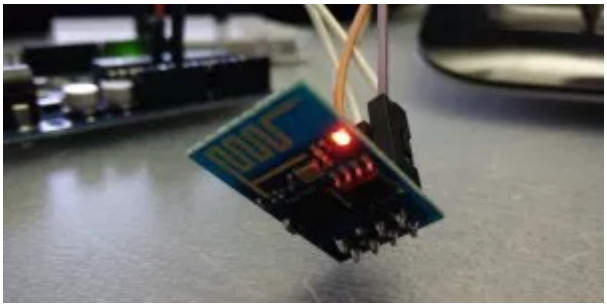
Feiticeir0's Blog

ESP8266 – Arduino wireless communication

October 20, 2015 by feiticeir0 / 7



ESP is a wonderful module – it can connect to wifi networks, create a webserver (accepting connections) and is very very cheap ! Its a lot more than this – just google it and you'll find out.

The communication is made through Serial communication using AT commands. You can connect it to a FTDI board and communicate with it !

There's a lot of documentation in the Web, but room-15 has a very nice page with the command reference for the ESP8266.

But, the ESP8266 module can provide wifi (like a wifi shield) for the Arduino to connect to and start communication with other devices – Just like the example we're going to see here.

Hardware

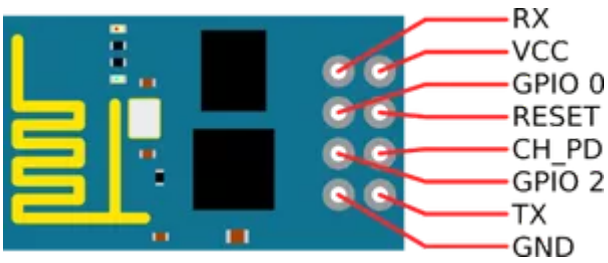
1x Arduino UNO (or any other)

1x ESP8266 module

1x breadboard

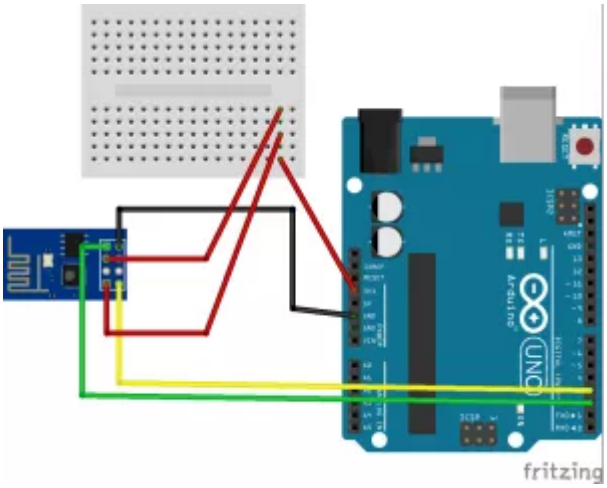
1x PC with a web server with PHP support

Wiring



ESP-01 Pinout – Image from http://randomnerdtutorials.com

NOTE: The ESP8266 connects to 3.3v AND NOT 5v



Software

Now, setup the apache webserver (or any other you may prefer). Just copy and paste the below code in any directory of your server. Mine is in /tmp and the page is called val.php

APACHE WITH PHP

```php
<?php
    $val = $_GET['string'];
    $bf = fopen("test.txt","w+");
    fwrite ($bf,$val);
    fclose($bf);
?>
```

The code just expects a variable named string, opens a file (always overwriting) and puts the content of the string inside.

ARDUINO

```
/**
* Testar o ESP8266
* Ligando apenas a uma rede sem fios
* E tentar aceder a uma pagina web
* e enviar uma string
*
* Feiticeir0 - http://blog.whatgeek.com.pt
*/

#include <SoftwareSerial.h>
#include <stdlib.h>

