



**Publication of the
Northern California
Contest Club**



Issue 486

November 2012

Inside this issue:

VP/CC Report	3
Math & Contesting	8
RX Loop	10
JUG Deadline	17

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

Next Meeting

CLUBLOG—For Contesters, Expeditioners, and DXers

Date:

Monday 5th November

Time:

6:00pm schmooze, 6:30pm dinner
7:00pm program

Location:

Tied House Brewery

Address:

Tied House Brewery 954 Villa Street, Mountain View, CA
94041

Directions: <http://www.tiedhouse.com/>

Dinner selections for this month's meeting are:

1. Half Pound Burger - Burger grilled and topped with cheddar cheese. Served with fries.
2. Voodoo Chicken Sandwich - Charbroiled spicy sweet marinated chicken breast topped with pepper jack cheese, red peppers, and radicchio on a soft French roll.
3. Traditional Fish & Chips - Seasonal white fish, dipped in Amber beer

From the President...

First, my apologies that this month's JUG is way late! Unfortunately the TODO list got too long – mostly due to a really bad head cold and the knock on effect from it.

I hope you will take a moment and read VP/CC Dean N6DE's article below – it's a summary of the internal club competition that we have put in place for this contest year. We wanted to encourage everyone to participate in NCCC focus and supporting contests, no matter whether an all out effort or just getting on the air for a few hours. In many contests, it's a combination of the large point hitters AND a lot of active contributors (small on up) that make the difference.

Oh, and did I mention, we think it could be a lot of fun!?

The next club meeting – our annual December Holiday Dinner is less than 4 weeks away – watch for details shortly... and then... it will be 2013 and supposedly the peak of Cycle 24. I guess the primary idea is get on the bands NOW and hope that 2012 brings a little more life to 10M.

Just a reminder that Dave W6DR is now the Pacific Division representative on the ARRL Contest Advisory Committee – this was announced at the September meeting by ARRL Division Director Bob W6RGG. Congratulations to Dave!



Northern California Contest Club

Excellence In Amateur Radio Contesting

Officers:

President	Stu Phillips	K6TU	stu@ridgelif.com
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Director	John Miller	K6MM	k6mm@arrl.net
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Volunteers:

New Member Mentor	Al Rendon	WT6K	wt6k@arrl.net
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Awards Chairs	Joanna Dilley	K6YL	joanna.k6yl@gmail.com
	Rebar Rebarchik	N6DB	rebar@hamilton.com
CQP Chair	Alan Eshleman	K6SRZ	doctore@well.com
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	Stu Phillips	K6TU	stu@ridgelif.com

Thursday Night Contesting:

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

NCCC Net

Thursday 8 PM
 Freq: 3.610 +/-

NCCC

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

Details [here](#)

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).

Please think about writing some articles for the JUG. With CQP just behind us, there must be SOME interesting county expedition stories or perhaps we can get some of our DXpeditioners to write about their adventures?

Wishing you and your families a wonderful Thanksgiving!

Stu K6TU

VP/CC Report

For those of you who weren't able to attend the October 2012 meeting, we announced the 2012-2013 NCCC Intra Club Competition.

NCCC 2012-2013 Intra Club Competition

What is it?

- 3 teams of NCCC dues-paid members.
- Includes 12 NCCC focus and supporting contests.
- Team score per contest is just like a real contest: points * multipliers.
- Points are normalized per contest so no one contest totally dominates.
- Multipliers are the number of members in your team who participated in that contest.
- There is a clear winning team per contest.
- The overall winning team after the 12 contests gets prizes (TBD) + major bragging rights for winning the first NCCC internal club competition!

Why?

- We mentioned in May 2012 that we would be creating an internal club competition.
- It is designed around our overall club goals for 2012-2013.
- Increase member participation - the scoring of this internal club competition emphasizes and rewards participation.
- Increase club enthusiasm - it is something new and fun for us to try.
- Give back - help your team members solve problems with their station, help them participate when they do not have a station, and foster increased contesting skills. Interact with members you ordinarily would not have met without the teams.
- Encourages participation outside our 175-mile circle. Members outside our club circle are still members, and we want to let them know that we haven't forgotten about them. This engages our members who have moved outside of our club circle and allows them to participate in a fun club event.
- Gives dues paying members an added benefit for being a paid member and gives them something fun to chase. You can recruit new NCCC members for your team. You can even recruit existing NCCC members to pay their dues and add them to your team. Lots of fun opportunities here.

NCCC 2012-2013 Intra Club Competition

The contests included in the competition are all of the contests we outlined as our focus and supporting contests from the 2012-2013 contest plan presented at the May 2012 meeting.

NCCC Focus Contests:

WPX SSB (March 2013) - normalize winning team scoring total to 750,000 points

WPX CW (May 2013) - 750,000 points

NAQP CW (Jan. 2013) - 500,000 points

NAQP SSB (Jan. 2013) - 500,000 points

NAQP RTTY (Feb. 2013) - 500,000 points

RTTY Roundup (Jan. 2013) - 500,000 points

NCCC Support Contests:

SS CW (Nov. 2012) - 350,000 points

SS SSB (Nov. 2012) - 350,000 points

CQP (Oct. 2012) - 350,000 points

CW Sprint (Feb. 2013) - 200,000 points

SSB Sprint (Feb. 2013) - 200,000 points

RTTY Sprint (March 2013) - 200,000 points

Example:

CQP

Team KB: 3M points with 20 team members active

Team Rate: 2M points with 30 team members active

Team Run: 1M points with all 59 team members active

Team KB wins the points total. They get 350,000 points.

The team totals are:

Team KB: $350,000 * 20$ participants = 7M points

Team Rate: $(350k * 66%) * 30$ participants = 7M points

Team Run: $(350k * 33%) * 59$ participants = 6.9M points

This example was constructed to show the variety of ways that teams can have virtually the same total (big scores with some participation, or small, part time scores with lots of participation).

