

Planning Station Improvements

ADDXA

**Albuquerque DX
Association**

Bill, K8TE

<http://groups.yahoo.com/group/adxa/>

Planning Station Improvements

Bill Mader, K8TE

Albuquerque DX Association

Rio Rancho NM

K8TE@ARRL.net

Why Plan?

- Every Goal Requires Planning
- Goal's Importance = Planning's Importance
- Planning Requires Analysis
- Analysis Uncovers Roadblocks
- Knowing the Roadblocks Provides the "Map"
- PPPPPPP (7)(British Military "Coarse" Term)

The 7 P's of Planning

- Proper
 - Planning and
 - Practice
 - Prevents
 - Piss
 - Poor
 - Performance
- Where Are You Now?
 - Where Are You Headed
 - Determine Your Path

Why Improve My Station?

- More Contacts
- Easier Contacts
- Work More/New DX
- Improve My Skills
- Have More Fun

Today's Agenda

- Easy is Good—if you OPERATE!
- Where to Start—Antennas First!
- Best Bang for the Buck
- Budgeting is Important (to me)
- Freebies—or “A Ham’s Dream”
- Measuring Improvements (RBN)

The Big Gun



The Rest of Us



Easy is Good

- Towers, Beams, Rotors—Not Easy!
- Towers, Beams, Rotors—Not Cheap!
- Wire Dipoles—Easy, Cheap, “Unobtrusive”
- Inverted L—Easy, Cheap, even “Invisible”
- Use Available Skyhooks First
- Think It Out First
- Go for Longevity and Future Improvements

Basic Station—Easy

- Radio for Bands/Modes of Interest
 - Technicians: Several VHF contests
 - All Mode 6 and 2 Meter transceivers
 - You don't need a high-end transceiver
- Antenna—Just One Band
- Logging – Paper and Pencil??
- “Start With What You Have”
from Yankee Clipper Contest Club WA1Z

Where to Start?

- What Doesn't Work for YOU?
- What is YOUR Operating Style?
- What do YOU Enjoy the Most?
- What to Do Next?

What Doesn't Work?

- Can't Break the Pileups
- Can't Hear Me on 75 Meters
- Can't Hear Weak DX/Others
- Don't Know My DXCC Status
- Can't Find My Log/QSO's
- Can't Contact My Buddy in ...

Best Bang for the Buck \$\$

- Antenna, Antenna, Antenna
- 2nd Antenna
- 3rd Antenna
- Higher
- Bigger
- Better

Practical Example at K8TE

- Multi-Band Dipoles
- Right Angles to Each
- Average 35 ft. High
- OCF 80-10
- Fan 40/20/10
- KAT500 Auto-Tuned
- 272/233 DXCC Entities Worked/Confirmed in the Last 4 Years
- 1,311 Band-Slots

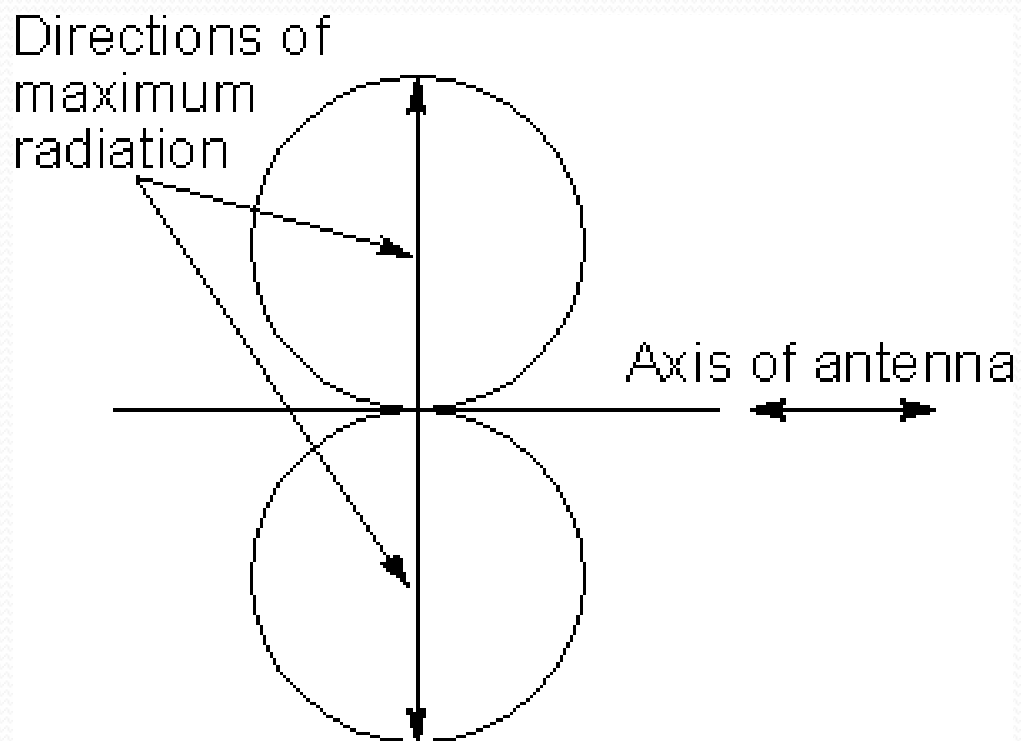


Wire Antennas Work (CHEAP)

- Resonant Dipoles
- Shoot for Half Wavelength High
- Fan Dipoles Effective Too
Limit to 2 or 3 Per Feedline
Interaction Among Them
- Use BALUNs/Current Chokes
Maintain Balance
Reduce Noise Pick-up
Cuts Static Discharge (Dust and Snow)

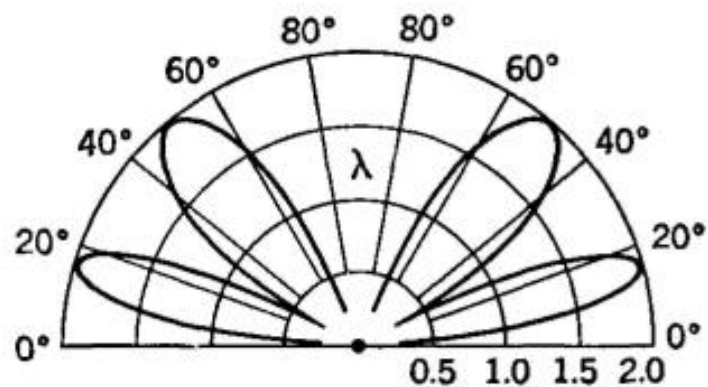
Dissecting the Dipole

- Bi-Directional
- At $\frac{1}{2}$ Wavelength Height
- Nulls Off Ends
- Omnidirectional at Low Heights

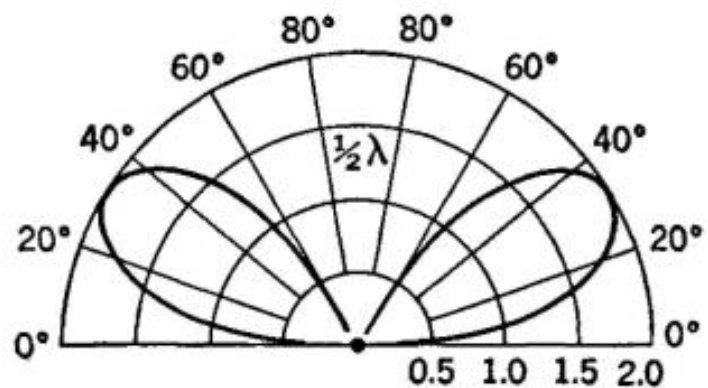


Height Matters!

