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JUG

Publication of the Northern California Contest Club

NCCC

55 Years of Contesting Excellence

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NCCC MEETING
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ZOOM
Tue 13 Jan 1800 PDT
Moderated discussion:
"No Slides. No Presenter. Just Contesting"

President's Report

David West, KO6M

Happy New Year!

With this new year I wonder: what's going to be fresh and new in our world of contesting? Maybe not even fresh and new but upgraded? Something that has been fresh on my mind almost all of last year is AI. I know, many of you just rolled your eyes. Some probably groaned. "What do we care?" "This won't affect us." "True Contesters will never use it to the extent you think" and lastly "It will never be able to win a contest."

Now, a year ago, I would have thought you were right on almost all of those. Then we had the N3QE talk. Then I, with zero programming skills outside of some basic in the mid 90s and maybe node red, had ChatGPT and Cursor write over 30 scripts for our business' CRM system and 10 apps. Yes, I somehow became a vibe coder. I still don't even know what that means. All I know is I don't know code and I have an apple developer account and several of us in my company use the apps I've written on a daily basis. Shoot, I even know what some of the billboards along I-80 in San Francisco are marketing towards now. Which brings me back to what I sat down to write about: AI in Contesting.

Listen any contest weekend today and you'll hear it: voices that sound too consistent, CW that's too clean, and logging that's too fast. Artificial intelligence isn't "coming to contesting" anymore—it's already

here, it's just unevenly distributed and we call it something else, station automation. Perhaps it is a way of making it sound like everything is still nice and warm, produced and amplified by transceivers of long ago and amplified by the tubes of our amps.

A good current example is N3QE's "Tina", an AI-generated SSB contest "operator" voice that's been publicly discussed on contesting reflectors and forums, and even featured as a formal talk at the Dayton Hamvention Contesting Forum("Introducing Tina – the N3QE AI op"). Which we had a preview of. Remember that? If not, Search up NCCCs meeting for May 2025. Tim gave us a great look at his method of making her and how he uses her.

Since then, I've wondered, how far can this go? Could AI run an entire contest—CW, RTTY, even SSB—at a level that wins? And what happens when you add advanced operating styles like SO2R and 2BSIQ? AI doesn't get tired, it doesn't care about the noise, it's not missing a youth football game. It can be any dialect or accent, it can even change languages on the fly.

Let's first talk about what "AI in contesting" already looks like. We already see it in various bits of automation in the shack. N1MM has been taking audio files and piecing them together as our "voice" for years. CW Decoders have been available to us and implemented into N1MM as well. Noise reducers are on the rise which will take your live stream from the radio and send you back an active noise reduced signal. Macros, macros with if then statements, Auto CQ features, skimmers, and the live band maps. All computer assistance which in some way can be considered AI. Tim, N3QE, clearly took it to the next step and talked about it. How many others have worked with AI in the shack and aren't being public about it? His synthesized voice is dynamically speaking callings, numbers, and full exchanges all based on his button presses. This is where we have been accepting of it, he is still the operator.

Thinking back to May 2025, for the most part we were all accepting of it. The idea of near perfection in our voices? Choosing a different voice that may "cut through the noise" better than others to beat the pileup. Allowing us to contest while sick and without our "radio" voice. What if we took a bigger leap? What if we used AI to help "decode" messy signals, understand thick accents, choose our tactics, time our replies better, and even manage not just our one radio better but our multiple radios better. The complete shack agent.

Granted I missed the window to get an agent (for those not knowing what an agent is, an autonomous software that perceives, decides, and acts on your behalf) ready for RTTY RU. I had imagined RTTY, being all computer decoding already, would be a wonderful way to test a fully automated shack. In my shack things are simple. An antenna, a computer, and a radio (currently a Flex Radio which can't transmit but can listen). Flex alread puts all of the radio control and audio onto the network for the computer to pick up. The computer is where the Agent would be doing its activities for lack of a better way to put it. Everything I needed to get a baseline done exists in the shack. To further my thought, RTTY (and many digital contest modes) already run through decoders that output text; the "AI" layer is mostly:

- Smarter error correction. I say smarter here because, RTTY decoders haven't been updated in who knows how long. Right? I haven't downloaded and update for my decoders…. ever.
- Smarter decision-making (when to ask repeats, when to log, when to move). We all get stuck thinking, we need this contact now, we must have it. AI can make a note to come back to the pileup, try again when it knows conditions will be better. When the path is more optimized. It can read signal reports and make

game time decisions without pausing its CQing or listening. It can multi task more better.

- Rate optimization. Same thing here, it can follow strict rules AND remember more of them on the fly. It can look at other sources for signal reports and spotting.

In other words: if I could feed decoded text into a rules engine, I could run a large fraction of a RTTY contest without human interpretation. Shoot, RTTY would have been easier than CW to figure out for automation. Again, though, I missed the contest. Life happens.

So, while I hoped this article was going to talk about how I did it, it became an article of theory. Theory and what I want to try still. What's next….?

Well CW of course. There are so many CW contests and so much more CW on the air at any given time, instead of worrying about rushing to RTTY, I can concentrate on the medium hard topic of CW. Here's what's great about that: CW is structured, narrowband, and, importantly, it already has decoders. More importantly there is already a contest suited for this, there is a group now organizing the CW BotBattle, using their words "The CW BotBattle Contest is a unique amateur radio competition designed specifically for automated CW systems, created in response to the emergence of publicly available automated contest software and AI-powered amateur radio tools."

What I think AI can do well in CW today

- Copy calls and exchanges at speed (especially on noise free and pileup free signals)
- Run stations with consistent timing - unwavered cadence and N1MM does this well already.
- Rapid dupe detection and exchange validation (N1MM does this but it relies on the operator typing in the call).
- Optimize run vs S&P decisions with bandmap + propagation models (like I mentioned in the RTTY section).

Where it can fall short in my quick experiments:

- Deep QSB + QRN + interference
- Pileups where partial calls overlap
- Human quirks: off-nominal exchanges, busted sending, "?" and repeats

A fully automated CW contest station is technically possible now, especially at mid-to-high rates on a run frequency with good SNR. Whether it's permitted is a different question, one that I hav a feeling I will hear an outstandingly loud NO from our members. Luckily, it's a hobby, we can choose our own adventure and we have methods of entering as check logs for now.

This Article is getting long, my apologies, like I said, this has been on my mind for a bit. Perhaps this is going to be a multipart series. I already have a second half written and if I read between the lines, I just said I would try to do something for the BOTbattle.

Sounds like I need to get to vibecoding…

KB all!

(Final thought: I will not be using this new found vibe coding power to win contests. I will only use it for research purposes. In fact it makes me think, we already do not distinguish between assisted and non assisted scores in the KB matchup, what happens with those that enter as check logs? Are they still counted? Could I accidentally develop a method to contest and become the next Platinum winner and only have check logs? <insert evil laugh here>)

NCCC Sprint Ladder XLI Announced

Vic VE3YT

A new NCCC Sprint Ladder (XLI) will start this coming Thursday, for four weeks, ending just before the NA Sprint (4-hour sprint) on Saturday February 7th. For the Ladder, your best three out of four scores will count.

