



CW Academy

CWA Advanced Class Notes

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September-October, 2023



CW Academy

Session 0

- Meet and Greet
- Introduce ourselves
- Test Jitsi and Sidetone audio
 - No time limit on Jitsi “free” account
 - No special audio settings
 - Jitsi seems to prioritize audio over video when allocating bandwidth
- Do the first three h/w assignments before 1st class
 - Some students do not like the “new” audio practice files
 - The “old” files are available on my Github repository:
 - <https://github.com/aa2il/CWA>
- Current DX: E51D (North Cook Isl.) and 9Q2WX (DRC) should be active for a few more days



CW Academy

Overview

- 8-weeks (M & Th 7-8PM on the West Coast)
 - MST follows immediately after on Mondays
 - **Please use headphones!!!**
- Daily Practice
 - Two or three 15-minute sessions per day is much more effective than one 4-hour block once per week
 - Homework: Short stories, QSOs and CWT exchanges
 - RufzXP and MorseRunner
 - There is a “community edition” of Morse Runner that includes several different contest formats
 - **GET ON THE AIR!!!**
 - SST, MST and CWT are great contest practice
 - Ragchews
- In-class exercises will reinforce skills but are no substitute for practice and OTA time
- We will supplement each class with related topics to help improve your operating skills and overall enjoyment of our great hobby



Coarse Course Overview

CW Academy

- Practice Mini-tests: SST, MST CWT
- Hit-and-Run and Short QSOs
- Rag-chewing
- Logging
- Chasing DX
- Cut Numbers
- Sending
- DX Cluster and RBN
- More Contesting
- CW Ops
- Digi-modes: RTTY and FTx
- ???



CW Academy

About AA2IL

- Grew up in Upstate New York
 - Job Transfer brought me to San Diego in 1993
 - Current QTH is in a rural area in the foothill North East of SD
- First licensed in the late 1970s as a teenager
 - Went silent for over 20-years
- Retired in Oct. 2021 after 35-years as an Electrical Engineer (signal processing)
- Radio activities include
 - Chasing DX and contesting
 - VHF/UHF and satellites
 - Antennas, Linux software development and micro-controllers
- Modest HF station
 - Main rig is an FTdx3000, no amplifier
 - 100W and wire antennas
- I took this class in spring 2002
 - Biggest take-away was how crucial daily practice is to improving speed





Week 1 - Session 1

CW Academy

- Go over h/w and OTA activities
- There are a bunch of State QSO Parties this weekend:
 - IA, NH, NJ, **TX and WA** (see contestcalendar.com for particulars)
 - Exchange is RST + STATE (out of staters) and RST + County (in-state)
 - RST is ALWAYS 5NN in a contest!
 - Speeds tend to be reasonable (tend to attract a lot of casual ops)
 - Its great fun to be on the other end of the pile-up
- Get on the air!
 - There's always rags to chew, POTA/SOTA/SES stations ...
 - Route 66 SESs
 - SST, MST, CWT ...
 - E-mail each other and/or Jim & I to arrange a sked ...
- A few comments regarding this course
- Word game drill – keep it simple!
 - Animals
 - Colors



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Philosophy

- Its a hobby, not a competition!
 - Keep it fun!!!
- Just like on the air (OTA), there are different skill levels coming into this class
 - Compare yourself **only to yourself**, not your classmates
 - Don't get frustrated or worry about slowing down your classmates
 - All of us, even the CW "speed demons," have been where you are now
 - More skilled ops, PSE QRS! GET THE MESSAGE THROUGH!!!
- Challenge yourself
 - Listen to homework a little faster than you are comfortable with
 - Strive to make a few more QSOs in the CWTs
 - Try "running" in the SSTs and MSTs
 - Practice sending a little faster ...
- Practice, get OTA and HAVE FUN!!!
- In-class activities will focus on contesting at first and gradually build up to longer QSOs



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GitHub Repository

- I have set up a repository on GitHub for items related to CW and this class:
 - <https://github.com/aa2il/CWA>
- There have been complaints about the “new” CWA practice files. The “old” versions of these files are available there. Use these instead if you prefer:
 - “OLD Advanced QSOs”
 - “OLD Advanced Short Stories”
- The sub-folder “N1MM” contains a collection of “quick-start” guides for N1MM logger
 - N1MM is the most popular contest logging program but certainly not the only one available
- The file “Panagrams.pdf” contains a long list of panagrams you can use for sending practice.
 - Panagrams are helpful in that they hit each letter of the alphabet at least once
- Poke around and feel free to suggest other material to include there
- Get an audio player that allows you to change the replay speed (e.g. audacity)



Week 1 - Session 2

CW Academy

- Questions on h/w & on the air activities?
- There are five (5) state QPs this weekend including TX and WA
- **Morse Runner CE** has several different contests
 - <https://github.com/w7sst/MorseRunner>
- **Iambic Master** is a program for Winkeyer to help you with your sending
 - <https://sites.google.com/site/korkowp1/iambic-master>
- Contesting Intro
- Drill: Simulated SST
 - Each student gets to run and others call
 - Muley and I might just jump in on this one



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Why Radio Sport?

- Major activity in our hobby
- Fun Competition
 - Some say its the most fun you can have with your clothes on
- Become a better operator
 - Difficult conditions
 - Emergency Comms
- Quickly rack up entities for “paper chasing” (WAS, DXCC, DX Challenge ...)
 - Regular Participation in CWTs is easiest path to CWops membership
- Dormant bands suddenly light up
- Test effectiveness of your station
- ...



Some Terminology

- **Runner**

- Station Calling CQ to solicit contacts
- Usually achieve a higher QSO rate, especially if you are a “big gun”
- Need to be able to recognize calls and exchanges without too many repeats

- **Search and Pounce (S&P)**

- Tune across band answering runners
- Often lower rate because you are tuning and competing with other S&Pers
- Much easier than running since you can listen to runner until you get call and info
 - Be careful with serial numbers, not always consecutive
- Often a better strategy for “little pistols” in larger contests

- Some mix of these is needed to work everybody

- I do a lot of this



SST Weekly Practice Contest

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- “Slow” Speed Test
- Friday 2000z and Monday 0000z
- Very Relaxed Pace - Speed limit is 20 wpm
- Exchange: NAME and STATE

CQ SST AC7FX



W0ABE

W0ABE TU JOHN WA

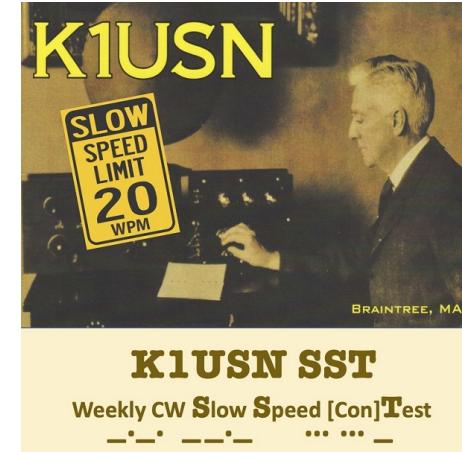


GE JOHN FIN CO

GL FIN 73 AC7FX



- If you miss something: ?, AGN, CALL?, NAME?, QTH?, ...
- Great place to get used to contesting and to try running





Week 2 - Session 3

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- Go over h/w and on air activities
- The first “major” contest of the winter season:
 - CQ WW RTTY
 - Everyone works everyone
 - SSB and CW versions are in October and November
- More Contesting
- MST



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Some More Terminology

- **SO1R/SO1V** – Single Operator, One Radio/One VFO
 - Most of us mere mortals
- **SO2V** – Single Operator, Two VFO's
 - One transmitter and two receivers (one in each ear)
- **SO2R** – Single Operator, Two (or more) Radios
 - Generally running on one radio and searching for multipliers on the other
- **2BSIQ** – Two-band Simultaneous Interleaved QSOs
 - Running on two bands, alternating CQ calls
- **Multi-Operator**
 - Larger contest stations with two or more ops



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Some Contest DOs ...

- **Do**

- Start off S&Ping until you build up skills and confidence
 - This is all many ops ever do
- If you are running, ask for a repeat if you have **any** doubt about what you copied
 - You only get one chance at the caller
- If you are S&Ping, you can either ask for a repeat or just listen to his next QSO
 - Be careful about serial numbers!
 - When you are starting out, listen before and after so not to slow down runner
- When you ask for a repeat, try to be specific which element that you missed
 - NAME?, NR?, QTH?, AGN?, ?
- If the runner misses your call, send it again then give your exchange
 - Courtesy demands that we look out for each other
- Be courteous but concise
- QRS if caller is slower or conditions are difficult
- After the contest, record your claimed score at 3830scores.com and you submit log to contest sponsor



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... and DON'Ts

- **Don't** send unnecessary information
 - Runner's Call
 - He knows what it is and its your problem if you are S&P and get it wrong!
 - DE before your call or NR before your Serial Number
 - Wastes time, throws off timing and can be confusing
 - Signal report if it is not part of the contest exchange
 - Anything other than 5NN (or ENN) if a signal report is required
 - “Flow control” prosigns, e.g. K, BK, ...
 - Long greetings/chatter
 - SST and MST are exceptions as friendly greetings are encouraged
 - I do like to send a quick comment to people I know
 - Some contests are very slow, e.g. VHF+, so chatter is acceptable
- Bottom line is we want to keep things moving!!!



MST Weekly Practice Contest

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- ICWC Medium Speed Test
- Monday 1300z and 1900z, Tuesday 0300z
- Relaxed Pace - Speed limit is 25 wpm
- Exchange: NAME and SERIAL No.



You don't need to wait for another CQ

- Great place to build up confidence and skill



Week 2 - Session 4

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- Go over h/w and on air activities
- On the Air
 - CQ WW RTTY
 - ME State QP
 - See WA7BNM's <https://www.contestcalendar.com>
 - South Pacific DXpeditions: Chatham, Lord Howe and Tuvalu
 - Look for increased DX activity around major International Contests
- Additional Practice Files – Panagrams at 10-25 WPM:
 - <https://cwa.cwops.org/intermediate-pangrams-files>
- Comments about RTTY
- MST Simulation



RTTY Contesting

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- Many CW contesters also enjoy RTTY contesting
 - Fast paced, rates can approach those of CW
 - Most modern rigs have soundcard built-in so easily plug-and-pray
 - Signaling is not as efficient as CW but higher than voice
 - Ops tend to naturally spread out so it's not the QRM-fest typical of FTx contests
- Good place to experiment with SO2R/SO2V and/or Sprints
 - Decoding is off-loaded to your computer so you can concentrate on juggling two radios
- **Do NOT use cut numbers**
 - All symbols are 5-bits
 - Cap. letters, digits, punctuation and control characters are obtained by switching between two tables with 32-symbols each
 - Result is that it actually takes longer to send 5NN than 599
- **Send <CR> and spaces before and after your messages** to help separate from noise/garbage
- See rttycontesting.com for more info



Week 3 - Session 5

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- Go over h/w and on air activities
- Upcoming contests
 - CA QSO Party Oct 7-8
 - Solar Eclipse QSO Party Oct 14
 - Several state QPs
 - CQ WW SSB
- Catch-up
 - CWT
 - Strategies/Muley Map
 - CWT Simulation (Time Permitting)



CWT Weekly Practice Contest

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- Wednesday 1300z and 1900z, Thursday 0300z and 0700z
- Very popular and very fast – “average” speed ~39 wpm
- Exchange: NAME and MEMBER No. or STATE or “CWA”

CQ CWT AE5JT



NN7O

NN7O TU JEFF 3389



TU TOM CA

or TOM CWA

73 AE5JT



or R or EE

- If you are aspiring to become a member of CWops, this is the easiest place to get your call recognized and build up sponsorship



CWT is a Unique Beast

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- Goals for participants vary
 - Make as many contacts as possible in an hour
 - Sharpen or maintain skills
 - Enjoy QRQ CW
 - Try new equipment, s/w, techniques ...
 - ...
- Each session is only an hour and not scored
- Most ops are using Call History
 - Once you get call sign, you've have everything
 - Generally no need to ask for repeats of exchange
- Recommendations
 - CWA Students should NOT use call history
 - Check your copy against the Club Roster or Call History



Week 3 - Session 6

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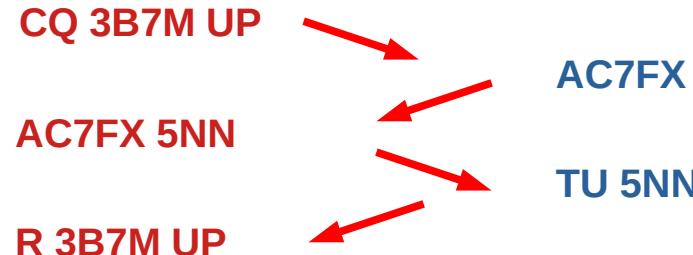
- Go over h/w and on air activities
- On the Air
 - Rather quite this coming weekend but ...
 - DX and Contest activity will take off in October
- Anatomy of a QSO – Part 1
 - Hit and Run
 - Short and Sweet QSOs
- Short QSO Drill
 - DX/POTA/SOTA, etc.
 - Each student gets to run and others call
- Sending



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“Hit and Run” QSOs

- By convention, a valid QSO must exchange some type of information in addition to call signs
- The minimal amount of “information” is a signal report (however meaningless it might be)
- Example – A “rare” DX station running a pile-up
 - His goal is to work as many stations as possible
 - Your goal is to bag an ATNO



- Contest exchanges (and FT4/8) obviously fall into this category also



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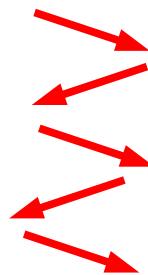
Short QSOs

- Special Event, POTA, SOTA, etc. ops also are generally trying to work as many stations as possible so they might only send a 5NN signal report (or RST + STATE)
- Some ops will exchange more meaningful information quickly (e.g. Actual RST+STATE+Op NAME)
- Example – A not-so-rare DX station who's not in a hurry

CQ CQ CQ SV2HUD SV2HUD

W0ABE GM 559 OP VAS VAS BK

QSL JUSTIN TNX ES 73



W0ABE W0ABE

GM VAS UR 569 569 IN CO CO OP JUSTIN JUSTIN BK

TU VAS 73 GL

- He may or may not want to engage further depending on conditions (QSB, QRN, etc.) or demand



Week 4 - Session 7

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- Go over h/w and on air activities
- On the Air
 - California QP is this weekend (SERIAL + STATE or COUNTY)
 - If operating “in state” with a non-W6 call sign, use /6 suffix
 - AA2IL/6, NN7O/6 ...
 - Plenty of rare/semi-rare DX to chase in Oct and Nov
- Anatomy of a QSO – Part 2
 - Rag Chewing
- Practice “cookie cutter” Rag Chews
 - CQ/Greeting
 - “Big Three:” RST, Name, QTH



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Rag Chew QSOs

- There's no precise definition for a "rag chew" QSO but they generally begin with "the big three"
 - Signal Report (RST)
 - Location (QTH)
 - Name (OP)

CQ CQ CQ DE AA2IL AA2IL AA2IL K

AA2IL DE KB1FGC KB1FGC KN

**KB1FGC DE AA2IL = GE OM ES TNX FER CALL = UR 57N 57N IN RAMONA, CA
RAMONA, CA, ABT 30 MILES NE OF SAN DIEGO = NAME HR IS JOE JOE = HOW
CPY? <AR> KB1FGC DE AA2IL <KN>**

**AA2IL DE KB1FGC RR FB JOE TNX FER RPRT, SOLID COPY = UR RST 55N
55N = OP RICH RICH ES QTH PROSPECT, CT PROSPECT, CT = SO HW? BK**



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Rag Chew QSOs (cont.)

