



## Inside this Issue:

|                              | Page |
|------------------------------|------|
| Presidents Report            | 1    |
| VP/CC                        | 4    |
| Point Generator Profile—K2RD | 5    |
| Buddipole for SS—KD6WKY      | 11   |
| Monk Apollo QSL Card         | 13   |
| Tube of the Month            | 14   |
| Gold Rush N6O                | 15   |
| Contest Editorial by N6WM    | 18   |
| Year of the Monkey           | 20   |
| Al Slater Award—CW Academy   | 21   |
| Meeting Minutes              | 22   |
| USB Audio Interfaces—K9YC    | 23   |
| Snake Humor                  | 27   |
| Contest Calendar             | 28   |
| HRO                          | 30   |

## President's Report

Hello KB'ers, and welcome to the holiday and the contest season!

Let's talk Sweepstakes:

As you all know by now, NCCC has intentionally not been a player in this year's SS. We have encouraged our members to participate in SS via REDXA, MLDXCC, and PL259 and there's been some huge scores posted from members of all of those clubs.

243,024, SS PH, K6SRZ (REDXA)

263,110, SS PH, N6WM@K6LRG (PL259)

286,516, SS PH, WC6H (MLDXCC)

198,868, SS PH, W1SRD (MLDXCC)

244,684, SS PH, N6BV@N6RO (NCCC)

281,204, SS PH, WX5S@W7RN, (NCCC)

192,560, SS CW, WA6O@N6XG (PL259)

183,098, SS CW, K6SRZ (REDXA)

222,108, SS CW, N6TV@W7RN (MLDXCC)

200,244, SS CW, WC6H (MLDXCC)

181,604, SS CW, W1SRD (MLDXCC)

### NCCC Meeting

Saturday 30th January 2016



Program and Location—TBD



## Officers:

|                               |                 |       |                          |
|-------------------------------|-----------------|-------|--------------------------|
| President                     | Bob Hess        | W1RH  | w1rh@yahoo.com           |
| Vice President /Contest Chair | Steve Dyer      | W1SRD | w1srd@arrl.net           |
| Treasurer                     | Dick Wilson     | K6LRN | treasurer.nccc@gmail.com |
| Secretary                     | Joanna Dilley   | K6YL  | secretary.nccc@gmail.com |
| Past President                | Rick Karlquist, | N6RK  | richard@karlquist.com    |
| Director                      | Rusty Epps      | W6OAT | w6oat@sbcglobal.net      |
| Director:                     | Rich Cutler     | WC6H  | wc6h@yahoo.com           |
| Director:                     | Ron Castro      | N6IE  | ronc@sonic.net           |

## Volunteers:

|                            |                  |       |                       |
|----------------------------|------------------|-------|-----------------------|
| New Member Mentor          | Al Rendon        | WT6K  | wt6k@arrl.net         |
| Charter Member             | Rusty Epps       | W6OAT | w6oat@sbcglobal.net   |
| Awards Chair               | Joanna Dilley    | K6YL  | joanna.k6yl@gmail.com |
| CQP Chair                  | Kevin Rowett     | K6TD  | k6td@arrl.net         |
| CQP Certificates           | John Miller      | K6MM  | k6mm@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         |
| Webinars                   | Chris Hoffman    | KG6O  | choffma@gmail.com     |
| JUG Editor                 | Ian Parker       | W6TCP | w6tcpian@gmail.com    |
| jug@nccc.cc                |                  |       |                       |



### NCCC Net

Thursday 8 PM  
 Freq: 3.610 +/-

### NCCC

Visit the meetings page of the NCCC website [here](#) for details of the next meeting

## 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).

185,920, SS CW, N6RO (NCCC)

192,394, SS CW, N6PN (NCCC)

185,920, SS CW, W6SX (NCCC)

These operators put in big efforts.

It's always nice to see the big scores from the big superstations like N6RO and W7RN. A special thanks goes out to Ken, N6RO and Tom, K5RC for always making their superstations available to some fantastic guest operators.

It sure looks like PL259 will win the ARRL Affiliated Club Local Station category again this year. Now, if the ARRL would just get them that 2014 gavel!

MLDXCC, with a limit of 50 logs to qualify for the Medium Club category has a good shot of winning that gavel, and they're doing it with lots of logs with scores (just about 50) from 25K on up. The competition is rough in the Medium Club category, with SCCC winning this gavel year after year and also from the Mad River Contesters who are trying hard to take the gavel from SCCC. It will be interesting to see how these three clubs place. A MLDXCC blindside would sure feel good!

My own scores (133,004 for SS CW and 169,320 for SS PH) went to MLDXCC this year.

I was very impressed with the SS efforts this year from the NCCC membership for their local clubs. I was also very impressed with how the members were rallied within MLDXCC to get on the air. W1SRD and I look at this year as a test to see if we can drum up the interest among NCCC membership to go for the Unlimited gavel in 2016. It's too early to tell, but my personal wish is to see NCCC go for it. We will be discussing all of this in the Spring.

OK, let's talk RTTY Roundup:

The ARRL RTTY Roundup is the contest we want to win and it's only a few weeks away. Last year, the Minnesota Wireless Association won the Unlimited Club category with a score of 1,891,478 (56 logs). PVRC won the Medium Club category with a score of 2,406,791 (47 logs).

We should be able to do a really good showing this year, especially with all of our new RTTY operators all set and ready to go. Last year, without any organized effort, MLDXCC (19 logs) did a total of 1,112,409, and NCCC (24 logs) did a total of 726,251. That's a total of 1,838,660 (43 logs)...again all without any sort of organized focus by either club. There's another 150K or so that went to REDXA or PL259. Add all of that together and we would have won the Unlimited Club category (assuming over 50 logs) but would have still come in second to PVRC in the Medium club category.

**WE CAN WIN THIS ONE!!!**

If you're not set up for RTTY, and want to operate in one of the really fun and low stress contest modes, please contact me for assistance. I'll find someone near you who can assist in getting you set up and ready to operate the contest. WK6I is also offering assistance. So far, at least 7 KB'ers have contacted me for assistance. Why not add your call to the list?

It's all about RTTY RU, KB'ers, so let's KICK BUTT in the first weekend of January!

---

## VP/CC Report

KB'ers,

Sweepstakes 2015 is behind us. We have some great scores submitted by NCCC members and MLDXCC looks to be in the hunt in the medium category with scores very close among the top three clubs.

Once again MDC leads in my logs for most worked section. I suspect it's the same for most of you. It will be interesting to see the winner of the Jughead award. Do they have to be a NCCC member? I'll be reaching out to everyone that participated to get their log so we can find the winner and do some interesting analytics in preparation for '16.

The holidays are just around the corner and that means RTTY RU is coming up quick. Is your station ready? The weekly NCCC RTTY Sprint is a great way to check it out. Also coming next weekend, Dec. 5th, is the TARA RTTY Melee and the 10m RTTY contest. Both fun and good warm ups to the big show.

Are you a newbie to RTTY? Need help with your station setups? Want to try SO2R for RTTY? We have a lot of RTTY talent in the Club. Drop a note to the reflector or send me an email. We'll get you connected!

Look for traffic on the reflector in the lead up to RU. We want to win this one!

73 es Happy Holidays  
Steve  
W1SRD

## Point Generator Profile

Ira, K2RD, has been in the contesting "business" for years and years and still remains a major point generator for NCCC, a premier contest operator, and an all-around nice guy. In 2015, Ira did 505K in CQ WPX SSB, and a whopping 3,759,136 in a CQWW SSB multi/single operation with W1CU, from his new station in Nevada. You will see K2RD in many contests every year.

Ira was also a Yankee Clipper Contest Club member on the East Coast.

And, now, a little more about K2RD:

Name/Call Sign: Ira Stoler / K2RD / Amateur Extra since 1967

Past Call Signs: Novice call WN2RDO issued February 1965, WB2RDO April 1965

Location: 2.5 acre lot in Southwest Reno at 5,100' elevation off of Mt. Rose Highway.

