ZUMspot Dual Band Kit User Guide

The ZUMspot Dual Band Kit has all of the capabilities of the original ZUMspot, but it also allows you to communicate either via UHF or VHF frequencies between your ZUMspot Dual Band and HT. The ZUMspot Dual Band Kit has been specially designed to function under both RF bands thanks to its finely tuned dual-band RF filters, which block any harmonics from polluting the RF spectrum.

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Board specifications

The ZUMspot RPi Dual Band is an Advanced Radio Module Board which when aired with a Raspberry Pi and the MMDVM software becomes a small and efficient multi-mode digital hotspot.

ZUMspot Kit Features:

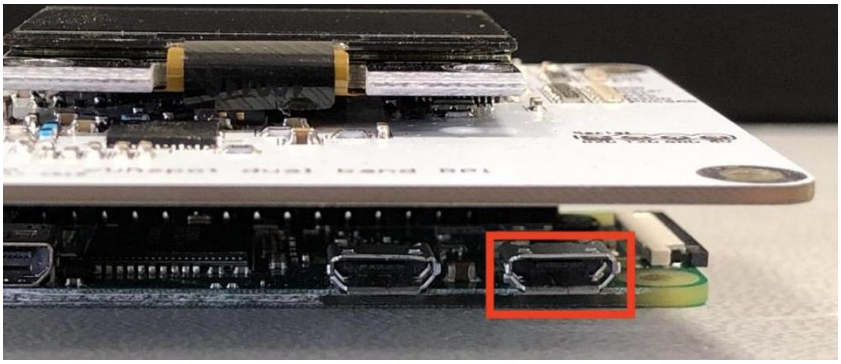
- High performance 32-bit ARM processor
- ZUMspot Board Fully Assembled And Tested
- Supports DMR, P-25, D-Star, System Fusion and NXDN
- Supports operation in both 2m and 70cm bands
- Onboard LEDs to show status (Tx, Rx, PTT, Mode)
- Up to 10mW RF power
- SMA antenna connector, dual band VHF/UHF antenna included
- Mounts cleanly on all current Raspberry Pi's including the Pi Zero WH
- Works on ODROID boards
- The open source firmware (MMDVM) is pre-loaded and is easily upgraded via software
- Built-in 1.3" OLED display
- Connection for Nextion LCD display
- 1 Year Warranty

Setup

- The ZUMspot Dual Band Kit should come with the following:
    - ZUMspot Dual Band board
    - Raspberry Pi Zero
    - Pre-programmed SD card
    - 4 plastic screws
    - 4 plastic standoffs
    - 4 plastic nuts
    - 1 dual band antenna
- Make sure the SD card is inserted into the Raspberry Pi Zero
- Connect the antenna to the RF connector

Powering up

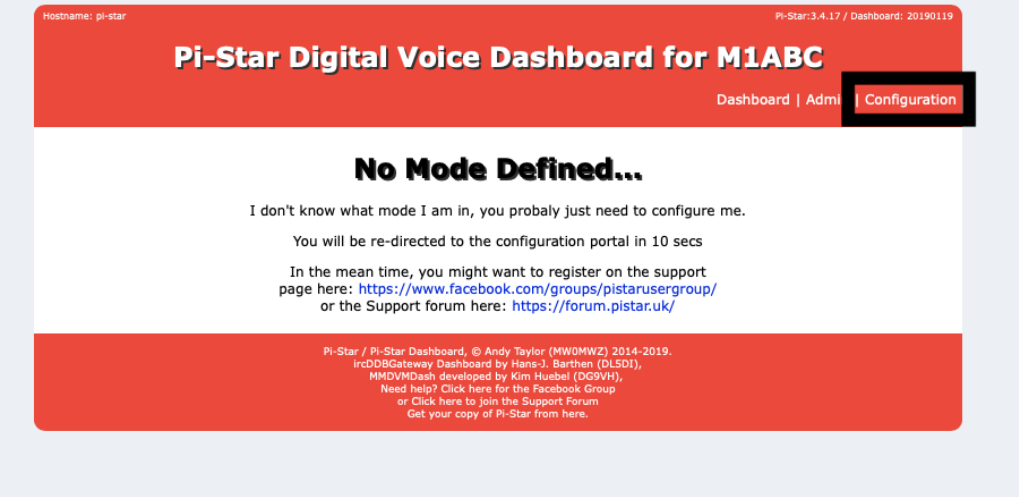
- Plug a USB micro power cable to your ZUMspot Dual Band Kit. The USB power port is the right most USB port on the Raspberry Pi Zero. The USB cable should also be connected to a USB power supply.