Tim Shoppa N3QE is creating the new ladder score page adapting it to some changes Bruce Horn WA7BNM has made to scrape the scores more easily. Thank you Tim, and thanks to Bruce for changing 3830 to the Ladder report forms and changing the Contest Calendar.

Upcoming State/Province QSO Parties

Thanks to WA7BNM

https://contestcalendar.com/stateparties.php

State/Province	Dates/Times
Vermont	1 Feb 0000Z to 2 Feb 2400Z
Minnesota	7 Feb 1400Z to 2400Z
British Columbia	7 Feb 1600Z to 8 Feb 0359Z 8 Feb 1600Z to 2400Z
So. Carolina	28 Feb 1500Z to 1 Mar 0200Z

Larger Contests on the Horizon

NAQP SSB	17 Jan 1800Z to 18 Jan 0559Z
CQ 160 Contest	23 Jan 2200Z to 25 Jan 2200Z
NA Sprint – SSB	1 Feb 0000Z to 0400Z
NA Sprint – CW	8 Feb 0000Z to 0400Z
ARRL International DX	21 Feb 0000Z to 22 Feb 2400Z
CQ 160 - SSB	27 Feb 2200 to 1 Mar 2200Z

Weekly CW (1 hr) Events

ID	DAY	UTC	EXCH	WPM	SPONSOR
SST	Fri	2000 - 2100	Name+SPC	<20	K1USN
	Mon	0000 - 0100			
MST	Mon	1300 - 1400	Name+QSO#	20-25	ICWC
	Mon	1900 - 2000			
	Tue	0300 - 0400			
CWT	Wed	1300 - 1400	Name+CWO# or Name+SPC	20->∞	CWops
	Wed	1900 - 2000			
	Thu	0300 - 0400			
	Thu	0700 - 0800			

Thursday FT4 NCCC Sprint

The Northern California Club is again pleased to sponsor our weekly FT4 Sprint, aka FT4NS (NCCC Sprint). This contest is held every Friday UTC between 0100Z and 0130Z (Thursday evening in North America). Non-North American stations are welcome to participate. No logs are necessary; please submit your score to 3830scores.com using the "NCCC FT4 Sprint" template. FT4 NS Sprint Rules are posted at: https://www.ncccsprint.com/ns.html See you on the screen! Frequencies: 1839, 3575, 7047.5 (also 7080), 14080, 21140, 28180, 50318.

FCC Expands 60 meter Amateur Allocation

The FCC has finally acted on the WRC-15 authorization to expand the US amateur allocations in the 60 m [5 MHz] range. US amateurs with General or above licenses have enjoyed 5 USB "channels" in this range for several years now. Four of those channels with center frequencies [kHz] – 5332.0, 5348.0, 5373.0, and 5405.0 – remain with power limited to 100 watts ERP using USB, CW, and PSK modes, all on a non-interference basis with the primary US Government users. This is essentially no change from prior authorization. Note that, all emissions must be centered in the channel.

Note: The FCC's Report and Order was issued on 9 Dec 2025 and is effective 30 days after appearing in the Federal Register. Normally, agency actions appear in the Register within a day or so of release. Thus, 9 Jan 2026 would be the first date that the allocation would be effective, and the date may be later. Hopefully, ARRL will provide an effective date for us.

The fifth channel was expanded into a non-channelized band at 5351.5 – 5366.5 kHz as a secondary allocation meaning of course that if a government user appears, hams must QRT. Permitted emissions remain the same as for the four discrete channels … however the power is limited to 9.15 watts ERP.[1] It's only 15 kHz **but** … it overlaps allocations in the rest of the world making it a DX band. By general agreement among US hams, it will not be a contest band. The JUG has not yet received word from ARRL on if and/or how this new band will be integrated into the DXCC, WAS, and other award programs.

Just as 50 MHz is often referred to as the "Magic Band" at VHF, the 5 Mhz range is somewhat of an HF equivalent, and the five original channels have seen increasing use. Most current radios have firmware updates that allow transmitting in the range, and activity has picked up with round-tables and nets showing up. It behaves a lot like 40 meters with ground wave and NVIS propagation during daylight, and much longer skip at night. However, during sunspot cycle minima, the MUF will often be below 7 MHz but above 5 MHz so 60 meters is not just "a mini forty."

Information for this JUG item was taken from ARRL Notices, the Federal Register, and the current 47CFR97 found on-line.

1 You are free to imagine exactly how they came up with this number, and why it's different than the other four channels.

R. Dean Straw – N6BV

Well known Senior Engineer in the ARRL Technical department, editor of the ARRL Antenna Book, a top contester, and long term NCCC member and former President Dean Straw, passed away in San Francisco last July following complications from Parkinson's disease. Dean was an avid contester, a long time member of the N6RO Contest Station Group, holding down 15 meter duties for many years, and former NCCC President and Vice-President/Contest Chair. He was inducted to the CQ Contest Hall of Fame, and possibly best known for his High Frequency Terrain Analysis [HFTA] and transmission line [TLW] software.

Beyond his technical knowledge and skills as an engineer and author, Dean was a mentor for all who encountered him. Jim, K9YC, wrote "*Dean was very welcoming to me when I moved here, and we later interacted on technical issues, especially antenna design issues and my early work on ferrite chokes. He contributed a very important paper to QST on the topic, emphasizing that they could be highly problematic when used in un-matched lines. We discussed the piece prior to publication, and he adopted my comments.*"

Alan, AD6E/KH6TU also commented, "*Sad to hear we lost him. I've known many really smart people in my life and Dean was right up there with the best. I only operated with him once, way back in 1999 as part of the Team Vertical. He straightened me out in many ways regarding vertical antennas ... specifically what doesn't work, what works, and why. The best Elmer one could hope for. He was also one of the best CW contest operators. He set the standard for which I've been trying to achieve ever since.*"

Rest in peace, Dean. You truly left a legacy that will endure.

The Lumber Yard

Awards and Kudos for NCCC Members

Antenna Feed Point Box Fabrication

Gary Johnson, NA6O

Some antennas need a special network at the feed point. For instance an inverted-L will have a low impedance where a 1:2 step-up impedance transformer is useful to improve the match. Or a multi-band vertical such as the popular 43- or 25-footers needs a 4:1 step-down transformer. Maybe a relay or two is required to shift the resonant frequency. Also, every antenna should have a proper common-mode choke for the feedline; sometimes that is all you need as in the case of a simple dipole or Yagi. All of this can be nicely packaged, making it mechanically robust, easy to mount and connect, and weatherproof. Here are some construction techniques that I've been using. At the end of this article are some actual examples.

