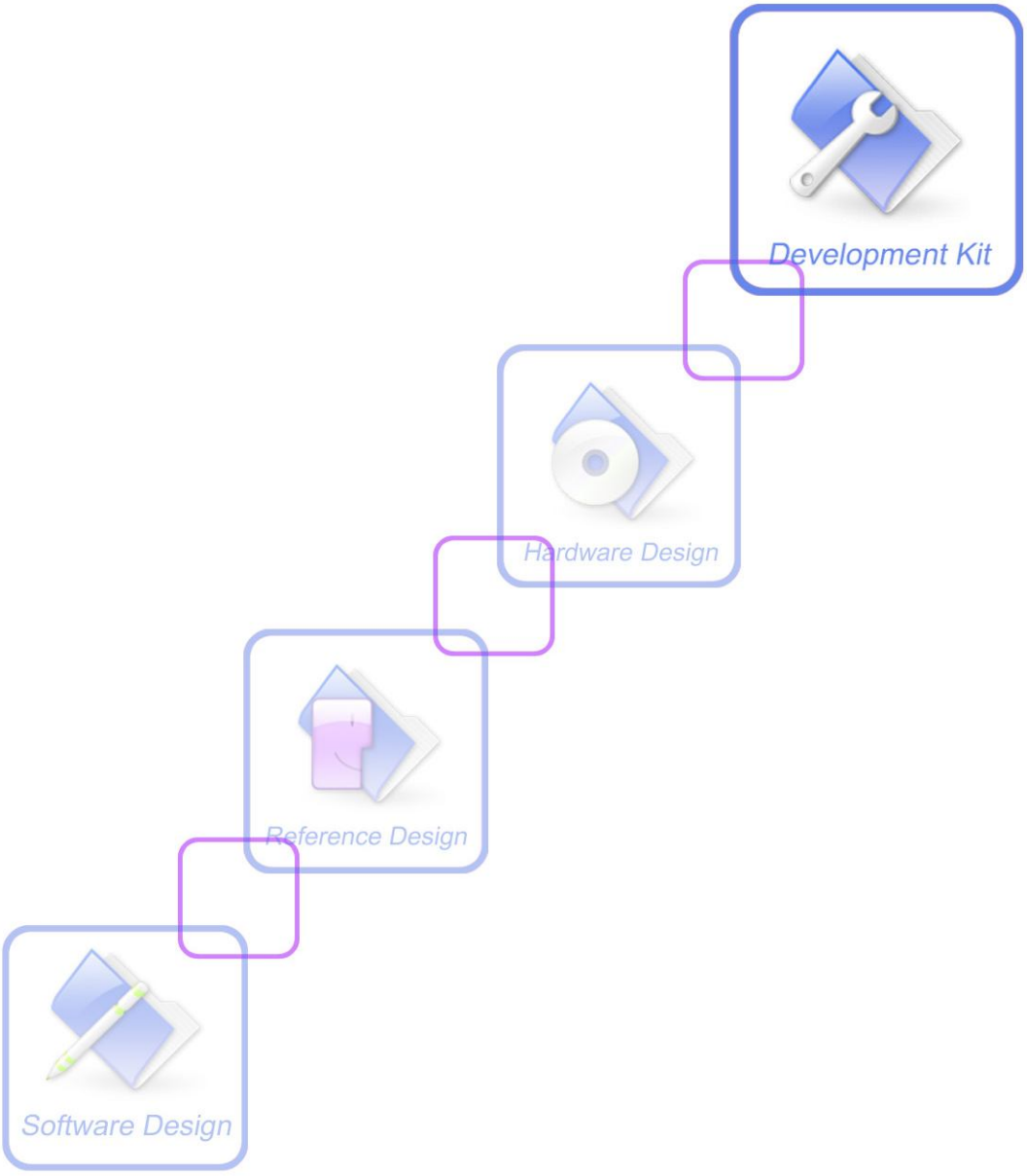
SIM928&SIM928A&SIM968-E VB kit_User Guide_V1.00



Document Title:	SIM928-EVB kit User Guide
Version:	1.00
Date:	2013-04-08
Status:	Release
Document Control ID:	SIM928&SIM928A&SIM968-EVB kit_User Guide_V1.00

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Version History

Data	Version	Description of change	Author
2013-04-08	1.00	Origin	Shengwu.Sun

SCOPE

This document describes how to use SIM928-EVB to do test; user can get useful info about the SIM928 EVB quickly through this document.

This document is subject to change without notice at any time.

1. EVB Overview

SIM928-EVB can work with the SIM928, SIM928A and SIM968 modules.

2. SIM928 EVB Introduction

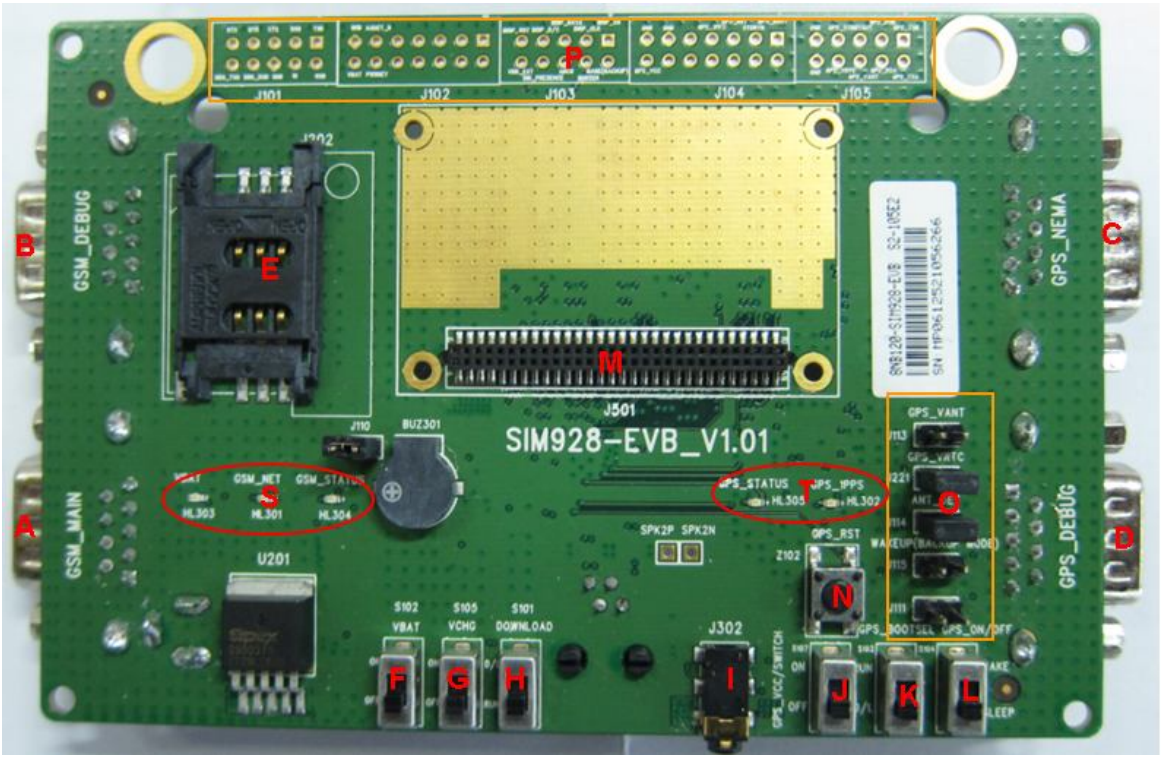

Figure 1: EVB TOP view

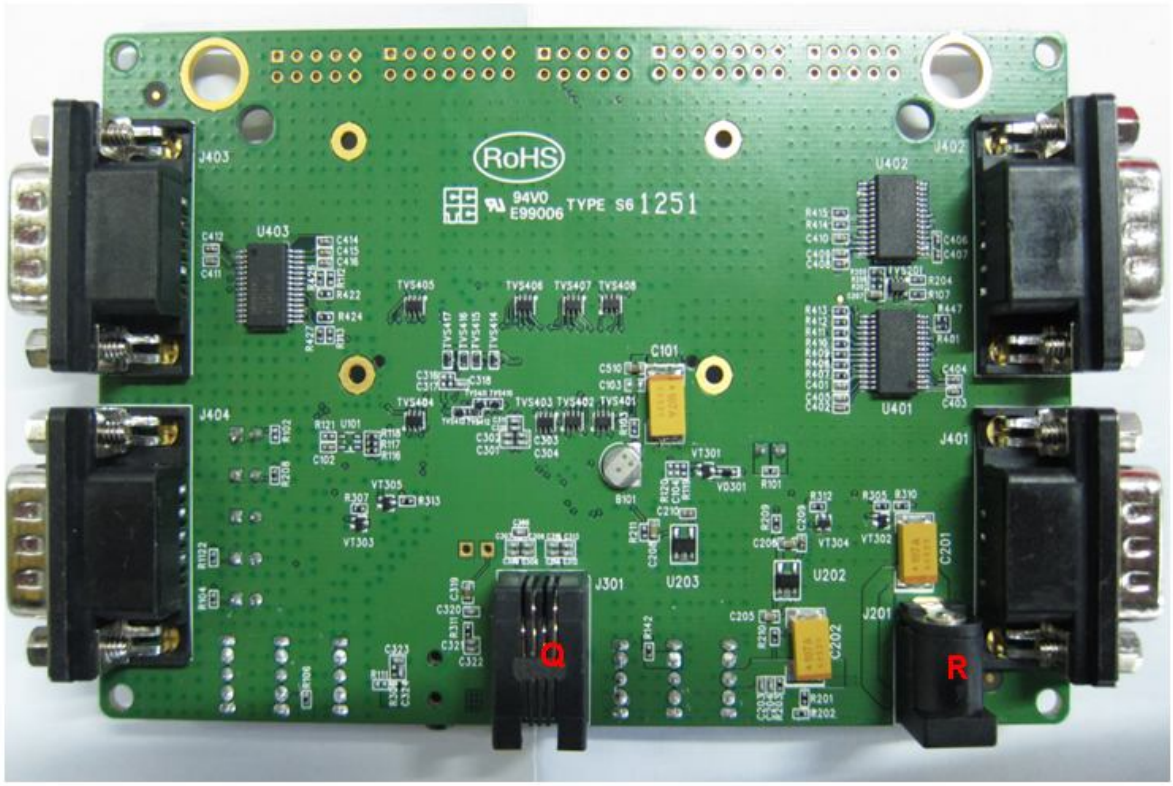

Figure 2: EVB BOTTOM view

A: GSM MAIN serial port
B: GSM DEBUG serial port
C: GNSS NMEA serial port
D: Reserved
E: SIM card holder
F: GSM Power switch
G: Charge switch
H: Download and power on GSM switch
I: Headset jack
J: GNSS Power switch
K: Reserved
L: Reserved
M: Module-TE interface (The interface compatible with SIM928-TE , SIM928A-TE and SIM968-TE)
N: Reserved
O: The jumper for GNSS
P: Test point
Q: Headphones jack
R: DC jack
S: LED indicator for GSM
T: LED indicator for GNSS

