

FPGA TECH SOLUTION

SOLUTION AHEAD

Wi-Fi Trainer Peripheral Control

Wi-Fi Trainer User Manual

Download all Source code from following link

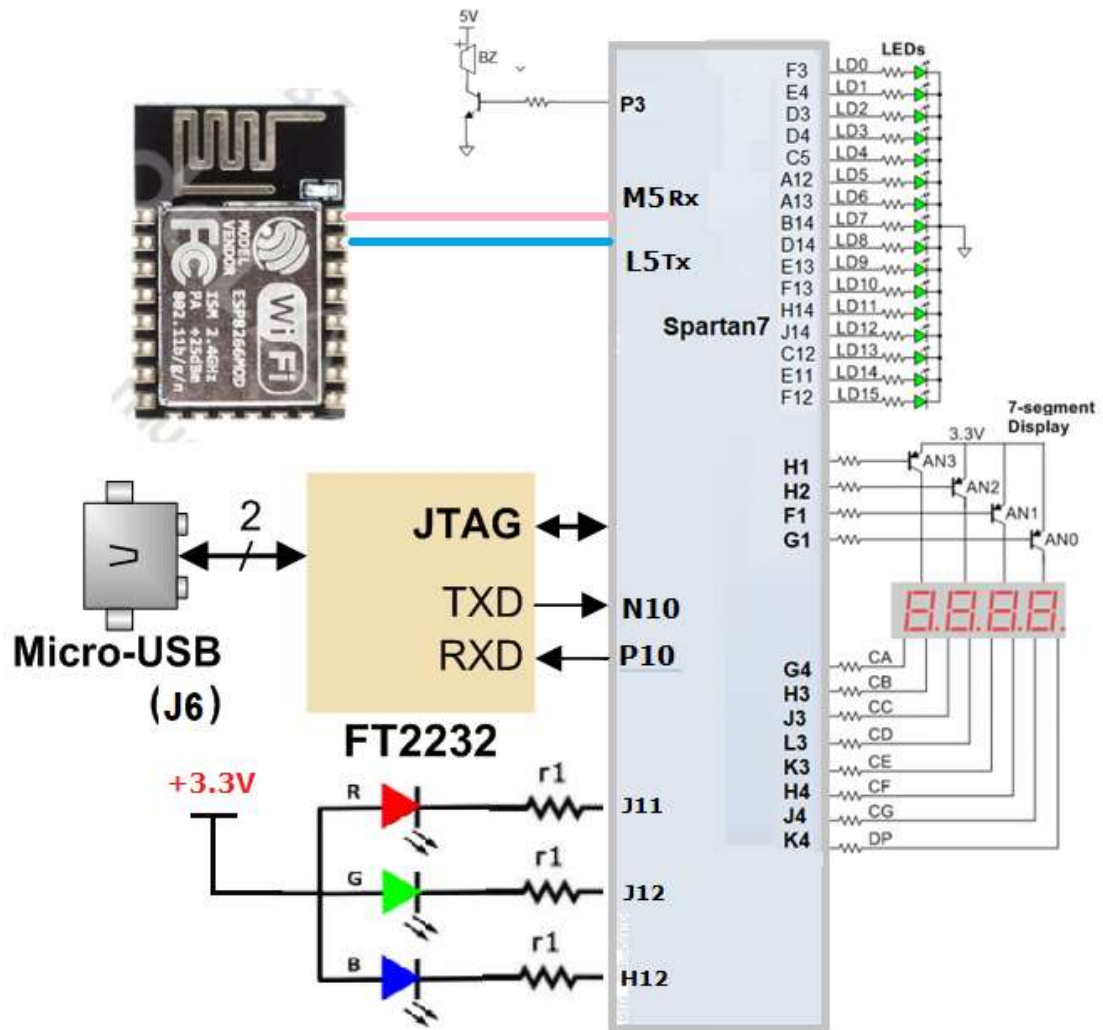
<https://github.com/fpgatechsolution/PINE-S7/tree/main/esp8266%20IO%20control>

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Introduction

With this manual let's understand how to interface ESP12E module
With PINE S7 and control multiple peripheral with all [source code](#).

