



CWA Advanced Class Notes

Joe Attili – AA2IL
Jim Mueller - N7AUE

January-February, 2023



Session 0

CW Academy

- Meet and Greet
- Introduce ourselves
- Test Jitsi and Sidetone audio
- Do the first three h/w assignments before 1st class
 - Some students do not like the “new” audio practice files
 - The “old” files are available on my Github repository:
 - <https://github.com/aa2il/CWA>



Overview

CW Academy

- 8-weeks (M & Th 6-7PM on the West Coast)
 - MST follows immediately after on Mondays
 - **Please use headphones!!!**
- Daily Practice
 - Two 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!!!**
- 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



About AA2IL

- Grew up in Upstate New York, moved to San Diego in 1993 (job transfer)
- 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
 - 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



Week 1 - Session 1

CW Academy

- Go over h/w and OTA activities
- The NAQP CW contest is on Saturday
 - Exchange is NAME and STATE (same as SST)
 - One of my favorites because power is limited to 100W and lasts only 12-hours
- DX - If you have any ambitions of “working them all:”
 - Crozet Island (FT8WW, #3) – One guy, active for a couple more weeks, seems mainly 20m & 30m FT8 & CW
 - Bouvet Island (3Y0J #2) – Expected by the end of the month
 - The Congo (TN8K) – Just started, big pile-ups
- Get on the air!
 - There’s always rags to chew, POTA/SOTA/SES stations s...
- A few comments regarding this course
- Word game drill
 - Animals
 - Colors



Philosophy

CW Academy

- 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!!!



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



Session 2

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



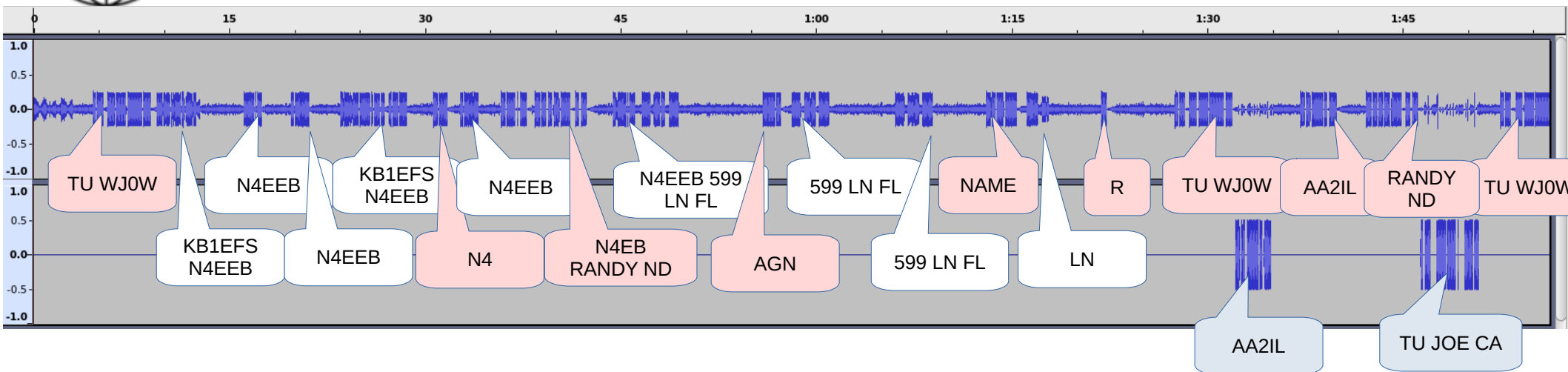
Week 2 - Session 3

CW Academy

- Questions on h/w & on the air activities?
 - NAQP ?
- Faster is NOT always better
 - Slow down for slower ops to get the message through!
- Word game drill
 - Colors
 - Hardware Store
- My setup and S/W



Fast is NOT Always Faster

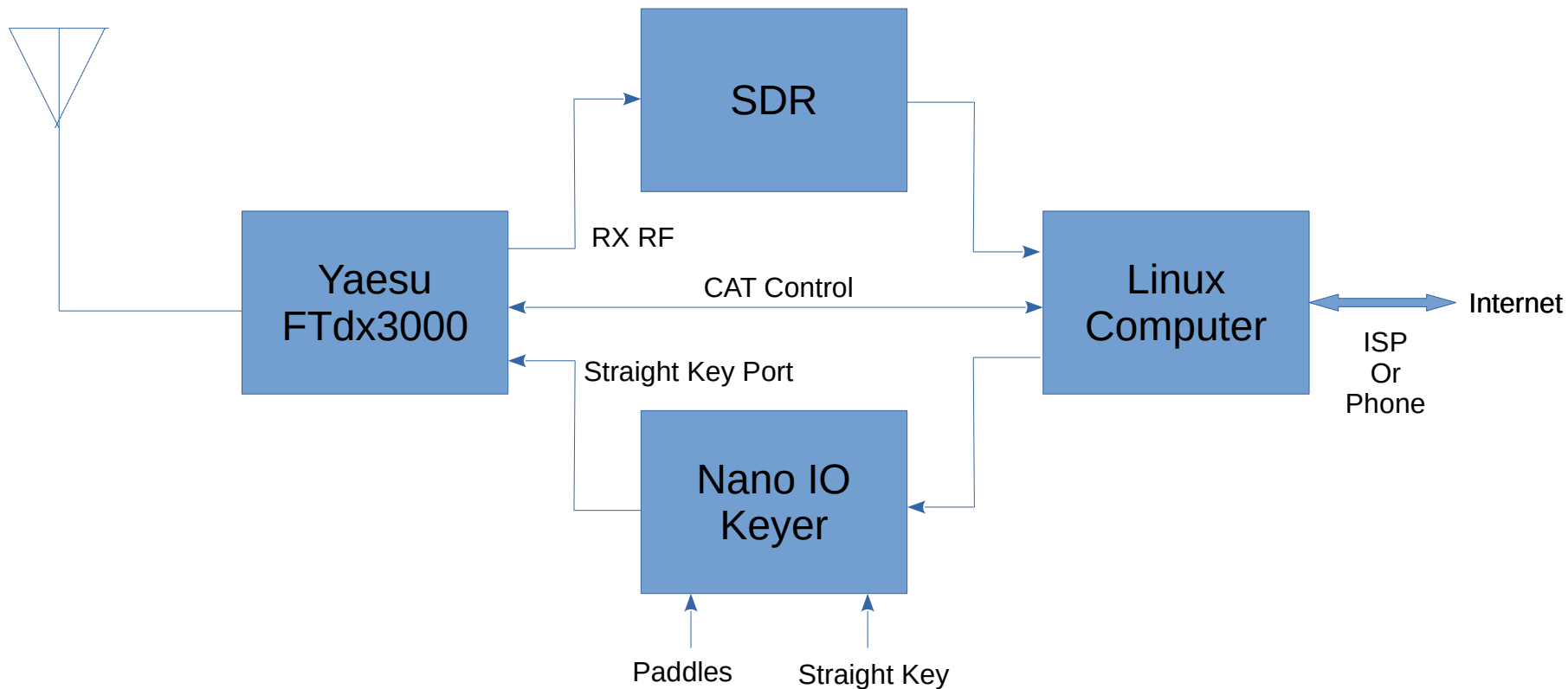


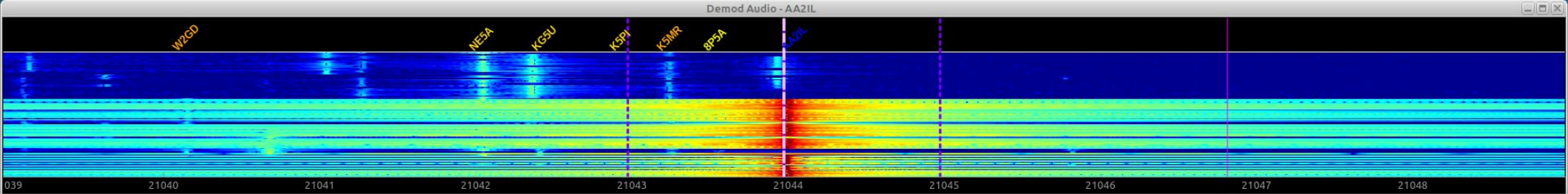
- Audio Clip from Jan. 2023 NAQP – PSE_QRS.mp3
- Runner is clearly struggling (major kudos for putting ND on the air!)
- Persistent Pouncer with difficult call and name only finally slows down after several repeats
 - Other pouncer gave up and moved on
 - “LN” is probably a shortened version of “ELLEN” but just doesn’t work in this context
- 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



