

Field Day Computer Skills

Getting the most out of your gear

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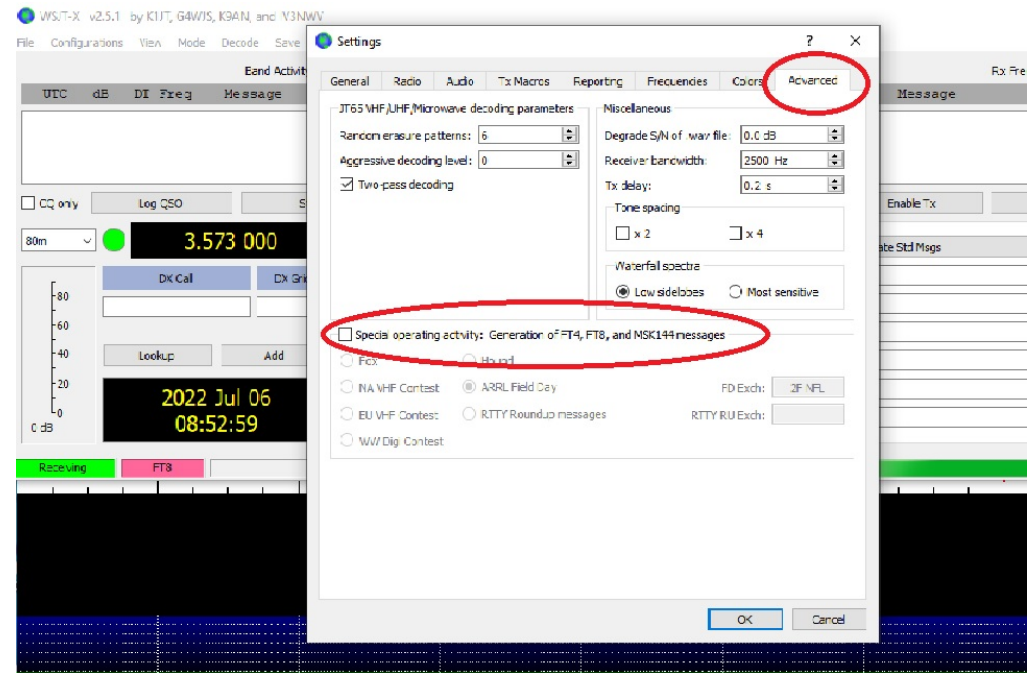
1. Field Day Exchange
2. WSJT-X talk to N3FJP (log)
3. N3FJP accept from WSJT-X
4. Your computer connected to WIFI from MESH system
5. N3FJP connected to Logging Computer
6. How to synch the time?
7. How to set the modulation level?

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.)