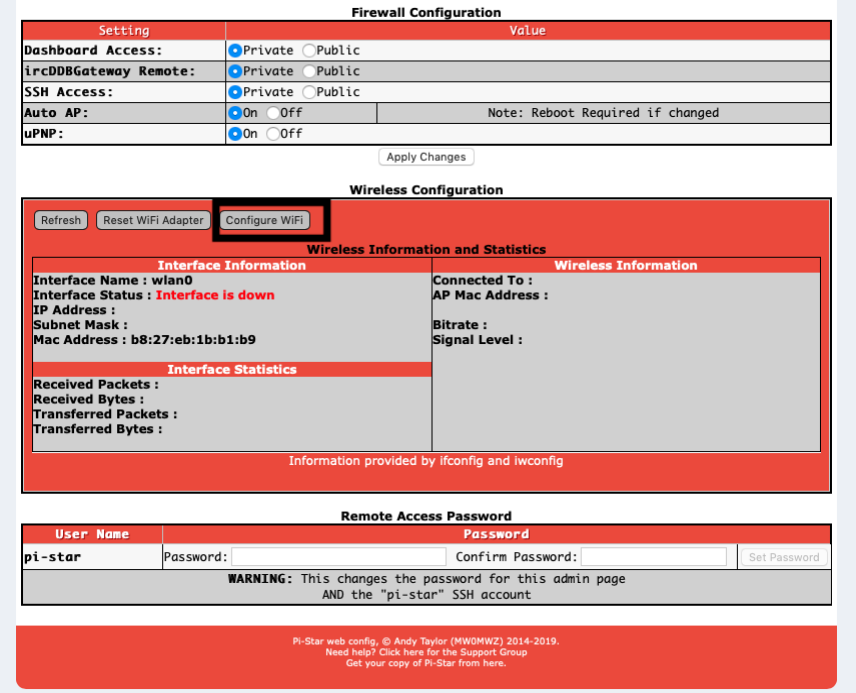
Setup Pi-Star

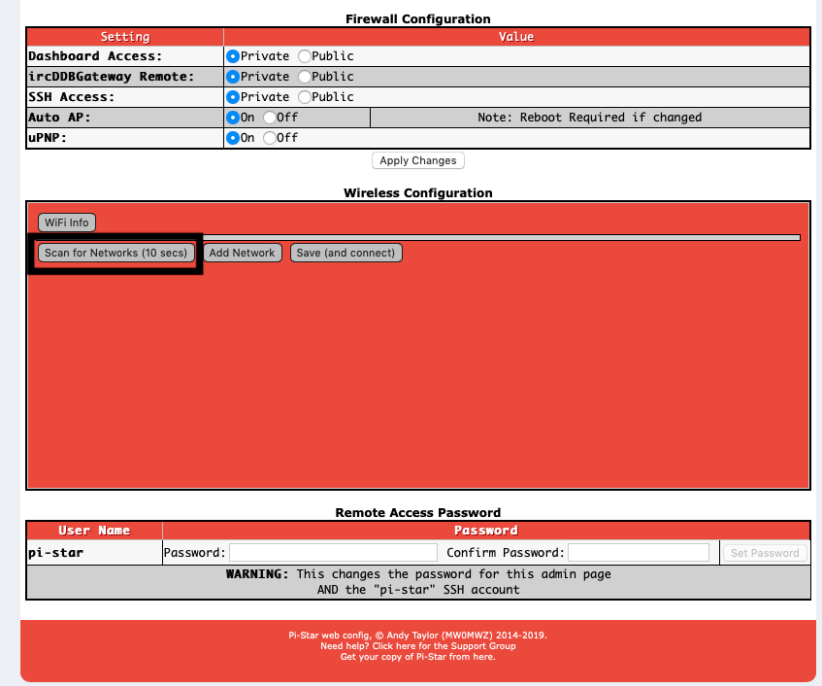
Wi-Fi

- Power up the ZUMspot Dual Band Kit.
- After 3 minutes, scan for Wi-Fi access points from your phone or laptop. One should appear with the name **Pi-Star-Setup**
- Connect to it. When asked for the Wi-Fi password type in: raspberry
- After 3 minutes, go to your web browser (Chrome, Firefox, etc.) and connect to the website:
  http://pi-star (for Windows, Linux and Android devices
  http://pi-star.local (for macOS and iOS devices)
- You should see this page.