Antenna System: Two towers:  
Tashjian DX-70 72 foot crank/tilt very heavy duty.  
Topped with JK Antennas 14 element MidTri40.  
(2 el 40m (47'elements), full sized 3/20,4/15, 5/10 meters interlaced.  
35' long loaded 30 meter dipole on top 10' above beam.  
Carolina Windom 160 hung below beam for 160/80

US Tower MA550 rotating tubular tower with Traffie Hex Beam on top.  
Use it for alternate directions on 10/15/20 and primary antenna for 12 and 17m..

Future: Need to improve reception on 80 and 160. Currently using Pixel loop but not working well.

In the Shack: FTdx5000, ACOM 1500, microHAM MK2. Hammaton Band decoder

Previously: City lot location in San Carlos, CA with US Tower and Hex Beam. Before San Carlos lived in various locations on the East Coast, most recently Fairfield,CT, but originally born and raised in Brooklyn, NY.  
Built a competitive 20 meter contest station in parent's house in Brooklyn as a teenager. Parents house was on a very narrow city lot on a corner. Still gasp a pictures of 4 element monobander up almost 80' attached to cinder block garage.

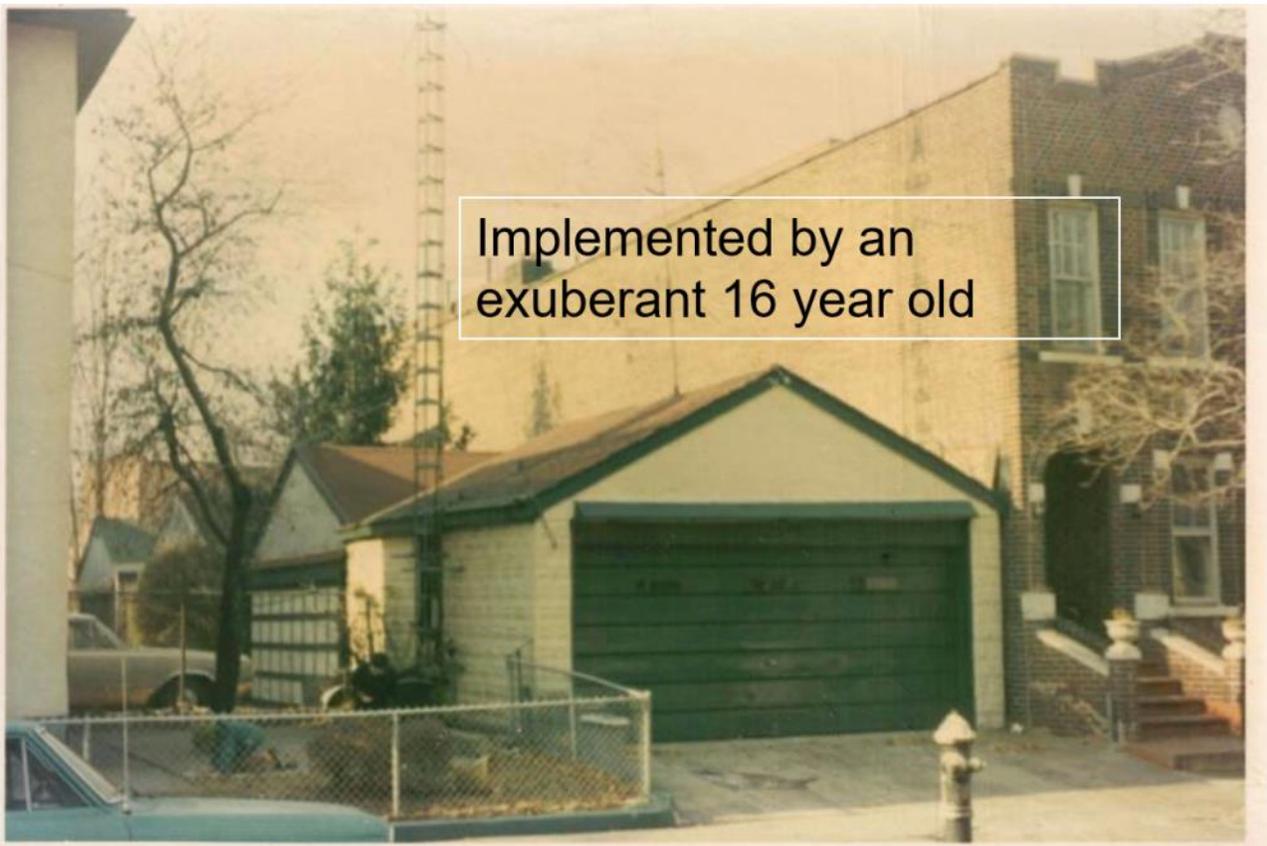
Career: Retired recently after 40+ years in the IT side of the biotech and pharmaceutical business. Have been CIO of three Bay Area firms. Also spent 10 years combined between Digital Equipment Corp. and Oracle in Life Science industry marketing positions. Original education in Math, Physics and Biomedical Engineering.

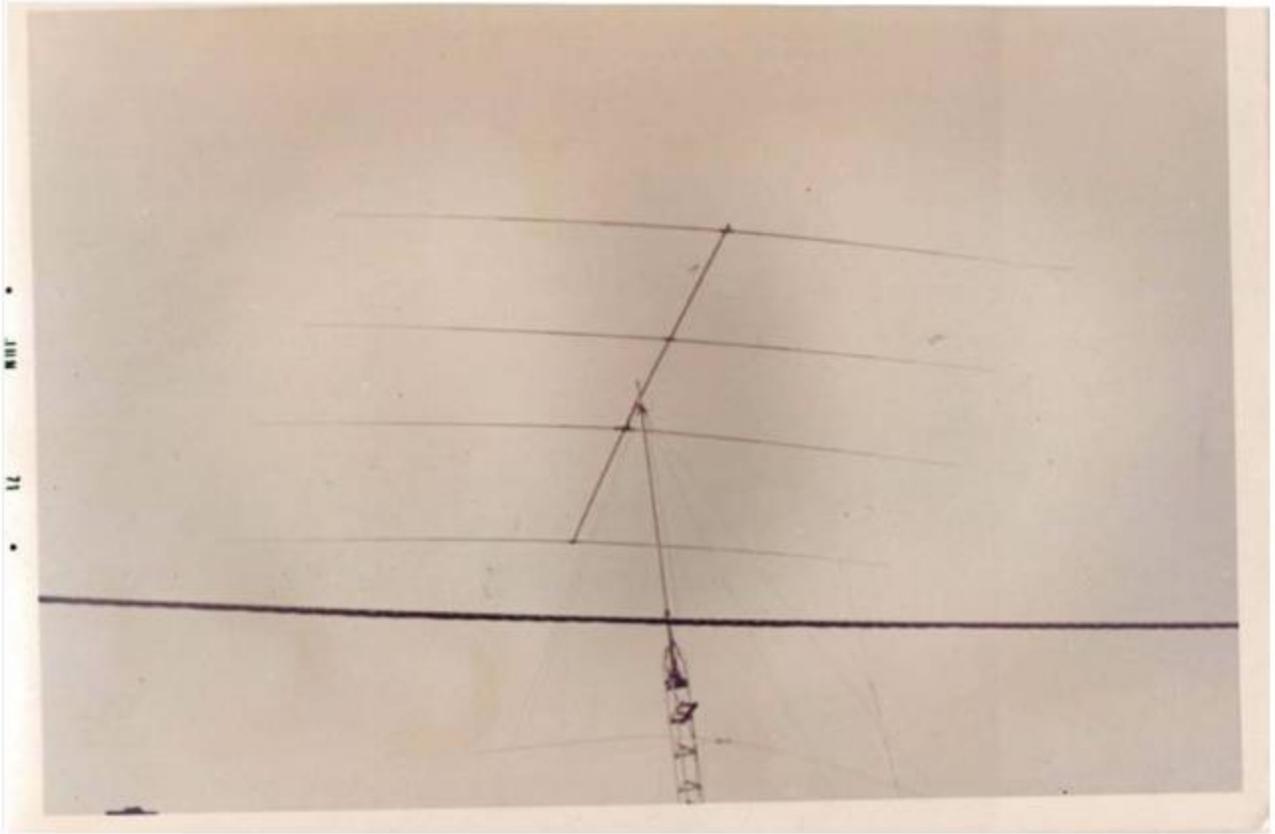
Family: Married 19 years to my wife Toby. Between us we have four kids, a boy and girl each and one grandson.

