



#626 – September 2024



Publication of the
Northern California
Contest Club



**NCCC – 54 years
of contesting
excellence**

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NCCC MEETING

<https://nccc.cc/meetings.html>

ZOOM – 10 Sep 1800-2000

Dean Wood, N6DE

***“You Can Be A Winner In CQP
2024”***

President's Report

David West, KO6M



It is upon us. Not just shorter days and longer night but Contest Season for 24/25! Did you do better last year than the year before? Will you do even better this year? Remember it's Butt in Chair Time that is the number one ingredient for higher scores. It's also the only item you can control. Murphy takes over the rest. Kick Butt!

Remember to mark down November 2-4th and 16th-18th for Sweepstakes (CW and SSB respectively) as well as December 14th-15th for ARRL 10m. I'll let Chris talk about those as we get closer.

The other thing you should mark down in your calendar is our NCCC BBQ! October 20th at N6RO (5480 Sellers Ave, Oakley). We don't have all the particulars down yet, but we know there will be food, entertainment, and comraderie. It is always a good time. Yes, I know it is the weekend of Pacificon but I've heard that people like that, so here we are.

Short and sweet this month! “See” you all on the air!



About NCCC

Officers and Directors, 2023-2024 Contest Season

President: David West, [KO6M](#)
Vice-President/Contest Chairman: Chris Tate, [N6WM](#)
Secretary: Greg Alameda, [KK6PXT](#)
Treasurer: Nian Li, [WU6P](#)
Past President: David Jaffe, WD6T
Director: Jim Brown, [K9YC](#)
Director: John Miller, K6MM
Director: Ed Radlo, [AJ6V](#)

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Awards Chair: Gary Johnson, [NA6O](#)
California QSO Party Chair: Dean Wood, [N6DE](#)
QSL Mgr [[K6ZM](#)]: **vacant**
QSL Mgr [[K6CQP/N6CQP/W6CQP](#)]: [Dean Wood](#), N6DE
NAQP Teams: **vacant**
NA CW Sprint Teams: Bob Vallio, [W6RGG](#)
NCCC Email Reflector Admin: Phil Verinsky, [W6PK](#)
Worked All CA Counties Award: Fred Jensen, [K6DGW](#)
Photographer: Bob Wilson, N6TV

NCCC Thursday Night Contesting

NCCC Sprint: Tom Hutton, [N3ZZ](#)
NS CW Ladder: Bill Haddon, [N6ZFO](#)
NS RTTY Sprint/Ladder: Ed Radlo, [AJ6V](#)

Communications

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Webinars: Bill Fehring, [W9KKN](#)
Membership: Gary Johnson, [NA6O](#)/Ian Parker, [W6TCP](#)

JUG Editor

Fred Jensen, [K6DGW](#): k6dgwnv@gmail.com
Home: 775.501.5488
Cell: 530.210.0778

VPCC Report

Chris Tate, N6WM



Greetings KBers.

Contest Season is upon us! Are you ready?

Well, time flies, doesn't it? Welcome to the 2024/25 contest

season! With the summer NAQP series behind us as well as the WW Digi contest, and sprints beginning, it's time to start putting focus on finishing any last minute antenna work and shack changes, and batten down the hatches for the whirlwind that the beginning of the primary contest season brings us.

I am preparing press releases soon for the largest annual RTTY contest in the world, the CQWW RTTY Contest that kicks off the busy part of the season. It will be occurring the last weekend of this month, the 28/29th of September.

This contest is near and dear to us here in NCCC territory. In fact, its contest manager is Ed W0YK and I (N6WM) sit on the contest management team providing journalistic services to produce the contest write-ups we all enjoy. That's a lot of NCCC team representation. We also have Rich N1IXF who rounds up our team, managing our plaque and awards for this worldwide contest.

