SIM7070_SIM7080_SIM7090 Series_FOTA_Application Note

LPWA Module
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About Document

Version History

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Owner</th>
<th>What is new</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1.00</td>
<td>2020.2.26</td>
<td>Wenjie.Lai</td>
<td>First Release</td>
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<td>V1.01</td>
<td>2020.7.8</td>
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<td>All</td>
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Scope

This document applies to the following products

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<th>Type</th>
<th>Size(mm)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM7080G</td>
<td>CAT-M/NB</td>
<td>17.6<em>15.7</em>2.3</td>
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<td>CAT-M/NB/GPRS</td>
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<tr>
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<td>NB/GPRS</td>
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<td>SIM7090G</td>
<td>CAT-M/NB</td>
<td>14.8<em>12.8</em>2.0</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Contents

About Document........................................................................................................................................... 3
   Version History........................................................................................................................................... 3
   Scope........................................................................................................................................................ 3

Contents.................................................................................................................................................. 4

1 Introduction........................................................................................................................................... 5
   1.1 Purpose of the document.................................................................................................................. 5
   1.2 Related documents............................................................................................................................ 5
   1.3 Conventions and abbreviations........................................................................................................ 5

2 FOTA Introduction.................................................................................................................................. 6

3 AT Commands for FOTA........................................................................................................................ 7

4 FOTA Examples...................................................................................................................................... 8
   4.1 SIMCom supports delta firmware file............................................................................................... 8
   4.2 The module gets the delta firmware file.......................................................................................... 8
      4.2.1 Download delta firmware file from HTTP server........................................................................ 8
      4.2.2 Download delta firmware file from FTP server.......................................................................... 10
      4.2.3 Download delta firmware file through USB/AT port................................................................. 10
   4.3 MCU requires the module to update by sending AT commands..................................................... 11
   4.4 MCU read the update status by AT commands.............................................................................. 12
1 Introduction

1.1 Purpose of the document

Based on module AT command manual, this document will introduce FOTA application process. Developers could understand and develop application quickly and efficiently based on this document.

1.2 Related documents


1.3 Conventions and abbreviations

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

- ME (Mobile Equipment);
- MS (Mobile Station);
- TA (Terminal Adapter);
- 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:

- TE (Terminal Equipment);
- DTE (Data Terminal Equipment) or plainly "the application" which is running on an embedded system;
2 FOTA Introduction

FOTA is the abbreviation of firmware upgrade Over the Air.

FOTA provides a way 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 ATC interface provided by SIM7070_SIM7080_SIM7090 Series, and accomplish SIM7070_SIM7080_SIM7090 Series Firmware upgrading according to their own condition.

Before firmware updating, a delta firmware package which contains only the differences between the source and the target firmware versions has to be obtained. By this way, the amount of data transmitted and the time taken can be reduced.

SIMCom defines the upgrading process:
1) Get the delta file from SIMCOM.
2) Put the delta file on HTTP(S) or FTP server or FS.
3) Get delta file to module directory "/fota/update.zip".
4) Executing AT+CFOTA=1 to update the firmware.
5) Query FOTA result and module firmware version.
3 AT Commands for FOTA

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT+CFOTA</td>
<td>FOTA Operation</td>
</tr>
</tbody>
</table>

For detail information, please refer to "SIM7070_SIM7080_SIM7090 Series_AT Command Manual".
4 FOTA Examples

4.1 SIMCom supports delta firmware file

When customer needs to upgrade the onsite SIM7070_SIM7080_SIM7090 Series Firmware from Version A to Version B, they can send the upgrade requirement to SIMCom via their module provider. SIMCom will provide related delta firmware file according to the information of Version A and Version B provided by customer. The size of the delta firmware file depends on the difference of Version A and Version B.

4.2 The module gets the delta firmware file

Local delta package name must be update.zip, otherwise cause to upgrade is failed.

4.2.1 Download delta firmware file from HTTP server

Customers usually use MCU to connect with SIM7070_SIM7080_SIM7090 Series, therefore customer’s MCU needs to get the delta firmware file first. This procedure is diversified, it may be by GPRS, or other methods. If GPRS method is used, customers can consider using HTTP to download delta firmware file from the customer’s server.

