

# ESP8266: Reflash Dance!

Posted by: Dave Vandebout (/blog/author/devbisme/) 4 months, 2 weeks ago

(17 comments)



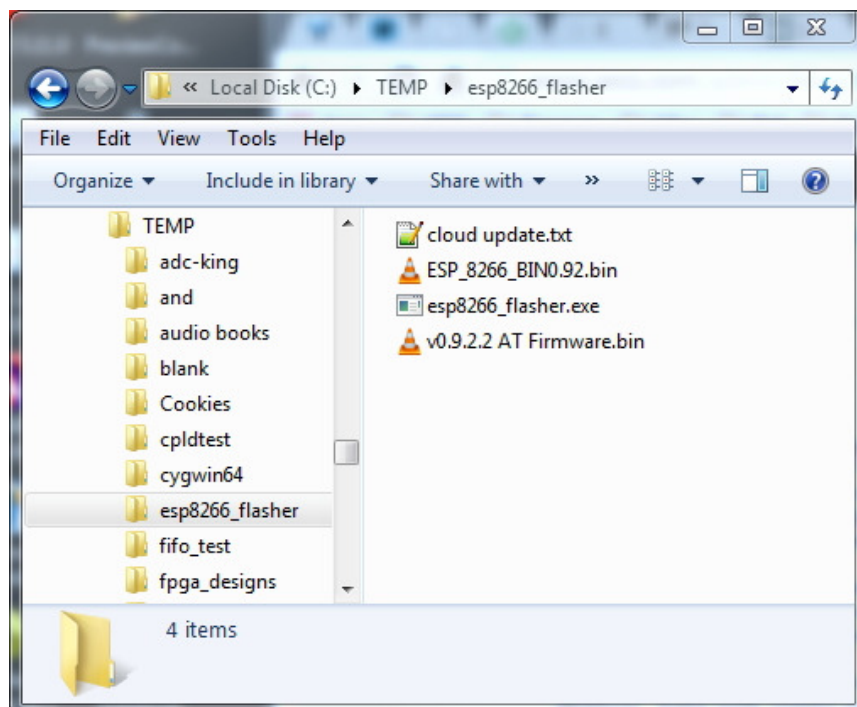
It's been a while since I connected my ESP8266 board to a ZPUino soft processor running in a XuLA2 board (<http://www.xess.com/blog/esp8266-it-dont-come-easy/>). I thought I would update the firmware on the ESP8266 to the latest version and see if it still worked.

Since everyone is compiling new applications for the Espressif chip (<http://bbs.espressif.com/viewtopic.php?f=7&t=67>) now, merely reprogramming the serial flash on the board should be easy, right? Just download a binary file and you're done! It turned out to be a bit more confusing.

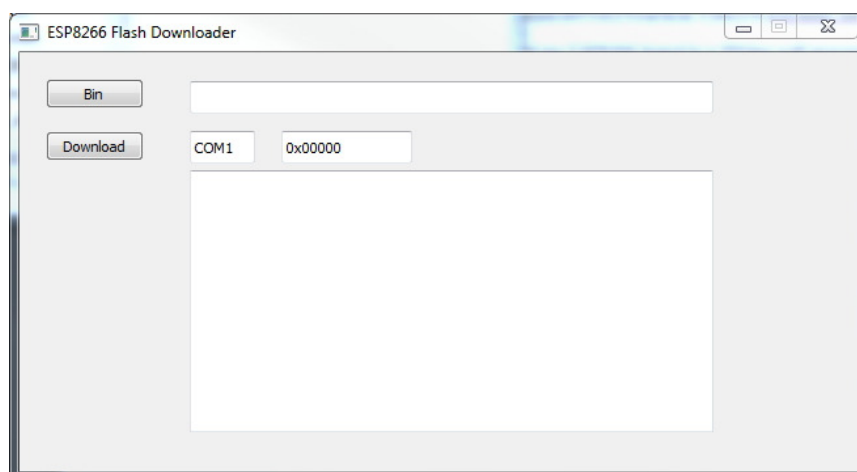
Note: If you would rather watch than read, there is a video at the end of this post that goes through the flash reprogramming process.

Part of the confusion is that there are a lot of different programming tools being used: binary executables, Python scripts, whatever. Some tools require specifying four different binary files (<http://scargill.wordpress.com/2014/11/29/espressif-update-for-esp8266/>), one for each particular address range of the flash chip. But the downloadable archives don't usually have four files in them, and if they do, they don't have filenames matching the ones shown in the examples. I didn't want to brick my modules, even if they only cost \$2.71/each (<http://www.aliexpress.com/item/2PCS-ESP8266-Serial-Esp-01-WIFI-Wireless-Transceiver-Module-Send-Receive-LWIP-AP-STA/32232009463.html>).