DXCC: I have worked them all (340) and confirmed 327 DXCC entities so far, all through LOTW. Lost a lifetime of QSL cards during a move 20+ years ago and restarted with LOTW in 1997.

- Favorite Contest:** Coming from the East Coast I still favor DX contests. CQWW and ARRL DX, although did adapt and learned how to place in the top ten in CQP a number of times. Kudos to AI6V(sk) and W6OAT for my CQP education.
- Help the Hobby:** Try to be helpful to fellow ham. Was recognized as Elmer of the Year by NCCC several years ago.
- Other Interests::** XYL Toby and I are big New England Patriots football fans as she's from Boston. We like to travel, especially cruise ships (you only have to unpack once!).

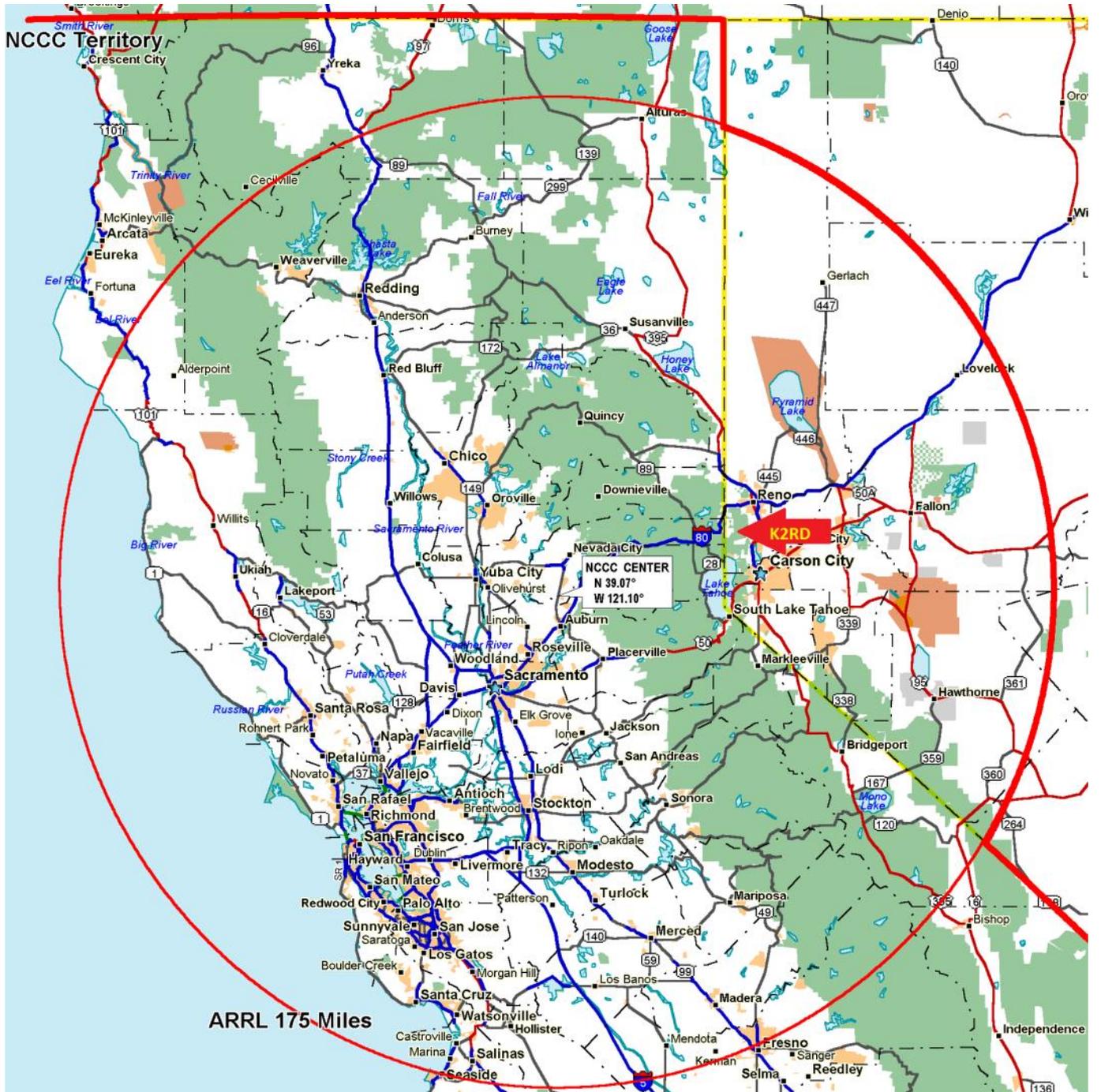
## QTH: WB2RDO – Brooklyn, NY - 1965 (26'X100')





K2RD - The Shack





## The view towards Europe



Big tower – Very Heavy!!



## Buddipole for Sweepstakes by Jerry KD6WKY

I worked a Clean Sweep this year in the November Sweepstakes! Part of my success was an improved antenna on 80 meters SSB erected just for the contest. My permanent antennas for the low bands are an Alpha Delta 40m/80m inverted vee dipole up 30' at the apex, and a GAP Titan DX multi-band vertical antenna on the side of the house. Neither antenna is tuned in the SSB portion of the 80 meter band very well. The dipole acts more like a Near Vertical Incidence Skywave (NIVS) in performance on 80 meters; usable but not that great. On 40 meters the dipole is very good.

I got to thinking about improving the 80 meter SSB portion of my antenna array at home leading up to November Sweepstakes and thought about trying my Buddipole™ on 80 meters since it worked so well in the walnut orchard (Yolo CE) during the California QSO Party.

Saturday morning before the contest I laddered up to the roof with my Buddipole™ pack over my shoulder and assembled the temporary antenna in the 80 meter vertical configuration featuring the big loading coil and the 66' counterpoise wire off the base of the coil. The counterpoise stretched out to the Japanese Maple Tree in the front yard.

After assembly and double checking the guys for a secure fit, I tuned the antenna by tapping the coil then raised the mast to its full extension. The antenna was tuned to a 1.2:1 match at 3.776 MHz with about an 80 KHz band width below 2.5:1 at the ends.



A third of my 320 contacts were on 80 meters. I spent most of my time in the contest during the evening hours because of other things going on around the house. On Saturday evening I thought 80 meters got much better after 0600 UTC going long into the Midwest and mid-Atlantic Sections. There were a couple of MDC stations that were booming! I worked plenty of West Coast and Rocky Mountain contacts as well. Over all, I picked up a dozen new sections on 80 meters making the Clean Sweep more doable as the contest moved forward.

I worked VE3ST in ONS with three hours remaining in the contest for section number 83; a goal made easier because of the volume of contacts made earlier on 80 meters with the Buddipole™.

Skip AF6HC helped me with set-up and take-down Sunday evening. I needed it down and put away before The Walking Dead at 9pm on TLC.

This isn't a permanent antenna, but for a contest the added temporary radiator made a difference in my score.

Perhaps a temporary antenna might be a good idea in a future contest for you?

