Phone Shield SIM908 User Manual

SIM908 Features

- Quad-band 850/900/1800/1900MHz
- GPRS multi-slot class 10
- GPRS mobile station class B
- Compliant to GSM phase 2/2+
    - Class 4 (2 W @ 850/900 MHz)
    - Class 1 (1 W @ 1800/1900 MHz)
- Control via AT commands (GSM 07.07, 07.05 and SIMCom enhanced AT Commands)
- SIM application toolkit
- Supply voltage range :
    - GPRS: 3.2 ~ 4.8 V
    - GPS: 3.0 ~ 4.5V
- Operation temperature : -40 °C to +85 °C

SMS
- Point-to-point MO and MT
- SMS cell broadcast
- Text and PDU mode

Audio
- Tricodec
    Half rate (HR)
    Full rate (FR)
    Enhanced Full rate (EFR)
- Hands-free operation
- Echo cancellation

GPRS
- GPRS class 8/10: max. 85.6 kbps (downlink)
- PBCCH support
- Coding schemes CS 1, 2, 3, 4
- PPP-stack

CSD
- CSD up to 14.4 kbps
- USSD
- Non transparent mode

GPS
- Receiver type
    42-channel
    GPS L1 C/A code
    High-performance STE engine
- Sensitivity
    Tracking: -160 dBm
    Cold starts : -143 dBm
- Time-To-First-Fix
    Cold starts : 30s (typ.)
    Hot starts : 1s (typ.)
- Accuracy
    Horizontal position: <2.5m CEP
- Power consumption (GSM engine in idle mode)
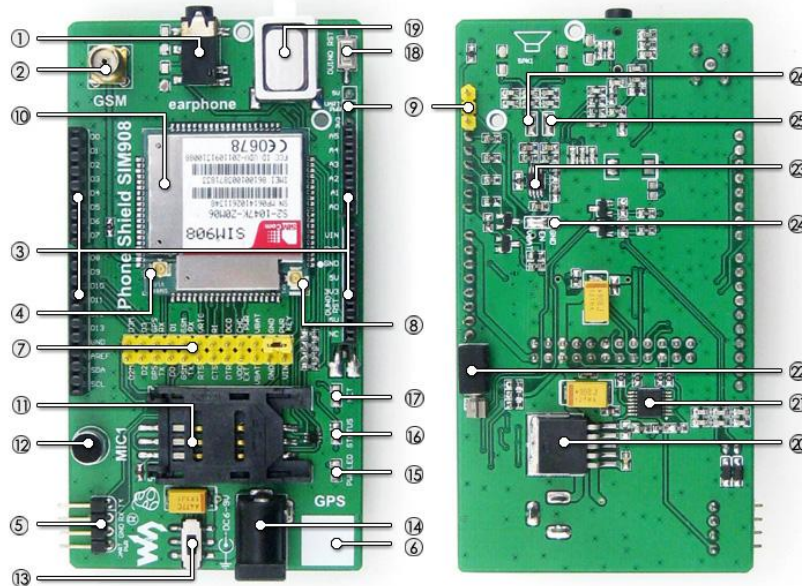   Acquisition : 77mA
    Tracking : 76mA

What's on Board

Figure 1: Resources on board

1. **Earphone jack :**
   SIM908 2nd analog voice channel output
2. **GSM antenna connector :** SMA interface
3. **Arduino expansion connector :**
   for connecting with an Arduino board
4. **GSM antenna connector**
5. **UART interface :** for debugging
6. **GPS antenna placeholder**
7. **SIM908 control interface**
8. **GPS antenna connector**
9. **External UART module power jumper**
10. **SIM908**
11. **SIM card slot**
12. **Mic :**
    SIM908 1st analog voice channel input
13. **Power switch**
14. **6V~9V DC power jack**
15. **Power indicator**

16. **SIM908 status indicator :**
    light up when SIM908 is powered
17. **SIM908 network indicator :**
    blinking slowly when network registration is successful
18. **Arduino reset button**
19. **NOKIA original speaker :** SIM908 1st analog voice channel output
20. **MIC29302 power chip**
21. **74HC125**
22. **Onboard vibration motor**
23. **NCP2890 power amplifier :**
    amplifies the SIM908 1st analog voice channel
24. **NCP2890 enable jumper :**
    short the EN and VBAT to enable
    short the EN and GND to disable
25. **SIM908 analog output positive jumper :**
    open it when NCP2890 is enabled
    short it when NCP2890 is disabled
26. **SIM908 analog output negative jumper :**
    open it when NCP2890 is enabled
    short it when NCP2890 is disabled

