



CW Academy

CWA Advanced Class Notes

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January-February, 2025



Session 0

CW Academy

- 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 the first class on Monday



CW Academy

Overview

- 8-weeks (Monday & Thursday evenings in North America, 6-7PM on the West Coast (0200-0300 UTC Tu & Fri)
 - MST follows immediately after on Mondays
 - We would like to have an on-air rag-chew session each week as well
 - **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
 - Practice sending also!
 - Software: **RufzXP** and **MorseRunner**
 - There is a “community edition” of Morse Runner that includes several different contest formats
 - DO NOT use any special lists of call signs!
 - Evaluate your sending (e.g. Iambic Master, recording ...)
 - **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



Course Topics

CW Academy

- Sending
- 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
- ???



CW Academy

Philosophy

- Its a hobby, not a competition or a vocation!
 - 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



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 foothills Northeast 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

Go Brass Flounders!





CW Academy

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)



NAQP CW Contest

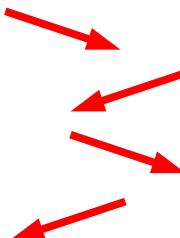
CW Academy

- Saturday 1800z, 12-hours (10-hour time-limit for Single Ops)
- 100W Power Limit – levels the playing field somewhat
- Exchange: NAME and STATE/PROVINCE (same as SST)

CQ NA AA2IL

N7AUE TU JOE CA

GL AA2IL



N7AUE

TU MULEY NV

- If you miss something: ?, AGN?, CALL?, NAME?, QTH?, N7?, AUE?, ..



Week 1 - Session 1

CW Academy

- Go over Homework and On-The-Air (OTA) activities
- We're in the middle of the winter contest season:
 - NAQP SSB Exchange is NAME and STATE
 - ARRL VHF+ Exchange is Grid Square (4-chars)
 - <SOAPBOX> **USE PROPER PHONETICS !!!** </SOAPBOX>
- Get on the air!
 - There's always rags to chew, DX/POTA/SOTA/SES stations ...
- Sending
- Word game drill
 - Animals
 - Colors



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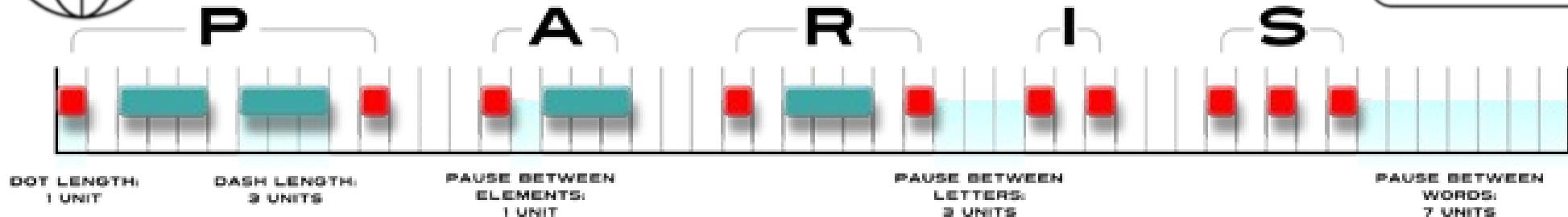
CW Sending

- 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 and context
- But, as you head copy skills improve, you will likely outpace your “clean” sending speed
- Most CONTEST OPS are using a computer for sending
 - You are encouraged to do this, especially in fast-paced events like the CWTs
- However, a well-rounded CW operator must have a decent “fist” so you need to devote time to practicing sending
- **For class sessions, keep your speed under 18-20 WPM!!!**



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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 = $60 \text{ sec.} / (50 \text{ T})$
- **T = 1.2/WPM seconds**
- e.g. For 25 WPM, each dit is $1.2/25 = 0.048 \text{ s} = 48 \text{ ms}$



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Sending Practice Ideas

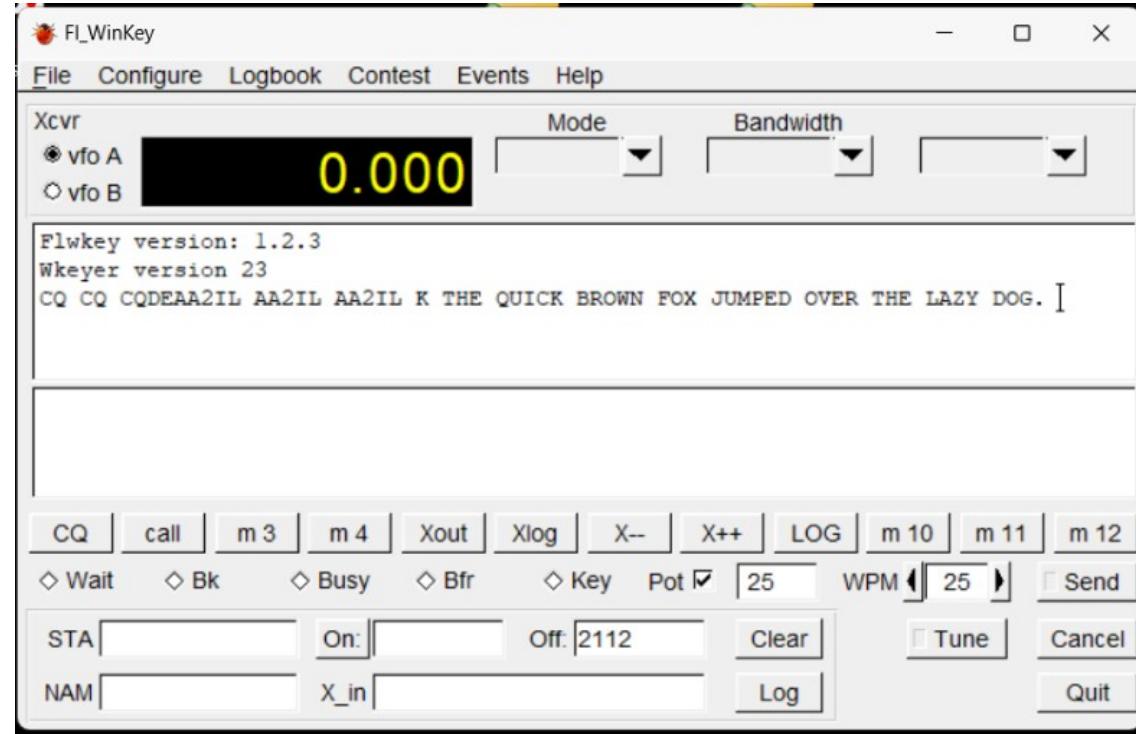
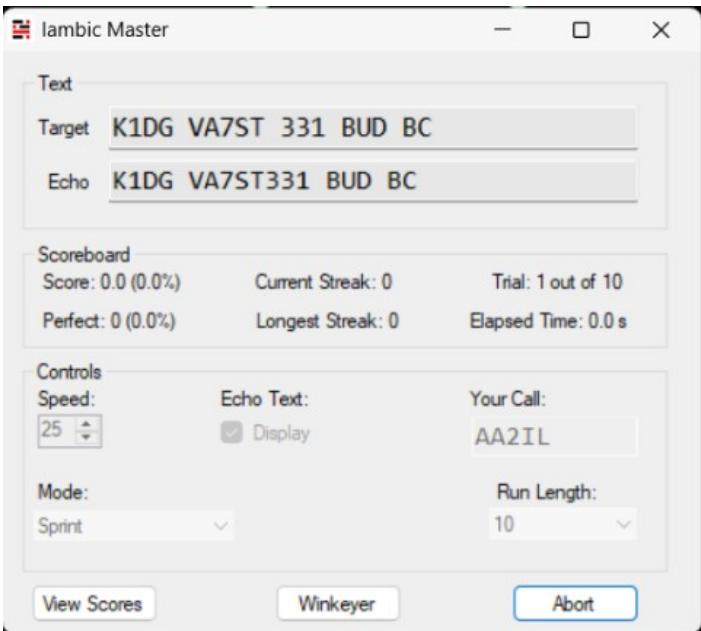
- Devote at least 5-10 min. each day to practicing with your paddles
- List of Panagrams
- List of Call Signs (e.g. from DX Cluster)
- Look around the room and/or send whatever comes to mind or what you might say in a QSO
- BEST: Get on the air and rag chew
- Use your paddles in SST or POTA activations
- Try sending slightly above your comfort zone (off the air)



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Evaluate Your Fist

- Programs exist that evaluate your sending
 - Iambic Master + Winkeyer
 - FLwkey + Winkeyer
 - Morseino
 - G4FON Trainer, ...
- Easy/cheap to “role your own” keyer that works with these programs
- Listen to a recording of yourself





Paddling Practice With My Keyer

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Sending Practice by AA2IL

Six boys guzzled cheap raw plum vodka quite joyfully.

HEAVY BOXES PERFORM QUICK WALTZES AND JIGS.

ZELDA MIGHT FIX THE JOB GROWTH PLANS VERY QUICKLY ON MONDAY.

SIX BOYS GUZZLED CHEAP RAWPLUMVODKA QUITE JOYFULLY.

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

Paddles: 24 Monitor: 0

Current Previous

Previous Next Strict Casual Keyer Ctrl 2 0 - 1 Quit

Let's Rock!

- Python code is available at <https://github.com/aa2il/pyKeyer>
- Runs under Linux and Windoz (see README.md)
- Should work with Winkeyer



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“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, ...



“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
 - The 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>



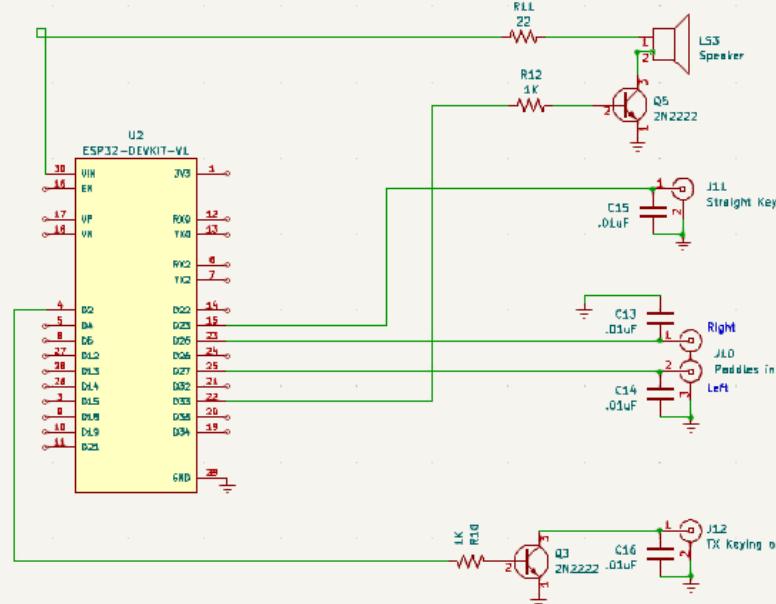
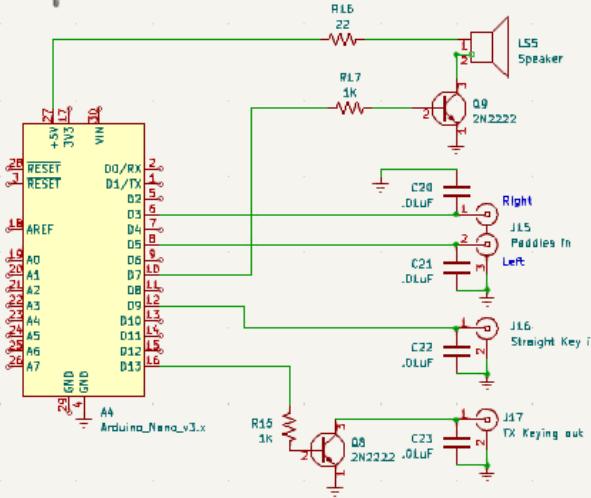
Homebrew Arduino Nano Keyer/Code Practice Oscillator

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 and includes Winkeyer emulation
 - Flldigi Nano IO (W1HKJ) – easily fits in an arduino nano
- I use adaptations of both the Nano IO and K3NG/Winkeyer emulator
 - 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



cademy



AAZIL

Sheet: /ESP32_Keyer1/
File: ESP32-Keyer.kicad_sch

Title: Two versions of bare-bones keyer

Size: A4 Date: Rev:
KiCad E.D.A. kicad 7.0.10-7.0.10-ubuntu22.04.1

Id: 4/4



Week 1 - Session 2

CW Academy

- Questions on h/w & on the air activities?
- January CW Ops Newsletter is available
- Leftovers
- Contesting Intro + SST
- Drill: Simulated SST
 - Each student gets to run and others call
 - Mulley and I might just jump in on this one
 - Set your keyer to 18-20 WPM



Miscellaneous Leftovers

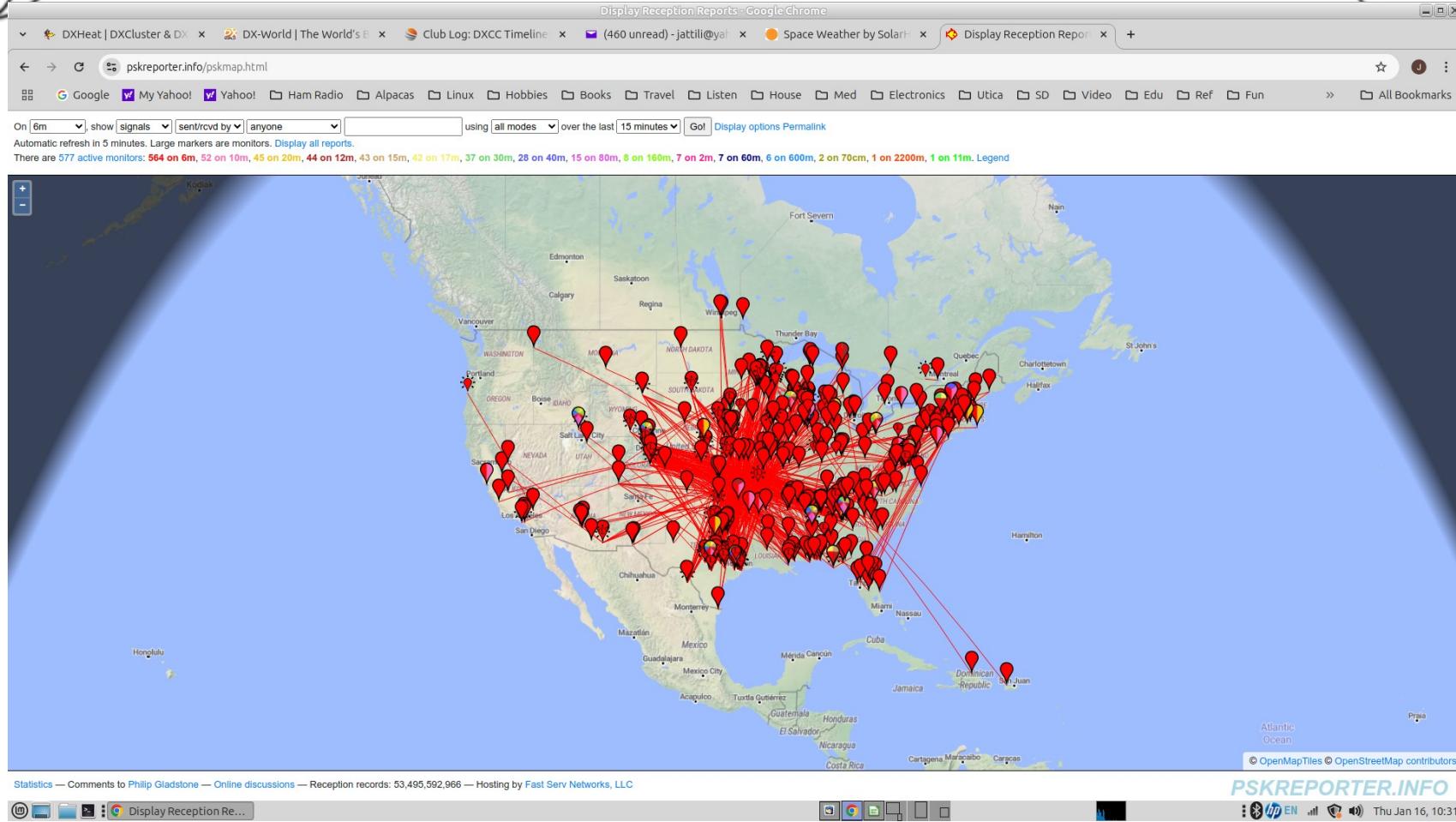
CW Academy

- Read over notes from Monday regarding “Squeeze Sending” and rolling your own keyer
- Jitsi: You can use the SPACE BAR as a PTT
- The January VHF+ Contest is this weekend
 - Exchange is 4-character maidenhead grid square (e.g. DM12)
 - Look for CW activity 50.09 MHz +/- and 144.2 MHz +/-
 - Look for SSB activity around 50.125 MHz, 144.2 MHz and 432.1 MHz, all +/-
 - Look for FM activity around the calling frequencies: 144.52 MHz and 446.0 MHz (Check the rules!)
 - FT8 dominates 6m with sporadic activity on 2m and 70cm
- **Morse Runner CE** incorporates several different contests
 - <https://github.com/w7sst/MorseRunner>
- If you have a Winkeyer, **Iambic Master** and **FLwkey** are programs to help you with your sending:
 - <https://sites.google.com/site/korkowp1/iambic-master>
 - <http://www.w1hkj.com>