KD6WKY's Contest Summary Report for ARRL-SS  
Created by N3FJP's ARRL November Sweepstakes Contest Log  
Version 5.8 [www.n3fjp.com](http://www.n3fjp.com)

Total Contacts = 320  
Total Points = 53,120

Operating Period: 2015/11/21 23:10 - 2015/11/23 02:56

Total Contacts by Band and Mode:

| Band  | CW | Phone | Dig | Total | %   |
|-------|----|-------|-----|-------|-----|
| 80    | 0  | 110   | 0   | 110   | 34  |
| 40    | 0  | 90    | 0   | 90    | 28  |
| 20    | 0  | 49    | 0   | 49    | 15  |
| 15    | 0  | 48    | 0   | 48    | 15  |
| 10    | 0  | 23    | 0   | 23    | 7   |
| Total | 0  | 320   | 0   | 320   | 100 |

Jerry Olive KD6WKY  
<http://www.jerryolive.com>  
<http://www.qrz.com/db/KD6WKY>

## MONK APOLLO QSL Card



Happiness is getting a QSL card from Monk Apollo the day before Thanksgiving!

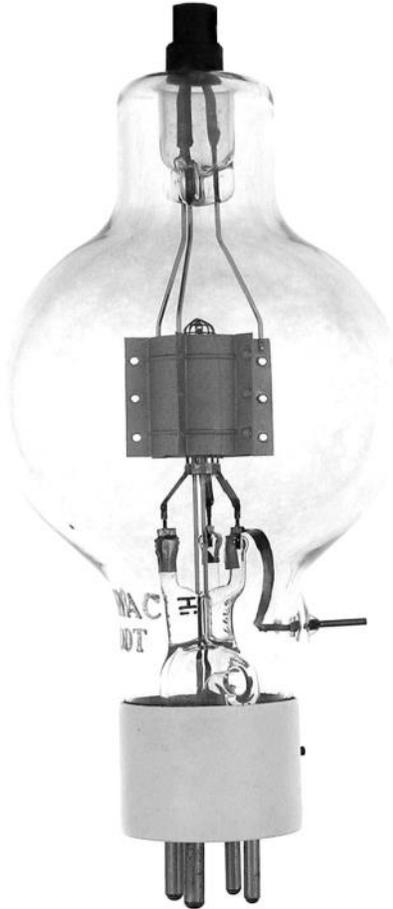
John, K6MM

# TUBE OF THE MONTH

Visit the museum at [N6JV.com](http://N6JV.com)

Norm N6JV

## 50T/100T



With the great success of Eimac's 150T in 1934, a smaller version was soon introduced. It was called the 50T. Like its bigger brother, it was renamed after it was discovered that it was highly under rated and became the 100T. Two versions of the tube were made. The "LO" mu version was similar to the old 50T and a new tube with a higher mu was called the "HI". The "HI" and "LO" were marked in ink on the filament stem. There was much confusion with this marking system and about 1938 the tubes became the 100TH and 100TL.

At 1KW input, a pair of 100TH tubes would get white hot and keep working. This impressed the ham community and the new tubes were a big success. The military in WWII also widely used the 100TH. In 1939, the Navy wanted a tube to power their first RADAR. A special tube was made called the 100TS, which was a 100TH with two plate and two grid stems exiting the sides of the envelope.



# California QSO Party

## GOLDRUSH—TEAM

### N6Q - Contra Costa

AF6WX K3EST K6AW N6BV N6KLS N6RO WX5S WZ6Z

Despite poor high band condx, we all had a good time. Score was down ~26%, CW ratio was up to 38%, compared to 32% last year. 20m total similar to last year, 80m up from last year, all other bands down, or way down (10m). Only SE US on 10m.

Six station setup allowed simultaneous CW and SSB on 80, 40, 20, 15. Had to reduce power substantially to co-exist on the same band, as all antennas are within a 300' circle.

Seven K3s, two AL-1200s, KPA-500, two 40 year-old Alphas, Acom 2000A; yagi stacks on 40 thru 10, TH6, 40m sloper, 4 SQs on 80/160, 2L loops on 80.

| BAND | MODE    | OPS   | ANTENNAS                                |
|------|---------|---|---|
| 160  | CW, SSB | N6RO, WX5S                                  | Wire 4 SQ (beverages and SAL-30 broken) |
| 80   | CW      | K6AW  | Wire 4 SQ                               |
| 80   | SSB     | N6RO<br>(SO2R on 80/160), WX5S              | 2L wire delta loops                     |
| 40   | CW      | N6BV,<br>AF6WX, WX5S                        | Half wave sloper                        |
| 40   | SSB     | N6KLS<br>WX5S, AF6WX(manned 40m all night!) | 4/4 yagi stack                          |
| 20   | CW      | K6AW  | C3 on 15m tower                         |
| 20   | SSB     | K3EST                                       | 5/5/5 yagi stack                        |
| 15   | CW      | N6BV  | TH6 @ 50'                               |
| 15   | SSB     | WZ6Z, AF6WX, N6BV                           | 6/6 yagi stack                          |
| 10   | CW, SSB | WX5S, N6RO                                  | 5/5/5 yagi stack                        |



California QSO Party (with additions/corrections to the 3830 post)

Call: N6O

Operator(s): AF6WX K3EST K6AW N6BV N6KLS N6RO WX5S WZ6Z

Station: N6RO

Class: M/MFixed HP

QTH: CA

Operating Time (hrs): 30

Radios: SO2R

Summary:

Band CW Qs Ph Qs

|      |     |      |
|------|-----|------|
| 160: | 56  | 11   |
| 80:  | 244 | 240  |
| 40:  | 414 | 546  |
| 20:  | 579 | 1336 |
| 15:  | 320 | 549  |
| 10:  | 81  | 36   |
| 6:   |     |      |
| 2:   |     |      |

Total: 1694 2718 Mults = 58 Total Score = 609,928

Total QSOs = 4412 (compared to 6070 last year)

The NCCC Goldrush celebration provided added fun, trying to figure out which 1 x 1 callsign was who! CU next year, N6RO



# Contesting from the West Coast – Musings on West Coast relevant contests by N6WM

(Opinions are specifically those of the author and do not represent any official statement of the NCCC)

Greetings fellow testers! By the time you read this we will have kicked off the 2015-16 contest with a bang! Sweepstakes (although not an unlimited club effort for the NCCC) was fun and conditions pretty good. Both the local small club PL-259 and one of the local Medium clubs – MLDXCC were on the hunt for the gavel in those categories. We also have put the big boy of DX contests, CQWW CW in the books for the year.

I mentioned in my last write up that the JIDX contest is a great contest to use as a proving ground and is West coast favorable. I personally spent some time doing a 20m HP effort, and with just a couple hours invested have apparently won the category. I highly recommend this contest in both CW and SSB for newer testers or little gun stations looking to cut their chops and possibly win some titles.

But I digress. Now on to the holiday month contest list for west coasters. I will cover some of the major ones I have found fun to compete in, or worthy of mention and commentary. This is the month we soar to the fringes of our ham bands, and explore

## **ARRL 160-Meter Contest - 2200Z, Dec 4 to 1600Z, Dec 6, 2015**

<http://www.arrl.org/160-meter>

A well sponsored top band contest by the ARRL. This one can be fun and indeed is a good way to cut your chops on 160. Serious competitors will be out there with their 4 squares, Listening antennas 1499.999 W amps.. The good news is that folks are equipped to listen on the band so many get on by loading less than optimal wires or their towers and have a lot of fun in this. They call this the “gentleman’s”, or Top band. But this is indeed the 21st century and with all the YL’s joining in on the contest fun don’t you think we should just default to calling it TOP band and drop the gentleman thing?

## **10 Meter RTTY Contest. - 0000Z-2400Z, Dec 6, 2015**

<http://www.rttycontesting.com/ten-meter-rtty-contest/rules/>

I have to be honest and say I have not operated this before. But it sounds like a lot of fun! The ARRL 10 is one of my favorites, (more on that in a bit) but with AA5AU and Rttycontesting.com sponsoring I bet it’s a fun one. Maybe I’ll give it a try this year. The NCCC will be going for Round-up as a focus contest, thus this is timed perfectly to help get your station in order and maybe compete for an award at the same time. I have heard good things about this... and 10 was in pretty good shape during SS so go some low frustration factor contesting on the band while we still have it!

