Ham Radio ‘How-To’ Guide

Winlink – VARA - Digirig - Baofeng BF-F8HP

Mike Spohn
N1SPW
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www.n1spw.net

“If it works out of the box – what fun is that?”

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Introduction

This document is a member of the **N1SPW** '*How-To Series'* of documents created to fill the gap between *YouTube* videos and real life. I applaud all of my Ham colleagues that have created hundreds of great videos, visualizing how to accomplish some cool Ham technology hack.

Videos are great, but, in most cases, they do not provide enough detail to get a system up and running. What seems to work without a hitch in the video, often becomes a nightmare when an average Ham attempts to recreate what they saw the presenter do.

To ease the frustration of "*YouTube* implementation pain" experienced by so many of us, my contribution to the Ham community is some long overdue documentation.

'How-To' Goal

The goal of this *'How-To'* is to document the steps needed to get a *Baofeng BF-F8HP* HT radio to send Emails on FM, using Winlink/VARA and a *Digirig*. Whatever your views are on the Baofeng line of products, there are a lot of these radios in Ham shacks everywhere. They provide new Hams an inexpensive option to get on the air.

Many Hams have told me it is not possible to use a Baofeng in digital modes. This is simply not true. I am about to show you how I got my BF-F8HP to send Emails.

To get your Baofeng HT to send Emails via Winlink, there are a lot of parts that have to work together to achieve success. I have broken these parts down into four categories:

1. Hardware
2. Software
3. Radio/Comms
4. Configuration

Hardware

The hardware you need includes the following:

- ✔ Windows 10/11 workstation or laptop
- ✔ *Digirig*
- ✔ *Digirig* cable for BF-F8HP
- ✔ USB-C cable that works with a *Digirig*

Software

The software you need includes the following:

- ✔ Winlink Express (including a Winlink account)
- ✔ VARA FM

Radio/Comms

For the radio will need the following:

- ✔ *Baofeng BF-F8HP HT*
- ✔ A Winlink FM RMS (Gateway) within range
- ✔ Clean RF signal between the Baofeng and the RMS

You must ensure all of the above play nice if you want to send Emails over radio waves.

Step-1: Hardware

Windows 10/11 workstation or laptop configured properly

The first thing you need is a Windows 10 or 11 workstation or laptop. Make sure that all Windows updates have been installed.

NOTE: You can also use a Linux or Raspberry Pi computer, but that is beyond the scope of this document. Look for future "How-To's" on how to do this.

Digirig

You can obtain a Digirig on Amazon. I suggest you order one directly from the Digirig web store; they are cheaper and *Digirig* does not have to pay Amazon's fees.

Digirig cable for BF-F9HP

You also need to buy the Baofeng data cable that connects the *Digirig* to your HT. The cable you need is the '*Baofeng cable kit for Digirig Mobile.*' The kit comes with two cables; one (green) is used to program the radio using Chirp or other programming software. The second cable (black) will be used for Winlink/VARA.
You can find the kit at the *Digirig* store. (Figure 1).

Figure 1: Digirig cable kit

NOTE: These cables work with a lot of HT's. In fact, most HT's with the K1 connector (two prongs) will work with this cable. I can attest these cables also work with my *Anytone AT-D878UV* HT.

USB-C cable that works with a *Digirig*

It is critically important that you find a USB-C cable that works correctly with a Digirig. Not all USB-C cables are the same.

I cover the setup of a *Digirig* on Windows in two "How-To's," one for Window 10 and one for Windows 11. Refer to those documents and get your *Digirig* configured on your Windows computer.

Step-2: Software

Winlink Express

If you have not already done so, download and install Winlink on your computer. Download the *Winlink Express* installer from here. Once installed, start the program (Figure 2).

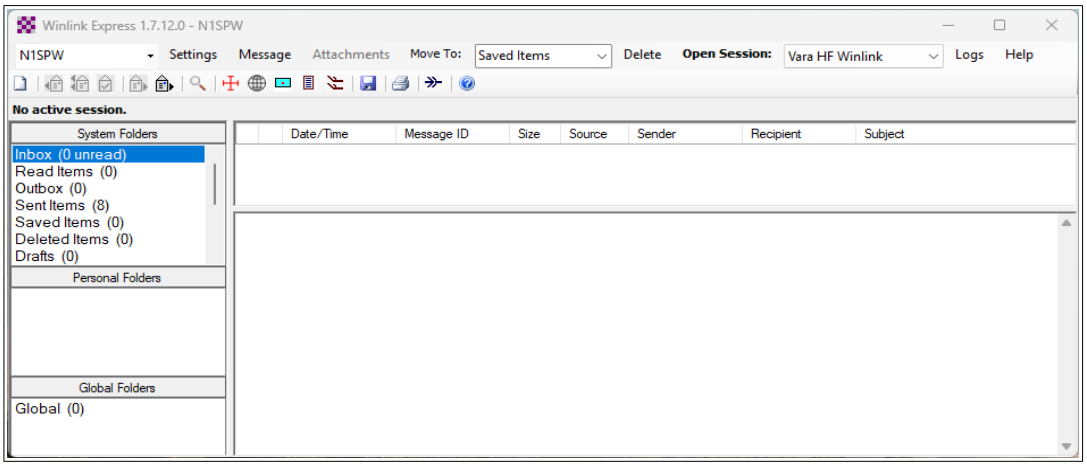


Figure 2: Winlink Express

Next, you need to create a Winlink account if you do not already have one. This can be done on the '*Settings*' page. Click on the Setting menu, and select '*Winlink Express Setup*' (Figure 3).

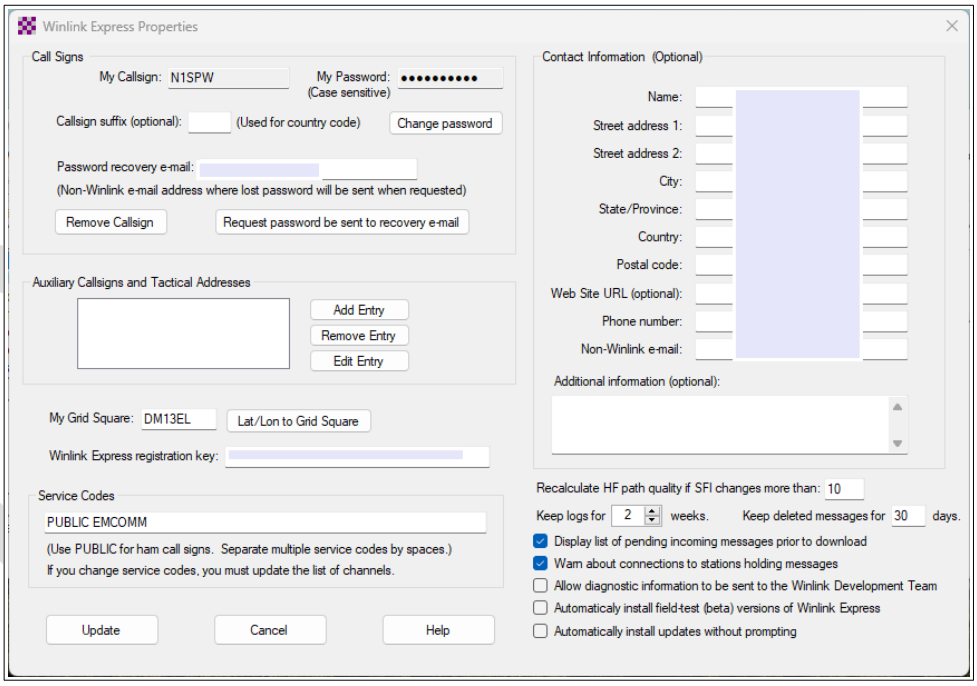


Figure 3: Winlink Express Setup

Fill in the required information:

- Call sign
- Password
- Password recovery Email address
- Grid square
- Service code(s)
- Contact information

Click 'Update'. Your account will be created once verification of your Call sign is completed. Your Winlink Email address is your <call sign>@winlink.org.

