

# West Gulf Division's Echolink/HF Project

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## ECHOLINK FOR HF RADIO

This paper covers the basic settings necessary to configure Echolink for an HF radio connection. Echolink is primarily used for repeater applications but can be used on any radio with a computer and a sound card interface. There are some issues from the general noise levels present on HF (and made worse by their variability), but it is a very useful capability.

The primary application for emergency communications is the ability to link remote locations into a station near a disaster which has HF capability. Due to propagation limitations, the remote locations may not be able to monitor and participate in local nets. With an active Echolink, remote parties can monitor and participate in the local nets. The slight transmit and receive audio delay takes a little time to get used to, but the process soon becomes second nature.

We won't repeat the Echolink installation instructions, but will show you the critical screens and adjustments that must be made for a functional interface.

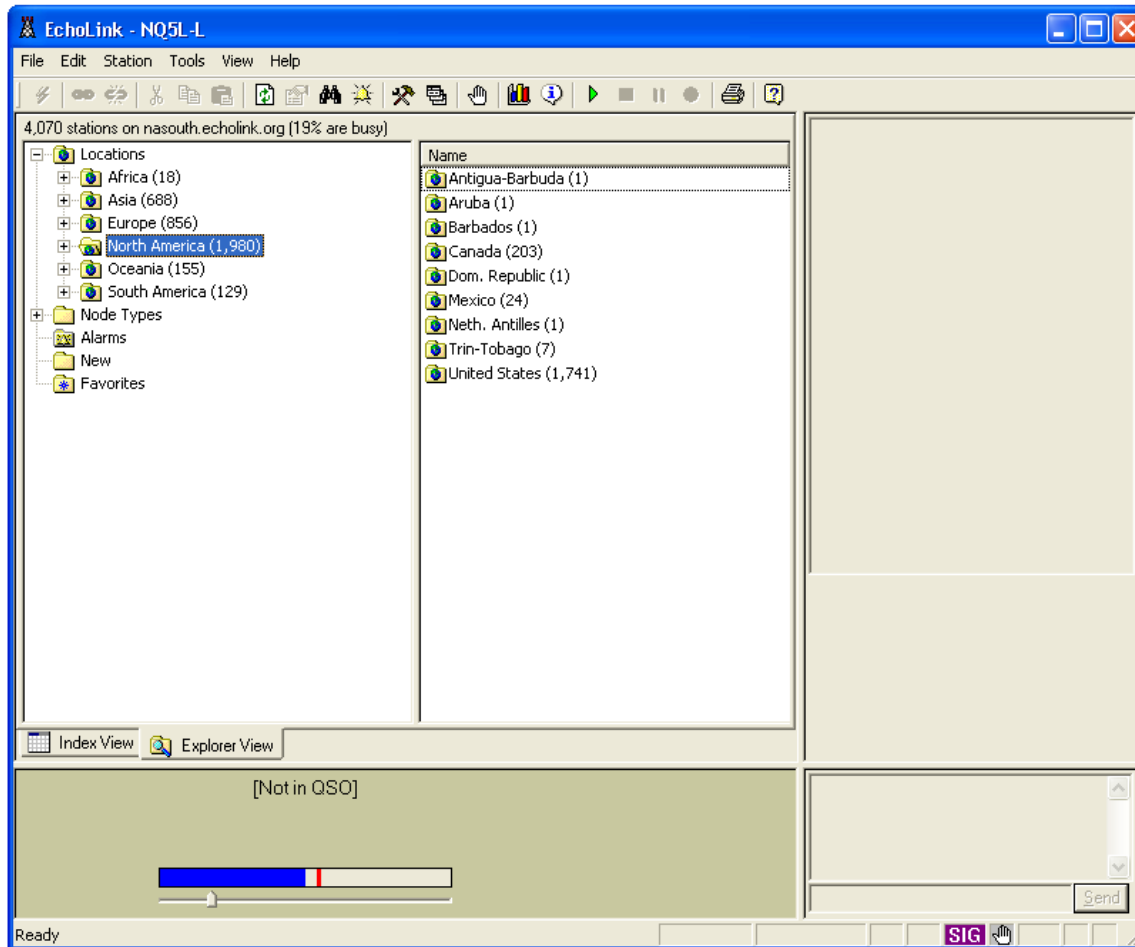
This paper is divided into two sections. The first one deals with those items that you must set up properly to make Echolink work for you. You should be able to complete that section and have it work. The second section is a reference for the other screens that don't directly interact with your ability to use Echolink on your HF rig, but which you might want to know more about.

## BEFORE YOU START

I know, you want to set up Echolink, but bear with me. The Echolink interface is the same as for any of the digital sound card modes. You can use any of the standard methods for attaching a sound card device (an actual sound card or a USB based external "sound card"). Since there are generally fewer things to set up to get a sound card mode working properly than you will have to deal with using Echolink, please consider getting a digital sound card mode working before trying to bring up Echolink. That way you know all of the interfaces work. You just need to get the program settings right.