Add all contest totals together to determine the final winning team.

FAQ

1. Why isn't contest <xyz> worth more points?

NCCC focus contests are intentionally worth more points than NCCC supporting contests. WPX is worth more than NAQP and the RTTY Roundup because it is a longer contest. This is the same reason that SS and CQP are worth more than Sprint. However, you can see that the shorter contests are still worth a very significant amount of points.

2. How is a participant defined?

Anyone who either hosts a guest operator at his/her station for the contest, or anyone who participates in the contest and makes at least 1 QSO, either as a Single-op or part of a Multi-op.

3. How are points split up among operators at a Multi-op?

Proportionally. For a 5-operator Multi-op, each operator gets to claim 20% of the total Multi-op score for his/her NCCC team.

4. Do host stations get to claim any points even if the host does not operate in the contest?

Yes. The host station gets to claim the entire point total made from his/her station and give that total to his/her NCCC team. This is to reward station hosts in the NCCC who open their stations for guest operators. If a station host is jointly owned, points are split up among the station hosts. Example: W6NL and K6BL host N5KO, and N5KO scores 1M points. W6NL gives 500k points to his NCCC team, K6BL gives 500k points to her NCCC team, and N5KO gives 1M points to his NCCC team.

5. If I live or operate outside of the NCCC 175-mile circle, do my points count?

Yes. Any NCCC paid member who participates in these contests from anywhere in the world gets to contribute points to his/her team. This is to encourage our NCCC members who have moved outside of NCCC territory to participate with us in a fun event and still be an important part of the NCCC outside of the 175-mile circle.

6. How does NCCC know if a team member participated?

In order to be counted, the member needs to send a claimed score

summary to the NCCC reflector or to me. Or someone else from the team can relay another person's claimed score. We do not force team members to submit a log to the contest sponsor in order to be counted for the NCCC Intra Club Competition total. Claimed score is what gets counted. It would take too long to wait for log checked scores in order to announce a winning NCCC team.

7. Can we change the NCCC Intra Club Competition rules to <xyz>?

Let's give the first shot at an NCCC internal club competition a try. Your current NCCC Board has approved this first attempt at the NCCC Intra Club Competition. We have to start somewhere. As a club, we should evaluate at the end what worked and what didn't work, and change the rules and scoring to make it better next year. But let's start somewhere and have some fun with it!

Here are the team assignments of NCCC currently paid dues members.

We assigned the teams with the following thoughts in mind:

- Attempt to even out the number of big guns, medium guns, little pistols, and relatively inactive members across the teams.
- Spread out NCCC BoD members across teams as evenly as possible to give no impression of Board favoritism.
- Keep husband and wife NCCC members on the same teams.
- Attempt to keep you and your operating friends on the same team wherever possible.

The teams are fluid. They will continue to grow as more people join NCCC and more existing members pay dues.

Please, let's try not to nitpick the teams. Remember that where a team may appear strong in one contest, it might be weak in another contest. Also remember that your team has a lot of control over improving its standing by getting more of your team members active in a contest, recruiting new members to NCCC and adding them to your team, and either convincing existing members to pay dues or sponsoring their dues so you can add them to your team! If you have a problem with your team assignment, or have some constructive advice about an oversight in the team assignments, please send an email to me or the Board. We can adjust.

Each team has 59 members right now. Let's have some fun with this!

KB and may the race begin!!

(callsigns in alphanumeric order)

Team NCCC Run

AB4RL AD6GI AF6RT AJ6V AK6DV DJ0QN K0BEE K2RD K6BL K6CSL
K6DGW K6ESL K6EU K6GFJ K6JK K6LRN K6MP K6NV K6TKD K6UM
K7GK K7MKL KA6BIM KE6PPE KI6EZ KI6WDX KJ6RA KM6I N2NS N3RC
N5KO N6DE N6DZR N6EE N6IE N6MEF N6XI N6ZB ND2T NI6T
NM6E NQ6N NW6P W0YK W1RH W1SRD W2SC W6DPD W6EB W6FA
W6FDU W6NF W6NL W6OAT W6ONV W6RGG W6SX WJ6O WX5S

Team NCCC Rate

AA6K AB6SO AD6E AE6Y AG6FU K6AET K6ANP K6AW K6IP K6JS
K6KO K6LE K6MM K6OWL K6SRZ K6ST K6TA K6TD K6TIG K6TT
K6TU K6UFO K6WV K6XN K6XX KD6WKY KE6ZSN KFOG KG6YPH
KH6GJV KU6F N6BV N6CCL N6DB N6DW N6GEO N6ORB N6PF N6PSE
N6RK N6XG N6ZFO N7TW NS6T W4UAT W6CT W6JEX W6NEV W6NN
W6OPO W6OSP W6PK W6SFK W7DR W8NF WA6O WB6JJ WC6H

Team NCCC KB

AA6XV AF6OP K1GI K2YY K3FIV K5RC K6CTA K6GHA K6GT K6KR
K6MD K6MLF K6MMU K6OK K6OQ K6RB K6RIM K6RM K6WX K6YL
K7AFO K7VC K9YC KE6TIM KU6J KZ2V N3ZZ N6AJS N6DQ N6ENO
N6JV N6ML N6NZ N6NU N6NUL N6SF N6TV N6VV N6WM N7KD
N7MH N9YS NC6RJ ND6S W6CZ W6DR W6EO W6FB W6GJB W6OTC
W6RFF W6RKC W6SR W6SZN W6XB W6XU WT6K WU6W WW6D

Any other questions? Send me an email and I'll answer them.

KB and may the fun begin!