- At this point, we can continue the QSO or politely end it

**KB1FGC DE AA2IL = RR SOLID CPY RICH ES GUD TO MEET U = XYL IS RINGING DINNER
BELL SO MUST SAY 73 FOR NW = HPE CU AGN SN = 73 <SK> KB1FGC DE AA2IL <KN>**

**AA2IL DE KB1FGC = FB JOE TNX FER QUICK CHAT ES WILL LOOK FER U AGN 73 73 <SK>
AA2IL DE KB1FGC K EE**

EE

- There is a lot more detail than in a “Hit an Run” QSO
- A lot of jargon and abbreviations are used to shorten the messages
- I like to use the “break” or “double dash” (=,<BT>) to separate various thoughts and also to bide a little time while I’m thinking of the next thing to say
- I also like to use accepted pro-signs to help with flow of transmissions



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Common Abbreviations

ABT	About	FT	Feet	PWR	Power	WX	Weather
AGN	Again	GA	Good afternoon	R	Roger, Decimal point	XCVR	Transceiver
ANT	Antenna	GB	God bless	RIG	Radio equipment	YL	Young lady
B4	Before	GBA	God bless America	RPT	Report	YR	Year
BK	Back to you	GD	Good day	RPRT	Report	YRS	Years
BTU	Back to you	GE	Good evening	RCVR	Receiver	XYL	Wife (Ex-young-lady)
BURO	QSL Bureau	GL	Good luck	RX	Receiver	73	Best regards
C	Yes ("Si")	GM	Good morning	SIGS	Signals	88	Hugs and Kisses
CONDX	Conditions	GN	Good night	SRI	Sorry		
CPY	Copy	GUD	Good	TKS	Thanks	<AR>	End of Message
CU	See you	HI	Laugh	TNX	Thanks	<AS>	Stand by
CUL	See you later	HPE	I hope/I hope to	TU	Thank you	<BT>	Break
CQ	Calling anyone ("Seek You")	HR	Here	TX	Transmitter	K	Go (anyone)
DE	From ("de")	HW	How	U	You	<KN>	Go only
DR	Dear	LID	Bad operator	UR	Your/You're/You are	<SK>	End of contact
DX	Long-distance	NIL	Nothing	URS	Yours		
EL	Element	NR	Near	VERT	Vertical	BN	BEEN
ES	And	OM	Old Man	VY	Very	MT	MEET
FB	Fine business	OP	Operator	W	Watt(s)	And so on	And so on and so on
FER	For	PSE	Please	WID	With		



Week 4 - Session 8

CW Academy

- Go over h/w and on air activities
- On the Air
 - California QP is this weekend (SERIAL + STATE/COUNTY)
 - If operating “in state” but non-W6 callsign, use /6 suffix
 - AA2IL/6, NN7O/6, N7AUE/6 ...
 - Practice session Friday 7-8PM PDT
 - Plenty of rare/semi-rare DX to chase in Oct and Nov
 - 5X3K (Uganda) ends this weekend
- Anatomy of a QSO – Part 2 (cont.)
 - Rag Chewing
- Practice “extended” Rag Chews
 - Rig, Antenna, Weather, Ham Adventures, Professional Career, Family, ...



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Rag Chew QSOs

- There's no precise definition for a "rag chew" QSO but they generally begin with "the big three"
 - Signal Report (RST)
 - Location (QTH)
 - Name (OP)

CQ CQ CQ DE AA2IL AA2IL AA2IL K

AA2IL DE KB1FGC KB1FGC KN

**KB1FGC DE AA2IL = GE OM ES TNX FER CALL = UR 57N 57N IN RAMONA, CA
RAMONA, CA, ABT 30 MILES NE OF SAN DIEGO = NAME HR IS JOE JOE = HOW
CPY? <AR> KB1FGC DE AA2IL <KN>**

**AA2IL DE KB1FGC RR FB JOE TNX FER RPRT, SOLID COPY = UR RST 55N
55N = OP RICH RICH ES QTH PROSPECT, CT PROSPECT, CT = SO HW? BK**



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Rag Chew QSOs (cont.)

- If we both choose to continue the conversation, there are a lot of things to talk about:

KB1FGC DE AA2IL = RR SOLID AGN = RIG HR IS A YAESU FTDX300 ABT 100W TO A MOXON BEAM UP 30 FT = WX HR TODAY SUNNY AND HOT, TEMP NR 100 DEG F = SO BTU RICH <KN>

R FB JOE DIDNT MISS A DIT = UR RIG AND ANT DOING NICE JOB HR IN CT = RIG HR IS KNWD TS2000 WID AMP RUNNING 500W TO A DIPOLE UP 45 FT = WX HR IS COOL AND RAIN, TEMP IN LOW 50S = FALL IS HR IN THE GREAT NE = BTU JOE KN

VY GUD RICH = I GREW UP IN UPSTATE NY AND MISS THIS TIME OF YR = WENT TO THE BEACH WID MY XYL YESTERDAY TO REMIND US WHY WE LIVE HR HI HI = I RETIRED LAST YR AFTER 35 YRS AS AN ELEC ENGR = NW I HV LOTS OF TIME TO PLAY RADIO = WHAT DO YOU DO FOR WRK RICH? <KN>

AA2IL DE KB1FGC R SOLID AGN JOE = MY FAMILY RUNS AN ANTIQUE TRUCK MUSEUM AND I USED TO DRIVE BIG RIGS = BEEN A HAM FER 25 YRS, I ENJOY CW RAG CHEWING AND CHASING DX. I ALSO LIKE TO REPAIR VINTAGE RIGS AND IM WORKING ON A SATELLITE SETUP

...

- ... and so on and so on
- Be sure to identify every 10-minutes
- Keep subject matter friendly and upbeat and non-controversial
- Keep exchanges short – don't dominate the conversation



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Rag Chew Drill

- For practice tonight, operate as if you've met the other op before::

CQ CQ CQ N5GG N5GG K

N5GG DE AA7TO AA7TO KN

AA7TO DE N5GG = GE JR ES GUD TO CU AGN = UR 57N 57N IN DALLAS = HOW? BK

RR HI COLIN GUD TO HEAR U ALSO = UR 5NN IN LAS VEGAS, FB SIG = RIG HR IS
ICOM 7300 100W TO A VERTICAL ON MY TRUCK = WX HR IS HOT AND DRY, TEMP IN
LOW 90S = BTU COLIN KN

VY GUD JR SOLID CPY = RIG HR IS TS450 100 W TO A DIPOLE AT 40 FT = WX TODAY
WAS HOT AND HUMID, SUMMER HAS ARRIVED BK

RR FB COLIN = YOUR TS450 DOING A GREAT JOB = IT WAS GUD CHATTING WITH
YOU AGN, I NEED TO QRT NW = HPE CU SOON 73 73 <SK> N5GG DE AA7TO K

OK JR WILL LOOK FOR U AGN 73 <SK> AA7TO DE N5GG E E

E E



Week 5 - Session 9

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- Go over h/w and on air activities
- Upcoming contests
 - NV, AZ, PA, SD State QSO Parties
 - Solar Eclipse QSO Party
 - Oceania DX CW
 - Makrothen RTTY
- Chasing DX
 - The bands have come back to life!
 - DXpeditioners are traveling again
 - Look for increased activity in the fall & winter, especially in the days surrounding the major International contests
- Round-robin sentences drill



Chasing (Rare) DX

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- This is quintessential ham radio and, for many, its most exciting aspect
- CW is the best mode for working weak stations rapidly
 - For better or worse, much DX activity has migrated to FT8
 - However, most large DXpeditions will operate CW as part of their effort
- Your QRQ and contesting skills will serve you well!
- The Internet and SDR have changed the landscape
 - Instant pile-ups once a rare station is spotted
 - A Panadapter gives you “situational awareness”
 - Can do this to some extent with dual VFOs or XIT/RIT
 - Radios with dual receivers are an advantage
 - Consider using a WebSDR, be creative!
 - Embrace it and use it to your advantage!



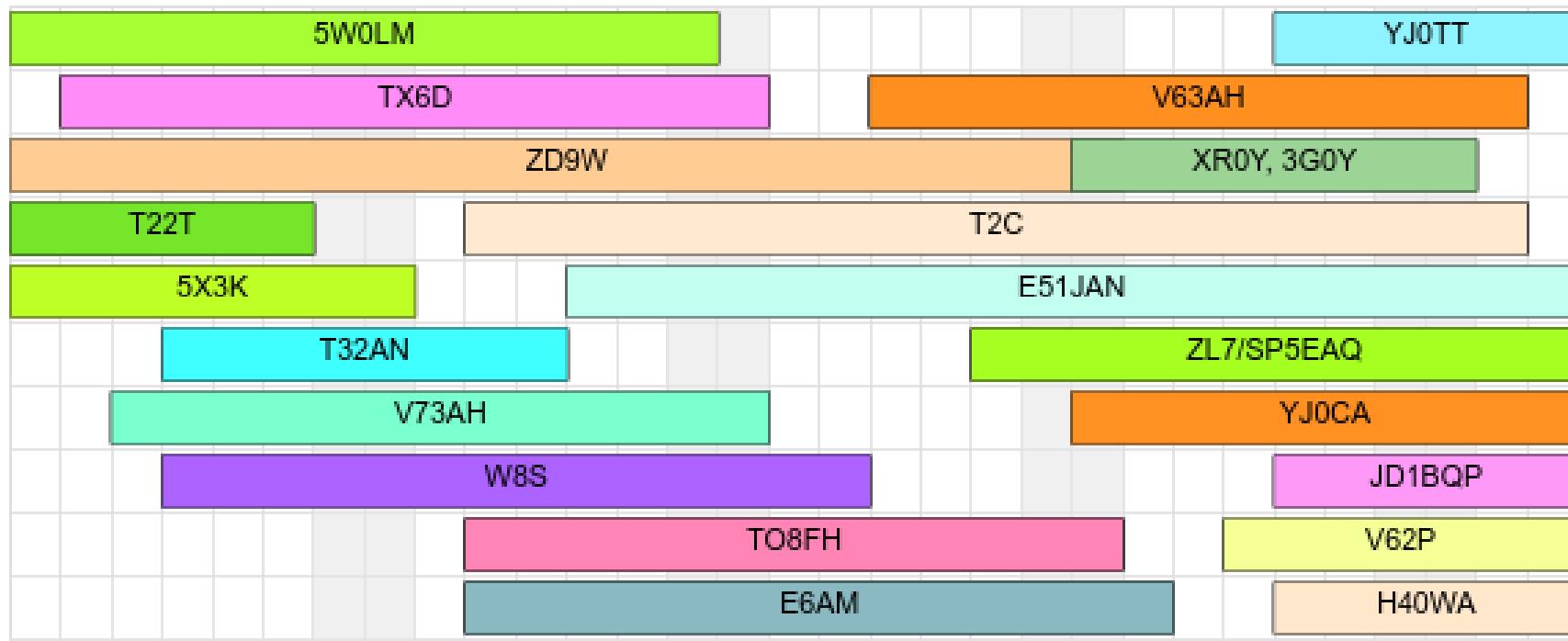
Up-coming DXpeditions

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FEATURED DXPEDITIONS TIMELINE

Last update: October 1, 2023





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Chasing DX (cont.)

- Do:
 - Listen Listen Listen and Listen some more!
 - Make sure you can hear him and verify his call!
 - Figure out his timing and where he is listening – and then transmit accordingly
 - Often listening UP 1-KHz or more, depending on demand
 - Use full QSX (break-in) and “Split”
 - Learn how to rapidly use dual VFOs and/or XIT/RIT functions on your rig
 - Be courteous and concise
 - Understand Propagation and Be Patient
 - Take a look at QRZ.com and/or the DXpedition website for operating plans and QSL info
- Don't be the lid who:
 - Tunes up and/or transmits on top of the DX!!!
 - Continues to operate simplex when the DX is running split (3Y0J UP)
 - Continues to call when the DX is clearly calling someone else
 - Thinks he's the “DX Police” (These guys usually cause more QRM than the errant simplex op!)



