



## Using ESP8266 WiFi microcontroller as Serial Internet Modem

Started by jedimatt42, Oct 26 2015 1:33 AM

jedimatt42 OFFLINE

Posted Mon Oct 26, 2015 1:33 AM

I have, after a false start, succeeded in getting my TI to telnet into heatwavebbs.com using a little wifi adapter I've built out of two basic components:

- 1) An Adafruit Huzzah ESP8266 breakout board ~ \$10 - <https://www.adafruit.com/products/2471> (<https://www.adafruit.com/products/2471>)
- 2) A Female Serial MAX232 adapter ~ \$3 \$10 - <http://www.amazon.co...duct/BooOPTOKIo> (<http://www.amazon.com/gp/product/BooOPTOKIo>)

<https://goo.gl/photo...BiFAQg3hute4ma6> (<https://goo.gl/photos/o8BiFAQg3hute4ma6>) ( I can't seem to attach photos this weekend... but here is the google album. )

The MAX232 board is a simple serial to ttl converter.

The ESP8266 chip is a growingly popular SoC that has an available firmware that lets you simply communicate to the internet with AT+ commands. To use like a modem, you have to update the firmware to the latest, and then use the 'transparent' mode, which lets all received data through to the chips serial out, and passes all input from serial to the other end.

The cheaper raw ESP8266 chips can be had for less than \$5. But the first one of those I bought had defective ram. And then to make it come close to working, I still had to build a little board with some pull up resistors to control the boot mode. And to update the firmware I would have had to build out even more. By going with the Adafruit breakout board, it is easily flashed to the latest firmware with an FTDI USB cable. You can test it with that cable on a PC to get a feel for it, and configure a sufficiently slow bps for connecting to the TI.

Then I wired up the TX, RX, and power for the MAX232. Conveniently, the Adafruit board regulates voltage, and makes 3.3v available. So I simply have a USB cord connected to provide power, and the MAX232 borrowing power off the Adafruit, and TX and RX wired up between the boards. The Adafruit board duplicates the VIN, and TX and RX for the FTDI cable, so I can still tinker with it on the PC if I need to flash it again or whatever.

I had to configure it down to 2400 bps to work well on the TI. Later I'll try hooking up the RTS & CTS for hardware flow control, and then maybe I can do 9600 bps.

AT Commands are interesting. ( I'm using firmware version 0.50 for the ESP8266 )

AT+UART\_DEF=2400,8,1,0,0

Sets the serial mode to 2400 bps, 8n1, and no flow control.

AT+CWMODE=1

Puts the thing in client or 'station' mode, instead of access point mode.

AT+CWJAP="myssid","mypassword"

join an access point. Use AT+CWJAP\_DEF="myssid","mypassword" to store it for default power state.

AT+CIPMODE=1

sets up transparent mode, otherwise everything coming back gets prefixed with +IPD

AT+CIPMUX=0

turns off multiplexing. required for transparent mode.

AT+CIPSTART="TCP","heatwavebbs.com",9640  
opens the connection, and stuff you receive starts to show up. 😊

AT+CIPSEND  
Opens up your outgoing communication so you can interact with the BBS.

Theoretically, you can press "+++" to get out of CIPSEND mode, and back to the AT mode... but I haven't been able to yet.. the reset button on the board works well enough instead. If you can get back to AT mode, then you'd close the connection with AT+CIPCLOSE

I need to get a little case for it, add a power switch, and add the hardware flow control ( that's just hooking up two more wires, and reconfiguring the UART on the ESP8266 )

TELCO worked ok. I just saw a thread with the TELCO manual today, so I'll have to look and see if the auto-dialing can be made to work. It is nice that this chip's firmware does DNS lookup. Oh, you have to configure your terminal program to send CR/LF when you press enter, or else the chip will ignore you.

I hope someone else finds this useful...

-M@

Edited by jedimatt42, Tue Oct 27, 2015 11:03 PM.

**Vorticon** OFFLINE

Posted Mon Oct 26, 2015 6:38 AM

Very cool! I don't have a true landline anymore as my home phone is now via my cable provider, and I have had very little luck getting a reliable modem connection to any BBS. So I'm stuck using telnet only with my PCjr.  
Check out Dave Brown's Term80 terminal program for the TI though instead of Telco. It gives you pseudo 80 columns as well as full color ANSI graphics, so it would be perfect for the heatwave bbs. I can send you disk images or real disks if you'd like (PM me).

