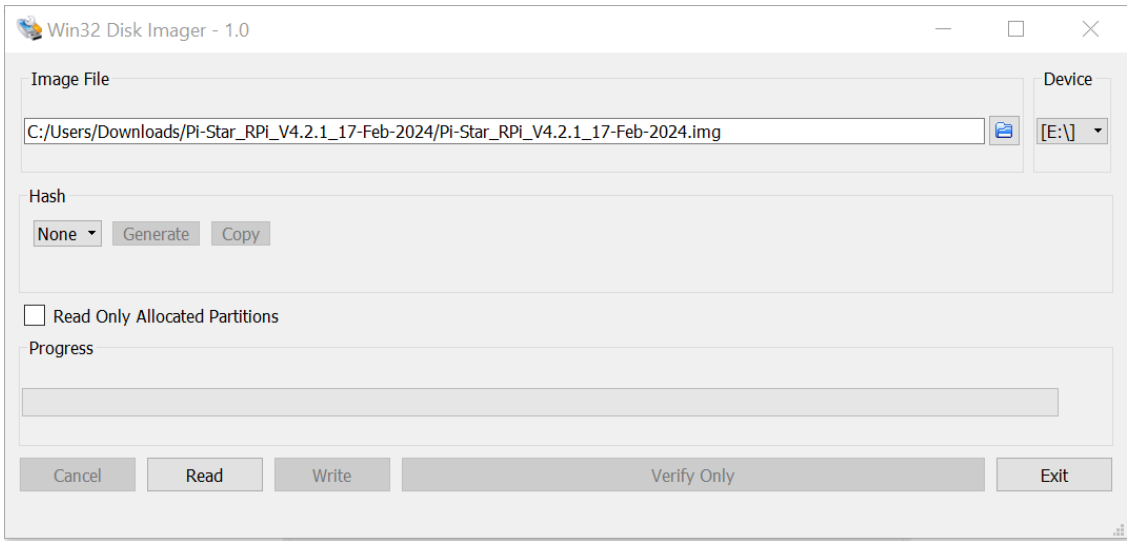
Multi+ ICOM D-Star Repeater and ID-RP2C Setup with Raspberry Pi

This setup allows you to use a set of ICOM repeaters, VHF, UHF and/or 1.2Ghz with any type of internet connection with or without port forwarding. It will also allow you to link to XLX and REF reflectors. If you have port forwarding you can setup the repeater with IRCDDB and a club call to allow incoming connections and callsign routing. Otherwise, you can use a personal callsign on the repeater without registering it as a repeater with USTRUST or IRCDDB. Make sure to submit it to dstarinfo.com and repeaterbook.com.

If you have any questions, feel free to reach out to us at www.widigitalnetwork.org

- ICOM D-Star Repeater and Controller
- Raspberry Pi ver. 2 B or higher
- Router or Network switch