6m Activity This Morning

CW Academy

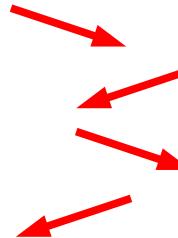




VHF+ Contesting

- Several times each year – January, **June, July** and September
- All modes, work each station once per band regardless of mode
- Propagation is MUCH more unpredictable than HF!
- A common practice is once you make a contact with someone, ask them to move around to different bands
- Exchange: 4-character Maidenhead Grid Square

CQ TEST WE7DW



VA4ADM

VA4ADM CN85

TU EN19

73 VA4ADM

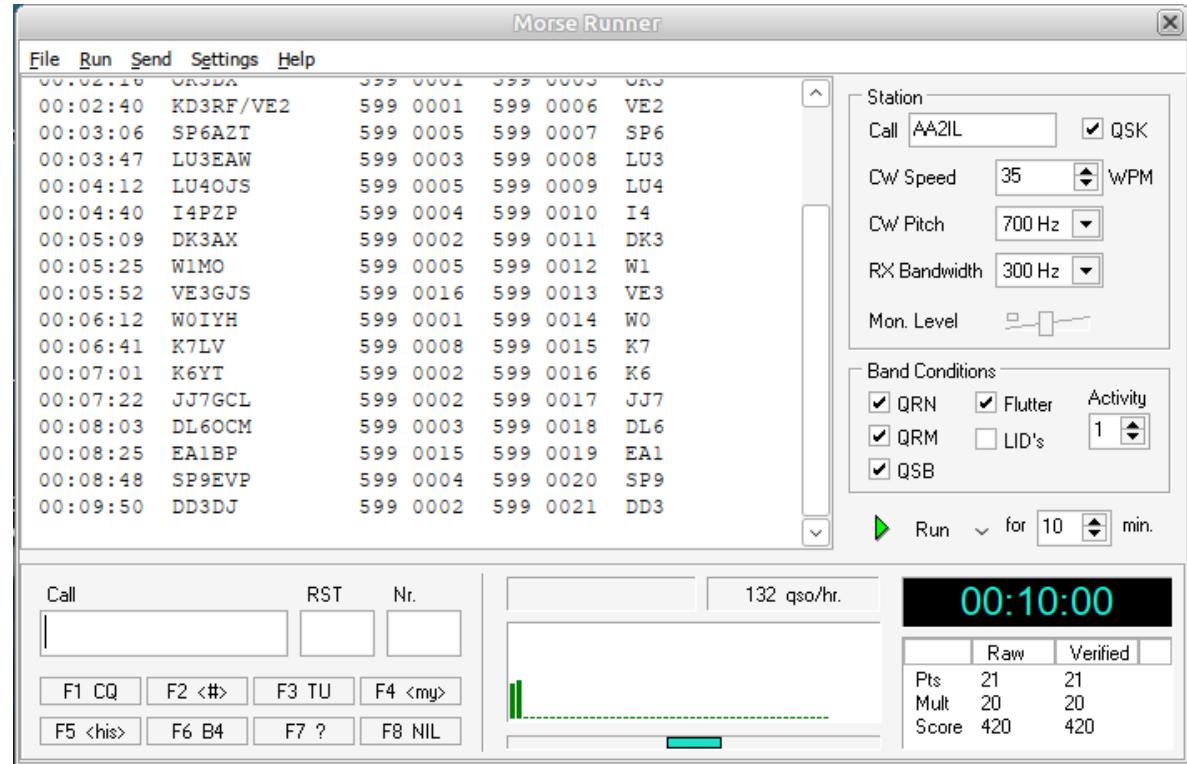
- Pace is generally relaxed so friendly greetings & chatter are acceptable



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Morse Runner

- Morse Runner is a realistic simulation of a contest environment
 - Signal effects
 - Multiple callers
 - Lids, etc.
- Experiment with the various settings to find where you are comfortable
 - Initially, set the **Activity** level to 1 and turn off **LIDs**
- Introduce more effects as you become more proficient





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Morse Runner Buttons

- **F1 = CQ** You are the runner, use this to solicit a call
- **F2 = #** Your Exchange (5NN + Serial Number)
- **F3 = TU** Got it, 73, next caller please
- F4 = My Call Shouldn't need this too much
- **F5 = His Call** Use this if you only copy part of a call
- F6 = B4 Duplicate QSO, don't use this, just work him again
- **F7 = ?** Please for a repeat
- F8 = Nil Incomplete/invalid QSO, Rarely ever need this
- F11 = Wipe Wipe everything
- F12 = Send Number
- Others???



CW Academy

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
- ...



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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
 - If you are “assisted,” Trust but Verify callsign
 - 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

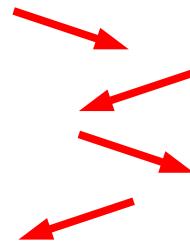
CW Academy

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

CQ SST AK4R

K7NX TU STEVE TN

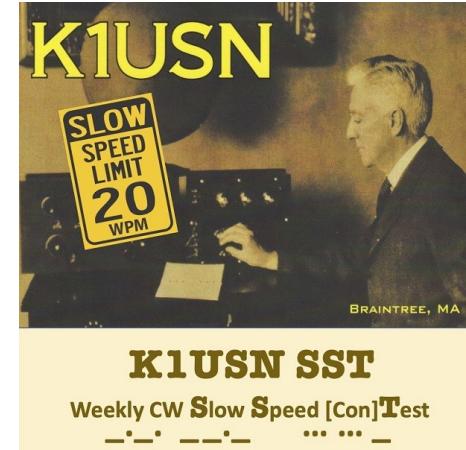
GL LLOYD 73EE



K7NX

GE LLOYD AZ

or
GE STEVE LLOYD AZ



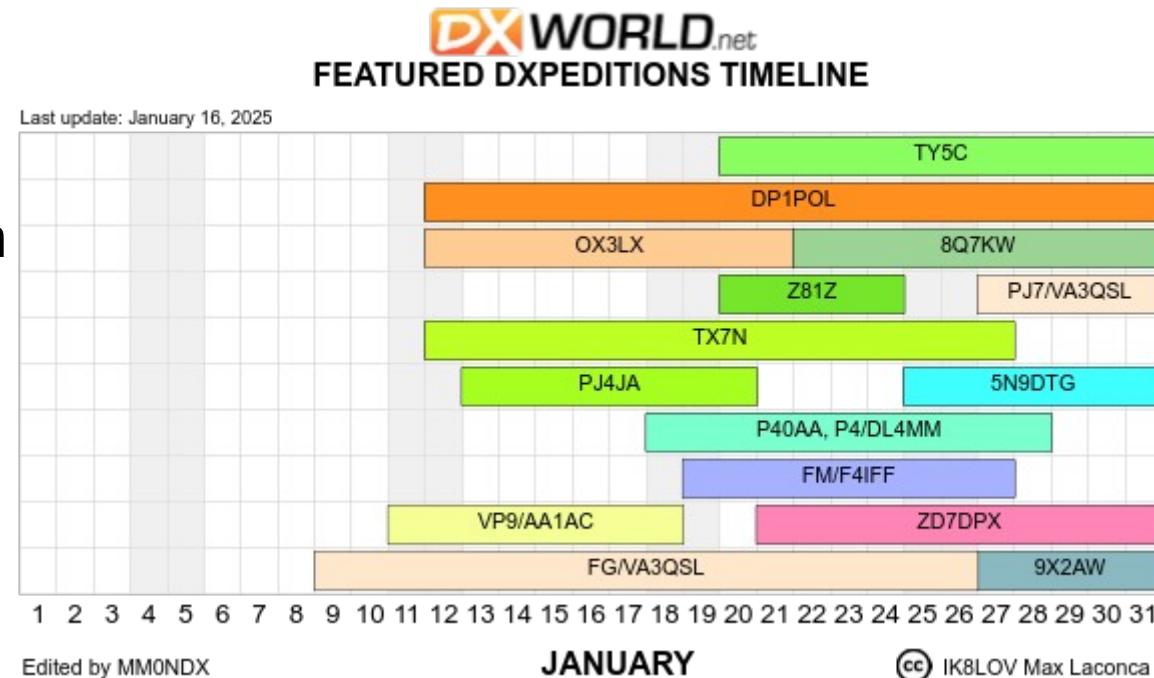
- If you miss something: ?, AGN, CALL?, NAME?, QTH?, K7?, NX? ...
- Great place to get used to contesting and to try running



Week 2 - Session 3

CW Academy

- Go over h/w and on air activities
- We're in the middle of the winter contest season:
 - CQ 160m CW
 - Winter Field Day
 - www.contestcalendar.com
- DX:
 - TX7N, others
 - www.dx-world.net
- More Contesting + MST





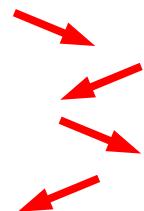
SST vs NAQP

- Extra greetings and “chatter” are perfectly acceptable (and encouraged) in the SST (and MST)
- Exchange for both SST and NAQP is NAME and STATE/PROVINCE but for the NAQP, keep messages concise:

CQ NA KF0PQR

KS4BG JEFF CO

TU KF0PQR



KS4BG

TU EDGAR TN

or

ED TN

- In a “real” contest (and even the CWT), avoid extra “fluff” in exchanges:
 - “Serious” competitors often use X, R or DIT-DIT instead of TU
 - No “flow control,” e.g. K, BK, TNX FER TN, ...
 - These actually disrupt the rhythm of the runner
 - Send exchange elements only once unless you think your signal is weak
 - Use STEVE STEVE TN TN instead of STEVE TN STEVE TN
 - If you’re running and think another caller is waiting, don’t send your call sign after the TU/R/EE
 - Short and sweet



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



Some Contest DOs ...

CW Academy

- 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?
- If the runner mangles your call, send it again then give your exchange
 - Courtesy demands that we look out for each other
- Be courteous but concise
- QRS if a caller is slower or conditions are difficult (e.g. flutter or multipath)
- After the contest, record your claimed score at **3830scores.com** and submit your log to contest sponsor



... and DON'Ts

- **Don't** send unnecessary information:
 - Runner's Call
 - He knows what it is and its your problem if you are S&Ping 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

CW Academy

- ICWC Medium Speed Test
- Monday 1300z and 1900z, Tuesday 0300z
- Relaxed Pace - Speed limit is 25 wpm
- Exchange: NAME and SERIAL NR

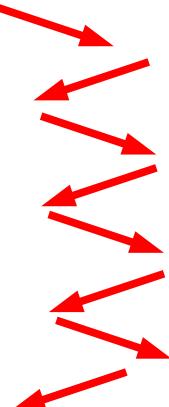
CQ MST KZ5H

WA2USA TU SETH 28

TU DENNIS 73 KZ5H

N7AUE TU SETH 29

TU MULEY 73 KZ5H



WA2USA

TU DENNIS 17

N7AUE

TU SETH MULEY 24



- **Don't** use “cut” numbers
- **QRS** for slower ops
- Another great place to build up confidence and skill



Week 2 - Session 4

CW Academy

- Questions on h/w & on the air activities?
 - Short Story was on Sending!
- New “Short” Practice files have been rolled out:
 - Words, Phrases, POTA
- Contests this weekend:
 - CQ 160m CW
 - Winter Field Day
- Tonight: Cut Numbers



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Cut Numbers



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Cut Numbers (cont.)

- In the CWTs and many of the larger contests (e.g. CQ WW, Intl DX), you will hear ops use abbreviations for numbers in the exchange

- 599	→	5NN or <ENN>	(Dummy signal report)
- 11	→	AA	(CQ Zone 11 – Brazil – CQ WW)
- 15	→	A5 or AE	(CQ Zone 15 – Italy - CQWW)
- 100	→	1TT or ATT	(100 Watts – International DX)
- 99	→	NN	(99 Watts – International DX)
- 1000	→	K or KW	(1 Kilowatt – International DX)
- 1090	→	ATNT	(N4FP's CWT Member No. - CWT)
- 2198	→	UAND	(N5OT CWT Member No. - CWT)



Cut Numbers (cont.)

- Other than the dummy signal report (5NN or ENN), I don't like this practice and advise against it
 - Eliminates the inherent redundancy which is very helpful in the presence of QRM and QSB
 - Generally leads to more "fill" requests (repeats)
 - 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!
- Never use cut numbers on RTTY – actually makes transmissions longer and more error-prone!



CW Math Drill

CW Academy

- 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 3 - Session 5

CW Academy

- Go over h/w and on air activities
- This weekend:
 - VT, MN, BC QSO Parties
 - NA Sprint CW
- Tonight:
 - CWT
 - CW Ops
 - Sprint Contests
 - Math drill with cut numbers



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CWT Weekly Practice Contest

- 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 AA2IL

WA2USA

WA2USA JOE 3177

TU DENNIS IN or TU DENNIS CWA

TU AA2IL

or R or EE or TU (w/o my call)

- Some ops will use every trick possible to shorten the exchange
 - Cut numbers
 - State instead of member number
 - Send exchange at 50+ WPM
- If you are aspiring to become a member of CWops, this is the easiest place to get your call recognized and build up the necessary sponsorship



CW Academy

The CWT is a Unique Beast

- Goals for participants vary
 - Make as many contacts as possible in an hour
 - Sharpen or maintain skills
 - Enjoy QRQ CW
 - Try new equipment, h/w, 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 know 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
 - Don't ask for repeats (CWT only)



CWops Membership Requirements

CW Academy

- Club to preserve and promote the art and use of CW
- 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 ...)
- 1-Nomination + 3-sponsors
 - Worked you at least twice OTA in the past year
- 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



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NA Sprint Contests

- Twice a year plus weekly practice sessions on Thursday evenings
- 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 at least 1-KHz
- 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



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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!



