Ham Radio 'How-To' Guide

Winlink – VARA - Digirig

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"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 send Emails on FM radio channels, using Winlink, VARA and a *Digirig*.

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 your radio

- ❤ 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:

- ❤ An FM radio transceiver

- ❤ A Winlink FM RMS (Gateway) within range

- ❤ Clean RF signal between your radio 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 so it keeps costs down.

Digirig cable for your radio

You also need to buy or make a *Digirig* cable for your radio. You can find one for your radio at the *Digirig* store.

NOTE: Many of *Digirig's* cables work in multiple radios. For example, the cable kit for the Baofeng radios will work with my *Anytone AT-D878UV* radio. In fact, most radio's with the K1 connector (two prongs) will work with this cable kit.

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 1).
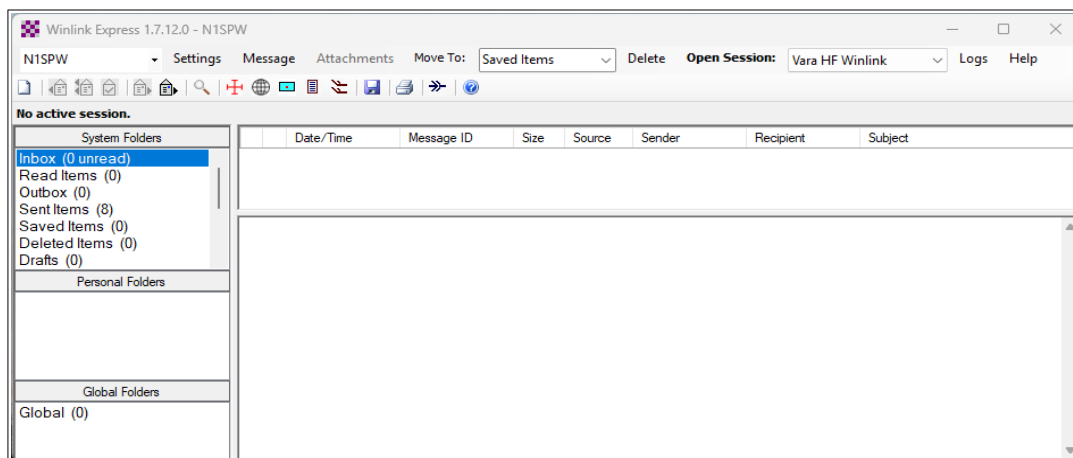

Figure 1: Winlink Express

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 'Settings' menu, and select '*Winlink Express Setup*' (Figure 2).

Figure 2: 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 3).
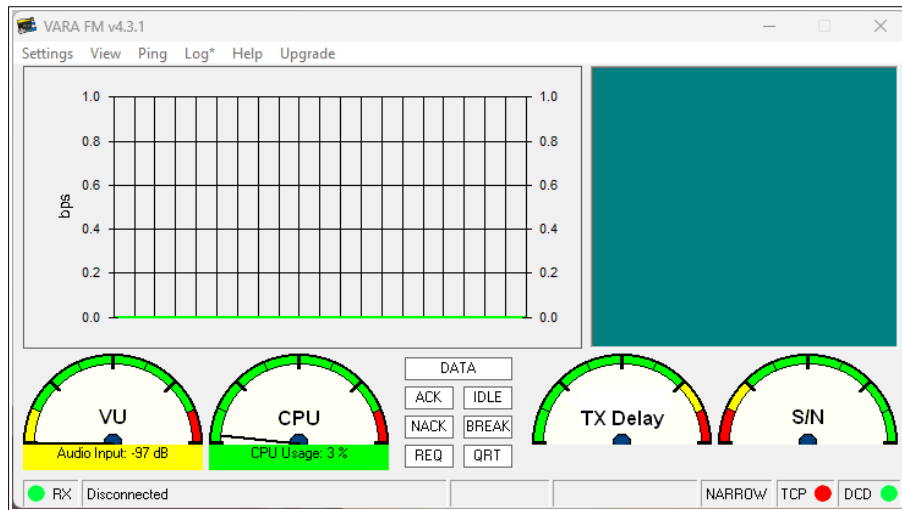
Figure 3: VARA FM base screen

Click on 'Setting | VARA Setup (Figure 4).
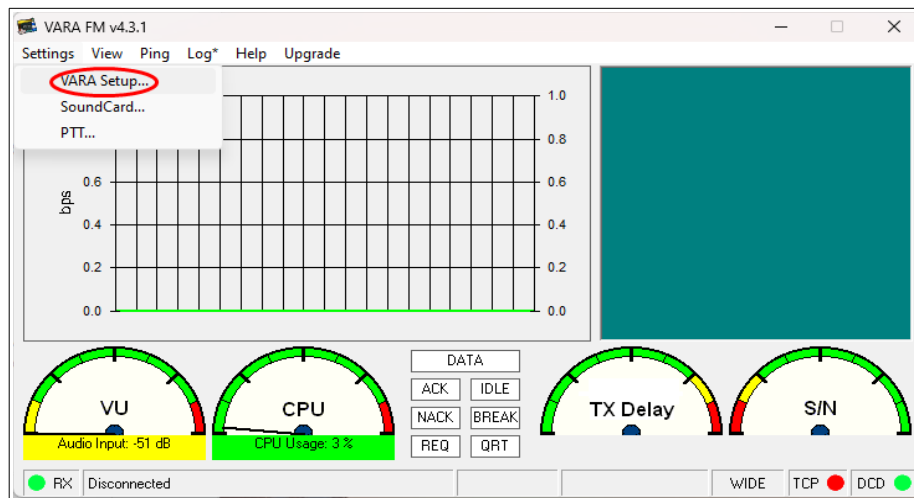
Figure 4: VARA FM Setup menu