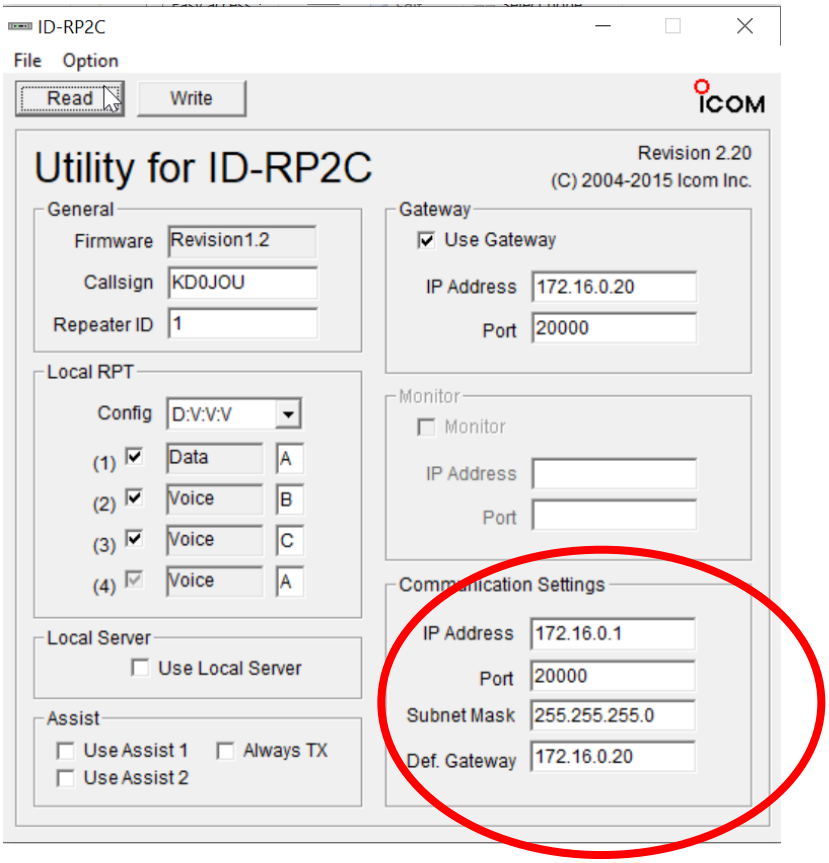
1. Download and install the latest version of Pi-star onto a microSD card.
    a. https://www.pistar.uk/downloads/
    b. Install onto SD card using a SD card imager software such as Win32DiskImager



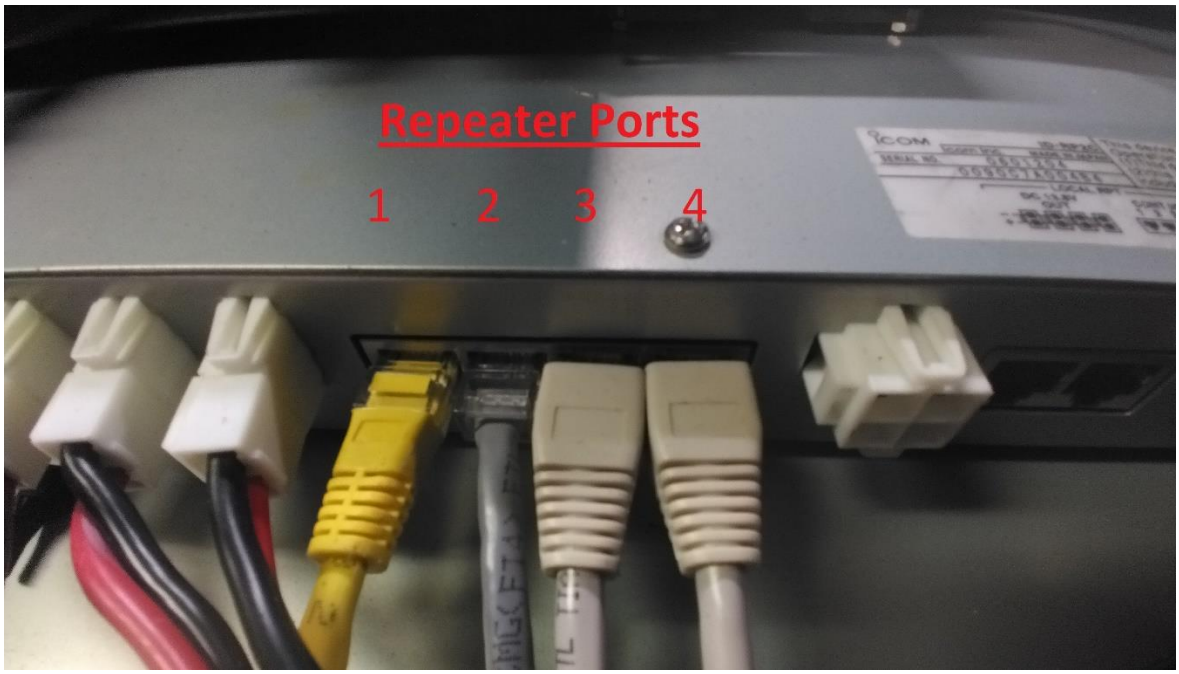
    c. Connect pi to router/switch
    d. Insert microSD card into pi and power on

