Digital Mobile Radio for the Radio Amateur

UHF/VHF DMR

Benefits of Digital Modes

- Improved Voice Communications
- Improved Channel Efficiency
- Internet-enabled worldwide communication
- Messaging

Digital Radio Modes

- Classic DMR
  - Multiple vendors
  - Brandmeister talk groups
  - Send phone and digital information (location, Images, etc…)
- D-Star
  - ICOM radio implementation - Digital Smart Technologies for Amateur Radio
  - Talk Groups
  - Send phone and digital information (location, Images, etc…)
- System Fusion
  - Yeasu Radio
  - Digital Groups
  - Send phone and digital information, (location, Images, etc…)

Repeaters

- Digital modes are usually enabled by repeaters
  - Yeasu DR-2X/XE
  - ICOM ID-RP2010V, ID-RP4010V, or ID-RP1200VD
  - Bridgecom BCR-50DV, or BCR-40DU

DMR Hotspots

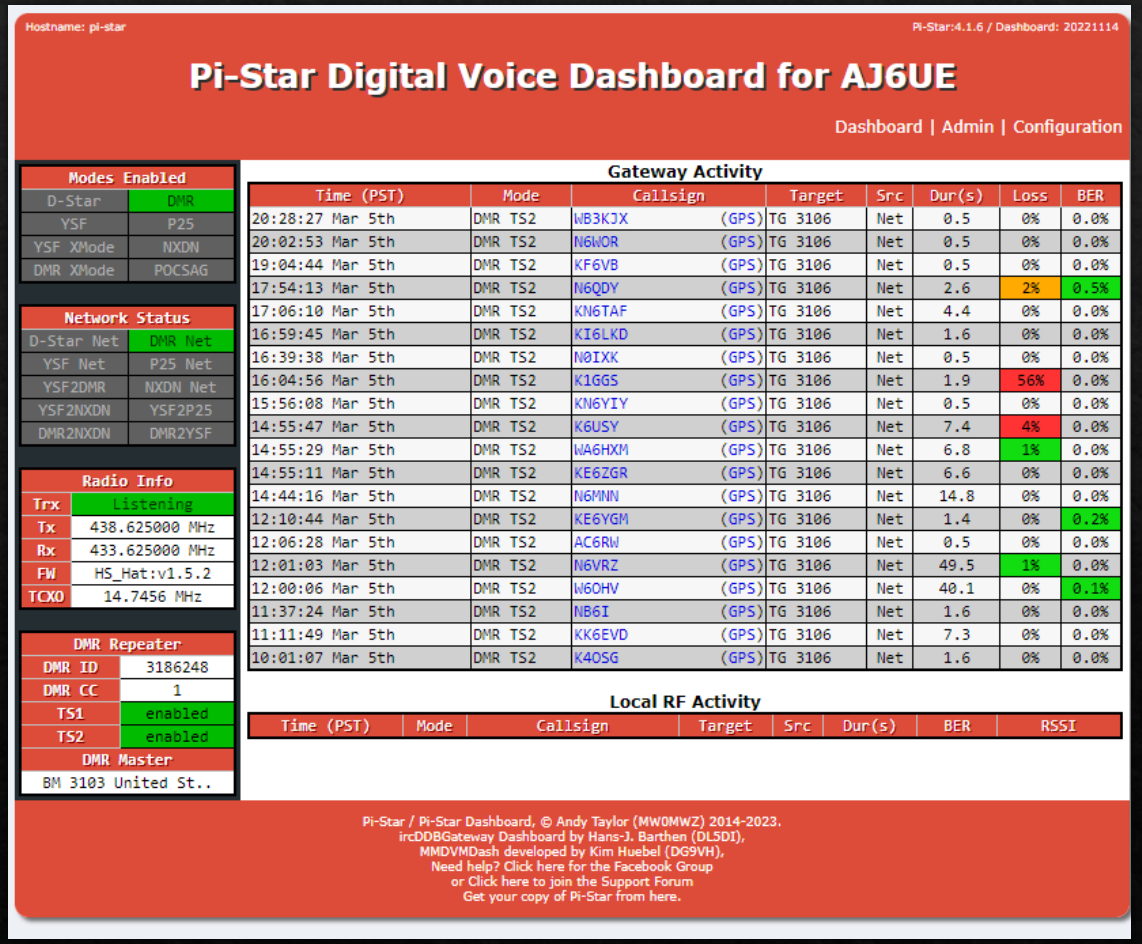
- Hotspots serve as small low-wattage repeater
- Connect to the internet
- User configurable
- Can be bought or built
  - Bridgecom
  - MMDVM and Raspberry pi

PiStar

- Information found at https://www.pistar.uk/
- Register for a digital ID here https://www.radioid.net/
  - Can Bridge DMR, D-STAR, C4FM, P25 and others

Pi-Star Dashboard

- Shows Recent Activity
- Shows Signal Quality
- Quickly review
  - Frequency settings
  - Hotspot state



Hostname: pi-star — Pi-Star:4.1.6 / Dashboard: 20221114

Pi-Star Digital Voice Dashboard for AJ6UE

Dashboard | Admin | Configuration

Modes Enabled	
D-Star	DMR
YSF	P25
YSF XMode	NXDN
DMR XMode	POCSAG

Network Status	
D-Star Net	DMR Net
YSF Net	P25 Net
YSF2DMR	NXDN Net
YSF2NXDN	YSF2P25
DMR2NXDN	DMR2YSF

Radio Info	
Trx	Listening
Tx	438.625000 MHz
Rx	433.625000 MHz
FW	HS_Hat:v1.5.2
TCXO	14.7456 MHz

DMR Repeater	
DMR ID	3186248
DMR CC	1
TS1	enabled
TS2	enabled
DMR Master	
BM 3103 United St..	

