Field Day Computer Skills

Getting the most out of your gear

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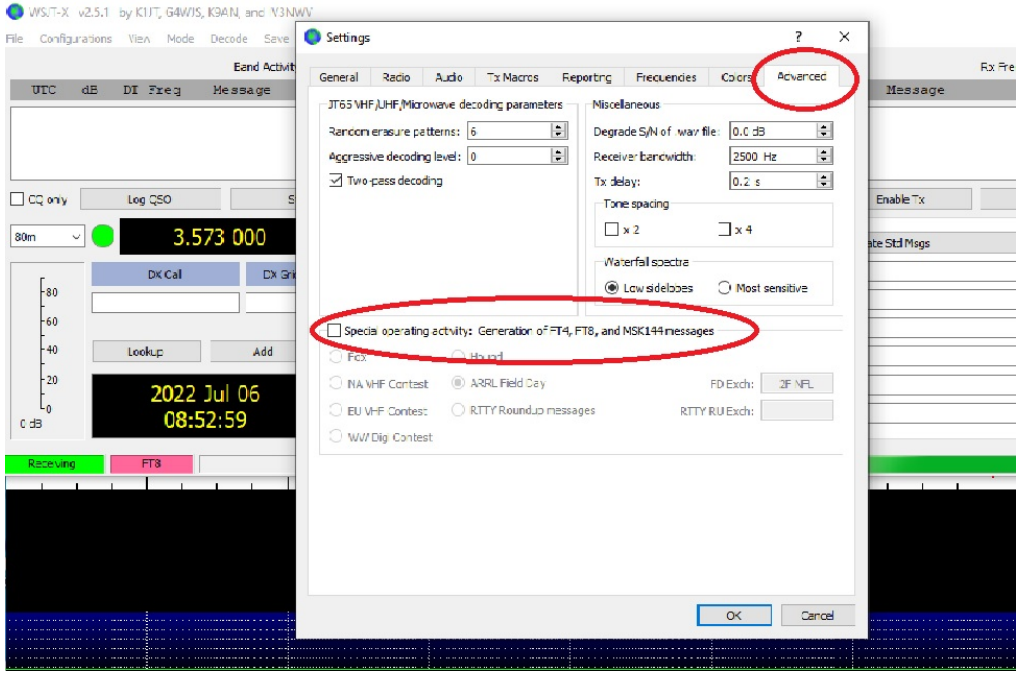
1. Field Day Exchange
2. WSJT-X talk to N3FJP (log)
3. N3FJP accept from WSJT-X
4. Your computer connected to WIFI from MESH system
5. N3FJP connected to Logging Computer
6. How to synch the time?
7. How to set the modulation level?

1. Field Day Exchange

- Normal FT8 – exchanges grid location etc. for DX'ers
- Field Day – different exchange!! Class/Category & Section
- (Field Day isn't the only contest! There are lots of them.)

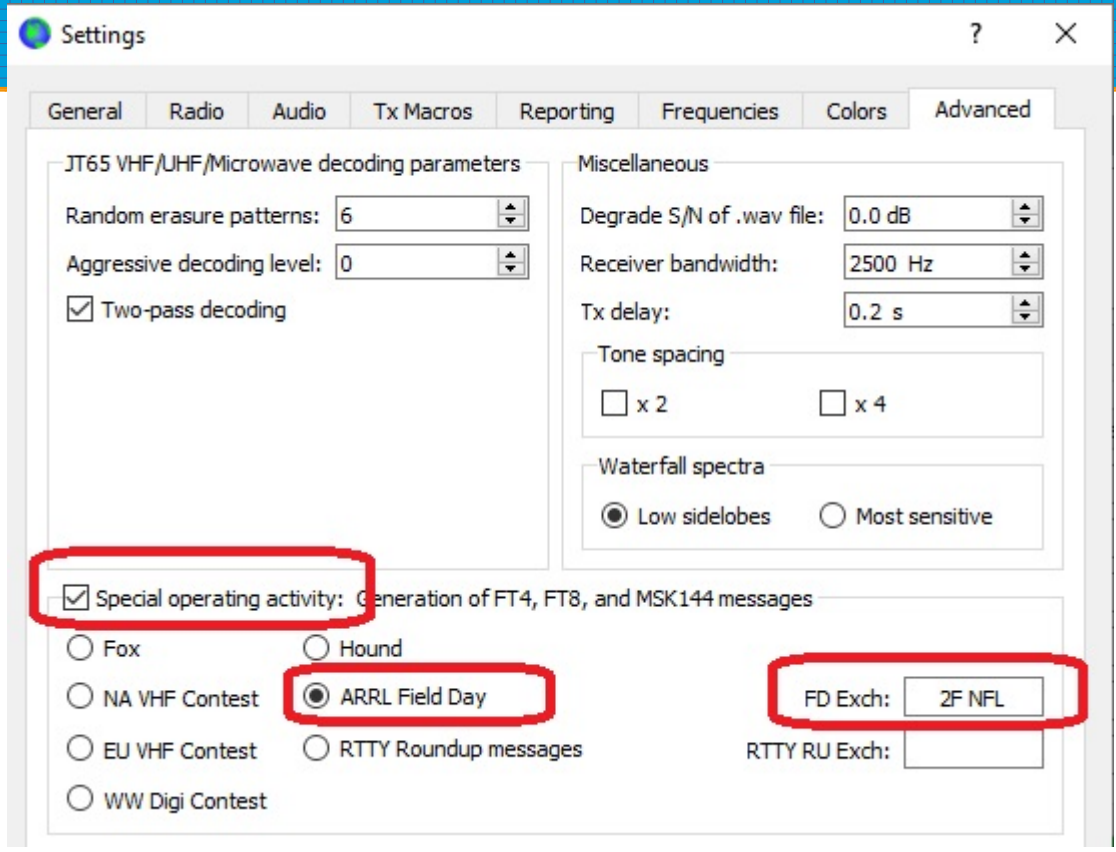
Putting WSJT-X into Field Day Mode

- WSJT-X can automatically generate and auto-sequence a QSO
- Field Day Exchange is DIFFERENT from normal everyday QSO exchange
- File | Settings | Advanced lets you tell WSJT-X that you're in FIELD DAY
- Click on "Special Operating Activity"



