



In this Instructable I will show you how to build the minimal circuit in order to flash a user program to the ESP-12F ESP8266 module.

This instructable is following the first testing of the module and is the second of my ESP8266 collection.

It can be used to flash a sketch done with Arduino IDE as I will show you here but the same circuit can be used in order to flash back again the AT commands software or to upgrade the SDK.



Add Tip



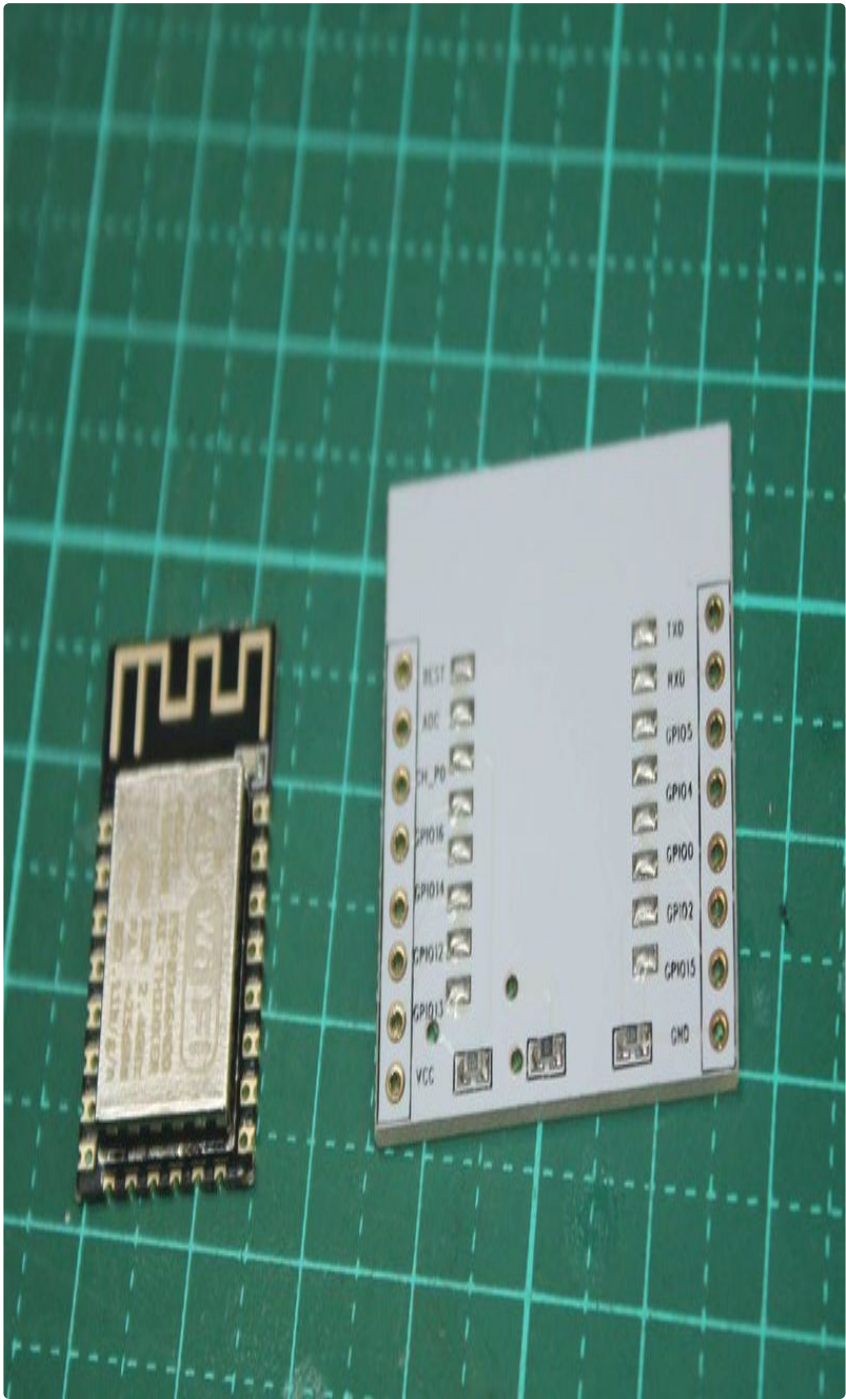
Ask Question

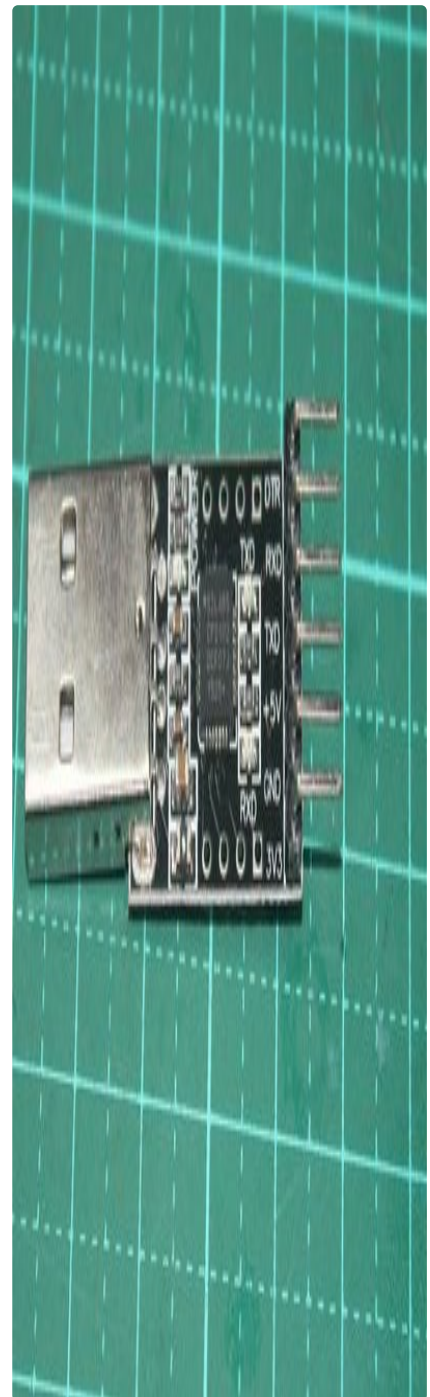


Comment

Download

Step 1: Parts Needed





The Hardware needed is the same as in my [the first test](#) plus a breadboard.

Here is the list:

1. ESP-12F Module [from ebay for example](#) around 2.31USD
2. An USB to serial TTL UART Module ([like CP2102 from ebay for example](#)): 1.24USDA
3. 3.3V Power supply like [MB102 from ebay](#): two for 1.67USD
4. A Breadboard starting from a few dollars [on ebay for example](#)
5. An optional ESP-12 adapter [like this ones from ebay](#): 3 for 1.20USD

If you are using the ESP-12 Adapter [follow this step](#) in order to solder the ESP-12F module on the adapter.