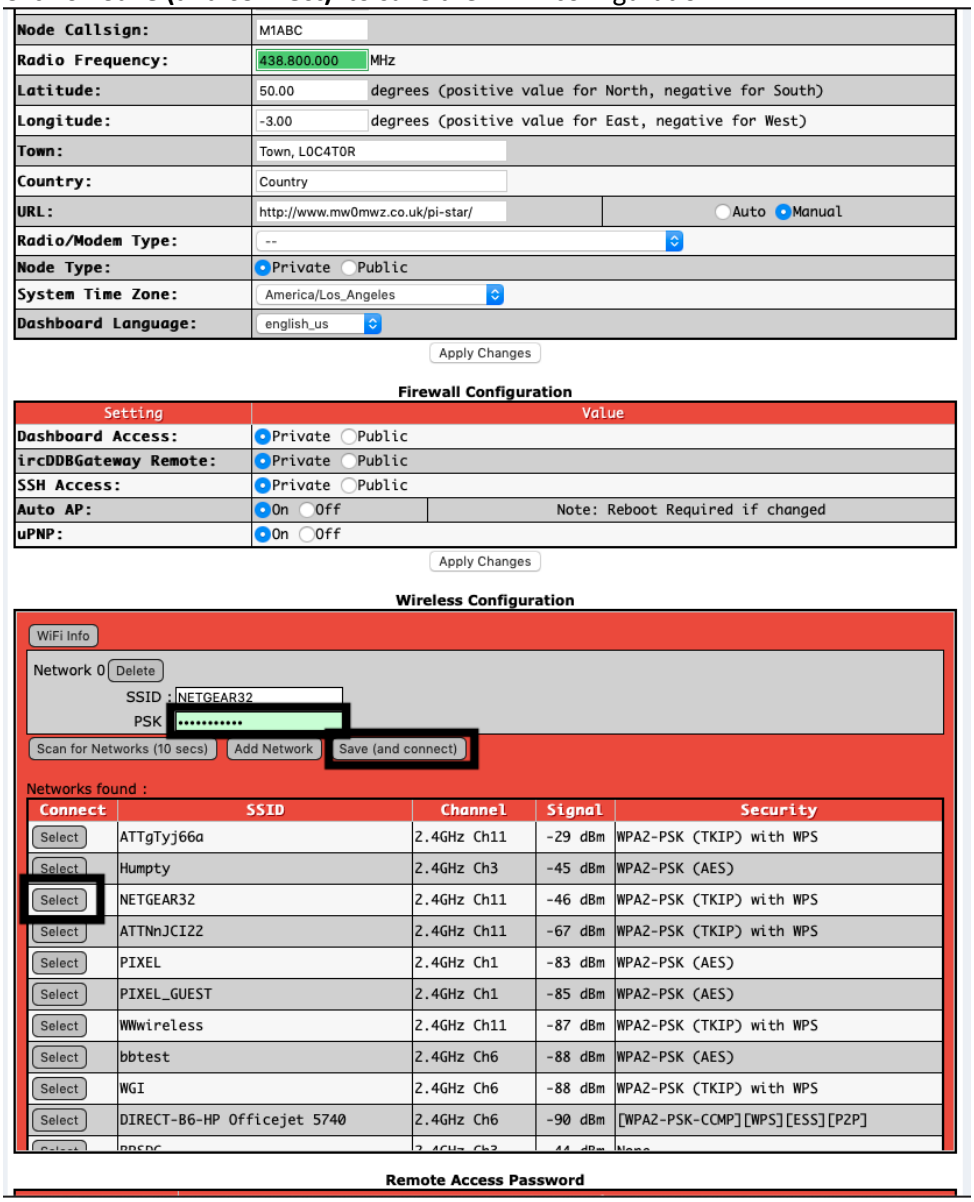
- Go to ***Configuration***
    - You will be asked to put in the default username which is **pi-star** and the default password which is **raspberry**
    - Select **Configure Wi-Fi** and then click on **Scan for Networks (10 secs)**





- Select your Wi-Fi SSID and enter your password.

