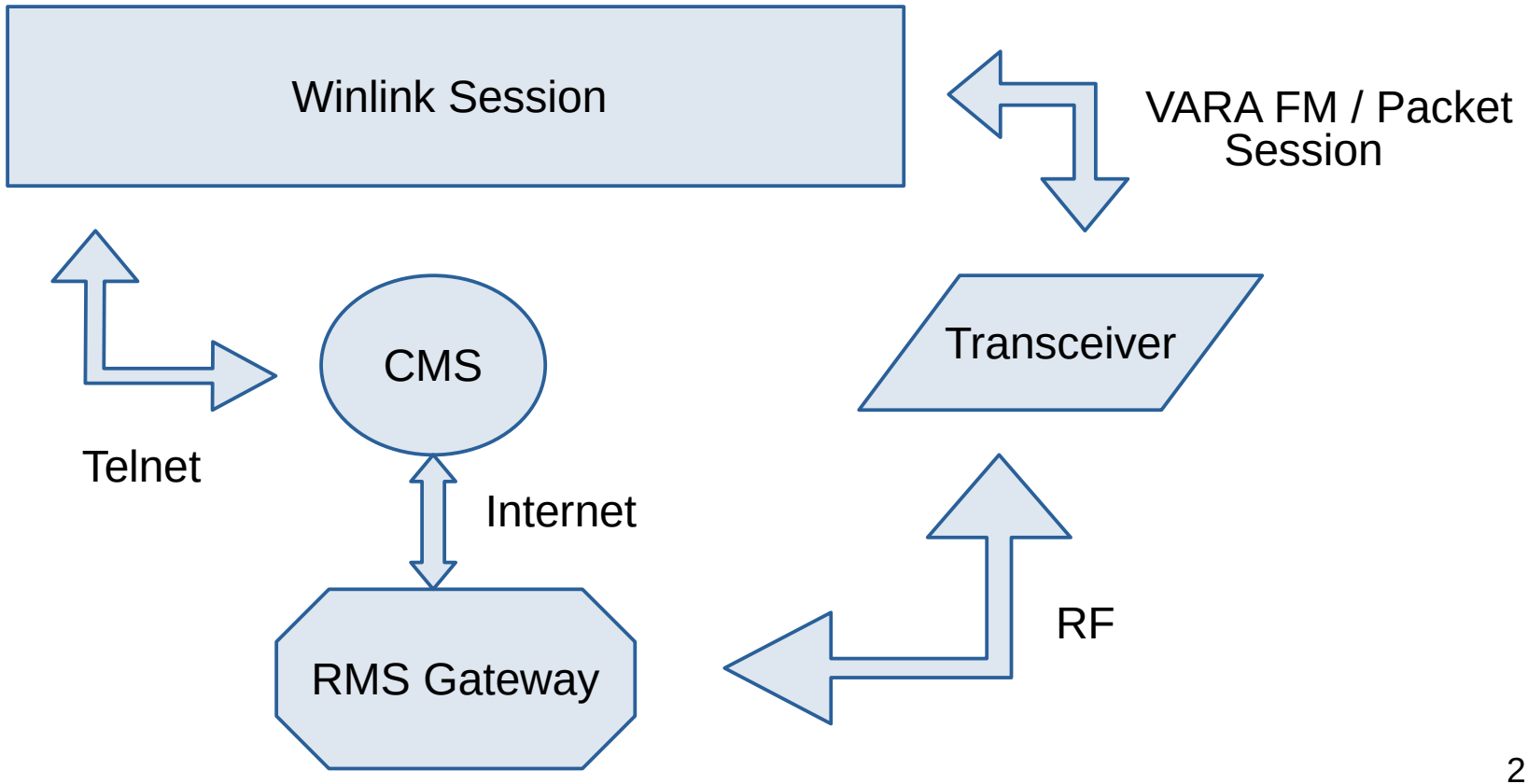
Yamhill County ARES Winlink Training

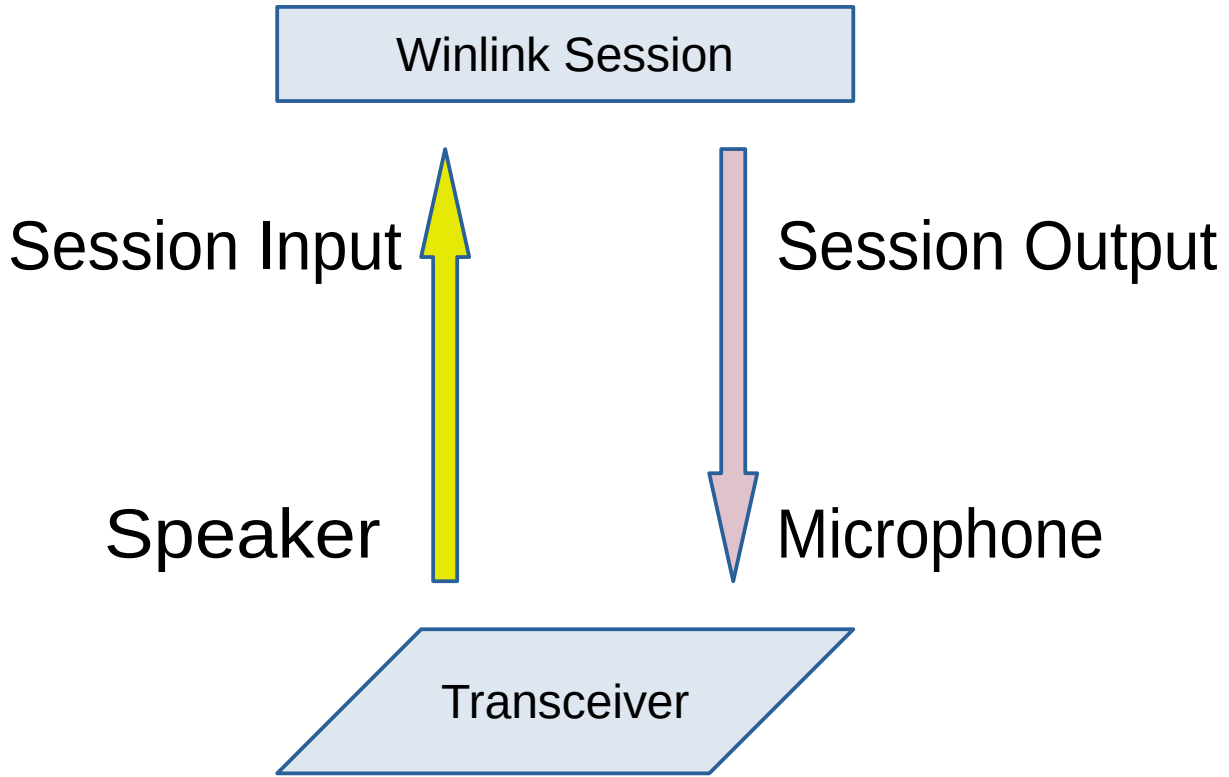
VHF/UHF Sound Card Interface

VARA FM and SoundModem Virtual Terminal Node Controllers

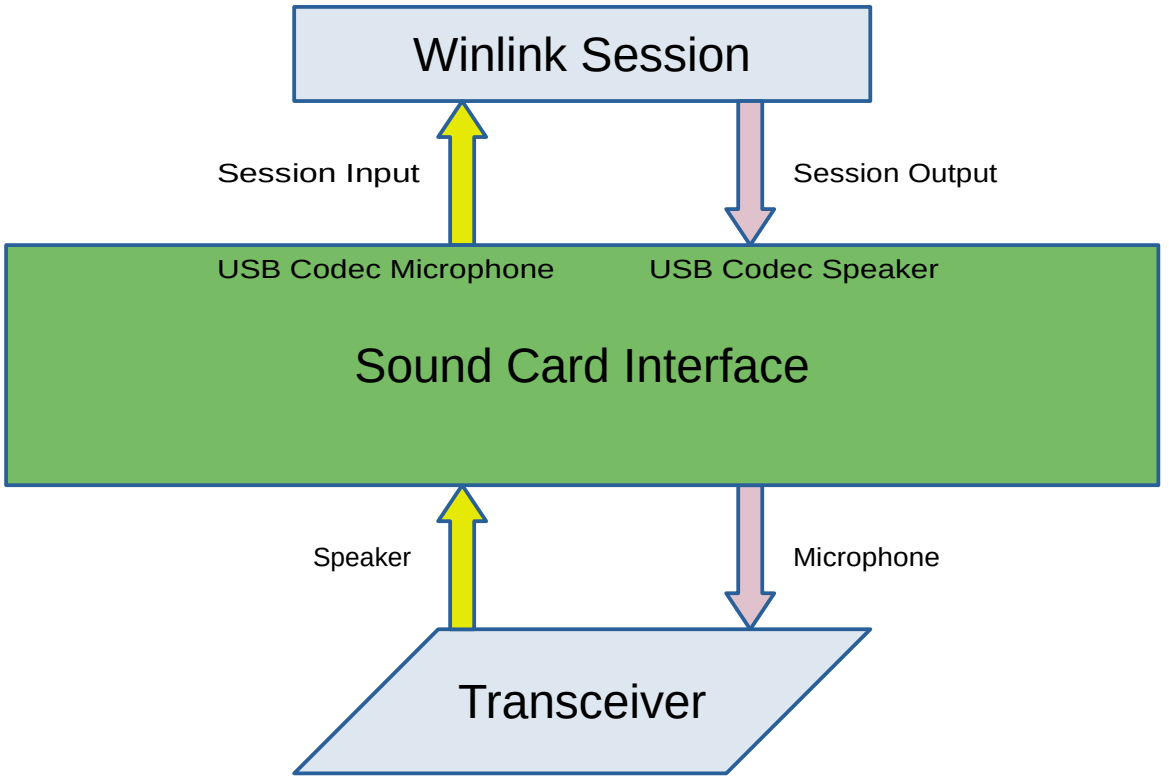
Winlink Session Interaction



VARA FM / Packet Session



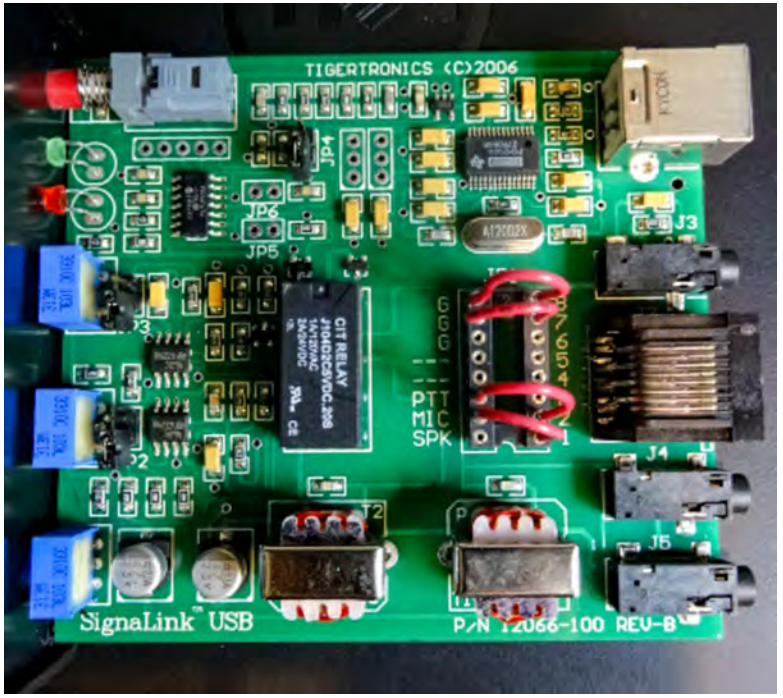
VARA FM / Packet Session



TigerTronics SignaLink & Cable Selection

Masters Communications DRA Version & Hardware Selection

Jumper Settings Where Applicable

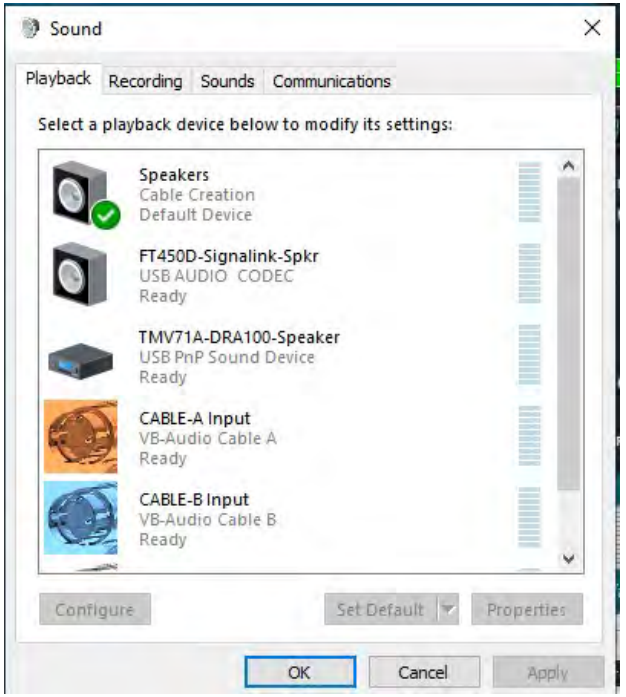


8-Pin Round Mic Connector (use SLUSB8R, SL1+8R, or SLCAB8R)

JP-1	Pin-out	Radio Models
	Pin 1 – Mic Input Pin 2 – PTT Pin 3 – N/C Pin 4 – N/C Pin 5 – N/C Pin 6 – N/C** Pin 7 – GND Pin 8 – GND	ALD-24T ALR-22T/22HT/72T DR-110T/112T DR-130T/135E/135T DR-150/235T DR-430T/435E/435T DR-510T/570T DR-590T/592T/599T DR-600T/610E/610T DR-620E/620T DR-635 DR-1200 DR-B185HT/HE DX-70/70T/70TH/70EH DX-77 DX-SR8T/E DX-SR9

