



Publication of the  
Northern California  
Contest Club



Issue 498

November 2013

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Guests are always welcome at the NCCC!  
Please join us.



**Monday, November 11th, 2013**

**Time:**

6:00pm Schmooz, 6:30pm Dinner, 7:00pm Program

**Location:**

Sneha Sunnyvale, 1214 Apollo Way, Suite 404 B,  
Sunnyvale, CA 94085

Directions: <http://goo.gl/maps/y2Xgr>

Phone: [\(408\) 481-0700](tel:4084810700)

**Program:**

Meeting Program: "Signal Cleanliness = Contesting Godliness" -Talks by Bob, K6XX and Jim, K9YC

**To register:**

Please RSVP to Tom [nccc.treasurer@gmail.com](mailto:nccc.treasurer@gmail.com)

Full menu details are on Page 4

**President's Report for November.**

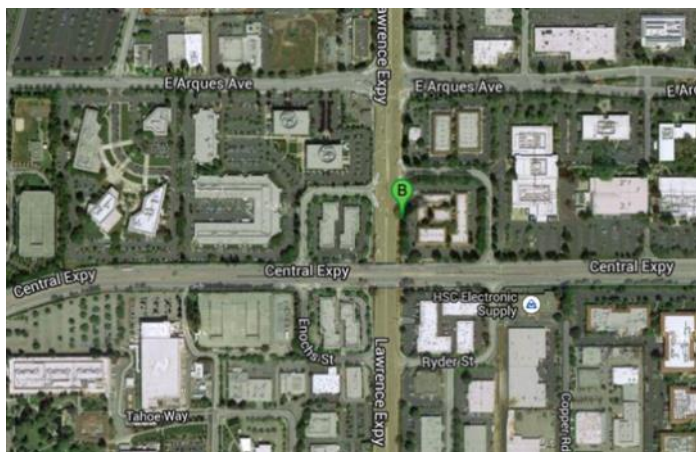
As I've mentioned before, one of the hardest parts of being a club officer is realizing that you can't do it all and that finding someone else to pitch in can sometimes be a struggle. I hope it's not just that we're all getting old, but there is certainly data to support that conclusion.

The exchange in the Japan International DX Contest includes the operator's age. It would be instructive to see if there exists some compilation of the mean age of entrants over the years [Google wasn't any help here]. I'm pretty sure that it would show the mean trending up.

Not long ago I had breakfast with a group of my ham radio friends where I was grumbling about club responsibilities. "I wonder," I said, "if it just means that the folks you can count on to get things done are just getting tired—that they feel like they've paid their dues and deserve to devote a little more time for... ham radio!

"Well," said one of my breakfast mates, "look around you—how many of us have already been club presidents?" All but one raised his hand, and the one who didn't had only been licensed for two years.

It is a testament to the talents and devotion of NCCC members that—when push comes to shove—we get things done. The CQP team has done a superb job managing the biggest and best state QSO party. The call to resume making Sweepstakes a focus contest has turned out the troops and as I write this





# Northern California Contest Club

Excellence In Amateur Radio Contesting

## Officers:

President	Alan Eshleman	K6SRZ	doctore@well.com	Penngrove CA
Vice President /Contest Chair	Alan Maenchen	AD6E	ad6e@arrl.net	San Jose, CA
Secretary/Treasurer	Tom Epperly	NS6T	tepperly@gmail.com	Livermore CA
Past President	Dean Wood	N6DE	cqden6de@gmail.com	Sunnyvale CA
Director	Fred Jensen	K6DGW	k6dgw@foothill.net	Auburn CA
Director	Steve Dyer	W1SRD	w1srd@arrl.net	Redwood City CA
Director	Jim Brown	K9YC	k9yc@arrl.net	Santa Cruz CA

## Volunteers:

New Member Mentor	Al Rendon	WT6K	wt6k@arrl.net
Charter Member	Rusty Epps	W6OAT	w6oat@sbcglobal.net
Awards Chairs	Joanna Dilley	K6YL	joanna.k6yl@gmail.com
	Rebar Rebarchik	N6DB	rebar@hamilton.com
CQP Chair	Chris Tate	N6WM	ctate@ewnetinc.com
CQP Certificates	Andy Faber	AE6Y	ae6y@arrl.net
K6ZM QSL Manager	George Daughters	K6GT	k6gt@arrl.net
K6CQP,N6CQP,W6CQP QSL Mgr	Ed Muns	W0YK	w0yk@arrl.net
NCCC Email reflector Admin	Phil Verinsky	W6PK	kb-w6tqg@verinsky.com
Webmaster	John Miller	K6MM	k6mm@arrl.net
JUG Editor	Ian Parker	W6TCP	w6tcpian@gmail.com

