FT8 – WHY NOW?

- This month, (earliest Jan. 25) Bouvet Isl.!!!
- 54 deg. 25 min. South, 3 deg. 22 min. East
- 1000 miles North of Antarctica...
- 3Y0Z Bouvet Island
  https://www.bouvetdx.org/the-island/
- Rare DX! No residents – expensive to go to
- May be 15 to 20 years before activated again

FT8 – Why Now

- 3Y0Z plans include FT8 operations https://www.bouvetdx.org/band-plan-frequencies/
- When other modes not working or have low rates due to poor propagation and
- During last days of the DX-pedition
- THIS IS AN OPPORTUNITY FOR THOSE NEW TO DXING and “Little Pistols”

FT8 for CIRC 1-24-18

- By Gary – AB9M
- Early adopter of new technology or modes
- DXer with 348 entities verified, 5BDXCC
- First DX – KL7EGR , 40 meters, CW, as Novice
- Started using WSJT-X JT-65 6-19-2017
- Moved to FT8 7-17-2017

FT8 Requirements

- SSB transceiver and antenna
- Computer running Windows (XP or later), Linux, or OS X
- 1.5 GHz or faster CPU and 200 MB of available memory.
- Monitor with at least 1024 x 780 resolution
- Computer-to-radio interface using a serial port or equivalent USB device for T/R switching, or CAT control, or VOX, as required for your radio-to-computer connections
- Audio input and output devices supported by the operating system and configured for sample rate 48000Hz with Audio or equivalent USB connections between transceiver and computer
- A means for synchronizing the computer clock to UTC within ±1 second

FT8 Software Requirements

- OS – Windows XP (or later), LINUX, OS-X
- WSJT-X ver 1.8.0
- CAT control (DXLab Commander and others)
- Logging software (DXKeeper and others)
- JT-Alert

FT8 Getting Ready

- Download and Install WSJT-X (1.8.0 or newer)
- Download and Install WSJT-X help files
- Download and Install JTAlert
- Read, Read, and Read again
- Configure WSJT-X FT8 for your radio or radio control program (i.e. DXLab Commander)
- Configure JTAlert for your logging program (i.e. DXKeeper) and your objectives

FT8 Timing Requirement

- FT8 uses three sync pulses; start, middle, end of each 13.5 second transmission
- Your computer clock must be within +/- 1.0 second
- Check your computer clock; https://time.is/
- Automatically set your computer clock with https://www.meinbergglobal.com/english/sw/ntp.htm, http://www.thinkman.com/dimension4/default.htm, http://www.timesynctool.com/ , or http://robomagic.com/download.htm (free and sunset)
- Output of above clock must be “UTC” & 24 Hr Format

FT8 – Sound Card Settings

- If you have run PSK-31 or AFSK RTTY you probably have audio settings close.
- Tune TX for 100 Watts
- Set Sound card output at mid scale
- Use RIGblaster (or similar isolation) into microphone input for 30 Watts out from TX
- Use FT8 control to adjust TX power out
- NO ALC indication and observe manual rating
- Do NOT run WinWarbler or similar at same time

FT8 Details

- Standard messages consist of two callsigns (or CQ, QRZ, or DE and one callsign) followed by the transmitting station’s grid locator, and/or a signal report, or R plus a signal report, or the final acknowledgments RR73 or RRR or 73. These messages are compressed and encoded in a highly efficient and reliable way. In uncompressed form (as displayed on-screen) they may contain as many as 22 characters.

FT8 More Details

- “Forward error correction (FEC) in FT8 uses a low-density parity check (LDPC) code with 75 information bits, a 12-bit cyclic redundancy check (CRC), and 87 parity bits making a 174-bit code-word. It is thus called an LDPC (174,87) code. Synchronization uses 7x7 Costas arrays at the beginning, middle, and end of each transmission. Modulation is 8-tone frequency-shift keying (8-FSK) at 12000/1920 = 6.25 baud. Each transmitted symbol carries three bits, so the total number of channel symbols is 174/3 + 21 = 79. The total occupied bandwidth is 8 x 6.25 = 50 Hz.”

FT8 Split Operation

- Split Operation: Significant advantages result from using Split mode (separate VFOs for Rx and Tx) if your radio supports it. If it does not, WSJT-X can simulate such behavior. Either method will result in a cleaner transmitted signal, by keeping the Tx audio always in the range 1500 to 2000 Hz so that audio harmonics cannot pass through the Tx sideband filter. Select Rig to use the radio's Split mode, or Fake It to have WSJT-X adjust the VFO frequency as needed, when T/R switching occurs. Choose None if you do not wish to use split operation.

