The BEACON

WEST MOUNTAIN RADIO

Quarter 4 - 2021

Holiday Rebates

See page 8 for full details

One of the frequent technical support issues I'm asked to help resolve is getting Winlink Express working on VHF with 1200 baud Packet Radio and a sound card interface.

The reoccurring factor I've noticed with these support calls is the user is usually unaware that Winlink Express cannot produce the Packet Radio audio waveforms itself. It must use a Packet Radio driver application to do this.

The following diagram shows how all the "moving parts" need to be connected in order for successful Winlink Packet Radio operation.

tcp/ip

| Winlink Express | ←→ | Packet Radio Driver |

Winlink Express communicates with the Packet Radio driver software via a tcp/ip connection. This is usually on the same PC but could be a networked machine instead.

The Sound Card Interface will physically connect to the transceiver with cables and allow audio to pass in both directions.

The transceiver will be using frequency modulation and audio levels need to be optimized for transmit and receive.

Sound Card Interface

VHF Transceiver

The Packet Radio driver application will control the sound card interface, not Winlink Express.

This involves configuring the software to activate PTT when required (usually via a serial COM port) and choosing which sound card to use when generating the audio waveforms.

Remember that the modulating audio will directly affect FM deviation so signals which are too low or high in amplitude will under- or over-deviate the transmitted signal and cause connection issues.

You have a choice of Packet Radio driver software to use with Winlink (e.g. UZ7HO, Dire Wolf, AGW PE). The UZ7HO software is free and highly recommended. See http://uz7.ho.ua/packetradio.htm
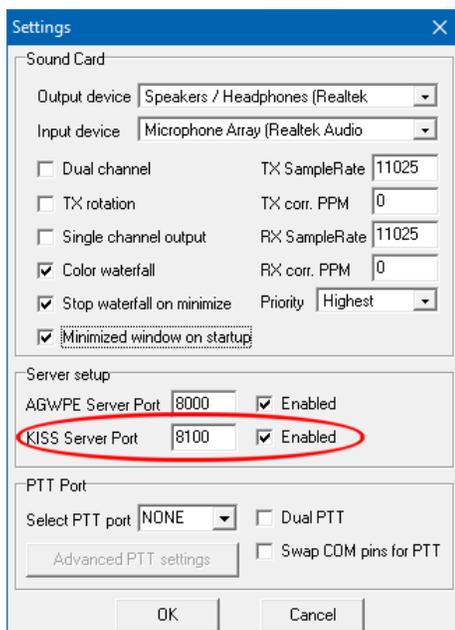
We don't need to configure much in UZ7HO Sound Modem as the Winlink Express software will set most parameters for us but we have to enable the KISS interface. This is in the settings screen and I've highlighted it in red.

Note that this is also where you configure which sound card to use, and the PTT method.

If no PTT port is chosen then operation would rely on the sound card interface's VOX circuit.

The next step is to tell Winlink Express to use it. We do this in the Packet Winlink/P2P Setup screen.

The Packet TNC Type should be set to KISS and the "Serial Port" will be TCP.

The TCP Host/Port refers to the PC running the UZ7HO Sound Modem application (usually the same computer so the localhost address of 127.0.0.1 and port 8100 is chosen).

If you specify the path to the Packet driver application and check the option then Winlink Express will automatically run Sound Modem when you open the Winlink session.

The TNC parameter defaults are often good enough to start with but there's some optimization which can be done depending on your local conditions.

Packet length (PACLEN) and Maximum Frames (MAXFRAME) can be reduced or increased depending on activity and distance to the RMS.
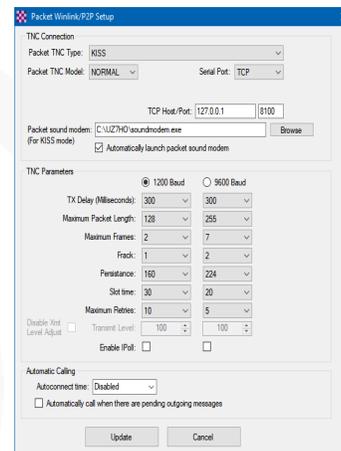
Packet Radio is a complex subject and further reading should be done if you want to understand how network parameters can affect traffic flow. Quite often your local ham club will have information on the correct parameters to use locally.

The final thing to configure is your sound card volume levels.

Experimentation may be necessary to find the "sweet spot" where FM deviation is optimal. 1200 Baud Packet Radio is not too fussy but deviation becomes critical at higher speeds (e.g. 9600).
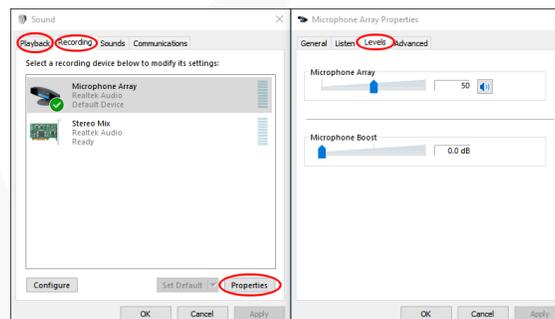
On Windows 10 I find the easiest method to change both the Playback volume (TX audio) and Recording volume (RX audio) is from the Sound Control Panel.