3. EVB Accessory

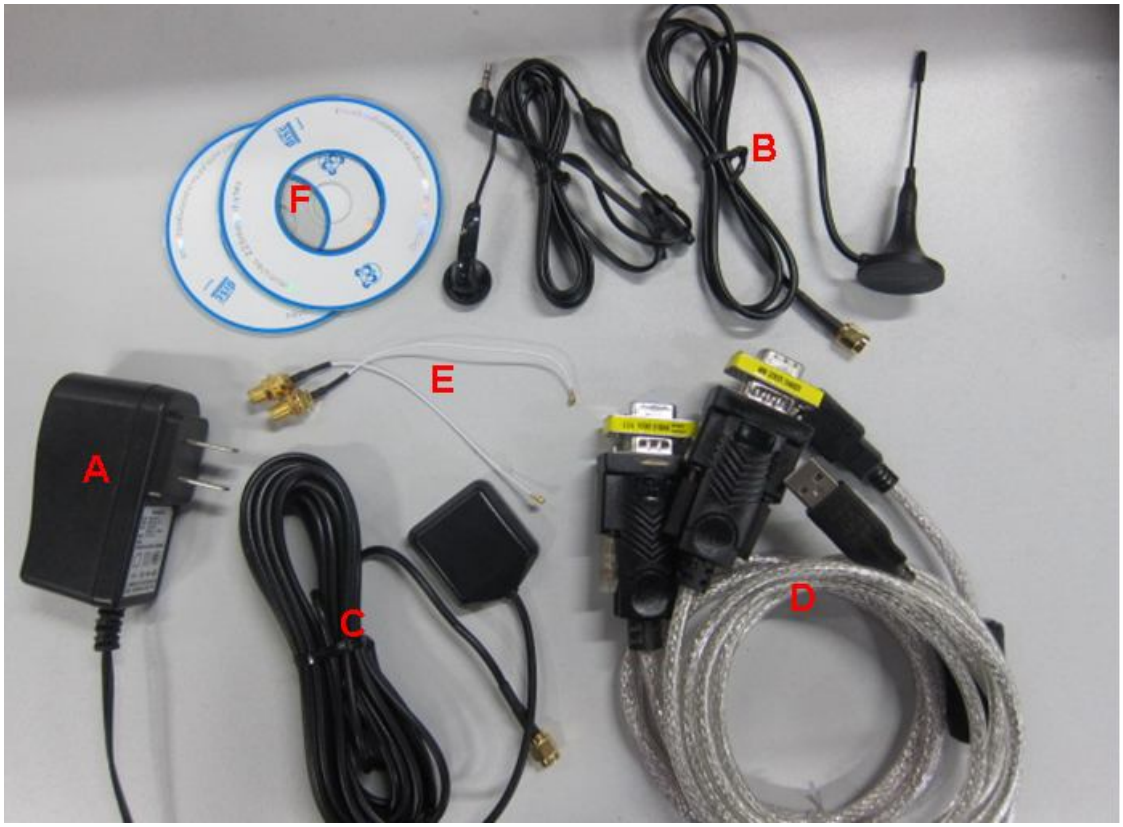

Figure 3: EVB Accessory

A: 5V DC adapter
B: GSM Antenna
C: GNSS Antenna
D: USB to Serial Port cable
E : Antenna cable
F : CD-ROM drive for USB to Serial Port cable

4. Accessory Interface

4.1 Power Interface

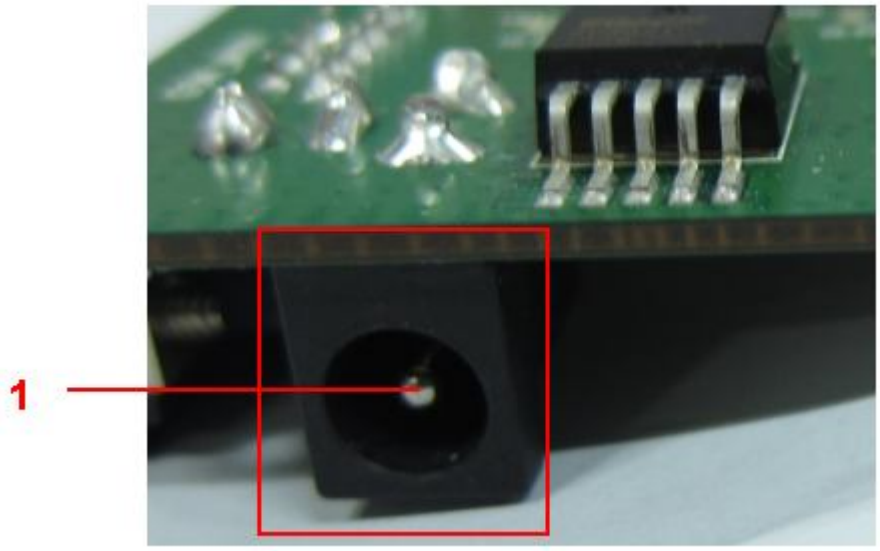

Figure 4: Power Interface

Table 1: Power Interface

Pin	Signal	I/O	Description
1	Adapter input	I	5V/2.0A DC source input

4.2 Audio Interface

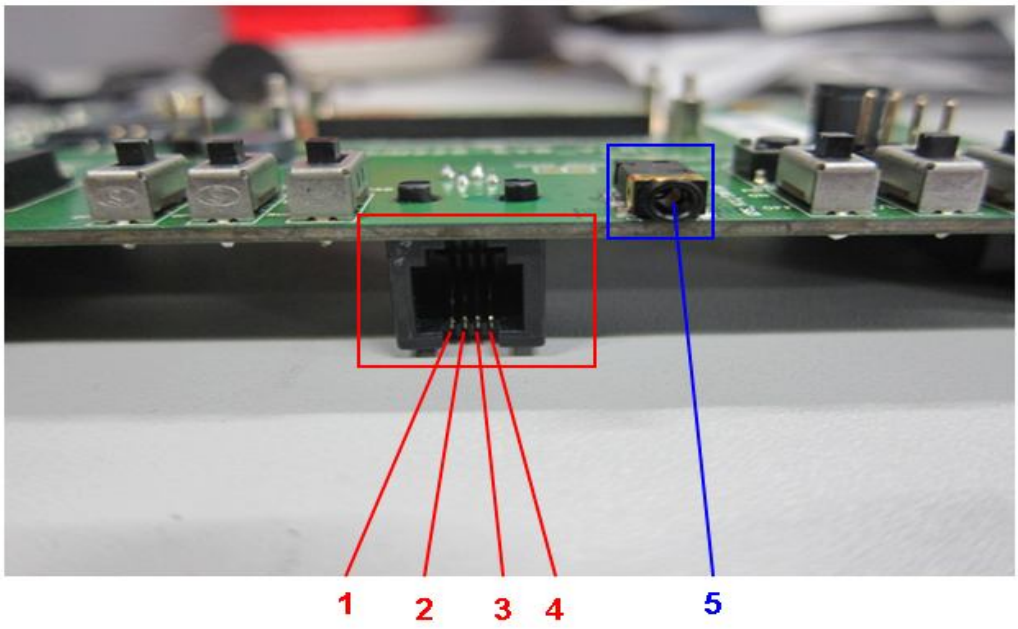

Figure 5: Audio Interface

Table 2:Headset Interface

Pin	Signal	I/O	Description
1	MIC1P	I	Positive microphone input
2	SPK1P	O	Positive receiver output
3	MIC1N	I	Negative microphone input
4	SPK1N	O	Negative receiver output

Table 3:Earphone Interface:

Pin	Signal	Input/Output	Description
5	MIC2P&SPK2P	I/O	Auxiliary audio input/output

