

WIRES-X AND THE FT-70D



**How to use your FT70D
remotely with WIRES-X and
Wires-X Nodes.**



WIRES-X AND THE FT-70D



The FT70D is a very versatile and affordable hand-held capable of;

- ✓ **Dual band operation**
- ✓ **C4FM / FDMA**
- ✓ **FM Analog**
- ✓ **But no WIRES-X Portable Digital Node compatible, unlike the FT2D, FT3D and FT5D**

This presentation describes the process to connect the FT-70D in C4FM mode to an FTM-300D radio connected to WIRES-X running on a PC, allowing the user to switch rooms on the FT-70D remotely, rather than clicking on the rooms in the WIRES-X program on the PC, or on the FTM-300D.

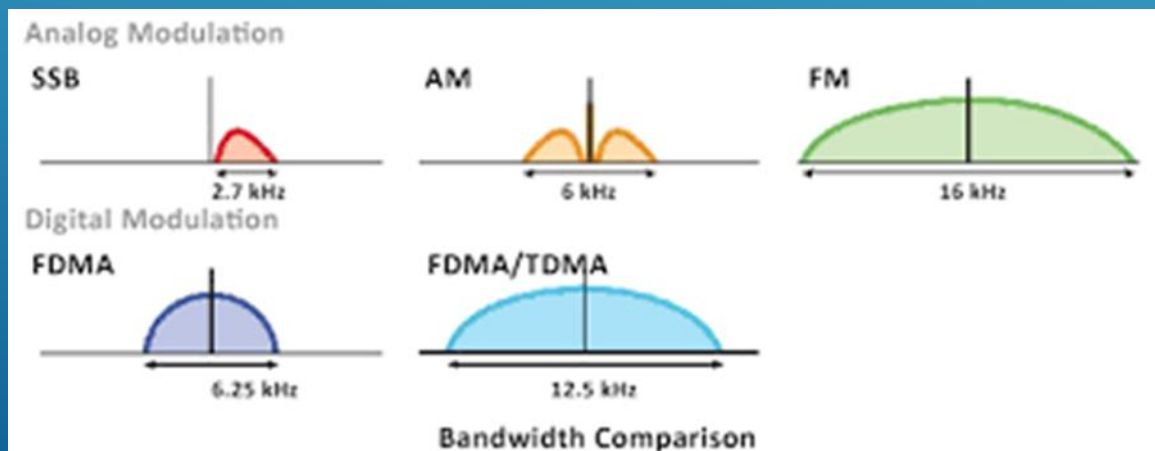
BACKGROUND - WHAT IS WIRES-X ?

- ❑ **Wide-coverage Internet Repeater Enhancement System (WIRES)** is a *de-facto* standard created by Yaesu designed to link compatible amateur radio repeaters over Voice over IP, allowing any home stations using those repeaters to communicate with each other over VoIP.
- ❑ Wires-X is a networking technology that runs on top of System Fusion. It provides a network of repeaters. Wires-X has a concept called rooms where multiple repeaters and nodes can connect and talk to each other.
 - ❖ **WIRES** - began as an experimental Internet linking project in the United States (California), and the initial Beta testing led to the development of an expanded and enhanced protocol with WIRES II.
 - ❖ **WIRES II** - Yaesu terminated WIRES-II service on Saturday, September 30, 2017. They moved the WIRES-X Internet linking system.
 - ❖ **WIRES-X** - Supports the C4FM digital and the voice technology enables high sound quality. By repeating C4FM digital data as it is via the Internet.
- ❑ Yaesu has implemented their System Fusion utilizing a customized, yet open, C4FM FDMA standard (4 - Level FSK Technology) to transmit digital voice and data over the Amateur radio bands.



