ZUMspot Duplex Kit Quick Start Guide

The ZUMspot Duplex Kit has all of the capabilities of the original ZUMspot, but it also enables a duplex connection between your hotspot and HT. This will allow you to switch to a different talk group from your HT even if the current talk group is tying up your hotspot.

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Board specifications

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 DMR/Fusion full duplex operation
- Onboard LEDs to show status (Tx, Rx, PTT, Mode)
- Up to 10mW RF power
- SMA antenna connectors, UHF antennas 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 Duplex Kit should come with the following:
    - ZUMspot Duplex board
    - Raspberry Pi Zero
    - Pre-programmed SD card
    - 4 plastic screws
    - 4 plastic standoffs
    - 4 plastic nuts
    - 2 right angle UHF antennas
- Make sure the SD card is inserted into the Raspberry Pi Zero
- Install each antenna into each RF connector, and position them 90 degrees away from each other as shown below

Powering up

- Plug a USB micro power cable to your ZUMspot Duplex 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

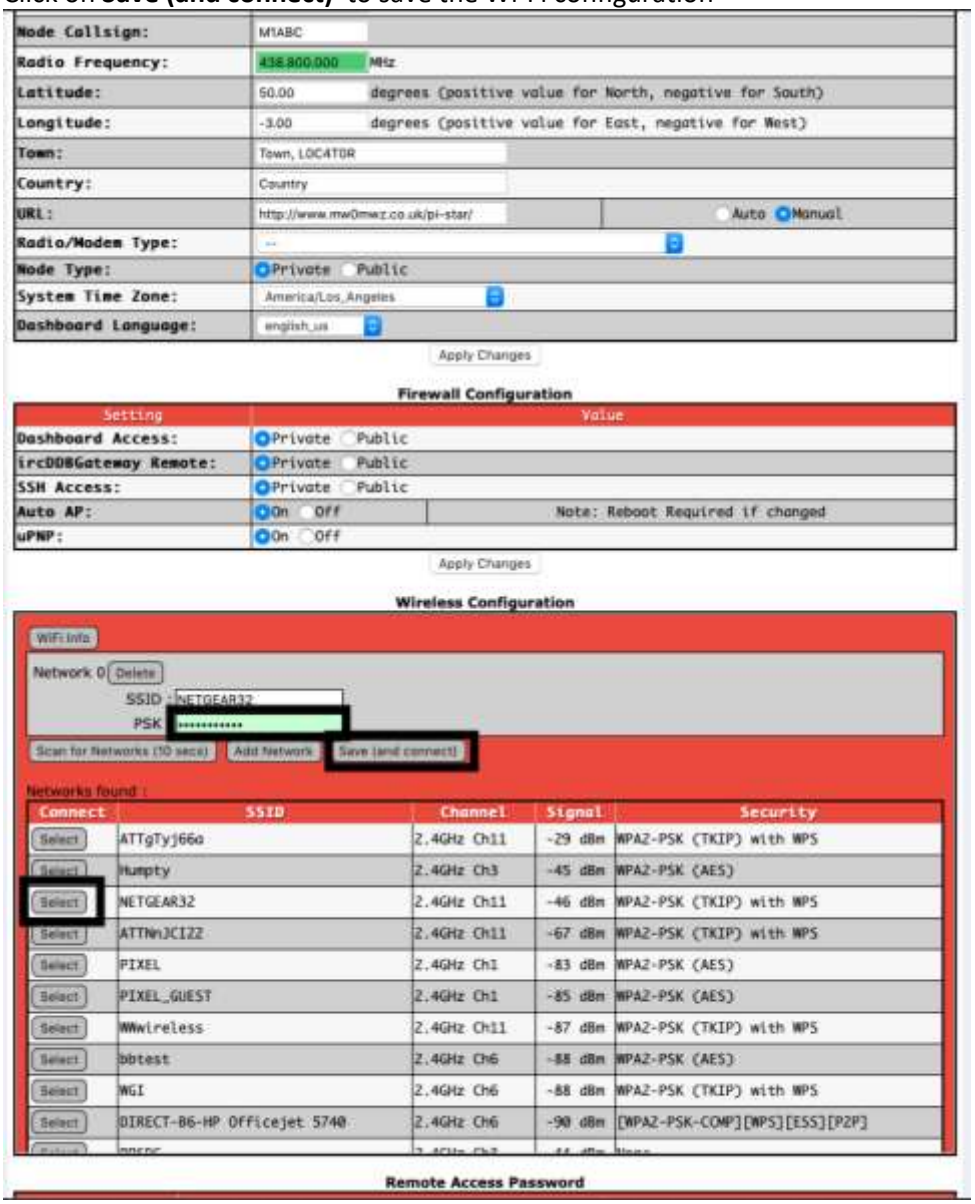
- Power up the ZUMspot Duplex Kit.
- After 3 minutes, scan for Wi-Fi access points from your phone or laptop. One should appear with the name **Pi-Star-Setup**
- Connect to it. When asked for the Wi-Fi password type in: raspberry
- After 3 minutes, go to your web browser (Chrome, Firefox, etc.) and connect 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.

