



# JUG

Publication of the  
Northern California  
Contest Club

**NCCC**



#610 – May 2023

## NCCC – 53 years of contesting excellence

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#### **NCCC MEETING**

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

Next Zoom Meeting 16 May

**Roberto SadKowski, K6KM**  
**“SOTA (Summits on the Air) and  
Contesting – Similarities and  
Differences”**

### President's Report

**David West, KO6M**



I am honored to be writing to you for the first time as the President of NCCC. As we embark on a new year of contesting, I would like to take a moment to reflect on the accomplishments of our club in the past year and to share my vision for the future.

First and foremost, I would like to thank each and every one of you for your dedication and commitment to Radio Sport. Our club has achieved great success in the past year, with several members placing in the top ranks of major contests. This is a testament to the skill and hard work of our members, and it is a source of pride for our entire community.

Looking ahead, I believe that our club has the potential to achieve even more success and growth. As your President, I am committed to supporting our members in their efforts to improve their contesting skills and to achieve their personal bests. I am excited to announce that we will be looking at more in person meetings and hopefully rekindle the excitement from the pre-Covid days that I always hear about.

I think we should put a touch of focus on training our newer members. That includes those both new to the entire hobby and those new to this corner of the hobby. This focus should provide opportunities for members to learn from some of the top contesters in the world (that's you) and to receive personalized coaching and feedback on their performance.



In addition to the training idea/program, I am also committed to enhancing our club's outreach and engagement with the broader ham radio community, I am hoping we can get back to co-club meetings. I would like to explore hosting a series of events and activities throughout the year to promote the sport of ham radio contesting and to build connections with other local clubs and organizations.

Most importantly, thank you to David (WD6T) for leading us the last 3 years and to Jack and Andy for their support.

As we move forward together, I am confident that our club will continue to thrive and to make a positive impact on the world of ham radio contesting. Thank you again for your support and dedication, and I look forward to working with each of you in the coming year.

### 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: Bob Cox, [K3EST](#)

Director: [John Miller, K6MM](#)

Director: [Ed Radlo, AJ6V](#)

#### Volunteers

Charter Member: Rusty Epps, [W6OAT](#)

Awards Chair: Gary Johnson, [NA6O](#)

California QSO Party Chair: Dean Wood, [N6DE](#)

QSL Mgr [[K6ZM](#)]: vacant

QSL Mgr [[K6CQP/N6CQP/W6CQP](#)]: Ed Muns [W0YX](#)

NAQP Teams: Fred Jensen, [K6DGW](#)

NA CW Sprint Teams: Bob Vallio, [W6RGG](#)

NCCC Email Reflector Admin: Phil Verinsky, [W6PK](#)

Worked All CA Counties Award: Fred Jensen, [K6DGW](#)

#### NCCC Thursday Night Contesting

NCCC Sprint: Tom Hutton, [N3ZZ](#)

NS CW Ladder: Bill Haddon, [N6ZFO](#)

NS RTTY Sprint/Ladder: Ed Radlo, [AJ6V](#)

#### Communications

Webmaster: John Miller, [K6MM](#)

Webinars: Bill Fehring, [W9KKN](#)

Membership: Gary Johnson, [NA6O](#)/Ian Parker, [W6TCP](#)

#### JUG Editor

Fred Jensen, [K6DGW](#): [k6dgwnv@gmail.com](mailto:k6dgwnv@gmail.com)

Home: 775.501.5488

Cell: 530.210.0778

### VPCC Report

#### **Chris Tate, N6WM**



Greetings Northern California Contesters! I want to thank you for the vote of confidence to step into the role of VP/Contest Chairman for the 4<sup>th</sup> time in 15 years and I am excited to do my best to assist the NCCC with the enthusiasm and energy required of a post pandemic era in contesting.

I want to also thank and express my appreciation to WD6T, AE6Y and the last several administrations for maintaining our club through tough times, for many, while sequestered in their homes, the NCCC allowed socializing albeit remote, and we continued to turn in great scores as a club despite all the travel and close quarters restrictions. We got through it together.

Now we have a chance to get things back on track. We just had our first in person meeting at Cattleman's. It was great to see many of the gang in person! Meanwhile, IDXC Visalia happened, and once again, lots of high fives, fist bumps and hugs as would be expected of friends who have not seen each other in years. I was able to pull together some valuable speakers for Contest Academy, all were very interesting.



Indeed this is a contest season with great potential. Knock on wood, it appears the worst of the Pandemic is behind us. Operators are traveling to contestpedition sites around the globe. The upcoming WPX CW contest should be amazing. This summer IARU contest will run in tandem with WRTC 2022(3). If you are not in Italy, I hope all of you are planning to work as many WRTC stations as possible and support our local competitors. Last year, conditions were quite good for a summer event.

