

## RMS Packet Dual-Mode (Packet and Vara FM) Setup Using a single radio and sound card

(updated 2/7/2025)

### Warning:

Packet and Vara FM do not play well together on the same channel.

Packet is a "carrier sense, multiple access" (CSMA) protocol, which allows for multiple concurrent connections. The protocol sorts out which station transmits at any given time. Packet users are accustomed to just pressing start and letting the protocol do the work. They typically do not monitor the frequency to see if it is busy. A heavily loaded channel (like more than 3 stations) will have terrible performance, but given enough time, messages will get through.

Vara FM is **not** CSMA, and in fact, pretty much hogs the channel 100% until the session has completed. Vara FM users that attempt a connection while another one is already in progress will be greeted with the "Channel appears busy" message and will have to retry the connection later. They need to monitor the frequency first, much like HF connections. The good news is that Vara FM connections are much faster than packet and sessions are completed in much less time.

Vara FM will detect packet transmissions and will present the "Channel appears busy" message. Packet stations on the other hand, will not detect Vara FM transmissions and will happily transmit right over them, causing both connections to fail.

If your gateway users understand these issues, and will monitor the channel and sequence their operations, you can successfully support both modes on the same channel. If you are using a long-time packet channel with many users who are not familiar with Vara FM, chaos will ensue (and likely with some heated arguments).

Do not set up a Vara FM gateway on a popular packet channel! You have been warned, continue with these instructions at your own risk.

### PTT Port:

These instructions assume the sound card interface generates PTT using the C-Media GPIO lines (DRA, DigiRig Lite, RIM, URI, etc.), or uses VOX for PTT. Sound card interfaces that use a COM port for PTT (DigiRig Mobile, etc.) cannot be shared between software TNC applications unless a COM port splitter application is used. There are several COM port splitter applications available. Follow the application instructions for setup.

### Basic process:

- Download and install RMS Packet, UZ7HO Soundmodem (and the PTT-dll.zip), and Vara FM
- Configure RMS Packet to use the AGWPE port, and configure Packet and Vara FM channels
- Adjust audio drive levels

Why not use the KISS port instead of the AGWPE port, isn't that simpler? Yes, but there is a timing issue that shows up with the KISS driver and the default settings in RMS Packet. The KISS driver does not have adjustable parameters to correct this, and with the default settings, you will get many collisions during message transfer. We have found that the AGWPE driver does not have these issues, though it is a bit more complicated to setup. Note, we are **NOT** using the actual AGWPE application from SV2AGW, Soundmodem supports both the AGWPE protocol and the KISS protocol. Running this way also allows the use of Winlink Express at the same time using the KISS port on Soundmodem.

### Download Links:

RMS Packet: <https://downloads.winlink.org/Sysop%20Programs/>

UZ7HO Soundmodem (get both Soundmodem and the PTT-dll files): <http://uz7.ho.ua/packetradio.htm>

Vara FM: <https://downloads.winlink.org/VARA%20Products/>

Use the default installation folders for RMS Packet and Vara FM. Soundmodem can be unzipped into the folder of your choice, there is no installation program (eg: C:\Ham\Soundmodem). Unzip the PTT-dll files to the same folder.