Operation Description

1. Preparations

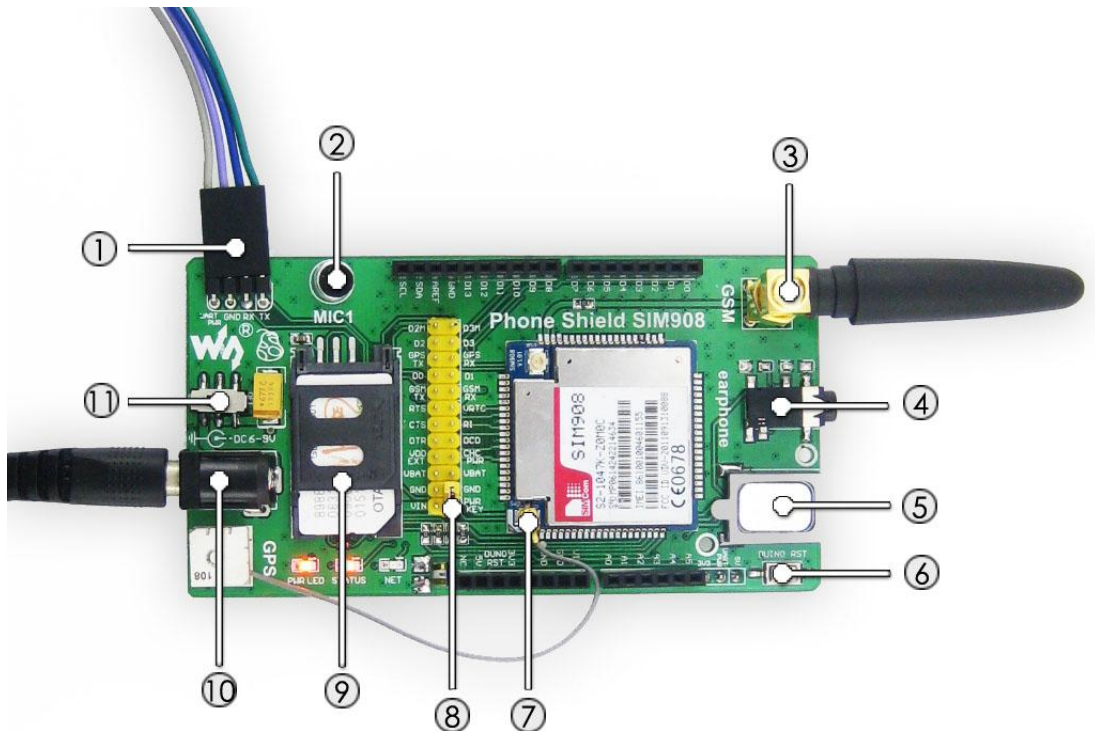| Phone Shield SIM908 module |
|:---:|
| SIM card |
| 5V TTL serial module |
| PC serial software |
| PC NEMA GPS DEMO |

Table 1: Preparations

2. Hardware configuration

Figure 2: Hardware connection

2.1 PC connection: connect to a PC via a UART serial module (TTL level) (tab ①);

2.2 GSM antenna connection: connect with a GSM signal enhancement antenna (tab ③);

2.3 Earphone connection: connect with a 3.5mm earphone (tab ④). However, it is not a necessary configuration. You can perform monitoring by a microphone as well (tab ②);

2.4 GPS antenna connection (tab ⑦);

2.5 Jumpers settings: PWRKEY should be connected to GND (tab ⑧, please refer to Remarks in this section for more information);

2.6 SIM card slot: press the SIM card slot, and push the plastic sheet

aside to open the slot, then, place a SIM card into it and close the slot (tab ⑨);

2.7   Power connection: connect to a 6V~9V DC power supply (tab ⑩);

2.8   Switch setting: turn on the switch (tab ⑪).

Remarks:

The power control of SIM908 module can be controlled by PWRKEY pin.

The switching between on and off states of the module can be controlled by connecting PWRKEY to GND for 1-2 sec and then disconnecting them.

For example, when SIM908 module is on, connecting PWRKEY to GND for 1-2 sec and then disconnecting will make the module switch to off.

If SIM908 module is off, tying PWRKEY to GND for 1-2 sec and then disconnecting will make the module switch to on as well (similar to a warm-boot).

When PWRKEY pin is always connected to GND, SIM908 module will remain on.