CW Math Ops

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- Plus: + ... <AR>
- Minus: - or -...- <BT>
- Times: x -..-
- Div: / -...-
- Decimal Point . R or Period



Week 3 - Session 6

CW Academy

- Go over h/w and on air activities
- This weekend:
 - State QSO Parties:
 - VT - He sends 5NN + COUNTY - You send 5NN + STATE
 - MN - He sends NAME + COUNTY - You send NAME + STATE
 - BC - He sends 5NN + DISTRICT - You send 5NN + STATE
 - NA Sprint CW
- Tonight – Short “Ragchews”



CW Academy

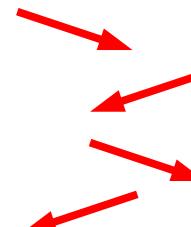
“Hit and Run” QSOs

- 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 that ATNO

CQ 3B7M UP

KF0PQR 5NN

R 3B7M UP



KF0PQR

TU 5NN or 5NN 73 or 5NN CO



- Contest exchanges (and FT4/8) obviously fall into the “Hit and Run” category



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 5NN + STATE
- Some ops will exchange more meaningful information quickly (e.g. Actual RST+STATE+Op NAME+Park ID)
- Example – A not-so-rare DX station who's not in a hurry:

CQ DX CQ DX SV2HUD SV2HUD

WA2USA GM 559 OP VAS VAS BK

QSL DENNIS TNX ES 73 CU K

WA2USA WA2USA

GM VAS UR 569 569 IN IN OP DENNIS DENNIS BK

TU VAS 73 GL K

Can usually get away with sending only your call

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



CW Academy

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

Typical 3x3 CQ

Send his call so he
knows you want a
contact AND your call 2
or 3 times

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



CW Academy

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



CW Academy

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 7

CW Academy

- Congrats to Seth and Lloyd – No.s 3667 and 3668
- Go over h/w and on air activities
- On The Air:
 - CQ WPX RTTY
 - 599 + Serial Number
 - Everybody works everybody
 - Contestcalendar.com
 - Contest sponsor usually has website also, e.g. cqwpxrty.com
- More Rag chewing



CW Academy

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

Typical 3x3 CQ

Send his call so he
knows you want a
contact AND your call 2
or 3 times

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



CW Academy

Rag Chew QSOs (cont.)

- If we both choose to continue the conversation, there are a lot of things to talk about:
 - Rig, antennas, radio adventures/exploits, ...
 - Weather, your city, ...
 - Age, work, family ...

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

...



Rag Chew QSOs (cont.)

CW Academy

- ... and so on and so on
- Be sure to identify every 10-minutes
- Keep subject matter friendly and upbeat and non-controversial
 - Avoid subjects like religion, politics, etc.
 - CW is not Social Media (or 80m Phone!)
- Keep exchanges relatively short – don't dominate the conversation



CW Academy

Rag Chew Drill

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

CQ CQ CQ AK4R AK4R K

AK4R DE KF0PQR KF0PQR KN

KF0PQR DE AK4R = GE JEFF ES GUD TO CU AGN = UR 57N 57N IN TN = HOW? BK

RR HI STEVE, GUD TO HEAR U ALSO = UR 5NN IN FT COLLINS, FB SIG = RIG HR IS
ICOM 7300 100W TO A VERTICAL ON MY TRUCK = WX HR IS COLD AND SNOW, TEMP IN
LOW 30S = BTU STEVE KN

VY GUD JEFF SOLID CPY = RIG HR IS FT991 100 W TO A DIPOLE AT 40 FT = WX TODAY
WAS SUNNY AND WARM, SPRING IS AROUND THE CORNER BK

RR FB STEVE = YOUR FT991 DOING A GREAT JOB = IT WAS GUD CHATTING WITH YOU
AGN, I NEED TO QRT NW = HPE CU SOON 73 73 <SK> AK4R DE KF0PQR K

OK JEFF WILL LOOK FOR U AGN 73 <SK> KF0PQR DE AK4R EE
EE



Where Can I find a Rag Chew?

CW Academy

- Tune around an open band and answer or call CQ
 - Evenings on 30m, 40m and 80m
 - CW Ops “Giveback”
 - Arrange a “sked” with classmate or advisor



CW Academy

RTTY Contesting

- 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
 - Bandwidth efficiency is not as efficient as CW but higher than voice
 - Ops tend to naturally spread out so its 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
 - 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 4 - Session 8

CW Academy

- Go over h/w and on air activities
- On the air:
 - This weekend: CQ WPX RTTY
 - Next weekend: ARRL International DX CW
 - Following weekend: NAQP RTTY
- Chasing “rare” DX
 - We are near or at the peak of the solar cycle
 - Look for increased DX activity in the fall & winter, especially in the days surrounding the major International contests
- No drills tonight!



Chasing (Rare) DX

CW Academy

- 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
 - Most major DXpeditions will include CW as part of their efforts
 - Often, smaller DXpeditioners might not use CW so you need to be flexible
- Your QRQ and contesting skills will serve you well!
- The Internet and SDR have changed the landscape
 - Instant pile-ups occur 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!



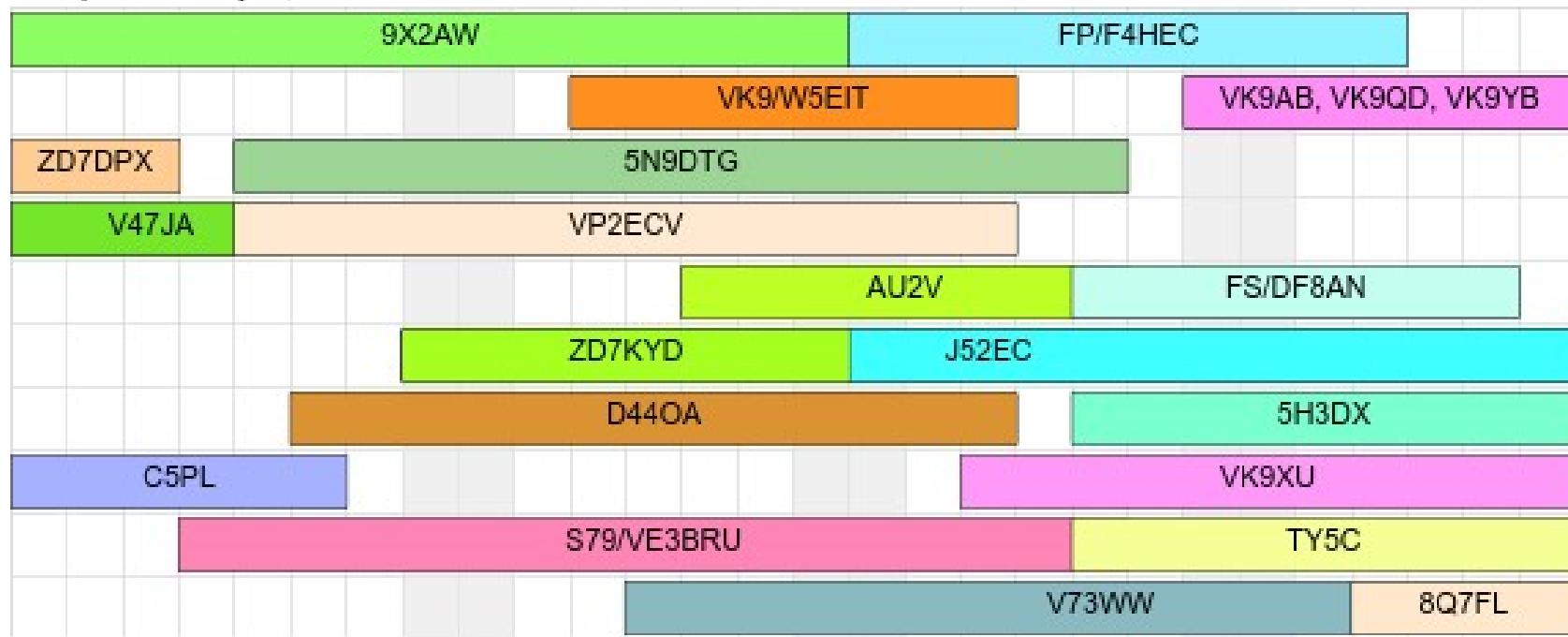
Up-coming DXpeditions

CW Academy



FEATURED DXPEDITIONS TIMELINE

Last update: January 31, 2025



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28



Chasing DX – Good Ops

CW Academy

- 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 the dual VFOs and/or XIT/RIT functions on your rig
- Be courteous and concise (TU 5NN)
- Understand Propagation and Be Patient
- Take a look at QRZ.com and/or the DXpedition website for operating plans and QSL info
- Verify that you are “in the log” via Clublog Expeditions and Live Streams



CW Academy

Chasing DX – Lids

- **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 (**TX5S UP**)
 - Continues to call when the DX is clearly calling someone else
 - Thinks he's the “DX Police” (These guys are the some of the worst lids and cause more QRM than the errant simplex op!)



My Contact with D60AE (Comoros) Fall 2022

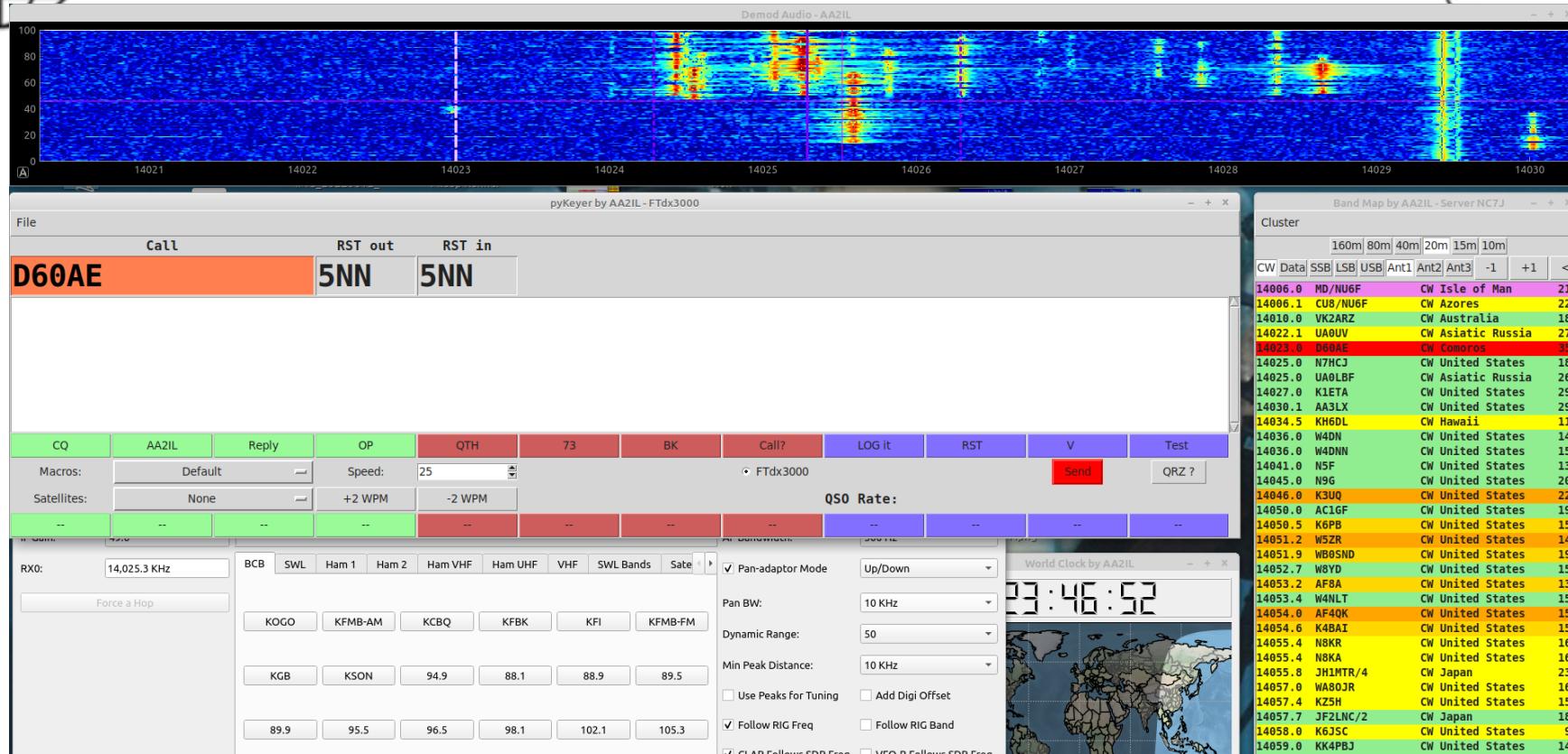
CW Academy

- 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
 - Don’t send him your exchange until he gets you call correct
 - Exchanged 5NNs and 73s
 - Confirmed “In the Log” the next day on Clublog
- Remember, my station is a “little pistol” - 100 W and fixed wire antennas
 - ~10,500 miles distance



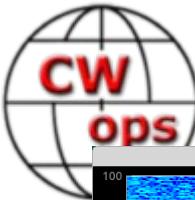
Contact with D60AE (Comoros)

CW Academy



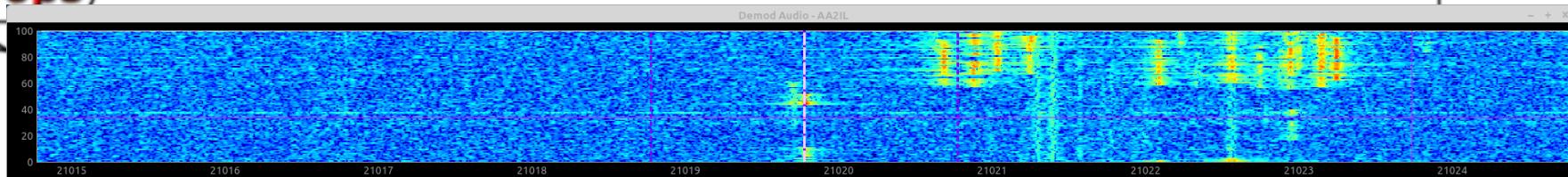
Band Map by AA2IL - Server NC7J	
Cluster	
	160m 80m 40m 20m 15m 10m
CW Data	SSB LSB USB Ant1 Ant2 Ant3 -1 +1 <
14086.0 MD/NU6F	CW Isle of Man 21
14086.1 CU8/NU6F	CW Azores 22
14010.0 VK2ARZ	CW Australia 18
14022.1 UA0UV	CW Asiatic Russia 27
14023.0 D60AE	CW Comoros 35
14025.0 N7HCJ	CW United States 18
14025.0 UA0LB	CW Asiatic Russia 26
14027.0 K1ETA	CW United States 29
14030.1 AA3LX	CW United States 29
14034.5 KA6DL	CW Hawaii 11
14036.0 W4DN	CW United States 14
14036.0 W4DNN	CW United States 15
14041.0 N5F	CW United States 13
14045.0 N9G	CW United States 20
14046.0 K3UQ	CW United States 22
14050.0 AC1GF	CW United States 19
14050.5 K6PB	CW United States 15
14051.2 W5ZR	CW United States 14
14051.9 WB0SN	CW United States 19
14052.7 W8YD	CW United States 15
14053.2 AF8A	CW United States 13
14053.4 W4NLT	CW United States 15
14054.0 AF4QK	CW United States 15
14054.6 K4BAI	CW United States 15
14055.4 N8KR	CW United States 16
14055.4 NBKA	CW United States 16
14055.8 JH1MTR/4	CW Japan 23
14057.0 WA80JR	CW United States 16
14057.4 KZ5H	CW United States 15
14057.7 JF2LNC/2	CW Japan 18
14058.0 K6JSC	CW United States 9
14059.0 KK4PBJ	CW United States 14
	CW United States 12
	CW United States 15
	CW United States 14
	CW United States 15
	CW Romania 18
	CW United States 14
	CW United States 29

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	



Contact with TY0RU (Benin)

CW Academy



pyKeyer by AA2IL - FTdx3000

File Call RST in QTH Hint

TY0RU 5NN DX

AA2IL
TU 5NN CA
[LOG]
AA2IL
[LOG]
[LOG]

CQ	Reply	TU/QRZ?	Call?	AA2IL	S&P Reply	?	Log QSO	My RST 2x	My QTH 2x	RST?	QTH?
NIL	TU/QRZ?	TU/QRZ?	Call?	His Call	S&P 2x	AGN?	RR				QRL?