NOW WE CAN START WITH ECHOLINK

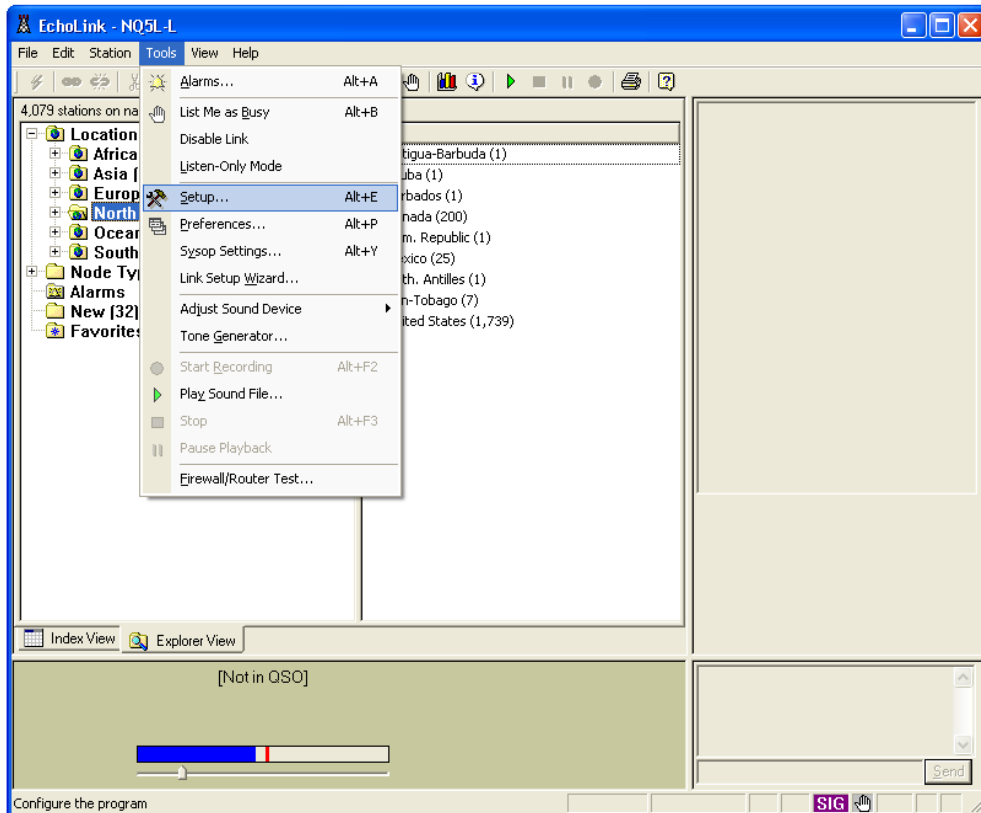
**This is the starting Echolink screen.**



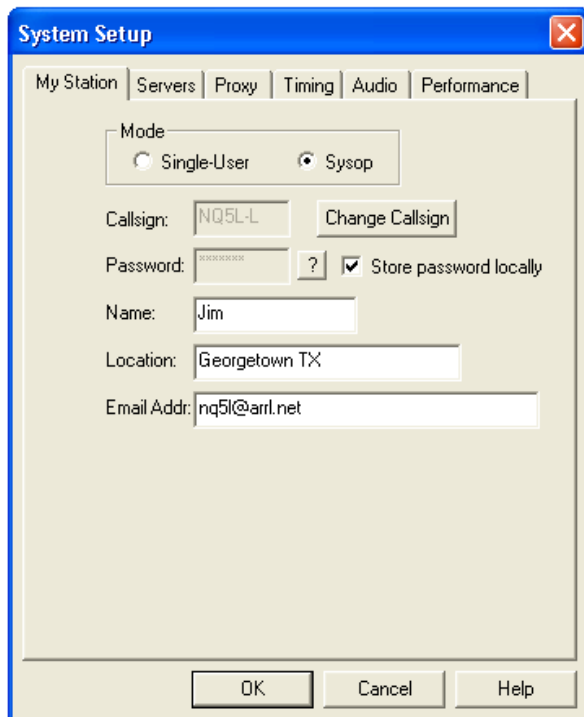
**The screen already shows a couple of interesting things besides the station information in the main windows. The blue bar in the bottom of the screen shows the instantaneous signal level into the sound card. The fact that it is in the middle shows that I have an audio signal into the program. The “SIG” in the bottom right side of the screen shows that the program thinks this is a valid signal. It might also be that the receiver is unsquelched and this is just noise. More on how to set that up later on.**

## **SYSTEM SETUP**

**First open the setup screen**



Click on Tools, Setup (or type <ALT>E) to bring up the setup screen, which has multiple tabs. Start with the My Station tab.