For connection of esp12E with FPGA board see following figure



AT Commands required for web server

- 1) Ensure AT commands are received correctly (the AT seems not to be case sensitive but the rest of any command is case sensitive):

Command : AT

Response : OK

- 2) Enable the module to act as both a “Station” and an “Access Point”

Command : AT+CWMODE=1

Response : OK

- 3) List surrounding WiFi networks.

Command : AT+CWLAP

Response : You should get a response like:

+CWLAP:(3,"Cherry",-25,"e0:2c:b2:c6:91:ab",6,40)

+CWLAP:(3,"FPGATECHSOLUTION",-37,"62:f0:34:72:6f:6e",11,123,0)

- 4) Join a suitable WiFi access point:

Command: AT+CWJAP="<access_point_name>","<password>"

Response:

WIFI CONNECTED

WIFI GOT IP

For example, with the above list of access points you might use:

AT+CWJAP= "FPGATECHSOLUTION","FPGATECH"

- 5) Check if the module has been allocated a IP address

Command : AT+CIFSR

Response :You should get your current IP address in response like below

+CIFSR:STAIP,"192.168.43.212"

+CIFSR:STAMAC,"2c:3a:e8:0e:f1:87"

Note: STAIP is important for us as we are using the same address from the remote location to access the ESP8266. Please note down the STAIP.

- 6) You can enable the module to accept TCP connections (i.e. act as a server) in the following manner. Enable multiple connections by sending command.

Command : AT+CIPMUX=1

Response : OK

- 7) Set the module to listen (first parameter, mode is set to 1) for a connection on a specific port (in this case 80)

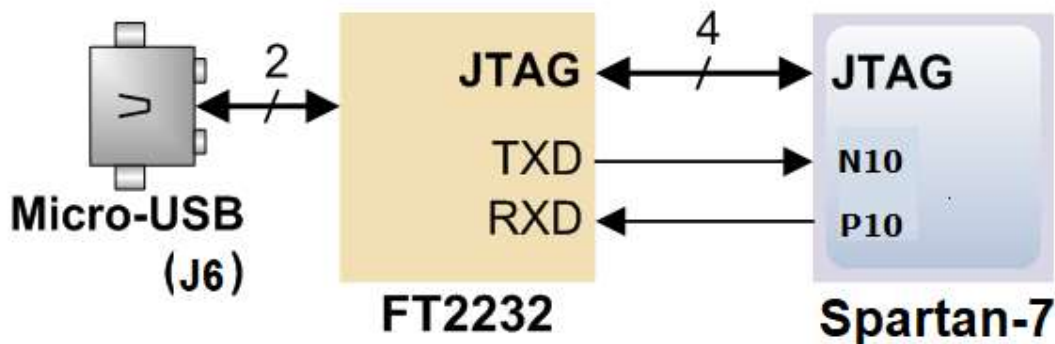
Command : AT+CIPSERVER=1,80

Response : OK

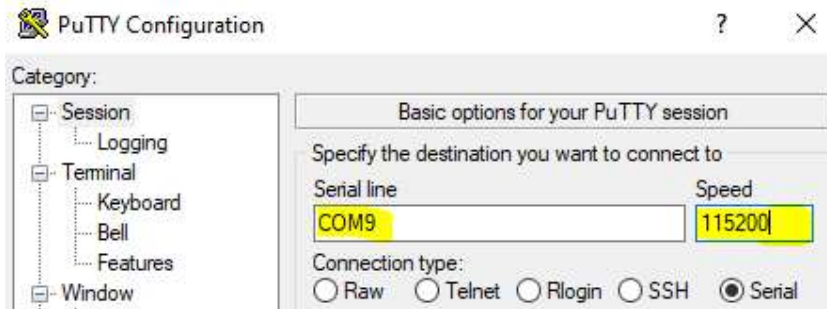
- 8) ESP8266 is ready to accept the connection, Now open peripheral.control.html in chrome, that will looks like as following

With this we can control general purpose LED, Buzzer & RGB LED on board

The **PINE S7** board have USB interface using device FT2232HL from FTDI. This act as USB to UART converter so that Communication with FPGA can accomplished by USB port.

