



SIM7022 Series_ TCPIP_Application Note

LPWA Module

SIMCom Wireless Solutions Limited

SIMCom Headquarters Building, Building 3, No. 289 Linhong
Road, Changning District, Shanghai P.R. China

Tel: 86-21-31575100

support@simcom.com

www.simcom.com

Document Title:	SIM7022 Series_TCPIP_Application Note
Version:	1.04
Date:	2023.03.30
Status:	Released

GENERAL NOTES

SIMCOM OFFERS THIS INFORMATION AS A SERVICE TO ITS CUSTOMERS, TO SUPPORT APPLICATION AND ENGINEERING EFFORTS THAT USE THE PRODUCTS DESIGNED BY SIMCOM. THE INFORMATION PROVIDED IS BASED UPON REQUIREMENTS SPECIFICALLY PROVIDED TO SIMCOM BY THE CUSTOMERS. SIMCOM HAS NOT UNDERTAKEN ANY INDEPENDENT SEARCH FOR ADDITIONAL RELEVANT INFORMATION, INCLUDING ANY INFORMATION THAT MAY BE IN THE CUSTOMER'S POSSESSION. FURTHERMORE, SYSTEM VALIDATION OF THIS PRODUCT DESIGNED BY SIMCOM WITHIN A LARGER ELECTRONIC SYSTEM REMAINS THE RESPONSIBILITY OF THE CUSTOMER OR THE CUSTOMER'S SYSTEM INTEGRATOR. ALL SPECIFICATIONS SUPPLIED HEREIN ARE SUBJECT TO CHANGE.

COPYRIGHT

THIS DOCUMENT CONTAINS PROPRIETARY TECHNICAL INFORMATION WHICH IS THE PROPERTY OF SIMCOM WIRELESS SOLUTIONS LIMITED. COPYING, TO OTHERS AND USING THIS DOCUMENT, ARE FORBIDDEN WITHOUT EXPRESS AUTHORITY BY SIMCOM. OFFENDERS ARE LIABLE TO THE PAYMENT OF INDEMNIFICATIONS. ALL RIGHTS RESERVED BY SIMCOM IN THE PROPRIETARY TECHNICAL INFORMATION, INCLUDING BUT NOT LIMITED TO REGISTRATION GRANTING OF A PATENT, A UTILITY MODEL OR DESIGN. ALL SPECIFICATION SUPPLIED HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME.

SIMCom Wireless Solutions Limited

SIMCom Headquarters Building, Building 3, No. 289 Linhong Road, Changning District, Shanghai P.R. China

Tel: +86 21 31575100

Email: simcom@simcom.com

For more information, please visit:

<https://www.simcom.com/download/list-863-en.html>

For technical support, or to report documentation errors, please visit:

<https://www.simcom.com/ask/> or email to: support@simcom.com

Copyright © 2023 SIMCom Wireless Solutions Limited All Rights Reserved.

About Document

Version History

Revision	Date	Chapter	Description
V1.00	2022.05.12	All	New version
V1.01	2022.05.31	All	Update file
V1.02	2022.07.06	All	Update file
V1.03	2022.11.22	All	Update file
V1.04	2023.03.07	3.1.1Network Environment	Word modification

Scope

This document could be applied to following modules.

Name	Type	Size(mm)	Description
SIM7022	NB2	17.6*15.7	Band 1/2/3/4/5/8/12/13/14/17/18/19/20/25/26/28/66/70/85

Contents

About Document	2
Version History	2
Scope	2
Contents	3
1 Introduction	5
1.1 Purpose of the document	5
1.2 The process of Using TCPIP AT Commands	6
1.3 Description of Data Access Mode	8
2 TCPIP AT Commands	9
2.1 Description of AT Commands	9
2.1.1 AT+NETOPEN Start Socket Service	9
2.1.2 AT+NETCLOSE Stop Socket Service	10
2.1.3 AT+CIOOPEN Establish Connection in Multi-Socket Mode	11
2.1.4 AT+CIPSEND Send data through TCP or UDP Connection	14
2.1.5 AT+CIPRXGET Set the Mode to Retrieve Data	17
2.1.6 AT+CIPCLOSE Close TCP or UDP Socket	20
2.1.7 AT+IPADDR Inquire Socket PDP address	22
2.1.8 AT+CIPHEAD Add an IP Header When Receiving Data	23
2.1.9 AT+CIPSRIP Show Remote IP Address and Port	24
2.1.10 AT+CIPMODE Set TCP/IP Application Mode	25
2.1.11 AT+CIPSENDMODE Set Sending Mode	26
2.1.12 AT+CIPTIMEOUT Set TCP/IP Timeout Value	28
2.1.13 AT+CIPCCFG Configure Parameters of Socket	29
2.1.14 AT+SERVERSTART Startup TCP Sever	30
2.1.15 AT+SERVERSTOP Stop TCP Sever	32
2.1.16 AT+CIPACK Query TCP Connection Data Transmitting Status	33
2.1.17 AT+CDNSGIP Query the IP Address of Given Domain Name	34
2.1.18 AT+CSOCKSETPN Set active PDP context's profile	35
2.1.19 AT+CTCPKA Conigure TCP heartbeat	36
2.1.20 AT+CDNSCFG Configure Domain Name Server	37
2.2 Description of URC	38
3 Examples	40
3.1 Configure and Activate context	40
3.1.1 Network Environment	40
3.1.2 Configure Context	40
3.1.3 Activate context	41

3.1.4 Deactivate Context	41
3.2 TCP Client	42
3.2.1 TCP Client Works in Direct Push Mode	42
3.2.2 TCP Client Works in Buffer Access Mode	42
3.2.3 TCP Client Works in Transparent Access Mode	44
3.3 UDP Client	45
3.3.1 UDP Client Works in Direct Push Mode	45
3.3.2 UDP Client Works in Buffer Access Mode	46
3.3.3 UDP Client Works in Transparent Access Mode	47
3.4 TCP Server	48
3.4.1 Transparent Mode	48
3.4.2 Non-Transparent Mode	49
3.4.3 Query Connection Status	50
4 Error Handling	51
4.1 Executing TCPIP AT Commands Fails	51
4.2 PDP Activation Fails	51
5 Summary of Error Codes	52
5.1 Description of <err_info>	52
5.2 Description of <err>	53
6 Appendix A Reference	54
6.1 Related documents	54
6.2 Conventions and abbreviations	54

