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Wonderful World of Digital Contesting

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Mini-CTU Ham Expo
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Program Test

There are 5 basic programs to use for FT operations:

MSHV

WSJT 2.7

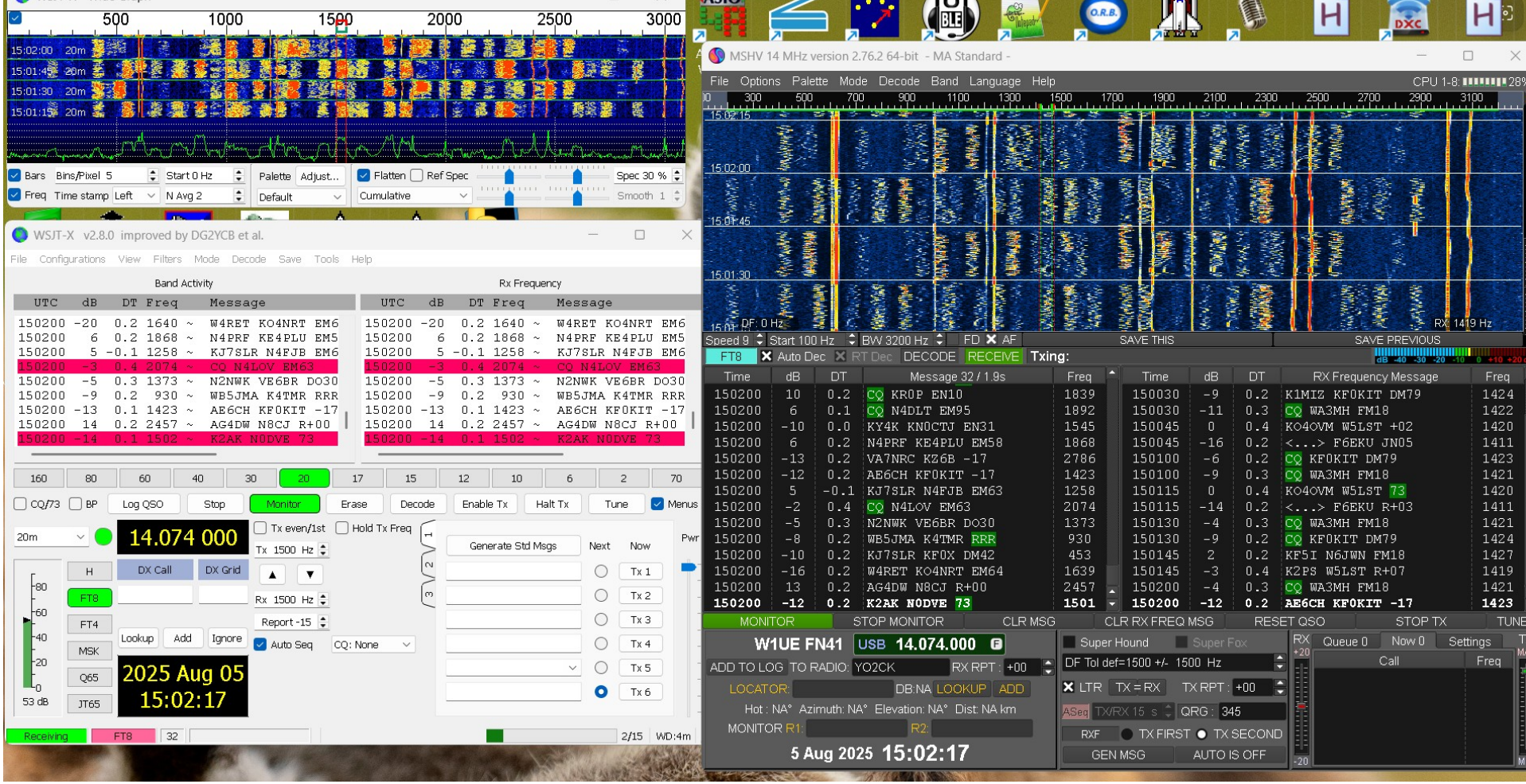
WSJT Improved 2.8

Writelog (Digirite)

JTDX

Program Test

I set up a test. Using a Ryzen 9 computer with 8 cores and 16 threads, I loaded WSJT, MSHV, and JTDX on the same computer and pointed them to the same audio stream. All programs were set to the same bandwidth and audio adjusted so as not to overload the inputs.



WSJT Improved

MSHV

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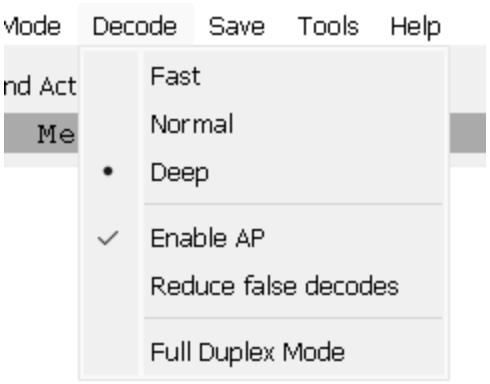
Program Test

I attempted to keep as many variables constant as I could. I used the same audio stream, and was able to find a setting that didn't overload or underload a given program. I chose one variable- number of decodes- and kept track over a several minute period. Most of the tests were done on FT8, as it offers the most decoding choices and most stations.

