

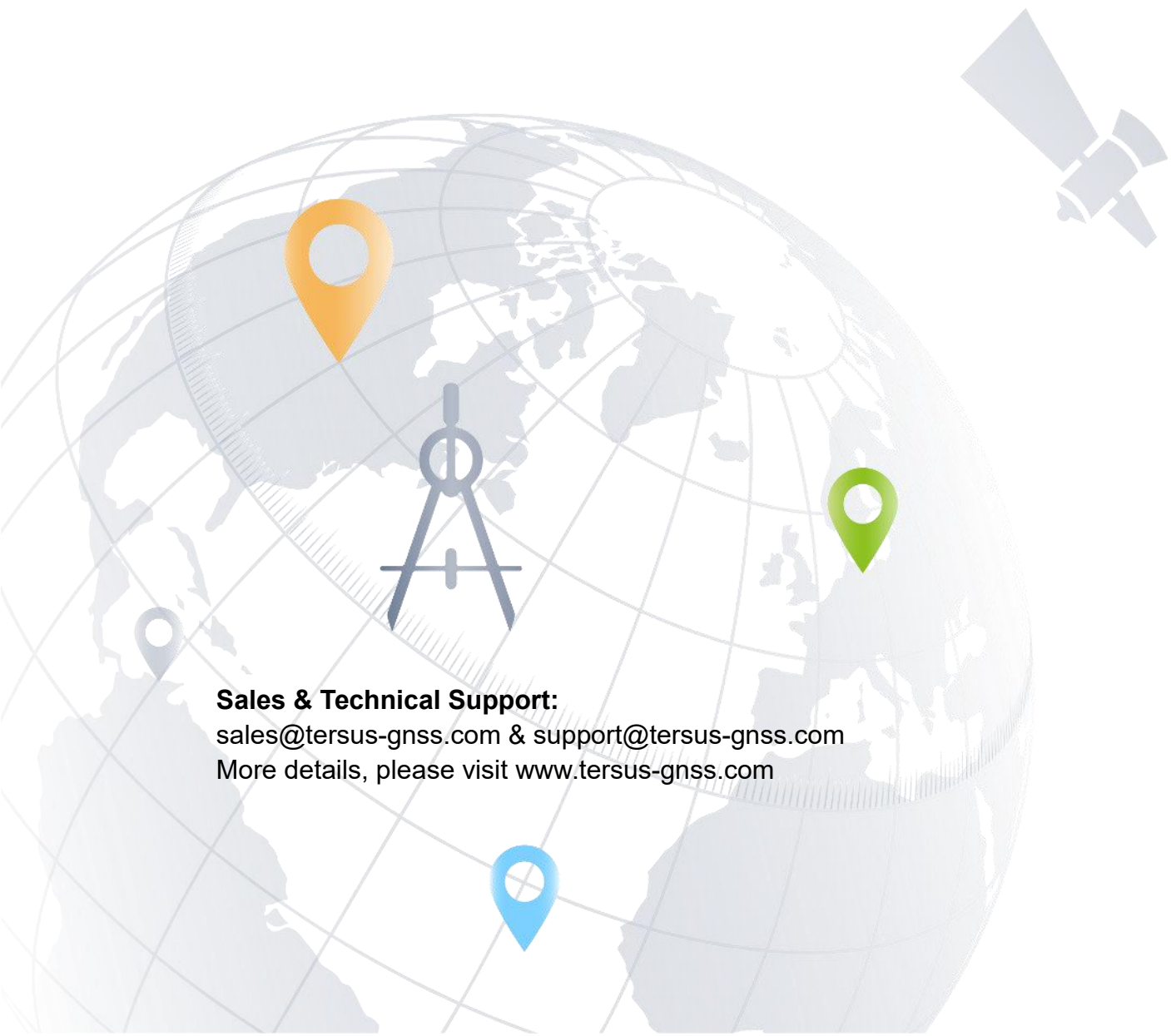
User Manual

Version V1.4-20200721



User Manual For Ntrip Modem TP688 Industrial Modem for Ntrip Corrections

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1. Introduction

This chapter mainly introduces the outlook, accessories, specifications and principle of TP688.

1.1 Brief Introduction

The Ntrip Modem TP688 is an industrial modem ideal for Ntrip corrections. It equips built-in industrial 4G wireless communication module, built-in 2600mAh battery, RS232 serial port, mounting handle, high-speed Internet access and high-speed data transmission ability. It is a cost-effective industrial wireless modem.

The TP688 supports Ntrip protocol, and it can be used in Ntrip server mode and Ntrip client mode. The Ntrip function is configured by RS232 serial port and text message.



Figure 1.1 Front side of TP688

1.2 Product Outlook



Figure 1.2 TP688 side view 1



Figure 1.3 TP688 side view 2

1.3 Standard Accessories



Figure 1.4 4G antenna



Figure 1.5 DB9 female to USB Type A male converter cable



Figure 1.6 DC-2pin AC Power Adapter with 1.2m cable

1.4 Working Principle

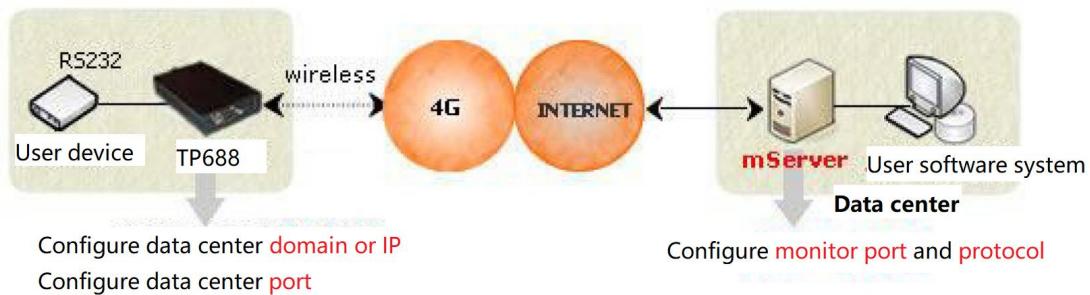


Figure 1.7 TP688 working principle

After setting the IP (or domain name) and port of the data center for the TP688, the TP688 uses the 4G wireless network to dial up to the Internet, and then initiates the connection of the configured IP and port (the monitor port of the mServer). In addition, the user software system connects to the mServer through an interface such as a virtual serial port, thereby implementing wireless and two-way data communication from the user device to the user software system.

1.5 Specifications

1.5.1 Technical Specifications

Table 1.1 Technical Specifications

Electrical	
Input Voltage	+5 ~ +36V DC
Operating Current	125mA @ +12V DC
Standby Current	90mA @ +12V DC
Power consumption (typical)	1.5W
Battery	2600 mAh
Charging time	3.5 hours
Operating hours (typical)	18 hours
Network	
Chinese version	2G: GSM/GPRS/EDGE/CDMA2000 1x 3G: UMTS/WCDMA/HSPA+/TD-SCDMA/CDMA2000 EVDO 4G: TDD-LTE/FDD-LTE
Eurasian version (Europe,	2G: GSM/GPRS/EDGE

Middle East, Africa, South Korea, Thailand)	3G: UMTS/WCDMA/HSDPA/HSPA+ 4G: TDD-LTE/FDD-LTE
North American version	3G: UMTS/WCDMA/HSDPA/HSPA+ 4G: FDD-LTE
Australian version (New Zealand, Australia, South America)	2G: GSM 3G: WCDMA 4G: FDD-LTE/TDD-LTE
Operating Frequency Band	
Chinese version	TDD-LTE B38/B39/B40/B41 FDD-LTE B1/B3/B8 UMTS/HSDPA/HSPA+ B1/B8 TD-SCDMA B34/B39 CDMA2000 1x/EVDO BC0 GSM/GPRS/EDGE 900/1800 MHz
Eurasian version	TDD-LTE B38/B40 FDD-LTE B1/B3/B7/B8/B20 UMTS/HSDPA/HSPA+ B1/B8 GSM/GPRS/EDGE 900/1800 MHz
North American version	FDD-LTE B2/B4/B5/B17 UMTS/HSDPA/HSPA+ B2/B5
Australian version	FDD-LTE B1/B2/B3/B4/B5/B7/B8/B28 TDD-LTE B40 WCDMA B1/B2/B5/B8 GSM 850/900/1800/1900
Interfaces	
Serial Port	RS232 x1
Antenna Connector	SMA Female x1
Power Connector	2pin LEMO
Physical	
Dimension	160x102x37mm (w/o connectors)
Weight	650g
Operating Temperature	-40°C ~ +85°C
Relative Humidity	95% @ +40°C

1.5.2 Indicator Description

Table 1.2 TP688 power indicator on the front

Location	Color	Description
The rightmost LED	Orange	Indicates DC power input.
The left four LEDs	Green	Press the small white button to indicate battery power level. It flashes when charging.