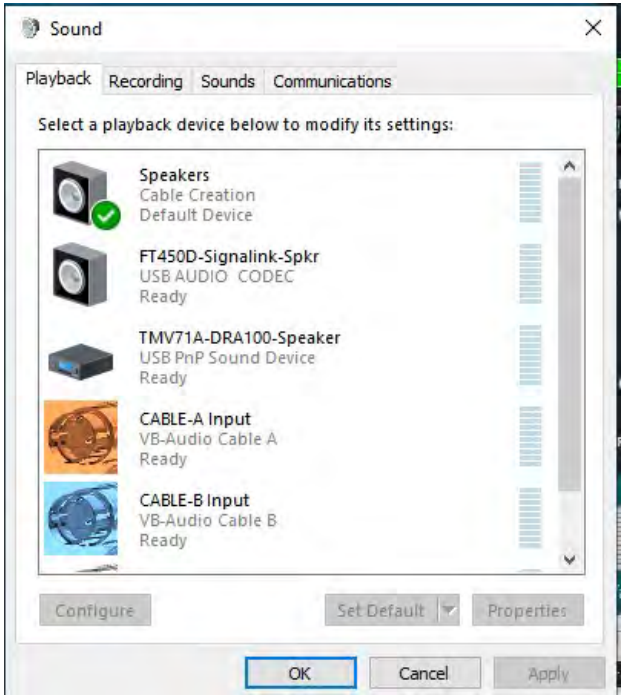
Sound Card Interface Initial Settings

Sound Control Panel



Sound Control Panel Initial Settings

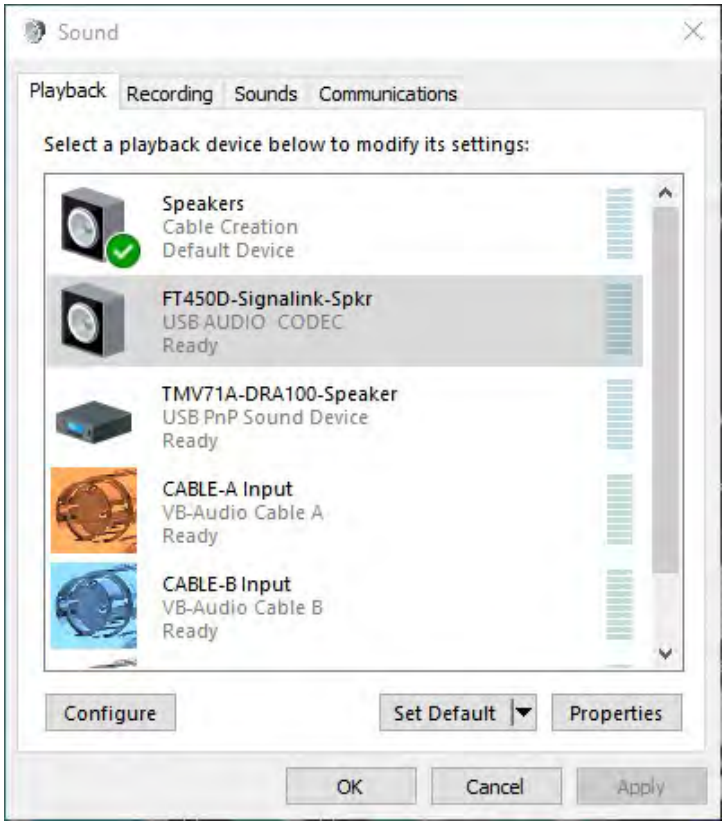
Adding the USB SoundCard Interface's Devices



1. Prior to plugging in the soundcard to the computer, Start up Sound Control Panel
2. For both the *Playback* and the *Recording* tabs, scroll through and note all the listed devices. Also note which one in each tab has the green check box (Default Device)
3. Switch Back to the *Playback* tab and with the USB Cable connected to the sound card interface, plug it into the computer.
4. Note the new device in the list. Reset the original device as the Default Device by clicking on the device and then click on the Set Default Button,
5. Select the *Recording* tab, note the new device in this list, and reset the original default device back to being the default.

