NCJ

NATIONAL CONTEST JOURNAL

$4

May/June 2004

Volume 32 Number 3

- The J7OJ Story
- *NCJ Profiles*: Jim White, K4OJ, SK
- October 2003 RTTY Sprint Results
- August 2003 NAQP CW and SSB Results
- Experiences of a Four Square Addict
- N6NB Roving in the 2004 ARRL VHF SS

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Top Photo: **The J7OJ Operator Team**: John, K3TEJ/J79Z, John, W4IX/J79JRC and George, K5KG/J75KG.

Bottom Photo: Remembering the late **Jim White**, **K4OJ**.

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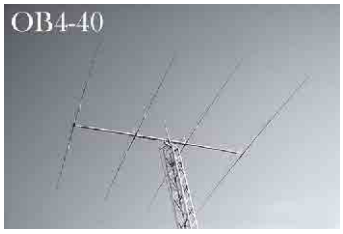

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Editorial

Carl Luetzelschwab, K9LA

K4OJ, SK

The contesting community lost one of its best recently—Jim White, K4OJ. I didn't know Jim personally, but his energy and enthusiasm for our facet of the hobby should be an inspiration to all of us. The entire *NCJ* staff offers its condolences to his mother, Ellen White, W1YL.

Our cover feature in this issue is the J7OJ story, penned by George, K5KG/J75KG. Additionally, Paul, K9PG, writes about K4OJ in his *NCJ Profiles* column. I hope you enjoy reading about Jim and his impact on contesting. If you're going to Dayton, Tim, K3LR, advises that K4OJ will be honored as part of the Contest Dinner on Saturday night.

NCJ Happenings

With some help from volunteers, we're making progress in taking care of some old business: NAQP records, Sprint awards, NAQP certificates, etc. Stay tuned for more news about these efforts.

K3NA's Antenna Interactions Series

Beginning in the July/August 2003 *NCJ*, Eric, K3NA, presented five installments of his *Antenna Interactions* series. The topics covered have been the basic tools used in the analysis (Part 1), the effects of twisting stacks (Part 2), self-interactions within a stack (Part 3), using current tapering to clean up stacks (Part 4), and antenna location with respect to pattern impairment (Part 5). If you're looking for Part 6 in this issue, you won't find it. It will be in the July/August issue due to Eric's participation in the 3B9C DXpedition.

The full version (in color) of each part is on the *NCJ* Web site under the **Bonus Content** link at the bottom of the home page. These versions also correct several errors that crept into the magazine versions. If you download these, you'll note that Part 5 is a considerably smaller file than Parts 1 through 4. Eric used the very latest Adobe software to make Part 5. He plans to go back and re-do the first four parts so they are smaller files, too.

Dupes

During the ARRL DX CW contest, I saw a packet cluster spot for ZF2A. I immediately knew that it was really Joe, W5ASP, (*NCJ*'s former *International Contests* columnist) at ZF1A. I tuned to the spotted frequency, and found Joe having a tough time with the masses thinking they were working a new one. In reality it was a dupe due to the busted spot.

This is just another reminder to listen to the station before accepting a packet cluster spot as the truth. I'm sure the majority of spots are correct—but it only takes but one incorrect one to really make a mess of things.

Errata

In Marc, W6ZZZ's, article *Canada Explained* that appeared in the March/April issue, the abbreviation for Manitoba should be MB, not MN.

In John, K3MD's, article *How to Operate Field Day—or A Remembrance of Field Days Past* that appeared in the March/April issue, we reversed the two captions under the photos.

In Al, K3LC's, article *Maximum-Gain Radial Ground Systems for Vertical Antennas* in the March/April issue, several errors crept into Tables XIII and XV. In Al's other article *A Four-Square with Eight Directions of Fire* in the same issue, a couple errors crept into Figure 6. The corrected versions of these articles are on the *NCJ* website under the Bonus Content link.

If you think this is an unacceptable amount of errors, you are correct. To make sure this doesn't happen in the future, we at *NCJ* have instituted a new review process to prevent these errors. NCJ

The J7OJ Story—A Memorial to Jim White, K4OJ

George Wagner, K5KG / J75KG
k5kg@arrl.net

This trip to operate in Dominica, J7, began pretty much like the seven others I have made. Two friends and I had planned the trip over many months and we had accounted for every detail and contingency. We had obtained individual operating licenses and had been issued a special contest call sign, J7A. We shipped equipment ahead, and even had J7A shirts made for the occasion. We were primed and equipped for anything, or so we thought. What we were not prepared for, however, was the distressing but courageous e-mail we received from Ellen White, W1YL, two days before we were to depart. Ellen wrote:

"Dear friends:

In September of 2002 K4OJ sat at this computer and wrote a poignant obituary honoring his father, W1CW, who had died that very morning.

On this afternoon of February 12, 2004, it is my reluctant turn to sit here and tell you that Jim did not survive yesterday's surgery. He left us about 11:30 a.m. this morning following liver failure after the somewhat risky heart valve replacement.

Just this past weekend he had a tremendous time operating the FOC Marathon and producing a splendid accounting of himself. This was just one more achievement during his lifetime of fun in and service to Amateur Radio and, in particular, the Florida Contest Group of which he was the first president. His operating abilities were manifest and he almost always the first one to volunteer his help, in spite of his declining physical abilities.

I know many of you will share my loss.

Ellen, W1YL/4 "ln""

We, along with many others, were devastated at the news of Jim's passing. Tributes to his many accomplishments and overall ham spirit came from far and wide and continue even as I write this.

With our trip following this terrible news by only two days, we wanted to memorialize Jim as a part of our operation. We realized that getting a special "OJ" call sign would be difficult, if not impossible, at the last minute. We tried to think of other ways of recognizing Jim during the contest. Could we send a contest exchange that would include "OJ"? Should we send "GO OJ" at the end of each QSO? With these unanswered questions in the forefront of our thoughts, we left for Dominica as planned, early on Valentine's Day morning.

The target contest for this trip was the 2004 ARRL DX CW Contest. My trip mates were John Bednar, K3TEJ, a veteran of fifteen Caribbean contest DXpeditions and John Colyard, W4IX, who had accompanied me to J7 in 2002 for the CQWW CW contest. W4IX and I, from the Florida Contest Group, and K3TEJ, from the Frankford Radio Club, are all passionate contesters and we had a shared objective to take first prize in the multi-two category.

We had shipped gear ahead via airfreight, and what we would carry and check through in our luggage was planned down to the last connector and cable. One amplifier, three transceivers, three laptops, wire, coax, band pass filters, keyers, paddles, tools, snacks and various odds and ends made up the complement. Advance e-mails alerted our Dominican host, Lambert Charles, J73LC, to have additional materials gathered for our arrival: power supplies, backup transceivers, transformers and, most of all, some tall bamboo poles. Lambert would secure our operating licenses and clear our air shipment through customs so it would be ready for pick up when we arrived.

Our trip via KP4 and our arrival at the Melville Hall Airport in Dominica were uneventful, although our approach was delayed by a flyby due to local rain showers. The approach into Melville Hall in a two-engine turboprop is always a thrill, to which anyone who has ever flown in there can attest. The field is on the eastern (Atlantic) side of the island and features a 3000 foot airstrip running across an open grassy field and ending at the road across from the beach. Dominica's terrain is very mountainous, which makes the approach into Melville Hall, let's say, interesting. Since landings must be into the wind, and the prevailing winds are off the ocean from the east, aircraft must first fly westward inland toward a large, extinct volcano, and then make a left turn onto their final approach to the east. The final 5 minutes—it seems like an hour—is down a narrow valley with palm trees whizzing by on hillsides higher than the aircraft, over a precipice, and finally onto the runway. A final sigh of relief is always in order. Incidentally, a Boeing 727 lands there weekly with air freight from Miami. Seeing a 727 land and take off at Melville Hall is something you have to see to believe!

As always, J73LC was there to greet us after a quick pass through immigration and customs. Unfortunately, W4IX's checked luggage did not make it. It was packed with radio equipment, but fortunately contained nothing essential for that night's operation. We expected the luggage to make it in on the next day's

Figure 1—George, J75KG (K5KG).

Figure 2—John, J79Z (K3TEJ), and John, J79JRC (W4IX).

flight from KP4, and it did.

Our operating location in Dominica was Sea Cliff Cottages. Sea Cliff is an attractive collection of ham-friendly rental units owned by Gwen and Jim, a Canadian couple who winter there. Sea Cliff is located on a bluff 160 feet. above the Atlantic beach. Adjacent to the cottages is a large area of open land that eventually goes down to the beach and has many large palm trees suitable for the unhindered stringing of antennas.

I keep a certain amount of antennas and equipment stored at Sea Cliff, so upon arrival the first chore was to unpack everything and get a C3 Yagi erected. The C3 mounts on a collapsible aluminum pole along with an antique HD-73 rotor. Lambert has donated his A3 Yagi to the cause, and that would be mounted later on a bamboo pole. By the time the C3 was up, it was dark and time for a visit to Domcan's restaurant in the local village of Calibishi and a drop by Gus's grocery store for grub and a supply of Kabuli, local 807s.

Figure 3—John, K3TEJ, Donford, and John, W4IX.

J7OJ License Request

At dinner we told Lambert about Jim, K4OJ, and how we wanted to memorialize him in our operation. I asked Lambert if it would be possible to get a special memorial call sign, J7OJ, to use solely in the contest. Lambert thought briefly about the request, and quickly said "done"; he would speak with the authorities about it. He asked that I write a request to the J7 licensing office explaining the reason for wanting a license with a special call sign. As I wrote that request the next day, I did not realize the emotional impact that using the J7OJ call would have on all who knew and loved Jim.

Following dinner, the next order of business was to get the luggage unpacked, get an IC-746PRO set up, and get on the air. We managed to erect a 170 foot Zepp high atop a bamboo pole in the dark. K3TEJ, who was now the proud owner of J79Z, spent a few hours that night and again at sunrise on 20, 30, 40 and 80 meters running his first J7 pileups. His first QSO was with WA3IKQ on 20 meter CW at 0229Z on Feb 15, only 8 hours after arrival. By breakfast, he had nearly 300 QSOs in the log.

The next day was spent putting up a 160 meter inverted L, an 80 meter full-wave loop, a 2 element 40 meter delta loop, a 12 meter full wave loop and the A3. Our 160 meter antenna was an inverted L with four raised radials. The vertical portion of the 160 meter radiator was connected from the same tie point as one corner of our 80 meter loop, which proved to be a constraint in our operation that I will discuss later.

My secret ingredient in J7 for erecting wire antennas quickly and efficiently is Donford, a young man and cousin of Lambert who climbs palm trees. Over the past two years, I have had Donford install stainless steel hooks and sailboat-grade pulleys in the tops of several palm trees. Now, to install wire antennas, up the trees he goes with Kevlar cords which he simply threads through the pulleys and comes back down again. With this arrangement, we are able to put up wire antennas in fairly short order. Donford works as an electrician and has a good understanding of what it takes to assemble and take down our setups, so he has proven to be a great help. He has also developed a keen interest in ham radio, and will sit for hours with headphones on listening to us run CW pileups. Of course, he doesn't understand the CW, but he definitely follows the rhythm of the QSOs as evidenced by his excitement when someone comes back to a CQ! I have begun to teach him the code. He seems to have good aptitude for it, so I am hopeful that we are planting the seeds for a future J73. One afternoon, I set him up with a keyer and a paddle, and he sat there sending jibberish for over an hour, and enjoyed every dit and dah of it.

Once the wire antennas were up, checked out and all coax cables labeled, it was time to assemble and erect the A3. The bamboo that Lambert cut out of the jungle for us was the biggest piece of bamboo we had ever seen. It was some 40 feet. tall and about 6 inches in diameter at the base. (A bit of trivia: bamboo is the world's tallest and fastest growing grass.) The A3 was attached at the 35 foot. level with the bamboo lying horizontally. With the help of the three of us plus two other men whom we commandeered to help, we managed to walk up the bamboo and secure it to the water tank structure at the back of the cottage. While walking it up, the weight of the A3 caused the bamboo to flex into a substantial bend, but it didn't break and once it got high enough, the bamboo snapped upright and into place where it stayed for the next 9 days, winds and all. A screwdriver was driven through the bamboo and used as an armstrong rotator to turn the A3.

The final chore was assembly of the additional stations—two IC-756PRO2s, an AL-572 amplifier, an Acom 1000 amplifier and related band pass filers, wattmeters and keyers. W4IX, now operating as J79JRC, was next to be QRV, with his first QSO with W4DF on 15 meter CW at 1831 Z. I was the last one to get on the air, and the first J75KG QSO of this trip was with AI4DW on 12 meters CW at 1929 Z, approximately 24 hours after arrival. This was Sunday, and we would continue to operate as J79Z, J79JRC and J75KG around the clock as much as sleep and hunger would permit until Wednesday morning.

We had arranged to take a tour of the island on Wednesday with Lambert. This turned out to be a wonderful day, and gave us an excellent idea of the many natural attractions that make Dominica the Nature Isle. A highlight was swimming into Titou Gorge, a freshwater underground river high in the mountains. The swim ends at a large waterfall deep inside a cave, at which point you can't go any farther. The water in the cave was cold but, upon emerging, we were treated to a bath in another waterfall, this one of naturally warm water coming out of the mountain. The swim at Titou Gorge was at dusk, which added to an overall blending of out-of-the-ordinary sensations—swimming in a dark cave, cold water, a rushing loud waterfall,

warm water and cold air.

J7OJ License Is Issued

On Thursday, we were back to our favorite pastime—operating. Lambert phoned us in the afternoon to tell us that we had been issued J7OJ, and that we could immediately begin to use it. We were very pleased at this wonderful news. We had chosen, however, to restrict the use of J7OJ to the contest and, furthermore, to keep it a secret until we would go public with it in the contest. There was one exception. We wanted Ellen to know in advance about the J7OJ license. I asked my wife, Kay, to phone Ellen about an hour before the contest to tell her about it. For Ellen, and ultimately many contesters, J7OJ was a complete and overwhelming surprise!

Once we knew that J7OJ had been issued, we decided to do an on-the-air trial run of our station using J7A in a multi-two mockup beginning 24 hours before the start of the actual contest. This would not only be a test of the RF components of our stations, but a test of our use of *WriteLog*, the laptop network, our ability to communicate among ourselves, and a way to understand what propagation might be like on 15 through 160 meters some 24 hours later. In a message relayed to Tom, K5RC, we told him of our intentions and asked him to post this on the CQ Contest reflector. We ran the test, beginning on 15 and 20 meters and, in the subsequent six hours, worked our way down to 160 meters and bagged an average of 266 per hour for a total of 1593 QSOs. Everything worked well.

Friday was spent running more DX pileups, but we did nothing strenuous that would take away from our stamina for the contest. Being the "station engineer", I decide that W4IX and K3TEJ would be the opening operators for the contest. That would leave me free to respond to problems. Fortunately, none came up at the beginning, so I was able to get some sleep, or at least think about sleep. (Who can sleep with contest adrenaline flowing?)

J7OJ Contest Operation

The contest started off well and continued rather smoothly for the entire 48 hours. We were very pleased to work Ellen in the first hour. During the contest, many stations signed off with a "Go OJ" instead of the characteristic "TU".

Late on Saturday evening, the 220 V ac that was powering our operation abruptly dropped to 175 volts. Lights dimmed and keying relays refused to activate, which prevented the amps from keying. Not realizing what was happening, we shut off the amps. Seeing that the voltage was low, but stable, we cautiously turned the amps back on and resumed a barefoot operation. I recall watching the high voltage on the AL-572, which had dropped to about 1500 V dc, slowly climb back to normal. At some point, the amps began to key again, and the lights returned to their usual brilliance. Within 15 minutes, everything was back to normal; this was the only power "glitch" in our entire 10 days of operation. (A standby 5 kW generator was ready and tested for us to use in the event of a power failure. It was only a crank away, but we never needed it.)

At about 6 am on contest Sunday morning, the VSWR went high on the 160 meter antenna. I stumbled out in the dark with a flashlight and found that the end of the inverted L had fallen out of the tree and about one foot of the end of the wire was totally burned off. The wire had been connected to a cord with a plastic egg insulator that had melted through, causing it to fall out of the tree. We figured that the end of the wire was at a very high potential—we were running about 1 kW at the time—and with the morning dampness, there must have been an arc over to the cord, thereby causing the plastic to melt. So much for plastic insulators.

J7OJ Results

We were quite pleased with our results since we proved to be fairly competitive with much larger Caribbean stations that were using permanent antenna installations. (We were essentially a Field Day operation.) The score we reported to the ARRL was 8,026,200 points from 7,644 QSOs and 350 multipliers. This put us in fourth place among the preliminary results reported from all non-W/VE multi-two stations. Actually, there is only a 600,000 point spread among these top four stations, so it will be very interesting to see the standings once log checking is complete and the final results are tabulated.

In addition to 7644 QSOs, we had an additional 398 dupes, or 5.2%, which we felt was high. This was, no doubt, partially due to bad packet spots. Dave, K1TTT, ran a packet spot analysis for us and reported the following:

Call spotted	*Nr. Spots*	*Call spotted*	*Nr. Spots*
J7OJ	248	J7OA	1
J7ØJ	20	J7JZ	1
J7OM	1	J7ØJ/BUST	1

It is possible that our constant attention to multipliers cost us some QSOs. However, the 350 sections in our log are second only to the 352 sections reported by PJ2T, and ahead of all other non-W/VE stations that have reported.

During 14 out of the 48 contest hours, we had rates in excess of 205/hr. Our best rates were 315/hr and 314/hr during the 1500 Z and 1900 Z hours, respectively, on Saturday. Lowest rates, averaging 64/hr, were from 0800 Z to 1100 Z on both Saturday and Sunday.

Although we had an excellent start—on time and without incident—we did not achieve the initial rates that we had hoped for. K3TEJ declared before the contest that we must get a running start. He expected that we would get at least 1000 QSOs in the first three hours. In actuality, we only managed to log 830 QSOs in the first three hours. We started on 15 and 20 meters and, by the third hour, had transitioned to 80, 160 and 40 meters. K3TEJ later wrote, "Had we done the 1000 Qs in the first 3 hours as I projected, we would have been number 2 at this point. I knew at the end of 3 hours that we were not off to a rip roaring start that I always feel is necessary to set the quick pace for the entire contest."

K3TEJ added, "Our other weak point was Saturday morning when the US was busy running and beaming Europe. Look at our rates for those hours, they […bleep…]. I just couldn't get a run going no matter what I tried. I got so desperate I was answering CQs because a low rate is better than no rate! Those few poor hours are what really hurt us. The rest of the time we were crankin' 'em out."

Being a multi-two operation, we constantly had to decide which two bands would yield the best rates. During the day, the tradeoff was among 10, 15 and 20 meters. Our set up permitted the two operators to choose any combination of these bands to work at any point in time. We were fortunate to have no inter-station interference. The evening hours were a different story, however. As mentioned earlier, our 160 meter inverted L was hung from one of the same tree supports as a corner of the 80 meter loop. Because of the close proximity of these two antennas, we could not be on 80 meters and 160 meters at the same time. We were therefore relegated to having one station on 80 or 160 meters and the other on 40 or 20 meters. From about 0600 Z to 1000 Z each night, 20 meters was "slim pickins" and 40 meter rates dropped off significantly. There were times we needed to be on 160 meters and 80 meters concurrently and we simply couldn't. (Curiously enough, I planned for one station to work only 80 meters or 160 meters and the other to work only 40 meters or 20 meters during the nighttime hours. My assumption that a combination of 40 meters and 20 meters would be productive all night long was flawed.)

Conclusion

We were saddened by the passing of a great contester—Jim White, K4OJ. His presence will be felt in our hobby for many years to come. We were honored to be able to pay a tribute to his good works and his life through an operation that offered an "OJ" to the world once again.

73, George Wagner, K5KG / J75KG

NCJ

160 Meter Antennas for One Man's Dream Station

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Introduction

I recently acquired some property on which to build my "dream station". The land is zoned "agricultural" and is rented to a local farmer. To discontinue farming would precipitate a large increase in the local taxes. Thus, while it will be possible to put up towers, I assume that it would be unwise to build any "four-square" arrays, lest the radials get plowed up! This then means that I must use (elevated) wire antennas for 160 meter operation.

As there are to be three towers 190 feet high, there are a number of possible alternatives to be considered, and this article describes the results of my quest for a suitable arrangement—one that would afford some useful gain in several desirable directions. The importance of deciding on a scheme for operating on 160 meters early in the planning process lies in the likelihood that, whatever arrangement I decide upon, will dictate the separation and orientation of the towers.

Table 1

Results of studies of the single-element designs described in the text

Model	*Gain (at 20°)*	*Front to Side*	*Impedance (at minimum VSWR)*	*Bandwidth (for source)*
Inverted V	1.3 dBi	4.4 dB	64.7-j0.3 Ω	75 kHz.(50 Ω)
Vertical with elevated radials	1.97 dBi	0 dB	27.8–j1.9 Ω	>100 kHz.(25 Ω)
Rectangular loop	3.13 dBi	12.5 dB	25.3+4.57 Ω	20 kHz.(25 Ω)
Dipole	3.37 dBi	11.2 dB	94.3–j2.6 Ω	80 kHz.(100 Ω)

Table 2

Results of studies of multi-element designs described in the text

Model	*Gain (at 20°)*	*Front to Side*	*Front to Back*	*Beamwidth (at 20°)*
Inverted V & Reflector	5.6 dBi	7.8 dB	7.8 dB	88°
Inverted V Yagi	6.9 dBi	29.1 dB	29.1 dB	80°
Dipole & Reflector	7.7 dBi	8.7 dB	8.7 dB	71°
Moxon	7.4 dBi	17.3 dB	17.3 dB	79°
K3LR	4.0 dBi	>100 dB	18.2 dB	176°

Single Elements

As a consequence of many earlier attempts to arrive at designs for 160 meter antennas offering some gain for my present location, I was aware that verticals play well over highly conducting soil (or ideally salt water). Absent such conditions, horizontal dipoles represent a better choice—*provided one can get them high enough*. While 190 feet is still well short of half a wavelength, it is enough to make dipoles appear interesting.

My initial thought then was to design a suitable single element that could be hung from one tower, or between two towers, and then replicate this to cover multiple directions. Accordingly, using *Eznec 3.0,*[1] I modeled inverted Vs and dipoles hung as high as possible, rectangular loops of various shapes and sizes hung at different heights, and a vertical with elevated radials.

The results of this exercise are summarized in Table 1, which lists the computed gain, front-to-side ratio, the impedance at resonance and the bandwidth. The latter was taken as the distance between points of 2:1 SWR when fed with a cable of the impedance indicated. In all these models the "real/high accuracy" ground option was selected, and the properties of the ground set as *dielectric constant* = 13 and *conductivity* = 5 mS.

For vertically polarized antennas, the choice of ground conductivity is particularly important, and can make a significant difference in the computed antenna gain. (Hopefully, the farmland at the new location offers better conducting soil than my present site, where *conductivity* = 2 mS seems to better represent the situation!). All the antenna elements were assumed to be 13 gauge copper wires without insulation. Element lengths were always adjusted to achieve minimum VSWR in the vicinity of 1.83 MHz.

The inverted V consisted of two arms 132 feet long and hung from the 180 feet level on one tower. The ends were to be pulled to 6 feet-high posts assumed to be 200 feet from the base of the tower. This antenna offered the least amount of gain (~1 dBi) and only a small amount (~4 dB) of front-to-side rejection. It would, however, probably be the easiest to put up.

The vertical was modeled as a wire 134 feet long suspended 40 feet above ground. It was assumed that it would be hung midway between two of the towers. This was fed at its base against *four* 131 feet-long, elevated radials placed 40 feet above ground. (The ends of these would have to be supported by four towers arranged in a square pattern.) This antenna is probably quite feasible to construct, and offers modest gain (~2 dBi) at a low elevation angle (19°) with an omni directional pattern. It is, moreover, quite broadband if fed by a 25 Ω source. I did not examine a "four-square" array made up of these elements, as the number of towers needed is excessive.

The investigation of a loop involved exploring both changes in shape and height. The best compromise appeared to be a loop 230 feet in length and 44 feet high, hung about 80 feet above ground. This offered modest (~3 dBi) gain and considerable front-to-side rejection (see Figure 1). As it would be fed halfway up one of the vertical arms the feed line could be routed to the nearest tower for support. The low height was also viewed as an advantage, as it would reduce the wind loading and be more readily repairable. On the other hand, the loop of this shape has a rather low impedance (~20 Ω) making it somewhat difficult to feed, and is quite narrow band as shown in Table 1.

The dipole was modeled as 262 feet

[1]Notes appear on page 00.

long, center-fed, and 180 feet high. This had a nice pattern (see Figure 2) and offered over 3 dBi gain at 20° elevation angle, as well as 11 dB of front-to-side rejection. Unfortunately, unless some way can be found to support the weight of 180 feet of feed line, this antenna may be rather impractical. Despite this, the idea of using three dipoles hung between three towers, arranged at the corners of an equilateral triangle, (thereby covering six directions) seemed very appealing. This same arrangement would also be possible with three loops, so my initial concept was to place the three towers in an equilateral triangle with side length sufficiently large (~300 feet) to be able to support loops or dipoles.

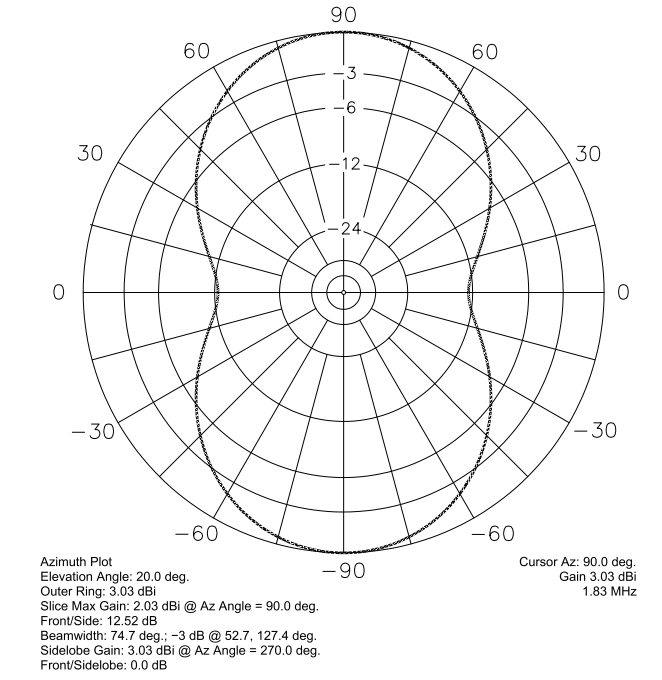


Figure 1—Azimuth pattern (at 20° elevation) for the rectangular loop.

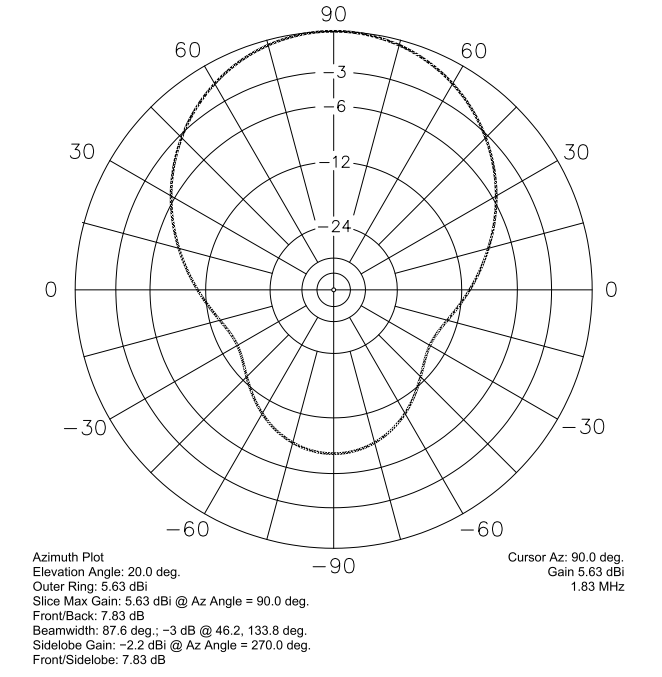


Figure 3—Azimuth pattern (at 20° elevation) for the Inverted V and reflector.

Multi-Element Designs

While achieving gain in six equal spaced directions seems very attractive, the reality is that for contest operations, one probably needs to seek DX mainly from Europe and the Caribbean plus Latin America. (From my location these are sectors centered on azimuths of 50° and 160°, respectively.) Accordingly, I also examined designs that might offer still more gain than any of the single element antennas discussed above. The results of this study are summarized in Table 2.

Simplest of the multi-element designs (and most practical) was an inverted V driven element with an inverted V reflector. It was assumed that the ends of the dipole and reflector were to be pulled

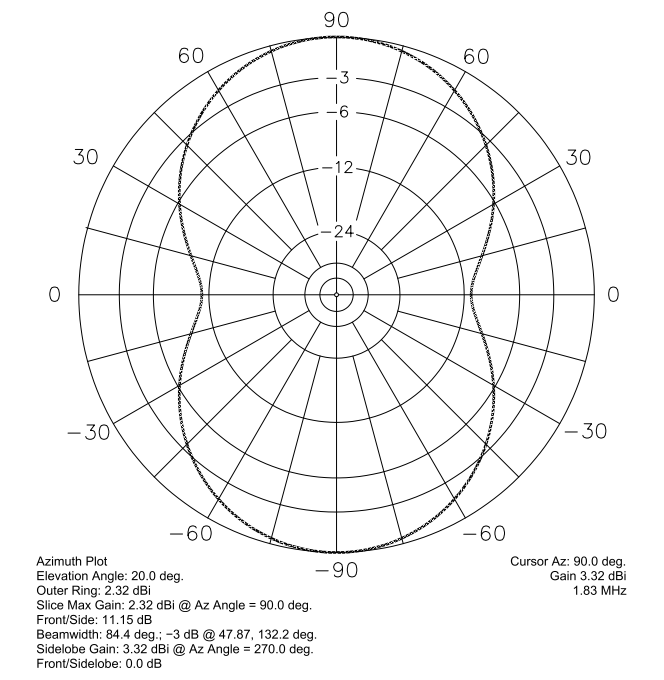


Figure 2—Azimuth pattern (at 20° elevation) for the dipole.

