Amateur Radio Notes ▼

by Toshen, KE0FHS
CQ · Base · D-STAR · DMR · Hotspots · Pi-Star

Updating hotspot firmware via Pi-Star

Revised: Apr 2020, CC BY-SA ↗

Most up-to-date version: amateurradionotes.com/firmware.htm *Links:* Standalone articles & PDFs ↗

Note: This is an extract from the full Pi-Star notes article.

8) Updating hotspot firmware via Pi-Star

It's possible to update the firmware of several hotspot boards via Pi-Star.

Related article: Updating and upgrading Pi-Star ↗

Note: These instructions are for hotspots. For updating firmware on MMDVM repeaters, see the Pi-Star Wiki article: Headless MMDVM Firmware Building ↗.

8a) Updating ZUMspot/MMDVM_HS, etc.

Current version as of Jun 1, 2019: v1.4.17 ↗ (there's also a beta available: 1.5.1b).

Beginning with Pi-Star dashboard v20181214, you can see in the Radio Info section which TCXO chip (12.288 or 14.7456 MHz) a ZUMspot/MMDVM_HS board is running. This info is needed to determine which firmware update to apply, for example, with the MMDVM_HS_HAT or MMDVM_HS_DUAL_HAT, there are separate firmware update script commands for the different chips.

Radio Info	
Trx	Listening
Tx	446.225000 MHz
Rx	446.225000 MHz
FW	ZUMspot:v1.4.14
TCXO	14.7456MHz

Firmware release notes on GitHub: ZUMspot/MMDVM_HS ☑.

1. Log into Pi-Star via SSH.

2. Run a Pi-Star Update:

   `sudo pistar-update`

   Note: If there's anything unusual about the update process, for example, if there are unusual error messages or it finishes with a "mount: / is busy" message, it might be a good idea to rerun the update and also to reboot before proceeding:

   `sudo reboot`

3. Run one of the following commands:

   Note 1: It isn't necessary to first put Pi-Star into read-write mode (rpi-rw); the script takes care of that.

   Note 2: When you first enter one of the following commands, you'll see a message showing the current version of firmware that is installed on your hotspot, for example:

   `MMDVM_HS_Hat-v1.3.3 20180224 ADF7021 FW by CA6JAU GitID #d90263f`

   `Press any key to write the hs_hat firmware to this modem or Ctrl-C to quit…`

   If you press any key to continue, the next thing you'll see is a message about the new version of firmware that is being installed, for example:

   `Flashing your hs_hat modem to the latest version`

   `--2018-05-23 08:41:20-- http://github.com/juribeparada/MMDVM_HS/releases/download/v1.3.6/`

   `install_fw_hshat.sh`

   - ZUMspot board connected to GPIO:

     `sudo pistar-zumspotflash rpi`

   - MMDVM_HS_Hat board with 14.7456 MHz TCXO[1] connected to GPIO:

     `sudo pistar-mmdvmhshatflash hs_hat`

- MMDVM_HS_Hat board with 12.288 MHz TCXO connected to GPIO:

  ```
  sudo pistar-mmdvmhshatflash hs_hat-12mhz
  ```

- MMDVM_HS_DUAL_Hat board with 14.7456 MHz TCXO connected to GPIO:

  ```
  sudo pistar-mmdvmhshatflash hs_dual_hat
  ```

- MMDVM_HS_DUAL_Hat board with 12.288 MHz TCXO connected to GPIO:

  ```
  sudo pistar-mmdvmhshatflash hs_dual_hat-12mhz
  ```

- Nano Hat board connected to GPIO:

  ```
  sudo pistar-vyehsflash nano_hs
  ```

- HS_DUAL_HAT (VR2VYE) connected to GPIO:

  ```
  pistar-vyehsflash hs_dual_hat
  ```

- NanoDV NPi board:

  ```
  sudo pistar-nanodvflash pi
  ```

- NanoDV USB board:

  ```
  sudo pistar-nanodvflash usb
  ```

- BD7KLE/BG3MDO devices:

  ```
  sudo pistar-mdoflash
  ```

- ZUMspot duplex board connected to GPIO:

  ```
  sudo pistar-zumspotflash rpi_duplex
  ```

- ZUMspot USB key:

  ```
  sudo pistar-zumspotflash usb
  ```

- USB-connected Libre Modem:

  ```
  sudo pistar-zumspotflash libre
  ```

4. A prompt will tell you to press any key to begin.

5. When the update is finished, another prompt will tell you to press any key to reboot Pi-Star. Be patient, this step takes a bit of time during which it doesn't look like anything is happening.