Add Tip



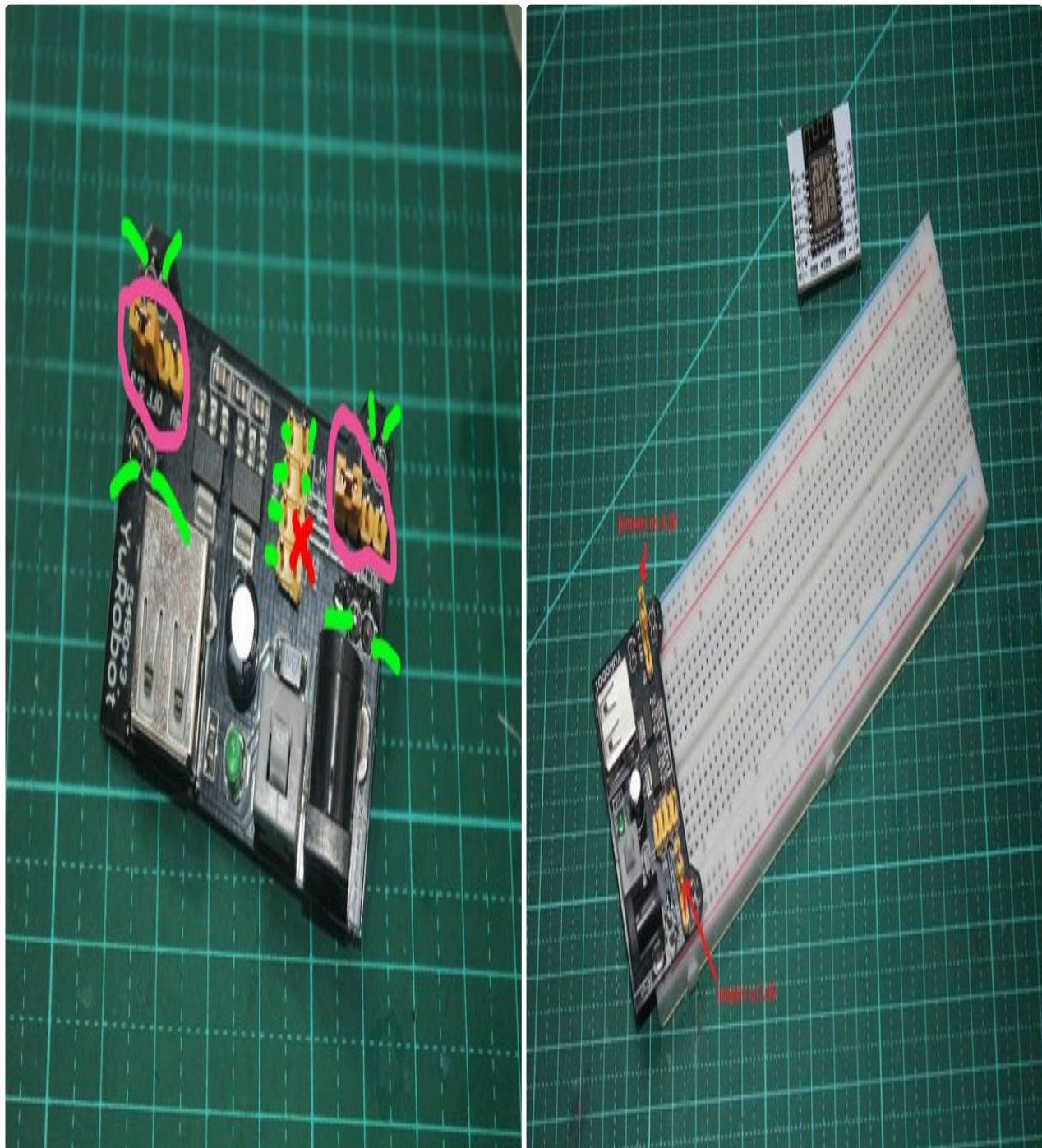
Ask Question



Comment

Download

Step 2: Mount the Power Supply on the Breadboard



Please set the to jumpers on both sides of the breadboard to 3.3v.

Then plug the power supply on the breadboard.



