

CX-4G Module User Manual

Shenzhen Coolmay Technology Co.,Ltd V20.61



CX-4G is a small, feature-rich GPRS transparent transmission module for Mobile, China Unicom, Telecommunications 4G and Mobile, China Unicom 3G and 2G network standard.

"Transparent Transmission" as the core function, a high degree of ease of use, users can quickly and easily integrated in their own systems.

This module is with perfect function, covering most of the conventional application. The user can achieve the two-way transparent data transmission from the serial port to the network through simple settings, and support the custom registration package, heartbeat package function, support 4-way Socket connection, and support transparent transmission, high speed, low latency!

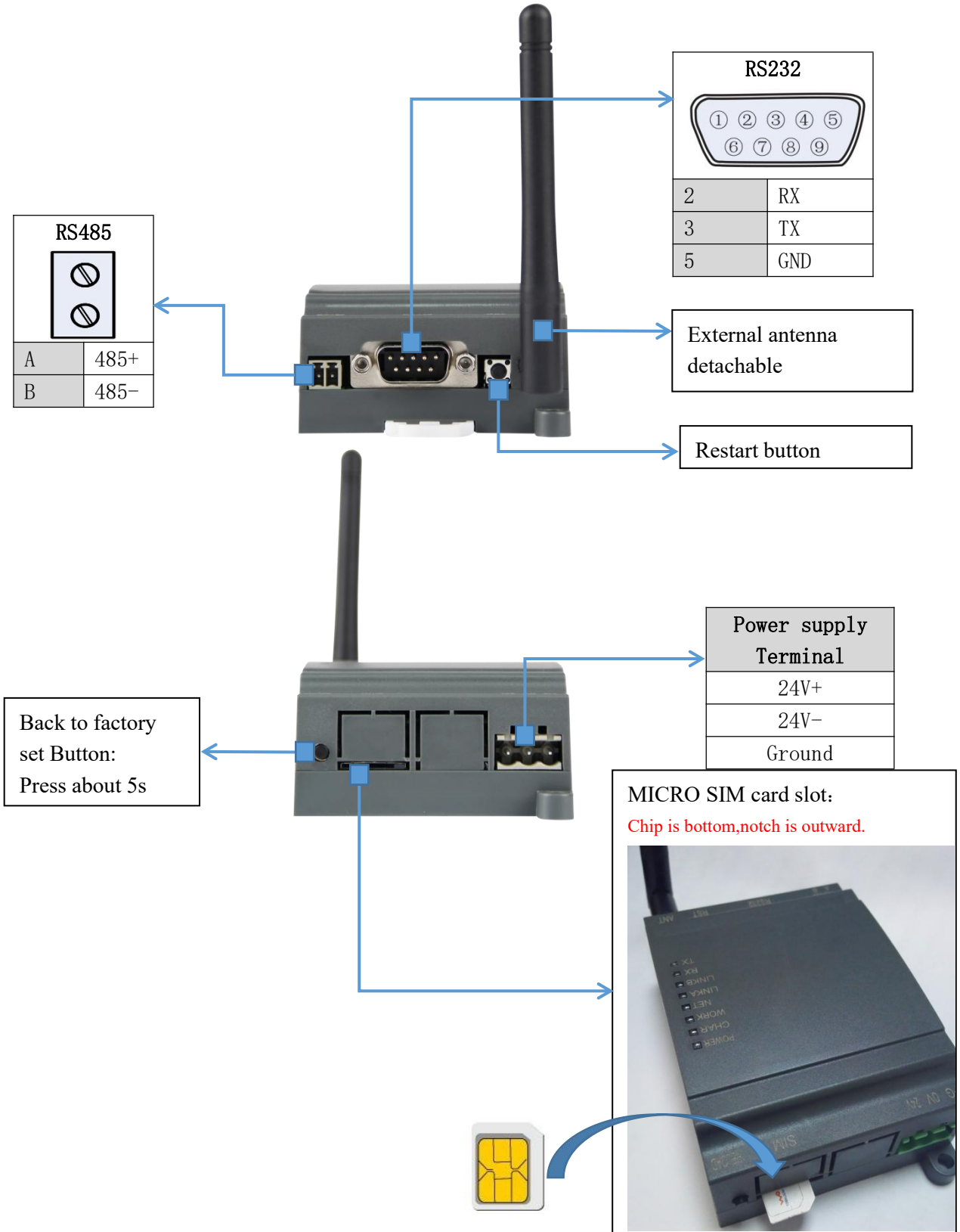
The module is compatible with our CM-GPRS module 2G product, the user can directly replace it to achieve a substantial increase in communication speed, we design watchdog on the hardware to ensure long-term stability working of the product.

Catalogue

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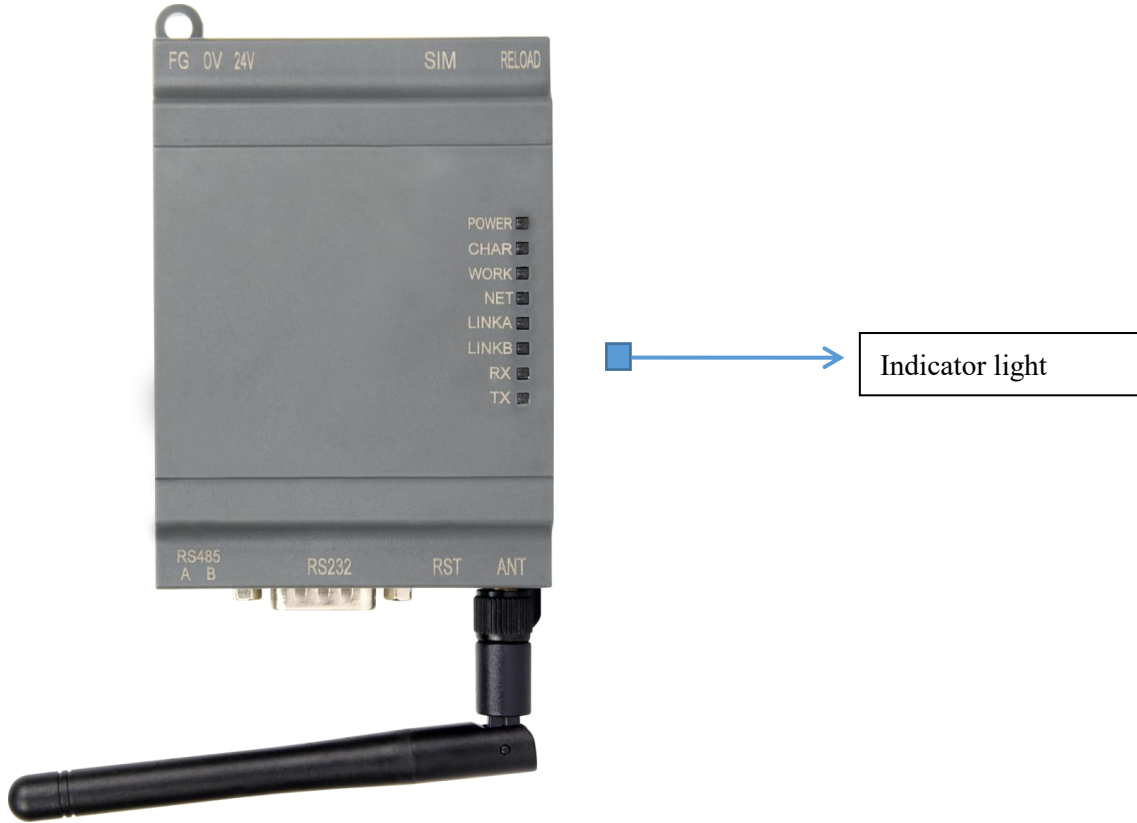
1. Hardware description

