Espressif ESP8266EX: AT COMMAND EXAMPLES

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<td>V0.4</td>
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<tr>
<td>Author</td>
<td>Fei Yu</td>
</tr>
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Version Info

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<td>2014.7.16</td>
<td>0.1</td>
<td>Fei Yu</td>
<td>Draft</td>
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<td>2014.9.12</td>
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<td>Add unvarnished transmission (AT_v019)</td>
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<td>Add UDP transmission (AT_v020)</td>
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1、Foreword

Herein contains examples for the usage of Espressif AT Commands. For the complete instruction set, please refer to Espressif AT Instruction Set documentation.

If you have any question about AT, please contact us support-at@espressif.com
2. User Guide

(1) First flash in blank.bin (contains default Wi-Fi parameter settings) into the ESP8266EX device, then flash in the BIN program that supports AT commands (`\esp_iot_sdk\bin\at`).

(2) Power on device and set serial baud rate to 115200. Enter AT commands.

Pay attention to the new line mode, AT command need “\n” to be the end.
2.1. Single connection as TCP client

1) Set wifi mode:
   AT+CWMODE=3  // softAP+station mode
   Response: OK

2) Connect to router
   AT+CWJAP="ssid","password"  // ssid and password of router
   Response: OK

3) Query device’s IP
   AT+CIFSR
   Response: 192.168.3.106  // Device got an IP from router.

4) PC connects to the same router which ESP8266 connects to. Using a network tool (eg: ”NetAssist.exe”) on the computer to create a server.

5) ESP8266EX connect to server as a client
AT+CIPSTART="TCP","192.168.3.116",8080  //protocol, server IP & port
Response: OK

6）Send data
   AT+CIPSEND=4  // set date length which will be sent, such as 4 bytes

   >DGFY         // enter the data, no CR
Response: SEND OK
Note: If the number of bytes sent is bigger than the size defined (n), will reply busy, and after sending n number of bytes, reply SEND OK.

7）Receive data:
   +IPD,n:xxxxxxxxxx  // received n bytes, data=xxxxxxxxxx
2.2. Transparent transmission

In AT Demo, transparent transmission only enables when it is “single connection as client” mode.

Here takes ESP8266EX station as an example, you can take ESP8266EX softAP as the same way according to document “4A-AT-Espressif AT Instruction Set”.

1) Set wifi mode:
   AT+CWMODE=3 // softAP+station mode
   Response: OK

2) Connect to router
   AT+CWJAP="ssid","password" // ssid and password of router
   Response: OK

3) Query device’s IP
   AT+CIFSR

4) PC connects to the same router which ESP8266 connects to. Using a network tool (eg: "NetAssist.exe") on the computer to create a server.

5) Device connect to server
   AT+CIPSTART="TCP","192.168.101.110",8080 // protocol, server IP & port
Response: OK
Linked

6) Enable transparent transmission mode

AT+CIPMODE=1
Response: OK

7) Start send

AT+CIPSEND

Response: >

Note: From now on, data received from uart will be transparent transmitted to server.

8) Stop send
Data packet contains only “+++” exits transparent transmission.

NOTE: Input +++ directly by keyboard, may not be continually, suggest using tool as below:

![Image of software interface]

Input ： +++
New Line Mode ： don’t select
Click “Send”

Note: We send “+++” to exit transparent transmission mode, back to normal AT command mode, TCP connection is still maintain, we can use command “AT+CIPSEND” back to transparent transmission mode.

9）Delete TCP connection

AT+CIPCLOSE

Response: CLOSED   OK
2.3. Multiple connection as TCP server

It has to be multiple connection when ESP8266EX runs as server, then there can be more than one client connects to ESP8266EX.

For example,

1) Set wifi mode:
   AT+CWMODE=3     // softAP+station mode
   Response: OK

2) Enable multiple connection
   AT+CIPMUX=1
   Response: OK

3) Setup server
   AT+CIPSERVER=1     // default port = 333
   Response: OK

4) PC connects to ESP8266EX softAP as station, then PC connects to ESP8266EX server as client.

   ![Image of network setup]

NOTE: ESP8266EX acting as server has a timeout mechanism. When connection is established and no data is transmitted within a period of time, it will disconnect the client. Please setup a recurring packet transmission
every 2s on the computer to ensure connection is maintained.

5) Send data

   // id number of connection is default to be 0.
   AT+CIPSEND=0,4  // send 4 bytes to connection NO.0

   >iopd  // enter the data, no CR

   Response: SEND OK

   Note: If the number of bytes sent is bigger than the size defined (n), will reply busy, and after sending n number of bytes, reply SEND OK.