Add Tip



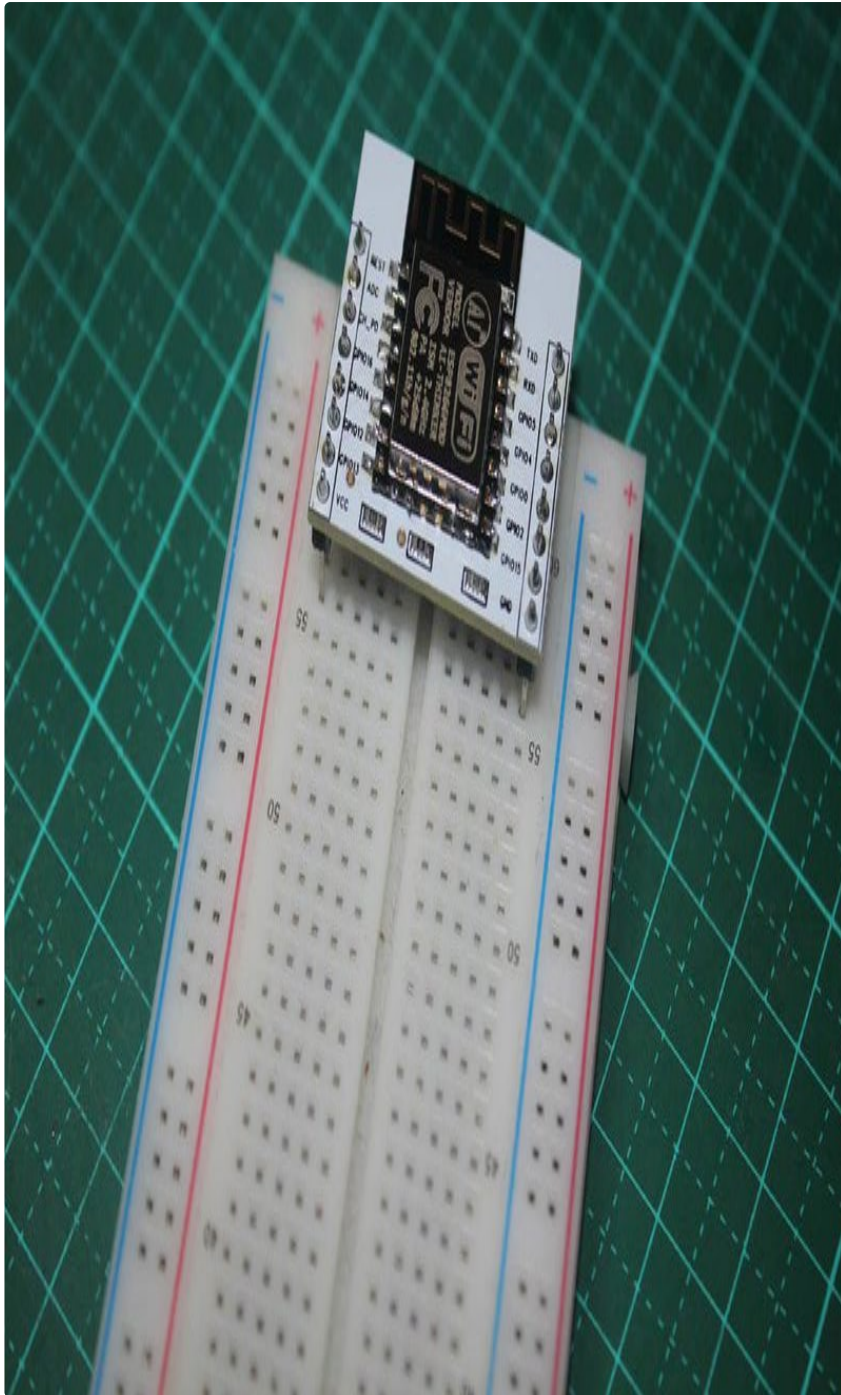
Ask Question



Comment

Download

Step 3: Wire the ESP-12F on the Breadboard





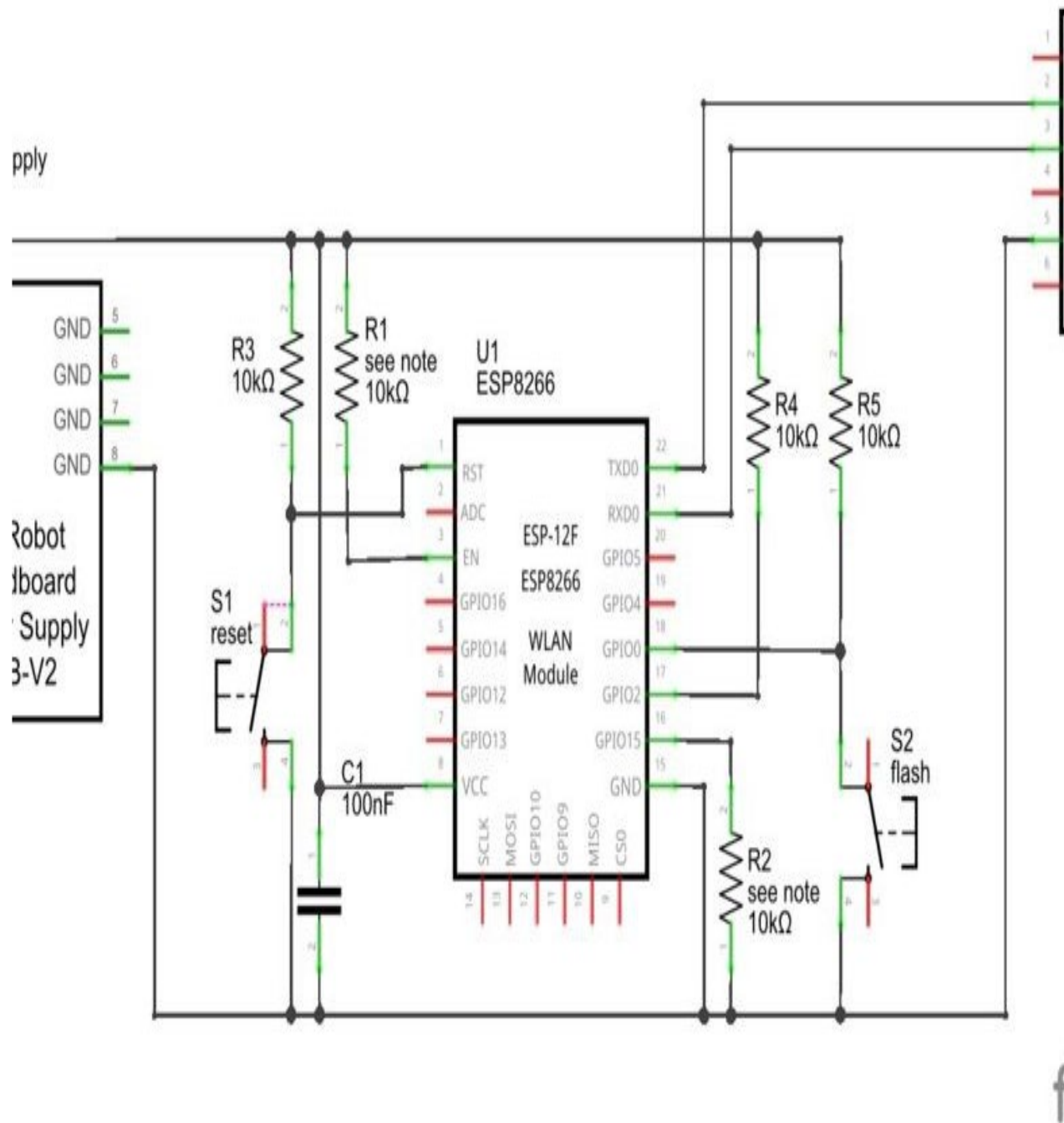
If you are using the adapter module like mine then you can see on the first photo that no space remains on the sides for wiring.

So the wiring has to be done before putting the module on the breadboard.

Wire in such a way that you have the corresponding pins of the module available on the breadboard in the same order. I have labelled on one of the picture the pins.

At the end of this step you have the power supply on one side the ESP-12F on the other leaving plenty of space on the breadboard.

Step 4: The Minimal Circuit



First let's see the schematic. You can find some resources for example on [ESP8266 Arduino Github](#).

- EN (CH_PD) Enable Pin has to be pulled up (R1)
- RESET Pin has to be pulled up (R3). In order to restart the module we connect also a push button to ground (S1)
- In all of the boot modes

- GIO15 has to be pulled down (R2)
- GIPO2 has to be pulled up (R4)
- GIPO0 has to be pulled up (R5) for running the program (flash boot). I has to be low in order to enter programming mode (UART). For this we add the S2 push button.
- We also connect the USB to Serial port
 - GND are connected together
 - RX module is connected to TX serial
 - TX module is connected to RX serial

Furthermore we add a capacitor between VCC and GND.