1.1. Model and appearance



1.2. Indicator light function

CX-4G 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 | In 2G, flash twice per second In 3G, flash 3 times per second In 4G, flash 4 times per second No net, not flash |
| 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 flashing |
| TX | Data transmission indicator | Serial port network TX has data flashing |

1.3. Function features

- 5 mode 12 frequency: Mobile, China Unicom, Telecommunications 4G high-speed access, while supporting mobile, China Unicom 3G and 2G access
- Based on the embedded Linux system development, with a high degree of reliability
- Support RNDIS remote network driver interface, the computer can connect the device through USB access to the Internet
- support 4 network online simultaneously, support TCP and UDP both
- Every channel supports 10KB serial data cache, when connect abnormal you can choose cache data not missing.
- Support sending data of register and heart beat
- support setting module parameters by message remotely
- support multi working modes: network transparent transmitting mode、HTTPD mode
- support basic instruction set
- Support socket distribution protocol, you can send data to different Socket
- support FTP man- made updated protocol, which can be convenient for customers update remotely.
- Support FTP self-updated protocol, keep solid state latest status
- Support RFC2217 function, can modify module serial data from network dynamics
- Can be compatible with our CM-GPRS module, customers can replace it directly.

1.4. Products parameters

| | Project | Index | | |
|---------------------|-------------------------|----------------|------------------------|---------------------------|
| Wireless parameters | Wireless standard | TDD-LTE | FDD-LTE | WCDMA |
| | | TD-SCDMA | GSM/GPRS/EDGE | |
| | Standard frequency band | TDD-LTE | Band 38/39/40/41 | |
| | | FDD-LTE | Band 1/3 | |
| | | WCDMA | Band 1/8 | |
| | | TD-SCDMA | Band 34/39 | |
| | | GSM/GPRS/EDGE | Band 3/8 | |
| | Transmit power | TDD-LTE | +23dBm(Power class 3) | |
| | | FDD-LTE | +23dBm(Power class 3) | |
| | | WCDMA | +23dBm(Power class 3) | |
| | | TD-SCDMA | +24dBm(Power class 2) | |
| | | GSM Band8 | +33dBm(Power class 4) | |
| | | GSM Band3 | +30dBm(Power class 1) | |
| | specifications | TDD-LTE | 3GPP R9 CAT4 downwards | 150 Mbps, upwards 50 Mbps |
| | | FDD-LTE | 3GPP R9 CAT4 downwards | 150 Mbps, upwards 50 Mbps |
| | | WCDMA | HSPA+ downwards | 21 Mbps upwards 5.76 Mbps |
| TD-SCDMA | | 3GPP downwards | R9 2.8 | |

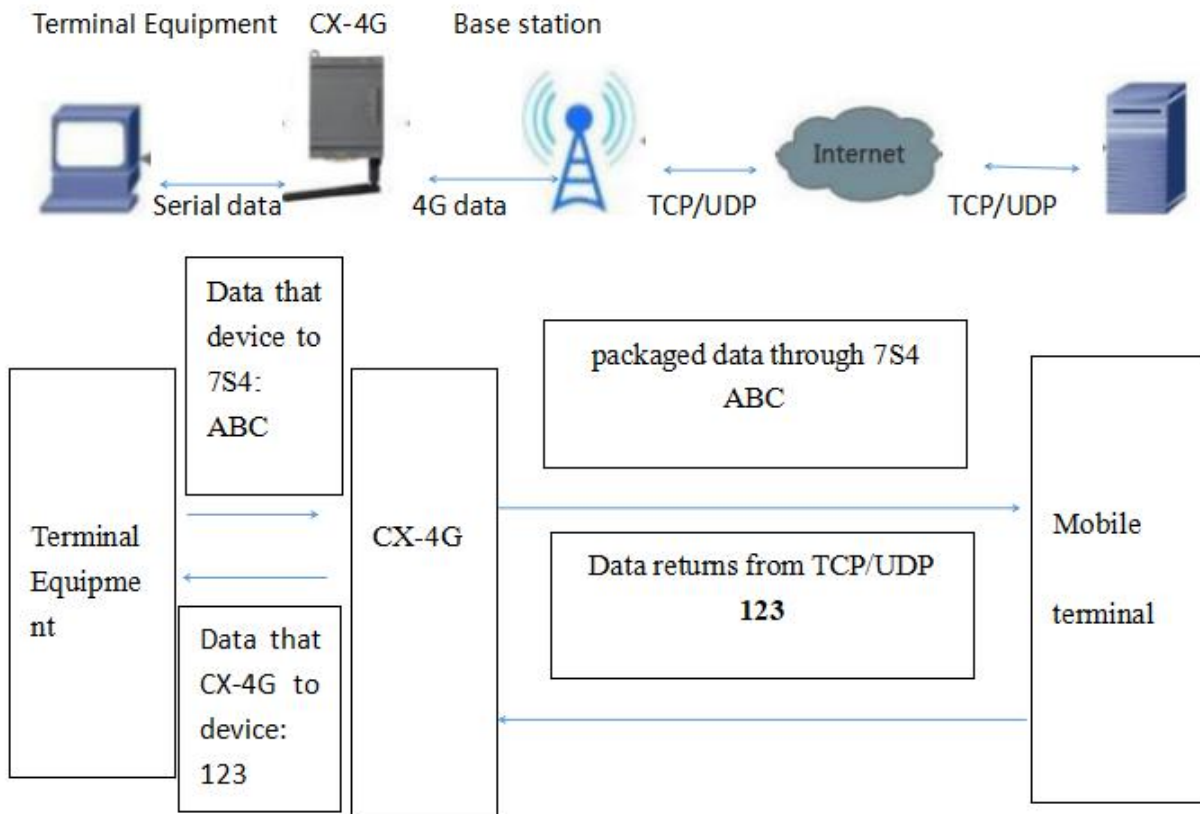
| | | |
|---------------------|-----------------------------------|---|
| | | Mbps upwards 2.2 Mbps |
| | GSM/GPRS/EDGE | MAX: downwards 384 kbps upwards 128 kbps |
| | Antenna options | IPEX port |
| Hardware parameters | Data interface | UART: 300bps - 230400bps |
| | Working voltage | DC 5V~30V |
| | Working current/consumption | 80mA@24V 3W MAX |
| | Working temp | -20°C- 70°C |
| | Storage temp | -40°C- 125°C |
| | dimension | 65×90×36mm |
| Software parameters | Working mode | Transparent transmit, HTTPD mode |
| | Setting command | AT+ command structure |
| | Network protocol | TCP/UDP/DNS/HTTP/FTP |
| | Maximum number of TCP connections | 4 |
| | User configuration | Serial AT command, network AT command, message AT command |
| | Customer application software | Supports custom application software |
| Software function | DNS | Support |
| | Simple way of transmission | Supports TCP clients/UDP clients |
| | Socket distribution protocol | Support sending data to different Socket through protocol |
| | HTTP protocol transmission | Support |
| | Heartbeat packets | Support |
| | RFC2217 | Support |
| | Registration package mechanism | Support for custom registration pack / ICCID registration package / IMEI registration package |

1.5. Serial parameters

| Project | Parameters |
|-------------|--|
| Baud rate | 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400 |
| Data bits | 7, 8 |
| Stop bit | 1, 2 |
| Check Digit | NONE(No parity bit) EVEN(Even parity) ODD(Odd parity) |

2. Operating mode

2.1. Network transparent transmit mode



Network transmission mode diagram

In this mode, the user's serial device, send data to the specified server on the network via this module. The module can also accept data from the server and forward the information to the serial device. Users do not need to focus on serial data and network data packet data conversion process, just through a simple parameter settings, you can achieve data transparent communication between serial device and network server.