3. Basic operations

3.1   After powering up, the power indicator PWELED will light up.

3.2   SIM908 module has two serial modes for different communication objections: GSM/GPS modes. To select GSM serial control port, D2M should be connected to GND via a jumper wire; while selecting GPS serial control port, D3M should be connected to GND with a jumper wire, as Figure 3 shows.
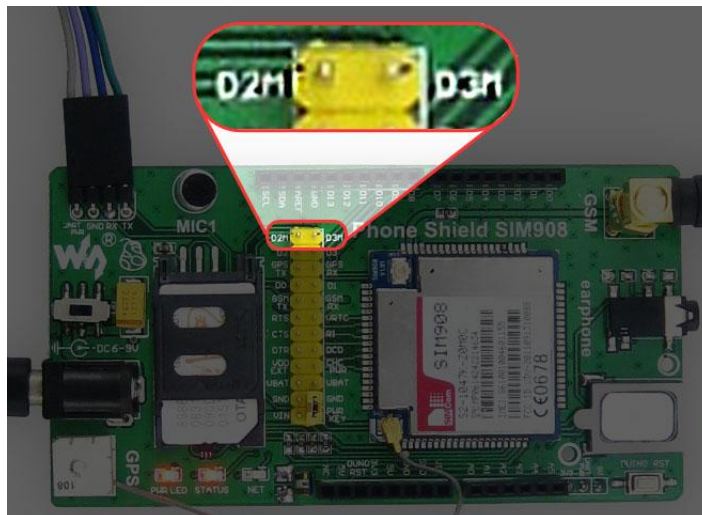

Figure 3: Selecting GPS/GSM serial mode

● Connect D2M to GND, and keep D3M suspended (High level). GSM serial control port is selected.

- Connect D3M to GND, and keep D2M suspended (High level). GPS serial control port is selected.
- Both D2M and D3M are suspended or connected to GND. In this case, there is no serial output.

We will illustrate the usage of the module with an example of how to operate under GSM mode in the following section.

3.3　Connect D2M to GND via a jumper wire, and keep D3M suspended, to select GSM serial control port.

3.4　Tie PWRKEY to GND. Then, you can see that STATUS indicator remains on, and NET indicator keeps blinking, of which fast blinking means the module is trying to register to the network, and slow blinking means network registration is done successfully.

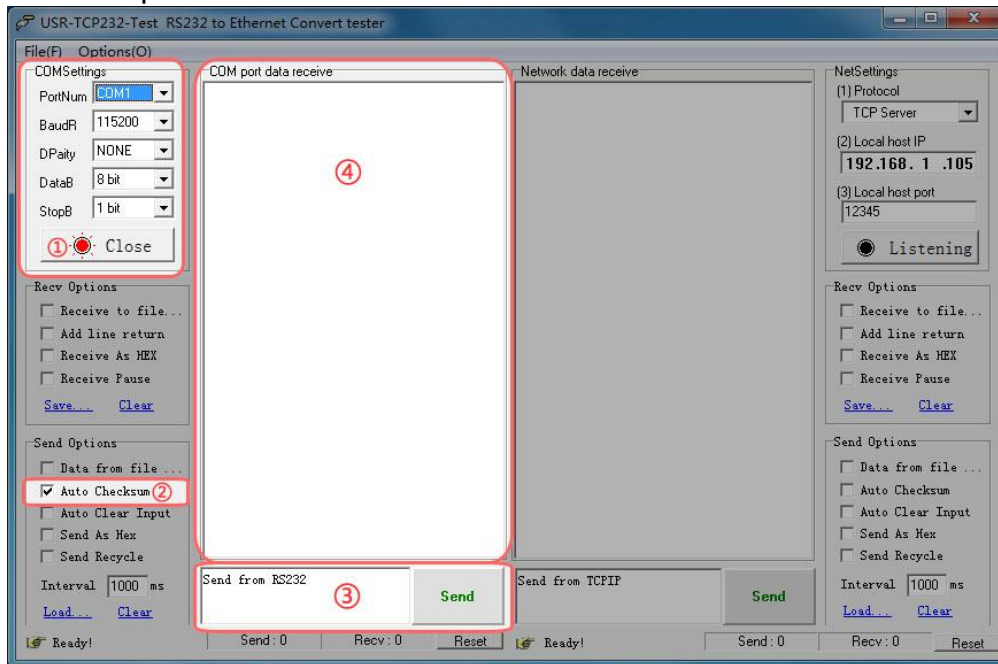3.5　Start the TCP232 serial tool 🗲 TCP232.exe on PC, and perform operations as followed.

Figure 4: TCP232 settings

① The serial port setting is as followed.

PortNum	Set to the corresponding serial port (*)
BaudR	115200
Dpaity	NONE
DataB	8 bit
StopB	1 bit

(*) In this example, the PortNum is set to COM5. In practical application, please right click the icon My Computer->Property->Device Manager, in order to check corresponding port number.