Sound Control Panel Initial Settings

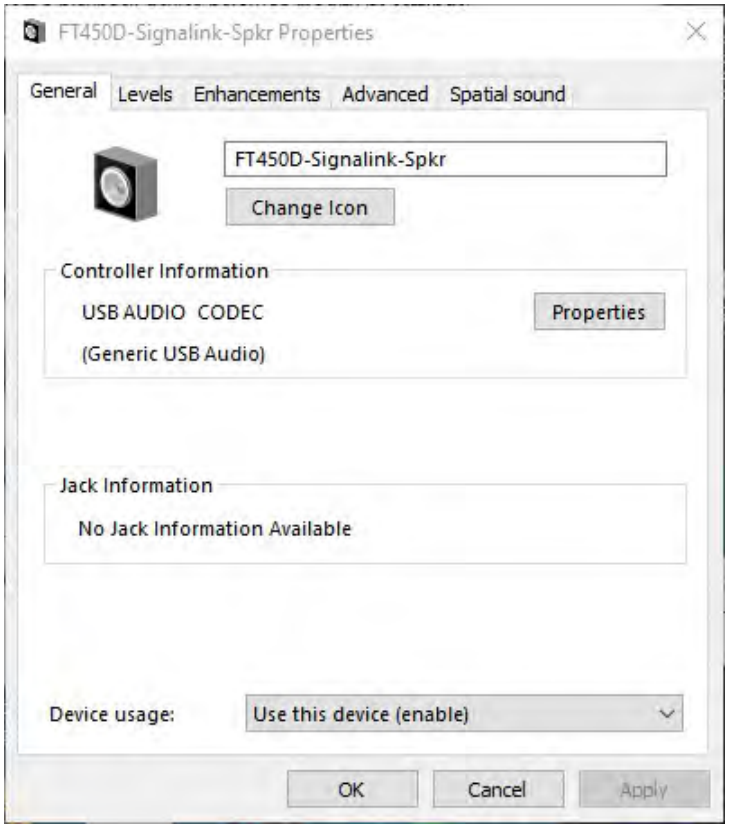
Configuring the Sound Card Interface's Speaker



1) Click on the Speaker you want to rename
    1) Click on Properties

Sound Control Panel Initial Settings

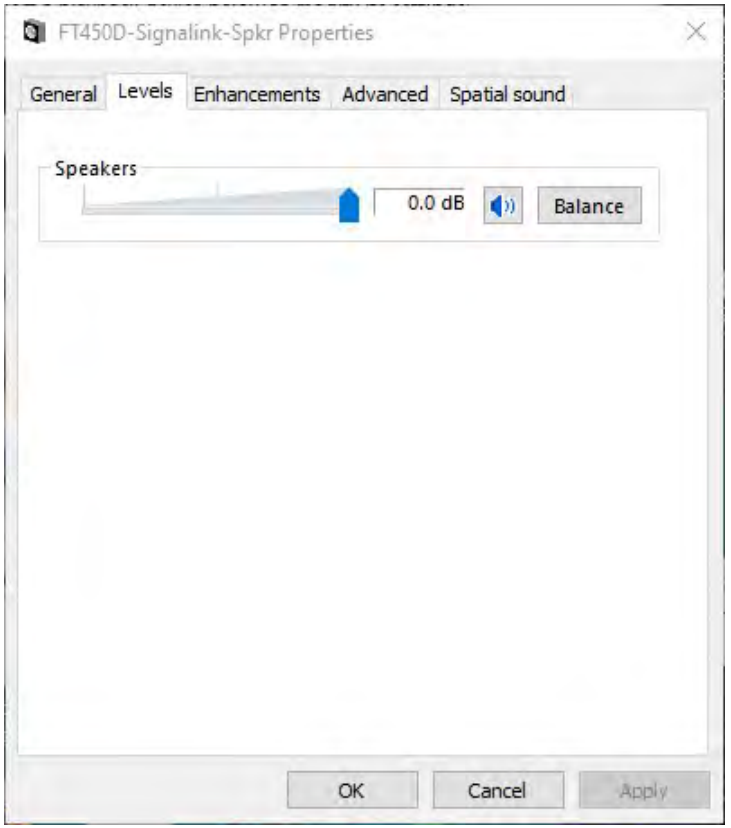
Renaming the Sound Card Interface's Speaker



1) Where this text box that shows *FT450D-Signalink-Spkr*, you will see *Speaker*
2) Click within the text box and edit to fit your setup.
    1) In my case it is the speaker device that is associated to my Yaesu FT-450D and the Sound Card Interface is a SignaLink.

Sound Control Panel Initial Settings

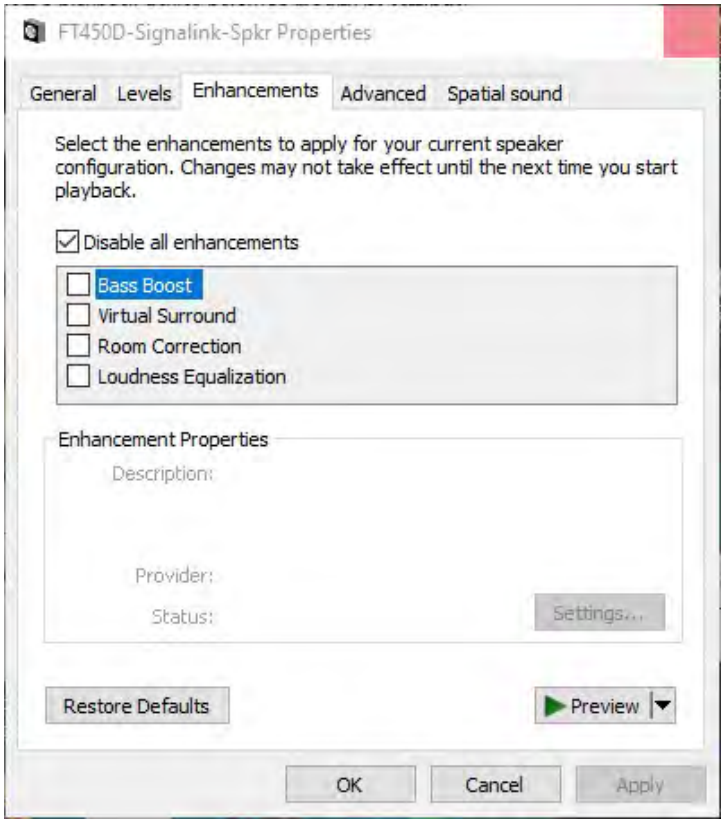
Setting the Sound Card Interface Speaker's Level



1) The slider controls the volume of the output from the speaker
2) Right clicking on the text box between the slider and Microphone icon allows you to view the value in dB's or percentage.
3) Since there is no amplification in this sound card, 0.0 db is 100% of the output of card.
4) For dual channel needs, click on balance and adjust each channel as needed
5) For VOX PTT interfaces Set to value to 100% (0.0 db). For DRA's or hardware PTT set value initially to 75% or -4.3 dB
6) During Tuning steps (discussed later) adjust as needed

Sound Control Panel Initial Settings

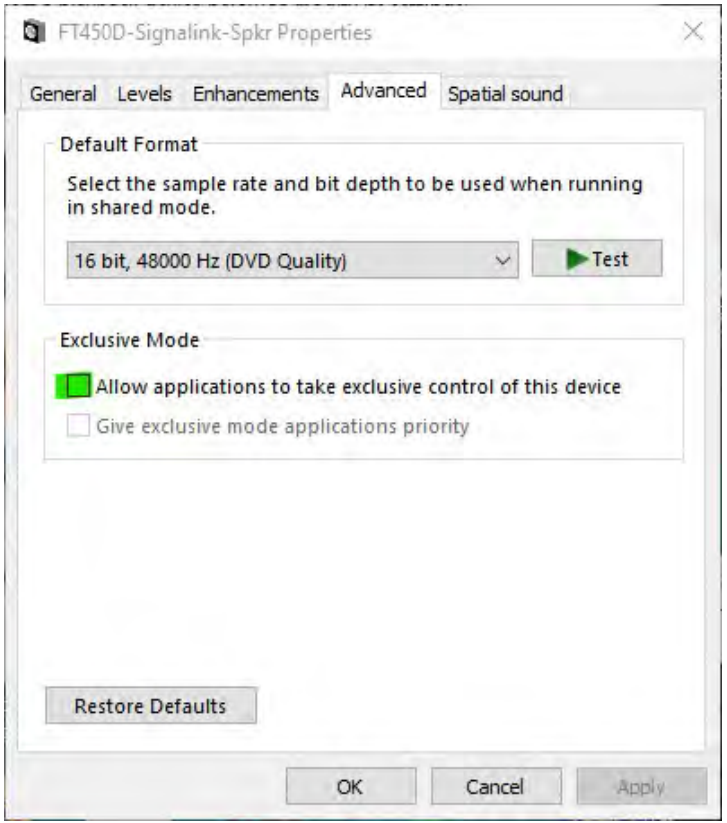
Turning off the Sound Card Interface Speaker's Enhancements



1) Ensure the *Disable all enhancements* check box is checked
2) Digital modes are based upon the tone of the sounds produced. Enhancements change the tones and will disrupt decoding the signal into text.

Sound Control Panel Initial Settings

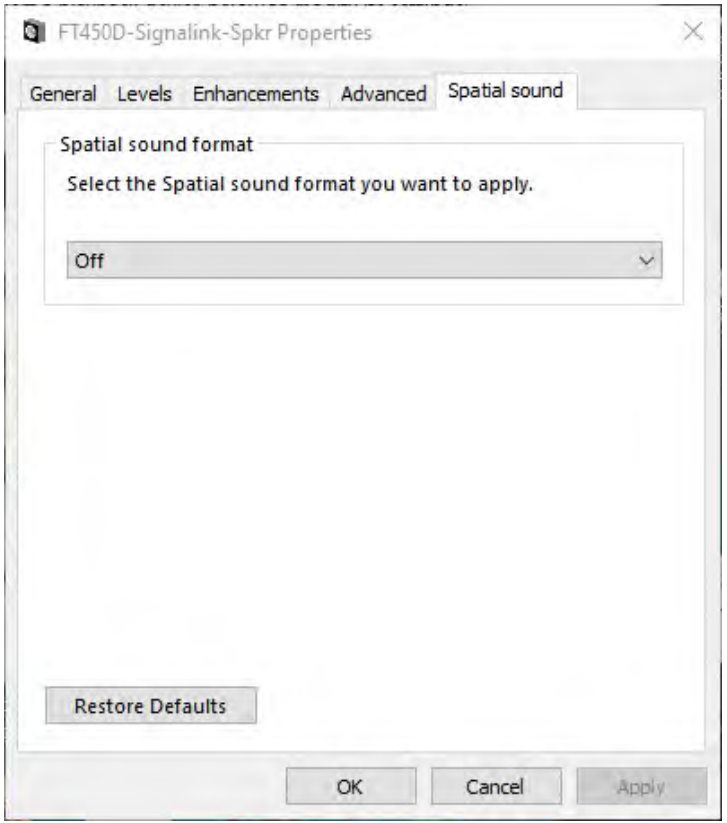
Setting the Sound Card Interface Speaker's Advanced Features



1) Click on the drop down for the default format of the sound.
   1) Select the DVD quality setting.
   2) Unless you are using dual channel features single channel modes will work.
2) Turn off Exclusive Mode by unchecking the checkbox.
   1) This prevents a single application from controlling the sound card
   2) I found with this turned off, when operating P2P, I can have a version of Winlink Express running a VARA FM P2P Session and another version of Winlink Express running Packet (SoundModem) at the same time. If an external station is attempting to connect to my station, they can connect via Packet or VARA FM.

