Setting up a Zumspot HotSpot for System Fusion (by K7VTT)

Items you will need:

1) A Zumspot HotSpot (several “styles” are available from HRO or from a variety of sources on the Internet)
2) A micro USB equipped power source (either a “wall wort” or battery pack)
3) A micro SD card of at least 16 Gigs capacity (if your Zumspot “kit” doesn’t already include one)
4) A computer equipped with an SD card slot or an external USB SD card “reader” and WiFi
5) A WiFi network (You need to know your WiFi network’s specific ID/name and password as well)
6) The FREE Pi-Star software downloaded to your computer (unless your Zumspot “kit” already has it pre-loaded)
7) A System Fusion capable radio (model doesn’t matter)
8) Some PATIENCE and PERSISTANCE!

Here are some links to assist you in finding where to purchase some of the items listed above:

1- Zumspot KIT from HRO (I strongly recommend this one because it includes a micro SD card pre-loaded with Pi-Star software on it:

https://www.hamradio.com/detail.cfm?pid=H0-016491

Also includes an OLED display built-in and Raspberry Pi Zero computer. No case is included, but you can buy or make one. HRO sells them, and they are widely available on Amazon and eBay as well.

2- USB micro power unit (the one below, from Amazon is $8 – I recommend it because it has an inline on/off switch):

https://www.amazon.com/gp/product/B073JDFML5/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1

NOTE: I recommend using this item because the power connector on the Pi Zero is a small, somewhat delicate micro USB port, and it’s better to have this inline switch to power-cycle it, since power cycling of the Pi is often required during setup and configuration, and it’s required repeatedly.

3- Radio:

For those of you who are just getting started and want the best "bang-for-the-buck" entry level Fusion-capable radio, I recommend the excellent and affordable Yaesu FT-70D:

https://www.gigaparts.com/yaesu-ft-70dr.html

CONNECTING TO YOUR ZUMSPOT VIA WiFi

On your computer, go to the following web site address:

http://www.pistar.uk

Along the left side, under "Pi-Star Tools", select "**WiFi Builder**". From the pop-up next to "WiFi Country Code" select **US.** In the "SSID" box enter your WiFi network's **name/ID**. In the "PSK" box enter your WiFi network's **password**. Click on "Submit", and this will automatically download a file named "**wpa_supplicant.conf**" to your computer, most likely into your "Downloads" folder. Go to your Downloads folder and find this file. I recommend dragging it out on to your desktop.

If you purchased a HotSpot with a micro SD card with Pi-Star software already loaded on it, make sure the HotSpot is POWERED OFF, and then remove the micro SD card from the slot on the Pi Zero.

Insert your micro SD card with Pi-Star already loaded on it into the internal or external SD card reader on your computer.

Find the **wpa_supplicant.conf** file you created using WiFi Builder on your Desktop, and drag it to the "root" of your micro SD card (that means it shouldn't be inside any folder(s) on the card). Eject and remove the micro SD card from the computer.

With the power TURNED OFF on your Zumspot, insert the micro SD card into the Pi Zero's micro SD card slot.

CRITICAL WARNING! There are TWO USB micro ports on the Zumspot/Pi Zero. The last one, which is opposite the end where the micro SD card goes, is the power port. It is ESSENTIAL that you plug the power into the correct port! Not doing so will destroy the Pi Zero. Once you've identified the correct port, plug your power unit into the Zumspot.

If you have the power unit with the inline power switch, you may need to press it to turn on the HotSpot. Once it's powered on, a small green LED near the power port on the Zumspot will "flicker" as the Pi-Star software loads – BE PATIENT! The boot up of a Raspberry Pi can be painfully slow compared to modern computers. Recommend you wait a FULL 5 MINUTES before proceeding to the next phase (the LED should eventually stop "flickering" when it's ready).

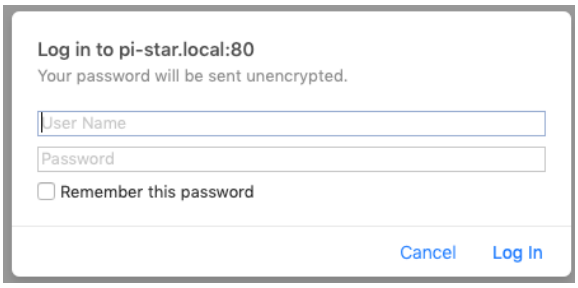
NOTE: If you need to download the latest STABLE version of the Pi-Star software, here's a link:
https://www.pistar.uk/downloads/Pi-Star_RPi_V4.1.2_20-May-2020.zip

After you unZip it, burn the .img file to your micro SD card using a program like "Etcher".