Dean Wood, N6DE

Mathematics And Contesting

Musings During CQP Around 0200 PDT Sunday

By Fred K6DGW

There is a certain “slowness” in CQP around 0200 Sunday morning even if you're the only station on the air from your county, and this can lead to some idle thinking as N1MM sends your CW CQ every 3 seconds. I generally volunteer for one of the late CW shifts, it gives me time to play with someone else's radio, in this case Don's [W6OA] IC-7600. And a nice radio it is. However, I finally did get to the point that I couldn't play around with much more and still be on my CQ frequency and actually transmitting, and at that point I found I was staring at the N1MM rate window. I'm not sure how long I had been doing that when I realized it.

For those unfamiliar with the N1MM Rate Window, there are several “departments” in the window including your call in case remembering it is a problem [common at 0200], and beam headings, DXCC entities, and sunrise/sunset times. In the “rate department” it tells you extrapolated hourly rates based on the last 10 QSO's, the last 100, the last hour, and the hourly rate since the beginning of the current clock hour.

I've been reading a book by John Derbyshire titled “Prime Obsession” in which he explores the Prime Number Theorem and the Riemann Hypothesis, the last of David Hilbert's list of major math problems to be solved. [I readily admit to advanced nerd-hood. I was licensed at 13 and ham radio didn't seem to interest many girls in HS. I graduated in mathematics, and have been paid to do mathematics exactly one time in my life]. While staring at the N1MM Last 10 rate which was asymptotically approaching zero, I realized that the delta time between my last QSO and 'now' was approaching ten minutes, and I began to wonder if maybe, 1) I should wake up and change bands [there are only two choices at 0200 local]; or 2) Possibly start tuning around. This led to what I'm going to present as the “Jensen Hypothesis for CQ Termination.”

I first noted that the Last Ten Rate [LTR] is simply $(10/\Delta t)*60$, where Δt denotes the time, in minutes, required to work those last 10 stations. So, if it took me 15 minutes to work those last ten, my LTR = 40 Q/hr, and at that average rate, I'll work a total of 40 when the hour is out. With N1MM still calling CQ with no answer, I further noted that if my LTR is 40 [it actually wasn't even close, but 40 is a more comforting example], it means that I'm making one QSO every 1.5 minutes – as I said, more comforting than reality -- or stated slightly differently -- since the *average* length of time between QSO's while calling CQ is 1.5 minutes, the probability of someone calling me after exactly 1.5 minutes of seemingly endless CQ's is 0.5 ... or so. Some of those 10 QSO's in 15 minutes occurred right after one another of course, probably because someone I worked [or K6III] spotted me. Some then took more than 1.5 minutes to get in the log, that's what an arithmetic mean of 1.5 minutes means. It would obviously be better to use the median rather than the mean to compute the point of 0.5 probability but unfortunately, N1MM does not do that.

What I'm really interested in however is not the probability of getting an answering QSO on the next CQ but an answer to the burning question [such as there **can** be burning questions at 0200], “Should I stop this endless repetition of 'CQP N6A', or not.” It seemed pretty clear that the above analysis had transformed the question to, “How much longer should I wait?” which means I need to decide what probability of getting a response I'm willing to give up by stopping now. If I CQ for 1.5 minutes and quit, I'm giving up a 50% probability of getting a response. If I CQ for 3 minutes and quit, I'm giving up a smaller, unfortunately unknown, probability of getting an answer, unless of course I just get lucky which is another branch of mathematics altogether. I settled on three times the mean interval between QSO's as predicted by the LTR. Longer than that and I'm going to do something else, even if it's just get up and go pee.

Now, at 0900Z [0200 PDT], every rational person in North America is likely asleep, and those “last ten” that I worked could actually be the absolute last ten on the band. This excludes California stations of course, because they're all calling CQ, having not yet heard about the Jensen Hypothesis of CQ Termination, and they're engaging in musings [mathematical or otherwise] as they get no answers either. Whether or not I work them depends primarily on whether or not I or one of my CW crewmates have already worked them on this band. Remember, on 40 and 80 at 0200 local, I can work just about every California station if I can find them ... which led me to a second musing.

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1. Bernhard Riemann offered an aside in an 1859 paper on the Prime Number Theorem [PNT] musing that, “All the non-trivial zeroes of the zeta function have real part one-half.” So far as news has come to Auburn, it still awaits proof.
 2. As I write this, I'm thinking that April might be a better issue for this than November. ☹
 3. “or so” A technical term used by mathematicians when they've run out of exact answers.

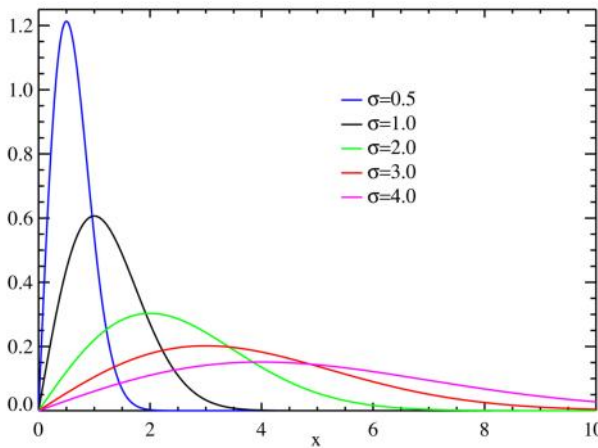
When in S&P at anytime, it is common to hear a needed multiplier calling someone. I usually say to myself, "Self, your rate was low-and-falling while running, here you are hearing a guy you need, but he's going to move. What to do? And, this is where I formulated a second hypothesis I have yet to name which I initially hoped might lead to a Nobel or Field Prize. Unfortunately, none of the people who nominate for the Nobel and Field prizes know me, and I've concluded my probability of a prize is just below the probability I'm pregnant with twins. However, thus encouraged ...

The S&P station I want is zero beat with the CA station he called. They will finish and he will move. The problem is, "Where should I park in the immediate vicinity of the CA station so the mult will find me as I call CQ to snag him?" It's sort of like fishing. We will assume there is no QRM to contend with ... after all, it is 0200 local -- if the band were full of signals and QRM, I'd still have N1MM sending CQ's.

