What's In Your Station?

Taking Your Amateur Radio Experience to the Next Level

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Bella Vista Radio Club
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Objective

- This is NOT a motivational speech
  - I will not "spoon feed" you tonight but give you info and references to improve your on-the-air amateur radio experience
- Social media has exponentially increased the dissemination of *misinformation* and confusion
  - Radio amateurs today, in general, are not technically oriented and don't care to be

W5ZN Station

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W5ZN Station

WN5IGF Vintage Station

W5ZN Station

Now a Test

1. Is W5ZN:
   A. OCD
   B. ADHD
   C. Bipolar
   D. Insomniac

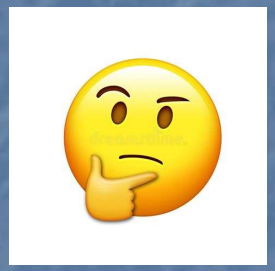
ANSWER: “E” none of the above

W5ZN is simply ***PASSIONATE*** about amateur radio!!!

Improving Your Station

- The Radio
- Antennas
- Coaxial Cable
- Connectors
- Enhancements in the Shack
- Noise
- Station Documentation

What is the BEST Radio?



What Do All Those Specifications Mean?

RECEIVER (Main and Sub)*

Sensitivity (MDS)	-136 to -138 dBm (typ.), preamp on, 500 Hz bandwidth. 6 m MDS with PR6 option: -143 to -144 dBm (typ.). Reduced sensitivity near 8.2 MHz (first I.F.) and from 44-49.5 MHz. Sensitivity decreases gradually below 1.8 MHz due to intentional high-pass response at the T-R switch. (Use RX ANT input or sub receiver's AUX input to avoid the high-pass filter loss.) **Note:** KBPF3 option required for full general coverage (including 0.49 to 1.7 MHz).
Dynamic Range	IMD3 > 100 dB, Blocking 140 dB, typical (at 5, 10, and 20 kHz spacing)
Image and I.F. Rejection	> 70 dB
Audio Output	2.5 W per channel into 4 ohms; typ. 10% THD @ 1 kHz, 2 W
S-Meter	Nom. S9 = 50 µV, preamp on; user-adjustable
Noise Blanker	Adjustable, multi-threshold/multi-width hardware blanker plus DSP blanker
Receive AF graphic EQ	+/- 16 dB/octave, 8 bands
Filter Controls	IF Shift/Width & Lo/High Cut with automatic crystal filter selection

* **Receive specifications are guaranteed only within ham bands.** Dynamic range measurements based on 400-Hz, 8-pole filter. Other available filters have very similar performance; see www.elecraft.com for full list.

TRANSMITTER *

What Do All Those Specifications Mean?

Rob Sherwood, NC0B
Sherwood Engineering
http://www.sherweng.com/index.html

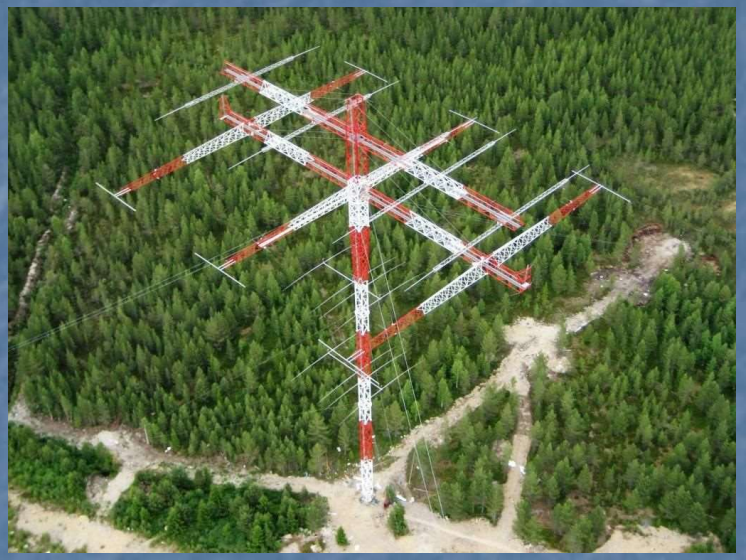
Choosing a Transceiver – Far from Simple
http://www.sherweng.com/ctu2010/NC0B-CU-2010-5b.pdf

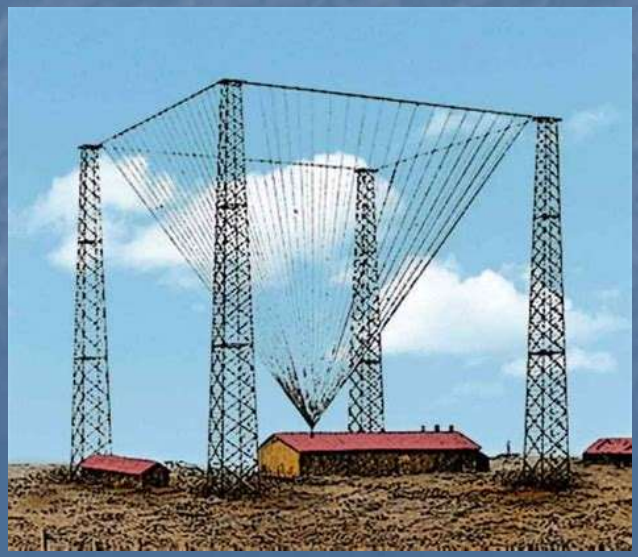
Bottom Line: Some radios **ARE BETTER** than others!

Pay attention to what top contesters and Dxpeditions use

Lean how to use whatever rig you have. The best radio will become the WORST radio with a BAD operator!

What is the Best Antenna?





What is the Best Antenna?

One that improves your current system!

If you have:

Dipole

- Go to a Yagi or a Sloper

Vertical (7 MHz & higher)

- Dipole, Sloper, Phased Verticals

What is the Best Antenna?