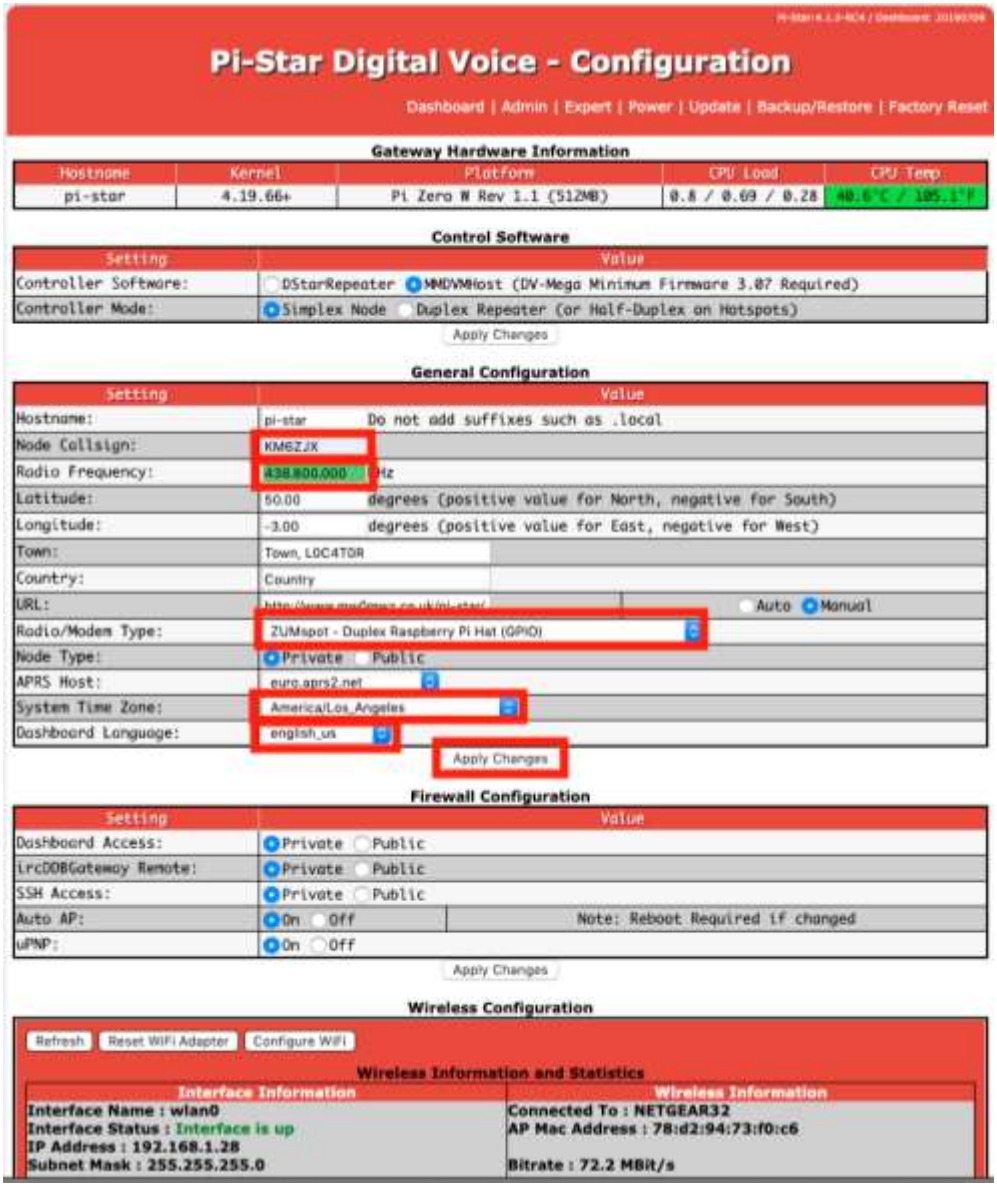
- Click on **Save (and connect)** to save the Wi-Fi configuration