Along with being released from the chains of “shelter in place” and things approaching normalcy, we also have the advantage of a very active solar cycle that has the potential to open up opportunities for records to be broken, and great propagation for international DX contests. All this translates to contesting FUN!

So how do we take advantage of this great potential contest season? Its going to require our membership to participate! Your leadership team is here to take care of club business, provide guidance and assistance, arrange for meetings and more. However, the leadership team is not here to do it all for the club. It requires volunteers within the membership to really bounce back. Volunteers to do things like coordinate contests or provide talks for meeting programs can come from membership and we are here to support this!! (W6RGG assured me he will be back to take on the CW sprint coordinator duties when I caught up with him in Visalia). So think about what you can do to help our club have a great contest season. Or if you need a suggestion, reach out to any of the leadership. We really need some members to step up so we can rise up and have a fun and fulfilling contest season. There have been a few that have consistently been there to do this... hoping a few more step up so we can up our game. I hope you all will join me in the excitement of what can be a great contest season ahead!

## Thanks to IDXC Contest Academy Faculty

### Chris, N6WM

I wanted to take a moment to thank the following for adding the the visalia experience and providing top quality contest related content.

**Hank W6SX and Kurt W6PH:** Hank not only put on a great show for an icebreaker, but bridged the north south diplomatic gap by co-presenting with W6PH.

**Bob N6TV:** Bob did an excellent job with an updated version of his panadapter use lecture.

**Bill W9KKN:** Bill covered and introduced many to hte ins and outs of in band contesting this was really good.

**Craig K9CT:** We were grateful to have Craig present an update on the Contest advisory committee and an amazing look at his very beefy new LUSO tower and 80m Beam Holy Guacamole!

Given that we had only 4 hours to run this program, I think it worked out ok. And, thanks to our new President, KO6M, who ordered special NCCC Contest academy polo shirts ... yes we even got SMC stalwart K9CT to fly our colors!. Thanks to K6MM for quickly designing a hybrid IDXC/NCCC logo for the shirt. Good team work all. We have a great deal of talent within this club. I hope others step forward next year to enhance a future program.

IT WAS GOOD TO BE BACK AT IDXC!! The eyeball qosos were and are priceless. lots of fist bumps, handshakes and hugs. lots of good things happening.. please join me in expressing thanks to this group.



## Officers – 2023-2024 Contest Year

President: **David West, KO6M**  
Vice President/Contest Chair: **Chris Tate, N6WM**  
Treasurer: **Nian Li, WU6P**  
Secretary: **Greg Alameda, KK6PXT**  
Past President: **Dave Jaffe, WD6T**  
Director: **Bob Cox, K3EST**  
Director: **Ed Radlo, AJ6V**  
Director: **John Miller, K6MM**

## 2022-2023 Awards

CQWW DX Founders Award: **Bob Wolbert, K6XX**  
Rookie of the Year: **Nian Li, WU6P**  
Rookie of the Year: **John Owens, NN6U**  
Most Improved Contester: **Larry Mitchell, KF6NCX**  
Elmer of the Year: **Gary Johnson, NA6O**  
Team Builder: **Tom Taormina, K5RC**  
Inspiration Award: **Skip Jensen, K6DGW**  
Operating Excellence CW: **Rob Brownstein, K6RB**  
Operating Excellence SSB: **Andy Faber, AE6Y/P49Y**  
Operating Excellence Digital: **Steve Dyer, W1SRD**  
Most Valuable Player: **David A. Jaffe, WD6T**  
Contester of the Year: **Ed Radlo, AJ6V**  
President's Award: **Bill Haddon, N6ZFO** *"Ladder to the Stars"*  
for founding NS Ladder and many years of service to NCCC)  
*(despite a future increasing orbital radius, we hope you'll still feel the gravitational pull of NCCC)*



## Meet (more) New Officers



**Chris Tate, N6WM (Vice-President/Contest Chair):** Chris is a member of the N6RO contesting team and is a founding member of the K6LRG hilltop contest station that includes a fully remote SO2R operating position. Chris is a past president of the NCCC, and has served as VP/CC for three prior terms. He's operated at DX QTH's such as ZF, KP4 and KH6, was a member of VP6D team, and is scheduled to be part of the TX5S Clipperton expedition in 2024. An amateur journalist, he writes the ARRL DX SSB results for QST, and is also a member of the CQ WW RTTY contest management team, writing the results for both the CQWW DX contest RTTY, as well as the CQ WPX RTTY results article in CQ Magazine.