Add Tip



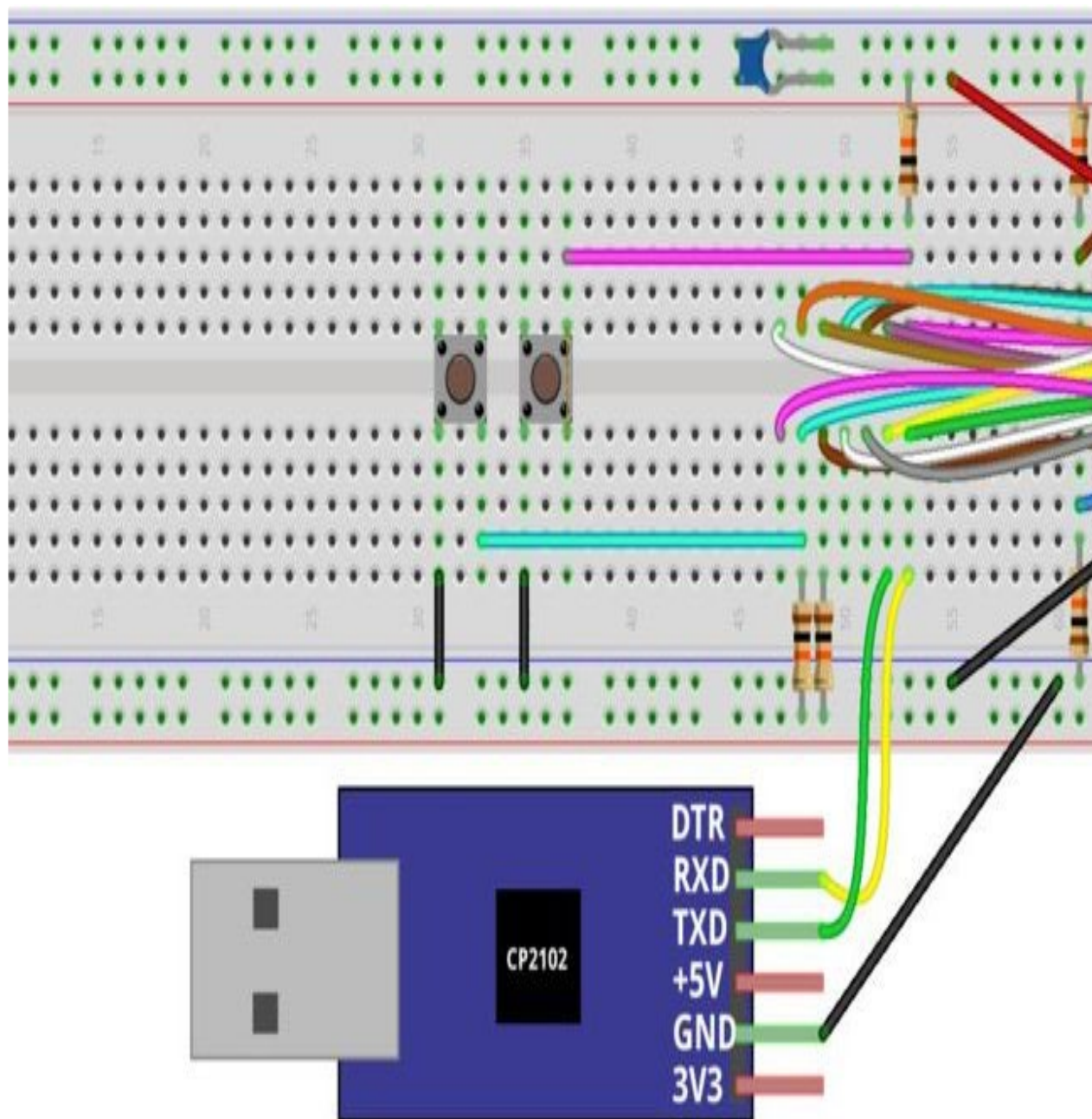
Ask Question



Comment

Download

Step 5: What the Breadboard Should Look Like



If you are not using the adapter module the breadboard should look like in this drawing.

We connect all the pins of the ESP-12F in the same order on the breadboard in order to have them in advance wired.

It makes a lot of wires but this will be usefull for our future testing. For a final design I would use only the usefull wires.