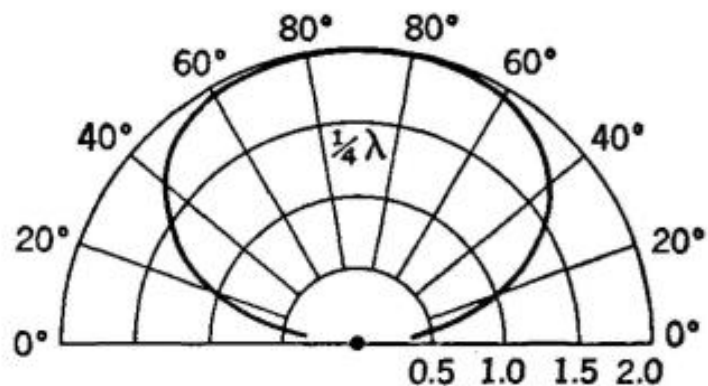
1λ High and Low #1



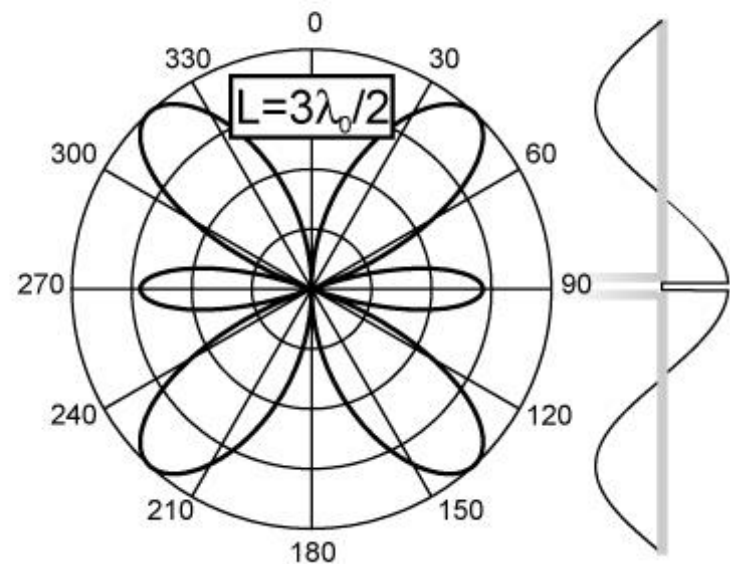
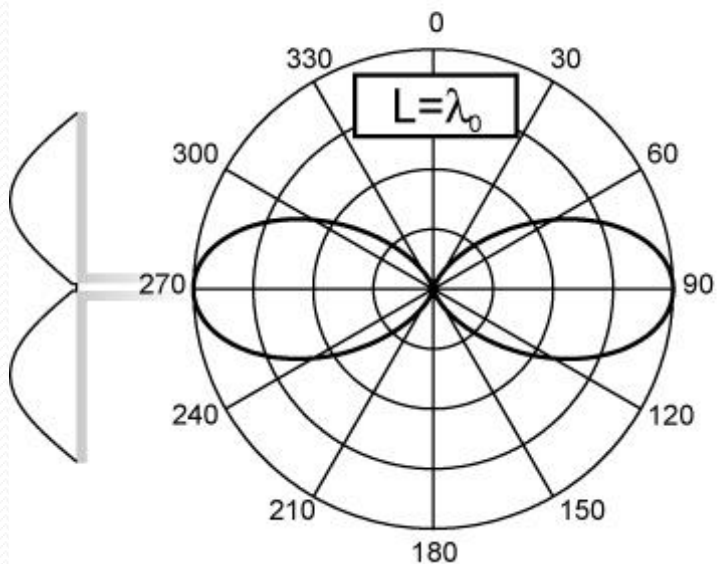
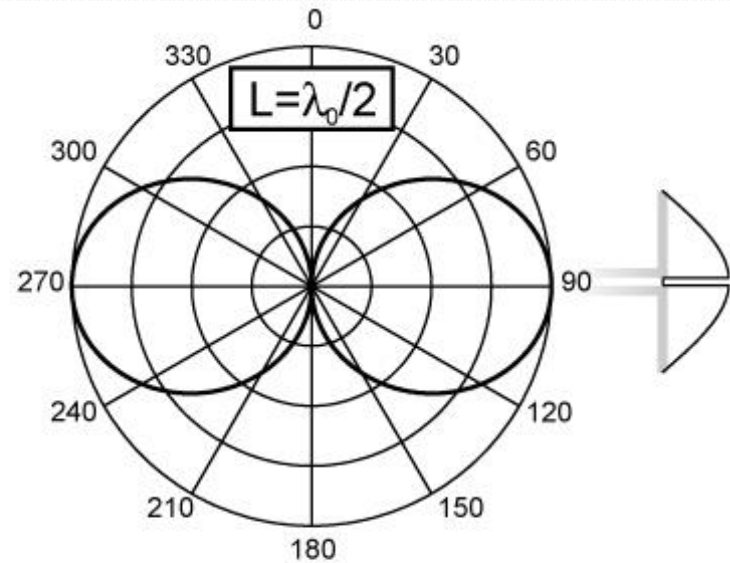
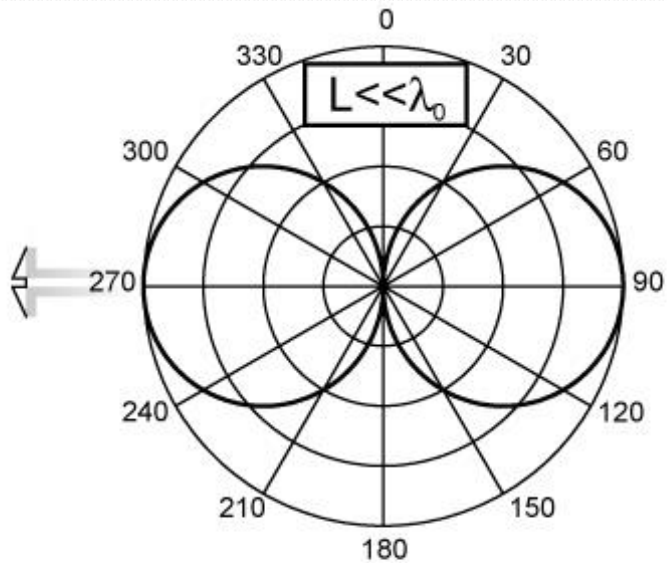
$\frac{1}{2} \lambda$ Getting Better #2



