VHF and HF Digital Modes

March 31 2026

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Agenda

- Introduction
- VHF/HF Modes
  - Packet Radio
  - VarAc
  - APRS
- HF Modes
  - WSJT-X (FT8, FT4, MSK144, etc.)
  - JS8Call (free form weak-signal mode)
- SoundCard Interfaces



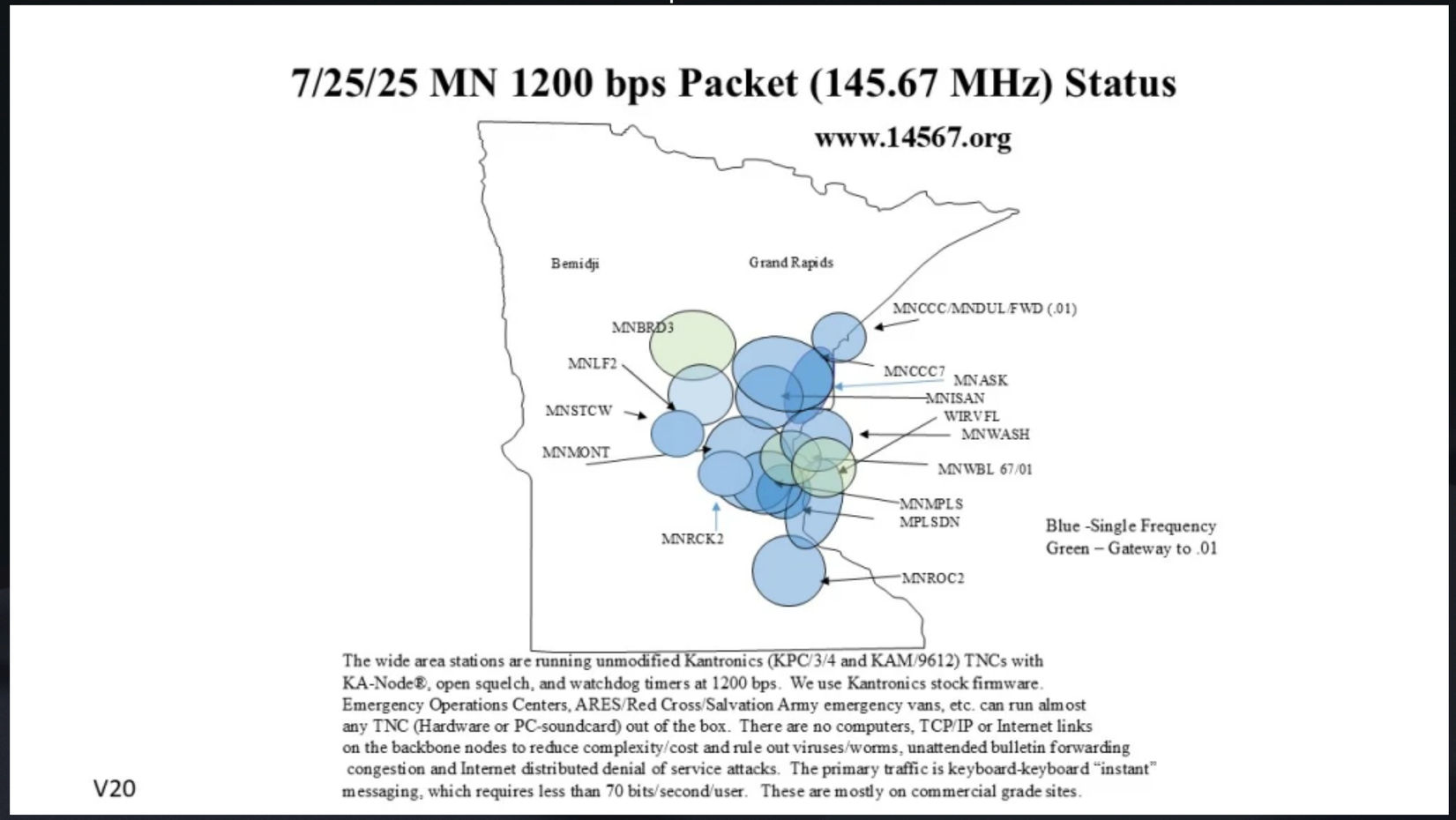
Packet Radio

Packet Radio

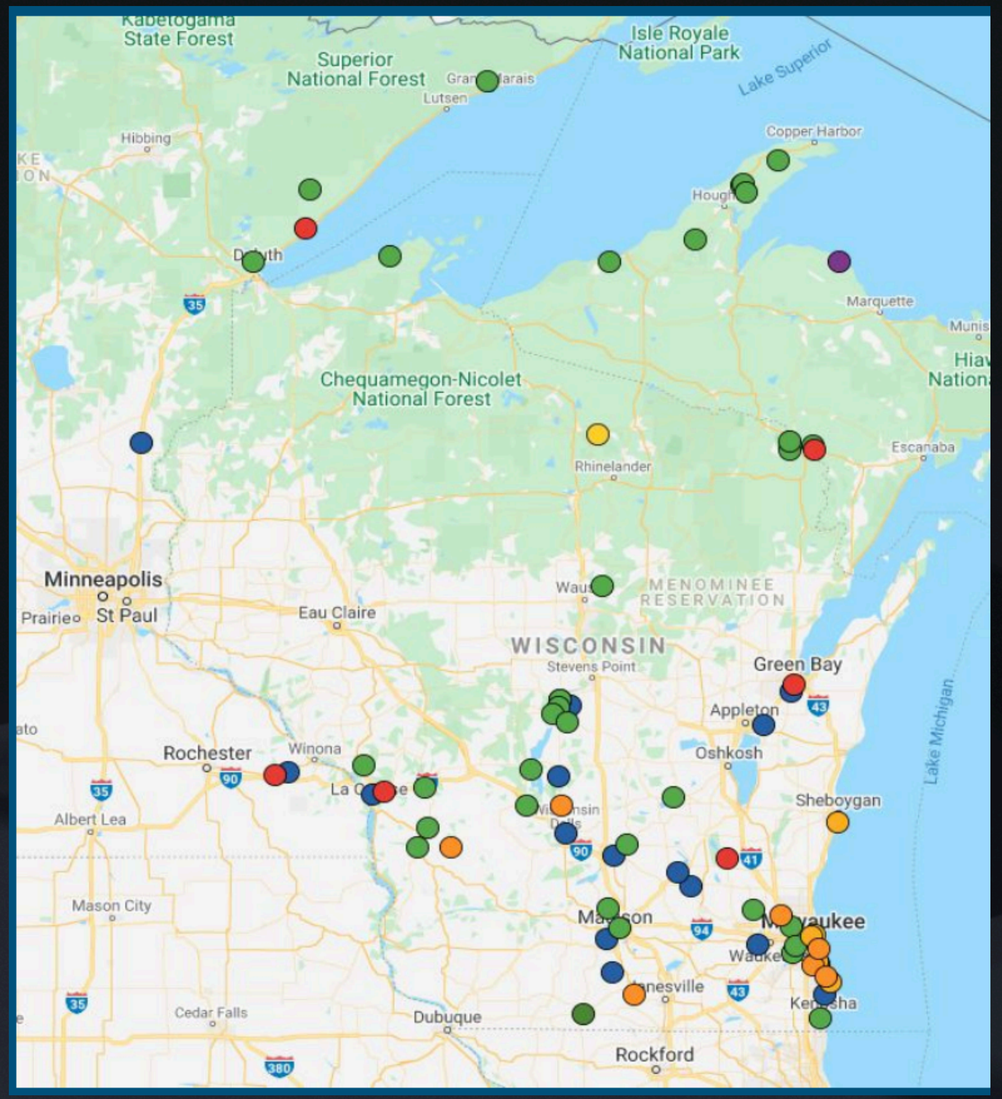
- Packet Radio got its start in the late 1970s
  - Utilizes AFSK (Audio Frequency Shift Keying) modulation (2 tones)
  - VHF stations run at 1200baud
  - Most HF stations running 300baud
    - HF symbol rate limits were removed 2 years ago
    - Some stations are experimenting with higher baud rates (600+)
  - Common frequencies are;
    - 2M (Minnesota) - 145.670Mhz FM
    - 20M (Net105) - 14.105MHz LSB
    - 40M (Net40) - 7.104MHz LSB

Packet Radio in MN

- There are a number 1200baud packet of stations in MN on 145.67Mhz and 145.01 MHz FM.