Gateway Activity

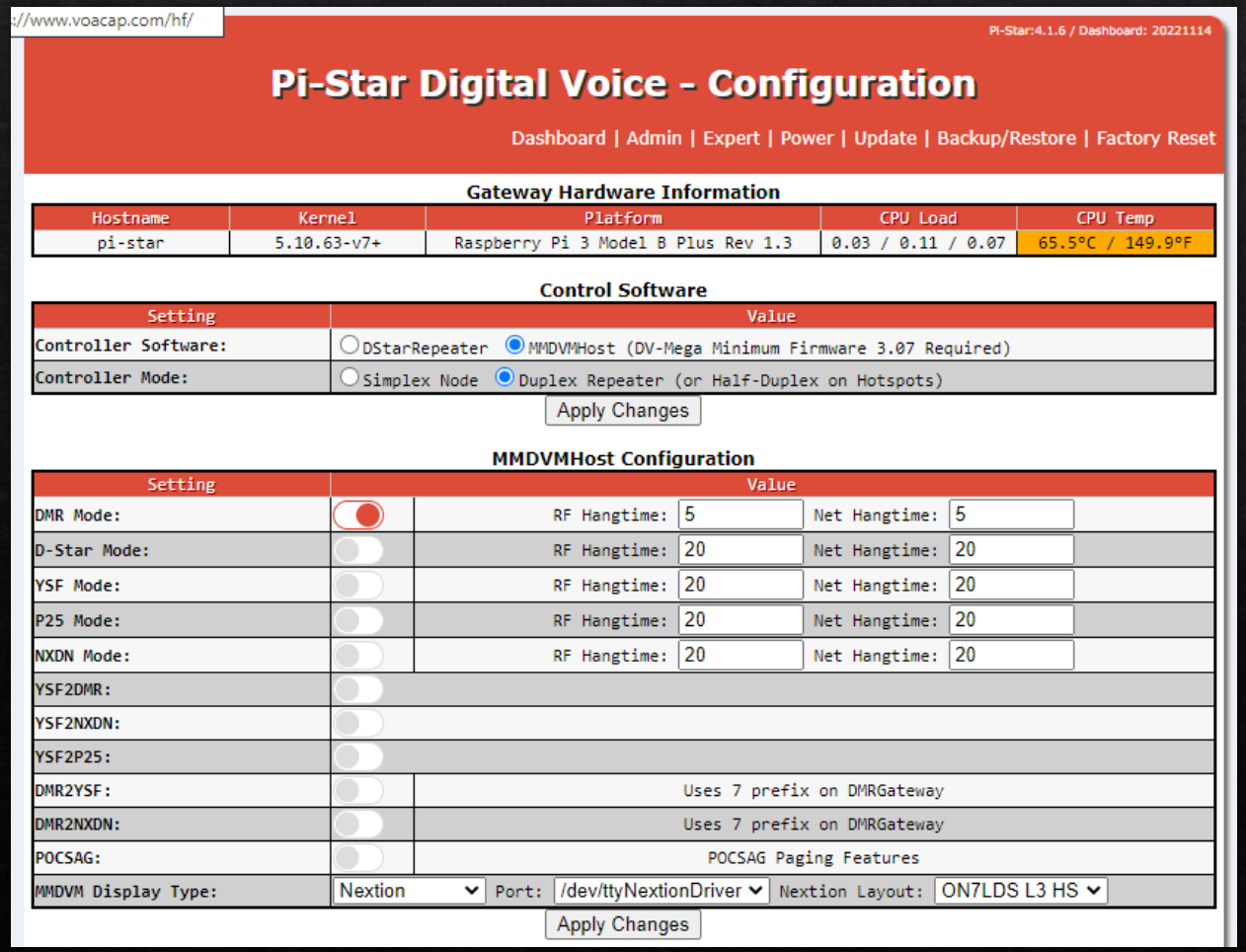
Time (PST)	Mode	Callsign	Target	Src	Dur(s)	Loss	BER
20:28:27 Mar 5th	DMR TS2	WB3KJX (GPS)	TG 3106	Net	0.5	0%	0.0%
20:02:53 Mar 5th	DMR TS2	N6WOR (GPS)	TG 3106	Net	0.5	0%	0.0%
19:04:44 Mar 5th	DMR TS2	KF6VB (GPS)	TG 3106	Net	0.5	0%	0.0%
17:54:13 Mar 5th	DMR TS2	N6QDY (GPS)	TG 3106	Net	2.6	2%	0.5%
17:06:10 Mar 5th	DMR TS2	KN6TAF (GPS)	TG 3106	Net	4.4	0%	0.0%
16:59:45 Mar 5th	DMR TS2	KI6LKD (GPS)	TG 3106	Net	1.6	0%	0.0%
16:39:38 Mar 5th	DMR TS2	N0IXK (GPS)	TG 3106	Net	0.5	0%	0.0%
16:04:56 Mar 5th	DMR TS2	K1GGS (GPS)	TG 3106	Net	1.9	56%	0.0%
15:56:08 Mar 5th	DMR TS2	KN6YIY (GPS)	TG 3106	Net	0.5	0%	0.0%
14:55:47 Mar 5th	DMR TS2	K6USY (GPS)	TG 3106	Net	7.4	4%	0.0%
14:55:29 Mar 5th	DMR TS2	WA6HXM (GPS)	TG 3106	Net	6.8	1%	0.0%
14:55:11 Mar 5th	DMR TS2	KE6ZGR (GPS)	TG 3106	Net	6.6	0%	0.0%
14:44:16 Mar 5th	DMR TS2	N6MNN (GPS)	TG 3106	Net	14.8	0%	0.0%
12:10:44 Mar 5th	DMR TS2	KE6YGM (GPS)	TG 3106	Net	1.4	0%	0.2%
12:06:28 Mar 5th	DMR TS2	AC6RW (GPS)	TG 3106	Net	0.5	0%	0.0%
12:01:03 Mar 5th	DMR TS2	N6VRZ (GPS)	TG 3106	Net	49.5	1%	0.0%
12:00:06 Mar 5th	DMR TS2	W6OHV (GPS)	TG 3106	Net	40.1	0%	0.1%
11:37:24 Mar 5th	DMR TS2	NB6I (GPS)	TG 3106	Net	1.6	0%	0.0%
11:11:49 Mar 5th	DMR TS2	KK6EVD (GPS)	TG 3106	Net	7.3	0%	0.0%
10:01:07 Mar 5th	DMR TS2	K4OSG (GPS)	TG 3106	Net	1.6	0%	0.0%