2. Program the D-Star repeater with your frequencies and callsign using the appropriate programming software

3. Program the D-Star controller with the local repeater information and change communication settings port from 20319 to 20000, all other setting should look the same as below.
    a. Make sure to set up the Local RPT with at least one repeater as seen below

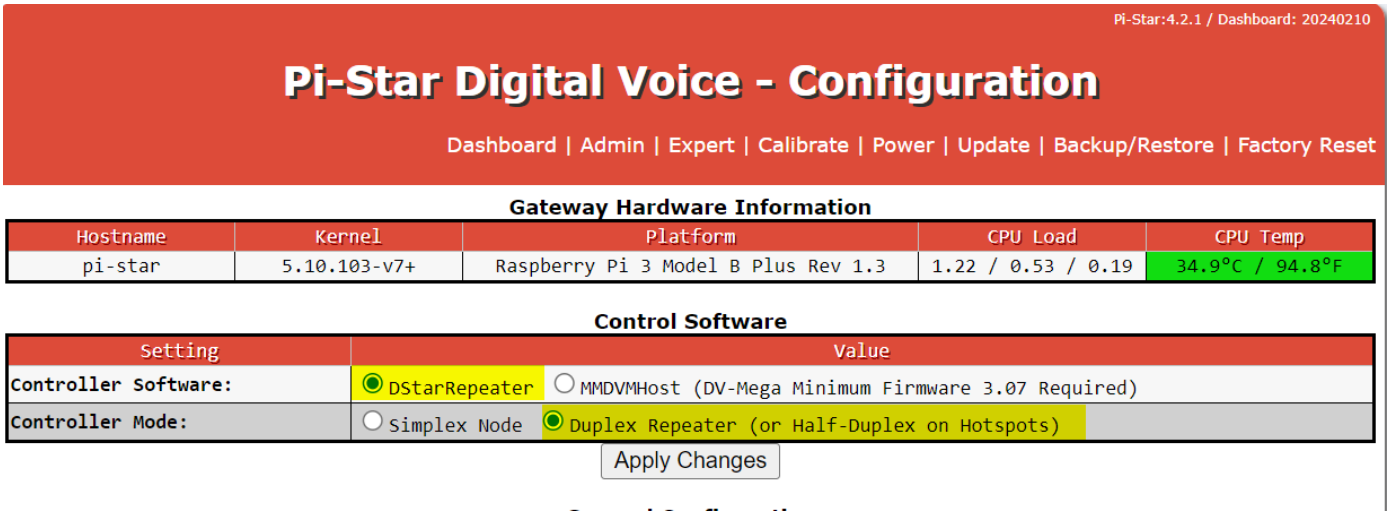


4. Connect the ICOM repeater to appropriate ports on the back of the ID-RP2C – Port 2 would be used for the UHF B module based on programming above and port 3 would be VHF



5. Program the raspberry pi with the proper frequency, callsign, coordinate info, make sure you change the default password to something unique.

a. Pi should be able to be accessed on the router/switch at pistar.local
b. Default Login – User=pi-star Password=raspberry
c. Change the Control Software to DStarRepeater and the Controller Mode to Duplex Repeater as seen below and apply changes.



d. Click “Power” in the top menu and reboot the pi

6. Configure the General settings on the Pi.
   a. Hostname(optional)
   b. Callsign
   c. Frequencies
   d. Location of the repeater, Coordinates, City/State, Country
   e. URL(optional)
   f. Change Radio/Modem Type to “Icom Repeater Controller ID-RP2C
   g. Change Node Type to Public
   h. Enable APRS Host
   i. Set APRS Host to “rotate.aprs2.net”
   j. Set Time Zone to “Your Local Time Zone” This will vary by location
   k. Set Dashboard Language to “english_us”
   l. Apply Changes