FT8 Prep for 3Y0Z

- Read 3Y0Z Band Plan and “Ten Steps on How to Work 3YØZ (Bouvet) With FT8” at https://www.bouvetdx.org/band-plan-frequencies/
- Read “Hinson tips for HF DXers on operating FT8” at http://www.g4ifb.com/FT8_Hinson_tips_for_HF_DXers.pdf
- Reread above
- Practice above on common DX or with locals

FT8 for 3Y0Z

- Configure station for FT8 frequency found at https://www.bouvetdx.org/band-plan-frequencies/
- Sync both VFOs
- Load WSJT-X (FT8) and JT-Alert
- Check Hold Frequency box
- Set your RX 200 – 400 Hz up from bottom (left) end of WSJT-X Wide graph using mouse click
- Set your TX (mouse shift click) in the clear at top of the pile near the right side of WSJT-X Wide Graph

FT8 for 3Y0Z (continued)

- Double click on standard message TX 1 to gray out (inhibits transmission of Grid Square)
- Double click on standard message TX 4 to change RRR to RR73
- You must do the above each time you start FT8
- You should make sure TX 2 is ready before you transmit
- Make sure auto sequence is checked
- Make sure you call opposite time slot
- Have fun, it's just a hobby!

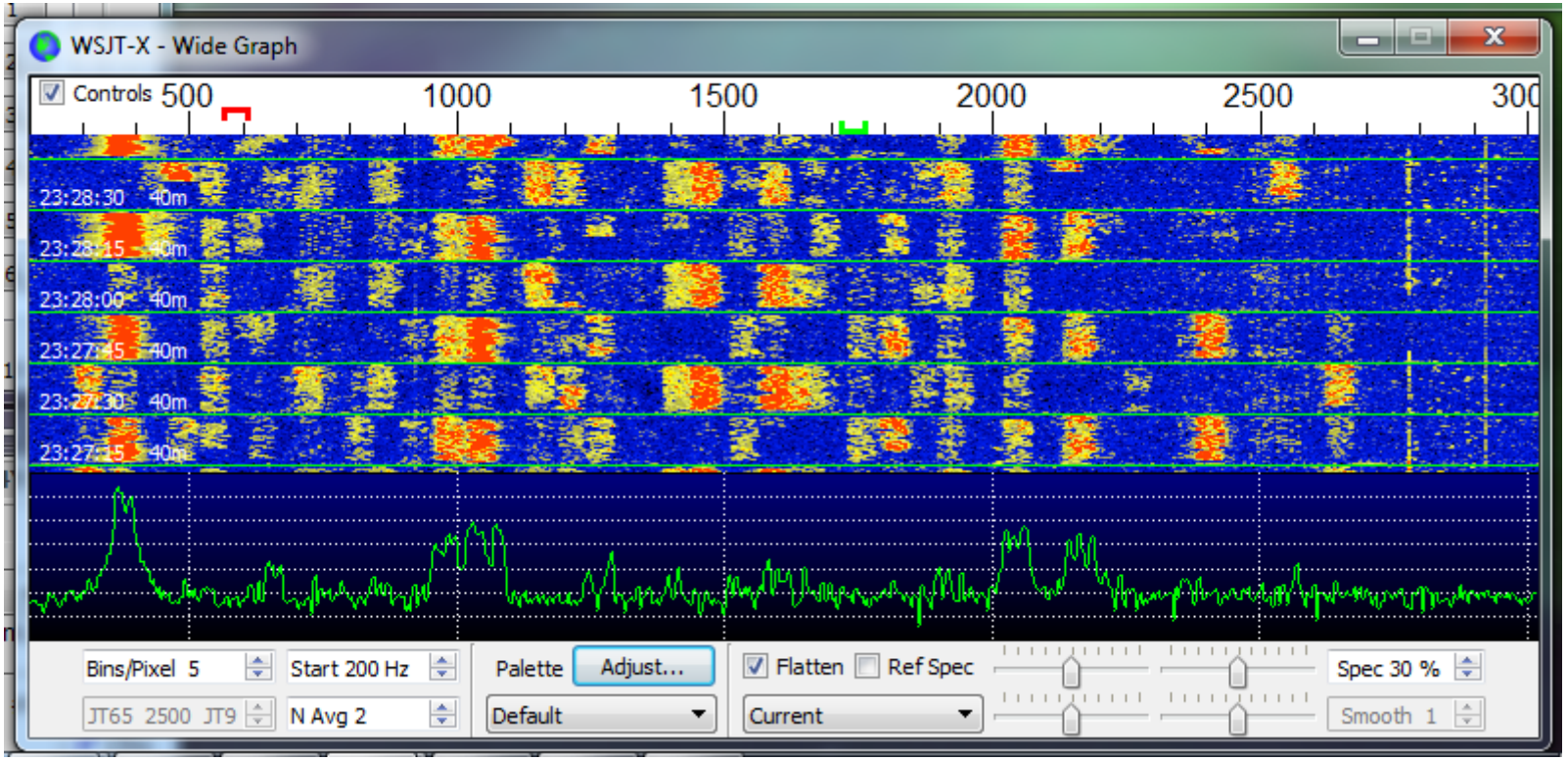
FT8 Tips

- Always have “Hold Frequency” checked
- Always have “Auto Sequence” checked
- Do Not have same TX and RX frequency unless DX only works on his QRG
- Except for above offset frequency or find a clear spot (use Shift Click to QSY TX frequency)
- Mouse click on Wide Graph to QSY RX freq.
- Double click on right callsign to RX QSY to his QRG and set YOUR TX to opposite time slot

FT8 Observations

- Decode of information MAY take 1.5 seconds or more, resulting in a CQ decode after your transmission should have started.
- If DX is sending RR73 you MAY need to watch the timing bar and Activate TX at 13 – 14 seconds in order start your TX on time.
- JTAlert notifications are based on “Needed” entries. Needed station May not be calling CQ but in QSO. (May require “Halt TX” until his 73)