I suggest you read the Winlink documentation to get familiar with the program. At a minimum, you should open a 'Telnet Winlink' session and practice sending Emails to/from your Winlink account and your personal Email account via the Internet.

VARA FM

In this step, you are going to install VARA FM on your computer. This software simulates a hardware modem and uses the proprietary VARA protocol. It is highly efficient, providing excellent throughput. Download the software from here and install it.

NOTE: VARA FM is free to use with some limitations:

- First, it will limit your bandwidth to the lowest setting. This will slow down your *Winlink* connections.
- Second, you will be presented with a 'nag' screen every time you connect to a *Winlink* gateway.
- Third, you will not be able to setup a *Winlink* gateway station, for testing or field use, if desired.

Registration of the program is $69 USD. You can purchase a license by clicking on the 'Upgrade' menu.

Once installed, plug your Digirig into your computer and start the VARA FM program. You will be presented with the application base screen (Figure 4).

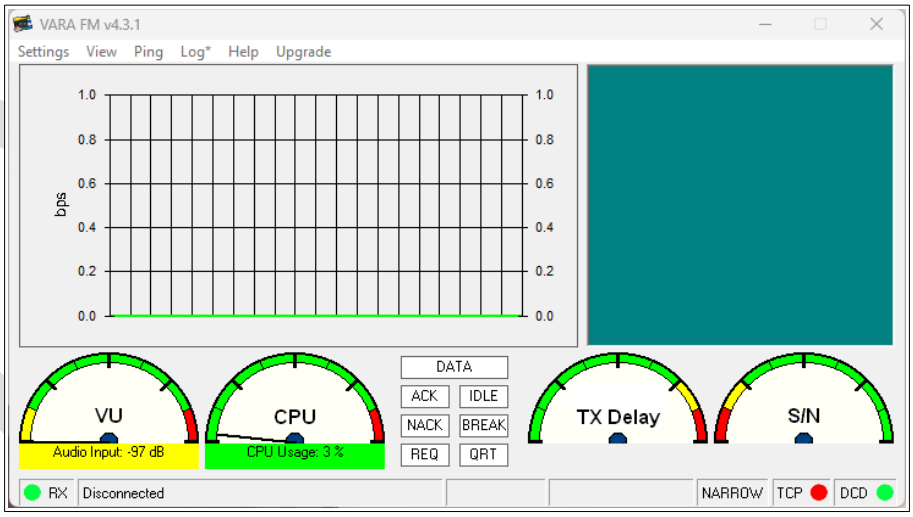


Figure 4: VARA FM base screen

Click on 'Setting | VARA Setup (Figure 5).

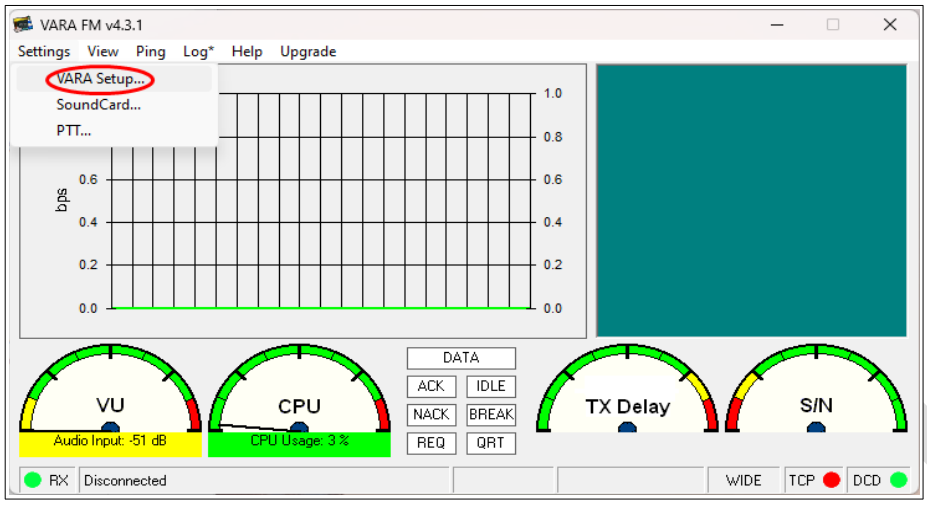


Figure 5: VARA FM Setup menu

There is not a lot to do on the 'Setup' page. Leave the TCP Ports section at the default values of 8300 and 8301. Select WIDE in the FM System, and add your Call sign and key if you have one (Figure 6). Then click 'Close'.

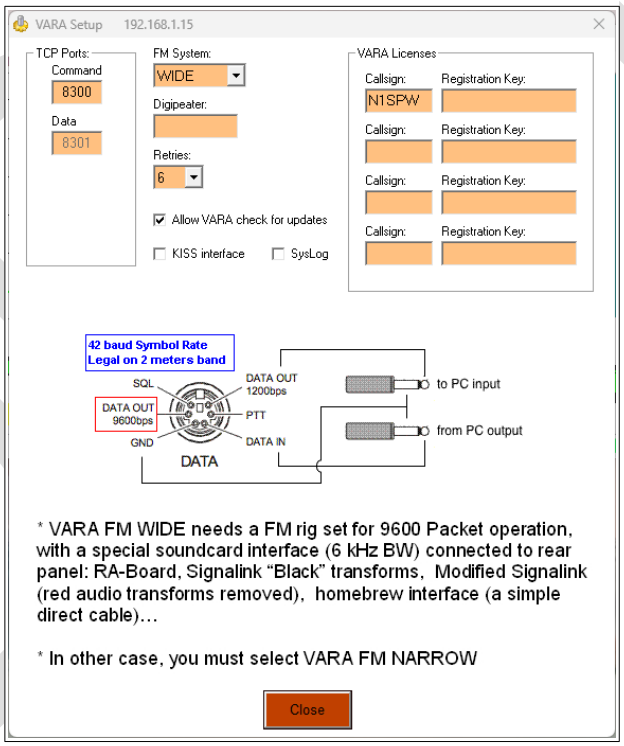


Figure 6: VARA FM Setup

Next, click on the 'Settings | Soundcard' menu. Be sure to select your *Digirig* as the input and output device (Figure 7). The *Digirig* will only appear in the dropdown list if it is connected to your computer.

NOTE: You did rename your sound device to '*Digirig*' as suggested in my Windows setup document – right?

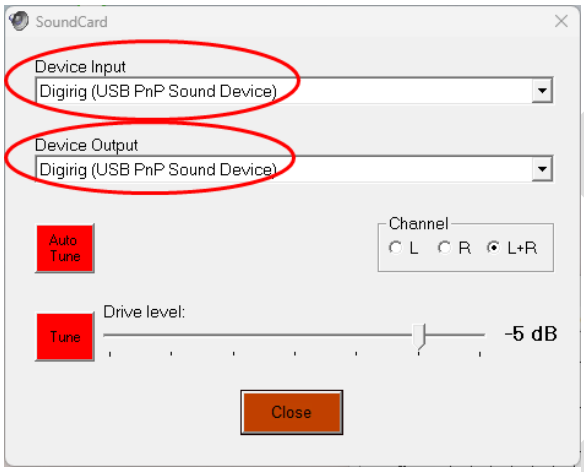


Figure 7: Digirig Soundcard

We will deal with the 'Auto Tune' and 'Tune' buttons later when setting up your rig. For now, click 'Close'.