6. Once the firmware update is complete, you can see the new version in the Radio Info module on the Pi-Star Dashboard or Admin pages.

[1] TCXO = Temperature Compensated Crystal Oscillator

[2] The script for updating a ZUM Radio MMDVM-Pi board can be found here: GitHub: juribeparada/MMDVM_man ↗.

Trouble re-opening the dashboard

Sometimes after performing a Pi-Star or firmware update, for some reason the dashboard won't re-open in the browser on my Windows 10 laptop when using the standard http://pi-star/ or http://pi-star.local/ URLs. When that happens, find the hotspot's IP address and use that. After the dashboard opens the first time using the IP address, the URLs should work again.

Downgrading firmware

For those rare situations when a firmware update breaks things, Michael Eckhoff, K5MRE, posted instructions for downgrading ZUMspot/MMDVM_HS firmware in the Pi-Star Users Support Group. I've tried this and it worked, but there are no guarantees. **Use at your own risk!**

Followup note: There is a script for downgrading the MMDVM_HS_Hat boards. I haven't tried this, so another **Use at your risk!** warning:

- To downgrade MMDVM_HS_Hat with 14.7456 MHz TCXO connected to GPIO:

  ```
  sudo pistar-mmdvmhshatdowngrade hs_hat
  ```

- To downgrade MMDVM_HS_Hat with 12.288 MHz TCXO connected to GPIO:

  ```
  sudo pistar-mmdvmhshatdowngrade hs_hat-12mhz
  ```

- To downgrade MMDVM_HS_DUAL_Hat with 14.7456 MHz TCXO connected to GPIO:

  ```
  sudo pistar-mmdvmhshatdowngrade hs_dual_hat
  ```

- To downgrade MMDVM_HS_DUAL_Hat with 12.2880 MHz TCXO connected to GPIO:

  ```
  sudo pistar-mmdvmhshatdowngrade hs_dual_hat-12mhz
  ```

Here's the manual script by K5MRE that I tried:

1. Log into Pi-Star via SSH.

2. Enable read-write mode:

   ```
   rpi-rw
   ```

3. Download the firmware you want to use (see juribeparada/MMDVM_HS ⬀). Note, the URL in the following command is split into two lines, but enter it with no spaces:

   ```
   wget https://github.com/juribeparada/MMDVM_HS/
   releases/download/v#.#.#/modem_fw.bin
   ```

   where #.#.# is the version of the firmware you want to downgrade to
   and modem_fw.bin is the bin file that matches your board:

   ```
   mmdvm_hs_dual_hat_fw-12mhz.bin
   mmdvm_hs_dual_hat_fw.bin
   mmdvm_hs_hat_fw-12mhz.bin
   ```

```
mmdvm_hs_hat_fw.bin

nanodv_npi_fw.bin

nanodv_usb_fw.bin

nano_hotspot_fw.bin

zumspot_duplex_fw.bin

zumspot_libre_fw.bin

zumspot_rpi_fw.bin

zumspot_usb_fw.bin
```

4. Flash the downloaded firmware:

   ```
   sudo pistar-mmdvmhshatflash-custom modem_fw.bin
   ```

   again, where modem_fw.bin is the bin file that matches your board.

5. Reboot

After rebooting, you optionally can clean up by removing the bin file:

1. Log into Pi-Star via SSH.

2. Enable read-write mode:

   ```
   rpi-rw
   ```

3. Remove the bin file:

   ```
   modem_fw.bin
   ```

   where modem_fw.bin is the bin file that matches your board.

∧ Top

8b) Updating DVMEGA mounted on an RPi

Note: This method, which was figured out by Tom, ON4TOP. Tony Corbett, G0WFV, discusses it in detail on his Radio Geek blog, HOW-TO Update DVMega firmware without a programmer or an Arduino ☑:

> Tom, ON4TOP, has come to your rescue. He has figured out that it is possible to flash the DVMega firmware using the Rpi itself with the DVMega still in situ by wiring the reset pin of the ATMEGA328 directly to a spare GPIO port and then using (a slightly modified version of) avrdude to flash the hex file straight over /dev/ttyAMA0. The same procedure works just as well on a single band DVMega….

Subsequently, Andy Taylor, MW0MWZ, adapted this method for use with Pi-Star. What follows is a summary of Andy's adaption.

This process works in Pi-Star's default Read-Only mode. These are the instructions for the non-"Japan" firmware update. (Sorry Japanese hams but I don't know the process for the "Japan" firmware update.)