Settings should look similar to example below -

General Configuration

Setting	Value
Hostname:	mplaindstar Do not add suffixes such as .local
Node Callsign:	KD0JOU
Radio Frequency RX:	449.875000 MHz
Radio Frequency TX:	444.875000 MHz
Latitude:	45.00282 degrees (positive value for North, negative for South)
Longitude:	-93.65218 degrees (positive value for East, negative for West)
Town:	Maple Plain, MN
Country:	USA
URL:	http://www.mw0mwz.co.uk/pi-star/ Auto Manual
Radio/Modem Type:	Icom Repeater Controller ID-RP2C (DStarRepeater Only)
Node Type:	Private Public
APRS Host Enable:	
APRS Host:	rotate.aprs2.net
System Time Zone:	America/Chicago
Dashboard Language:	english_us

Apply Changes

7. Set D-Star configuration
    a. Set RPT1 Callsign Module Letter
    b. If desired set a Default Reflector – Auto-Relink timer will be set in a later setting
        i. Select “Startup” if you would like the repeater to auto link to the default reflector at startup
        ii. Select “Manual” if you would like the repeater to only change links when a user sends a command or a relink timer expires
    c. Time Announcements(optional) – Repeater will announce time at the top of each hour
    d. Callsign Routing(optional) – You will need to set up port forwarding for this function to work.
    e. Use DPlus for XRF: - Leave Default I have not found a reason to change this yet

D-Star Configuration

Setting	Value
RPT1 Callsign:	KD0JOU B
RPT2 Callsign:	KD0JOU G
Remote Password:	•••••••••
Default Reflector:	REF019 B Startup Manual
ircDDBGateway Language:	English_(US)
Time Announcements:	
Callsign Routing:	Connect ircDDB for call routing
Use DPlus for XRF:	Note: Update Required if changed

Apply Changes

8. Firewall Configuration – These setting are optional and do not affect repeater operation
    a. Recommended – Change Dashboard Access to “Public”
    b. Recommended – Change Auto AP to “Off”

Firewall Configuration

Setting	Value	
Dashboard Access:	○ Private ◉ Public	
ircDDBGateway Remote:	◉ Private ○ Public	
SSH Access:	◉ Private ○ Public	
Auto AP:	○ On ◉ Off	Note: Reboot Required if changed
uPNP:	◉ On ○ Off	

Apply Changes

9. Click "Expert" at the top of the screen, then click "ircDDBGateway"

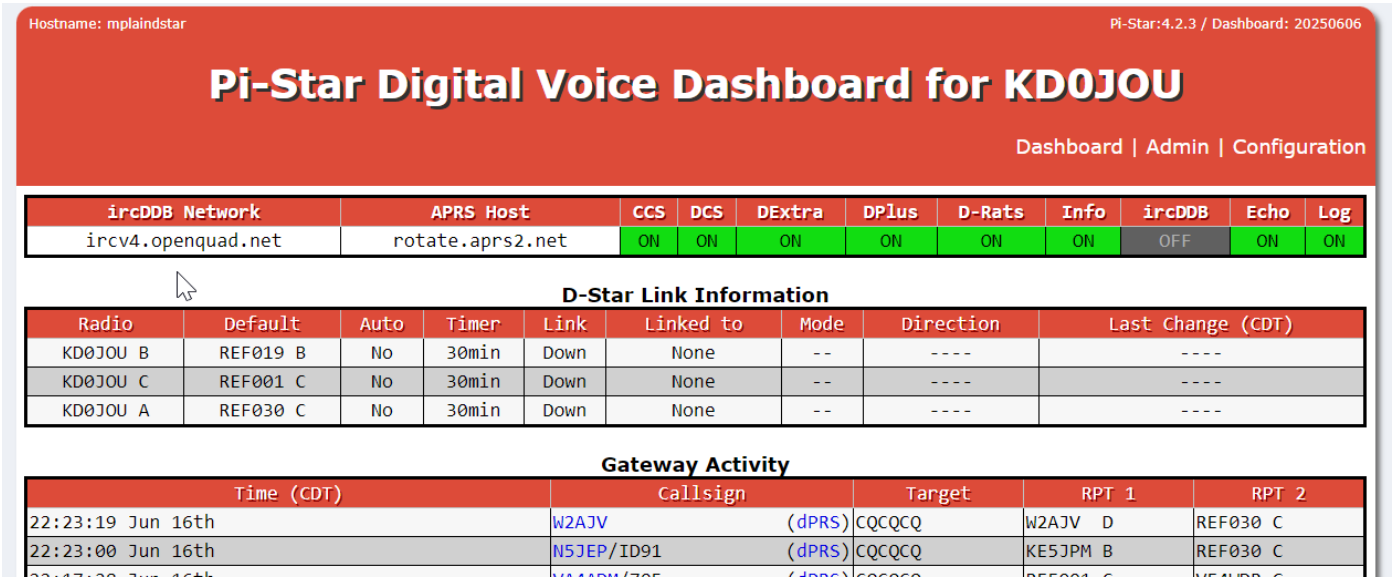
10. Scroll down till you see the "repeaterCall1" Heading, this heading should include all the information you already entered.
    a. "repeaterBand1" – Module Letter as entered in the ID-RP2C above
    b. "repeaterAddress1" – Should be set to 172.16.0.1 for all connected repeaters
    c. "repeaterPort1" – Should be set to 20000 for all connected repeaters
    d. "reflector1" – Default Reflector, enter reflector or repeater for default connections from repeater
    e. "atStartup1" – 0=diasbled, 1=repeater connects on boot up to default reflector/repeater
    f. "reconnect1" – 0=disabled, 1-10=reconnect to default reflector/repeater after a designated time enter a number for timer, 1=1min, 2=5min, 3=10min, 4=15min, 5=20min, 6=25min, 7=30min, 8=60min, 9=90min, 10=120min, Timer is reset based on local repeater activity.
    g. Verify additional repeater information

