



Publication of the  
Northern California  
Contest Club



Issue 529

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## Inside this Issue:

	Page
Presidents Report	1
New Member - Mike K6OR	5
New Member—Bill A16JZ	7
NCCC Next Meeting	9
All Asia CW Contest	10
NCCC Individual & Team Club Competition	13
For Sale	16
Killing Receive Noise Part 2	17
QSL Card Trivia	25
NCCC June Meeting	26
Member Awards—N6WM	30
In Memory	31
Point Generator Profile— W6SR	32
Tube Of the Month	37
WRTC	40
Contest Calendar	42
HRO	45

## NCCC Next Meeting

Saturday, July 30th, 2016

Joint meeting with PL259, MLDXCC, REDXA & NCCC

Time: 11:30 am Social Hour; 12:00 pm Lunch, 12:30 pm Program

**Venue:** Rockville Corners, 4163 Suisun Valley Rd, Fairfield, CA 94534

Program to be announced

Watch the NCCC Reflector for details.

## President's Report

Hello KB'ers!

I'm writing this on Field Day at the El Dorado County ARC site in the high Sierra. This is typically the day that most contesters worked their first contest, if you want to call Field Day a contest. I call it a competition and I've had a lot of fun at Field Day over the years. Our Massachusetts club used to build multiple towers, all with monobanders on them, a 3 element 40 meter beam, and all sorts of other good stuff. Food was always a focus too. It was fun and we would often have guest operators such as K5ZD, K1EA and many other YCCC guys. I hope those of you who did Field Day this year had fun and also mentored future NCCC members.

I think we have a very happy W6OAT. While it's too early to call, Rusty may just get his wish of winning each category, in Zone 3, in the All Asia CW contest. Lots of you did your part and I'm sure Rusty will come up with some sort of goofy award for the deserving. Thanks to Shirl, AA6K for Flogging this one.

Our NCCC Individual and Team Competition is underway and started with the CQ WPX CW contest. That one was followed by the ARRL June VHF contest and All Asian CW. Also, the NCCC RTTY Sprints and NCCC CW Sprints, since the official start date of the competition, have added to some of our member's totals.

Continued on page 3



## 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	Ian Parker	W6TCP	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
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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).

Because of the weighting of certain contests (multipliers given to some of the contests, especially the focus contests), the points can add up rapidly and the leader board can change radically as the year progresses. So far, based on WPX CW, ARRL June VHF, All Asian, three NCCC RTTY Sprints and three NCCC CW Sprints, here are the standings:

TOTAL	CALL	RANK
<b>WEIGHTED</b>		
32,485,882	W2SC	1
28,189,366	W6LD	2
15,914,410	W6NV	3
12,971,712	K6XX	4
5,974,006	N7MH	5
4,139,560	K3EST	6
3,855,168	K6SRZ	7
3,556,800	K6EU	8
3,358,960	WA6O	9
3,325,141	K6NV	10
3,325,141	N6XI	11
3,325,141	N6TU	12
3,316,435	N6RO	13
2,881,000	NA6O	14
2,855,164	K9YC	15
2,724,260	WX5S	16
2,646,160	N6WM	17
2,639,560	N6BV	18
2,639,560	N6NU	19
2,584,484	N6NUL	20
2,428,240	AE6Y	21
2,321,400	W6SR	22
2,212,630	W6SX	23
2,124,516	ND2T	24
2,057,116	K6IJ	25
1,992,596	W6OAT	26
1,760,400	N6TV	27
1,746,108	K6AW	28
1,553,608	K6MR	29
1,492,800	KX7M	30
1,414,400	K7XC	31
1,395,702	K2RD	32
1,085,800	K6KLY	33

TOTAL	CALL	RANK
<b>WEIGHTED</b>		
961,610	W1RH	34
867,984	K6TA	35
823,862	N2NS	36
811,520	K6XV	37
805,608	WX6V	38
801,840	K6YK	39
737,352	WE6Z	40
625,756	K6RB	41
471,920	K6RIM	42
432,606	W1SRD	43
402,336	W6FA	44
390,618	N6ZFO	45
367,806	KR6N	46
288,376	W6RGG	47
273,924	K6LRN	48
270,500	N3ZZ	49
222,006	K6GHA	50
194,880	K6MM	51
178,242	N3RC	52
168,960	K6JEB	53
158,400	N6IE	54
122,280	N6VV	55
96,174	KO6LU	56
79,540	NW6P	57
72,600	K7GK	58
61,984	N6PN	59
51,092	K6CSL	60
21,868	N0KQ	61
18,150	W6JZH	62
9,000	W6CT	63
3,420	KZZV	64
1,890	JN3NFQ	65
490	KI6OY	66

As the year progresses, and we get into some of the domestic contests, I think we will see significant changes in the rankings based on last year's totals.

If you don't see your call on the list, you didn't participate in any of the contests so far, or you didn't post your score on 3830. Also, this list includes all scores posted on 3830, whether or not the member has paid dues. The final totals will be based on dues paying members only.

The teams will be chosen soon and there will be a leader board showing the ranking of what I think will be 5 teams with within the club.

I am personally keeping the score tally, but I do hope we can automate the leader board in the future, assuming we continue doing this internal competition in future years. All of the contests, and the rules, are posted elsewhere in this issue of the Jug.

The Summer NAQP's are focus contests this year and include big multipliers in the NCCC club competition. If you see those big scores on the current leader board and say to yourself, "no way I can top that", think again. The NAQP multipliers will probably change the leader board big time!

I think all of you will agree that the two hardest working NCCC Board members are the Secretary and the Treasurer. It was a brilliant move by our 2014/2015 Board to separate the Secretary and Treasurer functions into two Board positions. It's just too much work for one person. Ian, now our Secretary, has been working on a way to keep better track of our huge membership, which at this point is tracked on a very complicated spreadsheet. At Ian's suggestion, the Board had a presentation on an organization called Member Planet, that automates the membership tracking for many clubs around the world. Dues reminders, CQP plaque sponsorships, welcome letters to new members, etc., can all be tracked, greatly assisting both the Secretary and Treasurer. I have spoken to a few clubs that have used the service and the response has been positive, although it will take some getting used to. You'll be hearing more about this soon.

The Board has been working with REDXA, MLDXCC, and PL259 on planning for the annual Joint Meeting, which will most likely be on July 30<sup>th</sup>, in Fairfield.

Bob W1RH

**Mike Malone K6OR**

I was first licensed in 1959 as WN6KKM . Lee Shaklee W6BH now SK, administered my novice test and was very instrumental in my interest in DX and contesting. Soon after my novice test, I took my general test and moved up in call sign to WA6KKM. I took the extra class test and changed my call sign to K6KKM and the latest call is K6OR.

My main interest for many years has been building homebrew amplifiers and HF antennas. When I moved to Livermore 6 years ago, I had the great luck of securing a building permit for a tower. Once the tower was up and running, aluminum tubing filled my garage for the homebrew tri-bander and 3 element 40 meter beam. In addition, followed a 2 element phased vertical system for 80 and a 160 meter shunt feed tower.

Continued on next page



**K6OR Antenna's**

Professionally I'm retired now after working for Motorola 10 years, then private business for 20 years and finally 13 years as Electronics and Communications Manager for AC Transit. In the upcoming months, I hope to upgrade my station using S02R and be able to remote the station as well.

I have a lot of research ahead of me and hope to gain knowledge from other members in how to make it happen.

Mike K6OR

**Bill Fenech, AI6JZ**

Originally licensed in 1988 as KC6DSB (double sideband), then AA6ZK once I obtained the Amateur Extra Class License. Went inactive in ham radio for a while, then relicensed about a year ago. Pics of some of my radios here: Icom IC-7300, Elecraft K1, Kenwood TS-590, Icom IC-718, Sony ICF-SW77 (shortwave receiver). others not shown include Collins R-390A, Yaesu, Icom, as well as a few other shortwave receivers. I first became interested in shortwave radio as a teenager listening to SW stations from around the world...BBC, Radio Netherlands, Radio Havana, Deutsch Welle, Radio Pyongyang, and many others (most have since sadly disappeared). Became a ham at 21.

Continued on next page



### Bill AI6JZ Station Pictures



My main HF operating location is in Lake County, I have an acre and room for Antennas there. The only contest I've participated in thus far other than Field Day is the 7QP (7 area QSO party) not too long ago, and had an absolute blast. I primarily operate phone but also looking to get more into CW and Digital Modes. I did the online/skype the CW Academy (which I highly recommend to anyone wishing to dive into Code) about six months ago, and ever since have been practicing CW 4 - 6 times a week (mostly listening). Looking forward to meeting NCCC hams and (hopefully) becoming an ace Operator and Contester!

