SIM7020 Series_HTTP(S)_Application Note

LPWA Module
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About Document

Version History

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<tr>
<td>V1.00</td>
<td>2018.4.10</td>
<td>Linshu.Guan</td>
<td>First Release</td>
</tr>
<tr>
<td>V1.01</td>
<td>2018.6.7</td>
<td>Albert</td>
<td>Revised</td>
</tr>
<tr>
<td>V1.02</td>
<td>2018.12.25</td>
<td>Jin.Zhang</td>
<td>Revised</td>
</tr>
<tr>
<td>V1.03</td>
<td>2020.6.10</td>
<td>Wenjie.Lai</td>
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Scope

This document applies to the following products

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www.simcom.com
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1 Introduction

1.1 Purpose of the document

Based on module AT command manual, this document will introduce HTTP 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 AT Commands for HTTP(S)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT+CHTTPCREATE</td>
<td>Create a HTTP client instance</td>
</tr>
<tr>
<td>AT+CHTTPCREATEEXT</td>
<td>Create a HTTPS client instance by multi packages for a long size command</td>
</tr>
<tr>
<td>AT+CHTTPCON</td>
<td>Establish the HTTP(S) connection</td>
</tr>
<tr>
<td>AT+CHTTPDISCON</td>
<td>Close the HTTP(S) connection</td>
</tr>
<tr>
<td>AT+CHTTPDESTROY</td>
<td>Destroy the HTTP(S) client instance</td>
</tr>
<tr>
<td>AT+CHTTPSEND</td>
<td>Send HTTP(S) package</td>
</tr>
<tr>
<td>AT+CHTTPSENDEXT</td>
<td>Send HTTP(S) package by multi packages for a long size command</td>
</tr>
<tr>
<td>AT+CHTTPPARAMA</td>
<td>Set parameter for AT command of AT+CHTTPSEND</td>
</tr>
<tr>
<td>AT+CHTTPTOFS</td>
<td>Download File to Module System</td>
</tr>
<tr>
<td>AT+CHTTPCLRMULCRTBUF</td>
<td>Clear multi create buffer of AT+CHTTPCREATEEXT</td>
</tr>
<tr>
<td>AT+CHTTPCLRMULSNDBUF</td>
<td>Clear multi send buffer of AT+CHTTPSENDEXT</td>
</tr>
<tr>
<td>AT+CHTTPRESUMESEND</td>
<td>Set resume send package or not when HTTP(S) disconnected</td>
</tr>
<tr>
<td>+CHTTPNMIH</td>
<td>Header of the response from host</td>
</tr>
<tr>
<td>+CHTTPNMIC</td>
<td>Content of the response from host</td>
</tr>
<tr>
<td>+CHTTPERR</td>
<td>HTTP(S) client connection error indicator</td>
</tr>
<tr>
<td>+CHTTPTOFS</td>
<td>HTTP(S) download indicate from host</td>
</tr>
<tr>
<td>+CHTTPTOFSOK</td>
<td>HTTP(S) download finished indicate</td>
</tr>
</tbody>
</table>

For detail information, please refer to “SIM7020 Series_AT Command Manual”.
3 Bearer Configuration

Usually module will register PS service automatically.

3.1 PDN Auto-activation

//Example of PDN Auto-activation.

```
AT+CPIN?            // Check SIM card status
+CPIN: READY
OK

AT+CSQ             // Check RF signal
+CSQ: 27,99
OK

AT+CGATT?          // Check PS service. 1 indicates PS has attached.
+CGATT: 1
OK

AT+CGACT?          // PDN active success
+CGACT:1,1
OK

AT+COPS?           // Query Network information, operator and network mode 9, NB-IOT network
+COPS:0,0,"CHN-UNICOM",9
OK

AT+CGCONTRDP       // Attached PS domain and got IP address automatically
+CGCONTRDP: 1,5,"shnbioit","10.250.0.213.255.255.255.0"
OK
```

3.2 APN Manual configuration
// Example of APN Manual configuration.

AT+CFUN=0 // Disable RF
+CPIN: NOT READY

OK
AT*MCGDEFCONT="IP","3GNET" // Set the APN manually

OK
AT+CFUN=1 // Enable RF

OK
+CPIN:READY
AT+CGATT? // Inquiry PS service
+CGATT: 1

OK
AT+CGCONTRDP // Attached PS domain and got IP address automatically
+CGCONTRDP:
1,5,"3GNET","10.250.0.253.255.255.255.0"