Table 2: serial port settings

② Check the option Auto Checksum. Then, an Apendix bits setting option box will pop up. Select the option Fixed Byte Checksum, and fill in the small box on the right of the option with 0D, since the ASCII code of 0D is CR, so that there will be an auto CR for each command transmission. The detailed settings are shown in Figure 5.
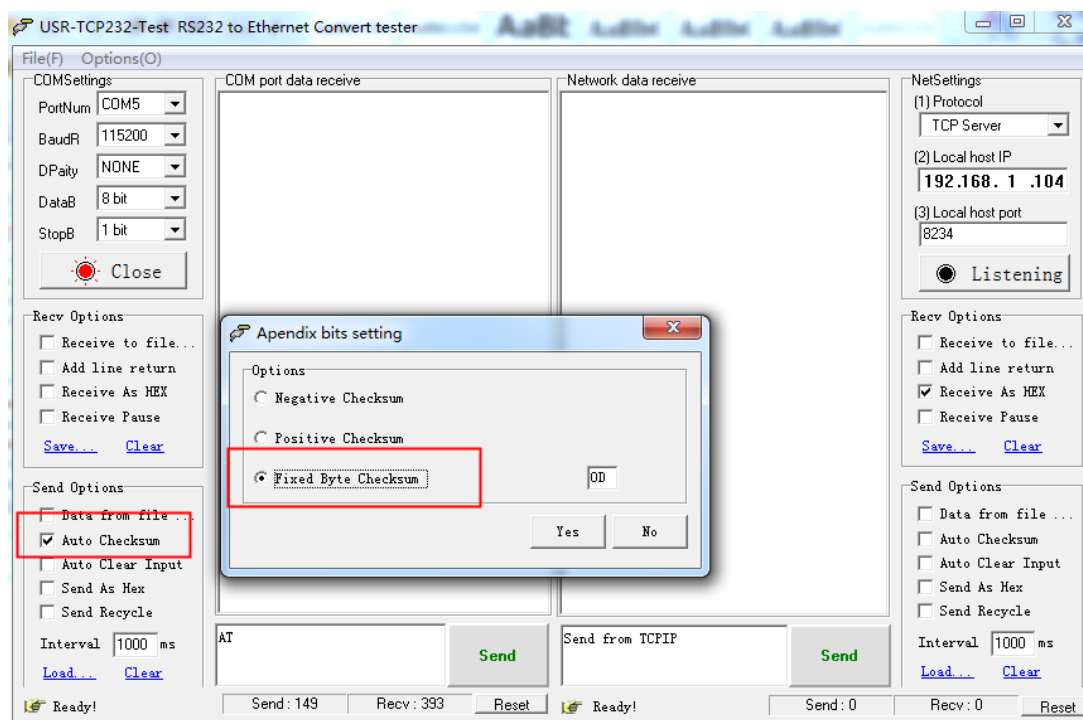

Figure 5: Data transmission settings

③ Fill in the transmission box with AT+GSV, and click the button Send to transmit the command.

④ The data receive box displays the return values from the corresponding serial port, as Figure 6 shows.
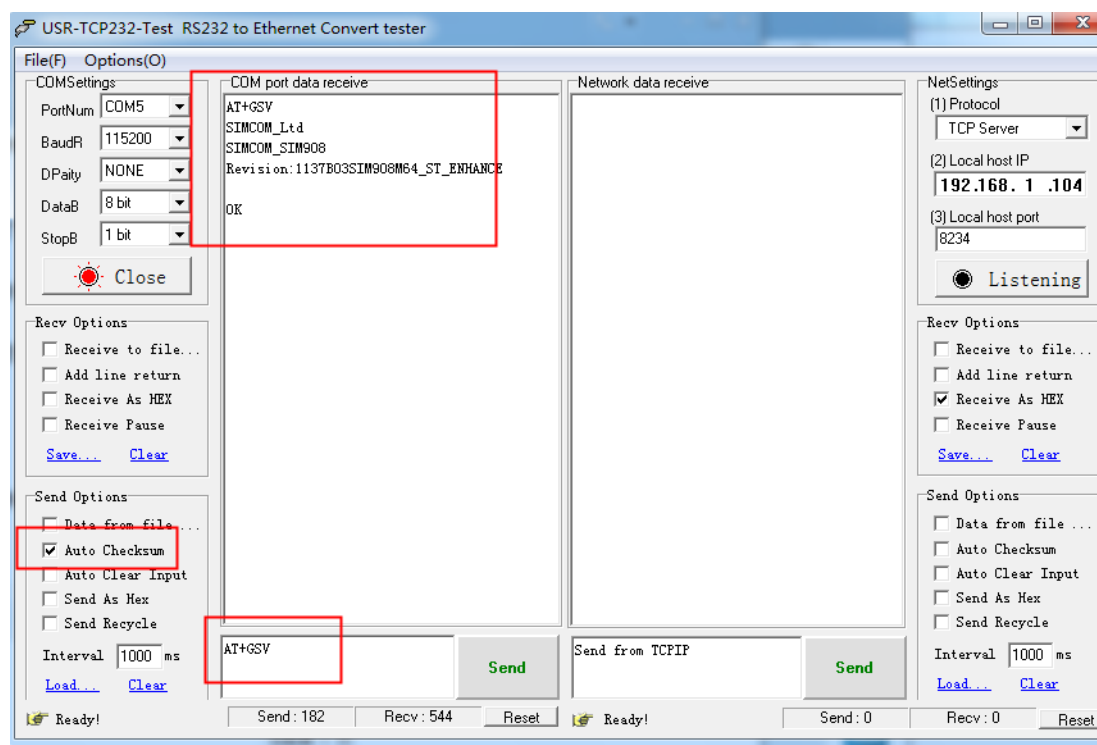
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Figure 6: Sending AT command for module verification testing

