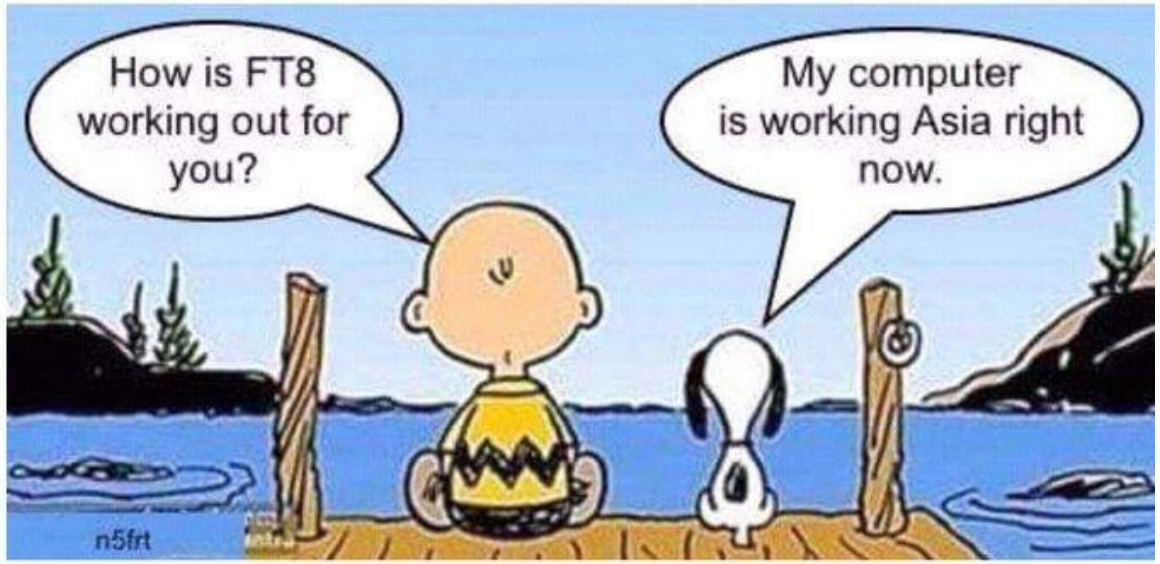
The Future of ~~FT8~~ FT4 in Contests

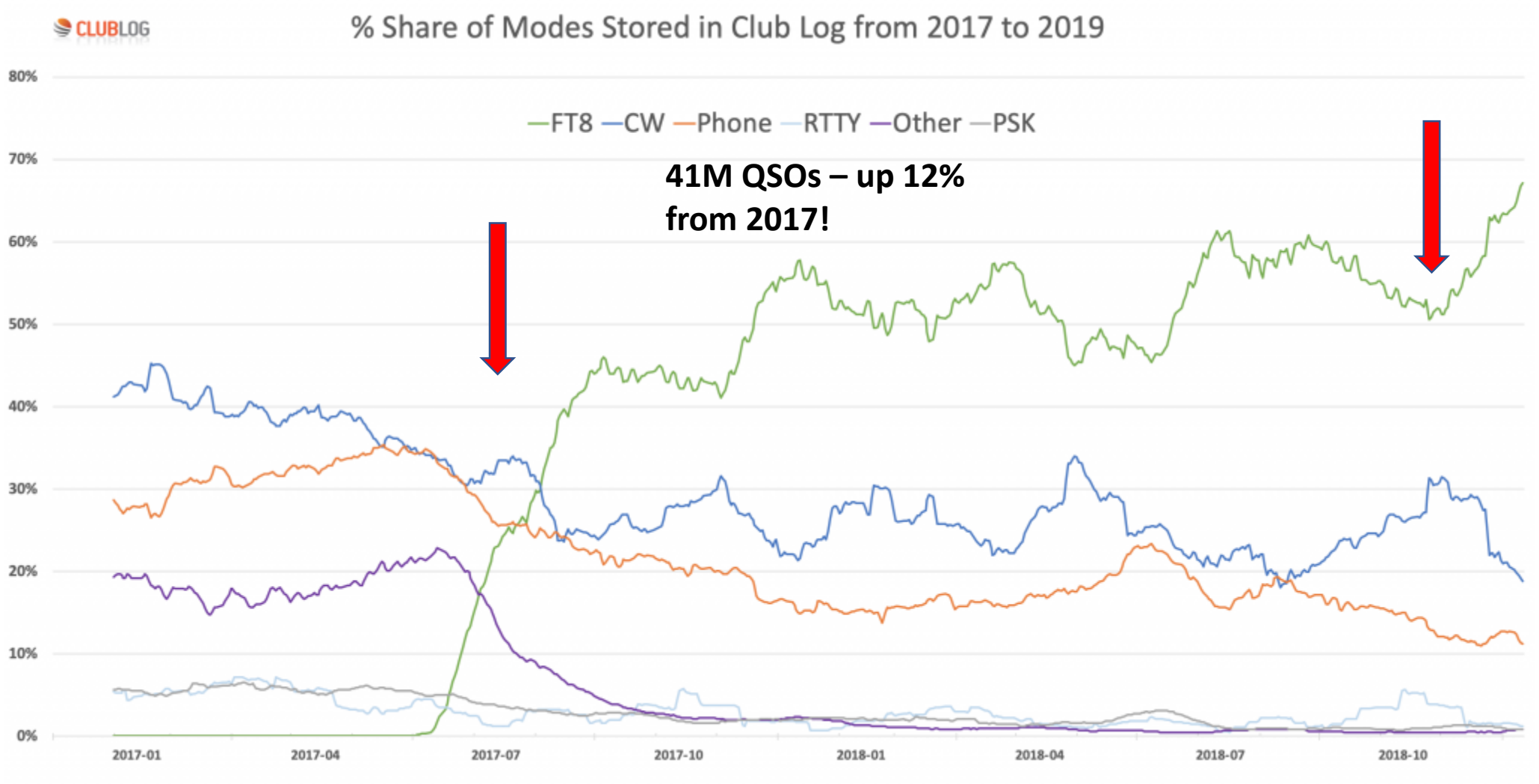
John Pescatore K3TN


How is FT8 working out for you?
My computer is working Asia right now.
n5frt


AMATEUR RADIO
1908 - 2018
MURDERED BY FT-8
AND COMPLACENCY


Millennials

DXers Show the Growth of/Shift to FT8

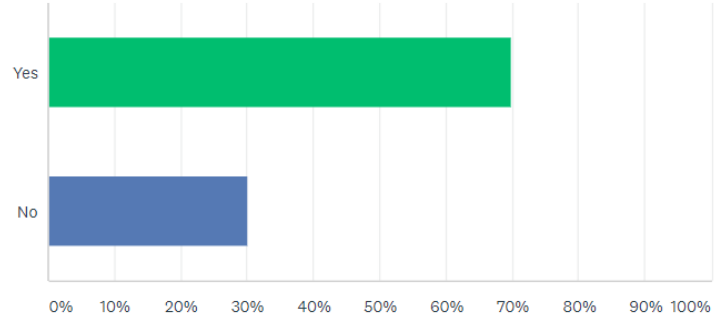


https://g7vjr.org/wp-content/uploads/2019/03/clublog-modes-2017-2018.png

Survey Says (via CQ CONTEST)

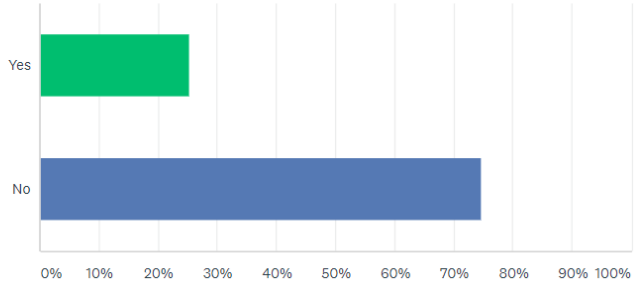
Have you ever made a QSO (contest or otherwise) on FT8?

Answered: 311 Skipped: 0



FT8 was allowed for the first time in RTTY Roundup 2019, and in the past few ARRL VHF Contests. Did you make any FT8 QSOs in any of those contests?