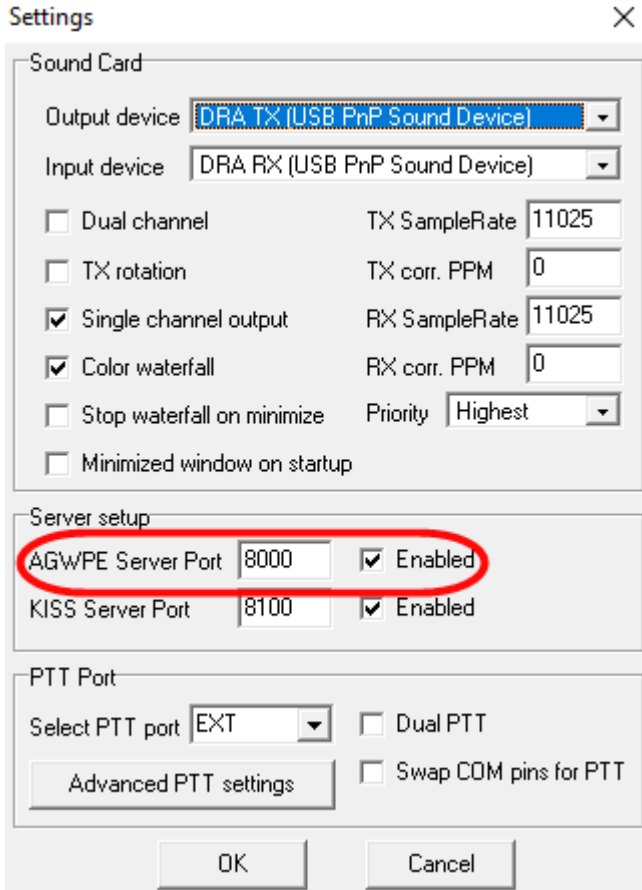
Once the programs have been installed, continue with the configuration settings below.

**Soundmodem:**

Start with Soundmodem first, enable the AGWPE port (or both ports), set the PTT port as appropriate for your sound card interface, and adjust the audio levels for 1200b packet using the Windows sound settings (and/or hardware controls if your sound card device has them). See the setup guide here for detailed instructions:

[https://winlink.org/content/packet\\_radio\\_winlink\\_uz7ho\\_software\\_using\\_sound\\_card\\_interfaces\\_signalink\\_dra\\_built\\_in\\_2020](https://winlink.org/content/packet_radio_winlink_uz7ho_software_using_sound_card_interfaces_signalink_dra_built_in_2020)

Start Soundmodem, then Settings → Devices:



Select your sound card interface as the Input and Output devices. Enable the AGWPE port, use the default port number of 8000 (unless you have good reason to change it). For DRA type sound card devices, set the PTT Port to EXT.

Continue on the next page

Still on Soundmodem, go to Settings → Modems:

Modem settings

Modem filters ch: A

BPF Width 1400 Show

TXBPF Width 1600 Show

LPF Width 650 Show

BPF Taps 256

LPF Taps 128

Default settings

PreEmphasis filter None  All

KISS Optimization

non-AX25 filter

Modem type ch: A

Mode AFSK AX.25 1200bd

TXDelay 250 msec

TXTail 50 msec

Add. RX 0 pairs

Add. RX shift 30 Hz

Bits Recovery NONE

FX.25 Mode NONE

Ok Cancel

Modem filters ch: B

BPF Width 1400 Show

TXBPF Width 1600 Show

LPF Width 650 Show

BPF Taps 256

LPF Taps 128

Default settings

PreEmphasis filter None  All

KISS Optimization

non-AX25 filter

Modem type ch: B

Mode AFSK AX.25 1200bd

TXDelay 250 msec

TXTail 50 msec

Add. RX 0 pairs

Add. RX shift 30 Hz

Bits Recovery NONE

FX.25 Mode RX-ONLY

These are mostly the defaults and should work fine, you might need to adjust the TXDelay on some radios. Do not select Bits Recovery as this could cause data integrity problems. FX.25 mode should only be selected if other stations in your network have this capability. Otherwise leave this set to NONE. Select OK.

On the main screen be sure the filter center is set to 1700 and the Hold Pointers option is checked:

SoundModem by UZ7HO - Ver 1.07 - [AFSK AX.25 1200bd]

Settings View Clear monitor Calibration About

A: AFSK AX.25 1200bd 1700 DCD threshold  Hold pointers

1:Fm W7MIR-10 To KM6SO <DISC C P> [19:04:59R] [+++]  
1:Fm K7NWS-10 To BEACON <UI R Pid=F0 Len=40> [00:09:48R] [+]  
Winlink 2000 RMS Packet Server K7NWS-10