CONFIGURING YOUR Pi-Star SETTINGS for SYSTEM FUSION

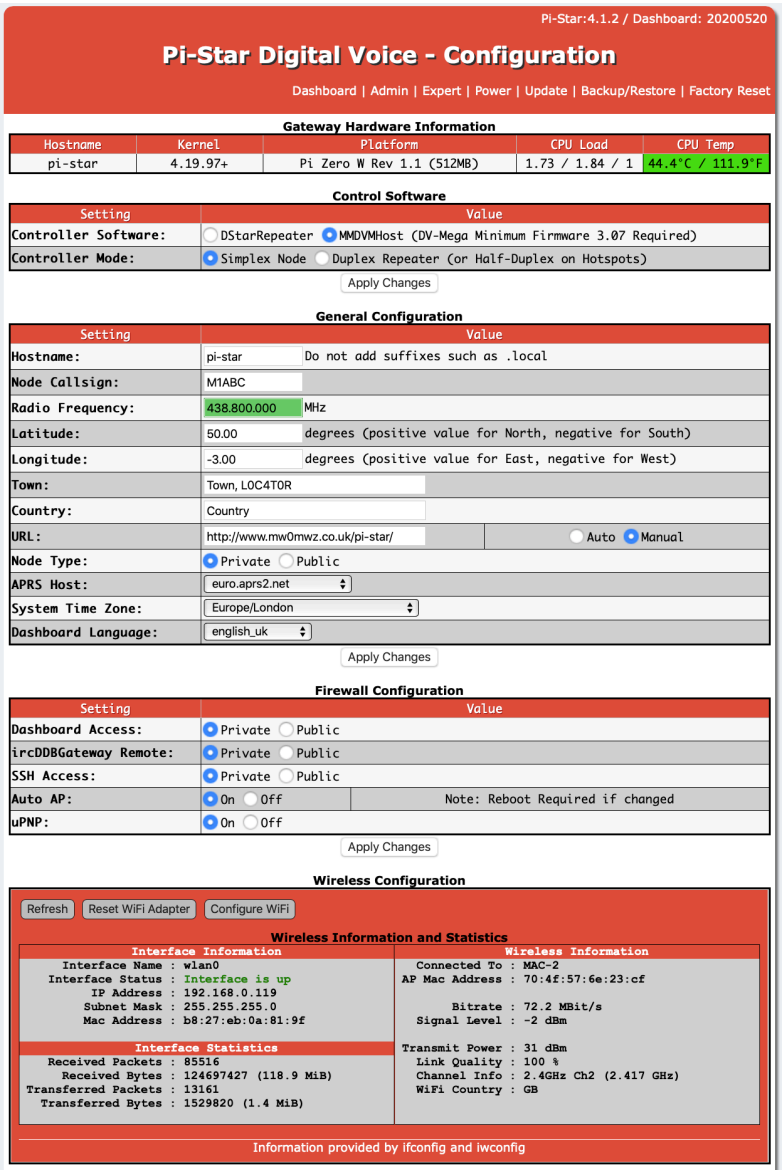
If you followed the instructions given so far, your Zumspot should be ready to be connected to and be configured via your WiFi network.

On the computer that is on the SAME WiFi network as the info you used in the previous "WiFi Builder" instructions, open a web browser (Firefox, Safari, Chrome, IE, Edge, etc.) and enter **http://pi-star.local/admin** and press Enter/Return on your keyboard. You should see the following Pi-Star "login screen":



In the User Name box, enter **pi-star** and in the Password box, enter **raspberry** and then hit Enter/Return on your keyboard.

The Pi-Star "Dashboard" appears. Click on "Admin" at the top of the Dashboard window, and you should be presented with the Pi-Star "Admin Dashboard" similar to that below (wait a few seconds after you see the "No Mode Defined" message, and it should go to the screen below):



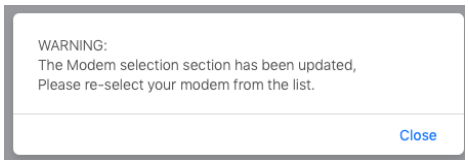
This is the Pi-Star "Configuration" screen. We will be concentrating primarily on the General Configuration section.