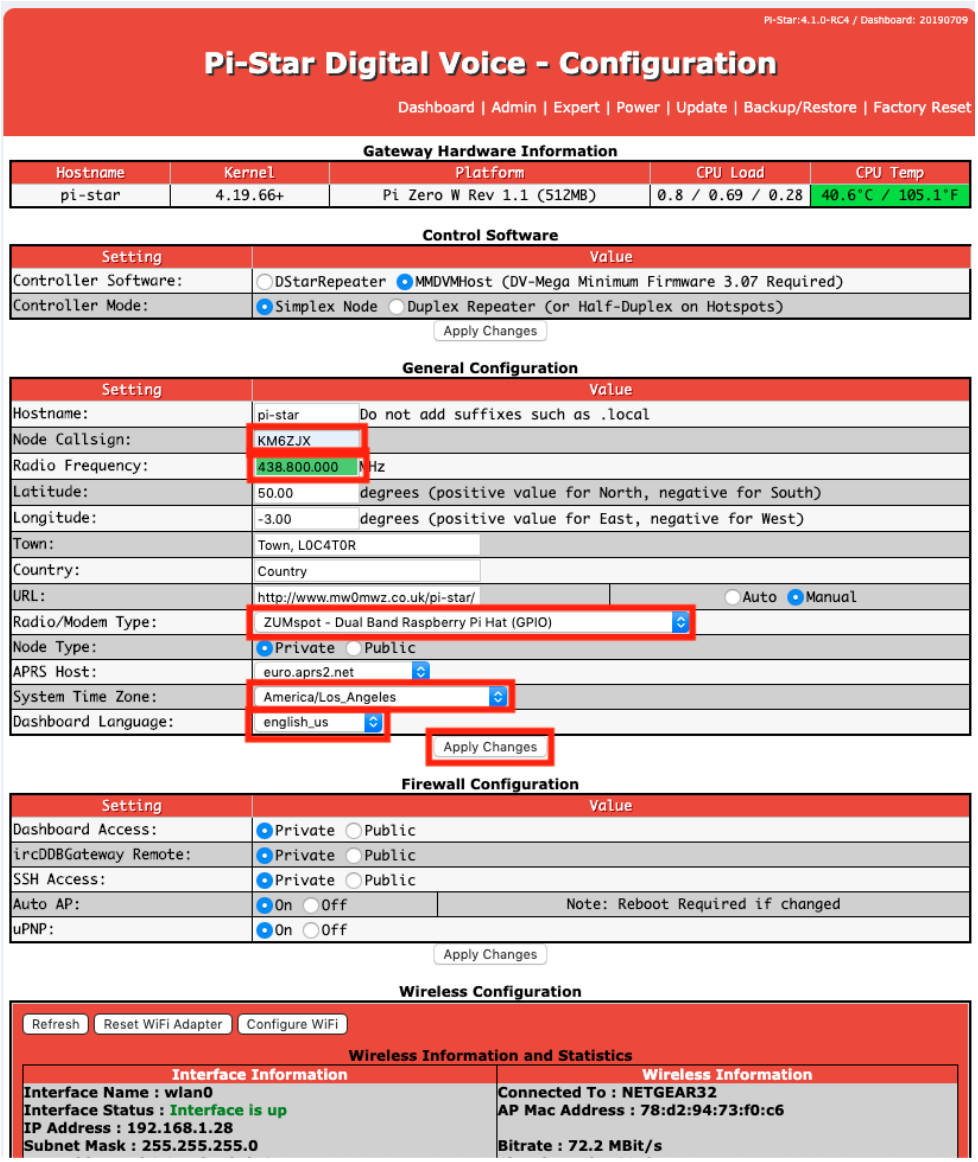
- Click on **Save (and connect)** to save the Wi-Fi configuration



- Reboot your ZUMspot Dual Band Kit
- Now you can continue to the **Configuration** section below.

Configuration

- Change the Node Callsign to your own, set the **System Time Zone** to your time zone, and set the **Dashboard Language** to the language you prefer.



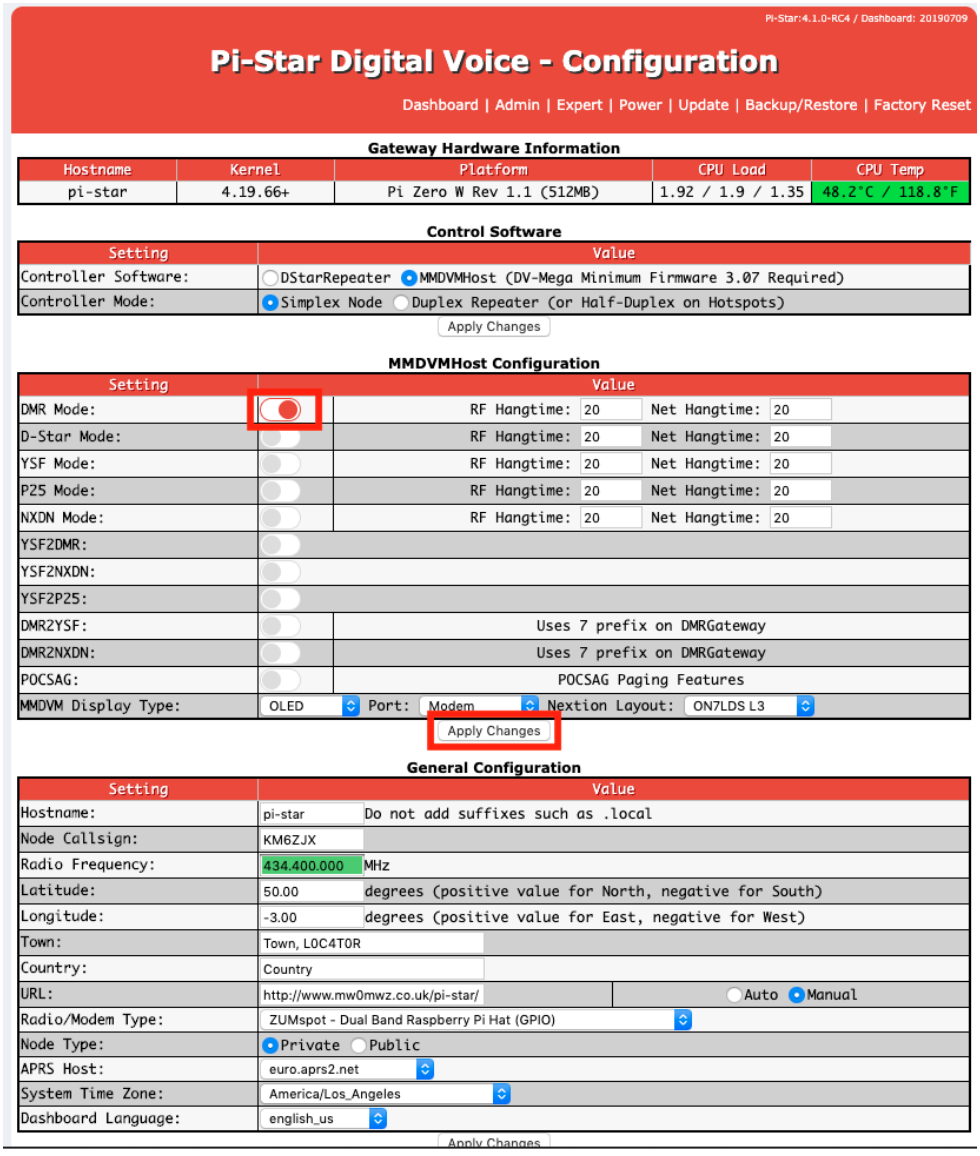
- Click **Apply Changes** when you are done

