Nine Band DXCC in a Covenant Restricted Neighborhood

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My DX Adventure

- Novice class license: 1980
  - CW only on small segments of 80m, 40m, 15m, 10m band
  - 250 W maximum power output

- General class license: 1985
- Similar to today's privileges

My DX Adventure – Early Days

My "little pistol station"
- Swan 350B transceiver – 50 watts out on a good day.
- Hygain 18AVT vertical – with a poor ground
- Ca. 150 feet of RG8 coax from the radio to the antenna.

I kept the ground warm in Buffalo, NY!

My total DX before leaving to go to college: 4 countries – Italy, Finland, Peru and Canada…

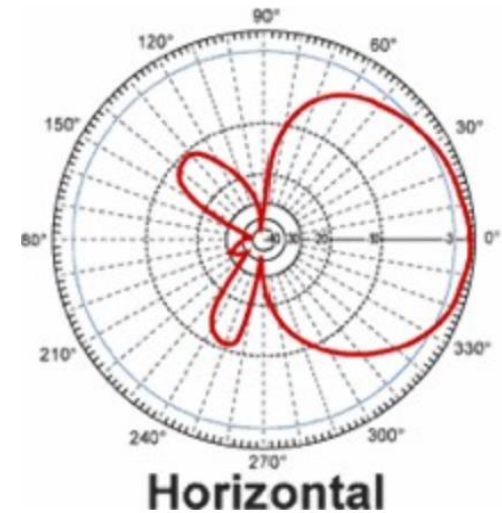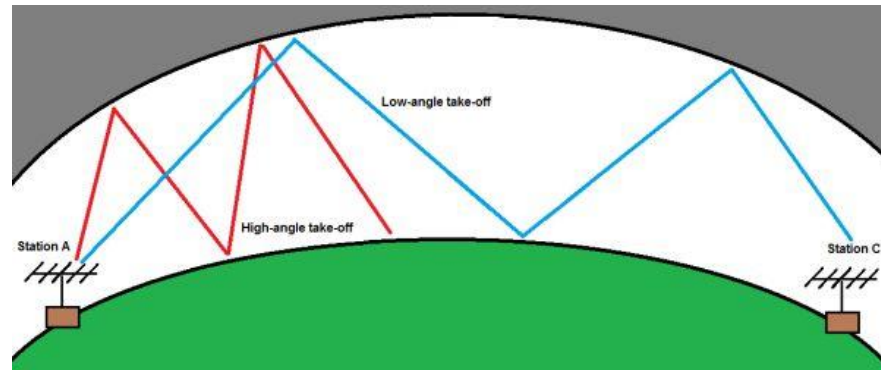# My DX Adventure – In my 20s and 30s
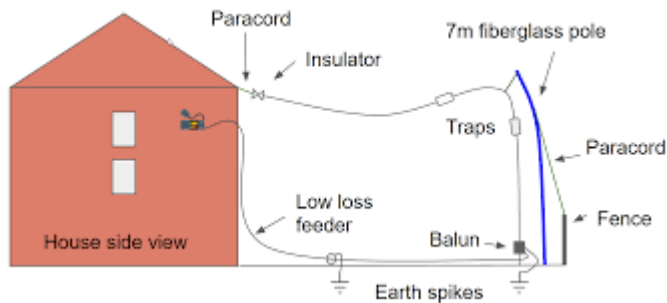
Intermediate Level Station
- Icom 706MKii
- Dipole antennas on 40m, 20m
- Inverted vee on 80m
- Full wave loop on 15m and 10m

Thanks to sunspot numbers picking up in the early 2000s, I racked up plenty of countries and QSL cards

Lessons Learned from Early Experience

(1) The most important part of your station is the antenna.

$$Antenna\ Efficiency = \frac{P_{RAD}}{P_T}\ \%$$

Aim for efficiency first
-Purely resistive impedance
-Resonant antennas

Low takeoff angle is paramount
-Horizontal antennas 1/2λ high
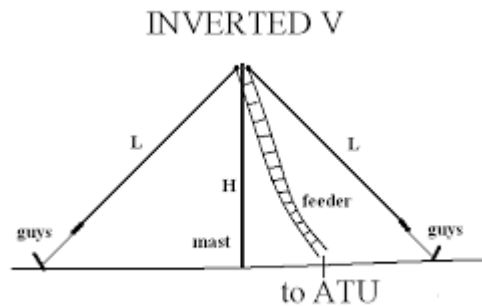-Vertical with good ground on high bands

Azimuth gain is secondary
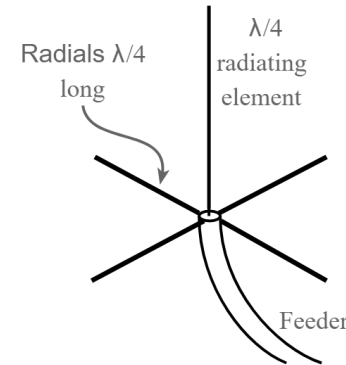-Great if you can get it, but I could not...

Good Antennas for DX

Dipole Antenna

- Inexpensive
- Trees for support
- 100% efficient
- Modest gain (2.1 dB)
- "Invisible"

- Fixed orientation
- Can be large on low bands

Inverted Vee

INVERTED V

- Inexpensive
- One tree for support
- 100% efficient
- Less space than dipole
- "Invisible"

- Omnidirectional
- Can be large on low bands

Vertical Antenna

Radials λ/4 long

λ/4 radiating element

Feeder

- Moderate price
- No supports

- Not invisible
- Omnidirectional
- Needs a good ground

Yagi or Quad

K2QMF

- Directional with good gain.

- Expensive
- Requires tower and rotor
- Not invisible

Lessons Learned from Early Experience

(2) You need a good receiver.

