SIM5360 Compatible with SIM900 ATC V0.01

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Version History

Version	Chapter	Comments
V0.01	New Version	Initital verison

Contents

1 Introduction

1.1 Scope of the document

This document presents the AT Command Set for SIMCom SIM900 series cellular engine.

1.2 Related documents

The present document is based on the following standards:
[1] 3GPP TS 27.005: Use of Data Terminal Equipment – Data Circuit terminating Equipment (DTE – DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS).
[2] 3GPP TS 27.007: AT command set for User Equipment (UE).
[3] ITU-T V.25 ter: Data communication over the telephone network – Serial asynchronous automatic dialing and control.
[4] TIA/EIA-578-A: Facsimile Digital Interfaces – Asynchronous Facsimile DCE Control Standard, Service Class
[5] 3GPP 27.010: Terminal Equipment to Mobile Station (TE-MS) Multiplexer protocol

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1.3 Conventions and abbreviations

In this document, the GSM engines are referred to as following term:
1)   ME (Mobile Equipment);
2)   MS (Mobile Station);
3)   TA (Terminal Adapter);
4)   DCE (Data Communication Equipment) or facsimile DCE (FAX modem, FAX board);

In application, controlling device controls the GSM engine by sending AT Command via its serial interface. The controlling device at the other end of the serial line is referred to as following term:
1)   TE (Terminal Equipment);
2)   DTE (Data Terminal Equipment) or plainly "the application" which is running on an embedded system;

1.4 AT Command syntax

The "AT" or "at" prefix must be set at the beginning of each Command line. To terminate a Command line enter <CR>.
Commands are usually followed by a response that includes. "<CR><LF><response><CR><LF>" Throughout this document, only the responses are presented,<CR><LF> are omitted intentionally.

The AT Command set implemented by SIM900 is a combination of GSM07.05, GSM07.07 and ITU-T recommendation V.25ter and the AT commands developed by SIMCom.

Note: A HEX string such as "00 49 49 49 49 FF FF FF FF" will be sent out through serial port at the baud rate of 115200 immediately after SIM900 is powered on. The string shall be ignored since it is used for synchronization with PC tool. Only enter AT Command through serial port after SIM900 is powered on and Unsolicited Result Code "RDY" is received from serial port. If auto-bauding is enabled, the Unsolicited Result Codes "RDY" and so on are not indicated when you start up the ME, and the "AT" prefix, not "at" prefix must be set at the beginning of each command line.

All these AT commands can be split into three categories syntactically: "**basic**", "**S parameter**", and "**extended**". These are as follows:

1.4.1 Basic syntax

These AT commands have the format of "**AT$<x><n>$**", or "**AT&$<x><n>$**", where "$<x>$"is the Command, and "$<n>$"is/are the argument(s) for that Command. An example of this is "**ATE$<n>$**", which tells the DCE whether received characters should be echoed back to the DTE according to the value of "$<n>$". "$<n>$" is optional and a default will be used if missing.

1.4.2 S Parameter syntax

These AT commands have the format of "**ATS$<n>=<m>$**", where "$<n>$" is the index of the **S** register to set, and "$<m>$"is the value to assign to it. "$<m>$" is optional; if it is missing, then a default value is assigned.

1.4.3 Extended Syntax

These commands can operate in several modes, as in the following table:

Table 1: Types of AT commands and responses

Test Command	AT+$<x>$=?	The mobile equipment returns the list of parameters and value ranges set with the corresponding Write Command or by internal processes.
Read Command	AT+$<x>$?	This command returns the currently set value of the parameter or parameters.
Write Command	AT+$<x>$=$<...>$	This command sets the user-definable parameter values.
Execution Command	AT+$<x>$	The execution command reads non-variable parameters affected by internal processes in the GSM engine.

1.4.4 Combining AT commands on the same Command line

You can enter several AT commands on the same line. In this case, you do not need to type the "**AT**" or "**at**" prefix before every command. Instead, you only need type "**AT**" or "**at**" the beginning of the command line. Please note to use a semicolon as the command delimiter after an extended command; in basic syntax or S parameter syntax, the semicolon need not enter, for example: ATE1Q0S0=1S3=13V1X4+IFC=0,0;+IPR=115200; &W.

The Command line buffer can accept a maximum of 556 characters. If the characters entered exceeded this number then none of the Command will executed and TA will return "**ERROR**".

1.4.5 Entering successive AT commands on separate lines

When you need to enter a series of AT commands on separate lines, please Note that you need to wait the final response (for example OK, CME error, CMS error) of last AT Command you entered before you enter the next AT Command.

