

The Worst PSK Presentation Ever

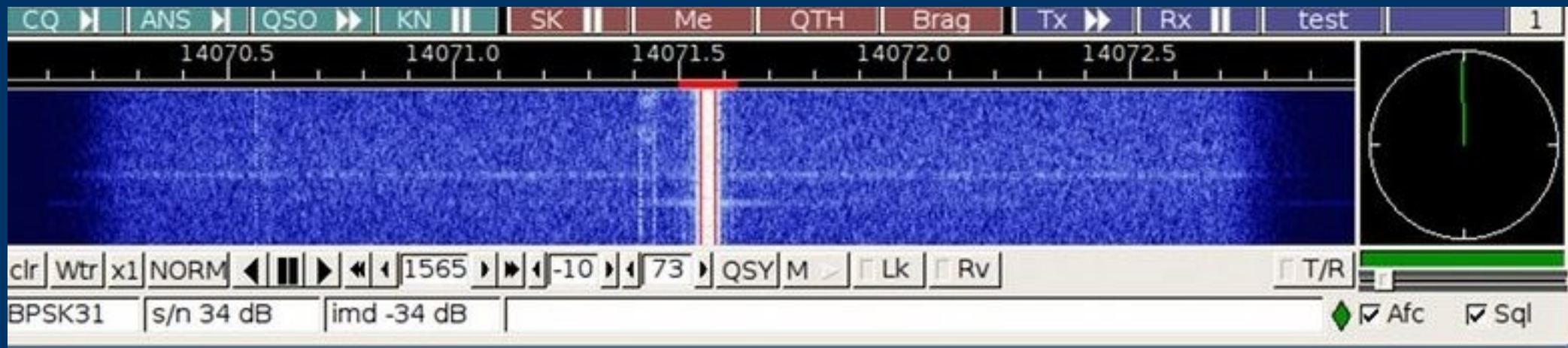


Welcome to what could quite possibly be the worst presentation you have ever seen on ham radio digital modes....EVER

Blame: kc2rgw
Time of Incident: Apr 2008

What's All This Then?

- Why digital modes?
- What are some examples of digital modes?
- What equipment is needed?



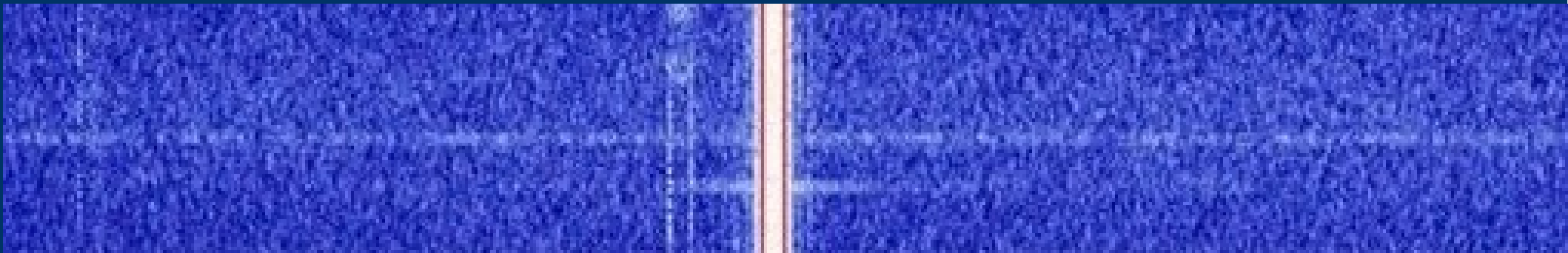
Why Digital Modes?

- Much more efficient
 - Will make contacts when voice will fail
 - With poor propagation this means many more countries
- Requires less power
 - As a result of the efficiency, lower power is needed
 - Excellent for QRP or portable operations
- Quiet....it can be silent
 - Can be handy if you don't want to disturb people
- Fun
 - Once you get started....it's addicting!



Examples of Digital Modes

- There are many digital modes
 - The fundamental differences are how the signal for the mode is generated and how the signal is modulated.
 - Frequency Shift Keying – FSK
 - Toggles the mark and space tones to communicate
 - Uses either built in rig hardware tones or a TNC “modem”
 - Audio Frequency Shift Keying – AFSK
 - Uses a sound card interface to generate the tones
 - Depending on the mode it can be the mark and space, or it can be alternate tones that are generated.