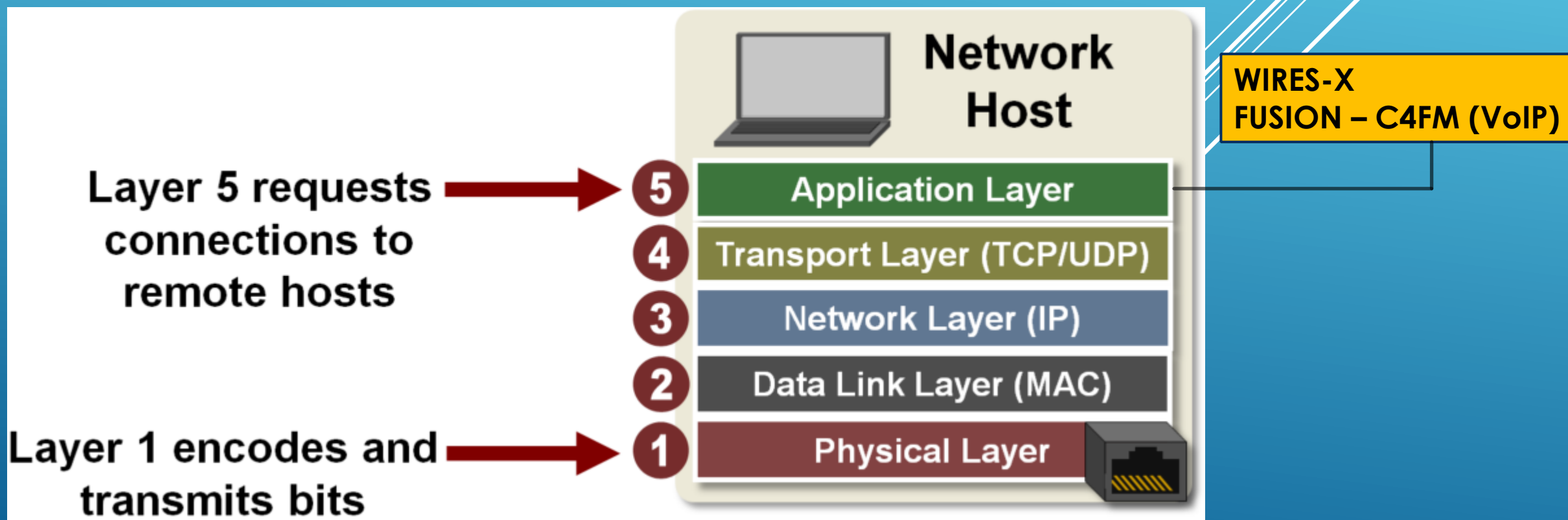
BACKGROUND - WHAT IS WIRES-X ?

- ❑ C4FM stands for **CONTINUOUS FOUR LEVEL FREQUENCY MODULATION**, which is a special type of 4PSK modulation, which is used in conjunction with FDMA (Frequency Division Multiple Access). FDMA is the same mode used in P25 by public service groups including Emergency Responders, but the higher layer data frame is not compatible.
- ❑ This sets C4FM apart from other digital voice technologies, such as D-STAR, DMR, P25, and NXDN is that it is backward compatible with Analog FM.
- ❑ Bandwidth for C4FM is 12.5 kHz at 9600 baud. Below is a comparison of bandwidths between various modulation techniques.



BACKGROUND - WHAT IS WIRES-X ?

IP NETWORK LAYERS with Yaesu's Fusion/WIRES-X Implementation over the Internet:



WIRES-X - Terminology

Node - Radio repeater connected to the Internet via a PC, which repeats communications of a conventional amateur radio as an access point. An example would be the VE9FNB repeater which is connected to Wires-X – CQ-MARITIMES ROOM (Rm #60207)

Local Node - This is a Node within the radio communication range of a conventional amateur radio station. An example would be a radio that can reach our VE9FNB repeater.

Analog Node - A Node that is a transceiver or repeater using a conventional FM format and can only repeat DTMF (Dual Tone Multi Frequencies) codes and analog audio transmission/receptions.

Digital Node - This is a Node which is a transceiver or repeater compatible with digital communications in C4FM (Continuous 4 Level FM) format. With this type of Node you can not only relay voice communications, but also text and image data transmissions. One can also repeat DMTF codes and audio transmissions/Receptions.

Convention Amateur Station - This is a normal Amateur Radio station either an individual on a hand held radio, a mobile radio and a base station.