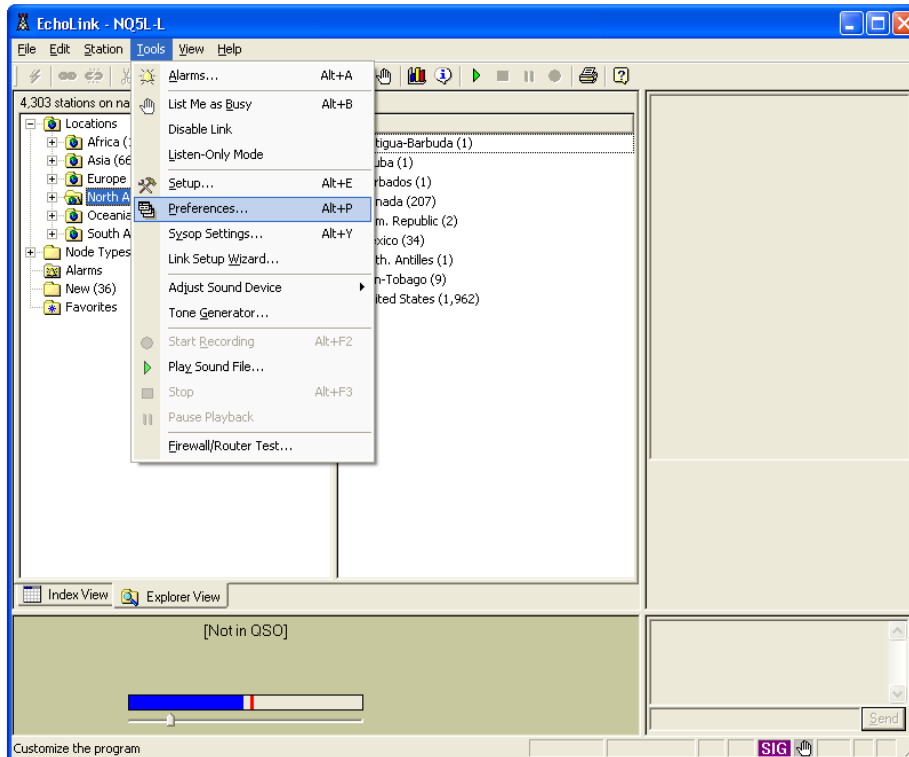


Your call sign will have been set during the initial installation and normally is not going to be changed. The critical step on the “My Station” tab is in the Mode

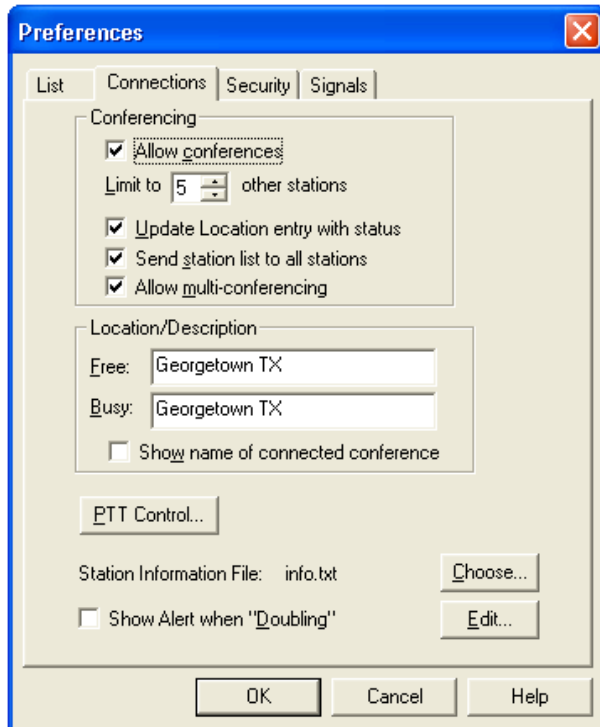
section of the window. You must select the Sysop radio button. That's what tells Echolink this is going to be a gateway station as opposed to someone accessing the system.

## PREFERENCES

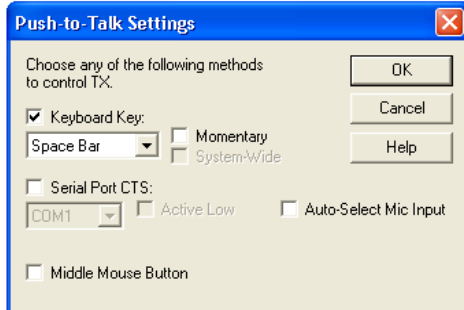
The next major tab is the Preferences tab (<ALT>P).



For the Connections tab, it is suggested that you allow conferences. It is entirely possible that more than one station will want to connect to your site at the same time.