The CX-4G module supports 4 socket connections, Socket A, Socket B, Socket C, and Socket D, which are independent of each other.

The CX-4G module supports 4 channels that are set to long and short links, and when set to long connections, the module remains connected when the module is connected to the server. When the short link is set only when the serial port has the data to send the connection, establish a connection without data transmission over the set time-out time automatically disconnect, used to save the server resources and traffic.

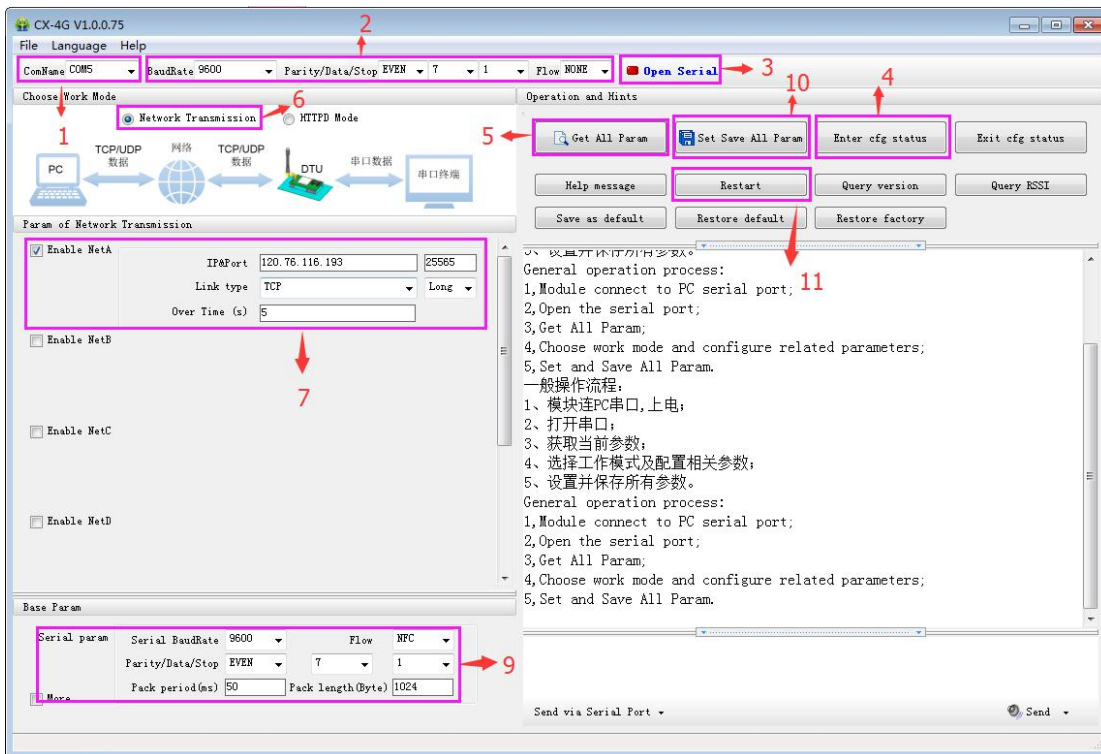
AT command setting method:

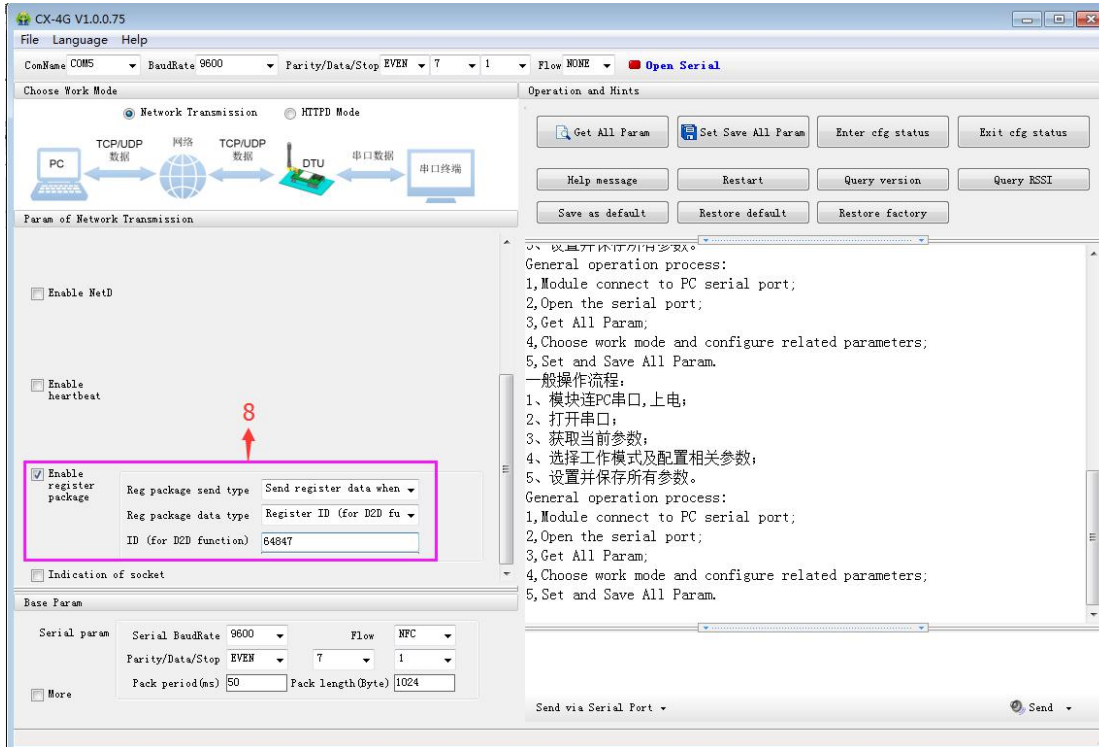
1. Set the work mode for the network transparent:

AT+WKMOD=NET

2. Set Socket A to the enabled state
AT+SOCKAEN=ON
3. Set Socket A to TCP Client
AT+SOCKA=TCP,120.76.116.193,25565
4. Set Socket A to long connection
AT+SOCKASL=LONG
5. Restart
AT+Z