The biggest RTTY contest in the world, but a little different than its cousins

There are some differences between the CQWW RTTY and its SSB and CW cousins. As with most RTTY contests, there is no 160 m operation. A multi-single operation can have 8 band changes per clock hour rather than a 10 min rule, same continent but different country contacts get 2 points, what I find the most intriguing, same-country contacts do count (no zero pointers), and a third multiplier will be available from US/VE stations

A great way to get your SO2R Game on!

One of the great things about RTTY contests are that since you are not decoding or trying to understand verbal communications, your mind is free to use the recouped mental clock cycles to perfect SO2R and 2BSIQ operations if you have the hardware to support it. If you have available radios, antennas and filters, you can often times at least get an opportunity to try this on a band or 2.(some flex radios are capable of this with 1 radio making them popular with some of the rty crowd) I have to say its quite addicting to start producing the large



scores running on 2 bands at a time. (heck some of us actually do it on 3 and up to 4 bands!).

Another Club competition we have a history with

The CQWW RTTY club competition is a completely separate competition from the joined CW/SSB events. In other words, we can compete in this one exclusively in an attempt to come out on top. In the past the NCCC has been a pioneering club for RTTY contesting. We are consistently in the top 3 clubs year after year. But it's been a while since we have come out on top. The club competition win has a direct correlation to logs submitted. Lets take a quick look at the 2023 club competition:

1	POTOMAC VALLEY RADIO CLUB	Logs =60	11,466,317	USA
2	YANKEE CLIPPER CONTEST CLUB	Logs=22	11,276,696	USA
3	NORTHERN CALIFORNIA CONTEST CLUB	Logs =28	10,120,442	USA

That is a horse race! PVRC clearly and simply won this via numbers of logs received, many of them small ones. YCCC perhaps and a few more big logs. NCCC traditionally has several big logs as well. The difference between us and a win over PVRC last year is approximately 1.4 million points. That can be as little as one big log, but if we produced 40 entrants, we probably would have had this one in the bag. This emphasizes the importance of club participation and no log being too small!

In order for us to emerge victorious, we need to mark our calendars and work as a team to 1. PARTICIPATE and 2. SUBMIT LOGS. This is the same for any Unlimited level club competition, but really is easy and within reach for this contest! No log too small, no effort too insignificant.

Lets get this season started out right!

If you have not started your season already (with WWDigi), I want to encourage as many of you, the NCCC membership, or TEAM NCCC to fix those audio devices, get your Mark and space calibrated and get ready to kick off the season with CQWW RTTY. For newer contesters, particularly ones that use WSJT and other digital modes, the setup process is mostly done already to support those applications, you just need to setup your logger and rty applications using the same audio devices.

Resources!

There are many resources online to help you get your RTTY setup operational and optimized. One of the most comprehensive sites is AA5AU's <https://www.rttycontesting.com> here you will find resources in digital interfacing with your transceivers, RTTY starter and setup guides and more.

And of course, our CQWW RTTY website <https://cqwwrtty.com> where you will find everything about this major contest and season starter, including printing award certificates for your prior efforts, rules, statistics and more!

I Hope you all had a wonderful summer, and are looking forward to a prosperous contest season ahead. I look forward to working as many of you as possible and look forward to having some fun!



Upcoming State/Province QSO Parties

A Quick Reference for those participating in the Intra-Club QSO Party Challenge or just looking for a weekend contest fix

CONTEST	DATE(S)/TIME(S)
Texas	9/21 1400Z – 922 0200Z 9/22 1400Z to 2000Z
Iowa	9/21 1400Z – 9/22 0200Z
New Hampshire	9/21 1600Z -- 2200Z 9/22 1400Z -- 2000Z
New Jersey	9/21 1600Z – 9/22 0359Z
Washington Salmon Run	9/21 1600Z -- 9/22 0700Z 9/22 1600Z -- 2400Z
Maine	9/28 1200Z – 9/29 1200Z
CALIFORNIA QSO PARTY	10/5 1600Z – 10/6 2200Z
Nevada	10/12 0300Z – 10/13 2100Z
Arizona	10/12 1500Z – 10/13 0500Z
Pennsylvania	10/12 1600Z – 10/13 0400Z 10/13 1300Z – 2200Z
South Dakota	10/12 1800Z – 10/13 1800Z
New York	10/19 1400Z – 10/20 0200Z
Illinois	10/20 1700Z – 10/21 0100Z

