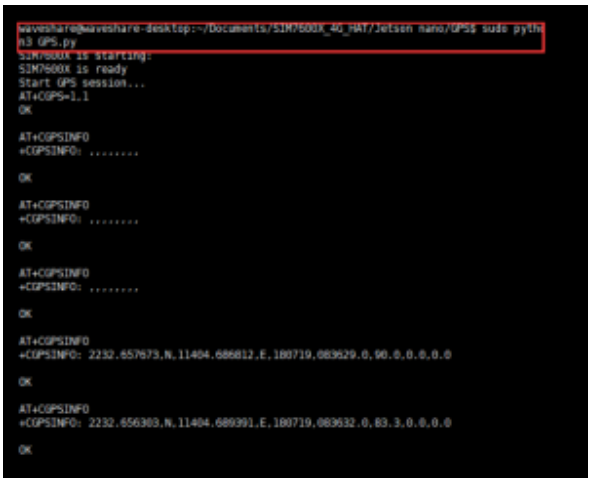
SIM7600X_4G_HAT is connected to Jetson Nano, connected to the antenna, the demo uses the software to power on and off, there is no need to press the button to power on and off, and when you exit, press Ctrl+C to power off the software. Enter the Jetson Nano/AT directory and execute the command:




```
cd ~/Documents/SIM7600X_4G_HAT/Jetson\ nano/AT/
sudo python3 AT.py
```

GPS

SIM7600X_4G_HAT is connected to Jetson Nano and GNSS antenna. The routine uses software to power on and off. There is no need to press the button to power on and off. When exiting, press Ctrl+C to power off the software. Enter the Jetson Nano/GPS directory and execute the command:

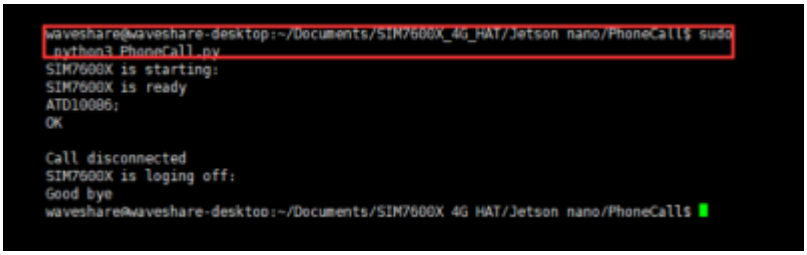


```
cd ~/Documents/SIM7600X_4G_HAT/Jetson\ nano/GPS/
sudo python3 GPS.py
```

PhoneCall

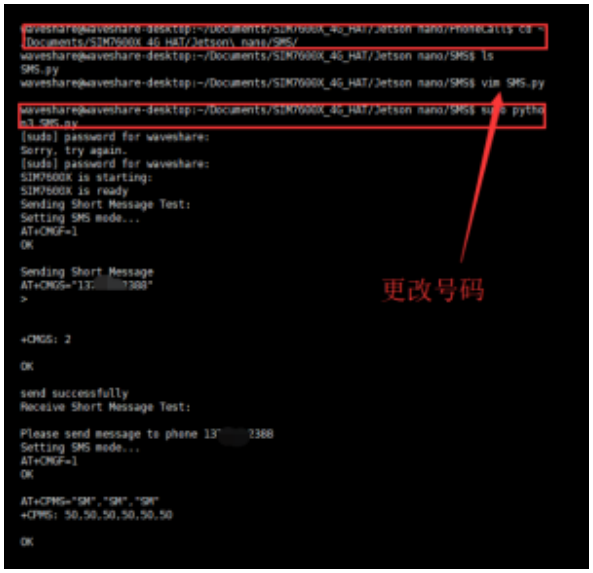
SIM7600X_4G_HAT is connected to Jetson Nano, main antenna and earphone. The demo uses software to power on and off, no need to press the button to switch on and off. This demo uses mobile card to automatically dial 10086. Press Ctrl+C when exiting, and the software will start Shut down. Enter the Jetson Nano/PhoneCall directory and execute the command:

```
cd ~/Documents/SIM7600X_4G_HAT/Jetson\ nano/PhoneCall/
sudo python3 PhoneCall.py
```



SMS

The SIM7600X_4G_HAT is connected to the Jetson Nano and the main antenna. The demo uses the software to turn it on and off, and there is no need to press the button to turn it on and off. This demo will automatically shut down the software after sending the information www.waveshare.com to the specified number. When users use SMS routines, they must **first use tools such as vim to change the number** in line 10 of the SMS.py file, replace * with a number, keep the ' symbol, How to use vim . Enter the Jetson Nano/SMS directory and execute the command:



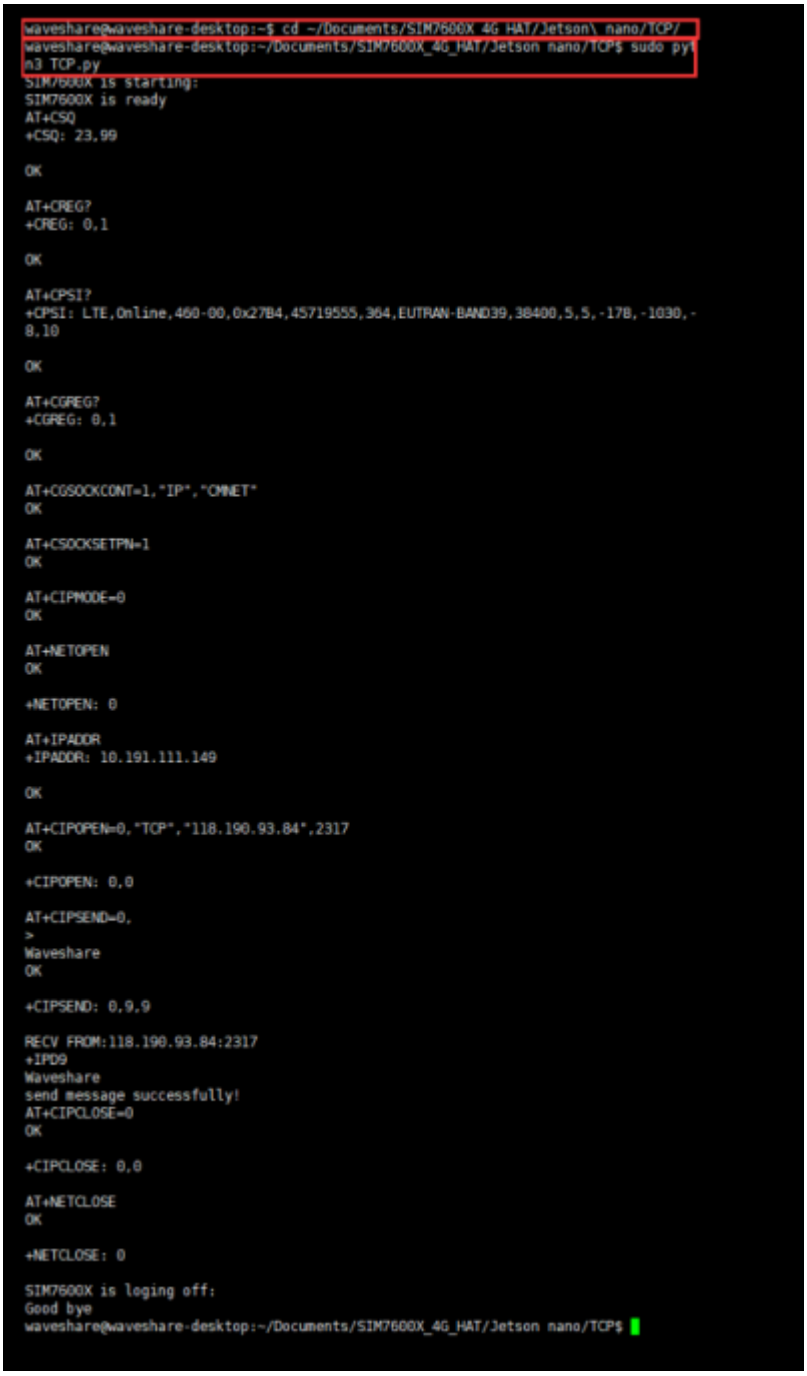
```
cd ~/Documents/SIM7600X_4G_HAT/Jetson\ nano/SMS/
sudo python3 SMS.py
```

TCP

The SIM7600X_4G_HAT is connected to the Jetson Nano and the main antenna. The demo uses the software to turn it on and off, and there is no need to press the button to turn it on and off.

Enter the Jetson Nano/TCP directory and execute the command:

```
cd ~/Documents/SIM7600X_4G_HAT/Jetson\ nano/TCP/
sudo python3 TCP.py
```



More sample programs are continuously updated...