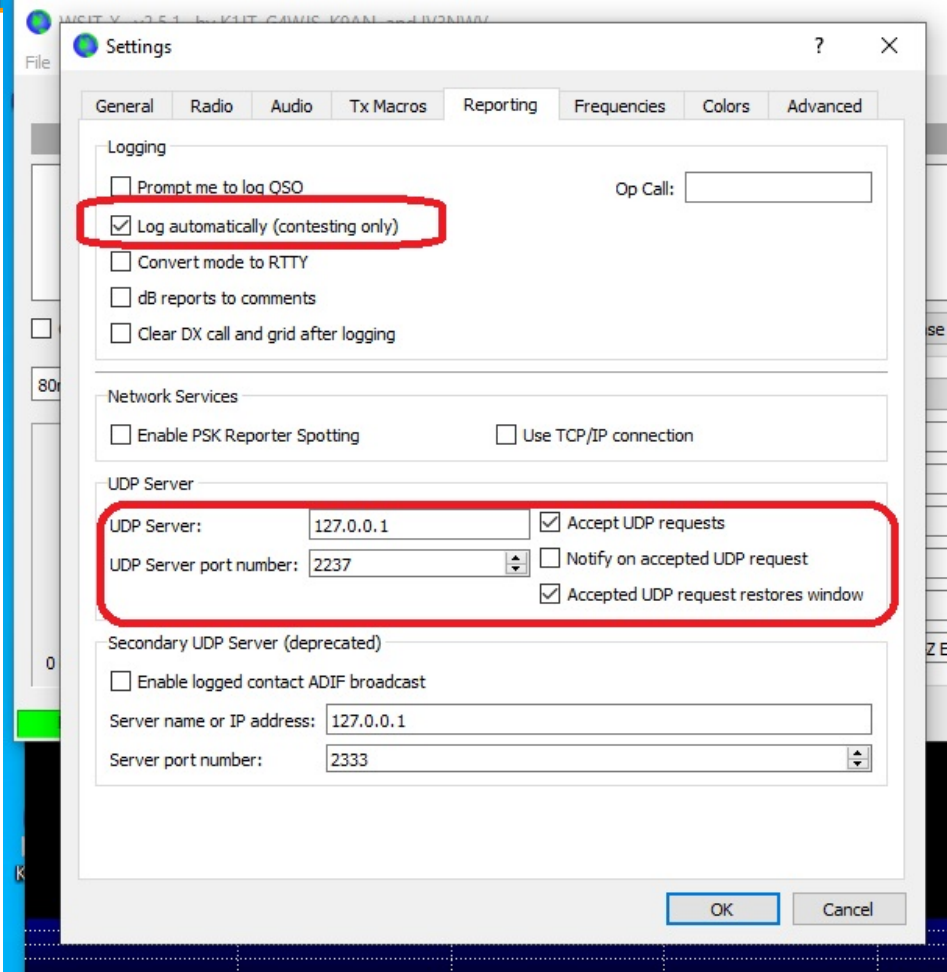
Pick Your Contest

- WSJT-X is capable of auto-generating the “exchange“ for many contests – you must tell it you are in in FIELD DAY, and what your “exchange“ is.
- Now that you know how to do this, you can check out OTHER Contests, or Fox/Hound escapades, etc!!



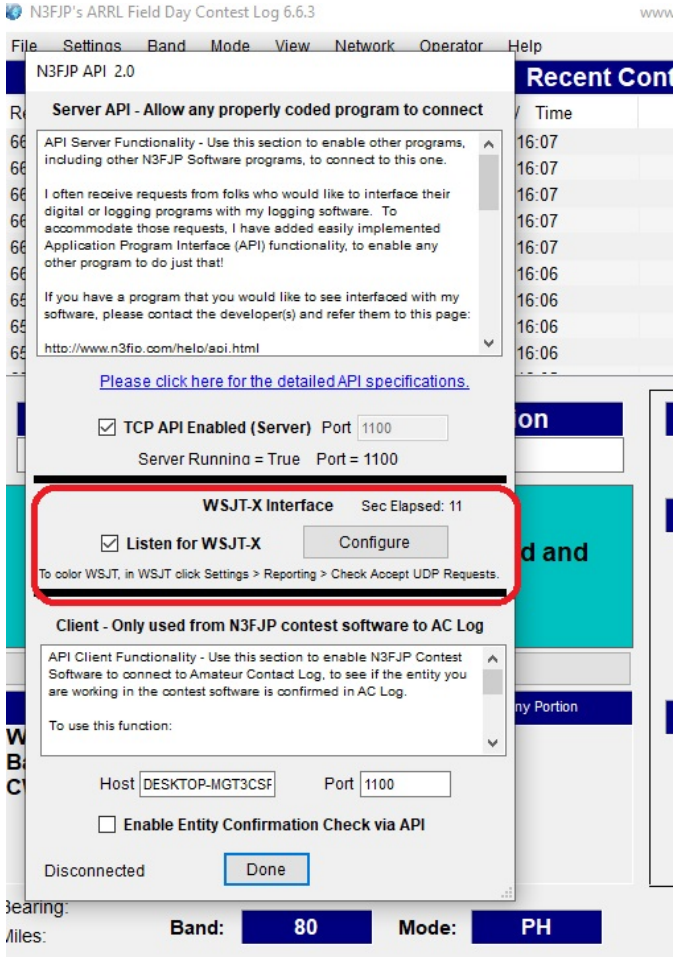
2. WSJT-X must talk to N3FJP Logging

- FILE | Settings
- REPORTING tab
- 1. LOG AUTOMATICALLY
- 2. Click to enable UDP type packet requests
  - Default UDP server: 127.0.0.1 (yourself)
  - Port Number: 2237 (N3FJP port)