- When everything reloads, you will need to set the **Radio/Modem Type** to **ZUMspot - Dual Band Raspberry Pi Hat (GPIO)** and click **Apply Changes** again.

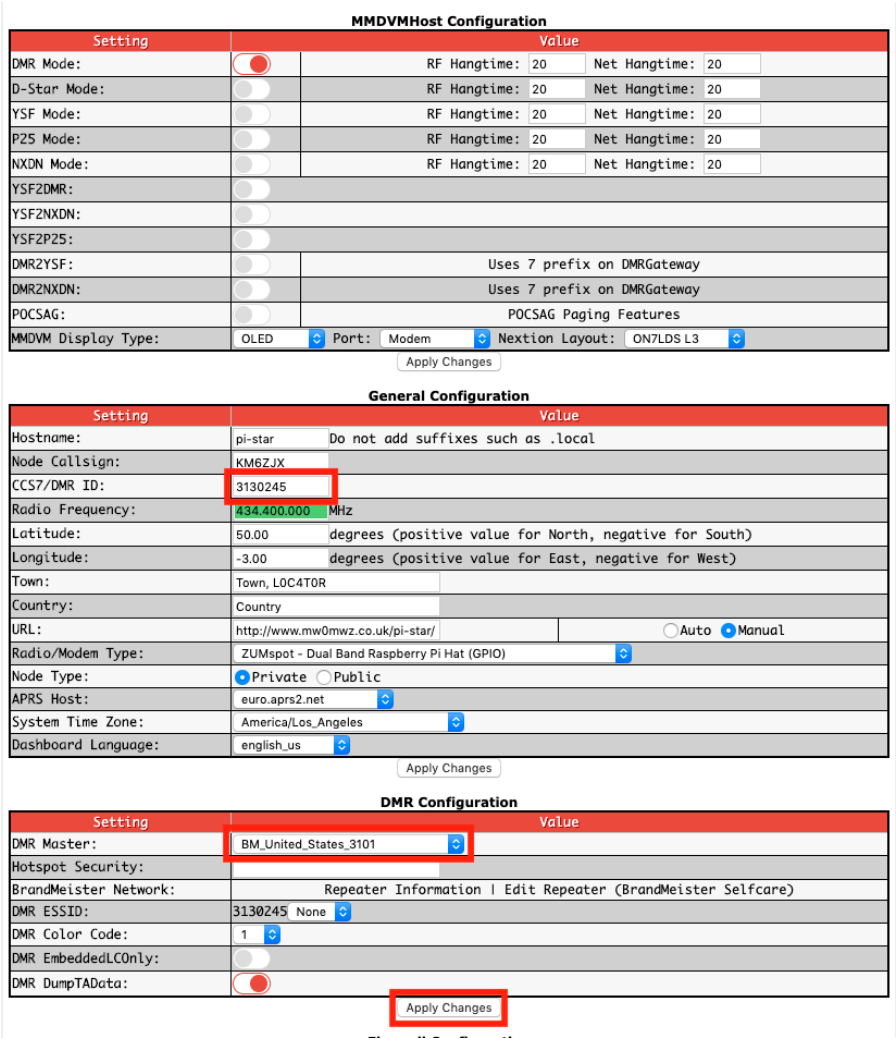
Enable DMR

Once you have completed the **Configuration** steps. You can finish setting up your ZUMspot Dual Band Kit with DMR