Sound Control Panel Initial Settings

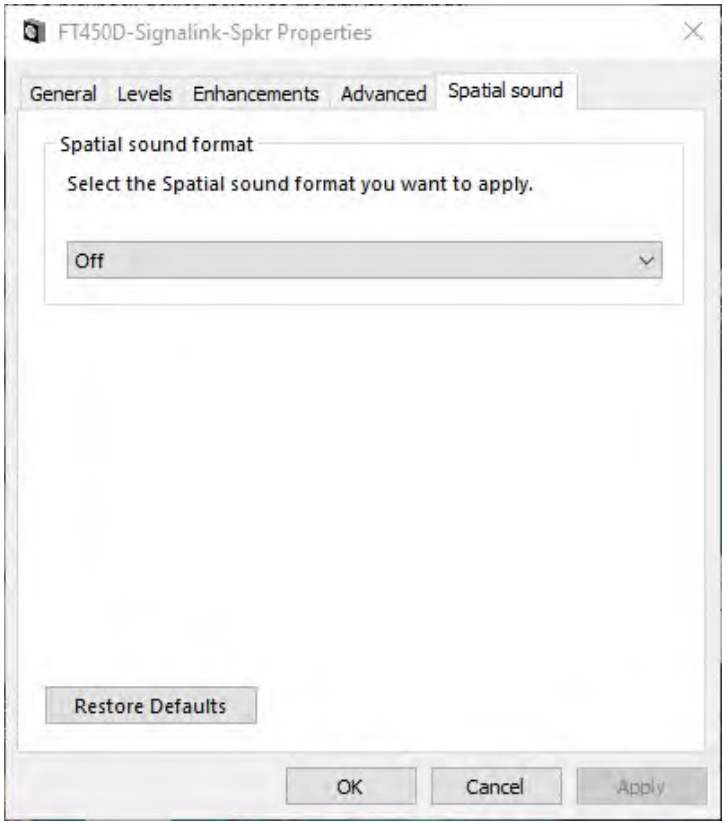
Turn Off the Sound Card Interface Speaker's Spatial Sounds



1) Select the Off option on the drop down selection box.

Sound Control Panel Initial Settings

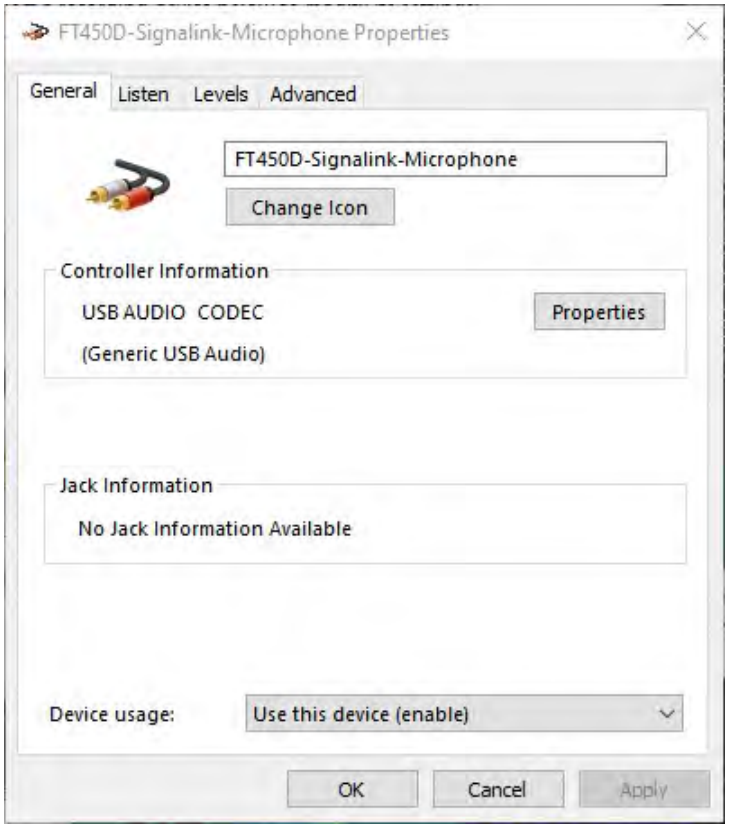
Turn Off the Sound Card Interface's Spatial Sounds



1) Select the Off option on the drop down selection box.

Sound Control Panel Initial Settings

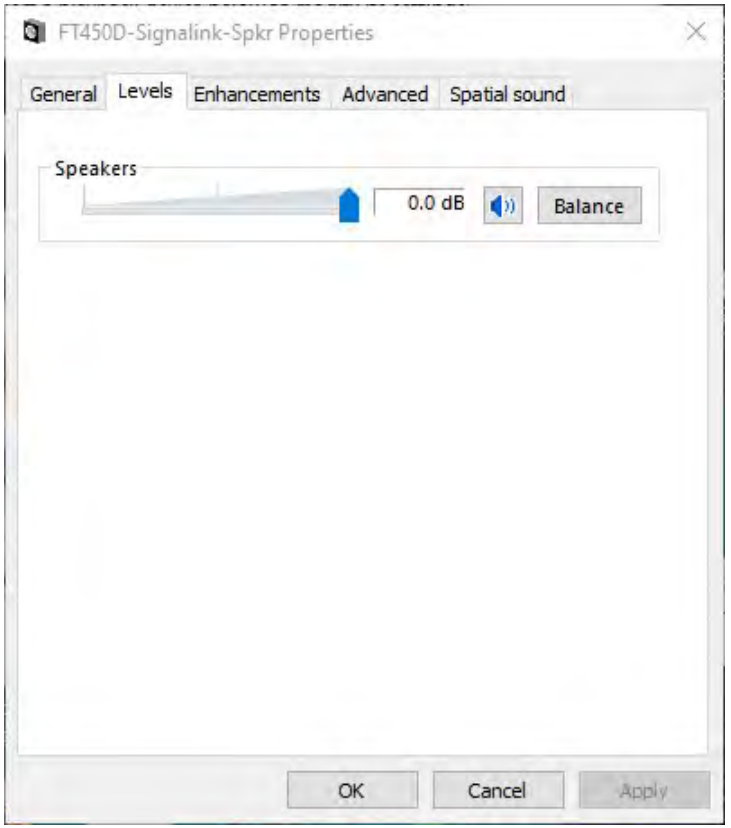
Renaming the Sound Card Interface's Microphone



1) Where this text box that shows *FT450D-Signalink-Microphone*, you will see *Microphone*
2) Click within the text box and edit to fit your setup.
   1) In my case it is the microphone device that is associated to my Yaesu FT-450D and the Sound Card Interface is a SignaLink.

Sound Control Panel Initial Settings

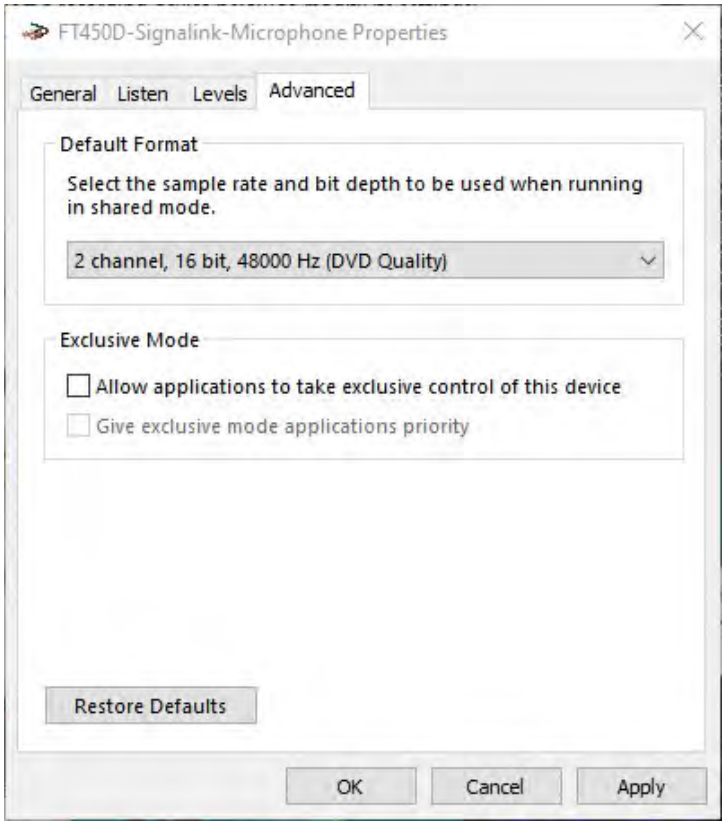
Setting the Sound Card Interface Microphone's Level



1) The slider controls the volume of the output from the speaker
2) Right clicking on the text box between the slider and speaker icon allows you to view the value in dB's or percentage.
3) Since there is no amplification in this sound card, 0.0 db is 100% of the output of card.
4) For dual channel needs, click on balance and adjust each channel as needed
5) Set value initially to 50% or -10.0 dB
6) During Tuning steps (discussed later) adjust as needed