Modern HF transceivers all have comparable transmitters. You are paying for the receiver!
- Sensitivity – ability to pick up weak signals – important for CW and SSB
- Selectivity – ability to separate out interference – important in pileups
- Additional features are helpful – more on that later…

Attributes of a Good Receiver

- Sensitivity: Aim for units with < 0.2 uV sensitivity at 10 dB S/N
- Selectivity: DSP or crystal filters: 500 Hz for CW, 2.4 KHz for SSB / Data
- Notch filter – to cancel out those who tune up on the DX frequency
- Noise reduction – helpful to reduce operator fatigue
- Dual watch or dual receive is very important for rare DX
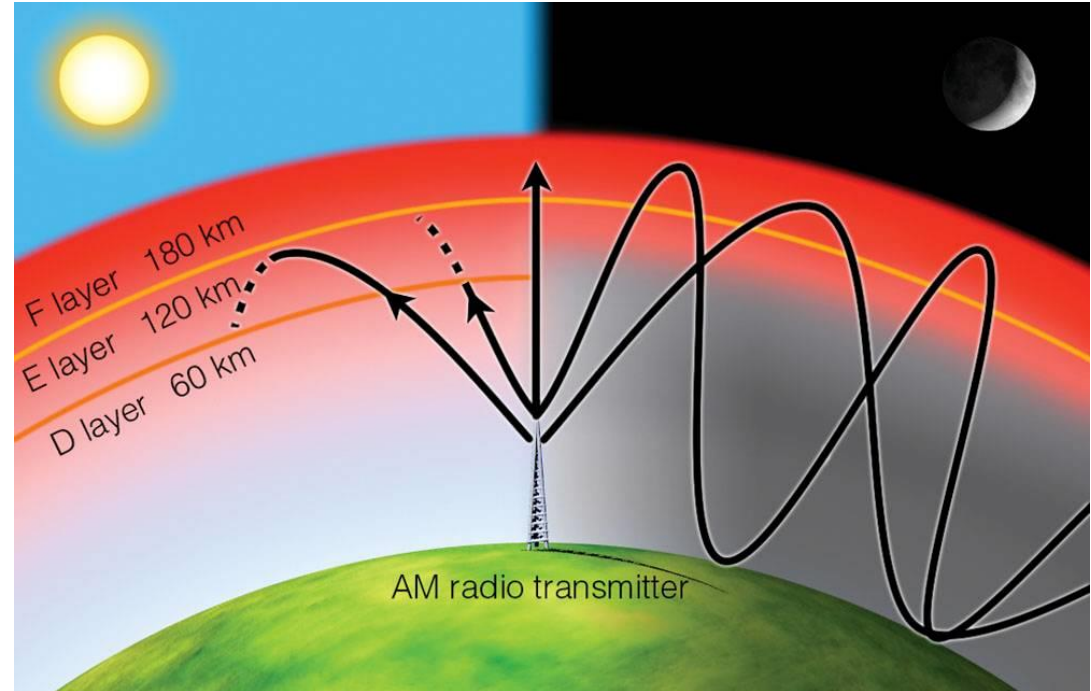
Lessons Learned from Early Experience

(3) Sunspots are very important!
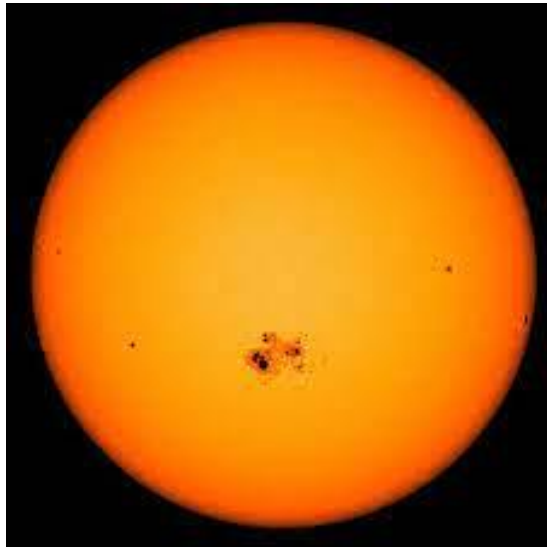
High sunspot numbers