```

```
// RX ESP -> TX Arduino
// TX ESP -> RX Arduino
SoftwareSerial ESPSerial(2, 3); // RX, TX

// this runs once
void setup() {

  // enable debug serial
  Serial.begin(9600);
  // enable software serial
  ESPSerial.begin(9600);

  // reset ESP8266
  ESPSerial.println("AT+RST");

  //conect to network
  ESPSerial.println("AT+CWMODE=1");
  ESPSerial.println("AT+CWJAP=\"<SSID>\",\"<PSK>\"");
  delay(4000);
}


// the loop
void loop() {

  // TCP connection
  String cmd = "AT+CIPSTART=\"TCP\",\"";
  cmd += "<WEBSERVER_IP>";
  cmd += "\",<PORT>";
  ESPSerial.println(cmd);

  if(ESPSerial.find("Error")){
    Serial.println("AT+CIPSTART error");
    return;
  }

  // prepare GET string to send - page to get - val.php
  String getStr = "GET /tmp/val.php?string=";
  // String to display
  getStr += "fromESPv4";
  getStr += "\r\n\r\n";

  // send data length
  cmd = "AT+CIPSEND=";
  cmd += String(getStr.length());
  ESPSerial.println(cmd);

  if(ESPSerial.find(">")){
    ESPSerial.print(getStr);
  }
  else{
    ESPSerial.println("AT+CIPCLOSE");
    // alert user
    Serial.println("AT+CIPCLOSE");
  }

  delay(1000);
}
```

A little explaining of the code

Because Arduino boards can get a bit cranky when connecting something to the PINs 0 and 1, I've changed them to 2 and 3 – PINs 0 and 1 are used for serial communication and if used we might lose the ability to load sketches onto the board. You can read more about that here and here.

Running just one time (void setup()), we do a reset of the board and connect to a wireless network

Reset the ESP8266 board

```
AT+RST
```

Put the ESP in client mode (station mode)

```
AT+CWMODE=1
```

Connect to a wireless network

```
AT+CWJAP=\"<SSID>\",\"<PSK>\"
```

<ssid> and <psk> to be replaced by the correct values (ie: wireless SSID and network password)

In the void loop() section, the code to send data to a web server

Establish a TCP connection to a web server and port

```
AT+CIPSTART=\"TCP\",\"";
   cmd += "<WEBSERVER_IP>";
   cmd += "\",<PORT>";
```

Prepare data to send – HTTP call, GET method

```
String getStr = "GET /tmp/val.php?string=";
   // String to display
   getStr += "fromESPv4";
   getStr += "\r\n\r\n";
```

SEND THE DATA

First, send the length of the data

```
cmd = "AT+CIPSEND=";
   cmd += String(getStr.length());
   ESPSerial.println(cmd);
```

After the execution of the above command, ESP will enter "unvarnished mode – returning of '>' character" – that we search for in the return of the command

```
if(ESPSerial.find(">")){
```

And, if successful, send the actual data

```
ESPSerial.print(getStr);
```

If not, we close the connection

```
  ESPSerial.println("AT+CIPCLOSE");
```

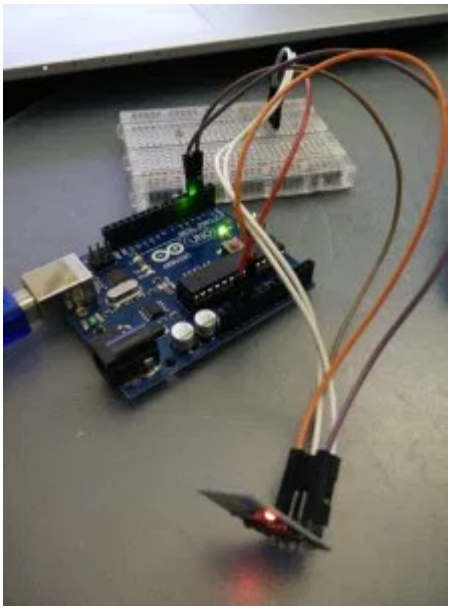
Now, connect your arduino and monitor the logs of your web server

In the apache logs – access.log – if it works, will get something like the following:

```
192.168.50.146 - - [19/Oct/2015:22:31:01 +0100] "GET /tmp/val.php?string=fromESPv4" 200 1
192.168.50.146 - - [19/Oct/2015:22:32:07 +0100] "GET /tmp/val.php?string=fromESPv4" 200 1
192.168.50.146 - - [19/Oct/2015:22:32:28 +0100] "GET /tmp/val.php?string=fromESPv4" 200 1
192.168.50.146 - - [19/Oct/2015:22:33:18 +0100] "GET /tmp/val.php?string=fromESPv4" 200 1
```