- Turn on **DMR** and then click **Apply Changes**



- Enter your **DMR ID**
- Choose your preferred **DMR master** server
- Click **Apply Changes** in order to save your settings



MMDVMHost Configuration

Setting	Value
DMR Mode:	RF Hangtime: 20 Net Hangtime: 20
D-Star Mode:	RF Hangtime: 20 Net Hangtime: 20
YSF Mode:	RF Hangtime: 20 Net Hangtime: 20
P25 Mode:	RF Hangtime: 20 Net Hangtime: 20
NXDN Mode:	RF Hangtime: 20 Net Hangtime: 20
YSF2DMR:	
YSF2NXDN:	
YSF2P25:	
DMR2YSF:	Uses 7 prefix on DMRGateway
DMR2NXDN:	Uses 7 prefix on DMRGateway
POCSAG:	POCSAG Paging Features
MMDVM Display Type:	OLED Port: Modem Nextion Layout: ON7LDS L3

Apply Changes

General Configuration

Setting	Value
Hostname:	pi-star Do not add suffixes such as .local
Node Callsign:	KM6ZJX
CCS7/DMR ID:	3130245
Radio Frequency:	434.400.000 MHz
Latitude:	50.00 degrees (positive value for North, negative for South)
Longitude:	-3.00 degrees (positive value for East, negative for West)
Town:	Town, L0C4T0R
Country:	Country
URL:	http://www.mw0mwz.co.uk/pi-star/ Auto Manual
Radio/Modem Type:	ZUMspot - Dual Band Raspberry Pi Hat (GPIO)
Node Type:	Private Public
APRS Host:	euro.aprs2.net
System Time Zone:	America/Los_Angeles
Dashboard Language:	english_us

Apply Changes

DMR Configuration

Setting	Value
DMR Master:	BM_United_States_3101
Hotspot Security:	
BrandMeister Network:	Repeater Information | Edit Repeater (BrandMeister Selfcare)
DMR ESSID:	3130245 None
DMR Color Code:	1
DMR EmbeddedLCOnly:	
DMR DumpTAData:	