## **ARRL 10-Meter Contest - 0000Z, Dec 12 to 2400Z, Dec 13, 2015**

<http://www.arrl.org/10-meter>

This is one of my favorite contests. Like I mentioned above, the 10m band was in acceptable shape domestically for Sweepstakes. If it holds up this one is a blast! You may ask... “Why do you like this one so much Chris?” oh... Thanks for asking. Here is why. You have the ability to operate dual

mode in this and prove your mad CW and SSB "Skilz" (intentional misspelling to make it sound edgy and trendy) and demonstrate your prowess on two modes simultaneously!

Some will do CW only.. Others will do SSB only.. "meh!" We all know a real competitor will get on and do DUAL MODE and show everyone what they've got! So fire up that President Lincoln and your K40 whip, ignore the CB free banders and have some fun!

### **RAC Winter Contest 0000Z-2359Z, Dec 19, 2015**

<http://wp.rac.ca/wp-content/uploads/2015/07/2015-Winter-Contest-Rules-English-French.pdf>

An annual favorite at Radio Oakley.. (it does have a Multi-Multi Category) and with good participation, the RAC winter contest is another opportunity where we can do well from W6. Ya.. ok so we get to work all of Canada.. but it's still a contest...

Honestly this is a fun one. Give it a try if you want to have some contesting fun. Maybe VY1JA will be qrv. Always satisfying to put NT in the log whatever the contest!

### **World Wide Iron Ham Contest 1200Z, Dec 26 to 1159Z, Dec 27, 2015**

[http://www.ironham.com.br/?page\\_id=22](http://www.ironham.com.br/?page_id=22)

Ok let me start by saying that as you can see by my opinion of the 10 meter contest, I LOVE the idea of multi-mode contesting. The PY's are trying real hard to get this one off the ground. It's cool, because of their sports twist on the contest.. Something I really like a lot. It's also cool because it's multi-mode. CW, SSB and RTTY. So I am looking over the rules.. Here is the deal.. You start on a mode, and you have to stay there for at least an hour, and you can operate no more than 8 hours per mode total during the 24 hour test. Suffice to say it will probably take a few runs to figure out a decent strategy on this one.. That's probably why it hasn't really gathered much steam. I again find it an intriguing twist on contesting. Feel free to give it a try, I may give it a go some day. How's your Portuguese? (Just kidding, the rules are also en Ingles) Show us what you have got! Are you an Iron Ham? (which contester will reign supreme? hihi)

And finally.. with a Monster truck commercial echo box cranked up with distortion... it's the

### **Stew Perry Topband (distance) Challenge 1500Z, Dec 26 to 1500Z, Dec 27**

<http://www.kkn.net/stew/>

I just love the name of this contest. Doesn't it sound cool? This is a debatably somewhat level playing field test that scores contacts by distance.. A favorite and friendly contest for Top band operators, its always a good one to try and play in. There is a lot of history about W1BB and this contest.. do some research and learn about a 160m pioneer.. or just get QRV and make some contacts!

That's all I have this time around.. Happy Holidays and enjoy the peak contesting season.

73 and seeya next time!

Chris

N6WM



I know it's a ways off, but save the first two weeks of February, and especially Saturday February 6th, 2016 for a Special Event!

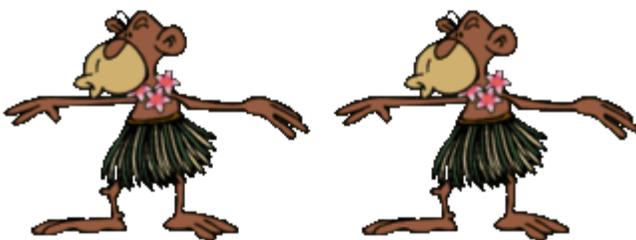
The K6MMM Monkeys, in honor of 2016 being the Lunar (Chinese) "Year of the Monkeys" will be hosting a special on-air event! We have obtained the callsign K6M (as Sue Grafton might say, "M is for Monkey"), and will be operating for two weeks as a special event station. On Saturday February 6th (that's the day before the Super Bowl, but trust me, the 49ers won't be playing) we will host a giant Chinese-themed party here at the House of Monkeys, and folks will be encouraged to "Be a Monkey" for a day on the air.

In addition, we invite anyone who wants to be a K6M monkey operator to join us here at any time during the 2-week event, centered on February 8th, Lunar (Chinese) New Year Day, but Saturday the 6th will include food, libation, and a Chinese-themed celebration.

Details are being worked out, but we will have a special commemorative certificate, a special QSL card, and other goodies for people who work the Monkeys on various bands and modes.

Here's your chance to "Be a Monkey!" Unlimited bananas will be available.

Feel free to pass this information on to any other interested ham or club in the area.



Rich KE1B (Top Banana at K6MMM)  
Anna W6NN, M.B.A. (Monkey Business Administrator)

## AI Slater, G3FXB Memorial Award

The AI Slater, G3FXB Memorial Award was presented Saturday evening at FOC's annual dinner in Milton Keynes, England. Below is the text of the citation, which was read by Roger, G3SXW:

In memory of AI Slater G3FXB who became a Silent Key on 11th November 1992. This award is presented once a year to an individual, group or society that has, in the judgement of the Committee made an outstanding contribution to the hobby that reflects the attitudes and approach of AI Slater. This came from exemplary and considerate operating standards and a high level of encouragement, friendship and support given to other amateurs, especially newcomers.

This therefore is FOC's most prestigious award, and held in high regard throughout amateur radio. It is presented only to truly outstanding and wholly deserving recipients. Previous awards have been made to N4AR, CDXC, K3ZO, NCDXF, ZL3GQ, PA0LOU, G3SXW, W3LPL, G4BUE, K1ZZ, G3MXJ/F5VHY, FISTS, G4BUO, EI5DI, G3XTT, G3RJV, G3BJ, G3PJT and G7VJR/ClubLog. All have been great contributors to our marvelous hobby.

This year, exceptionally, the award will be presented not to one but to two recipients. FOC Committee found them equally deserving in their different ways. They both fully reflect the aims as just quoted - one to an individual and one to a 'group or society'.

### K4UEE

The individual has been FOC member number 1759 since 2001, a loyal member for the past 14 years. He is undoubtedly one of the most well-known of call-signs, especially on the HF bands, on CW and for his contributions to DXpeditions. A superb practitioner of the art of Morse Code, an enormously influential and pro-active member of world-renowned amateur radio organizations, including the DXCC DX Advisory Committee, INDEXA and one of the major DX clubs in USA. He is a genuinely kind, hospitable and sociable individual who always makes time for strangers, especially youngsters. But his recent accolades have especially centred on his amazing feats leading major DXpeditions to many of the rarest and most inhospitable locations on the Earth. G3FXB would identify closely with all these attributes.

We refer of course to Bob Allphin, K4UEE, of Marietta, Georgia, USA. FOC feels greatly honored and humbled to count Bob amongst our number and to make this presentation to him - and wishes Bob every luck in all his future endeavors.

### CW Academy

The AI Slater Award is also being presented to the "CW Academy."

The CWA was created about four years ago. Its mission is to increase the number of competent CW operators on the air. CWA works with all levels of students, from those who want to learn CW for the first time to old timers who want to increase their speed. Students receive all class material free of charge and all of their instructors are volunteers.

About 600 hams have taken CW Academy courses, many of them progressing through all three skill levels so that they are now able to send and "head copy" at 25 words per minute, or better.

A driving force behind the CW Academy is **Rob, K6RB** (FOC 1821). Other FOC members are among its instructors.

This unique educational effort, aimed at ensuring that CW will remain a vibrant mode on the ham bands, is a worthy recipient of this award.

The FOC Committee

## Joint meeting of NCCC, REDXA, PL259 & MLDXCC notes

October 31, 2015

This was a meeting of members from Northern California Contest Club, Redwood Empire DX Association, Pizza Lovers 259 and the Mother Lode DX & Contest Club held at Rockville Inn on historic Highway 40 near Fairfield, CA.