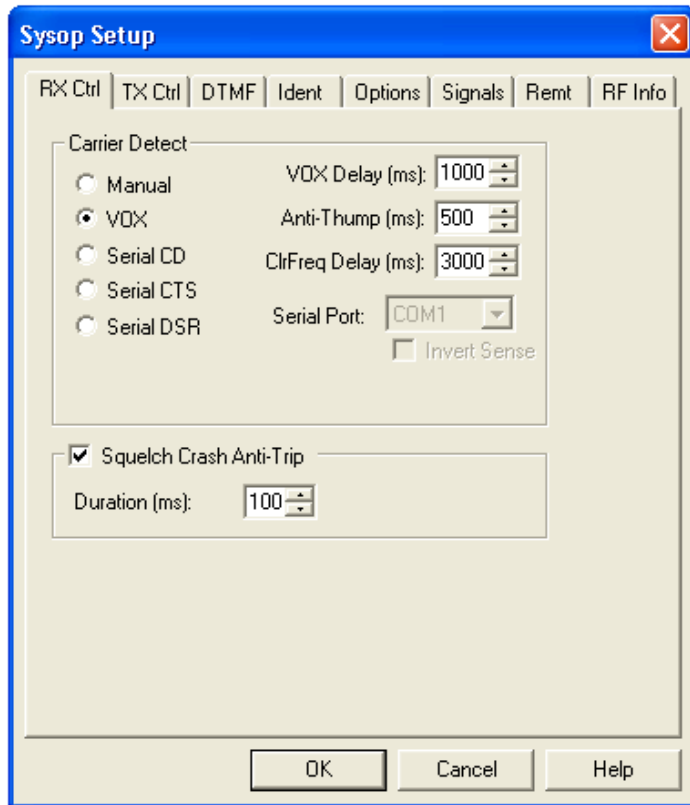


**There is another sub-menu on the Connections screen for PTT Control. Pressing that button will bring up this screen.**

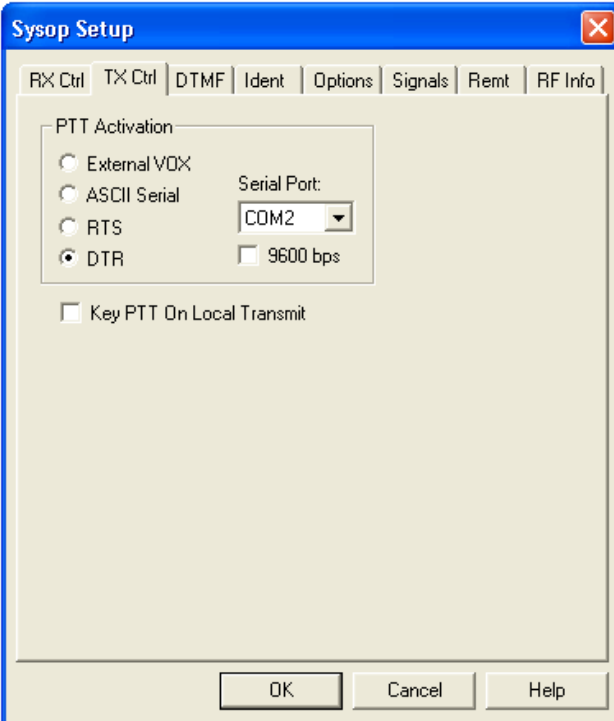


**It's a bit confusing because this is not where you want to set the control of the rig for transmitting from a remote site. This screen applies to using your computer to access the link (where the actual receiver and transmitter are located), not the remote link. Leave it set with the defaults using the space bar. The Security tab is an important one.**



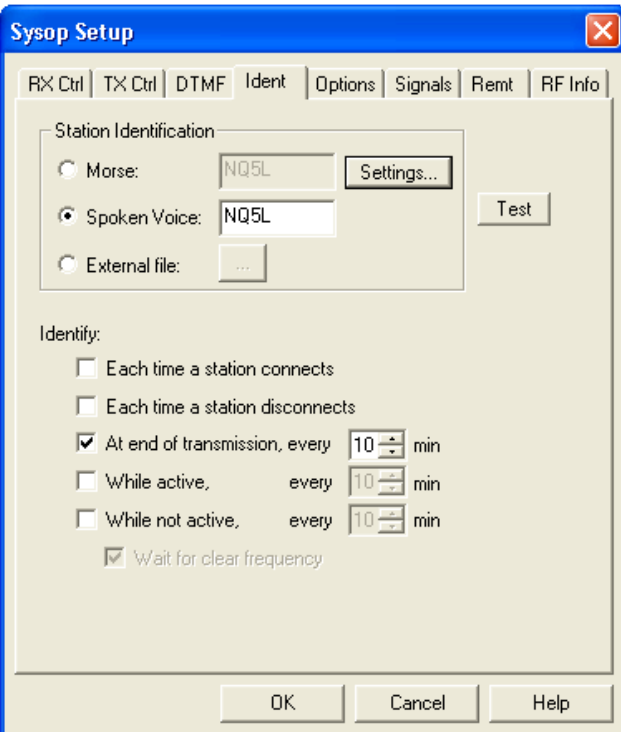


**For HF work, you probably need to use the “VOX” setting unless you have some other means of detecting an incoming signal. A very important point: you will need to use a radio that has a squelch control to use the VOX setting. Noise in the received audio will trigger the signal detector in Echolink. You CANNOT transmit if Echolink thinks it is receiving a signal. This does limit the effectiveness of the link for weak signals, especially with any atmospheric noise that interferes with the squelch control. The default values are shown for the various delays. The TX Ctrl screen sets up how to transmit from the remote station.**



You need some form of interface to the radio (usually provided by a standard sound card interface). In my case, I use COM2 as the PTT control on the radio. The interface can use either the RTS (request to send) line or DTR (data terminal ready) line. You will need to check your interface documentation for the right terminal. We recommend against VOX.

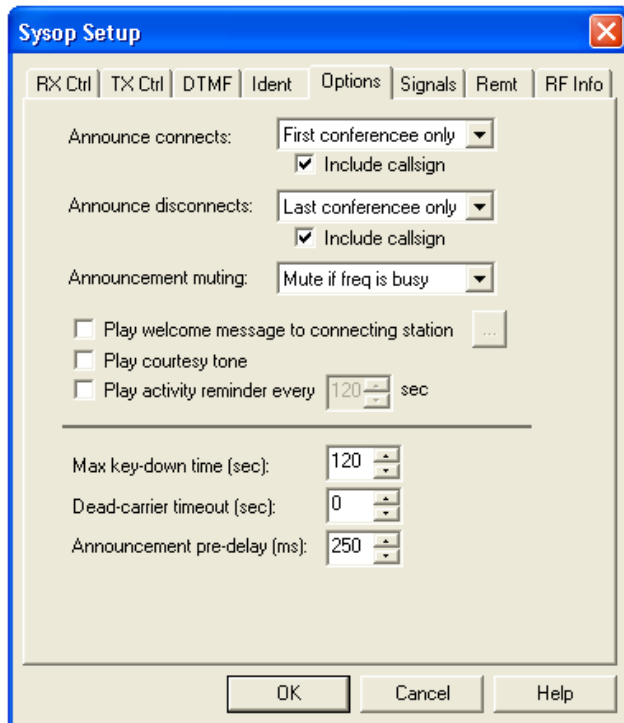
The Ident screen, is very important to keep your transmissions legal.