You can create a shortcut on your desktop that points to mmsys.cpl for easy access. I suggest starting with values of 50% for both Playback and Recording and go from there.

What exactly does an Antenna Tuner tune?
By Dave Ingold, WB9SXG

What do antenna tuners tune? Someone could say "Well, obviously, the antenna" This obvious answer is not so clear. Remember, an antenna tuner is connected between the transmitter output and the feed line and antenna combo. So, maybe it tunes the feed line and all that follows it, including the antenna. The more exact answer is, it matches the Antenna and feed line combo to something the transmitter likes to see.

Let's explain: The process of tuning is simply making something resonate with what we are tuning it against. Let's tune a guitar: We can take the top E string and pluck an A then we adjust the A string until it vibrates and plays the A in a sympathetic vibration with the top string A note that we just plucked. Alternatively, we can pluck both the top string we placed our paw on the A fret and pluck the open A string and adjust until we hear no beating sound (or they sound the same). So, what we are doing is to make each guitar string resonate with the stings plucked on the same note plucked above that string played on the same note.

Now that we tuned our guitar, let's tune our antenna! We want to make our antenna resonate with the frequency the transmitter throws out. The first thing we need to do is to match the impedance of our antenna assembly with what the transmitter wants to see. My transmitter wants to see 50 ohms, so we need our feed line and antenna show the transmitter a 50 ohm load. Impedance is measured in ohms. The maximum power transfer theorem is a fancy way of saying that to get maximum power transferred to a load, the output and the load impedance has to be equal. Most ham transmitters want to see 50 ohm loads connected to the output.

Ohms, implies we need to look at Ohm's law, right? Power (watts) is the voltage times the current. Voltage is the current times the impedance (ohms). Current is the Voltage divided by the impedance (ohms). Impedance, measured in ohms, come in 2 flavors: resistance and reactance. Resistance is the same amount of ohms in both DC and AC and any frequency. 50 ohms resistance is 50 ohms, no matter what frequency the current through it is. In fact, we can connect a 50 ohm resistor with enough wattage rating to our transmitter and our transmitter is perfectly happy throwing out all its power into that poor resistor. It won't put out anything on the air except a lot of heat. This is actually a what we call a dummy load. Dummy loads are not meant to put out anything on the air.

So, impedance is both resistance and reactance. Resistance is constant no matter what type of current or voltage, or frequency. Now we also have reactance: is capacitive and inductive reactance. Reactance is also measured in ohms, but the ohms vary with frequency. The higher the frequency, the higher the ohms in inductive reactance. The lower the frequency, the higher the ohms in capacitive reactance. What can we use to tune our antenna? Let's see, hmm, a variable inductor and variable capacitor? That's right!

Antenna tuners are basically a variable capacitor and inductor network. With a manual antenna tuner, we just fiddle around with the capacitance and inductance to get a good match the transmitter likes to see. An automatic antenna tuner like the TARGETuner Mobile Antenna Management System takes away all that fiddling. It senses the RF signal the transmitter is throwing out. it even "looks" at It then automatically sets the inductive and capacitive reactance to the transmitter frequency and remembers these settings in its memory bank.
It displays the transmission frequency and SWR with a digital display and can even sound an alarm when the SWR gets too high. This is useful when an antenna accidentally gets knocked off or broken or whatever happens. Believe me, anything can happen with a mobile rig!

The TARGETuner can even read the frequency directly from the radio using a serial input port to take input from CI-V, CAT or serial rig control.

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Antenna tuners only go so far as to matching impedance from your feed line and antenna to the transmitter. The antenna itself may not be radiating all that signal but as far as your transmitter is concerned, it's happy. It's happy with what ohms the antenna tuner made it look like. The real question is where are all those watts going? Hopefully, it goes out the antenna. In my novice days, I didn't have a lot of money as a teenager and struggling college student to afford low loss coax. I thought tube equipment was fairly tolerant with whatever I connected to them. I just dangled out a wire close to half wave or quarter wave at 40 or 20 or 10 meters out my dorm window. I was more worried about getting caught than SWR and resonance and radiation patterns. I was mostly concerned with just not banging my weight on the windows underneath me! As a result, I had losses and bad SWR's, no signal getting out.

Just bear in mind, antenna tuners only go so far. It's one thing to make a feed line and antenna resonant, but also keep in mind a good feed line and good antenna will finish what an antenna tuner started.