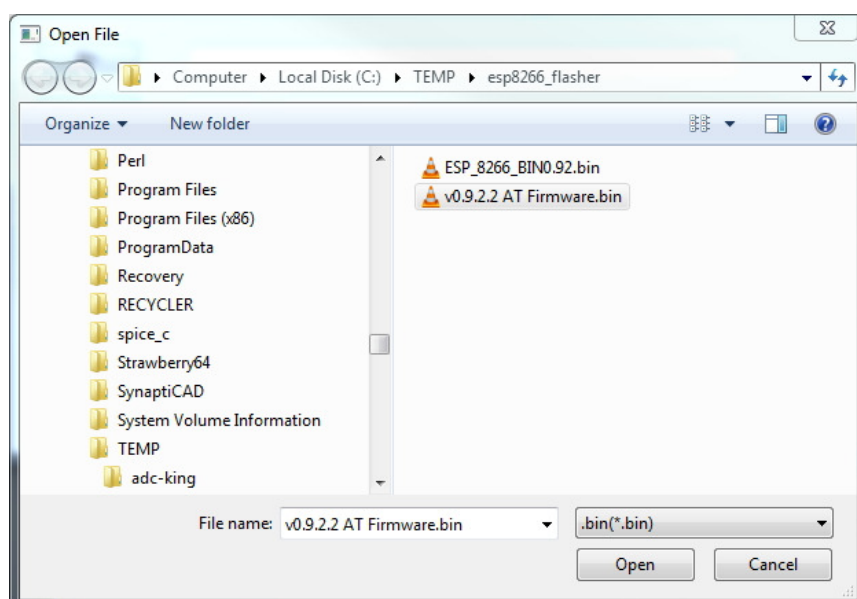
Finally, I settled on using the Espressif's official `esp8266_flasher.exe` program (<https://drive.google.com/file/d/0B3dUKfqzZnlwVGc1YnFyUjgxeIE/view?usp=sharing>). I also downloaded the `v0.9.2.2 AT Firmware.bin` file (<https://drive.google.com/file/d/0B3dUKfqzZnlwUJc2hkZDUyVjA/view?usp=sharing>). After dumping the contents of both archives into a local directory, I had this:



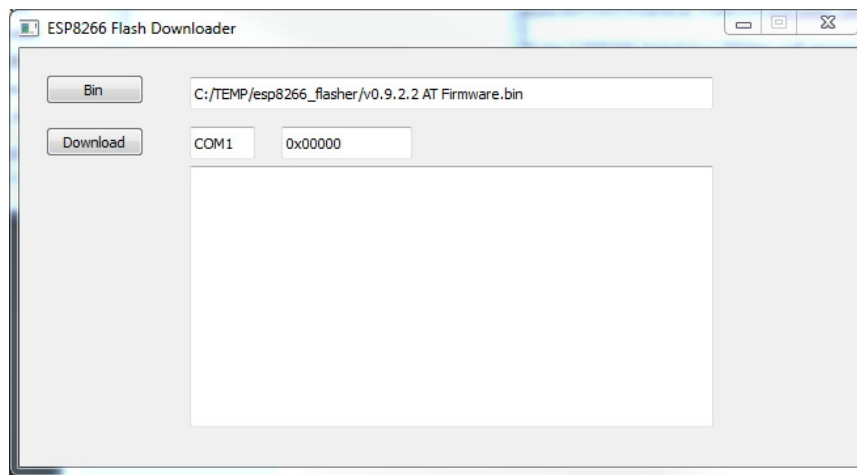
Double-clicking the `esp8266_flasher.exe` icon brought up the flashing tool:



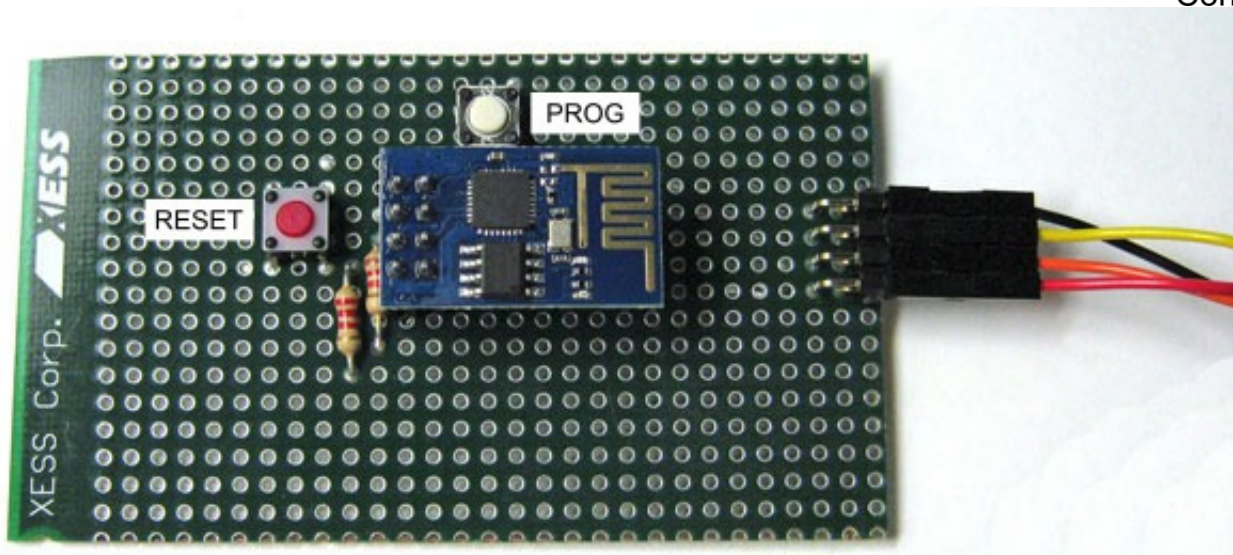
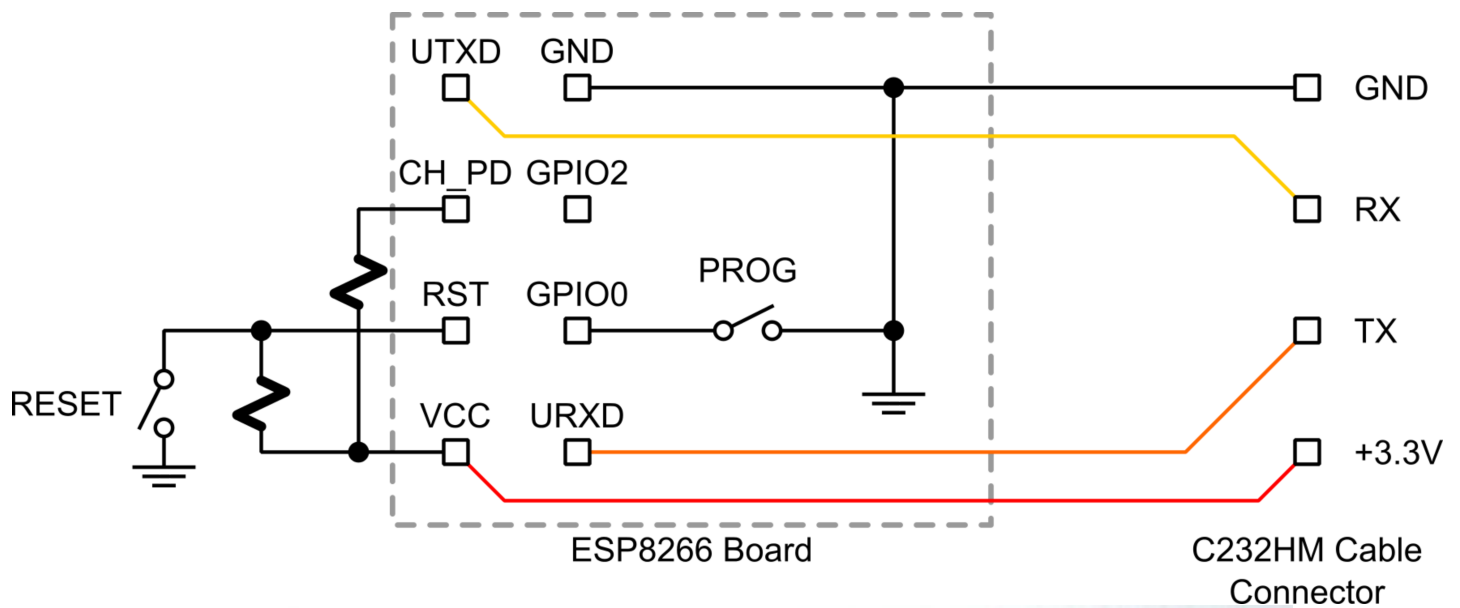
Clicking the `Bin` button opened a window where I selected the binary file to download into the serial flash of the board:



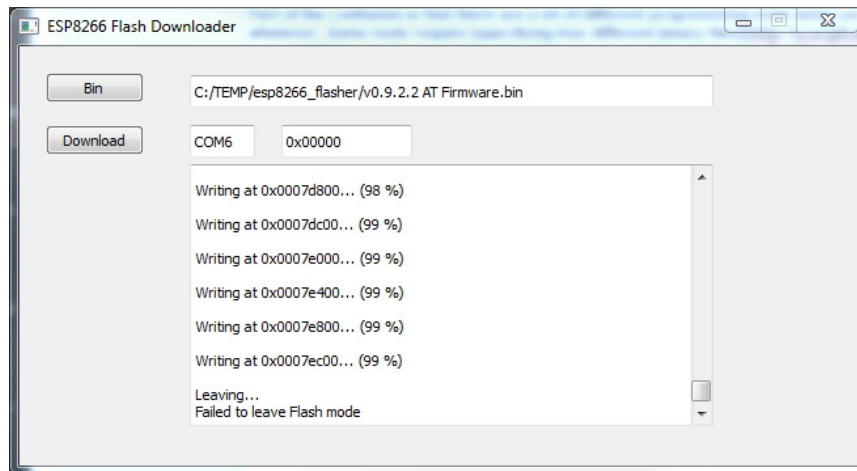
Selecting the `v0.9.2.2 AT Firmware.bin` file and clicking `open` took me back to the main window with the firmware file displayed in the `Bin` field.



Next I needed to put the ESP8266 into its flash programming mode. This is done by resetting the ESP8266 board while holding its GPIO0 pin low. I could do this with a few wires and a breadboard but, since I might be doing this more than once, I decided to build a little programming board. It has a  $4 \times 2$  socket for the ESP8266 board that is wired to a header where my C232HM USB-to-serial cable is attached. A couple of 2.2 KOhm pullup resistors for the chip-select and reset pins keep the ESP8266 enabled. **PROG** and **RESET** pushbuttons are provided to momentarily pull the GPIO0 and reset pins input to ground, respectively.

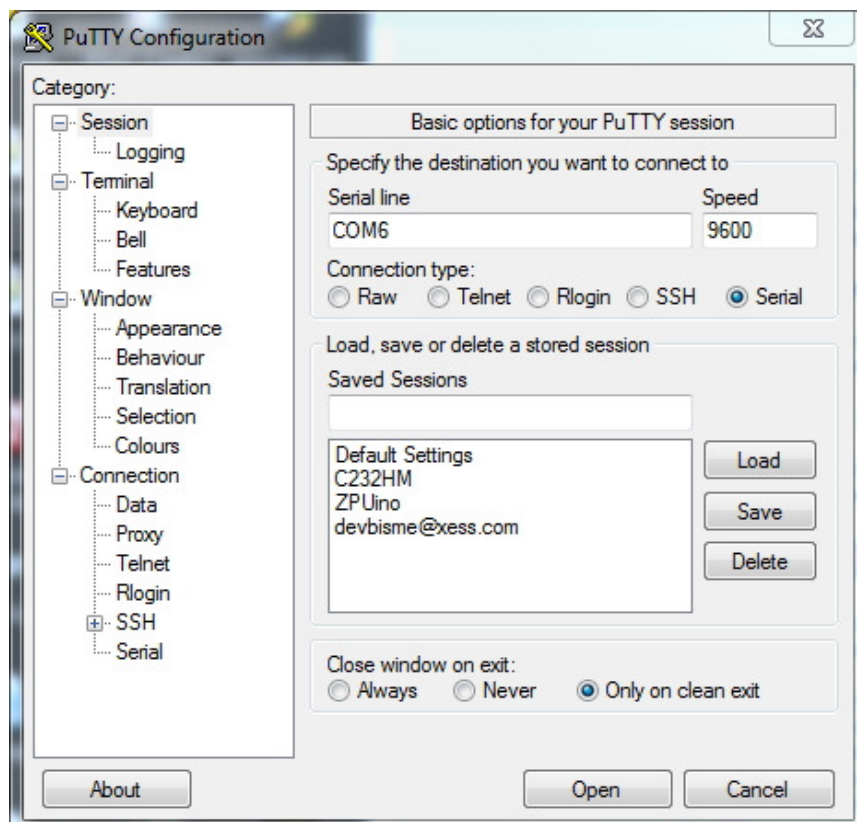


After inserting my ESP8266 board into the programming board and attaching the C232HM cable, I entered the flash programming mode by holding down the **PROG** button and then pressing and releasing the **RESET** button. In the flashing tool, I changed the serial port from **COM1** to **COM6** because that's where the CH232HM cable resides on my system. Clicking on the **Download** button started the reprogramming of the flash chip. The progress was displayed in the lower pane of the window and, after about a minute, the reprogramming was done.