Enclosure Types: Plastic is preferred because most chokes and inductors will tend to couple to metal, degrading performance. Plastic is easier to fabricate and there's no rust. Look for the NEMA 4X or 6P (IP66 or 68) specification which is waterproof. Cantex or Carlon PVC junction boxes are available from any hardware store. Common sizes are 2x2x4, 4x4x4, 6x6x4, and 8x8x4. Even larger ones are useful as big junction boxes at the base of a tower. Covers screw on and are gasketed. These have thick walls which will be mentioned later. Hammond and Bud also make a wide variety of enclosures. Some are available with a hinged cover which is very useful for networks that may require adjustment (Fig. 1).

Fig 1. Left to right: Cantex/Carlon PVC junction box; Bud HPB series; Hammond 1555 series (great for weatherproof QRP).

Coax Jacks: The square SO239 (Amphenol 83-1R) is usually my first choice (Fig. 2). If the panel is less than 1/8 in. thick, you can rear-mount it via a 3/4 in. hole. Otherwise it must be front-mounted via a 5/8 in. hole. Hold the connector in place while you drill 1/8 in. holes for #4-40 screws. To make the ground connections, I like to make a square copper tab as shown in the photo, but you can just use solder lugs. Connecting to more than one screw adds insurance against one coming loose. Always use stainless screws and nuts.

***Fig 2.** Left to right: Amphenol 83-1R; my copper grounding tab; a double-female feed-through connector; and a threaded SO239.*

An alternative is a double-female feed-through with a PL259 connector going to the device inside. This avoids pigtail connections and will perform better for VHF. Be sure you tighten the heck out of the nuts. A threaded SO239 is also tempting because it only requires one hole for mounting. The drawback is that it tends to spin when someone tightens the PL259. Also it may not work with thick-walled PVC boxes unless you spot-face the hole.

Other connector types may have similar options, as with N connectors. If you're building a little QRP box, you might use a BNC.

Antenna Terminals: For most antennas, you have two wires to connect. I generally use #10-32 stainless machine screws for terminals. Brass is good too. On plastic boxes, it's important to use flat washers inside and out to

spread the force. Otherwise the plastic tends to deform and creep away, leaving the fastener a bit loose. For the interior connection, use a large solder lug or crimp lug. On the outside, I sometimes supply a wingnut but regular nuts are fine. Leave a little bit of slack on the internal connection in case the terminal ever spins due to over-torquing the screw. You don't want the wire to shear off.

Antenna Wire Tie Point: To take the strain off of the wire connection, I use stainless eyebolts, usually 1/4 in. That way, the installer can loop the wire through and twist it or use a split-bolt connector to really lock it in place. Since the box is made of plastic, both the tie point and antenna terminals are automatically insulated well enough.

Mounting Toroids: Most often we wind our chokes and transformers on toroids (typically ferrite). Secure mounting is recommended because you never know what somebody is going to do to your nice assembly! I've tried bedding the coil in silicone glue but results are mixed, with adhesion failure to the plastic. Above all, don't leave it just hanging by the wires. A positive method is a long machine screw through the enclosure and through the center of the toroid, with a plastic or phenolic bar across the windings (Fig. 3). Almost any plastic will do, and 1/8 in. or thicker is fine. Acetal (Delrin) is my favorite. Use a nylock nut and don't get carried away tightening it.

Fig 3. *A toroidal choke clamped in place with a piece of 1/8 in. acetal and a machine bolt.*

Mounting Solenoidal Coils: Commercial coils like the old B&W Airdux are getting really hard to find and are expensive so I just make my own. They don't usually need a core or support unless they are really huge with a zillion turns. I wind mine from heavy wire such as #10 solid copper or copper refrigerator tubing, then it's easy to solder and holds its shape well. At each end, I form a loop. That loop can accept a bolt that goes into a standoff. The standoff could be metal in some cases but I usually make them from acetal or nylon. Good old porcelain is great if you can find it.

Static Bleeders: Fully-floating antennas might need a path for static electricity to drain to ground, and/or across the coax. For instance a simple vertical with elevated radials has no ground connection anywhere, and triboelectric charging from wind can really zap you when the coax is disconnected. (Your matching circuit may already contain some other components that takes care of all of this.) Inductors or resistors may be used but I prefer resistors because there is no chance of resonance, which is especially problematic with multi-band antennas. To accommodate 1500 W with extra SWR and transient tolerance, a good choice is a 1 Mohm, 1W, carbon resistor. This can be a series-parallel combination. Note that you may need some connection to Earth ground.

Internal Wiring: Coax can be stripped back and the braid fanned out for pigtail connections. Teflon coax, such as RG400, is a joy to use since it won't melt when you solder it. Any heavy-gauge copper wire (#16 or larger) should be fine for most connections since they are pretty short. Thin copper strip or braid is probably overkill but if you have it, use it. Of course a QRP application can get away with very small conductors.

Heat Dissipation: I once did a series of experiments on ferrite core heating in small enclosures. <*Ref 1*> The upshot is that a ferrite toroid experiencing 30W of dissipation will overheat and damage the ferrite in about 15 minutes. This amount of heating can occur, for instance, with a choke running 1500W at 30 MHz into an unbalanced load such as an off-center fed dipole. And transformers for end-fed antennas are seriously at risk of thermal damage. If you have any doubts about dissipation, you can ventilate your enclosure. I drill large holes, or

a series of small ones, and on the inside cover them with aluminum window screen held in place with silicone glue. As long as the opening faces downward it will be ok.

Weather Proofing: A quality enclosure will include a gasket and should be fine. When you install components through penetrations, seal them with a bit of silicone glue. A perfect hermetic seal can never be obtained, and there will be condensation inside. Drilling 1/16 in. weep holes in the bottom of the enclosure is recommended. Bugs won't get in but the enclosure can breathe and any condensate will drip out. A clever commercial vent device is the Hammond SDV180-1 for about $8.

If you have a control cable, feed it in through a compression type cord grip bushing, also known as a *non-metallic strain relief cord connector* at Home Depot.

Mounting: Smaller enclosures can be suspended via an eyebolt and rope for things like dipoles with no center support pole. Many enclosures have mounting ears for direct bolting to flat surfaces. There are several ways to mount on tubing and pipe. Bolt on a straight bar a bit longer than the enclosure and use hose clamps (Fig. 4). Or drill a small hole in the center of a hose clamp and bolt it directly to the back of the enclosure. A fancy installation might use a saddle clamp or channel strut fittings (Superstrut, Unistrut, etc).

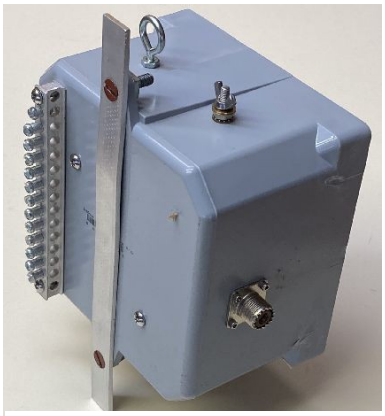


Fig 4. *A strip of aluminum allows this enclosure to be clamped to a pipe driven into the ground.*

Note the ground bus bar for radial connections. That's a standard electrical panel accessory.