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 registration key if you have one (Figure 5). Then click 'Close'.
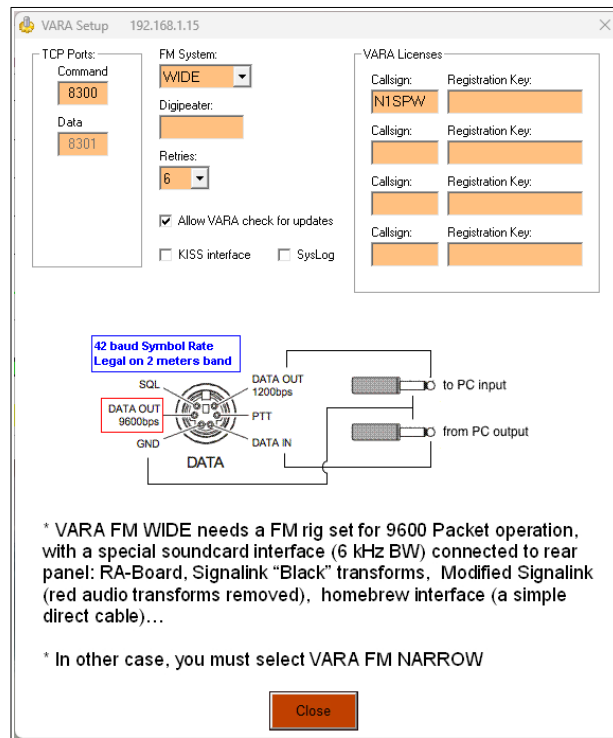
Figure 5: VARA FM Setup

Next, click on the 'Settings | Soundcard' menu. Be sure to select your *Digirig* as the input and output device (Figure 6). 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?
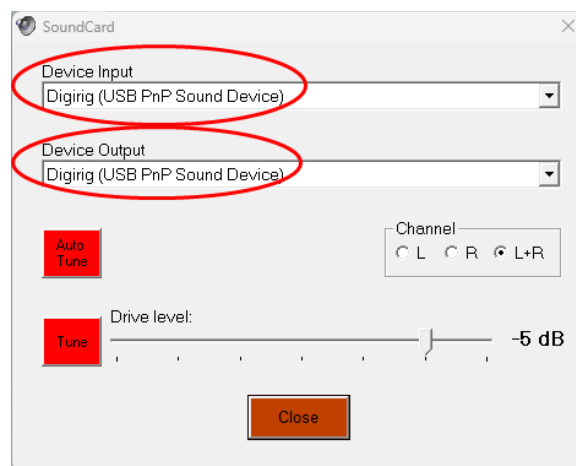
Figure 6: Digirig Soundcard

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 7).
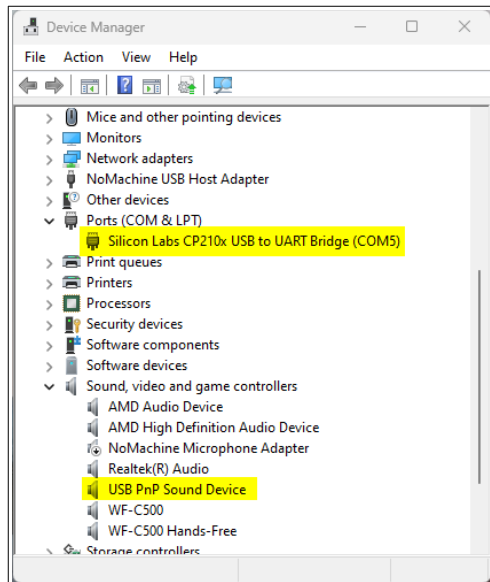
Figure 7: Device Manager
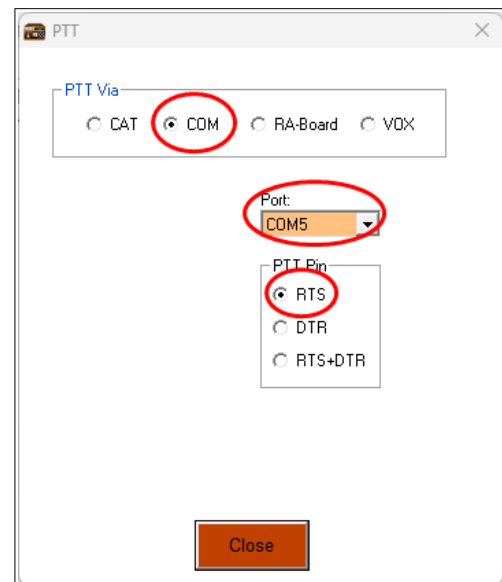
Figure 8: VARA FM PTT

Notice in Figure 7, 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 in Figure 8.

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

Step-3: Radio/Comms

You need to configure your radio to work properly with VARA and the *Digirig*. In most cases, there are not a lot of settings that need to change.

A few of the important settings include:
- The frequency you choose must be in simplex mode.
- The squelch must be turned off (Set to 0).
- PTT must work.
- VOX must be off.
- Dual-mode should be off.
- Power-saver mode on both Xmit and Rcv should be off.

I documented the settings I used for my fleet of HT's in the Appendix – Radio Settings.

NOTE: Now is a good time to configure your radio.

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 can return a signal to you. Remember, if you are using a 5 watt HT, your range on a simplex channel is limited.

Clean RF signal between the radio 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

Winlink

We need to make a few changes to Winlink. Start *Winlink Express*. In the 'Open Session' dropdown list, select 'Vara FM Winlink' as the session type (Figure 9).
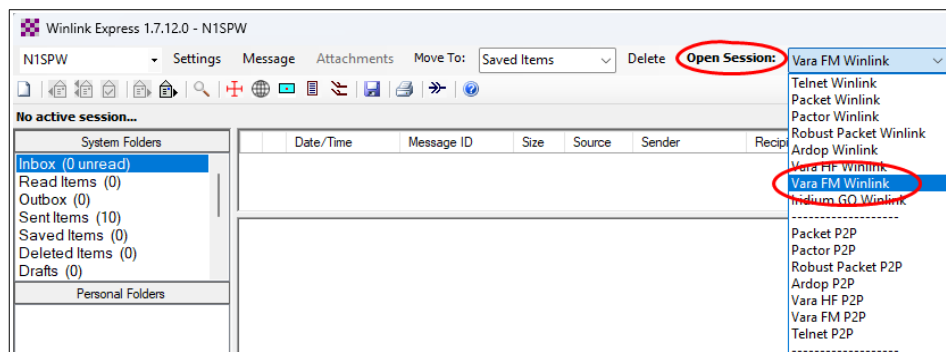
Figure 9: Winlink Session Type

