A76XX Series_
HTTP(S)_Application Note

LTE Module
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About Document

Version History

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Scope

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. This document applies to A1803S Series, A1603 Series, A1601 Series and A1802 Series.
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;

Other Conventions:
PDP(Packet Data Protocol);
FTP(File Transfer Protocol);
SSL(Secure Sockets Layer);
TLS(Transport Layer Security);
1.4 The process of Using HTTP(S) AT Commands

![Diagram showing the process of using HTTP(S) AT Commands]

- **HTTP(S) AT Commands**
- **Key Steps**
  1. **Hello**
  2. **HTTP(S) Request**
  3. **HTTP(S) Response**

**Detailed Steps**
- **Hello**
  - Connect to the network
  - Identify the network
- **HTTP(S) Request**
  - Send HTTP(S) request
- **HTTP(S) Response**
  - Receive HTTP(S) response

**Important Notes**
- **Network Configuration**
- **HTTP(S) Protocol**
- **Error Handling**

**Additional Resources**
- www.simcom.com
- Version 1.02
1.5 Error Handling

1.5.1 Executing HTTP(S) AT Commands Fails

When executing HTTP(S) AT commands, if ERROR response is received from the module, please check whether the U(SIM) card is inserted and whether it is +CPIN: READY returned when executing AT+CPIN?.

1.5.2 PDP Activation Fails

If it is failed to activate a PDP context with AT+CGACT command, please check the following configurations:
1. Query the PS domain status by AT+CGREG? and make sure the PS domain has been registered.
2. Query the PDP context parameters by AT+CGDCONT? and make sure the APN of the specified PDP context has been set.
3. Make sure the specified PDP context ID is neither used by PPP nor activated by AT+CGACT command.
If all above configurations are correct, but activating the PDP context by AT+CGACT command still fails, please reboot the module to resolve this issue. After rebooting the module, please check the configurations mentioned above for at least.

1.5.3 Error Response of HTTP(S) Server

When the <errcode> of +HTTPACTION: <method>,<errcode>,<datalen> or +HTTPPOSTFILE: <errcode>,<datalen> is not 200, it indicates an error code replied from HTTP(S) server.
For example, if <errcode> is 404, the URL can't be found. If <errcode> is 301, the URL is redirect, please refer to A76XXSeries_AT Command Manual_V1.01.
2 ATCommands for HTTP(S)

2.1 Overview of AT Commands for HTTP(S)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT+HTTPINIT</td>
<td>Start HTTP service</td>
</tr>
<tr>
<td>AT+HTTPTERM</td>
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<tr>
<td>AT+HTTPPPARA</td>
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<tr>
<td>AT+HTTPACTION</td>
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<tr>
<td>AT+HTTPHEAD</td>
<td>Read the HTTP Header Information of Server Response</td>
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<tr>
<td>AT+HTTPREAD</td>
<td>Read the response information of HTTP Server</td>
</tr>
<tr>
<td>AT+HTTPDATA</td>
<td>Input HTTP Data</td>
</tr>
<tr>
<td>AT+HTTPPOSTFILE</td>
<td>Send HTTP Request to HTTP(S) server by File</td>
</tr>
<tr>
<td>AT+HTTPREADFILE</td>
<td>Receive HTTP Response Content to a file</td>
</tr>
</tbody>
</table>
3 HTTP(S) Examples

Before all HTTP(S) related operations, we should ensure the following:
Ensure network is available:

```
AT+CSQ
+CSQ: 23,0
OK

AT+CREG?
+CREG: 0,1
OK

AT+CGREG?
+CGREG: 0,1
OK

AT+CPSI?
+CPSI:
LTE,Online,460-00,0x333C,39589680,308,EUT
RAN-BAND3,1350,5,0,0,54,0,22
OK

//In WCDMA/GSW, you need to continue to execute the following instructions

AT+CGDCONT=cid,"ip","APN"
OK

AT+CGACT=1,cid
OK

AT+CGACT=?
+CGACT: 1,1
OK
```