4.3 SIM card interface

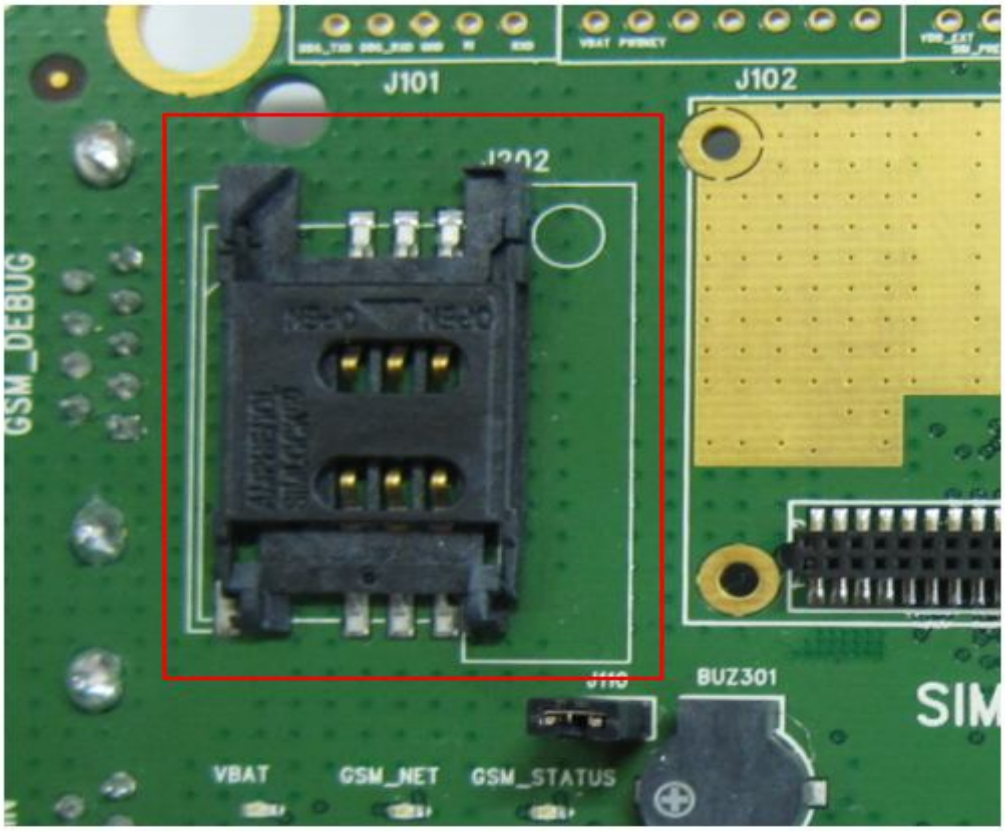

Figure 6: SIM card interface

4.4 Antenna Interface

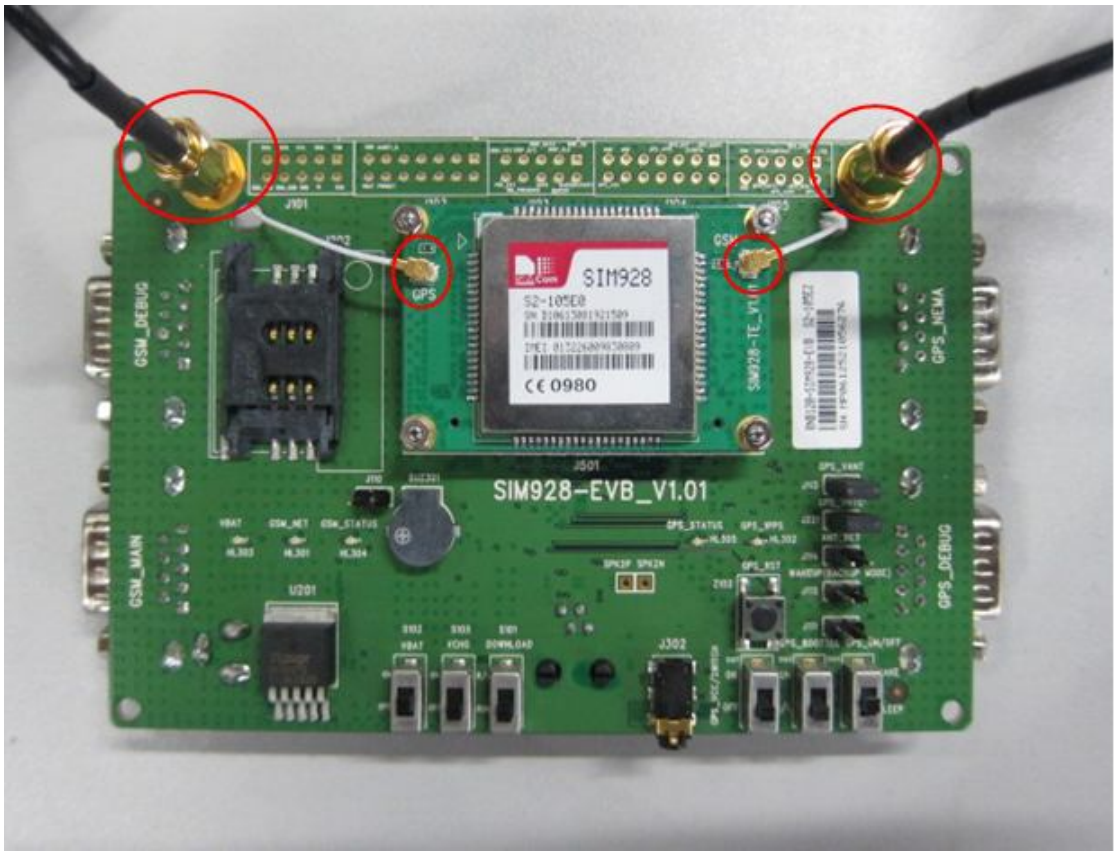

Figure 7: Antenna Interface

4.5 Serial port Interface

4.5.1 GSM part

Figure 8: GSM Serial Ports

Serial Port 1——GSM MAIN Interface
Serial Port 2——GSM DEBUG Interface

Table 4:Main Interface:

Pin	Signal	I/O	Description
1	DCD	O	Data carrier detection
2	TXD	O	Transmit data
3	RXD	I	Receive data
4	DTR	I	Data Terminal Ready
5	GND		GND
7	RTS	I	Request to Send
8	CTS	O	Clear to Send
9	RI	O	Ring Indicator

Table 5:Debug Interface:

Pin	Signal	I/O	Description
2	DEBUG_TX	O	Transmit data
3	DEBUG_RX	I	Receive data
5	GND		GND

4.5.2 GNSS Part

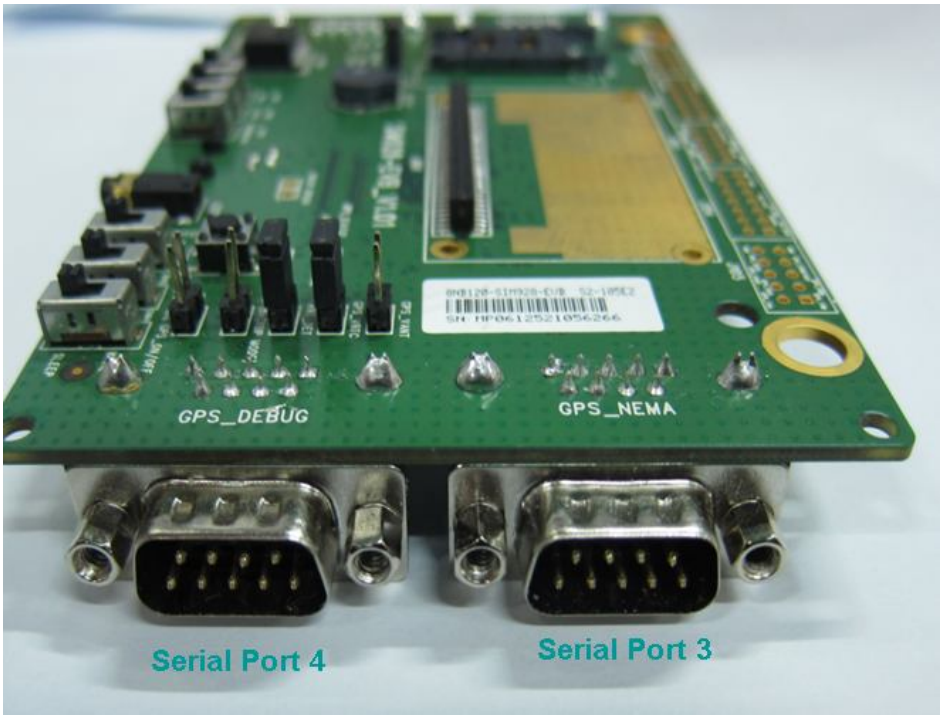

Figure 9: GNSS Serial Ports

Serial Port 3——GNSS NMEA Interface

Table 6: GNSS NMEA Interface

Pin	Signal	I/O	Description
2	GNSS_TX	O	Transmit data
3	GNSS_RX	I	Receive data
5	GND		GND

4.6 LED Indicator

4.6.1 GSM Part

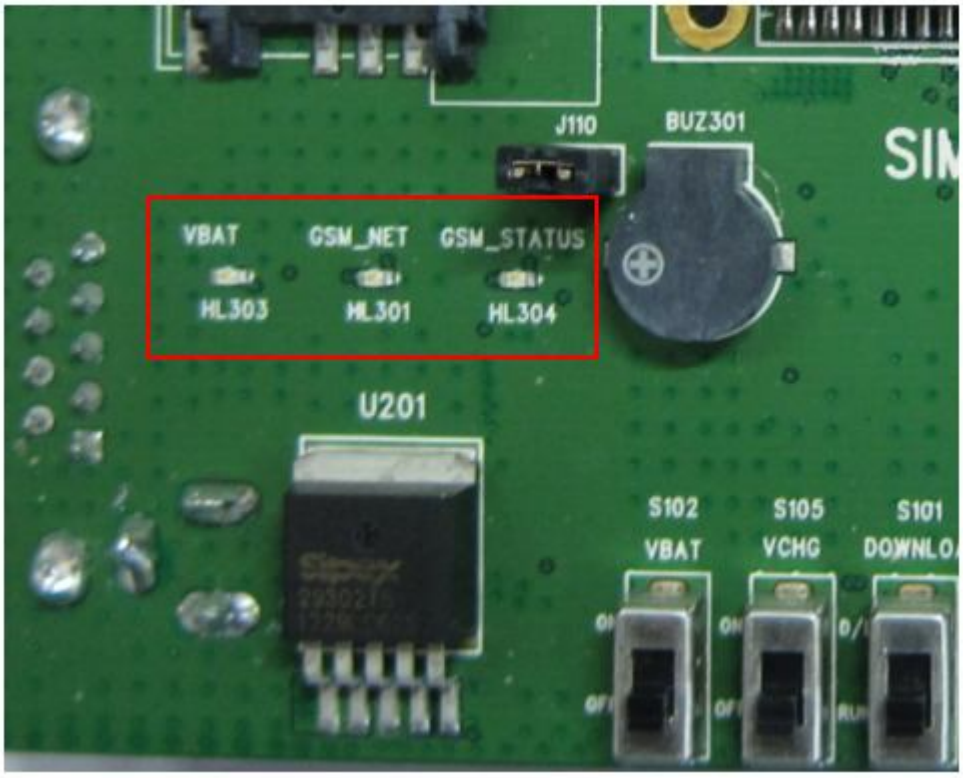

Figure 10: GSM LED Indicator

Table 7:Working state of GSM LED

Name	Description	STATUS
HL303	Power ON/OFF indicator	Bright：EVB Power ON; Extinct: EVB Power OFF
HL304	GSM status indicator	Bright: GSM system runs normally Extinct: System is powered down
HL301	GSM_NET status indicator	Blinking at a certain frequency according various GSM net status

4.6.2 GNSS Part

Figure 11: GNSS LED Indicator

Table 8:Working state of GNSS LED

Name	Description	STATUS
HL302	1PPS signal indicator	Bright：GNSS system is fixed succeed ; Extinct: GNSS system is not fixed ;
HL305	Module status indicator	Bright: GNSS system runs normally Extinct: GNSS System is powered down

5. Test Interface

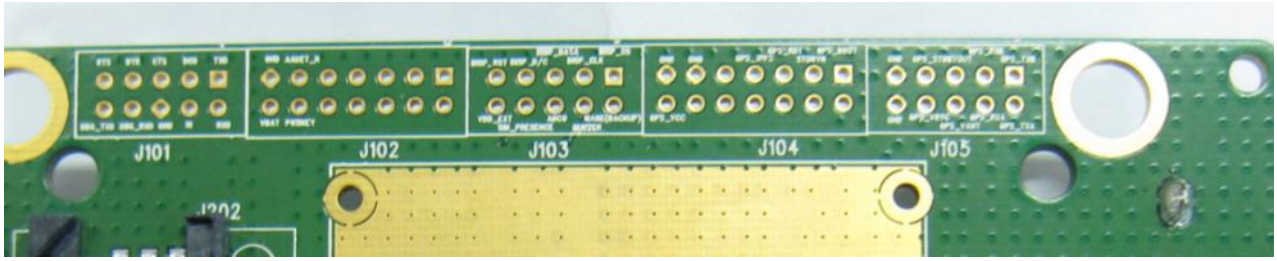

Figure 12: Test interface overview

5.1 J101 J102 J103 J104 J105 test interface

Table 9:J101 Interface

Pin	Signal	I/O	Description
1	TXD	O	Transmit GSM data
2	RXD	I	Receive GSM data
3	DCD	O	Data carrier detection
4	RI	O	Ring Indicator
5	CTS	O	Clear to Send
6	GND	/	GND
7	DTR	I	Data Terminal Ready
8	DEBUG_RXD	I	Receive GSM data
9	RTS	I	Request to Send
10	DEBUG_TXD	O	Transmit GSM data

Table 10:J102 Interface

Pin	Signal	I/O	Description
1,2,3,4,5,6,7, 8,9,10	NC		
11	AADET_N	I	GNSS Antenna detect
12	PWKEY	I	POWER KEY IN for GSM part
13	GND	/	GND
14	VBAT	I	Power for GSM part

Table 11:J103 Interface

Pin	Signal	I/O	Description
1	DISP_CS	O	Display select output
2	WAKE(BACKUP)	I	GNSS wakeup from backup mode
3	DISP_CLK	O	Display clock output
4	BUZZER	O	PWM output
5	DISP_DATA	O	Display data
6	ADC0	I	ADC input
7	DISP_D/C	O	Display data or address select
8	SIM_PRESENCE	I	SIM detect input
9	DISP_RST	I	DISP reset input
10	VDD_EXT	O	POWER

Table 12:J104 Interface

Pin	Signal	I/O	Description
1	GNSS_BOOT	I	Reserved
2,4,6, 8,9,10,12	NC		
3	STDBYN	I	Reserved
5	GNSS_RST	I	Reserved
7	GNSS_1PPS	O	GNSS 1PPS output
11,13	GND	/	GND