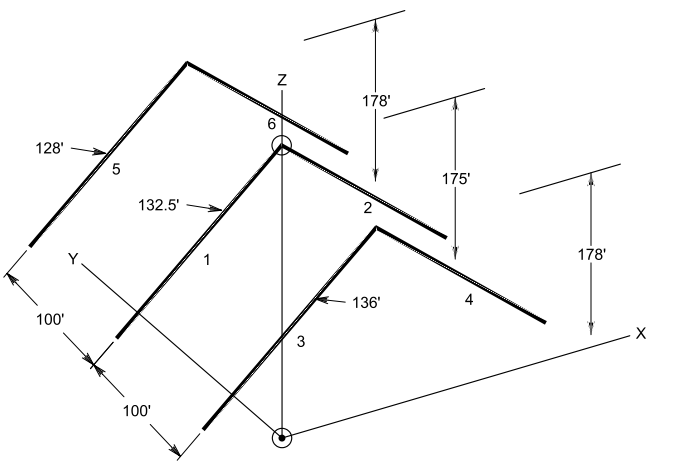


Figure 4—Sketch of the inverted V Yagi supported by a catenary.

towards 6 foot high posts some 200 feet from the base of their respective towers. Best results were achieved with a driven element having 131 feet of wire in each arm and the reflector with a length of 135 feet. The spacing was not critical and 100 feet was chosen. The gain achieved at 20° elevation was now 5.6 dBi, and front-to-back ratio was ~8 dB (see Figure 3). The chief difficulty with this scheme is the need to place towers only 100 feet apart, and with only three high towers it would be difficult to cover more than a single direction.

Despite the above objections, I also investigated a three element, inverted V Yagi. To avoid using all three towers as supports, the elements were to be hung from a catenary stretched between two towers. This antenna is sketched in Figure 4 and the pattern it produces in Figure 5. While these are excellent results, it was later determined that two such antennas could not be hung between three towers without coupling severely! Otherwise, this might have been the solution of choice.

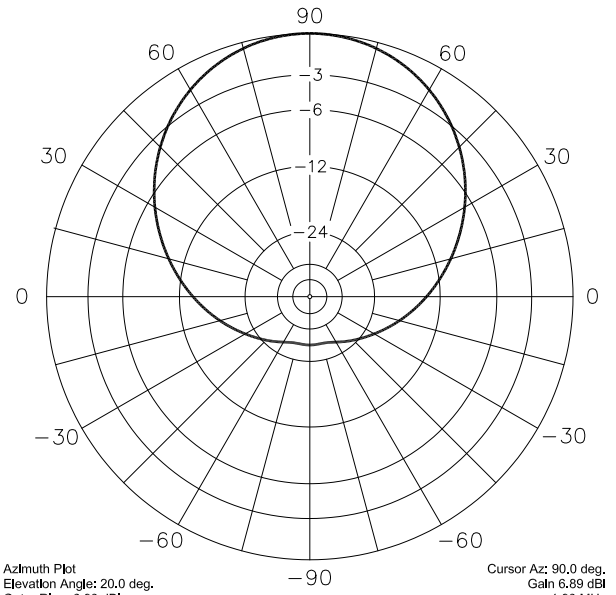


Figure 5—Azimuth pattern (at 20° elevation) of the inverted V Yagi shown in Figure 4.

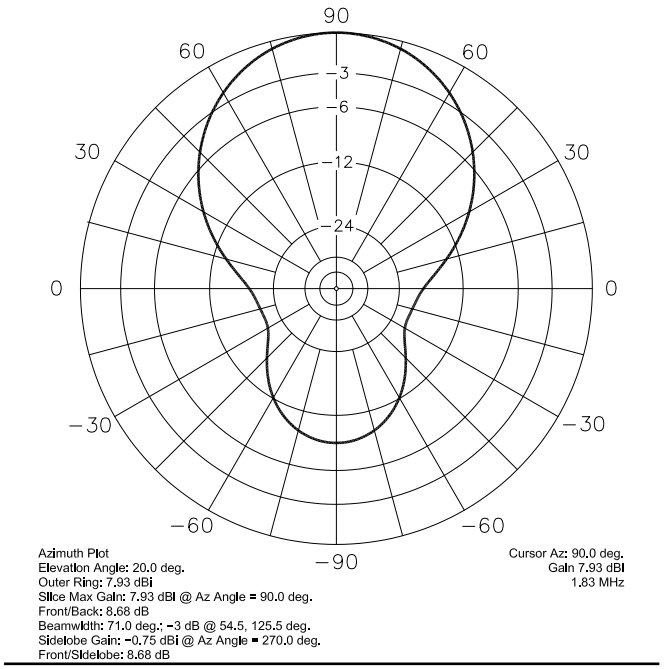


Figure 6—Azimuth pattern (at 20° elevation) of the dipole and reflector.

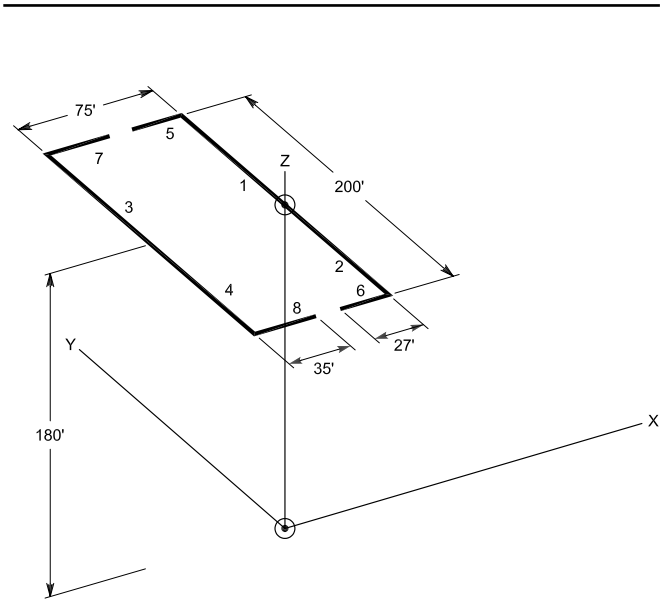


Figure 7—Sketch showing the dimensions of the 160 meter Moxon antenna.

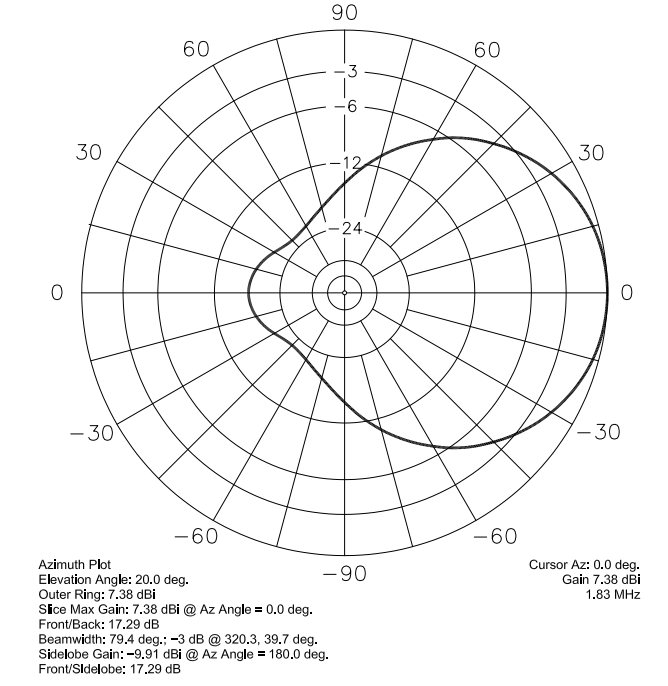


Figure 8—Azimuth pattern (at 20° elevation) of the Moxon antenna shown in Figure 7.

A dipole with a reflector was modeled at an 180 foot height and separated by 90 feet The dipole was 256 feet in length and the reflector was 265 feet long. This produced an excellent match to 50 Ω cable, 8 dBi gain (at 20° elevation) and over 8 dB front-to-back ratio (Figure 6). While most of us would love to get 8 dBi gain on 160 meters, this was not considered a very practical antenna. The weight of the unsupported feed line, together with the need for four tall towers to support it, were considered major drawbacks.

I did not attempt to model pairs of loops, as I had performed that exercise in an earlier study (Ref. 2), and was familiar with the results achievable. Next to be considered was a 160 meter Moxon antenna[3]. This was assumed to be at 180 feet height with dimensions shown in Figure 7. The gain (plotted in Figure 8) was comparable to that of the dipole and reflector (over 7 dBi), but the front-to-back ratio was superior (~17 dB). While these attributes are eminently desirable, this antenna was also considered impractical. Not only does it require four tall towers for support, but suffers, like the dipole, of having an element fed at its unsupported center 180 feet above ground.

Last of the multi-element antennas to be considered was the K3LR[4]. This had the dimensions shown in Figure 9. Basically, this consists of a vertical dipole fed against a vertical reflector, both pulled away from and supported by a single tower. Since their dimensions are identical, the roles of the driven element and reflector can be reversed by switching. To cause the reflector to be electrically longer than the driven element a length of feed-line is left connected that makes it look inductive. In the model a 5 µH lumped inductor represented this.

The role of the tower can be to enhance the gain if radials are added. Ideally these should be attached at a point (about 60 feet high for a 190 feet tower) that makes the tower resonant. However this was considered impractical and a more modest arrangement was employed (Figure 9). Because the tower is connected to the ground it was necessary to employ the *MININEC* ground model (which tends to overstate the gain). The pattern achieved with the K3LR is quite remarkable (Figure 10) with considerable front–to-back ratio and a peak gain at only 18° elevation. Unfortunately, the amount of gain achieved is only 4 dBi. Despite this, if one had only one high tower, the K3LR would be an attractive solution, as with two sets of elements *some* gain can be achieved in four directions, and the beam is extremely broad (Table 2).

Three tower arrangements

I next explored the use of three identical loops hung between three towers

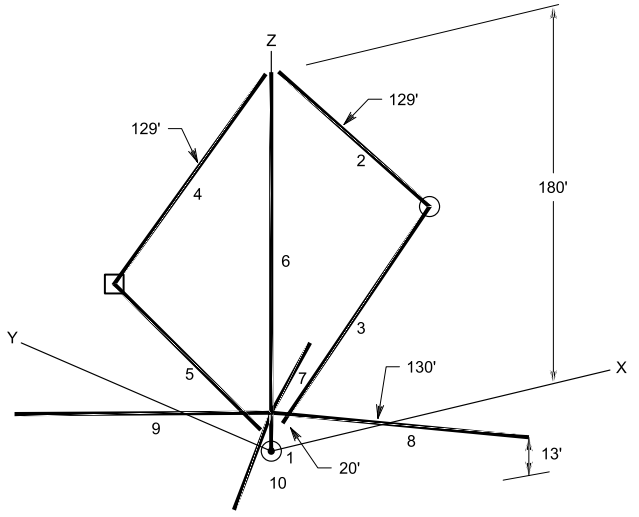


Figure 9—Sketch showing the K3LR antenna.

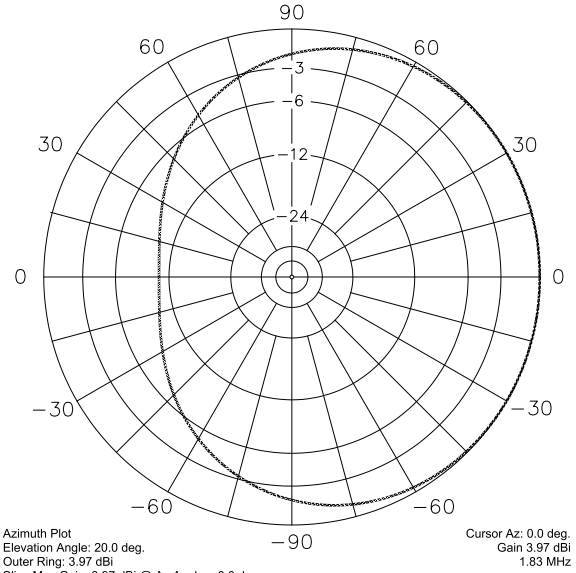


Figure 10—Azimuth pattern (at 20° elevation) of the K3LR antenna shown in Figure 9.

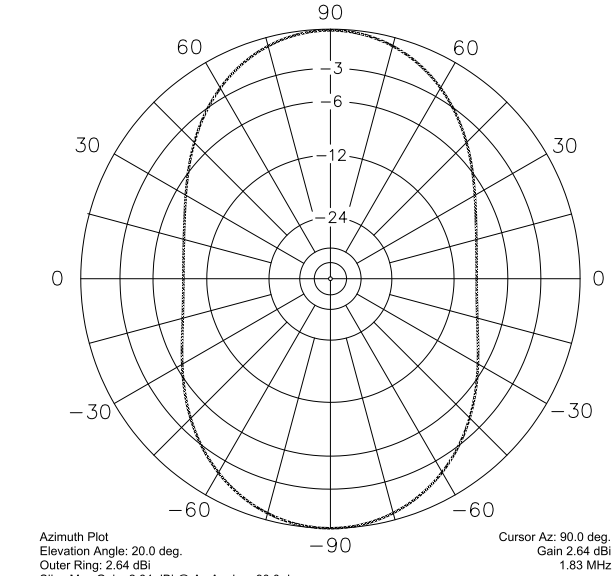
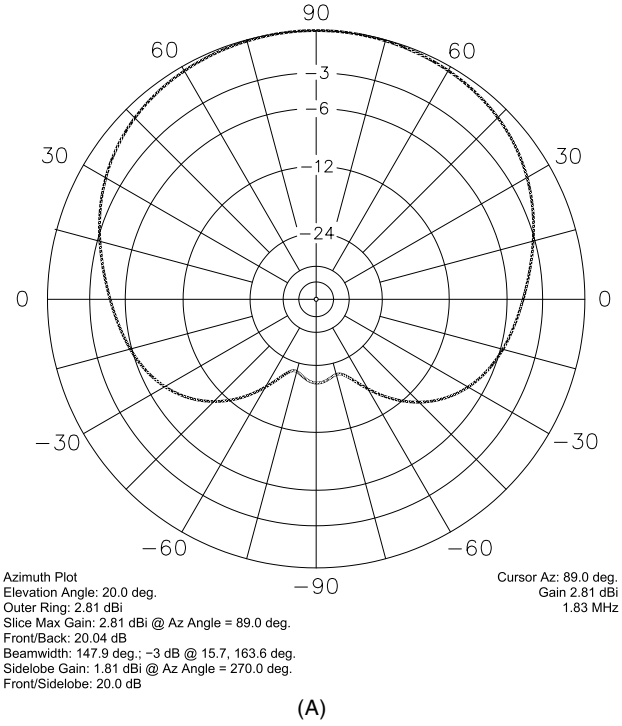


Figure 11—Azimuth pattern (at 20° elevation) of three loops when two are employed as reflectors.

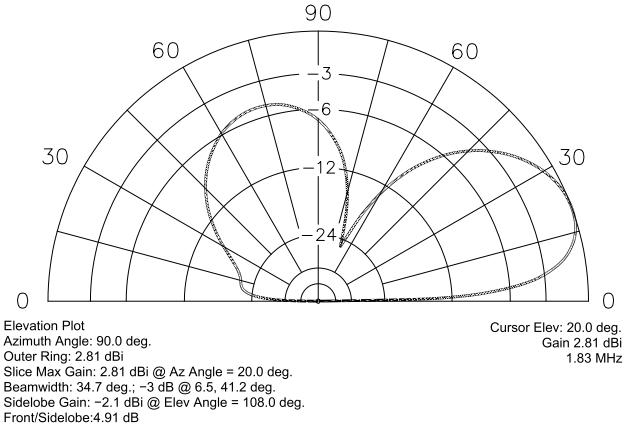
placed 300 feet apart at the corners of an equilateral triangle. I imagined that this would provide useful gain (~3 dBi) in six directions selectable through switching. The three loops were the same design as the single element described above. To my dismay I found that the loops coupled to one another, distorting the pattern that a single loop would produce. The gain dropped to 2.3 dBi, and a large unwanted lobe appeared in the zenith where previously there had been a null.

It was not possible even to place two loops at right angles to one another without seeing some interaction. As perhaps a way of turning a vice into a virtue, I explored the possibility of using two of the loops to act as reflectors for the third. This could be accomplished, as in the case of the K3LR antenna, by leaving an inductive length of feed-line attached to the loops that are not driven. The best inductance to employ appeared to be about 2.5µH, but the resulting pattern and gain were disappointing (see Figure 11).

I next explored whether feeding all three loops simultaneously might improve matters. The best arrangement appeared to be to feed the loops at the centers of the vertical sides most removed from one another, with one source at 0° phase and the other two at -80°. This produced an excellent azimuth pattern (Figure 12a), but a poor one in elevation (Figure 12b) and little gain. From a practical standpoint, splitting the power three ways could be performed with an Array Solutions Stackmatch transformer[5], and introducing the needed phase delays could be accomplished by switching in or out an appropriate length of feed line. The principal drawback is that the scheme offers little gain, and that in only three di-



(A)



(B)

Figure 12—Results obtained when feeding all three loop antennas: a) azimuth pattern (at 20° elevation). b) elevation pattern.

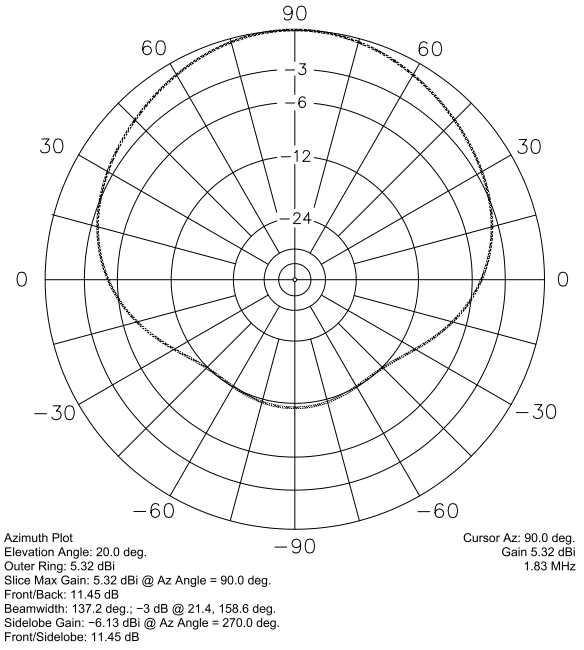


Figure 13—Azimuth pattern (at 20° elevation) of three dipoles when two are employed as reflectors.

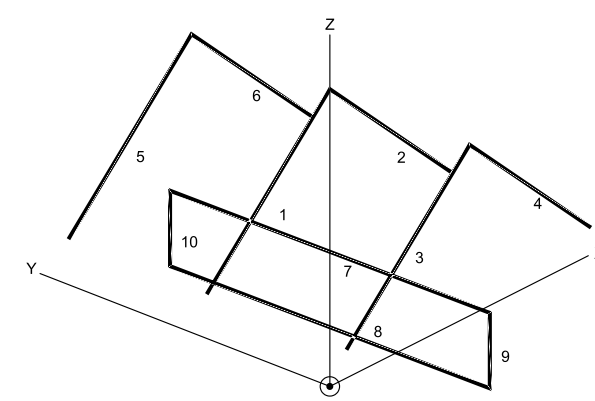


Figure 14—Sketch of the proposed new antenna scheme.

rections. If one of these were chosen to be the azimuth of Europe (say 50°), then the peak gain in the other two directions will be towards 170° (useful for the Caribbean and Latin America) and 290° (which offers little value).

Similar conclusions were reached when I studied three dipoles hung at 180 feet from three towers at the corners of the equilateral triangle. The dipoles coupled to one another distorting the pattern that otherwise would be expected from a single dipole. The basic problem is that, *in terms of wavelengths*, the separation is quite small, and there seems no way to place the dipoles far apart—given only three towers. Again some improvement could be achieved by using two of the dipoles to act as reflectors for the third. With 2.5 µH inductances at the centers of the two "reflector" elements the pattern shown in Figure 13 is obtained. There is now a useful amount of gain (over 5 dBi) and front-to-back ratio (over 11 dB). However, the problem of feeding these elements, and the fact that one achieves gain in only three directions, militate against this approach.

I next explored various combinations of loops and dipoles in the hope that by exploiting opposite polarizations the coupling between these close-spaced antennas could be overcome. None of these schemes achieved the desired result until I came to the realization that the elements need to be placed symmetrically with respect to one another on orthogonal axes. Thus, for example, a dipole placed at right angles to a loop with its arms symmetrically arranged on either side of the loop does not appear to couple to it. To support a loop of optimum dimensions requires the towers to be at least 250 feet apart. If the physical interference with Yagi antennas on the towers is considered, an even greater separation may be required. How then to deploy a dipole *at right angles* with only three towers?

The solution that I came up with is to use inverted Vs instead of dipoles, and support these by a catenary hung at 180 feet between the *same* two towers that support the loop. This arrangement is shown in Figure 14. Two inverted V driven elements are placed at opposite ends of the catenary. Placed midway between them and 100 feet away is a reflector element. The azimuth pattern resulting from feeding one of the inverted Vs is quite clean with over 5 dBi gain and 8.5 dB front-to-back ratio. Meanwhile the pattern of the loop is unchanged from that shown in Figure 1. By orienting the axis of these two towers towards Europe (say at 60°) one achieves gain in that direction—and by exciting instead the other inverted V—towards the South Pacific at 240°. The loop then offers modest gain towards the Caribbean (150°) and Japan (330°). Figure 15 shows the patterns achieved with the arrangement shown in Figure 14.

One possible alternative to this arrangement would be to hang the 3-element inverted V Yagi (described above) from the catenary oriented towards Europe, and forego any gain towards the South Pacific. In either case there will also be a need for a low dipole or inverted V for domestic contacts.

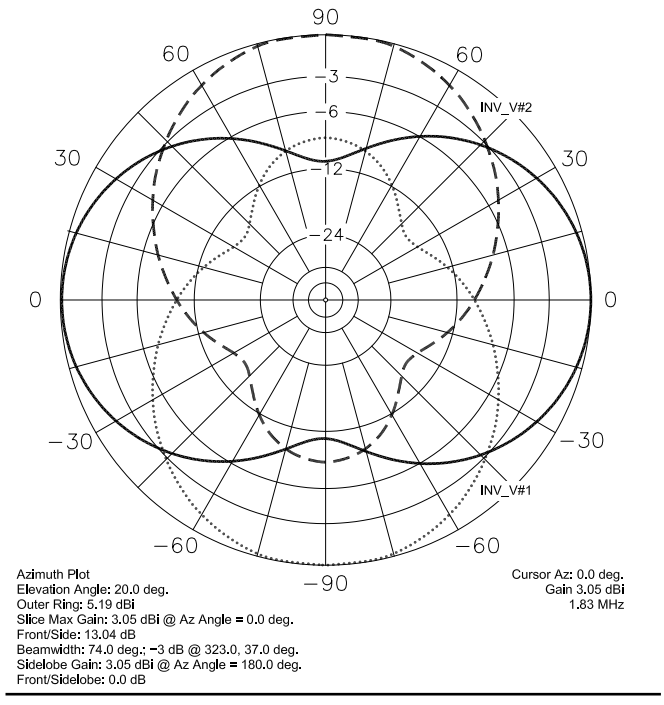


Figure 15—Azimuth patterns of the loop and two inverted V antennas (shown in Figure 14) illustrating the coverage achieved in four orthogonal directions.

Practical Considerations

As I intend to put up *rotating towers* it is immediately evident that these should be essentially identical. This is because it will be necessary to support any wire antennas from the guy rings, and hence these need to be at the same height. The most difficult part of erecting the antennas shown in Figure 14 would appear to be to get the catenary supporting the inverted Vs reasonably taught. This will be especially true once tension is applied to the center element to take out any sag. It seems best that the catenary be carried over pulleys at the guy rings and then down to anchor points at ground level that lie beyond the towers in the same straight line. If one of the tower guy posts is placed at this location the catenary can be pulled taut to it. Phillystran would be a good choice of material for the catenary, both for its strength and non-conducting properties.

If now the remaining guy posts are placed symmetrically about each of the two towers and 200 feet away they will appear as in the plan view of Figure 16. It happens that the two driven elements can be tilted out of the vertical plane without significantly altering the pattern. Thus, they can be anchored by pulling their ends towards the guy posts that sit on either side of the catenary (Figure 16). The reflector can also be anchored to these same four posts using equal lengths of line. This obviates the need for any anchors other than those for the tower guy posts. When computing the pattern for this arrangement it was found necessary to lengthen the arms of the driven element to 131.5 feet (and the reflector to 135.5 feet) to restore the minimum VSWR to 1.83 MHz. The results showed that tilting the driven elements degraded the front-to-back ratio slightly but further study in-

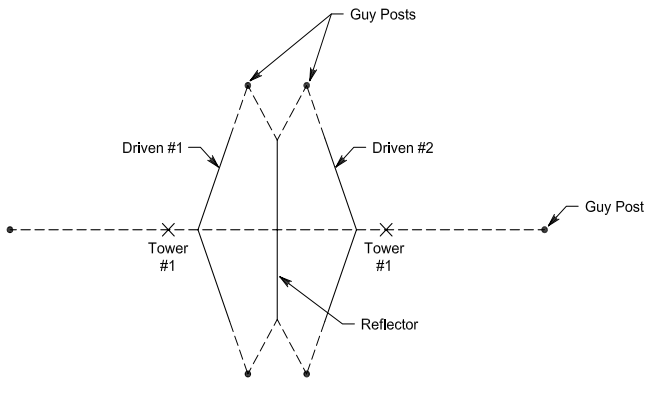


Figure 16—Plan view of the supports to be used for the antennas shown in Figure 14.

dicated that it can be raised to more than 9 dB if a length of feed line is left connected to the unused driven element so as to appear inductive with a value in the range 5 to 10 µH.

If instead of employing two inverted V driven elements and a single reflector, the catenary is used to support the three-element inverted V Yagi described earlier, it too can be mounted in the same manner. In this case it appears necessary to lengthen the arms of the director to 129 feet to maintain the excellent pattern.

Since the feed points of the inverted Vs are some distance from their respective towers, the feed lines will have to be run along the catenary. This is the principal objection to installing the three-element inverted V Yagi, as the weight of a feed line run to the center of the catenary will be considerable, further aggravating the problem of keeping it taut.

The principal problem to be solved for installing the loop is how best to feed it. In other situations I have employed balanced feed line to connect a loop to an unbalanced-to-balanced matching network[2], but that seems impractical here. Instead, it will probably be best to use a ferrite matching transformer. Unfortunately, Amidon[6] does not offer a 2:1 step down balun, but an unun that matches 50 Ω down to 22 Ω is available. This would then have to be followed by a choke balun. Again the loop will have to be supported by lines that go over pulleys hung from the guy rings. As the bottom corners are only 36 feet above ground they can be pulled toward the bases of the two towers.

Conclusion

The model studies described here revealed that it is not advisable to construct, at a single location, simple 160 meter wire antennas *of the same type* to achieve useful gain towards separate target areas. This is because at any reasonable distance from the station the separation of the antennas will be a wavelength or less, and there will be coupling between them that distorts the expected pattern and lowers the gain. To circumvent the problem one must either exploit the coupling in some way, or exploit symmetry to minimize it. One arrangement that appears to offer useful gain in four orthogonal directions is to employ a rectangular loop above which is a catenary that supports two inverted V driven elements, and an inverted V reflector placed between them.

Given four or more tall towers it does appear feasible to erect two or more three-element inverted V Yagis (described previously) - provided they are all kept well separated. A study of two such Yagis, oriented at 50° and 160° and arranged to face away from each other, exhibited relatively minor pattern distortion when 350 feet separated their feed points.

This study was undertaken to determine where to place tall towers at a new location. Without this exercise, they would probably have been located at the corners of an equilateral triangle, which turns out *not* to be a good arrangement.

Notes

[1]R. Lewellen, W7EL, *EZNEC,* PO Box 6658, Beaverton, OR 970067.

[2]J. Evans, N3HBX, "A Double–Loop Antenna for 160 Meters," *NCJ,* May/June 2003, pp 3-9.

[3] L. Moxon, G6XN,"HF Antennas for All Locations" (London, RSGB: 1982), pp 67, 168, 172-175.

[4]A. Christman, KB8I, T. Duffy, K3LR, J. Breakall, WA3FET, "The 160 meter Sloper System at K3LR" *QST,* August 1994, pp 36-38.

[5]Available from WXØB
www.arraysolutions.com

[6]Ferrite baluns and ununs are available from Amidon Associates Inc.
www.amidoncorp.com/aai-productselection.htm

NCJ

NAQP in for a Check-up

Mark Beckwith, N5OT

"In October 1985, a group of veteran contesters sat around a hotel hospitality suite at the ARRL National Convention discussing the demise of the ARRL QSO Parties. Someone suggested that perhaps the *National Contest Journal* could sponsor a replacement contest—one that would be simple to operate, yet challenging. A contest that would encourage the training of new contesters and the activity of the casual participant. Speculation evolved into a set of rules, and a new contest was born—the North American QSO Party."

