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General Notes

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SCOPE

Thanks you select SIMCom GSM/GPRS module.

This product has standard AT command interface, and can provide GSM call, short message and GPRS net services, etc.

Please read this user guide carefully. You can realize the powerful function and the easy operation method of the module.

This module is used in voice or data communication mainly. We are not charge with the duty of personal injury and property loss for the custom abnormal operation. Please design the corresponding product according to the technical specification and reference in the handbook. And note the general safe item when use mobile product especially GSM product.

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

This document is applicable to SIM100S, SIM100F, SIM100C, SIM200, SIM300 module.

# Revision History

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12		How to establish a Point to Point connection of TCP with TCP module, and send data. Delete this chapter.
14	14	How to use Transparence mode

Content

1. How to establish a TCP connection with remote server

First, you need establish a TCP connect. The module worked as a client to set up a TCP connection to remote server. In order to connect successfully, the remote server should be a PC that connects to the internet. Then run the server software in the server PC. As shown in below: after start server software, the IP address, TCP port (default 2020, changeable) and UDP port (default 3030, changeable) etc will appeared in the frame of the server.
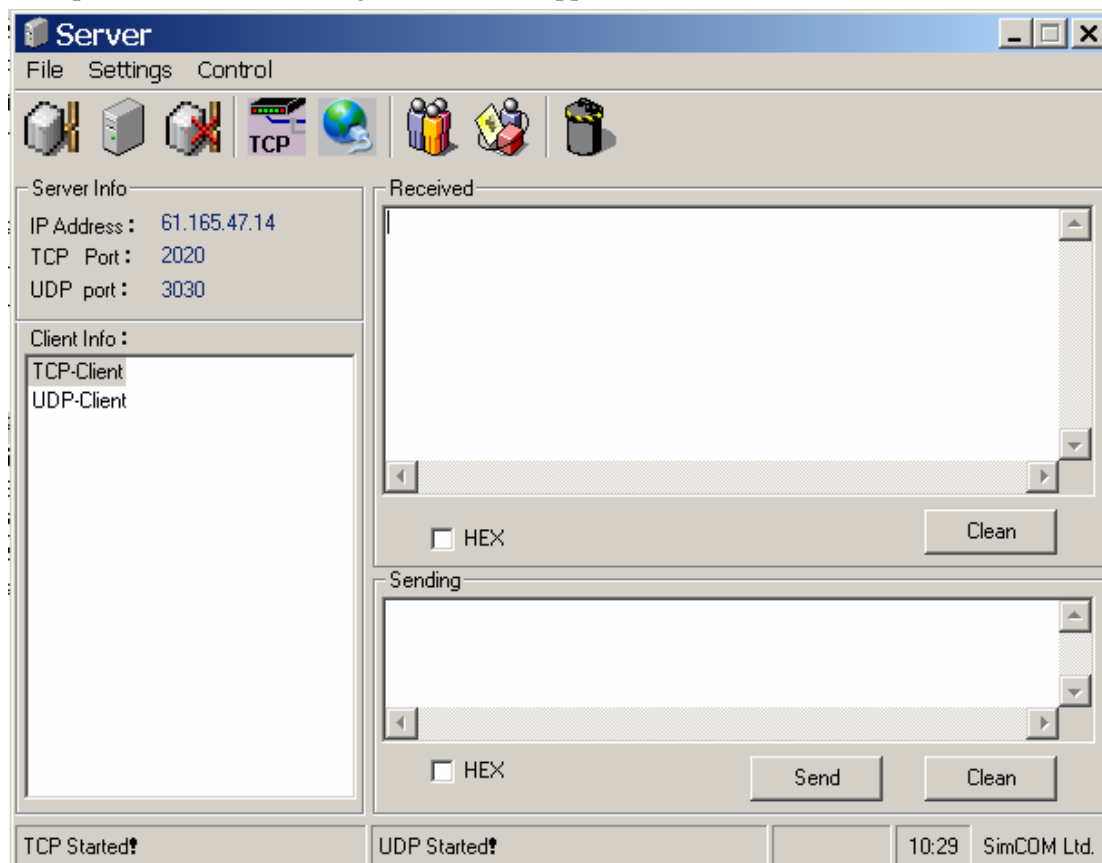
You can establish TCP connection between the module and the server by AT command (AT+CIPSTART="TCP", "IP address of server", "port number of the server), if the connection established successfully, response "CONNECT OK" will come up from the module.
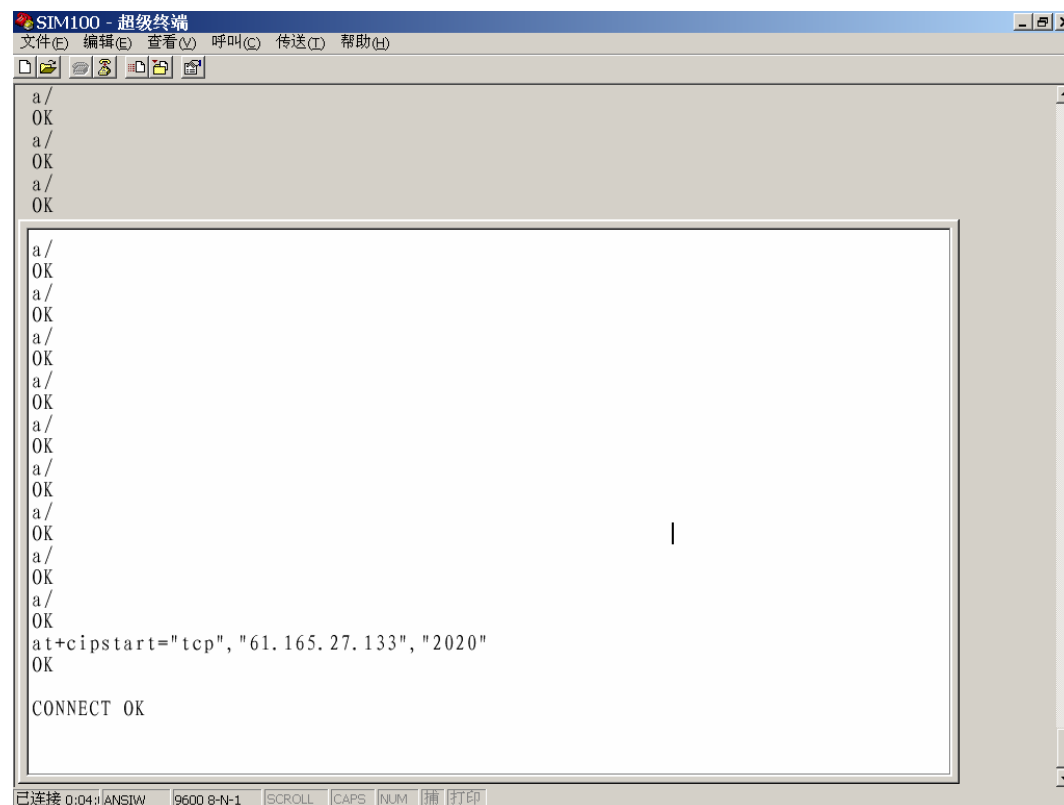
    If the connection established successfully, the IP address and port number of client (module) will appeared below TCP-Client.
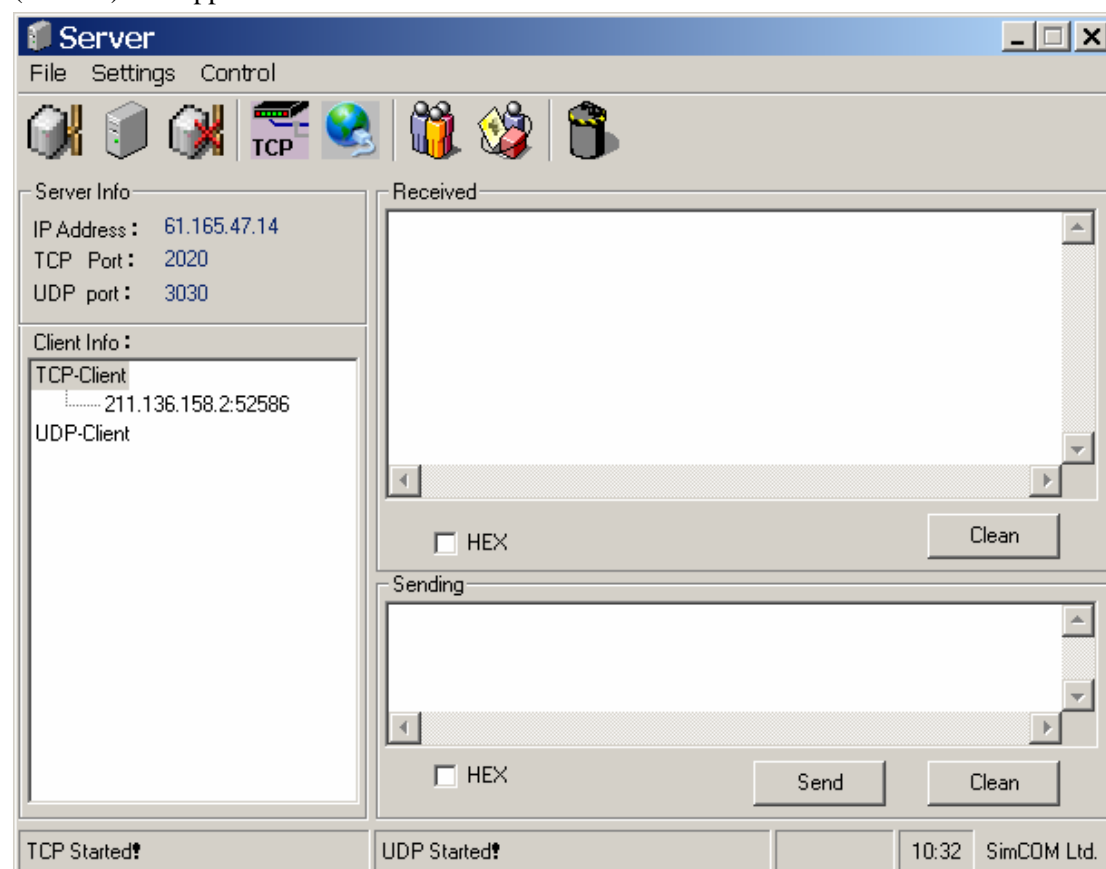
    Then you can send data to server with AT+CIPSEND, AT+CIPSEND will response ">",