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 10).
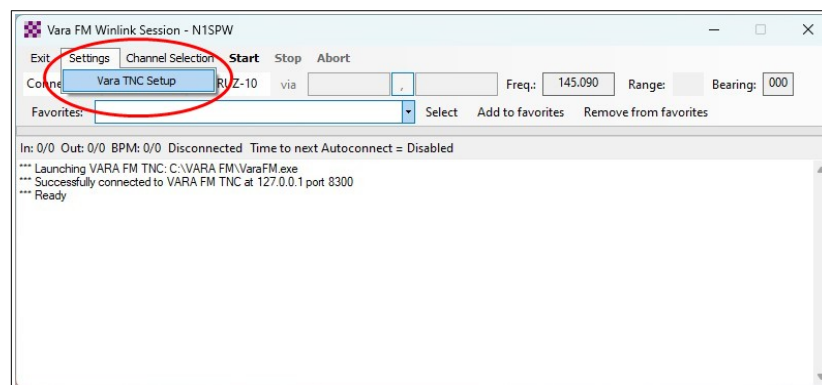
Figure 10: Vara TNC Setup

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 11).
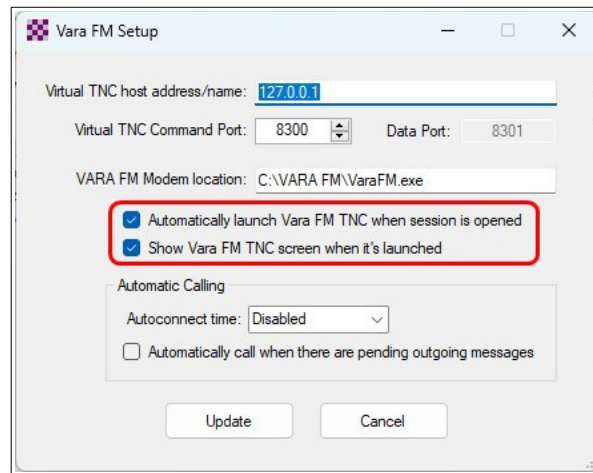
Figure 11: Vara FM Setup

Initial Testing

It is finally time to get all the parts working together and tested. Plug your *Digirig* radio *c*able into your rig. Be sure it is seated firmly in the jack. Connect the other end of the cable in to the '<u>Audio</u>' jack on the *Digirig*. Connect the USB-C cable between the *Digirig* and your Windows computer.

Turn on your radio. You should see your recv LED activate if you set the squelch to 0 as required. If the recv LED is not lit, go in to the radio Menu settings, or use a shortcut to set the squelch to 0 (Off).

Next, start 'Winlink Express'. Once started, make sure the session type is 'Vara HF Winlink', then click on the bold 'Open session' text (Figure 9).

You should now have three (3) windows open. Winlink, Winlink Vara FM Session, and VARA FM (Figure 12).
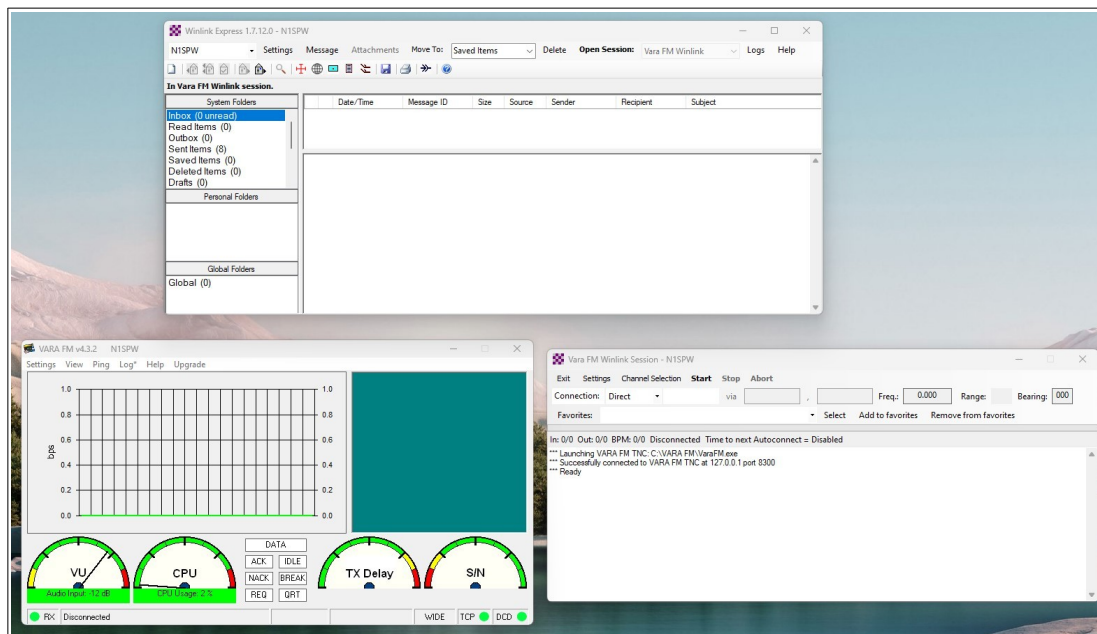
Figure 12: Winlink/VARA FM Windows

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, VARA 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 7).

