



Yaesu System Fusion & WIRES X- THE NETWORK



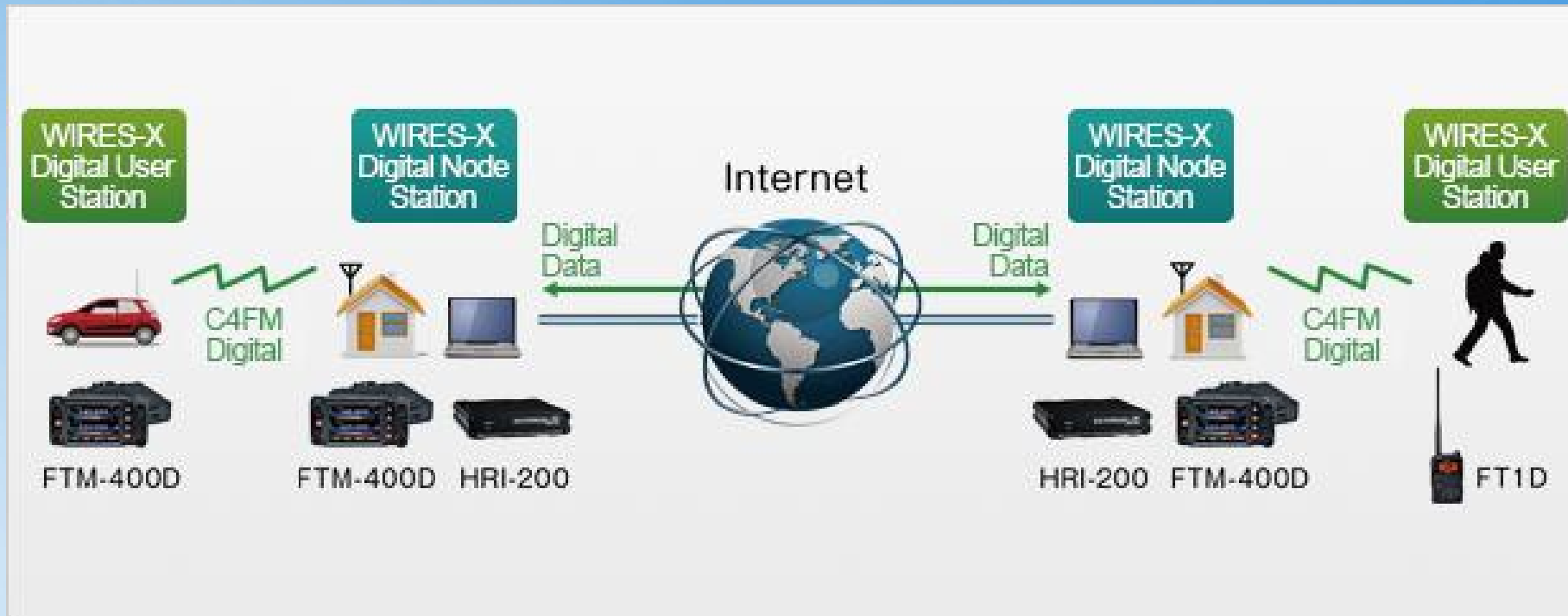
W4MIF – Randy Hunter

Today's Agenda

- The basic infrastructure of Yaesu System Fusion (YSF) and WIRES-X
 - Repeaters, Nodes, HotSpots and Reflectors
- The Ins & Outs of “how to get on YSF.”
 - Equipment Needed, Setup, Frequencies and Local Knowledge
- YSF Operation & Etiquette
- Useful Fusion Links

THE BASICS

What is System Fusion? It is just a name for another transmission format. Like AM, FM, and SSB System Fusion or Fusion for short is what we are calling C4FM which is way to transmit a digital signal inside an FM carrier.



Fusion Confusion!

