



#628 – November 2024



JUG

Publication of the Northern California Contest Club

NCCC

NCCC – 54 years of contesting excellence

Inside This Issue

- Inside this Issue
- President's Report
- About NCCC
- VP/CC Report
- ARRL 10 meter Contest
- Upcoming Contests
- Short Weekly Radiosport
- Bill Bridges, W6FA [SK]**
- Tube of the Month
- Antenna of the Month
- Editor Notes
- Prosigns
- NCCC Information
- Lands End Store
- Elecraft K4
- Ham Radio Outlet

NCCC MEETING
<https://nccc.cc/meetings.html>
November ZOOM Meeting
Tuesday 19 November 2024

President's Report

David West, KO6M

Greetings!



Thank you to Ken for hosting our BBQ in October and thank you all that made the trek. It was wonderful to see you all. Folks said the chicken was fantastic! (The secret? It was brined for an hour before I threw it on the grill).

I am writing this after reading comments from our fellow members. I had something else written but there was a comment that I wanted to address in a way that may be memorialized and perhaps read by someone that is looking for a club to join. Last month it seemed the club was only interested in the larger stations, the big scores, the whales so to speak.

I assure you that isn't true. We welcome all scores being reported for NCCC – large and small. We cannot be a successful club if we do not welcome the smaller stations just as much as we do the larger stations. I know we have many members that do POTA and SOTA excursions that also happen to coincide with a contest, and they submit logs for both the contest and the other activities. In fact, I know if it weren't for some of those outings then we wouldn't have some of those scores at all.

In addition, many of us have HOA's and small lots and we can't put up towers. Others have events with family which prevents doing the long BIC stints. However, we can get on the air and we can kick butt when we are able. Every point and every log matters. Do not think we do not want you to be active. As it is said:



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](#)

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](#)]: 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

Webmaster: John Miller, [K6MM](#)
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

“Do what you can, with what you’ve got, where you are”
Theodore Roosevelt quoting Squire Bill Widener.

Now, the next thing I want to address is what is the state of the club. Sure, we have contests every weekend. Some you report under NCCC and some you report for another club. What else? That’s up to you. It’s also up to us. Us as a club. In the coming bit John, [K6MM](#), and Chris, [N6WM](#), will be sending a survey that matches a survey that was sent out years ago: What do you do, what would you like help with, and what can you help with. We cannot be supportive if we don’t know where our strengths and weaknesses are. I hope you will fill that survey out and be honest about things.

I’m stepping off my pedestal but know that we can be successful if we work together. Every point and every log (including the dupes!)

KB in the next few contests! Hope to see you in the bands!

VPCC Report **Chris Tate, N6WM**



Greetings KBers. November is upon us, and with it the first of the ARRL sweepstakes contests, the CW competition was just completed as I write this. We have also competed in the CQWW SSB contest.

There were some great Sweepstakes performances from our members I'd like to put some focus on, in both California and Hawaii. First, Bob, [N6TV](#), took on the task as [KH6J](#) turning in one of his stellar cw performances from paradise. Second, Denis, [K7GK](#), dealt with many remote challenges, and despite them also turned in a top level competitive performance. And the elephant in the room was the Multi Op performance from [N6RO](#) ([N6RO](#) [N6WM](#) [WD6T](#) [WU6P](#) ops) squeaking in what could be the first place overall national performance pending log check. Great job to these and all other performances by our locals in this.

I'm going to address another elephant in the room, why are many of these scores going to different clubs? Well there are a number of SS operators who hold dual club membership and are highly competitive. Since we have contracted as a club in size that would make a push for a SS win extremely difficult, many of those operators have taken advantage of their regional club situations to compete for the ARRL SS gavel. Regional small club PL-259, as we as regional Medium club MLDXCC have parlayed this into multiple gavel wins at their respective



competitive levels. These clubs operate within the maximum entries based on their club size. Remember, an unlimited club competition requires 51 or more logs to even be considered in the category, and many more to be truly competitive. Since our membership numbers are eclipsed by other east coast contest organizations who focus on this unlimited category in sweepstakes its been difficult for us to consider a run in the unlimited category, without some serious long term planning, recruitment, and preparation.

So based on that I feel it the right thing to do in being supportive of those who hold dual membership with both the NCCC and their smaller clubs, and congratulate them, and wish them the best of luck in their pursuit of the sweepstakes gavel ... these guys are really in it to win it!

