YAESU SYSTEM FUSION

de KI5OMW

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cRHRc
CROSS ROADS HAM RADIO CLUB
www.crhrc.org   info@crhrc.org

COMPARISON TO OTHER DIGITAL MODES

YAESU System Fusion

DMR DIGITAL MOBILE RADIO

D-STAR

SIMPLE RADIO PROGRAMMING

9.6 KBPS (WIDE MODE)

YAESU RADIOS ONLY

COMPLICATED PROGRAMMING

4.8 KBPS X2 TIME SLOTS

BUDGET RADIO OPTIONS AVAILABLE

MODERATE RADIO PROGRAMMING

4.8 KBPS

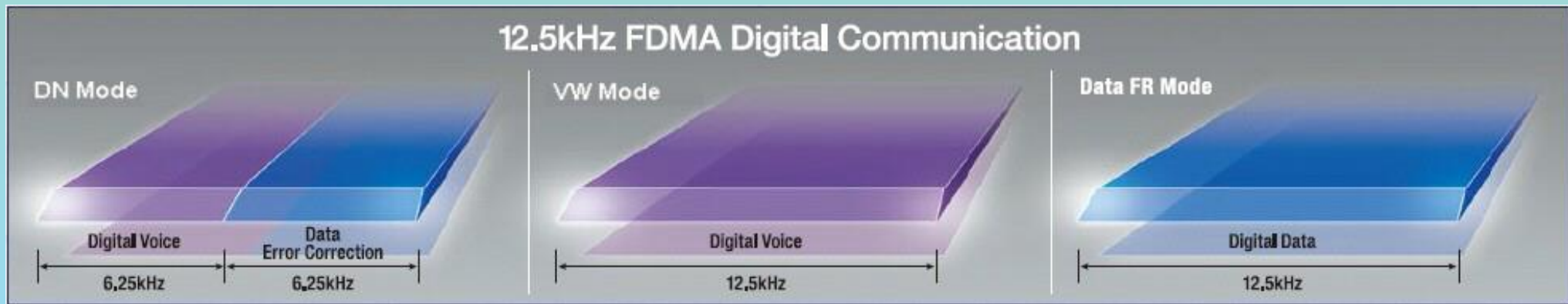ICOM LICENSED RADIOS ONLY

WHAT IS SYSTEM FUSION?

System Fusion is Yaesu's implementation of digital voice and data transmission in amateur radio using C4FM FSK technology.

Compatible 4-level Frequency Modulation – signal deviation varies between 4 levels

Dibit	Symbol	Frequency Deviation
00	+1	+900hz
01	+3	+2700hz
10	-1	-900hz
11	-3	-2700hz

DIGITAL NARROW (DN) VS. VOICE WIDE (VW)

Raw data rate is 9600bps with 7200bps payload after framing (header/terminator etc…)

12.5kHz FDMA Digital Communication

DN Mode

Digital Voice — 6.25kHz

Data Error Correction — 6.25kHz

VW Mode

Digital Voice — 12.5kHz

Data FR Mode

Digital Data — 12.5kHz

DN divides available bandwidth to accommodate voice and data. Data can consist of GPS location, text messages, or even images.

VW provides full bit rate for voice and has the best sounding audio.

DW provides full bit rate for data. This mode is not manually selectable.

SYSTEM FUSION RADIOS

FT-5DR
FT-70DR

FTM-500DR
FTM-300DR

FT-991A

PROGRAMMING A SIMPLEX FUSION CHANNEL

Channel No	Receive Frequency	Transmit Frequency	Offset Frequency	Offset Direction	Operating Mode	DIG/ANALOG		Tone Mode	CTCSS Frequency
▸ 1	445.97500	445.97500	0.00000	OFF	FM	AMS ▾	Digi Simplex	OFF	100.0 Hz
2						FM			
3						AMS			
4						DN			
						VW			

You will be prompted to enter your call sign when powering the radio for the first time. This is necessary.

No special programming considerations are necessary. Simply enter the desired frequency and select a digital mode! DN – Digital Narrow is available by default while VW – Voice Wide must be enabled in the radio's global settings. AMS – Auto Mode Select can be used to receive either analog or digital signals automatically!

Digital

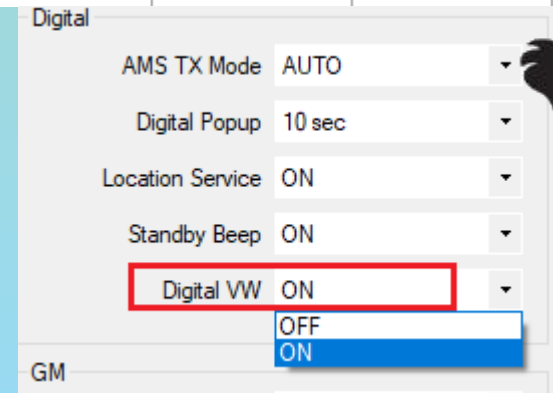| AMS TX Mode	AUTO
Digital Popup	10 sec
Location Service	ON
Standby Beep	ON
Digital VW	ON
	OFF
	ON

GM

PROGRAMMING A FUSION REPEATER CHANNEL

Channel No	Receive Frequency	Transmit Frequency	Offset Frequency	Offset Direction	Operating Mode	DIG/ANALOG	Name	Tone Mode	CTCSS Frequency
1	442.92500	447.92500	5.00000	+RPT	FM	VW ▾	Digi Repeater	OFF	100.0 Hz
2						FM			
3						AMS			
4						DN			
						VW			

Digital

AMS TX Mode	AUTO	▾
Digital Popup	10 sec	▾
Location Service	ON	▾
Standby Beep	ON	▾
Digital VW	ON	▾
	OFF	
	ON	

GM

You will be prompted to enter your call sign when powering the radio for the first time. This is necessary.