My Contact Last Fall with D60AE (Comoros)

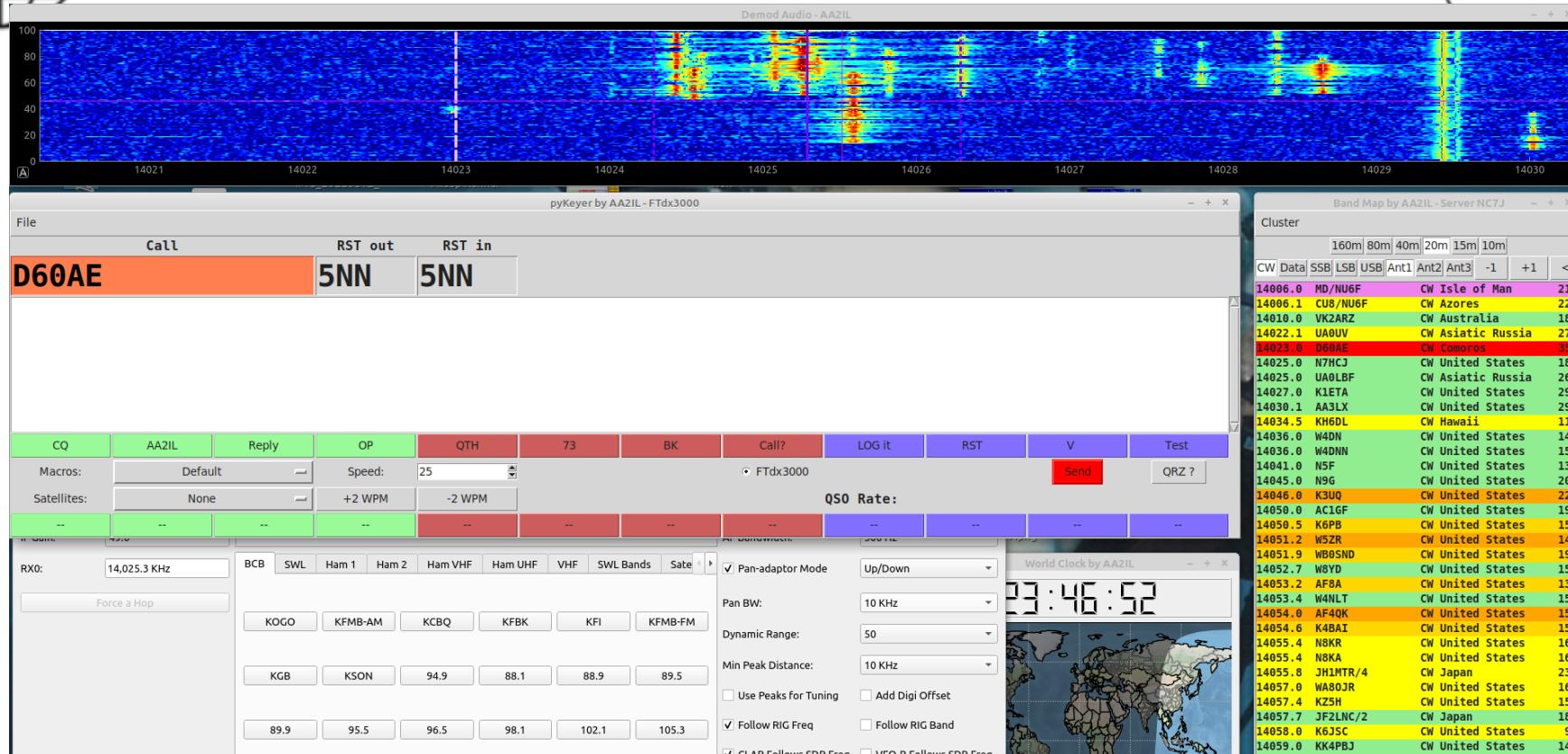
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- Turned on radio to participate in an SST
- Saw D60AE Spotted on 20m – clicked on it
- He was ~539 and a large pile-up extending up ~10 KHz
- Watched SDR waterfall to see who he was working and his patterns
 - About 7.5 KHz up, slowly moving down
- Set my rig to “split” while listening to a few more contacts
- Moved my XIT down a little more, threw out my call
 - After 4 or 5 tries, he came back with WW2IL
 - I sent AA2IL one more time, he responded correctly
 - Exchanged 5NNs and 73s
 - Confirmed “In the Log” the next day on Clublog
- Remember, my station is a “little pistol” - 100 W and wire antennas
 - ~10,500 miles distance

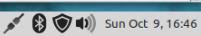


SDR Panadapter (Post-QSO)

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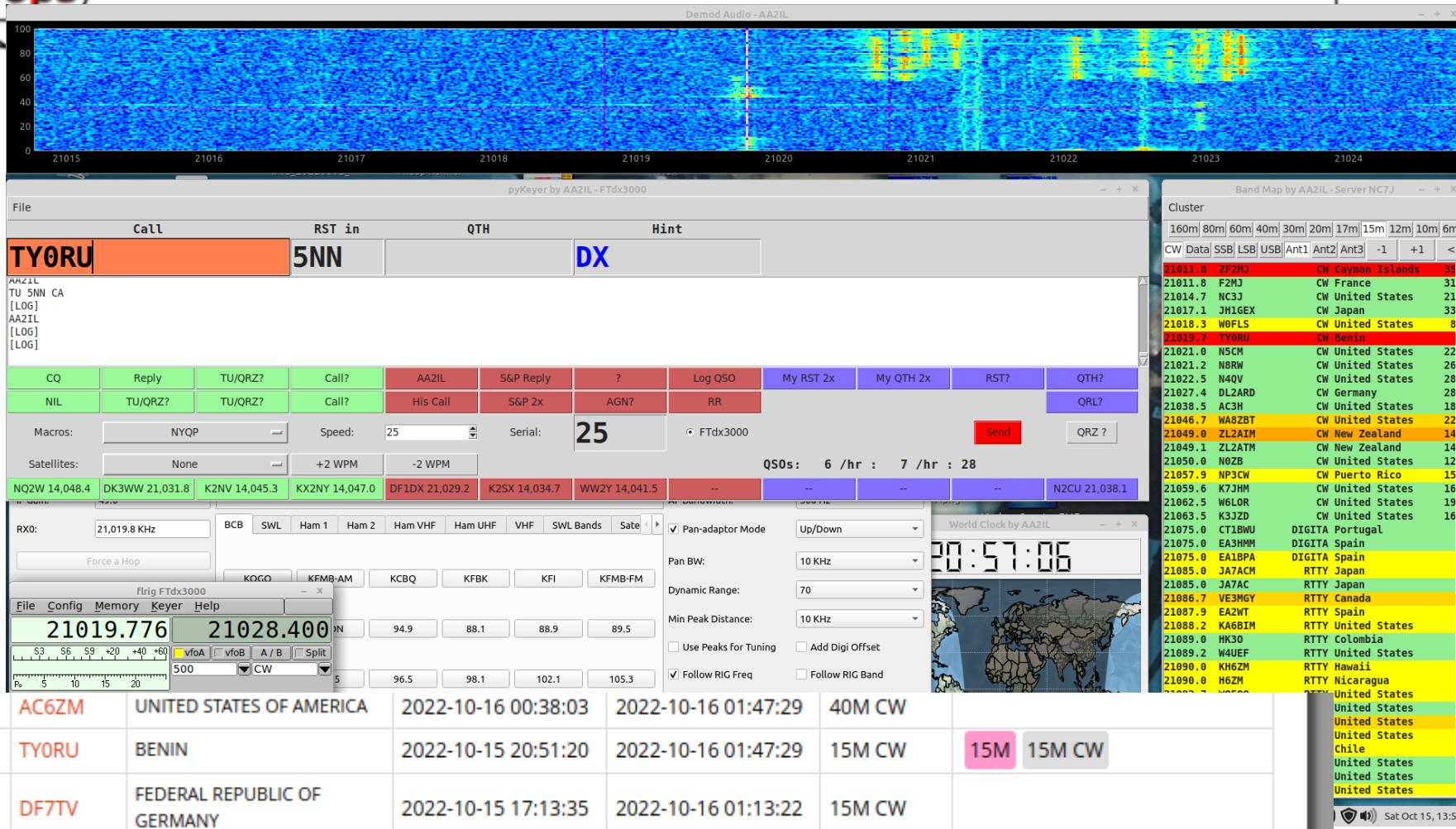
AA2IL/6	N2SO	UNITED STATES OF AMERICA	2022-10-01 18:39:51	2022-10-10 13:08:59	15M CW	
AA2IL	D60AE	COMOROS	2022-10-09 23:31:57	2022-10-10 06:36:34	20M CW	20M CW 20M CW
AA2IL	AC2YD	UNITED STATES OF AMERICA	2022-10-10 00:26:32	2022-10-10 03:21:46	20M CW	





SDR Panadapter (Benin TY0RU)

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Week 5 - Session 10

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- Postponed ...



Week 6 - Session 10

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- Go over h/w and on air activities
- Upcoming Contests
 - NY and IL State QSO Parties
 - 10-10 Fall CW Contest
- Round-robin sentences drill
- Computers and Logging



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Computers and Logging

- Computers are a fixture in most ham shacks now and are invaluable for contesting
 - Logging & Scoring
 - Keeping track of duplicates
 - Sending
- N1MM logger is the most popular logging program used for contesting
 - Many useful features
 - Windoz Only
 - ~~No comparable option~~ A clone is available for Linux (?)
- At this point, **you should be using a contest logger**
 - Its a good idea to let the computer do the **sending** for you, especially in the “fast” contests
 - The other ops will appreciate the “machine” code!
 - For S&P, you can also use the memory keyer in your rig for sending (e.g. Yaesu FH-2)
 - Use the “band map” to help with S&P (**verify** the call sign!)
- Try **not** to use the “call history files” and “auto-fill” until you can consistently copy exchanges
 - When you begin to use these features, you still need to verify that the information is correct!



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Rig Memory Keyer

- Most (all?) modern rigs have a built-in memory keyer to which you can program several short messages
- My “default” messages are (mainly for quick DX contacts):
 - Msg 1 = AA2IL
 - Msg 2 = TU 5NN CA
 - Msg 3 = OP JOE
 - Msg 4 = 73
 - Msg 5 = BK
- For S&P in a CWT (or SST), you might use something like this:
 - Msg 1 = AA2IL
 - Msg 2 = TU JOE 3177 or TU JOE CWA or TU JOE CA
 - Msg 3 = JOE
 - Msg 4 = 3177 or CWA or CA
 - Msg 5 = AGN? or ?
- Yaesu rigs also have a serial counter so feasibly, you use this facility to S&P in almost any contest
- **This is NOT cheating** – contesting is fatiguing and you want to employ any fair means that will maximize your BIC time and therefore your enjoyment and score!!!

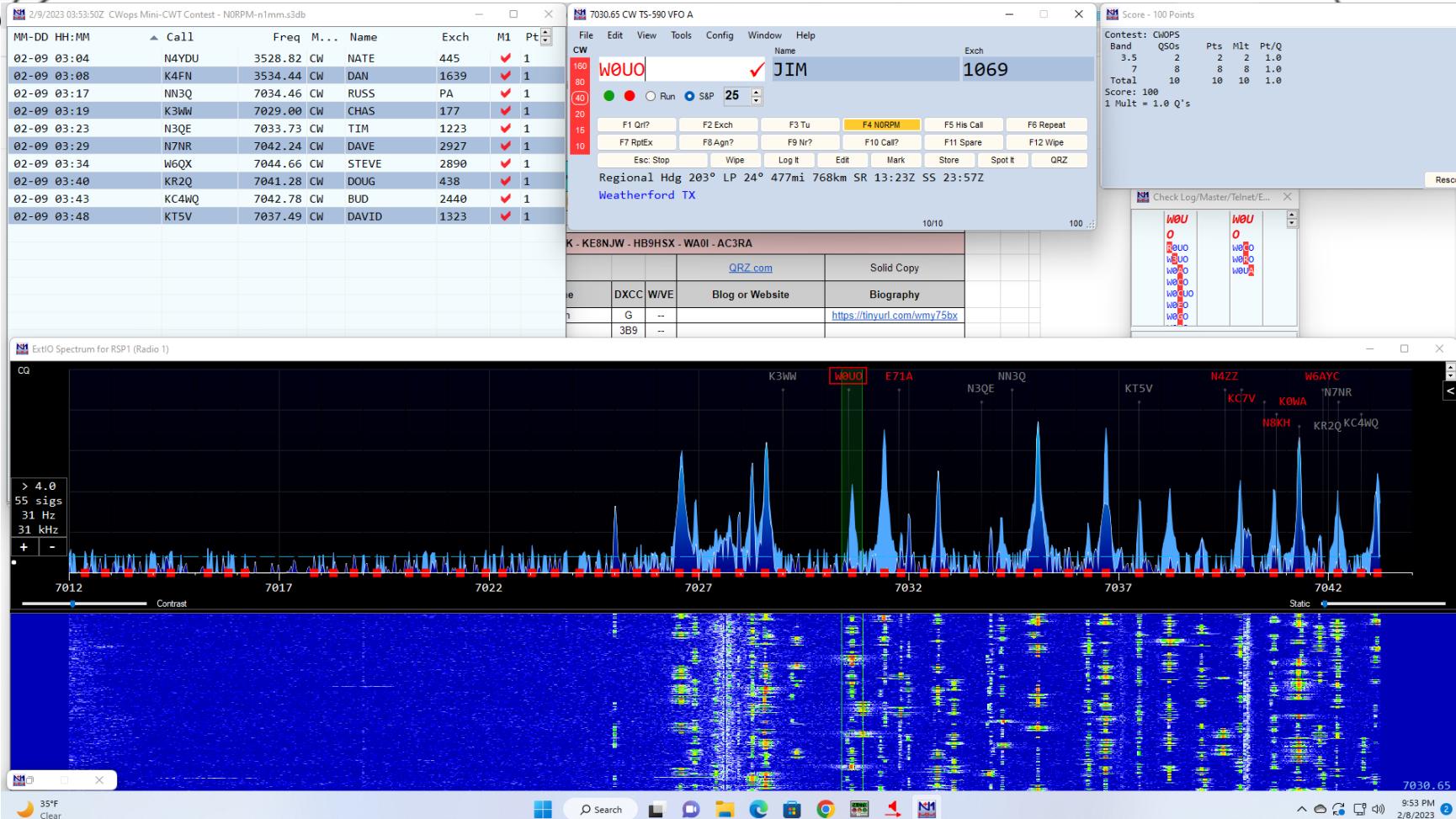




N1MM Logger

(Screenshot courtesy of N0RPM)

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Other Loggers

California QSO Party

57th Running Of The CQP!
1600 UTC October 1, 2022 to 2200 UTC October 2, 2022
CQP 2022 Begins:
2 :01 :37 :47
Days Hrs Mins Secs

CQP Logging Software
Top 10 Most Common Logging Software Programs Used in CQP
Based On Logs Received in 2021

Contest Logger	Links and Notes
N1MM+	<ol style="list-style-type: none">https://n1mmwp.hamdocs.comHow to log a county-line QSO in N1MM+
N1MM+ Call History File For 2022 Search for qsop_ca on this page:	https://n1mmwp.hamdocs.com/mnfiles/categories/callhistory/
N3FJP	<ol style="list-style-type: none">http://www.n3fjp.com/How to log a county-line QSO in N3FJP
Writelog	<ol style="list-style-type: none">https://writelog.comVersion 12.41 and after: Update of county line QSOs in Cabrillo file.How to log a county-line QSO in Writelog
DX Log	http://www.dxlog.net/
GenLog	https://www.qsl.net/w3km/
SkookumLogger (for Mac)	https://www.k1gq.com/SkookumLogger/
CQPWIN	CQPWIN
RUMLogNG (for Mac)	https://dl2rum.de/rumssoft/RUMLog.html
TR4W	https://www.tr4w.net/
TLF (for Linux)	https://tlf.github.io/
Utility	Links and Notes



My Screen During a Contest

CW Academy

Demod Audio - AA2IL

K9BS T8HBM K4HEKA KVTT K1EN A4MVO N8K3I K7RA N4VZB GROWNN NJABCL RAKFW WSCF KE3E J43KVE NOW N4BZ K7DR K7OB K7WA K7A8Y K7R9P K7R9Q K7R9C K7R9D K7R9E K7R9F K7R9G K7R9H K7R9I K7R9J K7R9K K7R9L K7R9M K7R9N K7R9O K7R9P K7R9Q K7R9R K7R9S K7R9T K7R9U

7022 7024 7026 7028 7030 7032 7034 7036 7038 7040

pyKeyer by AA2IL - FTdx3000

File Batter Up VFO A VFO B A->B SO2V PrtScrn Paddles: 20

Call Name Exchange

W4RRC JUL 3177
TU AA2IL [LOG]
WABKAN JOE 3177
TU AA2IL [LOG]
CQ CWT AA2IL

CQ	Reply	TU/QRZ?	Call?	AA2IL	S&P Reply	?	Log QSO	Name 2x	No. 2x	NAME?	NR?
QRZ?	TU/QRZ?	TU/QRZ?	Call?	His Call	S&P 2x	AGN?	RR				ORL?
Macros:	CWT		WPM:	32			FTdx3000				ORZ ?
Satellites:	None		+2 WPM	-2 WPM							
NSRZ 7,040.7	14,036.1	--	--	--	--	--	--	7,043.0	7,034.6	--	--
--	--	--	--	--	--	--	--	--	--	--	--