The last thing we need to do is configure the Push-to-Talk (PTT) feature. Click on 'Settings | PTT'. Here you want to be sure to assign the PTT setting to the Com port Windows assigned to your *Digirig*. You can determine this in the Windows 'Device Manager' (Figure 8).

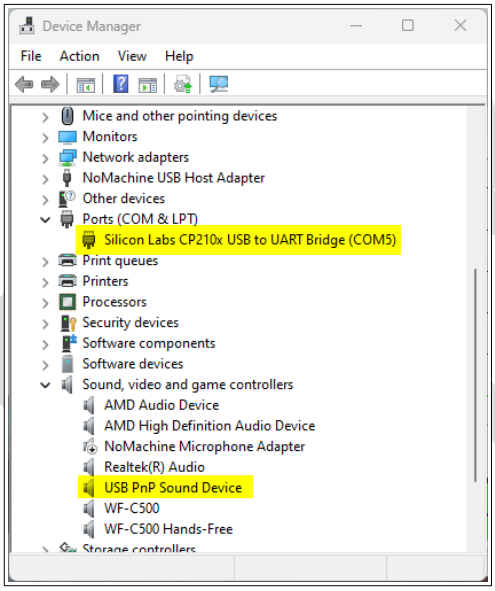


Figure 8: Device Manager

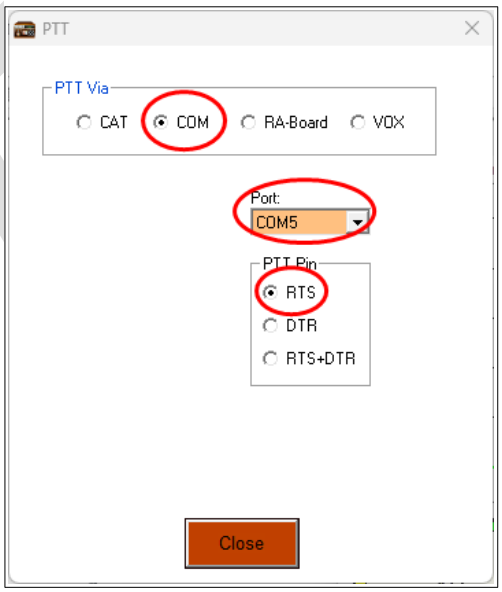


Figure 9: VARA FM PTT

Notice in Figure 8, the *Digirig* is recognized by Windows as a sound device with a name of 'USB PnP Sound Device'. Windows also assigned the *Digirig* COM port 5 (COM5). This Com port will be used by the *Digirig* for PTT control.

In the VARA FM PTT settings, Be sure the 'PTT Via' setting is set to COM. The Port must match the port assigned in the 'Device Manager'. The PTT Pin setting should be set to RTS. These settings are shown if Figure 9.

NOTE: If your *Digirig* cannot be found in the Windows Device Manager – you *must* correct this problem before moving on the Baofeng HT setup. Tips for troubleshooting the Digirig and Windows can be found in the relevant Windows 'How-To' document on my website.

Step-3: Radio/Comms

In this "How-To", I describe how to configure a Baofeng BF-F8HP HT. Why this model? Simple – I had one lying around my shack looking for something to do. Most new hams purchase the cheaper UV-5R model. I do not know if these instructions also work with the UV-5R. If there is enough interest, I will purchase one and write up a "How-To" for it.

Winlink FM RMS (Gateway) within range

It may be obvious; in order for all the hardware and software to work, you must have a Winlink FM RMS (Radio Mail Server) in range of your radio. Why do I bother to mention this? Because many Hams spend a lot of time trying to figure out why their rig does not send Emails, when they are simply not in range of a RMS.

This requires that your rig can get a signal to the RMS *AND* the RMS return a signal to you.

Clean RF signal between the BF-F8HP and the RMS

Having an RMS within radio range is not enough. You must also ensure the signals passed between the two stations are 'clean'. What does this mean? It means your VARA FM and your *Digirig* sends and receives clean audio signals from the computer to the radio, *AND* from the radio to the RMS.

The next section focuses on the configuration requirements to make sure this occurs.

Step-4: Configuration

First thing to do is configure the HT. The best way to do this is to reset the radio to factory default settings, and change the configuration items needed to work with *Winlink*. If you already have your radio configured the way you like, you can make the required adjustments without a reset.

NOTE: You can download the manual for the BF-FHP8 here.

To reset the radio to factory default settings – do the following:

- Press the 'Menu' button
- Press the '4' then '0' button
- Press the 'Menu' button
- When the 'ALL' item appears press the 'Menu' button
- When the 'Source?' item appears, press the 'Menu' button
- A 'Wait..' message appears – then the radio will reset.

Once reset, the radio will be in 'Chinese' mode. To change to English mode:

- Press the 'Menu' button, press '1' then '4'
- Press the 'Menu' button
- Use the down arrow to 'ENG'
- Press the 'Menu' button

I have provided a handy table that summarizes the configuration changes you need to make. The menu item numbers and the settings you need to make are in bold and highlighted in yellow (Table 1).

NOTE: These settings work for me. Contact me if this table needs corrections.

Table 1: BF-F8HP Menu Settings

Menu Item	Setting Name	Description	Default Value	Required Value
0	Squelch	Squelch	5	**0**
1	Step	Freq step	2.5K	N/A
2	TXP	Xmit Power	HIGH	**High**
3	Save	Battery Save	3	N/A
4	VOX	Voice operated	Off	**OFF**
5	WN	Wide/Narrow BW	WIDE	**NARROW**
6	ABR	Display lit time	5	N/A
7	TDR	Dual watch	OFF	**OFF**
8	Beep	Beep on/off	ON	N/A
9	TOT	Xmit time out	60	N/A
10	R-DCS	Rcv DCS	OFF	**OFF**
11	R-CTS	Rcv CTS	OFF	**OFF**
12	T-DCS	Xmit DCS	OFF	**OFF**
13	T-CTCS	Xmit CTCS	OFF	**OFF**
14	VOICE	Voice prompts	CHI	N/A
15	ANI-ID	Auto number ID	80808	N/A
16	DTMFST	Side tones	DT+ANI	**OFF**
17	S-CODE	Signal code	1	N/A
18	SC-REV	Scanner resume mode	TO	N/A
19	PTT-ID	PTT ID send mode	OFF	**OFF**
20	PTT-LT	PTT ID delay	5	N/A
21	MDF-A	Mode A display option	FREQ	N/A
22	MDF-B	Mode B display option	FREQ	N/A
23	BCL	Busy channel lockout	OFF	**OFF**
24	AUTOLK	Autolock on/off	OFF	OFF
25	SFT-D	Freq shift direction	OFF	**OFF**
26	Offset	Freq offset amount	000.000	N/A
27	Mem-CH	Store memory channel	CH-000	N/A
28	Del-CH	Delete memory channel	CH-000	N/A
29	WT-LED	Backlite LED color	PURPLE	N/A
30	RX-LED	Rx LED color	BLUE	N/A
31	TX-LED	Tx LED color	ORANGE	N/A
32	AL-MOD	Alarm mode	TONE	N/A
33	BAND	UHF/VHF	VHF	N/A
34	TDR-AB	Xmit select dual-watch	OFF	**OFF**

Menu Item	Setting Name	Description	Default Value	Required Value
35	STE	Sql tail elimination	ON	**OFF**
36	RP-STE	Rptr Sql tail elimination	5	**OFF**
37	RPT-RL	Sql tail delay	OFF	**OFF**
38	PONMSG	Power on message	FULL	N/A
39	ROGER	Roger beep	OFF	**OFF**
40	RESET	Reset radio	N/A	N/A

Traverse the menu system and make the changes highlighted in yellow above. The settings to use are in the 'Required Value' column. To change a setting, press the 'Menu' button, then use the up or down arrow button to move to the menu item. Press 'Menu' to enter edit mode. Change to the required value with the up/down arrow buttons. Press 'Menu' to exit edit mode. Press 'Exit' to exit Menu mode.