Bill AI6JZ



Date: **Saturday, July 30th, 2016**

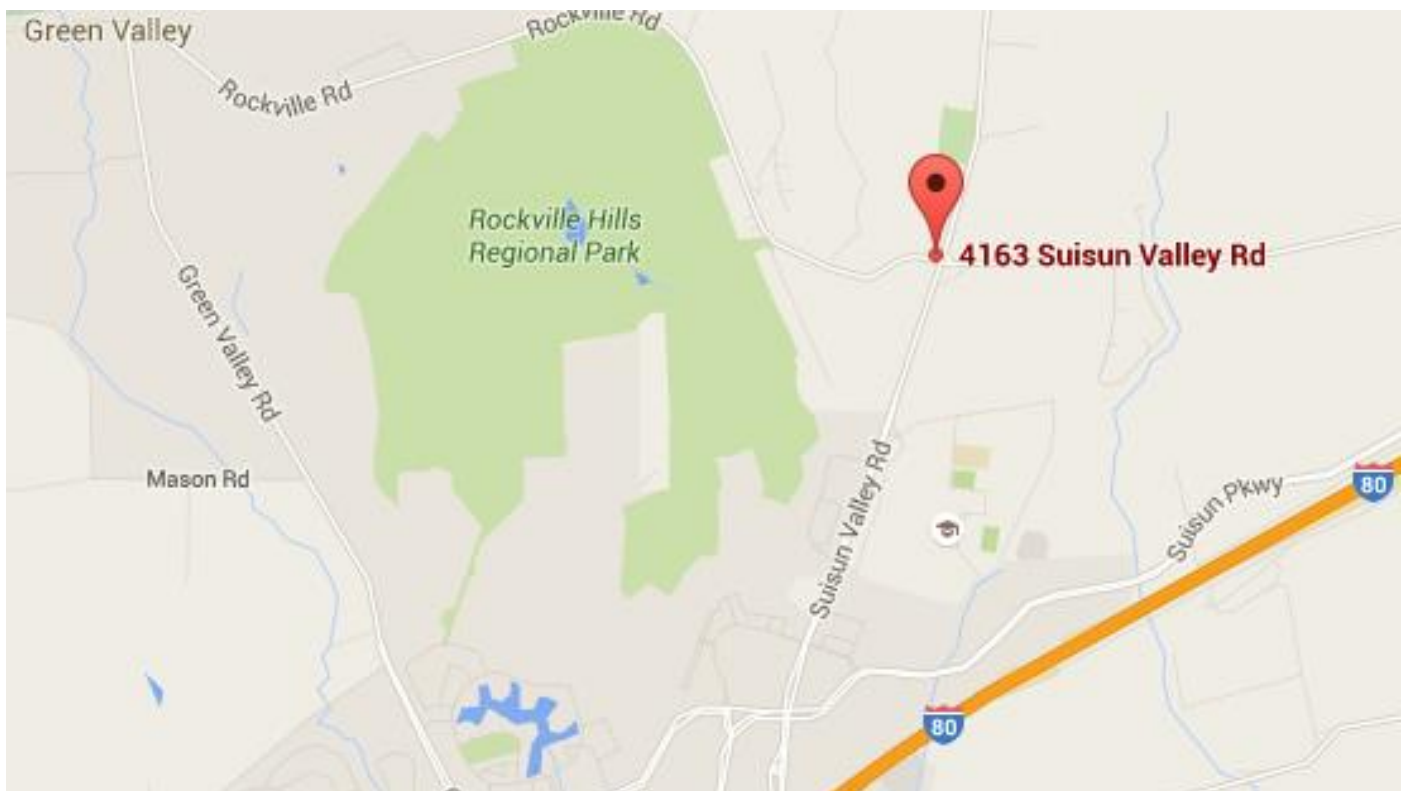
Joint meeting with PL259, MLDXCC, REDXA & NCCC

Time: 11:30 am Social Hour; 12:00 pm Lunch, 12:30 pm Program

**Venue:** Rockville Corners, 4163 Suisun Valley Rd, Fairfield, CA 94534

Phone: (707) 864-4325

Further details to follow, watch the NCCC reflector for details !



# Preliminary Results

## 2016 ALL ASIA CW CONTEST

By  
Rusty Epps, W6OAT

I am writing this article on Friday, June 24, almost exactly one week after the start of the 2016 All Asia CW Contest. The log deadline isn't for another three weeks yet, so naturally the scores I have been able to gather are unofficial and are not necessarily complete. But we can still make a number of observations.

Band conditions generally were awful. Ten meters was almost a no-show, with the bulk of contacts made on that band all coming in the last half-hour of the contest, and most of them made via a skew path with our guys beaming toward Hawaii rather than toward Asia. Our usual money band, 15 meters, fared only a bit better. We had a lot of aluminum in play there, but the top scorers managed to eke out only between 150 to 200 contacts. At the other end of the spectrum, 160 meters was pretty much what you'd expect in the summer -- lots of noise and not much activity. The same can be said for 80 meters except the activity level was a bit higher. The only two bands which really played the entire weekend were 20 meters, which was open to Asia 24 hours per day, and 40 meters which produced some great JA runs in the wee hours of the morning.

In spite of the lousy conditions, NCCers still turned out in force and proved there is no substitute for time in the chair. They attacked all six bands and aimed for victories in all nine of the entry categories for which we are eligible. I'm going out on a limb here because scores aren't final, but I predict WE DID IT! For the first time in NCCC's history, we won EVERY entry category open to us. Congratulations, NCCC!

There were two categories where our internal competition was particularly ferocious. Single Op All Band found Bob, K6XX, going head to head against Oliver, W6NV (operating as N6DZ). At the final bell, each one claimed 1,333 QSOs, but N6DZ logged six more multipliers than K6XX. On 15m Single Op Single Band, Rich KE1B (operating as K6MMM), Denis K7GK (operating from W6JZH) and Matt WX5S (operating from N6RO) all had to soak a nearly dead band for everything they could get out of it. What made this competition so much fun was that both K6MMM and K7GK were logged into the Real Time Scoreboard so the rest of us could watch their scores progress. For most of the weekend they were within one to three QSOs of each other and differed by only one or two mults; the leader changed constantly. Rich commented after the contest that seeing K7GK's score, and knowing how close they were, is what kept him going to the bitter end even though the rate was down to just a few QSOs per hour. But it paid off – Rich finally pulled away at the end and claims the victory.

Four other NCCC performances deserve special mention because they all set new North American records. Bob, K3EST, operating SOSB-20m, made 750 QSOs with 200 mults for a score of 150,000 points. This just annihilated the old record of 95,015 points set by VA7A way back in 1996. As SOSB-40, Mike WA6O logged 545 QSOs and 132 mults for 71,940 points, which topped N6RO's old record of 68,849 points from 2010. On 80 meters, all the summer noise couldn't pre-

vent Jim, K9YC, from bagging 202 contacts and 67 mults. Jim's 27,068 points score replaces K6OY's previous decade old record of 20,748 points from 2006. And finally, masochist-in-chief Ken, N6RO, operating SOSB-160, pulled 14 contacts and 12 mults out of the noise on top band. Ken's score of 504 points might not sound like much compared to scores garnered on other bands, but it blew away the old 160m record of 75 points set by W7DRA in 2008. Well done, guys!

A special tip of the hat goes to Kip, W6SZN, operating from his station outside Seattle. Kip agreed to watch both 160m and 10m for us to ensure we had a measure of geographical diversity just in case propagation acted up on us. What a shame it would have been to have missed winning all nine AA entry categories because nobody made any QSOs on one or both of those bands (remember, that's what happened to us on 160m last year). The idea was that if we didn't have propagation here in CA/NV, then maybe Kip could still save our bacon by making a couple of contacts from WA. As it turned out, Kip spent hours on 10m listening but hearing absolutely nothing. Not even a peep via skew path. He did much better on 160m. Kip's three top band QSOs and 27 points would have won that category in every year of the past decade except for 2008 when W7DRA set the record with 75 points.

The declining sunspots sure took their toll on our high band and multi band entries. W7RN (our multi-multi entry operated by K5RC, K5XI, KH2TJ and K6DGW), W6YX (our multi-single entry operated by N7MH, ND2T, W6LD and W6OAT), N6DZ (SOAB), NR6O (SOSB-10) and K6MMM (SOSB-15) all won their respective categories, but their scores were way down from previous years' records. I think it goes without saying that if we want record scores in these categories, we have to have good openings on both 10m and 15m.

Forty-one operators at 35 stations pre-registered for NCCC's internal Team Competition this year. Additionally, I found three more NCCCs who were active in the contest but who elected not to be on a Team. Unlike last year when our two Teams ended in a virtual tie, it was no contest this time. Team A won five of the nine entry categories on the way to running up 853 Team points as contrasted with Team B's win in four categories and 564 points. The big score swings in Team A's favor came because K6XX's 99 Team Points effectively negated the 100 Points N6DZ scored for Team B in the SOAB category; WX5S (on Team A) canceled K7GK's points for Team B in the SOSB-15 category, leaving K6MMM's 100 points to add mightily to Team A's lead; Team B failed to field an entry in SOSB-40 so K6MR's and WA6O's scores combined for another big boost for Team A; and in SOSB-80, K6SRZ (Team A) neutralized NA6O (Team B), leaving K9YC's points to provide another big boost to Team A. Soy sauce for Team A!

See [next page](#) for the claimed scores as I have them:-

<u>Category</u>	<u>Callsign</u>	QSOs	Mults	Score	<u>A Points</u>	<u>B Points</u>
Multi-Multi	W7RN	1,021	363	379,335	100	
Multi-Single	W6YX	1,382	432	625,104		100
Single Op All Band	N6DZ	1,333	418	593,142		100
	K6XX	1,333	412	588,336	99	
	KX7M	616	240	149,280	25	
	K2RD	360	204	85,476		14
	W6FA	203	134	28,006		5
	N6IE	160	99	15,840	3	
	K6RIM	163	90	14,670		2
	KR6N	110	73	8,395		1
	NW6P	102	82	7,954	1	
	W1RH	45	41	1,845	**	**
	W1SRD	49	35	1,715		0
	W6SX	34	30	1,170		0
	N2NS	25	22	594	**	**
	KM6I	18	15	270	0	
Single Op 10m	NR6O	14	10	280		100
Single Op 15m	K6MMM	170	59	10,030	100	
	WX5S	154	55	8,470	84	
	K7GK	132	55	7,260		72
	N6ZFO	27	23	621		6
Single Op 20m	K3EST	750	200	150,000		100
	K6MM	144	80	11,520	8	
Single Op 40m	WA6O	545	132	71,940	100	
	K6MR	452	128	57,856	80	
	N6WM	33	20	660	**	**
Single Op 80	K9YC	202	67	27,068	100	
	NA6O	146	57	16,644		61
	K6SRZ	123	52	12,688	47	
Single Op 160m	N6RO	14	12	504	100	
	W6SZN	3	3	27	5	
	N6RK	1	1	3		1
Team Total:					853	564

\*\* = No Team

# The First (Annual?) NCCC Individual and Team Club Competition

Bob, W1RH

During my term as President of the finest contest club in the world, I've had many members talk to me about their favorite contests. Some like the Sprints. Some like working the VHF contests. While the club, over the years, has focused primarily on domestic contests, like SS and NAQP which many of our members consider their favorite contests, still others prefer to work the international DX contests.

In my hours and hours of analyzing just what contests our members worked last year, I found that the number of our members working the international contest was not insignificant. Let's face it... the international DX contests can be a lot of fun. Unfortunately, due to our location on the globe, it is very difficult, if not impossible, for the Club to win contests such as ARRL DX and CQWW.

Considering all of this, along with the declining sunspots, I proposed to the Board that we try an internal competition featuring all kinds of contests. After I kicked the idea around with W1SRD, our VP/Contest Chair, I proposed the idea to the Board. The Board humored me with an OK, and we're giving it a try this year.

The competition will feature many contests, beginning with this year's WPX CW contest at the end of this past May. There will be awards for individual achievements and there will be an award given to the top team.