## Thursday Night Contesting:

NCCC—Sprint	Ken Keeler	N6RO	kenkeeler@jazznut.com
NS Ladder	Bill Haddon	N6ZFO	haddon.bill@gmail.com
Slow NS (SNS)	Chris Tate	N6WM	ctate@ewnetinc.com

### NCCC Net

Thursday 8 PM

Freq: 3.610 +/-

### NCCC

Monthly meetings take place on the second Monday of each month !

## NCCC Membership Information

If you wish to join NCCC, you must fill out an [application for membership](#), which will be read and voted upon at the next monthly meeting. ([PDF application form](#))

To join, you must reside within [club territory](#) which is defined as the maximum of:

- Northern California, anything north of the Tehachapi's up to the Oregon border, and
- A part of north-western Nevada (anything within our ARRL 175-mile radius circle centered at 10 miles North of Auburn on Highway 49).

we are neck-in-neck with PVRC in the CW portion of the event. Many members are active in elmering those who are new to radiosport. Understanding digital technology doesn't come easily to some of us—hey, it was a big achievement for me when I mastered my Casio Triathlon watch—but posting our problems to the very active NCCC reflector invariably results in a solution.

In AD6E's absence (he's with the T33A DXpedition to Banaba, the site of my first DXpedition nine years ago) I've taken on the VP/CC duties. It's my task to get as many of you on the air for our focus contests and, after the contest, to make sure your logs are submitted in a

timely manner. The VP/CC looks over "logs received" lists to make sure your calls are there and that the club is spelled out as the Northern California Contest Club because occasionally we enter the wrong club.

Sweepstakes accepts entries up to 15 days after each contest weekend. I urge you to visit the ARRL logs received site and be sure you're there and that your NCCC affiliation is noted. There's still time.

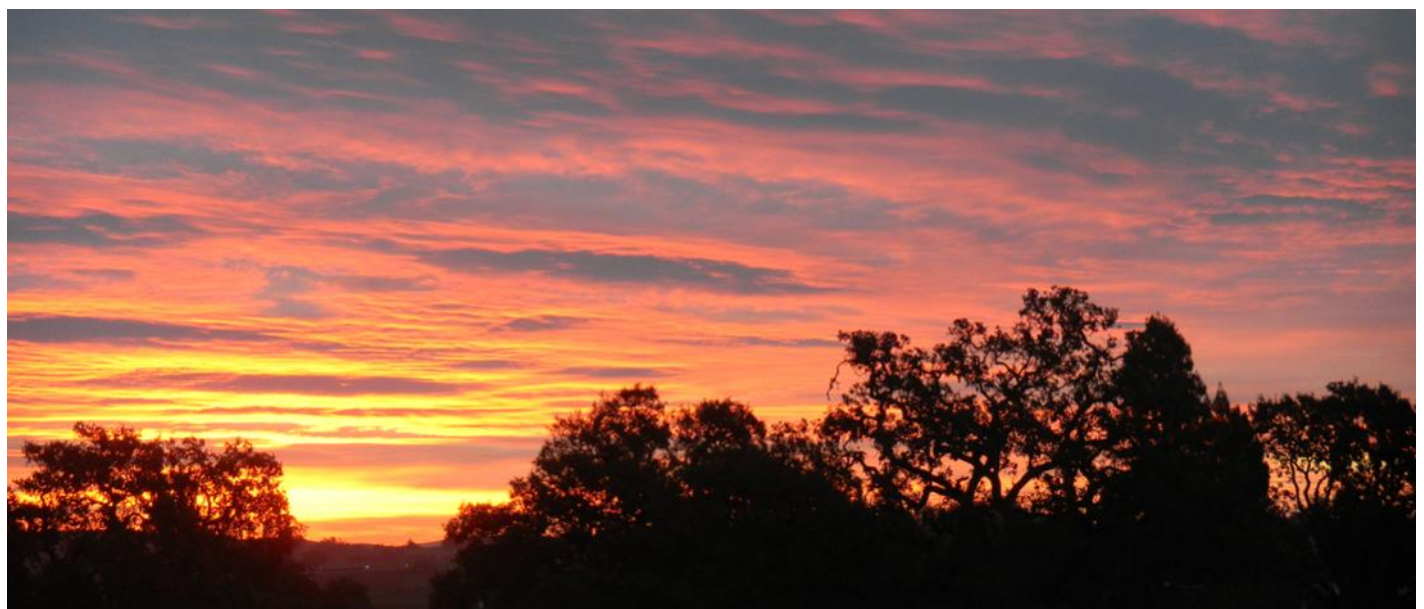
I hope to see you all at the November 11 meeting at Sneha in Sunnyvale. Bob, K6XX, and Jim, K9YC, are going to show us how to eliminate clicks, splatter, and distortion in our signals and Bill, N6ZFO, will be venturing down from Kelseyville to discuss the trends so far in Sweepstakes 2013.