Special Tools: *Step bits* are your friend especially for large holes. Easily and safely used with a hand drill, you can blast through thin plastic or metal with ease and obtain a very clean, round hole up to at least 1-3/8 in. Get them at any hardware store.

Choke Design: Every antenna needs a common-mode choke. The place to go for design details is the famous ***k9yc.com/2018Cookbook.pdf*** <*Ref 2*>. He also has a cookbook for VHF/UHF <*Ref 3*>. For the HF bands, that means a Fair-Rite mix 31 ferrite toroid wound with either RG400 Teflon coax or twisted-pair wires. He lists optimum turns counts for each band (or set of bands), and has links to spreadsheets with more details on each design. I prefer RG400 because it's always 50 ohms. Chinese sources on eBay are fine; every batch I've tested met all specifications.

Transformer Design: For antennas with an impedance far from 50 ohms, sometimes an efficient transformer is a good matching solution. My primary reference is a book by ***Jerry Sevick, W2FMI*** (SK) <*Ref 4*>. He covers a vast number of impedance matching transformer designs configured as baluns and ununs, all with actual samples that he built and tested. Efficiency is very important, so be sure to use the recommended core and wire types. For most applications I use a 2.4 in. Fair-Rite mix 52 (mu = 250) toroid. Mix 61 (mu = 125) is recommended for some cases, and VHF. These are both very low-loss materials. Mix 43 (mu = 800) is also sometimes useful. Most transformers are wound with bifilar or trifilar magnet wire; 14 gauge is a good choice (smaller for low power). Larger sizes are finger killers when you wind them.

Labeling: If something has a polarity or special function, please apply a label. I always show my call sign, date, and a short description of the device. *Brother* labels hold up very well in the weather. If it's a very large and complex box, print the schematic at reduced size and tape or glue it inside the lid.

Example 1: Choke for a Fan Dipole

Commercial chokes (they always seem to call them 1:1 baluns) are pretty expensive and often the specification include some pretty wild claims. Follow the K9YC winding guidelines and the other info presented here and you can build a better product at a fraction of the cost. Figure 5 shows one that I made for a fan dipole, based on a Fair-Rite 2631803802 mix 31 core wound with RG400 in a 4x4x2 Cantex box. There are eyebolts for the antenna wires to tie to and another one for hanging. Total cost is around $35.

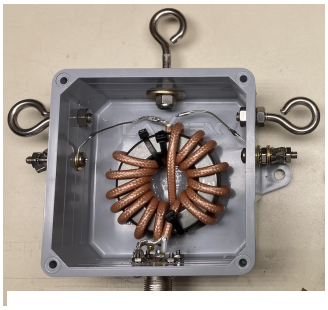
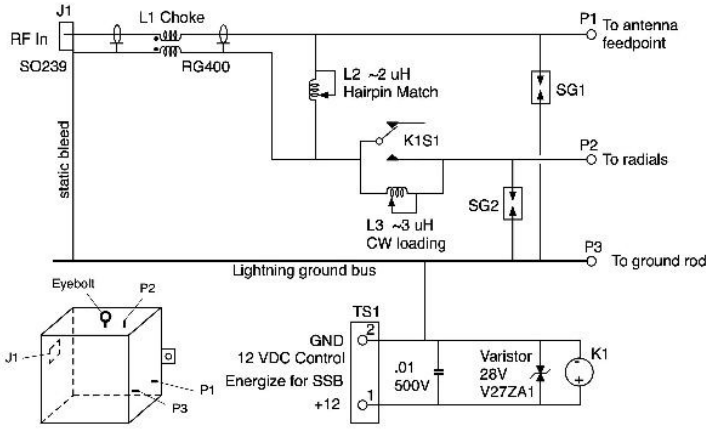


Fig 5. *Choke for a fan dipole. Anyone can build one of these!*

Example 2: Feed Point Box for a 160m Inverted-L

Simulation shows that the feed point impedance of my 160m inverted-L with elevated radials will be around 20 ohms, so a 2.25:1 impedance transformer is nearly perfect. A Fair-Rite 5952003801 mix 52 core is wound with 5 turns trifilar 14 AWG magnet wire. A 100 pF high-voltage "doorknob" transmitting capacitor is added at the 50 ohm side of the transformer to cancel leakage inductance, improving the match. Figure 6 shows the schematic and Fig. 7 the final product. Multiple eyebolts are needed for the vertical element and the elevated radials.

You can test a device like this with a VNA or antenna analyzer. Connect an appropriate resistor (22.2 ohms) across the antenna terminals and observe the input SWR.



K1: SPST, 12V coil. P&B PRD5GO-12V.
L1: 15T RG400 on FT240-31. Loss .03 dB, Pd=13W at 1500W.
L2, L3: #10 BC, 10 turns, 2" dia, 2.5" long. Stretch for match.
P1, P2, P3: 1/4-20 X1.5 brass bolts, nuts, washers.
SG1, SG2: GDT, 1400V, 25 kA. Epcos B88069X4300B152. M3 bolts.
TS1: Barrier strip.
Enclosure: 8x8x4 PVC NEMA-4, Cantex R5133712.

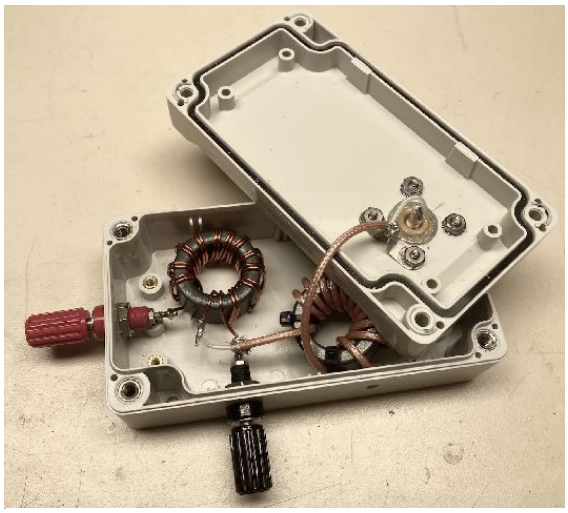


Fig 7. *Feedpoint box for a 160m inverted-L. A compensation capacitor is barely visible next to the 2.25:1 transformer. The hold-down clamp for the transformer is removed for clarity.*

Example 3: Feed Point Box for an 80m Vertical

Here is a complex design for an 80m full-sized vertical with a single elevated 1/4-wavelength radial formed in a

square, per N6BT (Figs. 8, 9). Besides the usual choke, this antenna needs a hairpin match (an inductor across the antenna feed). We also want to use this on SSB and CW portions of the band, so an inductor in series with the radial is added via a relay to shift resonance lower in the band. Coils are wound from #10 AWG solid copper wire, about 2 in. diameter and not too closely spaced. One is mounted on acetal standoffs while the other is clamped in place with a Teflon contraption I came up with. A larger 8x8x4 Cantex box was needed.