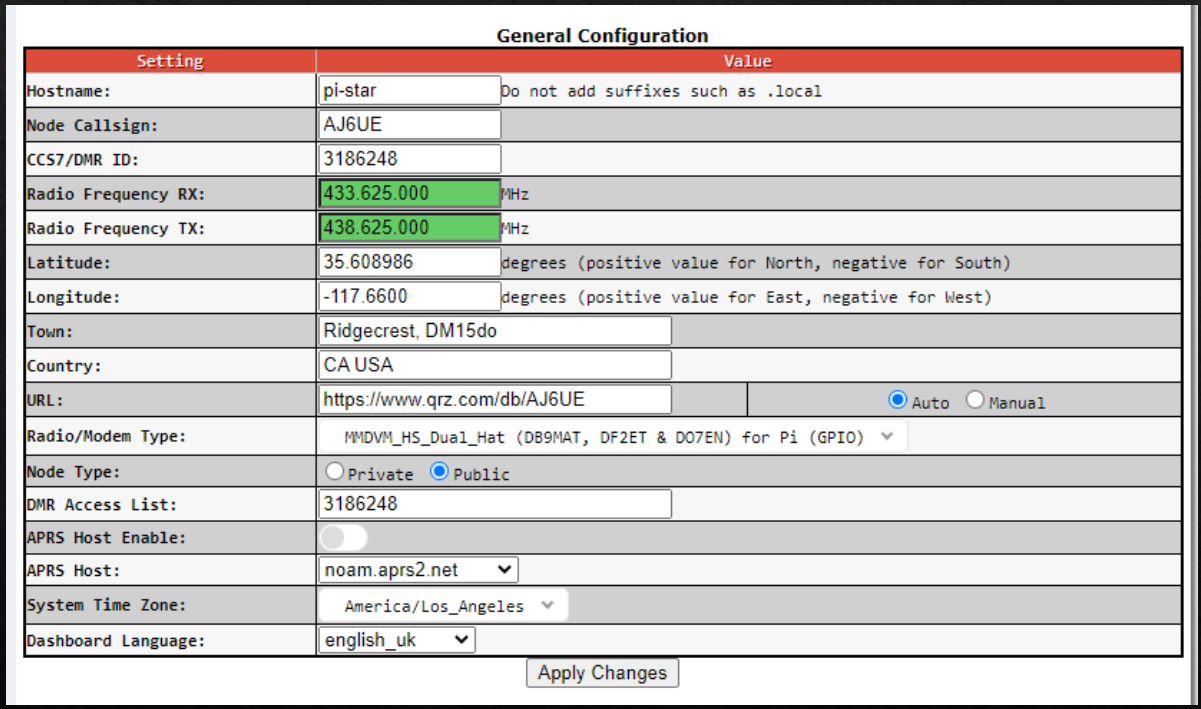
Local RF Activity

Time (PST)	Mode	Callsign	Target	Src	Dur(s)	BER	RSSI

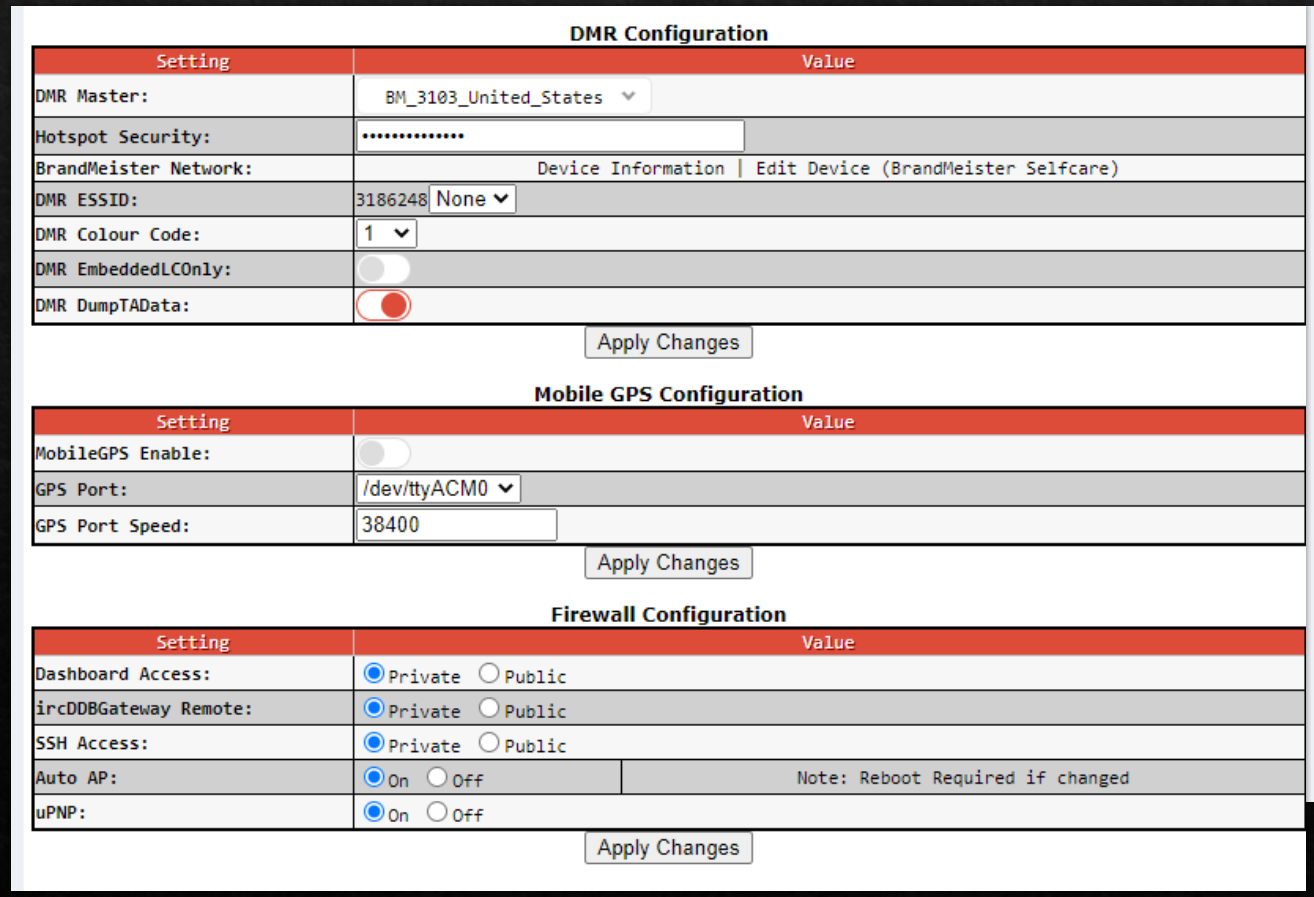
Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2023.
ircDDBGateway Dashboard by Hans-J. Barthen (DL5DI),
MMDVMDash developed by Kim Huebel (DG9VH),
Need help? Click here for the Facebook Group
or Click here to join the Support Forum
Get your copy of Pi-Star from here.