Packet Radio in WI



Common Frequency in

WI Packet Network

145.030MHz

Packet Radio across the globe

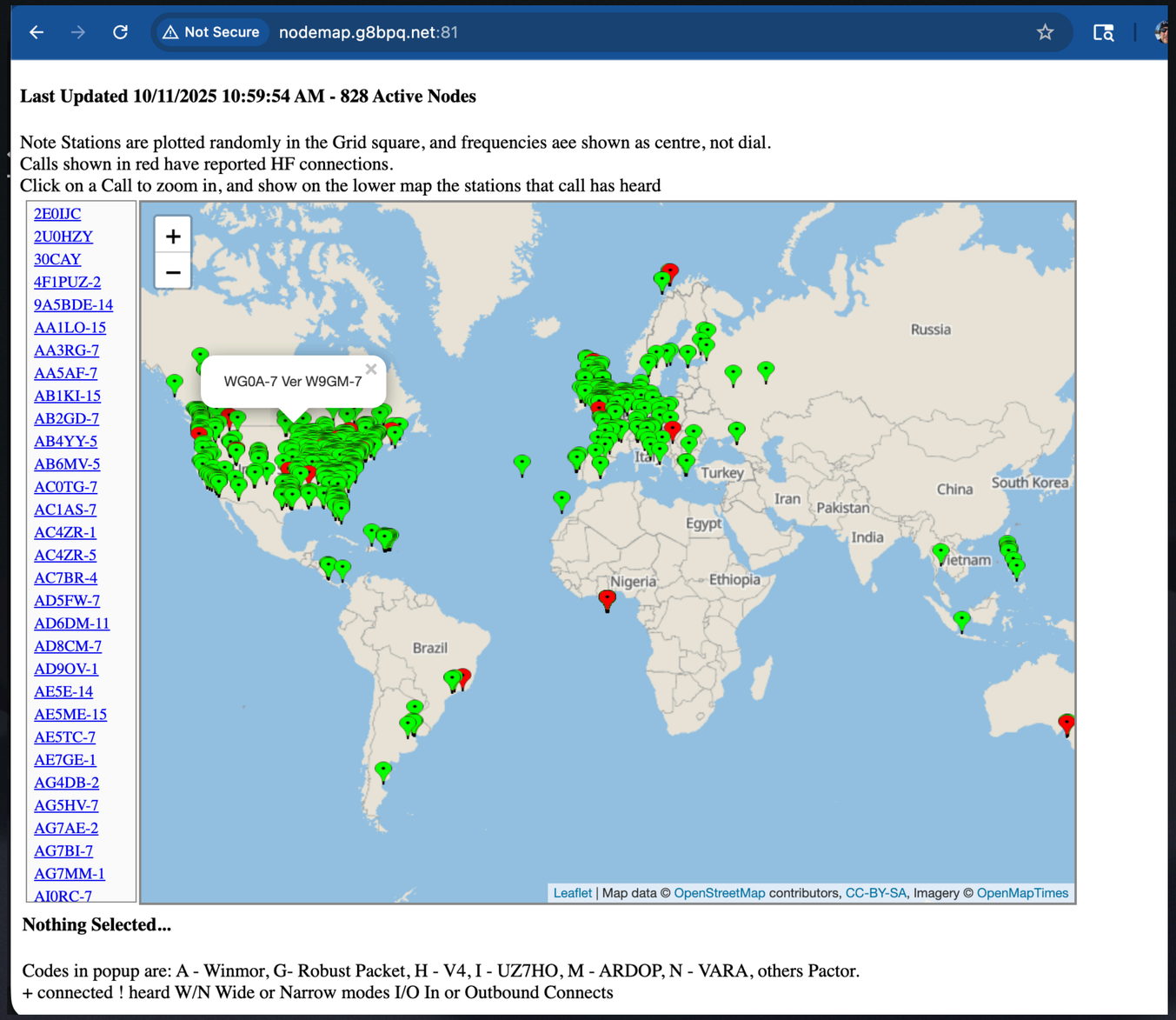
Map of Stations running

BPQ Packet Software

This is a combination of

Stations running across

Multiple bands and IP*



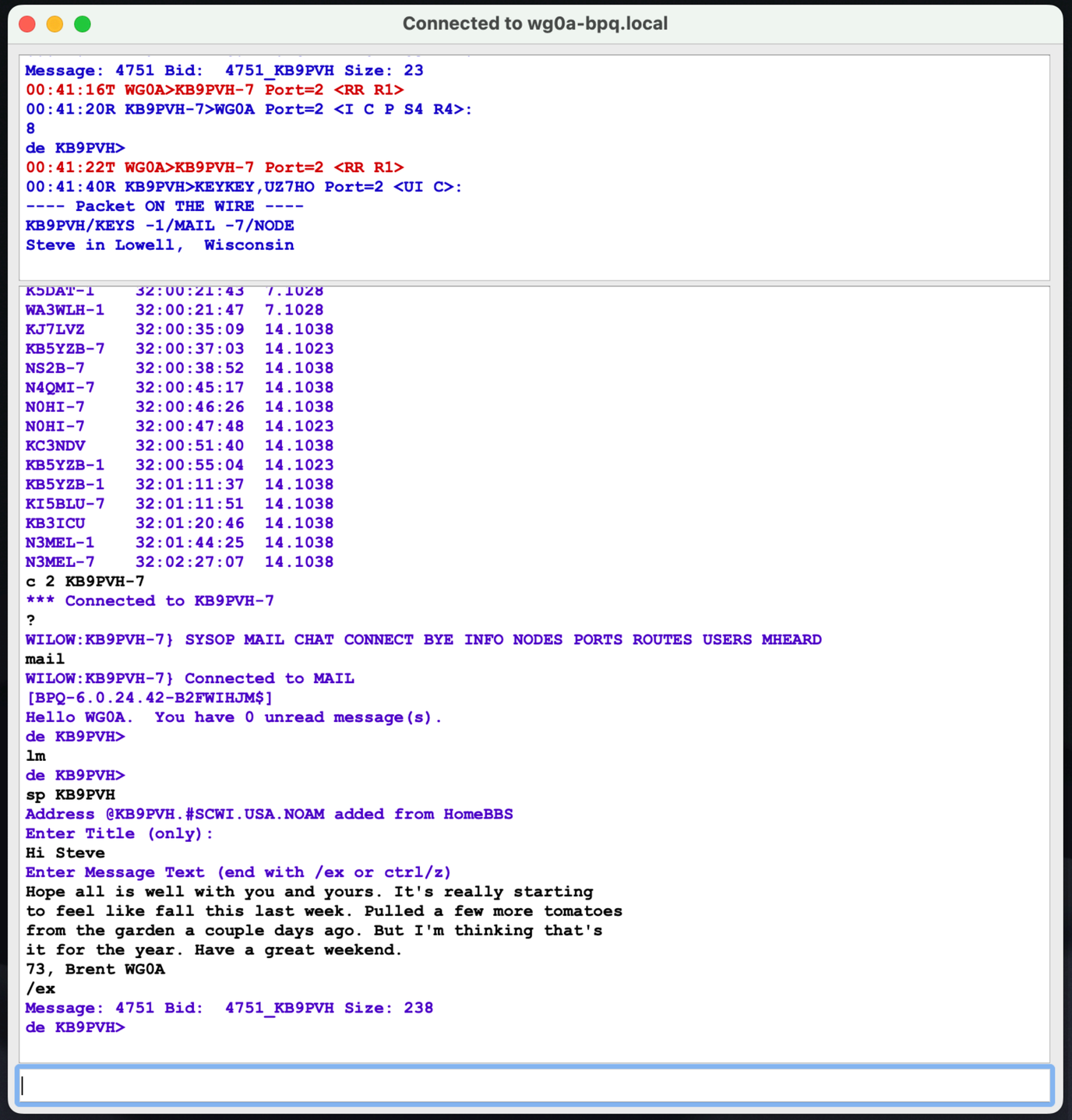
Packet Radio

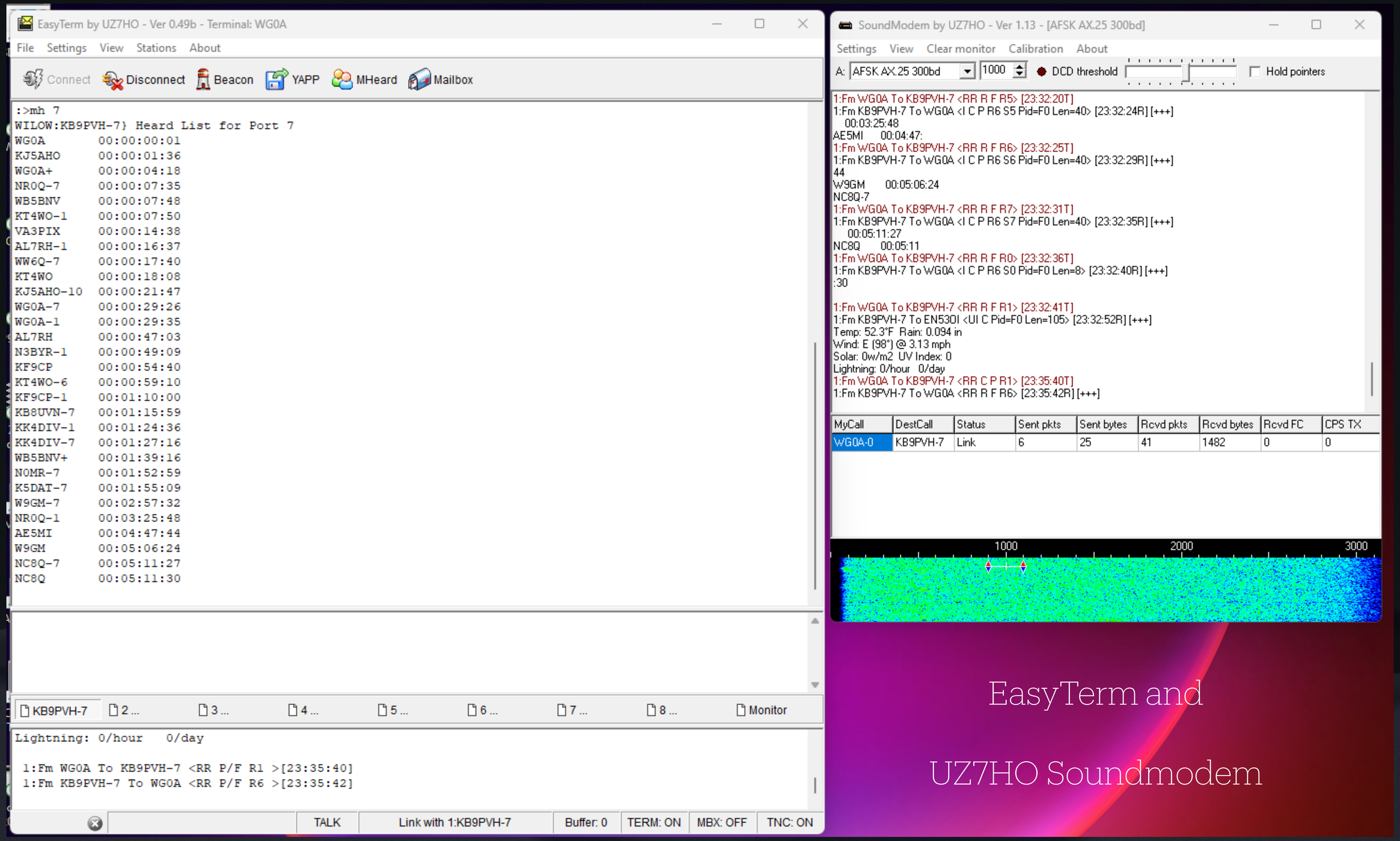
- What are operators running?
  - SoundCard Interface hardware
    - Connects to radio audio in/out, PTT and many support CAT controls
    - Products (Digirig, RIGBlaster, SignalLink, and more)
    - Provides audio and radio control to applications which support soundcard configurations
  - Dedicated Packet Hardware
    - Some are running traditional hardware TNCs (Kantronics, AEA, MFJ, etc.)
    - Some radios include built-in Packet (KISS) TNCs (Kenwood TH-D74/75, BTECH UV-PRO)
    - These will connect to a computer through a serial/USB connection
    - These are generally only support AX.25 based packet (some TNCs can support multi-modes)

Packet Radio

- What software are operators running?
  - Software Packet Modems
    - Direwolf - Popular open source AX.25/APRS program
    - UZ7HO Soundmodem
  - Packet terminal and BBS software
    - EasyTerm - Windows packet radio terminal/mailbox by UZ7HO
    - BPQ - Full featured packet radio station (includes Packet Terminal Programs)
    - FBB - Full packet station

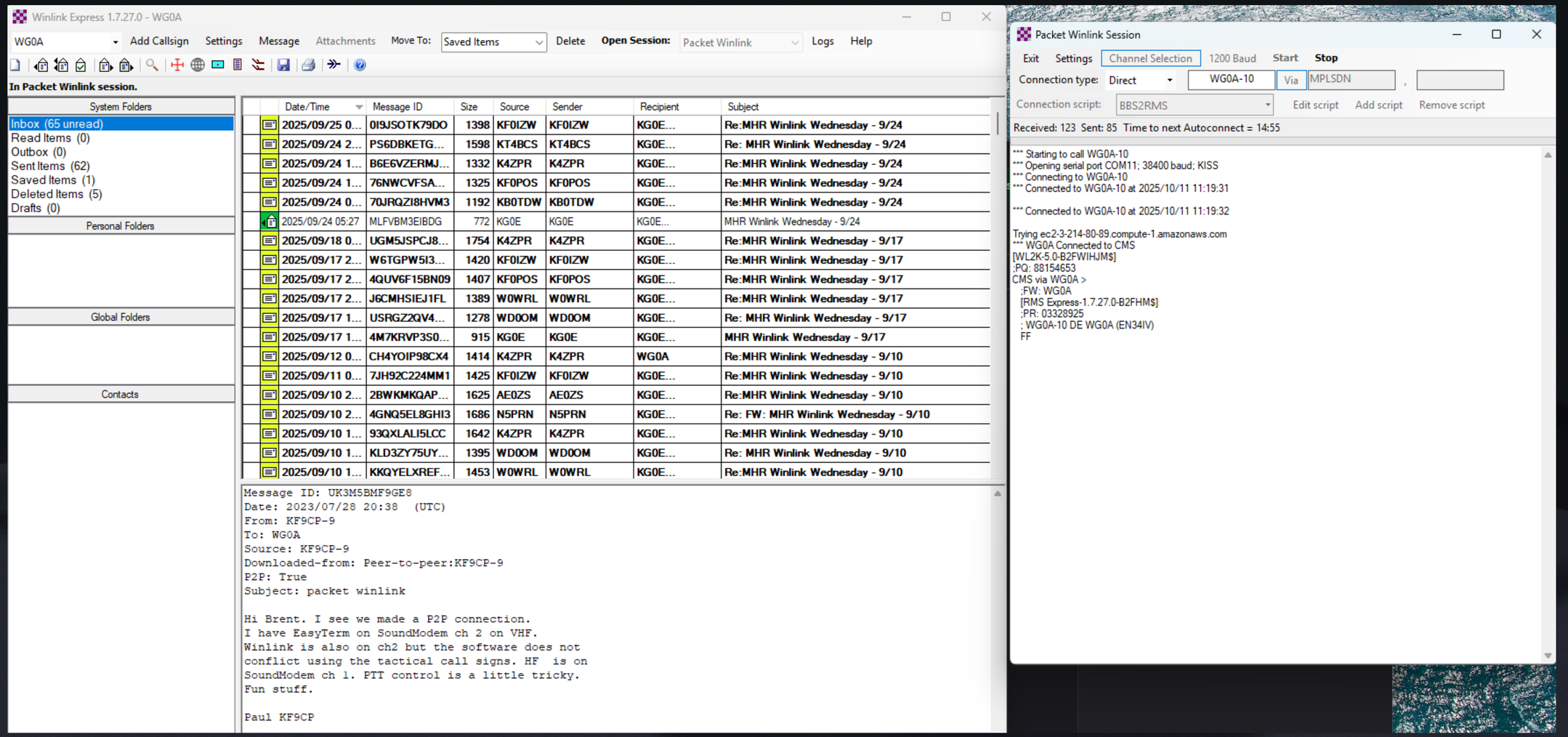
- Packet Radio Example
  - Connecting to another node from my station on 40M
  - Leaving a message
  - Can also connect for keyboard to keyboard QSO




EasyTerm by UZ7HO - Ver 0.49b - Terminal: WG0A
File Settings View Stations About
Connect Disconnect Beacon YAPP MHeard Mailbox
:>mh 7
WILOW:KB9PVH-7} Heard List for Port 7
WG0A 00:00:00:01
KJ5AHO 00:00:01:36
WG0A+ 00:00:04:18
NR0Q-7 00:00:07:35
WB5BNV 00:00:07:48
KT4WO-1 00:00:07:50
VA3PIX 00:00:14:38
AL7RH-1 00:00:16:37
WW6Q-7 00:00:17:40
KT4WO 00:00:18:08
KJ5AHO-10 00:00:21:47
WG0A-7 00:00:29:26
WG0A-1 00:00:29:35
AL7RH 00:00:47:03
N3BYR-1 00:00:49:09
KF9CP 00:00:54:40
KT4WO-6 00:00:59:10
KF9CP-1 00:01:10:00
KB8UVN-7 00:01:15:59
KK4DIV-1 00:01:24:36
KK4DIV-7 00:01:27:16
WB5BNV+ 00:01:39:16
N0MR-7 00:01:52:59
K5DAT-7 00:01:55:09
W9GM-7 00:02:57:32
NR0Q-1 00:03:25:48
AE5MI 00:04:47:44
W9GM 00:05:06:24
NC8Q-7 00:05:11:27
NC8Q 00:05:11:30
KB9PVH-7 2 ... 3 ... 4 ... 5 ... 6 ... 7 ... 8 ... Monitor
Lightning: 0/hour 0/day
1:Fm WG0A To KB9PVH-7 <RR P/F R1 >[23:35:40]
1:Fm KB9PVH-7 To WG0A <RR P/F R6 >[23:35:42]
TALK
Link with 1:KB9PVH-7
Buffer: 0
TERM: ON
MBX: OFF
TNC: ON
SoundModem by UZ7HO - Ver 1.13 - [AFSK AX.25 300bd]
Settings View Clear monitor Calibration About
A: AFSK AX.25 300bd
1000
DCD threshold
Hold pointers
1:Fm WG0A To KB9PVH-7 <RR R F R5> [23:32:20T]
1:Fm KB9PVH-7 To WG0A <I C P R6 S5 Pid=F0 Len=40> [23:32:24R] [+++]
00:03:25:48
AE5MI 00:04:47:
1:Fm WG0A To KB9PVH-7 <RR R F R6> [23:32:25T]
1:Fm KB9PVH-7 To WG0A <I C P R6 S6 Pid=F0 Len=40> [23:32:29R] [+++]
44
W9GM 00:05:06:24
NC8Q-7
1:Fm WG0A To KB9PVH-7 <RR R F R7> [23:32:31T]
1:Fm KB9PVH-7 To WG0A <I C P R6 S7 Pid=F0 Len=40> [23:32:35R] [+++]
00:05:11:27
NC8Q 00:05:11
1:Fm WG0A To KB9PVH-7 <RR R F R0> [23:32:36T]
1:Fm KB9PVH-7 To WG0A <I C P R6 S0 Pid=F0 Len=8> [23:32:40R] [+++]
:30
1:Fm WG0A To KB9PVH-7 <RR R F R1> [23:32:41T]
1:Fm KB9PVH-7 To EN53OI <UI C Pid=F0 Len=105> [23:32:52R] [+++]
Temp: 52.3°F Rain: 0.094 in
Wind: E (98°) @ 3.13 mph
Solar: 0w/m2 UV Index: 0
Lightning: 0/hour 0/day
1:Fm WG0A To KB9PVH-7 <RR C P R1> [23:35:40T]
1:Fm KB9PVH-7 To WG0A <RR R F R6> [23:35:42R] [+++]
MyCall DestCall Status Sent pkts Sent bytes Rcvd pkts Rcvd bytes Rcvd FC CPS TX
WG0A-0 KB9PVH-7 Link 6 25 41 1482 0 0
1000
2000
3000
EasyTerm and
UZ7HO Soundmodem