$\frac{1}{4} \lambda$ Cloud Burner #3



Develop Deep Nulls



Antennas' Effectiveness Factors

- Horizontal vs. Vertical Take-Off Angle
(Higher Angles vs. Lower Angles for DX?)
- Height Above “Ground”
- Noise—Shack, Home, Neighbors
- Separate Receive Antenna(s)
- Bigger IS Better
Higher, Longer, More Elements
- Consider Cost vs. Return

K8TE Current Antenna Farm

- 35 ft. TV Mast
- Off Center Fed (OCF) 80m Dipole
- 40/20/10 Fan Dipoles
- Cushcraft R8 Vertical
- Cushcraft 10M 3L Beam
- M2 6M Squalo
- Pixel Receiving Loop

K8TE Antenna Upgrades (not cheap)

- **Tower 1** 60 ft. 25G
Cushcraft A4 with 40m
6m/2m Horizontal Beams
2m/70cm Vertical Beams
2m/70cm Omni for Fixed Station
- **Tower 2** 60 ft. 45G Fold-Over
Hy-Gain TH6-DXX or Wilson SY6
Cushcraft D3W 12-17-30m Dipole
- **Tower 3** 40 ft. HBX
1.25m Omni for Repeater
70cm Omni for Repeater

Verticals Can Work—But!

K5RHD's
SteppIR
BigIR
Vertical

Key—
Many, Many
RADIALS!



K5RHD Radial Field

Dozens and
Dozens and
Dozens and
...



My Cushcraft R8

- Roof-Mounted on Garage
- No Nearby Objects to Absorb RF/Distort Pattern
- No Radials Required
- Provides Low Angle—Occasionally Better

For Your $\frac{1}{4}$ Wavelength Vertical:

- Elevated, Resonant Radials -Improved Functionality
- Cut 2 and Tune Each Pair as a Dipole
- Move Away from Metallic Structures Like Towers/Masts

If You Can't Hear 'Em...

Pixel RX Only Loop
Makes many 40/80
Meters QSO's Possible

RESULTS:

133/105 DXCC

Worked/

Confirmed

In 2 Years!

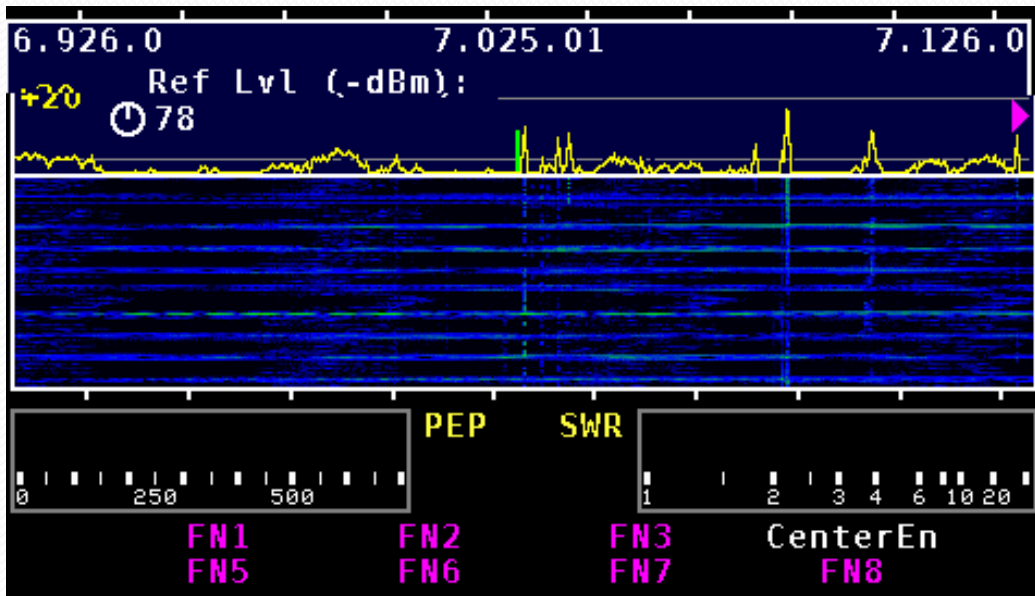
NOTE: Add Clip-on

Ferrites at Preamp

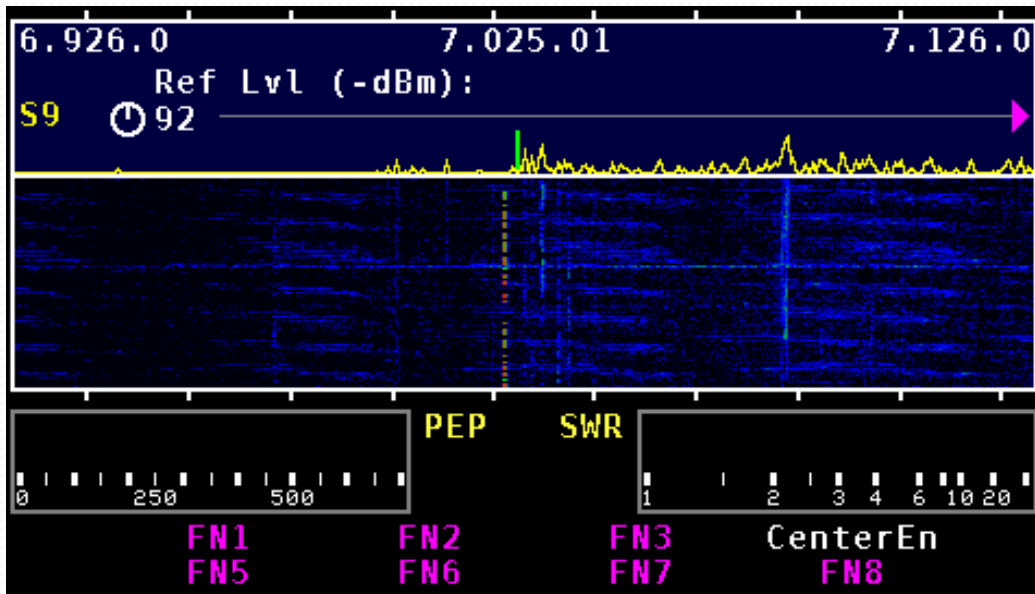
Output!



