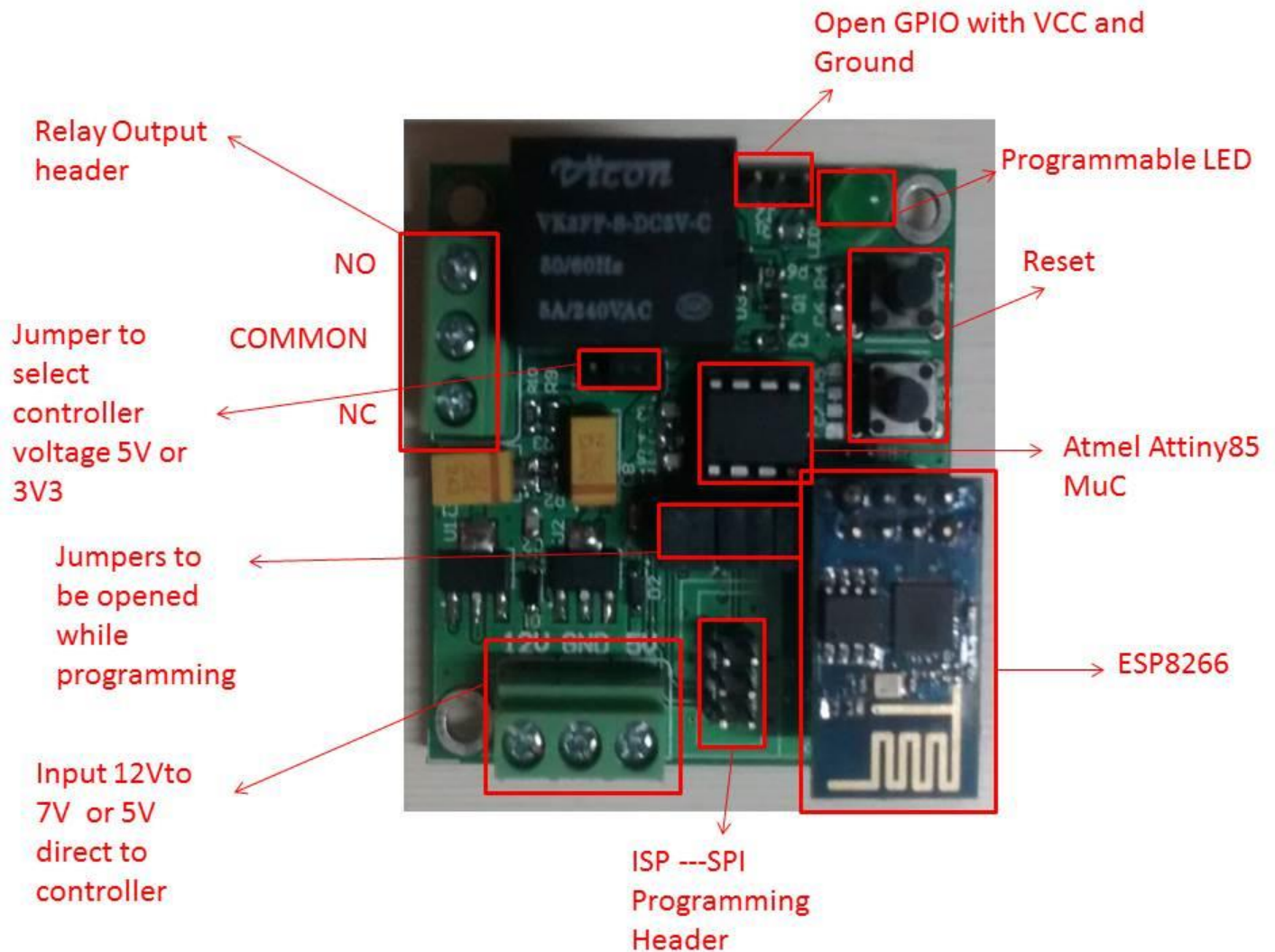# WiFi Arduino 85

A board with Esp8266 & Attiny 85

The Wifi Arduino 85 is a small board with ESP8266 -01 module, Attiny85 micro controller and a relay. It Also has and additional header for connecting an external relay or to connect sensors like PIR, IR etc depending on your application. If you are a tinkerer you will also be able to connect a HC-05/06 Bluetooth module and convert this board to a Bluetooth Arduino 85 board

ESP8266 -01 PIN Diagram and Firmware updating(Not required for the module provided with Wifi Arduino 85) :
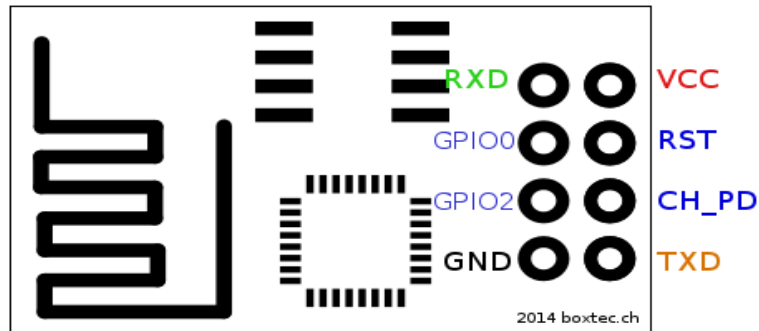
Figure 1.0:PIN DIAGRAM ESP8266-01 MODULE

The pin diagram of esp8266 is shown above in fig 1.0

If you wish to upgrade the firmware the below table will give you some idea

Pin ⬍	Description ⬍
VCC, GND*	power supply, better use a standalone, and share ground with uart port
TXD, RXD**	uart interface
RST	Restart on low TTL
CH_PD	Chip select on high TTL, should be set for both mode
GPIO0	set to low TTL for flash mode
GPIO 15	should be low TTL on start
GPIO 2	should be high TTL on start
LEDs	Red keeps constants on to show the power status, and Blue for module status, it's flashing once when module boot