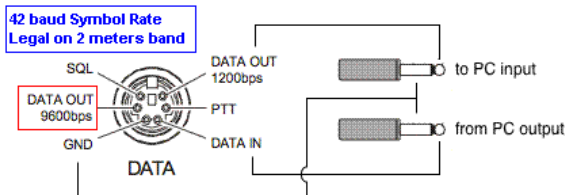
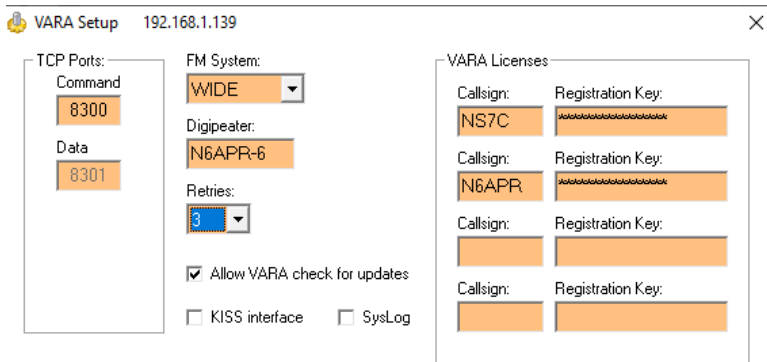
1:Fm K7NWS-10 To BEACON <UI R Pid=F0 Len=40> [01:09:48R] [+++]  
Winlink 2000 RMS Packet Server K7NWS-10

Leave Soundmodem running, and continue on the next page

## Vara FM:

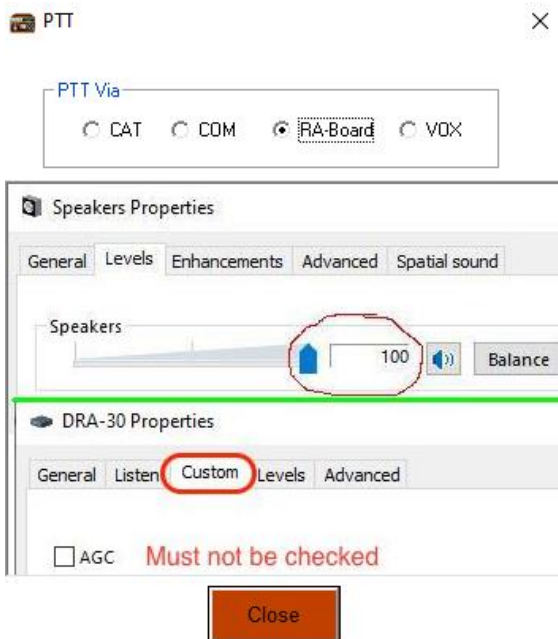
Start Vara FM. Go to the settings and add the call sign and registration key (registration is not needed if this call is only used as a gateway), select Wide or Narrow mode depending on your radio setup (1200 or 9600), and set a digipeater call sign if desired.

Settings → Vara Setup:



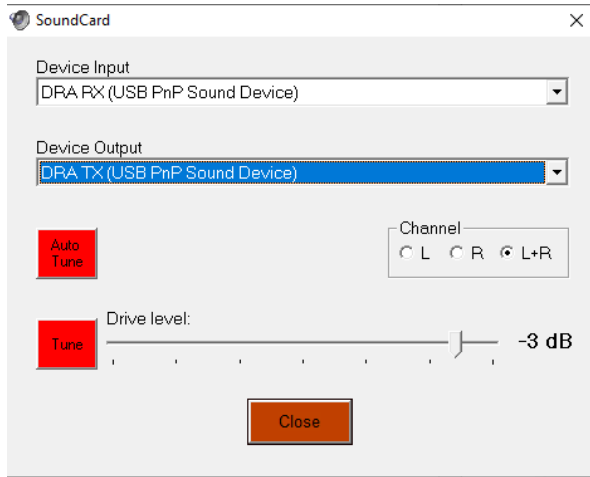
Settings → PTT:

Select the PTT port for your sound card interface (RA-Board for DRA type devices).



