

CM-GPRS User Manual

Shenzhen Coolmay Technology Co., Ltd V20.91



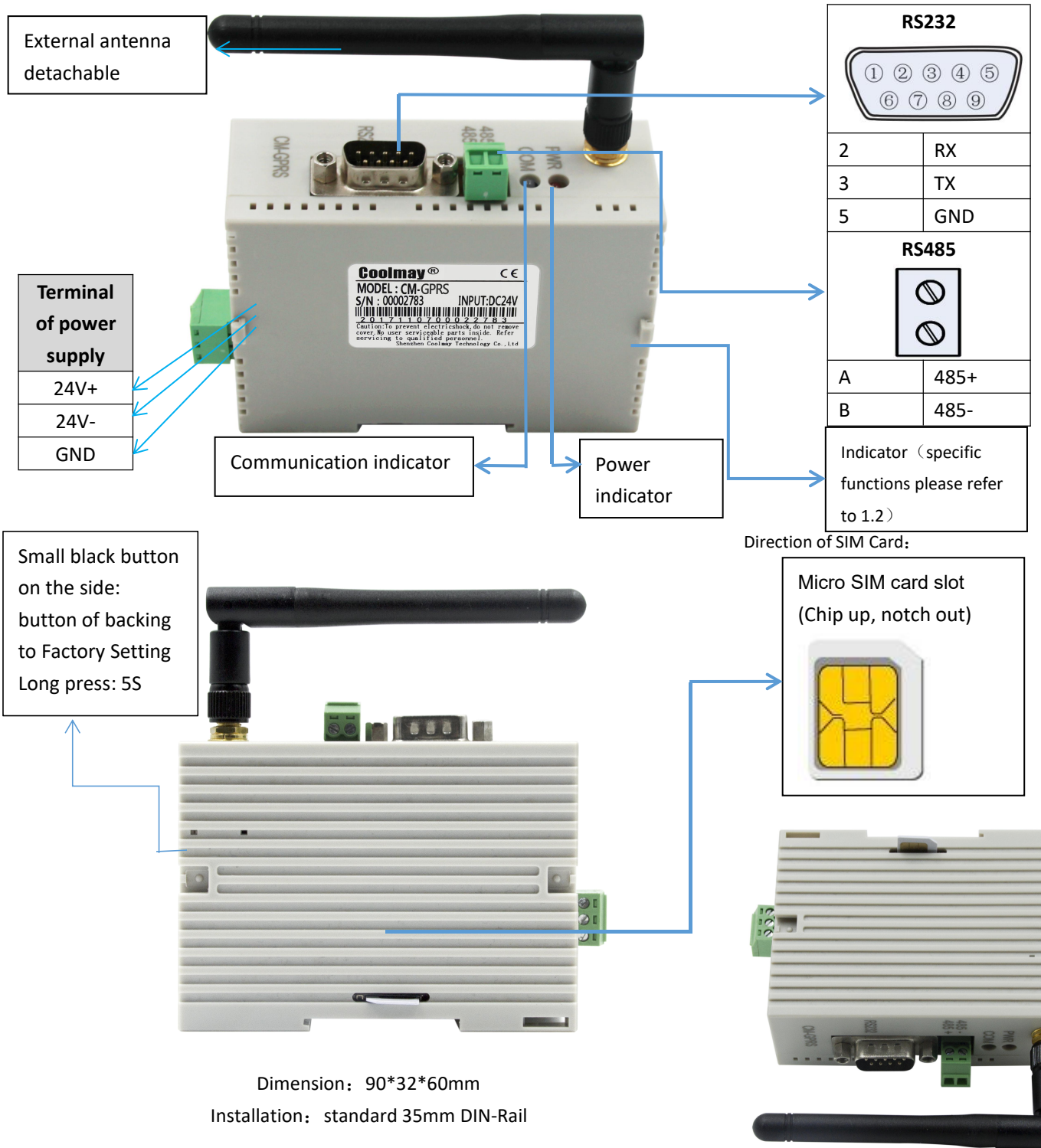
CM-GPRS is a wireless communication module adopts transparent transmission combined with GPRS. It can realize the connection between automatic system and GPRS and GSM used together with Coolmay PLC. Programming、diagnosing、uploading and downloading in a remote distance can be achieved through programming software. Cellphone users can control PLC through SMS messages. CM-GPRS can be particularly applied to distributed remote monitoring system.

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1. Hardware introduction

1.1. Model and appearance



1.2. Indicator state

CM-GPRS has five indicator pins, they are RUN, GPRS, LINKA, LINKB and DATA.

Name	Function	State
RUN	Working normally indicator	Flicker when the module is working well
GPRS	GPRS network connection indicator	Keep on when connect with GPRS
LINKA namely LA	Socket A connection indicator	Keep on when connection built
LINKB namely LB	Socket B connection indicator	Keep on when connection built
DATA namely DT	Data transmission indicator	Flicker when serial port network has data

1.3. Features

1. GSM module can be globally used, support Unicom, GPRS of mobile, SIM card (MICRO type)
2. Industrial module adopted, stable performance, quality assured
3. Support automatically start when without data transmission for a long time
(Set less than 600s to disable automatic restart function)
4. Transparent data transmission
5. Standard industrial port (RS-232/ RS-485)
6. Support long time on-line mode, with bolt redial and heart beat function
7. Support local configuration
8. Support transmit-receive of message, support setting parameters remotely through messages
(Setting parameters by message support password verification, which can prevent illegal users to set parameters or the bother of junk short message), support set parameters from a remote server (this function can be opened and closed).

1.4. Application area

- ◎Industrial controlling, remote sensing, telemetering
- ◎Unattended machine room and warehouse monitoring
- ◎Pipeline network monitoring
- ◎Oil field, coal mine data acquisition and monitoring
- ◎Fault diagnosis of large scale equipment
- ◎Other occasions needs wireless data transmission

1.5. Parameters

	Item	Index
Wireless parameter	Wireless standard	GSM/GPRS/EDGE
	Standard frequency range	850/900/1800/1900MHz Quad Band
	Transmitted power	GSM900 class4(2W)
		DCS1800 class1(1W)
	GPRS Terminal Device	Class Class B
	GPRS Multi-slot Class GPRS	Class 10
	GPRS Coding Schemes	CS1~CS4
Antenna options	I-PEX port	
Hardware parameters	Data interface	UART: 2400bps~921600bps
	Working voltage	DC 5~30V
	Working current	Average: 55mA~90mA Max.: 750mA
	Working temperature	-25℃~85℃
	Store temperature	-40℃~125℃
	Dimension	90×60×32mm
Software parameters	Wireless networking type	GSM/GPRS/EDGE
	Working mode	transparent transmission, message, HTTPD mode
	Setting command	AT+ command structure
	Networking protocol	TCP/UDP/DNS/HTTP
	Max. TCP linking number	2
	User Configuration	Serial port AT command, message AT command

