



CW Academy

# CWA Advanced Class Notes

Joe Attili – AA2IL  
Jim Mueller - N7AUE

May-June, 2023



CW Academy

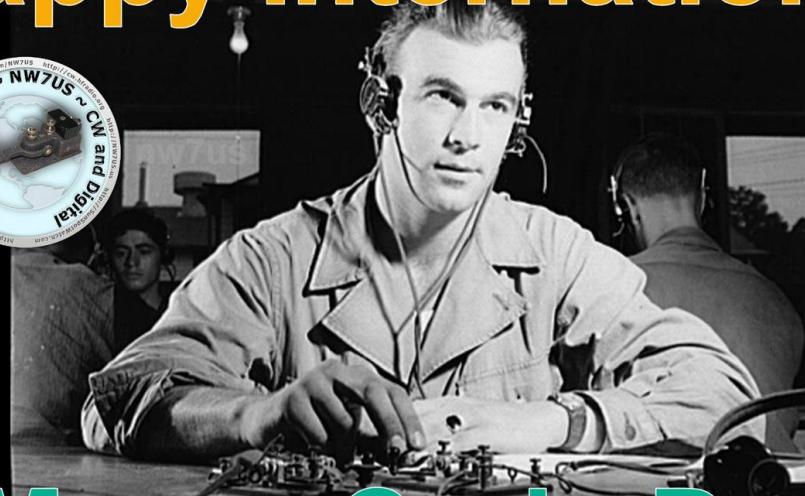
# Session 0

- Meet and Greet
- Introduce ourselves
- Test Jitsi and Sidetone audio
  - No time limit on Jitsi “free” account
  - Jitsi seems to prioritize audio over video when allocating bandwidth
- Congrats to Sean, N3RTW
- Do the first three h/w assignments before 1<sup>st</sup> class
  - Some students do not like the “new” audio practice files
  - The “old” files are available on my Github repository:
  - <https://github.com/aa2il/CWA>



W Academy

# Happy International



## Morse Code Day April 27

*Morse Code Day on April 27 honors the inventor of the Morse code, Samuel Morse, who was born on this day in 1791.*



CW Academy

# Overview

- 8-weeks (M & Th 7-8PM on the West Coast)
  - MST follows immediately after on Mondays
  - **Please use headphones!!!**
- Daily Practice
  - Two or three 15-minute sessions per day is much more effective than one 4-hour block once per week
  - Homework: Short stories, QSOs and CWT exchanges
  - RufzXP and MorseRunner
  - **GET ON THE AIR!!!**
    - FL QSO Party is this weekend
    - SST, MST and CWT are great 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



CW Academy

# About AA2IL

- Grew up in Upstate New York - Job Transfer brought me to San Diego in 1993
- 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 last spring because couldn't seem to get my "fist" back and wanted to see how it all worked
  - Biggest take-away was how crucial daily practice is to improving speed



CW Academy

# Week 1 - Session 1

- Go over h/w and OTA activities
- The Winter Contest season is over BUT there are a bunch of State QSO Parties this weekend:
  - DE, IN, W1 and W7 (16-states in total)
  - Exchange is RST and STATE (out of staters)
  - Next “major” CW contest is the CQ WPX toward the end of the month
- Get on the air!
  - There's always rags to chew, POTA/SOTA/SES stations ...
  - SST, MST, CWT ...
  - E-mail each other and/or Jim & I to arrange a sked ...
  - BTW, 6m has been on fire lately
- A few comments regarding this course
- Word game drill – keep it simple!
  - Animals
  - Colors



CW Academy

# Philosophy

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



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



# Week 1 - Session 2

CW Academy

- Questions on h/w & on the air activities?
- An updated version of Morse Runner is available
  - Several different contests
- Contesting Intro
- Simulated SST
  - Each student gets to run and others call



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
- ...



CW Academy

# Some Terminology

- **Runner**

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

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

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

- Some mix of these is needed to work everybody



# 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

CQ SST AA7TO



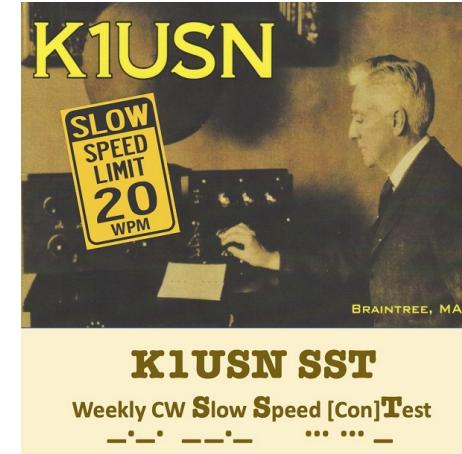
WB0RLJ TU JR NV

WB0RLJ

GE JR JIM NE

GL JIM 73 AA7TO

- If you miss something: ?, AGN, CALL?, NAME?, QTH?, ...
- 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
- Jim led “Scrabble” and “Rhyming” game exercise
- More Contesting
- MST



CW Academy

# 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 and DON'Ts

- Do
  - Start off S&Ping until you build up skills and confidence – this is all many ops ever do
  - If you are running, ask for a repeat if you have **any** doubt about what you copied
  - 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 ask for a repeat, try to be specific which element that you missed
  - If the runner misses your call, send it again then give your exchange
    - Courtesy demands that we look out for each other
  - Be courteous but concise
- Don't send unnecessary information
  - Runner's Call – he knows what it is (and its your problem if you are S&P and get it wrong!)
  - DE before your call or NR before your Serial Number – wastes time, throws off timing and can be confusing
  - Signal report if it is not part of the contest exchange
  - Anything other than 5NN (or ENN) if a signal report is required
  - Long greetings/chatter – SST and MST are exceptions as friendly greetings are encouraged



# MST Weekly Practice Contest

CW Academy

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

CQ MST N3RTW

N5GG

N5GG TU SEAN 28

TU COLIN 17

TU COLIN 73 N3RTW

KN6RDC

KN6RDC TU SEAN 29

TU CHRIS 24

TU CHRIS 73 N3RTW

You don't need to wait for another CQ

- Great place to build up confidence and skill





# CWT Weekly Practice Contest

CW Academy

- 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 WB0RLJ



N6GV

N6GV TU JIM 3312



TU GARY CA

or GARY CWA

73 WB0RLJ



or R or EE

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



# Week 2 - Session 4

CW Academy

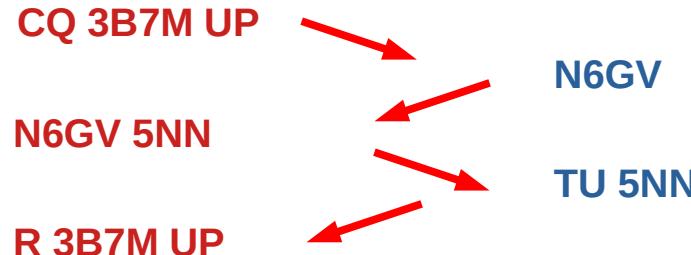
- Go over h/w and on air activities
- Upcoming contests
  - VE4/5/6 QSO Party
  - 6m Sprint, SKCC WES, ...
  - See WA7BNM's <https://www.contestcalendar.com>
- Anatomy of a QSO – Part 1
  - Hit and Run
  - Short and Sweet QSOs
- Short and Sweet QSO (DX/POTA/SOTA, etc.)
  - Each student gets to run and others call
- Sending Practice



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 an ATNO



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



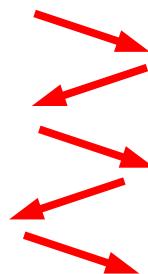
# Short QSOs

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

CQ CQ CQ SV2HUD SV2HUD

N6GV GM 559 OP VAS VAS BK

QSL GARY TNX ES 73



N6GV N6GV

GM VAS UR 569 IN CA CA OP GARY GARY BK

TU VAS 73 GL

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



# Some Thoughts on Sending

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



CW Academy

# Sending Practice Ideas

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



# Feedback from My Keyer

CW Academy

Sending Practice by AA2IL

How quickly daft jumping zebras vex.

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

Paddles: 25   Monitor: 0

Previous   Next   Quit

pyKeyer by AA2IL

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

Call	Name	Exchange	Super	Check	Partial

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

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



# Week 3 - Session 5

CW Academy

- Go over h/w and on air activities
- Upcoming contests
  - Arkansas QP is this weekend (5NN + STATE)
  - CQ WPX CW next weekend (5NN + SERIAL)
    - Look for increased DX activity surrounding contest
- Sending
- Anatomy of a QSO – Part 2
  - Rag Chewing
- Practice “cookie cutter” Rag Chews
  - CQ/Greeting
  - “Big Three:” RST, Name, QTH



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 AA2IL AA2IL AA2IL K

AA2IL DE KB1FGC KB1FGC KN

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

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



# Week 3 - Session 6

CW Academy

- Go over h/w and on air activities
- AR State QSO Parties is this weekend
- CQ WPX is next weekend
- Computers and Logging
- QSO Practice (if we have time)
  - Team up and send something you might send in a rag chew (rig/antenna, weather, ham radio adventures, ...)