2.1.1. Network transparent transmit mode setting steps by using software





1. Open the setting software “CX-4G”. Connect Rs232 or Rs485 of CX-4G with computer(if there isn’t Rs232 in computer, a USB to Rs232 male port cable can be used, and then connect to Rs232 cable, the pin definition is 2-3,3-2,5-5; Or adopt USB to Rs485 to connect computer and Rs485 of CX-4G), and then set the corresponding serial port.
2. Set the current internal baud rate,parity bit,data bit,stop bit,flow control and related parameters.
The factory defaulted parameters: baud rate 9600,parity bit EVEN,data bit 7, stop bit 1,flow control NONE; Back to factory defaulted parameters: baud rate 115200,parity bit NONE,data bit 8, stop bit 1,flow control NONE.
3. Click to open the serial port, connect CX-4G with computer.
- 4.Click “Configuration state”, Waiting for the equipment into the AT command configuration mode
5. Click “achieve current parameter”, after all the current parameters obtained, other parameters can be achieved, such as address,port,connect type,registered ID.
6. Select “network pass-through mode” in “Working mode”
7. Select link to Server A, set “address and port” as **120.76.116.193** and **25565**. Set “link type” as TCP and long connection, other server not selected.
8. Select Enable registration packet, set “register package transmit mode” to send to server once when connect with server. Set “register data type” as registered ID. Set “registered ID” as module factory defaulted ID (**Detailed ID please refer to factory defaulted parameters, the corresponding registered ID is noted in product label. If you forget the ID, please turn to Coolmay for it again.**)
9. All parameters Settings, settings of serial port,baud rate,parity,data,stop are parameters needed for devices with serial port. If communicate with Coolmay PLC, HMI/PLC all-in-one, Mitsubishi PLC or PLC which is compatible with Mitsubishi PLC, parameters are: **baud rate 9600, parity**

EVEN ,data7, stop bit 1, control flow NFC.

10.Click “ set and save all parameters”

11.After save all parameters, click “restart”, or discharge the device and then charge it again.

2.2. HTTPD Client

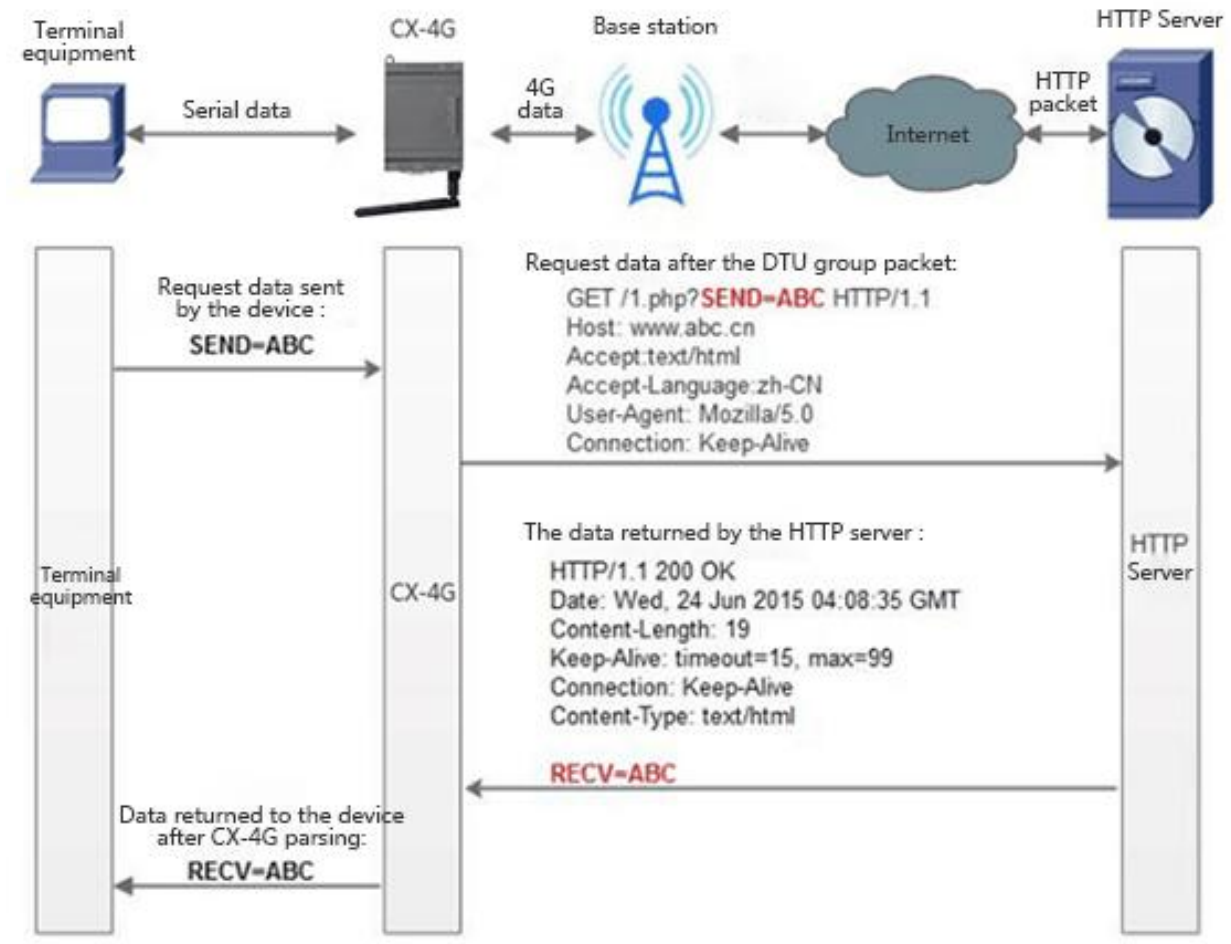


Diagram 4 HTTPD Client

Adopt the well set server address and port,request mode and other information. The user device send data to CX-4G, CX-4G pack all data according to HTTP protocol and then send the request package to HTTP server. HTTP server send the results back to CX-4G, CX-4G parse the result to the required format and then send them to the user device.

Since serial port receive buffer is 1000 byte, at most 1000 bytes when CX-4G is packaged.

If devices with serial port need to apply data from HTTP server, but where the device is located hasn't Ethernet, but has base station signal, a CX-4G can be adopted to build a bridge for devices with serial port and HTTP server.

AT instruct setting method

1. Set the working mode as HTTPD

AT+WKMOD=HTTPD

2. Set the request mode of HTTP

AT+HTPTP=GET

3. Set the request URL of HTTP
AT+HTPURL=/1.php[3F]
4. Set request server of HTTP
AT+HTPSV=120.76.116.193,80
5. Set the request head information of HTTP
AT+HTPHD=Connection: close[0D][0A]
6. Set the request over time of HTTP
AT+HTPTO=10
7. Set whether to filter reply information head
AT+HTPFLT=ON
8. Restart:
AT+Z