The meeting was called to order about 11:30 AM by NCCC President Bob Hess. The 50 people in attendance introduced themselves. In addition, K6XX, WJ6O, N6TV, KI6OY & N6GY attended via Webex. Bob made a few comments followed by a greeting from Fred Leoni N6YEU President of REDXA.

Meeting was turned over to Stu K6TU for a slide show of the remote station he, K6TD & others are building in Santa Cruz Mountains.

The buffet lunch of Rigatoni, Chicken Alfredo, salad, rolls & coffee was served.

After lunch, REDXA President Fred said he hoped they could win CQP "one of these days". Also gave some info on the club. Shirley Rose MLDXCC President spoke about Sweepstakes strategy and had some health advice for contesters of "a certain age group". Stu PL259 President commented on winning SS gavel and how the group was going for 2 M points in Local Club category.

NCCC VP Steve W1SRD had some more info on SS strategy saying those who cannot fully participate should get on 40 & 80 M to help others maximize scores. Noted how a few more Qs would have made a difference in scores of competitors.

Bob urged people to get into RTTY Roundup that occurs on first weekend in January. He noted there are people available to help with setup & testing.

Carol KP4MD, new ARRL Section Manager for SV talked about dues increase coming on the first of January. She mentioned Sac Valley's new website and the upcoming National Parks on the air program.

The meeting was then turned over to Paul Ewing N6PSE who spoke about the E30FB DXpedition of March 2015. We learned about operating from Eritrea, the other operators, conditions and some info on the country. Paul also spoke about plans for the VP8SGI/VP8STI DXpedition. Answering a question about operating from North Korea, Paul said it was 'difficult to get meetings' and that 'due to anti-American attitudes', the Polish or Spanish hams 'may have a better chance' of getting permission.

The names of prospective NCCC members enrolled at Pacifcon were read & voted in. They are N6KLS, AO6JY, W6PZA, K6KS, K6MKF, W6AER, AI6DR, & WB4FRQ. NR6Q who had signed up previously was voted in. W6/DG1CMZ was present & was voted in and as meeting was wrapping up, Sarla Sharma WU2SWS/VU2SWS was also voted in.

Meeting was adjourned about 2 PM.

## USB Audio Interfaces for Digital Modes

Jim Brown K9YC

[k9yc.com/publish](http://k9yc.com/publish)

[k9yc@arrl.net](mailto:k9yc@arrl.net)

Introduction I've been doing RTTY contesting since about 2008, and a few years later, started using several of Joe Taylor's WSJT modes. Until a few years ago, I made direct connections from my K3 to the sound card built into my T22 and T43 Thinkpads, using VOX to key the radio, but around that time I started wondering if I might do better with an outboard A/D and D/A interface. Since I'm a retired audio professional, I had an early vintage Sound Devices USBPre interface in the closet, so I tried it in an RTTY contest. Decoding results were good – I seemed to get better decodes of marginal signals – but the drivers for this 15 year old product weren't very stable with my contesting software on XP Pro, and I encountered lockups.

Sound Devices products are first rate, but they're pro products, with specs and prices to match, and a lot more spec than we need in the ham shack. There are at least a dozen companies making products for small semi-pro home studios and club Djs. Suspecting that I could find what I needed in that world, I looked through the online catalogs of several vendors that cater to this market. After considerable study, I ordered two products from manufacturers I knew and respected. They were the Numark Stereo IO USB interface and the Tascam US100. I paid about \$35 for the Numark, about \$75 for the Tascam, buying from B&H Photo in New York City. I've done business with B&H for years, and their prices were quite competitive for these units.

Both units interface to the computer via USB and use generic Windows drivers. Both have stereo inputs and outputs at consumer line level on RCA connectors, stereo RIAA phono inputs (to play 33 rpm vinyl LPs), and an output level control. The Tascam adds a single balanced mic input, a guitar input, an input gain control, a green signal presence LED, and a red LED that flashes on digital clip. I opened both units to study their construction. Both are well built, and do not suffer from Pin One Problems that could cause hum, buzz, and RFI.

Testing I own several Thinkpads of T42 and T43 vintage running XP Pro, and used two of them to test the interfaces. The line output of an Elecraft K3 fed both the input of the Thinkpad sound card on one computer and one of the USB interfaces on the other. This was several years ago, so I used W6CQZ's very nice JT65-HF software, with one copy running on each Thinkpad. Like WSJT-X, it has very good multi-decode capability of JT65A, and provides a signal-to-noise value for each decode referenced to a 2.8 kHz bandwidth.

Using this test setup, I let the two computers run on several HF bands, and on 160M. I analyzed hundreds of receive cycles, noting the number of decodes per cycle, and observing the signal-to-noise numbers. Both interfaces, tested in this manner, produced approximately twice the number of decodes per receive cycle as did the built-in sound card, and decoded much more deeply into the noise. The internal sound cards rarely decoded below -12dB, while both USB interfaces produced decodes in the range of -19 to -21 dB. That difference, about 8 dB, equivalent to a 6:1 power ratio, has made me a lot of QSOs with weak signals on 6M and 160M.

Next, I tested the two interfaces against each other, each feeding its own Thinkpad. This time, I analyzed many hundreds of receive cycles on the HF bands, often letting them run overnight on 160M. Their performance was equivalent – on any given pass, one interface might decode a signal that the other missed, but this was random between the two devices – that is, one time the Numark would miss a signal, another time the Tascam would miss it. Again, both produced occasional decodes in the range of -19 to -21.

I've been using both interfaces in my station ever since. The Tascam unit, having the most flexible set of controls, is used with my main radio for digital modes, and with both radios for SO2R SSB contesting. For SO2R RTTY contesting, I use the Numark on the second radio. I use this setup because it allows me to dedicate a laptop to a radio, and run three decoders on each radio without running out of screen space or microprocessor cycles.

I've always used VOX to key the radio for both SSB and digital modes. To prevent hot-switching of T/R relays, nearly all modern rigs include circuitry that delays RF by about 10 msec after VOX or PTT is initiated, and also delay PTT to power amps by that amount. For this reason, VOX works very well, and greatly simplifies the interface to radios. I'm a contester and 6M weak signal Dxer, so I use power amps (a Ten Tec Titan and an Elecraft KPA500), and I make several thousand digital QSOs in a year.

Fast forward several years to 2014. I had not been active using JT65 for a year or so, but when I got back to it, I loaded the newly developed WSJT-X and started using it for the mid-summer 6M Sporadic-E season. With WSJT-X, I'm seeing occasional JT65 decodes of -22 signals, and -24 decodes of JT9 signals.

The Tascam US100 was discontinued soon after I bought it, and has been replaced by several new models, some with more features, but all more expensive than the US100. The Numark Stereo IO has also been discontinued, and its replacement is not suitable for our uses. Among current Tascam models, the US122, US144, and the recently discontinued US125 have all of the relevant features we need, plus some we don't, at about \$100. All of these models are likely to be found on the used market, and amazon typically shows some US125s at a closeout price. In addition to B&H Photo, Sweetwater and Full Compass are two other widely respected vendors of audio gear. I've known the Full Compass owners for nearly 40 years, and still do business with them.

New Favorites, March 2015: N8LP alerted me to them – they are the ASUS Xonar U5 and U7 that he recommends for use with his LP-Pan SDR hardware. I've tested both for RTTY, JT65, and JT9, and both work quite well – even on a crowded band with a dozen decodes per pass, I often saw JT65 decodes in the range of -24, and JT9 at -26. I paid \$70 for the U5 at B&H Photo. N6NUL loaned me his U7 to test. The U5 comes with drivers for Win XP through Win 7, the U7 comes with drivers for Win 7 through Win 8.1 I tested on a Thinkpad running Win 7-64 Pro.

Alternatives: Certainly there are other products that will work well, and others that have issues. A local ham who is quite active in RTTY contesting suggested a tiny interface that New Egg sells for about \$18 under the GWC brand. I bought one and tested it. It's quite compact, but of poor build quality. It decodes fine – when it works – but I found connections to it to be intermittent.