WIRES-X - Terminology

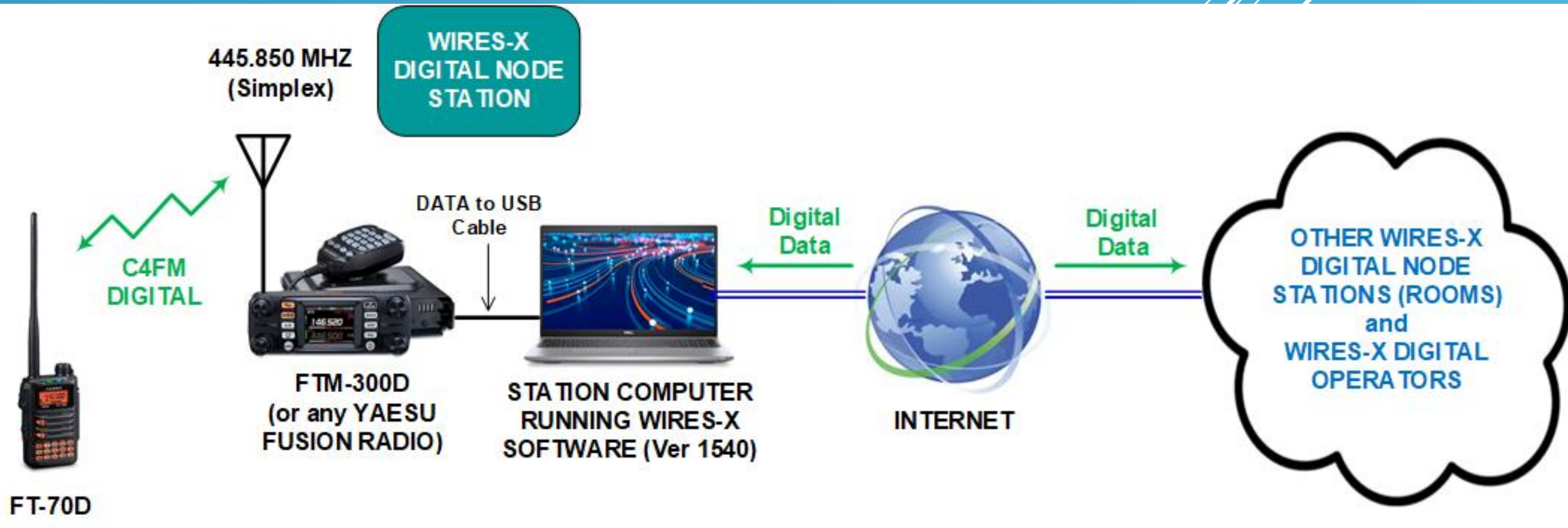
Room - This is a WIRES X Network community space to which multiple Nodes can connect simultaneously, like the conference call. This is a place where all amateur station can link to each other via local Node and communicate with each other. In addition to voice communication, one can chat with text messages on the PC use for the local Node.

WIRES X user ID (node) - YAESU provide identification name with the WIRES X node. Each node is assigned a DTMP ID (5-digit number, e.g. 71674) and user ID (alphanumeric e.g. VE1TE-ND) up to 10 digits in length provided. Wires-X user IDs are assigned by Yaesu when you register equipment to run a WiresX node.

ID List Nodes and rooms which currently operating WIRES are listed and published on the Yaesu website (https://www.yaesu.com/jp/en/wires-x/id/active_node.php). The website shows information such as IDs, the call sign and the node operating frequency.



MY WIRES-X SETUP WITH THE FT-70D



HOW DO I SET UP MY NODE?

1. WIRES-X Software Installation and Configuration

- ☐ Update or install the new version of WIRES-X Ver 1540 on your PC. A copy can be obtained from the Yaesu website under the HRI-200 device. This version looks the same as the 1530 version.



*If you are updating your WIRES-X program from Ver 1530, the configuration files will be retained with the new version. However, you should plan to **EXPORT** (save the configuration file on your computer).*

- ☐ When installing **WIRES-X Software**, a "Destination Folder" window will appear. In that window there is a check-mark for "**Enable WIRES-X Auto Start**". If you want to have Windows start **WIRES-X** on boot-up, or if **WIRES-X** is terminated for some reason, check this box and it will reboot automatically. For some users, this is a must.
- ☐ If you **don't** want to have Windows auto-boot **WIRES-X**, do not check this box, and ensure that the YmLAN program has been removed from the Task Manager background processes. This program is used to automatically reload **WIRES-X** when closed or re-booted.
- ☐ Once **WIRES-X** has loaded, click on **WIRES-X Software** icon on your computer, and ensure the USER-IDs, ROOM-ID's, BOOKMARKS and other configurations have been loaded.
- ☐ Under **FILE** -> select **TRANSCIVER (T)**. A window will appear with info to be inputted for the frequency, DG-ID (normally set to 00.00) and power level (LOW) you want to operate the FTM-300D in "WIRES-X Node" mode. This will transfer the information to the FTM-300R when the radio is put into WIRES-X node.