The phone edition of sweepstakes lies ahead. This is also an amazing competition, and literally was the contest that got me involved in radiosport. Its fast paced and exciting exchange really set the stage for a showcase in contesting. There is no cw decoding needed, just your brain and your voice and some good contesting technique. I know many of our regional clubs will continue their gavel pursuit in this, and hope many more of you take the opportunity to experience this contest.

ARRL 10 Meter Contest **14 Dec 0000Z – 2359Z, 15 Dec 2359Z**

ARRL 10 lies ahead for the next NCCC focus contest. Soon we will start asking for commitments to this event. Our president will be giving a talk on his experience in 10 meter contesting over the last several years as a newer entrant. In this, you are part of a greater team with a repeat win as an objective. Last year the NCCC did an amazing job in producing an unlimited win in this contest.

As part of team NCCC, we ask you to:

Plan for the time required to mount a meaningful effort, notify and plan with your family.. and understand the dates involved for this club commitment --

Secure your operating station! Do you have a place to operate? Are you planning on erecting a 10 m antenna at your QTH?.. Now is the time to get your “place to operate” reserved, constructed or otherwise ready to go. If you need help please reach out to me or any other NCCC board members so we can assist.

Think about ways you can maximize your time in the chair, think about health, ergonomics, meals etc. so you are in a position to do your best in support of your team.

That’s it for this month, I am excited that our solar peak contest season is well under way now. I hope to work you all in the upcoming Sweepstakes SSB and wish you all great enjoyment with the fun of contesting.

73 and seeya next time

Chris
N6WM



Upcoming Contests

ARRL Sweepstakes Contest, SSB	16 Nov 2100Z to 18 Nov 0300Z
ARRL 160	6 Dec 2200Z to 8 Dec 1600Z
CQ Worldwide DX Contest, CW	23 Nov 0000 to 24 Nov 2400Z
ARRL 10	14 Dec 0000Z to 15 Dec 2359Z
RAC Winter	29 Dec 0000Z to 2359Z
RTTY Round-up	4 Jan 1800Z to 5 Jan 2359Z
NAQP CW	11 Jan 1800Z to 12 Jan 0559Z
NAQP SSB	18 Jan 1800Z to 19 Jan 0559Z
CQ WW RTTY WPX	8 Feb 000Z to 9 Feb 2359Z
NAQP RTTY	22 Feb 1800z to 23 Feb 0600Z

Red entries denote NCCC Focus contest

PEED	XXT	DAY	TIME (UTC)	EXCHANGE	SPONSOR LINK
25 wpm	MST	Monday	1300 - 1400z	Name and QSO serial number	International CW Council
25 wpm	MST	Monday	1900 - 2000z	Name and QSO serial number	International CW Council
25 wpm	MST	Tuesday	0300 - 0400z	Name and QSO serial number	International CW Council
+ wpm	CWT	Wednesday	1300 - 1400z	Name and CWops # (or S/P/C)	CWops
+ wpm	CWT	Wednesday	1900 - 2000z	Name and CWops # (or S/P/C)	CWops
+ wpm	CWT	Thursday	0300 - 0400z	Name and CWops # (or S/P/C)	CWops
+ wpm	CWT	Thursday	0700 - 0800z	Name and CWops # (or S/P/C)	CWops
10 wpm	SST	Friday	2000 - 2100z	Name and S/P/C	K1USN
10 wpm	SST	Monday	0000 - 0100z	Name and S/P/C	K1USN

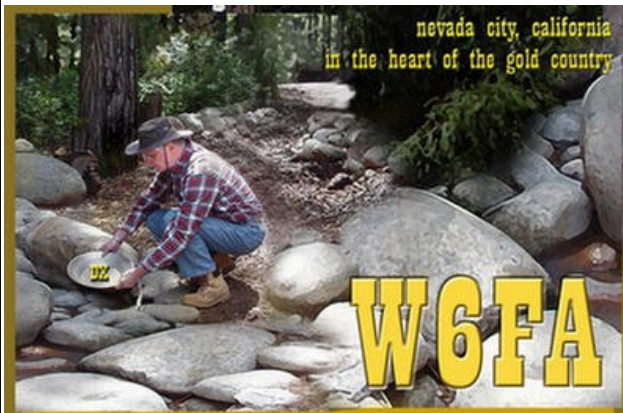


William “Bill” Bridges – W6FA (SK)