repeaterCall1	KD0JOU
repeaterBand1	B
repeaterType1	1
repeaterAddress1	172.16.0.1
repeaterPort1	20000
reflector1	REF019 B
atStartup1	0
reconnect1	2
frequency1	444.87500
offset1	5.0000
rangeKms1	1.000
latitude1	45.00282
longitude1	-93.65218
agl1	3.000
description1_1	Maple Plain, MN
description1_2	USA
url1	

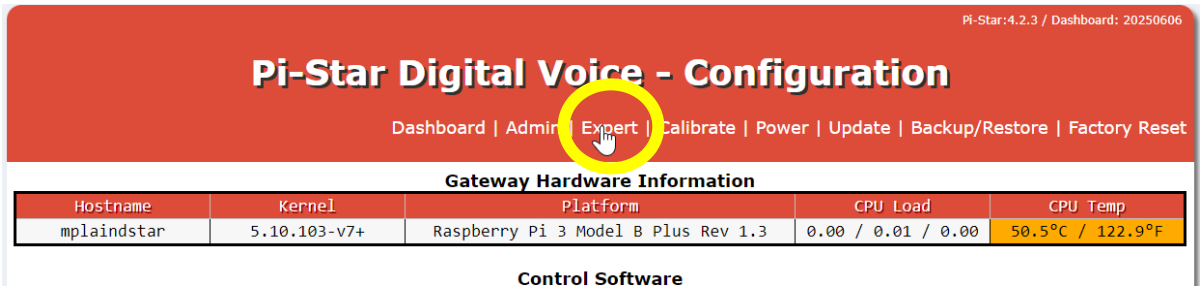
h. Scroll Down to the heading “repeaterCall2”, here you will enter the information for your second module, once done repeat these steps at “repeaterCall3” for a third repeater
    i. Change the “repeaterAddress” to 172.16.0.1 for each module
    ii. Change the “repeaterPort” to 20000 for each module

repeaterCall2	KD0JOU
repeaterBand2	C
repeaterType2	1
repeaterAddress2	172.16.0.1
repeaterPort2	20000
reflector2	REF001 C
atStartup2	0
▮▮connect2	7
frequency2	145.11000
offset2	-0.600
rangeKms2	1.000
latitude2	45.00282
longitude2	-93.65218
agl2	3.000
description2_1	Maple Plain, MN
description2_2	USA
url2	

