

DMR Radio

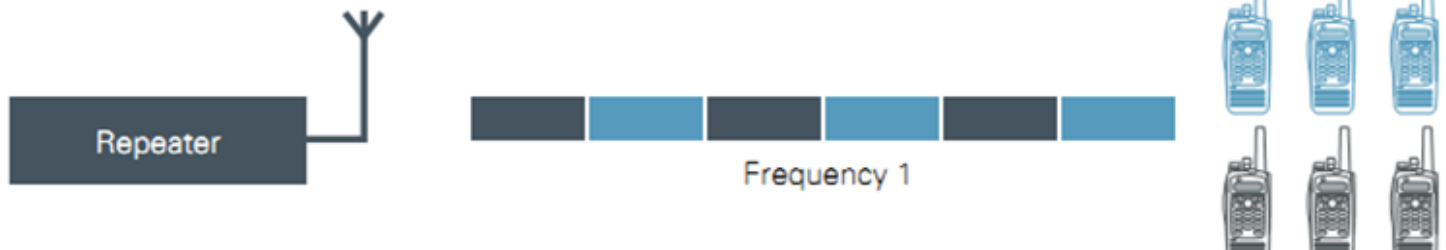
Presented by
Trygve Svärd
KD0PNQ



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.

Two-channel Digital TDMA System



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 = 30msTherefore 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

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

Talk Group Details

Time Slot 1

TG1: WW (World Wide)

TG3: NAm (North America)

TG13: WWE (WW English)

TG1127: MNDMR (new!)

Etc.

Time Slot 2

TG2: Local 2

TG9: Local 9

TG3127: MN State

TG3169: MidWest

- 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/>



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/>