FT8 WSJT-X Wide Graph



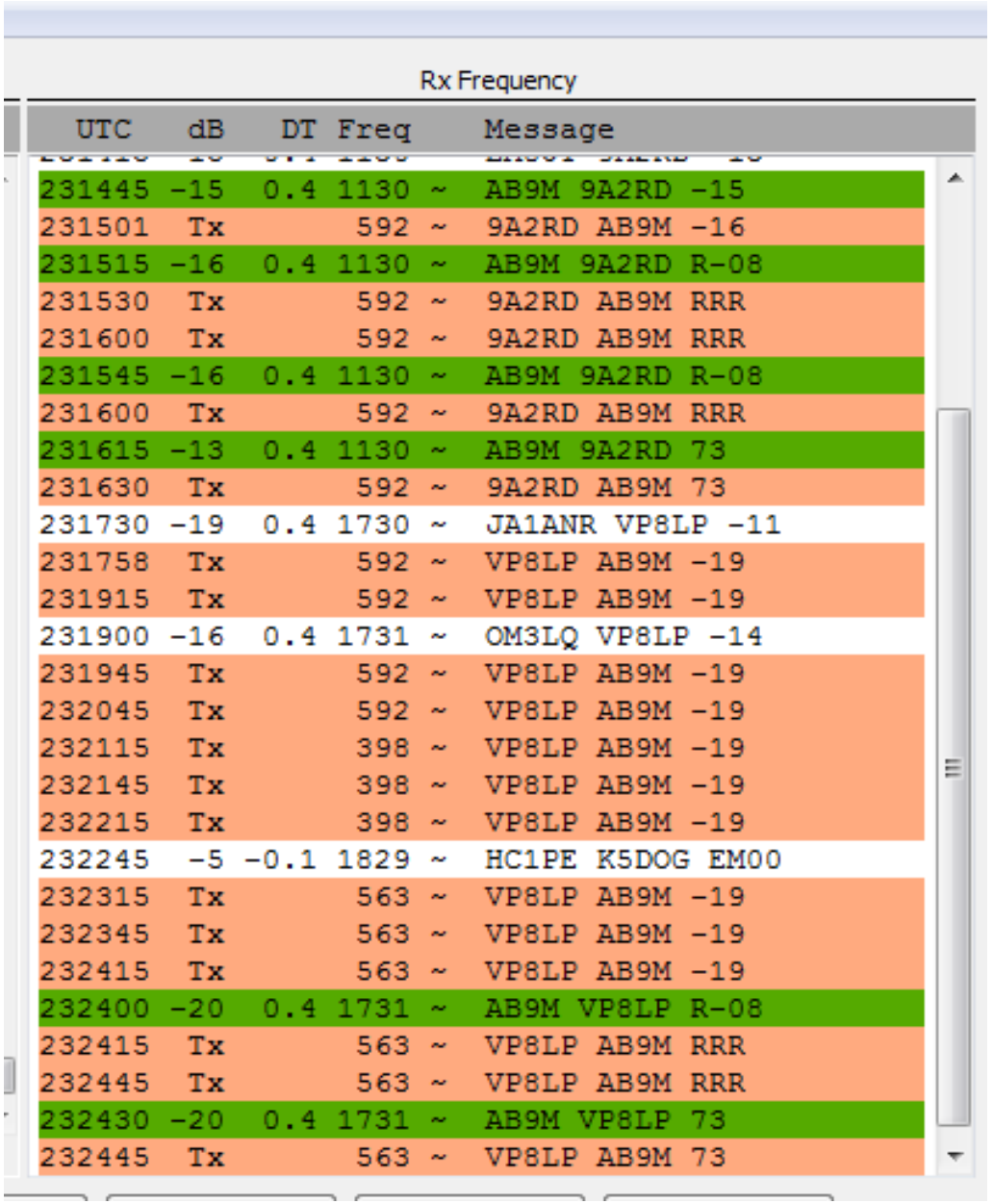
FT8 QSY on Wide Graph

- Click with the mouse anywhere on the waterfall display. The green Rx frequency marker will jump to your selected frequency, and the Rx frequency control on the main window will be updated accordingly.
- Do the same thing with the Shift key held down. Now the red Tx frequency marker and its associated control on the main window will follow your frequency selections.
- Do the same thing with the Ctrl key held down. Now the both colored markers and both spinner controls will follow your selections.
- Double-clicking at any frequency on the waterfall does all the things just described and also invokes the decoder in a small range around the Rx frequency. To decode a particular signal, double-click near the left edge of its waterfall trace.
