Pi-Star Digital Voice

Hostname: pl-star

Pi-Star: 3.4.11 / Deshboerd: 20180305

Pi-Star Digital Voice Dashboard for

Dashboard | Admin | Configuration

Modes Enabled	1		Gateway	Activity				
D-Star DMR	Time (MST)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER
YSF P25	17:14:15 Mar 5th	D-Star	SEEK.	COCOCO via REFORT C	Net	2.9	0%	0.0%
YSF2DMR NXDN	17:14:14 Mar 5th	D-Star	41852/5388	COCOCO via REFORT C	Net	2.8	0%	0.0%
TOTAL TOTAL	17:14:13 Mar 5th	D-Star	4174EV	COCOCO via REFORT C	Net	3.3	0%	0.0%
Network Status	17:14:12 Mar 5th	D-Star	KENNYS/TEME	COCOCO via REPORT C	Net	4.2	0%	0.0%
D-Star Net DMR Net	17:13:18 Mar 5th	D-Star	KF3H0/4388	CQCQCQ wie HEFBRI (Net	5.3	55%	0.0%
YSF Net P25 Net	17:12:46 Mar 5th	DMR Slot 2	6750	75 310	Net	0.5	8%	0.0%
YSF2DMR Net NXDN Net	17:12:42 Mar 5th	DMR Slot 2	#423EY	76 318	Net	0.4	0%	2.0%
Internet	17:12:19 Mar 5th	DMR Slot 2	ALL BRINGS	16.318	RF	1.1	0%	0.8%
	17:12:18 Mar 5th	DMR Slot 2	VE AIDA	76 318	Net	0.5	0%	0.0%
Radio Info	17:12:03 Mar 5th	DMR Slot 2	48380	76 318	Net	1.2	0%	0.0%
Trx Listening	17:11:43 Mar 5th	DMR Slot 2	8946.000	76 338	Net	0.5	0%	0.0%
Tx 433,300000 MHz	17:11:20 Mar 5th	D-Star	##CA/1091	COCOCO via REFORT C	Net	3.6	0%	0.0%
Rx 433.300000 MHz	17:10:46 Mar 5th	DMR Slot 2	x160F1	75 310	Net	0.1	0%	0.0%
ZUMspot:v1.3.2	17:09:50 Mar 5th	DMR Slot 2	alles.	15 318	Net	1.0	0%	0.6%
	17:09:27 Mar 5th	DMR Slot 2	4.34522	76 318	Net	2.2	40%	0.0%
D-Star Repeater	17:09:02 Mar 5th	DMR Slot 2	VERLE	76 338	Net	1.2	0%	0.0%
RPT1 B	17:08:53 Mar 5th	D-Star	10461,521/3046	CQCQCQ via REF001 C	Net	0.8	2%	0.0%
RPT2 G	17:07:55 Mar 5th	D-Star	PE10.PV/1951	EQCICQ Vis REFORT C	Net	2.7	0%	0.0%
D-Star Network	17:07:35 Mar 5th	DMR Slot 2	web).2	16.318	Net	0.5	0%	0.0%
APRS texas.aprs2.net	17:07:26 Mar 5th	DMR Slot 2	6429	76.31#	Net	7.6	1%	0.0%
IRC rr.openquad.net			Level Dr					
Linked to REF001 C	71 01575	and a	and the second se	Activity	-6-2	000	00	
(DPlus Outgoing)	Time (MST)	Mode			r(s)	BER	RS	51
an a	17:12:42 Mar 5th	DMR Slot	2 KEØFHS	TG 310 RF	1.1	0.3%		
DMR Repeater								
DHR ID NIMMAN								
DHR CC 1								
TS1 disabled								
TS2 enabled								
TG 310/not linked								
DHR Master								
BM United States 3103	3							
DMR+ PHOENIX-F								
	IrcOI		d by Hans-J. Barther	n (OLSDI), G9VH),				

Pi-Star can be what ever you want it to be, from a simple single mode hotsport running simplex providing you with access to the increasing number of Digital Voice networks, up to a public duplex multimode repeater!

Disclaimer: These are my personal notes and opinions based on my experience using Pi-Star, as well as by learning from what others are sharing. I'm not affiliated with the Pi-Star project,

except as an appreciative user. I've tried to be accurate, but there may be things I'm mistaken about; please let me know if you come across anything needing correction.

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1) Learning about Pi-Star

Pi-Star is relatively easy to set up as a personal hotspot, so don't be put off by the length of this article. Even though I was able to get Pi-Star working quickly, I wanted to understand more about its rich set of features and configuration options, so I have continued to research and write this article as a personal reference based on what I'm learning.

1a) To get quickly up and running

Just follow the easy steps outlined in the excellent Pi-Star initial setup video by Craig, W1MSG.

1b) Other good resources for learning about Pi-Star

- Pi-Star website
- Pi-Star wiki
- Pi-Star Users Support Group What a great community of helpful users! I've spent a ton of time browsing answers there, and numerous times throughout this article I quote answers provided by Andy Taylor and others in the support group.
- All of the many great videos by Craig, W1MSG.
- DMR, Fusion, MMDVM and other DV NEWS, by Ron, VE1AIC. Ron shares a wealth of info on his blog, including coverage of Pi-Star.

1c) Be sure to set up your D-STAR radio properly!

If you're going to be using a hotspot for D-STAR, it's really important that you set up your radio correctly. For example, you must set up RPT1, RPT2, and a zero offset (either +/–0.000). Sometimes, this is referred to as Duplex mode; other times, as D-STAR Repeater (DR) mode.

Craig, W1MSG, has a good video about this: D-STAR Radio Primer for using Pi-Star. For more info about setting up the D-STAR radio I use with my hotspots, see Programming the Kenwood TH-D74A for D-STAR.

2) Downloading Pi-Star

First things first: grab the latest Pi-Star image designed for your hotspot from Pi-Star Downloads.

At this time, I'm using Pi-Star with a ZUMspot mounted on a Raspberry Pi. Initially, I used it with a DVMEGA-DUAL mounted on a Raspberry Pi. So I use the RPi image.

Pi	Star.UK - Pi-Star Digital Voice Software
Home	Pi-Star Downloads
Information	Images available to Bownload
Help	Pi-Star_NanoPi_Air_V3.4.11_17-Mar=2018.zip Pi-Star_NanoPi_V3.4.11_17-Mar=2018.zip Pi-Star_Odroid_XU4_V3.4.11_17-Mar=2018.zip
Pi-Star Tools	Pi-Star_OrangePi_Zero_V3.4.11_17-Mar=2018.zip Pi-Star_RPi_V3.4.11_06-Mar=2018.zip Pi-Star_RPi_V3.4.11_17-Mar=2018.zip
BrandMeister Tools	dvnega-flash-tools.zip
DMR+ Tools	Information
D-Star Tools	Remember, all you need to do, is download the zipped version of the image that is most suitable for your Pi / Single Board Computer, Unzip the download, and then flash the image to your SD card (using your prefered
Downloads	image writing tool - see links below for some basic instructions), boot the Pi, wait 30-40 secs and then login to the admin portal in order to finish the setup your Pi-Star.
Credits	here: http://pi-star/admin/
Links	Default Username: pi-star Default Password: raspberry

In addition to the RPi image, there are Pi-Star images available for FriendlyARM NanoPi and NanoPi Air, Hardkernel ODROID, and Xunlong Software Orange Pi.



3) Flashing Pi-Star

Unzip the Pi-Star image zip file you downloaded, and then flash the image file itself (the one with the .img extension) to a microSD card. I did this using, for the first time, Etcher SD Card Imager ¹.

C Etcher			0	×
(+) —		4	0	۰
Pi-Star_R2017.img (94 G Change	B SDHC Card 8.00 GB Change	Flashi		
	CHER is an open source project by 🧐 resin.io		1.1,2	

[1] Etcher SD Card Imager is an open source project by resin.io available for Mac, Linux, and Windows with a modern design that is totally easy to use. Thanks resin.io team for bringing SD card imaging into the 21st century!

3a) Preparing to connect to WiFi

Using the AutoAP (Auto Access Point) method

If you're using Pi-Star 3.4.11 or later and a Raspberry Pi 3 or Zero W, you don't have to do anything to prepare to connect to WiFi.

Basically, if Pi-Star can't connect to a known WiFi network within two minutes of being powered on, it activates its own network access point that you'll use to connect to Pi-Star in order to configure WiFi.

For more info, watch the video Pi-Star WiFi AutoAP by Craig W1MSG.

