BraxRouter Software
for Raspberry PI 5, 4, 3B+
Version 5.5
User Guide

PART I - STARTING YOUR BRAX ROUTER

1. Insert the Micro-SD card with the BraxRouter Software into the Micro-SD Slot of the Pi. The case may vary for each Rasp Pi device. If there is an existing Micro-SD card, use a thin object like a paper clip to gently push the old card out. Note that there is a lip on the Micro-SD card.

   The current version uses a 16GB Micro-SD card. Some brands of 16GB cards do not have 16GB available so if you are burning your own card, we recommend a Sandisk 16GB or larger.

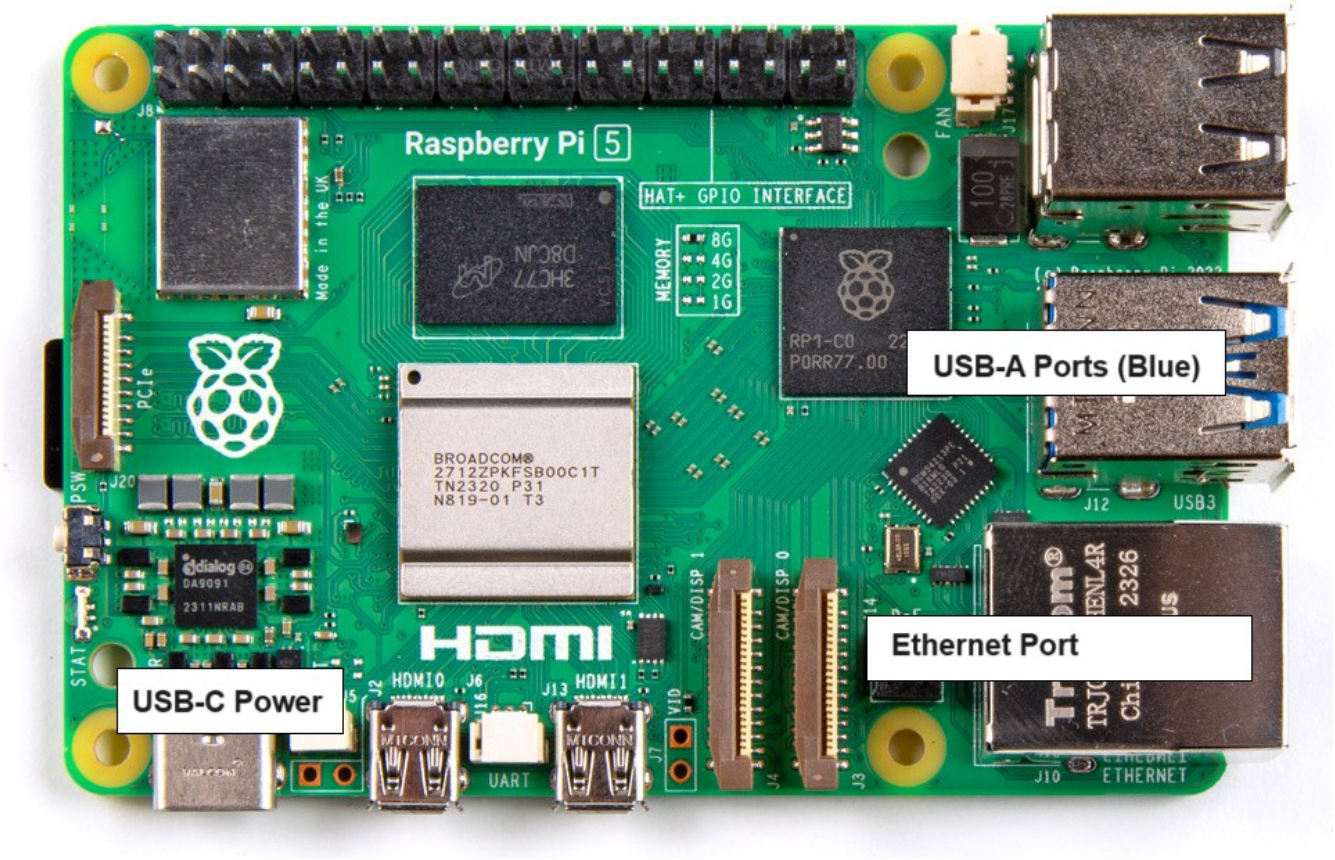
2. Attach all the desired accessories on the Raspberry PI. For unattended operation, all you need is to plug in one end of the Ethernet cable into the built in Ethernet slot on the Pi and then plug the other end into a LAN port on your main router. And as the last thing (always the last thing), you plug in the Power Supply. This will boot the Raspberry Pi.

   This will immediately start the PI in Wifi Mode. See next section for login instructions.

   If you want to actually control the Raspberry Pi directly and use it like a computer, simply plug in a monitor with an HDMI cable, and a USB Keyboard. Here is the layout of a Raspberry PI 5. The Raspberry PI 4 has some differences. The Ethernet port is located on the opposite side.

   BraxRouter is not intended for use as the only router. It is designed to be a child router of your main (upstream) Wifi router likely supplied by your cable provider. This router will provide HCP to BraxRouter. Without it, the BraxRouter will not have DHCP.