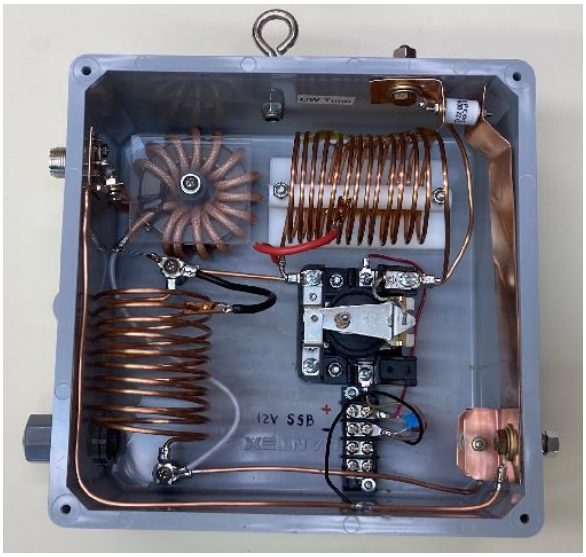


Fig 8. *Complex 80m vertical feed point box with hairpin coil, CW-shift coil with a relay, choke, and lightning arrestors. This box is bolted to Unistrut.*

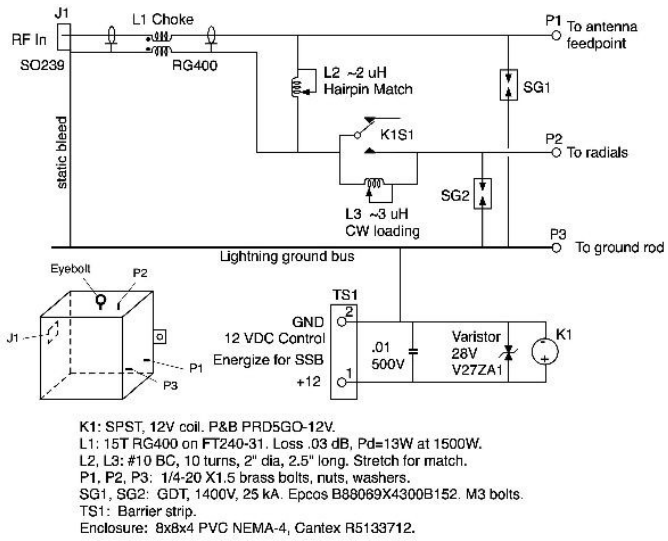


Fig 9. *Schematic of the 80m vertical feed point box with parts list.*

Because of lightning risk where this was installed, 1.4 kV gas discharge tubes (Epcos) were included on the vertical element and the radial with heavy copper sheet connected to a grounding bolt. It may be overkill but it's easy enough to install here.

I do initial adjustments of the coil taps with a small copper alligator clip on the shorting wire. This can be soldered in place when we're happy with the settings. Only solder one side of the clip so that you can change it if needed. Finding old-school coil clips is nearly impossible.

Example 4: 25-Foot Portable Vertical

This non-resonant antenna uses ground radials and presents an impedance in the region 200 ohms on many bands. An easy way to match this is a 4:1 impedance transformer (unun) with a common-mode choke. For 100W maximum power, small toroids can be used. The transformer has 12 bifilar turns of 23 AWG magnet wire on an FT140-61 core. Loss is only 0.17 dB at 30 MHz. For the choke, RG316 coax is sufficient for this power level and 12 turns are wound on a small Fair-Rite 2631801202 mix 31 core; this is a *very* broadband choke. The enclosure is a Hammond 1555 with a nice gasket seal (Fig. 10). Binding posts were ideal for this simple antenna and in fact it's being used by a blind ham.

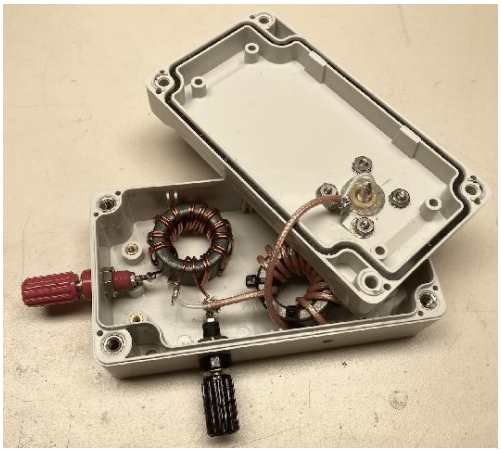


Fig 10. *Match box for a portable 25-foot vertical.*

References

1. *Four-Square Rebuild at N6RO* by NA6O. Includes feed point box design and thermal studies.

https://na6o.com/amateur_radio/ewExternalFiles/Four_square_rebuild_at_N6RO.pdf

2. Jim Brown, K9YC, *A New Choke Cookbook for the 160-10m Bands*. http://k9yc.com/2018Cookbook.pdf

3. Jim Brown, K9YC, *Transmitting Chokes for VHF and UHF.* http://k9yc.com/ChokesVHF.pdf

4. Jerry Sevick, W2FMI, *Understanding, Building, and Using Baluns And Ununs*. Now out of print but available as a PDF download. https://na6o.com/amateur_radio/ewExternalFiles/W2FMI_Baluns_and_Ununs.pdf

Tube of theMonth

Norm Wilson, N6JV

Visit the Tube Museum at *n6jv.com*

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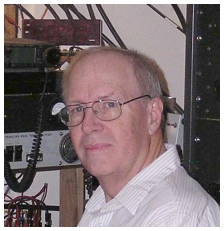
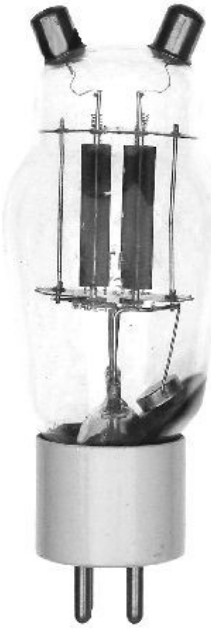
HY31Z – HY1231Z



In the early 1920's, the Hytron Corporation in Salem, Massachusetts, began making vacuum tubes under their Hytronic Laboratories division. I have seen little evidence of production until the middle 1930's when they cameout with a new, expanded line of high frequency transmitting tubes. They had a lot of competition so they needed to offer special features.The HY31Z incorporated many of these features.

The base was made of low loss ceramic for VHF operation. The HY31Z was rated to 60 MHz at full power. HYTRON tubes were only rated at CCS (Continuous Commercial Service). The plates are made from graphite that won't sag under overload. They are zero bias and are designed to be easy to drive. A tube with 2 sections can have the plates tied together for parallel or push-pull operation, or operated as a push pull or push push multiplier. Push pull triplers were the common circuit to get drive on 10 or 5 meters. The HY31Z operated with 6.3 volts on the filament, but you could order an HY1231Z which ran on 12 volts, perhaps in a mobile application.