2.2.1. HTTPD Client mode setting steps by using software

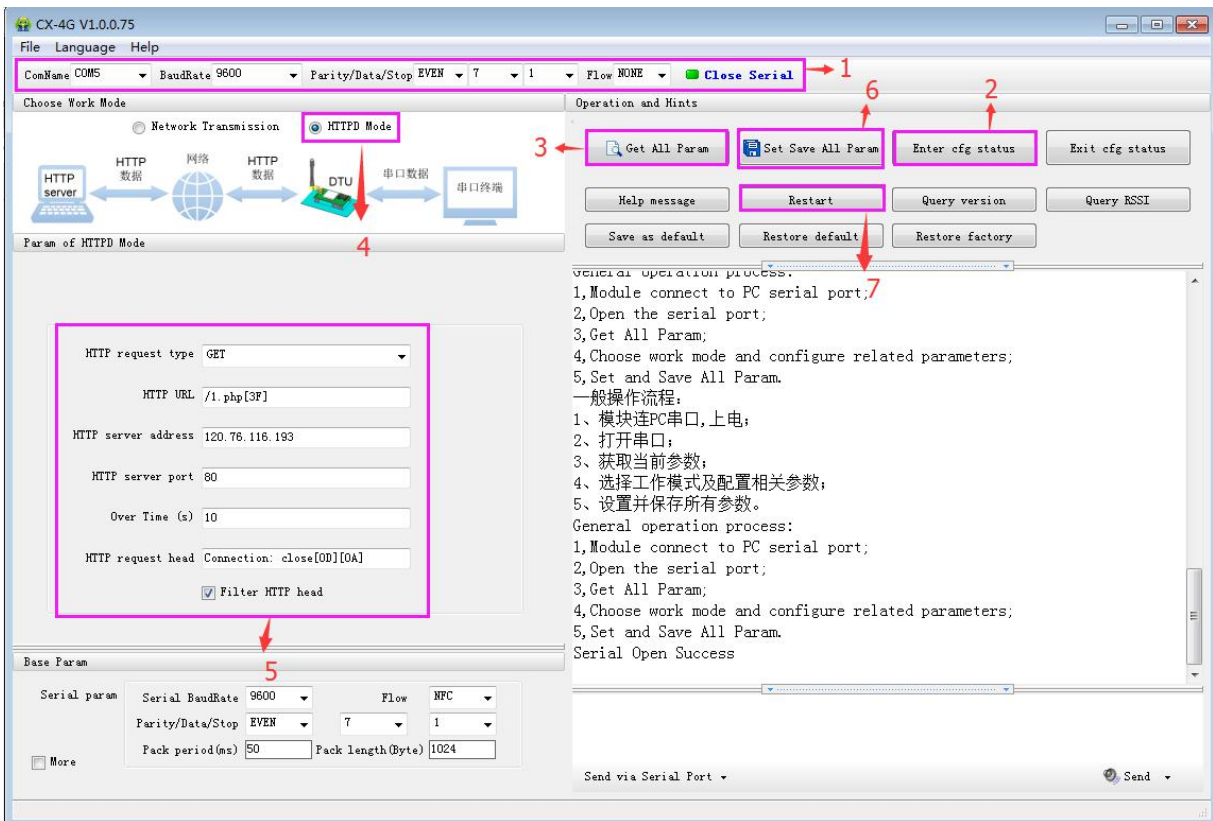


Diagram 5 set software

1. Open the exclusive setting software“CX-4G”. set serial port parameters and click “open serial port” accordingly.
2. Click “achieve current parameter”, wait until all parameters are obtained.
3. Click “configuration state”, wait until the device enter into AT instruct configuration mode.
4. Click “HTTPD mode” in “select working mode”

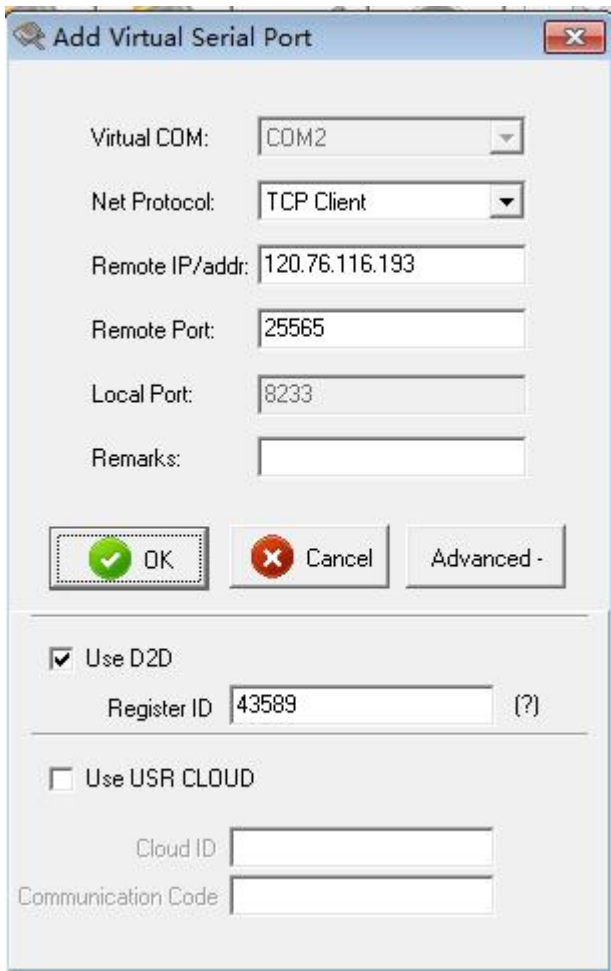
5. Set “HTTP request mode” as get. “HTTP request URL” as “/1.php[3F]”. “Server address” as “120.76.116.193”. “server port” as 80, set “overtime” as 10s.

Set “HTTP request head information” as “connection: Keep-Alive[0D][0A]”, select “filter HTTP head information”

6. Click “set and save all parameters”
7. After well saved, click “restart” to start the device, or discharge it and then charge it again.

3. Virtual serial port software settings

1. Install Coolmay virtual serial port software, and add a virtual serial port



Notes:

The virtual serial port is set to an unused COM port on the computer

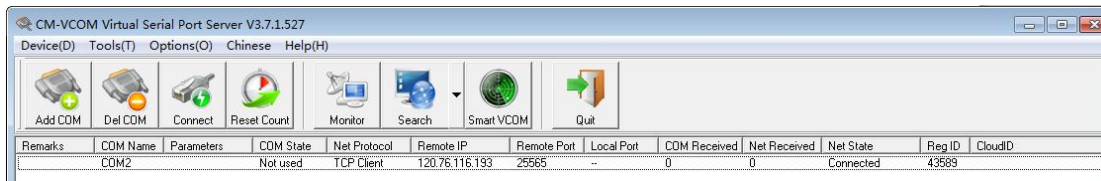
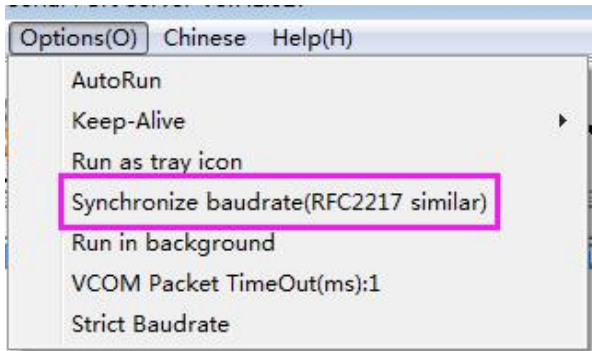
Network protocol selects TCP Client;

Target IP / domain name setting **120.76.116.193** (Note: Target IP / domain name for the Shenzhen-US technology domain name, must be connected with the US-US server)