SAVE	NCCC BBQ @N6RO
OCTOBER 20 2024	THE
DATE	95480 <small>Sellers Ave, Oakley, CA</small>



CQP 2024

5 Oct 1600Z to 6 Oct 2200Z

It's that time again and you don't want to miss the Sep meeting. CQP Chairman Dean, N6DE, will provide all the late-breaking developments for this year's California QSO Party. There are some changes this year, including awards, three "teasers" supplied by Dean are below. We of course hope to have all 58 CA Counties activated this year by at least one fixed station plus the usual mobile operations.

All the information you need is at the [Official CQP Website](#). You'll find a matrix of the current county coverage, forms to register your plans, award categories and information, and information to assist county expeditions. CQP is the premiere state QSO Party, and everyone wants to work you!



Don't miss Dean's presentation at the Sep ZOOM meeting on 10 Sep! This is the weekend when NCCC shows the rest of the world how it's done! We're at the peak of Cycle 25, what more could we ask for?



Tube of the Month

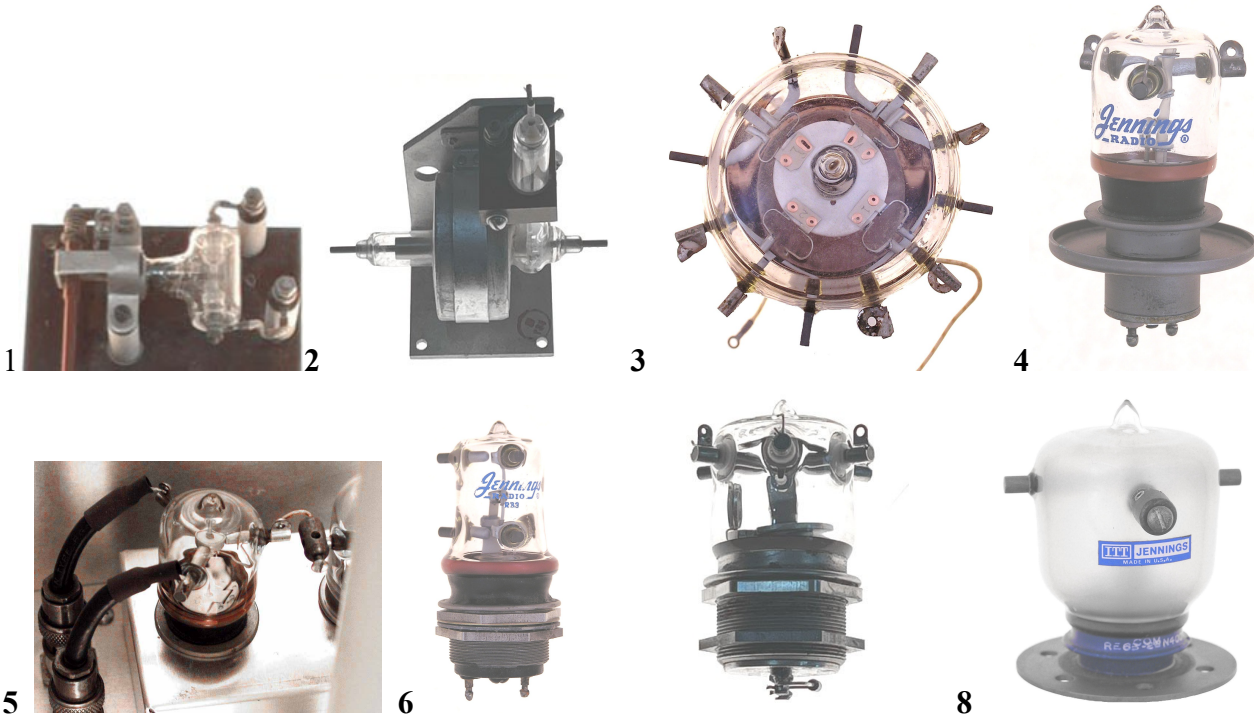
Norm Wilson, N6JV

Visit the Tube Museum at n6jv.com

Vacuum Relays



I am not sure when the first vacuum relays were commercially produced, but the Sperti Electronics Company was making a small unit in about 1938. Collins Radio produced the famous AN/ART-13 autotuned airborne transmitter in 1940 that used a Sperti relay for an antenna switch. These were mechanically actuated where the common pole is mounted in rubber. I think they were only rated at 1500 volts. Photo (1) shows one in a piece of Navy gear from 1952. In about 1942, EIMAC starting making a series of high voltage relays designated [VS-2, 4, 5 and 6](#) (2) that were rated at 20,000 RF volts at 5 amps up to 30 MHz. These relays could handle 14,000 volts DC. Copies of these relays were made by TORR and Kilovac.