The teams, probably numbering 5-10, will be composed of our entire paid membership. Each team will have a captain. All members of the winning team will receive a shirt with their callsign on the shirt, and showing them as a member of the winning team. The team selection process will begin soon.

Because some contests, like WPX, can generate huge point scores, and some contests, like SS, can generate much smaller scores, we have agreed on a weighting system to try to equalize the playing field. This is a best-guest effort and I'm sure, if we continue this competition in future years, that the weighting may be refined.

Here's the list of contests, along with the weighting multiplier for each contest:

CONTEST	WEIGHTING MULT	FOCUS CONTEST
CQ WPX CW	x 2	Yes
ARRL June VHF Contest	x 10	No
All Asian CW	x 10	Yes
IARU	x 5	No
NAQP Summer RTTY	x 50	Yes
NAQP Summer CW	x 50	Yes
NAQP Summer SSB	x 50	Yes

CQWW RTTY	x 1	No
CQP	x 20	No
CQWW SSB	x 1	No
ARRL SS CW	x 20	No
ARRL SS SSB	x 20	No
CQWW CW	x 1	No
ARRL 160 Meter	x 50	No
ARRL 10 Meter	x 10	No
ARRL RTTY RU	x 50	Yes
NAQP Winter RTTY	x 50	Yes
NAQP Winter CW	x 50	Yes
NAQP Winter SSB	x 50	Yes
ARRL DX SSB	x 5	No
ARRL DX CW	x 5	No
NCCC RTTY Sprints (all)	x 100	No
CQ WPX RTTY	x 2	Yes
NA Spring SSB Sprint	x 100	No
NA Fall SSB Sprint	x 100	No
NA Winter CW Sprint	x 100	No
NA Fall CW Spring	x 100	No
Ten Meter RTTY Contest	x 100	No
CQ WPX SSB	x 2	Yes
JARTS RTTY	x5	No
NCCC CW Springs (all)	x 100	No

### The Individual Competition Rules

Open only to paid members.

No club circle – Members can be anywhere.

Individual awards based on total cumulative points multiplied by total number of contests worked.

Contest weighting applied to focus contests and NCCC Sprints. ie: NAQP score multiplied by 50.

Additional weighting given to lower scoring contests (ARRL VHF, SS, etc.).

Members can give points scored to the club of their choice with the exception of NCCC focus contests. In the case of a NCCC focus contest, if the member does not give points scored to NCCC, the points do not count for the Individual or Team Competitions.

All scores must be submitted to 3830 (Can be posted under NCCC, PL259, MLDXCC, REDXA, or WVRC).

Multi-operator scores will be divided equally between the operators. ie: If the total score for the

team is 1,000,000 points, and there are 5 team members, each member will be credited 200,000 points.

A guest single-operator will get credited 100% of his score. The station host will be credited 25% of the guest operator's score. Ie: N6BV is a single-op at N6RO in SS. N6BV's total score is 200,000 points. N6BV gets credited 200,000 points. N6RO gets credited 50,000 points even though he did not operate.

For the competition, claimed scores will be used. In the case of a close tie, actual scores may be considered to break the tie.

### **The Team Competition Rules**

There will be a total of 5-10 teams.

Team members will be selected from the list of Full Members (dues paying members)

A Captain will be assigned to each team.

Team captains participate in a draft using the pool of existing paid members.

Once teams are chosen and in place, a team captain can recruit additional members (New NCCC members or Associate Members who become Full, dues paying, Members. New member scores will be retroactive to the start of the competition period (CQ WPX CW).

A new Full Member (dues paying members) who has not been recruited will be assigned to the team with the fewest members. The new member's scores will be retroactive to the start of the competition (CQ WPX CW)

Team scores are based on the total scores of all members multiplied by the number of members who participated in at least one of the featured contests.

A note about the team captains.....

Many of our members have suggested that we establish something like the PVRC chapter system, where each section has a captain. It's been suggested that there be a MLDXCC chapter, a REDXA chapter, etc. These are separate and unique clubs with their own bylaws and mission.

By creating teams within NCCC, not based on area but rather based on a "school-yard draft" by team captains, this does establish a network of team captains who end up with a fair amount of responsibility. This includes recruiting for their team, flogging for their team, and encouraging their team members to operate in contests. All of this helps the entire club to grow and to place better in competitions with other clubs.

Based on the rules, above, I have put together a spreadsheet based on last year's scores, had we had this competition. The top scorers last year will be offered the team captain positions. If someone declines, the captain position will be offered to the next highest scorer.

So, let's let the games begin!

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**For Sale**

**Members Ads**

**For Sale**



Kenwood TS-590s HF/6M transceiver with factory pack (hand mike, DC power cord, owner's manual, shipping cartons, etc.) Original owner.

**\$850.00**

Call Bob K6XV if interested 925-918-3767



# Killing Receive Noise – Part Two

by Jim Brown K9YC

**Evaluating Equipment For Noise:** When someone tells you that XYZ equipment produces no noise on the ham bands because he can't hear any noise in his radio, should you believe that the equipment is clean? **NO!** The equipment may be noisy but he doesn't hear it because it is being covered by other noise from the neighborhood. Figs 8 and 9 compare the daytime 80M spectra at K6GFJ in a San Jose residential neighborhood and K9YC 30 miles to the south in the Santa Cruz Mountains. The difference in the noise floor is 10 dB. And it's certainly not dead quiet in the mountains, either – everything on the displays from both QTHs is noise from either switching power supplies or other electronic sources.

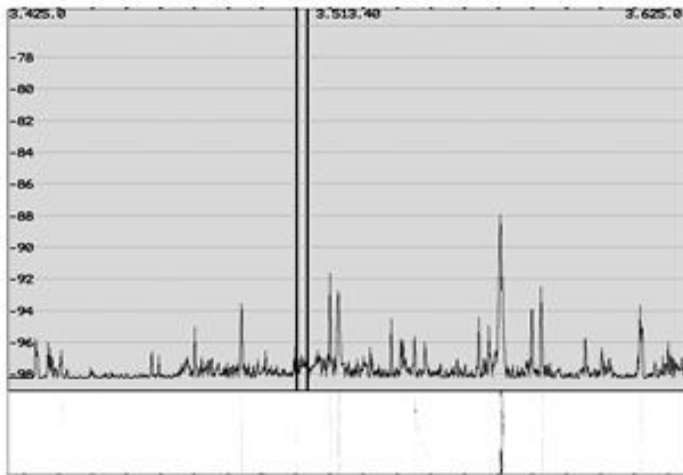


Fig 8 – 80M at K6GFJ – Noise floor -98 dBm

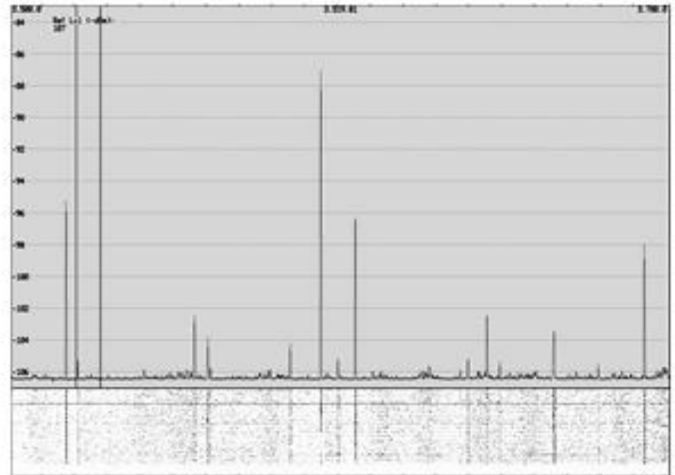


Fig 9 – 80M at K9YC – Noise floor -108 dBm

**Proximity to Antennas Is What Matters:** Noise radiates from sources on wires that are connected to noise sources, and enters our receivers via our **antennas**. My SteppIR that's up 120 ft and is 200 ft from the shack doesn't hear much noise from the shack, but the 160M Tee vertical only 25 ft from the operating position does. When someone tells you that a particular model of internet router or video monitor sits next to his power amp and there's no RFI, ask him how far it is from his **antennas**, not from his radio.

**An Exception – Magnetically Coupled Noise:** When a noise source produces strong magnetic fields, it can couple noise into equipment in close physical proximity to the victim (see Part One). Noise is coupled via the magnetic field to any circuit loop nearby, and to any victim equipment that has a similar circuit layout problem. Magnetic coupling dominates over electric field and electro-magnetic field coupling in the near field of the source. The solutions to magnetically coupled noise are 1) to reduce the area of the loop carrying the noise current, 2) reduce the area of the loop in the victim circuit, and 3) separate the source and victim by as much distance as possible. In general, this means using twisted pair or coax for all signal wiring and running it in close proximity to bonding conductors between the equipment it interconnects (because the bonding and the signal wiring forms a magnetic loop).

Several years ago, ON4WW put up an excellent web page with more than twenty case histories documenting the successful pursuit of a variety of RF noise. It's well worth a read. <http://www.on4ww.be/emi-rfi.html>

## Issues With Specific Product Types

**Low Voltage Lighting:** This generic type consists of any lamps and bulbs that run on DC voltage, including those in most architectural lighting fixtures, many track lights, and LED lighting.

Incandescent types CAN run on an ordinary transformer, but transformers large enough to power them don't fit in the electrical enclosures within walls or ceilings, so switch-mode power supplies are almost universally used. All that I have seen are unbranded, unlabeled, noisy pigs. They are sold by electrical supply houses, where they are called "electronic transformers."

Track lighting now comes in several forms. The track itself can carry "line voltage" (120VAC) or low voltage (12 or 24VDC). Track that carries low voltage is fed by a 24V supply, which could be a transformer (quiet), but is usually an SMPS (noisy). Fixtures for "line voltage" track can utilize 120VAC incandescent bulbs, in which case they will be as quiet as any other incandescent bulb. Sadly, over the last decade or so, manufacturers have gradually shifted to low voltage fixtures that use a switch-mode power supply built into the base of each lamp holder so that it can be connected to a line voltage track. Any noise produced by those supplies will be radiated by the wiring within the track and the wiring feeding the track. The only practical place to choke these noise sources is where external wiring feeds the track, but the parallel wires within the track are efficient radiators.