NOTE: N/A in the 'Required Value' column means that setting has no effect on the Winlink/Vara/*Digirig* configuration

Winlink

We need to make a few changes to *Winlink Express*. Start *Winlink Express*. In the 'Open Session' dropdown list, select 'Vara FM Winlink' as the session type (Figure 10).

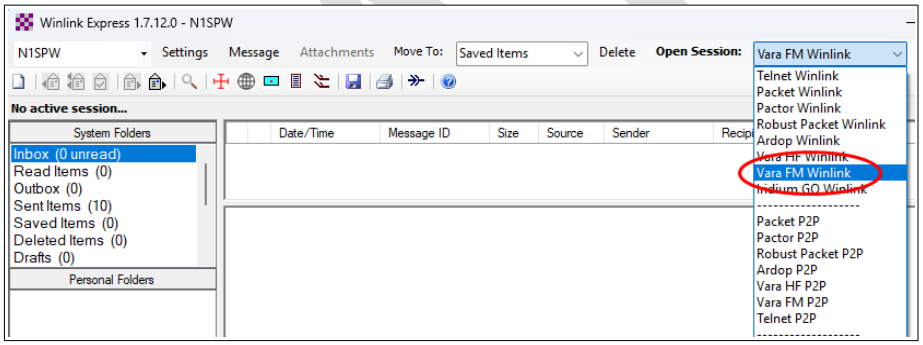


Figure 10: Winlink Session Type

Next, click on the 'Open Sessions' bold text to open a 'Vara FM Winlink' session. When the Winlink Session window opens, click on 'Settings | Vera TNC Setup' (Figure 11).

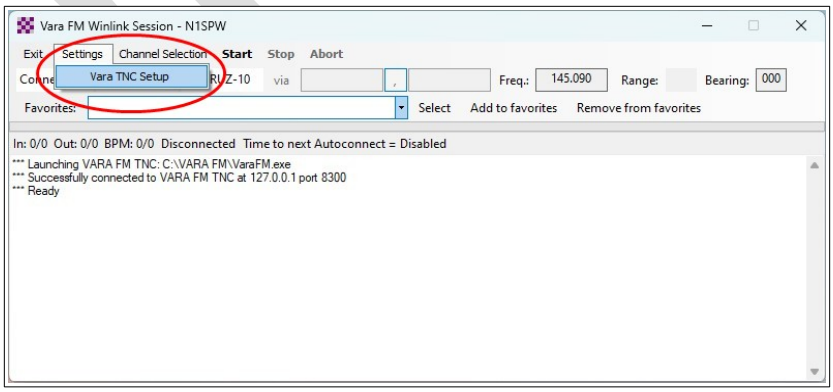


Figure 11: Vara TNC Setup

On the Vara FM Setup dialog, make sure the two check boxes are checked (shown in red). All other values can remain at their default values. Click the 'Update' button to dismiss the dialog (Figure 12).

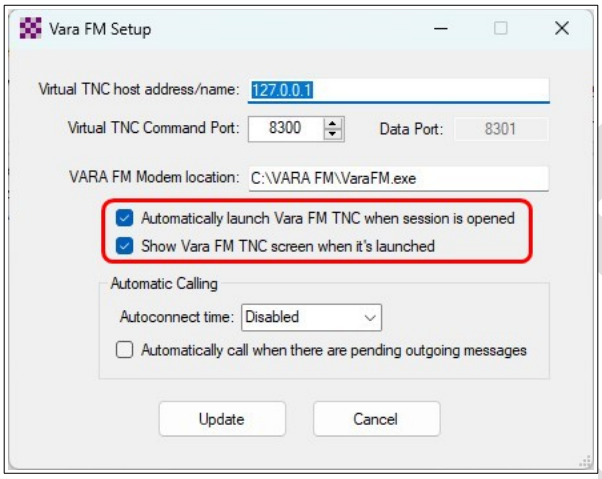


Figure 12: Vara FM Setup

Initial Testing

It is finally time to get all the parts working together and tested. Plug the black *Digirig* Baofeng cable into the BF-F8HP. Press firmly to ensure it is fully seated. Connect the other end of the cable in to the 'Audio' jack on the *Digirig*. Connect the USB-C cable between the *Digirig* and your Windows computer.

Turn on your BF-F8HP HT. You should see the green LED light up on the front if you set the squelch to 0 as required. If the green LED is not lit, go in to the Menu settings and set the squelch to 0.

Next, start 'Winlink Express'. Once started, make sure the session type is 'Vara HF Winlink', then click on the bold 'Open session' text (Figure 10).

You should now have three (3) windows open. Winlink, Winlink Vara FM Session, and VARA FM (Figure 13).

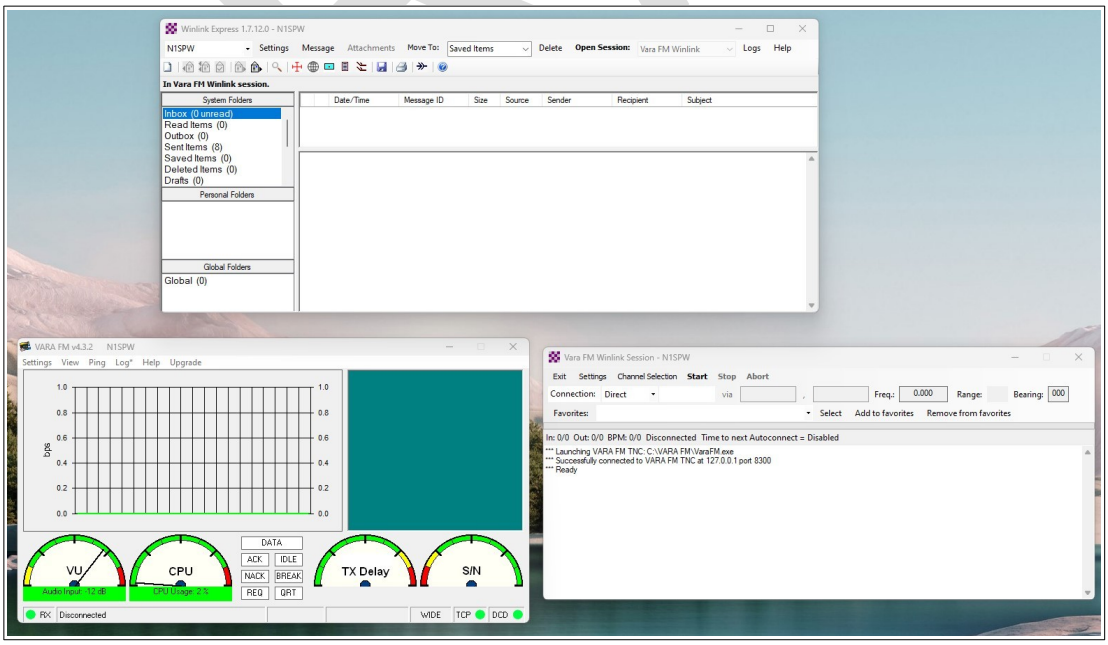


Figure 13: Winlink/VARA FM Windows

It is important that VARA FM can 'hear' the squelch of your radio. If it can, you will see the 'Audio Input' gauge deflect to the right. You can adjust the level by turning the volume knob on the radio,

If the gauge is pointing in the yellow region, it does not hear your radio. This must be fixed.

