NCJ

NATIONAL CONTEST JOURNAL

$4

November/December 2004

Volume 32 Number 6

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- Vertical Antennas with Top Loading
- The Anti-Murphy Box
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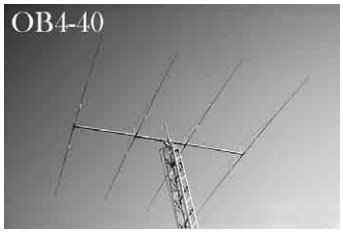

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Advertising Contesting

When I heard that the Central Texas DX and Contest Club was putting on a DX and contest forum at this year's Summerfest in Austin, I contacted Gary, W5ZL, to see if he'd write a story about the contest forum. He agreed, and the result is in this issue. His story is a good example of proactively going after new contesters. My guess is this type of forum happens more often than we think (hint, hint—*NCJ* would like to hear about your contest club's efforts to attract newcomers into contesting). If your contest club hasn't done something like this in the immediate past, I hope Gary's article gives you some ideas. Remember, *NCJ* will be glad to furnish sample *NCJs* for your activity.

Getting Old

The Contest Tips, Tricks and Techniques column by Gary, W9XT, in the September/October issue discussed what contesters are doing differently as they age (gracefully, of course). This issue of *NCJ* has a related "age" article by Henry, N4UH, titled "My Last Maximum Effort Contest: When Was Yours?" It's a realistic look at an event that all of us will face some day. Perhaps some of you have already passed this milestone. If so, I'd love to hear about it.

NAQP RTTY Contest Manager

Wayne, K7WM, our NAQP RTTY contest manager did the July 2004 NAQP RTTY contest results in this issue. These are his last results, as he's turning over the NAQP RTTY contest manager responsibilities to Shelby, K4WW. Thanks, Wayne, for all your efforts!

SP7HT's article

In the September/October issue, we ran an article by Tadek, SP7HT, titled "Use of Comparative Analysis to Estimate the DX Prowess of HF Receivers." Tadek's conclusion, although slanted toward DXing rather than contesting, generated some good comments from several contesters. What was interesting, in my opinion, is how these comments and Tadek's response were propagated—on the cq-contest and topband reflectors.

That got me thinking back to about 10 years ago. What probably would have happened then is *NCJ* would have taken the comments and published them in the next issue. Then Tadek would have responded and that would have been published in the subsequent issue—two issues after the original article (four months or so elapsed time). This episode certainly shows how far we've come in the past 10 years. And more importantly, it says *NCJ* has to evolve to keep up with the times.

This Issue's Cover Photos

The cover photos for this issue come from Matt, W5LL. Both photos were taken during the CQ WPX RTTY contest at N5YA's contest station near Bonham, Texas. Matt says north Texas received about 4 inches of snow that day, which is a rare event for that part of the country. I can vouch for that, having lived in the Dallas/Fort Worth area from 1979 to 1988. The most snow I remember was about an inch—and it was gone the next day. Judging by the snowman photo, it sure looks like the N5YA crew had some fun with this rare event. I hope their snowman project didn't interfere with the contest too much!

Photo Credit

To give credit where credit is due, Hector, XE2K, took the photo of K6VVA and the US Tower gals on page 30 in the July/August 2004 *NCJ*. Thanks, Hector!

NCJ

My Last Maximum-Effort Contest. When Is Yours?

Henry G. Elwell Jr, N4UH
2701 Rary Rd
Cleveland NC 27013

Has the following question ever crossed your mind?

"How old will I be when I finally toss in the towel and no longer want to make a major contest effort?"

I asked myself that question at age 52 in 1971 when I began thinking of retirement, which occurred at age 58 in 1977. No one knows the answer, but I have learned that I can benefit from the experiences of those who have gone before me.

With that in mind, in 1971 I looked through my back issues of *QST* to 1936, and picked out the calls of DX contest winners, including those who were top scorers. I had to make sure they were still alive, and I came up with 140 calls. A form letter was created and sent, asking them what they were currently doing and how it affected their contesting activities, plus other questions to get background information. I received 60 replies, which I thought was good. Not all my returns were from retired men, and not all retired men were still enthusiastic about ham radio. A lot was learned about others, but the conclusion was that my future would have to be my own; it boils down to my basic philosophy, "People do what they want to do."

I am a second-level contester, which means that although I have won many Section awards while I was W2JKH/W2MB in New Jersey and as N4UH in North Carolina, I am not a US Top-10 winner in the major contests. That takes a special talent and motivation, which brings up the question "Why do we do it?" You will have to answer that for yourself. Obviously, we enjoy the excitement of high-rate "runs," and the delight in finding that elusive multiplier, but winning out over the competition is the greatest satisfaction.

But in my case I've been contesting since 1938, and as my wife as a child would say, winning became a "cross-eyed bear." (Translated to adult talk, she had heard her parents talk about their "cross to bear.") I have always felt I had to get good scores just to let the other guys know I still had it in me to do that; this was my cross-eyed bear. So in many of the 48-hour contests, in later years, I entered with some reluctance, thinking of the grueling hours ahead of me. But once committed, I settled down, and had a good time.

However, in July 1977, a new contest started called the IARU Radiosport Championship. I had found my contest; a 36-hour competition for single operators and one I could handle in my late 50s. In addition, I felt sure it was not discovered by the Big Guns, or not important enough for them to bother with. I played around with it in 1977, coming in at number 40 in the nation. Because of the process of retiring, selling the house, removing antennas/towers and moving to North Carolina in December of that year, there was still a minimal station at W2MB. In July 1978, the reverse situation existed; my station was not set up in the Cleveland area of North Carolina, although I managed some activity from N4UH. That year I ended up at number 95 in the US.

By 1979 I had started using part of my 22 acres and had two towers with TH6 antennas on them and a 270-foot Zepp antenna at 70 feet. With those an-

N4UH at his station

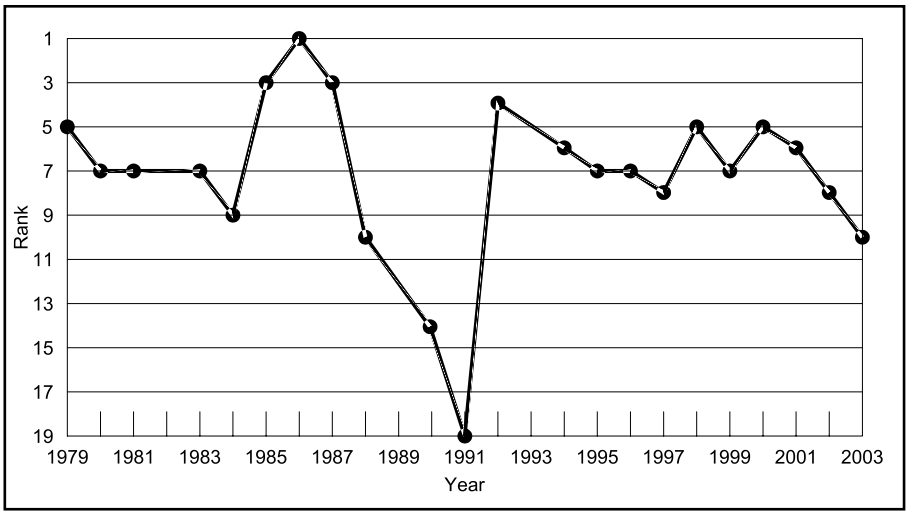

Figure 1—My ranking in the IARU contest from 1979 to 2003.

tennas, a TS520 transceiver, a homemade 4-1000 linear amplifier and probably minimum competition, I was able to rank number 5 in the country. Now I knew this was my contest, and I vowed to give it my maximum effort every time I was in it.

Retirement Dreams and Reality

One of my retirement dreams was to build a rhombic; not just any old rhombic, but one that I could use on all bands by changing its configuration for optimum operation on each band. That required designing and constructing a motor driven pulley system on the side towers, and a large weight on the end tower to keep the 271-foot-per-leg-antenna wires taut during and after a configuration change. Its beam was centered on London, England, with the Great Circle path going through the Arabian Peninsula. The antenna was operational by 1983. When reversed, the rhombic beamed into Easter, Pitcairn and Chatham Islands; I found little activity in that direction during a contest. Its operation has exceeded my dreams on 80 meters through 10 meters.

My next thought was to repeat the installation centered on Japan, and its reverse direction would cover South America. However, the cost of erecting another rhombic made me drop that idea. I would have to be satisfied with my acquired TH7 beam at 60 feet rotatable for Asia, and my TH6 fixed on South America.

The contest gave me a boost in 1986 when it changed its name to IARU HF World Championship and became a 24-hour contest. At that time, it added multipliers to the ITU Zones in the form of Headquarters stations, making it more interesting.

From 1979 through 2004, I missed operating in '82, '89 and '93 IARU contests because I was away from home. Although I dropped to rank 14 in 1990 and rank 19 in 1991, I maintained a record for the other 20 years of being in the Top Ten, actually being number 1 in 1986 (see Figure 1).

Finally Feeling the Effects of Age

As I went into my ninth decade of life at age 80, I started to feel the affects of a 24-hour grueling contest. After the 2002 contest at age 83, I felt nauseous and went right to bed, sleeping fitfully with hot and cold flashes. In the 2003 contest, I could not stay awake by the time 3 AM came around and had to sleep for two hours.

It was the 2004 contest, at age 85, that marked the end maximum-effort contesting for me. I drank a bottle of Boost at midnight local time, the halfway point, and was able to stay awake for the entire contest. But so what? There was no activity and I was just wasting my time. So I filled out QSL cards from 0800Z until 0930Z, and then went back to CQing, working only 32 contacts until the contest end at 1200Z came up. I was delighted to have the rhombic give me my last contact with one call through the European pileup with A71EM.

I did not go right to bed after the contest, but stayed up until lunchtime so I could take a nap at the same time that my wife did. I slept in the guest room for about an hour and awoke with terrifically painful leg cramps, which made me get up and walk around for a while. I lay down again, slept for an hour and awoke with terrifically painful leg cramps, which made me get up and walk around for a while. No, that's not a typo; it's *two incidents*. I decided to stay up and went to bed in the evening, sleeping peacefully through the night; there were no bad affects the following day.

So I ended my IARU contest career with 805 contacts, and a score 135,000 points better than 2003, when I took number 10 in the US. The conditions in 2004 were much better, and more top-level operators were heard. Writing this in August 2004 leaves me in the dark, as the results won't be published until early in 2005. But I would like to go out in the Top 10!

So, what can younger operators learn from this dissertation? Not much; it's just the experience of one senior citizen. Remember what I said earlier about people doing what they want to do? I'd like to make another maximum effort in 2005, but I also want to live healthily for as long as possible. So, I will play around in the IARU contest next year and get my proper rest. I'll be in there trying to give you a contact so you can be in the Top 10. NCJ

The Anti-Murphy Box

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Like many contesters, I have added a second radio in an effort to improve both my scores and my fun. Both of my radios are connected to my logging computer so that I don't have to worry about keeping track of which band I make a contact on. In turn, the computer controls the selection of antennas with a home-brew six-pack equivalent (it uses 24 relays—does that make it a "case"?). Switching of keying lines, keyer paddle, microphone and digital voice keyer is also handled by the computer. In general, this degree of automation reduces the chance of operator error late in the contest.

Murphy, however, has twice outwitted all of this automation! In two separate contests, I have managed to put both radios on the same band and then transmit. Fortunately, my low power rigs survived the excitement (although the power supply circuit breaker snapped each time) but I'm not sure whether my heart could take a third occurrence. Thus, I designed the "Anti-Murphy Box" to prevent the problem from recurring.

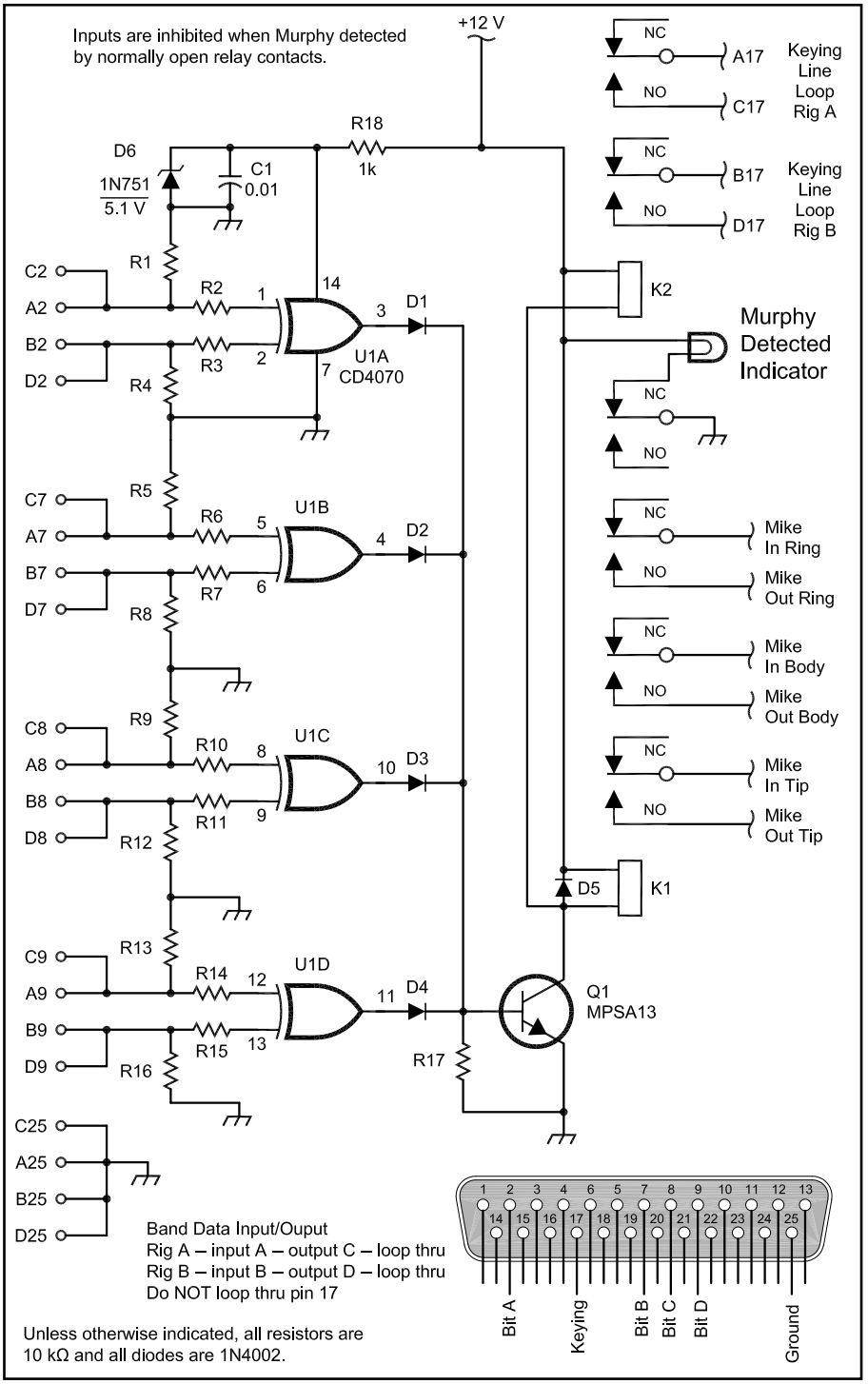
Murphy Visits

Like many contesters choosing their first logging program, I originally chose *CT*. I found it to be very solid, until I tried two-radio operation. I found that it had three drawbacks for two-radio operating in my station: 1) the band data was not reliably available for the second radio from LPT2; 2) it has an annoying extra "dit" (dubbed the "Acom" dit by many) when changing active radio from the keyboard; and 3) there was no way to lock out both radios from being on the same band.[1]

I briefly tried *NA*, but it seemed way too slow on my trailing edge computer, a finding confirmed in the hallways at Dayton 2000 by several prominent contesters. Therefore, I switched to *TRLog*, which many hailed as the ultimate two-radio logging software. It *appeared* to handle the three problems I had identified with *CT*. However, in the 2000 CQWW I found that the "SKIP ACTIVE BAND" command was not foolproof. I tried to move a station to another band. The other op sent "14125" so I dutifully typed in "14125" and hit **ENTER**. Yep, I heard him calling so I hit my paddle. Poof! The rig shut down. Then I noticed that both radios are on 20 meters. The "SKIP ACTIVE BAND" command only applies to the band change keys, **ALT-V** and **ALT-B**. It does *not* lock out direct frequency entry from the computer keyboard.

Since the author did not seem inclined to modify his program to handle this problem (I was not the only one on the product's reflector requesting such a change), I reinvestigated using *CT* with two computers for two radios (another approach recommended to get around the first two of *CT's* faults mentioned above). Still, there seemed no easy was to prevent both radios from being on the same band so I resolved to "be more careful."

I managed to make it through both the 2001 ARRL CW and Phone weekends without a problem, but just as I was get-



ting comfortable with *TRLog*, I again had the two-radios-on-the-same-band problem while entering a split frequency during the WPX SSB contest. Enough was enough!

I set out to design a foolproof lockout that would be both easy to construct and connect into my station. Both Array Solution's Six-Pack and Top Ten Devices' A/B switches, as well as W9RE's homebrew switch[2], have less-than-bulletproof lockouts for preventing both rigs from being on the same antenna. In each case, the first-to-arrive rig is granted access to the antenna, while the second is literally left hanging—in an open circuit! Thus, if (or should I say when) you inadvertently send on the second radio, you could be applying the legal limit to the open relay contacts. This could be very exciting and potentially very expensive, depending upon the degree of protection your amplifier has.

The Anti-Murphy Box

The Anti-Murphy Box (AMB) is quite simple to build, install and operate. It continually monitors the band-data from each rig or computer LPT. If both rigs are on the same band, the AMB's internal relays break the keying and microphone lines that go to your two-radio control box. In my specific case, I get the band data from LPT1 and LPT2 under control of the *TRLog* program, which I understand emulates the interface of the popular Yaesu FT1000MP series.[3] I currently route the band data to a pair of Top Ten Band Decoders that I already had to control my antenna relays. If I were constructing this box again, I would probably incorporate W9XT's BCD-10 band decoder boards inside the box, saving on cabling and the cost of two external band decoders.

Taking a page from K4OJ's *NCJ* article,[4] I found a computer switch box that had four DB25 connectors installed. The one I used has a very large switch occupying much of the interior of the box. By clipping the wires from the connectors right at the body of the switch, I ended up with four connectors already provided with hookup wire for connection to the AMB circuitry. The hole in the front panel that held the switch now contains a large red warning lamp. The box received a couple of coats of gray paint to blend in with the Top Ten boxes and my Ten Tec station.

The AMB circuitry is built on a Radioshack IC prototyping board (276-168). In order to avoid adding extra connectors to the box, I used a 1/8-inch stereo adapter cord (RS 42-2492), cut in half, to provide the microphone in and out cable. Installing the AMB into the shack merely requires plugging the DB25 connector that formerly went to the Top Ten Band Decoder "A" into AMB connector "A-in" and running a stock 25-pin double male computer cable from the AMB "A-out" connector to the Top Ten Band Decoder "A." I did the same with the second Band Decoder's cable. Phone operators will want to hook up their microphone/DVK as described at the end of the article.

Circuit Description

The band data for each radio consists of four logic lines. These 4 lines are pairwise compared with a quad gate exclusive-or (XOR) integrated circuit, CD4070. Each gate gives a high level output if the two inputs are different and a low level output if the two inputs are the same. Since we want the two radios to be on different bands, we are looking for at least one of the four XOR gates to have a high output. The outputs of the four gates are OR-ed using diodes. If any of the gates have a high output, the switching transistor will be turned on, pulling in a relay which enables the microphone and keying lines to the radios. In addition, a large red warning lamp is turned off. If both radios are on the same band, then all four gates will have low voltage outputs, which will disable the microphone and keying lines as well as turning on the warning lamp.

As shown in the schematic, I use a 4PDT relay and a DPDT relay. The AMB is fail-safe in that if Murphy dislodges the power to the AMB, the relays are not energized and the rigs will not key. The 4PDT relay switches the mike and/or keyer paddle, as well as the Murphy Detected Indicator. My old two-radio box switched my keyer paddle between the two radio's internal keyers. I used the same 1/8-inch stereo connector for the keyer paddle and mike (Heil Proset), so I merely unplugged the keyer paddle and replaced it with the mike when going from CW to SSB weekends.

Because I use a single W9XT Contest Card DVK, the actual audio connection flow is from the mike to the DVK then to the Anti-Murphy Box and finally to the DX Doubler SO2R box. I also used the Band Decoder's CW keying output to key each rig, thus the AMB's DPDT relay is used to disable the Band Decoders' keying lines. These same keying lines, pin 17 on the parallel port connectors, are used by the Top Ten DX Doubler. Nowadays, I keep my paddle connected to my new DX Doubler and use *TRLog's* internal keyer emulation so I can work mixed mode contests without having to unplug anything. Of course, additional relays could be driven to enable other functions the builder may desire.

The IC, diodes and transistor are readily available from online sources, such as **Jameco.com**. Suitable relays and computer switch boxes are also available from these sources. In my case, all the parts except for the protoboard were obtained at a hamfest for under $10. The AMB took me about an hour to build in its final form.

Now, maybe I can quit listing "Murphy" as the second op at my station.

Notes:

[1]Of course, the exact "features" that work in any logging program vary from update to update. That's another reason why hardware lockouts are so important.

[2]Mike Wetzel, W9RE, Single-Op Two Radio Station Automation at W9RE, *National Contest Journal*, Nov/Dec 1999, pp. 12-16.

[3]By the way, I highly recommend that users set their stations up for the switching to be done by the logging computer, rather than using rig-specific switching. My second radio has gone from a Corsair II, that had no band data available, to an OMNI VI+, that had band dedicated pins that go high when a band is selected, to an Orion, that also has band dedicated pins, but active low! However, the AMB and antenna switching has never needed changing because I have always used the LPT data from the logging computer.

[4]Jim White, K4OJ, Station Automation, *National Contest Journal*, Sept/Oct 1998, pp. 4-7.

NCJ

Improved Stack Switching with Invisible Stubs

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Most active contesters are aware of the interference-reducing power of tuned transmission-line stubs. These generally consist of quarter-wavelength long pieces of coax which are connected across the antenna feedline. Depending upon whether the far end of the coax is open-circuited or short-circuited, either a frequency is shorted to ground or passed through unattenuated. In addition to several articles in *NCJ*, W2VJN has written a comprehensive book on the topic.[1]

Most contesters are also aware of the advantages of stacking multiple antennas. Traditionally this was done with intricately interconnected quarter and half wavelength phasing sections of coax surrounding a multi-position coax switch. Several articles have appeared over the years in *NCJ* presenting different ways of connecting these parts, with K8CC's 1988 article probably being the most comprehensive.[2]

However, most of the previously described stack-switching methods have not made the optimal use of material; i.e., they use more parts and cost more than is necessary for a given level of performance. Furthermore, the previous literature has failed to note that phasing lines, when properly connected and switched, provide the rejection power of tuned stubs with no additional cost. This paper reviews the previous suggestions on switching stacks and presents an alternative that minimizes the number of coax tees and barrels while always providing some degree of stub action.

Figure 1 comes from K8CC's January/February 1988 *NCJ* summary paper. This shows K2TR's method for selecting either one or both of two antennas in a stack using a non-shorting switch (i.e., the unused contacts are open). This uses three quarter-wavelength sections of coax, three coax tees and a barrel. When antenna 1 is selected, the unselected positions "both" and "2" reflect the open to a short one-quarter wavelength away which is then transformed by the remaining phasing line to an open, thus isolating antenna 2 when it is not used. When "both" is selected, the two 75 Ω phasing lines transform the 50 Ω antennas to 100 Ω, which are then paralleled and presented to the 50 Ω line connected to the "both" terminal. An important feature of this configuration, and all of those presented in this paper, is that the length of coax in the signal path is constant no matter which antenna is selected. This is necessary to keep amplifier loading consistent even with less than perfect SWR at the individual antennas.

Because many commonly available coax switches ground the unselected connectors, N4SA suggested the configuration in Figure 2, also taken from K8CC's article. This requires a fourth quarter-wavelength of coax but just needs 3 tees with no barrel. This configuration has the advantage that when antenna 1 or 2 is selected, the phasing line tee'd between the both connector and the selected antenna connector is shorted to ground at the far end, thus enabling the phasing line to act like a stub. I refer to this as an "invisible stub" because the intended purpose of the coax line is a phasing line to transform an impedance, not to provide frequency selectivity. In the "both" position, each of the phasing lines from antenna connectors 1 and 2 are grounded, producing a quarter-wave shorted stub across each antenna. An additional 6 dB increase in rejection of the 28 MHz harmonic on a 20 meter stack should be expected when both antennas are selected in place of either one because of the additional invisible stub.

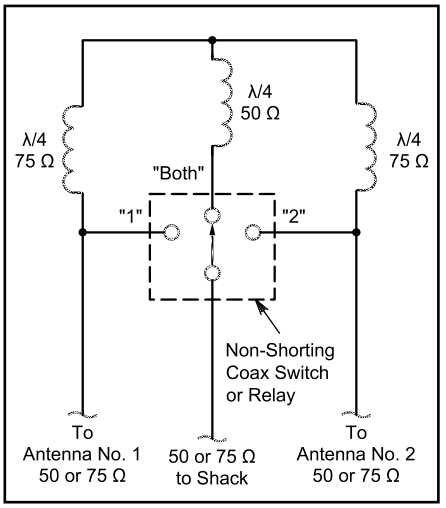

Figure 1— K2TR's method for selecting either one or both of two antennas in a stack using a non-shorting switch.

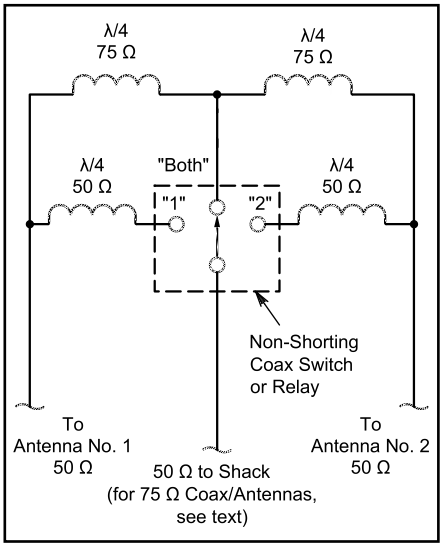

Figure 2—This configuration has the advantage that when antenna 1 or 2 is selected, the phasing line tee'd between the both connector and the selected antenna connector is shorted to ground at the far end, thus enabling the phasing line to act like a stub.

For completeness, K8CC presents KY1H's U/L/BIP/BOP system. This has quite a bit more complexity, requiring five quarter-wave and one three-quarter wave phasing lines, four tees and two barrels. K8CC also presents a version using a shorting switch, which requires the same amount of coax and adapters. I do not believe that the BIP/BOP design adds much in practice based on my observation that the top contesters generally do not use it. Therefore, I have not tested these configurations for the presence of an invisible stub.

K8CC presents a system attributed to K1EA for switching more than two antennas in a stack. This system, as described by K8CC, is overly complex, however, as it requires two relays to switch each end of a phasing line. K3LR published a version of this scheme for three antennas in *CQ Contest*, which also uses relays at each end of each phasing line.[3] ComTek Systems produces a commercial version of K3LR's system for a 3-high stack. His schematic from *CQ Contest* is shown in Figure 3.

An improved system is presented in Figure 4. This system is optimal for two, three or four antennas in that it uses the least number of coax phasing lines and adapters. Unlike the K1EA/K3LR designs, it presents at all times at least one invisible stub for the band in use. It relies upon the ability of modern remote switch boxes such as those made by

[1]Notes appear on page 10.

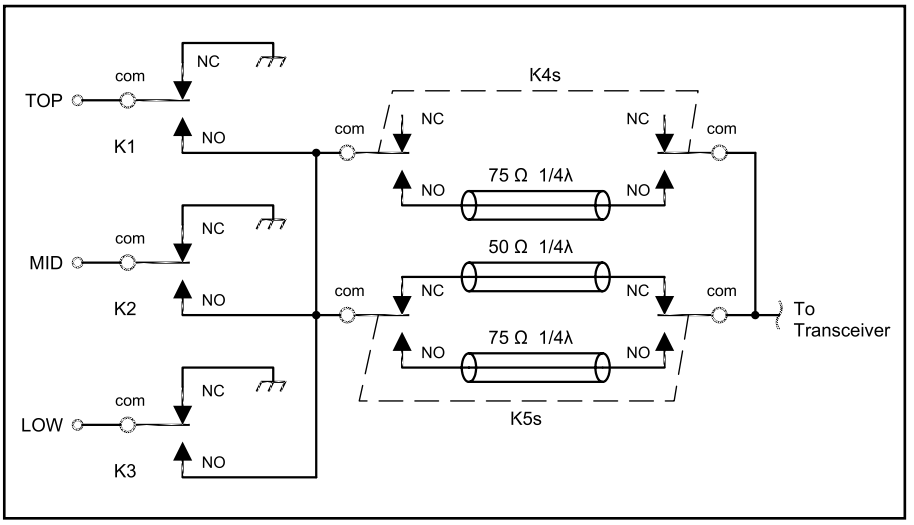

Figure 3—K3LR's scheme for switching three antennas in a stack.