4. GSM debugging

4.1 Select GSM serial control port. It can be done by connecting D2M to GND via a jumper wire, and keeping D3M suspended.

4.2 Common command descriptions for message transmission

Commands	Descriptions	Return values
AT	Make sure the module is working properly	AT OK
AT+CMGF=1	Select SMS message format	AT+CMGF=1 OK
AT+CMGS="13612345678"	Set the message transmission number and send SMS message. After receiving the symbol >, the message Hello World!(*) can be sent out	>
1A	This is a terminator. Before sending it out, you should check the option Send As Hex	Hello World!
(*)After sending the message Hello World!, you should check the option Send As Hex, then send the command 1A to indicate the message to be sent is end. In this case, the message you input will be delivered actually.		

Table 3: Common command descriptions for message transmission

4.3   Common command descriptions for dialing and answering a call

Commands	Descriptions	Return values
ATD13612345678;	Set the dialing number: 13612345678，and end with the symbol (;). Now, you can make a call	ATD13612345678 ok
ATA	Answer an incoming call	RING
ATH	Disconnect existing connection	

Table 4: Common command descriptions for dialing and receiving a phone

(For more detailed information about AT commands, please refer to SIM908_AT+Command+Manual_V1.01)

5. GPS debugging

5.1   Switching to GPS mode from GSM mode

① Configure GPS: connecting D2M to GND via a jumper wire, and keeping D3M suspended, to select GSM serial control port.
Send the following commands:
- AT+CGPSPWR=1 (turn on GPS power supply)
- AT+CGPSRST=1 (reset to GPS mode)
- AT+CGPSIPR=115200 (set Baud rate of the module)
Return OK.