Manually preparing to connect to WiFi

If you can't use AutoAP of you just like to do things the hard way, after you have finished flashing the image to a microSD card, you can manually add your initial WiFi settings to the root folder so they'll auto-install on first boot up:

- 1. Create a wpa_supplicant.conf file with your WiFi setting(s):
 - Use the Pi-Star WiFi Builder tool on the Pi-Star website.
 - Alternatively, roll your own: Manually adding WiFi settings to RPi.
- Copy the wpa_supplicant.conf file to the microSD card's Boot volume. Note: The first time you boot Pi-Star, that file is moved automatically to its permanent location (/etc/wpa_supplicant/), so don't be surprised if you don't see it the next time you look at the root folder.

3b) Preparing your hotspot for boot up

Insert the microSD card into your hotspot.

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4) Booting up Pi-Star

These steps differ depending on your circumstances. Do all the steps that apply to your current circumstance, in this order:

- a. For all boot ups
- b. If using AutoAP and setting up a new WiFi connection
- c. For all boot ups
- d. If starting Pi-Star for the first time
- e. If using AutoAP and setting up a new WiFi connection
- f. If starting Pi-Star for the first time

a) For all boot-ups

- 1. Power on your hotspot.
- 2. Wait for Pi-Star to boot up. Normally, Pi-Star takes a minute or so to boot up (a bit longer when using a RPi Zero W)

Note: If you have a display attached to your hotspot, optionally upi can watch the Linuxbased startup process until it displays a login prompt; however, you can't access the dashboard directly via the hotspot, so don't log in there.

b) If using AutoAP and setting up a new WiFi connection

Perform this step when you start Pi-Star for the first time or when you need to connect to a new WiFi network.

- 1. Let another minute pass so that Pi-Star can activate its own AutoAP access point.
- 2. On another Windows, Mac, or Linux-based computer that has WiFi enabled, look in the WiFi settings to find the Pi-Star access point, and select it to connect to it:

• If you're starting Pi-Star for the first time, it will be named "Pi-Star-Setup."



• If this isn't the first time, but you need to connect to a new WiFi network, it will be named using the hostname of your hotspot, by default, "pi-star" (or whatever you've changed the hostname to in the General Configuration section).



3. Enter the Pi-Star AutoAP password: raspberry.

	The Wi-Fi network "Pi-Star-Setup" requires a WPA2 password.
•	You can also access this Wi-Fi network by bringing your Mac near any iPhone, iPad, or Mac which has connected to this network and has you in their contacts.
	Password: Show password Remember this network
?	Cancel Join

c) For all boot ups

1. On another Windows, Mac, or Linux-based computer connected to the same network, open a browser window.

2. Navigate to: http://pi-star.local/

Note: That URL will work on all computers, but on Windows, you can get by with just: http://pi-star/

- d) If starting Pi-Star for the first time
 - 1. You'll be greeted by a "No Mode Defined" screen. This is normal because you haven't yet defined the mode you want to use (like D-STAR or DMR).

Hostname: pi-star	PI-Star:3.4.6 / Deshboard: 20171101
	Pi-Star Digital Voice Dashboard for M1ABC
	Dashboard Admin Configuration
	No Mode Defined
	I don't know what mode I am in, you probaly just need to configure me.
	You will be re-directed to the configuration portal in 10 secs
	In the mean time, you might want to register on the support page here: https://www.facebook.com/groups/pistar/
	Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2017. ircDDBGateway Dashboard by Hans-J. Barthen (DL5DI), MMDVMDash developed by Kim Huebel (DG9VH), Need help? Click here for the Support Group Get your copy of Pi-Star from here.

- 2. At this point, you can either click the Configuration link or wait 10 seconds to be redirected automatically.
- 3. The Configuration view requires authentication: the factory default user name is pi-star and the password is raspberry.

Hostname: pl-star	?	Authentication Required http://pi-star.local is requestin password. The site says: "Res		ne and	PI-Star: 3.4.6 / Deshboerd: 20171101 ABC ard Admin Configuration
	User Name:	pi-star			
	Password:				
		(Cancel	ОК	b
	I don't know	what mode I am in, you probally	just need to c	configure me.	
	You wil	be re-directed to the configura	ation portal in 1	0 secs	
		nean time, you might want to ne here: https://www.facebook.c	-		

Note: An important security step that should be part of your initial configuration of Pi-Star is changing that default password, which is discussed below: 5k) Remote Access Password.

e) If using AutoAP and setting up a new WiFi connection

Perform this step when you start Pi-Star for the first time or when you need to connect to a new WiFi network.

- 1. In the Configuration View, find the Wireless Configuration section.
- 2. Click Scan for Networks (takes about 10 seconds), find the one you want, and click Connect.

		Wireless Configu	ration		_
WiFi Info					
Scan for Networks (10 secs)	Add Network Sav	re (and connect)).	
Networks found :					
Connect	SSID	Channel	Signal	Security	
and the second sec	di secondo del		and the state of the state of the	a de la construcción de	

Alternatively, for example, if the scan doesn't find the network you want to use, you can add a network manually. For more info, see 5j) Wireless Configuration.

- 3. Reboot Pi-Star to disable AutoAP and initiate the connection to the WiFi network you just added.
- 4. While Pi-Star is rebooting, reconnect your computer to its usual WiFi connection.
- 5. Give Pi-Star time to finish rebooting, and then open the dashboard by navigating once again to: http://pi-star.local/

f) If starting Pi-Star for the first time

Continue performing initial Pi-Star configuration, as follows.

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5) Performing initial Pi-Star configuration

After authentication, the Configuration view is displayed. The first sets of options cover the Control Software, MMDVMHost Configuration (if you have MMDVMHost enabled), and General Configuration.

5a) Control Software
5b) MMDVMHost Configuration
5c) General Configuration
Jump to: Digital mode configuration settings
Jump to: Additional Pi-Star configuration settings

Pi-Star: 3.4.11 / Deshboard: 20180305

Pi-Star Digital Voice - Configuration

Dashboard | Admin | Expert | Power | Update | Backup/Restore | Factory Reset

	Gateway Hardware Information						
Hostname	Kernel	Platform	CPU Load	CPU Temp			
pi-star	4.9.35-v7+	Pi 3 Model B (1GB) - Embest, CH	0.45 / 0.35 / 0.21	48.3°C / 118.9°F			

Control Software						
Setting Value						
Controller Software:	OStarRepeater OMMDVMHost (DV-Mega Minimum Firmware 3.07 Required)					
Controller Mode:	 Simplex Node Ouplex Repeater (or Half-Duplex on Hotspots) 					

Controller Software

- If you'll be using Pi-Star with multiple modes, choose MMDVMHost. (MMDVM stands for Multi-Mode Digital Voice Modem).
- If you'll be using just D-STAR, you can select DStarRepeater instead.
- Note: DVMEGA has minimum firmware requirements when using MMDVMHost with the following modes: DMR = 3.07 and YSF = 3.14. Beyond those minimums, there are even newer versions available. For more info about updating the DVMEGA firmware, see DVMEGA firmware update on the Notes page at the end of my Diving into D-STAR article.
- **Controller Mode** For setting up a personal hotspot, choose Simplex Node.

Save your changes!

After making changes in any of the configuration sections, click the Apply Changes button below the section. The services are stopped, the changes are applied, and then the services are restarted, after which you'll be returned to the Configuration view.

Pi-Star Digital Voice - Configuration

Dashboard | Admin | Expert | Power | Update | Backup/Restore | Factory Reset

Hostname	Kernel	Gateway Hardware Info Plotform		CPU Load	CPU Temp
pi-star	4.9.35-v7+	Pi 3 Model B (1GB) - Er	mbest, CH	0.11 / 0.23 / 0.18	46.2°C / 115.2°F
	Stopping se	Working rvices and applying your o	configuration	changes	
		Done			
		Changes applied, starting	services		
		Pi-Star web config, @ Andy Taylor (MWC Need help? Click here for the Su Get your copy of Pi-Star fro	pport Group		
0		Changes buttons will a save after working in a		0	
	s modes (DMR, D)-STAR, etc.), the asso			

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5b) MMDVMHost Configuration

		MMDVMHo	st Configu	ration		
Setting				Val	ue	
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:						
MMDVM Display Type:	OLED	O Port: Moder	n 😒	Nextion	Layout: ON7LDS	0
		App	ly Changes			

- Modes Initially, I enabled all modes so I'd have access to all the configuration options for them. Subsequently, I enable only the one or two modes I want to use. For more info about the modes, see the Digital mode configuration settings section below.
- **Hangtime** Related to multi-mode use. The RF hang time is measured from the beginning of a transmission.