Answered: 311 Skipped: 0

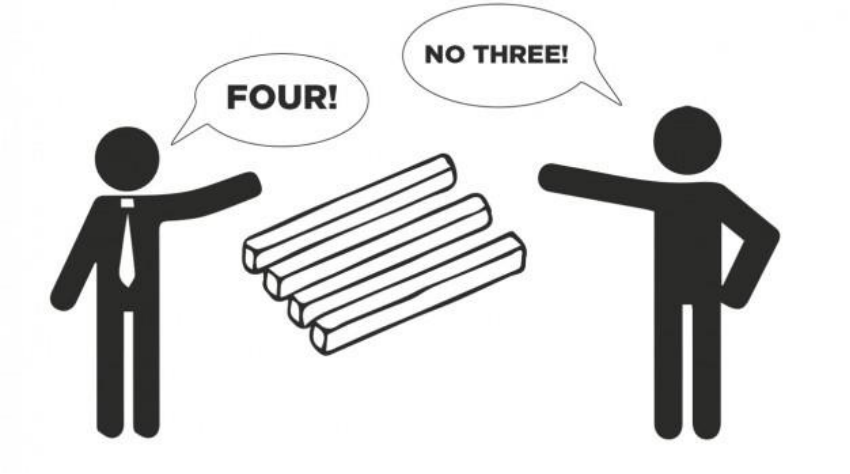


ANSWER CHOICES	RESPONSES	
FT8 should not be allowed in contests at all.	20.95%	62
FT8 should be allowed in VHF/UHF contests only.	3.72%	11
FT8 should be allowed in all contests that allow all digital modes (like RTTY RU and Field Day).	27.36%	81
FT8 should be allowed in all contests that allow all digital modes but only in the Multi or Assisted Category.	11.15%	33
FT8 should only be allowed in FT8 contests and not mixed in with other modes.	36.82%	109
TOTAL		296

A Few Key Points to Start

- **“FT8** is an amateur radio QSO communication **protocol** developed by Joe Taylor (K1JT) and Steve Franke (K9AN). FT8 uses 8-FSK modulation, transmission takes less than 15 seconds” (sigiwiki.com)
- **WSJT-X, MSHV and JTDX** are applications that encode and decode data using FT8 (and other protocols) and add a GUI along with various support functions and some levels of automation – kinda like MMTTY for RTTY.
- Most contests are single mode or SSB/CW or RTTY only – FD, RTTY RU, many state QSO parties and VHF/UHF contests are the major exceptions.
- In contest rules, the definition of “signal” and “assistance” were written around CW/SSB/RTTY, not modulation methods like FT8.

What is Different About FT8, FT4 or JT65, etc.?



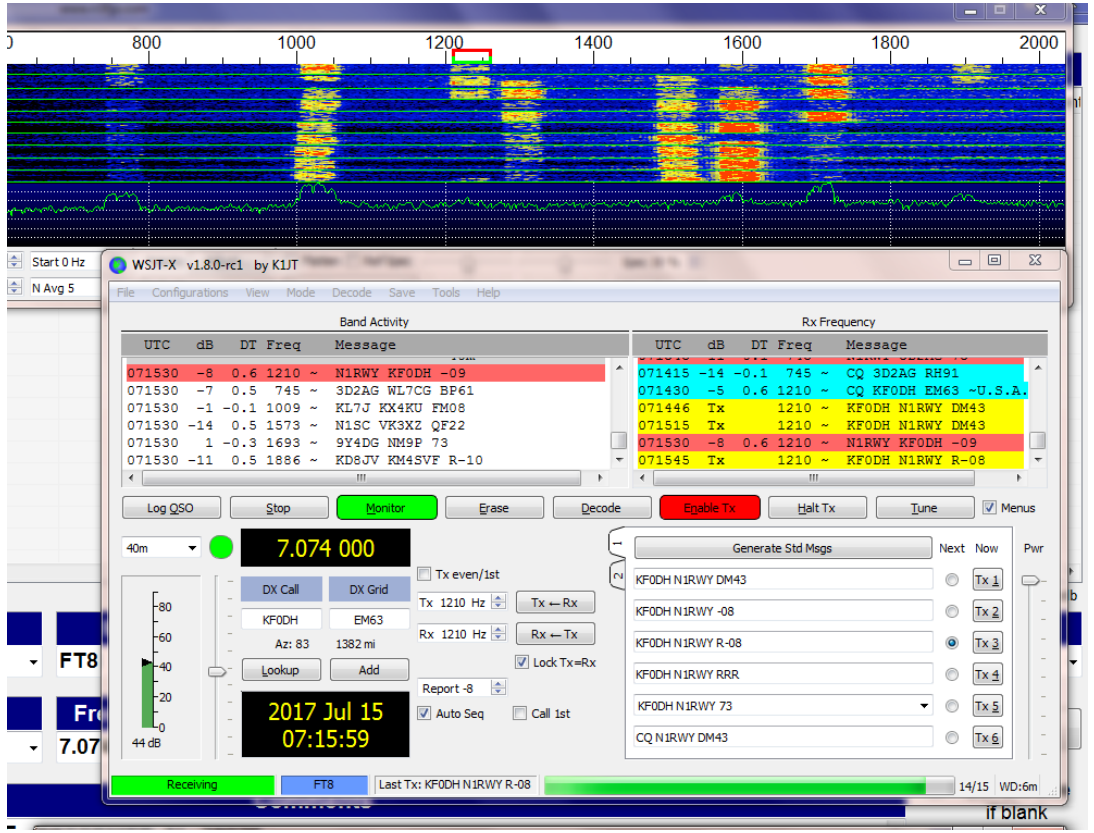
- Transmissions are synchronized.
- Error correction is used in encoding/decoding.
- Message content is constrained
- That’s about it!

