

In the recent Simulated Emergency Test (S.E.T.) performed by the Yamhill County ARES group, the goal was to have the majority of the communications to be transferred by digital modes. While there were issues with the 75 meter and 40 Meter band conditions, and some RMS Station configuration problems, using digital communications was a success. In discussions afterwards, there were several MARC members that were asking what would it take to add digital to their home stations. From the point of view of HF SSB transmission, this is question that can be easy to answer for those with Transceivers with built in TNC's, as they just need to get the software and Transceiver configured, though that step may not be so easy, but I'll leave that topic to another article. For those that don't have a TNC built into their HF transceiver like the MARC club's ICOM 735, what are they to do?

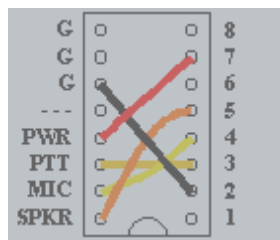
A USB sound card radio interface will provide the ability to add the modulation/demodulation mechanisms necessary to perform the digital communications modes. These modes can be Frequency-shift keying (FSK) used by RTTY, Multiple frequency-shift keying (MFSK) used by JT65 and WSPR, and Phase-shift keying (PSK) used in PSK31. There are several manufacturers of Sound Card Interfaces to choose from. The Tigertronics Signalink is a popular low cost device, that touts the ability to connect to most radios. West Mountain makes the Rigblaster line of interfaces, that professes to provide the connections to most radios as part of the single purchase, and use the same computer connection for radio control. There are others with additional features and controls such as the RigExpert and TimeWave interfaces. Even MFJ has their 1204 Series USB Digital Mode Interfaces that are purported to similar in feature and price to the Signalink interface.

I Have had some experience with the Signalink with my APRS IGate that receives and transmits VHF APRS messages to APRS radios reported to be within its vicinity, so I've chosen to look into what it would take to connect one of these to the IC735 to perform digital communications in HF. Unlike a TNC, it is the software on the computer that is performing the modulation and demodulation, TNC's shine with modes that require precise timing between tasks, which can be hard to do with a shared processor on a PC. The software on the PC must

perform three functions in working with the radio to have operations in digital modes. These are 1) Generate the audio and transfer it from the computer to the radio 2) Push to talk triggered on start of audio transfer to radio, and 3) Receive the audio from radio to the computer and convert it. An additional fourth function for remote control of the radio, is highly desirable as well. The Signal Link doesn't have any remote control features to it, but this is not necessarily an issue as there are cables easily available that will connect via a USB or serial port on the computer to the remote control jack on the back on most radios. This means that the audio and push-to-talk uses a separate computer port than the remote control uses, and just needs to be defined to the software. Even without remote control, one could always tune the radio manually, but the first three functions are absolutely necessary.

Looking at the manual for the IC735, there are two accessory eight pin din connectors on the back. Of the two, only the connector labeled Accessory 1 has the pin outs showing that it has a pin for push-to-talk (3), a pin for audio into the radio (4), and a pin for audio out of the radio (5). So this connector appears to be the connector to use.

When you purchase the SignalLink, you are also acquiring an appropriate cable that connects it to the radio. These cables use a RJ45 cable to connect to the SignalLink and the appropriate connector for the radio. For the IC735 a SignalLink USB Sound Card modem with the appropriate cable is part number SLUSB8PD. Their web site http://www.tigertronics.com/sl_wirebm.htm, lists many radios by brand with the part number of the SignalLink to purchase that has the correct radio cables. An optional purchase item is a plug-and-play jumper module that will map the SignalLink's pin requirements to the radio's pin requirements. For example the Signalink uses pin 1, 2, and 3 for audio out, audio in, and push-to-talk respectively, but the IC735 uses pins 5, 4, and 3 for audio out, audio in, and push-to-talk respectively. The jumper module performs the matching between the pins. If you chose not to purchase the plug-and-play jumper module, you will need to use the included jumper wires that you must push into a socket on the circuit board to make the match.



To the left is a stylized graphic with the jumper wire setting needed to connect the pins from the radio cable to the correct connections within the

SignalLink to work with the IC735. This jumper setting is also on the web page above. Of note the SignalLink USB draws the power from the USB connection of your computer. So the PWR jumper is not needed. Another page on the site

(<http://www.tigertronics.com/slmodules.htm>) shows the plug-and-play module selections

that are available. For the IC735 it appears to be the SLMOD8PD. A six foot USB cable is provided with the interface for connecting it to the computer. Those radios that use an accessory connection on the back of the radio, and are using CAT control as well, need to make sure the CAT control for push-to-talk is disabled. For the IC735 this is a moot point as its remote control doesn't include PTT.

Hopefully this will give you an idea of what is necessary in getting a sound card modem connected to your radio if it doesn't already have one. The next installment of this article will be attempting to find what it takes to get this configuration working with Winlink Express using WINMOR, and WSJT-X for WSPR. The WINMOR protocol is a good test, as it uses two or eight carriers depending upon the baud rate, with each carrier using a different sound card mode.