1.5 Supported character sets

The SIM900 AT Command interface defaults to the **IRA** character set. The SIM900 supports the following character sets:

- GSM format
- UCS2
- HEX
- IRA
- PCCP
- PCDN
- 8859-1

The character set can be set and interrogated using the "**AT+CSCS**" Command (GSM 07.07). The character set is defined in GSM specification 07.05.

The character set affects transmission and reception of SMS and SMS Cell Broadcast messages, the entry and display of phone book entries text field and SIM Application Toolkit alpha strings.

1.6 Flow control

Flow control is very important for correct communication between the GSM engine and DTE. For in the case such as a data or fax call, the sending device is transferring data faster than the receiving side is ready to accept. When the receiving buffer reaches its capacity, the receiving device should be capable to cause the sending device to pause until it catches up.

There are basically two approaches to achieve data flow control: software flow control and hardware flow control. SIM900 support both two kinds of flow control.
In Multiplex mode, it is recommended to use the hardware flow control.

1.6.1 Software flow control (XON/XOFF flow control)

Software flow control sends different characters to stop (XOFF, decimal 19) and resume (XON, decimal 17) data flow. It is quite useful in some applications that only use three wires on the serial interface.

The recommend flow control approach of SIM900 is hardware flow control (RTS/CTS flow control), to enable software flow control in the DTE interface and within GSM engine, type the following AT Command:

AT+IFC=1, 1

This setting is stored volatile, for use after restart, **AT+IFC=1, 1** should be stored to the user profile with **AT&W**.

NOTE:

The AT commands listed in the table of **AT&W** chapter should be stored to user profile with **AT&W** for use after restart. Most other AT commands in V.25, 07.05, 07.07, GPRS will store parameters automatically and can be used after module restart.

Ensure that any communications software package (e.g. Hyper terminal) uses software flow control.

NOTE:

Software Flow control should not be used for data calls where binary data will be transmitted or received (e.g. TCP/IP) as the DTE interface may interpret binary data as flow control characters.

1.6.2 Hardware flow control (RTS/CTS flow control)

Hardware flow control achieves the data flow control by controlling the RTS/CTS line. When the data transfer should be suspended, the CTS line is set inactive until the transfer from the receiving buffer has completed. When the receiving buffer is ok to receive more data, CTS goes active once again.

To achieve hardware flow control, ensure that the RTS/CTS lines are present on your application platform.

2 AT Commands for TCPIP Application Toolkit

2.1 Overview

Command	Description
AT+CIPMUX	START UP MULTI-IP CONNECTION
AT+CIPSTART	START UP TCP OR UDP CONNECTION
AT+CIPSEND	SEND DATA THROUGH TCP OR UDP CONNECTION
AT+CIPQSEND	SELECT DATA TRANSMITTING MODE
AT+CIPACK	QUERY PREVIOUS CONNECTION DATA TRANSMITTING STATE
AT+CIPCLOSE	CLOSE TCP OR UDP CONNECTION
AT+CIPSHUT	DEACTIVATE GPRS PDP CONTEXT
AT+CSTT	START TASK AND SET APN, USER NAME, PASSWORD
AT+CIICR	BRING UP WIRELESS CONNECTION WITH GPRS OR CSD
AT+CIFSR	GET LOCAL IP ADDRESS
AT+CIPSTATUS	QUERY CURRENT CONNECTION STATUS

2.2 Detailed Descriptions of Commands

2.2.1 AT+CIPMUX   Start Up Multi-IP Connection

AT+CIPMUX Start Up Multi-IP Connection	
Test Command **AT+CIPMUX=?**	Response **+CIPMUX: (0,1)** **OK**
	Parameter See Write Command
Read Command **AT+CIPMUX?**	Response **+CIPMUX: \<n>** **OK**
	Parameter See Write Command
Write Command **AT+CIPMUX=\<n>**	Response **OK**
	Parameter

<n>	<u>0</u>	Single IP connection
	1	Multi-IP connection
Reference	Note
	● Only in IP initial state, AT+CIPMUX=1 is effective;
	● Only when multi-IP connection and GPRS application are both shut down, AT+CIPMUX=0 is effective.

