An ESP8266 Firmware with On-Module HTTP WEB Server & Local DNS

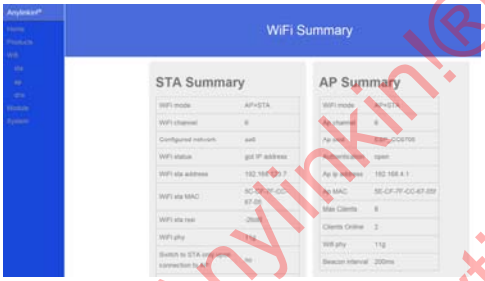
FEATURES

·ESP8266 WIFI AP+STA

- Latest ESP8266® SDK 2.0.0 base
- STA, AP, & STA+AP modes supported
- Supporting SmartConfig & Airkiss

·HTTP WEB SERVER On-module

- Accommodated by a HTTPD Server
- Web with HTML, JS, JSON, CGI, etc
- Compatible with most mainstream browsers
- Simple & neat UI for WEB operations



·Local Domain System On-module

- A small and fast Local DNS system
- Allowing for max 5 user-defined domain records
- Allowing for fuzzy hit and adaptive and pre-defined hit
- Allowing for domain name hit to AP IP address
- Simple to set your own LAN DNS system

·IO resources control via WEB UI

- Allowing for IO resources query and control via the WEB Server UI
- Supporting operations to IO resources of nearly all types of IO control including GPIO, PWM, I^2C, etc.
- Supporting UART control and communication
- Supporting Flash control and data dump
- Supporting system info query (such as chip id, mac, flash info, version etc) and control (such as reset, sleep etc)

·Configurations Query and Setting via WEB Interface

- Allowing for WIFI configurations query, settings, storage and load of those parameters
  - ➢ For STA mode, such as AP scanning, selecting or inputting AP SSID and password and connecting to AP
  - ➢ For AP mode, such as Channel No, Authentication, SSID and password, AP's IP address, Clients lists, etc

·Advanced Features

- Captive Portal supported for both Android and IOS access
- Automatic launching web page (e.g. home page) upon STA connecting to the AP of ESP8266 module

·Hardware Platform Compatibility

- Compatible with all ESP8266 platforms
- Small Flash size required: >=1MBytes

APPLICATIONS

·Those based on ESP8266 Modules

- 2.4-GHz 802.11b/g/n System
- Home/Building Automation, e.g. Smart Home, Lighting Systems etc
- Industrial Control and Monitoring
- Low-Power Wireless Sensor Networks
- Consumer Electronics
- Health Care

