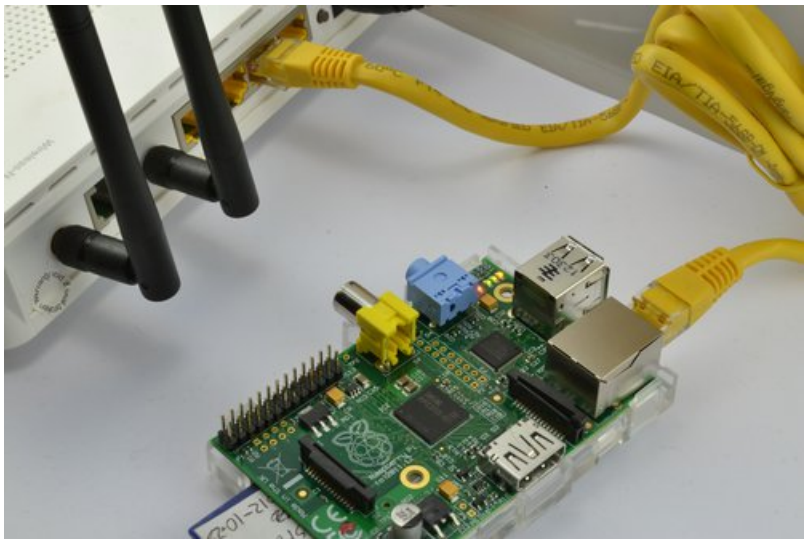
adafruit learning system

Adafruit's Raspberry Pi Lesson 3. Network Setup

Created by Simon Monk



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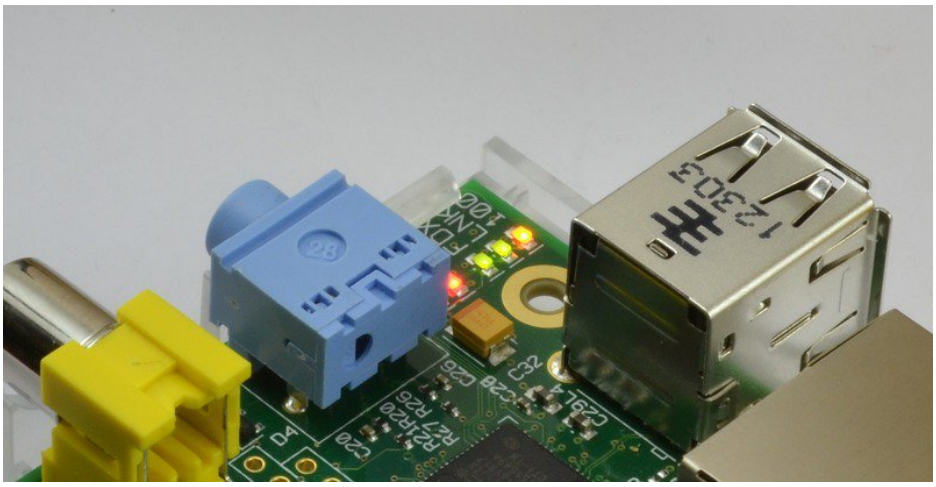
Overview

One of the first things that you will want to do is to get your Raspberry Pi connected up to the Internet.

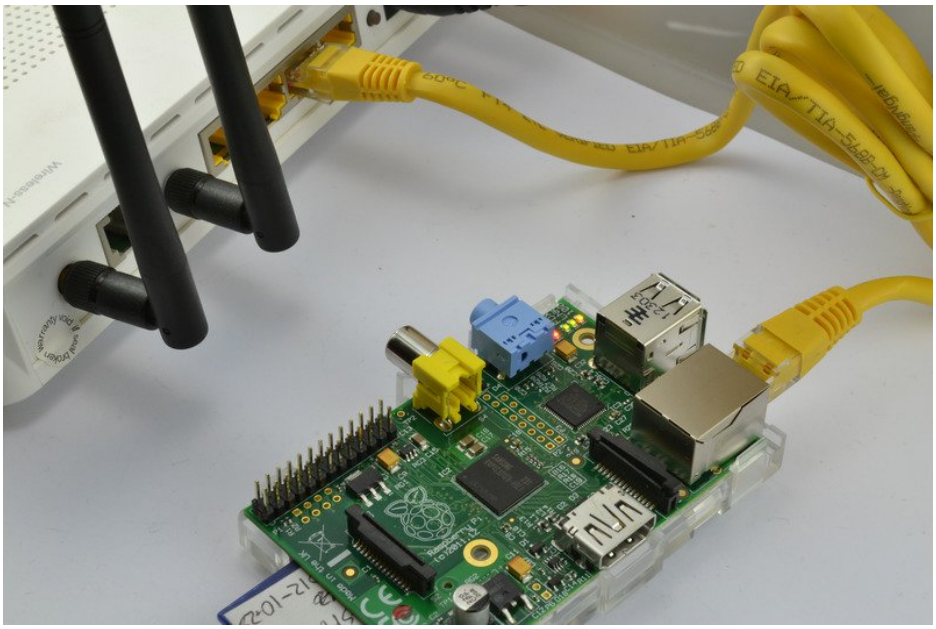
In this lesson, you will learn how to:

- Connect using an Ethernet cable
- Use a WiFi adapter with both Raspbian and Occidentalis
- Find out the IP address of your Raspberry Pi

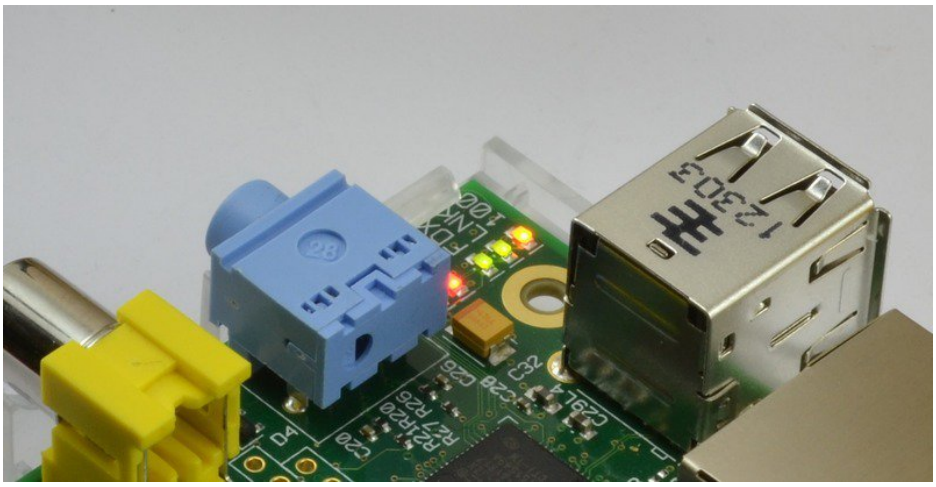


Using a Wired Network

The quickest way to get your Raspberry Pi connected is to use an Ethernet patch cable and just plug it into the back of your home network router.



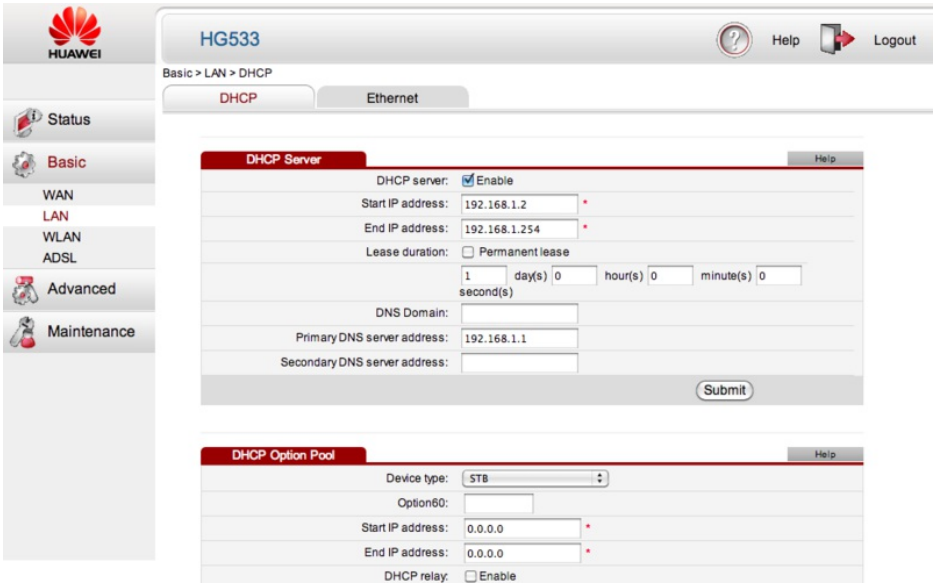
As soon as you plug your Pi in, you should see the network LEDs start to flicker.