First, adjust the volume knob on your radio and see if it moves the gauge. If so, set the volume so the gauge deflects to about the 2 o'clock position.

If this does not work, open up the device manager and be sure your Digirig is recognized by Windows (Figure 8).

Next, open up the 'Sound Settings' applet (Figure 14).

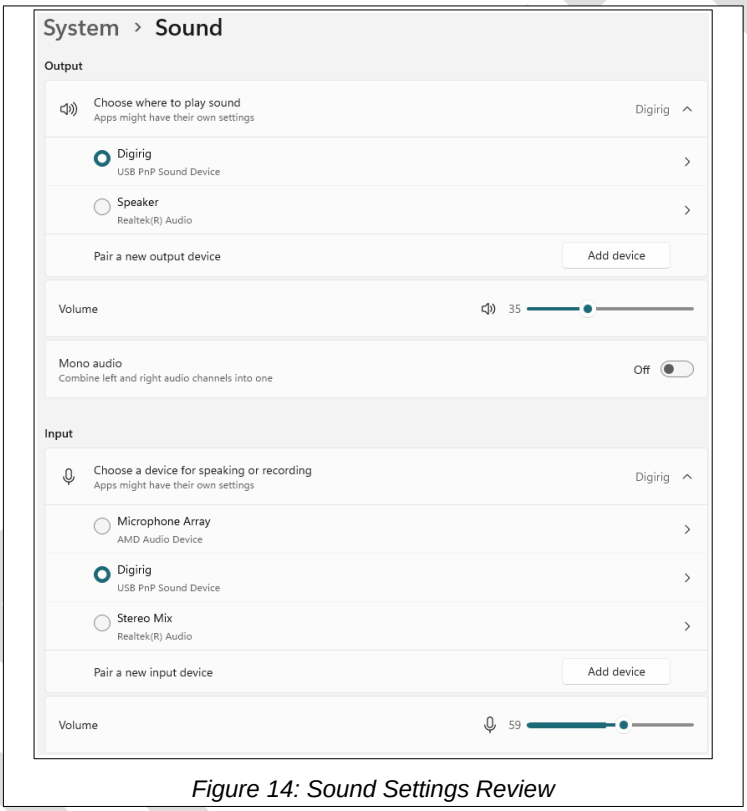


Figure 14: Sound Settings Review

Below are the things to confirm in 'Sound Settings':

- In the 'Output' section, make sure the *Digirig* is set as the output device.
- Set the 'Output' volume to about 1/3 of the scale and make sure the device is not muted.
- In the 'Input' section, make sure the *Digirig* is set as the input device.
- Make sure the 'Input' volume is not muted.
- Adjusting the volume knob on the radio, should move the 'Input' Volume slider. This should also affect the 'Audio Input' gauge in VARA FM.
- You can also adjust the 'Input' with the Volume slider. It is more precise than your radio volume knob.

In most cases, if VARA FM cannot hear your radio it is caused by not setting the *Digirig* as the Input/Output device, the 'Input' device is muted, the Input volume level is too low, or the radio squelch is not 0.

You can also use the Windows 'Volume Mixer' to confirm the audio settings are correct.

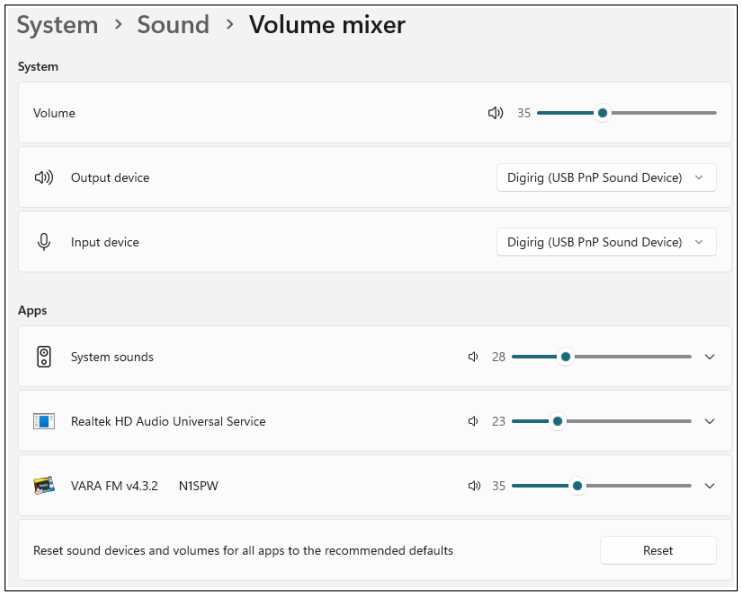


Figure 15: Sound Mixer Setting Review

If you are still having trouble getting VARA FM to hear your radio, refer to the Troubleshooting section.

Tune Test

Now that we know VARA FM can hear your radio, it is time to test PTT. In the VARA FM application, click on 'Settings | Soundcard' to open the 'SoundCard' dialog (Figure 16).

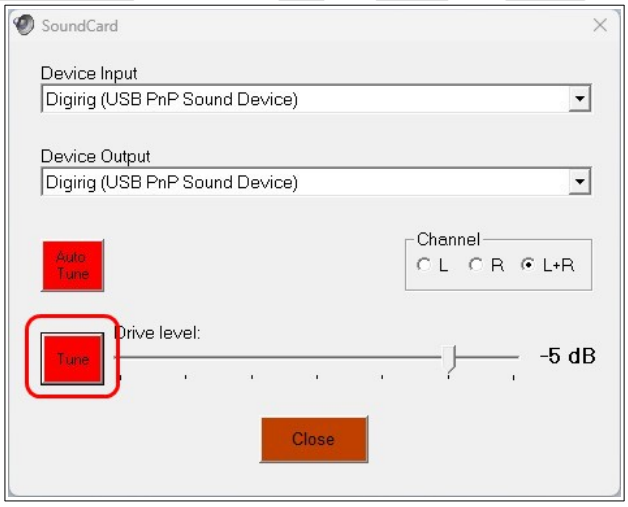


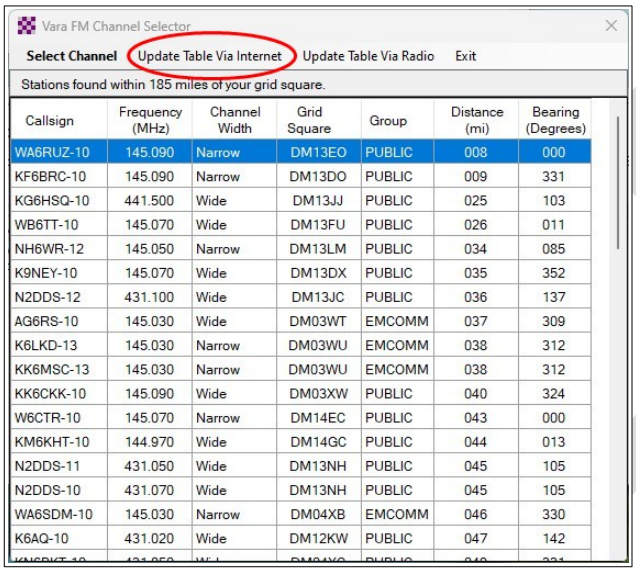
Figure 16: PTT Test

Tune your radio to a 2M frequency such as 145.090. Press the red 'Tune' button. Your radio should go into transmit mode (LED turns red). Quickly press the 'Tune' button again to exit transmit mode.

