

ESP-07S & ESP-12S EVB

User Manual

1. Introduction

The ESP-07S/ESP-12S EVB is the evaluation board for testing wifi module (ESP-07S or ESP-12S) and prototyping development. ESP-07S/ESP-12S EVB is composed of a ESP-07S or ESP-12S evaluation board and a ESP-07S or ESP-12S module.

2. Mechanical Size & Pin Description

The following is the size of ESP-07S/ESP-12S EVB:

2.54cm X 4.83 cm

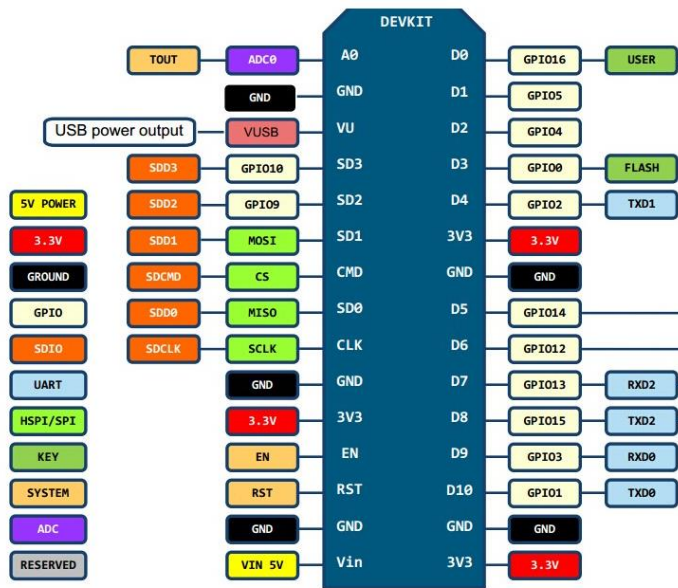
ESP-07S-EVB



ESP-12S EVB



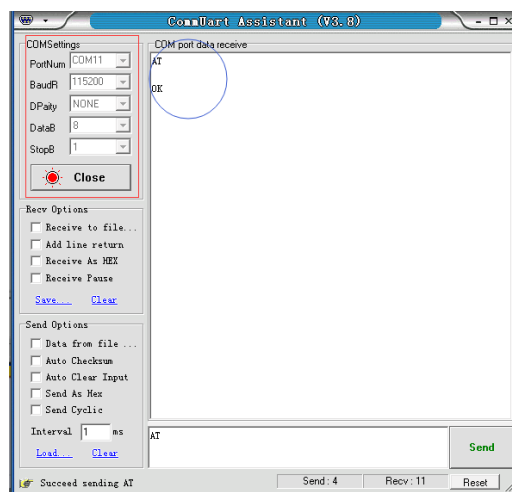
The following is the pin description of ESP-07S/ESP-12S EVB:



3. Start quickly

The following is the quick start guide:

1. Let ESP-07S/ESP-12S EVB connect to your computer with MicroUSB. As soon as ESP-12S EVB is connected to PC by MicroUSB, it will be brightening with blue light, and then the light will be out. It means ESP-12S EVB is ready to operate. But, in case of ESP-07S EVB doesn't have LED on EVB. ;
2. If MicroUSB driver is not installed in your PC, information box will be pop-up to show an unknown device. In this case, you can download a serial-driver for MicroUSB from the link, http://www.wch.cn/download/CH341SER_EXE.html And install it on PC.
3. Then open serial terminal for test as following. At this time, when you configure serial interface, the serial baud rate should be 9600 or 115200 as default value :



4. AT command

Espressif is providing you with AT command set functions and methods of using AT commands set. AT commands set is divided into three main parts such as Basic AT commands, WiFi related AT commands and TCP / IP AT commands.

4.1 AT Command Description

Type	Command Format	DescrIPtion
Test	AT+<x>=?	Query the Set command or internal parameters and its range values.
Query	AT+<x>?	Returns the current value of the parameter.
Set	AT+<x>=<...>	Set the value of user-defined parameters in commands and run.
Execute	AT+<x>	Runs commands with no user-defined parameters.

Each Command set is composed of four types of AT commands.

Notes:

1. Not all AT Command has four commands.
2. [] = default value, not required or may not appear
3. String values require double quotation marks, for example :
AT+CWSAP="ESP756290","21030826",1,4
4. Baud rate = 115200 or 9600
5. At Command has to be capitalized, and end with "r/n"

4.2 Basic AT Command Set

The ESP8266 wireless WiFi modules can be driven via the serial interface using the standard AT commands. Here is a list of some basic AT commands that can be used.

Basic	
Command	Description
AT	Test AT startup
AT+RST	Restart module
AT+GMR	View version info
AT+GSLP	Enter deep-sleep mode
ATE	AT commands echo or not
AT+RESTORE	Factory Reset
AT+UART	UART configuration, [@deprecated]
AT+UART_CUR	UART current configuration
AT+UART_DEF	UART default configuration, save to flash
AT+SLEEP	Sleep mode
AT+RFPOWER	Set maximum value of RF TX Power
AT+RFVDD	Set RF TX Power according to VDD33

AT – Test AT startup

The type of this command is "executed". It's used to test the setup function of your wireless WiFi module.

AT - Test AT startup	
Response	OK
Parameters	null

AT+RST – Restart module

The type of this command is "executed". It's used to restart the module.

AT+RST - Restart module	
Response	OK
Parameters	null

AT+GMR – View version info

This AT command is used to check the version of AT commands and SDK that you are using, the type of which is "executed".

AT+GMR - View version info	
Response	<AT version info> <SDK version info> <compile time> OK
Parameters	<AT version info> information about AT version <SDK version info> information about SDK version <compile time> time of the bin was compiled

AT+GSLP – Enter deep-sleep mode

This command is used to invoke the deep-sleep mode of the module, the type of which is "set". A minor adjustment has to be made before the module enters this deep sleep mode, i.e., connect XPD_DCDC with EXT_RSTB via OR.

AT+GSLP=<time>	
Response	<time> OK
Parameters	The time unit of <time> is ms. ESP8266 will wake up after deep sleep <time> ms.

ATE – AT commands echo

This command ATE is an AT trigger command echo. It means that entered commands can be echoed back to the sender when ATE command is used. Two parameters are possible. The command returns "OK" in normal cases and "ERROR" when a parameter other than 0 or 1 was specified.

ATE - AT commands echo	
Response	OK
Parameters	ATE0: Switch echo off ATE1: Switch echo on

AT+RESTORE – Factory reset

This command is used to reset all parameters saved in flash (according to appendix), restore the factory default settings of the module. The chip will be restarted when this command is executed.