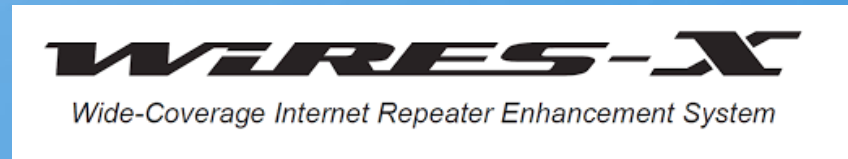
WiRES-X

HotSpot Jumbospot
openSPOT Pi-star



C4FM YSF

Reflector Brandmeister



Yaesu Digital WORLD



THE BASICS

Fusion Definitions

THE BASICS – DEFINITIONS

- **System Fusion** = C4FM Digital Mode
- **Wires X** = Analog FM & Digital Internet Connections – With HRI200 box can connect to internet and join rooms
- **Wires-X** = (Wide (coverage) Internet Repeater Enhancement System– Digital Internet Connections – signal stays digital though the whole connection
- **Node** = A Simplex Radio, Link Radio, or a Repeater on the network – where RF enter/leaves the internet connection
- **Room** = A central location where many different nodes can connect together on Yaesu servers– It is like a repeater on the internet
- **Reflector** = Like a room but on a independent server



THE BASICS – C4FM MODES

What are the different modes for C4FM

DN – Data & Voice – Splits the 12.5KHz bandwidth for voice and data. The data stream that is transmitted along with your voice on some radios that include a GPS and call sign information that will continuously transmit your location

VM – Digital Voice – Uses the full 12.5KHz bandwidth for your voice. You will get better voice quality but lose the GPS data

DATA – Uses the full bandwidth for data only. Currently the main use for this mode is the camera mic's for HT. The radios itself will use this mode when you set up a Wires-X connection for getting node data.



THE BASICS – DEFINITIONS

Types of internet connections:

- **Node** – A radio using an HRI-200 box in between the computer & radio. It can transmit out as a simplex link or a duplex link to a repeater
- **Portable Node** – Where the radio is directly connected the computer. In this case the radio is acting as a sound card/ interface and there will be no RF coming out of the radio

* *Only FTM-400, FTM-100, FT-2DR, FT-3DR, FT5DR*



Here is the System Fusion family

All of these radios can do the C4FM digital transmission. And can connect to the Wires-X network. Missing is the newest handhelds the FT5DR and the newest dual band mobile FTM-500/510

Some of the radios can act as node radios. The FTM-510, FTM500, FTM-400DR, and FTM300 etc... the handheld FT-2DR, FT-3DR & FT5D can be connected directly to a computer to become a node station.

FT-70DR
C4FM/FM 144/430 MHz Dual Band 5W Digital Transceiver
◀ 700 mW Loud and Clear audio, Commercial Grade Specifications ▶

FT-2DR
C4FM/FM 144/430 MHz Dual Band 5 W Digital Transceiver
◀ Improved 66 ch GPS receiver included ▶

FT-5DR
C4FM/FM 144/430 MHz Dual Band 50 W Digital Transceiver
◀ Improved 66 ch GPS receiver included ▶

FTM-100DR
C4FM/FM 144/430 MHz Dual Band 50 W Digital Transceiver
◀ Improved 66 ch GPS receiver included ▶

FTM-400XDR
C4FM/FM 144/430 MHz Dual Band 50 W Digital Transceiver
◀ Improved 66 ch GPS receiver included ▶

DR-2X
C4FM/FM 144/430 MHz Dual Band Dual Receive Digital Repeater

FTM-3200DR
C4FM/FM 144 MHz 65 W Digital Transceiver
◀ Genuine 65 Watts High Power ▶

FT-991
CW/SSB/AM/FM/C4FM HF/50/144/430 MHz Wide-Coverage 100 W All Mode Transceiver (144/430 MHz: 50 W)
◀ Real-Time Spectrum Scope included ▶

FTM-3207DR
C4FM/FM 430 MHz 55 W Digital Transceiver
◀ Heavy Duty 55 Watts High Power ▶

System Fusion II
C4FM Digital Pursuing Advanced Communications

System Fusion II Supports All C4FM Portables and Mobiles

- Firmware updates will enable System Fusion II compatibility with all existing C4FM products.
- FTM-3207DR: This device has not been approved by the FCC. This device may not be offered for sale or lease or be sold or leased until approval of the FCC has been obtained. The information shown is preliminary and may be subject to change without notice or obligation.

