STK User Guide

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Contents

VERSION HISTORY

Now document: "SIM STK User Guide" Version 1.00

Chapter	Page	What is new
V1.00		Origin

1 INTRODUCTION

1.1 Scope of the document

This document describes how to implement STK application on SIM900 module through STK AT interface. Examples of how to use the interface are also given for reference.

1.2 Related documents

[1] SIMCOM AT Commands Set.

You can visit the SIMCOM Website using the following link:
http://www.sim.com/wm

1.3 Conventions and abbreviations

In this document, the GSM engines are referred to terms as following table:

SAT	SIM Application Toolkit
EVB	Evaluation Board
*PSSTK	SIM Toolkit Unsolicited Command
URC	Unsolicited request code
TE	Terminal Equipment
TA	Terminal Adapter
DTE	Data Terminal Equipment or plainly "the application" which is running on an embedded system
DCE	Data Communication Equipment) or facsimile DCE(FAX modem, FAX board)
ME	Mobile Equipment
MS	Mobile Station

2 STK FUNCTION USAGE

2.1 STK AT command

*PSSTK command is defined to support SIM toolkit by AT commands. Only part of SIM toolkit commands that interact with user or MMI can be controlled. All other SIM toolkit mechanisms such as terminal profile, SMS or CBM data download, call control or MO SMS control by SIM, event download and all command that does not require interaction with the user (or screen) are internally managed by the ME.

AT*PSSTKI SIM Toolkit interface configuration	
Read Command AT*PSSTKI?	Response *PSSTKI: <mode> OK ERROR
	Parameter See Write Command.
Test Command AT*PSSTKI=?	Response *PSSTKI: list of supported <mode >s
	Parameter See Write Command.
Write Command AT*PSSTKI =<mode>	Response OK ERROR
	Parameter <mode > integer type <u>0</u> SIM toolkit notification is disabled 1 SIM toolkit notification is enabled
Reference	Note If AT*PSSTK=1 is set, *PSSTK: "SETUP MENU" string will be sent out after power on.

AT*PSSTK SIM toolkit control	
Read Command AT*PSSTK?	Response ERROR
	Parameter 　See Write Command.
Test Command AT*PSSTK=?	Response *PSSTK: list of supported <response type>s
	Parameter 　See Write Command.
Write Command AT*PSSTK =<response type>,[<parameter 1>,…,<parameter n]	Response OK ERROR
	Parameter <response type>　string type that represents the type of response to be sent 　　　　to SIM 　　　　"COMMAND REJECTED" 　　　　"NOTIFICATION" 　　　　"SETUP CALL" 　　　　"DISPLAY TEXT" 　　　　"GET INKEY" 　　　　"GET INPUT" 　　　　"PLAY TONE" 　　　　"SELECT ITEM" 　　　　"SETUP MENU" 　　　　"REMOVE MENU" 　　　　"MENU SELECTION" 　　　　"ALL CALLS DISCONNECTED" 　　　　"USER ACTIVITY" 　　　　"IDLE SCREEN AVAILABLE" 　　　　"SETUP CALL TERMINATED" 　　　　"GET ITEM LIST" 　　　　"LANGUAGE NOTIFICATION" 　　　　"SETUP IDLE MODE TEXT" <parameteri>　　integer or string type which number of parameters 　　　　depends of response type
Reference	Note

2.2 Phone Initialisation

For each application the AT commands listed below should be given before starting a SAT session

over the AT interface. It is highly recommended that AT*PSSTKI=1 should be set to enable the notification of STK information after module is powered on and "RDY" URC is sent from serial port. If AT*PSSTKI=1 is set, module will send out SETUP MENU URC as follows after SIM is initiated:

*PSSTK: "SETUP MENU",1,2,800551687403901A4E13533A,0,0,1,0,0,11

Initial Condition	Usage	Description
AT*PSSTKI=1	M	Command sets to enable notification about STK function.
AT+CMGF=1	O	Command sets the output mode to TEXT as opposed to PDU mode, and is more easily readable if test sequences are being run using a Terminal Emulator such as Hyperterminal.
AT+CMEE=2	O	Command sets the error reporting level to verbose mode to provide more useful error descriptions to the user.
AT+CSCS="UCS2"	O	Command sets the character set to UCS2.

The Usage column indicates whether the command is Advisable (A), Optional (O) or Mandatory (M) for running the STK via the AT command interface. All parameter values stated are those recommended for use in the application.