Table 13:J105 Interface

Pin	Signal	I/O	Description
1	GNSS_TXB	O	Reserved GNSS data
2	GNSS_TXA	O	Transmit GNSS data
3	GNSS_RXB	I	Reserved
4	GNSS_RXA	I	Receive GNSS data
5,7	GNSS_STDBYOUT	O	GNSS power output for antenna
6	GNSS_VANT	I	GNSS power input for antenna
8	GNSS_VRTC	I	Power input for GNSS RTC
9,10	GND		GND

6. EVB and Accessory

The EVB and its accessory are equipped as the Figure 13

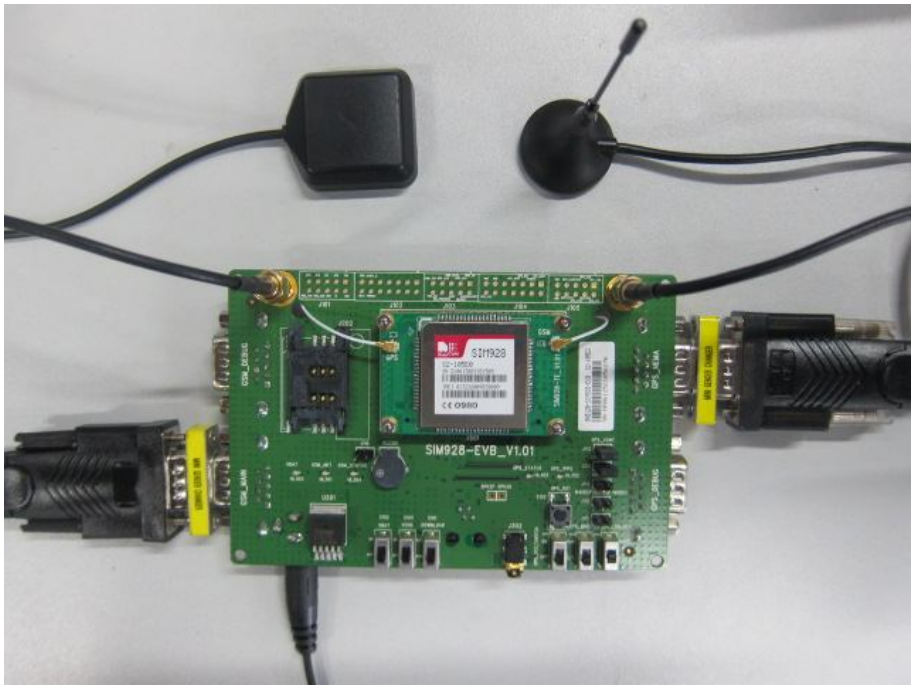

Figure 13: EVB and Accessory

7. Illustration

7.1 GSM Part

7.1.1 Power on GSM Part:

(1) Connect the Module-TE to the 60-pin connector on SIM928 EVB, plug in 5V DC adapter, switch S102 to "**ON**" state; keep S105 at "**OFF**" state,

(2) Switch S101 to "**ON**" state for more than 1 second and then switch to "**OFF**" state, the GSM part will be powered on.

After the GSM part is powered on, the light HL304 will bright and the light HL301 will flash at a certain frequency. Through the state of LED, users can judge registering status of the module. For detailed description, please refer to the document [1].

Note: customers should equip four sets of screws for better grounding to achieve a better performance.

7.1.2 Registering Network and making a call

(1) Connect the antenna to the Module-TE, insert SIM card and earphone.

(2) Connect the serial port cable to the GSM MAIN serial port; Open the Hyper Terminal (AT command windows) on user's computer.

(3) Check the serial port number:

My computer (right click) →Manage → Device Manager → Ports (COM&LPT)

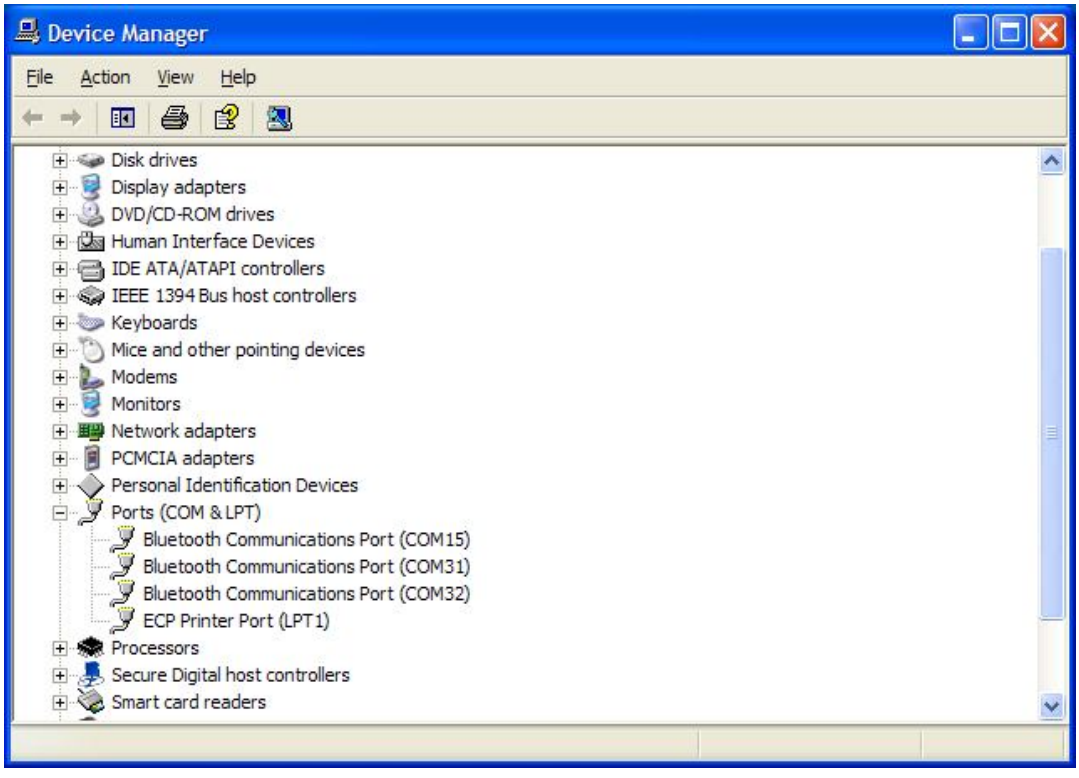

Figure 14: Check the serial port number

(4) Use the Hyper Terminal to call the module as following:

a. Open the HyperTerminal

START→ All Programs → Accessory →Communication → HyperTerminal.