Solar activity

F layer   180 km
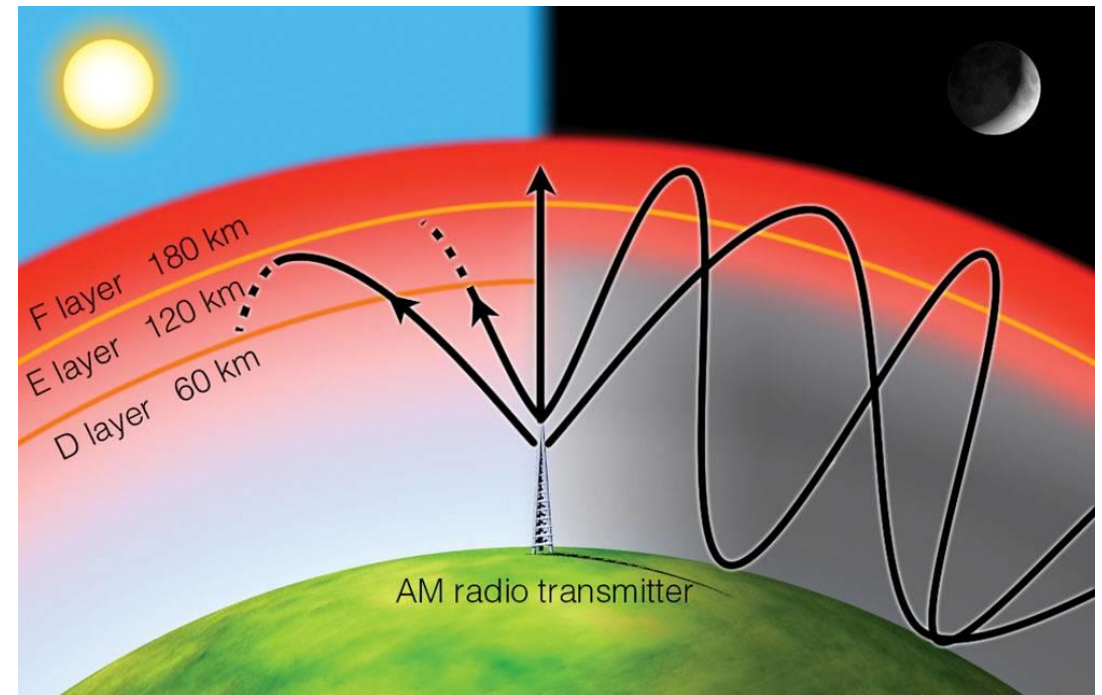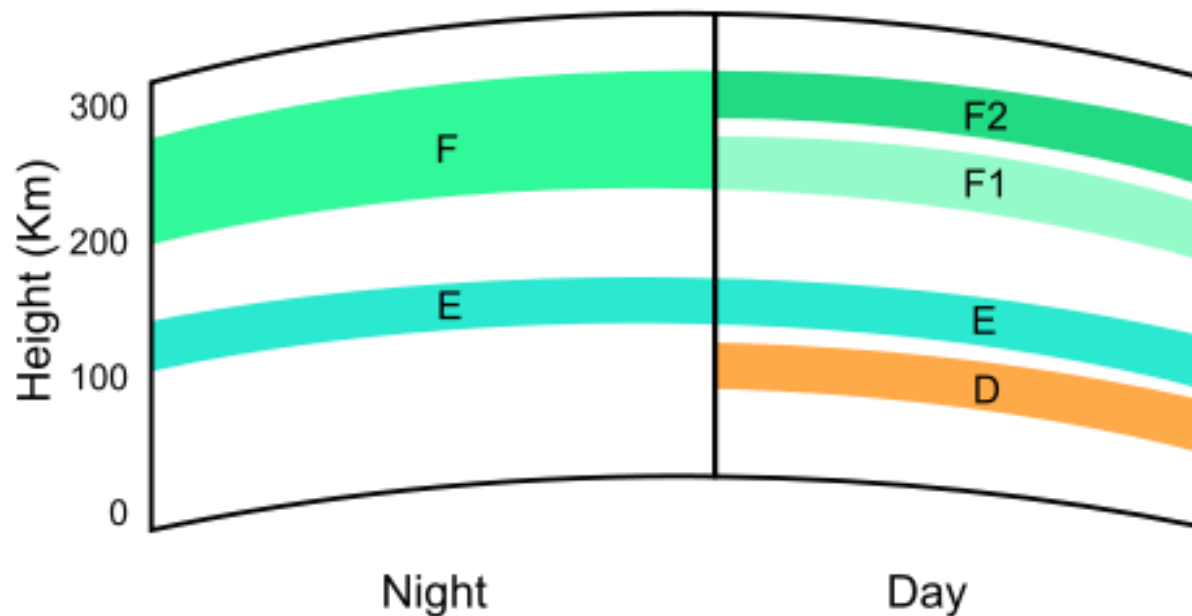E layer   120 km
D layer   60 km
AM radio transmitter
© 2007 Thomson Higher Education

Sunspot numbers raise ionization – and enable sky wave on the high bands (15m+)
- You can get by with a lesser station when the sunspot cycle is peaking

Fundamentals of Sky-Wave Propagation

5 Layers of the Ionosphere

Fundamentals of Sky-Wave Propagation

Selecting your Operating Frequency:

During the day:

- Absorption on the low bands is very high. Avoid 160m to 40m before early evening.
- Activity on 30m-17m is strong throughout the day.
- 15m-10m will be most active during daylight hours: morning to Europe and Africa; late afternoon to Asia.
- Grayline propagation enables a good path to South America at dawn and dusk.

Operating near the MUF (Maximum Usable Frequency) will maximize distance per skywave hop and minimize local interference.

Fundamentals of Sky-Wave Propagation

Selecting your Operating Frequency:

At night:
- Absorption on the low bands reduces as D-layer disappears.
- Activity on 160m to 40, increases. Target regions of the world that are dark: early evening to Europe and Africa; early morning to Asia.
- South America will be open anytime during the night hours.

Low band communication is more favorable in winter – fewer static crashes and atmospheric noise.

Lessons Learned from Early Experience

(4) A little power is helpful…
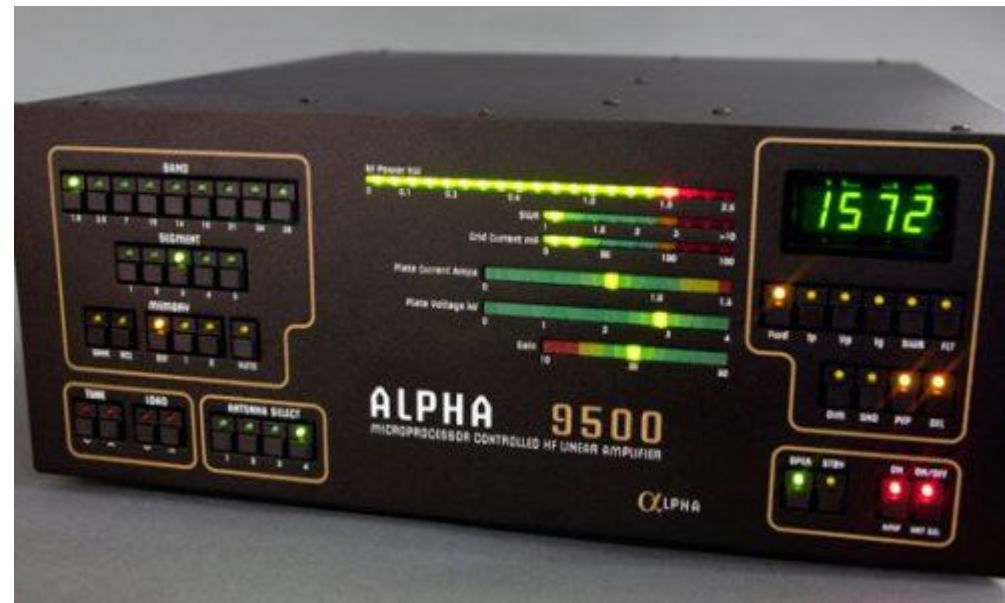
Aim for a 1 KW amplifier – this will boost your signal by 1-2 S-units.
- It doesn't sound like much, but in a pileup this amount of signal difference can be everything.
- Amplifiers do nothing on receive…

Amplifier Considerations

Tubes vs. solid state:
- Tube amplifiers require tuneup on each band (unless autotune enabled - $$$$).
    - Can match odd loads – to SWR = 3:1
    - Have continuous duty capability at full power
- Solid state amplifiers require no tuneup but need a good match to the antenna.
    - Tough to find legal limit solid state amplifiers. Most are ca. 500 W – 1 KW and cannot handle full duty cycle.