Pi-Star Configuration





Pi-Star Configuration (Cont.)



DMR Configuration

Setting	Value
DMR Master:	BM_3103_United_States
Hotspot Security:	••••••••••••••
BrandMeister Network:	Device Information | Edit Device (BrandMeister Selfcare)
DMR ESSID:	3186248 None
DMR Colour Code:	1
DMR EmbeddedLCOnly:	
DMR DumpTAData:	

Apply Changes

Mobile GPS Configuration

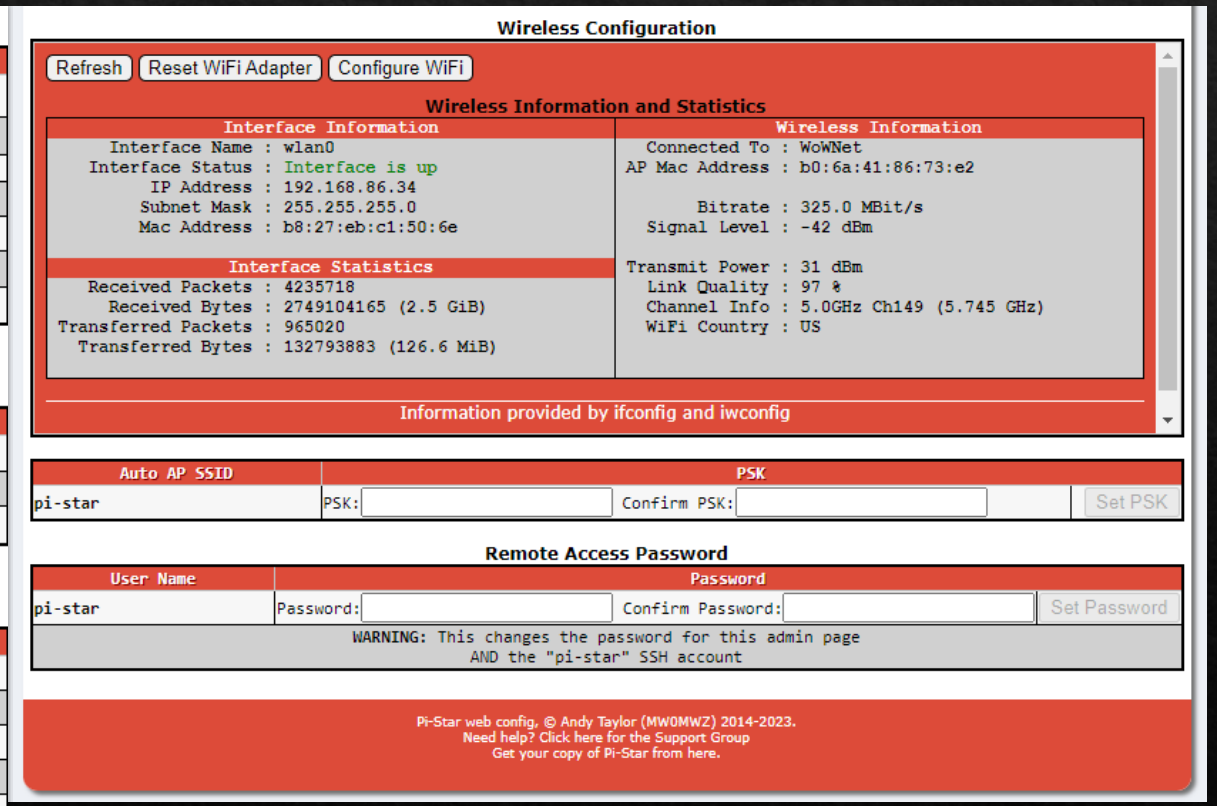
Setting	Value
MobileGPS Enable:	
GPS Port:	/dev/ttyACM0
GPS Port Speed:	38400

Apply Changes

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



Wireless Configuration

Refresh | Reset WiFi Adapter | Configure WiFi

Wireless Information and Statistics

Interface Information		Wireless Information	
Interface Name	: wlan0	Connected To	: WoWNet
Interface Status	: Interface is up	AP Mac Address	: b0:6a:41:86:73:e2
IP Address	: 192.168.86.34		
Subnet Mask	: 255.255.255.0	Bitrate	: 325.0 MBit/s
Mac Address	: b8:27:eb:c1:50:6e	Signal Level	: -42 dBm
Interface Statistics			
Received Packets	: 4235718	Transmit Power	: 31 dBm
Received Bytes	: 2749104165 (2.5 GiB)	Link Quality	: 97 %
Transferred Packets	: 965020	Channel Info	: 5.0GHz Ch149 (5.745 GHz)
Transferred Bytes	: 132793883 (126.6 MiB)	WiFi Country	: US