At the end of WWII, Jo Jennings, as he did with vacuum capacitors, decided to develop and expand the production of vacuum relays. Their first products were relatively large such as the 4-inch diameter, 4-pole double throw unit shown in (3). When Jennings developed some very small units like the RB1 (4) they became very popular because no more cleaning burned relay contacts. They were rated for 14 KV at 5 amps and a million operations. The SPDT units could be used in pairs as is shown in (5) from my 6-meter amplifier. They stacked the decks to make DPDT relays like the RB3 in photo 6 and the more modern Kilovac H14 (7) which currently lists for \$3012. The RE6 (8) is a larger unit rated at 30 KV at 25 amps. Modern vacuum relays are ceramic and



are made in many sizes and configurations by Jennings and others.

While I was doing research on the date of the invention of the vacuum relay, I found an odd use of the early EIMAC VS2 type units. In 1985, movie prop builders were tasked with making some fake electronic equipment. They found some of these relays and mounted them in a box with LEDs etc. The movie was *Back to the Future* and the box became the “Flux Capacitor”. Today the cult followers of this movie all want a Flux Capacitor and are willing to pay good cash for these relays. I have the relays, but I haven’t been in a DeLorean in 50 years and my stash of plutonium is depleted.

CW Sprint Request Ward Silver, N0AX

(If you live in Nevada, or can get on the air from Nevada, Ward wants you!)

Hi friends,

I'm sending out email to all of the NV stations on my list, hoping you'll get on for this coming weekend's NA CW Sprint (0000 UTC Sep 8 - Sat evening) from your coveted multiplier! Nice to hear so many of you in the NAQP CW a couple of weeks ago, too.

20 and 40 meters should be good all over for a couple of hours. Depending on noise levels 80 should be a lot of fun after dark. If you can make it - full-time or part-time - thanks and good luck!