For most home networks, you should also be able to connect to the Internet without any further configuration. For this to work, your router should be configured for DHCP (Dynamic Host Configuration Protocol). This service runs on your home network router, dishing out IP addresses to any device that connects to it either through WiFi or by cable.

If DHCP is not turned on, on your home network router, then connect to its management console using a different computer that is already connected.

You should be able to find a setting somewhere that turns it on.


HUAWEI
HG533
Help
Logout
Basic > LAN > DHCP
DHCP
Ethernet
Status
Basic
WAN
LAN
WLAN
ADSL
Advanced
Maintenance
DHCP Server
Help
DHCP server:
Enable
Start IP address:
192.168.1.2
End IP address:
192.168.1.254
Lease duration:
Permanent lease
1
day(s)
0
hour(s)
0
minute(s)
0
second(s)
DNS Domain:
Primary DNS server address:
192.168.1.1
Secondary DNS server address:
Submit
DHCP Option Pool
Help
Device type:
STB
Option60:
Start IP address:
0.0.0.0
End IP address:
0.0.0.0
DHCP relay:
Enable

Buying a USB WiFi Adapter

Look for a WiFi adapter that supports the RTL8192cu chipset, as both the latest Raspbian and Occidentalis distributions both have support for this built-in and we've found its much faster than the Ralink chipsets

If you already have a WiFi adapter, just give it a go, even a lot of the very low cost budget adapters will work without any trouble.

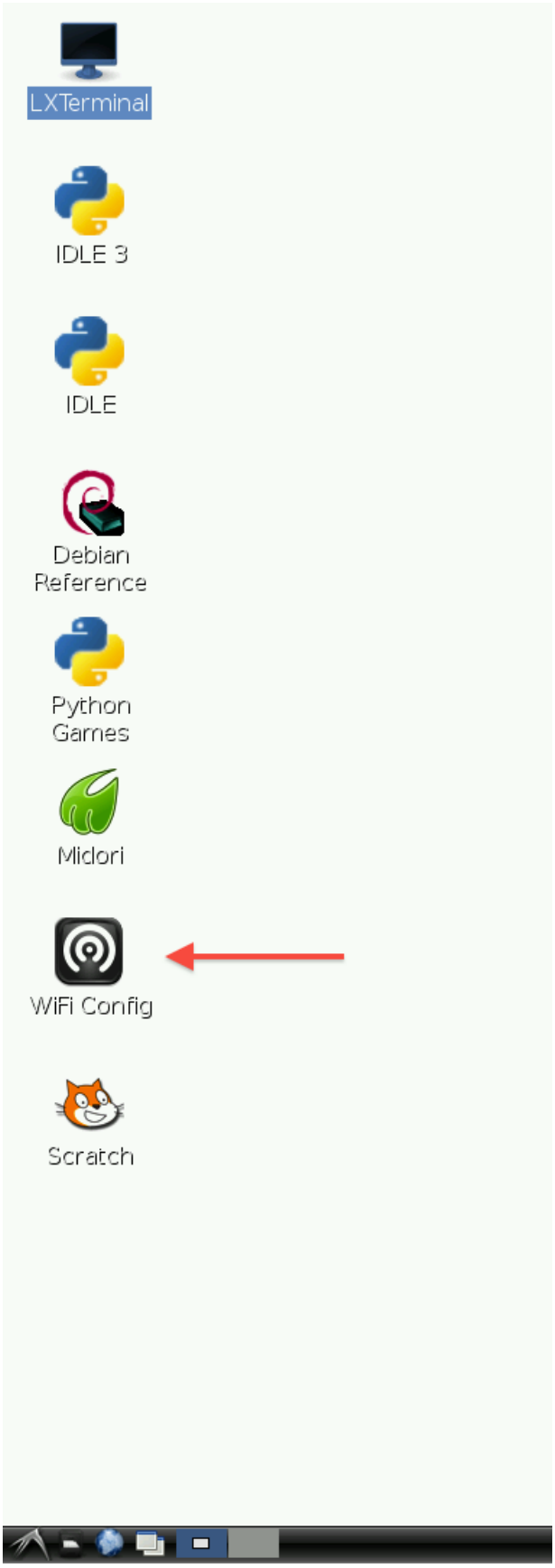
WiFi does however use quite a lot of power, so check the power rating of your power supply. Some WiFi adapters require an external power supply to work well. We suggest the 5V 1A power adapter in our shop if this is the case (http://adafru.it/501). All of the WiFi adapters we have in the Adafruit shop will work just fine this way.