40m
Dipole



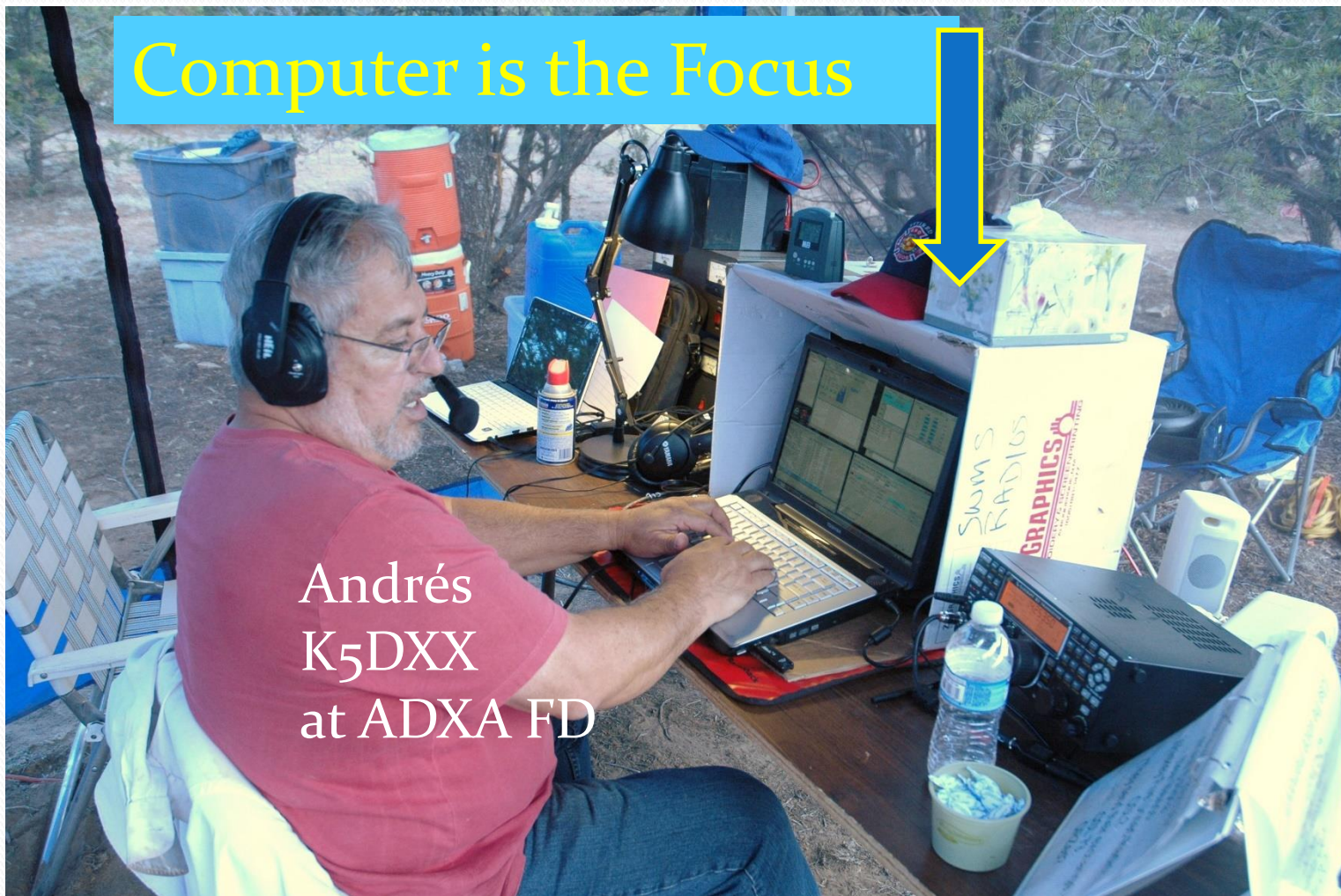
RX
Loop



Do Not Duplicate!