2. Working mode

CM-GPRS has three working mode: Network transmission, HTTPD (not support by CM-GPRS currently), SMS transmission

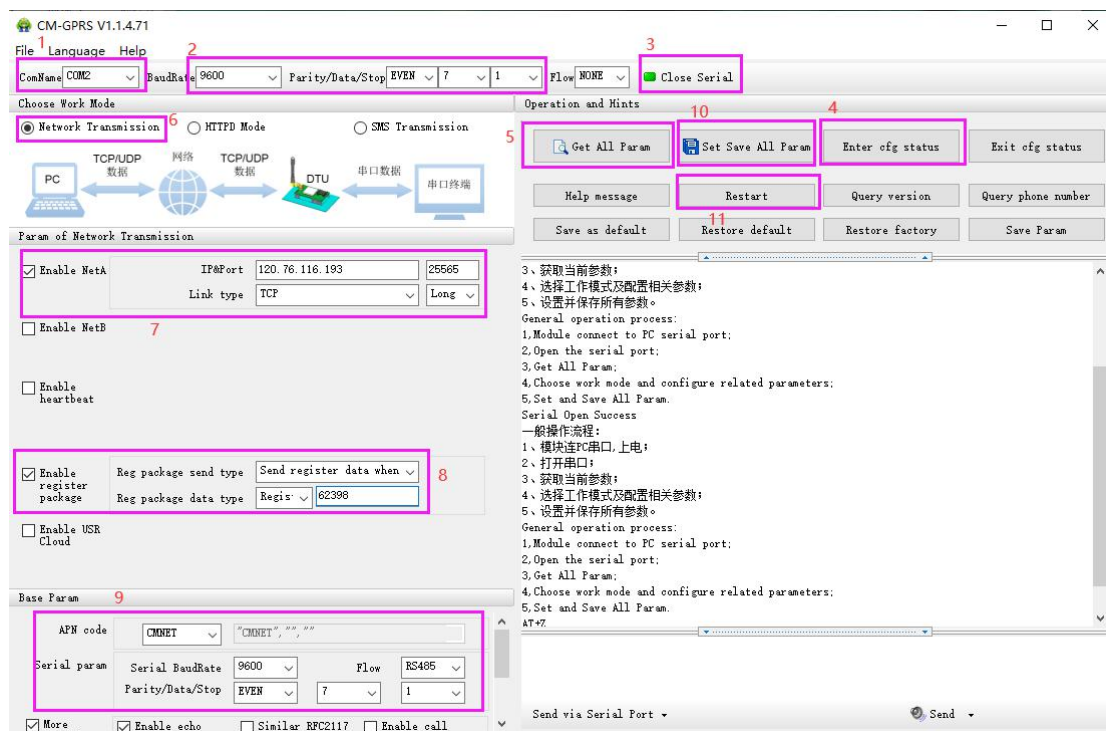
2.1. Network transmission

In this mode, users' serial device can send data to the assigned server through CM-GPRS. CM-GPRS can receive data from the server and then transmit the message to serial port.

Users only need to set simple parameters that transparent communication can be achieved instead of keeping an eye on the process of data conversion between serial port and network.

CM-GPRS supports two socket connections, socket A and socket B, they are mutually independent. CM-GPRS module can only be TCP Client and UDP Client.

Software setting:



2.2. SMS transmission

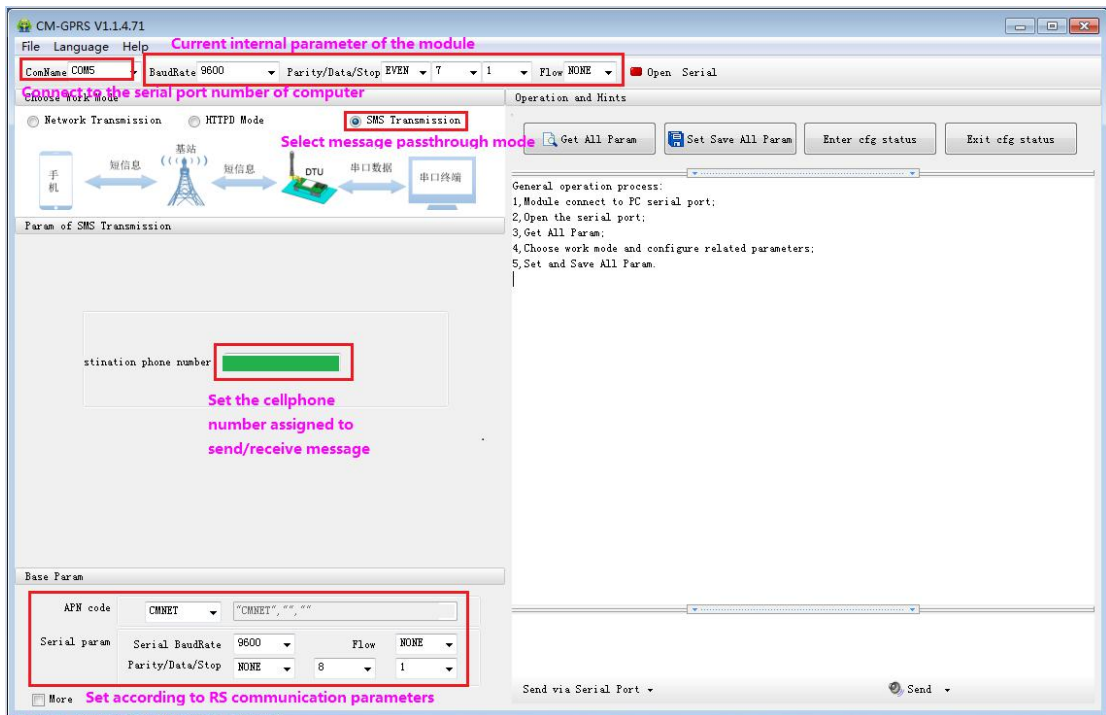
In this mode, user's serial device can send short messages to assigned cellphones, and can also receive short messages from any cellphone and then transmit them to serial devices.

Users only need to set simple parameters that communication between cellphones and serial devices can be achieved instead of keeping an eye on the process of data conversion between serial port and message.

Setting steps:

1. Connect Rs232 or Rs485 of CM-GPRS to computer, select the relevant port of USB to Rs232 or USB to Rs485. Baud rate、 Check/data/stop、 flow control is the corresponding parameters inside CM-GPRS.

