



SIM7028Series_FOTA _Application Note

LPWA Module

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About Document

Version History

Revision	Date	Chapter	Description
V1.00	2022.7.13	All	New version

Scope

This document presents the AT Command Set for SIMCom SIM70XX Series.

Name	Type	Size(mm)	Comments
SIM7028	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

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1 Introduction

1.1 Purpose of the document

SIM7028 module supports FOTA function, which enables firmware upgrading over the air.

In FOTA, a delta (the differential firmware package which only contains the binary differences between the current and the target firmware version) is needed. In this way, amount of the transmitted data and the consumed time can be reduced.

This document describes how to upgrade the firmware of the SIM7028 module via FOTA.

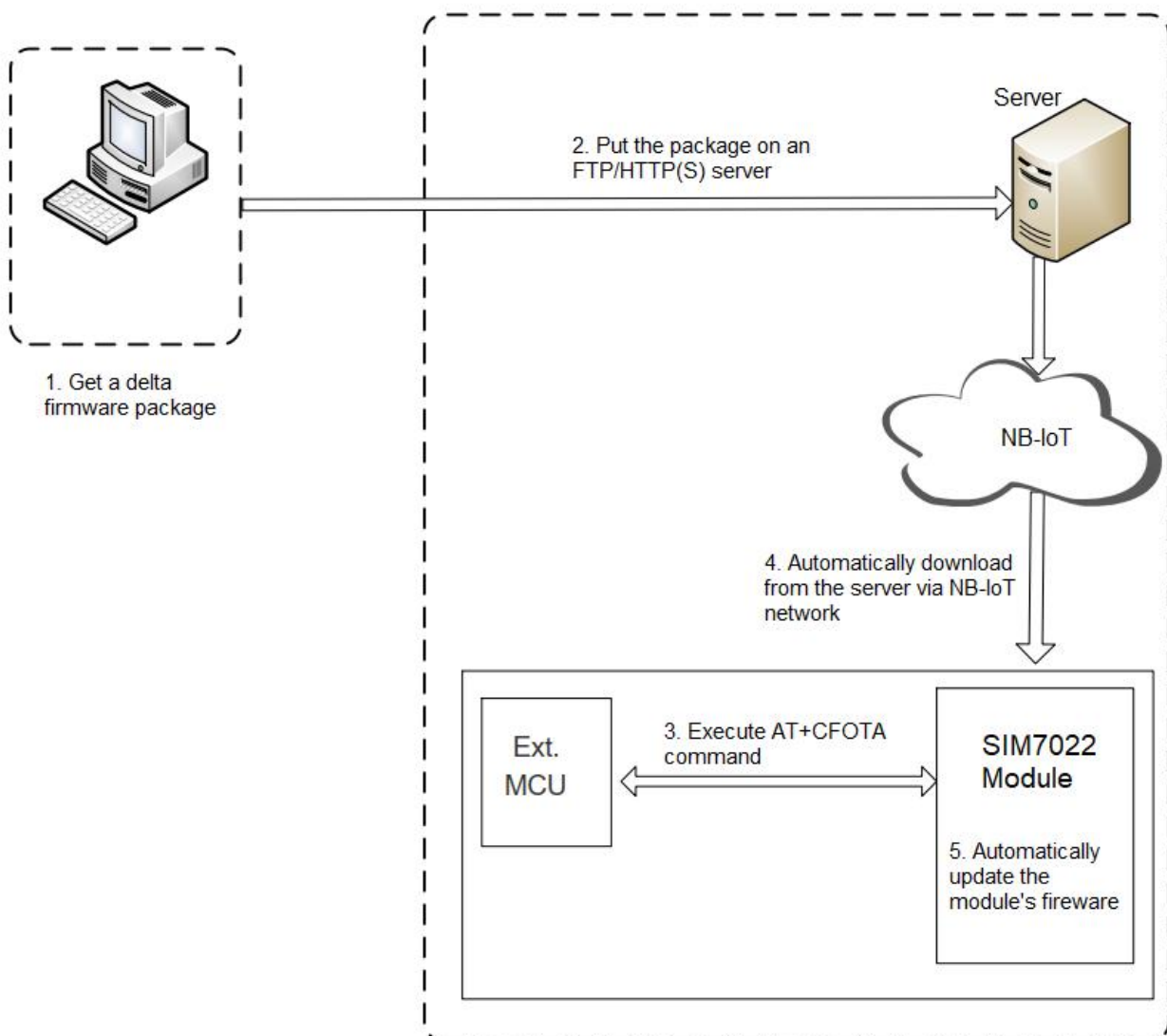
1.2 Related documents

[1] SIM7028 Series_AT Command Manual

2 FOTA over FTP/HTTP

2.1 Procedure Overview

The following chart illustrates the procedure of FOTA over FTP/HTTP when the delta firmware package is stored on an FTP/HTTP server.



2.2 Concrete Steps

The following steps need to be performed to upgrade the firmware when the firmware package is stored on an HTTP server:

- Step 1:** Get the delta firmware package from SIMCOM.
- Step 2:** Put the delta firmware package on an FTP/HTTP server.
- Step 3:** Check network status.
- Step 4:** Trigger automatic FOTA over FTP/HTTP with `AT+CFOTA=<channel>,<mode>,<URL>[,<username>,<password>]`.

2.2.1 Get Delta Firmware Package

Before upgrading, please check the original firmware version with **ATI** command and confirm the target firmware version, and then send the two firmware versions to SIMCOM Technical Support to get a delta firmware package.

2.2.2 Put Delta Firmware Package on FTP/HTTP Server

Put the delta firmware package on the server (SIMCOM does not provide such a server), and record the storage path, which is to be included in **AT+CFOTA**.

2.2.3 Check Network Status

Check whether the module is registered on network or not with the following AT commands after it powers on and before the firmware upgrade.

- AT+CESQ:** Query signal quality.
- AT+CEREG?:** Query network registration status.
- AT+CGPADDR?:** Query the allocated IP address for the default PDN.