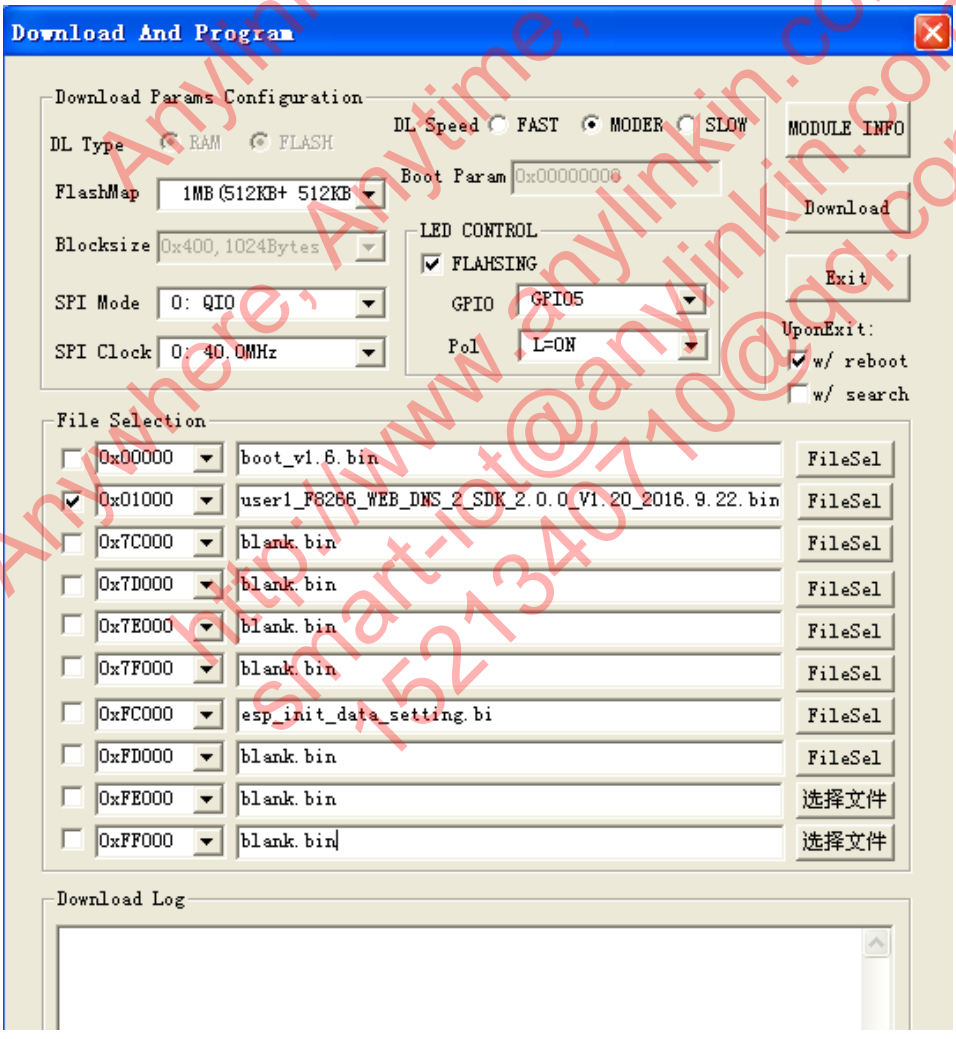
TABEL OF CONTENTS

1. DESCRIPTIONS

The F8266WIFI®-WEB+DNS is a firmware for ESP8266 modules accommodating an on-module HTTP WEB server and an on-module Local Domain System that users could customize. From the WEB user interface, users could perform many operations within or via the ESP8266 modules, such as query, control, and communication.

2. IMAGE TYPE AND BURNING

Although only a small 1Mbytes of SPI Flash with Flash Map = 2 (that is 512KB+512KB) will be required for the image, images with different types of Flash Map are also available upon request. Different Flash Map may introduce different flash burning. Please refer to Espressif SDK user manual for details. Here below is an example to burn an image of Flash Map = 2.

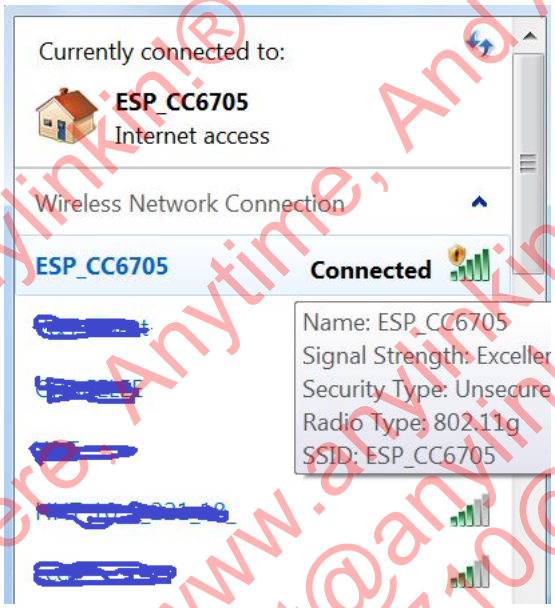


3. OPERATIONS FROM WEB USER INTERFACE

3.1 OPEN THE SERVER

Step 1 Power on the ESP8266 Module which has been burnt with the firmware image, and Connect a STA to the AP with the AP SSID.

Notes 1: If you have not configured the AP parameters before, the default AP SSID is ESP_XXXXXX, where the XXXXXX is the last 6 digits of the MAC address. See below picture as an example.



The Default AP SSID could be changed from default by user. Please refer to 3.3.2 WIFI AP QUERY AND CONFIGURATION PAGE for details.

Step 2 Open a browser in the STA to access the on-module WEB server in the ESP8266 AP by input *http://[AP's IP or AP's DNS name]*

Notes 1: If you have not configured the AP parameters before, the default AP's IP Address is 192.168.4.1. That is, you could input http://192.168.4.1 in the browser URL address to access the home page of the on-module web server.

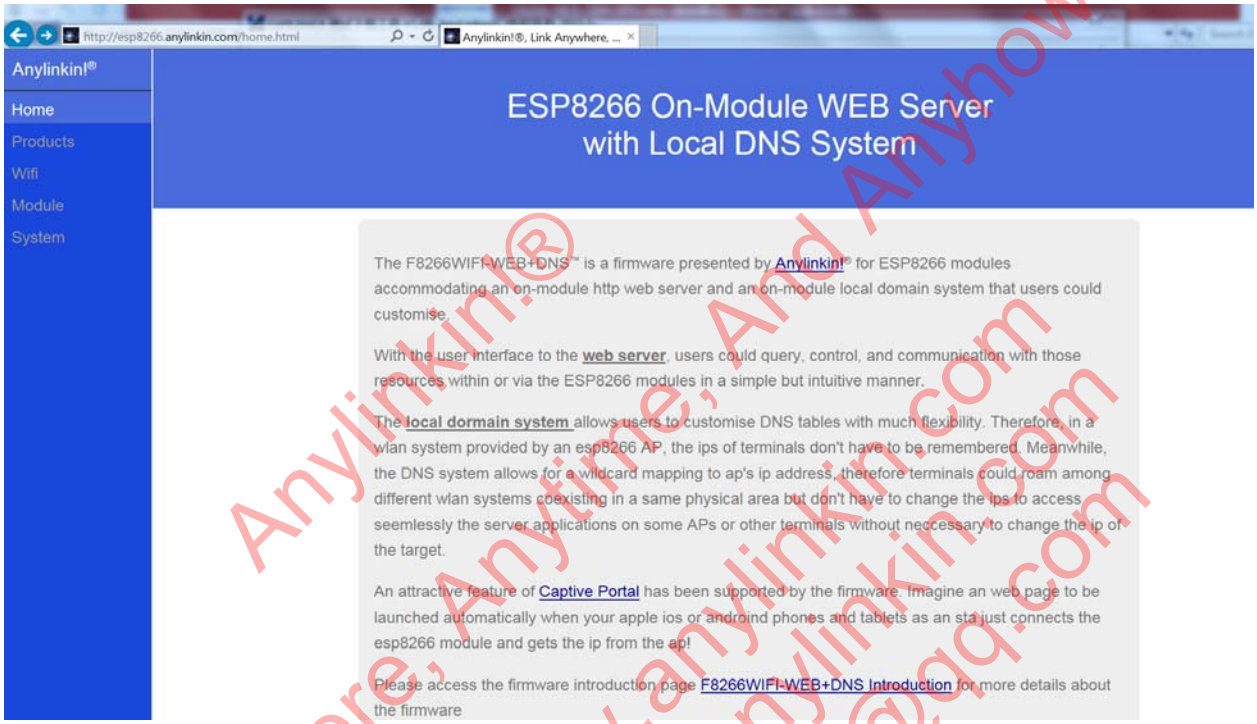
The Default AP's IP Address could be changed from default by user. Please refer to 3.3.2 WIFI AP QUERY AND CONFIGURATION PAGE for details.