- Avoid a Yagi with traps
  - Today's tri-band Yagi design provides monoband performance
    - JK Antennas

- **Bottom Line** – Install what you can but do it right for optimum performance
  - Pay attention to construction detail
  - Use good quality components
  - Use good quality coaxial cable

Coaxial Cable

- *Cheap is as cheap does* !
  - Forrest Gump 1994, sort of
- RG-213 is OK but can do better
- Double shield is much better
  - LMR400
  - DXE400 Max
- Pay attention to loss chart & Velocity Factor

Coaxial Cable

Inside the Shack

- I exclusively use RG-400
  - Close to the size of RG-58
  - High isolation
  - Double braid silver-copper shield
  - Teflon dielectric
  - Silver plated stranded copper center conductor
  - FEP jacket
  - Requires special connectors
  - Expensive ~$5.50/ft

Connectors

- Cheap is as cheap does!
- Do NOT buy the cheap ones in the hamfest flea market bins!
- Silver-plated brass shell and body, Silver-plated center pin securely mounted in PTFE dielectric
  - Amphenol 83-1SP-6 (Solder or crimp version)
  - DXE-PL259CS8U-6 (Crimp, solder center)
    - Don’t use a cheap crimping tool

Enhancements in the Shack

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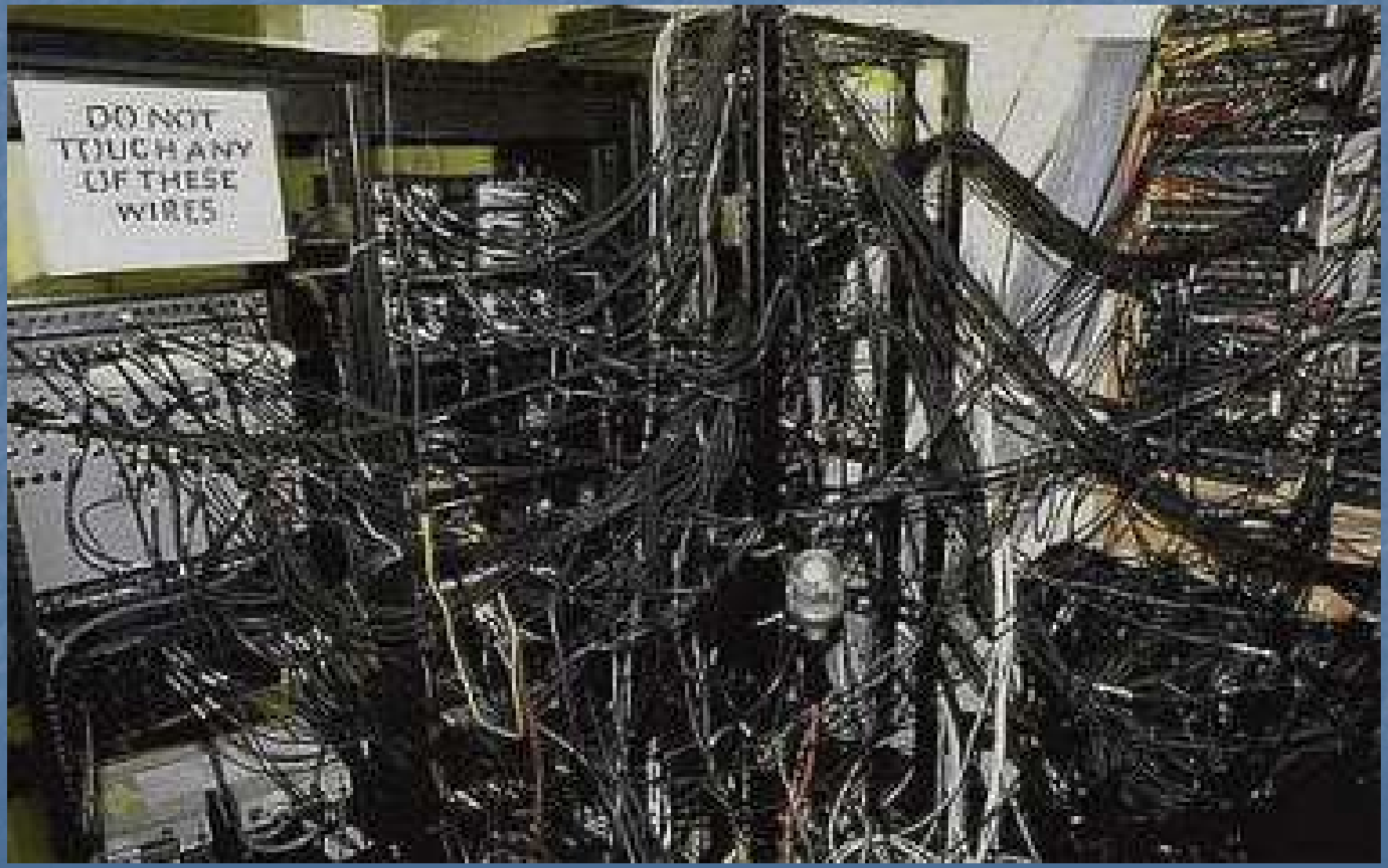