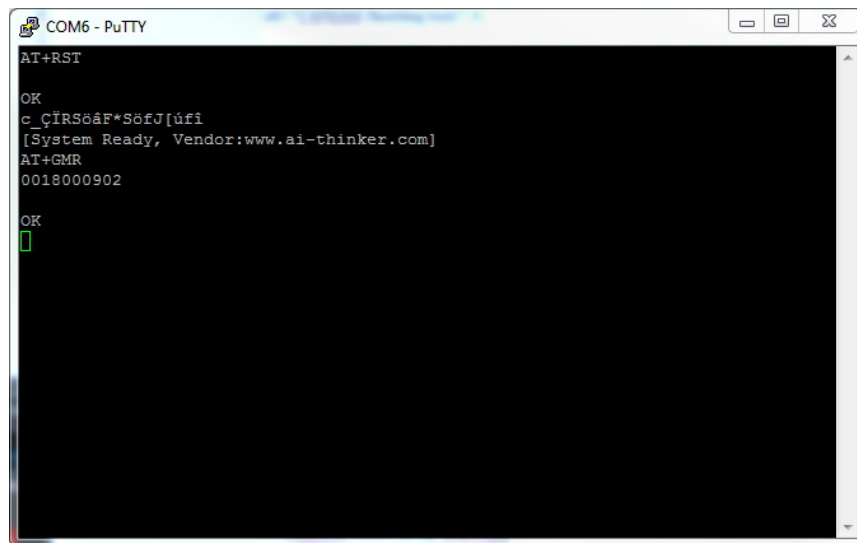


Note that the progress pane indicated "Failed to leave flash mode". That's probably because the flashing program doesn't have any way to bring the ESP8266 board out of programming mode. But it's not really a problem provided the contents of the flash chip were rewritten.

To verify the flash programming was successful, I needed to talk to the chip and query the firmware version. I closed the flash programming window and pressed the **RESET** button (without pressing the **PROG** button) to place the ESP8266 board in user mode. Then I brought up a PuTTY window and configured it as shown below. Note that I set the speed to 9600 bps. The new firmware defaults to this communication rate rather than the 115 Kbps rate used in the factory-installed firmware.



After opening the PuTTY terminal window, I sent the ESP8266 the reset command ( `AT+RST` ) and then had it print the firmware version ( `AT+GMR` ). The version was shown to be 0018000902 rather than the 00160901 version that originally came loaded in the board. So the firmware update appeared to have worked.

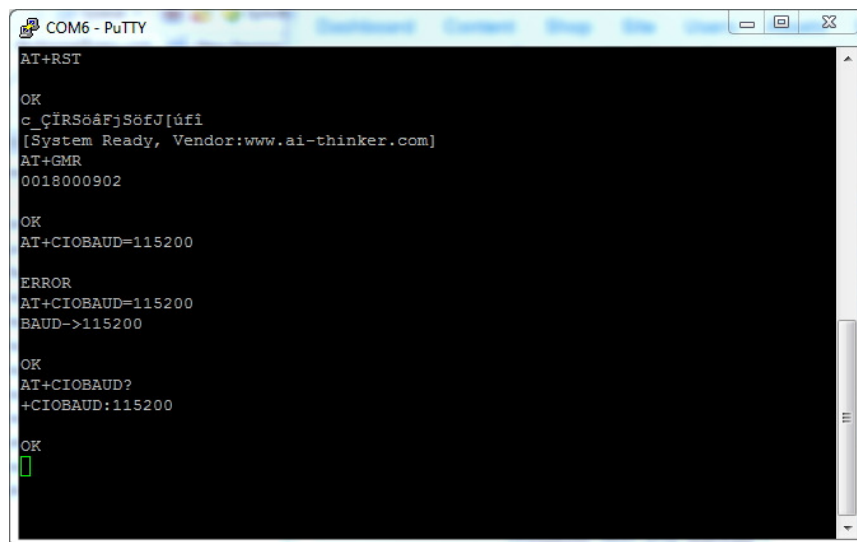


```
COM6 - PuTTY
AT+RST

OK
c_ÇİRS6âF*S6fJ[úfi
[System Ready, Vendor:www.ai-thinker.com]
AT+GMR
0018000902

OK
█
```

