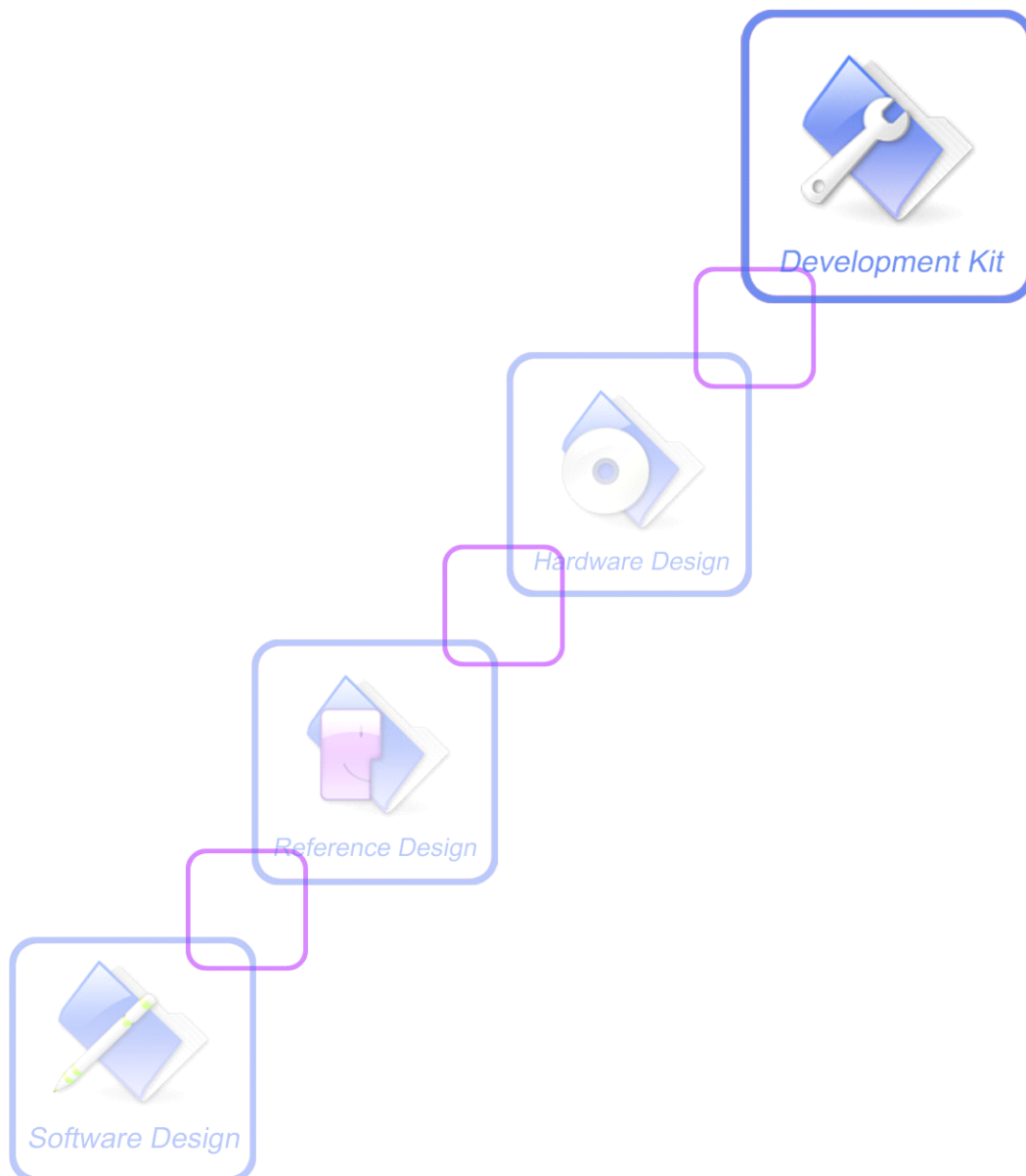


TCP/IP **Application Note**



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Version History

Version	Chapter	Comments
V0.01	New Version	Bai zhiqiang
V0.02	Add Transparent Mode Part	Song Jin

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1. Introduction

1.1 Overview

This document gives the usage of SIM52XX TCP/IP functions; user can get useful information about the SIM52XX TCP/IP functions quickly through this document.

The TCP/IP functions are provided in AT command format, and they are designed for customers to design their TCP/IP applications easily. User can access the TCP/IP AT commands through UART/ USB interface which communicates with SIM52XX module.