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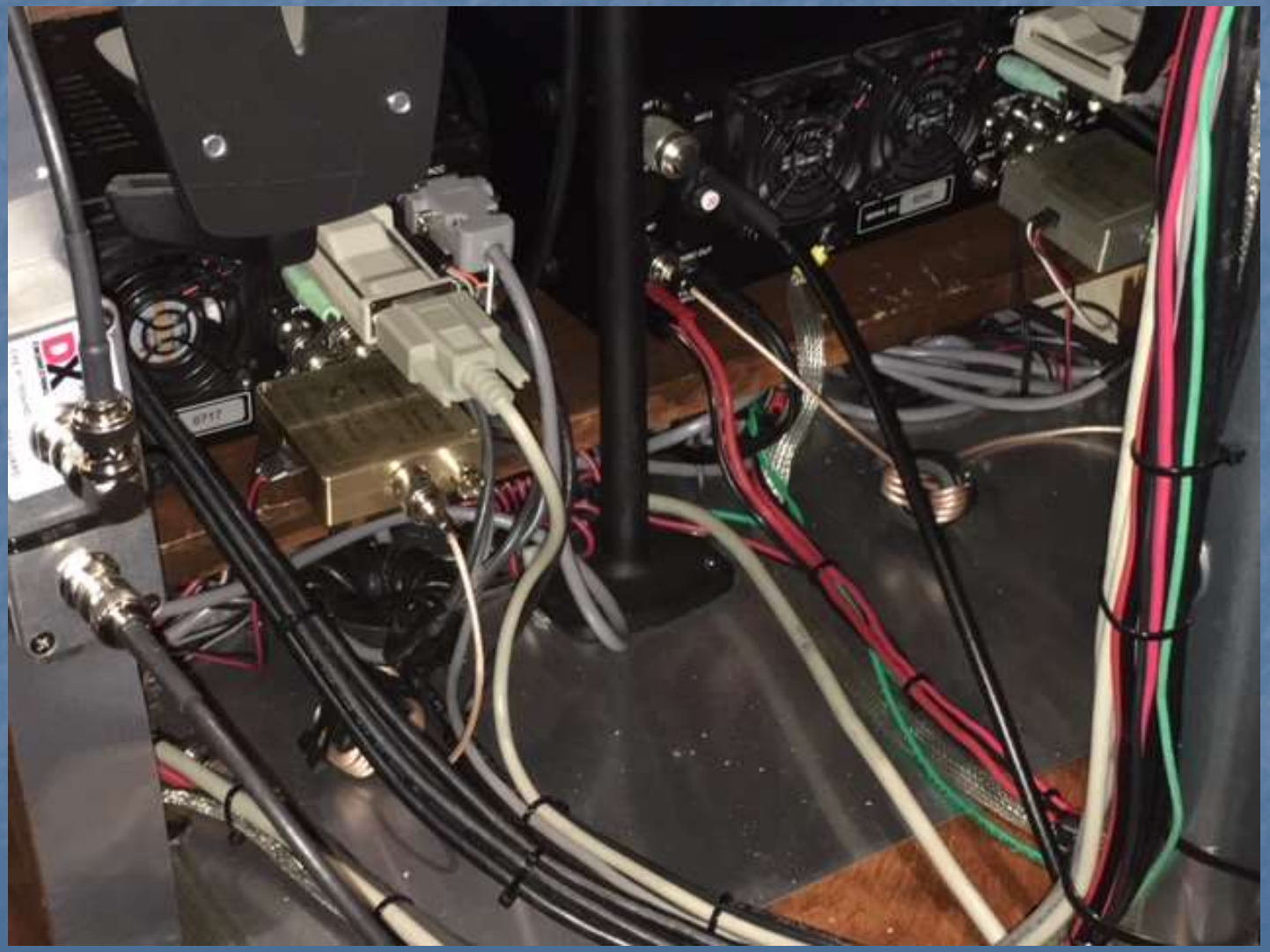
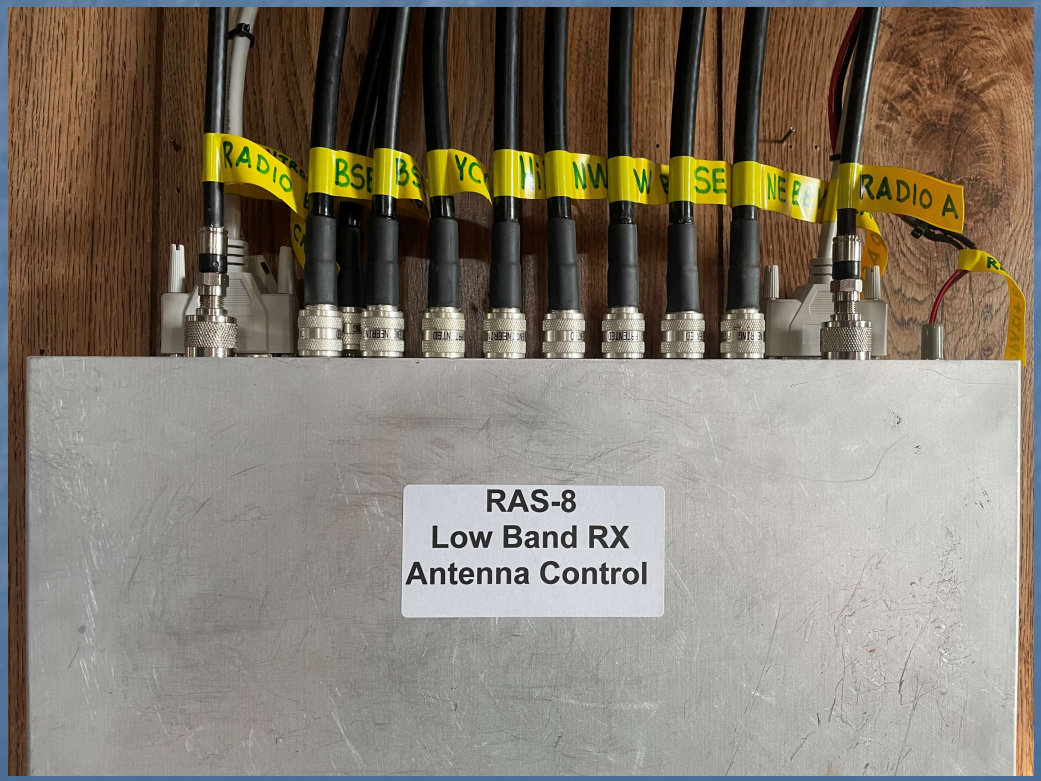
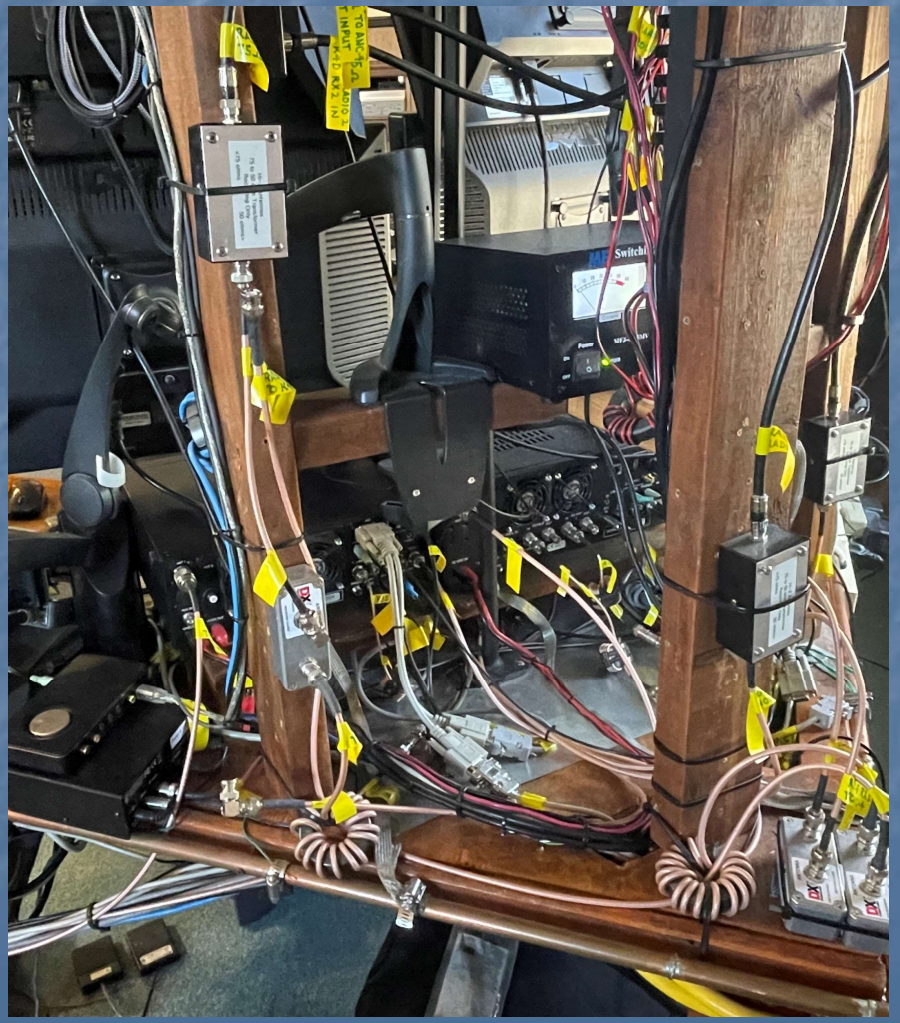