**LED Lighting:** LEDs are very efficient, requiring relatively low values of DC voltage and current for a lot of light, but there still must be a DC power supply somewhere. For screw-in 120V LED replacements, the DC power supply is built into the base of the bulb. Any noise produced will be radiated by the AC line. To suppress that noise, the line should be choked as close as practical to the bulb. A noisy outboard supply, if there is one, should be choked at its input and output terminals. Several years ago, ARRL tested a broad selection of LED screw-in bulb replacements and found them relatively clean. The bad news is that things change when products become a commodity – local hams report that off-brand LED bulbs from the local big box store were quite noisy, while Philips bulbs, among those ARRL reviewed, were relatively quiet. My advice – try a few in fixtures that are close to antennas and see if you hear them. And if they're noisy, return them for full credit, and make sure you tell the vendor that "they made noise in your radio."

Faced with noisy low voltage lighting, I'd still look for LED replacements -- their much lower current requirements could make it practical to replace the existing noisy supply with a quiet linear supply that's small enough to fit in the available space. I'm lighting my shack with five LED strips that I bought at Pacificon from Wired Electronics. The combined load is about 1.25A from the 12V system that runs my radios. The shift to LED lighting has already produced some LED lamps that are direct replacements for existing fixtures, and that trend is certain to continue.

**Grow Lights** can be a very powerful source of RF noise that can be heard a half mile away! These 600 – 1,000 W sodium or metal halide lamps run from ballasts that include switching power supplies in the range of 50-75 kHz. None are certified to Part 15 or 18 of FCC Rules. Wiring between the ballast and the lamp is usually fairly long and can form a large loop, so is rather efficient at ham frequencies both as an antenna and as a magnetic loop.

Tom Thompson, W0IVJ, and Larry Banks, W0QE, have researched these lamps extensively, and Tom has developed an effective filter which is designed to be applied between the ballast and the lamp. Tom found that a filter on the power line side of the ballast was less effective. A commercial version of Tom's filter, built by W7LOZ, is available at

<http://growershouse.com/revolution-ballast-emi-filter-reduce-rf-emi>

A report on Tom and Larry's work, including a schematic of the filter, is at <http://tomthompson.com/radio/GrowLight/GrowLightBallastFilter.html> Also, there's recent good news from W0IVJ – some ballast manufacturers are starting to place the ballast on the lamp hood, which reduces the loop area, reducing the both the magnetic field and the size of the antenna that can radiate the noise. In addition, Tom thinks that the Galaxy Grow Amp model 90220 may pass Part 18, but the extent to which this kills emissions will likely depend strongly on the loop area of the connection to the lamp. Tom's filter suppresses only noise radiated by wiring on the lamp side of the ballast. That may be sufficient for many installations, especially where noise is at 5 MHz and above. In more severe cases, or where RFI is present below 5 MHz, a common mode choke on the power line side of the ballast may also be required. Follow the recommendations in the Choke Cookbook in <http://k9yc.com/RFI-Ham.pdf> for small diameter coax (RG8X) for RFI in the frequency range where you hear the noise, running the line cord through the choke. W0QE shows a very different filter de-

sign on his website. [http://www.w0qe.com/RF\\_Interference/grow\\_light\\_electronic\\_ballasts.html](http://www.w0qe.com/RF_Interference/grow_light_electronic_ballasts.html)

**Switch Mode Power Supplies:** If you must use an SMPS, plan on adding suppression to it. Start with common mode chokes on both the 120VAC and low voltage DC lines for the frequency range(s) where you hear noise. Capacitors across the DC output terminals and the AC input terminals can also help. Select capacitors for low ESR (equivalent series resistance) at the frequency of interest and on the AC line side, use only type X1, X2, Y1 and Y2 capacitors, which are specifically rated for AC line use and designed to withstand the 3-6 kV spikes that can occur on power wiring. Choose this capacitor carefully – if it fails, it could catch on fire!

SMPS units tend to be noisiest at lower frequencies, especially on 160M. Fig 10 shows a choke wound with 18 turns of #16-2 “zip cord” on a 2.4-in o.d. #31 Fair-Rite toroid. It is intended to provide strong attenuation of SMPS noise on the 80 and 160M bands. It can safely be inserted in circuits carrying up to about 12A of AC or DC current without danger of overheating. This short length of #16 (about 4 ft) does not increase resistance enough to affect charging current.



Fig 10 - A 80/160M Choke



Fig 11 - 12VDC to 120VAC 1A Inverter with Required RF Filtering

**DC-AC Inverters:** The Samlex PST-series of “pure sine wave” DC-AC inverters carry an FCC Part 15 Class B rating for RF noise, and are relatively quiet, but may not be quiet enough for any given installation, depending on proximity to antennas for the bands you want to operate. (Part 15 Class A is a much looser specification for industrial applications, and allows 20 dB higher noise levels than Class B, which is for residential use.) The Pure Sine Wave inverter in Fig 10 carries FCC Part 15 Class B certification, but had to extensively choked to kill radiated noise. The smallest clamp-ons are for 2M; these and the three smaller multi-turn chokes (0.75-in i.d.) were sufficient when powering the logging computer for our 7QP mobile operation. As an experiment, the two larger (1-in i.d.) chokes (above the unit in Fig 11) were added in an attempt to suppress RFI to the 160M vertical 25 ft from my shack, and were not nearly enough, so I wound the choke shown in Fig 10, which helped.

**Uninterruptable Power Supplies (UPS)** come in two basic types: **On-line** types are always regenerating power, while **Standby** units monitor the AC line and regenerate power only when AC power fails. Both types include batteries to provide the power when power fails, a DC power supply to keep those batteries charged, and a DC-AC inverter that operates when the unit is producing AC power. If the DC power supply is an SMPS, it will likely produce RF noise while charging the battery.

All of the comments about DC-AC Inverters and SMPS apply equally to UPS units.

**Variable Speed Motor Controllers** are often used in furnaces and HVAC systems. These controllers are notoriously noisy for at least three reasons. First, they consist of an SMPS, the DC output of which is then pulsed at variable width and speed to control the speed of a motor. Both of those pulses are rich in harmonics, and they are radiated by wiring both internal and external to the unit. This radiation tends to be quite strong because the designers have failed to consider the impact of circuit layout on noise. Thus, loop area tends to be quite large, which increases antenna action and greatly increases the magnetic field produced by the noise current. Variable speed controllers are also widely used for motors in elevators and geothermal systems where both motor currents and loop areas are even greater.

Solutions include rewiring circuits with large loop area carrying motor current with twisted pair. Some product manufacturers sell optional filters to prevent noise from being conducted onto the power line, but that does not prevent that interior wiring from radiating.

N9TF reports electronic noise in the range of 20-23 MHz spaced about 17 kHz. The source is a Samsung washing machine, and lasts as long as the wash cycle. Peaks on 15M are 18- 20 dB above his noise level. Gene provided these videos of this noise, that are currently at the links below. [k9yc.com/SamsungWasher1.mp4](http://k9yc.com/SamsungWasher1.mp4) and [k9yc.com/SamsungWasher2.mp4](http://k9yc.com/SamsungWasher2.mp4)

**Plasma TVs** produce strong RFI that extends up to at least the 12M band, and it is just about impossible to suppress. The best solution is to replace it with an LCD model. The noise is produced by the current inside the display structure that it takes to light up each pixel turning on and off, and the magnetic and electromagnetic fields produced. In other words, the noise is not radiated by external wiring, but is radiated by the display itself. There's no way to suppress it short of major redesign of the display to either shield it or confine the fields by means of microstrip or stripline construction. Chokes on external wiring will have no effect at all on noise radiated by the currents within the display. Thankfully, plasma TVs are no longer manufactured, but existing units will continue to be used for years.

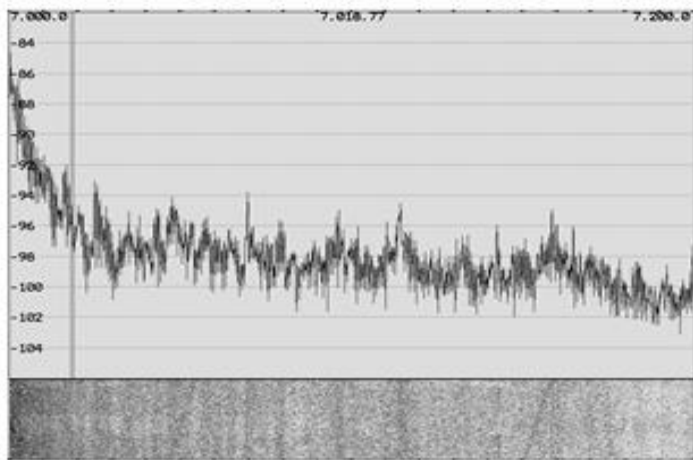


Fig 12: Plasma TV, 7 – 7.2 MHz

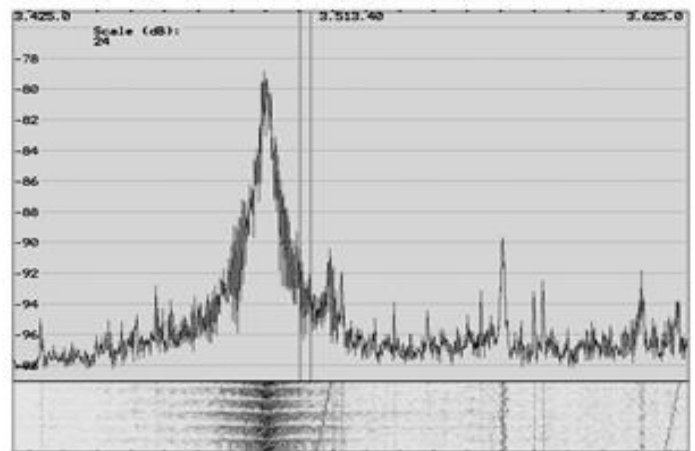


Fig 13: Plasma TV, 3.425 – 3.625 MHz

**Typical Plasma TV Noise Spectra** are shown in Figs 12 and 13 (K6GFJ) and Fig 14 (K7PI). K6GFJ's data is from his K3/P3/SVGA fed by a low dipole, and looking at his own NEC PlasmaSync 50MP2 TV. The bottom of each of the amplitude displays is the noise level at Ross's QTH in a San Jose residential neighborhood. Fig 8, from K7PI's SDR, shows a wider spectrum for his neighbor's plasma TV. Note that the spectra will be strongly dependent on which of the dozen or so common DTV video standard signals are being viewed at the time. There's more spectral data for plasma TV RFI at [k9yc.com/publish.htm](http://k9yc.com/publish.htm)