- Note 1: Per Andy Taylor in the Pi-Star Users Support Group: "these set the amount of time that mode is 'sticky' for – so if you have an incoming call over DMR from the network, how long would you like to stay stuck to DMR mode." For more info, watch Pi-Star Hang Time Update, by Craig, W1MSG.
- Note 2: The DVMEGA is "super snappy" when running a single mode, but can be a bit sluggish if you're running multiple modes because it needs about 1.5 seconds of RF to determine what the incoming mode is in order to latch onto it. In that case, it can be helpful to extend the hang time to something like 90. [Reference: See Andy Taylor's replies in this post in the Pi-Star Users Support Group.]
- **MMDVM Display Type** If you're using a display with your MMDVM, select:
 - Type of display: OLED, Nextion, HD44780, TFT Serial, or LCDproc.
 - Port you're using: Modem, /dev/ttyAMA0, or /dev/ttyUSB0.
 - Layout, if you're using a Nextion display: G4KLX or ON7LDS.
 - Note 1: To learn more about Nextion screens, visit the Nextion Ham-Radio Screens group administered by Rob van Rheenen, PD0DIB, a Dutch ham and Pi-Star enthusiast.
 - Note 2: Nextion screen layouts: see Nextion subfolders of the g4klx/MMDVMHost Github page.

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5c) General Configuration

		General Config	uration		
Setting			Va	ilue	
Hostname:	pi-star	pi-star Do not add suffixes such as .local			
Node Callsign:	KEOFHS				
CCS7/DMR ID:	3108683	2108883			
NXDN ID:					
Radio Frequency:	433.300.000	MHz			
Latitude:	40.205 degrees (positive value for North, negative for South)			or North, negative for South)	
Longitude:	-105.275	-105.275 degrees (positive value for East, negative for West)			
Town:	Lyons, DN70IE				
Country:	USA).			
URL:	http://www.qrz.c	om/db/KE0FHS		O Auto Manual	
Radio/Modem Type:	ZumSpot - Ras	ZumSpot - Raspberry Pi Hat (GPIO)			
Node Type:	OPrivate OPublic				
System Time Zone:	America/Denve	r 📀			
Dashboard Language:	english_us	0			

Apply Changes

- Hostname You can give your hotspot a unique hostname, for example, if you're running two hotspots simultaneously, you'll need different hostnames for each, such as pi-star and pi-star-2. If you do change the hostname, you must reboot the hotspot before it takes effect. Note: This doesn't change the authentication user name, which remains pi-star.
- Node Callsign For a hotspot, use your own callsign. For a repeater, use your repeater's callsign.
- CCS7/DMR ID For more info, see Optionally, register with CCS7 for DCS (and DMR) on page 2 of my D-STAR article.
- **NXDN ID** The IDs are 2 bytes long, for example, 0-65533. For more info, see NXDN-Forum and NXDNINFO.COM.
- Radio Frequency Used for connecting your radios to the hotspot or modem you're using. For help choosing a frequency, see your country's band plan (U.S. Band Plan) or the helpful info that Ron, VE1AIC, has posted on his blog: Digital Voice frequencies. See also the Pi-Star Users Support Group discussion about frequencies.

Important! Avoid frequencies used for other purposes, especially for satellites, for example, 435.00 - 438.00 (used internationally), as satellite communication can be disrupted easily by low power transmissions, such as those used for digital voice.

- Lat, Lon, Town, QTH Locator grid square, and Country Where the gateway (hotspot) is located. Per Andy Taylor in the Pi-Star Users Support Group: "If you are running D-Star mode, and you add your position information to the dashboard, you will get D-PRS positioning from ircDDBGateway." In addition, location info is used for your Brandmeister hotspot listing. To find your locator grid square, use a service like QTH Locator.
- URL If you want to use this for QRZ and your QRZ page uses the same callsign as your hotspot, select Auto; if they're different, select Manual and replace the placeholder callsign at the end of the URL with your own. Or, per Andy Taylor in the Pi-Star Users Support Group: "set to manual and you can set what you like here, this is reported upstream on some modes like D-Star and DMR; "Auto" populates it with your QRZ page, "Manual" allows you to enter whatever you like."
- **Radio/Modem Type** The Pi-Star RPi image supports a bunch of radios and modems running on the Raspberry Pi 3 or Raspberry Pi Zero W:

	 DV-Mega Raspberry Pi Hat (GPIO) - Single Band (70cm)	
Setting	DV-Mega Raspberry Pi Hat (GPIO) - Dual Band	
Hostname:	DV-Mega on Arduino (USB - /dev/ttyUSB0) - Dual Band DV-Mega on Arduino (USB - /dev/ttyACM0) - Dual Band	
Node Callsign:	DV-Mega on Arduino (USB - /dev/ttyUSB0) - GMSK Modem	
CCS7/DMR ID:	DV-Mega on Arduino (USB - /dev/ttyACM0) - GMSK Modem DV-Mega on Bluestack (USB) - Single Band (70cm)	
NXDN ID:	DV-Mega on Bluestack (USB) - Dual Band	
Radio Frequency:	GMSK Modem (USB DStarRepeater Only) DV-RPTR V1 (USB)	
Latitude:	DV-RPTR V2 (USB)	egative for South)
Longitude:	DV-RPTR V3 (USB) DVAP (USB)	gative for West)
Town:	MMDVM / MMDVM_HS / Teensy / ZUM (USB) STM32-DVM / MMDVM_HS - Raspberry Pi Hat (GPIO)	
Country:	STM32-DVM / MMOVM_HS - Raspberry Prink (GPIO) STM32-DVM (USB)	
URL:	ZumSpot Libre (USB) ZumSpot - USB Stick	O Auto Manual
Radio/Modem Type:	ZumSpot - Raspberry Pi Hat (GPIO)	
Node Type:	OPrivate OPublic	
System Time Zone:	America/Denver	
Dashboard Language:	english_us 📀	

For a full list, see the note RPi image supported radios and modems.

- Node Type Per Andy Taylor in the Pi-Star Users Support Group: "this relates to the UK restrictions, a Public node is just that, can be used by any callsign, while a Private node can only be accessed by the same callsign assigned to the Pi-Star." In his video, Craig, W1MSG, sets it to Public because he's in the U.S., and says that in the U.K. it needs to be set to Private.
- **System Time Zone** Select the time zone of where the gateway (hotspot) is located.
- **Dashboard Language** Select the default for the dashboard. English (US) is a good option for someone like me who wasn't able to understand much of anything being said when I was a visitor wandering around the streets of London!

If any changes made, click Apply Changes.

Radio/Modem Type do-over

When I saved after making changes in General Configuration section, I received a WARNING message: "The Modem selection section has been updated, Please re-select your modem from the list." I presume this was because either new or revised items had been added to the list, or the mode(s) I had selected changed the list. After re-selecting the radio/modem type and re-applying changes, everything was fine.

Digital mode configuration settings

- 5d) DMR Configuration
- 5e) D-STAR Configuration
- 5f) Yaesu System Fusion Configuration (including YSF2DMR)
- 5g) P25 Configuration
- 5h) NXDN Configuration

Jump to: Additional Pi-Star configuration settings

5d) DMR Configuration

2	DMR Configuration
Setting	Value
DMR Master:	DMRGateway
BrandMeister Master:	BM_United_States_3103
BrandMeister Network:	Repeater Information Edit Repeater (BrandMeister Selfcare)
DMR+ Master:	DMR+_PHOENIX-F
DMR+ Network:	Options= StartRef=4000;RelinkTime=60;UserLink=1;TS1_1=9;
XLX Master:	XLX_313 0
XLX Master Enable:	
DMR Color Code:	1 🗘
DMR EmbeddedLCOnly:	
DMR DumpTAData:	
	Apply Changes

 DMR Master – If you want to use only a specific system, choose a specific BrandMeister or DMR+ master. In that case, everything is simpler as you'll see only a few options for that system.

If you want access to multiple systems simultaneously, choose DMRGateway as your DMR master, and then you'll see options for BrandMeister, DMR+, and XLX². If you choose to use DMRGateway, make sure to read the following note, DMRGateway can be confusing.

- BrandMeister Master Choose a nearby master server.
- BrandMeister Network Click Edit Repeater to edit settings via BrandMeister My hotspots for your CCS7 ID².
- DMR+ Master Choose a nearby master server.
- DMR+ Network Set up any options you want to use ².