CW Academy

# Computers and Logging

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



CW Academy

# Rig Memory Keyer

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

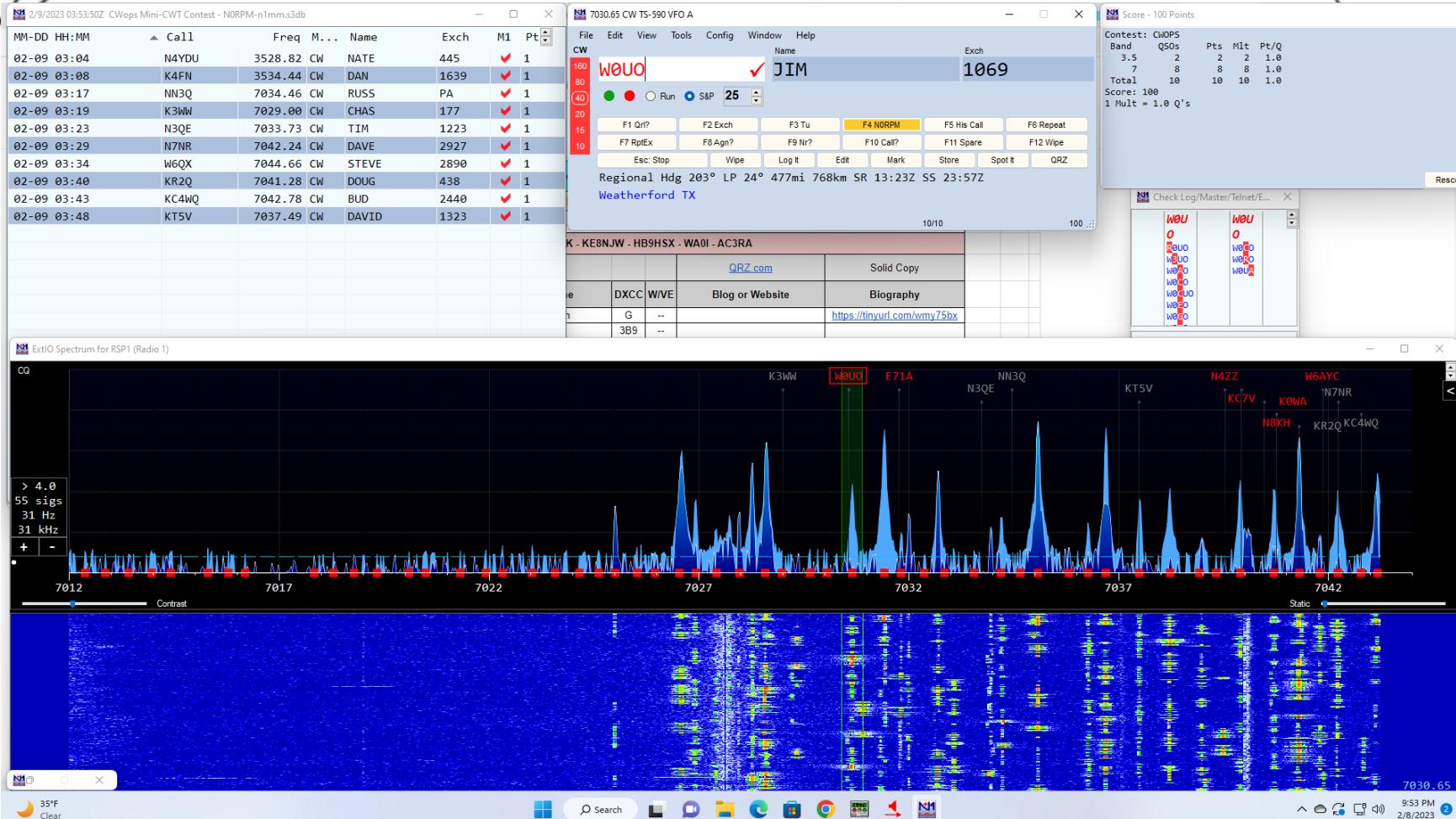




# N1MM Logger

(Screenshot courtesy of N0RPM)

CW Academy





CW Academy

# Other Loggers

## California QSO Party

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

**CQP Logging Software**

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

Contest Logger	Links and Notes
N1MM+	1. <a href="https://n1mmwp.hamdocs.com">https://n1mmwp.hamdocs.com</a> 2. How to log a county-line QSO in N1MM+
N1MM+ Call History File For 2022 Search for qsop_ca on this page:	<a href="https://n1mmwp.hamdocs.com/mnfiles/categories/callhistory/">https://n1mmwp.hamdocs.com/mnfiles/categories/callhistory/</a>
N3FJP	1. <a href="http://www.n3fjp.com/">http://www.n3fjp.com/</a> 2. How to log a county-line QSO in N3FJP
Writelog	1. <a href="https://writelog.com">https://writelog.com</a> Version 12.41 and after: Update of county line QSOs in Cabrillo file. 2. How to log a county-line QSO in Writelog
DX Log	<a href="http://www.dxlog.net/">http://www.dxlog.net/</a>
GenLog	<a href="https://www.qsl.net/w3km/">https://www.qsl.net/w3km/</a>
SkookumLogger (for Mac)	<a href="https://www.k1gq.com/SkookumLogger/">https://www.k1gq.com/SkookumLogger/</a>
CQPWIN	CQPWIN
RUMLogNG (for Mac)	<a href="https://dl2rum.de/rumssoft/RUMLog.html">https://dl2rum.de/rumssoft/RUMLog.html</a>
TR4W	<a href="https://www.tr4w.net/">https://www.tr4w.net/</a>
TLF (for Linux)	<a href="https://tlf.github.io/">https://tlf.github.io/</a>
Utility	Links and Notes



# My Screen During a Contest

CW Academy

Demod Audio - AA2IL

pyKeyer by AA2IL - FTdx3000

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

Call	Name	Exchange
TU AA2IL [LOG]		
WABKAN JOE 3177		
TU AA2IL [LOG]		
CQ CWT AA2IL		

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

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

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

Call	Name	Exchange	Options	CW Data SSB	Ant1	Ant2	Ant3	-1	+1	<
7028.3 W8FJT	CW United States	34								
7028.3 KM4CRJ	CW United States	28								
7028.3 K6TTT	CW United States	25								
7028.3 SN5J	CW Poland	33								
7028.7 K3JT	CW United States	35								
7028.7 VE3EJ	CW Canada	37								
7028.7 VE3T	CW Canada	41								
7028.7 KE3EJ	CW United States	40								
7029.4 N5W	CW United States	31								
7029.8 N4TP	CW United States	33								
7029.8 NJ6Q	CW United States	28								
7030.1 K70A	CW United States	37								
7030.1 K7UD	CW United States	33								
7030.5 N0WTT	CW United States	32								
7030.5 NT2W	CW United States	34								
7030.5 SP9ADG	CW Poland	20								
7030.5 WF4I	CW United States	31								
7030.9 K6WA	CW United States	35								
7031.3 WABY	CW United States	35								
7031.7 AA2IL	CW United States	32								
7031.7 TA2IL	CW Asiatic Turkey	32								
7032.0 K3W	CW United States	48								
7032.0 KG5U	CW United States	33								
7032.4 W6SX	CW United States	37								
7032.7 H4BRM	CW Hungary	32								
7032.7 K3T	CW United States	31								
7032.7 WA8RM	CW United States	30								
7032.7 HA7RM	CW Hungary	33								
7033.1 N3RS	CW United States	37								
7033.1 N3RA	CW United States	35								
7033.1 N3RN	CW United States	37								
7033.4 KY4GS	CW United States	28								
7033.4 W4GS	CW United States	28								
7033.5 KY4G	CW United States	28								
7033.9 K1VUT	CW United States	32								
7033.9 KK7RR	CW United States	30								
7034.3 W8UO	CW United States	33								
7034.3 E5555	CW Estonia	37								
7034.5 I13WRIC	CW Italy	32								
7034.5 TT3WRIC	CW Italy	28								

World Clock by AA2IL

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

AF Gain: Terminal flrig FTdx3000 pySDR by AA2IL Demod Audio - ... pyKeyer by AA2... World Clock by ... Band Map by A... EN Wed Jan 25, 19:56



# Week 4 - Session 7

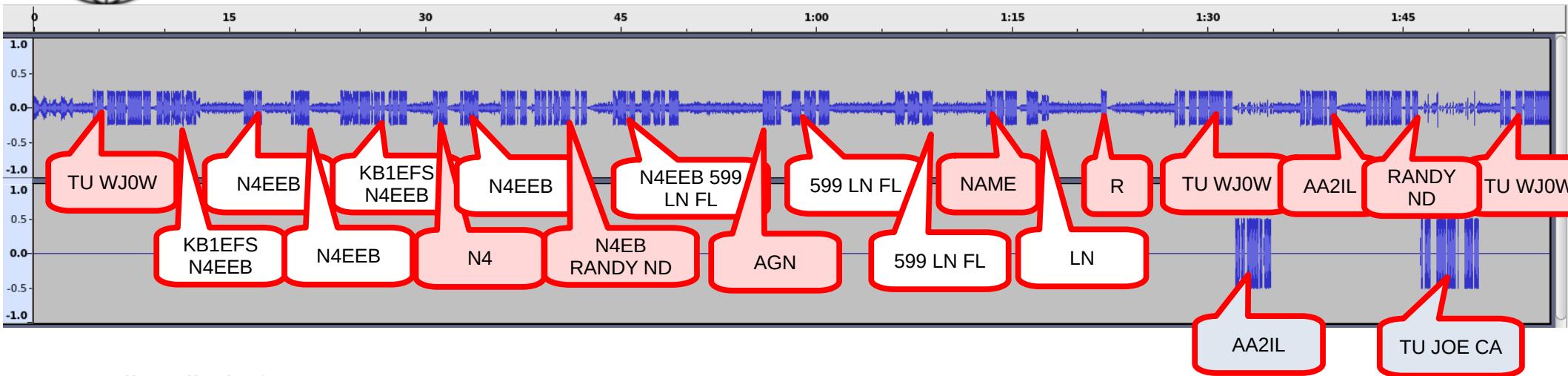
CW Academy

- Next Monday is Memorial Day – class?
- Go over h/w and on air activities
- CQ WPX CW
  - Worldwide → Work anyone anywhere
  - Value of contacts depends on country and continent
  - Multipliers are PrefiXes (AA7, N7, WB0 ...)
  - Exchange is 5NN + SERIAL (Same as Morse Runner)
  - Look for plenty of DX activity before and after the contest
  - Can you get DXCC in one weekend?
- A Comment on Speed
- Cut Numbers
- Math Drill