160m 80m 40m 20m 15m 10m

Call	Band	Mode	Antenna	TX Power	Mic Gain	Monitor	Pan BW	Dynamic Range	Min Peak Distance	Use Peaks for Tuning	Follow RIG Freq	CLAR Follows SDR Freq
7028.3 W8FJT	160m	CW	Ant1	99 W	0	5	160m	Dynamic Range	Min Peak Distance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7028.3 KM4CRJ	80m	RTTY	Ant1				80m					
7028.3 K6TTT	40m	USB	Ant1				40m					
7028.3 SN5J	20m	LSB	Ant1				20m					
7028.3 K3JT	15m	AM	Ant1				15m					
7028.7 VE3EJ	10m	FM	Ant1				10m					

QS0s: 72 /hr : 82 /hr : 74

Force a Hop

Pan Support Mode

World Clock by AA2IL

03:56:09

Band Map by AA2IL - Server NC7J

Call	Band	Mode	Antenna	TX Power	Mic Gain	Monitor	Pan BW	Dynamic Range	Min Peak Distance	Use Peaks for Tuning	Follow RIG Freq	CLAR Follows SDR Freq
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160m 80m 40m 20m 15m 10m

Call	Band	Mode	Antenna	TX Power	Mic Gain	Monitor</th
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Week 6 - Session 11

CW Academy

- Go over h/w and on air activities
- Upcoming contests
 - NY and IL State QSO Parties
 - 10-10 Fall CW Contest
- Drill: 20 Questions
- DX Cluster and Reverse Beacon Network



CW Academy

Spotting Networks

- The DX Cluster refers to websites that list DX stations that other ops have “spotted”
 - Rare and not so rare DX
 - Running stations in a domestic contest
 - dxwatch.com and dxheat.com are my “go to” sites but there are many others
- Reverse Beacon Network (RBN)
 - A world-wide system of SDRs monitoring one or more bands and using automatic decoders
 - CW and RTTY Skimmers
 - You can view data “live” or download and analyze historical data off-line
 - This is an excellent tool for assessing your station’s performance
 - Send CQ <YOUR_CALL> or TEST <YOUR_CALL> a few times to get spotted
 - reversebeacon.net – can also get raw RBN spots in real-time
 - PSK Reporter does something similar for FT4/8 signals → Almost everyone is a spotter/monitor!
- The use of these tools, even once, puts you in the “assisted” category in a contest
- These tools have altered the landscape for chasing DX
 - No longer have to endlessly “spin the big knob” to find DX
 - Generates instant pile-ups



DX Cluster

Ops Manually Enter “Spots”

CW Academy

dxheat.com

▼ Filters	DX de	Freq	DX	Tags	Comments	UTC	Date
All	W7B0B	28 180,8	Spain EA7KRB	⌚ @		17:53	18/10/23
None	KA3JAW	29 600,0	Spain S01AS		FN20JQ<ES> Heard 3x3 4x4	17:53	18/10/23
Sources	KI5MFF	28 495,0	USA KC5OUR	⌚ @	Valencia Mid School Students calling	17:52	18/10/23
W3LPL	N4WMB	28 565,0	Portugal CS8ABG	⌚ @		17:52	18/10/23
DXCC	LU6YR	28 074,0	Germany DL1RAE	⌚ @	FT8 db-17 From FF51 1965 Hz TNX QS	17:51	18/10/23
VALID	W7B0B	28 180,8	Spain EA7L	⌚ @		17:51	18/10/23
OTHER	NU4N	14 286,0	USA N2PQJ	⌚ @	POTA 2147 NY	17:51	18/10/23
Modes	W5AP	21 315,0	USA W8EDU	⌚ @	name Adam	17:51	18/10/23
CW	WU5E	28 455,0	Norway LA5XO			17:50	18/10/23
PHONE	N5BIG	28 580,0	Haiti J88IH	⌚ @		17:50	18/10/23
DIGI	W0KAL	14 327,0	USA K4DSX	⌚ @		17:49	18/10/23
Bands	PU9FDO	28 565,0	Portugal CS8ABG	⌚ @	59 CQ DX	17:49	18/10/23
SHF	LU6YR	28 074,0	Spain R2BY		FT8 db-14 From FF51 1965 Hz TNX QS	17:49	18/10/23
UHF	W2TAD	28 074,0	USA W1AW/0	⌚ @	FT8 - Nebraska	17:48	18/10/23
VHF	KE8RRG	28 387,0	France F5NBX	⌚ @		17:47	18/10/23
4m	KI6WJ	28 076,8	USA KL7HFI	⌚ @		17:46	18/10/23
	KG8V	21 270,0	USA PA3DRK	⌚ @	USB EN82hn -> JO21ol	17:46	18/10/23
	W3LPL	28 022,0	Barbados 3B8HL		Heard in NC	17:46	18/10/23
	NC1M	21 289,0	Spain S51CK			17:45	18/10/23
	KI6WJ	28 076,7	Spain EA1A	⌚ @		17:44	18/10/23
	PY2RT	28 075,7	Germany DG7LBB	⌚ @	FT8 Sent: -15 Rcvd: -24	17:44	18/10/23
	W8FJ	24 891,9	Ghana 9J2REK	⌚ @		17:43	18/10/23
	VE2JM	24 960,0	Canada HB0WR	⌚ @		17:42	18/10/23
	WP4U	50 313,0	Portugal NP2X	⌚ @	cqing	17:39	18/10/23
	KA3JAW	29 600,0	Spain EA1BXX	⌚ @	FN20JQ<ES>IN70DW Corrected Cal	17:39	18/10/23
	W2FTJ	28 573,0	Italy IZ0WEI	⌚ @	CDM I*	17:38	18/10/23

dxwatch.com

Realtime View

show/hide my last filters

showing spots for DX call: AA2IL,TO8FH,ZD9W

send a spot / search spot by callsign

rows to show: 25 ▾

de	dx	freq	obs	time
HB9XCL	TO8FH	21026.9	[AF-027] fb signal in HB9 trnx	1749z 18 Oct
F8AVK	TO8FH	28421	[AF-027] Up5	1746z 18 Oct
EA4HCZ	ZD9W	18140	10UP	1742z 18 Oct
IK5MEJ	ZD9W	50000	pse qsy try on 50 mhz trnx	1742z 18 Oct
F5MZE	TO8FH	24896	[AF-027] QSX 24897.0 UP 1.00	1742z 18 Oct
DF8V	TO8FH	18105.7	[AF-027] mci qso qsx 18108,7	1742z 18 Oct
Y09GDN	ZD9W	18140	up 5-15	1739z 18 Oct
RA6LO	ZD9W	18140	QSX 18140	1737z 18 Oct
EA4TX	TO8FH	24896	[AF-027] QSX 24897.48 IOTA AF027	1737z 18 Oct
F8AVK	TO8FH	28426	[AF-027] Up5	1734z 18 Oct
F4FGC	ZD9W	28021.6	Trnx Yuris 73 up 4	1733z 18 Oct
F8AVK	TO8FH	28421	[AF-027] up5	1731z 18 Oct
OK2LI	TO8FH	7060.5	[AF-027] FT8/H -14 trnx 73!	1730z 18 Oct
AA9RR	TO8FH	21027	[AF-027] UP 1	1729z 18 Oct
IK8TGH	TO8FH	21027	[AF-027] trnx 73 iso	1728z 18 Oct
DL3HR	TO8FH	24896	[AF-027] UP, calling EU	1727z 18 Oct
EC1D	TO8FH	21027	[AF-027] CW 599	1726z 18 Oct
W3LPL	TO8FH	24895.9	[AF-027] Heard in VA	1725z 18 Oct
IK8TGH	TO8FH	24896	[AF-027] tinx up up	1723z 18 Oct
W3LPL	TO8FH	18105.7	[AF-027] RTTY Heard in WI	1720z 18 Oct
W3LPL	TO8FH	21026.9	[AF-027] Heard in PA	1720z 18 Oct
EC1D	TO8FH	18105.7	[AF-027] RTTY 599 up 4.5	1718z 18 Oct
IV3ZUY	ZD9W	28021.5	Up 5 trnx qso 73	1718z 18 Oct
EA5JN	TO8FH	28421.5	[AF-027] UP 5 EASY TNX	1718z 18 Oct
F8AVK	TO8FH	28421	[AF-027] up5	1717z 18 Oct

Realtime View

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send a spot / search spot by callsign

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F4FGC	ZD9W	28021.6	Trnx Yuris 73 up 4	1733z 18 Oct
F8AVK	TO8FH	28421	[AF-027] up5	1731z 18 Oct
OK2LI	TO8FH	7060.5	[AF-027] FT8/H -14 trnx 73!	1730z 18 Oct
AA9RR	TO8FH	21027	[AF-027] UP 1	1729z 18 Oct
IK8TGH	TO8FH	21027	[AF-027] trnx 73 iso	1728z 18 Oct
DL3HR	TO8FH	24896	[AF-027] UP, calling EU	1727z 18 Oct
EC1D	TO8FH	21027	[AF-027] CW 599	1726z 18 Oct
W3LPL	TO8FH	24895.9	[AF-027] Heard in VA	1725z 18 Oct
IK8TGH	TO8FH	24896	[AF-027] tinx up up	1723z 18 Oct
W3LPL	TO8FH	18105.7	[AF-027] RTTY Heard in WI	1720z 18 Oct
W3LPL	TO8FH	21026.9	[AF-027] Heard in PA	1720z 18 Oct
EC1D	TO8FH	18105.7	[AF-027] RTTY 599 up 4.5	1718z 18 Oct
IV3ZUY	ZD9W	28021.5	Up 5 trnx qso 73	1718z 18 Oct
EA5JN	TO8FH	28421.5	[AF-027] UP 5 EASY TNX	1718z 18 Oct
F8AVK	TO8FH	28421	[AF-027] up5	1717z 18 Oct

Your Continent

Solar Activity
SFI: 137

Band Active

EU NA



Reverse Beacon Network (RBN)

Spots Automagically Generated by Skimmers

CW Academy

reversebeacon.net/main.php?zoom=40.02,-0.43,1.35&rows=100&max_age=1,day&spot_types=1&spotted_call=&hide=distance_km

Google My Yahoo! Yahoo! Ham Radio Alpacas Linux Hobbies Books Travel Listen House Med Electronics Utica SD Video Edu Ref Fun Friends Need to file

REVERSE BEACON NETWORK Hosted by www.dxwatch.com SSN: 151 SFI: 169 A5 K: 1 DxWatch Callsign Lookup

welcome main dx spots nodes FTB downloads about contact us

Leaflet © OpenStreetMap contributors

Unfreeze Zoom Max rows: 100 Max age: 1 Days New spots: 100 Show Spotters Advanced Mode CW Speed: Min all Max all Copy URL to Clipboard

630m 160m 80m 60m 40m 30m 20m 17m 15m 12m 10m 6m 4m 2m
ow my psk31 psk63
CQ DX BCB I/B NCDXF

callsign	spotter-callsign	distance mi	freq	mode	type	snr	speed	time	seen
● spotter	● spotted								
DK5KX	EA7EGU	1082 mi	14051.0	CW	CQ	8 dB	26 wpm	2033z 06 Jun	now
OG6EX	RD3AEY	754 mi	7053.3	CW	CQ	19 dB	10 wpm	2033z 06 Jun	now
DF7QB	EA7EGU	1112 mi	14051.0	CWV	CQ	6 dB	25 wpm	2033z 06 Jun	now
NN3RP	K2MD	175 mi	7030.1	CW	CQ	2 dB	23 wpm	2033z 06 Jun	now
PYTZC	NEAP	6123 mi	21023.9	CWV	CQ	14 dB	24 wpm	2033z 06 Jun	now
EA2RCF-4	4O4O	1077 mi	18083.0	CW	CQ	14 dB	25 wpm	2033z 06 Jun	now
G4ZFE	EA7EGU	1033 mi	14051.0	CW	CQ	9 dB	26 wpm	2033z 06 Jun	now
G4ZFE	4O4O	1095 mi	18083.0	CW	CQ	16 dB	24 wpm	2033z 06 Jun	now
G4HSO	REAP	1547 mi	21024.0	CW	CQ	32 dB	24 wpm	2033z 06 Jun	now
G4HSO	US71GN	1398 mi	21030.5	CW	CQ	4 dB	20 wpm	2033z 06 Jun	now
G4HSO	4O4O	1093 mi	18083.0	CW	CQ	11 dB	24 wpm	2033z 06 Jun	now
ES2RR	4O4O	1192 mi	18083.0	CW	CQ	25 dB	25 wpm	2033z 06 Jun	now
LA6TPA	4O4O	1548 mi	18083.0	CW	CQ	5 dB	25 wpm	2033z 06 Jun	now
JN1ILK	REAP	4598 mi	21024.0	CW	CQ	31 dB	23 wpm	2033z 06 Jun	now
Y4AAR	EA7EGU	4598 mi	21024.0	CW	CQ	44 dB	24 wpm	2033z 06 Jun	now



RBN Real-Time Filters

CW Academy

reversebeacon.net/main.php?zoom=40.02,1.77,1.35&rows=100&max_age=1,day&spot_types=1&spotted_call=4I4dx&hide=distance_km

Hosted by www.dxwatch.com SSN:151 SFI:169 A.5 K:1 DxWatch Callsign Lookup:

REVERSE BEACON NETWORK

welcome | main | dx spots | modes | FT8 | downloads | about | contact us

Map controls: + -

Frequency legend: 630m, 160m, 80m, 60m, 40m, 30m, 20m, 17m, 15m, 12m, 10m, 6m, 4m, 2m

Filter checkboxes: CQ DX BCN IB NCDXF

Search bar: Unfreeze Zoom

Filter settings: Max rows: 100, Max age: 1 Days, New spots: 3, Show Spotters, Advanced Mode, CW Speed: Min Max , Copy URL to Clipboard