Information provided by ifconfig and iwconfig

Auto AP SSID	PSK			
pi-star	PSK:		Confirm PSK:	Set PSK

Remote Access Password

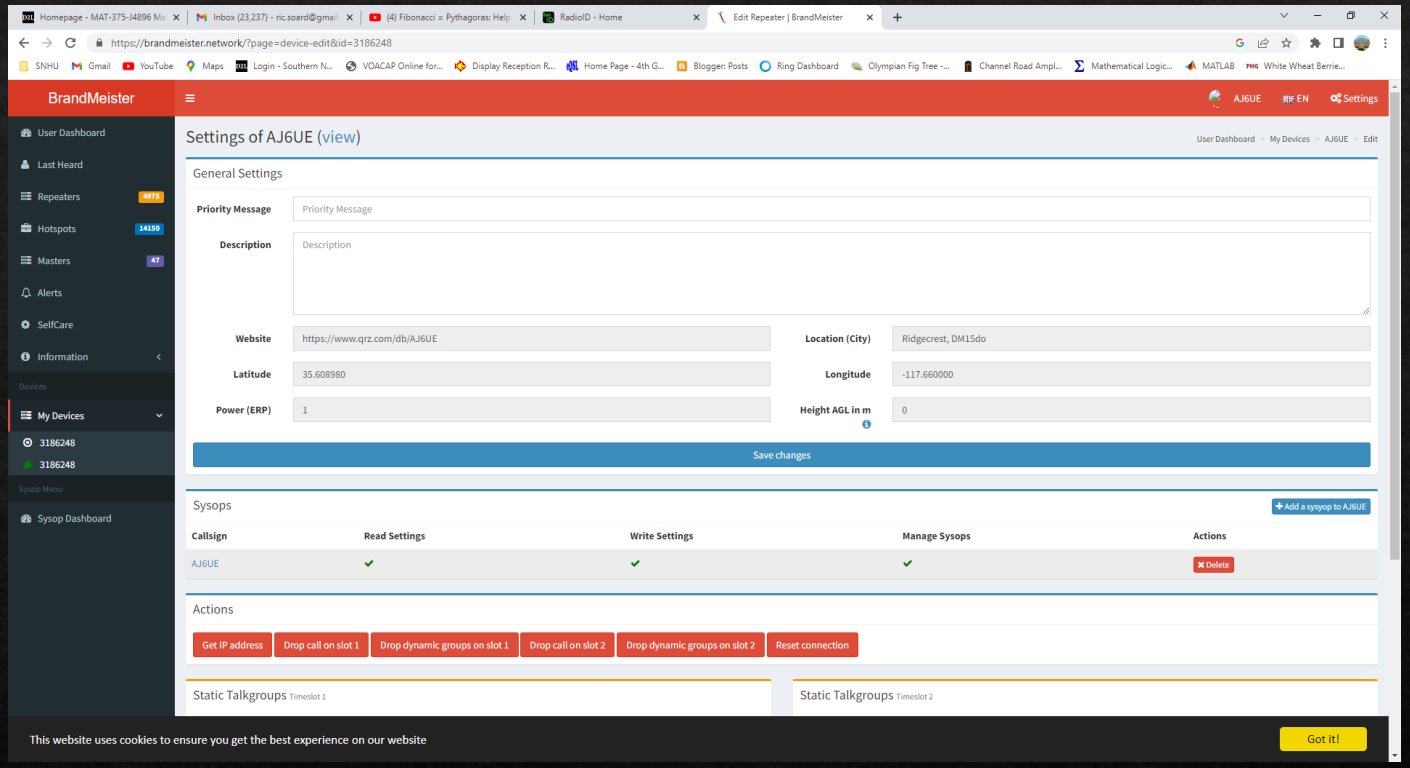
User Name	Password			
pi-star	Password:		Confirm Password:	Set Password

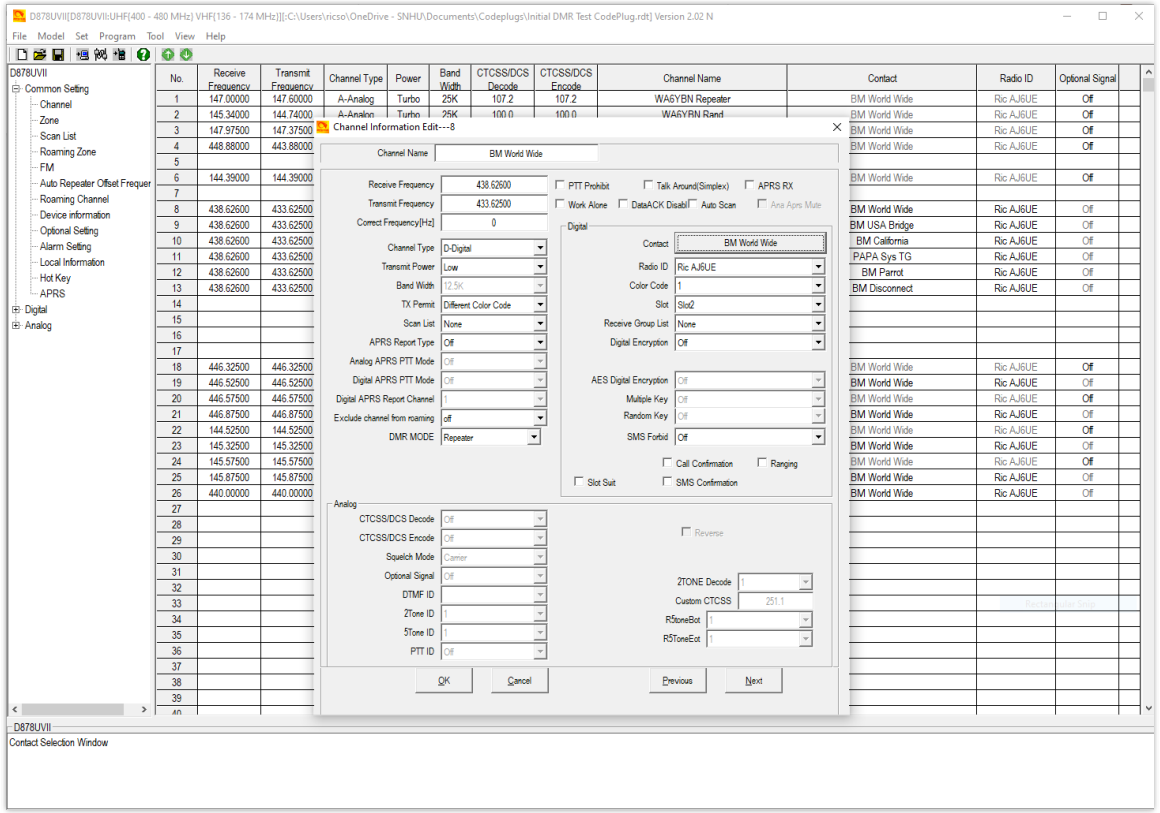
WARNING: This changes the password for this admin page
AND the "pi-star" SSH account