To program a Fusion repeater the settings are just as simple with only the addition of a transmit frequency offset! Like the simplex example, once "Digital VW" is enabled in the radio's settings, the VW option will become available for the channel. There's no need to program rooms like you would talk groups in DMR.

WHAT IS WIRES-X?

WIRES-X is a method of linking digital repeaters together on the internet. WIRES stands for Wide-Coverage Internet Repeater Enhancement System.

WIRES-X nodes and rooms cluster repeaters together.
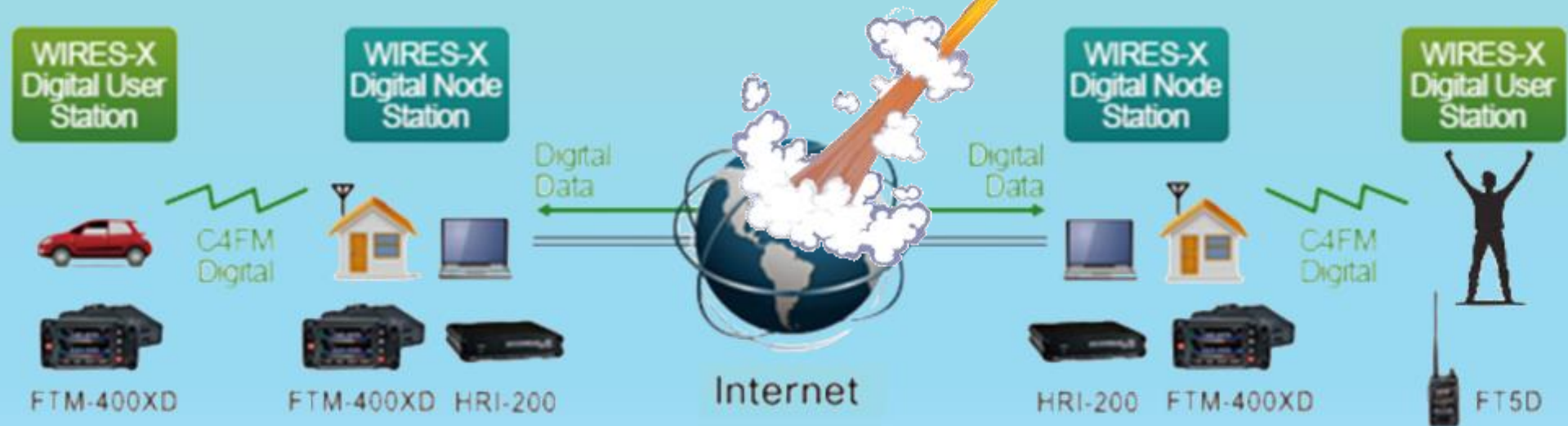
WHAT IS A REFLECTOR? WHAT ABOUT A ROOM?

A reflector is server on the internet that acts as a hub allowing multiple System Fusion users to connect and talk simultaneously.

A room is a dedicated space that allows users to connect on the Wires-X network.

Rooms and reflectors can be bridged allowing hotspot connectivity into a Wires-X room VIA a reflector.

USING A HOTSPOT TO CONNECT

MMDVMHost Configuration

Setting		Value			
DMR Mode:	⊙	RF Hangtime:	20	Net Hangtime:	20
D-Star Mode:	⊙	RF Hangtime:	20	Net Hangtime:	20
M17 Mode:	⊙	RF Hangtime:	20	Net Hangtime:	20
YSF Mode:	⊙ (on)	RF Hangtime:	20	Net Hangtime:	20
P25 Mode:	⊙	RF Hangtime:	20	Net Hangtime:	20
NXDN Mode:	⊙	RF Hangtime:	20	Net Hangtime:	20
YSF2DMR:	⊙				
YSF2NXDN:	⊙				
YSF2P25:	⊙				
DMR2YSF:	⊙	Uses 7 prefix on DMRGateway			
DMR2NXDN:	⊙	Uses 7 prefix on DMRGateway			
POCSAG:	⊙	POCSAG Paging Features			
MMDVM Display Type:	OLED Type 3 ⌄	Port: /dev/ttyAMA0 ⌄	Nextion Layout: G4KLX ⌄		

Apply Changes

After enabling YSF mode, the Yaesu System Fusion configuration area becomes available. Just choose a startup reflector and apply changes! Enable WiresX passthrough to use your radio's WIRES-X interface to change reflectors rather than DTMF tones.

Yaesu System Fusion Configuration

Setting	Value
YSF Startup Host:	YSF62426 - US-CRHRC-TX - crhrc.org ⌄
UPPERCASE Hostfiles:	⊙ (on) Note: Update Required if changed
WiresX Passthrough:	⊙ (on)

Apply Changes

USING A HOTSPOT TO CONNECT

From the dashboard page you can choose another reflector anytime! Your radio's WIRES-X capability can also be used to search for and change reflectors.

DISCUSSION