② GPS signal output: connecting D3M to GND via a jumper wire, and keeping D2M suspended, to select GPS serial control port.
Notices: User should send the commands listed above to turn on GPS power supply and reset to GPS mode under GSM mode, before switching to GPS mode by connecting D3M to GND via a jumper wire, and keeping D2M suspended. If you connect D3M to GND before sending out the commands listed above, it will be invalided. Because you have not turned on the GPS power supply and reset the module to GPS mode.
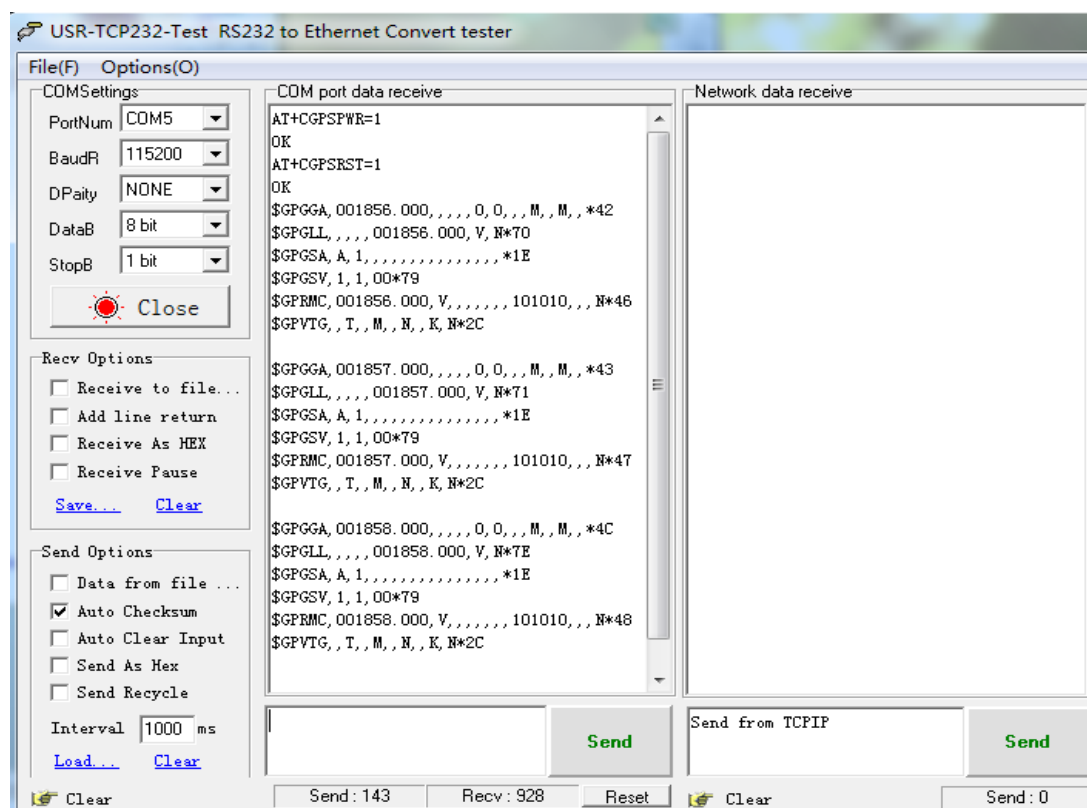
③ TCP232 receives relative messages, as Table 5 shows.

Table 5: Serial message receiving under GPS mode

5.2   Checking GPS information with NEMA GPS Demo

① Start the software NEMA GPS DEMO V2.2, as Figure 7 shows.
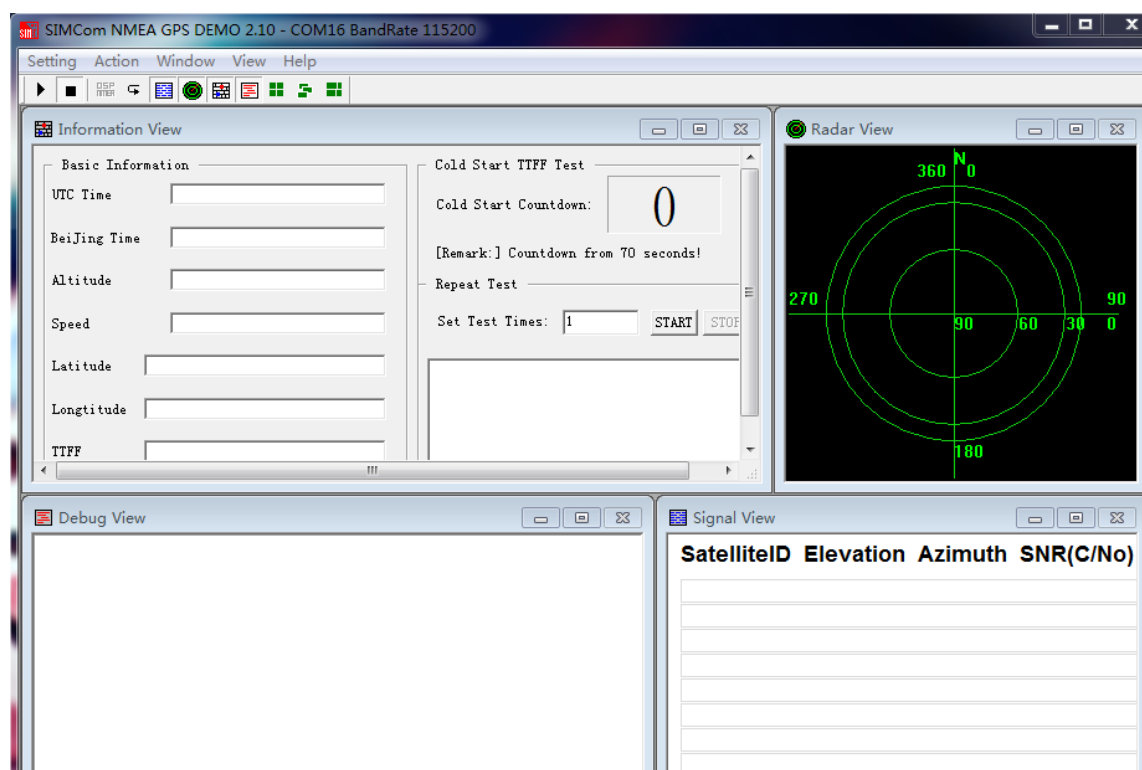

Figure 7: NEMA GPS Demo

② Open corresponding port: setting->port Setting, and set the port and Baud rate: 115200 (If the Baud rate of the module is modified to a certain value by sending AT+CGPSIPR command, the modified Baud rate should be used in here).

