



Digital Mobile Radio



What is it and how to get it set up for use

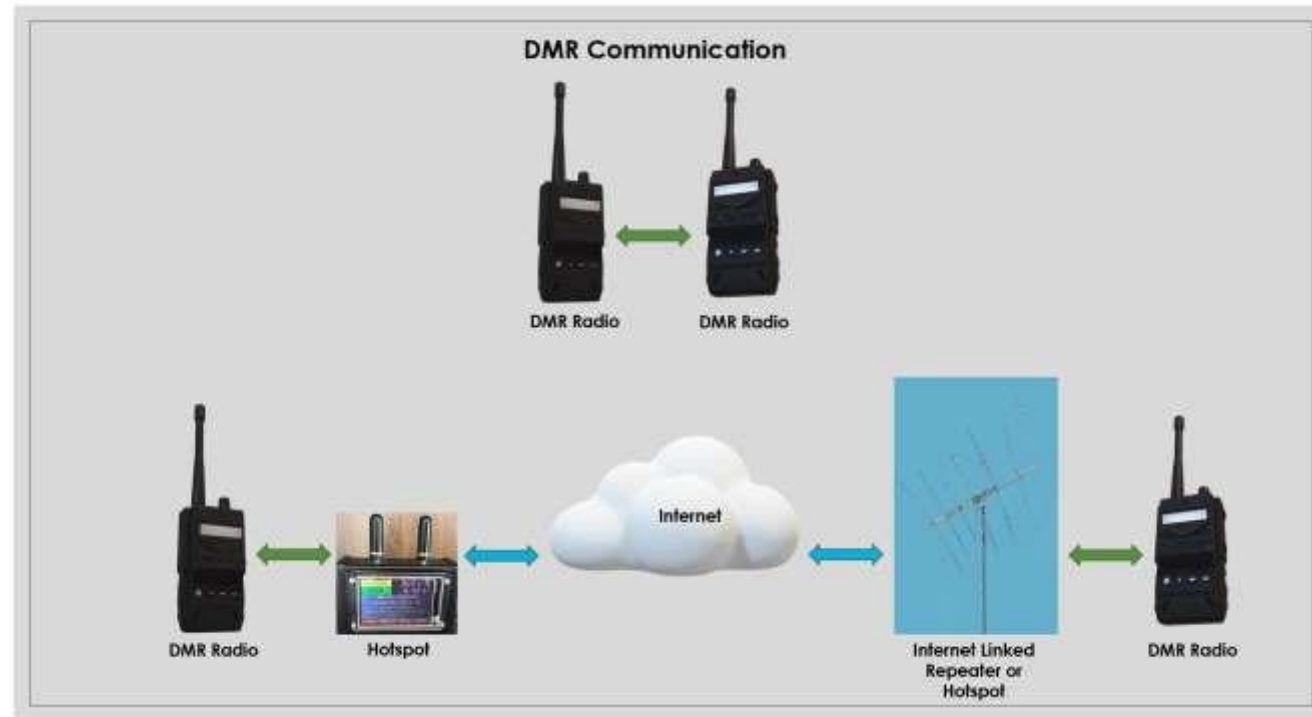


DMR is an exciting way to make contacts locally or worldwide. DMR offers flexible calling facilities – you can call one person or a group of people based on geography or common interests. It leverages technology that allows you to immediately make contacts regardless if you have access to a local DMR repeater, through Hotspots or other digital internet connected devices.

What is DMR?

Like other digital modes such as D-Star, C4FM and APCO P25, the DMR protocol converts your voice into a digital form and sends it out via RF (with other bits of information included) and allows you to communicate to other DMR radios and also DMR repeaters, which are networked together around the world via the internet.

DMR (Digital Mobile Radio) is an open standard defined by ETSI (European Telecommunications Standards Institute). This standard provides for two simultaneous communications paths in a 12.5kHz channel. This is accomplished by utilizing TDMA (Time Division Multiple Access) technology.



How does DMR operate

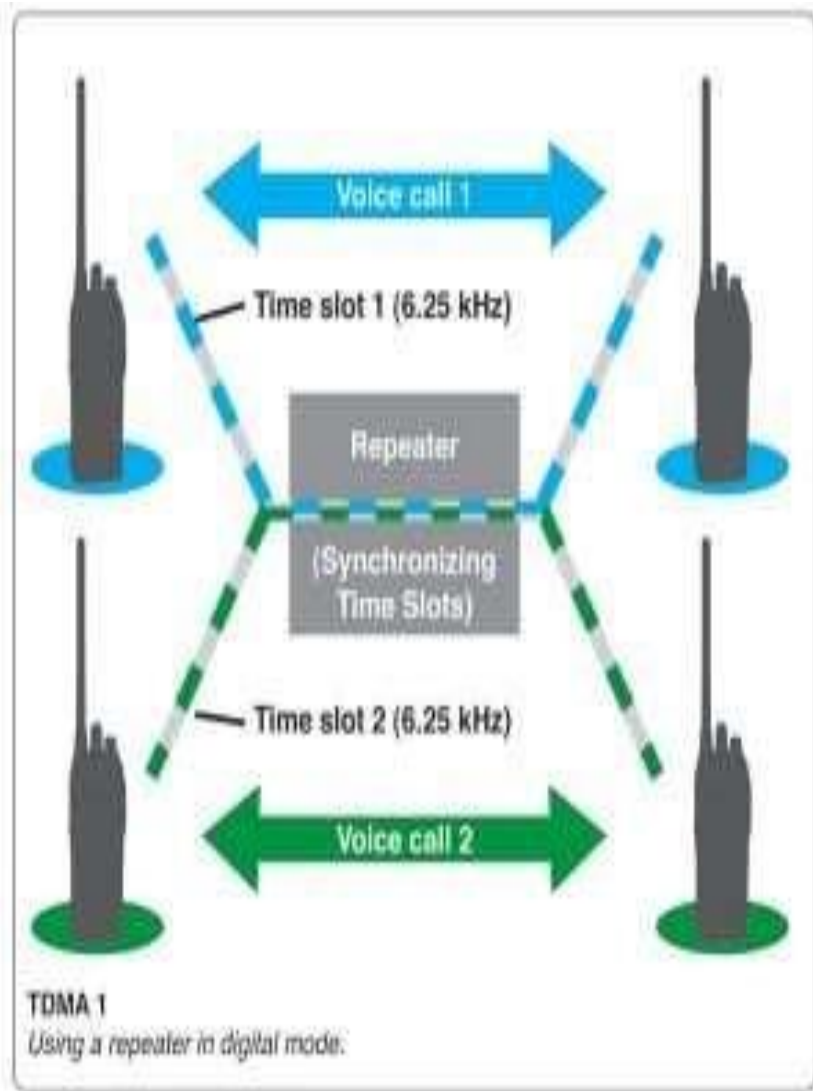
TDMA (Time Slots)

TDMA provides two 30ms “timeslots” (TS1 and TS2) per repeater channel.

When you key up the radio on TS1, the radio will start transmitting for 30ms, stop transmitting for 30ms, continuing to repeat this operation.

On TS2, the radio will do the opposite when the PTT is pushed. It will stop transmitting for 30ms, then start transmitting for 30ms, continuing to repeat this operation.

This provides alternating conversations on the same repeater channel; thus the radio is transmitting only 50% of the time.



This diagram shows how a repeater uses 12.5 kHz to support 2 separate radio communications at the same time. One radio needs to be on Time Slot 1 and the other radio needs to be on Time Slot 2. The repeater listens to both and transmits to both using only half of the bandwidth for each.