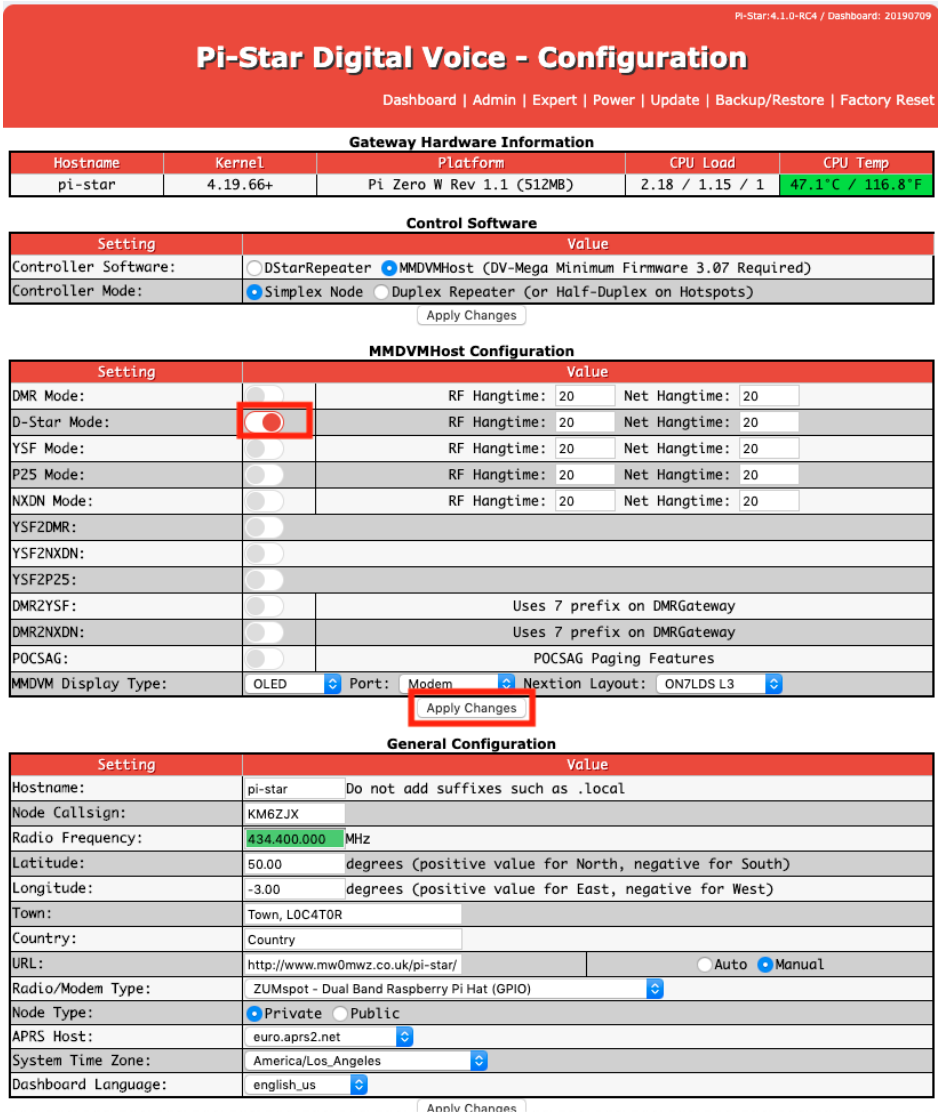
Apply Changes

- You can now use DMR with your ZUMspot Dual Band Kit

Enable D-Star

Once you have completed the **Configuration** steps. You can finish setting up your ZUMspot Dual Band Kit to use with D-Star.

- Now you can turn on D-Star by selecting the **D-Star Mode** switch and clicking **Apply Changes**

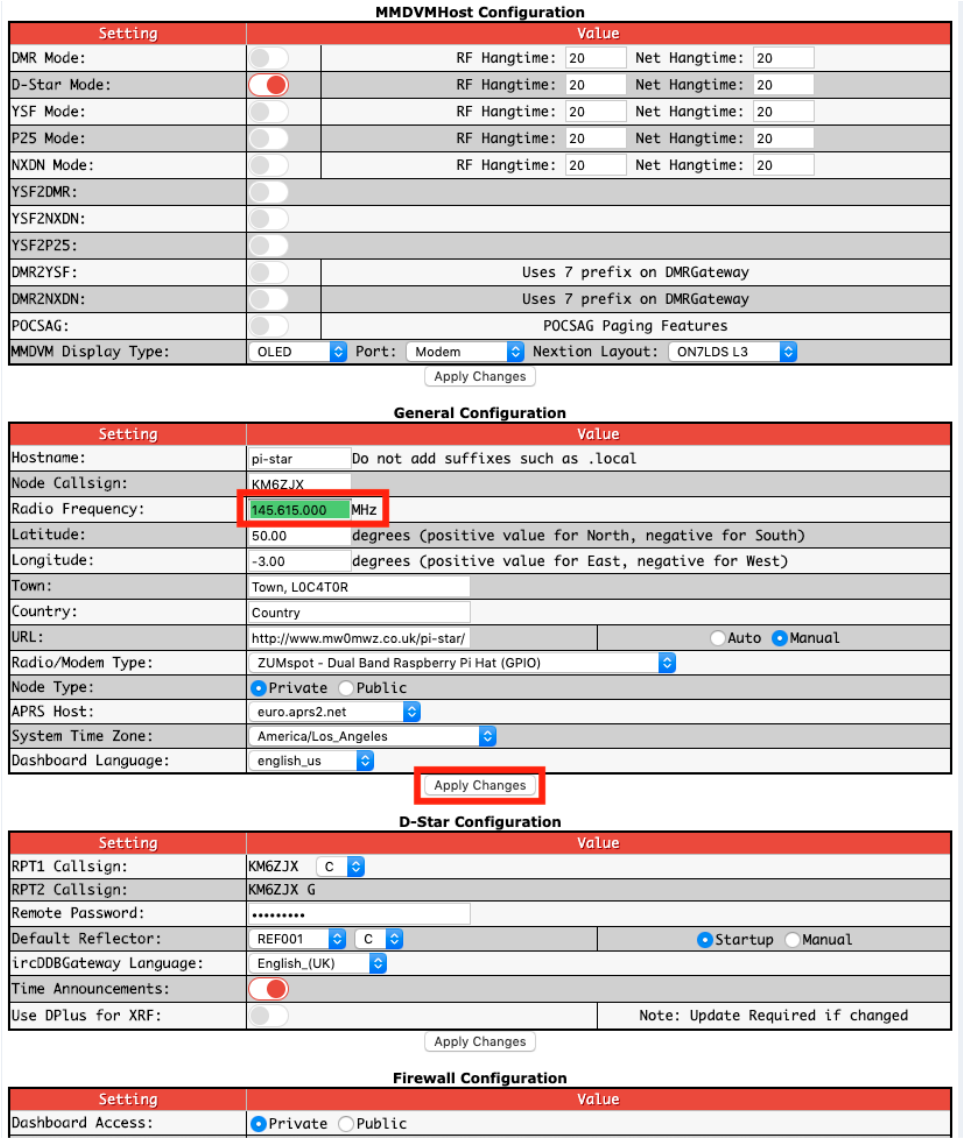


- You can now use D-Star with your ZUMspot Dual Band Kit

Use with VHF

To use the ZUMspot Dual Band Kit under the VHF band, you must first complete either the **Enable D-Star** or the **Enable DMR** section above