2.3 Notification from SIM to user: PSSTK unsolicited result code

According to specification GSM07.07, there are a lot of interactions between user and SIM, such as SETUP MENU, DISPLAY TEXT, SELECT ITEM, GET INPUT, GET INKEY. SIM will send out notification to user what users can do according to current SIM state. Moreover, sometimes there will be event that need user to take action. Thus, there are different notifications are sent from SIM to user. The following table describes the details about notifications.

Notification type	description

SETUP MENU	*PSSTK: "SETUP MENU",\<alphaID presence\>,\<alphabet\>,\<alpha ID\>,\<icon ID\>,\<icon qualifier\>,\<command number\>, \<default Item ID\>,\<helpInfo\>,\<numberOfItem\>
	
	\<alphaID presence\> integer type
	        0 alphaID is not present
	        1 alphaID is present
	\<alphabet\> integer type
	      the alphabet of alphaID
	\<alpha ID\> string type without quotation mark
	      alpha ID
	\<icon ID\> integer type
	      icon identifier

	<icon qualifier> integer type
	        icon qualifier
	<command number> integer type
	        command number
	<default Item ID> integer type
	        Default item ID of the menu
	<help Info> integer type
	        0 help info is not need
	        1 help info is need
	<numberOfItem> integer type
	        total number of menu item

NOTIFICATION	*PSSTK: "NOTIFICATION",<command number>,<type of command>,<alphaID presence>,<alphabet>,<alpha ID>,<icon ID>,<icon qualifier> <command number> integer type <type of command> integer type <alphaID presence> integer type <alphabet> integer type <alpha ID> string type <Icon ID> integer type <icon qualifier> integer type
LANGUAGE NOTIFICATION	*PSSTK: "LANGUAGE NOTIFICATION",<command number>,<specific language>,<simlanguage> <command number> integer type <specific language> integer type <simlanguage> integer type
SETUP IDLE MODE TEXT	*PSSTK: "SETUP IDLE MODE TEXT",<command number>,<alphabet>,<text>,<icon id>,<icon qualifier> <command number> integer type <alphabet> integer type <text> string type <icon id> integer type <icon qualifier> integer type
CONTROL BY SIM	*PSSTK: "CONTROL BY SIM",<command number>,<alphaID presence>,<alphabet>,<alpha ID> <command number> integer type <alphaID presence> integer type <alphabet> integer type <alpha ID> string type
REFRESH	*PSSTK: "REFRESH",<command number>,<refresh type> <command number> integer type <refresh type> integer type
END	*PSSTK: "END CALL",< command number >,<cause select>,<cause>,<call ID>

CALL	<command number> integer type
	<cause select> integer type
	<cause> integer type
	<call ID> integer type
PROCES SING	*PSSTK: "PROCESSING",<command number>
	<command number> integer type
END SESSIO N	*PSSTK: "END SESSION"
	no parameter
ABORT SESSIO N	*PSSTK: "ABORT SESSION"
	no parameter
SETUP CAL	*PSSTK: "SETUP CALL",<command number>,<typeOfCommand>,<confirmation>,<alphaID presence1>,<alphabet1>, <alphaID1>,<iconID1> ,<iconQualifier1>,< alphaID presence2>,<alphabet2>,<alphaID2>,<iconID2>,<iconQualifier2>,<repeat indicatior>
	<command number> integer type
	<typeOfCommand> integer type
	<confirmation> integer type
	<alphaID presence1> integer type
	<alphabet1> integer type
	<alphaID1> string type
	<iconID1> integer type
	<iconQualifier1> integer type
	<alphaID presence2> integer type
	<alphabet2> integer type
	<alphaID2> string type
	<iconID2> integer type
	<iconQualifier2> integer type
	<repeat indicatior> integer type
DISPLA Y TEXT	*PSSTK: "DISPLAY TEXT",<command number>,<priority>,<clear>,<immediate response>,<alphabet>,<text>, <iconID>, <iconQualifier>
	< command number > integer type
	<Priority> integer type
	<Clear> integer type
	<ImmediateResponse> integer type
	<Alphabet> integer type
	<Text> string type
	<IconId> integer type
	<IconQualifier> integer type
GET INKEY	*PSSTK: "GET INKEY",< command number >,<ResponseFormat>,<ResponseAlphabet>,<HelpInfo>,<Alphabet>, <Text>,

