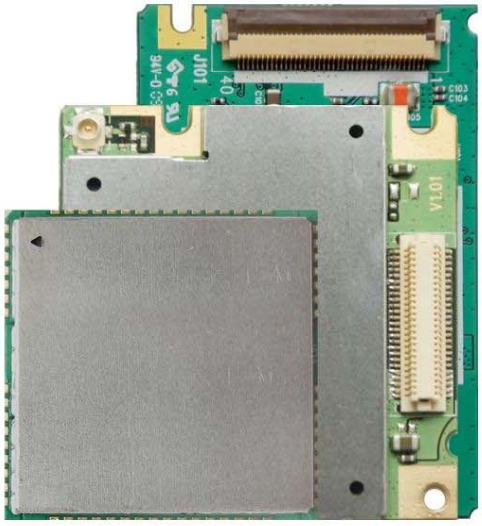
Quectel Cellular Engine

GSM Delta Package Firmware Update Application Notes

GSM_FOTA_AN_V1.0



Document Title	GSM Delta Package Firmware Update Application Notes
Version	1.0
Date	2010-09-07
Status	Release
Document Control ID	GSM_FOTA_AN_V1.0

General Notes

Quectel offers this information as a service to its customers, to support application and engineering efforts that use the products designed by Quectel. The information provided is based upon requirements specifically provided to Quectel by the customers. Quectel has not undertaken any independent search for additional relevant information, including any information that may be in the customer's possession. Furthermore, system validation of this product designed by Quectel within a larger electronic system remains the responsibility of the customer or the customer's system integrator. All specifications supplied herein are subject to change.

Copyright

Contents

Contents 2
0. Revision history 3
1. Introduction....4
2. Update module firmware with delta package....5
2.1. Obtain delta package 5
2.2. Download delta package 5
2.3. Update module firmware with delta package....5
2.3.1. AT command interface when hardware flow control enabled....5
2.3.2. AT command interface when flow control disabled....6
2.4. Check result of update....7

0. Revision history

Revision	Date	Author	Description of change
1.0	2010-09-06	Willis YANG	Initial

1. Introduction

FOTA is an acronym for Firmware Over-the-Air. FOTA updating technology enables mobile device manufacturers to remotely update software. New software that patches flaws in the software originally installed on the device is delivered over the air, eliminating the need for the user to bring the device to a service facility.

FOTA updating process consists of three stages: 1) generating the update package (we will call it delta package in this document); 2) delivery of the update package; 3) performing the update.

Stage 1: Generating Delta Package
The initial stage includes generating a software updating package containing bug fixed or new features. It includes the differences between the version of existing firmware on device and the updated version of firmware. Delta package is normally generated by device manufacturer. For Quectel module, customers (in this document, customer means the device manufacturer that adopts Quectel module in their device) can achieve delta package from Quectel when they need to update the firmware of Quectel module.

Stage 2: Delivery of the Delta Package
Once achieving the delta package, customer needs to deliver the delta package to the device. When the devices are distributed to end user, it will take a big effort to ask end user to bring the device to a service facility to update the firmware. A more convenient way is that the device can download the delta package from network (that is "Over–the-Air"). For Quectel module, Quectel does NOT provide service to deliver the delta package to the device. Customer needs to put the delta package on their own network server (HTTP, FTP, TCP etc), and uses GPRS function provided by Quectel module to download the delta package from their network server into the device.

Stage 3: Performing the Update
In the third stage, the downloaded delta package is used to perform the actual update of the original software image. This stage also validates that the correct delta package has been received and the update process has been successfully completed. For Quectel module, customer's device can use the specified AT commands to transfer delta package to Quectel module, and Quectel module will finish the validation and update process.

This document briefly introduces the first stage (generating the update package) and mainly describes the third stage (performing the update) in detail. The second stage (delivery of the delta package) is not included in this document, customer needs to design and implement it.

2. Update module firmware with delta package

2.1. Obtain delta package

Please query the current version of module firmware with the AT command "**ATI**". Then send this version and the target version (the version need update to) to Quectel. Quectel will generate the delta package with these two versions of firmware.

2.2. Deliver delta package

User can implement this part function by their own according to their requirement. User can put delta package on WEB server, and use MCU to download it from WEB server through module's GPRS function. User can also copy the delta package to a USB disk, and use MCU to read it from USB disk.

2.3. Update module firmware with delta package

There are two sets of AT commands which can be used to transfer delta package to module. And then the module can update its firmware with the delta package. The following parts describe how to use these two sets of AT commands in detail.

2.3.1. AT command interface when hardware flow control enabled

If hardware flow control function is enabled, AT command "**AT+QFUA**" can be used to transfer delta package to module and make module start firmware update process. Following is the detailed process.

```
AT+QFUA              // Initialize FOTA function
OK
CONNECT              // When received CONNECT , indicates UART port has entered data
                     // mode. Please input binary data of delta package through UART port.
……
……..
+++                  // After finishing delta package data transmission, please input three
                     // consecutive '+'. Module will stop receiving data and start firmware
                     // update process.

// Following information will be reported from UART port when update is in progress.

Finish data downloading, rebooting....
```

```
Quectel firmware update is processing....
.......RunFirmwareUpdate......
 Update   percent = 1%
 Update   percent = 2%
        .......
 Update   percent = 99%
 Update   percent = 100%
 Quectel firmware update success. status=0
Rebooting....
```

If the delta package is invalid or does not match with current module firmware, the error message will be reported from UART port and current module firmware will keep unchanged.

Note:
Before using **AT+QFUA** to transfer the delta package, please make sure hardware flow control is enabled. Otherwise, some data may be lost in transmission.

2.3.2. AT command interface when flow control disabled

```
AT+QFAI              // Initialize FOTA function
OK

AT+QFAW=”05A5D9…”
OK

AT+QFAW=”85B19D…”
OK

……                   // Input delta package data, the maximum length of written data for one
                     // AT command (AT+QFAW) is 450 bytes. The written data must be
                     // converted to ASCII character string at first. Below is an example
                  // code of the conversion algorithm.

……..
AT+QFAU              // After finishing delta package data, please input this AT command,
                     // and module will start update process.
// Following information will be reported from UART port when update is in progress.

Finish data downloading, rebooting....
Quectel firmware update is processing....
.......RunFirmwareUpdate......
 Update   percent = 1%
 Update   percent = 2%
        .......
```

```
  Update   percent = 99%
  Update   percent = 100%
  Quectel firmware update success. status=0
Rebooting....
```

Example code of the conversion algorithm that convert hex string to ASCII string.

```
void convert_hex_to_string (uint8 *hex, int16 len, uint8 *str)
{
   uint16 i=0, j=0;

   while (j<len)
   {
      i += kal_sprintf((char *)str+i, "%02X", hex[j]);
      j++;
   }
   str[i] = '\0';
}
```

2.4. Check result of update

After updating is finished, please query the version of module firmware with **ATI** to verify whether the module firmware has updated to target version successfully.

Shanghai Quectel Wireless Solutions Co., Ltd.

Room 501, Building 9, No.99, TianZhou Road, Shanghai, China 200233

Tel: +86 21 5108 2965

Mail: info@quectel.com