



#637 Aug 2025



JUG

Publication of the
Northern California
Contest Club

NCCC

**55 years of
contesting
excellence**

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NCCC MEETING

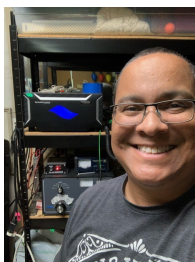
<https://nccc.cc/meetings.html>

ZOOM – 6pm chat, 6:30 meet

Dean, N6DE
“All Things CQP for 2025”

President's Report

David West, KO6M



Wonderful meeting/BBQ last month. Thank you so much to Rick and Ann as well as Bob and his wife for hosting us! I cannot say how nice it was to be there. I didn't get to talk to many of you, but it sure seemed like it was a great afternoon. There were about 35 of us up there. The weather was perfect, even with the thunderstorm in the distance (right on time, by the way, based on Rick's prediction). It was neat to have Eric, WA6HHQ, there showing the latest from Elecraft. We even had a demonstration of the KH1 from a member. Oh, and the food was fantastic too!

As I write this, many of you are prepping for NAQP CW. KB! We just finished a great NAQP RTTY a couple of weeks back. (I'm kicking myself for changing one of the teams at the last moment. Next time I do the teams, I need to remember that “part-time” and “a couple of hours” in your emails can also mean “almost full-time and I'm going to go full bore”. You guys did great!

Speaking of contests, we've got many coming up! It's that season. Based on our several results, I know which is your favorite. So I'll say now, KB! Don't worry, I'll also say it several other times, but imagine this as the catch-all when I happen to send the contest-specific reminder too late. Or imagine this as the reminder to get your things in order. Several times I've called the summer our off-season. I hoped you got



your prep work, antenna work, and practice in. It should be a fun season. May the solar conditions and weather conditions be on our side.

Last things before I let you get back to your more entertaining reading:

1) We need a VP/CC. I keep asking. Some of you by now will have received an email from me about a Committee for Contests. Let's call it the Contest Committee. Please consider it. If you didn't get an email, I still care about you, however, you didn't express interest in our surveys. If you would like to be on said Committee, please reach out to me. We hope having a Contest Committee helps distribute the workload. We all know VP/CC is a very busy job.

2) Plan now for CQP! Get those 1x1 callsigns in, prep those portable kits. It's going to be a great one!

3) Yes, we will have another BBQ in October. We need to finalize the date. News to follow!

It's Our Birthday Party!

Saturday, 9 Aug 1200 to 2000 PDT

All Bands: 160 m through 6 m, excluding the 30, 17, and 12 meters . Work stations once on each band/mode.

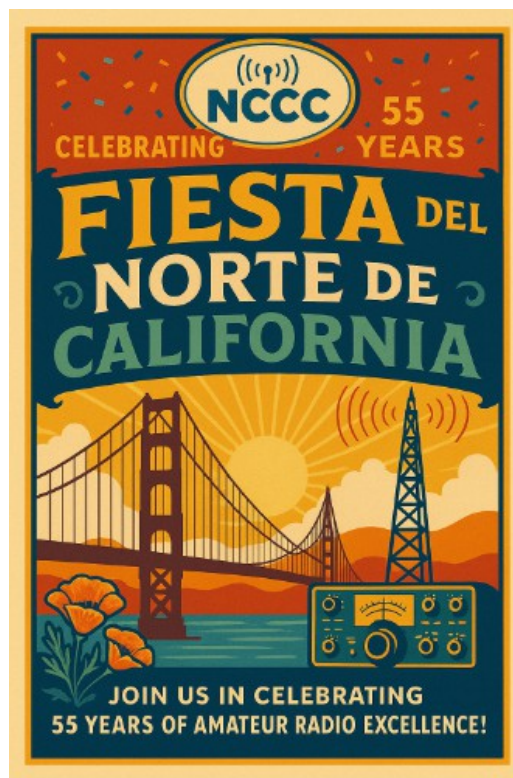
Everyone Works Everybody: Equality is our middle name!