There begins K8CC's write-up of the results of the first-ever running of the NAQP. The contest took place in April 1986, and the results appeared one year later in the March/April 1987 issue of the *NCJ*. Recently we took the NAQP in for a check-up just to make sure everything is running smoothly.

It was 1984 and the ARRL, to the horror of many die-hard contesters, ended a long League tradition called the CD Party. Originally intended to provide an opportunity for official ARRL volunteers to meet on the air, the CD parties were legendary among more than a generation of contesters. They were like Sweepstakes, but you could work everyone on all bands (multipliers counted only once). Like SS, they were 30 hours long.

ARRL Vice President John Kanode cuts to the chase: "The CD parties were stopped due to lack of participation." Former Contest Branch Assistant Warren Stankeiwicz elaborates "contest activity was measured not by the number of QSOs, or rates of the top contesters, but by the number of logs received—participation had dropped."

Whatever the reason, many active contesters felt as if they had been cut adrift. According to Dave Pruett, Editor of the *NCJ* at the time, "In the aftermath of the…decision, we received many comments from active contesters bemoaning the loss of these stateside contests, which would seem to contradict the idea that 'nobody operated the QSO Parties.'"

At the next ARRL National Convention, in Louisville, Kentucky in 1985, Dave continues, "The scene: a smoke-filled hospitality suite….the participants: K8CC, N4AR, K5RC, KZ5M, K5LZO, K1KI, K1ZZ and several others." Everyone in this group is or has been a serious stateside contester. "It wasn't long before a plan began to take form. …as the smoke thickened and the beer supply diminished, the idea looked better and better."

TOP TEN - CW

	score	QSO mul	160M	80M	40M	20M	15M	10M
N5RZ	127,484	628-203	52/24	112/43	193/44	167/44	58/27	46/21
N2IC/0	103,656	617-168	37/17	117/38	227/46	161/34	65/28	10/5
W1WEF	99,360	540-184	32/20	122/36	161/46	155/47	46/22	24/13
N6TR/7	97,173	549-177	58/25	99/37	190/46	144/39	52/26	6/4
N4ZZ	96,075	549-175	35/18	139/39	173/45	122/34	48/21	32/18
K6LL/7	92,040	520-177	20/11	95/36	171/47	148/45	62/25	24/13
K8CC	90,459	529-171	42/21	147/39	177/46	88/28	53/25	22/12
K5MR	85,974	534-161	25/13	105/36	194/44	152/39	36/18	22/11
K8MR	84,656	481-176	50/24	128/38	143/44	88/34	47/22	25/14
KW8N	82,877	463-179	47/25	114/40	144/45	64/24	49/25	45/20

Figure 1—Top Ten CW results of the first-ever running of the NAQP.

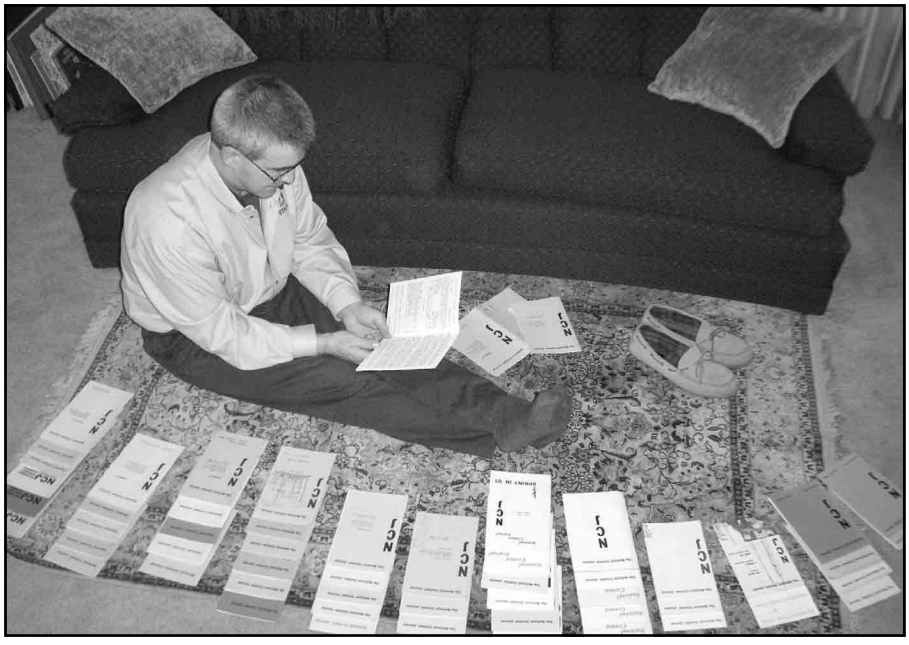


Figure 2—One-time *NCJ* publisher, N5OT, reviews back issues to remind himself exactly how the NAQP started.

Pruett expounds "If the truth were to be known, at some point in the distant past the North American Sprint was conceived in much the same manner…so it can be seen that good things can come from such beginnings." (See W6OAT's story in the January/February 2004 NCJ about how the Sprints came to be—*Ed*).

The group in Louisville came up with a set of preliminary rules, which then were published in the *NCJ* as a proposal for discussion. "The overall criteria were to make the contest easy to operate, not require an entire weekend to participate, maximize the available activity and make the logs easy to check—some of the same criteria that make the NA Sprint so appealing. In many ways our proposed contest was similar to the ARRL QSO Parties, but some facets were changed to encourage the contester and non-contester to participate."

A couple of those smoke-filled hospitality suite NAQP founders chime in: Tom Taormina, K5RC, emphasizes, "The NAQP is a training ground." Dennis Motschenbacher, K7BV (then KZ5M) adds "We were very focused on the fact that so many good contesters got their start in the CD parties. We wanted to

replace this friendly yet competitive event."

The *NCJ* was no stranger to innovative contest rules: by now, the verdict was in on that most infamous of all contest rules, the Sprint's unusual "QSY rule"—it was a great success. The NAQP founders were determined to make the NAQP stand out as "not just another contest." Among NAQP innovations: power amplifiers would not be used—everyone would use exciters only, and there would be no Multi-Single category. You either single-op'd or you went all out in Multi-Multi.

Following in the footsteps of the NA Sprint, in their attempt to transfuse life into the CD Party, the ARRL adopted the revolutionary one-day format—reducing the CD Party from a 30 hour contest across 2 days to a 12 hour contest on Saturday only. The ARRL also lengthened the requisite break duration to 30 minutes from 15 minutes, and specified a 10 hour on-time limit. Finally, though they will always be CD Parties to some of us OTs, the event was renamed the "ARRL QSO Party" shortly before its demise.

The first published score rumors indicated "overall, activity was very good for a first event." "The CW affair saw moderate, but serious activity…." "scatter in the Midwest and east was terrific on those bands…" "20, 40, and 80 meters were solid, and 160 was hopping…."

Finally, when the results were published, we knew we had a winner. With 101 logs received, the *NCJ* was quite satisfied with the first running. "A superlative effort by N5RZ … [Ralph] led the pack with the most CW QSOs and the highest single-operator multiplier…." Included in that first NAQP write-up were the foreshadowing of what were to become signature features of this new contest: "It is interesting to note in the N5RZ log how he moved multipliers from band to band without seriously affecting his QSO rate…." and on phone according to the 1986 write-up "NP4Z stayed on the higher bands and parlayed his DX status into a 24% QSO advantage." NP4Z won the event, beating out KW8N who had him by 26 multipliers.

The NAQP has gained momentum and evolved beyond the imaginable at the time— a highly-paced rate-fest where the winners maintain average rates of 130-140 QSOs per hour—on CW (unheard-of for a privately run QSO Party!). With the advent of commonplace two-radio single op stations, the multiplier totals and final scores have continued to climb, and the Multi-Two category, which quickly supplanted the original Multi-Multi category, has become a hotly contested prize where the top spot is known only after a log-checkers' field day.

It must be human nature that the more things stay the same the more we want to change them. Recently, many contesters weighed in on some questions about the NAQP—should there be a multi-single category added? Should the two-radio operators be separated out? Should stations outside of the continental US and Canada compete on the same footing as traditional W/VEs? Should Europeans be allowed to run their amps? The conversation, thanks to W4AN's **contesting.com**, was lengthy and lively.

After digging back to the roots and double-checking with everyone we could find who was in that dark and smoky hotel room in Louisville in 1985, the consensus is that the North American QSO Party is right on target, is in fine health, and no changes should be made. In short, we're sitting on a winner — let's leave it alone!

NCJ

Experiences of a Four Square Addict

Jack Schuster, W1WEF

Continuous improvement is part of the agenda of most serious contesters. After every contest we look at what we might have done better with an eye towards what we might change before the next contest to place higher in the results. For many of us, the biggest gains usually come from antenna improvements. After feeling fairly well satisfied with my single tower HF station performance on the high bands and 40 meters I started concentrating on 80 meter wire DX antennas about 15 years ago. I'd like to share my experiences that took me from dipoles and slopers to my present array of 8 phased wire verticals on 80 meters.

In the beginning, I ran a dipole from the top of my 60 foot tower to the top of a tree about the same height. To reach the treetops I use a closed face fishing reel mounted on a "Wrist Rocket" slingshot, with 8 lb test monofilament fishing line and a 1.5 oz lead fishing sinker as described in a club newsletter article by Jim Parise, KC1SJ (now W1UK). I paint my sinkers a fluorescent orange to make them easy to spot after they come down in the woods on the other side of the tree. With a little practice, one can put the line right on target. After shooting the fishing line over the tree, I use that line to pull up a brightly colored nylon mason line. An important caution should be mentioned here—*never* reel the sinker back over the tree—remove it or it will get tangled, guaranteed! Once the mason line is over the top and back at the slingshot, I tie it to a rope and pull the rope back with the end of the antenna attached to the other end. The rope I have found most durable at a reasonable price is Lehigh 3/16 inch polyester, available at Walmart, Home Depot and similar stores.

As my tower grew in stages to the present 108 feet, my dipoles got higher and higher. Along the way, I played with various 80 meter antennas; shunt feeding the tower, quarter slopers, inverted Ls, and sloping dipoles. I always knew I could do better as seen by my place in the pileups. I always left my high dipole up for comparison, and that was usually as good as anything else I tried. While I knew I'd never beat the likes of some of the big guns with 80 meter Yagis way up high, or stacked two element delta loops and the like, I was not satisfied.

In the late '70s, I used to hear W1CF and W1FC on 75 meters working stations I often couldn't even hear. They were using antennas they called four squares. I'm sure that being on Martha's Vineyard near the salt water helped a lot, but I was very impressed nonetheless. I believe they started a company called Colatchco and marketed their four squares, but it wasn't until the '80s when another company called Comtek started manufacturing a phasing box for *four squares* that I decided to give it a try. Since my earliest version in 1985 I have built seven variations, and I hope my experiences will benefit someone else contemplating a similar antenna. My antennas were all constructed of wire in the woods. Although my experience is with 80 meter four squares, the same can be done on 160 and 40 meters. What I intend to share are the practical aspects of my experiences and the subjective results of the various schemes I tried. I'll save the details of my latest array for last—one that I am not aware of anyone else using anywhere.

What is a Four Square Array?

The so-called four square is an array of four phased verticals, each at the corner of a square. In the classic square arrangement, the verticals are spaced a quarter wave apart. Other arrangements are described by John Devoldere, ON4UN, in his *Low Band DXing* books,[1] but I have only played with the "square" arrays. With the proper phasing, four directions are selectable, across the diagonals of the square. With the flip of a switch, one can "rotate" the antenna 90 degrees—much faster than those guys turning their big Yagis!

The first thing one must do in laying out a four square is to decide how to orient the diagonals of the square so that the desired directions are available. For me, in New England, Europe is most important so one diagonal points toward Europe (See Figure 1). When laying out the four verticals, the spacing is optimized for the part of the band you want to favor. The quarter wave distance between verticals is determined using the formula 246/frequency in MHz (remember, you're not cutting an antenna wire so it's 246, not 234!). My present array is optimized for 3525 kHz, so the spacing is 69. 8 feet. The vertical wire length is determined by 234/f, and adequately covers the bottom 100 kHz of the band.

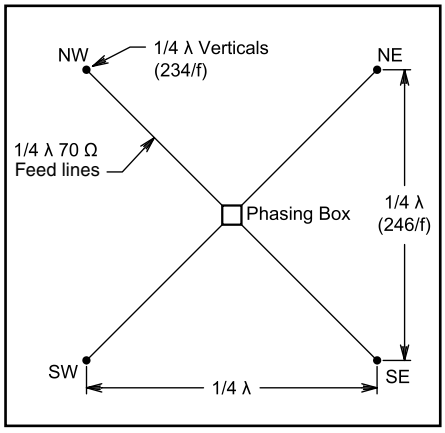


Figure 1—Array orientation.

Bandwidth

Along the way, I tried schemes for easy switching between the phone and CW ends of the band, as well as tuning it for 3650 kHz and using it on both modes. Although I felt this was too much of a compromise with my wire verticals, others have reported satisfactory bandwidth using irrigation tubing for the vertical elements. Another scheme tried was to put a loading coil at the base for CW, and tune the antenna for phone with the coil shorted out. I never felt that the base loading was as good as lengthening the antenna itself. One well known contester uses four insulated Rohn 25 towers and climbs the towers to adjust a mast extension on top for phone or CW. It's a good thing they allow at least two weeks between the phone and CW contests! Another uses a series capacitor made from glass epoxy double-sided PC boards in series with the base of each antenna. He shorts them out for CW. Yet another built a "cage" of parallel wires spaced about a foot apart to look like a fat single conductor, to increase the bandwidth.

How Do I Support 70 Foot Wires?

Not being able to find any sky hooks for sale, I had to find other alternatives. Unfortunately, wire four squares are not for everyone. Not only does one need the room for the four verticals, but you need a high tower or a lot of tall trees to support vertical wires. We'll talk about radials shortly—they take even more room, and each vertical needs radials.

My first approach is shown in Figure 2a. I ran ropes from the top of my 108 foot tower in the four directions that I wanted to orient the diagonals. The far end of the

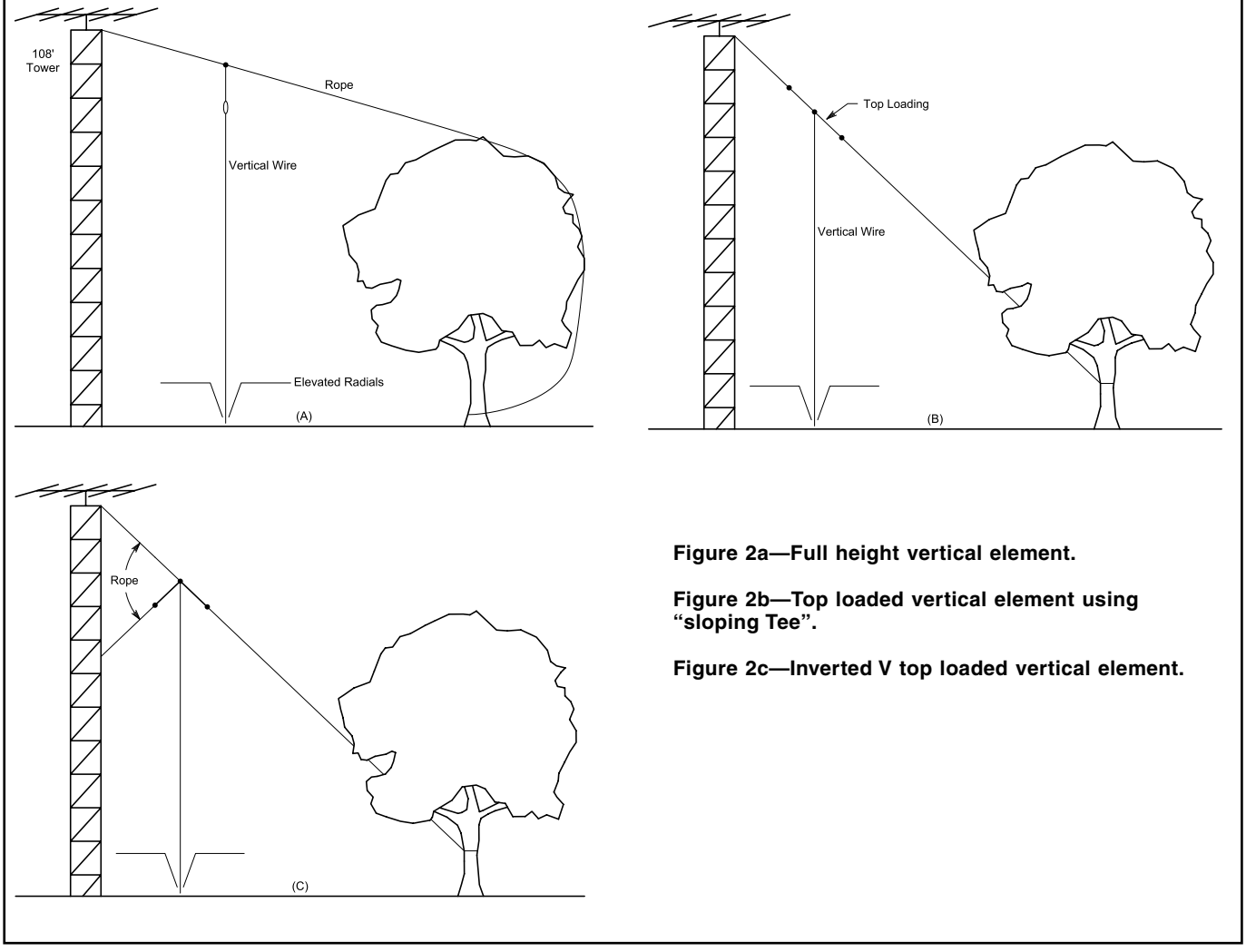


Figure 2a—Full height vertical element.

Figure 2b—Top loaded vertical element using "sloping Tee".

Figure 2c—Inverted V top loaded vertical element.

rope went over a treetop, using the slingshot and fishing reel method described earlier. Naturally, the best time of year to shoot lines over trees is when leaves are down. A lot of rope was required, because I had to keep going until there was a tree in the right place. At the appropriate calculated distance from the tower, I dropped a vertical wire from the rope. With a 108 foot tower, and the trees being 60 or 70 feet tall, I could drop a full height vertical wire from the rope. I never felt that the tower in the middle had any serious effect on the performance, but this configuration didn't last too long because the trees swayed in the winds and the ropes broke. It also was not easy to run a rope in the desired direction without interference from other trees in the way.

Rather than rebuilding the same arrangement I decided to run the ropes to the bottom of the trees, to avoid the sway problem (Figure 2b). The result was that I could no longer get the height I needed, so I top loaded the verticals with a sloping tee top in series with the ropes. This seemed to perform well also. I recall one night making front-to-back tests with Clive, GM3POI, when he reported 24 db front to back when I reversed direction. At that time, Clive had a similar arrangement, but his top loading was an inverted V with one leg supported by another rope going back toward the tower (Figure 2c). Clive is *always* loud, perhaps because he's on an island surrounded by salt water.

Before I get into radials, let me just say that elevated radials in dense old woods with tree limbs continually breaking in storms are a constant maintenance nuisance. It was because of this that I decided to rebuild the whole system following an idea from low band antenna guru ON4UN. John built an 80 meter four square with only one radial on each vertical. The neatest part of this scheme, in addition to requiring less maintenance, was that you could tune the antenna by merely pruning the one radial! I got rid of all the unsightly yellow insulated wires that decorated my woods, tuned the system to perfection with one radial on each vertical and had a much neater looking antenna array. The only problem was that it didn't play nearly as well as the earlier arrays. This was the worst yet! There was one key difference between my array and John's. His was built over a field of 160 meter radials that provided a ground screen that I didn't have. I enjoy experimenting and building antennas, so this was just another experience in the great outdoors and fresh air!

Shortly after the one radial experiment, I happened to help a friend on Cape Cod put up a new 80 meter four square that looked like another great solution to the radial problem. We put up four sloping dipoles, hung off his 120 foot tower, with no radials required! Initial tests looked good, so that was my next variation. On Cape Cod, on the edge of salt water, any antenna seems to play well. Back in Connecticut, mine wasn't very good at all, compared to my earlier verticals. It had just about no directivity. After further use on the Cape, my friend decided that his

wasn't that great there either, compared to the vertical four squares he was used to. What to try next?

Knowing that the vertical full height wires I started with were the best configuration I tried, I had to get full verticals up. Looking over another part of my wooded lot, I noticed I had some pretty tall trees. The woods were so dense that it seemed I could go straight up anywhere and find a branch to hang it from. I started with a configuration of four Inverted Ls, with the top part going out radially from the center. However, I could not possibly make the four antennas symmetrical because the woods were not symmetrical, I could not balance the system.

I next decided that many of my trees were high enough to support a full height vertical wire. I started with one vertical under one of the taller trees, and oriented the rest from there. In some cases, I couldn't support the full vertical height, but could get the full length I needed by letting the top bend over the treetop a bit, or slope to a nearby tree. This arrangement provided very good performance.

How About Those Radials?

It has been said that you can use as few as four elevated radials for effective performance, vs many more (maybe 75) laid on the ground. In my first vertical arrangements, I started with 4, then went to six, and then 8 elevated quarter wave radials. Note these are cut to 234/f in length. Using insulated wire for both the vertical wires and the radials, the resonant lengths are about 3% less than the formula length. I did not attempt to tune each pair of radials like a dipole as some have advocated. My gut feeling is that radial length is not that critical. Although it has been written that there is little to be gained with any more than 8 elevated radials, I used 12 on each vertical this time. My radials are supported by trees, and they are not always in the ideal places to allow them to slope upward at the same angles or to be spaced uniformly.

I solder my radials to a # l0 bare copper wire ring surrounding the top of a 4x4 pressure treated post at the base of each vertical. (See Figure 3) The top of the 4x4 post is cut on a slight angle to allow rain to run off, and it is capped with an aluminum (I would have preferred copper) plate cut to overlap on three sides by 1/4 inch, and on the downward sloping side by 1.5 inches. An electric fence insulator is nailed in the center of the plate, and on the 1.5 inch overlap there is an SO-239 coax connector mounted with the bottom up. The vertical wire is anchored on the fence insulator with an overhand knot, and the end soldered to the SO-239. The edge of the SO-239 is connected by a short piece of coax shield braid to the copper ring.

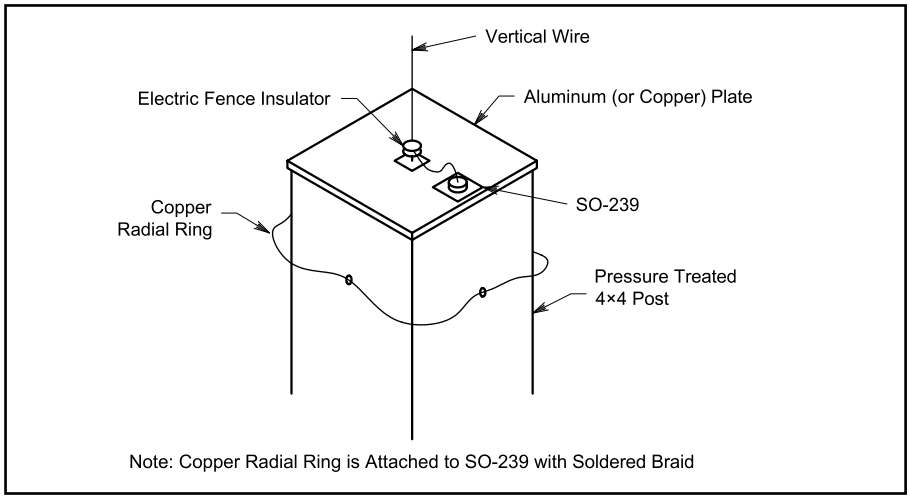


Figure 3—Vertical element base connectivity detail.

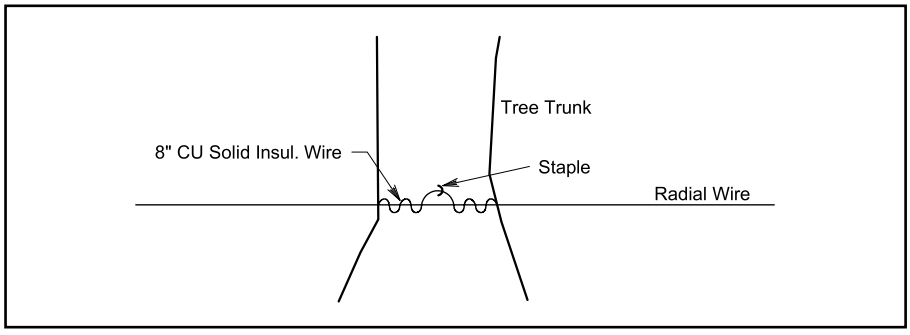


Figure 4—Radial attachment detail.

The coax connector is sealed with coax seal or similar electrical sealer.

The radials slope upward to about 6 or 7 feet in height towards trees about 15 feet away, and are then supported by additional trees at the same height. I support the radials at the trees with a 2 inch galvanized fence staple driven into the tree about a half inch. I then pass an eight inch long piece of insulated solid copper wire (from Romex house wire) halfway through the staple, and wrap each end around the radial wire as shown in fig 4. By supporting the radials in this manner, when branches break and fall on the radials, the radial wire will hopefully slip and avoid breaking After fallen branches are cleared, it is then only necessary to pull the radial back to tighten it.

What About The Phasing?

To get directivity from the antenna, the verticals must be fed with the right phase relationships. The easy way out to do this, as mentioned earlier, is to buy a Comtek or similar phasing box. My Comtek box is mounted on a post in the middle of the array, and is connected to each vertical with a quarter wave of 70 Ω foam dielectric coax. To cut the coax to length, the velocity factor must be taken into account, and is best done using an antenna analyzer like an MFJ-259B. Foam dielectric is necessary because other dielectric velocity factors result in the coax being too short to reach the phasing box!

Three cables run from the shack to the phasing box. One is the 50 Ω feed line to the transmitter. The second is a 50 Ω line to a dummy load that I locate in the shack behind the operating desk. I monitor the "dumped power" going into the dummy load with a wattmeter in the shack. When the antennas are all tuned properly for the desired frequency, the dumped power is a measure of how well the system is tuned. The lower the dumped power, the better, and if the array is symmetrical, the dumped power will be about equal in all directions. With 1500 W to my four square, my dumped power is under 5 watts at 3525 kHz. It is a good idea to record the dumped power in each direction, so that if a problem develops you can detect it by noting a change in the dumped power. The third

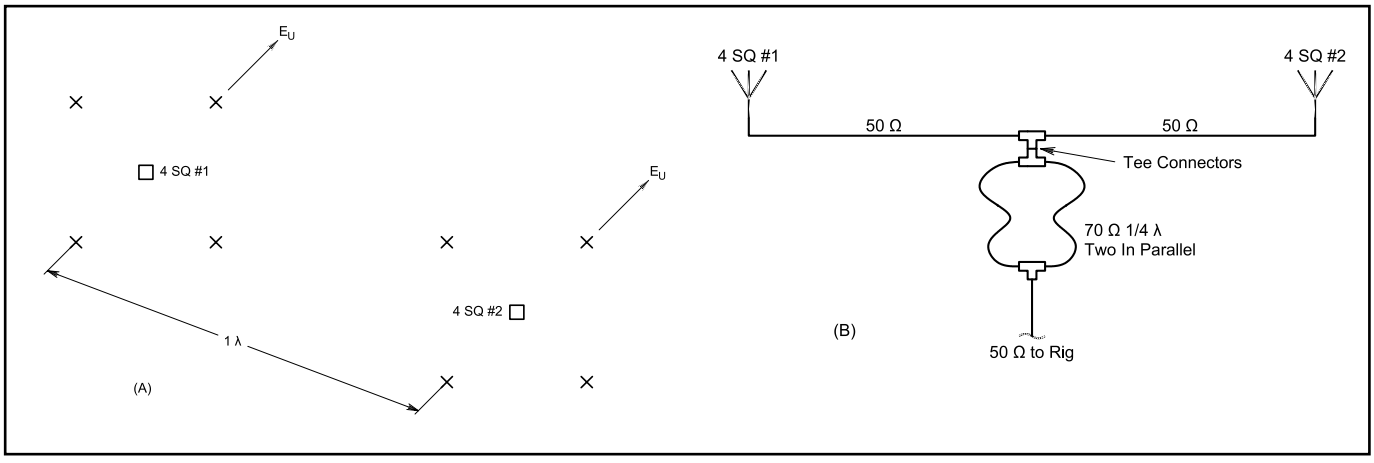


Figure 5a—Orientation of two four square arrays

Figure 5b—Quarter wave matching section.

cable is the control cable.

Tuning and Pruning

Here's how I went about laying out and tuning my antenna. I started by picking a good tall tree to support the first vertical and put a four foot 4x4 pressure treated post about a foot in the ground with a bag of ready mix concrete. I then cut the first radiator to be resonant about 50 kHz *below* the frequency at which I want the array to be optimized (234/f). Since I used insulated # 12 stranded wire, the actual resonant frequency was below the 234/f calculation. When the other verticals are in place, mutual coupling raises the resonant frequency of the array

Next, I planted the base posts for the other three verticals using a compass and adjusting for magnetic declination at my location. I then used the same wire dimensions as determined for the first vertical, suspending the vertical wires from the closest trees. Some were on slight angles rather than straight up, or bent over a treetop, because the tree branches weren't always in the ideal spot. I then installed all of the radials, and connected all four antennas to the phasing box with 1/4 wave, 70 Ω coax cables.