Table 1.3 TP688 LED indicator on the side

LED indicator	Color	Status	Description
Online	Green	Steady bright	Connected to the data center
		Extinguished	Not connected to the data center
		Fast flash	Connecting to the data center
		Slow flash	Dialing
Transmit	Red	Flash	Transmitting data / Standby
		Extinguished	No data transmitting

1.5.3 Serial Port Definition

Table 1.4 TP688 RS232 serial port pin definition

Pin	Signal	Definition
2	TXD	Data out
3	RXD	Data in
5	GND	Ground

1.6 Typical Applications

The five typical applications of TP688 are presented as below.

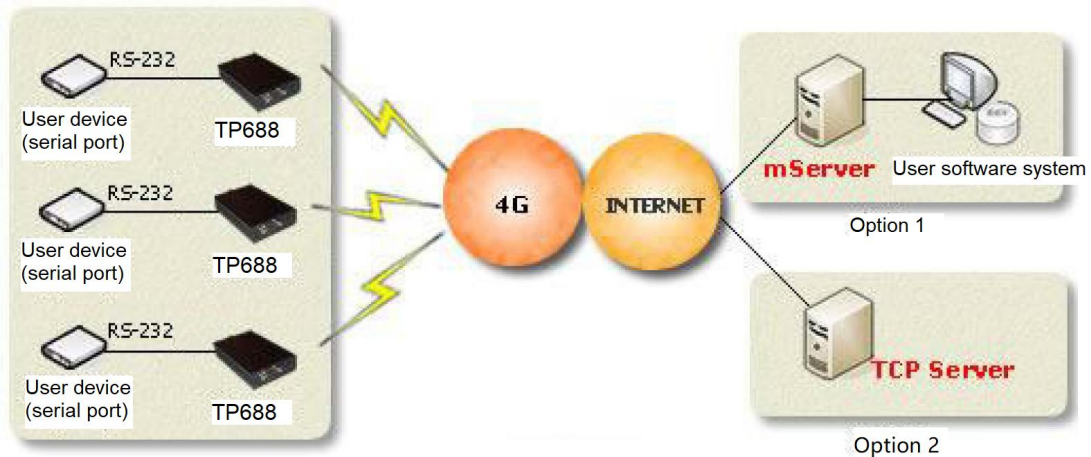


Figure 1.8 TP688 multi ends to center

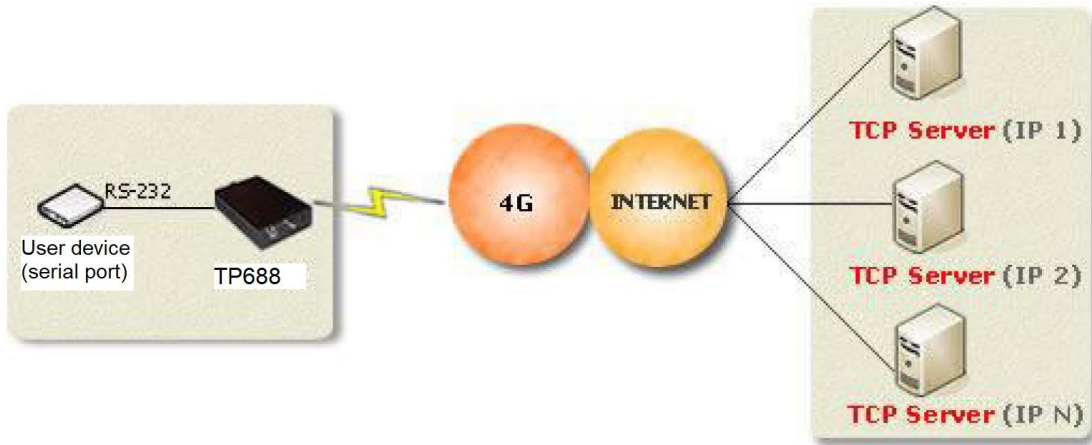


Figure 1.9 TP688 one end to multi centers

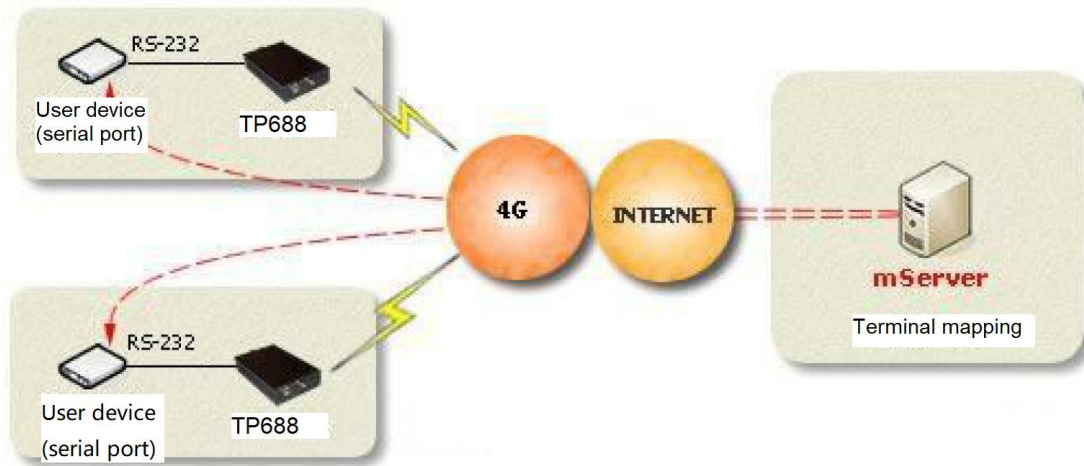


Figure 1.10 TP688 realizes point to point via mServer mapping

2. Configurations

This chapter introduces how to use TP688 and related parameters.

2.1 Configurations

2.1.1 Accessories Required

The accessories required are listed below:

- 1) One DB9 female to USB Type A male converter cable;
- 2) One PC (Personal Computer);
- 3) One 12V power supply;
- 4) One SIM card which can access internet.

Set up for TP688 configuration following the figure below. Power up TP688 by plugging the power adapter to the local 100~240V AC plug and long press the power button.



No.	Name
1	Ntrip Modem TP688
2	4G antenna
3	DB9 female to USB Type A male converter cable
4	DC-2pin AC Power Adapter
5	Standard SIM card 15x25mm
6	Personal computer

Note:

- 1) TP688 can work both by plugging power adapter and built-in battery. The operating hours powered by battery can reach to 18 hours typically.
- 2) The 4G antenna can be bent 90 degrees.
- 3) The SIM card is the 15x25mm standard SIM card.

2.1.2 Configure TP688 through serial port

The Ntrip Modem TP688 can be configured through serial port by mDevice Batch Configuration Software or Tersus GNSS Center software.

2.1.2.1 Configure TP688 by mDevice configuration tool

The detailed steps of using mDevice Configuration software are as follows.

- 1) Unscrew the nut and open the dustproof cover, insert the SIM card (standard SIM card) into the TP688 modem.
- 2) Use the DB9 female to USB Type A male converter cable to connect the DB9 male connector of TP688 and the computer.
- 3) Right click [This Computer] -> [Manage] -> [Device Manager] -> [Ports (COM & LPT)], and find the port shown as below.

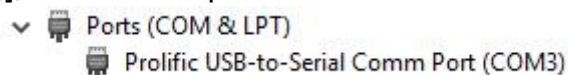


Figure 2.1 COM port detected on the computer

- 4) Double click to run dtucfg2_notm_26.exe application.
- 5) Click the [Options] button on the top tool bar, modify the COM port number as the corresponding port of TP688, then click [OK].