2. Select SMS transmission as working mode.
3. In parameters of SMS transmission, set assigned cellphone number which is used to receive messages as the target cellphone number.
4. In global parameters, set operator as Mobile or Unicom corresponding to the SIM card.
5. In serial parameters, set [Baud rate、Parity /Data/Stop] as parameters in RS communication(EVEN/7/1). Set [Flow control] as NONE.
6. Click and access to [Enter configuration status], and then click [Set Save All Parameters].
7. Take coolmay PLC as an example: Data needs to be converted to ASCII while sending them to CM-GPRS RS instructions.



3. Data transmission test

3.1. Initial parameters

Serial parameter is default as: serial port is COM5 in this example, [Connect the 232 or 485 port of the module to the computer (if the computer does not have a direct 232 serial port, you can add a USB to 232 male port conversion line, then connect the 232 programming line, lead The feet are defined as: 2 to 3, 3 to 2, 5 to 5; or use USB to 485 to connect the computer and the module 485), you can view the correct port number in the computer settings manager]. **module factory default parameters: Baud rate 9600; Parity EVEN; Data 7; Stop 1; Flow control NONE; module restore factory settings Parameters: baud rate 115200, parity bit NONE, data bit 8, stop bit 1, flow control NONE**

Defaulted working mode: network transmission

Defaulted sever for connection: Address: **120.76.116.193** or coolmay.wicp.net (standby), port: 25565 connection type: TCP long link.

Default to start registration packet: Transmit mode: send 1 to server when connect with server; registered data type: registered ID 3(Specific registered ID please refer to initial parameter settings, every registered number is marked on product label. If it not be saved, please ask Coolmay to provide it again)

3.2. Data transmission testing steps

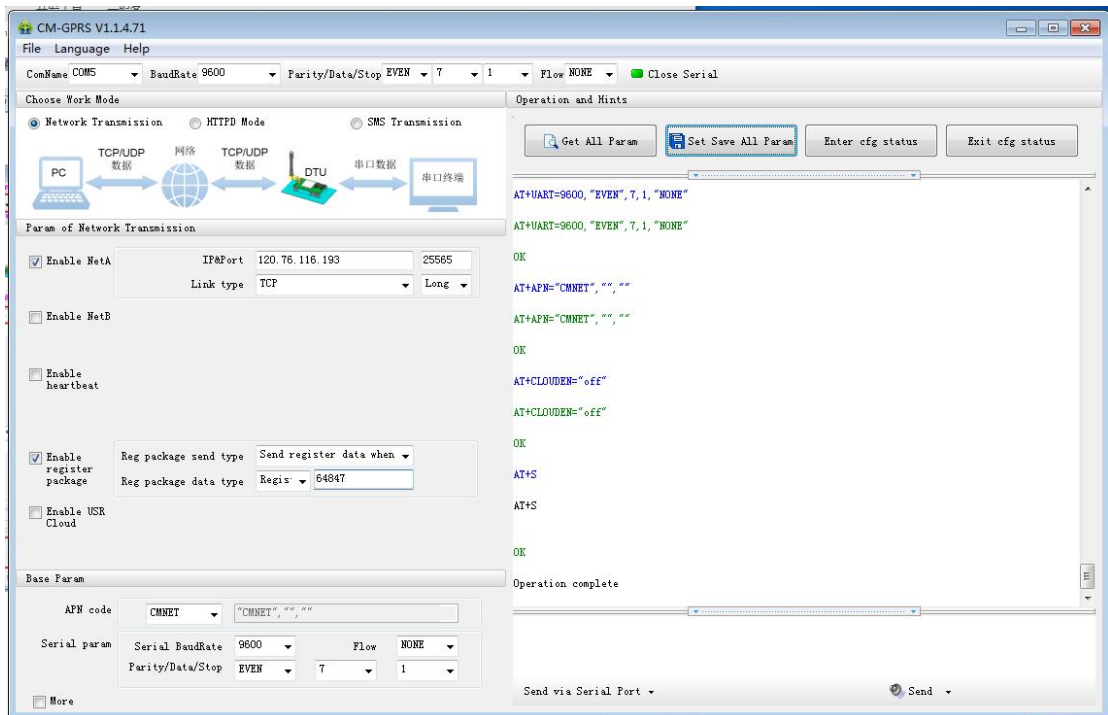
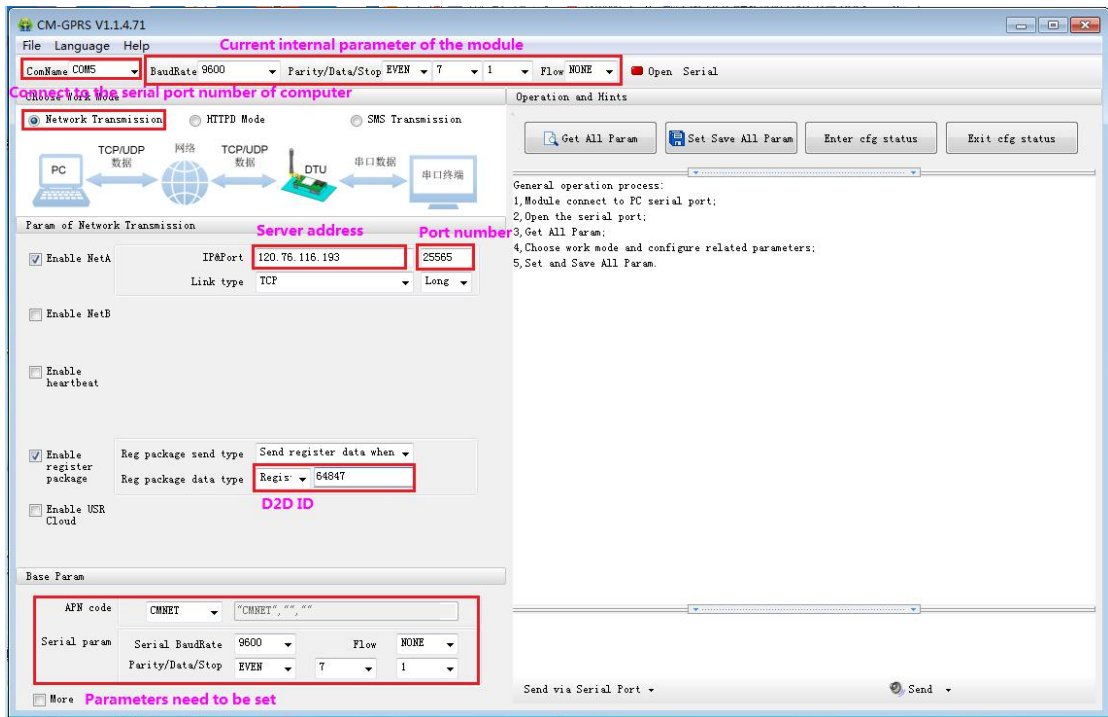
1. Take connecting with Coolmay PLC as an example. Insert SIM card to the slot inside CM-GPRS, a computer is needed to connect serial port with CM-GPRS in order to test data transmission between serial port and network. Since some computer hasn't a RS232, thus a USB to RS232 (male) is needed to connect RS232 programming cable (both side is female), or a USB TO RS485 is needed to connect with RS485.