HY31Z $3.50 Net

Twin-triode with instant-heating filament. Zero-bias class "B" modulator, R.F. power amplifier, frequency multiplier.

Filament potential (AC or DC)	6.3 volts
Filament current *	2.5 amps.
Plate potential	500 max. DC volts
Plate current *	150 max. DC ma.
Grid current *	30 max. DC ma.
Plate dissipation (CCS) *	30 max. watts
Average amplification factor	45
Mutual conductance	1800 μmhos

* For both triode sections

Inter-electrode capacitances	
Grid to plate	5.5 μμf.
Grid to filament	5.0 μμf.
Plate to filament	1.9 μμf.

Plate connections to twin top caps
Thoriated-tungsten filaments
Ceramic Alsimag base

"It's Not Over When The Last Flame Dies"

K6XX Station Rebuild, 2020-2025

Bob Wolbert, K6XX

Part 2 – "The Guvmint"

The first part of this saga, (September 2020 JUG, ***https://www.nccc.cc/jug/2020/09sep2020.pdf***), predicted that the "second disaster" would be dealing with the local government. I sure wish I wasn't always right! (Pay no attention to my wife's counterclaims). As 2025 came to a close, we are finally living in the replacement house, which still lacks some trim and other miscellaneous accouterments. The new shack has been commissioned, although it too remains unfinished. Critically, for those of us addicted to contesting, contest activity took a hit for only one year before nearly recovering to pre-fire rates and some scores. Priorities are priorities, after all.

"Public 'Servants?"

The first draft of this article included around four thousand words discussing insurance and logistics, and ranting about the County of Santa Cruz's misdeeds and perceived corruption. Not really the goal of the JUG and my keyboard has a "Delete" key, so here comes a highly condensed version.

Several folks have questioned how the insurance company treated us. Actually, I have few complaints, as we eventually collected nearly all of the policy's limits. Farmers Insurance delivered a first-payment within a couple days of evacuation, but this was not necessarily out of generosity, it also started their 12-month statue-of limitations clock. Fortunately, that clock was later extended to 36 months since this was declared a national disaster. Even so, this was barely enough time for all of the paperwork, with my final submission made mere days before the deadline. No insurance adjuster ever visited, another hallmark of the pandemic era, with all communications via phone or e-mail and with different people taking charge at different points. The insurance company determined its liability based on value at the time the house burned, so the ensuing hyperinflation following the pandemic was devastating with prices doubling or worse between the event and the actual rebuild. The new house, effectively half the size of the 2001 version and including lower-end appointments, cost double the original structure. Combining both the Structure and Possessions portions of the homeowners insurance policy was required which lead to a mostly empty new house …

When I built the first house in 2000-2001, the advertised "one month" permit process took nine. When asked why the process was so long and convoluted, the department staff replied that they "didn't think people should build outside of the suburban region". After losing the state's lawsuit for lack of affordable housing, County officials no longer *say* that, however, it continues foremost in their minds and they remain obstinate.

Here are low-lights of the 14½ month "expedited" process for a rebuild permit:

1. The County held a disaster recovery faire, where a representative angrily complained that we were inconsiderate by demanding quick response. "We've never issued even 100 permits in a year! How do you expect us to process 1,000?"

2 The County refused to do anything until FEMA inspected for hazardous material (1½ month delay)

3 The mandated debris removal permit was delayed because they changed the application form *after* I submitted it. I had to find this out for myself since they never told me. They first claimed that I had no application, then stated my original one was invalid. (2 weeks wasted plus 2 month delay)

4 I was warned I'd be cited for "illegal camping" for using a trailer on my property. Good thing *that* hideous crime never occurs in the city. Temporary occupancy permit application made; they played the "We changed the form" game one time, then shelved the application without action (3 month delay).

5 The County eventually contracted a disaster services consultant, 4Leaf, for all processing and inspections. The temporary occupancy permit was quickly approved! However, the County still had their tentacles in the mix. They insisted upon issuing the permit NUMBER. Rumors circulated that permit issuance was held up by this requirement, with no recourse until the consultant threatened a breach of contract lawsuit. I know for certain that my permit was issued days after the lawyers met.

6 The mobile home that was negotiated in September and meant for temporary living, had its lead time explode from 6-8 weeks to 48 weeks during the permit delay. Another too-long story; however a canceled order provided a lucky7 opportunity to skip that line.

7 Other items, some of which were discussed during NCCC pre-meetings. This JUG's legal team is hesitant to publish them … for my safety.

8 Following this, 4Leaf kept the process moving as smoothly as could be expected, given the COVID-inspired shortages and price spikes, and lack of tradesmen of every type.

Having suffered through the permitting ordeal in 2000, the necessity of immediately dealing with septic and PG&E issues was understood, since they could take forever and would prevent occupancy. This was done and put us at the head of the rebuild pack.

A bright spot was the generosity of Jim, K9YC. Upon being (mistakenly) informed that his house was destroyed, Jim signed a 6-month lease on a Santa Cruz city apartment. Jim gifted me that apartment, which was a great help during the fight for the right to return to my own property.

Once the rebuild permit was in process, a contractor was needed, but all were very busy and expensive. So I played that role, along with pretending to be a (painfully slow) electrician and carpenter. This further padded my resume beyond bulldozer operator and chainsaw jockey, since the waiting period was filled by removing dead-trees.

We will not discuss insuring the new house. Yet another disaster, one which has not yet been resolved.

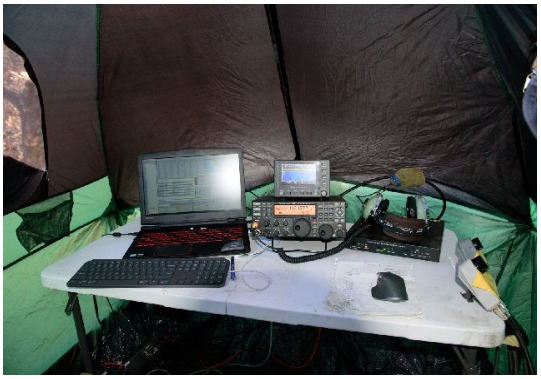
That's enough of a summary. There are loads more facts, names, and misdeeds, but they can wait for my "memoirs". Bottom line: Losing a house in 2020 was a very bad idea.

Radioactivity

We left my contesting saga in September 2020 as contest season was near. I had one surviving tower with antennas for most bands, but all of the feedlines had melted. The easiest way to get back on the air was to repair the coax and operate from directly beneath the tower. Conventional wisdom stated rebuilding would take about two years, but I was convinced I'd be recovered by summer. Dream on! … Between moving between seven different addresses, getting the well pumping water, coordinating the septic repair, and convincing multiple bureaucratic layers at PG&E to connect temporary power, weeks passed quickly and CQP was upon us.

CQP 2020 was the year of the SEQUOIA event and I had signed up for special callsign N6A. How could I justify that special event call from a severely handicapped operation? N6XI stepped up and generously lent me his Truckee station, which was a great way to take a break from the continuing disaster. His hospitality was fantastic, the contest was as great, and it was nice to get away for the weekend, since it would be many months before I again strayed far from my land.