HOW DO I SET UP MY NODE?

2. FT-70D and FTM-300D Configuration

- ☐ Ensure the FTM-300M is in either PDN mode [**DX + POWER**] or WIRES-X mode [**GM + DX + POWER**] and on the select simplex frequency. See Appendix A for details.
- ☐ Select the simplex frequency on the FT-70D to communicate to the FTM-300D, and save it is memory. In my case I chose 445.850 MHz. *Check with RAC Band Plan for 70cm.*
- ☐ Click the [**A/B**] button (not press) to select the radio into either **DIRECT** or **ACCESS** mode. For operation with the FT-70D. Select ACCESS mode, and the simplex frequency should be displayed.
- ☐ Press and Hold the [**DX**] button and the radio will disconnect from WIRES-X. The red **X** will disappear.



*When you are in **ACCESS** mode in the **PDN** mode and you are connected to WIRES-X, you will transmit out over the internet as well as on the frequency displayed on the FTM-300D.*

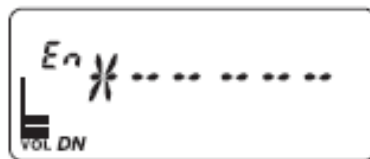


*When you are in **ACCESS** mode in the **WIRES-X** mode and you are connected to WIRES-X, you can not transmit with the mike on the FTM-300D.*

HOW DO I SET UP MY NODE?

3. WIRES-X Operation on the FT-70D ([see page 30 of the FT-70D Operating Manual](#))

- ☐ Ensure you are on the correct simplex frequency on the FT-70D and the FTM-300D.
- ☐ Press **[F] + [AMS]** on the FT-70D to connect the WIRES-X to the FTM-300D.
 - The message **WIRES** will flash on the FT-70D screen until it is connected.
 - The FT-70D will connect to the local node (*i.e. VE1TE-ND in my case*). At this point you are only connected to and communicating with the FTM-300D.
 - If this is the first-time operating WIRES-X with the FT-70D, there may be no rooms programmed into memory. If so, you can input the desired room # in the Direct Entry screen (En screen);



- Press **[AMS]** to connect to the room. *Note: Pressing the [PTT] will not connect to the room.*
- Once connected, the FT-70D will display **CONNECT** you will see the Room name being displayed on the FT-70D. You can then press the **[PTT]** button and start a conversation.
- In order to program and save the rooms in the FT-70D, you have to be connected to the entered room. Press and hold **[1 - 5]**, while in the **Cn** screen to store that room into the memory location.
- Once you have several rooms stored you can select any of the 5 memories (once programmed) via the Dial knob.

HOW DO I SET UP MY NODE?

- ☐ To change to a different room on the FT-70D, turn the dial knob to the desired stored “room” in one of the 5 rooms stored in memory and press **[PTT]**. The Wires-X system will disconnect and automatically connect you to the new selected room.
- ☐ The other method to change rooms is to enter the desired room # in the Direct Entry screen ((En screen) and press **[PTT]**, which will connect you to the selected room. You can get a complete Node/Room listing from Yaesu website (https://www.yaesu.com/jp/en/wires-x/id/active_node.php)



If a conversation is taking place while you are connected to that node, you cannot disconnect by the above methods until the conversation or network is clear.

- ☐ To Disconnect for the Wires-X and/or a room#, press **[BAND]**. The FT-70D will display **DISCON** and the connection to the FTM-300D node will still be displayed.
- ☐ To go back to normal operation on the FT-70D, press **[MODE]**, and the last frequency memory will be displayed. This will bring you back to the normal operation of the FT-70D with all the memory allocation for normal FM operation.

ON-LINE DEMO WITH VE1OL

Acknowledgements:

- Wires-X Bible (2021) - WB7OEV, K9EQ, and HamOperator.com
- An Introduction to Wires-X – KB5 TX
- Yaesu WIRES-X Websites, Documentation and Equipment
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