Self-Spotting Allowed: It's a Fiesta! Feel free to spot yourself, anyone else, or work out a schedule on-line, on-telephone, or in-person.

Simple Exchange: Members send state and year they joined NCCC [or closest guess], non-members send state. Feel free to engage in conversation ... It's a Fiesta!

Bonus Stations: There may be several 1x1 bonus stations such as N6N, K6C, and W6C, each worth 5 points on each band.

Scoring: NCCC members - 2 pts, non-members are 1. Logs go to ko6m@arrl.net and scores to 3830scores.com Power classes are QRP, LP, and HP.





Upcoming State/Province QSO Parties

Thanks to WA7BNM

<https://contestcalendar.com/stateparties.php>

State/Province	Dates/Times
Hawaii	23 Aug 0400Z to 25 Aug 0400Z
Ohio	23 Aug 1600Z to 24 Aug 0400Z
Colorado	30 Aug 1300Z to 31 Aug 0400Z
Kansas	30 Aug 1400Z to 31 Aug 0200Z 31 Aug 1400Z to 2000Z
Tennessee	7 Sep 1700Z to 8 Sep 0300Z
New Jersey	20 Sep 1400Z to 21 Sep 0159Z
Washington Salmon Run	20 Sep 1600Z to 21 Sep 0700Z 21 Sep 1600Z to 2400Z
New Hampshire	20 Sep 1600Z to 21 Sep 0400Z 21 Sep 1200Z 2200Z
Maine	27 Sep 1200Z to 28 Sep 1200Z
California	4 Oct 1600Z to 5 Oct 2200Z
Nevada	11 Oct 0300Z to 12 Oct 2100Z
Arizona	11 Oct 1600Z to 12 Oct 0500Z
Pennsylvania	11 Oct 1600Z to 12 Oct 0400Z 12 Oct 1300Z to 2200Z
South Dakota	11 Oct 1800Z to 12 Oct 1800Z

Larger Contests on the Horizon

CWops "CW Open"	6 Sep 0000Z to 2359Z
CWops "CW Open"	6 Sep 1200Z to 1559Z
CWops "CW Open"	6 Sep 2000Z to 2359Z
All Asian DX - SSB	6 Sep 0000Z to 7 Sep 2400Z
WAE DX – SSB	13 Sep 0000Z to 14 Sep 2359Z
CQ WW DX – RTTY	27 Sep 0000Z to 28 Sep 2359Z



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.



After Action Report

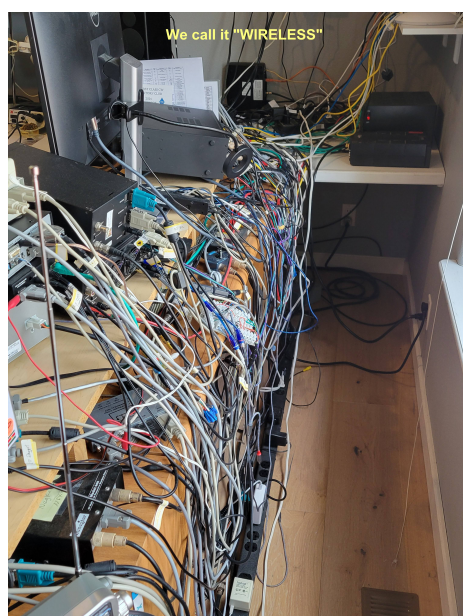
N6XI Truckee Radiogrill, 27 Jul

Compilation and photo's from several attendees



A large number [36 had RSVP'd but that number seemed low] of the NCCC membership trekked into the Sierra Nevada to Truckee on Sun, 27 Jul, for another of Rick and Ann's Radiogrill events at their home overlooking Boca Reservoir. The weather was perfect for the gatherings on the deck and it was a great time of camaraderie and opportunities to share stories, catch up everyone's activities. Ann had an array of accompaniments in the kitchen and Rick grilled hamburgers, hot dogs, and salmon burgers [particularly good!]. This was also the August NCCC meeting.