Most amplifiers will require a 220V power source for full capability.

Need RG-8 or equivalent coax to handle the power. Do NOT use RG-58 or RG-8x!

Your antenna, tuner and all connectors need to be rated for the power you are using!

Lessons Learned in my 40s and 50s

(5) Operating technique is very important – DX Code of Conduct

- I will listen, then listen, then listen again before calling.
- I will only call if I can copy the DX station properly.
- I will not trust the DX Cluster and will be sure of the DX callsign before calling.
- I will not interfere with the DX station nor with anyone calling, and I will not tune up on the DX frequency or in the QSX slot.
- I will wait for the DX station to end a contact before I call.
- I will always send my full callsign.
- I will call and then listen for a reasonable interval. I will not call continuously.
- I will not transmit when the DX station calls another callsign, not mine.
- I will not transmit when the DX station queries a callsign not like mine.
- I will not transmit when the DX station requests geographic regions other than mine.
- When the DX station calls me, I will not repeat my callsign unless I think he has copied it incorrectly.
- I will be thankful if and when I do make a contact.
- I will respect my fellow hams and conduct myself so as to earn their respect.

My First DXpedition: Palmyra Atoll

Ca. Number 5 on the DXCC most wanted list (Number 2 in EU) – This was going to be tough…

What is a DXpedition?

The South Sandwich Islands are a cold and inhospitable place. At 59 degrees south, Southern Thule Island is one of the most remote places on Earth.

What is a DXpedition?

Southern Thule is closer to the polar circle and the South Pole than either Bouvet Island or Heard Island. To get there, we will voyage the Drake Passage and brave strong winds and high seas.

The Intrepid-DX Group is proud to announce a major ham radio expedition to two rare entities in January-February 2016. South Sandwich Island and South Georgia Island are two of the most remote places on Earth. This DXpedition is made possible by the generous financial support of the global DX Community.

On January 9th, 2016 a team of fourteen Intrepid DXers will depart Stanley, the Falkland Islands on the venerable RV Braveheart and embark on a 37 day voyage encompassing South Sandwich and South Georgia Islands. Our plans have us activating South Sandwich island first as it is the #3 most wanted DXCC in Clublog. We will be active on South Sandwich for eight full days, weather and sea conditions permitting. We expect to start our activation of VP8STI on January 17th.

Our total budget for this DXpedition is $425,000 much of which is being provided by the fourteen team members. We invite all Foundation, Club and individual donations via our Donate page.

How to Properly Work a Pileup

First, determine what is going on. Is the DX Station working "Split"
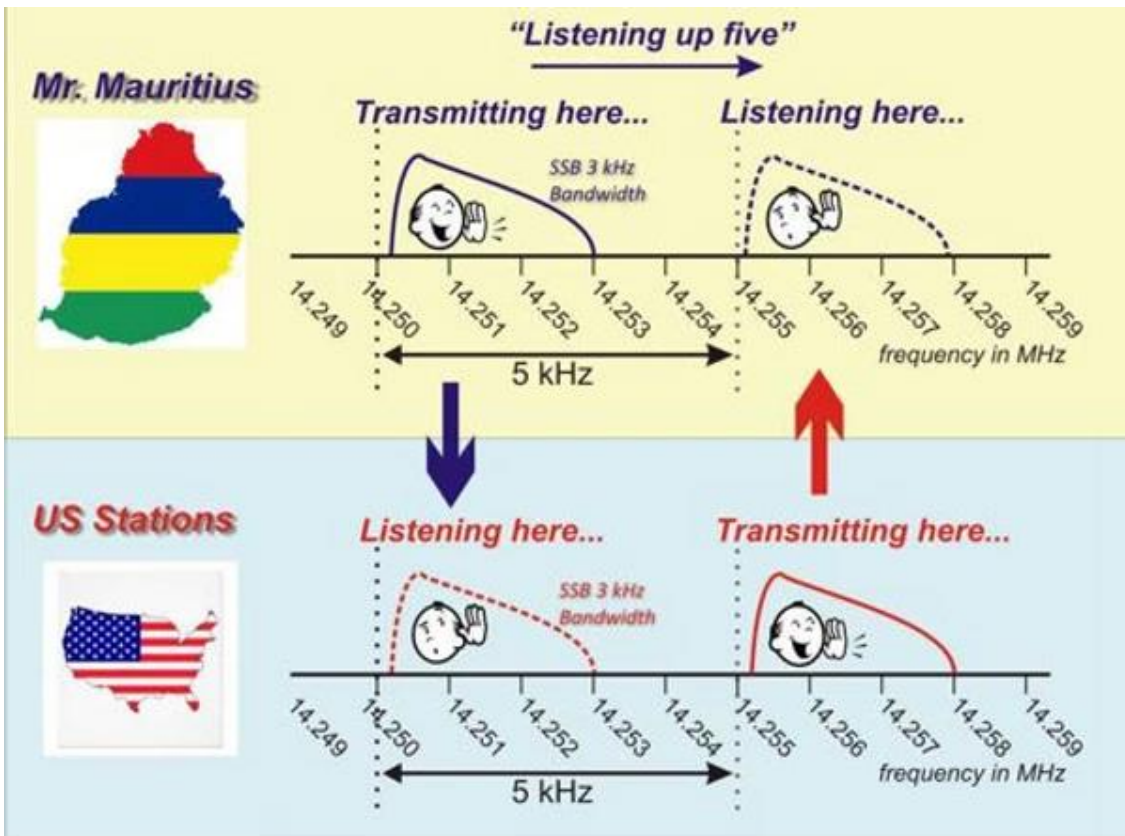
Split operation: DX is transmitting on one frequency and listening on another.