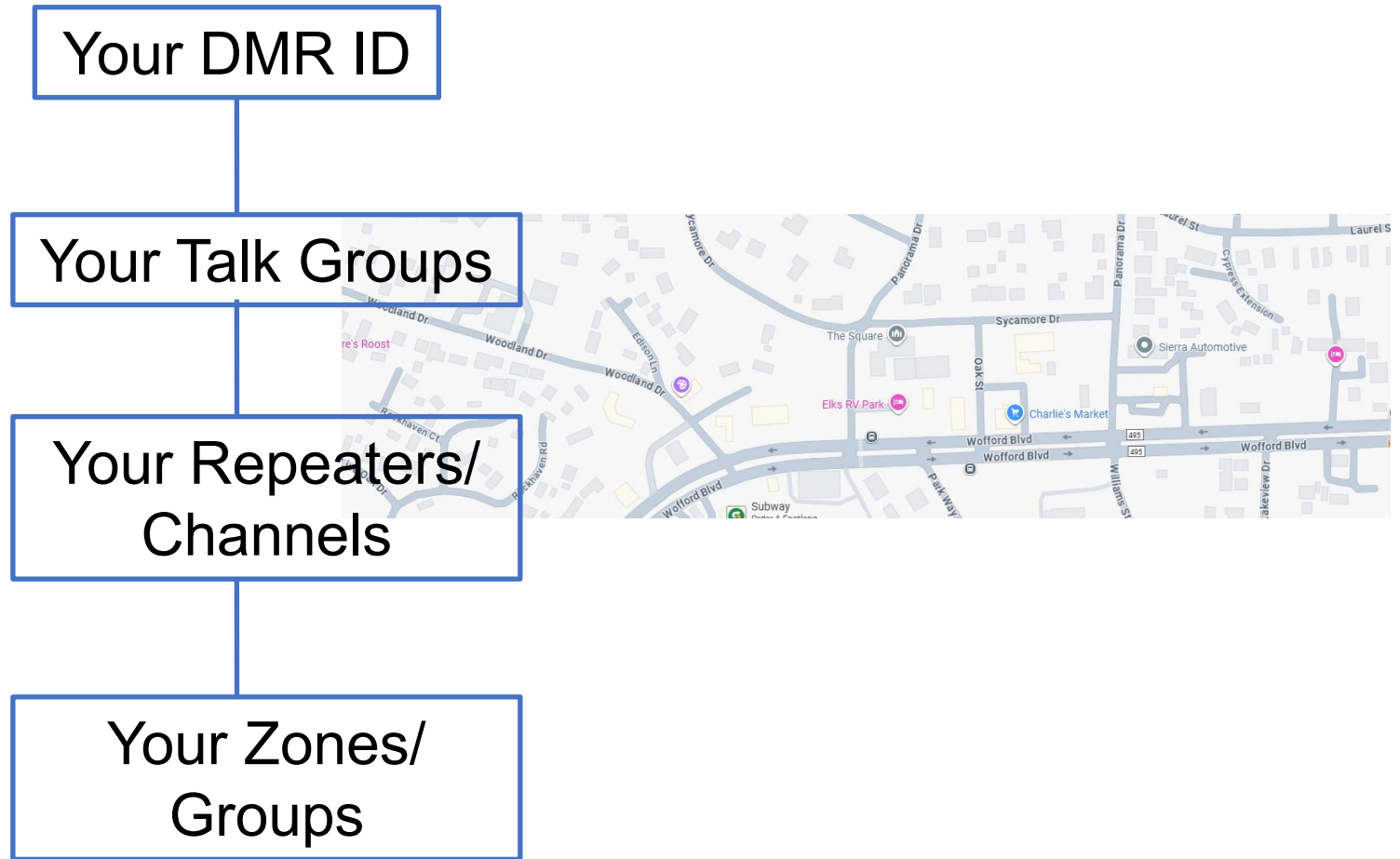
DMR will give you a headache when you are getting started. Understanding what is going on helps, a lot.

We have introduced you to the concept of a Time Slot (TS1 or TS2). When you start programing computer input for your radio you will need to choose either TS1 or TS2. Try to remember TS1 is usually local and private, TS2 is another repeater etc. and public.



Allow plenty of time to work and be ready to wait while everything loads and updates. Keep a cup of coffee handy.

This is the road map for building a Code Plug for your DMR radio. Your analog channels will be programmed as usual, but they will need to be placed in a Zone or you won't have access to them.



We have introduced the TS1 and TS2 concept. Now it's time to talk about YOU. The radio (and the rest of the DMR network) needs to know who is talking to it. Most of the time you only need one DMR ID, for you personally. If a husband and wife (any other persons) share equipment you may want a separate ID for each of you. Unless you will have more than 1 radio on the air at any given time you only need one DMR ID. Your hotspot (if you have one) can share your DMR ID as only one of the devices is accessing the internet at any given time.

A repeater (not a hot spot) will have its own ID number. They are currently being issued a 6-digit number beginning with a 3. The N6SR Rocky Point repeater has the ID of 313572. This is also the number assigned to the static TG on TS2 so that anyone wanting to talk to the Kern River Valley can make a group call to TG313572 and anybody monitoring that TG will hear you, even if the repeater has been quiet for more than 15 minutes. More on this later.

To obtain your DMR ID click on REGISTER at <https://radioid.net> and follow the instructions. Be sure to read and heed the warnings about duplicate requests, etc.

The screenshot shows the Radioid.net website interface. The browser's address bar displays "radioid.net". The website's header includes the Radioid.net logo, navigation links for Database, Contacts, FAQ, and Support, and buttons for Log In and Register. The main content area is divided into three columns showing statistics for "Today", "Last 7 days", and "Last 30 days". A summary section titled "In total:" provides overall network statistics. At the bottom left, there is a promotional banner for the "DMR CONTACT GENERATOR" with a URL. To the right of the banner is a "Contact Generator!" section with a list of features.

Today:

- 73 New DMR ID's
- 10 New NXDN ID's
- 1 New Repeater ID's

Last 7 days:

- 632 New DMR ID's
- 51 New NXDN ID's
- 10 New Repeater ID's

Last 30 days:

- 2369 New DMR ID's
- 168 New NXDN ID's
- 43 New Repeater ID's

In total:

- We have a global network of 287836 DMR ID's
- We have issued 12682 NXDN ID's
- There are 10414 repeaters worldwide

DMR CONTACT GENERATOR ONLY AT [HTTPS://WWW.RADIOID.NET](https://www.radioid.net)

Contact Generator!

- Live up-to-date data, We are the Worldwide Source, everywhere else is STALE data.
- Generate as many personalized lists as you like and associate them with different radio formats.
- Include the latest Brandmeister TG's in your generated lists.
- No radio Format! No Problem! We have a custom formatter so you can generate any kind of format you like!
- As the Database size grows, it will be more important than ever to be able to trim your contact lists.
- Use BM last heard Data to filter your list! **NEW**

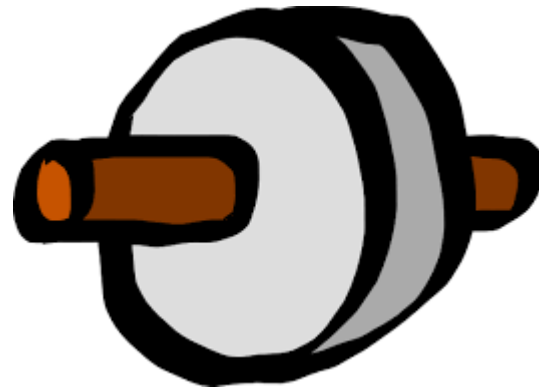
Okay, now we have our DMR ID. It's time to figure out who/where we want to go/talk to when we get on the air. Also, how do we get there from here. For the purposes of this presentation, we will use the Brandmeister network of repeater talk groups to reach our destination. There are thousands, yes thousands, of Talk Groups (TG) available world wide. Most repeater owners will provide you with a suggested group of 10 or 15 of the more popular local TGs used on their repeater. You will need this information BEFORE you start programming your radio.

Think of a TG (Talk Group) as a room with a door. The door is closed until you key up that TG on the repeater or your hot spot. If you don't key it up again within 15 minutes the door will close and you won't hear any traffic from that TG. The exception to this rule is that some repeater owners program a few TGs to be on all the time. This information may be on the sponsor's web site or available from other users. You can choose which TGs you want Static (on all the time) or Dynamic (on only when keyed up) on your Hot Spot. As long as you key up the TG, a Dynamic TG will stay active until you have not keyed up for 15 minutes.



There is a special TG to use if you want to close the door on a Dynamic TG before the 15 minutes expire, TG4000. It will not turn off a Static TG.

Now it's time to start programming the "Code Plug" for your radio. A Code Plug is a form of spreadsheet used to tell your radio what to do. It will contain your DMR ID, the TG IDs, and repeater information such as TS (time slot), Color Code (much like CTCSS), transmit and receive frequency. This is the roadmap that your radio will use to travel the world. Every vendor is slightly different, but most will contain the same information, but perhaps in a different order or call it a different name. This is why it is wise to choose a brand/model that someone nearby already has, so you don't have to re-invent the wheel.



It's time to have your radio communicate with the computer programming software. Open the software for your particular radio and hook the radio up to the computer with the proper cable. You may need to know which COM port your radio is using. You can usually find this out by opening the Device Manager on a Windows computer and watching the COM ports to see which one gets added when you plug in the radio. Some brands do not use a COM port but identify as a USB device.

The first thing you want to do is READ the radio. Next, SAVE the file with a title something like Radio Start.rdt. This gives you a place to return to if you get too messed up. As you go along and find things are working, save your progress. If something doesn't work, go back to the last time it did.

Trust me, it will get messed up!



The following slides are from the CPS (Computer Programming Software) used for the Anytone D878UVII. This is the opening screen on a new code plug. As you can see there isn't much there, just two frequencies, one VHF and one UHF.