Notes 2: If you have not configured the Local DNS system before, there is a default AP DNS Name which is esp8266.anylinkin.com. That is, you could input http://esp8266.anylinkin.com in the browser URL address to access the

home page of the on-module web server.

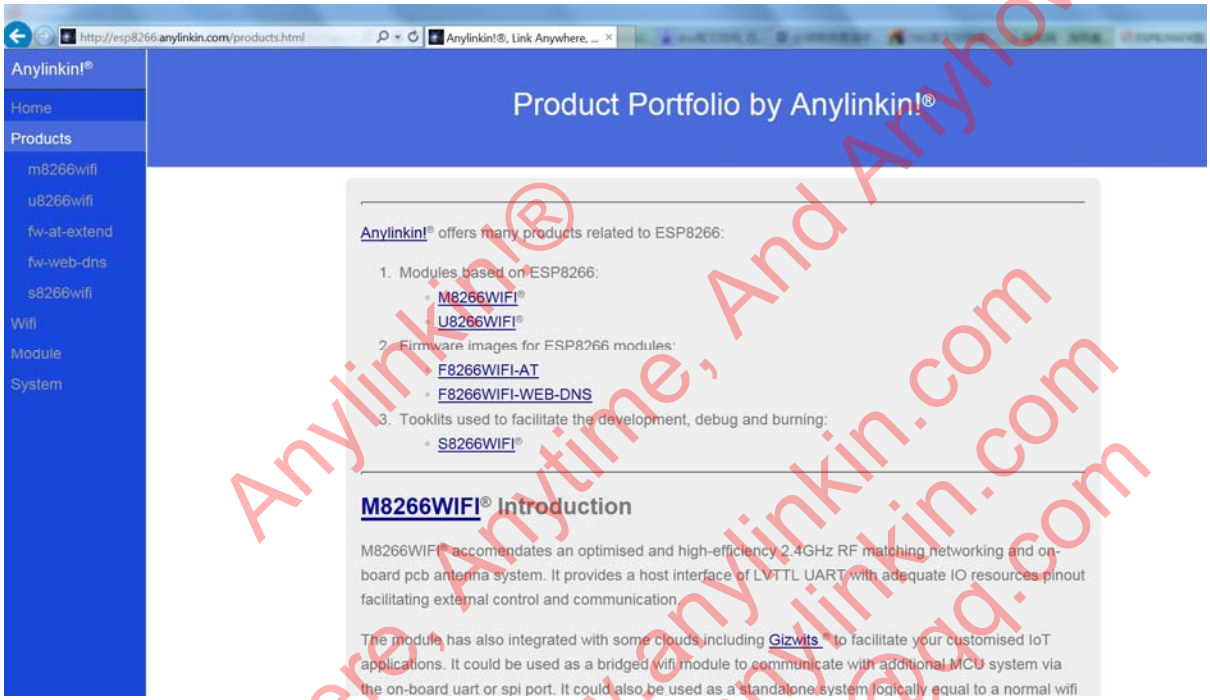
The Default AP DNS Name could be changed from default by user. Please refer to 3.3.2 WIFI AP QUERY AND CONFIGURATION PAGE for details.

Step 3 The home page of the web server comes out as below



3.2 PRODUCTS INFORMATION

If you would feel interested with parts of products presented by Anylinkin®, just press the "*Products*" from the left frame area, the Product Portfolio page will be launched out as below. Be kindly reminded that the features of the web server with local domain system could be found in the page as well.