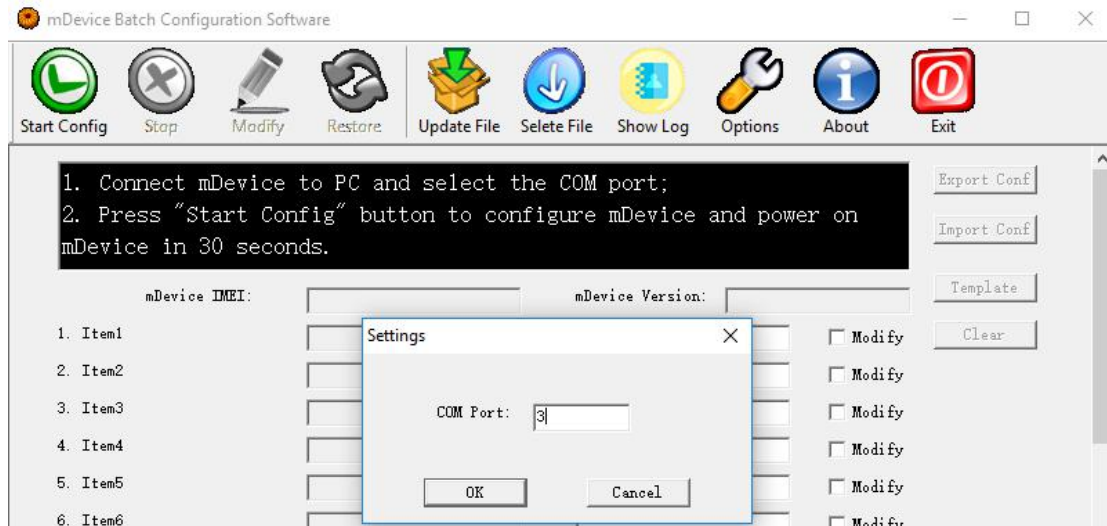


Figure 2.2 Set COM port number

- 6) Click the [Start Config] button on the top, and power on TP688 in 30 seconds. The software pops out a window to input password. The default password is 1234, and it can be modified in the configuration password. This password is also the password of SMS configuration.



Figure 2.3 Input password

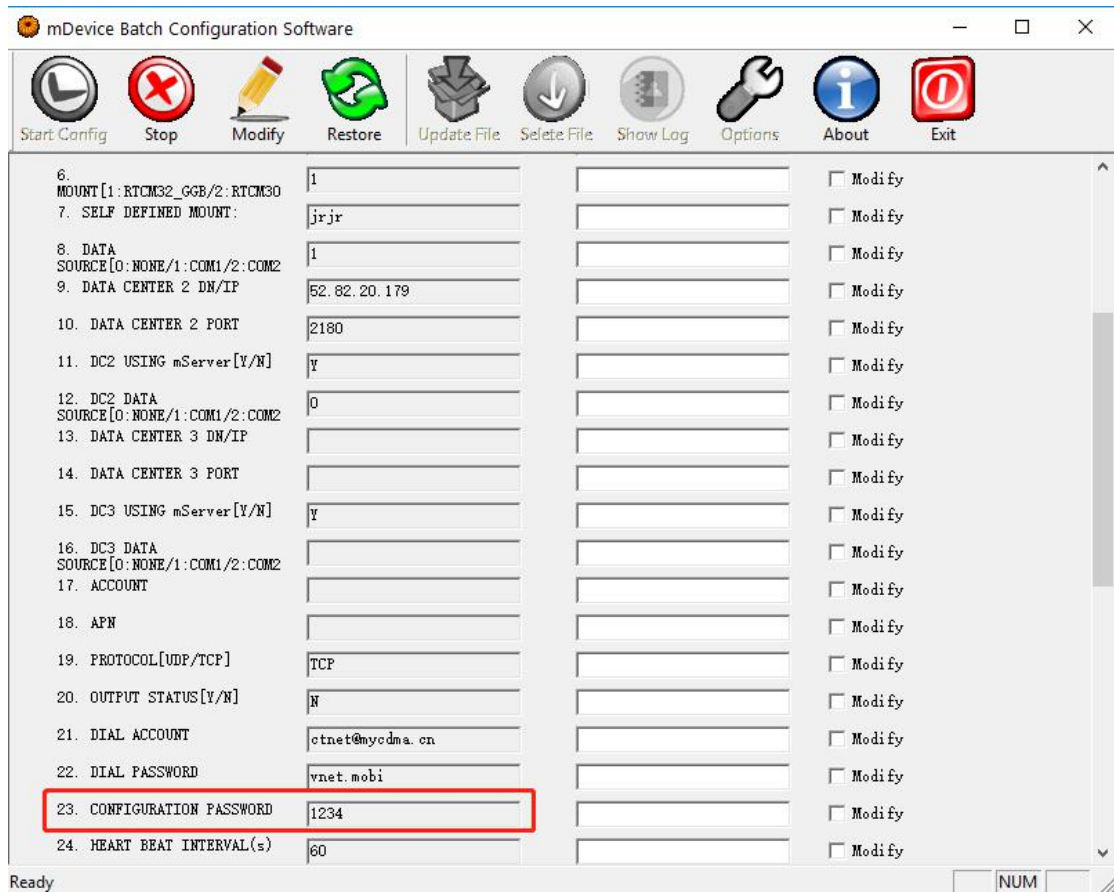


Figure 2.4 Modify configuration password

- 7) After you input the password, the software reads the original configuration of TP688 shown as below.



Figure 2.5 The software read the configuration automatically

- 8) Modify the first and second item of the parameter list. Change the first item NTRIP CASTER DN / IP ADDR and the second item NTRIP CASTER PORT to the Ntrip Caster's IP and port, then check the checkbox before [Modify].

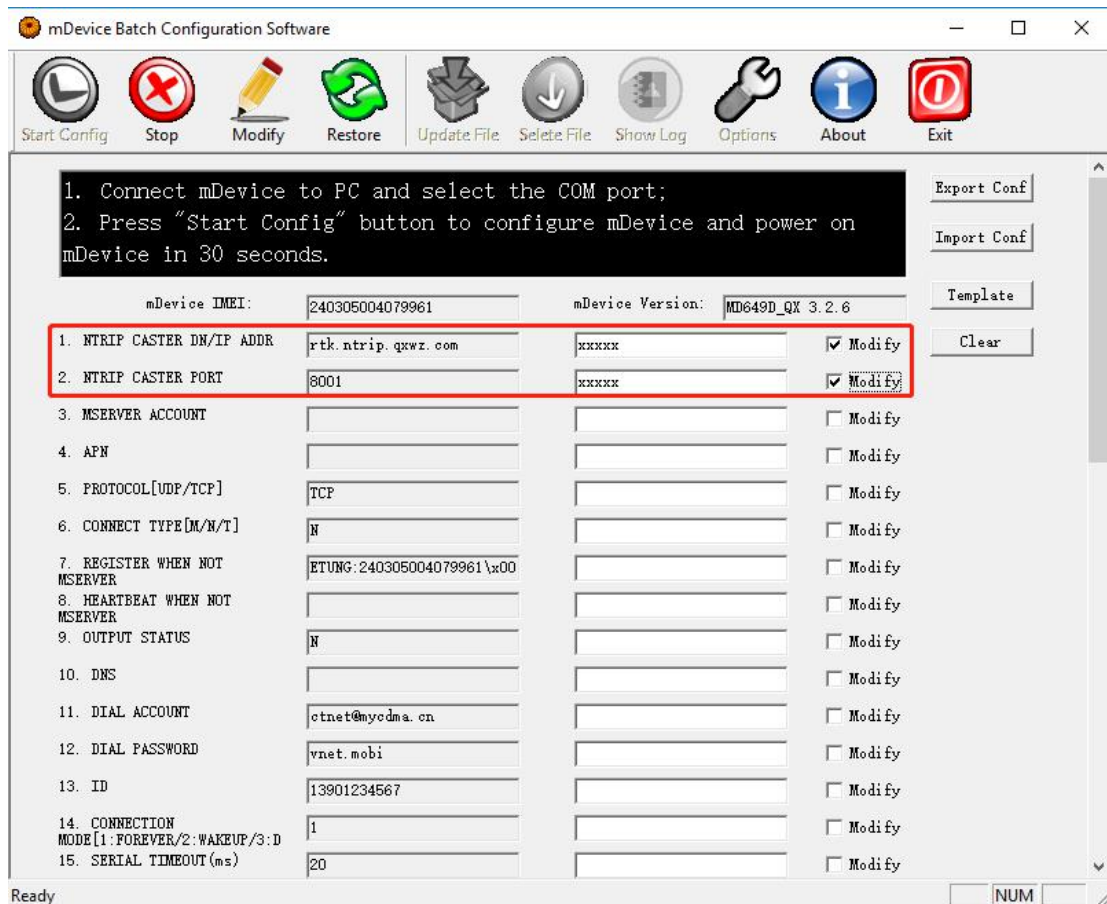


Figure 2.6 Modify IP and port of the data center

- 9) Configure the RS232 baud rate as 115200 bps, fill in the correct Ntrip account, Ntrip password and self-defined mount point. Then check the checkbox before [Modify].