- Double clicking on rightmost callsign will move the Rx marker on the Wide Graph to the clicked on station's transmit frequency. You may have to halt your TX.

FT8 - JTAlert

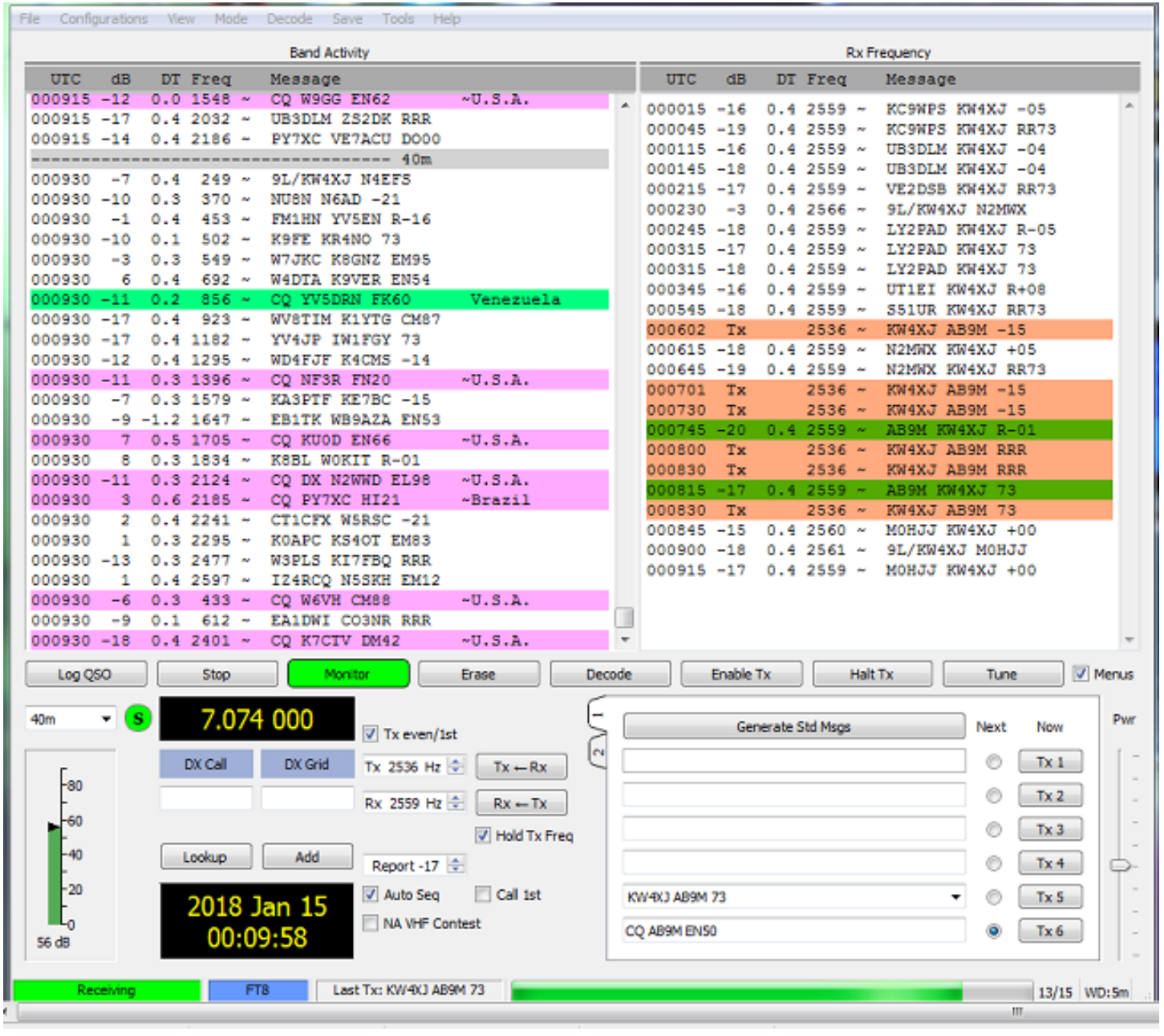
- JTAlert 2.10.9
- Audio and visual alerts for several alert conditions including wanted DXCC
- Automatic logging to these log types when QSO is logged in JT65-HF or WSJT-X ; DXLab DXKeeper, ACLog, Log4OM, HRD Log V5, Standard ADIF 2.2 file, MixW CSV file
- Works with DXLab applications; Automatic log to DXKeeper, Automatic post to SpotCollector, DXKeeper lookup of previous QSOs with decoded Callsign, Send Callsign to Pathfinder for lookup
- Dockable to bottom or top of JT65-HF and WSJT-X window