Program Test

First was a test run to compare the decoding variables that WSJT offers. I chose WSJT-X Improved, as its the program I use most of the time.

Decoding



For FT8, you have 3+ decoding levels:

- Fast
- Normal
- Deep
- Deep+ AP

Which one offers the most decoding? What are the tradeoffs between decoding level and time of decoding?

Decoding

FT8, Radio 1 Fast and Radio 2 Fast

Radio 1 had 915 decodes in 5 minutes

Radio 2 had 921 decodes in 5 minutes

Radio 2 had .06% more decodes- virtually identical

This satisfied me that they heard the same thing, and any changes in # decodes was not due to some other variable. All decoding runs were finished before the next period started.

Decoding

Second trial- Radio 1 Fast, Radio 2 Normal

Radio 1- 1080 decodes in 5 minutes

Radio 2- 1249 decodes in 5 minutes

Radio 2 decoded about 16% more transmissions

All decoding periods were finished by the start of the next period.

Decoding

Third Trial- Radio 1 Fast, Radio 2 Deep

Radio 1 decoded 769 stations in 5 minutes

Radio 2 decoded 1013 stations in 5 minutes

Radio 2 decoded 32% more stations.

Deep decoding took more time; it was finished about 1 second into the next period.

Decoding

Fourth Trial- Radio 1 Normal and Radio 2 Deep

Radio 1 decoded 1060 stations in 5 minutes

Radio 2 decoded 1185 stations in 5 minutes

Radio 2 decoded 12% more stations

Deep took longer to decode; decoding wasn't completed until about 1 second into the next period

Decoding

Fifth Trial- Radio 1 Normal, Radio 2 AP Deep

Radio 1 decoded 1233 stations in 5 minutes

Radio 2 decoded 1368 stations in 5 minute

Radio 2 decoded 6% more stations than Radio 1

Deep + AP was not finished decoding until 2 seconds into next period.

Decoding

Sixth Trial- Radio 1 Deep and Radio 2 Deep+AP

Radio 1 decoded 1207 stations in 5 minutes

Radio 2 decoded 1269 stations in 5 minutes

Radio 2 decoded 5% more stations

All decoding was finished before the start of the next period.

Decoding

Summation of Decoding- FT8

Fast vs Normal +16

Fast vs Deep +32

Norm vs Deep +12

Norm vs AP Deep +6

Deep vs AP Deep +5

Recommendation- At a minimum, use Deep. Your decoding should be finished about the start of the next period. If your computer is robust enough, use Deep + AP.

Decoding Summation

R1	R2	R1	R2	% Diff	Comments
Fast	Fast	915	921	+.06%	Finished Rx
Fast	Normal	1080	1249	+16%	Finished Rx
Fast	Deep	769	1013	+32%	Finished +1
Deep	DeepAP	1207	1269	+5%	Finished +2

All of the Fast decodes were finished within the same Rx period; Deep took another second, DeepAP 2 sec. All were for FT8. These were not the same time period.

Program Test

My next test was the decoding ability of 3 of the popular programs: WSJT-X Improved, MSHV, and JTDX. The most current copy of JTDX is from 2022, and there haven't been any updates since then, but it was the best I could do. I wasn't able to get Digirite set up to my satisfaction, so it wasn't included in this test.

Program Test

Using the same methodology, I tested WSJT-X Improved FT8 decoder, with Deep + AP + (Reduce False decodes). I set up the decoders on MSHV and JTDX for the maximum sensitivity that I could delve from their documentation.

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Program Test

All FT8. MSHV and JTDX both finished within the same Rx period; WSJT-X took 2 second longer.

WSJT-X Imp	1019	
MSHV	1046	+2.6%
WSJT-X Impr	1449	
JTDX	1532	+6%

Program Test

Unfortunately, those extra decodes came at a price. Max decodes is not the sole criteria; its maximum USABLE decodes. MSHV would often be decoding 4-5 seconds into the next transmit period. If those decodes came that late, you would have no ability to use the decode data in the most timely manner.

Program Test

Why choose one over the other? They all decode about the same. The JTDX increase was 83 decodes out of a thousand over 5 minutes. I scrutinized the additional decodes, and the additional decodes were mostly stations that were -20dB or less. Usually, I don't call stations that weak, as the chance of a QSO is marginal. But if QSB reduces a station that you're trying to work to that level, JTDX may dig it out better than WSJT.

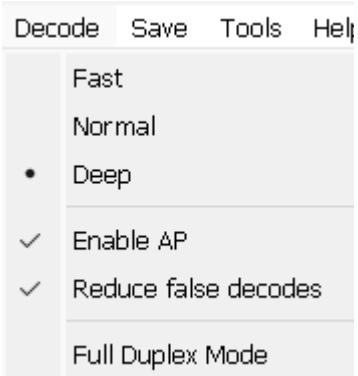
Program Test

Why choose one over the other? They all decode about the same. The MSHV increase was 27 decodes out of a thousand over 5 minutes. I scrutinized the additional decodes, and could find no rhyme or reason why they decoded on MSHV but not on WSJT 2.8.