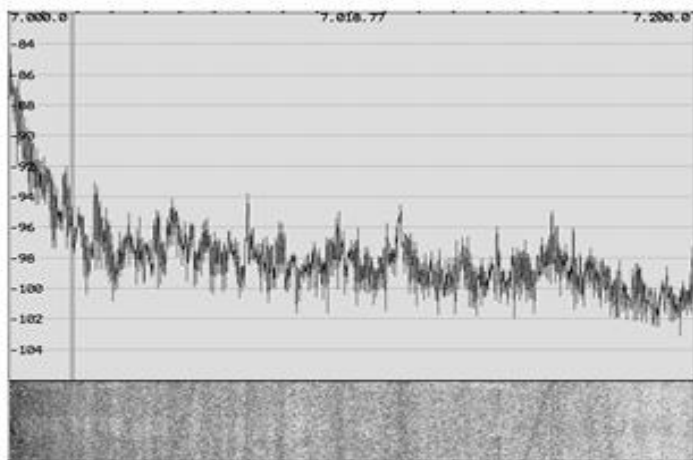


Fig 12: Plasma TV, 7 – 7.2 MHz

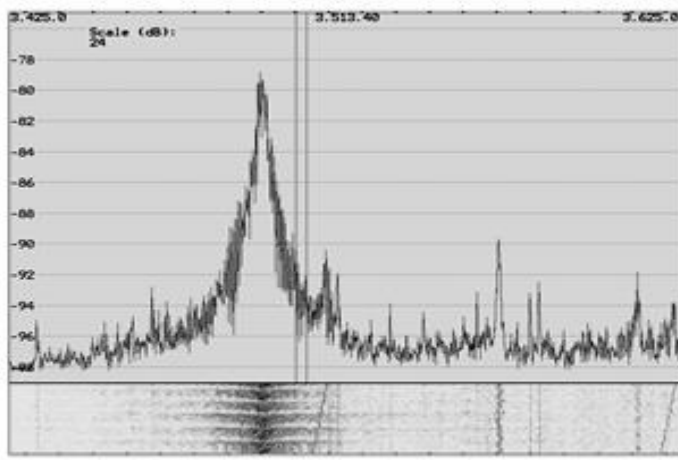


Fig 13: Plasma TV, 3.425 – 3.625 MHz

There can, of course, be other noise radiated by the unit – a switching power supply and other circuitry separate from the display itself. These components would most likely be radiated by cables connected to the unit and can be suppressed with chokes.

**Wired Ethernet RFI** on the HF bands (the carriers around 14,030, 21,052, and the low end of 10M and 6M) can be suppressed by choking every cable connected to the Ethernet switch. Both ends of the cable are potential noise sources; cables that are shorter than about  $\lambda/10$  at the frequency of interference can be choked in the middle with a single choke. Longer cables should be choked at both ends. Don't forget to choke the power supply cable. As noted earlier, you'll hear both your own carriers and those of your neighbors; to identify yours, kill power to the Ethernet switch and note which carrier dis-appears. Gauge your success on the reduction in strength of your carrier in each group; to kill the carriers from your neighbors you'll have to choke their cables. When setting up a network, always try to avoid the use of wired Ethernet; instead use WiFi if it will work reliably for your installation.

**VDSL and Cable Modem UpLink Leakage** in the range of 3.7 – 5 MHz shown in Fig 2 of Part One may be radiated by wires connected to modem itself or from the telephone or CATV company's wiring between homes. WA7JHZ and W0IVJ have documented this problem with spectrum measurements of the common mode signal on coax carrying CenturyLink and Comcast systems in Idaho and Colorado. It should be possible to suppress leakage from the modem with a 6-7 turn choke on each cable wound around a 1-inch long #31 clamp-on, but so far, cable and telcos have stonewalled. This would be a good issue for ARRL to address.

**Computers:** Some are RF-quiet, but many radiate RF from internal wiring, and from wiring for power and connected accessories. Some are quiet at HF but noisy at VHF. If a computer is noisy, choke all cables connected to it.

Some **Computer Video Monitors** are noisy, some are not. Choke both video and power cables on the noisy ones. Some cannot be suppressed – W4UAT gave me a Samsung with “touch” controls that he couldn't use because it went nuts when he keyed a radio feeding a nearby antenna. Nothing I tried could kill the noise it made in my receiver, nor prevent it from turning flips when I transmitted. Not all Samsung monitors are noisy – I've replaced all the monitors in my home and shack with 24-in Samsung models sold with outboard 14VDC switching power supplies, which I run from float-charged 12V batteries (see Part One.)

**USB Powered Equipment** like USB sound cards and computer extension speakers often includes a switch-mode power supply to convert the 5V USB voltage to that that the powered unit can more effectively use. Add equipment like this to the list of potential noise sources, and treat them like any other – choke the cable(s), and if that doesn't kill the noise, replace the noisy product. W6GJB reports that noise from a pair of USB-powered speakers radiated not only on their own USB cable, but also on every cable connected to the computer!

**Noisy Doorbell Transformers**, often buried in the walls, can be nasty sources of impulse noise. WX5L reports that “the older type doorbell transformer has a safety feature built in. A thermistor monitors the heat in the windings. If it detects overheating it, it opens a relay to disconnect power so it doesn’t combust. But even with a normal situation this relay can become pitted and chatter away causing RFI.” The defective transformer should be replaced with one that is UL or ETL listed. *[UL and ETL are safety inspection laboratories certifying the electrical safety of components connected to the power line. They do not test the quality or effectiveness of a product.]* If the transformer is inaccessible but its AC wiring is accessible, it should be disconnected and an alternate doorbell system installed. Most building codes require that all wiring associated with the mains system (120 and/or 240VAC) must be accessible.

**Solar Power Systems** can be very strong noise sources as a result of poor design, poor installation, or both. The best charge current regulators are DC-DC converters, and most are noisy. DC – AC inverters that provide 120VAC are also often noise sources. Both charge and discharge circuits carry large pulsed currents with strong harmonics; those harmonics will radiate if the current flows through large area magnetic loops. A large system with all wiring in steel conduit has the best chance of being quiet, **provided that the conduit is continuous and bonded to all equipment enclosures at both ends**. Solar power systems should always be wired with twisted pair. Genesun, a relatively new company makes a line of MPPT (the most efficient type) solar charger regulators for small systems that is quiet enough for nearly all installations (although I needed the choke of Fig 10 in mine to completely kill noise in a 160M vertical next to the panels). <https://genasun.com/products-store/mppt-solar-charge-controllers/> Most solar systems include DC to AC inverters, which as noted earlier are often noisy.

There has been a trend in recent years to solar panels with self-contained regulators and inverters; properly built and installed, these can greatly reduce the loop area and thus the noise. Because the power leaves the panel as 120VAC (or even 240V), wiring from the panel is usually in conduit. And because the output of the panel is at the higher line voltage, the current is much less than if it were at battery voltage. RF trash produced is directly related to current, so all of these factors can combine to result in less radiated noise if the units are well designed.

**April 2016 QST** includes a feature article on modern home solar power systems with respect to RF noise. There many good things about the article – a good discussion of overall system architectures in general and for this system in particular, recognition of the interconnection of solar panels and batteries as a magnetic loop, recommendation for the use of twisted pair for that loop with return circulating through the loop to minimize radiation and the loop area, recommendations that wiring be installed in steel conduit, and recommendations for the use of ferrite common mode chokes for suppression of noise currents. It also shows how much work it is to fix a bad system!

I have two problems with this article. First, the author, rather than searching out and buying a system that produces minimal RFI (or insisting that the vendor and/or manufacturer fix his RFI problems), instead buys a “bad” system and goes to considerable trouble and expense to fix it himself! How many hams will buy this product because QST has showed them how to fix it? And what do you do if the noisy system belongs to your neighbor? Second, there are a few significant technical errors, mostly related to specific recommendations for the common mode chokes.

**Active Noise Cancellers** When we’ve done our best and still have noise, an active Noise Canceller can make a big dent in a **single** source, but it won’t help with more than one source at a time. Noise Cancellers work by combining signals from our receive antenna with the signal from a “sense” antenna located near the source of the noise. The adjustable phasing network within the unit must then be carefully tweaked so that the two signals are equal in level and 180 degrees out of phase. This adjustment is frequency sensitive, so it must be readjusted each time we QSY. It must also be readjusted for every noise source. The MFJ 1026 and the DX Engineering NCC-1 are generally well regarded. Be careful when using any unit in line with the transceiver output – the carrier detector in my Timewave ANC-4 generated so much IMD that K6XX rang my phone within an hour of when I tried to use it that way.

**Fluorescent Lighting** can be noisy or quiet, mostly depending on the type of ballast used.

Many screw-in replacements for incandescent bulbs tend to be quiet, but can become nasty noise generators when they get old and begin to fail. Traditional tube-type fluorescents use either older-style magnetic (linear) ballasts, which tend to be relatively quiet (until they fail) or more efficient electronic ballasts, which have the same noise issues as SMPS. Electronic ballasts are rated for industrial use (FCC Part 15 Class A, noisy) or residential use (FCC Part 15 Class B, about 20 dB quieter). With help from his local power company, W9RE traced severe interference on 15M to fluorescent lighting in a home 1,500 ft away.

Replacing an industrial-rated ballast with a residential unit can reduce the noise significantly. Noise is radiated by the tubes and wiring within the fixture, and on the ac power line. A common mode choke on the ac line can suppress the power line radiation, but shielding is generally required to kill radiation from the fixture. The shielding must be a continuous screen or mesh, and must be bonded to the fixture, and some scraping of paint may be required.

K6LL and W7WW report success with this line of LED replacements for fluorescent tubes that need no ballast – the AC line must be re-wired direct to the LEDs with no ballast. This work should be done by a qualified electrician.

[earthled.com/collections/t8-t12-led-fluorescent-replacement-tube-lights-that-bypass-ballast-rewire](http://earthled.com/collections/t8-t12-led-fluorescent-replacement-tube-lights-that-bypass-ballast-rewire)

Direct plug-in replacements for fluorescent tubes are now being sold by “big box” stores. They are designed to work with existing ballasts. The jury is still out on how quiet they are; I’ve seen some positive reports, but see “Evaluating Equipment For Noise” at the beginning of Part Two.

### **Action Summary For Killing RF Noise**

**Study a Spectrum Analyzer Plot** to determine whether it is impulse noise or electronically generated, and if electronically generated, its characteristics. Review Part One.