Packet Radio and Winlink

- Winlink utilizes Packet as one connection mode

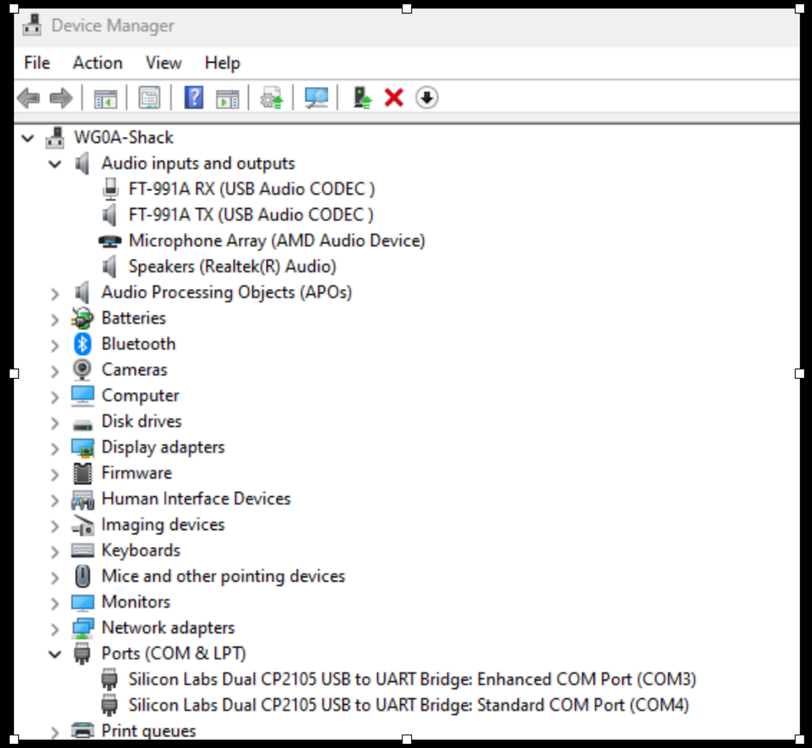


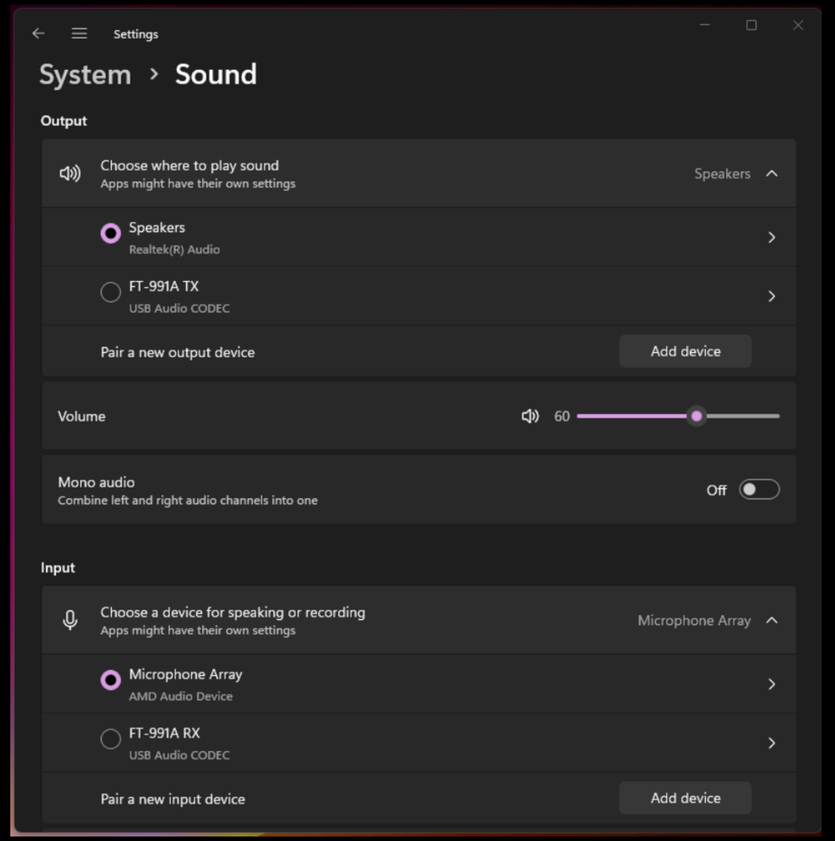
SoundCard Interfaces

Packet Radio and other modes

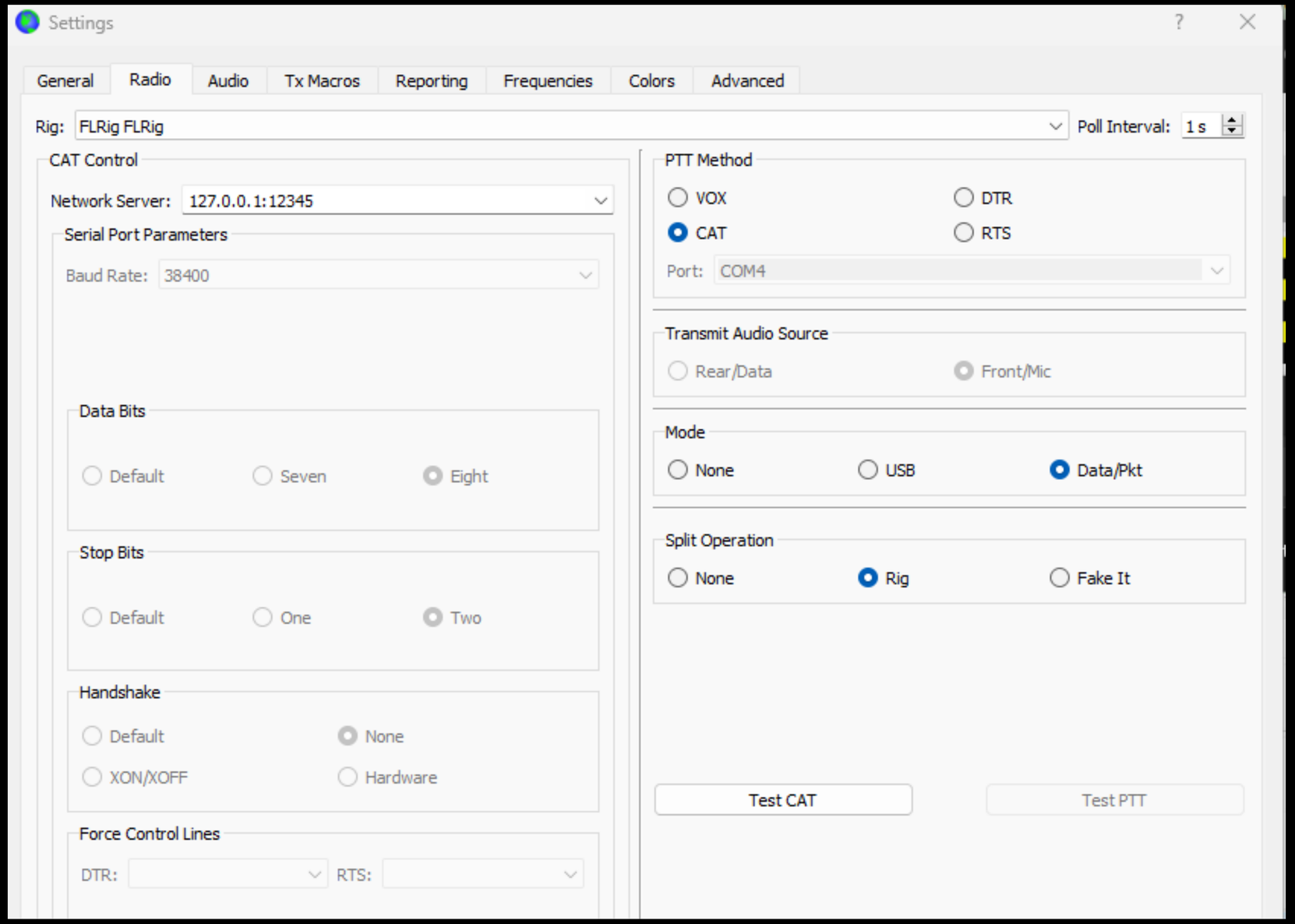
- Sound Card Interface Example (DigiRig, etc.)

