

AMATEUR DIGITAL VOICE

What DMR Is, and How It Actually Works

A 30-minute introduction for operators who already know analog

Presented by _____

What this covers

1

Where DMR came from

A commercial standard hams adopted

2

The engineering trick

TDMA, and why one channel carries two conversations

3

Talkgroups and time slots

Why you link instead of tune

4

Why DMR won

Radios, networks and people

5

The honest downsides

The codeplug, and the trap everyone falls into

6

The right way to start

Small, and on purpose

DMR was not invented for us

A commercial standard

- Published by ETSI, the European telecom standards body.
- Designed for fleets, factories and public-safety-adjacent users.
- Built to be cheap, rugged and spectrum-efficient.
- Hams adopted it, the way we have adopted surplus commercial technology for a century.

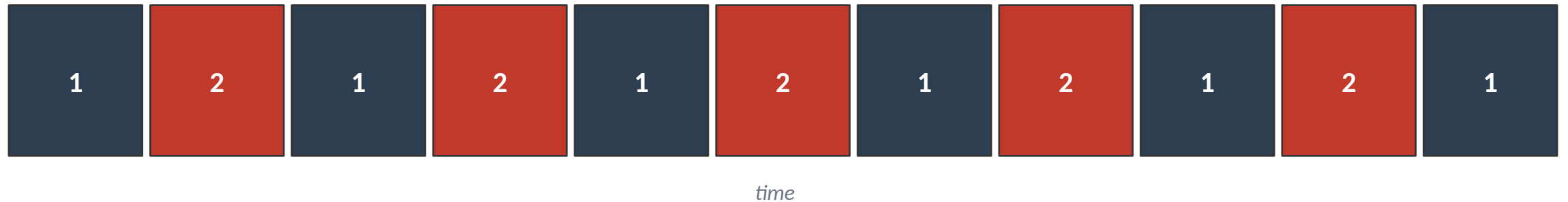
Why that matters to you

- The radio expects to be programmed, not dialled.
- The vocabulary is commercial: talkgroups, colour codes, contacts.
- But it also means a worldwide market of radios competing on price.
- Nothing about DMR is hard. It is foreign.

HOW IT WORKS

The trick at the heart of it: TDMA

One 12.5 kHz channel is divided into two alternating time windows. Each one carries its own conversation.



 Time slot 1 — one conversation

 Time slot 2 — a completely separate one

No other amateur digital voice mode does this.

What that buys you

2

conversations

on one frequency pair,
at the same time

1

repeater

does the work that
used to need two

50%

transmit time

your handheld's PA is
only on half the time

Better battery life on transmit is a real, measurable side effect — not marketing.

You do not tune. You link.

ANALOG

Spin the dial and listen

- The signal is out there whether you are listening or not.
- You can hunt around and discover activity.
- Static warns you when you are reaching the edge.

DMR

Choose a conversation

- A talkgroup is a conversation, not a frequency.
- You only hear the talkgroups you have programmed.
- Get a setting wrong and the radio just goes silent. No beep, no error.

Which slot do you use?



A duplex repeater

Listens on one frequency and transmits on another, so it can run both slots. Two talkgroups at once — one on TS1, one on TS2.



A simplex hotspot

Receives and transmits on the same frequency. With no repeater to supply the TDMA timing reference, it runs one slot only.

On your hotspot, assume time slot 2.

It is a convention of the hotspot software rather than a rule of the standard — but it is close enough to universal that you can rely on it.

Static and dynamic talkgroups

Two ways a talkgroup gets connected to you — and the difference explains most of the "why did it go quiet?" questions.

STATIC

Always connected

- You attach it permanently, in the network's SelfCare portal.
- It is carried all the time, busy or not.
- You can hold several on one slot at once.

DYNAMIC

Brought up on demand

- You activate it by keying it up.
- It drops on its own after about 15 minutes of inactivity.
- TAC 310–319 can only ever be dynamic.

Not every network works that way

TGIF has no dynamic talkgroups and no inactivity timeout.

You stay parked on the last talkgroup you keyed up — one per time slot — until you deliberately switch.

Why this matters if you run both

- The BrandMeister mental model — a few statics that stay, plus a dynamic that times out — simply does not carry over.
- Neither does the advice. Anything you read about statics is network-specific.
- FreeDMR, AmComm and QuadNet are different again.