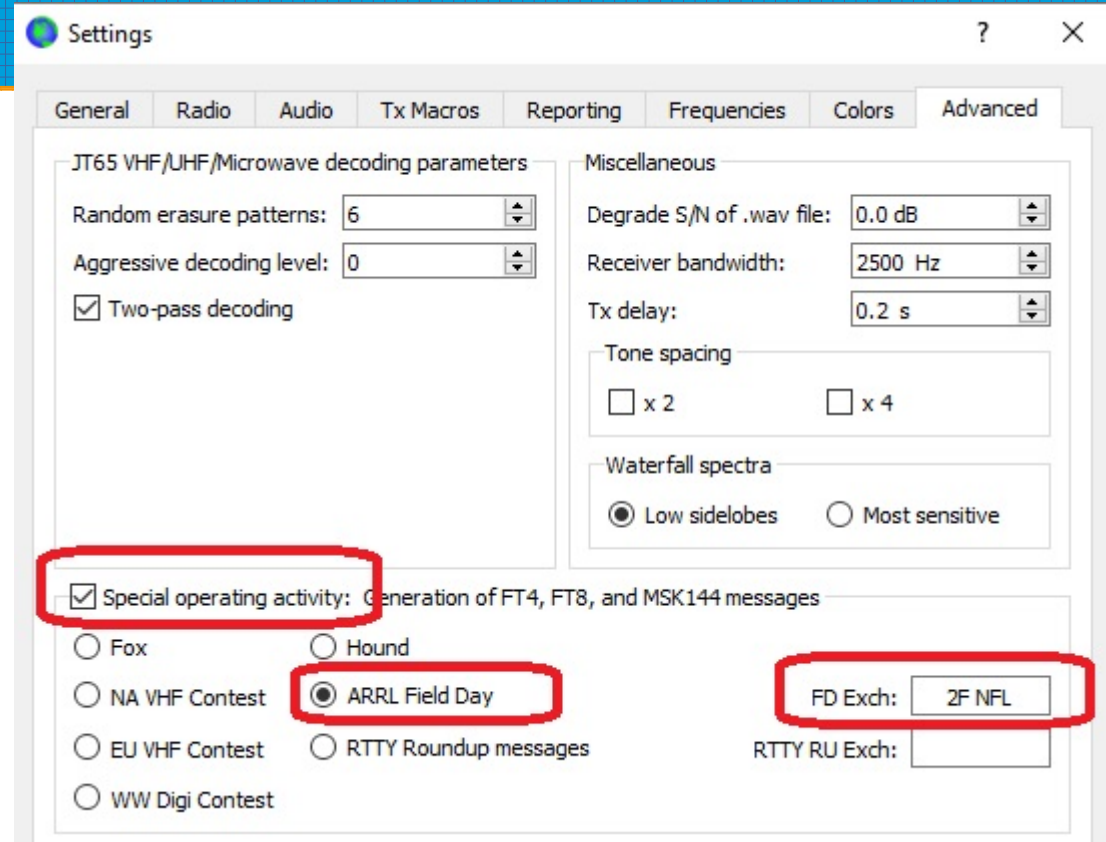
Putting WSJT-X into Field Day Mode

- 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"



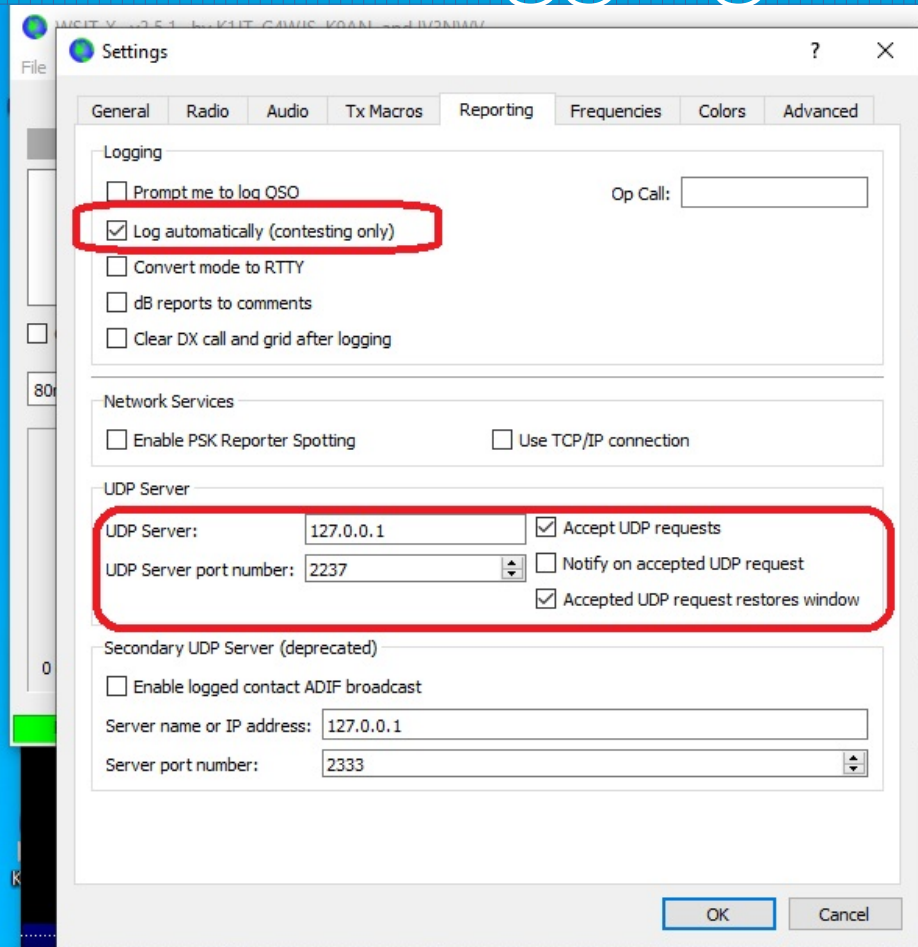
Pick Your Contest

- 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!!