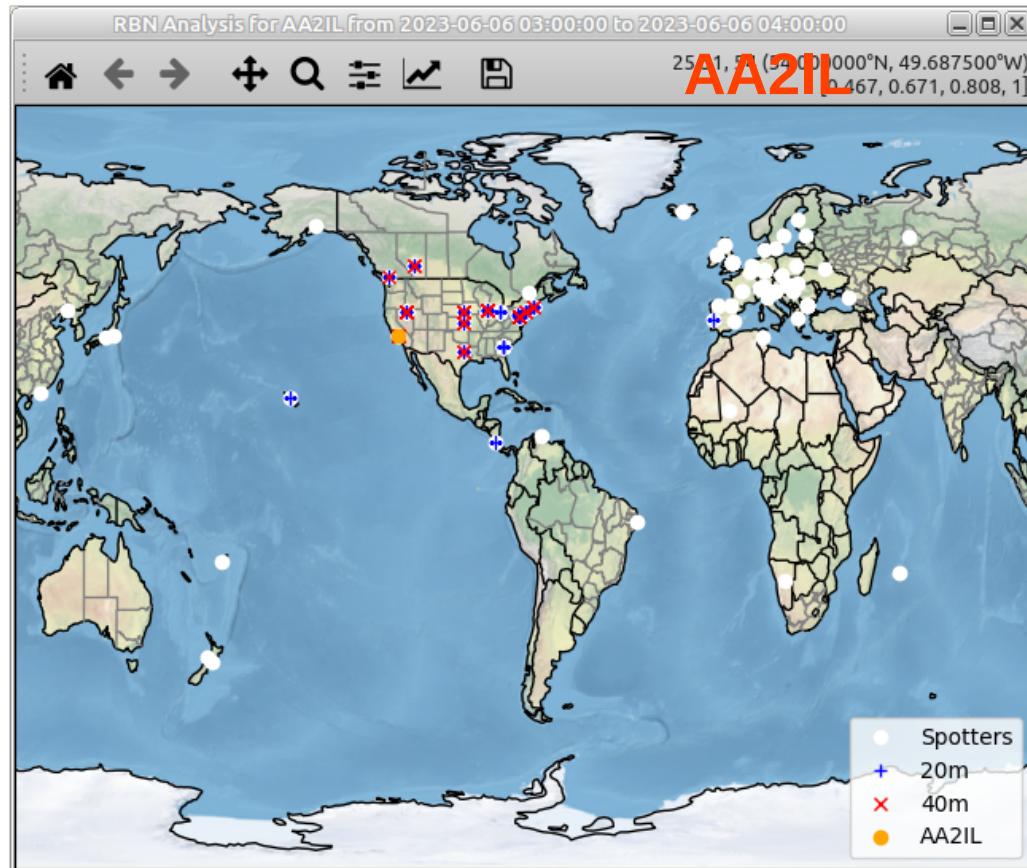
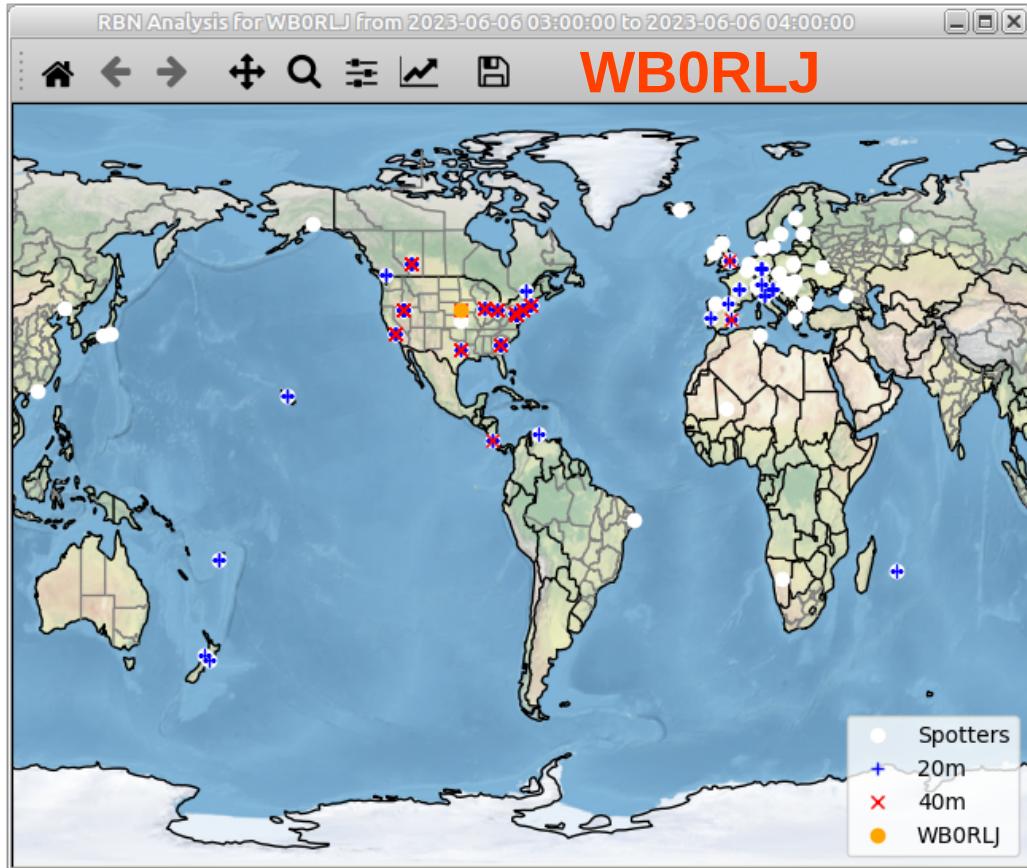
spotter-callsign		● Spotter (de)	● Spotted (dx)						
callsign	spotter-callsign	4I4dx							
● spotter	● spotted	distance mi	freq	mode	type	snr	speed	time	seen
DRAW	4I4DX	1693 mi	18076.9	CW	CQ	18 dB	25 wpm	2027z 06 Jun	now
OHBBG	4I4DX	1764 mi	18077.1	CW	CQ	26 dB	25 wpm	2027z 06 Jun	now
B08CS	4I4DX	3424 mi	18077.0	CW	CQ	15 dB	25 wpm	2027z 06 Jun	now
EATRCF-4	4I4DX	2409 mi	18077.0	CW	CQ	5 dB	25 wpm	2027z 06 Jun	98 seconds ago
IK4VET	4I4DX	1712 mi	18077.1	CW	CQ	16 dB	24 wpm	2027z 06 Jun	102 seconds ago
DC9YZ	4I4DX	1724 mi	18077.0	CW	CQ	13 dB	25 wpm	2027z 06 Jun	103 seconds ago
VU2CPL	4I4DX	2772 mi	18077.0	CW	CQ	15 dB	25 wpm	2027z 06 Jun	109 seconds ago
ES2RR	4I4DX	1503 mi	18077.0	CW	CQ	24 dB	25 wpm	2027z 06 Jun	110 seconds ago
TF3YY	4I4DX	3005 mi	18077.0	CW	CQ	12 dB	25 wpm	2027z 06 Jun	111 seconds ago
DM5GG	4I4DX	1616 mi	18077.0	CW	CQ	18 dB	25 wpm	2027z 06 Jun	113 seconds ago
HABTKS	4I4DX	1297 mi	18077.0	CW	CQ	21 dB	25 wpm	2027z 06 Jun	114 seconds ago
VIRZFUN-77	4I4DX	4078 mi	18077.3	CW	CQ	21 dB	25 wpm	2027z 06 Jun	115 seconds ago
JN1ILK	4I4DX	4794 mi	18077.0	CW	CQ	11 dB	25 wpm	2027z 06 Jun	115 seconds ago
SQ5J	4I4DX	1345 mi	18077.1	CW	CQ	14 dB	25 wpm	2027z 06 Jun	116 seconds ago
PA0AEV	4I4DX	4551 mi	18077.0	CW	CQ	7 dB	25 wpm	2027z 06 Jun	117 seconds ago



Can You Hear Me Now?

Archived data from 0300 MST for June 6, 2023

CW Academy

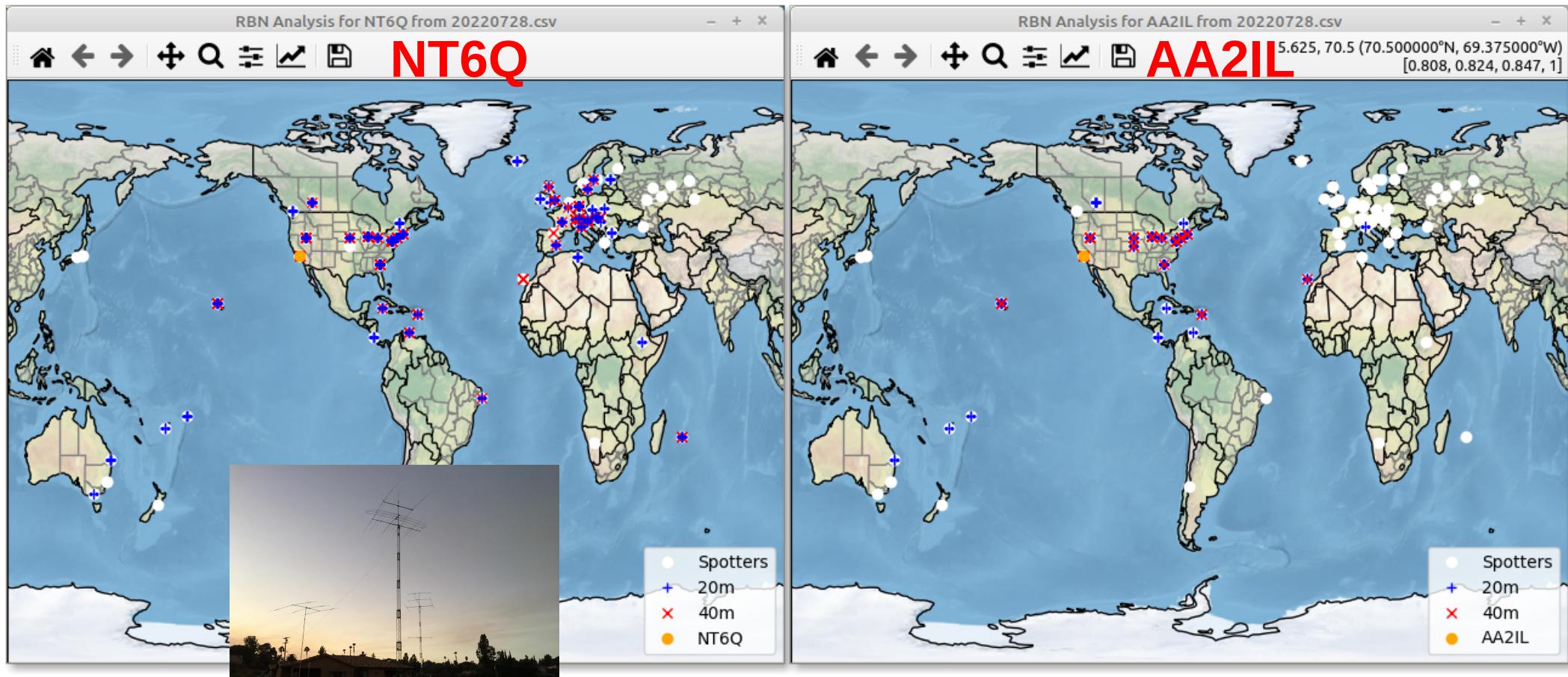




Big Gun vs Little Pistol

CWT 0300-0400 July 28, 2022

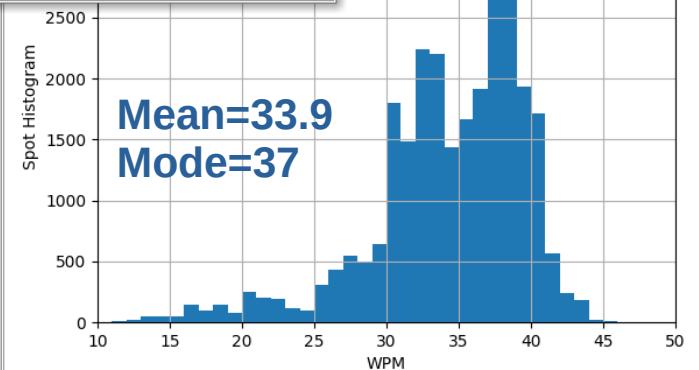
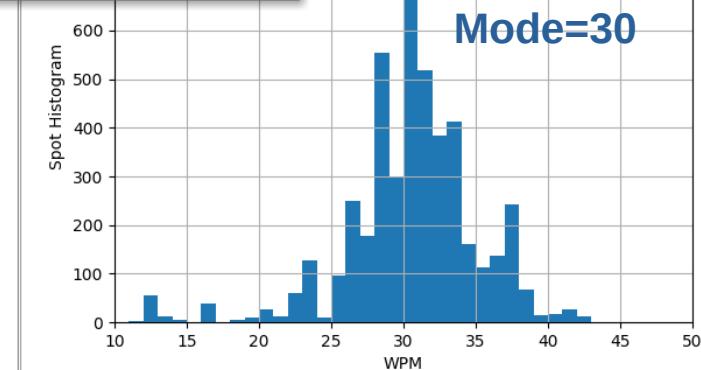
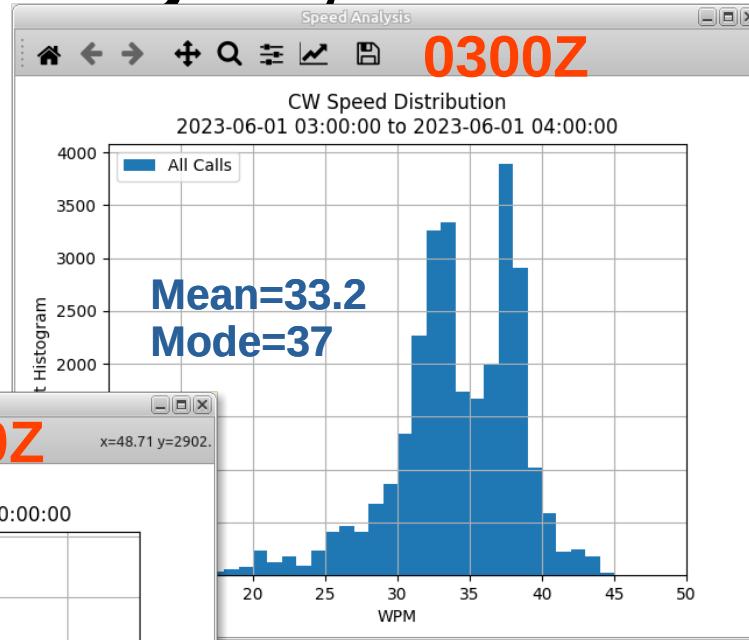
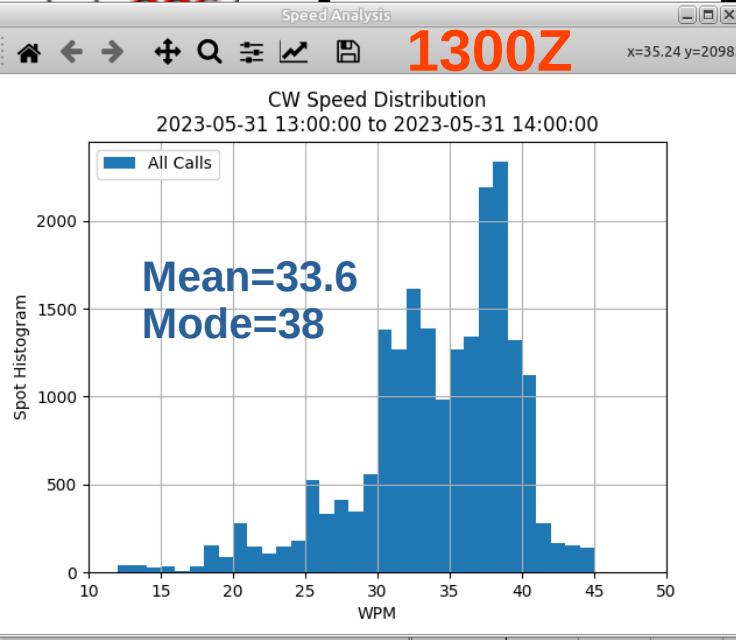
CW Academy