D878UVII

Common Setting

Channel

Zone

Scan List

Roaming Channel

Roaming Zone

FM

Auto Repeat Offset Frequency

Device Information

Optional Setting

Alarm Setting

Local Information

Hot Key

A-RS

GPS Roaming

Digital

Analog

No	Receive Frequency	Transmit Frequency	Channel Type	Power	Band	Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	Optional Signal
1	440.00000	440.00000	D-Digital	High	12.5K		Off	Off	Channel 1	Contact 1		Off
2	155.00000	155.00000	D-Digital	High	12.5K		Off	Off	Channel 2	Contact 1		Off
3												
4												
5												
6												
7												
8												
9												
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D878UVI

The AnyTone radio is a VHF and UHF radio with both Digital DMR (Tier I and II) and Analog capabilities. It offers a total of 1,000 channels (Analog and Digital), 10,000 Digital Talk Groups, and up to 200,000 contacts, as well as multiple DMR ID numbers (Radio IDs) for a single radio. With the enhanced capabilities of the AT radio, this Programming Guide will help users to understand all aspects of how to program and set up the radio for maximum usability.

Please note that the AT radio may have a locked key-board upon arrival. The FCC requires per 47CFR90.203 that an unauthorized user shall not be able to enter any frequencies and transmit on a frequency not authorized. Frequencies should only be programmed by service or maintenance personnel. This Guide is primarily provided for such service or maintenance personnel. For such person to open up the keyboard, press the [Menu] key and the [*] (star) key.

Upcoming Earnings

Search

7:27 PM

8/6/2023

This is the screen (Digital – Radio ID List) where you enter your personal DMR Radio ID. If you are sharing the radio, you can enter the other users IDs also.

D878UVII[D878UVIIL-UHF(400 - 480 MHz) VHF(136 - 174 MHz)][C:\Users\janet\Desktop\Documents\00 Ham Radio Stuff\SARG\Power Point Presentations\DMR\Blank (New) CPS.rdt] Version 3.01

File Model Set Program Tool View Help

Device information
Optional Setting
Alarm Setting
Local Information
Hot Key
APRS
GPS Roaming
Digital
Radio ID List
Contact/Talk Group
Prefabricated SMS
Receive Group Call List
AES Encryption Code
Digital Contact List
1---20000
20001---40000
40001---60000
60001---80000
80001---100000
100001---120000
120001---140000
140001---160000
160001---180000
180001---200000
200001---220000
220001---240000
240001---260000
260001---280000
280001---300000
300001---320000
320001---340000
340001---360000
360001---380000
380001---400000
400001---420000
420001---440000
440001---460000
460001---480000
480001---500000
Friends List
Talk Alias Settings
Encryption Code

No.	Radio ID	Name
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
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D878UVII

List Radio ID
This shows a brief message of 250 Radio IDs
Double click to enter the editing interface

2:38 PM
8/12/2025

This is the page that will eventually have all of your radio channels listed, analog and digital. If the frequency/channel is not on this page, you won't be able to use it. Your analog as well as digital channels go here.

D878UVI[D878UVI(UHF(400 - 460 MHz) VHF(136 - 174 MHz))]view.rdl Version 3.01

FileModelSetProgramToolViewHelp

D878UVI

Common Setting

Channel

Zone

Scan List

Roaming Channel

Roaming Zone

FM

Auto Repeat Offset Frequ

Device Information

Optional Setting

Alarm Setting

Local Information

Hot Key

A-RS

GPS Roaming

Digital

Analog

No	Receive Frequency	Transmit Frequency	Channel Type	Power	Band	Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	Optional Signal
1	440.00000	440.00000	D-Digital	High	12.5K		Off	Off	Channel 1	Contact 1		Off
2	155.00000	155.00000	D-Digital	High	12.5K		Off	Off	Channel 2	Contact 1		Off
3												
4												
5												
6												
7												
8												
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D878UVI

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Upcoming Earnings

Search

7:27 PM 8/6/2023

This is where you enter your DMR Talk Groups (TGs). These are not repeater, hot spot, or frequency specific. They are the “Door” you want to open. The “Address” will be added in the Channel screen. If you want to use a specific Talk Group (TG) it MUST be on this list. This is the first list you should build.

D878UVII[D878UVII:UHF(Rx(400 - 480 MHz) Tx(420 - 450 MHz)) VHF(Rx(136 - 174 MHz) VHF Tx(144 - 148 MHz))][C:\Users\janet\Desktop\Documents\2025 07 Jul 6.rdt] Version 3.01

FileModelSetProgramToolViewHelp

D878UVII

Common Setting

Channel

Zone

Scan List

Roaming Channel

Roaming Zone

FM

Auto Repeater Offse

Device information

Optional Setting

Alarm Setting

Local Information

Hot Key

APRS

GPS Roaming

Digital

Radio ID List

Contact/Talk Group

Prefabricated SMS

Receive Group Call

AES Encryption Co

Digital Contact List

1---20000

20001---40000

40001---60000

60001---80000

80001---100000

100001---120000

120001---140000

140001---160000

160001---180000

180001---200000

200001---220000

220001---240000

240001---260000

260001---280000

280001---300000

300001---320000

320001---340000

340001---360000

360001---380000

No.	TG/DMR ID	Call Alert	Name	Call Type
1	2	None	Local	Group Call
2	31062	None	MtWest	Group Call
3	31063	None	MtWest1	Group Call
4	3185	None	Cactus	Group Call
5	31068	None	NorCal	Group Call
6	31069	None	NorCal1	Group Call
7	31066	None	SoCal	Group Call
8	31067	None	SoCal1	Group Call
9	3106	None	Calif	Group Call
10	31061	None	Calif1	Group Call
11	31328	None	SNARS	Group Call
12	31096	None	Zone6	Group Call
13	93	None	N America	Group Call
14	91	None	World	Group Call
15	310	None	Tac310	Group Call
16	314455	None	KernDMR	Group Call
17	31077	None	PapaChat	Group Call
18	4000	None	TG4000	Group Call
19	3171684	None	W6SV	Private Call
20	3107333	None	K6RET	Private Call
21	3199164	None	KG6TBQ	Private Call
22	310997	None	PARROT	Private Call
23	310675	None	Kern System DMR	Group Call
24				
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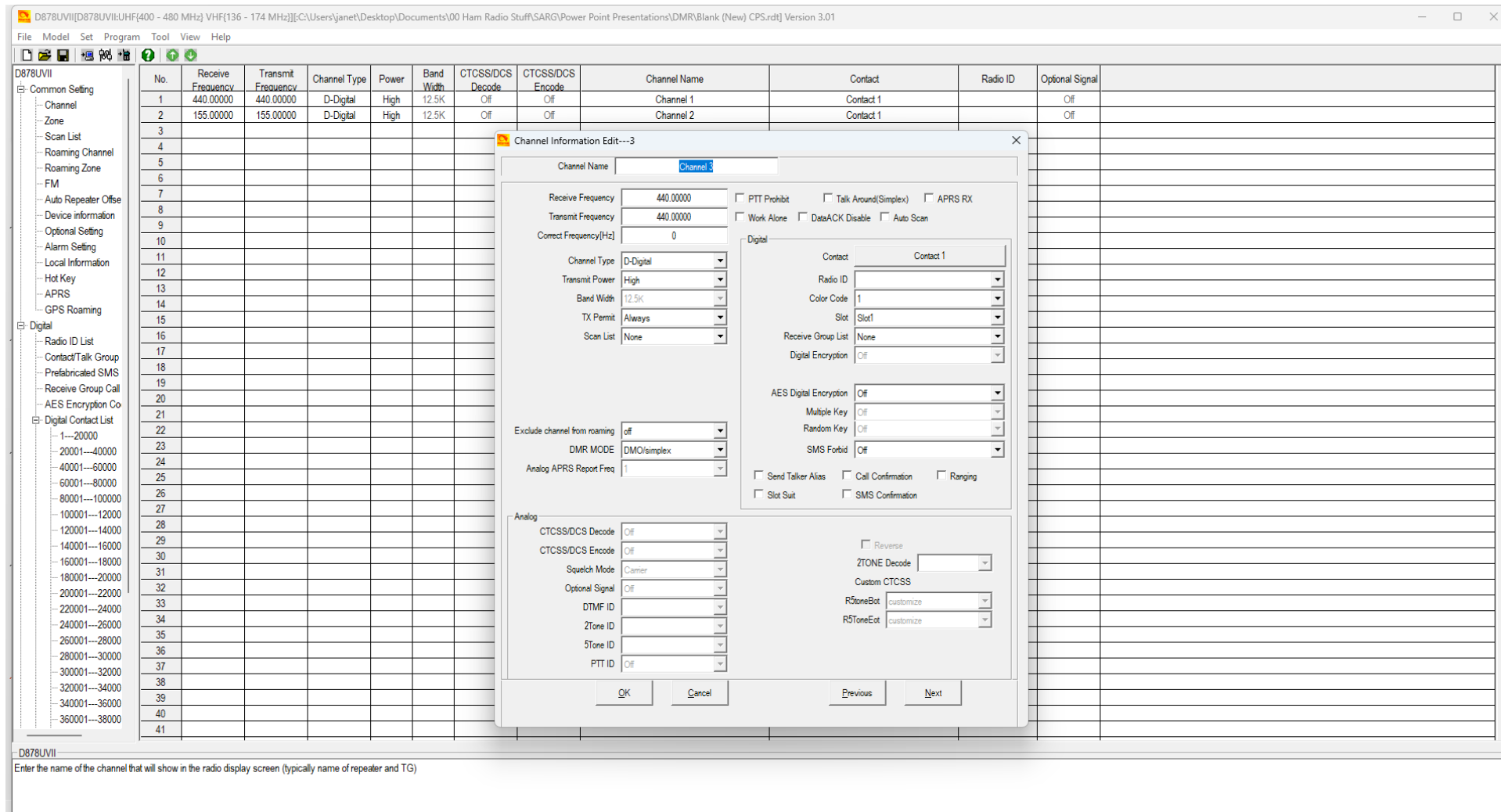
D878UVII

List Talk Group

This shows a brief message of 10000 Talk Groups

Double click to enter the editing interface

This is where we get to work entering radio channels. Double Click a blank line and the input window will pop up. Give each channel a unique name that represents what TG it is and where you want to use it.