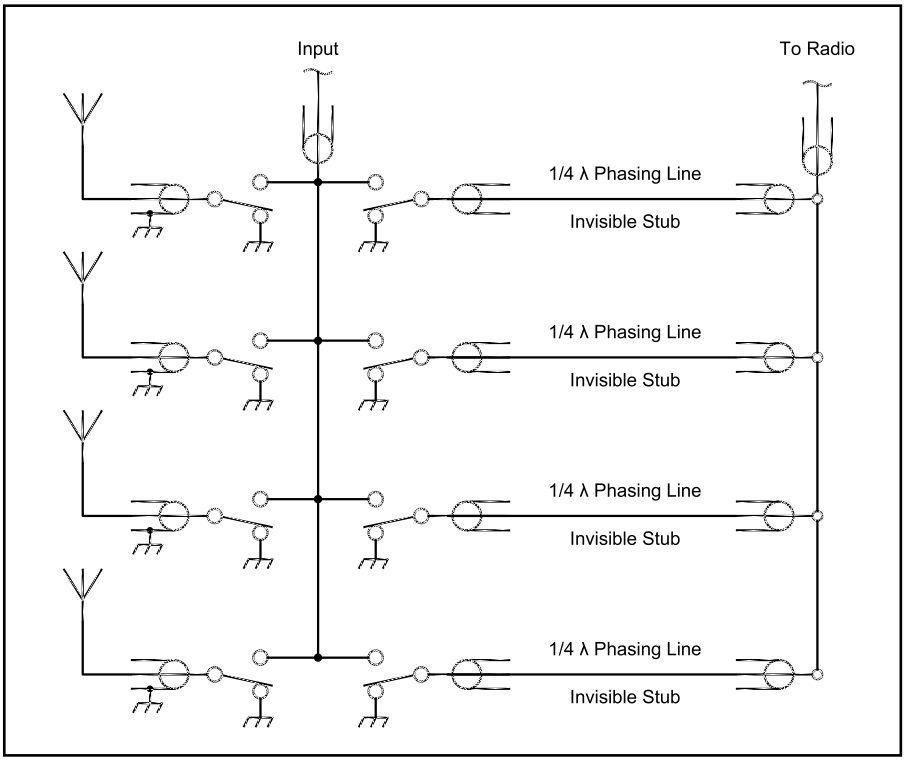

Figure 4— This system is optimal for two, three or four antennas in that it uses the least number of coax phasing lines and adapters. Unlike the K1EA/K3LR designs, it presents at all times at least one invisible stub for the band in use.

Table1

Configuration	*Energize relays*
Antenna 1	1, 3
Antenna 2	2, 3
Both	1, 2, 4, 5

Table 2

Configuration	*Energize relays*
Top antenna	1, 4
Middle antenna	2, 4
Bottom antenna	3, 4
Top and Middle	1, 2, 5, 6
Top and Bottom	1, 3, 5, 6
Middle and Bottom	2, 3, 5, 6
All 3 antennas	1, 2, 3, 4, 5

Table 3

Configuration	*Energize relays*
Top	1
Middle	2
Bottom	3
Top and Middle	1, 2, 4
Top and Bottom	1, 3, 4
Middle and Bottom	2, 3, 4
All 3 antennas	1, 2, 3, 4

Ameritron, Top Ten Devices and DX Engineering to select multiple connectors at the same time. All of the following circuits require the unused connectors to be grounded when not selected. All selected connectors are connected together inside the relay box to the nominal input terminal. Note that the "normal" input connector may not be used in some configurations. Because the quarter-wave phasing lines are physically in series between the radio and relay box, the main feedline will be one quarter wavelength shorter than with the other stack switching methods.

The simplest case is for a stack of two antennas. The first antenna is connected to connector 1 and the second to connector 2. Then, three quarter-wavelength phasing lines are used. One, with 50-Ω characteristic impedance, is attached to connector 3, while the other two, each with 75 Ω characteristic impedance, are attached to connectors 4 and 5. No connection is made to the normal input connector. The three ends of the phasing lines that are not connected to the relay box are connected together with the feedline to the radio using two coax tees and one barrel connector. The relays are operated according to the logic of Table 1.

When one antenna is used, the two 75 Ω lines act as an invisible pair of shorted stubs. When both antennas are used, the 50-Ω line acts as an invisible single stub. The 6 dB difference in attenuation of the second harmonic is confirmed by actual measurement. This configuration uses one less phasing line and one less adapter than the standard N4SA arrangement. This system does away with the extra relay box required by the K1EA/K3LR approach. I used this with an Ameritron RCS-8V in my first two-high stack in 1999.

The system may be extended to 3 or 4 antennas in the stack. For three antennas, a six-position relay box is needed. The antennas are connected to terminals 1, 2 and 3. A 50 Ω phasing line goes to terminal 4, while 75 Ω phasing lines are attached to terminals 5 and 6. Again, the other ends of the three phasing lines are connected together with the radio feed line with two tees and one barrel. The relay selection logic is per Table 2.

This approach uses the single 50-Ω line for matching one antenna, the pair of 75 Ω lines to match two antennas, and the 50 Ω and a 75-Ω line to match 3 antennas. A six-position relay box, such as that made by Top Ten Devices, is ideal.

For those wanting to use their old Ameritron 5 position box, a variation of this theme can still provide an adequate match. WXØB's StackMatch does not attempt to provide a perfect match for either 2 or 3 antennas. Rather, it uses a 2.25:1 unun to provide a theoretical SWR of 1.13 for 2 antennas (2.25/2) or 1.33 for 3 antennas (3/2.25). Experience has shown that many operators are quite satisfied with this level of mismatch. To implement this with the invisible stub system, connect the antennas to terminals 1, 2 and 3, and one 75 Ω phasing line to terminal 4. The 50-Ω quarter-wave phasing line is connected to the relay box input terminal. The other ends of the two phasing lines are connected with the main feed line with one tee and one barrel. Now, if the 75 Ω line is not selected, the single antenna has a perfect match, while if 2 or 3 antennas are chosen, the 75 Ω line in parallel with the always used 50 Ω input line provides an effective 30 Ω phasing line. This results in a 1.39:1 SWR with 2 antennas and an excellent 1.08:1 SWR with 3 antennas. Potentially more problematic than the slightly less-than-perfect match, however, is the loss of the invisible stub when two or three antennas are selected. The relay selection logic that needs to be implemented is in Table 3.

Finally, the invisible stub system is easily expanded to a four high stack. I use this on both 10 and 15 meters at N4TZ with Top Ten Devices 6 way switches. Because four of the terminals are of necessity used by the four antennas, only two additional switched stub inputs are available. However, we can borrow the same concept used to simplify the 3 high switch and connect a single 50 Ω phasing line to the switch box input. A second 50-Ω line is connected to terminal 5 while one 75-Ω line is connected to terminal 6. When 3 antennas are selected, the combination of one 50 and one 75 Ω cable provide a very good match, 1.08:1, while with all four antennas the theoretical match is perfect. As with the simplified 3 high switch, the two-antenna match is 1.39:1. Again, these are very similar to those provided by the popular StackMatch, which only accommodates 3 antennas. If one had the newly released DX Engineering 8 way box, then nearly perfect matches for all configurations could be provided by connecting two 50 Ω phasing lines to terminals 5 and 6, and two 75 Ω phasing lines to terminals 7 and 8. The simplified (6 way box) provides one invisible stub with multiple antennas while the 8-way box allows two invisible stubs to be available for all configurations. Table 4 shows the relay selection logic.

Table 4

Configuration	*Energize Relays (6 way box)*	*Energize (8 way box)*
Top	1	1, 5
Second	2	2, 5
Third	3	3, 5
Bottom	4	4, 5
Any 2	2 antennas + 6	2 antennas + 7 + 8
Any 3	3 antennas + 6	3 antennas + 5 + 7
All 4 antennas	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6

In summary, the invisible stub stack switching system in general uses the least amount of coax and associated adapters of any published design. Furthermore, all but the simplified 3 high switch provide an additional measure of suppression of out of band signals because the unused phasing lines are shorted to ground by the switch, creating invisible stubs. Perhaps this is the first published example of a free lunch, based on the savings on those genuine Amphenol tee and barrel connectors that are no longer needed. The lunch will taste even better knowing that the resulting stack switching system provides additional frequency selectivity at no additional cost.

Notes:

[1]George Cutsogeorge, W2VJN, "Band Switching Stubs for the Single-Op Two Radio Station," *NCJ*, Sep/Oct 1996, pp. 8-10. George Cutsogeorge, W2VJN, "Using Double 1/8 Wave Stubs," *NCJ*, Jan/Feb 1998, p 7. George Cutsogeorge, W2VJN, *Managing Interstation Interference: Coaxial Stubs and Filters*, 2003.

[2]K2TR, "Tricks with Coax, Upper-Lower-Both," *NCJ*, Jul/Aug 1980, p. 9. N4SA, "More Tricks with Coax, Upper-Lower-Both," *NCJ*, Sep/Oct 1980, p.7. Bill Myers, K1GQ, "Upper-Lower-BIP-BOP Switch," *NCJ*, Nov/Dec 1980, pp. 12-13. Dave Robbins, KY1H, "U-L BIP-BOP Box," *NCJ*, Sep/Oct 1987, p. 25. Dave Pruett, K8CC, "Switching Stacked Antennas," *NCJ*, Jan/Feb 1988, reprinted in *NCJ*, Jan/Feb 1992, pp. 26-27, 29.

[3]Tim Duffy, K3LR, "The 3-High Stack Switch at K3LR," *CQ Contest*, November 1998, pp. 17-19. NCJ

Vertical Antennas with Top Loading

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I recently was asked by a W7 in Montana about the optimum design for a top-loaded vertical antenna. This topic seems well suited to computer analysis, so I decided to simulate a simple antenna in which the height of the vertical portion was varied, along with the down-slope angle of the top hat wires. The results indicate that the gain of the antenna is essentially constant, independent of the antenna height and the slope-angle of the wires. However, the shorter antennas have less bandwidth, as one would expect. These conclusions support the fine experimental work of Dr Jerry Sevick, W2FMI, which was performed back in the 1970s using horizontal top hats.[1-5] However, the information reported here extends his studies to include sloping top hats, which are easier to build.

Reference Antenna

A frequency of 3.65 MHz in the 80 meter band was selected for the computer analysis, which was performed using *EZNEC-4*.[6] The first antenna to be studied was a full-size quarter-wave vertical element, which serves as a standard of reference. The monopole is composed of #10 AWG wire, and is placed over "average" soil where the conductivity is 5 milliSiemens per meter and the dielectric constant is 13. The ground system consists of 120 quarter-wave radials made from #12 AWG wire and buried to a depth of 3 inches. All of these wires were assumed to be lossless (that is, perfect conductors) in order to remove this variable from the analysis. I trimmed the vertical element until resonance was achieved (zero input reactance), which occurred when the length was 65.68 feet. The initial length of this wire was 67.368 feet, or 0.25 WL, so the full-size vertical monopole has a resonant length of about 87.7°, rather than 90°. The peak gain of the antenna was 0.66 dBi at a take-off angle of 24°, and the input resistance at resonance was 35.37 Ω. Using this impedance value as a reference, the 2:1 SWR bandwidth is approximately 220 kHz.

Procedure

For the computer analysis, I varied the height of the vertical portion of the antenna in 5° increments from 35° to 80°, to cover a wide range of possible lengths. The top hat was made from four equal length #12 AWG wires that were symmetrically spaced in azimuth around the top of the vertical element. The down-slope angle of these top-loading wires was varied in 10° increments from 0° (horizontal top hat) to 60°. Figure 1 shows a 35° vertical whose top-hat wires have a 0° down-slope angle, while Figure 2 illustrates the same vertical when the down-slope angle of the top hat wires is 60°. The same ground system described earlier (120 buried quarter-wave radials) was utilized for each test. As the down-slope angle was changed, the length of the four top hat wires was always readjusted to maintain resonance at the operating frequency of 3.65 MHz. (I assumed that an input reactance value of 0.025 Ω, or less, was equivalent to resonance.)

Results

Table 1 shows the outcome when the vertical element is only 35° tall (roughly 26.2 feet). Although very short, this antenna has a peak gain that is slightly higher than that of the full size radiator. However, the difference is so small that it would be undetectable in practice. The elevation angle where peak gain occurs is also slightly higher than for the reference antenna, by about 3 degrees. The input resistance (at resonance) changes markedly as the down-slope angle of the top loading wires increases, spanning the range from 13.4 Ω when the wires are horizontal, to only 4.89 Ω when the down-slope angle is 60°. In a similar fashion, the resonant length of the top hat wires continually increases as these wires are sloped more steeply downward. Tables 2 through 10 display the results for the other cases, in which the height of the vertical monopole is varied from 40° to 80°.

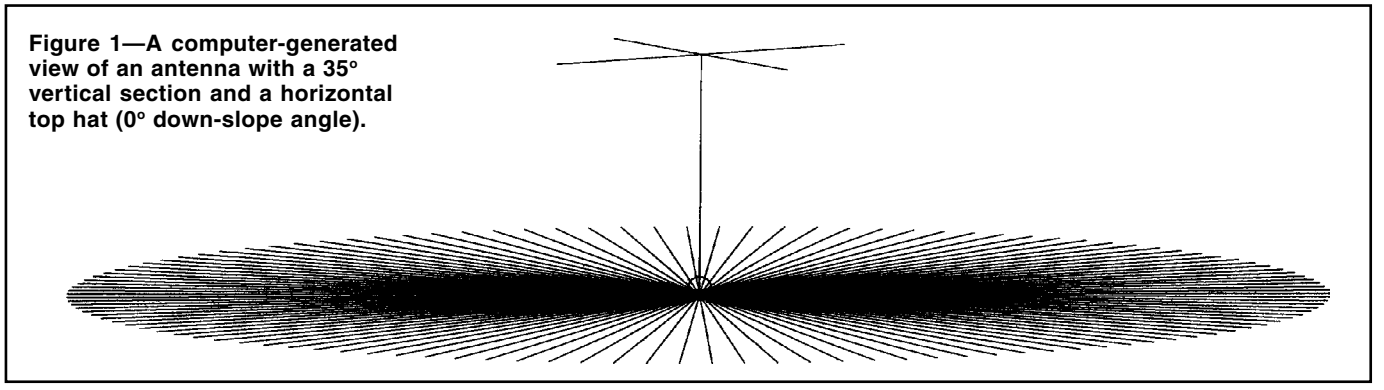

Figure 1—A computer-generated view of an antenna with a 35° vertical section and a horizontal top hat (0° down-slope angle).

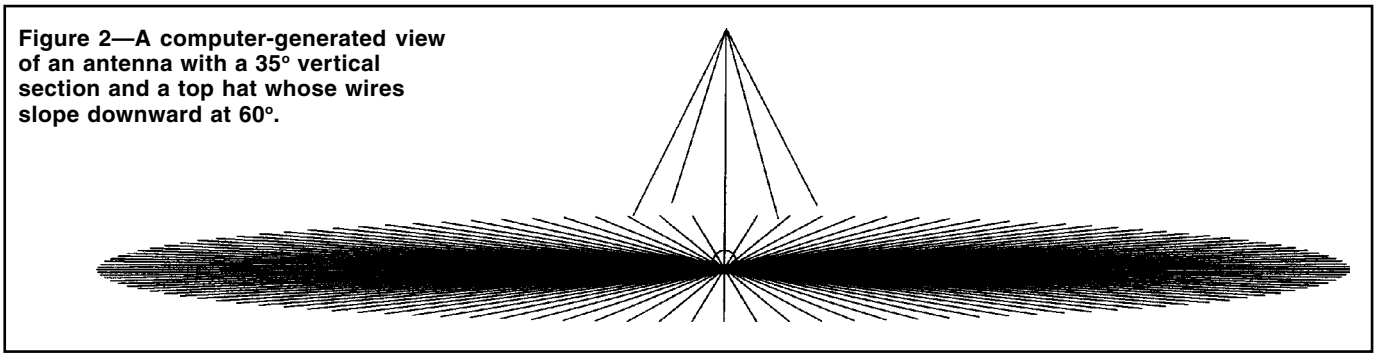

Figure 2—A computer-generated view of an antenna with a 35° vertical section and a top hat whose wires slope downward at 60°.

Table 11 lists the 2:1 SWR bandwidth for some of the antennas that were examined. As the height of the antenna is reduced, the bandwidth narrows in a corresponding manner. When the monopole is relatively tall, changing the down-slope angle of the top hat wires has only a small impact upon the bandwidth. However, if the vertical element is very short, the bandwidth decreases sharply as the down-slope angle increases. In every case, the broadest bandwidth was achieved with a horizontal top hat.

Conclusions

Table 12 contains the average values for the gain, takeoff angle, input resistance at resonance, and 2:1 SWR bandwidth, for the antennas that were analyzed in this study. Notice that the gain was virtually constant throughout the range of antenna heights that were simulated, although the takeoff angle did rise slightly as the antenna was shortened. Further, there was a continual reduction in the input resistance and SWR bandwidth as the height of the antenna decreased. If this loss of bandwidth is not a problem, then a short top loaded vertical monopole, equipped with a good impedance matching network and an extensive ground screen, can compete well with a full size quarter-wave antenna. To quote Jerry, W2FMI: "With low-loss matching and loading techniques, short verticals over a

Table 1

Performance characteristics of a top-loaded vertical antenna whose electrical height is 35 degrees (26.199 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.67	27	13.40	18.027
10	0.67	27	11.90	18.474
20	0.67	27	10.41	19.032
30	0.68	27	8.95	19.723
40	0.67	27	7.60	20.453
50	0.69	27	6.24	21.589
60	0.73	27	4.89	23.141

Table 2

Performance characteristics of a top-loaded vertical antenna whose electrical height is 40 degrees (29.941 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.67	27	16.62	15.388
10	0.67	27	15.31	15.785
20	0.67	27	13.98	16.291
30	0.67	27	12.64	16.934
40	0.68	27	11.29	17.769
50	0.70	27	9.91	18.892
60	0.68	26	8.61	20.275

Table 3

Performance characteristics of a top-loaded vertical antenna whose electrical height is 45 degrees (33.684 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.67	26	19.84	13.21
10	0.67	26	18.72	13.56
20	0.67	26	17.58	14.01
30	0.67	26	16.41	14.59
40	0.68	26	15.20	15.35
50	0.66	26	14.11	16.102
60	0.67	26	12.78	17.562

Table 4

Performance characteristics of a top-loaded vertical antenna whose electrical height is 50 degrees (37.427 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.66	26	22.99	11.122
10	0.66	26	22.10	11.422
20	0.66	26	21.17	11.811
30	0.66	26	20.21	12.313
40	0.66	26	19.21	12.976
50	0.67	26	18.14	13.886
60	0.66	26	17.08	15.037

Table 5

Performance characteristics of a top-loaded vertical antenna whose electrical height is 55 degrees (41.169 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.66	26	25.88	9.419
10	0.66	26	25.19	9.678
20	0.66	26	24.46	10.016
30	0.66	26	23.71	10.454
40	0.66	25	22.91	11.031
50	0.66	26	22.17	11.621
60	0.66	26	21.23	12.756

Table 6

Performance characteristics of a top-loaded vertical antenna whose electrical height is 60 degrees (44.912 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.66	25	28.50	7.732
10	0.66	26	27.99	7.951
20	0.66	26	27.47	8.238
30	0.66	26	26.92	8.61
40	0.66	26	26.34	9.099
50	0.66	25	25.70	9.775
60	0.67	26	24.95	10.772

large ground system suffer only in bandwidth."[7]

Notes

[1]Jerry Sevick, "The Ground-Image Vertical Antenna," *QST*, July 1971.
[2]Jerry Sevick, "The W2FMI 20-Meter Vertical Beam," *QST*, June 1972.
[3]Jerry Sevick, "The W2FMI Ground-Mounted Short Vertical," *QST*, March 1973.
[4]Jerry Sevick, "A High-Performance 20, 40, and 80-Meter Vertical System," *QST*, December 1973.
[5]Jerry Sevick, "The Constant Impedance Trap Vertical," *QST*, March 1973.
[6]*EZNEC* is available from Roy Llewellyn, W7EL, PO Box 6658, Beaverton, OR 97007.
[7]Jerry Sevick, "Short Ground-Radial Systems for Short Verticals," *QST*, April 1978, page 33.

Table 7

Performance characteristics of a top-loaded vertical antenna whose electrical height is 65 degrees (48.655 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.65	25	30.75	6.207
10	0.65	25	30.41	6.39
20	0.65	25	30.06	6.629
30	0.65	25	29.69	6.938
40	0.65	25	29.29	7.343
50	0.66	26	28.85	7.902
60	0.66	25	28.33	8.73

Table 8

Performance characteristics of a top-loaded vertical antenna whose electrical height is 70 degrees (52.397 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.65	24	32.59	4.966
10	0.65	24	32.37	5.122
20	0.65	24	32.15	5.329
30	0.66	25	31.90	5.592
40	0.66	25	31.64	5.922
50	0.65	25	31.44	6.096
60	0.65	25	31.12	6.769

Table 9

Performance characteristics of a top-loaded vertical antenna whose electrical height is 75 degrees (56.140 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.66	25	33.97	3.455
10	0.66	25	33.87	3.576
20	0.65	24	33.75	3.745
30	0.65	24	33.64	3.969
40	0.65	24	33.50	4.242
50	0.65	24	33.35	4.551
60	0.66	25	33.19	4.90

Table 10

Performance characteristics of a top-loaded vertical antenna whose electrical height is 80 degrees (59.883 feet at 3.65 MHz). As the down-slope angle of the four top-loading wires is varied, their length is also adjusted to maintain resonance.

Down-Slope Angle (deg)	*Elevation-Plane Peak Gain and Takeoff Angle (dBi and degrees)*		*Input Resistance (Ohms)*	*Top-Load Wire Length (feet)*
0	0.65	24	34.93	2.062
10	0.65	24	34.89	2.137
20	0.65	24	34.85	2.255
30	0.65	25	34.81	2.429
40	0.65	25	34.76	2.663
50	0.65	25	34.70	2.934
60	0.65	25	34.63	3.192

Table 11

Approximate 2:1 SWR bandwidth for various top-loaded vertical antennas, as a function of antenna height and top hot slope angle. In each case, the reference impedance used for calculating the SWR is the value of input resistance given previously in the corresponding tables. Recall that the full-height antenna has a bandwidth of about 220 kHz.

Vertical Monopole Height (degrees)	*2:1 SWR Bandwidth (kHz)*		
	0-degree slope angle	*30-degree slope angle*	*60-degree slope angle*
35	120	80	55
40	135	105	75
45	150	125	95
50	165	145	125
55	175	160	145
60	185	180	165
65	190	185	180
70	205	200	190
75	210	205	200
80	215	212	210

Table 12

Average values of the main performance characteristics for top-loaded vertical antennas, as a function of antenna height. Values for the full-size (resonant quarter-wave) element are shown at the bottom.

Vertical Monopole Height (degrees)	Elevation-Plane Peak Gain and Take-off Angle (dBi and degrees)		Input Resistance (Ohms)	2:1 SWR Bandwidth (kHz)
35	0.683	27.0	9.06	85
40	0.677	26.9	12.62	105
45	0.670	26.0	16.38	123
50	0.661	26.0	20.13	145
55	0.660	25.9	23.65	167
60	0.661	25.7	26.84	176
65	0.653	25.1	29.63	186
70	0.653	24.6	31.89	198
75	0.654	24.4	33.61	207
80	0.650	24.6	34.80	213
full-size	0.660	24.0	35.37	220

NCJ

Food And The Single Operator

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There have been a number of previous discussions on this topic, notably by KQ2M and to a lesser extent by N2RM. However, most discussions have to do with the necessity for a good food supply in the multi-operator category. Generally the single operator falls into the supported or unsupported type of classification. In the supported category, a significant other (Figure 1) provides food that is served to the single operator in an appealing and neat manner. Unfortunately, in today's world, often the significant other will say "I am going to my sister's (or mother's) house, see you on Monday." This puts the single operator, packet or not, into the unsupported category.

There are a few cautions for the single operator in the supported or unsupported category. First, and most important, is the proper way of keeping coffee hot in the shack. Figure 2 show the improper way of heating coffee in the shack, as it has been associated with electrocution, cracked 3-500ZG tube chimneys, etc. Coffee brought to the shack should be placed on the operating table and not on the linear. This is still true with the old-fashioned 3-hole 8874 finals — they can short out. This also applies to the 3CX800A7 and 4CX800 models.

The most often-quoted food remedy for the single operator is the three-full-sized-meatball-hoagie solution. These taste good either hot or cold, and this will decrease the amount of dead time you have while getting food. This is most important. They should be procured 2 hours prior to the start of the contest. Alternatively, the two-full-sized-pepperoni-extra-cheese-pizza solution has been used.

Figure 1—K3MD's wife Shirley—John's significant other in the "supported category."

The question of beverages comes to mind. In saying this, we mean the type that can be used on bands other than 160 or 80. Most of the dedicated single operators will claim that only water and diet coke are acceptable. Coffee is also good, but beware of the so-called "10-cup jitters." Some of the old-old timers are beer aficionados. However, this has been shown to only increase the rate temporarily with a disastrous effect over 48 hours, so it is not recommended. Gin and whiskey are definitely not recommended although used by some contesters. They can be of use at 3 AM Sunday when the sleep-wake cycle is totally screwed up.

One of the sad facts of life is that contesting is not an aerobic sport, and that you are going to have to overeat somewhat in order to stay awake. This accounts for the shape of some of our top contesters. You will find that at 3 AM, when 40 and 80 are wide open on the East coast, it is a necessity (not a choice) to have some candy bars on hand. The correct in-between contest diet, Atkins or Nutri-System, is a very complex issue and beyond the scope of this discussion.

One of the most vexing problems concerning contesting and food in general is the computer keyboard problem. One must not attempt to drink while leaning over the keyboard. If you do, you must have the spare keyboard on hand that you got from the local hamfest for $5. Figure 3 shows the proper method of removing old encrusted food from the keyboard.

N2RM is a big proponent of Italian food for contesting, something I really haven't tried. KQ2M is a proponent of the mini-refrigerator-in-the-shack method, something that is a personal choice. I personally enjoy walking 25 feet to the kitchen, as it helps prevent a pulmonary embolus (i.e., instant death). An often-voiced complaint about this is the possibility of "losing your frequency" for CQing. If you are concerned about this, your antenna is too small, and, furthermore, you don't have a frequency. This is ham radio—you have the use of a VFO.

Much more could be said about food and the single operator. However, the number of solutions would be greater than the number of single operators. I hope this has helped the number of operators who fall into the unsupported category.

Figure 2—How *not* to heat coffee in the shack.

Figure 3—Cleaning the keyboard.

The 3830 Reflector

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Reflectors (aka e-mail lists) have become a fixture of the Internet, and Amateur Radio operators have created more than their share. One that has become a central resource to contesters is the 3830 Score Reflector.

In today's fast paced Internet world, we have become used to getting contest results (albeit unofficial) within a matter of days following the end of a contest. It's getting hard to remember what it was like when the 3830 Score reflector didn't exist and we had to wait up to 12 months to see how we performed in any particular contest. Sure, maybe you could try to get on the post-contest net on 3830 kHz. But if you didn't have propagation, or were just too tired after the test to get back on the radio, you were out of luck. The CQ-Contest reflector first addressed this back in the early 1990s.

Unofficial score postings on the Internet first began in the earliest days of the CQ-Contest reflector, which was sponsored by the late Bill Fisher, W4AN; Trey Garlough, N5KO; Dave Pascoe, KM3T; Jim Reisert, AD1C and Randy Thompson, K5ZD. This was back in 1992 when e-mail was truly text based and Web browsers were just a dream. Still, the CQ-Contest reflector was much as it is today with a wide range of discussions taking place and the occasional posted score with comments. Of course, the volume of mail was not as great back then and scores weren't the major highlight of the reflector. Occasionally someone would take the scores off the air from 3830 kHz and post them as well—the first score summaries.

As the use of the Internet grew, so did the number of score postings on the CQ-Contest reflector. Score summaries began to include the postings made to the reflector as well as off-air reports from 3830 KHz. It should be mentioned that many individuals produced contest summaries in those early days—it was the kind of duty that someone would volunteer to take on as each contest came around. Eventually, though, the volume of score related mail on CQ-Contest became so great that towards the end of 1995, it became necessary to split out the posting of scores and the 3830 reflector was born. Of course, the name was based on that original on-the-air frequency of 3830 kHz. These days, 600-700 e-mails can be generated from a single popular contest such as a CQWW event, but even results from smaller tests are posted to the 3830 reflector.

Dink, N7WA—the 3830 guy—at his station.

One of a Kind

So, what makes 3830 rather unique among the world of e-mail lists? Well, while most reflectors are designed for discussions (threads) on a certain topic, discussions are *discouraged* on the 3830 reflector. The general rule is that if you want to post a score, do it on 3830. If you want to discuss anything related to contests, including scores, do it on CQ-Contest.

Another unique aspect of 3830 is that a good many of the contesters who use it do not actually belong as subscribers. Yet only subscribers can officially post to the list. This unusual property is the result of the 3830 Web Scoring page sponsored by Bruce Horn, WA7BNM. Bruce's page allows contesters to submit score rumors to a central database using a Web browser. His Web page then formats the data into a plain text message devoid of HTML, and sends it to the 3830 reflector. In this manner, many non-subscribers can contribute to 3830 without having to deal with the great deal of mail that is generated. Also, because of the central database, there is no need for a volunteer to collect all the data to produce summaries. Of course, contesters can still post directly to 3830 if they prefer.

The Future?

What will the future bring for the 3830 reflector? I hope to see greater usage by Amateur Radio operators around the world as time goes by. There has been good growth in the number of European users as they find out about the list and the connection to the 3830 Web Scoring page, but postings from Asian operators have been relatively rare. Personally, I would also like to see a relationship or link develop between the raw claimed scores and the officially verified results. That may be a bit much for an e-mail list per se and would require the cooperation of contest sponsors, but maybe another Web-type association could be developed.

If you are interested in checking out the 3830 reflector, you can browse the archives back through 1996 at **lists.contesting.com/pipermail/3830/**. For information on subscribing please visit **lists.contesting.com/mailman/listinfo/3830**. NCJ

SNØHQ in the 2004 IARU HF World Championship

Tom Barbachowski, SP5UAF

This year's SNØHQ operation was a great success, with many new changes this year since our first operation in 1994 as 3ZØHQ.

The most significant improvement was that for the first time in the SNØHQ operation all operating positions were networked together. This was made possible primarily by the tremendous effort of the SP3KEY club: SQ3JPM, SP3RBR, SP3DWQ and SP3HRN. It was their initiative and execution, with software written by Marek, SQ3JPM.

In March 2004, we had our first technical gathering for all those involved in making this project possible. Shortly after, we began software testing that lasted right up until the start of the contest. Although testing was done with SN0HQ operators for several months, it was not until the contest that we actually had every one of the operating positions on the network simultaneously.

In June of this year, we had the first of several pre-contest gatherings of all SNØHQ operators, this one at the home of Janusz, SP6IXF. As usual, we dedicated our time to discussing operating strategy and assigning bands/modes to individual stations. The deciding factor was, of course, the antennas available at each station, followed by the geographical location (Poland is a big country!) and the operating teams.