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



# Cut Numbers

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



CW Academy

# Cut Numbers (cont.)

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



CW Academy

# CW Math Drill

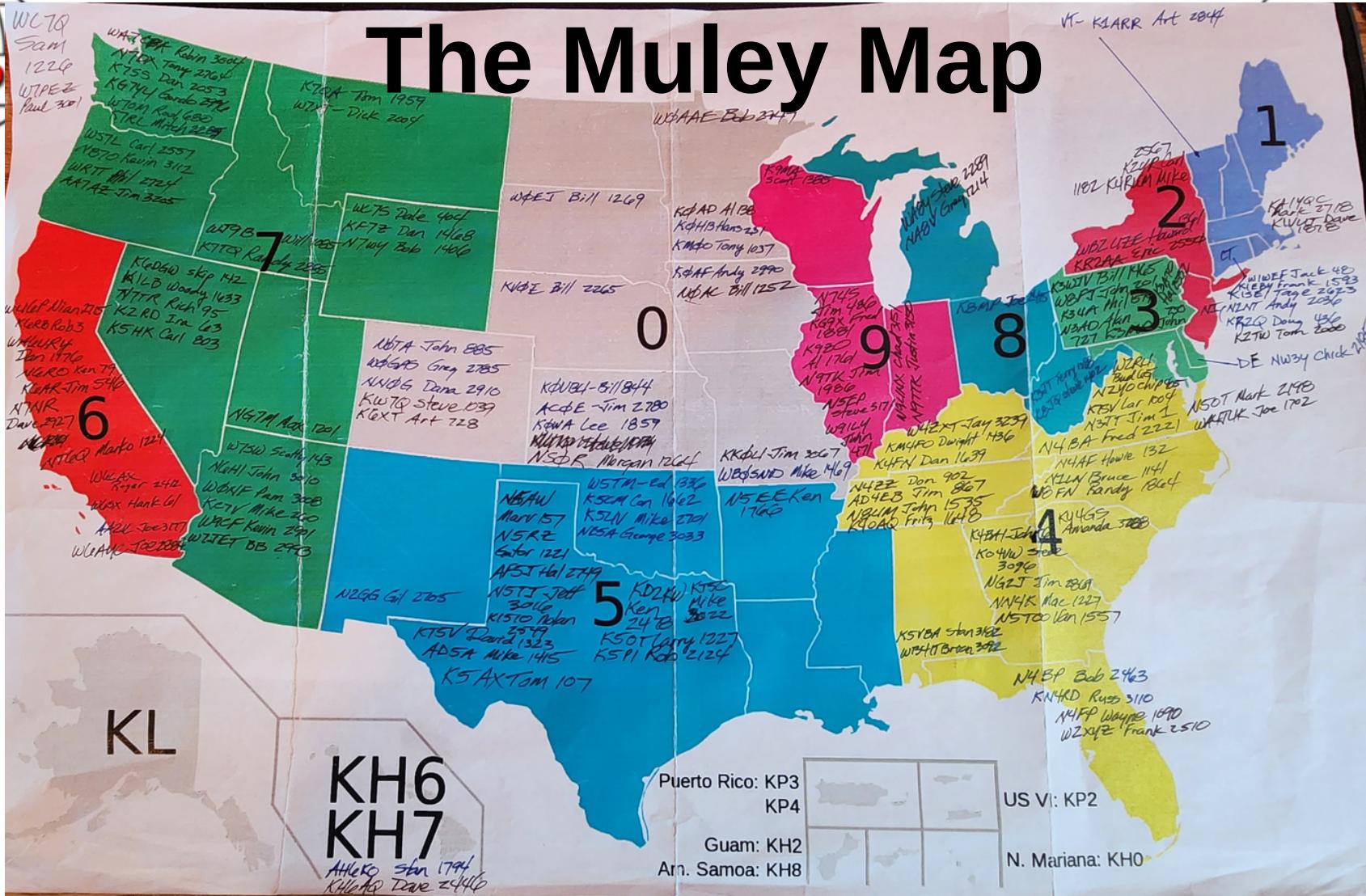
- 1 plus 2
- Is 3 R 3 times 5
- Is 15 R 15 div 3
- ? 15 div 3 Is 5 R 5 minus 1
- Is 6 NO 5 minus 1 Is 4 R ...
- Etc.
- Use ? Or AGN? for repeats and R to confirm answer
  - Try not using “voice” since you can’t do that on the air
- No Cut Numbers this time - We’ll do that on Thursday



# Week 4 - Session 8

CW Academy

- Jim N7AUE led
  - Went over h/w & on the air activities
  - Discussion of various aids and techniques that he found helpful for building speed





# Week 5 - Session 9

CW Academy

- Go over h/w and on air activities
- Up-coming Contests
  - ARRL QRM-fest (aka International Digital)
  - ARRL June VHF
  - ARRL Field Day
  - Handful of State QPs
- Topics for Second Half of CWA
  - Rag-chewing
  - Chasing DX
  - RBN and Other Operating Aids
  - CW for Field Day
- After the contest – Log Check Reports
- Sentences Drill



# More Contest DOs and DON'Ts

CW Academy

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



# What If You Miss Something?

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



CW Academy

# Scoring & Classifications

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



CW Academy

# 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 contests sponsored by the ARRL is particularly brutal as there is usually an additional penalty for each busted QSO
- The winners of many large contests are often determined by which ops make fewer mistakes
- This is not as much of a concern in the practice contests (SST/MST/CWT) since they are not adjudicated but how you practice will likely be reflected in your performance in an actual contest



CW Academy

# Log Check Report (LCR)

Contest: 2022 CQ WORLD WIDE CW DX CONTEST  
Call: AA2IL  
Category: Single Op All Band Low Power Assisted  
Location: SDG  
Processed: 2023-03-02 04:59:20

Thank you for submitting a log in the 2022 CQ WW DX CW Contest.

Your log checking report is below. We believe it is helpful for participants to receive information on how their log was scored.

Log checking details for CQ WW CW 2022:

7,770 Logs total

4,586,154 QSOs total

4,307,679 (93.9%) QSO checked against another log

4,184,853 (97.1%) QSO checked good when checked against another log

70,417 ( 1.8%) Busted calls

14,157 ( 0.5%) Busted exchange

37,279 ( 0.9%) Not in log

Median score reduction for all logs: 8.8%

Median error rate for all logs: 2.67%



CW Academy

# Log Check Report (cont.)

\*\*\*\*\* Summary \*\*\*\*\*

**309 Raw QSO before checking (does not include duplicates or missing exchanges)**  
**305 Final QSO after checking reductions**

835 Raw QSO points  
799 Final QSO points

75 Raw zones  
74 Final zones

131 Raw countries  
130 Final countries

**206 Raw mults**  
**204 Final mults**

172010 Raw score  
162996 Final score

**1.3% error rate based on raw and final qso counts**  
**5.2% score reduction**

- 1 (0.3%) not in log
- 3 (1.0%) incorrect calls
- 0 (0.0%) incorrect exchanges
- 0 (0.0%) missing exchanges
- 0 (0.0%) duplicates removed
- 2 (0.6%) calls unique to this log only (not removed)



CW Academy

# Log Check Report (cont.)

\*\*\*\*\* Not In Log \*\*\*\*\*

14060 CW 2022-11-27 2358 AA2IL 03 TY5AF 35

\*\*\*\*\* Incorrect Call \*\*\*\*\*

21031 CW 2022-11-26 0128 AA2IL 03 JJ1JML 25 correct JJ0JML

7007 CW 2022-11-26 0612 AA2IL 03 EA8M 33 correct EA8RM

21055 CW 2022-11-26 2239 AA2IL 03 JJ0JMD 25 correct JJ0JML

\*\*\*\*\* Unique Calls Receiving Credit (not removed)\*\*\*\*\*

\*\*\*\*\* Lost Multipliers \*\*\*\*\*

14060 CW 2022-11-27 2358 AA2IL 03 TY5AF 35 Not in log C,Z

\*\*\*\*\* Stations Copying AA2IL Incorrectly \*\*\*\*\*

14026 CW 2022-11-26 0148 KP3DX 08 AA2I 05

\*\*\*\*\* Stations Receiving Not In Log From AA2IL \*\*\*\*\*

7041 CW 2022-11-26 1517 JH4UYB 25 AA2IL 03

21000 CW 2022-11-27 2247 JQ1NGT 25 AA2IL 03

\*\*\*\*\* Stations Copying AA2IL Exchange Incorrectly \*\*\*\*\*

21000 CW 2022-11-26 0111 KH7Q 31 AA2IL 5 correct 3

14063 CW 2022-11-27 2123 NP4AW 08 AA2IL 05 correct 3



# Week 5 - Session 10

CW Academy

- Go over h/w and on air activities
- Up-coming Contests
  - ARRL QRM-fest (Intl Digi)
  - Kentucky State QP
  - POTA Contest
- Rag-chews – after the “big three”
- Practice inner part of a Rag-Chew QSO
  - Rig, Ant, Power ...
  - Weather ...
  - Job, family, ...
  - Ham exploits, activities, other hobbies...
  - Etc. etc.



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 AA2IL AA2IL AA2IL K**

**AA2IL DE KB1FGC KB1FGC KN**

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

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



CW Academy

# Rag Chew QSOs (cont.)

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

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

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

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

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

...

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



CW Academy

# Rag Chew Drill

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

CQ CQ CQ N5GG N5GG K

N5GG DE AA7TO AA7TO KN

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

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

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

RR FB COLIN = YOUR TS4500 DOING A GREAT JOB = IT WAS GUD CHATTING WITH  
YOU AGN, I NEED TO QRT NW = HPE CU SOON 73 73 <SK> N5GG DE AA7TO K

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

E E



# Week 6 - Session 11

CW Academy

- Go over h/w and on air activities
- Upcoming contests
  - ARRL June VHF Contest
    - 50-MHz and up – 6m has been fantastic this spring
    - FT8 dominates on 6m but look for CW around 50.090 MHz +/- and SSB 50.125 MHz and up
    - Look for 2m and 70cm FM on the calling frequencies and up
- Chasing DX
  - The bands have come back to life!
  - DXpeditioners are traveling again
  - Look for increased activity in the days surrounding the major International contests
- 20-questions Drill



# 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
  - However, most large DXpeditions will operate CW as part of their effort
- Your QRQ and contesting skills will serve you well!
- The Internet and SDR have changed the landscape
  - Instant pile-ups once a rare station is spotted
  - A Panadapter gives you “situational awareness”
    - Can do this to some extent with dual VFOs or XIT/RIT
    - Radios with dual receivers are an advantage
    - Consider using a WebSDR, be creative!
  - Embrace it and use it to your advantage!