Program Test

Conclusions:

I have a strong computer that can handle the decoding workload, so I would operate using the Deep+AP decoding setting, plus checking the “Reduce false decodes” box. If your computer isn’t as capable, I would stick to “Deep”.



Decoding

UTC	dB	DT	Freq		Message
142100	-6	0.2	1730	~	R9JAU DG2LMW JO61
142100	-5	0.2	468	~	CQ KD4EBL FM18 ITU Zone 8
142116	Tx		2644	~	DB2OO <...>
142117	Tx		1887	~	
142130	-5	0.2	1887	~	KD5BS VE4TM EN19
142215	Tx		1887	~	VE4TM W1UE FN41
142245	Tx		1887	~	VE4TM W1UE FN41
142230	-19	0.1	1449	~	W1UE 0Y2DFC/R PP63 ? a2
142315	Tx		1887	~	VE4TM W1UE FN41

Hazards of using AP- the dreaded “false decode”. Who has heard of an 0Y2DFC/R call? Or Grid PP63? That grid exists, in Siberia, and I doubt the Russians would approve a 0Y2 prefix there. If its an unrecognizable call to you, its probably bad.

Decoding

FT4 Trial

There are only three choices for FT4 decoding-

Fast

Normal

Deep

So I set up 2 trials.

Decoding

FT4 Trial 1- Radio 1 Fast, Radio 2 Deep

Radio 1 decoded 238 stations in 5 minutes

Radio 2 decoded 377 stations in 5 minute

Radio 2 decoded ~37% more stations

All decoding was completed before the start of the next period.

Decoding

FT4 Trial 2- Radio 1 Norm, Radio 2 Deep

Radio 1 decoded 275 stations in 5 minutes

Radio 2 decoded 311 stations in 5 minute

Radio 2 decoded ~12% more stations

All decoding was completed before the start of the next period.

Decoding

Summation of Decoding Tests- FT4

First choice would be Deep.

Second choice would be Normal.

I would tray to avoid using Fast. Too many decodes not made.

If you are consistently running into a situation where decoding is NOT finished before the next period on FT4, perhaps a stronger computer is in order.

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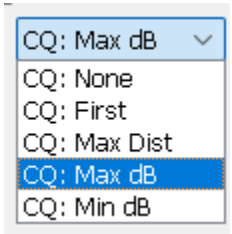
Dxpedition of the Year for last year!

I was a remote op for the Dxpedition, and finished just short of 10K QSOs, all FT. I learned a number of things about operations at high rates (mostly using Super Fox, but still applicable to contest operations.

Specifically, what calling station has the highest probability of completing a Q with the minimum number of cycles?

Our goal as contesters is to make as many QSOs as possible, working as many mults as we can in the process.

The quicker one makes a QSO, the more QSOs one can make. Set the automated QSO selector to MAX DB.



First Factor:

How strong are they to you? If they are strong to you, you are most likely strong to them. If you call CQ, and you get 3 answers, the strongest one is the most likely one to complete a Q with the minimum cycles. A -17dB station might be a new mult, but you may have to struggle to make a Q with him. But if its 3 DL stations that called, replying to the strongest will produce the most efficient Q.

Second Factor:

How recently they called you. I think everyone has called CQ and received 3-4 answers. Whomever you choose to work first, they will almost always reply. After they are worked, if you go to your second choice, they will often reply. After they are worked, and you go to your third choice, they will seldom reply. They've gone to work someone else.

How does the second factor fit into your operation?

If your #3 choice hasn't called you an additional time while you worked the first 2 guys, don't waste your time calling him. He's most likely not going to be there. Call CQ instead. However, if he's called you again while you're working the first two guys, he's reset his call number to 1 and he should be called.

Second Factor:

How recently they called you. I think everyone has called CQ and received 3-4 answers. Whomever you choose to work first, they will almost always reply. After they are worked, if you go to your second choice, they will often reply. After they are worked, and you go to your third choice, they will seldom reply. They've gone to work someone else. So how recently they called you is the second factor.