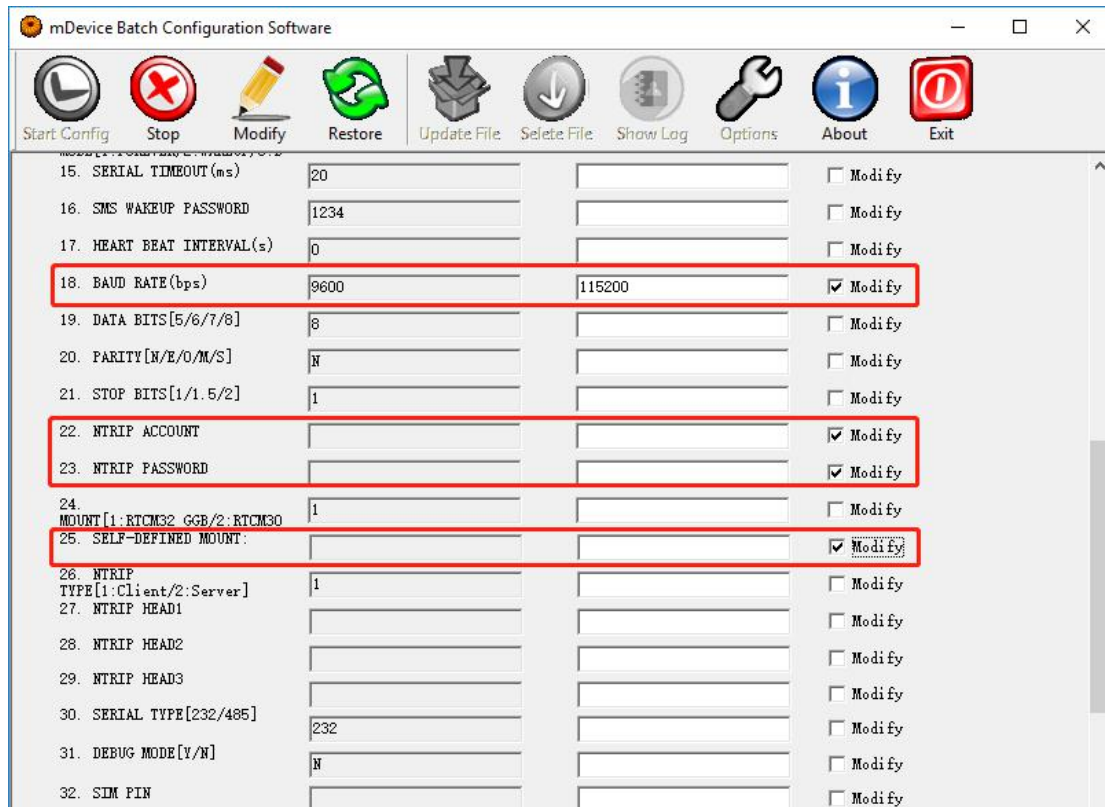


Figure 2.7 Set baud rate and Ntrip info

- 10) After completing the parameter modification, click the [Modify] button on the top. It pops out a prompt that the new parameter setting is successful. Then click [OK] and restart the Ntrip modem.

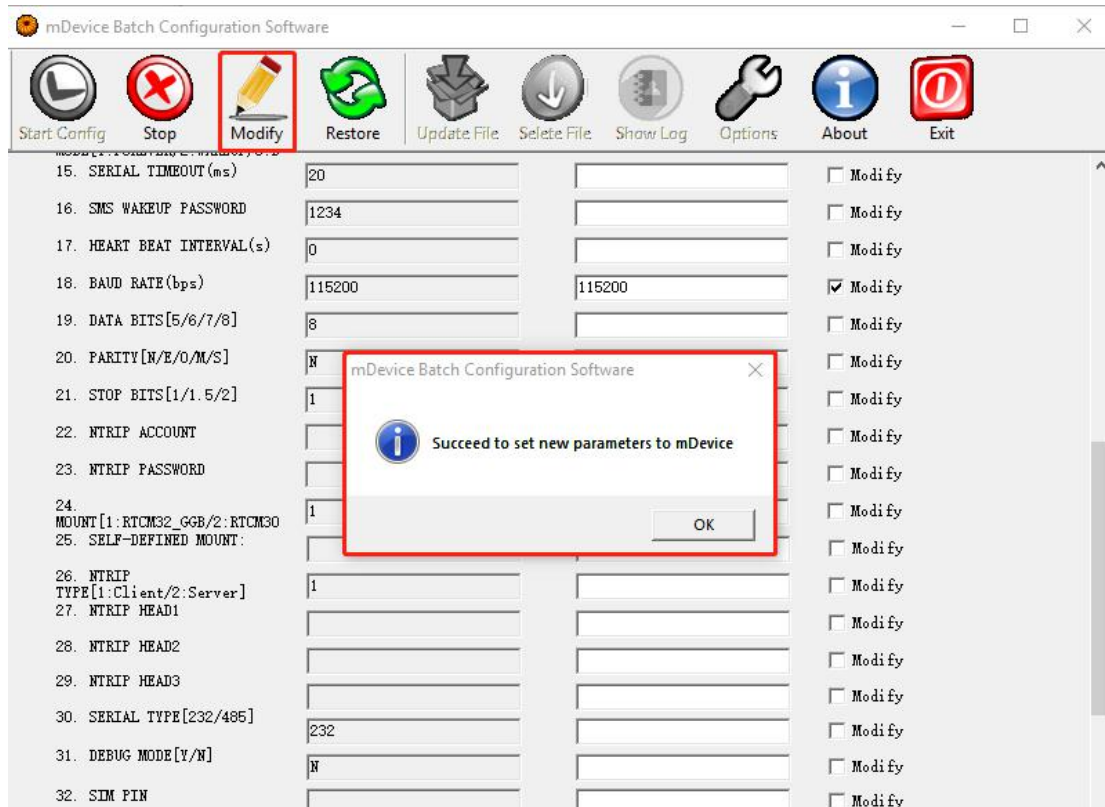


Figure 2.8 Set parameters successfully

10) After completing the configuration, click [Stop] and [Exit] to exit the software.

2.1.2.2 Configure TP688 by Tersus GNSS Center

The detailed steps of configuring TP688 by Tersus GNSS Center software are as follows.

- 1) Unscrew the nut and open the dustproof cover, insert the SIM card (standard SIM card) into the TP688 modem.
- 2) Use the DB9 female to USB Type A male converter cable to connect the DB9 female connector of TP688 and the computer.
- 3) Right click [This Computer] -> [Manage] -> [Device Manager] -> [Ports (COM & LPT)], and find the port shown as below.

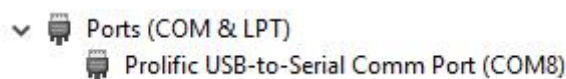


Figure 2.9 COM port detected on the computer

- 4) Double click the Tersus GNSS Center software, select Serial, COM8, 115200 (modified in mDevice Batch Configuration software) in the config window as below, and click [OK].

