DMR Radio

Presented by

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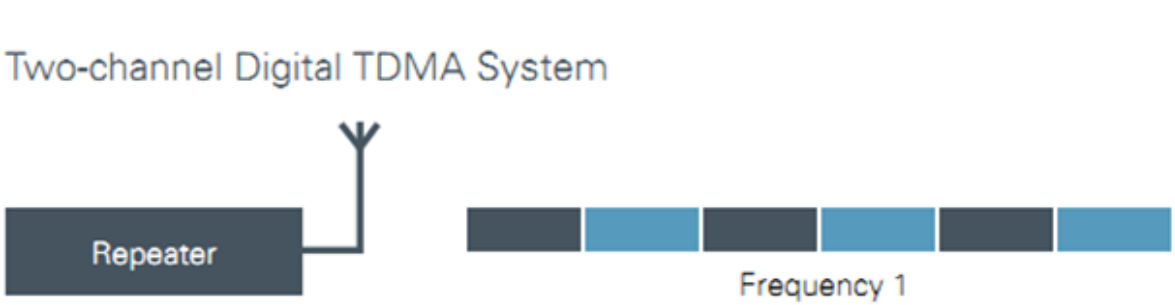
KD0PNQ

DMR definition

DMR is an open Digital Mobile Radio standard defined by the European Telecommunications Standard Institute (ETSI)…2-slot standard and uses Time Division Multiple Access (TDMA) to effectively accommodate two simultaneous users in a single 12.5 kHz channel.



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DMR Details

- 12.5 kHz Bandwidth Channels
- 2 Time Slots 6.25 kHz (called TS1 and TS2)
  TS1 27.5ms frame + 2.5ms gap = 30ms
  TS2 27.5ms frame + 2.5ms gap = 30ms
  Therefore during transmit time:
    Subscriber radios TX 27.5ms out of 60ms (46%)
    Repeaters TX a continuous data stream (100%)
- 1 Repeater supports 2 conversations simultaneously

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Talk Groups (TG)

- **Talk Group's (TG)** are a way groups can share a **Time Slot (TS)** without distracting and disrupting other users of the second TS.
- Only one Talk Group can use a Time Slot at a time.
- If your radio is not programmed to listen to a Talk Group, you will not hear that Talk Group's traffic.
- WorldWide TG will key up all repeaters world wide!
  - US TG will key up all US repeaters
  - Local TG will key up local repeaters only
  - TAC TG will key up only those TG's used

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Talk Group Details

Time Slot 1	Time Slot 2
TG1: WW (World Wide)	TG2: Local 2
TG3: NAm (North America)	TG9: Local 9
TG13: WWE (WW English)	TG3127: MN State
TG1127: MNDMR (new!)	TG3169: MidWest
Etc.	

- All at the same repeater frequency!
- Push-to-talk to activate some the TG on a frequency
- Websites offer list of all TG's available

http://mndmr.net/resources-2/talkgroups/

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DMR Talk Groups

PTT (On Demand)

Always On

	Name	Timeslot 1	Timeslot 2
Worldwide	Worldwide	1	
	WW German	10	
	WW English	13	
	WW Spanish	14	
	WW Nordic	17	
Regional / Statewide	North America	3	
	Minnesota Statewide		3127
	Midwest Regional		3169
	Northeast Regional		3172
	MidAtlantic Regional		3173

Source: http://mndmr.net/resources-2/talkgroups/

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Different Talk Groups

Regional Talk Groups			
Number	**Name**	**Number**	**Name**
31090	Callsign Area 0	31095	Callsign Area 5
31091	Callsign Area 1	31096	Callsign Area 6
31092	Callsign Area 2	31097	Callsign Area 7
31093	Callsign Area 3	31098	Callsign Area 8
31094	Callsign Area 4	31099	Callsign Area 9

Talk Groups on Time Slot 2		
Number	**Name**	**Description**
2 or 9	Local	Local Talk Group as Determined by Repeater Admin
8900*	Local	Local Talk Group for Las Vegas Area Repeaters
31XX**	Statewide	Statewide Talk Group Based on Repeater Location

Language Based Talk Groups		
Number	**Name**	**Description**
910	German	Worldwide German
911	French	Worldwide French
913	English	Worldwide English
914	Spanish	Worldwide Spanish

Statewide Talk Groups			
Number	**Name**	**Number**	**Name**
3101	Alabama	3130	Montana
3102	Alaska	3131	Nebraska
3104	Arizona	3132	Nevada
3105	Arkansas	3133	New Hampshire

Other Talk Groups		
Number	**Name**	**Description**
31268	SNARS	Sierra Nevada Amateur Radio Society
31261	Mi5 Statewide 1	Central Michigan Emergency Network
31262	Mi5 Statewide 2	Central Michigan Emergency Network
31089	Hytera USA	Legacy DMRPlus Repeaters

Country Based Talk Groups			
Number	**Name**	**Number**	**Name**
714	Panama	3026	Canada
334	Mexico	208	France
214	Spain	204	Netherlands
505	Australia	262	Germany

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MN DMR Repeaters

Airport

Callsign: N0BVE
Frequency: 444.92500
Offset: +5.000
ColorCode: 11

Centervill

Callsign: K0GOI
Frequency: 443.67500
Offset: +5.000
ColorCode: 11

White Bear

Callsign: N0NKI
Frequency: 443.95000
Offset: +5.000
ColorCode: 1

Litchfield

Callsign: KC0CAP
Frequency: 443.80000
Offset: +5.000
ColorCode: 3

Mpls

Callsign: N0BVE
Frequency: 442.65000
Offset: +5.000
ColorCode: 2

St. Paul

Callsign: N0YNT
Frequency: 442.02500
Offset: +5.000
ColorCode: 1

Oakdale

Callsign: N0YNT
Frequency: 442.02500
Offset: +5.000
ColorCode: 1

UofM

Callsign: NH7CY
Frequency: 442.42500
Offset: +5.000
ColorCode: 1

St Cloud, Medina, Buck Hill, Faribault, Rochester, moved to new C-bridge January 2017!