Speed Analysis – May 31, 2023 CWTs

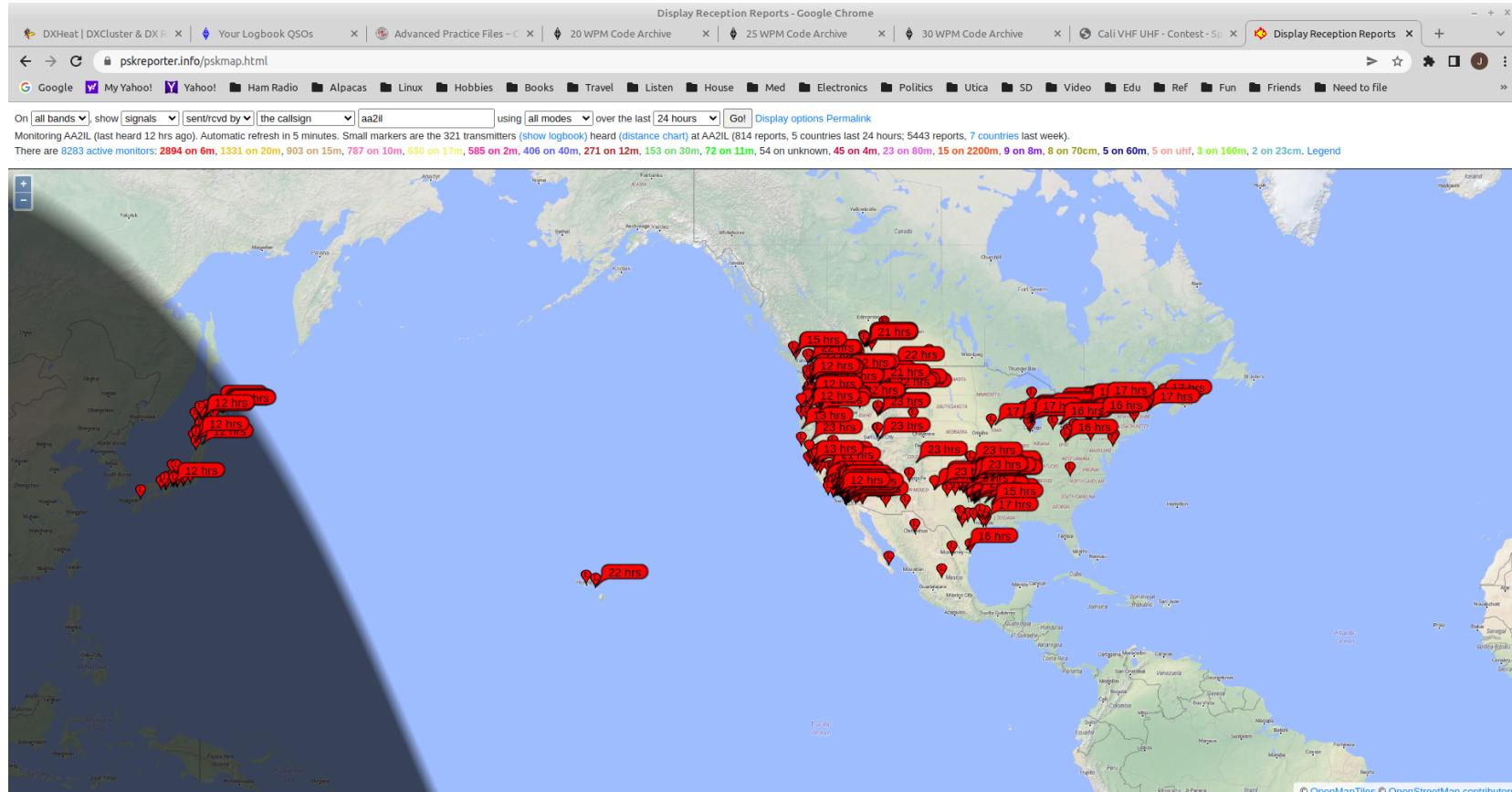
CW Academy





PSK Reporter – Stations Who Heard Me on 6m During the June 2022 VHF Contest

CW Academy





Week 7 - Session 12

CW Academy

- Go over h/w and on air activities
- CQ WW SSB is this weekend
 - Largest contest of the year
 - Look for a lot of DX activity before and after the contest!
 - Contests like this are a great time to hunt for rare **CW DX** (Most of the big guns are busy with the contest!)
- Cut Numbers
- Math Drill



Cut Numbers

- In the CWTs and many of the larger contests (e.g. CQ WPX), you will hear ops use abbreviations for numbers in the exchange
 - 599 → 5NN or even ENN
 - 11 → AA
 - 100 → 1TT or ATT
 - 1090 → ATNT
 - 2198 → UAND
- Other than 5NN, I don't like this practice and advise against it
 - However, others use it so you need to understand it!
- I find the easiest way to deal with a cut number is to log it and unwind the actual meaning later
- ~~One place where a cut number can be somewhat useful is~~ if you enter a contest late, you can send a leading "T" in your serial number to alert the other station to this:
 - 4 → T4 or TT4
- I advise against sending leading zeros for numbers above 9
 - Don't send TT7 or T25 in MST, just 7 or 25 – very few ops get over 100 Q's in the MST



CW Academy

Cut Numbers (cont.)

- Acceptable:
 - 0 → T
 - 1 → A
 - 9 → N
- Creative (Avoid Using These!):
 - 0 → the letter O
 - 5 → E
 - 2 → U
 - 8 → D
 - 3 → V NO!!!!!! Sound too much like 4
 - 7 → B NO!!!!!! Sounds too much like 6
- CQ WPX:
 - 599 → ENN
 - 1921 → AN2A
 - Some ops are very creative!



CW Academy

CW Math Drill

- 1 plus 2
- Is 3 R 3 times 5
- Is 15 R 15 div 3
- ? 15 div 3 Is 5 R 5 minus 1
- Is 6 NO 5 minus 1 Is 4 R ...
- Etc.
- Use ? Or AGN? for repeats and R to confirm answer
 - Try not using “voice” since you can’t do that on the air
- No Cut Numbers this time - We’ll do that next time



Week 7 - Session 13

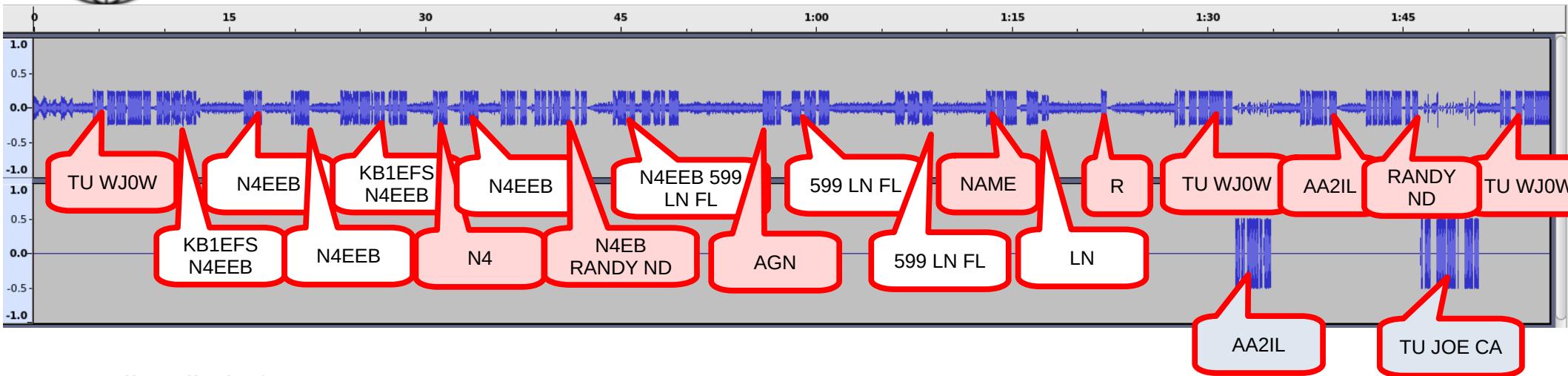
CW Academy

- Go over h/w and on air activities
- CQ WW SSB is this weekend
 - Largest contest of the year
 - Look for a lot of DX activity before and after the contest!
 - Contests like this are a great time to hunt for rare **CW DX** (Most of the big guns are busy with the contest!)
- A Comment on Speed
- 20-Questions



CW Academy

Fast is NOT Always Faster



- Audio Clip is from Jan. 2023 NAQP – PSE_QRS.mp3
- Running OP is clearly struggling (major kudos for putting ND on the air!)
- Persistent Pouncer with a somewhat difficult call and name only finally slows down after several repeats
 - Other pouncer gave up and moved on
 - “LN” is probably a shortened version of “ELLEN” but just doesn’t work in this context (IMHO)
- Runner never gets call correct so won’t get credit for QSO
- I was able to complete a contact quickly with no repeats simply by tapping on the brakes



Week 8 - Session 14

CW Academy

- Go over h/w and on air activities
- ARRL CW Sweepstakes is this weekend
 - Very popular
 - Difficult exchange
- CWops Club
- Math Drill
 - Higher numbers
 - Cut numbers



CWops Membership Requirements

CW Academy

- Demonstrate Proficiency at 25-WPM or higher
 - Easiest way is to make several contacts in the CWTs
 - You can also schedule contacts with current members to gain sponsorship (or call/answer CQ or have a give-back QSO or ...)
- Nomination + 3-sponsors
- You don't need to be perfect!
 - Implicit is the understanding that you will continue to improve as you get more involved with the club activities
- Dues: \$15/yr or \$60 for 5-years or \$125 for life



CWops Activities

CW Academy

- CWTs, CW Open, OTA Give Back, QTX
- CWA - **Please consider becoming a Advisor**
 - You can also be a co-advisor
- Solid Copy - Monthly Newsletter
- E-mail Reflector
- Awards: CWT Participation, ACA, CMA, WAS, DXCC, WAE, WAZ ...
 - Upload your logs to <https://cwops.telegraphy.de/>
 - Post CWT summaries to <https://3830scores.com/>



CW Academy

CW Math Drill

- 1 plus 2
- Is 3 R 3 times 5
- Is 15 R 15 div 3
- ? 15 div 3 Is 5 R 5 minus 1
- Is 6 NO 5 minus 1 Is 4 R ...
- Etc.
- Use ? Or AGN? for repeats and R to confirm answer
 - Try not using “voice” since you can’t do that on the air
- Use Cut Numbers this time if you are so inclined



Week 8 - Session 15

CW Academy

- Time change this weekend – meeting time on Monday?
- Go over h/w and on air activities
- ARRL CW Sweepstakes is this weekend
 - Very popular
 - Difficult exchange
- After tonight, one session remains
 - Any requested topics?
- 20-Questions



ARRL Sweepstakes (CW)

CW Academy

- First full weekend in November
- Very popular “treasure hunt”
- Non-trivial Exchange:
 - SERIAL, PRECEDENCE, YOUR CALL, CHECK, SECTION

CQ SS AA2IL

N7AUE

N7AUE TU 123 U AA2IL 78 SDG

TU 456 A N7AUE 74 NV

73 AA2IL



CW Academy

ARRL Sweepstakes (cont.)

- Serial = QSO Number (starting at 1)
- Precedence:
 - Q = Single Op QRP (<5W)
 - A = Single Op Low Power (<100W unassisted)
 - B = Single Op High Power (>100W unassisted)
 - U = Single Op Unlimited (i.e. assisted, any power)
 - M = Multi-op
 - S = School Club
- Your Call = Your Call Sign (again)
- Check = Year you were first licensed (two digits)
- Section = ARRL Section (There are 85 this year)
- NOTE: Work each station only once during entire contest (irrespective of band)



CW Academy

Accuracy is Important!

- Your score is generally the product of the number of QSOs and the number of “multipliers” (one or both may be weighted)
 - To get credit for a QSO, you must copy the call sign **and** exchange correctly
 - Your score tends to increase quadratically the longer you operate but ...
 - Errors tend to reduce your score quadratically as well
- Scoring for ARRL contests is particularly brutal as there is usually an additional penalty for each busted call sign
 - Not in Log (NIL)
 - Incorrectly copied/logged
- The winners of many large contests are often determined by which ops make fewer mistakes
 - Possible Goal: “Aim for a “Golden Log”
- This is not as much of a concern in the practice contests (SST/MST/CWT) since they are not adjudicated but ...
- How you practice will likely be reflected in your performance in an actual contest



CW Academy

Log Check Report (LCR)

ARRL SWEEPSTAKES 2022 CW AA2IL

CATEGORY-POWER: LOW

CATEGORY-ASSISTED: ASSISTED

CATEGORY-OPERATOR: SINGLE-OP

CATEGORY-STATION: FIXED

Note - Cabrillo category did not match your sent precedence.

I forgot to change my precedence b4 the start of the contest - no penalty.

TIME ON CALCULATION

2107-2142 = 36

2215-0709 = 535

1623-1722 = 60

2042-0258 = 377

On time = 1008 minutes (max of

CALLSIGN CHECK RESULTS

WR1GF is a busted call. The correct call is AC1GF. **Bad "fist"**

WJ6V is a busted call. The correct call is AJ6V. **QSO #235 (Sat. night)**



You had 2 calls in your log which were not found in the database of good callsigns. All of these were judged to be busted calls and will be removed from your score - along with an additional penalty of one QSO per busted callsign.



CW Academy

Log Check Report (cont.)

EXCHANGE CHECK RESULTS

QSO #281 W8PEN : A 64 OH should be A 65 OH
QSO #298 KX1E : U 56 ME should be A 56 ME
QSO #391 W4YE : B 52 VA should be A 52 VA

QSB?

Probably didn't correct pre-fill from call history
"

97.8% of your non dupe QSOs had their exchanges checked.

There were 3 exchange errors found. These QSOs will be removed from your score with no penalties.

CROSS CHECK RESULTS

QSO #84: QSO not found in log of N8XE
QSO #203: Received QSO# 299 should be 290 W5GAD
QSO #320: Received QSO# 225 should be 235 W2FDJ
QSO #348: Received QSO# 121 should be 21 AD5VC
QSO #366: Received QSO# 309 should be 209 K7FR
QSO #383: Received QSO# 82 should be 824 NE9U

Can't control what other guy does

Started to make more mistakes later in the contest

90.1% of your remaining good QSOs were cross checked.