Enables everyone to hear the DX regardless of what is happening in the pileup.

You need to know where the DX is listening. Did they tell you?

How to Properly Work a Pileup

DX is working split – What do I do?

First thing: Turn on the "Split" function on your radio. Then set the sub-band and mode for where you intend to transmit.

Second thing: LISTEN. Did the DX tell you where they were listening?
- VP8THU QRZ up: He is listening up and won't tell you where… You need to find out.
- VP8THU QRZ up 1: He is listening up 1 KHz. Tune your transmitter up 1 relative to the receiver.
- VP8THU QRZ up 1 to 5: He is listening up 1 to 5 KHz… You need to find out where.

How to Properly Work a Pileup

DX is working split but did not tell me where.

Turn on the "Dual Watch" function on your receiver. Set the tuning knob to control the sub-band (unless you have a 2nd tuning knob). If you can independently receive on 2 frequencies, turn the filters OFF on the sub-band. Adjust the sub-band volume to a comfortable level.

LISTEN. As soon as the DX calls a specific station:

- Scan the sub-band to find the station calling the DX. Their transmission will be short.
- Stop when you find that station. Wait for the DX to call QRZ again, and then proceed with your call.

How to Properly Work a Pileup

A Typical Rare DX QSO (phone)

- DX: VP8THU QRZ up
- Me: Kilo Echo One India Uniform… Kilo Echo One India Uniform
- DX: India Uniform
- Me: Kilo Echo One India Uniform 59 in CT Charlie Tango.
- DX: Kilo Echo One India Uniform 59. Thank You. QRZ.

It's short and sweet. Everyone is 59 – even if you are barely heard. The idea is to get in the log and get out of the way as quickly as possible. Hundreds of people are waiting….

How to Properly Work a Pileup

A Typical Rare DX QSO (CW or RTTY)

- DX: VP8THU up
- Me: KE1IU KE1IU
- DX: KE1IU 599
- Me: KE1IU 599 TU
- DX: VP8THU QRZ

He is ready for your call when he puts out his call, followed by "up" – or when he sends TU after the other person's call.

It's short and sweet. Everyone is 599 – even if you are barely heard. The idea is to get in the log and get out of the way as quickly as possible. Hundreds of people are waiting….

Special Operating Circumstances

Calling by numbers
DX: "VP8THU looking for Number 4" – Do not call unless you have a number 4 in your callsign!

Calling by regions
DX: "VP8THU EU" or "VP8THU Europe Only" – Do not call unless you are in Europe! EU = Europe, NA = North America, SA = South America, AS = Asia, AF = Africa, OC = Oceania

Calling by letters
DX: "India Uniform" – Do not call unless these letters are in your callsign. He is trying to pull out a specific station from the pileup.

If you call out of turn, you may get "Blacklisted"

FT8 – Pretty Cool for DX

Advantages of FT8:

▶ Automated – You can multitask while working DX.

▶ Multiple streams – DX can work several people simultaneously.

▶ Excellent weak signal performance.