Note: If you change modes via MMDVMHost Configuration, for example, if you turn off DMR Mode and turn on D-STAR mode, your options won't be saved, so you'll need to re-enter them the next time you turn on DMR Mode and choose DRM+ or DMRGateway as your DMR master.

- XLX Master Choose the XLX master server you want to use.
- XLX Master Enable Toggle the XLX master on/off.
- **DMR Color Code** Hotspots typically use color code 1.
- DMR EmbeddedLCOnly The default is off. Per Andy Taylor in the Pi-Star Users Support Group: "this feature relates to some of the data passed in/out from some radios.... Some radios are affected by this (Connect Systems, for example) and some are not (Motorola). Most of us can take the default."
- **DMR DumpTAData** The default is on, which enables "Talker Alias" information to be received, if your radio supports that.

If any changes made, click Apply Changes.

★ DMRGateway can be confusing!

As I discussed in my Discovering DMR article, DMR in general can be confusing because it was originally designed for commercial use and is a bit of an awkward fit for amateur radio. As powerful as DMRGateway is, I find that it can magnify this confusion because it enables so many additional options, is a work in progress on the bleeding edge, and changes fairly frequently.

Added to that, DMRGateway is the method by which Pi-Star makes access to the XLX system available. The XLX system is comprised of masters, reflectors, and talkgroups, and is also evolving rapidly.

I try to read everything I can about both DMRGateway and the XLX system, but some aspects of both still confuse me. All in all, this is a bit of a wild rollercoaster ride, for sure. The best advice I can offer is to pull down the safety bar and hold on tight!

[2] See also the notes:

- DMRGateway notes
- Constellation reflectors

• Auto-static talkgroups

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5e) D-STAR Configuration

D-Star Configuration	on
	Value
KEOFHS B	
KEOFHS G	
XRF002 😋 A 😳	🔷 Startup 🧿 Manual
texas.aprs2.net	
English_(US)	
	Note: Update Required if changed
	KEEFHS B C KEEFHS G XRF002 C A C texas.aprs2.net C

- **RPT1 Callsign** Pi-Star autofills the callsign you set up in General Configuration, and the B module is selected initially, which is what is used typically for UHF hotspots. If necessary, change the module to the one you want your radio to connect to.
- **RPT2 Callsign** This is set up automatically, with the module set to G for Gateway. (This is why it's so important to set up your D-STAR radio properly. This is the RPT2 setting.)
- Remote Password ³ (formerly labeled ircDDBGateway Password) Use for any kind of remote access to this system. Per Andy Taylor in the Pi-Star Users Support Group: "the ircDDBGateway password on the dashboard is for ircDDBGateway remote." Note: This is different from the Remote Access Password that is used for accessing the Pi-Star Admin and Configuration settings, as well as for SSH access. For that, see 5k) Remote Access Password.
- **Default Reflector** You can select your default reflector, as well as whether you want Pi-Star to connect to it automatically when it starts up.
- **APRS Host** Select your preferred APRS host, typically the nearest.
- **ircDDBGateway Language** Pick one you understand.
- **Time Announcements** If enabled, you'll hear a time announcement every 15 minutes when D-STAR mode is enabled. I found that these can override incoming calls, so turned them off.
- Use DPlus for XRF⁴ If your router doesn't support automatic uPNP port forwarding and you don't want to manually set up port forwarding for X-Reflectors, you can enable this option to make it possible for Pi-Star to connect to all X-Reflectors.
 Important! If you change this option, you must update Pi-Star.

[3] David, PA7LIM, the ham behind the BlueDV apps, also created Android and iOS "ircDDB Remote" apps, which handle REF, XRF, and DCS reflector connections. For more info, see the videos:

- irdDDB Remote Android app, by Michael Carey, VK5ZEA.
- ircDDB Remote Control Pi-Star (for iOS), by David Cappello, KG5EIU.

[4] X-Reflectors using either the older Dextra protocol or the FreeStar protocol (for example, XRF720, a Colorado statewide reflector) require port forwarding in order for Pi-Star to connect to them. This doesn't apply to X-Reflectors running the newer Dextra Enhanced protocol (for example, the XRF002 reflector). If 1) your router doesn't support uPNP, 2) you don't want to enable the "Use DPlus for XRF" option, and 3) you want to manually set up port forwarding, see the note: Port forwarding.

If any changes made, click Apply Changes.

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5f) Yaesu System Fusion Configuration (including YSF2DMR)

Value		
00002 - YSF2DMR - YSF2DMR Gateway		
texas.aprs2.net		
3108883		
BM_United_States_3103		
31672		

To use the optional YSF2DMR capability (requires Pi-Star 3.4.10 or later), in the MMDVMHost Configuration section enable both the YSF and YSF2DMR modes (and normally you should disable the DMR mode). Once YSF mode is enabled, this Yaesu System Fusion Configuration section is enabled. Once YSF2DMR mode is enabled, additional options specific to YSF2DMR are enabled in this section.

• **YSF Startup Host** – If you want to use a specific YSF Host, choose it. In that case, you'll see only a couple of options in this section.

For YSF2DMR: Choose the YSF2DMR Gateway option. This enables room 00002 (the default defined in YSFGateway) to be used by your Yaesu System Fusion radio to access DMR.

- **APRS Host** Select your preferred APRS host for YSF.
- YSF2DMR mode options:
 - **CCS7/DMR ID** Select the ID you want to use for YSF2DMR mode. For more info, see Optionally, register with CCS7 for DCS (and DMR) on page 2 of the D-STAR article.
 - **DMR Master** Select the master you want to use for YSF2DMR mode.
 - **DMR TG** Select the talkgroup you want to use for YSF2DMR mode.

• For more info, see the Using YSF2DMR mode note below.

If any changes made, click Apply Changes.

Using YSF with Pi-Star

Thanks to Dave Young for posting this info in the Pi-Star Users Support Group:

To change rooms, disconnect, or connect with the radio, you need to use the Wires-X button on your Yaesu radio to connect to Pi-Star. Make sure that you only have YSF mode selected in Pi-Star as the radio only sends out a short transmission to connect to Wires-X and the DvMega scans all active modes and will not hear a short Tx unless it is the only mode scanning. Once you make the Wires-X connection to Pi-Star you can use the radio to change rooms or disconnect as you would normally do as if you were connected to a Wires-X node. Note that if you are using the FT70 Yaesu radio, you need the latest radio firmware installed, which gives that radio Wires-X capability.

Using YSF2DMR mode

Thanks to Andrew Midns and Andy Taylor for all the great info about using YSF2DMR that they posted in the Pi-Star Users Support Group.

Once you have enabled YSF and YSF2DMR modes, select YSF2DMR Gateway as the YSF Startup Host, set the YSF2DMR mode options, apply your changes, and then:

- Key up (PTT) a second or two to make sure your modem has locked onto Yaesu System Fusion mode (C4FM).
- 2. This step varies based on the radio you're using, but basically, click the radio's Wires-X button and then navigate to or search for the YSF2DMR room, and then select it.
- 3. Now you can talk through the YSF2DMR room (00002) to the DMR talkgroup you set up in the Yaesu System Fusion Configuration DMR TG setting. At this time, you must use that setting to change DMR talkgroups, but it's possible that a change will be made at some point to enable changing talkgroups through the radio.

Note: Normally, you should make sure that you're logged into DMR in only one place, or else that you are using different CCS7/DMR IDs for each login instance (for example, if you're

running DMR on one hotspot and YSF2DMR on another). However, if you're using the BrandMeister DMR network, you have the option of appending a two-digit SSID (00 - 99) to your regular CCS7/DMR ID so that BrandMeister can distinguish between your logins.

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5g) P25 Configuration

		P25 Configuration	
Setting		Value	
P25 Startup Host:	10 - Parrot		
P25 NAC:	293		
		Apply Changes	

- **P25 Startup Host** Select your preferred startup host.
- **P25 NAC** Enter your P25 Network Access Code.

If any changes made, click Apply Changes.

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5h) NXDN Configuration

Setting	Value
NXDN Startup Host:	D2FET Test Host - 176.9.1.168
NXDN RAN:	1

- NXDN Startup Host Select your preferred startup host.
 Note: According to Pi-Star Change Log, NXDN was added to MMDVMHost in version 3.4.10; however, there is no NXDN Gateway service yet (supposed to be coming soon). In the meantime, the NXDN service is hardcoded to use the single public reflector that is available.
- **NXDN RAN** Enter your NXDN Random Access Number.