1.2 References

The present document is based on the following documents:

[1] SIMCOM_SIM5218_Serial_ATC_EN_V1.17.doc

1.3 Terms and Abbreviations

For the purposes of the present document, the following abbreviations apply:

- AT ATtention; the two-character abbreviation is used to start a command line to be sent from TE/DTE to TA/DCE
- EDGE Enhanced Data GSM Environment
- EGPRS Enhanced General Packet Radio Service
- TCP/IP Transmission Control Protocol/Internet Protocol
- GPRS General Packet Radio Service
- GSM Global System for Mobile communications
- PIN Personal Identification Number
- TA Terminal Adaptor; e.g. a data card (equal to DCE)
- TE Terminal Equipment; e.g. a computer (equal to DTE)
- UMTS Universal Mobile Telecommunications System
- URC Unsolicited Result Code
- USIM Universal Subscriber Identity Module
- WCDMA Wideband Code Division Multiple Access

2. Settings of PDP context

When you start to use TCP/IP feature, first you need to set some parameters of PDP context by AT commands, then you may active PDP context you defined.

2.1 Define PDP context

We know that AT+CGDCONT can define PDP context. In our products it is only used in the dial-up internet access. When you want to use our internal TCP/IP stack, you need to execute AT+CGSOCKCONT to define PDP context. The syntax of AT+CGSOCKCONT is same as the syntax of AT+CGDCONT. For example:

```
AT+CGSOCKCONT=1,"IP","cmnet"
```

2.2 Set authentication parameters

To some wireless networks, you are requested to provide username and password when you try to active PDP context. In this case, you need to set your username and password by **AT+CSOCKAUTH**. For example:

```
AT+CSOCKAUTH=1,1,"TEST","1234"
```

2.3 Set which setting of PDP context to be activated

By **AT+CGSOCKCONT** you can define 16 PDP contexts and you can select which PDP context will be activated by **AT+CSOCKSETPN**. For example:

```
AT+CSOCKSETPN=2
```

3. PDP context activation and deactivation

After setting PDP context's parameters, you may active or deactivate PDP context that you need.

3.1 PDP context activation

You can use **AT+NETOPEN** to active the PDP context. For example:

AT+NETOPEN="TCP", 80

If you need to use multiple IP clients, You can use the following command to active the PDP context:

AT+NETOPEN=, ,1

3.2 PDP context deactivation

You can use **AT+NETCLOSE** to deactivate PDP CONTEXT. The command will also close all sockets opened. For example:

AT+NETCLOSE

4. TCP/IP configure

4.1 Option of receiving data's length

When remote end send some data, then module will transmit these data to host. If host want to know what length of these data is, the option will be selected. For example:

AT+CIPHEAD=1

When this AT command is set, if there is any data received, the "+IPD<recv_len>" shall be reported. For example, when received "abcdefg", the following data will be reported:

*+IPD7
abcdefg*

4.2 Option of receiving data's address

When remote end send some data, then module will transmit these data to host. If host want to know where these data come from, the option will be selected. For example:

AT+CIPSRIP=1

When this AT command is set, if there is any data received, the "**RCV FROM: <IP ADDRESS>, <PORT>**" shall be reported. For example, when received "abcdefg", the following data will be reported:

```
RECV FROM:10.0.0.15, 30217  
abcdefg
```

If **AT+CIPHEAD=1** is also set, the report should be like the following:

```
RECV FROM:10.0.0.15, 30217  
+IPD7  
abcdefg
```

4.3 Other options

When we use TCP/IP feature, we need to adjust number of retransmission according to network status or you want to know whether your data is received by remote end. You can use **AT+CIPCCFG** to select options. For example:

```
AT+CIPCCFG=3,500,1,1,1
```

5. MULTI-CLIENT

5.1 Establish connection

After you active PDP context successfully using **AT+NETOPEN="TCP",80,1**, you may establish a TCP/UDP connection with remote end, then you can transfer data with remote end. For example:

```
AT+CIPOPEN=0,"TCP","116.228.221.51",100
```

If the second parameter is set with "**UDP**", it would be used for UDP data transaction. Currently up to 10 clients can be used at the same time.