Dust off those microphones and get ready for Round Two.

73,  
Alan/K6SRZ



My niece Grace, age 8, working the Colorado QSO party while proud control operator K6SRZ lurks out of view.



Long path sunrise from K6SRZ

## **JUG December Deadline**

The last date to submit articles for the December JUG is Saturday 30th November.

We would welcome articles and information from other reader ! Please submit you material to Ian W6TCP, via email at [w6tcpian@gmail.com](mailto:w6tcpian@gmail.com)

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## **All License Class Exam!**

An all license class exam will be held in Fairfield at the office of Jerry Olive KD6WKY, 1530 Webster Street, Suite A, Fairfield, CA on Saturday, December 7 at 9:30am. Walk-in's are welcomed. Please have \$15 cash exact change with you if you plan to test. This is an unsponsored test session, VEs have already been arranged. Call Jerry at [707-422-6777](tel:707-422-6777) (days) if you have any questions.

Jerry Olive

<http://www.jerryolive.com>

<http://www.qrz.com/db/KD6WKY>

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## **NCCC November meeting—Menu Information**

Typical Dinner Buffet menu has the following items:

Appetizers: Chili Pakora/Spinach Pakora/ Vegetable Samosa/ Moong Pakora/  
Chana Chat/ Dahi Vada/ Papad.

South Indian: Masala Dosa/ Idly/ Vada/ Uttappam/ Sambar.

Vegetarian Entrees: Mixed Vegetable Curry/ Vegetable Noodles/ Dal Curry/  
Chana Masala/ Vegetable Kurma/ Palak Paneer/Alu Gobi Masala/ Alu Mattar/  
Potato Curry/ Vegetable Biryani

Non-Vegetarian (Meat) Entrees: Chicken Tikka Masala/ Chicken Maharaja/  
Chili Chicken/ Egg Curry/ Tandoori Chicken/ Chicken Masala/ Lamb Kurma/  
Lamb Curry/ Lamb Biryani.

Others: Plain Nan/ Basmathi Rice/ Raitha/ Green Salad/ Onion,chili,lemon  
salad/ Mango Pickle/ Mint Chutney/ Sweet & Sour Chutney/ Coconut Chutney/  
Hot Chutney/ Oranges.

Desserts: Kheer/ Fruit Salad/ Gulab Jmoon/ Suji Halwa/ Mango Ice Cream.

73 de Tom NS6T  
NCCC Sec/Treas

My Townhome Shack - Byron N6NUL  
½ A Pound of Solder

There is a chill in the air here at My Townhome Shack, and it got me to thinking about all the projects I have lined up to build this winter. I will be adding them to the list of projects I have built with the pound of solder I bought several years ago. My thought in keeping the list was that at some point I would write a “1 Pound of Solder” article.

Well, I weighed my spool the other day, and I’ve only used half! So, what can you build with ½ a pound of solder? A lot. So much, I consolidated the list:

Elecraft K1-4	Elecraft K1 Options	Elecraft KAT1 Tuner
Elecraft K2/100	Elecraft K2 Options	Elecraft KAT100-2 Tuner
Elecraft Mini-Modules	Elecraft KRC2	Elecraft XV50 Transverter
K6XX K1 CW Indicator	YCCC SO2R Box	WinKey USB
Uncounted Cables	Uncounted Torroids	Uncounted Small Projects

Already lined up and started is an Elecraft XV144 transverter, and a second YCCC SO2R box for a fellow NCCC member. Then, a pair of the TXBPF filter projects that Jim K9YC wrote about recently the NCJ.