**Greg Alameda, KK6PXT (Secretary):** Greg was first licensed in 1981 as a high school student using the school's had a station. As life progressed he lost interest in ham radio, only to rekindle the hobby in 2015. He was really interested in contesting and was introduced to the NCCC by Gary, NA6O. It has been a whirlwind of learning, camaraderie, and support for the hobby and the club. "I hope all members can appreciate the effort made by the leadership both past and present, I encourage all members to take an active part in the club by participating in contests. Lets make NCCC the best it can be."



## Announcing the Winners of the 2022 Championship Asian-Oceania Challenge Intra-Club Contest

**David Jaffe, WD6T**

A little late, but the winners of the 2022 intra-club contest and their awards (Starbucks gift cards) are:

**GOLD:** KA6BIM – 3,182 QSOs, 5 contests – \$50 gift card

**SILVER:** K6XX – 2,629 QSOs, 4 contests – \$30 gift card

**BRONZE:** W6SX – 365 QSOs, 3 contests – \$20 gift card

As a reminder, this competition involves six contests that focus on Asia and Oceania. These are contests we can win from the West Coast. You must enter 3 of the 6 to be eligible. The three top contestants win gift cards. For complete rules, please see the NCCC web site: [nccc.cc/awards.html](http://nccc.cc/awards.html)

The contests for 2023 are:

**APRIL: JIDX CW Japan International DX Contest.** Second week. The world works Japanese stations. 30 hours (0700z Sat – 1300z Sun) [www.jidx.org](http://www.jidx.org)

**JUNE: ALL ASIA CW All Asian contest.** The third weekend. 48 hours. The world works Asian stations. [www.jarl.org/English/4\\_Library/A-4-3\\_Contests/2021AA\\_rule.htm](http://www.jarl.org/English/4_Library/A-4-3_Contests/2021AA_rule.htm)

**SEPTEMBER: ALL ASIA SSB All Asian contest.** First weekend. 48 hours. The world works Asian stations. [www.jarl.org/English/4\\_Library/A-4-3\\_Contests/2021AA\\_rule.htm](http://www.jarl.org/English/4_Library/A-4-3_Contests/2021AA_rule.htm)

**OCTOBER: OCEANIA CW Oceania contest.** Second weekend. 24 hours. 0800z – 0800z. The world works Oceania stations. [www.oceaniadxcontest.com](http://www.oceaniadxcontest.com)

**OCTOBER: JARTS RTTY JARTS WW RTTY Contest.** Third full weekend. 48 hours. You can work anyone. [jarts.jp/rules2022.html](http://jarts.jp/rules2022.html)

**NOVEMBER: JIDX SSB Japan International DX Contest.** The second weekend. 30 hours. 0700z Sat– 1300z Sun The world works Japanese stations. 30 hours. Sun) [www.jidx.org](http://www.jidx.org)



## Tube of the Month

**Norm Wilson, N6JV**

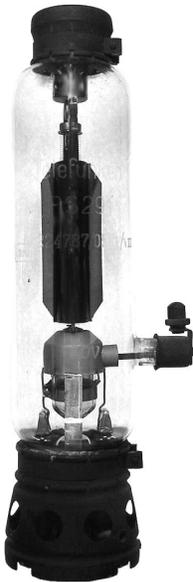
**(Chief Funker)**

Visit the Tube Museum at [n6jv.com](http://n6jv.com)

### Unterseebootsenderöhre, RS 291



In the years before WWII, the Telefunken Company developed special tubes for specific applications. The German surface fleet was neutralized early in the war so the Unterseeboote (U-boats) were the primary focus. Telefunken made two types of short-wave transmitters for the U-boats. One was a standard unit for normal operations in the North Atlantic and a more powerful transmitter was made for very long-range operations. The most common unit was the 200-watt, S 406 S/36 developed in 1936. It used a pair of [RS 291](#) tetrodes in its final amplifier. The RS 291 is rated at 110 watts dissipation which seems to be overly modest when the tube is about 10.5 inches long. The anode was rated at 1500 volts at 160 ma. The filament was 8 volts at 1.6 amps. This tetrode was designed for efficient operation using grid modulation. The base has three banana plug sized sockets instead of pins.