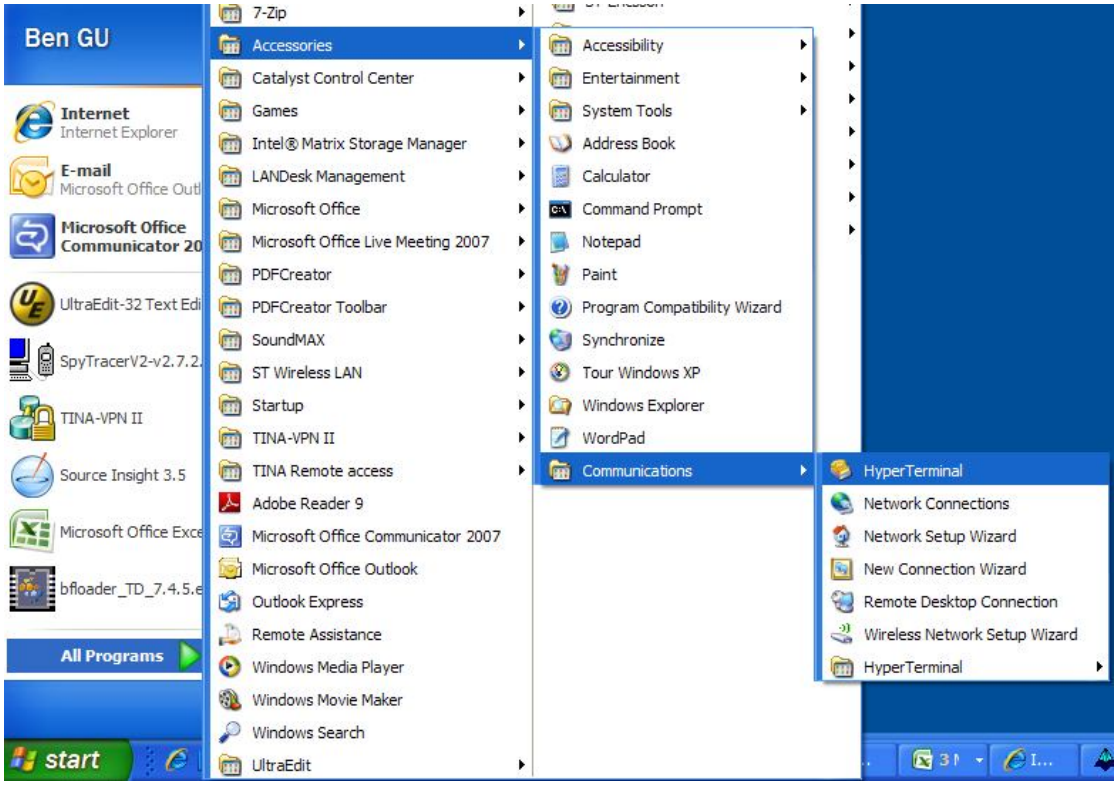

Figure 15: Open the HyperTerminal

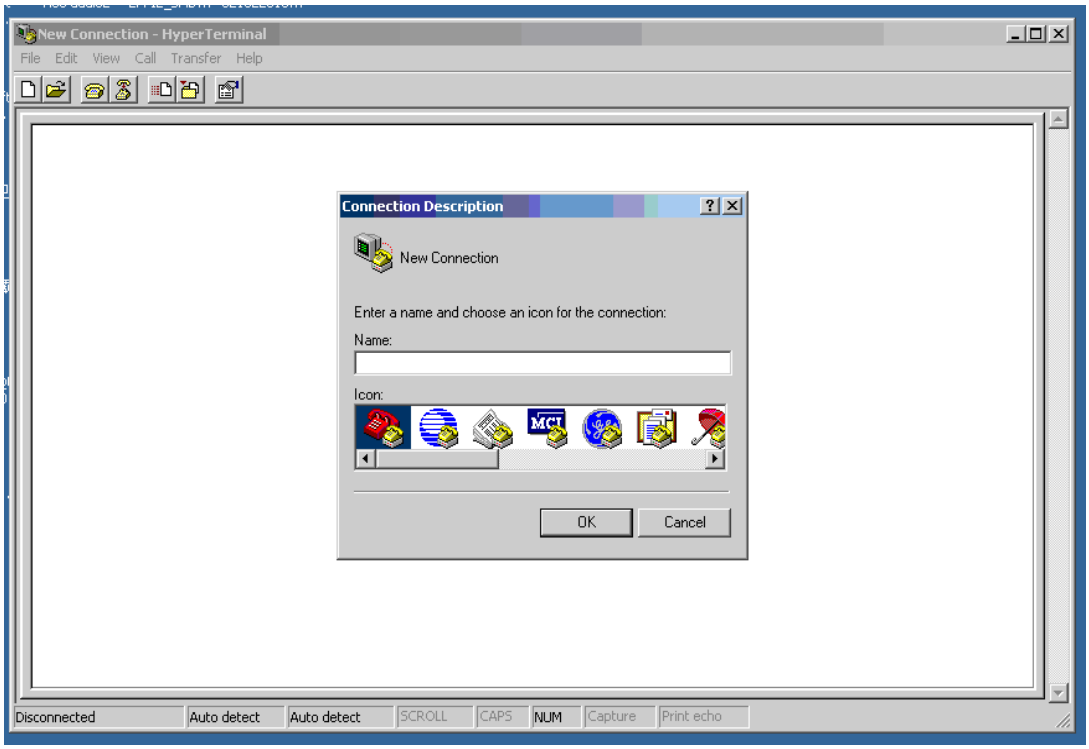

Figure 16: New Connection

(5) Configure the serial port number

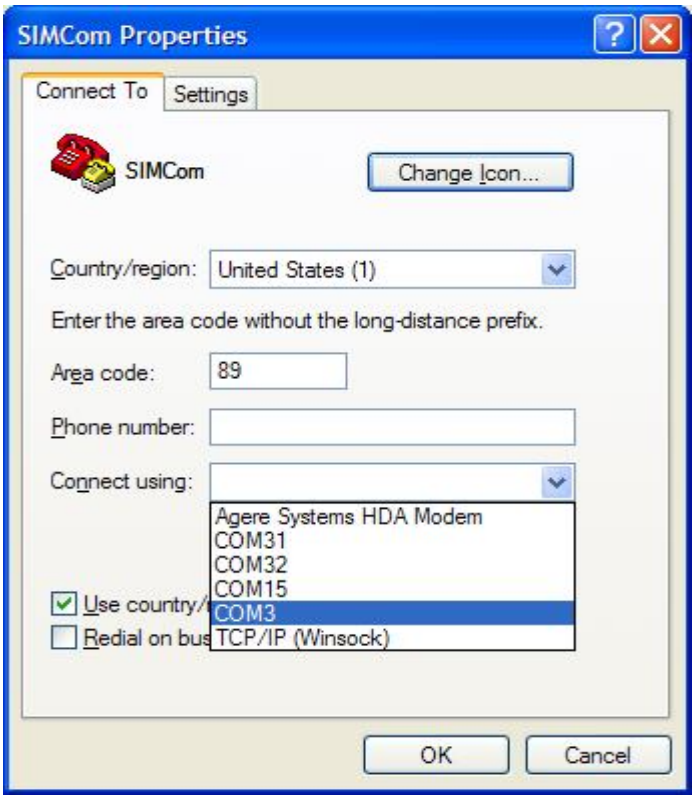

Figure 17: Configure the serial port number

(6) Set the baud rate and flow control

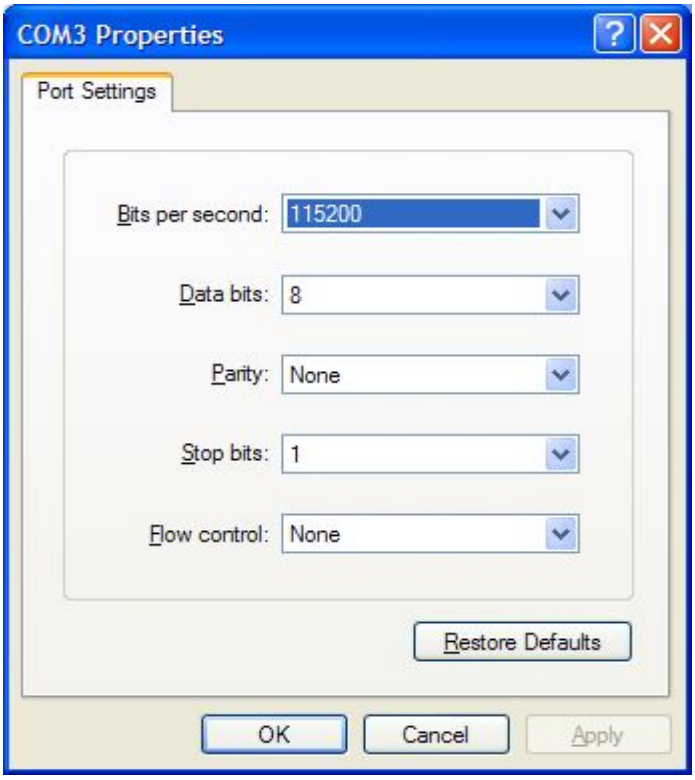

Figure 18: Set the baud rate and flow control

User can set the baud rate from 1200bps to 115200bps, and the flow control set to "None"

(7)Act on the step of running which mentioned above, power on the module, typing the AT command in the HyperTerminal, and then the module will execute its corresponding function.

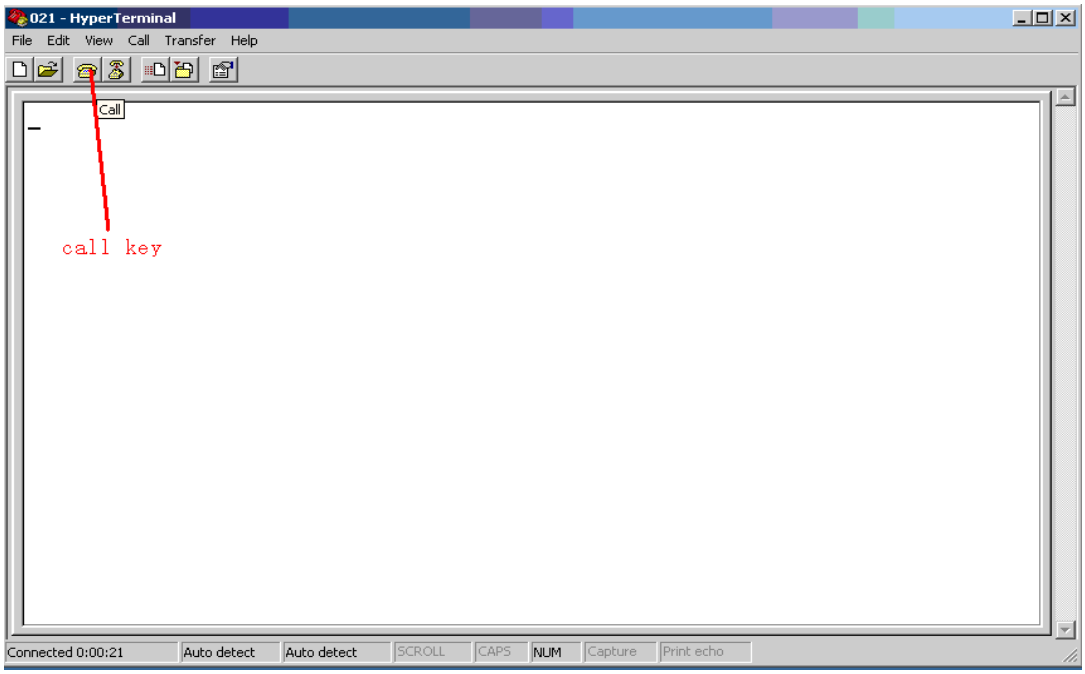

Figure 19: Connect the module

Click the "**call**" icon.

b. Typing the AT command. When module is powered on with autobauding enabled, user must firstly send "AT" to synchronize the baud rate. The default setting of the module is autobauding.

c. Use AT command to make a call.

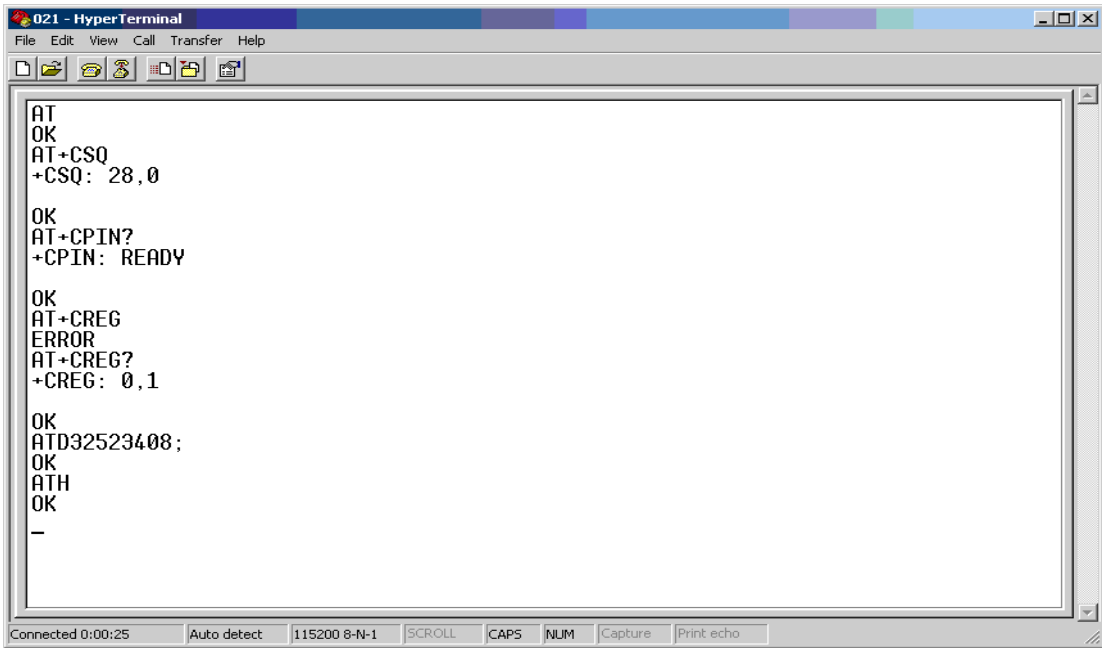

Figure 20: AT command

7.1.3 GSM Firmware update

Connect the serial port cable to the GSM DEBUG serial port, plug in 5V DC adapter, open the download tool and click the START key, switch the S102 and S101 to "**ON"** state. An example of SIM928 is show as below.

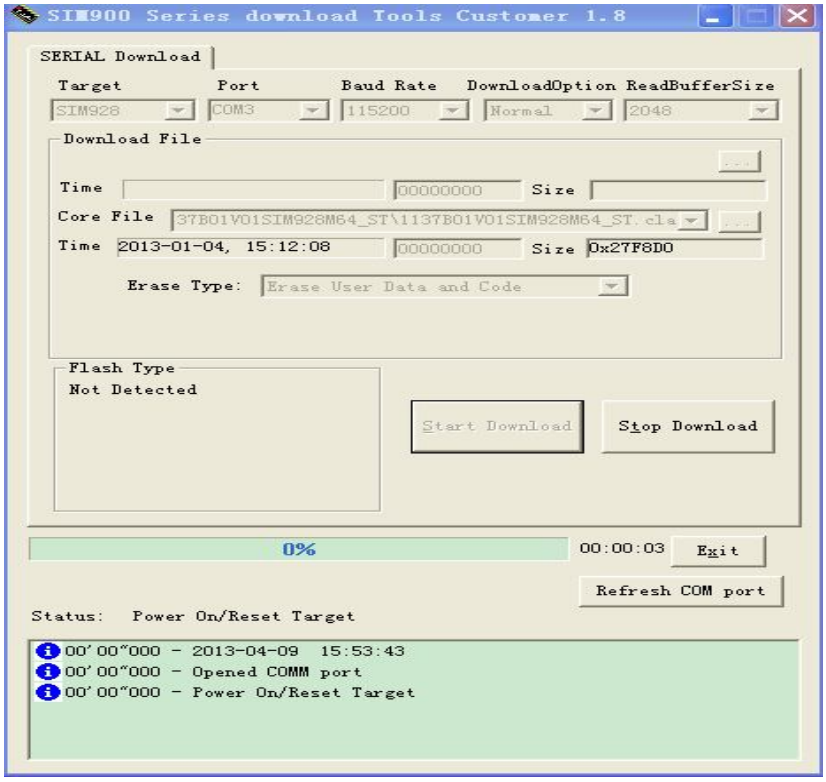

Figure 21:GSM Firmware Update

7.1.4 Turn off

Turn off the module: switch S101 to "**OFF**" state for about 2 seconds, the module will be turned off.