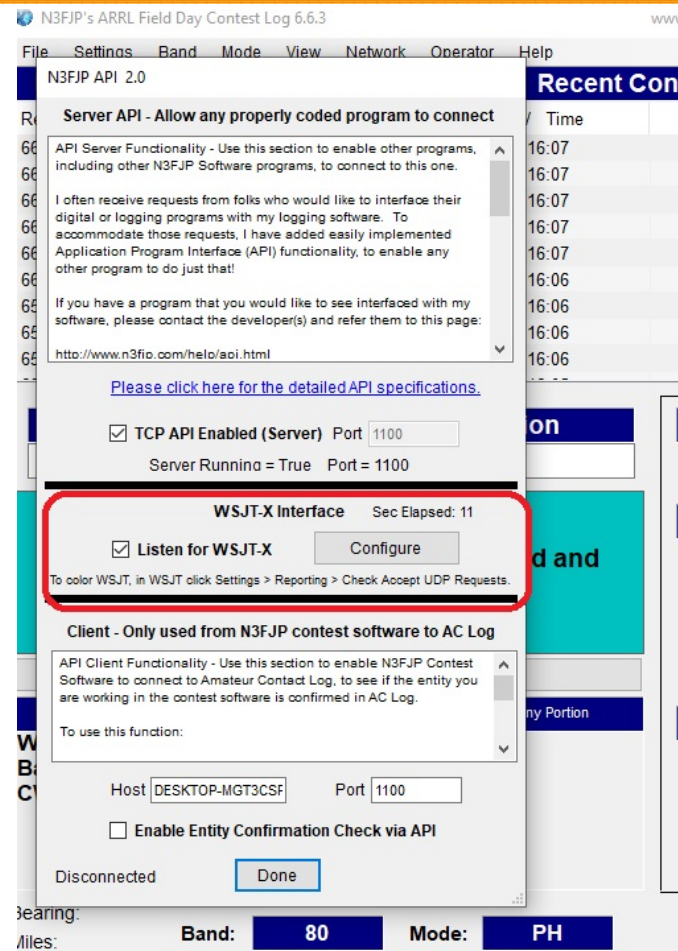
2. WSJT-X must talk to N3FJP Logging

- 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.

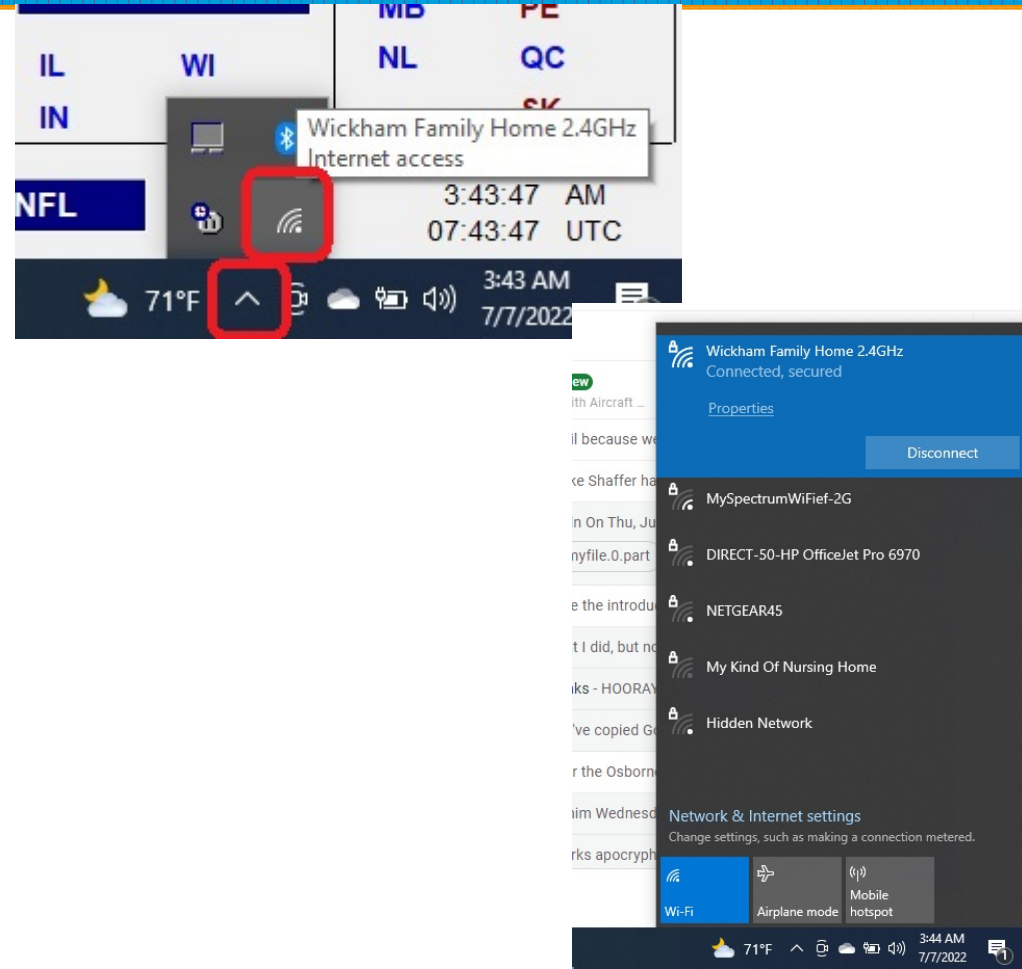
The screenshot shows the 'WSJT Configuration' window from the N3FJP API 2.0 interface. The window is titled 'N3FJP's ARRL Field Day Contest Log 6.6.3' and 'N3FJP API 2.0'. It contains several configuration sections:

- Server API - Allow**: Includes a checkbox for 'TCP AP' and 'Listen'. Below it, there is a checkbox for 'Client - Only use'.
- WSJT Configuration**: Contains input fields for 'IP' (127.0.0.1) and 'Port' (2237), an 'Auto Detect' button, and a checked checkbox for 'Color Duplicate Calls'. Below this are 'Forecolor' and 'Backcolor' buttons. A checkbox for 'Dupes are digital mode spec' is unchecked.
- Color unconfirmed entities:**: Includes a checked checkbox for 'Countries', 'Grids', and 'Watch List'. Each has 'Forecolor' and 'Backcolor' buttons. Below this, it says 'Watch List forecolor = Duplicate forecolor if dupe'.

The 'Color Duplicate Calls' checkbox is highlighted with a red background, and the 'Watch List' checkbox is highlighted with a purple background. The 'Watch List forecolor = Duplicate forecolor if dupe' text is also highlighted with a purple background.

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.**

The screenshot shows the 'Network Status Display 1.2 (Ctrl N)' dialog box in the N3FJP software. The dialog box is divided into several sections:

- Grid:** A grid of status indicators for various frequencies. The top row shows frequencies from 160 to 10. The bottom row shows frequencies from 6 to 3 cm. The '80' frequency is highlighted in red, and the '2' frequency is highlighted in blue.
- Configuration:** Fields for 'This Station's Name' (WinningStn1), 'Server Name or IP' (ESKTOP-MGT3CSP), and 'Port' (1000). The 'Port' field is circled in blue.
- Networking Options:** A section with 'Network Method' (File Share and TCP) and 'Enable Status / Chat Functions' (checked). The 'TCP' radio button is circled in blue.
- Help:** A scrollable text area containing instructions on how to network multiple PCs.

At the bottom of the dialog box, it says 'Status: Connected to: DESKTOP-MGT3CSP'.

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 entries 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>

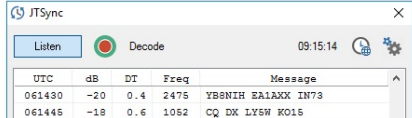
secure | dxshell.com/jtsync.html#downloads

DX Shell

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JTSync

JTSync is a simple utility that provides the ability to synchronize your computer clock over a network with world-wide NTP servers. When the Internet connection is not available, JTSync allows you to make time adjustments based on decoded QSOs within the WSJT-X application. JTSync supports joining a UDP multicast group when interacting with WSJT-X to run simultaneously with other applications such as JTAAlert or GridTracker.



UTC	dB	DT	Freq	Message
061430	-20	0.4	2475	YB0NIH BALANX IN73
061445	-18	0.6	1052	CQ DX LY5W #015

Current version: 1.3
Size of a file zip: 183 KB (32-bit)
Date Published: August 23, 2020

The minimal requirements:

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)

WSJT-X v2.5.1 by K1JT, G4WJS, K9AN, and IV3NWW

File Configurations View Mode Decode Save Tools Help

Band Activity

UTC	dB	DT	Freq	Message	UTC
062415	10	0.2	804	~ CQ K3K EM96	
062415	10	0.1	666	~ CQ K2D FN31	
062415	4	0.1	1404	~ K7CTV WY0V	
062415	-1	0.1	445	~ N5CET NT9P	
062415	-3	0.1	1460	~ EA8AQD KK4W	