1 Introduction

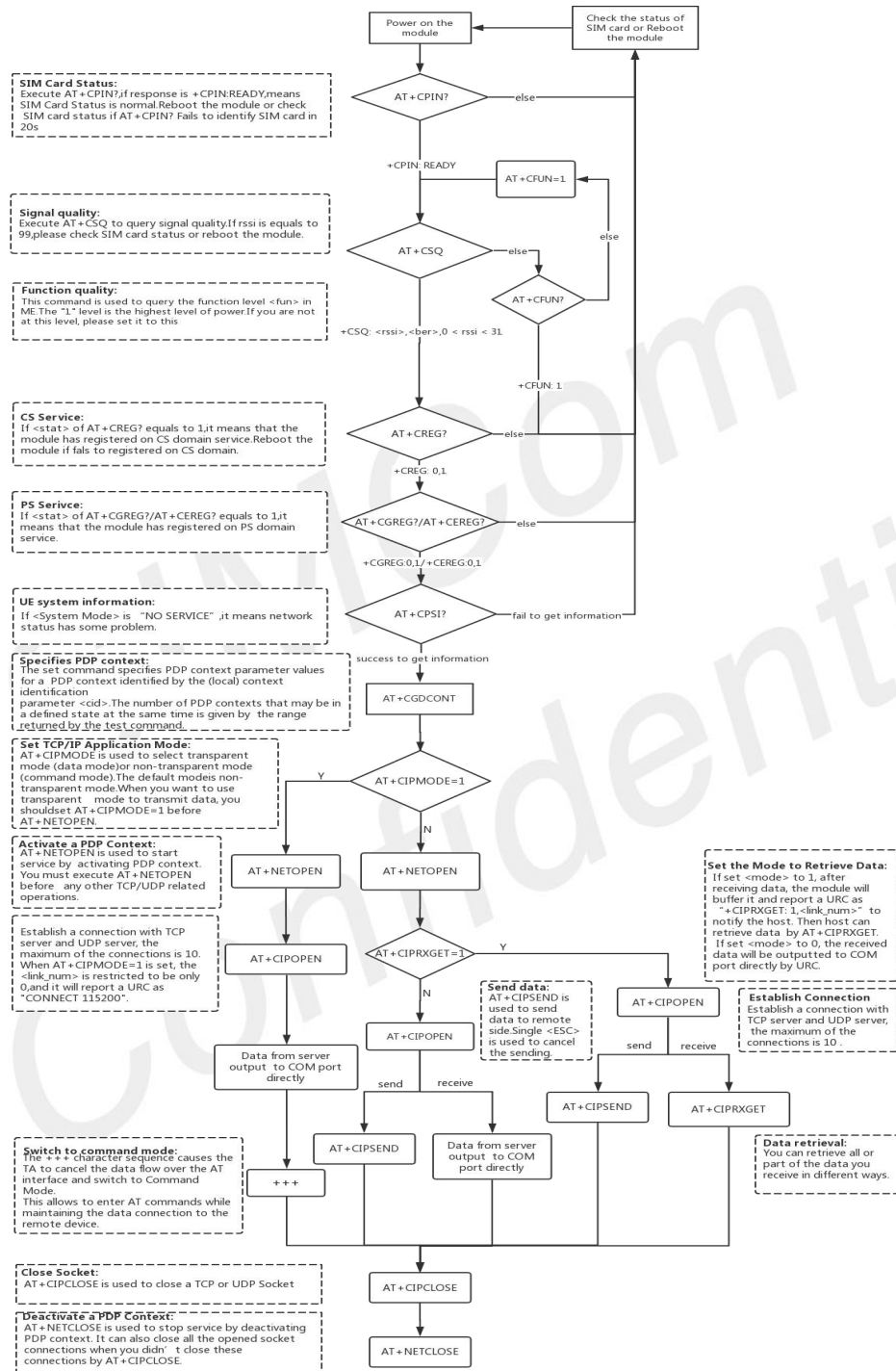
1.1 Purpose of the document

Based on module AT command manual, this document will introduce TCPIP application process for SIM7022 series of module. Developers could understand and develop application quickly and efficiently based on this document.

SIMCom
Confidential

1.2 The process of Using TCPIP AT Commands

Figure illustrates how to use TCP/IP AT commands:



NOTE: If you need to use the TCP server, you'll need special SIM cards.

SIM Card Status:
Execute AT+CPIN?, if response is +CPIN:READY, means SIM Card Status is normal. Reboot the module or check SIM card status if AT+CPIN? fails to identify SIM card in 20s

Signal quality:
Execute AT+CSQ to query signal quality. If rssi is equals to 99, please check SIM card status or reboot the module.

Function quality:
This command is used to query the function level <fun> in ME. The "1" level is the highest level of power. If you are not at this level, please set it to this

CS Service:
If <stat> of AT+CREG? equals to 1, it means that the module has registered on CS domain service. Reboot the module if fails to registered on CS domain.

PS Service:
If <stat> of AT+CGREG?/AT+CEREG? equals to 1, it means that the module has registered on PS domain service.

UE system information:
If <System Mode> is "NO SERVICE", it means network status has some problem.

Specifies PDP context:
The set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter <cid>. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.

Set TCP/IP Application Mode:
AT+CIPMODE is used to select transparent mode (data mode) or non-transparent mode (command mode). The default mode is non-transparent mode. When you want to use transparent mode to transmit data, you should set AT+CIPMODE=1 before AT+NETOPEN.

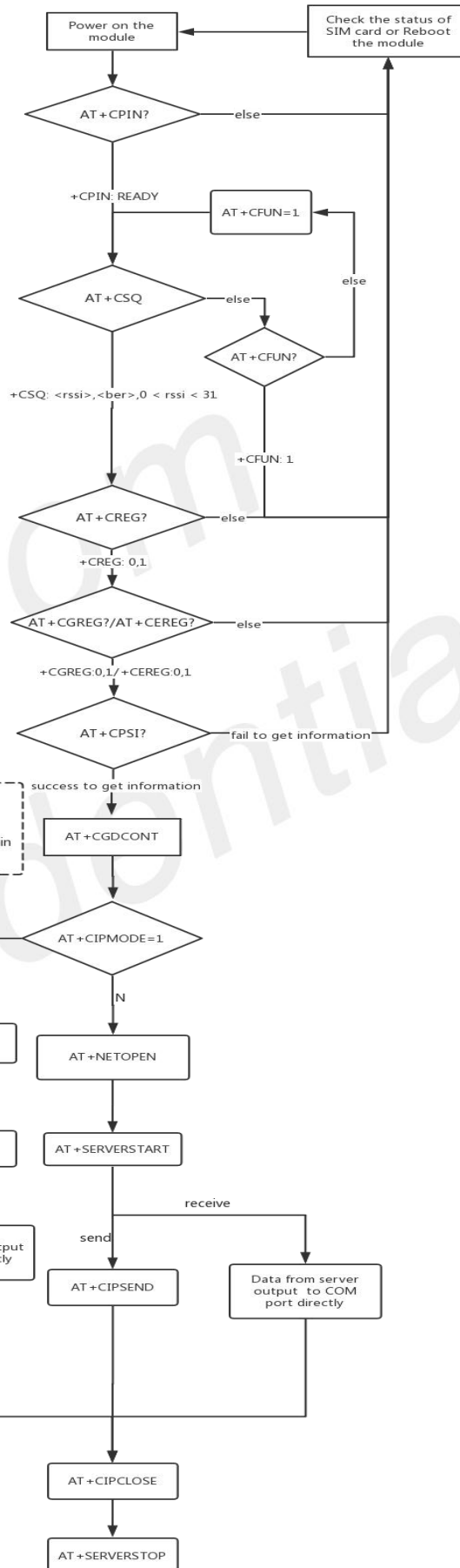
Activate a PDP Context:
AT+NETOPEN is used to start service by activating PDP context. You must execute AT+NETOPEN before any other TCP/UDP related operations.

Open Connection:
Establish a connection with TCP server and UDP server, the maximum of the connections is 10. When AT+CIPMODE=1 is set, the <link_num> is restricted to be only 0

Switch to command mode:
The +++ character sequence causes the TA to cancel the data flow over the AT interface and switch to Command Mode. This allows to enter AT commands while maintaining the data connection to the remote device.

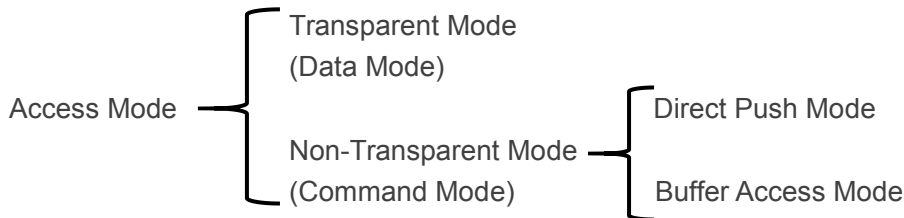
Close Socket:
AT+CIPCLOSE is used to close a TCP or UDP Socket

Deactivate a PDP Context:
AT+NETCLOSE is used to stop service by deactivating PDP context. It can also close all the opened socket connections when you didn't close these connections by AT+CIPCLOSE.



1.3 Description of Data Access Mode

SIM7022 series of module could support following data access mode for TCP\UDP data transmission.



The default mode is direct push mode.

1. Transparent Mode

AT+CIPMODE=1 is used to enter into transparent access mode. In transparent mode, all data received from COM port will be sent to remote side directly, and all received data from remote side will be output to COM port directly as well. “+++” could be used to exit from transparent access mode, when “+++” command returns OK, the module will be switched to command mode. In transparent access mode, host cannot execute any AT command. Currently, only one socket is available under transparent mode, either TCP\UDP client or TCP\UDP server. In transparent mode, the first server (<server_index> = 0) and the first client socket (<link_num> = 0) are used for transparent mode operation. Other servers index (<server_index> = 1-3) and other client sockets index (<link_num> = 1-9) are still running in command mode.

2. Non-Transparent Mode

Direct Push Mode:

AT+CIPRXGET=0 is used to enter direct push mode. In direct push mode, customer need to send data by AT+CIPSEND command. The received data will be outputted to COM port directly by URC as “+RECV FROM:<IP ADDRESS>:<PORT><CR><LF>+IPD(data length)<CR><LF><data>”.