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Contest Setup

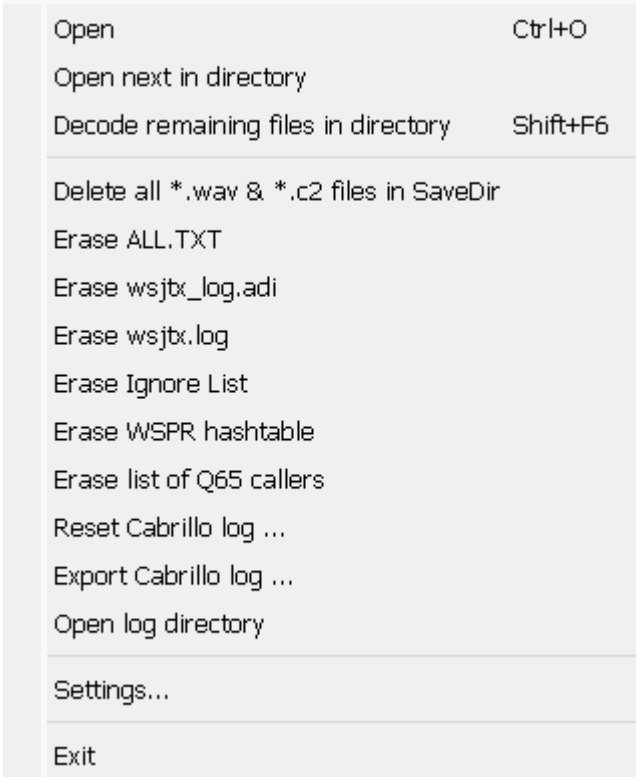
Erase (or rename) ALL.TXT

Erase (or rename) wsjtx_log.adi

Reset Cabrillo log

The adi file directly determines what colors WSJT chooses for the calls.

We want to start with empty logs.



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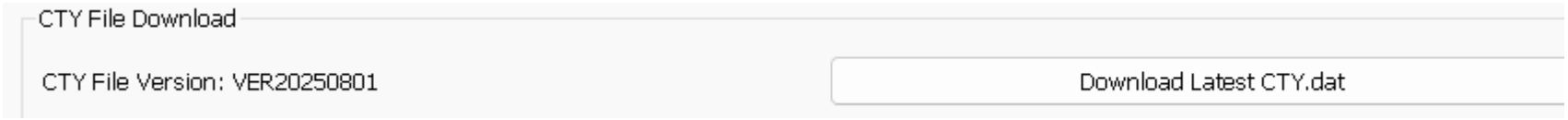
Contest Setup

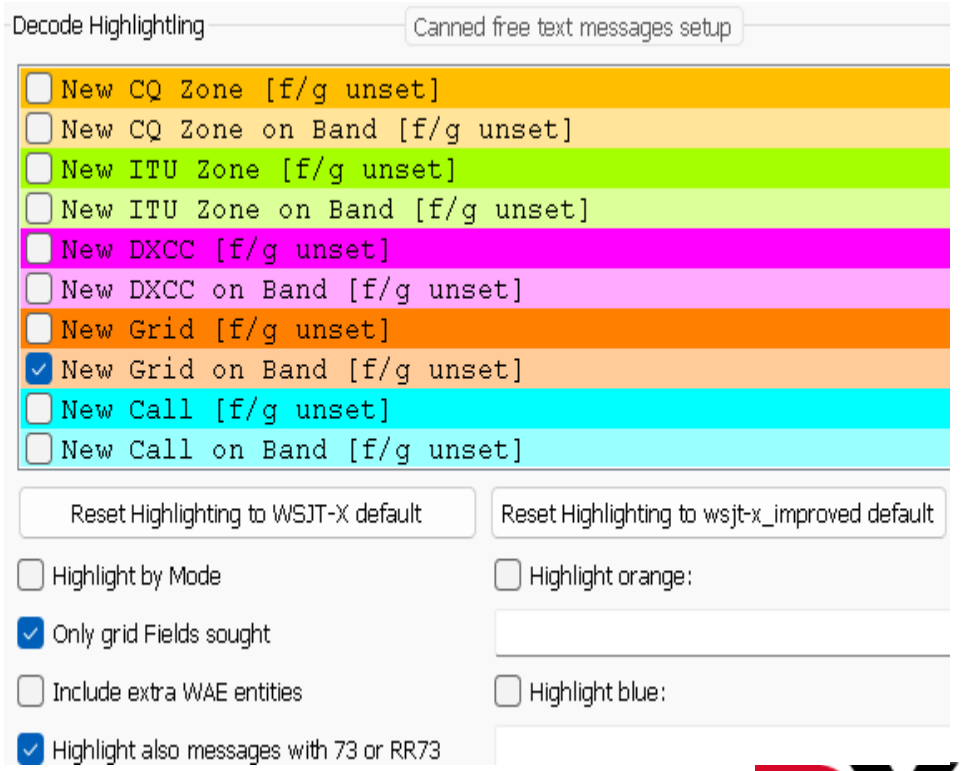
Download the latest country file. Click on it and the CTY file version number should change.



Contest Setup

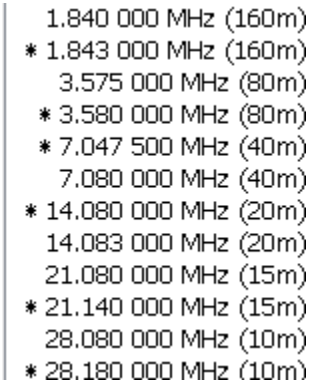
Choose appropriate colors for the contest multipliers. For WW-Digi, you want “New Grid on Band” and also check the “Only Grid Fields Sought”.

“Highlight also messages with 73 or RR73 should be checked so that you can “tail end” more efficiently.