## Settings → Soundcard

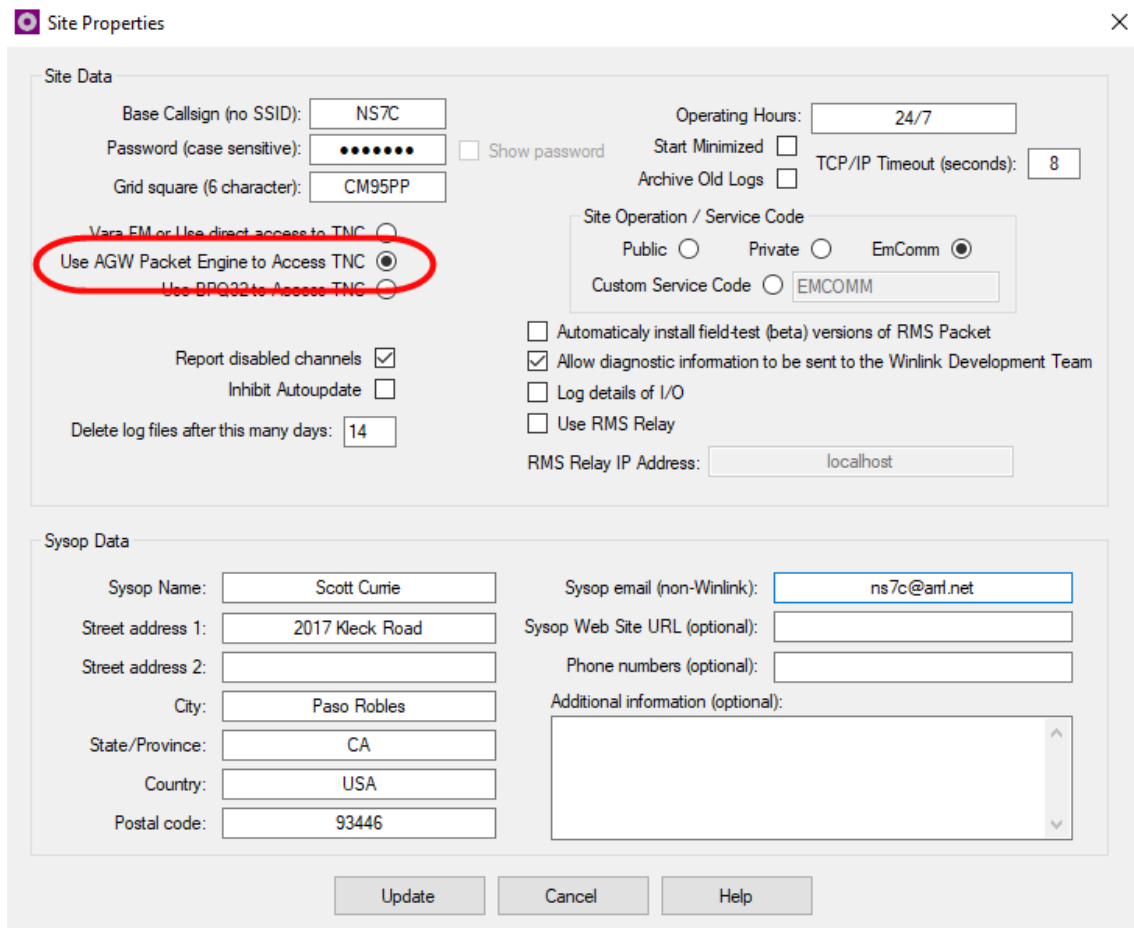
Select your sound card for input and output (same as packet). Adjust TX level using the AutoTune function if you have another station to test with. If not, you will have to ballpark the level, but use the Drive slider in Vara FM, not the Windows Playback level (which would also change the setting for Soundmodem). When finished, close Vara FM.



## RMS Packet:

Start Soundmodem if not already running, leave it running.

Setup the RMS Packet site properties, select Use AGW Packet Engine for the packet connection. Add your other site settings information, and then update.