then type the data, press CTRL+Z to send. If send successfully, it will response SEND OK.

Received data will appear in the received frame.
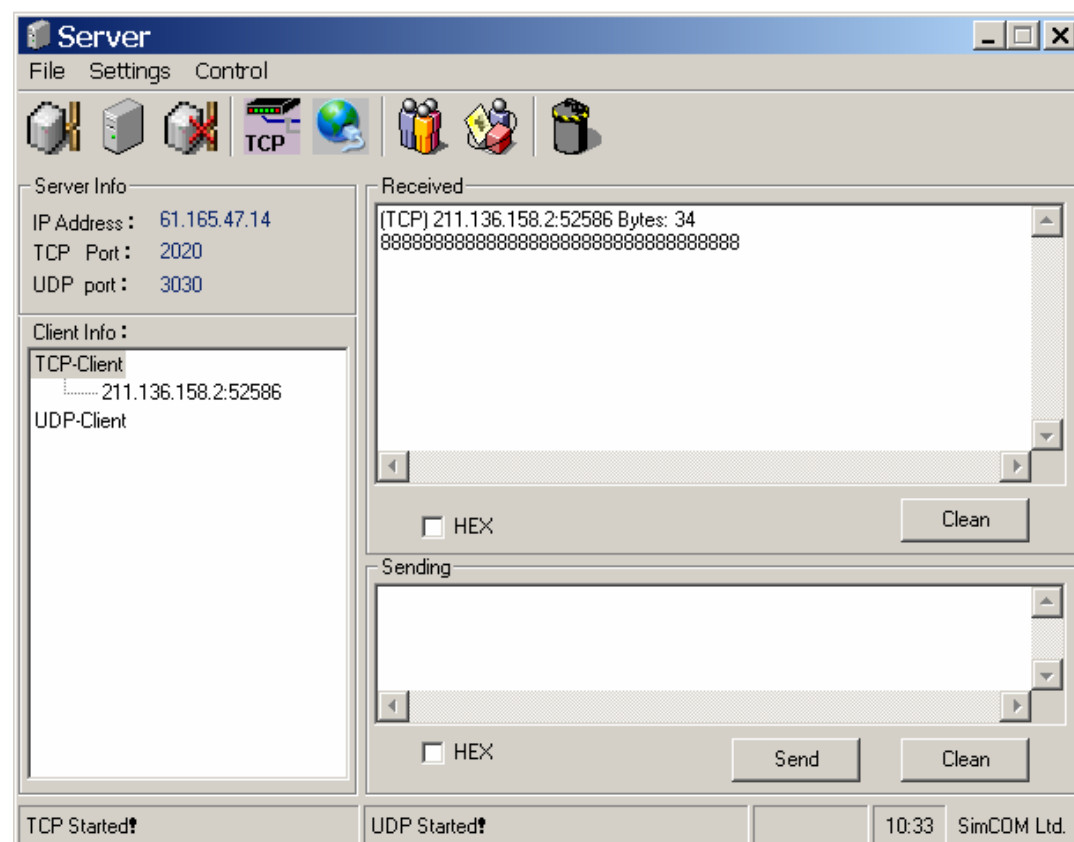
If server needs to send data to module, you can type the data in the sending frame, and then choose the