THE EQUIPMENT – SO WHAT DO YOU NEED!

*What Do I Need
To Make It Work*

THE EQUIPMENT – SO WHAT DO YOU NEED!

Nearby Fusion Repeater

You will just need a radio! If you can access a repeater you need no other equipment to access the Wires-X network.



THE EQUIPMENT – NO NEARBY DIGITAL REPEATERS

A Portable Node Setup

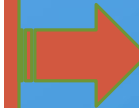
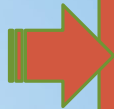
To setup a portable node you will just need one of these radios FTM-500/400/300/200/100, FT-2DR, and FT-3DR & FT-5DR and a computer interface cable to hook to the computer. This will now let you use the radio speaker and mic to connect to any room or node you want. *Note this will turn the radio into an interface box no RF will be transmitted.



THE EQUIPMENT – NO NEARBY DIGITAL REPEATERS

A Node Setup

On this setup you will need two radios. One that transmit and the other to connect to your HRI-200 box. This will give you freedom to move around and communicate to any room/node if you are in range of the node radio. This is also how most repeater are hooked up to the internet.



WiRES-X Software Interface – Not Needed As a "user" of YSF (WIRES-X)

The screenshot displays the WiRES-X software interface. The main window features a menu bar (File(F), View(V), Connect(C), Tool(T), Help(H)) and a toolbar. Below the menu bar is a table listing various users and their details.

G.User ID	DTM...	-Act	Call/RmName	City	State	Cou...	Freq(MHz)	SQL	Lat	Lon	Cc
MNWS-FUSION	21493	020	MNWS Fusion Group	Lino Lakes	Minnesota	USA					
MVARC-IDAHO	43210	018	MVARC BY KB7SQS	Twin Falls	Idaho	USA					
QSO-AMERICA	43815	009		Harvey	Illinois	USA					
CAROL-LINK	43008	009	Carolina Link	Charlotte	North Car...	USA					
DENVERSKYHUBLINK	46361	004	DENVERSKYHUBLINK	Wheat Ridge	Colorado	USA					
COLORADO-MEGA	40895	004	Colorado MEGA XC...	Castle Rock	Colorado	USA					
QUADNET-ARRAY	45058	002	Quadnet Array	Abilene	Texas	USA					
COLORADO-LNK	40052	002	COLORADO LINK	Denver	Colorado	USA					
SE-KANSAS	46341	001	SE-KANSAS	Pittsburg	Kansas	USA					
DWARC	46694										
NZEUS-ROOM	40963	000	Southern Tier Backup	Elmira	New York	USA					
COLORADO-MEGA	40895										
KCOJIM-HRO-DNR	40866	000	HRO Denver	Denver	Colorado	USA					
CQ-CANADA-VEIAO	40678										
OHIO-LNK	40557										
KANSAS-CITY	28952										

Below the main table is a section for room selection, showing "Room COLORADO-MEGA (40895) member 4 nodes". The selected room is "COLORADO-MEGA".

