SIM82XX_SIM83XX Series _HTTP(S)_ Application Note

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<td>Xianxiang Ma</td>
<td>First Release</td>
</tr>
<tr>
<td>V1.01</td>
<td>2021.11.25</td>
<td>Xianxiang Ma</td>
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Scope

This document applies to the SIMCom SIM820X series, SIM821X series, SIM826X series and SIM83XX series.
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1 Introduction

1.1 Purpose of the document

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

HTTP (HyperText Transfer Protocol) is an application layer protocol. When you browse a web page, the browser and the web server will send and receive data on the Internet through the HTTP protocol. HTTP is a stateless protocol based on request and response patterns. That is what we usually call Request/Response.

2.1 Characteristic

- **Support client/server mode;**
  - **Simple and fast**
    When a client requests a service from a server, it only needs to pass the request method and path. Because the HTTP protocol is simple, the program size of the HTTP server is small, and the communication speed is fast.
  - **Flexible**
    HTTP allows the transfer of any type of data object. The type being transferred is marked by Content-Type;

- **No connection**
  No connection means limiting the processing of only one request per link. After the server processes the client's request and receives the customer's response, the server disconnects the link. This way, the transmission time can be saved.

- **Stateless**
  The HTTP protocol is a stateless protocol. Stateless means that the protocol has no memory for transaction processing. A lack of state means that if subsequent processing requires the previous information, it must be retransmitted, which may result in an increase in the amount of data transferred per connection. On the other hand, it responds faster when the server does not need previous information.

2.2 Request Method

According to the HTTP standard, HTTP requests can use a variety of request methods. HTTP 1.0 defines three request methods: the GET, POST, and HEAD methods. HTTP 1.1 adds six new request methods: OPTIONS, PUT, PATCH, DELETE, TRACE, and CONNECT
methods.

<table>
<thead>
<tr>
<th>No</th>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GET</td>
<td>Make a request to a specific resource.</td>
</tr>
<tr>
<td>2</td>
<td>HEAD</td>
<td>Ask the server for a response that is consistent with the GET request, except that the response body will not be returned. This method can obtain the meta information contained in the response message header without having to transmit the entire response content.</td>
</tr>
<tr>
<td>3</td>
<td>POST</td>
<td>Submit data to a specified resource for processing requests (such as submitting a form or uploading a file). The data is included in the request body. POST requests may result in the creation of new resources and/or modifications to existing resources.</td>
</tr>
<tr>
<td>4</td>
<td>PUT</td>
<td>Uploads its latest content to a specified resource location.</td>
</tr>
<tr>
<td>5</td>
<td>DELETE</td>
<td>Requests the server to delete the resource identified by the Request-URI.</td>
</tr>
<tr>
<td>6</td>
<td>CONNECT</td>
<td>The HTTP/1.1 protocol is reserved for proxy servers that can connect connections to pipes.</td>
</tr>
<tr>
<td>7</td>
<td>OPTIONS</td>
<td>Returns the HTTP request method supported by the server for a particular resource. You can also test the functionality of the server by sending a &quot;*&quot; request to the web server.</td>
</tr>
<tr>
<td>8</td>
<td>TRACE</td>
<td>Echoes requests received by the server, primarily for testing or diagnostics.</td>
</tr>
<tr>
<td>9</td>
<td>PATCH</td>
<td>It is a supplement to the PUT method for local updating of known resources.</td>
</tr>
</tbody>
</table>

The SIM8200 series supports several methods: GET, POST and HEAD.
# 3 AT Commands for HTTP(S)

<table>
<thead>
<tr>
<th>Command</th>
<th>DESCRIPTION</th>
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<tr>
<td>AT+HTTPPARA</td>
<td>Set HTTP(S) Parameter</td>
</tr>
<tr>
<td>AT+HTTPINIT</td>
<td>Start HTTP(S) service</td>
</tr>
<tr>
<td>AT+HTTPACTION</td>
<td>HTTP(S) Method Action</td>
</tr>
<tr>
<td>AT+HTTPHEAD</td>
<td>Read the HTTP Header Information of Server Response</td>
</tr>
<tr>
<td>AT+HTTPREAD</td>
<td>Read the response Information of Server Response</td>
</tr>
<tr>
<td>AT+HTTPDATA</td>
<td>You can use AT+HTTPDATA to input data to post when you send a HTTP/HTTPS POST request</td>
</tr>
<tr>
<td>AT+HTTPPOSTFILE</td>
<td>Send HTTP request in a file via AT+HTTPPOSTFILE command</td>
</tr>
<tr>
<td>AT+HTTPREADFILE</td>
<td>Receive HTTP Response Content to a file</td>
</tr>
<tr>
<td>AT+HTTPTERM</td>
<td>Stop HTTP service</td>
</tr>
</tbody>
</table>

For detail information, please refer to "SIM82XX_SIM83XX_Series_AT Command Manual".
4 Bearer Configuration

Usually module will register PS service automatically.