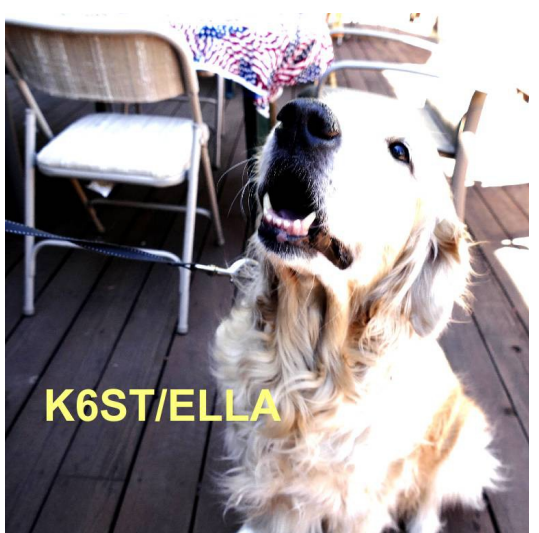
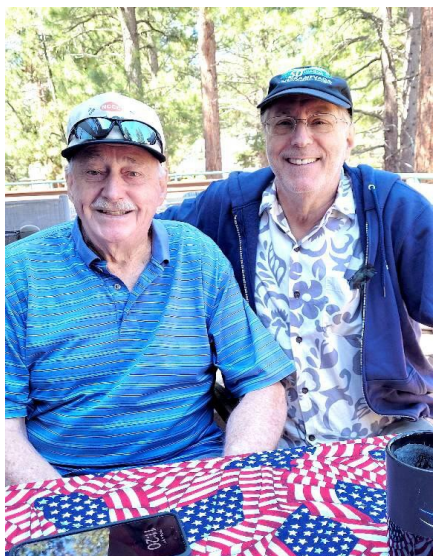
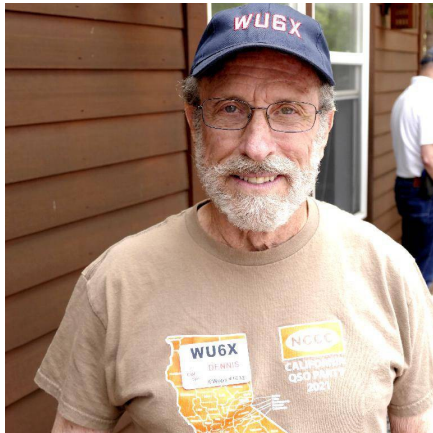
Rick's Elecraft station was on the air for guest ops. Rick may be the only NCCC member who has operational bi-directional remote stations. He operates his Truckee and Saratoga Elecraft stations from either location. They were open for guest operators of which several were noted throughout the afternoon. Rick's shack is truly impressive, both the front part where you sit and the back where all the magic happens.



Eric, WA6HHQ from Elecraft, came with the latest Elecraft news. Someone came with the recently released Elecraft KH1 handheld HF CW/SSB transceiver, and got quite a bit of attention. While the little rig is really impressive in many ways, one feature that really stood out was the erasable log in the attached cover. Keeping a log with the radio on your lap while sitting on a rock during a POTA or SOTA activation is always a bit dicey and this solves that problem nicely.



Hank, W6SX, and wife Rhonda came up from Mammoth Lakes, and quite a number of members came all the way from the South Bay as well as Sacramento and MLDXCC Country.





Many “New” Things Aren't Really New

JUG Editor

Several years ago, I found my early logs and notebooks from 1953 through about graduation from Cal Poly, all packed by Mom when I left for basic training in mid-summer of '62.

The logs are indicative of the FCC rules then: “Log every QSO and every CQ or test transmission.” I found the page on the right in one of my notebooks, no doubt from something at W6BHZ, the Cal Poly ham club.