The software we developed allowed connecting *CT* in a network at each of the individual locations throughout Poland. We made continuous improvements and changes to the network over a period of several months, thanks to the intensive effort of Marek, SQ3JPM. We used the TCP/IP protocol and client-server software to connect all operating positions. Each operating position had the client software installed in the computer with *CT*. Prior to starting *CT* it was necessary to run the client software and establish a connection with the server. Next, *CT* was run and configured and was in fact connected to the client software. All data entered in *CT* (QSOs, messages, passes, etc.) were transferred to the server via the client. The server software was processing all received data batches and distributing them to other networked clients. There, on each computer, the client software was transferring them to *CT* and we could see them as QSOs, Alt-G messages, passes, etc.

The 40-meter SSB team: (from the front) SP6DNS, SP6IXF, SP9P, SP6A.

The 20-meter SSB team: (l to r in back) SQ2BZW, SP2BZW (father of SQ2BZW), SO0WDX (US5WDX), SP4ZO; (l to r in front): SQ2CFB, DJØIF (SP8RX), SP2FAX.

The Moment of Truth

When the start of the contest finally came, it was our moment of truth. If all else failed, we'd go back to individual logs like we had done in previous years.

It worked! We did have stations that would lose their local network connections, and upon reconnecting, they would not have QSOs logged by other stations during the interruption. Unlike *WriteLog*, *CT* does not update other logs during such an interruption. But despite this flaw, everything else worked flawlessly and was stable throughout the contest period. Our efforts paid off!

Operating in a network during the contest was an emotional experience—we had the opportunity to immediately see the results on all bands. For the first time we had a feeling of operating "live," that this was really a group operation—the result of the combined efforts of the whole team.

The first hour saw 1300 QSOs flash by on our screens, the next few hours were not much worse. In addition, spots from the DX Cluster, the band maps, "Alt-G" (intra-station talk) and "Alt-=" (show pass window) appeared on our

screens like a kaleidoscope. For many of us that had never operated multi with *CT*, it was quite an experience. Did you see the movie *The Matrix?* At the start of the movie, there are millions of numbers that scroll on the screen. The same thing was appearing on our *CT* screens.

Despite our extensive preparations, during the contest we discovered some weaknesses in our programming that we will certainly fix before our next operation. Nevertheless, it was a big improvement in our score from SN0HQ. We ended up with a claimed score of 19,861,240 points (18,788 Qs for 44,632 points with a zone multiplier of 210 and an HQ multiplier of 235).

This is the best score ever from our HQ station in the IARU. But we realize that we haven't reached our potential yet. We still have a ways to go, primarily in improving the skills of our operators and taking more advantage of what a networked log has to offer. We're satisfied, but at the same time, we know we can do better!

This year's effort was record-breaking in the number of people who participated in the operation at all the various stations. We had a total of 70 operators involved: SP-0404-JG; SP2BZW; SP2FAX; SP3DOI; SP3DWQ; SP3GEM; SP3HRN; SP3HUU; SP3J; SP3RBR; SP3VT; SP4-17-001; SP4DZT; SP4GFG; SP4JCQ; SP4R; SP4Z; SP4ZO; SP5HNK; SP5UAF; SP5XVY; SP6A; SP6BBE; SP6CZ; SP6DNS; SP6EKS; SP6GCU; SP6HEQ; SP6IXF; SP6M; SP6ML; SP6RZ; SP6T; SP6TGD; SP7GIQ; SP7MTF; SP7NJX; SP7SP; SP7VC; SP8ATI; SP8BRQ; SP8FHK; SP8FUX; SP8GQU; SP8GWI; SP8GXA; SP8LBK; SP8NFE; SP8NR; SP8QED; SP8RX (DJ0IF); SP8SRZ; SP8TJU; SP9ENV (DL1EKO); SP9H; SP9HVV; SP9P; SP9XCN; SQ2BZW; SQ2CFB; SQ3A; SQ3JPM; SQ3TQM; SQ6ELV; SQ6MS; SQ8J; SQ8JLA; SQ8JX; SQ9IET; SQ9UM and US5WDX (SO0WDX).

To this list we need to add those who provided logistical support—mostly family and friends. On an optimistic note, we have to report that this year we had many young hams involved in our operation, mostly members of the WWYC (World Wide Young Contesters). The opportunity to operate under the watchful eyes of experienced contesters is one we hope will bring us further rewards in the future.

Our stations this year were located at the QTH of the following individuals:

1.8 CW	SP6EKS
1.8 SSB	SP6CZ
3.5 CW	SP3GEM
3.5 SSB	SP8BRQ
7 CW	SP4Z
7 SSB	SP6IXF
14 CW	SP7GIQ
14 SSB	SP2FAX
21 CW	SP8YMM
21 SSB	SP3GEM
28 CW	SP3KEY
28 SSB	SP6CZ (antennas, equipment, etc. prepared by SP7VC)

Over the past few years of operation in IARU, we've created a strong and integrated team. It was not an easy task. Every operator has his own approach and strategy in the contest. Those who offered their stations for the SN0HQ are individualists – you have to be an individualist to build and maintain a big station. As part of Team SN0HQ, we learned to put priority on the results of the multi instead of on individual results. There is always much discussion on our mailing list and during our periodic meetings on how to accomplish this.

Sharing Knowledge

The efforts of Team SN0HQ have extended beyond the IARU contest. We recently published our first "contest handbook" for Polish hams. The first edition of the handbook became available a few weeks before the IARU contest. It is on the Web as a PDF file and is constantly being updated and revised. One of the chapters is a translation (with *NCJ* permission) of "How Much Is A dB?" by Jürgen, OE5CWL, from the September/October 2003 *NCJ*. It is our contribution to introduce contesting to the large number of hams who are entering the HF bands, which is happening in Poland as well as elsewhere.

Following the contest this year, for the second year in a row, we've been exchanging logs with HQ stations in other countries. For years we have been doing it with DA0HQ, which has helped both stations in improving scores. Last year we exchanged logs with DA0HQ, OH2HQ and R7HQ. For us it has been very instructive. We have published some comparative analysis of these logs, which is available at **www.sn0hq.org/files/hq_logs.zip** (it is a zipped *MS Excel* file).

At the time of this writing, we will be having a post-contest meeting of Team SN0HQ at the annual SPDX Club gathering in October. We will summarize our SN0HQ operation to the SPDX Club and the PZK leaders.

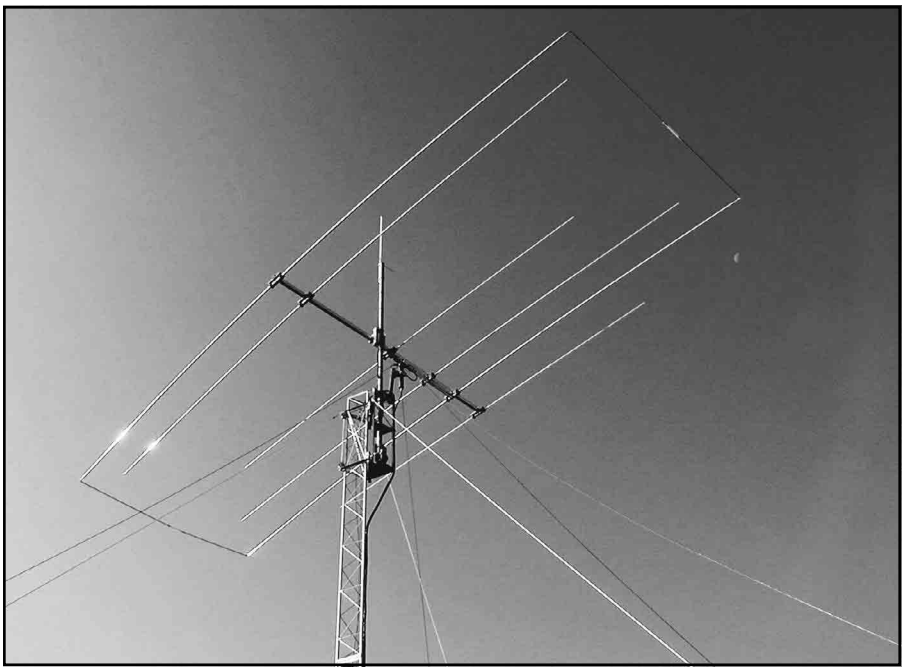
We hope to work you in the 2005 IARU HF World Championship! NCJ

Back Into Contesting After 11 Years

Claudio Astorri, IK2DZN

Businesses and families are normally contesters' greatest enemies. They even tend to absorb the contesters' minds when they desperately need time to dream and think about larger antennas, better strategies and new solutions for efficient operations. Fortunately, in my case, my family was in favor of contesting, particularly after my wife Silvia felt the spiritual and cultural need in me for contests. So, she helped me create time and activities for contesting in order to take me away from my own business, PRO RADIO, the largest consulting and engineering radio broadcasting service in Italy. I am a radio broadcaster as a professional and an Amateur Radio operator as an enthusiast. Radio means very much in my life.

In the late '80s and early '90s, I used to operate from a country site with a Hy-Gain TH7DXX at 67 meters (huge tower) and full-size wire dipoles for 40, 80 and 160 meters. I still own the CQWWDX 21 MHz Low-Power record for Zone 15, which was established in 1993. Now I restarted ham operations from the new city apartment with a relatively small but very efficient tri-band antenna, an Optibeam OB6-3M, and a PKW broadband wire dipole for the lower bands.



IK2DZN's Optibeam and inverted-vees.

Claudio, IK2DZN, at the operating position.

The IARU HF World Championship was a wonderful contest for my return. It is a very crowded one, with lots of participants from all over the world. The contest is not too long, 24 hours from mid Saturday to mid Sunday, and this allows a better focus and encourages full participation. In fact, I managed to operate for more than 16 hours. The "no spot" policy is another good point, probably the clearest choice that puts the IARU HF World Championship into the pure sport and open competition area. The exclusion of Top Band (160 meters) is another good message to contesters that have no room for monster antennas. One final mention of the rules concerns the Power Categories; it's nice to be able to participate in the Low Power category. The choice of Low Power is too often confused with no amplifier, or no money for it. In reality, Low Power means a philosophy, the search for better signals with fewer Watts in a less extreme environment than QRP. Running barefoot is a real good thing in cities, but it requires you to focus completely on the antenna system, the single highest priority on HF.

Before starting the contest I wanted to set a target; how many QSO or how many points would make me satisfied after 11 years of no contesting? I thought 1000 QSOs would be a nice target and I managed to make 1005—very good! There were good, but quite short, conditions on the bands. Ten meters had strong European signals for most of the time, with 3V8BB, UP9L, 5B/RW4WR and some good Asiatic Russians thrown in. Fifteen and 20 meters were frequently open also to North, Central and South America, while Japan and the Far East were less frequently reachable. Acceptable conditions were also on 40 and 80 meters.

It seems to me that even though 11 years has passed since my last contest, the passion is really the same or even stronger. One new thing to me since older times is voice keying. You do not need to be a broadcaster to recognize those using keyboards and recorded sounds instead of live voices. I really like very much to say "Good Morning," "Good Night," "Hello, nice signal" or "Hey, you are 20dB over" depending on who is on the other end. Radio is a living being to me and Amateur Radio is no exception. So please forgive me if I extend our QSO by 1.82 seconds with a "Thank you for calling." NCJ

DXing = Connections = Friendships = World Peace?

Cindy Howard

I've lived in the shadows of radio antennas for over 25 years. My husband Geoff, W0CG, was on the radio chatting (in CW) with a fellow ham in Scotland while I was entering labor with our son. Adam, KB8KIA, grew up embracing the part of his heritage that is Scottish and even plays the bagpipes! (Coincidence? Who knows?) I've helped build towers, dig radial ditches, wrap dead-ends and pull-ropes to hoist antennas both in the States and on DX trips and in Curaçao. Why not? The benefits to me have been many.

Geoff and I have laughed over the years at a sort of joke we share. He is of the opinion that "guys talk about things and women talk about people." I guess that's a simplified version of the Mars and Venus conundrum. At any rate, I do relish the "people" aspect of being a ham wife. Yes, there are plenty of hams who would, at first glance, appear to be not interested in the people aspect of the hobby. But by and large, the contest folks I've met over the years are the main reason I am, and will continue to be, a supportive and interested ham wife. They're just some of the most caring, interesting and fun people in the world!

The Proof is in the Experience

There are many ways in which I've met some of these great folks. I've traveled with Geoff and members of the pre-CCC group (CCC stands for Caribbean Contesting Consortium) on several DXpeditions, I've attended the Dayton Hamvention and experienced the presentations in the DX forums and dinner. I helped launch the PJ2T station on Curaçao and have enjoyed hosting numerous groups of contesters there. Through all those venues, I've been amazed at the variety of people who are represented in this hobby. And part of that amazement comes from the common bonds that people from all over the world can find or create through their interest in Amateur Radio contesting.

The first time we were involved in a contest operation on Curaçao was in October 1999. We exited the airport terminal and were surprised to be met (without any prearrangement) by two local hams—Jossy Cyntje, PJ2MI, and Brett Ruiz, PJ2BR—who gave much time and assistance to make that contest operation a success.

Two years ago we invited members of the Curaço VERONA club to participate with CCC members in the IARU contest, signing PJ2HQ. We had a number of local hams join the CCC members to take part over the 24 hours of the contest, and some of their spouses and partners also came to view this intriguing new contest station and to share food and fellowship. We had such a terrific time that we did it again this year, and had more than 30 people visit and share food and good times throughout the day! Many of these hams are newly licensed and for many of them, this was an initial opportunity to actually take part in a contest. It was a phenomenal experience the first year to watch and listen as the experienced contesters helped the rookies learn to make contest contacts! This year more VERONA club members participated and it's obvious that their radio skills are improving and their interest in contesting is growing. A few of them are even gaining proficiency in code and hope to participate in that part of the contest in future years.

In between stints on the radio, the hams and their spouses relaxed around the table in the balmy breeze and enjoyed chatting. For 300 years the island of Curaçao has been populated by more than 50 nationalities, gradually learning to live together in peace and equality. There is a lot of what you might call native Antilleans, but also many Dutch and people from neighboring islands, South America or other countries in Europe. Part of what drew us to make a second home on Curaçao was the friendly people. They easily smile and know that your nationality doesn't matter—it's who you are inside.

Where else could I host an afternoon and evening of thirty people speaking Dutch, French, Papiamento, Portuguese, Spanish and English? Where else could I have experienced our caretaker, Zoom, teaching us Papiamento words on one side of the table in exchange for Leo Xhoko, S50R, from Slovenia, teaching us the same words in Russian on the other? Where in the US could you have such a wide range of people discuss world politics in a friendly manner?

Watching and listening to all the sons and daughters of Curaçao and those from the U S or other parts of the world share food and conversation and laughter is an absolute delight! As the conversations progress, we always find some common ground. There is always something to discuss or share, something to drink to, laugh about or help with. Geoff and I count ourselves lucky to have met many great people through this Curaçao ham radio venture.

Some hams just visit Curaçao for a day and it's a delight to meet them and show them a piece of our island home. Some come for one contest, to investigate this PJ2T phenomenon. Others come back again and again and are counted among our dearest friends. Still others are new friends—local or from afar—with whom we're waiting to share recipes, good food (or an Amstel!), travel stories, or further ham radio adventures.

So, at least for this "people person," contesting and DXing has been a way to make many new friends and hear, or experience, first-hand, what life is like in different corners of this planet. And if for each contest or DXpedition there is one new friendship forged through shared conversations or common interests, then life will be sweeter, more people will understand each other and, who knows, someday there *may* be world peace. It could happen! NCJ

Author Cindy (back to camera) with PJ2FF, PJ2DH and Curacao wives during IARU 2004.

Attracting More Sheep to the Fold

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We contesters tend to be passionate about our little corner of ham radio. Why else would we stay up 48 straight hours trying to dig that last elusive multiplier out of the din? Once bitten by the contesting bug we tend to be infected for life. But looking around the room at a meeting of the Central Texas DX and Contest Club last winter, it was brutally obvious that, nicely put, as a group we're not getting any younger. And worse, we're apparently doing a lousy job of mentoring in the next generation to take up the mantle. This is, of course, not just a contesting problem, but arguably the biggest threat to the future existence of our hobby—maybe bigger than BPL!

CTDXCC has provided contest-oriented programming to Austin's annual August hamfest for years, but mostly had put on sessions targeted to the experienced contester, bringing in hotshot contesting speakers who mostly preached to the choir. Excellent, informative programs to be sure, but not especially conducive to generating excitement in new hams or even old hams who never considered dabbling in the seemingly rarified air of contesting.

This year, we decided, would be a good time to depart from the old formula and to put on a "Contesting for Dummies" program. Okay, to be honest, political correctness got the better of us and ultimately "An Introduction to Contesting" shared the podium with a similarly targeted "Introduction to DXing" at this year's Summerfest. Early returns indicate that both the DXing and contesting programs were a big hit. Going in we knew we probably wouldn't create an immediate explosion in newbie contest participation, but the first step was to light the fuse.

Figure 1—The first *PowerPoint* slide: Contesting—Join the Fun!

Figure 2—The second *PowerPoint* slide: A Contest for Every Skill Level.

Promoting the Forum

The Club agonized over how best to get the word out, and whether to offer door prizes to lure and retain attendees to the bitter end. Ultimately, we chose to employ the cheapest form of advertising, the Internet, to do the heavy lifting, publicizing our forum to other DX clubs in the region through selective e-mail announcements and cross-links to/from their Web sites. The Summerfest committee provided CTDXCC with a table adjacent to the registration table, which we manned with club members throughout the weekend, encouraging interested passersby's to visit to the live forum. Five hundred one-page fliers were printed up and handed out both at the registration and the Club's tables.

We ultimately decided against in-fo-

Standing room only at the "An Introduction to Contesting" forum!

rum door prizes to blackmail attendees into staying until the bitter end. It was a good decision—we didn't need them. Though our time slot was in direct competition with a controversial and much-anticipated regional VHF society meeting, we drew nearly 100 to the room, making ours one of the best-attended forums of the weekend, and few, if any, left before it was over. The *National Contest Journal* Editor Carl, K9LA, was kind enough to send down a stack of the latest *NCJs*, which we passed out to those most aggressively waving their hands (thanks, Carl!), so we did have one very nice, but unadvertised, giveaway.

Know Thy Audience

Unlike the peer-to-peer talk to which we have become accustomed in contesting forums, this was from the outset to be a pitch to The Uninitiated and probably The Skeptical. A lot of non-contesters look at us as a bunch of wild-eyed zealots and ne'er-do-wells who just sweep in, wreck *their* bands for a weekend and disappear back into the ozone. Perhaps at one level they're partly right, but that's not the whole story. We knew that this would be a great platform from which to preach the benefits of contesting to the masses—good contest operators tend to be *great* emergency operators, and in this use-it-or-lose-it spectrum environment in which we find ourselves, contest participants are sometimes the only sources of activity on the bands.

Given the intended audience, we stressed the *fun* aspects of contesting rather than the *winning*, noting that while there were a number of area "contest superstations" with massive aluminum farms—N3BB, K5NA, N5TW and W5KFT, to name just a few—there were also mere mortals like W5JAW who were amazingly competitive with modest wire antennas on normal city lots. The point to be taken from this (see Figure 1) was that "Even a Little Pistol can have a lot of fun competing with the Big Guns." Though I can't recall ever cracking a million points in any contest I've ever entered, I've gotten tremendous pleasure from playing the game, so it must be true!

Packing 50 lb of Stuff into a 5-lb Bag

With the limited time available for the contesting segment (about 15 minutes) and the breadth of material to be covered, it was essential that the presentation be delivered at a near machine-gun cadence—too fast for anyone to take notes even if they were so disposed. Enter the CTDXCC Web site, which we announced early and often during the DX and contesting sessions would shortly host the presentations in their entirety, including hyperlinks to other websites with a cumulative gold mine of information.

The **www.ctdxcc.org** URL was prominently displayed at the bottom of each *PowerPoint* slide—all an interested party would need to know to access the full presentation, and by Tuesday afternoon following Summerfest, thanks to CTDXCC's Webmaster Ken, WM5R, this was a reality. In the first month following the hamfest, Ken reported 303 hits on the main CTDXCC Summerfest page (CTDXCC Web site stats in excruciating detail are available at **www.ctdxcc.org/stats/**). The HTML version of the DXing and Contesting presentation was accessed 128 times, and the *PowerPoint* file was opened and/or downloaded 126 times (*the Contesting portion of the entire presentation is also in the Bonus Content on the* NCJ *Web site at* **www.ncjweb.com—**Ed). It's unknown how many of these hits were from search engine robots and how many were "real" people, but it's fair to assume that a reasonable percentage were attendees following up. In addition to the Web follow-up, we encouraged those interested to attend a monthly club meeting or visit one of our members' stations during a contest to observe our special form of insanity.

To be sure, we didn't try to cover every aspect of contesting in the allotted time (impossible!), but instead concentrated on pointing the audience to resources they could tap at their own pace. Possibly one of the more useful slides in the presentation (see Figure 2) showed a sampling of contests as they are scheduled throughout the year against a blended color background that indicated which were geared more to beginners (e.g., SKN, state QSO Parties, etc.) and which were almost exclusively the domain of experienced contesters (e.g., Sprints). In the Web-based version of this non-comprehensive contest listing, the user can click on any of the contests to jump to the Web site for that particular event. Again, the idea here was to provide newbies with the impetus and information to try out contesting, but to let them be educated about which ones might be most compatible with their experience levels.

Wrapping up, we touted the Texas QSO Party (TQP) scheduled just a few weeks after Summerfest as a tailor-made opportunity to get one's contesting feet wet. Since the session immediately following our "Introduction" was devoted to TQP, this made for a perfect handoff, and though we won't take all the credit, the TQP presenters had an undiminished full house for their excellent program as well.

Conclusion

Did we light any contesting fires? Only time will tell, but this sort of grass roots soap boxing may be all that someday stands between contesting as we know it and extinction as we begin to age out.

If your club would like to make use of any of the CTDXCC presentation materials, feel free to download them from the club Web site and alter to your tastes. Since this is all about recruiting new players to our sport, as you make changes and improvements to the originals you are encouraged to share them with us. NCJ

NCJ Profiles

By Paul Gentry, K9PG

Having been to about 20 different DXCC entities, I consider myself a fairly well traveled person. Certainly not even close to the likes of N6AA and N6ZZ…and most definitely not in the same realm as this month's profile. One of the things that many of us contesters strive for is DXCC. Some try to get DXCC in a single contest weekend, while others try to get it over the course of many contests. How many of you can say that you've done DXCC the hard way…traveling to over 100 entities? Probably not very many of us. You're about to meet someone who has done just that.

My Story

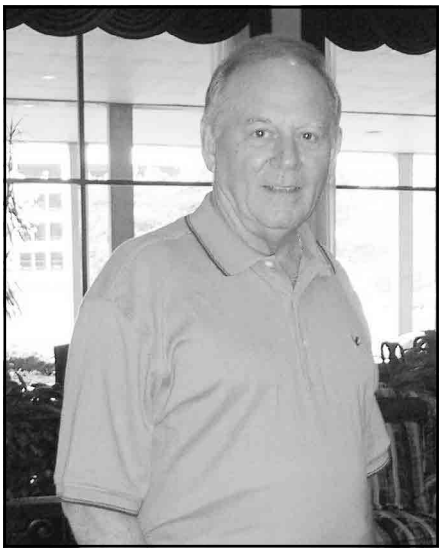
By Paul Newberry N4PN

I was born in Macon, Georgia on November 1, 1937. Grew up in Macon and became interested in ham radio while a junior in high school. I took and passed the Novice test in late 1952 with some friends, and on January 8, 1953, I received WN4YWX. My friends got WN4YWV, WN4YWW, WN4YWY and WN4YWZ. All are still active except WN4YWZ. I upgraded to General in 1954 and dropped the "N."

After graduating from high school in 1955, I entered the Navy in September as a Seaman First Class and went right to boot camp. After boot camp, I went to Norfolk, Virginia to Class A Radio School. Bud, K4ASU, was a Chief Radioman at the school and we became friends and stayed in touch over the years. I did a lot of traveling during the four years in the Navy and operated from numerous countries with calls like OD5AU, VP4WI (that was Trinidad at that time), KP4KD, KV4AA, KG4AO, etc.

All of my Navy travels must have developed my "hobo blood," as I have always enjoyed traveling. In 1967, K4BAI and I traveled to Guatemala and operated M/S in CQ WW CW using TGØAA … and that was the start of my contest traveling! The following years John and I operated from PJØCW, PJ9GIW, PJ9PN and various other calls from Chet's old place in Curacao along with the Vic, W4KFC, Bill, W4GF, Gene, W4BRB, etc.

In April 1979, I met Kit Carson, VP2KC, on the air and we quickly established a good friendship. I put together the team of 22 operators who went after and won the CQWW SSB Contest in 1979 in the Multi-Multi category—from a 2-point area. That was the world record for many years, and stood as the North American M/M record for 22 years until VP2E broke it in 2001. I went back for the same contest in 1980, 1981 and 1983 using my call, VP2KAA, and won the world in the single band category two years: 20 meters in '80 and 15 meters in '83. In 1981, I was the first ham to break 2 million points single band in the CQWW SSB Contest (all paper logging—no computers). Today, that wouldn't even get a second look. Sadly, VP2KC died in 1984.



Paul, N4PN, at Dayton in 2004.

Over the next 10 years or so, I operated from several other places, including ZF, VS6 (now VR2), J3, J8 and many others. Then, in 1992, I bought a lot on St George Island, Florida about five miles off the coast of a small place called Eastpoint, Florida in the panhandle out in the Gulf of Mexico. I built a home there in 1994 and started assembling a contest station not too long after. Presently I have a 75-foot tower with a Force 12 C31XR. On an 88-foot crank-up tower, I have a 2-element 40-meter Yagi (given to me by Bill, W4AN, SK) and a Force 12 C19XR. Thanks to the five acres next to me, I have a pair of Force 12 80-meter verticals with elevated radials. Near the beach, I have a 1/4 wave linear-loaded vertical for 160 meters with 65 radials. There are four 500-foot Beverages and various other wire antennas for the "spotter" station. There's a total of 12 different antennas plus the Beverages.

The following is not even remotely related to contesting or even ham radio. In 1979 I was appointed and signed a contract with the National League/Major League Baseball to act as the "Official Scorer" for the Atlanta Braves beginning in 1980. It was a year-to-year contract that wound up lasting for fifteen full seasons. I still "work" a few games each year. My job was/is to decide whether a ball should be a hit or an error, or if a pitch should be a wild pitch or a passed ball. All of these decisions can and usually do affect batting averages, pitcher's ERA, etc. It opened many doors for me over those years and I got to know players like Dale Murphy, Phil Neikro, Jeff Treadway, Biff Pocoroba, Rick Camp and many others.

One of my best friends for most of those years was Don Sutton. We kept in touch after he retired, and have remained good friends through the years. He is still with the Braves today. As you might imagine, I have heard from many players over the years wanting me to change my decisions. I only made six changes in fifteen years, and only after reviewing video of the play. Because every batter thinks everything he hits is a hit and every fielder thinks every thing he misses is a hit and every pitcher thinks every ball hit is an error (to protect his ERA), there were times when I had "little discussions" with various players. About the only thing I never witnessed while I was working was a no-hitter. I came close on many occasions. Steve Trout, pitching for the Chicago Cubs back in the late '80s, was within one out of a no-hitter...that was as close as I ever got.

Thanks, Paul! I wonder what kind of a plaque he got for his DXCC-V? I'd imagine getting Paul to change a call he made in a game would be similar to getting a contest sponsor to putting a mult back in the log that shouldn't have been removed. I'd be curious to know if any readers have been to, or know of anyone who has been to, over 100 entities? I know N6ZZ and N6AA are close, and NQ4I might be up there.

That's it for now. See everyone next time! And as always, if you'd like to do a guest profile on someone, or have someone in mind for a profile, drop me a note and let me know who you have in mind. In the meantime, be good to each other…and stay off my frequency!

"Imagine how many more people we would have to work if each one of us got just one other person involved in contesting!" W4AN (SK). 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 February 2005. 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!