Macros: NYQP Speed: 25 Serial: 25 FTdx3000 Send ORZ ?

Satellites: None +2 WPM -2 WPM

QSOs: 6 / hr : 7 / hr : 28

NO2W 14,048.4 DK3WW 21,031.8 K2NV 14,045.3 KX2NY 14,047.0 DF1DX 21,029.2 K2SX 14,034.7 WW2Y 14,041.5 -- -- -- -- N2CU 21,038.1

RXO: 21,019.8 KHz BCB SWL Ham 1 Ham 2 Ham VHF Ham UHF VHF SWL Bands Satel

Force a Hop KOGO KFMB-AM KCBQ KFBK KFI KFMB-FM

Flrig FTdx3000 File Config Memory Keyer Help

21019.776 21028.400

94.9 88.1 88.9 89.5

S3 S6 S9 +20 +40 +60 vfoA vfoB A/B Split

500 CW 5 96.5 98.1 102.1 105.3

Band Map by AA2IL - Server NC7J

Cluster

160m	80m	60m	40m	30m	20m	17m	15m	12m	10m	6m
CW	Data	SSB	LSB	USB	Ant1	Ant2	Ant3	-1	+1	<
21011.8 ZF2MJ	CW Cayman Islands	38								
21011.8 F2MJ	CW France	31								
21014.7 NC3J	CW United States	21								
21017.1 JH1GEX	CW Japan	33								
21018.3 WOFLS	CW United States	8								
21019.7 TY0RU	CW Benin									
21021.0 N5CM	CW United States	22								
21021.2 N8RW	CW United States	26								
21022.5 N4QV	CW United States	28								
21027.4 DL2ARD	CW Germany	28								
21038.5 AC3H	CW United States	18								
21046.7 WA8ZBT	CW United States	22								
21049.0 ZL2AIM	CW New Zealand	14								
21049.1 ZL2ATH	CW New Zealand	14								
21050.0 NO2B	CW United States	12								
21057.9 NP3CW	CW Puerto Rico	15								
21059.6 K7JHM	CW United States	16								
21062.5 W6LOR	CW United States	19								
21063.5 K3JZD	CW United States	16								
21075.0 CT1BWU	DIGITA Portugal									
21075.0 EA3HMM	DIGITA Spain									
21075.0 EA1BPA	DIGITA Spain									
21085.0 JA7ACM	RTTY Japan									
21085.0 JA7AC	RTTY Japan									
21086.7 VE3MGY	RTTY Canada									
21087.9 EA2WT	RTTY Spain									
21088.2 KA6BIM	RTTY United States									
21089.0 HK3O	RTTY Colombia									
21089.2 W4UEF	RTTY United States									
21090.0 KH62M	RTTY Hawaii									
21090.0 H6ZH	RTTY Nicaragua									
21090.0 H6ZG	RTTY United States									
21090.0 H6ZG	United States									
21090.0 H6ZG	United States									
21090.0 H6ZG	United States									
21090.0 H6ZG	United States									
21090.0 H6ZG	Chile									
21090.0 H6ZG	United States									
21090.0 H6ZG	United States									
21090.0 H6ZG	United States									

World Clock by AA2IL

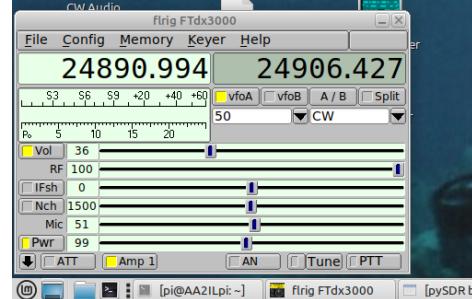
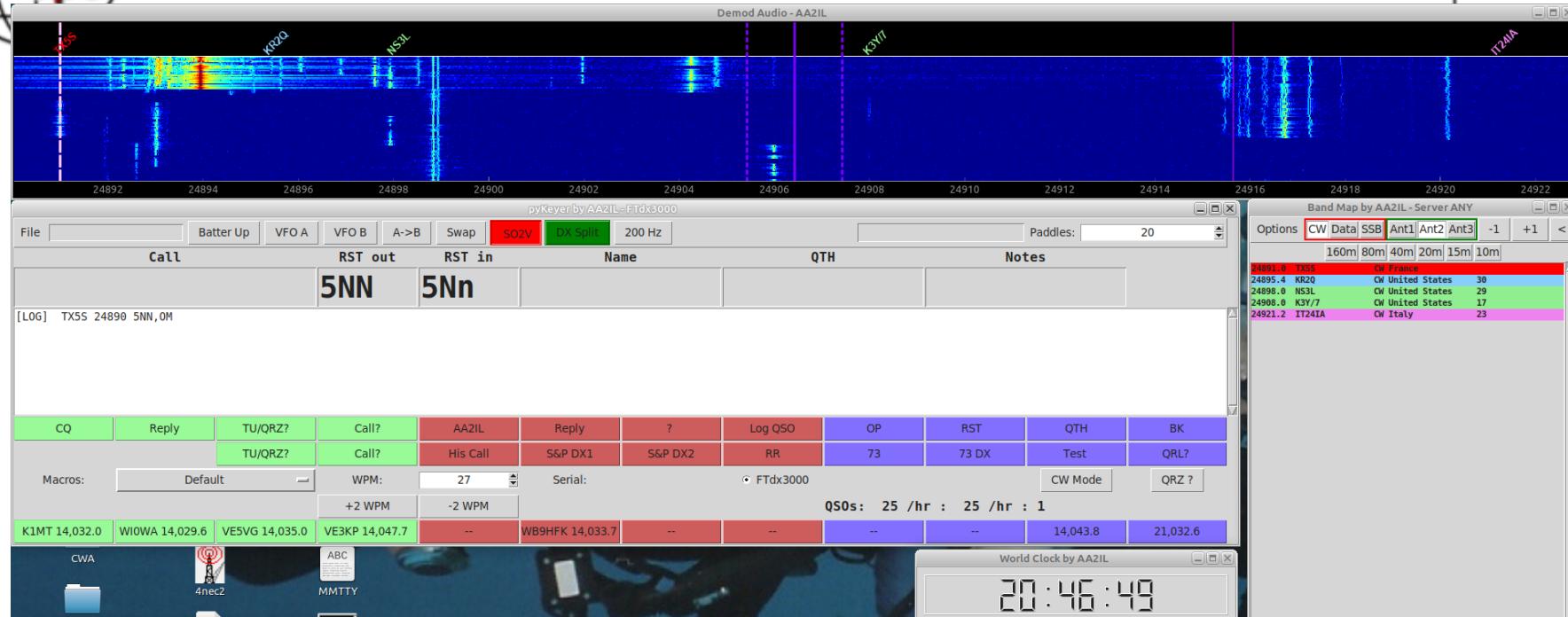
20:57:06

AA2IL	AC6ZM	UNITED STATES OF AMERICA	2022-10-16 00:38:03	2022-10-16 01:47:29	40M CW	
AA2IL	TY0RU	BENIN	2022-10-15 20:51:20	2022-10-16 01:47:29	15M CW	15M 15M CW
AA2IL	DF7TV	FEDERAL REPUBLIC OF GERMANY	2022-10-15 17:13:35	2022-10-16 01:13:22	15M CW	



TX5X (Clipperton Isl. - 2024)

CW Academy



DX Call	Entity	QSO Date	Match Date	Band/Mode	Outcome
VP2ETE	ANGUILIA	2024-01-22 21:28:01	2024-01-22 21:55:52	12M Data	
TX5S	CLIPPERTON ISLAND	2024-01-22 21:12:45	2024-01-22 21:55:52	17M Data	17M Data
TX5S	CLIPPERTON ISLAND	2024-01-22 20:39:55	2024-01-22 21:55:52	12M CW	12M 12M CW
TX5S	CLIPPERTON ISLAND	2024-01-22 20:08:22	2024-01-22 21:55:52	20M CW	DXCC 20M CW 20M CW
W0EJ	UNITED STATES OF AMERICA	2024-01-22 19:31:34	2024-01-22 21:55:52	20M CW	



SDR Panadapters

CW Academy

- Some high-end radios (e.g. IC7610) have dual receivers so you can listen to DX and the pile-up simultaneously
 - Can approximate this with a single RX radio by rapidly toggling between VFOs
- Many current radios have built-in panadapters
 - Marginally useful at best
- Some radios (e.g. FTdx300, TS590,...) have “taps” into the RF and/or IF chain brought out to the rear panel
 - Easily add an SDR Dongle for under \$30
- Many radios (e.g. FT991, IC7300) do not have any such provisions so you’ll need to add an external antenna switch also
 - These can be rather expensive (\$200+) but decent-quality knock-offs can be found for under \$50



SDR Panadapter for FT991a

CW Academy





CW Academy

Week 5 – Session 9

- Go over h/w and on air activities
- On the air
 - ARRL International DX CW
 - The last “major” CW contest of the winter season
 - There is a lot of activity leading up to this contest
 - We only work stations outside of USA and Canada
 - We send 5NN + State
 - They send 5NN + Power
 - NN = 99 Watts
 - ATT = 100 Watts
 - K or KW = Kilowatt ...
- Computers and Logging
- Round-robin questions – try not to write anything down



CW Academy

Computers and Logging

- Computers are a fixture in most ham shacks now and are invaluable for contesting (and everyday operating)
 - Logging & Scoring
 - Keeping track of duplicates
 - Sending
- **N1MM Logger** is the most popular logging program used for contesting
 - Many many helpful features
 - Windoz Only
 - A clone is under active development 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 cleaner machine-generated 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!



CW Academy

Built-in 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 ARRL Intl DX, you might use something like this:

- Msg 1 = AA2IL
- Msg 2 = TU 5NN CA
- Msg 3 = CA CA
- Msg 4 = 73
- Msg 5 = AGN? or ?



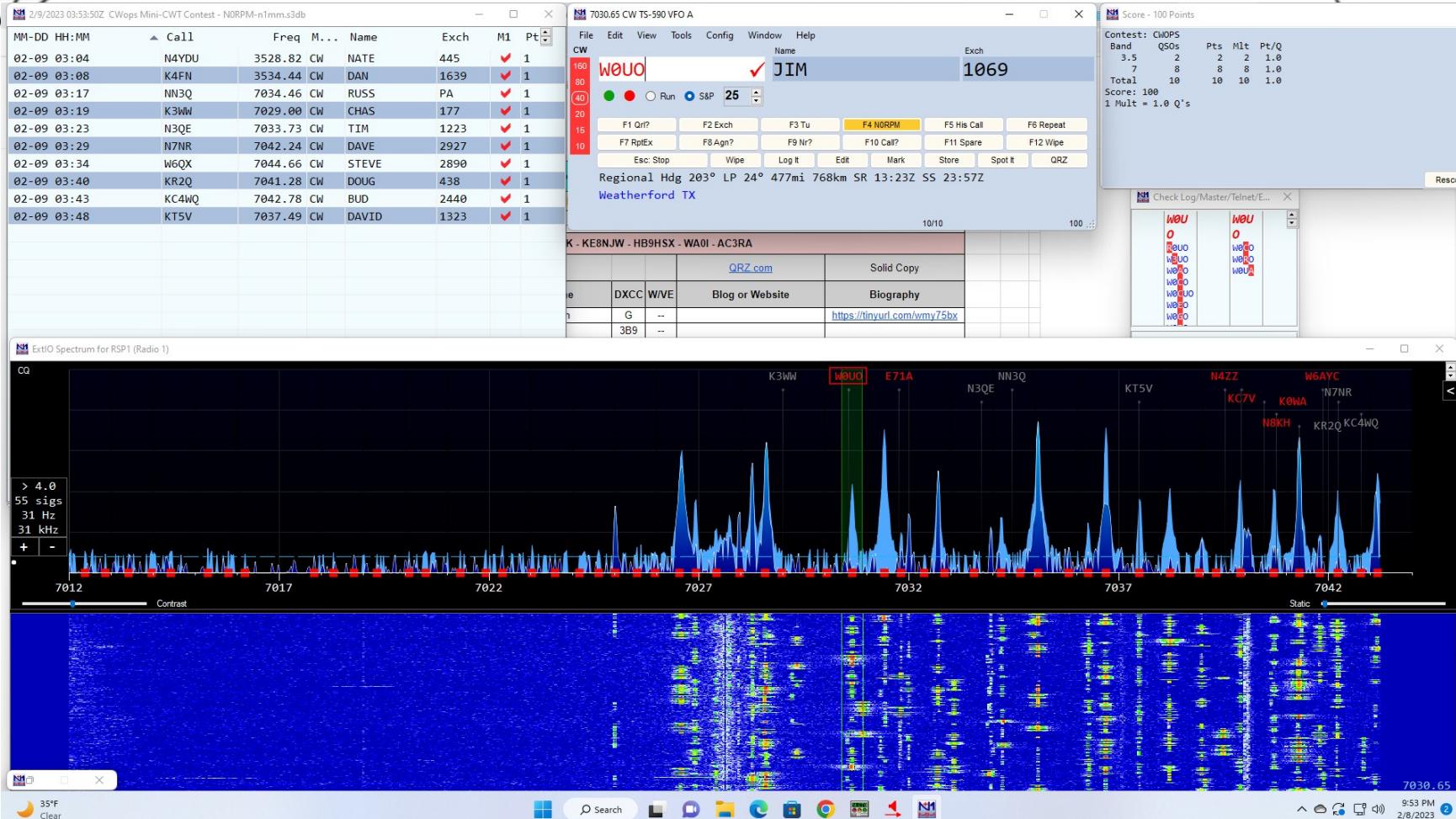
- Yaesu rigs also have a serial counter so feasibly, you use this facility to S&P in almost any contest
- **This is NOT cheating** – contesting is fatiguing and you want to employ any fair means that will maximize your Butt-In-Chair (BIC) time and therefore your enjoyment and score!!!