Using the supports like flag poles [upper right sketch] holds the multiple wires of the fan in place during raising and lowering. We did this in SE Asia to avoid wire tangles on night-entry missions. Won't work in all situations, but yet another potential tool.

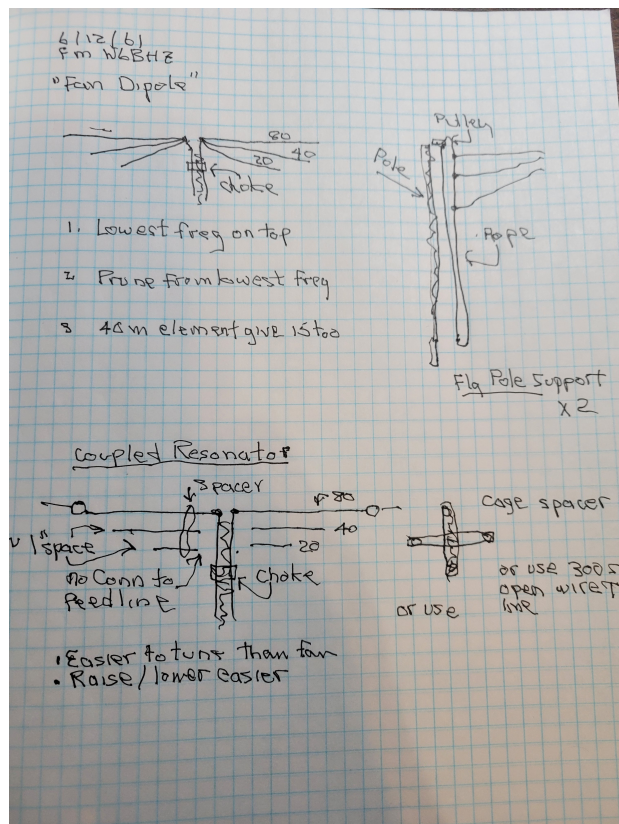
Tuning a fan is iterative: Start with the longest element and prune to frequency. Then, move to the next shorter. You'll probably have to repeat the process. One iterations got us close enough in war ... three will usually satisfy any purist.

The Coupled Resonator or “C-R” design is another way to avoid the tangled wires of the fan and is reminiscent of the cage design used in early radio. Like the fan, the longest element supports the antenna, but unlike the fan, it is the only element that is fed power. The other elements are spaced 1 to 1.5 in apart under it but do not connect to the feedline. Bakelite cross-shaped spacers [see sketch lower right] were readily available in 1961. Fabrication with a 3D printer is a modern option.

A two element, 3 band C-R for 80 and 40 – plus 15 on the 40 m element's 3rd harmonic – can easily be made from open-wire transmission line. 300 ohm open wire line has the right spacing but is a bit scarce however 450 ohm “window line” is an OK substitute. The velocity factor will change some when wet detuning things a bit but it is very easy to work with. Tuning the C-R is less iterative than the fan, and one careful pass through the bands may be sufficient.

I've tried two variants: Add another band by lashing another length of open wire line below. Electrically, it worked fine, mechanically in the wind ... not so much. I also tried feeding all of the elements from the common-mode choke on the feed line. Tuning that configuration proved close to impossible with strong interaction between the elements and I never made it work.

(Apologies for the shading on the page, it's 64 years old)





Attention Amateur Spooks!

Announcing the 4th CW/RTTY Crypto Test!



The [Marine Radio Historical Society](#) in cooperation with our good friends at the [Cipher History Museum](#) will send a coded message in letter groups via the facilities of coast station KPH on Saturday August 30, 2023. The message will be encrypted using the famous Enigma code machine. The Enigma was the Germans' most sophisticated coding machine for securely transmitting command and control messages via radio communications in WWII. It was considered so secure that it was used to encipher the most top-secret of messages. All KPH listeners are invited to try their hand at receiving and decrypting the message. Certificates will be awarded for proof of successful decode, first to decode, and use of original or replica hardware.