2.2.2 AT+CIPSTART   Start Up TCP or UDP Connection

AT+CIPSTART	Start Up TCP or UDP Connection
Test Command **AT+CIPSTART= ?**	Response 1) If AT+CIPMUX=0 **+CIPSTART: (**list of supported **<mode>),(<IP address>),(<port>)** **+CIPSTART: (**list of supported **<mode>),(<domain name>),(<port>)** **OK** 2) If AT+CIPMUX=1 **+CIPSTART: (**list of supported **<n>),(**list of supported **<mode>),(<IP address>),(<port>)** **+CIPSTART: (**list of supported **<n>),(**list of supported **<mode>),(<domain name>),(<port>)** **OK**
	Parameters See Write Command
Write Command 1)If single IP connection (+CIPMUX=0) **AT+CIPSTART= <mode>,<IP address>,<port>** or **AT+CIPSTART= <mode>,<domai n name>,<port>** 2)If multi-IP connection (+CIPMUX=1) **AT+CIPSTART= <n>,<mode>,<ad dress>,<port>**	Response 1)If single IP connection (+CIPMUX=0) If format is right response **OK** otherwise response If error is related to ME functionality: **+CME ERROR <err>** Response when connection exists **ALREADY CONNECT** Response when connection is successful **CONNECT OK** Otherwise **STATE: <state>** **CONNECT FAIL** 2)If multi-IP connection (+CIPMUX=1) If format is right

or **AT+CIPSTART=** **<n>,<mode>,<do** **main name>,** **<port>**	**OK**, otherwise response If error is related to ME functionality: **+CME ERROR <err>** Response when connection exists **<n>,ALREADY CONNECT** If connection is successful **<n>,CONNECT OK** Otherwise **<n>,CONNECT FAIL**
	Parameters **<n>**　0..7　A numeric parameter which indicates the connection number **<mode>**　A string parameter(string should be included in quotation marks) 　　　　which indicates the connection type 　　　"TCP"　　Establish a TCP connection 　　　"UDP"　　Establish a UDP connection **<IP address>**　A string parameter(string should be included in quotation 　　　　marks) which indicates remote server IP address **<port>**　Remote server port **<domain name>**　A string parameter(string should be included in 　　　　quotation marks) which indicates remote server domain name **<state>**　A string parameter(string should be included in quotation marks) 　　　　which indicates the progress of connecting 　　　　0　IP INITIAL 　　　　1　IP START 　　　　2　IP CONFIG 　　　　3　IP GPRSACT 　　　　4　IP STATUS 　　　　5　TCP CONNECTING/UDP CONNECTING/ 　　　　　　SERVER LISTENING 　　　　6　CONNECT OK 　　　　7　TCP CLOSING/UDP CLOSING 　　　　8　TCP CLOSED/UDP CLOSED 　　　　9　PDP DEACT 　　　In Multi-IP state: 　　　　0　IP INITIAL 　　　　1　IP START 　　　　2　IP CONFIG 　　　　3　IP GPRSACT 　　　　4　IP STATUS 　　　　5　IP PROCESSING 　　　　9　PDP DEACT

Reference	Note
	● This command allows establishment of a TCP/UDP connection only when the state is IP INITIAL or IP STATUS when it is in single state. In multi-IP state, the state is in IP STATUS only. So it is necessary to process "AT+CIPSHUT" before user establishes a TCP/UDP connection with this command when the state is not IP INITIAL or IP STATUS.
	● When module is in multi-IP state, before this command is executed, it is necessary to process "AT+CSTT, AT+CIICR, AT+CIFSR".

2.2.3 AT+CIPSEND   Send Data Through TCP or UDP Connection

AT+CIPSEND Send Data Through TCP or UDP Connection	
Test Command **AT+CIPSEND=?**	Response 1) If single IP connection (+CIPMUX=0) **+CIPSEND: \<length\>** **OK** 2) If multi-IP connection (+CIPMUX=1) **+CIPSEND: \<0-7\>,\<length\>** **OK**
	Parameters See Write Command
Read Command **AT+CIPSEND?**	Response 1) If single IP connection (+CIPMUX=0) **+CIPSEND: \<size\>** **OK** 2) If multi-IP connection (+CIPMUX=1) **+CIPSEND: \<n\>,\<size\>** **OK**
	Parameters **\<n\>** A numeric parameter which indicates the connection number **\<size\>** A numeric parameter which indicates the data length sent at a time
Write Command 1) If single IP connection (+CIPMUX=0) **AT+CIPSEND=\<length\>**	Response This Command is used to send specified length data If single IP is connected (+CIPMUX=0) If connection is not established or module is disconnected: If error is related to ME functionality: **+CME ERROR \<err\>**