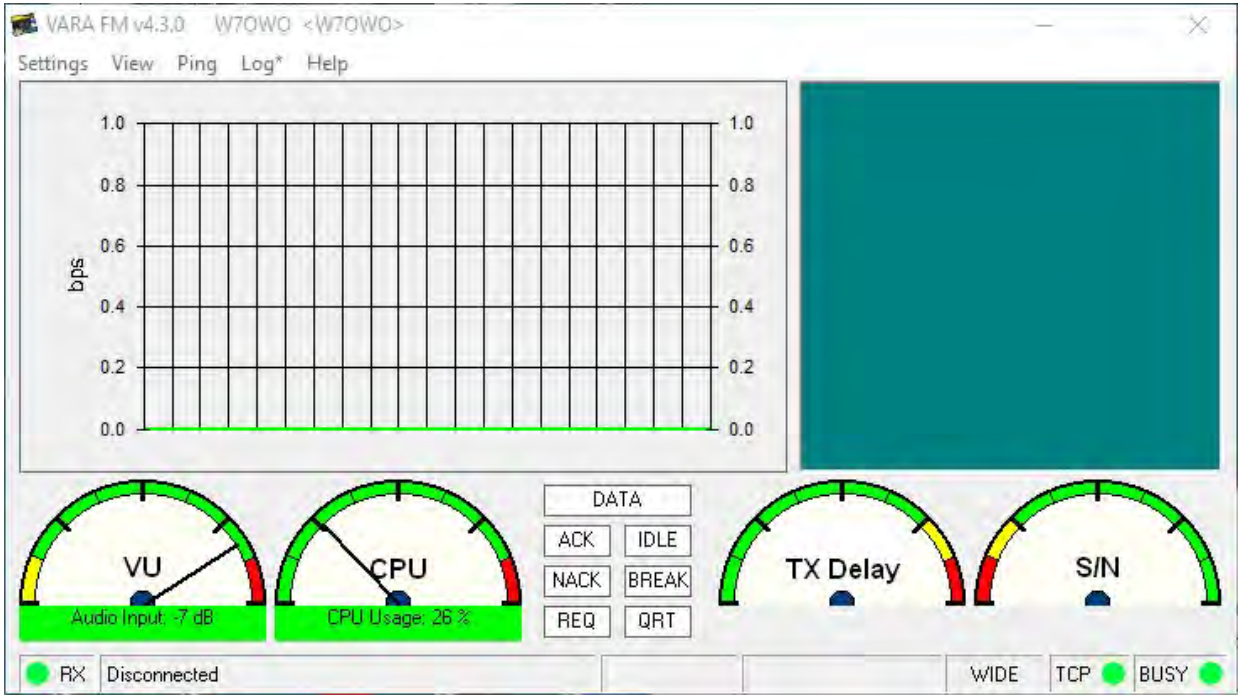
Sound Control Panel Initial Settings

Setting the Sound Card Interface Microphone's Advanced Features



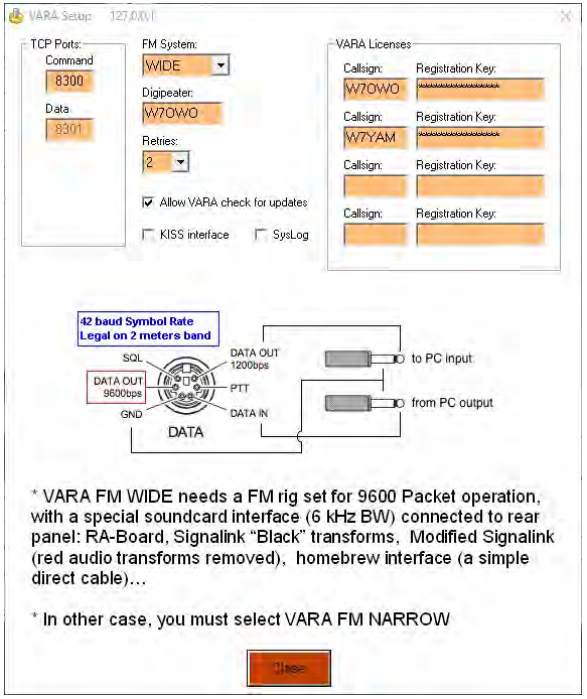
1) Click on the drop down for the default format of the sound.
   1) Select the DVD quality setting.
   2) Unless you are using dual channel features single channel modes will work.
2) Turn off Exclusive Mode by unchecking the checkbox.
   1) This prevents a single application from controlling the sound card
   2) I found with this turned off, when operating P2P, I can have a version of Winlink Express running a VARA FM P2P Session and another version of Winlink Express running Packet (SoundModem) at the same time. If an external station is attempting to connect to my station, they can connect via Packet or VARA FM.

VARA FM Download and Install



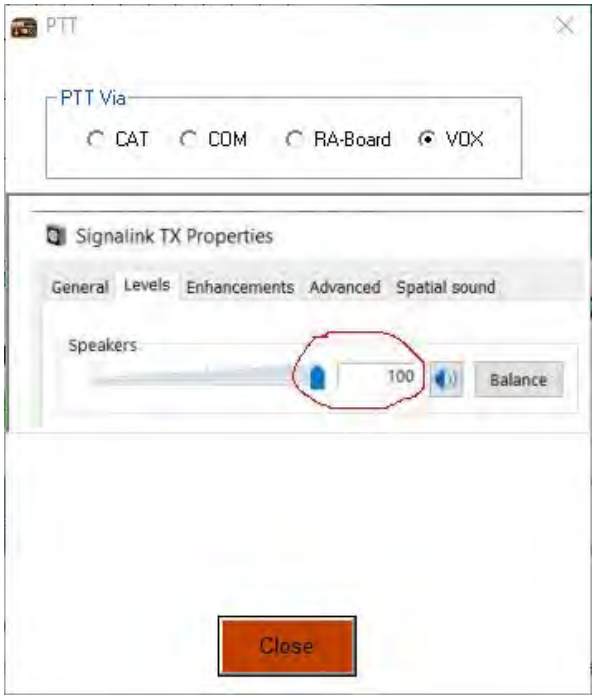
1) Download VARA FM zip file from: https://rosmodem.wordpress.com/
2) The Current Version is v4.3.1
3) Extract all from ZipFile
4) To install, as administrator execute:
    1) VARA FM setup (Run as Administrator).exe

VARA FM Configuration
Settings → VARA Setup...



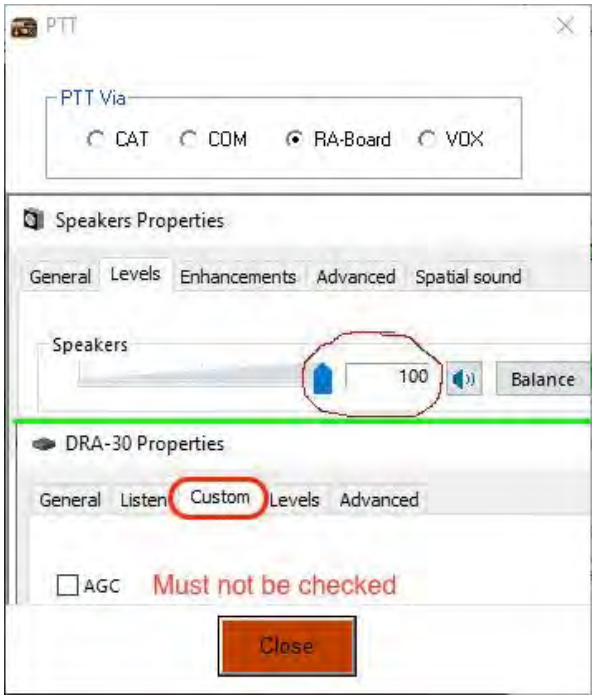
- **TCP Ports**: VARA FM uses TCP for communicating with Winlink. Values need to match between Winlink and VARA FM
  - Ports must be unique for any application running. If you plan on having multiple VARA FM's running, each needs to have their own set of values. Data defaults to 1 plus the Command Port
- **FM System**: WIDE only works with data ready radios and the 9600 baud data port is in use and the radio is configured for that. Otherwise use NARROW
- **Digipeater**: Provide your callsign with a SSID and VARA FM will behave as a digipeater if someone connects to this CallSign and SSID
- **VARA Licenses**: If you have a paid license you enter you callsign and registered code. Since it is possible to have mulitple instances of VARA FM running, one could be for an auxilary callsign like W7YAM or W7NDR

VARA FM Configuration
Settings → PTT… (VOX)



- PTT Via
  - With a SignaLink or a VOX capable DRA that is enabled the VOX radio button should be selected

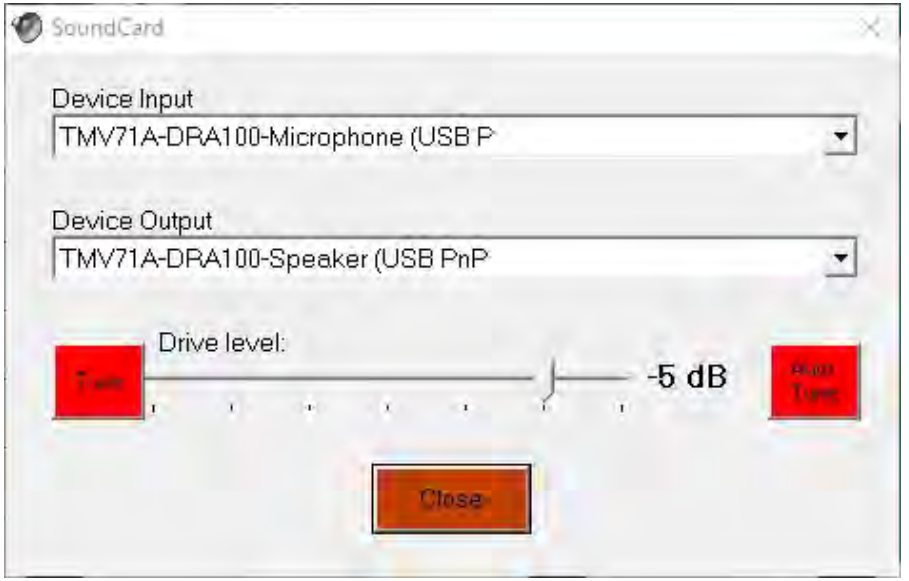
VARA FM Configuration
Settings → PTT… (GPIO)