You say your Enigma hardware is a bit rusty? Perhaps it has slipped a cog? No problem, MRHS has you covered! Software simulations exist for the Enigma code machine. Click [Here](http://www.101computing.net/enigma/) <http://www.101computing.net/enigma/> for an easy-to-use Enigma simulator. It is web-based, no download necessary.

For additional information on the Enigma please see Ralph Simpson's' [Cipher Museum History](#) site.

Crypto broadcast date, time and formats

The crypto broadcast will commence at 2000Z (1300 Pacific) on 30 August 2025 on all KPH CW and RTTY frequencies. The CW frequencies are (in kc): 6477.5, 8642.0, 12808.5, 17016.8, and 22477.5 . Upon completion of the CW transmissions, the broadcast will be repeated on the KPH RTTY frequencies. The RTTY transmission will be 170cps shift Baudot, 45 baud. The RTTY frequencies are (in kc): 6324.5, 8427.0 and 12585.5



Further Information

Full details will be announced in mid-August via a Special Bulletin to all MRHS newsletter subscribers and on the MRHS website (www.radiomarine.org). The bulletin will contain a link to a code book where the Enigma machine keys can be found, plus helpful hints on Enigma decoding procedures.

For more information or questions about the KPH cipher broadcast send email to crypto@radiomarine.org.

Thanks to Steve, M0KKB/W3SMK for the information and permission to publish. Final instructions and information will be posted to the NCCC email list when they are finalized

9-11 Special Event Station

Special Event Station K4A " 9-11 We Do Remember"

From W6OAT

Special Event to Honor the Victims of 9-11 --- New York City, Shanksville PA, and Washington D. C.

When: Sat 6 Sep 1700 PDT to Thu 12 Sep 1700 PDT

This year's event will be called "9-11 We Do Remember" and Many members of the Alabama Contest Group will activate K4A for the fifth year. We will operate all modes SSB, FT8, CW, and RTTY We will try to be on all bands 160 through 10 meters, including WARC bands.

This year a new special QSL and certificate: "We Do Remember" theme will be available.

To those who contact K4A on 3 bands using any combination of bands/modes we will offer a full color glossy certificate on heavy paper which will be mailed in a full size Manila envelope all postage paid by the Alabama Contest Group, even if you are DX.

If you qualify for the certificate send your QSL to WA1FCN and put each QSO information on your QSL. We request a \$3.00 donation to help cover cost of Special Event certificates. Or, for our QSL only (no certificate), send your QSL and your SASE to:

Robert Beaudoin WA1FCN
970 Mountainview Rd
Cordova, AL 35550

Bob Sarnecki NF7D
591 Deer Run Rd
Alabaster AL 35007-9502

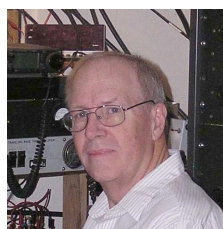


Tube of the Month

Norm Wilson, N6JV

Visit the Tube Museum at n6jv.com

152T



In 1938, Eimac started experimenting with paralleling 75T tubes in the same envelope. The earliest form of a two-unit tube was the [152T](#) rated at 150 watts. The grids were connected in parallel but the filaments were separated. Eimac advertised that you could run one triode until it failed and then turn the tube 180 degrees and use the second triode. If both sections were to be used, the filaments could be paralleled and run at 5 volts or in series and operated at 10 volts. The plate had a maximum of 3000 volts at 450 ma. The maximum frequency for full power was 40 MHz. When used as a pulse modulator, the maximum voltage was 18 KV. Subsequent tubes made in WWII had a different envelope shape.

The first example is the oldest example I have ever seen. It has an envelope that slopes to the anode connection and a brown ceramic base. Eimac filed a patent numbered [2,355,717](#) in February 1941 that illustrated the 152T with an envelope that was flat on top as is shown in the second photo. The original design was probable made in 1940 or before. During the war, the grid connection was made internal and an internal shield was added as seen in the third photo. These tubes were used as pulse modulators in the REL MK IIIC gun laying RADAR and other equipment. The later tubes were designated the [152TH](#) with a mu of 20 and the [152TL](#) with a mu of 12.