If any changes made, click Apply Changes.

Additional configuration settings

- 5i) Firewall Configuration
- 5j) Wireless Configuration
- 5k) Remote Access Password

5i) Firewall Configuration

Setting		Value
Dashboard Access:	Private OPublic	
ircDDGBateway Remote:	Private Public	
SSH Access:	Private OPublic	
Auto AP:	On Off	Note: Reboot Required if changed

Dashboard Access, ircDDBGateway Remote, SSH Access

- Dashboard Access: requests TCP/80
- ircDDBRemote Access: requests UDP/10022
- SSH Access: requests TCP/22

These options are used for accessing the dashboard remotely, from outside your network. Per Andy Taylor in the Pi-Star Users Support Group: "These settings tell the uPNP daemon to request port forwards from your router. If you don't use uPNP, they have NO effect."

AutoAP (Auto Access Point)

The AutoAP feature, which works with the RPi 3 and RPi Zero W, was added in version 3.4.11. If the feature is enabled and Pi-Star can't connect to a known WiFi network within two minutes of boot up, it activates its own access point.

AutoAP makes initial configuration easier because you don't need to create a wpa_supplicant.conf and copy it to the root folder of your microSD card. Instead, you can just flash the Pi-Star image file to the microSD card, boot up, and then create your network.

If any changes made, click Apply Changes.

Some notes about AutoAP:

• You can use AutoAP when traveling to connect to new networks.

- AutoAP includes limited support for a small number of 3rd-party WiFi cards (limited by the Linux driver used for the support).
- AutoAP also enables connection sharing, so if you connect your hotspot to a wired network or tether it to your phone via USB, you also can share the connection via AutoAP.

For more info, watch the video Pi-Star WiFi AutoAP by Craig, W1MSG.

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5j) Wireless Configuration

Refresh Reset WiFi Adapter Configure WiFi	
	nformation and Statistics
Interface Information	Wireless Information
Interface Name : wlan0	Connected To
Interface Status : Interface is up	AP Mac Address :
IP Address : 10.0.1.6	
Subnet Mask : 255.255.255.0	Bitrate : 72.2 Mb/s
Mac Address :	Transmit Power : 31 dBm
Interface Statistics	Link Quality : 63/70
Received Packets : 1687	Signal Level : -47 dBm
Received Bytes : 877831 (857.2 KiB)	
Transferred Packets : 1283	
Transferred Bytes : 432498 (422.3 KiB)	

- 1. To add or modify your WiFi network connections, click Configure WiFi.
- 2. Click Scan for Networks (takes about 10 seconds), find the one you want, and click Connect.

Wireless Configuration

WiFi Info				
Scan for Networks (10 secs)	Add Network Sa	ve (and connect)		
Networks found :				
Connect	SSID	Channel	Signal	Security

Alternatively, for example, if the scan doesn't find the network you want to use, you can add a network manually.

Manually adding networks

1. Click Add Network to open the options to manually add a WiFi network.

		Wireless Configu	ration	
WiFi Info				
Scan for Networks (10 secs)	Add Network Sa	ve (and connect)		
Networks found :				
Connect	SSID	Channel	Signal	Security
Di statutation i	a secondar de			· · · · · · · · · · · · · · · · · · ·

Wireless Configuration	
WiFi Info Network 0 Delete SSID : PSK :	
Scan for Networks (10 secs) Add Network Save (and connect)	

- 2. Type the SSID (wireless network name).
- 3. Type the PSK (password to access the wireless network). The field will be highlighted green.
- 4. Click Save (and connect) ⁵. When it has finished, the field will be highlighted white. AutoAP note: If you're setting up a wireless configuration using AutoAP, you'll need to reboot Pi-Star to disable AutoAP and initiate the connection to the WiFi network you just added. While Pi-Star is rebooting, reconnect your computer to its usual WiFi connection.
- 5. Optionally, you can add additional wireless network connections.

[5] This step tripped me up initially when I was setting up my DVMEGA + RPi, which was connected to my network via cable. After saving, Pi-Star basically froze waiting to reconnect. I had to shut down and power off my RPi, disconnect the network cable from the RPi, and also shut down the Pi-Star dashboard and power off my computer, before restarting everything. After that, it all started working smoothly (and wirelessly).

Adding multiple wireless network connections

If you have multiple wireless network connections, when you turn on your Pi-Star hotspot, it will scan each one in turn based on its priority until it finds one to connect to.

- Be patient: connection attempts can take ~40 seconds each.
- The first wireless network connection you add is given an ID of 0 and a priority of 100.
- For each additional wireless network connection you add, the ID is incremented by one and the priority is decremented by one.

Thanks to Bob, NØYWB, for his post in the Pi-Star Users Support Group explaining how this works.

For more info, see Manually adding WiFi settings to RPi.

Scanning for networks

This feature seems to be a bit unreliable. It didn't always work for me, sometimes finding neither my own wireless network nor any of the neighboring networks I see when I scan with other devices. Other people in the Pi-Star Users Support Group have reported similar experiences.

It's not clear what the underlying issue is. Some people have said that if they run the scan several times, eventually their network will show up. Others say it's a Raspberry Pi 3 issue, but haven't yet identified what the exact issue is. Still others say it's an issue with the wireless network names (SSID), that they need to be short and simple, but haven't identified what the maximum length should be or which characters are breaking the scan feature (and anyway, I'm a firm believer in using long passwords).

Regardless, it's easy to configure wireless using the manual method outlined above.

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5k) Remote Access Password

Used both for accessing the Pi-Star Admin and Configuration settings, and for SSH access.

★ Strongly recommended: In order to protect your settings and network, change the password from the default to something stronger and more challenging to hack. A challenging password is especially important if you make your dashboard publicly accessible in the Firewall Configuration section.

User Name	Remote A	Password Password	6
pi-star	Password:	Confirm Password:	 Set Password
pi-star	WARNING: This changes th		Set Passw

- 1. The user name is pi-star, and can't be changed. This is different from the Hostname that can be changed in the General Configuration section.
- 2. In the Password field, type your new password, preferably something long and strong.

- 3. Confirm your password. Once you have typed an identical password, the field turns from red to green.
- 4. Once you get the green light, click Set Password.
- 5. Once the password has been set, the Authentication Required dialog box will be presented, and you can sign in using your new password.

★ Remote Access Password gotcha

Apparently, some special characters work for accessing Pi-Star Admin and Configuration settings, but not for SSH. For example, including a tilde symbol (~) in the password worked for logging into Pi-Star Admin, but prevented me from signing in via SSH.

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6) Running Pi-Star

Once you've finished the initial configuration, running Pi-Star is easy peasy. Just start your hotspot modem and give the Pi-Star RPi image a minute or two to fully boot up. As long as you have your radio set up correctly, you should be able to start using your radio for digital voice mode activity.

Optionally, you can browse to http://pi-star.local/ on any computer connected to your network to open the Pi-Star dashboard. You'll see the mode(s) you've configured to run highlighted in green, and you can monitor activity.

Important! If you're using D-STAR, you must set up your radio correctly in order to use Pi-Star successfully. It doesn't work to use DV mode; instead, you must set up RPT1, RPT2, and a zero offset (either +/–0.000). Sometimes, this is referred to as Duplex mode; for my TH-D74A, it's called D-STAR Repeater (DR) mode.

Craig, W1MSG, has a short video that addresses this: D-STAR Radio Primer for using Pi-Star. And if you want more detailed info, see my write-up, Programming the TH-D74A for D-STAR. While my doc is specific to the Kenwood TH-D74A, some of the info applies to any D-STAR radio.

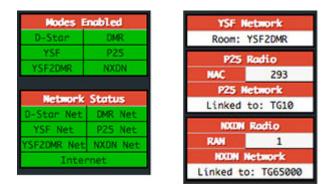
6a) Dashboard view

Here's what the dashboard looks like with D-STAR and DMR modes enabled after it's been running for a while linked to D-STAR REF0001 C and DMR TG 310 (TAC310). You can click a callsign to open the associated QRZ page in a new tab.