   There are special instructions of this device will be used in Wired mode (no Wifi). Wired mode is recommended if you’re running the BraxRouter in a large space. See Part VI.



3. Once the boot process is completed on the Raspberry Pi (which can take over 1-2 minutes), the device will be operational. There may be additional delays when starting in TOR mode for the first time or after switch from another mode.

4. If you are using an Ethernet USB dongle or a Wifi Adapter dongle, please reboot the device TWICE. The first boot will detect the device. Wait at least 2 minutes before rebooting. You can also notice that the status lights on the device will just be a steady green light.

5. If you are using a Raspberry PI 4 or 5 in wired mode, the following needs to be installed on it. There should be heat sinks, particularly on the CPU and the Memory a (which is adjacent to the CPU) and over the USB chip. Also each Raspberry PI version uses a different power supply. So it is important to get the correct parts.

   In our testing, there is no difference in performance between a Raspberry PI 4 vs a Raspberry PI 5 in Wifi mode.

PART II – CONNECTING TO YOUR BRAX ROUTER

To begin using your BraxRouter, simply connect to the Wifi using the regular Wifi features of your device.

Use these default credentials.

SSID (Wifi Name): HomeWifi
Password: hidemyzuckingass

If you made a mistake when entering the password, the best way to correct is to first use the option “Forget the Network” on your computer or mobile device: so you can start again cleanly.

You will need a BytzVPN account to fully utilize BraxRouter. It is shipped with a temporary subscription. You will need to update it with your own credentials before the service terminates.

PART III – CONFIGURING YOUR BRAX ROUTER VIA HOMEWIFI

To configure your BraxRouter, we will need to access it via an IP Address. There will be 3 ways of doing this. Normally the first method described here will be easiest and simplest but the other methods will be discussed as well if you are not able to access the device due to a prior misconfiguration.1.

If you followed the instructions to connect to 'HomeWifi' as your Wifi, you will automatically have a connection to the device and the BraxRouter will have a fixed IP address of **192.168.44.1**

Using a browser, type the above IP address on the URL or address bar and it will display the page similar to that shown below.

If you want extra security, prefix the IP address with https as shown below:
https://192.168.44.1

This may generate some certificate errors, depending on the browser, all of which you can ignore. The only purpose is to encrypt the traffic so these errors do not matter.

Note that the displayed BraxRouter webpage will show another IP address that you can use to access the device if you're not connected to the 'HomeWifi' network. Make a note of that and stick a label on the router itself. This could be useful if you are not able to login due to a mistake.

Select the Login option to proceed.

Enter your device login and password and tap on the arrow to proceed.