This is the channel list for my radio, it continues beyond the first page.

D878UVII[D878UVII:UHF(Rx(400 - 480 MHz) Tx(420 - 450 MHz)) VHF(Rx(136 - 174 MHz) VHF Tx(144 - 148 MHz))][new.rdt] Version 3.01

File Model Set Program Tool View Help

D878UVII

- Common Setting
 - Channel
 - Zone
 - Scan List
 - Roaming Channel
 - Roaming Zone
 - FM
 - Auto Repeater Off
 - Device Information
 - Optional Setting
 - Alarm Setting
 - Local Information
 - Hot Key
 - APRS
 - GPS Roaming
- Digital
 - Radio ID List
 - Contact/Talk Group
 - Prefabricated SMS
 - Receive Group Call
 - AES Encryption Co
- Digital Contact List
 - 1---20000
 - 20001---40000
 - 40001---60000
 - 60001---80000
 - 80001---100000
 - 100001---120000
 - 120001---140000
 - 140001---160000
 - 160001---180000
 - 180001---200000
 - 200001---220000
 - 220001---240000
 - 240001---260000
 - 260001---280000
 - 280001---300000
 - 300001---320000
 - 320001---340000
 - 340001---360000
 - 360001---380000

No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	Optional Signal
1	145.15000	144.85000	A-Analog	High	25K	100.0	100.0	BRECKENRIDGE	Local	Mike KA6IYS	Off
2	441.95000	446.95000	A-Analog	Turbo	25K	Off	141.3	OAK FLAT	Local	Mike KA6IYS	Off
3	145.28000	144.68000	A-Analog	High	25K	Off	131.8	TABLE MTN	Local	Mike KA6IYS	Off
4	145.41000	144.81000	A-Analog	High	25K	Off	103.5	SHIRLEY 2M	Local	Mike KA6IYS	Off
5	145.45000	144.85000	A-Analog	High	25K	Off	156.7	ROCKY PT	Local	Mike KA6IYS	Off
6	146.08500	146.68500	A-Analog	High	25K	Off	141.3	146.085	Local	Mike KA6IYS	Off
7	147.00000	146.10000	A-Analog	High	25K	Off	123.0	TEHACH 2M	Local	Mike KA6IYS	Off
8	146.80500	146.20500	A-Analog	Turbo	25K	Off	156.7	RP ANALOG	Local	Mike KA6IYS	Off
9	146.52000	146.52000	A-Analog	High	25K	Off	Off	146520	Local	Mike KA6IYS	Off
10	145.53500	146.53500	A-Analog	High	25K	Off	Off	146535	Local	Mike KA6IYS	Off
11	146.55000	146.55000	A-Analog	High	25K	Off	Off	146550	Local	Mike KA6IYS	Off
12	146.56500	146.56500	A-Analog	High	25K	Off	Off	146565 CERT	Local	Mike KA6IYS	Off
13	146.44500	146.44500	A-Analog	High	25K	Off	Off	146445 ARES	Local	Mike KA6IYS	Off
14	147.42000	147.42000	A-Analog	High	25K	Off	Off	147420 RED CRS	Local	Mike KA6IYS	Off
15	144.39000	144.39000	A-Analog	High	25K	Off	Off	APRS	Local	Mike KA6IYS	Off
16	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP Local	Local	Mike KA6IYS	Off
17	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP MtWest	MtWest	Mike KA6IYS	Off
18	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP MtWest1	MtWest1	Mike KA6IYS	Off
19	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP Cactus	Cactus	Mike KA6IYS	Off
20	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP NorCal	NorCal	Mike KA6IYS	Off
21	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP NorCal1	NorCal1	Mike KA6IYS	Off
22	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP SoCal	SoCal	Mike KA6IYS	Off
23	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP SoCal1	SoCal1	Mike KA6IYS	Off
24	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP Calif	Calif	Mike KA6IYS	Off
25	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP Calif1	Calif1	Mike KA6IYS	Off
26	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP SNARS	SNARS	Mike KA6IYS	Off
27	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP Zone6	Zone6	Mike KA6IYS	Off
28	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP N America	N America	Mike KA6IYS	Off
29	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP World	World	Mike KA6IYS	Off
30	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP Tac 310	Tac310	Mike KA6IYS	Off
31	443.00000	448.00000	D-Digital	Turbo	12.5K	Off	Off	SP KernDMR	KernDMR	Mike KA6IYS	Off
32	443.00000	448.00000	D-Digital	Turbo	12.5K	Off	Off	SP KERN System	Kern System DMR	Mike KA6IYS	Off
33	440.00000	440.00000	D-Digital	High	12.5K	Off	Off	Channel 1	Local	Mike KA6IYS	Off
34	440.00000	440.00000	D-Digital	High	12.5K	Off	Off	Channel 2	Local	Mike KA6IYS	Off
35	440.00000	440.00000	D-Digital	High	12.5K	Off	Off	Channel 3	Local	Mike KA6IYS	Off
36	440.50000	440.50000	D-Digital	Low	12.5K	Off	Off	HS4000	TG4000	Mike KA6IYS	Off
37	153.78500	146.00000	A-Analog	High	25K	167.9	167.9	Kern 1 Fire	Local	Mike KA6IYS	Off
38	155.88000	146.00000	A-Analog	High	25K	167.9	167.9	Kern 2 Fire	Local	Mike KA6IYS	Off
39	155.62500	146.00000	A-Analog	High	25K	167.9	167.9	Kern 3 Fire	Local	Mike KA6IYS	Off
40	154.86000	146.00000	A-Analog	High	25K	167.9	167.9	Kern 4 Fire	Local	Mike KA6IYS	Off
41	151.10000	146.00000	A-Analog	High	25K	167.9	167.9	Kern 5 Fire	Local	Mike KA6IYS	Off

D878UVII

The AT-D868UV offers programming of 4,000 channels for UHF and VHF.
To start entering channel information Double Click on the first line No.1 to open the Channel Information programming window for that channel.
Enter the appropriate channel information for your Repeater, Simplex, Analog or Digital channel.
Advanced Sorting and Editing of all Channels can be done by using Tool-> Export / Import features to export channel information to a CSV format file. Opening the Channel CSV file with a program like Excel, changes can be made to all channels at ones, channels can be sorted and the saved CSV file can be imported back into the Customer Programming Software (CPS).

3:43 PM 8/12/2025

This is an example from my radio – SP tells me it is on the Shirley Peak DMR Repeater. KERN System tells me it is the TG KERN SYSTEM. The transmit and receive frequencies get entered on this screen along with all of the other required info to use the channel such as Color Code, Time Slot, transmit power, channel type etc. Notice the Radio ID button, on a shared radio this is where you ID the user.

Channel Information Edit---32

Channel Name: SP KERN System

Receive Frequency: 443.00000
Transmit Frequency: 448.00000
Correct Frequency[Hz]: 0

Channel Type: D-Digital
Transmit Power: Turbo
Band Width: 12.5K
TX Permit: Always
Scan List: None

Exclude channel from roaming: off
DMR MODE: DMO/simplex
Analog APRS Report Freq: 1

Digital

Contact: Kem System DMR
Radio ID: Mike KA6IYS
Color Code: 1
Slot: Slot1
Receive Group List: None
Digital Encryption: Off

AES Digital Encryption: Off
Multiple Key: Off
Random Key: Off
SMS Forbid: Off

Send Talker Alias: ☐
Call Confirmation: ☐
Ranging: ☐
Slot Suit: ☐
SMS Confirmation: ☐

Analog

CTCSS/DCS Decode: Off
CTCSS/DCS Encode: Off
Squelch Mode: Carrier
Optional Signal: Off
DTMF ID: 1
2Tone ID: 1
5Tone ID: 1
PTT ID: Off

Reverse: ☐
ZTONE Decode: 1
Custom CTCSS
R5toneBot: 1
R5toneEot: 1

OK Cancel Previous Next

This entry is for the same TG, but it is for use on my Hot Spot. Notice the change in transmit and receive frequencies and a different channel name. Most of the other data remains the same.