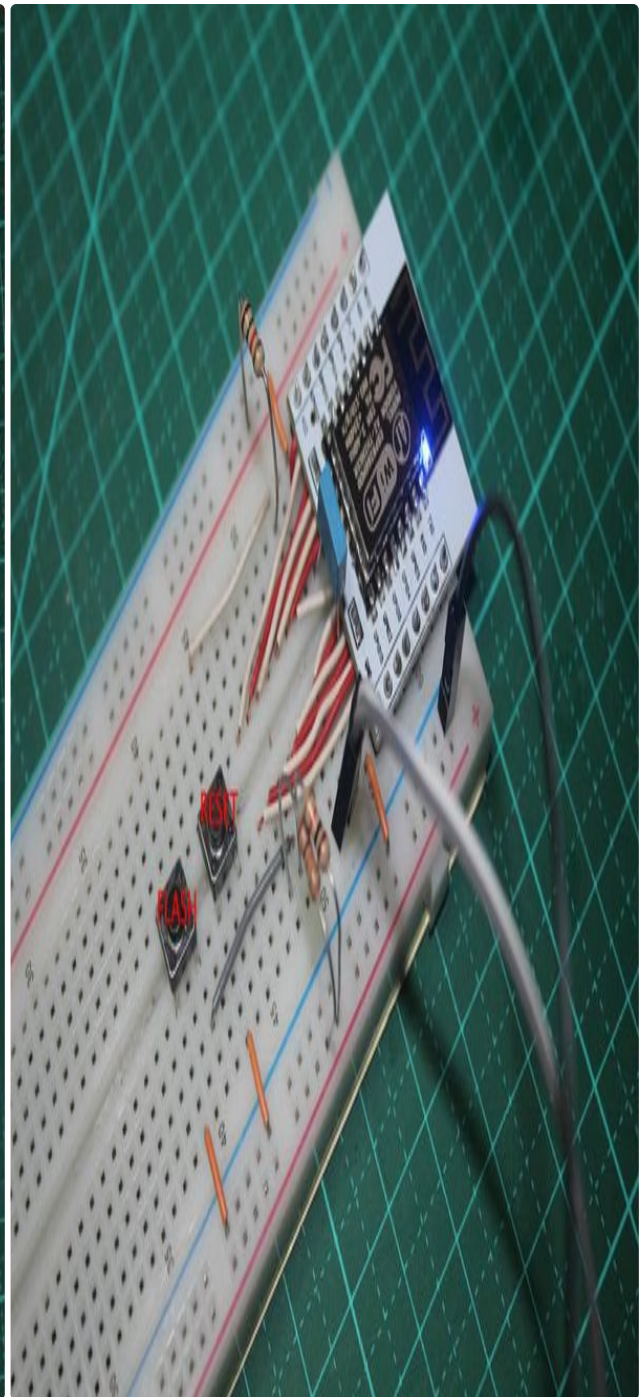
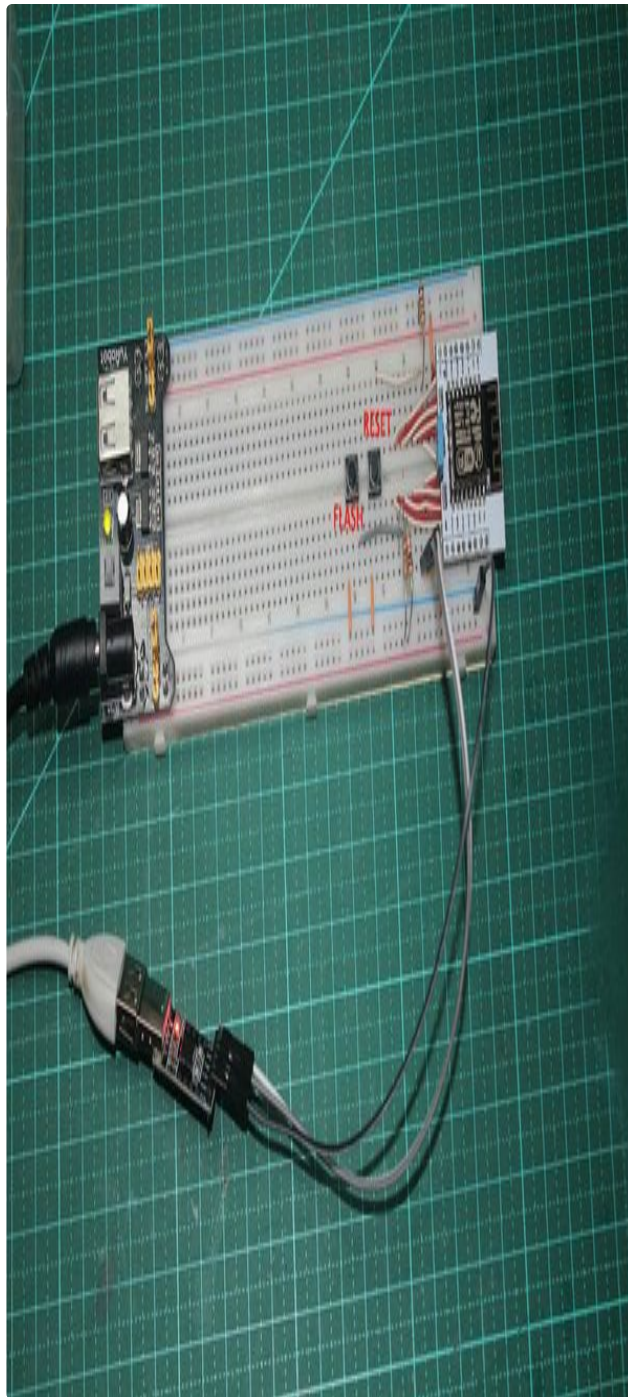
☐ Add Tip

☐ Ask Question

☐ Comment

☐ Download

Step 6: Real Wiring



As we are using the adapter module we do not have to connect R1 and R2. They are already in the adapter module.