7.1.5 Charging

Connect the Module-TE to the 60pins connector on SIM928 EVB and the external battery to charging interface, which have been provided on the EVB. Insert the direct current source adapter; switch shifter S105 on the OFF state, shifter S105 on the ON state, then the Module will go to the charging state.

7.2 GNSS Part

7.2.1 Power on GNSS part

Connect the Module-TE to the 60-pin connector on SIM928 EVB, plug in 5V DC adapter, switch S102 and 107 to

"**ON**" state; keep S103 and S104 at "**OFF**" state. Then, the GNSS part of the module begins to run.

Users will see the GNSS LED indicator (HL305) on the EVB bright all the time, then users can judge whether the EVB and the GNSS part of the module is running or not.

Notes: There are two types of GNSS antenna:

One is active antenna, if the customer uses the active GNSS antenna in the SIM928-EVB kit to demo GNSS, for providing the power to the active GNSS antenna, it is necessary to short J114 and J221 by jumper.

The other is passive antenna, if the customer wants to use passive GNSS antenna to demo GNSS, there is no need to short J114 by jumper.

7.2.2 SIMCom GNSS Testing Tool

Users can use SIMCom GNSS testing Tool to test the modules, for example cold TTFF and so on.

(1) Connect the serial port line to the GNSS_NMEA serial port

(2) Connect the GNSS antenna to the module using an antenna transmit line

(3) Run the GNSS part of the module as 7.2.1 described

(4) Then users will see the information transmitted by the GNSS_NMEA serial port in our demo tool

7.2.2.1 Port setting

In the testing tool interface, open the "setting" window according to the following path: Module→Properties.

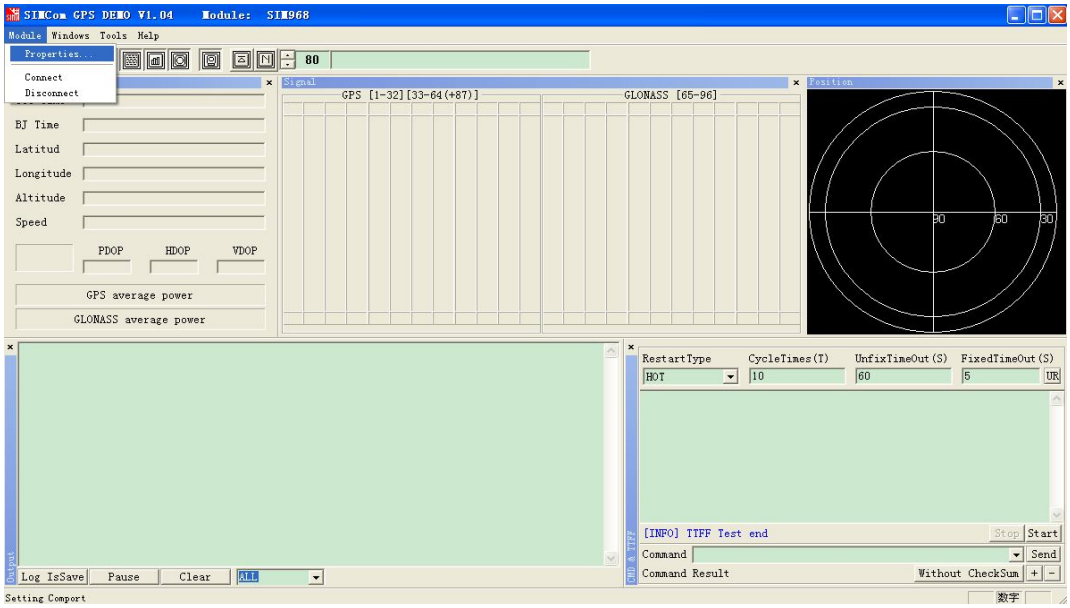

Figure 22: Testing tool interface

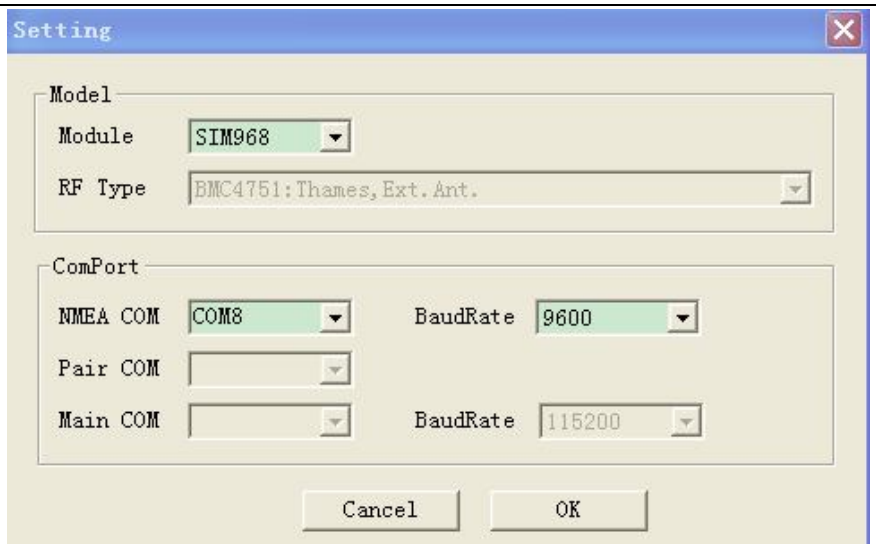

Figure 23: Setting Window

In the "NMEA COM" drop down list choose the corresponding com mentioned before. The baud rate is 115200 or 9600. Then click OK.

7.2.2.2 Click to run

Click the button "Run Comport" to run the module.

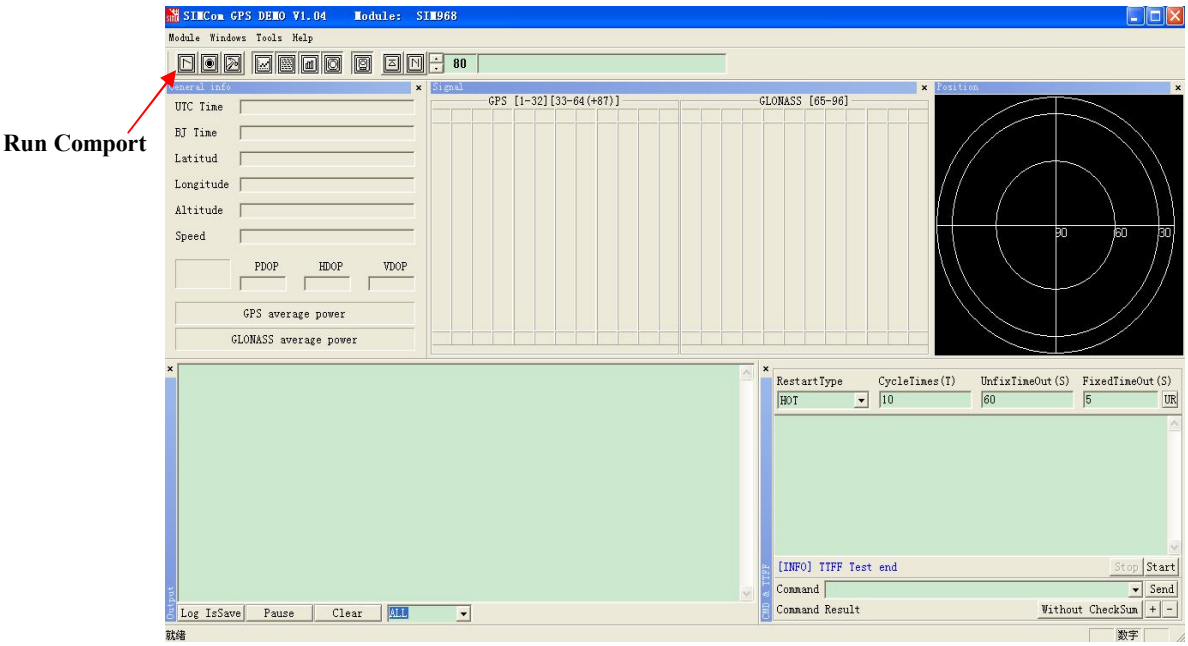

Figure 24: Click to run

The module will run as the following figure:

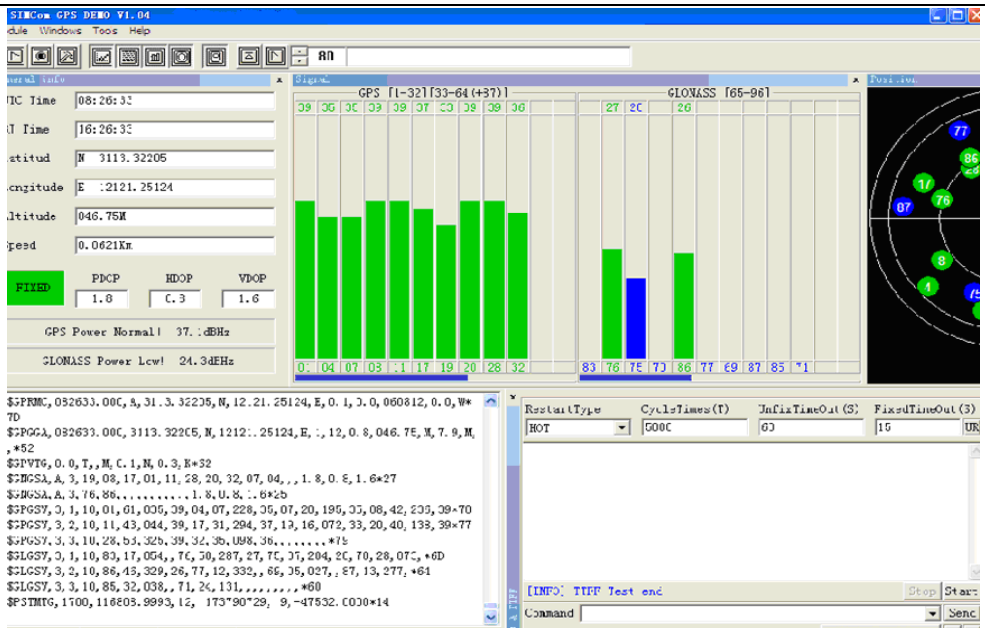

Figure 25: The Module is running

After position has been fixed, the GNSS information can be viewed in the "General info" window. In the "Signal" window, satellite signal has been tracked as showing, GNSS on the left side and GLONASS on the right side. The NEMA message can be accessed on the bottom window, and it will be saved as txt file in the GNSS testing tool directory, with start time as its name.