Sound Card Device - Computer View

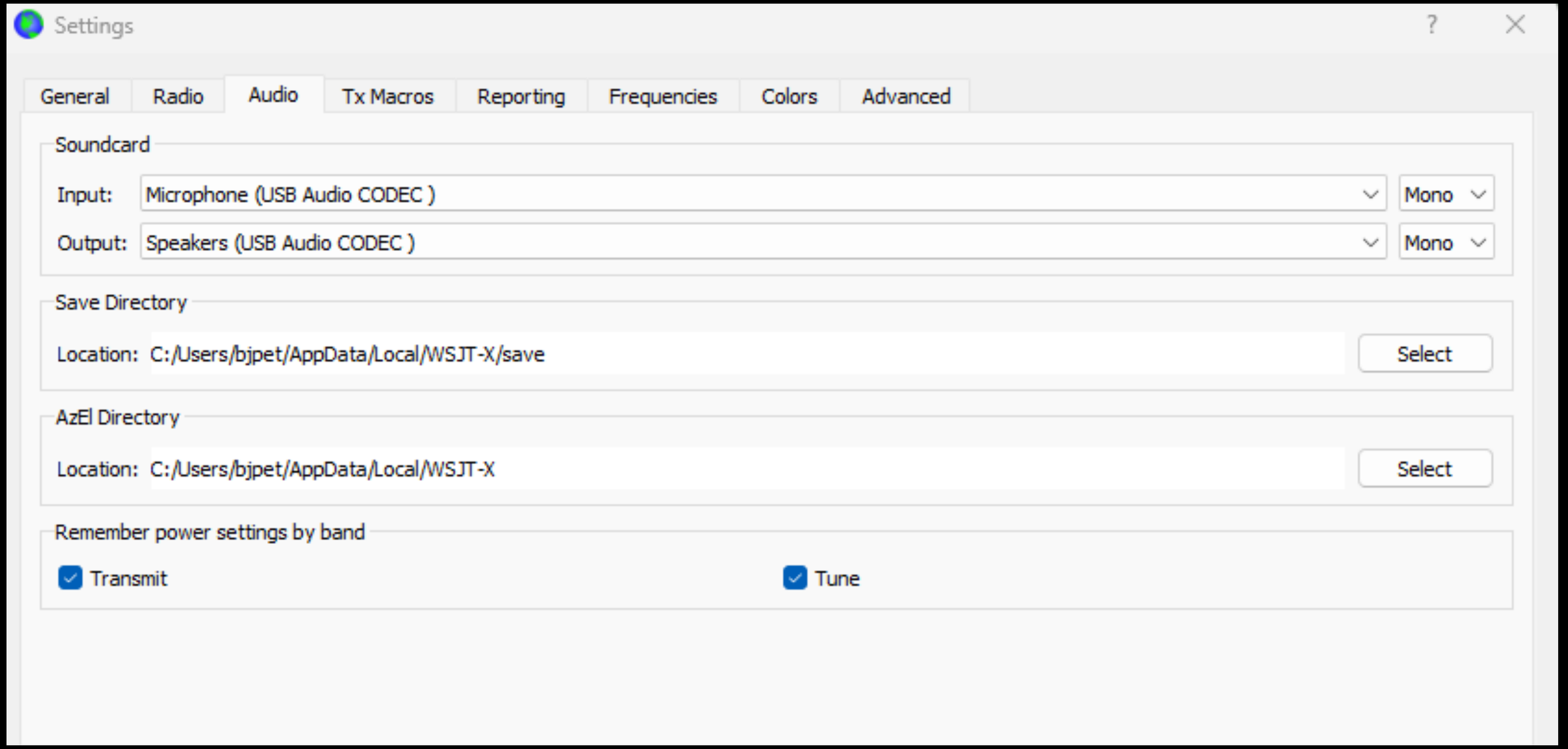




Example (WSJT-X)— Sound Card / PTT Configuration



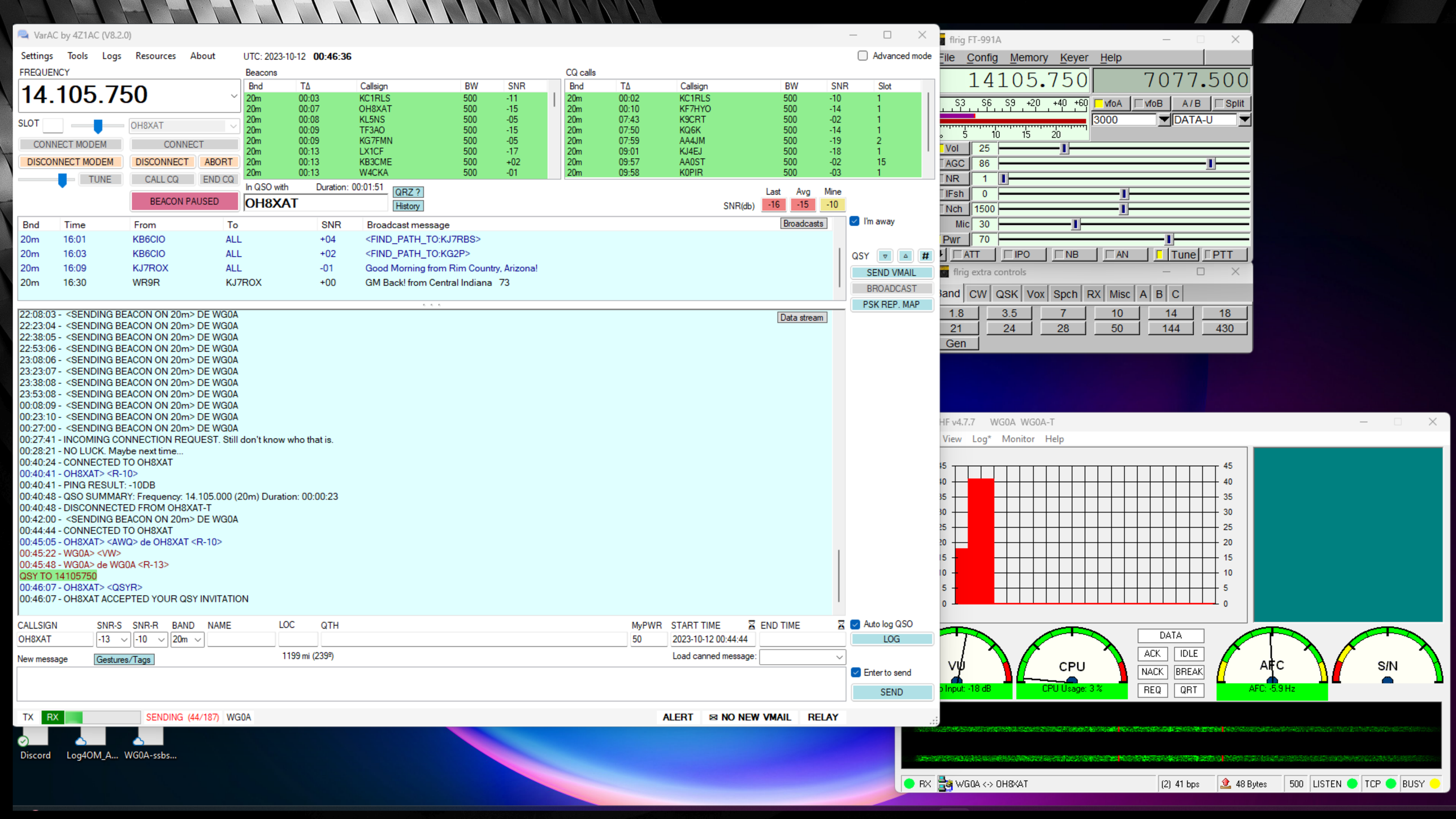
Example (WSJT-X)— Sound Card / PTT Configuration



VarAC

VarAC

- Created by Irad Deutsch, 4Z1AC
- Released in 2021
- Actively developed - new features with recent releases
- Supports free-form QSO, sending files and images and mailbox
- Recent release include games, relay of messages and notifications
- Utilizes VARA HF or VARA FM modem
  - Created by Jose Alberto Nieto Ros EA5HVK
  - Popular modem for HF Winlink - very good weak signal modem


VarAC by 4Z1AC (V8.2.0)
Settings Tools Logs Resources About
UTC: 2023-10-12 00:46:36
Advanced mode
FREQUENCY
14.105.750
SLOT
OH8XAT
CONNECT MODEM
CONNECT
DISCONNECT MODEM
DISCONNECT
ABORT
TUNE
CALL CQ
END CQ
BEACON PAUSED
Beacons
Bnd TΔ Callsign BW SNR
20m 00:03 KC1RLS 500 -11
20m 00:07 OH8XAT 500 -15
20m 00:08 KL5NS 500 -05
20m 00:09 TF3AO 500 -15
20m 00:09 KG7FMN 500 -05
20m 00:13 LX1CF 500 -17
20m 00:13 KB3CME 500 +02
20m 00:13 W4CKA 500 -01
CQ calls
Bnd TΔ Callsign BW SNR Slot
20m 00:02 KC1RLS 500 -10 1
20m 00:10 KF7HYO 500 -14 1
20m 07:43 K9CRT 500 -02 1
20m 07:50 KQ6K 500 -14 1
20m 07:59 AA4JM 500 -19 2
20m 09:01 KJ4EJ 500 -18 1
20m 09:57 AA0ST 500 -02 15
20m 09:58 K0PIR 500 -03 1
In QSO with
Duration: 00:01:51
OH8XAT
QRZ ?
History
SNR(db)
Last -16
Avg -15
Mine -10
Bnd Time From To SNR Broadcast message
20m 16:01 KB6CIO ALL +04 <FIND_PATH_TO:KJ7RBS>
20m 16:03 KB6CIO ALL +02 <FIND_PATH_TO:KG2P>
20m 16:09 KJ7ROX ALL -01 Good Morning from Rim Country, Arizona!
20m 16:30 WR9R KJ7ROX +00 GM Back! from Central Indiana 73
Broadcasts
I'm away
QSY
SEND VMAIL
BROADCAST
PSK REP. MAP
Data stream
22:08:03 - <SENDING BEACON ON 20m> DE WG0A
22:23:04 - <SENDING BEACON ON 20m> DE WG0A
22:38:05 - <SENDING BEACON ON 20m> DE WG0A
22:53:06 - <SENDING BEACON ON 20m> DE WG0A
23:08:06 - <SENDING BEACON ON 20m> DE WG0A
23:23:07 - <SENDING BEACON ON 20m> DE WG0A
23:38:08 - <SENDING BEACON ON 20m> DE WG0A
23:53:08 - <SENDING BEACON ON 20m> DE WG0A
00:08:09 - <SENDING BEACON ON 20m> DE WG0A
00:23:10 - <SENDING BEACON ON 20m> DE WG0A
00:27:00 - <SENDING BEACON ON 20m> DE WG0A
00:27:41 - INCOMING CONNECTION REQUEST. Still don't know who that is.
00:28:21 - NO LUCK. Maybe next time...
00:40:24 - CONNECTED TO OH8XAT
00:40:41 - OH8XAT> <R-10>
00:40:41 - PING RESULT: -10DB
00:40:48 - QSO SUMMARY: Frequency: 14.105.000 (20m) Duration: 00:00:23
00:40:48 - DISCONNECTED FROM OH8XAT-T
00:42:00 - <SENDING BEACON ON 20m> DE WG0A
00:44:44 - CONNECTED TO OH8XAT
00:45:05 - OH8XAT> <AWQ> de OH8XAT <R-10>
00:45:22 - WG0A> <VW>
00:45:48 - WG0A> de WG0A <R-13>
QSY TO 14105750
00:46:07 - OH8XAT> <QSYR>
00:46:07 - OH8XAT ACCEPTED YOUR QSY INVITATION
CALLSIGN SNR-S SNR-R BAND NAME LOC QTH MyPWR START TIME END TIME
OH8XAT -13 -10 20m 50 2023-10-12 00:44:44
Auto log QSO
LOG
New message
Gestures/Tags
1199 mi (239°)
Load canned message:
Enter to send
SEND
TX RX SENDING (44/187) WG0A
ALERT
NO NEW VMAIL
RELAY
flrig FT-991A
File Config Memory Keyer Help
14105.750
7077.500
vfoA vfoB A / B Split
3000
DATA-U
Vol 25
AGC 86
NR 1
IFsh 0
Nch 1500
Mic 30
Pwr 70
ATT IPO NB AN Tune PTT
flrig extra controls
Band CW QSK Vox Spch RX Misc A B C
1.8 3.5 7 10 14 18
21 24 28 50 144 430
Gen
HF v4.7.7 WG0A WG0A-T
View Log* Monitor Help
VU
CPU
CPU Usage: 3 %
DATA
ACK IDLE
NACK BREAK
REQ QRT
AFC
AFC: -5.9 Hz
S/N
RX WG0A <-> OH8XAT (2) 41 bps 48 Bytes 500 LISTEN TCP BUSY
Discord
Log4OM_A...
WG0A-ssbs...

VarAC by 4Z1AC (V8.2.0)

Settings Tools Logs Resources About UTC: 2023-10-12 **01:50:44** Advanced mode

FREQUENCY ◄ ► Profile: VarAC

14.105.750

FREQ SCHEDULE OFF

SLOT 11 500Hz 2300Hz

CF 14.105.000 N7QJP

CONNECT MODEM | CONNECT | PING

DISCONNECT MODEM | DISCONNECT | ABORT

TUNE | CALL CQ | END CQ

PTT Disabled

BEACON PAUSED

VarAC Log

```
01:14:55 - PSKReporter: Sending accumulated records
01:23:54 - Report Received: -13
01:33:38 - Report Received: -16
01:43:43 - Report Received: -14
```

VARA Log

```
01:50:26 - PTT ON
01:50:28 - PTT OFF
01:50:39 - PTT ON
01:50:40 - PTT OFF
```

In QSO with Duration: 00:37:26

N7QJP QRZ ? History

Beacons — Time diff view

Bnd	TΔ	Callsign	BW	SNR
20m	00:40	KK6QMS	500	-13
20m	00:47	AJ4RJ	500	-10
20m	00:47	W4CKA	500	-01
20m	00:49	KF7HYO	500	-10
20m	00:53	KC4EEL	500	-03
20m	00:53	TF3AO	500	-14
20m	00:56	OH8XAT	500	-20
20m	01:07	KC1RLS	500	-11

CQ calls

Bnd	TΔ	Callsign	BW	SNR	Slot
20m	00:37	N7QJP	500	-14	11
20m	00:51	AJ4RJ	500	-12	1
20m	00:54	KF7HYO	500	-11	1
20m	00:55	KC4EEL	500	-04	1
20m	01:06	KC1RLS	500	-10	1
20m	08:47	K9CRT	500	-02	1
20m	08:54	KQ6K	500	-14	1
20m	09:03	AA4JM	500	-19	2

Graph Last Avg Mine

SNR(db) -18 -14 -14

Send 'is typing' Mute all sounds I'm away Verbose SNR

QSY

SEND VMAIL BROADCAST PSK REP. MAP SEND FILE PATH FINDER SNR INFO LH.P FS.P

Broadcasts

Bnd	Time	From	To	SNR	Broadcast message
20m	16:30	WR9R	KJ7ROX	+00	GM Back! from Central Indiana 73
20m	00:51	WG0A	ALL	--	<FIND_PATH_TO:KJ7ROX>
20m	00:51	W4CKA	WG0A	+07	<HEARD> KJ7ROX @ 2023-10-11 18:24:39 on 14.105.000 (SNR: -13)
20m	00:52	KC9CEZ	WG0A	-11	<HEARD> KJ7ROX @ 2023-10-11 18:54:38 on 14.105.000 (SNR: -13)

N7QJP is typing

```
<SNRR>
01:32:53 - WG0A> <R-12>
01:33:30 - N7QJP> de N7QJP <R-16>
01:34:02 - WG0A> de WG0A <R-12>
01:34:48 - WG0A> I did hear a couple europe stations here about 30min ago. Dropped a note in OH8XAT's vmail box.
01:35:36 - N7QJP> Good to hear that.
01:36:35 - N7QJP> I've been trying to fill in the FT8 DX spots on 80 meters but the band is still a little noisy yet. Looking forward to it quieting down as winter gets here.
01:37:39 - N7QJP> <SNRR>
01:37:52 - WG0A> <R-19>
01:38:05 - N7QJP> A little bit of extra power helps the bps rate get up there further.
01:39:10 - N7QJP> A bit of QSB it looks like.
01:40:08 - N7QJP> Do you work or are you retired?
01:41:52 - WG0A> True. It've been struggling with 80m. My dipole was damaged in a wind storm and doesn't quite tune up on 80 these days.
01:42:09 - N7QJP> <SNRR>
01:42:40 - WG0A> I work. I'm a software engineer.
01:42:47 - N7QJP> That makes it more of a challenge for sure.
01:43:22 - WG0A> <R-18>
01:43:35 - N7QJP> de N7QJP <R-14>
01:44:07 - WG0A> de WG0A <R-13>
01:44:14 - N7QJP> I retired early, about 8 years ago. I was a software system analyst integrator at a nuclear power plant in AZ. Moved back to MN....got tired of cactus and sand.
01:45:48 - WG0A> I should be able to get it fixed up before the snow starts to fall.
01:47:26 - N7QJP> I had to do some repairs during last winter. I think a squirrel or woodpecker took out one of my support lines. ARGH!
01:50:13 - WG0A> I have a small city lot and my dipole snakes through a couple trees. Some of the big winds were just to much. Now one end is a bit shorter.
```