If you have a WiFi adapter plugged in, then you no longer have two free USB sockets available for your keyboard and mouse, so you may also need a powered USB hub. (http://adafru.it/961)

Setting up Wifi with the Graphic Interface

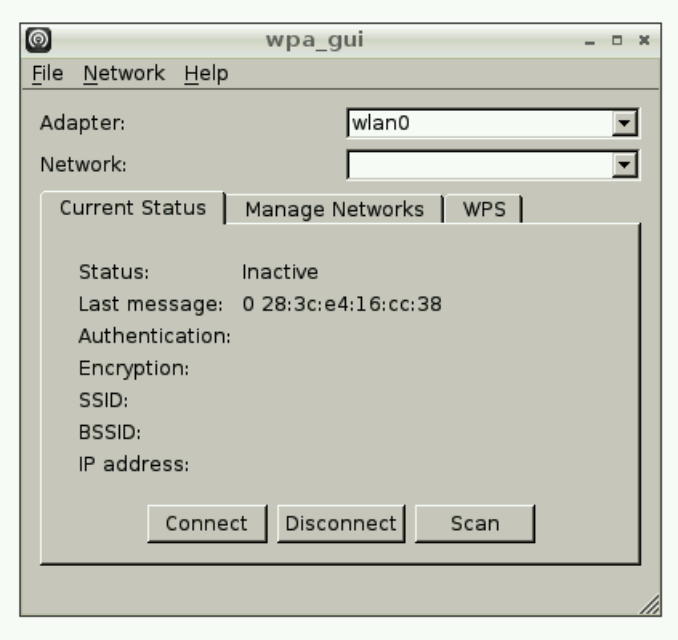
> Setting up WiFi requires that your router is broadcasting the SSID. Make sure you have "Broadcast SSID" set up on your router! This will not work with "private" SSID setups

Raspbian releases after 2012-10-28 include a WiFi configuration utility. You will find the shortcut for this on the Desktop. If you are using command-line tools or are logging in over Ethernet, check the next page for how to edit **/boot/wpa_supplicant.conf** by hand