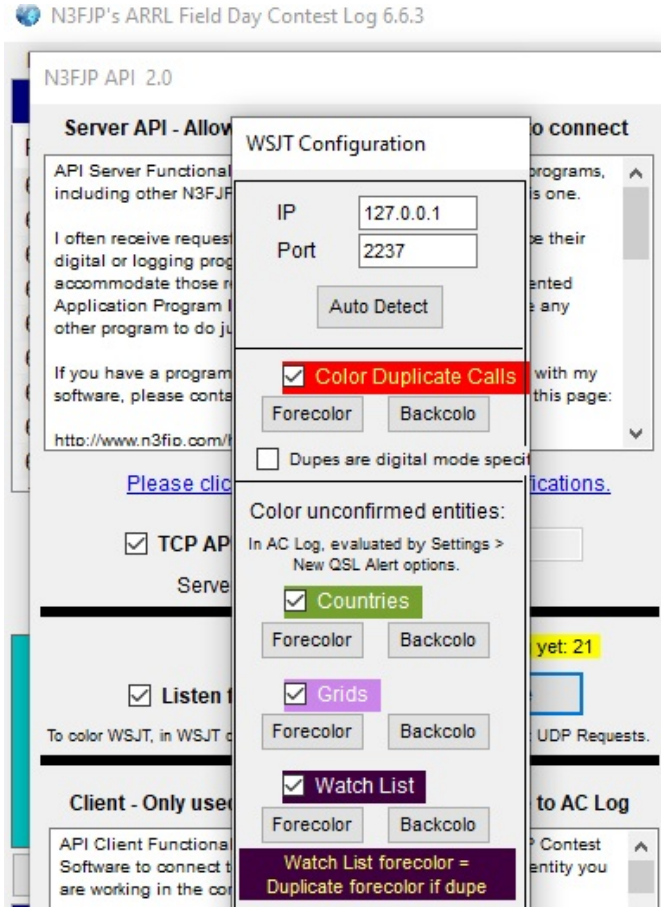
3. N3FJP Logging must accept input from WSJT-X (FT8)

- Settings | Application Program Interface (API)
- Click to allow WSJT connection
- Watch for a “message“ to flash if you wish
- Click DONE



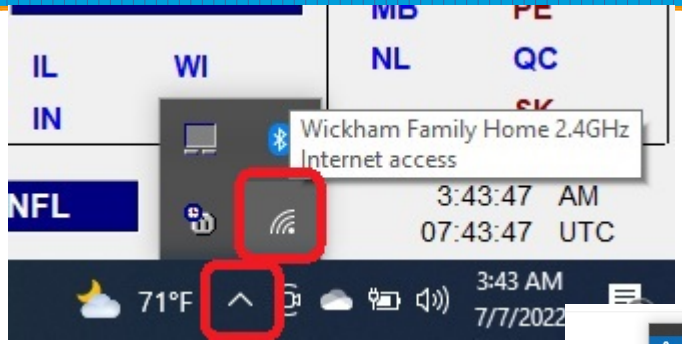
Additional “Configuration“ usually unnecessary

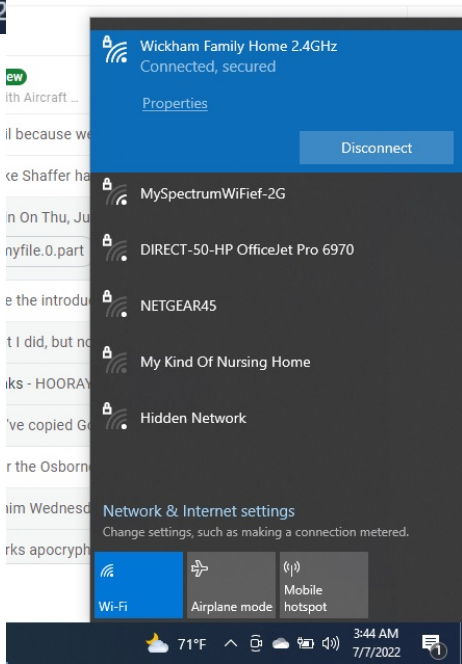
- Port 2237 default
- Duplicate stations show in RED
- I never touched this.



4. Your Computer on our Network!

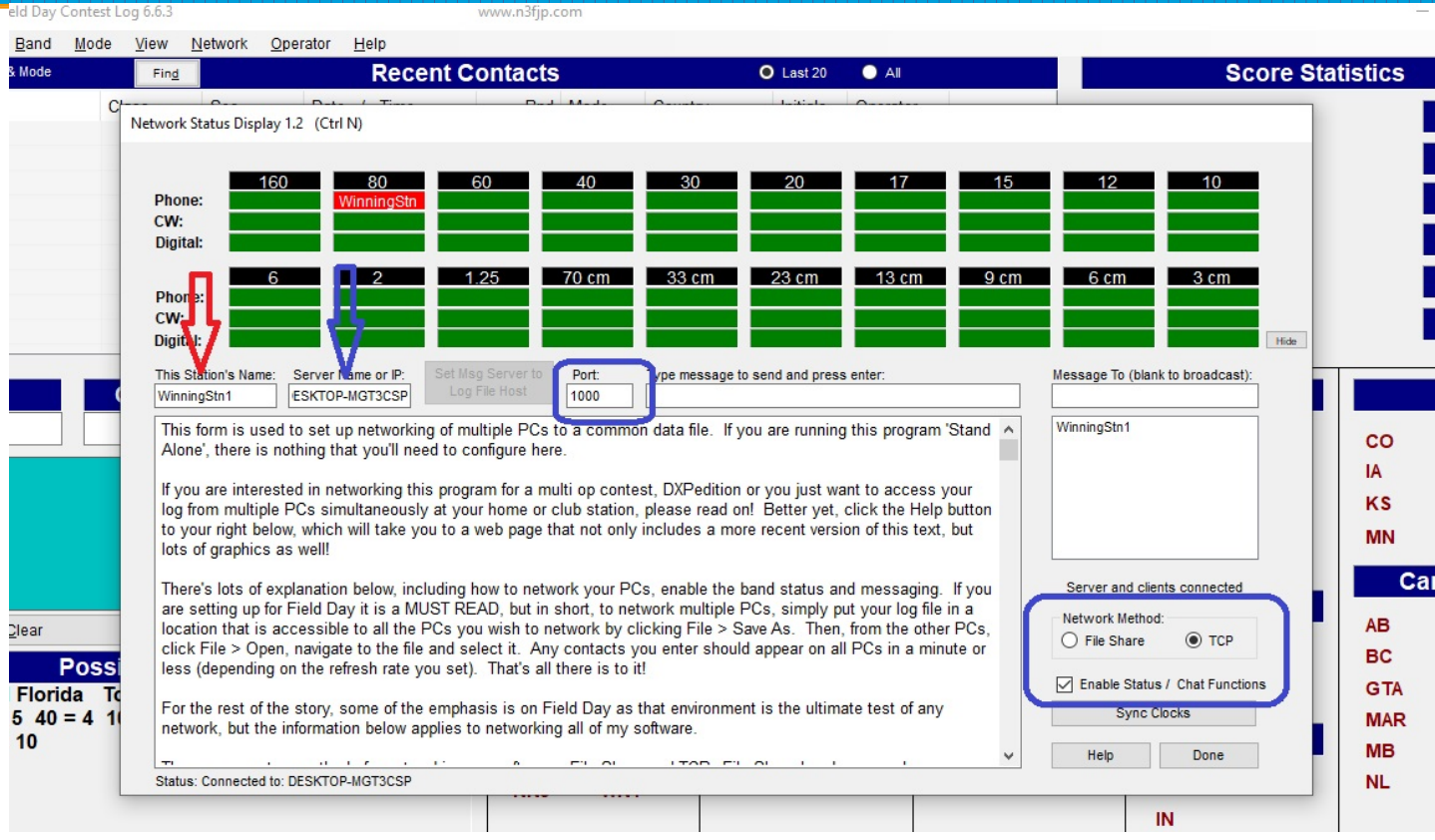
- Sometimes the WIFI icon gets hidden from the bottom SYSTEM TRAY, inside a hidden area.
- Accessed by clicking the ^ icon on the SYSTEM TRAY (bottom of screen)
- You can click the WIFI icon and drag it back to show up on the SYSTEM TRAY if you wish.
- Pick the desired network and provide any password requested. Ours were “TENDA002“ and “TENDA006“ at the ends of our mesh network.
- WIFI PASSWORDS were NF4RC**FD