**Is it impulse noise** – broadband, no variation within a band, strongest at low frequencies, gets weaker with increasing frequency, covers a fairly wide area? If yes, it’s probably something arcing within the power company’s distribution system, or occasionally a neon sign. Try to get a bearing with a directional antenna, then listen with a mobile rig tuned for AM around 160 MHz, then when it gets loud, zero in on it by listening with an AM detector at UHF. When you hear it loud at UHF, get out of the car with a talkie tuned to that range. Then communicate what you’ve learned to the power company.

**Is it electronically generated noise** – harmonically related carriers that repeat every 10-100 kHz, stronger in some bands than in others? If the carriers are wobbly in frequency, are surrounded by humps of noise, and drift a bit over time, the source is likely an SMPS. If the carrier(s) are relatively stable in frequency, the source is likely within digital equipment. Begin your search by listening with your rig running from a battery as you kill power to everything in your home, then finding and suppressing each noise you hear as you turn on one circuit breaker at a time.

Remember that most of us hear many noise sources, both impulse noise and electronic noise, and from many sources. The key to success is to identify and tackle them one at a time.

**Kill electronically generated noise** by replacing noisy products with clean ones, or by applying common mode chokes to all wiring connected to each source, one at a time. If there are multiple sources on a circuit, turn all off but one and suppress it, then turn that source off and move on to the next. When you find a source you cannot suppress, turn it off and work on the others.

**When a new noise appears, think like Sherlock Holmes.** What new product have you (or your neighbor) bought? Is there a pattern to when you hear it? Can you connect that pattern to patterns of use of something that could be a noise source? Is it the same every day (perhaps tied to a circuit that senses daylight) or appliances that are used at certain times?

## Using A Spectrum Analyzer To Chase Noise (and DX) Jim K9YC

We can maximize the visibility of signals (and man-made noise) with several important settings.

Set the analyzer for maximum averaging, and with repetition rate in the range of 100-250 msec. Averaging is a powerful signal analysis tool because it causes all random noise to average out to near zero, but signals are reinforced because they are coherent (i.e. not random).

Adjust reference level so that the bottom of the display is the level of the averaged "white" noise

Set the scale of the display so that the strongest signals fills most (but not all) of the height of the spectrum display.

Set the width (frequency span) wide enough to see any variation in noise with frequency. For example, many electronic noise sources repeat every 10-30 kHz.

When we've done this correctly, the bottom of the amplitude display will be the average of the white noise, and the waterfall will go to black anywhere there are no signals or electronic noise sources. Figs 1, 4, 8, 9, 12, and 13 illustrate this technique with an Elecraft P3, which allows frequency span to be adjusted over the range of 2 - 200 kHz. An important benefit of setting the analyzer this way is that it causes very weak signals to show up in the waterfall as faint traces against a black background. This can be very helpful when looking for DX, especially on a nearly dead band.

Figs 2 and 14 are the displays of SDRs (software defined radios) whose displays can be set for a much wider frequency span. The wider span allows us to see more patterns in the noise. Be cautious about reading too much into the relative strength of noise (and signals) over a frequency span greater than the bandwidth of the antenna you're using, or wider than the bandwidth of any band-pass filters that may be between the antenna and the SDR.

Note also that I have post-processed all of these analyzer "screen grabs" by converting them to grey scale and turning them negative to make them print better in hard copy. I didn't do that in earlier versions of this applications note, and the detail didn't show up nearly as well.

See May issue for the previous notes, references etc.

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## JUG Articles Wanted!

Without your help we cannot reproduce a quality newsletter so please consider submitting a suitable article!

We welcome any and all relevant articles for inclusion in the JUG.

Deadline is 7 days before month end.

Preferred format is MS Word, Arial 12 point and pictures should be full resolution.

Send your material to Ian, W6TCP at [w6tcpian@gmail.com](mailto:w6tcpian@gmail.com)

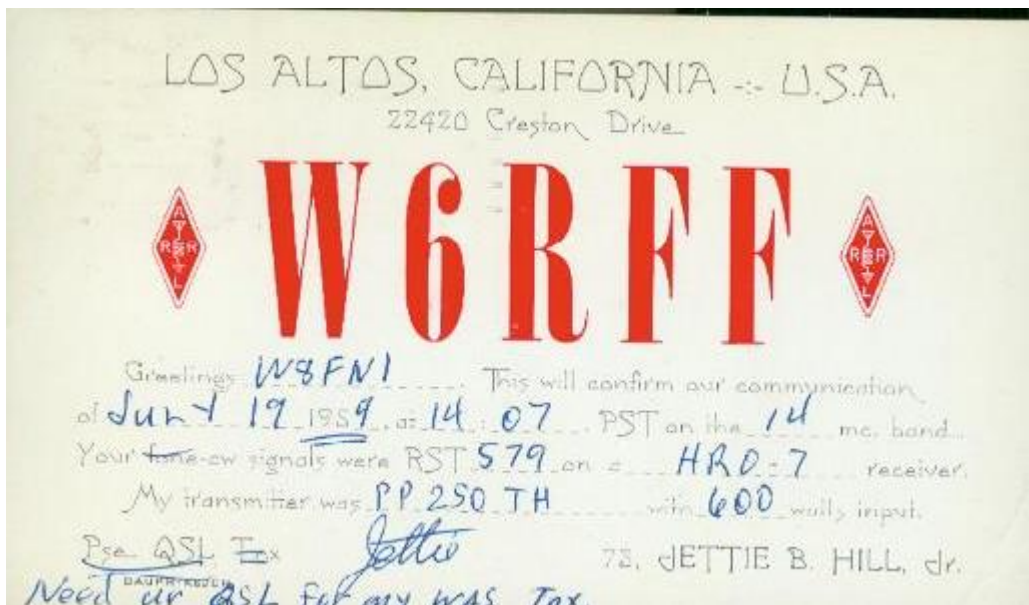
Don't worry about the formatting, we can take care of that if necessary !



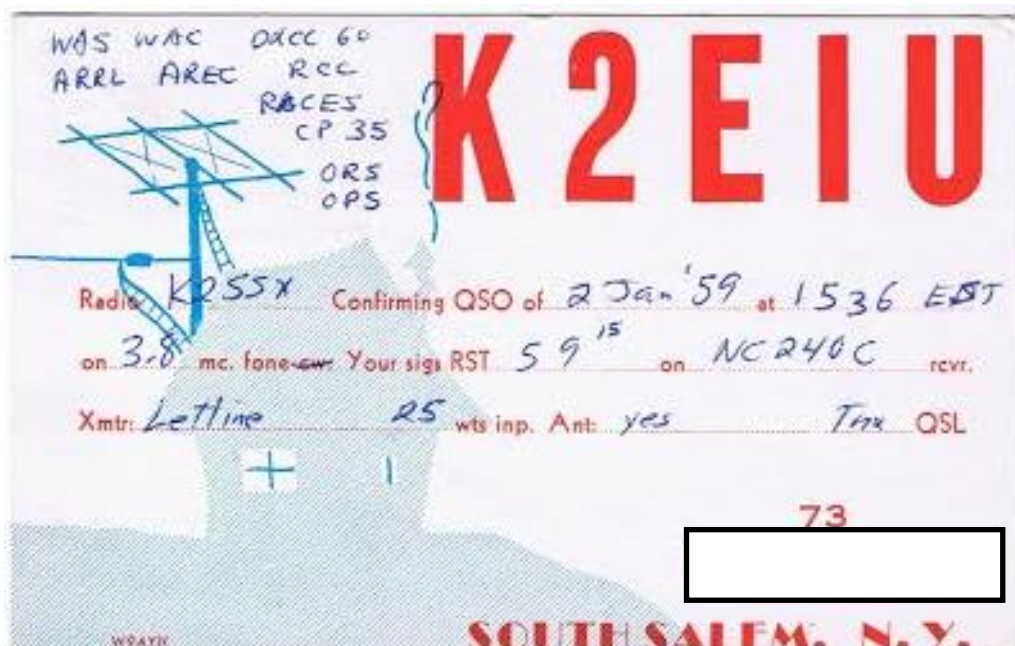
## QSL Card Trivia

Any idea who these two, currently active, KB'ers are?

Who was W8FNI, who worked W6RFF in 1959?



Who was K2EIU?



Find out on page 39!



The June NCCC meeting took place on Sunday June 5h at El Tapatio, in Pleasant Hill. The meeting was attended by Twenty Eight NCCC members/visitors. A further Eleven members joined the meeting via Webex.

AJ6JZ, K6EL +1, K6JAT, K6KNS, K6LRN, K6TKD, K6VNA, KD6WKY, KK6DF, N6ENO, N6KLS, N6KT, N6RO, N6TV, N6VV, N7MH, NA6O, NJ6G, NS6T, NW6P, W1RH, W1SRD, W6RGG, W6TCP, WC6H, WD6EIW and WX5S.

And via Webex:- Al Rendon, Chip W6MY, David Aslin, Giuseppe, John K6MM, Lee KI6OY, Mike WA6O, Ric N6AJS, W6FB, Hank W6SX, Jeff WK6I

The Two featured presenters for the meeting were:- How to Record an Entire Contest, and Learn from your Mistakes," - Bob N6TV and 2016/7 Contest Strategy - Bob W1RH, Steve W1SRD









## Member Awards

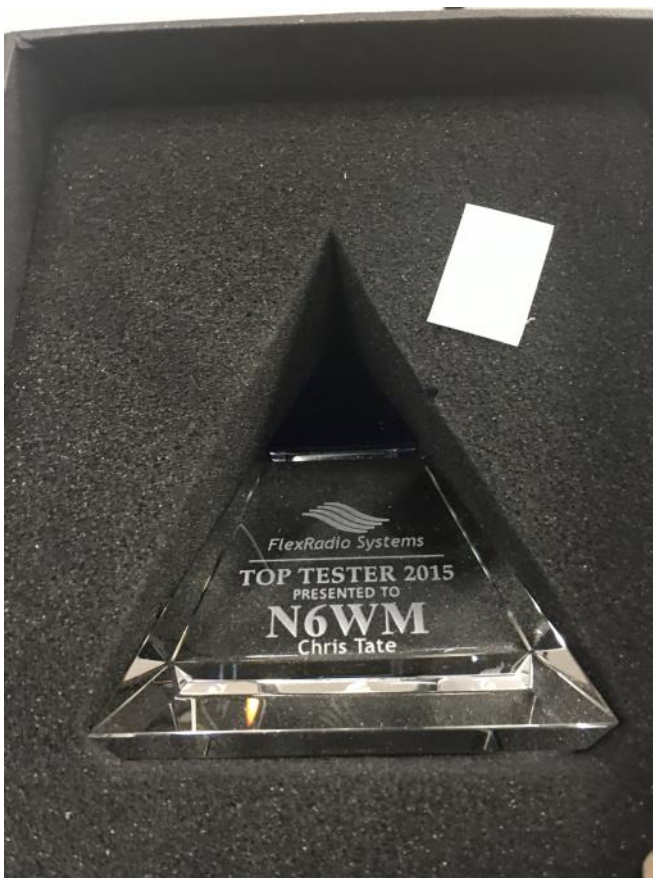


### NCCC Member Chris N6WM With his Top tester Award from Flex Radio

At the FlexRadio Banquet back in May, Stephen Hicks N5AC highlighted the ongoing accomplishments of the Alpha team and asked all Alpha team members to stand and be recognized.