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	Hvtera USA	Legacv 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

MN DMR Repeaters

Airport

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



Centerville

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/>

DMR Repeater Map

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

K4USD Net
Saint Paul, Minnesota

Time Slot #1 - Group Call 1 = World Wide
Time Slot #1 - Group Call 13 = WW English
Time Slot #1 - Group Call 3 = N. America

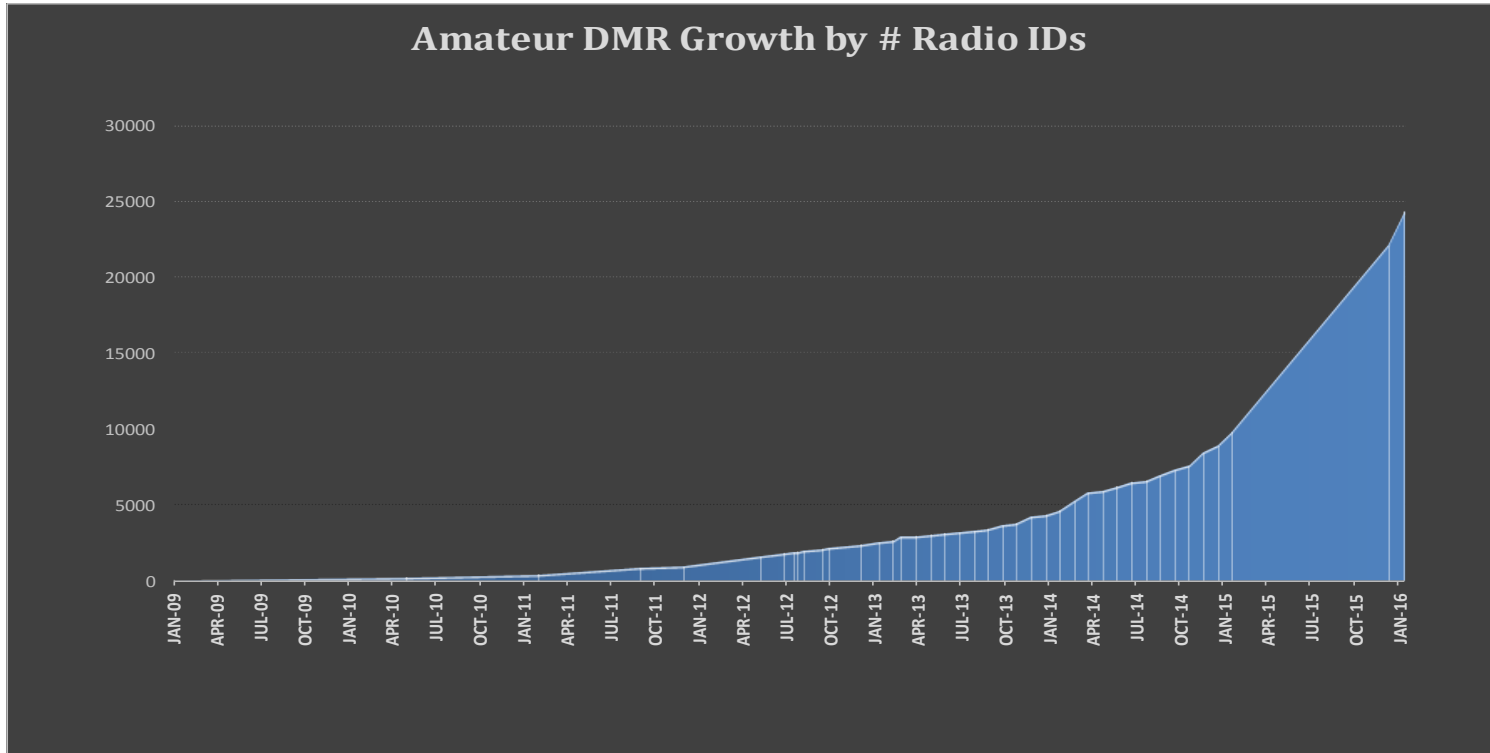
Time Slot #1 - Group Call 310 = TAC 310 (PTT activated)
Time Slot #2 - Group Call 2 = Local
Time Slot #2 - Group Call 3169 = Midwest Regional