RIGrunner 4005i: Version 4 Features
By Mike Primeau

The RIGrunner 4005i is an excellent tool for DC power distribution that includes remote monitoring and control for 5 output ports up to 40A. There is also a rack mounted version, the 10010i, that has 10 output ports up to 100A.

The monitoring and control of output nodes is done through internet web pages that are hosted by the unit. The latest software version for the Internet RIGrunners, software version 4, adds additional features to further improve what can be accomplished with this device with enhanced alarm and control options. Below are some of the new features found in software version 4:

SNMP Agent Integration

A new SNMP agent has been integrated into the 4005i for monitoring and control purposes. SNMP or Simple Network Management Protocol allows for the exchange of management information between the 4005i and other network devices. The integrated agent within the RIGrunner allows the user to request information regarding the state of the output nodes, set device parameters, and other control and monitoring features. An MIB or Management Information Base file can be downloaded from the Device Setup page and then imported into SNMP MIB browsing software to view the database describing the 4005i parameters.

ManageEngine MIB Browser, shown in Figure 1, is a free utility that can be used to import and view an MIB file. The software can then be used to perform SNMP commands like GET, GETNEXT, and SET SNMP. These commands can be used to view the name and current draw of output nodes, and turn nodes on or off.
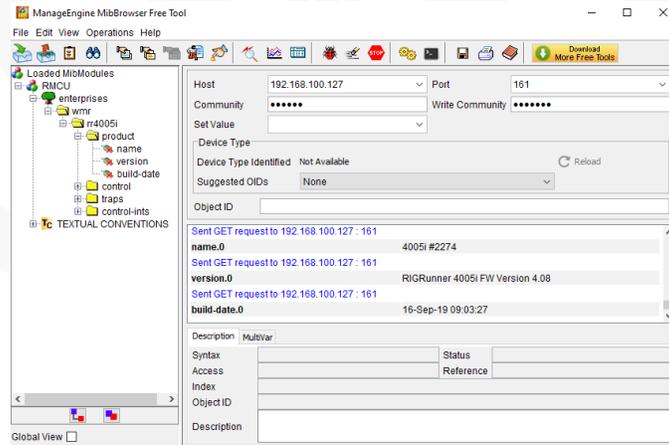
Figure 1 - ManageEngine MibBrowser connected to RIGrunner 4005i

More Alarm Triggers

Additional alarm features have also been added to software version 4 of the 4005i. The alarms previously could be set to trigger when the unit powered on, when the voltage was too high or low, or when a fuse was blown. Now, alarms can also be triggered by specific outputs. This includes alarms triggered when outputs turn on or off, or have them trigger periodically and provide the state of the unit at that time. These alarms are then handled by email or one of the new alarm handling options. *Figure 2* shows the user interface for the alarm control of individual nodes.

Figure 2 - Node alarm control

More Alarm Handling Options

Previously, these alarms could be emailed to the user to alert them to any changes to the unit. With the new software version, two new options have been added for the handling of alarms. Alarms can now be logged to an internal SD card, which can be pulled at a later time to view events that occurred. The 4005i can also be configured to cause an SNMP trap when an alarm occurs. This causes the unit to send an unrequested message to SNMP managers to provide information about the alarm that occurred.

Output Scheduling

The RIGrunner 4005i allows users to turn output nodes on or off through internet web pages. With the new software version, these outputs can be configured to follow a user-determined schedule. The 4005i can be set to either turn an output on or off at a specific time on a given weekday or, an output can be configured to turn on during a set duration. The 4005i supports up to 16 possible schedule options at one time, Figure 3 is an example showing 3 of the 16 scheduled outputs being used.

Figure 3 - Output scheduling interface

This allows for automation of power distribution and provides a more hands-off experience for 4005i users.

Network Watchdog Timer

The 4005i can now be configured to use a Network Watchdog Timer. This allows the unit to reboot if a specific HTTP request is not received at periodic intervals, ranging from 5 minutes to 24 hours. By implementing this Watchdog Timer, the unit can be reset remotely in case of errors in HTTP communication or for other user-specific cases.

2022 Product Update: Backorders and Price Increases
By West Mountain Radio Sales Team

West Mountain Radio has been trying to keep product in stock, but there have been quite a number of components that have long lead times. In other cases, the stock that may be obtained has astronomical price increases. We try to post a backorder date on each product page, but we cannot guarantee that the date may not be extended. If you place a backorder, it puts you in line to receive the order when product is available. Backorders can be canceled at any time.

Due to the rising inflation and component price increase, we will be forced to increase our prices in 2022. Any products that may not be affected by these issues, we will try to maintain prices. Any backorders placed before a price increase, but not shipped, will receive the price as of the date of the order.

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January 16, 2022

Winterfest
Collinsville, IL
January 22, 2022

Due to COVID-19, production has been delayed. West Mountain Radio encourages all the hams to keep communication going through these hard times over radio! Stay healthy!

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