Six numbers worth knowing

1	Local	Stays on the repeater. Not linked anywhere.
2	Cluster	A defined group of repeaters — a club, for example.
9	Dial-a-TG	On slot 2 this is the gateway. A poor choice for 'local'.
91	Worldwide	Busy around the clock. The best place to hear traffic.
99	Simplex	Radio to radio, off the network entirely.
9990	Parrot	Plays your own audio back. Nobody else hears it.

WHY IT TOOK OVER

Why DMR won: the radios

Because it is a commercial standard with worldwide adoption, hams shop in a market the other modes simply do not have.

Budget imports

Baofeng, Radioddity, Retevis

A working DMR handheld for the price of a nice dinner.

The ham sweet spot

AnyTone, TYT, BTECH

Big channel capacity, GPS, Bluetooth, strong Talker Alias support.

Commercial iron

Motorola, Hytera, Kenwood

Fleet-grade build, and a deep surplus market.

Compare that with System Fusion — Yaesu only — or D-STAR, where the choice is Icom or Kenwood.

Why DMR won: networks, and people

A competitive ecosystem

- BrandMeister — the worldwide giant
- TGIF — the hotspot-friendly second power
- DMR+, FreeDMR, FreeSTAR, AmComm and regional systems
- Hundreds of active talkgroups across them

The network effect

New hams go where the activity is. The activity grows because new hams go there.

DMR won the population race years ago, and the lead compounds.

Whatever hour you switch on, somebody is talking.