The bottom section of the interface displays a list of rooms and their details:

Room ID	DTM...	-Act	Room name	City	State
----AMERICA-LINK	21080	154	America Link Network	Beaumont	Texas
ALLJA-CQ-ROOM	20510	134	ALL JA CQ ROOM A	Komoro-city	Nagano
ALLJA-CQ-ROOM-D	20610	079	ALL JA CQ ROOM D	Komoro-city	Nagano
TEXAS-NEXUS	21636	055	TEXAS-NEXUS	Austin	Texas
ITALY	27003	042	WIRES-X ITALIA	Cassolnovo	Lombardy
CQ-CANADA-VEIAO	40678	036	CQ-CANADA-VEIAO	Truro	Nova Scotia
-----CQ-UK	27793	033	CQ-UK	Pudsey	West Yorkshire
---FUKUOKA-LINK-	20587	030	FUKUOKA-LINK	Fukutsu-city	Fukuoka
PHILIPPINE-LINK	43534	027	PHILIPPINE-LINK	Rancho Palos V...	California
OHIO-LNK	40557	027	Ohio Link	Columbus	Ohio
ARGENTINA-LINK	40831	025	ARGENTINA LINK	Caba	Buenos Aires
TSQLO945-ROOM	20945	025	fglf" fX/Pf-f"HD%at	Koriyama-city	Fukushima
THE-DARC-ROOM	28439	022	The DARC Room	Little Falls	Minnesota
KANSAS-CITY	28952	020	Kansas Ciy Metro		Kansas
MNWS-FUSION	21493	020	MNWS Fusion Gr		Minnesota

On the right side of the interface, there are several buttons: "NET", "DIGITAL", "ON-AIR", "LOCAL", and "COLORADO-MEGA". Below these buttons is a log window showing the following text:

```
User = KOPRA > ***** (DN:FT2D)
Uplink = AE2L (35755)
Downlink = WOSUNPOT2 (50410)
Room = (40895)

2020/04/16 16:57:22 Error: Socket
Communication Timeout.
2020/04/16 16:57:25 *-*-* Call Start No.40895
*-*-*
2020/04/16 16:57:26 Room Member 3 Nodes.
2020/04/16 16:57:26 Connected to COLORADO-
MEGA(40895).
```

At the bottom right, there are buttons for "SEND" and "CLR".

HOW IT WORKS – WIRES–X NETWORK

Nodes and Rooms

What is a Node and what is a room? When you sign up for a Wires–X node connection {HRI– 200} you get assigned a node number and a room number. For example Melbourne Florida Repeater W4MLB Node is 98532. By connecting directly to this node number you have a direct connection to the repeater. But only one user can connect this way. If you want to share the conversation among several users/nodes, then all the users would have to connect to the Repeater or room number 08532.

**Note if you have set up a portable node you will only get a node number and no room number*



HOW IT WORKS – WIRES–X NETWORK

Wires–X Repeaters & Rooms

If your lucky enough to live close enough to a digital C4FM repeater or a node, the repeater or node will be your direct link into the world of YSF/WIRES X. You would just tune to that repeater/Node frequency and start talking using DN Mode or AMS. In Brevard County there are limited digital repeaters and Nodes that stay full time connected.



HOW IT WORKS – WIRES–X NETWORK

Changing from Room to Room/Nodes:

So how do they work? A few Yaesu repeaters have node connections, but currently only the W4MLB Repeater is connected to the internet. HENCE if you can connect to the W4MLB or W4MIF Node via RF you will be able to change the room numbers to any room around the world. So by pressing a few buttons on your radio you can change the repeater to any other room, like "The Kansas City Wide" room # 28054 which connects you to the World! KC Wide has over 150 nodes/repeaters connected to it!