JTSynch

Listen 02:24:38

UTC	dB	DT	Freq	Message
062415	10	0.2	804	CQ K3K EM96
062415	10	0.1	666	CQ K2D FN31
062415	4	0.1	1404	K7CTV WY0V EN12
062415	-1	0.1	445	N5CET NT9P RR73
062415	-3	0.1	1460	EA8AQD KK4WYR FM06
062415	-6	0.1	545	K2L KESRBS EM34
062415	-11	0.2	1696	W0OVX EA4ZM RR73
062415	4	0.2	1539	CQ WZ4CH EM64
062415	-2	-0.1	1226	M0BEW K9LCY 73
062415	-5	0.1	1587	CQ EA7HY IM66
062415	-16	0.3	265	N4ZV ZL4TT -20
062415	-15	0.9	899	<...> EA3CJU JN01

80m 3.573 000

66 dB

2022 Jul 07 06:24:38

Receiving FT8

Calculate Update

Computes Average Error

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

WSJT-X v2.5.1 by K1JT, G4WJS, K9AN, and IV3NWW

File Configurations View Mode Decode Save Tools Help

Band Activity

UTC JTSync Listen 02:25:36

UTC	dB	DT	Freq	Message
062515	5	0.1	1403	K7CTV WY0V EN12
062515	-5	0.1	1459	EA8AQD KK4WYR FM06
062515	9	0.2	804	K7BWC K3K RR73
062515	12	0.1	665	CQ K2D FN31
062515	-5	0.1	544	K2L KESRBS 73
062515	-5	0.1	1587	AD8AK EA7HY -01
062515	-6	0.1	445	CQ NT9P DM33
062515	-6	0.2	1129	<...> F8TRT JN33
062515	-19	0.3	265	LW3DMA ZL4TT -15
062515	-11	0.2	401	W4JNG EA4ZM R-11
062515	-14	0.9	897	TM5FTDM <EA3CJU> 73
062515	-17	0.2	315	AD8AK FLNQP JN19

64 dB

Calculate 0.16 Update

Receiving FT8 12

Fixed!

- Once updated, my numbers were perfect again.

WSJT-X v2.5.1 by K1JT, G4WJS, K9AN, and IV3NWW

File Configurations View Mode Decode Save Tools Help

JTSync

Listen 02:27:18

UTC	dB	DT	Freq	Message
062700	1	0.0	903	WA6SVX KO6YO 73
062700	3	0.0	1693	CQ W00VX DN98
062700	1	0.0	1785	ZL4TT N42V EM63
062700	0	0.2	1898	K9LCY N1MGO FN42
062700	-5	-0.0	1017	CQ K2L EM94
062700	-11	0.0	958	CQ GB13COL
062700	-4	0.2	1157	KG4EGZ AC3ED R-16
062700	-5	0.0	218	KD9NUE MOBEW -15
062700	-10	-0.0	1737	CQ EA1FJR IN62
062700	-15	-0.0	1403	WZ4CH K7CTV DM42
062700	-16	0.8	1246	NT9P EA7JAN -17
062700	-20	0.1	1227	K9LCY EA4HBW -16

64 dB 06:27:18

Receiving FT8 16

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!!
- FIX TIME FROM SCRATCH WITH JS8:
- 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)

The screenshot shows the JS8 software interface (v2.2.0) running on a Windows system. The main window displays the call sign NCS521, the time 06:41:47 (+5000ms), and the date 2022 Jul 07. The frequency is set to 1310 Hz. A message window shows a test message: "15:01:31 - (1310) - KX4Z: THIS IS A TEST". Below the message window is a green text input field labeled "TYPE YOUR OUTGOING MESSAGES HERE". The interface includes various control buttons such as RX, TX, SPOT, LOG, and TUNE. A bottom panel shows a waterfall plot with a CAT display on the left. A red box highlights a "Control" panel with three buttons: "Set Time Drift to Now (Minute Start)", "Set Time Drift to Now (TX End)", and "Set Time Drift to Now (TX Start)". A red arrow points to the "Set Time Drift to Now (TX End)" button. The Windows taskbar at the bottom shows the system tray with the time 2:41 AM on 7/7/2022.

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 JTSynch)
- Without even GPS!