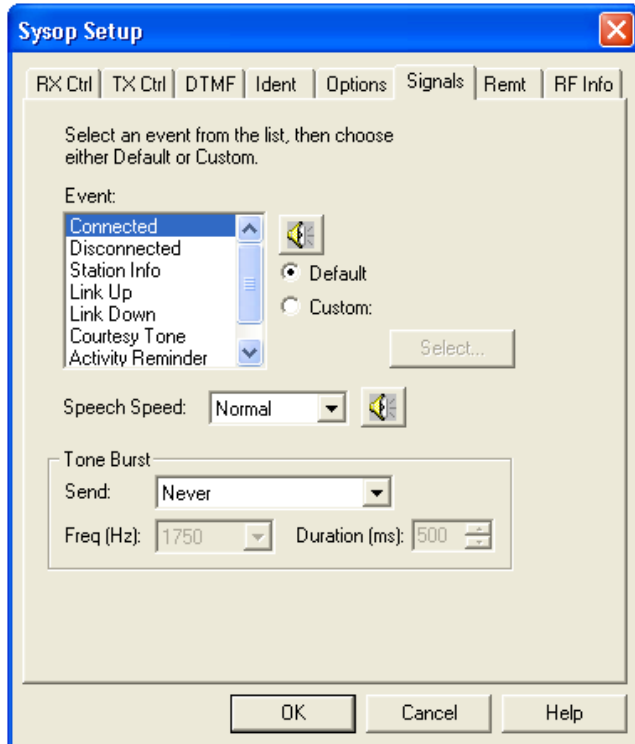


If you want a more descriptive identification than just your call sign, use Windows sound recorded to create an external file and link it in this screen. As a note, if you want to test any of the transmitted audio such as the ID to see what it sounds like, disconnect the serial port so you don't key the transmitter and plug a speaker or headset into your sound card.

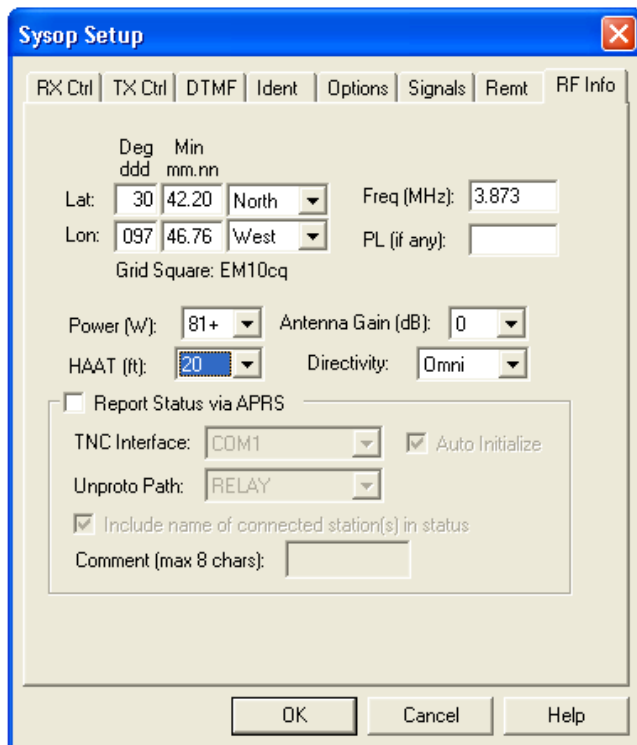
The options screen generally applies to conference connections. Recommended settings are here.



The Signals tab relates to sounds that Windows uses to notify you of events. Change it to suit your tastes.



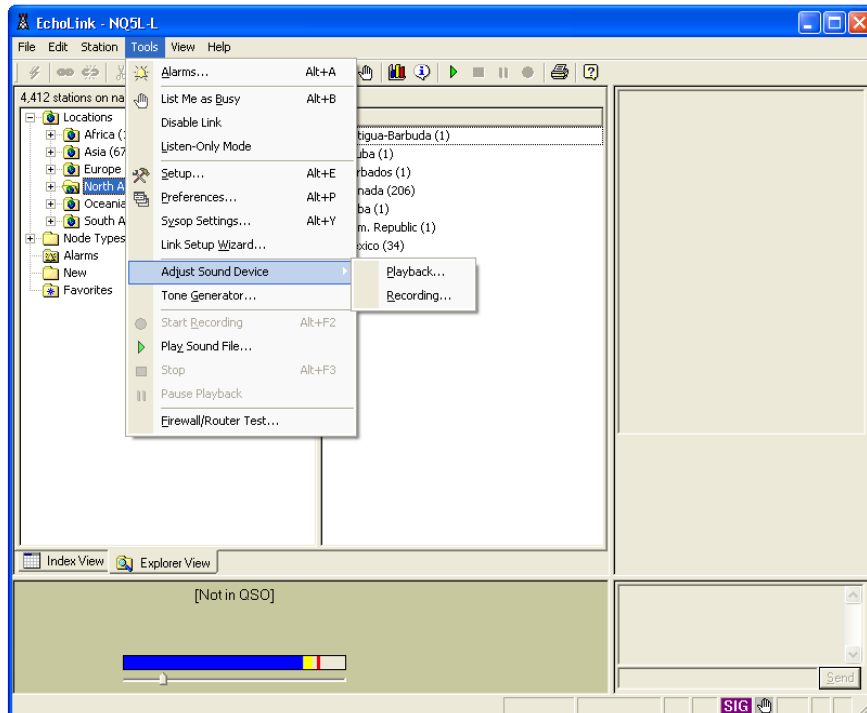
The RF Info tab has some useful information about your location, etc.