2. Open the setting software, after CM-GPRS is charged and started, if SIM card is inspected, it will automatically connect with GPRS and the server and then access to the working mode which had been set, the serial port will open as set. RUN light ON, then access to the next step after GPRS indicator and LA indicator ON.

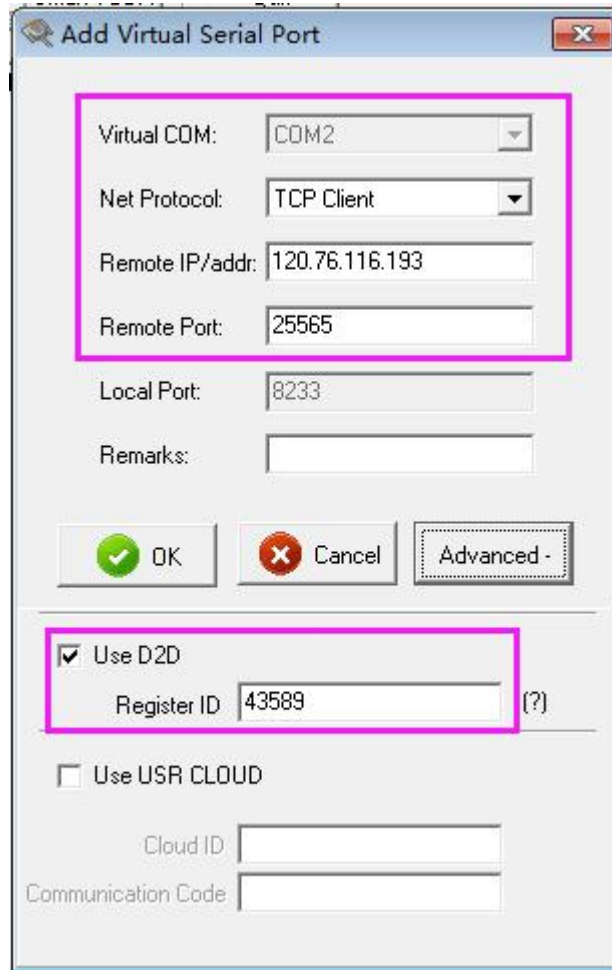
3. After LA indicator ON, connect CM-GPRS with Rs232, click to acquire current parameters after serial port opened, check whether it is successfully connected, access to [Enter configuration status], set serial parameters and then click [Set Save All Parameters]. Finally, click and access to communication state, it is OK when OK prompts.

Note:

The above three steps have been set before shipment, this settings can connect with coolmay PLC, parameters should be modified if need to connect with PLC with other brands. Each CM-GPRS has a unique register ID, specific register ID please refer to initial parameter settings, register ID is marked in the product label, users also need to fill the corresponding register ID. If forget it, please ask Coolmay to provide it again.



4. Install virtual serial port software, add virtual serial port.



Note:

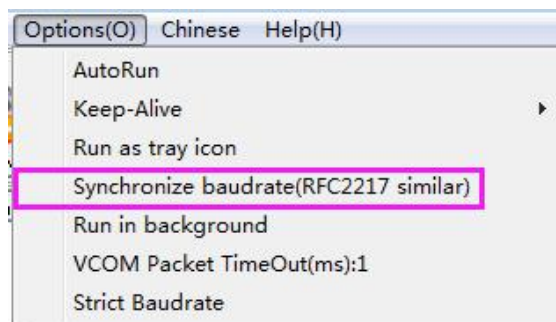
Net protocol select TCP Client;

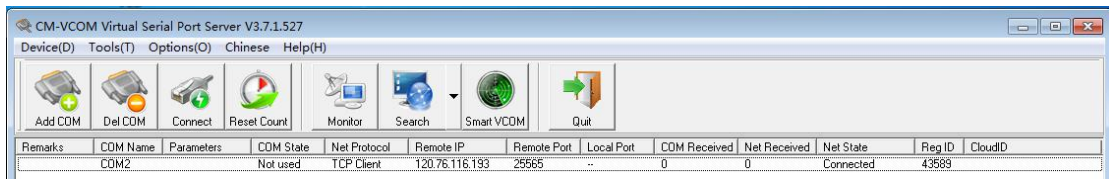
Remote IP/ address set 120.76.116.193 or coolmay.wicp.net (standby) (Note: Remote IP/ address is Coolmay domain name, must link with Coolmay server.

Remote port set 25565;

Set [Register ID] in [Advance] 43589 . (Specific register ID please refer to initial parameter settings, every register number is marked on product label. If it not be saved, please ask Coolmay to provide it again)

Successfully created as below image, and then modify [Synchronous baud rate] as [not chosen].