2) If multi-IP connection (+CIPMUX=1) **AT+CIPSEND=<n>[,<length>]**	If sending is successful: When +CIPQSEND=0 **SEND OK** When +CIPQSEND=1 **DATA ACCEPT: <length>** If sending fails: **SEND FAIL** If multi-IP connection is established (+CIPMUX=1) If connection is not established or module is disconnected: If error is related to ME functionality: **+CME ERROR <err>** If sending is successful: When +CIPQSEND=0 **<n>,SEND OK** When +CIPQSEND=1 **DATA ACCEPT: <n>,<length>** If sending fails: **<n>,SEND FAIL**
	Parameters **<n>** A numeric parameter which indicates the connection number **<length>** A numeric parameter which indicates the length of sending data, it must be less than <size>
Execution Command **AT+CIPSEND** response">", then type data for send, tap CTRL+Z to send, tap ESC to cancel the operation	Response This Command is used to send changeable length data. If single IP connection is established (+CIPMUX=0) If connection is not established or module is disconnected: If error is related to ME functionality: **+CME ERROR <err>** If sending is successful: When +CIPQSEND=0 **SEND OK** When +CIPQSEND=1 **DATA ACCEPT: <length>** If sending fails: **SEND FAIL** Note This Command can only be used in single IP connection mode (+CIPMUX=0) and to send data on the TCP or UDP connection that has been established already. Ctrl-Z is used as a termination symbol. ESC is used to cancel sending data. There are at most **<size>** bytes which can be

sent at a time.

Reference	Note
	● The data length which can be sent depends on network status.
	● Set the time that send data automatically with the Command of AT+CIPATS.
	● Only send data at the status of established connection.

2.2.4 AT+CIPQSEND   Select Data Transmitting Mode

AT+CIPQSEND	Select Data Transmitting Mode
Test Command **AT+CIPQSEND =?**	Response **+CIPQSEND: (0,1)** **OK**
	Parameter See Write Command
Read Command **AT+CIPQSEND ?**	Response **+CIPQSEND: <n>** **OK**
	Parameter See Write Command
Write Command **AT+CIPQSEND =<n>**	Response **OK**
	Parameter **<n>** 0 Normal mode – when the server receives TCP data, it will responsd SEND OK. 1 Quick send mode – when the data is sent to module, it will responsd DATA ACCEPT: <n>,<length>, while not responding SEND OK.
Reference	Note

2.2.5 AT+CIPACK   Query Previous Connection Data Transmitting State

AT+CIPACK Query Previous Connection Data Transmitting State	
Test Command **AT+CIPACK=?**	Response **OK**
Write Command If multi-IP	Response **+CIPACK: <txlen>,<acklen>,<nacklen>**

connection (+CIPMUX=1) AT+CIPACK=<n>	**OK**
	Parameters
	<n> A numeric parameter which indicates the connection number
	<txlen> The data amount which has been sent
	<acklen> The data amount confirmed successfully by the server
	<nacklen> The data amount without confirmation by the server
Execution Command If single IP connection (+CIPMUX=0) **AT+CIPACK**	Response **+CIPACK: <txlen>,<acklen>,<nacklen>** **OK**
	Parameters See Write Command
Reference	Note

2.2.6 AT+CIPCLOSE   Close TCP or UDP Connection

AT+CIPCLOSE	Close TCP or UDP Connection
Test Command **AT+CIPCLOSE =?**	Response **OK**
Write Command 1) If single IP connection (+CIPMUX=0) **AT+CIPCLOSE =[<n>]** 2) If multi-IP connection (+CIPMUX=1) **AT+CIPCLOSE =<id>, [<n>]**	Response 1) If single IP connection (+CIPMUX=0) **CLOSE OK** 2) If multi-IP connection (+CIPMUX=1) **<id>, CLOSE OK**
	Parameters **<n>** <u>0</u> Slow close 1 Quick close **<id>** A numeric parameter which indicates the connection number
Execution Command **AT+CIPCLOSE**	If single IP connection only (+CIPMUX=0) Response If close is successfully: **CLOSE OK** If close fails: **ERROR**

Reference	Note AT+CIPCLOSE only closes connection at the status of TCP/UDP which returns CONNECTING or CONNECT OK, otherwise it will return ERROR, after the connection is closed, the status is IP CLOSE in single IP mode.