Source: http://mndmr.net/repeaters-2/repeaters/

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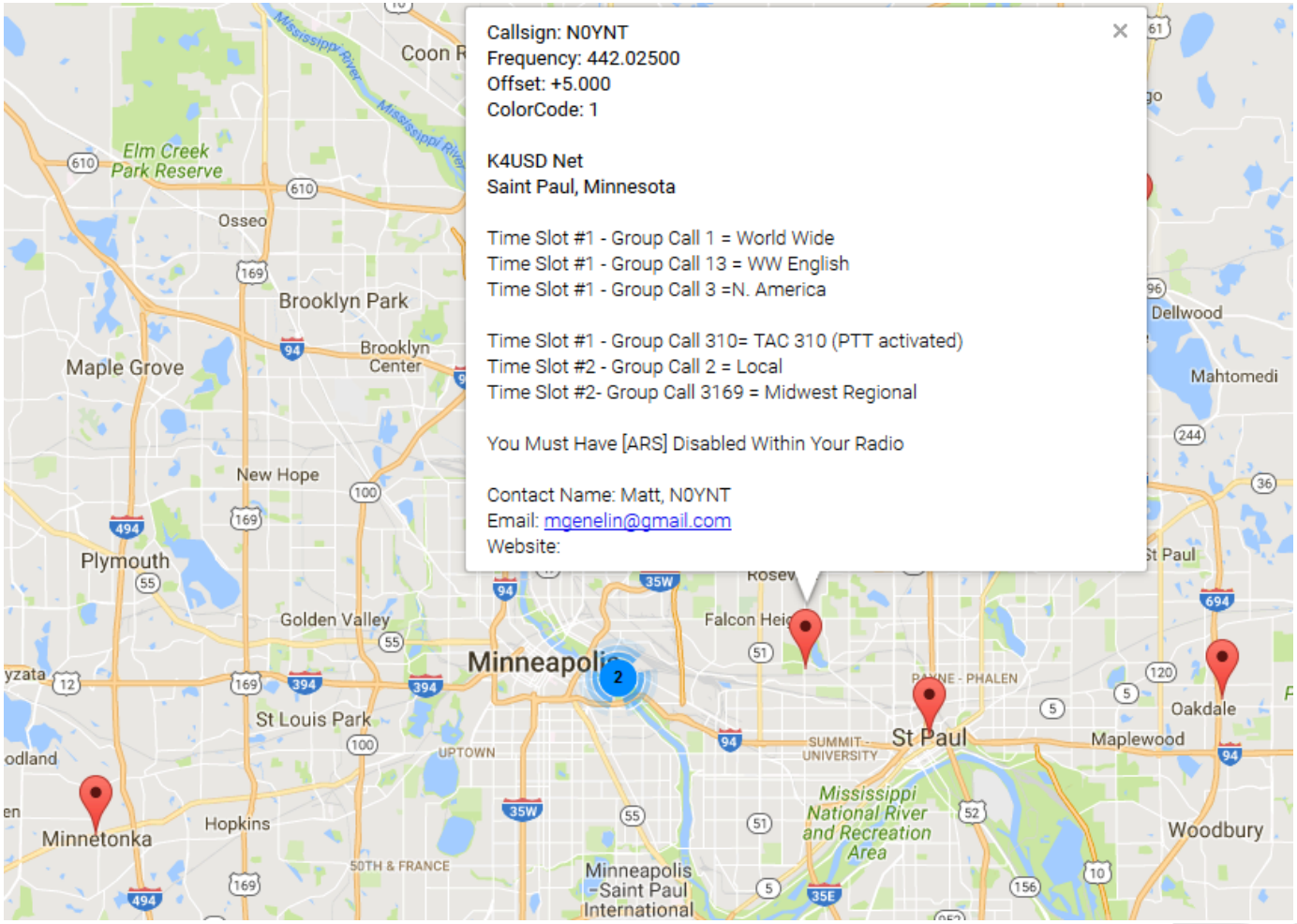
DMR Repeater Map



https://dmr-marc.net/MAP/fullscreen.html

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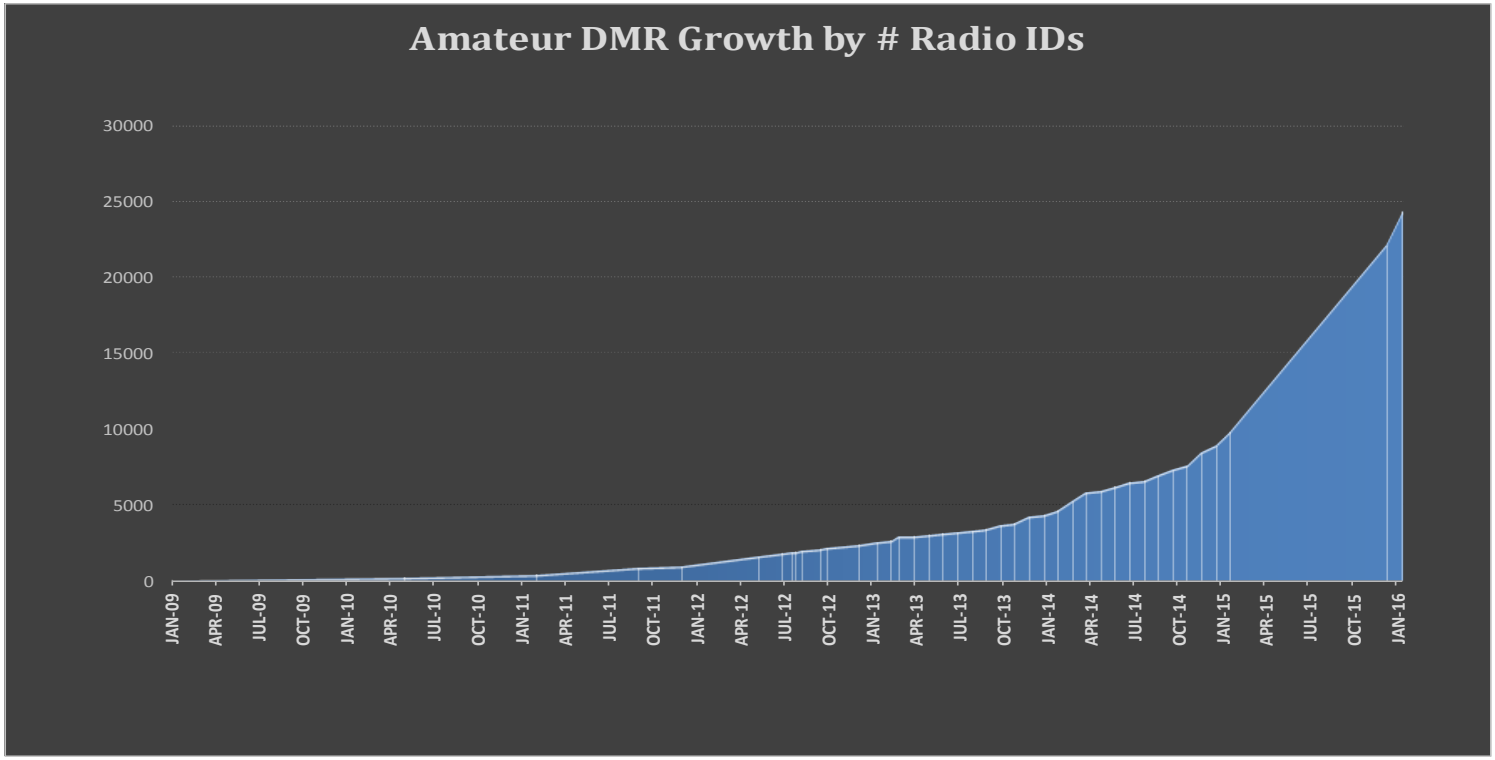
30,000+ DMR Users by now