You Must Have [ARS] Disabled Within Your Radio

Contact Name: Matt, NOYNT
Email: mgenelin@gmail.com
Website:

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

30,000+ DMR Users by now

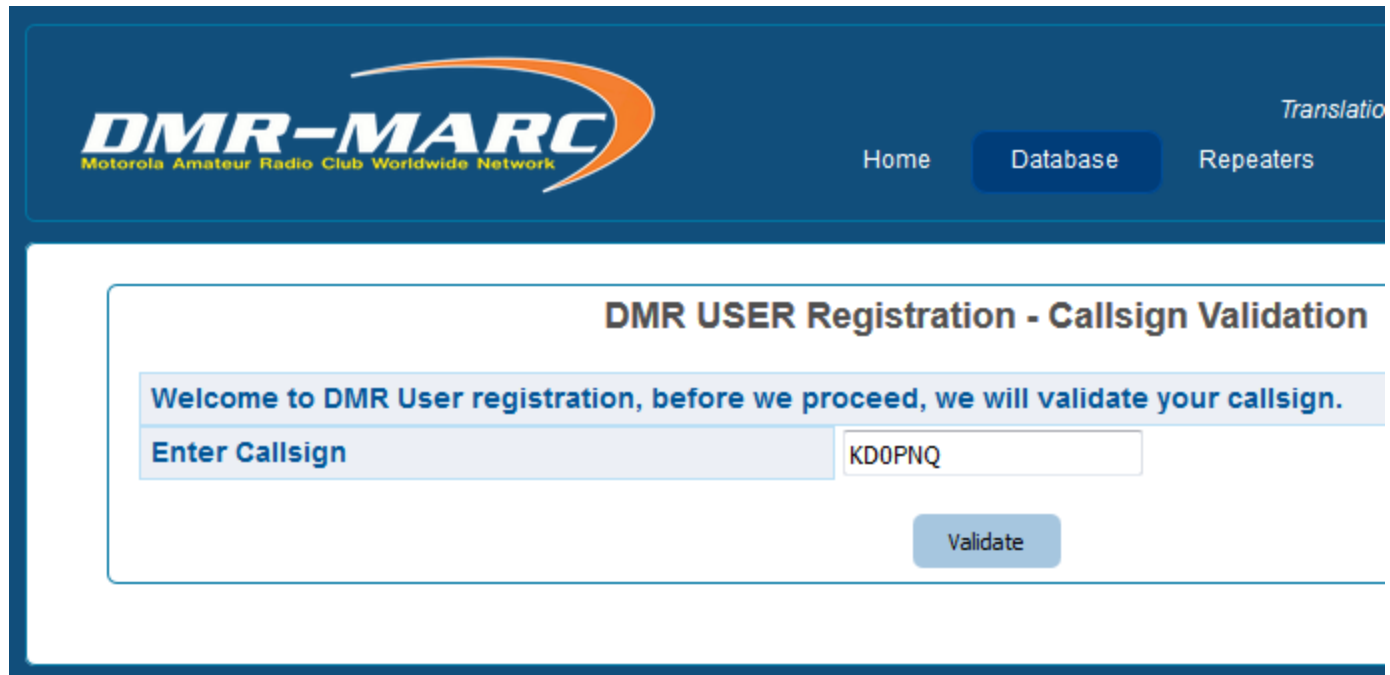


DMR Repeater Network

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



DMR-MARK.net



The screenshot shows the DMR-MARC website interface. At the top left is the logo for DMR-MARC, which includes the text "Motorola Amateur Radio Club Worldwide Network". To the right of the logo are navigation links: "Home", "Database" (highlighted with a dark blue background), and "Repeaters". Further right, the word "Translation" is partially visible. Below the navigation bar is a white box with a blue border containing the title "DMR USER Registration - Callsign Validation". Inside this box, there is a blue header bar with the text "Welcome to DMR User registration, before we proceed, we will validate your callsign." Below this is a form with a label "Enter Callsign" and a text input field containing "KD0PNQ". A "Validate" button is positioned below the input field.

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

KD0PNQ ID's: 3127055 and 3127155



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**

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



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.MNDRM*	All MNDRM 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/0BzUdsOWq7f9acHBUEG5FR0RZTIU>





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/>



Radio "Code Plug" programming

The screenshot displays the CPS MD_380 software interface. The main window is titled "General Setting" and contains various configuration options. A red arrow points to the "General Setting" menu item in the left-hand tree view. A black callout box with red text says "Set your radio ID before loading code-plug" with a red arrow pointing to the "Radio ID" field, which is circled in red. The "Radio ID" field contains the value "3127106". Another yellow callout box with black text says "Optional Boot Screen Text" with a yellow circle around the "Intro Screen" dropdown menu and the "Intro Screen Line 1" and "Intro Screen Line 2" text boxes. The "Intro Screen" dropdown is set to "Char string", "Intro Screen Line 1" is "NONKI", and "Intro Screen Line 2" is "E20161016".

CPS MD_380 - MD-380_AM_GEN_E20161101 n0nki.rdt
File Edit Program Setting View Window Help

CPS MD_380

- Basic Information
- General Setting**
- Menu Item
- Buttons Definitions
- Text Message
- Privacy Setting
- Digit Emergency System
- Digital Contacts
- Digital RX Group Lists
- Zone Information
- Scan List
- Channels Information
- DTMF Signaling