NOTE: Be careful. *You must* press the Tune button a second time to exit transmit mode. You should also set your radio into low power mode when 'Tune' testing. Press <Menu> <2>, <Menu>, down arrow to 'LOW', <Menu> <EXIT>.
HINT: When you press the 'Tune' button, VARA FM transmits a distinct beep. It is handy to have another radio tuned to the same frequency as your BF-F8HP, so you can hear what VARA is doing. You can also use an SDR device if you have one.

Ping Test

The next test is the VARA Ping test. Exit the VARA 'SoundCard' dialog if you still have it open. Go back to your 'Winlink Vara FM' session Window, and click on 'Update Table Via Internet' (Figure 17).



Callsign	Frequency (MHz)	Channel Width	Grid Square	Group	Distance (mi)	Bearing (Degrees)
WA6RUZ-10	145.090	Narrow	DM13EO	PUBLIC	008	000
KF6BRC-10	145.090	Narrow	DM13DO	PUBLIC	009	331
KG6HSQ-10	441.500	Wide	DM13JJ	PUBLIC	025	103
WB6TT-10	145.070	Wide	DM13FU	PUBLIC	026	011
NH6WR-12	145.050	Narrow	DM13LM	PUBLIC	034	085
K9NEY-10	145.070	Wide	DM13DX	PUBLIC	035	352
N2DDS-12	431.100	Wide	DM13JC	PUBLIC	036	137
AG6RS-10	145.030	Wide	DM03WT	EMCOMM	037	309
K6LKD-13	145.030	Narrow	DM03WU	EMCOMM	038	312
KK6MSC-13	145.030	Narrow	DM03WU	EMCOMM	038	312
KK6CKK-10	145.090	Wide	DM03XW	PUBLIC	040	324
W6CTR-10	145.070	Narrow	DM14EC	PUBLIC	043	000
KM6KHT-10	144.970	Wide	DM14GC	PUBLIC	044	013
N2DDS-11	431.050	Wide	DM13NH	PUBLIC	045	105
N2DDS-10	431.070	Wide	DM13NH	PUBLIC	045	105
WA6SDM-10	145.030	Narrow	DM04XB	EMCOMM	046	330
K6AQ-10	431.020	Wide	DM12KW	PUBLIC	047	142

Figure 17: Update Channels

This will update the Channel table with the closest RMS' in in/near your grid square. You can see in the table, the nearest RMS to me is 8 miles (WA6RUZ-10). Click 'Exit' to dismiss the dialog.

Go back to the VARA FM application and click on the 'Ping' menu item. When the dialog opens, key in the nearest RMS (Figure 18).

HINT: You may want to put your radio in HIGH transmit mode for the Ping test.

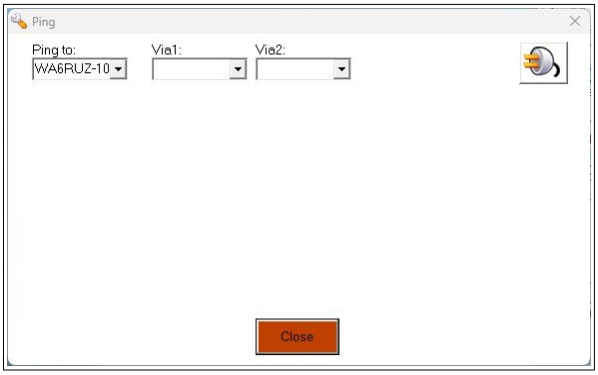


Figure 18: VARA FM Ping

Next, tune your radio to the frequency of the RMS you want to ping. In my case, WA6RUZ-10 is on frequency 145.090. Click the 'plug' icon.
VARA will key the radio and transmit a single 'ping' message to the RMS. It will then briefly wait for a reply. If all is well, the RMS should reply to the ping with a response. If so, VARA will show the signal strength between the two stations (Figure 23).

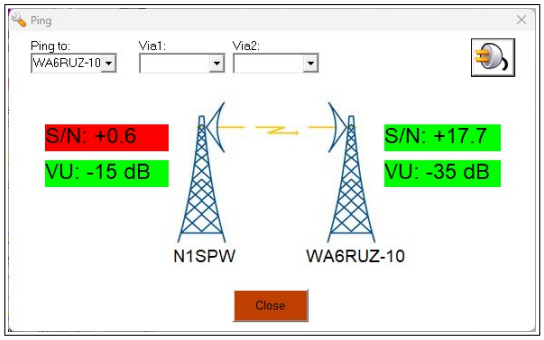


Figure 19: Successful Ping

If the ping fails, you will see a 'No Signal' message (Figure 20).

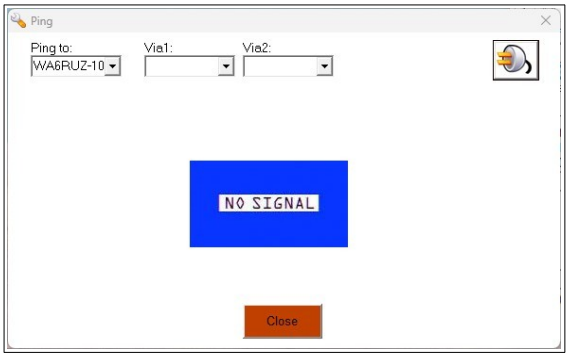


Figure 20: VARA Ping - No Response

If you get get no response, do not panic. In my experience, here is a list of the reasons your ping may fail:

- The remote RMS cannot hear you
- You cannot hear the remote RMS
- Your audio levels are not set properly
- You are not transmitting a signal
- You are not transmitting a 'clean' signal
- Your radio does not terminate Xmit cleanly

Before you go into troubleshooting mode, let's run another test. VARA has the ability to perform an 'Auto Tune' function.

Auto-Tune Test

This is a nice feature. When you run the test, VARA will send a series of 'Ping' messages to an RMS. Between each ping, VARA will increase the output gain. This results in a series of pings, each one louder than the previous.

From the VARA SoundCard dialog, click on the 'Auto Tune' button (Figure 21)

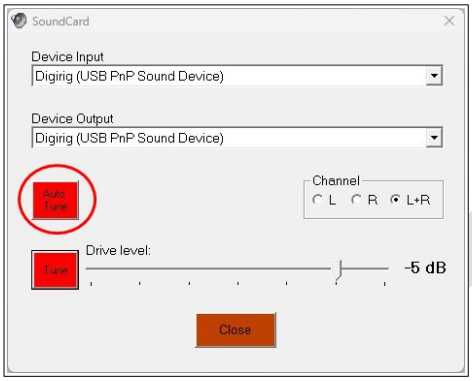


Figure 21: SoundCard Auto Tune

The 'Calibration' dialog will open (Figure 22).