The SignalLink USB has been sold into ham channels for many years. A support applications note I saw a few years ago on the DX Engineering website described symptoms and fixes that strongly suggest to me that the unit has a Pin One Problem. A recent QST piece by OZ1PIF in the Hints and Kinks column shows how to improve it's mediocre weak signal performance, but fails to notice it's Pin One Problem. ***I don't recommend it.***

I view specialized "do everything" ham interfaces as overly complicated to set up and overpriced. Some have interconnect cables with long pigtailed (Microham, for example) that are an invitation to RFI. If you're using VOX to key the radio, all you need for digital modes is one of the USB interfaces I've recommended.

Rig Control If you also want software to control the radio (for contesting or general logging) you also need an RS232 interface. For many years, I've used either the hardware RS232 port built into a Port Extender for my Thinkpads, or a Quatech DSP-100 PCMCIA card that provides two hardware RS232 ports. Newer vintage computers no longer support these cards, nor do they have RS232 ports, so you'll need some form of USB to RS232 interface. USB to RS232 interface cables are widely available at low cost. ***Make sure that the one you buy uses the FTDI chipset (and watch out for counterfeits. Products sold by Elecraft are the real thing, and can be used with rigs other than Elecraft).***

Links to Current Products (May 2015)

[http://www.bhphotovideo.com/c/product/1086995-REG/asus\\_xonar\\_u5\\_sound\\_card.html](http://www.bhphotovideo.com/c/product/1086995-REG/asus_xonar_u5_sound_card.html)

[http://www.bhphotovideo.com/c/product/1053131REG/asus\\_xonar\\_u7\\_7\\_1\\_usb.html](http://www.bhphotovideo.com/c/product/1053131REG/asus_xonar_u7_7_1_usb.html)

How Do You Know If You Need A Better Interface? If you run JT65 or JT9 using JT65-HF or WSJT-X, it's easy to tell. If you regularly see decodes of weak signals with indicated levels in the range of -19 to -22, you've got a nice sound card with input level set well. If you rarely see decodes below about -14 to -16, you either need a better interface, or you need to more carefully set the input level to the one you have.

Setting Sound Card Input Level is important to achieving maximum signal-to-noise performance. With the Tascam, that's pretty easy, thanks to a clip light on the front panel that flashes red with digital clip. Simply turn up the input gain until the red light flashes with the loudest signals, then back it off slightly so that it never flashes. Then set the digital gain in your encode/decode software as directed by the manual.

Setting Sound Card Output Level is important to avoid transmitting a dirty signal. There are three steps, all of which are important – making the output of the computer clean, not overdriving the radio's audio input stage, and setting the audio input gain in the radio. There are (at least) four good ways to set output level from the computer, depending on what test equipment is available.

The first method uses a scope connected to the output of the sound card (in this case, the USB interface) that feeds the radio. Set the sweep so that you see clearly defined sine waves that make up the signal from the digital program (WSJT-X, MMTTY, etc.) in transmit mode. Because these modulation schemes include multiple frequencies, you won't get the display to sync. Increase the output level until you see squaring at the top of the sine waves or "spiky" digital distortion, then reduce the output level by half the voltage.

The second method uses an audio spectrum analyzer connected to the output of the sound card. With the digital program in TX mode and output level set fairly low, note the spectrum lines. With JT65 or JT9, you should see only the tones that you would see on the WSJT-X or JT65-HF display, roughly 200 Hz wide. Now, increase levels until you begin to see additional lines spread out from the JT65 tones. These additional lines are distortion, and will cause QRM. Note the difference in strength (in dB) between the signal and the distortion, and gradually increase output level until you see the difference become smaller. (which indicates that the percentage distortion is rising). Now back off the output level until the difference is larger (the distortion is less).

The third method uses an audio voltmeter connected to the output of the sound card. Again, with the digital program in transmit mode, start with very low output, and gradually increase it until you no longer see voltage increasing, then back off the output level until it reads half the maximum voltage.

The fourth method uses your ears and headphones connected to the output of the sound card. Start with the output of the sound card pretty low, gradually increasing it until you hear harshness or sharpness in the tones. That harshness is distortion. Now, reduce the output of the sound card until the tones sound half as loud. This works because a change of 6-10 dB is perceived as half (or twice) as loud.

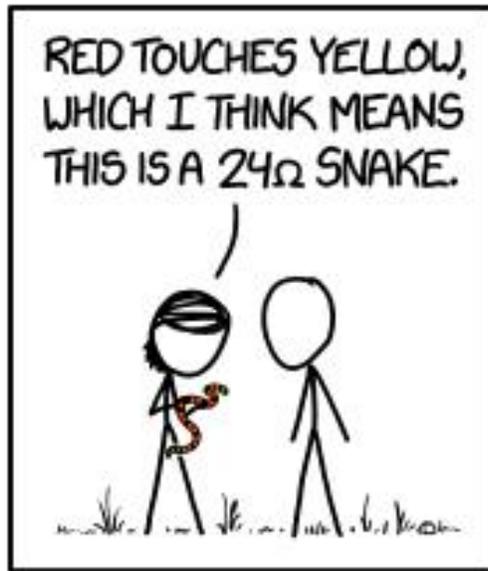
To avoid overdriving the radio's audio input, feed the computer sound card to the rig's Line input. In older rigs, this may be called a Phone Patch input, or for a hardware RTTY interface.

If the rig has no Line input, you'll need to feed the mic input through a simple voltage divider (often called a "pad") so that you don't overload it. All it takes is two resistors, one in series with the audio path, and one in parallel with the input of the radio. 20dB (a 10:1 voltage divider) should be enough for most rigs, and calls for a 10:1 ratio between the two resistors. The values are not critical, but 10K for the series resistor and 1K for the parallel resistor, or 4.7K and 470 Ohms are good choices. You can fit these resistors into the connectors of the patch cable between the computer and the radio if you use low wattage resistors and the right connector. RCA and 1/8-in connectors made by Switchcraft have the most space inside them. I buy them from Full Compass, ordering from the website.

With all of these methods, adjust the input gain control of your radio according to the user manual for the radio for transmitting digital modes. Always make sure that any processing in the radio is turned off.

As a final check, ask another ham who is receiving your signal fairly loud to look carefully for sidebands in his waterfall display (first making sure that his Noise Blanker is turned off, and that you are not overloading his receiver).

## Snake Resistor Humor



(The last band of color indicates the snake's tolerance for being held before biting)

---

### **Northern California Contest Club Reflector—Guidelines**

This reflector is devoted to the discussion of contesting.

This includes contests, station building, dxpeditions, technical questions, contesting questions, amateur radio equipment wants/sales, score posting, amateur radio meetings/conventions, and membership achievements.

This does not include personal attacks, politics, or off-subject posts which will be considered a violation of the Guidelines.

Violations may result in removal of the violator from the reflector and possibly from club membership in good standing.