C1 has to be placed the closer possible to the module.

☐ Add Tip ☐ Ask Question | ☐ Comment ☐ Download

Step 7: First Program

We are doing here a very simple program.

Start Arduino IDE and if not done already follow this instructions to install ESP8266
addon: <http://esp8266.github.io/Arduino/versions/2.3.0/d...>

Enter this first program:

```
/* example from http://www.arduinesp.com/examples */  
/* to be flashed directly to ESP8266 */  
int ledPin = 2;  
void setup()  
{  
  pinMode(ledPin, OUTPUT);  
}  
void loop()  
{  
  digitalWrite(ledPin, HIGH); // turn the LED on (HIGH is the voltage level)  
  delay(1000); // wait for a second  
  digitalWrite(ledPin, LOW); // turn the LED off by making the voltage LOW  
  delay(1000); // wait for a second  
}
```

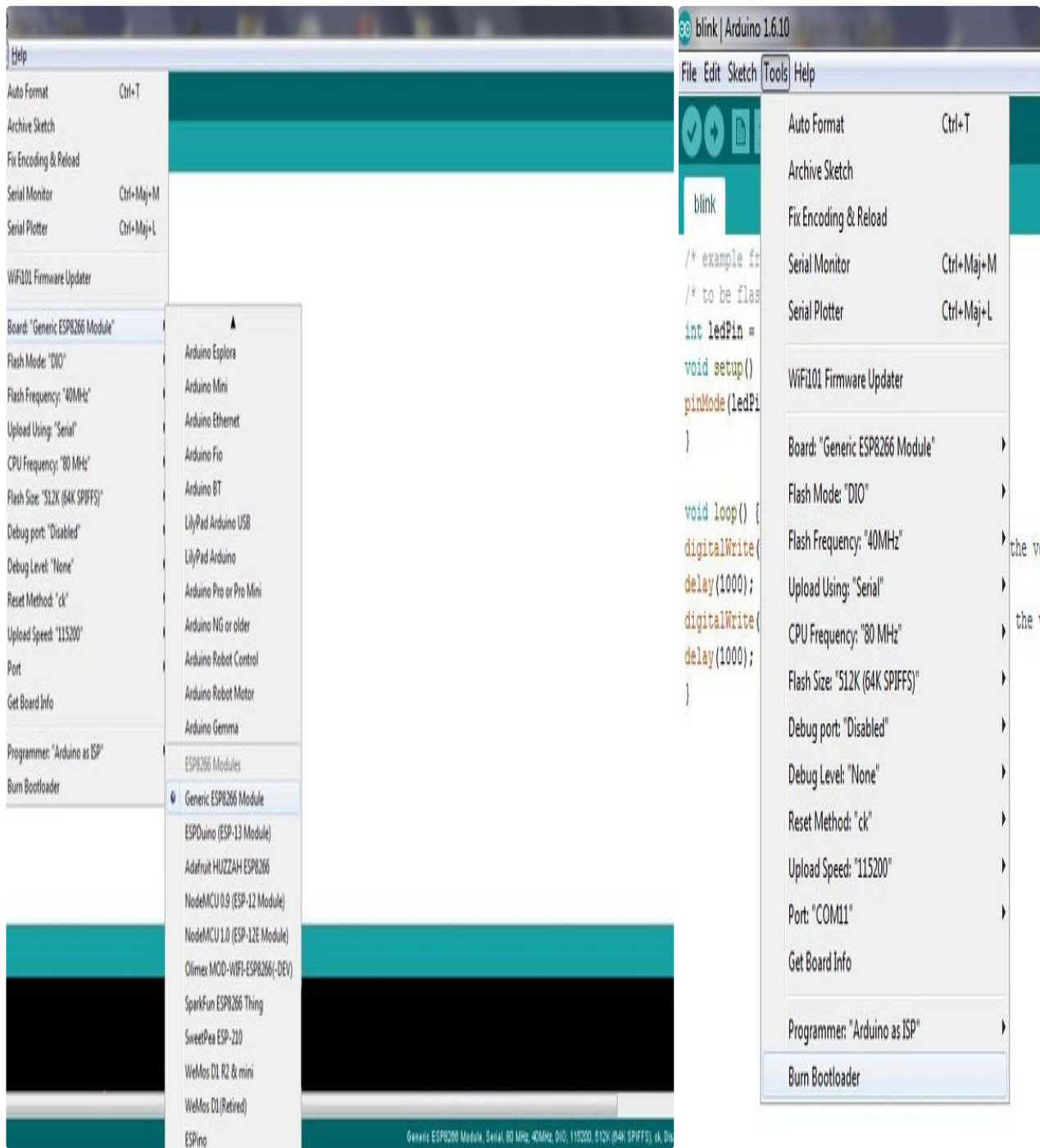
☐ Add Tip

☐ Ask Question

☐ Comment

☐ Download

Step 8: Select Board



Select Generic ESP8266 Module in boards.

Look at all the other settings.

Select the right COM port.

☐ Add Tip ☐ Ask Question | ☐ Comment ☐ Download

Step 9: Flash





Run "Upload" in Arduino IDE.