**ti99iuc** OFFLINE

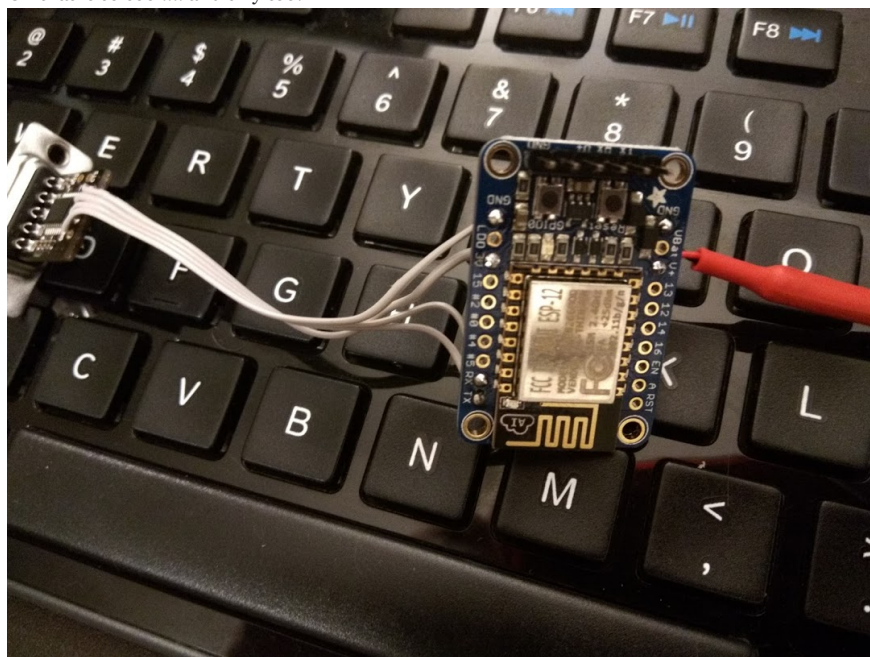
Posted Mon Oct 26, 2015 6:41 AM

WOW ! 🤖

**Ω** OFFLINE

Posted Mon Oct 26, 2015 6:49 AM

Oh that is so cool.... and tiny too!



**Cschneider** OFFLINE

Posted Mon Oct 26, 2015 10:46 AM

Let us know how the 9600 bps works with you get your RTS and CTS pins hooked up.

also will it AutoAnswer ?

**jedimatt42** OFFLINE

Posted Mon Oct 26, 2015 12:10 PM

*Cschneider, on 26 Oct 2015 - 6:46 PM, said:*

Let us know how the 9600 bps works with you get your RTS and CTS pins hooked up.

will do!

*Cschneider, on 26 Oct 2015 - 6:46 PM, said:*

also will it AutoAnswer ?

It does have some 'server' connection modes. But it doesn't generate 'RING' and I don't think it responds to ATA. Server mode might act more like auto answer... I'll experiment with that and see. I can hear you thinking about using it for the hosting side of the BBS.

An interesting aspect of it, is that it supports multiplexing multiple connections over the one serial port. For a BBS client, I'm obviously taking steps to turn that off. But theoretically, you could rewrite some BBS hosting software to understand the indicators for data coming from different client channels, and sending packets of data out directed at those specific client channels again. In this mode, everything coming in starts with +IPD and some connection number, and meta data about the data, then the data. The outgoing data is sent with AT+CIPSEND=<channel>, <length>,<data>.... It would require very differently designed BBS hosting software, but you could service multiple callers with one serial port.

These chips are also completely reprogrammable. They have extensions to the Arduino dev SDK to target them if you want to replace the firmware completely.

**slinkeey** OFFLINE

Posted Tue Oct 27, 2015 7:12 PM

*jedimatt42, on 26 Oct 2015 - 09:33 AM, said:*

I have, after a false start, succeeded in getting my TI to telnet into heatwavebbs.com using a little wifi adapter I've built out of two basic components:

- 1) An Adafruit Huzzah ESP8266 breakout board ~ \$10
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The MAX232 board is a simple serial to ttl converter.

...

By any chance is that a MAX3232?

I only ask because the MAX3232 is a new design that will accommodate 3.3v correctly, according to the spec sheets.

**slinkeey** OFFLINE

Posted Tue Oct 27, 2015 10:38 PM

Awesome though! 🍷

**jedimatt42** OFFLINE

Posted Tue Oct 27, 2015 10:59 PM

*slinkeey, on 28 Oct 2015 - 03:12 AM, said:*

By any chance is that a MAX3232?

I only ask because the MAX3232 is a new design that will accommodate 3.3v correctly, according to the spec sheets.

I believe it is that design... SP3232EE. Ridiculously difficult to read. And I was wrong, this wasn't the \$3 item of DX.com, but a \$10 item I got from Amazon: <http://www.amazon.co.uk/dp/B00OPTOKIo> (<http://www.amazon.com/gp/product/B00OPTOKIo>)

I had purchased a similar item from DX.com but it was less convenient to integrate.

**jedimatt42** OFFLINE

Posted Mon Nov 2, 2015 7:55 PM

I took a stab at enabling hardware flow control and had no luck. More research needed. It looks like hardware flow control is sharing a pin with a boot mode control. I may need a switch to only connect that after power on. Or more...

Wiring it the way I had also screws with the ftdi programming cable. So you don't want to lock it in with the serial port attached. But you can put the tx rx on the ftdi header instead.

But it worked really well at 2400, so still cool.  
I'll keep at it.

-M@

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