- PTT Via
  - DRAs using the GPIO PTT feature should have the RA-Board radio button selected
    - DRA's are enhanced version of the RA-Boards used for other applications

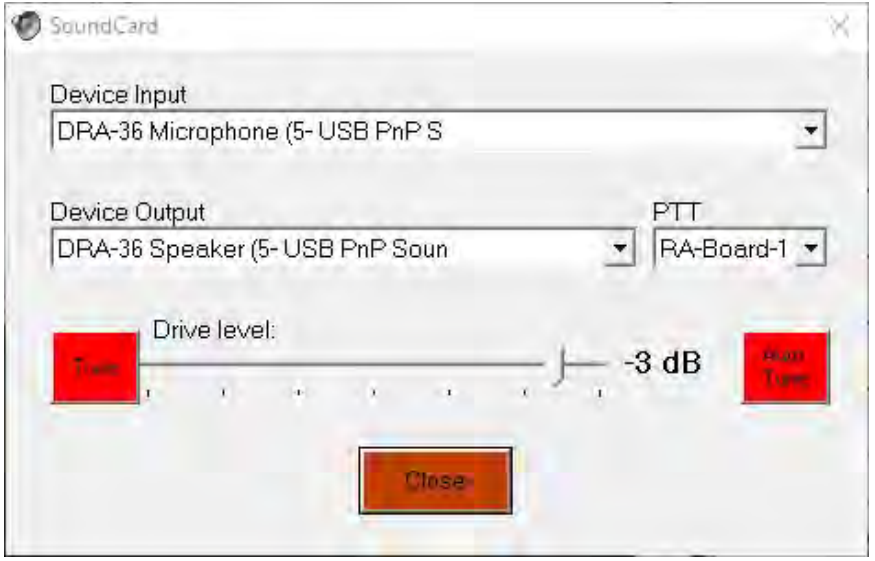
- Note that if the Microphone has the Custom Tab, make sure the AGC is not selected. This can disprupt the tone frequencies and cause issues in decoding.

VARA FM Configuration
Settings → SoundCard… (VOX)



- Device Input
  - Select from the drop down list the microphone associated to the sound-card you wish to use.
- Device Output
  - Select from the drop down list the speaker associated to the sound-card you wish to use.

VARA FM Configuration
Settings → SoundCard… (GPIO)



- Device Input
  - Select from the drop down list the microphone associated to the sound-card you wish to use.
- Device Output
  - Select from the drop down list the speaker associated to the sound-card you wish to use.
- PTT
  - Select from the PTT drop down list the RA-board that will perform the PTT.
    - If there is only one DRA attached there will be just one. I've found it is trial and error on machines I've installed multple DRA's

VARA FM Configuration
Receive Levels

Adjust the VARA FM received sound level to the VU meter reads around -10 dB

If the sound card is connected to the radio via a Data Port

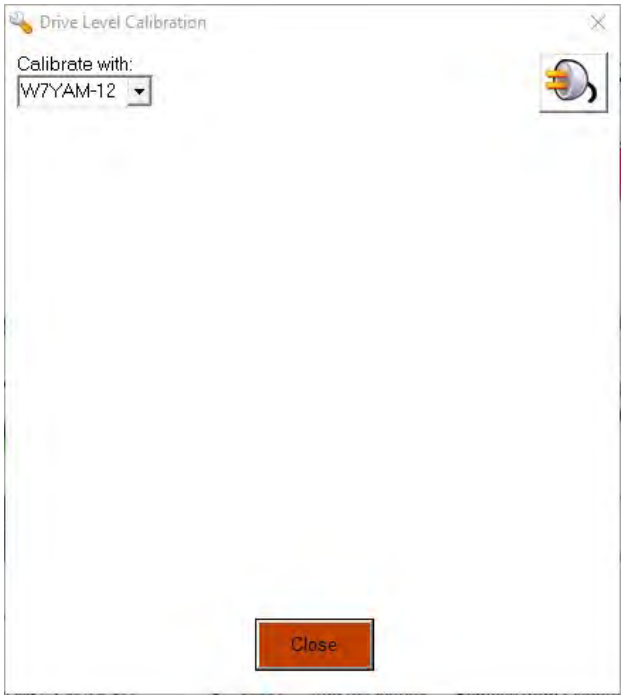
- **Signlink**: Rotate the RX knob so value is near the 10 db mark on the meter
- **DRA**: Rotate the potentiometer R12 (large blue) is near the 10 db mark.

If the sound card is connected to the radio via the microphone jack and the headphone jack

- Turn off the Squelch. (with the headphone jack inserted, no sounds are heard anyway) This also helps for receiving weak signals
- Rotate the AF volume knob to the VU meter value is near the 10 dB mark

Note: You may need to use the Sound Control Panel properties of the sound card's microphone levels to bring the microphone into a range so it can be adjusted with the above methods.

VARA FM Configuration
Settings → SoundCard → AutoTune



- Calibrate with:
  - Enter a VHF VARA FM Gateway or Digipeater that is closest to your QTH* or more likely to be line of sight. I suspect this will be either W7YAM-10 (144.970 MHz), W7YAM-12 (145.090 MHz) or W7OWO-10 (145.090) and tune your radio to the associated frequency
- Button with plug icon (Start Calibration)
  - Pressing this button will start the calibration with the target VARA FM station. Your radio will send tones of increasing drive level to estimate the best setting of the drive level to use with that gateway.
  - If it can't get an optimal level, if you have a DRA it will request you rotate the TX potentiometer either clockwise or counter clock wise

* Visit https://winlink.org/RMSChannels & click on VARA FM to see a map of all the current VARA FM Gateways

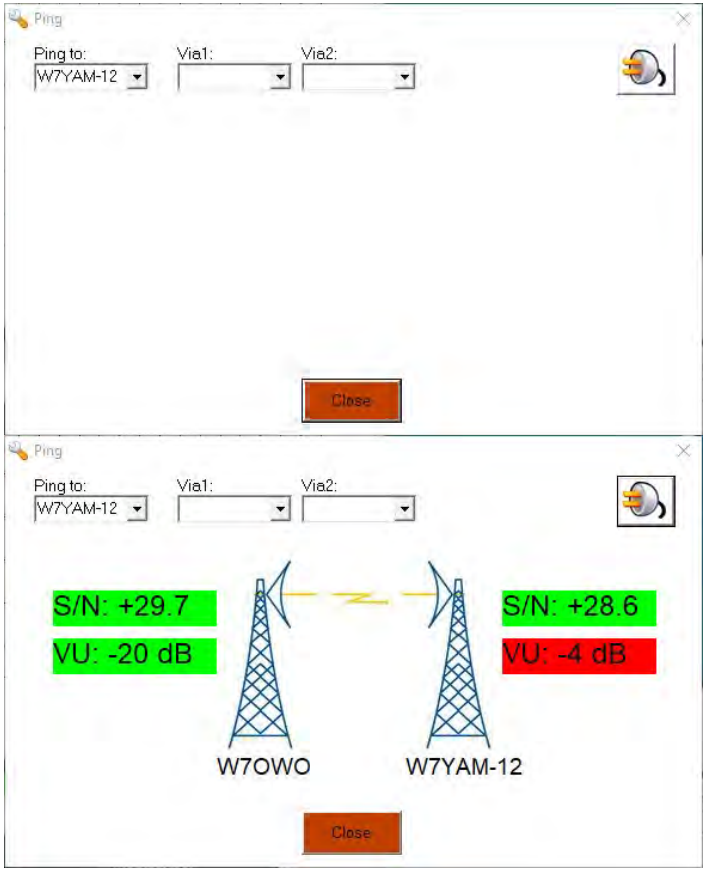
VARA FM Configuration
Settings → SoundCard → AutoTune

Once the TX potentiometer on a DRA or the TX knob on a Signalink are optimal, the AutoTune will find a working drive level and you will get the approved stamp.

If the S/N value is +25 dB or better, VARA FM will use the highest VARA Speed levels fitting the need. For small messages, the VARA Speed level may be a low value, but that is all that is needed to send the one buffer.

Because of distance or other obstacles, some gateways may have a much lower S/N value for it optimum connection between you station and the gateway.

VARA FM
Ping Feature



The Ping feature in the VARA FM main window menu, allows you to get an idea of how well you are being heard by a gateway or a digipeater, or if you can work a gateway via one or two digipeaters. It is a very good tool for testing the connectivity between two VARA FM stations.

Enter (or select from the drop down if you have entered before) the call sign and SSID of the gateway or digipeater and press the plug Icon (Start Ping)

You will presented with a display as shown in the bottom screen capture. In this case my Winlink Client had a S/N of +29.7 and VU reading of -20 dB from the reception of the W7YAM-12 RMS Gateway. W7YAM-12 had a S/N of 28.6 and a VU value of 4 db. It is red, meaning the Microphone on W7YAM-12 is too high for my signal. Both my station and W7YAM-12 are in line of sight of each other and only 4 miles away so even though I am running low power my signal is strong. Since I am seeing the fastest capable VARA FM speed level with that gateway, I have not adjusted it so it may pickup more remote stations better.