Buffer Access Mode:

AT+CIPRXGET=1 is used to enter into buffer access mode. In buffer access mode, customer need to send data by AT+CIPSEND command. When receiving data, the module will buffer it internally and report a URC as “+CIPRXGET: 1,<link_num>” to notify the host. Then host can achieve data by AT+CIPRXGET.

3. Switch Between Data Mode and Command Mode

(1) Data mode -> Command mode

Software switching: By command sequence +++, this is a complete command, do not separate each character. And the time delay before and after this sequence should be more than 1000 milliseconds, the interval of each character should not be more than 900 milliseconds.

Hardware switching: DTR pin could be used to trigger data mode to command mode. AT&D1 should be configured before application.

2 TCPIP AT Commands

2.1 Description of AT Commands

2.1.1 AT+NETOPEN Start Socket Service

AT+NETOPEN is used to start service by activating PDP context. You must execute AT+NETOPEN before any other TCP/UDP related operations.

AT+NETOPEN Start Socket Service

Read Command
AT+NETOPEN?

Response
+NETOPEN: <net_state>

OK

Execute Command
AT+NETOPEN

Response
1)If the PDP context has not been activated or the network closed abnormally, response:
OK

+NETOPEN: <err>
2)When the PDP context has been activated successfully, if you execute AT+NETOPEN again, response:
+IP ERROR: Network is already opened

ERROR
3)other:
ERROR

Parameter Saving Mode

NO_SAVE

Max Response Time

Range: 3000ms-120000ms
default: 120000ms
(it can be set by AT+CIPTIMEOUT)

Reference

3GPP TS 27.005

Defined Values

<net_state>	Integer type, indicates the state of PDP context activation. 0 network close (deactivated) 1 network open(activated)
<err>	Integer type, the result of operation. 0 is success, other value is failure, please refer to Chapter 9.3.2 for details

Examples

AT+NETOPEN?

+NETOPEN: 1

OK

AT+NETOPEN

OK

+NETOPEN: 0

2.1.2 AT+NETCLOSE Stop Socket Service

AT+NETCLOSE is used to stop service by deactivating PDP context. It can also close all the opened socket connections when you didn't close these connections by AT+CIPCLOSE.

AT+NETCLOSE Stop Socket Service

Test Command AT+NETCLOSE=?	Response OK
Execute Command AT+NETCLOSE	Response 1)If the PDP context has been activated, response: OK +NETCLOSE: <err> 2)If the PDP context has been activated and one connection is in non-transparent mode and transparent mode, response: OK CLOSED +CIPCLOSE: <link_num>,<err>

	+NETCLOSE: <err> 3)If the PDP context has not been activated, response: +NETCLOSE: <err> ERROR 4)Others: ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	Range: 3000ms-120000ms default: 120000ms (it can be set by AT+CIPTIMEOUT)
Reference	

Defined Values

<err>	Integer type, the result of operation. 0 is success, other value is failure, please refer to Chapter 9.3.2 for details
-------	---

Examples

AT+NETCLOSE

OK

+NETCLOSE: 0

2.1.3 AT+CIOPEN Establish Connection in Multi-Socket Mode

You can use AT+CIOPEN to establish a connection with TCP server and UDP server, the maximum of the connections is 2.

AT+CIOPEN Establish Connection in Multi-Socket Mode

Test Command AT+CIOPEN=?	Response +CIOPEN: (0-1),("TCP","UDP") OK
Read Command AT+CIOPEN?	Response +CIOPEN: <link_num>[,<type>,<serverIP>,<serverPort>,<index>] +CIOPEN:

<p>Write Command TCP connection AT+CIOPEN=<link_num>,"TCP",<serverIP>,<serverPort>[,<localPort>]</p>	<p><link_num>[,<type>,<serverIP>,<serverPort>,<index>] [...]</p> <p>OK If a connection identified by <link_num> has not been established successfully, only +CIOPEN: <link_num> will be returned.</p> <p>Response 1)if PDP context has been activated successfully, response: OK</p> <p>+CIOPEN: <link_num>,<err> 2)when the <link_num> is greater than 9, response: +IP ERROR: Invalid parameter</p> <p>ERROR 3)If PDP context has not been activated, or the connection has been established, or parameter is incorrect, or when AT+CIPMODE=1 is set, the <link_num> is greater than 0, or other errors, response: +CIOPEN: <link_num>,<err></p> <p>ERROR 4)Transparent mode for TCP connection: When you want to use transparent mode to transmit data, you should set AT+CIPMODE=1 before AT+NETOPEN. And if AT+CIPMODE=1 is set, the <link_num> is restricted to be only 0. if success CONNECT [<text>] if failure CONNECT FAIL 5)Others: ERROR</p>
<p>Write Command UDP Connection AT+CIOPEN=<link_num>,"UDP",,,<localPort></p>	<p>1)If PDP context has been activated successfully, response: +CIOPEN: <link_num>,0</p> <p>OK 2)When the <link_num> is greater than 9, response: +IP ERROR: Invalid parameter</p> <p>ERROR If PDP context has not been activated, or the connection has been established, or parameter is incorrect, or other errors, response: +CIOPEN: <link_num>,<err></p> <p>ERROR</p>

	3)Others: ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	Range: 3000ms-120000ms default: 120000ms (it can be set by AT+CIPTIMEOUT)
Reference	

Defined Values

<link_num>	Integer type, identifies a connection. Range is 0-1. If AT+CIPMODE=1 is set, the <link_num> is restricted to be only 0.
<type>	String type, identifies the type of transmission protocol. TCP Transmission Control Protocol UDP User Datagram Protocol
<serverIP>	String type, identifies the IP address of server. The IP address format consists of 4 octets, separated by decimal point, like "AAA.BBB.CCC.DDD". Also the domain name is supported here.
<serverPort>	Integer type, identifies the port of TCP server, range is 0-65535. NOTE: When open port as TCP, the port must be the opened TCP port; When open port as UDP, the port may be any port.
<localPort>	Integer type, identifies the port of local socket, range is 0-65535.
<index>	Integer type, indicates whether the module is used as a client or server. When used as server, the range is 0-3, <index> is the server index to which the client is linked. -1 TCP client 0-3 TCP server index
<text>	String type, indicates CONNECT result code.
<err>	Integer type, the result of operation. 0 is success, other value is failure, please refer to Chapter 9.3.2 for details

Examples

AT+CIOPEN=?

+CIOPEN: (0-1),("TCP","UDP")

OK

AT+CIOPEN?

+CIOPEN: 0

+CIOPEN: 1,"TCP","183.230.174.137",6031,-1

OK

AT+CIOPEN=0,"TCP","183.230.174.137",6031

OK

//TCP connection

+CIOPEN: 0,0

AT+CIOPEN=1,"UDP",,,6031

+CIOPEN: 1,0

// UDP Connection

OK

2.1.4 AT+CIPSEND Send data through TCP or UDP Connection

AT+CIPSEND is used to send data to remote side. If service type is TCP, the data is firstly sent to the module's internal TCP/IP stack, and then sent to server by protocol stack. The <length> field may be empty. While it is empty, each <Ctrl+Z> character present in the data should be coded as <ETX><Ctrl+Z>. Each <ESC> character present in the data should be coded as <ETX><ESC>. Each <ETX> character will be coded as <ETX><ETX>. Single <Ctrl+Z> means end of the input data. Single <ESC> is used to cancel the sending.

<ETX> is 0x03, and <Ctrl+Z> is 0x1A,<ESC> is 0x1B.

AT+CIPSEND Send data through TCP or UDP Connection

Test Command
AT+CIPSEND=?

Response
+CIPSEND: (0-1),(1-1500)

OK

Write Command
If service type is "TCP", send data with changeable length
AT+CIPSEND=<link_num>

Response ">", then type data to send, tap CTRL+Z to send data, tap ESC to cancel the operation

Response
1)If the connection identified by <link_num> has been established successfully, response:

>

<input data>

CTRL+Z

OK

+CIPSEND: <link_num>,<reqSendLength>,<cnfSendLength>

2)If <reqSendLength> is equal <cnfSendLength>, it means that the data has been sent to TCP/IP protocol stack successfully.