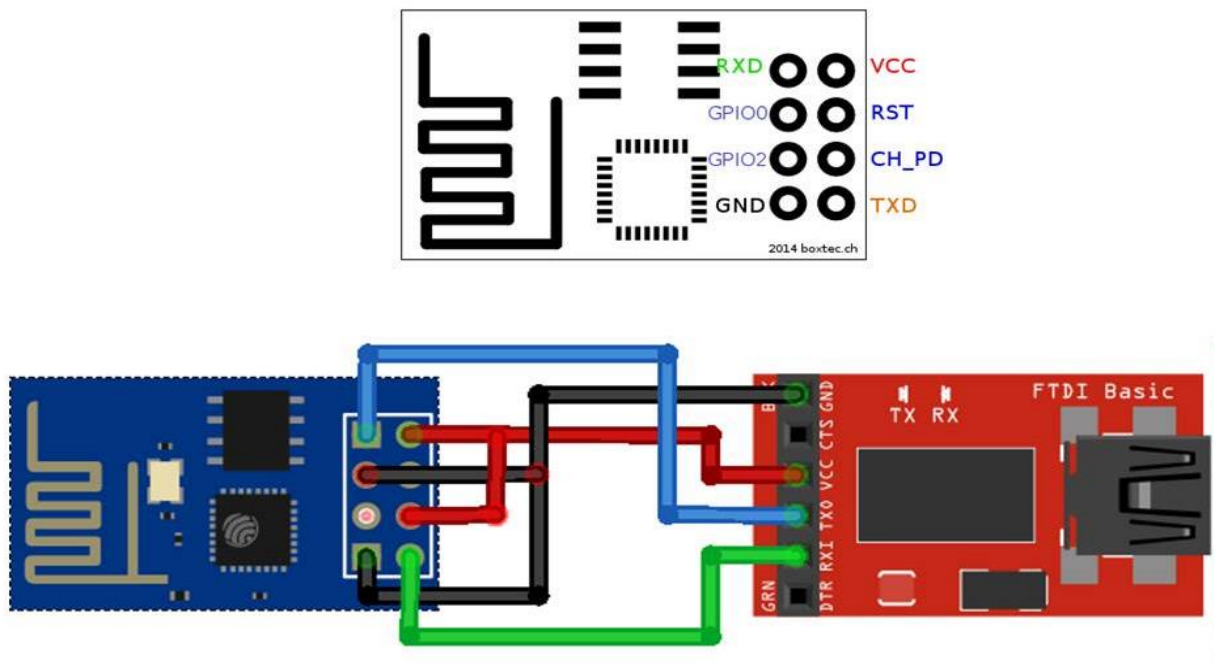The image below shows how one can make the connections to update esp module

Figure 1.1:ESP8266-01 MODULE FIRMWARE UPDATE CONNECTION

First of all arrange your esp and ftdi(USB-UART) and connect them as shown above(Fig 1.1)

The esp8266 firmware flasher and binary can be downloaded <u>here</u>

You can use this firmware v0.9.2.2 AT Firmware.bin

Use a low numbered COM port , 6 or less, you can change this in the device manager if needed, in windows handling comports about COM10 is slightly different so a lot of software won't do it

Power on the esp8266 with serial at **4800(for the module with Wifi Arduino 85**, generally it will be 115kbps for other modules)
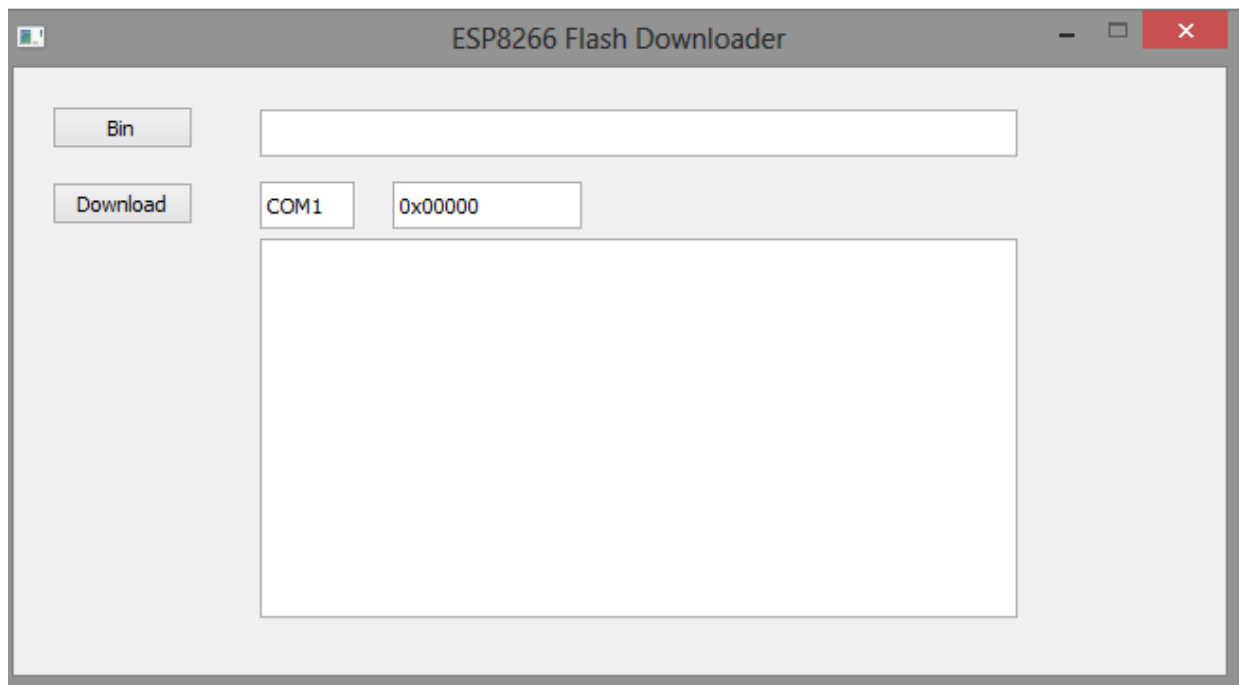

Figure 1.2:FLASH TOOL LOADER

Run the flash tool it will look something link the fig above, load the binary change the COM port to match, leave the second number (offset) at 0x0000)

Hit download, should see this, I've always gotten the last warning.

connecting ....

Erasing flash...

Writing at 0x00000000... (0 %)

Writing at 0x00000400... (0 %)

Writing at 0x00000800... (0 %)

Writing at 0x0007e800... (99 %)

Writing at 0x0007ec00... (99 %)

Leaving...