Fill in the following boxes with your own information:

- Call Sign
- Radio Frequency (the UHF frequency you plan to use to connect from your Fusion radio to the Zumspot)
- Latitude and Longitude
- Town, Locator (the latter is your "Maidenhead grid square" location – mine is DM42mk) Link to find yours: https://www.levinecentral.com/ham/grid_square.php
- Country – enter **United States**
- Set URL to **Auto**
- Set APRS Host to **texas.aprs2.net**
- Set Time Zone to **America/Phoenix**
- Set Dashboard Language to **english_us**

  Finally, click on the **"Apply Changes"** button right under that section, and **WAIT WAIT WAIT while it updates and refreshes the page.**

  You will most likely get the following message:

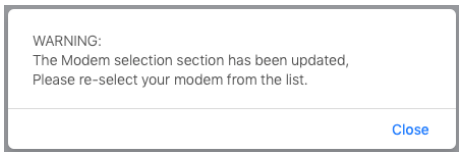
  

  Click "close".

  You will now see the Pi-Star Configuration screen again, but this time there is a whole new section labeled "**MMDVMHost Configuration**". That's where we're going to work next.

  - Click on the "slider" next to "**YSF Mode**": to enable it (turns red when "on").
  - NOTE: If you have a Zumspot with the small OLED display, on the line where it says "**MMDVM Display**", select "**OLED Type 6**" where it says "None", leave the "Port" set to **/dev/ttyAMA0**, "Nextion Layout" set to **G4LX**.
  - Click on the "**Apply Changes**" button right under that section, and **WAIT WAIT WAIT while it updates and refreshes the page again.**

  You will most likely get the following message:

  - Click "Close". Under the section we previously configured labeled "General Configuration", there's a new line labeled "**Radio/Modem Type**". Click on that and select "**ZUMspot Dual Band Raspberry Pi Hat (GPIO)**. Once again, click on the "**Apply Changes**" button right under that section, and **WAIT WAIT WAIT while it updates and refreshes the page again.**
  - We now have another section labeled **"Yaesu System Fusion Configuration** we need to modify.
  - On the line labeled "**YSF Startup Host**", select from the (LONG) scrolling list (scroll way up the list to "U" to find it – they're shown in alphanumeric order): **YSF74158 – US ORO VALLEY AZ – ORO VALLEY ARC**
  - Optionally, you can enable **"WiresX Passthrough**" by clicking on its "slider" to enable it (turns red when on).
  - Click on the "**Apply Changes**" button right under that section, and **WAIT WAIT WAIT while it updates and refreshes the page again.**

If all went well and was done correctly, you should now be ready to test your Zumspot with a Fusion radio!

The following instructions are for connecting to your Zumspot using a Yaesu FT-70D:
Turn on the radio, press the V/M button and ensure the radio is NOT in “Memory” mode. Press the “Band” button until you are on the UHF frequency band. Press the “Mode” button until the display shows “DN”. On the keypad, enter the same frequency as we set in the Zumspot (in the previous instructions, we set it to 438.800 MHz). NOTE: You do not need to enter the last “zero” on the keypad. Simply enter 4-3-8-8-0 and you will hear a “confirmation” beep after the “0”.

In the Pi-Star software screen on your computer, click on “Admin” at the top of the screen. You should see the Pi-Star “Dashboard” similar to that shown below. On your radio, press the PTT button, and you should see your call sign appear under both the “Gateway Activity” and “Local RF Activity” sections. It should also show on the Zumspot’s OLED screen. If it does – **CONGRATULATIONS!** You now connected to OVARC’s linked repeater system via your Zumspot and its connection to the Internet!

If it doesn’t show up, please go back and review the information we previously covered in this tutorial. It also sometimes helps to power cycle the Zumspot – REMEMBER to **WAIT WAIT WAIT!** for it to fully re-boot. You can monitor the OLED display (if yours has one) and when it is ready to use, it will momentarily display “Fusion” on the OLED screen when you key up your radio.