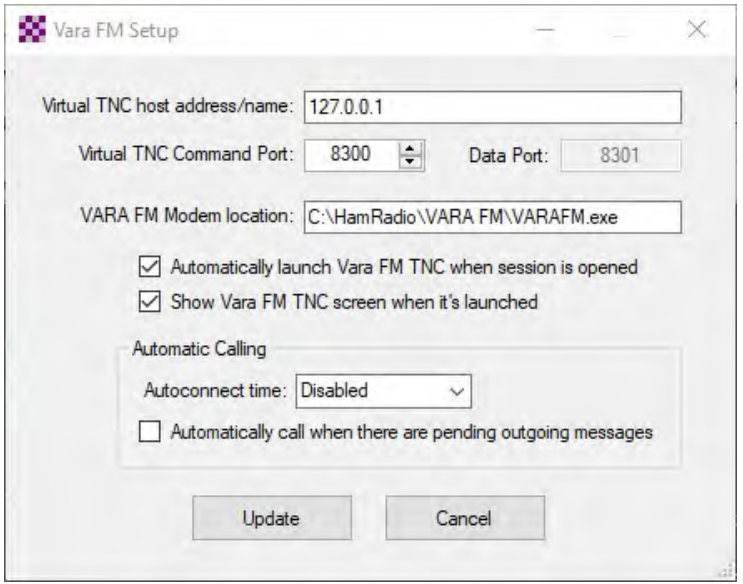
VARA FM
Configure Data Capable Radio For 9600 Baud

DATA		
1 COM PORT SETTING	COM port settings	SPEED: 4800 bps / **9600 bps** / 19200 bps / 38400 bps / 57600 bps OUTPUT: OFF / GPS OUT / PACKET / WAYPOINT WP FORMAT: NMEA 6 / NMEA 7 / NMEA 8 / **NMEA 8** WP FILTER: ALL / MOBILE / FREQUENCY / OBJECT/ITEM / DIGIPEATER / VoIP / WEATHER /YAESU / CALL RINGER / RANGE RINGER
2 DATA BAND SELECT	APRS/DATA band selection settings	APRS: MAIN BAND / SUB BAND / A-BAND FIX / B-BAND FIX / A=TX/B=RX / A=RX/B=TX DATA: MAIN BAND / SUB BAND / A-BAND FIX / B-BAND FIX / A=TX/B=RX / A=RX/B=TX
3 DATA SPEED	APRS/DATA communication baud rate settings	APRS: 1200 bps / 9600 bps DATA: 1200 bps / 9600 bps
4 DATA SQUELCH	Squelch detection settings	APRS: RX BAND / TX/RX BAND DATA: RX BAND / TX/RX BAND TX: ON / OFF

Data capable radios may default to 1200 baud data rates and will need a menu setting to change to 9600 baud

My Yaesu FTM-300DR default is 1200 baud and I need to go the the Data section if the setup, then menu item 3 and change the data to 9600 baud.

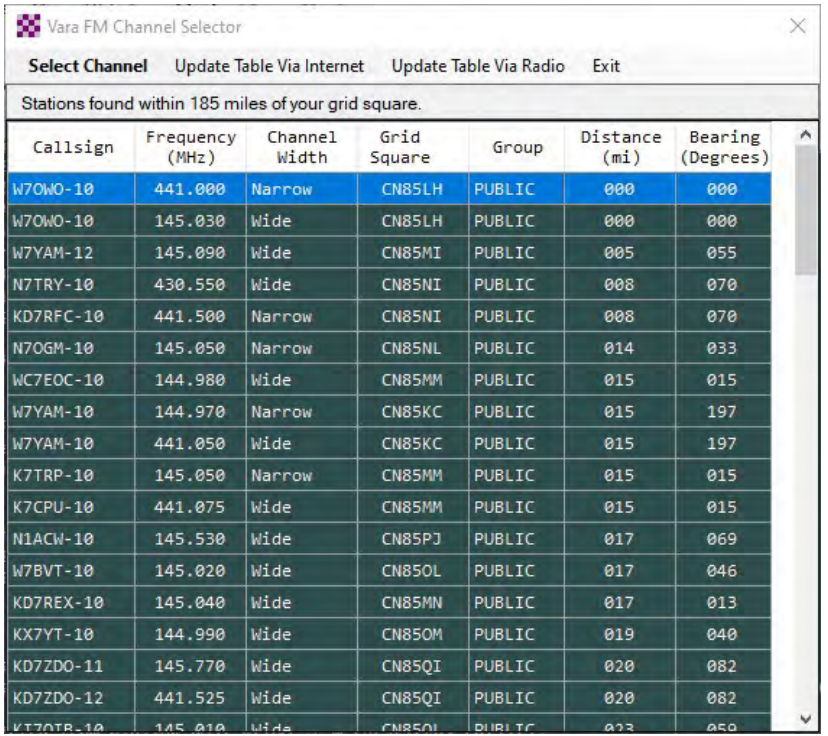
VARA FM Winlink Session Configuration Settings → Vara TNC Setup



1) Open a VARA FM Winlink Session
2) If VARA FM is on your computer use 127.0.0.1 to tell the application to use the local host
3) The Virtual TNC Command Port should be the same value as specified in slide 22
4) If when you open a VARA FM Winlink Session you want VARA FM to start provide the path where the VARAFM.exe file resides and click on the Automatically launch VARA FM TNC
5) By default it will be a hidden window, click the Show VARA FM TNC if you would like it visible
6) Don't use automatic calling under normal scenarios.
7) Click Update

*To open a VARA FM Winlink session, on the Main Winlink Express window, in the Open Sessions: dropdown list select **Vara FM Winlink** and click on the Open Sessions menu item.

VARA FM Channel Selector



Callsign	Frequency (MHz)	Channel Width	Grid Square	Group	Distance (mi)	Bearing (Degrees)
W7OWO-10	441.000	Narrow	CN85LH	PUBLIC	000	000
W7OWO-10	145.030	Wide	CN85LH	PUBLIC	000	000
W7YAM-12	145.090	Wide	CN85MI	PUBLIC	005	055
N7TRY-10	430.550	Wide	CN85NI	PUBLIC	008	070
KD7RFC-10	441.500	Narrow	CN85NI	PUBLIC	008	070
N7OGM-10	145.050	Narrow	CN85NL	PUBLIC	014	033
WC7EOC-10	144.980	Wide	CN85MM	PUBLIC	015	015
W7YAM-10	144.970	Narrow	CN85KC	PUBLIC	015	197
W7YAM-10	441.050	Wide	CN85KC	PUBLIC	015	197
K7TRP-10	145.050	Narrow	CN85MM	PUBLIC	015	015
K7CPU-10	441.075	Wide	CN85MM	PUBLIC	015	015
N1ACW-10	145.530	Wide	CN85PJ	PUBLIC	017	069
W7BVT-10	145.020	Wide	CN85OL	PUBLIC	017	046
KD7REX-10	145.040	Wide	CN85MN	PUBLIC	017	013
KX7YT-10	144.990	Wide	CN85OM	PUBLIC	019	040
KD7ZDO-11	145.770	Wide	CN85QI	PUBLIC	020	082
KD7ZDO-12	441.525	Wide	CN85QI	PUBLIC	020	082

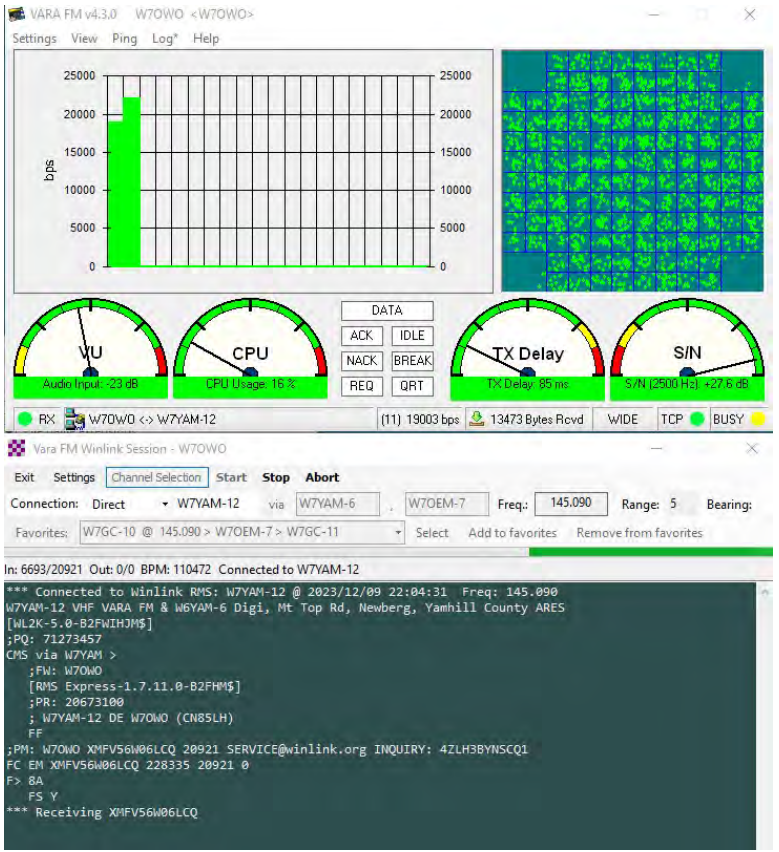
Clicking on Update Table Via Internet will refresh the list with the latest known VARA FM Gateways.

Update Table Via Radio will post a request in you outbox. When you upload this message, in your next active session, you will down load a message that contains the updated list which will automatically update the table with the down loaded information.

Click on the Channel you wish to use and click on Select Channel.

Clicking on a column header will sort by that column.