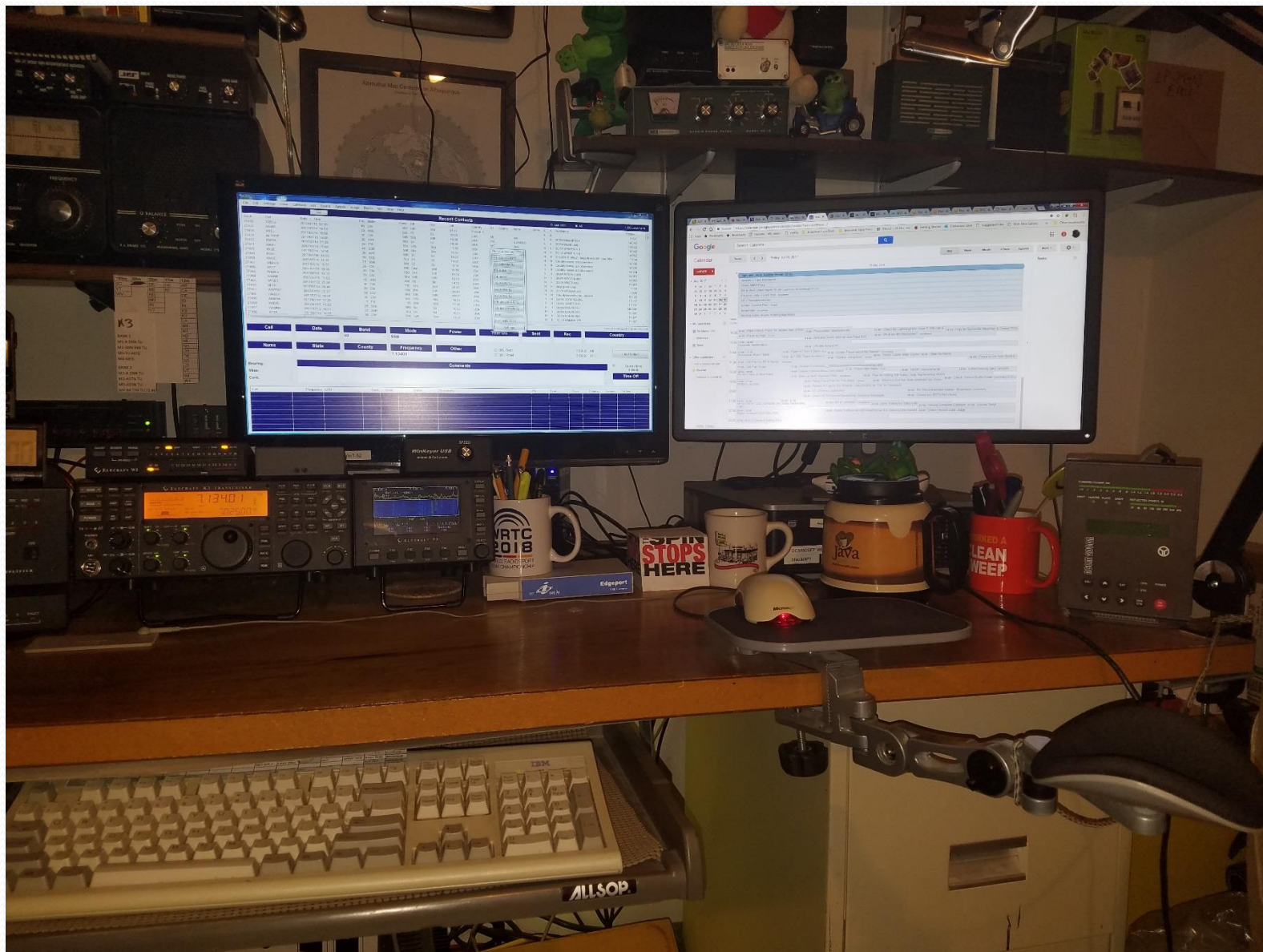
“Proper” (FD) Station Setup



K8TE Command Post

- Very “Simple” to Operate
- Fully Integrated K3/KPA500/KAT500
- Multiple Antennas Choices
- SSB & CW Ready
- DX Cluster via VE7CC
- Very Cheap Operating “Desk”

Inside Picture—Right



Inside Picture—Left



ESD Discharge Pad!

Points Worth Mentioning

- Monitors at Eye Level—No Neck Strain!
- Arm Rest for Mouse Use (Broken Wrist)
Rarely-Used Mouse—Touch Typing/Function Keys
- Room for 2nd K3/KPA500/KAT500 for SO2R
- Frequently Used Control Within Easy Reach
- Headset Easy to Quickly Grab and Use
- Item to Headset's Right is Cup Holder
NO OPEN Drinks on Table! Coffee Mug is Closed Top
- Full-Sized Keyboard Much Better than Typical Laptop

After Antennas?

- How Well do you Know Your Rig?
- RTFM—Spread Out the Reading
- Start with Page 1
- Review Features List—Practice Using
- Line Up Features with YOUR Operating
- “Can a Feature Solve a Problem I Have?”
- Other Helpful Sources?

Download PDF of Each Manual

- Make Notes Adobe Acrobat Reader
- Highlight Text
- Look for and Download Latest Version
- Move Notes Not in New Version
- Remember Firmware Updates! Usually Free!
- Include User Group Notes/Ideas
- PDF Easily Searched (CTRL+F)
- Copy to Laptop for Portable Use

Not in Original Manual K3 Example

Line-level isolated TX/RX audio interface (stereo outputs); front (1/4") and rear (1/8") stereo headphone jacks; stereo **speaker jack**.

Transmit, 0 dBm typ.; BNC input connector (KXV2 optional module, KXV2-A (updated KXV3) includes connector)

BNC connector (KXV3 Optic

Key/Keyer/**Computer**, Paddle binary interface and AUXBU

Accuracy: Approx. +/- 20 pp

Battery: 3 V coin cell (see pg

Bill

EXTERNAL SPEAKER JACK CAUTION: This jack is stereo. If you use a mono speaker plug, turn off the right channel amplifier by setting the `CONFIG:SPKRS` menu entry to 1. This will eliminate the possibility of damaging the right-channel amplifier. (You will still hear stereo when using

13.8 V nominal (11 V min, 15 V max). 17-22 A typical in TX for K3/100, 3-4 A

Radios' Features vs. Problems

- Always Begin with Listening!
- QRM—Passband Tuning
IF Shift/Passband
Narrow for Eliminating QRM
Wide for Best SSB Audio
Wide for Most CW Signals
- Noise Blanker—Impulse Noise
Creates Distortion on Strong Signals
Test Variable Settings for Your QTH

Radios' Features vs. Problems

- Problem—Bad Hearing
Solution—Use a Headset
Yamaha CM500—\$50!
Heil \$100-\$275



- Shack “Monitoring”
External Speakers RFI on Transmit
West Mountain Radio Power Speakers
COMspkr \$39.95/pair—NO RFI!



Radios' Features vs. Problems

- Problem—Heterodynes/Carriers
Notch Filter—Auto or Manual
External Devices Available Too (AF, not IF)
JPS NIR-12 Audio DSP (used only)
Use for Older Radios (Drake 2B)
- Modern Rigs have
IF Notch Filtering
- Did I Mention RTFM?



Up-to-Date Solution

K3S Transceiver



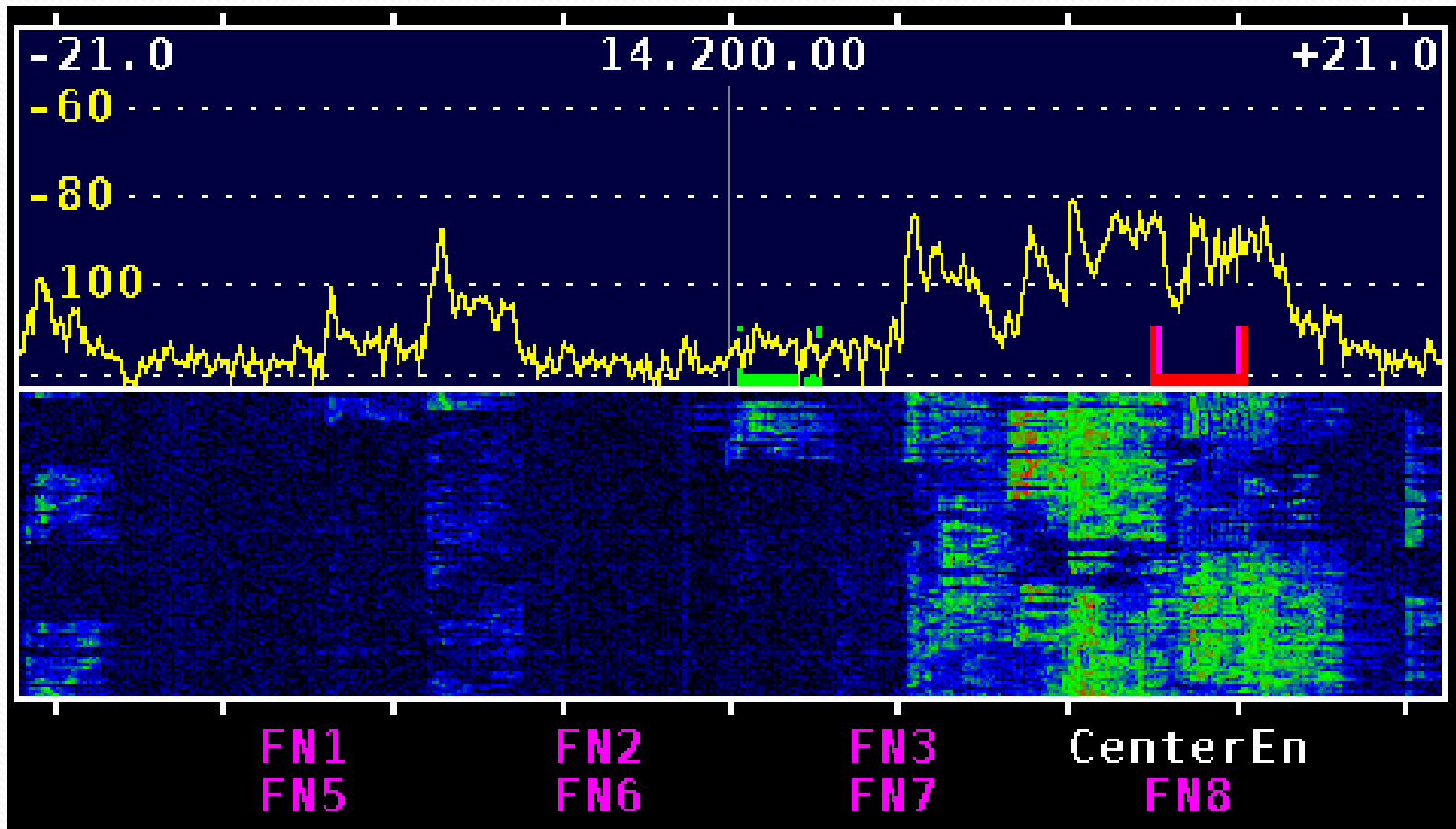
160-6 m • Superhet / SDR Architecture • Ultra Low-Noise RX/TX