First question is, "Which direction is he tuning?" It is intuitively obvious there are two choices, up and down, and I'm going to accept that as an axiom without proof. If he is tuning down, I need to park below his current QSO. If he is tuning up, I need to park above. I am left-handed and I tune down the band in S&P. I've talked to a few other left-handers and they do too. Many left-handers have learned to paddle right-handed so they can write with their left and operate other hams' stations, the vast majority of which will be set up for a right-handed operator. So, is the mult right or left-handed?

The general population average for left-handedness is between 10 and 12%, slightly higher for males and most hams are male. On statistical grounds, if southpaws tune down, northpaws probably tune up, and the odds that he is right-handed are about 9 out of 10, so I should have have my best results by parking above the current QSO. Now, studies have shown that technically inclined males tend to have a higher likelihood of left-handedness ... hams are sort of technically inclined ... and informal studies sort of bear this out. Thus the odds he eats right-handed may not be 9 out of ten, but probably aren't worse than 4 out of 5. Consequently, we will park above.

The next question is, "How far above?" Obviously, if there's someone there, don't park there, it will just annoy him and he might cover your CQ. Too close and your CQ might get missed in the other callers to the just-worked station. After extensive research, I have discovered what I believe to be the ideal function for answering this question. It is [Eq 1]:



where $f(x)$ describes the probability of actually catching the mult, and x denotes the distance [KHz] you move up [or down if he's left-handed] from his previous QRG. This function is depicted graphically at the left for various values of σ , which is called the cosmological parameter.

Now, the first thing we note is that for $\sigma = 0.5$, the probability of snagging the mult one Khz up is 1.2 which sounds really super ... "20% better than certain" ... but it should be noted that this function goes into imaginary space for certain values of x and σ .

The second thing we note is that, calling CQ really close to his last QSO frequency [e.g. less than 1 Khz away] rapidly becomes non-productive the closer we get. There is an optimum cosmological parameter and QSY distance that will produce the highest probability of a snagging him, provided you guessed correctly the hand in which he holds his toothbrush.

This is a fairly touchy business and will depend on the bandwidth your and the running station's radios are set to. A QSY of 1 Khz yields the desirable "better than certain" probability of a QSO, but if you are using an S-38C receiver

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4. Asking a few folks
 5. Approximately 10-15 minutes
 8. Colloquially called "In Your Dreams Space"

and a Globe King 500, it is highly unlikely you can accurately move only one Khz, you wouldn't know it if you did, and even if you could, you'll still hear the running station quite well. Moving 2 Khz up reduces your probability of snagging the S&P to 0.6 and coupled with a probability of 0.8 that he is right-handed and actually tuning upwards in frequency, you have a .0.48 probability of snagging him.

Having completed this rather astounding analysis, I spent the remainder of my 0200 shift trying it out. My LTR continued its descent to zero more or less asymptotically, but the first derivative of the descent rate became smaller, and when Larry stumbled in to relieve me, I could proudly hand him an $LTR > 0$.

APPENDIX A – Derivation of Equation 1

Eq 1 represents the vector magnitude of two orthogonal independent Gaussian distributions. One of those distributions is the probability that there will be an acceptable number of stations obsessed enough to be on the air at 0200 local. The other is the normalized probability that the one station you haven't worked yet on this band will be left-handed.

I hope this helps everyone improve their rates at 0200 local. Failing that, I hope it gives you something to do to keep you awake [or put you to sleep as the case may be] as your LTR falls to zero. I'm more than happy to help out. This all seemed like a good idea at the time, it's my story, and I'm sticking to it.

RX Loop

by Byron N6NUL

Introduction and Motivation

I live in what I like to call medium density housing (I'm sure it has an actual name, I just don't know what it is). My HOA contains 16 units in 9 buildings on 1 acre of land, and my home is on a 12.2m (40ft) by 9.1m (30ft) lot. We are all packed in together, and sandwiched between 2 similar HOAs.

In such a tiny lot, all of my antennas are compromises, particularly on 40 and 80 meters. Also, the proximity of the neighbors means the noise from their electronic devices can be loud. A small receiving loop antenna that has sharp nulls aimed at the neighbors while improving reception on the lower bands can help with both of these problems.

When constructed out of spare pieces of coaxial cable with a small break in the shield at the top, these antennas are inexpensive and effective, but I find them unattractive. I suspect my neighbors would too (we can all see into each others yards), so I decided to build a small loop antenna in a way I found more attractive than a loop of coax.

Design

The electrical design for these antennas can be found in several places, but I found NCCC member Rick N6RK's presentation on "Low Band Receiving Loops" to the 2008 Pacificon convention the best. I particularly like his derivation of the theory behind the "shield" and summary of the necessary equations.

Mechanically, I wanted to use copper as the "shield". I think it is attractive, and as it develops a patina it looks even better. This requires soldering, and I could not figure out how to guide a bare wire through the copper, not touch the sides, and not melt the guides during construction. So, I settled on using solid #12 THHN from a spool I bought for antenna experimentation, and fed the wire in after soldering the pipe.

The pipe is connected to a metal outdoor junction box to house tuning and matching electronics, and everything is hung on my fence.

I am fortunate that my fence is “aimed” at about 70 degrees, and the neighbor with the most noise makers is on the other side, where the nulls should naturally be. The fence is about 1.9m (6.23 ft) high, and I didn’t want my functional art to extend over the top. This constrains the size of the loop.

Rick’s presentation explains the theory behind these loops clearly, but there is one magic number: 0.085.