AT+RESTORE - Factory reset	
Response	OK
Notes	Restore factory default settings. The chip will restart.

Detailed instruction test, please refer to the [Espressif ESP8266 official AT command Set list](#).

Actual practice:

The operation method of client mode:

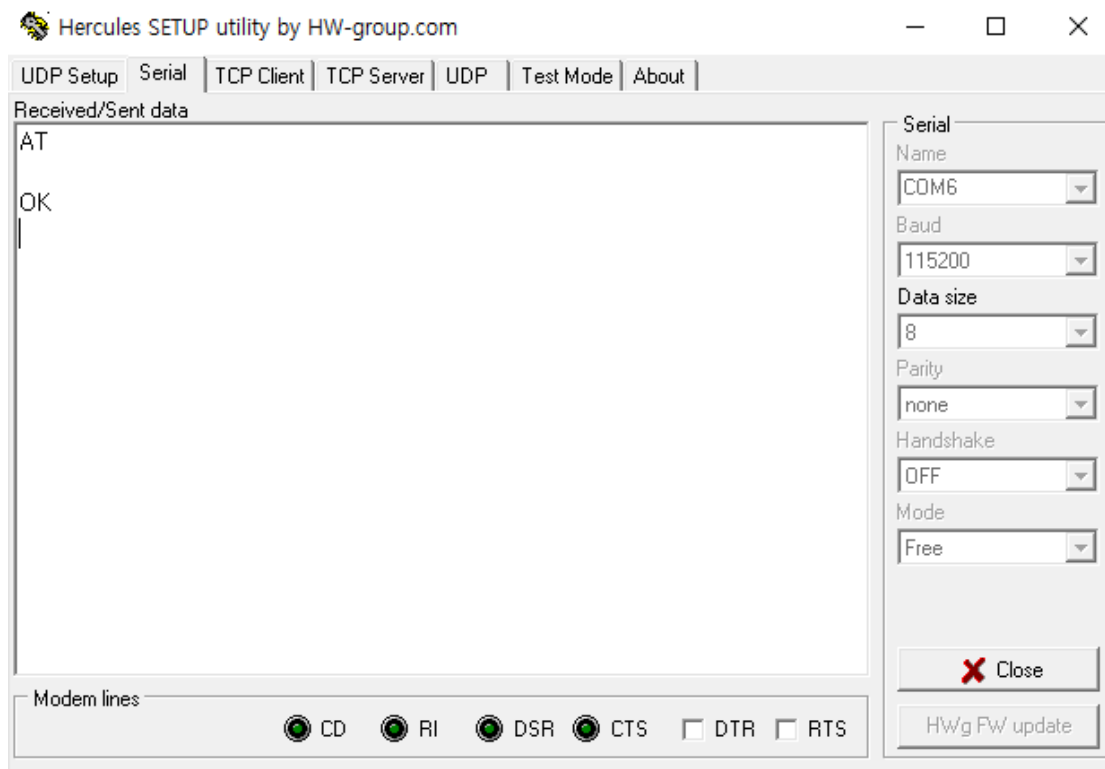
All of AT command should be written by capital letter.

1. Input AT command for startup.

Ex> AT

The type of this command is "executed". It's used to test the setup function of your wireless WiFi module.

AT - Test AT startup	
Response	OK
Parameters	null

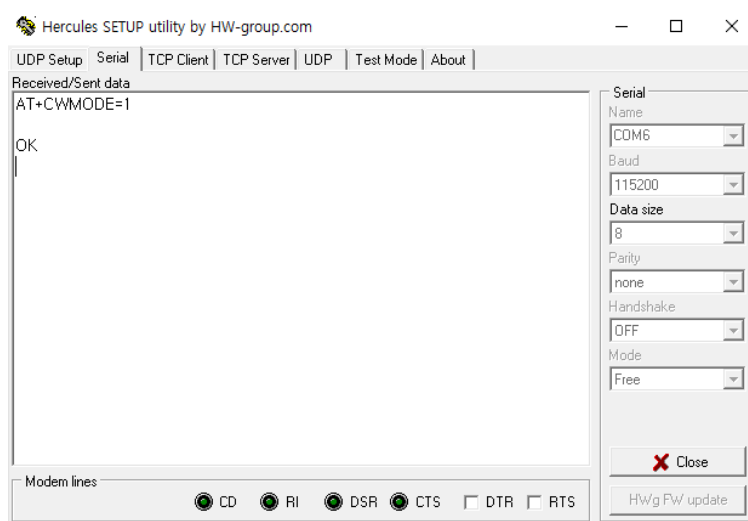


2. Set of working mode(1 → Client(station) mode, 2 → Server(Soft AP) mode, 3 → both(station + Soft AP mode))

Ex> AT+CWMODE=1(Client(station) mode)

The function of this AT command is to get the value scope of WiFi mode, including station mode, softAP mode, and station+softAP mode, enquiry about the information of WiFi mode, or set the WiFi mode.

AT+CWMODE - WiFi mode	
This command is deprecated. Please use AT+CWMODE_CUR or AT+CWMODE_DEF instead.	
Command	AT+CWMODE=?
Response	+CWMODE:(value scope of <mode>) OK
Parameters	Please refer to AT command settings.
Command	AT+CWMODE?
Response	+CWMODE:<mode> OK
Parameters	Please refer to AT command settings.
Command	AT+CWMODE=<mode>
Response	OK
Parameters	<mode> 1 : station mode 2 : softAP mode 3 : softAP + station mode
Notes	This setting will be stored in the flash system parameter area. It won't be erased even when the power is off and restarted.