Enhancements in the Shack

Label all cables





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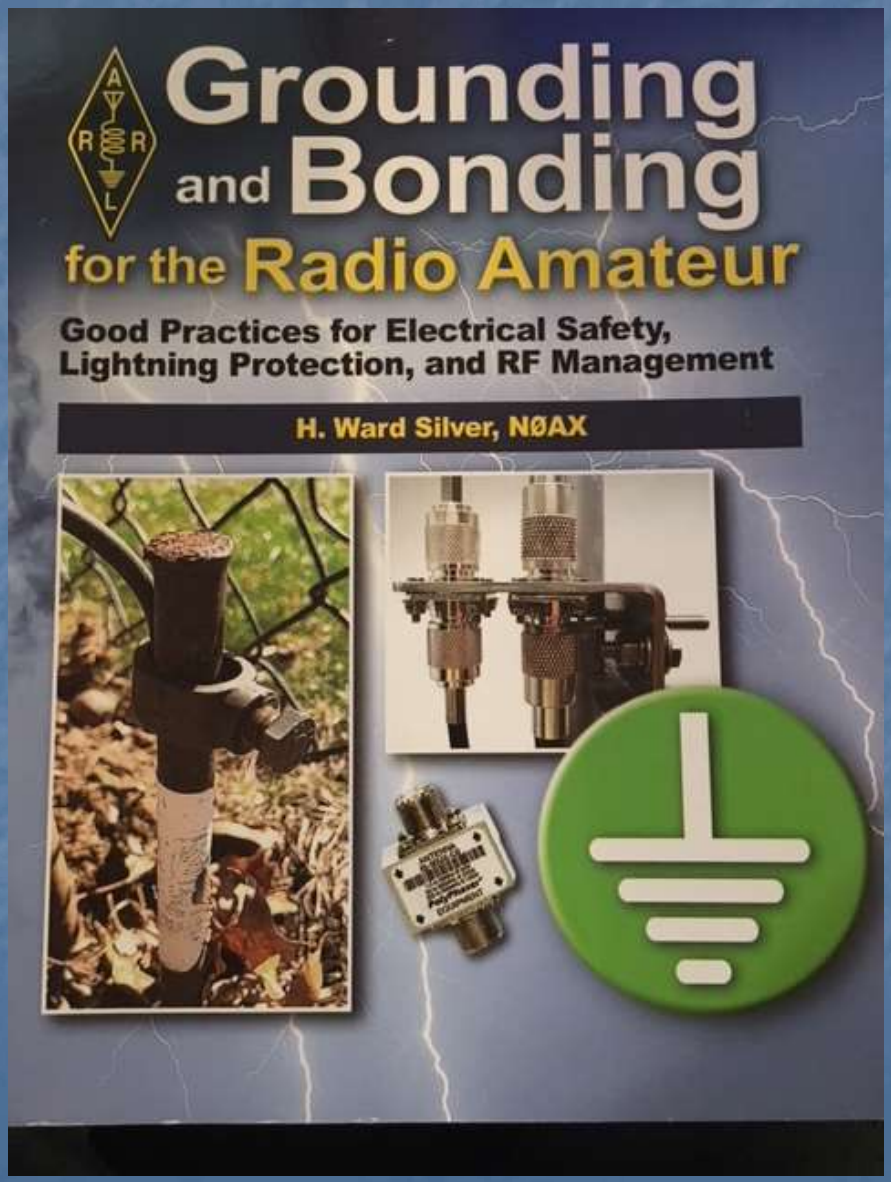


