Yaesu DR2X Repeater Overview

Overview

- Introduction to the DR2X

- C4FM Overview

- C4FM vs. D-STAR

- SMRC D-STAR Roadmap

- Repeater Backhaul Configuration

Introduction to the DR2X

- Yaesu's latest offering in analog + digital repeaters

- Dual-band (2m + 70cm)
    - No simultaneous transmit = two access channels

- Automatic Mode Select (AMS)
    - Automatically senses analog FM or C4FM digital
    - Transmit out can be fixed to either FM or C4FM

- Programmable from the repeater control face
    - No computer program/cables required
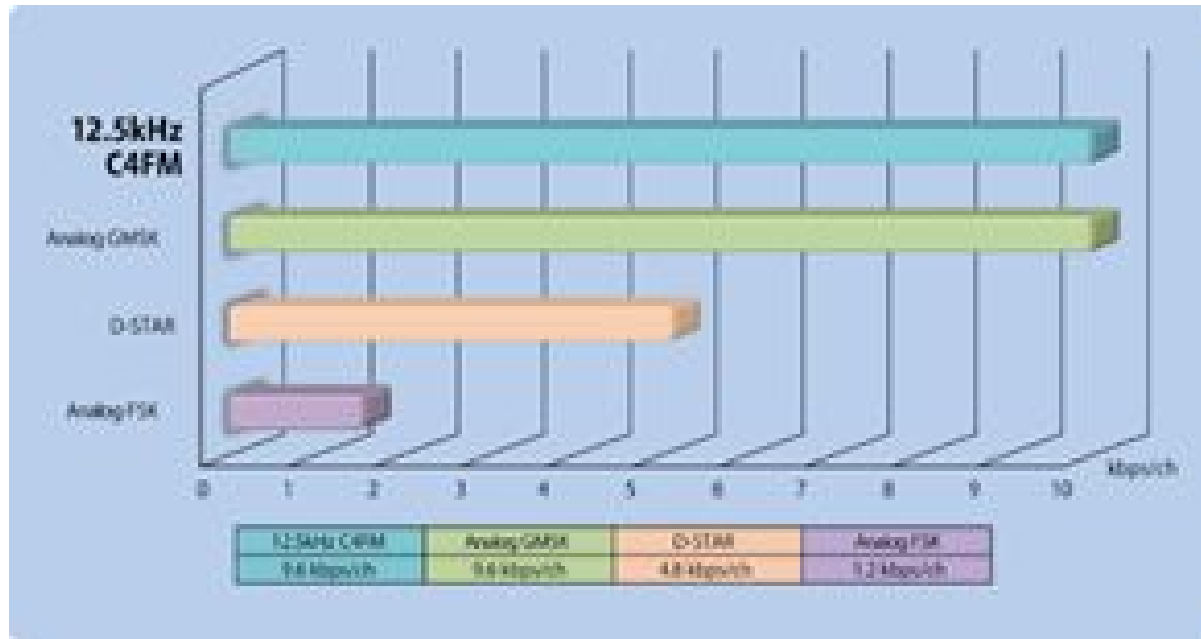
YAESU *System Fusion*
The radio

Introduction to the DR2X

- Auto-switching to backup DC power built-in

- Multi-Site Repeater Link
    - LAN card allows repeater to be linked to other repeaters using a standard TCP/IP connection

- Programmable voice & text message/announcement function

C4FM Overview

- One of the "Big 3" digital modes currently used in amateur radio
  - Similar functionality to D-STAR & DMR
  - Provides both digital voice & data
  - Uses 4-level FSK in a 12.5kHz occupied bandwidth

C4FM Overview

- Three major user-selectable operating modes

    - V/D Mode (Voice/Digital)
        - Uses 6.25kHz for digital voice + 6.25kHz for error correction
        - Allows maximum signal decodability under limit conditions

    - Voice FR Mode
        - Uses all 12.5kHz for voice
        - Better voice quality at the expense of dropped frame risk