Contest Setup

Set up frequency window. It should look like this:



The starred entries are the frequencies that

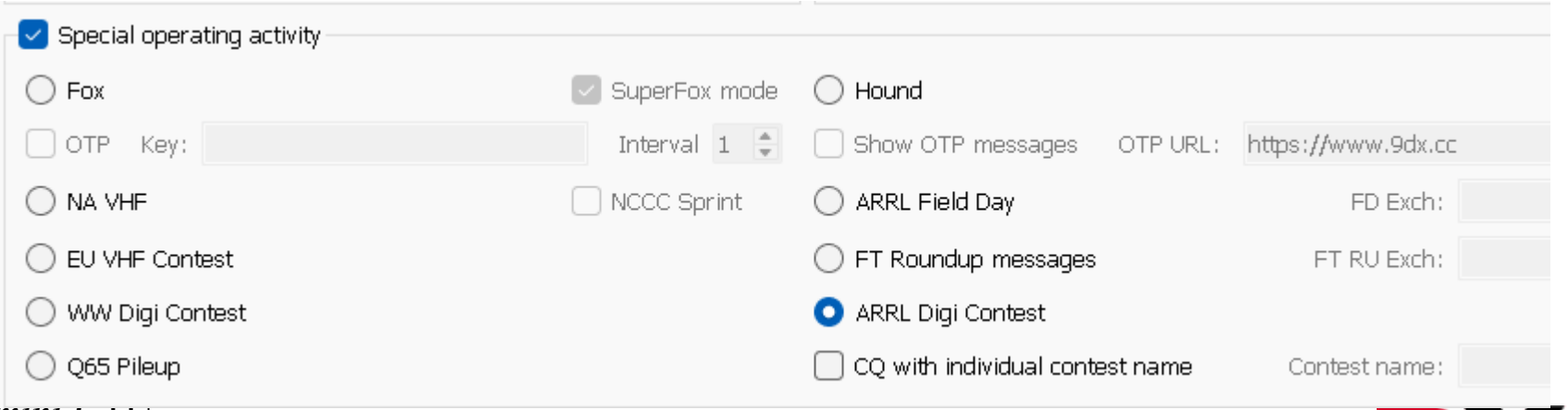
WSJT will go to first when changing bands.

If you would like, I can send you a file to effect this.

Contest Setup

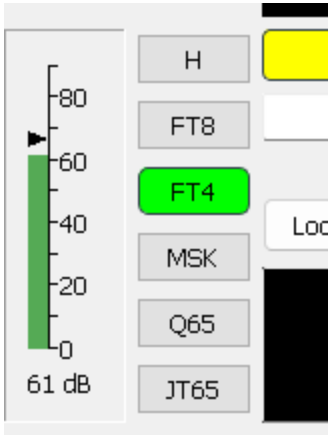
Advanced- Special Operating Activity

Check “Special operating Activity” then the contest. If you want to call “CQ WW” for WW-Digi, click on the CQ with individual contest name and fill in the contest name (4 char max)



Contest Setup

You don't have to go back to this window to toggle the contest mode. You can do it by right-clicking the "FT8" button on the main screen.



Interfacing with N1MM+

WSJT-X will nicely interface with N1MM+. It does take a bit to get it going, however, and you should not wait until the contest is here to do it. When you do interface it, N1MM+ will keep track of your mults, keep track of your rate, and incorporate telnet spots into the FT spots.

The recently revised “Available Mults & Qs” window can also assist in finding mults.

Working a contest

Don’t think of the bands as 20, 40, 80.

Think of each band as 8 bands. For 15m this is:

FT4 140 Even	FT4 140 Odd
FT4 80 Even	FT4 80 Odd
FT8 74 Even	FT8 74 Odd
FT8 90 Even	FT8 90 Odd

Working a contest

Systematically check each band segment as you tune.

It is often easier to make Qs on the non-waterhole frequencies. Fewer stations, less competition.

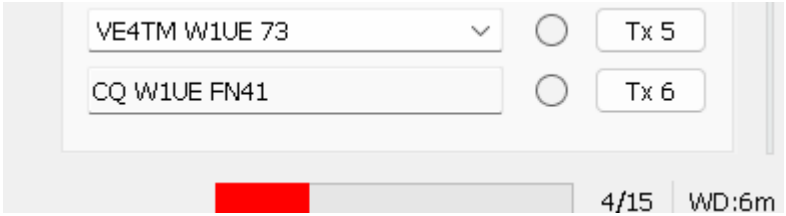
You will find more multipliers on FT8 than FT4.

There are more stations to work on FT8.

FT8 operations will go on all night; FT4 not so much.

Timing

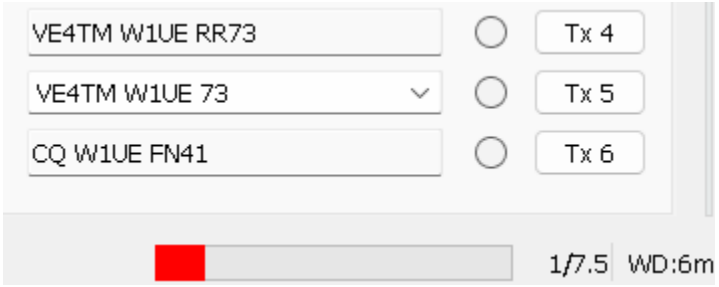
You can change a transmission contents after it has begun, but it has to be done quickly. For FT8 you can change the transmission:



If you wait longer than 4 second, the old transmission will be sent or you will garble the transmission and have to resent it.

