




DMR for Beginners



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What Are We Going to Cover?

- What is DMR?
- A Little Technomumbojumbo
- DMR Network
- Competitors to DMR
- How to DMR
- Equipment
- How to Program a Radio
- Help and Resources



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What Is DMR?

Digital mobile radio

Article Talk Read Edit View history Tools

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Digital mobile radio (DMR) is a digital radio standard for voice and data transmission in non-public radio networks. It was created by the European Telecommunications Standards Institute (ETSI) and is designed to be low-cost and easy to use. DMR, along with P25 phase II and NEXED are the main competitor technologies in achieving 6.25 kHz equivalent bandwidth using the proprietary AMBE-v2 vocoder. DMR and P25 II both use two-slot TDMA in a 12.5 kHz channel, while NEXED uses discrete 6.25 kHz channels using frequency division and TETRA uses a four-slot TDMA in a 25 kHz channel.

DMR was designed with three tiers. DMR tiers I and II (conventional) were first published in 2005, and DMR III (Trunked version) was published in 2012, with manufacturers producing products within a few years of each publication.

The primary goal of the standard is to specify a digital system with low complexity, low cost and interoperability across brands, so radio communications purchases are not locked into a proprietary solution. In practice, given the current limited scope of the DMR standard, many vendors have introduced proprietary features that make their product offerings non-interoperable with other brands.

Source: https://en.wikipedia.org/wiki/Digital_mobile_radio

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Common Terms

- Talk Groups
- Digital Contacts
- Tier I, II, III
- Zones
- Color Codes
- Channels
- Code Plugs

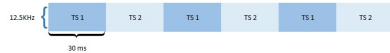


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Tier I, II and III



- DMR Tier 1
 - Short Range Simplex Communication
- DMR Tier 2
 - Two Slot TDMA on 12.5KHz Channels
 - Simple Messaging / GPS Data
- DMR Tier 3
 - Two Slot TDMA on 12.5KHz Channels
 - Simple Messaging / GPS Data
 - Trunked Systems



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What is a DMR Network?

- A collection of Repeaters and Hotspots that are networked together over TCP/IP and pass traffic from one device to another.
 - Can use private network(s) or public network(s) (Internet)
- Networks can be stand-alone or cross connected to other networks
- Networks can be cross connected to other Digital Mode networks
 - DMR-Marc can cross connect Talk Groups to Brandmeister Talk Groups
 - Brandmeister Talk Groups can cross connect to Yaesu System Fusion Rooms

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DMR Networks

- DMR-MARC
 - Largest DMR Network Worldwide
- DMR+
 - This is how you access DMR-MARC on Hotspots
- Brandmeister
 - Largest DMR Network in US
- TGIF
 - Started in Florida, growing fast
- ... there are more, the list keeps growing

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What are Some Other Digital Modes?

- D-Star
- System Fusion (C4FM)
- NXDN
- M-17
- Project 25 (P25 or APCO-25)



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Digital Mode Comparison Chart

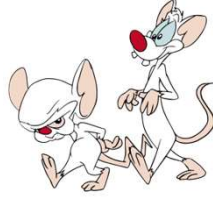
Mode	Analog	D-Star	DMR	YSF
Networks	IRLP, EchoLink, All-Star	REF, XLX, DCS	Brandmeister, DMR-MARC, TGIF, DMR+, many others	Wire-X, YSF, FCS
Server Nomenclature	Reflector	Reflector	Talk Group	Room, Reflector
Signal Validation	CTCSS, Tone, Tone-Squelch	RPT 1	Color Code	N/A
Modulation	FM	GMSK	4-State FSK with TDMA	C4FM
Creator	N/A	JARL	ETSI	Yaesu
Verbal ID Required?	Yes	No	Yes	No

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How Do I 'DMR'?

Things you will need:

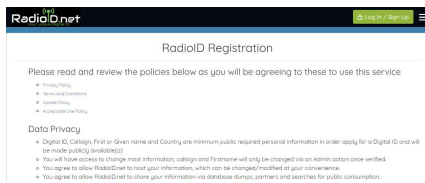
- DMR ID
- Radio with an AMBE+2 Vo-coder
- Connect to a DMR Network
 - Repeater Network or via MMDVM Hotspot
 - Stand-alone Repeater or Simplex



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DMR ID

- Be a Licensed Amateur Radio Operator
- <https://www.radioid.net>



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What DMR Equipment Should I Buy?

- What features are you looking for?
 - Memories (Contacts & Channels)
 - Availability of Programming Software
- HT vs Mobile
 - Hotspot?
 - Repeater?
- USB Dongle

• What's your budget?