1. For updating the DVMEGA firmware using a Raspberry Pi 3, solder a jumper wire between the ATMEGA328 reset pin and GPIO header Pin 7.

   - - - - - - - - - - - - - - -

   Important! Soldering a DVMEGA and updating its firmware are at your own risk. The only thing that is guaranteed is that if you wreck your DVMEGA doing this, then you own a wrecked DVMEGA.

   - - - - - - - - - - - - - - -

   Important! This jumper configuration is for use only when using the Raspberry Pi for updating the firmware. When using the BlueStack board, there is a different configuration and method (see Updating DVMEGA firmware using a BlueStack board 🔗).
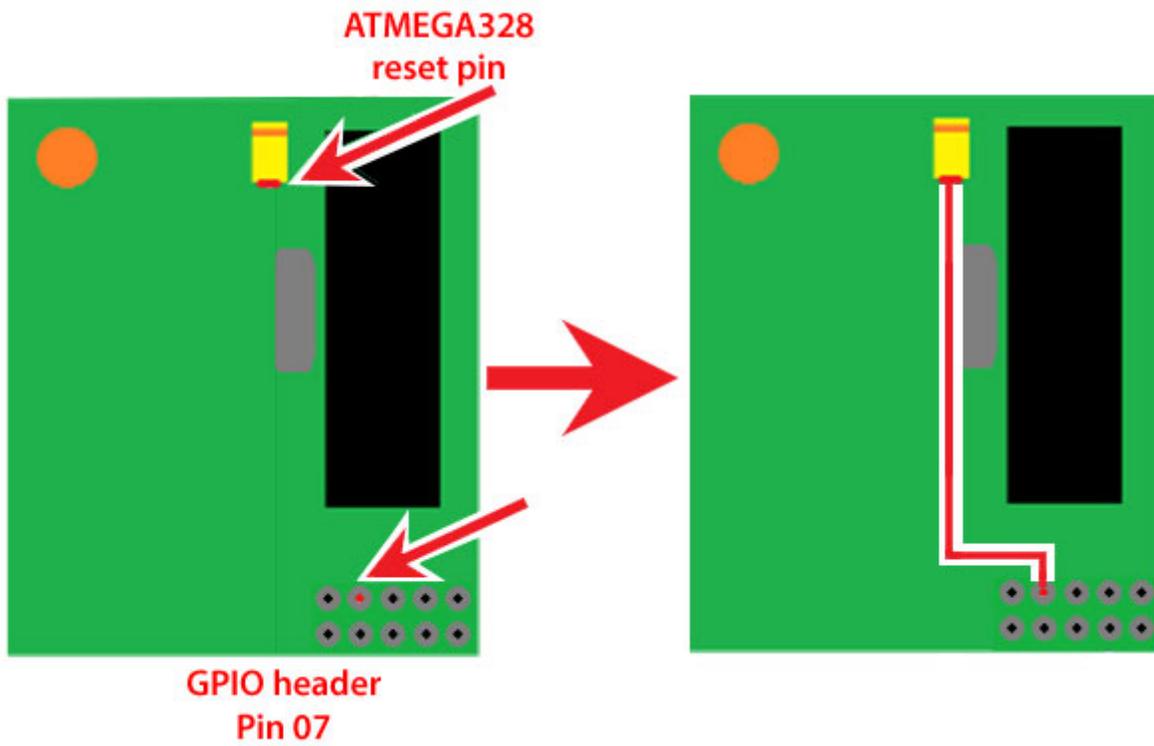
   Note: You can leave the soldered jumper wire in place after updating the firmware, making subsequent updates much easier.

   DVMEGA-DUAL

DVMEGA-SINGLE:

ATMEGA328
reset pin

GPIO header
Pin 07
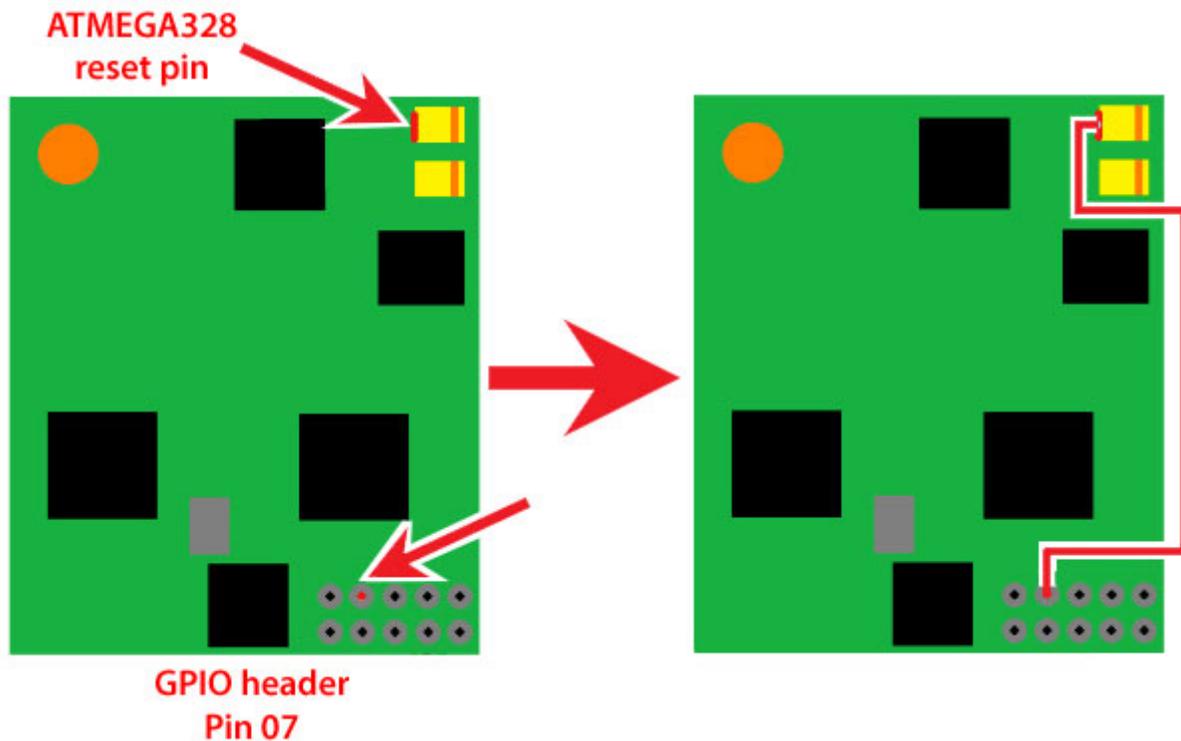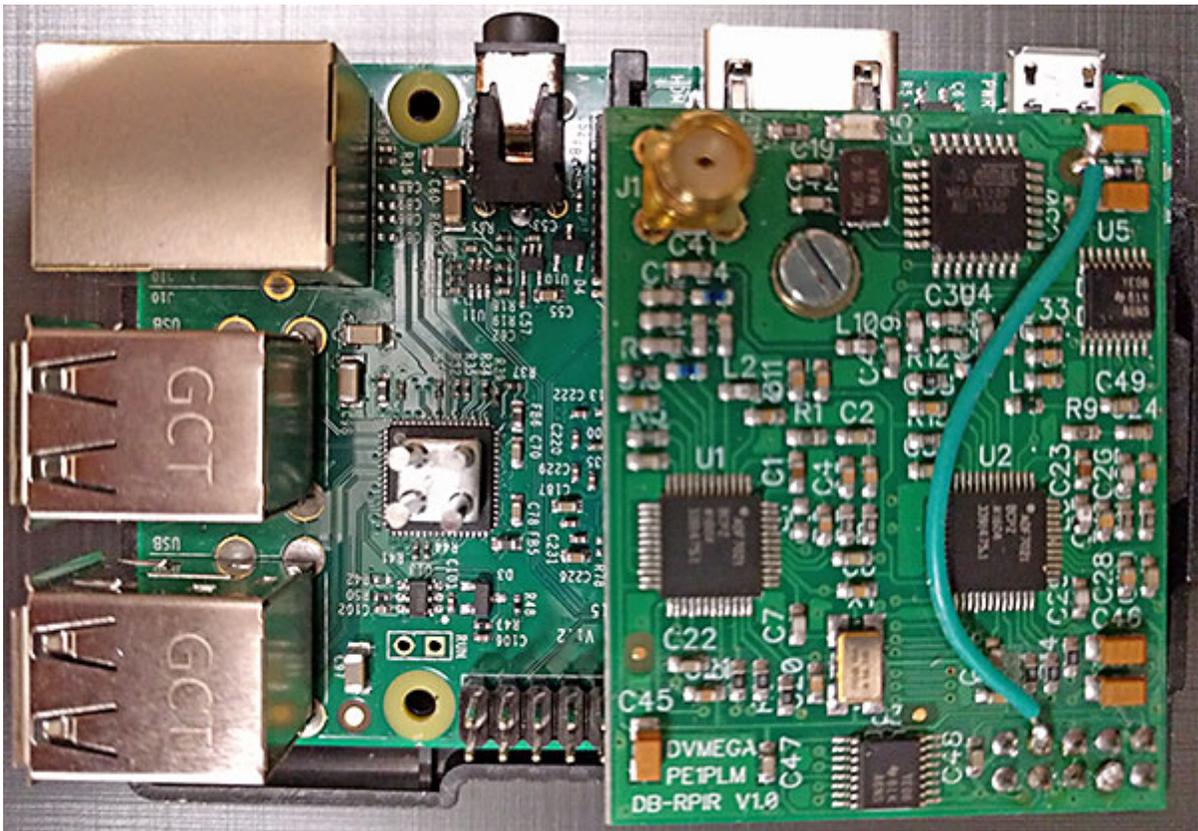
2. SSH into your Pi-Star.