7.2.2.3 TTFF Test

The test configure should be set before each TTFF test. It is in the right bottom of the tool interface.

The restart type (hot, warm or cold) could be selected in the drop down list of "Restart type". Fill in the next three blank ("Cycletimes" for the testing times, "Unfixtimeout" for the max time limit of each test and "Fixedtimeout" for the time waiting before next TTFF test) and press the start button.

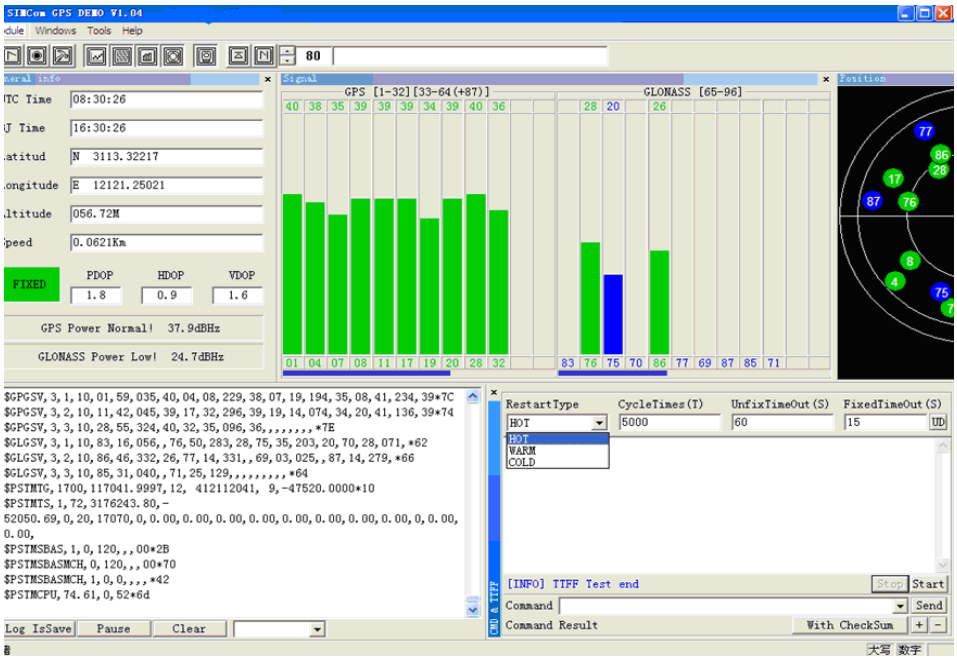

Figure 26: Setting TTFF testing configuration

The result of each TTFF will be shown in the window, each TTFF shorter than the "UnfixTimeOut" is labeled as

Pass.

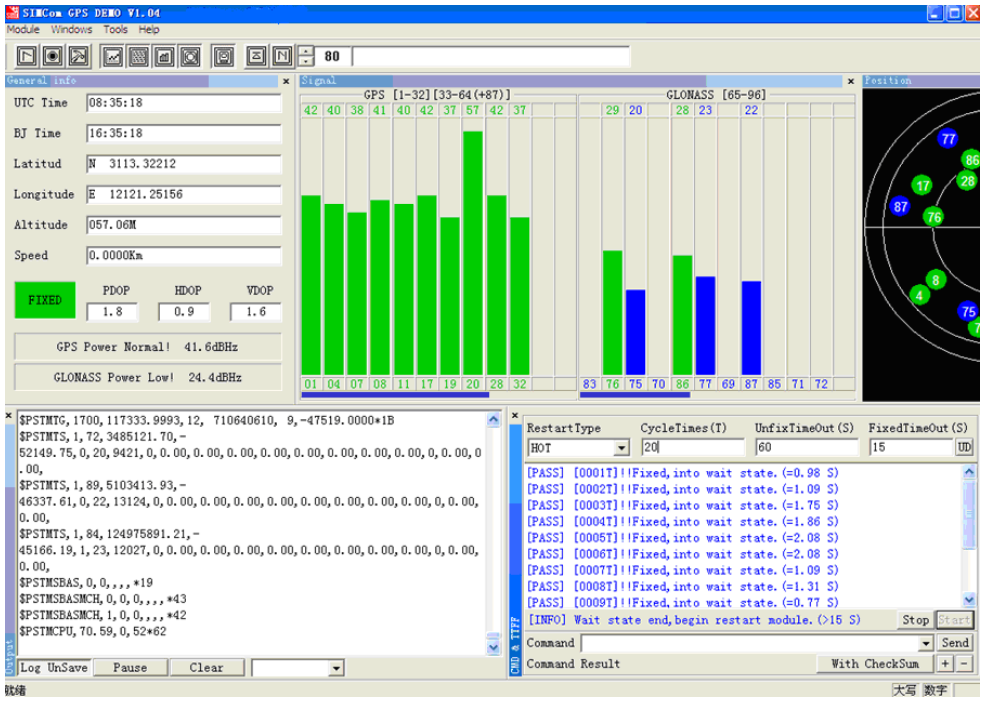

Figure 27: TTFF Test Result

7.2.2.4 PMTK command input

The module supports some kinds of modes that must be enabled by PMTK commands as mentioned in the HD document, GNSS Demo provides an access to send PMTK command to module, as the following figure shows, customer can refer to document[2] to get the detailed information of PMTK list that module supported.

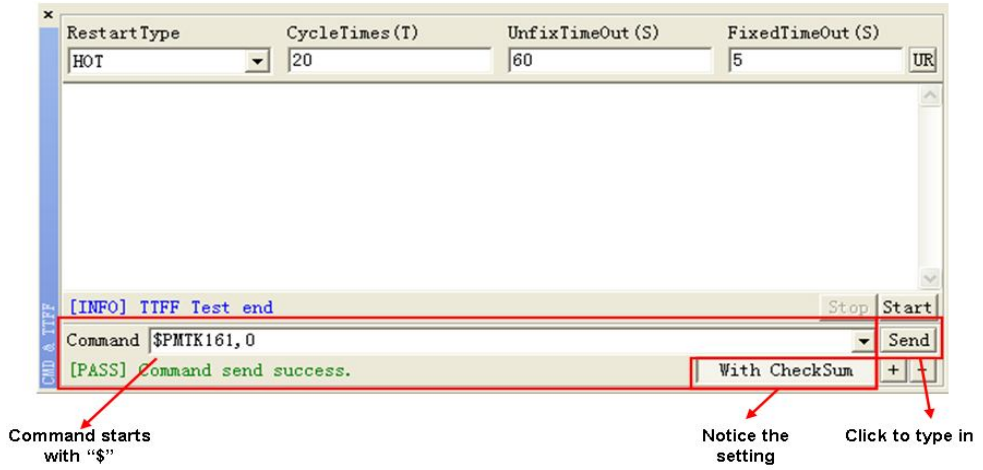

Figure 28: Command window

7.3 GNSS Firmware update

To update the module software, the following operations are needed:

1. Install the tool of "Power Flash".
2. Connect the SIM928-EVB GNSS_NMEA port to PC with Serial Port cable.

3. Plug in 5V DC adapter
4. Switch on S102 and S107

Step1. Customer should open the tool Power Flash, the following figure shows the interface of power flash.

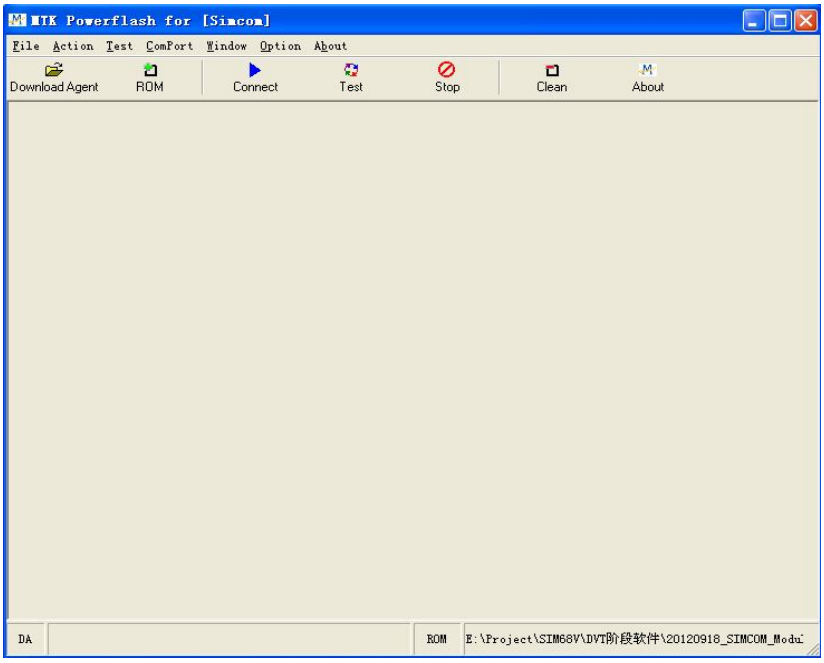

Figure 29: power flash main UI

Step 2.Using the combination key “CTRL+ALT+T” to set the port, the password is “123456”.

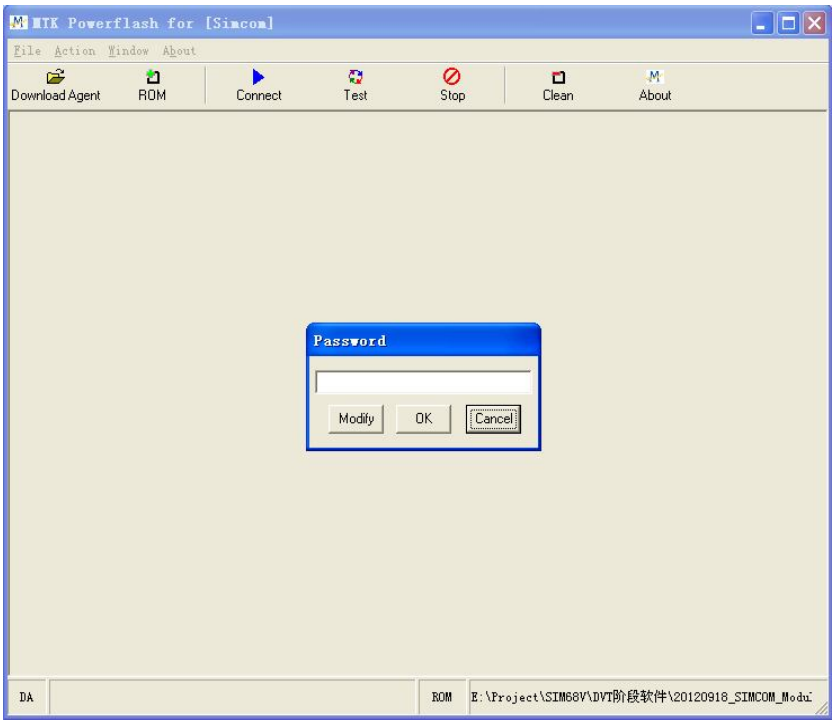

Figure 30: the main UI

Step 4.Setting the number of comport as following figure shows, here is the comport 3.