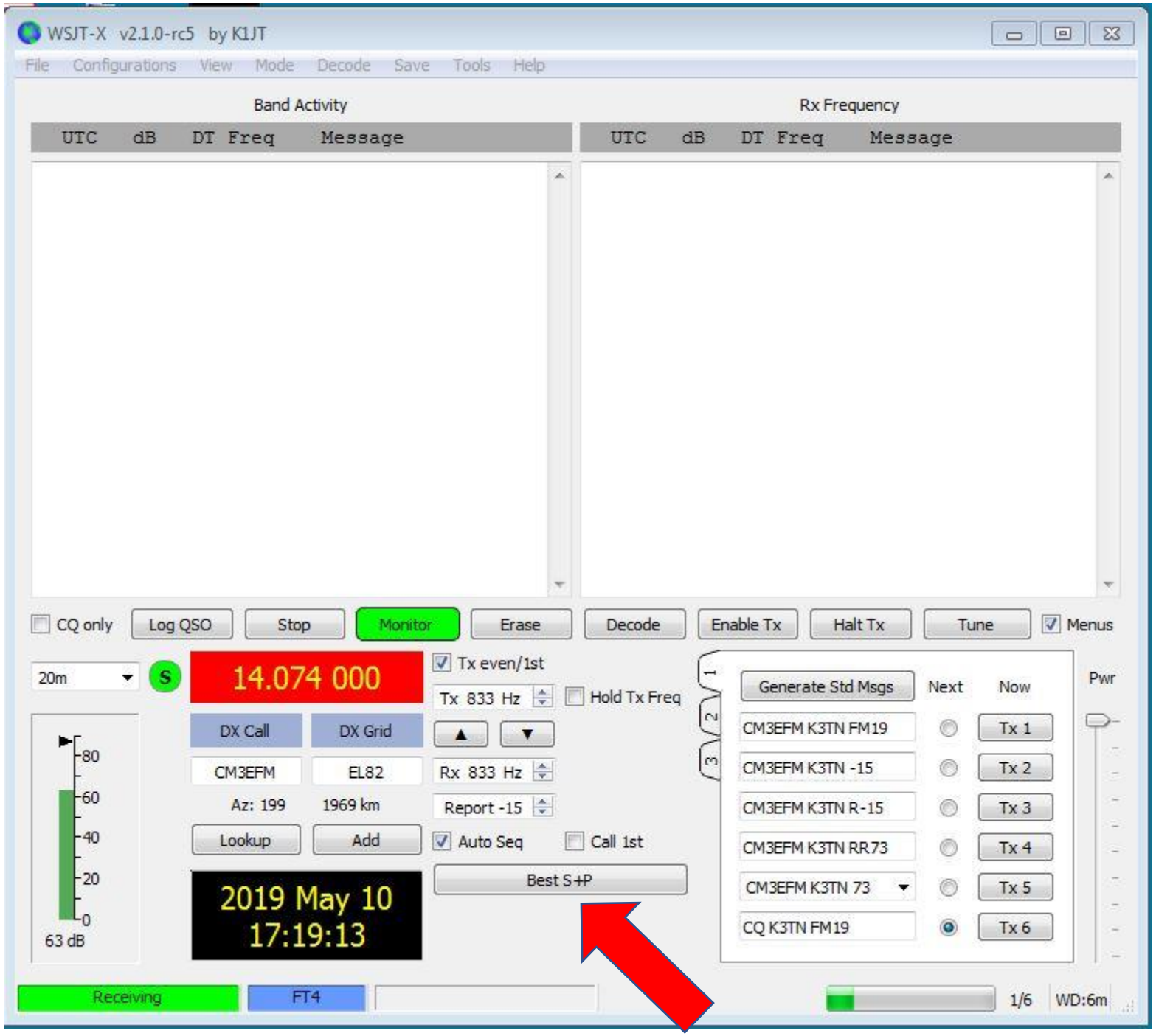
What is FT4?