	<IconId>,<IconQualifier>
	< command number > integer type
	<ResponseFormat> integer type
	<ResponseAlphabet> integer type
	<HelpInfo> integer type
	<Alphabet> integer type
	<Text> string type
	<IconId> integer type
	<IconQualifier> integer type
GET INPUT	*PSSTK: "GET INPUT",< command number >,<ResponseFormat>,<ResponseAlphabet>,<HideEntry>, <AlphabetText>, <Text>,<IconId>,<IconQualifier>,<AlphabetDefault>,<DefaultText>,<MinLength>,< MaxLength>, <HelpInfo>
	< command number > integer type
	<ResponseFormat> integer type
	<ResponseAlphabet> integer type
	<HideEntry> integer type
	<AlphabetText> string type
	<Text> string type
	<IconId> integer type
	<IconQualifier> integer type
	<AlphabetDefault> integer type
	<DefaultText> string type
	<MinLength> integer type
	<MaxLength> integer type
	<HelpInfo> integer type
PLAY TONE	*PSSTK: "PLAY TONE",<Presence>,<Alphabet>,<AlphaId>,<IconId>,<IconQualifier>,< command number >, <Tone>,<Duration>
	<Presence> integer type
	<Alphabet> integer type
	<AlphaId> string type
	<IconId> integer type
	<IconQualifier> integer type
	< command number > integer type
	<Tone> integer type
	<Duration> integer type
SELECT ITEM	*PSSTK: "SELECT ITEM",<Presence>,<AlphaId>,<Alphabet>,<IconId>,<IconQualifier>,< command number >, <DefaultItem>, <HelpInfo>,<NumberOfItem>
	<Presence> integer type

	<Alphabet> integer type
	<AlphaId> string type
	<IconId> integer type
	<IconQualifier> integer type
	< command number > integer type
	<DefaultItem> integer type
	<HelpInfo> integer type
	<NumberOfItem> integer type
REMOVE MENU	*PSSTK: "REMOVE MENU",< command number > < command number > integer type
DISCONNECT	*PSSTK="DISCONNECT",<CauseSelect>,<Cause>,<CallIdListStatus0>,<CallIdListStatus1>,<CallIdListStatus2>,<CallIdListStatus3>,<CallIdListStatus4>,<CallIdListStatus5>,<CallIdListStatus6>,<CallId>,<MaxNumberOfCallRepeatAttempts>,<RepeatCallAttemptWaitingTime>,<CallIdPreviousState> <CauseSelect> integer type <Cause> integer type <CallIdListStatus0> integer type <CallIdListStatus1> integer type <CallIdListStatus2> integer type <CallIdListStatus3> integer type <CallIdListStatus4> integer type <CallIdListStatus5> integer type <CallIdListStatus6> integer type <CallId> integer type <MaxNumberOfCallRepeatAttempts> integer type <RepeatCallAttemptWaitingTime> integer type <CallIdPreviousState> integer type

2.4 Response from user to SIM

According to the notification from SIM card, user can take actions such as SETUP MENU, REJECT COMMAND, SETUP CALL, GET INPUT. The following table describes the details of response. It is highly recommended that user should response to notification from SIM in 2 minutes. If user does not want to go on with STK function, user can use command reject as a response.

Response type	description

SETUP MENU	AT*PSSTK="SETUP MENU", <command number>,<icon display>
	 <command number> integer type
	 <icon display> integer type
	                                   0 none icon
	                                   1 display icon

	2 not display icon
COMMAND REJECT	AT*PSSTK=”COMMAND REJECT”, <command number>,<cause> <command number> integer type <cause> integer type 0x01 screen is busy 0x02 screen is busy in call context 0x03 screen is busy in SS context 0x04 screen busy in security context 0x10 session terminated by the user 0x11 backward move requested by user 0x12 no response from the user 0x14 USSD terminated by user 0x15 SS terminated by user 0x16 User reject ATP connection 0x1A bearer refused 0x20 ME currently unable to process this command 0x22 user didn't accept the call setup request 0x23 user cleared down call before connection or network release 0x30 unable to treat the message, beyond ME capabilities 0x31 call completion activation rejected 0x32 no network 0x47 Unknown alphabet 0x48 screen is busy in USSD context 0x80 an incoming call arrives but TE is not connected 0x81 external MMI (ATP) is frozen, and a call is active 0x82 TE cable is disconnected

NOTIFICATION	AT*PSSTK=”NOTIFICATION”, <command number>,<icon display>
	 <command number> integer type
	 <icon display> integer type
	                 0 none icon
	                 1 display icon
	                 2 not display icon

SETUP CALL	AT*PSSTK=”SETUP CALL”, <command number>,<icon display>
	 <command number> integer type
	 <icon display> integer type
	                 0 none icon
	                 1 display icon
	                 2 not display icon

DISPLAY TEXT	AT*PSSTK=”DISPLAY TEXT”, <command number>,<icon display> <command number> integer type