TCP client (module), press send button, the data will be sent.
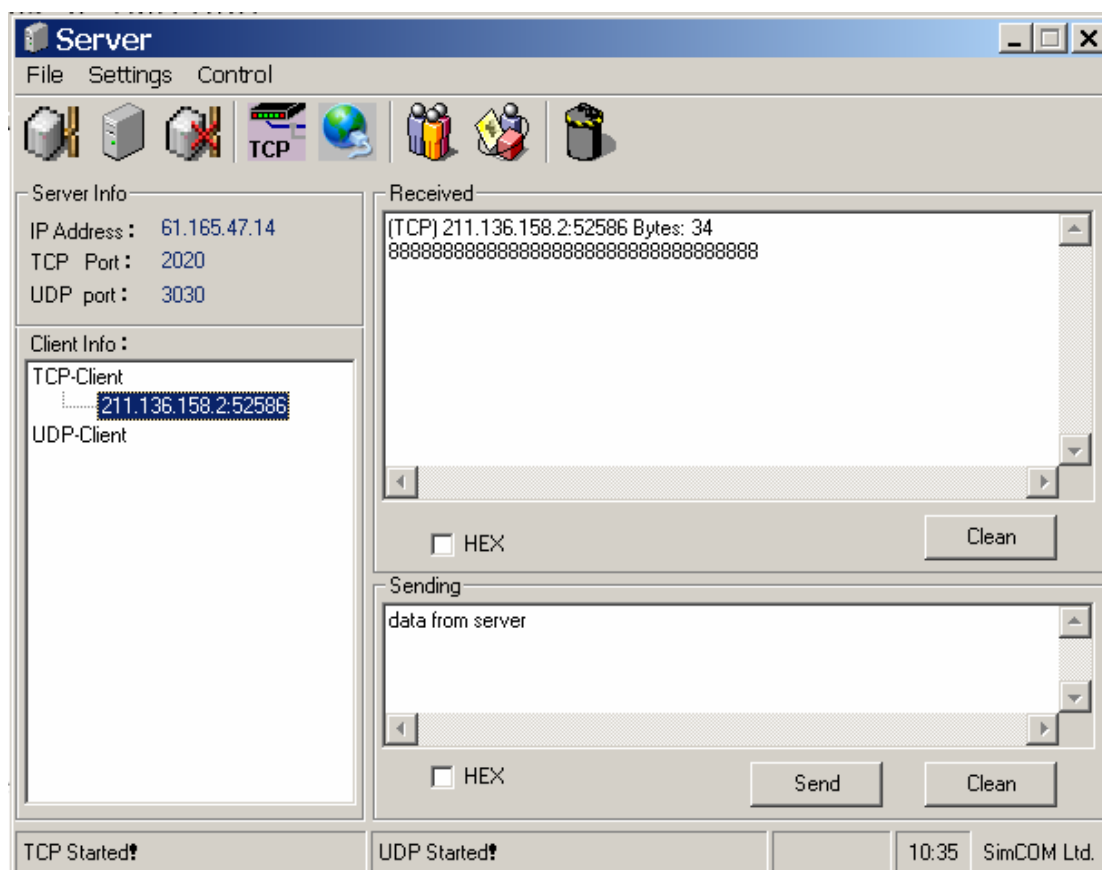
The data from server will be received and directly displayed at module serial port.
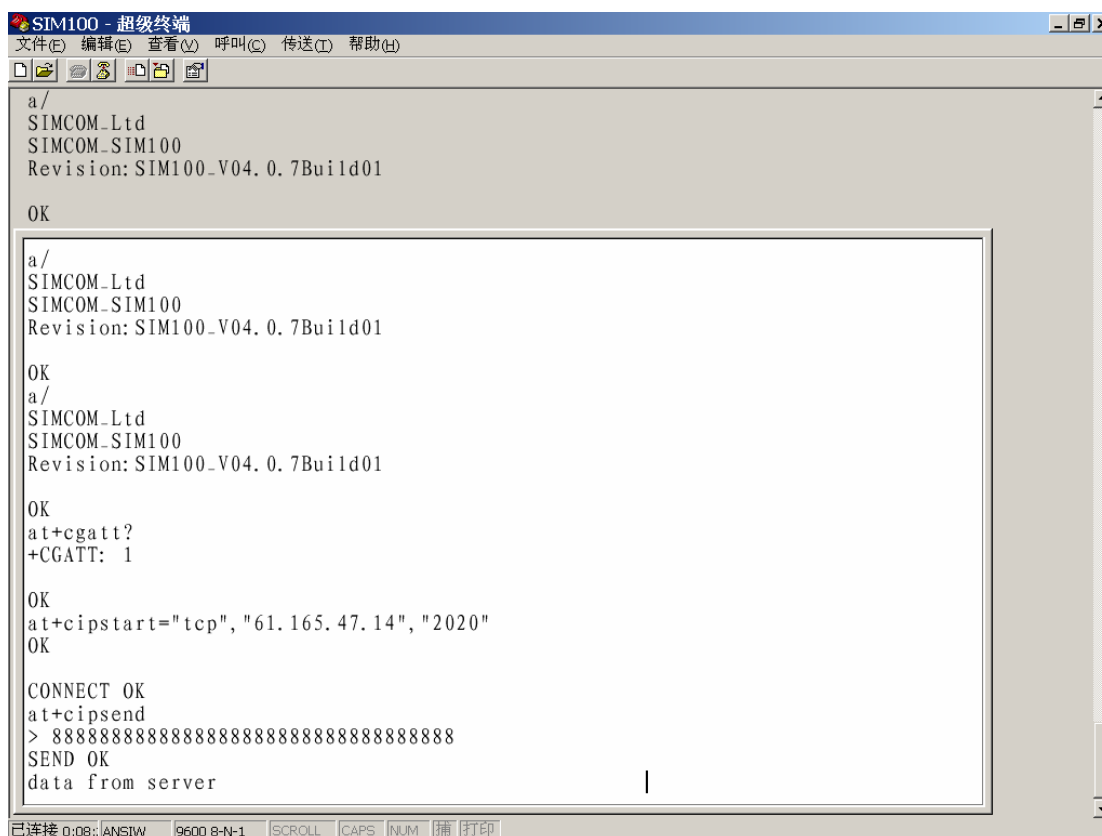
You can close the TCP connection with AT+CIPCLOSE command.

