M17

An Introduction

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M17 is Dead

MMDVM
MULTIMODE DIGITAL VOICE MODEM

MX17

2

Thanks for attending!

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Introduction

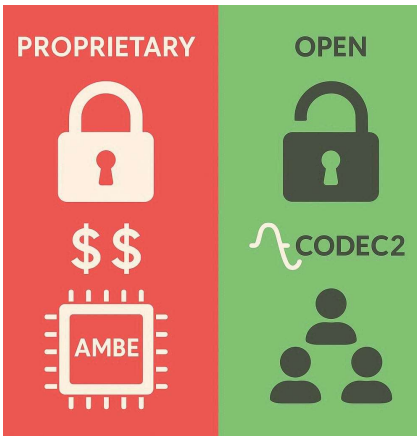
- What is M17?
  - An Amateur Radio digital voice/data protocol.
  - Designed to be fully open and royalty-free.
- Who developed it?
  - Wojciech Kaczmarski (SP5WWP)
- Why is it important?
  - Breaks dependence on closed, commercial solutions like AMBE codec.



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Motivation

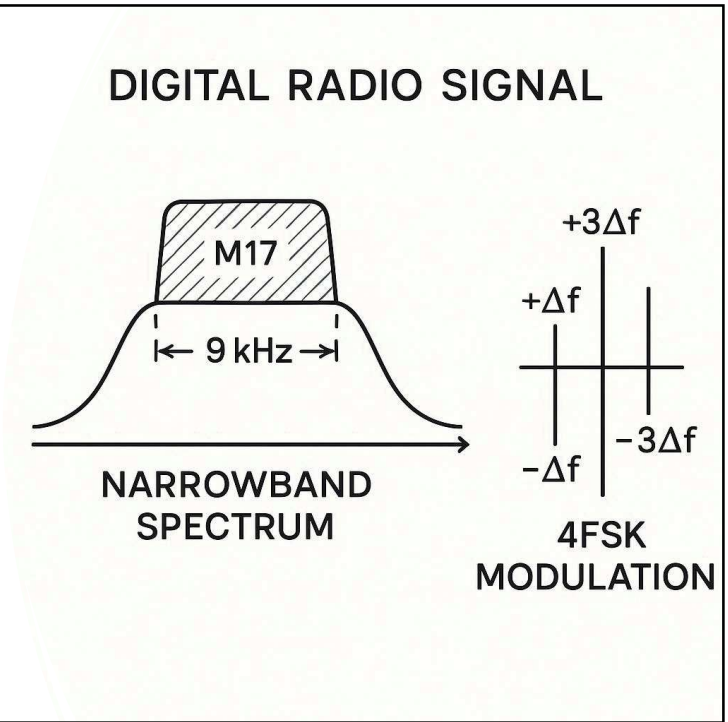
- Problem with existing modes:
  - D-Star, DMR and Fusion rely on AMBE+2 chips with licensing fees.
  - Restricts innovation and increases radio costs.
- M17's Philosophy
  - Freedom to innovate – No royalties or NDAs.
  - Encourage experimentation, just like early packet radio.
- Community values
  - Collaboration, education, transparency.



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Technical Overview

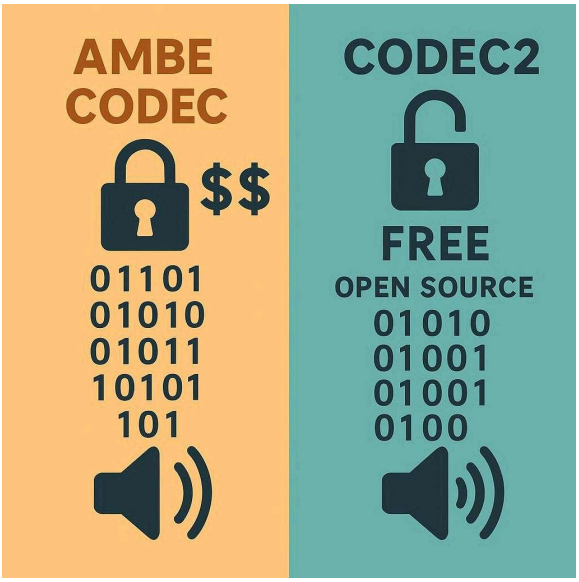
- Modulation type
  - 4FSK (four-level frequency shift keying).
- Data rate
  - 9,600 bps gross 3,200 bps for voice payload.
- Channel fit
  - Occupies 9 kHz within standard 12.5 kHz narrowband.
- Framing structure
  - 40 ms frames with sync patterns, grouped into superframes



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Voice Codec: Codec 2

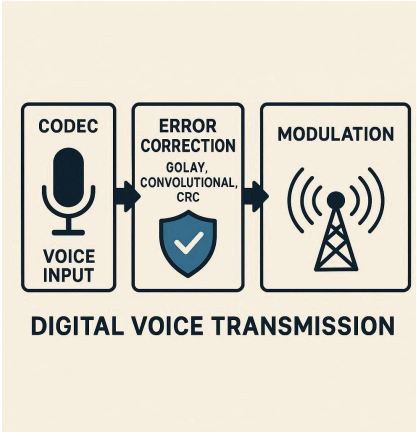
- Codec 2
  - Developed by David Rowe (VK5DGR)
  - Open source, no royalties
- Bitrate options
  - 3,200 bps (full rate) for better audio
  - 1,600 bps (half rate) for conserving bandwidth
- Comparison
  - AMBE codec is closed, costly and restricted
  - Codec 2 is flexible, runs on open hardware



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Error Control & Data Extensions