AA2IL HF Station

CW Academy





pyKeyer by AA2IL - FTdx3000

File [] Batter Up VFO A VFO B A->B SO2V [] PttScrn Paddles: 20 []

Call: **n3jt** Name: **JIM** Exchange: **1**

Q CQ CWT AA2IL
SM2M JOE 3177
HNY AA2IL [LOG]
N3JT JOE 3177

CQ	Reply	TU/QRZ?	Call?	AA2IL	S&P Reply	?	Log QSO	Name 2x	No. 2x	NAME?	NR?
	TU/QRZ?	TU/QRZ?	Call?	His Call	S&P 2x	AGN?	RR			QRL?	
Macros:	CWT	WPM:	32	FTdx3000						Send	QRZ ?
Satellites:	None	+2 WPM	-2 WPM	QSOs: 102 /hr : 72 /hr : 28							
--	WJ9B 28,037.0	--	--	--	--	--	--	--	--	--	--
NA1NA 21,028.7	EA1X 21,032.0	K7RL 21,032.5	--	--	--	--	--	--	--	--	--

Band Map by AA2IL - Server NC7J

Options: CW Data SSB Ant1 Ant2 Ant3 -1 +1 <

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

Frequency	Call	Country	Count
21026.6	VA7DX	CW Canada	37
21028.7	NA1NA	CW United States	37
21029.9	K7OA	CW United States	35
21030.5	W39B	CW United States	10
21032.0	EA1X	CW Spain	23
21034.6	C08NMN	CW Cuba	6
21036.5	VE3YT	CW Canada	26
21040.1	H2GD	CW United States	25
21041.3	K3ZA	CW United States	11
21042.0	NE5A	CW United States	28
21042.4	KG5U	CW United States	7
21042.9	KSP1	CW United States	36
21043.2	K5MR	CW United States	34
21043.5	BP5A	CW Barbados	36
21044.0	AA2IL	CW United States	33
21050.7	K3VA	CW United States	20

flrig FTdx3000

File Config Memory Keyer Help

21043.973 14033.305

S3 S6 S9 +20 +40 +60

Vol 36 RF 100 IFsh 0 Nch 1500 Mic 51 Pwr 99

Att Amp 1 AN Tune PTT

Band: 160m 80m 40m 20m 15m 10m 60m 30m 17m 12m 6m RTTY USB LSB AM FM

Ant1 Ant2 Ant3

Clarifier << || >> Adjust Mic

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

World Clock by AA2IL

19:24:11

Pan-adaptor Mode

Pan BW:

Dynamic Range:

Min Peak Distance:

☐ Use Peaks for Tuning

☒ Follow RIG Freq

☐ CLAR Follows SDR Freq

Un-Mute RX1

Un-Mute RX3

Un-Mute RX5



Week 2 - Session 4

CW Academy

- Questions on h/w & on the air activities?
- NAQP SSB is this Saturday
- The ARRL January VHF Contest is this weekend
 - Exchange is 4-character maidenhead grid square
 - 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
 - FT8 dominates 6m with sporadic activity on 2m and 70cm
- Contesting Intro
- Simulated SST
 - Each student gets to run and others call



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 ...)
- Dormant bands suddenly light up
- Test effectiveness of your station
- ...



Some Terminology

- **Runner**
 - Station Calling CQ (soliciting 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 – 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

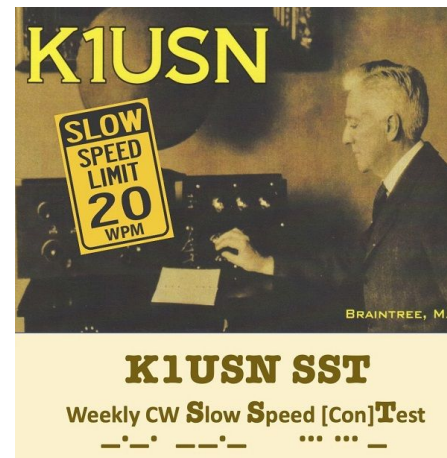
CQ SST N0RPM

W5CYN

W5CYN TU JASON MN

GE JASON JIM TX

GL JIM 73 N0RPM



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



Week 3 - Session 5

CW Academy

- Go over h/w and on air activities
- Upcoming contests
 - CQ 160m CW is this weekend (5NN + STATE)
- Practice Contests
 - MST and CWT



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 AG5ZN

W0WL

W0WL TU BILL 28

TU JOE 37

TU JOE 73 AG5ZN

KE7MPO

KE7MPO TU BILL 29

TU GOE 37

TU GOE 73 AG5ZN



You don't need to wait for another CQ

- Great place to build up confidence and skill



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

KM6GOX TU JOE 3177

73 AA2IL

KM6GOX

TU DEREK CA or DEREK CWA
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



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



Scoring & Classifications

- **YOUR SCORE = QSO POINTS x MULTIPLIERS**
- **Unassisted** – No spotting assistance or multi-signal decoder
- **Assisted** – Use 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, ...



Session 4

CW Academy

- Go over h/w and on air activities
- Loose ends
 - WebSDR.org
 - EU Contests: MWC, NTC (Dutch) QSO Parties
 - <https://memorial-ok1wc.cz>
 - <https://pi4ntc.nl/ntcqp>
- Upcoming contests
- Round-robin word game
 - Words related to a car
 - Words related to a hardware store



UPCOMING CONTESTS

CW Academy

- **CQ WW RTTY**

- Very popular and good way to get ready for CQ WW CW in November
- This coming weekend starting at 0000z Saturday for 48-hours
- Everybody works everybody
- Condx have been good this week

- **California QSO Party**

- More competitive than most state QPs
- Oct 1 1600z through Oct 2 2200z
- Exchange:
 - CA stations send SERIAL No. and COUNTY
 - Non-CA send SERIAL No. and STATE
- CW QSOs count 1.5x Phone QSOs (no digi contacts)



Session 6

CW Academy

- Go over h/w and on air activities
- Loose Ends:
 - CQP is this weekend – practice session at 4:30-5:00 PM tomorrow
 - AZ and NV QPs are next weekend
 - We will be discussing logging on Monday
 - Current thread on CWops email reflector regarding logging
 - Recent thread on CWT Strategy
- Anatomy of a QSO
 - Hit and Run
 - Rag Chew
- Round-robin Sentences
 - Next week, we'll try full QSOs



“Hit and Run” QSOs

- By convention, a valid QSO must exchange some type of information in addition to call signs
- However meaningless, the minimal amount of “information” is a signal report
- 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

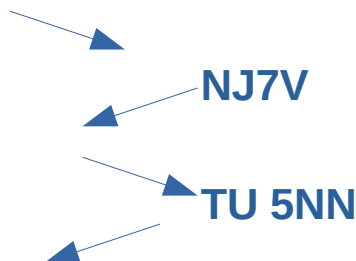
CQ 3Y0J UP

NJ7T 5NN

R 3Y0J UP

NJ7V

TU 5NN





“Hit and Run” QSOs (cont.)

- The goal of (most) contesters is also to work as many stations as possible but there is a prescribed exchange
- Example – California QSO Party

CQ CQP AA2IL/6

N7AUE TU 123 SDIE

73 AA2IL/6

N7AUE

TU 456 NV



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
- Some ops will exchange more meaningful information quickly
- Example – A not-so-rare DX station who's not in a hurry

CQ CQ CQ SV2HUD SV2HUD

KM6GOX KM6GOX

KM6GOX GM 559 559 OP VAS BK

GM VAS UR 569 IN CA CA OP DEREK BK

QSL DEREK TNX ES 73

TU VAS 73



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 IS RICH RICH ES QTH IS PROSPECT, CT PROSPECT, CT = HW? BK**



Rag Chew QSOs (cont.)