By default the login credentials are:

```
Userid : braxrouter
Password: hidemyzuckingass
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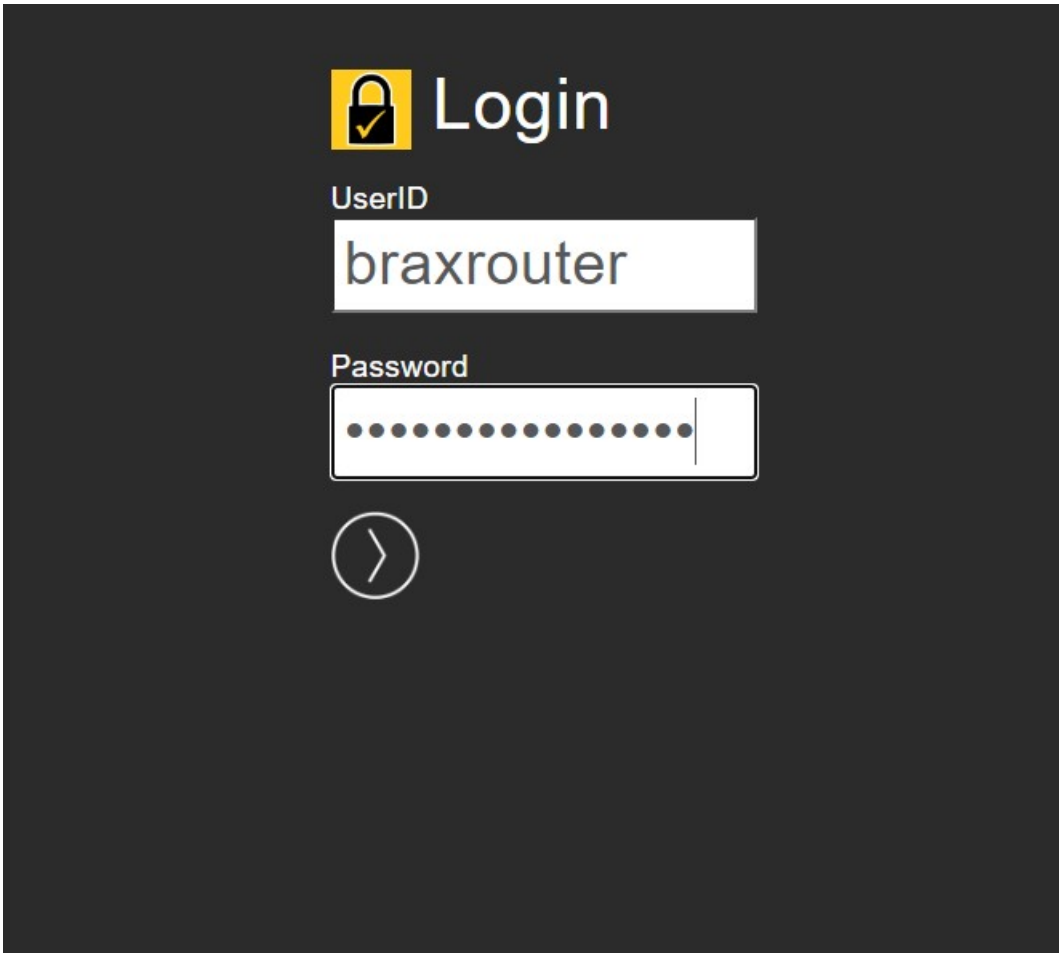
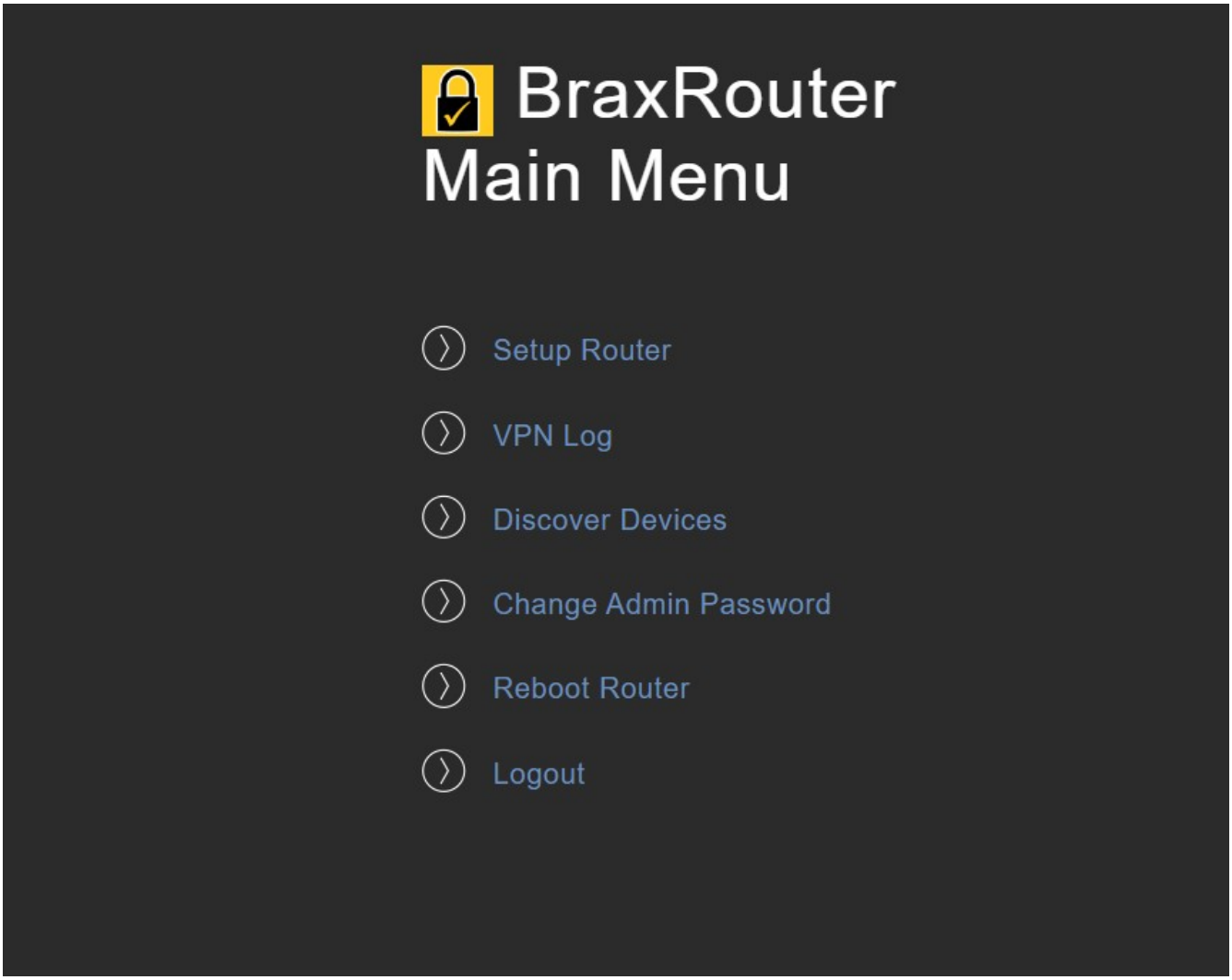


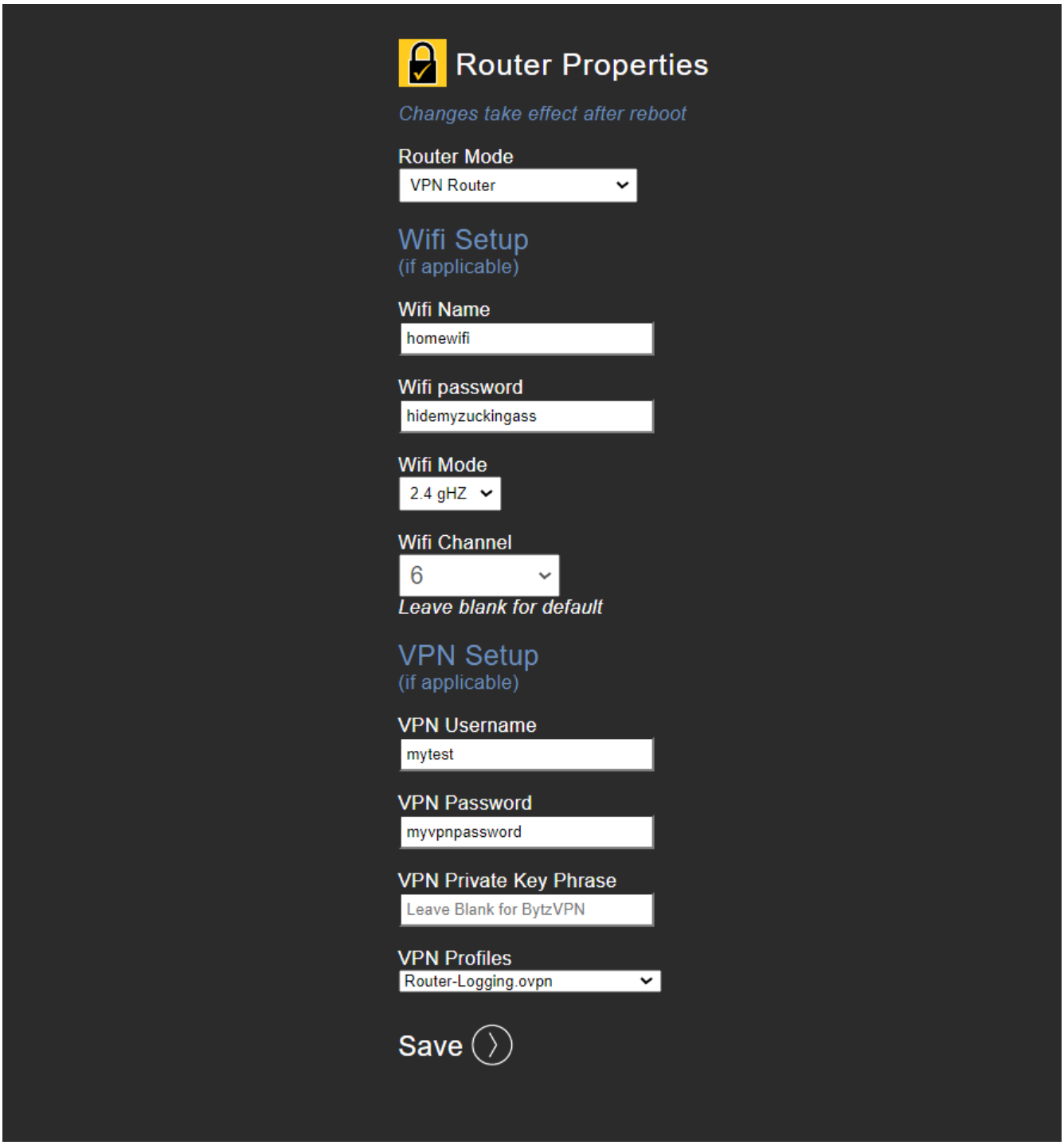
After logging in, the following menu will be displayed



Here are the menu options.

1. MAIN MENU - Setup Router

Click on Setup Router to modfy router settings. This will display the page below. Change the desired values and click on Save. The settings will only take effect after a reboot.



Below is a guide to the values you can modify on the setup.

Router Mode – this gives you the option to operate the device as (a) An Open Router – a

Regular wifi router with no subscriptions required. (b) a TOR Router – no subscriptions required, (c) a VPN Router – VPN subscription is required.

Wifi Setup – this section allows you to change the Wifi SSID or network name, the Wifi password, and whether to use 2.4 GHZ or 5 GHZ mode.

The default is 2.4gHz and is best for speed and range. Also you are able to select a channel for use. If you leave the channel blank it will default to channel 6 for 2.4 gHz and channel 48 for 5 gHz. For 2.4 gHz you should limit the channels to 1, 6 or 11 only for best performance. 5 gHZ channels are from 36-161.

There are some limitations on the Raspberry PI chip in 5 gHZ mode and it is single channel. So there is no speed advantage in 5 gHZ and less range. See the section on a Wired configuration for a faster network.

VPN Setup – this section allows you to enter your VPN credentials. Your VPN credentials are always available on your Brax.Me account which you used to subscribe to the VPN. It is visible in Brax.Me SETTINGS – MY VPN SERVICE.

VPN Profile entry allows you to choose VPN profile which selects the servers to which you will connect to. Select a VPN profile closest to you in region and you can use the No-Ads or standard version as desired. You can change this anytime you want.Note that changes only take effect after a reboot.