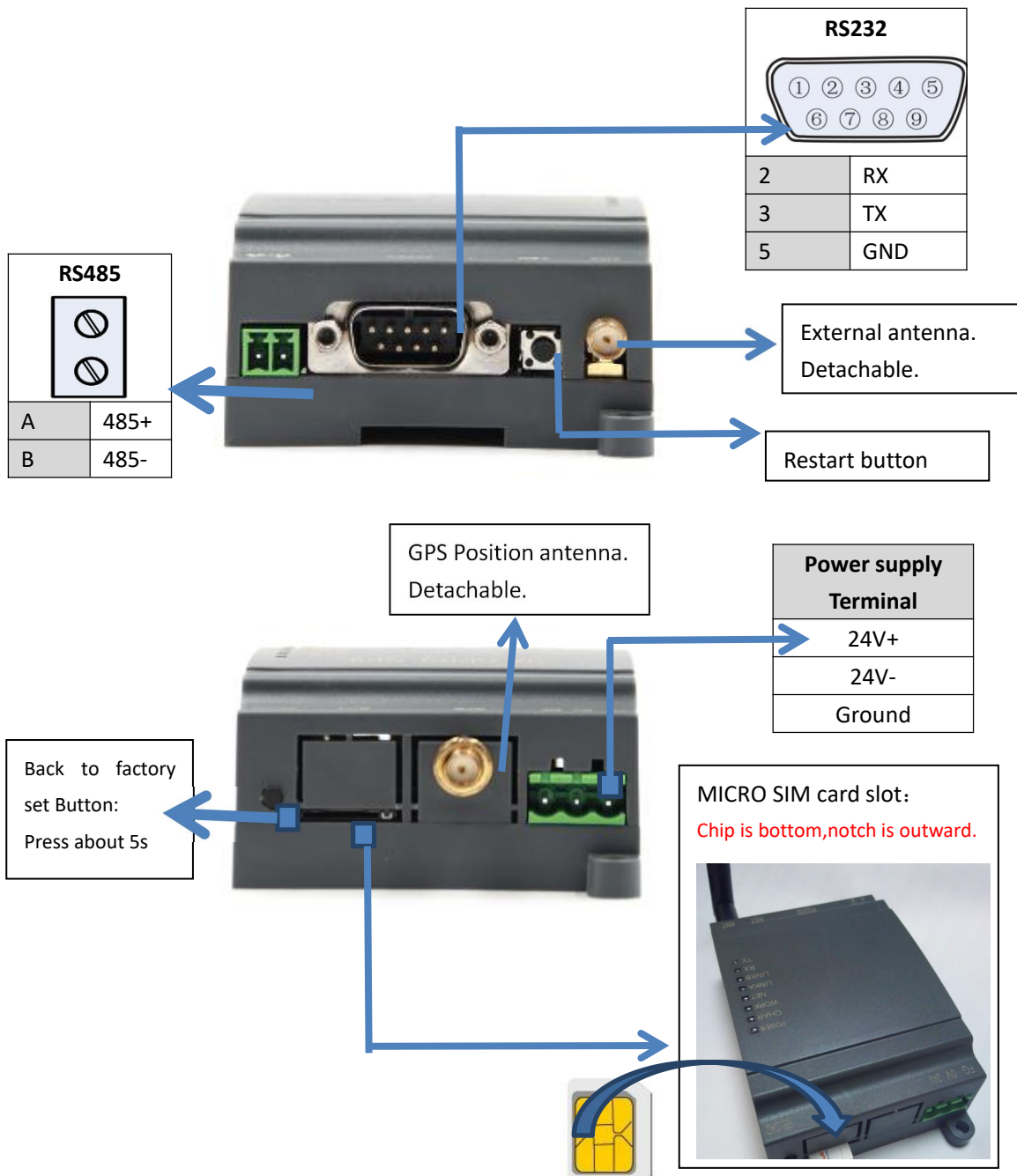


- In this demo program, virtual serial port is COM2, PLC program software needs to connect with COM2, thus program downloading and monitoring remotely can be achieved. **Note: 2N series PLC ,software must be GX8.52 or WORKS 2; 3G series PLC ,software must be GX8.86 or WORKS 2. Meanwhile, communication time inspection must above 20s and retry time above twice that it can be successfully linked.**

4. CX-GPRS-G support positioning function

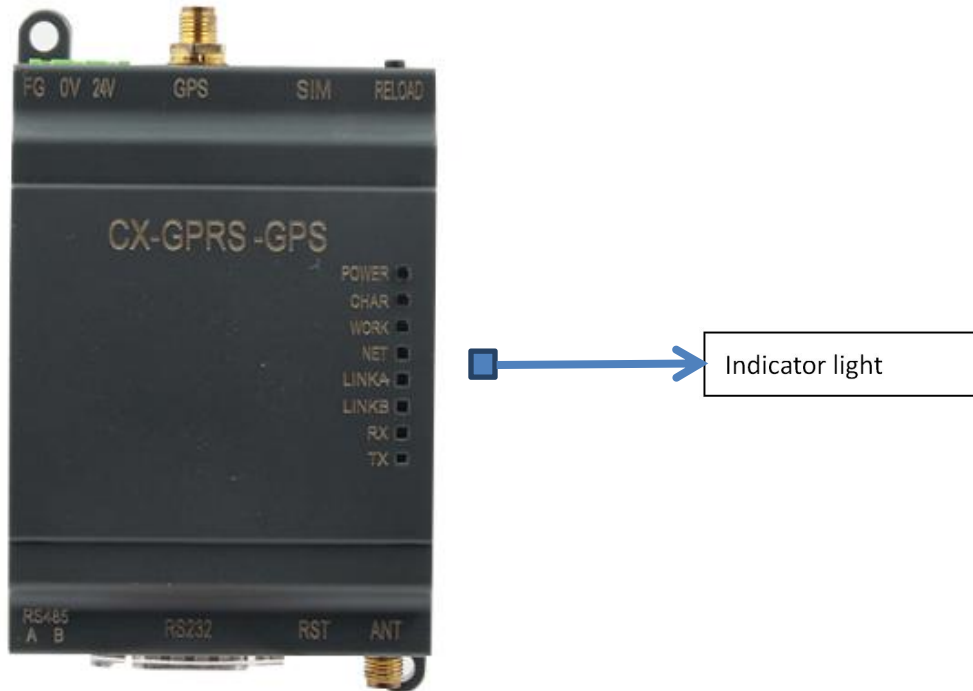
Users can choose to use the GPS positioning function. When acquiring positioning information, they can use command query, and can also send GPRMC positioning information packets through transparent transmission regularly. In transparent transmission mode, you can choose to send to the network server or to the serial device, then obtain positioning data according to the GPRMC information format.

4.1. Model and appearance



4.2. Indicator light function

CX-GPRS-G module, there are 8 indicator light. POWER, CHAR, WORK, NET, LINKA, LINKB, RX, TX.