5.2 Send data

You can send TCP/UDP data by **AT+CIPSEND**. For example:

```
AT+CIPSEND=0,4  
>Test  
+CIPSEND:4,4  
OK
```


5.3 Receive data

If there is any data received, the **+RECEIVE,<link_num>,<recv_len>** or **+IPD<recv_len>** may be used to indicate the length of the data received. For example, if the “abcdefg” is received, and the fifth parameter of **AT+CIPCCFG** is set to 0, the following data shall be reported:

```
+IPD7  
abcdefg
```

If the fifth parameter of AT+CIPCCFG is set to 1, the following data shall be reported:

```
+RECEIVE, 0, 7  
abcdefg
```

5.4 Close the IP connection

When the transaction is finished, you may want to close the IP connection. For example:

```
AT+CIPCLOSE=0
```

6. TCP Server

6.1 Create socket

If you want to use module as a TCP server, you need to create a socket first and assign a port to it. For example:

```
AT+NETOPEN="TCP", 80
```

This command also activates the PDP context.

6.2 Startup server

After creating socket and appointing a port to it, then you set the port as listening port. The TCP server may work. For example:

```
AT+SERVERSTART
```

6.3 List all clients connected

The AT+LISTCLIENT can be used to list the information of all connected clients:

```
AT+LISTCLIENT
+LISTCLIENT: 0, 10.71.34.32, 80
+LISTCLIENT: 1, 10.71.78.89, 1020
OK
```

6.4 Select a client to serve

As a TCP server, there may be several connected clients at the same time, and you may need to select a client to transfer data. For example:

```
AT+ACTCLIENT=0
```

6.5 Send data to the active client

As a TCP server, you can use **AT+TCPWRITE** to send data. For example:

```
AT+TCPWRITE=4
>Test
+TCPWRITE: 4,4
OK
```

6.6 Close a client IP connection

You may close a connection with a client. For example:

```
AT+CLOSECLIENT=0
```

7. Transparent Mode

SIM52XX 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 directly, similarly all data received from the remote side will be sent to serial port directly too. In transparent mode, all AT commands are not available. Methods are provided to switch back and forth between data mode and

command mode. Once switched to command mode, all AT commands can be used again.

Like the normal SIM52XX TCP/IP transaction method, the SIM52XX TCP/IP transparent mode also supports client-side transparent mode and server-side transparent mode.

Note: *SIM52XX's UART supports two modes: 3 line mode and 7 line mode. In transparent mode, you must select 7 line mode by AT+CSUART=1. If you need to use DCD function, the AT&C1 should be set before calling the TCP related AT commands.*

7.1 Configure the transparent mode

To enable transparent mode, the following AT command should be used:

```
AT+CIPMODE=1
```

7.2 Client-side transparent mode

After the **AT+CIPMODE=1** is set, the **AT+TCPCONNECT** command can be used to establish a transparent mode TCP connection, and when the TCP connection is established, the "**CONNECT 115200**" shall reported immediately indicating the serial port enters the transparent mode:

```
AT+TCPCONNECT="116.228.221.51",9003  
CONNECT 115200
```

7.3 Server-side transparent mode

If you need to realize a server-mode TCP transparent transaction, both the **AT+CIPMODE=1** and **ATS0=<n>** needs to be set. Then the following **AT+SERVERSTART** can be used:

```
AT+SERVERSTART
```

The client side needs to know the server IP address before establishing TCP connection. The **AT+CIPADDR** can be used to query server IP address:

```
+IPADDR: 10.71.155.118  
OK
```

If a client connects to the server successfully, the "**CONNECT 115200**" will be reported to indicate the serial port enters the transparent mode:

```
+CLIENT: 10.0.0.13:30132  
CONNECT 115200
```

Note: In server-side transparent mode, only one client can be allowed to connect the SIM52XX TCP server at the same time.

7.4 Switching between data and command mode

Currently only USB-MODEM and UART ports can be used to switch between data mode and command mode:

7.4.1 Switch from data mode to command mode

The following methods can be used to switch from data mode to command mode:

- 1) The default escape sequence is +++ , and to use this sequence, there should be 1000 ms idle period before this sequence and 1000 ms idle period after this sequence.
- 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. When setting **AT&D2**, operating DTR pin may close the connection and switch from data mode to command mode, then the “**CLOSED**” will be reported.
- 3) For TCP client connection, if the remote server closes the connection, the module will switch back to command mode automatically.