▶ Direct interface with your radio and your logging software.
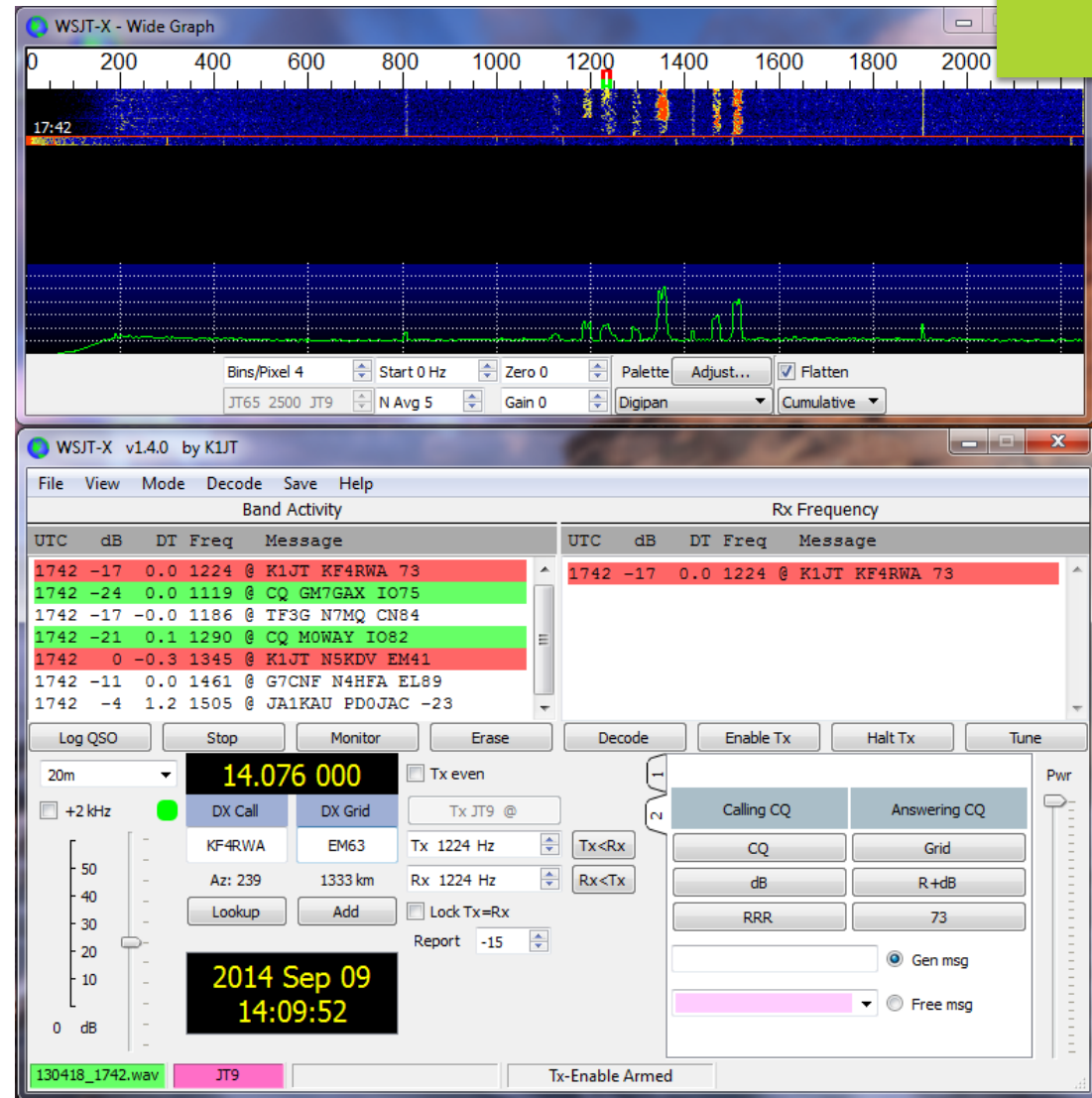
Setting up WSJT for DXPeditions
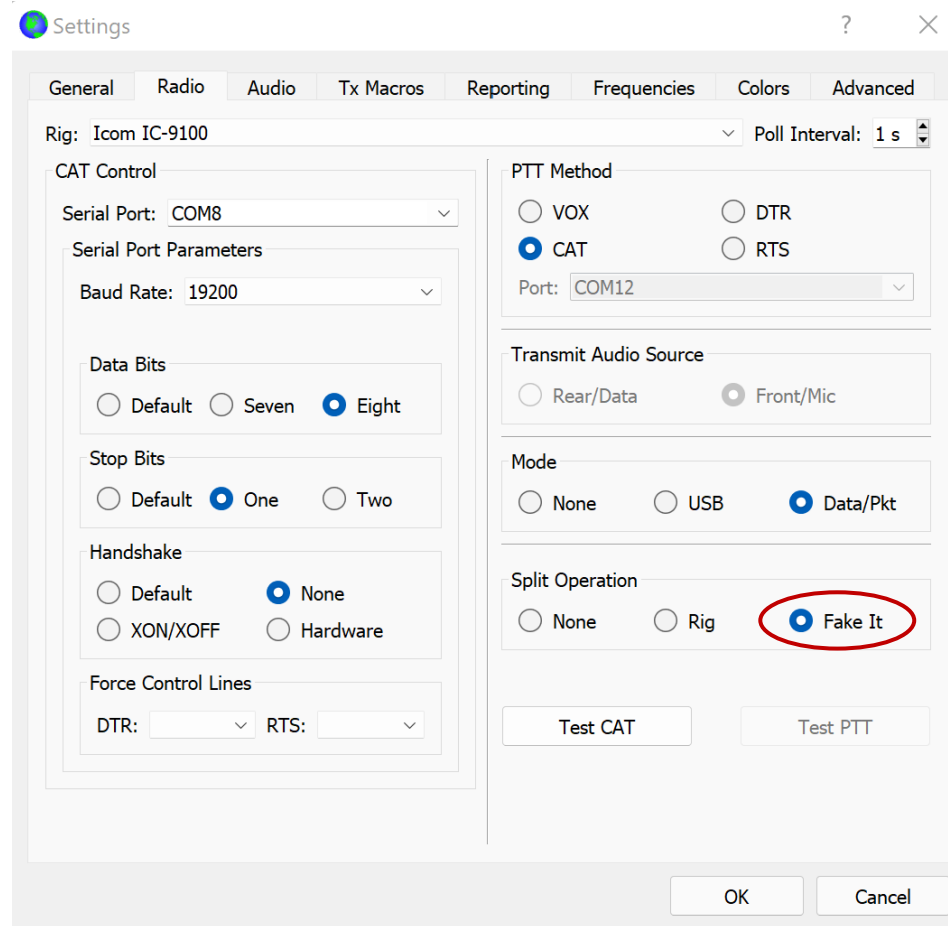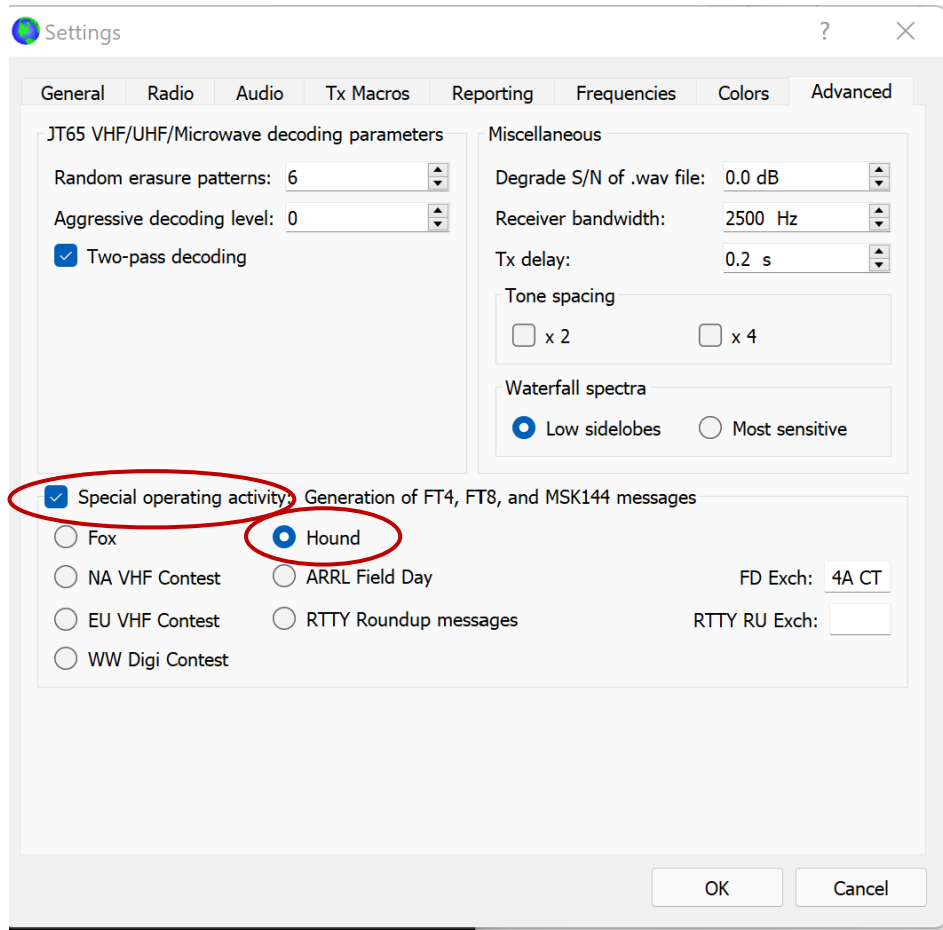
What is Fox-Hound Mode Like?