5. N3FJP connected to the Logging Computer

- Click **NETWORK** on top menu.
- (Previously Unknown) You can NAME your Station! E.g. STN#1, STN #2 etc! (Would have helped!!!)
- **IP Number for Logging Computer** (avoids DNS/other problems)
- Port: 1000 (default)
- **TCP networking, Enable Status/Chat**.



Working on networking problems

- Entire file apparently being transferred to EVERY computer after EVERY new contact –
- Most client computers at the GRASSY FIELD – other end of the mesh from the LOGGING COMPUTER
- Huge network pile-up.
- We'll fix!

6. How to set the Computer **Time**?

- Normally FT8/other users synchronize to world-wide Network Time Protocol (NTP) servers.
- Lots of software out there to accomplish this; we like DIMENSIONS 4.5 better than internal Windows time synchronization.
- REQUIRES INTERNET ACCESS
- Our Field Day Mesh Network is AIR-GAPPED – not connected to the Internet AT ALL. (Handy simulation of being in a disaster, eh?)
- Troublesome to disconnect from mesh; connect to cell-phone HOTSPOT; **must remember to reconnect to mesh system or logging no longer works!**

Synchronizing Computer Time

- Laptop computers do not have atomic time clocks inside and can't synchronize to 60Hz power system...they will slightly DRIFT during a day like a cheap wristwatch.
- How accurate is required for FT8 / FT4??
  - Not that picky – 1 second accuracy
  - Radio is not INFINITELY FAST!! Signals actually take TIME to get to you – so received signals may be slightly "late" compared to world-wide time server predictions. Hence the slop allowed in the FT8 protocol!
- Can you tell when signals **aren't decoded**?
  - ***You don't get any decodes***, or perhaps a green bar on some signals???
  - DT entried are trending to a second more more on the ones that do decode (you're way off!)
  - RARE unless your computer has been unused for a day or more. But POSSIBLE

Techniques for Synchronizing Clock

- **Overview Document on Syncing:**
  https://www.dxzone.com/how-to-sync-your-computer-clock/
- **1. Normal Home Technique:** Access to NTP (network time protocol) servers (internet access)
- **2. $15 Easiest Deployed Technique:** **GPS computer on one or more computers** (synch individually or activate NTP server on one computer that is synch'ed and use IT as our NTP server for all our Dimension 4's
- **3. Free-but-tricky-Manual:** Time synch your computer manually using manual time update and watching your cell phone (requires good hand-eye coordination)
- **4. Free Cool Solution:** **JTSync** & JS8 – can auto synch to incoming JS8 signals [not certain if it updates internal clock?]
- **5. Fancy Network Solution**: *Our own Windows 10 NTP Server*, GPS synced. Easy once done!

GPS Dongle

- VK-162 GPS
- Requires driver to be loaded. Easiest for Windows.
- https://www.amazon.com/Navigation-External-Receiver-Raspberry-Geekstory/dp/B078Y52FGQ

GPS Dongle

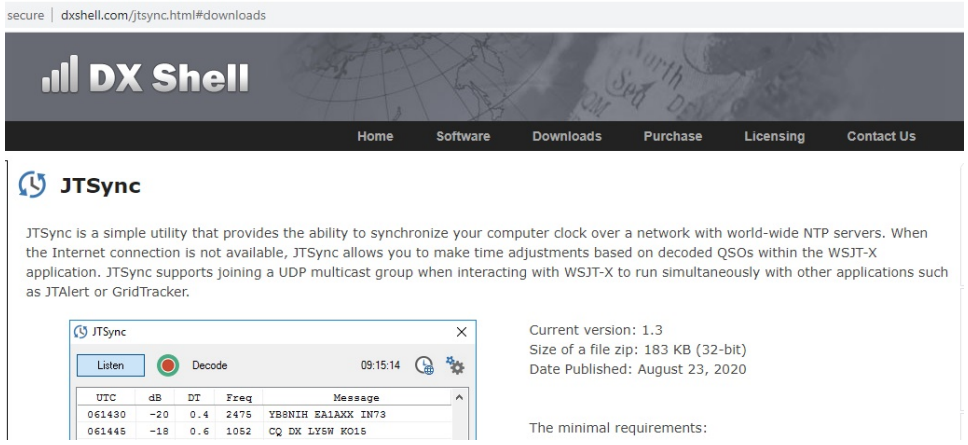
- VK-172 GPS Dongle
- $14
- These dongles could be installed on computers doing FT8...or on ONE computer that activates NTP Server and provides time services to remainder of deployment.