- “FT4 is an experimental digital mode designed specifically for radio contesting. Like FT8, it uses fixed-length transmissions, structured messages with formats optimized for minimal QSOs, and strong forward error correction. T/R sequences are 6 seconds long, so FT4 is 2.5 × faster than FT8 and about the same speed as RTTY for radio contesting. FT4 can work with signals 10 dB weaker than needed for RTTY, while using much less bandwidth.”
- With JT-65, an exchange took 5 minutes. With FT8 an exchange could be done in 1 minute. With FT-4, that is down to about 24 seconds or a 150 hour.

Most of the Difference is in WSJT-X

- Calling responders to your CQ or answering CQs can be **automated – for one response**
- Fox and Hound mode **multiplexes** multiple data streams **simultaneously** within one chunk of bandwidth – like skimmers or the Reverse Beacon Network, but on XMIT, too. **But not for contests.**
- That's about it!
- Much automation and assistance already in contesting software but…




WSJT-X v2.1.0-rc5 by K1JT
File Configurations View Mode Decode Save Tools Help
Band Activity
UTC dB DT Freq Message
Rx Frequency
UTC dB DT Freq Message
CQ only
Log QSO
Stop
Monitor
Erase
Decode
Enable Tx
Halt Tx
Tune
Menus
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Tx even/1st
Tx 833 Hz
Hold Tx Freq
DX Call
DX Grid
CM3EFM
EL82
Az: 199
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Rx 833 Hz
Report -15
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Add
Auto Seq