3.1 Access to HTTP server

```// Send HTTP GET Request```
AT+HTTPINIT
OK

OK
AT+HTTPACTION=0
OK

+HTTPACTION: 0,200,22505
AT+HTTPHEAD
+HTTPHEAD: 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

OK

AT+HTTPREAD=0,500
OK

+HTTPREAD: 500
<!DOCTYPE html PUBLIC "-/W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="content-type" content="text/html;charset=GB2312"/>
</head>

//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

//22505 is the length of HTTP response information

//read the HTTP response header

//387 is the length of response header

// Content-Length indicates the length of HTTP response information is 22505 bytes

//read the response information of HTTP server, the length to read is 500 bytes
Send HTTP POST Request

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
AT+HTTPHEAD
+HTTPHEAD: 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
Content-Length: 30

OK
AT+HTTPREAD=0,30
OK
Send HTTP HEAD Request

AT+HTTPINIT
OK

OK

AT+HTTPACTION=2
OK

+HTTPACTION: 2,200,387

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

OK
AT+HTTPTERM
OK

//stop HTTP Service

POSTFILE to HTTP server and read HTTP response content to a file

AT+HTTPINIT
//start HTTP service, activate PDP context
OK
AT+HTTPPARA="URL","http://www.baidu.com" //set server URL
OK
AT+HTTPPOSTFILE="getbaidu.txt",1
//access server and send file getbaidu.txt to server
OK
+HTTPPOSTFILE: 200,14615
AT+HTTPHEAD
//read the HTTP server response header information.

+HTTPHEAD: 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
Server: BWS/1.1
Set-Cookie: BAIDUID=A374BCFD28DFEEAF0BA0C4EEAC77B0B0:FG=1; expires=Thu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com
Set-Cookie: BIDUPSID=A374BCFD28DFEEAF0BA0C4EEAC77B0B0; 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+HTTPREADFILE="readbaidu.dat"
//read the HTTP server response content to a file named readbaidu.dat, saved to local storage
OK
+HTTPREADFILE: 0
AT+HTTPTERM
//stop HTTP Service
OK
3.2 Access to HTTPS server

Send HTTPS GET Request

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
// 52060 is the length of HTTPS response information

AT+HTTPHEAD
+HTTPHEAD: 390
// 390 is the length of HTTPS response header.

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: 1000000

OK

AT+HTTPREAD=0,500
// read the response information of HTTPS server,
the length to read is 500 bytes

OK

+HTTPREAD: 500

Send HTTPS POST Request

`AT+HTTPINIT`  // start HTTP service, activate PDP context
OK

`AT+HTTPPARA="URL","https://pv.csdn.net/csdnbi"`  // set the URL which will be accessed, for HTTPS, the request URL begins with “HTTPS://”
OK

`AT+HTTPDATA=465,1000`  // send data to post, the length is 465 bytes
DOWNLOAD