K3S Options

- Internal Tuner (must for portable)
- 10/100 Watts QRP/QRO
- Sub-Receiver
- RF/IF I/O RX Antenna
- Digital Voice Recorder
- 2m Transverter
- External Panadaptor P3

Radios' Features vs. Problems

- Where to Call Them? TX₃X Early On



Radios' Features vs. Problems

- Narrow Antenna VSWR—Tuner
- Louder is Better—100 Watts or KPA500
- Split TX—Where? KRX3/P3
- Local QRN—Separate RX Antenna
- Long Contests—K3DVR
- Rapid DX Calls—Internal CW Messages

Complex Controls & Manuals

- Take Your Time
- Start at Page 1
- Find an Elmer
- Join/Search E-mail Group
- Ask Questions
- Hold a Radio “Clinic”
- Practice, Practice, Practice

12 Sep 2015 QSO's

- Summer Radio Fun in the Park
(1) PSK-31 QSO 100 Watts to BuddiPole
Bad Propagation?
- K8TE as W6H Route 66 On-the-Air
12 Sep: 445 40m SSB QSO's
13 Sep: 284 40m SSB QSO's
13 Sep: 466 20m SSB QSO's
13 Sep: 70 40m CW QSO's
13 Sep: 77 20m CW QSO's
- 500 vs. 100 Watts 30 ft. High Dipoles vs. BuddyPole
- Bands Selection? Mode Selection? Experience?

Bang for the Buck?

- Half-Wave Dipoles—CHEAP
- KPA500—NOT CHEAP
Not Absolutely Necessary
Weekly Phone Fray—40 QSO's 30 Minutes
- Radio Differences?
Helpful, but of Minimal Importance
- Rapid Logging—Often Very Helpful
- Experience—Key Element
Obtain through BIC (Butt In Chair)

K8TE Starting Point 15 Jul 2017

160	80	60	40	30	20	17	15	12	10	Total	Slots
20	66	1	188	150	211	184	196	139	155	272	1312

- Choose Your Targets
- 160m and 80m for Me
- Too Noisy at Home
- No Room for GOOD 160m Antenna

Budgeting?

- Choose Your Targets
- Develop a Plan
- Gauge ROI (Return On Investment)
- Review the Plan Annually (at least)
- “Instant” Gratification Helps (Briefly)
What can you afford/accomplish first?

K8TE Budgeting Example

- Home: Antennas/Towers \$2,000
- 10-20 dB Added Size/Height
- Remote Operation from Vacant Lot
Low Noise!! But \$5,000 to \$10,000
120 ft. Tower/Beam Choices?
KTX34, SteppIR 3L, New Beam?
Small Building with UHF/Wi-Fi Links
Solar/Generator Power Daily DX
Weekend Contesting in RV
Adjacent Lots Purchase? \$5,000-\$10,000

Freebies (or nearly free)

- On-Line Propagation Resources
VOACAP
DXpedition Sites
<http://k6tu.net/> Stu Phillips
- Radio/Computer Interfacing
WARNING—FTDI USB-Serial ONLY!
Great, Multiple Benefits
- Ergonomics Considerations
Comfortable Chair
Equipment Placement

Station Automation

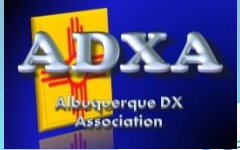
- Elecraft K-line
- No Tuning
- Automatic Antenna Selection
- All Antennas Tuned/Ready
- Prevent DOM (Dumb Operator Moves)
- Simplify the Complex

Operating Convenience

- Log Linked to Notebook PC
- Year-to-Date DX at ClubLog
- Comfortable Chair
- Monitors at Eye Level (bifocals)
- 99% Headset Operation

Monitor #1

- Logging Program
- N3FJP Amateur Contact Log
Simple (I need simple)
Reasonably Effective
Cheap! (DXLabs Suite Soon—Free!)
- CW via WinKeyer
- Linked to VE7CC
- Little Macro Capability
- Can't Select DX Year-to-Date



Call	Frequency	QTH
T2GC	10.1380	Tuvalu
TX3X	14.2000	Chesterfield Is.
TX3X	14.0230	Chesterfield Is.
TX3X	14.0230	Chesterfield Is.
TX3X	14.2000	Chesterfield Is.
TX3X	14.2000	Chesterfield Is.
TX3X	14.0230	Chesterfield Is.
TX3X	14.0230	Chesterfield Is.
TX3X	14.0230	Chesterfield Is.
TX3X	14.0230	Chesterfield Is.
V85NL	7.0020	Brunei Darussalam

TX3X

Chesterfield Island
Cluster Spots



and Log



Rec#	Call	Date / Time
15206	T2GC	2015/10/01 12:52
15169	T2GC	2015/09/29 20:51
15148	T2GC	2015/09/28 09:06
15059	T2GC	2015/09/25 19:15
15055	T2GC	2015/09/25 04:20

Keyboard and Mouse

- Under “Desk” Tray
- Wrist Rest (Racing Wall Incident)
- Hands on the Keyboard!
- Touch Typing
- Adjust Screen Resolution