LXTerminal
IDLE 3
IDLE
Debian Reference
Python Games
Midori
WiFi Config
Scratch

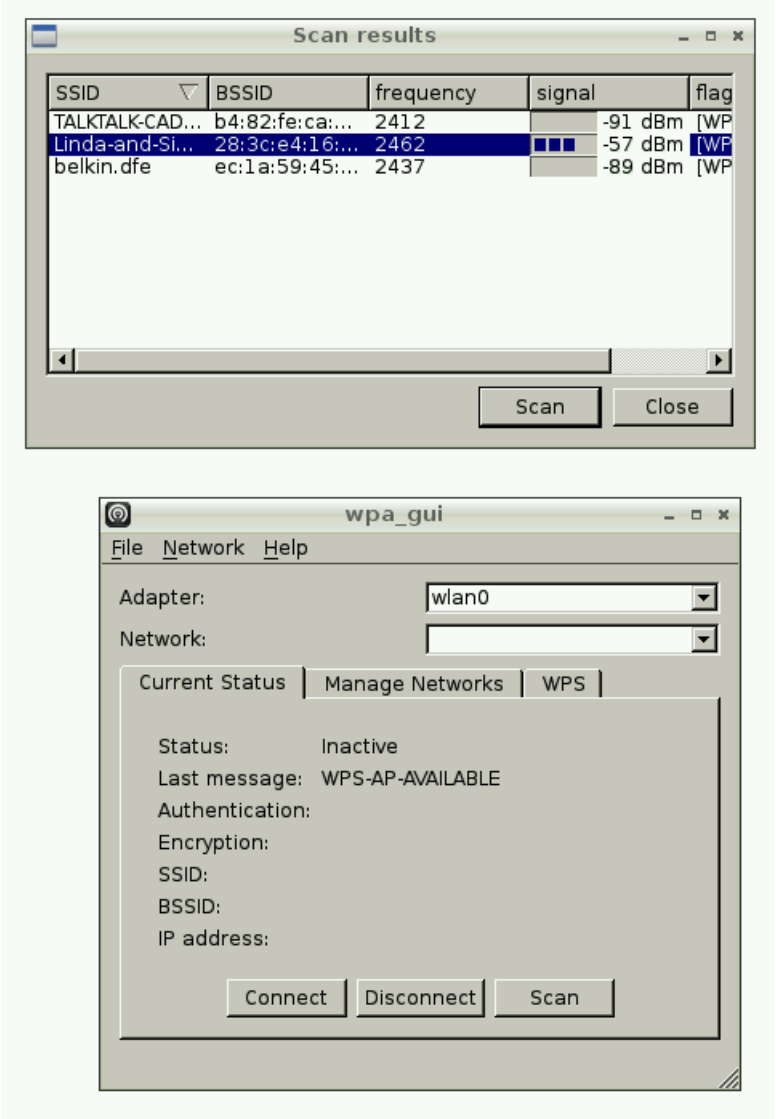
Step 1.

Double-click the icon and this is what you will see.



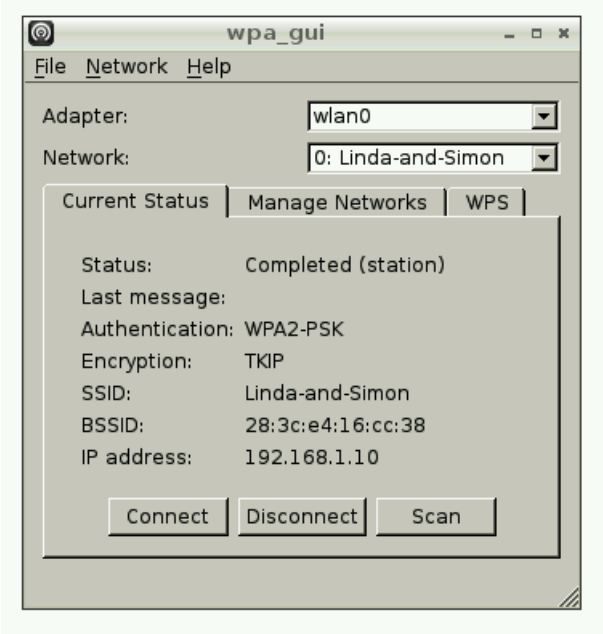
Step 2.

Click on the Scan button and a second window will open. Find your Wireless access point in the list and double click on it. This will open another window.



Step 3.

Enter your password in the PSK field and then click Add. When you look at the first window, you should see that the connection is all set up for use. You can connect or disconnect using the buttons. Notice also the IP address of the Pi is shown at the bottom of the window.


wpa_gui
File Network Help
Adapter: wlan0
Network: 0: Linda-and-Simon
Current Status
Manage Networks
WPS
Status: Completed (station)
Last message:
Authentication: WPA2-PSK
Encryption: TKIP
SSID: Linda-and-Simon
BSSID: 28:3c:e4:16:cc:38
IP address: 192.168.1.10
Connect
Disconnect
Scan

Setting up Wifi with the Command Line

To configure Wifi you will need to edit the file **/etc/wpa_supplicant/wpa_supplicant.conf**. There are two ways to do this as described below. Use whichever is most convenient for your setup and situation.

With either approach, you'll want the contents of the file to be what is shown below. Replace **YOURSSID** and **YOURPASSWORD** with whatever is used for your network setup.