6) Receive data:

   +IPD,0,n:xxxxxxxxxx  // received n bytes, data = xxxxxxxxxx

7) Delete TCP connection

   AT+CIPCLOSE=0  // Delete NO.0 connection.

   Response: 0,CLOSED OK
2.4. UDP Transmission

AT+CIPSTART can create a UDP transmission, more details in documentation “Espressif AT Instruction Set”.

1) Set wifi mode:
   AT+CWMODE=3       // softAP+station mode
   Response: OK

2) Connect to router
   AT+CWJAP="ssid","password"       // ssid and password of router
   Response: OK

3) Query device’s IP
   AT+CIFSR

4) PC connects to the same router which ESP8266 connects to. Using a network tool (eg: "NetAssist.exe") on the computer to create UDP.

Then we example two different kinds of UDP transmission.
2.4.1. UDP（remote ip, port won’t change）

In UDP transmission, remote ip and port can change or not is decided by the last parameter of “AT+CIPSTART”, 0 means changeless, usually we give it a link id.

1) Enable multiple connection

   AT+CIPMUX=1
   Response: OK

2) Create a UDP transmission, for example, id is 4.

   AT+CIPSTART=4,"UDP","192.168.101.110",8080,1112,0
   Response: 4,CONNECT OK

   Note:
   "192.168.101.110",8080 here is the remote ip and port of UDP transmission which create on PC in step 4;
   1112 is the local port of ESP8266, user define, if user does not define it, it will be a random value;
   0 means destination peer entity of UDP will not change. For example, in this case, if another PC also creates a UDP entity and sends data to ESP8266 port 1112, ESP8266 can receive these data, but when we send data with command “AT+CIPSEND=4,X”, it will still be sent to the first PC. If this parameter is not 0, it will send to the new PC.

3) Send data

   AT+CIPSEND=4,5 // Send 5 bytes to transmission NO.4

   >DGFYQ // enter the data, no CR

   Response: SEND OK

   Note: If the number of bytes sent is bigger than the size defined (n), will reply busy, and after sending n number of bytes, reply SEND OK.
4）Receive data:
   
   +IPD,4,n:xxxxxxxxxx   // received n bytes, data=xxxxxxxxxx

5）Delete transmission NO.4
   AT+CIPCLOSE=4
   Response: 4,CLOSED   OK

2.4.2. UDP（remote ip，port can change）

1) Create a UDP transmission，last parameter to be 2.
   AT+CIPSTART="UDP","192.168.101.110",8080,1112,2
   Response: CONNECT   OK
   Note:
   "192.168.101.110",8080 here is the remote ip and port of UDP
transmission which create on PC in step 4;
   1112 is the local port of ESP8266, user define, if user does not define it,
it will be a random value;
   2 means destination peer entity of UDP will change automatically to be
the last one which send UDP packet to ESP8266. For example, in this case,
if another PC also creates a UDP entity and sends data to ESP8266 port
1112, ESP8266 can receive these data and when it send data back with
command “AT+CIPSEND=X”, it will still be sent to the new PC.
2) Send data
   AT+CIPSEND=5   // Send 5 bytes
   
   >DGFYQ  // enter the data, no CR
   Response: SEND OK
   Note: If the number of bytes sent is bigger than the size defined (n), will
reply busy, and after sending n number of bytes, reply SEND OK.
3) If you want to send data to any other UDP destination, just set a specific ip and port.


   >abcdef    // enter the data, no CR

   Response: SEND OK

4) Receive data:

   +IPD,n:xxxxxxxxxx  // received n bytes, data=xxxxxxxxxxxx

5) Delete UDP transmission

   AT+CIPCLOSE

   Response: CLOSED   OK
3. Q&A

If you have any question about AT instructions, please contact us (support-at@espressif.com) with information as follows:

1. Version info or AT: Using “AT+GMR” to get the version info. Hardware Module info: example AITHINK ESP-01

2. Screenshot of the test steps, for example:

3. If possible, please offer the test log, such as:

```
ets Jan  8 2013,rst cause:1, boot mode:(3,3)

load 0x40100000, len 26336, room 16
tail 0
chksum 0x8e
load 0x3ffe8000, len 5672, room 8
tail 0
chksum 0x69
load 0x3ffe9630, len 8348, room 8
tail 4
chksum 0xc5

csum 0xc5
SDK version:0.9.1
addr not ack when tx write cmd
```