In order to push the transfer speed of the board back up to 115 Kbps (since the ZPUino can handle that speed, there's no need to cripple the interface), I used the `AT+CIOBAUD=115200` command. Then I checked that the change took using the `AT+CIOBAUD?` command. (Observe that it required two attempts to change the baud rate, so don't be put off if that happens to you.) The baud rate is stored in nonvolatile memory so it will remain in effect from then on, even if the power is interrupted or a reset occurs.



```
COM6 - PuTTY
AT+RST

OK
c_ÇİRS6âF*S6fJ[úfi
[System Ready, Vendor:www.ai-thinker.com]
AT+GMR
0018000902

OK
AT+CIOBAUD=115200

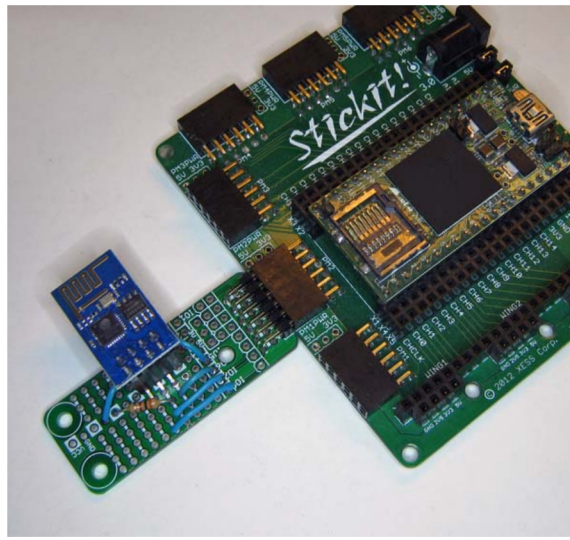
ERROR
AT+CIOBAUD=115200
BAUD->115200

OK
AT+CIOBAUD?
+CIOBAUD:115200

OK
█
```

With the new firmware in place and the baud rate back at 115Kbps, I took the ESP8266 module from the programming jig and put it back into my ZPUino development board (/blog/esp8266-lets-get-physical/). Now it was just a matter of running my existing program (<https://gist.github.com/xesscorp/3f791cdec611db3eb400#file-esp8266-ino>) that downloads the contents of a web page over the wireless link, right?





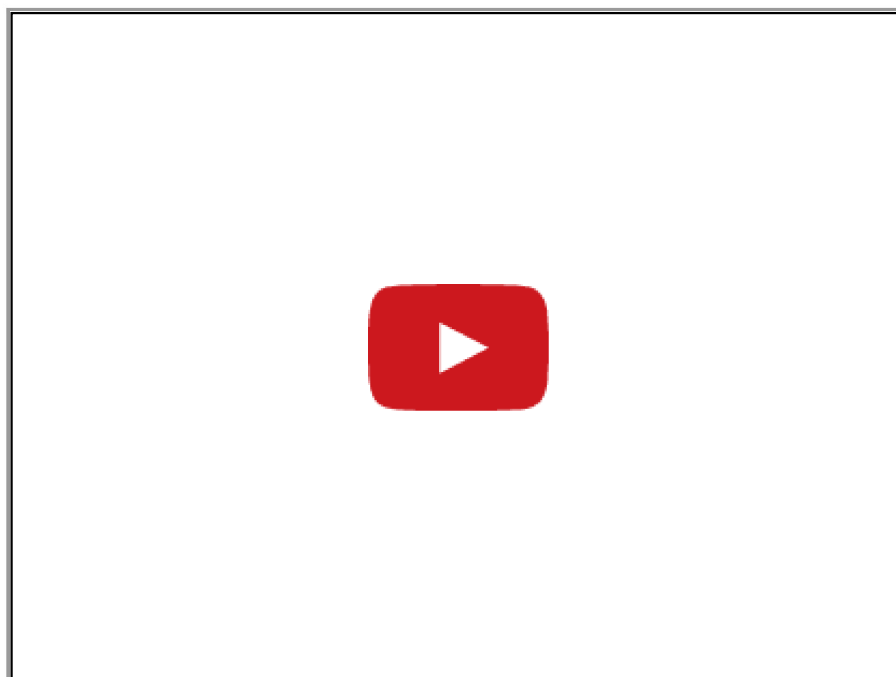
Wrong! It turned out the update of the ESP8266 firmware is sufficiently different that the following minor changes were needed:

- AT commands to the ESP8266 had to be terminated with "\015\012" (ctrl-M, ctrl-J or carriage-return, linefeed) instead of "\n".
- After initiating a reset using the AT+RST command, the string the ESP8266 uses to terminate its response changed from "ready" to "ai-thinker.com"]".

While making those changes, I also had to fix my code for timing-out if no characters were received from the ESP8266. The updated program can be found here (<https://gist.github.com/xesscorp/0f3546c674fb7e1d34ac>).

So after all that, I finally had an updated Wifi module and a working example. I hope this procedure helps if you decide to update your own ESP8266.