General Setting

Save

Save Preamble

Save Mode Receive

Alert Tone

Disable All Tone

CH Free Indication Tone

Talk Permit Tone Analog & Digital

Call Alert Tone Duration(s) 5

Scan

Scan Digital Hang Time(ms) 5000

Scan Analog Hang Time(ms) 5000

Lone Worker

Lone Worker Response Time(min) 1

Lone Worker Reminder Time(s) 10

Power On Password

Password and Lock Enable

Power On Password 00000000

Radio Name Eric Osterberg

Radio ID 3127106

Monitor Type Silent

VOX Sensitivity 3

TX Preamble Duration(ms) 960

RX Low Battery Interval(s) 120

PC Programming Password

Radio Program Password 99999999

Back Light Time(s) Always

Set Keypad Lock Time(s) Manual

Disable All LEDs

Talk-around

Group Call Hang Time(ms) 3000

Private Call Hang Time(ms) 4000

Intro Screen

Intro Screen Char string

Intro Screen Line 1 NONKI

Intro Screen Line 2 E20161016

Contact Manager s/w

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

N0GSG DMR Contact Manager 1.31 (c) 2015-2016 Tom A. Wheeler

File Edit Data Help

Working Codeplug File Save Codeplug File

E:\Downloads\MD-380_GENERIC_8-17-2016.rdt Open Codeplug File... Donate

Support this Project

Status Radio Name Radio DMR-MARC ID Number

Total of 278 contacts and 252 channels in Codeplug KDOPNQ 3127999

Radio Type

AnyTone D858

No.	Channel Name	Rx Freq	Mode	BW	Tx Freq	Admit	PWR	Slot	Color	T-Enc/Contact	R-Dec/Grp
1	2.400 Maple Grv	442.400	FM	25.0	447.400	Corre...	H	-	-	-	-
2	2.550 W StPaul	442.550	FM	25.0	447.550	Corre...	H	-	-	114.8	-
3	2.600 Maplewood	442.600	FM	25.0	447.600	Corre...	H	-	-	156.7	-
4	2.925 Minnetonka	442.925	FM	25.0	447.925	Corre...	H	-	-	-	-
5	3.00 U of M	443.000	FM	25.0	448.000	Corre...	H	-	-	118.8	-
6	3.000 Chaska	443.000	FM	25.0	448.000	Corre...	H	-	-	100.0	-
7	3.050 Hugo	443.050	FM	25.0	448.050	Corre...	H	-	-	118.8	-
8	3.100 St Paul	443.100	FM	25.0	448.100	Corre...	H	-	-	114.8	-
9	3.250 Dayton	443.250	FM	25.0	448.250	Corre...	H	-	-	D023N	-
10	3.300 Mpls	443.300	FM	25.0	448.300	Corre...	H	-	-	114.8	-
11	3.500 Austin	443.500	FM	25.0	448.500	Always	H	-	-	-	-
12	3.575 Mpls	443.575	FM	25.0	448.575	Corre...	H	-	-	114.8	-
13	3.700 Rochester	443.700	FM	25.0	448.700	Always	H	-	-	-	100.0
14	3.825 Hopkins	443.825	FM	25.0	448.825	Corre...	H	-	-	-	-
15	4.025 Ham Lake	444.025	FM	25.0	449.025	Corre...	H	-	-	D026N	-
16	4.050 St Paul	444.050	FM	25.0	449.050	Corre...	H	-	-	114.8	-
17	4.075 MoundsView	444.075	FM	25.0	449.075	Corre...	H	-	-	D023N	-
18	4.100 StLouisPar	444.100	FM	25.0	449.100	Corre...	H	-	-	114.8	-
19	4.125 Edina	444.125	FM	25.0	449.125	Corre...	H	-	-	114.8	-
20	4.175 Cedarvale	444.175	FM	25.0	449.175	Corre...	H	-	-	114.8	-

Export to CSV... Import From CSV... Import from Codeplug... Exit

- CSI radios
- Tytera radios
- AnyTone radios

- Converts
- Imports
- Exports
- Edit



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



MN DMR Website



[Getting Started w/ DMR](#)

