Hotspots

January 27, 2019
Pi-star

YSF Reflectors

Hotspot Bridges

YSF Global Monitor

DV4mini Fusion Monitor Program

This is a discussion about hotspots and their use on Yaesu System Fusion.

Hotspot Overview

“Hotspots” are digital-only, small, low-power radio transceivers that connect to reflectors on the network. They are simple “gateways” that take the digital data from a radio and process it so that it may be streamed on the Internet. They are purely digital and have no ability to process analog audio – that’s all done by the radio!

Reflectors are servers that allow Hotspots to connect to each other. Hotspots don’t require any incoming ports to be open so it is impossible to remotely connect to a Hotspot. The reflectors do have incoming ports open (like a web server) and that does allow Hotspots to originate connections to them. Thus all Hotspots must connect to a Reflector.

There are many different types of reflectors, but for this discussion I am only going to refer to reflectors that support Yaesu System Fusion (YSF). The two types of reflectors are “FCS”

and “YSF”.

An FCS reflector is a large server that can host up to 100 “Modules”. In this case each module is like a Room or a channel. There can be 100 independent groups that are only separated by their module or channel number. The modules are identified by a number, such as “FCS003-23”. As of this writing there are only 5 FCS reflectors in the world. They are FCS001: Europe, FCS002: Florida, FCS003: Canada, FCS004: Spain, and FCS005: Experimental. There is a master List Server that is the root for defining all of the FCS reflectors and providing information needed to locate them on the Internet. This List Server is at: TBD.

YSF reflectors can only host one Room or Reflector per instance. Unlike FCS, it is easy for an individual or a club to set up their own YSF Reflector. YSF Reflectors are identified by their name, i.e., “US MNWis RDNT”, or their number, i.e. “21493”. Like the FCS reflectors, YSF Reflectors use a master List Server: ysfreflector.de.

When using a Hotspot, you’ll need to connect the radio end and the Internet end. For the radio end you’ll set a frequency for the “Modem”. This is usually a simplex frequency and is the same frequency that you must use from your Fusion radio.

On the Internet side, you’ll need to connect to one of the available reflectors.

Hotspot Hardware

Most hotspot hardware is very similar but there are two basic types and the type you get will depend on how you want to use it and your comfort with computer technology.

Commercial Hotspots are manufactured units that are maintained

by the manufacturer. By that I mean that firmware updates are easy to accomplish and you do not need to know anything about the underlying firmware technology. As of this writing, the only commercial vendor is SharkRF. No longer available, the DV4mini was another commercial hotspot.

Open Hotspots are those in which the device is a collection of independently developed firmware, software, and hardware. While the "openness" has permitted a proliferation of Open Hotspots, the quality has not always been good and the user will, at one time or another, find the need to know something about Linux.

In some cases the Open Hotspots have design flaws that cause issues on a network or result in very poor performance. So you take your chances with Open Hotspots.

Bottom line: If you don't want to know about Linux, buy from SharkRF.

Hotspots and Fusion

Yaesu has two networks that support System Fusion. They are IMRS and WiRES-X. You are more likely to be familiar with WiRES-X so we'll ignore IMRS for now.

Yaesu manages the WiRES-X network through their own List Server. Each WiRES-X Node can also be a Room or "Reflector" and permit many nodes to connect simultaneously. Unlike Hotspots, WiRES-X permits Node-to-Node connections without an intermediate server or reflector. This is an important point: **NO HOTSPOTS CONNECT TO WiRES-X!** The Hotspot networks are not compatible with the WiRES-X network. (Also note that the FCS network is not compatible with the YSF network, so this isn't a "Yaesu thing".)

Hotspot networks can be connected to WiRES-X through a "Bridging" process. This is done by connecting a WiRES-X Node to

a WiRES-X Room. A Hotspot is set to the same frequency as the Node and connected to the Bridging Reflector. So when a person talks on a Hotspot and is heard on a Fusion Repeater, the process goes like this:
HT -> RF -> Hotspot -> Internet -> Reflector -> Internet -> Hotspot -> RF -> WiRES-X Node -> Internet -> WiRES-X Room -> Internet -> WiRES-X Repeater Node -> Wire -> Fusion Repeater
As you can see that's a long path and a good reason to leave breaks between transmissions!

Setup

Bridging *your* WiRES-X room to a hotspot reflector

This is surprisingly easy to do. Take a WiRES-X node set to a simplex frequency. Add a hotspot set to that same frequency and set the hotspot to the reflector you wish to use. Note that you MUST leave the WiRES-X node connected to YOUR room. If you change the WiRES-X node to another room you may unintentionally bridge another network. Believe me when I say that network operators do not like this! It may cause looping if your hotspot is set to a reflector that already carries the room your WiRES-X node is connected to.

DO NOT BRIDGE ANYTHING OTHER THAN YOUR OWN ROOM/REFLECTOR.

You may find it necessary to change a gateway function within the hotspot to get this to work. This tells the hotspot it is not "talking" to a user/radio, but talking to a node instead.

Fixing Hotspots

My post on getting inexpensive Chinese 0.96″ OLEDs to work on hotspots. (Tired of funny stuff scrolling across the screen where there should be text?)

Trouble getting DMR working on Pi-star? Try this. This is also a good article on how to use a spectrum analyzer to set up a digital transmitter.
Note: A take-away from this is that Fusion is way easier setup and use.

Resources

Hotspot suppliers

OpenSpot: SharkRF.com
TGIF (USA, custom programming: http://tgifspot.com
Nextion Display Files and setup instructions: http://mitchhopto.com/index.html

For additional discussion of Pi-star and common Hotspot hardware, continue to the Pi-star page.

For a list of WiRES-X to Hotspot bridges, see: Hotspot Bridges

Check the HamOperator blog for further hotspot developments.