D878UVII[D878UVII:UHF(Rx(400 - 480 MHz) Tx(420 - 450 MHz)) VHF(Rx(136 - 174 MHz) VHF Tx(144 - 148 MHz))][new.rdt] Version 3.01

File Model Set Program Tool View Help

D878UVII

Common Setting

Channel

Zone

Scan List

Roaming Channel

Roaming Zone

FM

Auto Repeater Offset Freq

Device information

Optional Setting

Alarm Setting

Local Information

Hot Key

APRS

GPS Roaming

Digital

Radio ID List

Contact/Talk Group

Prefabricated SMS

Receive Group Call List

AES Encryption Code

Digital Contact List

1---20000

20001---40000

40001---60000

60001---80000

80001---100000

100001---120000

120001---140000

140001---160000

160001---180000

180001---200000

200001---220000

220001---240000

240001---260000

260001---280000

280001---300000

300001---320000

320001---340000

340001---360000

360001---380000

No.	Receive Frequency	Transmit Frequency	Channel Type	Power	Band Width	CTCSS/DCS Decode	CTCSS/DCS Encode	Channel Name	Contact	Radio ID	Optional Signal
24	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP Calif	Calif	Mike KA6IYS	Off
25	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP Calif1	Calif1	Mike KA6IYS	Off
26	443.00000	448.00000	D-Digital	High	12.5K	Off	Off	SP SMARS	SMARS	Mike KA6IYS	Off
27	443.00000	448.00000	D-Digital	High	12.5K	Off	Off			Mike KA6IYS	Off
28	443.00000	448.00000	D-Digital	High	12.5K	Off	Off			Mike KA6IYS	Off
29	443.00000	448.00000	D-Digital	High	12.5K	Off	Off			Mike KA6IYS	Off
30	443.00000	448.00000	D-Digital	High	12.5K	Off	Off			Mike KA6IYS	Off
31	443.00000	448.00000	D-Digital	Turbo	12.5K	Off	Off			Mike KA6IYS	Off
32	443.00000	448.00000	D-Digital	Turbo	12.5K	Off	Off			Mike KA6IYS	Off
33	440.00000	440.00000	D-Digital	High	12.5K	Off	Off			Mike KA6IYS	Off
34	440.00000	440.00000	D-Digital	High	12.5K	Off	Off			Mike KA6IYS	Off
35	440.00000	440.00000	D-Digital	High	12.5K	Off	Off			Mike KA6IYS	Off
36	440.50000	440.50000	D-Digital	Low	12.5K	Off	Off			Mike KA6IYS	Off
37	153.78500	146.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
38	155.88000	146.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
39	155.62500	146.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
40	154.86000	146.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
41	151.10000	146.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
42	460.22500	440.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
43	460.12500	440.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
44	460.10000	440.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
45	453.37500	440.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
46	453.05000	440.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
47	453.92500	440.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
48	453.72500	440.00000	A-Analog	High	25K	Off	Off			Mike KA6IYS	Off
49	443.00000	448.00000	D-Digital	Turbo	12.5K	Off	Off			Mike KA6IYS	Off
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60	440.50000	440.50000	D-Digital	High	12.5K	Off	Off				
61	440.50000	440.50000	D-Digital	High	12.5K	Off	Off				
62	440.50000	440.50000	D-Digital	High	12.5K	Off	Off				
63											
64											

Channel Information Edit---61

Channel NameHS Kem System

Receive Frequency440.50000

Transmit Frequency440.50000

Correct Frequency[Hz]0

Channel TypeD-Digital

Transmit PowerHigh

Band Width12.5K

TX PermitAlways

Scan ListNone

Exclude channel from roamingoff

DMR MODEDMO/simplex

Analog APRS Report Freq1

Analog

CTCSS/DCS DecodeOff

CTCSS/DCS EncodeOff

Squelch ModeCarrier

Optional SignalOff

DTMF ID1

ZTone ID1

STone ID1

PTT IDOff

Digital

ContactKem System DMR

Radio IDMike KA6IYS

Color Code1

SlotSlot1

Receive Group ListNone

Digital EncryptionOff

AES Digital EncryptionOff

Multiple KeyOff

Random KeyOff

SMS ForbidOff

Send Talker Alias

Call Confirmation

Ranging

Slot Suit

SMS Confirmation

Reverse

ZTONE Decode1

Custom CTCSS

RStoneBot1

RStoneEst1

OK

Cancel

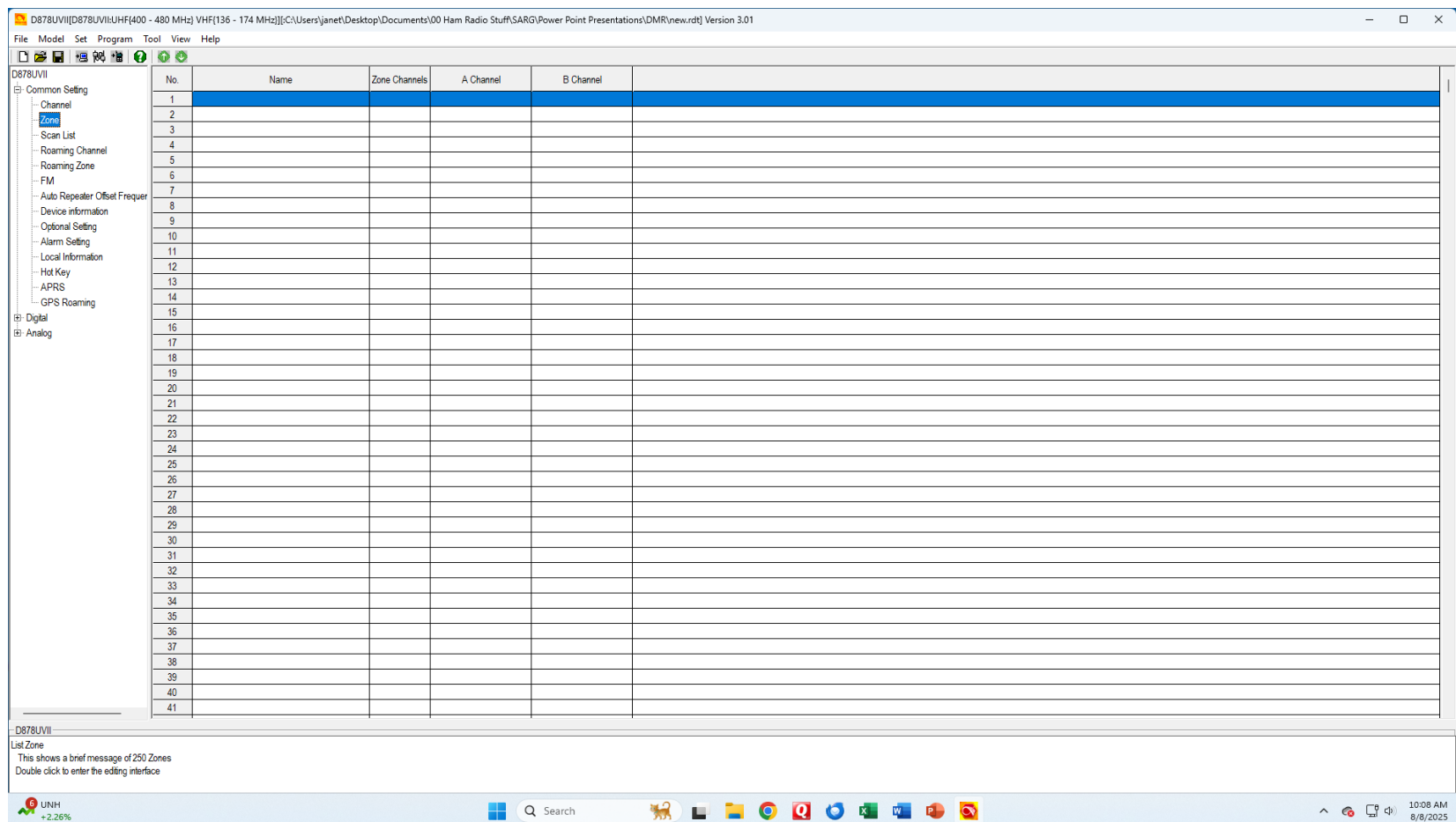
Previous

Next

D878UVII

Enter the name of the channel that will show in the radio display screen (typically name of repeater and TG)

This is the Zone input screen. Think of Zones as channel groups. I have a separate Zone for my analog channels, my Public Service Channels, my Hot Spot, Rocky Point DMR and Shirley Peak DMR. It makes it easier and quicker to find a desired channel without having to scroll through 50 plus channels. If you don't set up your Zone(s) you will not be able to use your channels.



These are my Zones. You can have more or less; it's up to you. I have a separate zone for each repeater I plan to use. I treat my Hot Spot as a repeater, even though it works on simplex.