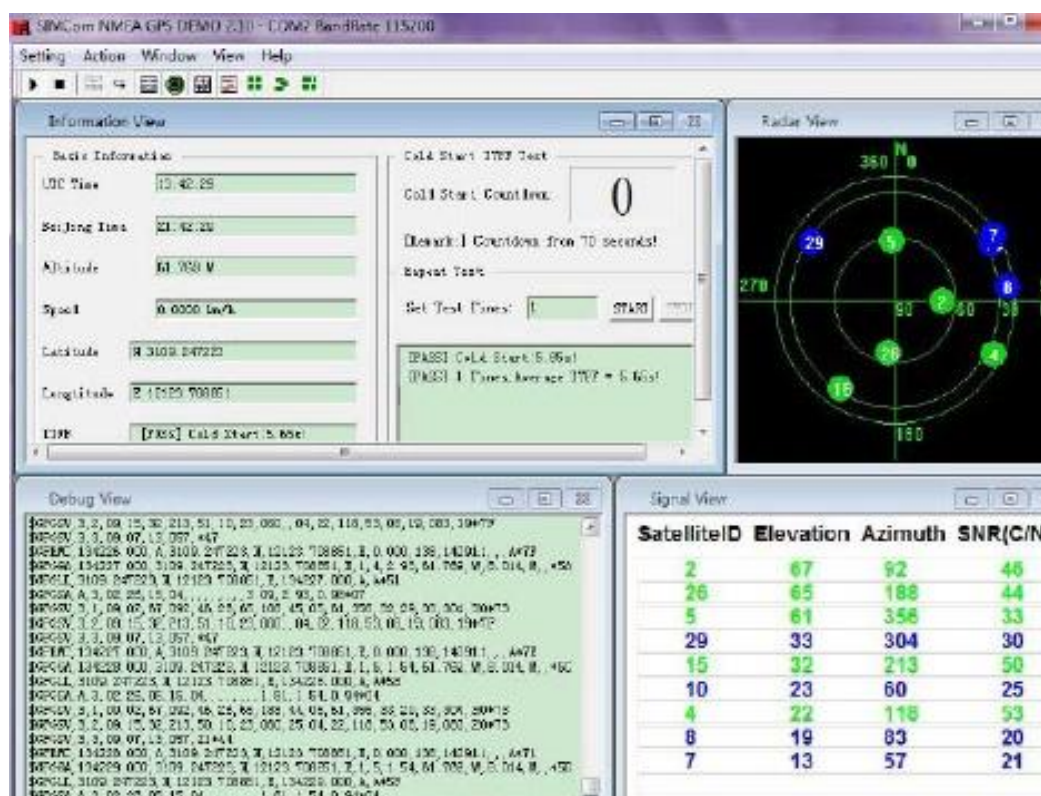③ Select Action->run. Then, you can see the relative GPS information, as Figure 8 shows.

Figure 8: Checking GPS information

5.3   GPS command descriptions
Notices: The commands listed in the Table 6 should be used under GSM mode.

Firstly, you should select GSM serial control port by connecting D2M to GND via a jumper wire, and keeping D3M suspended.

Commands	Descriptions	Common values
AT+CGPSPWR	GPS power control	Value=1, GPS is on
AT+CGPSRST	GPS mode reset	0 is for cold start
AT+CGPSINF	Get current GPS location information	Common value: 32
AT+CGPSOUT	GPS NMEA data output control	Set to 255, GSM_DEBUG is selected as data output pin
AT+CGPSSTATUS	Check GPS status	
AT+CGPSIPR	Set GPS Baud rate	115200

Table 6: GPS command descriptions

(For more detailed information about AT commands, please refer to SIM908_AT+Command+Manual_V1.01)

6. GPRS debugging

6.1 Selecting GSM serial control port.

Connect D2M to GND via a jumper wire, and keep D3M suspended, to select GSM serial control port.

① Configure virtual server on local PC. Virtual server defines the mapping relationships between WAN service port and LAN servers. Any access to this WAN service port will be retargeted to corresponding local network server which is assigned by IP address (For more detailed information, please refer to your router manuals).