Currently sending CLR In queue CLR EDIT

CALLSIGN	SNR-S	SNR-R	BAND	NAME	LOC	QTH	MyPWR	START TIME	END TIME
N7QJP	-13	-15	20m	Stu	EN27LJ	Bemidji, MN	50	2023-10-12 01:13:17	

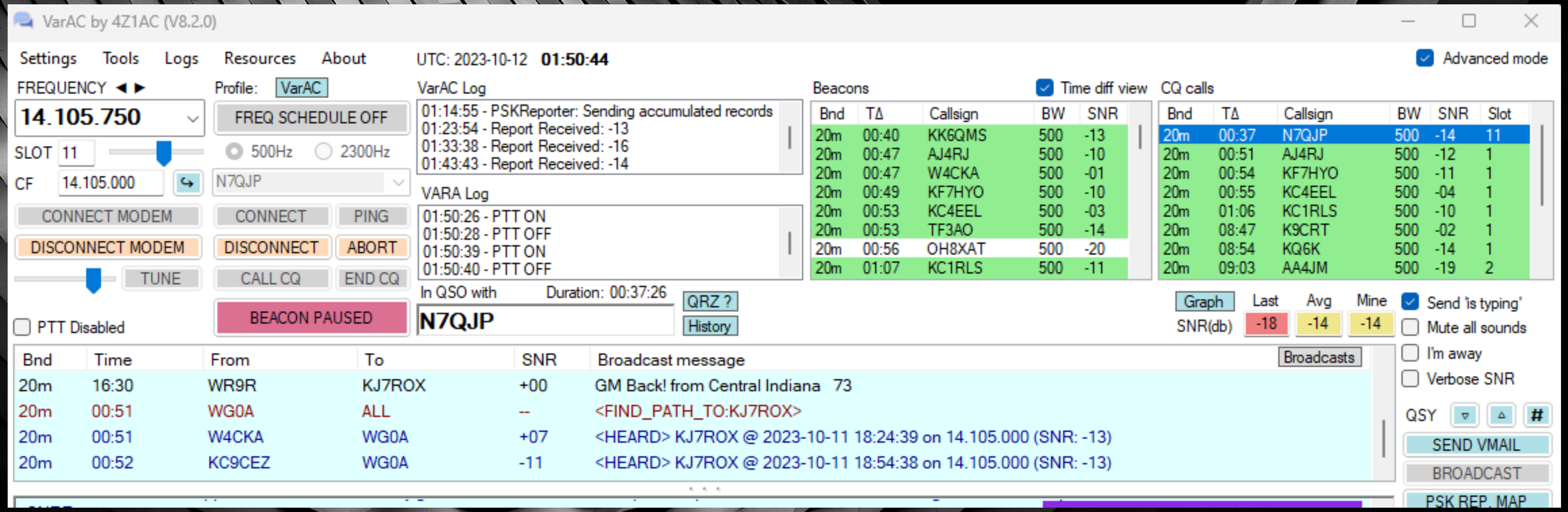
192 mi (335º)

Auto log QSO LOG CLR SPOT (DXCluster)

New message Gestures/Tags Load canned message: MY INFO

Enter to send SEND CLR

TX RX 1092/2042 IDLE WG0A ALERT ✉ NO NEW VMAIL RELAY Outbox: 2 Parking: 0


VarAC by 4Z1AC (V8.2.0)
Settings Tools Logs Resources About
UTC: 2023-10-12 01:50:44
Advanced mode
FREQUENCY
14.105.750
Profile: VarAC
FREQ SCHEDULE OFF
SLOT 11
500Hz 2300Hz
CF 14.105.000
N7QJP
CONNECT MODEM
CONNECT
PING
DISCONNECT MODEM
DISCONNECT
ABORT
TUNE
CALL CQ
END CQ
PTT Disabled
BEACON PAUSED
VarAC Log
01:14:55 - PSKReporter: Sending accumulated records
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VARA Log
01:50:26 - PTT ON
01:50:28 - PTT OFF
01:50:39 - PTT ON
01:50:40 - PTT OFF
In QSO with
Duration: 00:37:26
N7QJP
QRZ ?
History
Beacons
Time diff view
Bnd TΔ Callsign BW SNR
20m 00:40 KK6QMS 500 -13
20m 00:47 AJ4RJ 500 -10
20m 00:47 W4CKA 500 -01
20m 00:49 KF7HYO 500 -10
20m 00:53 KC4EEL 500 -03
20m 00:53 TF3AO 500 -14
20m 00:56 OH8XAT 500 -20
20m 01:07 KC1RLS 500 -11
CQ calls
Bnd TΔ Callsign BW SNR Slot
20m 00:37 N7QJP 500 -14 11
20m 00:51 AJ4RJ 500 -12 1
20m 00:54 KF7HYO 500 -11 1
20m 00:55 KC4EEL 500 -04 1
20m 01:06 KC1RLS 500 -10 1
20m 08:47 K9CRT 500 -02 1
20m 08:54 KQ6K 500 -14 1
20m 09:03 AA4JM 500 -19 2
Graph
Last Avg Mine
SNR(db) -18 -14 -14
Send 'is typing'
Mute all sounds
I'm away
Verbose SNR
QSY
SEND VMAIL
BROADCAST
PSK REP. MAP
Bnd Time From To SNR Broadcast message
Broadcasts
20m 16:30 WR9R KJ7ROX +00 GM Back! from Central Indiana 73
20m 00:51 WG0A ALL -- <FIND_PATH_TO:KJ7ROX>
20m 00:51 W4CKA WG0A +07 <HEARD> KJ7ROX @ 2023-10-11 18:24:39 on 14.105.000 (SNR: -13)
20m 00:52 KC9CEZ WG0A -11 <HEARD> KJ7ROX @ 2023-10-11 18:54:38 on 14.105.000 (SNR: -13)

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01:37:52 - WG0A> <R-19>
01:38:05 - N7QJP> A little bit of extra power helps the bps rate get up there further.
01:39:10 - N7QJP> A bit of QSB it looks like.
01:40:08 - N7QJP> Do you work or are you retired?
01:41:52 - WG0A> True. It've been struggling with 80m. My dipole was damaged in a wind storm and doesn't quite tune up on 80 these days.
01:42:09 - N7QJP> <SNRR>
01:42:40 - WG0A> I work. I'm a software engineer.
01:42:47 - N7QJP> That makes it more of a challenge for sure.
01:43:22 - WG0A> <R-18>
01:43:35 - N7QJP> de N7QJP <R-14>
01:44:07 - WG0A> de WG0A <R-13>
01:44:14 - N7QJP> I retired early, about 8 years ago. I was a software system analyst integrator at a nuclear power plant in AZ. Moved back to MN....got tired of cactus and sand.
01:45:48 - WG0A> I should be able to get it fixed up before the snow starts to fall.
01:47:26 - N7QJP> I had to do some repairs during last winter. I think a squirrel or woodpecker took out one of my support lines. ARGH!
01:50:13 - WG0A> I have a small city lot and my dipole snakes through a couple trees. Some of the big winds were just to much. Now one end is a bit shorter.

N7QJP is typing

PSK REP. MAP
SEND FILE
PATH FINDER
SNR | INFO
LH.P | FS.P

Currently sending | CLR | In queue | CLR | EDIT

CALLSIGN	SNR-S	SNR-R	BAND	NAME	LOC	QTH	MyPWR	START TIME	END TIME
N7QJP	-13	-15	20m	Stu	EN27LJ	Bemidji, MN	50	2023-10-12 01:13:17	

Auto log QSO | LOG | CLR

New message | Gestures/Tags | 192 mi (335º) | Load canned message: MY INFO | SPOT (DXCluster)

Enter to send | SEND | CLR

JS8Call

JS8Call Mode

- Derived from FT8
  - Created by Jordan Sherer KN4CRD
  - Modified to support longer, freeform messages
- Allows Keyboard to Keyboard communication between 2 or more stations
  - Supports Multiple speeds
    - Slow, Normal, Fast, Turbo
- Mailbox - stations can leave mail in your mailbox
- JS8Call QSO Party - 2nd weekend of the month (groups.io)

JS8Call de KN4CRD (v2.2.0)

File Configurations Mode Log View Control Help

7.077 500
1700 Hz

WG0A - EN34IV
03:18:30
2024 Oct 05

RX | TX | NORMAL+MULTI+AUTO+HB | SPOT | LOG | TUNE

Offset	Age	SNR	Message(s)
1488 Hz	45s	-02 dB	...SEE MANY EUROPE STATIONS IN GRIDTRACKER. .....
804 Hz	45s	+06 dB	AD8IM: NN4H HEARTBEAT SNR +13 ◊ W0ANM: .....
699 Hz	45s	+03 dB	...W6OEM: K6MQY HEARTBEAT SNR -21 ◊ W6OEM: .....
752 Hz	1m	-14 dB	...AT SNR +12 ◊ KG4UHM: NN4H HEARTBEAT SNR -11 ◊
554 Hz	1m	+08 dB	W0ANM: NN4H HEARTBEAT SNR +00 ◊
2107 Hz	1m	-10 dB	W3BFO/P: NN4H HEARTBEAT SNR -05 ◊
1560 Hz	1m	-12 dB	...MAS ON JONES & RUSSEL RD. PLEASE JOIN US 1/F ◊
652 Hz	1m	-02 dB	...AT SNR -20 ◊ KF5ZPA: NN4H HEARTBEAT SNR +09 ◊
600 Hz	1m	+04 dB	...AT SNR -09 ◊ W5ODJ: NN4H HEARTBEAT SNR +15 ◊
421 Hz	1m	-04 dB	KN4EBW: NN4H HEARTBEAT SNR -05 ◊
1609 Hz	1m	-15 dB	... JO43GI26IA ◊ K4ICW: NN4H HEARTBEAT SNR +10 ◊
958 Hz	1m	-09 dB	...U HW CPY? ◊ KQ4DSO: NN4H HEARTBEAT SNR +16 ◊
895 Hz	1m	-11 dB	NN4H: @HB HEARTBEAT EM76 ◊

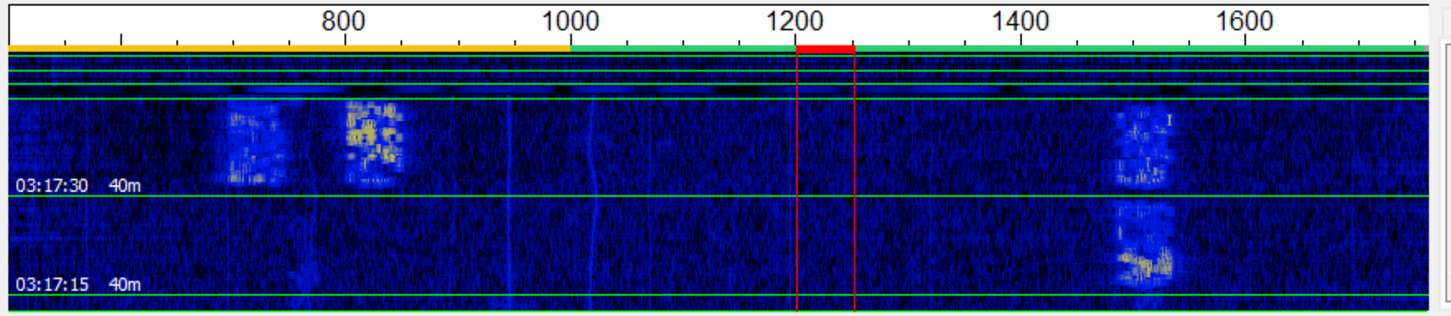
03:10:44 - (652) - KC3KVT: WG0A HEARTBEAT SNR +00 ◊
03:10:57 - (900) - W5ODJ: WG0A HEARTBEAT SNR -03 ◊
03:11:43 - (950) - WG0A: K5DCC HEARTBEAT SNR +02 ◊
03:12:39 - (1200) - WG0A: W0ANM GRID? ◊
03:13:12 - (1423) - W0ANM: WG0A GRID EN35EE ◊
03:14:30 - (1200) - WG0A: DL5XL SNR? ◊
03:15:09 - (1200) - WG0A: DL5XL GRID? ◊
03:15:57 - (1602) - DL5XL: WG0A GRID JO43GI26IA ◊
03:14:57 - (2390) - WA8WQU: @ALLCALL (@JS8CHESS ANYONE..... ◊
03:17:32 - (1200) - WG0A: DL5XL MSG HEARING YOUR STATION FROM MINNEAOLIS, MN EN34IV. 7