Visiting other stations in the area, I’ve been jealous of their Elecraft P3’s. Being able to visualize the band helps tremendously, so I bought an LP-Pan kit along with the IF buffer amplifier required to interface with the K2. While I’m at it, I will build a fixed audio out board to help with digital modes.

And, of course, the electronics for my Moxon Claw antenna project. I’ve been making progress, but the end of the summer was too hectic for me to finish the task in time for Sweepstakes this year. Hopefully, I will have more positive news on the Claw project next month.

There is a lot of fantastic gear available, and the best radios now far out-strip the K2. But if you enjoy building your own gear, there are a lot of options available. You can do it, and the winter months are a great time to do get started.

73, Byron N6NUL  
byron@n6nul.org

# Going Solo in Yolo for CQP

## By Jerry Olive, KD6WKY

A few years ago after working two CQP County Expeditions with my good friend Ralph Jones AA6GM in Southern California it was my turn to find a location suitable for a CE that was rare, doable, and located in a place where I could drive a car. Knowing Yolo County had been under represented in years past and that I had a client in Winters, CA with a 60 acre walnut and prune orchard, I decided to get permission from him to set up a station there for CQP. The location was open and flat as well as close to home; about 30 minutes from my QTH.

For the past few years Ralph and I had been setting up our K6Y station over there, each year doing improvements to the station to increase our score all the while keeping it fun. CQP 2013 was the third year at the site and with the addition of a three element Super Antenna™ YP-3 beam K6Y had a claimed score that jumped over 40% to just over 68,000 with 477 contacts and 56 mults missing only MS and NT for a sweep.



Gear on ground

I acquired the YP-3 last winter on eBay and had tested it making notes and modifications to the mast assembly prior to CQP. My other antenna was my trusty Buddipole™ which I used on 40m and 80m very nicely. I'll explain later.



K6Y Station

continued on next page

This year for the first time I operated single operator, low power. Ralph AA6GM had moved to AZ and my friend Skip AF6HC hurt his back so I wasn't able to put together a serious CQP crew this year. I had some interest from friends that wanted to bring their untested equipment and antennas as sort of an October Field Day weekend. I kindly declined their offers on several occasions requesting only their help on the radio since I had everything needed to make K6Y work. Nobody seemed interested so I went Solo in Yolo!



The Super Antenna™ YP-3 beam

I was able to set up the station in about an hour leaving the YP-3 for last. In my haste I set up the YP-3 incorrectly using the wrong traps and had a short in the banana clip connection at the same time. It took me 45 minutes to analyze the problem and correct my initial assembly mistakes. I made my first contact at 1641 UTC. Someday I'll be QRV at 1600, but this was the best start time I have had in years from a CE

While setting up Bill Ragsdale K6KN stopped by and set up his QRP rig using a portable vertical antenna. Bill set up about 50 meters away from me on the tree line. About Noon Bill had to leave and attend a family function but it was nice to meet him face to face.

I spent the first three hours on 15m SSB working east of the Mississippi and into Europe, that CQP advertising in EU paid off nicely. When I reached 100 contacts on SSB I switched over to 15m CW for the rest of the afternoon. Just before new day, I took a break and broke out the Buddipole™ setting it up among the trees. The walnuts are spaced 20' x 26'; plenty of room!

In the late afternoon and early evening I moved to 40m both CW and SSB working a steady flow of stations on a run frequency. About 0100 UTC my wife Cora arrived with dinner; a nice warm entrée of chicken apiritada and rice. I added walnuts for fun. We ate dinner as the sunset through the walnut trees on a nice October evening in Yolo County, it was great! When we finished dinner I got back on the air and built a nice little pile up on 40m CW while Cora walked the rows of walnut trees picking up nuts that were left on the ground from the sweeper that had just harvested this stand of trees earlier in the week. She left about 0500 UTC with a shopping bag of walnuts and a promise to send daughter Julie back Sunday afternoon to help me take down K6Y.

continued on next page

At about 0330 UTC I reconfigured the Buddipole™ to the low band 80m vertical configuration featuring the 80m coil and 66' counterpoise wire. Walnut trees are perfect for this set up. With the 9' vertical antenna up 20' at the base, the counterpoise wire needed to be at least 5' off the ground with a right angle turn at the 33' mark. The tree branches were a perfect place to lay the wire as I unwound it and made the turn. I had a 1.2:1 match with a nice 60 KHz low spot on 80m for both CW and phone with that antenna. Don't laugh, that antenna was awesome on 80m.