Failed to leave Flash mode

ESP8266 -01 AT command using putty or real term(Not required for the module provided with Wifi Arduino 85 unless you need to connect it to your home router manually):
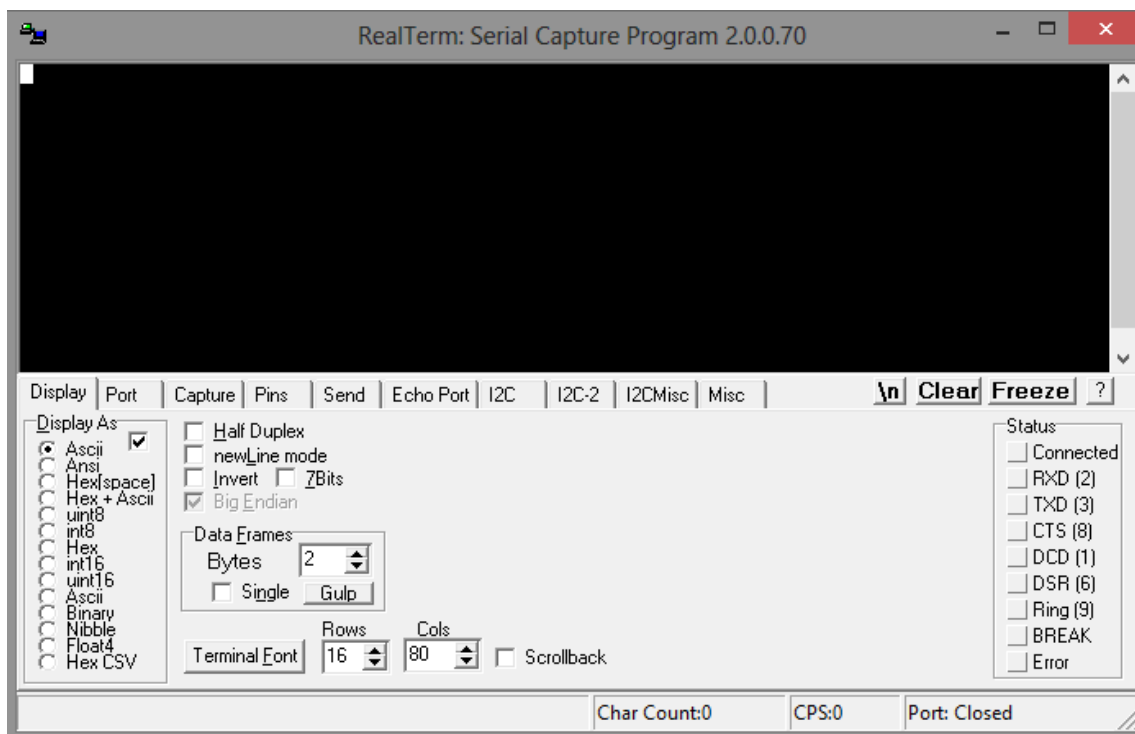

Figure 1.3:REALTERM

After flashing the ESP8266 settings will likely reset to 9600n81, enjoy new baud rates etc!, Turn the module offr **, remove GPIO 0 low make it floating or HIGH** , and restart the module .

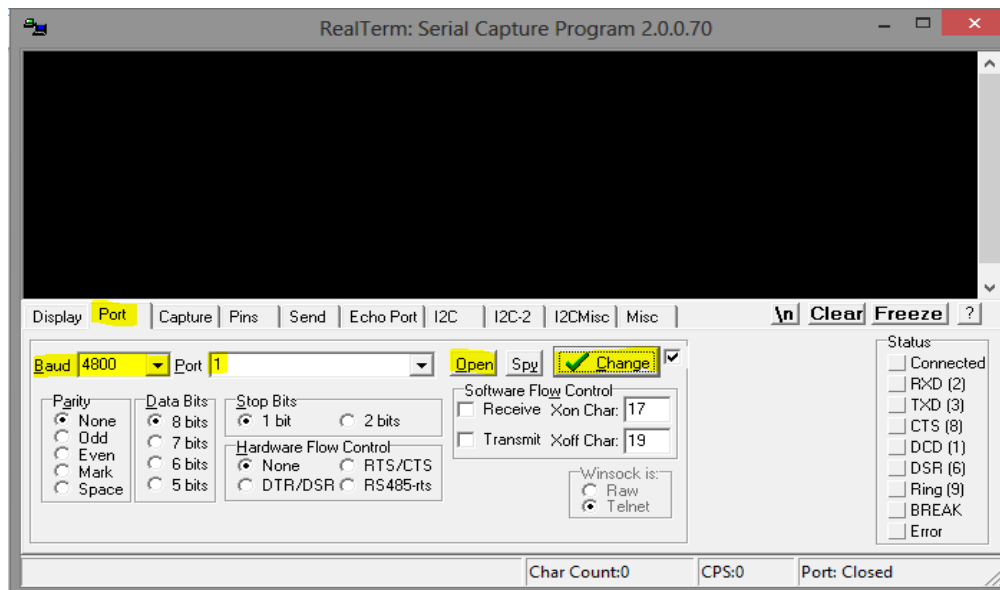Open a serial terminal tool like putty or real term as shown in fig 1.3

Figure 1.4:REALTERM PORT SETTINGS

First set the Baud rate then the port number of the USB-UART module which you can get from device manager in windows then press **Change** and after that press **Open**. You can see figure 1.4 for details.
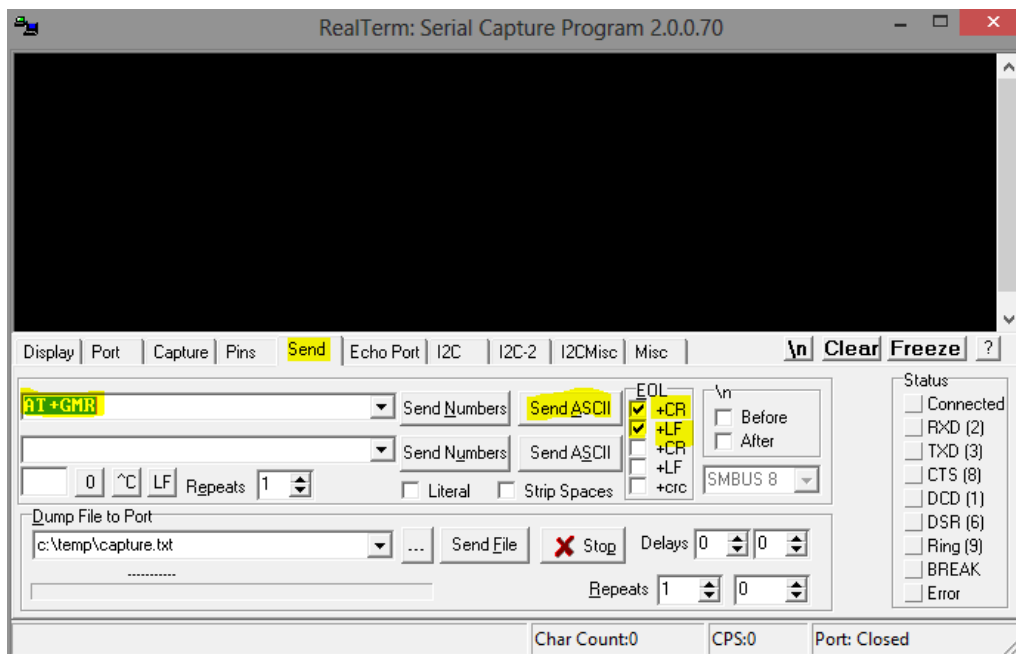