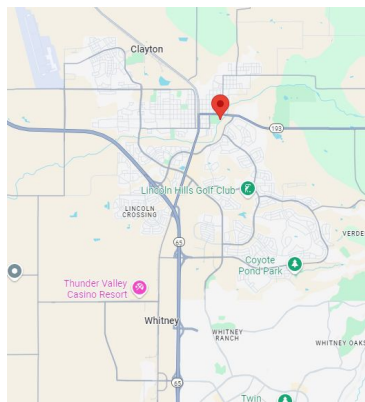
73, Ward N0AX

CW Sprint Manager

<https://ncjweb.com/north-american-sprint/>

Lincoln Hamfest

Western Placer Amateur Radio Club 18th Annual Hamfest



Saturday Sept 21, 2024

65 McBean Park Drive (HWY 193), Lincoln, CA

0700 to 1200 hours

<https://www.wparc.us>

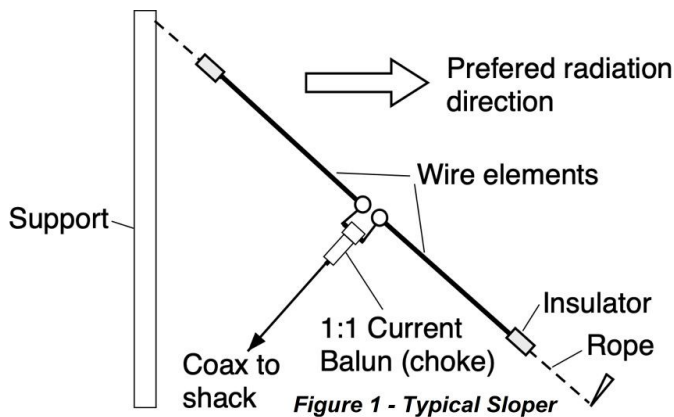


Antenna of the Month

Gary Johnson, NA6O

The “Sloper”

Another modification to a simple half-wavelength dipole is the *sloper* where the dipole is erected at a steep angle, often 45 degrees. This only requires one relatively tall support, making it somewhat more convenient. Most often slopers are used on the low bands, 160 through 40 meters. They don't make much sense on the higher bands where a regular dipole or more complex antenna is probably just as easy to erect.



What are the properties of sloper, compared to a flat dipole? What you'll add is some vertically-polarized radiation and perhaps a somewhat directional pattern in the direction of the downhill slope. What you'll lose is gain since the pattern of the dipole has diminished and because you have lost some of the horizontal radiation, which would otherwise be reflected by the Earth. Exact results will depend upon the height above ground and the slope angle.

I did some simulation in EZNEC to compare a 40 m dipole to a sloper. I placed the dipole at a height of 30 ft (about a quarter wavelength, which is really too low for optimum performance), and the sloper was hung from 65 ft and at a 45 degree angle. The SWR chart in Fig. 2 shows some differences but either of these are completely acceptable to any radio with an antenna tuner. Height is the biggest driver of absolute impedance and low antennas often end up closer to 50 ohms. Both of these antennas are actually a better match to 75 rather than 50 ohms which is not unusual.

Looking at the pattern in azimuth (Fig. 3), the two are similar in peak gain. However there may be cases where the small (~8 dB) null off the back of the sloper could assist in rejecting QRM. There also is significant gain in the far field—actually *more* gain—off the sides of the sloper! That's because the polarization is primarily horizontal off the sides and vertical along the direction of the slope. See Fig. 4.

Again, horizontally-polarized radiation reflects off the Earth and at some angles you get constructive interference that can be worth as much as 5.5 dB. So it's funny that this antenna is normally sold as

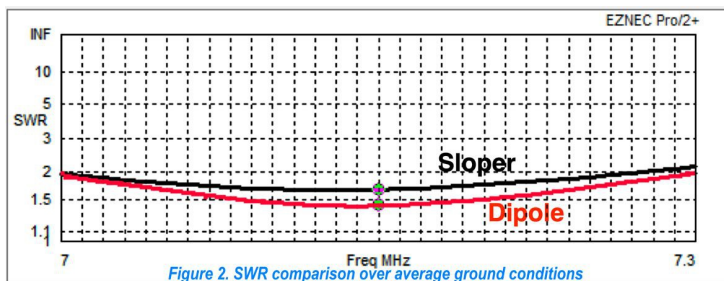


Figure 2. SWR comparison over average ground conditions

Looking at the pattern in azimuth (Fig. 3), the two are similar in peak gain. However there may be cases where the small (~8 dB) null off the back of the sloper could assist in rejecting QRM. There also is significant gain in the far field—actually *more* gain—off the sides of the sloper! That's because the polarization is primarily horizontal off the sides and vertical along the direction of the slope. See Fig. 4.