D878UVII[D878UVII:UHF{Rx(400 - 480 MHz) Tx(420 - 450 MHz)} VHF{Rx(136 - 174 MHz) VHF Tx(144 - 148 MHz)}}[:new.rdt] Version 3.01

File Model Set Program Tool View Help

D878UVII

- Common Setting
 - Channel
 - Zone
 - Scan List
 - Roaming Channel
 - Roaming Zone
 - FM
 - Auto Repeater Offset Freq
 - Device information
 - Optional Setting
 - Alarm Setting
 - Local Information
 - Hot Key
 - APRS
 - GPS Roaming
- Digital
 - Radio ID List
 - Contact/Talk Group
 - Prefabricated SMS
 - Receive Group Call List
 - AES Encryption Code
- Digital Contact List
 - 1---20000
 - 20001---40000
 - 40001---60000
 - 60001---80000
 - 80001---100000
 - 100001---120000

No.	Name	Zone Channels	A Channel	B Channel	
1	Shirley	18	SP KernDMR	SP KernDMR	
2	Analog	13	ROCKY PT	BRECKENRIDGE	
3	Rocky Point	20	RP KernSystem	RP KernSystem	
4	Public Service	12	KCSO East Disp	KCSO East Tac	
5	Hot Spot	3	HS Kern DMR	HS Kern System	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					

This shows the Zone Edit (or Add) screen. You select from the TGs (or analog channels) on the left and move them into the column on the right to use them. Name the Zone something that is meaningful to you.

D878UVII

Common Setting

Channel

Zone

Scan List

Roaming Channel

Roaming Zone

FM

Auto Repeater Offset

Device information

Optional Setting

Alarm Setting

Local Information

Hot Key

APRS

GPS Roaming

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Radio ID List

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Receive Group Call

AES Encryption Co

Digital Contact List

1---20000

20001---40000

40001---60000

60001---80000

80001---100000

100001---120000

120001---140000

140001---160000

160001---180000

D878UVII[D878UVII:UHF(Rx(400 - 480 MHz) Tx(420 - 450 MHz)) VHF(Rx(136 - 174 MHz) VHF Tx(144 - 148 MHz))][new.rdt] Version 3.01

File Model Set Program Tool View Help

No.

Name

Zone Channels

A Channel

B Channel

1

Shirley

18

SP KernDMR

SP KernDMR

2

Analog

13

ROCKY PT

BRECKENRIDGE

3

Rocky Point

20

RP KernSystem

RP KernSystem

4

Public Service

12

KCSO East Disp

KCSO East Tac

5

Hot Spot

3

HS Kern DMR

HS Kern System

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

Zone Edit---6

Zone Name

New

A Channel

B Channel

☐ Zone Hide

Available Channel

Zone Channel Member

1 BRECKENRIDGE

2 OAK FLAT

3 TABLE MTN

4 SHIRLEY 2M

5 ROCKY PT

6 146.085

7 TEHACH 2M

8 RP ANALOG

9 146.520

10 146.535

11 146.550

12 146.565 CERT

13 146.445 ARES

14 147.420 RED CRS

15 APRS

16 SP Local

17 SP MWest

18 SP MWest1

19 SP Cactus

20 SP NorCal

21 SP NorCal1

>>

<<

Order By

ID

Name

Up

Down

This is a portion of the Radio IDs stored in my radio. When any of these people are talking their name and location will usually show up on the face of my radio. This is one of the benefits of an above entry level radio. If you don't have the name data in your radio, only the ID number will appear.

D878UVII[D878UVIHHF[Rx(400 - 480 MHz) Tx(420 - 450 MHz)] VHF[Rx(136 - 174 MHz) VHF Tx(144 - 148 MHz)]]:[new.rdt] Version 3.01

File Model Set Program Tool View Help

Device information

Optional Setting

Alarm Setting

Local Information

Hot Key

APRS

Digital

Radio ID List

Contact/Talk Group

Prefabricated SMS

Receive Group Call

AES Encryption Co

Digital Contact List

1---20000

20001---40000

40001---60000

60001---80000

80001---100000

100001---12000

120001---14000

140001---16000

160001---18000

180001---20000

200001---22000

220001---24000

240001---26000

260001---28000

280001---30000

300001---32000

No.	TG/DMR ID	Call Alert	Name	City	Call Type	Callsign	State/Prov	Country	Remarks
145044	3128930	None	Cynthia	Almacen	Private Call	KN4LVN	Opelika	Alabama	United States
145045	3128931	None	Robert	Lehman	Private Call	K7RKL	Lake Havasu City	Arizona	United States
145046	3128932	None	Lynne	Dixon	Private Call	KJ7CUD	Kirkland	Washington	United States
145047	3128933	None	Dennis	Albrecht	Private Call	N4DMA	Alexandria	Virginia	United States
145048	3128934	None	Michael	Higgins	Private Call	KA6IYS	Weldon	California	United States
145049	3128935	None	Alfred J	Degeyter Jr	Private Call	KF5THS	Parks	Louisiana	United States
145050	3128936	None	Gary B	Bosworth Jr	Private Call	KC8ZZS	Marietta	Ohio	United States
145051	3128937	None	Shawn A	Schmidt	Private Call	K9EVP	Roxana	Illinois	United States
145052	3128938	None	Paul	Easter	Private Call	WW5PA	HOUSTON	Texas	United States
145053	3128939	None	Steven R	Bleistein	Private Call	KB8IRQ	Euclid	Ohio	United States
145054	3128940	None	Fred	De Roos	Private Call	WA0GMH	Yankton	South Dakota	United States
145055	3128941	None	Walter W	Nichols	Private Call	KE5ILE	Steelville	Missouri	United States
145056	3128942	None	Oscar A	Cabrera	Private Call	N3GVB	Clinton	New York	United States
145057	3128943	None	John J	Isella	Private Call	K1KSC	Tallahassee	Florida	United States
145058	3128944	None	Timothy	Clay	Private Call	KC8THC	Bath	Michigan	United States
145059	3128945	None	Paul D	Pate	Private Call	WA8OOM	Crystal Falls	Michigan	United States
145060	3128946	None	Daniel J	Lemke	Private Call	KG6TYQ	Redding	California	United States
145061	3128947	None	Eric	Dobrowansky	Private Call	K2CB	Manahawkin	New Jersey	United States
145062	3128948	None	Bryan	Ramsey	Private Call	KD5GGC	Argyle	Texas	United States
145063	3128949	None	Mike	Duffert	Private Call	KE0PTE	Fort Collins	Colorado	United States
145064	3128950	None	Chuck	Henrici	Private Call	N9TZO	Elgin	Illinois	United States
145065	3128951	None	Michael	Rafati	Private Call	KM6MHT	Salida	California	United States
145066	3128952	None	John K	Stevenson	Private Call	KJ7BSG	Tempe	Arizona	United States
145067	3128953	None	Robert	Racicot	Private Call	KM6IEQ	Phelan	California	United States
145068	3128954	None	Shwan-Paul	O Dell	Private Call	KM6OHT	Sebastopol	California	United States
145069	3128955	None	Steven	Gutierrez	Private Call	K5DXF	Miami	Florida	United States
145070	3128956	None	Jennifer N	Ryall	Private Call	KK4STE	Lexington	Kentucky	United States
145071	3128957	None	Elot R	Bradshaw	Private Call	KE0TQM	Saint Louis	Missouri	United States
145072	3128958	None	Deanne R	Sorens	Private Call	KD9HLX	Aurora	Illinois	United States

Don't forget to save your work. Name the file in such a manner that you will know when you did it so if you have to go back in time to fix an error, or the program in your radio crashes. It's a computer, it will crash! You don't want to have to start over from scratch. I usually include the date and some reference to the change I made.

"20250913 SARG Pgm.rdt" would be a good example for me to use today. The filename extension may not be "rdt" for your particular software.

This takes care of your radio, next we will discuss programming a Mini 2.4 Color LCD **ZUM**spot.



The Mini 2.4 Color LCD **ZUM**spot comes ready to configure to your desired frequency (UHF) and callsign. The WPSD software and the operating system for the Raspberry Pi Zero W2 are preprogrammed on the SD card provided.

The radio modem in the ZUMspot is very low power, 10 milliwatts, and uses a rubber duck antenna. I have had no problems with using it anywhere in my house or nearby in the yard outside. It runs on 5V provided by a 3A USB Power cube that has a power switch in the cable. They advise against using less than 3A power cubes.

It does not come with any instructions. You can find a user manual for the software at:
<https://manual.wpsd.radio/>

Your first challenge is to get logged into the ZUMspot. When you plug it in and boot it up it will go into Access Point Mode after a few minutes when it can't find and connect to a wi-fi router. Look for the "WPSD Setup" wi-fi on your available networks in your computer wi-fi settings. Select that network and log in. Log in will be "Pi-star" (no quotes) and password will be (all lower case) raspberry. (Notice the "p" in raspberry). Once logged in you will be taken to the configuration section of the Dashboard.

Fill out the General Configuration Section and then go to the Wireless Configuration section (near the bottom of the configuration section).