Figure 1.5:REALTERM TO SEND COMMANDS

After that come to Send tab as shown in figure 1.5 type the at command **AT+GMR** and press Send. Please note +CR, +LF should be selected if everything is fine you should get **0018000902** on the black window .You can try other commands like **AT** which will give you **OK** as response. For more details on AT commands refer the data sheet of ESP8266.

Wifi Arduino 85 Board Setting up :

Figure 1.5:Wifi Arduino 85

As mentioned earlier the board comes with EP8266 -01 module as shown in the figure 1.5

Once you plug the module on to its header it will look as shown in figure 1.6
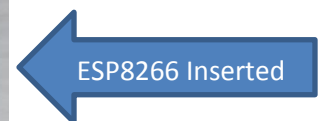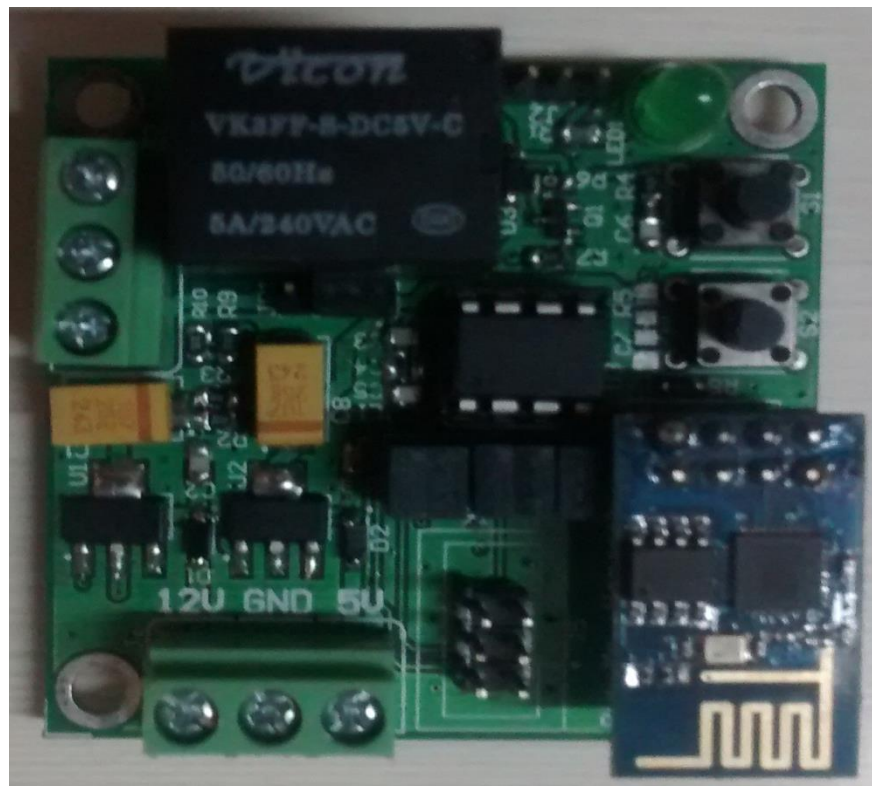

ESP8266 Inserted

Figure 1.6:WIFI ARDUINO 85 WITH ESP8266 -01 MODULE

Once that is done you can power it up using a **12-7 V DC** power supply or a **5V -5.3V DC** Max

Short these two and 3V3 will connected to Attiny 85

Short these two and 5V will directly go to Attiny 85

Jumper to select controller voltage 5V or 3V3

Attiny 85 microcontroller

12V to 7 V input

Common Ground for both 12V ,5V input

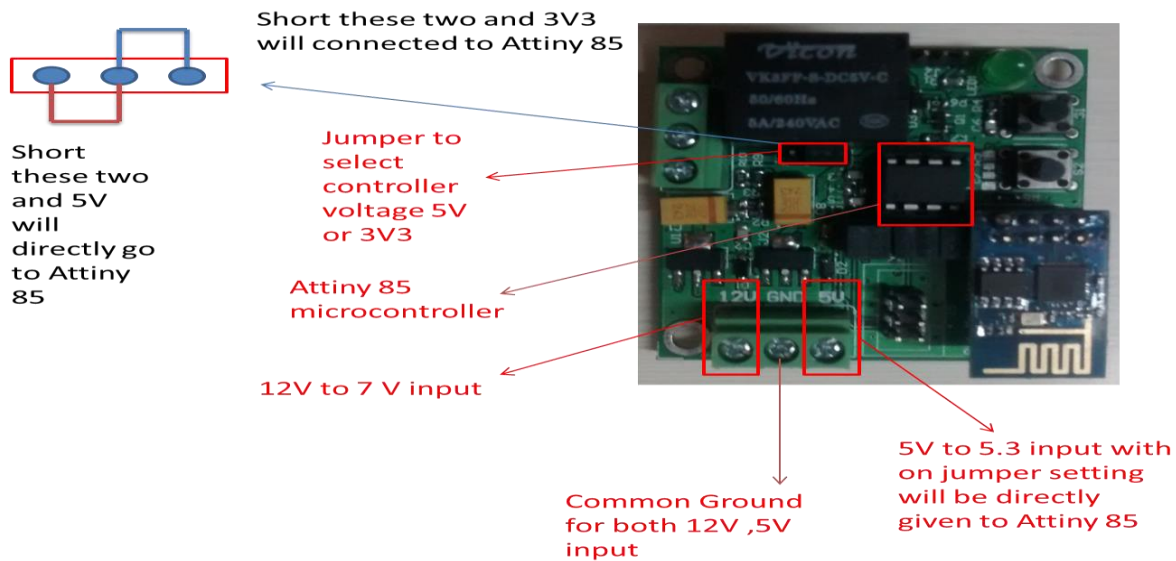5V to 5.3 input with on jumper setting will be directly given to Attiny 85

Figure 1.7:WIFI ARDUINO 85 INPUT POINTS

The figure 1.7 shows the point where one needs to connect the power supply Please do not apply voltage above recommended voltage specially on the 5V input side as on one of the jumper setting shown in figure will be directly connected to the microcontroller.