● Set port number: 12345 (it can be set to any number but existing port number. In this example, it is set to 12345).

● Set PC intranet IP address (To obtain the intranet IP address of your PC, you can run a CMD command on your PC to enter MS-DOS (Win XP) or Command Prompt (Win 7 or higher version OS), and input the command ipconfig to check the IPv4 address. In this example, the intranet IP address of PC is 192.168.1.104.

6.2 GPRS configuration

The GPRS configuration can be performed by sending out following commands sequentially.

Commands	AT command descriptions
AT+CSQ	Signal quality report
AT+CSTT="CMNET"	Set wireless access point to CMNET
AT+CIICR	Bring up wireless connection with GPRS or CSD
AT+CIFSR	Get local IP address
AT+CDNSGIP=www.sim.com	Query the IP address of the given domain name

Table 7: GPRS command configuration

6.3   Checking WAN IP address (hereafter "Extranet IP address")

The extranet IP address can be obtained by entering the relative IP address into the search engine directly, or inquiring to your network service provider. In this example, the WAN IP address is 222.125.175.28. Then, send out the following commands sequentially, to perform GPRS debugging testing.

Commands	AT command descriptions
AT+CIPSTART="TCP"," 222.125.175.28","12345"	The extranet IP address should be set according to actual condition. In this example, the extranet IP address is 222.125.175.28, and port number is 12345
AT+CIPSEND	Send SMS message. After receiving the symbol >, the message ABCDEF(*)can be sent out
1A	This is a terminator. Before sending it out, you should check the option Send As Hex
AT+CIPCLOSE	Close TCP or UDP connection
AT+CIPSHUT	Deactivate GPRS PDP context
(*)After sending the message ABCDEF, you should check the option Send As Hex, and then send the command 1A to indicate the message to be sent is end. In this case, the message you input will be delivered actually.	

Table 8: GPRS debugging commands

(For more detailed information about AT commands, please refer to SIM908_AT+Command+Manual_V1.01)
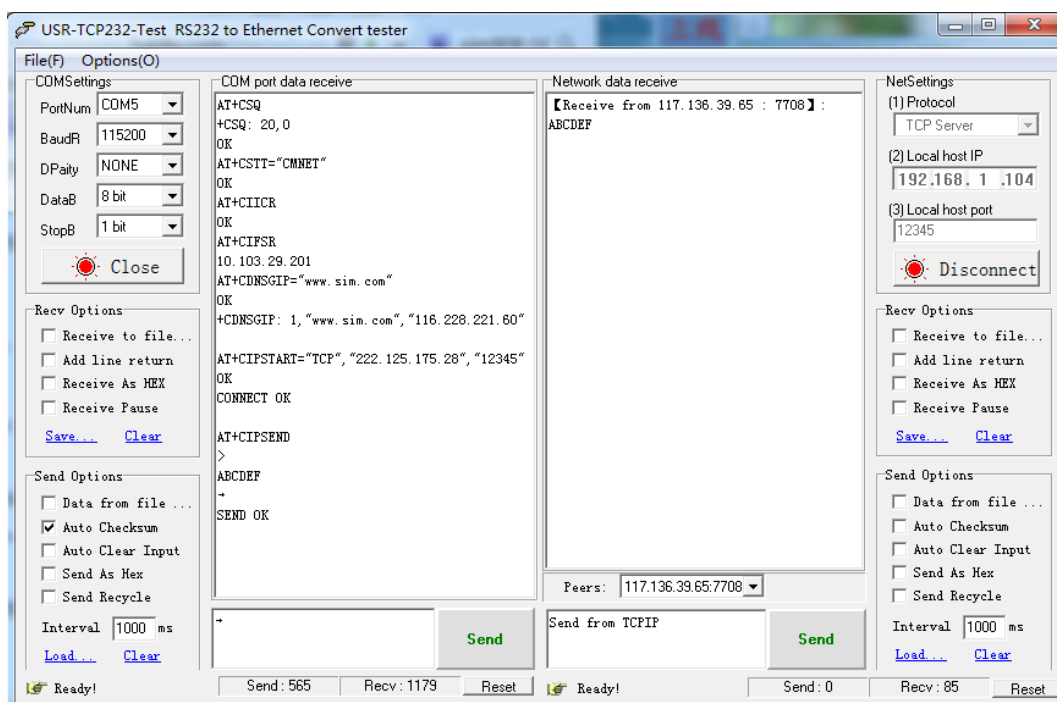
The running state of GPRS is shown as Figure 9.

Figure 9: GPRS running state