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2019 May 10
17:19:13
80
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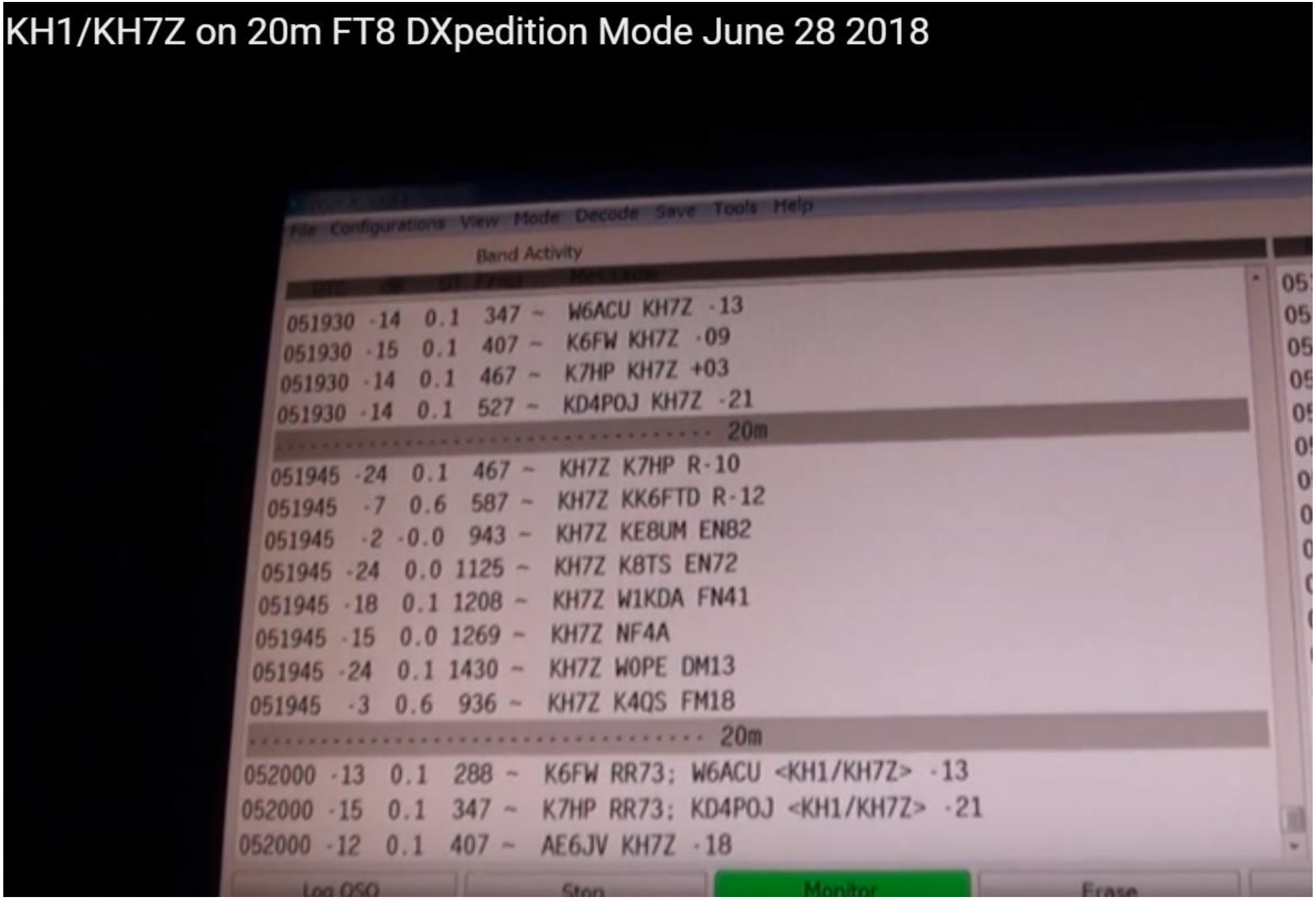
CM3EFM K3TN -15
CM3EFM K3TN R-15
CM3EFM K3TN RR73
CM3EFM K3TN 73
CQ K3TN FM19
Tx 1
Tx 2
Tx 3
Tx 4
Tx 5
Tx 6
Receiving
FT4
1/6
WD:6m

Automation

- Some level of automation has long been accepted in contesting
  - Keyers, DVKs
  - Keyboard CW
  - Auto-repeat CQ
  - History files
  - Decoders for RTTY
- Other levels have not been accepted or are called “assistance”
  - Decoders for CW
  - Multi-channel decoders/displays like skimmers
  - Auto-running or auto-S&P

Source:
WX0V
YouTube



Multiplexing

- Simultaneous “signals” from one station on one band is generally prohibited in contests
- Informal norms for how much bandwidth a station “can use at once” in a contest: 2.8 kHz SSB, 400-500 hz CW or RTTY, etc.
  - Splatter on SSB, bad
  - Key clicks on CW, bad
  - Overdriven AFSK, bad
  - Working split, frowned on
- Is a 3 kHz wide transmission with 30 FT8 (or 10 CW) data streams one signal or 30 (or 10) signals?
- Fox and Hound mode supports up to 5 simultaneous TX data streams – **but not for contest mode**.

Two Levels To Think Through

1. Adding FT4 as a mode to mixed mode contests
   - ✓ Increased participation in Field Day, VHF tests and RTTY RU
   - ✓Really just another mode – ARRL VHF/FD, CQ VHF rules stop here
2. Allowing some level of automation and multiplexing – this is where it gets tricky.

Uh oh – Automation plus Multiplexing?