Monitor #2

Chrome Browser Tabs

www.sotawatch.org

(Summits On The Air)

Gmail

www.W6RK.com

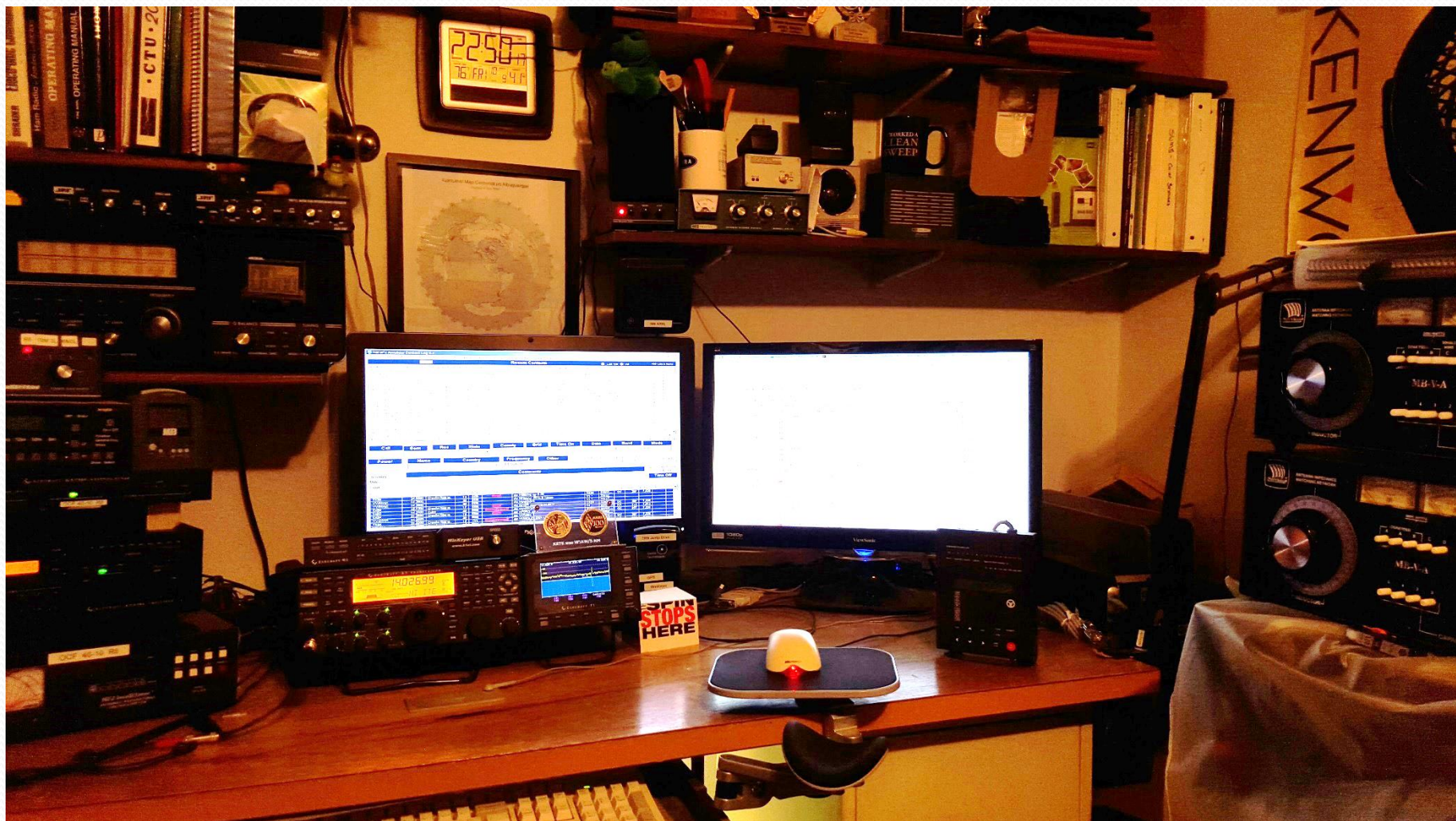
(County Hunter Tracking)

www.ClubLog.org

(Needed/Logged Counties)

www.QRZ.com

www.bandconditions.com





Propagation

- DXpedition's Web Site
Often Find Propagation Pages
- Or W6EL (free)
- www.solarham.net
for Current Conditions & Indices
- www.VOACAP.com