If MCU acquires delta firmware file by GPRS method, customer may start a session via SMS or other methods.

SIMCom defines the upgrading process:
As shown in the above figure, the following steps must be done to update the firmware when the delta file is put on the HTTP(S) server:

1) Get the delta file from SIMCOM
2) Put the delta file on HTTP(S) server.
3) Execute AT+HTTPSTOFS command.
4) The module starts to download the delta file automatically.
5) After the delta file is downloaded, executing AT+CFOTA=1 to update the firmware.

Here SIMCom provides an example to acquire delta firmware file by using SIM7070_SIM7080_SIM7090 Series HTTP function:

///FOTA examples of download delta firmware file from HTTP server

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT+CNACT=1,1</td>
<td>//Open GPRS session.</td>
</tr>
<tr>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>+HTTPTOFS: 200,109285</td>
<td></td>
</tr>
</tbody>
</table>
4.2.2 Download delta firmware file from FTP server

Here SIMCom provides an example to acquire delta firmware file by using SIM7070_SIM7080_SIM7090 Series FTP function:

```c
//FOTA examples of download delta firmware file from FTP server
AT+CNACT=1,1
OK
AT+FTPCID=1
OK
AT+FTPSERV="112.74.93.163"
OK
AT+FPUTN="tmf"
OK
AT+FTPPW="tmf123"
OK
AT+FTPGETNAME="update.zip"
OK
AT+FTPGETPATH="/"
OK
AT+FTPEXTGET=2,1,"update.zip"
OK
AT+FTPTOFSST
+FTPTOFSST: 1,0,10
OK
+FTPEXTGETFILE: 1,0
```

4.2.3 Download delta firmware file through USB/AT port

Customers usually use MCU to connect with SIM7070_SIM7080_SIM7090 Series, therefore customer’s MCU needs to get the delta firmware file first. This procedure is diversified, it may be by AT port, or other methods. If AT port method is used, customers can consider using AT command to download delta firmware file.

Here SIMCom provides an example to acquire delta firmware file by AT port:
# FOTA Examples of download delta firmware file through USB/AT port

**Step 1:**

```
AT+CFSINIT
OK
```

//Initialize the FS AT command

**Step 2:**

```
AT+CFSWFILE=1, "update.zip", 0, 10000, 10000
DOWNLOAD
```

//Set file parameters and get ready to write the data to the beginning of the file "update.zip" in /custapp/ folder, which size is 10000 bytes.

```
... // data
OK      //All data has been received over, and DCD is set to low.
```

//Begin to download data to UART.

**Step 3:**

```
AT+CFSWFILE=1, "update.zip", 1, 10000, 10000
DOWNLOAD
```

//Set file parameters and get ready to write the data to the end of the file "update.zip" in /custapp/ folder, which size is 10000 bytes. The size is determined by the remaining size of the delta file.

```
... // data
OK      //All data has been received over, and DCD is set to high.
```

//Data transfer is finished

**Step 4:**

Repeat Step 3 until the delta file is all sent to the modem.

**Step 5:**

```
AT+CFSTERM
OK
```

//Terminate the FS command

## 4.3 MCU requires the module to update by sending AT commands

After writing the delta firmware file into SIM7070_SIM7080_SIM7090 Series flash memory successfully, MCU should send instruction to module by AT command to start the update. Once getting the instruction, the module will automatically reset itself and then enter FOTA upgrading process. After upgrading finished, the module will restart again automatically.

//FOTA examples of update the firmware

```
AT+CFOTA=1
```

//Set the flag bit for FOTA update, and reset
4.4 MCU read the update status by AT commands

If upgrading process is finished, the module will restart again automatically. Customer can use AT command to inquire the update result.

//FOTA examples of update status

**AT+CFOTA?**  //Inquire the update result by command CFOTA. 6 means updated and succeeded; 7 means updated but failed.

+CFOTA: 6

**OK**

**AT+GMR**  //Inquire the firmware version by AT+GMR.

Revision: 1951B02SIM7080G

**OK**