Pi-Star web config, © Andy Taylor (MW0MWZ) 2014-2023.
Need help? Click here for the Support Group
Get your copy of Pi-Star from here.

Brandmeister Admin Page

- Configure talk groups for your pi-star
- Manage talk group activity
  - Get Hotspot IP
  - Drop Talk Group
  - Reset Talk Group
  - Etc…



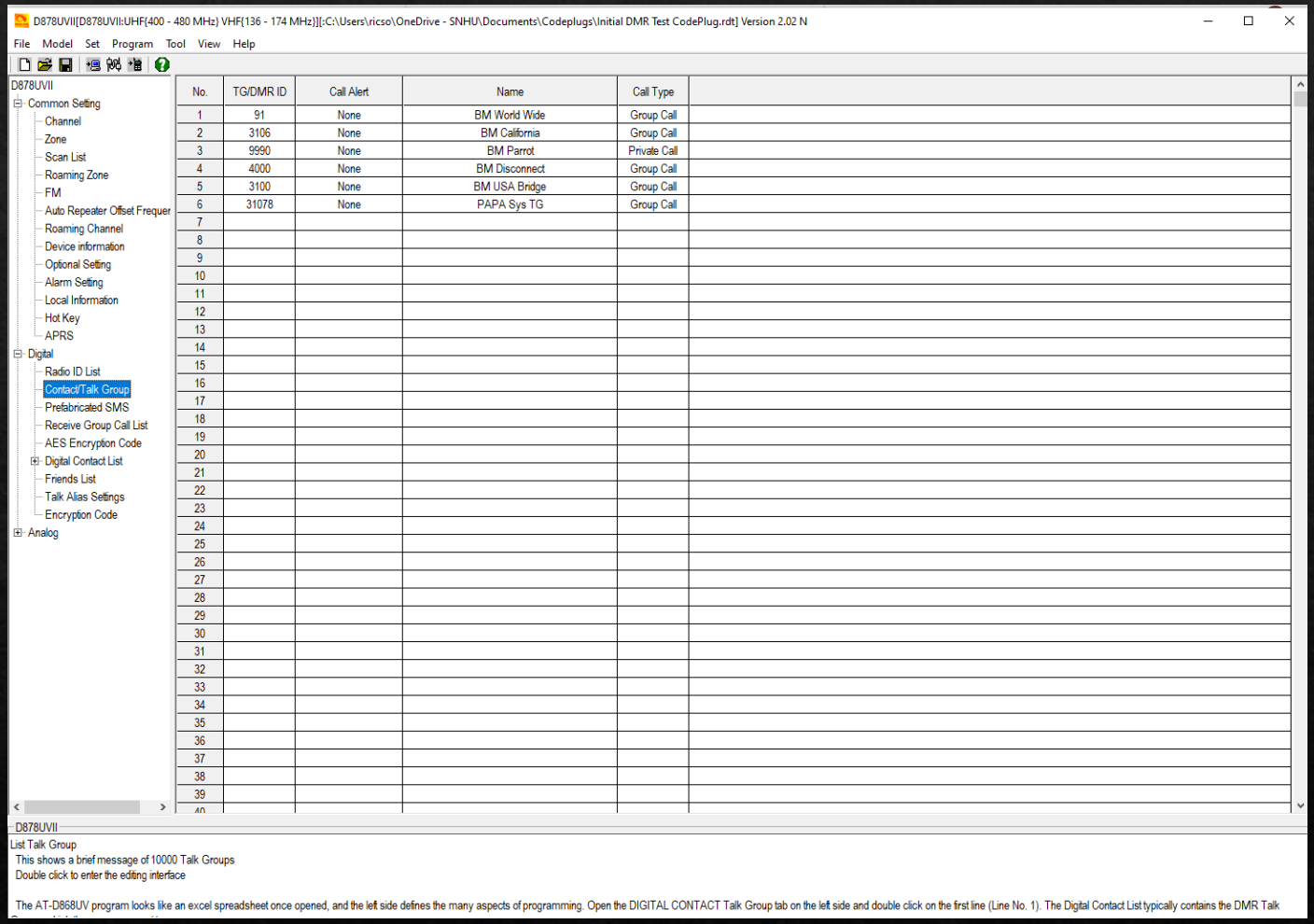


Configuring your code plug for DMR