CW Academy

- At this, I 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” 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



Rag Chew QSOs (cont.)

CW Academy

- 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



Week 4 - Session 7

CW Academy

- Go over h/w and on air activities
- Upcoming contests
 - AZ and NV State QPs this coming weekend
- Logging
- Short QSO Drill
 - Not so rare DX
 - Slow day as SES/SOTA/POTA



Computers and Logging

- Computers are a fixture in most ham stations 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 for Linux
- At this point, you should be using a contest logger
 - Its a good idea to let the computer do sending for you (other ops will appreciate machine code)
 - Also, use the “band map” to help with S&P (verify call sign!)
- Do not 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



Other Loggers

CW Academy

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



HOME

Awards

Activate Your County

Audio-Video

CountyTracker

CA Counties Map

Club Competition

CQP Certificate

CQP Multipliers

FAQ

History

Log Submission

Records

Results

Rules

Software

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. https://n1mmwp.hamdocs.com 2. How to log a county-line QSO in N1MM+
N1MM+ Call History File For 2022 Search for qso_ca on this page:	https://n1mmwp.hamdocs.com/mmfiles/categories/callhistory/
N3FJP	1. http://www.n3fjp.com/ 2. How to log a county-line QSO in N3FJP
Writelog	1. https://writelog.com 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	http://www.dxlog.net/
GenLog	https://www.qsl.net/w3km/
SkookumLogger (for Mac)	https://www.k1gq.com/SkookumLogger/
CQPPWIN	CQPPWIN
RUMLogNG (for Mac)	https://dl2rum.de/rumsoft/RUMLog.html
TR4W	https://www.tr4w.net/
TLF (for Linux)	https://tlf.github.io/
Utility	Links and Notes



My Screen During a Contest

CW Academy

Demod Audio - AA2IL

pyKeyer by AA2IL - FTdx3000

Band Map by AA2IL - Server W3LPL

Cluster

160m	80m	60m	40m	30m	20m	17m	15m	12m	10m	6m
CW Data	SSB	LSB	USB	Ant1	Ant2	Ant3	-1	+1	<	
14023.6	RC8CD									CW Asiatic Russia
14024.0	ID9/IK6QON									CW Italy
14025.3	60HFL/P									CW England
14007.8	SP8ARY									CW Poland
14028.0	KH0W/M									CW Mariana Islands
14028.0	WB2KAO									CW United States
14028.0	K5F1									CW United States
14029.0	K4RUM									CW United States
14029.5	KE4EA									CW United States
14030.0	R3DCR									CW European Russia
14030.2	DL1BUG									CW Germany
14030.5	N5EP									CW United States
14031.0	K3JT									CW United States
14032.7	W7GB									CW United States
14033.4	K1SM									CW United States
14033.4	K1EM									CW United States
14033.8	TN3QE									CW The Congo
14034.3	KN4RD									CW United States
14034.5	N2DEE									CW United States
14034.7	W6SX									CW United States
14035.0	N7AUE									CW United States
14035.4	N7US									CW United States
14036.0	W48ZNC									CW United States
14036.3	N0TA									CW United States
14036.8	A4ACF									CW United States
14036.8	A4CF									CW Oman
14037.2	VA3IK									CW Canada
14037.8	K17VEM									CW United States
14037.8	K17V									CW United States
14038.4	K6NR									CW United States
14039.0	N5SA									CW United States
14039.5	W0NF									CW United States
14040.0	KR2Q									CW United States
14040.5	K5VBA									CW United States
14040.7	WB9HFK									CW United States
14041.1	W8TK									CW United States
14042.3	NB7O									CW United States
14042.6	N3DXX									CW United States
14045.0	W7SW									CW United States

File

Call Name QTH

w6sx HANK CA

TU CLAUDE JOE CA
[LOG]
AA2IL
TU JIM JOE CA
[LOG]
AA2IL
TU HANK JOE CA

CQ Reply TU/ORZ? Call? AA2IL S&P Reply ? Log QSO Name 2x State 2x NAME? QTH?

TU/ORZ? Call? His Call S&P Reply AGN? NIL QRL?

Macros: SST Speed: 20 FTdx3000

Satellites: None +2 WPM -2 WPM

QS0s: 24 /hr : 21 /hr : 10

RX0: 14,035.4 KHz BCB SWL Ham 1 Ham 2 Ham VHF Ham UHF VHF SWL Bands Satellites Other VHF

Force a Hop

KOGO KFMB-AM KCBQ KFBK KFI KFMB-FM

KGB KSON 94.9 88.1 88.9 89.5

89.9 95.5 96.5 98.1 102.1 105.3

105.7 107.9

AF Gain:

Pan-adaptor Mode

Pan BW:

Dynamic Range:

Min Peak Distance:

Use Peaks for Tuning

Follow RIG Freq

CLAR Follows SDR Freq

Mute RX1

Un-Mute RX3

Un-Mute RX5

World Clock by AA2IL

20:32:58

World Map

Terminal

femacs@Lut...

flrig FTdx3000

pySDR by A...

Demod Audi...

pyKeyer by ...

World Clock ...

Band Map b...

EN

Fri Jun 10, 13:32



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
- Some ops will exchange more meaningful information quickly
- Example – A not-so-rare DX station who's not in a hurry

CQ CQ CQ SV2HUD SV2HUD

KM6GOX KM6GOX

KM6GOX GM 559 559 OP VAS BK

GM VAS UR 569 IN CA CA OP DEREK BK

QSL DEREK TNX ES 73

TU VAS 73



Week 4 - Session 8

CW Academy

- Go over h/w and on air activities
- I may need some help with class next Thursday
- Upcoming contests
 - AZ and NV State QSO Parties are this coming weekend
- Rag Chew QSOs
 - CQ/Greeting
 - “Big Three:” RST, Name, QTH
 - Wrap-up



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>**

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AA2IL DE KB1FGC K EE**

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CW Academy

- 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 ...
- You don't have to send call signs each time but be sure to identify every 10-minutes
- Keep subject matter friendly and upbeat and non-controversial



Week 5 - Session 9

CW Academy

- Jim and Vas to lead class on Thursday
 - “MULEY,” please send out a meeting invitation
- Go over h/w and on air activities
- Upcoming contests (November)
 - ARRL Sweepstakes
 - CQ WW CW
 - The bands are alive with the sound of DX music!
- Basic Contest Strategy and sEtiquette
- ARRL Sweepstakes Drill



Some Contest DOs and DON'Ts

- Do
 - Start off S&Ping until you build up skills and confidence
 - If you are running, ask for a repeat if you have any doubt about what you copied
 - If you are S&Ping and miss part of his exchange, you can either ask for a repeat or just listen to his next QSO
 - When you ask for a repeat, ask specifically for the element that you missed
 - If the runner misses your call, send it again then give your exchange
 - Be courteous but concise
- Don't send unnecessary information
 - Runner's Call – he knows what it is (and its your problem if you get it wrong!)
 - DE before your call or NR before 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 if a signal report is required
 - Long greetings/chatter – exception is SST and MST where friendly greetings are encouraged



More 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 rig and antennas)
 - Take a look at the NCJ for hints from top-tier testers
- After the contest:
 - Upload your summary to 3830scores.com
 - Track your progress
 - Get more visibility for your call sign
 - 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
- 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 advisor and classmates/friends for extra brownie points!!!



What If You Miss Something?