Again, horizontally-polarized radiation reflects off the Earth and at some angles you get constructive interference that can be worth as much as 5.5 dB. So it's funny that this antenna is normally sold as



being directional along the slope.

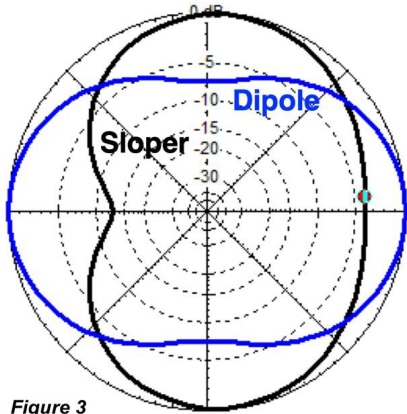


Figure 3

Often, a sloper is hung from a tower. The tower may or may not interact, depending upon whether it's resonant due to its height and what antennas are mounted on it. Sometimes it acts as a reflector that makes the sloper more directional with some added gain in the expected direction... And sometimes not. Simulation can give you an idea what to expect but every installation will be different.

The azimuth patterns in Figure 3 compare total fields. The sloper element wire goes downward to the right. Elevation angle is 35 degrees. Outer ring is 4 dBi.

Figure 4: Investigating vertical and horizontal polarization in azimuth. The

sloper element wire goes downward toward the right.

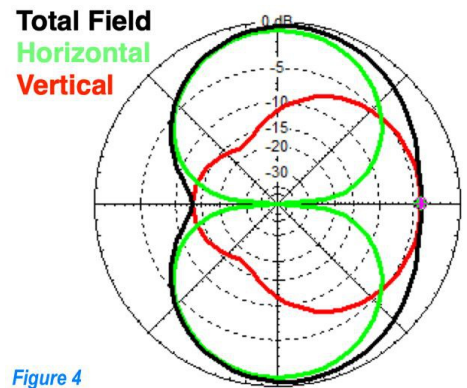


Figure 4

Comparing the elevation patterns in Fig. 5, things are fairly evenly matched at low angles, and with the dipole radiation most strongly straight up since it's so low. The sloper shows its symmetrical broadside pattern (H polarized) and its forward-skewed pattern (V polarized) along the sloping wire. A higher dipole may be best of all, but it needs at least two supports way up there instead of the single one needed by the sloper.

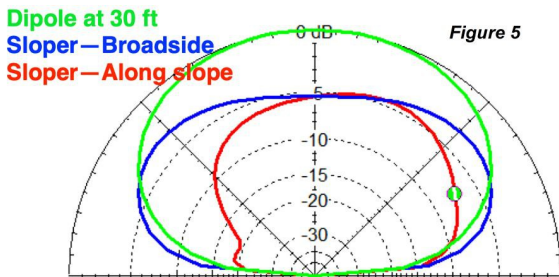


Figure 5

Figure 5. Elevation pattern comparison showing total fields. The sloper goes downward toward the right. Outer ring is 4 dBi.

In conclusion, the sloper is rather a degenerated dipole, giving up some gain in exchange for a more convenient installation. Some stations use a set of slopers as a directional array. In that case, two or more elements are driven via a phasing network thus combining to provide

additional gain and steerable pattern.

In conclusion, the sloper is rather a degenerated dipole, giving up some gain in exchange for a more convenient installation. Some stations use a set of slopers as a directional array. In that case, two or more elements are driven via a phasing network thus combining to provide additional gain and steerable pattern.



Editor Notes



32 R W1*** 9 BILLERICA MA AUG 29
VIRGIL THOMPSON
BLACK ROCK NV
BT
HOPE YOU GOT TO CLIMB THE BURNING MAN TOWER
BT
TOMMY
AR

Received during a casual QSO when asked if I could deliver a message for NV. It morphed into one of my longer CW QSO's, explaining the geography of N. Nevada and that finding one guy in a crowd 70,000 people crammed onto a dry lake bed was a non-starter – even if I could get there before it ended. Burning Man 2024 is over now leaving a lot of \$\$ in Reno-Sparks.