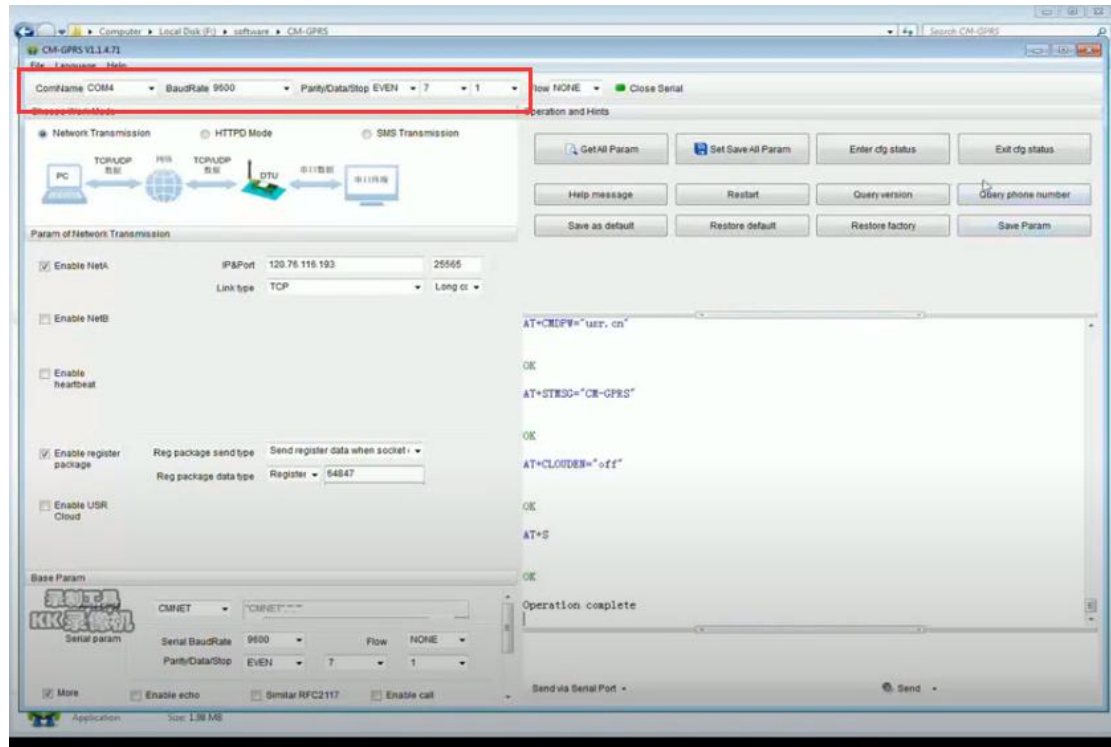


Indicator light name	Indicator function	Status
POWER	Power indicator	Power supply work normally, light stays on.
CHAR	Lithium battery charging indicator (optional)	When a lithium battery is selected, it is always on when the rechargeable battery is charged, and automatically turns off when the battery is fully charged.
WORK	System operation indicator	light always on after system operation
NET	Network status connection indicator	GPRS network connection is always on
LINKA	Socket A connection indication	When connection, always on
LINKB	Socket B connection indication	When connection, always on
RX	Data transmission indicator	Serial port network RX has data
TX	Data transmission indicator	Serial port network TX has data

4.3. Setting method

4.3.1. Using the serial port to set

1. Open the CM-GPRS software, select the com port connected between the module and the computer, and set the corresponding communication parameters of the module as follows:



1. Click "Open serial", use the command to open GPRS function.

(1) Enable GPS Positioning function:

`AT+GPS=1`

(2) Set the message send method: send to Serial Port:

`AT+GPSTP="com"`

(3) Enable heartbeat:

`AT+GPSEN="on"`

(4) Set the packet sending interval 60s:

`AT+GPSTM=60`

After the above configuration is set, the GPRS module with positioning will send a packet of GPRMC location information to the serial port every 60s. You can also use the command

AT+GPSDT? to query location information.

The screenshot shows the CM-GPRS V1.1.4.71 software interface. The 'Execute command and prompt' window displays the following sequence of commands and responses:

```

AT+GPS=1
AT+GPS=1
*GPS: 1
OK
执行完毕
AT+GFSTP=COM
AT+GFSTP="COM"
OK
执行完毕
AT+GFSEN=ON
AT+GFSEN="ON"
OK
执行完毕
AT+GFSTM=60

```

Red boxes highlight the command input and response output for each step. A pink arrow points to the command input line with the note: "Note: The cursor must be on the next line of the instruction".

The screenshot shows the CM-GPRS V1.1.4.71 software interface. The 'Execute command and prompt' window displays the following sequence of commands and responses:

```

AT+GFSTM=60
AT+GFSTM=60
OK
执行完毕
串口已关闭
串口已打开
AT+GFSTM=60

```

Red boxes highlight the command input and response output for each step. A pink arrow points to the command input line with the note: "Note: The cursor must be on the next line of the instruction".

At this time, every 60 seconds (settable) will receive a set of raw data of latitude and longitude,

as below::

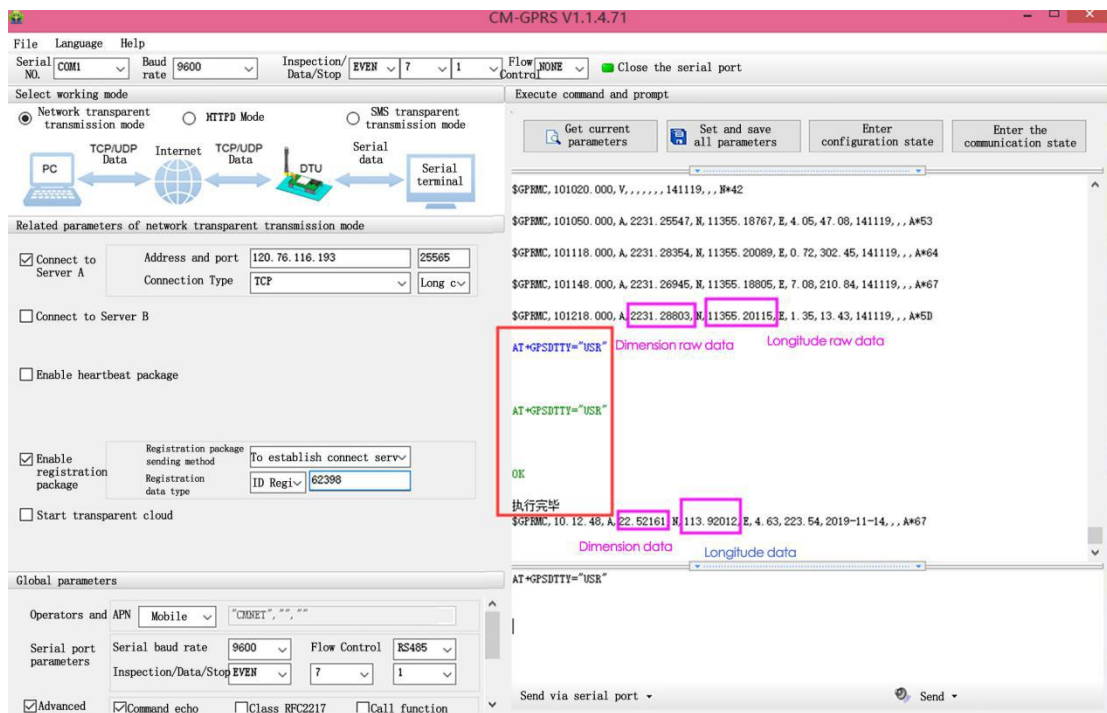
(1) Calculate the latitude and longitude from the original data in the figure as an example:

Latitude: $22+31.288031/60=22.52147$

Longitude: $113+55.20115/60=113.92001$

(2) can also send instructions directly:

AT+GPSDTTY="USR", get the final latitude and longitude data immediately, No need to do calculation.