There is no way we could accomplish all the things we do without your ongoing support and everyone at Flex is most appreciative and honored that you spend your free time helping us.

As in previous years, we gave out awards to two Alpha team members that have gone above and beyond. These awards are TOP TESTER awards and were awarded to Al Groff, K0VM and Chris Tate, N6WM.



## In Memory

SK - Larry R. Murphy, KE6PPE - June 23, 2016

Larry Murphy, KE6PPE, passed away on June 23, 2016 at age 70 after a lifetime of volunteering to help others. He enjoyed many aspects of ham radio, including field day and traveling to conventions. Most of all, he enjoyed emergency preparedness and volunteering with many organizations. He is survived by his wife, two children, and four grandchildren.

Please don't send flowers. Larry and Jean decided a donation to the Boy Scouts Pico Blanco Ham Radio Fund would be best. As Larry worked with many young people and scouts over the years. Some radio equipment and antennas and are already being used by the boy scouts. So it furthers our efforts to continue teaching boys the merits of volunteer work.

In lieu of flowers, please send any donations to:  
Silicon Valley & Monterey Bay Council  
Attention Michael Wilson 970 W. Julian Street San Jose, CA 95126

Please notate the donation as:  
In Memory of Larry Murphy, KE6PPE Camp Pico Blanco Capital Radio Fund

Thank You, Larry & Jean Murphy and Family

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## 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.

# Point Generator Profile

By Bob, W1RH

This month's featured point generator is my good friend, Rick, W6SR. Rick lives near me, in rural El Dorado County, near Placerville.

His station, just off of Highway 49, is at the 2000 foot level at the top of the American River Canyon and plays well. I have used Rick's fully automated station for SS HMO operations as have others, including a frequent user, Jim, K6OK.

Rick is always building antennas and they ALWAYS work well. He has 265 entities confirmed on 80 and a whopping 185 confirmed on 160. He achieved #1 Honor Roll years ago and has also achieved 9BDXCC, 5BWAZ, and has worked all continents on 6 meters.

He has operated several contests from the Caribbean and has generated huge scores in not only the international contests, but also Sweepstakes.

I'll also note that Rick's former 3-tower QTH is now the QTH of Steve and Doris, W1SRD and K0BEE.

**Name/Call Sign:** Rick Samoian - W6SR

**Past calls:** WB6OKK

**Location:** Placerville,CA

**How much property do you have?** 3 acres

**Describe your antenna system:**

**Current:** StepIR 3 Element Beam, 30 & 40M rotating Dipoles, 80M inverted V,160M Inverted "L" 6 element 6M beam

**Future:** 6M EME, a pair of 7 element M2 beams on a 20 ft tower with elevation

**What's in your shack?** Elecraft K3, P3, Alpha 87A PA & Home Brew 1.5KW++ 6M power Amp

**What are your previous QTH's?** Torrance, CA, Palos Verdes, CA, Yorba Linda CA

**If you're working, what is your career? If not, what was your career?**

Retired in 2000, I worked as an engineer (EE) and supervisor for 40 Years in defense electronics, in the Product Test and Reliability Area, the last 20 years for Hughes Aircraft Company

**Married?** Yep for 50 years

**Kids?** 3 kids, 2 boys and a girl



**Grandkids?** 3, also 2 boys and a girl. Granddaughter graduated last December from USF, with a degree in Chemistry/Biology. The oldest grandson will graduate this December from Cal Poly San Luis Obispo, with a degree in Materials Engineering. Not a big surprise since his dad and both granddads were engineers.

**How many DXCC entities have you worked?** 358

**What's your favorite contest?** Both CQWW contests

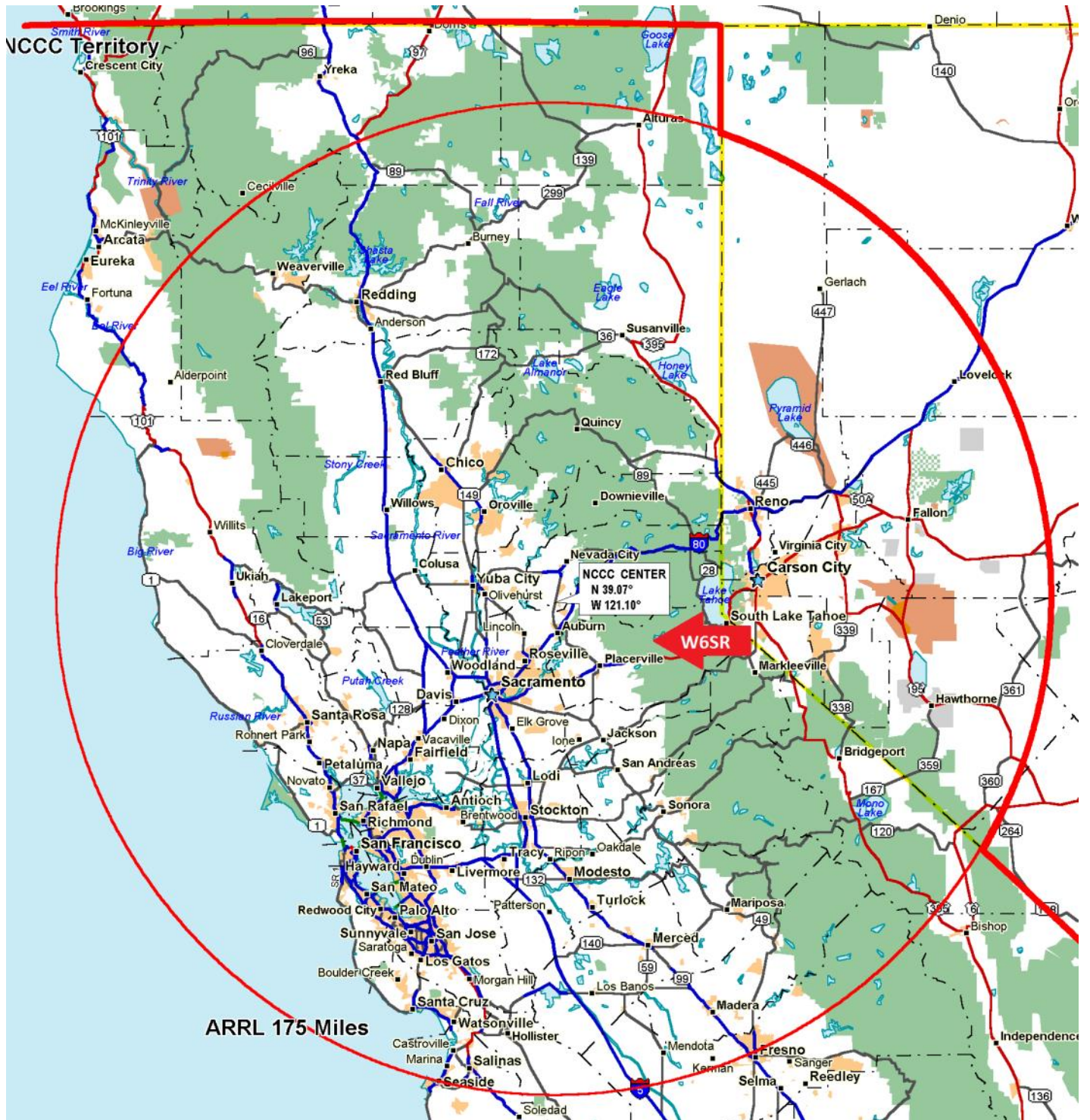
**Any tips for contesters?** Turn back the clock 40 years, that will help your score a lot, Hi Hi

**What would you like to see changed in NCCC?** I would like to see the NCCC, as a group, push for shorter contest periods. At 75, I now think that 48 hour contests are too long. Maybe score contests by age group?

**Any other hobbies besides ham radio?** Sports cars, had many different cars thru my lifetime, but now mostly Corvettes, I have been a member of the Cameron Park Corvettes for the past 12 years. Handgun Target Shooting.









# TUBE OF THE MONTH

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

Norm N6JV

## AUDIOTRON

**A California Pirate**

With de Forest's success with his new triode, there were a few who tried to capitalize on the new technology. Elmer T. Cunningham of Oakland, California was one of the first. The early hams were always looking for a deal and Cunningham wanted his cut. He produced a triode that was made out of a test tube and called it the AudioTron or Audiotron and always priced it for less than de Forest. It featured an aluminum plate formed in a cylinder and a copper grid wound on a fat pencil like the one they gave you in the first grade. The grid was supported on only one end so it would vibrate wildly if someone tapped the table. As the signals were arcs and sparks, I guess it didn't matter much with the microphonics. Very small lengths of platinum wire were required in each lead as it passed through the presses. This was to make a vacuum seal. No two Audiotrons were exactly the same. Manufacture started in 1915.

Californians have always admired their local bandits like Black Bart or Zorro. The legend of Cunningham has many stories that may be hard to prove. One popular tale was that when de Forrest's lawyers were hunting them down, they would load all the gear in the Model T and move to another garage. De Forest finally caught up with them and the patent infringement suit was eventually settled out of court. De Forest made their own version of the Audiotron, but the Cunningham was always priced \$.25 less.