**Congratulations! You should have Echolink set up and just about ready to rock and roll. Now there are just a few things to set up on your radio and you're ready to test the whole shootin' match.**

## RADIO SETUP

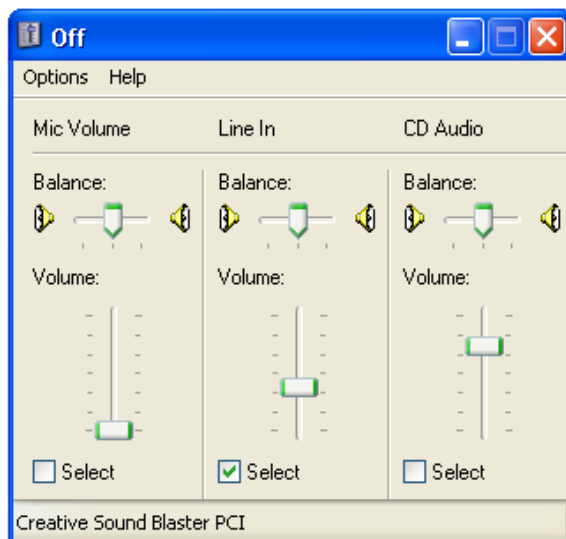
Setting the audio levels is an important part of making Echolink work. There is a specific sub-task that allows access to the sound card settings.



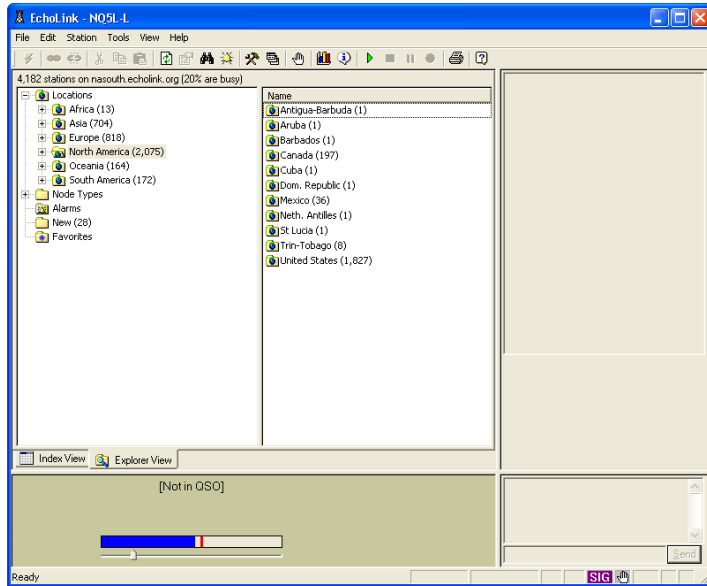
As you can see there is a separate sub-tab for Playback (Transmit level) and Recording (Receive level).

In the screen shot, the receive level is set too high. The yellow indicates clipping. The red line is the short term peak level. The radio may be unsquelched as well. You can't tell from the screen if the signal is a valid radio station or atmospheric noise.

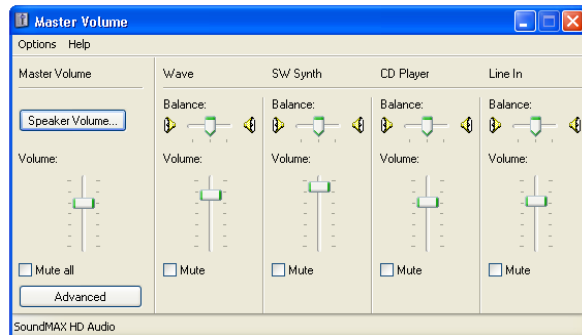
The level setting screen will look like this for receive.



You can see this computer is using the line input. Adjust the sound level so that it is roughly in the middle of the bar. It should look like this.



The transmit volume is also set. To set it correctly, you will eventually need to work with someone else to connect via Echolink and verify your transmitted audio is correct. A good starting place will be the settings you use for PSK31 or some other sound card mode. When testing the installation monitor your power output or ALC meter to make sure you are getting good modulation without overdriving anything.



You should now be ready to go. The best testing scenario involves two other stations. One station uses your HF Echolink node to connect to and have a QSO with a third station. The third station will hear both direct connections (you) and the Echolink connection and can judge how good the audio quality is. It often takes a bit of tweaking to get the audio levels just right.

## CONCLUSION

There you have it. You're now all set to configure and have a unique HF radio connection between your area and the rest of the radio world. If you have any questions, email me at [nq5l@arrl.net](mailto:nq5l@arrl.net) and I'll try to help you out.

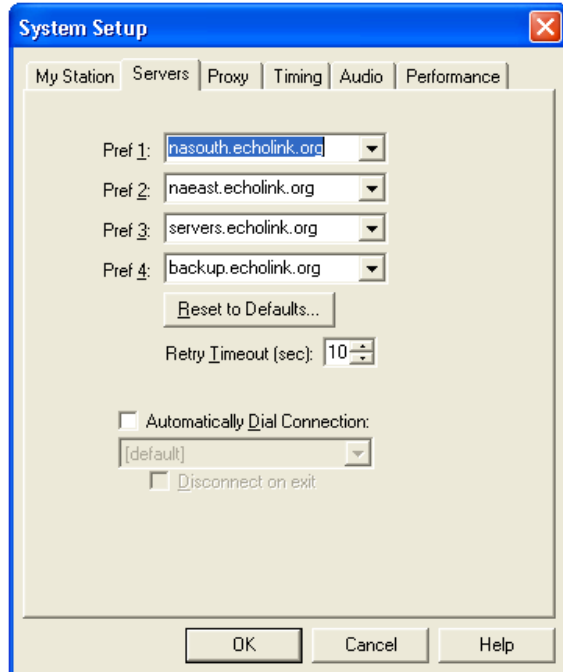
## APPENDIX – OTHER PROGRAM SETTINGS

The following screens are generally not going to be used much if at all. We added them in case you have a question about them. They are from a working system at NQ5L. Many of them won't affect the operation of Echolink.