Welcome to the MNDMR CBridge and Repeater Network System



<http://mndmr.net/>

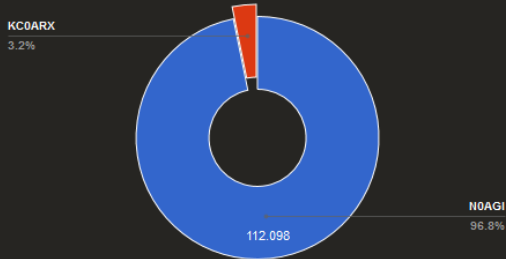




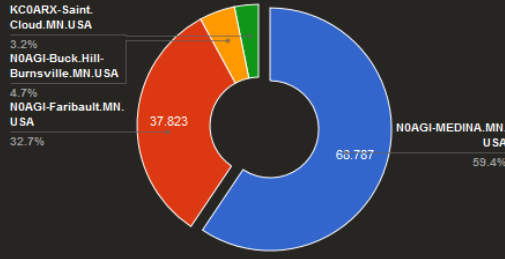
MNDMR website Dash Board/Net Watch

Statistics for MNDMR Repeaters Network

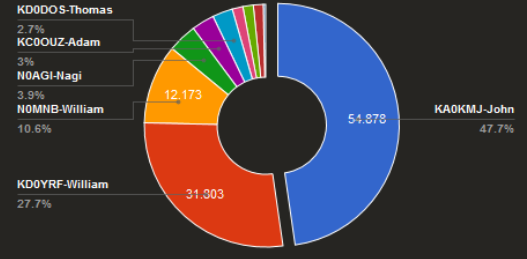
Top 10 MNDMR Repeaters Call Talk Time



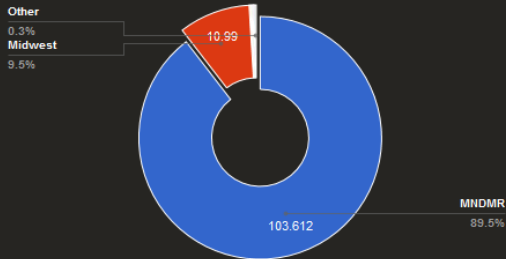
Top 10 MNDMR Repeaters Talk Time



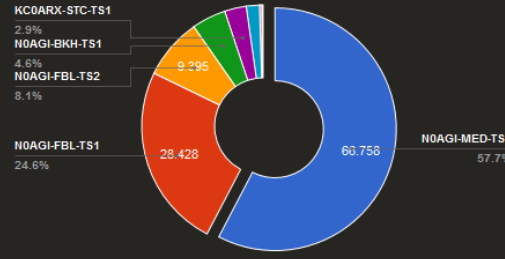
Top 10 MNDMR Users Talk Time



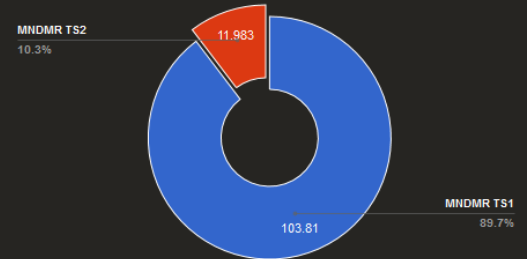
Top 10 MNDMR TG Talk Time



MNDMR Repeater Timeslot Talk Time



CBridge Timeslot Talk Time



Thu, 09 Feb 2017 18:25:31 GMT

Show Realtime Activity Show Loss Report Show Last Activity Report

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	NOAGI-Faribault, MN, USA	2.3	0.0%	-95.2	MNDMR	NOAGI-FBL-TS1	312706	3127071	MNDMR
17:38:48.3 Feb/9 2017	KD0YRF-William	NOAGI-Faribault, MN, USA	3.4	0.0%	-96.4	MNDMR	NOAGI-FBL-TS1	312706	3127072	MNDMR
17:38:40.9 Feb/9 2017	KC0OUZ-Adam	NOAGI-Faribault, MN, USA	3.1	0.0%	-91.1	MNDMR	NOAGI-FBL-TS1	312706	3127071	MNDMR
16:43:05.4 Feb/9 2017	NOANC-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	NOAGI-Faribault, MN, USA	4.2	0.0%	-90.8	MNDMR	NOAGI-FBL-TS1	312706	3127075	MNDMR
16:04:43.6 Feb/9 2017	W0DJK-Don	NOAGI-Faribault, MN, USA	3.8	0.0%	-94.4	MNDMR	NOAGI-FBL-TS1	312706	3127075	MNDMR
16:04:42.2 Feb/9 2017	W0DJK-Don	NOAGI-Faribault, MN, USA	0.5	0.0%	-126.3	MNDMR	NOAGI-FBL-TS1	312706	3127075	MNDMR
15:47:51.8 Feb/9 2017	KD0PNQ-Trygve	NOAGI-MEDINA, MN, USA	2.7	0.0%	-77.8	MNDMR	NOAGI-MED-TS1	312715	3127094	MNDMR
15:19:03.0 Feb/9 2017	NSPTZ-Daniel	KC0ARX-Saint, Cloud, MN, USA	4.9	0.0%	-118.2	WI State	KC0ARX-STC-TS2	312720	3127162	MNDMR