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
country=US

network={
    ssid="YOURSSID"
    psk="YOURPASSWORD"
    scan_ssid=1
}
```

Don't put any spaces around the = in this file. It doesn't like that.

https://adafru.it/B1R

https://adafru.it/B1R

Create the file in /boot

This approach will allow you to configure Wifi by creating and editing the file directly on the SD card in another PC. The **/boot** partition is FAT formatted which is readable by most PC's. So you can simply insert the SD card in a USB reader and a **boot** folder should show up.

If you create a **wpa_supplicant.conf** file in **/boot**, it will be copied to the main partition's **/etc/wpa_supplicant** location at boot time,replacing whatever is there. It will then be deleted from **/boot**, so you won't see it there if you go looking.

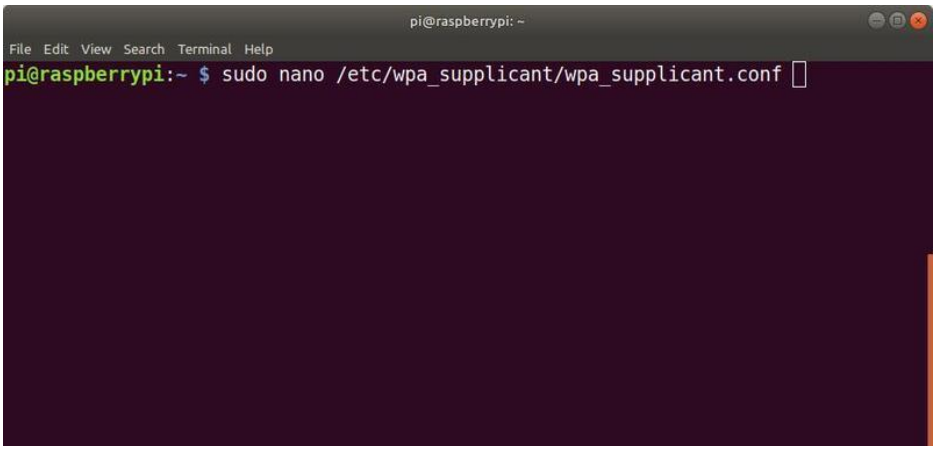
So just use whatever text editor (not word processor) you want on your PC to create the file in **/boot**, like this:

Save the file and safely remove the SD card from your PC. Put it in the Raspberry Pi and power it up. If all goes well, it should copy the file over and connect to your Wifi.

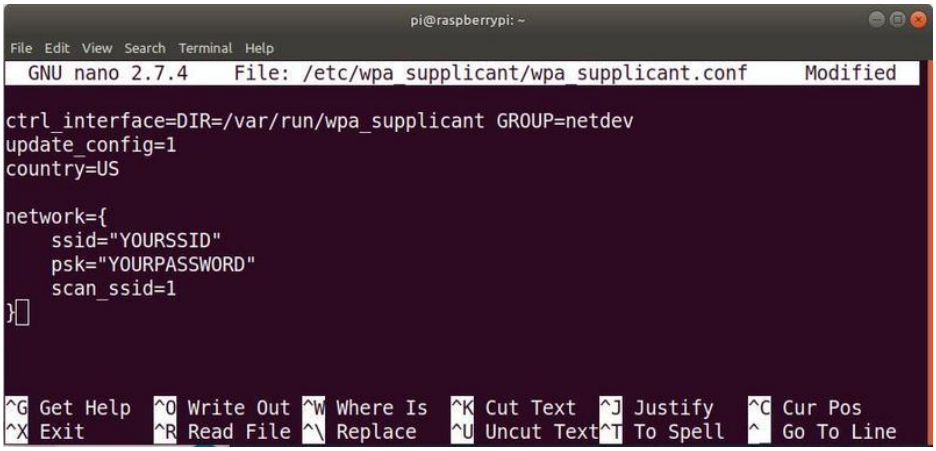
Edit the file in /etc/wpa_supplicant

This is the more direct approach - you edit the file directly on the Raspberry Pi. This approach works good if you are already connected to the Raspberry Pi via a console cable or monitor.

Since this file requires elevated privileges to access, you'll need to open it with **sudo**.



Then add the contents. Don't forget to actually change **YOURSSID** and **YOURPASSWORD**.



Press CTRL-X and then Y to save and and exit. Then run the following command to have the file read and try to connect to your Wifi.