~~WG0A: DL5XL MSG HEARING YOUR STATION FROM MINNEAOLIS, MN EN34IV. 7~~3 BRENT WG0A 2XE

★	Callsigns (38)	Age	SNR	Offset	Speed	✓	Name
	@ALLCALL						
	KG4UHM	1m	-14 dB	752 Hz	S		
★	W0ANM	1m	+08 dB	554 Hz	N		
★	W3BFO/P	1m	-10 dB	2107 Hz	N		
★	KC3KVT	1m	-08 dB	752 Hz	N		
	KF5ZPA	1m	-02 dB	652 Hz	N		
★	W5ODJ	1m	+04 dB	600 Hz	N		
★	KN4EBW	1m	-04 dB	421 Hz	N		
★	K4ICW	1m	-15 dB	1609 Hz	F		
	KQ4DSO	1m	-09 dB	958 Hz	F		
	AD8IM	1m	-07 dB	801 Hz	F		
	NN4H	1m	-11 dB	895 Hz	N		
	KK6ZSN	2m	-18 dB	955 Hz	N		

HB | CQ | REPLY | SNR | INFO | STATUS | Saved | Directed to DL5XL | Deselect | Sending (45s) | Halt

CAT/S



Control | Display | Timing

Time Drift: 0 ms

Automatic

Start Automatic Time Drift

Stop After: 1 decode(s)

Tx: MN EN34IV. 7 | JS8 | Last Tx: MINNEAOLIS, | 0/15 | 10.0wpm / 57.3cpm

JS8Call de KN4CRD (v2.2.0)

File Configurations Mode Log View Control Help

14.078 000

1410 Hz

WG0A - EN34IV

02:27:22

2023 Oct 11

RX TX NORMAL+MULTI+AUTO+HB

SPOT LOG TUNE

Offset	Age	SNR	Message(s)
506 Hz	4m	+13 dB	W7SUA: WG0A HEARTBEAT SNR +10 ◊
607 Hz	1m	-10 dB	3:15 - (600) - WB6NL.....
951 Hz	4m	-06 dB	KJ6OLW: WG0A HEARTBEAT SNR +00 ◊
980 Hz	3m	+02 dB	N0BN: WG0A HEARTBEAT SNR +03 ◊
1006 Hz	4m	-13 dB	KI5SMN: WG0A HEARTBEAT SNR -06 ◊
1602 Hz	45s	-13 dB	KJ6OLW: WG0A GRID DM03 ◊

01:43:57 - (751) - KJ6OLW: WG0A HEARTBEAT SNR +01 ◊

01:43:57 - (1006) - KI5SMN: WG0A HEARTBEAT SNR -07 ◊

01:43:57 - (490) - KG4UHM: WG0A HEARTBEAT SNR -09 ◊

01:44:24 - (967) - XE2MAM: WG0A HEARTBEAT SNR -11 ◊

01:45:28 - (650) - WG0A: KF7ZLU HEARTBEAT SNR -14 ◊

01:49:12 - (550) - WG0A: K1MIO HEARTBEAT SNR -15 ◊

01:49:31 - (1410) - WG0A: XE2MAM GRID? ◊

01:50:24 - (965) - XE2MAM: WG0A GRID DM61SS50PA ◊

02:22:37 - (750) - WG0A: @HB HEARTBEAT

02:23:12 - (506) - W7SUA: WG0A HEARTBE

02:23:12 - (951) - KJ6OLW: WG0A HEARTBI

02:23:12 - (1006) - KI5SMN: WG0A HEARTE

02:23:56 - (980) - N0BN: WG0A HEARTBEAT

02:25:36 - (1410) - WG0A: KJ6OLW GRID?

02:26:12 - (1602) - KJ6OLW: WG0A GRID D

TYPE YOUR OUTGOING DIRECTED MESSAGE

★	Callsigns (29)	Age	SNR	Offset	Speed	✓	Name	Comment
	@ALLCALL							
★	KJ6OLW							
★	N0BN							
★	KI5SMN							
★	W7SUA							
★	XE2MAM							

Jump to 1602Hz
Jump to -1200 ms time drift
Log...
Show Message Inbox...
Store Message...
Saved Messages...
Directed to KJ6OLW...
Relay via KJ6OLW...
Deselect KJ6OLW
Add New Station or Group...
Remove Station
Clear
Clear All

Q	63d	-20 dB	1605 Hz	N	
	63d	-09 dB	851 Hz	N	
4/I24	63d	-20 dB	741 Hz	N	
	72d	+05 dB	2312 Hz	F	
	72d	-01 dB	2002 Hz	N	
Y	72d	+11 dB	652 Hz	N	
	72d	-03 dB	951 Hz	N	

Send a directed message to selected callsign

Reply - Send reply message to selected callsign
SNR - Send a signal report to the selected callsign
INFO - Send my station information
GRID EN34IV - Send my current station Maidenhead grid locator

SNR? - What is my signal report?
INFO? - What is your station information?
GRID? - What is your current grid locator?
STATUS? - What is your station status message?
HEARING? - What are the stations are you hearing? (Top 4 ranked by most recently heard)
>[MESSAGE] - Please relay this message to its destination
MSG [MESSAGE] - Please store this message in your inbox
MSG TO:[CALLSIGN] [MESSAGE] - Please store this message at your station for later retreival by [CALLSIGN]
QUERY CALL [CALLSIGN]? - Please acknowledge you can communicate directly with [CALLSIGN]
QUERY MSGS - Do you have any messages for me?
QUERY MSG [ID] - Please deliver the complete message identified by ID

AGN? - Please repeat your last transmission
QSL? - Did you receive my last transmission?
QSL - I confirm I received your last transmission
YES - I confirm your last inquiry
NO - I do not confirm your last inquiry
HW CPY? - How do you copy?
RR - Roger. Received. I copy.
FB - Fine Business
73 - I send my best regards
SK - End of contact
DIT DIT - End of contact / Two bits

HB CQ REPLY SNR INFO

Deselect Send (15s) Halt

CAT/S

80 60 40 20 0

68 dB

1000 1500 2000 2500

02:27:15 20m

02:27:00 20m

02:26:45 20m

500

Control Display Timing

Set Time Drift to Now (TX End)

Set Time Drift to Now (TX Start)

Reset Time Drift

Receiving JS8 Last Tx: WG0A: KJ6OLW GRID? 7/15 8.0wpm / 56.0cpm

WSJT-X - FT8, FT4, MSK144, etc.

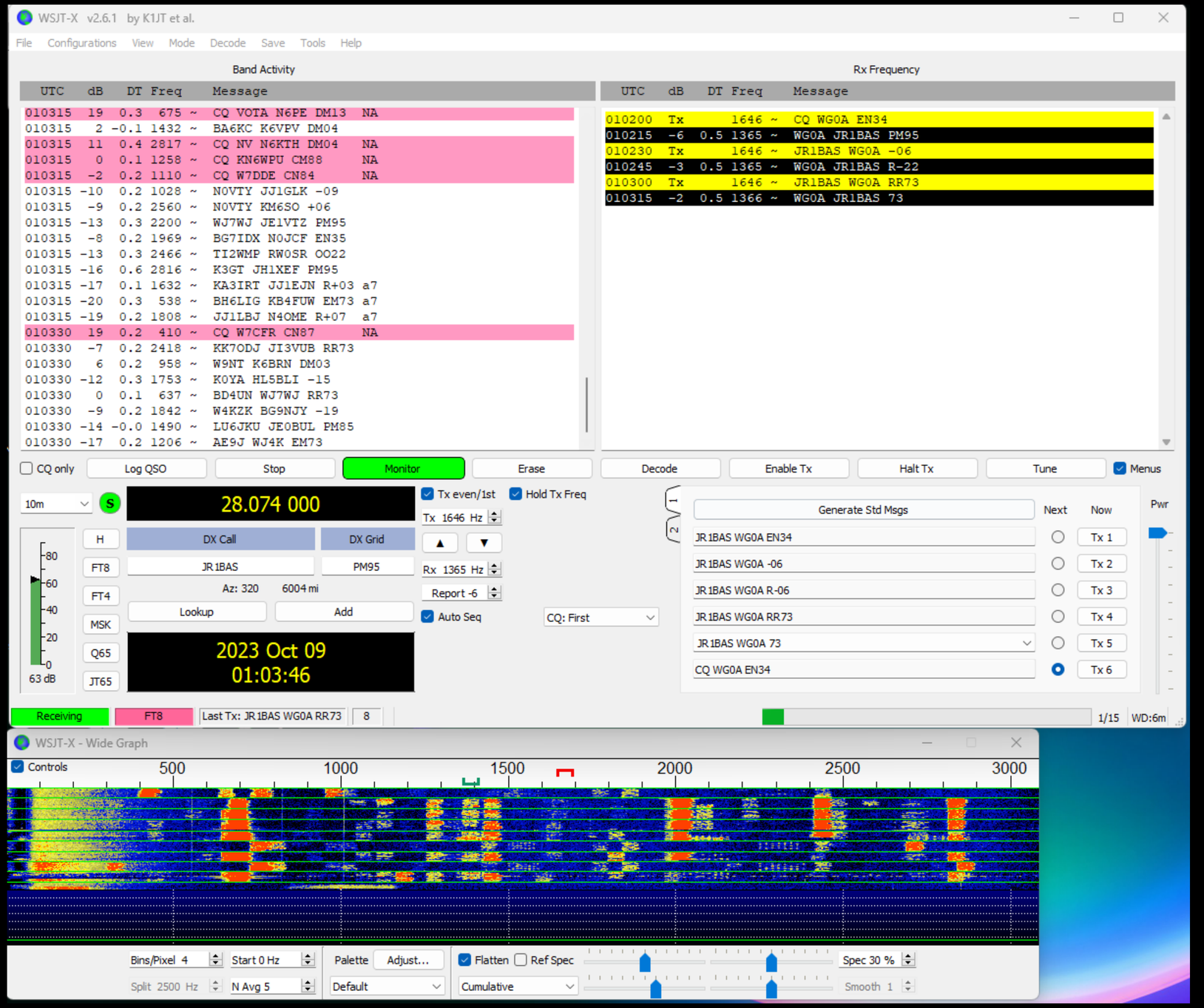
WSJT-X Modes

- FT8 - Joe Taylor, K1JT and Steve Franke, K9AN
  - 8- tone FSK, 50Hz bandwidth
  - 15 Second Xmit, 15 Second Rec cycle
  - 77-bit payload
- FT4
  - 4-tone FSK, 90Hz bandwidth
  - 6 Second Xmit, 6 Second Rec cycle
  - 77-bit payload
- Both modes very good in weak signal conditions

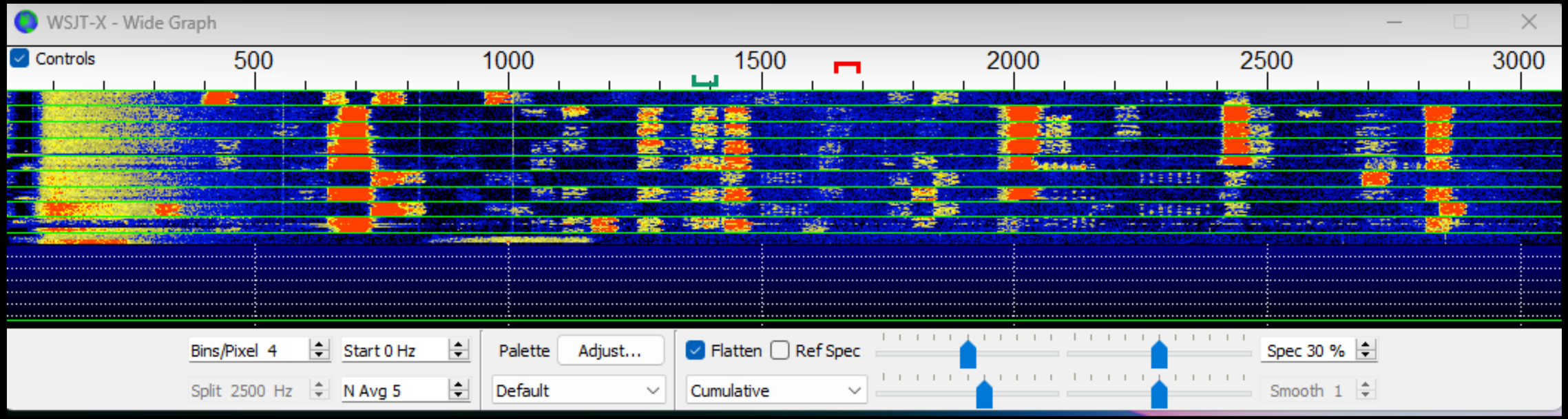
Some other WSJT-X Modes

- JT65 - Joe Taylor, K1JT
  - 65- tone FSK, 2500Hz bandwidth
  - 60 Second Xmit/Rec cycle
  - Very-low signal and EME uses
- MSK144
  - Designed for Meteor Scatter communication
  - Used in VHF frequencies (6m, 2m)