4.1 PDN Auto-activation

AT+CPIN?
+CPIN: READY // Check Status of SIM Card

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

OK
AT+CGREG?
+CGREG: 0,1 // Check Status of PS Service

OK
AT+CEREG?
+CEREG: 0,1

OK
AT+COPS?
+COPS: 0,0,"CHN-UNICOM",13 // Check Information of Operator

OK
AT+CPSI?
+CPSI: NR5G_SA,Online,460-00,0x161816,13190066179,476,NR5G_BAND41,504990,-1130,-140,30 // Check Information of Network

OK
AT+CGDCONT=1, "IP", "CMNET" // Set PDP context Parameters

OK
AT+CGDCONT?
+CGDCONT: 1,"IPV4","CMNET","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0 // Check Information of PDP Context
5 HTTP(S) Examples

5.1 HTTP Function

5.1.1 HTTP GET

// Following commands shows how to send a HTTP GET request to server, and how to read HTTP response.

```
AT+HTTPINIT
OK
OK
AT+HTTPACTION=0
OK
+HTTPACTION: 0,200,22505
```

// start HTTP service, activate PDP context

// set the URL which will be accessed, for HTTP, the request URL begins with “HTTP://”

// send HTTP GET request

```
+HTTPHEAD: DATA,387
HTTP/1.1 200 OK
Server: nginx
Content-Type: text/html
Connection: close
Date: Thu, 16 Aug 2018 05:13:36 GMT
Powered-By-ChinaCache: MISS from 06053423gG.15
ETag: W"5b7379f5-57e9"
Last-Modified: Wed, 15 Aug 2018 00:55:17 GMT
Expires: Thu, 16 Aug 2018 05:18:36 GMT
Vary: Accept-Encoding
X-Cache-Hits: 14
Content-Length: 22505
CC_CACHE: TCP_REFRESH_HIT
Accept-Ranges: bytes
```

// 22505 is the length of HTTP response information

// read the HTTP response header
5.1.2 Send HTTP POST Request

// HTTP POST and PUT

AT+HTTPINIT
OK
AT+HTTPPARA="URL","http://api.efxnow.com/DEMOWebServices2.8/Service.asmx/Echo?"
OK
AT+HTTPDATA=18,1000
DOWNLOAD Message=helloworld
OK
AT+HTTPACTION=1
OK

+HTTPACTION: 1,500,30

+HTTP_PEER_CLOSED
AT+HTTPHEAD
OK
+HTTPHEAD: DATA,258
HTTP/1.1 500 Internal Server Error
Cache-Control: private
Content-Type: text/plain; charset=utf-8
Server: Microsoft-IIS/7.0
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
Date: Mon, 20 Aug 2018 04:18:58 GMT
Connection: close

// start HTTP service, activate PDP context
// set the URL which will be accessed, for HTTP, the request URL begins with "HTTP://"
// send data to post, the length is 18 bytes
// send HTTP POST request
// 30 is the length of HTTP response information
// read the HTTP response header
5.1.3 Send HTTP HEAD Request

// HTTP HEAD

**AT+HTTPINIT**
OK


OK

**AT+HTTPACTION=2**
OK

+HTTPACTION: 2,200,387

+HTTP_PEER_CLOSED

**AT+HTTPHEAD**

+HTTPHEAD: DATA,387
HTTP/1.1 200 OK
Server: nginx
Content-Type: text/html
Connection: close
Vary: Accept-Encoding
Powered-By-ChinaCache: MISS from 06053423gG.15
ETag: W/"5b7379f5-57e9"
Last-Modified: Wed, 15 Aug 2018 00:55:17 GMT
Content-Length: 22505
X-Cache-Hits: 14
Date: Thu, 16 Aug 2018 10:58:00 GMT
Expires: Thu, 16 Aug 2018 11:03:00 GMT
CC_CACHE: TCP_REFRESH_HIT
Accept-Ranges: bytes
5.2 Access to HTTPS server

5.2.1 Send HTTPS GET Request

```cpp
//HTTPS GET
AT+HTTPINIT
OK
AT+HTTPPARA="URL","https://ss0.bdstatic.com/5aV1bjqh_Q23odCf/static/mancard/css/card_min_dee38e45.css"
OK
AT+HTTPACTION=0
OK

+HTTPACTION: 0,200,52060
AT+HTTPHEAD
+HTTPHEAD: DATA,390
HTTP/1.1 200 OK
Server: bfe/1.0.8.13-sslpool-patch
Date: Thu, 16 Aug 2018 11:38:08 GMT
Content-Type: text/css
Content-Length: 52060
Connection: close
ETag: "5a323f72-cb5c"
Last-Modified: Thu, 14 Dec 2017 09:08:02 GMT
Expires: Sat, 18 Aug 2018 09:50:53 GMT
Age: 2425635
Accept-Ranges: bytes
Cache-Control: max-age=2592000
Vary: Accept-Encoding
Ohc-Response-Time: 100000
```