K6Y—operating position

I went to sleep about 0630 UTC when the Q rate dropped off and I was starting to shiver; my core temperature was dropping a bit. After about ten minutes in my retired US Army medium cold sleeping bag, I was warm and asleep. Knowing how to stay warm, dry and be comfortable outdoors is important.



View of the Orchard

On Sunday morning after a quart of hot coffee I could see well enough to adjust my YP-3. I reconfigured it for 20m and ran it there all day picking up both new contacts and third and fourth contacts from stations I had worked on other bands. While operating, I worked in some oatmeal and scrambled eggs using my canteen cup for cooking. Unfortunately I forgot to bring a pan so I made it work with what I had.





Birds on a Beam

Everything I used one person could set up and take down. I avoided using antennas designed for permanent installation favoring portable antennas designed for temporary use. My generator was a used Kipor IG1000 which has plenty of power for a Kenwood TS-570D with peak power usage at only 350 watts when everything was running. Everything you see in the photos fits into a Toyota Corolla so going anywhere reasonable is possible.

Set up time when everything is done right is about 90 minutes including staking guys and assembling antennas. Take down runs about two hours because I am careful repacking antennas and radio gear, cleaning as I go. Camping is dirty.

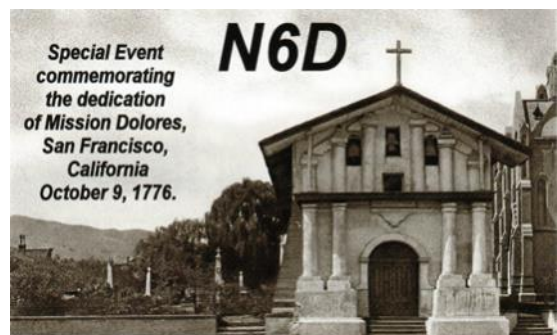
If you are kind of bored working CQP from home and want to try something different, maybe set a record in a rare county, work a County Expedition and help those light orange counties that Bob N6TV illustrates go dark orange full-time in 2014. K6Y will be back in Yolo in 2014 working for a six figure score.

73 Jerry KD6WKY

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## N6D—CQP QSL

Here is a picture of the QSL card for N6D, a special event I did during the weekend of CQP. If anybody who worked me during the Cal Qso Party would like one, just send a QSL card and an SASE via AE6YB and I'll send this card.



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## CQP—Expeditions

Next month in the JUG, we will have a report from N6G from Tuolumne county..

**Where did you go?** Send your report and pictures to Ian W6TCP @  
w6tcpian@gmail.com

# The Salmon Whisperer

## Don K6GHA

Operating QRP is interesting and challenging. Operating QRP in a contest environment is like swimming upstream (sorry for the pun). 2013 was my first time swimming with the big fish of the Washington State QSO Party - Salmon Run; and I could think of no better way to jump in than with 5 watts, a lot of hope, and some great operators at the receiving end

My choice to operate QRP for this contest, upon reflection, would be like choosing fly fishing over bait fishing. In bait fishing, you can use the fancy and powerful attractant (think of this as power), and drift it into big pools where fish should be. Then you wait until one (or more) take the bait. A powerful station will draw many fish... er... operators.

With fly fishing, you have to craftily place your lure, drift it over the hole where you think the fish are, and then hope that your hook simulates something the fish wants to take. With the 5 watts QRP, placing your call at the right time, in front of the right operator, and overcoming all the other adverse conditions (attractants) is the key, and it requires a little luck.

As with fishing, sometimes you hook into something you weren't expecting, because you just stumble into the right place (or group of operators) at the right time. In my case, it was a group of intrepid mobile operators. Like the illusive salmon, mobile operators were crisscrossing the state and leaving valuable contacts and multipliers in their wake. It was one of the first times I had actually tracked someone from one county to the next. And running QRP, I never expected to work someone more than once on a band in the contest. Well, I found out that Mobile Ops are the contest gift that keeps on giving.

Now, I have to say I am much more appreciative of these guys and gals for their tenacity, and actually pulling out my weak signal, at most of their county crossings, throughout the contest. Once I understood that a station was mobile, I kept scanning the bands listening for the next time I heard them call to see if their county changed. It became the contest within the contest. Trying to find them, while spinning the dial (casting about), made getting the contacts more intensive, sometimes harder to reach, but all the sweeter when you landed a new county.

