DIGTRX
What you see is what you get! Review by Bruce Jones VK4EHT

Several members of the SEQATV group have been experimenting with "DIGTRX". What is DIGTRX? Written by Roland Zurmely Py4ZBZ, this program evolved from a suite of programs (known as RDFT software by Barry Sanderson KB9VAK) designed to send binary data (files) over an audio bandwidth channel using a computer sound card. DIGTRX controls this original suite of programs and automates their functions. Computer files can be transferred via amateur radio using DIGTRX.

How does this happen? Take the file to be transferred and convert it to a sound file in WAV format (codify for TX). Play the sound file over the audio path (which may be a radio link). Record the received sound file. Process the received sound file to recover the original binary data (file) without errors (decoding).

The received sound file will contain noise, distortion, frequency response effects and may be recorded at a slightly higher or lower level so how can this convey error free data? The codify process adds an amount of redundancy to the file such that missing or errors can be detected and even corrected in the decode process. The degree of redundancy can be varied from 10% (for a clean FM transmitter) to 70% (for SSB on a noisy HF band). To account for frequency and phase response effects in the audio path the audio signal is in the form of 8 narrow band carriers each using binary phase shift keying (BPSK). This all is done by Digital Signal Processing (DSP) using the sound card and the software.

The latest version of DIGTRX adds start, stop and identification signals to the transmission which enables the receive process to become completely automatic. Also the ability to display received picture and text from within DIGTRX makes it easy to use. However DIGTRX can transmit any binary file (up to 64K size limit). Files received are stored in a folder (called "autosave") and can be opened with appropriate software later (no need to have DIGTRX running for this). To date we have sent PDF. DOC and ZIP files.

DIGTRX is also full of other smarts. For picture transmission there is a JP2 converter. With this smart piece of work you open any picture file and the program converts it to the JP2 format. This is a little like JPEG compression where you trade off quality with file size. The beauty of this one though is that by just using a slider tool in the software you see the result of the compression as well as the effect on transmission time and file size. What you see IS what you get.

DIGTRX in receive mode has 4 displays of the incoming signal: an oscilloscope, spectrum analyser, signal level (audio not RF) and a waterfall display. The waterfall display is in effect a scrolling spectrum display. This displays the eight BPSK carriers and also any noise received. A clean display indicates that all is well. DIGTRX has also made novel use of the waterfall display. It is able to encode the ID (callsign) of the transmitting station such that it is visible in the waterfall display. It can even encode a picture such that it is visible (low res monochrome) similarly. This is ideal for CQ calls etc. Very short text messages can be encoded similarly.

Because it uses 8 audio carriers close attention needs to be taken to the level of signal fed into the transmitter to ensure there is no clipping or distortion.

DIGTRX is a free internet download (1.58 Mbyte) which comes as a self installing EXE file. The version I have described is V1.48.
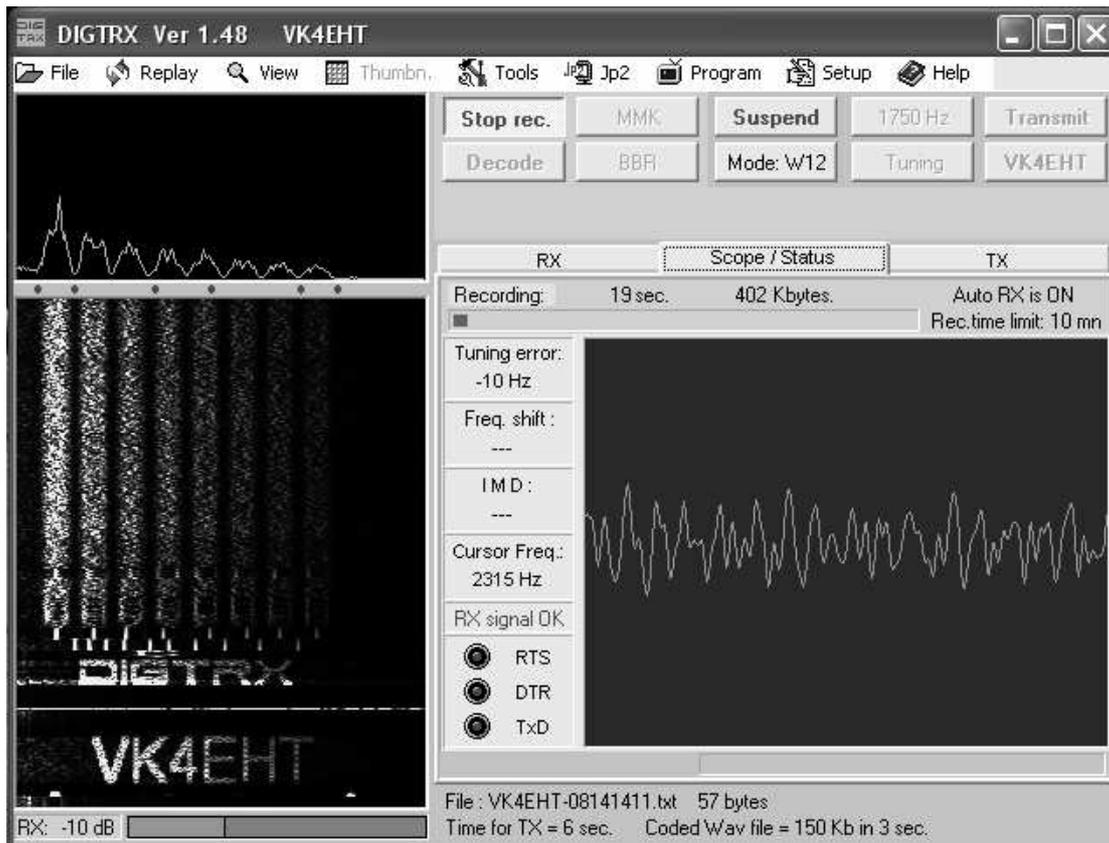
Above is an example of the DIGTRX screen as it is recording an incoming signal. The "Scope/Status" window emulates an oscilloscope. The spectrum display (top left) shows the 8 carriers and in this example shows a drop in level of the higher frequencies. The waterfall display scrolls downwards showing the ID sent at the beginning of transmission followed by the 8 carriers (about 19 seconds into the transmission as indicated in the recording panel). Below this is the audio level in bar graph form.

When recording is complete the decoding process begins. This may take several minutes depending on the size of the file received and the computer processing speed. It may even take longer than the time taken to send the file.

Once the decoding process is complete some files (picture, text and HTML) are actually displayed in the RX window. (The RX window is in the same position as the Scope/Status window and can be selected by clicking the tab.

Comparison with SSTV modes:

There is no degradation of picture files as happens with SSTV because the actual binary file is sent. However the degree of compression required to send a picture in a reasonable time can lead to visible degrading of the picture. Some pictures compress elegantly and some do not. It is a matter of individual preference. One thing particularly good is the ability to send pictures with an extreme aspect ratio such as a panorama (wide horizontally) or a tower or waterfall (high but narrow).

Enjoy!