DMR Repeater Network

- ~ 95% UHF (440 MHz) and US east coast VHF
- ~ 47 Countries
- ~ 2,000 Repeaters
- ~ 30,000+ Radio IDs and growing rapidly

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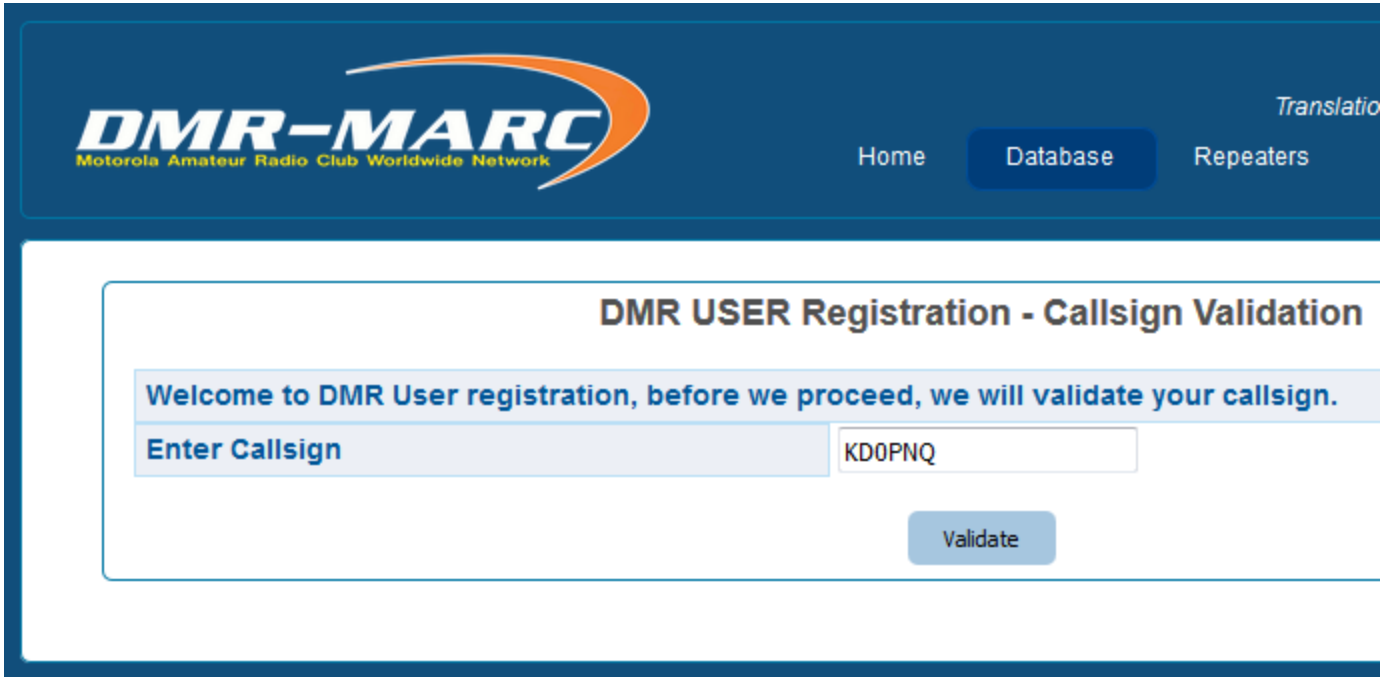
DMR-MARK.net



Sign up and in a few days you will have your digital radio ID

KD0PNQ ID's: 3127055 and 3127155

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DMR More Definitions

- Code Plug
  Radio's software configuration file
- Color Codes (CC0-CC15) *Not Optional!*
  Functions like CTCSS tones for Analog repeaters
- Grouping of channels
  1. Analog Simplex and Repeaters
  2. Minnesota DMR Repeaters
  3. DMR Simplex – 4 frequencies at 44X.xxx MHz
     Program as TG99/CC1/TS1

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User Info

Many brands of DMR radios available – walki-talkie and mobile
Upload a CodePlug into the radio
available from MNDMR.NET or MINNESOTADMR.COM
Parameters containing these values:
ADD your Radio ID (DMR-MARC assigned)
Automatic Registration Service (ARS) = *Disabled*
Repeater Channels:
Admit Criteria = *Color Code Free* (polite mode)
In Call Criteria = *Follow Admit Criteria*
Simplex Channels:
Admit Criteria = *Always* (impolite mode)
In Call Criteria = *Always*
Radio is now ready to be on the air