Ways to communicate with Fusion

- Simplex – promoting National Calling Frequency of 145.5625 MHz (FM users will hear digital “noise”)
- Repeaters – See repeater chart
- WiRES-X – like voip – communicate over internet
- PDN – Personal Digital Node
- Hotspots – YSF reflectors are NOT Yaesu and cannot connect directly to Wires-X

PDN – Portable HRI mode

- Digital and analog FM
- Note addition of audio cables
- Install USB cable driver first!
- Set radio to low power
- Use direct or hotspot mode–No HRI Hardware needed
- Use your radio
- USB Cable, audio cables (SCU–XX Cable Sold at HRO etc)
- Windows pc or tablet
- No special Internet setup
- Cannot host your own room
- FT70, FTM3200, FTM3207, FTM7250 do not have this capability
- Also need audio cable for mixed mode
- Runs on Windows 10 & 11
- Use at home or travel

Getting started with PDN

1. Can use only with FT2, FT3, FTM100, FTM400, FTM500/510 and FTM300 radios at this time.
2. Submit for WiRES-X registration at the following Yaesu website: <https://www.yaesu.com/jp/en/wires-x/regist/index.php> You need to register separately each radio you plan on using for PDN. Will need the radio ID. Instructions for how to read the ID are in the radio manual.
3. Order the USB and the audio cables if you plan on operating in mixed mode rooms with analog users.
4. Make sure your radio firmware is updated to the latest. There is main, sub and dsp firmware
5. Download and install the Wires-x software, ver. 1.53 or later on your windows pc. Note that there are minimum pc hardware and internet speed requirements
6. Help for setting up the pc here: https://wp.hamoperator.com/?page_id=41
7. N9RIM has put together a good document on the Southern Tier System Fusion Facebook page that goes into more detail on setting up a Wires-x HRI-200 and a Portable Digital Node.
8. The USB cable driver is a separate download and that must be installed for your particular radio BEFORE you plug it into your pc.
9. Set up communication port
10. Activate the Wires-x software.
11. Transceiver settings.
12. Download the additional manuals at the Yaesu website for the radio and the Wires-x software which is under the HRI-200 tab.

Local YSF & WIRES X Repeaters

FREQUENCY ▲	OFFSET	ACCESS	CALL	LOCATION	ST/PR	USE	MODE	MI	STATUS
<u>146.850</u>	-0.6 MHz	DG-00	W4MLB	Melbourne	FL	OPEN	FM/YSF/ WIRES-X	0.00	
<u>444.7250</u>	+5 MHz	107.2	K4CPJ	Vero Beach	FL	OPEN	FM EchoLink YSF WIRES-X	33.34 SSE	
<u>444.4250</u>	+5 MHz	107.2	W4MLB	Melbourne, Hospital	FL	OPEN	FM YSF	0.46 NW	
<u>444.3250</u>	+5 MHz	107.2	K4DCS	Melbourne, Trinity Towers	FL	OPEN	FM YSF	0.00 SSE	
<u>441.5000</u>	+5 MHz	156.7	N4TDX	Titusville	FL	OPEN	FM YSF	42.76 NNW	
<u>147.3450</u>	+0.6 MHz	107.2	W4AKH	Fort Pierce, WQCS-FM Tower	FL	OPEN	FM EchoLink YSF WIRES-X	48.23 SSE	
<u>147.2550</u>	+0.6 MHz	107.2	K4DCS	Palm Bay	FL	OPEN	FM YSF	3.59 SSE	
<u>146.7900</u>	-0.6 MHz	103.5	W4SIE	Saint Cloud	FL	OPEN	FM YSF	42.93 WNW	
<u>146.6400</u>	-0.6 MHz	107.2	K4JC	Vero Beach	FL	OPEN	FM EchoLink YSF	25.76 SSE	
<u>145.3100</u>	-0.6 MHz	107.2	W4IRC	Vero Beach, Indian River Med Center	FL	OPEN	FM YSF	33.34 SSE	
<u>145.1300</u>	-0.6 MHz	107.2	AB4AZ	South Vero Beach	FL	OPEN	FM YSF WIRES-X	33.34 SSE	

HOW IT WORKS – Local Access

W4MLB – 146.850 C4FM Repeater

Located at PCARS Club Station

W4MIF – 145.5625 YSF Node

Located Central Merritt Island

N4URW – 434.850 YSF Node

Located Palm Bay – **Currently Down due to lightning strike.**



WIRES X Connection (The RED X Button!)