Resource

Documentation

- schematic V1
- schematic V2
- size map

- 3D Drawing

Program

- sample program

Software

- SIM7600 Driver
- CP2102 driver
- SIM7600 Serial Debug Assistant
- GPS Debug Tool
- TCP Test Tool
- Xshell
- VLC media player

- Unicode Conversion Software

Datasheet

SIM7600CE-T official information link
SIM7600G-H official information link
SIM7600E-H official information link
SIM7600E official information link

Certificate

- CE EMC

Relate videos

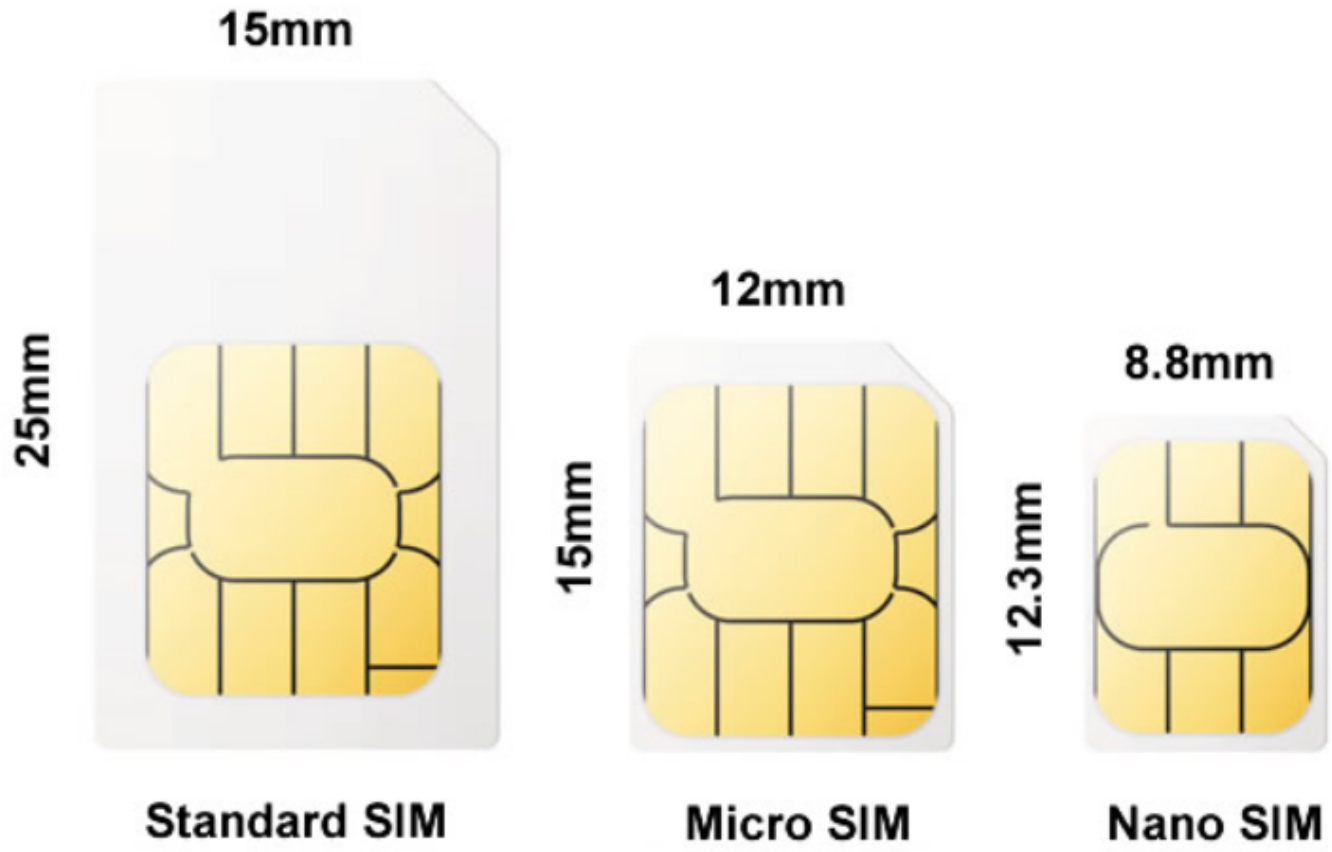
youtube

FAQ

Question: **Type of SIM card?**

Answer:

Support Nano SIM card:



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:

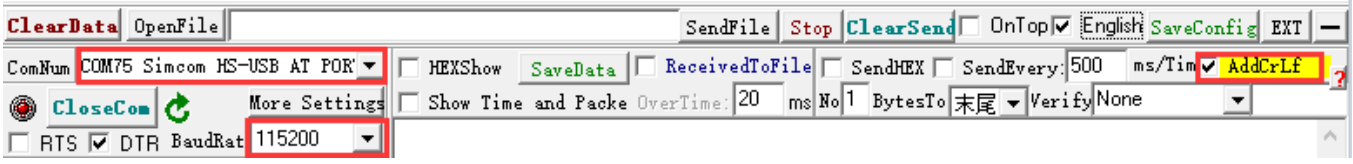
- Check if the MAIN antenna is well connected;
- Whether the connected SIM card can call and surf the Internet normally on mobile phones and other devices:

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 whether RF is turned on (flight mode is turned off): AT+CFUN?
- 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 the operator's access situation: AT+CGDCONT?
- Check the connection status: AT+SIMCOMATI
- 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-MNSE	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-FDDB2/4/5/13	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: B2/4/5/12/13/1425/26/66/71 LTE-TDD: B41	LTE-FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28/66 LTE-TDD: B34/38/39/40/41 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/Antel/ ROHS/REACH/	CE/RCM/FCC/NCC/Antel/ ROHS/REACH/	FCC*/IC*/PTCRB*/GCF* AT&t*/Verizon*/Sprint*	CE/RCM*/FCC/IC/PTCRB*/GCF* AT&T*/Verizon* * on going

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
```

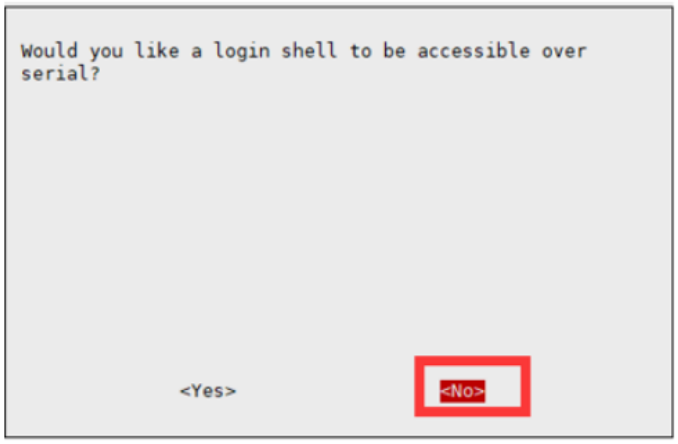
Question: **Why can't I use UART to control the module on the Raspberry Pi, I can't open the ttyS0 through minicom, and it prompts that there is no ttyS0?**

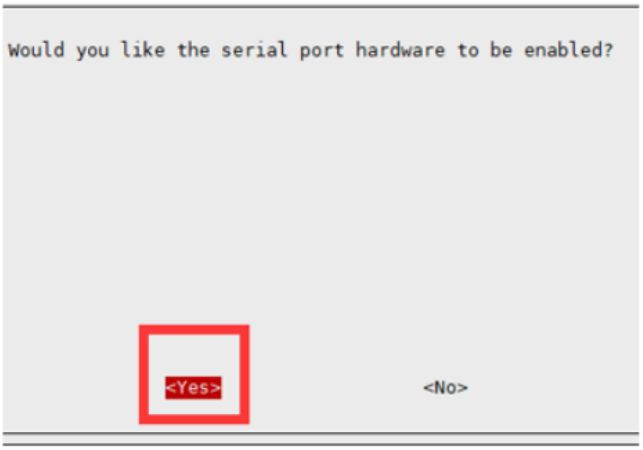
Answer:

Since the Raspberry Pi serial port is used for terminal debugging by default, if you need to use the serial port, you need to modify the Raspberry Pi settings. Execute the following command to enter the Raspberry Pi configuration:

```
sudo raspi-config
```

Select Interfacing Options ->Serial ->NO ->YES to disable serial debugging





Open the /boot/config.txt file, find the following configuration statement to enable the serial port, if not, add it at the end of the file:

```
enable_uart=1
```

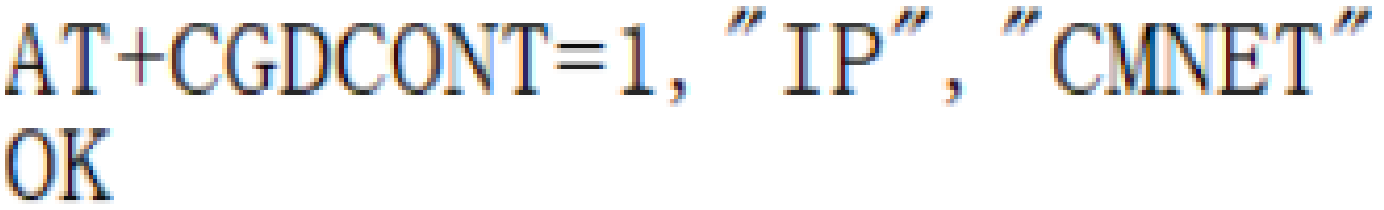
Restart to take effect

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
```



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$QCRMCALL=1,1
```

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

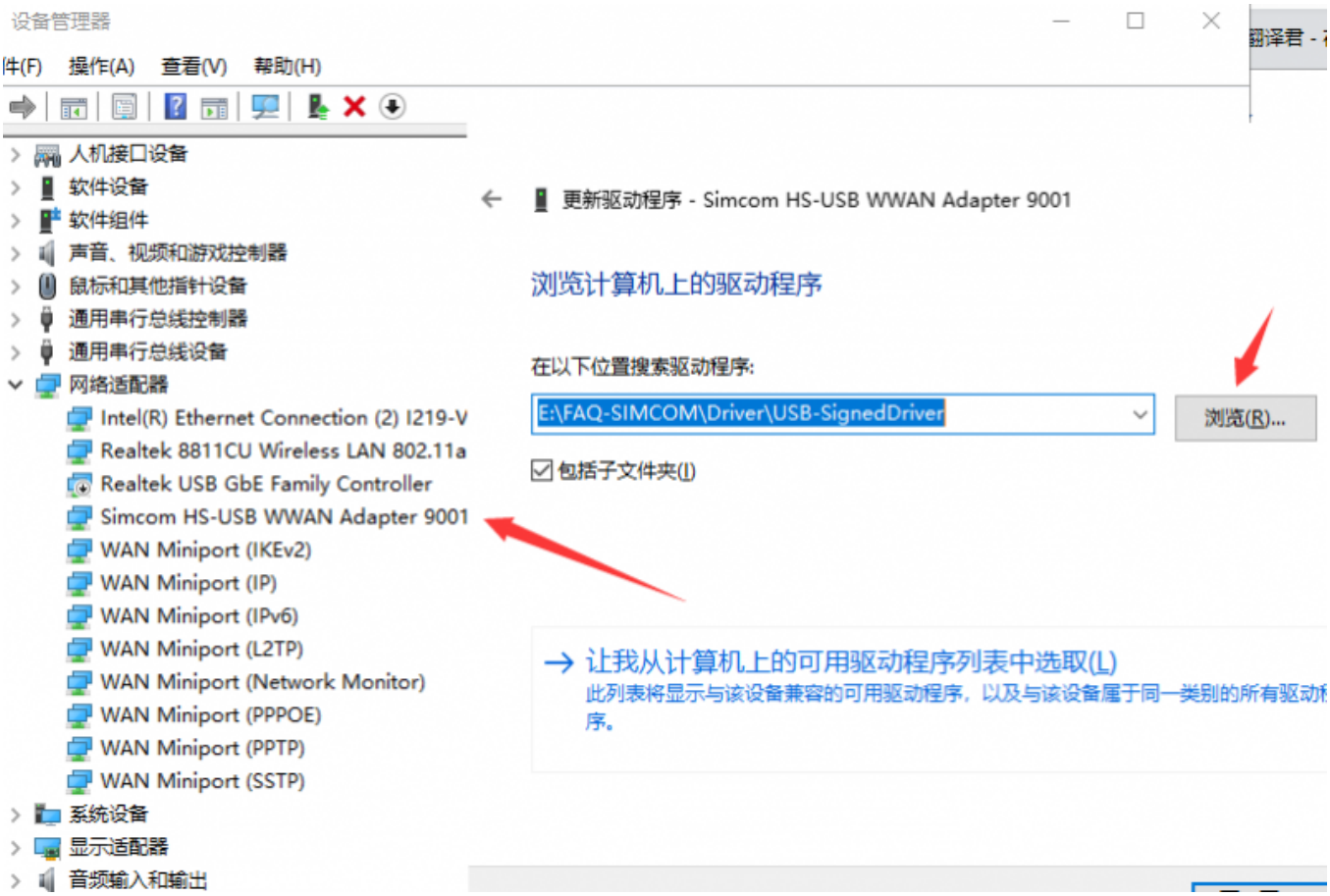
Answer:

- 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;

- You can also install the driver SIM7600X dial-up Driver to update the network card



- The network card display is enabled after installing the driver

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.)
```