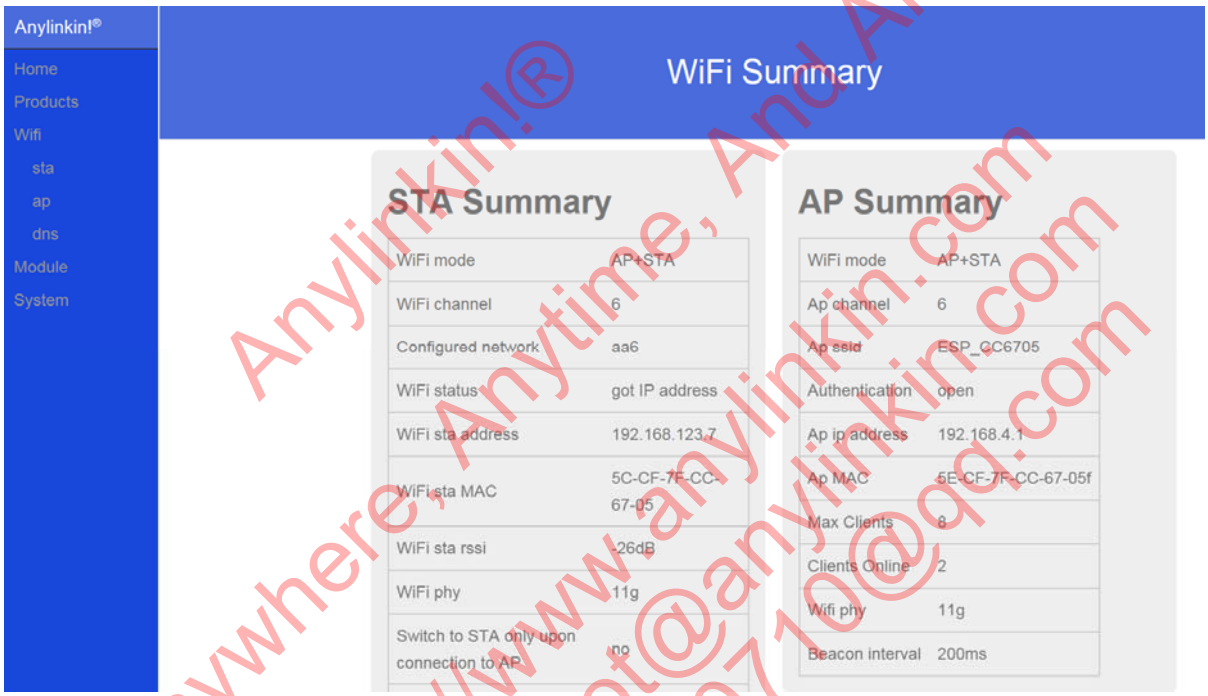


3.3 WIFI OPERATIONS

Wifi operations include wifi information summary, AP and STA configurations.

3.3.1 WIFI SUMMARY PAGE

Press the “Wifi” from the left frame area, the WiFi Summary page will be launched out as below. Two columns is listed, one for the information of STA mode of the ESP8266 module, and the other for AP.



3.3.1.1 WIFI SUMMARY - STA

3.3.1.2 WIFI SUMMARY - AP

3.3.2 WIFI AP QUERY AND CONFIGURATION PAGE

Press the "*ap*" under the "*Wifi*" from the left frame area, the AP Configuration page will be launched out as below.

The current configuration of AP mode has been displayed in the left and the connected STA clients are listed in the right. There are two clients connecting to the ESP8266 AP in this example, which are the laptop and mobile we used for testing now.

Change the values in the left table, and press Set, the AP parameters could be updated and valid at once and saved inside the ESP8266 module which could be loaded next time upon boot-up. Here, you may change the authentication, SSID, password, AP' IP, Channel, etc.

Kindly reminded that, since ESP8266 share the RF channel for both AP and STA when in STA+AP mode and STA's channel predominate the AP's one, therefore when the module connects to other AP or router(which means that the channel has been selected), the AP channel will be the same with STA channel and can't be set. However, your setting value

will still be saved into the Flash of the ESP8266 module and be loaded next time.