3. Change directory to tmp:

```
pi-star@pi-star(ro):~$ cd /tmp
```

4. Download the imaging tools:

```
pi-star@pi-star(ro):tmp$ wget --tries=3 https://www.pistar.uk/downloads/dvmega-flash-
tools.zip
```

5. Download the DVMega firmware update file:

    a. To find the latest firmware version, visit the DVMEGA Downloads ☑ page and look in the section for BlueDV-MMDVMhost, Raspberry Pi based.
        Where ### is the firmware update version:

        *   *For firmware versions 3.19 and earlier:*

            ```
            pi-star@pi-star(ro):tmp$ wget --tries=3 http://www.dvmega.nl/wp-
            content/uploads/2018/11/DVMEGA_RH_V###_UNO.zip
            ```

        *   *For firmware versions 3.26 and later:*

            ```
            pi-star@pi-star(ro):tmp$ wget --tries=3 http://www.dvmega.nl/wp-
            content/uploads/2018/11/DVMEGA_RH_V###_RPI.zip
            ```

        - - - - - - - - - - - - - -

        Thanks to Bruce, NB0DV, for his post about the change that happened with v3.26 on the Pi-Star User Forum ☑.

        - - - - - - - - - - - - - -

        Note: I added `--tries=3` after I ran into a problem with the DVMEGA site being unavailable the first time I tried this. The retries kept happening and each one took a long time, so this step seemed to be in an unending loop. I ended up rebooting the device to break the looping. Turns out the default for wget ☑ (web get) is 20 retries, which seems excessively high to me for this operation.

        - - - - - - - - - - - - - -

    b. Unzip both imaging tools and firmware files to the dvmega directory:

        ```
        pi-star@pi-star(ro):tmp$ unzip -d dvmega dvmega-flash-tools.zip
        ```

    c. Where ### is the firmware update version:

        *   *For firmware versions 3.19 and earlier:*

            ```
            pi-star@pi-star(ro):tmp$ unzip -j -d dvmega DVMEGA_RH_V319_UNO.zip
            ```

        *   *For firmware versions 3.26 and later:*

            ```
            pi-star@pi-star(ro):tmp$ unzip -j -d dvmega DVMEGA_RH_V319_RPI.zip
            ```

        - - - - - - - - - - - - - -

        Note: The -d switch causes the files to be extracted into the dvmega folder. The -j switch extracts files into the current folder without the folder structure in zip file being recreated.

        - - - - - - - - - - - - - -

d. Change directory to dvmega:

```
pi-star@pi-star(ro):tmp$ cd dvmega/
```

e. For versions 3.26 and later, delete the unnecessary file, where ### is the firmware update version:

```
pi-star@pi-star(ro):dvmega$ sudo rm DVMEGA_RH_V###_RPI_JAPAN.hex
```

f. Run the script:

```
pi-star@pi-star(ro):dvmega$ sudo ./flash_gpio.sh
```

g. When the script is finished, you'll see:

```
strace: |autoreset: Broken pipe
```

```
Once flashing has been completed, you should reboot your Pi-Star
```

h. Reboot Pi-Star:

```
pi-star@pi-star(ro):dvmega$ sudo reboot
```

(or you can exit the SSH session and reboot from the Pi-Star dashboard).

∧ Top

Amateur radio notes by Toshen, KE0FHS:

CQ · Base · D-STAR · DMR · Hotspots · Pi-Star

Questions or comments?

Please let me know ⧉