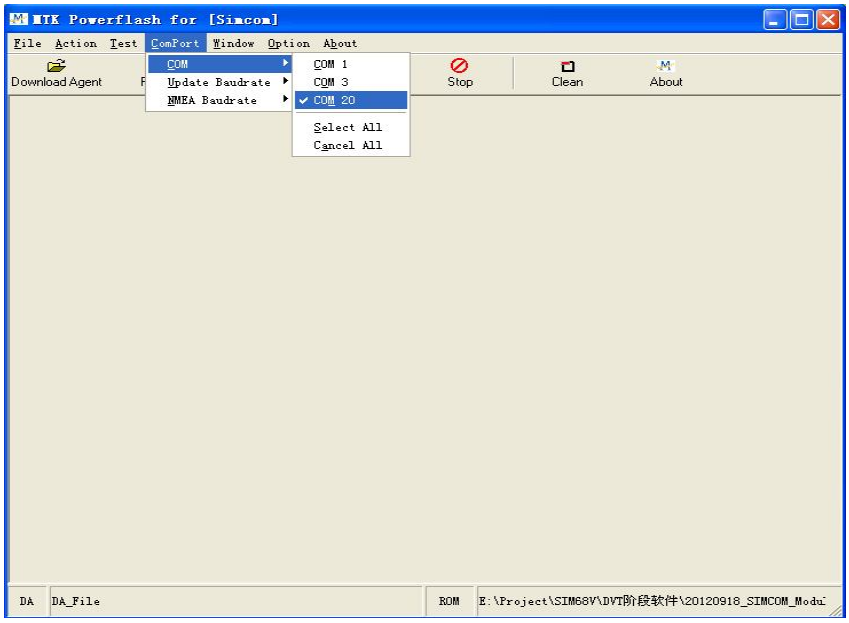

Figure 31: setting port

Step 5.Setting the update baud rate as 115200.

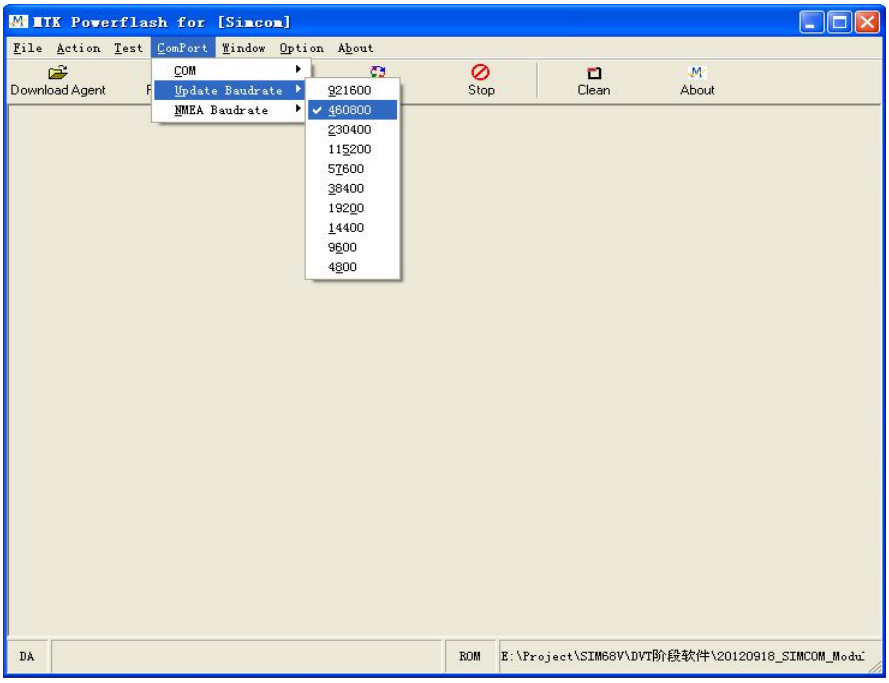

Figure 32: setting baud rate

Step 6.Load files to the power flash.

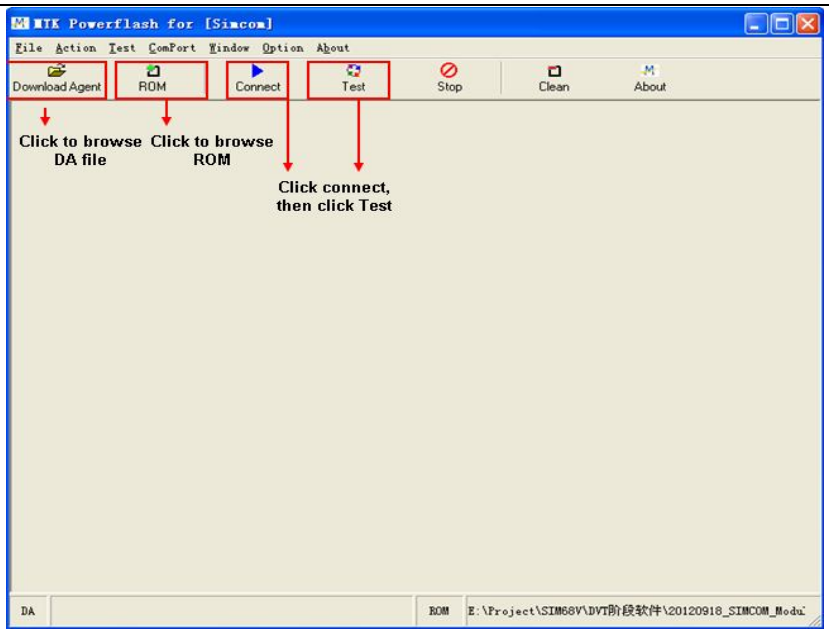

Figure 33: detailed settings

Step 7.The DA file is in downloading proceeding.

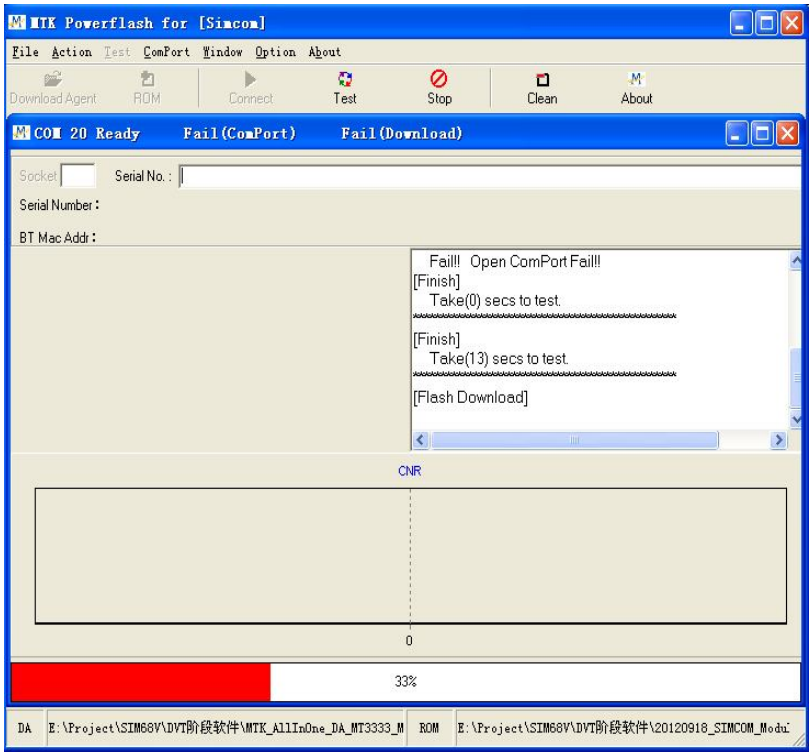

Figure 34: DA file in downloading proceeding

Step 8.The ROM is in downloading proceeding.

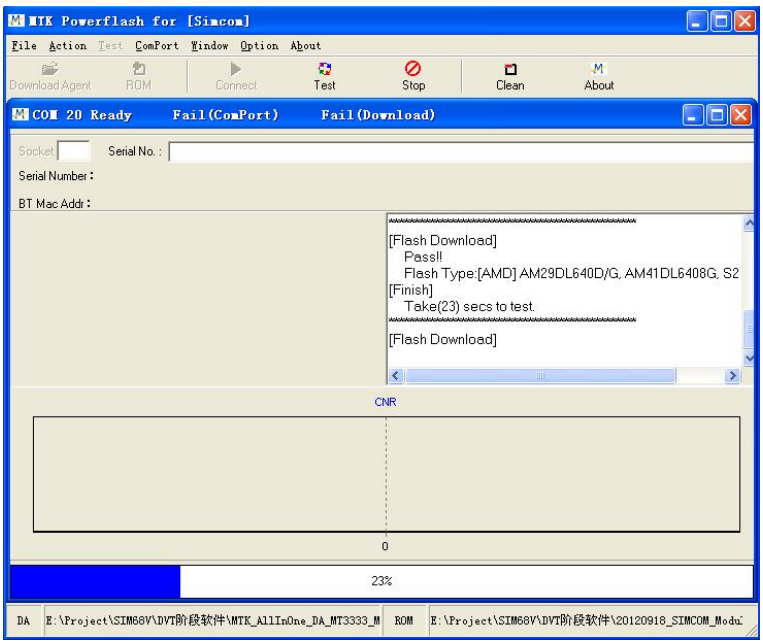

Figure 35: ROM file in downloading proceeding

Step 9.Firmware update succeeds.

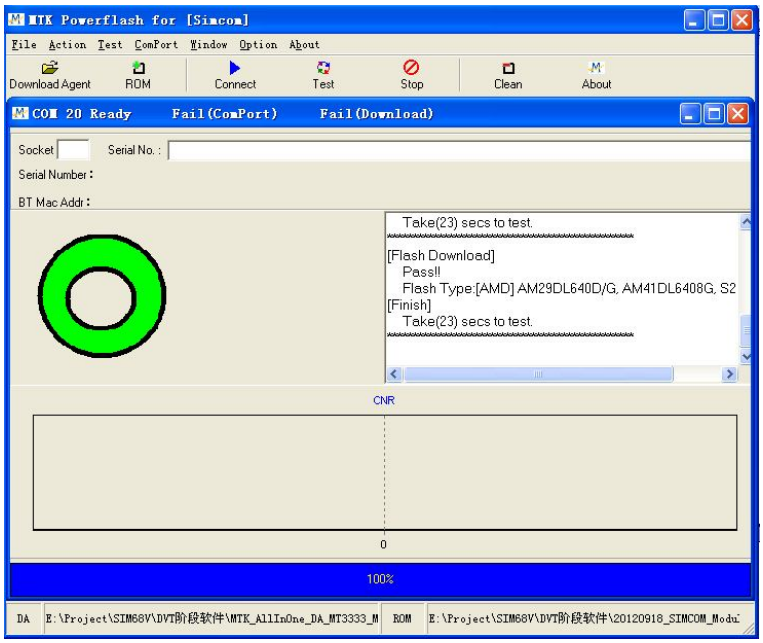

Figure 36: Firmware update succeeds

Appendix

A. Related Documents

Table 14: Related documents

SN	Document name	Remark
[1]	SIM928/SIM928A/SIM968_Hardware Design_V1.00	
[2]	SIM28/68R／68V NMEA Messages SpecificationV1.01	

B. Terms and Abbreviations

Table 15: Terms and Abbreviations

Abbreviation	Description
DC	Direct Current
I/O	Input/Output
LED	Light Emitting Diode
GNSS	Global Positioning System
GSM	Global Standard for Mobile Communications
NMEA	National Marine Electronics Association
UART	Universal Asynchronous Receiver & Transmitter

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