The JUG is saddened to report that Bill Bridges, W6FA, passed away on 1 Nov after a somewhat lengthy illness. First licensed as W6GEB in 1949, Bill held one of NCCC's earliest ARRL Sweepstakes checks. He also held EI4VTC and VK7WB. He operated from their retirement home in Nevada City CA, and maintained a second home in Sierra Madre CA. Bill was a retired professor of Electrical Engineering and Applied Physics at the California Institute of Technology

Dr. Bill Haddon, N6ZFO, (HMC class of '64, chemistry), a good friend of Bill's wrote: “W6FA was always a special friend and valued ham radio acquaintance. As an early graduate of (rival) Harvey Mudd College I was particularly appreciative of his distinguished career in EE and applied Physics at Cal Tech. I believe we may have discussed some of my physics connections at Harvey Mudd, which included founding President Joe Platt, but also three physics professors, Prof. Al Folke, Prof. James Stoddard and Prof Al Baez (physicist father of singers Joan Baez and Mimi Farina). [The latter three, certainly Prof Baez, may have preceded Bill's tenure at Cal Tech.] The familiar W6FA call sign will be very much missed by fellow radio contest enthusiasts.”



Bill was best known in scientific circles for his invention of the argon ion laser while at Hughes Research Laboratory in Malibu CA in 1961, which is still used today to treat diabetic retinopathy, in DNA sequencing, and to help increase the power of other lasers, for example. He was a Sherman Fairchild Distinguished Scholar at Cal Tech and was named the Braun Professor in 1983.

[Cal Tech Obituary Link](#)



Tube of the Month

Norm Wilson, N6JV

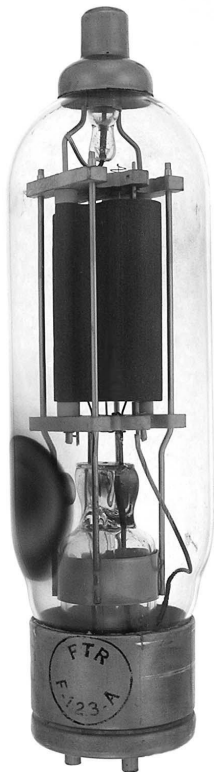
Visit the Tube Museum at n6jv.com

F-123A



Before the United States entered WWII, the British were losing many merchant ships to the Axis powers. They wanted the U.S. to build replacement ships using a design they had been using. The U.S. agreed to the project, but wanted to alter the design to speed production. British ships were built with rivets. This is a slow process and requires well trained workers. The American shipyards wanted to build all the parts on an assembly line and weld everything together. A worker could be trained to weld in a short time. They also wanted to power with oil and not coal. The final design was called the “Liberty Ship”.

Most of these ships were built in Richmond, California with their power plants constructed in Sunnyvale. With the draft and volunteers removing many of the available construction workers, large numbers of women were hired. “Rosie the Riveter” was replaced by “Wendy the Welder”. “Wanda the Welder” was busy making aircraft and war ships in the East. It is relatively easy to maintain a good arc weld with a steady hand and lots of current, but attention must be made for foul smells that may indicate that your clothing and/or hair may be on fire.



The contract for the ships was “out the door” so all operational equipment including radios and antennas were required. Federal Telephone and Radio was contracted to provide radio equipment for the early ships. The Federal [F-123A](#) was chosen, or may have been developed, especially for this application. I have identified no other use for this tube except for the Liberty ships. This 125-watt triode is slightly longer than the 211 tube at 8.25 inches. Maximum plate voltage is 2000 volts at 300 ma. The filament is 10 volts at 4 amps. The tube’s mu is 14.5 so it could be used as an RF amplifier or as a modulator. The 240-watt CW transmitter that FTR built was the 129A and used one tube as the driver and two in the final amplifier. The tube was capable of full power up to 30 MHz. Marine transmitters operated on CW to pass traffic with coastal stations and other ships. They also had to operate on 500 KHz or 600 meters. This was the emergency frequency and it had to be monitored at all times. The lifeboat radios were also on this frequency and could send CW with a built-in key or use a motor driven SOS (HELP!) or SSS (under submarine attack) wheel as shown in the photo of my Navy TCY-1 lifeboat transmitter.