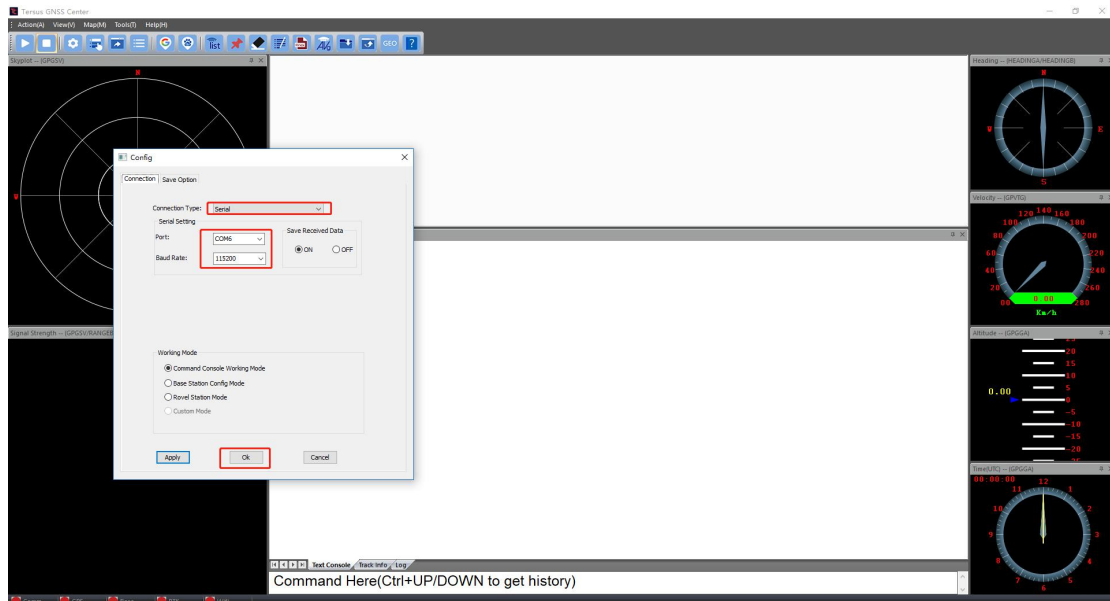


Figure 2.10 Config window of Tersus GNSS Center

- 5) After the TP688 is powered on normally, type 'AT+ENTERCFG\r' in the text console window of Tersus GNSS Center to enter the configuration mode. If the execution is successful, it responds 'OK'.
- 6) Use AT+SET command to modify the configuration item of TP688. It will response 'OK' after successful execution. Each AT+SET command is used to modify the value of one configuration item. The quantity of AT+SET commands depends on the configuration requirement.
- 7) At last, type 'AT+EXITCFG' to exit configuration mode. At this time, TP688 will reboot automatically to make the modified configuration effective.

For example, there is a requirement to modify TP688's data center domain to usacaster1.tersus-gnss.com, set port as 2101, serial port baud rate as 115200, network protocol as Ntrip client, Ntrip account as test, Ntrip password as test, and customized mount point as mountpoint01. Type below AT commands **ONE by ONE** in the text console window of Tersus GNSS Center:

```
AT+ENTERCFG
AT+SET=1,usacaster1.tersus-gnss.com
AT+SET=2,2101
AT+SET=27,115200
AT+SET=3,1
```

AT+SET=4,test
 AT+SET=5,test
 AT+SET=7,mountpoint01
 AT+EXITCFG

The command responses are shown as below.

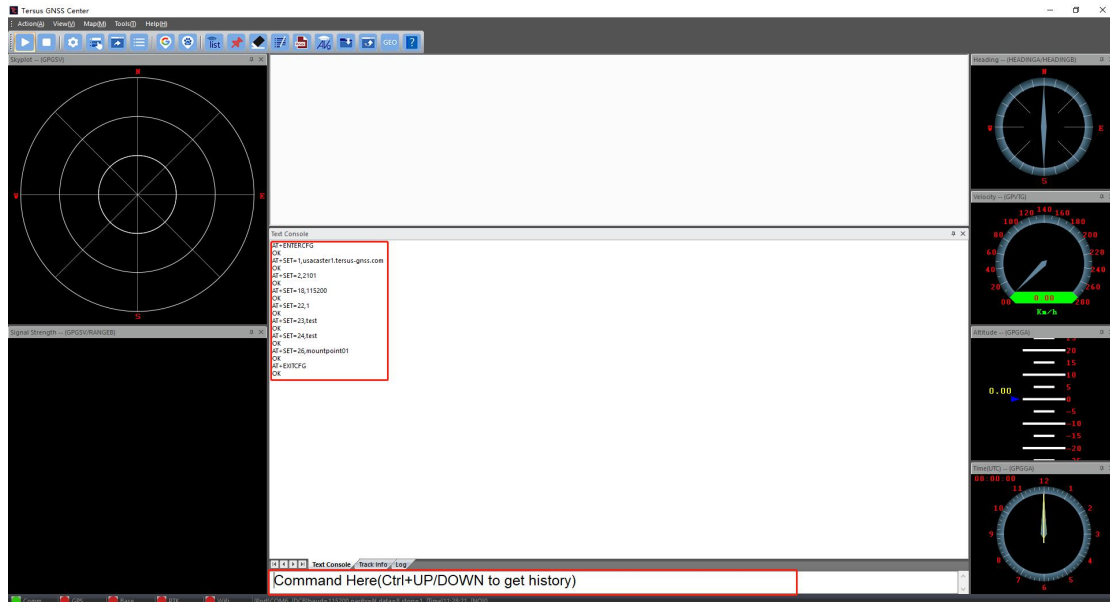


Figure 2.11 AT commands and responses

More AT commands refers to section 2.1.4.

2.1.3 Configure TP688 remotely

The Ntrip Modem TP688 supports remote configuration including SMS (Short Message Service) and mServer configuration by AT commands.

2.1.3.1 SMS configuration

SMS (Short Message Service) can be used to remotely modify the IP address and port of the data center of the Ntrip Modem TP688.

The detailed steps of remote setting IP address and port using SMS are as follows:

1) In the condition that TP688 is offline, TP688 detects incoming configuration SMS when it is dialing and then updates IP and port accordingly.

2) The format of SMS configuration is:

1234;IP/domain;port

For example: 1234; usacaster1.tersus-gnss.com;2101

in which, 1234 is the initial password, ';' is semicolon in English. If you want change this initial password, connect TP688 to a PC using a DB9 female to USB Type A male converter cable, enter the TP688 configuration software menu, and change 'SMS wakeup password' (the default is 1234). Please be noted that this password can only be digits, English characters or the combination.

Note: The content of SMS must be characters in English and digit numbers in single byte, and cannot be double byte. If SMS configuration is successful or fail, TP688 will response SUCCESS/FAIL; it will not response if the SMS does not meet the format requirements.

More SMS configuration commands:

a) AT+RESTORE

Restore to default setting, mainly used when the SMS password was changed.

b) 1234;value1;value2;value3;...

The quantity of configuration item is not limited currently. If no change for some item, leave two continuous semicolons; to clear some item, leave a space. For example:

1234;value1;value2;; ;value5

in which, the value of the first item is value1, the value of the second item is value1, the value of the third item remains unchanged, the value of the fourth item is clear, and the value of the fifth item is value5.

c) 1234+AT commands

The AT commands can be multiple, separated by semicolon. Once a command is regarded as an error, the commands afterwards will not be processed. If TP688 receives an unknown AT command, it will response ERROR. The configuration commands take into effect after reboot, which means there should be 'AT+REBOOT' at the end of a SMS or send a separate SMS with 'AT+REBOOT'.

The AT commands should be in CAPITAL letters, while the parameters within the AT commands have no such limitation.

2.1.3.2 mServer configuration

The detailed steps of remote setting IP address and port using mServer software are as follows:

- 1) Only when TP688 is displayed as online in mServer software, the IP address and port can be modified.
- 2) Select this terminal in mServer software, right-click and choose [Remote Configure]. Type "AT+MSERVER=IP,PORT" in the command list of the pop up window.

For example: AT+MSERVER= usacaster1.tersus-gnss.com;2101

After typing the above command, click [Run]. If the operation is correct, it will display OK in the response on the right. Therefore, TP688 will be offline from mServer and connected to the new data center and port.

More AT commands refers to section 2.1.4.

2.1.4 AT commands

Note: The AT commands in this section should be capital letters, and need to end with enter (0x0d) key expressed as '\r' in the following description.

The commonly used AT commands supported by the serial port configuration software (including Tersus GNSS Center, mServer and Vircom) are listed below.

- 1) AT+CELLID\r
Query the area code and cell code of the base station.