3)If the connection has not been established, abnormally closed, or parameter is incorrect, response:

+CIPERROR: <err>

ERROR

4)Others:

<p>Write Command</p> <p>If service type is "TCP", send data with fixed length</p> <p>AT+CIPSEND=<link_num>,<length></p>	<p>ERROR</p> <p>Response</p> <p>1)If the connection identified by <link_num> has been established successfully, response:</p> <p>></p> <p><input data with specified length></p> <p>OK</p> <p>+CIPSEND: <link_num>,<reqSendLength>,<cnfSendLength></p> <p>2)If <reqSendLength> is equal <cnfSendLength>, it means that the data has been sent to TCP/IP protocol stack successfully.</p> <p>3)If the connection has not been established, abnormally closed, or parameter is incorrect, response:</p> <p>+CIPERROR: <err></p> <p>ERROR</p> <p>4)Others:</p> <p>ERROR</p>
<p>Write Command</p> <p>If service type is "UDP", send data with changeable length</p> <p>AT+CIPSEND=<link_num>,<serverIP>,<serverPort></p> <p>Response ">", then type data to send, tap CTRL+Z to send data, tap ESC to cancel the operation</p>	<p>Response</p> <p>1)If the connection identified by <link_num> has been established successfully, response:</p> <p>></p> <p><input data></p> <p>CTRL+Z</p> <p>OK</p> <p>+CIPSEND: <link_num>,<reqSendLength>,<cnfSendLength></p> <p>2)If the connection has not been established, abnormally closed, or parameter is incorrect, response:</p> <p>+CIPERROR: <err></p> <p>ERROR</p> <p>3)Others:</p> <p>ERROR</p>
<p>Write Command</p> <p>If service type is "UDP", send data with fixed length</p> <p>AT+CIPSEND=<link_num>,<length>,<serverIP>,<serverPort></p> <p>Response ">", type data until the data length is equal to <length></p>	<p>Response</p> <p>1)If the connection identified by <link_num> has been established successfully, response:</p> <p>></p> <p><input data with specified length></p> <p>OK</p> <p>+CIPSEND: <link_num>,<reqSendLength>,<cnfSendLength></p> <p>2)If the connection has not been established, abnormally closed,</p>

	<p>or parameter is incorrect, response:</p> <p>+CIPERROR: <err></p> <p>ERROR</p> <p>3)Others:</p> <p>ERROR</p>
Parameter Saving Mode	NO_SAVE
Max Response Time	<p>Range: 3000ms-120000ms</p> <p>default: 120000ms</p> <p>(it can be set by AT+CIPTIMEOUT)</p>
Reference	

Defined Values

<link_num>	Integer type, identifies a connection. Range is 0-1.
<length>	Integer type, indicates the length of sending data, range is 1-1500.
<serverIP>	String type, identifies the IP address of server. The IP address format consists of 4 octets, separated by decimal point, like "AAA.BBB.CCC.DDD". Also the domain name is supported here.
<serverPort>	<p>Integer type, identifies the port of TCP server, range is 0-65535.</p> <p>NOTE:</p> <p>When open port as TCP, the port must be the opened TCP port;</p> <p>When open port as UDP, the port may be any port.</p> <p>But, for Qualcomm, connecting the port 0 is regarded as an invalid operation.</p>
<reqSendLength>	Integer type, the length of the data requested to be sent
<cnfSendLength>	<p>Integer type, the length of the data confirmed to have been sent</p> <p>-1 the connection is disconnected.</p> <p>0 own send buffer or other side's congestion window are full.</p> <p>Note: If the <cnfSendLength> is not equal to the <reqSendLength>, the socket then cannot be used further.</p>
<err>	<p>Integer type, the result of operation.</p> <p>0 is success, other value is failure, please refer to Chapter 9.3.2 for details</p>

Examples

AT+CIPSEND=?
+CIPSEND: (0-1),(1-1500)

OK

AT+CIPSEND=1,5
>12345

// If service type is "TCP", send data with fixed length

OK

+CIPSEND: 1,5,5

AT+CIPSEND=1,5,"183.230.174.137",6031

>12345

OK

// If service type is "UDP", send data with fixed length

+CIPSEND: 1,5,5

NOTE

If you use UDP to send more than 1400 bytes of data when the server does not receive data, this may be the reason for the carrier, in this case please send no more than 1400 bytes of data.

If you use TCP to send data, the instruction can be followed by a comma just like "AT+CIPSEND=0," or "AT+CIPSEND=0,10," without an error, but it doesn't make any sense

2.1.5 AT+CIPRXGET Set the Mode to Retrieve Data

If set <mode> to 1, after receiving data, the module will buffer it and report a URC as "+CIPRXGET: 1,<link_num>" to notify the host. Then host can retrieve data by AT+CIPRXGET.

If set <mode> to 0, the received data will be outputted to COM port directly by URC as "RCV FROM:<IP ADDRESS>:<PORT><CR><LF>+IPD(data length)<CR><LF><data>".

The default value of <mode> is 0.

AT+CIPRXGET Set the Mode to Retrieve Data

Test Command

AT+CIPRXGET=?

Response

+CIPRXGET: (0-4),(0-1),(1-1500)

OK

Read Command

AT+CIPRXGET?

Response

+CIPRXGET: <mode>

OK

Write Command

AT+CIPRXGET=<mode>

In this case, <mode> can only be 0 or 1

Response

1)If the parameter is correct, response:

OK

2)If the parameter is incorrect, response:

+IP ERROR: <err_info>

	<p>ERROR</p> <p>3)Others:</p> <p>ERROR</p>
<p>Write Command AT+CIPRXGET=2,<link_num>[,<len>]</p> <p>Retrieve data in ACSII form</p>	<p>1)If <len> field is empty, the default value to read is 1500. If the buffer is not empty, response: +CIPRXGET: <mode>,<link_num>,<read_len>,<rest_len> <data>ACSII form</p> <p>OK</p> <p>2)If the buffer is empty, response: +IP ERROR: No data</p> <p>ERROR</p> <p>3)If the parameter is incorrect, response: +IP ERROR: <err_info></p> <p>ERROR</p> <p>4)Others:</p> <p>ERROR</p>
<p>Write Command AT+CIPRXGET=3,<link_num>[,<len>]</p> <p>Retrieve data in hex form</p>	<p>Response</p> <p>1)If <length> field is empty, the default value to read is 750. If the buffer is not empty, response: +CIPRXGET: <mode>,<link_num>,<read_len>,<rest_len> <data> hex form</p> <p>OK</p> <p>2)If the buffer is empty, response: +IP ERROR: No data</p> <p>ERROR</p> <p>3)If the parameter is incorrect, response: +IP ERROR: <err_info></p> <p>ERROR</p> <p>4)Others:</p> <p>ERROR</p>
<p>Write Command AT+CIPRXGET=4,<link_num></p>	<p>Response</p> <p>1)If the parameter is correct, response: +CIPRXGET: 4,<link_num>,<rest_len></p> <p>OK</p> <p>2)If the parameter is incorrect, response:</p>

	+IP ERROR: <err_info>
	ERROR 3)Others ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	8s
Reference	

Defined Values

<mode>	Integer type, sets the mode to retrieve data <u>0</u> set the way to get the network data automatically 1 set the way to get the network data manually 2 read data, the max read length is 1500 3 read data in HEX form, the max read length is 750 4 get the rest data length
<link_num>	Integer type, identifies a connection. Range is 0-1.
<len>	Integer type, the data length to be read. Not required, the default value is 1500 when <mode>=2, and 750 when <mode>=3.
<read_len>	Integer type, the length of data that has been read.
<rest_len>	Integer type, the length of data which has not been read in the buffer.
<err_info>	String type, displays the cause of occurring error, please refer to Chapter 15.3.1 for more details.

Examples

AT+CIPRXGET=?

+CIPRXGET: (0-4),(0-1),(1-1500)

OK

AT+CIPRXGET?

+CIPRXGET: 1

OK

AT+CIPRXGET=1

OK

AT+CIPRXGET=2,0

+CIPRXGET: 2,0,6,0

123456

OK

AT+CIPRXGET=3,0
+CIPRXGET: 3,0,6,0
313233343536

OK

AT+CIPRXGET=4,0
+CIPRXGET: 4,0,18

OK

NOTE

When data is received and reported, the maximum length of <data length> is 1500 each time.

2.1.6 AT+CIPCLOSE Close TCP or UDP Socket

AT+CIPCLOSE is used to close a TCP or UDP Socket

AT+CIPCLOSE Close TCP or UDP Socket

Test Command
AT+CIPCLOSE=?

Response
+CIPCLOSE: (0-1)

OK

Read Command
AT+CIPCLOSE?