	<icon display> integer type
	0 none icon
	1 display icon
	2 not display icon
GET INKEY	AT*PSSTK="GET INKEY",<alphabet>, <alphabet character>,<command number>,<icon display>,<help info>
	<alphabet> integer type
	<alphabet character> string type
	<command number> integer type
	<icon display> integer type
	0 none icon
	1 display icon
	2 not display icon
	<help info> integer type
GET INPUT	AT*PSSTK="GET INPUT", <command number>,<alphabet>, <alphabet character>,<icon display>,<help info>
	<command number> integer type
	<alphabet> integer type
	<alphabet character> string type
	<icon display> integer type
	0 none icon
	1 display icon
	2 not display icon
	<help info> integer type
PLAY TONE	AT*PSSTK="PLAY TONE", <command number>,<icon display>
	<command number> integer type
	<icon display> integer type
	0 none icon
	1 display icon
	2 not display icon
SELECT ITEM	AT*PSSTK="SELECT ITEM", <command number>,<item identifier>,<icon display>,<help info>
	<command number> integer type
	<item identifier> integer type
	<icon display> integer type
	0 none icon
	1 display icon
	2 not display icon
	<help info> integer type
REMOVE MENU	AT*PSSTK="REMOVE MENU", <command number>

	<command number> integer type
MENU SELECTION	AT*PSSTK="MENU SELECTION", <item identifier>,<help info> <item identifier> integer type <help info> integer type
ALL CALLS DISCONNECTED	AT*PSSTK="ALL CALLS DISCONNECTED" no parameter
USER ACTIVITY	AT*PSSTK="USER ACTIVITY" no parameter
IDLE SCREEN AVAILABLE	AT*PSSTK="IDLE SCREEN AVAILABLE" no parameter
SETUP CALL TERMINATED	AT*PSSTK="SETUP CALL TERMINATED" no parameter
GET ITEM LIST	AT*PSSTK="GET ITEM LIST", <number of item> <number of item> integer type

SETUP IDLE MODE TEXT	AT*PSSTK="SETUP IDLE MODE TEXT", <command number>,<icon display>
	 <command number> integer type
	 <icon display> integer type
	      0 none icon
	      1 display icon
	      2 not display icon

LANGUAGE NOTIFICATION	AT*PSSTK="LANGUAGE NOTIFICATION", <number of languages>,<preferred language> <number of languages> integer type <preferred language> integer type

3 STK USAGE EXAMPLE

The following tables provide some examples for STK usage. Different SIM card has different STK function. It is not sure that the following examples are also suitable to every SIM card.

Notification and Response	Expected Result	comment
*PSSTK: "SETUP MENU",1,2,8005 51687403901A4 E13533A,0,0,1,0, 0,11		There are total 11 menus.
at*psstk="SETU P MENU",1,1	OK *PSSTK: "DISPLAY TEXT",1,0,0,0,2,801D5C0A656C768451687 403901A5BA26237FF1A611F8C2260A8900962E 94E2D56FD79FB52A8901A4FE1FF015168740 3901A52A960A86210529FFF01,0,0	Setup menu
AT*PSSTK="DI SPLAY TEXT",1,0	OK *PSSTK: "END SESSION"	
AT*PSSTK="GE T ITEM LIST",11	*PSSTK: "GET ITEM LIST",1,1,2,80056211662F51687403901A,0,0,0 *PSSTK: "GET ITEM LIST",2,3,2,80048D857EA753F77C3F,0,0,0 *PSSTK: "GET ITEM LIST",3,4,2,80046D3B52A84FE1606F,0,0,0 *PSSTK: "GET ITEM LIST",4,6,2,80044E1A52A163A88350,0,0,0 *PSSTK: "GET ITEM LIST",5,7,2,80048D448D3963A88350,0,0,0 *PSSTK: "GET ITEM LIST",6,8,2,800481EA52A9670D52A1,0,0,0	*PSSTK: "GET ITEM LIST",<index>,<item identifier>,<alphabet>,<text>,<next action>,<iconID>,<iconQualifier>