3.3.3 WIFI STA QUERY AND CONFIGURATION PAGE

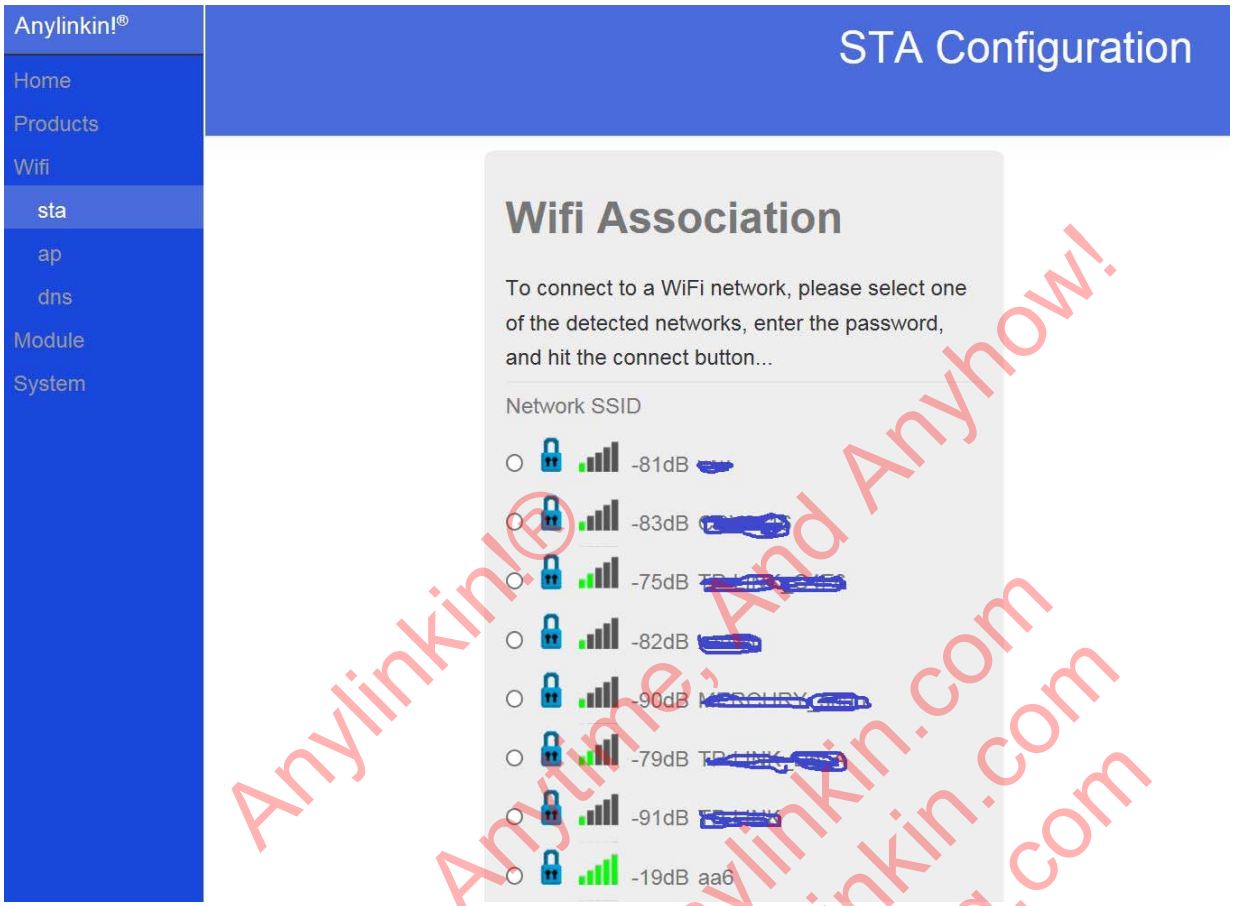
In the 3.3.2 WIFI AP QUERY AND CONFIGURATION PAGE, we connect our laptop or mobile to the web server via the AP IP address (or domain name) when the ESP8266 functions as the AP. If you expect to access the on-module web server via the STA IP address of the ESP8266 module, you will have to connect the ESP8266 as an STA to another AP or router at first. Meanwhile, you will have to connect the laptop or mobile to that AP or router as well so that they are in a same WLAN with the ESP8266 module.

Press the "*sta*" under the "*Wifi*" from the left frame area, the STA Configuration page will be launched out as below.

3.3.3.1 AP SCANNING

Initially, the ESP8266 module of STA mode will start to scan the Aps nearby and the page will be displayed as below which indicating the module is scanning Aps nearby.

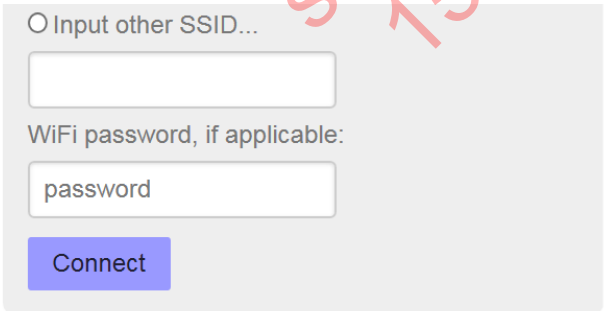
Once the scanning gets completed, the APs scanned will be listed as below



Kindly noticed that there is an AP called "*aa6*", which is the testing router we are using and to which the ESP8266 module in AP+STA mode has connected as an STA.

3.3.3.2 SELECT AP OR INPUT AP INFO TO CONNECT

In the bottom of the scanned ap list, there are additional two input Editboxes of SSID and password. In order to connecting the ESP8266 module in STA mode to an AP, you may select one the the scanned Aps, or you may input other SSID in the SSID EditBox. And input the password in the password EditBox, then hit the button *Connect* to connect ESP8266 module to the selected APs or routers.