2.2.7 AT+CIPSHUT   Deactivate GPRS PDP Context

AT+CIPSHUT Deactivate GPRS PDP Context	
Test Command **AT+CIPSHUT=?**	Response **OK**
Execution Command **AT+CIPSHUT**	Response If close is successful: **SHUT OK** If close fails: **ERROR**
Reference	Note ● If this command is executed in multi-connection mode, all of the IP connection will be shut. ● User can close gprs pdp context by AT+CIPSHUT. After it is closed, the status is IP INITIAL. ● If "+PDP: DEACT" urc is reported which means the gprs is released by the network, then user still needs to execute "AT+CIPSHUT" command to make PDP context come back to original state.

2.2.8 AT+CSTT   Start Task and Set APN, USER NAME, PASSWORD

AT+CSTT Start Task and Set APN, USER NAME, PASSWORD	
Test Command **AT+CSTT=?**	Response **+CSTT: "APN","USER","PWD"** **OK**
	Parameters See Write Command
Read Command **AT+CSTT?**	Response **+CSTT: <apn>,<user name>,<password>** **OK**
	Parameters See Write Command
Write Command **AT+CSTT=<apn**	Response **OK**

>,<user name>,<passwor d>	ERROR
	Parameters
	<apn> A string parameter (string should be included in quotation marks) which indicates the GPRS access point name
	<user name> A string parameter (string should be included in quotation marks) which indicates the GPRS user name
	<password> A string parameter (string should be included in quotation marks) which indicates the GPRS password
Execution Command **AT+CSTT**	Response **OK** **ERROR**
Reference	Note The write command and execution command of this command is valid only at the state of IP INITIAL. After this command is executed, the state will be changed to IP START.

2.2.9 AT+CIICR   Bring Up Wireless Connection with GPRS or CSD

AT+CIICR Bring Up Wireless Connection with GPRS or CSD	
Test Command **AT+CIICR=?**	Response **OK**
Execution Command **AT+CIICR**	Response **OK** **ERROR**
Reference	Note ● AT+CIICR only activates moving scene at the status of IP START, after operating this Command is executed, the state will be changed to IP CONFIG. ● After module accepts the activated operation, if it is activated successfully, module state will be changed to IP GPRSACT, and it responds OK, otherwise it will respond ERROR.

2.2.10 AT+CIFSR   Get Local IP Address

AT+CIFSR Get Local IP Address	
Test Command **AT+CIFSR=?**	Response **OK**
Execution Command **AT+CIFSR**	Response **<IP address>** **ERROR**

	Parameter
	<IP address> a string parameter(string should be included in quotation marks) which indicates the IP address assigned from GPRS or CSD.
Reference	Note
	Only after PDP context is activated, local IP Address can be obtained by AT+CIFSR, otherwise it will respond ERROR. The active status are IP GPRSACT, TCP/UDP CONNECTING, CONNECT OK, IP CLOSE.

2.2.11 AT+CIPSTATUS   Query Current Connection Status

AT+CIPSTATUS **Query Current Connection Status**	
Test Command **AT+CIPSTATUS =?**	Response **OK**
Write Command If multi-IP connection mode (+CIPMUX=1) **AT+CIPSTATU S=<n>**	Response **+CIPSTATUS: <n>,<bearer>,<TCP/UDP>,<IP address>,<port>,<client state>** **OK**
	Parameters See Execution Command
Execution Command **AT+CIPSTATUS**	Response 1）If in single connection mode (+CIPMUX=0) **OK** **STATE: <state>** 2) If in multi-connection mode (+CIPMUX=1) **OK** **STATE: <state>** If the module is set as server **S: 0,<bearer>,<port>,<server state>** **C: <n>,<bearer>,<TCP/UDP>,<IP address>,<port>,<client state>**

	Parameters
	<n> 0-7 A numeric parameter which indicates the connection number
	<bearer> 0-1 GPRS bearer, default is 0
	<server state>
	          OPENING
	          LISTENING

	CLOSING
	\<client state\>
	INITIAL
	CONNECTING
	CONNECTED
	REMOTE CLOSING
	CLOSING
	CLOSED
	\<state\> A string parameter(string should be included in quotation marks) which indicates the progress of connecting
	0 IP INITIAL
	1 IP START
	2 IP CONFIG
	3 IP GPRSACT
	4 IP STATUS
	5 TCP CONNECTING/UDP CONNECTING/SERVER LISTENING
	6 CONNECT OK
	7 TCP CLOSING/UDP CLOSING
	8 TCP CLOSED/UDP CLOSED
	9 PDP DEACT
	In Multi-IP state:
	0 IP INITIAL
	1 IP START
	2 IP CONFIG
	3 IP GPRSACT
	4 IP STATUS
	5 IP PROCESSING
	9 PDP DEACT
Reference	Note

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