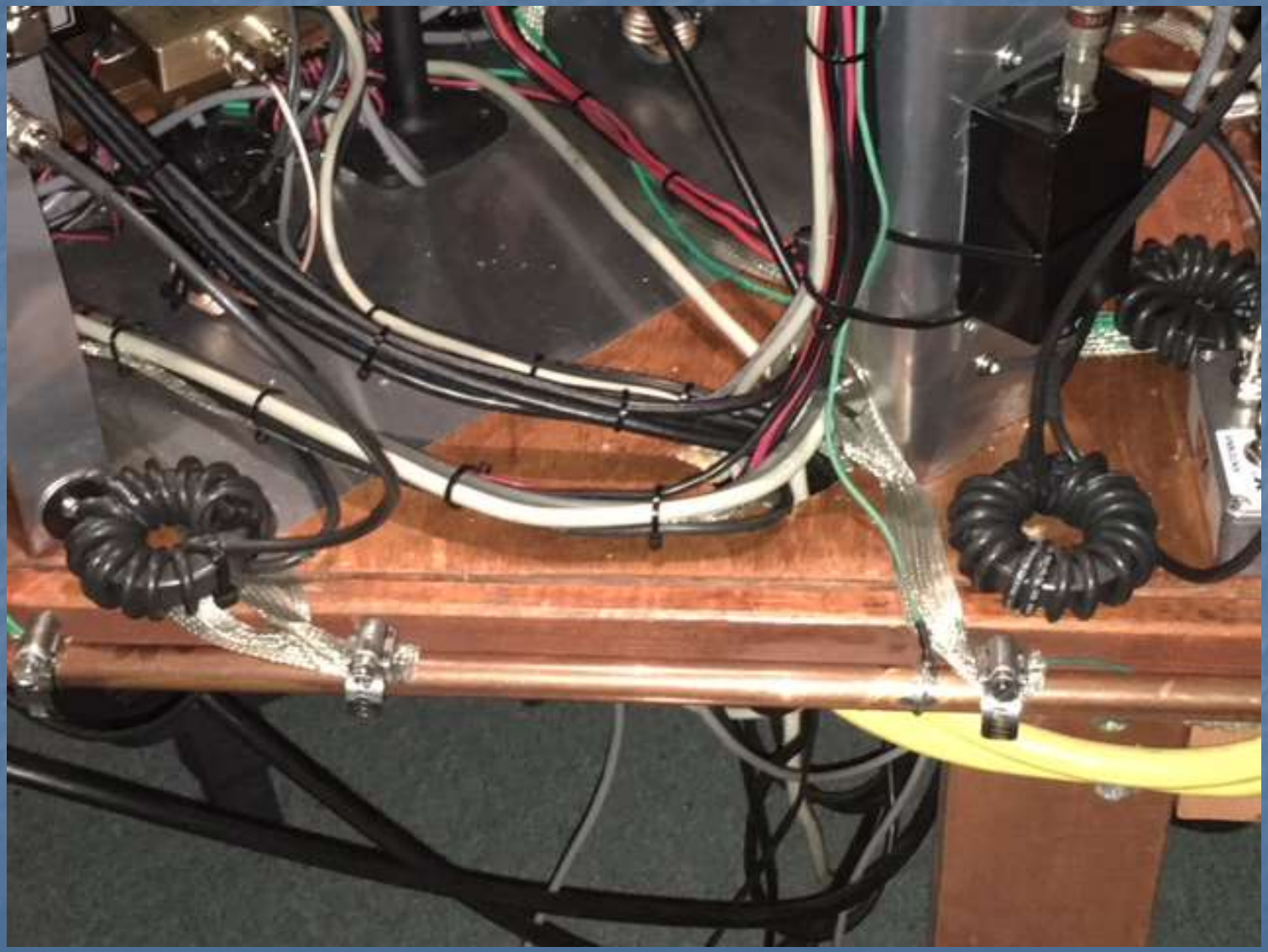
Enhancements in the Shack

Grounding ? !

Have everything at the same ground potential

"I don't ground any of my equipment because that provides a path for lightning!"

Enhancements in the Shack



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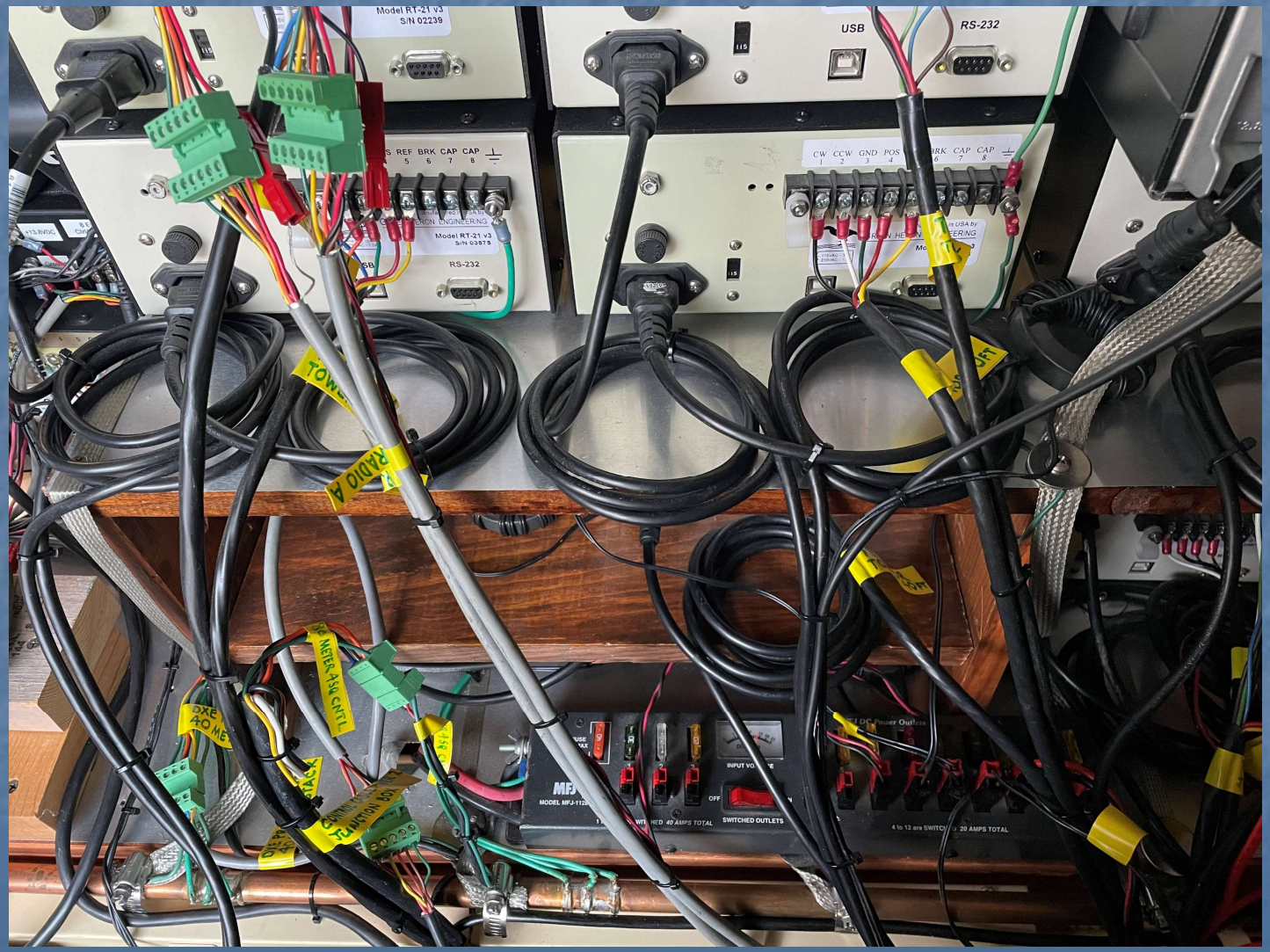


Noise

The Grim Reaper of Noise is NOT your friend

Noise

- Several years ago the only noise threat to your station was line noise
  - Amateur radio was viewed as the noise & interference threat to consumer electronics
- Today, consumer electronics generate significant noise and interference to amateur radio reception