192.168.50.146 is the IP of the ESP8266

This is just an example of how to use the ESP8266 module as a wireless card for the Arduino. You can also use the ESP8266 independently – that's the power of the ESP8266



Category: Arduino Tag: add wifi to arduino with ESP8266, Arduino ESP8266 tutorial, Arduino ESP8266 wifi module, ESP8266 module Arduino, ESP8266 WiFi Module connect to Arduino, Use Arduino and ESP8266 to connect to wifi, use ESP8266 with Arduino as a wifi-shield, Use ESP8266 with Arduino to connect to a wireless network 7 Comments

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INSTALL XIBO IN CENTOS 7 X86_64

7 thoughts on “ESP8266 – Arduino wireless communication”

Prashant

May 4, 2016 at 18:14

Hello,

thanks for the explanation. I have some questions:
– the functions like : ESPSerial.print(), are written by you in special library? As these functions are not part of standard SoftSerial library from Ardunino.
– But i tried to copy your code with with mySerial.write(), like in standard library. But some how it doesnt work. Any hint?
Thanks a lot for any suggestion.

REPLY

feiticeir0

May 4, 2016 at 18:22

Hi Prashant !

No, the ESPSerial.print is like the Serial.print function, but with the ESPSerial variable name. On line 15, I’m initialing a variable called ESPSerial using the SoftwareSerial library. Is the same as Serial.begin or Serial.println – but ESPSerial variable uses the PINs 2 and 3 that are connected to the ESP8266 and takes advantage of the SoftwareSerial library whereas Serial uses the Arduino serial port on PINs 0 and 1.

Do you have the SoftwareSerial library installed ?

REPLY

Keshav

July 20, 2016 at 12:21

I have interfaced with the above circuit set up but after executing ,In my serial monitor, it displays AT+CIPCLOSE continously.

REPLY

feiticeir0

July 20, 2016 at 13:12

Hi Keshav !

That appears to be a firmware problem – please check it here:
https://github.com/adafruit/Adafruit_ESP8266/issues/2

and here

http://www.esp8266.com/viewtopic.php?f=14&t=5492

and here (for a firmware upgrade):
http://bbs.espressif.com/viewtopic.php?f=13&t=163#p632

Probably a firmware upgrade could solve your problem.

hope it helps

REPLY

Keshav
July 21, 2016 at 07:45

Ok.Thank you for the reply.

REPLY

DURGESH JOSHI
January 2, 2017 at 08:54

this blog is a waste of time leave the code just connection itself is wrong it's never gonna work. the blogger more concerned about the visitors than concept.

REPLY

feiticeir0
January 2, 2017 at 12:24

ah ah ah ah ah 🙂 You must be one of those trolls...

Have you tried the code ? Of course not.. If you did, you new it works.. It is to show how to communicate using the ESP8266. Is not rocket science on how to go to mars! Next time, just leave a constructive comment. If it is wrong, just offer a solution !

REPLY

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12h

Bruno Ricardo Santos Retweeted

The Pi Hut
@ThePiHut

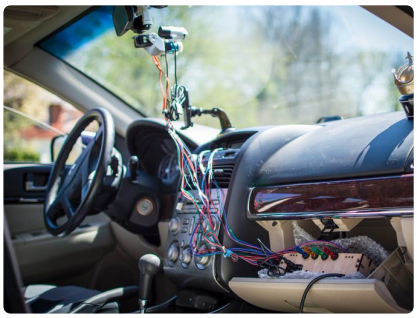
We're at Sony today to see Raspberry Pi being made! Hopefully we'll be allowed to take photos!

14 Mar

Bruno Ricardo Santos Retweeted

Into Robotics
@IntoRobotics

This project make my day! #robotics #AutonomousVehicles #ArtificialIntelligence #raspberrypi bit.ly/2noDBNX



14 Mar

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Shower Thoughts
@TheWeirdWorld

The most blessed people are those who sneeze the most.

13 Mar

Bruno Ricardo Santos

Retweeted

50 Nerds of Grey
@50NerdsofGrey

He really enjoyed 3.14159265 in a bed . . . he was Pi-sexual.
#PiDay

14 Mar

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