Frequencies for your hotspot

Edit your talk groups

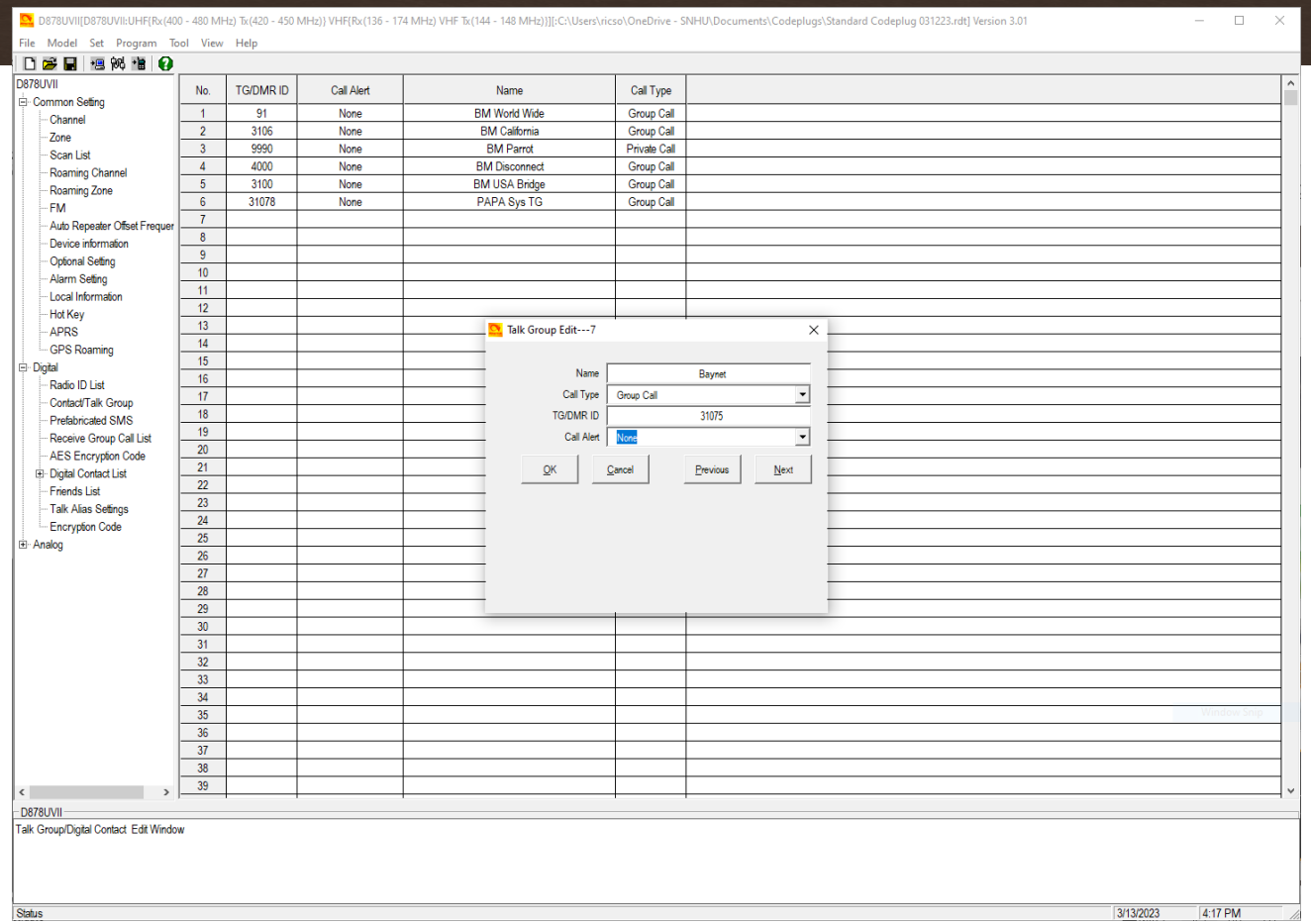
- Talk group ID
  - Find from the Brandmeister network
  - Talk group name
    - Usually a group call
    - Parrot is a private call
    - Parrot is a radio check



Code Plug Demo

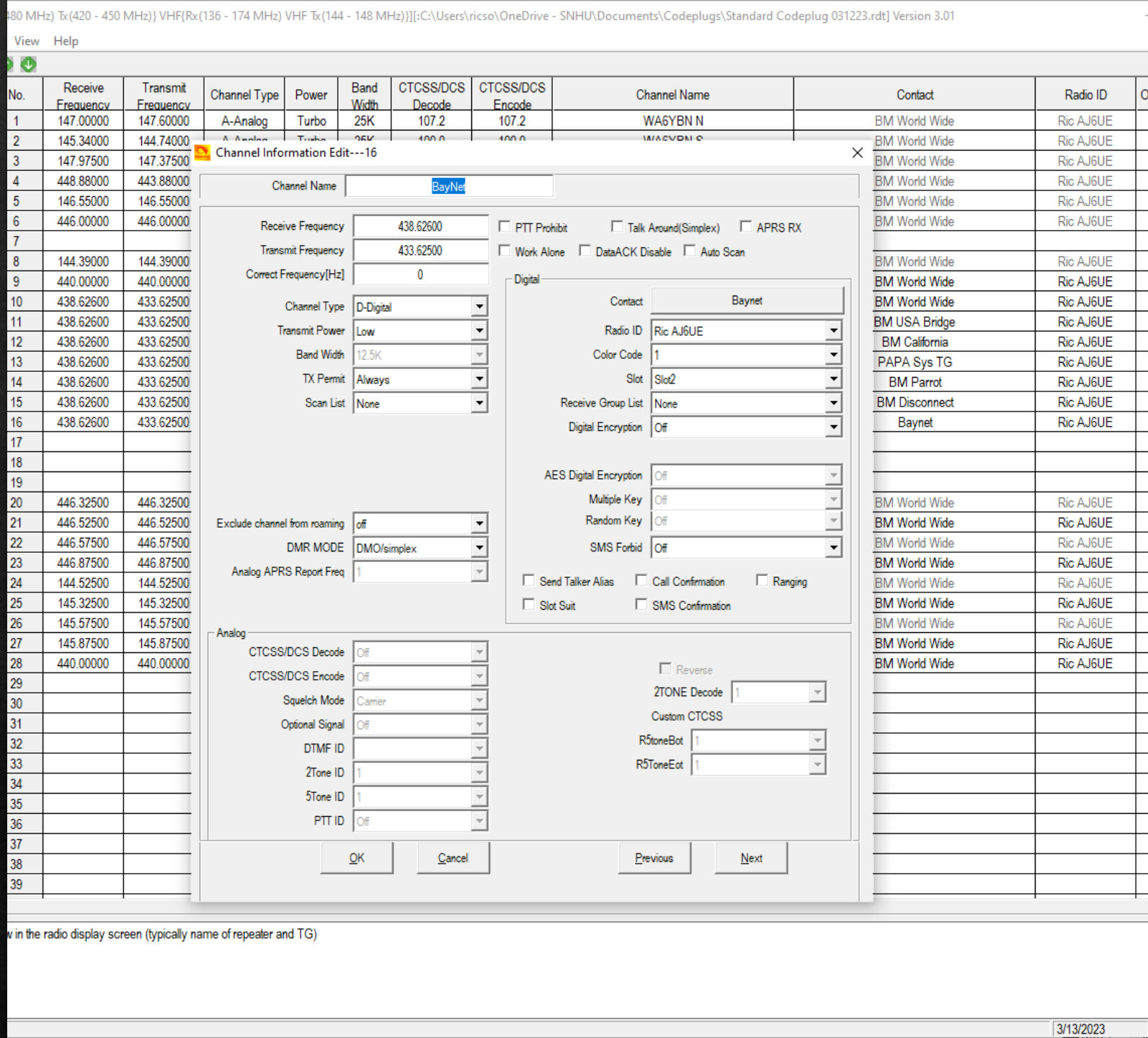
Let's add BayNet to our Radio Talk Group 31075