Hotspots

- Many choices
- Price ranges
- Basically tunnels
- Connection to YSF, FCS, XLX reflectors
- Pi-Star is popular software
- Can add custom displays and cases
- Will cross-mode
- Will NOT connect to Wires-X



Amazon – MMDVM Hotspot



Shark RF – OpenSpot 4

Digital World on a Budget

FUSION Yaesu FT-70D \$150



DMR TYT MD-380 \$80-\$100



Jumbospot \$70-\$100



Build Your Own Hotspot - \$40

<https://www.dmr-utah.net/hotspot>



Where To Begin?

► <https://www.pistar.uk/>

PI-STAR

BrandMeister Tools

DMR+ Tools

D-Star Tools

YSF/FCS Tools

P25 Tools

NXDN Tools

Pi-Star Digital Voice Dashboard for MW0MWZ

Dashboard | Admin | Config

Modes Enabled	
D-Star	DMR
YSF	P25

Network Status	
D-Star Net	DMR Net
YSF Net	P25 Net
Internet	

Radio Info	
Trx	Listening
Tx	431.187500 MHz
Rx	431.187500 MHz
FW	ZumLibre:20170414

D-Star Repeater	
RPT1	MW0MWZ B
RPT2	MW0MWZ G
D-Star Network	
APRS	uk.aprs2.net
IRC	rr.openquad.net
Linked to REF001 C (DPlus Outgoing)	

DMR Repeater	
DMR ID	2353150
DMR CC	1
TS1	disabled
TS2	enabled
TG 91/not linked	
DMR Master	
bn-dmr.uk	

Active Starnet Groups				
Calisign	LogOff	Info	UTOT	GTOT
PISTAR B	PISTAR U	Pi-Star User Group on D-Star	30	30
GW6GM B	GW6GM U	Blackwood Club Members Group	30	30

Last 20 calls heard via this Gateway							
Time (BST)	Mode	Calisign	Target	Src	Dur(s)	Loss	BER
2017-05-30 16:30:19	D-Star	43VDR/DAVE	CQCCQ via REF001 C	Net	0.8	0%	0.2%
2017-05-30 16:27:55	DMR Slot 2	434CWN	TG 91	Net	0.5	0%	0.1%
2017-05-30 16:25:15	DMR Slot 2	43KAS	TG 91	Net	10.5	8%	0.0%
2017-05-30 16:24:52	DMR Slot 2	43WDRH	TG 91	Net	18.1	0%	0.0%
2017-05-30 16:19:35	DMR Slot 2	43HSP	TG 91	Net	1.6	0%	0.0%
2017-05-30 16:17:56	D-Star	43WQJ/5100	CQCCQ via REF001 C	Net	11.8	0%	0.0%
2017-05-30 16:17:23	D-Star	43WQJ/DNGL	CQCCQ via REF001 C	Net	1.4	0%	0.0%
2017-05-30 16:16:36	D-Star	43WA	CQCCQ via REF001 C	Net	0.7	0%	0.0%
2017-05-30 16:11:39	D-Star	433LC/d74	CQCCQ via REF001 C	Net	1.9	0%	0.5%
2017-05-30 16:10:44	D-Star	43WQJ/INFO	CQCCQ via REF001 C	Net	7.1	0%	0.0%
2017-05-30 16:10:42	D-Star	43WQJ/M	I	RF	0.7		0.0%
2017-05-30 16:09:28	D-Star	434556/WIN	CQCCQ via REF001 C	Net	1.2	0%	0.0%
2017-05-30 16:05:55	D-Star	43WQJ/NEIL	CQCCQ	Net	7.9	0%	0.0%
2017-05-30 15:56:09	D-Star	434308/DVAP	CQCCQ	Net	0.1	0%	10.3%
2017-05-30 15:54:49	D-Star	43WQJ/ID51	CQCCQ	Net	1.2	96%	0.0%
2017-05-30 15:49:35	D-Star	43432L	CQCCQ	Net	0.0	0%	0.0%
2017-05-30 15:48:20	D-Star	434K1A/RSNC	CQCCQ	Net	0.4	0%	0.0%
2017-05-30 15:47:01	D-Star	43WQJ/ID31	CQCCQ	Net	0.2	0%	0.0%
2017-05-30 15:40:50	D-Star	4355PK/SUN	CQCCQ	Net	0.4	0%	0.0%
2017-05-30 15:36:33	D-Star	43WQJ/DNGL	CQCCQ	Net	6.8	0%	0.0%