November 2004

ARS Spartan Sprint	0200Z-0400Z, Nov 2
IPARC Contest, CW	0600Z-1000Z, Nov 6 and 1400Z-1800Z, Nov 6
Ukrainian DX Contest	1200Z, Nov 6 to 1200Z, Nov 7
ARRL Sweepstakes Contest, CW	2100Z, Nov 6 to 0300Z, Nov 8
NA Collegiate ARC Championship, CW	2100Z, Nov 6 to 0300Z, Nov 8
IPARC Contest, SSB	0600Z-1000Z, Nov 7 and 1400Z-1800Z, Nov 7
High Speed Club CW Contest	0900Z-1100Z, Nov 7 and 1500Z-1700Z, Nov 7
DARC 10-Meter Digital Contest	1100Z-1700Z, Nov 7
WAE DX Contest, RTTY	0000Z, Nov 13 to 2359Z, Nov 14
JIDX Phone Contest	0700Z, Nov 13 to 1300Z, Nov 14
OK/OM DX Contest, CW	1200Z, Nov 13 to 1200Z, Nov 14
LZ DX Contest	1200Z, Nov 20 to 1200Z, Nov 21
All Austrian 160-Meter Contest	1600Z, Nov 20 to 0700Z, Nov 21
ARRL Sweepstakes Contest, SSB	2100Z, Nov 20 to 0300Z, Nov 22
NA Collegiate ARC Championship, SSB	2100Z, Nov 20 to 0300Z, Nov 22
RSGB 2nd 1.8 MHz Contest, CW	2100Z, Nov 20 to 0100Z, Nov 21
CQ Worldwide DX Contest, CW	0000Z, Nov 27 to 2400Z, Nov 28

December 2004

ARCI Topband Sprint	0000Z-0600Z, Dec 2
ARRL 160-Meter Contest	2200Z, Dec 3 to 1600Z, Dec 5
TARA RTTY Melee	0000Z-2400Z, Dec 4
Wake-Up! QRP Sprint	0400Z-0600Z, Dec 4
CIS DX Contest, CW	0000Z-2400Z, Dec 5
ARCI Holiday Spirits Homebrew Sprint	2000Z-2400Z, Dec 5
ARS Spartan Sprint	0200Z-0400Z, Dec 7
ARRL 10-Meter Contest	0000Z, Dec 11 to 2400Z, Dec 12
MDXA PSK DeathMatch	0000Z, Dec 18 to 2400Z, Dec 19
OK DX RTTY Contest	0000Z-2400Z, Dec 18
RAC Winter Contest	0000Z-2400Z, Dec 18
Croatian CW Contest	1400Z, Dec 18 to 1400Z, Dec 19
Stew Perry Topband Challenge	1500Z, Dec 18 to 1500Z, Dec 19
DARC Christmas Contest	0830Z-1059Z, Dec 26

January 2005

SARTG New Year RTTY Contest	0800Z-1100Z, Jan 1
AGCW Happy New Year Contest	0900Z-1200Z, Jan 1
Original QRP Contest	1500Z, Jan 1 to 1500Z, Jan 2
WQF QRP Party	0000Z-2400Z, Jan 7
Midwinter Contest, CW	1400Z-2000Z, Jan 8
ARRL RTTY Roundup	1800Z, Jan 8 to 2400Z, Jan 9
North American QSO Party, CW	1800Z, Jan 8 to 0600Z, Jan 9
EUCW 160-Meter Contest	2000Z-2300Z, Jan 8 and 0400Z-0700Z, Jan 9
NRAU-Baltic Contest, CW	0530Z-0730Z, Jan 9
Midwinter Contest, Phone	0800Z-1400Z, Jan 9
NRAU-Baltic Contest, SSB	0800Z-1000Z, Jan 9
DARC 10-Meter Contest	0900Z-1059Z, Jan 9
Hunting Lions in the Air Contest	0000Z, Jan 15 to 2400Z, Jan 16
LZ Open Contest	1200Z-2000Z, Jan 15
MI QRP January CW Contest	1200Z, Jan 15 to 2359Z, Jan 16
Hungarian DX Contest	1200Z, Jan 15 to 1200Z, Jan 16
North American QSO Party, SSB	1800Z, Jan 15 to 0600Z, Jan 16
BARTG RTTY Sprint	1200Z, Jan 22 to 1200Z, Jan 23
ARRL January VHF Sweepstakes	1900Z, Jan 22 to 0400Z, Jan 24
CQ 160-Meter Contest, CW	0000Z, Jan 29 to 2359Z, Jan 30
REF Contest, CW	0600Z, Jan 29 to 1800Z, Jan 30
UK DX Contest, RTTY	1200Z, Jan 29 to 1200Z, Jan 30
UBA DX Contest, SSB	1300Z, Jan 29 to 1300Z, Jan 30

February 2005

Vermont QSO Party	0000Z, Feb 5 to 2400Z, Feb 6
10-10 Int Winter Contest, SSB	0001Z, Feb 5 to 2359Z, Feb 6
Minnesota QSO Party	1400Z-2400Z, Feb 5
AGCW Straight Key Party	1600Z-1900Z, Feb 5
Delaware QSO Party	1700Z, Feb 5 to 0500Z, Feb 6 and 1300Z, Feb 6 to 0100Z, Feb 7
Mexico RTTY International Contest	1800Z, Feb 5 to 1759Z, Feb 6
North American Sprint, SSB	0000Z-0400Z, Feb 6
ARCI Winter Fireside SSB Sprint	2000Z-2400Z, Feb 6
ARRL School Club Roundup	1300Z, Feb 7 to 0100Z, Feb 12
KCJ Topband Contest	1200Z, Feb 10 to 1200Z, Feb 11
CQ WW RTTY WPX Contest	0000Z, Feb 12 to 2359Z, Feb 13
Asia-Pacific Spring Sprint, CW	1100Z-1300Z, Feb 12
Dutch PACC Contest	1200Z, Feb 12 to 1200Z, Feb 13
Louisiana QSO Party	1500Z, Feb 12 to 0300Z, Feb 13
FISTS Winter Sprint	1700Z-2100Z, Feb 12
RSGB 1st 1.8 MHz Contest, CW	2100Z, Feb 12 to 0100Z, Feb 13
North American Sprint, CW	0000Z-0400Z, Feb 13
AGCW Semi-Automatic Key Evening	1900Z-2030Z, Feb 16
ARRL Inter. DX Contest, CW	0000Z, Feb 19 to 2400Z, Feb 20
CQC Winter QSO Party	2200Z, Feb 20 to 0359Z, Feb 21
Russian PSK WW Contest	2100Z, Feb 25 to 2100Z, Feb 26
CQ 160-Meter Contest, SSB	0000Z, Feb 26 to 2359Z, Feb 27
REF Contest, SSB	0600Z, Feb 26 to 1800Z, Feb 27
UBA DX Contest, CW	1300Z, Feb 26 to 1300Z, Feb 27
CZEBRIS Contest	1600Z, Feb 26 to 2400Z, Feb 27
North American QSO Party, RTTY	1800Z, Feb 26 to 0600Z, Feb 27
High Speed Club CW Contest	0900Z-1100Z, Feb 27 and 1500Z-1700Z, Feb 27
North Carolina QSO Party	1700Z, Feb 27 to 0300Z, Feb 28

NCJ

Contest Tips, Tricks & Techniques

By Gary Sutcliffe, W9XT

Single-band Contesting

Longtime readers of this column will note that I have often suggested doing single-band efforts. They allow operators to be competitive when they can't be competitive otherwise. This month we will look at what other single-band specialists have to say about the subject.

K4WI and others note that single-band contesting is an alternative when you don't have effective antennas on every band.

K9AY feels single-band contesting is an excellent way for a modest station to be highly competitive. "One good antenna, favorable propagation to your area, and an experienced single-band op can be a winner. My first Top Ten box and my highest contest finish were 40-meter single-band efforts," says Gary.

Another reason to do a single-band effort is suggested by N3BB. Jim notes that a single-band competition is an option if the antennas on one band are temporarily out of order.

WØUO and others mention time off as a reason for doing a single-band effort. Ten and 15 meters close at night giving you time to sleep. The lower bands are open primarily at night giving you the day for other activities. However, die hard 40- and 80-meter single-band ops, or the contesters who handle those bands for multi-ops in the northern part of the US, will scan the bands during day light hours for VE stations not in the contest to get extra points in CQWW.

Mel, KJ9C, often does single-band competitions when he is unable to put in a full time effort. He picks the higher bands when he feels he needs sleep. If his daytime activities, such as being a ski instructor, prevent a full-fledged push, Mel will do 160 or 80 meters and take a nap.

K9AY stresses the educational value of any single-band entry. A concentrated single-band effort helps you really learn about propagation, active stations and antenna performance.

K8IR finds it fascinating to follow the propagation around the globe through the course of the day. "After a while you get a pretty good feel for when certain paths should be open," notes Jim. "Sometimes you have only a few minutes into some areas of Asia and the Pacific."

K4WI is a big fan of 10 meters. He decided that doing something big on 10 meters would be much less expensive than for 20 meters. Cort built an array of four seven-element Yagis at 140/105/70/35 feet (see "A 4-High Stack of 7-Element 10-Meter Yagis" by K4WI in the May/June 2003 *NCJ*). Each one is independently selectable and rotatable. Cort feels this is a killer setup despite being in the southern part of the Black Hole.

K8IR prefers 10 meters at the top of the cycle. For the last couple of years Jim has done 15 meters. As the sunspots disappear, he expects to end up on 20 for a while if 15 meters doesn't provide the opportunity to work Europe.

Paul, K5AF, likes 160 and 10 meters for opposite reasons. On 10 meters, a low-power antenna-challenged guy can run when conditions are good. On the other hand, Paul feels the quality of ops on 160 is generally so good that he has great success with S&P even with a puny signal.

W9RE usually works the bands 40 meters and above when he is assigned to a single band in a multi-op competition. Mike does not like 40 because of the QRM and QRN, though. His favorite is 15 meters because he gets out best on that band and likes the long European openings.

N8UX considers himself a bit of a masochist since he has always liked 40 meters and the challenge of interference from short wave broadcasters. Rich stresses the importance of being familiar with the various QRM-fighting tools in the shack—pass band tuning, IF and audio notches and external DSP devices. He says that they allow making QSOs out of otherwise impossible situations.

WØUO changes his picks throughout the cycle. Since he likes 160, 80 and 40 meters so much, Jim is more concerned with geomagnetic conditions than solar flux.

If you are limited by space and/or budget and decide to specialize on a single band, you might find it odd that your best chances might lie at opposite ends of the HF spectrum.

Ten meters offers many advantages. Antennas on the band are smaller than they are on lower frequencies. The band is very large, allowing you to move away from the big guns and QRM. When conditions are good, low power and small antennas can be amazingly effective. When I first moved to this location, we were heading towards the peak of the sunspot cycle. I decided to put together a small stack of a pair of four-element 10-meter Yagis at about 65 and 35 feet. I felt I ruled the band with that setup, yet in terms of price, size and complexity it was not much more than the same tower with a large tribander.

Unfortunately, 10 meters gets quiet when the sunspots disappear. Despite this, I still operate my favorite contest, the ARRL 10-Meter Contest — even at the bottom of the sun spot cycle. For the DX contests, a single-band 10-meter competition from the Black Hole is too much for even this 10-meter diehard. A migration to the bottom bands may be the solution.

Although there are some very large antenna systems on 80 and 160 (such as 4-squares) they are still relatively rare. A vertical or inverted L with an exceptional ground system will put you above average as noted by K9SD. For receiving, Beverage antennas are inexpensive if you have the space or understanding neighbors. Loops, EWE and K9AY arrays are an option for those with less space.

Doing a single-band effort has some down sides. It can get very boring late in the contest. From North America on Sunday afternoon on 10 or 15 meters during a DX contest, it is mainly a matter of looking for a new PY or LU to appear. I remember an 80-meter single-band push that I did in the ARRL DX contest during the mid-1990s. Friday night was great and I was way beyond where I had expected to be. I was hoping for a repeat Saturday night. Conditions were still great, but I only found a half-dozen new stations to work by midnight.

Single-band competitions also require less strategy than all-band efforts. Deciding what band to be on is something that must be constantly evaluated in an all band competition. In that respect, single-band competitions are less interesting.

Single-band efforts can be good alternatives for those with the inability to be competitive on multiple bands. They are also great educational experiences. If you want to move into the arena of major multi-op competitions, becoming known as an expert on a certain band can't hurt your chances of being invited to one.

That wraps up this installment of Contest Tips, Tricks and Techniques. Thanks as usual go out to our readers who sent in their comments, including K4WI, K5AF, K8IR, K9AY, K9SD, KJ9C, N3BB, N8UX, WØUO, W1WEF and W9RE.

Topic for Jan-Feb 2005 (deadline December 10, 2004)

What was the strangest or toughest problem you had with your station? How did you track it down, and what was the solution?

Send in your ideas on these subjects or suggestions for future topics. Postal mail: 3310 Bonnie Lane, Slinger, WI 53086. E-mail: **w9xt@unifiedmicro.com**. NCJ

Contesting on a Budget

By Paul Schaffenberger, K5AF

Saving Money through Planning

During my 27 seven years in the Air Force, I've managed multiple long-term projects, and have gained a great appreciation for the importance of long and short-term planning. I now teach project management to corporations, and the biggest selling point for having a project plan is that it ultimately saves money.

The three principle variables in project management are scope, schedule and resources. Scope deals with *what* you intend to do, such as building a winning, single-tower, single-op low power HF contest station; or a world-class multi-multi high-power station. Schedule deals with *when;* in other words, the time frame in which you intend to do it, five years, 10 years, etc. Resources deal with *how* you will accomplish the project, or the equipment, antennas, peripherals, etc that will help you reach the goal.

My call for inputs brought an immediate and very interesting mix of responses, with ample evidence that sound planning principles are being applied within the contesting community.

Why Plan?

Planning station improvements as a long-term project makes sense. By determining which improvements will yield the greatest increase in our overall contest performance, we can sequence these improvements as major phases of an overall plan, and develop detailed task lists of things to do to accomplish each phase. These tasks, in turn, can be sequenced in an efficient manner to ensure that we don't have to circle back to accomplish missed items.

By having visibility of our improvement efforts over the long run, we can start aligning needed resources (hardware, work crews, etc) against the plan. Typically, in the highly competitive corporate environment, schedules often drive projects. Most of us, however, don't have the luxury of buying everything new off the shelf and putting a monster station together in time to win the next contest. We are usually resource-constrained rather than time-constrained. This often means spending time searching for that good deal at a swap meet, or hiring tower installers during their off season when they can be engaged for a lower cost.

Long versus Short Term Planning

Short-term planning is typically considered to be planning for the next two to three years, while long-term planning is for the next four to 10 years. With these definitions in mind, the responses were quite varied and interesting. Given that many of us are still part of the "mobile society" and are still working our way up the real estate food chain, few have the long-term "visibility" to develop a long-term plan.

One of the few with a long-term design strategy was K5ZD, who had a plan for his towers that he finally competed over an 11-year period. If Randy's operating success is indicative of his planning, he obviously did a very good job! Gary, W9XT, has long-term capabilities, such as low-band and VHF capabilities that he rolls into a plan looking several years out. Jim, K1IR, notes that while most of his planning is short-term, his building efforts are always for the long term. He notes, "I do the installation as if it should be there 20 years." Billy, AA4NU, notes that his long-term planning is driven by the sunspot cycle. Obviously, there's no use in building big stacks for bands that are not likely to be open. Jim, WØUO, has a long-term plan, but executes it as time, space and resources allow.

Gary, KØBHC, just retired from the Army, and in true military fashion, put together a long and short-term plan for his new "retirement" station. He has "…a very detailed plan…including a list of items to be purchased, which is prioritized by how the items will affect the performance of my station." As an Infantry Sergeant First Class, Gary was familiar with importance of planning to carry an operation, so he's a "true believer."

Most respondents indicated that their planning was mostly short-term, typically one to two years forward. N4GG calls his planning "short to mid-term, with amplifier and SO2R switching systems in the works." Robert, K5PI, maintains the W5KFT station and usually plans about a year out. Doing so allows the 'KFT team to look for bargains, often saving a lot of money. Gary, W9XT and Jim, K1IR, have short-term plans that extend through the summer in preparation for the contesting season.

Identifying Gaps and Weaknesses in Capability

Gaps and/or weaknesses in capability need to be identified in order to drive planning efforts. Jim, K1IR, has his multi-op team assess the station performance and discuss both indoor and outdoor improvements to be made. They discuss upcoming propagation and attempt to configure the antenna mix accordingly. Considering the recent propagation conditions, they are stressing the low bands.

Jim, N3BB, has not yet run *TA* (Terrain Analysis) at his location to get a detailed analysis of his antenna capabilities, but his operating experience has indicated weaknesses on 80 and 160 meters, and he has addressed them. Bill, AA4LR and Billy, AA4NU, have a similar take on assessing gaps and weaknesses. They compare scores with other stations in the general geographical area and factor in differences in equipment and antennas to determine the potential of various alternatives.

Randy, K5ZD, addresses this area with his typical concise analysis. Randy writes "Put stuff up. Stuff that works, you keep. Stuff that doesn't, you replace. Try not to break anything that is working."

Perhaps the most insightful comments, though, addressed the human factor. Jim, WØUO, does a thorough analysis on how he performed after each contest and looks for performance gaps that he can improve upon. Hal, N4GG, touts the benefits of guest operating at the big stations and staying in touch with those interested in station design in order to find areas to improve. Grad Student and contester K8GU, Ethan, echoes that sentiment, stating that guest operating and visiting other stations afford him the opportunity to see what other operators and station builders are doing that will help him in his station planning. Bill, AA4LR, neatly summarizes the human factor, "…sometimes it is the station, sometimes it is luck. It's skill most of the time."

Hal, N4GG, and Brad, KØBHC, both support reading and evaluating everything on the subject of contesting that you can get your hands on. Brad recommends asking a lot of questions, and he praises the "Big Guns" for their consistent help with his queries. As Brad says, "knowledge is power."

Planning versus Budget Realities

Does the budget drive the plan, or vice-versa? Most of you are driven by budget constraints, some more than others. Even those with a long-term strategic plan in place like, Jim, N3BB, indicated, "…tactically, the expenditures

must be in line with the basic family budget." Congratulations to Ethan, K8GU, who has a fiancé-approved station plan for when he gets out of graduate school. That's thinking ahead, Ethan! Jim, K1IR, prioritizes all the improvement projects by their value. Even a low-cost improvement like doubling the number of radials on a low-band inverted L has a high return in terms of mults and Qs. Prioritizing by value provides a roadmap that gives the best "bang for the buck" overall. The sudden appearance of a "good deal" on a needed value-driven resource may alter the overall priority list.

Hal, N4GG, wanted to build the best contest station possible independent of budget, but favored being frugal over being frivolous. He notes that some of the best gear ever made is only available on the used market, and some of the best switching and interfacing gear is home-designed and built. One only has to be willing to invest the time. Gary, W9XT, also talked about the time versus budget tradeoff. He rescued a few miles of wire from the dumpster that will become the radial system for his 160-meter antenna, but it will take a lot of time to make this inexpensive improvement. As Jim, N3BB, states, "…money is important, of course, but time is really important as well."

The Technology "Silver Bullet"

Technology is the food that fuels a contester's soul, and we're all looking for that one "silver bullet" that will give us the big score and put us in the box. Most respondents expressed excitement over new technology. The Ten-Tec Orion and the Yaesu FT-1000MP with the Inrad roofing filter mod were mentioned as important hardware advances, but most respondents expressed caution in too much reliance in new transceiver technology.

Gary, W9XT, referred to new technology, as "bleeding edge," an apparent reference to the high cost of the newest and best. He notes that a quantum leap in station performance is mostly limited to small pistols making major equipment upgrades. He recommends slow and steady improvements and attention to detail. As Randy, K5ZD, succinctly states, "There are no quantum leaps. Only small incremental improvements."

Impact on the Bottom Line

There was strong consensus on the benefits of planning. Benefits such as "avoids false starts", "helps quantify what needs to be done", "helps in finding the right bargain items", "you don't buy stuff you don't need", "…makes sure that each incremental change *adds* to and does not detract…" and "maximizes what can be done against constraints" deliver the message loud and clear.

Ironically, those with limited resources are often the best planners. As Bill, AA4LR, says, "One aspect of having a constrained budget is that you tend to think about and make plans for station improvements." Based on these many positive responses, long and short term planning will hopefully become an integral part of contesting on a budget.

Thanks to K1IR, N3BB, N4GG, AA4LR, AA4NU, K5PI, K5ZD, K8GU, W9XT, KØBHC and WØUO for their great comments.

Topic for the Jan-Feb *NCJ*: Self-investment, the best investment? What type of investments do you make in yourself to improve your operating skills and technical competence? Guest op? Help design and build a super station? DXpeditions? Contest club memberships? NCJ

RTTY Contesting

By John Fleming, WA9ALS

NAQP RTTY Rover

Most RTTY ops don't seem to give much thought to operating mobile. I think that's understandable given that many come from a background of Model 25s. However, with the influx of tiny rigs, laptop computers and better mobile antennas, there's really no excuse for not giving RTTY mobile more consideration.

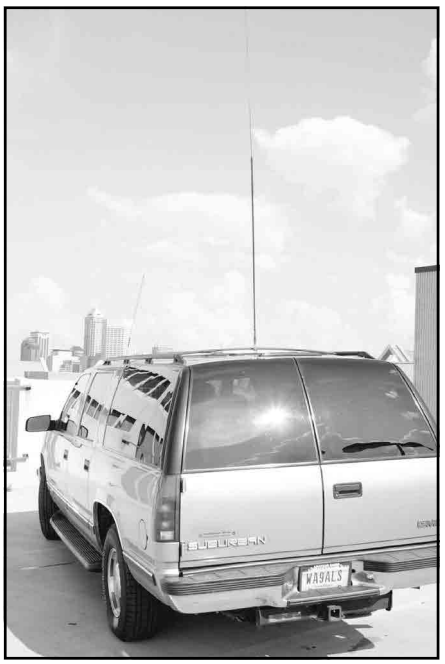
Should we be equipped with the sophistication of some VHF rovers? No. However, anyone with a rig like my IC-706MKIIG and a laptop should really give RTTY mobile a try. Whether it's operating while the wife or husband drives on a vacation, portable operating or contesting, RTTY mobile is great fun. In recent casual RTTY mobile operating, I've diddled from IN, KY, MI, TN, GA, AL and NC. But my original goal was to contest!

For the first casual try at RTTY mobile contesting, I asked Alan, WD9GMK, to help me. I figured we could take turns operating and driving. Of course, we wanted a short contest for the first mobile effort and the NAQP RTTY was just ahead. How would we make it interesting for a short run? We considered taking I-74 southeast to the Cincinnati area where we would be able to operate from IN, OH, and KY, but last-minute considerations kept us near home in the Indianapolis area. So, what did we do to make it more interesting? We decided to try to operate from several locations that we found "interesting" in one way or the other!

Our vehicle was my 1999 Chevy Suburban, offering adequate room and a ground-plane beneath a mag-mount HamStick antenna for 20 meters and an Iron Man vertical for 80 meters. Our rig was the IC-706MKIIG, which is rated at full power (100W) in full-duty cycle modes. The 706 is usually my second radio when operating SO2R in the shack. The computer was a Dell D-500 with the low-power-consuming Centrino technology, running on batteries to keep the noise level low. I would recommend against using an ac power converter. They add too much noise on most bands. I haven't tried one of the dc power cords available for most computers.

I picked Alan up at his home on the

The operators: John, WA9ALS (left) and Alan, WD9GMK (right).



The mobile antennas.

Making Qs from the Indianapolis Motor Speedway.

east side of Indianapolis and we headed for the Indiana University Medical Center. Having done my medical residency there a few years ago, I was familiar with a nice parking garage that I thought would offer a great high-elevation spot. Of course, Alan was making contacts on the way to our first stop, too! The top of the parking garage was a great place, offering views of the Indianapolis skyline as well as the medical center. To RF, it was essentially an unlimited view of the horizon.

After awhile on the garage top, we headed out again, this time for the Indianapolis Motor Speedway. Here we operated from the Speedway Museum and from the front entrance to the track itself. By this time, it was raining, but we continued to make contacts and the rain didn't hamper our fun a bit.

However, Murphy did strike. As I turned a corner, Alan shouted, "Uh-oh, I just lost the log!" In disbelief, I darted into a gas station and stopped. All of the contacts showing in the log window had vanished! Thinking it was just a display problem, I reached over and saved the log, over Alan's verbal objections. I think he might've been right. We never did regain about 40 Qs that were lost. Our spirits were dampened by the log problem, but everything was still working, so we continued. Next on our agenda was the Indiana State Capital building. Of course, each stop was a photo opportunity as well.

I finally dropped Alan off at home and went to my house and supper. Later in the evening, I sat in our driveway and made some 80-meter Qs during the last couple of hours of the contest.

Our first mobile contesting experience was great fun. We hope that more hams will consider taking the RTTY rig and supporting hardware with them the next time they travel. And if there's a contest on, so much the better! Consider traveling to a rare RTTY state for the next big contest. Finding a suitable place to stay and put up antennas is always a challenge on these sorts of contest expeditions, even in the US. However, if you're mobile, you always have a place to stay and a place to operate, complete with antennas. So, try it the next time you hit the highways!

For more photos of our operation, see **www.wa9als.com/NAQP/2004NAQPRTTY.html.** NCJ

DX Contest Activity Announcements

By Bill Feidt, NG3K

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

Call	*Entity*	*Class*	*Operators*
4X0WV	Israel	M/S	KC8FS WA8WV
6W1RY	Senegal	SOAB	F5VHJ
7P8Z	Lesotho	SOAB HP	ZS4TX
A5	Bhutan	M/?	F2VX F9DK G0LMX F5LMJ + other CDXC ops
A61AJ	UAE	SOAB	S53R
C5	Gambia	SOSB 20M	ON4ACA
C91Z	Mozambique	SO HP	ZS6WPX
CN2R	Morocco	SOAB HP	W7EJ
CU	Azores	M/S	DL1EK DH4JQ DL7AOS
DF0CG	Germany	M/M	DB6JG DF3KV DF9ZP DH5HV DJ7EO DK6WL DL1MFL DL3DXX DL6FBL DL8NSB DL8WPX DO1ET
ED3SSB	Spain	M/S	EA3QP EA3IN
ES6Q	Estonia	M/2	ES5RY ES5RV ES5MC ES5JR ES5QX ES5RW
EY8MM	Tajikistan	SOSB 20M	EY8MM
FM	Martinique	SOAB	F5MUX
FP/VE7SV	St Pierre Miq	M/2	VE7SV + VE/XE/W team
FS/AH8DX	St Martin	SOAB	AH8DX
GM3W	Scotland	SOAB LP	W3LEO
GM0B	Scotland	M/M	Team
HI3TEJ	Dominican Rep	???	HI3TEJ
HS8AC	Thailand	M/S	E20HHK E21EIC
IH9P	Italy (Africa)	M/S	IT9BLB + international team
IS0A	Sardinia	M/M	IS0GRB IS0MYN IS0CLA IS0XDA IS0ADZ IS0SEL IS0XSE IS0WBT
J3	Grenada	???	possibly 1 or 2 ops
J49Z	Crete	M/S	I2WIJ IK8UND IK8HCG
J75J	Dominica	M/?	W4WX W9AAZ W1LR N1WON N5VL
JW5NM	Svalbard	M/S	JW5NM JW7FD + others
LY7Z	Lithuania	M/S	LY2CY LY2TA
LZ9W	Bulgaria	M/M	LZ Contest Team
OE4A	Austria	SOAB HP	OE1EMS
OH0I	Aland Is	M/S	YL1ZF YL2KL YL2LY YL3CW
OH0Z	Aland Is	SOAB HP	OH5DX
OM7M	Slovakia	M/S	Low Bands Contest Club
P40A	Aruba	SOSB 20M	KK9A
P40W	Aruba	TBD	W2GD
PJ4/T93M	Neth Antilles	SOAB HP	T93M
PJ7/K7ZUM	Sint Maarten	SOAB	K7ZUM
S79MH	Seychelles	???	HB9OCR
SY9Y	Crete	M/S	SV9FBM SV9FBZ
T30T	W. Kiribati	SOAB	K7ZZ
T88QQ	Palau	???	JA1KAJ fm Koror (OC-009)
TI8M	Costa Rica	M/2	TI2KAC W4BW K4UN W4KTR WW4LL N5VI
V26DX	Antigua	M/?	W3CF + others TBA
V63B	Micronesia	SOAB	JA7HMZ
VK9XD	Christmas	SOAB	VK2CZ
VP2E	Anguilla	M/2	KC5EA N5AU N5TJ K5MR VE3EJ K1DG N2NT
V26B	Antigua	M/2	Team Antigua
VP5X	Turks & Caicos	M/S	KY1V WA4PGM K0RAY N0VD + others
VP9	Bermuda	M/?	K4UU K6CT K9VV KI4CCO W4OV WD4R W4OV
XU7ACE	Cambodia	SOAB LP	ES1FB
YV4A	Venezuela	M/M	Team
ZP0R	Paraguay	SOAB	ZP5AZL

Thanks to: 425DXN, AC8G, AH8DX, DL7AOS, E21EIC, EA3IN, ES1FB, ES5RY, EY8MM, F5MUX, F5VHJ, GM0EGI, HB9OCR, HI3TEJ, IK8UND, IS0GRB, IT9BLB, JA7HMZ, JW5NM, K7ZUM, K9VV, KA2AEV, KC8FS, KK9A, KY1V, LY2TA, LZ2CJ, N4AA, N5AU, NG3K, OE1EMS, OH5DX, OH9MM, OM5ZW, ON4ACA, OPDX, S53R, SV9FBM, T93M, VE7AVV, VK2CZ, W2GD, W3CF, W3LEO, W4BW, W7EJ, YV5LMW, ZP5AZL, ZS4TX, ZS6WPX.

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

Call	*Entity*	*Class*	*Operators*
3D2	Fiji	M/M	K2KW N6BT KE7X + others
9M6NA	East Malaysia	SOAB HP	JE1JKL
9Y4ZC	Trinidad Tobago	SOAB HP	DL6FBL
AT0B	India	SO LP	VK2BNG fm Vypin Is
C91F	Mozambique	M/S	AA4NN W4GMY
CN2R	Morocco	SOSB 80M	W7EJ
CN2KM	Morocco	SOSB 20M	SM2EKM
CW2A	Uruguay	SOSB 15M	SM4DHF
ES6Q	Estonia	M/2	ES5RY ES5RV ES5MC ES5JR ES5QX
EY8MM	Tajikistan	SOSB 20M	EY8MM
IH9P	African Italy	SOSB 80M	OL5Y
JW5NM	Svalbard	M/S	JW5NM JW7FD + others
LZ9W	Bulgaria	M/M	LZ Contest Team
MJ0ASP	Jersey	SOSB 15M	F5SHQ
OE4A	Austria	M/S	OE1EMS + others
OH0I	Aland Is	SOAB HP	YL2KL
OH0Z	Aland Is	SOAB HP	OH5DX
OM7M	Slovakia	M/S	Low Bands Contest Club
P40W	Aruba	TBD	W2GD
SU8BHI	Egypt	???	HA3JB
TO4A	Martinique	SOAB	N6TJ
VK9AA	Cocos (Keeling)	SOAB	VK2IA
VP5W	Turks & Caicos	M/2	W7VV VE7XF KT7G K7BTW
VP8WWW	Falkland Is	M/?	WF5W NM5G W5MJ W5PF
WP2Z	Virgin Is	M/?	K3TEJ K3CT
XU7ADI	Cambodia	SO LP	SM5GMZ
ZS4TX	South Africa	SOAB HP	ZS4TX

Thanks to: 9M6NA, AA4NN, ES5RY, EY8MM, F5SHQ, JW5NM, K2KW, K3TEJ, LZ2CJ, N6TJ, NG3K, OE1EMS, OH5DX, OH9MM, OL5Y, OM5ZW, OPDX, SM2EKM, SM4DHF, SM5GMZ, VK2BNG, VK2IA, W2GD, W7EJ, W7VV, ZS4TX.

ARRL 160 M Contest (December 3-5, 2004)

Call	*Entity*	*Class*	*Operators*
P40TA	Aruba	SO HP	K6TA

Thanks to: K6TA

ARRL 10 M Contest (December 11-12, 2004)

Call	*Entity*	*Class*	*Operators*
LX5A	Luxembourg	M/S	KT8X LX1ER LX1RQ
MJ0ASP	Jersey	SO CW	F5SHQ
P40K	Aruba	M/S	K6KO K6TA
PJ4Z	Neth Antilles	M/S	WW4LL K4BAI
ZS6WPX	South Africa	SO HP	ZS6WPX
ZW2R	Brazil	???	PY5FB

Thanks to: F5SHQ, K6TA, LX1RQ, PY5FB, WW4LL, ZS6WPX.

VHF-UHF Contesting!