# Contest Calendar— December page 1

|                                 |  |
|---------------------------------|--|
| QRP Fox Hunt                    | 0200Z-0330Z, Dec 2   |
| CWops Mini-CWT Test             | 1300Z-1400Z, Dec 2 and<br>1900Z-2000Z, Dec 2 and<br>0300Z-0400Z, Dec 3   |
| QRP ARCI Topband Sprint         | 0000Z-0600Z, Dec 3   |
| NRAU 10m Activity Contest       | 1800Z-1900Z, Dec 3 (CW) and<br>1900Z-2000Z, Dec 3 (SSB) and<br>2000Z-2100Z, Dec 3 (FM) and<br>2100Z-2200Z, Dec 3 (Dig) |
| NCCC RTTY Sprint                | 0145Z-0215Z, Dec 4   |
| QRP Fox Hunt                    | 0200Z-0330Z, Dec 4   |
| NCCC Sprint                     | 0230Z-0300Z, Dec 4   |
| ARRL 160-Meter Contest          | 2200Z, Dec 4 to 1600Z, Dec 6   |
| TARA RTTY Melee                 | 0000Z-2400Z, Dec 5   |
| Wake-Up!QRP Sprint              | 0600Z-0629Z, Dec 5 and<br>0630Z-0659Z, Dec 5 and<br>0700Z-0729Z, Dec 5 and<br>0730Z-0800Z, Dec 5                       |
| UK/EI DX Contest, SSB           | 1200Z, Dec 5 to 1200Z, Dec 6   |
| TOPS Activity Contest           | 1600Z, Dec 5 to 1559Z, Dec 6   |
| AWA Bruce Kelley 1929 QSO Party | 2300Z, Dec 5 to 2300Z, Dec 6 and<br>2300Z, Dec 12 to 2300Z, Dec 13   |
| Ten-Meter RTTY Contest          | 0000Z-2400Z, Dec 6   |
| SARL Digital Contest            | 1300Z-1600Z, Dec 6   |
| CQC Great Colorado Snowshoe Run | 2100Z-2259Z, Dec 6   |
| ARS Spartan Sprint              | 0200Z-0400Z, Dec 8   |
| NAQCC CW Sprint                 | 0130Z-0330Z, Dec 9   |
| QRP Fox Hunt                    | 0200Z-0330Z, Dec 9   |
| CWops Mini-CWT Test             | 1300Z-1400Z, Dec 9 and<br>1900Z-2000Z, Dec 9 and<br>0300Z-0400Z, Dec 10  |
| NCCC RTTY Sprint                | 0145Z-0215Z, Dec 11  |
| QRP Fox Hunt                    | 0200Z-0330Z, Dec 11  |



# Contest Calendar— December page 2

|  |   |
|--|---|
| NCCC Sprint                              | 0230Z-0300Z, Dec 11   |
| ARRL 10-Meter Contest                    | 0000Z, Dec 12 to 2400Z, Dec 13  |
| SKCC Weekend Sprintathon                 | 1200Z, Dec 12 to 2400Z, Dec 13  |
| International Naval Contest              | 1600Z, Dec 12 to 1559Z, Dec 13  |
| QRP ARCI Holiday Spirits Homebrew Sprint | 2000Z-2359Z, Dec 13   |
| QRP Fox Hunt                             | 0200Z-0330Z, Dec 16   |
| CWops Mini-CWT Test                      | 1300Z-1400Z, Dec 16 and<br>1900Z-2000Z, Dec 16 and<br>0300Z-0400Z, Dec 17 |
| NAQCC CW Sprint                          | 0130Z-0330Z, Dec 17   |
| NCCC RTTY Sprint                         | 0145Z-0215Z, Dec 18   |
| QRP Fox Hunt                             | 0200Z-0330Z, Dec 18   |
| NCCC Sprint                              | 0230Z-0300Z, Dec 18   |
| Russian 160-Meter Contest                | 2000Z-2400Z, Dec 18   |
| AGB-Party Contest                        | 2100Z-2400Z, Dec 18   |
| OK DX RTTY Contest                       | 0000Z-2400Z, Dec 19   |
| RAC Winter Contest                       | 0000Z-2359Z, Dec 19   |
| Feld Hell Sprint                         | 0000Z-2359Z, Dec 19   |
| Croatian CW Contest                      | 1400Z, Dec 19 to 1400Z, Dec 20  |
| ARRL Rookie Roundup, CW                  | 1800Z-2359Z, Dec 20   |
| Run for the Bacon QRP Contest            | 0200Z-0400Z, Dec 21   |
| SKCC Sprint                              | 0000Z-0200Z, Dec 23   |
| CWops Mini-CWT Test                      | 1300Z-1400Z, Dec 23 and<br>1900Z-2000Z, Dec 23 and<br>0300Z-0400Z, Dec 24 |
| NCCC RTTY Sprint                         | 0145Z-0215Z, Dec 25   |
| NCCC Sprint                              | 0230Z-0300Z, Dec 25   |
| DARC Christmas Contest                   | 0830Z-1059Z, Dec 26   |
| World Wide Iron Ham Contest              | 1200Z, Dec 26 to 1159Z, Dec 27  |
| Stew Perry Topband Challenge             | 1500Z, Dec 26 to 1500Z, Dec 27  |
| RAEM Contest                             | 0000Z-1159Z, Dec 27   |
| CWops Mini-CWT Test                      | 1300Z-1400Z, Dec 30 and<br>1900Z-2000Z, Dec 30 and<br>0300Z-0400Z, Dec 31 |

# HAM RADIO OUTLET

14 STORE BUYING POWER!

**ICOM**



**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-7200 | HF Transceiver**

- 160-10M • 100W • Simple & tough with IF DSP • AGC Loop Management • Digital IF Filter • Digital Twin PBT • Digital Noise Reduction • Digital Noise Blanker • USB Port for PC Control



**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



**ID-5100A | VHF/UHF Dual Band Digital Transceiver**

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

**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\*\* • AM/FM/FM-N/WFM/DV • 1304 Alphanumeric Memory Chls • Integrated GPS • D-STAR Repeater Directory • IPX7 Submersible



**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 • Li-Ion Battery

**KENWOOD**



**TS-590SG | HF/50MHz Transceiver**

- Equipped with 500 Hz/2.7 kHz roofing filter as standard • ALC derived from TS-990S eliminating spike issues • Antenna output function (shared with DRV connector) • CW - morse code decoder function



**TM-D710G | 2M/440 Dualband**

- V+V/V+U/U+U operation • Built-in GPS • Built-in TNC for APRS & DX-Cluster operation • 50W 2M & UHF • 1,000 memories • Dual receive • Green or amber backlight colors • Latest APRS firmware w/new features • Sky Command II remote functions



**TM-V71A | 2M/440 Dualband**

- High RF output (50W) • Multiple Scan • Dual receive on same band (VxV, UxU) • Echolink® memory (auto dialer) • Echolink® Sysop mode for node terminal ops • Invertible front panel • Choice of green/amber for LCD panel • 104 code digital code squelch



**TM-281A | 2 Mtr Mobile**

- 65 Watt • 200 Memories • CTCSS/DCS • Mil-Std specs • Hi-quality audio



**FT-60R | 2M/440 5W HT**

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

**YAESU**  
The radio



**FT-991 | HF/50MHz/2M/440 Transceiver**

- 160 M-440MHz - SSB/CW/FM/C4FM Digital/AM/RTTY/PSK • 100 W (2M/440: 50 Watts) • 3.5" TFT full-color touch panel operation • High speed spectrum scope • Roofing filters: 3kHz & 15kHz • 32-bit high speed floating point IF DSP



**FTDX1200 | 100W HF + 6M Transceiver**

- Triple Conversion Receiver With 32-bit Floating Point DSP • 40 MHz 1st IF with selectable 3 kHz, 6kHz & 15 kHz Roofing Filters • Optional FFT-1 Supports AF-FFT Scope, RTTY/PSK31 Encode/Decode, CW Decode/Auto Zero-In • Full Color 4.3" TFT Display



**FT-450D | A100W HF + 6M Transceiver**

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



**FTM-400DR | 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



5 Ways to Shop!

- 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

ANAHEIM, CA  
(800) 854-6046

OAKLAND, CA  
(877) 892-1745

SUNNYVALE, CA  
(877) 892-1749

PORTLAND, OR  
(800) 765-4267

PHOENIX, AZ  
(800) 559-7388

WOODBRIIDGE, VA  
(800) 444-4799

PLANO, TX  
(877) 455-8750

BURBANK, CA  
(877) 892-1748

SAN DIEGO, CA  
(877) 520-9623

NEW CASTLE, DE  
(800) 644-4476

DENVER, CO  
(800) 444-9476

ATLANTA, GA  
(800) 444-7927

SALEM, NH  
(800) 444-0047

ONLINE STORE  
WWW.HAMRADIO.COM

Contact HRO for promotion details. Toll-free including Hawaii, Alaska and Canada. Call will be routed to the nearest store. All HRO 800-lines can assist you. If the first line you call is busy, you may call another. AZ, CA, CO, GA, VA residents add sales tax. Prices, specifications and descriptions subject to change without notice.

New Store!