- Occasionally, you will miss a call sign or an exchange:
 - QSO, QRM, QRN, Poor Fist, Fatigue ...
- If you are running, you **must** ask for a repeat if you have any doubts:
 - Call sign: N7?
 - 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'ed in several QSOs
- In either case, try to be specific what you need
- Perfection is not necessary in an un-scored practice contest



ARRL Sweepstakes (CW)

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

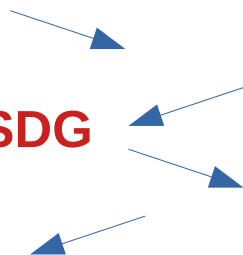
CQ SS AA2IL

N7AUE TU 123 A AA2IL 78 SDG

73 AA2IL

N7AUE

TU 456 U N7AUE 74 NV





Week 5 - Session 10

CW Academy

- Jim and Vas to lead class
- Go over h/w and on air activities
- Rag Chew QSOs
 - Practice inner part of a long QSO
 - Rig, Ant, Power ...
 - Weather ...
 - Job, family, ...
 - Ham career, activities, ...
 - Etc. etc.



Week 6 - Session 11

CW Academy

- Go over h/w and on air activities
- Upcoming contests
 - CQ WW SSB
 - ARRL Sweepstakes
 - CQ WW CW
- Chasing DX
 - The bands have come back to life!
 - Look for increased activity in the days surrounding the CQ WW contests
- Math Drill



Chasing (Rare) DX

- For many, this is the most exciting aspect of ham radio
- CW is the best mode for working weak stations rapidly
 - For better or worse, much DX activity has migrated to FT8
 - However, most 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 “situational awareness”
 - Can do this to some extent with dual VFOs or XIT/RIT
 - Embrace it and use it to your advantage!



Up-coming DXpeditions

CW Academy

[UPDATED] If we look closer at the next 3-4 months worth of DX / DXpeditions, you can see we've come a very long way from Covid times when nothing was happening! Let's break down the coming months:

OCTOBER

S79/OE1MWW, VQ9SC, 3C3CA, S79/DL5RDO, FO/K6VVK, AH2_AH0/WA7WJR, TX7G, 8Q7TD, D60AE, 5R8FG, 5R8WP-5R8WG-5R8MM-5R8CG, VP2MLB-VP2MZN-VP2MOK-VP2MYV-VP2MDA-VP2MXH, TY0RU, VK9CM (VK9C), PJ5/W5JON, VP5Z, JD1BQP

NOVEMBER

5H2JC, 5V7RU, P40DA, 7Q6M, P29RO, J28MD, TX5XG, 7P8CW, T88WA, A35GC, TL8AA-TL8ZZ, PJ4A, TY5AF, 3B8M, 3B9KW, T8YA-T8AR

DECEMBER

TO9W, S21DX, FT/W (Crozet), T88PB

JANUARY

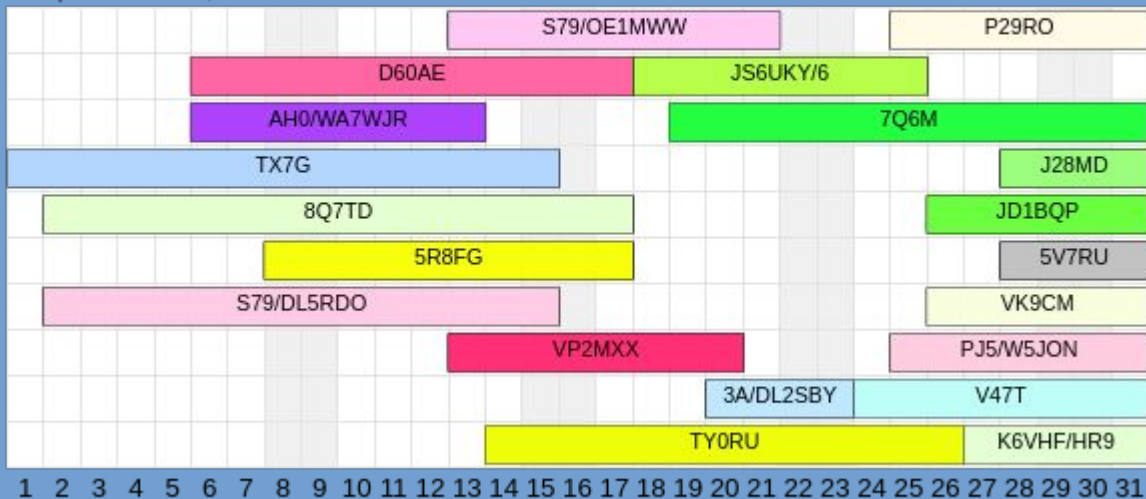
TN8K, T88SM-T88AQ-T88RH, and the BIG ONE.....3Y0J Bouvet Island

One thing is for sure – with the sunspot cycle now taking off and propagation improving all the time – now is the time to make your station ready for the pileups!

PS: Don't forget to check out the often updated DX-World Featured DXpedition Timeline top right of this website. (October coming soon).

DX WORLD.net FEATURED DXPEDITIONS TIMELINE

Last update: October 10, 2022



Edited by MMONDX

OCTOBER

CC IK8LOV Max Laconca

PREMIUM ADVERTISER IV

SO POWERFUL

FlexRadio

EN

Mon Oct 10, 11:32



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 transmit accordingly
 - Often 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 use 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”



My Recent Contact with D60AE (Comoros)

CW Academy

- Turned on radio to participate in 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
 - 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
 - Exchanged 5NNs and 73s
 - Confirmed “In the Log” the next day on Clublog
- Remember, I’m only running 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: **D60AE** RST out: **5NN** RST in: **5NN**

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

Macros: Default Speed: 25 FTdx3000 Send QRZ ?

Satellites: None +2 WPM -2 WPM

QSO Rate:

RX0: 14,025.3 KHz BCB SWL Ham 1 Ham 2 Ham VHF Ham UHF VHF SWL Bands Sate

Force a Hop

KOGO KFMB-AM KCBQ KFBK KFI KFMB-FM

KGB KSON 94.9 88.1 88.9 89.5

89.9 95.5 96.5 98.1 102.1 105.3

Pan-adaptor Mode Up/Down

Pan BW: 10 KHz

Dynamic Range: 50

Min Peak Distance: 10 KHz

☐ Use Peaks for Tuning ☐ Add Digi Offset

☒ Follow RIG Freq ☐ Follow RIG Band

☒ CLAR Follows SDR Freq ☐ VFO-R Follows SDR Freq

World Clock by AA2IL

23:46:52

Band Map by AA2IL - Server NC7J

Cluster

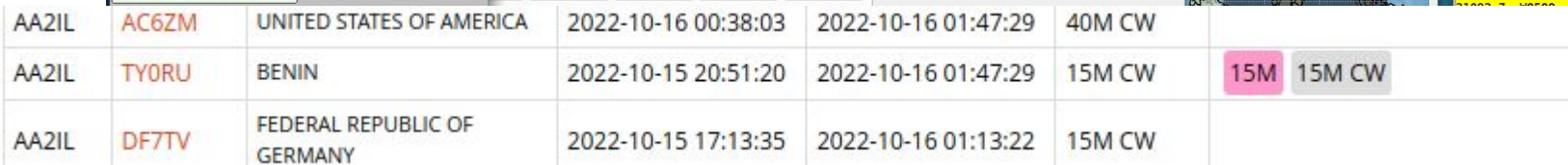
160m 80m 40m 20m 15m 10m

CW Data	SSB	LSB	USB	Ant1	Ant2	Ant3	-1	+1	<
14006.0	MD/NU6F								21
14006.1	CUS/NU6F								22
14010.0	VK2ARZ								18
14022.1	UA8UV								27
14023.0	D60AE								31
14025.0	N7HCJ								18
14025.0	UA8LBF								26
14027.0	K1ETA								29
14030.1	AA3LX								29
14034.5	KH6DL								11
14036.0	W4DN								14
14036.0	W4DNN								15
14041.0	N5F								13
14045.0	N9G								20
14046.0	K3UQ								22
14050.0	AC1GF								19
14050.5	K6PB								15
14051.2	W5ZR								14
14051.9	WB8ND								19
14052.7	W8YD								15
14053.2	AF8A								13
14053.4	W4NLT								15
14054.0	AF4QK								15
14054.6	K4BAI								15
14055.4	N8KR								16
14055.4	N8KA								16
14055.8	JH1MTR/4								23
14057.0	WA8QJR								16
14057.4	KZ5H								15
14057.7	JF2LNC/2								18
14058.0	K6JSC								9
14059.0	KK4PB								14
									12
									15
									14
									15
									18
									14
									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	