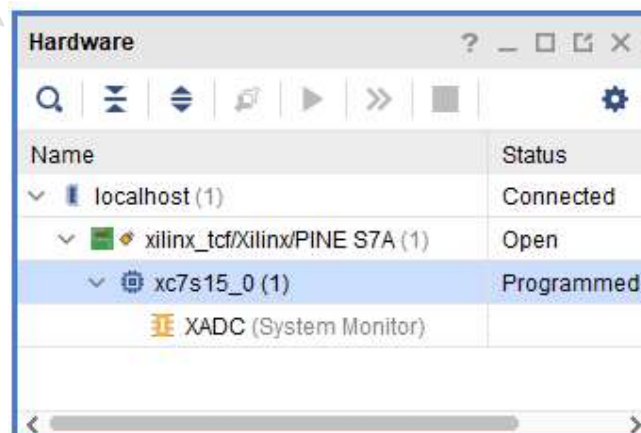


Now connect USB cable to PINE S7 Board and open UART terminal with 115200 baud rate



On this serial terminal we can see AT commands sent to ESP8266 and also response for those AT commands

Program wifi_top.bit file in PINE S7 board then all things will done automatically



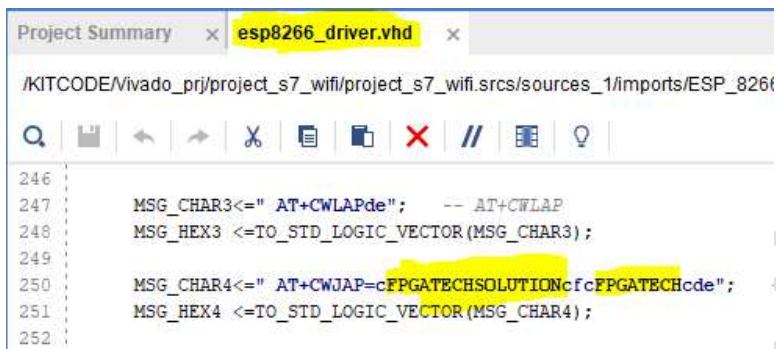
Detail source code can be download from [here](#).

To test using existing wifi_top.bit file you must set your

WiFi Name : **FPGATECHSOLUTION**

WiFi Password : **FPGATECH**

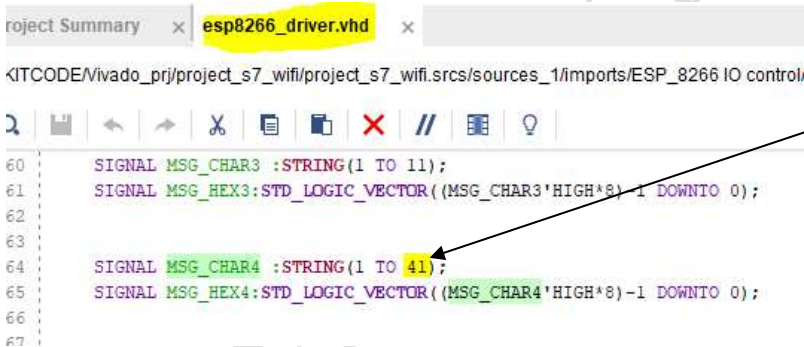
OR you can change WiFi name & password in code and generate new bit file



```

246
247 MSG_CHAR3<=" AT+CWLAPde";  -- AT+CWLAP
248 MSG_HEX3 <=TO_STD_LOGIC_VECTOR(MSG_CHAR3);
249
250 MSG_CHAR4<=" AT+CWJAP=cFPGATECHSOLUTIONcfcFPGATECHcde";
251 MSG_HEX4 <=TO_STD_LOGIC_VECTOR(MSG_CHAR4);
252