After a few words at contact, and a few more with each additional contact, I was able to see the pattern and track and log each new county. It was like finding the resting spot for salmon before or after the rapids. I was completely surprised at how they remembered me as the 'QRP guy', and how often it was I able to break around the edges of pileups to make a contact.

There were a number of mobile operators (and I thank you all), but I have to thank one specific operating team. Will W7MBW greeted me each time, congratulated me at every contact, and sometimes gave me a heads up to where the next county was on their journey (Thanks brother!). Each simple QSO made me feel as if I was part of a greater journey, a road/river trip where I felt as if I was along for the ride, swimming along with them as they weaved their way around the state, and drifting the bands (rivers) of Washington together throughout the contest.

Thanks to all of the operators in Washington for a fun contest and a great time fly fishing (um... contesting)! Hope to hear you (and follow you) next year.



# Contest Calendar—November page 1

NCCC Sprint	0230Z-0300Z, Nov 1
IPARC Contest, CW	0600Z-1000Z, Nov 2 and 1400Z-1800Z, Nov 2
Himalayan Contest	1200Z, Nov 2 to 1200Z, Nov 3
Ukrainian DX Contest	1200Z, Nov 2 to 1200Z, Nov 3
NA Collegiate ARC Championship, CW	2100Z, Nov 2 to 0300Z, Nov 4
ARRL Sweepstakes Contest, CW	2100Z, Nov 2 to 0300Z, Nov 4
IPARC Contest, SSB	0600Z-1000Z, Nov 3 and 1400Z-1800Z, Nov 3
High Speed Club CW Contest	0900Z-1100Z, Nov 3 and 1500Z-1700Z, Nov 3
1500Z-1700Z, Nov 3	
DARC 10-Meter Digital Contest	1100Z-1700Z, Nov 3
ARS Spartan Sprint	0200Z-0400Z, Nov 5
QRP Fox Hunt	0200Z-0330Z, Nov 6
NRAU 10m Activity Contest	1800Z-1900Z, Nov 7 (CW) and 1900Z-2000Z, Nov 7 (SSB) and 2000Z-2100Z, Nov 7 (FM) and 2100Z-2200Z, Nov 7 (Dig)
NCCC RTTY Sprint	0130Z-0200Z, Nov 8
QRP Fox Hunt	0200Z-0330Z, Nov 8
NCCC Sprint	0230Z-0300Z, Nov 8
WAE DX Contest, RTTY	0000Z, Nov 9 to 2359Z, Nov 10
10-10 Int. Fall Contest, Digital	0001Z, Nov 9 to 2359Z, Nov 10
JIDX Phone Contest	0700Z, Nov 9 to 1300Z, Nov 10
OK/OM DX Contest, CW	1200Z, Nov 9 to 1200Z, Nov 10
SKCC Weekend Sprintathon	1200Z, Nov 9 to 2400Z, Nov 10
Kentucky QSO Party	1400Z, Nov 9 to 0200Z, Nov 10
CQ-WE Contest	1900Z-2300Z, Nov 9 (CW/Digital) and 0100Z-0500Z, Nov 10 (Phone) and 1900Z-2300Z, Nov 10 (Phone) and 0100Z-0500Z, Nov 11 (CW/Digital)
EANET Sprint	0800Z-1200Z, Nov 10
QRP Fox Hunt	0200Z-0330Z, Nov 13