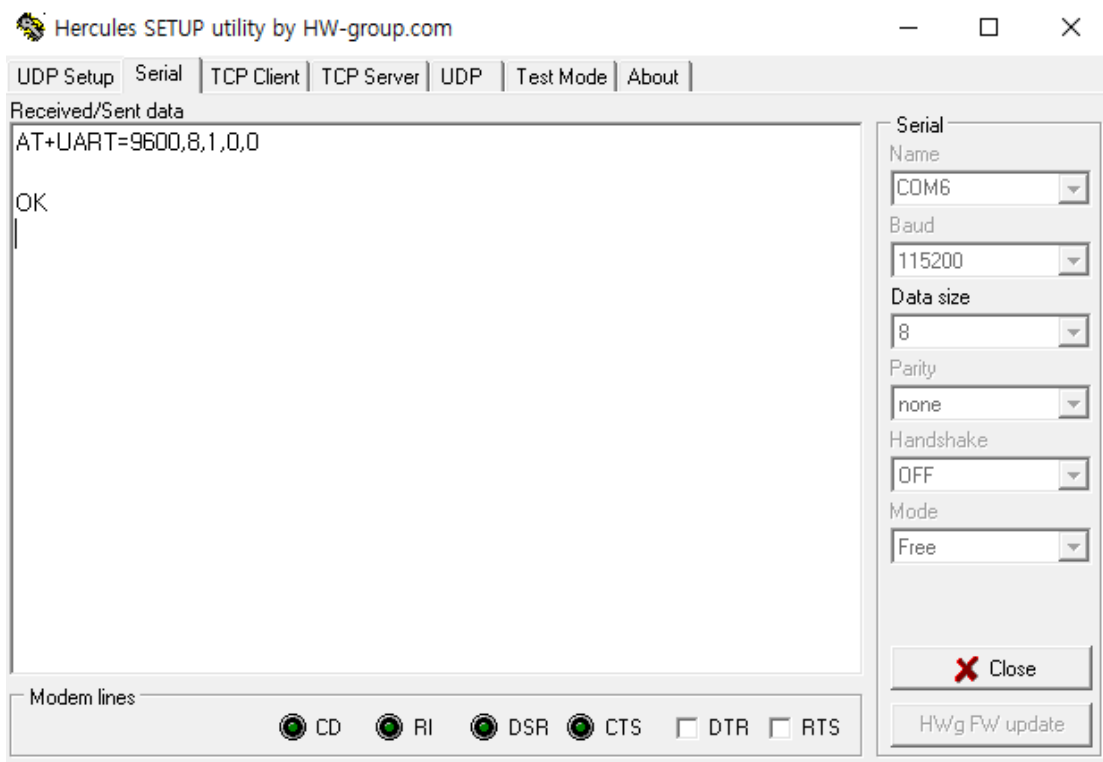


- Set of UART(the default baud rate would be 9600 or 115200, when you change the baud rate, you need to reconnect COM port)

Ex> AT+UART=9600,8,1,0,0

This command sets the UART configuration and writes the new configuration to the flash. It is stored as the default parameter and will also be used as the default baudrate henceforth. [THIS API IS DEPRECATED.]

AT+UART=<baudrate>,<databits>,<stopbits>,<parity>,<flow control> This command is deprecated, please use AT+UART_CUR or AT+UART_DEF instead.	
Example	AT+UART=115200,8,1,0,3
Response	OK
Parameters	<baudrate> Baudrate range: 110 to 115200*40 (4.608 Mega)
	<databits> 5: 5 bits data 6: 6 bits data 7: 7 bits data 8: 8 bits data
	<stopbits> 1: 1 bit stop bit 2: 1.5 bit stop bit 3: 2 bit stop bit
	<parity> 0: None 1: Odd 2: EVEN
	<flow control> 0: disable flow control 1: enable RTS 2: enable CTS 3: enable both RTS and CTS
Notes	<ul style="list-style-type: none"> This configuration will also store the baudrate as the default rate in the user parameter area in the Flash for boot up. Flow control needs hardware support: MTCK is UART0 CTS and MTDO is UART0 RTS.

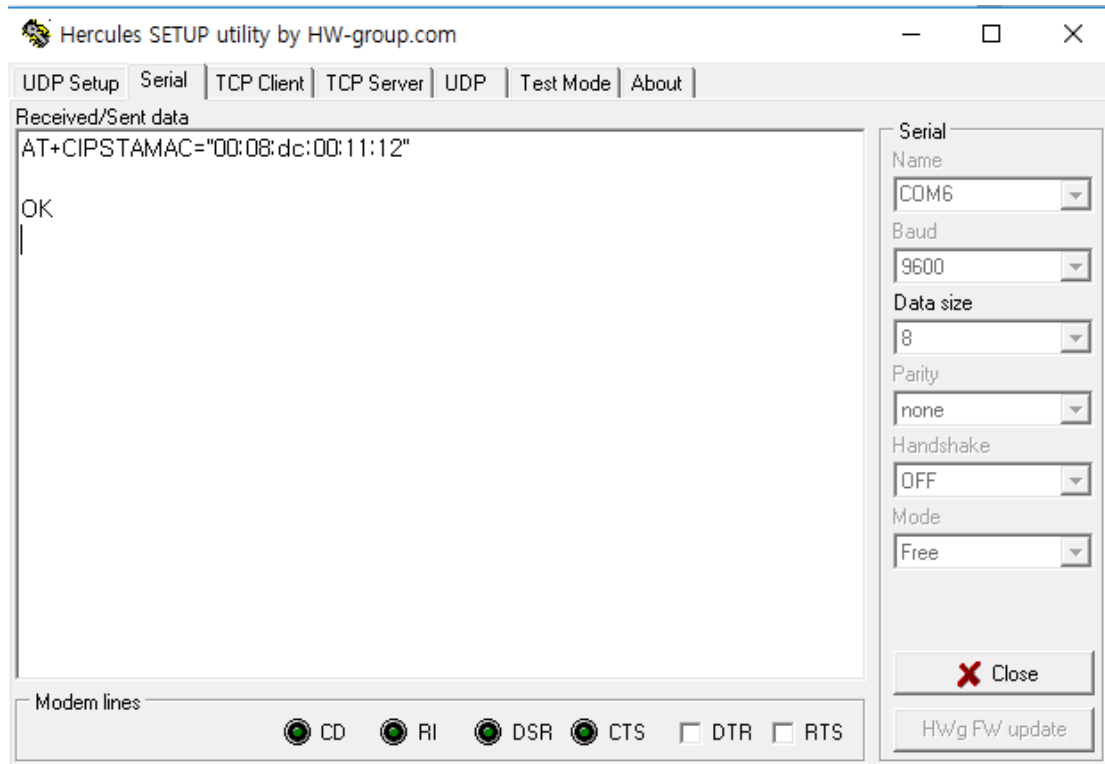


4. Set of MAC address

Ex>AT+CIPSTAMAC="00:08:dc:00:11:12"

MAC addresses of ESP8266 soft-AP and station are different, please do **NOT** set them to be the same.

AT+ CIPSTAMAC - Set MAC address of ESP8266 station	
[@deprecated]. Use AT+CIPSTAMAC_CUR or AT+CIPSTAMAC_DEF instead.	
Example	AT+CIPSTAMAC="18:fe:35:98:d3:7b"
Command	AT+CIPSTAMAC?
Response	+CIPSTAMAC:<mac> OK
Parameters	<mac> string, MAC address of ESP8266 station
Command	AT+CIPSTAMAC=<mac>
Response	OK
Parameters	<mac> string, MAC address of ESP8266 station
Notes	This configuration will store in Flash user parameter area.