FT8 Walkthrough



FT8 Walkthrough - Waterfall

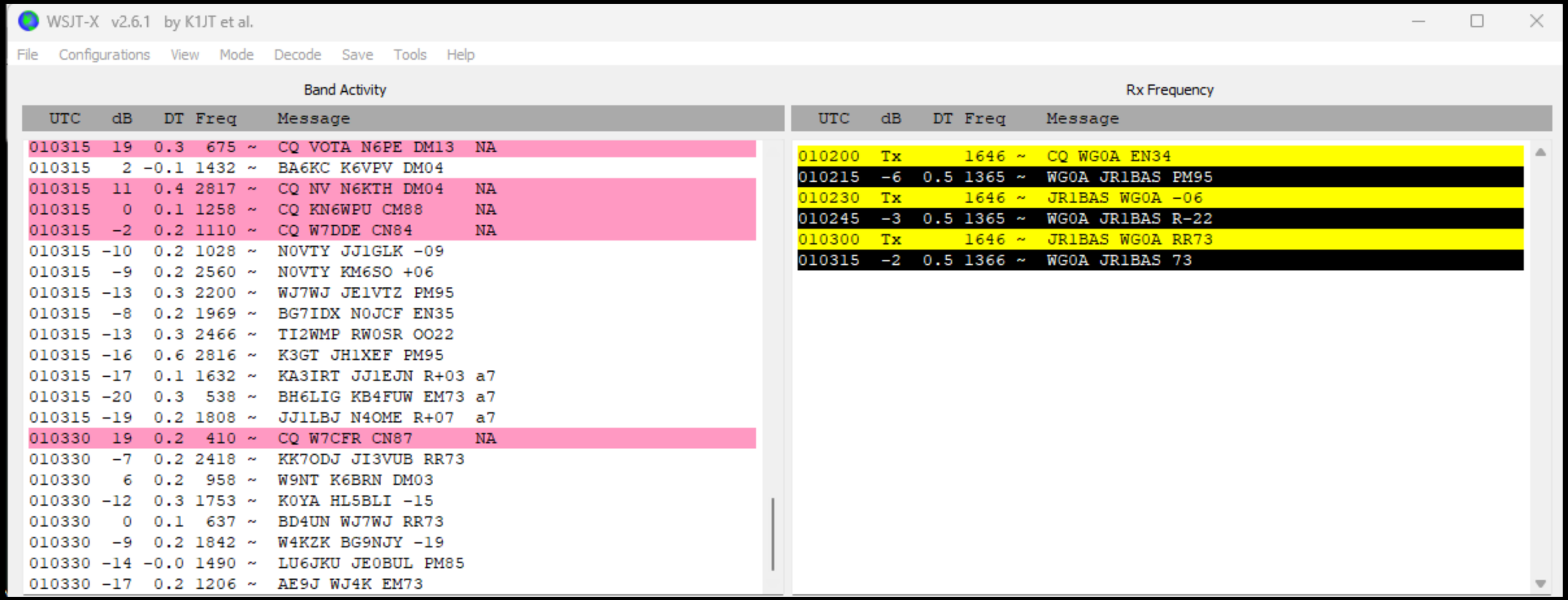


Click - Select RX Frequency (Green)

Shift-Click - Set TX Frequency (Red)

Ctl-Click - Set both RX/TX Frequency

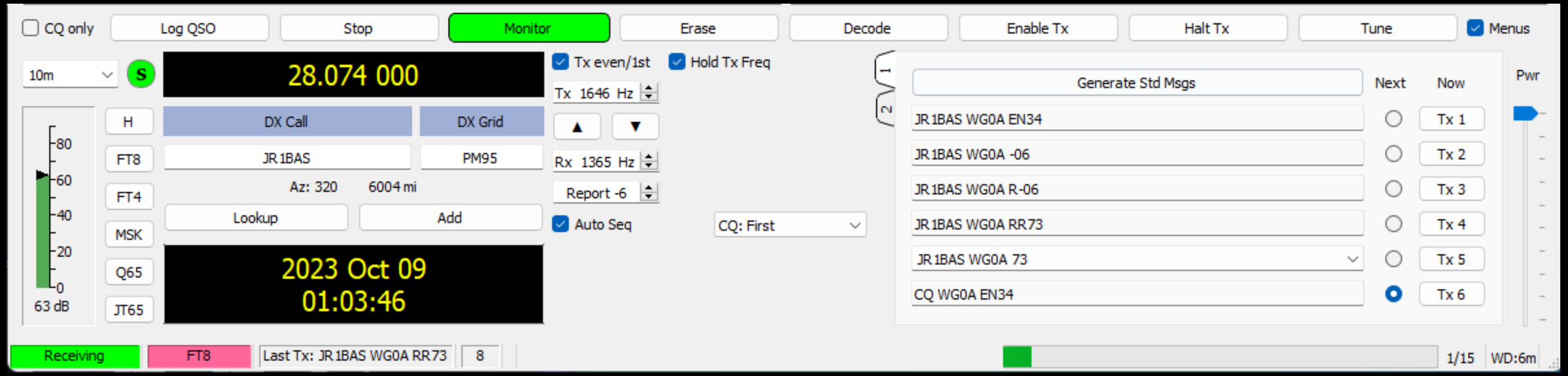
FT8 Walkthrough - Activity Panes



UTC	dB	DT	Freq		Message	
010315	19	0.3	675	~	CQ VOTA N6PE DM13	NA
010315	2	-0.1	1432	~	BA6KC K6VPV DM04	
010315	11	0.4	2817	~	CQ NV N6KTH DM04	NA
010315	0	0.1	1258	~	CQ KN6WPU CM88	NA
010315	-2	0.2	1110	~	CQ W7DDE CN84	NA
010315	-10	0.2	1028	~	N0VTY JJ1GLK -09	
010315	-9	0.2	2560	~	N0VTY KM6SO +06	
010315	-13	0.3	2200	~	WJ7WJ JE1VTZ PM95	
010315	-8	0.2	1969	~	BG7IDX N0JCF EN35	
010315	-13	0.3	2466	~	TI2WMP RW0SR OO22	
010315	-16	0.6	2816	~	K3GT JH1XEF PM95	
010315	-17	0.1	1632	~	KA3IRT JJ1EJN R+03	a7
010315	-20	0.3	538	~	BH6LIG KB4FUW EM73	a7
010315	-19	0.2	1808	~	JJ1LBJ N4OME R+07	a7
010330	19	0.2	410	~	CQ W7CFR CN87	NA
010330	-7	0.2	2418	~	KK7ODJ JI3VUB RR73	
010330	6	0.2	958	~	W9NT K6BRN DM03	
010330	-12	0.3	1753	~	K0YA HL5BLI -15	
010330	0	0.1	637	~	BD4UN WJ7WJ RR73	
010330	-9	0.2	1842	~	W4KZK BG9NJY -19	
010330	-14	-0.0	1490	~	LU6JKU JE0BUL PM85	
010330	-17	0.2	1206	~	AE9J WJ4K EM73	

UTC	dB	DT	Freq		Message
010200	Tx		1646	~	CQ WG0A EN34
010215	-6	0.5	1365	~	WG0A JR1BAS PM95
010230	Tx		1646	~	JR1BAS WG0A -06
010245	-3	0.5	1365	~	WG0A JR1BAS R-22
010300	Tx		1646	~	JR1BAS WG0A RR73
010315	-2	0.5	1366	~	WG0A JR1BAS 73

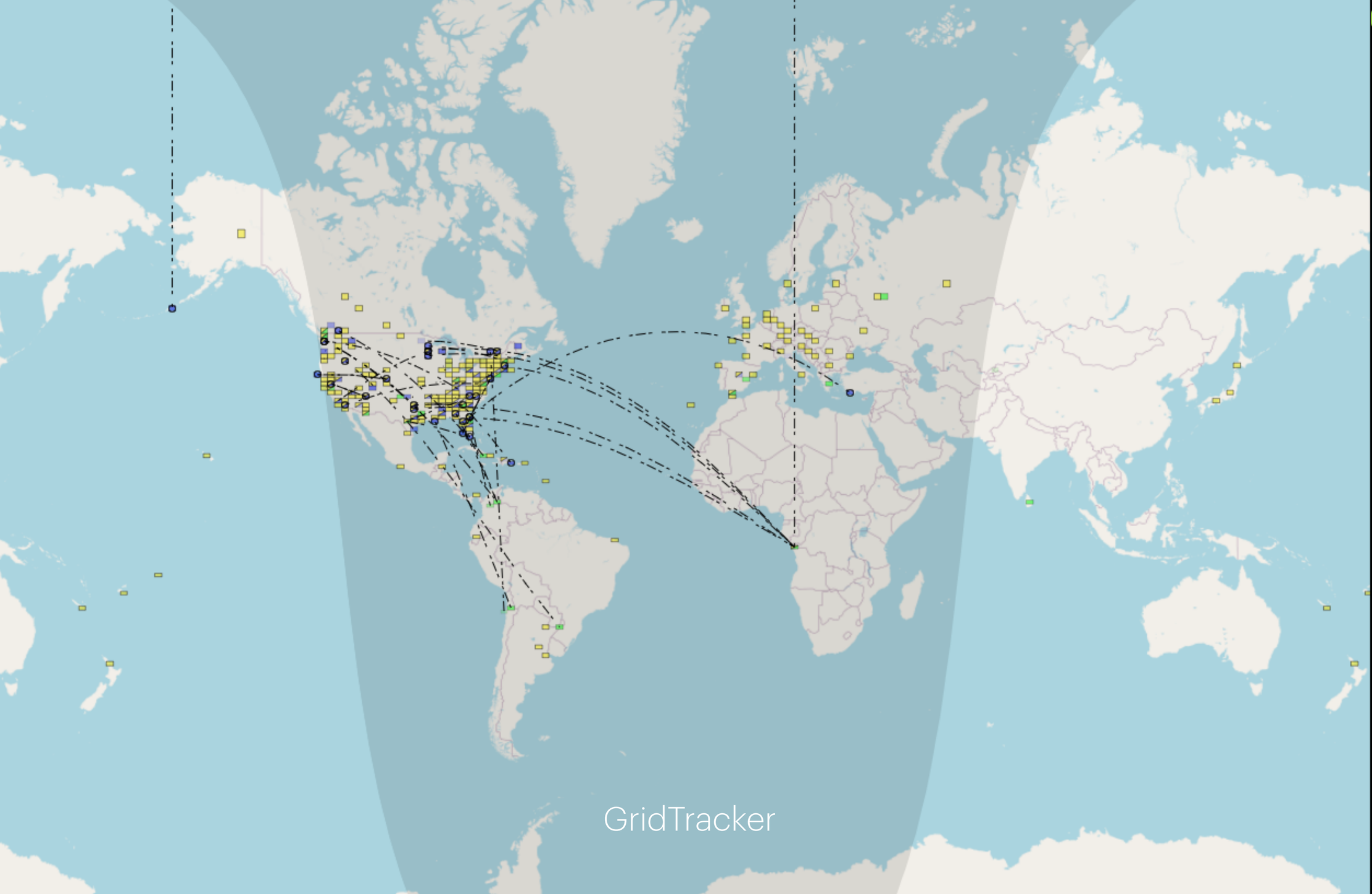
FT8 Walkthrough - Controls and Status



Add-ons

Expanding on FT8 & FT4

- WSJT-X can connect with other applications for reporting and status
  - JTAlert - https://hamapps.com/JTAlert/
    - Display heard stations and present additional detail
  - GridTracker - https://gridtracker.org/
    - Map stations and provide additional detail
- PSKReporter - Reporting for WSJT-X modes, and more
  - https://pskreporter.info/pskmap.html



RECEIVE

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

Rx Calls 237 QSO 859

Rx DXCC 27 QSL 0

Clear Live Clear Log

Map View Filters

Band Auto

Mode Auto

Prop Mixed

Data Logbook & Live

Logged to GridTracker backup

Mon 09 Oct 2023 01:31:27 UTC

WG0A HI8RMQ RR73

Mon 09 Oct 2023 01:30:59 UTC

WG0A KQ4EFL 73

Mon 09 Oct 2023 01:30:57 UTC

WG0A HI8RMQ -14

Logged to GridTracker backup

Mon 09 Oct 2023 01:30:29 UTC

WG0A KQ4EFL R-04

Logged to GridTracker backup

Mon 09 Oct 2023 01:29:29 UTC

WG0A KQ4EFL EM71

Mon 09 Oct 2023 01:29:26 UTC

WG0A WA8CAC RRR

Mon 09 Oct 2023 01:28:56 UTC

WG0A WA8CAC +01

20m / FT8

20m / FT4

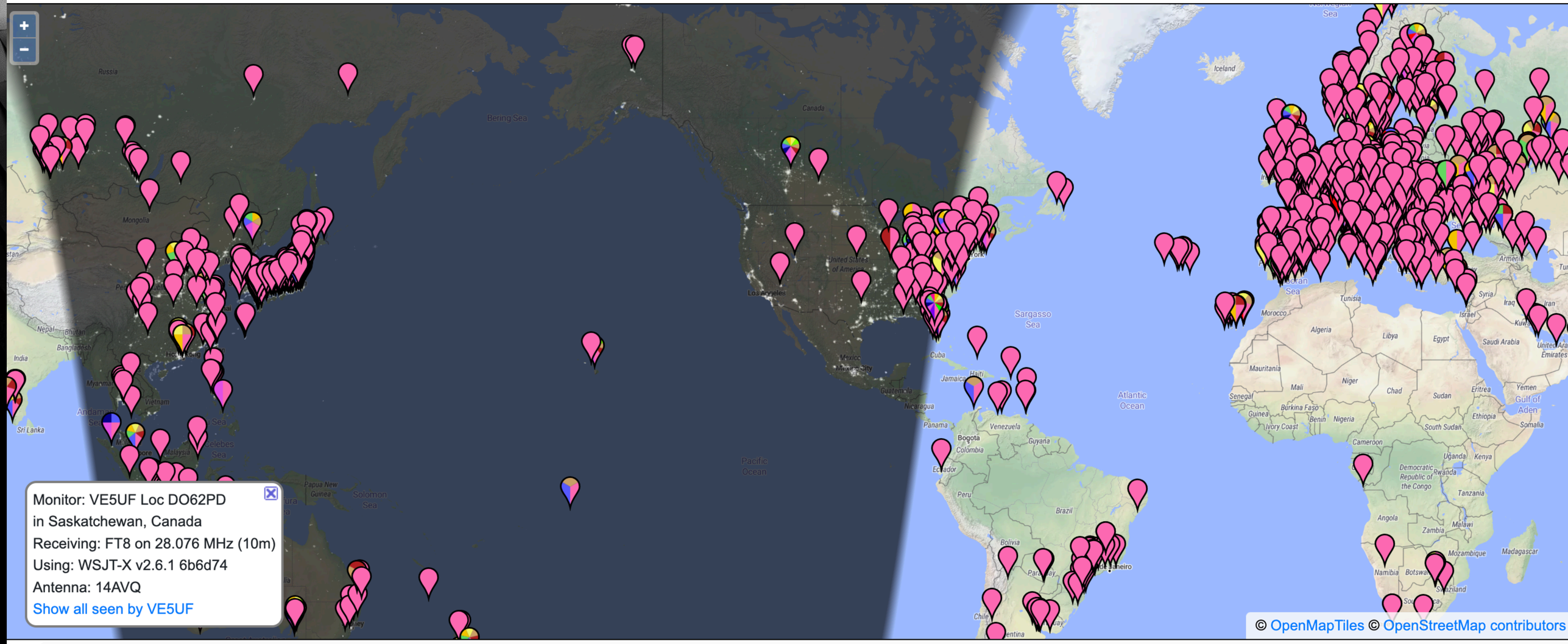
pskreporter.info/pskmap.html

Update

On 10m, show signals, sent/rcvd by, the callsign, using FT8, over the last 30 minutes, Go! Display options Permalink

Automatic refresh in 5 minutes. Large markers are monitors.