WSJT-X v2.5.1 by K1JT, G4WJS, K9AN, and IV3NWW

JTSynch

Listen 02:40:22

UTC	dB	DT	Freq	Message
064000	6	0.1	554	GB13COL N2CCG
064000	7	0.1	1693	CQ W0OVX DN98
064000	3	0.1	1227	WY0V W1PID R+03
064000	-18	0.1	664	K3K EA5JDW JN00
064000	9	0.2	1092	CE4KTM AH0U CM97
064000	-20	0.1	1853	CQ F50IH JN06
064000	8	0.1	1117	CQ KC3Y FM19
064000	-10	0.2	958	N5BSB <GB13COL> -05
064000	-11	0.1	1736	CQ EA1FJR IN62
064000	-6	0.1	995	KGOINS KM6SO CN87
064000	-20	0.3	1408	EA2BHE VK2WCP RR73
064000	-7	0.1	1017	CQ K2L EM94

Calculate 0.12 Update

63 dB 06:40:22

Receiving FT8 16

Google Chrome Flarq 4.3.8 CBPro EVB GUI CW Decoder JTSynch

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

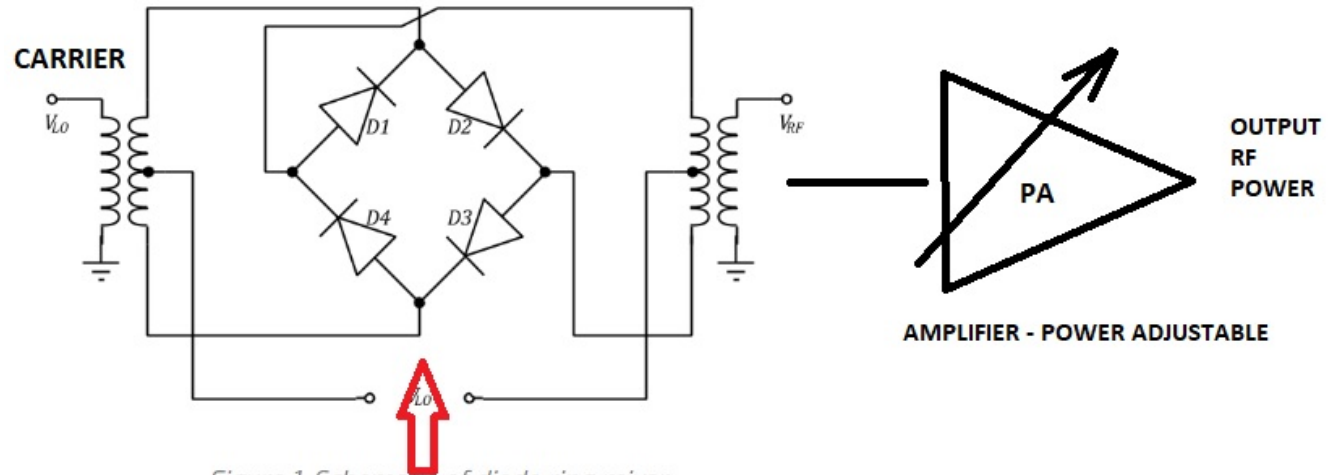


Figure 1. Schematic of diode ring mixer

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 sensitivity, 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 screenshot displays the WSJT-X v2.5.1 software interface. The title bar reads "WSJT-X v2.5.1 by K1JT, G4WJS, K9AN, and IV3NWW". The menu bar includes "File", "Configurations", "View", "Mode", "Decode", "Save", "Tools", and "Help". The main window is divided into several sections:

- Band Activity** and **Rx Frequency**: Each has a table with columns for UTC, dB, DT, Freq, and Message.
- Control Buttons**: A row of buttons including "CQ only", "Log QSO", "Stop", "Monitor" (highlighted in green), "Erase", "Decode", "Enable Tx", "Halt Tx", and "Tune" (highlighted with a red box).
- Frequency and Mode**: A dropdown menu set to "80m", a frequency display showing "3.573 000", and checkboxes for "Tx even/1st" and "Hold Tx Freq".
- Transmit Settings**: "Tx 1399 Hz" and "Rx 1050 Hz" dropdowns, a "Report -15" dropdown, and checkboxes for "Auto Seq" and "Call 1st".
- Message Entry**: "DX Call" and "DX Grid" fields, "Lookup" and "Add" buttons, and a "Generate Std Msgs" section with "Next" and "Now" columns and radio buttons for "Tx 1" through "Tx 6".
- Power Control**: A vertical "Pwr" slider (highlighted with a red box) on the right side of the interface.
- Status Bar**: Shows "Receiving" (green), "FT8" (pink), and "10/15 WD:6m".

The End