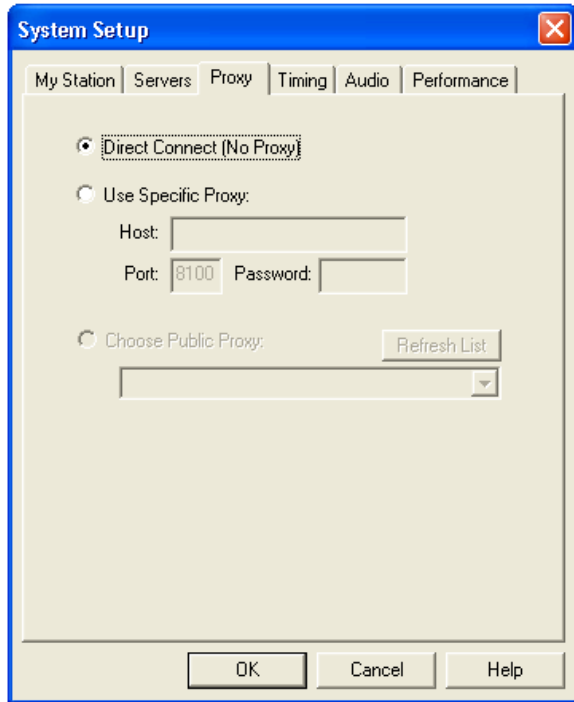
The other tabs should be left in their default conditions for the most part. The screen shots below show those conditions.

## SYSTEM SETUP

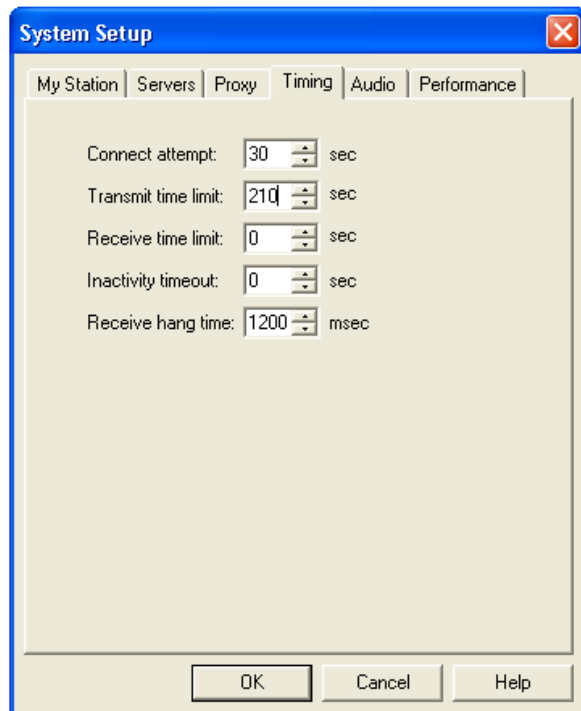
Use the default servers for the system.

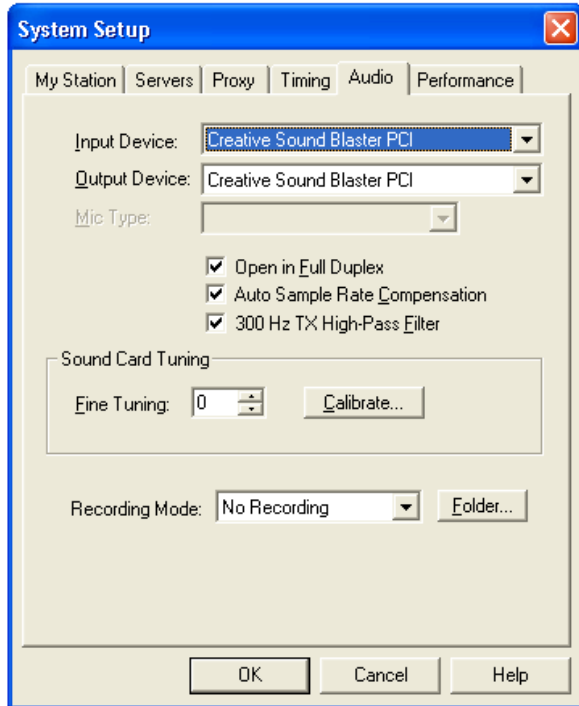


On the next tab, you might need to select a proxy server in some cases, but not normally. See the Echolink documentation for a discussion of the use of proxies. With the later of Echolink this is not normally needed unless you are behind a very strict firewall. Life is certainly easier if you don't need the proxy.

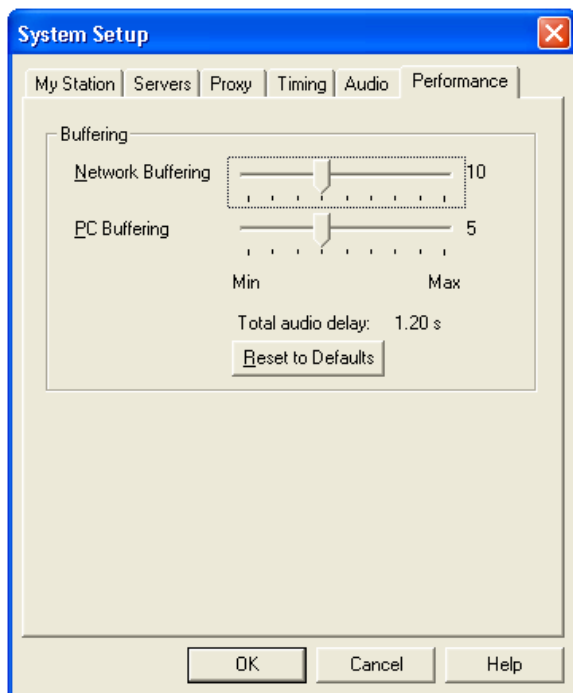


The timing window has some settings that you might want to experiment with. The defaults are a good place to start.