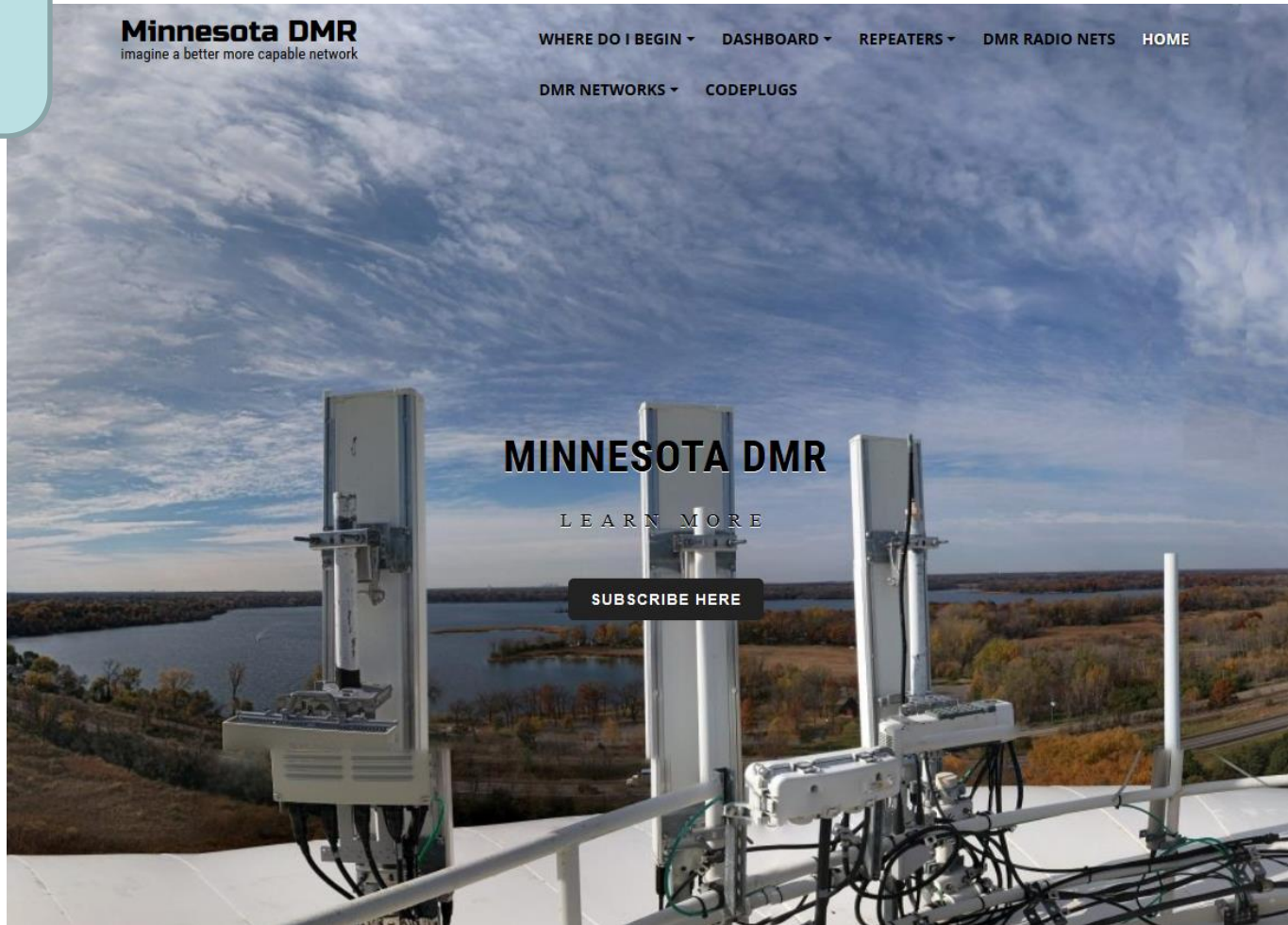
dash.mndmr.net



St. Paul

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

Minnesota DMR Website



St. Paul

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

DMR Net Watch



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%

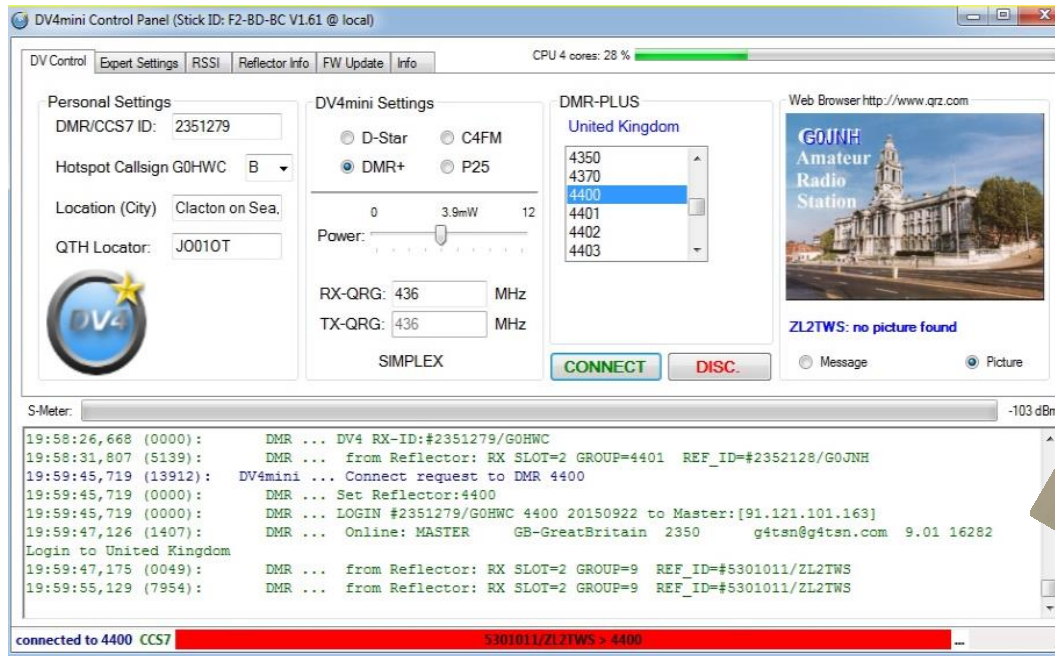
start time	duration	source peer alias	source radio alias	Bridge Group	RSSI (dBm)	Site name	Loss rate
16:35:47.316 Aug 21	0.9	N0BVE - Minnetonka Minnesota USA -- 312711	KD0PNQ - Trygve - Minneapolis Minnesota USA -- 3127094	MNstate 16-32-2	-110.4	K4USD-2 Network	0.0%
16:35:08.054 Aug 21	16.4	KK4ECR - 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>



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



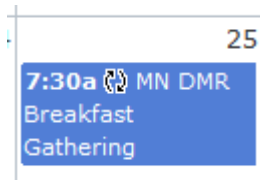
DMR Events and Nets



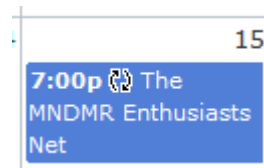
DMR-MARC
Worldwide Net

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

MN = Saturday's at 11:00 AM



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



MNDMR net every week Wednesday
MN State Talk Group 3127





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?
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I am here to answer any questions you have

Trygve KD0PNQ