Next, open up the 'Sound Settings' applet (Figure 13).
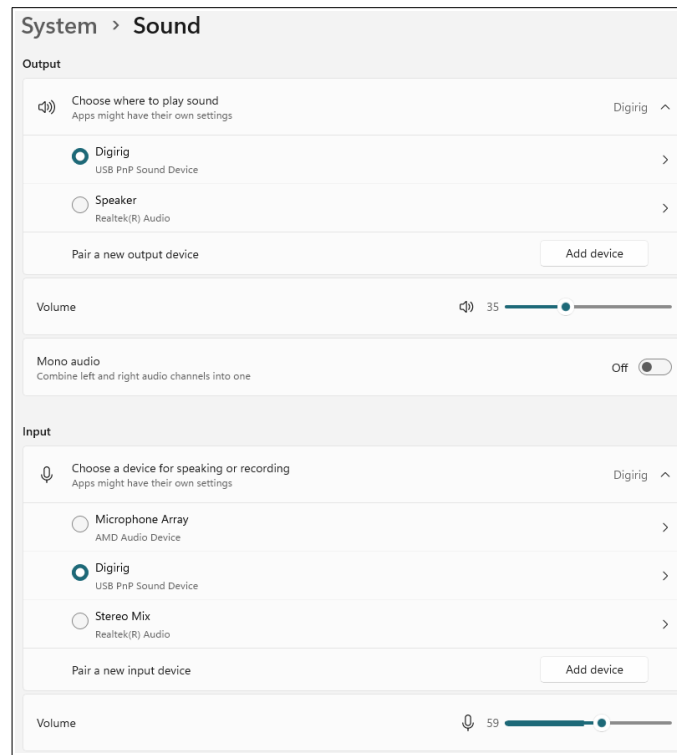
Figure 13: Sound Settings Review

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.
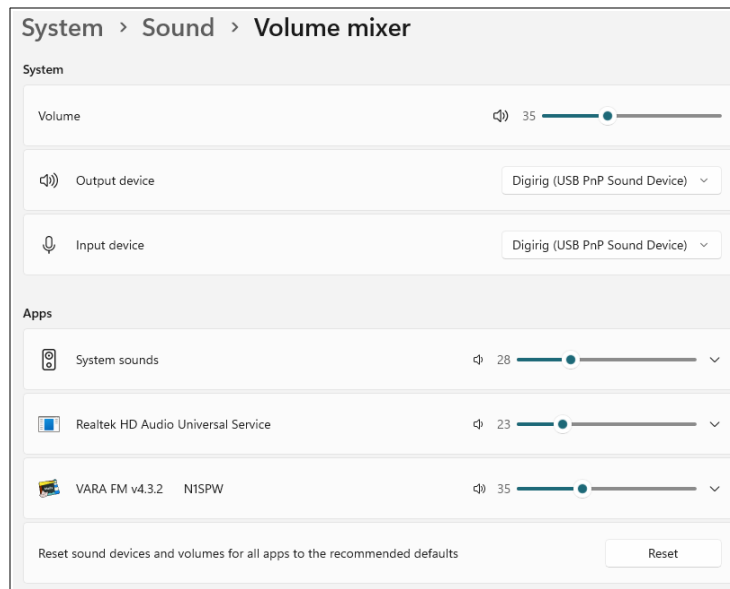
Figure 14: Sound Mixer Setting Review

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 15).
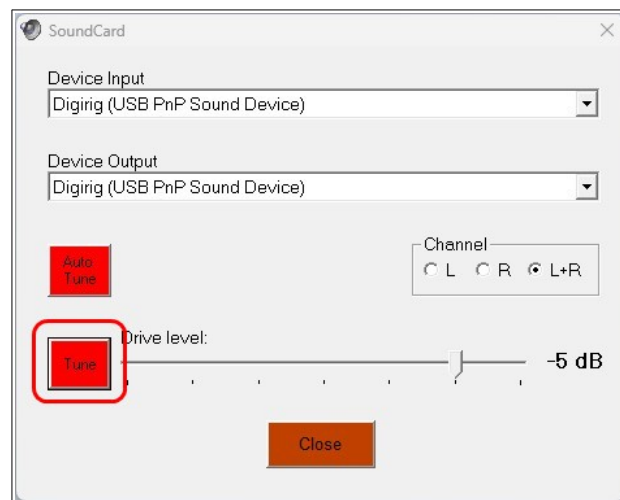
Figure 15: PTT Test
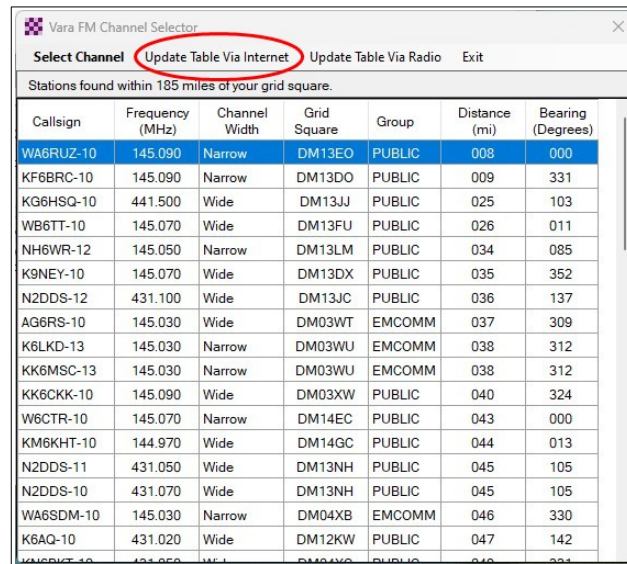
Tune your radio to a 2M frequency such as 145.090. Press the red 'Tune' button. Your radio should go into transmit mode (xmit LED lights). Quickly press the 'Tune' button again to exit transmit mode.

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.

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 radio 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 16).

Figure 16: Update Channels

This will update the Channel table with the closest RMS' 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 17).