DX will call here and stay here.

You call anywhere here.
- Upon initiating QSO, you will automatically be moved to the DX area
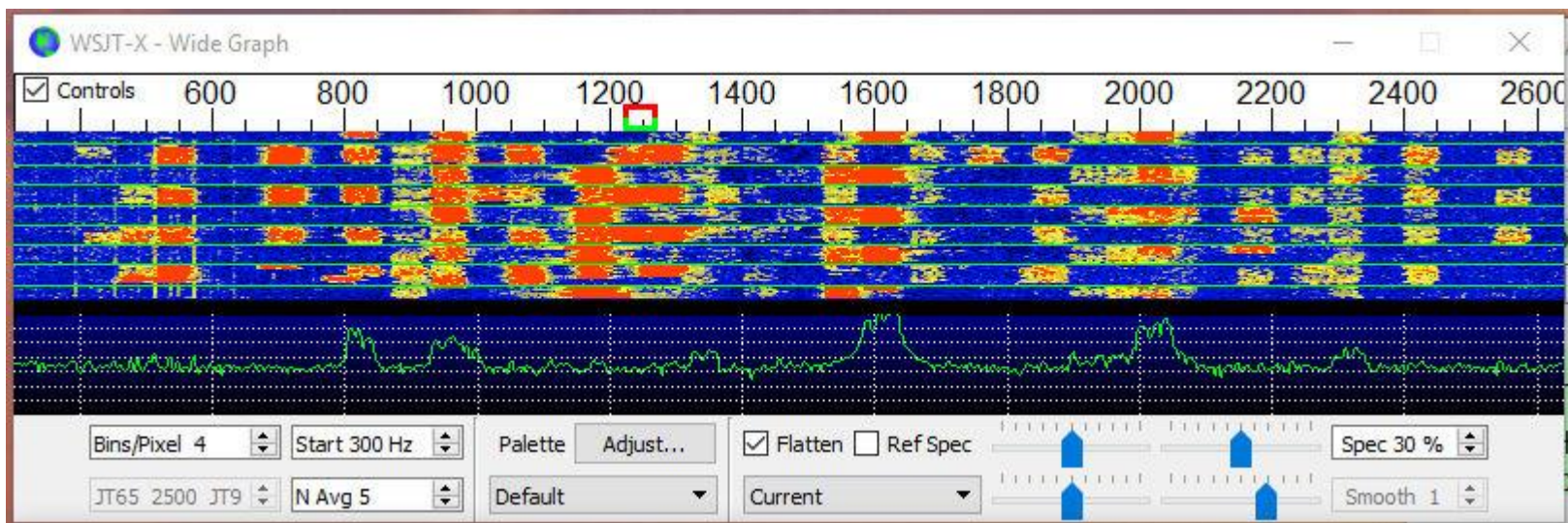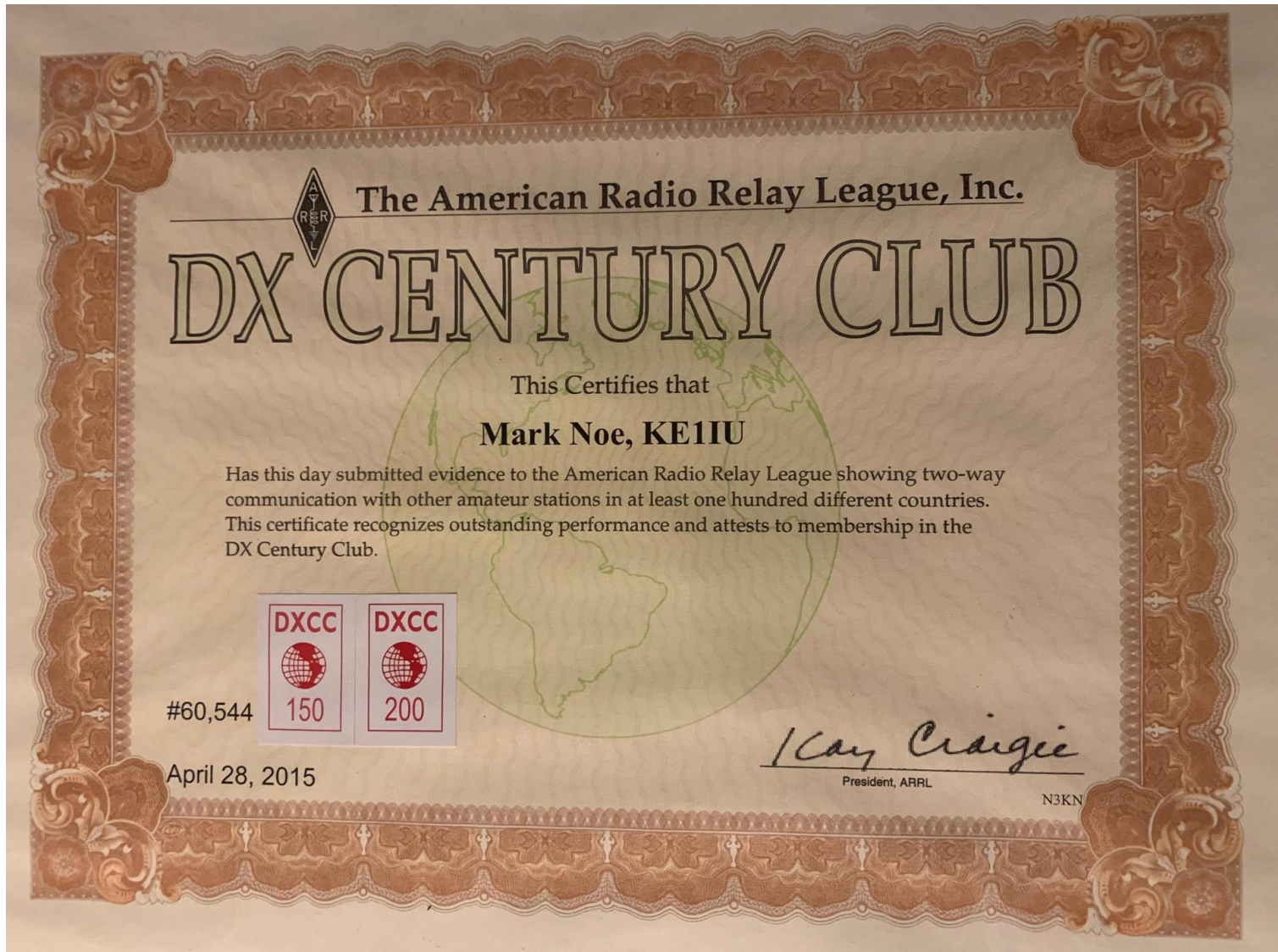
Awarded for 100 "Countries" in various permutations