Target port setting **25565**

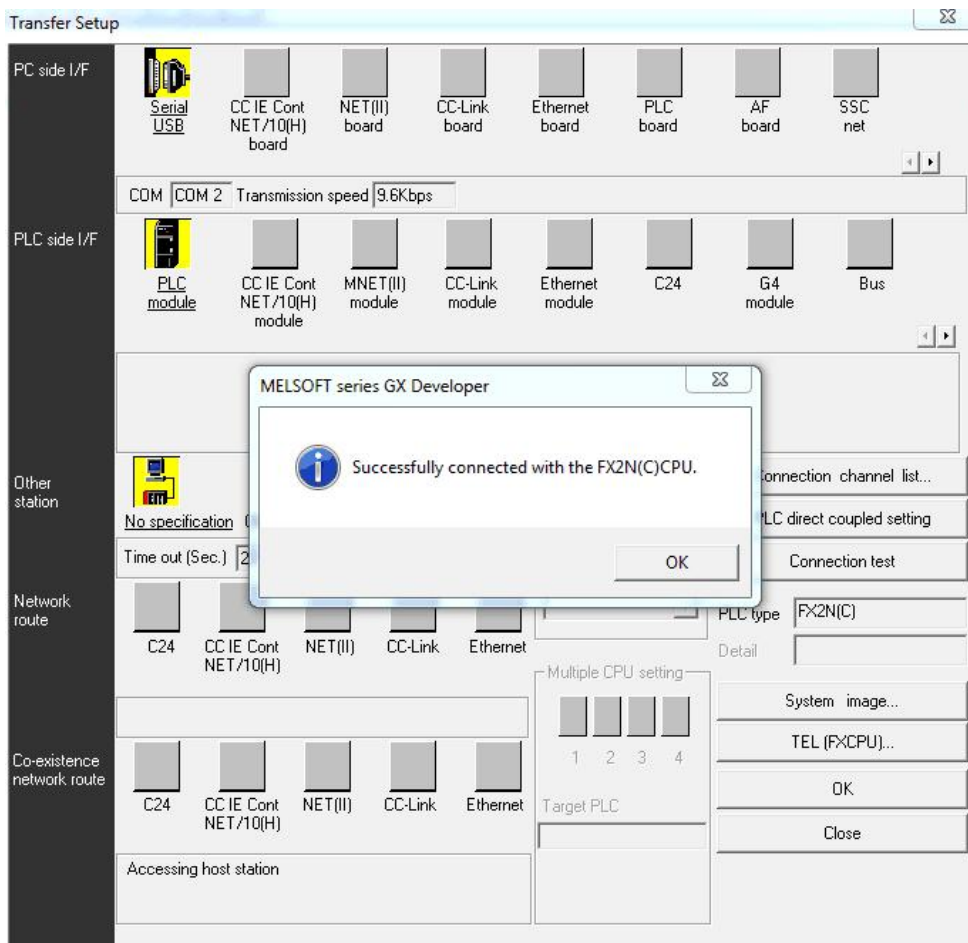
Advanced registration ID setting **43589** (Note: Each CX-4G module has a unique pair of registration ID, the specific registration ID in accordance with the factory parameters set, the product label will indicate each module corresponding to the registration ID number, if you forgot or not saved please ask Coolmay to obtain).

After the success of the creation as shown below, and the option of the synchronization baud rate option to un-selected state:



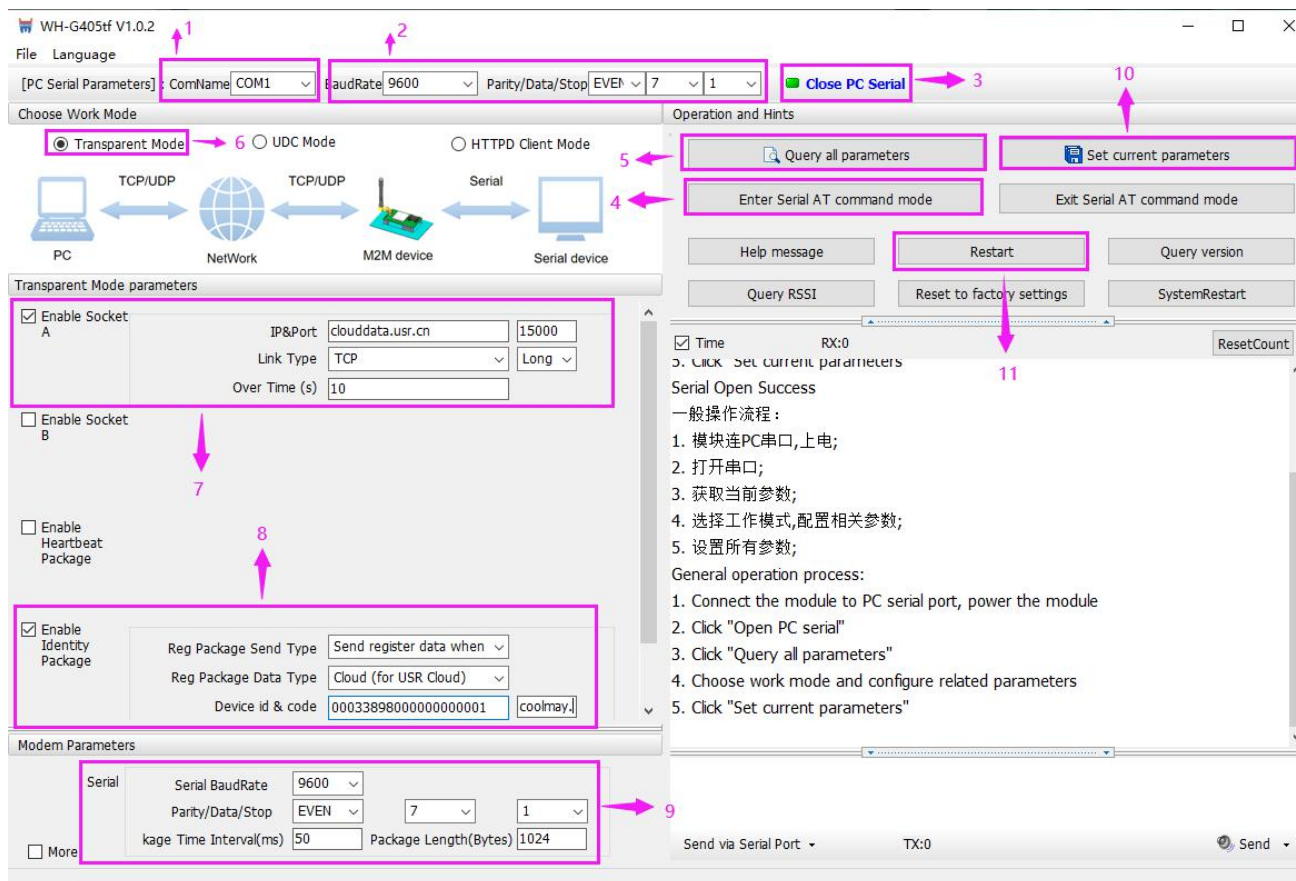
2.This procedure in the virtual serial port number COM2, PLC programming software to use COM2 connection, you can download the PLC program and remote monitoring control.

Note: PLC software version must be GX 8.52 or WORKS 2 can be connected successfully.



4. New module setting method (enable transparent cloud)

4.1 Network transparent transmission mode



1. Open the special setting software for new module “CX-4G”. Connect Rs232 or Rs485 of CX-4G with computer(if there isn’t Rs232 in computer, a USB to Rs232 male port cable can be used, and then connect to Rs232 cable, the pin definition is 2-3,3-2,5-5; Or adopt USB to Rs485 to connect computer and Rs485 of CX-4G), and then set the corresponding serial port.
2. Set the current internal baud rate,parity bit,data bit,stop bit,flow control and related parameters.
The factory defaulted parameters: baud rate 9600,parity bit EVEN,data bit 7, stop bit 1,flow control NONE; Back to factory defaulted parameters: baud rate 115200,parity bit NONE,data bit 8, stop bit 1,flow control NONE.
3. Click to open the serial port, connect CX-4G with computer.
- 4.Click “Configuration state”, Waiting for the equipment into the AT command configuration mode
5. Click “achieve current parameter”, after all the current parameters obtained, other parameters can be achieved, such as address,port,connect type,registered ID.
6. Select “network transmission mode” in “Working mode”
7. Select link to Server A, set “address and port” as `clouddata.usr.cn` and 15000. Set “link type” as TCP and long connection, other server not selected.