This is the maximum perimeter for a small receiving loop according to the ARRL Antenna Book, and Rick points out that no reference for it is given. Accepting this, the maximum size of a loop that would reasonably fit on my fence was going to be for 40m.

$$\text{Maximum Circumference } (300 / 7.300) * 0.085 = 3.493\text{m (11.46 ft)}$$

$$\text{Side of the Octagon } 3.493\text{m} / 8 = 43.66\text{cm (17.19 in)}$$

I rounded up to 45cm (17.72 in) to make measuring easier. I am also positive that I introduced a lot of error in cutting, and soldering, so clearly I am treating 0.085 as a guideline and not a hard requirement. The diameter of this octagon is about 1.18m (3.86 ft), which fit comfortably on my fence.

Construction Part 1 - Painting, Cutting, Soldering, and Drilling

I had no experience soldering copper pipe when I started this project (part of the attraction for me), but owned a propane torch, Workmate and pliers. I did buy a new pipe cutter and wire brush for this project.

First, I cut all of the pipe. I used 3 x 5 foot lengths of 3/4” copper pipe from Home Depot. You will also need 8 x 45 degree fittings, 2 x 90 degree fittings, and 2 solid caps for this loop.

Quantity	Length	Purpose
6	45cm (17.72 in)	Sides of the octagon
2	15cm (5.9 in)	Top side of octagon
2	17.5cm (6.89in)	Bottom of octagon
2	4cm (1.5 in)	Junction box inserts

As it turns out, the bottom 17.5cm (6.89in) pieces are 1cm too long. They should have been 16.5cm (6.5 in) to make the bottom side the same length as the other sides. As you can see from the picture, it still looks good. I can only tell it is wrong by measuring.

After cutting the pipe, de-burr each end as much as possible. The THHN will be pulled through the completed sides, and sharp edges can cut the insulation.

Next, I took out the 2, 3/4” punchouts from the junction box and used a Dremel tool to widen them a bit so the copper pipe would fit. Holes were drilled for a BNC jack and ground lug before painting the outside. I used a brown (excuse me, “espresso”) Rustoleum to blend in with the fencing. Then it was time to solder the pipe to form 2 sides of the octagon.

I used silver bearing solder, not electrical solder, because I couldn't find any that was very thick. I reasoned that the outer loop needed to be grounded, not carry signal, and that the silver solder would probably be sufficient.

To hold the pipe, I used a Black & Decker Workmate, and I only touched hot pipe with pliers. To clean the ends, I used a wire brush for $\frac{3}{4}$ " pipe and flux. I learned quickly that if you think you have used enough flux, use that much again and you will be about right. I also learned that the Benz-o-Matic heat-proof pad is a bad choice for handling the pipe because little black threads get all over everything. Stick with pliers.

Once cleaned properly, heat the joint until solder touching the junction melts easily. You will see the solder get sucked right up into the joint.

To make sure the sides would fit flat on the fence, I lay them on a flat portion of concrete after every joint and adjusted them by re-heating and pressing down to rotate the joint as necessary. Not over-heating the pipe nor using too much solder appear to be the marks of real craftsmen in this job. I did not reach that level of skill, but I did avoid burning myself and (as predicted) my joints at the end of the process were much better than at the beginning.

Construction Part 2 - Assembly

The end caps at the top of the loop are used to form the gap in the shield. I drilled them to hold $\frac{1}{8}$ " x $\frac{3}{64}$ " nylon flange bearings I found while browsing at Orchard one day. The hole in the bearing is the right size for THHN and let me eliminate one possibility of cutting the insulation. The low friction in the bearing also made feeding the wire into the loop easier.

I marked the center of about 5.8m (19 ft) of solid #12 THHN and the width of the gap in the shield so I would know how far to feed the wire through each side of the octagon. With the first side clamped in my Workmate, feeding the wire was easy, until it hit the 90 degree bend at the bottom! I used forceps to pull the wire up through the bend, which is why the inserts for the junction box are so short: my forceps had to reach. Once I could grab the wire, feeding from the top with one hand and pulling from the bottom with the other was easy.

During my first attempt, I scraped some of the outer clear coat of the THHN (as you can see in the picture), but not the insulation. Putting a piece of electrical tape inside the 90 degree bend eliminated this on a second try.

The second side is a little harder, but not terribly so. My concern was to not put a sharp bend in the THHN, and I avoided that by working slowly and patiently. When that was done, I had all of the parts of the antenna, and could mount it on my fence.

After a few trials, I found that mounting the metal junction box to the fence first worked best. Then, a couple of temporary nails to hold the top of the copper octagon in place were necessary. Because I was unable to find a way to attach the pipe to the junction box, I mounted the octagon with a bit of tension from top to bottom so they would not come out of the junction box easily. To ensure a good electrical connection between the box and the copper, I drilled and tapped the pipe for a ground screw, and used short pieces of #12 THHN to connect the pipe to the junction box. The box itself was grounded by connecting it to a length of #4 copper that runs to a nearby ground rod. I had pre-positioned it for this purpose when I installed my ground system.

Lastly, to prevent water from getting into the pipe, I wrapped the wire where it enters the nylon bearing with some coax seal and painted it with some liquid electrical tape. If this still leaks, I will drill a few very small drainage holes in the bottom section of pipe, perhaps near the last of the 45 degree elbows.

Construction Part 3 - Tuning and Matching

After the loops were hung, I attached my antenna analyzer and discovered that Rick N6RK's presentation was right on (AIM4170 graphs are available at the link below). A few hundred pF of capacitance, and my loop resonated low in the 80m band. When my order of T61 cores arrived, a 50:5 transformer matched it to the 75 ohm coax I used to get the signal back into my shack.

I did not use Rick's design for tuning the loop. My goal is to build a slightly different system, so at present I am still using a single tuning capacitor.

Questions

When I agreed to write a few articles for the JUG, I mentioned to the editors that one thing that might be preventing more people from submitting articles is that the NCCC audience is intimidating! Many of the books we all use were written or edited by NCCC members. I have already mentioned that Rick N6RK is an NCCC member.

I hope to use that to my advantage by asking questions, and for feedback. First, the questions.