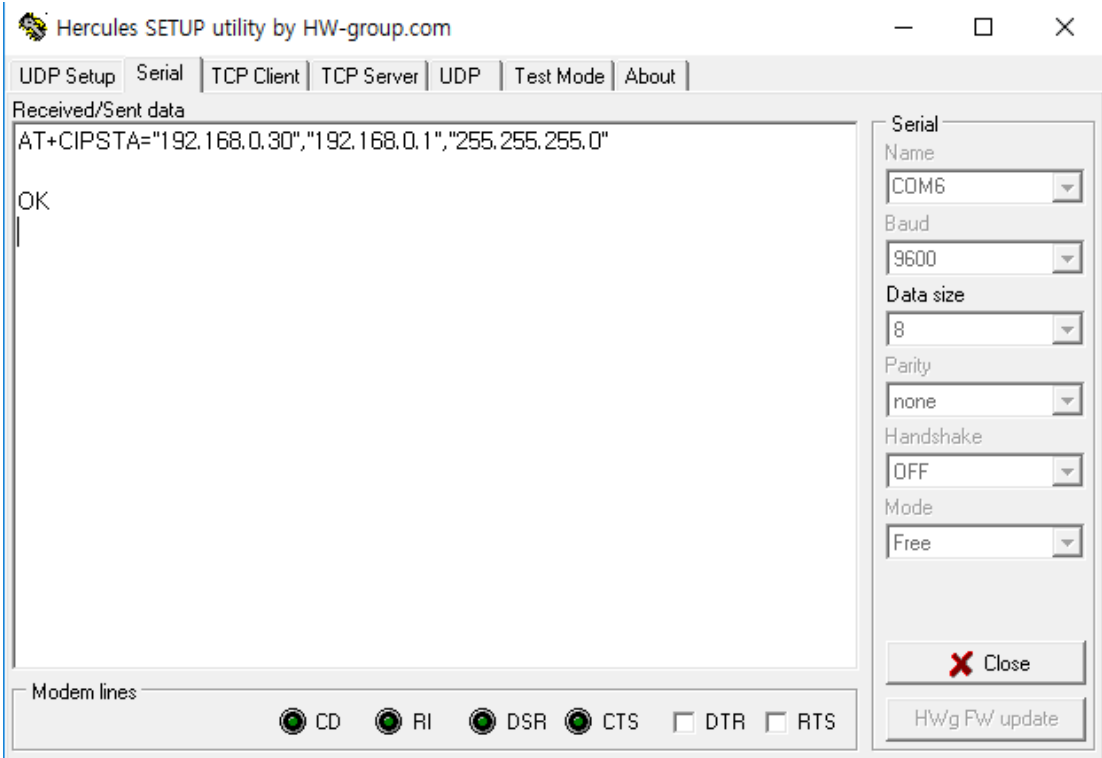


5. Set of IP address

Ex) AT+CIPSTA="192.168.0.30","192.168.0.1","255.255.255.0"

Only after ESP8266 station connected to AP, station IP can be got and inquired. This configuration will store in Flash user parameter area.

AT+ CIPSTA - Set IP address of ESP8266 station	
[@deprecated]. Please use AT+CIPSTA_CUR or AT+CIPSTA_DEF instead.	
Example	AT+CIPSTA="192.168.6.100","192.168.6.1","255.255.255.0"
Command	AT+CIPSTA?
Response	+CIPSTA:<IP> OK
Parameters	<IP> string, IP address of ESP8266 station
Command	AT+CIPSTA=<IP>[,<gateway>,<netmask>]
Response	OK
Parameters	<IP> string, IP address of ESP8266 station [<gateway>] gateway [<netmask>] netmask
Notes	This configuration interacts with AT+CWDHCP related AT commands: <ul style="list-style-type: none"> • If enable static IP, DHCP will be disabled; • If enable DHCP, static IP will be disabled; • This will depend on the last configuration.



6. Connection to AP(Access Point)

Ex) AT+CWJAP="easy-net","66795252"

AT+CWJAP - Connect to AP	
[@deprecated]. Please Use AT+CWJAP_CUR or AT+CWJAP_DEF instead.	
Example	<ul style="list-style-type: none"> AT+CWJAP = "abc", "0123456789" If SSID is "ab/,c" and password is "0123456789"/" AT+CWJAP = "ab///,c", "0123456789"/"/" If several APs have the same SSID as "abc",target AP can be found by bssid: AT+CWJAP = "abc","0123456789","ca:d7:19:d8:a6:44"
Command	AT+CWJAP?
Response	+CWJAP:<ssid>,<bssid>,<channel>,<rssi> OK
Parameters	<ssid> string, AP's SSID
Command	AT+CWJAP=<ssid>,<pwd>[,<bssid>]
Response	OK or +CWJAP:<error code> FAIL
Parameters	<ssid> string, AP's SSID <pwd> string, MAX: 64 bytes ASCII [<bssid>] string, AP's MAC address, for several APs may have the same SSID <error code> only for reference,it's not reliable <error code> 1 connecting timeout <error code> 2 wrong password <error code> 3 can not found target AP <error code> 4 connect fail This command needs station mode enable. Escape character syntax is needed if "SSID" or "password" contains any special characters ('\' \'\"and'/')



7. Connection to the remote Server

Ex> AT+CIPSTART="TCP","192.168.0.2",23

Please refer to documentation "4B-ESP8266__AT Command Examples" to use this command.