Unplug the Raspberry PI and plug back in to reboot.

If you are trying to debug the operation of the VPN (due to issues encountered), use the profile Router-Logging.ovpn. This is the only profile with a log. All the others have no logs. And this should be the default operation as logging may damage the SD card over the long term.

2. MAIN MENU – VPN Log

The VPN Log allows you to see the status of your VPN connection. This is useful for debugging if something is not working as expected.

Please note that the VPN log only works if you use the profile Router-Logging.ovpn. You should use a non-logging profile in normal use because constant writing to the SD card could damage the card.

3. MAIN MENU – Discover Devices

This option will allow you see the devices attached to BraxRouter. The listed devices will show both the IP address and the MAC address.

4. MAIN MENU - Change Password

The other option available to you from the main menu is to change the password used when

accessing via a browser.If you select Change Admin Password from the menu, you will see this page which allows you to enter a new password and confirm it. This only affects the browser setup page.

5. MAIN MENU – Reboot Router

This option will cause the router to remotely reboot. If this does not work, you can always just unplug the router and replug to perform a reboot.

PART IV - ACCESSING YOUR BRAX ROUTER VIA SSH

You can access the BraxRouter in “headless mode” meaning with no HDMI monitor attached. You will need to access the device using SSH from the LAN.You will need the IP address of the device which you can acquire using the techniques discussed in Part IV.

If you have a GNU/Linux computer, MacOS computer, or Windows 10 or better, you can run SSH from the command line.