Response
+CIPCLOSE: <link0_state>,<link1_state>

OK

Write Command
AT+CIPCLOSE=<link_num>

Response
 1)If service type is TCP and the connection identified by
 <link_num> has been established, response
OK

+CIPCLOSE: <link_num>,<err>

2)If service type is TCP and the access mode is transparent mode,
 response:

OK

CLOSED

+CIPCLOSE: <link_num>,<err>

3)If service type is UDP and the connection identified by <link_num> has been established and closed successfully, response:

+CIPCLOSE: <link_num>,0

OK

4)If service type is UDP and access mode is transparent mode, response:

CLOSED

+CIPCLOSE: <link_num>,<err>

OK

5)If the connection has not been established, abnormally closed, or parameter is incorrect, response:

+CIPCLOSE: <link_num>,<err>

ERROR

6)Others:

ERROR

Parameter Saving Mode

NO_SAVE

Max Response Time

Range: 3000ms-120000ms
default: 120000ms
(it can be set by AT+CIPTIMEOUT)

Reference

Defined Values

<link_num>	Integer type, identifies a connection. Range is 0-1.
<linkX_state>	Integer type, indicates state of connection identified by <link_num>. Range is 0-1. 0 disconnected 1 connected
<err>	Integer type, the result of operation. 0 is success, other value is failure, please refer to Chapter 5.3.2 for details

Examples

AT+CIPCLOSE=?

+CIPCLOSE: (0-1)

OK

AT+CIPCLOSE?

+CIPCLOSE: 0,0

OK

AT+CIPCLOSE=0

OK

+CIPCLOSE: 0,0

2.1.7 AT+IPADDR Inquire Socket PDP address

AT+IPADDR is used to get active PDP address.

AT+IPADDR Inquire Socket PDP Address

Test Command

AT+IPADDR=?

Response

OK

Response

1)If PDP context has been activated successfully, response

+IPADDR: <ip_address>

Execute Command

AT+IPADDR

OK

2)

+IP ERROR: Network not opened

ERROR

Parameter Saving Mode

NO_SAVE

Max Response Time

default: 9000ms

Reference

-

Defined Values

<ip_address>

String type, identifies the IP address of current active socket PDP.

Examples

AT+IPADDR

+IPADDR: 10.84.17.161

OK

2.1.8 AT+CIPHEAD Add an IP Header When Receiving Data

AT+CIPHEAD is used to add an IP header when receiving data.

AT+CIPHEAD Add an IP Header When Receiving Data

Test Command AT+CIPHEAD=?	Response +CIPHEAD: (0-1) OK
Read Command AT+CIPHEAD?	Response +CIPHEAD: <mode> OK
Write Command AT+CIPHEAD=<mode>	Response 1)If the parameter is correct, response: OK 2) ERROR
Execute Command AT+CIPHEAD	Response Set default value:(<mode>=1) OK
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms
Reference	-

Defined Values

<mode>	Integer type, indicates whether adding an IP header or not when receiving data 0 not add IP header <u>1</u> add IP header, the format is "+IPD(data length)"
---------------------	--

Examples

```
AT+CIPHEAD=?
+CIPHEAD: (0-1)

OK
AT+CIPHEAD?
```


+CIPHEAD: 1

OK

AT+CIPHEAD=1

OK

AT+CIPHEAD

OK

2.1.9 AT+CIPSRIP Show Remote IP Address and Port

AT+CIPSRIP is used to set whether to display IP address and port of server when receiving data.

AT+CIPSRIP Show Remote IP Address and Port

Test Command AT+CIPSRIP=?	Response +CIPSRIP: (0-1) OK
Read Command AT+CIPSRIP?	Response +CIPSRIP: <mode> OK
Write Command AT+CIPSRIP=<mode>	Response 1)If the parameter is correct, response: OK 2) ERROR
Execute Command AT+CIPSRIP	Response Set default value:(<mode>=1) OK
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms
Reference	-

Defined Values

<mode>	Integer type, indicates whether to show IP address and port of server or not when receiving data. 0 not show <u>1</u> show, the format is as follows: "RCV FROM:<IP ADDRESS>:<PORT>"
---------------------	---

Examples

AT+CIPSRIP=?
+CIPSRIP: (0-1)

OK

AT+CIPSRIP?
+CIPSRIP: 1

OK

AT+CIPSRIP=0

OK

AT+CIPSRIP

OK

2.1.10 AT+CIPMODE Set TCP/IP Application Mode

AT+CIPMODE is used to select transparent mode(data mode) or non-transparent mode(command mode).The default mode is non-transparent mode.

AT+CIPMODE Set TCP/IP Application Mode

Test Command AT+CIPMODE=?	Response +CIPMODE: (0-1) OK
Read Command AT+CIPMODE?	Response +CIPMODE: <mode> OK
Write Command AT+CIPMODE=<mode>	Response 1)If the parameter is correct, response: OK 2) ERROR
Execute Command AT+CIPMODE	Response Set default value:(<mode>=0) OK
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms

Reference

-

Defined Values

<mode>	Integer type, sets TCP/IP application mode <u>0</u> Non transparent mode 1 Transparent mode
---------------------	---

Examples

```
AT+CIPMODE=?
+CIPMODE: (0-1)
```

```
OK
AT+CIPMODE?
+CIPMODE: 0
```

```
OK
AT+CIPMODE=1
OK
AT+CIPMODE
OK
```

NOTE

When you want to use transparent mode to transmit data, you should set AT+CIPMODE=1 before AT+NETOPEN.

2.1.11 AT+CIPSENDDMODE Set Sending Mode

AT+CIPSENDDMODE is used to select sending mode when service type is "TCP".

If set <mode> to 1, when sending data by AT+CIPSEND, the URC "+CIPSEND:

<link_num>,<reqSendLength>,<cnfSendLength>" will not be returned until module receives the server's ACK message to the sent data last time.

If set <mode> to 0, the URC "+CIPSEND: <link_num>,<reqSendLength>,<cnfSendLength>" will be returned If the data has been sent to module's internal TCP/IP protocol stack. In this case, the module doesn't need to wait for the server's ACK message.

The default mode is sending without waiting peer TCP ACK mode.

AT+CIPSENDMODE Set Sending Mode

Test Command AT+CIPSENDMODE=?	Response +CIPSENDMODE: (0-1) OK
Read Command AT+CIPSENDMODE?	Response +CIPSENDMODE: <mode> OK
Write Command AT+CIPSENDMODE=<mode>	Response 1)If the parameter is correct, response: OK 2) ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms
Reference	-

Defined Values

<mode>	Integer type, sets sending mode <u>0</u> sending without waiting peer TCP ACK mode 1 sending wait peer TCP ACK mode
---------------------	---

Examples

AT+CIPSENDMODE=?

+CIPSENDMODE: (0-1)

OK

AT+CIPSENDMODE=1

OK

AT+CIPSENDMODE?

+CIPSENDMODE: 1

OK

2.1.12 AT+CIPTIMEOUT Set TCP/IP Timeout Value

AT+CIPTIMEOUT is used to set timeout value for AT+NETOPEN/AT+CIPOPEN/AT+CIPSEND.

AT+CIPTIMEOUT Set TCP/IP Timeout Value

Read Command AT+CIPTIMEOUT?	Response +CIPTIMEOUT: <netopen_timeout>,<cipopen_timeout>,<cipsend_timeout>
	OK
Write Command AT+CIPTIMEOUT=[<netopen_timeout>][,<cipopen_timeout>][,<cipsend_timeout>]]]	Response 1)If the parameter is correct, response: OK 2) ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms
Reference	-

Defined Values

<netopen_timeout>	Integer type, timeout value for AT+NETOPEN. default is120000ms. Range is 3000ms-120000ms.
<cipopen_timeout>	Integer type, timeout value for AT+CIPOPEN. default is120000ms. Range is 3000ms-120000ms.
<cipsend_timeout>	Integer type, timeout value for AT+CIPSEND. default is120000ms. Range is 3000ms-120000ms.

Examples

```
AT+CIPTIMEOUT?
+CIPTIMEOUT: 120000,120000,120000

OK
AT+CIPTIMEOUT=3000,3000,3000
OK
```

2.1.13 AT+CIPCCFG Configure Parameters of Socket

AT+CIPCCFG is used to configure parameters of socket.