Powering the array from the shack, I then determined the frequency at which dumped power was minimum in each direction. I decided to tune the array for 3525 kHz, but the minimum dumped power was initially at a frequency lower than 3525 so I had to prune each vertical. I "guesstimated" how much to shorten each, based on how far off I was, but it took a few iterations to get close to 3525 with minimum dumped power. Since it is difficult to make every wire antenna identical, especially when one wire might bend over a treetop more than another, it took some trial and error pruning to get to the final configuration. When one vertical is changed, the mutual coupling to the others changes, and the resonant frequencies change. I have made adjustments to each by dropping three to eliminate the interaction, and then tuning each with the analyzer, but actually found that trial and error, and looking at dumped power was easier. I have also found that eliminating interaction by shorting or opening the bottom of the antenna or the end of the quarter wave feed line didn't seem to work as well as trial and error.

A handy tool I found for soldering radials and radiators in the woods is a Bernzomatic model ST1l00TS butane soldering torch. To solder a single conductor, I use the removable tip. When soldering radials I find that using the torch flame directed an inch or so away on the buss from the spot being soldered works best.

So How Does It Play?

As mentioned earlier, I kept my high dipole for comparison to all the other antennas I tried. What I love most about the four square is the directivity. In a contest with a lot of callers in a pileup, I can point my antenna at the station I'm calling, and attenuate all the other guys calling from other directions. Often, just hearing better rather than being louder is what helps you crack the pileup with better timing. My four square *always* hears as well or better than the dipole, is usually quieter than the dipole when the band is noisy and is usually as good or better than my 550 ft beverage receiving antenna. Signal reports are *not* always better than the dipole but often the difference in received signal strength is truly amazing when the direction is switched. Often, steering the array to the right direction makes the difference between a readable signal and no signal at all. On longer haul DX the four square is almost always best because of the lower angle of radiation. I do well in the pileups, but can't say I'm always the first to get through.

What About That Unique New Array?

So I have a four square that plays pretty well—what do I do now? I like playing with antennas, and I have them all performing pretty well. I wonder if *two* four squares would be better than one? I can space the second a full wave away, and phase it with the first one. That's exactly what I did! I located it so it was broadside to the first when beaming Europe (Figure 5a). I have two independent Comtek boxes, and can point both in the same direction, or one in one direction and one in another. I also can switch one out to compare one to two, or I can switch to the dipole in place of the four square.

The phasing circuit is shown in Figure 5b. When I first completed the project I installed switching so I could compare one four square to the other, and always got reports that they were the same. Subsequent tests with switching that allowed me to compare one to both, almost always produced reports of one to two S units better with both! I could also *hear* the difference when I switched between one or two. However, there were times that the two were the same as one.

As we head into the downside of the solar cycle, I look forward to better low band propagation and more opportunity to evaluate the antenna's performance. I operated the July 2003 IARU HF Championship contest, and won first place in the US. What put me over the top was my 80 meter score, but I have to admit I had a New England advantage. I was pleased with the way it performed nonetheless, under less than

terrific summer conditions. In the recent CQWW CW contest, I made more contacts than ever on 80 meters, and may have met my goal to be among the top ten Single Ops. Again I must admit that conditions were outstanding, and I may have been concentrating on 80 more than ever.

In Conclusion

Four square arrays are really neat. Although a wire version can be built for a lot less than a tall tower with an 80 meter Yagi, one does need a lot of space. My eight vertical wires in the woods, with 96 elevated radials require a lot of maintenance. The addition of a second four square phased with the first gave me the ability to split power or listen in two directions, and better reports for one vs. two under some conditions. Right now, my feeling is that if I had it to do again I wouldn't build the second one because the elevated radial maintenance is too much. To be honest, that first version shown in Figure 2a played very well. I think that if I put a bungee cord in line with the rope at the base of the trees, and used heavier rope or cable where abrasion was likely, I could have overcome the reliability problem.

I am fortunate to live in a wooded area on 4 acres surrounded by conservation land. My 96 elevated radials give the birds an added perch, so they don't have to sleep in trees all night. The deer can steer clear of the wires and roam freely on the conservation land. On the other hand, for what I pay in taxes on that extra two acre lot, I could have a tall tower with a *big* Yagi, and then some. Hmmm—I wonder what W6RJ was using when he beat me on that EA8?

Notes:

[1]Devoldere, J, ON4UN, ARRL, Newington, CT, *Low Band DXing,* third edition, Ch 11 pp 47-61.

NCJ

SO2R Station Design Considerations Part 1: Does "Handedness" Play a Role? Should It?

Hal Kennedy, N4GG

Returning to contesting three years ago after a fifteen-year layoff, I quickly discovered that virtually everything had changed during my down time. There was one key exception, however—the willingness of contesters to share their insights and techniques. The majority of active contesters are as I remember them when I got started in the early '60s—eager to learn through sharing information.

As I contemplated building an optimized SO2R station, I decided to take advantage of the collective wisdom of the contest community and put forth a set of questions regarding SO2R station layout on the **contesting.com** reflector. This two-part article reports on the responses I received to questions concerning SO2R physical layout and audio switching methodology.

Background—Handedness

Virtually all of us have a dominant hand—true ambidexterity is quite rare. The majority of us (87%) are right handed, the remaining 13% are left handed. After dabbling with a crude SO2R lash-up, it seemed to me that having the most frequently used controls near the favored hand could be valuable in two ways: optimizing performance of the most frequent tasks, and limiting fatigue. I am right-hand dominant. With one radio *running* and the other *S&Ping*, my early thinking was that tuning the S&P VFO was the most frequent task, and it would be best done by making the right hand radio the S&P radio and operating it with my right hand. As with a lot of nice theories, the collected data proved this thinking to be naive.

In an attempt to determine if handedness was or should play a role in SO2R station layout, I posted the following question set to the contesting.com reflector in early November 2003:

Question #1 - Are you left handed or right handed?

Question #2 - If you operate with radios side by side, do you always have the Run radio to one side (L or R?) and the S&P radio to the other, or do you exchange?

Question #3 - If you exchange, why?

Question #4 - Other comments welcome.

Question #1 was asked to provide a means to assess data validity by comparing the result with the known characteristic of the general population; and to support deciphering the answers to question #2.

The Data Set

Forty-four ops took the trouble to respond to the questions, providing enough data to yield useful results. If you responded—thanks! Responses are not ascribed to individuals in this article, as I did not ask the permission of any of the respondents to do so. Please accept the fact, however, that many of the responses were from operators whose call signs frequently appear in top-ten boxes.

With respect to interpreting the answers received, most were non-ambiguous and easy to score. In those cases where answers were not emphatic, but showed a strong bias, e.g., "I do it this way 95% of the time," I scored those as if they were absolute answers. Those few responses that were of the "I do it 50/50" nature were set aside and are not included in the data presented below.

Those who answered the questions concerning handedness received a second set of questions, via email, regarding audio switching. The audio switching responses will be presented in Part 2 of this article.

Results

Question #1:

The result for the dominant hand question was:

Right handed = 82%, Left handed = 18%.

This is reasonably close to the general population (87%/13%), providing comfort that the rest of the data is valid.

Question #2:

The result for the question concerning fixed Run and S&P radio positions versus frequent position exchanging was:

Fixed radio positions: 52%, Frequent position exchanges: 48%.

Of the fixed position stations, 74% have the run radio on the opposite side of their handedness, i.e., right handers have the run radio on the left 74% of the time. 26% of the fixed layout stations have the run radio on the same side as their handedness. Reasons for this are discussed in the next sections.

Question #3:

Of the 48% of the stations that frequently exchange Run and S&P radio positions, there were two dominant reasons why:

It's faster/easier/most flexible, etc. A

A typical SO2R station layout. Is everything located to optimize performance and minimize fatigue?

typical response: "If the Run radio is on 20 and the S&P radio is on 15, and 20 gets cold and 15 gets hot, I don't want to lose any time, I just start running on 15 without changing anything."

With respect to station limitations, here are some typical responses: "My radios are not the same, one is better for running on the low bands, the other on high bands," or, "My left radio only has the low band antennas, and my right radio only has the tribander." Station limitations force operators to move their run position to the left or right radio based on a tiered decision of which band is best to be running on, followed by which hardware is able, or best able, to run that band.

Of the stations that frequently exchange run and S&P positions, 78% change for the faster/easier reason, 22% because of hardware limitations.

Discussion and Conjecture

Stations that I recognized as frequently in the top ten and having a lot of SO2R experience were almost all in the "frequently exchange positions" category, and gave the faster/easier reason. Many of these ops indicated they had identical radios and nearly all of them indicated they had switching to provide any antenna to either radio.

The biggest surprise came in an area that was not specifically asked about—manual keying. For those who used radios in fixed positions, left/right layout appears to be driven largely by whether or not the operator does much hand keying. There are significant distinctions between those who do a lot of hand keying and/or mouse manipulation and those who don't. Those who mentioned they hand key a lot (a minority of responses) mostly do so with their dominant hand, and have their run radios on their dominant side. Why? The run radio requires much less touching—typically just a tweak of the RIT now and then. Given the two tasks of working the paddles and tuning the S&P radio, the preference is to give the paddles to the dominant hand and the S&P tuning to the non-dominant hand. Those who did not mention hand keying (the majority of responses) were those who had the S&P radio with the dominant hand. These ops only have one hand chore, not two (ignoring the keyboard)—that being tuning the S&P radio, which they have allocated to the dominant hand.

Conclusions

My early theory that the dominant hand should perform the *most frequent* tasks was not supported by the data. The data suggests the dominant hand should perform the *most complex* tasks, such as hand keying.

Learning to use keyboard CW keying (ALT-K on all the popular contest software packages) is often touted as a valuable skill. It allows one to keep ones' hands on the keyboard and may have slight fatigue and speed-of-response advantages over moving a hand over to a manual key. There may be an additional advantage as well—it frees the dominant hand from the most complex task in an SO2R station (keying) and allows the dominant hand to be dedicated to other complex or repetitive tasks such as tuning the S&P VFO. This is not an all or nothing situation, either—if you can reduce your use of hand keying you can put the S&P radio as well as the hand key with the dominant hand.

Stations that have their Run and S&P positions change from one band to another, as dictated by hardware limitations, may be able to achieve some operating performance improvement without incurring the potentially large expense of moving to identical radios and full antenna switching. There seems little doubt that this is the ideal end-state. Adding just enough hardware (often just antenna switches) to allow the S&P radio to always be on the same side may provide performance and fatigue benefits and be easy to accomplish.

Layout experiments at my SO2R station have shown me that you do not need to be ambidextrous to handle nearly any of the tasks involved with either hand—perhaps even keying (although keying with 'the other hand' is difficult for most people to master). The tasks slowly become second nature. It is my belief, however, that paying attention to layout such that the dominant hand performs the most complex tasks, followed by the most repetitive tasks, may provide some advantage—particularly near the end of long contests when fatigue becomes the performance-limiting factor.

Some Interesting One-offs

Lot's of ops responded to question #4: "Other comments welcome." Many comments were redundant or in specific support of the data presented above, but there were some unique comments that I found thought provoking:

"I stack the radios ... I would strongly advocate against setting the radios out horizontally."

It is interesting to note that on K8ND's excellent SO2R Web page,[1] only two of the 36 stations pictured have the radios stacked. Are we all missing something here? Stacking takes up less desk space and can put the controls of both radios with the dominant hand. I plan to give stacking a try.

"The single largest factor has turned out to be the height/location of the monitor. That height/location factor is critical because you can easily tire yourself out w/head moves, eye shifts, and contrast issues that are unneeded, etc."

I could not agree more. Several stations pictured on K8ND's Web page have monitors located far above the equipment. I suspect the station owners have developed strong neck muscles over the years! My contesting fatigue was reduced when I added a high quality monitor at eye level.

"Sometimes I wind up running on both radios at the same time—it's very challenging."

I received this reply from two stations and have begun doing it myself. The degree of challenge is something like exponential to the two rates. Ping-ponging CQs is actually relaxing physically—it only requires occasional operation of each of the RIT controls. This challenge is mental!

SO2R Audio Switchology

In the next issue of NCJ, we will take a look at the SO2R audio switching preferences of some perennial top-ten finishers.

[1]home.columbus.rr.com/jmaass/Radio/K8ND_SO2R.htm

Meaningful Contest Exchanges

Rick Hilding, K6VVA

A recent topic on the contest reflector discussed cutting numbers short for the sake of speed. Here's K6VVA's view on the subject.

After returning to the wonderful world of HF contesting after being away for decades, trying to get up to speed with contesting in the new millennium has been challenging for an old fogy.

I want to thank my good friend Jim, ZD8Z/N6TJ, for pestering me the last 20 years to do more than just be a degenerate mobile rag-chewer on the local 440MHz repeater and to get back in the game. Because of Jim's persistence and help, along with the whole gang at the Northern California Contest Club (NCCC). Special thanks to N6RO, WØYK, K6XX, N7MH/W6YX and others, I would not have had the blast I did operating as KP2CW in the ARRL DX CW Contest—in spite of still being more QLF than I preferred.

When I got back on HF with a barefoot transceiver and wire antenna just before the Sweepstakes last November, as I dabbled in various contests during the next few months I found myself questioning the meaninglessness (and sanity) of contest exchange derivatives like 5NNATT and others. I yearned for the "good old days" and the non-computer generated CW by some of the great fists like DU7SV, W4KFC and others. You know, you could tell who it was without even hearing his call. And there *was* a specialness to hearing the full 599 (as in dah dah dah dah dit—dah dah dah dah dit). It was musical the way some guys sent the *real* 599.

After a recent NCCC thread and other forum discussions about all the "creative" power multipliers used by many DX entities in the last contest (and resulting confusion to many W/VE stations), I personally envision the future of *599KW* most likely evolving (or degrading) to something like *ETTTE* before long. I have decided to speak out.

We've all heard the term "meaningful relationship". I'd like to suggest that we need to have meaningful contest exchanges and abandon the growing trend toward insane weirdly shortened power multipliers as well as the nonsense use of 599 (especially when the guy is really 339 or has almost a raw ac signal like many I worked in the contest).

Many non-ham contests and competitive races, etc. require an entrant to "register" *before* the event. In this age of instant Internet technology, a real no-brainer solution that could also result in a more challenging "meaningful contest exchange" is as follows (using the ARRL DX CW Contest as an example):

Each contester clicks on an ARRL "Contest Registration" Web site, chooses the desired contest from a drop-down list and enters his call sign in a text field.

Through the miracle of Internet technology, they are immediately emailed a unique "registration number" 8, 10 or maybe 12 alpha/numeric characters in length. This will be the "exchange id" to use in the contest, and "unique" only *for the that event. It's no different than an ID or Password we all use accessing various Web sites/databases.*

Obviously, this ID is not published for the world, and given only to the entrant. Once used in the contest, it is known for other band QSOs, but still elevates the need for operator skills versus the use of 599KW or the mass-confusion caused by the ETTTE type derivatives).

Since the ARRL generates the "EXCHANGE ID", log checking by them would be a breeze since they have the master list of all the exchange IDs. It is a total no-brainer…except that more operator skill is require during the contest.

OK, that's my two-cents on the subject. 73, and good luck, errr, good skill in the contest, OM.

Rick ("Locust") Hilding, K6VVA

Bio

K6VVA was a co-founder of the NCCC, worked DXCC 330+ 30 years ago, and is ex-FOC #845. NCJ

The Fun of Being a Host Station

Scott Johns, W3TX
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If you have a great station getting too little use, then my hope is after reading this article you will consider trying the fun experience of being a host station for a guest-op. Over 23 years ago little did I or my guest Bob, W3BBO, know that the elements eventually leading to our host/guest-op relationship had already started to unfold.

In the 1970s two kids growing up in a small Northwestern Pennsylvania neighborhood became lifetime friends. One kid is the daughter of W3BBO. Fast-forward to 1993: The other kid is all grown up, and I met her at the frozen food isle of a grocery store, and soon thereafter asked her out on a date. Unmarried hams take note—my typical strategy on the third date was to show the young lady a picture of W6RU's Big Bertha festooned with monoband Yagis and then ask her what she thought of having three of those in her yard. Thankfully for W3TX, this particular date was best friends with W3BBO's daughter and had grown up next door to a ham family. She thought antennas and radios were cool. We soon married!

Flashback to the 1980s—my teenage weekends were for contesting and weekdays were for DXing. I ate, drank and lived Amateur Radio. While the other kids were out doing whatever they did on Friday and Saturday night, I was running JAs on the low end of 10 or 15 meters. While the other kids were sleeping in on Saturday and Sunday morning I was running EU. I had typically worked a lot of DX on weekday mornings before my Mom and Dad awoke me for school. Sleep was optional and radio was mandatory! I'll even admit to feigning illness on many occasions to stay home from school to work a DXpedition or to prepare for a contest! I love this hobby of ours so much that I made it my lifetime passion to build a super station one day and to spend every free moment thereafter enjoying my radio oasis of fun.

When I hit college my operating time became limited, but the passion was alive. Physics, math and engineering were a struggle, but I was a natural at biology and chemistry. So I picked a career that was fun and that could support building a nice radio station and provide, hopefully, some free time on weekends to enjoy it. Somewhere along the way I had the audacity to write a letter to Lew, K4VX, to ask him what it takes to build a top contest station. Lew didn't know me from Adam! Despite that, he wrote me an entire series of letters stretching over several years. Additionally, he spent considerable time fielding my urgent radio questions on the phone. Always a good mentor with a vision to the future, Lew had a simple mantra to remember: Do very well in school, think antennas, antennas, antennas—the rest will take care of itself.

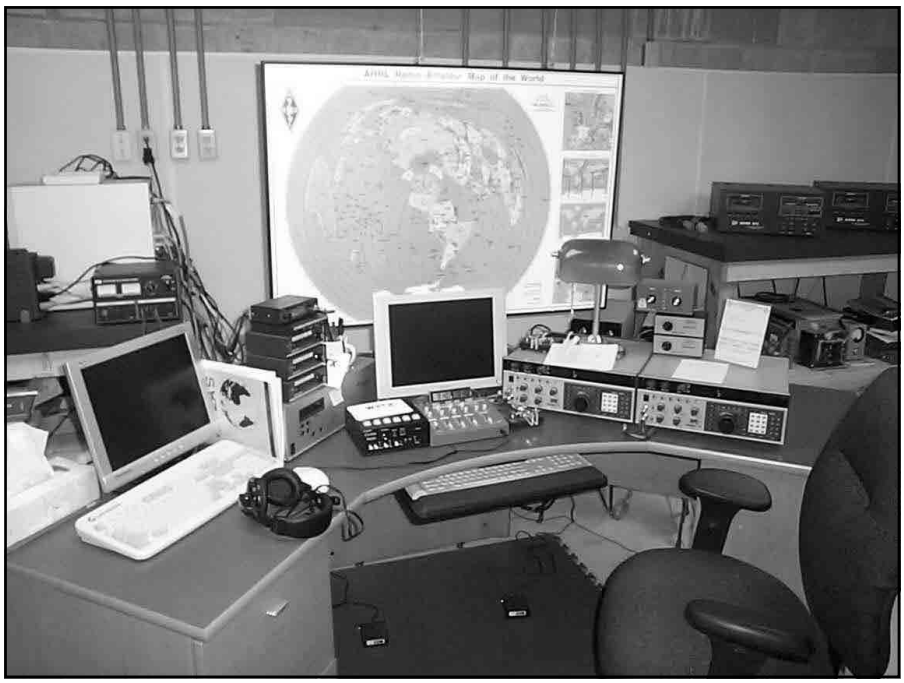

Figure 1—W3TX's station, nice and clean and uncluttered.

Figure 2—W3TX's stack of monobanders on a Big Bertha.

Like the Guru planting the seeds that grew and helped Grasshopper understand how to walk over the hot coals of life, Lew granted me this little kernel of wisdom: "When you are old enough to afford this great station you will build" Lew said, "you may not have the time to operate it." My twenty something brain thought "what did he mean, and why does this guy with such a great station have visitors operate contests all the time?" The seeds needed time and nurturing to grow.

Now in my late 30s, I've come to a crystal clear understanding of what Lew had been preparing me for all along. Despite having built a great station with an impressive first phase of antennas, I also have all the rights and responsibilities that come with a family and a career. Children are only young once, and clients pay the bills, so my beautiful radio station often sits patiently, quietly, waiting for an operator.

In 2003 our family had the opportunity to acquire a 50 acre pumpkin and tomato farm in a great school district. This led to the inevitable family plans for a "farm warming" party, and since it was a pumpkin farm and since it was autumn the plans grew into a Halloween pump-

kin decorating party for 25 toddlers/preschoolers and all their parents. Unfortunately, the 2003 PA QSO Party and the Pumpkin Party converged on the same day. So, after gaining the approval of my wife, I placed an urgent call to her best friend's dad, Bob, W3BBO. Fortunately, he accepted the offer to guest-op, resulting in an opportunity for me to fully enjoy the Pumpkin Party, and for Bob to fully enjoy the QSO Party while putting the W3TX radio hardware to good use.

The responsibilities of being a good host are numerous, and do require some balancing between family and guest. First, for the family's sake, it's an important responsibility to pick the right guest. The imposition on one's spouse and children of having a radio guest visit for the weekend is great, so pick guest-ops carefully. In this case, my entire family already knew W3BBO and, since he was my wife's best friend's dad, it seemed like a good fit. Before inviting new ops to guest-op I would recommend an interview to determine if there is a potential match or not.

Second, it's ideal to create a situation of separation between one's family and one's radio guest. That way the flow of your family's day and night activities can proceed unchanged while the radio guest is free of potential distractions. Unfortunately, in my current home, sounds carry from the basement radio room throughout the home via the ductwork: Past experience had proven that SSB efforts would awaken the children at night, and we all know that is no fun for anyone! So the compromise in my current home is CW efforts only (Future solution: At the pumpkin farm QTH the station will be in a pre-existing building separate from the house.)

Third, it's important to educate the guest-ops so that they understand how the station is engineered, especially if the host will not be present at times during the contest. This is an area that I need to pay more attention to in the future! While I was at the Pumpkin Party, Bob experienced a hardware problem. Despite my absence he was able to work around the problem but at the cost of much operating time.

Finally, a good host ensures that their guest is well fed. If a guest loses weight during their visit to us, my family feels we have failed in our host responsibility! All kidding aside, the important thing is for host and guest to coordinate a meal plan that works for the guest. A little planning goes a long way. If the host is to cook, be sure to inquire about your guest's food sensitivities. And be sure to deliver meals and beverages to the guest on time!

That memorable October Saturday of the Pumpkin Party and PA QSO Party had, arguably, the best autumn weather of 2003—70 degrees, mostly sunny with big puffy autumn clouds levitating over Lake Erie, and light breezes filled with the sounds, sights, and aromas of autumn. All the kids and parents attending our Pumpkin Party had a great time! And radio conditions were great for the QSO Party. It's fair to say that both W3TX and W3BBO learned a lot and had a blast, and fun is what it's all about! Now that I've experienced the fun of being the host, I can't think of a better way to enjoy station building, family time, and creating great opportunities for tomorrow's top ops other than being a host station. To my mentor K4VX…thank you Lew for your guidance and inspiration! I hope my story inspires other readers to try hosting, too! NCJ

The Fun of Being a Guest Operator

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After losing a guyed tower to vandals some years ago, Scott, W3TX, installed a Big Bertha rotating pole that supports a multitude of stacked monobanders for 10, 15 and 20 meters, topped off with a full sized 3 element 40 meter Yagi at 120 feet. This antenna setup sure outplays my little city lot with its 30 foot tower, small triband Yagi, and a ground mounted vertical for the low bands. It was a real treat one afternoon to hook up my K2 transceiver and see how the bands sound with real antennas. I must admit, the K2 was never the same after returning home—it really liked those antennas!

Scott asked me if I would like doing a guest op during the PA QSO Party (PAQSOP) this year. Wow, that sounded like fun! My previous forays into the PAQSOP have mostly been all CW efforts using QRP with the mediocre antennas. Naturally, I said yes to this guest op opportunity. Then the thought struck home, what do I do now?

Scott said I could bring my equipment, my computer, or simply use his setup. In addition to the Bertha, Scott's station sports a couple of Ten Tec Omni VI transceivers and Alpha 87A amplifiers in an SO2R configuration. It is really a first rate station. I had pretty much decided not to do QRP this time and instead to use Scott's gear. Though the amplifiers looked really tempting, I thought I'd better stick with a low power CW entry.

This was a first for both of us. A few weeks before the contest, as I drove over to Scott's place for station orientation, I wondered what it is like to be invited on a DXpedition or to a multi-op super contest station and whether I would have the same butterflies? As a small time contester, I considered how intimidating those opportunities might be. Fortunately as a single op, my only pressure was not to embarrass myself, or wreck Scott's station. In my mind, it seemed best to forgo trying to operate SO2R and configure the station for a single radio operation. Scott was very accommodating and allowed me to configure his station in the way that I would feel most comfortable.

Decisions, decisions! First was which Omni VI to use? This was simply solved by sitting in the chief operator's chair and selecting the one similar to my home setup. Scott had recently installed new silent keyboards that I found very uncomfortable. These were swapped out for a standard keyboard that I was more familiar with. The remaining decisions were which antennas and which logging program to use.

The stacked arrays and the 40 meter beam are great antennas, but very much an overkill for an in-state QSO Party. Scott's solution to this was to set up a pole in the side yard and string inverted-vees for 40 and 80 meters. He also configured the system to feed the 3 element 40 meter Yagi and the inverted 40 meter Vee together. This allowed working the close in stations, while still having access to the distant guys. Both the 80 and 40 meter antennas provided lots of contacts.

Scott uses TR Log, which I have used in the past, so I wasn't completely unfamiliar with it. However for the PAQSOP, I've always liked KA3JWE's *Windows* based program. It is a no-brainer and scores the party well. Fortunately, Scott had a machine in the shack that ran *Windows* and we loaded in KA3JWE's program. The next problem was to get the computer program talking with the Omni and to get it to send CW. Interfacing with the radio wasn't a problem, but for CW we needed another serial port interface, which Scott quickly cobbled together. Now I was set and waiting on the weekend to begin.

That Saturday in October quickly arrived. On the drive to Scott's place, I realized that I still had several decisions yet to make. The PAQSOP gives an off time between 0500z and 1300z Sunday morning. Do I stay over, or drive home and sleep in my own bed? Home is only 30 miles away, but it will be dark and I'll be tired, so I decided to simply postpone that decision until 0500z. Scott said I had free access to his fridge, but should I impose? I opted to stop along the way and pick up some soda and snacks for the afternoon. Arriving at Scott's place, I found myself alone. Scott and his wife Sharon had taken their kids to the local pumpkin farm. Fortunately, I remembered how to power up the gear and get started.

The Omni played very well and there was only one glitch, thanks to Mr Murphy on Saturday afternoon. While on 40 meters, suddenly the Omni 6 went dead. Resetting the power on, I noted the SWR was sky high and after a short try at tuning, the power supply would trip out again. Now what? Scott wasn't home and I was on my own and 40 meters was the "money" band for this contest. I lost about a half hour or so while trying to figure out what to do. I decided to bypass the automatic switching and hook the inverted-vee directly to the Omni. That did the trick! I was back on 40 meters. Switching to other bands, however, became a real chore of manually switching coaxial cables, running a bunch of contacts, then swapping cables again to get back to 40 meters. Fortunately Scott had taken the time to talk me through the antenna switching scheme step by step before the contest.

Finally, 0500z arrived and I was too tired to consider driving back across town and decided to curl up in a corner of the ham shack. I had brought a pillow and comforter from home, so I was able to get some sleep. Sunday morning came soon enough; I had enough time to attend church, then grab a greasy egg and sausage sandwich at the corner gas station. Ah, the life of a contester! I made it back to Scott's place in time for the 9 AM starting bell.

The rest of Sunday went very well. I was still manually switching the coaxial feed lines, and I was getting pretty quick about it. Scott showed up around noontime with a sandwich and soda, the contacts continued and I was really enjoying myself. When the finish bell went off, I had a personal best for this contest and had really enjoyed using Scott's station.

I consider myself fortunate that Scott only lives 30 miles away and I was able to familiarize myself with his station several times before the contest. Walking in cold would have been really traumatic, especially with the station manager being away. From my perspective, I came away with a real appreciation for the hams who turn over the station keys to a guest operator and to the hams who operate as guests.

So, what would I do differently? Well, if I were after more wallpaper, I'd have simply cut the power back to 5 W, as the antennas would certainly make up the difference—plus the two times multiplier for QRP would add even more compensation. However, I decided on running low power, which was fun, but if I had it to do it over again, I think I should have cranked in an amplifier. In the past, I've heard Scott running a kW down on the low end of 40 meters and running an endless string of contacts. So the old adage *be loud* has made me a believer! And lastly, I should have tried SO2R, even if only for the experience when things slowed down on Sunday afternoon. NCJ

All Time ARRL Field Day Records

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ARRL Field Day 2003 was again great fun. Although the 10 and 15 meter bands didn't cooperate, there were four records broken and ten new records set (as indicated by **bold type**). All of the high "F" class scores were new records for this new class. Good luck, be safe, and have fun in Field Day 2004.

The listing shows class, call sign, year record set, club or group name, number of QSOs, power level (5—less than 5W, 2—less than 150W, 1—more than 150W), number of operators, and total score. Commercial classes are not listed.