Worst Noise Generators

#1 Offender

#2 Offender

Worst Noise Generators

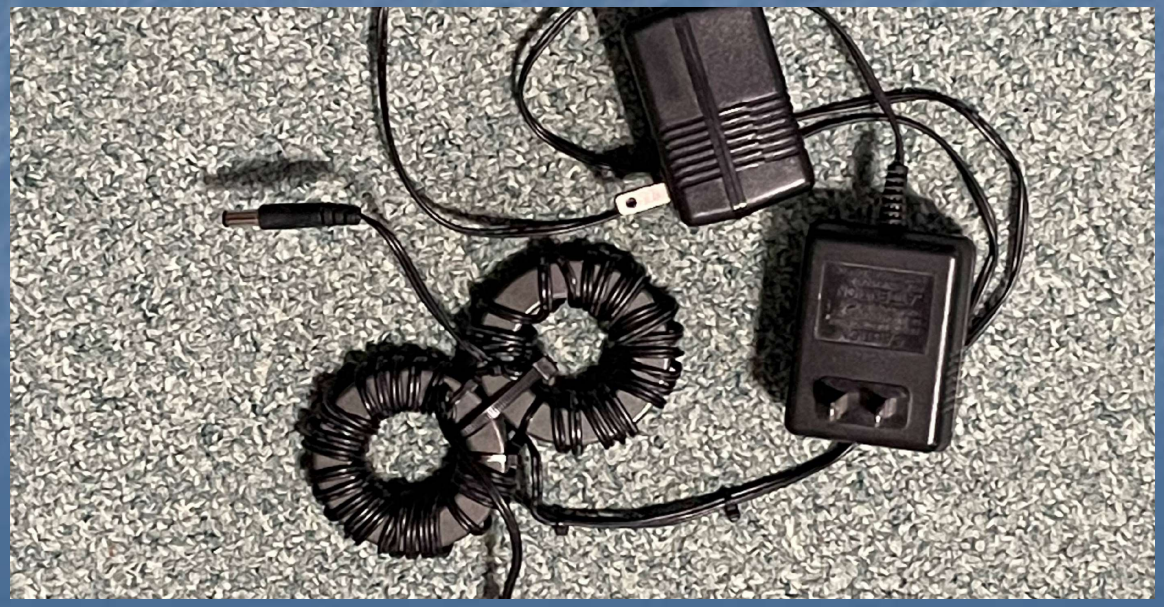
- Others include:
  - Switching power supplies
  - Plasma TV's
  - Medical devices
  - LED lights, outside light & dimmer controls
  - The list is endless and they are everywhere!
- So what can a little old meek and mild ham do to "GET IN THERE AND WORK 'EM" if he can't hear them over the noise?

Clean Up Your Station First!

- This is Rule #1. Here are some guidelines:
  - Unplug all unused wall warts, better yet, don't use them but that's a tall order
  - If you must use a switching power supply, be very selective on what you purchase/use
  - Use high quality cables and connectors to interconnect all of your equipment.

Clean Up Your Station First!

- If you are using a 12 Vdc wall wart, cut the cable off and connect it to a 12 Vdc power supply. Throw the wart in the trash
- Can't live without it? Here's how to neuter a wall wart



Clean Up Your Station First!

- If you must use a switching power supply instead of a linear supply, purchase one that is designed to filter out the noise

MFJ switching power supplies were designed by "RF engineers" and they took steps to properly filter the output

Toroids

- Extremely effective – but MUST use the right ones
  - Do NOT buy something out of a tray at a hamfest or order one that simply advertises "Excellent RFI suppression"
- Use a #31 mix toroid

  Mouser # 623-2631803802

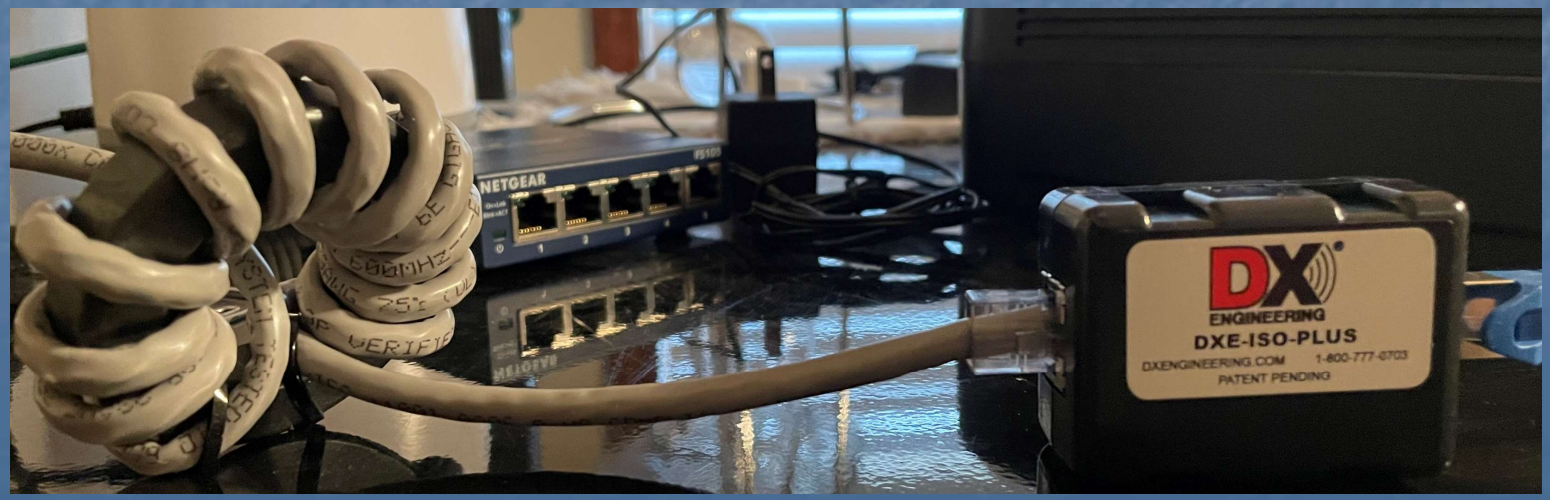
  Fair-Rite Part No:2631803802
  - If it's a DC voltage or control cable – WRAP IT!