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Oakdale

Callsign: N0YNT
Frequency: 442.02500
Offset: +5.000
ColorCode: 1

DMR Code Plug #1

OAK - Oakdale (443.425+ CC1)

Channel Number	Channel Name	Description	TG Number(s)
1	oak.MNTR.TS1	Monitor TimeSlot 1 (Receive-Only)	1, 3, 8, 13, 99, 1127, 3777215
2	oak.MNTR.TS2	Monitor TimeSlot 2 (Receive-Only)	2, 9, 310, 311, 3127, 3155, 3169
3	oak.LOCAL9	Local Repeater Only (TS2)	9
4	oak.LOCAL2	Local Networked Repeaters	2
5	oak.MNDMR*	All MNDMR Repeaters (TS1)	1127
6	oak.MN.State^	All Minnesota Repeaters	3127
7	oak.Midwest	All Midwest Repeaters	3169
8	oak. NA.Call	All NA Repeater Calling Channel	3
9	oak.TAC310^	Tactical Repeater to Repeater (TS2)	310
10	oak.TAC311^	Tactical Repeater to Repeater (TS2)	311
11	oak.COMM1^	Tactical Repeater to Repeater (TS1)	3777215
12	oak.WW.Call^	Worldwide Repeaters Calling Channel	1
13	oak.WW.Eng^	Worldwide English Speaking Repeaters Calling Channel	13
14	oak.WI State^	All Wisconsin Repeaters	3155
15	oak.Parrot^	Audio Echo Test	9998
16	oak.DMRPLX	DMR Simplex (446.075 MHz, CC1,TS1, TG: National Simplex)	99
17	oak.UofM 4.425	KA0KMJ University of MN (444.425+ MHz, CTCSS: 114.8, TSQ)	
18	oak.LOCAL8	Local Networked Repeater (TS1)	8

	Standard 16 Channel Zone
	Additional Channels Beyond Standard 16 Channel Zone (for radios that support this)

Key
^ = PTT (Push To Talk, User Access)
** = PTT Override NA (3 min T/O)*
CC = Color Code
TG = Talk Group
TS = Time Slot

https://drive.google.com/drive/folders/0BzUdsOWq7f9acHBUeG5FR0RZTlU

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DMR Code Plug #2

MED – Medina, N0AGI
443.200+ CC11

Channel		Description	Time Slot	Mode	Talk Group	
Number	Name				Name	Number
1	Local med	Local Repeater Only	2	Full Time	Local 9	9
2	Zone med	MRC Local Zone Repeaters Only	2	Full Time	Local 2	2
3	MNDMR med	MNDMR Repeaters	1	Full Time	MNDMR	1127
4	Midwest med	Midwest Repeaters	2	Full Time	Midwest	3169
5	NA Call med	North America Calling	1	PTT	NA Call	3
6	WW Call med	Worldwide Calling	1	PTT	WW Call	1
7	WW Eng med	Worldwide English Calling	1	PTT	WWE Call	13
8	TAC 1 med	Tactical Repeater to Repeater	1	PTT	TAC 1	8951
9	TAC 310 med	Tactical Repeater to Repeater	2	PTT	TAC 310	310
10	TAC 311 med	Tactical Repeater to Repeater	1	PTT	TAC 311	311
11	TAC 312 med	Tactical Repeater to Repeater	2	PTT	TAC 312	312
12	EmComm 1 med	Emergency Communication	1	PTT	EmComm 1	8901
13	EmComm 2 med	Emergency Communication	2	PTT	EmComm 2	8902
14	Event 1 med	Special Event	1	PTT	Event 1	8911
15	Event 2 med	Special Event	2	PTT	Event 2	8912
16	Parrot med	Audio Echo Test	2	PTT	Parrot	9998

http://mndmr.net/talkgroups/

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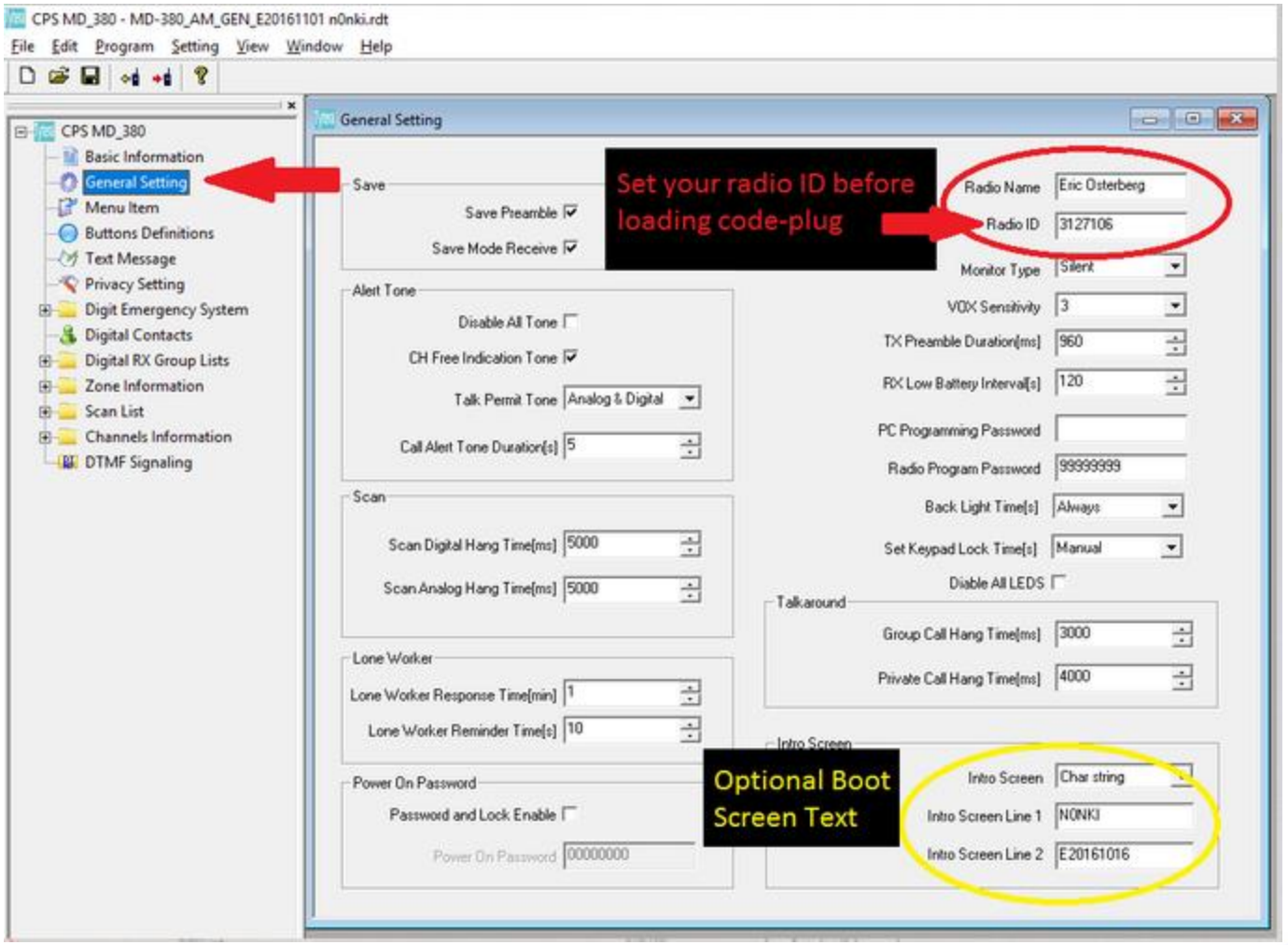
Radio “Code Plug” programming