GPS original data format:

Frame Header	UTC Time	Status	Latitude	North Latitude / South Latitude	Longitude	North Longitude / South Longitude	Speed
\$GPRMC	hhmmss.sss	A/V	ddmm.mmm	N/S	E/W	W/W	knots
Azimuth	UTC Date	Magnetic declination	Magnetic declination direction		Mode	Check	Enter
Degree	ddmmyy	000-180	E/W		A/D/E/N	*hh	CR+LF

Format: \$GPRMC,<1>,<2>,<3>,<4>,<5>,<6>,<7>,<8>,<9>,<10>,<11>,<12>*hh<CR><LF>

Explanation:

Field 0: \$GPRMC, Field ID, indicating that the statement is Recommended Minimum Specific GPS/TRANSIT Data (a RMC)

Recommend minimum positioning information

Field 1: UTC time, hhmmss.sss format

Field 2: Status, A=positioned, V=not positioned

Field 3: Latitude ddmm.mmmm, degree and minute format (the leading digit is not enough, then fill 0)

Field 4: Latitude N (north latitude) or S (south latitude)

Field 5: Longitude dddmm.mmmm, degree and minute format (the leading digits are not enough, then fill 0)

Field 6: Longitude E (east longitude) or W (west longitude)

Field 7: speed, knots; Knots (one knot is also 1.852 km/h)

Field 8: Azimuth, degree (two-dimensional direction, equivalent to two-dimensional compass)

Field 9: UTC date, DDMMYY format

Field 10: magnetic declination, (000-180) degrees (the leading digits are not enough, then fill 0)

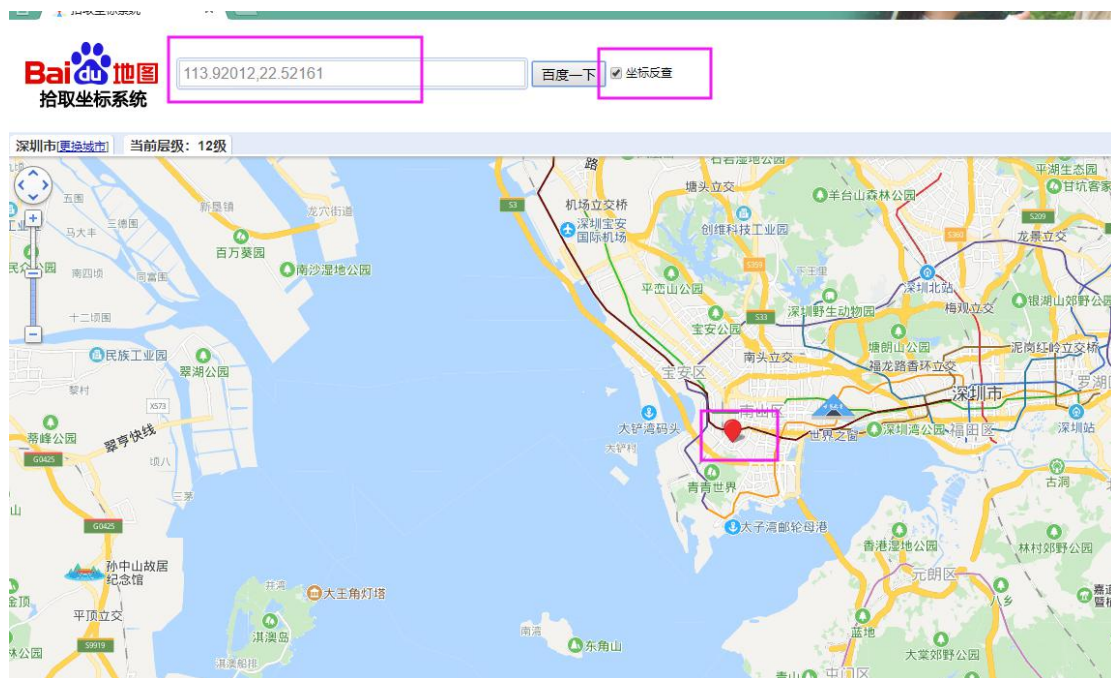
Field 11: magnetic declination direction, E=East, W=West

Field 12: mode, A=automatic, D=differential, E=estimated, N=data invalid (3.0 protocol content)

Field 13: check value

Note: You need to connect the GPS antenna interface to an external suction cup antenna, and place the antenna outdoors where there is GPS signal.

Open the map : <http://api.map.baidu.com/lbsapi/getpoint/index.html> Enter the latitude and longitude separated by a semicolon, check the coordinate check, Baidu, the current address will be displayed on the map.