```
sudo wpa_cli -i wlan0 reconfigure
```

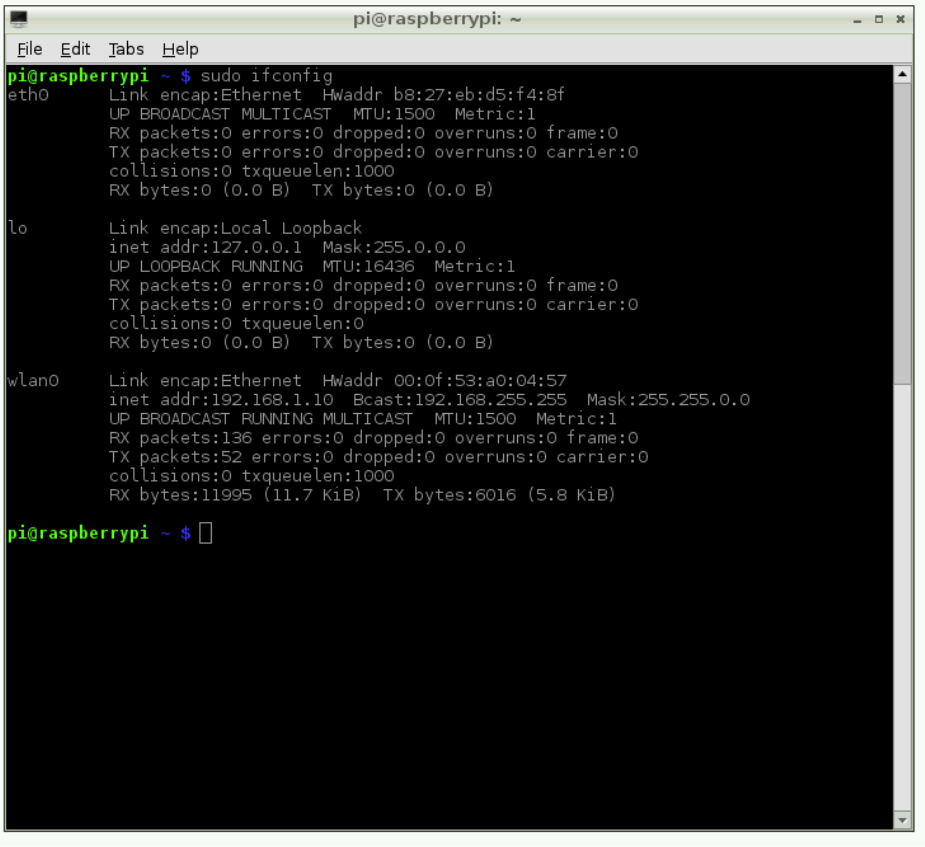
pi@raspberrypi: ~
File Edit View Search Terminal Help
pi@raspberrypi:~ $ sudo wpa_cli -i wlan0 reconfigure
OK
pi@raspberrypi:~ $

Finding Your Pi's IP Address

You can find the IP address of your computer, either by opening the WiFi setup tool again. The IP address will appear at the bottom of the Window.

If you are using Occidentals, or you want to do this over a command line terminal. Open up a LXTerminal window and type the following command:

```
sudo ifconfig
```



Next to the **wlan0** entry you will see inet addr: **192.168.1.10** which is the IP address of the Raspberry Pi.

Remember! If your IP address starts with **192.168** or **10.0** then its an internal address - that means you can get OUT to the Internet but you cannot have someone outside your home or network reach your Pi via the IP address. This is important if you want to have a webserver running on a Pi that outside people can reach. In general, its much safer to keep your Pi on an internal network so it can't be hacked as easily!

Test and Configure

If you have X running, open the Midori web browser and navigate to the URL of your favourite electronics supplier.

If you are using a command line, the **ping** command can be used to see if you are reaching the internet. Try **ping google.com** or **ping adafruit.com** to check if you can reach those sites!

Fixing WiFI Dropout Issues

If you find your module 'drops out' from time to time, you can fix it fairly easily with a command line fix *(thanks perseus286* (https://adafru.it/cL5)*!)*

Create and edit a new file in /etc/modprobe.d/8192cu.conf

> **sudo nano /etc/modprobe.d/8192cu.conf**

and paste the following in

```
# Disable power saving
options 8192cu rtw_power_mgnt=0 rtw_enusbss=1 rtw_ips_mode=1
```

Then reboot with **sudo reboot**

https://adafru.it/aTH

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