Awarded for 1000 "Band-countries"

Paper Chasing – DXCC Challenge

What is a "Country" for DXCC

- A unique political entity. What we might think of as a country (e.g. Canada vs. United States"
- A geographic separation entity – by more than 100 Km on land or 350 Km on water. Examples: Alaska vs. Hawaii vs. Mainland USA.
- Special Areas – such as the Spratly Islands or Western Sahara – where sovereignty issues are present.
- Other Recognized Areas – UN Headquarters, Vatican, etc.

What Counts as a Confirmed Contact

- Paper QSL Card – Needs to be verified by an ARRL Sanctioned Card Checker. Note that 16om DXCC has its own special approved checkers.

- Electronic QSL record – Only ARRL LOTW QSL records are recognized. Sign up for an account at lotw.arrl.org

  - Most DX uses LOTW these days. DXpeditions will take longer.

Finding DX – Use the Clusters!

Hello! *Please* **log in** *or* **register** *if you are a new visitor.*

show/hide my last filters

band: 160m

cancel filter selection / send a spot / search spot by callsign

rows to show: [15 ∨]

de	dx	freq	obs	time
OK1CF	🇺🇸 K0RF	1827.5	[LoTW] CQ Loooud!	0257z 12 Jan
K0RF	🇨🇿 OK1CF	1825.8	[LoTW] CW	0255z 12 Jan
VA3EBM	🇺🇸 NJ9Y	1840.4	[LoTW] FN03EK<>EN52 FT8	0249z 12 Jan
OK1CF	🇨🇦 VE6WZ	1828.6	[LoTW] CQ Loud tonite	0249z 12 Jan
N1PGA	🇨🇿 OK1CF	1825.9	[LoTW] Tnx QSO Karel - gd signal tonight	0249z 12 Jan
VE6WZ	🇨🇿 OK1CF	1825.8	[LoTW]	0244z 12 Jan
CT1JQC	🇪🇸 EA7JZ	1848	[LoTW] LSB CQing	0230z 12 Jan
W3LPL	🇲🇽 XE1CCB	1821	[LoTW] Heard in KY and AZ	0220z 12 Jan
VA3EBM	🇺🇸 KA9TOX	1840.4	[LoTW] FN03EK<>EN40 FT8	0147z 12 Jan
VA3EBM	🇺🇸 K4SAF	1840.4	[LoTW] FN03EK<>EM88 FT8	0145z 12 Jan
VA3EBM	🇺🇸 K2NYG	1840.4	[LoTW] FN03EK<>FN30 FT8	0139z 12 Jan
WA2VJL	🇺🇸 W4AW	1840	[LoTW] EL16ED<>EM56UR	0024z 12 Jan
SV3SPC	🇧🇪 ON75HCC	1841.1	TU ft8 qso	2344z 11 Jan
GM1BAN	🇬🇬 GU8FBO	1840	[EU-114] FT8 -07dB 1547Hz	2322z 11 Jan
SM5ATP	🇮🇹 II7WRTC	1832.9		2308z 11 Jan

Dxwatch.com is my favorite!

Other Helpful Software

Win4Icom
- For certain Icom radios only
- ClubLog spotting window interfaces with LOTW to show you only the "new ones"
- Click on the call sign – the radio is "automatically" set up for the QSO.

Other Helpful Software

JTAlert
- Interfaces with your radio and WSJT
- Shows you all the new stations calling or present on FT8
- Click the station, and the radio is all set up to make the QSO
- Use with Log4OM – it's all free, and it's easy to log and interface with ARRL LOTW.

Closing Thoughts

DXCC Award	New LoTW QSLs	LoTW QSLs in Process	DXCC Credits Awarded	Total (All)	Total (Current)
Mixed *	9	0	230	239	239
CW *	13	0	179	192	192
Phone *	8	0	150	158	158
Digital *	16	0	164	180	180
Satellite	2	0	0	2	2
160M *	3	0	103	106	106
80M *	9	0	117	126	126
40M *	11	0	156	167	167
30M *	7	0	121	128	128
20M *	20	0	167	187	187
17M *	21	0	113	134	134
15M *	11	0	136	147	147
12M *	4	0	100	104	104
10M *	2	0	100	102	102
6M	0	0	1	1	1
2M	1	0	0	1	1
Challenge *	88	0	1114	---	1202

* = Award has been issued

You too can do this! What does it take?

- Interest
- Building your skill at DXing – particularly for expeditions
- A solid station - rig, amplifier, antenna
- The right tools – FT8, spotting software
- Software that interfaces with your radio and avoides "dupes" is a big help.