2. How to establish a UDP connection with remote server

First, you need start a UDP connection (AT+CIPSTART="UDP", "IP address of the server", "port number of the server"), if the connection established successfully, response 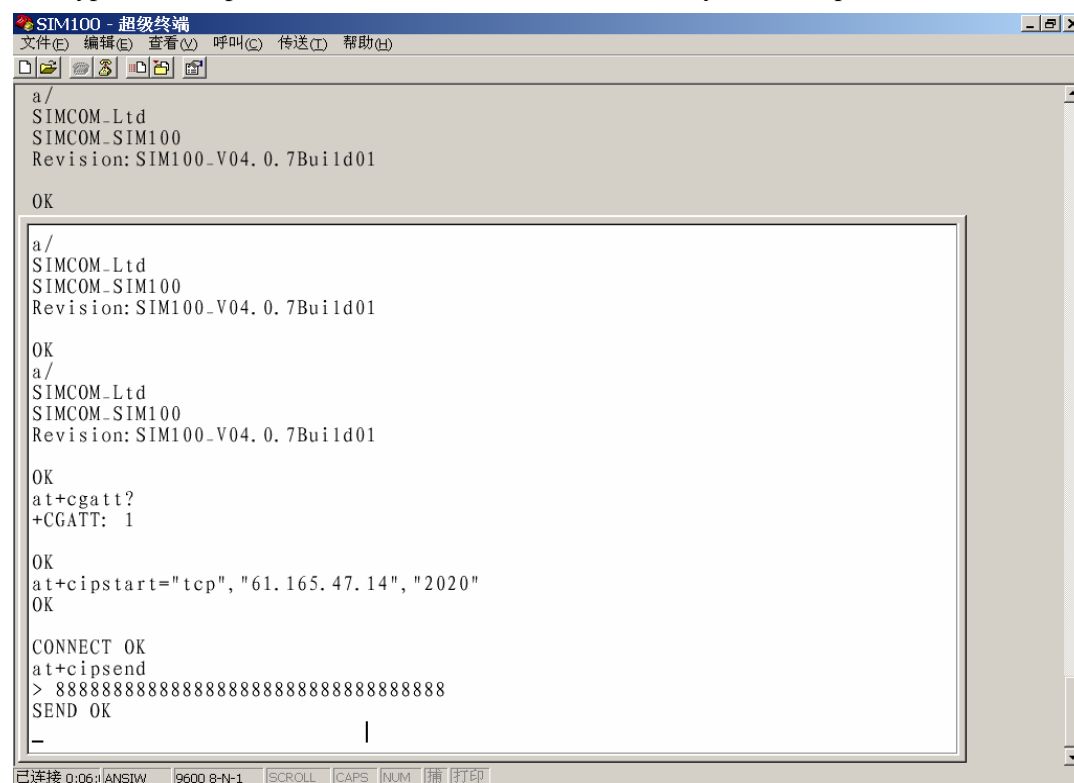"CONNECT OK" will comes up from the module. Then send UDP packet to remote server with AT+CIPSEND. Module will receive the data from server automatically, and send out the data from serial port. The process of send data with UDP is similar to TCP.

3. How to send data

You need establish a TCP connect or register a UDP connection before sending data. There are three ways to send data. You can send the changeable length data with AT+CIPSEND command, then type the data when response ">", ctrl+z (0x1a) is used to start the sending. You can send the fixed length data with AT+CIPSEND=LENGTH, then type the data when response ">", the data will be send automatically when the length of the data equal to LENGTH. You do not need to type the terminal symbol in this case. There is another way to send data automatically. First, set the time that send data automatically with the command of AT+CIPATS=<MODE>, <TIME>, then type AT+CIPSEND command, enter the data when response ">". The data will be sent automatically when it comes to the setting time. When the remote site received the data, response "SEND OK" will comes out from the module. Module still on the command state, you can repeat the steps if you want send other data.