Last 20 calls that accessed this Gateway						
Time (BST)	Mode	Calisign	Target	Src	Dur(s)	BER
2017-05-30 16:10:42	D-Star	43WQJ/M	I	RF	0.7	0.0%

Pi-Star / Pi-Star Dashboard, © Andy Taylor (MW0MWZ) 2014-2017.
ICODBGateway Dashboard by Hans-J. Berthoin (DL5BI),
MW0MWZdash developed by Kim Huebel (DG5VH).
Need help? Click here for the Support Group
Get your copy of Pi-Star from here.

HOW IT WORKS – WIRES–X NETWORK

Active Room List

http://www.yaesu.com/jp/en/wires-x/id/active_room.php

Active Node List

https://www.yaesu.com/jp/en/wires-x/id/active_node.php

LATEST WIRES-X ACTIVE ROOM ID LIST							
Update every 20 min 1							
ROOM ID	DTMF ID	Act▼	Room Name	City	State	Country	Comment
ALLJA-CQ-ROOM	20510	112	ALL JA CQ ROOM A	Komoro-city	Nagano	Japan	*CQ ROOM* for JA ALLmodes - CQが出せる広域シブ けます
—AMERICA-LINK	21080	106	America Link Network	Beaumont	Texas	USA	America Link Network-Central
ALLJA-CQ-ROOM-D	20610	045	ALL JA CQ ROOM D	Komoro-city	Nagano	Japan	*CQ ROOM* for PDN and Digital -- http://cqwires.com
TEXAS-NEXUS	21636	044	TEXAS-NEXUS	Austin	Texas	USA	Howdy! Linking Texans and Texans at Heart together.
ITALY	27003	042	WIRES-X ITALIA	Cassolnovo	Lombardy	Italy	WIRES-X ITALIA - http://www.wires-x-italia.it
—FUKUOKA-LINK	20587	030	FUKUOKA-LINK	Fukuoka-city	Fukuoka	Japan	--C4FM/APRS UHF 96/12bps yousers Group
—CQ-UK	27793	028	CQ-UK	Pudsey	West Yorkshire	UK	XLX925A ALL MODES
OHIO-LINK	40557	027	Ohio Link	Columbus	Ohio	USA	Ohio Link Net Sunday at 8:30 PM Eastern.
TSQI 0945-ROOM	20945	026	トーンスケルチ愛好会	Koriyama-city	Fukushima	Japan	WIRES-X おめでとう！
CQ-CANADA-VE1AO	40678	025	CQ-CANADA-VE1AO	Truro	Nova Scotia	Canada	
MNWIS-FUSION	21493	023	MNWis Fusion Group	Lino Lakes	Minnesota	USA	Minnesota and Wisconsin Fusion room

Radio Operating Etiquette

- Check your mic gain. Over modulating will cause distortion and dropouts over networks. Your special mic or Bluetooth mic might be handy but some sound like crap on digital...
- Leave 2 second gap between transmissions
- Push PTT then wait a second before talking. When done talking wait another second before releasing the PTT
- Call signs show up on the radios. You do not need to give both call signs at the beginning and end of each transmission. Identify per FCC rules every 15 minutes as normal as some network connections may not pass your call sign
- Do NOT quick key like you do to connect and disconnect. It disrupts the network and interferes with existing QSO's. Use WiRES-X for control to find out if repeater is connected and what room it is connected to or to change rooms.
- On FM/YSF Repeater – First ask if the repeater is in use before going to Digital. Always “disconnect” WIREs-X after using digital side of repeaters. (Usually the “*” key on Mic for 2 – 3 seconds. Or the “Band Key “ on FT5D