Active VARA FM Winlink Session

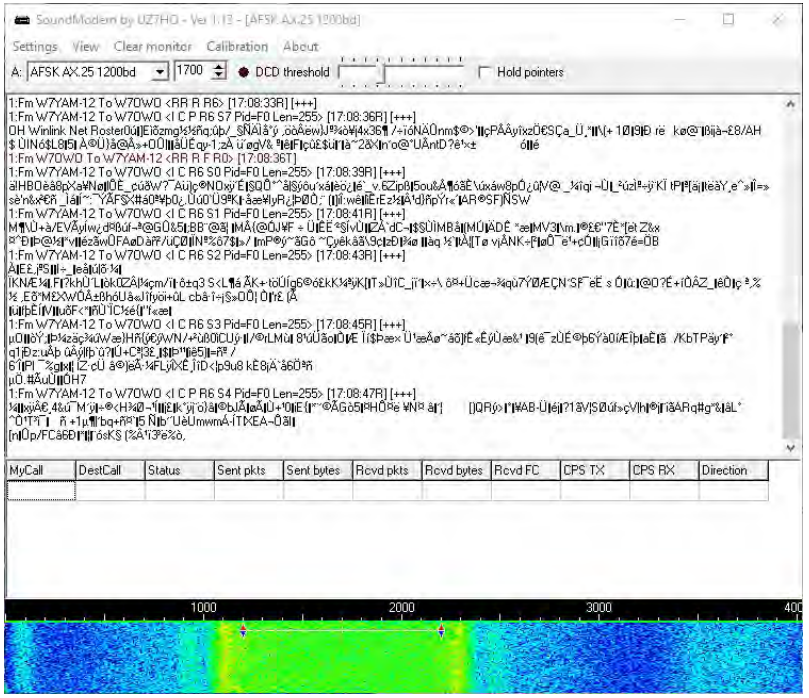


The screen capture shows both the VARA FM window and the Winlink VARA FM Session window during an active down load.

Prior to clicking start make sure your radio is at the frequency displayed in the text box labeled **Freq:**. I've found the majority of my failed connections is I am not on the frequency of the gateway. Or I have exited from the Channel Selector rather than selected. That leaves the Connection Gateway field blank.

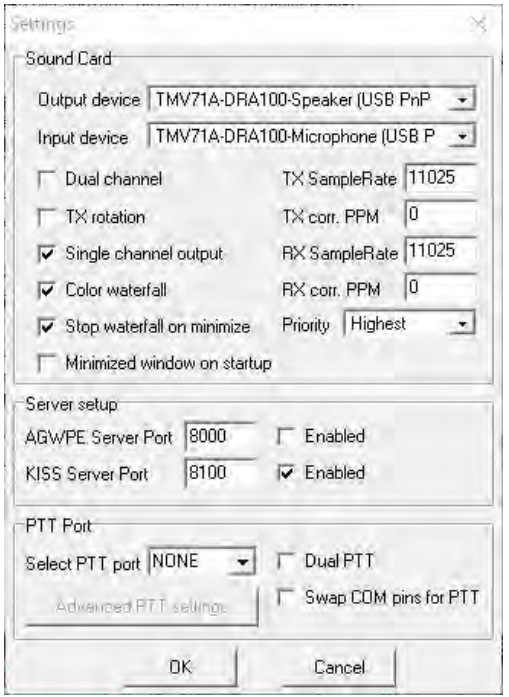
As in all Session Windows, clicking the menu item **Start** will begin the connection and if a connection is made will pass you Winlink Credential to the Gateway. If successful, message waiting for you will be downloaded, messages in the Outbox will be uploaded.

UZ7HO SoundModem Download and Install



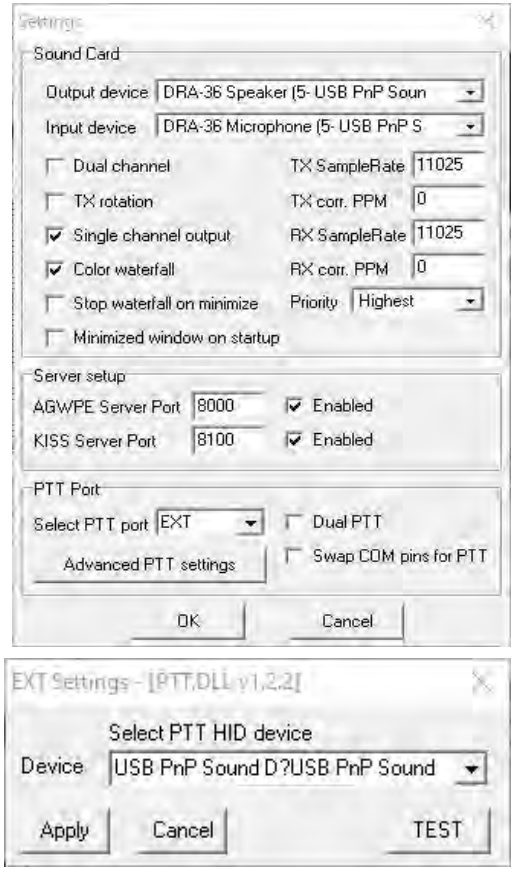
1) Download UZ7HO SoundModem zip file from: http://uz7.ho.ua/packetradio.htm
2) Download the files
   1) soundmodem114.zip
   2) If using DRA GPIO pt-dll.zip
3) Create a directory in the location you are keeping you ham radio software
   1) Extract soundmodem114.zip and also pt-dll.zip if you downloaded it into the same directory.
   2) You should now have CAT.dll, PTT.dll, and soundmodem.exe in the directory
4) To start configuration double click on soundmodem.exe
5) This program usually starts minimized and places the icon in your system tray.

U7HO SoundModem Configuration
Settings → Devices (SignaLink)



- Sound Card
  - Output device
    - Select from the dropdown the Signalink speaker
  - Input device
    - Select from the drop down the Signalink microphone
  - Keep remaining Sound Card fields
- Server setup
  - Unless running multiple SoundModem applications keep as default
- PTT Port
  - Since the SignaLink uses VOX keep port to NONE

U7HO SoundModem Configuration
Settings → Devices (DRA/GPIO)

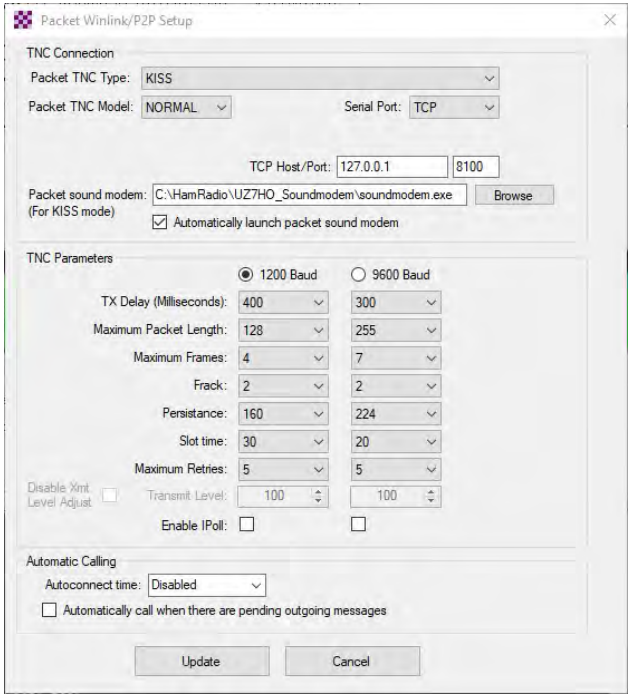


- Sound Card
  - Output device
    - Select from the dropdown the DRA speaker
  - Input device
    - Select from the drop down the DRA microphone
  - Enable Stop waterfall on minimize
  - Keep remaining Sound Card fields
- Server setup
  - Disable AGWPE Server Port
  - Keep the KISS Server Port enabled and keep the port number as 8100.
- PTT Port
  - The DRA uses the PTT.dll so select EXT for the PTT port
  - Click on Advanced PTT settings
- Select PTT HID device
  - From the dropdown list select the USB PnP Sound Device
- Click Apply then OK

UZ7HO SoundModem Configuration

- On the SoundModem main screen, enable Hold Pointers
- There should be no need to adjust the threshold
- Exit the program, this will write the .INI file in the directory with the .EXE file.
- Open SoundModem.ini in notepad
- Find the text *MyDigiCall*= 18 lines under the text *[AX25_A].*
  - Add the same call sign and SSID you provided for the VARA FM Digipeater. This created the Packet Digipeater
- Save the .INI file.

UZ7HO SoundModem Winlink Session Configuration Settings



- Close any open sessions.
- Change the Open Session type to *Packet Winlink*
- Click on Opwn Session
- Packet TNC Type should be *KISS*
- Packet TNC Model should b *NORMAL*
- Serial Port should be *TCP* (last item in list)
- Enter the complete path to the soundmode.exe file
- Automatically launch packet soundmodem should be selected
- Leave the TNC Parameters
  - If you have strong Packet connections you can increase the Maximum Frames by one or two.
- Disable AutoConnect Time
- Click on **Update**

Winlink Packet Session

- After configuration, close Winlink Express and reopen.
- Change the Session type to Packet Winlink if not already so
- Click on Open Session
- Click on Channel Selection, and update the Table from the Internet.
- Click on a nearby Gateway and click select
- Validate your radio is on the frequency of that Gateway
- Click Start. Any pending receipt messages will be downloaded and any pending messages in the outbox will be sent.
- By addressing a message to **TEST;** it will be sent to the Winlink reflector, and on your next connection it will be sent back to you. I generally keep a 5 K text message in my drafts and make a copy of it for testing through put on the gateways I support. And by addressing it to TEST; I can test both the upload and download from CMS.
- In recent test, I found it took 73 seconds for the complete session for a PACKET Winlink session, the same message took 22 seconds for the full session with VARA FM.
- All W7YAM VHF/UHF Gateways support PACKET. All but W7YAM-11 support VARA FM.