Mackay Radio & Telegraph (ITT Mackay Marine) provided service for many of the Merchant Marine ships. They contracted spare tubes for the older transmitters and the [MR-123-A](#) was produced for them.



Antenna of the Month

Square Loop ["Squalo"]

Gary, NA6O



A popular and compact antenna for 6 and 2 m is the square loop, also called a squalo. Available commercially or easily built from copper tubing, it offers an omnidirectional pattern, horizontal polarization, and a good match to 50 ohms. In principle it could be built for any band but low VHF is where it's most popular and practical. It's a nice complement to a vertical, and also handy for a "quick look around" if you only have a Yagi. In this article, we'll look at a popular design for 6m, one that I built myself in a few hours when desperate for an antenna to join an ongoing June VHF contest (Fig. 1).



Figure 1. My emergency 6 m squalo, made of refrigerator tubing and installed on a piece of conduit.

The squalo is basically a dipole (half wavelength of course) with the ends bent around until they nearly touch. This is not to be confused with other loop designs of various lengths that are in fact contiguous closed loops. An important factor in its design is that if we do nothing special, the impedance at the feedpoint would be very low, on the order of 10-15 ohms. So some form of matching device is required to transform that up to 50 ohms.

There are many ways to provide a match including transformers, transmission line matching sections, LC networks, gamma match, beta match, and others. In this case, we will follow the lead of the most common design for 6 m and use a modified beta match. A full description of how a beta match works is beyond the scope of this short note but is covered in detail in *ARRL Antenna Handbook*. It turns out that it's what amounts to a simple loop of wire placed across the feedpoint acts as a small inductor. This is also called a *hairpin* match. By adjusting the geometry of the antenna (chiefly its length), we force it to have a small effective capacitance at the feedpoint at the center of the desired band. When combined with our little inductor, they act like an *L network*. *L networks* in general are very useful in impedance transformation, and in this case it's configured to convert a lower to a higher impedance. It's just a matter of mechanical adjustment.

Figure 2 shows a good design from PA3EGH. Make it from half-inch copper tubing and fittings for best



results, or bend it up from soft refrigerator tubing (kinked corners are ok). Coax attaches at the locations marked "feed point." You will need to come up with some kind of clamps to make the connections. There's a shorting strap that determines the length of the beta match loop. Adjust that carefully for lowest SWR. To change resonant frequency, either trim the ends of the antenna that go into the insulator, or try bending them apart. A piece of aluminum angle can be used to attach it to the mast, and it's pretty well balanced.

A common-mode choke is needed, as close as you can get to the feedpoint. Two turns through a mix 31 ferrite toroid, or a series of 5 or 6 beads or clamp-ons over the coax will work fine. This will prevent the outside of the coax from becoming part of the antenna and detuning it, along with conducting noise onto the antenna.

I ran some simulations in EZNEC with the antenna up 20 feet and the results are shown in Figs. 3 through 5. An SWR less than 2:1 is available over a 1 MHz bandwidth. Peak gain is about 1 dB less than a simple dipole in exchange for a more omnidirectional pattern. It's somewhat directional along the centerline of the antenna as shown in the azimuth pattern. For additional gain, two or more antennas can be stacked and fed via a phasing harness like the ones from M-Squared (m2inc.com). Overall, this is a simple and robust antenna that anyone can build.