Timing

You can change a transmission contents after it has begun, but it has to be done quickly. For FT4, realistically, you have one second to change the message:



Wait any longer, and either the original message or a garbled message is sent.

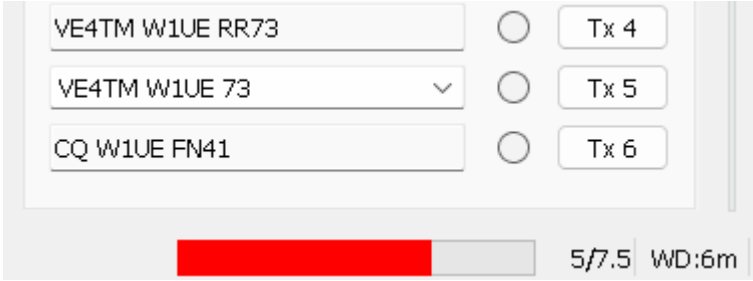
Timing

There is a point where you can change messages without fear of sending a garbled or incorrect message.

For FT8, it is the 10 second mark. Whatever message you selected will be the next message sent.

Timing

There is a point where you can change messages without fear of sending a garbled or incorrect message.



For FT4, it is the 5 second mark. Whatever message you have now selected will be the next message sent.

Timing

Why the end mouse clicks? I'm doing many mouse clicks during normal operation. This gives me an opportunity to spread out my mouse clicks and make sure they get done in a timely manner.

FT4 vs FT8

2024 WW-Digi Contest:

A sampling of five of the top scorers that reported the numbers:

83% of the QSOs were FT8

17% of the QSOs were FT4

There are many, many stations that are on FT8 that never show on FT4. There are many multipliers that show up on FT8 that never show up on FT4.

FT4 vs FT8

The faster rates on FT4 are there while the ops are there, but as the day grows into night and ops scratch for Qs, FT8 is where the action will be.

Don’t ignore FT4, but FT8 is where the bulk of the Qs are made.

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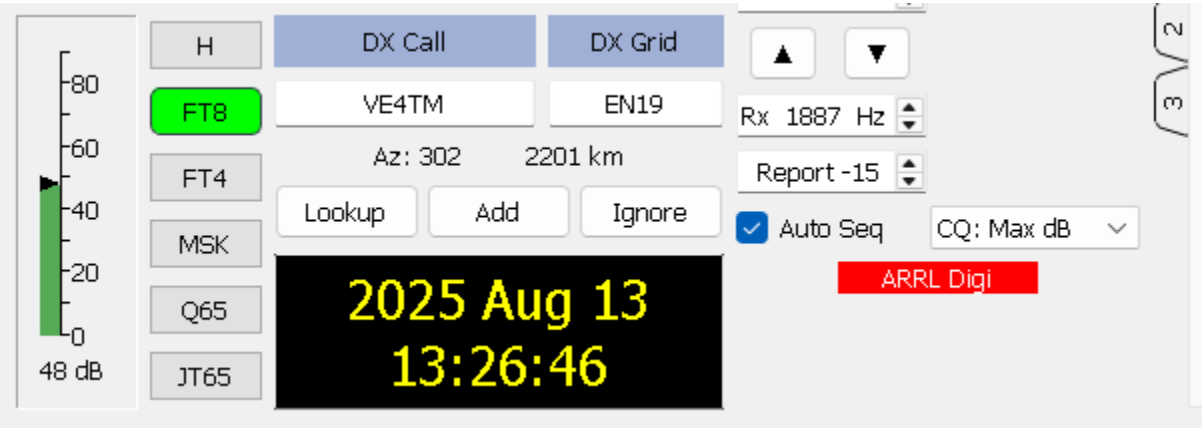
Toggle Contest mode

Setup the contest and activate it under the Advanced tab.

To toggle into/out of contest mode, right click the FT8 button.

Good for working stations that need the normal exchange.

I will use this many times during WW-Digi.



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Auto Reply

Auto Reply saves much of the quick clicking. When you call CQ, it picks the one that corresponds to your selection.

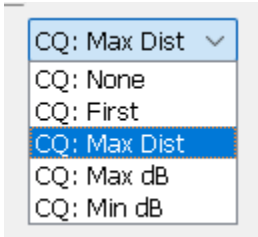
None- No Replies

First- First Reply

Max Dist- furthest away, based on grids

Max dB- strongest signal

Min dB- weakest signal



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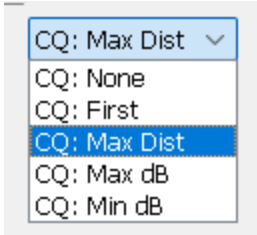
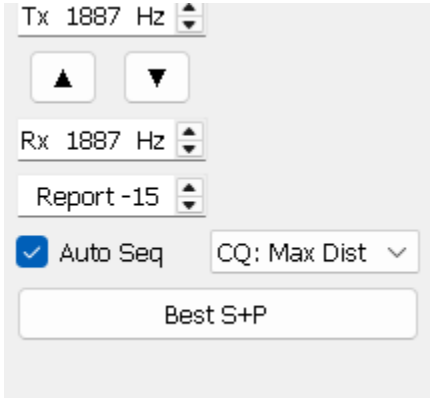
Auto Reply

Max Dist can also be used to screen out stations replying to your CQ that aren't sending their grid squares. Since the points are determined by the distance between the middle of Grid Squares, if you work someone and can't get their Grid, you get 1 point for the QSO. Since Mults are determined by the Grid, he can also never be a mult. Max Dist is a nice tool to have.