Jon K. Jones, NØJK
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Aurora in VHF Contests

Aurora and geomagnetic storms often "spoil" propagation in the HF contests. But to VHFers, aurora is a great propagation mode that may add significantly to your QSO and grid totals in the VHF Contests. Aurora can and has appeared in all of the major VHF Contests. What is aurora and how can you use it to improve your score?

Aurora Borealis (Latin for "northern dawn") is a ring-shaped belt of ionization and light displays surrounding the Earth's geomagnetic poles. It is associated with geomagnetic activity. It is generally thought to be caused by high-speed particles knocked loose from the Van Allen belts by the solar wind, which are then guided Earthward by the geomagnetic field lines. When these high-speed particles collide with gas molecules in the Earth's upper atmosphere at an altitude of 100 km, the gases are ionized. As the ionized gases "relax" to their normal state, energy is released as colored light. That causes the visual aurora. The ionized gases in the aurora curtains can reflect radio signals, too. This is radio aurora. Aurora can reflect 50, 144, 222, 432 MHz and rarely 903 MHz signals when intense enough. Most aurora VHF QSOs are made on 50 and 144 MHz.

Aurora ionization occurs in the E layer. Thus, the maximum range possible for aurora QSOs is around 2000 km for an east-west path. The North American DX record for 144 MHz aurora is 2178 km set by WAØTKJ and KA1ZE on February 08, 1986. Most contacts are considerably shorter. Aurora typically favors the northern stations. During intense geomagnetic storms the aurora belt is pushed south. Stations as far south as TX, AZ, CA and FL have worked aurora during major geomagnetic storms, such as in October 2003. As I write this column (August 30), there is a minor aurora opening in progress. I see K9ZO spotted "55A" by K9MU EN44, NW7O DN47 working K7TNT DN73 on 144.200 MHz and WZ1V FN31 working K9MU EN44 on 2 meters. Most spots are CW, but K9MU notes W8GG EM88 is "vry strong on aurora 2M SSB!" at 2215 UTC.

Aurora-reflected radio signals are heavily distorted. SSB sounds like a very mushy voice in a steam hiss. CW is the preferred mode for Aurora. When aurora is strong, 50 MHz SSB can be worked if the stations speak slowly, and sometimes this even works on 144 MHz. Aurora tends to favor the high-power, big-antenna stations. You can quickly tell the difference between the big guns and the little pistols during aurora. The intensity of aurora reflections drops as you go higher in frequency. Thus, a QRP or low-power, small antenna station will do better on 50 MHz during a contest aurora opening. If conditions are good, you may make 144 MHz aurora QSOs as well. Stations running 10 W and halos have made 144 MHz aurora contacts, but these are not common. Stations running 100 W or more and a good Yagi should be able to make plenty of QSOs up through 222 MHz during a good aurora.

Because a big aurora opening can reflect 50 through 432 MHz signals out to ranges of 2000 km, it can be a significant factor in a VHF contest. An aurora opening is unique in that it can be predicted to a certain degree. Solar coronal holes and CMEs (coronal mass ejections) are two events that cause geomagnetic storms that in turn cause aurora. The occurrence of these can be noted from solar observations. These can be found on the Internet at Web sites such as **Spaceweather.com**. Often there are forecasts for when the high-energy particles reach earth and may cause aurora. So, if a coronal hole or CME occurs about two days before a VHF Contest, there is a chance of aurora in the contest. There is more to having aurora actually occur, though. Even though high-energy particles arrive from the Sun, there may not be aurora. This is because the Earth's magnetic field and the Interplanetary (or Sun's) magnetic field must be aligned to "couple" the energy from the solar wind. The "Bz" vector of the IMF must point "south" so the terrestrial and solar magnetic fields can couple. In other words, for aurora to occur the Bz must be south. The Bz is measured by magnetometers on satellites. You can find the Bz in "real time" on the Internet at various Web pages such as Aurora Sentry.

A dramatic example of how Bz can affect aurora was in October 2003. There were several large geo-effective CMEs that month. When the massive clouds of charged particles arrived, the Bz was north. No aurora was noted for hours, to the disappointment of VHF DXers. Finally, the Bz swung south and aurora occurred.

Contest Tips For Using Aurora

Check **Spaceweather.com** and other Web sites a few days before the contest to see if a coronal hole was in position or CME occurred, and thus a chance of aurora. If so, be prepared. During the contest, watch the Bz. If it swings south, that means a good chance of aurora. Even a minor "gust" in the solar wind can cause some aurora if the Bz is strongly south.

During the aurora, move your antenna east and west of north. A mistake often made is to just "point the antenna north" during aurora. The longest east-west QSOs will be made by pointing your antenna east and west of north. Aurora is dynamic, and the "hot spot" will often move. During the aurora on July 27, 2004, I found the best reflections were at 30 degrees azimuth initially; they moved to 310 degrees later in the opening. Start on 50 MHz and move up the bands if the aurora is strong. Don't forget 222 MHz, as often aurora reflections there can be as strong as 144 MHz and the QSOs are two pointers. If you are a big gun, try 432 MHz aurora. Doppler shift can be significant. In the July 27 aurora I had 1 to 2 kHz Doppler shift on 144 MHz during a QSO with VE3AX. So, when calling a station, if you don't get a reply calling zero-beat, try calling up or down a kHz. When calling CQ, be sure to use the RIT and listen up and down for replies. Doppler shift increases with frequency, and can be up to 10 kHz or more on 903 MHz.

Watch for aurora E_s while the aurora is in progress and when it breaks up. Sometimes, on 2 meters, you will be working a station a thousand miles away with loud auroral hiss, and the tone changes in seconds to clear. This is E_s. Auroral E_s is most common on 6 meters, but has been worked on 2 meters as well. The range is typically "single hop" out to 2200 km, but as auroral E_s occurs higher in altitude than "regular" E_s, the range can be further. Sometimes double hop auroral E_s is worked, such as Alaska to W1, W9, WØ and OX, TF to W1. F2 can sometimes appear on 6 meters during and just after an aurora. This will be more likely in the September and January VHF Contests. Possible 6-meter F2 contacts are to Central and South America, Hawaii and Australia.

More On K8GP's High 6-Meter Score In The 2004 June VHF QSO Party

K8GP reported "210 E_s QSOs out of 900 total contacts on 6" for the June 2004 VHF QSO Party (see *QST*, Sep-

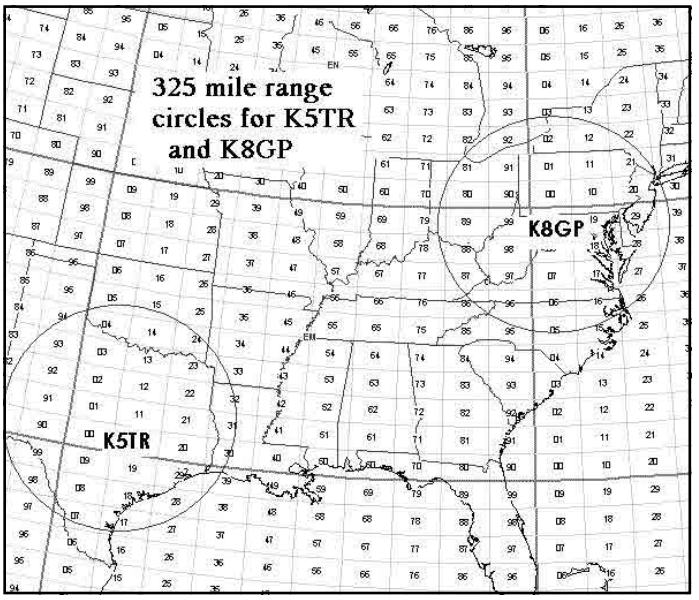

Figure 1—325 mile radius circles around K8GP and K5TR.

tember 2004, pp.79). That implies 690 6-meter contacts via ground wave, tropo, scatter and other modes. K8GP's location in FM08 is within ground wave/tropo/scatter distance of the high population centers of the northeast corridor. Their high location on Spruce Mountain helped, too. Thus, K8GP could continue to make many 6-meter contest QSOs under the "dead band" conditions of this year's contest. Compare K8GP's location with K5TR (an outstanding VHF contest station in Texas) in EM10. Draw range circles at 200, 300 and 400 miles around EM10 and FM08 and note what is within "ground wave" range of K8GP and K5TR (see Figure 1). Contesting on VHF from the northeast corridor is a whole different world than out in KS or TX when the "band is dead." W3ZZ notes from K8GP's mountain top site in FM08 they can work just about "anyone within 500 miles, so we do work a lot of W8s, W9s, and W4s besides stations in the northeast (corridor)."

K8GP's 210 E_s QSOs are still good for this year's contest, as was their 172 Grids. W3ZZ noted K8GP picked up some rare grids on 6 meters including CM87, DM03, 04, 10, 11, 12, 14, 43, 44, 73, 84, 90, 93, 94, 95, DN30 and DN33, EM00, 02, 04, 05, 06, and 08, and EN08, 18 and 19. Quite a few "double hop E_s" grids for "an otherwise bad weekend." K8GP worked many "mini-E_s" openings. These were short 1-2 minute openings where 1-3 stations from 700 to 1000 miles away would be worked, then nothing.

Great operators help, too. The K8GP 6-meter bullpen includes Rich Zwirko, K1HTV, his son Andy, K1RA, Dave, KM3T and Gene, W3ZZ, who are all seasoned and experienced contest operators.

The 6-meter station at K8GP consists of a TS-850 HF transceiver for the IF, a Downeast Microwave transverter, a Teletec 60 W intermediate amp and a 1.5 kW Henry type final amplifier. Using an HF transceiver with a transverter results in much better receive performance than one of the "HF + 6M radios" such as the IC-706, etc. At WBØDRL we used the Kenwood TS-920 HF transceiver for the IF, an SSB Electronic 6-meter transverter, a Mirage 150 W intermediate amp and an 8877 1.5 kW final amp. The Elecraft transceivers also make great IF rigs for VHF/UHF transverters.

As discussed in my Sept/Oct 2004 column, K8GP uses the C3I C5 Yagis on 6 meters. The K8GP main stack consists of four C5 Yagis with the lowest Yagi about 18 feet high. A second stack of C5s is located about 125 feet from the main stack on a 24-foot high mast. The bottom Yagis are fixed to the northeast, while the top two rotate. The Yagis can be phased in various combinations on receive, but transmit is on all three pairs of Yagis. On receive one can listen to the bottom fixed pair of northeast Yagis, the top rotary pair of Yagis, the remote pair of Yagis or the 4-stack at once. Stations 1000 miles away in VE1 report K8GP can be heard 24/7 on 6 meters.

So, what is the secret to K8GP's 900 6-meter contest contacts in the June 2004 VHF QSO Party? "Super location (both on a mountain top and close to high population centers), good operators, and decent equipment and antennas." Thanks to Gene, W3ZZ, for sharing this behind-the-scenes information on K8GP.

Report on the September 2004 VHF QSO Party

Many stations were hoping for a big tropo opening in the VHF QSO Party. On Wednesday and Thursday before the contest, stations in the Midwest were working up to 1000 mile tropo paths on 144 and 222 MHz. Typical paths were TX-MN, OK-MI, KS-WI and AL-IL. Hepburn's tropo forecast page hinted at a possible repeat of the big tropo opening in September 2003. But as the weather in the Midwest heated up over the contest weekend, the VHF bands cooled off. It was 94 degrees Sunday afternoon in Wichita, hotter than in July! I saw few tropo contacts reported on the loggers. There was some tropo reported in the northeast by N3FZ and others. One of the better 2-meter tropo QSOs I saw was between W1QK in FN31 and WA9KRT in EN61 (690 miles) at 0336 UTC on September 12. From EM18, I worked K5QE EM31 with 10 W over a 500-mile path on 2 meters at 0053 UTC on September 13. Switching to CW got me this one.

I did not see aurora, E_s or F2 DX spotted on 6 meters by any W/VE. There was some decent 6-meter scatter on Sunday. K0HA in EN10 spotted W3SO, K8EP, K1WHS, K2EY, AA4ZZ, K8MD, K3YTL, W4NH, K8ROX, K5QE, N3DB, K5IX and K3EAR among others via scatter on 6 meters. As for F2 on 6 meters, K4RX heard "CE FM Music," a commercial broadcast on 48.2 MHz on September 12 around 2050 UTC. Despite the low solar flux, TEP (trans-equatorial propagation) still occurs, with PY2SRB in Brazil hearing the 2-W V44KAI/b beacon on 50.054 MHz at 0130 UTC on September 13. If a KP4 had been active on 6 meters in the contest, he may have been able to make some 6-meter TEP QSOs to LU and PY.

The big gun stations on 6 meters were able to grind out scatter QSOs. On 2 meters, alert operators (who used CW) made some long haul tropo scatter QSOs. The digital mode enthusiasts using JT6M and JT-44 were able to complete some skeds. The rest was groundwave. Overall, it was a slow contest for most participants. NCJ

Results, January 2004 NAQP CW Contest

By Bruce Horn, WA7BNM
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Once again, the January edition of the NAQP CW Contest proved to be record setting. ZF2NT used his Caribbean location to his advantage on the high bands to take first place and set a new single-op record for total QSOs (1312), broke his old Cayman Islands record by more than 50 percent, and came within a few hundred points of the all-time single-op record. N6MJ, operating what turned out to be his last NAQP CW from W6KP's superb QTH before it was sold, was a strong second and set a new California record. N9RV was third, while N6ZZ set a new New Mexico record for fourth. W4PA was fifth, followed closely by K6LL with a new Arizona record. N2NC took seventh, while W7RN, operated by K5RC, set a new Nevada record and squeaked by fellow NCCC teammate, N6RO, for eighth. N3BB rounded out the top ten.

For those single-ops running QRP power, KG5U was the winner by a wide margin over second-place K7RE. WB8RTJ took third, while K3WWP squeaked by K7UP for fourth.

With a slight edge in both total Qs and mults, K5KA took first place in the multi-two category and set a new record of 598,689 points. Old record-holder, W5NN, took second, while WE9V captured third.

Once again, the Southern California Contest Club #1 team used top-ten single-op finishes by two of its members to power to first place in the team competition by a comfortable margin over the second-place Tennessee Contest Group #1 team. With three team members having top-ten single op scores, but only four of its five team members submitting logs, the Northern California Contest Club #1 team captured third.

In addition to the new records noted above, N4AF broke his own North Carolina record, N5OT smashed his own Oklahoma record and N4OGW exceeded his own Mississippi record. K5GO captured the Arkansas record, while AA5AU broke the record for Louisiana. In the West, W7CT nudged the Utah record upward and KO7X almost doubled the old Wyoming record. WD0T broke his own South Dakota record, NP3A operated NP4Z's station to break NP4Z's Puerto Rico record, and N6KI once again operated XE2MX to a new Mexico record.

Team Scores

1. SCCC #1		2. TCG #1		3. NCCC #1	
N6MJ	363,938	W4PA	314,550	ZF2NT	367,360
K6LL	312,872	KØEJ	272,745	W7RN	285,740
K6LA	263,130	K4WX	236,880	N6RO	284,566
AC6T	228,448	K4RO	196,186	K7NV	175,055
K6AM	219,936	NA4K	165,946		
Total	1,388,324	Total	1,186,307	Total	1,112,721

3.	SMC #1(N9RV,N9CK,N9FH,N9CO,WT9U)	1,094,223
4.	Austin Powers #1(N3BB,K5NA,K5WA,K5TR,KG5U)	1,062,861
5.	SECC #1(K4NO,K4BAI,W4OC,K4OGG,KU8E)	841,135
6.	TCG #2(WO4O,K4AMC,W4NZ,K4LTA,N4IR)	832,708
7.	PVRC #1(N4AF,K7SV,KD4D,NY3A)	775,026
8.	SCCC #2(AA6PW,K6NR,XE2MX,N6HC,W6TK)	763,149
9.	Florida Contest Group Team #1(N4FCG,K4FCG,K5KG,WD4AHZ)	745,336
10.	CCO #1(VE3EJ,VE3DZ,VE3KZ,VE3KP,VE3IAY)	721,766
11.	GMC's Rocky Mountain Contesters #1(W7UT,NØSXX,KO7X,N4VI,KØUK)	684,288
12.	MWA #1(NØAT,NAØN,KMØO,KØAD)	668,313
13.	NCCC #2(KX7M,K6RIM,AD6E,WZ6Z)	643,902
14.	Azenmokers 3(N6ZZ,N5UL,KC7V,K7UP)	617,835
15.	FRC(AA3B,N3AD,K3MD,W7OM)	596,309
16.	Team Mississippi(N4OGW,W5XX,WQ5L,KB5IXI)	582,425
17.	Azenmokers 1(N5OT,K8IA,N7MAL,NEØP)	582,646
18.	Mad River Radio Club #1(K9NW,N8EA,W8MJ,K5IID,AF8A)	571,090
19.	SMC #3(KØOU,WØUY,W9LO,KX9DX,W9RE)	556,448
20.	Ozark Contest Club(K5GO,KM5G,W5MK)	482,944
21.	Azenmokers 2(N2IC,KY7M,W7YS)	449,352
22.	SMC #2(K9MMS,WA9IRV,W9IU,NØAV)	446,102
23.	SECC #3(N4GG,KA1DWX,K4GA,WB6BWZ)	361,601
24.	MWA #5(KØSR,KØMPH,NØKK,KØSV)	354,646
25.	MWA #2(NØFP,NØIJ,KTØR,ACØW)	338,767
26.	SECC #2(WA4PGM,AE4Y,KA9EKJ,W4NTI)	324,340
27.	Florida Contest Group Team #2(K9OM,K4LQ)	312,158
28.	NCCC #5(K6XX,N6EE,N6WG,K6OWL,AD6TF)	308,977
29.	PVRC #2(W4AU,K3MM,N4ZR)	287,807
30.	Mad River Radio Club #3(NY1S,K8MR,N8IW,N8VW)	284,245
31.	MWA #4(K4IU,N0BUI,WA2MNO,NØIM,WBØTRA)	262,501
32.	SMC-IL(K9QVB,N9BOR,AA9KH,N9GUN)	253,432
33.	Austin Powers #2(W5ZL,W5JAW,NX5M,K5PI/KH6)	251,783
34.	TCG #3(N4DW,K4BEV,NY4N,W9WI,NY4T)	248,481
35.	CCO #2(VA3NR,VE3SMA,VA3DF,VE3FU,VE3MGY)	238,781
36.	Order of Boiled Owls(N2GA,KW2O,W2OWL,NA2M,W2YK)	230,977
37.	NCCC #3(K6LRN,NT6K,AE6Y)	224,142
38.	SMC-IN(K9WX,KJ9C,AJ9C,KA9F,K9MI)	222,153
39.	CWrocks (WA3HAE,N3FR,WA3SES)	184,218
40.	Team CCO #3(VA3DX,VE3NBJ,VE3AGC,VE3XD/W4,VE3UKR)	173,249
41.	Score Reductions Greater Than 10%(N4YDU,AF4QZ,KE9R,K3ASK)	166,640
42.	Keep Clam Contesters(NØAX,KB7N,NG7Z)	160,866
43.	Mad River Radio Club #4(KT8X,K8DD,W8RU)	160,364
44.	Austin Powers #3(AC5AA,N5XU,KI5DR)	154,975
45.	Mad River Radio Club #2(NU8Z,ND8DX)	151,276
46.	CTRI Contest Group(KS1J,N3KCJ,N1HRA,AJ1M)	150,398
47.	NCCC #4(N6ZFO,KO6LU)	138,579
48.	Florida Contest Group Team #4(W4SAA,W4EBA,K4LW)	132,535
49.	PVRC #3(K4QPL,N3XL)	131,382
50.	SCCC #3(W7WW,W6KY,N6RT,W4EF)	127,071
51.	TCG #4(K3CQ,W4RK,K1GU,N4UW,KG4PKQ)	122,031
52.	Mad River Radio Club #5(WX3M,K8GT)	106,022
53.	SMC #5(N9JF,N4TZ,K9IJ)	101,407
54.	MWA #3(KØHB,WGØM,AAØAW,KØVG)	97,175
55.	NCCC #7(K6SRZ,W6ZZZ)	93,058
56.	SECC #4(K2UFT,AA4LR,WB4SQ,NJ8J)	70,458
57.	TCG #6(KY4L,WØETC,KM4H,AAØBA)	69,983
58.	Florida Contest Group Team #3(KN4Y,N4GI,KB4N)	69,591
59.	SCCC #4(WA6BOB,K6EY,K6ZCL,ZL/W3SE)	62,388
60.	TCG #5(W4HZD,KE4OAR,W4TYU,N9GG,N5NW)	60,535
61.	NCCC #6(WJ6O,N6EM)	56,767
62.	SMC #4(N9AZZ,AK9F,WI9WI)	55,150
63.	North Coast Contesters(WW3S)	51,408
64.	Livermore ARK(KI6OY,AE6IS,WB6ETY)	8,293
65.	AVILES-CW(EA1WX,EA1CS)	1,645

Single Op Top Ten Breakdowns

Call	Score	QSOs	Mults	160	80	40	20	15	10	Team
ZF2NT	367,360	1312	280	80/36	124/39	240/48	245/52	358/51	265/54	NCCC #1
N6MJ	363,938	1286	283	91/34	187/41	327/53	198/52	251/52	232/51	SCCC #1
N9RV	351,900	1275	276	210/42	294/46	270/50	220/46	134/47	147/45	SMC #1
N6ZZ	323,361	1159	279	99/33	164/45	206/51	192/50	280/50	218/50	Azmkr 3
W4PA	314,550	1165	270	137/40	267/45	244/47	245/50	163/47	109/41	TCG #1
K6LL	312,872	1208	259	32/19	127/40	317/51	210/49	281/52	241/48	SCCC #1
N2NC	292,672	1088	269	95/33	177/46	346/51	183/49	180/48	107/42	
W7RN (K5RC)	285,740	1099	260	81/28	205/46	227/50	153/44	159/43	274/49	NCCC #1
N6RO	284,566	1082	263	88/35	133/40	192/47	184/44	259/49	226/48	NCCC #1
N3BB	276,000	1104	250	74/28	143/42	307/50	184/44	172/44	224/42	APwr #1

Single Op QRP Top Five Breakdowns

Call	Score	QSOs	Mults	160	80	40	20	15	10	Team
KG5U	113,176	602	188	0/0	143/36	81/35	83/36	135/42	160/39	APwr #1
K7RE	74,036	446	166	27/15	74/29	88/36	82/31	111/30	64/25	
WB8RTJ	51,888	368	141	28/19	64/22	85/35	80/29	58/20	53/16	
K3WWP	47,640	397	120	21/9	114/30	83/29	68/24	80/21	31/7	
K7UP	47,460	420	113	0/0	0/0	12/9	96/35	154/36	158/33	Azmkr 3

Multi-Two Breakdowns

Call	Score	QSOs	Mults	160	80	40	20	15	10
K5KA	598,689	1989	301	220/41	421/48	450/54	394/55	302/53	202/50
W5NN	590,139	1987	297	161/33	379/50	471/56	375/55	332/53	269/50
WE9V	524,030	1807	290	251/43	378/49	470/54	355/54	196/48	157/42

Single Operator Scores

Call	Score	QSOs	Mults	QTH	Team
NY1S	113,031	661	171	ME	MRRC #3
KS1J	109,011	609	179	RI	CTRI Contest Group
K5ZD	84,525	483	175	MA	
W2JU	80,012	482	166	CT	
K1HT	45,780	327	140	MA	
WG1Z	38,571	299	129	MA	
K1JB	26,196	236	111	ME	
W1END	25,750	250	103	NH	
K1DAN	23,484	228	103	NH	
N3KCJ	18,860	205	92	MA	CTRI Contest Group
W1NK	18,326	187	98	CT	
N1HRA	11,583	143	81	RI	CTRI Contest Group
AJ1M	10,944	144	76	RI	CTRI Contest Group
K1EP	9,271	127	73	MA	
W1TO	8,832	128	69	MA	
W1JQ	7,910	113	70	CT	
N1MD	7,888	116	68	CT	
KA1VMG	4,704	96	49	CT	
N2NC	292,672	1088	269	NJ	
N2GA	117,845	637	185	NY	Order of Boiled Owls
KW2O	78,474	451	174	NY	Order of Boiled Owls
WB2AA	72,534	462	157	NJ	
N2CU	41,374	302	137	NY	
NJ3C	22,908	249	92	NJ	
W2LE	19,928	212	94	NJ	
W2OWL(N2FF)	16,560	184	90	NY	Order of Boiled Owls
N2DBI	10,650	150	71	NY	
NA2M	9,128	163	56	NY	Order of Boiled Owls
W2YK	8,970	130	69	NY	Order of Boiled Owls
WA2MCR	6,372	108	59	NY	
W2QOB	4,992	96	52	NJ	
N2GC	4,532	103	44	NY	
*KD2HE	3,280	80	41	NY	
N2BZP	960	32	30	NY	
*K2DB	266	19	14	NY	
W5KI	198	18	11	NJ	
WB2ART	180	15	12	NY	
WB2ABD	4	2	2	NY	
AA3B	253,704	1023	248	PA	FRC
K3WW	197,505	855	231	PA	
KD4D	184,230	801	230	MD	PVRC #1
N3AD	154,775	755	205	PA	FRC
NY3A	151,296	768	197	PA	PVRC #1
K3MM	125,802	723	174	MD	PVRC #2
WA3HAE	115,173	603	191	PA	CWrocks
K3MD	98,560	560	176	PA	FRC
NS3T	86,779	539	161	MD	
N3SD	70,992	493	144	PA	
N8NA	70,744	478	148	DE	
WW3S	51,408	357	144	PA	North Coast Contesters
*K3WWP	47,640	397	120	PA	
N3FR	41,082	334	123	PA	CWrocks
WA3SES	27,963	239	117	PA	CWrocks
NA3V	26,730	243	110	PA	
AA3ML	20,200	202	100	PA	
WA3AAN	19,698	201	98	PA	
N3XL	10,230	155	66	MD	PVRC #3
*NG3K	10,147	139	73	MD	
N3NZ	9,600	128	75	PA	
W4ZE	9,380	140	67	PA	
W3PT	8,514	129	66	PA	
*K3AS	7,056	112	63	DE	
N3HCN	5,700	100	57	MD	
K3DSP	3,871	79	49	MD	
N9GG	3,713	79	47	DE	TCG #5
*W3ZMN	456	24	19	PA	
K3FH	384	24	16	PA	
K3ASK	154	14	11	MD	Score Reductions Greater Than 10%
W4PA	314,550	1165	270	TN	TCG #1
N4FCG(N4BP)	273,053	1133	241	FL	FCG Team #1
K0EJ	272,745	1045	261	TN	TCG #1
N4AF	247,434	978	253	NC	PVRC #1
K9OM	239,014	941	254	FL	FCG Team #2
K4WX	236,880	1008	235	TN	TCG #1
K4FCG(K4OJ)	221,364	858	258	FL	FCG Team #1
N4PN	204,057	861	237	GA	
K4NO (KA1DWX)	202,050	898	225	AL	SECC #1
K4RO	196,186	842	233	TN	TCG #1
K7SV	192,066	807	238	VA	PVRC #1
K4BAI	191,400	825	232	GA	SECC #1
K5KG	188,571	789	239	FL	FCG Team #1
W4OC	184,070	790	233	SC	SECC #1
WO4O	179,424	801	224	TN	TCG #2
N4GG	178,425	793	225	GA	SECC #3
K4AMC	178,314	789	226	TN	TCG #2
K4OGG	171,275	775	221	GA	SECC #1
W4NZ	169,694	782	217	TN	TCG #2
NA4K	165,946	794	209	TN	TCG #1
K4LTA	164,031	749	219	TN	TCG #2
N4KG	158,232	694	228	AL	
WA4PGM	153,080	712	215	VA	SECC #2
N4YDU	151,938	734	207	NC	Score Reductions Greater Than 10%
W4AU	150,380	730	206	VA	PVRC #2
N4IR	141,245	689	205	TN	TCG #2
K4QPL	121,152	631	192	NC	PVRC #3
W4SAA	112,112	572	196	FL	FCG Team #4
KA1DWX	111,619	529	211	AL	SECC #3
KU8E	92,340	540	171	GA	SECC #1
N4DW	88,888	542	164	TN	TCG #3
N4TB	88,510	530	167	FL	
AE4Y	85,158	513	166	GA	SECC #2
K4VU	80,013	447	179	AL	
K4BEV	78,750	450	175	TN	TCG #3
K4LQ	73,144	446	164	FL	FCG Team #2
WD4AHZ	62,348	436	143	FL	FCG Team #1
K3CQ	61,770	435	142	TN	TCG #4
KA9EKJ	61,686	414	149	AL	SECC #2
N8UX	60,492	426	142	KY	
K4DJ	51,684	354	146	NC	
K4GA	50,820	363	140	GA	SECC #3
KN4Y	43,680	312	140	FL	FCG Team #3
KM4FO	43,329	303	143	KY	
K4BX	40,950	325	126	TN	
K4IQJ	38,468	326	118	AL	
K2UFT	37,524	318	118	GA	SECC #4
W4RK	35,990	305	118	TN	TCG #4