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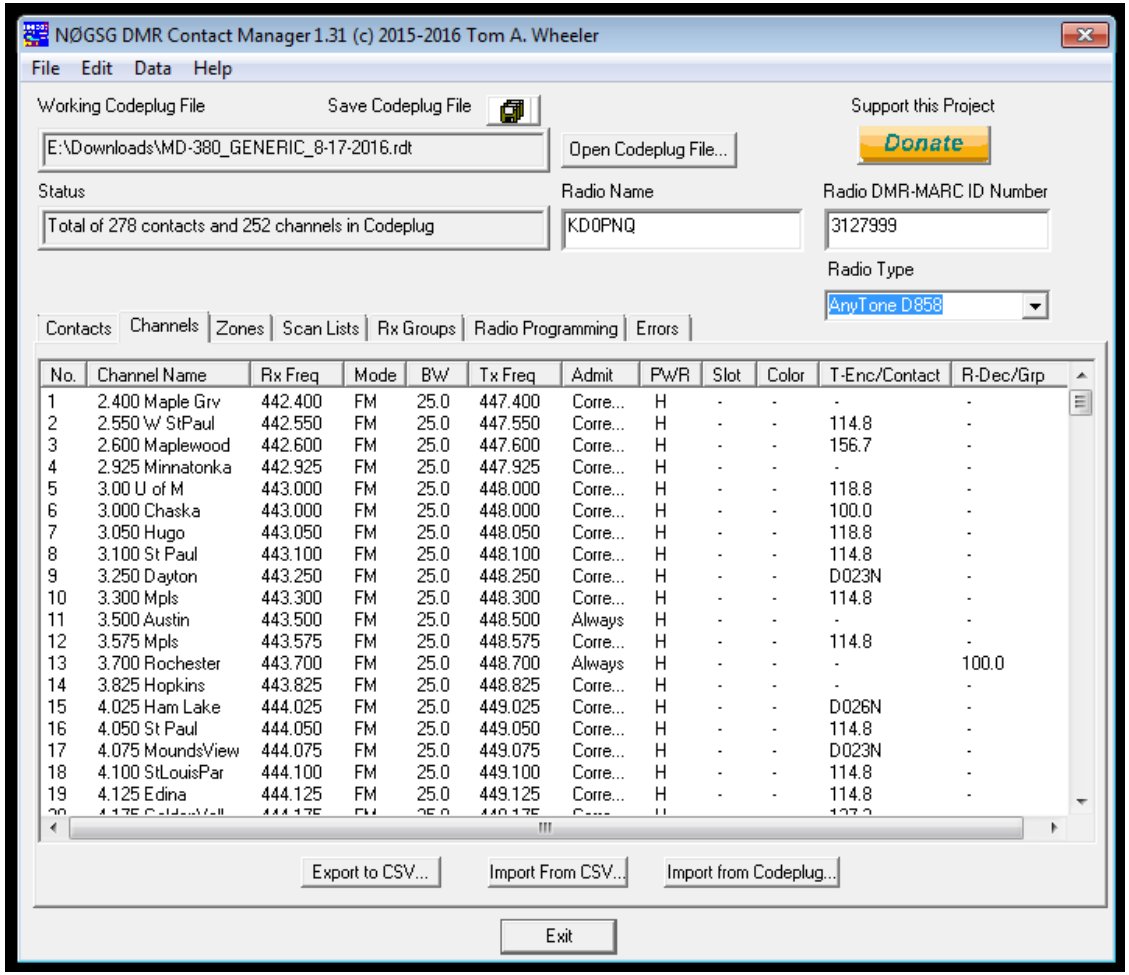
Contact Manager s/w