> *Note: The maximum of data block that can be sent at each time is 1024bytes*

4. How to receive data

The module will receive data automatically if there is data coming from remote server. You can choose to add a header information before the received data with AT+CIPHEAD=1.

5. How to close a TCP/UDP connection

You can close the connection by AT+CIPCLOSE (only close current TCP/UDP connection, PDP context is still active), also you can close a connection by AT+CIPSHUT (current PDP context is deactivated)

Note:

If module communicate with server (PC), we suggest set AT+CIPFLP=0 after module power on.

The reconnection will faster after server close connection or module close connection (AT+CIPCLOSE). If modules communicate with each other, you must not set this.

6. How to use APN

SIMCom TCP module supports special APN. Detailed operation procedure is list as below:

AT+CSTT=”APN”, ”USER NAME”, ”USER PASSWORD” （set APN，user name，password）
AT+CIICR
AT+CIFSR
AT+CIPSTART=”TCP”,”REMOTE SERVER”,”PORT”   （establish a TCP connection）

OR as following steps:
AT+CIPCSGP=1,”APN”,”USER NAME”,”USER PASSOWRD”   （Select GPRS connection, set
                                                                                APN，user name，password）
AT+CIPSCONT (Save the configuration to flash memory)
AT+CIPSTART=”TCP”,”REMOTE SERVER”,”PORT”   （establish a TCP connection）

7. How to use the TCP server

You can configure the module as a TCP server. Detailed operation procedure is list as below:

For GPRS connection:
AT+CIPCSGP=1，”cmnet”（GPRS mode）
AT+CLPORT=“TCP”，“PORT” (set the TCP listening port)
AT+CIPSERVER (start server function, if successfully, response SERVER OK, and the server
                       function is now started to listen the TCP port)
AT+CIFSR (get the local IP address of server)

For CSD connection:
AT+CIPCSGP=0,”17201”,”172”,”172”, 2   （CSD mode, dial 17201, user name and password are
                                                     172, connect rate is 9600 bps）
AT+CLPORT=“TCP”，“PORT” (set the TCP listening port)
AT+CIPSERVER (start server function, if successfully, response CONNECT 9600 and SERVER
              OK, the server function is now started to listen the TCP port)
AT+CIFSR (get the local IP address of server)

You can notify the IP address and the port of local server to the remote client module via SMS, so that the remote client can know the server IP and port, then remote module can connect to server,

receiving and sending data.

If the client connects to the server successfully, it will display the IP address and port of remote client at server side. And the server can receive the TCP data (not include TCP header) from remote client. Also you can set the AT+CIPCCON=2, and then use AT+CIPSEND to send data back to the remote client.

Note: TCP server only supports one TCP connection at present.

8. How to receive remote data with UDP

The module will not receive any UDP data from remote until a UDP connection is established. You can receive the remote UDP data as the following steps:

For GPRS connection:
AT+CIPCSGP=1，"cmnet"（GPRS mode）
AT+CLPORT="UDP"， "port"（set UDP port）
AT+CSTT （start TCP task，if successfully, response OK）
AT+CIICR （activate an PDP context，if successfully, response OK)
AT+CIFSR （get local IP address）
AT+CIPSTART="UDP"， "REMOTE IP ADDR"， "REMOTE PORT"（start a UDP connection，"REMOTE IP ADDR" and "REMOTE PORT" can be any valid number，if successfully, response CONNECT OK）

For CSD connection:
AT+CIPCSGP=0,"17201","172","172"，2 （CSD connection, dial 17201, user name and password are 172, connect rate is 9600 bps）
AT+CLPORT="UDP"， "PORT"（set UDP port）
AT+CSTT (start TCP task，if successfully, response OK）
AT+CIICR (activate an PDP context，if successfully, response OK)
AT+CIFSR （get local IP address）
AT+CIPSTART="UDP"， "REMOTE IP ADDR"， "REMOTE PORT"（start a UDP connection，"REMOTE IP ADDR" and "REMOTE PORT" can be any valid number，if successfully, response CONNECT OK）

Then module receives the UDP packet from remote site. You can choose to add a header information (including the data length, remote IP address and port) before the received data with AT+CIPHEAD=1 and AT+CIPSRIP=1

9. How to use the DNS function

You can choose to connect to a hostname rather than an IP address with the DNS function of SIMCom TCP module, or resolve a hostname to get IP address. Detailed operation procedure list as below:

Connect to a hostname:
1：Configure DNS server address
AT+CDNSCFG="211.136.18.171" （for example: shanghai）
2：Choose hostname as a target
AT+CDNSORIP=1
3：Start a TCP connection
AT+CIPSTART="TCP","www.263.net", "80"   （connect to server）
4：Send data
AT+CIPSEND, send data when response">"，ctrl+z to startup send

Resolve a hostname to get IP address
1：Activate a PDP context
AT+CSTT
AT+CIICR
AT+CIFSR
2：Configure DNS server address
AT+CDNSCFG="211.136.18.171" （for example: shanghai）
3：Resolve hostname and get IP address
AT+CDNSGIP="www.263.net"
Here we get the IP address of the hostname.