FT8 RX Panel



UTC	dB	DT	Freq		Message
231445	-15	0.4	1130	~	AB9M 9A2RD -15
231501	Tx		592	~	9A2RD AB9M -16
231515	-16	0.4	1130	~	AB9M 9A2RD R-08
231530	Tx		592	~	9A2RD AB9M RRR
231600	Tx		592	~	9A2RD AB9M RRR
231545	-16	0.4	1130	~	AB9M 9A2RD R-08
231600	Tx		592	~	9A2RD AB9M RRR
231615	-13	0.4	1130	~	AB9M 9A2RD 73
231630	Tx		592	~	9A2RD AB9M 73
231730	-19	0.4	1730	~	JA1ANR VP8LP -11
231758	Tx		592	~	VP8LP AB9M -19
231915	Tx		592	~	VP8LP AB9M -19
231900	-16	0.4	1731	~	OM3LQ VP8LP -14
231945	Tx		592	~	VP8LP AB9M -19
232045	Tx		592	~	VP8LP AB9M -19
232115	Tx		398	~	VP8LP AB9M -19
232145	Tx		398	~	VP8LP AB9M -19
232215	Tx		398	~	VP8LP AB9M -19
232245	-5	-0.1	1829	~	HC1PE K5DOG EM00
232315	Tx		563	~	VP8LP AB9M -19
232345	Tx		563	~	VP8LP AB9M -19
232415	Tx		563	~	VP8LP AB9M -19
232400	-20	0.4	1731	~	AB9M VP8LP R-08
232415	Tx		563	~	VP8LP AB9M RRR
232445	Tx		563	~	VP8LP AB9M RRR
232430	-20	0.4	1731	~	AB9M VP8LP 73
232445	Tx		563	~	VP8LP AB9M 73

FT8 Main Panel



FT8 Links

- https://physics.princeton.edu/pulsar/k1jt/wsjtx.html
- https://physics.princeton.edu/pulsar/k1jt/Release_Notes_1.8.0.txt
- https://physics.princeton.edu/pulsar/k1jt/wsjtx-doc/wsjtx-main-1.8.0.html
- JTAlert – http://hamapps.com/
- http://www.dxlabsuite.com/dxlabwiki/GettingStartedwithK1JTModes
- http://www.g4ifb.com/FT8_Hinson_tips_for_HF_DXers.pdf
- https://en.wikipedia.org/wiki/Costas_array
- https://www.openoffice.org/
- Created with OpenOffice free software

FT8 Questions

- My email is glhuber@msn.com
- Grid locator (for most) EN50
- FT8 is full duty cycle, most will run 30 Watts out or drive amplifier at RTTY rating
- Presentation is at CIRC website http://www.qsl.net/w9aml/