

How to configure a Remote Spectrum Display for N1MM+

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N1MM+ has the capability of displaying its spectrum window on multiple computers. I happen to do a lot of remote operation and use N1MM+ for logging exclusively. One difference between local and remote operation is the ability to have a spectrum display.

One difficulty in using an SDR at the station end, and displaying at a remote site, is the bandwidth required. Typically, this involves either displaying the spectrum on a local monitor at the station, and using a remote-desktop program to ship the pixels across the Internet, or, sending the I/Q signals from SDR over the internet, and doing the decoding/display work on the remote station PC. Both of these methodologies require significant bandwidth, which, for the remote stations I use, is not available.

N1MM+ remote spectrum display does the FFT/Decimation at the station. What is sent over the Internet (or LAN) is a very small XML document which describes what to draw. The average bandwidth requirement is about 6 kilobits per second – FAR less than shipping pixels or I/Q!

In my remote operation, we use a remote desktop application to view the amplifier, rotators and antenna switching. N1MM+ is always run on the remote PC, and this talks to the RemoteRig box controlling the remote radio.

What is required:

- N1MM+, latest rev, must be running at both the station end and at the remote end.
- N1MM+ must be configured to use the AirSpy HF+ as it's spectrum source. You can use i-f or rf ports on your radio (Mine is a K3).
- N1MM+ at the station end DOES NOT have to be connected to the radio for rig control. Frequency information will be provided by the remote-side.

Configuring your Station and Remote Routers

In order to correctly forward the remote spectrum display information, you must do port forwarding on both the station-side and remote-side routers.

Each router will have a different way of doing port forwarding. You'll have to research and figure out how to do it. You'll need the username and password of your router (Have you forgotten it?)

Once you have it open on the Port Forwarding page:

- Add a Port Forward (It might be called a custom forward)

For the Station Side:

Type: UDP Outside/WAN Port: 13064 Inside/LAN Port: 13064

Destination LAN IP: The address of the computer running N1MM+ with AirSpy HF+

You can find the ip address of your N1MM PC by looking at the Network Adapter Status, or, by going to a command prompt and issuing the command: ipconfig/all. If you have multiple network adapters, make sure you get the address which is the same subnet as your router (first three octets the same (like 192.168.1.X or 192.168.0.X)).

(Be careful here – if your PC with N1MM has a DHCP (Automatically assigned IP Address), it might change in the future. Ether make the PC a fixed address, or, use a DHCP Reservation. If you don't know what that is, Google it.)

For the Remote Side:

Type: UDP Outside/WAN Port: 13064 Inside/LAN Port: 13064

Destination LAN IP: The address of the computer running N1MM+ for the Remote.

You can find the ip address of your N1MM PC by looking at the Network Adapter Status, or, by going to a command prompt and issuing the command: ipconfig/all. If you have multiple network adapters, make sure you get the address which is the same subnet as your router (first three octets the same (like 192.168.1.X or 192.168.0.X)).

(Be careful here – if your PC with N1MM has a DHCP (Automatically assigned IP Address), it might change in the future. Ether make the PC a fixed address, or, use a DHCP Reservation. If you don't know what that is, Google it.)

An Example Port Forwarding Setting on a DLink Router, provided by Tom, N1MM:

The screenshot displays the NETGEAR Genie web interface for a NETGEAR Nighthawk(R) X4S R7800 router. The browser address bar shows the URL 192.168.1.1/adv_index.htm. The interface is divided into a sidebar on the left and a main content area on the right. The sidebar includes sections for BASIC and ADVANCED settings, with the ADVANCED section expanded to show various configuration options. The main content area is titled "Port Forwarding / Port Triggering" and contains a form for adding new services and a table of existing services.

NETGEAR genie
Nighthawk(R) X4S R7800
Router Firmware Version V1.0.2.28

ADVANCED | Port Forwarding / Port Triggering

Please select the service type.
 Port Forwarding
 Port Triggering

Service Name: FTP | Server IP Address: 192.168.1. | Add

#	Service Name	External Ports	Internal Ports	Internal IP address
1	N1MM-12071	12071	12070	192.168.1.7
2	N1MM-12070	12070	12070	192.168.1.8
3	Spectrum	13064	13064	192.168.1.7