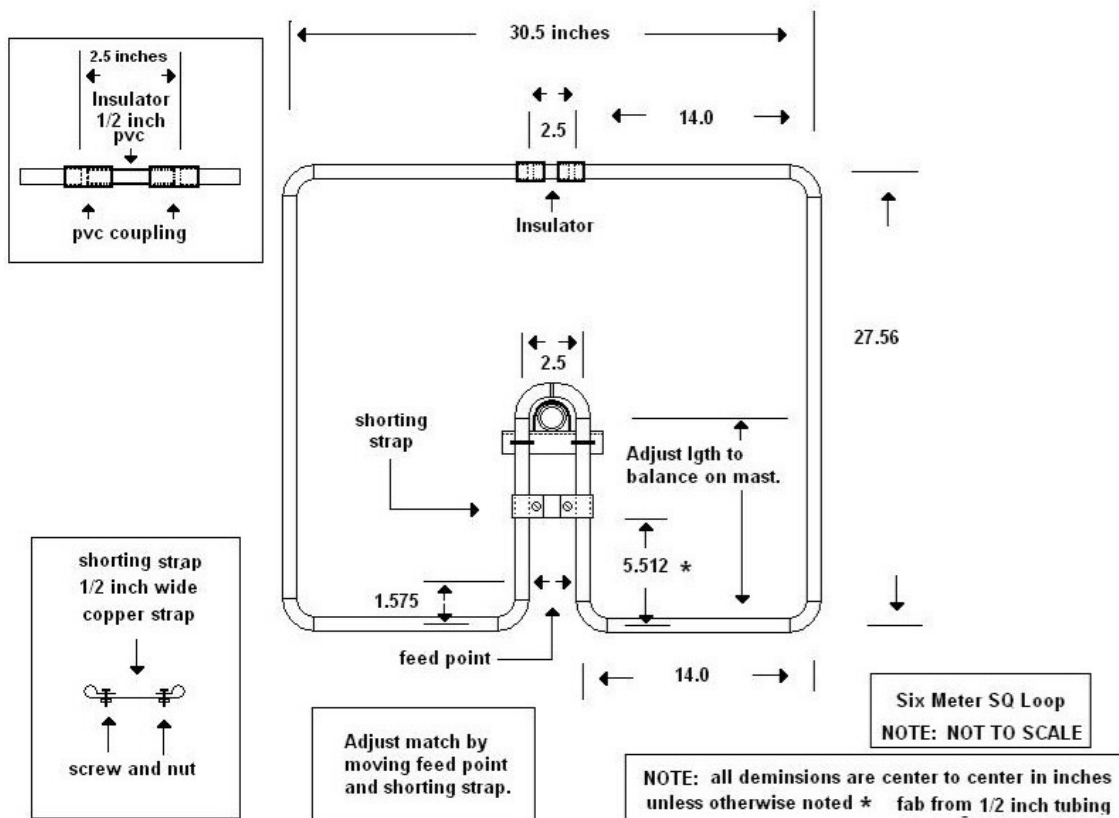


Figure 2. Design for a 6 m squalo by PA3EGH

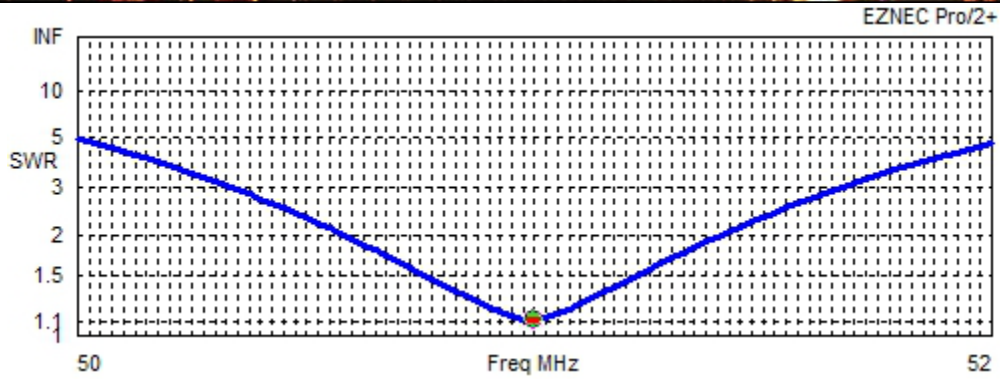


Figure 3. SWR when optimized for 51 MHz.

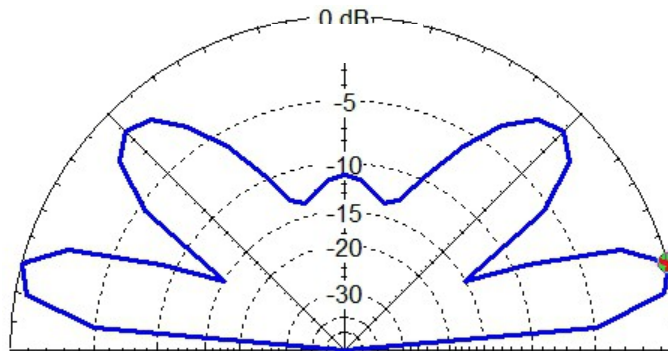


Figure 4. Elevation pattern along centerline with the antenna at 20 ft .Outer ring is 6.75 dBi