CW Academy





Session 12

CW Academy

- Go over h/w and on air activities
- Upcoming contests
 - CQ WW SSB
 - ARRL Sweepstakes
 - CQ WW CW
- Loose ends:
 - Jim says TS590 “Drive” output can be connected to an SDR
 - Apparently intended for panadaptor or amplifier
 - TS2000 doesn’t appear to have easy access to RF or IF
 - Many mods showing how to tap into IF are available
 - IC7610 has dual receivers and panadaptors – nice!
 - Use notch filter to suppress pesky tones
- Math Drill



CW Math Drill

CW Academy

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



Week 7 - Session 13

CW Academy

- Go over h/w and on air activities
- Upcoming contests
 - CQ WW SSB (This weekend – look for CW activity DX B4 and after)
 - ARRL 160m (December)
 - ARRL 10m (December)
- Cut Numbers
- Math Drill using Cut Numbers



Cut Numbers

- In the CWTs and many of the larger contests, 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!
- Another place where a cut number can be somewhat useful is if you enter a contest late, you can send a leading "T" to alert the other station to this:
 - 4 → T4 or TT4
- I advise against sending leading zeros for numbers above 9



Cut Numbers (cont.)

CW Academy

- Acceptable:
 - 0 → T or the letter O
 - 1 → A
 - 9 → N
- Creative (Don't Use!):
 - 5 → E
 - 2 → U
 - 8 → D



CW Math Drill

CW Academy

- 1 plus 2
- Is 3 R times 5
- Is 15 R div 3
- ? 15 div 3 Is 5 R minus 1
- Etc.
- Use ? Or AGN? for repeats and R to confirm answer
 - Try not using “voice” since you can’t on the air
- You can use Cut Number this time – T, O, A and N



Session 14

CW Academy

- Go over h/w and on air activities
- Upcoming contests
 - CQ WW SSB & CW – Look for DX activity B4 and after the contest
 - ARRL 160m (December)
 - I neglected to mention the Stew Perry 160m contest last weekend
 - 160m contests generally generate a lot of CW activity
 - ARRL 10m (December)
- QTCs
- “Squeeze” Sending
- A quick note about RTTY
- “Grocery store” drill:
 - Items you might find in a grocery store
 - Build list until someone finally can remember the list
 - Prior person confirms or corrects the list



QTCs

CW Academy

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

- Example (Time Call Number)

CQ TEST SV2HUD

NJ7V TU 5NN 123

R QTC?

R ...

NJ7V

TU 5NN 456

R 1608 KM6GOX 455

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



“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
 - K, R, L, F, Q, Y, ...



“Squeeze” Sending (cont.)

- If you don’t “squeeze,” there is no real difference between single and dual-lever paddles
- There are two lambic “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

- 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
 - Decoding is off-loaded to your computer
- Do NOT use cut numbers
 - All symbols are 5-bits
 - Switching between two tables with 32-symbols each
 - Actually takes longer to send 5NN than 599
- Send <CR> and spaces before and after your messages to help separate noise
- See rttycontesting.com for more info



Week 8 - Session 15

CW Academy

- Go over h/w and on air activities
- Upcoming contests
 - ARRL Sweepstakes – complicated exchange
 - ARRL 160m (December)
 - ARRL 10m (December)
- Operating aids
- ? Drill
 - Store game
 - Sentences
 - Ragchew QSO
 - Other?



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: <https://dxnews.com/>
- There are many other very good sites



Reverse Beacon Network (RBN)

CW Academy

RBN - Reverse Beacon Network - Google Chrome

reversebeacon.net/main.php?zoom=32.91,-25.22,2.15&rows=100&max_age=10&hours&spot_types=1&spotted_call=nj7v,n7aue,tx7g&hide=distance_km

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

Leaflet | © OpenStreetMap contributors

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

☐ cw ☐ rty ☐ psk31 ☐ psk63

☒ CQ ☐ DX ☐ BCN ☐ /B ☐ NCDXF

Unfreeze Zoom Max rows: 100 Max age: 10 Hours New spots: 100

Show Elements: ☒ map ☐ distance mi ☐ distance km

☒ freq ☒ mode ☒ type ☒ snr ☒ speed ☒ time ☒ seen

Show Spotters Advanced Mode

CW Speed: Min all Max all

Copy URL to Clipboard

Spotter (de) Spotted (dx)

callsign spotter-callsign nj7v,n7aue,tx7g

spotter	spotted	distance mi	freq	mode	type	snr	speed	time	seen
K5TR	TX7G	3867 mi	28027.0	CW	CQ	20 dB	24 wpm	1732z 08 Oct	23 minutes ago
KO7SS	TX7G	3461 mi	24892.4	CW	CQ	28 dB	24 wpm	1712z 08 Oct	43 minutes ago
N6TV	TX7G	3434 mi	24892.4	CW	CQ	20 dB	27 wpm	1657z 08 Oct	58 minutes ago
KO7SS	TX7G	3461 mi	24892.4	CW	CQ	29 dB	27 wpm	1657z 08 Oct	58 minutes ago
KO7SS	TX7G	3461 mi	24892.4	CW	CQ	22 dB	27 wpm	1645z 08 Oct	70 minutes ago
K1TTT	TX7G	5498 mi	24892.4	CW	CQ	13 dB	27 wpm	1640z 08 Oct	75 minutes ago
K1TTT	TX7G	5498 mi	24892.4	CW	CQ	13 dB	27 wpm	1640z 08 Oct	75 minutes ago
KO7SS	TX7G	3461 mi	24892.4	CW	CQ	20 dB	25 wpm	1543z 08 Oct	2 hours ago
EA8/DF4UE	TX7G	8665 mi	24892.4	CW	CQ	12 dB	25 wpm	1543z 08 Oct	2 hours ago
KO7SS	TX7G	3461 mi	24896.9	CW	CQ	34 dB	26 wpm	1537z 08 Oct	2 hours ago
N6TV	NJ7V	619 mi	14065.0	CW	CQ	7 dB	25 wpm	1536z 08 Oct	2 hours ago
KO7SS	NJ7V	97 mi	14065.0	CW	CQ	12 dB	25 wpm	1536z 08 Oct	2 hours ago
VE7CC	NJ7V	1211 mi	14065.0	CW	CQ	7 dB	25 wpm	1536z 08 Oct	2 hours ago
NC7J	NJ7V	515 mi	14065.0	CW	CQ	8 dB	25 wpm	1536z 08 Oct	2 hours ago
WE9V	NJ7V	1422 mi	14064.9	CW	CQ	4 dB	25 wpm	1536z 08 Oct	2 hours ago
K3PA-1	NJ7V	1006 mi	14065.0	CW	CQ	12 dB	25 wpm	1536z 08 Oct	2 hours ago
W6YX	NJ7V	645 mi	14065.0	CW	CQ	20 dB	25 wpm	1536z 08 Oct	2 hours ago
VE6JY	NJ7V	1391 mi	14065.0	CW	CQ	14 dB	25 wpm	1536z 08 Oct	2 hours ago
KO7SS	N7AUE	705 mi	7033.0	CW	CQ	6 dB	18 wpm	1243z 08 Oct	5 hours ago
W8WWV	N7AUE	2004 mi	7033.0	CW	CQ	11 dB	21 wpm	1242z 08 Oct	5 hours ago
WE9V	N7AUE	1656 mi	7033.0	CW	CQ	10 dB	21 wpm	1242z 08 Oct	5 hours ago
K3PA-1	N7AUE	1323 mi	7033.0	CW	CQ	19 dB	21 wpm	1242z 08 Oct	5 hours ago
K9IMM	N7AUE	1566 mi	7033.0	CW	CQ	18 dB	21 wpm	1242z 08 Oct	5 hours ago
W3RGA	N7AUE	2251 mi	7033.0	CW	CQ	9 dB	21 wpm	1242z 08 Oct	5 hours ago
VK6ANC	TX7G	6728 mi	18079.9	CW	CQ	13 dB	27 wpm	0943z 08 Oct	8 hours ago
KO7SS	TX7G	3461 mi	10107.0	CW	CQ	9 dB	27 wpm	0719z 08 Oct	10 hours ago
N6WIN-7	TX7G	3484 mi	10107.0	CW	CQ	20 dB	27 wpm	0705z 08 Oct	10 hours ago

Version: v2.1.9

RBN - Reverse Beacon ...