Call	Score	QSOs	Mults	QTH	Team
W4DAN	35,872	304	118	TN	
W3ZI/4	35,148	303	116	VA	
KY4L	34,748	292	119	TN	TCG #6
NY4N	34,686	282	123	TN	TCG #3
W4HZD	29,458	286	103	TN	TCG #5
K4WW	26,814	246	109	KY	
*K4ORD	24,856	239	104	VA	
W9WI	24,817	299	83	TN	TCG #3
W4NTI(WA4UA)	24,416	218	112	AL	SECC #2
AA4NO	23,793	231	103	NC	
W3DCG	22,236	218	102	GA	
NY4T(W1ARN)	21,340	194	110	TN	TCG #3
*WB6BWZ	20,737	233	89	GA	SECC #3
K4HAL	19,190	202	95	AL	
AA4LR	16,353	207	79	GA	SECC #4
WB4SQ	15,725	185	85	GA	SECC #4
K1GU	15,300	180	85	TN	TCG #4
W4EBA	15,023	181	83	FL	FCG Team #4
KE4OAR	13,944	168	83	TN	TCG #5
AA4FU	13,932	162	86	NC	
N4GI	13,671	217	63	FL	FCG Team #3
W4TYU	13,416	156	86	TN	TCG #5
VE3XD/W4	13,351	169	79	FL	Team CCO #3
KI3O	13,284	162	82	VA	
KB4N	12,240	153	80	FL	FCG Team #3
*WN4M	11,988	148	81	TN	
KM4H	11,475	153	75	TN	TCG #6
WY4Y(N4EIL)	11,400	150	76	GA	
KC4WQ	9,850	197	50	KY	
AF4QZ	9,048	156	58	SC	Score Reductions Greater Than 10%
N4UW	8,946	126	71	TN	TCG #4
*KW4JS	8,658	117	74	TN	
K4WI	7,524	132	57	AL	
WA4GLH	7,344	102	72	TN	
K0COP	7,280	112	65	SC	
WW4LL	6,804	108	63	GA	
N7DLS	6,732	102	66	TN	
K4LW	5,400	100	54	FL	FCG Team #4
N4NTO	4,150	83	50	NC	
*NA4BW	3,552	74	48	GA	
K4SV	3,424	107	32	NC	
W4KAZ	2,280	57	40	NC	
K4GM	1,715	49	35	VA	
N4NX	1,508	52	29	GA	
K3MZ	1,131	39	29	VA	
NJ8J	946	43	22	GA	SECC #4
AE4EC	918	34	27	NC	
AA0BA	540	30	18	TN	TCG #6
N4CU	480	24	20	FL	
NX9T	400	25	16	NC	
W4OGG	392	28	14	TN	
KG4PKQ	25	5	5	TN	TCG #4
*K2EKM	9	3	3	VA	
KV4DJ	6	3	2	VA	
N6ZZ	323,361	1159	279	NM	Azenmokers 3
N3BB	276,000	1104	250	TX	Austin Powers #1
N5OT	272,250	1125	242	OK	Azenmokers 1
K5NA(KI5DR)	257,808	1048	246	TX	Austin Powers #1
AD5Q	238,632	978	244	TX	
K5CM(W5AO)	234,192	984	238	OK	
K5WA	232,078	959	242	TX	Austin Powers #1
N4OGW	230,418	918	251	MS	Team Mississippi
K5GO	225,184	908	248	AR	Ozark Contest Club
N5DO	218,700	900	243	TX	
N2IC	216,979	973	223	NM	Azenmokers 2
KM5G	207,675	923	225	AR	Ozark Contest Club
W5XX	192,800	800	241	MS	Team Mississippi
AA5AU	192,500	875	220	LA	
N5PO	190,210	827	230	TX	
K5TR	183,799	847	217	TX	Austin Powers #1
N5RG	178,849	781	229	TX	
N5UL	172,716	778	222	NM	Azenmokers 3
K5XR(W5ASP)	143,748	726	198	TX	
WQ5L	132,200	661	200	MS	Team Mississippi
W5ZL	121,191	597	203	TX	Austin Powers #2
W5JAW	113,932	626	182	TX	Austin Powers #2
*KG5U	113,176	602	188	TX	Austin Powers #1
K5GN	90,720	560	162	TX	
N5CHA	89,612	521	172	TX	
AC5AA	79,450	454	175	TX	Austin Powers #3
N5XU(KM5TY)	70,623	413	171	TX	Austin Powers #3
NI5F	62,643	399	157	MS	
N7KA	61,420	415	148	NM	
K7IA	58,500	375	156	NM	
K5UV	54,405	403	135	OK	
W5MK	50,085	371	135	AR	Ozark Contest Club
W5RW	47,472	368	129	AR	
*K7UP	47,460	420	113	NM	Azenmokers 3
K0GEO	47,160	360	131	TX	
W5EKF	34,102	289	118	LA	
KB5IXI	27,007	239	113	MS	Team Mississippi
N5KA	22,477	247	91	TX	
AD6G	20,889	211	99	TX	
*W5KDJ	17,800	200	89	TX	
W1DY	11,919	137	87	OK	
NX5M(NT5TU)	10,212	138	74	TX	Austin Powers #2
KB5NJD	6,300	105	60	TX	
*KI5DR	4,902	86	57	TX	Austin Powers #3

Call	Score	QSOs	Mults	QTH	Team
N5NJ	3,696	77	48	TX	
NE0P	1,950	65	30	OK	Azenmokers 1
AC5Z	1,750	50	35	TX	
AC5ZQ	945	35	27	TX	
W5PDB	156	13	12	OK	
N6MJ(at W6KP)	363,938	1286	283	CA	SCCC #1
N6RO	284,566	1082	263	CA	NCCC #1
K6LA	263,130	1074	245	CA	SCCC #1
AC6T(at N6VR)	228,448	944	242	CA	SCCC #1
K6AM	219,936	928	237	CA	SCCC #1
KX7M	217,560	980	222	CA	NCCC #2
N7CW	177,760	880	202	CA	
AA6PW	171,696	876	196	CA	SCCC #2
K6NR	168,078	771	218	CA	SCCC #2
K6RIM	166,012	847	196	CA	NCCC #2
K6XX	160,161	813	197	CA	NCCC #5
N6HC	157,377	753	209	CA	SCCC #2
N6ZFO	138,358	662	209	CA	NCCC #4
AD6E	133,600	668	200	CA	NCCC #2
WZ6Z	126,730	667	190	CA	NCCC #2
K6LRN	110,670	527	210	CA	NCCC #3
W6TK	99,007	547	181	CA	SCCC #2
K6CTA	97,148	596	163	CA	
K6SRZ	77,572	473	164	CA	NCCC #7
K6III	76,776	457	168	CA	
NT6K	69,174	427	162	CA	NCCC #3
W6IXP	59,976	408	147	CA	
N6EE	56,544	372	152	CA	NCCC #5
K6DGW	51,986	374	139	CA	
W6XU	50,468	407	124	CA	
WA6OGO	46,953	333	141	CA	
AE6Y	44,298	321	138	CA	NCCC #3
WJ6O	43,847	269	163	CA	NCCC #6
KE6ZSN	42,980	307	140	CA	
W6CWM	39,762	282	141	CA	
*N6WG	39,552	309	128	CA	NCCC #5
KG6CMS	38,771	283	137	CA	
K6OWL	38,090	293	130	CA	NCCC #5
K2RP	31,877	251	127	CA	
W6KY	28,482	303	94	CA	SCCC #3
N6RT	25,806	253	102	CA	SCCC #3
W6ISO	24,921	213	117	CA	
N6YEU	21,935	205	107	CA	
WA6BOB	21,112	203	104	CA	SCCC #4
K6EY	20,500	205	100	CA	SCCC #4
K6ZCL	19,776	192	103	CA	SCCC #4
W7SW	17,172	212	81	CA	
W6ZZZ	15,486	178	87	CA	NCCC #7
AD6TF	14,630	190	77	CA	NCCC #5
N6EM	12,920	152	85	CA	NCCC #6
W6ZL	10,010	154	65	CA	
AD6FR	9,875	125	79	CA	
K6CSL	9,648	134	72	CA	
W8KIE	6,832	112	61	CA	
K5PI/KH6	6,448	124	52	KH6	Austin Powers #2
K2MM	4,773	111	43	CA	
KI6OY	3,936	82	48	CA	Livermore ARK
AE6IS	3,237	83	39	CA	Livermore ARK
W4EF	2,736	76	36	CA	SCCC #3
W1MVY	2,108	68	31	CA	
N6AN	1,952	61	32	CA	
WB6ETY	1,120	40	28	CA	Livermore ARK
K3KOA	690	30	23	CA	
KE6CC	400	25	16	CA	
N5VWN	396	22	18	CA	
KO6LU	221	17	13	CA	NCCC #4
KN6N	63	9	7	CA	
K6MI	25	5	5	CA	
K6LL	312,872	1208	259	AZ	SCCC #1
W7RN(K5RC)	285,740	1099	260	NV	NCCC #1
W7UT	252,384	1056	239	UT	GMC's Rocky Mountain Contesters #1
K8IA	233,910	1035	226	AZ	Azenmokers 1
K7NV	175,055	785	223	NV	NCCC #1
K4XU	162,408	804	202	OR	
KY7M	131,793	669	197	AZ	Azenmokers 2
KO7X	116,788	679	172	WY	GMC's Rocky Mountain Contesters #1
N7WA	112,896	672	168	WA	
KI7Y	109,369	611	179	OR	
N7LOX	104,248	664	157	WA	
W7YS	100,580	535	188	AZ	Azenmokers 2
WC7CW	92,070	594	155	MT	
W7OM	89,270	565	158	WA	FRC
N0AX	76,960	520	148	WA	Keep Clam Contesters
N7MAL	74,536	484	154	AZ	Azenmokers 1
KC7V	74,298	609	122	AZ	Azenmokers 3
W7WW	70,047	387	181	AZ	SCCC #3
KB7N	55,626	381	146	WA	Keep Clam Contesters
WA7YAZ	46,827	363	129	UT	
W7TSM	30,250	275	110	WY	
NG7Z	28,280	280	101	WA	Keep Clam Contesters
W3CP	28,080	240	117	OR	
N7ZN	25,705	265	97	ID	
W7HS	23,790	195	122	UT	
W6RLL	19,474	182	107	AZ	
N7IR	19,140	220	87	AZ	
N7JB	17,864	203	88	WA	

Call	Score	QSOs	Mults	QTH	Team
KC7NUP	11,457	171	67	NV	
K7NTW	10,050	150	67	WA	
K7GS	7,701	151	51	WA	
N7EIE	4,539	89	51	WA	
KR7X	4,416	92	48	OR	
AB7RW	3,120	65	48	WA	
NB7F	92	37	25	OR	
N7JST	340	20	17	OR	
N8EA	167,535	765	219	MI	MRRC #1
KT8X	121,404	604	201	MI	MRRC #4
K8MR	109,324	604	181	OH	MRRC #3
K8IR	109,112	593	184	MI	
NU8Z	99,616	566	176	MI	MRRC #2
WX3M	97,442	587	166	MI	MRRC #5
W8MJ	75,761	553	137	MI	MRRC #1
N8NM	74,820	516	145	MI	
K8JQ	74,365	535	139	WV	
K5IID	65,875	425	155	WV	MRRC #1
AF8A	60,203	421	143	OH	MRRC #1
*WB8RTJ	51,888	368	141	OH	
ND8DX	51,660	369	140	OH	MRRC #2
K8DD	37,926	294	129	MI	MRRC #4
N8IW	37,510	310	121	OH	MRRC #3
*W8TM	29,376	306	96	OH	
W8WTS	27,972	252	111	OH	
*N8VW	24,380	230	106	OH	MRRC #3
WD8S	23,400	260	90	MI	
KB8TYJ	17,850	210	85	MI	
N4ZR	11,625	155	75	WV	PVRC #2
K8GT	8,580	143	60	MI	MRRC #5
WA8TNO	5,100	100	51	OH	
K8WV	4,900	98	50	WV	
N8XP	3,740	85	44	OH	
N8XD	3,496	76	46	MI	
*KT8K	2,394	63	38	MI	
NF8M	2,200	55	40	MI	
K8KHZ	1,888	59	32	MI	
K8VFR	1,363	47	29	MI	
W8RU	1,034	47	22	MI	MRRC #4
KZ8E	270	18	15	WV	
N5NW	4	2	2	OH	TCG #5
N9RV	351,900	1275	276	IN	SMC #1
N9CK	223,223	1001	223	WI	SMC #1
K9NW	201,716	844	239	IN	MRRC #1
N9FH	200,236	886	226	WI	SMC #1
K9QVB	164,820	820	201	IL	SMC-IL
K9MMS	153,080	712	215	IL	SMC #2
WT9U	152,544	681	224	IN	SMC #1
WA9IRV	127,140	652	195	WI	SMC #2
W9IU	124,460	635	196	IN	SMC #2
NØIJ	109,112	593	184	WI	MWA #2
W9LO	96,936	577	168	WI	SMC #3
K9WX	90,654	521	174	IN	SMC-IN
KX9DX	74,745	453	165	IL	SMC #3
N9BOR	72,988	514	142	IL	SMC-IL
N9JF	69,222	417	166	IL	SMC #5
KJ9C	69,027	519	133	IN	SMC-IN
W9RE	63,282	398	159	IN	SMC #3
K9JE	46,766	349	134	IL	
N9AZZ	32,768	256	128	IL	SMC #4
K9JWI	31,654	266	119	IN	
N4TZ	25,872	231	112	IN	SMC #5
AJ9C	24,576	256	96	IN	SMC-IN
KA9F	19,656	182	108	IN	SMC-IN
K9MI	18,240	192	95	IN	SMC-IN
AK9F	17,082	234	73	IL	SMC #4
AA9KH	11,840	148	80	IL	SMC-IL
K9LA	10,721	151	71	IN	
K9OZ	9,520	136	70	IL	
K9IJ	6,313	107	59	IL	SMC #5
KG9N	5,551	91	61	IL	
KE9R	5,500	100	55	IN	Score Reductions Greater Than 10%
WI9WI	5,300	100	53	WI	SMC #4
KB9YDI	4,150	83	50	WI	
N9GUN	3,784	88	43	IL	SMC-IL
K9OSH	3,600	90	40	WI	
W9HLY	1,625	65	25	IN	
W9ID	1,350	50	27	IN	
W3HDH	1,000	40	25	IL	
N9NDS	910	35	26	IN	
K9PK	612	34	18	IL	
K9JS	322	23	14	IL	
KØSR	255,116	1081	236	MN	MWA #5
WDØT	236,472	1002	236	SD	
NØAT	216,408	1016	213	MN	MWA #1
KØOU	209,975	925	227	MO	SMC #3
N9CO	166,320	840	198	CO	SMC #1
NØSXX	165,121	883	187	CO	GMC's Rocky Mountain Contesters #1
NAØN	155,600	778	200	MN	MWA #1
WØBH	152,382	699	218	KS	
KMØO	152,200	761	200	MN	MWA #1
KØAD	144,105	739	195	MN	MWA #1
NØFP	120,365	665	181	MN	MWA #2
WØUY	111,510	590	189	KS	SMC #3
AE9B	105,930	535	198	MO	
K4IU	105,591	577	183	MN	MWA #4
KØMPH	94,809	561	169	MN	MWA #5
KØRI	85,278	466	183	CO	
N5AW/Ø	83,660	470	178	CO	
N4VI	77,575	535	145	CO	GMC's Rocky Mountain Contesters #1
*K7RE	74,036	446	166	SD	
KØUK	72,420	510	142	CO	GMC's Rocky Mountain Contesters #1
KJØG	70,065	405	173	CO	
NØBUI	69,296	488	142	MN	MWA #4
KØVBU	68,403	453	151	KS	
KTØR	66,220	430	154	MN	MWA #2
WØVD	63,294	411	154	MO	
KFØUR	62,376	552	113	CO	
KSØT	49,792	389	128	MN	
KØHB	49,446	369	134	MN	MWA #3
KØTK	43,524	351	124	MN	
KØHW	43,335	321	135	SD	
WA2MNO	43,310	355	122	MN	MWA #4
ACØW	43,070	295	146	MN	MWA #2
NØAV	41,422	298	139	IA	SMC #2
NØIM	40,524	307	132	MN	MWA #4
KØXM	39,744	288	138	KS	
KØCF	35,754	303	118	IA	
WGØM	32,592	291	112	MN	MWA #3
KØJPL	32,450	295	110	MO	
KØPC	25,208	274	92	MN	
WØETC	23,220	215	108	IA	TCG #6
AAØAW	14,877	171	87	MN	MWA #3
KSØM	10,452	134	78	MO	
KBØCRG	6,840	114	60	IA	
KIØF	6,100	100	61	MN	
NØKK	4,611	87	53	MN	MWA #5
WBØTRA	3,780	90	42	MN	MWA #4
KNØV	2,993	73	41	MN	
NØOA	2,574	66	39	MN	
KØEWS	1,600	50	32	SD	
WBØB	798	38	24	IA	
KØIR	600	30	20	MN	
WØHW	384	24	16	MN	
KØVG	260	20	13	MN	MWA #3
KØSV	110	11	10	MN	MWA #5
VE3EJ	215,520	898	240	ON	CCO #1
VE3DZ	184,224	808	228	ON	CCO #1
VE3KZ	148,730	695	214	ON	CCO #1
VE3NE	145,122	722	201	ON	
VA3NR	112,077	593	189	ON	CCO #2
VE3KP	102,438	542	189	ON	CCO #1
VE5SF	95,613	609	157	SK	
VE2AWR	88,146	531	166	PQ	
VE3IAY	70,854	482	147	ON	CCO #1
VE7FO	63,618	461	138	BC	
VA3DX	61,544	392	157	ON	Team CCO #3
VE3SMA	61,200	425	144	ON	CCO #2
VE3NBJ	56,516	398	142	ON	Team CCO #3
VA7LC	53,060	379	140	BC	
VE5ZX	52,521	427	123	SK	
VE3AGC	38,570	290	133	ON	Team CCO #3
*VA3DF	29,998	283	106	ON	CCO #2
VE3FU	20,582	251	82	ON	CCO #2
VE3GLO	20,181	217	93	ON	
VE6EPK	18,531	213	87	AB	
VE3OM	15,575	175	89	ON	
VE2QY	15,088	184	82	PQ	
VE3MGY	14,924	182	82	ON	CCO #2
VA3RJ	13,500	180	75	ON	
VA3EC	11,952	144	83	ON	
VE3WZ	11,466	147	78	ON	
VE2OWL	9,656	136	71	PQ	
VE5UF	8,100	135	60	SK	
VE4YU	6,900	115	60	MB	
VA3IX	5,073	89	57	ON	
VE7JKZ	4,750	95	50	BC	
VE3UKR	3,268	86	38	ON	Team CCO #3
VO1MP	1,508	52	29	LAB	
VE3TW	1,485	45	33	ON	
VE3RCN	910	35	26	ON	
VE2DSK	460	23	20	PQ	
VA7CAB	340	20	17	BC	
ZF2NT	367,360	1312	280	ZF	NCCC #1
NP3A (at NP4Z)	176,187	843	209	KP4	
XE2MX(N6KI)	166,991	799	209	XE	SCCC #2
CX7BY	10,944	152	72	DX	
EA8CN	8,241	123	67	DX	
EA1WX	1,620	54	30	DX	AVILES-CW
ZL/W3SE	1,000	40	25	DX	SCCC #4
EA1CS	25	5	5	DX	AVILES-CW

* Indicates QRP entry

Multi-Two Scores

Call	Score	QSOs	Mults	QTH
K5KA (K5YAA,N5RZ,W5TM,K5KA)	598,689	1989	301	OK
W5NN (NO5W,N1LN,K5GA,K5NZ)	590,139	1987	297	TX
WE9V (WE9V,K9PG,KO9A)	524,030	1807	290	WI
W6YX (K6UFO,N7MH)	453,152	1666	272	CA
N2UT (AA5B,WA7LNW,WD7Z)	430,890	1626	265	NM
NØNI (NØNI,WØFLS,NSØB,NØAC)	416,066	1582	263	IA
KM4M (W3BP,K9GY,K4JA)	405,000	1500	270	VA
N9KI (KØSN,W9YQ)	279,146	1098	253	WI
W4WS (WB4MSG,AG4RZ,W2DZO,KG4NEP)	142,296	726	196	NC
N4CW (N4CW,WØUCE)	133,509	699	191	NC
WA6OEC (WA6OEC)	32,768	256	128	CA

Check Logs: K2NV, KT1V, N4IG, VA3XRZ, WØYK, WA7VNI

Results, January 2004 NAQP SSB Contest

By Bruce Horn, WA7BNM
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The West Coast was the place to be during the January NAQP SSB Contest with seven of the top-ten single-op scores. N6MJ, operating what would be his last NAQP from W6KP's station, beat his own all-time records for most points and most QSOs to take first place with 444,876 points. Until this contest, Dan had been the only single-op to break the 400,000-point barrier. However, K6LL added 95k points to his old Arizona record to become a member of the 400k club and take second, followed by K7RL with a new Washington record for third and 400k membership. N6RT operated W6EEN for fourth, K9PG was fifth and W7GG took sixth. K5CM, operated by W5AO, was seventh, with K4XS, W7EJ and W7WW finishing out the top ten.

In the single-op QRP power category, NA4BW took first place, followed closely by WAØVBW for second. KIØII, N8IE and WA4PGM were third through fifth, respectively.

As further evidence of the West Coast advantage in this edition of the contest, the crew at W6YX took first place from California in the multi-two category, with the guys at NK7U taking second from Oregon. Frequent winner, K9NS, was third from Illinois.

With four members with top-ten single-op scores, the Southern California Contest Club #1 team took first place in the team competition, even though only four of their five registered members submitted a log. Powered by two members in the top-ten, the Orygun Staight team was second (also with only four members submitting logs), and the Northern California Contest Club #1 team was third.

Other record-breaking performances included K1JB setting a new Maine record and W5WMU, KØUK and KTØR breaking their own Louisiana, Colorado and Minnesota records, respectively. 8P6SH established a first-time record with a strong effort from Barbados, and CO8TW set a first-time record for Cuba.

Team Scores

1. SCCC #1		2. Orygun Staight		3. NCCC #1	
N6MJ	444,876	W7GG	330,876	W7RN	275,124
K6LL	417,912	W7EJ	292,603	WX5S	240,009
W6EEN	380,828	K7ZSD	284,988	N6ZFO	152,100
W7WW	288,718	K7ZS	233,584	K6LRN	146,672
				K6RIM	145,964
Total	1,532,334	Total	1,142,051	Total	959,869

4. SMC #1 (K9PG, N9CO, KØOU, W9IU) 827,876
5. MWA Gladiators (KTØR, NØAT, ACØW, WRØDK, KØSV) 767,016
6. Mad River Radio Club #1 (KW8N, W8MJ, ND8DX, WZ8P) 651,676
7. Tennessee Contest Group Team 1 Lions (K4WX, K4RO, K4BEV, KE4OAR, N4JN) 641,546
8. SCCC #2 (N6KI, K6AM, N6HC) 639,480
9. GMC Rocky Mountain #1 (KØUK, WØAH, WØETT) 581,005
10. West Texas Rowdies (N5DO, KE5OG, K5FD, AD5BY, KD5QEB) 554,743
11. Yankee Clipper 1 (N1SV, W1JQ, NA1QP, K1HT, K5ZD) 491,457
12. Yankee Clipper 3 - Green Mountain Boys (K1KD, KK1L, W1SJ) 470,266
13. Austin Powers (K5NA, W5KFT, KY5V, K5PI/KH6) 449,493
14. NCCC #2 (ND2T, K6III, KE6ZSN, W6IXP, AE6Y) 401,746
15. SMC #2 (K9JS, W9RE, KX9DX, KA9F, N9AZZ) 369,074
16. SMC #5 (N9RV, N2BJ, AA9RT, WT9U) 344,062
17. Bay Area Wireless Assn (KE9S, KØSN, K8IR) 335,780
18. NCCC #3 (N6EE, W0YK, W6FRH, N6EM, K6DGW) 304,422
19. TCG Team 2 Tigers (K4MA, K4AMC, K4BP, WA4OSD, W4DUI) 280,006
20. FRC (N3AD, N3PUR) 277,821
21. GMC Rocky Mountain #3 (N4VI, KO7X) 200,696
22. MWA Spartans (WA2MNO, KØTO, NØWBO, KSØT, N9TTX) 196,325
23. TCG Team 3 Cougars (W4NZ, K4LTA, W4RK, AF4QB, N5NW) 193,015
24. SECC #2 (K4BAI, KU8E, WB6BWZ) 192,069
25. SECC #1 (AA4LR, WA4TII, KN6RO) 171,800
26. MWA Trojans (KIØF, WBØTRA, KMØO, NØHJZ) 160,496
27. TCG Team 4 Leopards (WN4M, W9WI, WO4O, KM4H, W4PA) 141,159
28. SECC #3 (N4LR, AA4GA) 137,220
29. GMC Rocky Mountain #2 (KØGAS, KIØII, NØSXX) 129,200
30. Order of Boiled Owls (NA2M, KW2O, N2GA) 113,925
31. SMC #4 (K9QVB, K9WX, N9JF, N9GUN) 109,432
32. Mad River Radio Club #2 (NY1S, N8BU) 101,967
33. TCG Team 7 Wildcats (WØETC) 101,931
34. Yankee Clipper 2 (NZ1U, W1AIR) 90,150
35. PVRC Part Timers (WX3B, K1RH) 85,249
36. SMC #3 (K9MI, AK9F, N4TZ) 82,866
37. SCCC #3 (K6EY, K6ZCL, NN6O, WA6BOB, W6KY) 81,897
38. NCCC #4 (AK6DV, WA4FIB, NU6T, K6PRN) 78,630
39. CTRI Contest Group (N1HRA, AJ1M, KS1J, KA1VMG) 72,817
40. Florida Contest Group (KK4TA, K8OSF, KB4ET, WD4AHZ) 65,554
41. Mad River Radio Club #3 (K9NW, N8IW, WX3M) 51,562
42. TCG Team 5 Jaguars (K4JNY, AAØBA, WA4JA) 46,406
43. Mad River Radio Club #4 (NU8Z, AF8A, K8KHZ, K8MR) 42,520
44. A Boy Named Slim (NR3X, K3ASK, KB1IPK) 38,350
45. Wild and Crazy Guys (KB8TYJ, N8PUG, WI8W) 25,276
46. Colony Mountain Contest Club (W5RZ) 17,910
47. TCG Team 6 Panthers (KG4ABM, WC4DC) 6,450

Single Op Top Ten Breakdowns

Call	*Score*	*QSOs*	*Mults*	*160*	*80*	*40*	*20*	*15*	*10*	*Team*
N6MJ	444,876	1698	262	33/15	88/32	219/48	472/57	463/57	423/53	SCCC #1
K6LL	417,912	1583	264	33/12	139/39	345/53	348/54	309/54	409/52	SCCC #1
K7RL	412,100	1585	260	43/17	141/45	301/54	453/55	375/48	272/41	
W6EEN (N6RT)	380,828	1421	268	29/16	127/45	279/53	237/54	323/55	426/45	SCCC #1
K9PG	348,992	1216	287	261/53	375/54	190/56	185/54	116/40	89/30	SMC #1
W7GG	330,876	1414	234	35/11	66/24	219/49	345/50	270/51	479/49	Or St
K5CM (W5AO)	302,549	1369	221	75/31	340/49	251/43	385/46	262/39	56/13	
K4XS	295,225	1225	241	34/22	195/49	298/52	360/57	310/47	28/14	
W7EJ	292,603	1289	227	50/16	86/30	171/43	202/44	404/50	376/44	Or St
W7WW	288,718	1198	241	32/14	106/30	220/48	295/54	275/49	270/46	SCCC #1

Single Op QRP Top Five Breakdowns

Call	Score	QSOs	Mults	160	80	40	20	15	10	Team
NA4BW	50,141	377	133	0/0	110/31	70/33	93/39	66/20	38/10	
WAØVBW	46,731	421	111	0/0	50/23	34/16	173/38	137/32	27/2	
KIØII	36,024	316	114	6/6	42/21	28/19	159/39	75/24	6/5	GMC RM2
N8IE	29,920	272	110	0/0	76/30	46/28	51/25	76/17	23/10	
WA4PGM	15,050	175	86	31/17	45/23	19/12	36/14	22/11	22/9	

Multi-Two Breakdowns

Call	Score	QSOs	Mults	160	80	40	20	15	10
W6YX	731,276	2548	287	52/14	272/47	353/54	587/59	710/59	574/54
NK7U	709,660	2590	274	54/20	360/53	431/52	499/53	661/52	585/44
K9NS	674,424	2204	306	314/54	446/55	432/58	610/60	138/38	264/41

Top Ten Combined Single Operator Scores for January 2004 NAQPs

Dan, N6MJ, won the combined CW/SSB NAQP competition with his first place SSB and second place CW finishes. K6LL and K5RC took second and third places, respectively. Congratulations to all of these great ops!