Hamming on the Black Rock: Is there a Burning Man special event station on the ham bands? After all, it does have it's own "Municipal Airport [88NV] and an FM station, and one can easily conjure up a host of ham radio services for the Burners and public... radiograms, Worked All Black Rock Desert, local lost/found ... AA7BM is available.

JUG Typography: All of two (2) responses to the query regarding ragged vs aligned right margin for the JUG favored aligned so we'll continue with that for awhile.

Digital Modes: What began as a single esoteric mode called JT65 has morphed into a variety of related modes for various applications ... Super Fox? The JUG is looking for a contributor to explain them to the uninformed [e.g. your Editor], possibly in a one mode/month format. And, thanks to Gary, NA6O, for Antenna of the Month.



NCCC Membership Information

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

JUG Articles Wanted!

Your help allows us to produce a quality newsletter. Please consider submitting an article! The editor welcomes any and all relevant articles for inclusion in the JUG. The preferred format is plain, unformatted ASCII text, MS Word (.doc/.docx) are acceptable. Indicate the insertion point and title of diagrams and pictures in the text and attach photos/diagrams separately. Pictures should be as high a resolution as available. Please do not spend time formatting your submittal, the publication templates will re-format everything. Send your material to k6dgwnv@gmail.com indicating "JUG Submittal" in the subject.

Northern California Contest Club Reflector—Guidelines

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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Welcome to the NCCC Land's End store. You can choose many different products and add a custom-embroidered NCCC logo.

If you would like to add your name and/or call sign, click the Add Personalization button when designing your garment (\$8 charge, 10 character limit).

If you have questions, contact the NCCC secretary at: secretary.nccc@gmail.com



Northern California Contest Club

[NCCC Lands' End Store](#)

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.



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Excellence In Amateur Radio Contesting

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.

Comprehensive I/O, plus full remote control

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

Up to 5 receive antenna sources

Full remote control via Ethernet



The K4 interfaces seamlessly with the KPA500 and KPA1500 amplifiers

"The performance of their products is only eclipsed by their service and support. Truly amazing!" Joe - W1GO



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IC-7100 | All Mode Transceiver

• HF/50/144/430/440 MHz Multi-band, Multi-mode, IF DSP • D-STAR DV Mode (Digital Voice + Data) • Intuitive Touch Screen Interface • Built-in RTTY Functions

IC-V86 | VHF 7W HT

• 7W Output Power Plus New Antenna Provides 1.5 Times More Coverage • More Audio, 1500 mW Audio Output • IP54 & MIL-STD 810G-Rugged Design Against Dust & Water • 19 Hours of Long Lasting Battery Life • 200 Memory Channels, 1 Call Channel & 6 Scan Edges



IC-7610 | HF/50 MHz All Mode Transceiver

• Large 7-inch color display with high resolution real-time spectrum scope and waterfall • Independent direct sampling receivers capable of receiving two bands/two modes simultaneously



IC-2730A | VHF/UHF Dual Band Transceiver

• VHF/VHF, UHF/UHF simultaneous receive • 50 watts of output on VHF and UHF • Optional VS-3 Bluetooth® headset • Easy-to-See large white backlight LCD • Controller attachment to the main Unit

NEW

IC-T10 | Rugged 144/430 MHz Dual Band

• Disaster Ready - Excellent Fit for Your Emergency Bag • Loud Audio - New Speaker Design • Long Battery Life - Up to 11 Hours • FM Broadcast & Weather Channels



IC-R8600 | Wideband SDR Receiver

10 kHz to 3 GHz Super Wideband Coverage • Real-time Spectrum Scope w/Waterfall Function • Remote Control Function through IP Network or USB Cable • Decodes Digital Incl P25, NXDN™, D-STAR • SD Card Slot for Receiver Recorder