Hostname:	pi-star		server an	2552 - 246223	and the second			Pl-Star:	3.4.11 / Des	hboerd:	20180305
	Pi-S	Star Digita	Voice	Dashbo	oard fo				Admin (Config	uration
				Gateway	Activity						· · · · · ·
D-Sto	des Enabled	Time (MST)	Mode	Callsign	Tan	aet		Src	Dur(s)	Loss	BER
YSF	the second se	17:14:15 Mar 5th	D-Star	NR. C. N.	cococo via	And the second second	10	Net	2.9	0%	0.0%
YSF2D		17:14:14 Mar 5th	D-Star	NURSE/5188	COCOCO via	and the second last		Net	2.8	0%	0.0%
13720	MADN	17:14:13 Mar 5th	D-Star	6176EU	COCOCO via		_	Net	3.3	0%	0.0%
-	work Status	17:14:12 Mar 5th	D-Star	KENNIG/TIME	COCOCO via	And in case of the local division of the loc	_	Net	4.2	0%	0.0%
D-Star		17:13:18 Mar 5th	D-Star	17100/4180	COCOCO via		_	Net	5.3	55%	0.0%
YSF N	AND ALL AND A CONTRACTOR	17:12:46 Mar 5th	DMR Slot 2	1750	TG 310			Net	0.5	0%	0.0%
	Net NXDN Net	17:12:42 Mar 5th	DMR Slot 2	842351	TG 318			Net	0.4	0%	2.0%
Rectification and the	description of the second s	17:12:19 Mar 5th	DMR Slot 2	AZ BENE	76 310			RF	1.1	0%	0.8%
4	Internet	17:12:18 Mar 5th	DMR Slot 2		TG 310	_		Net	0.5	0%	0.0%
	adia Tafa	17:12:03 Mar 5th	DMR Slot 2	48.180	TG 310			Net	1.2	0%	0.0%
-	adio Info	17:11:43 Mar 5th	DMR Slot 2	strei bCu	TG 310		100	Net	0.5	0%	0.0%
Tex	Listening	17:11:20 Mar 5th	D-Star	##CA/1091	COCOCO via	REFOR	10	Net	3.6	0%	0.0%
	33.300000 MHz	17:10:46 Mar 5th	DMR Slot 2	\$360F1	76 310		-	Net	0.1	0%	0.0%
	UMspot:v1.3.2	17:09:50 Mar 5th	DMR Slot 2	ALC: Y	76 310			Net	1.0	0%	0.6%
E. Z	UMSpot:VI.3.2	17:09:27 Mar 5th	DMR Slot 2	4.16322	76 310			Net	2.2	40%	0.0%
		17:09:02 Mar 5th	DMR Slot 2	STREET.	76 310			Net	1.2	0%	0.0%
The local division in which the local division in the local divisi	tar Repeater	17:08:53 Mar 5th	D-Star	10461, CO./ 50946	COCOCO via	REFOR	1.0	Net	0.8	2%	0.0%
RPT1	KERFHS B	17:07:55 Mar 5th	D-Star	PE1049/1051	COCOCO via		_	Net	2.7	0%	0.0%
RPT2	KERFHS G	17:07:35 Mar 5th	DMR Slot 2	146831	TG 310		-	Net	0.5	0%	0.0%
The Party New York, Name	itar Network	17:07:26 Mar 5th	DMR Slot 2	0428	TG 310	_	-	Net	7.6	1%	0.0%
station and an	exas.aprs2.net	ATTOTICO PAT SCI	orat brock		1.0 2.00		_	110.0	1.0		0.00
Contraction of the local division of the loc	r.openquad.net			Local R	Activity						
	d to REF001 C us Outgoing)	Time (MST)	Mode	Callsi	gn Target	Src	Dur(s	0	BER	RS	SI
COPE	us outgoing)	17:12:42 Mar 5th	DMR Slot		TG 310	RF	1.	1	0.3%	-	
	R Repeater										
DHR I	and the second se										
DHR C											
TS1	disabled										
TS2	encbled										
-	10/not linked										
_	NR Master										
-	and the second										
	ted States 3103 + PHOENIX-F										
UMR	+ PHOENIX-P										_
		Pi-Star / P	i-Star Dashboard, ©	Andy Taylor (MWOM	W71 2014-2018						

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2018. IrcDDBGateway Dashboard by Hans-J. Barthen (DLSDI), MMDVMDash developed by Kim Huebel (DG9VH), Need help? Click here for the Support Group Cet ways come of BLStar from here.

If you enable the YSF, P25, NXDN, or YSF2DMR modes, you'll see additional info displayed in the dashboard's left column.



6b) Admin view

You can switch to the Admin view (requires authentication) to see more info, like Gateway Hardware Information and Service Status.

Pi-Star Digital Voice Dashboard for

Dashboard | Admin | Live Logs | Power | Update | Configuration

		Gateway Hard	ware Information		
Hostname	Kernel	Pla	CPU Temp		
pi-star	4.9.35-v7+	Pi 3 Model B (LGB) - Embest, CH	1.44 / 1.32 / 0.75	45.1°C / 113.2°F
		Servic	e Status		
MMDVMHost	DMRGateway	YSFGateway	YSFParrot	P25Gateway	P25Parrot
DStarRepeater	ircDDBGateway	TimeServer	PiStar-Watchdog	PiStar-Remote	PiStar-Keeper

Modes Enabled			D-Sta	Link Infor	mation					
D-Star DMR	Radio Defaul	t Auto Time	r Link	Linked to	Mode	Directio	n Lo	st Char	ige ()	HST)
YSF P25	8	A No Never	r Up	C	DPlus	Outgoing	1 1	7:06:04	Mar	Sth
YSF2DMR NXDN			D.64	ar Link Ma	anger					
	Radio Module	De	flector		and the second second	Un-Link		Act	ion	
Network Status	Addio Hoddie	XRF002			and the second second	and the second		Request		
D-Star Net DMR Net		ARFOUZ		× 💌	Link	UnLink		Request	chang	je
YSF Net P25 Net		0.0	tive Bra	ndMeister	Connectic	ne				
SF2DMR Net NXDN Net	BrandMeister Ma	and the second se	ilt Ref	Timeout(s			tatic	TGe Do	mamic	TGe
Internet	BM United States	and and a second se	EFØ	0(s)	RE	Statistics of the local division in which the local division in th	None	103 09	TG31	
	bit bitteed states	5105		0(3)	n.		HOTE		1055	
Radio Info			Ga	teway Acti	vity					
TX NXON	Time (MST)	Mode	Call	Including the second	Targ	et	Src	Dur(s)	Loss	BER
X 433.300000 MHz	17:14:15 Mar 5th	D-Star	ABBR.			-	Net	2.9	0%	0.0%
433.300000 MHz	17:14:14 Mar 5th	D-Star	HL812/1	100			Net	2.8	0%	0.0%
ZUMspot:v1.3.2	17:14:13 Mar 5th	D-Star	827680				Net	3.3	0%	0.0%
	17:14:12 Mar 5th	D-Star	AT BEING	124		-	Net	4.2	0%	0.0%
D-Star Repeater	17:13:18 Mar 5th	D-Star	NF INC./	1.00			Net	5.3	55%	0.0%
8	17:12:46 Mar 5th	DMR Slot 2	4700			-	Net	0.5	0%	0.0%
PT2 G	17:12:42 Mar 5th	DMR Slot 2	MAJ DOT Y				Net	0.4	0%	2.0%
D-Star Network	17:12:19 Mar 5th	DMR Slot 2	ST BENE				RF	1.1	0%	0.8%
PRS texas.aprs2.net	17:12:18 Mar 5th	DMR Slot 2	10.000	-			Net	0.5	0%	0.0%
IRC rr.openquad.net	17:12:03 Mar 5th	DMR Slot 2	48380	1		-	Net	1.2	0%	0.0%
Linked to REF001 C	17:11:43 Mar 5th	DMR Slot 2	1046.2010	-			Net	0.5	0%	0.0%
(DPlus Outgoing)	17:11:20 Mar Sth	D-Star	640A/20	92		-	Net	3.6	0%	0.0%
	17:10:46 Mar 5th	DMR Slot 2	<2x0F1				Net	0.1	0%	0.0%
DMR Repeater	17:09:50 Mar 5th	DMR Slot 2	-			-	Net	1.0	0%	0.6%
DHR ID DHR CC 1	17:09:27 Mar 5th	DMR Slot 2	4.16122	-			Net	2.2	40%	0.0%
	17:09:02 Mar 5th	DMR Slot 2	-			-	Net	1.2	0%	0.0%
	17:08:53 Mar 5th	D-Star	eners, Ch.	204			Net	0.8	2%	0.0%
TS2 enabled TG 310/not linked	17:07:55 Mar 5th	D-Star	PELOW	1091		-	Net	2.7	0%	0.0%
DHR Master	17:07:35 Mar 5th	DMR Slot 2	104833			-	Net	0.5	0%	0.0%
M United States 3103	17:07:26 Mar 5th	DMR Slot 2	8478		-		Net	7.6	1%	0.0%
DMR+ PHOENIX-F			Lo	cal RF Acti	vitv					
	Time (MST)	Mode		allsign		Src Dur	(5)	BER	RS	SI
	17:12:42 Mar 5th	DMR Slot			G 310	and the second se		0.3%		

Pi-Star / Pi-Star Dashboard, ⊕ Andy Taylor (MW0MWZ) 2014-2018. ircDDBGateway Dashboard by Hans-J. Barthen (DL501), MHIO/MDash developed by Kim Huebel (DG9VH), Need help? Click here for the Support Group Get your copy of Pi-Star from here.