- Reboot your ZUMspot Duplex 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.



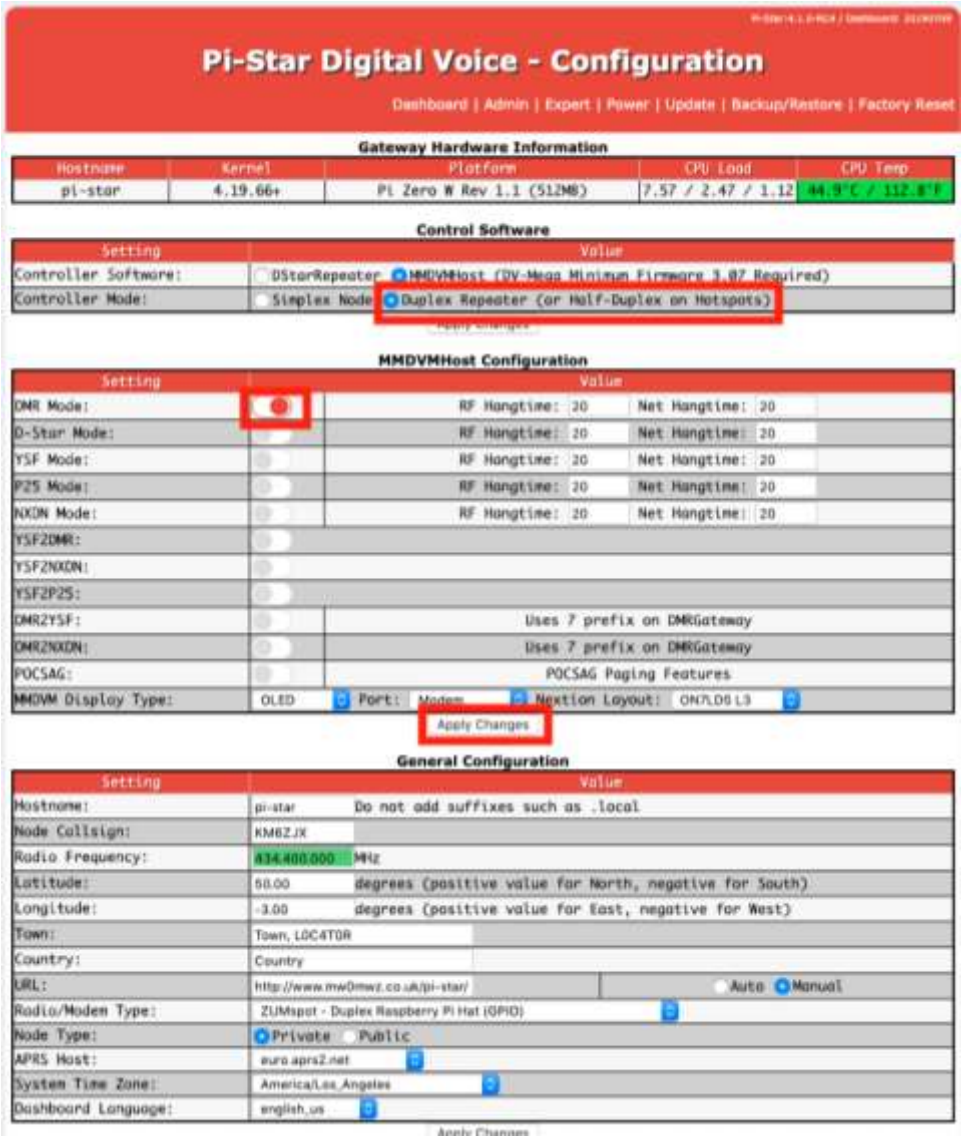
- Click **Apply Changes** when you are done