Editor Notes



Summer may not afford us the best band conditions, but it does afford us a great time at Rick and Ann's Radiogrill at their home in Truckee! The JUG had an army of volunteer photographers who did a super job getting photos. Alas, using anywhere near all of them in this issue of the JUG was spiraling the PDF size to multi-megabytes and counting, even with size and resolution reductions to the photos. "640 kilobytes should be enough for everyone," often falsely attributed to Bill Gates, may have been true for the early IBM PC but it sure doesn't seem to apply to today's applications and graphics.

The JUG published early this month because of the Fiesta del Norte de America this Saturday. Hope to work you on CW and I'll tune around a bit for RTTY if I can get it to work. I left it in a working state after NAQP RTTY but it never seems to remain so.

We've had SFI's over 100, sometimes as high as 160-170, and Kp indices staying around 2 for much of the summer, no serious flares, and only a couple of short-ish CME's. Yet, with a few exceptions, HF Propagation seems to have been steadily less than super. Any propagation/ionosphere experts out there who might be able to "splain all of this? Space is available in any issue of the JUG.



About NCCC

Officers and Directors, 2023-2024 Contest Season

President: David West, [KO6M](#)
Vice-President/Contest Chairman: **VACANT**
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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](#)

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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

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!

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

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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Facebook: "Northern California Contest Club"

Twitter: "NCCCKB"



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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, enter 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.



Northern California Contest Club

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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-9700 | All Mode Tri-Band Transceiver

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IC-V3500 | 144MHz FM Mobile

• 65W of Power for Long Range Communications • 4.5 Watts Loud & Clear Audio • Modern White Display & Simple Operation • Weather Channel Receive & Alert Function



IC-7851 | HF/50MHz Transceiver

• 1.2kHz "Optimum" roofing filter • New local oscillator design • Improved phase noise • Improved spectrum scope • Dual scope function • Enhanced mouse operation for spectrum scope



IC-705 | HF/50/144/430 MHz All Mode Transceiver

• RF Direct Sampling • Real-Time Spectrum Scope and Waterfall Display • Large Color Touch Screen • Supports QRP/QRPp • Bluetooth® and Wireless LAN Built-in



IC-2300H | VHF FM Transceiver

• 65W RF Output Power • 4.5W Audio Output • MIL-STD 810 G Specifications • 207 alphanumeric Memory Channels • Built-in CTCSS/DTCS Encode/Decode • DMS



IC-7300 | HF/50MHz Transceiver

• RF Direct Sampling System • New "IP+" Function • Class Leading RMDR and Phase Noise Characteristics • 15 Discrete Band-Pass Filters • Built-In Automatic Antenna Tuner



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/UHF, 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



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

ID-52A | VHF/UHF D-STAR Portable

• Bluetooth® Communication • Simultaneous Reception in V/V, U/U, V/U 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 Mode/Mod 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



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



FT-6SR | 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



FTM-200DR | C4FM/FM 144/430MHz Dual Band

- 1200/9600bps APRS® Data Communications • 2" High-Res Full-Color TFT Display • High-Speed Band Scope • Advanced C4FM Digital Mode • Voice Recording Function for TX/RX



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

- All New User Operating Interface-E20-III (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



- RETAIL LOCATIONS - Store hours 10:00AM - 5:30PM - Closed Sunday
- PHONE - Toll-free phone hours 9:30AM - 5:30PM
- ONLINE - WWW.HAMRADIO.COM
- FAX - All store locations
- MAIL - All store locations

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The radio

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Contact HRO for promotion details. Toll-free including Hawaii, Alaska and Canada. All HRO 800-lines can assist you. If the first line you call is busy, you may call another. Prices, specifications and descriptions subject to change without notice.