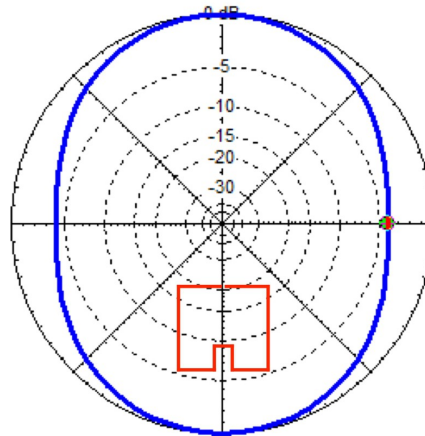


Figure 5. Azimuth pattern at an elevation of 15 degrees. Outer ring is 6.75 dBi.



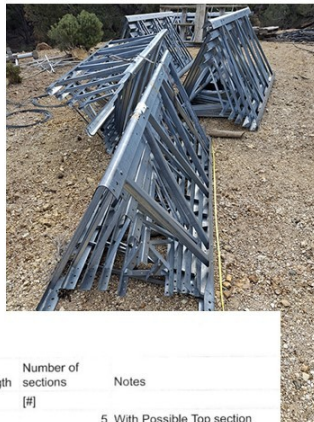
W7RN Clean Out Tom, K5RC

Over the years, we have accumulated a great deal of materials that are now excess to our needs. There are other hams that can benefit from the aluminum, coax, cables, etc. Most of it is free for the taking with a few items that have a price tag. Perhaps a Club member with room to store this stuff can be the new home for others to pick through. In any event, I really need to get it off my property. More important is that deserving hams can build projects once too costly to build. Call for an appointment and schedule a moving party as a Club Activity. 775-847-2360

(Ed. Note: Tom's submittal includes many more photos of the "stash" than we have room for in the JUG. You can view a much larger set of photos of the collection at [W7RN Stuff](#) Even the photos do not depict the entire extent of the items available)



HDBX STYLE TOWER
\$50 PER SECTION



Longest Leg Measurement [ft in]	Across Flat [ft in]	Section Length [ft]	Number of sections [#]	Notes
1 3' 0"	2' 7"	8'	5	With Possible Top section
2 4' 0"	3' 6"	8'	5	With a mast and braces
3 3' 9"	3' 4"	8'	5	With possible top section
4 2' 8"	2' 3"	8'	4	with braces
5 2' 11"	2' 6"	8'	2	with a mast
6 2' 8"	2' 3"	8'	2	with braces



80 M 4 SQUARE
\$250.00



Editor Notes



Well, it's official ... the scientific sun-watchers have declared that the Cycle 25 maximum has arrived. Cycle 24 and several others have had two peaks roughly a year apart, we'll see about this one. What has been a sort of steady observation over decades is that the sun gets grumpier on the downside of the cycle, not that it hasn't been pretty active on the upside of 25. The good news is that things should remain generally good to excellent on HF for another several years, punctuated by occasional upsets.

Conditions for the ARRL Sweepstakes CW seemed to be somewhere between outstanding and phenomenal. Particularly on 10/15..

Prosigns

For radioaffectionados, prosigns are one, two, and occasionally three letter combinations that can have one or more meanings. Prosigns are not to be confused with International Q-signals and NATO Z-signals. They are used on CW and RTTY, and many originate in military and aircraft usage. Some also have a one-word equivalent [Proword] for use on voice circuits.

PROSIGN	PROWORD	MEANING
AA		End of msg line
AR		End of msg
AR m		End of msg, m to follow
AR N		End of msg, none to follow
AS	WAIT	Wait [momentary]
AS n	WAIT OUT	Wait approx n minutes
BT	BREAK	Start new message section
BK	BREAK-IN	End stn A/Begin new stn
C	AFFIRMATIVE	Positive response
IMI	SAY AGAIN	Repeat last or "I say again"
INT		Interrogative – precedes a question
K	OVER	Invitation to transmit
N	NEGATIVE	Negative response
R	ROGER	Transmission[s] received
SK	OUT	No more
X	STOP	Full stop [period]
Z	UTC	Preceding time is UTC
		MILSPEAK
BZ	BRAVO ZULU	Well Done!
ZBM 2		Place a competent operator on ckt



Prosigns are typically written with an overbar, and the open-frame Underwood mills I encountered in 1956/57 had a number of prosigns in the upper case with the bars. Prosigns may have a code page in UTF-8 but I've never had the time to look for them so just pretend all the ones in the above table [except ZBM] have an overbar.