N1MM Logger

(Screenshot courtesy of N0RPM)

CW Academy





CW Academy

Other Loggers

Contest Logger	Percent of CQP 2023 Logs Received *
N1MM+	57.5%
N1MM+ Call History File - Search for qsop_ca HERE	
N1MM+ Tutorial and Cabrillo log submission Watch How-To video HERE	
N3FJP	21.8%
N3FJP Tips in CQP	
Writelog	3.2%
DX Log	1.7%
RUMLogNG (for Mac)	1.0%
SkookumLogger (for Mac)	0.9%
TR4W	0.8%
GenLog	0.5%
CQPWIN	0.5%
SD by EI5DI	0.5%



N3FJP Logger

(Screenshot courtesy of VA4ADM)

CW Academy

N3FJP's RAC Contest Log 3.6.5
www.n3fjp.com

File Settings Band Mode View Help

Current Band & Mode Find

Recent Contacts

Last 20 All

Rec	Call	Rcvd	PR/#	Snt	Date / Time	Bnd	Mode	Pnts	Country	# S
684	KD2KW	599	84	599	12/30 20:12	15	CW	2	USA	
683	WA2MCR	599	195	599	12/30 20:12	15	CW	2	USA	
682	VA3YV	599	ON	599	12/30 20:11	15	CW	10	Canada	
681	WA2JQK	599	296	599	12/30 20:10	15	CW	2	USA	
680	WK6I	599	10	599	12/30 20:10	15	CW	2	USA	
679	N2SO	599	38	599	12/30 20:09	15	CW	2	USA	
678	VE3KTB	599	ON	599	12/30 20:09	15	CW	10	Canada	
677	W7RG	599	21	599	12/30 20:08	15	CW	2	USA	
676	N6TQ	599	158	599	12/30 20:08	15	CW	2	USA	
675	VA3IJK	599	ON	599	12/30 20:07	15	CW	10	Canada	
674	NC8O	599	EA	599	12/30 20:07	15	CW	2	USA	

Score Statistics

Total Contacts	684
Total QSO Points	3,038
Total Multipliers	45
Total Score	136,710
QSOs / Hr (Last 20 min)	0
QSOs / Hr (Last 60 min)	0

Multipliers worked in current mode:

Call	RSTr	Prov / Ser	RSTs	Country	160	80	40	20	15	10	CW F (Ctrl+Shift W)
AA2IL				Belgium	NS	NS	NS	NS	NS	NS	F1: ((RAC)) VA4ADM VA
				Bonaire	NS	NS	NS	NS	NS	NS	F2: \$ 5NN MB
				Bulgaria	QC	QC	QC	QC	QC	QC	F3: TU VA4ADM ((TEST
				Canada	ON	ON	ON	ON	ON	ON	F4: VA4ADM
				Canary Is.	ON	ON	ON	ON	ON	ON	F5: 5NN MB
				Chile	MB	MB	MB	MB	MB	MB	F6: NR NR?
				Costa Rica	SK	SK	SK	SK	SK	SK	F7: AGN
				Czech Republic	SK	SK	SK	SK	SK	SK	F8: QRL?
				Dominican Republic	AB	AB	AB	AB	AB	AB	F9: VVV DE VA4ADM
				England	AB	AB	AB	AB	AB	AB	F10:
				European Russia	BC	BC	BC	BC	BC	BC	F11:
				Federal Republic o	NT	NT	NT	NT	NT	NT	Settings
				France	NB	NB	NB	NB	NB	NB	
				Ireland	NB	NB	NB	NB	NB	NB	
				Israel	NL	NL	NL	NL	NL	NL	
				Italy	NU	NU	NU	NU	NU	NU	
				Jamaica	YT	YT	YT	YT	YT	YT	
				Mexico	PE	PE	PE	PE	PE	PE	
				Norway	PE	PE	PE	PE	PE	PE	
				Puerto Rico	PE	PE	PE	PE	PE	PE	
				Romania	PE	PE	PE	PE	PE	PE	

Possible Duplicate!

Clear Spot Last

Pos Dups / Partials Any Portion

AA2IL AA2IL AA2IL/6

Bearing: 237 Start tracking op time 08:21:59

Miles: 1,492 Band: 15 Mode CW

VA4ADM RS(T) MB 9:10:06 PM
03:10:06 UTC

Cont: NA



My Screen - 0300z CWT

CW Academy

Demod Audio - AA2IL

RT4H W9CF NY3A K7SS N4L VE3MX HAGNL K5EBI K5RKO WIKS SM5MO SM5GM NJ3JT K1DW A43K N9FZ NA8W

7017 7018 7019 7020 7021 7022 7023 7024 7025 7026

pyKeyer by AA2IL - FTdx3000

File Batter Up VFO A VFO B A->B Swap SO2V DX Split 200 Hz Paddles: 20

Call Name Exchange Super Check Partial

nf8m **FRANK** **1634** **NF8M EF8M NJ8M**

GM TU AA2IL [LOG] K4GM 7021 GE0,779
CQ CWT AA2IL
VE3EJ JOE 3177
TU AA2IL [LOG] VE3EJ 7021 JOHN,513
NF8M JOE 3177

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			TEST	QRL?
Macros:			CWT	WPM:	32	FTdx3000					
			+2 WPM	-2 WPM		QSOs: 144 /hr : 104 /hr : 76					
W1WEF 7,035.6	N4ZZ 7,028.9	--	--	--	--	--	--	7,021.6	14,036.9		

76 QSOs x 74 Uniques = 5624 Last Worked: VE3EJ

IF Bandwidth: 000 kHz
IF: 0 KHz
IF Gain: 50
RXO: 7,021.6 KHz
Force a Hop

Band: 160m 80m 40m 20m 15m 10m
60m 30m 17m 12m 6m
Mode: CW RTTY USB LSB AM FM
Antenna: Ant1 Ant2 Ant3

TX Power: 99 W
Mic Gain: 0
Monitor: 5

Contest Mode Reset Clarifier << || >> Adjust Mic
VFO A VFO B A->B B->A A->>B

Pan/BW: 10 KHz
Dynamic Range: 90
Min Peak Distance: 10 KHz
 Use Peaks for Tuning
 Add Di
 Follow RIG Freq
 Follow
 CLAR Follows SDR Freq
 VFO-B

Un-Mute RX1 Un-Mute RX3 Un-Mute RX5

World Clock by AA2IL
03:44:28

World Map showing time zones and world clock display.

Band Map by AA2IL - Server W3LPL

Options	CW	Data	SSB	Ant1	Ant2	Ant3	-1	+1	<
160m	80m	40m	20m	15m	10m				
7000.9 DL4MFH	CW Germany	15							
7003.9 EA8AF	CW Canary Islands	20							
7005.5 JJ1JOQE	CW Japan	18							
7009.0 SM4OTI	CW Sweden	26							
7009.0 SM4TTI	CW Sweden	26							
7009.0 SM40	CW Sweden	27							
7010.0 HABWZ	CW Hungary	19							
7012.0 Y09KWC	CW Romania	33							
7012.0 Y09CRC	CW Romania	33							
7018.6 RT4H	CW European Russia	26							
7020.5 NY3A	CW United States	10							
7021.6 AA2IL	CW United States	31							
7022.3 VE5MX	CW Canada	38							
7022.3 KESMX	CW United States	35							
7022.8 HAGNL	CW Hungary	33							
7023.1 KSVB	CW United States	29							
7023.1 K1SEI	CW United States	31							
7023.2 K7RI	CW United States	38							
7023.2 K7RT	CW United States	39							
7024.0 WBEAS	CW United States	31							
7024.0 WLTO	CW United States	36							
7024.0 WLTM	CW United States	11							
7024.6 SM5IM	CW Sweden	32							
7024.7 SM5IM	CW Sweden	32							
7025.0 NJ3JT	CW United States	35							
7025.3 K1DW	CW United States	32							
7025.9 AA3B	CW United States	38							
7025.9 AA3X	CW United States	38							
7025.9 AA3K	CW United States	38							
7026.3 N9FZ	CW United States	13							
7026.5 NABW	CW United States	38							
7026.7 NABK	CW United States	37							
7026.9 WA3AN	CW United States	37							
7027.3 K0Z0	CW United States	43							
7027.6 KL2A	CW Alaska	38							
7027.9 WB6J	CW United States	41							
7028.0 MBFJ	CW England	40							
7028.6 K4KAI	CW United States	30							
7028.6 K4KAI	CW United States	31							
7028.9 NAZZ	CW United States	41							
7028.9 N4OZ	CW United States	39							
7028.9 NAZO	CW United States	39							
7028.9 N4ZO	CW United States	38							
7029.5 N2YO	CW United States	29							
7029.5 T2Y0	CW Tuvalu	41							
7030.1 KR2AA	CW United States	36							
7030.3 K0ZR	CW United States	32							
7030.3 K0QR	CW United States	32							
7030.3 K0QL	CW United States	47							
7030.6 K3MM	CW United States	39							

Howdy Ho!



Week 5 - Session 10

CW Academy

- Go over h/w and on air activities
- This weekend is the ARRL International DX CW
 - “International” → We only work stations outside of the U.S.
 - We send 5NN + STATE/PROVINCE
 - DX sends 5NN + Power
 - The best strategy for “little pistols” is S&P for this one
 - Look for plenty of DX activity before and after the contest
 - Can you get DXCC in one weekend?
- DX Cluster and Reverse Beacon Network
- Drill: Sentences





My Screen - Typical CWT

CW Academy

Demod Audio - AA2IL

RT4H W9CF NY3A K7SS N4M VE3MX HAGNL K5EBI K9RKO WIKS SM5IMO SM5GM NJ3JT K1DW A43K N9FZ NA8W

7017 7018 7019 7020 7021 7022 7023 7024 7025 7026

pyKeyer by AA2IL - FTdx3000

Paddles: 20

File Batter Up VFO A VFO B A->B Swap SO2V DX Split 200 Hz

Call Name Exchange Super Check Partial

nf8m FRANK 1634 NF8M EF8M NJ8M

GM TU AA2IL [LOG] K4GM 7021 GE0,779
CQ CWT AA2IL
VE3EJ JOE 3177
TU AA2IL [LOG] VE3EJ 7021 JOHN,513
NF8M JOE 3177

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			TEST	QRL?
Macros: CWT			WPM:	32	FTdx3000						
			+2 WPM	-2 WPM	QSOs: 144 /hr : 104 /hr : 76						
W1WEF 7,035.6	N4ZZ 7,028.9	--	--	--	--	--	--	7,021.6	14,036.9		

76 QSOs x 74 Uniques = 5624 Last Worked: VE3EJ

IF Bandwidth: 000 kHz

IF: 0 KHz

IF Gain: 50

RX0: 7,021.6 KHz

Force a Hop

Band: 160m 80m 40m 20m 15m 10m
60m 30m 17m 12m 6m

Mode: CW RTTY USB LSB AM FM

Antenna: Ant1 Ant2 Ant3

TX Power: 99 W

Mic Gain: 0

Monitor: 5

Contest Mode Reset Clarifier << || >> Adjust Mic

VFO A VFO B A->B B->A A->>B

Pan/BW: 10 KHz

Dynamic Range: 90

Min Peak Distance: 10 KHz

Use Peaks for Tuning Add Di

Follow RIG Freq Follow

CLAR Follows SDR Freq VFO-B

Un-Mute RX1 Un-Mute RX3 Un-Mute RX5

AF Gain:

World Clock by AA2IL

03:44:28

Band Map by AA2IL - Server W3LPL

Options	CW	Data	SSB	Ant1	Ant2	Ant3	-1	+1	<
160m 80m 40m 20m 15m 10m									
7000.9	DL4MFH	CW	Germany	15					
7003.9	EABA	CW	Canary Islands	20					
7005.5	JJ1QOE	CW	Japan	18					
7009.0	SM4OTI	CW	Sweden	26					
7009.0	SM4TTI	CW	Sweden	26					
7009.0	SM40	CW	Sweden	27					
7010.0	HABWZ	CW	Hungary	19					
7012.0	Y09KWC	CW	Romania	33					
7012.0	Y09CRK	CW	Romania	33					
7018.6	RT4H	CW	European Russia	26					
7020.5	NY3A	CW	United States	10					
7021.6	AA2IL	CW	United States	31					
7022.3	VE5MX	CW	Canada	38					
7022.3	KE5HX	CW	United States	35					
7022.8	HAGNL	CW	Hungary	33					
7023.1	K5VB	CW	United States	29					
7023.1	K1SEI	CW	United States	31					
7023.2	K7RI	CW	United States	38					
7023.2	K9RT	CW	United States	39					
7024.0	WBEAS	CW	United States	31					
7024.0	WLTO	CW	United States	36					
7024.0	WLTM	CW	United States	11					
7024.6	SM5IMO	CW	Sweden	32					
7024.7	SM5IM	CW	Sweden	32					
7025.0	NJ3JT	CW	United States	35					
7025.3	K1DW	CW	United States	32					
7025.9	A43B	CW	United States	38					
7025.9	AA3X	CW	United States	38					
7025.9	AA3K	CW	United States	38					
7026.3	N9FZ	CW	United States	13					
7026.5	NABW	CW	United States	38					
7026.7	NABK	CW	United States	37					
7026.9	WA3AN	CW	United States	37					
7027.3	K9ZD	CW	United States	43					
7027.6	KL2A	CW	Alaska	38					
7027.9	WB6J	CW	United States	41					
7028.0	MBFJ	CW	England	40					
7028.6	K4BAI	CW	United States	30					
7028.6	K4AKI	CW	United States	31					
7028.9	N4ZZ	CW	United States	41					
7028.9	N4OZ	CW	United States	39					
7028.9	N4ZD	CW	United States	39					
7028.9	N4ZO	CW	United States	38					
7029.5	N2YO	CW	United States	29					
7029.5	T2YD	CW	Tuvalu	41					
7030.1	KR2AA	CW	United States	36					
7030.3	K0ZR	CW	United States	32					
7030.3	K9QR	CW	United States	32					
7030.3	KQOL	CW	United States	47					
7030.3	K3MM	CW	United States	39					

Howdy Ho!



DX Cluster

CW Academy

- 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)
 - Automated systems that do this for CW and RTTY (Next Slide)
- The use of these tools, even once, puts you in the “assisted” category in a contest
 - S&P: Quickly identify un-worked stations and “multipliers”
 - RUNNING: Quickly identify open frequencies
- 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



DXHeat.com

Ops Manually Enter “Spots”

CW Academy

Filters	DX de	Freq	DX	Tags	Comments	UTC	Date
All	W7BOB	28 180,8	Spain	EA7KRB	Green circle with checkmark, red circle with question mark, green circle with checkmark	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	Yellow circle with question mark, green circle with checkmark, red circle with question mark	17:52	18/10/23
W3LPL	N4WMB	28 565,0	Portugal	CS8ABG	Red circle with question mark, green circle with checkmark, red circle with question mark	17:52	18/10/23
DXCC	LU6YR	28 074,0	Germany	DL1RAE	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:51	18/10/23
VALID	W7BOB	28 180,8	Spain	EA7L	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:51	18/10/23
OTHER	NU4N	14 286,0	USA	N2PQJ	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:51	18/10/23
CW	W5AP	21 315,0	USA	W8EDU	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:51	18/10/23
PHONE	WU5E	28 455,0	Norway	LA5XO		17:50	18/10/23
DIGI	N5BIG	28 580,0	Venezuela	J88IH	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:50	18/10/23
Modes	W0KAL	14 327,0	USA	K4DSX	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:49	18/10/23
CW	PU9FDO	28 565,0	Portugal	CS8ABG	Red circle with question mark, green circle with checkmark, red circle with question mark	17:49	18/10/23
PHONE	LU6YR	28 074,0	Russia	R2BY	FT8 db-14 From FF51 1965 Hz TNX QS	17:49	18/10/23
DIGI	W2TAD	28 074,0	USA	W1AW/0	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:48	18/10/23
Bands	KE8RRG	28 387,0	France	F5NBX	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:47	18/10/23
SHF	KI6WJ	28 076,8	USA	KL7HFI	Red circle with question mark, green circle with checkmark, red circle with question mark	17:46	18/10/23
UHF	KG8V	21 270,0	USA	PA3DRK	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:46	18/10/23
VHF	W3LPL	28 022,0	Barbados	3B8HL	Heard in NC	17:46	18/10/23
4m	NC1M	21 289,0	Montenegro	S51CK		17:45	18/10/23
DXCC	KI6WJ	28 076,7	Spain	EA1A	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:44	18/10/23
VALID	PY2RT	28 075,7	Germany	DG7LBB	Yellow circle with question mark, green circle with checkmark, red circle with question mark	17:44	18/10/23
OTHER	W8FJ	24 891,9	China	9J2REK	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:43	18/10/23
CW	VE2JM	24 960,0	Russia	HB0WR	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:42	18/10/23
PHONE	WP4U	50 313,0	Portugal	NP2X	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:39	18/10/23
DIGI	KA3JAW	29 600,0	Spain	EA1BXX	FN20JQ<ES>IN70DW Corrected Cal	17:39	18/10/23
Bands	W2FTJ	28 573,0	Italy	IZ0WEI	Green circle with checkmark, green circle with checkmark, green circle with checkmark	17:38	18/10/23