For more details about the above commands, see SIM7028 Series_AT Command Manual.

2.2.4 Trigger Automatic FOTA over FTP/HTTP

After the network status is ready, execute `AT+CFOTA=<channel>,<mode>,<URL>[,<username>,<password>]`, and the module will download the delta firmware package from the FTP/HTTP server and upgrade the firmware automatically via FOTA. For more details on the command, see *Chapter 3.2*

3 AT Command for FOTA

3.1 Overview

Command	Description
AT+CFOTA	Start FOTA Service
AT+LFOTA	Start Local FOTA Service

3.2 Detailed Description of AT Command for FOTA

3.2.1 AT+CFOTA Start FOTA service

AT+CFOTA Start FOTA Service	
Write Command AT+CFOTA=<channel>,<mode>,<destination_ip/url>[,<username>[,<password>]]	Response 1) OK +CFOTA: <err> 2) ERROR
Parameter Saving Mode	NO_SAVE
Max Response Time	12000ms
Reference	-

Defined Values

<channel>	0-5 means the channel number
<mode>	0 FTP way 1 HTTP way
<destination_ip:port/url>	The remote site server's IP address or URL address. IP address should be in the format of the dotted decimal notation:

	<p>XXX.XXX.XXX.XXX. URL address should be ASCII characters, the maximum of the length is 255 bytes.</p> <p>NOTE: If <port> are omitted, the default FTP port is 21 and the default HTTP port is 80.</p>
<username>	The login user name, it should be ASCII characters, and the maximum of the length is 128 bytes.
<password>	The login password, it should be ASCII characters, and the maximum of the length is 128 bytes.

Examples

```
AT+CFOTA=0,0,"183.230.174.137:6047/fbf_dfota.bin",simcom,simcom
```

```
OK
```

```
+CFOTA: 0
```

3.2.2 AT+LFOTA Start Local Fota Service

AT+LFOTA Start Local Fota Service

<p>Test Command AT+LFOTA=?</p>	<p>Response +LFOTA=<0-1>,<File Size></p> <p>OK</p>
<p>Read Command AT+LFOTA?</p>	<p>Response</p> <p>1)if data pass check +LFOTA: 1</p> <p>OK</p> <p>2)if data doesn't pass check +LFOTA: 0</p> <p>OK</p> <p>3)if data has not transfer yet. It will be initial value -1 +LFOTA: -1</p> <p>OK</p>
<p>Write Command AT+LFOTA=<ops>,<File Size></p>	<p>Response</p> <p>1)If successfully: ></p> <p>OK</p>

	2)If failed: > ERROR
	3)If failed: ERROR
Parameter Saving Mode	-
Max Response Time	300000ms
Reference	-

Defined Values

<ops>	0 initial parameters 1 start transfer
<File Size>	The bytes of the file data to send.