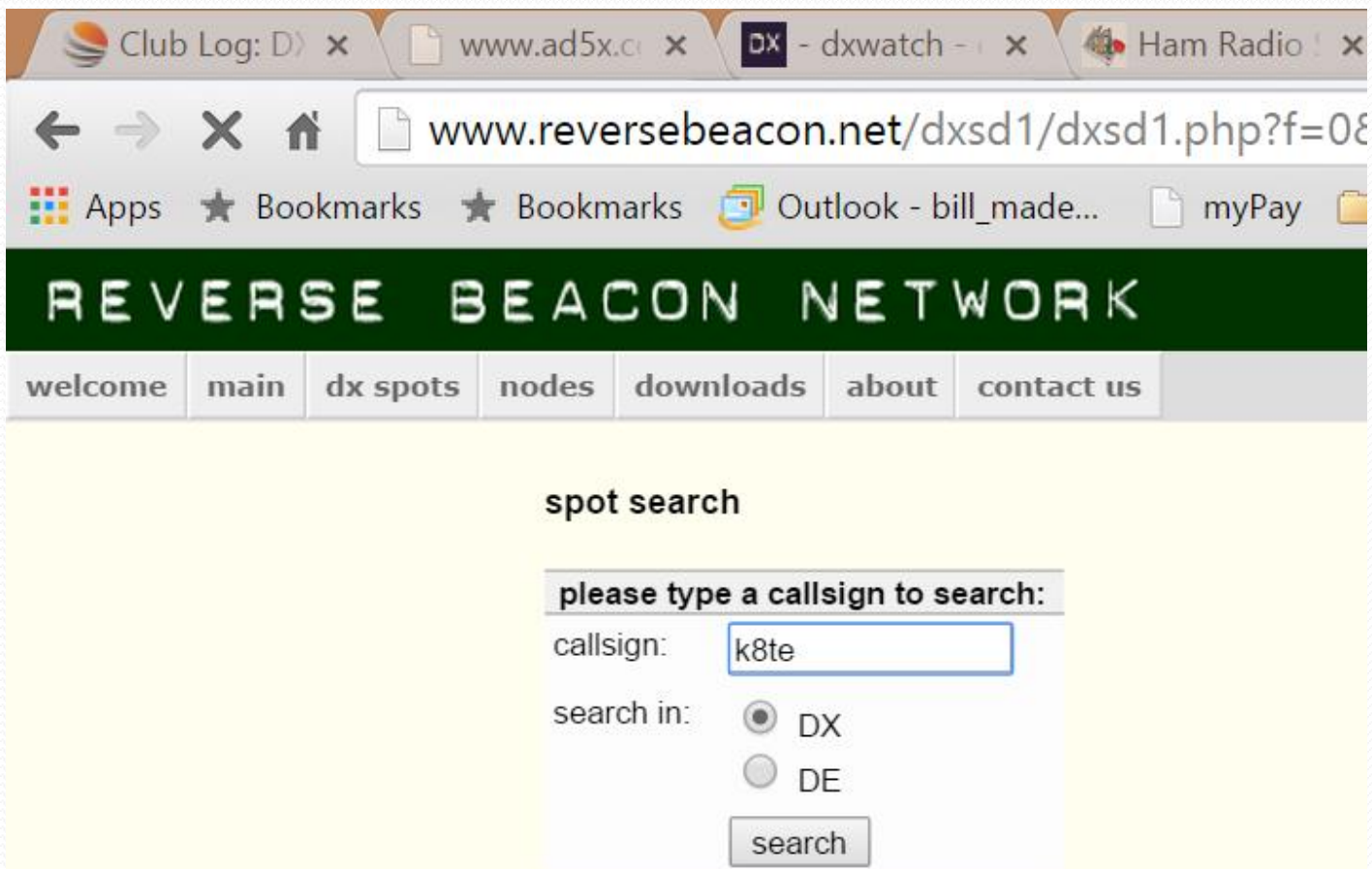
Measuring Improvements

- Compare Your Logs
- Enter Contests
- Watch DXCC/WAS Totals Grow
- WSPRLite TX x2
- Reverse Beacon Network

Reverse Beacon Network

- Real Time Performance
- Use CW “TEST DE K8TE”
or “CQ CQ DE K8TE”
- QSY 1 KHz for New Reports
- Test for 5 Minutes
Test Again for 5 Minutes
Test at Different Times

RBN Input



The screenshot shows a web browser window with several tabs: "Club Log: D...", "www.ad5x.c...", "DX - dxwatch -", and "Ham Radio!". The address bar displays the URL "www.reversebeacon.net/dxsd1/dxsd1.php?f=0&". Below the address bar, there are navigation icons for "Apps", "Bookmarks", "Outlook - bill_made...", and "myPay". The main content area features a dark green header with the text "REVERSE BEACON NETWORK" in white, all-caps font. Below this header is a navigation menu with buttons for "welcome", "main", "dx spots", "nodes", "downloads", "about", and "contact us". The "dx spots" button is highlighted. The main content area is titled "spot search" and contains a search form. The form has a label "please type a callsign to search:" above a text input field containing "k8te". Below the input field, there is a "search in:" label followed by two radio button options: "DX" (which is selected) and "DE". A "search" button is located at the bottom of the form.

Club Log: D... x www.ad5x.c... x DX - dxwatch - x Ham Radio ! x

← → X Home www.reversebeacon.net/dxsd1/dxsd1.php?f=0&

Apps ★ Bookmarks ★ Bookmarks Outlook - bill_made... myPay

REVERSE BEACON NETWORK

welcome main dx spots nodes downloads about contact us

spot search

please type a callsign to search:

callsign:

search in: DX DE

RBN Output for K8TE on 40m

- Sorted by
- Date
- Time
- Re-Sort By
- Frequency
- Sub Antenna Name
- Compare Antennas at Each "de" QTH
- Look Up at QRZ
- W2LB Farmington NY
- KM3T Amherst NH
- NY3A Glen Rock PA
- W7HR Port Orchard WA
- KO7SS Tucson AZ
- K9TM Sylvania OH

de	dx	freq	snr	time
W2LB	K8TE	OCF	15 dB	1424z 13 Mar
W2LB	K8TE	OCF	15 dB	1425z 13 Mar
W2LB	K8TE	OCF	21 dB	1425z 13 Mar
W2LB	K8TE	OCF	22 dB	1426z 13 Mar
KM3T	K8TE	OCF	8 dB	1425z 13 Mar
JSJRZ	K8TE	OCF	7 dB	1425z 13 Mar
NY3A	K8TE	OCF	13 dB	1425z 13 Mar
W7HR	K8TE	OCF	38 dB	1424z 13 Mar
W7HR	K8TE	OCF	41 dB	1425z 13 Mar
W7HR	K8TE	OCF	42 dB	1426z 13 Mar
W2LB	K8TE	FAN	13 dB	1425z 13 Mar
W2LB	K8TE	FAN	18 dB	1425z 13 Mar
W2LB	K8TE	FAN	13 dB	1425z 13 Mar
W2LB	K8TE	FAN	18 dB	1426z 13 Mar
KO7SS	K8TE	FAN	31 dB	1425z 13 Mar
VE2WU	K8TE	FAN	18 dB	1425z 13 Mar
K9TM-4	K8TE	FAN	6 dB	1425z 13 Mar
KM3T	K8TE	FAN	10 dB	1425z 13 Mar
E1SGH	K8TE	FAN	13 dB	1426z 13 Mar
W7HR	K8TE	FAN	34 dB	1424z 13 Mar
W7HR	K8TE	FAN	42 dB	1425z 13 Mar
W7HR	K8TE	FAN	35 dB	1426z 13 Mar

Bored with Ham Radio?

- Dwayne Allen, WY7FD, at Socorro?
- Too Many Choices for Boredom
- Fun is YOUR Choice!
- New is Always Fun and Challenging
- Better is Always Fun
- Sharing is Always Fun
- Have Fun!

References

- <http://www.yccc.org/>
- www.elecrafter.com
- www.clublog.org
- <http://audiosystemsgroup.com/CoaxChokesPPT.pdf>
- <http://lists.contesting.com/mailman/listinfo/rfi>
- <http://www.cushcraftamateur.com/Product.php?productid=R-8>
- <https://www.dxengineering.com/parts/dxe-rf-pro-1b>
- <http://www.m2inc.com/amateur/6m-ho-loop-50-0-50-3-mhz/>

References

- <http://www.cushcraftamateur.com/Product.php?productid=TEN-3>
- <http://www.bcdxc.org/ve7cc/Ver3/V3Help.htm>
- http://www.westmountainradio.com/product_info.php?products_id=COM_spkr
- www.n3fjp.com
- <https://www.dxlabsuite.com/>
- <http://www.qsl.net/w6elprop/>
- <http://www.reversebeacon.net/>

Questions

- Contact Me at k8te@arrl.net
- Google Is Your Friend
- RTFM!
- ADXA Meets Each Last Wednesday at the Copper Canyon, 5455 Gibson Blvd SE, With Similar Programs