

DIGITAL VOICE FOR AMATEUR RADIO

Yaesu System Fusion

A beginner's guide to C4FM digital radio — how it works and why it's easy to start.

THE BASICS

What is System Fusion?

System Fusion is Yaesu's digital voice-and-data mode for ham radio. It uses C4FM digital while staying fully compatible with traditional analog FM — so one radio does both.



Clearer digital audio

C4FM voice stays crisp and noise-free, even on weak signals.

Analog + digital in one

Talk to both C4FM and older FM stations on the same radio.

More than voice

Sends GPS position, text messages, and images alongside speech.

UNDER THE HOOD

How C4FM Works

C4FM stands for Continuous 4-Level Frequency Modulation. It encodes voice and data as four frequency states (4-level FSK) using FDMA — one station per channel.



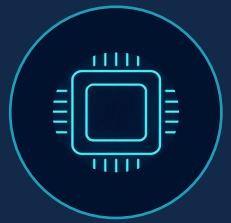
4-Level FSK

Voice is turned into four distinct frequency steps for reliable digital decoding.



12.5 kHz / 9.6 kbps

Fits a standard channel and carries data at up to 9,600 bits per second.



AMBE+2 Vocoder

Compresses speech efficiently with strong error correction for clean audio.

OPERATING MODES

Four Ways Fusion Transmits



V / D Mode (DN)

The everyday mode — half the channel carries voice, half carries data like GPS and text.



Voice FR (VW)

Uses the full channel for the highest-quality digital voice when audio matters most.



Data FR (DW)

Devotes the whole channel to fast data — sending images and text at full rate.



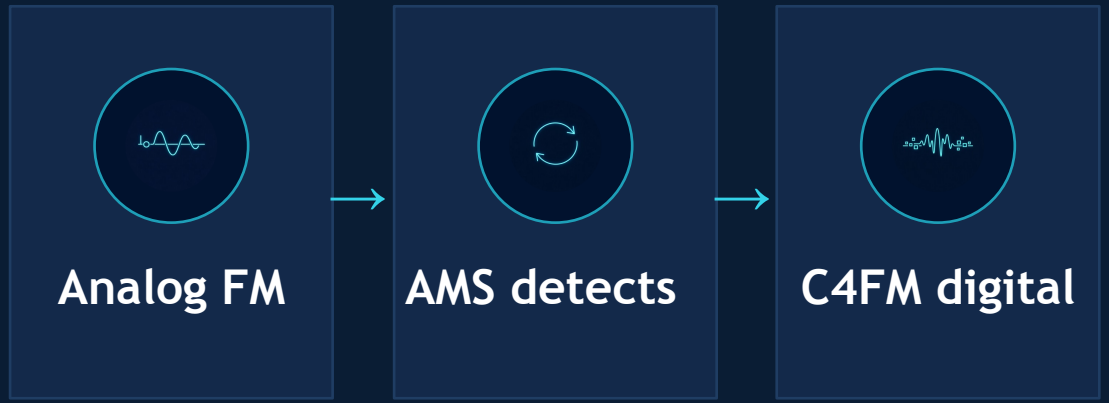
Analog FM

Falls back to conventional FM so you can still reach non-digital stations.

SET IT AND FORGET IT

Automatic Mode Select (AMS)

AMS is Fusion's signature feature. The radio (and repeater) detects whether an incoming signal is analog FM or C4FM digital and switches to match it — automatically, with no menus to change.





No reconfiguration needed — analog and digital users share the same repeater seamlessly.

GO GLOBAL

Wires-X Internet Linking

Wires-X (Wide-Coverage Internet Repeater Enhancement System) connects Fusion nodes and repeaters over the internet — turning a local radio into a gateway to the world.



Rooms & nodes

Join voice "Rooms" — like chat channels for clubs, nets, and interest groups.

Worldwide reach

Link distant repeaters together for long-distance digital contacts.

Simple to connect

Jump between Rooms right from your radio using DTMF tones.

BEYOND VOICE

Smart Data Features

GPS Position

Share your location and see distance and bearing to other stations.

Text Messaging

Send short text messages and even images between Fusion radios.

Group Monitor

Track everyone in your group with live distance-and-direction info.

Emergency (EAI)

One button auto-sends your ID and location if you need help fast.

HOW IT COMPARES

Fusion vs. DMR vs. D-STAR

	Fusion (C4FM)	DMR	D-STAR
Modulation	C4FM · FDMA	4FSK · TDMA	GMSK · FDMA
Bandwidth	12.5 kHz	12.5 kHz (2 slots)	6.25 kHz
Voice codec	AMBE+2 · 9.6 kbps	AMBE+2 · 4.8 kbps	AMBE+ · 4.8 kbps
Analog fallback	Yes — automatic (AMS)	No	No
Internet linking	Wires-X Rooms	Talkgroups	Reflectors
Ease of use	Plug-and-play	Complex code-plug	Moderate setup

Fusion's edge for newcomers: automatic analog/digital switching and the simplest setup.

GET ON THE AIR

Getting Started with Fusion



1. **Pick a Fusion radio**
   Look for "C4FM" in the specs — the FT-70DR is a popular, affordable handheld to start.

2. **Find a Fusion repeater**
   Search for a local C4FM repeater (like Yaesu's DR-2X) and program it in.

3. **Make your first call**
   Key up in AMS mode and you'll reach both digital and analog operators.

Radios to explore: FT-70DR · FT-5DR · FTM-300DR / 500DR · FT-991A

THE TAKEAWAY

Digital made easy

- One radio does both analog FM and C4FM digital.
- AMS switches modes automatically — nothing to fuss with.
- Clearer audio, plus GPS, messaging, and images.
- Wires-X links you to operators worldwide.
- Start with an affordable HT and a local Fusion repeater.