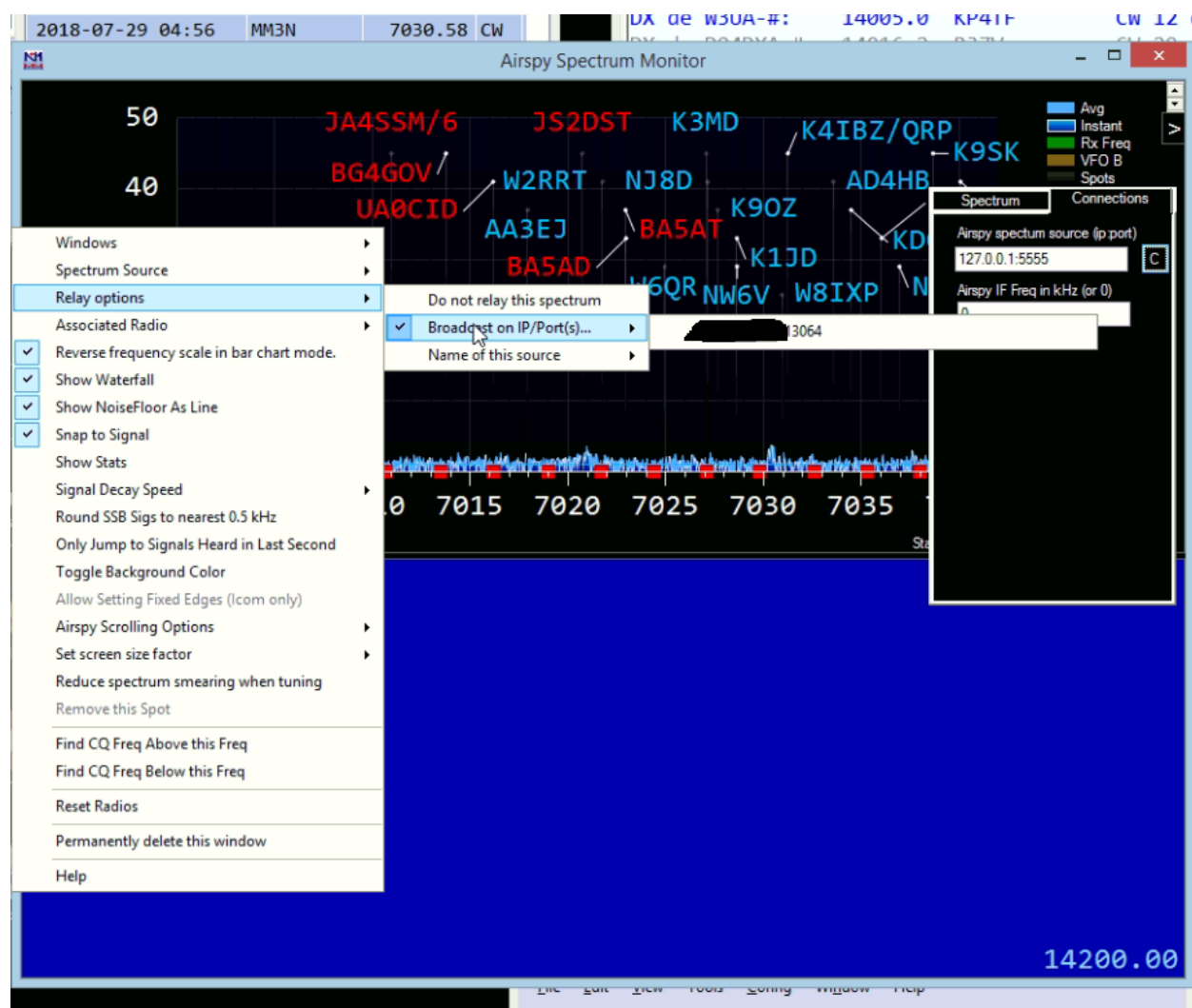
Buttons: Edit Service, Delete Service, Add Custom Service, Arrange by internal IP

Footer: Help & Support | Documentation | Online Support | Router FAQ | GNU GPL | SEARCH HELP | Enter Search Item | GO

Making the Magic Happen

There are two settings required to make this work:

Station Side:



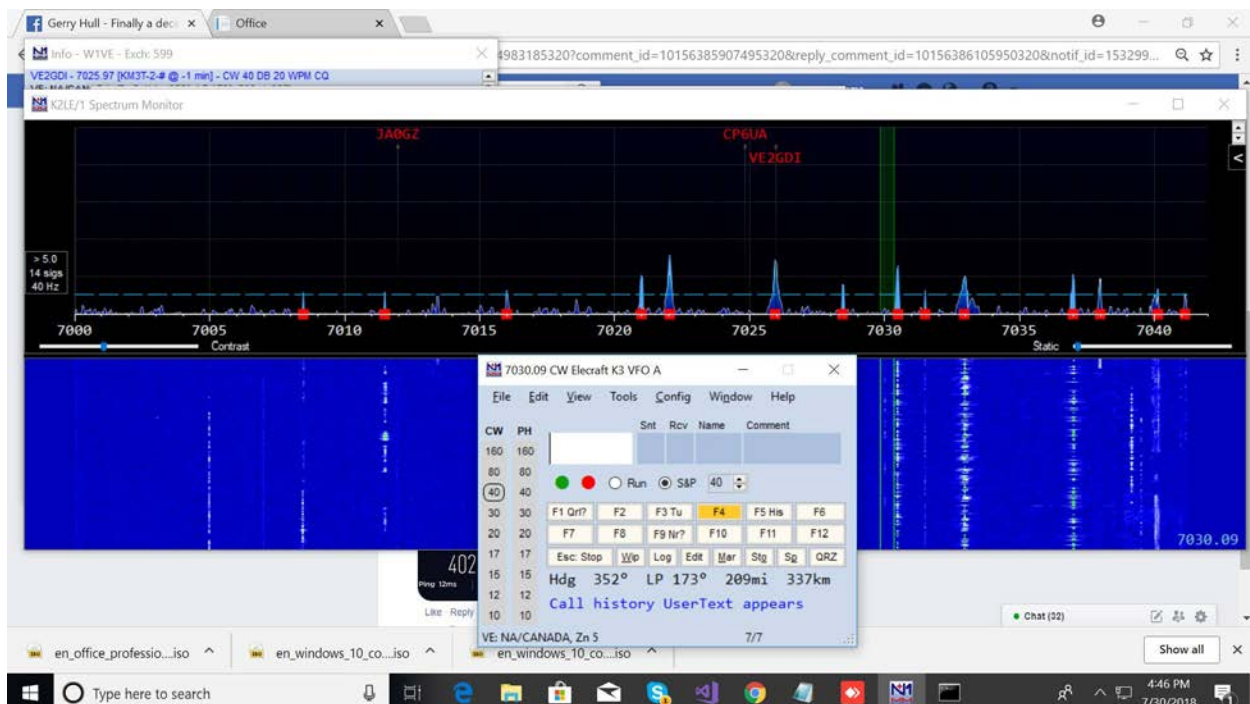
Go to the Spectrum Window which is already running. On the Relay Options menu, Select the “Broadcast on IP/Port” menu. Then, you can type in one or more DNS:port or IPAddress:port combinations, separated by commas.

The DNSname or IPAddress should be the DNS or IPAdress of your remote-side computer. If this is an address with a dynamic IP address, I suggest getting a Dynamic DNS account, so that it will always work if your IP address changes. The Port is going to be **13064**. If you have more than one remote user who wants to use the feature, use a comma between entries.

Once you have made this setting, also go to Relay Options->Name of this Source, and enter a name. In the example here, the station is K2LE/1.

Remote Side:

Open the Spectrum window, and display the Spectrum Window:



From the right-click context menu, select Spectrum Source, go to the bottom of the list, and enter the name of the source you specified at the station.

This is all you need to do. The Spectrum should populate!!

Controlling the Frequency of the AirSpy HF+ from your remote

The final piece is making your remote station change the frequency of the K3 back at the station, so that the AirSpy HF+ change when you change frequencies at the remote. You do this via the N1MM+ Config Menu:

Select the type of data you wish to broadcast, and the the IP Address(es) and port(s) for the receiver(s) of the data. Use 127.0.0.1 for the local machine. Use 12060 as the port unless the receiving application requires a different port. 255 in the low order octet will broadcast to your current subnet.

Type of data	IP Addr:Port	IP Addr:Port...
<input type="checkbox"/> Application Info		127.0.0.1:12060
<input checked="" type="checkbox"/> Radio	192.168.1.1	13064
<input checked="" type="checkbox"/> Contacts <input checked="" type="checkbox"/> All Computers		127.0.0.1:12060
<input type="checkbox"/> Spots		127.0.0.1:12060
Rotor		127.0.0.1:12040
<input type="checkbox"/> Score		127.0.0.1:12060

WSJT and JTAlert connection settings. IP Address and port must match each programs settings. Allows direct logging from each program into N1MM.

Enable	IP Address	UDP Port
<input type="checkbox"/> Enable	127.0.0.1	2333

Sets the IP Address and port that an external program can connect to N1MM+ via TCP Port for logging purposes. (JTDX)

Enable	IP Address	TCP Port
<input type="checkbox"/> Enable	127.0.0.1	52001

OK Cancel Help

Check the Radio Box, and enter the public IP of your Station Router, with the Port 13064.

Now, when you change frequency on the remote, the frequency will be updated on the slave N1MM+ at the station, and the spectrum will update.

Tom fixed a bug where the Remote display was not zooming. This is in 1.0.7230.

Other than that, it is very functional! Click on a spot, and you are there!