First, about the gap at the top of the shield: is mine too large? I chose 15cm (5.9 in) because I thought $\frac{1}{3}$ of a side of the octagon would look nice. I found no specific guidance anywhere, but I used a larger gap than any I found.

Second, Rick N6RK uses an panel connector for his BNC jack that is isolated from the ground of the box and shield. I suspect this is because of the tuning mechanism Rick describes in his presentation, so I used the regular panel jacks I had on hand. Was this a mistake?

Feedback on proper techniques for soldering copper pipe are also welcome. I may try to build a version of this loop sized for 80m at some point and just see if the neighbors complain. It would be nice to do a better job.

Conclusions

I really enjoyed this project. The antennas (I actually built 3) look good to my eyes, and accomplish the task of eliminating some of the noise I hear on my $\frac{1}{4}$ wave 80m vertical and $\frac{1}{2}$ wave 40m delta loop.

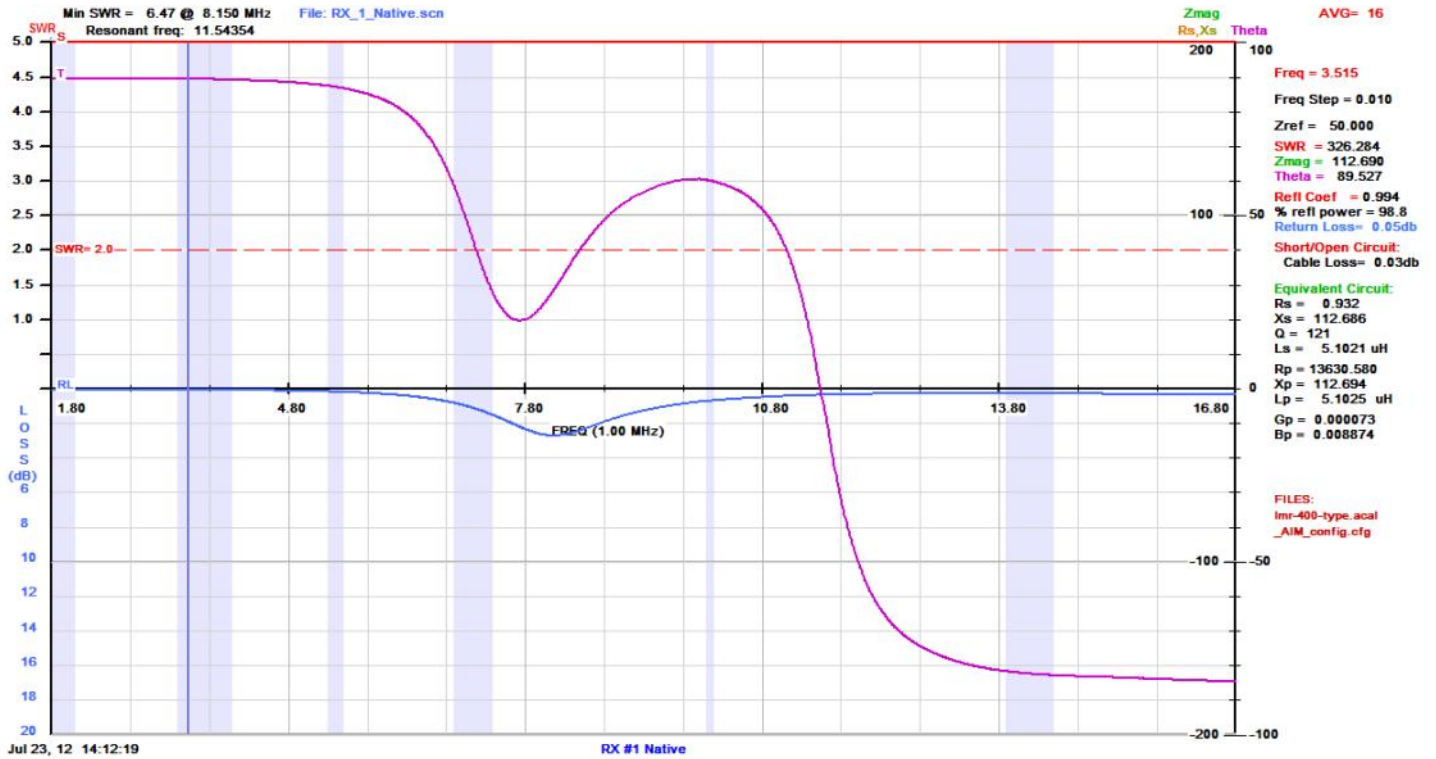
Because of the reduced size of my loops, I am losing gain on 80m according to Rick's presentation. So, I am going to try a Clifton Laboratories Norton pre-amp on one of them to see if it improves reception. I will let you know how that works out.