AT+CIPCCFG Configure Parameters of Socket

Test Command AT+CIPCCFG=?	Response +CIPCCFG: (0-10),(0-1000),(0),(0-1),(0-1),(0-1),(500-120000) OK
Read Command AT+CIPCCFG?	Response +CIPCCFG: <NmRetry>,<DelayTm>,<Ack>,<errMode>,<Header-Type>,<AsyncMode>,<TimeoutVal> OK
Write Command AT+CIPCCFG=[<NmRetry>][,<DelayTm>][,<Ack>][,<errMode>][,<HeaderType>][,<AsyncMode>][,<TimeoutVal>]]]]]]]]	Response 1)If the parameter is correct, response: OK 2) ERROR
Execute Command AT+CIPCCFG	Response Set default value: OK
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms
Reference	-

Defined Values

<NmRetry>	Integer type, number of retransmission to be made for an IP packet. Range is 0-10. The default value is 10.
<DelayTm>	Integer type, number of milliseconds to delay to output data of Receiving. Range is 0-1000. The default value is 0.
<Ack>	Integer type, it can only be set to 0. It's used to be compatible with old TCP/IP command set.
<errMode>	Integer type, sets mode of reporting <err_info>, default value is 1. 0 error result code with numeric values 1 error result code with string values
<HeaderType>	Integer type, select which data header is used when receiving data, it only takes effect in multi-client mode. Default value is 0. 0 add data header, the format is "+IPD<data length>" 1 add data header, the format is "+RECEIVE,<link num>,<data length>"

<AsyncMode>	Integer type, range is 0-1. Default value is 0. It's used to be compatible with old TCP/IP command set.
<TimeoutVal>	Integer type, set the minimum retransmission timeout value for TCP connection. Range is 500ms-120000ms. Default is 500ms.

Examples

AT+CIPCCFG=?

+CIPCCFG: (0-10),(0-1000),(0),(0-1),(0-1),(0-1),(500-120000)

OK

AT+CIPCCFG?

+CIPCCFG: 10,0,0,1,0,0,500

OK

AT+CIPCCFG=2

OK

AT+CIPCCFG

OK

2.1.14 AT+SERVERSTART Startup TCP Sever

AT+SERVERSTART is used to startup a TCP server, and the server can receive the request of TCP client. After the command executes successfully, an unsolicited result code is returned when a client tries to connect with module and module accepts request. The unsolicited result code is+CLIENT:
<link_num>,<server_index>,<client_IP>:<port>.

AT+SERVERSTART Startup TCP Sever

Test Command AT+SERVERSTART=?	Response +SERVERSTART: (0-65535),(0-1) OK
Read Command AT+SERVERSTART?	Response 1)If the PDP context has not been activated successfully, response: +CIPERROR: <err> ERROR 2)If there exists opened server, response: [+SERVERSTART: <server_index>,<port>

	...]
	OK 3)Others:
	ERROR
Write Command	Response
AT+SERVERSTART=<port>,<server_index>[,<backlog>]	1)If there is no error, response: OK 2)If the PDP context has not been activated, or the server identified by <server_index> has been opened, or the parameter is not correct, or other errors, response: +CIPERROR: <err>
	ERROR 3)Others:
	ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms
Reference	-

Defined Values

<port>	Integer type, identifies the listening port of module when used as a TCP server. Range is 0-65535.
<server_index>	Integer type, the TCP server index, range is 0-1.
<backlog>	Integer type, the maximum connections can be queued in listening queue. Range is 1-3. Default is 3.

Examples

```
AT+SERVERSTART=?
+SERVERSTART: (0-65535),(0-1)
```

```
OK
AT+SERVERSTART?
OK
AT+SERVERSTART=8080,0
OK
```


2.1.15 AT+SERVERSTOP Stop TCP Sever

AT+SERVERSTOP is used to stop TCP server. Before stopping a TCP server, all sockets <server_index> of which equals to the closing TCP server index must be closed first.

AT+SERVERSTOP Stop TCP Sever

Write Command AT+SERVERSTOP=<server_index>	Response 1)If there exists open connection with the server identified by <server_index>, or the server identified by <server_index> has not been opened, or the parameter is incorrect, response: +SERVERSTOP: <server_index>,<err>
	ERROR 2)If the server socket is closed immediately, response: +SERVERSTOP: <server_index>,0
	OK (In general, the result is shown as below.) 3)If the server socket starts to close, response: OK
	+SERVERSTOP: <server_index>,<err> 4)Others: ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms
Reference	-

Defined Values

<server_index>	Integer type, the TCP server index, range is 0-1.
<err>	Integer type, the result of operation. 0 is success, other value is failure, please refer to Chapter 9.3.2 for details

Examples

AT+SERVERSTOP=0

OK

+SERVERSTOP: 0,0

2.1.16 AT+CIPACK Query TCP Connection Data Transmitting Status

AT+CIPACK is used to query TCP connection data transmitting status.

AT+CIPACK Query Connection Data Transmitting State

Test Command AT+CIPACK=?	Response +CIPACK: (range of supported <link_num>s) OK
Write Command AT+CIPACK=<link_num>	Response 1)If the PDP context has not been activated, or the connection identified by <link_num> has not been established, abnormally closed, or the parameter is incorrect, or other errors, response: +IP ERROR: <err_info> ERROR 2)If the connection has been established, and the service type is "TCP", response: +CIPACK: <sent_data_size>,<ack_data_size>,<recv_data_size> OK
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 9000ms
Reference	-

Defined Values

<link_num>	Integer type, identifies a connection. Range is 0-1.
<sent_data_size>	Integer type, the total length of sent data
<ack_data_size>	reserve
<recv_data_size>	Integer type, the total length of received data
<err>	Integer type, the result of operation. 0 is success, other value is failure, please refer to Chapter 9.3.2 for details
<err_info>	String type, displays the cause of occurring error, please refer to Chapter 3 for details.

Examples

AT+CIPACK=?
+CIPACK: (0-1)

```
OK
AT+CIPACK=0
+CIPACK: 10,0,5
OK
```

2.1.17 AT+CDNSGIP Query the IP Address of Given Domain Name

AT+CDNSGIP is used to query the IP address of given domain name.

AT+CDNSGIP Query the IP Address of Given Domain Name

Test Command AT+CDNSGIP=?	Response OK
Write Command AT+CDNSGIP=<domain name>	Response 1)If the given domain name has related IP, response: +CDNSGIP: 1,<domain name>,<IP address> OK 2)If the given name has no related IP, response: +CDNSGIP: 0,<dns error code> ERROR 3)Others: ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	default: 6s
Reference	-

Defined Values

<domain name>	String type (string should be included in quotation marks), indicates the domain name. The maximum length of domain name is 254. Valid characters allowed in the domain name area include a-z, A-Z, 0-9, "-" (hyphen)and ".". A domain name is made up of one label name or more label names separated by "." (eg: AT+CDNSGIP="aa.bb.cc"). For label names separated by ".", length of each label must be no more than 63 characters. The beginning character of the domain name and of labels should be an alphanumeric character.
<IP address>	String type, indicates the IP address corresponding to the domain name.
<dns error code>	Integer type, indicates the error code.

10 DNS GENERAL ERROR

Examples

```
AT+CDNSGIP=?
OK
AT+CDNSGIP="www.baidu.com"
+CDNSGIP: 1,"www.baidu.com","61.135.169.121"
OK
```

2.1.18 AT+CSOCKSETPN Set active PDP context's profile

This command sets default active PDP context's profile number and type. When we activate PDP by using AT+NETOPEN command, we need use the default profile number and type.,and the context of this profile is set by AT+CGDCONT command.

AT+CSOCKSETPN Set active PDP context's profile

Test Command AT+CSOCKSETPN=?	Response +CSOCKSETPN: 1,(1,6) OK
Read Command AT+CSOCKSETPN?	Response +CSOCKSETPN: <profile_num>,<ip_family> OK
Write Command AT+CSOCKSETPN=<profile_num>,<ip_family>	Response 1)If the parameter is correct, response: OK 2)If the parameter is wrong,or NETOPEN is already active, response: ERROR
Parameter Saving Mode	NO_SAVE
Maximum Response Time	default: 9000ms
Reference	-

Defined Values

<profile_num>	Packet Data Protocol context's profile number. Now only 1 is supported for this parameter value.
<ip_family>	Packet Data Protocol type 1 IPV4 6 IPV6

Examples

```
AT+CSOCKSETPN=?
+CSOCKSETPN: 1,(1,6)
```

```
OK
AT+CSOCKSETPN?
+CSOCKSETPN: 1,1
```

```
OK
AT+CSOCKSETPN=1,6
OK
```

2.1.19 AT+CTCPKA Conigure TCP heartbeat

This command is used to set TCP heartbeat parameters. Set this up after we activate PDP by using AT+NETOPEN command.