    - Data FR Mode
        - Uses all 12.5kHz for data transmission
        - Up to 9600 bps data rate

C4FM Overview

- Group Monitor Function
    - Allows users to check the status of a designated Group
        - On-air / In-range
        - Position
        - Group text message capability

- All this works seamlessly with traditional analog FM functionality
    - Don't have to go out and buy a new radio to talk
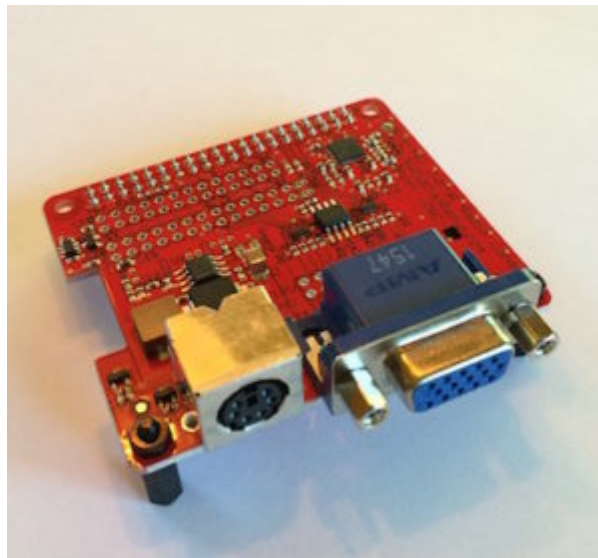
C4FM vs. D-STAR

- C4FM provides similar functionality, but is not compatible with D-STAR

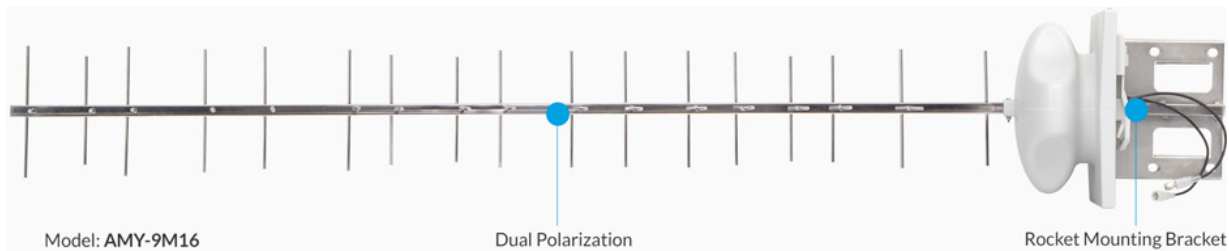|	D-STAR	C4FM
VOCODER	AMBE+	AMBE+2
MODULATION	GMSK	C4FM
MULTIPLEX METHOD	FDMA	FDMA
TRANSMISSION RATE	4.8kbps	9.6kbps
BANDWIDTH	6.25kHz	12.5kHz
REGISTRATION REQUIRED	YES	NO
LINKING	YES INTERNET / OTHER	YES INTERNET / OTHER
ANALOG / DIGITAL DUAL-MODE	NO	YES
USER GROUPS / MONITORING	NO	YES

SMRC D-STAR Roadmap

- Old DR1X repeaters were compatible with Northwest Digital UDRC 2
    - Adds D-STAR capability to DR1X repeaters allowing 3-way operation

- DR2X is not currently compatible with UDRC due to rear-panel pinout
    - ARCOM (repeater controllers) is actively engaged with Yaesu
    - Expect a firmware update to the machines which will fix

- SMRC objective is to support both digital modes on our repeater system

Repeater Backhaul Configuration

- The DR2X does not simultaneously TX/RX on 2m/70cm
    - Will have to leverage existing 70cm link radios in the short-term

- Our DR2X machines are all equipped with MSRL LAN card
    - Allows TCP/IP networking

- Ubiquiti Part 15 NLOS 900 MHz may provide a better solution
    - Approximately $570 to link two sites

Model: AMY-9M16   Dual Polarization   Rocket Mounting Bracket

Questions?

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