**Note in this screen that, if you have multiple sound card devices in your system, be sure to select the correct input and output audio channels. Some systems seem to work better with dedicated external USB sound devices. Here we have changed the defaults to select all three options in the middle of the screen.**

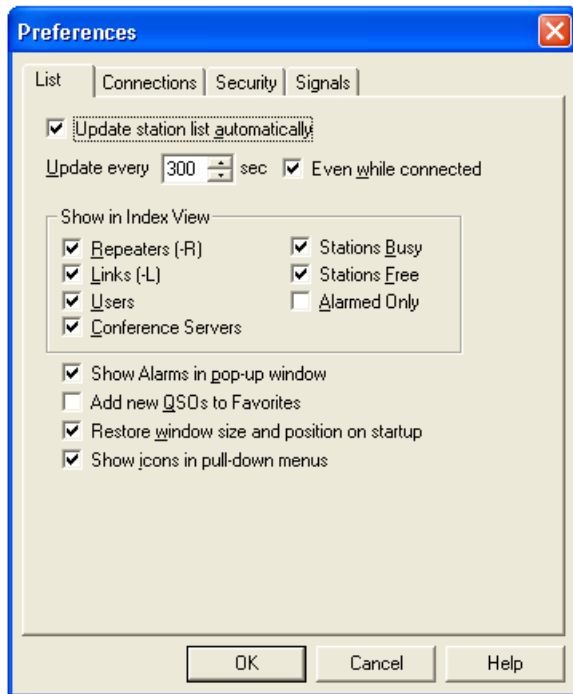


**The buffering timing may need to be adjusted depending on the speed of your Internet connection and your computer. Faster connections and computers can benefit from shorter times. The total audio delay time is the amount of lag between**

hearing a received signal through Echolink. You'd like this to be as short as you can make it and still work reliably. If it is too short, the audio signals (on both transmit and receive) sound broken, like a bad cell phone connection. If it's too long, it becomes annoying.

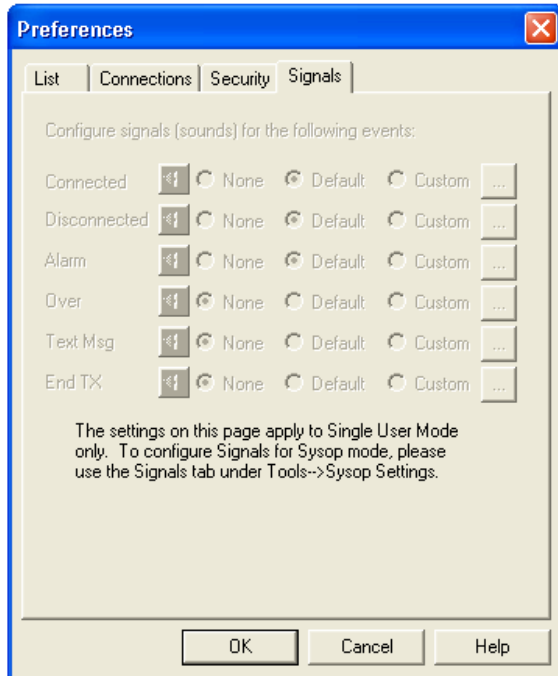
## PREFERENCES SCREENS

The defaults are shown below for the List screen.



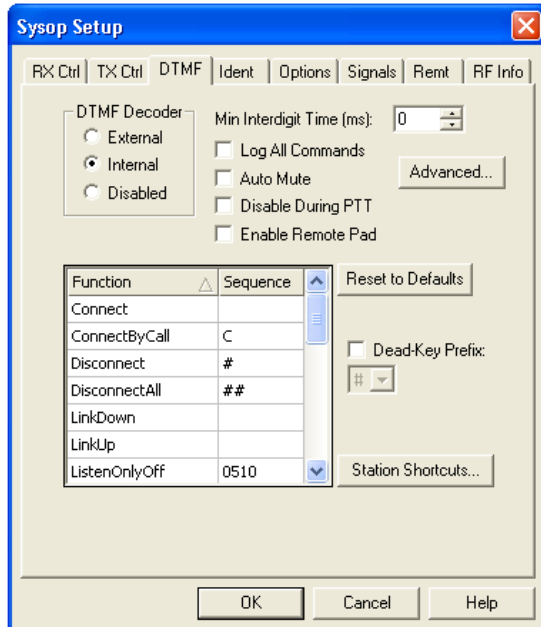
The last tab, Signals, only applies to single user mode and so can't be changed. So you obviously can leave it alone.





## SYSOP SETUP

The DTMF screen is particularly applicable to HF operation so you can skip it.



The screen only applies if stations connected by the RF link want to control Echolink.

The Remt tab sets up remote control and probably won't be used.

**Sysop Setup** ✖

RX Ctrl | TX Ctrl | DTMF | Ident | Options | Signals | Remt | RF Info

Enable Web remote control

TCP Port:

Username:

Password:

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Enable dial-in remote control

Voice-modem device:

No TAPI-compatible voice modem devices detected.

OK Cancel Help