AT+CTCPKA Conigure TCP heartbeat

Test Command AT+CTCPKA=?	Response OK
Read Command AT+CTCPKA?	Response +CTCPKA: <keepalive>,<keepidle>,<keepcount>,<keepinterval>
Write Command AT+CTCPKA=<keepalive>,<keepidle>,<keepcount>,<keepinterval>	OK Response 1)If successfully: OK 2)If failed: ERROR
Parameter Saving Mode	NO_SAVE
Maximum Response Time	default: 9000ms
Reference	-

Defined Values

<keepalive >	Set TCP keepalive option. 0 Disable TCP keep alive mechanism 1 Enable TCP keep alive mechanism
<keepidle>	The unit is minute. If there is no data interaction within this period, the probe is performed. (1-120)
<keepcount>	Number of probe retries. If all times out, the connection is considered Invalid.(1-10)
<keepinterval>	The unit is minute. Interval for sending probe packets during probe.

Examples

AT+CTCPKA=1,2,5,1

OK

AT+CTCPKA?

+CTCPKA: 1,2,5,1

OK

2.1.20 AT+CDNSCFG Configure Domain Name Server

This command is used to configure Domain Name Server.

AT+CDNSCFG Configure Domain Name Server

Test Command AT+CDNSCFG =?	Response +CDNSCFG: ("Primary DNS"),("Secondary DNS"),type OK
Read Command AT+CDNSCFG?	Response Primary IPv4 DNS: <pri_dns>,Secondary IPv4 DNS: <pri_dns> Primary IPv6 DNS: <pri_dns>,Secondary IPv6 DNS: <pri_dns> OK
Write Command AT+CDNSCFG=<pri_dns>[,<sec_dns>][,<type>]	Response 1)If successfully: OK 2)If failed: ERROR
Parameter Saving Mode	NO_SAVE

Maximum Response Time	default: 9000ms
Reference	-

Defined Values

<pri_dns>	A string parameter which indicates the IP address of the primary domain name server.
<sec_dns>	A string parameter which indicates the IP address of the secondary domain name server.
<type>	0 Set the server for the ipv4 network 1 Set the server for the ipv6 network

Examples

AT+CDNSCFG?

Primary IPv4 DNS: 183.230.126.224,Secondary IPv4 DNS: 183.230.126.225

Primary IPv6 DNS: 2409:8060:20EA:101::1,Secondary IPv6 DNS: 2409:8060:20EA:201::1

OK

AT+CDNSCFG=183.230.126.224,183.230.126.225,0

OK

2.2 Description of URC

Table 1:Description of URC

URC	Description
+CIPEVENT: NETWORK CLOSED UNEXPECTEDLY	Network is closed for network error(Out of service, etc). When this event happens, user's application needs to check and close all opened sockets, and then uses AT+NETCLOSE to release the network library if AT+NETOPEN? shows the network library is still opened.
+IPCLOSE: <client_index>,<close_reason>	Socket is closed passively. <client_index> is the link number. <close_reason>: 0 Closed by local, active 1 Closed by remote, passive

+CLIENT: <link_num>,<server_index>,<client_IP>:<port>	2 Closed for sending timeout or DTR off TCP server accepted a new socket client, the index is<link_num>, the TCP server index is <server_index>. The peer IP address is <client_IP>, the peer port is <port>.
--	--

SIMCom
Confidential

3 Examples

3.1 Configure and Activate context

3.1.1 Network Environment

TCP/IP application is based on NB network. Please make sure that NB network is available before TCP/IP setup.

AT+CSQ

+CSQ: 23,0

OK

AT+CEREG?

+CEREG: 0,1

OK

3.1.2 Configure Context

If based on ipv4

AT+CGDCONT=1,"IP","CMNET"

OK

If based on ipv6

AT+CGDCONT=1,"IPV6","CMNET"

OK

//The CGDCONT IP_TYPE is set to IPV6 instead of IP

3.1.3 Activate context

If based on ipv4

AT+NETOPEN

OK

+NETOPEN: 0

AT+IPADDR

+IPADDR: 10.148.0.17

OK

If based on ipv6

AT+CSOCKSETPN=1,6

OK

AT+NETOPEN

OK

+NETOPEN: 0

AT+IPADDR

+IPADDR: 2409:8960:1e64:94d8:1:0:3b3b:7118 //The queried IP address is an ipv6 address

OK

Other commands are used in the same way based on IPV4 or IPV6.

3.1.4 Deactivate Context

AT+NETCLOSE

OK

+NETCLOSE: 0

AT+IPADDR

+IP ERROR: Network not opened

ERROR

3.2 TCP Client

3.2.1 TCP Client Works in Direct Push Mode

//Set up TCP Client Connection

AT+NETOPEN

OK

+NETOPEN: 0

AT+CIOPEN=1,"TCP","117.131.85.139",5253

OK

// set up a TCP connection, <link_num> is 1.
Before using AT+CIOPEN, host should activate
PDP Context with AT+NETOPEN first.

+CIOPEN: 1,0

//Send Data To Server

AT+CIPSEND=1,5

// send data with fixed length

>HELLO

OK

+CIPSEND: 1,5,5

//Receive Data From Server

RECV FROM:117.131.85.139:5253

// data from server directly output to COM

+IPD16

data from server

//Close TCP Connection

AT+CIPCLOSE=1

OK

+CIPCLOSE: 1,0

3.2.2 TCP Client Works in Buffer Access Mode

//Set up TCP Client Connection

AT+NETOPEN

OK

+NETOPEN: 0

AT+CIPRXGET=1

// buffer access mode, get data by AT+CIPRXGET

OK

AT+CIOPEN=1,"TCP","117.131.85.139",5253

OK

+CIOPEN: 1,0

//Send Data to Server

AT+CIPSEND=1,5

// send data with fixed length

>hello

OK

+CIPSEND: 1,5,5

//Receive Data from Server

+CIPRXGET: 1,1

// URC to notify host of data from server

AT+CIPRXGET=4,1

// query the length of data in the buffer of socket with

+CIPRXGET: 4,1,16

// <link_num>=1

OK

AT+CIPRXGET=2,1,5

// get data in ASCII form

+CIPRXGET: 2,1,5,11

// read 5 bytes data and left 11 bytes

Data1

OK

AT+CIPRXGET=3,1,5

// get data in hex form

+CIPRXGET: 3,1,5,6

66726F6D20

OK

AT+CIPRXGET=4,1

// read the length of unread data in buffer

+CIPRXGET: 4,1,6

OK

AT+CIPRXGET=2,2

// the connection identified by link_num=2 has not been established

+IP ERROR: No data

ERROR

AT+CIPRXGET=2,1

+CIPRXGET: 2,1,6,0

server

OK

AT+CIPRXGET=4,1

+CIPRXGET: 4,1,0

// all the data in buffer has been read, the rest_len is 0.

OK

//Close TCP Connection

AT+CIPCLOSE=1

OK

+CIPCLOSE: 1,0

3.2.3 TCP Client Works in Transparent Access Mode

//Set up TCP Client Connection

AT+CIPMODE=1

// Enter into transparent mode by at+cipmode=1

OK

AT+NETOPEN

OK

+NETOPEN: 0

**AT+CIPOEPN=0,"TCP","117.131.85.139",5253
CONNECT 115200**

// only <link_num>=0 is allowed to operate with transparent mode.

//Send Data to Server

**All data got from com port will be sent to
remote directly**

//Receive Data From Server

DATA FROM SERVERDATA FROM SERVER

OK

//all the received data from server will be output to com port directly

//sequence of +++ to quit transparent mode

AT+CIOPEN?

+CIOPEN: 0,"TCP","117.131.85.139",5253,-1

+CIOPEN: 1

OK

ATO

//ATO to enter transparent mode again

CONNECT 115200

HELLO CLIENT

OK

//Close TCP Connection

AT+CIPCLOSE=0

OK

CLOSED

+CIPCLOSE: 0,0

3.3 UDP Client

3.3.1 UDP Client Works in Direct Push Mode

//Set up UDP Client Connection

AT+NETOPEN

OK

+NETOPEN: 0

AT+CIPOPEN=1,"UDP",,,5000

+CIPOPEN: 1,0

OK

// when set a UDP connection, the remote IP address and port is not necessary, but the local port must be specified.