Realtime World Clock

17:53:39 UTC

Wednesday, 18. of October 2023

Search

CALLSIGN Search

Default Wildcard

Submit

Submit a DX Spot

(Login required)

Propagation

Solar Activity SFI: 137

Magnetic Activity K: 0 A: 2

Band Activity

Your Continent is N. America

EU NA SA AS AF OC

6

10



Week 6 - Session 11

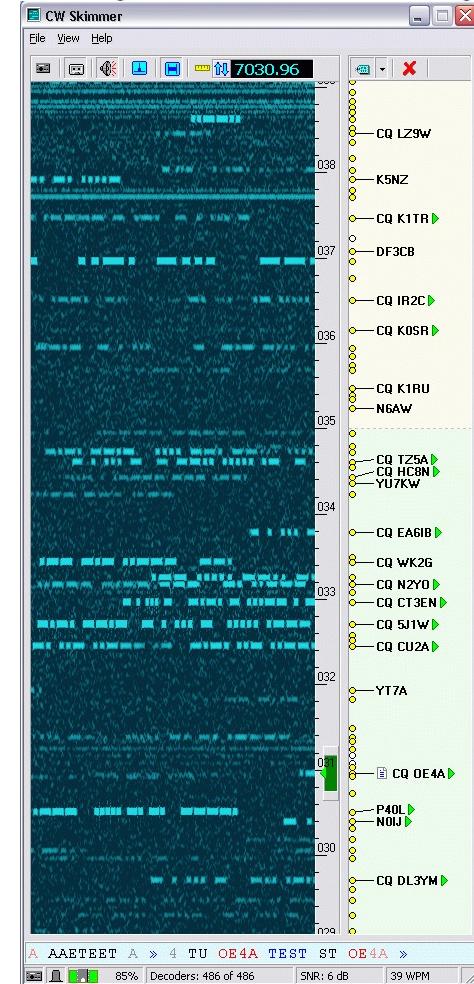
CW Academy

- Go over h/w and on air activities
- On the air:
 - SC and NC State QSO Parties
 - NAQP RTTY
- Preliminary results from Jan. NAQP CW have been posted
<https://ncjweb.com/current-naqp-cw-results/>
- February *Solid Copy* is available at
<https://cwops.org/newsletter-current/>
- Reverse Beacon Network (cont.)
- Round Robin Q&A



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!
- Competitive Contest Loggers have the ability to import spots from a cluster node
 - From cluster or RBN or both
 - Can usually “filter” the spots you actually see





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

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

welcome main dx spots nodes FTP downloads about contact us

630m 160m 80m 60m 40m 30m 20m 17m 15m 12m 10m 6m 4m 2m

ow my psk3t psk63

CQ DX BCN I/B NCDXF

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

callsign	spotter-callsign	distance mi	freq	mode	type	snr	speed	time	seen
● spotter	● spotted								
DD5XX	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
DFTQB	EA7EGU	1112 mi	14051.0	CW	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	CW	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	US7ION	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
LASTPA	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



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=4l4dx&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 A.5 K: 1 DxWatch Callsign Lookup: []

welcome main dx spots nodes FT8 downloads about contact us

Leaflet | OpenStreetMap contributors

Unfreeze Zoom Show Elements
Max rows: 100 Max age: 1 Days
New spots: 3
Show Spotters Advanced Mode
CW Speed: Min [] Max []
Copy URL to Clipboard

630m 160m 80m 60m 40m 30m 20m 17m 15m 12m 10m 6m 4m 2m

OW RTTY PSK31 PSK63 CQ DX BCN IB NCDXF

callsign spotter-callsign ● Spotter (de) ● Spotted (dx)

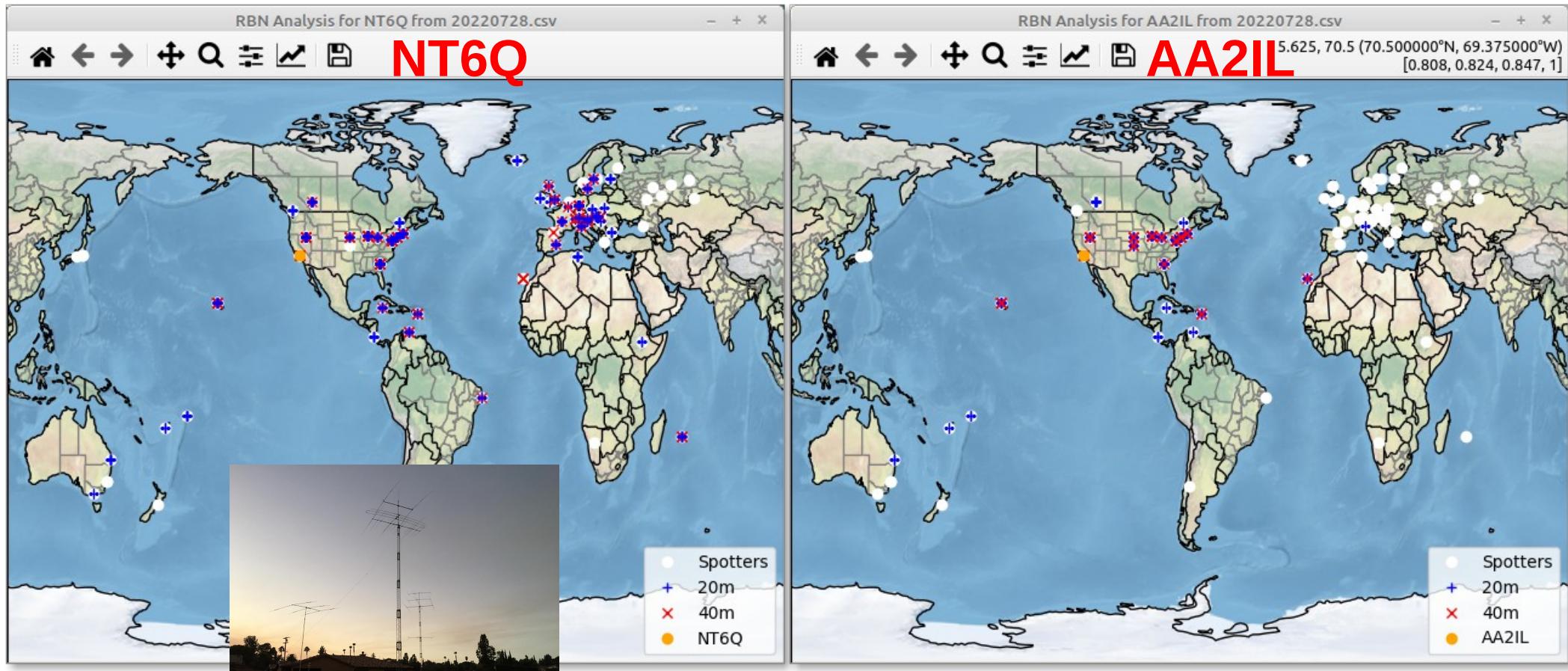
callsign	spotter-callsign	distance mi	freq	mode	type	snr	speed	time	seen
● spotter	● spotted								
DRAW	4L4DX	1693 mi	18076.9	CW	CQ	18 dB	25 wpm	2027z 06 Jun	now
OHBBG	4L4DX	1764 mi	18077.1	CW	CQ	26 dB	25 wpm	2027z 06 Jun	now
B06CS	4L4DX	3424 mi	18077.0	CW	CQ	15 dB	25 wpm	2027z 06 Jun	now
EZR2CF-4	4L4DX	2409 mi	18077.0	CW	CQ	5 dB	25 wpm	2025z 06 Jun	98 seconds ago
IK4VET	4L4DX	1712 mi	18077.1	CW	CQ	16 dB	24 wpm	2025z 06 Jun	102 seconds ago
DC9YZ	4L4DX	1724 mi	18077.0	CW	CQ	13 dB	25 wpm	2025z 06 Jun	103 seconds ago
VU2CPL	4L4DX	2772 mi	18077.0	CW	CQ	15 dB	25 wpm	2025z 06 Jun	109 seconds ago
ES2RR	4L4DX	1563 mi	18077.0	CW	CQ	24 dB	25 wpm	2025z 06 Jun	110 seconds ago
TF3Y	4L4DX	3005 mi	18077.0	CW	CQ	12 dB	25 wpm	2025z 06 Jun	111 seconds ago
DM5GG	4L4DX	1616 mi	18077.0	CW	CQ	18 dB	25 wpm	2025z 06 Jun	113 seconds ago
HASTKS	4L4DX	1297 mi	18077.0	CW	CQ	21 dB	25 wpm	2025z 06 Jun	114 seconds ago
VIRZFUN-77	4L4DX	4078 mi	18077.3	CW	CQ	21 dB	25 wpm	2025z 06 Jun	115 seconds ago
JN1ILK	4L4DX	4794 mi	18077.0	CW	CQ	11 dB	25 wpm	2025z 06 Jun	115 seconds ago
SQ5J	4L4DX	1345 mi	18077.1	CW	CQ	14 dB	25 wpm	2025z 06 Jun	116 seconds ago
PA7AE	4L4DX	4794 mi	18077.0	CW	CQ	7 dB	25 wpm	2025z 06 Jun	117 seconds ago



Big Gun vs Little Pistol

CWT 0300-0400 July 28, 2022

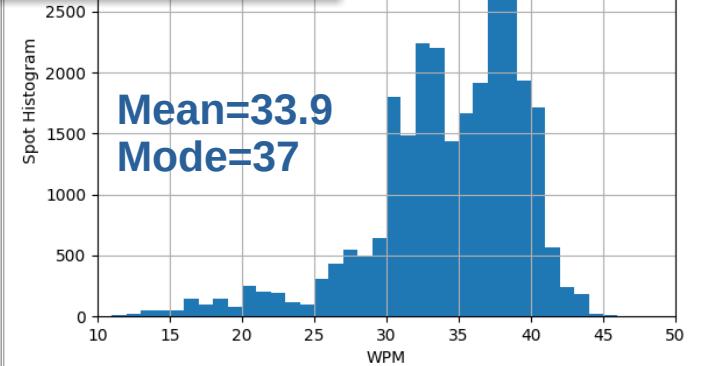
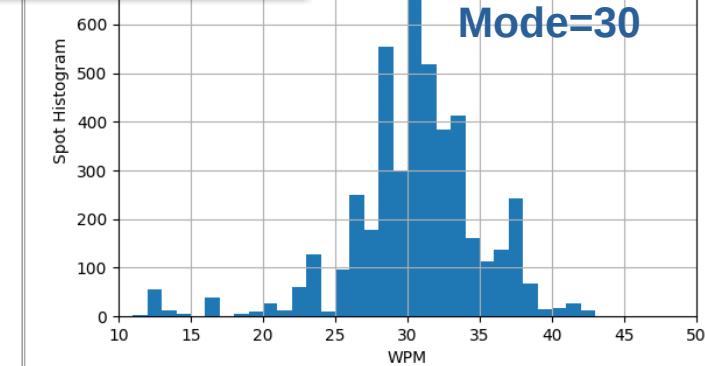
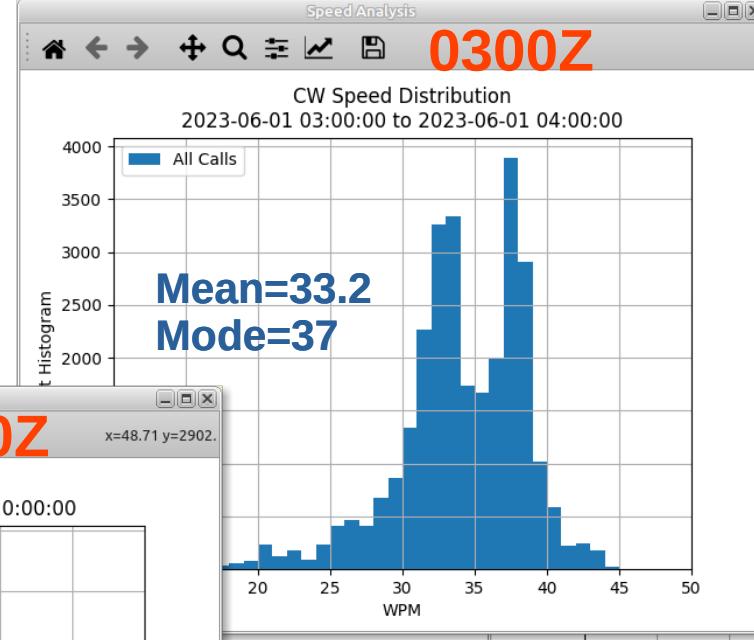
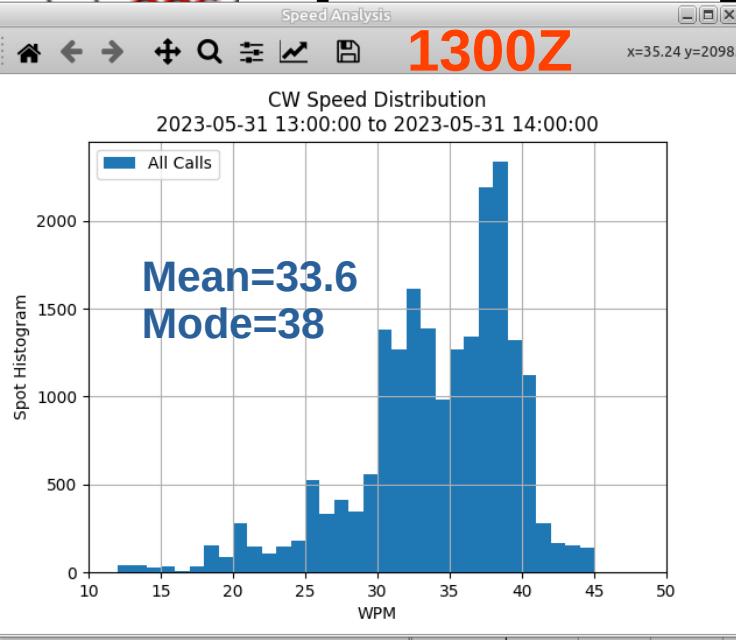
CW Academy