Once you power the board the green led on the Wifi Arduino 85 should turn ON and the Red colour Led on the ESP8266 module also should turn on .There is also a blue/green colour led on the ESP8266 module which will start blinking, these indications mean every thing is up and good to go. After some time the blue/green colour led will stop blinking this means that the board has initialized .After that go to Wifi connection, select AI-THINKER_986B1A/armtronix(Refer Figure 1.8) .After it connects(Plese remember to turn offyour G,2G,3G internet connection) go to Wifi Arduino app(Refer Figure 1.8) on your android mobile open it and then type 192.168.4.1 in the IP text box and 333 in the port text box and then press connect .
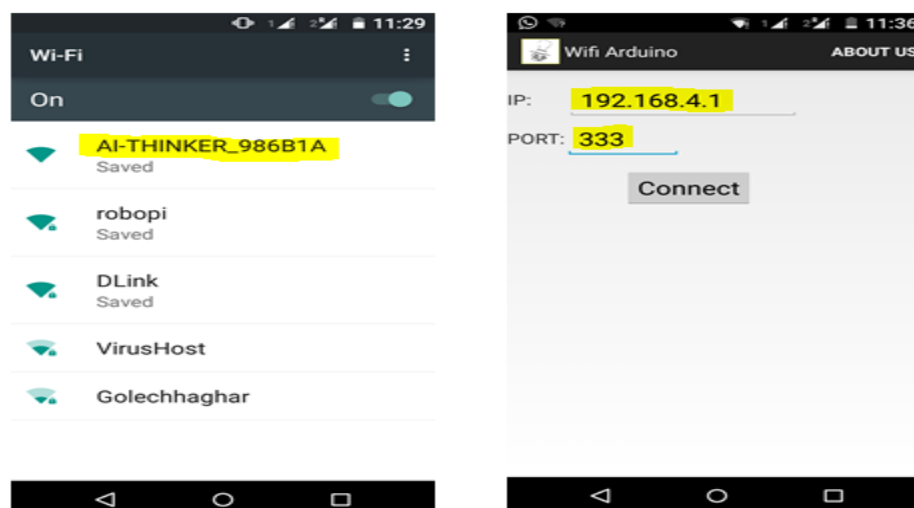

Figure 1.8:WIFI ARDUINO APP CONNECTING TO THE BOARD

Once you do that you will be able to see the following figure 1.9.The description of the app are mention on the figure please try it out. An immediate test to is to press the on/off toggle Relay button .You will be able to hear the relay tick sound every time you press it.
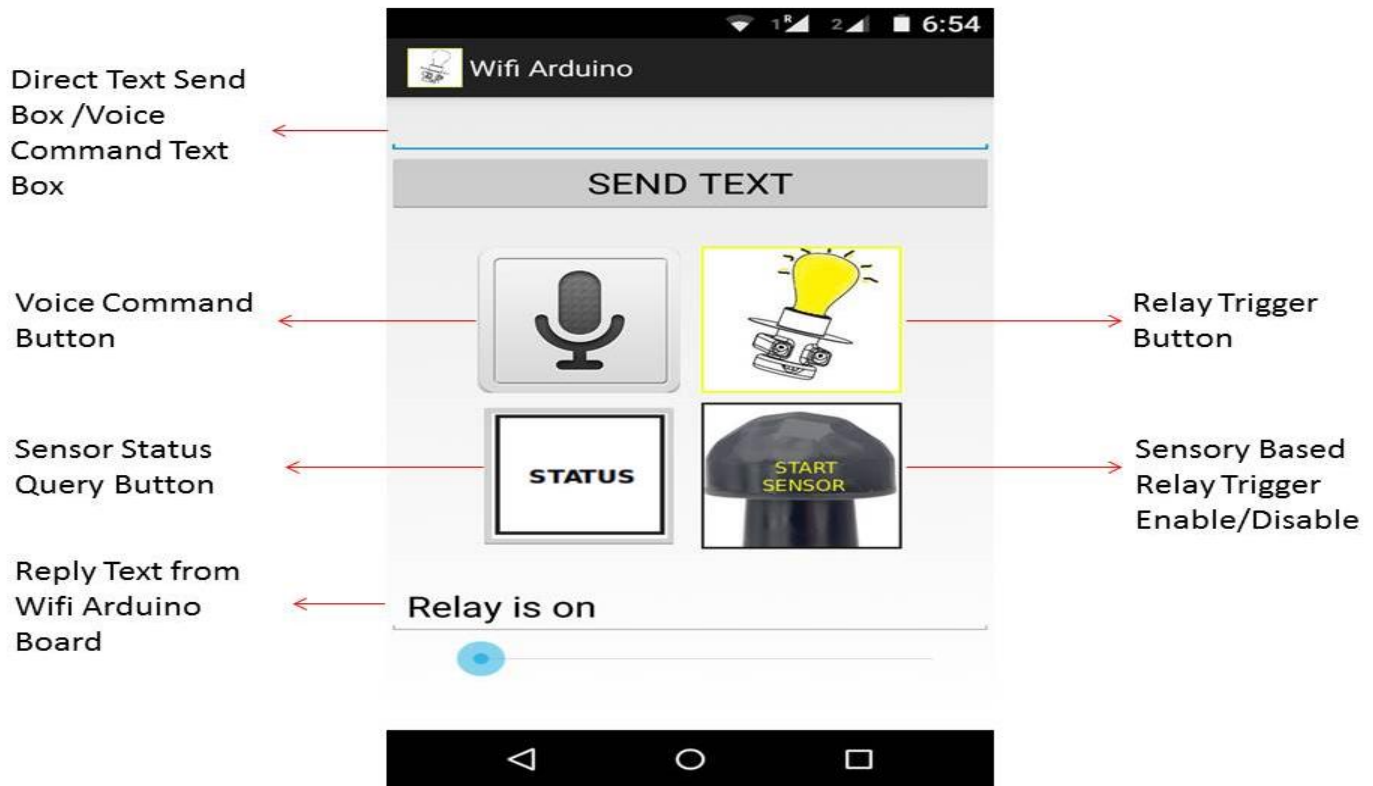