For CQWW, I needed to be back on my own with my callsign. Feedlines were spliced from their melting point to a semi-flat spot 50' from the surviving tower base. New parts were hard to come by, but donations were generous and improvisations were extensive. Repairs only had to last a few months, right? The feedline chore was completed minutes before the 5 pm starting gun and operations commenced from a truck bed tent with a small generator. Things went as well as could be expected for about an hour, then darkness fell. I had no lamp! Operating low power from a dark, wind whipped tent produced my lowest-ever CQWW score, but I was back on the air from home!



By CQWW CW in November, a travel trailer was on site. It was parked where the truck had been for fone and the antennas were mostly the same, but now I had 500W and comfort. The difference was outstanding.

K6XX-II: The "Shed-Shack"

About the same time as Part 1 of this tale was published in the September 2020 JUG, I ordered an 8' x 10' garden shed kit to temporarily house my station. This being the depths of the COVID mass-hallucination, the retailer took my funds but did not provide a delivery date. "Three Weeks Typical" was promised on the web site. But it was three months later, at 2300Z on the Friday afternoon of CQWW CW 2020, that the kit arrived. The driver

fortuitously ignored the factory delivery instructions (“Leave on driveway at street”) and instead hauled the large, extremely heavy package up the rough road leading to the tower.

Latent damage to the lowest antenna of the old JA stack, now rotated toward Europe, caused arcs and amplifier faults when driven above 300W. The generator was RF sensitive on some bands, causing ground fault interrupter trips. Even after a late start, a healthy 2k+ QSO effort was logged, a significant improvement over the previous month's fone adventure.

Monday after the contest, shed construction commenced, with rough completion the following day. Electrical wiring, windows (including a ground window for coax cables), insulation and sheetrock were added. My girls, still visiting for Thanksgiving, made it look great with paint. Things happen fast with the County uninvolved! The 500W amplifier wasn't generating enough heat for comfort, so a noisy diesel heater was installed, making the Shed-Shack pleasantly toasty after a half-hour. This was definitely more comfortable than the truck bed, and less attractive to potential looters than the travel trailer. Cables were routed though a lightning-protective ground windows, a buried ground loop encircled the structure, and proper ground rods were installed. For the next 4½ years, from December 2020 until August 2025, this was home for all on-air activity.

The Shed-Shack's first contest was ARRL 10, another favorite of mine. Propagation was less than ideal, but operating from a fixed structure was a great step forward.

Early 2021 operations were all merely token. I spent my days cutting and moving dead trees or preparing sites and was dirty and exhausted by contest time. Commuting up the hill from town every day was complicated by the construction everywhere along the route. For weeks, if I didn’t get through before 6 am, a certain contractor closed the road for up to 20 minute at a time!.

WPX CW ‘21 was also moving weekend from the apartment in town to the mobile home. This temporary residence was (almost) completed Friday afternoon but our apartment rental was up on Monday, the end of the month. Unfortunately moving was given higher priority than this very enjoyable contest – no accounting for taste. Sure was nice finally moving back "home" after ***only 9½ months*** of homelessness: #$%^&*()!!.

Radio was third priority during summer 2021. Besides the house rebuild logistics, we prepared for hosting a long-delayed wedding in August. Finally, the wedding passed and resources could be directed to antenna rebuilding. The original tower, Sarah, was resurrected and reasonably decent antennas pointing at 70 degrees were pulled into place, reaccessing a large number of contesting “customers”.

The haywire antenna selection scheme using multiple antenna switches was getting old. Not that there were too many antennas, but the cabling inside the Shed was messy and error-prone. I missed the semiautomatic system I formerly had. The previous system allowed any one of six stations to connect to any unused antenna bank, where each bank represented a band. It did not require a confuzer and responded instantly upon station power-up. Reprogramming was accomplished by changing diodes: “programming with a soldering iron”. This is adequate when changes are rare, but isn’t applicable at this point in the rebuild process.

Microcontrollers were investigated for its successor, with Arduino, Raspberry Pi, and the new Raspberry Pi Pico as finalists. I knew nothing about any of them, so they all had an equal chance of selection. The Raspberry Pi was pulled from contention due to its long boot time. The newly released Pico had advantages across the board when compared to the Arduino family and won the competition. So instead of learning Arduino code, I studied microPython.

The next contest, CQWW RTTY 2021, was the first using the new antenna switching system running on a Raspberry Pi Pico. Band switching was automatically controlled by the radio and direction was via a single rotary switch: almost idiot-proof! Enough operating time was put in to discover weaknesses and verify functionality before the following week's CQP.

CQP 2021: After months of token entries in the various contests, the first weekend of October was cleared for a full contesting effort. Saturday featured a beautiful dawn, with the autumnal sun rising directly over Loma Prieta. The contest was typical: Great. Given all the recent station rebuilding effort, I was motivated to fully push the equipment. A significant majority of contacts were made with the newly installed TH-7 facing 70°, which performed well enough to set a new county record. The worst was behind us, maybe.

Next was CQWW SSB 2021, where the high bands were in good shape. Got discouraged when the "new" TH7 facing North America/Africa and the A3S directed toward South America were both storm damaged, but 35½ hours produced 814 Q and 2,022,657 points. Then came CQWW CW 2021, where a decent effort of 2,300 Qs in 39 hours were made after re-repairing various broken aerials. Seven hours in the ARRL 10 contest ended the year.

Adapting

The Shed-Shack's location near the surviving tower base reduced feedline loss noticeably. Further, the Shed-Shack eliminated distractions as it was a long hike from "home". Once operating commenced, operating continued (especially when it rained). In 2022, serious operating resumed in all of my favorite contests and scores improved greatly. From the Shed-Shack, tribanders and wires replaced the previous shack's destroyed monobanders. Lacking sufficient antennas for SO2R, the return to honest single-radio operation was revealing. My error rate improved as my increasingly-limited brain cells concentrated on a single audio stream. Throughout this period, operation was with a single transmitter into the same wires and tribanders. The most noticeable dips were during the IARU contests, where the July sun heated the Shed above 100°F, wilting this operator.

Over the next four years, the positives and negatives mostly balanced, and with improving solar conditions, several new personal-high scores, personal-best full-hour run rates, and even a few regional records were made from this less-than-plush Shed-Shack. Top-of-the-cycle propagation was definitely the primary reason -- antenna hardware was certainly not. I won't bore you with the list, but year-over-year improvements occurred in most contests.

Part 3 of this saga will appear in the Feb 2026 issue of the JUG, and will describe the reconstruction of a "real" amateur radio station.

Editor Notes

We lost several ham giants in 2025, the latest: News of Dean Straw, N6BV, passing in July 2025. Way too frequent these days.

Cycle 25 persists with SFI's in the mid to high 100's, moderately low Kp indices, and the peak seems flatter than many ... it may even provide a double peak if the sun continues the general grumpiness it has shown us so far.