On IOS you can install an SSH Client app such as Termius -SSH Client. This way you can control the device from your iPhone or iPad.Once you have access to a Linux or Mac OSX command line type this (the IP address will be whatever is appropriate for your device as explained in prior instructions.

ssh braxrouter@192.168.44.1

Then you will be prompted for a password.

password: **hidemyzuckingass**

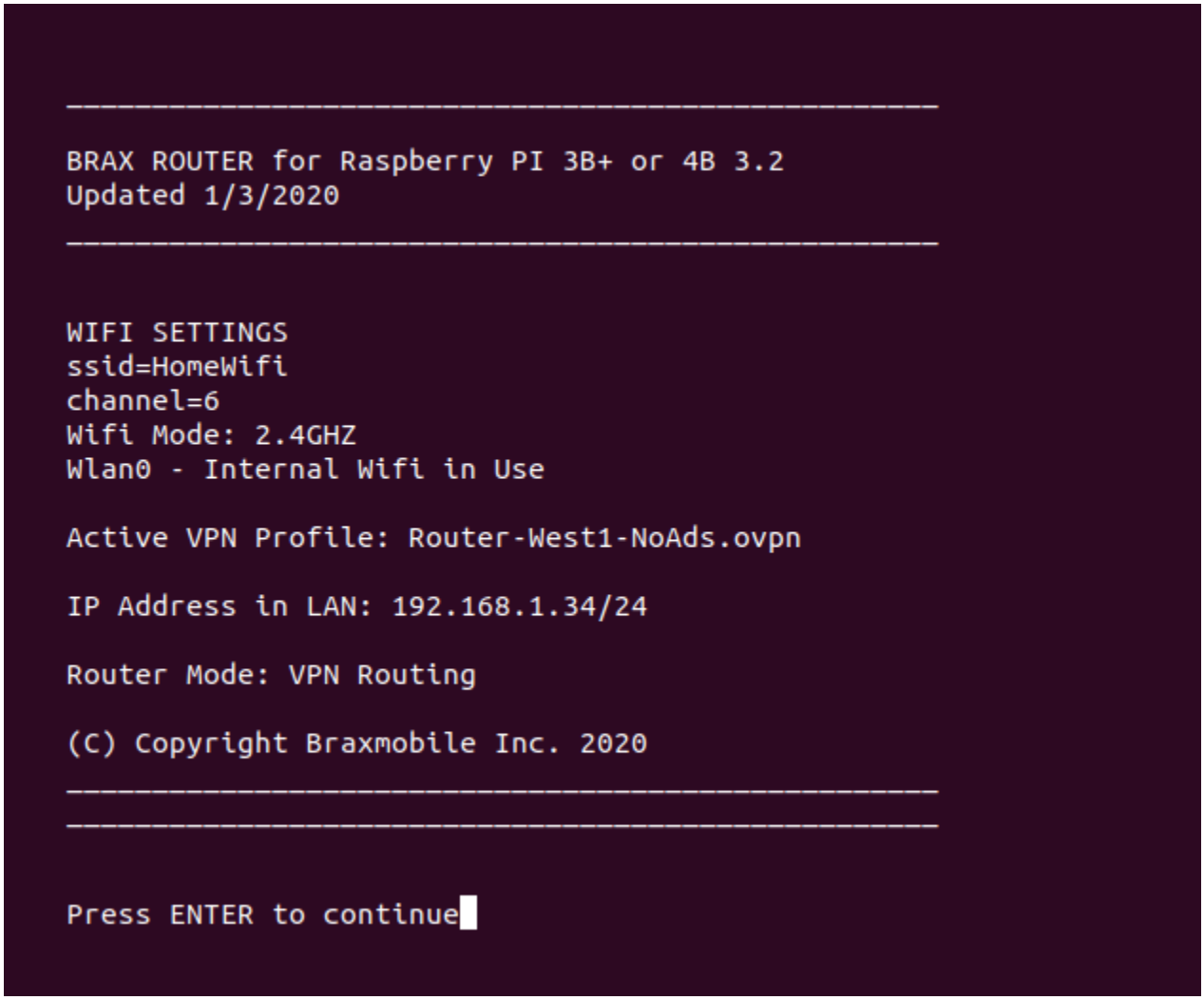
If you cannot access this IP address, you may be in a different subnet. You will need to find the IP address assigned to BraxRouter by the upstream router. This will typically be listed in the connected devices list on the upstream router.

You can also type this command on your command line (Windows example):

arp -a

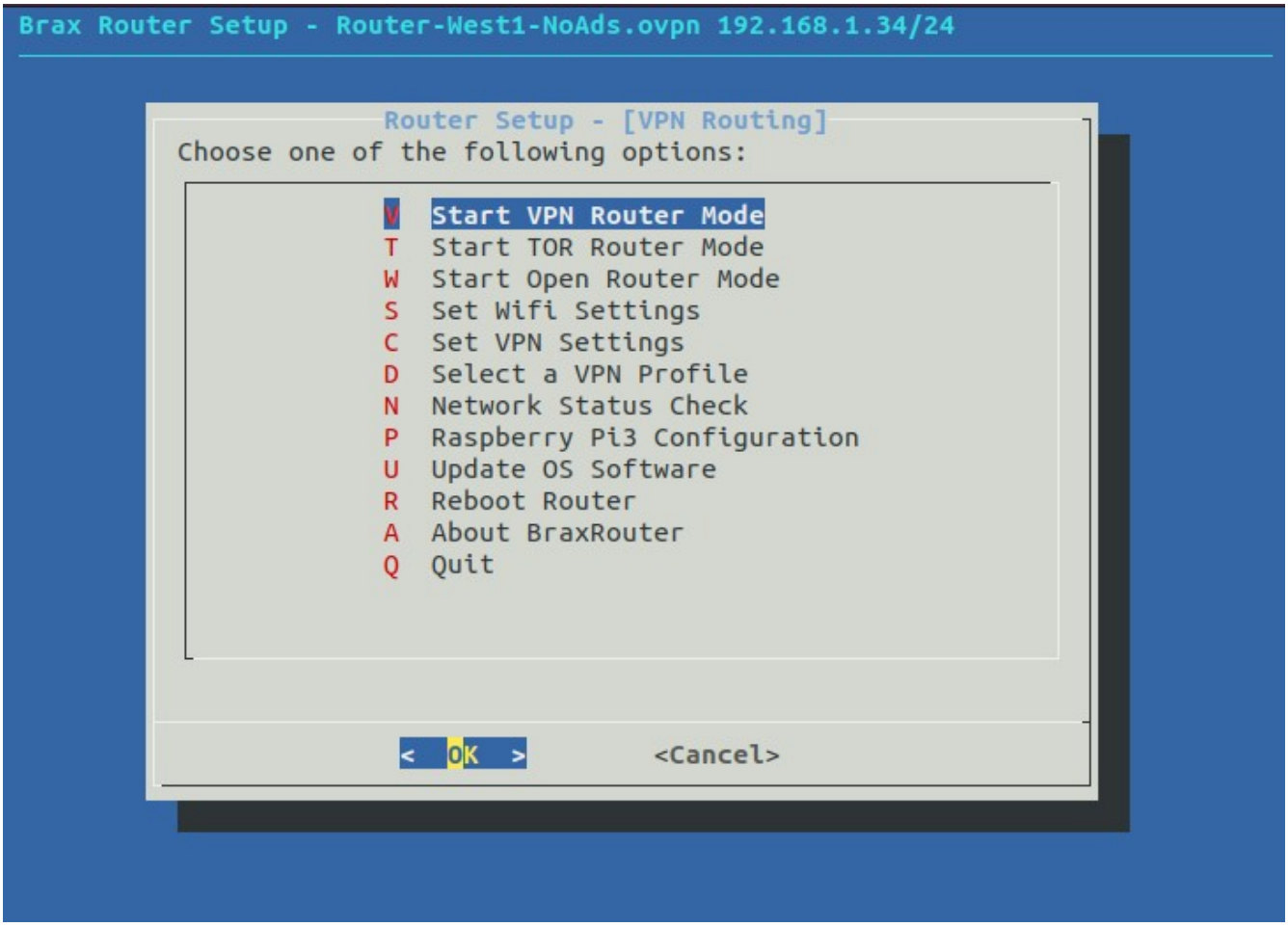
This will list all the devices on your network and their MAC addresses.

Once you login via SSH, you should see the display below.



Note: The version information will be different for each version of the software and some of this is updated automatically.

Press ENTER to continue to the main menu which is shown below.



This will then display the menu above and from here on you can set it up and change settings.If you type in a wrong command and you find yourself in some unfamiliar spot inside the Raspbian OS in the Raspberry PI, simply reboot the device (by unplugging and plugging in the power supply connector – Micro-USB).

Following is a description of each menu option.

(A) VPN Router mode turns the Raspberry Pi into a Wifi router that routes all traffic to BytzVPN. This is the default configuration and is preshipped with this and with temporary settings that already make the VPN active. So it is plug and play.

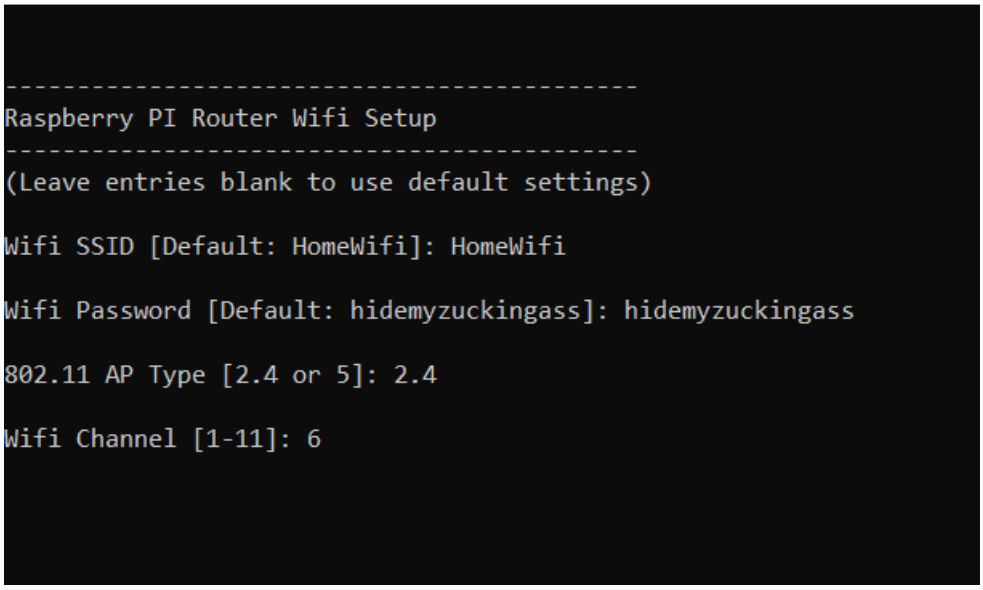
But several settings can be modified and will be explained below.