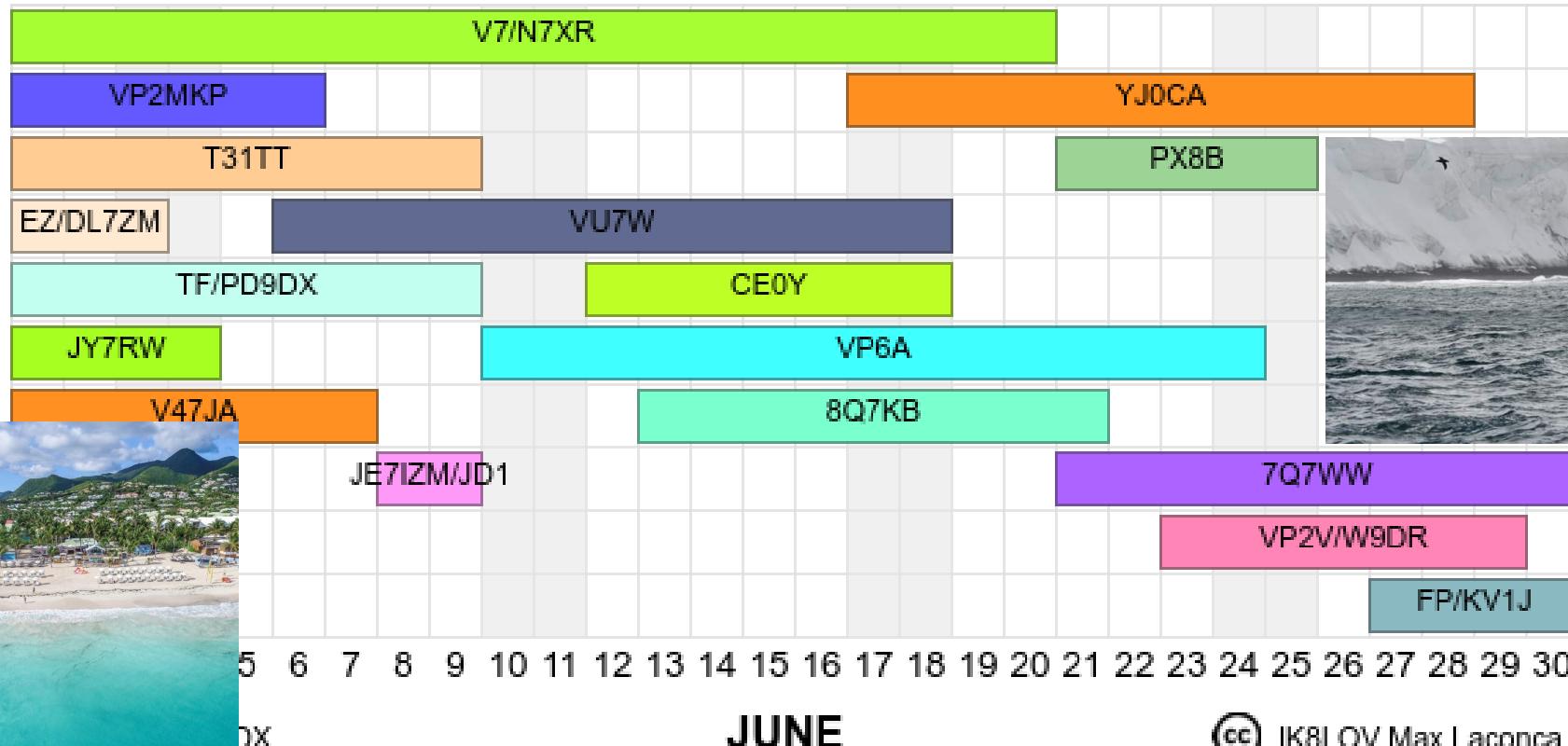
# Up-coming DXpeditions

CW Academy



## FEATURED DXPEDITIONS TIMELINE

Last update: June 5, 2023





CW Academy

# Chasing DX (cont.)

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



# My Contact Last Fall with D60AE (Comoros)

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
  - Exchanged 5NNs and 73s
  - Confirmed “In the Log” the next day on Clublog
- Remember, my station is a “little pistol” - 100 W and wire antennas
  - Approximately 10,500 miles distance



# SDR Panadapter (Post-QSO)

CW Academy

Demod Audio - AA2IL

pyKeyer by AA2IL - FTdx3000

File

Call	RST out	RST in
D60AE	5NN	5NN

CQ AA2IL Reply OP OTH 73 BK Call? LOG it RST V Test

Macros: Default Speed: 25 FTdx3000 Send QRZ?

Satellites: None +2 WPM -2 WPM

QSO RATE:

World Clock by AA2IL

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 CW 20M CW

AA2IL AC2YD UNITED STATES OF AMERICA 2022-10-10 00:26:32 2022-10-10 03:21:46 20M CW

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 K3UO	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 WB0 SND	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				

Sun Oct 9, 16:46



# SDR Panadapter (Benin TY0RU)

CW Academy

Demod Audio - AA2IL

pyKeyer by AA2IL - FTdx3000

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? QRL?

NIL TU/QRZ? TU/QRZ? Call? His Call S&P 2x AGN? RR ORZ?

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

ON 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

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

Band Map by AA2IL - Server NC7J

Cluster	160m	80m	60m	40m	30m	20m	17m	15m	12m	10m	6m
21011.8 ZF2MJ	CW Cayman Islands	38									
21011.8 F2MJ	CW France	31									
21014.7 NC3J	CW United States	21									
21027.1 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 VE3GY	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 H6ZH	United States										
21090.0 H6ZH	United States										
21090.0 H6ZH	United States										
21090.0 H6ZH	United States										
21090.0 H6ZH	Chile										
21090.0 H6ZH	United States										
21090.0 H6ZH	United States										
21090.0 H6ZH	United States										

World Clock by AA2IL

20:57:06

Sat Oct 15, 13:57



# Week 6 - Session 12

CW Academy

- Go over h/w and on air activities
- Upcoming contests
  - June VHF
  - SKCC WES
- DX Cluster and Reverse Beacon Network
- 20 Questions (again)



CW Academy

# Spotting Networks

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



# Reverse Beacon Network (RBN)

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

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

welcome main dx spots nodes FTB downloads about contact us

REVERSE BEACON NETWORK

Leaflet | © OpenStreetMap contributors

Unfreeze Zoom Max rows: 100 Max age: 1 Days New spot: 100 Show Elements: map distance mi distance km freq mode type snr speed seen

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

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

ow my psk3t psk63

CQ DX BCB I/B NCDXF

● Spotter (de) ● Spotted (dx)

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	CWV	CQ	6 dB	25 wpm	2033z 06 Jun	now
NN3RP	K2MD	175 mi	7030.1	CWV	CQ	2 dB	23 wpm	2033z 06 Jun	now
PYTZC	NEAP	6123 mi	21023.9	CWV	CQ	14 dB	24 wpm	2033z 06 Jun	now
EA2RCF-4	4O4O	1077 mi	18083.0	CW	CQ	14 dB	25 wpm	2033z 06 Jun	now
G4ZFE	EA7EGU	1033 mi	14051.0	CW	CQ	9 dB	26 wpm	2033z 06 Jun	now
G4ZFE	4O4O	1095 mi	18083.0	CW	CQ	16 dB	24 wpm	2033z 06 Jun	now
G4HSO	REAP	1547 mi	21024.0	CW	CQ	32 dB	24 wpm	2033z 06 Jun	now
G4HSO	US71GN	1398 mi	21030.5	CW	CQ	4 dB	20 wpm	2033z 06 Jun	now
G4HSO	4O4O	1093 mi	18083.0	CW	CQ	11 dB	24 wpm	2033z 06 Jun	now
ES2RR	4O4O	1192 mi	18083.0	CW	CQ	25 dB	25 wpm	2033z 06 Jun	now
LAAETPA	4O4O	1548 mi	18083.0	CW	CQ	5 dB	25 wpm	2033z 06 Jun	now
JN1ILK	REAP	4598 mi	21024.0	CW	CQ	31 dB	23 wpm	2033z 06 Jun	now
Y4AAR	EA7EGU	4598 mi	21024.0	CW	CQ	44 dB	24 wpm	2033z 06 Jun	now



# RBN Real-Time Filters

CW Academy

reversebeacon.net/main.php?zoom=40.02,1.77,1.35&rows=100&max\_age=1,day&spot\_types=1&spotted\_call=4I4dx&hide=distance\_km

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

REVERSE BEACON NETWORK

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

Leaflet | OpenStreetMap contributors

Unfreeze Zoom

Show Elements:  map  distance mi  distance km  
 freq  mode  type  
 air  speed  seen  
 sea  time  seen

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

spotter-callsign		● Spotter (de)	● Spotted (dx)						
callsign	spotter-callsign	4I4dx							
● spotter	● spotted	distance mi	freq	mode	type	snr	speed	time	seen
DRAW	● 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
B08CS	● 4L4DX	3424 mi	18077.0	CW	CQ	15 dB	25 wpm	2027z 06 Jun	now
EATRCF-4	● 4L4DX	2409 mi	18077.0	CW	CQ	5 dB	25 wpm	2027z 06 Jun	98 seconds ago
IK4VET	● 4L4DX	1712 mi	18077.1	CW	CQ	16 dB	24 wpm	2027z 06 Jun	102 seconds ago
DC9YZ	● 4L4DX	1724 mi	18077.0	CW	CQ	13 dB	25 wpm	2027z 06 Jun	103 seconds ago
VU2CPL	● 4L4DX	2772 mi	18077.0	CW	CQ	15 dB	25 wpm	2027z 06 Jun	109 seconds ago
ES2RR	● 4L4DX	1503 mi	18077.0	CW	CQ	24 dB	25 wpm	2027z 06 Jun	110 seconds ago
TF3YY	● 4L4DX	3005 mi	18077.0	CW	CQ	12 dB	25 wpm	2027z 06 Jun	111 seconds ago
DM5GG	● 4L4DX	1616 mi	18077.0	CW	CQ	18 dB	25 wpm	2027z 06 Jun	113 seconds ago
HABTKS	● 4L4DX	1297 mi	18077.0	CW	CQ	21 dB	25 wpm	2027z 06 Jun	114 seconds ago
VIRZFUN-77	● 4L4DX	4078 mi	18077.3	CW	CQ	21 dB	25 wpm	2027z 06 Jun	115 seconds ago
JN1ILK	● 4L4DX	4794 mi	18077.0	CW	CQ	11 dB	25 wpm	2027z 06 Jun	115 seconds ago
SQ5J	● 4L4DX	1345 mi	18077.1	CW	CQ	14 dB	25 wpm	2027z 06 Jun	116 seconds ago
PA7RVE	● 4L4DX	4510 mi	18077.0	CW	AM	7 dB	25 wpm	2027z 06 Jun	117 seconds ago



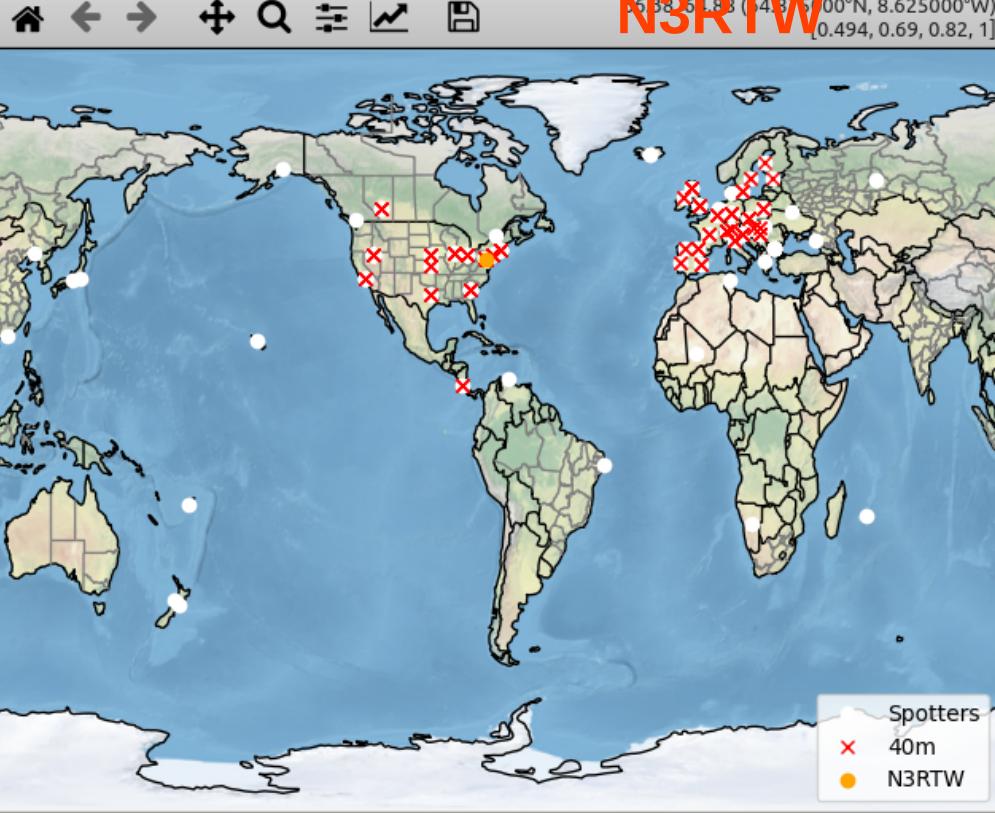
# Can You Hear Me Now?