8. Select Enable registration packet, set “register package transmit mode” to send to server once when connect with server. Set “register data type” as registered ID. Set the "Register Data Type" to **Transparent Cloud**. Set the "equipment number and password" to BH which is the factory-set device number of the module (the specific device number BH should be set according to the factory parameters, and the device number BH corresponding to each module will be indicated on the product label. If you forget or do not save, please contact Coolmay);
9. All parameters Settings, settings of serial port, baud rate, parity, data, stop are parameters needed for devices with serial port. If communicate with Coolmay PLC, HMI/PLC all-in-one, Mitsubishi PLC or PLC which is compatible with Mitsubishi PLC, parameters are: **baud rate 9600, parity EVEN, data 7, stop bit 1, control flow NFC**.
10. Click “ set and save all parameters”
11. After save all parameters, click “restart”, or discharge the device and then charge it again.

4.2 Virtual serial port settings

1. Install Coolmay virtual serial port software and add virtual serial port

The screenshot shows the 'Add Virtual Serial Port' dialog box with the following settings:

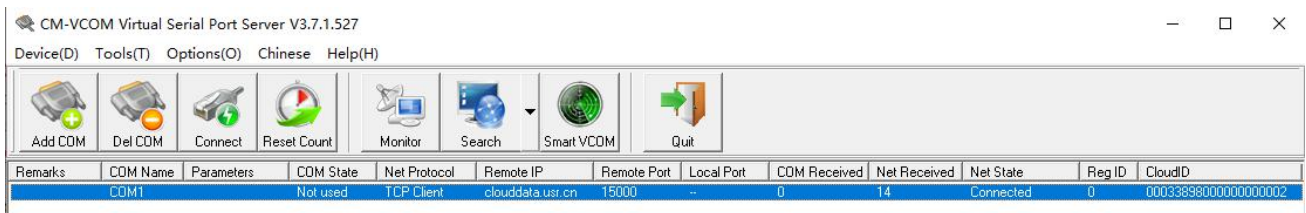
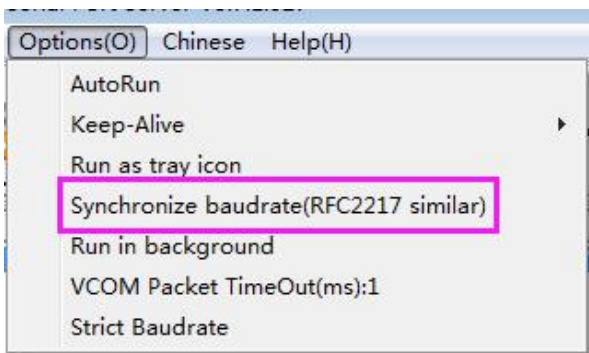
- Virtual COM: COM1
- Net Protocol: TCP Client
- Remote IP/addr: clouddata.usr.cn
- Remote Port: 15000
- Local Port: 8233
- Remarks: (empty)
- Use D2D:
- Register ID: 0 (?)
- Use USR CLOUD:
- Cloud ID: 00033898000000000002
- Communication Code: coolmay.

Notes:

The virtual serial port is set to an unused COM port on the computer
 Network protocol selects TCP Client;
 Target IP / domain name setting **clouddata**;
 Target port setting **15000**

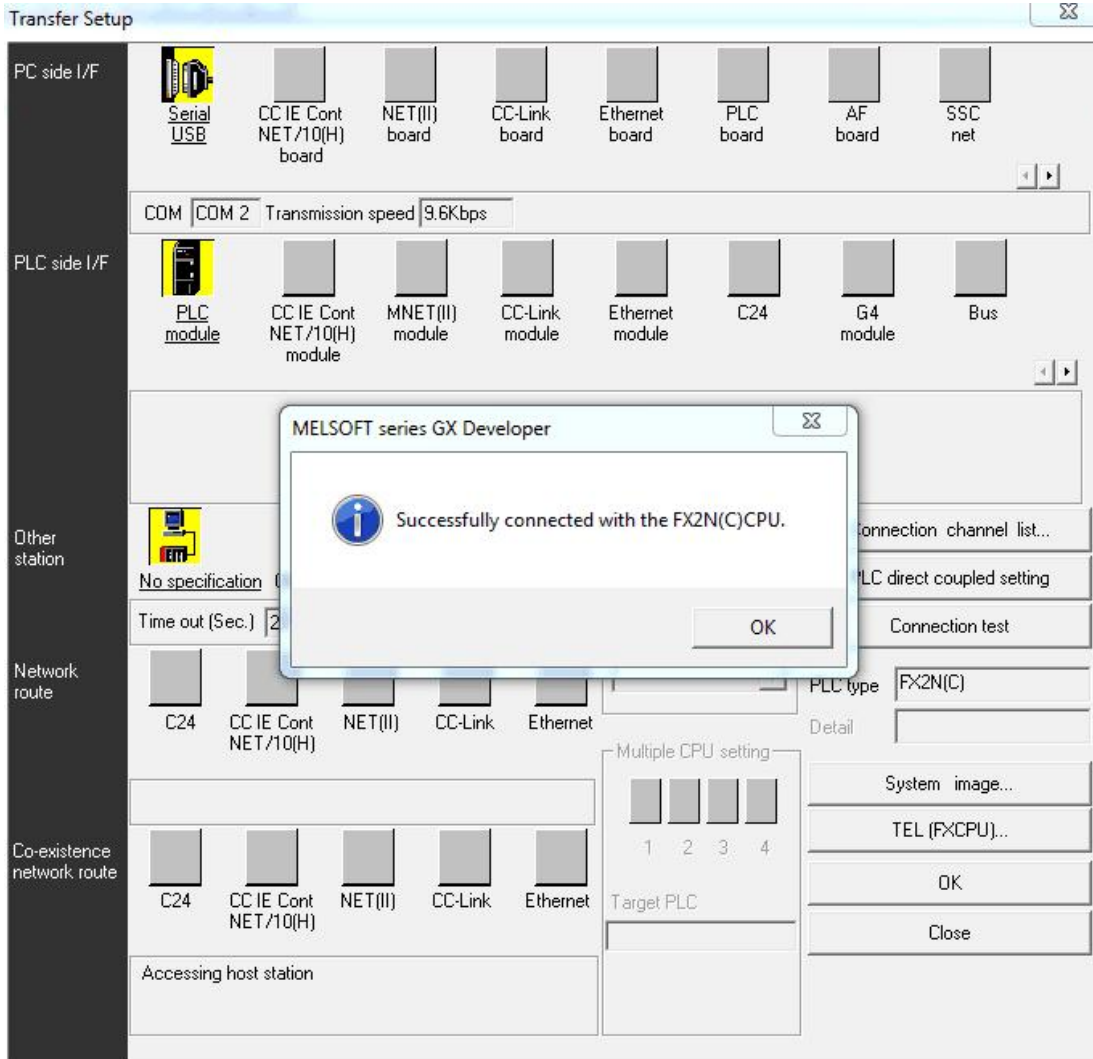
Advanced registration ID setting **43589** (Note: Each CX-4G module has a unique pair of registration ID, the specific registration ID in accordance with the factory parameters set, the product label will indicate each module corresponding to the registration ID number BH, if you forgot or not saved please contact coolmay. Communication password is “coolmay”).