Best S&P

Best S&P was only available with FT4. It was a concept that was never really implemented, so it doesn't work. Don't bother trying to get it to work.



Logging

WSJT offers logging abilities. For a contest, you have several options:

ADIF Files

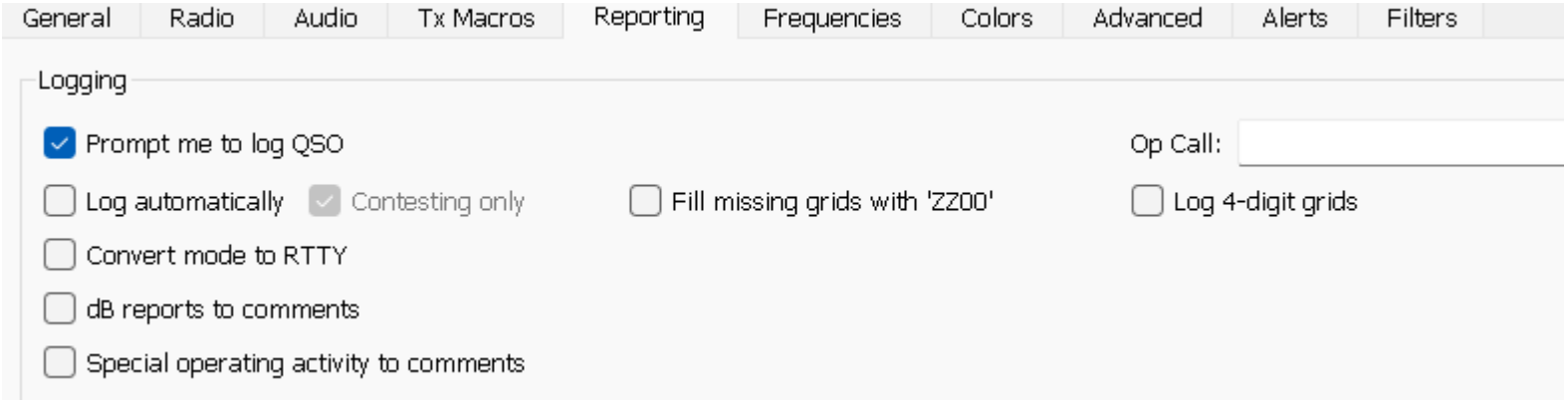
Cabrillo Files

Contest Files

Automatic Logging

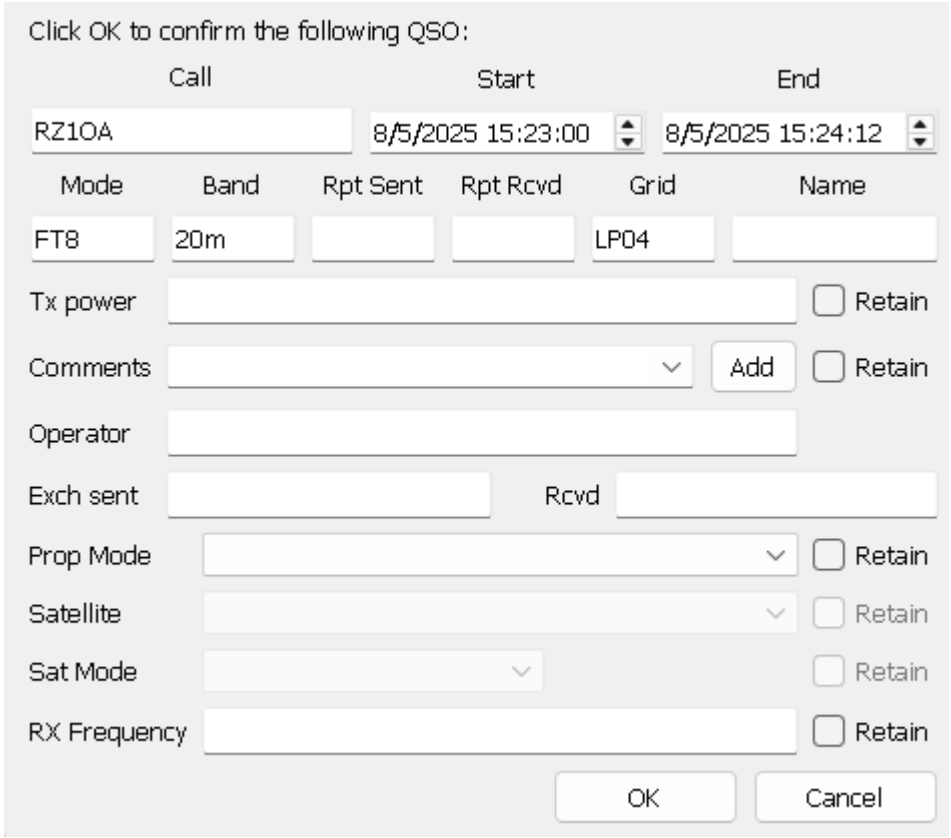
Logging Window

Logging



I don't use the automatic logging; I've found it will miss too many completed Qs. When that Logging Window pulls up and I click the "OK" button, I know the Q has been logged