- 2) AT+CSQ\r
It is to query signal strength. It will return a value between 0 and 31, and a larger value indicates a better signal.
- 3) AT+DC1=addr,port,mserver,data-source\r
Configure parameters of data center 1.
addr: data center's domain or IP address;
port: port of the data center;
mserver: whether connected to mserver, Y: connected, N: not connected;
data-source: data source, 1: none, 2: RS232, 3: RS485
- 4) AT+DC2=addr,port,mserver,data-source\r
Configure parameters of data center 2.
- 5) AT+DC3=addr,port,mserver,data-source\r
Configure parameters of data center 3.
- 6) AT+ENTERCFG\r
It is to enter configuration mode. Returning a response 'OK' indicates that TP688 has entered the AT command configuration mode and the TP688 will automatically go offline from the data center.
- 7) AT+EXITCFG\r
It is to exit configuration mode. TP688 will reboot automatically.
- 8) AT+ENTERSMS\r
Enter SMS mode.
- 9) AT+EXITSMS\r
Exit SMS mode.
- 10) AT+GET=n\r
It is to obtain the value of the configuration item with the sequence number n. For example, check the value of configuration 1, type command 'AT+GET=1\r' will get a response of
1,usacaster1.tersus-gnss.com
OK
If n=0, it indicates query the values of all configuration items.
- 11) AT+HBI=hb, hb_to\r
Set heartbeat parameters of the Ntrip Modem: heartbeat interval and heartbeat time out. It can be simplified to "AT+HBI=heartbeat interval". If only the heartbeat interval is set, the heartbeat timeout is automatically set to 3 times the heartbeat interval.

- 12) AT+IMEI\r
It is to query IMEI number.
- 13) AT+OPER\r
It is to query operator.
- 14) AT+REBOOT\r
It is for reboot.
- 15) AT+RESTORE\r
It is to restore to the factory setting.
- 16) AT+SERPORT=<baud rate>,<data bit>,<parity>,<stop bit>,<flow control>\r
It is to configure the serial port attribute.
Baud rate: from 300 to 115200 bps;
Data bit: 5, 6, 7, 8;
Parity: N: no parity; E: even parity; O: odd parity; M: mark; S: space.
Stop bit: 1, 1.5, 2;
Flow control: N: no flow control, H: hard flow control, S: soft flow control;
If only change baud rate, it can be simplified to "AT+SERPORT=baud rate",
for example "AT+SERPORT=115200".
- 17) AT+SERPORT?\r
Query the serial port attribute of the current Ntrip Modem.
- 18) AT+SET=n,value\r
Set the value of the configuration item with the sequence number n to a specific value. For example, to configure the value of the first configuration item as usacaster1.tersus-gnss.com, write the command as 'AT+SET=1,usacaster1.tersus-gnss.com\r'. After TP688 receives the configuration modification command successfully, it returns 'OK'.

For the sequence number and corresponding description of the configuration item, refer to Table 2.1 Configuration item of TP688.
- 19) AT+SIMID\r
Query the IMSI number and CCID number of the SIM card.
- 20) AT+SMS=<target number>,<encoding format>,<data length>,<data>\r
Send SMS, command format is as below:
Target number: the mobile number which receives SMS;

Encoding format: 1: ASCII code, 2: 8bit code, 3: Unicode;

Data length: length of the real data;

Data: data to be sent, each byte is formatted to a 2-byte hexadecimal number, for example, to send "1234", type "31323334".

Examples:

a. Send "1234" to 13812345678 in ASCII encoding:

```
AT+SMS=13812345678,1,4,31323334\r
```

b. Send "1234" to 13812345678 in 8bit encoding:

```
AT+SMS=13812345678,2,4,31323334\r
```

c. Send "1234" to 13812345678 in Unicode encoding:

```
AT+SMS=13812345678,3,4,31323334\r
```

21)AT+SMSA=<target number>,<data length>,<data>\r

Send SMS of ASCII code, command format is as below:

Target number: the mobile number which receives SMS;

Data length: length of the real data;

Data: data to be sent, should be ASCII string.

Example:

Send "1234" to 13812345678 in ASCII encoding:

```
AT+SMSA=13812345678,4,1234\r
```

22)AT+SMSPING=PN\r

Make Ntrip Modem send a SMS to the phone number, the SMS content is the IMEI number of the Ntrip Modem.

23)AT+STATUS\r

It is to query connection status. 0: not connected to data center; 1: connected to data center.

24)AT+SVR=udp_tcp,self_reg,self_hb

Configure data center protocol, self-defined registration pack and heartbeat packet.

Udp_tcp: data center protocol, UDP or TCP;

Self_reg: self-defined registration packet when not connecting to mServer, set 'NULL' to clear self-defined registration packet;

Self_hb: self-defined heartbeat packet when not connecting mServer, set 'NULL' to clear self-defined heartbeat packet.

25)AT+UPTIME\r

Query the operation time of the device.

26)AT+VER\r

It is to query firmware version of the Ntrip Modem.

27) AT+232SERPORT=baud rate, data bit, parity, stop bits\r

Configure parameters of RS232 serial port.

Baud rate: 2400/4800/9600/19200/57600/115200

Data bit: 5/6/7/8

Parity: N: none, E: even, O: odd

Stop bit: 1/2

28) AT+232SERPORT?\r

Query parameters of RS232 serial port.

The following AT commands only support mServer and Vircom software.

29) AT+TIME\r

Query the system time of the Ntrip Modem.

Example response:

+TIME: 2019/07/13 11:12:13

OK

30) AT+CICCID\r

It is to query the ICCID info of the SIM card.

31) AT+CPSI?\r

It is to query the UE system information.

Note: After the terminal dials up to the data center, it cannot interact with the Ntrip Modem in real time. This information is the buffer that the terminal queries before dialing, and will not change during the terminal's current dial-up connection.

32) AT+CNBP?\r

It is to query the frequency band selection.

33) AT+CSCA?\r

It is to query the number of the SMS service center.

The CSCA and CNBP information can be modified through item 37 and 38 in the serial configuration software shown as below. It is only effective after reboot.

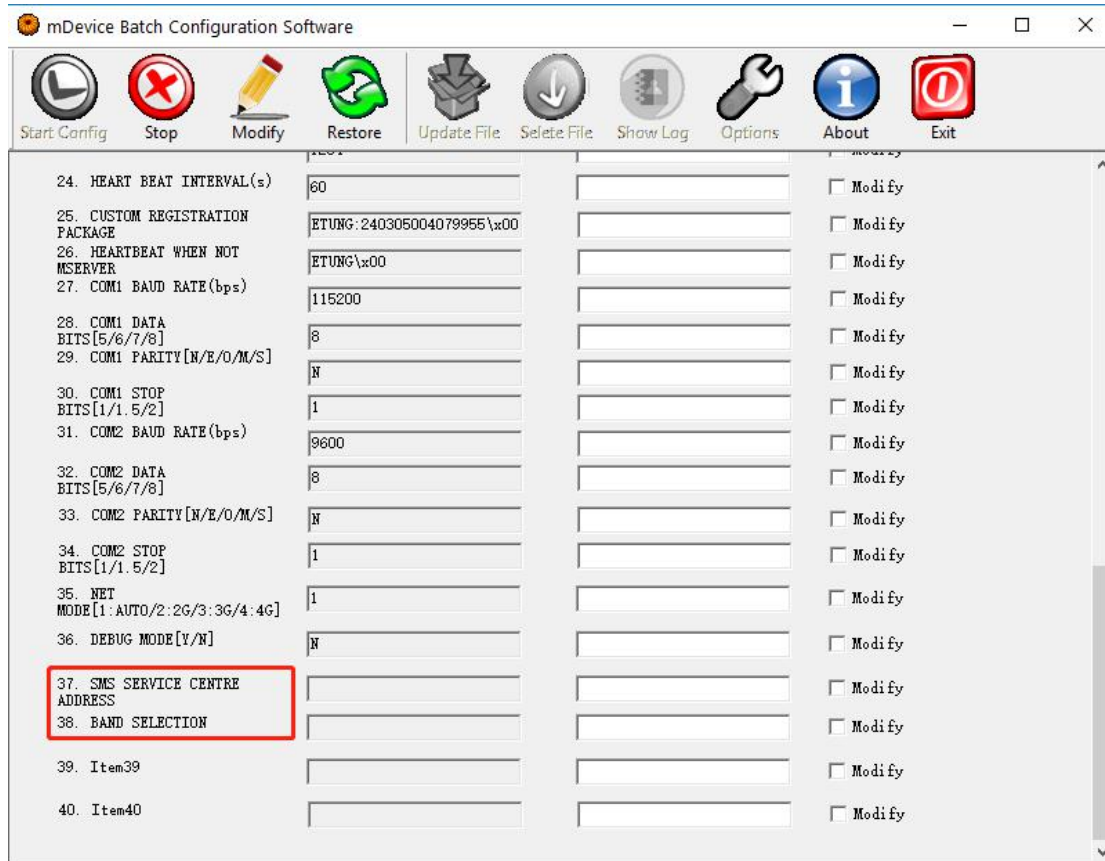


Figure 2.12 Modify CSCA or CNBP

Note: If the CSCA is set incorrectly, the SMS will not be able to send. The setting of CNBP will affect the network registration, and improper setting may cause the module to fail to register the network.