JTSync – A Simple Solution!!

- **Synch without even a GPS**
- Great Explanatory Page:

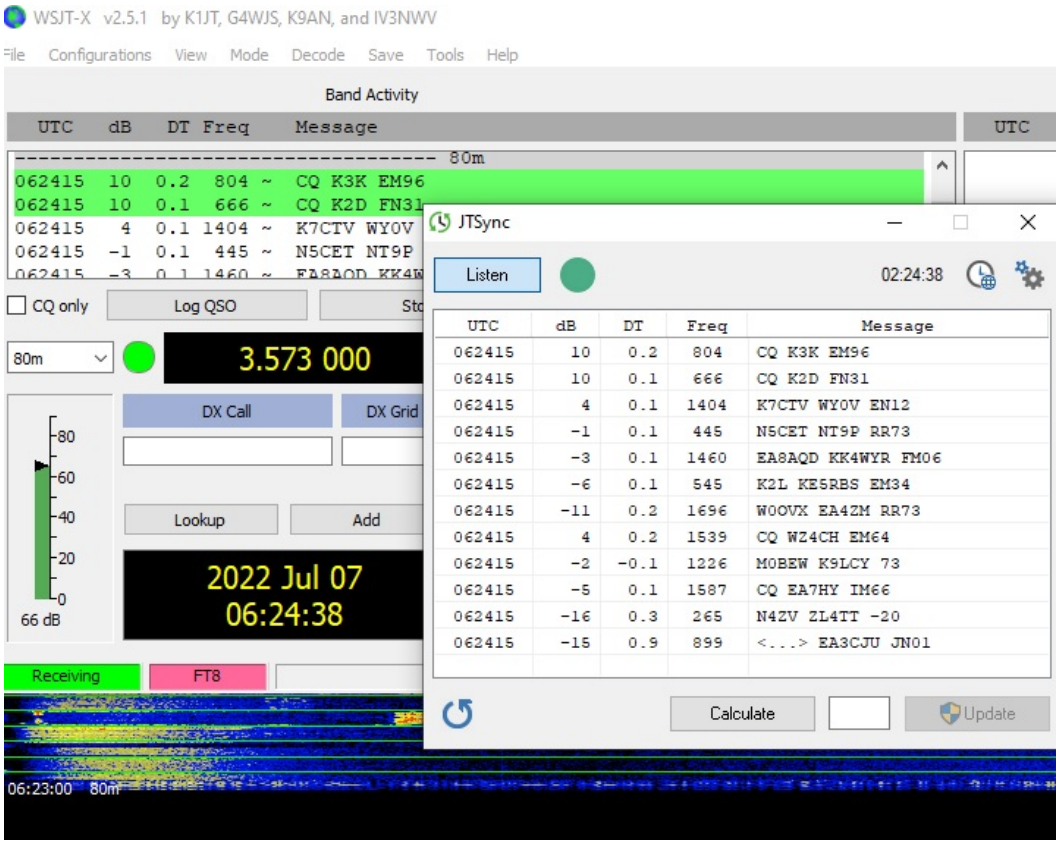
  http://www.dxshell.com/jtsync.html#downloads
- 64-bit Windows Version w/Installer:

  http://www.dxshell.com/downloads/JTSyncSetup64.zip



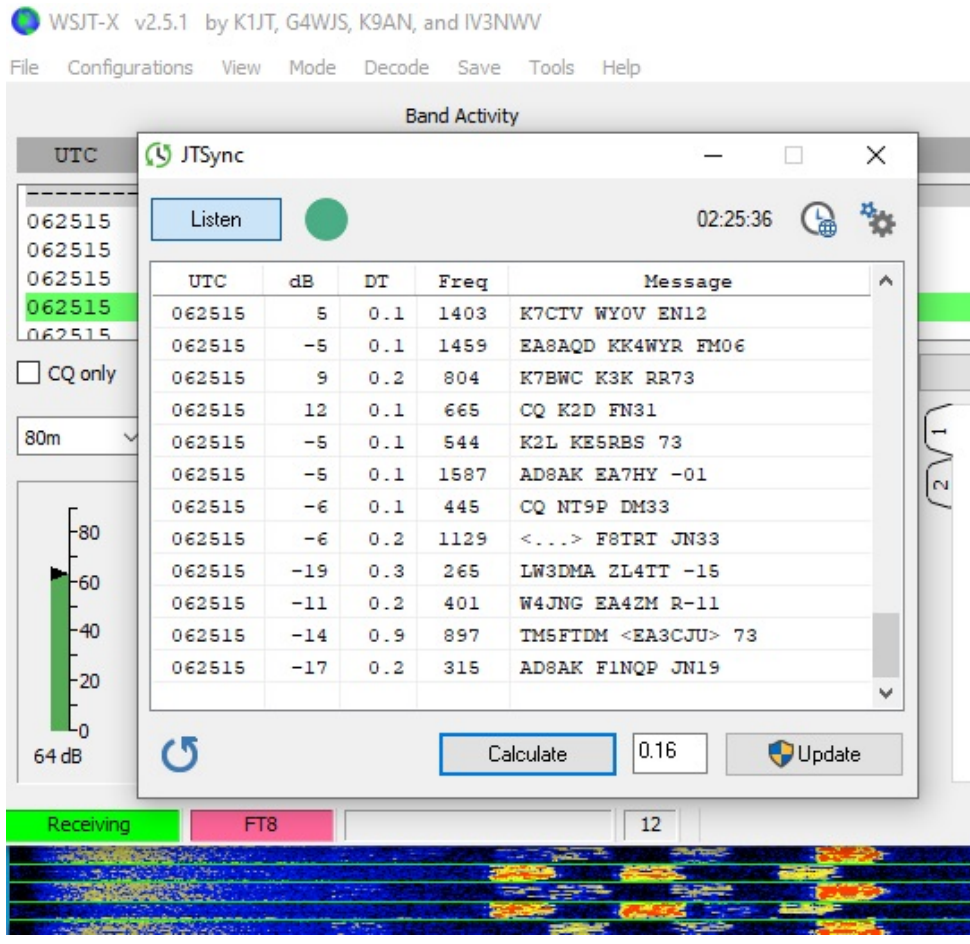
JTSynch: Introduction

- Runs at same time as WSJT-X (FT8) – Click “LISTEN“ and it displays decodes.
- Click CALCULATE and it gives your average time error.
- (Not needed after you’re happy)