There were 6 bad cross check QSOs removed.

You had one not-in-log. There will be a **penalty of one QSO for this.**



CW Academy

Log Check Report (cont.)

DUPE CHECK RESULTS

QSO #391 N9RV is a dupe or invalid.

Can only work each station once in the entire contest.

There was one dupe found. It was removed with no penalty.

MULTIPLIER CALCULATION

Clean sweep!

List of 84 mults = Al Nh Me Tn Ct WMa Ri Oh NLi Mn Ar Sdg WPa Wi NFL Nc Ga NNj Ne NTx Ok WTx Co EPa Or Ms La STx Sd EMa Ky Va Ks Sk Mdc Pac Qc Nd Wv Ons Nv ENy Org In WWa Mi SFl Pe Ia Il NNy Vt WNy Ak Mt Az Sv Vi Mo Sc Nm Scv Gta Sf Wcf Eb Bc Nt Id EWa Sjv Sb One Ab Pr Ut De SNj Wy Lax Mar Nl Onn Mb

SCORE SUMMARY

Raw QSOs = 462

RAW SCORE = $2 * 462 * 84 = 77,616$

Dupes = 1

SCORE REDUCTION = $1 - 75,096 / 77,616 = 3.2\%$

Busted QSOs = 11

Penalty QSOs = 3

Time Expired = 0

Final QSOs = 447 Band Breakdown (160-10):

0	44	206	76	95	26
---	----	-----	----	----	----

QSO Points = 894

Multiplier = 84

Final score = 75096

Error rate = 2.4% (100 X (Busted QSOs / Duped QSO total))



IARU HF Log Check Report

CW Academy

2022 IARU HF CHAMPIONSHIP AA2IL

There were 404 calls found.

Your full callsign is = AA2IL

Your ITU zone was 6

Easy exchange: 5NN ZONE

Call sign and/or call history give big clues
as to ITU Zone

CALLSIGN CHECK RESULTS

40CW JI1RFN is a busted call. The correct call is JI1RFB. **QSB?**

You had 1 calls in your log which were not found in the database of good callsigns. All of these were judged to be busted calls and will be removed from your score - along with an **additional penalty of one QSO** per busted Callsign.

EXCHANGE CHECK RESULTS

40CW K2ZW : 8 should be 6

Probably didn't correct pre-fill from call history

100.0% of your non dupe QSOs had their exchanges checked.

There was only one exchange error found. This QSO will be removed from your your score with **no penalty**.



IARU HF LCR (cont.)

CW Academy

CROSS CHECK RESULTS

15CW K4ZW QSO not found in log.

Can't control what other guy does

87.8% of your remaining good QSOs were cross checked.

There was one bad cross check QSO removed.

You had one not-in-log which will be deducted from your score.

There is an **additional penalty of one QSO** for every not-in-log.

DUPE CHECK RESULTS

KA0PQW is a dupe on 40CW at line # 403

There were 404 QSOs checked for dupes.

There was one dupe found. It was **removed with no penalty**.

Error rate = 0.7% ($100 \times (\text{Busted QSOs} / \text{Duped QSO total})$)

Easy exchange --> fewer mistakes!



CW Academy

More Contest DOs and DON'Ts

- Before the contest:
 - Become familiar with the rules (who to work, exchange, scoring, multipliers, log submission deadline)
 - Update and test computer OS and logging software (Also test your rig and antennas)
 - Take a look at the NCJ for hints from top-tier contestants
- After the contest:
 - Upload your summary to 3830scores.com
 - Track your progress
 - Get more visibility for your call sign
 - Credits toward club awards
 - Upload your log to LoTW and Clublog
 - The final courtesy of a QSO is a confirmation (QSL)
 - Submit your log to the contest sponsor
 - Helps with log checking
 - Many sponsors will provide you a log-check report so you can see how accurate you are
- During the contest:
 - Don't send "B4" to a Dupe
 - Just work him again - Its almost always faster
 - He may not have you correctly in his log
 - He may be using an old-school paper log
 - Call your CWA advisors/classmates/friends for extra brownie points!!!



What If You Miss Something?

- Occasionally, you will miss a call sign or part of an exchange:
 - QSB, QRM, QRN, Poor Fist, Fatigue ...
- If you are running, you **must** ask for a repeat if you have any doubts:
 - Call sign: N0? or PM? or 0? or CALL? or ? or “the pregnant pause”
 - Serial: NR?
 - Name: Name?
 - QTH: QTH?
 - Entire Call or Exchange: ? or AGN?
- If you are S&Ping, use your discretion whether to ask for a repeat or just listen to the next QSO
 - How competitive are you?
 - How busy is the runner?
 - Try not to slow the runner or next caller down
 - Don't ask for his call sign unless he hasn't ID'd in several QSOs
 - Be careful with serial numbers – they are not always consecutive!
- In either case, try to be specific what you need
- Perfection is not necessary in an un-scored practice contest but don't get lazy!



CW Academy

Scoring & Classifications

- **YOUR SCORE = QSO POINTS x MULTIPLIERS**
- **Unassisted** – No spotting assistance or multi-signal decoder
- **Assisted** – Use of Spotting Assistance
 - DX Cluster, Reverse Beacon Network, CW Skimmer, WSJT-X ...
- **QRP** – 5-Watts or less
- **Low Power** – 100-Watts or less
- **High Power** – Over 100-Watts
- Single Op, Multi-op, ...



CW Academy

Session 16 – Graduation!!

- Certificates
- “It’s the Most Wonderful Time of the Year” for CW:
 - CQ WW CW in a couple of weeks
 - DX: Yemen, Botswana, Cameroon, Temotu,...
- Major CW contests throughout the year:
 - NAQP – January and August
 - ARRL International DX CW – February
 - CQ WPX CW – May
 - ARRL Field Day - June
 - IARU HF Championships – July
 - CWops CW Open – September
 - California QSO Party - October
 - ARRL Sweepstakes - November
 - CQ WW CW – November
 - State QPs - February – November
 - ARRL 10m and RAC Winter QP – December
- Final slide deck for class is available at https://github.com/aa2il/CWA/blob/master/0-CWA_Notes.pdf





CW Academy

My Favorite Ham Websites

- Contesting related:
 - WA7BNM's Contest Calendar: contestcalendar.com
 - WA7BNM's Contest Score Rumors: 3830scores.com
- DX Cluster:
 - DX Heat: www.dx-world.net
 - DX Watch: dxwatch.com
- Activity:
 - Reverse Beacon Network: reversebeacon.net
 - PSK Reporter: pskreporter.info
- Chasing DX:
 - DX World: dx-world.net
 - DX News: dxnews.com
- Propagation:
 - VOCAP: voacap.com
 - DX View: hf.dxview.org
- Just Plain Cool:
 - ADIF to MAP: analyzer.adventureradio.de
- There are many other very good sites



Final Comments

CW Academy

- It has been a genuine pleasure working with each of you
 - You each have made significant progress
 - There is an optional self-evaluation on the CWops website
- Please keep in touch
- Keep on practicing
- Get on the air!
- Please provide feedback to us on this class:
 - Overall format (too much talk, not enough practice?)
 - Topics you would like to see
 - Topics that we should have skipped ...
- If any of you are linux hackers and are interested, I'd like some collaborators on the operating tools I showed you



Additional Material

CW Academy

- More Contesting Info
- Sending
- Morse Code Timing
- A simple iambic keyer/code practice oscillator
- FT8
- My station and software



CW Academy

ARRL Field Day

- Fourth Weekend in June
- One of the most popular operating event all years
 - “Its not a contest” – Logs are not adjudicated
 - RAC Section list as been updated (and a few other rule changes)
- Exchange:
 - No. TRANSMITTERS, CLASS and SECTION

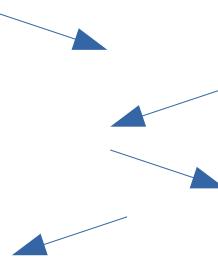
CQ FD AA2IL

N7AUE TU 2E SDG

73 AA2IL

N7AUE

TU 1B NV





CW Academy

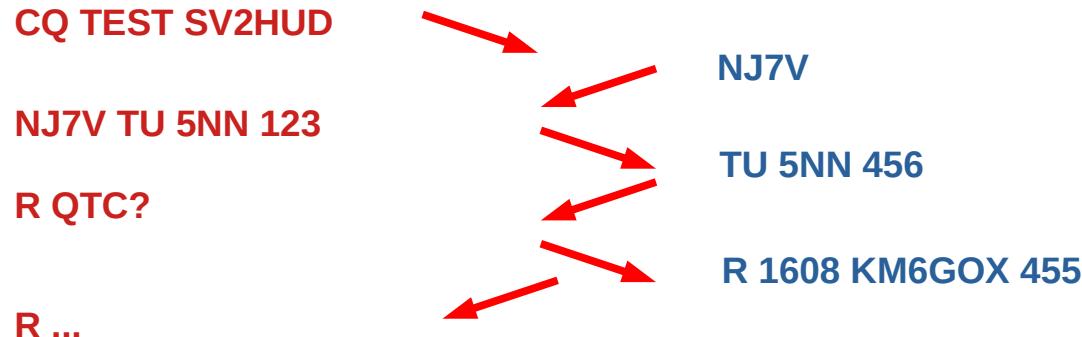
Sprint Contests

- The QSY requirements make these events quite different compared to a typical contest:
 - If you call CQ, you must QSY at least 5-KHz before you can call CQ again
 - If you pounce, you can answer one caller and then you must QSY
- The order of the elements in the exchange indicates who is the CQer and who is the pouncer:
 - **CQ NA AA2IL**
 - **N7AUE**
 - **N7AUE AA2IL 123 JOE CA**
 - **AA2IL 456 JIM NV N7AUE**
 - **TU**
 - **W0WL**
 - **W0WL N7AUE 457 JIM NV**
 - **N7AUE 789 JOE WA W0WL**
 - **TU**
- See <https://www.kkn.net/n6tr/sprint.html> for an in depth look



QTCs

- Some European contests include “QTCs” which add another level of difficulty to the exchange
 - A QTC is info from a previous contact you had in the contest
 - True test of skill since nearly impossible to predict
- Example (Time Call Number)



- YL3JD's QTC Trainer: <https://yl3jd.fizioikskile.lv/qtc/>
- YL3JD's Contest Trainer: <https://yl3jd.fizioikskile.lv/fsm/>



Some Thoughts on Sending

- Sending clean and crisp code is as important as copying
 - Your “fist” is your signature on the air
- General rule of thumb is to never send faster than you can comfortably copy
 - Will depend on conditions
- But, as you head copy skills improve, you will likely outpace your “clean” sending speed
- In a contest, most ops are using a computer for sending
 - This is perfectly acceptable and I encourage you to do this, especially in the CWTs
- However, a well-rounded CW operator must have a decent “fist” so you need to devote time to practicing sending



CW Academy

Sending Practice Ideas

- Lists of panagrams (see CWops website and my github site)
- Look around the room and/or send whatever comes to mind
- Get on the air and rag chew
- Use your paddles in SST or POTA activations
- Try sending above your comfort zone (off the air)
- Programs exist that turn sending with an external keyer into a game
 - Iambic Master + Winkeyer
 - Morseino
 - Role your own (nanoIO, K3NG, ...)
- Other options
 - Use a code reader (ONLY FOR THIS PURPOSE!!!!!!)
 - Listen to a recording of your sending





Feedback from My Keyer

CW Academy

Sending Practice by AA2IL

How quickly daft jumping zebras vex.

Panagrams Call Signs Letters Letters+Numbers Special Chars All Chars Stumble QSO Book

Paddles: 25 Monitor: 0

Previous Next Quit

pyKeyer by AA2IL

File Batter Up VFO A VFO B A->B Swap SO2V DX Split Paddles: 25

Call	Name	Exchange	Super	Check	Partial

~S022s~U022u
~S024s~U024u
~S025s~U025u
NST
TEST
QUICK FOX JUMPS NIGHTLY ABOVE WIZARD.
HOW Q~CKLY DAFT JUMPING ZE BRAS }X.
HOW QUICKLY DAFT JUMPING ZEBRAS VEX.

CQ	Reply	TU/QRZ?	Call?	AA2IL	S&P Reply	?	Log QSO	Name 2x	No. 2x	NAME?	NR?
QRZ?	TU/QRZ?	TU/QRZ?	Call?	His Call	S&P 2x	AGN?	RR				QRL?
Macros:	CWT		WPM:	25				None	Send	QRZ ?	
			+2 WPM	-2 WPM					QSO Rate:		



CW Academy

“Squeeze” Sending

- CWops encourages use of paddles and electronic keyers
 - Cleaner fist at faster speeds
 - Most ops “hit a wall” at 15-20 wpm using a straight key
 - Eventually, you will hit a wall with a keyer also → keyboard sending
- There are two types of paddles
 - Single lever
 - Dual lever
- With a dual lever paddle, you can “squeeze” the levers together to form letters with alternating dit/dah patterns:
 - Reduces number of “motions” required to form a symbol
 - A, C, K, N, R, period, ...
 - Can even combine squeeze technique with “non-squeeze” to form most other symbols
 - L, F, Q, Y, ...



CW Academy

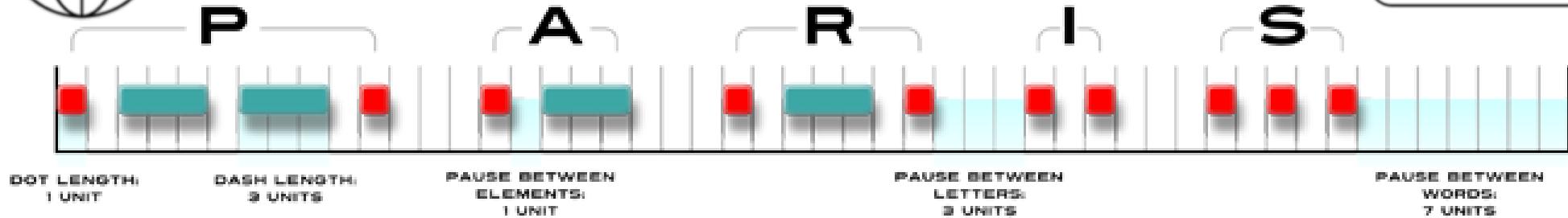
“Squeeze” Sending (cont.)

- If you don’t “squeeze,” there is no real difference between single and dual-lever paddles
- The advantage of squeezing dual-paddles over a single-lever paddle is not nearly as much as using an electronic keyer over a straight key
 - HST guys use single-lever paddles because less prone to making mistakes
- There are two Iambic “squeeze” modes:
 - Mode A: Sending stops after current element is sent
 - Mode B: Alternate element is sent before sending stops
- Excellent video demonstration by AA4OO:
 - <https://www.youtube.com/watch?v=6R4t3Wq1Gic>



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PROPERLY SPACED MORSE CODE TIMING



"PARIS" [at 50 units in length] is used to represent 1 word which can then be divided into a minute to get the WPM rate.