My thanks go to this month's contributors. The September 2020 JUG issue presented the story of the tragic, devastating wildfire that destroyed K6XX's home and shack. The saga continues with this issue and Bob's navigation of the bureaucratic wasteland. The February issue will conclude his story with the re-building of Amateur Radio Station K6XX.

Everyone has a story. Think about yours. Empty JUG pages await you.

E-Prime

In November 1967, I returned home from a year in the frozen North and 4 on the other side of the planet to an assignment with NASA MSC in Houston as one of around 200 USAF officers working on the Apollo program. MSC often offered noon-time lectures, usually on technical subjects but not always. I recall one, "Keplerian Eccentricities" (not the astronomical ones) and another titled "E-Prime – Active English" where I learned that "E-Prime" denotes English without the verb **to be** in any of its conjugations and usages around the beginning of 1969. The lecturer [forgot his name] asserted that the verb **to be** encouraged passive sentence construction, promoting **is**-ness (i.e. passive voice rather than active voice and actions.) It almost forces passive words into one's sentences … or so he said.

OK ... maybe interesting and possibly a bit strange … but who would think that an auditorium filled with educated, brown-bagging space nerds would buy into this? Well, they did -- for awhile at least – and at least on the 3rd floor of Bldg. 30 where I toiled in the Landing Analysis Branch. Some NASA documents on the do's, dont's, and technicalities for landing on and ascending from the moon originated from work done by some of those space nerds attending that noon lecture. You can find some of the memos and publications written by them in E-Prime with the ubiquitous Internet search. Narrow your search to 1969, E-Prime excitement waned near the end of that year. Or, you can just take my word for it.

Learning to write in E-Prime actually resembles learning Morse code in some ways. With Morse, you first hear patterns of dots and dashes which soon to morph into sounds of letters. As your skill increases, you begin to hear shorter, and then longer words. With E-Prime, you first struggle to simply avoid the "forbidden" words … hard because of their large number. That soon morphs into a recognition of the active voice sentence constructions typical of E-Prime, and eventually, those constructions just become automatic for you. I stopped searching for the many conjugations of the verb **to be** that sneak into my writing decades ago, but I still tend to use the active voice more often than before I ever heard of E-Prime.

*With the exception of the words in **bold red Ariel** font, this edition of Editor Notes demonstrates E-Prime.*
To describe a subject you usually must name it at least once.

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Tim Shoppa *tshoppa@gmail.com*
FT4/8 Sprint: Dennis W1UE *egan.dennis88@gmail.com*

Communications
Webmaster: John Miller, K6MM
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JUG Editor
Fred Jensen, K6DGW: *k6dgwnv@gmail.com*
Home: 775.501.5488
Cell: 530.210.0778

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If you wish to join NCCC, please fill out an application for membership, which will be read and voted upon at our monthly meeting. To join, you must reside within club territory which is defined as everything in California north of the Tehachapi's up to the Oregon state line, and part of northwestern Nevada (anything within our ARRL 175-mile radius circle centered at 10 miles north of Auburn on Highway 49).

Life Memberships

Life memberships are $250.00 Contact secretary.nccc@gmail.com. Members who have reached 80 years of age have and been an NCCC member for 20 or more years are eligible for Honorary Life Membership ("80/20 Rule"). Contact secretary.nccc@gmail.com

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Please consider submitting an article! The preferred format is plain, unformatted ASCII text MS Word (.doc/.docx) are acceptable, Pictures should be as high a resolution as available. Please do not spend time formatting your submittal, the templates will re-format everything. Send your material to *k6dgwnv@gmail.com*

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The NCCC email reflector is devoted to the discussion of contesting. Topics include contests, station building, dxpeditions, technical questions, contesting questions, amateur radio equipment wants/sales, score posting, amateur radio meetings/ conventions, and membership achievements. Postings may not include personal attacks, politics, or off-subject posts. Such postings will be considered a violation of the Guidelines

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We are pleased to announce that the new NCCC Land's End store is online! You can choose from an array of shirts, jackets, and hats and apply your choice of custom-embroidered NCCC logos: A plain one, or one that also says Fifty Years. And, you can personalize your item by adding your name and/or call sign. The store is open 24/7 and items are shipped directly to you. No more waiting for everyone else to make up their minds on a group purchase.

https://business.landsend.com/store/nccc/ or from the NCCC website: http://nccc.ccc/members/lestore.html
Thanks to W6TCP for helping to set this up. Instructions for purchases from Lands' End NCCC Store

1. Go to https://business.landsend.com/store/nccc/
2. Click on Men's or Women's link, then choose item(s)
3. Pick color, inter quantity of each size you want to order.
4. Click Apply Logos and Personalizations. This will display the logo choices. Try them out. It will show you what they look like on your chosen fabric color.
5. Select a location for logo (left side, ride side, back, etc)
6. Click Apply Logo.
7. Optionally, click Add Personalization to add your name or call sign ($8.00, 10 character limit)
8. Click Add to Bag and Continue Shopping or.

   Start Secure Check out. Account creation and credit card required.

K4 HIGH-PERFORMANCE DIRECT SAMPLING SDR

A direct-sampling SDR you'll love to use

Our new K4 transceiver harnesses advanced signal processing while retaining the best aspects of the K3S and P3. It features a 7" touch display, plus a rich set of dedicated controls. Per-VFO transmit metering makes split mode foolproof. Band-stacking registers and per-receiver settings are versatile and intuitive. Control usage information is just one tap away thanks to a built-in help system.

Modular, hybrid architecture adapts to your needs

The basic K4 covers 160-6 m, with dual receive on the same or different bands. The K4D adds diversity receive, with a full set of band-pass filters for the second receiver. (Thanks to direct RF sampling, there's no need for crystal filters in either the K4 or K4D.) The K4HD adds a dual superhet module for extreme-signal environments. Any K4 model can be upgraded to the next level, and future enhancements–such as a planned internal VHF/UHF module–can be added as needed.

Single or dual panadapter, plus a high-resolution tuning aid

The main panadapter can be set up as single or dual. Separate from the main panadapter is our per-receiver *mini-pan* tuning aid, with a resampled bandwidth as narrow as +/- 1 kHz. You can turn it on by tapping either receiver's S-meter or by tapping on a signal of interest, then easily auto-spot or fine tune to the signal.

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The K4's rear panel includes all the analog and digital I/O you'll ever need. All K-line accessories are supported, including amps, ATUs, and our K-Pod controller. The Video output can mirror the K4 screen or display a high-res Panadapter only screen. Via Ethernet, the K4 can be 100% remote controlled from a PC, notebook, tablet, or even another K4, with panadapter data included in all remote displays. Work the world from anywhere–in style!

K4 KEY FEATURES

- Optimized for ease of use
- Modular, upgradeable design
- 7" color screen with touch and mouse control
- ATU with 10:1+ range, 3 antenna jacks
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The K4 interfaces seamlessly with the KPA500 and KPA1500 amplifiers

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