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

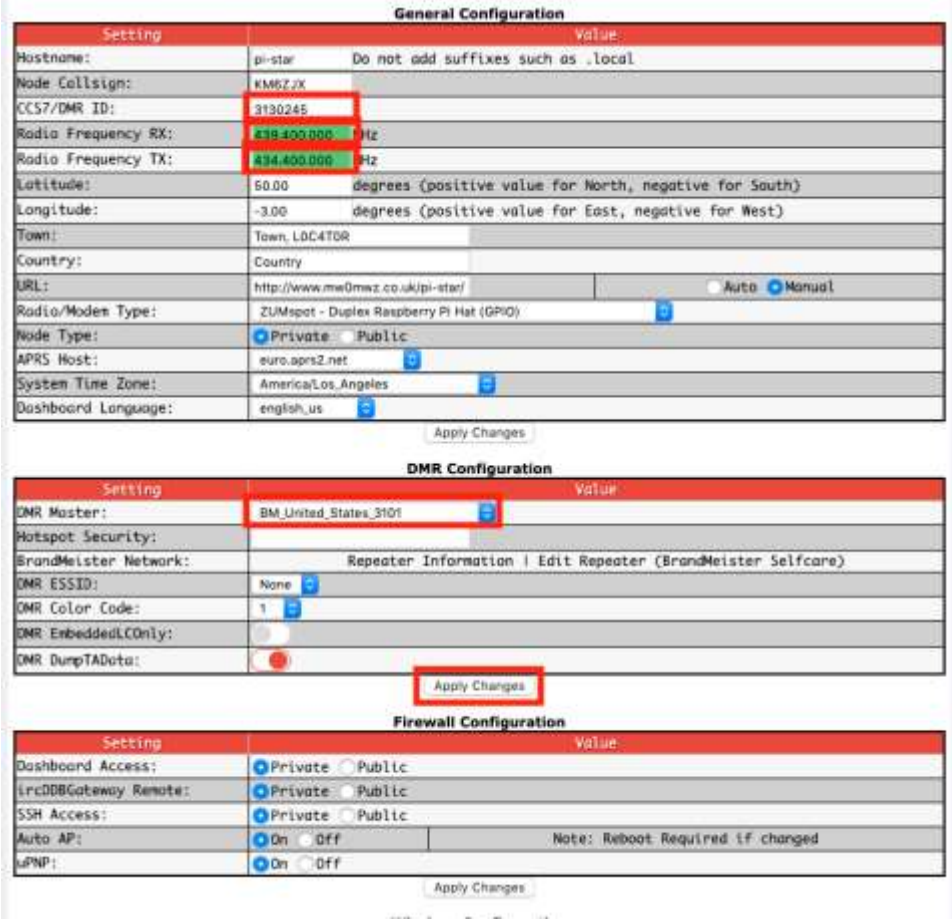
DMR with Duplex

Once you have completed the **Configuration** steps. You can finish setting up your ZUMspot Duplex Kit with DMR using a duplex connection

- Turn on **DMR** and confirm that **Controller Mode** is set to **Duplex** and then click on **Apply Changes**