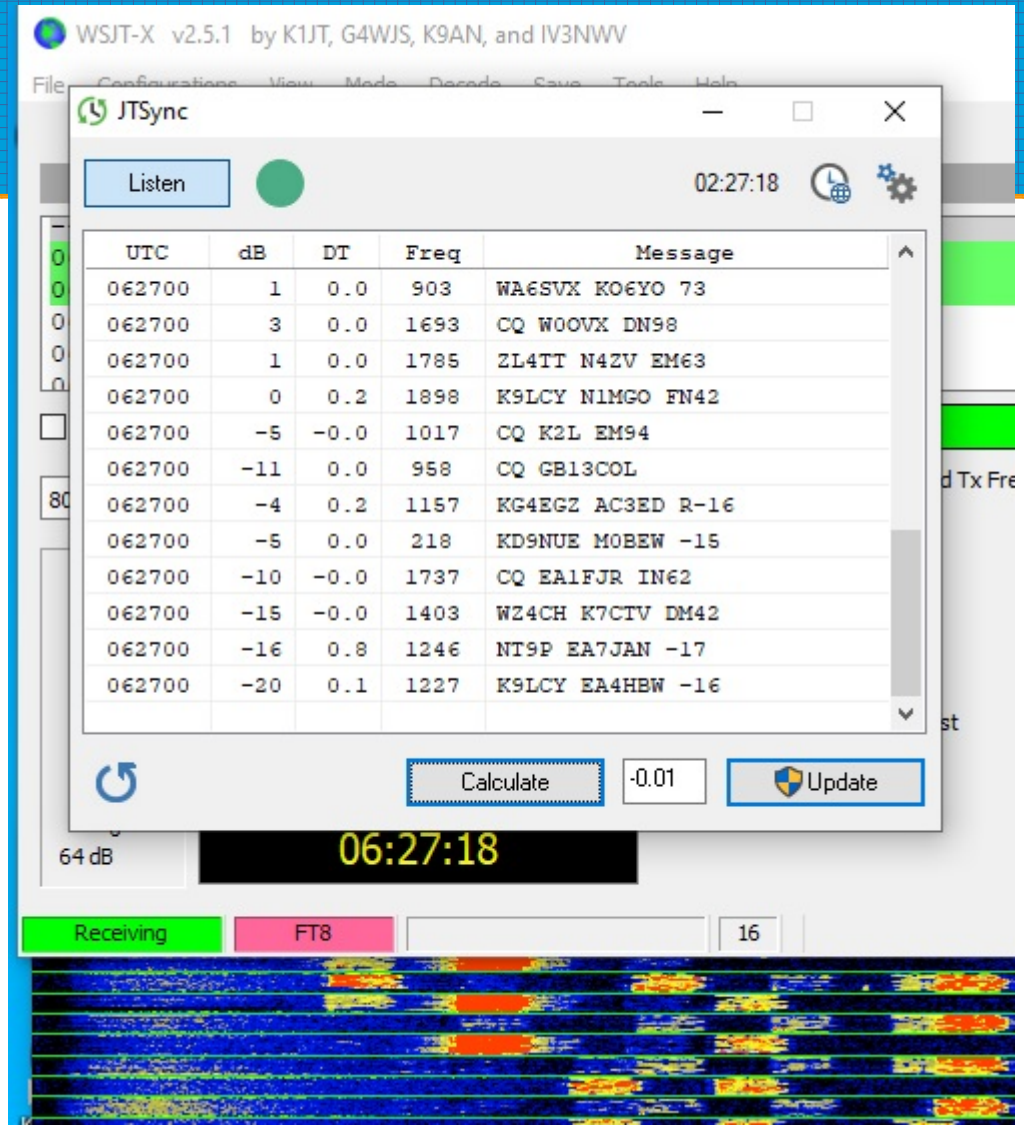
Computes Average Error

- My computer was 0.16 seconds off on average…
- **Click “Update“ and it resets your computer time!**



Fixed!

- Once updated, my numbers were perfect again.