Figure 22: Auto Tune Calibrate

In the 'Calibrate with:' dropdown list, enter the name of the RMS. Your entry will be saved in the list. Do not worry about overwriting and existing entry - it will be retained. Be sure to set your HT to the frequency the RMS is listening on. Then press the 'Plug' button.

VARA should key the HT mic and send a series of 10 pings – each one louder than the previous. After the 10th ping, VARA will release the mic and listen for a response.

NOTE: If you have another HF radio handy, tune to the RMS frequency. When you perform the calibration test, you can hear what your HT is sending. If the RMS replies, you will hear a brief response at the end of the test.

If the 'Auto-Tune' was successful, you will see a message describing the results (Figure 23). VARA will also automatically adjust your radio mic gain to the correct amount.

Figure 23: Auto-Tune Success

If both the 'Ping' and 'Auto-Tune' test fail, then you will have to do some troubleshooting. At the very least, have another FM radio tuned to the same frequency, so you can 'hear' the conversation between your HT and the RMS. During each test, you should hear your HT transmit. You may or may not hear the RMS respond.

Free Advice: Before spending a lot of time troubleshooting, be sure you are within radio range of the RMS you are trying to reach. The problem may be as simple as; nobody hears you (Don't ask me how I know).

After reviewing you setup following the instructions presented so far, and you still are having trouble, refer to the Troubleshooting section.

NOTE: If you do not have a second radio, there is a way to hear what VARA is doing through your computer speakers. To learn more, refer to the Troubleshooting section.

Step-5: Send an Email

Finally, we are ready to send an Email over FM radio. There are three tasks in this step:

1. Compose an Email
2. Send Email to a remote RMS
3. Confirm Email receipt

Compose an Email

The first step is to compose an Email. In Winlink, this is easy. From the Winlink base menu select 'Message | New Message…' (Figure 24).

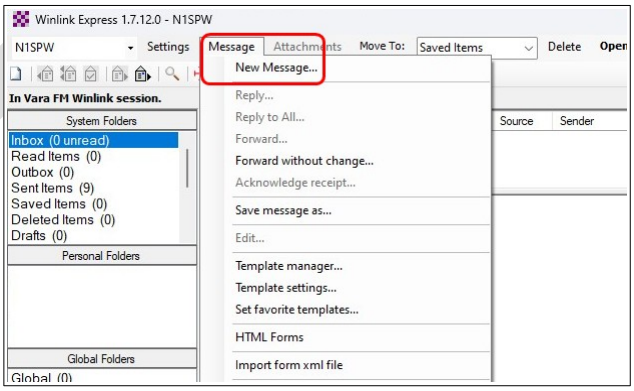


Figure 24: Compose Email

Fill in the Email message details, then click on 'Post to Outbox' (Figure 25)

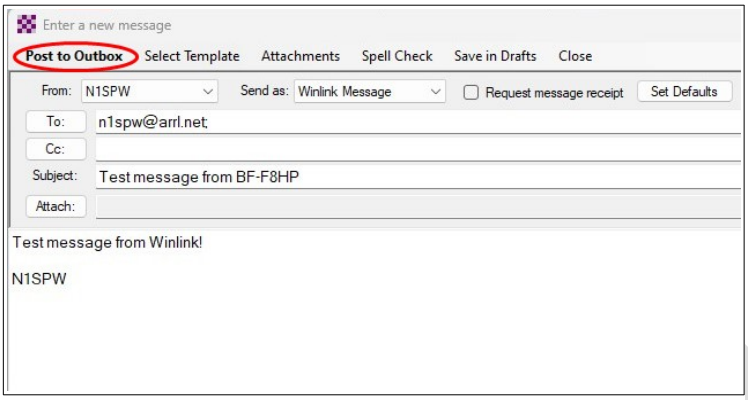


Figure 25: Post Message

Send Email to Remote RMS

Once the Email message is in the Outbox – we can send it. Open a VARA FM session from the Winlink base screen if you have no session open. Use 'Channel Selection' to select the remote RMS, or enter the RMS name and frequency. Then click on the 'Start' button (Figure 26).

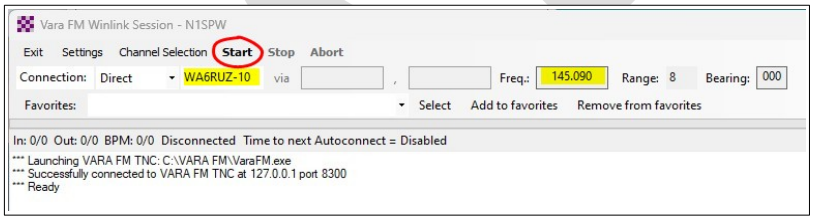


Figure 26: Start Email Session

VARA will open a connection to the remote RMS. If a link is established, the two radios will communicate back and forth and make quite a racket. You can watch all the excitement in the VARA window Figure 27).

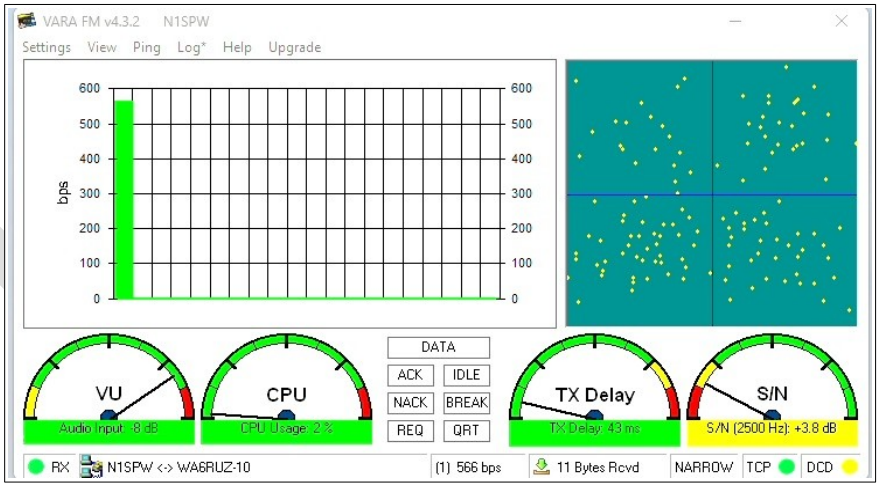


Figure27: VARA display

Winlink also tracks the progress of the session in the session console (Figure 28).