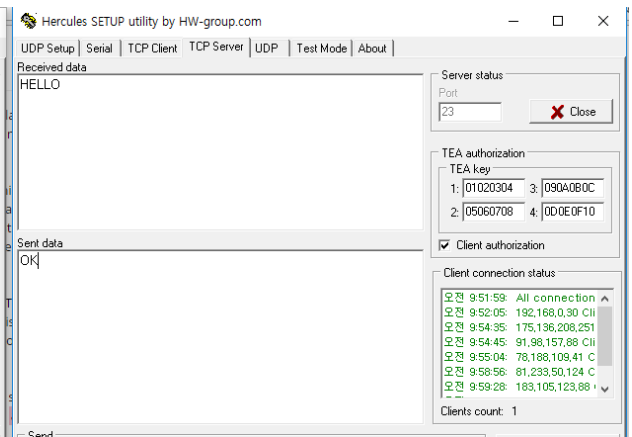
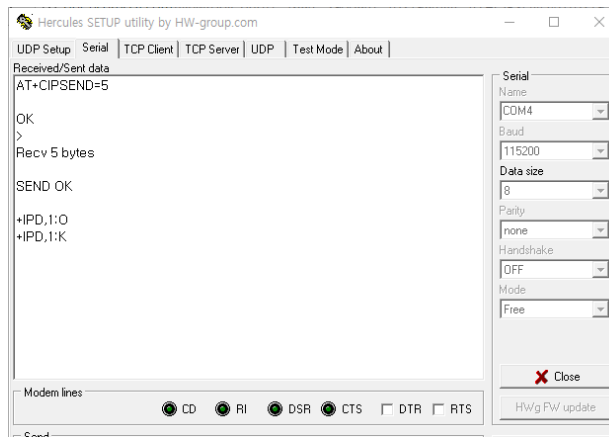
AT+CIPSTART - Establish TCP connection or register UDP port, start connection	
Example	AT+CIPSTART="TCP","192.168.101.110",1000
Single connection	(+CIPMUX=0) AT+CIPSTART=<type>,<remote IP>,<remote port>[,<UDP local port>,<UDP mode>][,<TCP keep alive>]
Multiple connection	(+CIPMUX=1) AT+CIPSTART=<link ID>,<type>,<remote IP>,<remote port>[,<UDP local port>,<UDP mode>][,<TCP keep alive>]
Response	OK or ERROR If connection already exists, returns ALREAY CONNECT
Parameters	<link ID> ID of the connection (0~4), for multi-connect <type> string, "TCP" or "UDP" <remote IP> string, remote IP <remote port> string, remote port [<UDP local port>] for UDP only [<UDP mode>] In UDP transparent transmission, it has to be 0. [<UDP mode>] 0 : destination peer entity of UDP will not change. [<UDP mode>] 1 : destination peer entity of UDP can change once. [<UDP mode>] 2 : destination peer entity of UDP is allowed to change. Note: [<UDP mode>] can only be used when [<UDP local port>] is set. [<TCP keep alive>] default 0. unit: 500 milliseconds. [<TCP keep alive>] 0 : disable TCP keep-alive [<TCP keep alive>] 1 ~ 7200 : TCP keep-alive interval

8. Data transmission

Ex>AT+CIPSEND=10

Please refer to documentation "4B-ESP8266_AT Command Examples" for more examples.

AT+CIPSEND - Send data	
Single connection	(+CIPMUX=0) AT+CIPSEND=<length>
Multiple connection	(+CIPMUX=1) AT+CIPSEND=<link ID>,<length>
UDP Transmission	AT+CIPSEND=[<link ID>,<length>,<remote IP>,<remote port>]
Response	Wrap return ">" after set command. Begins receive of serial data, when data length is met, starts transmission of data. If connection cannot be established or gets disconnected during send, returns ERROR If data is transmitted successfully, returns SEND OK
Parameters	<link ID> ID of the connection (0~4), for multi-connect <length> data length, MAX 2048 bytes [<remote IP>] UDP transmission can set remote IP when send data [<remote port>] UDP transmission can set remote port when send data
Command	AT+CIPSEND
Response	Wrap return ">" after execute command. Enters unvarnished transmission, 20ms interval between each packet, maximum 2048 bytes per packet. When single packet containing "+++" is received, it returns to normal command mode. This command can only be used in transparent transmission mode which require to be single connection mode. For UDP transparent transmission, <UDP mode> has to be 0 in command "AT+CIPSTART"



The operation method of Server(Soft AP) mode:

1. Set of working mode(1 → Client(station) mode, 2 → Server(Soft AP) mode, 3 → both(station + Soft AP mode))

Ex>AT+CWMODE=2(Server(Soft AP) mode)

The function of this AT command is to get the value scope of WiFi mode, including station mode, softAP mode, and station+softAP mode, enquiry about the information of WiFi mode, or set the WiFi mode.

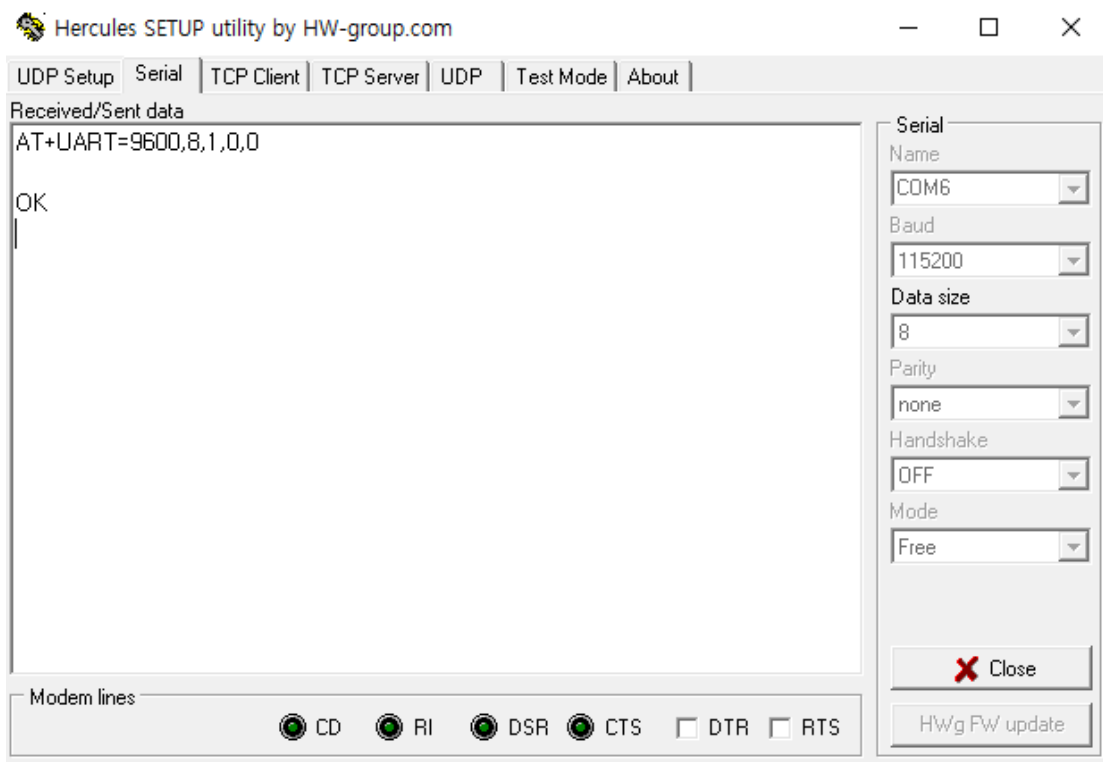
AT+CWMODE - WiFi mode	
This command is deprecated. Please use AT+CWMODE_CUR or AT+CWMODE_DEF instead.	
Command	AT+CWMODE=?
Response	+CWMODE:(value scope of <mode>) OK
Parameters	Please refer to AT command settings.
Command	AT+CWMODE?
Response	+CWMODE:<mode> OK
Parameters	Please refer to AT command settings.
Command	AT+CWMODE=<mode>
Response	OK
Parameters	<mode> 1 : station mode 2 : softAP mode 3 : softAP + station mode
Notes	This setting will be stored in the flash system parameter area. It won't be erased even when the power is off and restarted.