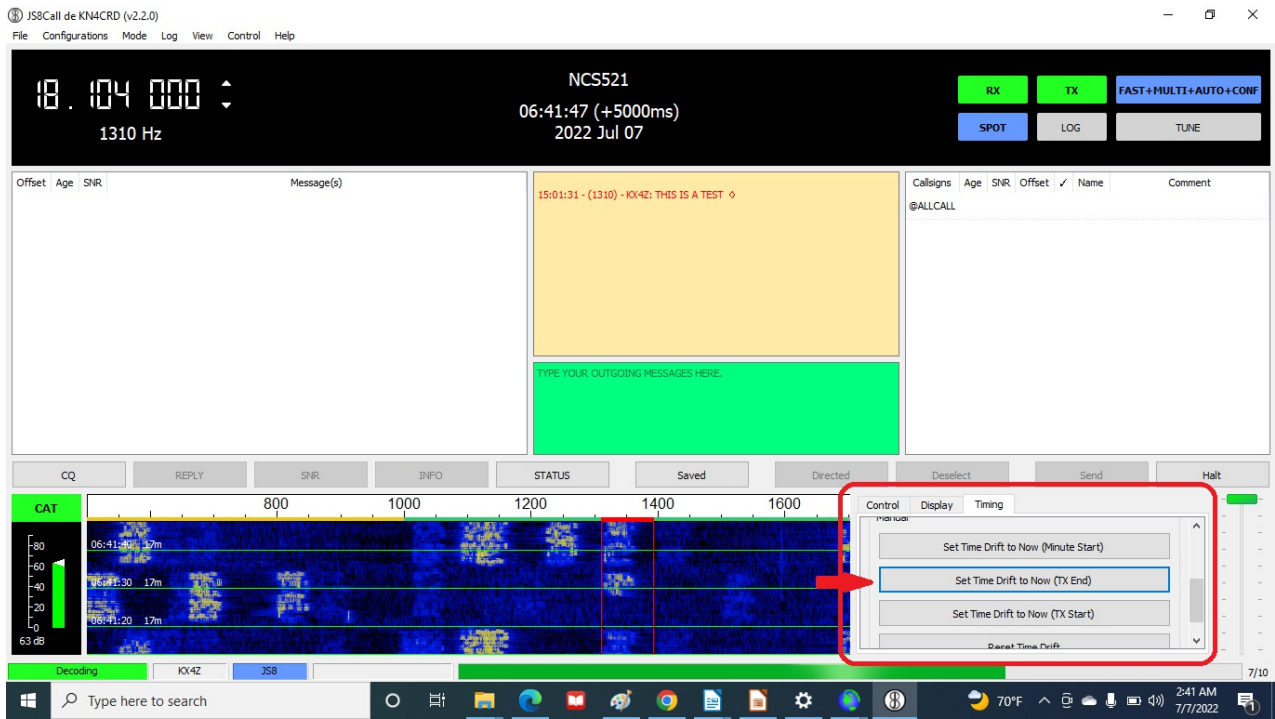


That's nice. . . .but what about worst-case?

- How do you deal with the situation that **your computer time is SO FAR OFF that you can't even decode enough for JTSync to calculate?**
- Note: You don't care if you are a multiple of 15 sec off...you just care that you know the 15-second ticks, right?
- Can we get there from **completely fouled up**?
- YES – *see next slides*.

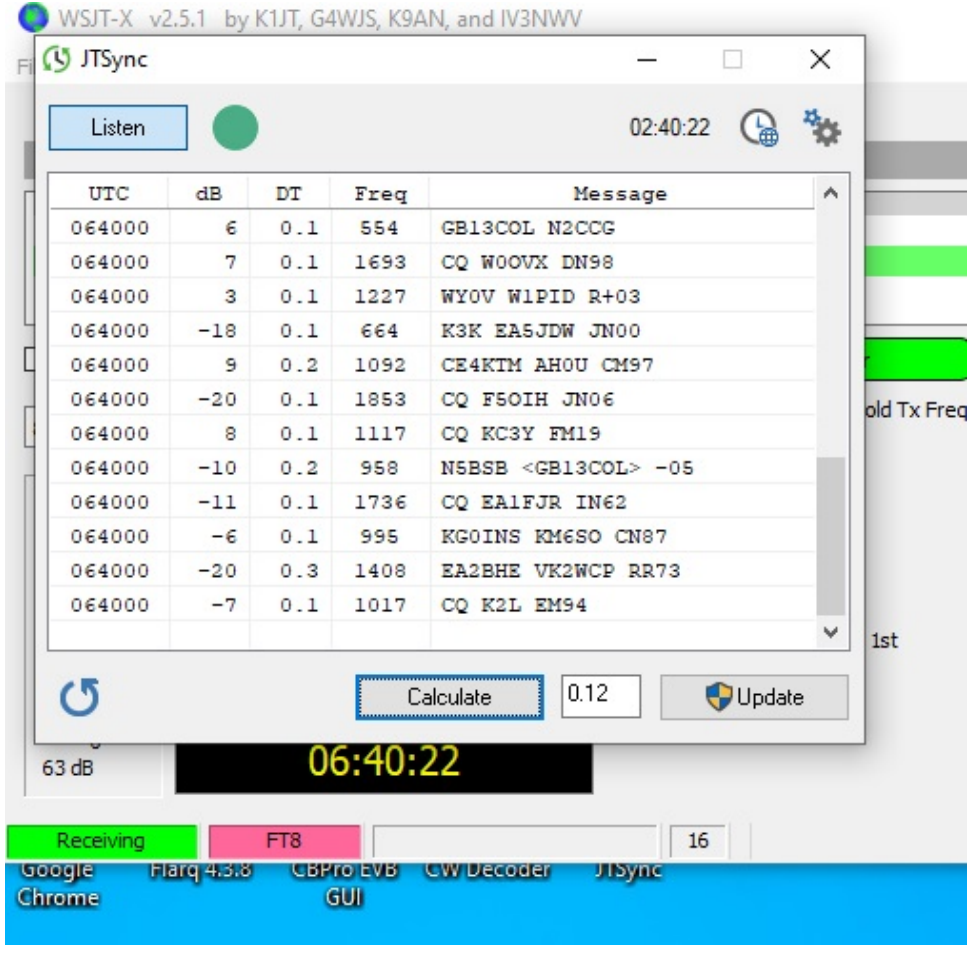
A TEST – using JS8 software

- **Intentionally manually "updated" my computer time, RANDOMLY - hoping to foul it up.**
- SUCCESS! Nothing decoded at all – on WSJT-X or on JT Synch!!
- <u>FIX TIME FROM SCRATCH WITH JS8:</u>
- Brought up JS8 (simultaneously) – *auto timing set did not work on FT8 signals.*
- Tried **manual synch** to "TX End" (easier for me) (click mouse when you hear everyone PAUSE)



Will it set system time for WSJT-X??

- **SUCCESS!!** WSJT-X decodes again… and JTSynch once again produces an average error result
- Step 2: UPDATE with JTSynch to fix it perfectly again.
- **Success!!** JTSynch fixed it again – proving a complete technique to set the time from COMPLETELY FOULED UP!! (Manual JS8, then JTSync)
- Without even GPS!