Get ready for restarting the module: keep pressed the FLASH button.

When "esptool.exe -cp COM...." appears in the messages area then quickly press and release RESET. Then release FLASH button.

You should see in the messages area the flashing process.

After the flashing the you should see the the blue led blinking.

Step 10: Using Wifi to Control GPIO2


This is another simple sketch.

It creates a http server on the ESP8266 allowing you to turn on and off GPIO2.

Set in line 16 and 17 the credetials to you WiFi network.

Have a look on you Serial connection on your computer. This will show you the IP address of esp8266.

This shetch showed me one thing: the LED on the ESP-12f is connected between VCC and GPIO2.

 **wifi_server.ino**

Download

☐ Add Tip

☒ Ask Question


|

☐ Comment

☐ Download

Step 11: Files

Here is the Fritzing file of the Hardware.

 **esp-12f-minimal.fzz**

Download

☐ Add Tip

☒ Ask Question

|

☐ Comment

☐ Download

Share

Did you make this project? Share it with us!


Recommendations




Designing a Simple 3D Printed Rubber Band Car Using Autodesk Fusion 360
by gzumwalt in Technology


LED Candle - Lights, Flickers, Blows Out, Smokes, and Smells
by keith204 in Arduino

VORONOI HEART LAMP
by TheTNR in Arduino


 3D CAM and CNC Class
1,703 Enrolled








Add Tip



Ask Question



Post Comment

We have a **be nice** policy.
Please be positive and constructive.

Add Images

Post

6 Discussions



SupDoc **Question** 6 weeks ago on **Step 9**

☐ Answer / Upvote

i got to the download stage, pushing all the right buttons, got garbage symbols on the monitor. Here are the error messages. Any help?

```
sptool v0.4.13 - (c) 2014 Ch. Klippel <ck@atelier-klippel.de>
setting board to ck
setting baudrate from 115200 to 115200
setting port from COM1 to COM11
setting address from 0x00000000 to 0x00000000
espcomm_upload_file
espcomm_upload_mem
setting serial port timeouts to 1000 ms
opening bootloader
resetting board
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
flush complete
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
read 0, requested 1
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
```

flush complete
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
espcomm_send_command: receiving 2 bytes of data
espcomm_send_command: receiving 2 bytes of data
espcomm_send_command: receiving 2 bytes of data
read 0, requested 1
error: failed reading byte
warning: espcomm_send_command: can't receive command response header
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
flush complete
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
read 0, requested 1
resetting board
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
flush complete
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
read 0, requested 1
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
flush complete
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
read 0, requested 1
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
flush complete
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
read 0, requested 1
resetting board
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
flush complete
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
read 0, requested 1
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
flush complete


```
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
serialport_receive_C0: 12 instead of C0
trying to connect
flush start
setting serial port timeouts to 1 ms
setting serial port timeouts to 1000 ms
flush complete
espcomm_send_command: sending command header
espcomm_send_command: sending command payload
read 0, requested 1
warning: espcomm_sync failed
error: espcomm_open failed
error: espcomm_upload_mem failed
error: espcomm_upload_mem failed
```



VincenzoB9 5 months ago



Reply



Upvote

Hi,
thankyou for your manual.
I have an issue, in the step 9, I cannot select the port because it's grey.
If I connect my Arduino, the port comes back black.
I have checked more times the connections, but seems that all is linked as described by you.
Can you give me some suggestion?
Thankyou!!!



VladimirD28 Question 9 months ago on Step 10

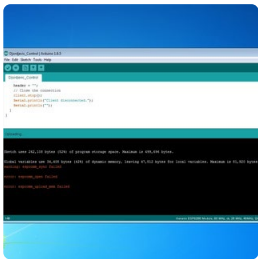


Answer



Upvote

Dear Sir,
Please, I want to upload one program in the module ESP8266 12 F,
but without success.
See the picture in the attachment.
I work all as You said here.
Only direct connection PC-Arduino UNO-ESP826612f.
VCC 3.3V, GND, TX-TX i RX-RX.
My initial source program is on desktop of the PC.
How can I solve this noted problem on the picture!?
A lot of Thanks.
Vladimir Đorđević,
Serbia.



1 answer F



JunaidA81 Question 10 months ago on Step 10



Answer



Upvote

Hi Sir,
I made the same project. It works fine but there is one issue. Communication of webpage with esp8266 goes off randomly and I need to push reset button for esp to make that connection again and then it works fine again for some random period of time. My router is working properly and everything is as per you mentioned in this page.
Please help me how to get rid of this issue.
Thanks

/

1



ShermS1

a year ago

Reply

/

Upvote

I found most of what you posted useful. However mine still would not load. I found out (possibly)the chip I got had bad firmware or wrong firmware. I went to http://dembryo.com/how_to_esp12f and down at the bottom they had download for a gui that did load the nodeMCU firmware. After updating, loading of the firmware I only had to hit the reset while holding down flash button on my custom board (made from your schematics thank you), just prior to load. It then worked great.
Thank you
Sherm