Archived data from Monday's 0300 MST (June 6, 2023)

CW Academy

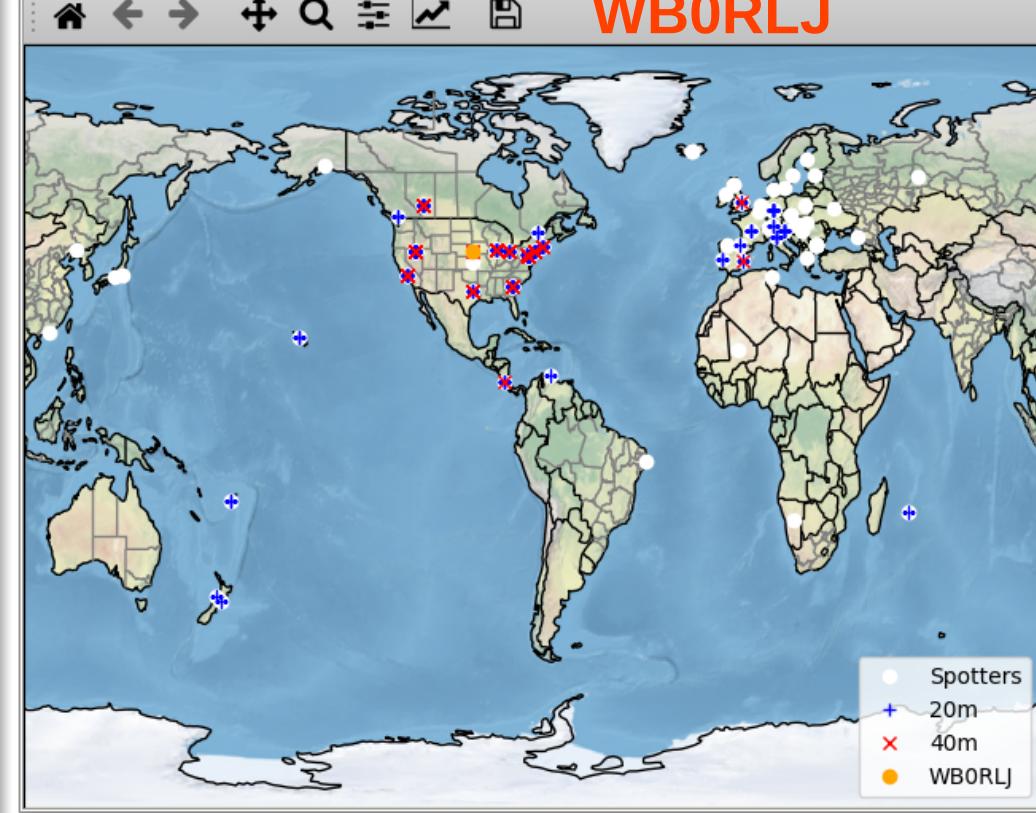
RBN Analysis for N3RTW from 2023-06-06 03:00:00 to 2023-06-06 04:00:00

N3RTW  
[65.886183, -143.560000, 0.494, 0.69, 0.82, 1]



RBN Analysis for WB0RLJ from 2023-06-06 03:00:00 to 2023-06-06 04:00:00

WB0RLJ

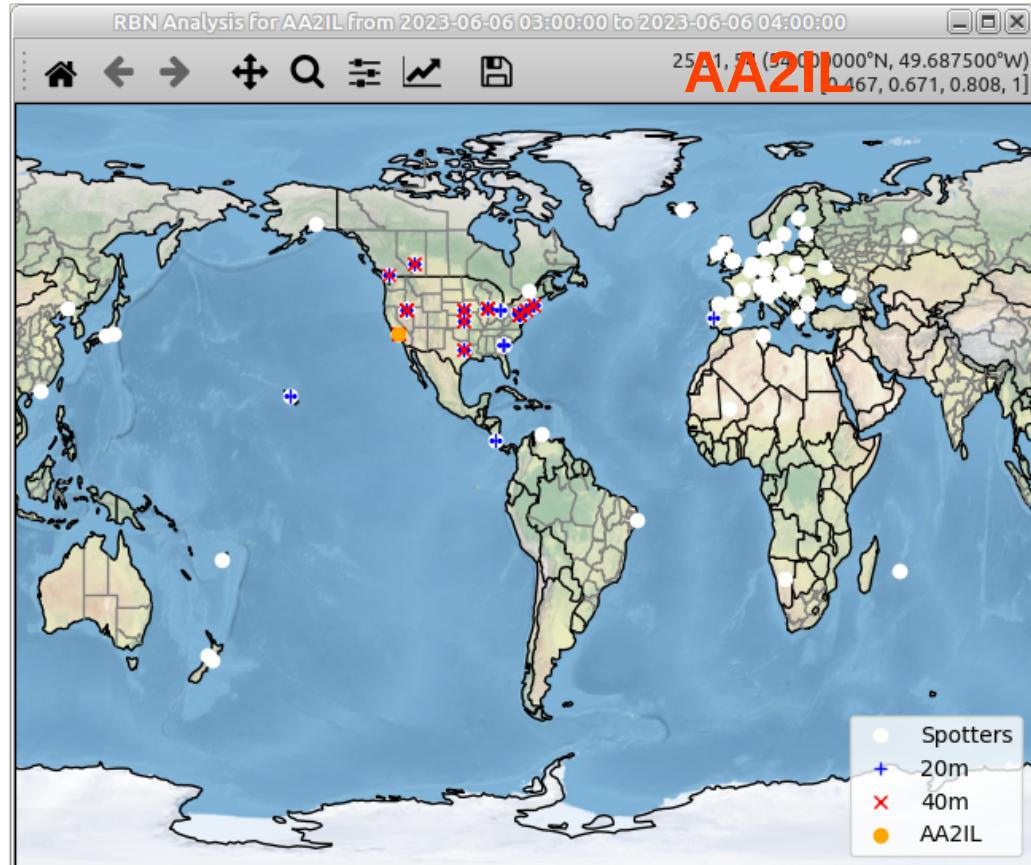
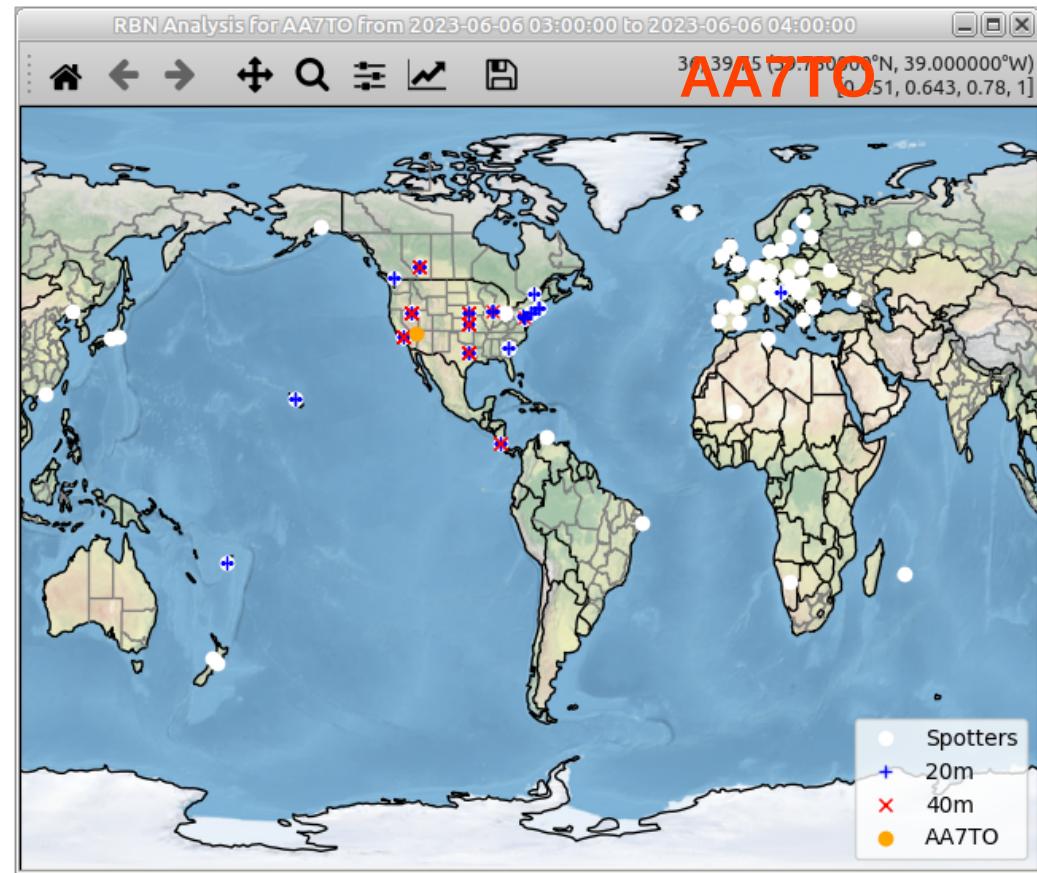




# Can You Hear Me Now?

Archived data from Monday's 0300 MST (June 6, 2023)