After the success of the creation as shown below, and the option of the synchronization baud rate option to un-selected state:



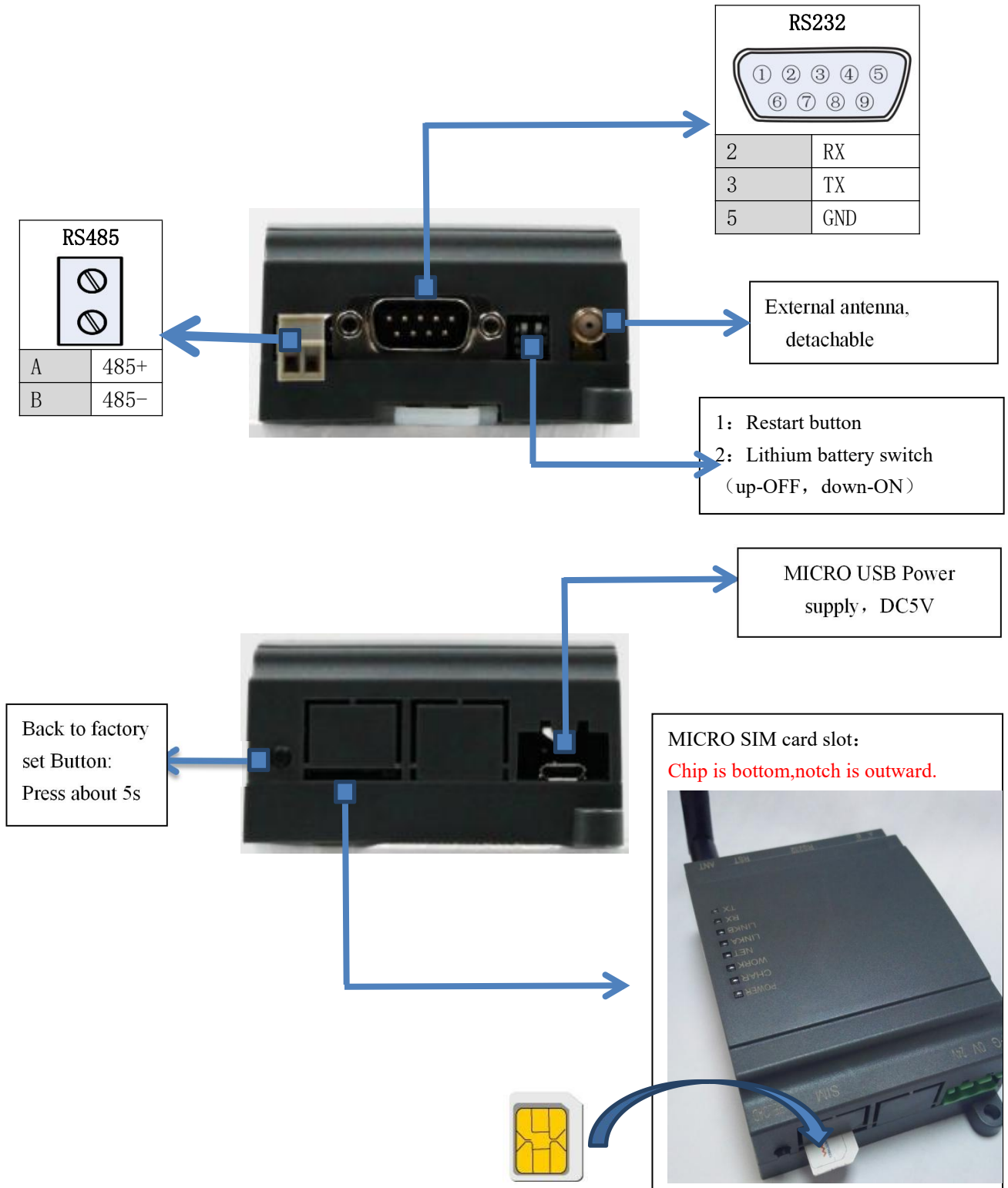
2.This procedure in the virtual serial port number COM3, PLC programming software to use COM3 connection, you can download the PLC program and remote monitoring control.

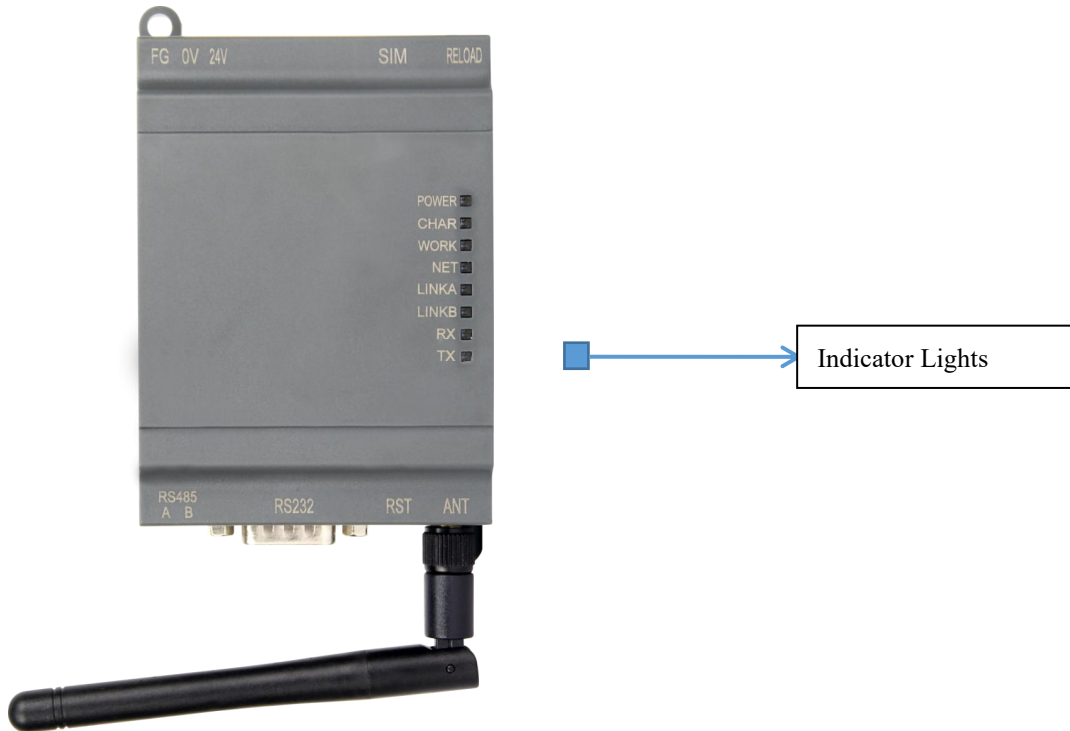
Note:2N series PLC software version must be GX 8.52 or WORKS 2 ,and 3G series PLC software must be GX8.86Q or WORKS 2 can be connected successfully.



5. CX-4G-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 CX-4G, as shown below:





| 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 | In 2G, flash twice per second In 3G, flash 3 times per second In 4G, flash 4 times per second No net, not flash |
| 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 flashing |
| TX | Data transmission indicator | Serial port network TX has data flashing |