ID-5100A Deluxe VHF/UHF Dual Band Digital Transceiver

• Analog FMD-Star DV Mode • SD Card Slot for Voice & Data Storage • 50W Output on VHF/UHF Bands • Integrated GPS Receiver • AM Airband Dualwatch

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• Bluetooth® Communication • Simultaneous Reception in VV, UV, VU and DV/DV • Enriched D-STAR® Features Including the Terminal Mode/Access Point Mode • UHF (225-374.995MHz) Air Band Reception



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FTDX101MP | 200W HF/50MHz Transceiver

- Hybrid SDR Configuration • Unparalleled 70 dB Max. Attenuation VC-Tune • New Generation Scope Display 3DSS • ABI (Active Band Indicator) & MPVD (Multi-Purpose VFO Outer Dial) • PC Remote Control Software to Expand the Operating Range • Includes External Power With Matching Front Speaker



FT-710 Aess | HF/50MHz 100W SDR Transceiver

- Unmatched SDR Receiving Performance • Band Pass Filters Dedicated for the Amateur Bands • High Res 4.3-inch TFT Color Touch Display • AESS: Acoustic Enhanced Speaker System with SP-40 For High-Fidelity Audio • Built-in High Speed Auto Antenna Tuner



FTM-400XD | 2M/440 Mobile

- Color display-green, blue, orange, purple, gray • GPS/APRS • Packet 1200/9600 bd ready • Spectrum scope • Bluetooth • MicroSD slot • 500 memory per band



FTDX10 | HF/50MHz 100 W SDR Transceiver

- Narrow Band and Direct Sampling SDR • Down Conversion, 9MHz IF Roofing Filters Produce Excellent Shape Factor • 5" Full-Color Touch Panel w/3D Spectrum Stream • High Speed Auto Antenna Tuner • Microphone Amplifier w/3-Stage Parametric Equalizer • Remote Operation w/optional LAN Unit (SCU-LAN10)



FT-891 | HF+50 MHz All Mode Mobile Transceiver

- Stable 100 Watt Output • 32-Bit IF DSP • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to a PC with a Single Cable • CAT Control, PTT/RTTY Control



FT-70DR C4FM/FM 144/430MHz Xcvr

- System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging



FT-991A | HF/VHF/UHF All Mode Transceiver

- Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO



FTM-300DR | C4FM/FM 144/430MHz Dual Band

- 50W Output Power • Real Dual Band Operation • Full Color TFT Display • Band Scope • Built-in Bluetooth • WIRES-X Portable Digital Node/Host Node with HRI-200



FT-5DR C4FM/FM 144/430 MHz Dual Band

- High-Res Full-Color Touch Screen TFT LCD Display • Easy Hands-Free Operation w/Built-In Bluetooth® Unit • Built-In High Precision GPS Antenna • 1200/9600bps APRS Data Communications • Supports Simultaneous C4FM Digital • Micro SD Card Slot



FT-65R | 144/430 MHz Transceiver

- Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Powerful Clear Audio • 5 Watts of Reliable RF Power Within a compact Body • 3.5-Hour Rapid Charger Included • Large White LED Flashlight, Alarm and Quick Home Channel Access



FTDX101D | HF + 6M Transceiver

- Narrow Band SDR & Direct Sampling SDR • Crystal Roofing Filters Phenomenal Multi-Signal Receiving Characteristics • Unparalleled -70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream



FT-2980R | Heavy-Duty 80W 2M FM Transceiver

- 80 watts of RF power • Large 6 digit backlit LCD display for excellent visibility • 200 memory channels for serious users



FTM-6000R | 50W VHF/UHF Mobile Transceiver

- All New User Operating Interface-E20-II (Easy to Operate-III) • Robust Speaker Delivers 3W of Clear, Crisp Receive Audio • Detachable Front Panel Can Be Mounted in Multiple Positions • Supports Optional Bluetooth® Wireless Operation Using the SSM-BT10 or a Commercially Available Bluetooth® Headset



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