CW Academy

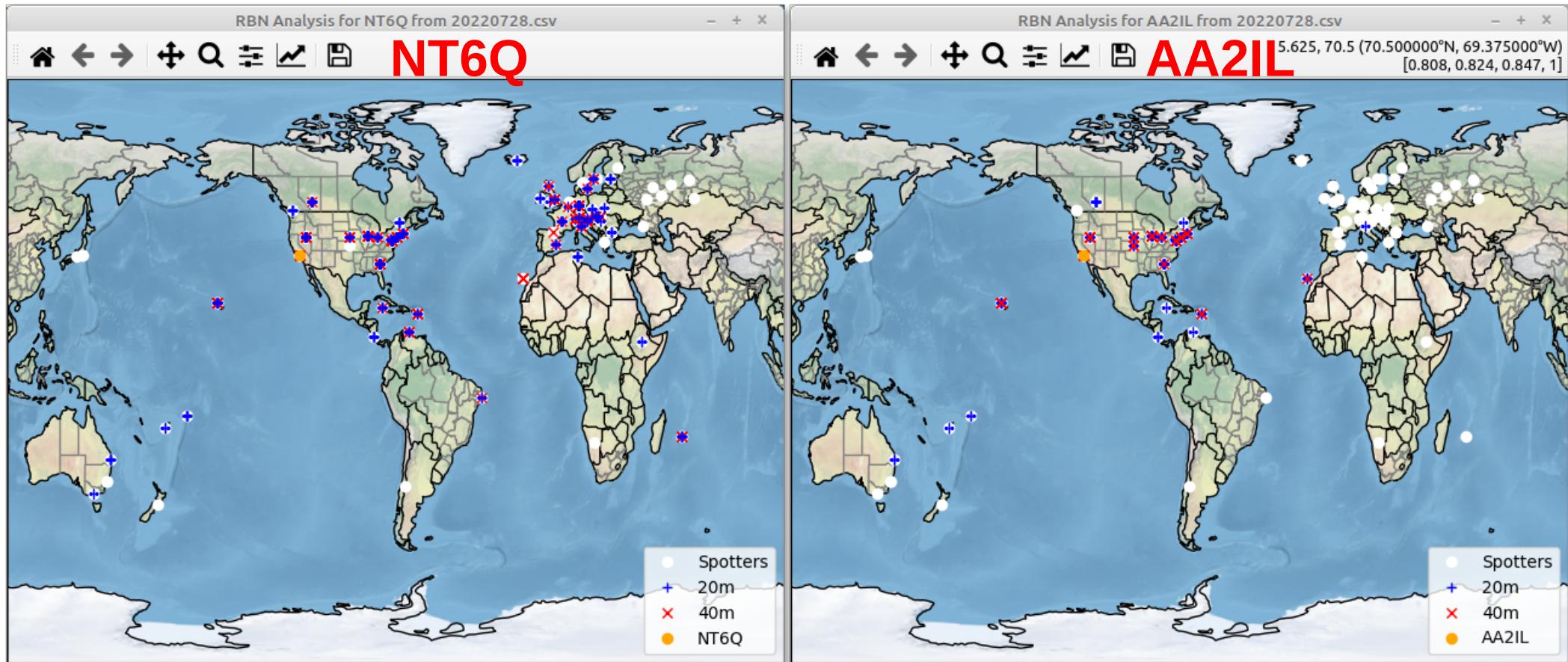




# Big Gun vs Little Pistol

## CWT 0300-0400 July 28, 2022

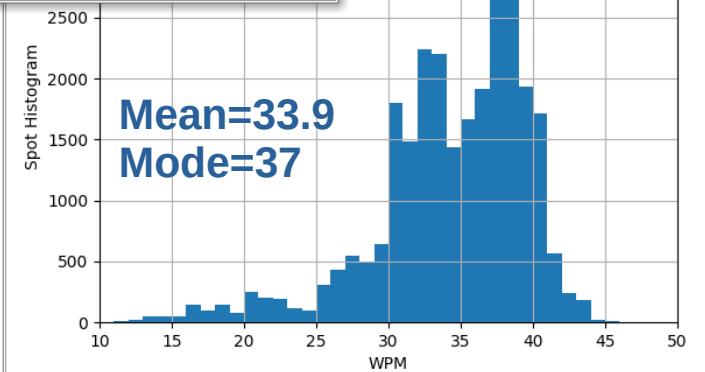
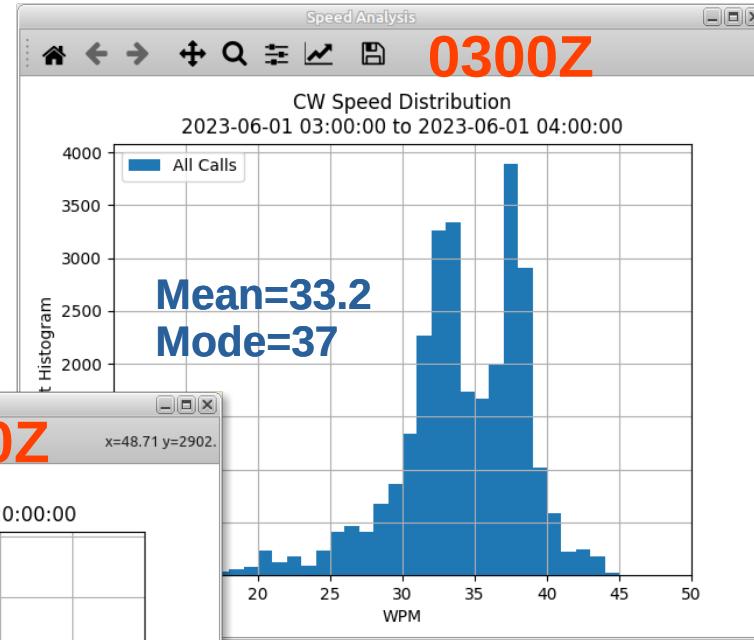
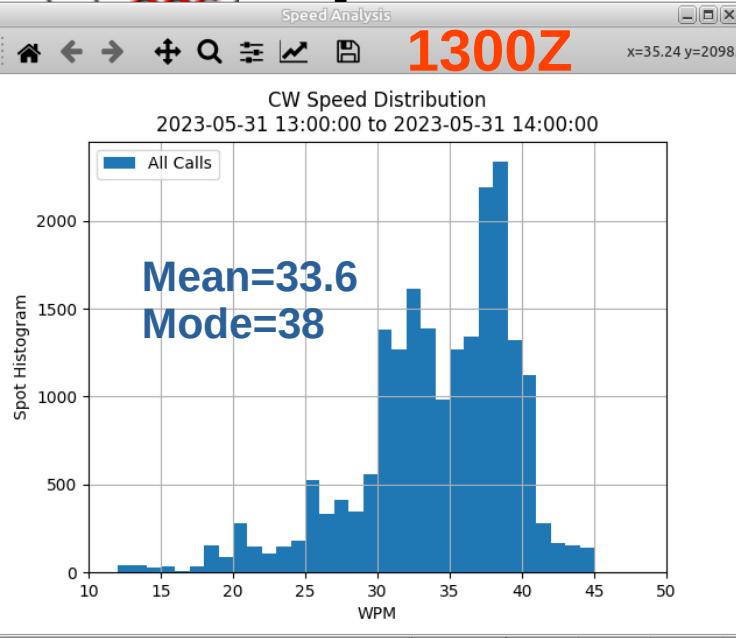
CW Academy





