Application

SIM7020 Series_FOTA_Application Note

Version:1.01

Release Date: Dec 22, 2018

Simplify Communication.

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About Document

Document Information

Document	
Title	SIM7020 Series_FOTA_Application Note
Version	1.01
Document Type	Application Note
Document Status	Released/Confidential

Revision History

Revision	Date	Owner	Status / Comments
1.00	Sep 21, 2018	Yong Lu	First Release.
1.01	Dec 22,2008	Yong Lu	

Related Documents

[1] SIM7020 Series AT Command Manual V1.02.pdf

This document applies to the following products:

Name	Type	Size (mm)	Comments
SIM7020E	NB1	17.6*15.7	Band 1/3/5/8/20/28
SIM7020G	NB2	17.6*15.7	Band 1/2/3/4/5/8/12/13/17/18/19/20/25/26/28/66/70/71
SIM7060G	NB2+GNSS	24*24	Band 1/2/3/4/5/8/12/13/17/18/19/20/25/26/28/66/70/71

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1 Introduction of FOTA Architecture

FOTA is the abbreviation of firmware upgrade over the Air.

FOTA provides a method which allows device to update the core firmware over the air. Considering the specialty and variety of modern usage, SIMCOM refines the whole FOTA procedure. Customers can use AT interface to accomplish SIM7020 Firmware upgrade according to their own condition.

Here is general process to get the delta file from SIMCom.

1) Once customer requires the delta file from base line version, just contact SIMCom.
2) SIMCom will generate delta file based on the requirements and upload it to FOTA server. SIMCom uses third party FOTA server and maintains the server.
3) Customer just needs to trigger FOTA process in application level to target new version.

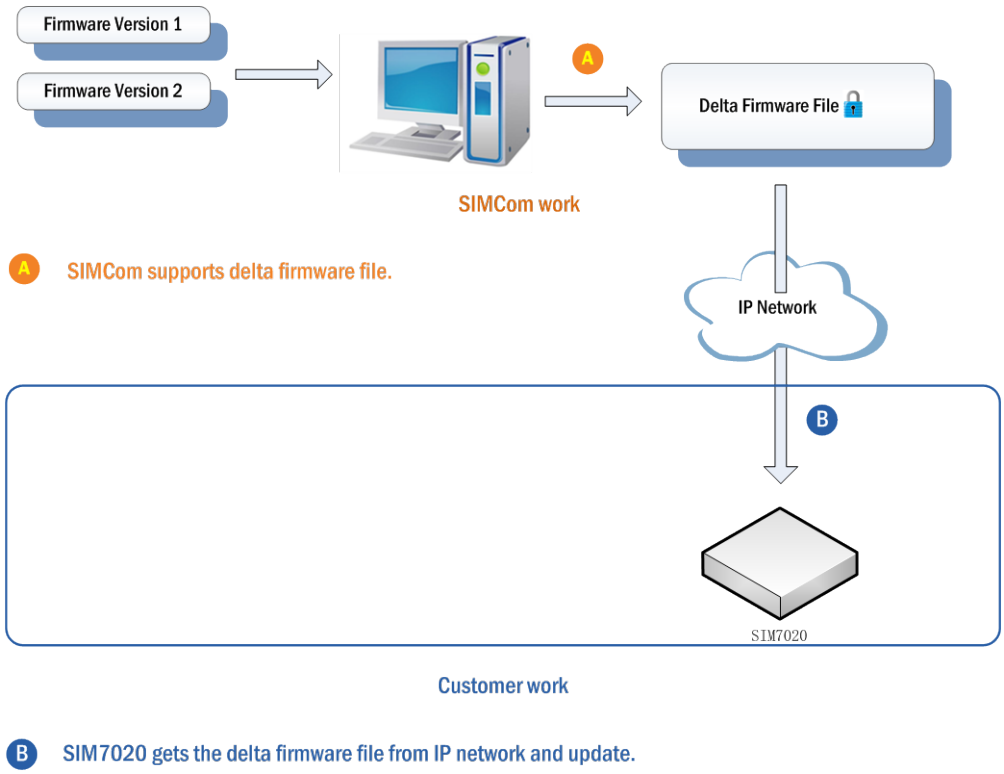
The size of the delta file (differential firmware package file between two versions) depends on the difference between the two firmware versions.

Here are two methods for upgrading firmware using delta file.

1.1 Update Over the air

Delta file could be downloaded over cellular network. The speed is different under different network.

Broken-point Continuingly-transferring mechanism is supported during differential package transfer procedure.