Speed Analysis – May 31, 2023 CWTs

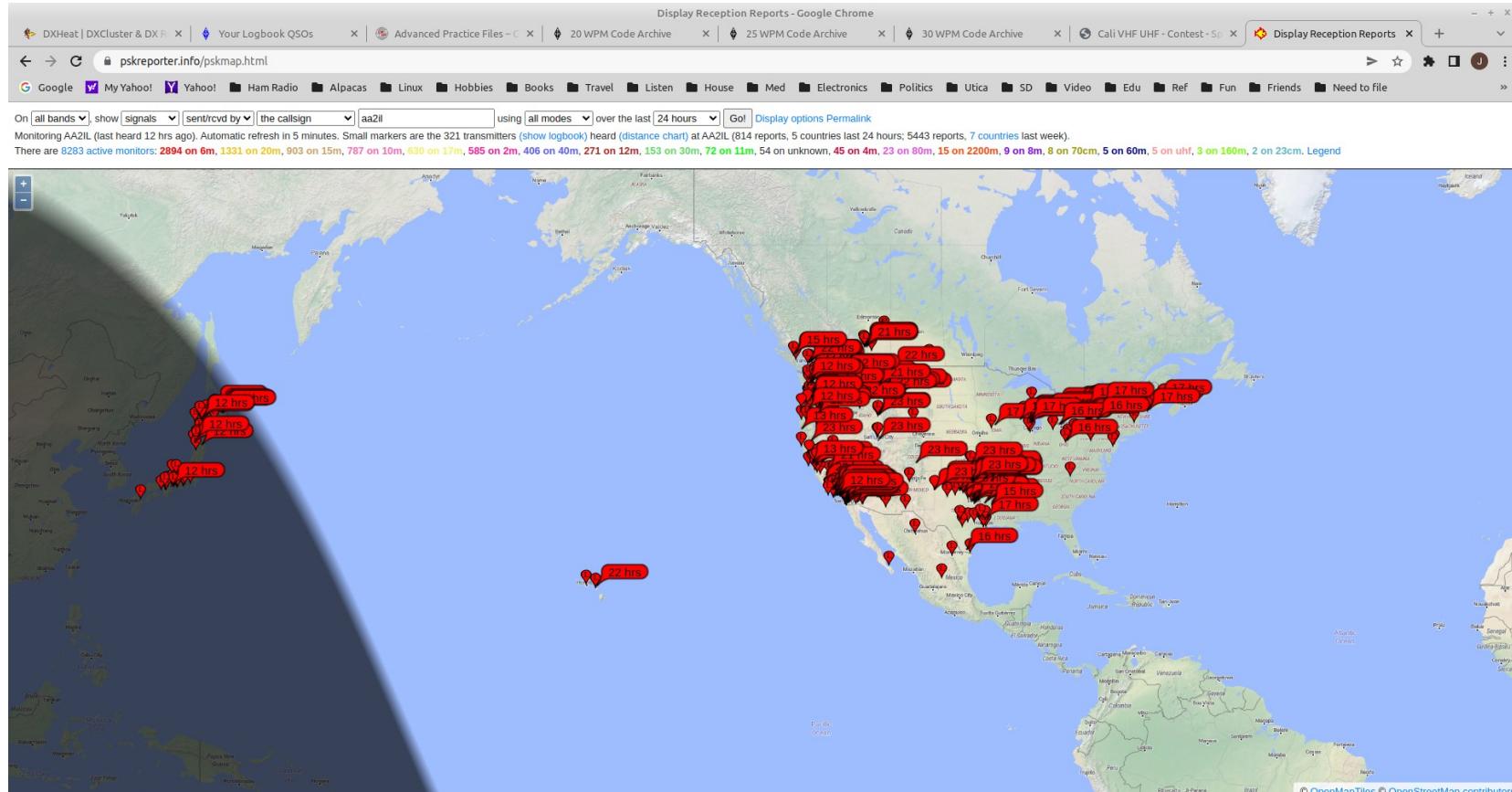
CW Academy





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

CW Academy





Setting Up Your Own Monitoring Station

CW Academy

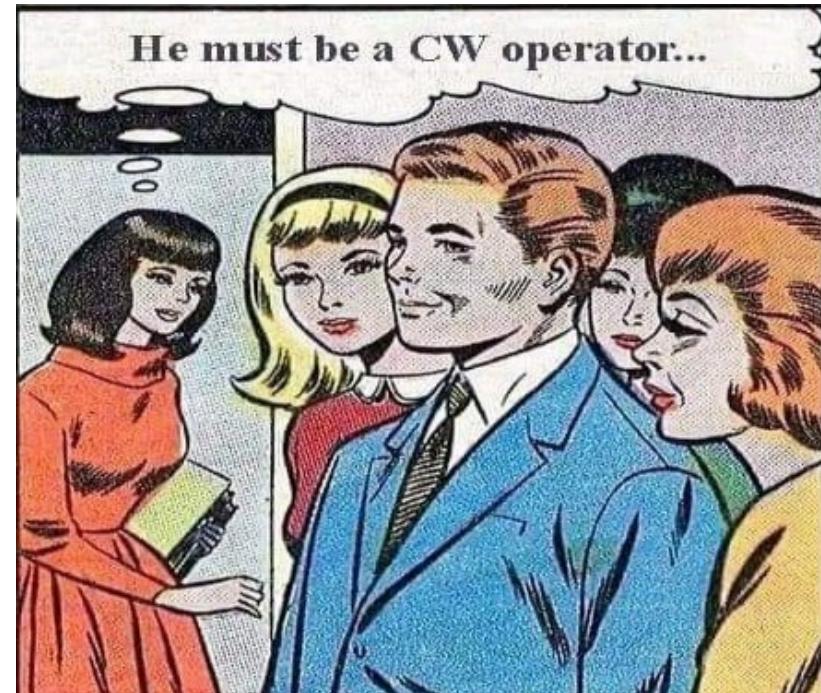
- CW and RTTY skimmers are available at same place you found Morse Runner
 - 30-day Free Trial
 - Can use regular WSJT-X for FTx (free)
- An RTL Dongle allows you to monitor a single band
 - 160m and 80m are close enough to monitor simultaneously
- I've used an SDRPlay RSP-1 to monitor up to 3-bands simultaneously
- "Wideband" SDRs (e.g. Red Pitaya) can monitor the entire HF-spectrum simultaneously
- To post spots to the RBN, also need "Aggregator"



Week 6 - Session 12

CW Academy

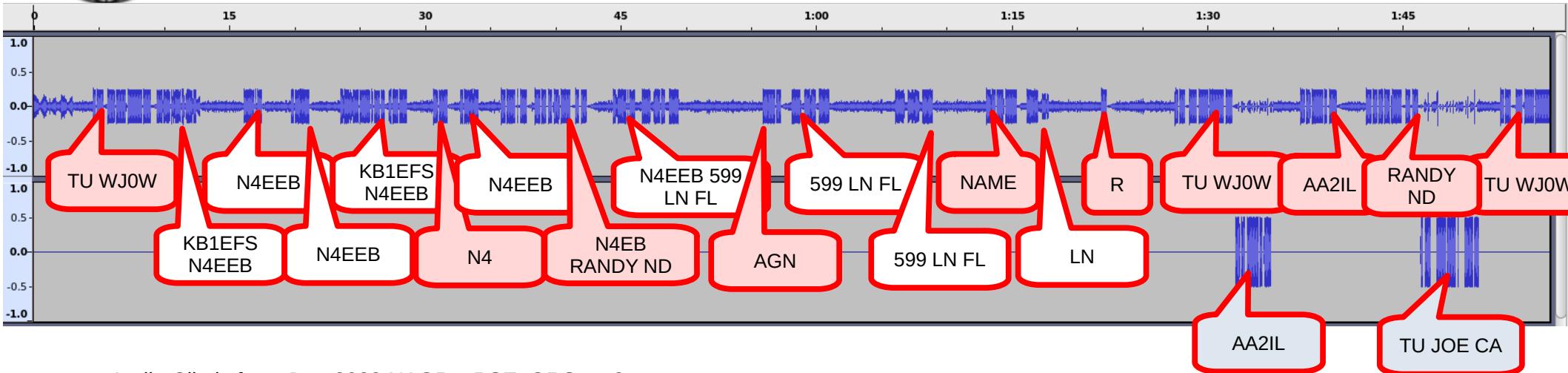
- A Big THANK YOU to Marty, N7AAE, for skimmer and logger demonstration last time
- Go over h/w and on air activities
- On the air:
 - SC and NC State QPs
 - NAQP RTTY
- A Comment on Speed
- After the contest
- English Idiom Exercise





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

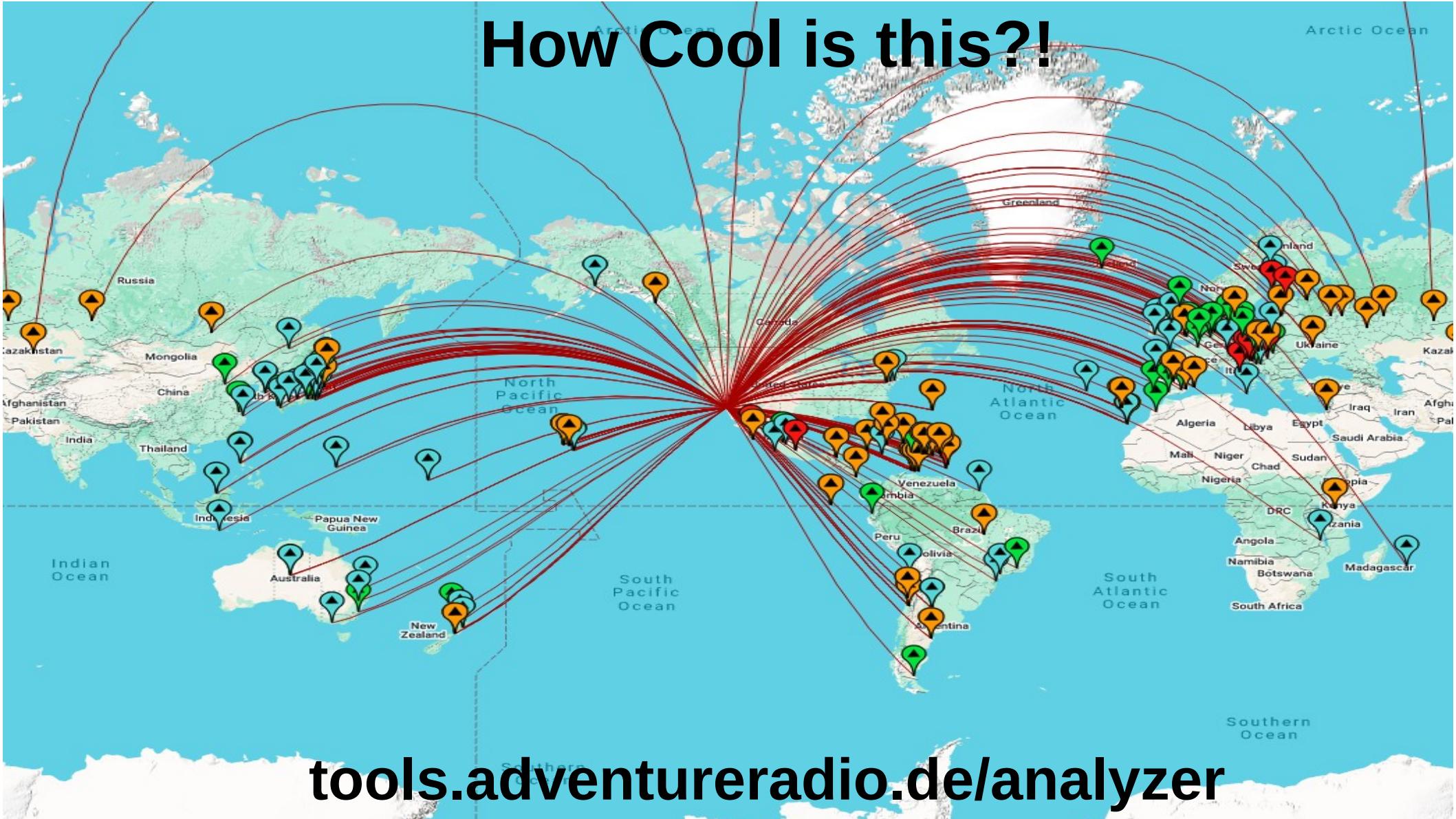


CW Academy

After the Big Event

- Take a deep breath
- Write some quick notes on what was good and what to do different/better next time
 - Review and follow-up:
 - After scores have been posted (get LCR if possible)
 - Before next contest and/or next run of same contest
- Submit summary to 3830scores
- Upload ADIF log to Clublog and LoTW
- Submit CABRILLO log to contest sponsor

How Cool is this!?



tools.adventureradio.de/analyzer



English Idiom Exercise

CW Academy

- Some English Idioms:
 - The Check is in the Mail
 - The Ball is in Your Court
 - A Blessing in Disguise
- Round-Robin Drill
 - First Op sends an idiom
 - Second Op repeats
 - Get confirmation from First Op
 - Rinse and repeat
 - Head-copy Only!



Week 7 - Session 13

CW Academy

- Go over h/w and on air activities
- ARRL International DX SSB is this weekend
 - Very popular, good luck to AK4R and his friends at PJ2T!
 - Look for increased DX activity surrounding the contest
 - It's often easier to chase CW DX during a major phone (or digi) contest
- We have two weeks left – Are there any topics you want to explore?
 - Log Check reports (Thursday)
 - CWops Club (Next Monday)
 - Graduation/Feedback (Next Thursday)
- Comments on RufzXP and MorseRunner
- Drill: Story Time



Are You Bored with MR and RufzXP?

CW Academy

- MorseRunner and RufzXP are fantastic practice tools BUT ...
- They are a means to an end (Improving your abilities OTA), not an end in themselves
 - It can become addicting to beat your best score but ...
 - Its even more fun to run in a contest and/or beat your best score
- Both tools emphasize rapid ICR and touch typing what you hear
 - Obvious advantages for Contesting, Chasing DX and similar activities like POTA/SOTA, Field Day with your local club, ...
- There are also advantages if you are primarily a rag chewer:
 - ICR will also help you improve your head copy speed
 - Morse Runner gets you used to copying high-speed code in typical conditions
 - Low SNR (QRN)
 - Interference (QRM)
 - Fading (QSB)
 - ...



Plateauing with RufzXP?

CW Academy

- RufzXP should always be challenging since it automatically increases the sending speed the more successful you are
- If your scores seem to be plateauing, increase your starting speed and/or try not to ask for repeats
 - I don't worry too much about the actual score but pay much more attention to the speed at which I "top out"
- At some point, you will have trouble distinguishing between similar characters (e.g. I vs S vs H vs 5, V vs 4, B vs 6, etc.)
- You will have to have some knowledge of valid international call signs to deal with this
 - S62ABC is not a likely ham call but HB2ABC is
 - H5HY is not valid but S55Y is
- What happens if you manage to exceed 50-WPM?



Plateauing with Morse Runner

CW Academy

- MR and MR CE are very realistic simulations of what you will see in an actual contest
- If you are plateauing with this training tool:
 - Increase sending speed
 - Turn on more channel effects (QRM, QSB)
 - Increase “activity level”
 - Try running in an actual contest (e.g. SST, MST, CWT)
- One of the most difficult skills to develop is how to work through a pile-up of nearly zero-beat callers
 - Hopefully, one of the callers is louder or more persistent or slightly tuned off from the rest
 - If not, try grabbing a partial call to help “thin the herd”
 - Some callers still won’t honor your request so you might have work them to get them out of the way
 - You need to become efficient at working through a small pile-up as the “un-chosen” will quickly look elsewhere
- If you are looking for another challenge, get a taste of what a DXpeditioner faces via PileUp Runner.



CW Academy

Story Time Exercise

- You guys have been outstanding with all of the drills we've done so far!
- Let's try telling a story:
 - OP1: I have a large white dog
 - OP2: I have a large white dog
She guards my animals
 - OP3: She guards my animals
She also likes to hunt rabbits
 - OP4: She also likes to hunt rabbits
I can tell when she ate a rabbit because her breath really stinks
 - OP1: etc. etc. ...
- Usual round-robin approach
 - Send call of op you are sending to
 - Repeat sentence from previous op



Week 7 - Session 14

CW Academy

- Go over h/w and on air activities
- ARRL International DX SSB is this weekend
 - Very popular, good luck to AK4R and his friends at PJ2T!
 - Look for increased DX activity surrounding the contest
 - It's often easier to chase CW DX during a major phone (or digi) contest
- We have two weeks left – Are there any topics you want to explore?
 - Log Check reports (Thursday)
 - CWops Club (Next Monday)
 - Graduation/Feedback (Next Thursday)
- Log Check Reports
- Drill: Story Time



Week 7 - Session 14

CW Academy

- Postponed
 - Class will still have 16-sessions



Week 8 - Session 14

CW Academy

- Go over h/w and on air activities
- This weekend OTA:
 - OK, ID and WI State QPs
 - Stew Perry 160m contest
- We have three sessions left – Are there any topics you want to explore?
 - Log Check Reports and/or Muley Map (Tonight)
 - CWops Club (Thursday)
 - Graduation/Feedback (Next Monday)
- Daylight Savings Time starts this weekend
 - Suggest we keep last meeting time at 6PM PDT
- Log Check Reports
- Drill: Story Time



Left Overs – Yum!