Talker Alias: a name, not a number

Without it

3107662

With it

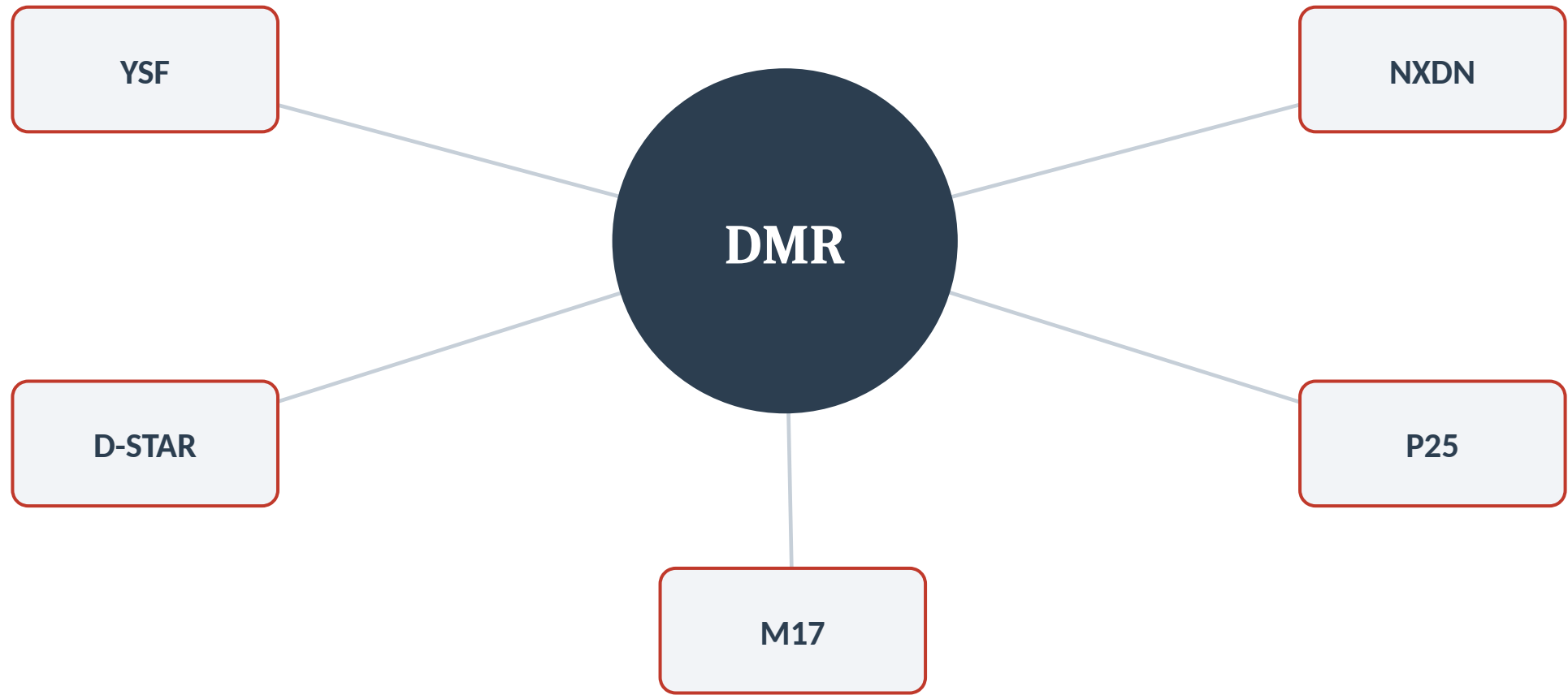
N6JET Chris

The transmission itself carries the operator's callsign, embedded in the digital stream.

- The old fix was brute force: load a database of the entire worldwide DMR user registry into your radio.
- Hundreds of thousands of entries, stale the day you load them, and too big for smaller radios.
- With Talker Alias you need no contact list at all. Set your callsign once, and you are a name everywhere you go.

WHY IT TOOK OVER

One radio, the whole digital voice world



Through transcoding reflectors, cross-mode functions and network bridges, a DMR radio reaches into all of them.

The honest downside: the codeplug

The codeplug is the price of admission — the steepest first day in amateur radio.

Before your first contact you will meet the programming software and build:

A Channels

frequency + talkgroup
+ time slot + colour code

B Zones

channels grouped into
something navigable

C Contacts

the talkgroups your
radio can call

It is not hard so much as foreign. Nothing in analog FM prepares you for it.

WHAT NOBODY WARNS YOU ABOUT

And the trap almost everyone falls into

What people do

~1,800

talkgroups downloaded into a brand-new radio, 99% of which they will never key up.

What works

~100

hand-picked across every network you actually use — chosen by you, so every entry means something.

A curated hundred beats an imported sixteen hundred, every time.

The rest of the honest list

You must register

A DMR ID is free and quick at radioid.net, but it is one more step before you can transmit.

Text messaging is fragmented

Vendor formats are mutually incompatible in places — commercial fragmentation we inherited.

The vocoder is proprietary

AMBE sits at DMR's heart, which is an irony in a hobby that prizes openness. It is why M17 exists.

Etiquette has commercial manners

Key up, pause, then talk. Leave gaps between overs so linked systems and other operators can get in.

Many networks means confusion

The same talkgroup number can mean different things on different networks.

IF YOU TAKE ONE THING AWAY

The right way to start

1

One hotspot, one radio

A station you fully control, on your desk, where experiments cost nothing and nobody minds your learning curve.

2

Start on BrandMeister

The biggest user base, the most talkgroups, and the most documentation when you get stuck.

3

One talkgroup to begin

TG 91 Worldwide is busy around the clock. Hearing real traffic proves your setup works.

4

Add one thing at a time

A codeplug scales from a dozen channels to hundreds without ever starting over.

IF YOU TAKE ONE THING AWAY

Build your own codeplug

The codeplug is not a toll. It is the tuition.

The tempting shortcut is to download somebody else's. Resist it.

- A borrowed codeplug hands you hundreds of someone else's decisions — their networks, their talkgroup picks, their zone logic, their naming.
- It can still carry their DMR ID, so you transmit under their identity.
- And when something breaks you have no idea how to fix it, because you never learned how any of it was put together.
- Every channel you create teaches you what a channel is. Every zone teaches you how the radio organises itself.

THE VERDICT

DMR is not the most elegant digital mode,
the most open, or the easiest first hour.

It is the most alive.

The most radios, the most networks, the most talkgroups, the most users, the most bridges to everywhere else — at the lowest cost of entry in digital voice.

Questions?

TAKE THIS AWAY

Every slide in this talk, written out at length

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Send your club here when the questions start:

www.n6jet.com — the Digital Voice Guides

Getting started

DMR Guide · How to Be Successful with DMR · Hotspot Basics

The confusing bits

Talkgroups & Time Slots · The Codeplug · Scanning with a DMR Radio

When it goes wrong

Troubleshooting · Setting Your TX Audio Level