# Contest Calendar—November page 2

CWops Mini-CWT Test	1300Z-1400Z, Nov 13 and 1900Z-2000Z, Nov 13 and 0300Z-0400Z, Nov 14
NAQCC-EU Monthly Sprint	1800Z-2000Z, Nov 13
RSGB 80m Club Sprint, SSB	2000Z-2100Z, Nov 13
QRP Fox Hunt	0200Z-0330Z, Nov 15
NCCC Sprint	0230Z-0300Z, Nov 15
YO International PSK31 Contest	1600Z-2200Z, Nov 15
ARRL EME Contest	0000Z, Nov 16 to 2359Z, Nov 17
SARL Field Day Contest	1000Z, Nov 16 to 1000Z, Nov 17
LZ DX Contest	1200Z, Nov 16 to 1200Z, Nov 17
All Austrian 160-Meter Contest	1600Z, Nov 16 to 0700Z, Nov 17
Feld Hell Sprint	1600Z-1800Z, Nov 16
ARRL Sweepstakes Contest, SSB	2100Z, Nov 16 to 0300Z, Nov 18
RSGB 2nd 1.8 MHz Contest, CW	2100Z, Nov 16 to 0100Z, Nov 17
NA Collegiate ARC Championship, SSB	2100Z, Nov 16 to 0300Z, Nov 18
EPC PSK63 QSO Party	0000Z-2400Z, Nov 17
Homebrew and Oldtime Equipment Party	1300-1500Z, Nov 17 (40m) and 1500-1700Z, Nov 17 (80m)
Run for the Bacon QRP Contest	0200Z-0400Z, Nov 18
QRP Fox Hunt	0200Z-0330Z, Nov 20
NAQCC Straight Key/Bug Sprint	0130Z-0330Z, Nov 21
QRP Fox Hunt	0200Z-0330Z, Nov 22
NCCC Sprint	0230Z-0300Z, Nov 22
CQ Worldwide DX Contest, CW	0000Z, Nov 23 to 2400Z, Nov 24
SKCC Sprint	0000Z-0200Z, Nov 27
QRP Fox Hunt	0200Z-0330Z, Nov 27
CWops Mini-CWT Test	1300Z-1400Z, Nov 27 and 1900Z-2000Z, Nov 27 and 0300Z-0400Z, Nov 28
QRP ARCI Topband Sprint	0000Z-0600Z, Nov 28
RSGB 80m Club Sprint, CW	2000Z-2100Z, Nov 28
QRP Fox Hunt	0200Z-0330Z, Nov 29
NCCC Sprint	0230Z-0300Z, Nov 29
Feld Hell Sprint	0000Z-2359Z, Nov 30

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sandiego@hamradio.com

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**(800) 444-4799**  
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### TM-281A 2 Mtr Mobile

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### TS-590S HF + 6M Transceiver

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- Built-in auto tuner • Best dynamic range in class
- 32 bit DSP

### TH-F6A 2M/220/440

- Dual channel receive • .1 - 1300 MHz (cell blocked) RX • FM, AM, SSB • 5W 2M/220/440 TX, FM • 435 Memories
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### TM-V71A 2M/440 Dual Band

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- 2.5" color TFT display



### ID-51A VHF/UHF Dual Band Transceiver

- 5/2.5/1.0/0.5/0.1W Output • RX: 0.52-1.71, 88-174, 380-479 MHz\*\* • AMV FM/FM-N/WFM/DV • 1304 Alphanumeric Memory Chis • Integrated GPS • D-STAR Repeater Directory • IPX7 Submersible



### IC-7600 All Mode Transceiver

- 100W HF/6M Transceiver, gen cov. receiver • Dual DSP 32 bit • Three roofing filters - 3, 6, 15kHz • 5.8 In WQVGA TFT display • Hi-res real time spectrum scope



### IC-V8000 2M Mobile Transceiver

- 75 watts • Dynamic Memory Scan (DMS)
- CTCSS/DCS encode/decode w/tone scan • Weather alert • Weather channel scan • 200 alphanumeric memories

### ID-880H Analog + Digital Dual Bander D-STAR

- D-STAR DV mode operation • DR (D-STAR repeater) mode • Free software download • GPS A mode for easy D-PRS operation • One touch reply button (DV mode) • Wideband receiver



## YAESU

The radio



### FTDX-3000 100W HF + 6M Transceiver

- 100 Watt HF/6 Meters • Large and wide color LCD display • High Speed Spectrum Scope built-in • 32 bit high speed DSP/Down Conversion 1st IF



### FT-7900R 2M/440 Mobile

- 50W 2M, 45W on 440MHz • Weather Alert • 1000+ Memories • WIRES capability • Wideband receiver (cell blocked)

### FT-60R 2M/440 5W HT

- Wide receiver coverage • AM air band receive • 1000 memory channels w/al-pha labels • Huge LCD display • Rugged die-cast, water resistant case • NOAA severe weather alert with alert scan



### FT-450D 100W HF + 6M Transceiver

- 100W HF/6M • Auto tuner built-in • DSP built-in
- 500 memories • DNR, IF Notch, IF Shift



### FT-857D Ultra Compact HF/VHF/UHF

- 100W HF/6M, 50W 2M, 20W UHF • DSP included
- 32 color display • 200 mems • Detachable front panel (5K-87 required)

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