CW Academy

- Last Monday, we had the pleasure of another discussion about SDRs and Skimmers, etc.
- Please review comments about MR and RufzXP
 - There are ways to make these practice tools more challenging
- One of the most difficult skills to develop is how to work through a pile-up of nearly zero-beat callers
 - Hopefully, one of the callers is louder or more persistent or slightly tuned off from the rest
 - If not, try grabbing a partial call to help “thin the herd” **K7?** **NX?**
 - Some callers still won’t honor your request so you might have to work them to get them out of the way
 - You need to become efficient at working through a small pile-up as the “un-chosen” will quickly look elsewhere



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
 - 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



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**.



CW Academy

IARU HF LCR (cont.)

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!



Week 8 - Session 15

CW Academy

- Go over h/w and on air activities
- This weekend OTA:
 - OK, ID and WI State QPs
 - Stew Perry 160m contest
- We have two sessions left – Are there any topics you want to explore?
 - CWops Club (Tonight)
 - Graduation – Muley Map and Feedback (Monday, **TIME CHANGE: 0100 UTC = 6PM PDT**)
- CWops Club
- Drill: Dear Diary



And Now a Word From Our Sponsor ...

CW Academy

- CWops is an international club to promote the art and use of CW on the amateur bands
 - Rag Chewing
 - Competitive Events/Contesting
 - DX/Awards Chasing
- Created approximately 15-years ago, current active membership is ~3,000
- It is NOT contesting club, nor a “Top Operators” Club
- The 25-WPM threshold and sponsorship criteria are designed to attract operators who have a serious commitment to CW



CWops is an Activities Oriented Club

CW Academy

- CW Academy
 - Please consider becoming a Advisor or Co-Advisor!
- CWTs – Four one-hour sessions each week
- CW Open – Annually in September – GO BRASS FLOUDERS!
- Give Back – Conversational Practice most evenings
- QTX - Rag Chewers
- Awards: CWT Participation, ACA, CMA, WAS, DXCC, WAE, WAZ ...
 - Upload your logs to <https://cwops.telegraphy.de/>
 - Post CWT summaries to <https://3830scores.com/>
- Solid Copy - Monthly Newsletter
- E-mail Reflector



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
 - Solicitation of sponsors is perfectly acceptable!
- 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



CW Academy

Session 16 – Graduation!!

- Certificates
- 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

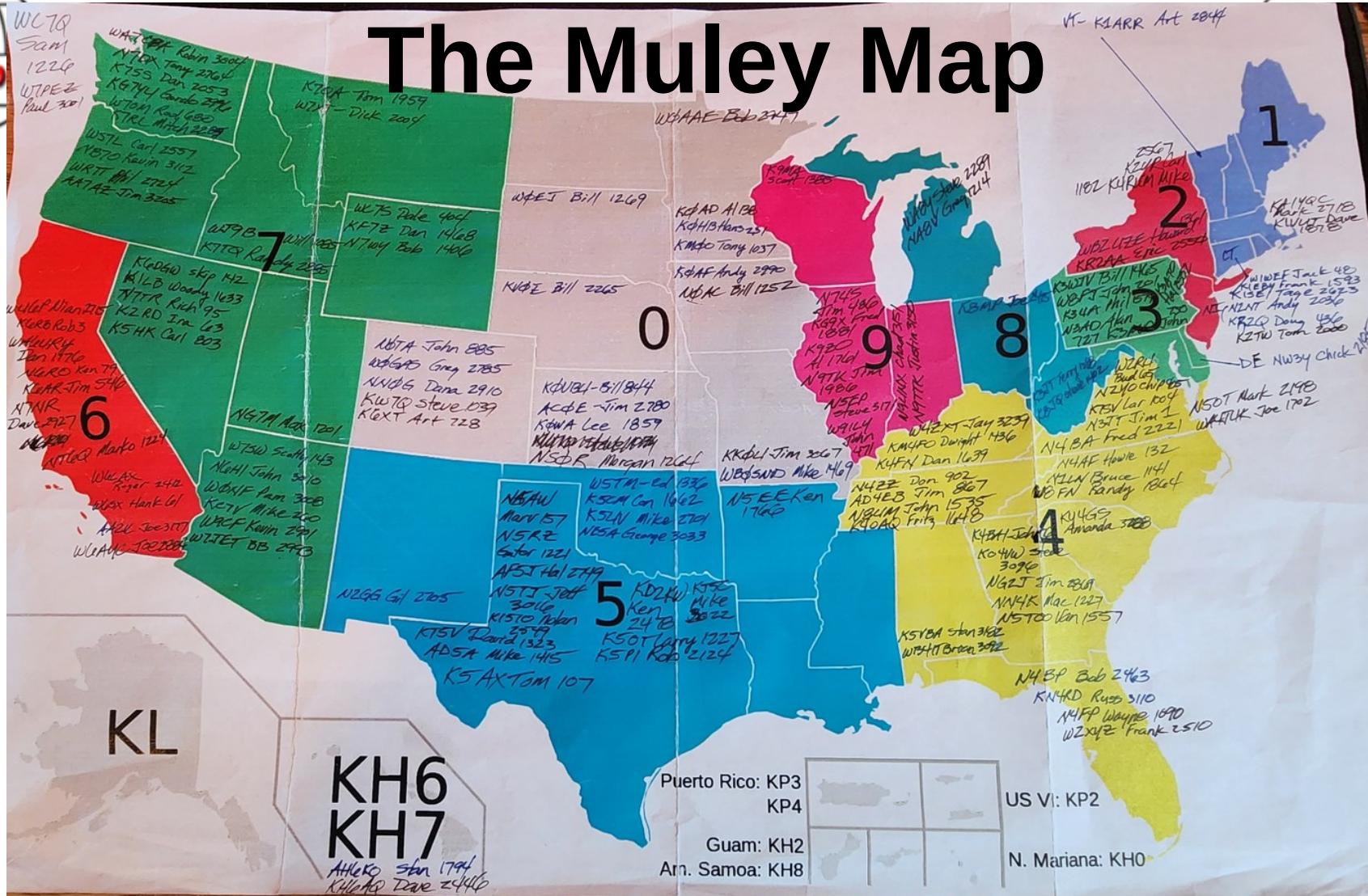




CW Academy

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





CW Academy

Final Comments

- 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



CW Academy

Feedback From Class #6

- Need to have some “structured/driven” sending practice
 - We do a lot of receiving practice
 - Not big fans of iambic master
 - Need to get paddling.py distributed?
- Organization of CWops website
 - Would be better if mp3 files were organized by week and session number
 - Perhaps I can put together a cheesy website that does this?
- How do we route audio directly to computer instead of listening to sidetone captured by microphone
 - Some have echos
 - Some can't hear what they are sending very well
- The guys would be very interested in OTA auxilary sessions



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

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 - It's 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: NO? 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 × 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

ARRL Field Day

- Fourth Weekend in June
- One of the most popular operating event all years
 - “It's 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

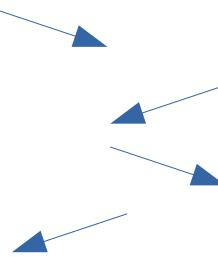
CQ FD AA2IL

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)

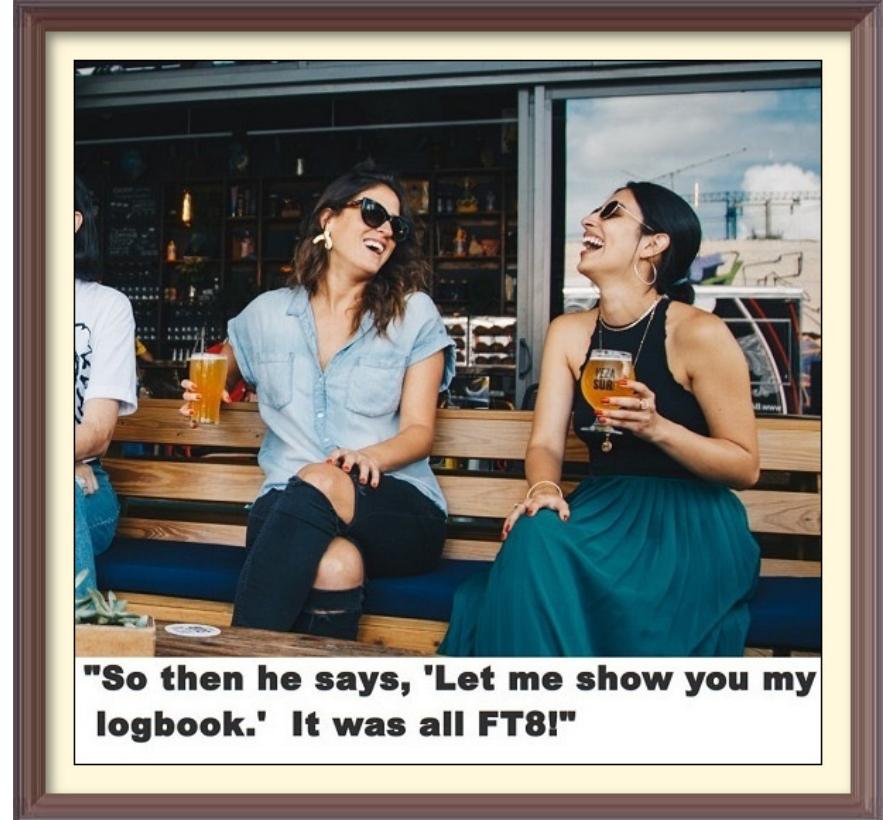


- YL3JD's QTC Trainer: <https://yl3jd.fizioikskile.lv/qtc/>
- YL3JD's Contest Trainer: <https://yl3jd.fizioikskile.lv/fsm/>



The Elephant in the Room

CW Academy



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



CW Academy

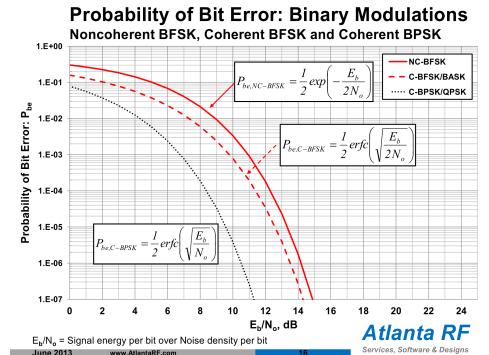
What about FT8?

- 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!



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:
 - $\text{SNR}_{\text{fb}} = S / N = [E_b R] / [N_0 B_{\text{ref}}] = E_b / N_0 R / B_{\text{ref}}$
 - E_b = Average Energy per Information bit
 - N_0 = Noise Power Spectral Density (assumed white)
 - R = Information data rate = ~77-bits/15-sec.
 - $R/B_{\text{ref}} = (77/15)/2500 \sim -27 \text{ dB}$
 - $E_b/N_0 = \text{SNR}_{\text{fb}} + 27 \text{ dB}$ 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 a GitHub repository page for `aa2il/pyKeyer`. The main area displays a list of files and their commit history. On the right side, there's a sidebar with repository statistics and a 'Releases' section. The 'Releases' section is circled in red, showing a single entry for 'pyKeyer v1.0 by AA2IL' with a green 'Latest' badge. Below the releases, there's a note about publishing first packages and a languages usage chart.

Releases 1

pyKeyer v1.0 by AA2IL [Latest] last week

No packages published Publish your first package

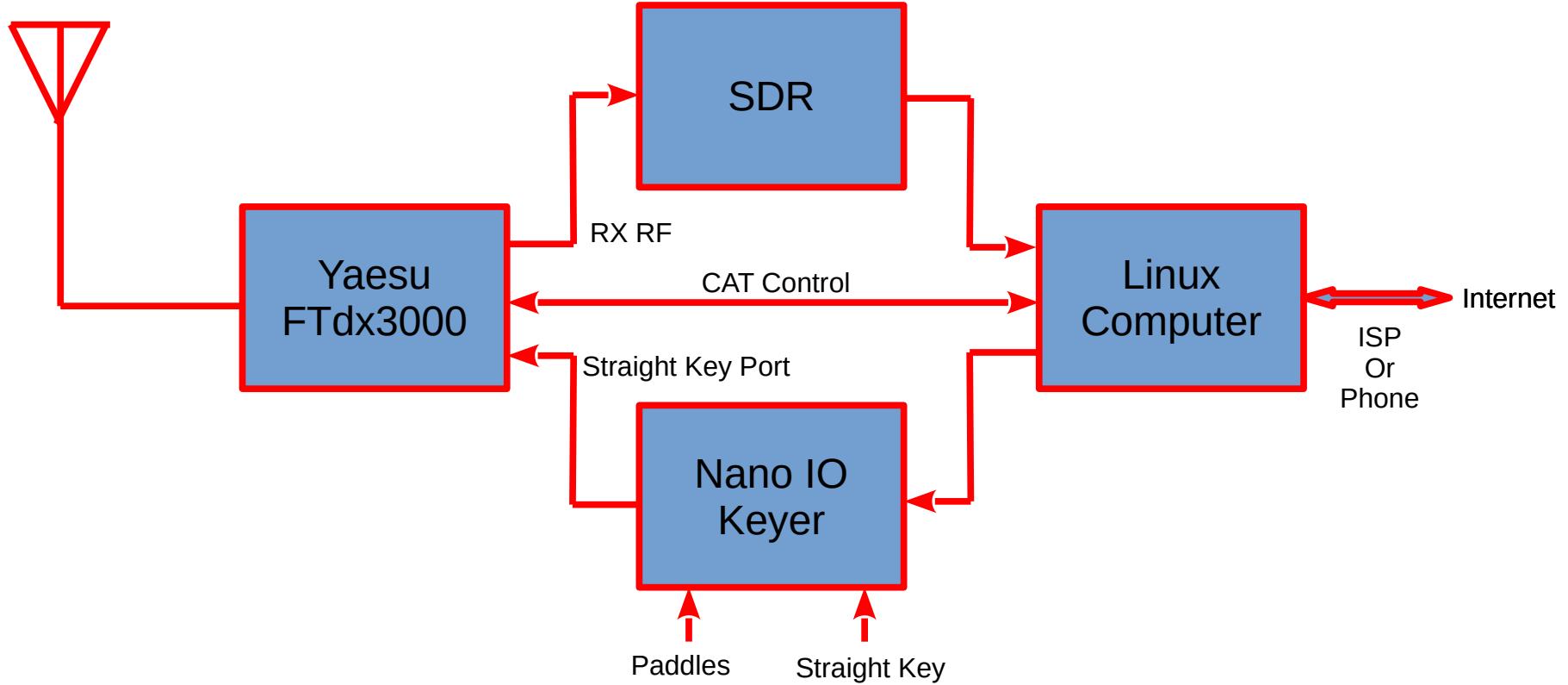
Languages

Python 93.0% Shell 5.6% Other 1.4%



AA2IL HF Station

CW Academy





Some Notes from Intl DX Contest

CW Academy

- These were some of the best condx in many years
 - 20m was open around the clock
- This contest is difficult for Low Power stations
 - Competing with QRO stations
 - Spend a lot of time trying to break pile-ups
- RST is always 5NN
- Cut numbers for power:
 - I always translate these to their numerical equivalent
 - According to discussion on CW ops email reflector, the log checking software does recognize 4tt, 1oo, K, KW, etc.



CW Academy

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