EN Sat Oct 8, 10:56

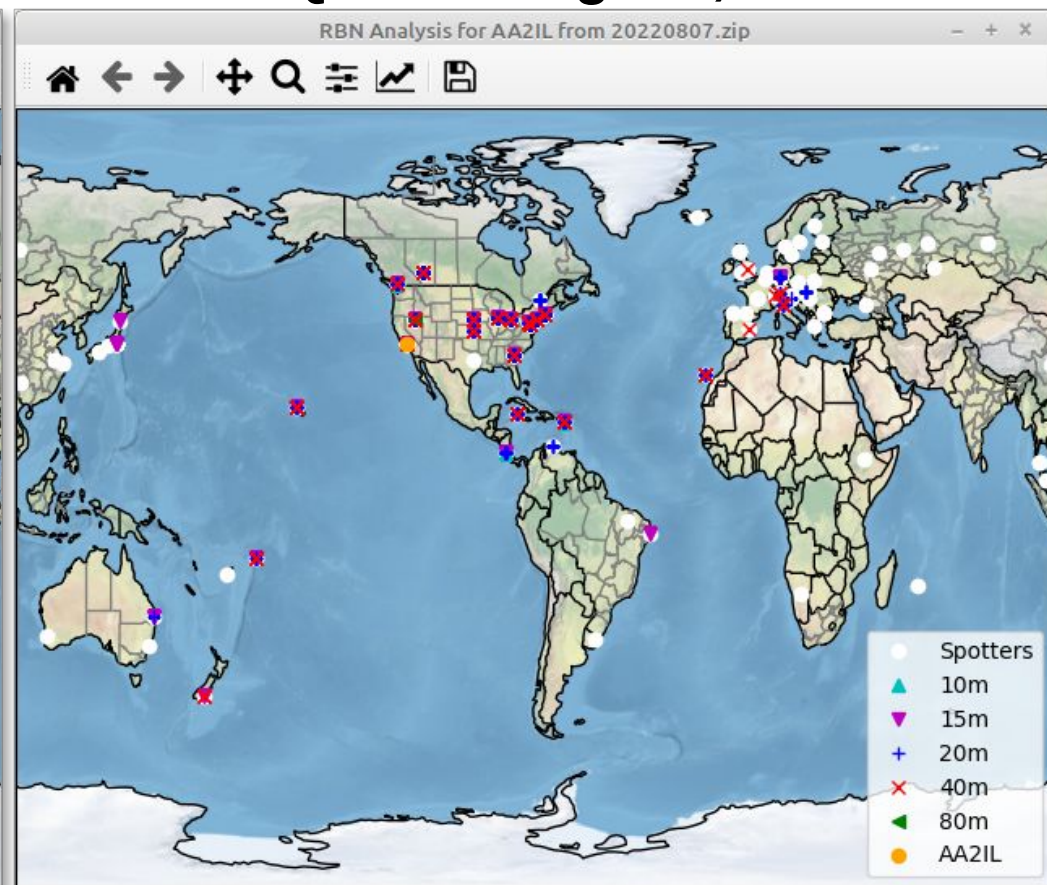
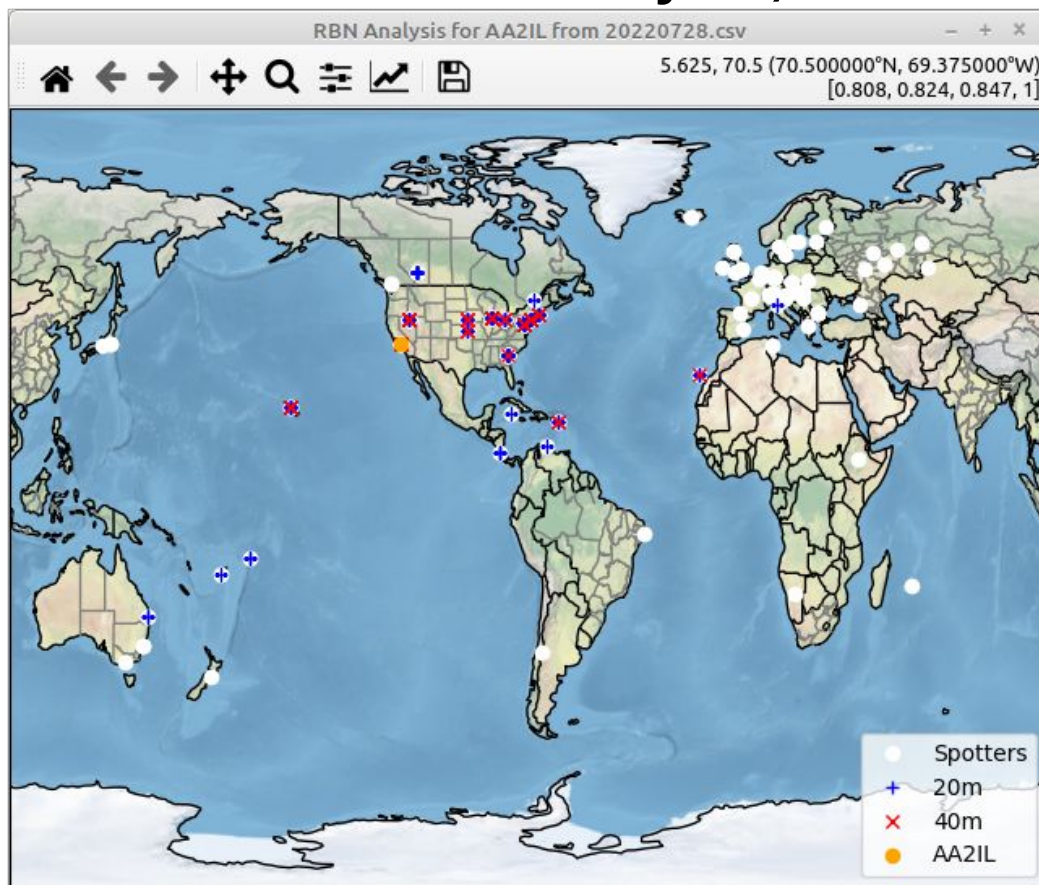


Can You Hear Me Now?