**Site Properties**

**Site Data**

Base Callsign (no SSID):  Operating Hours:

Password (case sensitive):   Show password Start Minimized

Grid square (6 character):  Archive Old Logs  TCP/IP Timeout (seconds):

Use AGW Packet Engine to Access TNC  (circled in red)

Use BPPQ32 to Access TNC

Use BPQ32 to Access TNC

Site Operation / Service Code

Public  Private  EmComm

Custom Service Code

Automatically install field-test (beta) versions of RMS Packet

Allow diagnostic information to be sent to the Winlink Development Team

Log details of I/O

Use RMS Relay

RMS Relay IP Address:

Report disabled channels

Inhibit Autoupdate

Delete log files after this many days:

**Sysop Data**

Sysop Name:  Sysop email (non-Winlink):

Street address 1:  Sysop Web Site URL (optional):

Street address 2:

City:  Phone numbers (optional):

State/Province:  Additional information (optional):

Country:

Postal code:

Create the Packet channel. This gets a little tricky since we are using the AGWPE port, and RMS Packet wants to start the actual AGWPE application instead of Soundmodem. To get around this, select "Use AGW Packet Engine on Remote Computer." Enter localhost or 127.0.0.1 for the host IP, 8000 for the port, then hit refresh AGW. Fill out the rest of the information for your site, and make sure to check Enable This Port. Select Update This Channel, then Close and Restart.

Settings → Packet Channels

AGW Packet Engine Configuration

Configure the AGW Packet Engine

AGW Packet Engine Callsign: NS7C-10

IP Address to Packet Engine: localhost

AGW Packet Engine IP Port: 8000

Grid Square of TNC Location: CN87WH

Path to the AGW Packet Engine: C:\Program Files (x86)\AGWsoft\Packet Engine Pro\

Use AGW Packet Engine on Remote Computer

AGW ID:

AGW Password:

Login/Refresh AGW

Configure a Port on the AGW Packet Engine

There are 1 port(s) available with the selected TNC - Select a port to configure: 1

Enable This Port

Selected Port:

Port Frequency (MHz): 145.030

Maximum Streams: 3

On-Air Baud Rate: 1200

Max Frames: 2

Beacon Transmission Interval (Minutes): 20

Power (Watts): 25

Packet Length: 128

Enable Beacon

Antenna Direction: OMNI

Antenna Gain (db): 4

Antenna Height AGL Feet: 25

Optional Beacon Text: NS7C RMS Gateway and Vara FM test

Destination: Path: WL2KUSERS

Optional Login Message: Welcome to the NS7C packet/Vara FM dual mode gateway.

Update This Channel Close and Restart Help

Set up the Vara FM channel on the next page

Go to the Vara FM Settings. Enable the TNC, and fill in the other information for the site, choose your speed, Wide or Narrow. Hit Update.

Settings → Vara FM Settings

Vara FM TNC Settings

Enable Vara FM TNC

Virtual TNC host address/name: 127.0.0.1

Virtual TNC Command Port: 8300 Data Port: 8301

Channel width: Wide

VARA FM Modem location: C:\Vara FM\VARAFM.exe Browse

Launch Vara FM TNC when RMS Packet starts

Vara FM Port Properties

Port call sign:	NS7C-11	Antenna Direction:	OMNI
Port Frequency (MHz):	145.070	Antenna Height AGL Feet:	25
Power (Watts):	25	Antenna Gain (db):	4

Optional Login Message:

Update Cancel

You should now be up and running.

The only trick here is to make sure you start Soundmodem before RMS Packet (Vara FM will be started automatically by RMS Packet, but not Soundmodem). These applications can be started with the Windows task scheduler. Put a delay on RMS Packet to make sure networking and Soundmodem are up and running first.

Also, be sure the BIOS settings on the computer will start the computer after a power failure. Windows power settings should be set to never sleep or hibernate, and you may need to set the power profile for maximum performance. Do not allow USB ports to be powered off to save energy.

These instructions reflect my preferred applications and settings. You can substitute Direwolf or even AGWPE for UZ7HO Soundmodem if you prefer these applications. You can also use the KISS port on RMS Packet instead of the AGWPE port. I think you will find these instructions provide a setup that will perform better than the alternatives.

-Scott, NS7C