HOW IT WORKS – WIRES–X ROOMS

Here are some of the most popular Wires–X rooms

28054 – Kansas City Wide – 150

21080 – America Link Network – 97

21636 – TEXAS–NEXUS – 44

27003 – WIRES–X ITALIA – 41

27793 – CQ–UK – 25

40557 – Ohio Link – 18

40678 – CQ–CANADA – 24

Room Number – Name – Number of Connections



HOW IT WORKS – WIRES–X ROOMS

Here are some of the Wires–X Nets

America Link Net – Saturday 8:00PM – 21080

Digital Amateur Net {TX} – Saturday 8:00PM – 21636

Ohio Link – Sunday 8:30 PM – 40557

Some even have their own logos and ads on Facebook:



Useful YSF Links

System Fusion Links... Official Yaesu US Website: <https://www.yaesu.com/> Official Yaesu Japan Website (English): <http://www.yaesu.com/jp/en/index.html> Official Yaesu Facebook Page: <https://www.facebook.com/groups/yaesuusa/> Official Yaesu Fusion Facebook Page: <https://www.facebook.com/groups/YaesuSystemFusionOfficial/> Good for maps and general (but not updated in a while): <http://c4fm.xyz/> Hotspot history and what they are: <https://www.youtube.com/watch?v=TuEpFJbXNq4> Finding Fusion rooms: fusion.ke5eo.com Difference between Yaesu WiRES-X and hotspots: https://www.youtube.com/watch?v=RghsOLCv_mU What is System Fusion: <http://systemfusion.yaesu.com/what-is-system-fusion/> RTSystems Programming https://www.youtube.com/watch?v=pT8FiVvDQNs&fbclid=IwAR19uRJ8tXHFLQhi4Uk5JVZZ_zWne_gWNTb_MFkkcUROK7hXkOb_6SYxNwM Southern Tier System Fusion Network: <https://www.facebook.com/groups/174762320398275/> 145.5625 Fusion Simplex: <https://www.facebook.com/groups/1731516706988359/> Yaesu's WIREs-X: <https://www.facebook.com/groups/wiresx.fusion/> Excellent site with great info: <http://hamoperator.com> Information on Fusion and MMDVM projects: <http://ve1cra.net/main/ysf.html>

Yaesu FT-70DR Wires X Control https://www.youtube.com/watch?v=_luhryJODP4&t=2s Yaesu FT-70DR Wires X Operations https://www.youtube.com/watch?v=C_T43pSLgol How to use Wires-X on the FT3D : <https://www.youtube.com/watch?v=NsZR9K4EhY0> FTM-100 Wires-X Portable Digital Node + Firmware update : <https://www.youtube.com/watch?v=qpu1QjH0k00> (Laboenligne.ca) Yaesu USA Soundcloud: <https://soundcloud.com/user-620300163> YSF Reflectors: <https://register.ysfreflector.de/> FCS Reflectors: <http://fcs001.xreflector.net/> Yaesu Wires-X active node list : https://www.yaesu.com/jp/en/wires-x/id/active_node.php Lots of info on digital modes and pi-star hotspots : <https://amateurradionotes.com> Pi-Star main page : pistar.uk and youtube videos on pi-star setup by W1MSG: <https://www.youtube.com/channel/UCcjYjtognBaSAaZLk3EU2A/videos>

This Presentation with Links can be downloaded at

W4MIF.COM

Thank you

W4MIF – Randy Hunter