HINT: You may want to put your radio in HIGH transmit mode for the Ping test.
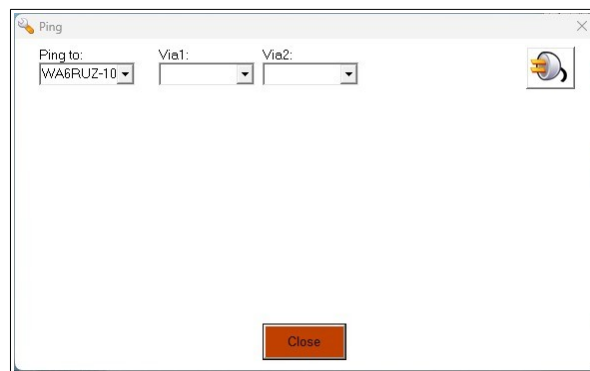
Figure 17: VARA FM Ping

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 22).
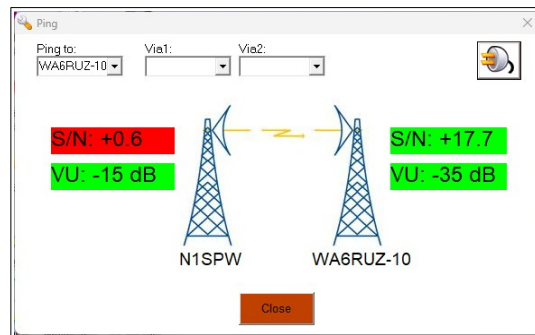
Figure 18: Successful Ping

If the ping fails, you will see a 'No Signal' message (Figure 19).
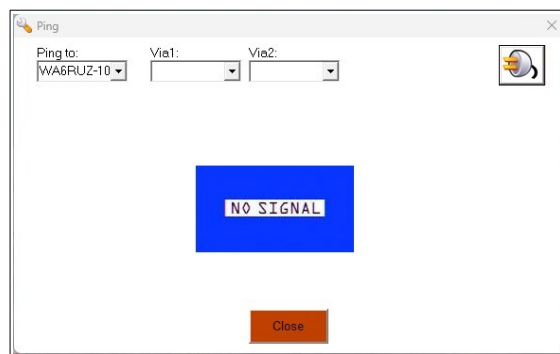
Figure 19: VARA Ping - No Response

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 20)
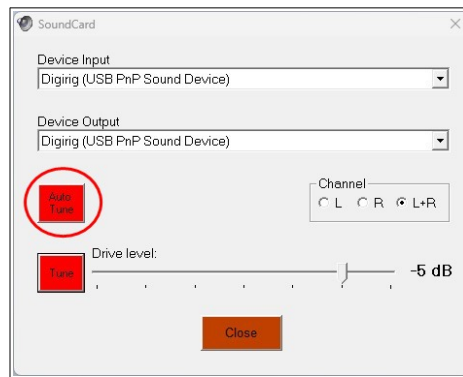
Figure 20: SoundCard Auto Tune

The 'Calibration' dialog will open (Figure 21).
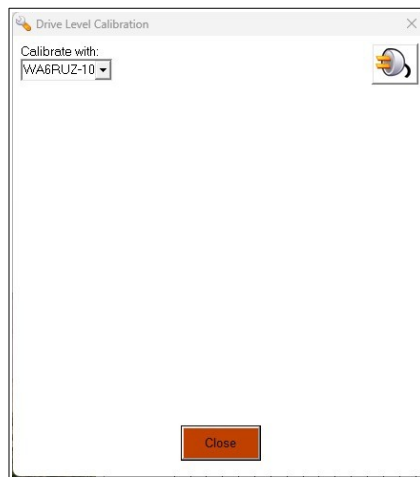
Figure 21: Auto Tune Calibrate

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 radio to the frequency the RMS is listening on. Then press the 'Plug' button.

VARA should key the radio 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 radio 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 22). VARA will also automatically adjust your radio mic gain to the correct amount.

Figure 22: 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 radio and the RMS. During each test, you should hear your radio transmit. If an RMS responds, you will hear it.

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 your 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 23).
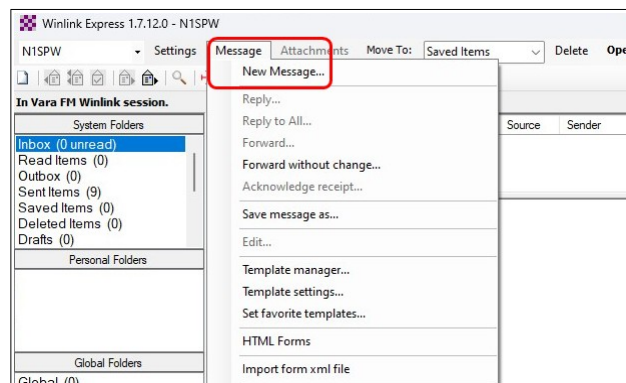
Figure 23: Compose Email

Fill in the Email message details, then click on 'Post to Outbox' (Figure 24)
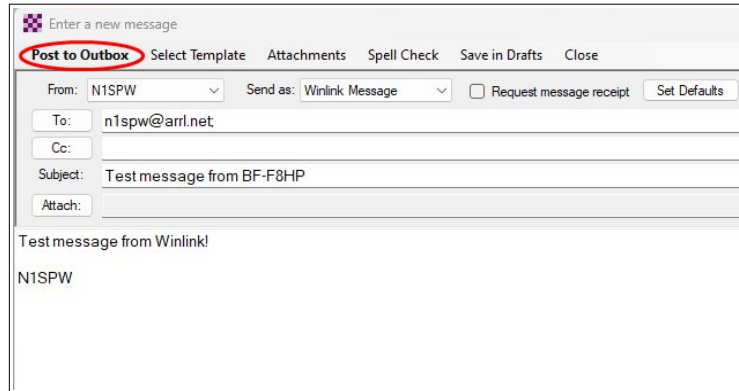
Figure 24: Post Message

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 25).
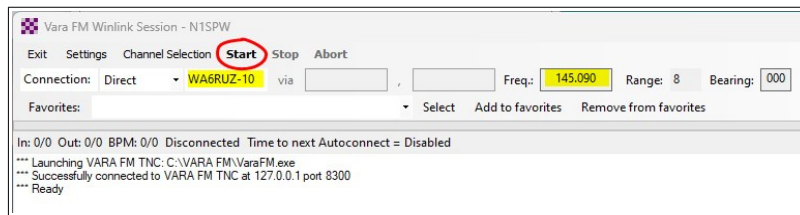
Figure 25: Start Email Session