N0GSG (Tom) has prepared a Contact Manager for DMR radios



- CSI radios
- Tytera radios
- AnyTone radios

- Converts
- Imports
- Exports
- Edit

http://n0gsg.no-ip.org/contact-manager/

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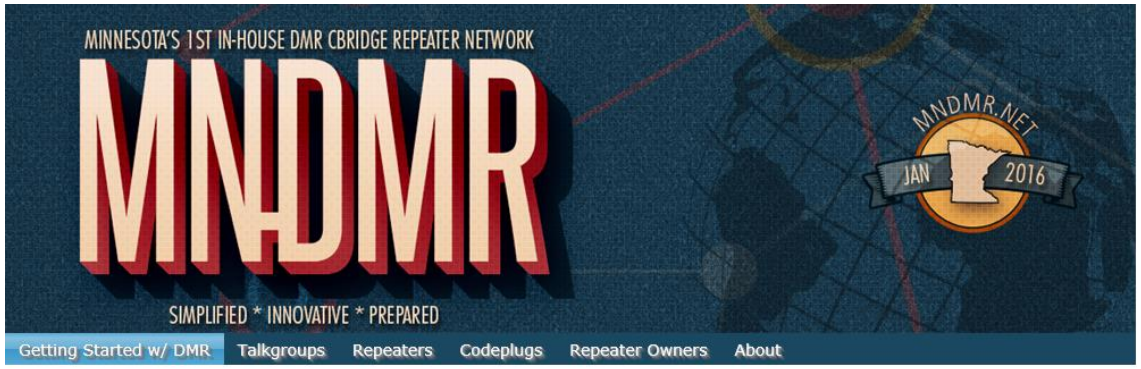
MN DMR Website



Getting Started w/ DMR

Welcome to the MNDMR CBridge and Repeater Network System

http://mndmr.net/

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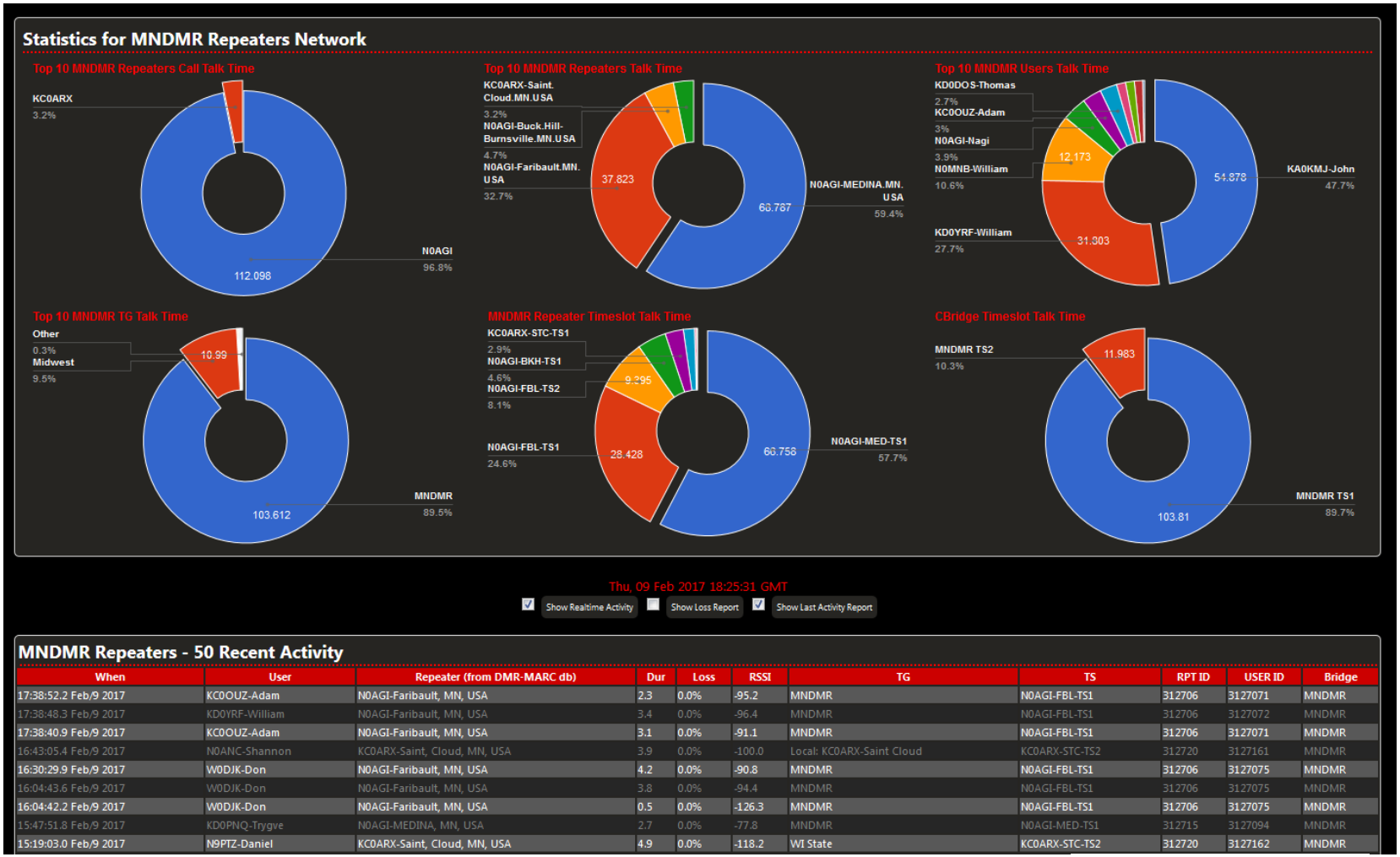
MNDMR website Dash Board/Net Watch