```



```

60 SIGNAL MSG_CHAR3 :STRING(1 TO 11);
61 SIGNAL MSG_HEX3:STD_LOGIC_VECTOR((MSG_CHAR3'HIGH*8)-1 DOWNT0 0);
62
63
64 SIGNAL MSG_CHAR4 :STRING(1 TO 41);
65 SIGNAL MSG_HEX4:STD_LOGIC_VECTOR((MSG_CHAR4'HIGH*8)-1 DOWNT0 0);
66
67

```

Change this number as per total
number or character assigned to
MSG_CHAR4

Serial terminal output we can see AT commands sent to ESP8266 and also response for those AT commands

```

ready

AT
OK

AT+CWMODE=1
OK

WIFI DISCONNECT

AT+CWLAP
+CWLAP:(0,"BADG-Z29kc2dpZnRhmhpamVldA",-88,"dc:e8:38:06:d0:0a",6,103,0)
+CWLAP:(3,"FPGATECHSOLUTION",-55,"a6:9f:2e:2d:e7:46",11,115,0)
OK

AT+CWJAP="FPGATECHSOLUTION","FPGATECH"
WIFI CONNECTED
WIFI GOT IP
OK

AT+CIFSR
+CIFSR:STAIP,"192.168.43.212" ← use this ip address in peripheral control.html
+CIFSR:STAMAC,"2c:3a:e8:0e:f1:87"

OK

AT+CIPMUX=1
OK

AT+CIPSERVER=1,80
OK

0,CONNECT




+IPD,0,293:GET /?PIN=011 HTTP/1.1
Host: 192.168.43.212
Connection: keep-alive
Accept: */*
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko)
Chrome/80.0.3987.163 Safari/537.36
Origin: null
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9

AT+CIPCLOSE=0
0,CLOSED

OK

```

Open **peripheral control.html** with test editor

GIT > PINE-S7 > esp8266 IO control > html				
<input type="checkbox"/> Name	Date modified	Type	Size	
 jquery.min.js	4/18/2020 9:30 PM	JavaScript File	83 KB	
 New Text Document.txt	4/18/2020 10:25 PM	Text Document	1 KB	
 peripheral control.html	1/24/2021 10:30 PM	Chrome HTML Do...	3 KB	


```

54
55 <!--button id="XXX" class="led">Toggle Pin XXX</button> <!-- button
56 <script src="jquery.min.js"></script>
57 <script type="text/javascript">
58 $(document).ready(function() {
59     $(".led").click(function() {
60         var p = $(this).attr('id'); // get id value (i.e. pin13)
61         // send HTTP GET request to the IP address with the pin
62         $.get("http://192.168.43.51:80/", {PIN:p}); // execute
63     });
64 });
65 </script>

```

Now Just modify ip address you see in serial terminal

```

WIFI GOT IP
OK

```

```

AT+CIFSR
+CIFSR:STAIP,"192.168.43.212"
+CIFSR:STAMAC,"2c:3a:e8:0e:f1:87"
OK

```

use this ip address in
peripheral control.html

Then close **peripheral control.html** file from test editor and now open **peripheral control.html** file with chrome browser, this will look like following

Note: laptop & esp12e must be connected with same WiFi

Welcome to FPGATECHSOLUTION

Toggle GP LED

Toggle BUZZER

Toggle RGB LED

Toggle SEVEN SEGMENT

WhatsApp Support for all FPGA related activity

WhatsApp +919665889991

If you click on button in above window respective peripheral will toggle



www.ipgatechsolutions.com