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 26).
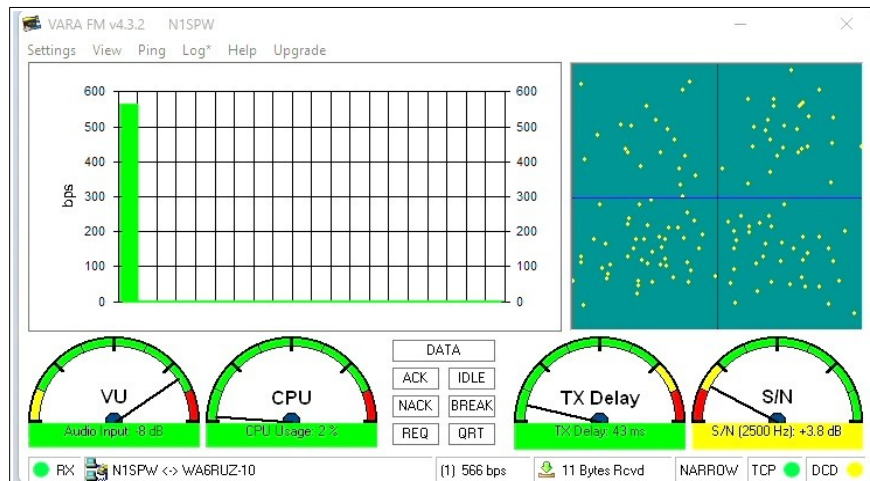
Figure26: VARA display

Winlink also tracks the progress of the session in the session console (Figure 27).
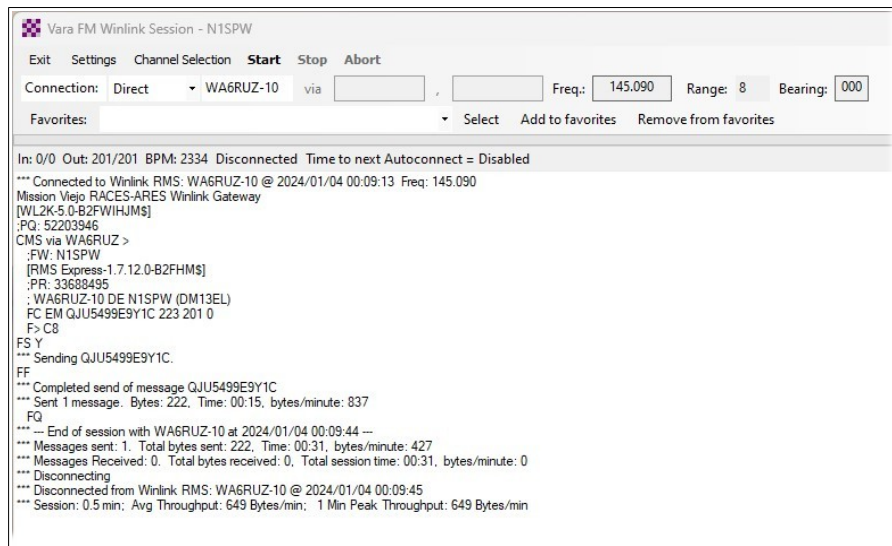
Figure 27: Session console

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 8). 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.

Free Advice: If you are using a VX-6R, I suggest you remove the o-ring from the Digirig cable. This will ensure the tip seats completely in the radio.

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

You should not have to make a lot of changes to your radio setting to get all this to work. The way I determined what settings I needed for each of my radios was to reset them to factory default settings. Then I made as few changes as I needed to the default settings to get the rig to work.

I suggest you look at my 'Cheater' document to see if your radio is on the list. If not, you should be able to get an idea on what your settings should be from the setting in the document. 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 switches 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.

In my opinion, if you can get the Digirig PTT circuit working with your radio, it should be able to send Emails on FM.

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.
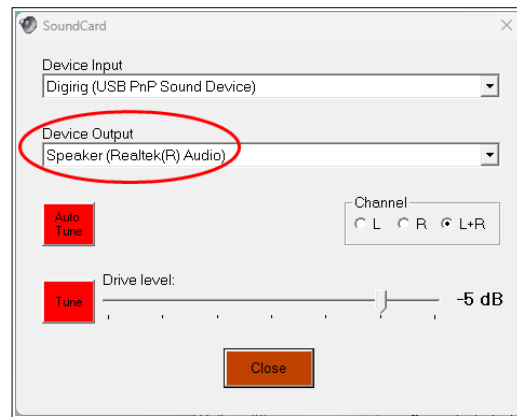
Figure 28: VARA output to speakers

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.

NOTE: If you use this trick, the VARA signals are not sent to your radio. The PTT *will* work and put your radio into xmit mode.

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 29). Click OK. You can now hear the radio through your speakers.
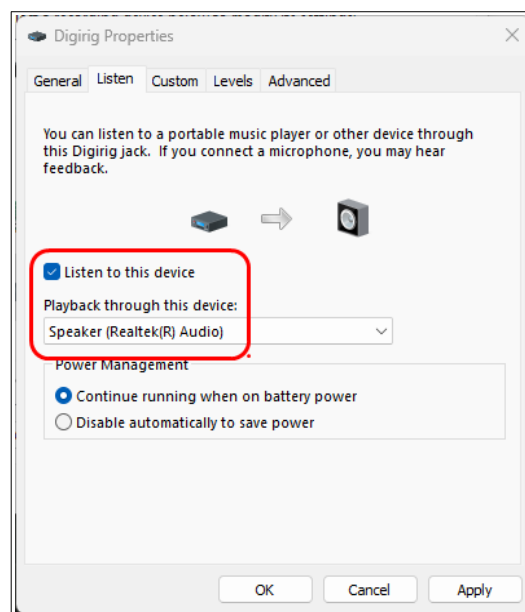
Figure 29: Listen to Digirig

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 19, 2024

Appendix – Radio Settings

You may be surprised to learn there are very few setting changes you need to make to get your rig to send Emails via VARA/Winlink. In fact, my Yaesu FT-60, and VX-6R only needed the squelch to be set to 0 (Off) after a factory reset, and they were sending Emails.