The supported AT commands for **SMS configuration** are as follows:

- 1) AT+CFG?
The Ntrip Modem will response:
OK;item 1;item2;...
- 2) AT+DC1=addr,port,mserver,data-source
Configure parameters of data center 1.
addr: data center's domain or IP address;
port: port of the data center;
mserver: whether connected to mserver, Y: connected, N: not connected;
data-source: data source, 1: none, 2: RS232, 3: RS485
- 3) AT+DC2=addr,port,mserver,data-source
Configure parameters of data center 2.
- 4) AT+DC3=addr,port,mserver,data-source
Configure parameters of data center 3.
- 5) AT+INFO?
The Ntrip Modem will response:
OK;IMEI;version;signal strength;network mode;modem version
- 6) AT+PWD=password
Set new SMS password, with no more than 8 characters, excluding ";",",",".", "=", and etc. It is advised to use digit number and English characters only. The response is OK or ERROR.
- 7) AT+REBOOT
Reboot the device, with response OK.
- 8) AT+RESTORE
Restore to default settings and reboot automatically, with response OK. No need to add additional command AT+REBOOT.
- 9) AT+SERPORT= baud,data_bits,parity,stop_bits,type
baud: baud rate (2400/4800/9600/19200/38400/57600/115200)
data_bits: data bits (5/6/7/8)
parity: parity checking (N: None/E: Even/O: Odd)
stop_bits: stop bits (1/2)
type: serial port type, for Ntrip Modems that supports RS232 and RS485 at the same time, configure this parameter to specific serial port type (RS232/RS485).
- 10) AT+SET=n,value

Set the value of the configuration item with the sequence number n to a specific value. For example, to configure the value of the first configuration item as usacaster1.tersus-gnss.com, write the command as 'AT+SET=1, usacaster1.tersus-gnss.com\r'. After TP688 receives the configuration modification command successfully, it returns 'OK'.

11) AT+SVR=udp_tcp,self_reg,self_hb

Configure data center protocol, self-defined registration pack and heartbeat packet.

Udp_tcp: data center protocol, UDP or TCP;

Self_reg: self-defined registration packet when not connecting to mServer, set 'NULL' to clear self-defined registration packet;

Self_hb: self-defined heartbeat packet when not connecting mServer, set 'NULL' to clear self-defined heartbeat packet.

12) AT+WN=apn,user,password

Configure parameters related to dialing, TP688 will response OK or ERROR.

apn: Access point name, this parameter is unused for CDMA/EVDO device and can be null. Set 'auto' to select APN automatically.

user: dialing account, the dialing password should be changed together with the dialing account.

password: dialing password, the dialing account should be changed together with the dialing password.

13) AT+232SERPORT=baud rate, data bit, parity, stop bits

Configure parameters of RS232 serial port.

Baud rate: 2400/4800/9600/19200/57600/115200

Data bit: 5/6/7/8

Parity: N: none, E: even, O: odd

Stop bit: 1/2

2.2 Configuration Parameters

Detailed configuration parameters are described as below.

Table 2.1 Configuration item of TP688

No.	Configuration item	Description
1	Ntrip Caster domain or IP address	Configure data center domain or IP
2	Ntrip Caster port	Configure data center port
3	Ntrip type (1: client; 2: server)	Configure the Ntrip type, 1: Client; 2: Server. Default 1
4	Ntrip account	Configure the Ntrip account
5	Ntrip password	Configure the Ntrip password
6	Mount (1: RTCM32_GGB, 2: RTCM30_GG)	Configure the mount point, 1: RTCM32_GGB; 2: RTCM30_GG, default 1
7	Self-defined mount point	Customized mount point
8	Data source (0:None, 1:COM1, 2:COM2)	Default 1
9	Data center 2 DN/IP	Data center 2 domain or IP
10	Data center 2 port	Data center 2 port
11	DC2 using mServer (Y/N)	Default N
12	DC2 data source (0:None, 1:COM1, 2:COM2)	Data center 2 data source
13	Data center 3 DN/IP	Data center 3 domain or IP
14	Data center 3 port	Data center 3 port
15	DC3 using mServer (Y/N)	Default N
16	DC3 data source (0:None, 1:COM1, 2:COM2)	Data center 3 data source
17	Account	Configure the user name that has been applied for
18	APN name	Configure the APN name for the wireless network
19	Network protocol (TCP/UDP)	Configure data communication protocol, TCP or UDP
20	Output status (Y/N)	Configure the connection information outputs from serial port when the modem is connected or disconnected with server, the default is N (no output).
21	Dial account	Configure dialing account, normally no need to change
22	Dial password	Configure dialing password, normally no need to change
23	Configuration password	Set up password

24	Heartbeat interval (seconds)	Configure the heartbeat interval, the unit is second.
25	Customize registration pack	Customize register pack when the modem is not connected to mServer
26	Heartbeat when not mServer	Customize heartbeat pack when the modem is not connected to mServer
27	COM1 baud rate (bps)	Configure the serial baud rate for data transmission mode. Default 9600
28	COM1 data bits (5/6/7/8)	Configure the serial data bit for data transmission mode. Default 8
29	COM1 parity (N/E/O/M/S)	Configure the parity for data transmission mode. N: no parity; E: even parity; O: Odd parity; M: mark parity; S: space parity. Default N
30	COM1 stop bits (1/1.5/2)	Configure the serial stop bit for data transmission mode. Default 1
31	COM2 baud rate (bps)	Default 9600
32	COM2 data bits (5/6/7/8)	Default 8
33	COM2 parity (N/E/O/M/S)	Default N
34	COM2 stop bits (1/1.5/2)	Default 1
35	Net mode (1: Auto, 2:2G, 3:3G, 4:4G)	Default auto
36	Debug mode (Y/N)	Set debug mode, default N
37	SMS service center address	
38	Band selection	
39	Item 39	Reserved
40	Item 40	Reserved

2.3 Firmware Upgrade

Make the connections stated in section 2.1 and then double click to run dtucfg2_notm.exe application which is shown as below.

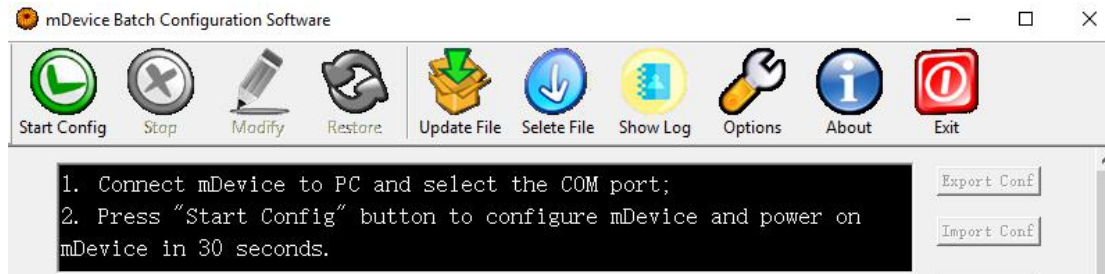


Figure 2.13 Firmware upgrade software

Connect the Ntrip Modem TP688 in the way stated in section 2.1 and find the port number in computer management. Click [Options], fill the port number in the pop out window of settings.