# Speed Analysis – Last Week's CWTs

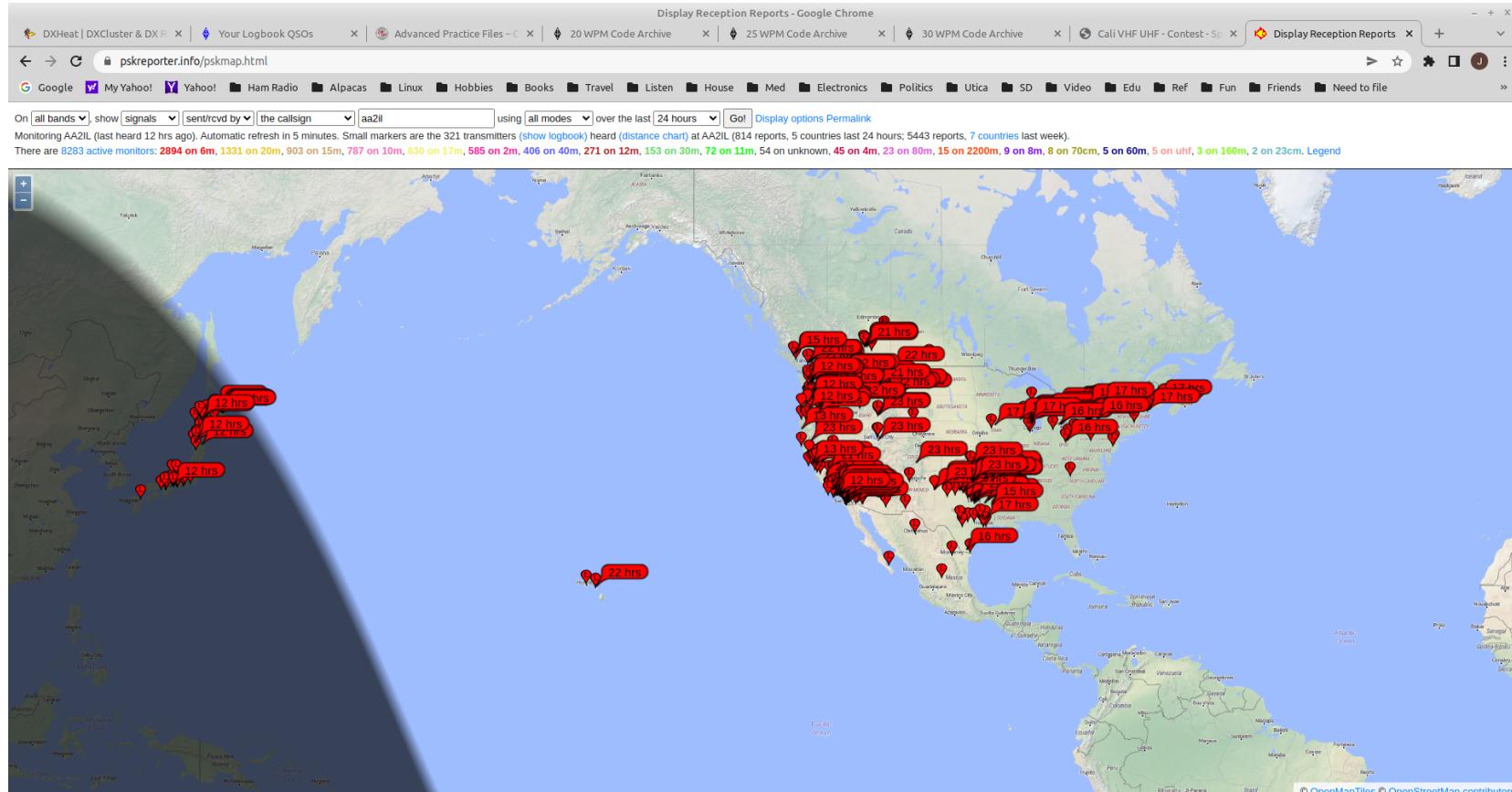
CW Academy





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

CW Academy

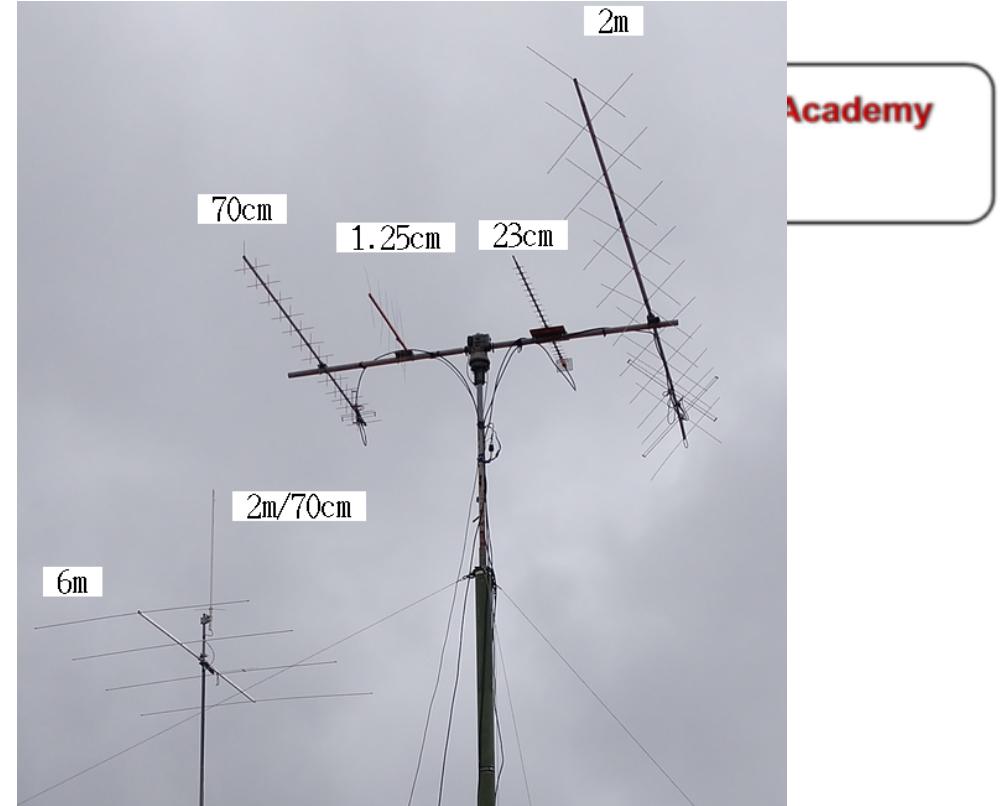




# Week 7 - Sessions 13+14

CW Academy

- Go over h/w and on air activities
- Upcoming contests
  - All Asian DX CW
  - West Virginia QP
  - Stew Perry Top Band (160m)
- Field Day
  - And other contesting left-overs
- Field Day Drill



Academy



CW Academy

# ARRL Field Day

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

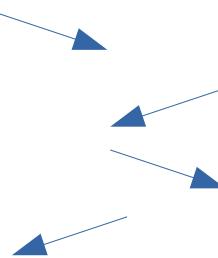
**CQ FD AA2IL**

**N7AUE TU 2E SDG**

**73 AA2IL**

**N7AUE**

**TU 1B NV**





CW Academy

# ARRL Sweepstakes (CW)

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

**CQ SS AA2IL**

**N7AUE**

**N7AUE TU 123 A AA2IL 78 SDG**

**TU 456 U N7AUE 74 NV**

**73 AA2IL**



CW Academy

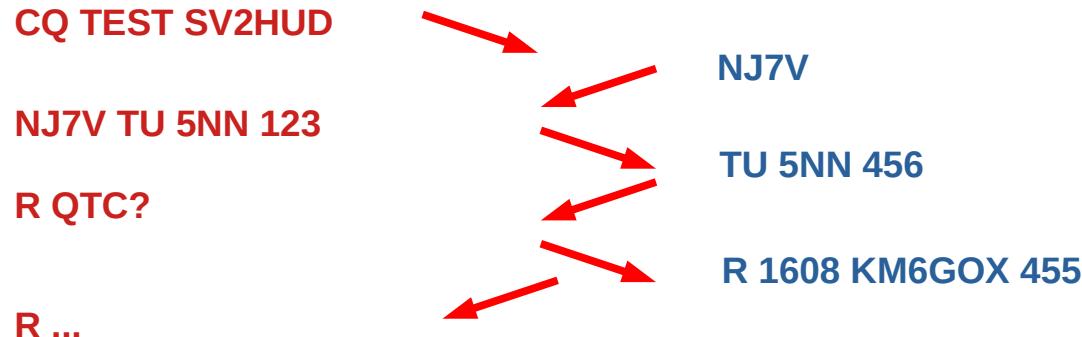
# Sprint Contests

- 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/>



CW Academy

# CQP Log Check Report

AA2IL QTH:SDIE  
CQP LOG CHECKING RESULTS

:

QSO: 21031 CW 2022-10-01 1641 AA2IL/6 37 SDIE N5KB 22 IA  
Duplicate QSO....removed without penalty...

:

QSO: 7030 CW 2022-10-02 0207 AA2IL/6 547 SDIE N2JF 105 FL  
This QSO was removed without penalty because it is not in the received stations log (NIL)

:

QSO: 7030 CW 2022-10-02 0216 AA2IL/6 562 SDIE VA3FN 66 ON  
Half-credit awarded for this QSO: serial # 76

:

QSO: 3542 CW 2022-10-02 0612 AA2IL/6 783 SDIE W6NL 1106 MONO  
No credit award for this QSO: serial # 772, location mismatch SCLA

:

After Log Checking:

Total Raw QSO's: 933 CW: 933 PH: 0

Duplicate QSO's: 22

Number of QSO's earning full or partial credit: 909

CW QSO's: Full Credit: 903 Half-Credit: 6 No-credit (NIL or Multiple Errors): 2

PH QSO's: Full Credit: 0 Half-Credit: 0 No-credit (NIL or Multiple Errors): 0

Checked Mults: 56

QSO Points granted: 2718

FINAL SCORE: 152208



# 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

## CALLSIGN CHECK RESULTS

---

40CW JI1RFN is a busted call. The correct call is JI1RFB.

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

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

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



# IARU HF Log Check Report

CW Academy

## CROSS CHECK RESULTS

-----  
15CW K4ZW QSO not found in log.

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 X (Busted QSOs / Duped QSO total))



# Week 8 - Session 15

CW Academy

- Go over h/w and on air activities
- Field Day is this weekend – Have Fun!!!
- Before a contest:
  - Propagation?
  - Other prep?
- QSLing
- Where to you go from here?
  - GOTA!!!
  - LICW
  - Become a CWA Advisor
- Other Topics?
- QSO Drill



CW Academy

# “Squeeze” Sending

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



CW Academy

# “Squeeze” Sending (cont.)

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



# RTTY Contesting

CW Academy

- Many CW contesters also enjoy RTTY contesting
  - Fast paced, rates can approach those of CW
  - Most modern rigs have soundcard built-in so mostly plug-and-pray
  - Signaling 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
  - Result is that it actually takes longer to send 5NN than 599
- Send <CR> and spaces before and after your messages to help separate from noise/garbage
- See [rttycontesting.com](http://rttycontesting.com) for more info



# Session 16 – Graduation!!

CW Academy

- Certificates
- Major CW contests throughout the year:
  - NAQP – January and August
  - ARRL International DX CW – February
  - CQ WPX CW - May
  - IARU HF Championships – July (WRTC)
  - CWops CW Open – September
  - California QSO Party - October
  - ARRL Sweepstakes - November
  - CQ WW CW – November
  - State QPs - February - November
- CWops
- One last rag chew drill?





# CWops Membership Requirements

CW Academy

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



# CWops Activities

CW Academy

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



CW Academy

# My Favorite Ham Websites

- Contesting related:
  - WA7BNM's Contest Calendar: [contestcalendar.com](http://contestcalendar.com)
  - WA7BNM's Contest Score Rumors: [3830scores.com](http://3830scores.com)
- DX Cluster:
  - DX Heat: [www.dx-world.net](http://www.dx-world.net)
  - DX Watch: [dxwatch.com](http://dxwatch.com)
- Activity:
  - Reverse Beacon Network: [reversebeacon.net](http://reversebeacon.net)
  - PSK Reporter: [pskreporter.info](http://pskreporter.info)
- Chasing DX:
  - DX World: [dx-world.net](http://dx-world.net)
  - DX News: <https://dxnews.com/>
- Propagation:
  - VOCAP
  - DX View (TNX JR)
- Just Plain Cool:
  - ADIF to MAP: <http://analyzer.adventureradio.de/index.php>
- There are many other very good sites



# Final Comments

CW Academy

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



# Additional Material

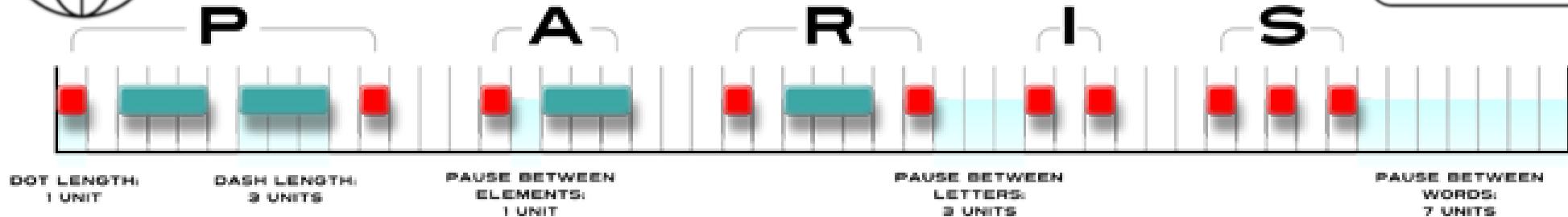
CW Academy

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



CW Academy

## PROPERLY SPACED MORSE CODE TIMING



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

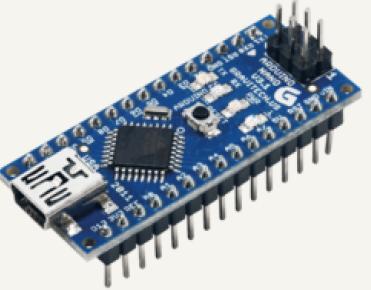
- T = Duration of a dit (seconds)
- “Paris” is the “standard” word length = 50 dits
- WPM = No. Times we can send this standard word in a minute = 60 sec. / (50 T)
- **T = 1.2/WPM seconds**
- e.g. For 25 WPM, each dit is  $1.2/25 = 0.048$  s = 48 ms