Figure 1.9:WIFI ARDUINO APP DETAILS

Connecting an AC load to Wifi Arduino 85 relay output:

The relay on the board is a 5V DC input to the coil and 220V AC 5A load bearing output .You will have access to both NC(Normally closed) and NO (Normally open)terminal of the relay

Most of us generally use the NO terminal .The figure 1.10 will show you how one can connect a load to the board. Please note to prevent the EMI from disturbing the controller and Wifi module we have provided a varistor which you will need to connect across NO and Common point of the relay (in case you are using NC then across NC and Common) and incase you are connecting inductive loads please make sure you use appropriate snubber circuit across your load. Please note if you are dealing with AC power do not touch the board directly even if you have turned off the AC switch because sometimes the wiring in houses will be reversed meaning phase and neutral interchanged .You can check it by holding a tester across the relay terminal block point to check if there is any AC power before touching the board .
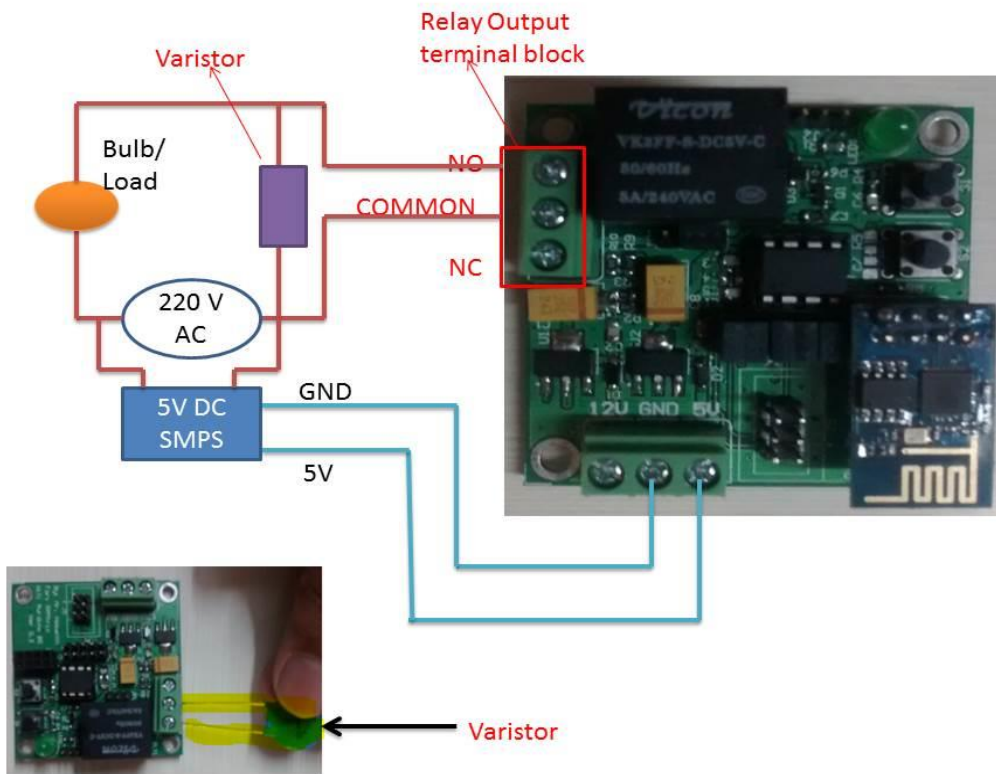
Figure 1.10: CONNECTING LOAD TO THE BOARD

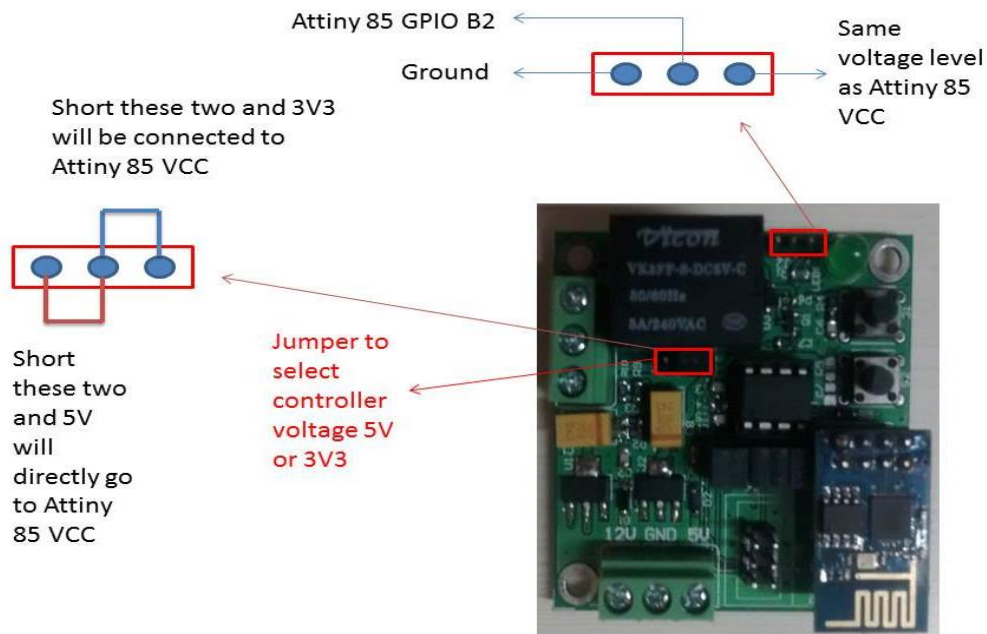**Connecting a sensor or an external relay:**

Figure 1.11: Open GPIO Pin

On the board you will be able to find an open GPIO pin directly from the Attiny 85 controller

Which can be used either as input(default code it is set as input) or output. You will be able to connect sensors like PIR to it .In addition we have also provided a VCC and Ground pin on the same header .The VCC pin will be at the same voltage level as that of the Attiny 85 microcontroller which depends on the previously mentioned jumper selection of VCC voltage to the controller .These things are clearly shown in the figure 1.11 .If you wish to connect an external relay you will be able to connect it through a transistor circuit using the Attiny 85 gpio and by changing the Attiny 85 code. For more details refer the schematics on the last page of this document