Manufacturer	Model	Price
Baofeng	DM-1702	\$ 69.99
TYT	MD-380	\$ 99.00
Relevie	RT3S	\$ 119.99
Radioddity	GD-88	\$ 219.99
Bleech	DMR-8X2 Pro	\$ 299.99
AnyTone	AT-D878UVII Plus	\$ 349.99
Rtminder	B1-Plus	\$1,099.95
Rtminder	P10	\$1,499.95

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Hotspots?

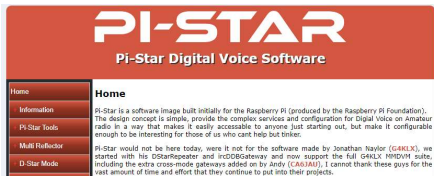
- [ZUMradio ZUMspot](#) (\$300)
- AMBE+2 Board or USB Dongle * [BlueDV Software](#)
- [Bridgecom SkyBridge](#) (\$425)
- [Hamspot 4](#) (\$150)
- [SharkRF OpenSpot 4 \(Pro\)](#) (\$340 US)
 - The "Pro" version has transcoding
- Generic, Cloned and Custom MMDVM Boards



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What is Pi-Star?

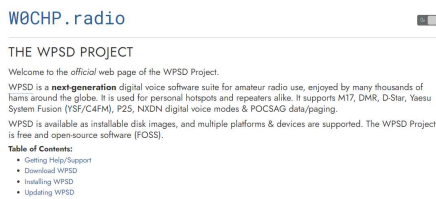
- <https://www.pistar.uk>
- First update in 3 years, January 2024



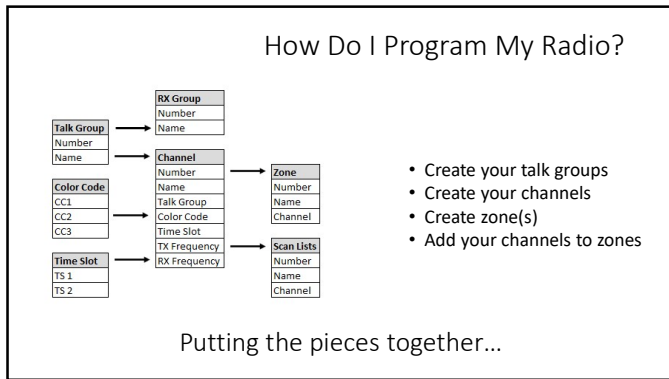
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The WPSD Project

- <https://w0chp.radio/wpsd/>
- Updates almost every week



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Programming Your Channel(s)

The Important Things:

- Channel Type
- Transmit Power
- TX Permit
- Contact
- Radio ID
- Color Code
- Slot
- DMR Mode

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Programming Tips

- Programming Lucedale Talk group 312801
 - For the repeater is one channel
 - For your hot spot, it is another channel
- Use Zones to your advantage.
 - Create a Zone for the Lucedale Repeater or (George County)
 - Create a Zone for your hot spot
- Create Disconnect and Parrot channels in each zone.
- Remember to ID, Your Brandmiester ID is not ID'ing.

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Programming Made Easier

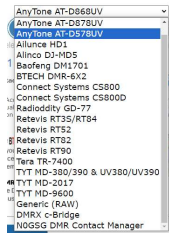
Make Your Own Lists (Excel, Google Sheets, etc)

- Contacts List
- Talk Group List
- Zone List
- Scan Lists

Saving Time

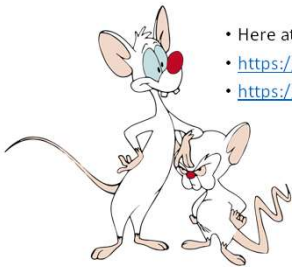
- <https://www.pistar.uk/downloads/anytone/>
- <http://www.dmrcontacts.com/>
- <https://amateurradio.digital/> (\$12/year)
 - Picture to right →

Digital Contacts Wizard



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Where Can I Get Info / Help?



- Here at our meeting.
- <https://amateurradionotes.com/pi-star.htm> *
- <https://www.dmrfordummies.com>

* Good information, but is no longer being updated.

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A Few Good Resources:

- <https://dmr-marc.net>
 - https://dmr-marc.net/media/Amateur_Radio_Guide_to_DMR_Rev_I_20150510.pdf
 - https://dmr-marc.net/media/DMR_MARC_Best_Practice_Guide_Rev_BB.pdf
- <https://n5amd.com>
- <https://pistar.uk>
- <https://radioid.net>

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