(B) TOR Router mode turns the Raspberry PI into a Wifi router that routes all traffic to TOR. Basically making it a TOR Router. No configuration is necessary to use this mode.

(C) Open Router mode turns the device into a regular Wifi Router and it will route the traffic to the internet like any normal Wifi Router.The Rasp Pi has a built in Wifi internally. You can set up a different Wifi name (SSID) and password.By default, the

Wifi (SSID) name is:

(S) Select Set Wifi Settings from the Menu and this will allow you to make changes as shown below:

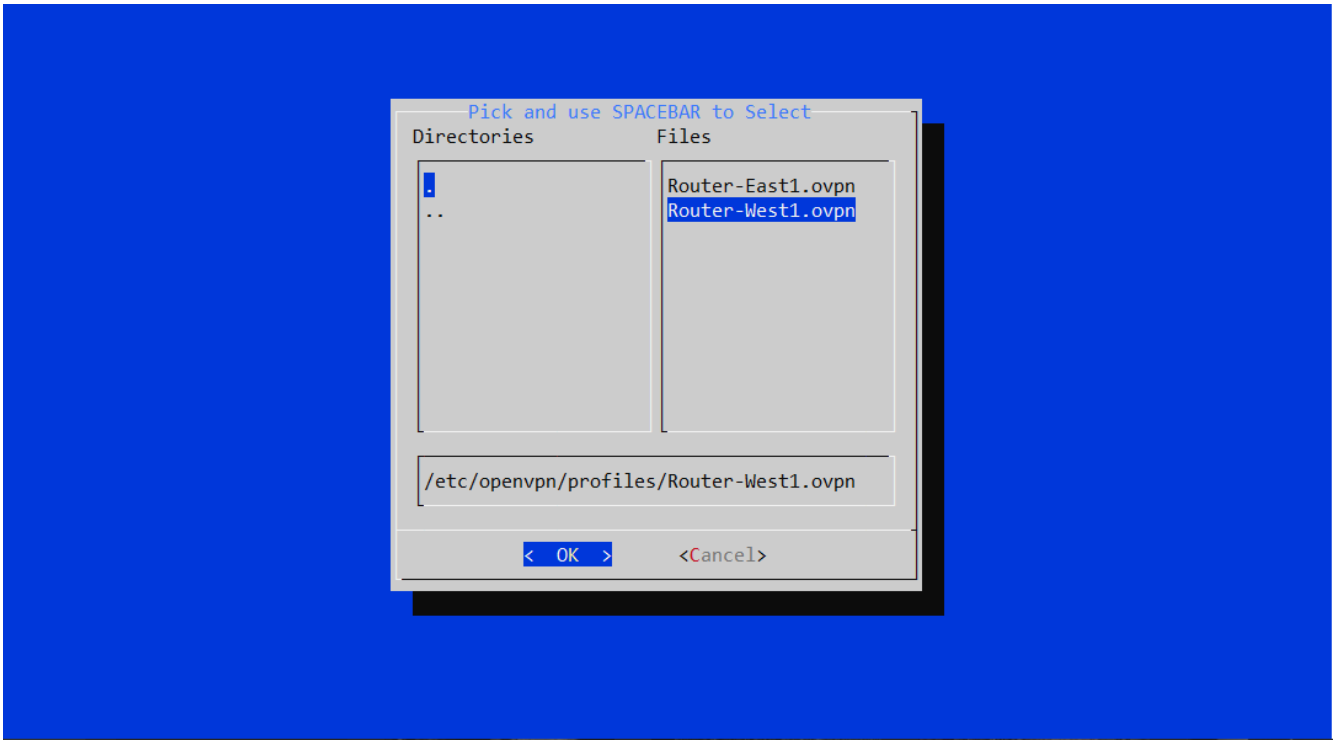


- **Wifi SSID** – This is the name of your network. By default or if left blank, it will use the name HomeWifi.
- **Wifi Password** – if left blank or the password as shipped is 'hidemyzuckingass'
- **802.11 AP Type** - The channel range will be different depending on which AP Type was used. “2.4” corresponds to 2.4gHz wifi “5” corresponds to 5gHz wifi. If you are further away from the PI, use 2.4GHZ for more range.

  A Rasp PI has a small antenna so it is really intended for short range use.

(C) Set VPN Settings - You can set your VPN Login credentials from the menu option Set VPN Settings. That menu option will display the entry options below. Those should match your VPN settings from BytzVPN. Changing Wifi settings takes effect only after a reboot.

(D) Select a VPN Profile **-** The BraxRouter automatically downloads all the available VPN Profiles from BytzVPN when you select the option SELECT VPN PROFILE. It will then give you a selection of VPN Pools to choose from: East, South or West currently. There are also versions that have Ad-blocking.



The interface for using this is as follows. Use the up and down arrow keys to move inside each rectangular area. Use the TAB key to change to another section. Tab to the section marked FILES. Use the up/down arrow to highlight your desired profile, then hit the SPACE BAR to make the selection.This should change the file name at the bottom section to be a complete file name instead of just a directory name.