10. How to check the TCP and GPRS network connectivity

Any time you can query current state of TCP with AT+CIPSTATUS. If TCP connection is active, you can get the response of CONNECT OK. If remote server closes the TCP connection, response CLOSE will come from module, and the TCP state is changed to IP CLOSE. You can restart a TCP connection by AT+CIPSTART. You can close the connection by AT+CIPSHUT if fails to connect, then restart the TCP connection.
If the current active PDP context is deactivated by the GPRS network, the module will give the response +PDP: DEACT, and TCP state is changed to GPRS DEACT, you must close the current TCP connection by AT+CIPSHUT, then restart the TCP connection by AT+CIPSTART.

11. How to distinguish received data with AT command responses

With AT+CIPHEAD=1, a header information field will added before the data from remote server automatically, the format is +IPD (data length), +IPD is sign; data length is the length of the data from remote server. So you can easily know which is the data from remote server or the response of AT command.

12. How to intercommunicate between modules

SIMCom TCP module does not support Multi-TCP connections simultaneously, but UDP mode supports this function. You can startup UDP function of module, and then the module can receive the UDP packet from remote. Get the IP address and the port of the sender that contained in UDP packet, then local module can response with a UDP packet. So it can intercommunicate with each other. For example:

Three modules A, B, C intercommunicates with each other. You can follow the way below (GPRS mode)

1：Initialize modules A, B, C separately
    AT+CIPCSGP=1，"cmnet"（GPRS mode）
    AT+CIPSRIP=1 (show remote IP and port before received data, optional)
    AT+CLPORT="UDP"，"port"（set UDP port）
    AT+CSTT （start TCP task，if successfully, response OK）
    AT+CIICR (activate a PDP context, if successfully, response OK)
    AT+CIFSR （get local IP address）
    AT+CIPSTART="UDP"，"REMOTE IP ADDR"，"REMOTE PORT"（start a UDP connection， "REMOTE IP ADDR" and "REMOTE PORT" can be any valid number，if successfully, response CONNECT OK）

2：If send data from A to B, follow the steps as below
    AT+CIPCLOSE （close the current UDP connection）
    AT+CIPSTART="UDP"，"IP address of B"，"port of B"（start a new UDP connection to B）
     （if success, response CONNECT OK and OK）
    AT+CIPSEND （send data）

    B will receive the UDP data from A and get the IP address and port of A. At the same time, then B can response a UDP packet to A.

3：If send data from C to A, A will received the data automatically, and get the IP address and port of C at the same time, so A can send UDP packet to C, general procedure is similar to the procedure listed before.

Then any module can send data to another (by AT+CIPSEND)

13. How to establish a CSD call

You can obtain the data call service from the network provider. Dial the number of remote module (data call, not voice call), the remote module response with ATA, and after a few seconds module will response CONNECT 9600. The two modules then enter the transparent data mode. They can receive and send data to each other. It can switch to command mode after sending +++ (note: there should be at least a 500ms idle period before and after +++, then it can switch to command mode), and return to data mode with ATO. You and terminate the data call with ATH in the command mode.

14. How to use Transparent Mode

SIMCom module supports Transparent Mode which provides a special data mode for data receiving and sending by TCP/IP application task. Once the connection is established under Transparent Mode, the module will be in data mode. All received data from serial port will be treated as data packet to be transferred later, similarly all data received from remote server will be sent to serial port directly. Methods are provided to switch back and forth between the data mode and command mode. Once switched to command mode, all AT commands can be used.

14.1 How to configure Transparent Mode

To enable Transparent Mode, AT+CIPMODE should be used. It has only one parameter which represents the mode, 0 is Command Mode and 1 is Transparent Mode. This command can only be used before you startup a TCP/UDP connection.

It can be configured by AT+CIPCCFG which has 4 parameters NmRetry, WaitTm, SendSz, Esc. NmRetry is the number of retries to be made for an IP packet. WaitTm is the number of 200ms intervals to wait for incoming data before sending the packet. SendSz is the size of data block to be received from serial port before sending. Esc represents whether the escape sequence is allowed, default is TRUE.

All parameters of AT+CIPMODE and AT+CIPCCFG can be saved by AT+CIPSCONT. These parameters will be read when the module power up.

14.2 How to establish TCP/UDP connection with Transparent Mode

To do this, AT+CIPSTART should be used. When connection is established, CONNECT will be returned in the serial port and the module will be in data mode. At the same time, DCD pin will be active low.