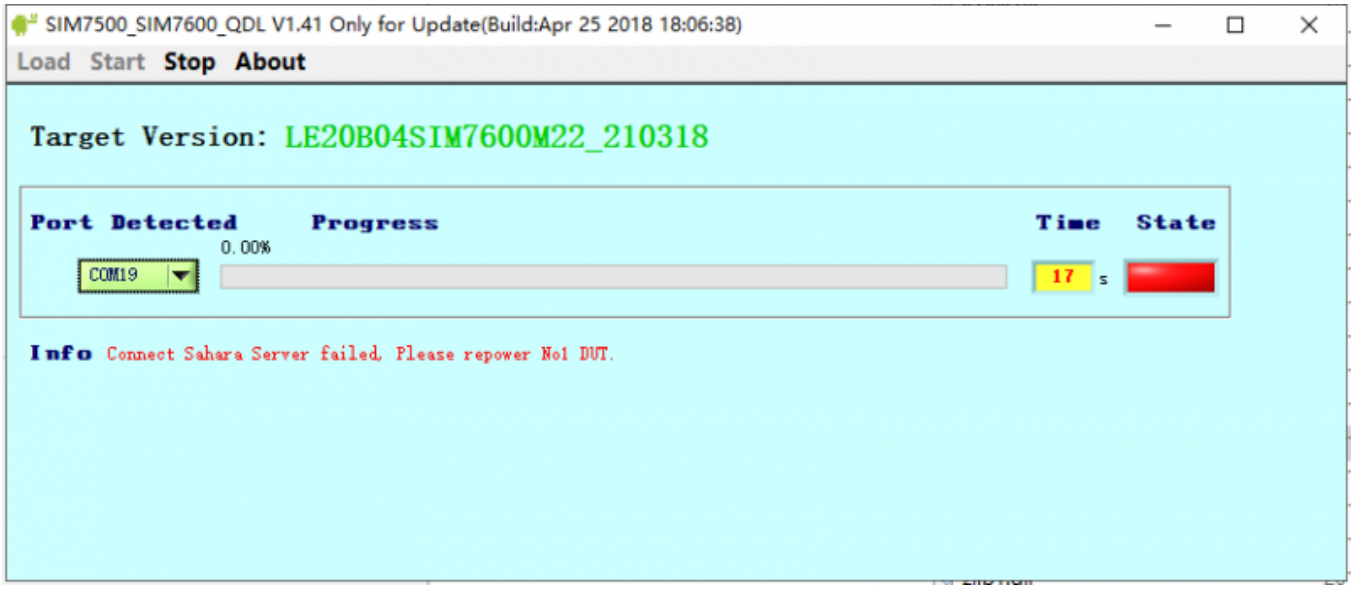
```
AT+CNBP=0x0002000000400183,0x000001E000000000,0x0000000000000021 //After returning OK, measure the speed
```

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

```
AT+CNBP?
+CNBP:
0x0002000004400180,0x480000000000000000000000000000000000000000000042000001A0000800D5,0x000000000000003F

OK
AT+CNBP=0x0002000000400183,0x000001E000000000,0x0000000000000021
OK


AT+CNBP=0x0002000004400180,0x000001E000000000,0x000000000000003F
OK
```

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

Answer:



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

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:SIM7600G-H 4G DONGLE How to install Android driver:

Answer:

- Currently there is the driver source code of Android4-Android11, that is, the system version is Android4-Android11 only supported;
- Get the source code and SDK of the Android system of the target device (requires official image support), then add SIMCOM's Android system driver source code to the Android source code, and recompile (the compilation time varies from 1-10 hours, it is recommended to use a high-configuration PC operate);
- If the USB can be recognized, it means that the Android driver has been installed successfully. Set the module to 9011 mode or 9018 mode, and you can dial up to access the Internet;
- The steps to install the Android driver are cumbersome, and the operator is required to have certain Android system development experience and R&D capabilities.

File:SIM7600-Android_RIL.zip

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
物理串口/USB转串口	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
USB网卡	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

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: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
```

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 $
```

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#
```

Answer:

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