Then hit ENTER and a confirmation window will appear.This change takes effect immediately.

The other options on the menu allow you to do more advanced things like update the OS, modify Raspberry PI Configuration settings, and view the version information. We do not recommend that you change any Raspberry PI Configuration as that may render the device inoperable.

However, you may update the OS anytime you wish. It is not something that needs to be done frequently however. Usually it is essential if some security flaw has been announced for the Raspberry PI (none has occurred in years).

The option to check Network Status is for tech support purposes. The IP address that you need to do SSH is already displayed at the top of the menu.

PART V – BURNING AN SD CARD FOR YOUR BRAX ROUTER

Some of you may have obtained an “img” file from Braxmobile which will allow you to burn your own MicroSD card.

Please note that you that if you are given a download link for BraxRouter software, it will be zip format. It has to be uncompressed and the final name will have a “.img” extension.

You cannot copy this file directly to the MicroSD card. This has to be “flashed” to the MicroSD as an image using software for flashing.

The easiest way to do this on Windows and MacOS is to install the app Balena Etcher

https://etcher.balena.io.

Then using the img file as the source, flash it to your MicroSD card which must be 16GB are larger. Note that some cards marketed as 16GB can be as small as 14.8GB so if it fails use a different card or a larger one.

PART VI – WIRED ROUTING MODE

This version of the BraxRouter has the ability to act as a wired router. To use this mode, you will need to have a USB Ethernet Adapter.

For a Raspberry PI 5 or 4, you need to get a USB 3.0 Gigabit Ethernet Adapter.