//Send data to Server

AT+CIPSEND=1,"117.131.85.139",5254

>HELLOSERVER

OK <CTRL+Z>

+CIPSEND: 1,11,11

AT+CIPSEND=1,5,"117.131.85.139",5254

>HELLO

OK

// for UDP connection, when sending data, user must specify the remote IP address and port
//send data with changeable length, <CTRL+Z> to end

//send data with fixed length

+CIPSEND: 1,5,5

//Receive Data From Server

RECV FROM:117.131.85.139:5254

//data from server output to COM port directly

+IPD14

HELLO CLIENT

//Close UDP Connection

AT+CIPCLOSE=1

+CIPCLOSE: 1,0

OK

3.3.2 UDP Client Works in Buffer Access Mode

//Set up UDP Client Connection

AT+NETOPEN

OK

+NETOPEN: 0

AT+CIPRXGET=1

// buffer access mode, get data by AT+CIPRXGET

OK

AT+CIOPEN=1,"UDP",,,5000

// when set a UDP connection, the remote IP address and port is not necessary, but the local port must be specified.

+CIOPEN: 1,0

OK

//Send Data to Server

AT+CIPSEND=1,"117.131.85.139",5254

// for UDP connection, when sending data, user must specify the remote IP address and port

>HELLOSERVER

//send data with changeable length, <CTRL+Z> to end

OK <CTRL+Z>

+CIPSEND: 1,11,11

AT+CIPSEND=1,5,"117.131.85.139",5254

//send data with fixed length

>HELLO

OK

+CIPSEND: 1,5,5

//Receive Data From Server

+CIPRXGET: 1,1
AT+CIPRXGET=4,1
+CIPRXGET: 4,1,16

// URC to notify host of data from server
// query the length of data in the buffer of socket
with <link_num>=1

OK
AT+CIPRXGET=2,1,5
+CIPRXGET: 2,1,5,11
data

// get data in ASCII form

OK
AT+CIPRXGET=3,1,5
+CIPRXGET: 3,1,5,6
66726F6D20

// get data in hex form

OK
AT+CIPRXGET=4,1
+CIPRXGET: 4,1,6

// read the length of unread data in buffer

OK
AT+CIPRXGET=2,2
+IP ERROR: No data

// the connection identified by link_num=2 has not
been established

ERROR
AT+CIPRXGET=2,1
+CIPRXGET: 2,1,6,0
server

OK
AT+CIPRXGET=4,1
+CIPRXGET: 4,1,0

// all the data in buffer has been read, the rest_len
is 0.

OK

//Close UDP Connection

AT+CIPCLOSE=1
OK

+CIPCLOSE: 1,0

3.3.3 UDP Client Works in Transparent Access Mode

//Set up UDP Client Connection

AT+CIPMODE=1

OK

AT+NETOPEN

OK

+NETOPEN: 0

AT+CIOPEN=0,"UDP","117.131.85.139",5254,5000 //only <link_num>=0 is allowed to operate with transparent mode.

CONNECT 115200

//Send Data to Server

All data got from com port will be sent to internet directly

//Receive Data From Server

HELLO CLIENT

//data from server output to COM port directly

HELLO CLIENT

OK

// sequence of +++ to quit transparent mode

AT+CIOPEN?

+CIOPEN: 0,"UDP","117.131.85.139",5254,-1

+CIOPEN: 1

OK

AT+CIOPEN=0,"UDP","117.131.85.139",5254,5000 //only <link_num>=0 is allowed to operate with transparent mode.

CONNECT 115200

3.4 TCP Server

3.4.1 Transparent Mode

AT+CIPMODE=1

OK

AT+NETOPEN

OK

+NETOPEN: 0

AT+SERVERSTART=8080, 0 //only <server_index>=0 is allowed to operate with transparent mode.

OK

+CLIENT: 0,0,192.168.108.5:57202 //only <link_num> 0 can be used for transparent

CONNECT 115200

mode operation.

OK

AT+CIPCLOSE=0

// sequence of +++ to quit data mode

// close client connection

OK

CLOSED

+CIPCLOSE: 0,0

AT+SERVERSTOP=0

// close server socket

+SERVERSTOP: 0,0

OK

3.4.2 Non-Transparent Mode

AT+NETOPEN

OK

+NETOPEN: 0

AT+SERVERSTART=8080,0

//only <server_index>=0 is allowed to operate with transparent mode.

OK

AT+SERVERSTART=9090,1

OK

+CLIENT: 0,0,192.168.108.5:57202

//If a socket is accepted, the following URC will be reported:

AT+CIPOPEN?

//User can use AT+CIPOPEN? to check the accepted socket

+CIPOPEN: 0,"TCP","192.168.108.5",57202,1

//last parameter of 1 indicates this is an accepted socket, this server index is 1

+CIPOPEN: 1

OK

AT+CIPSEND=0,5

// only supports fixed-length to send

>HELLO

OK

+CIPSEND: 0,5,5

AT+SERVERSTOP=0

// if unspecified, it will close 0 channel

+SERVERSTOP: 0,0

OK

AT+SERVERSTOP=1

+SERVERSTOP: 1,0

OK

AT+NETCLOSE

OK

+NETCLOSE: 0

3.4.3 Query Connection Status

AT+CIOPEN=1,"TCP","117.131.85.139",5253

OK

+CIOPEN: 1,0

AT+CIOPEN?

// query the current state of all sockets

+CIOPEN: 0

+CIOPEN: 1,"TCP","117.131.85.139",5253,-1

OK

AT+CIPCLOSE?

+CIPCLOSE: 0,1

OK

AT+CIPCLOSE=1

OK

+CIPCLOSE: 1,0

AT+CIPCLOSE?

+CIPCLOSE: 0,0

OK

4 Error Handling

4.1 Executing TCPIP AT Commands Fails

When executing TCPIP AT commands, if ERROR response is received from the module, please check whether the U(SIM) card is inserted and whether it is +CPIN: READY returned when executing AT+CPIN?,also please check by AT+CGDCONT? If the 1st PDP context has correct APN.

4.2 PDP Activation Fails

If it fails to activate a PDP context with AT+NETOPEN command, please make sure the module has registered to network successfully, AT+CEREG? and AT+CPSI? could be used to verify registration state,also please check by AT+CGDCONT? If the 1st PDP context has correct APN.

5 Summary of Error Codes

5.1 Description of <err_info>

The fourth parameter <errMode> of AT+CIPCCFG (TODO) is used to determine how <err_info> is displayed.

If <errMode> is set to 0, the <err_info> is displayed with numeric value.

If <errMode> is set to 1, the <err_info> is displayed with string value.

The default is displayed with string value.

Table 2: description of <err_info>

Numeric Value	String Value
0	Connection time out
1	Bind port failed
2	Port overflow
3	Create socket failed
4	Network is already opened
5	Network is already closed
6	No clients connected
7	No active client
8	Network not opened
9	Client index overflow
10	Connection is already created
11	Connection is not created
12	Invalid parameter
13	Operation not supported
14	DNS query failed
15	TCP busy
16	Net close failed for socket opened
17	Sending time out
18	Sending failure for network error
19	Open failure for network error
20	Server is already listening
21	Operation failed
22	No data

5.2 Description of <err>

Table 3:description of <err>

<err>	Description of <err>
0	operation succeeded
1	Network failure
2	Network not opened
3	Wrong parameter
4	Operation not supported
5	Failed to create socket
6	Failed to bind socket
7	TCP server is already listening
8	Busy
9	Sockets opened
10	Timeout
11	DNS parse failed for AT+CIOPEN
12	Unknown error

6 Appendix A Reference

6.1 Related documents

Table 4:Related documents

SN	Document Name	Remark
[1]	SIM7022 Series_AT Command Manua	AT Command of SIM7022 module

6.2 Conventions and abbreviations

Table 5:Conventions and abbreviations

Abbreviation	Description
ME	Mobile Equipment
MS	Mobile Station
TA	Terminal Adapter
DCE	Data Communication Equipment
TE	Terminal Equipment
DTE	Data Terminal Equipment
PDP	Packet Data Protocol
TCP	Terminal Control Protocol
UDP	User Datagram Protocol