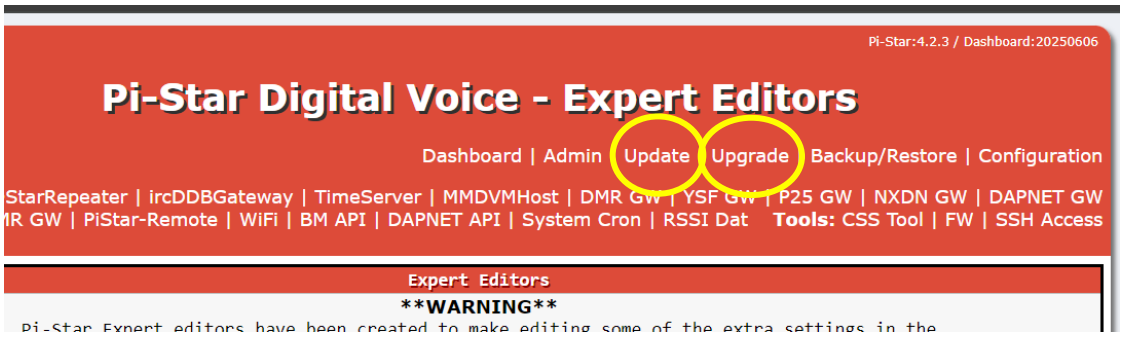
i. Once all repeaters are entered click “Apply Changes” at the bottom of the page
j. The dashboard should look similar to the example below showing all the modules you programmed



11. Upgrade and Update Pi-Star
    a. Make sure you have internet connected to the router/switch you are using, the following steps will not work without internet.
    b. From the Configuration page click “Expert” at the top,

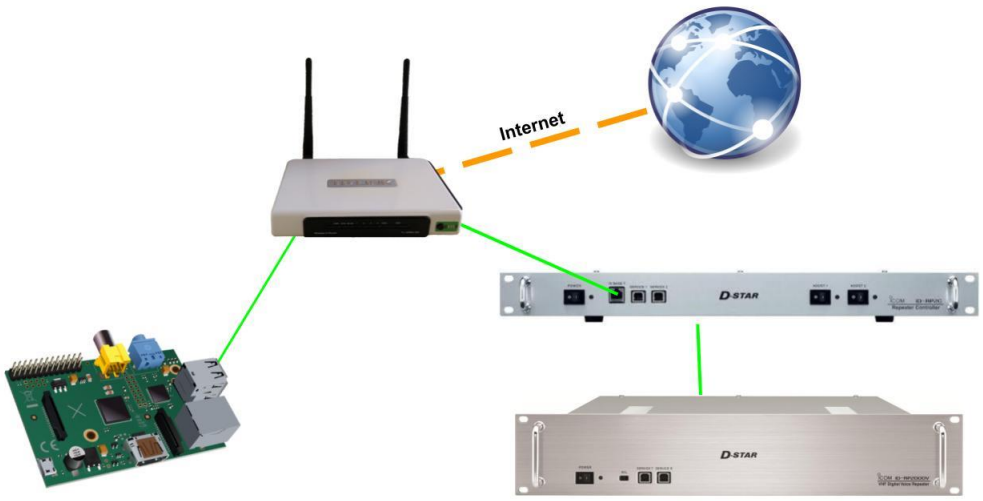


    c. Next select upgrade, it will start automatically, and pi-star will be upgraded to the latest version



    d. Once the Upgrade is completed, select “Update”, This will upgrade all hosts and dependances for proper gateway operation. The software will need to be updated periodically.

12. Connect the 10-Base-T port on the ID-RP2C to the router/switch
    a. Network should look like the following example



Once connected your repeater should be able to link and unlink to reflectors and other repeaters. Sometimes I have found that it takes a few minutes for the pi to start talking to the repeaters and sometimes a reboot of the pi once connected to the repeater helps.

I also recommend setting up a Cron Job in the Expert Config area to reboot the pi regularly.

Add [0 3 * * 0 sudo reboot] to the System Cron page if you would like the pi to reboot at 3am every Sunday.

Remember while outbound linking will work just fine without port forwarding but if you would like to allow incoming connections to the repeater, port forwarding will be required and be sure to us a club callsign and register the repeater on IRCDDB.net

Issues or Questions

Reach out via

www.widigitalnetwork.org