For a Raspberry PI 3B+, you can use a USB 2.0 10/100 Ethernet Adapter. Because of the slower performance of this Ethernet adapter, the use of a PI 3B+ is not recommended.

On a Raspberry PI 5 and 4, there are two sets of USB ports. The blue ones are USB 3.0 so use that with the Gigabit Ethernet Adapter.

Some other considerations for wired routing use: On a PI 4 or 5, wired routing at gigabit speeds is CPU and memory intensive so the PI 4 will get hot. So ensure that the PI 4 or 5 is equipped with heat sinks particularly on the CPU, and Memory module (adjacent to the CPU). You will also need a 3A or larger power supply. The adapter will draw additional power and it will shut down if you don't have the correct power supply.

The wired routing mode is an advanced mode so some advanced terminology will be used. Do not use wired mode if you don't understand what is being discussed.

The BraxRouter requires a DHCP server. Usually, the DSL modem acts as a DHCP server and will give you a single IP address. And it will be up to the Wifi router to allocate more IP addresses using NAT (Network Address Translation).

The IP address of the BraxRouter in wired mode is:

192.168.44.1

If you want to still have a wireless network on the VPN, you will need to get another router that you will plug into the BraxRouter.

Note that an Ethernet adapter only has one Ethernet port. In order to plug in multiple devices with Ethernet cable, you will need to expand the number of ports. A device that does this is called an Ethernet Switch. Ethernet switches can expand typically to 4-8 available ports.

Note that Ethernet switches come in 10/100 and Gigabit flavors so make sure they match the Ethernet adapter that you are using. On a Raspberry PI 3B+, you have to use an Ethernet

switch 10/100. Use a Gigabit Ethernet Switch if you are using a PI4 or it will cause a bottleneck and slow the network down.

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