CW Academy

CWT 0300-0400 July 28, 2022

NAQP CW Aug 6-7, 2022



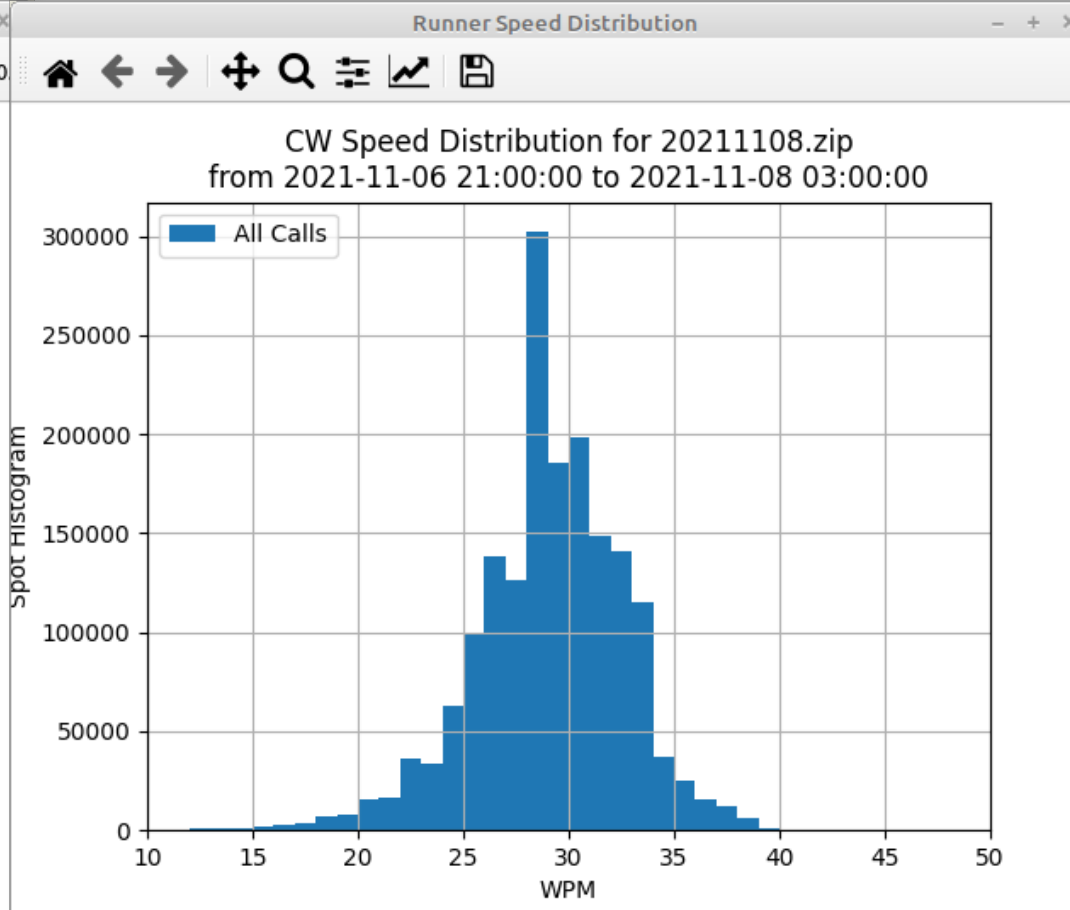
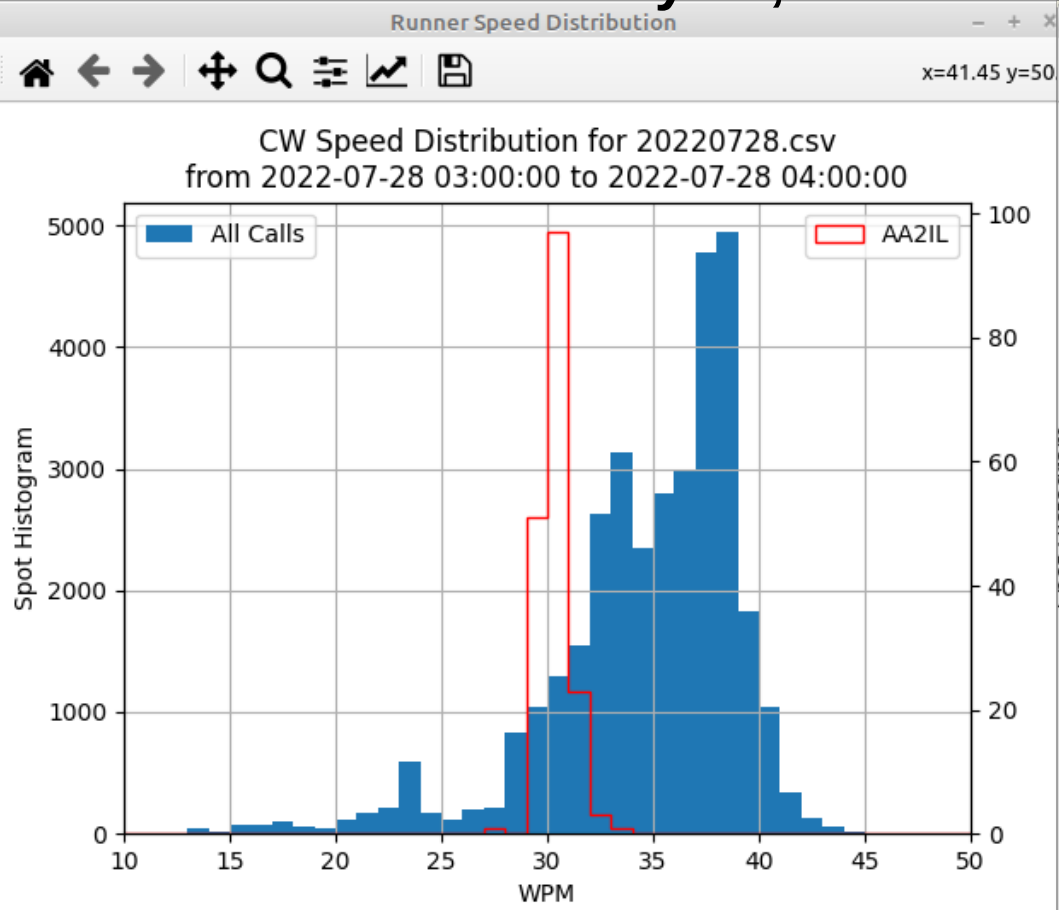