// start HTTP service, activate PDP context

// set the URL which will be accessed, for HTTPS, the request URL begins with “HTTPS://”

// send HTTPS GET request

// read HTTPS response header

//390 is the length of HTTPS response header
### 5.2.2 Send HTTPS POST Request

```plaintext
//HTTPS POST
AT+HTTPINIT  
OK
AT+HTTPPARA="URL","https://pv.csdn.net/csdnbi"  
OK
AT+HTTPDATA=465,1000  
DOWNLOAD
[{
    "headers": {
        "component": "enterprise",
        "datatype": "track",
        "version": "v1"
    },
    "body": {
        "ui": "merry1996",
    }
}]
OK
AT+HTTPACTION=1  
OK
+HTTPACTION: 1,200,2  
*/

+HTTP_PEER_CLOSED  
AT+HTTPHEAD  
+HTTPHEAD: DATA,377  
// read the HTTPS response header
```

// start HTTP service, activate PDP context

// set the URL which will be accessed, for HTTPS, the request URL begins with "HTTPS://"

// send data to post, the length is 465 bytes

// send HTTPS post request

//2 is the length of HTTPS response information
HTTP/1.1 200 OK
Server: openresty
Date: Mon, 20 Aug 2018 03:20:30 GMT
Content-Type: application/octet-stream
Connection: close
Set-Cookie: uuid_tt_dd=10_37481894210-1534735230305-445993; Expires=Thu, 01 Jan 2025 00:00:00 GMT; Path=/; Domain=.csdn.net;
Set-Cookie: dc_session_id=10_1534735230305.501284; Expires=Thu, 01 Jan 2025 00:00:00 GMT; Path=/; Domain=.csdn.net;

OK
AT+HTTPTERM
OK

5.2.3 Send HTTPS HEAD Request

// HTTPS HEAD

AT+HTTPINIT
OK
AT+HTTPPARA="URL","https://ss0.bdstatic.com/5aV1bjqh_Q23odCf/static/mancard/css/card_min_dee38e45.css"
OK
AT+HTTPACTION=2
OK

+HTTPACTION: 2,200,390
+HTTP_PEER_CLOSED

AT+HTTPHEAD
+HTTPHEAD: DATA,390
HTTP/1.1 200 OK
Server: bfe/1.0.8.13-sslpool-patch
Date: Thu, 16 Aug 2018 11:46:22 GMT
Content-Type: text/css
Content-Length: 52060
5.2.4 POST FILE to HTTPS server and read HTTPS response content to a file

// HTTPS POST/PUT

AT+HTTPINIT
OK

AT+HTTPPARA="URL","https://www.baidu.com"
OK

AT+HTTPPOSTFILE="getbaidu.txt",1,0
OK

+HTTPPOSTFILE: 0,200,14615

+HTTP_PEER_CLOSED
AT+HTTPHEAD
+HTTPHEAD: DATA,773
HTTP/1.1 200 OK
Accept-Ranges: bytes
Cache-Control: no-cache
Connection: Keep-Alive
Content-Length: 14615
Content-Type: text/html
Date: Thu, 13 Sep 2018 05:14:30 GMT
Etag: "5b8641dc-3917"
Last-Modified: Wed, 29 Aug 2018 06:49:00 GMT
P3p: CP=" OTI DSP COR IVA OUR IND COM "
Pragma: no-cache

// read the HTTP server response header information.
Server: BWS/1.1
Set-Cookie:
BAIDUID=A374BCFD28DFEEAF0BA0C4EEAC
77B0B0:FG=1; expires=Thu, 31-Dec-37
23:55:55 GMT; max-age=2147483647; path=/;
domain=.baidu.com
Set-Cookie:
BIDUPSID=A374BCFD28DFEEAF0BA0C4EEA
C77B0B0; expires=Thu, 31-Dec-37 23:55:55
GMT; max-age=2147483647; path=/;
domain=.baidu.com
Set-Cookie: PSTM=1536815670; expires=Thu,
31-Dec-37 23:55:55 GMT;
max-age=2147483647; path=/;
domain=.baidu.com
Vary: Accept-Encoding
X-Ua-Compatible: IE=Edge,chrome=1

OK
AT+HTTPTERM // stop HTTPS Service
OK