14.3 How to send and receive data with Transparent Mode

When the connection is established under Transparent Mode, data received from serial port will be sent by TCP/IP application task according to the profile which is defined by AT+CIPCCFG.
The module will receive data automatically. All received data are TCP/UDP data.

14.4 How to switch between command mode and data mode

To switch from data mode to command mode, following methods are available:
(1)The escape sequence can be used if the last parameter of AT+CIPCCFG is TRUE. The default escape sequence is +++, and to use this sequence, there should be 500ms idle period before and after this sequence. Besides, the interval between each + should not exceed 20ms, otherwise it will be treated as TCP/IP data.
(2)DTR line of serial port can also be used. To use this method, AT&D1 should be set firstly. Pull DTR line to ground for at least 1 second and then pull up, the module will switch from data mode to command mode and OK will be returned indicating the module is in command mode. If you want use this method again after power up, use AT&W to save this profile.
(3)For TCP connection, if the remote server closes the connection, the module will switch back to command mode automatically.
(4)If there is an error during data transferring, module will switch back to command mode and display the error prompt.

To switch back to data mode, following method is available:
ATO command can be used to switch from command mode to data mode if the connection is active. Otherwise ERROR will be returned.

14.5 How to use flow control

Hardware flow control is enabled under Transparent Mode. CTS pin of serial port will be deactivated (high) if a flow control is needed. Flow control will arise if the data buffer size is larger than 1/2 of the buffer size. When flow control arises, the module will still receive data from serial port. But if the received buffer overflows, module will not receive any data until there is enough buffer space. If the data buffered size is less than 1/4 of the buffer size, CTS will be activated (low) again.

14.6 How to handle incoming call and short message in data mode

RI pin of serial port will give a 50ms low pulse when a call is incoming during data mode.
RI pin will give a 120ms low pulse when a short message is received.
To handle the incoming call or SMS, you need to enter command mode first (using DTR or +++), and then the module will give the normal unsolicited responses as following:

RING (incoming call)

+CMTI："SM"，17 (short message)

And then it is able to answer the call or read the short message.

14.7 How to check the TCP/UDP connection activity

If TCP/UDP connection exists, the DCD pin will be active (low). At any time if the connection is dropped, DCD pin will go inactive (high).

14.8 How to handle with errors

If an error occurs, for example if module's TCP task failure while transmitting data or PDP context is deactivated from network, or remote server closes the TCP connection, serial port will be switched from data mode to command mode automatically.
If module can not transfer data anymore in Transparent Mode, first use escape sequence (+++) or DTR pin to switch to command mode.
Then shut down the TCP/UDP connection using AT+CIPSHUT and restart the connection.

14.9 Examples of Transparent Mode

Example I

AT+CIPMODE=1   //select transparent mode

OK

AT+CIPCCFG=3,2,256,1   //configure the mode: retry 3 times if sending failed

                                 //wait for 2*200ms to send one packet

                                 //send data at once if there are 256 bytes in the buffer

                                 //Escape sequence is allowed

OK

AT&D1   //DTR pin is allowed to switch serial port from data mode to command mode

OK

AT+CIPSTART="TCP","222.66.38.187","5000" //startup a TCP connection

OK

CONNECT   //Connection is established, serial port is in data mode

……   //display data received by TCPIP application task

……   //send data to serial port, it will not echoed back to Tx

+++   //valid escape sequence is received, switched back to command mode

OK   //in fact, +++ will not echo back to serial port

ATO   // switched back to data mode

CONNECT

……

……   //short message is received，RI pin gives 120ms active pulse

……   //activate DTR pin, serial port is switched to command mode

OK

+CMTI："SM"，17   //new message indication in the serial port

ATO   // switched to data mode

CONNECT

……   // continue transferring and sending data

+++   //when data transfer ends, switch to command mode

OK

AT+CIPSHUT   //shut down TCP/IP application

SHUT OK

Example II

AT+CIPMODE=1

OK

AT+CIPCCFG=5,2,1024,1

OK

AT&D1

OK

AT+CIPSCONT   //save parameters of AT+CIPMODE and AT+CIPCCFG

OK

AT&W   //save AT&D1 to profile

OK

AT+CIPSTART="TCP","222.66.38.187","5000"

OK

CONNECT

……   //buffered size is larger than 1/2 of buffer size

                        //CTS is deactivated (high)

……   //if more data is sent to serial port, data maybe throw away

……   //buffered size is less than 1/4 of buffer size

                        //CTS is reactivated (low)

……   //data transfer is OK, no data will be throw away

……

                        //if an error occurs, serial port will be switched to command mode

TCP ERROR：18   //TCP Error indications will be given to serial port

AT+CIPSHUT   //shut down TCPIP application

SHUT OK