Get your copy or in-star from here.

If you're running D-STAR mode, in Admin view you have the option of changing the reflector and linking/unlinking directly from the D-Star Link Manager section. Admin view also can be helpful for troubleshooting, though I haven't had to do much of that.

6c) Live Logs view

From the Admin view, you can select the Live Logs view, which starts a more detailed live logging process that can be useful for troubleshooting.

6d) Changing active mode(s)

If you want to change which modes are active, just hop over to the Configuration view. In the MMDVMHost Configuration section, switch modes on and off as wanted, and then apply the changes.

Setting	Value							
DMR Mode:		RF Ho	ingtime:	20	Net Hangtime:	20		
D-Star Mode:		RF Ho	ingtime:	20	Net Hangtime:	20	1	
YSF Mode:		RF Ho	ingtime:	20	Net Hangtime:	20		
P25 Mode:		RF Ho	ingtime:	20	Net Hangtime:	20		
NXDN Mode:		RF Ho	ingtime:	20	Net Hangtime:	20		
YSF2DMR:								
MMDVM Display Type:	Nextion	Port: Modem	🗢 N	extion	Layout: ON7LDS	0		



7) Backing up or restoring Pi-Star

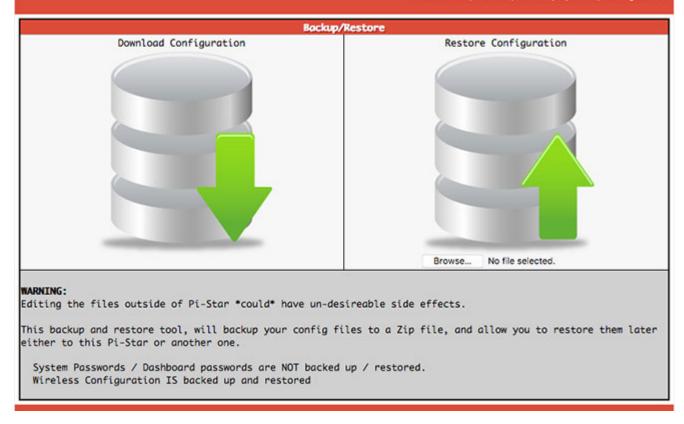
After you've done all the work of setting up Pi-Star just the way you want, it's a good idea to back it up. In Admin view, click the Backup/Restore link.

			PI-St	ar:3.4.6 / Deshboard: 20171
	Pi-Star	Digital Voice - Confi	iguration	
		Dashboard Admin Po	wer Update Backup/R	lestore Factory Re
		Dashboard Admin Po	wer Update Backup/R	lestore Factory Re
		Dashboard Admin Por Gateway Hardware Information	wer Update Backup/R	lestore Factory Re
ostname	Kernel		wer Update Backup/R	CPU Temp

In the Backup/Restore view, click Download Configuration, and then choose a location to safely tuck away your work so that you can easily restore your configuration if things ever go sideways, for example, if you decide to play around in the Expert Editor (discussed below) and muck things up totally.

Pi-Star Digital Voice - Backup/Restore

Dashboard | Admin | Power | Update | Configuration



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8) Rebooting or shutting down Pi-Star

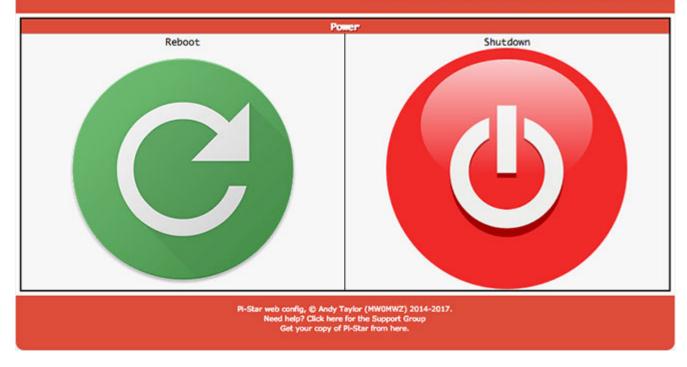
Pi-Star provides a graceful way to reboot or shut down your hotspot. In Admin view, click the Power link.



In the Power view, click Reboot or Shutdown. Give your hotspot or modem a couple minutes to complete rebooting or powering down.

Pi-Star Digital Voice - Power

Dashboard | Admin | Update | Backup/Restore | Configuration





9) Updating Pi-Star

One of the nice things about Pi-Star is that it's updated on a regular basis to add new features and options, including MMDVMhost updates.

Per Andy Taylor in the Pi-Star Users Support Group: "just for info here, MMDVMHost is updated reasonably often, Pi-Star will pull in the updates over night after I release them, or you can press update on the dashboard to pull in the updates if you want it before the nightly pull. I don't update the binaries daily, but I do try and track the upstream source reasonably often."

Note: Running Pi-Star Update updates the dashboard and binaries. The **update** process doesn't **upgrade** the operating system, services, and packages (there's a manual process for that discussed further below). Upgrades are released less frequently.

If you don't leave Pi-Star running overnight or you want to manually launch an **update** at any other time, in the Admin view, click Update. (Alternatively, you can run the update via SSH, which is discussed below.)

Pi-Star Digital Voice - Configuration

Dashboard | Admin | Power | Update | Backup/Restore | Factory Reset

In the Update view, you'll see the process running. Let it run until it's totally finished.



Note: In my experience, sometimes the log entries displayed on this screen hang. When that happens, I simply give the process a few minutes to run, and then switch my view back to Dashboard, Admin, or Configuration. Every time I've encountered this, the update has still always completed. To avoid this possibility, use optional "fullscreen SSH client" built into Pi-Star. There's a link for it at the bottom of the Expert Editor's built-in SSH Access window. I find that for some reason the update script log runs better in the fullscreen SSH client, and the bigger window also makes it easier to read the log entries and spot any errors, which are quite rare, but can happen.

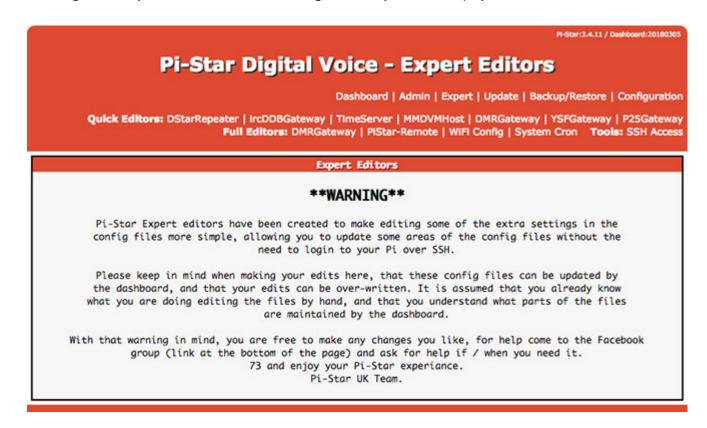
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10) Advanced Pi-Star configuration (Expert Editor)

If you are in Configuration View, you can click the Expert link to access the "Expert Editor," a set of advanced quick editors, full editors, and tools. Alternatively, navigate to: pi-star.local/admin/expert.



You'll be greeted by a **WARNING** message, which you should pay attention to:



"Please keep in mind when making your edits here, that these config files can be updated by the dashboard, and that your edits can be over-written. It is assumed that you already know what you are doing editing the files by hand, and that you understand what parts of the files are maintained by the dashboard."