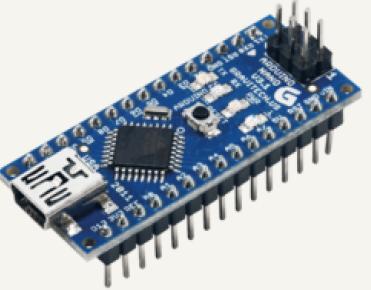
- T = Duration of a dit (seconds)
- “Paris” is the “standard” word length = 50 dits
- WPM = No. Times we can send this standard word in a minute = 60 sec. / (50 T)
- **T = 1.2/WPM seconds**
- e.g. For 25 WPM, each dit is $1.2/25 = 0.048$ s = 48 ms



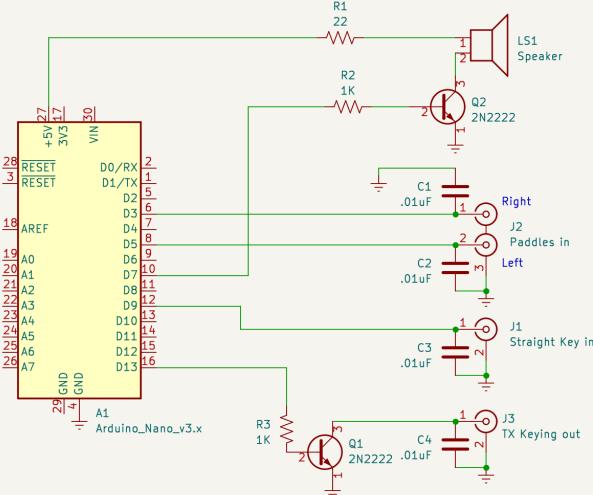
Homebrew Arduino Nano Keyer/Code Practice Oscillator

CW Academy

- A number of keyers are commercially available and are quite popular, e.g.
 - Winkeyer
 - Morseruino
- You can easily “roll your own” using a micro-controller (Arduino, ESP-32, ...)
 - This is a much cheaper option, especially if you have a well-stocked junk box
 - K3NG – Has every feature imaginable!
 - Fldigi Nano IO (W1FKJ) – easily fits in an arduino nano
- The keyer I use is an adaptation of W1FKJ’s Nano IO
 - Full schematics and firmware source are available at <https://github.com/aa2il/nanoIO>
 - Doubles as a code practice oscillator and gives you feedback on your timing
 - Minimal parts count
 - I’ve recently adapted K3NG firmware which emulates Winkeyer protocol so should work with N1MM logger



Schematic

**NOTES:**

1. Circuit is powered via USB cable to Arduino Nano.
2. Firmware for Arduino Nano was originally based on nano io interface by W1HKJ.
3. Precise values of components is not critical. Use what you have in your junk box!
4. R1 controls the sidetone volume.
5. C1-C4 are bypass caps to suppress RF — precise values are not critical. If RF continues to be a problem, replace Q1 with an optocoupler.
6. LS1 is a small conventional magnetic speaker I scavenged from an old answering machine. If a different type of transducer is used, consider connecting R1 directly to Q2 and AC coupling the audio transducer through a 10uF electrolytic capacitor as shown on the next page.
7. Assignments of Arduino data pins is configured in firmware and easily changed.
8. PTT and RTTY signalling are also available via pin D10 and D12 respectively. Simply add two switching circuits similar to that shown for TX keying. A cleaner solution is to use an quad optocoupler as shown on the next page.
9. Device can be operated as stand-alone using default parameters. The full capabilities of the device can be accessed via a terminal program such as putty or minicom. Device is fully supported by pyKeyer by AA2IL.

Full-featured Keyer

File: Full_Featured_Keyer.kicad_sch

Dr. J. B. Attili
AA2IL

Sheet:
File: keyer.kicad_sch

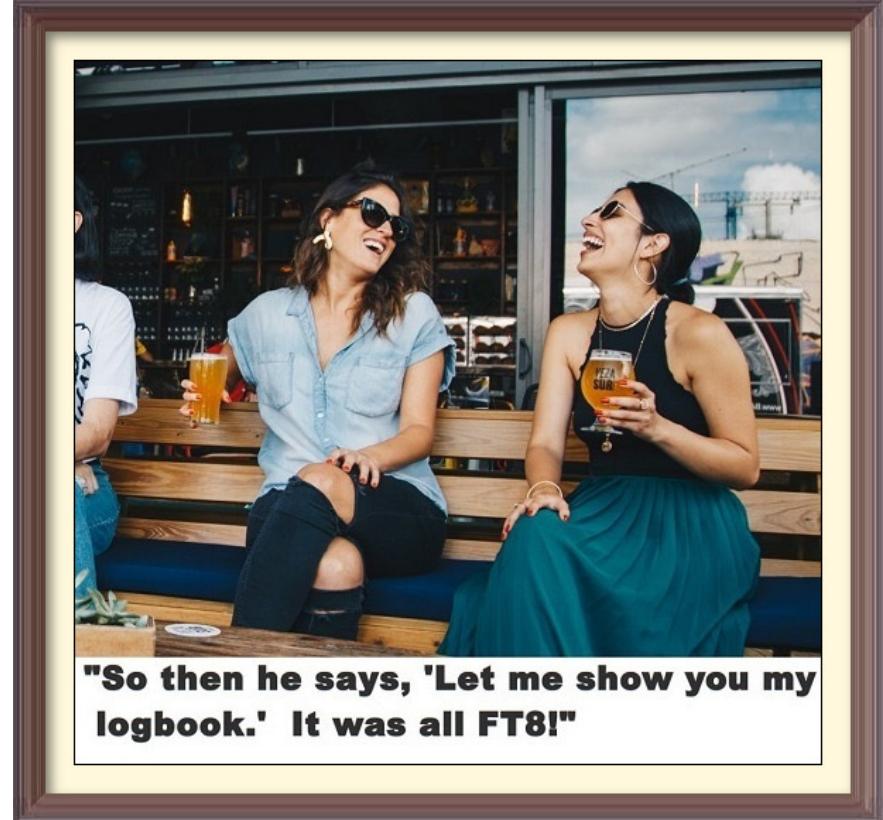
Title: Barebones Nano IO Keyer

Size: A4 Date: Feb. 2023 Rev: 1.0
KiCad E.D.A. kicad 7.0.0-da2b9df05c-163-ubuntu22.04.1 Id: 1/2



The Elephant in the Room

CW Academy



"So then he says, 'Let me show you my logbook.' It was all FT8!"



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What about FT8?

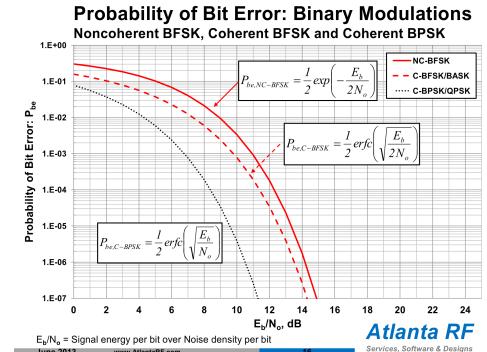
- There is no question that FT8 is by far the most popular mode in use these days
 - Nearly all DXpeditions include a significant FT8 component in their operating plan
- There is also no denying that this mode stirs up some very heated comments amongst CW devotees.
- On the plus side:
 - The use of error control coding introduces redundancy that improves performance compared to RTTY
 - In an age of ever increasing restrictions (e.g. HOAs) and RF noise, it offers many ops an opportunity for many to still enjoy our great hobby
 - It can provide a gateway to newcomers (who we hope will eventually become bored with FT8 and endeavor to learn CW!)
 - It is possible to enjoy being on the air while doing something else
 - There's always a party to be found on somewhere!



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FT8 – The Rest of the Story

- Major Objections include:
 - The existence of “robot” variants of WSJT-X that don’t require any human intervention – not as prevalent as it is made out to be
 - Lack of a conversational capability - JS8CALL is not very popular
 - Dependency on an accurate clock – easy to overcome using a cell-phone or GPS dongle
- IMHO, the WSJT software and operating technique have not kept up with the explosive popularity of this mode
 - Confining a large number of ops into a single voice channel with no standard method to “spread out” results in a “QRM-fest”
- Its sensitivity/capabilities are greatly exaggerated:
 - Referencing the SNR of a signal that only occupies a few Hz of bandwidth to 2.5KHz is questionable:
 - $\text{SNR}_{\text{ft8}} = S / N = [E_b R] / [N_0 B_{\text{ref}}] = E_b/N_0 R/B_{\text{ref}}$
 - E_b = Average Energy per Information bit
 - N_0 = Noise Power Spectral Density (assumed white)
 - R = Information data rate = ~77-bits/15-sec.
 - $R/B_{\text{ref}} = (77/15)/2500 \sim -27 \text{ dB}$
 - $E_b/N_0 = \text{SNR}_{\text{ft8}} + 27 \text{ dB}$ is the standard measure of SNR when evaluating the performance of a digital comm schemes
 - **The myth that FT8 somehow magically digs signals out from well beneath the noise floor and is therefore much more sensitive compared to other modes, including CW, is simply NOT TRUE!**
- The F/H mode is confusing and of dubious value since it reduces the fox’s signal by 6-dB each time he doubles the number of streams
 - Burying this option in an obscure menu doesn’t help – turns out “hounds” don’t need it if they stay above 1-KHz!
 - Signals from the MSHV variant look similar but are not F/H





Why do I Still Use FT8 Occasionally?

CW Academy

- Its radio – it still requires some skill to navigate through propagation and QRM
 - CW is much more satisfying!!!
- Chasing DX
 - You need to be where the action is
 - The behavior in some recent CW DX pile-ups has been a blemish on our great hobby (DQRM, lids, cops). The FT8 pile-ups were much more orderly (not at all perfect!).
- VHF Contesting and EME
 - FT8 is dominant on 6m and JT65 is dominant on EME
- Although exaggerated, the signal reports are real and objective measures (unlike the usual 5NN)
- PSK Reporter immediately shows what bands are open and who's on
- I can still play radio while doing something else



AA2IL Homebrew Software

CW Academy

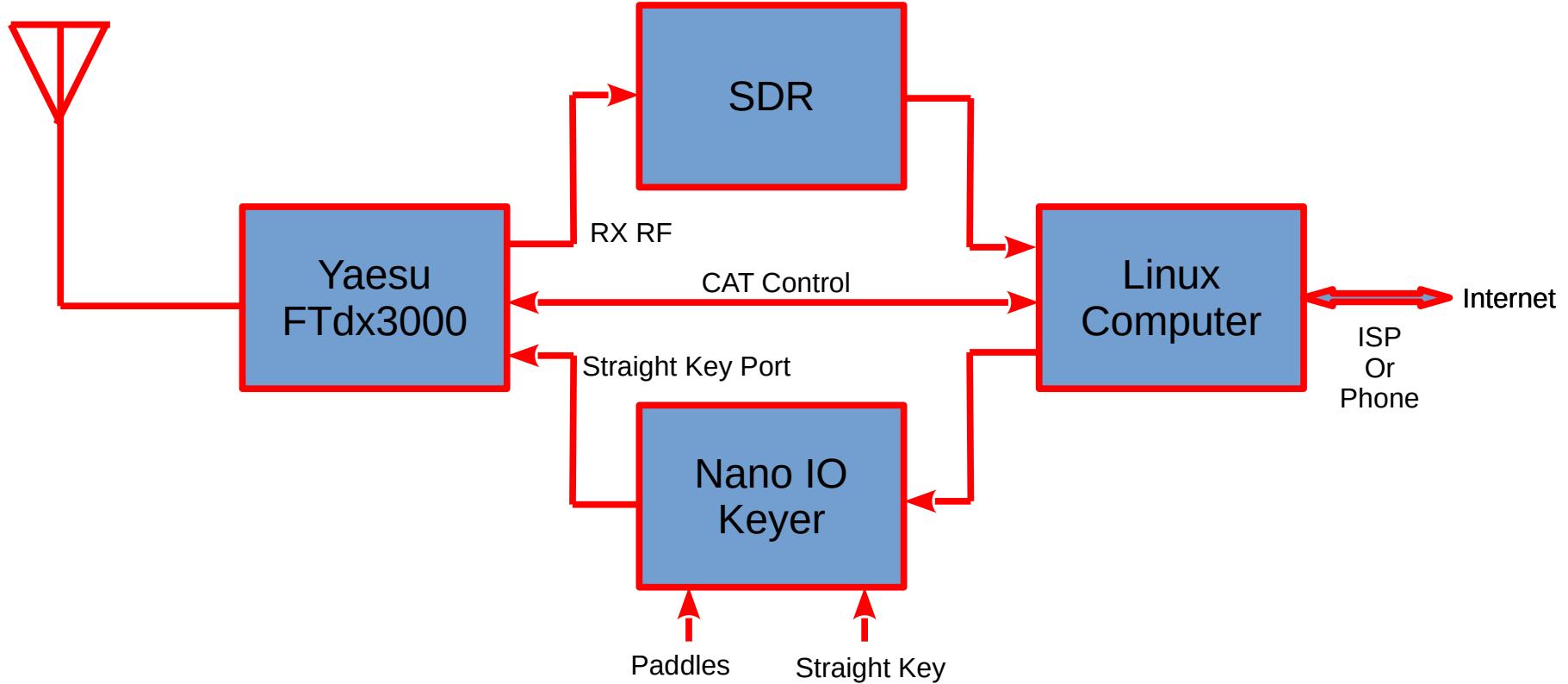
- Source and some binaries are available at github.com/aa2il
 - Integrated suite of apps
 - Developed under linux but most recently ported to Windoz
 - Windoz binaries also available – see “Releases” on RHSs
 - Very little documentation
 - Would welcome collaboration!
- **pyKeyer**
 - Contest rig control (via flrig) and logging
 - Practice mode for contests and sending
- **bandmap**
 - DX Cluster spots
 - Worked/”Need” tracking
- **wclock** – World clock with gray-line map
- **pySDR**
 - Software Defined Receiver
 - Panadapter
 - Does not work yet on Windoz

The screenshot shows the GitHub repository page for `aa2il/pyKeyer`. The page includes a list of files in the `master` branch, a detailed commit history, and a sidebar with repository statistics like stars, forks, and languages. The **Releases** section is highlighted with a red oval, showing a single release entry for `pyKeyer v1.0 by AA2IL` marked as `Latest`.



AA2IL HF Station

CW Academy





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Other Topics – Next Time?

- SOTA/POTA
- VHF+ and Satellite Contacts
- Other games:
 - Dear Diary – sending practice, what did you do today?
 - Never ending story – each person adds to the story
 - It was sunny today
 - My dog went outside
 - He chased a cat ...
- Log for Old Men – A couple of students were using this one
- Muley had an interesting variation of SST drill where he and I jumped in under other call signs