- Any form of decoding starts to make the slope slippery.
- Adding automated response to decoding seems to take away the human element
  - Automation of state selection OK? (ESM)
  - Automated aids OK? (SCP, History files)
  - Automated response not OK?
- Multiplexing eliminates humans from the top ten (except maybe N6MJ)

RTTY RU 2019 Rule Changes to Address FT8

FT8 entrants: Participants must use ***WSJT-X* version 2.0** or later to ensure they are able to transmit and receive the exchange messages the event requires. **Unattended operation is not permitted. Utilizing QSO/macro automations is not permitted. Fox-and-Hounds mode is not permitted (each contact must be carried out in a one-to-one mode, manually accepting/logging each contact.) Since ARRL contest rules regarding spotting assistance prohibit the use of "automated, multi-channel decoders" by Single-Operator entrants, stations using software that decodes *more than one* FT8 signal at a time will have to enter as Single-Operator Unlimited or as Multioperator, just as PSK participants have had to do in the past when using *fldigi* or *DigiPan* software.** Logging software mode "DG" will be accepted as an abbreviation for all digital QSOs other than RTTY, which will continue to be designated as "RY." This will assist the ARRL Contest Branch in distinguishing RTTY from other digital-mode contacts in order to assess the popularity of each. Logs designating all contacts with "RY" will be accepted, however. FT8 users are encouraged to spread out to help increase decoding and contact success. High power and large antennas are not necessary for successful FT8 decodes.

Discussion with W9JJ, ARRL Contest Manager

- ARRL wants to ensure that human intervention is required with each FT8 QSO. Whether that's a prompt to log a contact, or a prompt to enable CQ, both require intervention to move on to a new QSO.
- If more than one call sign is decoded on the screen at one time that moves the participant into Assisted (Unlimited) Class. RTTY RU log checkers made sure that anyone making FT8 QSOs was in the Assisted Category

Discussion with K1JT

- No plans to support Fox/Hound mode with contest exchanges
- No plans to increase CQ response automation to more than once
- Will add support for additional contests that have fixed exchanges.
- Does not feel FT8 synchronous approach would work as an “engine” like MMTTY.
- 2019 RTTY RU:
  - 2595 total entries was up 46% from best of recent pre-FT8 years
  - 923 FT8 only logs, 298 mixed
  - RTTY only logs down 23%

First Try, Huge Success: FT8 Roundup 2018

Single Operator Top Ten

Pos	Call	80	40	20	15	10	QSO	Mults	Score
1	WV4P	120	301	249	23	0	693	95	64,885
2	K6LL	99	231	273	142	0	745	83	59,428
3	K1JT	119	205	149	120	2	595	89	51,175
4	KI6DY	89	176	278	80	1	624	84	50,736
5	W6BQ	123	237	218	103	1	682	76	50,692
6	YO9HP	158	264	113	0	0	535	87	45,588
7	W4GO	107	113	152	60	0	432	104	44,200
8	W7CD	22	142	331	10	0	505	88	43,384
9	LU5FF	0	21	285	138	0	444	97	40,740
10	N4BP	27	117	258	72	0	474	86	40,248

1,253 logs submitted from 91 different DXCC entities, all 48 contiguous states + DC, and six Canadian provinces. The log-checking software showed there were **2,106 different calls claimed** and 131,181 QSOs.


TEXAS INSTRUMENTS
SR-52
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INC.

Summing Up

- ✓FT8 is tremendously popular, and has already proven it will attract operators to contests and increase contest activity. FT4 will follow.
- ✓Contesting has always rewarded motivated operators who work to increase their rates and scores with technology.
- ✓Contests are more fun with more contestants. Silent Keys don’t make many QSOs…
- ✓Keeping the human element in competitions is considered important.
- ✓Automation and “multiplexing” moves into the gray area.
- ✓Classic vs. Accepted vs. Assisted vs. Unlimited

Possible Choices for Contest Sponsors

(Only matters for multi-mode or all digital contests)

- FT4-only contests
- Amend rules to explicitly allow automation and/or multiplexing
- Ban or limit response automation and/or multiplexing
- Combination of ban/define/limit, a la RTTY RU
- Define automation and/or multiplexing as assistance
- Create unlimited category where everything goes
- Create separate contests where response automation and/or multiplexing is allowed.
- Figure out a way to make FT8/4 like GOTA in Field Day
- State QSO Parties?

Make Sure Your Voice Is Heard

- **Contest clubs and contesters should weigh in**
- QST Letters to the Editor: qst@arrl.org
- NCJ Letters to the Editor: ScottWrightMD@me.com
- ARRL Contest Manager: w9jj@arrl.org
- CQ Contests: sbolia@woh.rr.com
- Jpescatore at aol dot com