Hams tend to be somewhat flexible in their use of prosigns. **INT** followed by text was originally designed to turn the preceding Q-Signal into a question ... e.g. "**INT QRU**" – Do you have anything for me? This arose because **IMI**, the repeat prosign overlapped the Morse ? character. Early hams must have figured out how to tell the difference from context because **INT** has fallen into disuse.

BK: It's proper usage is to signal the end of communication temporarily with Station A, to be followed by a call to and communications with Station B, and carries the connotation that Station A will stick around for future traffic. In aircraft usage by a controller, it would sound like: "DELTA 123 DESCEND TO AND MAINTAIN FLIGHT LEVEL 210 BREAK UNITED 321 FLY 040 REPORT ESTABLISHED." **BREAK** separates instructions for one A/C from instructions for another, but both A/C will remain on frequency. At some point, hams began using it in place of **K** to signify "over to you." The custom continues today. A frequent stranger occurrence today is one station ending a transmission with **BK** [i.e. **K**] and the other station beginning his/her transmission with **BK**. Doesn't make a lot of real sense but to repeat, hams are flexible.

A common response to **JOHN?** ["Is your name John?"] in an QSO is **R**. Technically, the proper response would be **C** for "yes" or "affirmative" whereas **R** means "received" but again, we're pretty flexible. **AS** technically means "wait just a moment," **AS n** means "wait n minutes" where n is a small number such as for a bathroom break. Both imply that the station has more for you and you are expected to stick around on frequency. **QRX mins** or **QRX date/time** means I will call you in mins or at date/time and feel free to shut down or go elsewhere in the interim.

Hams have a strong propensity to "nounify," "verbify," and even "adjectivify/adverbify" Q-signals, as in "What is his **QRG**?" Again technically, **QRG?** Means "What is my [or XXXX's] frequency?" and the reply "**QRG xxxx**" is "Your frequency is xxxx kcs." Similarly, **QRM?** Means "Are you being interfered with?" and the reply **QRM** is "I am being interfered with." We will say or send, "The **QRM** is really bad" turning **QRM** into a noun.

Finally, the Z-Signals originated at NATO and are codified in ACP131. They tend to be commands and do not follow the question-response format of Q-signals, as in **ZUI YYYY 123** – "Your attention is directed to YYYY's message number 123." **ZBM 2** is good for a laugh but usually only on the sender's side and is not recommended for everyday use.

If you find dissertations such as the above to be outside the realm of Amateur Radio and/or Radiosport, you are encouraged to contribute something closer to the centerline of our hobby.



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

Find NCCC on Social Media

Facebook: “Northern California Contest Club”

Twitter: “NCCCCKB”



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.



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 KPAS500 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 • 831-763-4211

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

Northern California Contest Club

Excellence In Amateur Radio Contesting

HAM RADIO OUTLET®

WWW.HAMRADIO.COM

***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/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/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

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

• Bluetooth® Communication • Simultaneous Reception in VV, 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



- 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



FOLLOW HRO ON SOCIAL MEDIA



twitter.com/HamRadioOutlet
facebook.com/HROHamRadioOutlet
instagram.com/HamRadioOutlet
youtube.com/HamRadioOutlet

*On most orders over \$100 in the continental US. (Rural locations excluded) **Except 60M Band. The Icom logo is a registered trademark of Icom Inc. 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.



Northern California Contest Club

Excellence In Amateur Radio Contesting

HAM RADIO OUTLET

WWW.HAMRADIO.COM

See us at HAMCATION Booth 024-028!



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 Mode/Mod 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



FTM-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-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



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



- 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



SACRAMENTO, CA (877) 892-1745	PORTLAND, OR (800) 765-4267	PHOENIX, AZ (800) 559-7388	MILWAUKEE, WI (800) 558-0411	WOODBIDGE, VA (800) 444-4799	WINTER SPRINGS, FL (800) 327-1917
SAN DIEGO, CA (877) 520-9823	DENVER, CO (800) 444-9476	ATLANTA, GA (800) 444-7927	NEW CASTLE, DE (800) 644-4476	SALEM, NH (800) 444-0047	WWW.HAMRADIO.COM

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.