Programming Attiny 85 on Wifi Arduino using Arduino UNO:

Figure 1.12:ISP—SPI Programming PIN
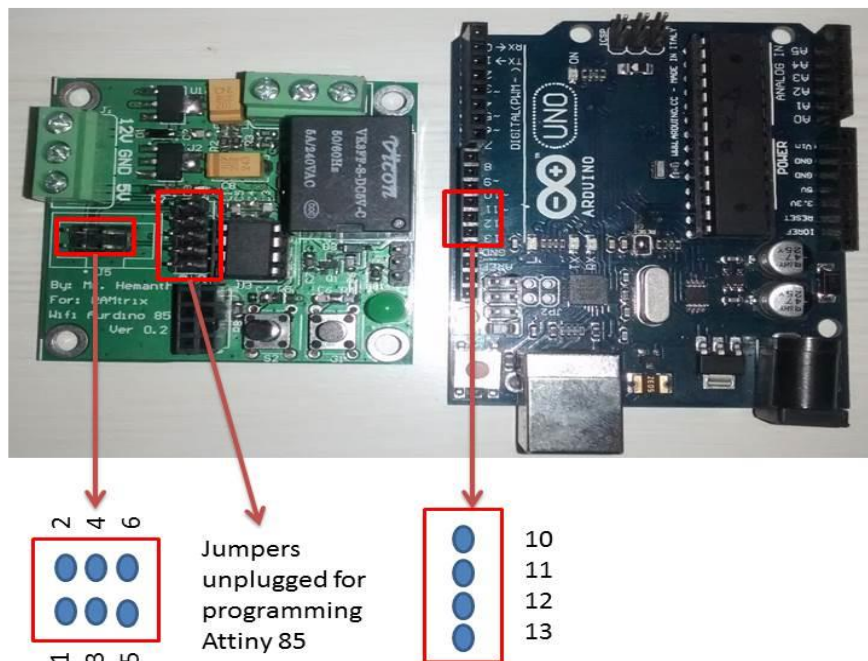
The above shown figure are the in system programming pins of Wifi Arduino 85 and you can use it to program the Attiny 85 IC by removing the jumpers as shown in figure 1.12.To the left of the on the figure is the Arduino programming pin and is described in detail in the figure 1.13 also please remove the esp module from the board while programming.
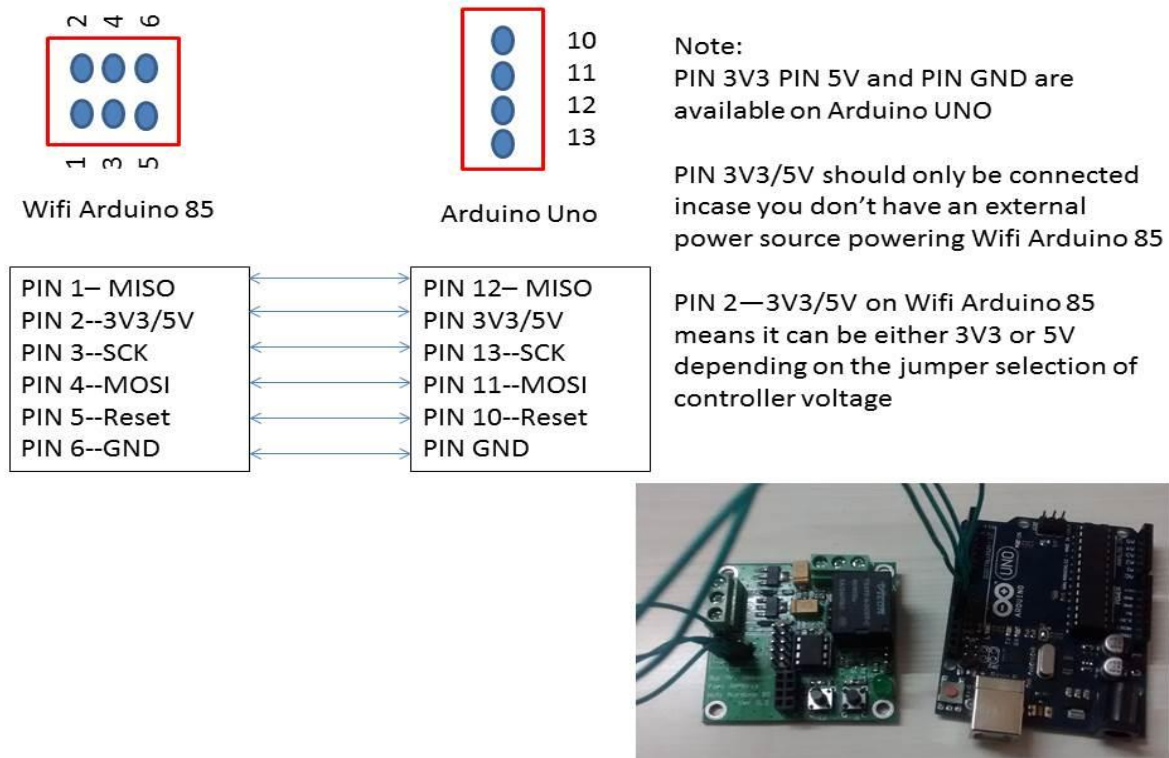
Note:
PIN 3V3 PIN 5V and PIN GND are
available on Arduino UNO

PIN 3V3/5V should only be connected
incase you don't have an external
power source powering Wifi Arduino 85

PIN 2—3V3/5V on Wifi Arduino 85
means it can be either 3V3 or 5V
depending on the jumper selection of
controller voltage

Figure 1.13: PROGRAMMING PIN DISCRIPTION

For more details on Arduino programming you can refer this site

Beta Development

You can try to directly connect Wifi Arduino board to your router by first connecting your android phone to the board and then through the app sending the following command

%XX,"YYYY","ZZZZZ"

XX represents number of "YYYY","ZZZZZ" (including quots)+1

YYYY represents your wifi router SSID

ZZZZZ represents Wifi Password of your router

Example: Lets say my SSID is robo and wifi password is aaa111

Then the command would be

%16,"robo","aaa111"