The U.S. relied mainly on quartz crystals for transmitter frequency control and produced about 30 million crystals. Germany had little access to quartz as it was mainly mined in Brazil so their consumption was less than 1 million. Telefunken knew they had to produce a stable VFO for frequency control especially in the U-boats, so an extensive research program was started to solve the issues. Thermal expansion of the metal in a VFO's enclosure was solved by die-casting a magnesium-aluminum ceramic which made the structure more rigid and the ceramic had a neutral response when heated or cooled. The enclosure was plated with copper to provide shielding. Most transmitting capacitors were made using mica but mica was another material in short supply in Germany. Ceramic was developed to make highly stable fixed value capacitors. For the proposed VFO's inductance, a variometer was made of high tolerance ceramic with electroplated traces of copper and silver. The ceramic capacitors were made in stacks of several small value capacitors that had different thermal responses and thus canceled out any thermal drift. With this transmitter they were able to stably transmit on

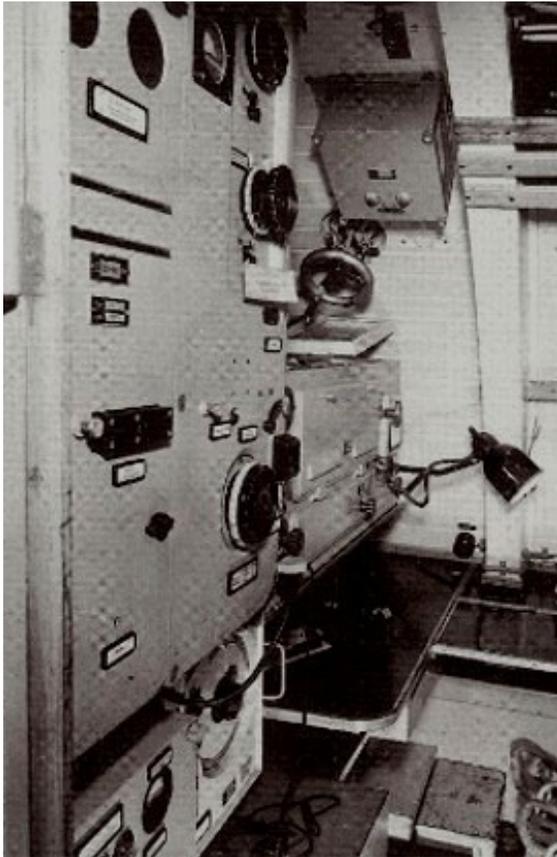


1,125 different 10 kHz split channels covering 3500 to 15000 KHz.

At the beginning of WWII, the U-boats were extremely successful. There was little defense against them. Their greatest enemy was a micromanaging command structure. They demanded that the boats make radio schedules to get instructions. With the VFO controlled radio, they could be anywhere in the spectrum and even if the



Allies heard a message, they couldn't accurately get a bearing. All transmissions were CW and encoded using an Enigma machine. Eventually the Allies developed a technology they called "Huff Duff" or HF Direction Finding utilizing a "birdcage" antenna that wasn't affected by masts or other objects. A quarter of the U-boats that were sunk were the result of radio intercepts. Microwave RADAR and SONAR helped deal with the rest. The crew of a standard U-boat was 44 including 2 "funkers" or radio operators, all sharing 1 bathroom and no shower.

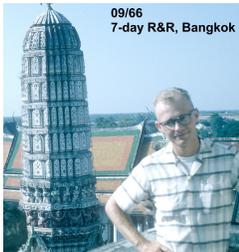


The photos of the U-boat radio room (left), the RS 291s (previous page) and the S 406 S/36 transmitter (right) are shown with permission from [cdvandt.org](http://cdvandt.org)

*(Ed. Note: Click on "senderohre" in the article title to view a list of WW2 German transmitting tubes)*



## Editor Notes



And, a new contest season starts! With Cycle 25 performing somewhat above forecasts, it should be a good one. We have two more bio's of our new slate of officers in this issue. My apologies for dropping the Atlantic Division NS Ladder results in the April issue, I've corrected it and John has reposted that issue.

The "Inspiration Award" and the "KB 3<sup>rd</sup> in Silver bracket" were waiting for me at W7RN while getting ready for 7QP. Many thanks to all! Awards from one's comrades in the club are always special.

I received a request from the Digital Library of Amateur Radio & Communications [DLARC], part of the "Wayback Machine," to archive all 610 and future issues of the JUG. Officers and Board approved and it's underway now. DLARC is funded by a grant from ARDC. The archive can be found at [archive.org/details/dlarc](https://archive.org/details/dlarc). I don't know when they'll start appearing however.

## SS CW

May QST reported the final 2022 November Sweepstakes CW scores and Bob, N6TV swept the Single Operator High Power in the Pacific Division from W7RN with 217,224 points, right behind N2IC, the SO HP overall winner with 236,040 points. Congratulations Bob!