CLASS	*CALL*	*YR*	*NAME*	*QSOs*	*Pwr*	*OPs*	*Pts*
1Abat	**K6MI**	**03**	**Chew's Ridge Gang**	**1080**	**5**	**7**	**11,725**
1A	N5RR	92	Albuerque DXA	2870	2	28	8550
2Abat	W0CQC	00	Colorado QRP Club	1688	5	12	17,410
2A	KP2N	93	Virgin Islands ARC	5252	2	16	15,580
3Abat	W0CQC	01	Colorado QRP Club	2310	5	10	20,360
3A	W0GG	00	Pikes Peak DX Group	5825	2	17	17,306
4Abat	WB8JBM	83	Northern Ohio ARS	2029	5	127	17,345
4A	W2GD	02	Cherryville Rpt Assoc II	6626	2	57	20,112
5Abat	W3VPR	84	Anne Arundel RC	2495	5	49	26,570
5A	W2GD	99	Cherryville Rpt Assoc	6566	2	42	20,520
6Abat	VE3QDR	02	Durham Region QRP Club	1210	5	8	11,960
6A	W2GD	00	Cherryville Rpt Assoc II	6694	2	43	20,628
7Abat	W4DW	89	Raleigh ARS	1236	5	12	11,215
7A	W3AO	99	Potomac Valley RC 1	9163	2	17	26,224
8Abat	N6WG	00	Alameda County Rpt Club	1305	5	25	10,850
8A	W4IY	02	Woodbridge Wireless	7839	2	63	24,088
9Abat	VE3NAR	95	Nortown ARC	1105	5	30	7930
9A	W4IY	98	Woodbridge Wireless	6217	2	56	18,834
10Abat	N6R	01	Ventura City ARS	908	5	20	6895
10A	W4IY	85	Woodbridge Wireless	5067	2	67	15,474
11Abat	VE3NAR	97	Nortown ARC	1170	5	36	9465
11A	W4IY	90	Woodbridge Wireless	4669	2	60	14,688
12Abat	AA6CV	00	Conejo Valley ARC	1340	5	38	11,490
12A	W4IY	88	Woodbridge Wireless	4791	2	55	13,646
13Abat	AA6CV	99	Conejo Valley ARC	1142	5	30	9880
13A	W4IY	99	Woodbridge Wireless	7329	2	65	22,780
14Abat	AA6CV	97	Conejo Valley ARC	1246	5	55	10,795
14A	W4IY	00	Woodbridge Wireless	8064	2	83	24,904
15Abat	K6CAB	94	Conejo Valley ARC	3460	5	34	30,150
15A	W4IY	01	Woodbridge Wireless	6572	2	68	22,056
16Abat	K8UU	01	Utica Shelby ECA	2111	5	153	19,015
16A	WY8M	94	Utica Shelby ECA	5917	2	295	21,468
17Abat	K6CAB	89	Conejo Valley ARC	3119	5	40	23,685
17A	**W4IY**	**03**	**Woodbridge Wireless**	**5922**	**2**	**73**	**20,272**
18Abat	K6CAB	90	Conejo Valley ARC	2569	5	30	21,275
18A	N1FD	00	Nashua Area RC	6246	2	100	19,614
19Abat	KK8M	98	Utica Shelby ECA	2233	5	177	18,650
19A	K2AA	86	South Jersey Radio Assn	4320	2	65	13,178
20Abat	KK8M	99	Utica Shelby ECA	2527	5	176	20,920
20A	N1NH	96	Nashua ARC	6738	2	85	21,756
21A	W2RJ	76	Englewood ARA	2845	2	55	10,186
22Abat	AD6T	91	Conejo Valley ARC	2962	5	52	23,500
23Abat	K5DX	89	Texas DX Society	3326	5	28	25,260
23A	N1FD	01	Nashua ARC	4484	2	80	15,740
24A	N1NH	95	Nashua ARC	6209	2	95	21,648
25Abat	K6CAB	92	Conejo Valley ARC	2343	5	62	20,255
26A	W3AO	01	PVRC & CARA	10141	2	40	31,760
27A	N1NH	97	Nashua ARC	6768	2	87	22,080
28Abat	K8UO	02	Utica Shelby ECA	2193	5	17	20,595
28A	N1FD	99	Nashua ARC	7902	2	96	24,358
30A	W3AO	00	PVRC & CARA	9908	2	50	31,534
35A	VA3RAC	00	Capital Region FD2000	1940	2	190	10,136
38A	W3AO	02	PVRC & CARA	10150	2	45	33,442
51A	**W3AO**	**03**	**PVRC & CARA**	**7754**	**2**	**60**	**27,834**
1B-1bat	KW8N	95		945	5	1	8975
1B-1	W8TK	96		1460	2	1	6586
1B-2bat	W8DL	02		1095	5	2	11,250
1B-2	**N5RZ**	**03**		**2136**	**2**	**2**	**7524**
2B-1bat	KW8N	02		727	5	5	7525
2B-1	KW8N	00		1698	2	1	6374

Figure 1—Denis, W4DC, at his station.

CLASS	*CALL*	*YR*	*NAME*	*QSOs*	*Pwr*	*OPs*	*Pts*
2B-2bat	WB8JBM	81		953	5	2	8965
2B-2	W2GD	88		2560	2	2	8814
3B-1	**KW8N**	**03**		**1346**	**2**	**1**	**5556**
3B-2bat	KW8N	97		962	5	2	8695
3B-2	K5TA	93		2137	2	2	7000
4B-2	KW8N	98		1720	2	2	6040
5B-2	W8TQE	89		272	2	2	1212
1C	WA4YRN	91		934	5	1	8080
2C	N6BT	80		1885	2	3	4912
3C	WB4GQX	76		836	2	3	2162
4C	WA5FRF	00		301	5	5	2525
5C	AB3A	80		694	2	8	1696
6C	VO1AA	78		30	5	8	715
1D	NA5TX	99		1450	2	1	5800
2D	W4MYA	99		4019	2	14	10,758
3D	K1AR	78		3825	2	6	8928
4D	N6TV	92		2253	2	17	5708
5D	W1AW	91		1650	2	6	4726
6D	W1AW	95		3200	2	16	9290
7D	W1AW	94		2890	2	7	8820
8D	N4T	00		2465	2	10	6034
9D	N6OP	91		2849	2	22	8206
1E	KR0B	88		1525	5	3	11,490
2E	KR0B	89		2000	5	5	13,975
3E	N0NI	99		4421	2	6	12,480
4E	W3PP	99		3720	2	8	10,504
5E	W6YX	00		3059	2	10	8932
6E	W6YX	01		4722	2	22	13,902
7E	W6YX	02		4304	2	24	12,570
8E	WU8A	95		1963	2	21	6474
9E	K5PXP	02		1605	2	23	4820
11E	W4WVP	01		205	2	13	632
13E	AA5EQ	90		235	2	7	554
15E	K9GL	82		8179	1	25	10,541
41E	K7AUO	91		567	1	20	815
1F	**K5PXP**	**03**	**ARVARF 1**	**127**	**2**	**15**	**3374**
2F	**W5UR**	**03**	**Albuquerque DX Assn**	**2621**	**2**	**18**	**8494**
3F	**W7PXL**	**03**	**Valley RC**	**864**	**2**	**23**	**4344**
4F	**W8FY**	**03**	**Van Wert ARC**	**1739**	**2**	**18**	**5660**
5F	**W6NWG**	**03**	**Palomar ARC**	**2917**	**2**	**68**	**9192**
6F	**W8VND**	**03**		**1461**	**2**	**26**	**4586**
7F	**W6YX**	**03**	**Stanford University ARC**	**4349**	**2**	**30**	**15,610**
8F	**WE1CT**	**03**	**Worcester Emer Comm**	**1126**	**2**	**32**	**4330**
9F	**W4WVP**	**03**	**Arlington (VA) ARC**	**352**	**2**	**23**	**2618**

Roving In VHF Contests: How To Score Three Million Points—and Why

Wayne Overbeck, N6NB

A group of three "rover" stations, N6MI, N6MU and N6NB, scored more than three million points (over one million each) during the January 2004 VHF Sweepstakes. This article tells how it was done—and why anyone would want to do such a thing.

How it was done is a familiar story to any serious contester, HF or VHF. It's about months of planning, station building, recruiting top operators and practicing to develop efficient operating techniques. *Why* it was done is perhaps a longer story, rooted in the history of the rover phenomenon.

A Little History

The rover category in VHF contests has been controversial ever since the advent of the Maidenhead grid square multiplier system 20 years ago. Under the Maidenhead plan (so named because it was developed at a conference in Maidenhead, England), the world is divided into geographic units. Each unit is one degree of latitude high and two degrees of longitude wide.

Rovers began traveling to various grid squares during VHF/UHF contests even before the rules were formally amended to clarify that multiple contacts between the same two stations on the same band are okay—if one of them moves to a different grid square. What rovers do is akin to a road rally with amateur radio equipment aboard, and it has considerable appeal to people who might not otherwise participate in a VHF contest.

Some rovers spend months planning an itinerary that will take them on a 1200-plus mile trek through 20 or more grid squares during a VHF contest. Rovers have dramatically increased the activity level in sparsely populated areas, while providing otherwise unavailable multipliers to fixed contestants and other rovers, especially on the microwave bands.

Although it's popular, roving has been controversial for several reasons. For one, questions have been raised about rover operating practices. Rovers usually attempt to visit as many grid squares as possible, a practice encouraged by the ARRL rules (which award an extra multiplier for each grid square activated during the contest period). That causes many rovers to keep moving, never venturing far off the major highways and rarely stopping long enough to set up high, directional antennas. If they are to visit as many grid squares as possible, rovers have no choice but to leave *rare* grid squares quickly and go on to grid squares that are *not* rare.

There have also been complaints about the operating practices of *captive* rovers who go out on behalf of a large multi-operator group and make little or no effort to work anyone except the affiliated multi-multi station.

The rover scoring system has also been controversial. The system has been radically changed twice, and some amateurs are not pleased with the result. Originally, rover stations scored their activity in each grid square separately. For a time *QST* listed all of these individual scores. That produced low scores for rovers; they demanded better treatment. The response was a rover scoring system that some have called "mega-scoring." The contacts and multipliers from all locations were aggregated and the sums were then multiplied, producing enormous total scores. One could work (and count) the same multiplier again and again (by working it from different grid squares).

To dramatize what they saw as the unfairness of that system, four amateurs (two father and son teams) in New England went roving in the January 1993 VHF contest in two vehicles, working each other on nine bands as they circled around the point where four grid squares came together. Then they did the same thing at another convergence of four grid squares. When the contest was over, each of the four had amassed over 1.25 million points: four people in two vehicles had scored five million points. For comparison, the highest fixed station score in that contest was about 300,000 points.

Then the four added their scores to those of fixed stations in their radio club, the Hampden County Radio Assn., creating a club aggregate score more than triple that of the perennial winner, the Mt. Airy VHF Club in Philadelphia. The Mt. Airy Pack Rats had won the club aggregate competition every year for more than 30 years, but the rover scoring system ended that tradition. Fixed stations simply could not compete. A further irony was that the Rochester Area

Figure 1—In January 2004, the rover team grew to three 10-band stations, shown here in CM99. At left is the Isuzu Rodeo used by N6MU/R, with driver Bill Reese beside the car. In the foreground is the Ford Explorer used by N6MI/R. Behind it is the van used by N6NB/R and KG6TOA. Each of the three rover stations scored more than one million points in the 2004 VHF Sweepstakes.

VHF Group, the perennial number two club in the January contest, also topped the Pack Rats that year—but got upstaged by four guys in two vehicles. RAVG's long-sought number one score in the club competition was not to be—until later. In reporting the contest results, *QST* pointed out that RAVG's club aggregate score was also boosted by rover scores.

The high scoring foursome (Stan Hilinski, KA1ZE, and his son Kevin, NR1L, and Robert Cohen, K1CPJ, and his son Scott, KA1QAS) revolutionized VHF roving and demonstrated what was possible. But because their monster scores overwhelmed the traditional club competition, there was an outcry for still another change in the scoring system. Many rovers defended the "mega-scoring" system by arguing that it made the contests a lot more fun and stimulated activity in many parts of the country. The debate raged at club meetings and conventions, in petition-gathering efforts and on the air.

In the end, the ARRL reached a compromise: rovers could continue to aggregate their QSO points, but they could count each multiplier only once per band. This resulted in rover scores somewhat more comparable to those attainable by fixed stations. However, it became clear over the years that rovers still have an edge in scoring opportunities, especially when two or more rovers travel together so they all can work the rare multipliers that they are handing out to others. By roving in tandem and sometimes "circling" a four-grid "convergence," rovers routinely amass scores that even the top fixed stations have a difficult time matching. This tactic has enabled some rovers to achieve high scores even in sparsely populated areas where there are few fixed stations active on the higher bands. Also, tandem rovers can still tilt the balance in the club competition.

After the rules were changed, just about everyone thought the scoring record set by KA1ZE's team would hold up indefinitely. But the mark only stood for six years. Operating under the new scoring system, a team formed out of the legendary Grid Pirates multi-operator contest group recorded one of the truly historic efforts in the annals of VHF contesting in January 1999: N3IQ/R scored **1,391,942 points** in VHF SS. Operators ND3F and WD8ISK roved in tandem with K8GP/R, operated by K6LEW and KA3QPG, who posted a score of **827,372 points**. The two teams visited 15 grid squares and worked each other on an incredible **12 bands**—and then set out to work everyone else they could hear in the activity-rich Northeast Corridor. *That* score will be hard to top, even in the Northeast.

Figure 2—After the contest, the group did another photo session at the Red Bluff sign in CN80, this time with three vehicles. In the foreground, Scott Bovitz, N6MI, shoots video of the scene as Bill Reese stands beside the Rodeo used for rover station #3.

Figure 3—Before the contest began, the group posed at N6NB's house in Tustin, CA (DM13). From left: N6NB, KG6TOA, N6MU, N6MI and Bill Reese.

Building Rover Stations

In 2003 I decided to upgrade my rover van to 10 bands: 50, 144, 222, 432, 902, 1296, 2304, 3456, 5760 and 10,368 MHz. Because many of the top-scoring rovers were forming teams and traveling together, I built a second 10 band rover station in an SUV and asked John Desloge, N6MU, to rove with me in the September 2003 VHF contest. We drove 1,300 miles, visited 16 grid squares, worked each other literally hundreds of times on 10 bands, and ended up with the two highest rover scores in the contest (setting a new record).

As any serious contester knows, success is addictive. If we could do that with two stations, I wondered, what could be done with *three*? So during the fall I built a third 10-band rover station. All three stations utilize commercial transceivers for 50, 144, 222 and 432 MHz, with

Down East Microwave transverters (plus two made by the German firm, SSB Electronic) for the higher bands. The antennas are a mixture of homebrew and commercial. Each vehicle has a stack of multiband cubical quads, UHF Yagis, and assorted horn and axial mode helix arrays atop an antenna rotor mounted on the roof. We use mainly loop antennas for 50 MHz.

The equipment is housed in a removable console that can be placed on the passenger seat or the rear seat of a car. Power comes from batteries mounted at the console and recharged by the car's electrical system. The stations typically run 100 W output on 50 and 144 MHz, 30 W on 222, 75 W on 432, 10 W on 902 and 1296, and 1-2 W on all higher bands.

Planning and Operating

The real key to achieving high scores in VHF SS was recruiting outstanding operators. In addition to N6MU, Scott Bovitz, N6MI, agreed to operate one of the stations, and two non-ham friends volunteered to act as drivers. One of them, Rob Hughes, took the technician class exam the Saturday before the contest. Amazingly, his new call sign (KG6TOA) showed up in the FCC database in only six days and he became a licensed amateur the day before the contest, enabling him to operate as well as being a designated driver. Another friend, Bill Reese, did much of the driving in N6MU's vehicle. N6MI managed to operate and drive—and to run a video camera at the same time. Some people are good at multi-tasking!

Another major factor in a successful rover effort is careful route planning. We mapped out a route that would take us to three four-grid convergences in open country where we could move less than a mile each time we switched grid squares. If you do the math, you'll see that three stations working each other round robin on 10 bands at a four-grid convergence can each amass 320 QSOs and 40 multipliers. With practice, we got these four-grid, 10 band runs down to less than two hours. We also worked each other as we moved back and forth across six two-grid boundaries. Altogether, each of us worked the other two a total of 1280 times during the contest. We also worked anyone and everyone else whom we could hear. The result was three rover scores that topped one million points each.

We knew there would be raised eyebrows if we pulled this off. So we were careful to dot every i and cross every t. We interrupted high-speed runs through the bands to correct every mistake in sending our grid squares and then to get the correction confirmed. We also did time-consuming moves back and forth to get solid 10 GHz signals past unseen obstacles in our path late at night. And we relied heavily on GPS linked computers to make sure we were really where we thought we were. Finally, we called endless CQs near the calling frequencies and searched the bands for other stations to work as we moved from Orange County (DM13) toward our final destination near Mt. Lassen (CN90), almost 600 miles to the north.

Does It Matter?

Why did we do all of this? Aside from the answer often attributed to Sir Edmund Hillary about climbing Mt. Everest ("because it was there"), we wanted to see what could be done by a group of motivated operators under the current scoring system, just as KA1ZE's group did 11 years ago under the former rules. And we were getting tired of roving alone and being crunched by rovers who traveled together and worked each other in grid after grid. Winning is more fun, for heaven's sake. But we also know that records are made to be broken. It's only a matter of time until someone else finds a way to do this better than we did.

Some would say what we did should be outlawed. In his excellent write-up of the June 2003 VHF contest results, Bill Seabreeze, W3IY, summarized the pros and cons of "grid circling." He pointed out that it brings activity to otherwise-dormant bands in out-of-the-way places. It enables rovers to get some return on their investment in equipment even if they don't live in a hotbed of VHF/UHF activity like the Northeast Corridor. It also allows rovers to achieve scores that fixed stations (and rovers who travel alone) cannot often match. The claimed scores published on the ARRL Web site indicate that at least seven of the top ten rovers in the January 2004 contest traveled with another rover. The controversies that have bedeviled the rover rules for 20 years are obviously not resolved.

N6NB bio:

First licensed in 1957 as K6YNB, Wayne Overbeck has been operating VHF contests for 40 years. He set national scoring records in he June and September VHF contests during the 1970s, operating portable on Mt. Equinox, VT, 3,000 miles from home. He served four terms as ARRL Southwestern Division Vice Director (1984-92).

NCJ

One unfortunate inevitable fact of life is that we will all eventually become Silent Keys. For the majority of us, it'll happen when we're old curmudgeons. But every now and then, it happens to someone much too early, as was the case with friends like KL7Y, 8P6CV and N8SM.

On February 12 of this year, I was saddened when I read this heart wrenching e-mail on the CQ-Contest reflector sent by Ellen White, W1YL.

Dear friends:

In September of 2002 K4OJ sat at this computer and wrote a poignant obituary honoring his father, W1CW, who had died that very morning.

On this afternoon of February 12, 2004, it is my reluctant turn to sit here and tell you that Jim did not survive yesterday's surgery. He left us about 11:30 a.m. this morning following liver failure after the somewhat risky heart valve replacement.

Just this past weekend he had a tremendous time operating the FOC Marathon and producing a splendid accounting of himself. This was just one more achievement during his lifetime of fun in and service to Amateur Radio and, in particular, the Florida Contest Group of which he was the first president. His operating abilities were manifest and he almost always the first one to volunteer his help, in spite of his declining physical abilities.

I know many of you will share my loss.

Ellen, W1YL/4 "In"

Over the next week, there were over 60 posts from people all across the world who wanted to share their memories of him. K1AR said it best in his post, "Whether it was pancakes in Dayton at 4 AM or an e-mail that brightened our day, there are at least enough OJ memories left behind to begin to fill a void that has just been created."

I first met Jim back in the mid '90s at Dayton and had seen him about a dozen more times, including three visits to the "White House" (his parent's house in Florida). My first visit to the White House was in 1998 with K9NW and WC4E, on the day that their big tower was going up. All of the Whites, W1CW, W1YL and K4OJ, exemplified why this hobby that we all share is the greatest in the world! They fed us until we were ready to explode, then threw desert in front of us—and made sure that we had plenty to drink! Every year that Jim attended Dayton, he was always one of the last to leave the Society of Midwest Contesters hospitality suite on the 12th floor of the Crowne Plaza. Once, he was unfortunate enough to fall asleep on the couch while the party was still in full swing. He then became a human platform for an empty beer can stacking contest, but cracked up when he saw the pictures the following day. He was one hell of a guy!

Perhaps the person who knew him the best is Dan Street, K1TO. For those of you who read *CQ Contest,* this is a dupe—but this February 13 post from Dan exemplifies who K4OJ was, and always will be:

Figure 1—Jim in action.

OJ remembered—

One of the many wonderful things about ham radio is that it transcends age. Thus, as a teenager in Connecticut, I spent the majority of my free time with Murphy's Marauders members who had welcomed me enthusiastically into the group. The White family was a prominent segment of that group and, despite a few years of age difference, Jim and I became friends quickly.

I drove to and from Dayton in 1977 with Jim. My Opel Manta's water pump blew on Rt 80 with Jim driving, and we spent the next hour sorting through incoming WA1QNF QSLs while we waited for help to arrive. Amazingly, there was an Opel dealer in the thriving metropolis of nearby Clearfield and we were able to resume the journey home by Monday afternoon. One of the scariest moments in my life was looking over to realize that Jim was having an epileptic seizure, very likely because he'd not brought along enough medicine for that extra day.

"Happiness is a good run." That was

Figure 2—Jim with Dick, N4RP.

the byline on the 1977 ARRL DX Test results, authored by Jim White, K1ZX/WA1NNC and Dan Street, WA1QNF. Along with Bill Jennings, WA1AHI/K1WJ, who became a tragic SK two summers ago, the three of us spent a fabulous summer checking logs and yukking it up. I had just graduated from high school, while Jim was dating the girl that ended up being his (first) wife.

Not long after that, the Whites all moved to Homestead, FL, just south of Miami. Bob, K1XA, another good ARRL friend, and I took a week of vacation in Fort Lauderdale one spring and made a special trip down to see Jim.

Soon after that, Jim had a very serious auto accident and was laid up with multiple injuries for quite a while.

For a number of years from then, the only time I'd see Jim would be in Dayton. Many have, very appropriately, chronicled Jim's adventures at Dayton. Despite being immersed in a ham radio family day in and day out, Dayton was consistently the highlight of Jim's year. It was during those years that Jim met and married Teresa and became an instant grandparent.

After Hurricane Andrew destroyed Ellen and Bob's home, the Whites all moved to the Tampa area on the other coast of Florida. There, they collectively began to build up a very solid contest station.

In March 1994, just under 10 years ago, Jim established the Florida CW Contest Group that soon became the Florida Contest Group. Jim served as President for the first four plus years of the club. When this writer took over in September 1998, the club foundation was solid and it's been a pleasure to build and build upon that.

Jim particularly liked to host multi-ops and consistently invited anyone and everyone to his operations. Perhaps operating at W2PV in the mid 1970s seeded that interest. Here are some recent highlights:

Figure 3—Jim with NF4A, then WA4IMC.

IARU

W1AW/4 in 2000 was a huge success, due greatly to OJ's coordination. While WC4E and I were overseas for WRTC, Jim led the effort to have six separate stations on the air across Florida with two band/modes each. I believe that the score attained by W1AW/4 that year remains the record for all of the W1AW/ operations. There was a terrific write-up about this in* NCJ.

ARRL Sweepstakes

In Nov 1996, Jim kindly asked me to join him for an SS CW M/S, even though he had finished fourth as a Single Op the year before and was itching for a win. We managed to win M/S that year, unseating the four-year championship run of AA5B.

The following November, 1997, saw Jim sport his new K4OJ call sign. Along with his folks, he piloted the station to a second straight win in the M/S category.

Two weeks later, K1TO hosted a pair of Multi-Singles for SS SSB and Jim enthusiastically operated some SSB (a mode that was largely banned at the W1YL/W1CW QTH), all in the name of maximizing FCG points. Initially, it appeared that the KØRF team had pushed K4OJ down to 2nd place in SS CW for 1998, but revised results published a month later showed that the Whites had their three-peat.

After two more weeks, OJ returned here for another fun battle of Multi-Singles (although one of the entries never got published). Jim had by far our best hour, something like a 157 contact hour. The fun that he had doing that was just mesmerizing for the rest of us to watch.

ARRL DX Contest

Jim invited me back for a M/2 in February 1997. When another promised op failed to materialize, we did essentially a two-man effort, giving me a good intro to DX from Florida.

February of 1998 was time to try a Multi-Multi. One of the absolutely mind-blowing experiences of my "career" was hearing JAs peaking at 599+30 dB on 160 meters! With a single Yagi on 15 meters, we still beat all the M/Ms.

Along with Kevin, N4KM, Team OJ beat out Team N4WW for top W4 M/S in February 2000 to sneak into the box at #5, less than 5% from #2.

Less than one year ago, as I write this, in February 2003, using the K4NNN call sign, another #5 finish.

CQ WW CW DX Contest

After the passing of Bob, W1CW, in November 2002, Jim and Ellen set out to expand the station capabilities. This was in preparation for a W1CW Memorial operation for CQWW 2003 on essentially the one-year anniversary of Bob's passing. While those results are not out yet, it was again a labor of love as many contributed to the station upgrades and the ultimate operation. With 10 operators, and using the W1CW call sign, they achieved their goal of honoring Bob.

Jim's health declined over a long period of time, but as many of you recognized and emphasized, his enthusiasm and positive outlook were staunchly consistent. In one of my last e-mail exchanges with Jim, he told me that I'd soon be able to retire from antenna work at the W1CW station because he would once again climb proudly.

When WC4E and I wearily exited our return plane from the WRTC in Finland in July 2002, we were met with a K4OJ-organized group of FCGers waving banners and greeting us back. Quite amazing since we were something like 4 hours late and arrived at 1 AM.

Long road trips to Fort Walton Beach and Miami in recent years gave us a chance to crank up the classic rock and get caught up.

One of Jim's greatest pleasures was developing funny phonetics. For some odd reason, N4BP and WC4E were the butt of many of those cracks.

There are just a zillion stories like this and there is just no way to give a comprehensive recall here and now, but I hope this has provided a flavor of the man that OJ was, from my personal perspective.

Thanks to all of you who have already posted tributes to Jim. Some of the suggestions regarding memorial awards are

great, and the FCG will be setting up a number of awards as well. Thanks also to K5KG, W4IX and K3TEJ for dedicating their J7 effort in Jim's memory. I'm also hearing of some plans to honor Jim at Dayton in May.

The next issue of the FCG Gazette *will be solely dedicated to K4OJ, the founding father of this great club (***www.floridacontestgroup.org/newsletter/k4oj.pdf***—Ed).*

Since promoting the FQP was yet another source of joy for Jim, I encourage everyone to circle the last weekend of April on your calendars and get on the air as much as you can in the Florida QSO Party, in honor of Jim.

As mentioned earlier, Jim became a devoted father and grandfather, in addition to all of his contesting interests. Teresa White would appreciate hearing from any of you at 3527 King George Ln, Seffner, FL 33584-6117.

As an only child, Jim ("Jamie") was the apple of Ellen's eye and I just hope that we can all help Ellen through this staggeringly difficult time of losing her husband and only son in less than 15 months.

At Ellen's request, the W1CW Memorial Fund is now the W1CW/K4OJ Memorial Fund. In lieu of flowers, Ellen prefers that contributions be made in Jim's name to that fund. Any donations should be made out to the Florida Contest Group with a note to the effect that it is designated for the K4OJ Fund. Please mail any donations to the FCG Treasurer: Fred Perkins, 3437 Lake Josephine Drive, Lake Placid, FL 33852.

RIP and Keep Smiling, old friend.
Dan, K1TO/4

The QRZ.com bio for K4OJ says the following:

What do you love about ham radio? I love contesting. There is something about the camaraderie, discipline and knowledge contesting demands that fits me, it doesn't fit everyone—but it sure fits me.

It sure did! He was the one of the best and will not be forgotten.

I really don't like writing things like this. I certainly hope that I don't have the opportunity to write something like this for anyone else in the near future.

The Florida QSO Party, which is largely K4OJ's baby, is the weekend of April 24 and 25. The Florida Contest Group has dedicated the 2004 FQP in memory of K4OJ—the FQP's biggest "Cheerleader". Many stations will simply sign "OJ" in place of "73" or "TU". How about getting on and handing out some Qs, and signing OJ for Jim. I'll be there doing it! Stop by **www.floridaqsoparty.org** for the rules, maps and a list of planned mobile operations. NCJ

VHF-UHF Contesting!

Jon K. Jones, NØJK
n0jk@hotmail.com

The ARRL Proposed Rule Changes to the VHF Contests

On February 20, 2004, Tom Frenaye, K1KI, posted the ARRL MSC VHF-UHF Contest and Awards Subcommittee proposed changes to the ARRL VHF Contests. This caused a very spirited discussion on the VHF Contest Reflector.

For the last year or so the ARRL has been studying ways to increase interest and participation in VHF+ contests (and awards). It was a good sign that participation was up in last June's VHF QSO Party, and we're looking to encourage more participation, especially those who have multi-band transceivers.

Our recommendations had several basic goals. Changes to the contest rules and awards programs should:

1) Encourage more people to work more other people.

2) Encourage QSOs made over longer distances.

3) Encourage more people to join in and participate.

Major recommendations:

1) Changes in the rover rules.

2) QSO point changes.

3) June VHF QSO Party 50-1296 only.

4) New categories in Jan/Jun/Sept.

5) Expanded Microwave contest based on 10 GHz Cumulative—UHF contest dropped.

These major recommendations, and a number of minor ones, are still just recommendations. We felt it would be important to have further input from the VHF+ contest community at this point.

The full text of the MSC proposals is here: **lists.contesting.com/archives/html/VHFcontesting/2004-02/msg00038.html**

I would encourage you to review it and the many posts discussing the proposals on the VHF Contest Reflector. As might be expected, proposed changes to the Rover Category drew by far the most posts. Grid circling, "captive rovers" and other issues were discussed. Lost in all the fiery debate it seemed were how can we encourage more entries in the ARRL VHF Contests?