Examples

AT+LFOTA=0,5358979

OK

AT+LFOTA=1,5358979

>

OK

NOTE

File size must be set correctly. Can't send any bytes to current channel when data transferring.

The speed of sending data should match the baud rate. Such as, data exceeding 11520 bytes should not be sent within 1s if the baud rate is 115200, and it is safe to send only 8192 bytes.

3.3 Unsolicited Result Codes

URC	Description
+CFOTA: 100	FOTA COMPLETE, it will restart in 8s.
+CFOTA: 1001	FOTA URL is invalid, maybe PDP was active.
+CFOTA: 1002	FOTA timeout

+CFOTA: 1003	FOTA URL is unknown
+CFOTA: 1004	FOTA username or password is error
+CFOTA: 1005	FOTA file is not exist
+CFOTA: 1006	The size of FOTA file is invalid
+CFOTA: 1007	Get file failed
+CFOTA: 1008	Check file error
+CFOTA: 1009	FOTA internal error
+CFOTA: 1010	Fota file too large
+CFOTA: 1011	Fota set flag error
+CFOTA: 1012	Fota parameter size error

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4 Example

Before all FOTA related operations, we should check network status:

```
AT+CESQ //Query signal quality
+CESQ: 99,99,255,255,22,58

OK
AT+CEREG? //Query network registration status.
+CEREG: 0,1

OK
AT+CGPADDR //Query the allocated IP address for the default PDN
+CGPADDR: 0,"11.102.241.134"

OK
```

4.1 FOTA Service of FTP

```
//Upgrade firmware when the delta firmware package is stored on an FTP server.
//The FTP server address is "183.230.174.137:6047/update.zip".
AT+CFOTA=0,0,"183.230.174.137:6047/update.zip",simcom,simcom
OK

+CFOTA: 100 //download the firmware package complete, the module will restart in 8s
```

4.2 FOTA Service of HTTP

```
//Upgrade firmware when the delta firmware package is stored on an HTTP server.
//The HTTP server address is "47.108.134.22:80/update.zip".
AT+CFOTA=0,1,"47.108.134.22:80/update.zip"
OK

+CFOTA: 100 //download the firmware package complete, the module will restart in 8s
```

4.3 FOTA Service Locally

```
AT+LFOTA=1,3892224
```

```
><input the firmware package data>
```

```
OK //download the firmware package complete
```

```
AT+QCRST //restart the module
```

```
OK
```

NOTE

//After the module restart, the system will enter upgrade process and print the status of FOTA upgrade as follows URC in UART0.

AdupsProcedure 4.0

```
abup check_delta,Header:0x20, 0x3, 0x17, 0x20
```

```
abup check_delta, delta md5 check sucess. //check the firmware package success
```

```
adups_IsPartPackge: NO!
```

```
adups_IsPackgeFound ret=1
```

```
adups_bl_notify_status:200,0
```

```
check old bin
```

```
check old bin end, is old bin.
```

```
patch forward ...
```

```
+FOTA: patch ratio: 1
```

```
+FOTA: patch ratio: 3
```

```
+FOTA: patch ratio: 4
```

```
+FOTA: patch ratio: 6
```

```
+FOTA: patch ratio: 7
```

```
+FOTA: patch ratio: 9
```

.....
+FOTA: patch ratio: 92

+FOTA: patch ratio: 93

+FOTA: patch ratio: 95

adups_bl_notify_status:201,100

Update done, reboot now ... //update the system success

bootloader try normal boot system start!

LoadVerifyImageHead read(len=272), Time(ms)->0.

test:VerifyImageHead skip

VerifyImageBody sha256 skip

//After the upgrade is completed, the module will restart automatically.

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