7. How to set the modulation level??

- Modulation percentage is separate from power output selection – but related to outcome!
- e.g. 50% power selected, modulation at 50% = 25 watts out
- 50% power selected, modulation at 100% = 50 watts out
- 50% power selected, modulation at **150%** = 50 watts of SPLATTER output

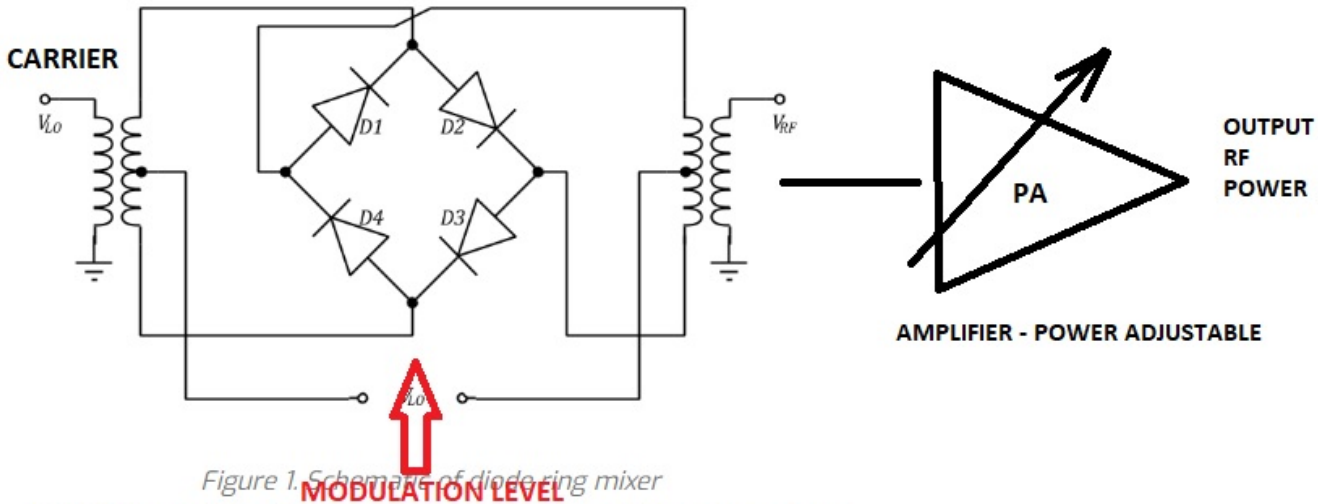


Figure 1 Schematic of diode ring mixer

CREDIT: https://analog.intgckts.com/rf-mixer/diode-ring-mixer/

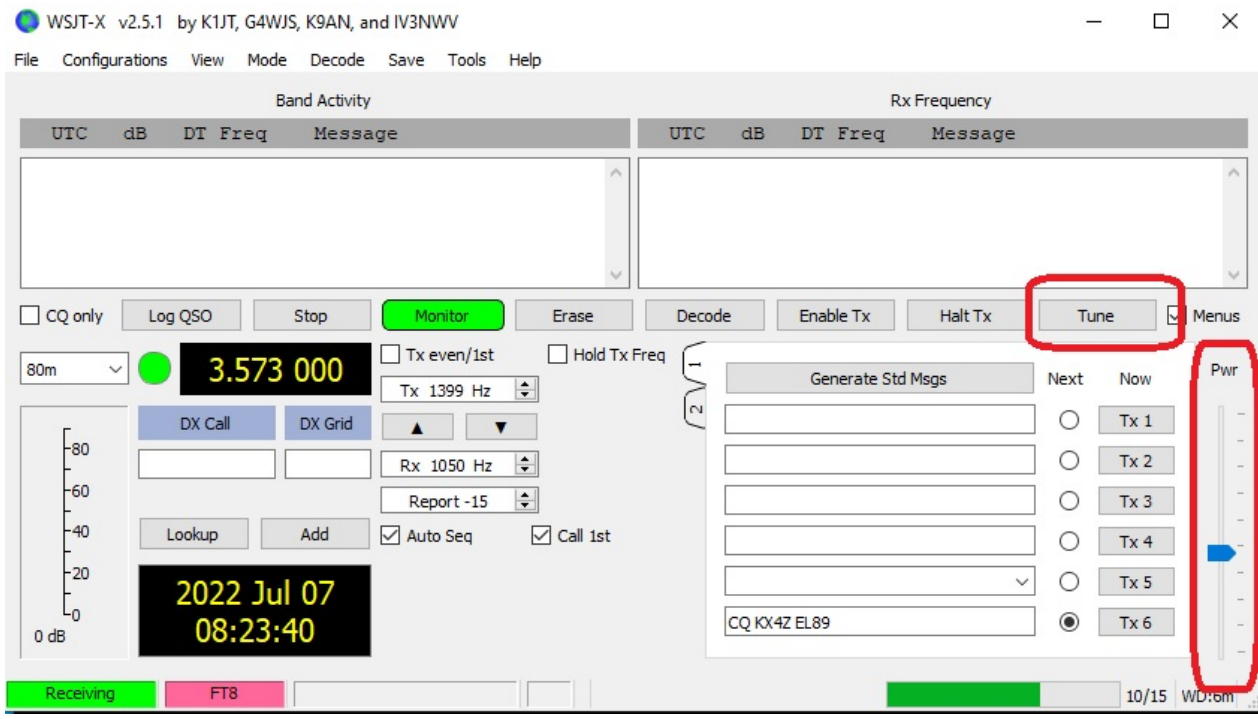
SSB Voice, Data, FM Voice – doesn't matter – modulation must ALWAYS be kept < 100%!! (ALC automatic level control attempts to enforce this but distorts PSK and other such data signals, less impact on FSK signals)

How to set?

- Getting modulation in the sweet spot -
  - FM: ask people if you are “light“ [undermodulated] or sound OVERmodulated – this is completely separate from your SIGNAL LEVEL (“scratchy“ versus “full quieting“)
  - SSB: two methods
    - Watch your ALC (automatic level control) display or meter reading, keep minimal
    - Data: Easiest to simply set your PA for 100 Watts out….and then adjust MODULATION for 50-75 watts. Now changing PA power level will automatically scale everything properly.

Easy setting in moments

- WSJT-X (and many other advanced data systems including WINLINK modems) provides a **modulation adjustment**
- *For our 7300‘s with our choices of radio modulation input senstitivity, typically this must be reduced considerably from max.*
- Easy: Set PA Power to 100; hit TUNE, adjust modulation for 50-75 watts out into a good 50 ohm load.



The End