Speed Analysis

CW Academy

CWT 0300-0400 July 28, 2022

ARRL SS CW Nov. 2021

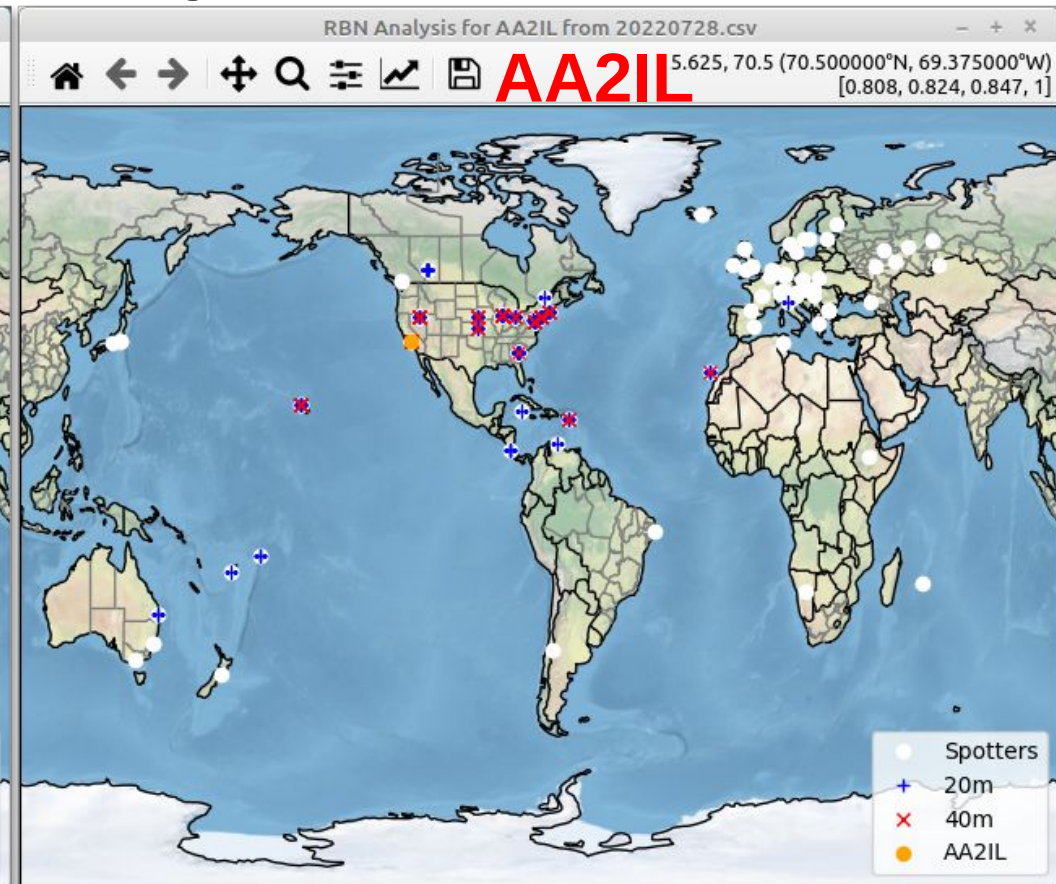
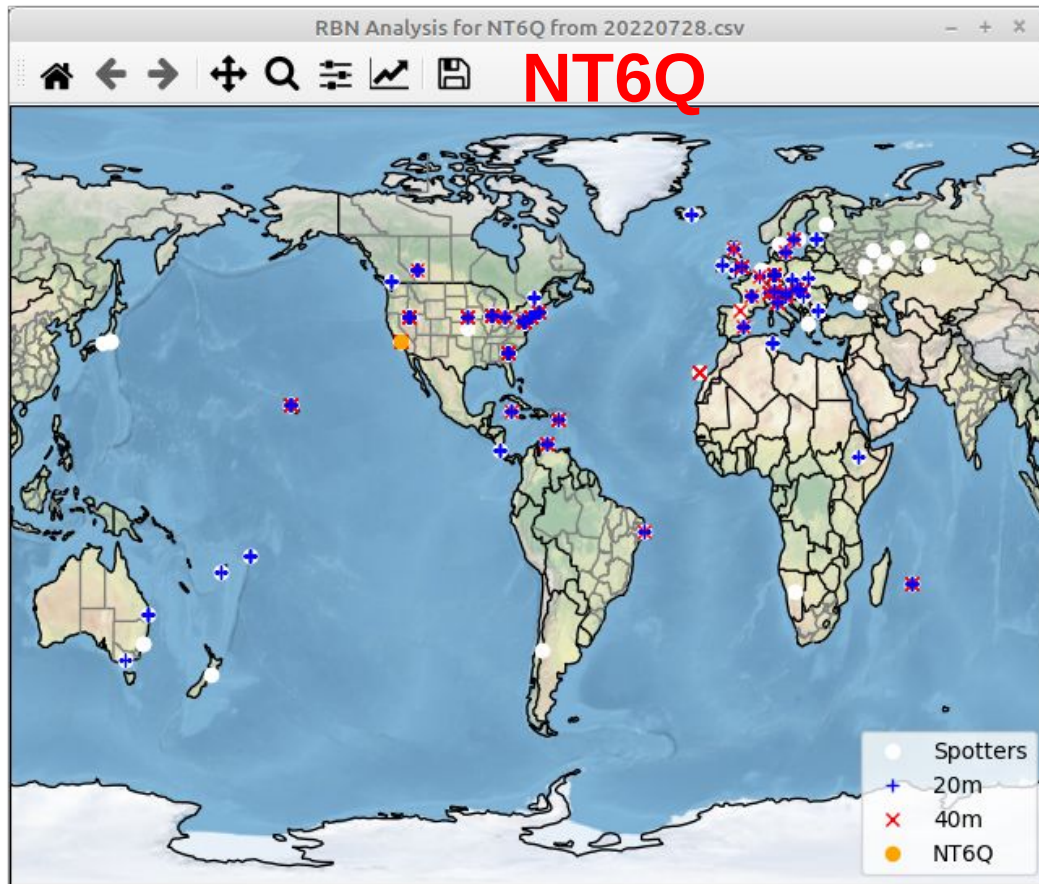




Big Gun vs Little Pistol

CW Academy

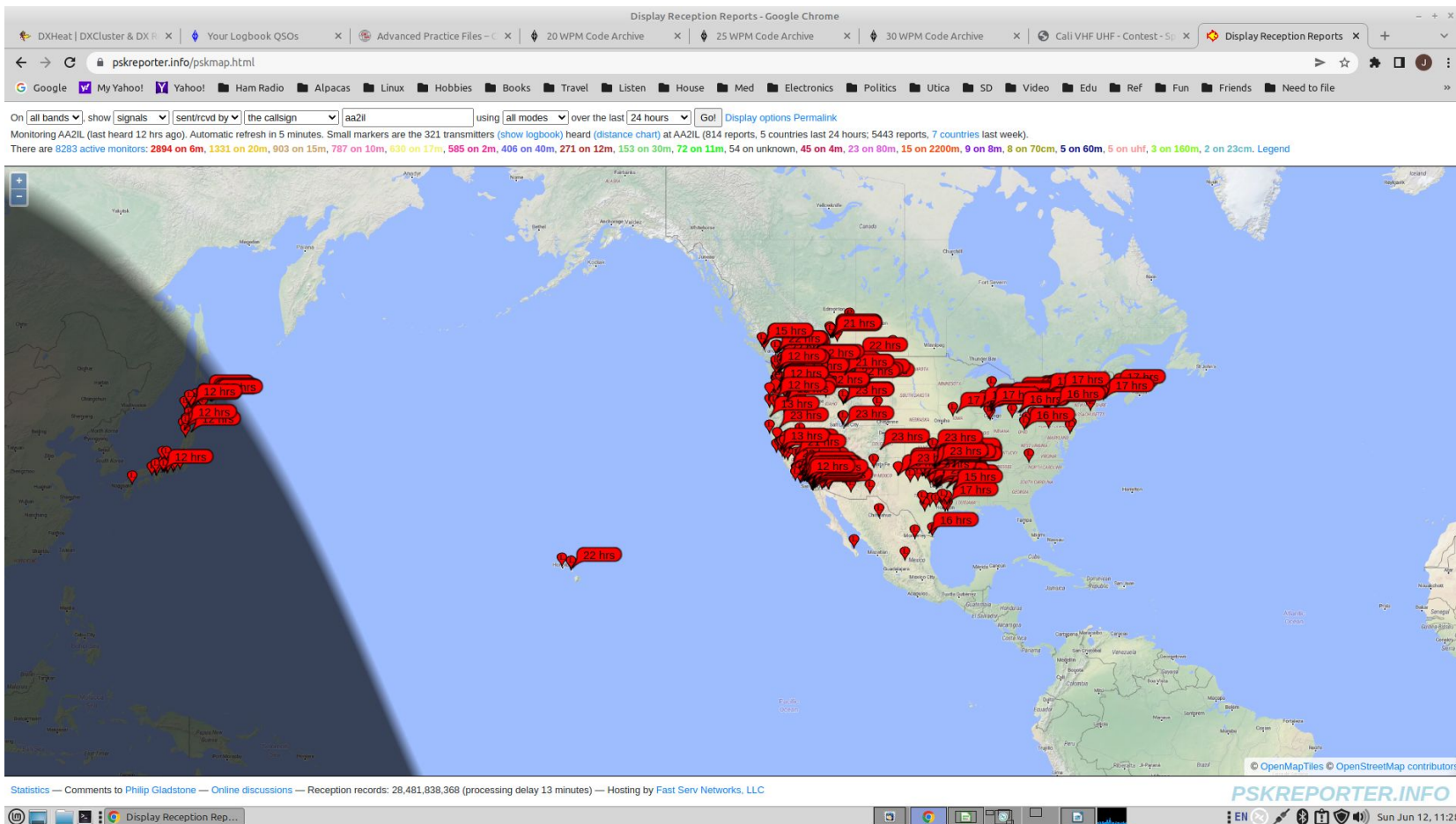
CWT 0300-0400 July 28, 2022





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

CW Academy





Session 16 – Graduation!!

CW Academy

- Go over h/w and on air activities
- Other CW contests
 - NAQP – January and August
 - ARRL International DX – February
 - CQ WPX CW - May
 - IARU HF Champs – July (WRTC)
 - CWops CW Open – September
 - ...
- CW Ops
- Certificates



CWops Membership

CW Academy

- Our class is unusual in that we now have 3-members
- Demonstrate Proficiency at 25-WPM or higher
- Nomination + 3-sponsors
- \$12/yr or \$100 for life
 - Fee structure is changing in January so cheaper now to upgrade to life membership if you are considering this



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/>



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 me on this class:
 - Overall format (too much talk, not enough practice?)
 - Topics you would have 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



Other Topics – Next Time?

CW Academy

- SOTA/POTA
- Sprints



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 ...)
- Dormant bands suddenly light up
- Test effectiveness of your station
- ...