Study K9YC's Paper

http://www.k9yc.com/RFI-Ham.pdf

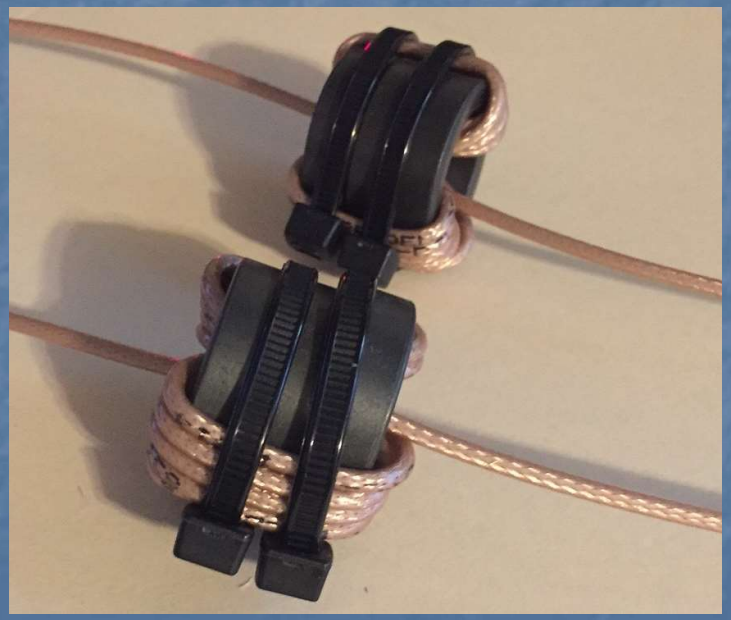
Internet Modems & Routers

- Even if you're all wireless, you can still have noise issues
  - Any power or other cable connected to these devices is an antenna!
  - For CAT5 or 6, wrap several turns of the cable in a #31 toroid



For *Receive* Antennas

- To eliminate common mode noise on the shield

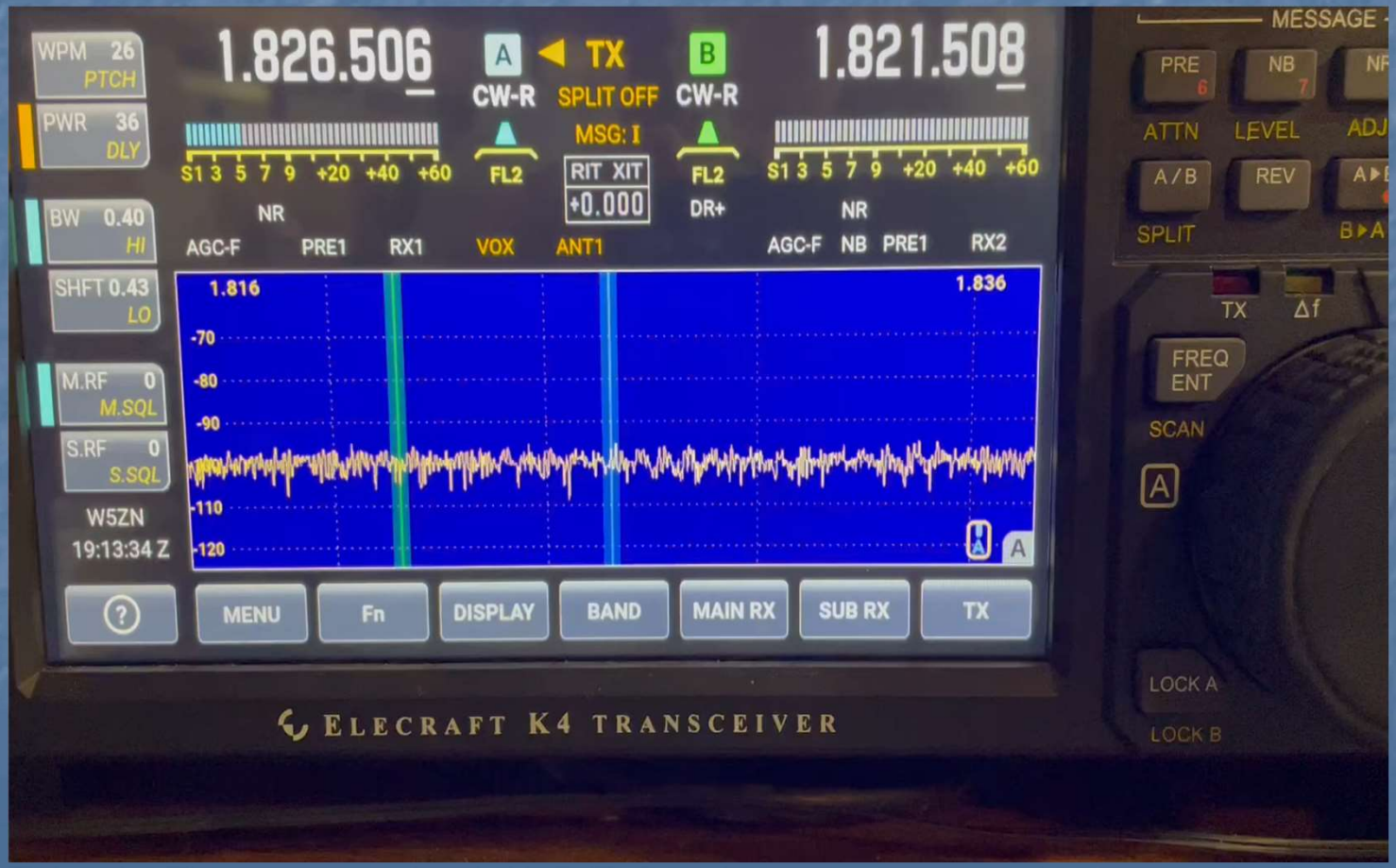


Now What?

- You're station is clean, but you have noise from somewhere
  - Not much you can do (legally) with noise that comes a neighbor's house.
- I have a horrible noise to the east on 160 meters.
  - Thought it was line noise but we cleared all power line noise
  - Generated from a house over ¼ mile away

Now What?