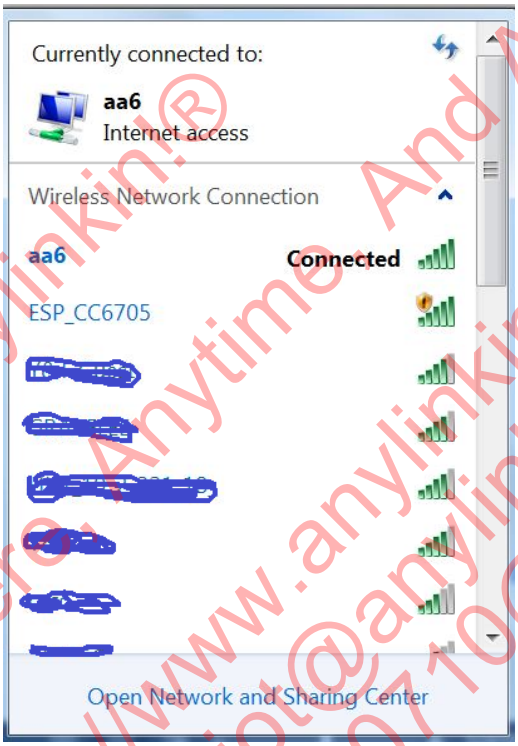


OK, if the ESP8266 module as an STA has connected to another AP or routers and gets an valid IP, it will be displayed in the summary 3.3.1 WIFI SUMMARY PAGE. Write down

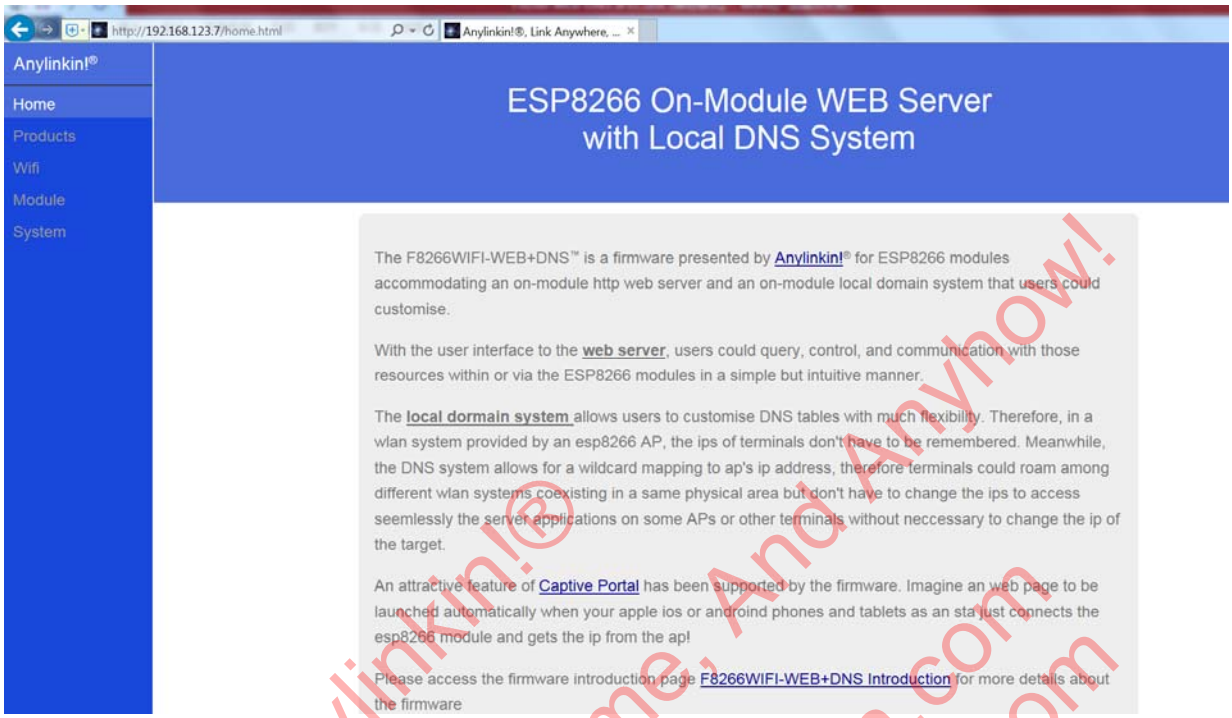
the STA IP address of the module, which will be used to access the web server later. In the snapshot of the example, the ESP8266 as an SAT has joined the WLAN of "*aa6*" and gets an ip of "*192.168.123.7*". We will use this STA IP to access the ESP8266 on-module web server next.

3.3.3.3 ACCESS THE WEB SERVER VIA ESP8266 STA MODE

Before that, we need change the testing laotop and mobile to connect the router "*aa6*" at first, so that the testing laptop, mobile, and the ESP8266 module of STA mode will be in the same WLAN.



Then input http://192.168.123.7 (i.e. the STA IP Address got from the router) into the address bar of your browser and web page as below will be displayed



Yes, the home page comes out which means that we connect to the on-module web server via the router of "*aa6*" successfully. Via the STA mode or AP mode to go ahead with following operations make no much difference. And we will go back with operations via the ESP8266 AP mode.