Google Calendar - Schedule sta x Latest Earthquakes x Personal Weather Station Dashi x KA6IYS - Dashboard - Configur x The WPSD User Manual — The x +

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📦 Google Calendar - S... Latest Earthquakes Personal Weather St... ISABELLA DAM (ISB) AltaOne Federal Cre... Kern Catalog Zimbra Web Client... Log In < Sequoia A... Adobe Acrobat Home

Hostname: zumspot | Current Profile: Initial_Setup WPSD Dashboard Ver. # fe53ffae76

WPSD Dashboard - Configuration

Dashboard Admin Power Advanced WPSD Update Backup/Restore Factory Reset

General Configuration

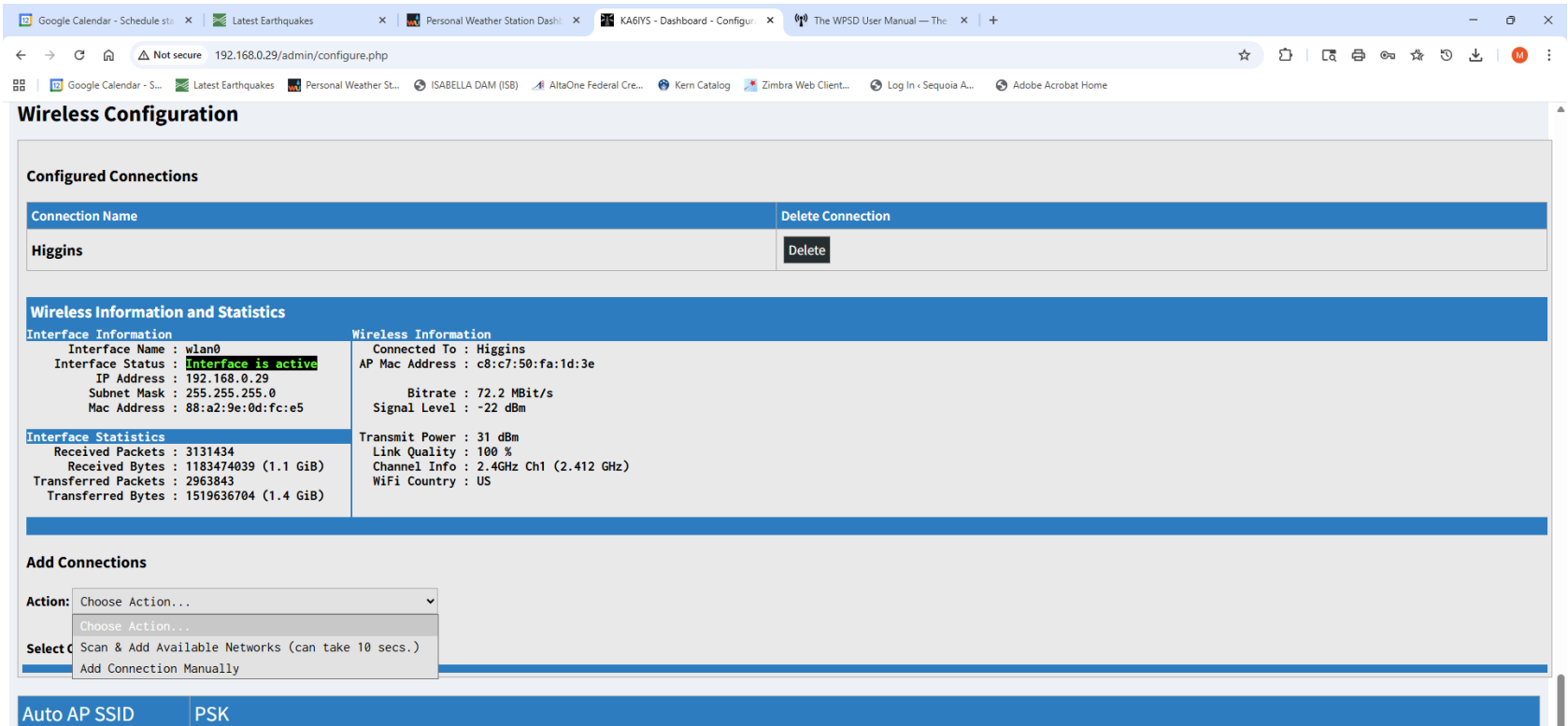
Hostname:	zumspot	⚠ Do not add suffixes such as ".local", etc. Note: A reboot is required for this change to take effect.
Node Callsign:	KA6IYS	⚠ Do not add suffixes such as "-G"
DMR/CCS7 ID:	3128934	ℹ Required for DMR Mode & DMR Cross-Modes (If you don't have one, get a DMR ID from RadioID.Net)
NXDN ID:		ℹ Required for NXDN Mode & NXDN Cross-Modes (If you don't have one, get an NXDN ID from RadioID.Net)
Radio Mode:	☒ Simplex ☐ Duplex	ℹ Duplex mode requires Dual-Hat/Duplex Modems
Radio Frequency:	440.500.000 MHz	
Radio/Modem Type:	ZUMspot - Single Band Raspberry Pi Hat (GPIO)	
Modem Port:	/dev/ttyAMA0	ℹ Typically there is no need to manually change/set this; for advanced settings/usage.
Modem Baud Rate:	115200	
System Time Zone:	America/Los_Ange...	Dashboard Time Format: ☐ 24 Hour ☒ 12 Hour
Dashboard Language:	english_us	

Node Location & Info Settings

Latitude:	35.651570	degrees (positive value for North, negative for South)
Longitude:	-118.2644	degrees (positive value for East, negative for West)
ℹ Hint: You can use this tool to try and calculate your location coordinates.		
Show This Node on the WPSD User Map:	☒ Hide ☐ Display	Display Your WPSD Node on the WPSD User Map . ℹ Notes: You must input your latitude and longitude coordinates above to ensure map accuracy. The WPSD User Map is <i>not</i> APRS -- it's just a fun map for users to share that they use WPSD and what their location is.

Go to the Add Connection area and select the Action: Scan & Add Available Networks. Select the Wi-Fi network you want to connect to and enter the required credentials to connect to it. When you are prompted to reboot, click the box and let the ZUMspot reboot.

When you are back at the Dashboard select the WPSD Update button on the top line. Let the program update. If you skip this step, you will have problems later on. **They don't tell you this in the manual**, I found out the hard way with my ZUMspot and my Repeater Controller.



Now complete each section of the Configuration Section.

Google Calendar - Schedule sta...Latest EarthquakesPersonal Weather Station Dashl...KA6IYS - Dashboard - Configur...The WPSD User Manual — The...+

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📱📅 Google Calendar - S...🌐 Latest Earthquakes🏠 Personal Weather St...🌐 ISABELLA DAM (ISB)🌐 AltaOne Federal Cre...🌐 Kern Catalog🌐 Zimbra Web Client...🌐 Log In - Sequoia A...🌐 Adobe Acrobat Home

Dashboard Language:english_us▼

Node Location & Info Settings

Latitude:	35.651570	degrees (positive value for North, negative for South)
Longitude:	-118.2644	degrees (positive value for East, negative for West)
💡 Hint: You can use this tool to try and calculate your location coordinates.		
Show This Node on the WPSD User Map:	☒ Hide ☐ Display Display Your WPSD Node on the WPSD User Map . 💡 Notes: You must input your latitude and longitude coordinates above to ensure map accuracy. The WPSD User Map is <i>not</i> APRS -- it's just a fun map for users to share that they use WPSD and what their location is.	
Town:	Weldon, DM05up	
Country:	USA	
URL:	http://www.qrz.com/db/ka6iys ☐ Auto ☒ Manual 💡 Auto vs. Manual: Auto simply creates a URL to your QRZ.com callsign page. Manual allows you to specify your own custom URL/site.	
APRS Gateway:	☐ APRS Host Pool: rotate.aprs2.net ▼ Publish APRS Data for Mode(s): ☐ DMR ☐ YSF ☐ DGLd ☐ NXDN ☐ ircDDB (D-Star) (Note: Radio/MMDVM Mode must be enabled to select APRS mode publishing.) Select APRS Symbol: WPSD Default ▼ Preview:	
💡 APRSGateway will use the location information (Lat./Lon.) you have entered above. However, If you have a GPS device connected and have enabled GPSd (below), it will use the GPS device location informaion.		
GPSd:	☐ 💡 Enabling this option, allows an externally-connected GPS device to send your location information to APRS, vs. the location information (Lat./Lon.) you have entered above. This functionality requires that you also enable APRS Gateway (above).	

Radio/MMDVMHost Modem Configuration

Main Radio Modes

D-Star Mode:	☐	RF Hangtime: 20	Net Hangtime: 20
DMR Mode:	☐	RF Hangtime: 20	Net Hangtime: 20

functionality requires that you also enable AT IS Gateway (above).