- Set of UART(the default baud rate would be 9600 or 115200, when you change the baud rate, you need to reconnect COM port)

Ex>AT+UART=9600,8,1,0,0

This command sets the UART configuration and writes the new configuration to the flash. It is stored as the default parameter and will also be used as the default baudrate henceforth. [THIS API IS DEPRECATED.]

AT+UART=<baudrate>,<databits>,<stopbits>,<parity>,<flow control> This command is deprecated, please use AT+UART_CUR or AT+UART_DEF instead.											
Example	AT+UART=115200,8,1,0,3										
Response	OK										
Parameters	<table border="1"> <tr> <td><baudrate></td> <td>Baudrate range: 110 to 115200*40 (4.608 Mega)</td> </tr> <tr> <td><databits></td> <td>5: 5 bits data 6: 6 bits data 7: 7 bits data 8: 8 bits data</td> </tr> <tr> <td><stopbits></td> <td>1: 1 bit stop bit 2: 1.5 bit stop bit 3: 2 bit stop bit</td> </tr> <tr> <td><parity></td> <td>0: None 1: Odd 2: EVEN</td> </tr> <tr> <td><flow control></td> <td>0: disable flow control 1: enable RTS 2: enable CTS 3: enable both RTS and CTS</td> </tr> </table>	<baudrate>	Baudrate range: 110 to 115200*40 (4.608 Mega)	<databits>	5: 5 bits data 6: 6 bits data 7: 7 bits data 8: 8 bits data	<stopbits>	1: 1 bit stop bit 2: 1.5 bit stop bit 3: 2 bit stop bit	<parity>	0: None 1: Odd 2: EVEN	<flow control>	0: disable flow control 1: enable RTS 2: enable CTS 3: enable both RTS and CTS
	<baudrate>	Baudrate range: 110 to 115200*40 (4.608 Mega)									
	<databits>	5: 5 bits data 6: 6 bits data 7: 7 bits data 8: 8 bits data									
	<stopbits>	1: 1 bit stop bit 2: 1.5 bit stop bit 3: 2 bit stop bit									
	<parity>	0: None 1: Odd 2: EVEN									
<flow control>	0: disable flow control 1: enable RTS 2: enable CTS 3: enable both RTS and CTS										
Notes	<ul style="list-style-type: none"> This configuration will also store the baudrate as the default rate in the user parameter area in the Flash for boot up. Flow control needs hardware support: MTCK is UART0 CTS and MTDO is UART0 RTS. 										



3. Set of AP(Access Point)

Ex>AT+CWSAP_CUR="ESP8266","1234567890",5,3

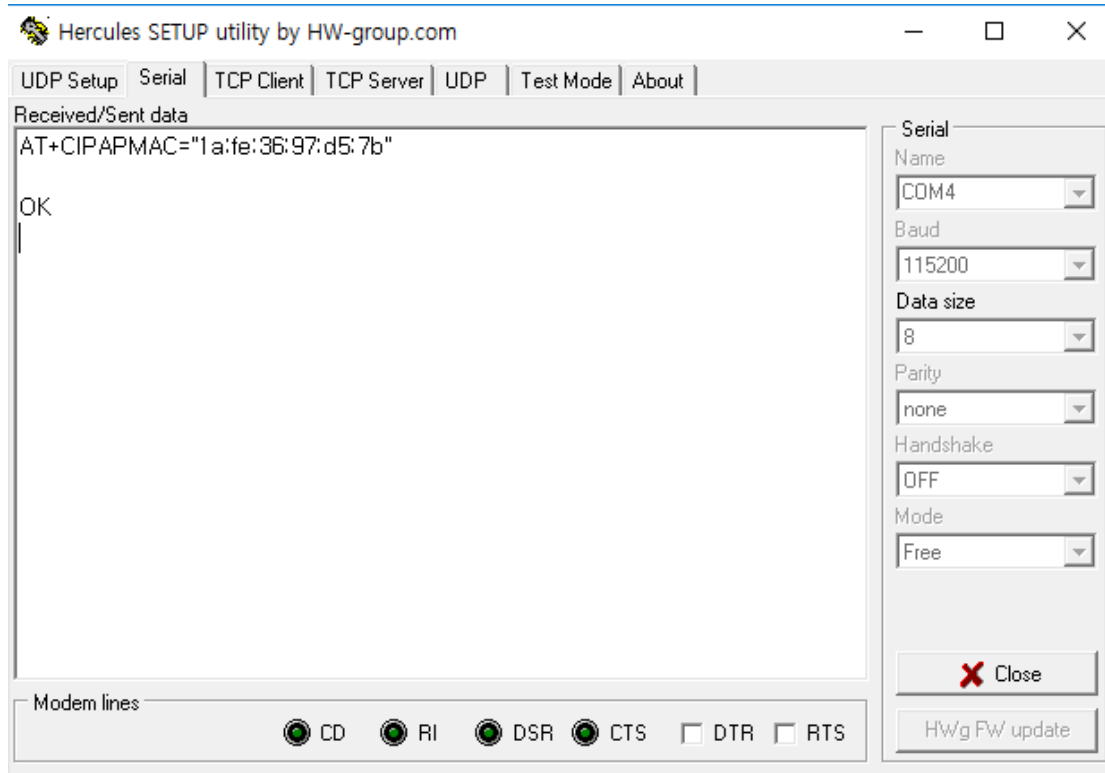
AT+CWSAP_CUR - Set configuration of softAP mode, won't save to Flash	
Example	AT+CWSAP_CUR="ESP8266","1234567890",5,3
Command	AT+CWSAP_CUR?
Response	+CWSAP_CUR:<ssid>,<pwd>,<chl>,<ecn>
Parameters	<ssid> string, ESP8266 softAP' SSID <pwd> string, range: 8 ~ 64 bytes ASCII <chl> channel id <ecn> 0 OPEN 2 WPA_PSK 3 WPA2_PSK 4 WPA_WPA2_PSK
Command	AT+CWSAP_CUR=<ssid>,<pwd>,<chl>,<ecn>
Response	OK ERROR
Parameters	The same as above.
Notes	This command is only available when softAP mode enable. ESP8266 softAP don't support WEP. This configuration will NOT store in Flash.