MNDMR Repeaters - 50 Recent Activity

When	User	Repeater (from DMR-MARC db)	Dur	Loss	RSSI	TG	TS	RPT ID	USER ID	Bridge
17:38:52.2 Feb/9 2017	KC0OUZ-Adam	N0AGI-Faribault, MN, USA	2.3	0.0%	-95.2	MNDMR	N0AGI-FBL-TS1	312706	3127071	MNDMR
17:38:48.3 Feb/9 2017	KD0YRF-William	N0AGI-Faribault, MN, USA	3.4	0.0%	-96.4	MNDMR	N0AGI-FBL-TS1	312706	3127072	MNDMR
17:38:40.9 Feb/9 2017	KC0OUZ-Adam	N0AGI-Faribault, MN, USA	3.1	0.0%	-91.1	MNDMR	N0AGI-FBL-TS1	312706	3127071	MNDMR
16:43:05.4 Feb/9 2017	N0ANC-Shannon	KC0ARX-Saint, Cloud, MN, USA	3.9	0.0%	-100.0	Local: KC0ARX-Saint Cloud	KC0ARX-STC-TS2	312720	3127161	MNDMR
16:30:29.9 Feb/9 2017	W0DJK-Don	N0AGI-Faribault, MN, USA	4.2	0.0%	-90.8	MNDMR	N0AGI-FBL-TS1	312706	3127075	MNDMR
16:04:43.6 Feb/9 2017	W0DJK-Don	N0AGI-Faribault, MN, USA	3.8	0.0%	-94.4	MNDMR	N0AGI-FBL-TS1	312706	3127075	MNDMR
16:04:42.2 Feb/9 2017	W0DJK-Don	N0AGI-Faribault, MN, USA	0.5	0.0%	-126.3	MNDMR	N0AGI-FBL-TS1	312706	3127075	MNDMR
15:47:51.8 Feb/9 2017	KD0PNQ-Trygve	N0AGI-MEDINA, MN, USA	2.7	0.0%	-77.8	MNDMR	N0AGI-MED-TS1	312715	3127094	MNDMR
15:19:03.0 Feb/9 2017	N9PTZ-Daniel	KC0ARX-Saint, Cloud, MN, USA	4.9	0.0%	-118.2	WI State	KC0ARX-STC-TS2	312720	3127162	MNDMR

dash.mndmr.net

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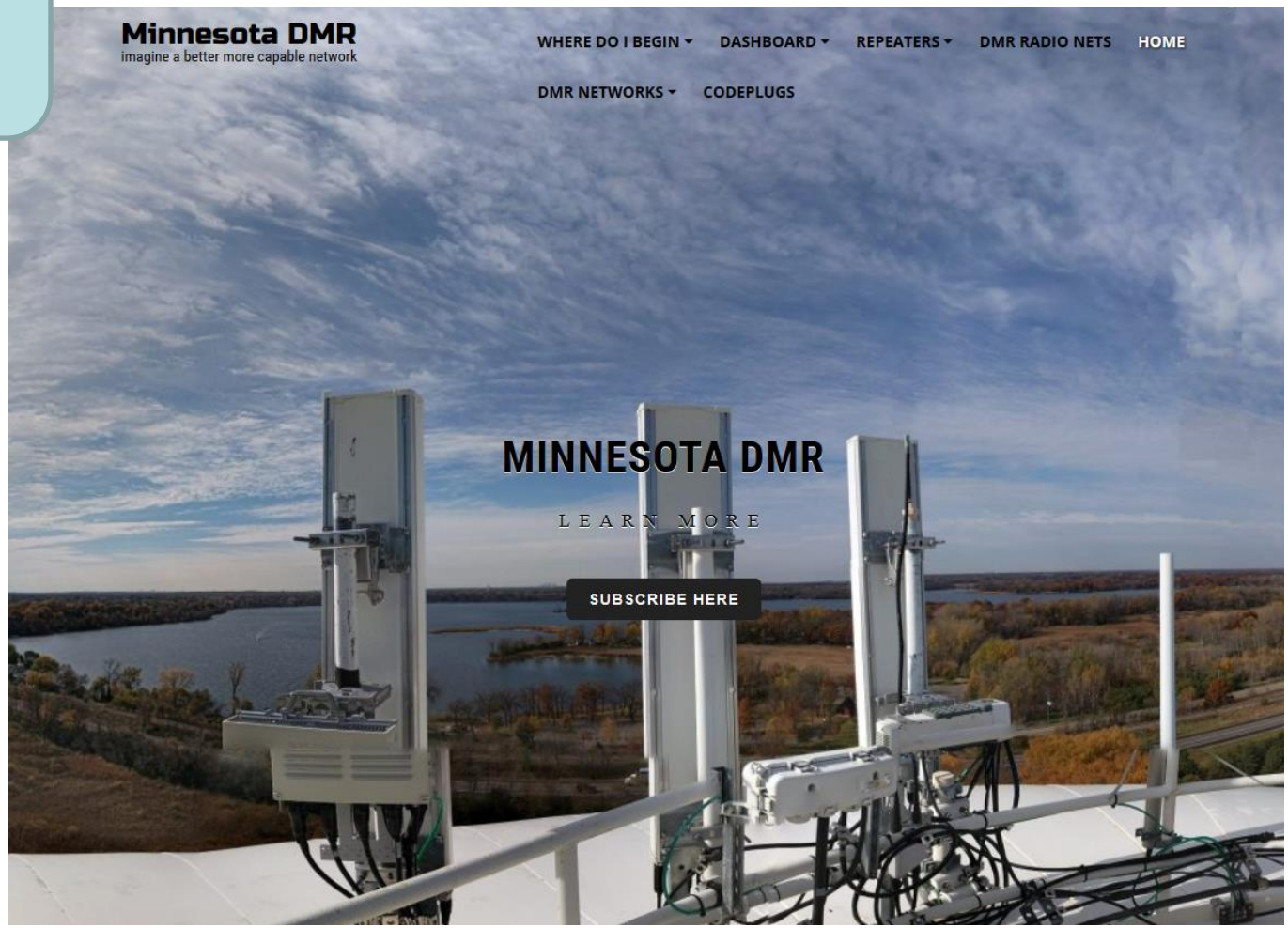
St. Paul

Callsign: N0YNT
Frequency: 442.02500
Offset: +5.000
ColorCode: 1

Minnesota DMR Website



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St. Paul

Callsign: N0YNT
Frequency: 442.02500
Offset: +5.000
ColorCode: 1

DMR Net Watch

Rayfield Communications

Control Center K4USD Network

16:35:50 August 21, 2016 UTC

start time	duration	source peer alias	source radio alias	Bridge Group	RSSI (dBm)	Site name	Loss rate
16:35:20.236 Aug 21	29.4	Brandmeister	WB3EHB - Clint - Vineland New Jersey USA -- 3134022	PAstate CC BM	0.000	BM-US-3102	0.0%
16:35:25.673 Aug 21	24.0	W4DFU - Gainesville Florida USA -- 311259	KK4LWR - Andrew - Gainesville Florida USA -- 3112746	FLstate 48-96	-80.6	K4USD Network	0.0%