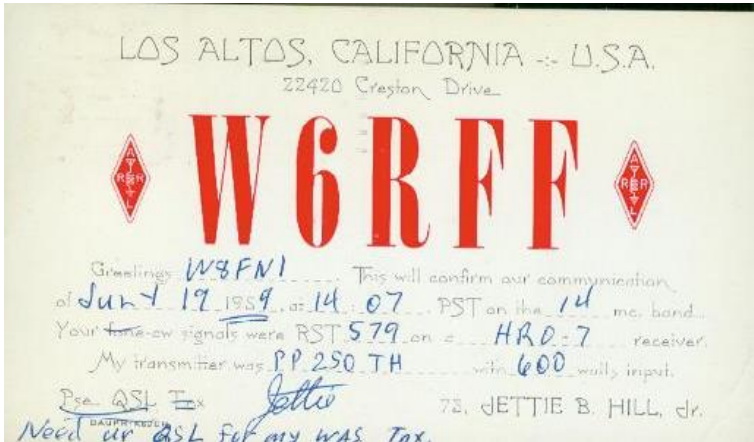
After World War I, Cunningham continued production of the Audiotron. In 1919 a new company called the Radio Corporation of America was founded. They were a holding company and had acquired the de Forest and Fleming patents. The next lawsuit was also settled out of court. The agreement between RCA and Cunningham became a legend on its own. If you can't whip 'em, you join 'em.

RCA allowed Cunningham to make 5000 more Audiotrons and then stop production. RCA also agreed to supply tubes to Cunningham at a discount for sale on the West Coast. Cunningham had become an RCA distributor and sold vast numbers of tubes. All of the tubes made for Cunningham were not marked RCA. GE was the actual manufacturer and an RCA UV200 that was to be sold to Cunningham would be marked C300. Same tube in a different box. People swore that the Cunninghams were better than the RCA and everyone raked in the cash. This arrangement lasted into the 1930s. RCA had a monopoly that they disguised by creating competition within their own organization. Who was the real pirate?

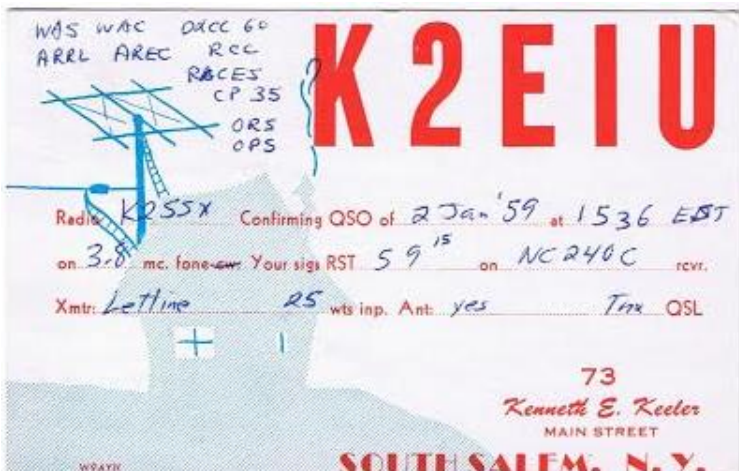
Norm N6JV



## QSL Card Trivia—Answers!



W8FNI, is now K9YC  
Sent in by Bob W1RH



K2EIU is now N6RO  
Sent in by Hank W6SX

Do you have an old card from a current or former NCCC member? If so, please scan it and send it to [w6tcpian@gmail.com](mailto:w6tcpian@gmail.com)

(Friedrichshafen, 25th June 2016) The organizers of the WRTC 2018 have the pleasure to announce that YAESU Musen will support WRTC 2018 as Prime Sponsor. During the Ham Radio 2016 YAESU Director Masao Mori and WRTC 2018 President Christian Janssen, DL1MGB, signed a “Memorandum of Understanding”. YAESU Musen, well renowned as a leading manufacturer of amateur radio equipment, is celebrating its 60th anniversary this year. The name YAESU stands for innovation and tradition. YAESU has been supporting a great variety of projects in the field of DXing and contesting for many decades. Already at the WRTC 2002 in Finland YAESU stood in the front row in developing the idea of the World Radio Team Championship.



YAESU has announced immediate financial support and to provide technical equipment. They will donate all rotators for the WRTC antennas. Their most reliable technical standard will guarantee fairness in this radio-sport competition, the core idea of the WRTC for more than 25 years.





Masao Mori stated, "YAESU is happy to get into such close contact with the WRTC 2018 on the occasion of the 60th anniversary. We are looking forward to providing our long standing experience in the cooperation with the great events of amateur radio."

Christian Janssen replied, „I am delighted to be able to welcome YAESU Musen, one of the leading manufacturers of communication equipment as Prime Sponsor. The support by YAESU means a great step forward towards our sponsoring target."

The agreement was also signed by Martti Laine (OH2BH) and Volkmar Junge (DF2SS). In his office as WRTC 2018 Ambassador, Martti Laine has established the link to YAESU and being one of the organizers of the WRTC 2002 in Finland he has contributed unpayable support in the negotiations. Volkmar Junge, President and CEO of the WiMo company, will assist in the execution of the agreement as the European partner.



Furthermore, the signing was witnessed by Saya Nakamura, Liason Officer of YAESU, as well as by Michael Hoeding (DL6MHW) and Rudolf Schwenger (DJ3WE) of the WRTC 2018 Fundraising Committee.

The WRTC 2018 expresses its gratitude towards YAESU Musen for its most generous support as a token of world wide cooperation in amateur radio and Martti and Volkmar for their consulting and support.

#### About WRTC 2018

The World Radiosport Team Championships (WRTC) are held every four years and assemble more than 60 two-operator-teams of the world's best radio contesters on a level playing field. Quite different from their usual contesting they must use identical equipment in the same geographical region eliminating all variables except their personal skills. Previous WRTCs were held in Seattle/USA (1990), San Francisco/USA (1996), Slovenia (2000), Finland (2002) Brazil (2006) Russia (2010) and New England/USA (2014).

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# Contest Calendar— July page 1

RAC Canada Day Contest	0000Z-2359Z, Jul 1
QRP Fox Hunt	0100Z-0230Z, Jul 1
NCCC RTTY Sprint	0145Z-0215Z, Jul 1
NCCC Sprint	0230Z-0300Z, Jul 1
FISTS Summer Slow Speed Sprint	0000Z-0400Z, Jul 2
DL-DX RTTY Contest	1100Z, Jul 2 to 1059Z, Jul 3
Marconi Memorial HF Contest	1400Z, Jul 2 to 1400Z, Jul 3
Original QRP Contest	1500Z, Jul 2 to 1500Z, Jul 3
PODXS 070 Club 40m Firecracker Sprint	2000Z, Jul 2 to 2000Z, Jul 3
Venezuelan Ind. Day Contest	0000Z-2359Z, Jul 3
DARC 10-Meter Digital Contest	1100Z-1700Z, Jul 3
10-10 Int. Spirit of 76 QSO Party	0001Z, Jul 4 to 2400Z, Jul 10
RSGB 80m Club Championship, CW	1900Z-2030Z, Jul 4
ARS Spartan Sprint	0100Z-0300Z, Jul 5
Phone Fray	0230Z-0300Z, Jul 6
CWops Mini-CWT Test	1300Z-1400Z, Jul 6 and 1900Z-2000Z, Jul 6 and 0300Z-0400Z, Jul 7
NRAU 10m Activity Contest	1700Z-1800Z, Jul 7 (CW) and 1800Z-1900Z, Jul 7 (SSB) and 1900Z-2000Z, Jul 7 (FM) and 2000Z-2100Z, Jul 7 (Dig)



# Contest Calendar— July page 2

QRP Fox Hunt	0100Z-0230Z, Jul 8
NCCC RTTY Sprint	0145Z-0215Z, Jul 8
NCCC Sprint	0230Z-0300Z, Jul 8
FISTS Summer Sprint	0000Z-0400Z, Jul 9
SKCC Weekend Sprintathon	1200Z, Jul 9 to 2400Z, Jul 10
IARU HF World Championship	1200Z, Jul 9 to 1200Z, Jul 10
CQC Great Colorado Gold Rush	2000Z-2159Z, Jul 10
Phone Fray	0230Z-0300Z, Jul 13
CWops Mini-CWT Test	1300Z-1400Z, Jul 13 and 1900Z-2000Z, Jul 13 and 0300Z-0400Z, Jul 14
RSGB 80m Club Championship, SSB	1900Z-2030Z, Jul 13
QRP Fox Hunt	0100Z-0230Z, Jul 15
NCCC RTTY Sprint	0145Z-0215Z, Jul 15
NCCC Sprint	0230Z-0300Z, Jul 15
Russian Radio Team Championship	0700Z-1459Z, Jul 16
Trans-Tasman Low-Bands Challenge	0800Z-1400Z, Jul 16
DMC RTTY Contest	1200Z, Jul 16 to 1200Z, Jul 17



# Contest Calendar— July page 3

Feld Hell Sprint	1400Z-1759Z, Jul 16
CQ Worldwide VHF Contest	1800Z, Jul 16 to 2100Z, Jul 17
North American QSO Party, RTTY	1800Z, Jul 16 to 0559Z, Jul 17
RSGB Low Power Contest	0900Z-1200Z and 1300Z-1600Z, Jul 17
Run for the Bacon QRP Contest	0100Z-0300Z, Jul 18
Phone Fray	0230Z-0300Z, Jul 20
CWops Mini-CWT Test	1300Z-1400Z, Jul 20 and 1900Z-2000Z, Jul 20 and 0300Z-0400Z, Jul 21
NAQCC CW Sprint	0030Z-0230Z, Jul 21
RSGB 80m Club Championship, Data	1900Z-2030Z, Jul 21
QRP Fox Hunt	0100Z-0230Z, Jul 22
NCCC RTTY Sprint	0145Z-0215Z, Jul 22
NCCC Sprint	0230Z-0300Z, Jul 22
SKCC Sprint	0000Z-0200Z, Jul 27
Phone Fray	0230Z-0300Z, Jul 27
CWops Mini-CWT Test	1300Z-1400Z, Jul 27 and 1900Z-2000Z, Jul 27 and 0300Z-0400Z, Jul 28
QRP Fox Hunt	0100Z-0230Z, Jul 29
NCCC RTTY Sprint	0145Z-0215Z, Jul 29
NCCC Sprint	0230Z-0300Z, Jul 29
Feld Hell Sprint	0000Z-2359Z, Jul 30
RSGB IOTA Contest	1200Z, Jul 30 to 1200Z, Jul 31

# HAM RADIO OUTLET

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**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**

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