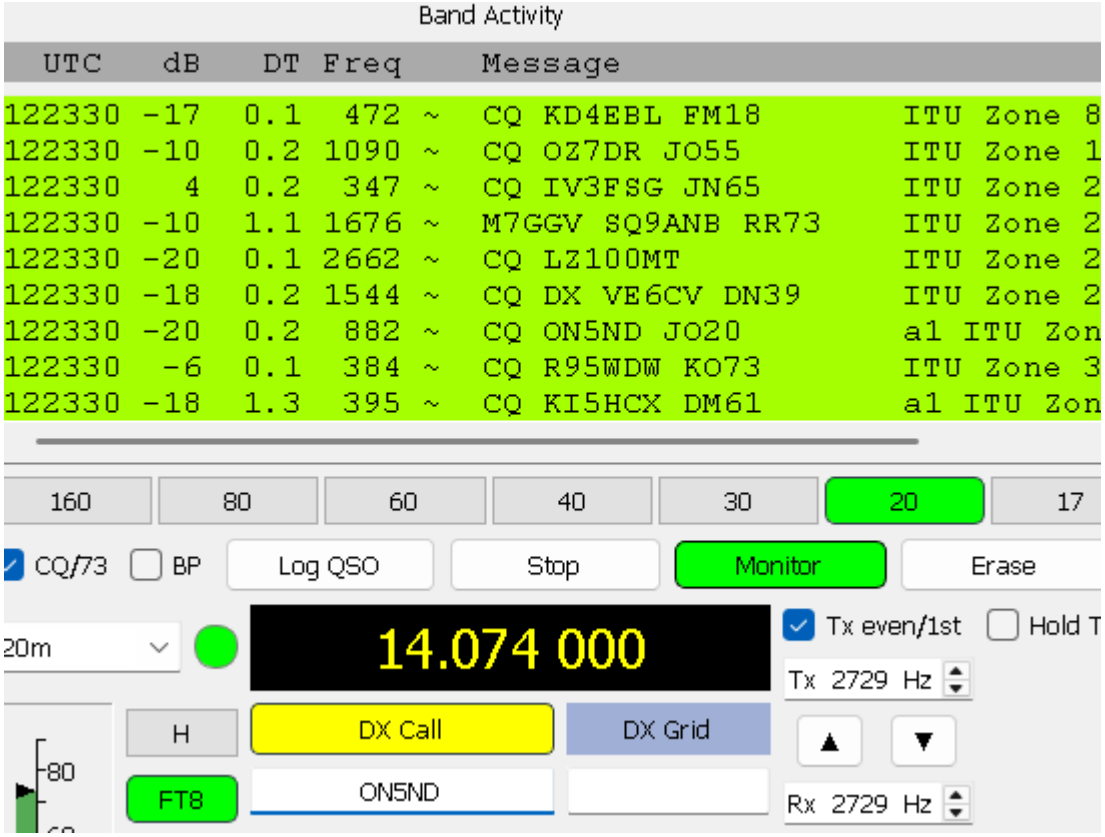
Logging



By bringing up this window, I get one last chance to make sure the data I need will be in the log. For some reason, this Q did not get the signal reports; if the contest requires them, I can look through the immediate log and perhaps find them. This works especially well on Qs that are missing a required Grid; its quicker to find it now than to try and find it later.

Logging

Sometimes you will see that a call and DX Grid got separated. In the Band Activity Window, you can see that ON5ND has the Grid JO20. You can freely add the Grid to the QSO either here or on the Logging Window. Nothing says it has to flow perfectly through the program!



Logging

Every contest, there are a number of Qs that are “fractured”- you send your report, he doesn’t reply, you send your report, he doesn’t reply, so you go on to work the next station. Suddenly, you get an RR73 from that station. That is a legitimate Q, but you’ll have to add it to the log manually. Automatic Logging won’t work in this case.

Reducing Nils

Typical contests have NILs (Not-In-Log) of 1-1.5%

FT contests have NILs of 4-6%

How can they be reduced?

Reducing Nils

1. Manually invoke the RR73 message, using Fkeys/mouse

2. Look for a clue that your message wasn't received, such as their sending their report again.

3. Always log the Q when you receive an RR

4. Always log the Q when you send an RR

5. If he still doesn't get your RR, try changing your Xmit freq. He might not be hearing you on the original one.

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Upcoming FT Contests

Every Thursday- NCCC NS FT4 Sprint

WW-Digi Aug 30-31

RSGB FT4 Sept 15, Oct 27, Nov 17, Dec 15

FT Challenge Dec 6-7

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