3.3.4 LOCAL DNS QUERY AND CONFIGURATION PAGE

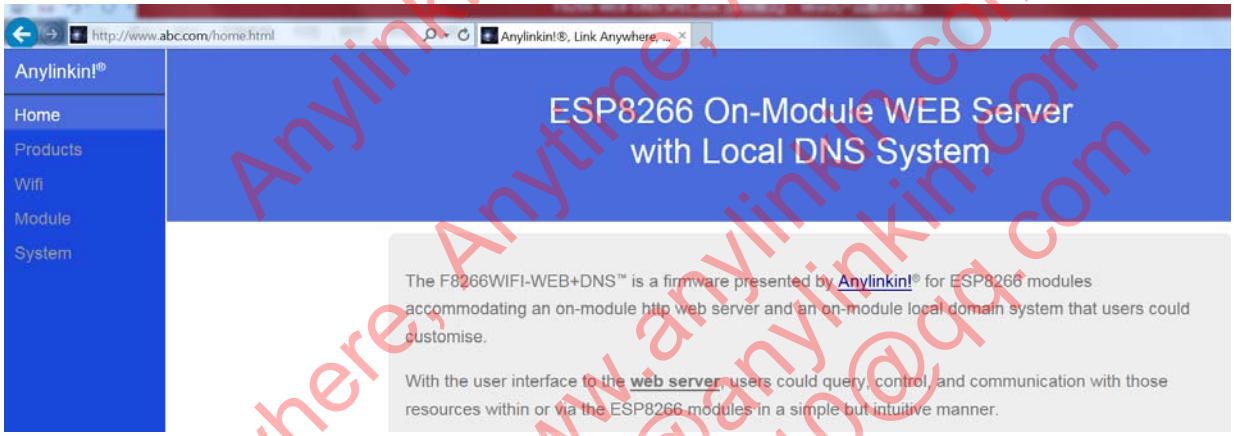
Press the "*dns*" under the "*Wifi*" from the left frame area, the DNS Configuration page will be launched out as below.

Yes, you will find that there is already a pair of domain name="*esp8266.anylinkin.com*" and ip="*ap*", which is the default initial value built into the firmware, which would be useful when you don't know the module AP's IP address. You could access the on-module web server via the same domain name even when the AP's IP address has been changed. Sure, you could change, add, or remove the values here as well.

3.3.4.1 CUSTOMIZE LOCAL DNS SYSTEM

As an example, we remove the domain name "*esp8266.anylinkin.com*" but add two customized domain records as below. Input the value and press "*Set*":

Now access the http://www.abc.com and you may find that the home page comes out which means that the just-added domain name has been validated by our on-module local DNS system:



Reboot the ESP8266 module and then browse the DNS page and you will find that the updated values are kept.

3.3.4.2 RULES TO CUSTOMIZE LOCAL DNS SYSTEM

Also kindly noticed that:

- The record in a row is invalid when the name field in that row is blank.
- However, if the name field is not blank while the ip field is blank or filled with "ap", then the domain name will be parsed as the AP's IP address of the ESP8266 module.

  This feature would be helpful. In many case the module AP IP address may not be fixed or predefined or unique the same. For example, your system may have several AP provided the ESP8266 modules and STAs are grouped to connect different APs for purpose and the AP IP address should be different. However, you expect to access different web server in different WLAN without need to change the AP IP address when a STA roams. You may define a same domain name which will parse to the

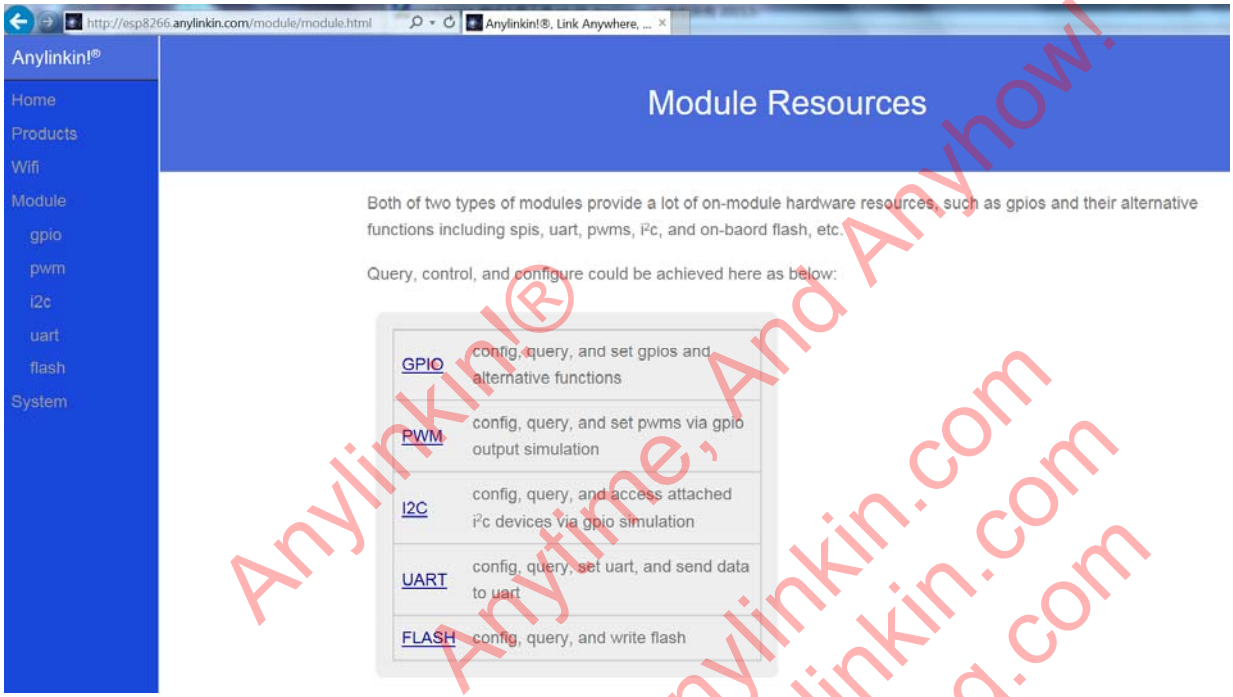
corresponding AP' IP address (by inputting "*AP*" in the ip field) in each ESP8266 modules which provides the WLANs, then the STA will automatically connecting the web server via the corresponding AP's IP address upon roaming.