- To use the ZUMspot Dual Band Kit under VHF, all that is needed is to set the **Radio Frequency** to a VHF frequency
- Change the **Radio Frequency** to the desired VHF frequency and then click **Apply Changes**



- Now you are all set to use the ZUMspot Dual Band Kit under VHF

Finishing setup

Once you have completed the Pi-Star configuration you can start using the ZUMspot Dual Band Kit to connect to D-Star, DMR and other networks.

There is more information on configuring and using Pi-Star in this document.
https://amateurradionotes.com/images/1-Playing_with_Pi-Star.pdf

Firmware update

- The firmware can be updated directly from the Pi. A script needs to be download to flash the board.
- Go to Configuration->Expert->SSH Access
- Login to pi-star
- Run command

  rpi-rw
- Run command:

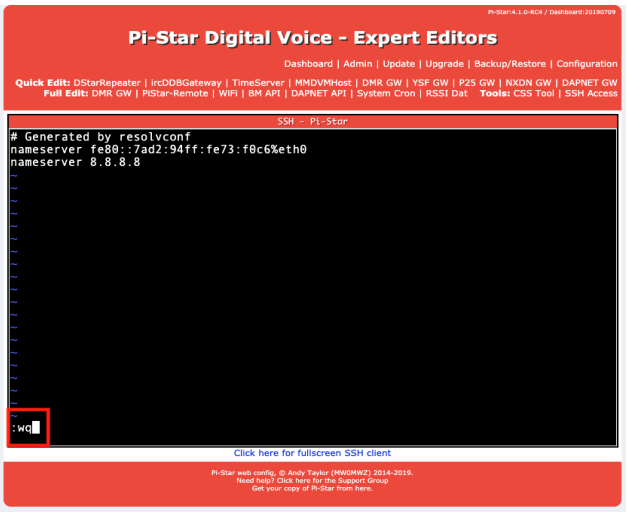
  curl -OL https://raw.githubusercontent.com/veraabad/ZUMspot_Update/master/install_fw_dualband.sh
- If you get an error saying “Could not resolve host”, it likely means that your network is setup for IPV6 and the Pi has not been able to acquire the IPV4 nameserver via DHCP. Try the following. Otherwise skip to the “sudo chmod” step
  - Run command

    sudo vi /etc/resolv.conf
  - Move cursor to the end of the line that starts with “nameserver” and then press the “a” key on your keyboard in order to move the cursor over
  - Press Enter to start typing on a new line, and then type this in:

    nameserver 8.8.8.8

  - Press the ESC key on your keyboard
  - Then type the following:

    :wq



- Then press Enter
- You should now have exited the text editor. You can try the curl command again and it should work now

- Next type the command followed by the enter key
  sudo chmod +x install_fw_dualband.sh
- Then type the command followed by the enter key
  ./install_fw_dualband.sh

- The flashing script will take care of the rest. Once the script is done it will reboot Pi-Star.

Building firmware on Pi-Star

- Go to *Configuration->Expert->SSH Access*
- Login to pi-star
- Run command *rpi-rw*
- Make sure the necessary software tools are installed by running these commands:
  sudo apt-get install gcc-arm-none-eabi gdb-arm-none-eabi libstdc++-arm-none-eabi-newlib libnewlib-arm-none-eabi
- Install updated stm32flash utility by running these commands:
  cd ~
  git clone https://git.code.sf.net/p/stm32flash/code stm32flash
  cd stm32flash
  make
  sudo make install
- Download the firmware sources by running these command:
  cd ~
  git clone https://github.com/juribeparada/MMDVM_HS.git
  cd MMDVM_HS/
  git submodule init
  git submodule update
  cp configs/ZUMspot_dualband.h Config.h
- Build the firmware by running this command:
  make
- Stop services by running these commands:
  sudo pistar-watchdog.service stop
  sudo systemctl stop mmdvmhost.timer
  sudo systemctl stop mmdvmhost.service
- Upload the firmware to ZUMspot RPi board:
  sudo make zumspot-pi

Support

MMDVM groups.io group:
https://groups.io/g/OpenDV

Pi-Star support forum:
https://forum.pistar.uk/

Pi-Star Facebook support group:
https://www.facebook.com/groups/pistar/

Pi-Star Wiki:
http://wiki.pistar.uk

ZUM Radio Facebook group:
https://www.facebook.com/groups/249802742395450/