4.3.2. Use SMS to set and query (Please use a mobile phone SIM card)

1. Use SMS to send:



2. Query the position that module is in.

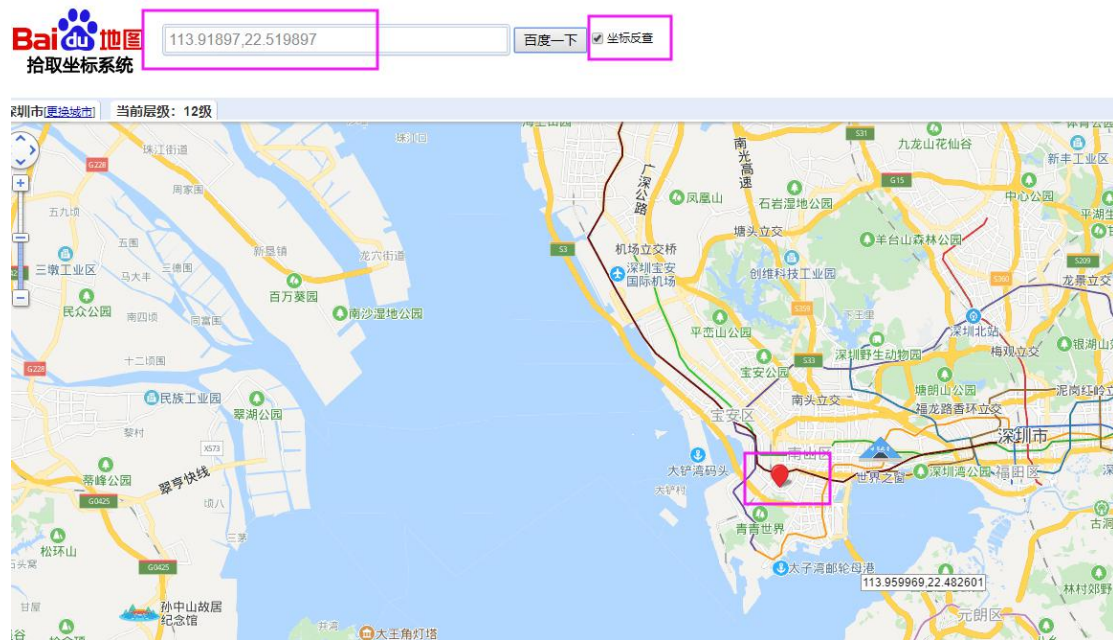


3. Calculate the latitude and longitude from the original data in the figure as an example:

Latitude: $22+31.19384/60=22.519897$

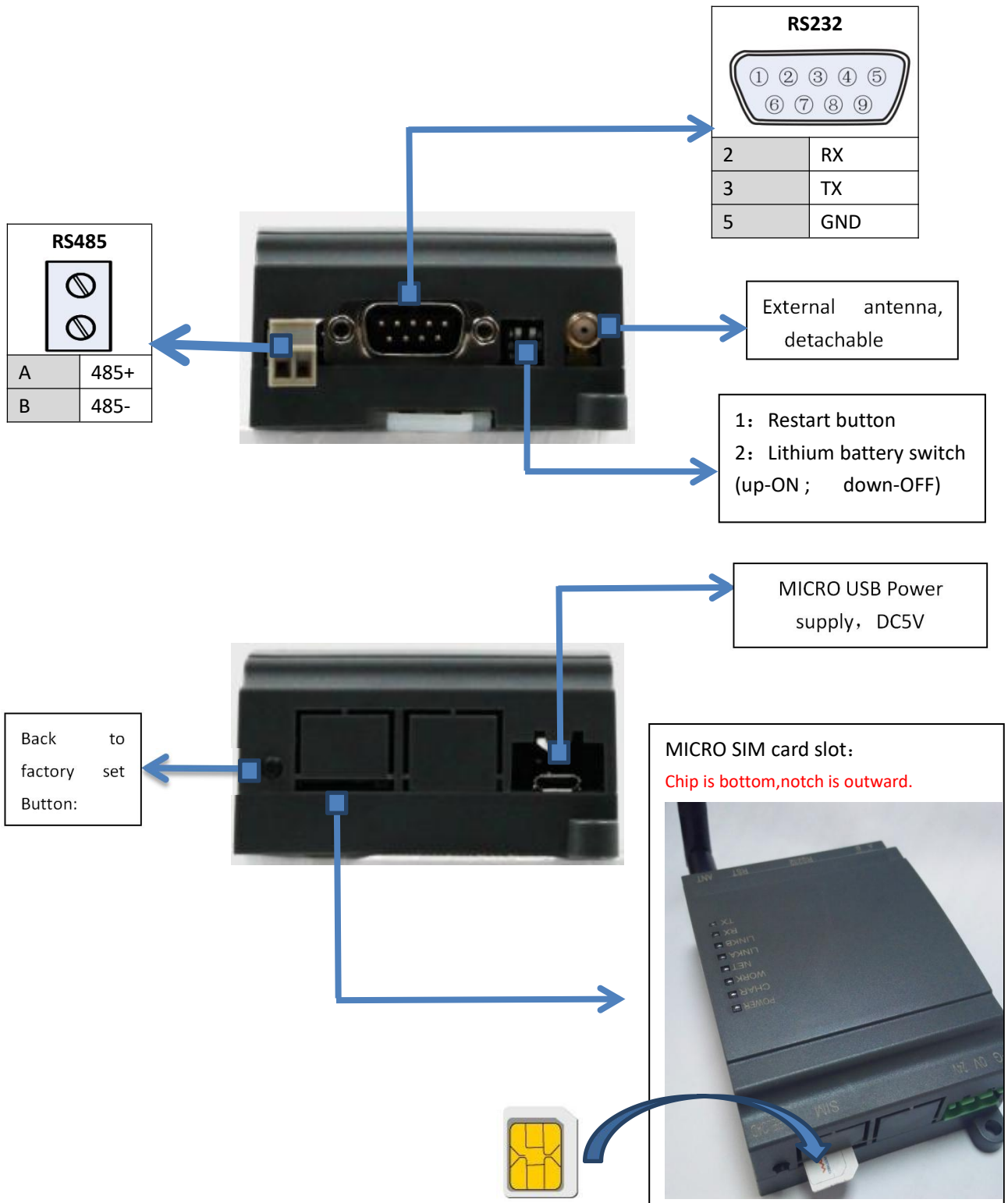
Longitude: $113+55.13824/60=113.91897$

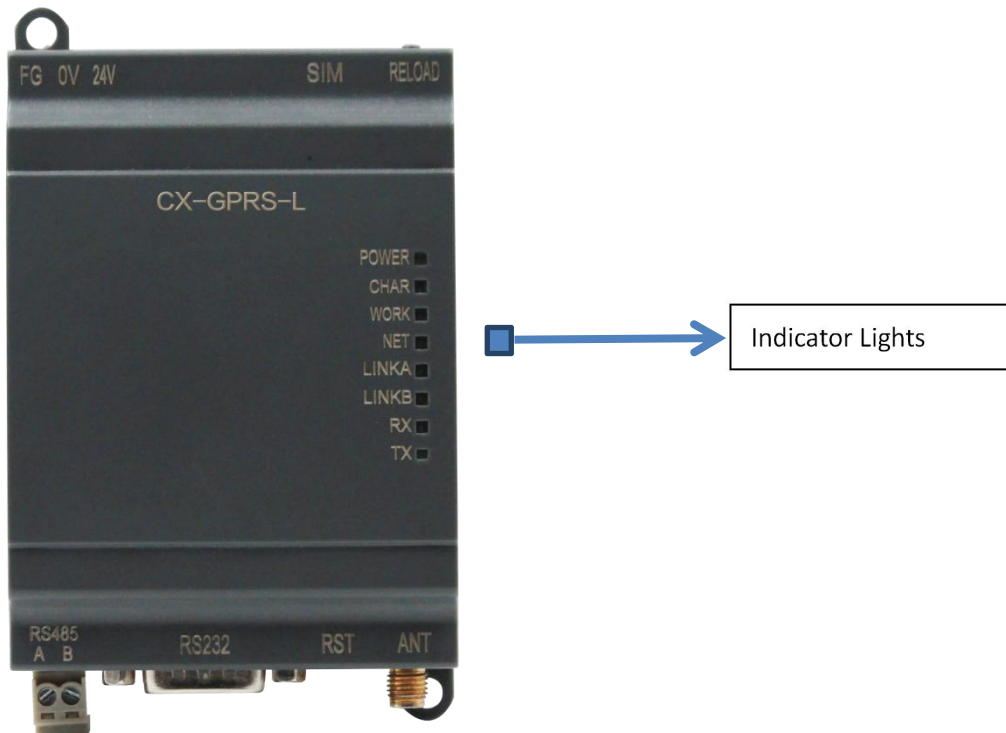
4. Open the map: <http://api.map.baidu.com/lbsapi/getpoint/index.html> Enter the latitude and longitude separated by a semicolon, check the coordinate check, Baidu, the current address will be displayed on the map.



5. CX-GPRS-L Lithium battery is Optional

Users can choose rechargeable lithium batteries according to their needs (full charge can last about 20 hours), the function is the same as CM-GPRS, as shown below:





Indicator light name	Indicator function	Status
POWER	Power indicator	Power supply work normally, light stays on.
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