Radio/MMDVMHost Modem Configuration

Main Radio Modes

D-Star Mode:	☐	RF Hangtime: 20	Net Hangtime: 20
YSF Mode:	☐	RF Hangtime: 20	Net Hangtime: 20
DMR Mode:	☒	RF Hangtime: 20	Net Hangtime: 20 Primary DMR Network: Brandmeister
P25 Mode:	☐	RF Hangtime: 20	Net Hangtime: 20
NXDN Mode:	☐	RF Hangtime: 20	Net Hangtime: 20
POCSAG Mode:	☐	POCSAG Mode Hangtime: 5	

Radio Cross-Modes

YSF2DMR:	☐	Note: YSF Mode must be enabled & applied first.
YSF2NXDN:	☐	Note: YSF Mode must be enabled & applied first.
YSF2P25:	☐	Note: YSF Mode must be enabled & applied first.
DMR2YSF:	☐	ⓘ Uses "7" talkgroup prefix in DMR. Note: Cannot be enabled in conjunction with DMR2NXDN.
DMR2NXDN:	☐	ⓘ Uses "7" talkgroup prefix in DMR. Note: Cannot be enabled in conjunction with DMR2YSF.

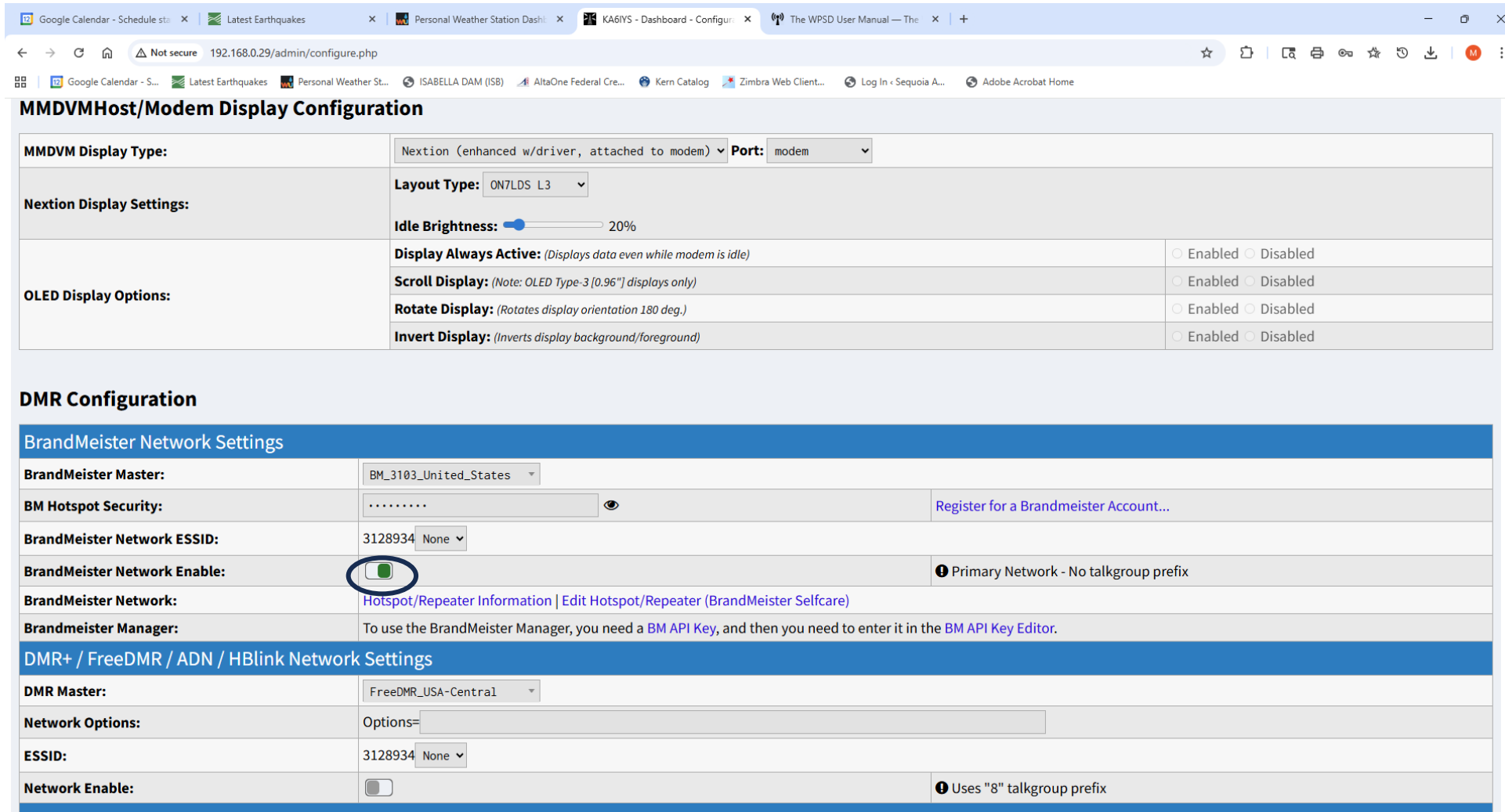
Other MMDVM Modem Options

CW ID:	☐	Interval: 10 Minutes ⓘ Enabling CW ID will periodically have the modem TX your callsign via CW for identification.
--------	--------------------------	---

MMDVMHost/Modem Display Configuration

MMDVM Display Type:	Nextion (enhanced w/driver, attached to modem)	Port: modem
Layout Type:	ON7IDS 1.3	

The MMDVMHost/Modem Display Configuration shouldn't need any changes. The DMR Configuration Section should be completed. If you need a Bransmeister account you can click the link to set one up. You will need to set a password at Brandmeister and enter it both places. Make sure the Brandmeister Network ESSID is your DMR ID and "NONE". Make sure Brandmeister Network Enable is "ON".



The screenshot shows a web browser window with the URL `192.168.0.29/admin/configure.php`. The page is titled "MMDVMHost/Modem Display Configuration" and "DMR Configuration".

MMDVMHost/Modem Display Configuration

MMDVM Display Type:	Nextion (enhanced w/driver, attached to modem) Port: modem
Nextion Display Settings:	Layout Type: ON7LDS L3 Idle Brightness: 20%
OLED Display Options:	Display Always Active: (Displays data even while modem is idle) ☐ Enabled ☐ Disabled Scroll Display: (Note: OLED Type-3 [0.96"] displays only) ☐ Enabled ☐ Disabled Rotate Display: (Rotates display orientation 180 deg.) ☐ Enabled ☐ Disabled Invert Display: (Inverts display background/foreground) ☐ Enabled ☐ Disabled

DMR Configuration

BrandMeister Network Settings

BrandMeister Master:	BM_3103_United_States
BM Hotspot Security:	 Register for a Brandmeister Account...
BrandMeister Network ESSID:	3128934 None
BrandMeister Network Enable:	☒ Primary Network - No talkgroup prefix
BrandMeister Network:	Hotspot/Repeater Information Edit Hotspot/Repeater (BrandMeister Selfcare)
Brandmeister Manager:	To use the BrandMeister Manager, you need a BM API Key , and then you need to enter it in the BM API Key Editor .

DMR+ / FreeDMR / ADN / HBlind Network Settings

DMR Master:	FreeDMR_USA-Central
Network Options:	Options=
ESSID:	3128934 None
Network Enable:	☐ Uses "8" talkgroup prefix

You can skip the other mode types (unless you want to use them, then you are on your own). Node Access Control will usually be Private. If you are using more than one DMR ID, select Semi-Public and list the other IDs in the access list. I did not have to change Firewall Configuration or AccessPoint Mode.

Google Calendar - Schedule sta...Latest EarthquakesPersonal Weather Station Dash...KA6IYS - Dashboard - Configur...The WPSD User Manual — The...+192.168.0.29/admin/configure.php

Google Calendar - S...Latest EarthquakesPersonal Weather St...ISABELLA DAM (ISB)AltaOne Federal Cre...Kern CatalogZimbra Web Client...Log In - Sequoia A...Adobe Acrobat Home

DMR DumpTADData:

Node Access Control

⚠ Caution: This section is for advanced multi-user hotspot or repeater usage only!

Node Type:

☒ Private

☐ Semi-Public

Access List:

7654321

ⓘ Note: Semi-Public mode cannot be enabled without entering at least one allowed DMR/CCS7 ID in the access list below and applying the changes FIRST.

ⓘ Enter one, or a comma-separated list of DMR/CCS7 IDs which are allowed access to this hotspot/repeater (required for public functionality). For fully-public/fully-open access without adding each ID, ignore these settings and [see the FAQs](#).

Firewall Configuration

UPnP:

☒ Enabled

☐ Disabled

ⓘ Note: The following options cannot be made Public until UPnP is Enabled.

Dashboard Access:

☒ Private

☐ Public

ircDDBGateway Remote:

☒ Private

☐ Public

SSH Access:

☒ Private

☐ Public

AccessPoint Mode

Auto AP:

☒ On

☐ Off

ⓘ Note: Reboot Required if changed

Wireless Configuration

Configured Connections

Connection Name	Delete Connection
Higgins	Delete

You should now be ready to go! Make sure any changes have been saved and then click on the Power Button at the top and select REBOOT.



The module to the left is what turns an analog FM repeater into a DMR repeater. It connects to the internet and does all of the analog to digital conversion. That's a whole different challenge.



"That's all Folks!"