Examples of Digital Modes

- PSK – Phase Shift Keying
 - psk31 – The dominant mode a.k.a. bpsk31
 - 31 baud text mode, fast enough for basic typing “live” during a contact. Very narrow, more signals can fit in a given space of your band pass.
 - psk63, psk125 – same mode but faster and also wider in bandwidth as a result. You can send more text faster, but it takes up more space on the band to do it.
 - keys by reversing the phase of the signal 180 degrees
 - qpsk
 - Has error correction so there is a delay as the information is being processed. Can be more accurate in poorer conditions and ensure better quality copy.
 - Works by using two phase reversals, 90 degrees out of phase with each other.
 - Not as popular as this takes more bandwidth than psk31
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More Digital Modes

- **MFSK16**
 - Uses 16 tones the encoding, sends characters twice for error correction. Wider than psk31 but allows 42wpm typing speeds. Fairly commonly used along side psk band space.
 - **MT63**
 - Uses 64 tones, extremely wide 1kHz bandwidth. Allows for 100wpm throughput and very good copy in terrible band conditions. Unpopular due to difficulties tuning the signal and extreme bandwidth use.
 - **Throb**
 - Similar to MFSK16 not commonly used now as MFSK has improved on the overall performance of the mode
 - **Olivia**
 - Combines MFSK with an additional layer for error correction that is among the best of the modes.
 - The bandwidth can be varied as can be the number of tones
 - Higher bandwidth means faster throughput and more tones slows down the copy but increases the error correction
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Yet More Digital Modes

- There are many more modes than I have listed
 - Lots of great information available on the internet
 - New modes are developed fairly frequently as there is ongoing experimentation
 - These modes have all been AFSK since the demonstration will be given using a soundcard interface.
 - Try them all...it's part of the fun!
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This guy is boring the heck out of me.....Someone pull the plug please!



Let's Get on With This, Shall We?

- What do we need to do this thing?
 - **General class or higher license.** Data modes are not permitted for Technician class licensees on the HF bands. There is confusion over techs working 10m digi modes, it is definitely NOT permitted. Time to upgrade!
 - An HF capable radio. Digital modes are operated on all the amateur bands in the cw/data segment of the bands.
 - A sound card interface. You can make your own or buy one of many designs. It's up to you and the interface options span a wide budget range.
 - A computer to run the digital mode software. Software is available for almost any major operating systems; Windows, Linux, various BSDs, OS X and probably more.
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Sound Card Interfaces??

- What gets connected?
 - Take the received audio from the rig from either a data jack output on the rear or via the speaker level output and input that into a computer sound card for processing by the digital mode software.
 - This goes from the rig into the mic input on the soundcard
 - Take the processed audio from the software ready to transmit and send it to the rig either via a data input jack or in through a mic jack adapter.
 - This comes preferably from the line level output or alternately the speaker output of the sound card.
 - Key the rig for transmit via
 - serial port connection to PTT on the rig
 - parallel port connection to PTT on the rig
 - VOX – voice operated transmit in through the mic jack and the rig detects the signal...not particularly reliable depending on the rig.
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What are the differences?

- Audio isolation
 - Proper audio isolation prevents ground hums. Noise on a signal for receive will make copy and tuning difficult. Noise on transmit will annoy the people on the band with you and ruin your copy and potentially interfere with others
 - Keying interfaces vary and can be a better choice based on what type of computer you have and what type of rig you are running.
 - Audio generation and signal amplification will vary and obviously will have an effect on your signal processing. You don't need an expensive sound card, but a better spec sound card will absolutely help.
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Get On With It Already!

- Many excellent resources are available on the internet. There are many HOWTO guides for mode information, interface assembly, preferred frequencies and on and on.
 - Ask your local hams...a bunch of us are fiddling with these modes and are glad to help you get going.
 - Check the club web site – I'll post this presentation there and links of interest on the subject... once we get the site a bit more finalized.
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You Made It!
You have survived
The Worst PSK Presentation Ever!!