To test the radio settings on my HT's, I first reset them to factory specs. This ensured that all settings were at their default settings. Next, I tested each radio without making any changes. They Yaesu's worked with only a squelch adjustment. The Baofeng's did not work until I disabled the squelch tail-elimination function.

Below are my recommended radio settings:
- The frequency you choose must be in simplex mode.
- The squelch must be turned off (Set to 0).
- PTT must work.
- VOX must be off.
- Dual-mode should be off.
- Power-saver mode on both Xmit and Rcv should be off.

NOTE: These settings are only a guide. Your radio may need other setting changes. Experiment until you achieve success.

In the following pages, you will find the detailed settings of my rigs. I will add more as I complete more testing.
- Baofeng UV-5R*
- Baofeng BF-F8HP*
- Yaesu FT-60
- Yaesu VX-6R

* The Baofeng radios did not connect to the remote CMS unless the HT volume was at the maximum setting, and the Windows speaker sound card setting was at 100%. This pinned the VARA VU gauge to the right (red). This is not surprising for a radio that costs around $20.

Baofeng UV-5R

Menu Item	Setting Name	Description	Default Value	Required Value (Bold)
0	**SQL**	**Squelch**	**5**	**0**
1	STEP	Freq step	10K	
2	TXP	Xmit Power	HIGH	
3	SAVE	Battery Save	3	
4	VOX	Voice operated	OFF	
5	WN	Wide/Narrow BW	WIDE	
6	ABR	Display lit time	5	
7	**TDR**	**Dual watch**	**ON**	**OFF**
8	BEEP	Beep on/off	ON	
9	TOT	Xmit time out timer	60	
10	R-DCS	Rcv DCS	OFF	
11	R-CTS	Rcv CTS	OFF	
12	T-DCS	Xmit DCS	OFF	
13	T-CTCS	Xmit CTCS	OFF	
14	VOICE	Voice prompts	CHI	
15	ANI-ID	Auto number ID	80808	
16	DTMFST	Side tones	DT+ANI	
17	S-CODE	Signal code	1	
18	SC-REV	Scanner resume mode	TO	
19	PTT-ID	PTT ID send mode	OFF	
20	PTT-LT	PTT ID delay	5	
21	MDF-A	Mode A display option	FREQ	
22	MDF-B	Mode B display option	FREQ	
23	BCL	Busy channel lockout	OFF	
24	AUTOLK	Autolock on/off	OFF	
25	SFT-D	Freq shift direction	OFF	
26	OFFSET	Freq offset amount	000.000	
27	MEM-CH	Store memory channel	CH-000	
28	DEL-CH	Delete memory channel	CH-000	
29	WT-LED	Backlite LED color	PURPLE	
30	RX-LED	RX LED color	BLUE	
31	TX-LED	TX LED color	ORANGE	
32	AL-MOD	Alarm mode	TONE	
33	BAND	UHF/VHF	VHF	
34	**TDR-AB**	**Xmit select dual-watch**	**OFF**	**OFF**
35	**STE**	**SQL tail elimination**	**ON**	**OFF**
36	RP-STE	Rptr Sql tail elimination	**5**	
37	RPT-RL	Sql tail delay	OFF	
38	PONMSG	Power on message	FULL	
39	ROGER	Roger beep	OFF	
40	RESET	Reset radio	N/A	

Reset the radio to factory default settings:
- 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

Baofeng BF-F8HP

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

Reset the radio to factory default settings:
 • 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

Yaesu FT-60

Menu #	Item	Description	Default	Required Setting (Bold)	Menu #	Item	Description	Default	Required Setting (Bold)
1	APO	Auto power OFF	OFF		29	PAGER	Enables CTCSS paging	OFF	
2	AR BEP	ARTS beep	INRANG		30	PAG.ABK	CTCSS answer back	OFF	
3	AR INT	ARTS polling	25 sec		31	PAG.CDR	CTCSS rcv pager code	05-47	
4	ARS	Auto Repeater Shift	ON		32	PAG.CDT	CTCSS xmt pager code	05-47	
5	BCLO	Busy channel lockout	OFF		33	PSWD	Password setting	OFF	
6	BEEP	Beeper	KEY +SC		34	PWSD W	Store the password	-	
7	BELL	CTCSS/DCS bell reps	OFF		35	RESUME	Scan resume mode	BUSY	
8	BSY.LED	Enable busy led	ON		36	REV/HM	HM/RV function key mode	REV	
9	CLK.SFT	CPU clock shift	OFF		37	RFSQL	Squelch threshold setting	OFF	
10	CWID	ARTS CWID	OFF		38	RMP.MOD	Repeater shift direction	-	
11	CW WRT	CW Identifier	-		39	PRI.RVT	Enable the Priority Revert	OFF	
12	DC VLT	DC supply voltage	-		40	RX MOD	Receive mode	AUTO	
13	DCS.COD	DCS code	104 codes		**41**	**RXSAVE**	**Rvc mode battery saver**	**200ms**	**OFF**
14	DCS.N/R	Inverted DCS code	OFF		42	S SRCH	Smart search sweep mode	SINGLE	
15	DT DLY	DTMF delay time	450ms		43	SCN MD	Memory scan select mode	SINGLE	
16	DT SPD	DTMF dialing speed	50ms		44	SCN.LMP	Scan lamp while paused	ON	
17	DT WRT	Program DTMF	-		45	SHIFT	Repeater shift	-	
18	EAI	Emergency atuo ID	OFF		46	SKIP	Memory scan skip mode	OFF	
19	EDG.BEP	Band-edge beep	OFF		47	SPLIT	Enables CTCSS split mode	OFF	
20	EMG S	Emergency alarm	EMG.B+L		48	SQL.TYP	Tone encoder mode	OFF	
21	I NET	Internet link	OFF		49	STEP	Synthesizer step	AUTO	
22	INT CD	WIRES access number	CODE 1		50	TN FRQ	CTCSS tone frequency	100hz	
23	INT MR	Non-WIRES #	d1		51	TOT	Time out time	6 min	
24	LAMP	LCD/Keypad Lamp mode	KEY		52	TX.LED	Tx LED	ON	
25	LOCK	Keypad lock setting	LK K+D		**53**	**TXSAVE**	**Xmit batter saver**	**OFF**	**OFF**
26	M/T-CL	MONI switch function	T-CALL		54	VFO.BND	Enable VFO edge limit	BAND	
27	NAME	FREQ/NAME toggle	FREQ		55	WID.NAR	Tx deviation	WIDE	
28	NM WRT	Memory channel name	-		56	WX ALT	Weather alerts	OFF	