One proposed change that I believe will encourage more DX entries in the ARRL VHF Contests is to allow *DX to DX contacts for QSO point and multiplier credit* and offer awards to the DX stations. However, I favor different criteria for DX entries than the one the MSC used but *the DX station must make at least one QSO with W/VE on each band for which QSOs are submitted.* Several other commentators and I were concerned that the DX would just work each other to the exclusion of W/VE. A European VHF DX station could work one W/VE on 50, 144 and 432 MHz EME, which is not difficult to do with JT-44 or FSK441c, for example. Then the DX would "run local Europeans" for a big score. A model that I believe is better for the ARRL VHF Contests is that of the North American QSO Party. W/VE and "North American DX" work each other, and DX outside of "North America." North America is defined as "the ARRL DXCC list + KH6." DX outside of North America work only "North America" as defined in the contest **www.ncjweb.com/naqprules.php.**

I believe this would encourage VHF DXpeditions to the Caribbean and to Central America and local resident DX activity in the ARRL VHF Contests. It could also foster international good will with local VHF operators in these regions. DX outside of "North America" can still participate and compete in the ARRL VHF Contests in their own category.

The proposed changes to the ARRL VHF Contests, if adopted, may take place in 2005. For the 2004 June VHF QSO Party, the rules posted by the ARRL appear to be the same as in 2003 **www.arrl.org/contests/rules/2004/june-vhf.html**

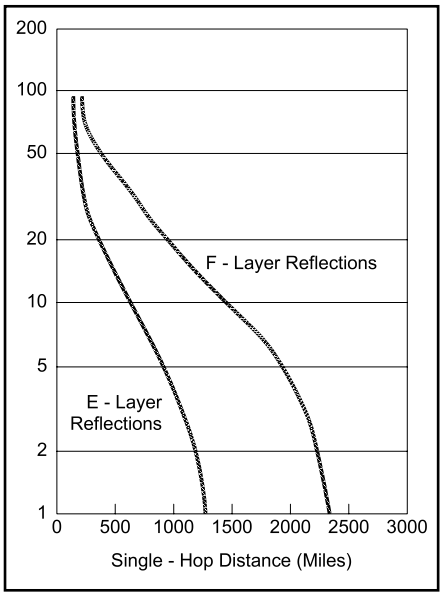
Despite the ARRL rules not recognizing DX participation in the VHF Contests, I plan on returning to Bermuda to operate the June VHF QSO Party. This will be "contesting for fun" as there are no awards offered to DX stations.

The Moxon 6 meter Antenna

Coming up with a small portable 6 meter antenna with gain has been a challenge to the Rover and single op portable (QRP) operator classes in the VHF Contests. Many use loops such as the M_2, a whip or a dipole. These work OK on E_s openings, but the operator is often frustrated and discouraged. You hear many stations, but they don't seem to hear you well.

Back in the '60s, Ed Tilton, W1HDQ, described this situation when he operated the June VHF QSO Party from New Mexico. He was driving on a back road and heard a good 6 meter E_s opening in the contest. He pulled off to the side of the road and using a halo loop antenna and 10 W on AM, he tried CQing. No replies. Ed then put up a small 3 element Yagi on a 15 foot mast. One CQ and he had a pileup calling him.

The lesson Ed wrote about has not changed. A small Yagi will give you a much better signal than a whip or loop, and can make the difference between struggling to work stations or running them during an E_s opening. Clarke Greene, K1JX, reviewed the Par Electronics Moxon antenna for 6 meters in the March 2004 issue of QST (page 66). Clarke notes the antenna goes together in less than 5 minutes and it really works. If you are a rover who pulls over to the side of the road to operate, this is the antenna for you. You can get it up on a pole in 5 minutes, and have a "big signal" on 6 meters. At the risk of helping my competition in the single op portable class, here is a suggestion for a big QRP Portable signal on 6 meters. Clarke says one can stack two Moxons at 10 and 20 feet. The gain will approach a 5 element Yagi at 20 feet, with a much broader pattern in the H plane. More information about the Moxon can be found at: **www.cebik.com/radio.html** and **www.parelectronics.com/**



Many rovers spend a lot of time and effort on their 144, 222, 902 MHz and microwave antennas while using a whip or loop on 6 meters. This often results in mediocre results on 6 meters. If you are roving and don't wish to use a Moxon or Yagi on 6 meters, at least get your loop up higher when you are stopped. A 6 meter loop mounted at 6 feet (not too much above a quarter wavelength) radiates much of the signal straight up. Put it up on a 15 or 20 foot mast (now three quarters to one wavelength high), and the main lobe radiation angle drops to around 15° (you're putting more energy at low angles). This is much better for E_s (see the accompanying figure) and extended ground wave QSOs. NCJ

Contest Tips, Tricks & Techniques

Gary Sutcliffe, W9XT

Time Spent on Non-Operating Contest Related Activities—Part 2

Last time we started a two-part installment on how contesters spend their radio related time between actual operating events. We covered time in preparation for a specific contest, reviewing contest related materials including the Internet and NCJ, QSLing, and the extra work done by owners of multi-op stations. We will continue on other ways to spend time between contests, including some actual totals sent in by our readers.

Supporting the Contesting Hobby

AD1C noted that he spends a fair amount of time in activities like updating the country files, assisting K5ZD in maintaining the master call sign database, and writing software utilities like his recently released program to analyze *Cabrillo* logs for stations passed to other bands.

Many other contesters do a lot for us behind the scenes as well. Don't forget those that maintain the various Internet sites and mailing lists or are officers of our contest clubs. N6XI estimates he spent 100 hours getting the NCCC troops ready for the ARRL Sweepstakes in 2003, more than twice what he spent operating the two weekends.

The guys that really put in the effort and get very little credit (and often a lot of grief) are the log checkers. Checking logs, even with some of the new software, is a very time consuming task.

Another area in which contesters help the hobby is by introducing and promoting contesting at general radio clubs. Giving talks, inviting members over to operate some multi-op efforts or training new operators at Field Day are other ways to contribute.

Some Time Totals

K6LA sent in a break-down of his contest related time. Some of the major and more interesting totals are 436 hours in contests, 20 hours in goal setting and reviewing prior contests, 73 hours with e-mail, 36 reading magazines and 60 hours on QSLs. Station work adds an estimated 50 hours more. Ken also operates VY2TT, which means adding in over 150 hours of travel time per year. He also estimates 100 hours thinking and daydreaming about contesting. His total comes out to about 37 days each year in some sort of contest related activity.

For CW contests, VE7FO's preparation breakdown includes a little over two hours for reviewing past results and setting up his computer. Jim also tries to put in a couple of hours on the *TR-Log* contest simulator for practice, but admits he does not always get the chance. Jim has been using phone contests to let non-contesters get a feel for HF contesting. He spends additional hours setting up schedules and explaining what they will experience and how to react. After the contest he spends a few hours getting his logs sent in, printing out reports for the contest, and an additional three hours reading scores and stories on the 3830 reflector.

KJ9C also did a time break down. For each contest, Mel spends about an hour configuring his computer and station, and another hour reviewing results, propagation and setting goals. He spends another hour after the contest preparing and sending in his log and rationalizing why he didn't make his goals.

Mel is also big on mobile operations in state QSO parties, especially the Indiana QSO Party. He spends over 50 hours organizing various aspects of that one, plus about 60 more hours planning and traveling to other states to operate mobile from there. All total, Mel figures it is about a 1:1 ratio between operating and preparation time.

Operating from outside the home station can take a lot of extra effort. N9KT figures he spends about three extra hours for each contest. The exception is Field Day where David estimates he spends up to 40 hours getting ready.

W2GD also spends a lot of time preparing for Field Day. John often operates other contests like the 160 meter contests Field Day style from seaside sites. His club has set records in a number of FD categories. These require a lot of planning, including getting permission to use the sites, getting equipment lined up and scheduling work groups and working out operating schedules. They begin setup for the 160 meter contest weeks in advance because weather and length of day issues as the contest gets close.

W2GD also does much of his operating from his station in Aruba. This is located at a non-ham's home, and John may go as long as 10 months between visits. Naturally a lot can happen to the equipment in this time and he must plan for a lot of repair time once he gets there. John feels he needs at least two antennas per band plus Beverages or other receive antennas to key directions. The salty and windy environment of the Caribbean is not easy on antennas. This means a lot of potential repair.

P43P helps W2GD by sending digital pictures of his antennas before his trips. This lets John get an idea of what he will need to bring down to make repairs. Then he must round up the supplies. Since there will usually be a weight limit, he often must ship the equipment in advance. John plans at least three weeks for shipping, clearing customs, etc.

One of the more interesting things John has to consider is watching airline ticket prices for the best deal. If you are operating from another country you must also allow for time to get a license.

K3WW's estimate is about two hours per day. Station maintenance can hit several hundred hours per year. Processing his yearly total of 3000 to 4000 QSL cards takes up around 40 hours. He spends a few hundred more hours on various contest club activities, along with log conversion and UBN analysis.

K5ZD figures he spends an extra 8-16 hours for a 48 hour contest. Randy's estimate includes antenna repairs, QSLing, reviewing results, and log processing.

That wraps up this topic of radio-related time spent outside of actually operating contests. Did you add up your hours? Were you surprised? You just may want to keep that total to yourself!

Thanks to everyone who sent in their comments, including AA4NU, AD1C, NS3T, GW4BLE, K3WW, K4JA, K4RO, K4TMC, K5ZD, K6LA, KB1H, KJ9C, N3BB, N5OT, N6XI, NØOCT, OH5DX, N9KT, VE7FO, W2GD, and W7DRA. I hope you will consider adding your call to the next issue by sending in your tips.

Topic for July-Aug 2004 (deadline May 10): Favorite Mode Tips.

What is your favorite tip that applies only to phone contests? What is your favorite tip that applies only to CW contests? What is your favorite tip for RTTY contests?

Send your tips to **w9xt@qth.com** or to 3310 Bonnie Lane, Slinger WI 53086. Also include suggestions for future topics you would like see covered. NCJ

RTTY Contesting

John Fleming, WA9ALS

Thanks to my guest columnist Marty, NWØL, and his robust team of RTTY ops, we vicarious DXpeditioners are treated to an "NDxpedition" to the frigid north.

As much fun as it might be to go to some rare tropical island to operate a RTTY contest, few hams can really afford such a trip. If money isn't the issue, finding time to take off from work often is. So what's an eager ham to do?

Well, how about a trip to someplace that's not too far away, not too expensive, but is every bit as much "in demand" as the rarest coral outcropping in the middle of the ocean? Sound interesting? Then please, read on…

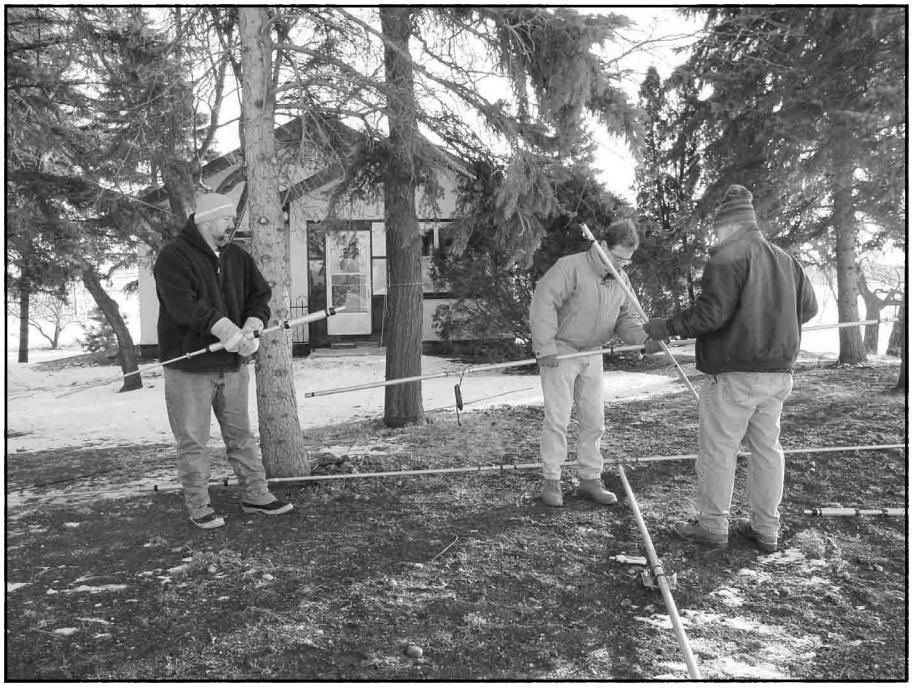
Several members of the Kansas City DX Club and I made a trek to Hankinson, North Dakota in early January, specifically to operate in the ARRL RTTY Roundup contest.

This would be our second trip, having made the first in 2003. Everything had gone remarkably well on that trip; even the weather cooperated and brought us nice weather and highs in the 30s. The almanac called for an average high of about 15° F and a low of 0° F, and the record snowfall in that area was 25 inches during early January. It didn't seem likely that we'd luck out on the weather twice in a row, but we decided to tempt fate anyway.

Hankinson is in the far southeast corner of North Dakota only a few miles from the South Dakota border and just a few miles from the interstate. We rented a nice cottage next to a large lake and were fortunate that the owners accommodated us "eccentric" hams without complaint.

The plan, as it had been in 2003, was to set up a pair of kW HF stations, with a broad selection of antennas and a fully networked array of computers. We'd set everything up a day or two before the contest, play radio a bit before the contest and then try to make a respectable showing as a multi-single entry in the Roundup.

Our journey started much too early on New Year's Day 2004, when Tom Baugh, AE9B, picked me up at around 5:00 AM. We loaded my radio, computer and lots of cold weather gear into his already-stuffed 3/4 ton pickup truck. Tom had brought another FT-1000MP, two Kenwood TL-922A amplifiers, verticals for 40 through 160 meters, lots of coax, a Beverage antenna and what seemed like 500 pounds of food, graciously prepared by his wife Jeannie. We met up with Lee Ward, KØLW, and Rick Parent, WØZAP, at a truck stop north of Kansas City. Lee had a 3/4 ton pickup also, and it was packed to the gills with wire antennas, coax, a military crank-up mast and plenty of other goodies that might be useful.



Intrepid RTTY operators assemble the tribander.

The trip up I-29 was mostly uneventful. We made a planned stop in Sioux Falls, South Dakota, to pick up the last member of our team, Dave Anderson, K4SV. Dave was to go on a DXpedition to Peter Island in Antarctica, only to see the DXpedition cancelled at the last minute (it has been postponed to January 2005—*Ed*). So Lee invited Dave to join us, and much to our surprise, he accepted, eager to try out the hundreds of dollars of cold weather gear purchased for the Peter Island DXpedition. Dave lives in North Carolina and had to catch a flight at "o'dark-thirty" and make several connections to eventually meet us in Sioux Falls. In addition to his mukluks, Dave brought an ICOM IC-756ProII and his laptop computer.

After picking up Dave at the airport, we stopped at a truck stop for lunch—one of the few establishments in that area open on New Year's Day. There was a 25-foot-tall very anatomically correct buffalo statue outside the truck stop, so we felt somewhat obligated to try the buffalo burger. It didn't taste like chicken, and certainly didn't taste like hamburger. But it wasn't bad.

We arrived at the cottage just as the sun was setting, and the first order of business was to put up the low-band antennas. The weather was cold, about 20° F, but there wasn't much snow on the ground and the wind wasn't howling, so it didn't seem too bad.

The 80/160 meter vertical went up in a matter of minutes, followed closely by the 40 meter vertical. We strung a Beverage antenna out onto the ice and hoped no snowmobilers would get hung up in it for the next couple of days. While all the antenna work was going on outside, Rick and I started setting up the radios and computers. It didn't take long to get everything hooked up and we were soon on the low bands, with Tom pounding out "portable ND" on the CW key, much to the surprise of the first several stations he worked.

Friday morning rolled around and we went back to work setting up Lee's 50 foot. military crank-up mast, with a Cushcraft A3 tribander borrowed from Dave, KGØUS. We also raised an 80 meter dipole, using the crank-up tower for support, and we erected a second tribander on a smaller crank-up mast mounted to Lee's trailer. A good part of Friday was eaten up with Rick and I trying to solve some problems with networking the three laptops together. One was running *Windows 2000*, another *Windows XP* and the

third was running *Windows ME*—and it was all but impossible to get that combination configured so that *WriteLog* would work properly. (We learned after we got home that the solution was to use only capital letters in the user names and passwords for the networking. What a goofy *Windows* limitation.)

We spent the rest of Friday evening and most of Saturday morning playing radio and trying to get used to the somewhat dismal band conditions in the far northern middle part of the USA—if we thought propagation was poor at home, the lack of signals here was just plain awful.

We started the contest on 15 meters but propagation was poor so we soon moved to 20. First hour rate was a blazing 75 Qs, and the second hour was close to 90. From there, things really dropped off as we struggled against the poor propagation and our marginal antennas, trying desperately to get a sustained run going. We had a couple of frequency "skirmishes" with stations that could clearly hear us but chose to move in on top of us anyway. We knew we weren't big enough to win a testosterone match against a big contest station, so we moved off the frequency. I also remember things like that, and the result was that the offending station now doesn't appear anywhere in the NWØL contest log and won't get the ND multiplier this year.

Things really picked up about 0300Z, as we found the conditions on 80 meters to be incredible, at least for rate if not much DX. We worked nearly 100 stations in the 0400 hour and stayed on the air until 0900 when we took our 6-hour break. Sunday was quite disappointing overall, as we never were able to get a run going on any band despite the high levels of activity – rates on Sunday never topped 50 Qs/hour. The equipment stood up fairly well to our abuse, though we had two almost-blown amplifiers that mysteriously came back to life after we went to the trouble of trading tubes between them. A couple of band pass filters gave up the ghost as well; it seems that RTTY is pretty hard on the equipment.

We ended the contest with 1188 Qs, 47 states, 7 provinces and a whopping 32 DXCC entities. Total score was about 102K and probably won't win us any medals, though I'm pretty sure we'll have the highest score in North Dakota!

Once the contest was over, we spent the evening packing up most of the radios and many of the antennas. By this time, the weather had turned against us and the outside temperature was somewhere around minus 5F and dropping. So we hurried to get everything taken apart and packed up, planning to leave early Monday morning for the trip home.

Things got really interesting. Did you know that diesels sometimes don't handle the cold weather well? The temperature Monday morning was a balmy minus 15° F when we went to start the trucks. Both trucks have engine block heaters and had been plugged in all weekend, but apparently that wasn't enough for Lee's 2002 Ford. It would start and run for a minute or two, sounding like the engine was going to fly apart, before finally sputtering to a stop. Numerous attempts to restart the engine failed and eventually the battery died. Fortunately, Tom's 10-year-old Ford truck started right up so we weren't totally stranded. A call to the nearest Ford dealer didn't help either—we asked if the newer trucks had any known issues in the cold, and the service manager laughed, telling us they "hadn't even had a cold snap yet" (so what do they call minus 15° F?).

Tom pulled Lee's truck into "town" and had Bubba and Coy at the gas station take a look. They messed with the engine for a good two hours before finally admitting that they really hadn't ever worked on a diesel before. We got the owner of the gas station to push the truck about 20 miles over to the next town where the Ford dealer was. They couldn't get to it right away and said they'd pull it inside overnight and look at it the next morning. Tom, Rick and I decided reluctantly to head back home, leaving Lee and Dave to wait for the truck repairs. Just as we got to the suburbs of Kansas City (at about midnight), the cell phone rang and it was Lee, telling us the Ford dealer was able to find time in their busy schedule to replace the fuel filter and that all was well—they were about 3 hours behind us but at least they'd make it home.

Overall, we had another great trip—lots of fun and camaraderie, plenty of radio and more food than we could possibly eat. Operating in the contest was really a minor highlight of the trip—the challenge of setting up a field day style station in the dead of winter and making it all work is really the reason we went.

If you live reasonably close to one of the perpetual "rare ones" for the Roundup, why not do your RTTY buddies a favor and try a portable operation next year? North Dakota, Nevada, Delaware and several Canadian provinces seem to be really lacking in RTTY operators. It's really not hard to do and you're guaranteed to enjoy yourself!

See you next year—we're thinking of heading to Wyoming for the 2005 Roundup!

73 de NWØL, AE9B, WØZAP, KØLW and K4SV NCJ

Adventures in Contesting

Last issue

The photo in the Mar/Apr issue shows a sign seen by Ward, NØAX, halfway between St Louis and Rolla on I-44. Does anyone know what it really means?

This issue

Pierre, F5JFU, keys up a sign announcing his competitive intentions.

Contesting on a Budget

Paul Schaffenberger, K5AF

Cashing in on the "Peace Dividend"

As a lifelong collector of RF parts and avid builder of RF matching networks, I've been excited by the steady stream of power tubes and parts coming from the former Soviet Union since the end of the Cold War. I had hoped that this "peace dividend" would spur a whole new generation of us to start building gear (such as power amps), just like many of us did after World War Two.

That hasn't happened, but what has happened is quite profound. Just about every major manufacturer of linear amplifiers is taking advantage of low-cost, reliable Russian power tubes, which have made amplifiers more powerful and affordable to the worldwide community.

Even without a widespread interest in building and/or modifying amplifiers, Russian tubes are breathing life into older designs. The 811 and 572B tubes are available through many sources at less than half the price in today's dollars than we would have paid ten years ago. That factor is making new amplifiers that use these tubes very affordable and is also keeping older two, three and four tube amplifier designs viable on the used market. There is a whole cottage industry modifying and otherwise keeping these older amps, such as the SB-200 and the Dentron Clipperton series, on the air.

For those who aren't faint-hearted about building or modifying gear, the 811/572B amplifier designs are amenable to conversion to the Russian GU7B. Typically, this tube with socket can be purchased for $50-100, takes up about the same real estate as a pair of 811s, and will provide at least equivalent output. There are some challenges in mounting and cooling these tubes, and power supplies need to be modified to accommodate the higher plate voltage requirements.

For those interested in building and/or modifying amplifiers to accommodate Russian tubes, go to **www.nd2x.net/index.html**. Dentron amps seem to be very good candidates for modification, ranging from their sweep-tube GLA-1000 series all the way up to the MLA-2500. This Web site also contains a great deal of technical information on Russian tube characteristics and properties.

Commercial manufacturers seem to be using the Russian 3CX800A as the tube of choice for their legal-limit amps. Barry, W2UP, and others expressed a high level of satisfaction with these amp designs. The tubes are widely available and Jeff, K8ND, reports getting a new tested pair for around $220. George, K5KG, and others expressed concern about sending money to places like Latvia for these tubes, but no one has indicated any bad experience with these purchases.

While the tubes are popular, other parts don't fare so well. Our guest columnist from last month, OH6LI, gave a quick rundown on other parts. Jukka says that the vacuum variables tend to be very large in size compared to western counterparts, relays tend to be SPST designs and are bulky but reliable, and tube sockets really tend to corrode and show their age. Jukka notes that parts are widely available and that dealers are generally honest, but prices can vary wildly from one dealer to another.

One part that does seem to find a degree of acceptance is the doorknob capacitor. These are widely advertised online, with a wide range of values and voltage ratings up to 30 kV. Bob, W6WRT, has purchased some of these and notes they appear to be very well made.

George, K5KG, notes that the real peace dividend is not the parts, but the freedom that the ex-Eastern Bloc hams now enjoy. We've seen increasing participation in operating events and DXpeditions by our Eastern-Bloc counterparts, and it has improved the quality and intensity of our sport. George and I met Gerd, DL7VOG, and his lovely wife Erika, when we were in J7. George notes that this would not have been possible just a few years ago.

Thanks to K1VU, W2UP, K5KG, W6WRT, K8ND and OH6LI for their inputs.

Topic for July/August issue: I am going to have another guest columnist, stay tuned! NCJ

CONTEST CALENDAR

Compiled by Bruce Horn, WA7BNM

Here's the list of major contests of possible interest to North American contesters to help you plan your contesting activity through August, 2004. The web version of this calendar is updated more frequently and lists contests for the next 12 months. It can be found at: **www.hornucopia.com/contestcal/**.

As usual, please notify me of any corrections or additions to this calendar. I can be contacted at my *Callbook* address or via e-mail at **bhorn@hornucopia.com**. Good luck and have fun!

May 2004

US IPARC Annual Contest, CW	0000Z-2400Z, May 1
MARAC County Hunters Contest, CW	0000Z, May 1 to 2400Z, May 2
UBA Welcome to European Union	0000Z-2400Z, May 1
10-10 Int. Spring Contest, CW	0001Z, May 1 to 2359Z, May 2
2 GHz and Up Contest	0600 local, May 1 to 2400 local, May 2
Microwave Spring Sprint	0600 local – 1300 local, May 1
Indiana QSO Party	1500Z, May 1 to 0300Z, May 2
ARI International DX Contest	2000Z, May 1 to 1959Z, May 2
New England QSO Party	2000Z, May 1 to 0500Z, May 2 and 1300Z-2400Z, May 2
US IPARC Annual Contest, SSB	0000Z-2400Z, May 2
ARS Spartan Sprint	0100Z-0300Z, May 4
Nevada QSO Party	0000Z, May 8 to 0600Z, May 9
VOLTA WW RTTY Contest	1200Z, May 8 to 1200Z, May 9
Oregon QSO Party	1500Z, May 8 to 0300Z, May 9
Mid-Atlantic QSO Party	1600Z, May 8 to 2400Z, May 9
FISTS Spring Sprint	1700Z-2100Z, May 8
50 MHz Spring Sprint	2300Z, May 8 to 0300Z, May 9
US Counties QSO Party, SSB	0000Z, May 15 to 2400Z, May 16
Portuguese Navy Day HF Contest	0800Z, May 15 to 2300Z, May 16
Manchester Mineira CW Contest	1500Z, May 15 to 2400Z, May 16
Anatolian RTTY WW Contest	1800Z, May 15 to 2100Z, May 16
His Maj. King of Spain Contest, CW	1800Z, May 15 to 1800Z, May 16
ARCI Newcomer's Run	1800Z-2000Z, May 15
CW WW WPX Contest, CW	0000Z, May 29 to 2359Z, May 30
Great Lakes QSO Party	0000Z, May 29 to 2359Z, May 30
ARCI Hootowl Sprint	2000 local – 2400 local, May 30
MI QRP Memorial Day CW Sprint	2300Z, May 31 to 0300Z, Jun 1

June 2004

Major Six Club Contest	2300Z, Jun 4 to 0200Z, Jun 7
QRP TAC Sprint	1800Z-2359Z, Jun 5
ARS Spartan Sprint	0100Z-0300Z, Jun 8
ANARTS WW RTTY Contest	0000Z, Jun 12 to 2400Z, Jun 13
Asia-Pacific Summer Sprint, SSB	1100Z-1300Z, Jun 12
ARRL June VHF QSO Party	1800Z, Jun 12 to 0300Z, Jun 13
SARL Kid's Day	0700Z—0900Z, Jun 16
All Asian DX Contest, CW	0000Z, Jun 19 to 2400Z, Jun 20
SMIRK Contest	0000Z, Jun 19 to 2400Z, Jun 20
West Virginia QSO Party	1600Z, Jun 19 to 0200Z, Jun 20
Kid's Day Contest	1800Z-2400Z, Jun 19
UK DX Contest, CW	1400Z, Jun 25 to 1400Z, Jun 26
Marconi Memorial HF Contest	1400Z, Jun 26 to 1400Z, Jun 27
ARRL Field Day	1800Z, Jun 26 to 2100Z, Jun 27
ARCI Milliwatt Field Day	1800Z, Jun 26 to 2100Z, Jun 27
His Maj. King of Spain Contest, SSB	1800Z, Jun 26 to 1800Z, Jun 27

July 2004

RAC Canada Day Contest	0000Z-2359Z, Jul 1
Venezuelan Ind. Day Contest, SSB/CW	0000Z, Jul 3 to 2400Z, Jul 4
DL-DX RTTY Contest	1100Z, Jul 3 to 1059Z, Jul 4
Original QRP Contest	1500Z, Jul 3 to 1500Z, Jul 4
DARC 10 Meter Digital Contest	1100Z-1700Z, Jul 4
MI QRP July 4th CW Sprint	2300Z, Jul 4 to 0300Z, Jul 5
ARS Spartan Sprint	0100Z-0300Z, Jul 6
IARU HF World Championship	1200Z, Jul 10 to 1200Z, Jul 11
UK DX Contest, RTTY	1200Z, Jul 10 to 1200Z, Jul 11
FISTS Summer Sprint	1700Z-2100Z, Jul 10
ARCI Summer Homebrew Sprint	2000Z-2400Z, Jul 11
Mid-Summer Six Club Contest	2300Z, Jul 16 to 0300Z, Jul 18
North American QSO Party, RTTY	1800Z, Jul 17 to 0600Z, Jul 18
CQ Worldwide VHF Contest	1800Z, Jul 17 to 2100Z, Jul 18
Russian RTTY WW Contest	0000Z, Jul 24 to 2400Z, Jul 25
RSGB IOTA Contest	1200Z, Jul 24 to 1200Z, Jul 25

August 2004

SARL HF Phone Contest	1230Z-1630Z, Aug 1
ARS Spartan Sprint	0100Z-0300Z, Aug 3
TARA Grid Dip Contest	0000Z-2400Z, Aug 7
10-10 Int. Summer Contest, SSB	0001Z, Aug 7 to 2359Z, Aug 8
European HF Championship	1200Z-2359Z, Aug 7
North American QSO Party, CW	1800Z, Aug 7 to 0600Z, Aug 8
ARRL UHF Contest	1800Z, Aug 7 to 1800Z, Aug 8
WAE DX Contest, CW	0000Z, Aug 14 to 2359Z, Aug 15
Maryland-DC QSO Party	1600Z, Aug 14 to 0400Z, Aug 15 and 1600Z-2359Z, Aug 15
SARTG WW RTTY Contest	0000Z-0800Z, Aug 21 and 1600Z-2400Z, Aug 21 and 0800Z-1600Z, Aug 22
ARRL 10 GHz and Up Contest	0600 local – 2400 local, Aug 21 and 0600 local – 2400 local, Aug 22
Keyman's Club of Japan Contest	1200Z, Aug 21 to 1200Z, Aug 22
SEANET Contest	1200Z, Aug 21 to 1200Z, Aug 22
North American QSO Party, SSB	1800Z, Aug 21 to 0600Z, Aug 22
New Jersey QSO Party	2000Z, Aug 21 to 0700Z, Aug 22 and 1300Z, Aug 22 to 0200Z, Aug 23
ALARA Contest	0600Z, Aug 28 to 1159Z, Aug 29
TOEC WW Grid Contest, CW	1200Z, Aug 28 to 1200Z, Aug 29
YO DX HF Contest	1200Z, Aug 28 to 1200Z, Aug 29
SCC RTTY Championship	1200Z, Aug 28 to 1200Z, Aug 29
Ohio QSO Party	1600Z, Aug 28 to 0400Z, Aug 29
SARL HF CW Contest	1230Z-1630Z, Aug 29

NCJ

DX Contest Activity Announcements

Bill Feidt, NG3K

CQ WPX CW Contest (May 29-30, 2004)

Call	*Entity*	*Class*	*Operators*
CS6T	Portugal	SO	CT1ILT
D4B	Cape Verde	SOAB	HP4L5A
J49PM	Crete	OSB 15 meters	HB9IQB
LY4A	Lithuania	M/2	LY2FY, LY2CO, LY3CI, LY4CW and others
LZ9W	Bulgaria	M/M	LZ Contest Team
P40X	Aruba	TBA	LY2CY, LY2TA
PJ4U	Neth Antilles	M/2	YL2KL, YL3CW, YL2GM, YL2GQT, YL2VW, K7GEX
SC1AG	Sweden	SOAB	SM1TDE
SX1R	Greece	TBA	SV1XV
T93M	Bosnia	M/S	T93M, T93Y, T94DX, T97M
ZW2R	Brazil	SOAB	PY2RW

Thanks to: 4L5A, CT1ILT, HB9IQB, LY2FY, LY2TA, LZ2CJ, PY5FB, SM1TDE, SV1XV, T93M and YL2KL.
See **www.ng3k.com/Misc/wpxc2004.html** for further details.