	*PSSTK: "GET ITEM LIST",7,9,2,800579FB52A865B04E1A52A1,0,0,0 *PSSTK: "GET ITEM LIST",8,11,2,800597F34E506392884C699C,0,0,0 *PSSTK: "GET ITEM LIST",9,12,2,800465B095FB8D448BAF,0,0,0 *PSSTK: "GET ITEM LIST",10,13,2,800465E07EBF4F1195F2,0,0,0 *PSSTK: "GET ITEM LIST",11,18,2,800600530049004D53614FE1606F,0,0,0 OK	
AT*PSSTK="MENU SELECTION",3	OK *PSSTK: "SELECT ITEM",0,0,"",0,0,1,0,0,7	Select <item identifier>=3 menu
at*psstk="GET ITEM LIST",7	*PSSTK: "GET ITEM LIST",1,1,2,800453F77C3F7BA17406,0,0,0 *PSSTK: "GET ITEM LIST",2,2,2,800462FC97F367E58BE2,0,0,0 *PSSTK: "GET ITEM LIST",3,3,2,800459D3540D67E58BE2,0,0,0 *PSSTK: "GET ITEM LIST",4,4,2,800453F77C3F6D4F89C8,0,0,0 *PSSTK: "GET ITEM LIST",5,5,2,800477ED4FE17FA453D1,0,0,0 *PSSTK: "GET ITEM LIST",6,6,2,80047FA47EC47BA17406,0,0,0 *PSSTK: "GET ITEM LIST",7,7,2,800465B0589E8BB05F55,0,0,0 OK	There are total 7 item lists.

AT*PSSTK="SE LECT ITEM",1,1,0,0	OK *PSSTK: "SELECT ITEM",0,0,"",0,0,1,0,0,5	Select \<item identifier\>=1
at*psstk="GET ITEM LIST",5	*PSSTK: "GET ITEM LIST",1,1,2,80045F53524D53F77C3F,0,0,0 *PSSTK: "GET ITEM LIST",2,2,2,80045207636253F77C3F,0,0,0 *PSSTK: "GET ITEM LIST",3,3,2,800466F4540D53F77C3F,0,0,0 *PSSTK: "GET ITEM LIST",4,4,2,80046E057A7A53F77C3F,0,0,0 *PSSTK: "GET ITEM LIST",5,5,2,80045BB991CF67E58BE2,0,0,0 OK	There are total 5 item lists.
AT*PSSTK="SE LECT ITEM",1,5,0,0	OK *PSSTK: "DISPLAY TEXT",1,0,1,0,2,804700530049004D536153F7 7C3F0031FF1A603B5BB991CF00320035003 06761FF0C52694F5900310030003067613002 0A00530049004D536153F77C3F0032FF1A603 B5BB991CF0032003500306761FF0C52694F59 0032003500306761300200200A00530049004D53 6153F77C3F0033FF1A603B5BB991CF003200 3500306761FF0C52694F590032003500306761 3002,0,0	Select \<item identifier\>=5. The item list will display text to user.
AT*PSSTK="CO MMAND REJECTED",1,1 7	OK	Quit current item
AT*PSSTK="M ENU SELECTION",18	OK *PSSTK: "SELECT ITEM",0,0,"",0,0,1,0,0,3	Select \<item identifier\>=18 menu
at*psstk="GET ITEM LIST",3	*PSSTK: "GET ITEM LIST",1,1,2,8004536172477C7B578B,0,0,0 *PSSTK: "GET ITEM LIST",2,2,2,800975358BDD53F7780153CA77E D4FE15BB991CF,0,0,0	There are 3 item lists.

	*PSSTK: "GET ITEM LIST",3,3,2,8007004F00540041529F80FD4ECB7ECD,0,0,0 OK	
AT*PSSTK="SELECT ITEM",1,3,0,0	OK *PSSTK: "DISPLAY TEXT",1,1,1,0,2,804F7A7A4E2D4E0B8F7D4E1A52A1662F5229752877ED4FE14EA44E92FF0C7BA17406624B673A00530049004D536183DC535576844E0098794E1A52A13002901A8FC76B64529F80FDFF0C60A853EF4EE5968F65F64E8689E3670065B04E1A52A1FF0C5E766839636E970089816DFB52A03001522096640053004D536183DC53559879FF0C771F6B635B9E73B000530049004D536183DC53555B9A5236FF01,0,0	Select <item identifier>=3 and display text to user.
AT*PSSTK="COMMAND REJECTED",1,17	OK *PSSTK: "SELECT ITEM",0,0,"",0,0,1,0,0,3	Exit current menu and return to last menu
AT*PSSTK="SELECT ITEM",1,2,0,0	OK *PSSTK: "DISPLAY TEXT",1,1,1,0,2,8028670059275BB991CF003A00200037003500304E2A75358BDD53F77801002C00320035676177ED4FE1000A52694F595BB991CF003A00200036003000304E2A75358BDD53F77801002C0032676177ED4FE1,0,0	Select <item identifier>=3 and display text to user

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