```
{"headers":{"component":"enterprise","datatypetrack","version":"v1"},"body":"
```
OK

`AT+HTTPACTION=1`  // send HTTPS post request
OK

+HTTPACTION: 1,200,2  // 2 is the length of HTTPS response information

+HTTP_PEER_CLOSED

`AT+HTTPHEAD`  // read HTTPS response header

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_37481894210-1534735230305-44
5993; 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+HTTPREAD=0,10  //read the response information of HTTPS server, the length to read is 10 bytes
OK

+HTTPREAD: 2  //ok is the content of HTTPS response information, 2 bytes
OK
+HTTPREAD: 0
AT+HTTPTERM  //stop HTTP Service
OK

Send HTTPS HEAD Request

AT+HTTPINIT  //start HTTP service, activate PDP context
OK
AT+HTTPPARA="URL","https://ss0.bdstatic.com/5aV1bjqh_Q23odCf/static/mancard/css/card_min_dee38e45.css"  //set the URL which will be accessed, for HTTPS, the request URL begins with “HTTPS://”
OK
AT+HTTPACTION=2  // send HTTPS HEAD request
OK

+HTTPACTION: 2,200,390  // 390 is the length of HTTPS response header
+HTTP_PEER_CLOSED
AT+HTTPHEAD
+HTTPHEAD: 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
Connection: close
ETag: "5a323f72-cb5c"
Last-Modified: Thu, 14 Dec 2017 09:08:02 GMT
POSTFILE to HTTPS server and read HTTPS response content to a file

AT+HTTPINIT //start HTTP service, activate PDP context
OK
AT+HTTPPARA="URL","https://www.baidu.com"
OK
AT+HTTPPOSTFILE="getbaidu.txt",1
OK

+HTTPPOSTFILE: 200,14615
AT+HTTPHEAD //read HTTPS response header .
+HTTPHEAD: 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
Server: BWS/1.1
Set-Cookie:
BAIDUID=A374BCCFD28DFEEAF0BA0C4EEAC77B0B0:FG=1; expires=Thu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com
Set-Cookie:
BIDUPSID=A374BCCFD28DFEEAF0BA0C4EEAC77B0B0; 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+HTTPREADFILE="readbaidu.dat"
OK
AT+HTTPTERM
   //stop HTTP Service
OK
## 4 Appendix

### 4.1 Summary of Error Codes

<table>
<thead>
<tr>
<th>&lt;statuscode&gt;</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Continue</td>
</tr>
<tr>
<td>101</td>
<td>Switching Protocols</td>
</tr>
<tr>
<td>200</td>
<td>OK</td>
</tr>
<tr>
<td>201</td>
<td>Created</td>
</tr>
<tr>
<td>202</td>
<td>Accepted</td>
</tr>
<tr>
<td>203</td>
<td>Non-Authoritative Information</td>
</tr>
<tr>
<td>204</td>
<td>No Content</td>
</tr>
<tr>
<td>205</td>
<td>Reset Content</td>
</tr>
<tr>
<td>206</td>
<td>Partial Content</td>
</tr>
<tr>
<td>300</td>
<td>Multiple Choices</td>
</tr>
<tr>
<td>301</td>
<td>Moved Permanently</td>
</tr>
<tr>
<td>302</td>
<td>Found</td>
</tr>
<tr>
<td>303</td>
<td>See Other</td>
</tr>
<tr>
<td>304</td>
<td>Not Modified</td>
</tr>
<tr>
<td>305</td>
<td>Use Proxy</td>
</tr>
<tr>
<td>307</td>
<td>Temporary Redirect</td>
</tr>
<tr>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>401</td>
<td>Unauthorized</td>
</tr>
<tr>
<td>402</td>
<td>Payment Required</td>
</tr>
<tr>
<td>403</td>
<td>Forbidden</td>
</tr>
<tr>
<td>404</td>
<td>Not Found</td>
</tr>
<tr>
<td>405</td>
<td>Method Not Allowed</td>
</tr>
<tr>
<td>406</td>
<td>Not Acceptable</td>
</tr>
<tr>
<td>407</td>
<td>Proxy Authentication Required</td>
</tr>
<tr>
<td>408</td>
<td>Request Timeout</td>
</tr>
<tr>
<td>409</td>
<td>Conflict</td>
</tr>
<tr>
<td>410</td>
<td>Gone</td>
</tr>
<tr>
<td>411</td>
<td>Lenth Required</td>
</tr>
<tr>
<td>412</td>
<td>Precondition Failed</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>413</td>
<td>Request Entity Too Large</td>
</tr>
<tr>
<td>414</td>
<td>Request-URI Too Large</td>
</tr>
<tr>
<td>415</td>
<td>Unsupported Media Type</td>
</tr>
<tr>
<td>416</td>
<td>Requested range not satisfiable</td>
</tr>
<tr>
<td>417</td>
<td>Expectation Failed</td>
</tr>
<tr>
<td>500</td>
<td>Internal Server Error</td>
</tr>
<tr>
<td>501</td>
<td>Not Implemented</td>
</tr>
<tr>
<td>502</td>
<td>Bad Gateway</td>
</tr>
<tr>
<td>503</td>
<td>Service Unavailable</td>
</tr>
<tr>
<td>504</td>
<td>Gateway timeout</td>
</tr>
<tr>
<td>505</td>
<td>HTTP Version not supported</td>
</tr>
<tr>
<td>600</td>
<td>Not HTTP PDU</td>
</tr>
<tr>
<td>601</td>
<td>Network Error</td>
</tr>
<tr>
<td>602</td>
<td>No memory</td>
</tr>
<tr>
<td>603</td>
<td>DNS Error</td>
</tr>
<tr>
<td>604</td>
<td>Stack Busy</td>
</tr>
</tbody>
</table>

### 4.2 Unsolicited Result Codes

<table>
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<tr>
<th>URC</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>+HTTP_PEER_CLOSED</td>
<td>It’s a notification message. While received, it means the connection has been closed by server.</td>
</tr>
<tr>
<td>+HTTP_NONET_EVENT</td>
<td>It’s a notification message. While received, it means now the network is unavailable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;errcode&gt;</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Success</td>
</tr>
<tr>
<td>701</td>
<td>Alert state</td>
</tr>
<tr>
<td>702</td>
<td>Unknown error</td>
</tr>
<tr>
<td>703</td>
<td>Busy</td>
</tr>
<tr>
<td>704</td>
<td>Connection closed error</td>
</tr>
<tr>
<td>705</td>
<td>Timeout</td>
</tr>
<tr>
<td>706</td>
<td>Receive/send socket data failed</td>
</tr>
<tr>
<td>707</td>
<td>File not exists or other memory error</td>
</tr>
<tr>
<td>708</td>
<td>Invalid parameter</td>
</tr>
<tr>
<td>709</td>
<td>Network error</td>
</tr>
<tr>
<td>710</td>
<td>start a new ssl session failed</td>
</tr>
<tr>
<td></td>
<td>Error Description</td>
</tr>
<tr>
<td>----</td>
<td>---------------------------</td>
</tr>
<tr>
<td>711</td>
<td>Wrong state</td>
</tr>
<tr>
<td>712</td>
<td>Failed to create socket</td>
</tr>
<tr>
<td>713</td>
<td>Get DNS failed</td>
</tr>
<tr>
<td>714</td>
<td>Connect socket failed</td>
</tr>
<tr>
<td>715</td>
<td>Handshake failed</td>
</tr>
<tr>
<td>716</td>
<td>Close socket failed</td>
</tr>
<tr>
<td>717</td>
<td>No network error</td>
</tr>
<tr>
<td>718</td>
<td>Send data timeout</td>
</tr>
<tr>
<td>719</td>
<td>CA missed</td>
</tr>
</tbody>
</table>