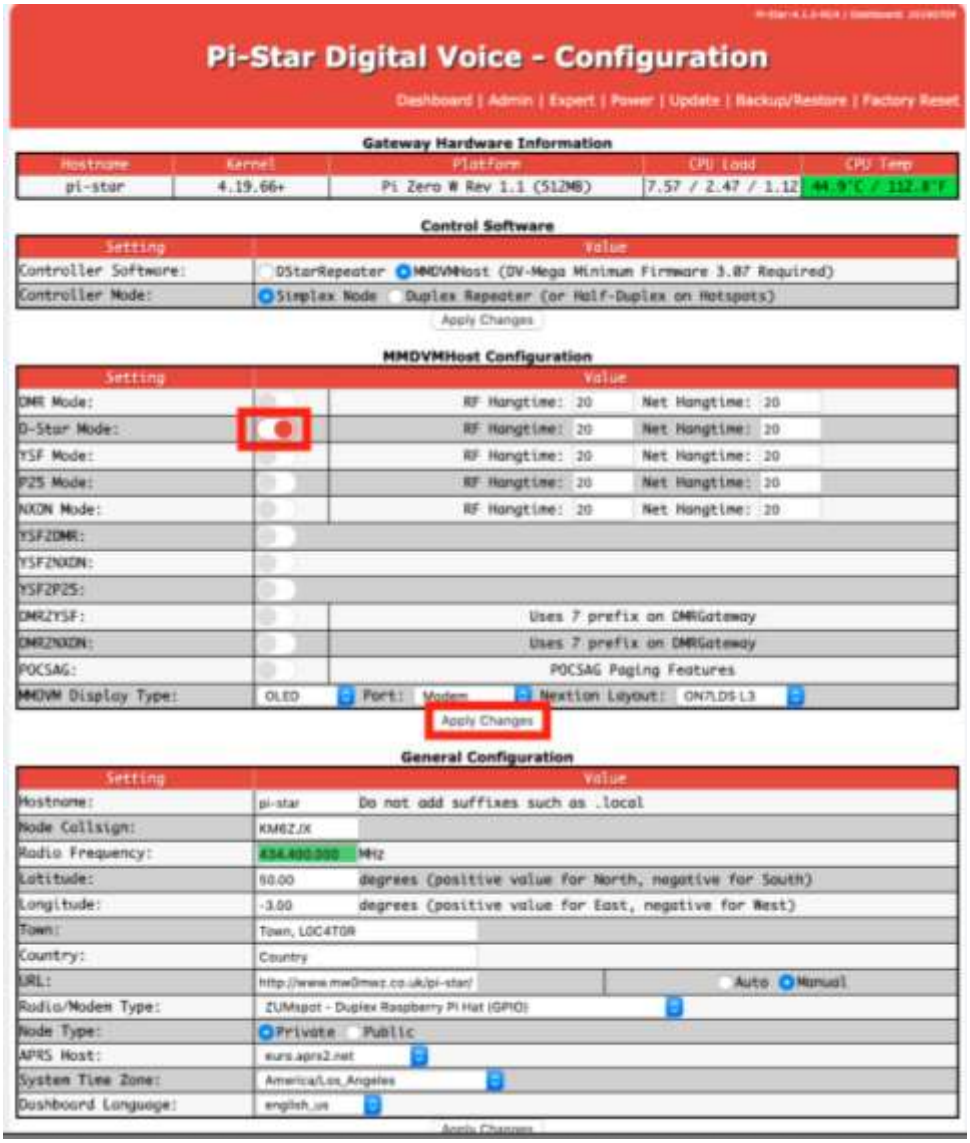
- Set the **RX** and **TX** frequencies to be used.
    - NOTE: For best performance, the frequency offset between RX and TX should be at least 5MHz, but 10MHz is recommended
- Enter your **DMR ID**
- Choose your preferred **DMR master** server
- Click **Apply Changes** in order to save your settings



- You can now use DMR with a duplex connection with your ZUMspot Duplex Kit

Enable 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 Duplex Kit

Finishing setup

Once you have completed the Pi-Star configuration you can start using the ZUMspot Duplex 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_duplex.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_duplex.sh
- Then type the command followed by the enter key

  ./install_fw_duplex.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_duplex.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 Yahoo group:
https://groups.yahoo.com/neo/groups/mmdvm/conversations/messages

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/