Finally, if you're someone who would rather watch than read, then here's a video showing the entire process of updating the ESP8266 firmware:



Current rating: 4.9

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

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Extending the ZPUino → (</blog/extending-the-zpuino/>)

## Comments



**William Chouinard**

4 months, 2 weeks ago

Excellent article! Detailed, and to the point. The jig is a great idea, and I'll need to figure out how to build one for my 03 module... Oh, just one thing: You might want to put the video at the top of the article, just in case "someone who would rather watch than read" ;)

[Link \(/blog/esp8266-reflash/#comment-199\)](/blog/esp8266-reflash/#comment-199) / Reply



**Dave Vandembout**

4 months, 2 weeks ago

Hey, William. Thanks for the comment! I'll look at rearranging the video content.

[Link \(/blog/esp8266-reflash/#comment-200\)](/blog/esp8266-reflash/#comment-200) / Reply



**Jas**

4 months, 1 week ago

Hi Dave,

Very nice article, video and test board :)

Thank you.

What are the values of the pull up resistors ?

[Link \(/blog/esp8266-reflash/#comment-201\)](/blog/esp8266-reflash/#comment-201) / Reply



**Dave Vandebout**

4 months, 1 week ago

Thanks, Jas!

The pullup resistor values aren't critical. I used 2.2K for my programming jig. I think any value between 1K and 10K will work.

[Link \(/blog/esp8266-reflash/#comment-202\)](/blog/esp8266-reflash/#comment-202) / Reply



**Matt**

3 months, 3 weeks ago

Hi do you have the url for the firmware please? id like to check for updates as 9.4 has been released

[Link \(/blog/esp8266-reflash/#comment-206\)](/blog/esp8266-reflash/#comment-206) / Reply



**Dave Vandebout**

3 months, 2 weeks ago

You can check for firmware here: [https://drive.google.com/folderview?id=0B3dUKfqzZnlwRjFaNTUzZFptbzg&usp=drive\\_web](https://drive.google.com/folderview?id=0B3dUKfqzZnlwRjFaNTUzZFptbzg&usp=drive_web) ([https://drive.google.com/folderview?id=0B3dUKfqzZnlwRjFaNTUzZFptbzg&usp=drive\\_web](https://drive.google.com/folderview?id=0B3dUKfqzZnlwRjFaNTUzZFptbzg&usp=drive_web))

[Link \(/blog/esp8266-reflash/#comment-210\)](/blog/esp8266-reflash/#comment-210) / Reply



**Tom Emerson**

3 months, 1 week ago

Great Article,

Couple of questions

Is the ESP8266 you used a ESP-01 or ESP-03 or someother?

When do you release the PROG pushbutton? Do you hold it down the whole time the ESP8266 is being programmed?

I checked the link for updates to the firmware, it looks like its is now at Ver 9.5

Thanks

[Link \(/blog/esp8266-reflash/#comment-212\)](/blog/esp8266-reflash/#comment-212) / Reply





**Dave Vandebout**

3 months, 1 week ago

My board is the ESP-01 with the 8-pin connector. The ESP-03 has more I/O pins exposed and they're SMD-like, not pin headers.

I press the PROG button and then press-and-release the RESET button. That puts the ESP8266 into programming mode. Once that's done, I release the PROG button.

[Link \(/blog/esp8266-reflash/#comment-215\)](/blog/esp8266-reflash/#comment-215) / Reply



**Nazir Khan**

3 months, 1 week ago

Hello,

I think i bricked 3 ESP8266 by performing the circuit. All worked fine until i pressed on the reset button i.e RESET to the ground, and thats all it goes into a garbage loop. Event completed disconnected and getting the same.

Tried disconnecting and connecting when the PROGRAM button (i.e GPIO0 connected to ground) and it starts without any loop (i can see the blue led not glowing) and unable to flash, the flashing tool gives 'Failed to connect'....any idea how to unbrick it.....i am a looser tried the same reset button with all the three ESP i had :-)

[Link \(/blog/esp8266-reflash/#comment-213\)](/blog/esp8266-reflash/#comment-213) / Reply



**Dave Vandebout**

3 months, 1 week ago

Nazir, I don't have any real advice on this. Perhaps ask for help on some of the sites I listed here: <http://www.xess.com/blog/esp8266-resources/>  
(<http://www.xess.com/blog/esp8266-resources/>)

If worst comes to worst, you can always buy more. You can get another four ESP8266 modules for about \$10 now.

[Link \(/blog/esp8266-reflash/#comment-216\)](/blog/esp8266-reflash/#comment-216) / Reply



**Shabbir**

3 months ago

I am trying to connect the esp 8266 to the arduino and trying to control a bulb using it. But there is a problem flashing the firmware.