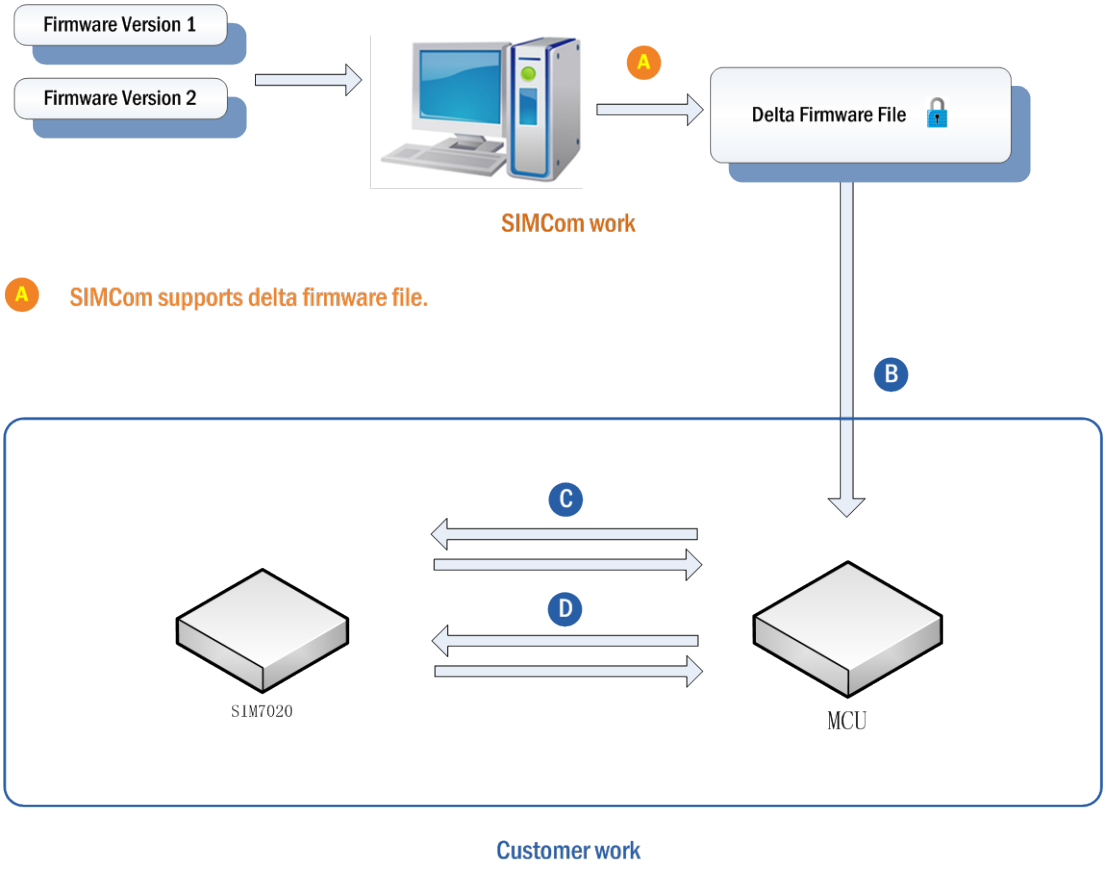
1.2 Update through the hardware interface

Supposed delta file will be transferred via UART or USB interface from external controller. Below is the flow diagram.

After delta file transferred to module specified memory space, external controller can trigger one AT command to start the update process. Module will reboot itself after the process is finished successfully.

*Note

The module will continue upgrading the firmware after reboot once terminated accidentally in previous loop. Below is the block diagram for this method.



1.3 Update through HTTP

There have some AT commands to download through HTTP.

2 FOTA Related AT commands

This chapter describes AT commands related to FOTA.

Command	Description
AT+CFOTA	FOTA Operation
AT+CFLE	Flash Erase
AT+CFLW	Flash Write
AT+CFLR	Flash Read

3 Bearer Configuration

Usually module will register PS service automatically.

3.1 PDN Auto-activation

AT Command	Response	Description
AT+CPIN?	+CPIN:READY OK	Check SIM card status
AT+CSQ	+CSQ: 20,0 OK	Check RF signal
AT+CGREG?	+CGREG: 0,1 OK	Check PS service
AT+CGACT?	+CGACT: 1,1 OK	Activated automatically
AT+COPS?	+COPS: 0,0,"CHN-UNICOM",9 OK	Check operator info CHN-UNICOM is operator's name 9 is NB-IOT network
AT+CGCONTRDP	+CGCONTRDP: 1,5,"shnbiot","10.250.0.213.255.255.255.0" OK	Get APN and IP address from network

3.2 APN Manual configuration

If not attached, could configure correct APN setting.