4. Set of MAC address

Ex>AT+CIPAPMAC="1a:fe:36:97:d5:7b"

MAC addresses of ESP8266 soft-AP and station are different, please do **NOT** set them to be the same.

AT+ CIPAPMAC - Set MAC address of ESP8266 softAP	
[@deprecated]. Use AT+CIPAPMAC_CUR or AT+CIPAPMAC_DEF instead.	
Example	AT+CIPAPMAC="1a:fe:36:97:d5:7b"
Command	AT+CIPAPMAC?
Response	+CIPAPMAC:<mac> OK
Parameters	<mac> string, MAC address of ESP8266 softAP
Command	AT+CIPAPMAC=<mac>
Response	OK
Parameters	<mac> string, MAC address of ESP8266 softAP
Notes	This configuration will store in Flash user parameter area.

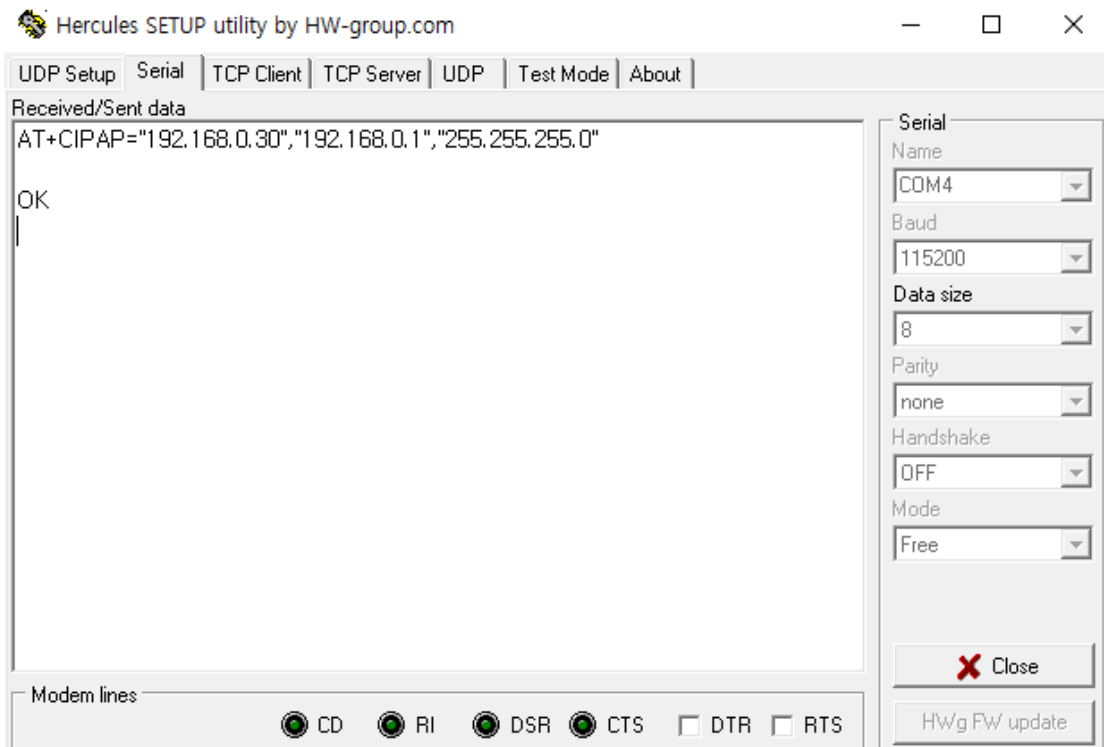


5. Set of IP address

Ex>AT+CIPAP="192.168.0.30","192.168.0.1","255.255.255.0"

ESP8266 only support class C IP address. This configuration will store in Flash user parameter area.

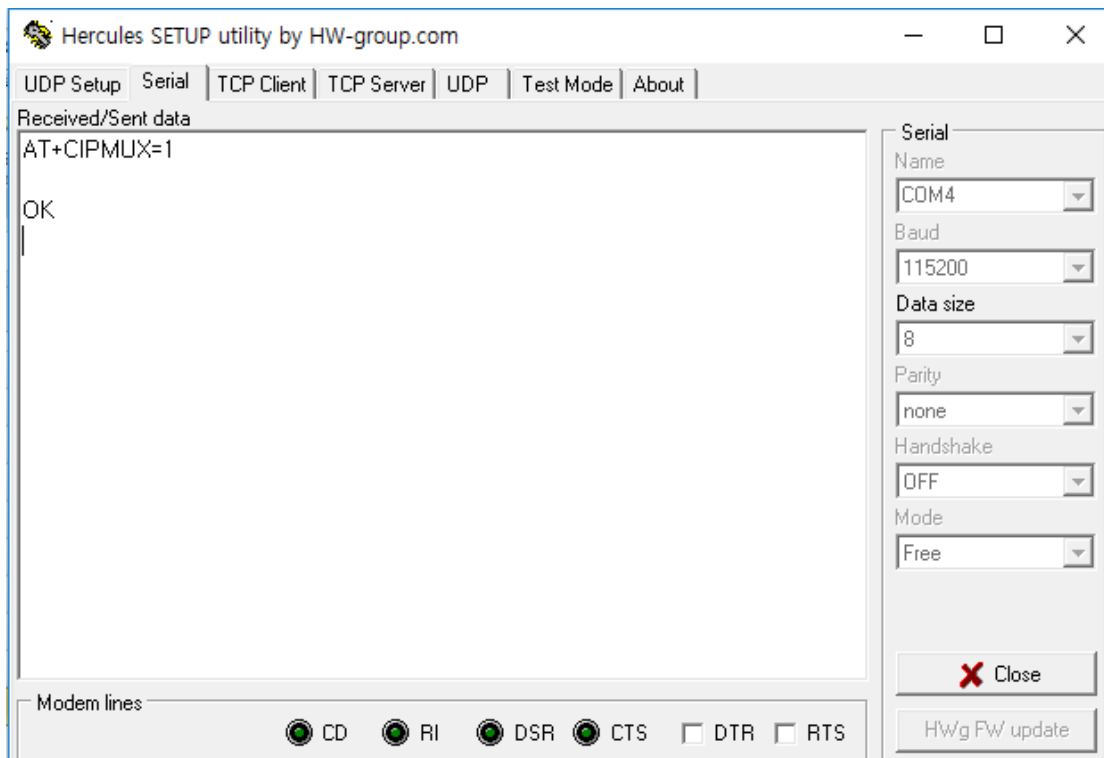
AT+ CIPAP - Set IP address of ESP8266 softAP [<i>@deprecated</i>]. Please use AT+CIPAP_CUR or AT+CIPAP_DEF instead.	
Example	AT+CIPAP="192.168.5.1","192.168.5.1","255.255.255.0"
Command	AT+CIPAP?
Response	+CIPAP:<IP> OK
Parameters	<IP> string, IP address of ESP8266 softAP
Command	AT+CIPAP=<IP>[,<gateway>,<netmask>]
Response	OK
Parameters	<IP> string, IP address of ESP8266 softAP [<gateway>] gateway [<netmask>] netmask
Notes	This configuration interacts with DHCP related AT commands (AT+CWDHCP related): <ul style="list-style-type: none"> • If enable static IP, DHCP will be disabled; • If enable DHCP, static IP will be disabled; • This will depend on the last configuration.