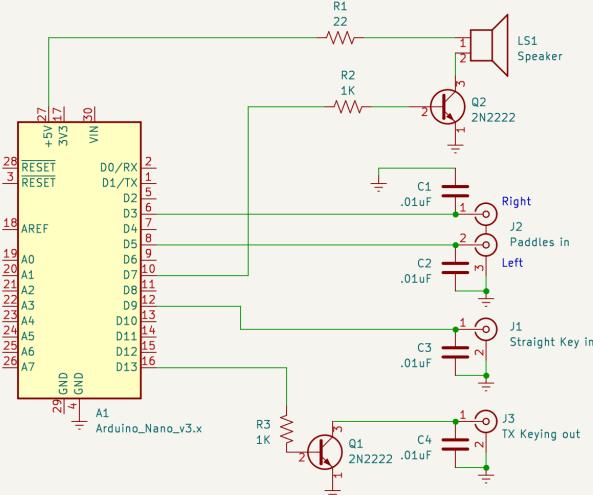
# Homebrew Arduino Nano Keyer/Code Practice Oscillator

CW Academy

- A number of keyers are commercially available and are quite popular, e.g.
  - Winkeyer
  - Morseruino
- You can easily “roll your own” using a micro-controller (Arduino, ESP-32, ...)
  - This is a much cheaper option, especially if you have a well-stocked junk box
  - K3NG – Has every feature imaginable!
  - Flldigi Nano IO (W1FKJ) – easily fits in an arduino nano
- The keyer I use is an adaptation of W1FKJ’s Nano IO
  - Full schematics and firmware source are available at <https://github.com/aa2il/nanoIO>
  - Doubles as a code practice oscillator and gives you feedback on your timing
  - Minimal parts count
  - Current firmware is not compatible with Winkeyer protocol so will not work with N1MM logger



# Schematic

**NOTES:**

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

Full-featured Keyer

File: Full\_Featured\_Keyer.kicad\_sch

Dr. J. B. Attili  
AA2IL

Sheet:  
File: keyer.kicad\_sch

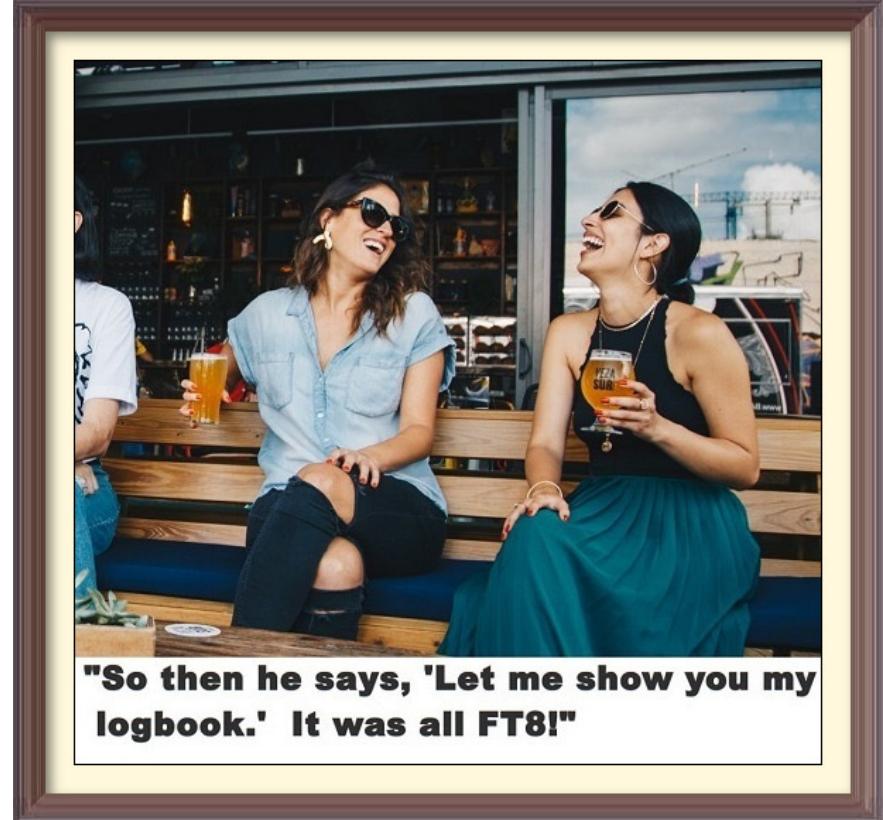
Title: Barebones Nano IO Keyer

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



# The Elephant in the Room

CW Academy



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



CW Academy

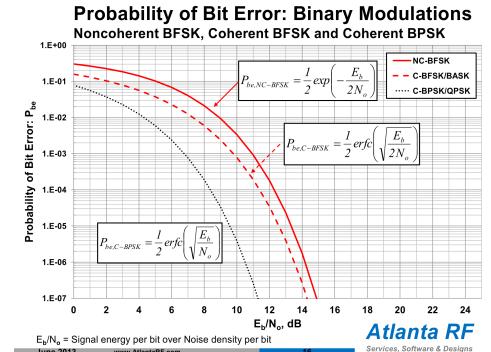
# What about FT8?

- 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:
    - $\text{SNR}_{\text{ft8}} = S / N = [E_b R] / [N_0 B_{\text{ref}}] = E_b/N_0 R/B_{\text{ref}}$
    - $E_b$  = Average Energy per Information bit
    - $N_0$  = Noise Power Spectral Density (assumed white)
    - $R$  = Information data rate = ~77-bits/15-sec.
    - $R/B_{\text{ref}} = (77/15)/2500 \sim -27 \text{ dB}$
    - $E_b/N_0 = \text{SNR}_{\text{ft8}} + 27 \text{ dB}$  is the standard measure of SNR when evaluating the performance of a digital comm schemes
  - **The myth that FT8 somehow magically digs signals out from well beneath the noise floor and is therefore much more sensitive compared to other modes, including CW, is simply NOT TRUE!**
- The F/H mode is confusing and of dubious value since it reduces the fox’s signal by 6-dB each time he doubles the number of streams
  - Burying this option in an obscure menu doesn’t help – turns out “hounds” don’t need it if they stay above 1-KHz!
  - Signals from the MSHV variant look similar but are not F/H





# Why do I Still Use FT8 Occasionally?

CW Academy

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



# AA2IL Homebrew Software

CW Academy

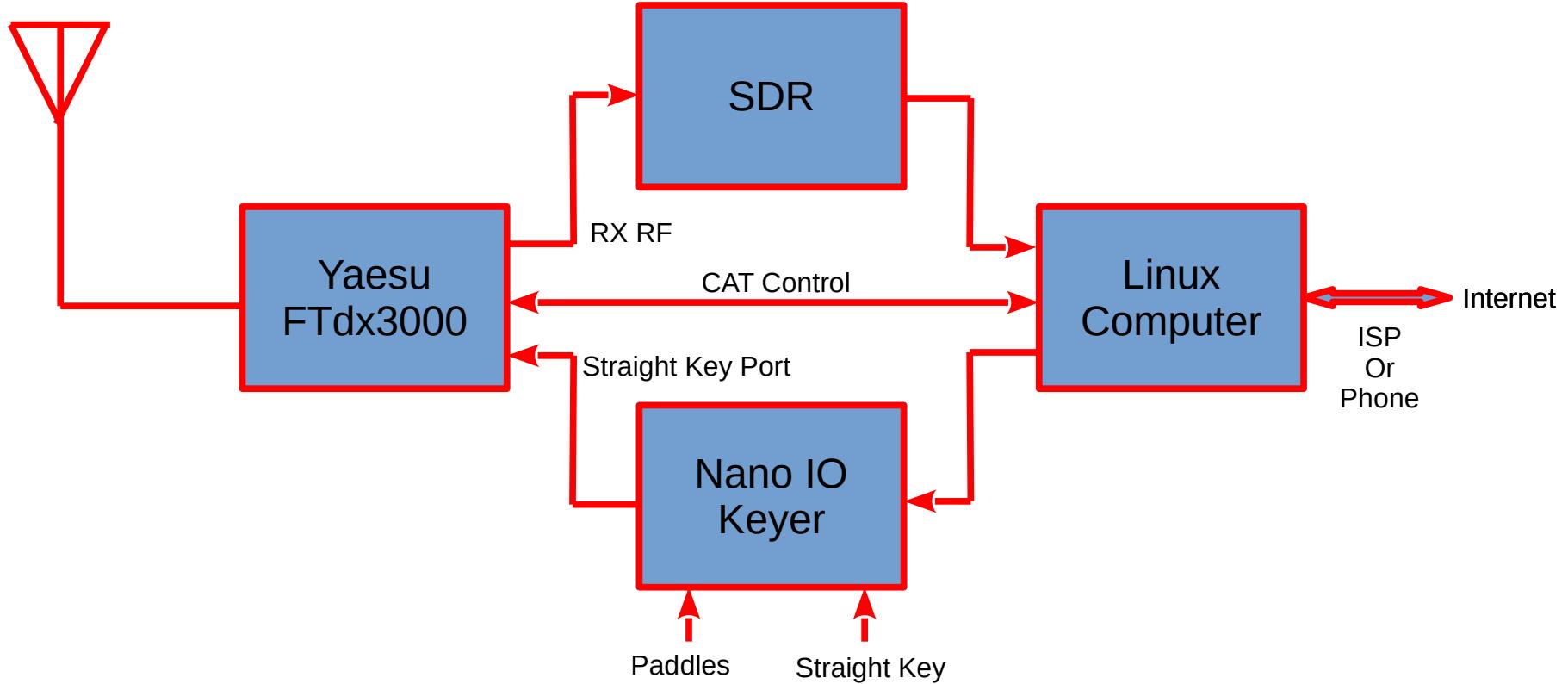
- Source and some binaries are available at [github.com/aa2il](https://github.com/aa2il)
  - Integrated suite of apps
  - Developed under linux but most recently ported to Windoz
  - Windoz binaries also available – see “Releases” on RHSs
  - Very little documentation
  - Would welcome collaboration!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

The screenshot shows the GitHub repository page for `aa2il/pyKeyer`. The page includes a list of files in the `master` branch, a detailed commit history, and a sidebar with repository statistics like stars, forks, and languages used (Python 93.0%, Shell 5.6%, Other 1.4%). A prominent red oval highlights the `Releases` section, which contains a single entry for `pyKeyer v1.0 by AA2IL`, labeled as `Latest`.



# AA2IL HF Station

CW Academy





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