start time	duration	source peer alias	source radio alias	Bridge Group	RSSI (dBm)	Site name	Loss rate
16:35:47.316 Aug 21	0.9	N0BVE - Minnetonka Minnesota USA -- 312711	KD0PNQ - Trygve - Minneapolis Minnesota USA -- 3127094	MNstate 16-32-2	-110.4	K4USD-2 Network	0.0%
16:35:08.054 Aug 21	16.4	KK4ECR - Orange Park Florida USA -- 311266	WJ0WE - Joseph - Green Cove Springs Florida USA -- 1112166	FLstate 19-38-2	-102.8	K4USD-2 Network	11.6%
16:35:20.041 Aug 21	4.5	N2VUG - Hopatcong New Jersey USA -- 313406	WA2LNC - Anthony - Mount Arlington New Jersey USA -- 3134212	Tri-State CC	-91.2	NJ-TRBO	7.7%
16:34:57.920 Aug 21	22.0	Brandmeister	WB3EHB - Clint - Vineland New Jersey USA -- 3134022	PAstate CC BM	0.000	BM-US-3102	0.0%
16:35:02.743 Aug 21	5.6	KB2RF - Howell New Jersey USA -- 313408	N2HHH - Howard - Freehold New Jersey USA -- 3134182	Tri-State CC	-92.7	NJ-TRBO	0.0%
16:35:01.694 Aug 21	1.1	KK4ECR - Orange Park Florida USA -- 311266	WJ0WE - Joseph - Green Cove Springs Florida USA -- 1112166	FLstate 19-38-2	-84.2	K4USD-2 Network	11.4%
16:34:59.354 Aug 21	2.2	KK4ECR - Orange Park Florida USA -- 311266	WJ0WE - Joseph - Green Cove Springs Florida USA -- 1112166	FLstate 19-38-2	-108.8	K4USD-2 Network	22.0%
16:34:59.417 Aug 21	1.0	KB2RF - Howell New Jersey USA -- 313408	N2HHH - Howard - Freehold New Jersey USA -- 3134182	Tri-State CC	-91.3	NJ-TRBO	0.0%
16:34:37.913 Aug 21	18.6	W4DFU - Gainesville Florida USA -- 311259	KK4LWR - Andrew - Gainesville Florida USA -- 3112746	FLstate 48-96	-89.4	K4USD Network	0.0%
16:34:49.301 Aug 21	4.8	N2VUG - Roxbury New Jersey USA -- 313414	WA2LNC - Anthony - Mount Arlington New Jersey USA -- 3134212	Tri-State CC	-77.5	NJ-TRBO	2.5%

http://cbridge.k4usd.org:42420/MinimalNetwatch

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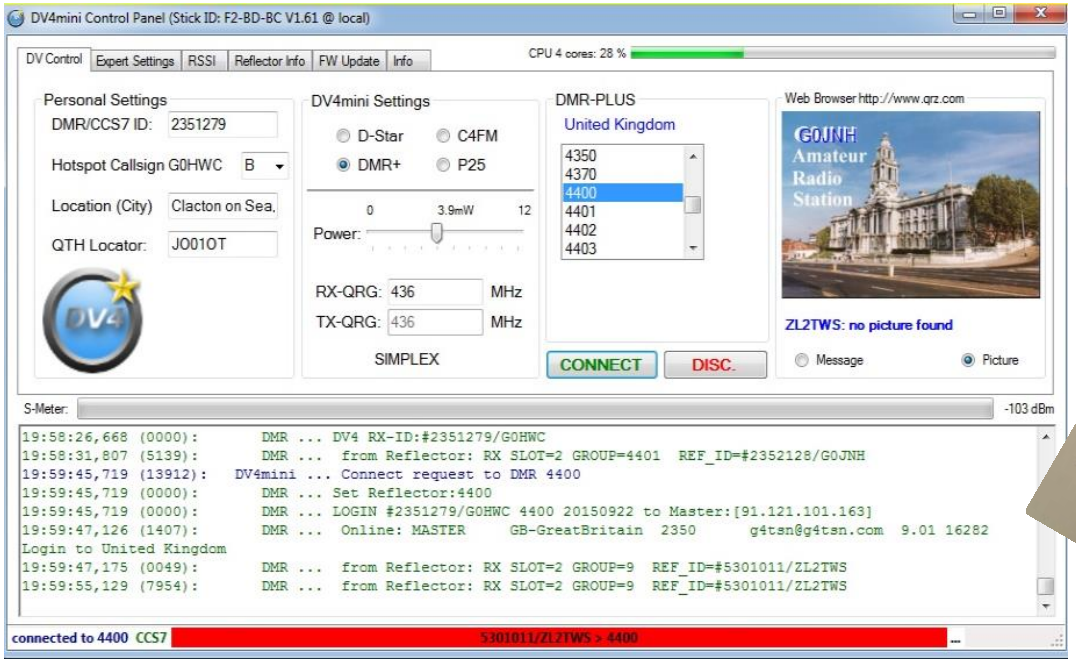
DMR mini repeater

- There are a few mini-repeaters available for the DMR network
- Works like a WiFi local DMR repeater for your radio to communicate with the world
- DV4mini one example



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DMR Events and Nets

DMR-MARC Worldwide Net

Saturday's @ 1700 (1600 DST) UTC
Worldwide Talkgroup (TG 1)

MN = Saturday's at 11:00 AM

15
7:00p The MNDMR Enthusiasts Net

25
7:30a MN DMR Breakfast Gathering

MNDMR net every week Wednesday
MN State Talk Group 3127

Fat Nat's Eggs 2700 39th Ave. NE St. Anthony Village, Minnesota 55421 every second Saturday – see MNDMR.net

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Hennepin County Sheriff Department Volunteering!

- We are looking for Radio amateurs interested in volunteering
- 16 hours per month and lots of fun opportunities
- See handout
- Please consider!
- I am having fun!

Questions?

Questions?

- Is the DMR radio for me?
- Is the coverage around Stillwater good?
- VHF or UHF?
- What is the cost?
- …..

I am here to answer any questions you have

Trygve KD0PNQ

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