- Under Digital ->Contact/Talk Group, add Baynet

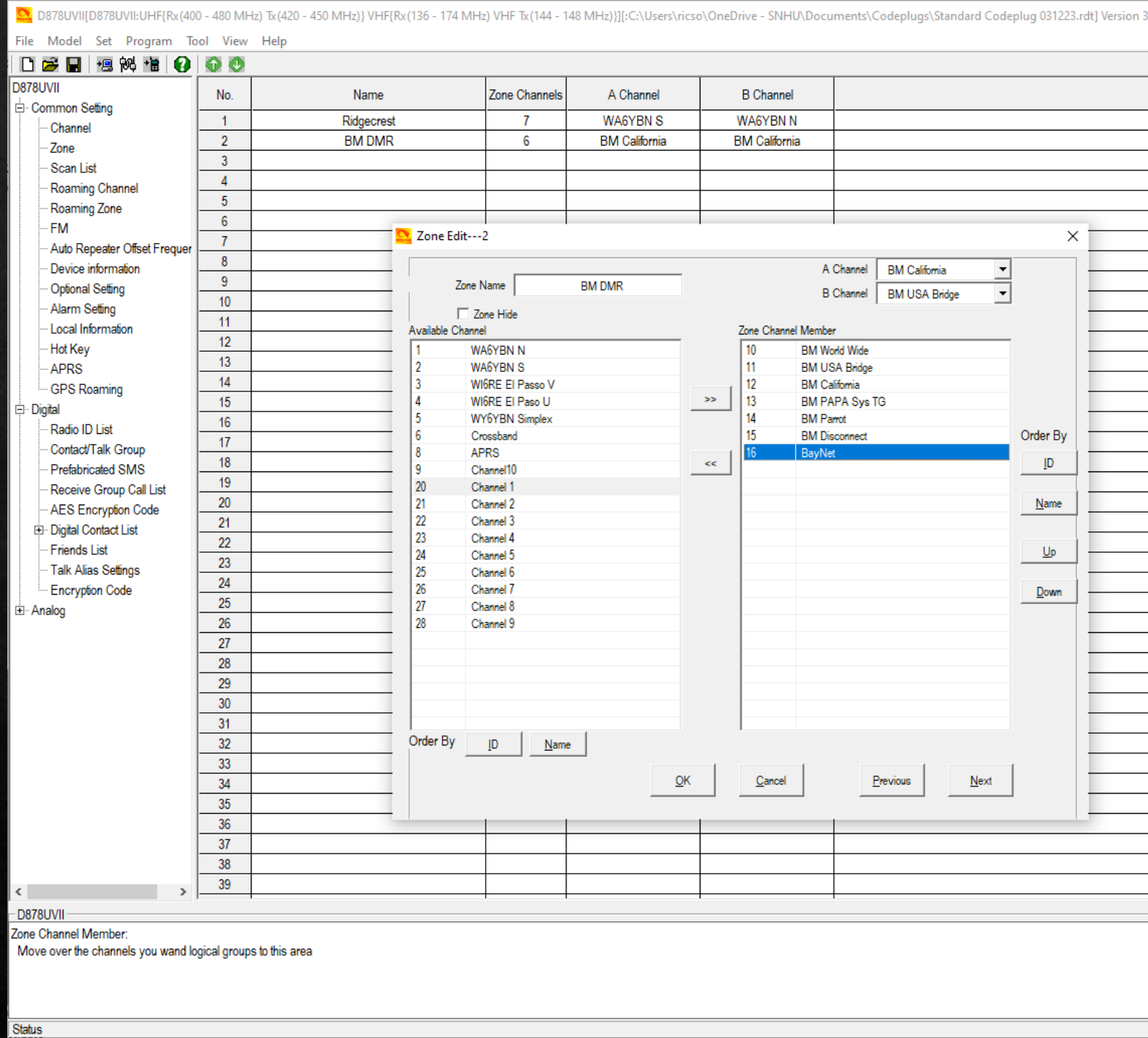


Create a channel

- On your radio, create BayNet Channel
- Contact: BayNet
- Transmit and receive Frequency from your Hot Spot
- Select your color code
- Select slot 1 or slot 2
- DMR Mode: Repeater



Add to your DMR Zone



Essential Channels

- Parrot: 9990
  - Radio check for the DMR network
- Disconnect: 4000
  - Removes your radio from a talk group

DMR Demo


AnyTone
C01
CH-4
SoCal
SIERRA PEAK
VFO B
446.00000
Menu Zone List
P1
P2
1 !<
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
* ␣
0 +
⇧