References

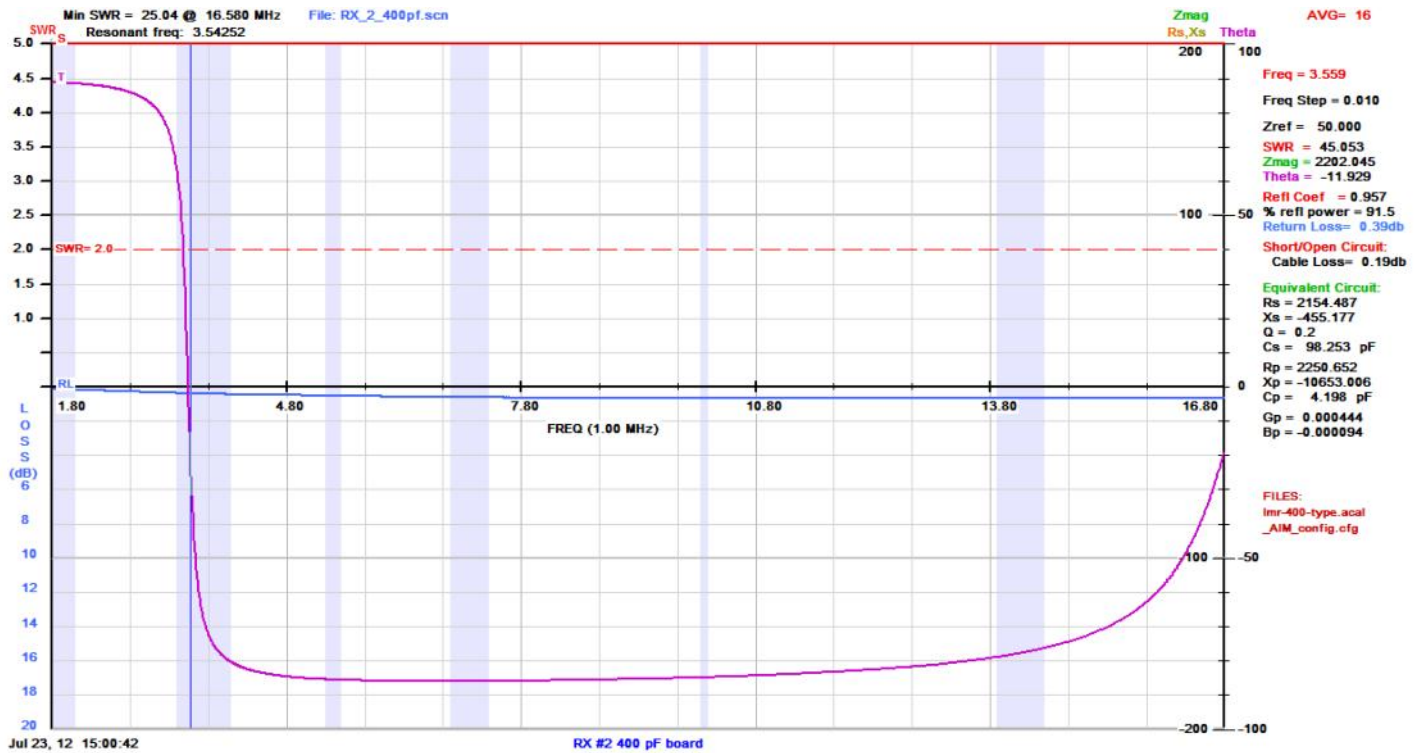
N6RK 2008 Pacificon RX Loop Presentation
<http://www.n6rk.com/loopantennas/pacificon.pdf>

Parts list and AIM4170 Antenna Charts
<https://docs.google.com/folder/d/0B02xNvKV26J2WURY0xTcWFyZzQ/edit>

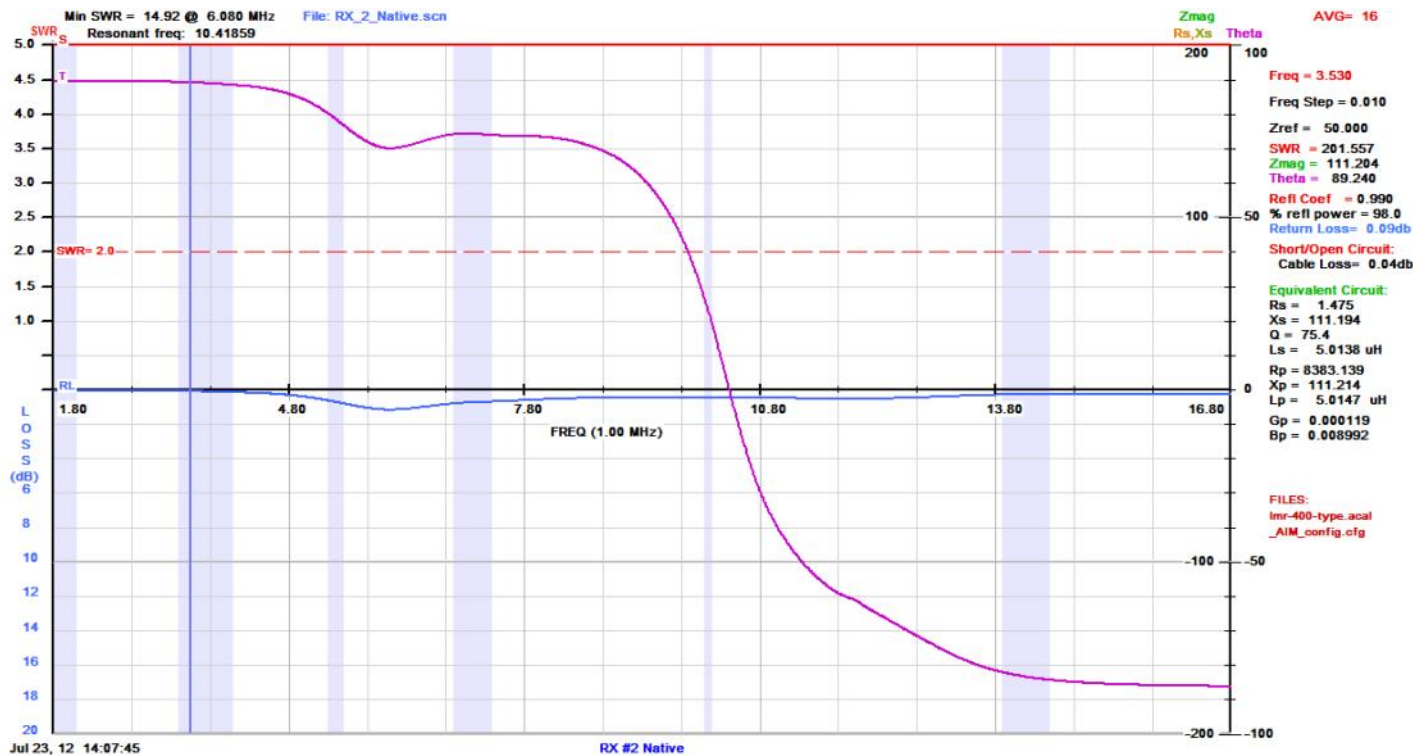
Antenna Scan files and pictures continued