7.4.1 Switch from command mode to data mode

The ATO command can be used to switch from command mode to data mode if the connection is active, and “**CONNECT 115200**” will be reported again:

```
ATO  
CONNECT 115200
```

7.5 Close the transparent mode TCP connection

If you need to close the current transparent mode TCP connection, the following methods can be used:

- 1) If **AT&D2** is set, the DTR can be pulled down for 1 second to disconnect the connection
- 2) You can switch to command mode, and use AT+NETCLOSE to shutdown the TCP connection, and it will also deactivate the current PDP context. For server-side mode, the AT+CLOSECLIENT=0 can be used to shutdown the current TCP connection without deactivate the current PDP context.

If the connection is closed by the remote end, the **"CLOSED"** will be reported and the DCD shall be pulled up if ATC1 is set.

8. TCP/IP AT Command Samples

7.1 Multi-client

Commands and Responses	Comments
AT+NETOPEN=,1 Network opened OK	Activate the specified socket's PDP context and Select in multi-client mode
AT+CIPOPEN=0,"TCP","116.228.221.51",100 Connect ok OK	Establish a connection with TCP Server
AT+CIPOPEN=1,"UDP","116.228.221.51",120 OK	Establish a connection with UDP Server
AT+CIPSEND=0,7 >SimTech +CIPSEND: 7, 7 OK Send ok	Send data in the connection of number 0
AT+CIPSEND=1,7 >SimTech +CIPSEND: 7, 7 OK	Send data in the connection of number 1
AT+CIPCLOSE=0 OK	Close the connection of number 0
AT+NETCLOSE OK	Close all of connections and Deactivate the specified socket's PDP context.

7.2 TCP server

Commands and Responses	Comments
AT+NETOPEN="TCP",80 Network opened OK	Activate the specified socket's PDP context and Create a socket.
AT+SERVERSTART OK	For Tcp Server,it starts a Passive open for connec tions.
AT+LISTCLIENT NO.0 client : 10.71.34.32 80 NO.1 client : 10.71.78.89 1020 OK	List all of clients' information.
AT+ACTCLIENT = 0 OK	Activate the specified client.
AT+TCPWRITE=8 >ABCDEFGH +TCPWRITE: 8, 8 OK Send ok	Send data to an active client.
AT+CLOSECLIENT=0 OK	Close the specified client.
AT+NETCLOSE Network closed OK	Close all of clients and Deactivate the specified socket's PDP context.

7.3 Client-side transparent mode

Commands and Responses	Comments
AT+CIPMODE=1 OK	Set using transparent mode
AT&C1 OK	Set using DCD pin to indicate the TCP connection
AT&D1 OK	Set using DTR to switch from data mode to command mode
AT+NETOPEN="TCP",80 Network opened OK	Activate the specified socket's PDP context and Create a socket.
AT+TCPCONNECT="116.228.221.51",4497 CONNECT 115200	Establish the connection. After the "CONNECT 115200", the serial port enters the transparent mode

+++ (or DTR is pulled down for 1 second) OK	Switch from data mode to command mode. After the "OK" is reported, user can input AT commands.
ATO CONNECTION 115200	Switch from command mode to data mode again
+++ (or DTR is pulled down for 1 second) OK	Switch from data mode to command mode. After the "OK" is reported, user can input AT commands.
AT+NETCLOSE Network closed OK	Close the TCP connection and deactivate the PDP context.

7.4 Server-side transparent mode

Commands and Responses	Comments
AT+CIPMODE=1 OK	Set using transparent mode
AT&C1 OK	Set using DCD pin to indicate the TCP connection
AT&D1 OK	Set using DTR to switch from data mode to command mode
AT&S0=1	Set using the current serial port to establish transparent mode TCP connection
AT+NETOPEN="TCP",4497 Network opened OK	Activate the specified socket's PDP context and Create a socket. The TCP listening port is 4497.
AT+IPADDR +IPADDR: 10.71.155.118 OK	Query the server IP address. The port is set to 4497 currently.
AT+SERVERSTART OK	Start the TCP server. In this example the server listening address is 10.71.155.118:4497
+CLIENT: 10.0.0.13:30132 CONNECT 115200	Client established the connection, and after the "CONNECT 115200" is reported, the serial port enters the transparent mode
+++ (or DTR is pulled down for 1 second) OK	Switch from data mode to command mode. After the "OK" is reported, user can input AT commands.
ATO CONNECTION 115200	Switch from command mode to data mode again
+++ (or DTR is pulled down for 1 second) OK	Switch from data mode to command mode. After the "OK" is reported, user can input AT commands.

AT+NETCLOSE Network closed OK	Close the TCP connection and deactivate the PDP context.
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