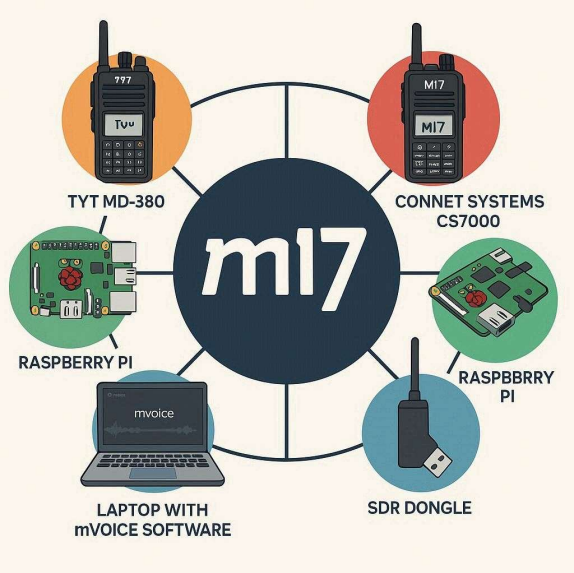
- Error correction methods
  - Golay codes, convolutional codes, interleaving, CRC
  - Improves readability in weak signal or mobile conditions
- Data capabilities
  - Parallel low-speed data stream (GPS, APRS, telemetry).
  - Text messaging and short file/data payloads.
- Encryption
  - AES-CTR available for testing/educational purposes (not for regular ham use).



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Hardware & Software

- Radios
  - TYT MD-380/390/UV380 can be reflashed with OpenRTX firmware.
  - CS7000 M17 is the first commercial handheld
- Software Tools
  - DroidStar (Android app), mvoice (PC), SDRangel, SDR++
- Experiment platforms
  - Raspberry Pi + SDR dongle as gateways/repeaters



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Bridging & Networking

- Reflectors
  - Similar to D-Star – About 100 M17 reflectors worldwide
- Cross-mode bridges
  - Interconnects with DMR, Fusion, P25, NXDN, AllStarLink, and EchoLink
- Hotspots
  - Pi-Star and WPSD (You have to build M17 support back in)



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Achievements & Recognition

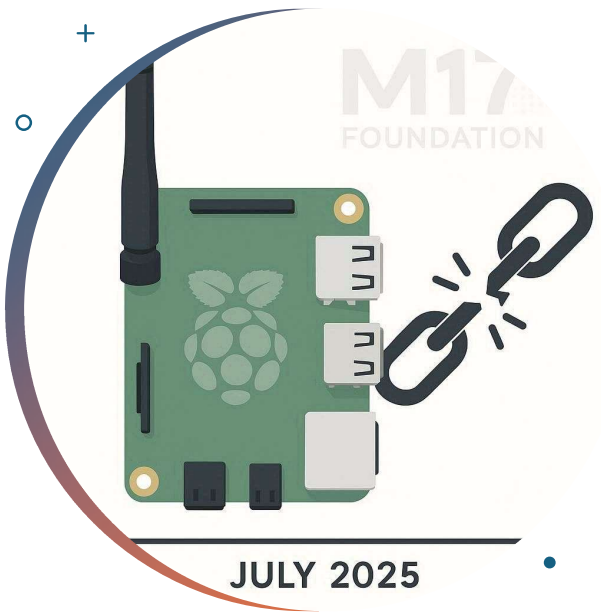
Awards
- ARRL Technical Innovation Award, 2021

Grants
- Nearly $500K in two grants provided by ARDC in 2021 and again in 2022

Notable demonstrations
- Used over QO-100 geostationary satellite

Recent milestones
- Rev 2.0 protocol spec released this year (2025)
- LinHT SDR transceiver prototype announced this year (2025)

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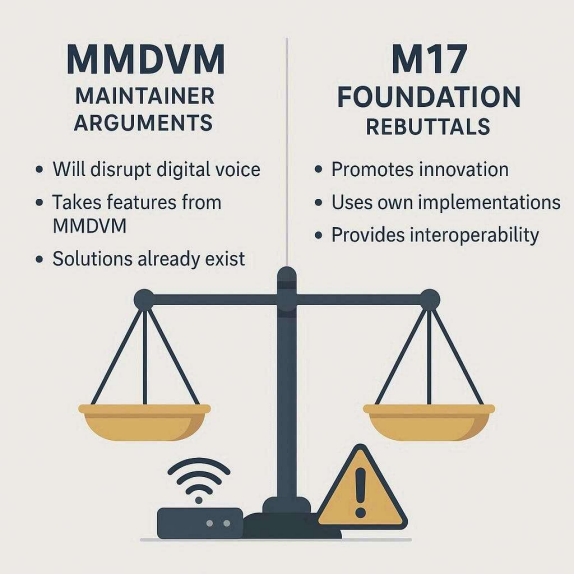
MMDVM Controversy

- MMDVM defined
  - "Multi-Mode Digital Voice Modem" powering most digital hotspots/repeaters
- What happened?
  - MMDVM maintainer (G4KLX) removed M17 support in July 2025.
- Impact
  - Hotspots auto-updated → M17 instantly unavailable.
  - Thousands of users affected worldwide

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Perspectives & Fallout

- MMDVM maintainer's position
  - Claimed M17 wasn't technically ready.
  - Raised governance/royalty concerns.
- M17 Foundation's rebuttal
  - Strongly denied royalties.
  - Argued decision was personally/politically motivated, not technically.
- Community response
  - Mixed – Most side with M17, others defend MMDVM.
  - Practical outcome: Users had to freeze firmware or switch software.



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Summary & Looking Ahead

- M17's Strengths
  - Open, royalty free, community driven.
  - Technical maturity and expanding ecosystem.
- Current challenges
  - Infrastructure dependence (MMDVM).
  - Need for more native radios and gateways.
- Future opportunities
  - Expand reflector networks, continue hardware projects.
  - Educate hams on the importance of open systems.

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