Scan of a North/South oriented loop w/ AIM4170 connected directly to the antenna without matching circuitry



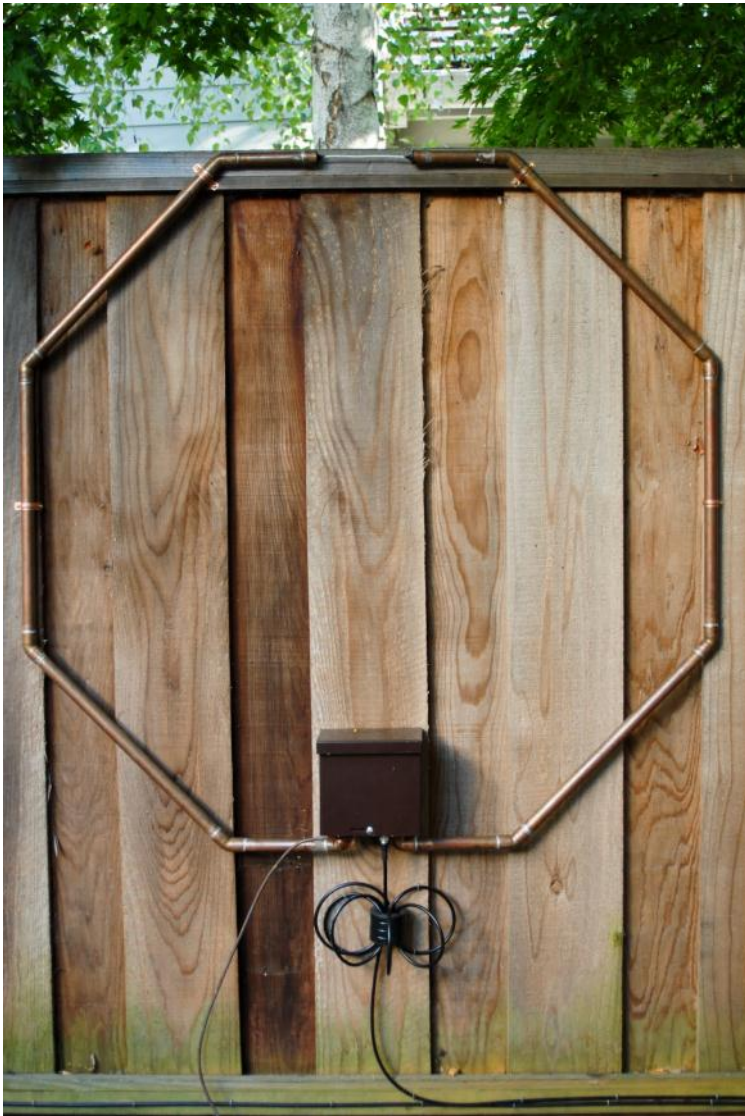
RX #2 with 400pf of capacitance to resonate in the 80m band



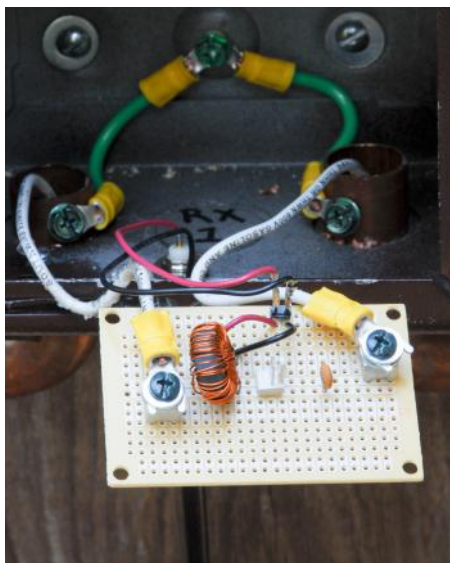
East-most East/West oriented loop



West-most East/West oriented loop



One of the 3 RX loops I made



The prototype resonating board I made for the antennas

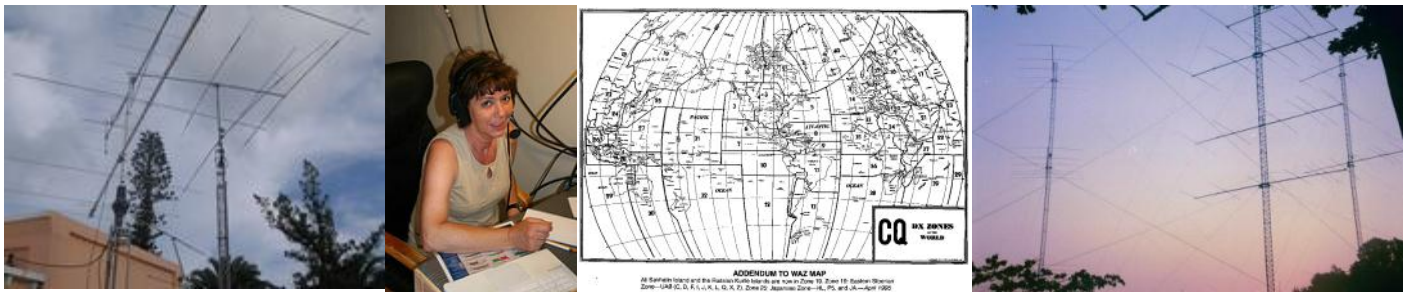


Please consider writing an article for JUG !

December 2012 Newsletter Deadline—November 28th

This is your newsletter so lets make it something we are proud of. I hope you will consider writing an article for the JUG! Whether its about your station, recent contest experience or a technical article we would appreciate hearing from you.

Send your articles to Ian W6TCP w6tcp@comcast.net and Stu K6TU stu@ridgelift.com



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