The Expert Editor provides access to:

- Quick Editors:
 - DStarRepeater
 - IrcDDBGateway
 - TimeServer
 - MMDVMHost
 - DMRGateway
 - YSFGateway
 - P25Gateway
- Full Editors:
 - DMRGateway
 - PiStar-Remote ⁶

- WiFi Config (wpa_supplicant.conf)
- System Cron
- Tools:
 - Built-in SSH Access window

[6] The PiStar-Remote Config File provides configuration options for:

- 1. The Pi-Star Keeper remote control system, which gives repeater keepers an RF KillSwitch for their repeaters.
- 2. Some basic remote control ability via RF. For more info, including a Pi-Star Easter Egg, see 15) Watchdogs, Remote RF commands, and Keepers on the Pi-Star notes page.

10a) Performing firmware updates via Pi-Star

It's possible to update the firmware of several hotspot boards via Pi-Star's SSH Access, including the ZUMspot, MMDVM_HS Hat, BD7KLE/BG3MDO, and the DVMEGA mounted on an RPi. For more info, see Performing firmware updates via Pi-Star on the Pi-Star notes page.

10b) Other advanced configuration notes

See the Pi-Star notes page for some other advanced configuration notes, including:

- Running Pi-Star SSH Access
- Expanding the root partition
- Fine tuning for high BER
- Forcing RPi system time re-sync
- Watchdogs, Remote RF commands, and Keepers

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11) Upgrading Pi-Star

To **upgrade** the operating system, services, and packages, you need to SSH into Pi-Star and run an **upgrade** (you can run this in the default read-only mode).

For upgrades, it's recommended that you use an SSH (Secure Shell) app like Termius or PuTTY. This minimizes the chance of upgrade errors that may be caused by Pi-Star's built-in (shell-in-a-box) SSH Access.

1. SSH into Pi-Star and log in.

⁶	PI-Star:3.4.9 / Dashboard:20180127
Pi-Star	Digital Voice - SSH Access
	Dashboard Admin Update Backup/Restore Configuration
Edit: DStarRepeater MMDVMHost DMRGate	way YSFGateway P25Gateway IrcDDBGateway TimeServer PIStar-Remote SSH Access
	SSH - Pi-Star
pi-star login:	
	Click here for fullscreen SSH client
	I-Star web config, © Andy Taylor (MW0MWZ) 2014-2018. Need help? Click here for the Support Group Get your copy of Pi-Star from here.

2. Begin with an **update** of the dashboard and binaries:

sudo pistar-**update**

Allow the update process to run until you see:

```
Updates complete, sleeping for a few seconds before making the disk Read-Only Finished
```

3. Next, **upgrade** the operating system, services, and packages:

```
sudo pistar-upgrade
```

4. Run the process as many times as needed until the system reports you are on the most recent version:

Detected Pi-Star #.#.# running on RPi hardware, attached to dvmpid modem...

You are already running the latest version...

Sleeping a few seconds before making the disk Read-Only...

Finished

- It's a good idea to reboot the hotspot after upgrading: sudo reboot
- In your browser window, navigate back to the dashboard: http://pi-star.local/

To view the upgrade changes, visit the Pi-Star Downloads page and scroll down to Change Log.

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12) Pi-Star – Summary thoughts



I really like Pi-Star!

Pi-St is my favorite hotspot software for the two digital radio modes I use: D-STAR and DMR. It also handles YSF, and even P25 and NXDN (when used with an MMDVM-capable modem like the ZUMspot).

At this time, I'm using Pi-Star with a ZUMspot mounted on a Raspberry Pi. Initially, I used it with a DVMEGA-DUAL mounted on a Raspberry Pi. They're both great combinations, though the ZUMspot has the advantage of P25 and NXDN support.

itname: pl-star				P-3	Rar: 3.4.10 / Deshboard: 20180
P	i-Star Dig	ital Voice I	Dashboar	d for	
			Dashooard Au	nin Live Logs Power	Configurate Configurat
	i de la construcción de la const	Gateway Hardv	vare Information	10.000	
Hostname	Kernel	Pla	tform	CPU Load	CPU Temp
pi-star	4.9.35-v7+	Pi 3 Model B (1	GB) - Embest, CH	1.44 / 1.32 / 0.7	5 45.1°C / 113.2"
Sector Contraction		Servio	e Status		
MMDVMHost	DMRGateway	YSFGateway	YSFParrot	P25Gateway	P25Parrot
DStarRepeater	ircDOBGateway	TimeServer	PiStar-Watchdo	g PiStar-Remote	PiStar-Keeper
			D-Star Link Info	mation	
Modes Enabled	Radio D	efault Auto Timer	Link Linked to	Mode Direction	Last Change OFT
D-Star DMR	Constant and the second second	and the second se			Last Change (MST) 08:30:41 Feb 24th
YSF P25	• B	A No Never	Up C	DExtra Outgoing	00:50:41 FED 24th
YSF2DMR NXDN					

12a) The dashboard is great

I'm actually surprised by how much I like the dashboard. I thought it would be a "nice-to-have" feature, but it turns out that it's great to be able to watch the activity on a reflector, especially during a net. It's also nice to be able to easily look up people's QRZ pages.

12b) Actively developed and supported

Another thing I really appreciate is how actively and enthusiastically Andy Taylor and team are developing and supporting Pi-Star; they're very responsive to the community of Pi-Star users.

12c) Totally won over

The moment I became totally won over was when Andy documented a method for updating the DVMEGA firmware via Pi-Star while it's mounted on the RPi. That was a pain point for me—having

to take apart my RPi hotspot and mount the DVMEGA-DUAL on my BlueStack board every time I wanted to update its firmware—so I really appreciated this much easier method. Thanks, Andy and team!

For more info, see: Performing firmware updates via Pi-Star.

My appreciation was further solidified when, as of version 3.4.8, a new "Use DPlus for XRF" setting was introduced in the D-STAR Configuration section for people like me who don't have a router that supports automatic uPNP port forwarding and who don't want to manually set up port forwarding. The new setting enables linking to X-Reflectors that run either older versions of their operating software or the FreeStar operating software (like XRF720, a Colorado statewide reflector I like to connect to). Thanks to Adrian Fewster, VK4TUX, a helpful member of the Pi-Star Users Support Group who originally came up with this solution, which was subsequently incorporated into a Pi-Star upgrade.

As each new version is released, I am further won over. The new features being incorporated into Pi-Star make the experience of using it richer and more exciting. Pi-Star is definitely changing the face of digital voice!

12d) Magic 8-Ball!

If all that weren't enough, when I discovered the Magic 8-Ball ⁷ built into Pi-Star ... well, as they say in movie trailers: "My life was changed forever!"

Question: "How is my sanity?" Answer: "Outlook is not so good !"

[7] See Remote Control RF commands on the Pi-Star Notes page.

12e) A base station and a mobile hotspot

Paired with a ZUMspot RPi UHF Hotspot board, Pi-Star is a great solution for use both as a base station and as a mobile hotspot.



For more info, see:

- ZUMspot + Pi-Star An invitation to play more.
- Connecting Pi-Star via cell phone

12f) Worth supporting

Obviously, Andy and team are pouring a lot of energy, intelligence, and heart into creating Pi-Star, which they're giving away freely to digital hams. There's also a robust community of hams contributing to helping Pi-Star users via the Pi-Star Users Support Group. Per Andy:

And now to you dear reader, you are probably reading this because you already run Pi-Star, or you are about to start. Without you, this project wouldn't be where it is today, a shining beacon of what can be when a few like-minded people with similar interests are prepared to set monetary gain aside and just give away their work. You might not be a coder, you might not feel that you understand digital radio enough to give anything back, but that time will come. Enjoy the hobby, tell your friends what we got right with Pi-Star, and tell us when it does something it shouldn't.

TX some support!

If you end up appreciating Pi-Star as much as I do, consider supporting this work by contributing to the Pi-Star Users Support Group or by sending some monetary support their way toward the running costs of the server / build / test environments that they're using to make Pi-Star what it is. For more info, see Pi-Star – How can I help?.

Thanks for creating a really nice solution, Andy and team!

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Notes »

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- e. D-STAR Configuration
- f. Yaesu System Fusion Configuration

Note: Using YSF2DMR mode

- g. P25 Configuration
- h. NXDN Configuration
- i. Firewall Configuration

Dashboard Access, ircDDBGateway Remote, SSH Access

AutoAP (Auto Access Point)

- j. Wireless Configuration
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- 6. Running Pi-Star
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Pi-Star notes
Тор
Full DV hotspots article
Introduction to digital voice hotspots
Playing with Pi-Star
Pi-Star notes
Zooming around with the ZUMspot
Тор
« Introduction · Pi-Star notes »

\rightleftharpoons Give me a holler!







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