OK
4 HTTP(S) Examples

4.1 HTTP GET Service

//Example of HTTP GET Service
AT+CHTTPCREATE="http://www.sim.com/"  //Create HTTP host instance
+CHTTPCREAT: 0
OK
AT+CHTTPCON=0  //Connect server
OK
AT+CHTTPSEND=0,0,"/index.html"  //If succeed, will report incoming data
OK
+CHTTPNMH:0,0,800,Date: Tue, 10 Apr 2018 07:24:25 GMT
Server: Apache/2.0.58 (Win32) PHP/5.2.11
Last-Modified: Fri, 16 May 2014 01:01:31 GMT
ETag: "282e-45-f4410fef"
Accept-Ranges: bytes
Content-Length: 69
Content-Type: text/html
+CHTTPNMIC:0,0,69,138,3c736372697074206c6f636174696f6e2e687265663d27657370636d732f696e6465782e706870273c2f7363726970743e
AT+CHTTPDISCON=0  //Disconnected from server
OK
AT+CHTTPDESTROY=0  //Destroy HTTP instance
OK

4.2 HTTP POST Service
//Example of HTTP POST Service
AT+CHTTPCREATE="http://139.217.9.49:8080/"
+CHTTPCREAT: 0
OK
AT+CHTTPCON=0
OK
AT+CHTTPSEND=0,1,"/setBikeData",4163636570743a202a2f2a0d0a436f6e6e656374796f6e3a240b6565702d416c697665700d0a557365722d4167656e743a2053494d434f4d5f4d4f44554c450d0a,"application/json",7b22646576534e223a22313131313232323232222c2232352e36222c223336222c2239382e36222c2231302e38222c22352e38222c7d
OK
AT+CHTTPDISCON=0
OK
AT+CHTTPDESTROY=0
OK

//Connect server

//send HTTP request
If succeed, will report incoming data
+CHTTPNMHI is header
+CHTTPNMIC is content

4.3 HTTPS Instance Created by Long Command Multi-package

//Example of Long Command Multi-package to create an HTTPS instance
//First Packet
AT+CHTTPCREATEEXT=1,3268,998,"https://18
0.97.33.108/",42454794e2043455254494649434154452d2d2d0a4d4949454343413147741426749424167494c424141414141425777516b6377451594a4b6f5a496876634e4151454c42514177567a454c4d416b4d268443516b55784754415445464763234a6862464e705a323467626e5974633245785444414f42674e5424173442314a760d0a6233516751304578477a415a42674e5424173442314a760d0a6233516751304578477

//Multi-package creates an HTTPS host example
//where the parameter <server_cert> is split into
//four command packets.
//The first parameter: 1 means that there is still
//unpacked data to be sent later; 0 means the last
//packet of data.
//The second parameter: the total length of the
//multi-packet data, here
3268=998+1000+1000+270
//The third parameter: indicates the data length of
//the current unpacking command, that is, the
length of the content in the quotation marks.

//The fourth parameter: HTTP host

//The fifth parameter: user name, Omitted here

//The sixth parameter: password, omitted here

//The seventh parameter: 3232 is the length of the server certificate

//The eighth parameter: the content of the server certificate, it includes:
1) server certificate part of the first packet data of AT+CHTTPCREATEEXT "2d2d2d.... 4b4d"
2) The second packet data content of AT+CHTTPCREATEEXT "434c6b... 593239"
3) The third packet data content of AT+CHTTPCREATEEXT "744c33... 534f6c"
4) server certificate part of the 4th packet of AT+CHTTPCREATEEXT "43646a... 2d0d0a"

//The ninth parameter: client_cert_len , here 0, in the last package command.

//The 10th parameter: client_cert, omitted here, in the last package command.

//The 11th parameter: client_pk_len, here 0, in the last package command.