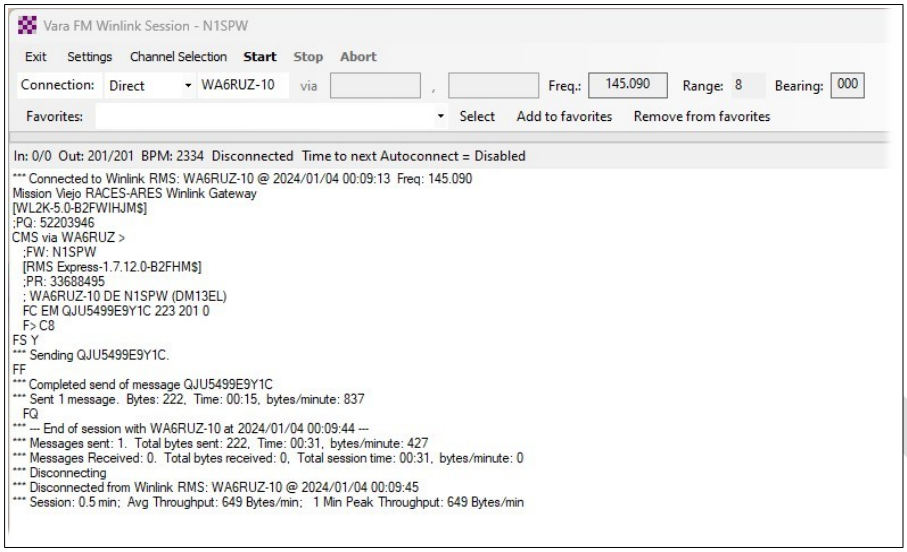


Figure 28: Session console

Reading the session console entries, you can see the Email was sent to the RMS. It will be routed to the Winlink CMS servers on the Internet, and then forwarded on to its destination.

Confirm Email receipt

The routing of Emails by the *Winlink* infrastructure is highly efficient. I was able to retrieve the Email I sent to myself from my inbox in less than a minute.

When you send your first Email via Winlink, it becomes readily apparent how useful this capability is. Especially, when you consider it is offered as a free service.

Troubleshooting

Sending an Email via radio waves is a complex process. As you can see from the previous pages, there are a lot of parts that need to work together to get an Email from a radio to recipient inbox. A lot can go wrong.

Depending on the issue you are having, the Internet support forums are a great help. Winlink and *Digirig* have very active forums that have experienced Hams ready to give you advice. Denis, the creator of the Digirig is very active in his support forum and has been extremely generous with his time and genius to help anyone who asks.

Based on my experience and digging around support forums, here are the areas that cause the trouble:

1. Digirig and Windows
2. Windows audio controls
3. Push-To-Talk (PTT)
4. Radio settings
5. Radio comms

Digirig and Windows

I have written detailed instructions on how to get a Digirig working on Windows 10 and 11. You can find them here. After reading those "How-To's", if you still have trouble getting your *Digirig* to work on Windows, head over to the *Digirig* forum and look for assistance there.

Push-To-Talk (PTT)

Getting the *Digirig* to send a serial PTT signal to your radio can be a challenge. I suspect this is the most common issue Hams have with the *Digirig*. Denis (*Digirig* creator) has done a great service building customized cables for so many radios. He also freely provides cable schematics, and encourages Hams to build their own cables.

I can only provide general advice here. The key is to ensure that the VARA PTT setting matches the COM port assigned to the *Digirig (*Figure 9). If you are having trouble with PTT, sometimes it helps to unplug, then reconnect the *Digirig* USB cable from the computer. A reboot can also clear us problems if you have been making a lot of settings changes.

Also be sure the radio cable is securely seated in the radio. This is a particular problem for the Yaesu VX-6R cable with a threaded tip.

On many radios, you must enable/disable menu items to get PTT to work. In particular, you may need to ensure VOX is disabled.

If PTT is a problem for you, the *Digirig* support forum is the place to find detailed troubleshooting information for your particular radio.

Radio settings

This is another area of frustration for Hams. There are so many settings. The BF-F8HP has forty (40) menu items. Many radios have more than 100.

I spend a lot of time tweaking radio settings when writing "How-To's". I figure out which settings work, and then document them in a table (Table 1). I suspect this is the highest value item in my efforts.

I suggest you try my recommended settings to see if you can get your radio to talk to an RMS. If my settings do not work, you may need to experiment to find the right formula. One area to pay attention to is VOX and squelch tail elimination. The other is the radio volume level.

The key to radio settings is to ensure your audio volume levels are correct, and that you xmit a clear signal with a clean/fast break at the end. The xmit/rcv cycle between your radio and the RMS is near instantaneous. There can be no squelch tail, beeps, or anything else preventing your radio from instant rcv after a transmit.

One other thing that can catch you – repeater offsets. Be sure to observe your radio display when transmitting. If you see it switch channels on xmit, you have a repeater offset in play. You need to be sure you are in simplex mode on all frequencies when talking to an RMS.

Radio comms

As a final troubleshooting step, I again want to emphasize, the importance of having an distortion free radio signal and clean xmit cutoff.

If you do not have another FM radio or SDR to listen in on your RMS communications, you can determine what VARA is sending to the RMS via your computer speakers.

To do this, you need to change the VARA output device from the Digirig to your computer speakers.

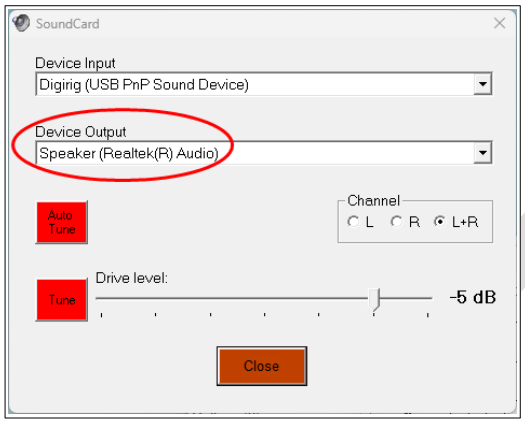


Figure 29: VARA output to speakers

Now when you do a 'Tune' or 'Auto-Tune' test, you will hear what VARA is doing. This can be handy when you need to ensure VARA is generating signals.

Another trick is to direct the feed from VARA or the *Digirig* to your system speakers. To listen to the Digirig input, open up 'Control Panel | Sound' settings. Click on the 'Recording' tab. Select the *Digirig.* Click on the 'Recording' tab. Finally, select the 'Listen' tab.

Check the 'Listen to this device' and select your system speakers in the dropdown list. (Figure 30). Click OK. You can now hear the radio through your speakers.

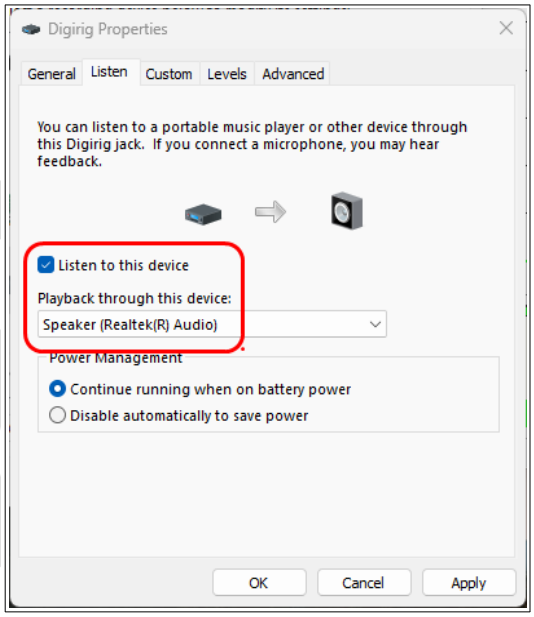


Figure 30: Listen to Digirig

Wrap-Up

I hope you find this guide useful and that it helps you navigate the craziness of Windows sound settings.

I am certainly not an expert in all things Winlink, VARA or *Digirig*. My intent here is to provide some detailed, visual, documentation, to help new Hams or those do have little patience for the complications of technology.

Please send corrections, comments, complaints, ideas, or any other feedback to: *n1spw@arrl.net*.

73,
N1SPW
Jan 7, 2024