6. Set of multiple connection

Ex>AT+CIPMUX=1

AT+ CIPMUX - Enable multiple connections or not	
Example	AT+CIPMUX=1
Command	AT+CIPMUX?
Response	+ CIPMUX:<mode> OK
Parameters	<mode>0 single connection <mode>1 multiple connection
Command	AT+CIPMUX=<mode>
Response	OK If already connected, returns Link is builded
Parameters	The same as above.
Notes	1. "AT+CIPMUX=1" can only be set when transparent transmission disabled ("AT+CIPMODE=0") 2. This mode can only be changed after all connections are disconnected. 3. If TCP server is started, has to delete TCP server first, then change to single connection is allowed.

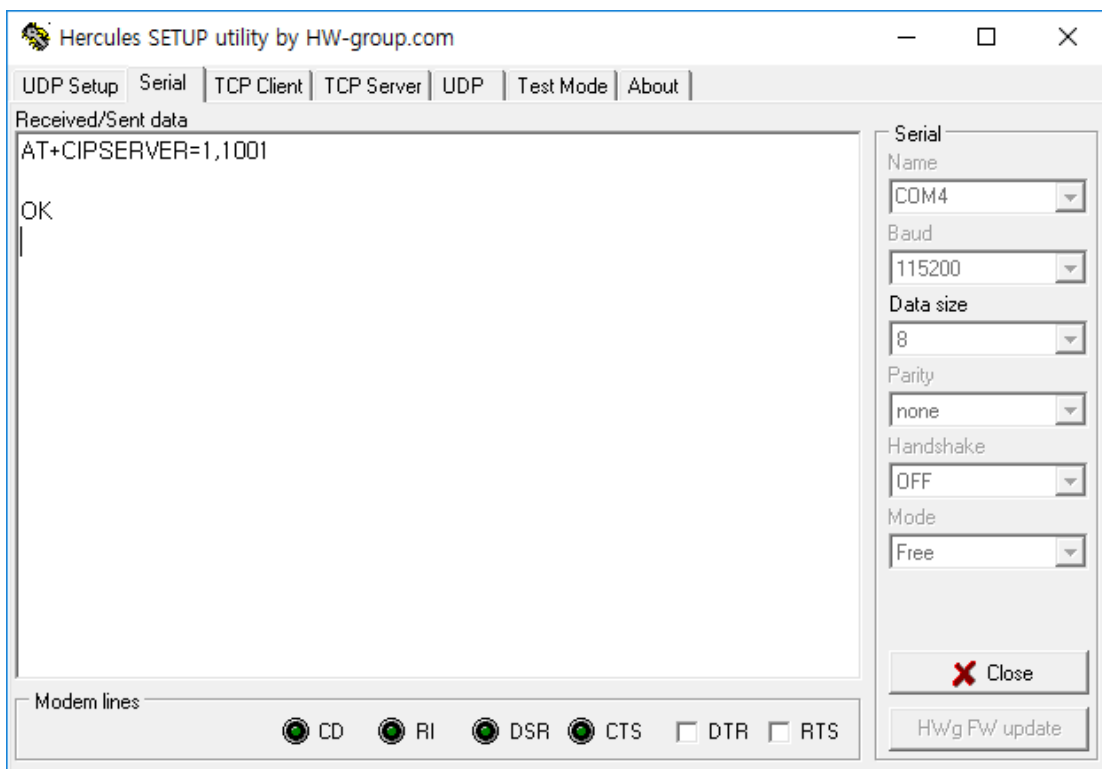


7. Set of working as TCP server

Ex>AT+CIPSERVER=1,1001

Server monitor will automatically be created when Server is created. When a client is connected to the server, it will take up one connection, be gave an id.

AT+CIPSERVER - Configure as TCP server	
Example	AT+CIPMUX=1 AT+CIPSERVER=1,1001
Command	AT+CIPSERVER=<mode>[,<port>]
Response	OK
Parameters	<mode> 0 Delete server <mode> 1 Create server <port> port number, default is 333
Notes	Server can only be created when AT+CIPMUX=1



8. Set of DHCP function


Ex>AT+CWDHCP=0,1

AT+ CWDHCP - Enable/Disable DHCP	
[@deprecated]. Please use AT+CWDHCP_CUR or AT+CWDHCP_DEF instead.	
Command	AT+CWDHCP?
Response	DHCP disabled or enabled now?
Parameters	Bit0 : 0 - soft-AP DHCP disable 1 - soft-AP DHCP enable bit1 : 0 - station DHCP disable 1 - station DHCP enable
Command	AT+CWDHCP=<mode>,<en>
Response	OK
Parameters	<mode> 0 : set ESP8266 soft-AP 1 : set ESP8266 station 2 : set both softAP and station <en> 0 : Disable DHCP 1 : Enable DHCP
Notes	<ul style="list-style-type: none"> This configuration will store in Flash User parameter area. This configuration interact with static IP related AT commands (AT+CIPSTA related and AT+CIPAP related): <ul style="list-style-type: none"> If enable DHCP, static IP will be disabled; If enable static IP, DHCP will be disabled; This will depends on the last configuration.

9. Connection to ESP-12S/07S EVB(ESP8266) from notebook or PC

Wi-Fi

알려진 네트워크 관리

 ESP8266

⊙ ESP8266

범위 내에 있는 경우 자동 연결

켜

데이터 통신 연결

데이터 요금이 제한된 경우 데이터 사용량을 보다 효율적으로 제어



10. Check of connection in Terminal program(Console)