There are 2247 active FT8 monitors: 2226 on 10m, 187 on 12m, 187 on 15m, 165 on 20m, 149 on 30m, 141 on 17m, 127 on 40m, 58 on 80m, 41 on 6m, 39 on 60m, 31 on 2m, 29 on 160m, 7 on 11m, 3 on 600m, 3 on 8m, 1 on 10Ghz, 1 on 2.4Ghz, 1 on 70cm, 1 on 23cm. Show all on all bands. Legend



Statistics — Comments to Philip Gladstone — Online discussions — Reception records: 40,263,018,681 (409/sec) — Hosting by Fast Serv Networks, LLC

PSKREPORTER.INFO

APRS

What is APRS

- Automatic Packet Reporting System
  - Developed by Bob Bruninga, WB4APR, in the 80s
  - Supports Status, Beacons, Messaging, Bulletins and more
  - Based on AX.25 Packet Radio Protocol
  - APRS most commonly run on 2m at 1200 baud
    - VHF/UHF frequencies vary across the world
    - In North America 144.390 simplex is the standard APRS frequency
  - Limited activity on HF at 300 baud and UHF at 9600 baud

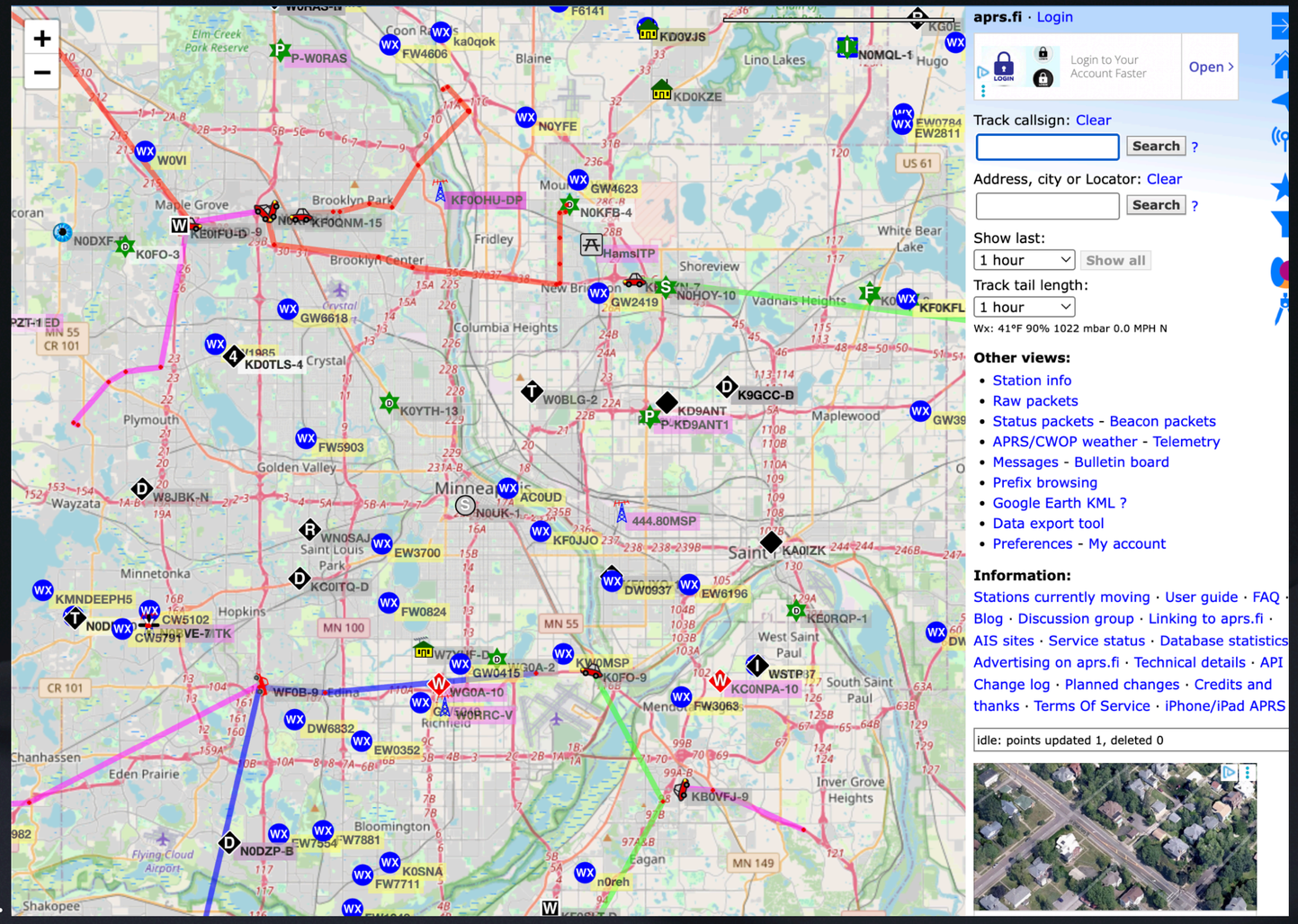
What is APRS

- Digipeaters
  - A digipeater (digital repeater) retransmits packets
  - APRS uses special formatting for digipeater addresses
    - Stations should use WIDEn-N for digipeater addressing (i.e, WIDE2-1)
      - n: 1 = fill-in-digipeater, 2 = wide coverage, 3 (uncommon) = very wide coverage
      - N: hop count - number decremented by digipeater with each hop
  - Each digipeater defines which addresses it will handle
  - Illustration of Digipeating
    - https://aprs.net.au/info/digipeaters/

What is APRS

- iGates
  - An iGate is an APRS node which can route APRS packets to/from the internet
  - Nodes configured as iGate connect to a service known as APRS-IS
    - APRS-IS (**A**utomatic **P**acket **R**eporting **S**ystem**-I**nternet **S**ervice)
    - This service is spread across a hierarchy of ~500 servers across the globe
  - Details can be found here
    - https://www.aprs-is.net/
  - An APRS packet can be routed from RF to the internet via an iGate, then to another iGate in a different location and back out over RF

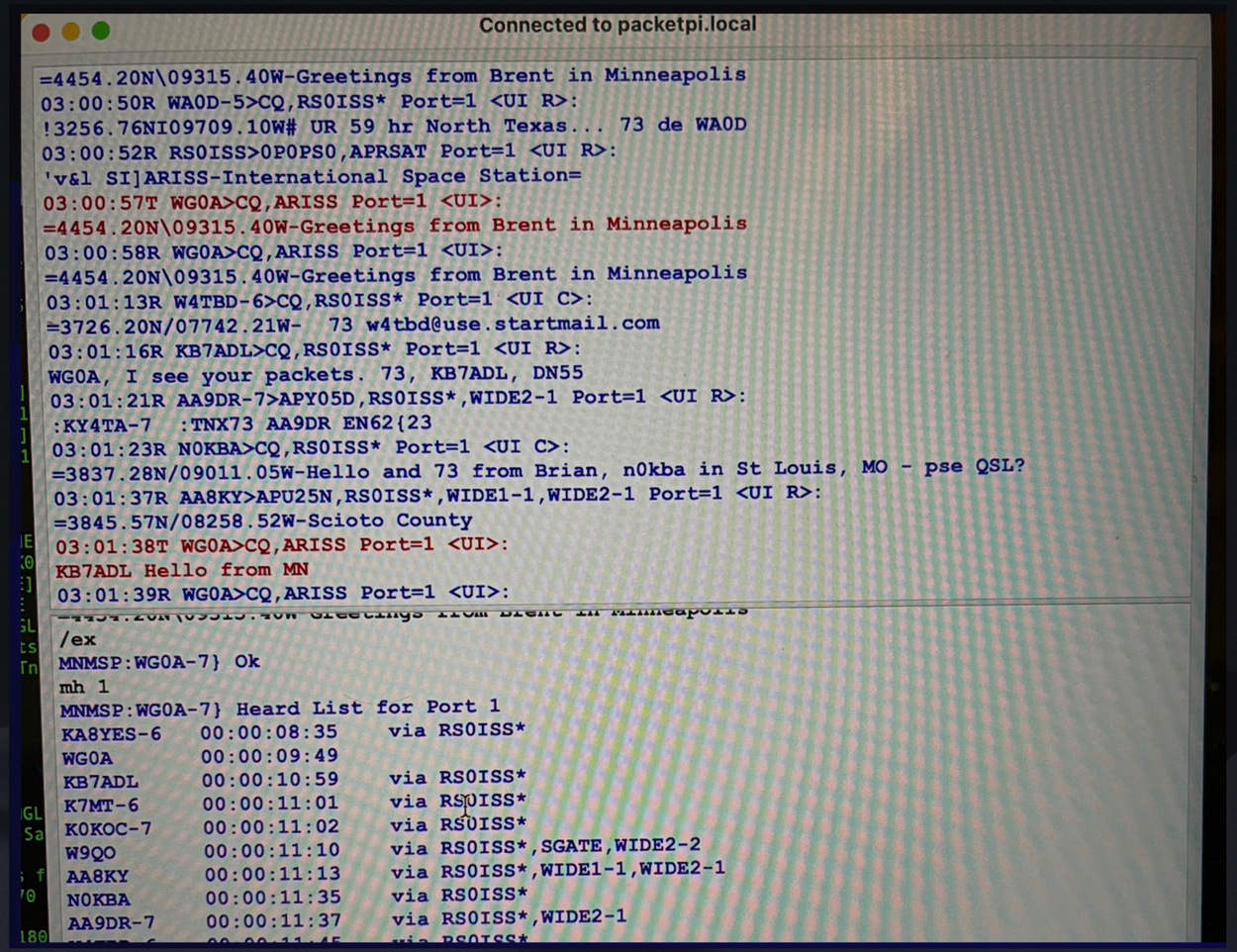
Accessing APRS data (aprs.fi)



Getting on APRS

- Many mobile and HTs include built-in APRS support
- There are a number of APRS clients for Mac, Linux and PC
  - YAAC - Java based APRS client
  - XASTIR - Mac, Linux and PC support
  - https://aprs.fi - web based APRS mapping tool
  - List of clients (in varying states of disrepair)
    - https://www.aprs-is.net/ClientSoftware.aspx

APRS and Satellites



- There are a number of satellites which carry APRS Digipeaters
  - The International Space Station also carries one
  - 145.825 MHz FM
  - ISS Digipeater Path ARISS
- During a pass, you may be able to hear other stations via the satellite
  - For more information see amsat.org and ariss.org.

Links

- WSJT-X
  - Main site: https://wsjt.sourceforge.io/wsjtx.html
  - User Forum: https://groups.io/g/wsjtgroup
- GridTracker
  - Main Site: https://gridtracker.org/
- https://hamapps.com/JTAlert/

Links

- JS8Call
  - Main Site: http://js8call.com/
  - https://groups.io/g/js8call
  - https://oh8stn.org/blog/category/js8call/
- VarAC
  - Main Site: https://www.varac-hamradio.com/
- FLDigi/FLRig
  - Main Site: http://www.w1hkj.com/

Links

- BPQ Packet Node and BBS software
  - https://www.cantab.net/users/john.wiseman/Documents/index.html
  - https://w0ne.org/wp-content/uploads/bsk-pdf-manager/2022/01/Packet-Radio-101.pdf
- Direwolf software packet modem and APRS digipeater/igate
  - https://github.com/wb2osz/direwolf
  - https://groups.io/g/direwolf
- EasyTerm and UZ7HO SoundModem
  - http://uz7.ho.ua/packetradio.htm
- Network 105 (HF Packet discussion)
  - https://groups.io/g/network105

Thank You - Questions?