- Concluded it is a medical device or a grow lamp



Noise Cancelling Devices

Different models available

- Timewave ANC-4+
- MFJ 1026
- DX Engineering NCC-2

Noise Cancelling Devices

Noise nulled ~ 20 dB

Before Null

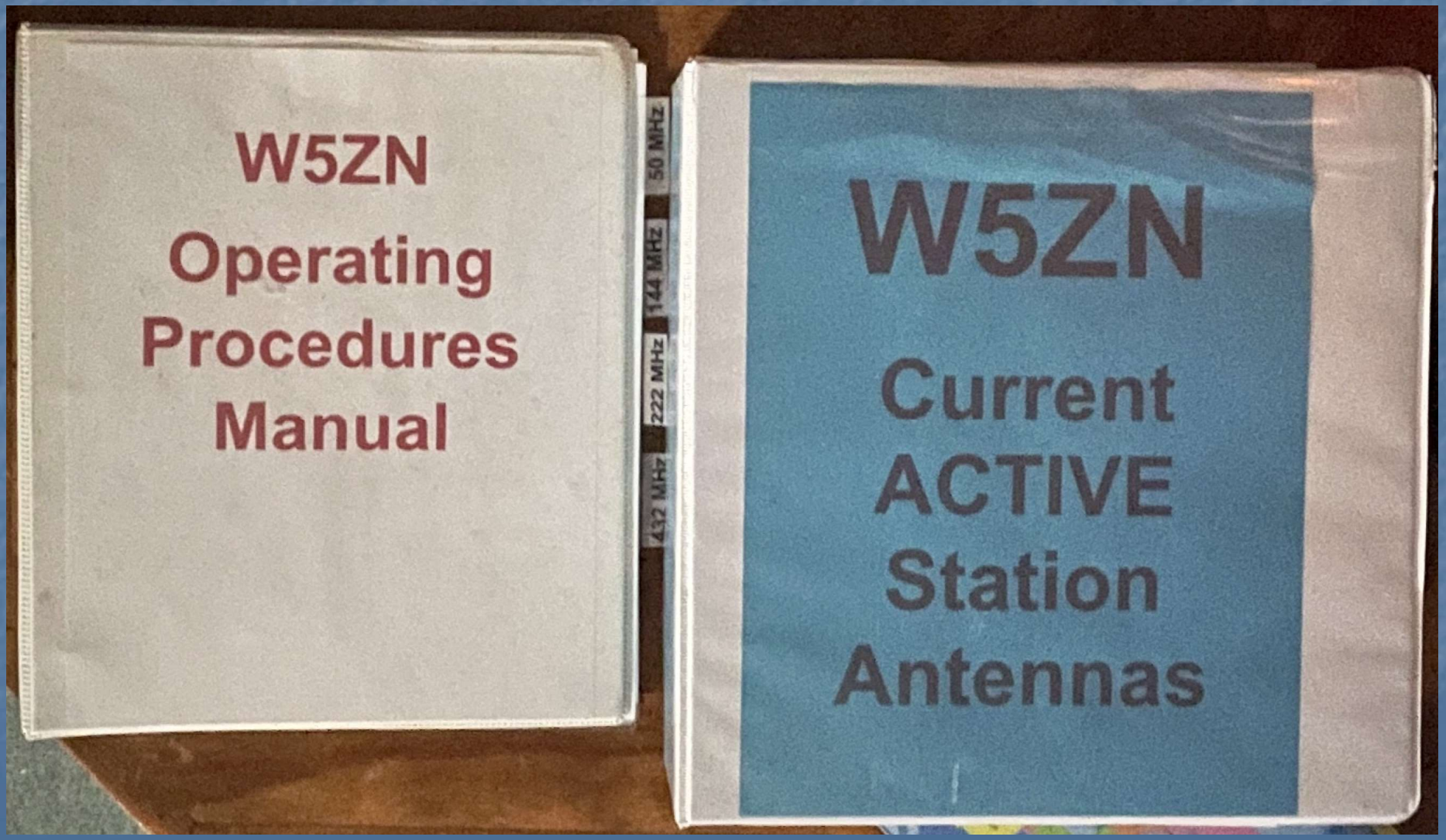
After Null

Noise Cancelling Devices

How to properly use a noise cancelling device by VE6WZ

https://www.youtube.com/watch?v=Gt0Hokz_m3w

Station Documentation

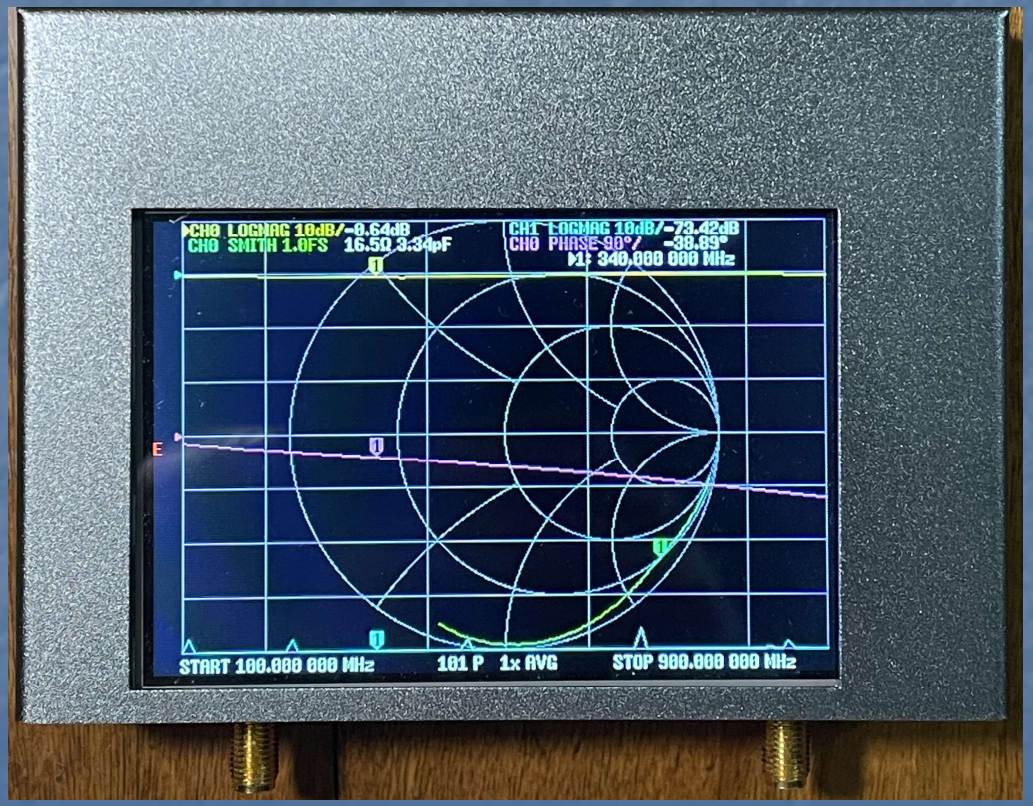


Test Equipment

The two most valuable instruments beyond a VOM

Test Equipment

Now there are three !!!!



Questions