//The 12th parameter: client_pk, omitted here, in the last package command.
//Third Packet
AT+CHTTPCREATEEXT=1,3268,1000,"744c33a6c63479396a236d77755a32793765
96d6830644841364c79396a236d77755a32793765
96d647363326c6626935755a585176636d9766
443356a636d7775501594894b775942d0a426515
54841545454d544176d4330474374374741515
546427a1426869466f4852774f69387662324e
7a634356e62473969577787a615764754c6d4e
760da0a625339762323930636a45774877594456
52306a42426777466f1555948746d476b554e6c
38714a5543393424d303071502f382f5577374455
1594a46bf5a490d0a6876634a151454c425144
467674521455971376c3639726746674e7a455
2686e4630746b5a4a79421572f6939694978657
2483466346775334b3377347370d0a333252316a7
555596371654d4f6f764a724b56355506676e7
154676f4938556364d71582b782b6252446d756
f32743496432446b797325647345514c790d0
a58e40637666e4566c672f554273443834694f4b
4a48445752f4235771646863494f4b727762464
94e696859394273726b387931363538474556314
2536c330d0a33304a415e4753477669703243544
676485534306d6443462f76496843505e4739764
8515765035766a77494b414e675764435385a4
1575236356e357279410d0a5346c" OK

//Fourth Packet
AT+CHTTPCREATEEXT=0,3268,270,"43646a53
5856576b6b446f5076f43323039664e35696b6b
6f644270426f63c544a4967314d4743554637546
84243497850547364776179754a32470d0a4b3
1707037345031533857174437234664b4778685
a534d39417948445053735150685a535a673dd0d
a2d22d2d2d454e4420434552544949434154
452d22d2d2d0a,0,,0," OK
4.4 HTTP POST Created by Long Command Multi-package

//Example of Long Command multi-package to HTTP post
AT+CHTTPCREATE="http://139.217.9.49:8080/"  //Create HTTP host instance
+CHTTPCREAT: 0

OK
AT+CHTTPCON=0  //Connect server
OK

//First Packet
AT+CHTTPSENDEXT=1,949,177,0,1,12,"/setBikeData",128,4163636570743a202a2f2a0d0a436f6e6e656e6966696e3a20b56565702d416c696766006a557365722d4166656e743a20543494d34f4d54f4d450d0a,16,"application/json",  //Multi-packet sending HTTP request

The first parameter: 1 means that there is still unpacked data to be sent later; 0 means the last packet of data.

The second parameter: the total length of the data of the multi-package command, here 949=177+404+368

//Second Packet
AT+CHTTPSENDEXT=1,949,404,768,7B22646576522C2265646966696365646966696e3a207365650d0a557365722d4166656e743a20543494d34f4d54f4d450d0a,16,"application/json",  //The third parameter: the length of the current command packet, that is, the data length after the third parameter in each command.

The fourth parameter: 0, which means HTTP client_id

The fifth parameter: 1, HTTP method: post

The sixth parameter: 12, the length of HTTP path "/setBikeData"

//Third Packet
AT+CHTTPSENDEXT=0,949,368,373438383133  //The seventh parameter: HTTP path
2C3131362E37302C302E3030303030302C313222
C02E33362C312C313532353538333938375D2
C5B302E3730303030302C3131332E36333233830
332C33342E3734383830342C3131372E33302C3
02E30303030302C31302C302E33362C312C3
135235353833939315D2C5B302E33383030
302C3131332E36333233830322C33342E3734383
830342C3131372E39302C302E30303030302C3
31302C302E33382C312C31353235353833393933

OK  //The eighth parameter: HTTP header length

The ninth parameter: HTTP header

The tenth parameter: the length of the Content type

//11th parameter: Content type

The 12th parameter: 768

//The length of the Content content, in the second
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<th>Command</th>
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<tr>
<td>35D5D7D</td>
<td>package command</td>
</tr>
<tr>
<td>OK</td>
<td>//The 13th parameter: Content content, included in the 2nd and 3rd package commands</td>
</tr>
<tr>
<td>AT+CHTTPDISCON=0</td>
<td>//Disconnected from server</td>
</tr>
<tr>
<td>OK</td>
<td>//Destroy HTTP instance</td>
</tr>
<tr>
<td>AT+CHTTPDESTROY=0</td>
<td></td>
</tr>
</tbody>
</table>