And after sending it you need to wait for at least 4 min then you can access your wifi router and gen the ip of this device and connect it directly through the router .Please note this is still not a perfect program and fails some time mostly due to lengthy string of ssid and password

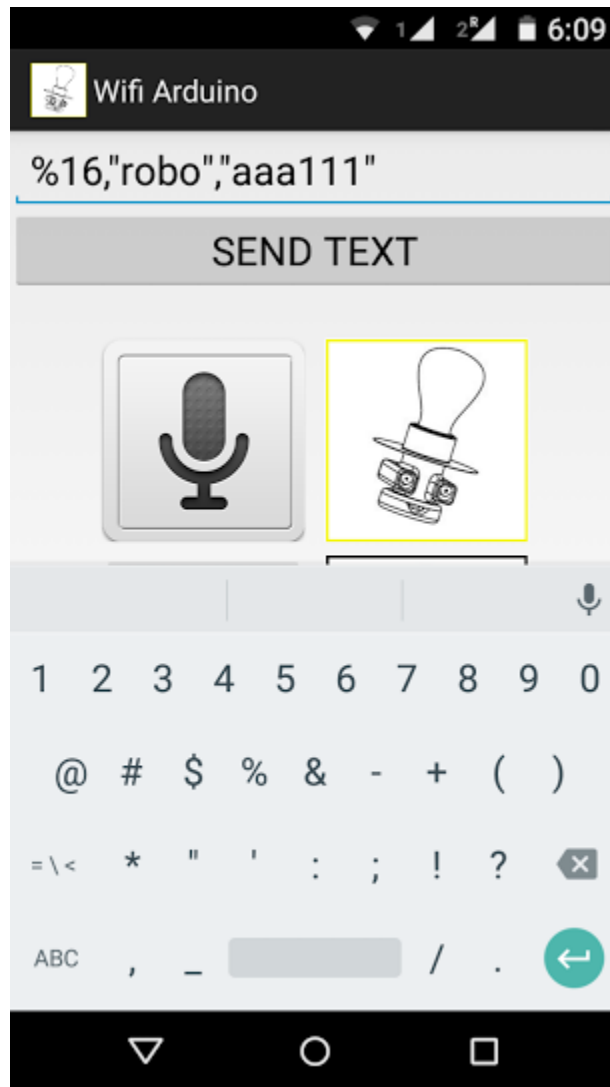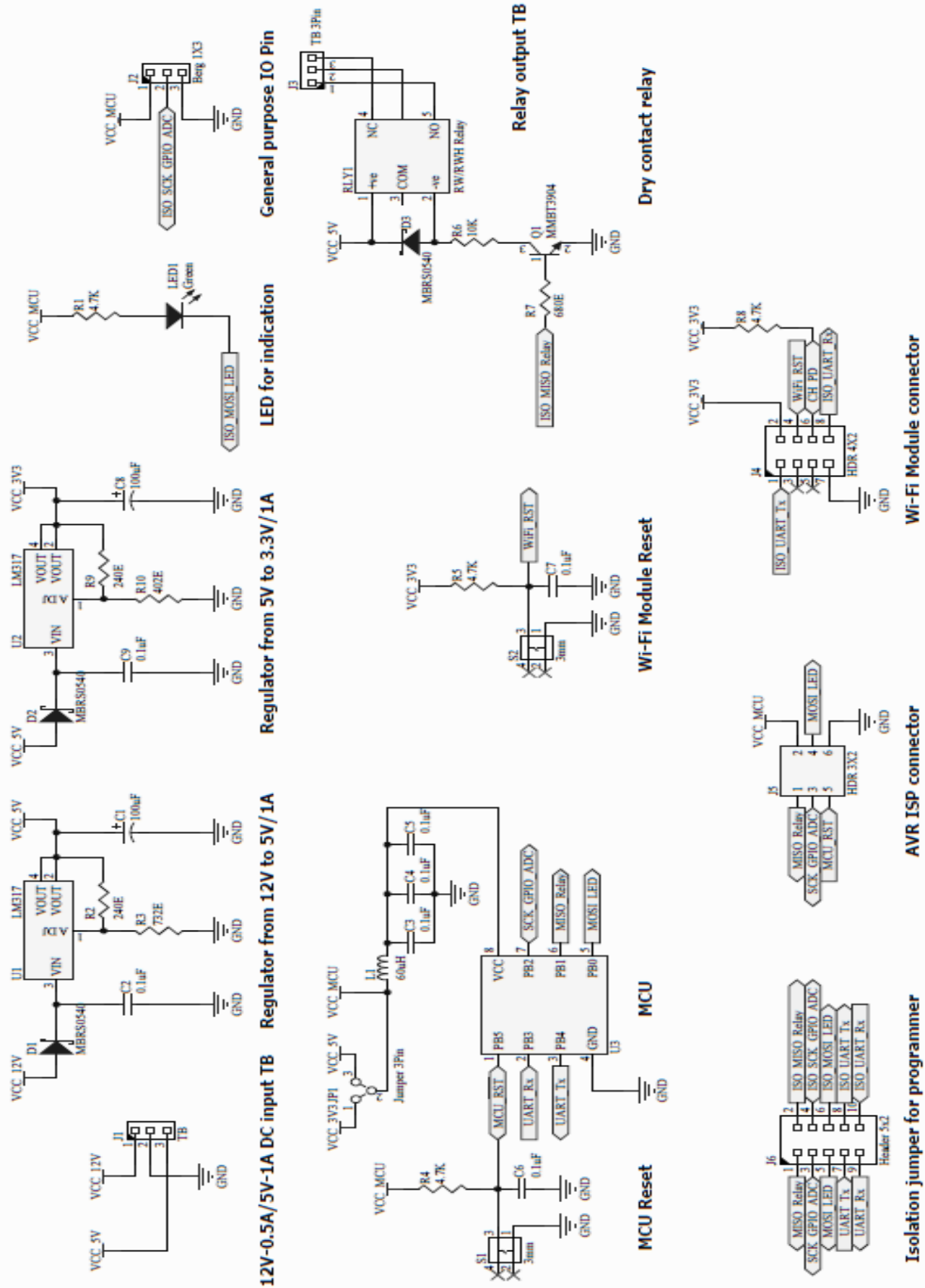A snap shot(fig 1.14) of the way it can be sent is show below

Figure 1.14: SSID PASSWORD SETTING

Figure 1.15: WIFI ARDUINO SCHEMATICS