I made the connections according to the following link:

iot-playground.com/2-uncategorised/17-esp8266-wifi-module-and-5v-arduino-connection

I also connected the GPIO0 to gnd and rst,chpd,GPIO2 to 3.3v

But there is an error in flashing the firmware . "failed to connect".

Please help!!

[Link \(/blog/esp8266-reflash/#comment-222\)](#) / Reply



**Dave Vandebout**

3 months ago

I don't know what the problem is, Shabbir. I don't use an Arduino to program my ESP8266. Perhaps you should ask your question at the link where you found the flashing procedure you're using. Or try asking at one of the places I listed here:  
<http://www.xess.com/blog/esp8266-resources/> (<http://www.xess.com/blog/esp8266-resources/>)

[Link \(/blog/esp8266-reflash/#comment-223\)](#) / Reply



**Alfred**

2 months, 4 weeks ago

Hi, I have a big problem with a module esp 8266, after accidentally typed the command AT + UPDATE not responding to AT commands.

In serial monitor appear an infinite number of alphanumeric characters.

I tried to reset, but the module does not respond.

you have any solution?

Thank you for those who answer me ..

[Link \(/blog/esp8266-reflash/#comment-228\)](#) / Reply



**Brian (<http://www.brianmoreau.com/>)**

2 months, 4 weeks ago

Ok so I discover it wont work with Arduino using SoftSerial and I read that an ESP update is required.

The update files contain a file named cloud update.txt and it appears to have instructions for a cloud update.

Is this a FLASH update?

Its been loading data from the web for over half an hour right now.

The beginning of the file was corrupt, this is the instructions

1. ÖÆÉý¼¶!;ÄÜÊ¹ÓÃ£°  
ÏÈÓÃÍ¨·ÓÃÉý¼¶³ìÐð£-ÉÕÐ´0.92°æ±¾¹ì¼pµ½ÄãµÄÄ£¿é£;

2. È»°ó²îÕÕïÄÃæÔÆÉý¼¶Ö,Áîê³É×îÐÂ°æ±¾Éý¼¶

Update steps

1. Make sure TE (terminal equipment) is in sta or sta+ap mode

ex. AT+CWMODE=3

OK

AT+RST

2. Make sure TE got ip address

ex. AT+CWJAP="ssid","12345678"

OK

AT+CIFSR

192.168.1.134

3. Let's update

ex. AT+CIUPDATE

+CIUPDATE:1 found server

+CIUPDATE:2 connect server

+CIUPDATE:3 got edition

+CIUPDATE:4 start start

OK

note. If there are mistakes in the updating, then break update and print ERROR.

[Link \(/blog/esp8266-reflash/#comment-229\)](#) / Reply



**Wilson Mach**

2 months, 2 weeks ago

I can't seem to send any commands to the ESP8266

I reset it and I would get

@atal exception (0):

epc1=0x402191bf, epc2=0x00000000, epc3=0x00000000, excvaddr=0x00000000,

depc=0x00000000

ets Jan 8 2013, rst cause:4, boot mode:(3,7)

```
wdt reset
load 0x40100000, len 212, room 16
tail 4
chksum 0x5e
load 0x3ffe8000, len 788, room 4
tail 0
chksum 0x1c
load 0x3ffe8314, len 72, room 8
tail 0
chksum 0x55
csum 0x55
jump to user1
```

I'm suppose to get a ready but it never appears. Does anyone know what's wrong? The main problem is the fact that I can't send commands. I've checked the wires and everything is in check. I just don't get a response from commands and the only response is from resetting on the RST pin.

[Link \(/blog/esp8266-reflash/#comment-232\)](/blog/esp8266-reflash/#comment-232) / Reply



**Android (http://smart-device.ir/)** کنترل خانه هوشمند اندروید پروژه الکترونیک

2 months, 1 week ago

Thank You

I've tried [flash](http://smart-device.ir) downloader but got this error:  
connecting ....  
Erasing flash...

Writing at 0x00000000... (0 %)  
Invalid head of packet

How should I solve it?

[Link \(/blog/esp8266-reflash/#comment-233\)](/blog/esp8266-reflash/#comment-233) / Reply



**Bill**

2 weeks, 3 days ago

Hi, I have the same problem (invalid header). Have you solved it?  
I have tried many different flashing tools and different firmware versions. I have grounded the GPIO0 already...

[Link \(/blog/esp8266-reflash/#comment-240\)](/blog/esp8266-reflash/#comment-240) / Reply

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Name

required

Email

required (not published)

Website

optional

Comment

Comment

0 items in cart: \$0.00 (/shop/cart/)

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