Now try to access the http://esp8266.anylinkin.com again, you will get a failure page notice since the esp8266.anylinkin,com has been removed. (kindly reminded that some buffers of dns data in the testing laptop may delay to be flushed and possible you may have to reboot the laptop or mobile to ensure the previously successful domain records to be invalid:p).

The local domain system are not definitely be used under the ESP8266 AP mode, or only related to the AP's IP address. Like the web server, it could be valid when the ESP8266 module is in STA mode. And we could access the on-module DNS system via the STA IP address of the module as well. However, if you uses the ESP8266 module in STA mode, then, you may have to set the DNS searching address of those STAs who uses the domain system to the STA IP address of the ESP8266 module who contains the DNS system. Normally this setting should be added inside another APs or routers to which the ESP8266 module of STA mode, and STAs connected. Since in most case STAs will get the DNS search ip address from the AP including the AP's IP address, therefore when to access the local dns system on ESP8266 module in AP mode, you don't have to set the DNS searching address in your STA.

3.4 MODULE RESOUCES OPERATIONS

3.4.1 MODULE RESOUCES ENTRY PAGE



3.4.2 GPIO OPERATIONS

3.4.3 PWM OPERATIONS

3.4.4 I2C OPERATIONS

3.4.5 UART OPERATIONS

3.5 SYSTEM OPERATIONS

ORDERING INFORMATION

F 8266 WEB+DNS -2 -SDK2.0.0 V1.20 2016.9.22

SDK, FW Ver and Build Time

Flash Map Built
- 2: 1MB(512KB+512KB)
- 3: 2MB(512KB+1536KB)
- 4: 2MB(1024KB+1024KB)
- 5: 4MB(512KB+3584KB)
- 6: 4MB(1024KB+3072KB)

Feature type
- AT: AT Command
- WEB: WEB SERVER
- DNS: Local DNS System

Identification code

Anylinkin!® Product Type
- F: FIRMWARE

·Purchase

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http://www.ebay.com/itm/282191379273

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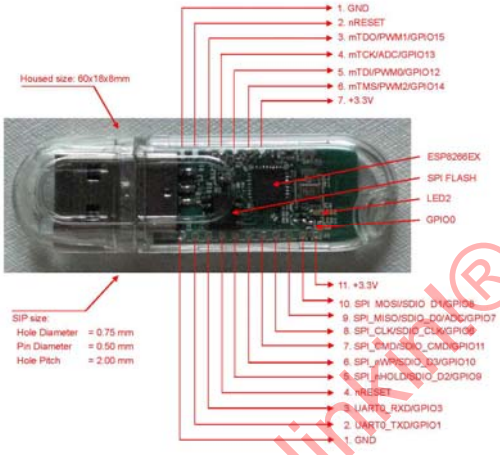
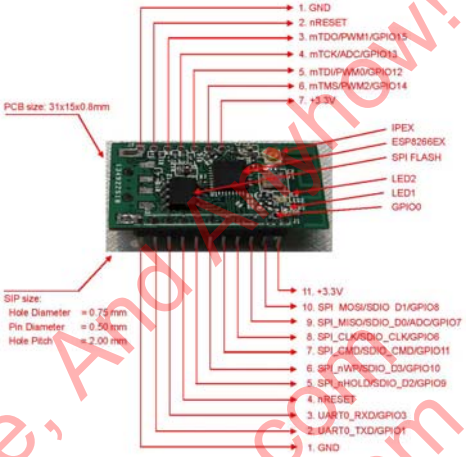
Welcome to use the customized One-Press-Programming USB WIFI modules and the debug and download toolkit, which bring about much conveniences redevelopment and burning. Modules could be purchased from the below URLs and more detailed specifications could be provided upon request.

ESP8266EX Module, USB Connector



ESP8266EX Module, SIP Connector



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