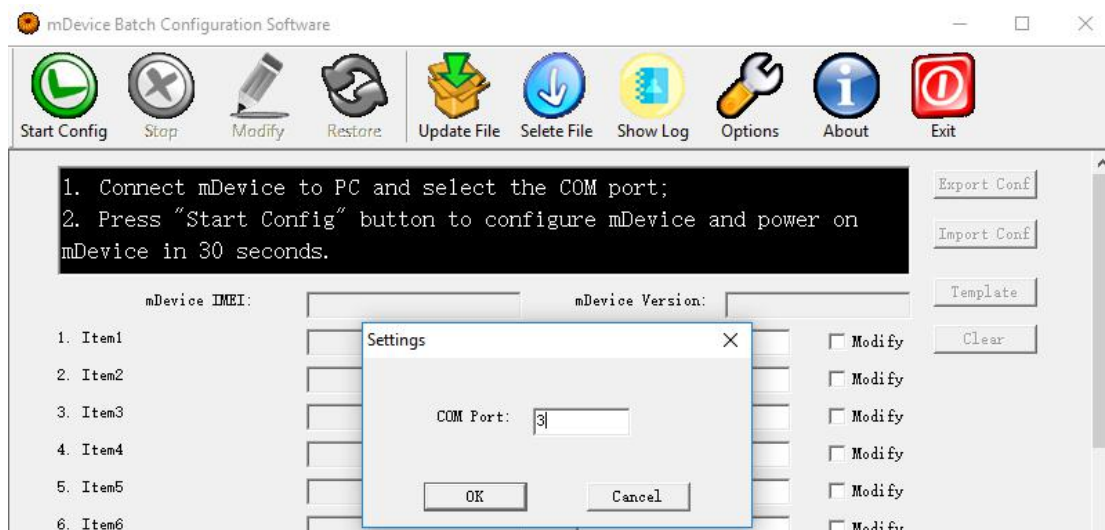


Figure 2.14 Set COM port

Click [Select File], find the firmware file and click [Open] to load the firmware file. Contact Tersus Support for firmware file to upgrade.

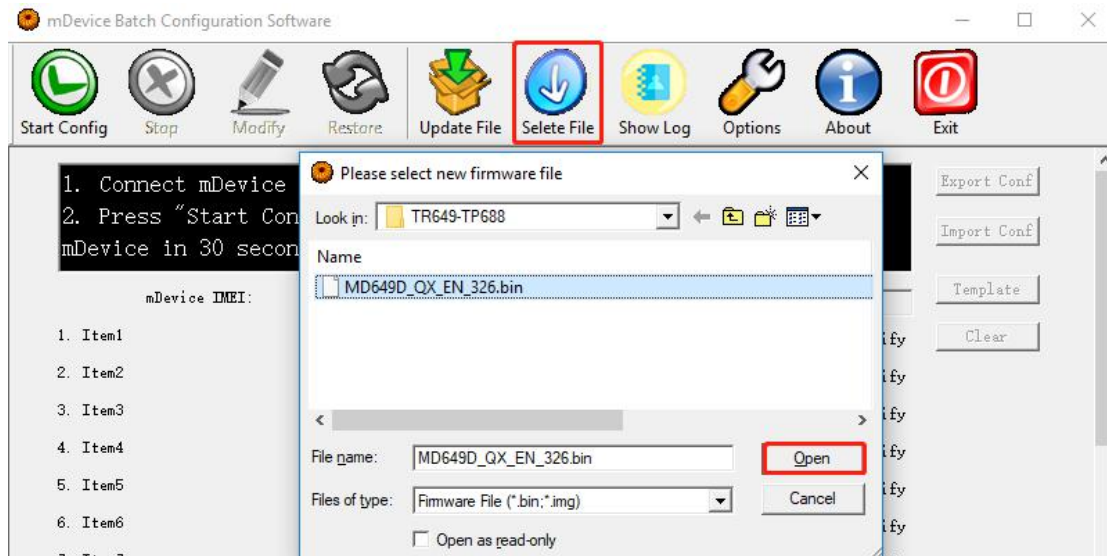


Figure 2.15 Select firmware file

Click [Update File], power on the Ntrip Modem TP688 and it starts upgrading automatically. The screenshot below shows the upgrading progress.

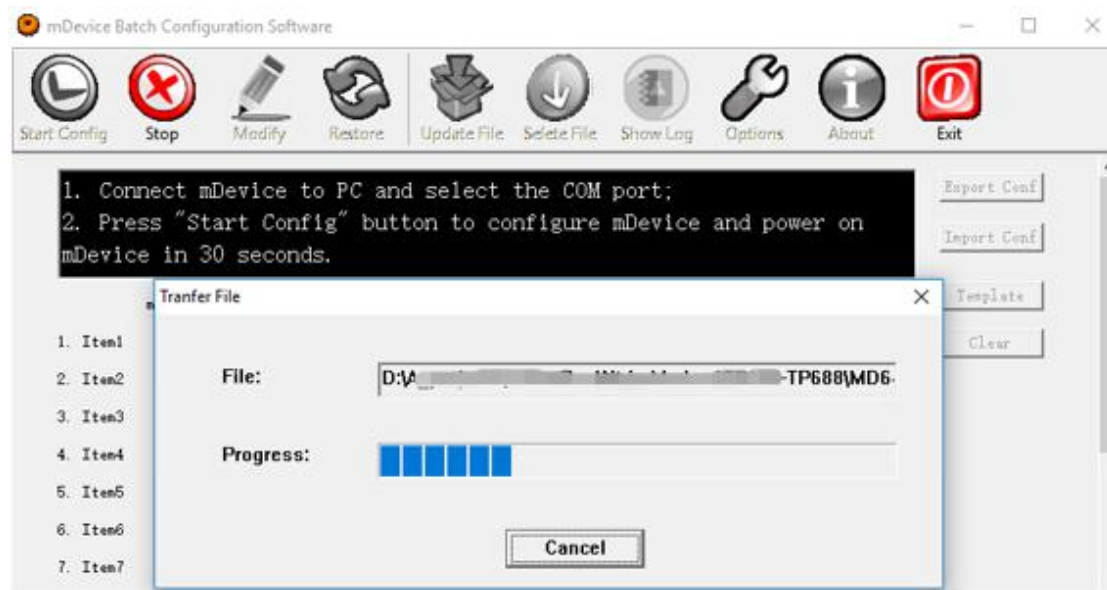


Figure 2.16 Firm_ware upgrade in progress

When the firmware upgrade is completed, the software shows the status 'Updated firmware successfully!' and it will restart automatically.

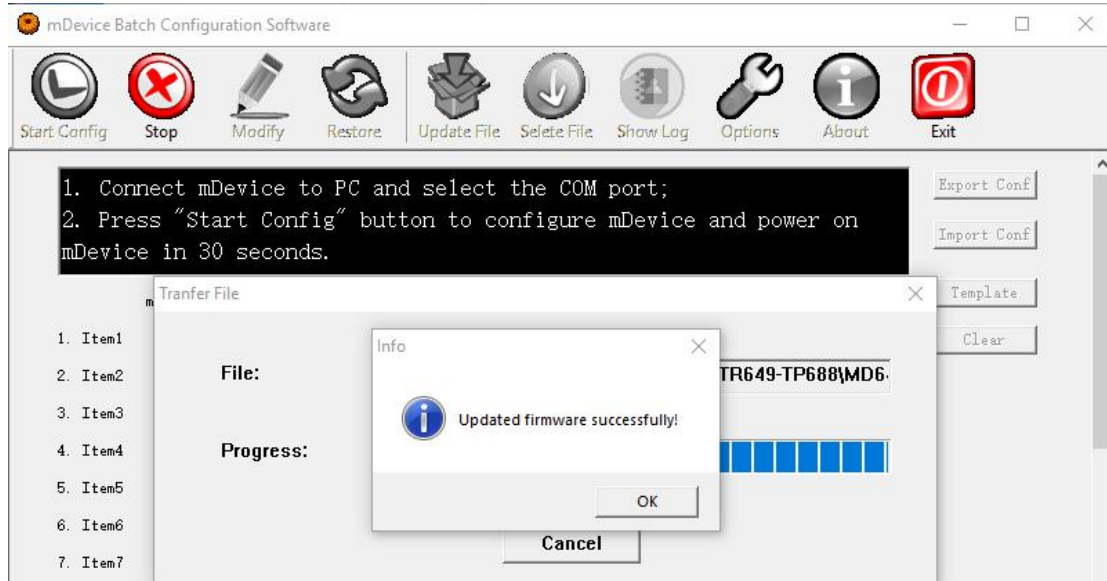


Figure 2.17 Firmware upgrade finished

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