RSGB IOTA Contest (Jul 24-25, 2004)

Call	*Entity*	*IOTA*	*Operators*
JM1PXG/6	Japan	AS-047	JM1PXG
MJ0DLQ/p	Jersey	EU-009	ON4ASG, ON4AVA, ON4ON, ON5SY, ON6CX, ON7PQ, ON7XT

Thanks to: JM1PXG, ON9CGB.
See **www.ng3k.com/Misc/iota2004.html** for further details.

CQ/RJ Worldwide DX Contest, RTTY (September 25-26, 2004)

Call	*Entity*	*Class*	*Operators*
VP2E	Anguilla	SO	KU4J

Thanks to: KU4J.
See **www.ng3k.com/Misc/cqr2004.html** for further details.

CQ World Wide DX SSB Contest (October 30-31, 2004)

Call	*Entity*	*Class*	*Operators*
FS/AH8DX	St Martin	SOAB	AH8DX
J49Z	Crete	M/S	I2WIJ, IK8UND, IK8HCG
LZ9W	Bulgaria	M/M	LZ Contest Team
PJ4/T93M	Neth Antilles	SOAB HP	T93M
PJ7/K7ZUM	Sint Maarten	SOAB	K7ZUM
VK9XD	Christmas	SOAB	VK2CZ

Thanks to: AH8DX, IK8UND, K7ZUM, LZ2CJ, T93M, VK2CZ.
See **www.ng3k.com/Misc/cqs2004.html** for further details.

CQ World Wide DX CW Contest (November 27-28, 2004)

Call	*Entity*	*Class*	*Operators*
LZ9W	Bulgaria	M/M	LZ Contest Team
VK9AA	Cocos (Keeling	SOAB	VK2IA

Thanks to: LZ2CJ, VK2IA.
See **www.ng3k.com/Misc/cqc2004.html** for further details. NCJ

Results, August 2003 NAQP SSB Contest

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Breaking N6MJ's recent seeming stranglehold on the top spot in the NAQP SSB contest, K4XS took first place in the single-op category by almost 25,000 points with superior QSO and mult totals. N6MJ, as the only other single op over 200,000 points, took second. N6RT piloted the W6EEN station to third place, while W5AO operating at W5TM squeaked by KØUK for fourth place. K4WX took sixth for another top-ten finish and K5RC held on to seventh over N7GYD. K4WI operated NA4W for ninth, with NX9T completing the top ten finishers.

Like its finish in the CW contest, the W5NN group took first place in the multi-two category. The W4MYA and W6YX multi-ops each had the same mult totals, but W4MYA's advantage in QSOs allowed it to capture second place.

With two of its members in the top three in single-op, the Southern California Contest Club #1 team took first place in the team competition with almost double the points of the second-place GMC Stove Prairie Pass team. The Northern California Contest Club #1 team was close behind for third.

Team Scores

1. SCCC #1		*2. GMC: Stove Prairie Pass*		*3. NCCC #1*	
N6MJ	233,366	KØUK	162,159	K5RC	147,452
W6EEN	183,393	WA7LNW	88,296	K6IF	109,560
W1US	95,634	KØGAS	73,073	K6LRN	73,839
K6NR	87,285	KVØK	20,670	N6EM	11,218
N6ED	78,884				
Total	678,562	Total	344,198	Total	342,069

4. FCG #1 (K4XS, W4DJ) 337,818
5. SMC #1 (WE9V, WT9U, K9PW, W9RE) 284,700
6. FCG #2 (N4BP, NF4A, KK4TA, K1HG) 241,507
7. TCG Roots (K4WX, K4BEV, KE4OAR, K4BP, KØEJ) 228,870
8. A Princess and 4 Lids (LU1FAM, KE9R) 181,842
9. SECC #1 (K4BAI, AA4LR, WB4SQ, A4GA) 164,476
10. Grand Mesa Contesters: Paradox Pass (NØSXX, KØRI, WØETT, KIØII, ABØMV) 156,956
11. Minnesota Wireless Association (KTØR, KØAD, K8GU) 149,695
12. SMC #2 (NX9T, N9GUN) 136,925
13. NCCC #2 (ND2T, W6FRH, KE6ZSN, NT6K, W6ZZZ) 133,951
14. CCO#1 (VE3XD, VE3KZ) 127,396
15. NCCC #4 (K7NV, K6III) 112,174
16. CCO #2 (VE3AGC, VE3KP, VA3XRZ, VE3MGY) 92,171
17. SCCC #2 (W6TK, K6EY, WA6BOB) 91,107
18. NCCC #3 (W6OAT, KE6QR, KJ6RA, K6DGW) 82,406
19. Colony Mountain Contest Club (K5BAT, N5QJ, WA5BDU, W5RZ) 70,841
20. SMC #3 (K9MI, N9LTO, KJ9C, AA9RT) 70,015
21. SCCC #3 (W6AQ, N6AA, NN6O, K6ZCL) 52,374
22. TCG Kernels (AF4QB, W4TDB, W4JPG, W4BCG) 28,204
23. TCG Tuxes (AAØBA, W1KLM, KM4H, AK4ST) 28,116
24. TCG Daemons (WA4JA, W9WI, K4AMC, KG4ABM) 24,649
25. Actually, Only a Couple of Bob's Vanity Calls (N9GG, W3TT) 765

Single Op Top Ten Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*	*Team*
K4XS	258,258	1118	231	5/5	76/31	108/46	565/65	256/52	108/32	FCG #1
N6MJ	233,366	1106	211	14/7	40/18	160/42	570/58	253/53	69/33	SCCC #1
W6EEN (N6RT)	183,393	861	213	20/8	66/26	196/48	355/59	179/49	45/23	SCCC #1
W5TM (W5AO)	166,600	952	175	39/18	106/32	147/43	532/50	128/32	0/0	
KØUK	162,159	849	191	25/12	101/23	83/31	324/53	233/47	83/25	GMC SPP
K4WX	155,420	818	190	22/15	134/33	299/50	207/44	103/28	53/20	TCG R
K5RC	147,452	764	193	24/8	66/19	160/42	295/53	120/43	99/28	NCCC #1
N7GYD	145,839	843	173	6/4	72/21	156/42	352/52	256/49	11/5	
NA4W (K4WI)	141,740	746	190	36/19	75/29	183/42	301/49	98/31	53/20	
NX9T	134,520	760	177	7/7	50/25	210/42	251/51	212/40	30/12	SMC #2

Multi-Two Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*
W5NN	321,120	1440	223	28/15	107/30	285/49	801/61	167/47	52/21
W4MYA	275,216	1336	206	14/11	135/33	299/47	524/55	281/37	83/23
W6YX	239,990	1165	206	26/6	71/16	157/42	534/58	277/51	150/33

Single Operator Scores

Call	*Score*	*QSOs*	*Mults*	*QTH*	*Team*
W1US (K6ND)	95,634	759	126	VT	SCCC #1
KK1L	87,308	598	146	VT	
KG1E	53,280	555	96	MA	
N1ICL	26,320	280	94	CT	
K1GU	8946	142	63	MA	
KA1LMR	5593	119	47	NH	
K1VU	198	18	11	MA	
N2CU	41,301	353	117	NY	
KC2KGZ	4356	121	36	NJ	
KV2M	1350	50	27	NJ	
KC2FBV	364	28	13	NY	

Call	*Score*	*QSOs*	*Mults*	*QTH*	*Team*
K3CR (LZ4AX)	111,492	652	171	PA	
W3IQ	10,833	157	69	PA	
K3ASK	5439	111	49	MD	
WB3LGC	3956	92	43	DE	
AD8J	3234	77	42	PA	
KA3DAE	735	35	21	MD	
AAØCY	551	29	19	PA	
N9GG	420	28	15	DE	Couple of Bob's Vanity Calls
W3TT (N3LJB)	345	23	15	PA	Couple of Bob's Vanity Calls
K4XS	258,258	1118	231	FL	FCG #1
K4WX	155,420	818	190	TN	TCG Roots

Call	Score	QSOs	Mults	QTH	Team
NA4W (K4WI)	141,740	746	190	AL	
NX9T	134,520	760	177	NC	SMC #2
N4BP	118,128	856	138	FL	FCG #2
NF4A	104,496	622	168	FL	FCG #2
K4BAI	87,840	610	144	GA	SECC #1
W4DJ	79,560	612	130	FL	FCG #1
AA4LR	67,648	448	151	GA	SECC #1
WD2E	66,912	492	136	TN	
K5KG	64,014	454	141	FL	
K4BEV	60,792	408	149	TN	TCG Roots
WA4TII	52,260	402	130	GA	SECC #2
NS4T	48,375	375	129	SC	
NA4BW	30,348	281	108	GA	
N2XD	30,086	307	98	SC	
WY4Y (N4EIL)	28,325	275	103	GA	
AF4QB	19,600	196	100	TN	TCG Kernels
K5EEE	19,250	250	77	FL	
KK4TA	15,960	190	84	FL	FCG #2
WA4JA	12,750	150	85	TN	TCG Daemons
AA0BA	10,584	147	72	TN	TCG Tuxes
N4GG	9000	125	72	GA	
KE4OAR	7502	121	62	TN	TCG Roots
W4TDB	7104	111	64	TN	TCG Kernels
WA4OSD	6720	105	64	TN	
W9WI	6148	116	53	TN	TCG Daemons
K4AMC	5616	104	54	TN	TCG Daemons
KM4H	5280	96	55	TN	TCG Tuxes
AB4GG	5184	96	54	TN	
WB4SQ	5040	105	48	GA	SECC #1
KF4ZEO	4995	111	45	TN	
KG4TWX	4700	100	47	TN	
K8MR	4560	95	48	NC	
K4BP	4472	104	43	TN	TCG Roots
W4KAZ	4420	85	52	NC	
AA4GA	3948	94	42	GA	SECC #1
KG4TUL	3825	85	45	GA	
K1HG	2923	79	37	FL	FCG #2
N4NTO	2508	66	38	NC	
AK4ST	2178	66	33	TN	TCG Tuxes
K3CQ	2160	54	40	TN	
KG4RZH	1564	46	34	VA	
K4JAF	1204	43	28	FL	
W4JPG	912	38	24	TN	TCG Kernels
K0EJ	684	36	19	TN	TCG Roots
W4BCG	588	28	21	TN	TCG Kernels
KG4ABM	135	15	9	AL	TCG Daemons
W5TM (W5AO)	166,600	952	175	OK	
W5WMU	122,500	625	196	LA	
W5GN	94,080	640	147	TX	
N5DO	93,808	572	164	TX	
WA7LNW	88,296	566	156	NM	GMC: Stove Prairie Pass
K5XR (W5ASP)	66,367	499	133	TX	
K5BAT (K5RPD)	51,660	410	126	AR	Colony Mtn Contest Club
K0CIE	27,169	269	101	OK	
W5MK	20,202	222	91	AR	
WA5SOG	18,096	232	78	AR	
W5IBM (AE5Q)	10,790	166	65	TX	
W1KLM	10,074	138	73	AR	TCG Tuxes
N5QJ	8085	147	55	AR	Colony Mtn Contest Club
K7RB	7729	131	59	AR	
AD5BY	7049	133	53	TX	
WA5BDU	6344	104	61	AR	Colony Mtn Contest Club
NI5F	5445	99	55	MS	
KE5OG	4752	99	48	TX	
W5RZ	4752	99	48	AR	Colony Mtn Contest Club
K5WTR	3000	75	40	TX	
K5WW	1320	44	30	TX	
KD5SWK	1058	46	23	TX	
K5PAX	850	34	25	NM	
K3TD	112	16	7	TX	
N6MJ (@W6KP)	233,366	1106	211	CA	SCCC #1
W6EEN (N6RT)	183,393	861	213	CA	SCCC #1
K6IF	109,560	660	166	CA	NCCC#1
K6NR	87,285	529	165	CA	SCCC #1
N6ED	78,884	533	148	CA	SCCC #1
K6LRN	73,839	489	151	CA	NCCC#1
W6OAT	64,326	453	142	CA	NCCC#3
W6TK	52,065	445	117	CA	SCCC #2
ND2T	47,380	412	115	CA	NCCC#2
KA6MAL	37,544	361	104	CA	
K6III	37,510	341	110	CA	NCCC#4
W6AQ	31,512	303	104	CA	SCCC #3
K6EY	30,685	323	95	CA	SCCC #2
W6FRH	30,016	268	112	CA	NCCC#2
KE6ZSN	29,382	354	83	CA	NCCC#2
NT6K	24,940	290	86	CA	NCCC#2
W6ISO	13,608	189	72	CA	
N6AA	12,384	172	72	CA	SCCC #3
N6EM	11,218	158	71	CA	NCCC#1
W6AFA	10,530	195	54	CA	
KE6QR	9086	154	59	CA	NCCC#3
WA6BOB	8357	137	61	CA	SCCC #2
NN6O	6812	131	52	CA	SCCC #3
KJ6RA	6370	130	49	CA	NCCC#3
WØYK	5565	105	53	CA	
WA7BNM	4465	95	47	CA	SCCC #4
N6AJR	4368	91	48	CA	
KD4GBA	4181	113	37	CA	
W6DPD	4048	92	44	CA	
N6WR	3120	80	39	CA	
K6DGW	2624	64	41	CA	NCCC#3
N6NT	2262	58	39	CA	
W6ZZZ	2233	77	29	CA	NCCC#2
K6ZCL	1666	49	34	CA	SCCC #3
WH6VH	1600	50	32	HI	
AH6NF	1320	44	30	HI	
K6BIR	1014	39	26	CA	
WA4FIB	920	46	20	CA	
K6OWL	544	32	17	CA	
NC6P	476	28	17	CA	
WB6NFO	232	29	8	CA	
AK6DV	88	11	8	CA	
K5RC	147,452	764	193	NV	NCCC#1
N7GYD	145,839	843	173	WA	
K7NV	74,664	488	153	NV	NCCC#4
N7LOX	27,927	321	87	WA	
KH6SH/K7	14,809	251	59	UT	
KI7Y	12,483	171	73	OR	
KD7NZK	8855	161	55	AZ	
KG9JP	7812	126	62	AZ	
N7MAL	4539	89	51	AZ	
AK9N	4488	102	44	AZ	
K7ZO	3002	79	38	ID	
NB7F	1890	63	30	OR	
KB6BYU	1512	56	27	UT	
KI7ST	850	50	17	UT	
K8IR	45,630	338	135	MI	
W8TM	14,596	178	82	OH	
N8RY	14,016	192	73	MI	
NU8Z	11,285	185	61	MI	
KZ8E	9792	144	68	WV	
ND8DX	6439	137	47	OH	
K8GU	3825	85	45	OH	MWA
AB8CL	2800	70	40	OH	
*N8VW	1705	55	31	OH	
KC8RAN	1680	48	35	OH	
KT8X	1260	60	21	MI	
KC8VPA	1122	51	22	OH	
W8SGZ	984	41	24	MI	
WD8LQB	20	5	4	OH	
WE9V	128,586	739	174	WI	SMC #1
K9BGL	100,408	652	154	IL	
KE9S	80,352	496	162	WI	
WT9U	79,632	474	168	IN	SMC #1
KE9R	79,300	610	130	IN	A Princess and 4 Lids
K9PW (@K9MOT)	70,839	463	153	IL	SMC #1
WA1UJU	34,200	300	114	WI	
K9MI	30,797	299	103	IN	SMC #3
N9NT	16,564	202	82	IL	
N9LTO	15,687	189	83	IN	SMC #3
WW9R	14,766	214	69	WI	
KJ9C	14,620	172	85	IN	SMC #3
K9SG	11,470	155	74	IN	
AA9RT	8911	133	67	IL	SMC #3
K9LA	6206	107	58	IN	
W9RE	5643	99	57	IN	SMC #1
K9QVB/9	5100	100	51	WI	
N9GUN	2405	65	37	IL	SMC #2
W9THD	1680	56	30	IN	
KB9KEG	943	41	23	WI	
KØUK	162,159	849	191	CO	GMC: Stove Prairie Pass
KTØR	113,750	650	175	MN	MWA
KØOU	100,960	631	160	MO	
KØGAS	73,073	511	143	CO	GMC: Stove Prairie Pass
NØSXX	55,660	460	121	CO	GMC: Paradox Pass
KØHW	49,044	402	122	SD	
WØZP	42,117	417	101	CO	
KØRI	42,066	342	123	CO	GMC: Paradox Pass
KØAD	32,120	292	110	MN	MWA
NØYO	29,808	276	108	KS	
WØETT	27,918	297	94	CO	GMC: Paradox Pass
N4VI	24,672	257	96	CO	
WGØM	21,750	250	87	MN	
KBØBUV	21,266	217	98	IA	
KVØK	20,670	265	78	CO	GMC: Stove Prairie Pass
*KIØII	17,487	201	87	CO	GMC: Paradox Pass
NØWY	17,085	201	85	NE	
ABØMV	13,825	175	79	CO	GMC: Paradox Pass
KØCF	11,850	150	79	IA	
NØMWY	7638	134	57	CO	
NØZA	7450	149	50	CO	
KØJJM	5995	109	55	KS	
KØKX	3927	77	51	MN	
KØFG	1050	50	21	MO	
VE3XD	80,898	582	139	ON	CCO#1
VE3KZ	46,498	347	134	ON	CCO#1
VE3AGC	45,356	391	116	ON	CCO#2
VE3KP	33,394	283	118	ON	CCO#2
VE5SF	14,200	200	71	SK	
VA7LC	14,007	203	69	BC	

Call	*Score*	*QSOs*	*Mults*	*QTH*	*Team*
VA3XRZ	12,870	165	78	ON	CCO#2
XL3OX (VA3OX)	5546	118	47	ON	
VE9TX	2,964	78	38	NB	
VE4VID	1,102	38	29	MB	
VA7MJR	1,053	39	27	BC	
VE3MGY	551	29	19	ON	CCO#2
LU1FAM	102,542	649	158	DX	A Princess and 4 Lids
PY2NY	10,050	150	67	DX	

* Indicates QRP entry

Multi-Two Scores

W5NN	321,120	1440	223	TX	
(NT5TU, N5RP, K5NZ)					
W4MYA	275,216	1336	206	VA	
(WA4PGM, W4MYA)					
W6YX	239,990	1165	206	CA	
(K6UFO, W6RQ, N7MH, W6LD, KT6YL, KG6D, AA6XV, N6DE)					
W5KFT	235,125	1125	209	TX	
(K5PI,N5DUW,KI5DR)					
W4WS	164,430	1015	162	NC	
(W2DZO, WS4NC, N0KTY, KG4ECI, KG4CZU, KG4NEP)					
K5ARM	89,498	613	146	NM	
(NA5S, N2IC, K5SLY, W5GZ)					
W6UE	85,320	632	135	CA	
(KA6SAR, KC0MZL, N6AN, W4EF)					
N5YA	70,347	537	131	TX	
(N5YA, N5UM, W5LL)					

Top Ten Combined Single Operator Scores for August 2003 NAQPs

Dan, N6MJ, won the combined CW/SSB NAQP competition with his first place CW and second place SSB finishes. N6RT and K5RC took second and third places, respectively. Congratulations to all of these great ops!

Operator	*CW Points*	*SSB Points*	*Total Points*
N6MJ	500	452	952
N6RT	443	355	798
K5RC	337	285	622
W5WMU	316	237	553
K0UK	217	314	531
K0OU	316	196	512
K4XS	0	500	500
KU1CW	461	0	461
N2IC	461	0	461
LZ4AX	238	216	454

Call	*Score*	*QSOs*	*Mults*	*QTH*	*Team*
K4HTA	29,830	314	95	VA	
(N4ZPT, KF4KJQ, KG4JBJ, K3MV, AC4LT, KG4ZR, N4JDR, KD4REE, KG4OJT, K4TCM, K2HYD)					
VE7FO	20,520	216	95	BC	
(VA7CCF, VE7FO)					
N8UZE	504	28	18	MI	
(N8UZE)					

Check Logs: KI5XP, VE3SY

NCJ

Results, August 2003 NAQP CW Contest

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Although N6MJ has been almost unbeatable in the NAQP SSB contest and has had many single-op top ten finishes in the NAQP CW contest, Dan has never won the CW contest—until now! KU1CW edged N2IC by a mere 57 points to take second, while N6ZZ took fourth. N6RT operated W6EEN to a fifth place finish by less than 200 points over sixth place finisher K5PI at W5KFT. W9RE had a solid seventh place finish, with NØAV, K4RO and N2LA rounding out the top ten.

With both most QSOs and most mults, the W5NN multi-op crew once again captured first place in the multi-two category by a comfortable margin over the second-place K5KA group. These two finished in the same order in the January contest. KØRF took third.

With team members taking first, fourth and fifth in the single-op category, the Southern California Contest Club #1 team cruised to first place in the team competition by a comfortable margin over the second-place Tennessee Contest Group Team Freedom. Even with only four of their five team members submitting logs, the Northern California Contest Club #1 team captured third.

Although the August edition of the NAQP CW contest does not usually produce many record-setting scores, K9OT set a new St Pierre record, and CX6VM operated TI5N to establish a first-time record for Costa Rica.

Team Scores

1. SCCC #1	*2.*	*TCG Team Freedom*		*3. NCCC #1*	
N6MJ	178,808	W4NZ	92,070	K5RC	120,520
N6ZZ	161,253	K4AMC	89,012	WA6O	113,220
W6EEN	158,422	WO4O	87,525	K7NV	86,292
AC6T	90,376	KØEJ	87,450	WØYK	72,051
W6UE	89,428	K4LTA	80,311		
Total	678,287	Total	436,418	Total	392,083

4. NCCC #2 (N6NT,AD6TF,K6LRN,WX5S,WX6V) 350,573
5. GMCC #2 Rocky Mountain Trappers (N2IC,WA7LNW,W7UT) 340,215
6. SECC #1 (K4BAI,W4OC,AA4GA,KU8E) 310,864
7. SCCC #2 (N6AA,AA6PW,WN6K,XE2MX,W6TK) 302,577
8. SMC #1 (W9RE,K5OT,WT9U) 302,005
9. Team UBN (AA3B,N3AD,K3WW) 288,423
10. KCDXC (KU1CW,KØOU) 278,000

11. GMCC #1 Hardscrable Miners(WØETT,NØKE,KØRI,NØHF) 271,417
12. TCG Team Liberty(K4RO,W4CAT,VA7ST,VE1OP) 270,378
13. SMC #2 (NØAV,K9MMS,K9IG,K9KM) 220,520
14. GMCC #3 Buckaroos (AEØQ,KØUK,K8FC,KVØK) 219,765
15. CCO #1 (VE3DZ,VE3KP,VE3OJ,VE3IAY) 208,852
16. North Texas Contest Club (AD5Q,W5GN) 203,370
17. GMCC #4 Rough Riders (TI5N,N4VI,KIØII,WØHXB) 201,125
18. PVRC #1 (K7SV,WJ9B,N4AF) 186,854
19. NCCC #5 (K6CTA,K6TA,AD6E,KE6ZSN,N6EE) 177,447
20. NCCC #3 (W6YL,ND2T,K6DGW,K6XX,NT6K) 128,288

21. SCCC #3 (N6TW,W6KY,K6NA,WA6BOB,K6LA) 128,229
22. SCCC #4 (K6XT,K6EY,ZL/W3SE) 127,476
23. TCG Team Stars (W9WI,K4BEV,NY4N,W4TYU,KE4OAR) 119,769
24. Team NIL (WA4PGM,AD8J) 117,741
25. SMC #4 (WØUY,W9WUU,N9GUN,WE9V,N9BOR) 92,727
26. NCCC #6 (W6RGG,K6III,W6OAT,AE6Y) 90,367
27. SMC #5 (KJ9C,WA1UJU,N9EP) 86,327
28. Mad River Radio Club (K5IID,N8VW,K9NW) 67,722
29. CCO #2 (VE3KZ,VE3XD) 59,148
30. NCCC #4 (KE6QR,KI6T,K6OWL,AD6G) 42,524

31. SMC #3 (K9WX,K9MI) 42,284
32. PVRC #2 (N4ZR,N8II) 39,636
33. TCG Team Stripes (N4DW,KM4H) 37,560
34. TCG Team Old Glory (W4DAN,W4BCG,N5NW) 15,737
35. Actually, All of Bob's Vanity Calls (W3TT,N9GG,K3HRO,NN9G) 3971

Single Op Top Ten Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*	*Team*
N6MJ	178,808	868	206	31/13	89/35	299/51	313/55	95/35	41/17	SCCC #1
KU1CW	164,832	808	204	68/24	116/40	272/50	243/49	102/34	7/7	KCDXC
N2IC	164,775	845	195	31/14	89/29	196/48	344/54	144/39	41/11	GMCC #2
N6ZZ	161,253	779	207	34/19	106/35	200/47	235/49	128/37	76/20	SCCC #1
W6EEN (N6RT)	158,422	758	209	19/11	100/36	245/51	240/55	119/40	35/16	SCCC #1
W5KFT (K5PI)	158,250	750	211	24/15	71/29	192/45	245/53	163/43	55/26	
W9RE	147,581	727	203	65/27	169/47	193/48	183/46	87/24	30/11	SMC #1
NØAV	134,136	648	207	55/27	114/38	174/52	204/50	89/31	12/9	SMC #2
K4RO	130,713	699	187	52/24	136/39	211/50	221/46	56/22	23/6	TCG Lib
N2LA	130,640	710	184	16/11	74/28	134/39	319/55	149/39	18/12	

Multi-Two Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*
W5NN	324,104	1276	254	67/24	160/42	353/57	407/59	206/43	83/29
K5KA	281,064	1176	239	87/27	231/48	311/50	372/54	141/42	34/18
KØRF	276,080	1190	232	73/24	175/41	305/54	362/56	192/37	83/20