Reset Procedures:
1. Turn the radio off.
2. Press and hold in the **MONI** switch (Below PTT) while turning the radio on.
3. Rotate the dial to select one of the reset options.
    F1 SETRST: Reset the Set(Menu) mode settings to their factory defaults.
    F2 MEMRST: Clears the memory settings to factory defaults.
    F3 MB RST: Clears the memory bank assignments.
    F4 ALLRST: Reset to factory new settings.
4. Press the [**F/W**] key to complete the reset.

NOTE: After ALLRST, the only change to radio settings is to use squelch knot to set squelch to 0 (Off).

Yaesu VX-6R

Menu #	Item	Description	Default	Required Setting (Bold)	Menu #	Item	Description	Default	Required Setting (Bold)
1	APO	Auto power off	OFF		38	MW MD	Memory selection	NEXT	
2	AR BEP	ARTS Beep	IN RNG		39	NAME	Freq/Name mode	FREQ	
3	AR INT	ARTS Interval	25 SEC		40	NM SET	Name memory	N/A	
4	ARS	Auto repeater shift	ON		41	ON TMR	Power ON timer	OFF	
5	ATT	Attenuator	OFF		42	OPN.MSG	Boot up message	DC	
6	BCLO	Busy channel lock out	OFF		43	PAGER	Enhanced CTCSS	OFF	
7	BEEP	Keypad beeper	ON		44	PAG.ABK	Enhanced CTCSS	OFF	
8	BELL	CTCSS.DCS ringer rep	OFF		45	PAG.CDR	Enhanced CTCSS	05_47	
9	BP LVL	Beep volume level	LVL 5		46	PAG.CDT	Enhanced CTCSS	05_47	
10	BNK NM	Bank name	N/A		47	PSWD	Password set	N/A	
11	BSY.LED	Busy LED	ON		**48**	**PTT.DLY**	**PTT Delay**	**OFF**	**OFF**
12	CH CNT	Channel counter	+-5MHz		49	RESUME	Scan resume mode	5 Sec	
13	CLK.SFT	Clock Freq	OFF		50	RF.SQL	Squelch threshold	OFF	
14	CW ID	CW ID	N/A		51	RPT	Repeater shift direction	SIMP	
15	CWTRNG	CW training feature	OFF		52	RX MD	Slects receiving mode	AUTO	
16	DC VLT	DC Voltage	N/A		**53**	**RXSAVE**	**Battery saver mode**	**200ms**	**OFF**
17	DCS CD	DCS Code	023		54	S SRCH	Smart search	SINGLE	
18	DCS RV	Reverse DCS	DISABLE		55	SCN.LMP	Scan lamp mode	ON	
19	DIMMER	Display brightness	LVL 7		56	SHIFT	Repeater shift	N/A	
20	DMR.WRT	DMR overwrite	ON		57	SKIP	Memory scan skip	OFF	
21	DT A/M	DTMF auto feature	MANUAL		58	SPLIT	Split CTCSS/DCS	OFF	
22	DT SET	DTMS Autodial	N/A		**59**	**SQL**	**Squelch threshold**	**LVL-0**	**LVL-0**
23	EAI	Emergency ID	OFF		60	SQL.TYPE	Tone encoder	OFF	
24	EAI.TMR	Emergency ID timer	CON.5M		61	STEP	Synthesizer steps	AUTO	
25	EDG.BEP	Band edge beep	OFF		62	SU1.ALT	Altimeter unit	Meter	
26	EMG S	Emergency alarms	BP+STR		63	SU1.BRM	Baro. Pressure units	MB	
27	HLF.DEV	Deviation level	OFF		64	SU1.SET	Sensor display	OFF	
28	HM/RV	HM/RV key function	REV		65	TEMP	Internal temp	N/A	
29	INT CD	WIRES access no.	DTMF-1		66	TN FRQ	CTCSS tone freq	100hz	
30	INT MD	Internet link mode	SRG		67	TOT	XMIT Timeout timer	3 Min	
31	INT.A/M	DTMF autodialer	MANUAL		68	TS MUT	Tone search mute	ON	
32	INT.SET	WIRES register DTMF	N/A		69	TS SPD	Tone search speed	FAST	
33	LAMP	LCD lamp mode	KEY		**70**	**TXSAVE**	**Xmitter battery saver**	**OFF**	**OFF**
34	LED LT	Strobe	N/A		71	VFO MD	VFO band edge limiter	BAND	
35	LOCK	Key lock setting	K+D		72	WAKEUP	Wakeup setting	OFF	
36	M/T-CL	MONI/CALL function	MONI/CALL		73	WX ALT	Weather alert scan	OFF	
37	MCGAIN	Mike Gain	LVL-5						

To clear all memories and all other settings to factory defaults (Hard Reset – memory settings wiped):*
1. Turn the radio off.
2. Press and hold in the [**MODE (SP S) SQ TYP**], [**0 (SET)**], and [**V/M (DW) MT**] keys while turning the radio on.
3. Press the [**F/W**] key momentarily to reset all settings to their factory defaults (press any other key to cancel the Reset procedure).

To reset the Set Mode Item settings to their factory defaults (Soft Reset – memory settings retained):*
1. Turn the radio off.
2. Press and hold in the [**MODE (SP S) SQ TYP**] and [**V/M (DW) MT**] keys while turning the radio on.
3. Press the [**F/W**] key momentarily to reset the Set (Menu) mode settings to their factory defaults.
   (Press any other key to cancel the Reset procedure).