## The Plea [again]

You might notice that this issue of the JUG is a bit thin. Technical articles, station activities/changes, contest activities of course, NCCC history ... all are welcome. And, we'll get it into JUG format for you. Just type it into an email, attach any graphics and photos as .JPG, .PNG, .BMP or any of the common formats are fine.



## **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](mailto: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](mailto: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](mailto: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

### **Find NCCC on Social Media**

Facebook: “Northern California Contest Club”

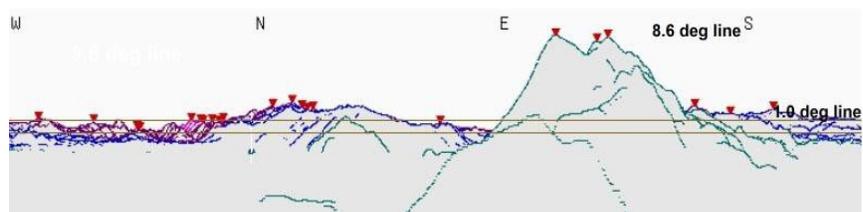
Twitter: “NCCCCKB”



## N6ZFO—Lake County Residence For Sale -(pre-list)

N6ZFO and XYL are relocating to Virginia to be near family, including grandchildren. Thus our Lake County property is available for sale — one of the best ham radio locations in CA. Notable features include:

- Atop a USGS peak—Mt. Dali-Dona — possibly the only USGS peak in CA in private ownership.
- 4-bedroom 3-level Tuscan style house with spectacular views. All masonry construction, resulting in below average insurance rates. 1.3 miles off Soda Bay Road through a locked gate. Road maintained jointly by 3 property owners. Solar supplies 10KWH/day on sunny days. No HOA.
- 2500 gallons of high quality water on site. Well is 450 feet below the house, >100 feet deep;
- Town of Kelseyville (population ~3500) has regular events include a traditional Christmas parade, Olive Festival, street dances in the summer, a bacon festival. Lake County has a major quilt show on the CQP weekend. Traffic is minimal — only one traffic light in the city. Has the 2nd largest astronomical observatory north of Bay Area (Taylor Observatory) and exceptionally dark skies.
- 26 acre property borders an almost inaccessible portion of the Clear Lake State Park. There is just one other resident in the adjacent 140 acre area and just 3 land-owners, all “ham-radio friendly.”
- The tower and two Innov antennas (13-el multi-monobander, 10, 15, 20, and 5-el 6m beam) were installed by Kurt, K7NV with full county permits. Lake is a ‘ham friendly’ county.
- The radio horizon is <2 degrees over 320 degrees, rising to 9 deg in the direction of Rio de Janeiro. (4 deg points are between N. Brazil and Buenos Aires — see “hey what’s that” profile below)
- Includes a licensed, bonded small winery, the Talleyrand Winery, with 1.6 acres of Petite Sirah and Sirah grapes, plus small amounts of Viognier and Marsanne. See [blogspot.talleyrandwinery.com](http://blogspot.talleyrandwinery.com).
- **Please contact Bill, N6ZFO directly at 415 209-3084 or our agent, Mara Eichelmann of Engel and Volk, at 707 485-2922. Price is 1.425M. Movie and photos shortly on commercial sites.**





**LANDS' END**   
BUSINESS

<https://business.landsend.com/store/nccc/>    MEN   WOMEN   PROMOTIONAL PRODUCTS

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



# Northern California Contest Club

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



For complete features and specifications visit [elecraft.com](http://elecraft.com) • 831-763-4211

# Northern California Contest Club

Excellence In Amateur Radio Contesting

# HAM RADIO OUTLET®

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**\*Free Shipping and Fast Delivery!**



### IC-9700 | All Mode Tri-Band Transceiver

- VHF/UHF/1.2GHz • Direct Sampling Now Enters the VHF/UHF Arena • 4.3" Touch Screen Color TFT LCD • Real-Time, High-Speed Spectrum Scope & Waterfall Display • Smooth Satellite Operation



### IC-718 | HF Transceiver

- 160-10M\*\* • 100W • 12V operation • Simple to use • CW Keyer Built-in • One touch band switching • Direct frequency input • VOX Built-in • Band stacking register • IF shift • 101 memories



### 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/ORPp • 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/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 FM/D-Star DV Modes • 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 VV, UV, VU and DV/DV • Enriched D-STAR® Features Including the Terminal Mode/Access Point Mode • UHF (225-374.995MHz) Air Band Reception



- RETAIL LOCATIONS - Store hours 10:00AM - 5:30PM - Closed Sunday
- PHONE - Toll-free phone hours 9:30AM - 5:30PM
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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



**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/Fixed 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-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



**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-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



**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



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