AT Command	Response	Description
AT+CFUN=0	+CPIN: NOT READY OK	Disable RF
AT*MCGDEFCONT="IP","3G	OK	Configure new APN

NET"		
AT+CFUN=1	OK +CPIN: READY	Enable RF
AT+CGREG?	+CGREG: 0,1 OK	Inquiry PS service
AT+CGCONTRDP	+CGCONTRDP: 1,5,"3GNET","10.250.0.253.255.255.255.0" OK	Attached PS domain and got IP address automatically

4 Update over the air

4.1 Updating successfully

Below is an example to acquire differential firmware file by using SIM7020 TCP function:

AT Command	Response	Description
AT+IPR=115200	OK	Active URC report by setting the baud rate
AT+CGACT?	+CGACT: 1,1 OK	PDP connection
AT+CGMR	1752B05SIM7020C OK	Check FW version
AT+CFOTA=1	OK +CFOTA: Start to download new package +CFOTA: Download completed +CFOTA: Start to update,please wait for reset *MATREADY: 1 +CFUN: 1	Download and update differentialpackage(DNS resolution should work) Start to download Download completed Module reset (the upgrade session takes around 10min)

	+CFOTA: Update successfully	Update successfully
	+CPIN: READY	
AT+CFOTA=4	OK	Report update result to FOTA server after restart and network is OK.
AT+CGMR	1752B06SIM7020C	Check FW version
	OK	

4.2 Updating failed

No update package error

AT Command	Response	Description
AT+IPR=115200	OK	Active URC report
AT+CGACT?	+CGACT: 1,1	PDP connection
	OK	
AT+CGMR	1752B05SIM7020C	Check FW version
	OK	
AT+CFOTA=1	OK	
	+CFOTA: No update package	No update package or connecting FOTA server fail

Download pause error

AT+CFOTA=1	OK	
	+CFOTA: Download pause	Download pause error

Download fail error

AT+CFOTA=1	OK	
	+CFOTA: Download fail	Download fail error

Update fail

AT+CFOTA=1	OK	
	+CFOTA: Start to download new package	Start to download
	+CFOTA: Download completed	Download completed
	+CFOTA: Start to update, please wait for	Module reset

	reset	
	*MATREADY: 1	
	+CFUN: 1	
	+CFOTA: Update fail	Update fail
	+CPIN: READY	

5 Update through hardware interface

Below is an example to write differential firmware file into SIM7020 by using CFOTA command.

AT Command	Response	Description
AT+CFLE=0,0,1	OK	Erase FOTA update partition, the third parameter value is the number of the block which needs to be erased. The size of the differential package here is 313 bytes, so it is 1 block
AT+IPR=115200	OK	Active URC report by setting the baud rate
AT+CFLW=0,0,313,0,30	>	Write data and enter data mode Upload the differential package
	OK	
AT+CGMR	1752B05SIM7020C	Check FW version
	OK	
AT+CFOTA=5,313,f1351d44d9a338c867046ebf16ec62d1	+CFOTA: Start to update, please wait for reset	Start to update (the upgrade session takes around 10min)
	OK	Restart
	*MATREADY: 1	
	+CFUN: 1	
	+CFOTA: Update successfully	Update successfully
AT+CFOTA=4	OK	Report update result to FOTA server after restart and network is OK.
AT+CGMR	1752B06SIM7020C	Check FW version

	OK	

6 Update through HTTP

Below is an example to write differential firmware file into SIM7020 by using HTTP command.

AT Command	Response	Description
AT+CHTTPCREATE="http://117.131.85.139:5265"	+CHTTPCREATE: 0 OK	Create a http client instance
AT+CHTTPCON=0	OK	Establish the HTTP Connection
AT+CHTTPTOFS=0,"/HTTP_test/test3-bin/SIM7020C_V1-SIM7020C_V2-153724757 0.bin"	OK +CHTTPNMIH: 0,200,287,Content-Type: application/octet-stream Content-Length: 31047 Accept-Ranges: bytes Server: HFS 2.3 beta Set-Cookie: HFS_SID=0.699653631309047; path=/; Last-Modified: Tue, 18 Sep 2018 05:14:19 GMT Content-Disposition: attachment; filename="SIM7020C_V1-SIM7020C_V2-15 37247570.bin"; +CHTTPTOFSOK: 0,31047,31047	write differential firmware file SIM7020C_V1-SIM7020C_V2-153724757 0.bin into SIM7020
AT+CGMR	1752B06SIM7020C OK	Check FW version
AT+IPR=115200	OK	Active URC report by setting the baud rate
AT+CFOTA=5,31047, 86060c29c18b2981 f8b87de61c1765b7	+CFOTA: Start to update, please wait for reset OK *MATREADY: 1 +CFUN: 1 +CFOTA: Update successfully	Start to update (the upgrade session takes around 10min) Restart Update successfully

AT+CGMR	1752B06SIM7020C_20180918 OK	Check FW version

Contact

Shanghai SIMCom Wireless Solutions Ltd.

Address: Building B, No.633 Jinzhong Road, Changning District, Shanghai P.R.China 200335
Zip Code：200335
Tel：+86-21-31575126
Support：support@simcom.com