Operator	CW Points	SSB Points	Total Points
N6MJ	500	495	995
K6LL	426	470	896
K5RC	389	309	698
N9RV	479	184	663
W5AO	319	340	659
K4WX	323	298	621
N5DO	298	284	582
K8IA	318	235	553
K6AM	299	241	540
NØAT	295	215	510

Single Operator Scores

Call	Score	QSOs	Mults	QTH	Team
N1SV	174,974	983	178	MA	YCCC 1
K1KD	164,312	893	184	VT	YCCC 3 – Green Mountain Boys
KK1L	158,570	785	202	VT	YCCC 3 – Green Mountain Boys
W1SJ	147,384	801	184	VT	YCCC 3 – Green Mountain Boys
W1JQ	122,574	659	186	CT	YCCC 1
NA1QP	100,806	634	159	CT	YCCC 1
K1JB	100,480	628	160	ME	
NZ1U (N1XS)	74,745	495	151	CT	YCCC 2
K1HT	67,473	459	147	MA	YCCC 1
N1BCL	60,621	501	121	VT	
NY1S	54,639	467	117	ME	MRRC #2
N1HRA	39,788	343	116	RI	CTRI Contest Group
WG1Z	28,137	249	113	MA	
K5ZD	25,630	233	110	MA	YCCC 1
W1AIR	15,405	195	79	CT	YCCC 2
W1TO	14,996	163	92	MA	
AJ1M	12,629	173	73	RI	CTRI Contest Group
NE1RD	11,920	149	80	MA	
AA9VI	11,130	159	70	RI	
KS1J	10,608	156	68	RI	CTRI Contest Group
KA1VMG	9,792	136	72	CT	CT RI Contest Group
K1VU	9,315	135	69	MA	
W2JU	7,616	112	68	CT	
KB1LN	7,198	118	61	RI	
KB1IPK	1,560	65	24	CT	A Boy Named Slim
N1MD	1,400	50	28	CT	
W1CRK	120	15	8	MA	
N2WK	57,663	387	149	NY	
N2CU	44,634	346	129	NY	
NA2M	43,625	349	125	NY	Order of Boiled Owls
KW2O	43,434	381	114	NY	Order of Boiled Owls
KI7WX	42,042	429	98	NJ	
W3TB	36,740	334	110	NY	
N2GA	26,866	266	101	NY	Order of Boiled Owls
N2MH	26,265	255	103	NJ	
WA2MCR	24,119	271	89	NY	
NQ3N	21,021	231	91	NJ	
W2RLK	7,260	121	60	NY	
KC2HZW	6,882	111	62	NY	
W2QOB	4,752	99	48	NJ	
KD2HE	4,216	136	31	NY	
N2MTG	1,881	57	33	NY	
WB2ART	1,680	60	28	NY	
N2LQQ	1,300	50	26	NY	
KC2FBV	1,100	50	22	NY	
K2HVE	936	39	24	NJ	
WB2DVE	902	41	22	NY	
WA2BKN	891	33	27	NJ	
N2GT	684	36	19	NJ	
W2WJO	391	23	17	NJ	
*KB2OFC	48	8	6	NY	
N3AD	195,936	942	208	PA	FRC
N3PUR	81,885	515	159	PA	FRC
W3LL	55,440	385	144	MD	
WX3B	54,849	389	141	MD	PVRC Part Timers
N8NA	42,037	331	127	DE	
W3PT	37,288	316	118	PA	
K3WW	32,400	300	108	PA	
NA3V	30,636	276	111	PA	
K1RH	30,400	304	100	MD	PVRC Part Timers
W4ZE	16,800	200	84	PA	
AK3E	9,486	186	51	MD	
K3VY	8,320	128	65	MD	
K3ASK	8,128	127	64	MD	A Boy Named Slim
NT3J	3,760	94	40	PA	
N3XL	1,643	53	31	MD	
K3FH	1,632	51	32	PA	
KD4UTI	1,566	54	29	DE	
N3LJS	1,479	51	29	MD	
*NG3K	1,122	51	22	MD	
K3ISH	1,012	46	22	PA	
N3HCN	882	49	18	MD	
*W3RFA	567	27	21	MD	
*WB0IWG	390	30	13	PA	
KB3LMS	117	13	9	PA	
WB2EZL	81	9	9	PA	
K4XS	295,225	1225	241	FL	
K4WX	265,500	1125	236	TN	TCG Team 1 Lions
K4WI	188,325	837	225	AL	
K4BAI	159,800	850	188	GA	SECC #2
K4RO	157,755	809	195	TN	TCG Team 1 Lions
N4LR	135,054	738	183	GA	SECC #3
K4MA	125,245	677	185	NC	TCG Team 2 Tigers
K7SV	111,639	597	187	VA	
K4BEV	93,879	549	171	TN	TCG Team 1 Lions
W4NZ	92,901	537	173	TN	TCG Team 3 Cougars
W4NF	87,449	557	157	VA	
K4AMC	81,252	549	148	TN	TCG Team 2 Tigers
AA4LR	80,460	540	149	GA	SECC #1
WN4M	77,572	473	164	TN	TCG Team 4 Leopards
KE4OAR	76,406	506	151	TN	TCG Team 1 Lions
WA4TII	68,716	419	164	GA	SECC #1
N4CW	61,104	402	152	NC	
K4WW	55,544	424	131	KY	
K4LTA	51,870	399	130	TN	TCG Team 3 Cougars
N3DRK	51,788	428	121	NC	
*NA4BW	50,141	377	133	GA	
W4DAN	49,861	419	119	TN	
N4JN	48,006	381	126	TN	TCG Team 1 Lions
KK4TA	42,940	380	113	FL	FCG
K4BP	39,894	366	109	TN	TCG Team 2 Tigers
W9WI	36,565	355	103	TN	TCG Team 4 Leopards
NX9T	35,636	302	118	NC	
W4KAZ	29,920	272	110	NC	
NR3X (N4YDU)	28,662	281	102	NC	A Boy Named Slim
N4TN	26,160	240	109	TN	
KU8E	25,248	263	96	GA	SECC #2
KA1ARB	24,598	251	98	NC	
K5EEE	24,528	292	84	FL	
W4RK	23,594	251	94	TN	TCG Team 3 Cougars
KN6RO	22,624	224	101	GA	SECC #1
AF4QB	22,134	238	93	TN	TCG Team 3 Cougars
K4JNY	21,854	223	98	TN	TCG Team 5 Jaguars
W4DUG (N4WEB)	19,688	214	92	FL	
W4BD	18,240	190	96	GA	
KM4FO	18,011	217	83	KY	
WA4OSD	17,015	205	83	TN	TCG Team 2 Tigers
W4DUI	16,600	200	83	TN	TCG Team 2 Tigers
AA0BA	15,280	191	80	TN	TCG Team 5 Jaguars
*WA4PGM	15,050	175	86	VA	
AC4PY	14,833	163	91	KY	
WB4QDX	14,700	175	84	GA	
WO4O	14,190	165	86	TN	TCG Team 4 Leopards
W3BP	11,840	160	74	VA	
KM4H	11,544	148	78	TN	TCG Team 4 Leopards
K8OSF	11,388	156	73	FL	FCG
N4RZ	11,222	181	62	KY	
N4GI	10,620	180	59	FL	
K4LW	9,588	141	68	FL	
WA4JA	9,272	152	61	TN	TCG Team 5 Jaguars
KK4DF	8,694	126	69	GA	
VE3XD/W4	7,074	131	54	FL	
*WB6BWZ	7,021	119	59	GA	SECC #2
K4SV	6,820	110	62	NC	
KØEJ	6,549	111	59	TN	
KG4ABM	6,324	124	51	TN	TCG Team 6 Panthers
KB4ET	6,138	99	62	FL	FCG
WD4AHZ	5,088	106	48	FL	FCG
K4PTT	4,845	95	51	GA	
K4WES	4,700	94	50	NC	
AB4D	4,536	84	54	VA	
KF4TJE	4,410	90	49	TN	

Call	Score	QSOs	Mults	QTH	Team
KG4MWO	3,444	82	42	FL	
KF4CQS	3,168	72	44	NC	
K4GM	3,108	74	42	VA	
KG4IUM	2,952	72	41	GA	
KG4OCJ	2,925	75	39	KY	
W4/KL7GLL	2,701	73	37	VA	
N4IOZ	2,257	61	37	NC	
AA4GA	2,166	57	38	GA	SECC #3
WA2SRY	1,920	64	30	NC	
W4UII	1,914	58	33	VA	
*K3MZ	1,683	51	33	VA	
K3CQ	1,612	52	31	TN	
N4GG	1,400	50	28	GA	
N4NTO	1,300	50	26	NC	
W4PA	1,288	46	28	TN	TCG Team 4 Leopards
AE4EC	1,012	44	23	NC	
K3HE	988	38	26	VA	
WA4GLH	925	37	25	TN	
N1JAC	820	41	20	NC	
NJ8J	567	27	21	GA	
KV4DJ	425	25	17	VA	
N5SMQ	406	29	14	VA	
WC4DC	126	14	9	TN	TCG Team 6 Panthers
K4APG	45	9	5	AL	
K5CM (W5AO)	302,549	1369	221	OK	
K5NA (KI5DR)	279,380	1145	244	TX	Austin Powers
W5WMU	255,116	1081	236	LA	
N5DO	253,120	1120	226	TX	West Texas Rowdies
N7KA	231,080	1060	218	NM	
KE5OG	148,630	835	178	TX	West Texas Rowdies
W5KFT(K5TWJ)	135,582	766	177	TX	Austin Powers
K5YAA	115,731	693	167	OK	
K5FD	105,968	716	148	TX	West Texas Rowdies
N5ZK (W5ASP)	103,782	706	147	TX	
W5NN (K5NZ)	49,920	416	120	TX	
W5MK	49,104	396	124	AR	
W5PUF	39,060	310	126	OK	
AD5BY	38,760	323	120	TX	West Texas Rowdies
KD5LNO	31,590	270	117	TX	
NI5F	26,316	258	102	MS	
W0VX	26,214	257	102	TX	
N6ZZ	25,048	248	101	NM	
WK5K	22,638	231	98	TX	
KC5R	20,367	279	73	LA	
N5ZC	19,694	229	86	TX	
KY5V (KC5YKX)	19,197	243	79	TX	Austin Powers
W5RZ	17,910	199	90	AR	Colony Mountain Contest Club
W5RW	16,020	180	89	AR	
KK5MI	15,810	186	85	TX	
KC5RPF	15,288	182	84	TX	
AD6G	14,112	196	72	TX	
N5RKK	12,936	154	84	LA	
KD5RYQ	11,880	165	72	MS	
AD5PR	9,159	129	71	TX	
KD5QEB	8,265	145	57	TX	West Texas Rowdies
W5JEN	8,178	141	58	TX	
K5KA	5,586	98	57	OK	
N5XU (KM5TY)	4,851	99	49	TX	
KC5TA	3,525	75	47	TX	
KA5BAY	3,485	85	41	OK	
WB0YEA	2,926	77	38	TX	
WB5VGI	2,244	68	33	TX	
K5WW	1,890	54	35	TX	
AD5GE	1,450	50	29	NM	
K5IX	1,378	53	26	TX	
N5DTT	962	37	26	TX	
AD5LL	560	28	20	AR	
K5YAB	352	22	16	OK	
*KF6AAQ	300	20	15	TX	
N5OT	280	20	14	OK	
N6MJ (at W6KP)	444,876	1698	262	CA	SCCC #1
W6EEN (N6RT)	380,828	1421	268	CA	SCCC #1
WX5S (at N6RO)	240,009	1039	231	CA	NCCC #1
N6KI	221,488	1016	218	CA	SCCC #2
K6AM	214,376	1016	211	CA	SCCC #2
N6HC	203,616	1008	202	CA	SCCC #2
N6ZFO	152,100	845	180	CA	NCCC #1
K6LRN	146,672	712	206	CA	NCCC #1
K6RIM	145,964	802	182	CA	NCCC #1
ND2T	145,962	918	159	CA	NCCC #2
N6EE	138,565	749	185	CA	NCCC #3
W6AFA	137,484	804	171	CA	
K6III	100,082	614	163	CA	NCCC #2
KE6ZSN	78,884	533	148	CA	NCCC #2
W0YK	75,674	482	157	CA	NCCC #3
W6IXP	60,564	412	147	CA	NCCC #2
W6FRH	51,986	374	139	CA	NCCC #3
AK6DV	48,994	374	131	CA	NCCC #4
NC6X (N6STX)	46,398	418	111	CA	
KO6BB	30,392	262	116	CA	
K6EY	25,764	228	113	CA	SCCC #3
N6EM	23,668	244	97	CA	NCCC #3
K6ZCL	22,077	223	99	CA	SCCC #3
WA4FIB	21,024	219	96	CA	NCCC #4
KE6CC	20,586	219	94	CA	
W6ISO	20,564	212	97	CA	
AE6Y	16,254	189	86	CA	NCCC #2
KD4GBA	15,840	198	80	CA	
W4EF	15,688	212	74	CA	
K5PI/KH6	15,334	187	82	HI	Austin Powers

Call	Score	QSOs	Mults	QTH	Team
K6DGW	14,529	167	87	CA	NCCC #3
NN6O	14,110	170	83	CA	SCCC #3
W6KC	12,375	165	75	CA	
W1MVY	11,234	137	82	CA	
K6OWL	10,650	150	71	CA	
WA6BOB	10,602	171	62	CA	SCCC #3
W6CWM	10,005	145	69	CA	
W6KY	9,344	128	73	CA	SCCC #3
K6CSL	9,072	126	72	CA	NCCC #5
W6ZZZ	8,908	131	68	CA	NCCC #5
KD6PQF	8,694	138	63	CA	
WA6OGO	7,440	120	62	CA	
NU6T	7,140	119	60	CA	NCCC #4
K6BBQ	6,867	109	63	CA	
KO6LU	6,848	107	64	CA	NCCC #5
WA6OEC	6,588	108	61	CA	
W6TK	4,343	101	43	CA	
WB6NFO	3,888	81	48	CA	
WA7BNM	3,700	100	37	CA	
NO6X	2,840	71	40	CA	
AD6FR	1,824	57	32	CA	
K6PRN (KJ6RA)	1,472	64	23	CA	NCCC #4
K6RFM	620	31	20	CA	
AH6RH	483	23	21	HI	
KQ6TW	99	11	9	CA	
KE6EYZ	16	4	4	CA	
K6UFO	12	4	3	CA	
AE6OU	9	3	3	CA	
K6LL	417,912	1583	264	AZ	SCCC #1
K7RL	412,100	1585	260	WA	
W7GG	330,876	1414	234	OR	Orygun Staight
W7EJ	292,603	1289	227	OR	Orygun Staight
W7WW	288,718	1198	241	AZ	SCCC #1
K7ZSD	284,988	1397	204	OR	Orygun Staight
W7RN (K5RC)	275,124	1212	227	NV	NCCC #1
K7ZS	233,584	1123	208	OR	Orygun Staight
K8IA	209,166	982	213	AZ	
N7LOX	191,000	955	200	WA	
K7INA	174,075	1055	165	WA	
W7OM	115,596	676	171	WA	
KI7Y	84,000	525	160	OR	
KO7X	75,576	564	134	WY	GMC Rocky Mountain #3
KW7N	70,080	480	146	ID	
WG7Y	60,630	470	129	WY	
K7WM	56,250	375	150	AZ	
K0TO	45,689	427	107	ID	MWA Spartans
K7BG	24,200	242	100	MT	
WG7X	23,876	254	94	WA	
W6RLL	21,560	196	110	AZ	
N7UK	17,372	202	86	WA	
W1ZWV	15,810	170	93	AZ	
W7YS	11,620	140	83	AZ	
N9ADG	10,443	177	59	WA	
KQ6MU	10,208	319	32	NV	
KR7X	7,192	116	62	OR	
KG9JP	6,993	111	63	AZ	
WA7YAZ	3,322	151	22	UT	
N7BKS	3,124	71	44	WA	
W7KMC	2,030	58	35	AZ	
W7LDT	1,680	48	35	AZ	
K7VIT	1,323	49	27	OR	
KL1SF	1,269	47	27	KL7	
K7AEK	551	29	19	NV	
*KK7A	176	16	11	ID	
KW8N	198,835	805	247	OH	MRRC #1
W8MJ	172,200	861	200	MI	MRRC #1
ND8DX	146,445	751	195	OH	MRRC #1
WZ8P	134,196	844	159	OH	MRRC #1
K8IR	87,980	530	166	MI	Bay Area Wireless Assn
N8BU (KT8X)	47,328	348	136	MI	MRRC #2
K9NW	35,203	329	107	OH	MRRC #3
*N8IE	29,997	297	101	OH	
NU8Z	28,086	302	93	MI	MRRC #4
W8TM	23,496	267	88	OH	
N8OL	20,085	195	103	MI	
W1PDI	19,251	207	93	OH	
KB8TYJ	15,604	188	83	MI	Wild and Crazy Guys
N8IW	15,471	191	81	OH	MRRC #3
W8KNO	12,358	167	74	OH	
N8BJQ	10,720	160	67	OH	
WC8VOA	10,010	143	70	OH	
N8PUG	9,100	140	65	MI	Wild and Crazy Guys
AF8A	8,906	146	61	OH	MRRC #4
KZ8E	7,366	127	58	WV	
N8NX	7,192	124	58	MI	
K8WV	4,944	103	48	WV	
KN8J	4,508	98	46	WV	
K8KHZ	3,854	82	47	MI	MRRC #4
W8SGZ	3,567	87	41	MI	
K8SAK	3,240	81	40	MI	
KC8UMB	3,102	66	47	MI	
*KC8UWG	2,925	75	39	MI	
N5NW	2,516	68	37	OH	TCG Team 3 Cougars
K8MR	1,674	54	31	OH	MRRC #4
KC8VJR	1,472	46	32	MI	
WD8S	1,372	49	28	MI	
NF8M	1,350	50	27	MI	
KC8RAN	1,305	45	29	OH	
K8MJZ	1,178	62	19	MI	
WX3M	888	37	24	MI	MRRC #3
KC8UDV	630	35	18	OH	

Call	Score	QSOs	Mults	QTH	Team
WI8W	572	44	13	MI	Wild and Crazy Guys
K9PG	348,992	1216	287	IL	SMC #1
N9RV	164,052	837	196	IN	SMC #5
N2BJ	152,036	796	191	IL	SMC #5
KE9S	146,664	756	194	WI	Bay Area Wireless Assn
AJ9C	131,211	717	183	IN	
K9JS	117,476	683	172	IL	SMC #2
W9IU	104,754	663	158	IN	SMC #1
K0SN	101,136	588	172	WI	Bay Area Wireless Assn
W9RE	85,656	498	172	IN	SMC #2
K9QVB	80,822	502	161	IL	SMC #4
KX9DX	79,002	513	154	IL	SMC #2
K9SG	71,391	449	159	IN	
K9MI	50,096	404	124	IN	SMC #3
KA9F	44,352	336	132	IN	SMC #2
N9AZZ	42,588	364	117	IL	SMC #2
K9JE	35,340	285	124	IL	
WW9R	31,828	292	109	WI	
K9WX	25,334	239	106	IN	SMC #4
AK9F	24,255	245	99	IL	SMC #3
KE9I	20,076	239	84	IN	
N9NT	18,240	228	80	IL	
AA9RT	17,910	199	90	IL	SMC #5
N9TTX	10,251	153	67	WI	MWA Spartans
WT9U	10,064	148	68	IN	SMC #5
K9OSH	9,504	132	72	WI	
K9LA	9,300	150	62	IN	
W0HED	8,875	125	71	IL	
K9ZF	8,804	142	62	IN	
N4TZ	8,515	131	65	IN	SMC #3
N9OX	8,512	133	64	WI	
W9IFR	7,080	120	59	IL	
W9CEO	6,510	105	62	IL	
N9LTA	5,084	124	41	WI	
KG9N	4,428	82	54	IL	
K9EFP	4,214	98	43	IN	
KC9DUX	3,612	86	42	IL	
N9JF	3,034	74	41	IL	SMC #4
W9AEM	3,034	74	41	WI	
K9LO	2,890	85	34	WI	
N9EP	2,701	73	37	IL	
AE9YL	2,520	72	35	IN	
N9LF	1,750	50	35	IN	
K9PLX	960	40	24	IL	
WI9WI	580	29	20	WI	
N9GUN	242	22	11	IL	SMC #4
K0UK	270,402	1122	241	CO	GMC Rocky Mountain #1
KT0R	246,512	1136	217	MN	MWA Gladiators
N9CO	232,470	1134	205	CO	SMC #1
W0LSD	224,919	1119	201	CO	
W0AH	202,572	993	204	CO	GMC Rocky Mountain #1
N0AT	191,438	962	199	MN	MWA Gladiators
AE9B	189,000	875	216	MO	
AC0W	185,850	885	210	MN	MWA Gladiators
KD0S	172,176	816	211	SD	
W0BH	142,080	768	185	KS	
K0OU	141,660	787	180	MO	SMC #1
N4VI	125,120	736	170	CO	GMC Rocky Mountain #3
K0XM	109,440	608	180	KS	
W0ETT	108,031	671	161	CO	GMC Rocky Mountain #1
W0ETC	101,931	557	183	IA	TCG Team 7 Wildcats
WR0DK	101,736	648	157	MN	MWA Gladiators
KF0UR	101,036	754	134	CO	
K0GV	97,836	789	124	MN	
WA2MNO	69,012	486	142	MN	MWA Spartans
K0GAS	65,120	407	160	CO	GMC Rocky Mountain #2
KI0F	62,568	396	158	MN	MWA Trojans
N0WE	51,186	449	114	MN	
K0MPH	49,664	388	128	MN	
*WA0VBW	46,731	421	111	MN	
K0RH	44,400	370	120	KS	
N0WBO	43,554	357	122	MN	MWA Spartans
K0SV	41,480	305	136	MN	MWA Gladiators
WB0TRA	36,072	334	108	MN	MWA Trojans
*KI0II	36,024	316	114	CO	GMC Rocky Mountain #2
KM0O	34,356	409	84	MN	MWA Trojans
KB0BUV	34,102	289	118	IA	
KC0IGY	31,000	310	100	CO	
N0SXX	28,056	334	84	CO	GMC Rocky Mountain #2
KS0T	27,819	281	99	MN	MWA Spartans
N0HJZ	27,500	275	100	MN	MWA Trojans
N3XT	25,245	297	85	CO	
K0IRL	23,808	248	96	CO	
K0JPL	21,715	215	101	MO	
N0AC	21,222	262	81	IA	
K0AD	20,972	214	98	MN	
N0OBM	17,630	215	82	KS	
K0BWJ	17,533	197	89	IA	
N0BUI	17,425	205	85	MN	
KB0ARZ	15,385	181	85	NE	
KB8CL	14,800	185	80	ND	
KR6NA	9,310	245	38	CO	
AA0A	9,035	139	65	MO	
KC0PBY	6,032	116	52	MN	
N0MWY	5,757	101	57	CO	
N9OE	5,400	135	40	IA	
W0IE	4,794	102	47	KS	
KC0EFR	3,650	73	50	CO	
KB0ENE	3,600	80	45	IA	

Call	Score	QSOs	Mults	QTH	Team
K0UH	3,024	72	42	MN	
*KA0LDG	2,628	73	36	ND	
K0VH	2,607	79	33	MN	
N0OA	1,947	59	33	MN	
W0VD	1,890	54	35	MO	
*WW0WB	1,664	52	32	CO	
*W0ANM	754	29	26	MN	
N0EO (AA0AW)	690	30	23	MN	
K0MY	495	33	15	MN	
VE5SF	236,900	1150	206	SK	
VE3AGC	89,333	569	157	ON	
VE3WIB	69,836	442	158	ON	
VY2LI	54,900	450	122	PEI	
VE3MGY	47,553	393	121	ON	
VE4YU	42,532	343	124	MB	
VE2CQ (DL7FER)	41,664	336	124	PQ	
VE3DZ	34,128	316	108	ON	
VE6JY	33,604	271	124	AB	
VE3KP	32,400	270	120	ON	
VE3TW	32,264	296	109	ON	
VA3SWG	27,160	280	97	ON	
VE3CRU	24,985	263	95	ON	
VA3NR	16,020	178	90	ON	
VA3OX	15,760	197	80	ON	
VA7AM	15,210	195	78	BC	
VA3NU	12,324	156	79	ON	
VE4HAZ	9,288	129	72	MB	
*VA3DF	8,905	137	65	ON	
VE7WWW	8,500	125	68	BC	
VE3KZ	8,052	132	61	ON	
VE9DX	7,788	132	59	NB	
VA3IX	6,440	115	56	ON	
VA3PL	6,110	130	47	ON	
VY1MB	5,577	143	39	YT	
*VA7JC	4,554	99	46	BC	
VE3EJ	3,198	78	41	ON	
VO1AU	2,788	68	41	LAB	
VE3TPZ	2,701	73	37	ON	
VE2DC	2,680	67	40	PQ	
VE3FU	2,418	62	39	ON	
VO1MX	2,226	53	42	LAB	
VE2OWL	1,692	47	36	PQ	
VE3UKR	1,638	63	26	ON	
VE4VID	1,575	45	35	MB	
VO1MP	1,248	48	26	LAB	
VE2DSK	551	29	19	PQ	
8P6SH	98,525	563	175	8P	
CO8TW	8,804	142	62	CO	
WP3GW	450	30	15	KP4	
CT1ILT	7,296	128	57	DX	
LU5EVK	36	6	6	DX	
JA0AVS	6	3	2	DX	

* Indicates QRP entry

Multi-Two Scores

Call	Score	QSOs	Mults	QTH
W6YX (K6IF, W6LD, N7MH)	731,276	2548	287	CA
NK7U (NK7U, K7ZO, KW7J)	709,660	2590	274	OR
K9NS	674,424	2204	306	IL
(K9HMB, K9PW, K9XW, KO9A, W9RM)				
K5TR (WM5R, K5TR)	660,672	2368	279	TX
NX5M (NX5M, N5XJ, NT5TU)	595,840	2128	280	TX
K4NO	425,430	1630	261	AL
(K4NO, KA9EKJ, K4GU, KA1DWX)				
KY5R (K4VU, KY5R)	366,296	1477	248	AL
W4WS	258,408	1164	222	NC
(KG4NEP, W2DZO, WX1NCC, KG4ECI)				
NY4T (K1KY, W1KLM, NY4T, W1ARN)	215,926	1009	214	TN
W8FT	102,718	638	161	OH
(N8ET, AD8P, N8RMF, N8RMT, KC8TZR, KC8YUD)				
N0AOM (N0AOM)	96,760	590	164	MO
W0EF	54,400	425	128	MN
(K0BUD, N0NFU, WB0N, ND0M, WA1GWE, N0OE, N0NYH)				
K4HTA/8	52,920	392	135	WV
(AC4LT, N4ZPT, KG4OJT, KG4JBJ, KG4URU, KG4VQU,				
KF4KJQ, K2HYD, K2VX, K4TCM, KO1D, KO4ALA, KG4PRN, KG6ZR)				
K4YTZ (AE4VJ, N4UFP)	47,082	354	133	SC
W4NTI (W4NTI, WA4UA)	42,402	382	111	AL
K0USN (K0RI, WV7T, N0QJS)	40,128	304	132	CO
K5BSA	21,600	240	90	TX
(KR1ZAN, KD5IQO, KG4VPV, KC5QAI, KD5JLK, WA5TET, K9VOL,				
W5RWH, KA5SOT, KD5HHZ, KD5JVF)				
W5DJT	20,988	212	99	AR
(W5DJT, KD5KPJ, KD5CCG, N5BU)				
W8LBZ (W8LBZ)	9,060	151	60	OH
KL7CQ (AL1G, KL7FH, KL1MX)	8,976	187	48	KL7
W7LSK (W7LSK, NG7Z)	7,074	131	54	WA
W6BAR (W6BAR)	6,696	108	62	CA
N8UZE (N8UZE)	5,390	98	55	MI
W2RDS (W2RDS)	2,448	68	36	NJ
W2ORO (W1ORO)	369	41	9	KY
VE7FO (VE7HAK, VE7FO)	120	15	8	BC

Check Logs: K1DAN, K9ZO, KA7PLE, N0KK, VK2CZ, WA6BFW, WA8WV, WW4LL

Results: July 2004 *NCJ* North American QSO Party RTTY Contest

Wayne Matlock, K7WM

The July 2004 *NCJ* RTTY NAQP was a little different than other July NAQPs. If the "soapbox" comments are looked at, it was highly dependant on one's location as to what band was open and what the operating strategy should be. Here in the Southwest desert, 10 meters was absolutely dead all the time. I never heard a peep anytime I checked it. Fifteen meters was right behind it, too, as it would come and go and without a second radio I couldn't stay on the band waiting for it to open.

It was sure was nice seeing ET3TK, 5U7B, 5WØDL, 4X/OK1FIA/P and the other great DX that showed up. While listening to the pileups, it became clear that some of the ops had forgotten that they were in a contest; the DXer in them had taken over. Four land won the title of having the most operators by a large margin, but we had great participation from all call areas and the Canadian Provinces. Overall, it was the best July *NCJ* RTTY NAQP—more logs submitted, more teams participating, more DX showing up and more multi-2 teams.

The SWACC Team, comprised of AA5AU, KI5XP, K5AM, AD6WL and K7WM (put together by Dave, K6LL) won the team competition with a great score (for July) of 393,498. I had my first-ever computer failure during a contest when the hard drive on my machine decided to go bonkers. I spent all my 2-hour off time plus a little more getting all the hardware out of the busted machine and into another. It took 30 minutes of operating (without making any contacts and thinking there had to be a huge solar flare) before someone told me that I was just transmitting a solid tone. A click of the mouse on the tone selection and I was back in business. The rest of the contest was spent in the "catch-up mode."

This is/was my last stint as CD for the RTTY NAQPs and Shelby, K4WW, will be taking the task on. I know he will be doing a great job and the *NCJ* RTTY NAQP will continue to grow and be the fun contest that it is.

Soapbox

A propagation scientist's delight! Wildly varying real-time indications, flares before and after, A rising and K declining meant QSB galore! Tough conditions for the low power urban lot operator. K6OWL...K7WM was the only other AZ call I heard. K7KAR...RTTY by *WF1B* software v5, PK-232 (old lightning-bit unit). Enough thunderstorms to power the spaceship *Enterprise*. K8DO...First ever contest log submission after 36 years of hamming. K8UT...Propagation to US was not good. Too bad, but I had fun anyway. 5U7B...Enjoyed the contest, but in July? AAØCY...One of my favorite contests. Conditions were good here when they were not so good in other parts of the US (you can say that again, Don) AA5AU...First time on RTTY, had fun. AB9EK...It was a blast! Gotta put up that 80-meter antenna. AG4ZG...Had lots of fun operating from a DX location. A lot of stations couldn't believe they were working 5WØDL and wanted to log me as WØDL, especially on 40 meters. 5WØDL...Summertime in Texas, with vertical and wire antennas, makes for challenging work. Wish the high bands still had some life, but that was not apparent this weekend. AC5AA...Nice to see 10 meters open at the start of the contest. It was also nice to work the contest without having to stop for a lightning storm. Thanks for all the QSOs and I look forward to the next one. AF4Z...My second NAQP summer RTTY. K4AQ ...Enjoyed the time I was able to participate, 0100Z to 0520Z, and lightning showed up outside the house at 0520Z. Conditions on 40 meters (only band I have an antenna for) were marginal due to thunderstorms in area. They were bad enough that I tried to convince Michal, ET3TK, that he was KT3TK by repeatedly asking for his state. Finally, Michal got through to me that his call was really ET3TK! Thanks to all who put up with my multiple requests for repeats. Most signals would have been easy copy except for the thunderstorms on my end. Nice to work "J," VY1JA, on 40 meters. Tennessee was well represented in the contest, at least from my perspective. The path length by the time I started must have been ideal between this part of Virginia and Tennessee. Thanks to the folks who take the time and effort to put on this contest, it is appreciated. KG4MH...Thanks to WØETC for assembling all the teams. K4RO...Lots of fun in spite of the solar flare. Nice activity for the time I was on the air. I look forward to next year. K5PAX...Noisy on the low bands. K5ZD...Operated from cabin in Northern Wisconsin, conditions were good to poor at times. K9JS...My very first trip into RTTY contesting. Last time I was on RTTY, it was with a MacroTronics interface and a TRS-80. Much improved. Had a lot of fun. KE6CC...Nice 10-meter opening, but it and 15 meters died too early. Working 40 meters at 2200Z is crazy. Lots of static on 80 meters, so the mults were hard to come by. KI5XP...I want to thank K7ZSD for the use of his station. KR7X...I was able to put in 6 ½ hours. Conditions were fair in MO. Using the beam and the vertical helped a lot. Worked four DX calls: CT4DX, OK2PAY, HG4I and 9A7R. A lot of "agn" macros used. KI1G was everywhere. Best exchange was NY1S with "byte me." Sorry that I had to QRT at 0930Z just as 80 meters was getting hot. I will be back next year. KS0M...Great fun. We operated from a hunting camp in Rutland County Vermont. N1MGO...Twenty meters was slow in the afternoon and then it picked up after dark. Fifteen meters was surprisingly good as was 40 meters. It was a fun contest, though. N5PA...Thunder storms!. N5PU...I worked five provinces and one other country for a total of 57 multipliers. N7UVH...Better score than last year. Enjoyed this 10-hour contest very much and enjoyed being part of a team with Club TCG 5 O'clock Somewhere this year. NA5Q...Fifteen meters is the new 10 meters. Started really slow, about half the February rate and stayed that way. Only the 0000Z hour felt airy, the rest was a slog and an exercise staying in the chair, but I'll be back in the winter. ND2T...Make the thunderstorms go away! NI5F... Propagation awful. Poor turnout. Some Murphy issues. Should've gone fishing instead. NN6NN...Did not have much time, but enjoyed every minute. The A index was high, but it didn't hurt this domestic contest. Hope to have more time next time.