Single Operator Scores

Call	Score	QSOs	Mults	QTH	Team
W1ZT	61,248	464	132	MA	
KB1H (K1EBY)	57,620	430	134	CT	
W1RM	49,591	491	101	CT	
K1GU	28,392	273	104	MA	
AK1W (K5ZD)	17,100	190	90	MA	
W1EEP	10,952	148	74	MA	
W1END	4896	102	48	NH	
N1MD	180	15	12	CT	
WB2AA	12,960	180	72	NJ	
N2GC	10,956	166	66	NY	
W2LE	5900	118	50	NJ	
KV2M	704	32	22	NJ	
AA3B	116,622	682	171	PA	Team UBN
N3AD	86,100	574	150	PA	Team UBN
K3WW	85,701	539	159	PA	Team UBN
K3CR (LZ4AX)	85,170	501	170	PA	
AD8J	36,621	313	117	PA	Team NIL
K3MD	23,587	229	103	PA	
NA3V	20,332	221	92	PA	
K3UW	11,248	152	74	PA	
AA0CY	6930	126	55	PA	
K3SV	6566	134	49	PA	
W3TT (NY3C)	2898	69	42	DE	All of Bob's Vanity Calls
NG3K	1560	52	30	MD	
N3NZ	1392	48	29	PA	
N9GG	1036	37	28	DE	All of Bob's Vanity Calls
K3HRO (K3TL)	25	5	5	DE	All of Bob's Vanity Calls
NN9G (N3LJB)	12	4	3	PA	All of Bob's Vanity Calls
K4RO	130,713	699	187	TN	TCG Team Liberty
K9OM	116,928	672	174	FL	
K7SV	101,061	591	171	VA	PVRC # 1
W4CAT (K1KY)	97,416	594	164	TN	TCG Team Liberty
W4NZ	92,070	594	155	TN	TCG Team Freedom
K4BAI	90,072	556	162	GA	SECC #1
K4AMC	89,012	578	154	TN	TCG Team Freedom
WO4O	87,575	565	155	TN	TCG Team Freedom
K0EJ	87,450	530	165	TN	TCG Team Freedom
WA4PGM	81,120	507	160	VA	Team NIL
K4LTA	80,311	539	149	TN	TCG Team Freedom
W4OC	80,028	494	162	SC	SECC #1
AA4GA	74,934	543	138	GA	SECC #1
WJ9B	72,600	550	132	NC	PVRC # 1
KU8E	65,830	454	145	GA	SECC #1
W9WI	47,719	401	119	TN	TCG Team Stars
N4GG	45,824	358	128	GA	
W4AU	36,180	335	108	VA	
N4DW	32,376	284	114	TN	TCG Team Stripes
K4BEV	31,248	279	112	TN	TCG Team Stars
NY4N	29,785	259	115	TN	TCG Team Stars
N4TB	19,313	217	89	FL	
NA4W (K4WI)	16,464	196	84	AL	
KN4Y	15,624	186	84	FL	
N4AF	13,193	167	79	NC	PVRC # 1
W4DAN	13,065	195	67	TN	TCG Team Old Glory
W3JGG	13,026	167	78	FL	
WB4MSG	11,914	161	74	NC	
NF4A	7080	118	60	FL	
W4NTI	6000	120	50	AL	SECC #2
N4GN	5618	106	53	KY	
W4TYU	5529	97	57	TN	TCG Team Stars
KE4OAR	5488	112	49	TN	TCG Team Stars
KM4H	5184	96	54	TN	TCG Team Stripes
N4BP	3069	99	31	FL	
W4BCG	2496	64	39	TN	TCG Team Old Glory
W4WXA	726	33	22	GA	
*K4IR	294	21	14	GA	
AA3VA	216	18	12	TN	
*AF8A/4	190	19	10	NC	
*K2EKM	54	9	6	VA	
KF4TJE	9	3	3	TN	TCG Team Patriotic
N2IC	164,775	845	195	NM	GMCC #2 Rocky Mtn Trappers
N6ZZ	161,253	779	207	NM	SCCC #1
W5KFT (K5PI)	158,250	750	211	TX	
N2LA	130,640	710	184	TX	
AD5Q	113,580	631	180	TX	North Texas Contest Club
W5WMU	112,988	601	188	LA	
KZ5D	98,091	519	189	LA	
WA7LNW	93,388	631	148	NM	GMCC #2 Rocky Mtn Trappers
K1NT	90,036	549	164	TX	
W5GN	89,790	615	146	TX	North Texas Contest Club
N5PO	85,956	551	156	TX	
N5RG	71,896	473	152	TX	
K5XR (W5ASP)	68,362	514	133	TX	
W5MK	40,248	344	117	AR	
K0GEO	27,560	265	104	TX	
*WU5X	22,272	256	87	AR	
NI5F	16,732	188	89	MS	
KC5R	10,350	150	69	LA	
*K5UV	6240	130	48	OK	
K5WTR	1215	45	27	TX	
N6MJ (@W6KP)	178,808	868	206	CA	SCCC #1
W6EEN (N6RT)	158,422	758	209	CA	SCCC #1
N6NT	121,576	668	182	CA	NCCC #2
WA6O	113,220	629	180	CA	NCCC #1
K6XT	99,456	592	168	CA	SCCC #4
AC6T	90,376	572	158	CA	SCCC #1
W6UE (W4EF)	89,428	566	158	CA	SCCC #1
N6AA	80,400	536	150	CA	SCCC #2
AA6PW	80,332	604	133	CA	SCCC #2
AD6TF (@K6KM)	76,152	501	152	CA	NCCC #2
W0YK	72,051	511	141	CA	NCCC #1
N6HC	69,434	466	149	CA	
K6CTA	68,229	513	133	CA	NCCC #5
K6LRN	67,598	463	146	CA	NCCC #2
WN6K	65,136	472	138	CA	SCCC #2
WX5S (@AD6E)	51,816	408	127	CA	NCCC #2
W6YL (W6CT)	42,362	359	118	CA	NCCC #3
N6TW	41,400	345	120	CA	SCCC #3
W6KY	38,533	341	113	CA	SCCC #3
K6TA	38,232	354	108	CA	NCCC #5
W6RGG	37,744	337	112	CA	NCCC #6
ND2T	36,624	327	112	CA	NCCC #3
WX6V	33,431	331	101	CA	NCCC #2
K6NA	33,280	320	104	CA	SCCC #3
K6III	27,132	266	102	CA	NCCC #6
K6DGW	26,220	276	95	CA	NCCC #3
KE6ZSN	24,570	234	105	CA	NCCC #5
K6EY	23,655	249	95	CA	SCCC #4
K6XX	20,970	233	90	CA	NCCC #3
W6RKC	18,748	218	86	CA	
W6OAT	18,291	201	91	CA	NCCC #6
KE6QR	16,400	205	80	CA	NCCC #4
W6TK	15,554	202	77	CA	SCCC #2
N6EE	15,308	172	89	CA	NCCC #5
KI6T	13,608	168	81	CA	NCCC #4
K6OWL	9516	156	61	CA	NCCC #4
WA6BOB	8184	124	66	CA	SCCC #3
AE6Y	7200	144	50	CA	NCCC #6
K6LA	6832	122	56	CA	SCCC #3
K6CSL	5150	103	50	CA	
W1SRD	4998	119	42	CA	
AD6G	3000	75	40	CA	NCCC #4
NT6K	2112	66	32	CA	NCCC #3
W1HIJ/M		252	21	12	CA
KI6OY	234	18	13	CA	
K5RC	120,520	655	184	NV	NCCC #1
K7NV	86,292	564	153	NV	NCCC #1
W7UT	82,052	562	146	UT	GMCC #2 Rocky Mtn Trappers
W6RLL	30,849	273	113	AZ	
KI7Y	30,502	302	101	OR	
KO7X	29,422	313	94	WY	
KH6SH/K7	24,948	297	84	UT	
N7ZN	20,880	240	87	ID	
N7WA	18,662	217	86	WA	
W7GG	13,500	225	60	OR	
*KG7Q	11,232	156	72	NV	
KU7K	9246	138	67	OR	
N7MAL	6840	120	57	AZ	
KU7T	3572	94	38	WA	
W7YS	3264	68	48	AZ	
K7MM	3225	75	43	WA	
AB7RW	2160	60	36	WA	
N7EIE	1485	55	27	WA	
K7WA	1219	53	23	WA	
W7DRA	1080	54	20	WA	
K5IID	45,804	347	132	WV	Mad River Radio Club
N4ZR	33,465	291	115	WV	PVRC # 2
K8JQ	33,075	315	105	WV	
W9OP	32,946	289	114	WI	
KG8GW	24,320	256	95	WV	
*N8VW	21,204	228	93	OH	Mad River Radio Club
NU8Z	14,134	191	74	MI	
W8UE	13,224	174	76	MI	
*W8TM	8684	167	52	OH	
K8IR	6726	114	59	MI	
N8II	6171	121	51	WV	PVRC # 2
WB8RTJ	5992	107	56	OH	
N4GXP	4224	88	48	OH	
N8UZE	3450	75	46	MI	
*KC8LTL	2356	76	31	MI	
KZ8E	1700	50	34	WV	
K9NW	714	34	21	OH	Mad River Radio Club
K8VFR	475	25	19	MI	
N5NW	176	16	11	OH	TCG Team Old Glory
WA8MWA	144	16	9	OH	

Call	*Score*	*QSOs*	*Mults*	*QTH*	*Team*
W9RE	147,581	727	203	IN	SMC #1
K5OT	84,245	581	145	WI	SMC #1
K9MMS	70,280	502	140	IL	SMC #2
WT9U	70,179	471	149	IN	SMC #1
W9WUU	41,769	357	117	WI	SMC #4
K9WX	39,444	346	114	IN	SMC #3
KJ9C	38,760	340	114	IN	SMC #5
WA1UJU	37,752	312	121	WI	SMC #5
AD6E	31,108	308	101	IN	NCCC #5
K9QVB/9	28,512	288	99	WI	
K9JWI	21,896	238	92	IN	
N9NT	16,102	194	83	IL	
K9IG	11,780	155	76	IN	SMC #2
N9EP	9815	151	65	IL	SMC #5
K9KM	4324	94	46	IL	SMC #2
K9LA	3978	78	51	IN	
N9GUN	3403	83	41	IL	SMC #4
WE9V	3300	75	44	WI	SMC #4
K9MI	2840	71	40	IN	SMC #3
AA9KH	2829	69	41	IL	
*KG9N	999	37	27	IL	
KC9ARR	680	34	20	IL	
N9BOR	630	35	18	IL	SMC #4
KU1CW	164,832	808	204	MO	KCDXC
N0AV	134,136	648	207	IA	SMC #2
AE0Q	115,089	681	169	CO	GMCC #3 Buckaroos
K0O	113,168	643	176	MO	KCDXC
NA0N	100,980	594	170	MN	
N4VI	90,376	572	158	CO	GMCC #4 Rough Riders
W0ETT	82,170	498	165	CO	GMCC #1 Hardscrable Miners
N0KE	80,070	510	157	CO	GMCC #1 Hardscrable Miners
K0UK	77,462	503	154	CO	GMCC #3 Buckaroos
K7RE	67,900	485	140	SD	
K0RI	57,190	430	133	CO	GMCC #1 Hardscrable Miners
N0HF	51,987	403	129	CO	GMCC #1 Hardscrable Miners
W0UY	43,625	349	125	KS	SMC #4
K4IU	34,916	301	116	MN	
K0OB	32,028	314	102	MN	
K8FC	20,839	229	91	CO	GMCC #3 Buckaroos
N0AT	20,045	211	95	MN	
N0BUI	17,820	220	81	MN	
K0EWS	16,000	200	80	SD	
K0CF	15,853	191	83	IA	
N0ZA	10,950	150	73	CO	
*KI0II	10,582	143	74	CO	GMCC #4 Rough Riders
WN8P	10,400	160	65	KS	
W0HXB	7847	133	59	CO	GMCC #4 Rough Riders
KV0K	6375	125	51	CO	GMCC #3 Buckaroos
K0BX	4171	97	43	MO	
W0ZP	2652	68	39	CO	
WG0M	2343	71	33	MN	
WA0OTV	63	9	7	MO	
VE3DZ	92,379	581	159	ON	CCO #1
VE3KP	42,837	327	131	ON	CCO #1
VE7FO	41,170	358	115	BC	
VE3OJ	39,852	324	123	ON	CCO #1
VE1RGB	34,230	326	105	NS	
VE3IAY	33,784	328	103	ON	CCO #1
VE3JM/2	33,504	349	96	QC	
VE3KZ	33,228	284	117	ON	CCO #2
VE3XD	25,920	270	96	ON	CCO #2
VA7ST	22,446	261	86	BC	TCG Team Liberty
VE1OP	19,803	287	69	NS	TCG Team Liberty
VE3AGC	16,044	191	84	ON	
VE2QY	12,024	167	72	QC	
*VA3DF	9088	142	64	ON	
VE5SF	2030	70	29	SK	
VE2HLS	390	30	13	QC	
VA3HUN	364	26	14	ON	
VE2OWL	80	10	8	QC	
TI5N(CX6VM)	92,320	577	160	TI	GMCC #4 Rough Riders
XE2MX(N6KI)	61,155	453	135	XE	SCCC #2
FP/K9OT	2856	84	34	FP	
CX7BY	22,113	243	91	DX	
ZL/W3SE(W3SE)	4365	97	45	DX	SCCC #4
UA3AGW	960	40	24	DX	

* Indicates QRP entry

Multi-Two Scores

Call	*Score*	*QSOs*	*Mults*	*QTH*
W5NN	324,104	1276	254	TX
(UA0OFF, K5ZTY, N1LN, K5GA, K5NZ)				
K5KA	281,064	1176	239	OK
(K5KA, N5RZ, W0UA)				
K0RF	276,080	1190	232	CO
(K0RF, W1XE)				
KM4M	175,296	913	192	VA
(K4JA, K9GY, W3BP)				
W6YX	151,025	863	175	CA
(AA6XV, K6UFO, N6DE, W7SW)				
VE3YDX	82,144	544	151	ON
VA3ATT, VE3GKW, VE3XAX, VE3YDX)				

Check Logs: K4FCG, K4WW, K4BAM

Results, October 2003 RTTY Sprint

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Another RTTY Sprint has come and gone. While conditions did not seem to be as favorable as those experienced in March 2003, the level of participation seems to have been fairly consistent. Despite the apparent downturn in conditions, however, as noted below there were some first rate scores submitted in each category.

In addition, and on a personal note, the logs submitted as compared to those of March seem to be more consistent with the *Cabrillo* standard. The variations of those submitted in March seemed to have been as great as the number of participants. If this trend continues, it should prove easier to provide more data and break down of information than previously available. As such, this Sprint Manager would like to thank each and every participant.

Further, this Sprint Manager would like to continue to encourage everyone that gets on during a RTTY Sprint to submit a log. Although it is most convenient if the log were to be in the *Cabrillo* format, this is not a must. Of course, don't forget that Bruce, WA7BNM, has provided the manual entry of your log. It works! Each and every additional log makes it that much easier to develop the database against which to check the logs. In other words, participate *and* submit, regardless of your QSO or multiplier count!

High Power

Congratulations are in order to Barry, W2UP, who posted a terrific score of 10,710. W7WW and K6LL also made strong showings, placing second and third, respectively. K6UFO, operating at W6YX, and NI6T rounded out the top five.

Low Power

Equally impressive was the score of KI6DY in the low power category. In fact, the top five operators in this category submitted scores that would have placed well even in the high power category. AE5P had a nice score for second place, as did AD6WL for third. N2DBI and N6TQS rounded out the top five, and were only separated by 19 points.

QRP

The QRP winner was W7TI, with an amazing score of 3840. His score would place him in the top ten box for either the high or low power categories. Way to go Bill! K6MI also did well running only 5 W.

Teams

In the team competition, NCCC, paced by W2UP, won over SWACC, with a great combined score of 55,895.

Get on and join the mayhem in the next RTTY Sprint!

Soapbox

Started with 100 W, but since nobody could read my signals I had to turn on the PA and run 500 W—7S3A (SM3CER). Great fun again more QSOs, fewer multipliers—AE5P. More contacts this year with lower score—AI9T. My first Sprint. Decided to try this after some urging from K6LL, an old friend from AZ and my OM K7OX. Thanks for the Q and help this contest really keeps you jumping—KE7AJ. Glad to finally work an Ontario station in the last few minutes of the contest. See you next time—VA3PC. Frustration #1—answering a Sprint newbie and his not relinquishing the frequency at the end of the exchange. Frustration #2—getting beaten by NI6T to a European on 40 meters (my beam was pointing west, though). Good activity, but low mult count—W2UP.

October 2003 NA RTTY Sprint Results

Call	*QTH*	*QSOs*	*Mults*	*Score*	*Team*
W1TO	MA	18	11	198	
*N2DBI	NY	161	29	4669	
WB2JEP	NJ	137	30	4110	
W2UP	PA	306	35	10,710	SWACC
W4OX	FL	138	28	3864	
AD4EB	TN	98	20	1960	
*W4BCG	TN	78	19	1482	
*KA3VME/4	NC	19	12	228	
*NX9O	GA	3	2	6	
*AE5P	TX	197	27	5319	
WAØSXV	NM	102	29	2958	
K5AM	NM	53	21	1113	
W6YX (K6UFO)	CA	204	31	6324	NCCC
NI6T	CA	186	32	5952	NCCC
KB5MU (@N6KI)	CA	169	31	5408	SWACC
*AD6WL	CA	156	31	4836	SWACC
*N6TQS	CA	150	31	4650	NCCC
*AC6JT	CA	139	29	4031	NCCC
*WA6BOB	CA	143	27	3861	SWACC
**W7TI	CA	128	30	3840	
WK6I	CA	87	26	2262	NCCC
*K6OWL	CA	78	22	1716	
**K6MI	CA	31	15	465	
*W6ZZZ	CA	25	15	375	NCCC
W7WW	AZ	232	35	8120	SWACC
K6LL	AZ	262	30	7860	SWACC
*KE7AJ	WA	140	25	3500	SWACC
*N7ESU	ID	61	27	1647	
AI9T	IL	201	29	5829	SWACC
*W9HLY	IN	111	23	2553	
*W8WTS	OH	89	24	2136	
*K9WX	IN	81	22	1782	
*K9JS (@AI9U)	IL	62	22	1364	
*KI6DY	KS	199	29	5771	SWACC
*KØHW	SD	138	26	3588	
WØETC	IA	100	24	2400	
*KØXU	NE	98	24	2352	
*NNØG	CO	92	23	2116	
*VA3PC	ON	150	27	4050	
*VE3IAY	ON	98	26	2548	
*VA7ST	BC	76	27	2052	
VE2OWL	QC	5	5	25	
7S3A (SM3CER)	DX	47	15	705	

*Low power
**QRP

***Team Scores*:**

SWACC	55,895
NCCC	23,594

Top-Ten Scores

W2UP	10,710
W7WW	8120
K6LL	7860
W6YX (K6UFO)	6324
NI6T	5952
AI9T	5829
*KI6DY	5771
KB5MU (@N6KI)	5408
*AE5P	5319
*AD6WL	4836

Top-Ten Low Power

KI6DY	5771
AE5P	5319
AD6WL	4836
N2DBI	4669
N6TQS	4650
VA3PC	4050
AC6JT	4031
WA6BOB	3861
KØHW	3588
KE7AJ	3500

Top-Ten QRP

W7TI	3840
K6MI	465

Top-Ten QSOs

W2UP	306
K6LL	262
W7WW	232
W6YX (K6UFO)	204
AI9T	201
*KI6DY	199
*AE5P	197
NI6T	186
KB5MU (@N6KI)	169
*N2DBI	161

Top-Ten Mults

W2UP	35
W7WW	35
NI6T	32
W6YX (K6UFO)	31
KB5MU (@N6KI)	31
*AD6WL	31
*N6TQS	31
K6LL	30
WB2JEP	30
**W7TI	30

NCJ

SAVE BIG ON ANTENNAS, TOWERS & CABLE

TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832

.375	$.70/ft	1.375"	$1.75/ft
.500"	$.80/ft	1.500"	$1.95/ft
.625"	$.90/ft	1.625"	$2.25/ft
.750"	$1.00/ft	1.750"	$2.50/ft
.875"	$1.10/ft	1.875"	$2.75/ft
1.000"	$1.20/ft	2.000"	$3.00/ft
1.125"	$1.35/ft	2.125"	$3.50 /ft

In 6' or 12' lengths, 6' lengths ship UPS. Call for 3/16"& 1/4" rod, bar stock, and extruded tubing.

CUSHCRAFT ANTENNAS

13B2/A148-10S	$159/89
A270-6S/A270-10S	$79/99
A3S/A4S	$459/549
A50-3S/5S/6S	$99/169/269
A6270-13S	$199
AR2/ARX2B	$55/69
AR270/AR270B	$89/99
R6000/R8	$309/459
X7/X740	$649/269
XM240	$679

Please call for more Cushcraft items.

FORCE 12–MULTIBAND

C3	10/12/15/17/20m, 7 el	$599
C3E	10/12/15/17/20m, 8 el	$649
C3S	10/12/15/17/20m, 6 el	$539
C3SS	10/12/15/17/20m, 6 el	$559
C4	10/12/15/17/20/40m, 8 el	$759
C4S	10/12/15/17/20/40m, 7 el	$679
C4SXL	10/12/15/17/20/40m, 8 el	$979
C4XL	10/12/15/17/20/40m, 9 el	$1119
C19XR	10/15/20m, 11 el	$959
C31XR	10/15/20m, 14 el	$1299

Please call for more Force 12 items.

TRYLON "TITAN" TOWERS

SELF-SUPPORTING STEEL TOWERS

T200-64	64', 15 square feet	$1209
T200-72	72', 15 square feet	$1429
T200-80	80', 15 square feet	$1649
T200-88	88', 15 square feet	$1949
T200-96	96', 15 square feet	$2249
T300-88	88', 22 square feet	$2189
T400-80	80', 34 square feet	$2089
T500-72	72', 45 square feet	$1979
T600-64	64', 60 square feet	$1869

Many more Trylon towers in stock!

BENCHER / BUTTERNUT

Skyhawk, Triband Beam	$1129
HF2V, 2 Band Vertical	$249
HF5B, 5 Band Minibeam	$359
HF6VX, 6 Band Vertical	$339
HF9VX, 9 Band Vertical	$369
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
TBR160S, 160m Kit	$139

More Bencher/Butternut–call

M2 VHF/UHF ANTENNAS

144–148 MHz

2M4/2M7/2M9	$95/109/129
2M12/2M5WL	$165/209
2M5-440XP, 2m/70cm	$179

420–450 MHz

440-470-5W/420-450-11	$139/95
432-9WL/432-13WLA	$179/239
440-18/440-21ATV	$129/149

Satellite Antennas

2MCP14/2MCP22	$169/239
436CP30/436CP42UG	$239/279

ROHN TOWER

25G/45G/55G	$89/189/239
25AG2/3/4	$109/109/119
45AG2/4	$209/225
AS25G/AS455G	$39/89
BPC25G/45G/55G	$75/99/110
BPL25G/45G/55G	$85/109/125
GA25GD/45/55	$68/89/115
GAR30/GAS604	$35/24
SB25G/45/55	$39/89/109
TB3/TB4	$85/99

Please call for more Rohn prices.

US TOWER

MA40/MA550	$999/1549
MA770/MA850	$2599/3999
TMM433SS/HD	$1349/1649
TMM541SS	$1789
TX438/TX455	$1279/1749
TX472/TX489MDPL	$2899/7299
HDX538/HDX555	$1499/2549
HDX572MDPL	$6669

Please call for help selecting a US Tower for your needs. Shipped factory direct to save you money!

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$149
GP6, 2m/70cm Vertical	$139
GP9, 2m/70cm Vertical	$169
B10NMO, 2m/70cm Mobile	$36
SB14, 6m/2m/70cm Mobile	$59
SBB224NMO,2m/220/70cm	$69
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$49
SBB7NMO, 2m/70cm Mobile	$69
UHV4/UHV6	$109/135

Much more Comet in stock–call.

M2 ANTENNAS

50–54 MHz

6M5X/6M7JHV	$209/269
6M2WLC/6M9KHW	$459/499

10/12/15/17/20m HF

10M4DX, 4 Element 10m	$399
12M4DX, 4 Element 12m	$399
15M4DX, 4 Element 15m	$449
17M3DX, 3 Element 17m	$399
20M4DX, 4 Element 20m	$529

More M2 models in stock–please call.

GLEN MARTIN ENGINEERING

Hazer Elevators for 25G

H2, Aluminum Hazer, 12 sq ft	$359
H3, Aluminum Hazer, 8 sq ft	$269
H4, HD Steel Hazer, 16 sq ft	$339

Aluminum Roof Towers

RT424, 4 Foot, 6 sq ft	$159
RT832, 8 Foot, 8 sq ft	$239
RT936, 9 Foot, 18 sq ft	$389
RT1832, 17 Foot, 12 sq ft	$519
RT2632, 26 Foot, 9 sq ft	$869

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$539/769/1089
7-50'/60'/70'	$979/1429/1869
9-40'/50'/60'	$759/1089/1529
12-30'/40'	$579/899
15-40'/50'	$1019/1449
23-30'/40'	$899/1339
35-30'/40'	$1019/1569

Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!

DIAMOND ANTENNAS

D130J/DPGH62	$79/139
F22A/F23A	$89/119
NR72BNMO/NR73BNMO	$39/54
NR770HBNMO/NR770RA	$55/49
X200A, 2m/70cm Vertical	$129
X500HNA/X700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
CR627B/SG2000HD	$99/79
SG7500NMO/SG7900A	$75/112

More Diamond antennas in stock.

MFJ

259B	$219
269	$299
941E	$109
945E	$99
949E	$139
969	$169
986	$289
989C	$309
1798, 80–2m Vertical	$249
1796, 40/20/15/10/6/2m Vert.	$189

Big MFJ inventory–please call

COAX CABLE

RG-213/U, (#8267 Equiv.)	$.36/ft
RG-8X, Mini RG-8 Foam	$.19/ft
RG-213/U Jumpers	Please Call
RG-8X Jumpers	Ple ase Call

Please call for more coax/connectors.

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$11/12
1/2"x9"EE / EJ Turnbuckle	$16/17
1/2"x12"EE / EJ Turnbuckle	$18/19
3/16" / 1/4" Big Grips	$5/6

Please call for more hardware items.

GAP ANTENNAS

Challenger DX	$289
Challenger Counterpoise	$29
Challenger Guy Kit	$19
Eagle DX	$299
Eagle Guy Kit	$29
Titan DX	$329
Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
Voyager Guy Kit	$45

Please Call for Delivery Information.

LAKEVIEW HAMSTICKS

9106	6m	9115	15m 9130 30m
9110	10m	9117	17m 9140 40m
9112	12m	9120	20m 9175 75m

All handle 600W, 7' approximate length, 2:1 typical VSWR ... $24.95

TIMES MICROWAVE LMR® COAX

LMR-400	$.59/ft
LMR-400 Ultraflex	$.89/ft
LMR-600	$1.19/ft
LMR600 Ultraflex	$1.95/ft

HIGH CARBON STEEL MASTS

5 FT x .12" / 5 FT x .18"	$35/59
10 FT x .18" / 11 FT x .12"	$129/80
16 FT x .18" / 17 FT x .12"	$179/129
20 FT x .25" / 21 FT x .18"	$315/235
22 FT x .12" / 24 FT x .25"	$149/379

HUSTLER ANTENNAS

4BTV/5BTV/6BTV	$129/169/199
G6-270R, 2m/70cm Vertical	$169
G6-144B/G7-144B	$109/179

Hustler Resonators in stock–call.

ANTENNA ROTATORS

M2 OR-2800P	$1249
Yaesu G-450A	$249
Yaesu G-800SA/DXA	$329/409
Yaesu G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550/G-5500	$299/599

PHILLYSTRAN GUY CABLE

HPTG1200I	$.45/ft
HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$6.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$8.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$12.00
HPTG11200	$1.89/ft
PLP2758 Big Grip (11200)	$18.00

Please call for help selecting the Phillystran size for your application.

ROTATOR CABLE

R62 (#18)	$.32/ft.
R81/82	$.25/ft./.39/ft.
R84	$.85/ft

WEEKDAY HOURS:
9 AM–5 PM CST

SATURDAY HOURS:
9 AM–12 NOON CST

CREDIT CARDS:
M/C, VISA, DISCOVER

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EMAIL ADDRESS:
sales@texastowers.com

INTERNET ADDRESS:
www.texastowers.com

IC-7800
The Ultimate HF!

Multiple Meter Readouts See the latest in meter technology with the '7800's virtual meter system. These digital meters are visually superior to and of a higher performance than analog. Don't believe it? Log on to www.icomamerica.com/7800 and see for yourself!

Multiple Spectrum Displays You can select a standard spectrum display either centered on your operating frequency or a fixed range to view the band! Choose how you want to SEE the band, and then tune to what signals you see. (Photo shows the fixed range spectrum display.)

CF Card Slot The ultimate way to "take your rig with you". Just pull your CF card from your '7800, slide it into another '7800, and you now have your rig!

Triple Band Stack Registers Memorizes the last 3 used frequencies – quick recall for band hopping, provides the ultimate in multi-mode flexibility.

DUAL RECEIVER CONTROLS

Digital Voice Recorder Controls Simple record and play controls for the internal DVR. Great for quick recording and playback of a call, great for reducing the number of broken calls in your log.

Dual VFO Tuning Knobs Independent tuning knobs for each receiver. There's no mistake about which receiver you are adjusting, as the size difference allows for "no-look" operation!

DUAL RECEIVER CONTROLS

Gentlemen, start your engines. All four of them!

Power your way to front of the pack with Icom's new IC-7800. Cutting edge digital meets the best of world class analog, resulting in an amazing 110dB of receiver dynamic range and a *+40dBm IP3 in the HF bands!* But that's not all. The '7800 has two identical, independent receiver circuits. Receive two different bands simultaneously on different antennas, with no adverse effects from one receiver to the other – take your band hopping and contesting to the next level! There are four 32-bit floating point DSP units with 24-bit AD/DA converters, one each for the main RX, second RX, TX, and spectrum scope, to accelerate data processing to whiplash speeds! Newly designed power amplifiers provide a powerful 200W of output power at full duty cycle and low transmit IMD. So what are you waiting for? Make your move. See your authorized Icom dealer!

Dual Receive Controls Separate key receiver controls are available for each receiver. Controls for volume, RF gain, and DSP controls, the '7800 also has independent controls for the Digital Twin PassBand tuning as well as the 70 dB Manual Notch filters. Whether in a contest, or just hopping around the bands, easy access to receiver controls such as volume, RF gain, and AGC adjustments are at your fingertips.

Dual Digital Twin PassBand Tuning Only Icom brings you Digital Twin PassBand tuning. Adjustments can be made for each receiver without affecting the other receiver.

Independent Digi-Sel Controls Incorporated into the IC-7800 is a newly designed digital pre-selector, with separate controls for each receiver.

Independent Auto Tune Automatically zero beat your CW or AM carrier signals. The '7800 makes sure you're right on the proper frequency for these modes. Each receiver has a separate control.

Independent AGC Settings Multiple AGC settings for each receiver. On-the-fly adjustment for either preset AGC settings, or a completely variable AGC control.