Top Tens

QSOs		*Mults*		*Score*	
AA5AU	685	KI1G	197	AA5AU	133575
KI5XP	660	AA5AU	195	KI1G	121943
KI1G	619	KI5XP	183	KI5XP	120780
NØAT	568	NØAT	177	NØAT	100536
K4WW	470	KE4KWE	162	K4WW	74260
KI6DY	465	VA3DX	161	W8BAR	73440
AB5K	461	K4WW	158	KI6DY	73005
W8BAR	459	KI6DY	157	KE9S	72311
WX4TM	450	WX4TM	157	WX4TM	70650
KE9S	433	N8NR	150	KE4KWE	70632

NO2T...To bad conditions were very poor. ON6MX...Had a lot of fun! Great contest. PT2FM...Nice to know our friend's names. PY2NY...Started the first 2 hours on 10 and 15 meters for mults. Forty and 80 meters were the best bands. Got VY1JA, VE4YU and WY in last 15 minutes on 40 meters. Best name was "byte me" from NY1S. VA3DX...Twenty meters had very unusual propagation and 80 meters was so noisy that *MMTTY* couldn't copy. VE3ESH...Interesting propagation. VE4YU...Nice surprise to find 10 meters open. Part-time effort on this end. Hope I helped a few out with the mult. Nice to see ET3TK, SX2OO4A and YW6C join in. Heard 5U7B a couple of days ago say he would be on, but never heard him. Thanks to all for the Qs. VE9DX...Operated all the time available to me. Sorry it could not be more. VY1JA...Great conditions and as usual, a lot of fun. Lots of stations, too. W1HY...Very nice contest! Started off slow, but picked up speed as it went along. Definitely plan to work this one again. Thanks. W3MEL...My first RTTY contest and I enjoyed it. Strictly S&P operation. See y'all next year. W3OFD...Conditions were awful. W6OAT...Thanks for the contest. Only short time available to operate. W7DPW...1st NAQP contest and 1st *Writelog* use. W7LD...Used station K1TTT. Thanks to Dave for use of his great station. W8BAR/W1TO...Great contest! Thanks to all for listening to my 20 W on 80 meters. W9ILY...I'm a first timer in this contest and I had fun. See you again next year. WA6NOL...I wish I had more time to participate, but the time I was able to work the contest was an absolute blast. I will be a participant in many upcoming RTTY contests. WBØDUL...Interesting contest this time. I operated a couple of hours mobiling around Marion County in a multi-op with John, WA9ALS/Ø. Hope John was able to recover the log I lost! WD9GMK...Current solar cycle is limiting band usage, but what a lot of fun. Got tired and went to bed before the contest ended. WN1OTV...First RTTY contest. Lots of fun. WN6K...First half was pure drudgery due to software issues. WO4O.

Team Scores

CCO Terminalators

VE3YF	20710
VE3IAY	27489
VE3XD	51375
VE3HG	14256
	113830

4 Dogs and Kuwait

K9JS	28034
K9MI	12774
K9WX	46028
K9MUG	64680
N9KO	11592
	163108

Cocosolo Sibichi Club

N2CN	1624
N2TA	48764
AK2P	———
	50388

Florida Boys

WO4D	51539
K4PX	48764
WB4EQS	49560
KC4HW	61190
	276050

TCG Traveling Men

NN5A	4320
NY4N	19992
KA5DON/3	234
KØIDT	38115
KØXU	16744
	79405

TCG CanAms

VA7SW	———
VE9DX	8750
VE3GSI	35625
VA7ST	17860
KE4OAR	8040
	70275

Lightning Bolts

N4GI	———
K4LQ	17460
	17460

NCCC #1

ND2T	26967
AC6JT	19580
W6OAT	48375
KJ6RA	16125
K6OWL	6206
	117253

NCCC #3

N6TQS	8636
K6RFM	6270
A6BOB	14784
	29690

SWACC

AA5AU	133575
KI5XP	120780
K7WM	50304
K5AM	45666
AD6WL	43173
	393498

CCO Rising Machinists

VA3PC	21828
W1AJT/VE3	27390
VA3XRZ	16632
VE3ESH	20776
	86626

Wireless Assn of South Hills

W4ZE	44763
N3FR	
N3RDV	
	44763

YCCC & Friends

K5ZD	7004
KI1G	121943
W8BAR	73440
W1ZT	378
W8WEJ	20592
	223357

5 O'Clock Somewheres

AD0K	———
WØBR/1	44634
AF4Z	64998
NA5Q	51240
W4LC	47655
W0ETC	59353
	202882

TCG Long & Winding Road

W4BCG	34040
KM4H	3220
K4RO	13527
N1WI	15486
KR7X	32970
	99243

TCG California Dreamers

KSØM	14784
AB8NI	12665
AD4EB	65415
WO4O	44649
K1GU	18768
	156281

TCG Top Fortys

K8DO	11715
WBØDUL	2340
	14055

NCCC #2

W6ZZZ	204
K6DGW	10164
AK6DV	16530
KO6LU	2736
WB6TQG	10419
	40053

Austin Powers

KC5YKX	27000
KD5SQF	———
AB5K	66384
AC5AA	24860
K4WW	74260
	192504

Scores

Call	*Name*	*QTH*	*80m*	*40m*	*20m*	*15m*	*10m*	*QSOs*	*Mults*	*Score*
N0AT	RON	MN	88/34	194/50	183/48	74/28	29/17	568	177	100536
KI6DY	BOB	KS	73/22	174/45	133/37	64/29	21/14	465	157	73005
WØETC	LAR	IA	42/22	106/32	178/42	77/27	24/16	427	139	59353
KØIDT	RON	NE	46/25	108/34	68/26	65/23	28/13	315	121	38115
KØFX	DON	CO	47/29	166/45	127/38	0/0	0/0	340	112	38080
KØXU	JIM	NE	16/12	76/31	56/30	36/18	0/0	184	91	16744
NØOBM	SID	KS	22/17	70/30	68/25	19/12	5/2	184	86	15824
KSØM	DICK	MO	20/15	28/15	70/30	40/20	10/8	168	88	14784
KØHW	JIM	SD	40/24	79/32	33/15	0/0	0/0	152	71	10792
KØEWS	ERIC	SD	13/11	41/23	47/24	0/0	0/0	101	58	5858
WØHW	CHAZ	MN	0/0	36/20	50/24	0/0	0/0	86	44	3784
WBØDUL	DICK	CO	2/2	40/19	23/15	0/0	0/0	65	36	2340
NØIBT	DAVE	CO	0/0	0/0	40/24	9/6	0/0	49	30	1470
KØVG	VERN	MN	0/0	21/14	0/0	0/0	0/0	21	14	294
ABØYM	GEORGE	CO	1/1	8/7	1/1	0/0	0/0	10	9	90
KI1G	RICK	RI	88/39	173/44	202/48	107/41	49/25	619	197	121943
W8BAR	TOM	MA	77/30	128/42	122/39	92/30	40/19	459	160	73440
NY1S	BYTE	ME	30/18	108/40	110/39	67/28	30/16	345	141	48645
WØBR/1	BOB	CT	51/24	99/34	126/39	50/20	20/12	346	129	44634
KB1JZU	BOB	MA	37/22	72/32	79/31	22/16	7/5	217	106	23002
W1HY	PAUL	RI	4/4	49/25	94/33	36/22	9/9	192	93	17856
K5ZD	RANDY	MA	16/11	19/14	25/16	24/14	19/13	103	68	7004
WN1OTV	DON	ME	8/6	48/27	40/17	5/4	5/5	106	59	6254
KB1HDO	JOHN	MA	0/0	26/18	49/25	21/15	3/2	99	60	5940
WA1Z	BOB	NH	0/0	6/6	52/20	17/12	15/12	90	50	4500
KB1IKD	JOHN	NH	0/0	2/2	65/21	16/11	11/8	94	42	3948
W1LZ	LES	NH	0/0	0/0	35/22	14/11	1/1	50	34	1700
W1ZT	GEO	MA	0/0	0/0	3/3	5/5	13/10	21	18	378
WA2ETU	CARL	NY	77/30	102/41	123/40	72/28	33/15	407	154	62678
NO2T	JETRY	NJ	39/24	80/33	55/28	38/21	11/8	223	114	25422
KA2D	TOM	NY	9/7	24/16	119/36	58/22	13/8	223	89	19847
WA2LUY	FRANK	NY	0/0	44/23	91/39	25/16	8/8	168	86	14448
NT2A	GENNADY	NY	12/8	90/36	54/23	2/2	0/0	158	69	10902
K2MK	MIKE	NJ	0/0	26/17	34/21	14/10	9/7	83	55	4565
W1TY	RICK	NY	0/0	100/36	0/0	0/0	0/0	100	36	3600
NC2N	ANDREI	NY	0/0	39/22	19/6	0/0	0/0	58	28	1624
K2PH	PAUL	NY	1/1	5/4	14/9	3/3	0/0	23	17	391
W4ZE	TED	PA	62/26	89/36	127/39	53/20	16/8	347	129	44763
W3MEL	MEL	PA	72/26	87/32	80/35	17/10	0/0	256	103	26368
W3KB	KEITH	PA	37/21	60/27	73/29	26/15	19/11	215	103	22145
KA3PVA	BILL	PA	49/24	74/25	63/29	13/9	5/2	204	89	18156
WA1LWS	HANS	MD	22/14	76/35	71/33	11/7	0/0	180	89	16020
N5LBJ	DOUG	MD	44/22	50/27	40/15	33/18	6/6	173	88	15224
W3OFD	RICH	PA	26/17	35/23	71/35	12/11	0/0	144	86	12384
K3UW	DOUG	PA	26/19	60/26	38/18	6/6	0/0	130	69	8970
W3DSX	RANDY	PA	0/0	41/20	40/23	27/14	0/0	108	57	6156
AA0CY	JJ	PA	0/0	12/9	28/21	26/15	1/1	67	46	3082

Call	Name	QTH	80m	40m	20m	15m	10m	QSOs	Mults	Score
K3FH	MIKE	PA	20/15	31/19	8/6	8/5	0/0	67	45	3015
W3FQE	LEE	MD	0/0	0/0	35/20	6/6	0/0	41	26	1066
KA5DON/3	DON	MD	0/0	0/0	18/13	0/0	0/0	18	13	234
K4WW	BO	KY	80/34	146/45	168/44	68/27	8/8	470	158	74260
WX4TM	TOM	AL	67/30	104/37	177/44	74/28	28/18	450	157	70650
KE4KWE	TOM	AL	61/28	131/40	130/44	77/29	37/21	436	162	70632
AD4EB	JIM	TN	52/26	98/35	185/47	82/26	28/13	445	147	65415
AF4Z	DON	FL	33/22	106/37	142/40	85/32	48/26	414	157	64998
K9MUG	ROD	AL	67/28	133/39	153/45	78/28	9/7	440	147	64680
KC4HW	JIM	FL	31/19	80/31	163/42	123/38	25/15	422	145	61190
WO4D	ORRIN	FL	38/19	89/35	135/43	48/27	43/22	353	146	51538
WB4EQS	RON	FL	31/15	75/33	137/44	80/31	31/17	354	140	49560
K4PX	GEORGE	FL	29/15	77/31	104/42	74/34	50/24	334	146	48764
W4LC	JIM	KY	90/33	98/38	118/38	46/25	1/1	353	135	47655
WO4O	RIC	TN	104/35	102/36	139/40	7/5	11/7	363	123	44649
NA4K	STEVE	TN	73/28	86/34	81/32	53/23	22/15	315	132	41580
W4BCG	BILL	TN	39/19	113/40	117/42	27/14	0/0	296	115	34040
AG4ZG	ROBERT	FL	1/1	45/28	111/38	90/34	35/18	282	119	33558
W4UEF	RICK	NC	43/23	145/45	11/8	22/13	8/8	229	97	22213
WB2RHM	BEN	NC	36/16	989/39	32/19	29/16	13/9	208	99	20592
NY4N	JEFF	TN	26/18	76/34	59/32	27/15	8/3	196	102	19992
K1GU	NED	TN	23/17	79/25	44/22	49/22	9/6	204	92	18768
K4LQ	FRED	FL	9/7	54/26	76/34	24/16	17/14	180	97	17460
K4BX	BILL	TN	22/15	58/28	77/33	18/12	5/3	180	91	16380
WB4YDL	JAMIE	TN	68/26	102/37	37/15	0/0	0/0	207	78	16146
AE4Y	KENT	GA	15/9	44/25	70/27	33/19	13/10	175	90	15750
W3OA	DICK	NC	18/13	40/19	60/28	35/23	17/9	170	92	15640
N1WI	TER	TN	0/0	66/33	71/28	27/14	3/3	178	87	15486
K4RO	KIRK	TN	27/18	45/23	88/37	5/2	2/1	167	81	13527
WA4OSD	FRANK	TN	22/14	47/24	41/26	21/13	3/3	134	80	10720
K4AQ	MATT	GA	4/3	41/22	46/22	29/20	4/4	124	71	8804
KE4OAR	CHUCK	TN	19/16	89/30	26/14	0/0	0/0	134	60	8040
K4IQJ	DICK	AL	0/0	0/0	51/25	47/27	18/15	116	67	7772
K4GMH	MIKE	VA	0/0	159/46	0/0	0/0	0/0	159	46	7314
AA4VV	TOM	NC	0/0	61/25	33/21	6/4	1/1	101	51	5151
NN5A	TOM	TN	0/0	26/17	49/22	10/6	5/3	90	48	4320
KM4H	MIKE	TN	0/0	15/14	45/23	10/9	0/0	70	46	3220
KV4CN	DAVE	NC	0/0	28/18	16/7	6/6	1/1	51	32	1632
NQ4K	GORDON	VA	39/21	0/0	0/0	0/0	0/0	39	21	818
N4AU	BOBBY	AL	0/0	0/0	12/9	10/10	8/7	30	26	780
NT4D	JAY	NC	10/9	20/13	0/0	0/0	0/0	30	22	660
AB4GG	KENNY	TN	0/0	20/14	10/5	0/0	0/0	30	19	570
AA5AU	DON	LA	90/33	212/49	194/50	142/42	47/21	685	195	133575
KI5XP	CHAS	LA	80/33	175/46	227/50	152/40	26/14	660	183	120780
AB5K	TERRY	TX	19/13	117/36	205/49	87/29	33/17	461	144	66384
NA5Q	ROLAND	LA	44/23	117/42	124/38	65/27	16/10	366	140	51240
K5BG	BOB	TX	41/23	111/38	131/43	61/24	21/11	365	139	50735
K5AM	MARK	NM	26/13	106/32	217/51	37/21	1/1	387	118	45666
K5NRC	CHAS	AR	43/24	66/31	162/43	62/25	12/6	345	129	44505
W5MK	CHRIS	AR	28/16	124/37	113/35	66/30	13/10	344	128	44032
KE5OG	BILL	TX	20/13	162/47	142/42	36/18	0/0	360	120	43200
N5PA	ALAN	MS	32/21	72/33	124/40	78/31	0/0	306	125	38375
K0CIE	KARL	OK	46/23	64/29	91/31	37/16	15/8	253	107	27071
KC5YKX	REID	TX	12/10	67/34	139/42	24/16	8/6	250	108	27000
AC5AA	DUANE	TX	14/10	82/40	92/37	27/15	10/8	225	110	24860
K5CM	CONNIE	OK	48/22	78/35	76/22	0/0	0/0	202	79	15958
N5VYS	OBIE	TX	0/0	67/31	127/35	6/6	5/4	205	76	15580
N5IJE	TED	TX	18/12	64/30	79/35	11/8	2/1	174	86	14964
K5RCR	RICK	LA	6/4	48/25	62/31	41/21	9/5	166	86	14276
NI5F	BILL	MS	1/1	37/22	68/27	36/21	13/10	155	81	12555
N5PU	LEON	MS	0/0	33/21	27/18	61/29	13/9	134	77	10318
KC5NYO	MIKE	OK	11/9	56/26	75/35	0/0	0/0	142	70	9940
NS5A	DIETER	TX	15/11	48/24	52/30	9/6	2/1	126	72	9072
K5PAX	HARVEY	NM	0/0	29/20	48/23	1/1	0/0	78	44	3432
KA5EYH	DON	TX	1/1	21/15	67/28	16/12	0/0	105	56	5880
K5SF	RICH	TX	0/0	52/27	0/0	0/0	0/0	52	27	1404
K5WW	GERT	TX	0/0	0/0	20/14	0/0	0/0	20	14	280
W6OAT	RUSTY	CA	26/12	111/41	181/51	46/24	11/1	375	129	48375
AD6WL	JIM	CA	43/21	108/38	200/48	18/10	0/0	369	117	43173
K6HGF	DOUG	CA	38/15	111/38	162/46	36/18	0/0	347	117	40599
N6OJ	CHUCK	CA	2/2	74/33	172/46	33/17	0/0	281	98	27538
ND2T	TOM	CA	19/7	51/27	155/45	40/21	2/1	267	101	26967
WN6K	PAUL	CA	24/8	101/39	104/37	16/9	0/0	245	93	22785
AC6JT	BRYAN	CA	22/8	81/37	93/33	20/10	4/1	220	89	19580
W6FFH	DON	CA	8/5	58/27	141/43	11/7	0/0	218	82	17876
AK6DV	CHUCK	CA	17/6	81/35	78/35	12/10	2/1	190	87	16530
KJ6RA	RICH	CA	18/6	74/33	123/36	0/0	0/0	215	75	16125
WA6BOB	BOB	CA	26/13	111/39	55/25	0/0	0/0	192	77	14784
WB6TQG	PHIL	CA	0/0	33/19	99/40	15/9	4/1	151	69	10419
K6DGW	FRED	CA	4/1	24/12	113/44	13/9	0/0	154	66	10164
N6TQS	DOUG	CA	17/8	38/23	67/34	4/2	1/1	127	68	8636
K6RFM	RICH	CA	0/0	60/32	44/22	5/2	1/1	110	57	6270
K6OWL	MARK	CA	14/4	33/20	59/33	1/1	0/0	107	58	6206
KE6CC	JOHN	CA	9/1	41/23	52/29	2/1	0/0	104	54	5616
KF6CNV	JEFF	CA	0/0	65/31	23/15	1/1	0/0	89	47	4183
KO6LU	BOB	CA	0/0	2/1	58/25	13/9	3/1	76	36	2736
N6RCE	KEVIN	CA	2/1	34/22	24/12	1/1	1/1	62	37	2294
WA6NOL	RICHARD	CA	0/0	0/0	45/27	0/0	0/0	45	27	1215
W6FRH	BOB	CA	1/1	9/9	16/14	6/5	0/0	32	29	928
W6ZZZ	MARK	CA	0/0	9/6	8/6	0/0	0/0	17	12	204
K7WM	WAYNE	AZ	36/22	170/48	171/45	16/13	0/0	393	128	50304
KR7X	HANK	OR	4/3	79/35	193/48	38/19	0/0	314	105	32970
KJ7NO	BRAD	UT	19/12	91/36	107/40	3/2	0/0	220	90	19800
W7LD	JACK	WA	15/7	89/32	120/39	7/6	0/0	231	84	19404
N7UVH	PAT	ID	8/5	34/21	187/47	2/2	0/0	231	75	17325
W7KB	RICK	UT	0/0	3/2	201/43	11/9	0/0	215	54	11610
N7XB	BRUCE	OR	11/5	49/27	62/33	9/7	0/0	131	72	9432
K7KAR	KEITH	AZ	1/1	41/22	59/35	0/0	0/0	101	58	5858
KD7RX	JERRY	WY	4/3	45/26	23/16	1/1	0/0	73	46	3358
N7JB	JIM	WA	4/2	12/7	64/32	0/0	0/0	80	41	3280
N7ON	JOHN	NV	3/1	7/6	36/25	0/0	0/0	46	32	1472
W7DPW	DAVE	WA	0/0	0/0	41/23	1/1	0/0	42	24	1008
N7IXI	KELLY	OR	0/0	0/0	15/10	0/0	0/0	15	10	150
N8NR	BOB	OH	44/27	136/44	125/40	66/24	21/15	392	150	58800
WI8W	THOM	MI	79/33	118/41	95/31	61/24	34/14	387	143	55341
K8IR	JIM	MI	70/33	99/42	102/37	52/26	17/14	340	152	51680
K8UT	LARRY	MI	46/26	67/32	88/32	46/23	24/15	271	128	34688
W8UL	JOHN	OH	40/23	71/31	76/37	46/23	13/11	246	125	30750
W8WEJ	JOHN	WV	66/27	53/30	69/31	18/9	2/2	208	99	20592
KZ8E	JEFF	WV	42/24	47/27	68/33	18/13	1/1	176	98	17248
AB8NI	DENNIS	OH	32/17	22/15	54/27	35/20	6/6	149	85	12665
KT8X	SHREK	MI	0/0	29/21	55/20	56/24	16/12	156	77	12012
K8DO	DENNY	MI	10/8	20/15	128/42	6/5	1/1	165	71	11715
N8PUG	JIM	MI	28/20	9/8	20/10	11/8	6/6	74	52	3848
WA8SDA	FRANCIS	WV	0/0	23/16	28/17	5/4	6/6	62	43	2666
N8BJQ	STEVE	OH	19/16	20/14	12/7	0/0	0/0	51	37	1887
KE9S	JEFF	WI	63/30	138/46	120/43	68/29	44/19	433	167	72311
KB9AX	DAN	IN	91/32	125/44	173/47	33/18	9/7	431	148	63788
WB9Z	JERRY	IL	78/36	104/36	136/41	41/17	30/13	389	143	55627
N2BJ	BARRY	IL	81/31	115/36	151/40	41/22	6/4	394	133	52402
K9WX	TIM	IN	73/31	109/38	148/42	30/16	1/1	361	128	46208
W9HLY	VERN	IN	96/37	87/36	63/28	52/23	21/11	319	135	43065
W9ILY	JOHN	IL	21/17	113/38	67/32	56/22	14/6	271	115	31165
K9JS	JON	WI	5/5	69/30	100/33	70/28	18/11	262	107	28034
N5UWY/9	PETER	IL	43/25	59/28	53/25	18/9	5/4	178	91	16198
K9MI	MIKE	IN	30/17	69/32	46/23	12/10	0/0	157	82	12874
N9KO	CALVIN	IL	16/13	50/27	52/29	14/9	6/6	138	84	11592
N7GVV	JIM	IN	9/7	43/25	33/17	26/12	15/9	126	70	8820
K9XL	RAY	IL	11/8	20/12	29/19	20/12	3/1	83	52	4316
N9KT	DAVID	IN	29/19	45/26	6/3	1/1	1/1	82	50	4100
WD9GMK	ALAN	IN	0/0	34/22	24/19	4/3	0/0	62	44	2728
K9EMG	ROGER	WI	0/0	0/0	28/16	34/17	6/5	68	38	2584
K9FOH	BOB	IN	7/5	15/9	28/15	2/2	0/0	52	31	1612
W9RVG	MARSHAL	IL	0/0	14/11	8/5	9/6	2/1	33	23	759
N0ICV	TONY	IL	3/3	6/6	8/5	0/0	0/0	17	14	238
AB9EK	TOM	WI	0/0	0/0	17/8	0/0	0/0	17	8	136
N9NDS	BRAD	IN	0/0	0/0	4/4	8/7	0/0	12	11	132
KH6GMP	GARY	HI	0/0	14/8	156/41	1/1	0/0	171	50	8550
NP4BM	VICTOR	PR	2/2	38/24	70/32	12/9	3/2	125	69	8625
VY1JA	J	YT	1/1	43/22	62/27	2/2	0/0	108	52	5616
VA3DX	GLEN	ON	90/36	130/50	112/34	57/25	38/16	427	161	68747
VE3XD	DON	ON	54/24	125/43	146/48	50/22	0/0	375	137	51375
VE3GSI	ERIC	ON	40/21	60/28	109/36	53/26	23/14	285	125	35625
VE3IAY	RICH	ON	41/22	88/39	67/32	27/18	8/8	231	119	27489
W1AJT/VE3	ART	ON	33/24	49/21	128/45	37/18	2/2	249	110	27390
VA3PC	PAUL	ON	21/12	48/26	81/38	42/23	12/8	204	107	21828
VE3ESH	IAN	ON	52/25	55/25	54/21	30/14	21/13	212	98	20776
VE3YF	MIKE	ON	0/0	80/36	103/38	35/21	0/0	218	95	20710
VA3XRZ	JULIO	ON	33/20	50/31	68/35	13/10	4/3	168	99	16632
VE3HG	PETER	ON	11/6	57/27	59/30	29/19	6/6	162	88	14256
VE3LFA	DAVE	ON	0/0	49/30	53/27	19/12	11/8	132	77	10164
VE3UKR	NICK	ON	0/0	0/0	58/25	0/0	0/0	58	25	1450
VE3RCN	KEVIN	ON	0/0	5/5	10/9	9/8	0/0	24	22	528
VE4YU	ED	MB	9/8	36/23	61/35	13/11	0/0	119	77	9163
VE6YR	BOB	AB	23/11	104/41	133/45	40/25	0/0	300	122	36600
VA6MM	MACRASTER	AB	0/0	37/20	108/39	0/0	0/0	145	59	8555
VA7ST	BUD	BC	4/3	101/34	125/36'	5/3	0/0	235	76	17860
VE7UQ	KEN	BC	1/1	28/16	61/26	0/0	0/0	90	43	3870
VA7CAB	CHRIS	BC	0/0	10/4	31/19	1/1	0/0	42	24	1008
VA7IRL	ANTHONY	BC	1/1	11/3	4/3	0/0	0/0	16	7	112
VE9DX	ANDY	NB	3/3	28/20	46/18	15/13	33/16	125	70	8750
QRP										
KO1H	JOHN	RI	0/0	0/0	102/34	0/0	0/0	102	34	3468
DX										
PY2NY	VITOR	PY	0/0	14/11	118/38	43/24	0/0	175	73	12775
ET3TK	MICHAL	ET	0/0	6/6	163/40	0/0	0/0	169	46	7774
5W0DL	DAVE	5W	0/0	22/15	69/34	11/3	0/0	102	52	5304
HG4I	TIBOR	HG	0/0	0/0	114/40	0/0	0/0	114	40	4560
ON6MX	MARTIN	ON	0/0	0/0	88/38	0/0	0/0	88	38	3344
HB9BJJ	ROY	HB	0/0	29/19	20/14	0/0	0/0	49	33	1617
PR7ZZ	JOSE	PY	0/0	0/0	47/25	0/0	2/2	49	27	1323
4X/OK1FIA/P	ZDENEK	4X	0/0	0/0	37/22	0/0	0/0	37	22	814
PT2FM	PHIL	PY	0/0	1/1	34/21	0/0	0/0	35	22	770
UA4FCO	YURI	UA	0/0	0/0	38/19	0/0	0/0	39	19	722
CT4DX	LUIS	CT	0/0	0/0	34/19	0/0	0/0	34	19	646
PR7AR	IRA	PY	0/0	0/0	16/13	6/5	0/0	22	18	396
SQ6FHP	JAREK	SP	0/0	5/5	13/10	0/0	0/0	18	15	270
5U7B	BRUCE	5U	0/0	0/0	17/15	0/0	0/0	17	15	255
PT2AC	PEDRO	PY	0/0	0/0	23/10	0/0	0/0	23	10	230
YL3FW	SERGE	YL	0/0	0/0	10/8	0/0	0/0	10	8	80
LA6FJA	RAG	LA	0/0	4/4	4/4	0/0	0/0	8	8	64
JA1XRH	TAC	JA	0/0	0/0	3/3	0/0	0/0	3	3	9
JR3RIY	NOB	JA	0/0	0/0	0/0	3/3	0/0	3	3	9
MULTI-2										
W5KFT	ED	TX	98/36	214/49	246/48	130/37	24/16	712	186	132432
W5NN	BOB	TX	52/25	161/43	223/50	120/41	63/25	619	184	113896
W6YX	JOHN	CA	51/24	174/48	229/52	93/33	8/1	555	158	87690
N1MGO	BAMBI	MA	89/32	196/48	124/38	96/28	16/10	521	156	81276
NN6NN	DOC	CA	44/20	121/43	217/53	36/15	1/1	419	132	55308
N3XLS	JOE	PA	71/25	120/37	102/35	40/19	7/3	340	119	40460
WA9ALS	ALAN/JOHN	IN	0/0	441/22	20/10	0/0	0/0	61	32	1952

MULTI-2 OPERATORS:
W5KFT: K5PI-K5TWT-KS5V
W5NN: NT5TV-K5GA-K5NZ
W6YX: K6UFO-N7MH-W6LD-KJ9U-KG6RYB
N1MGO: N1MGO-KT1I
NN6NN: W6XK-N6EE
N3XLS: N3XLS-N3KAE
WA9ALS: WD9GMK-WA9ALS

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KE4YZE, W3BUI, WA6FQM, W0PSS, SM7B

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(4) Other Classes Mailed Through the USPS	399	401
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d. Free Distribution by Mail (Samples, complimentary, and other free) (1) Outside-County as Stated on Form 3541	57	57
(2) In-County as Stated on Form 3541	0	0
(3) Other Classes Mailed Through the USPS	32	30
e. Free Distribution Outside the Mail (Carriers or other means)	68	72
f. Total Free Distribution (Sum of 15d. and 15e.)	157	159
g. Total Distribution (Sum of 15c. and 15f)	2,168	2,148
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17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Larry Baltz, Business Manager — Date: September 27, 2004

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5. If the publication had Periodicals authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
6. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
7. Item 17 must be signed.

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PS Form 3526, October 1999 (Reverse)

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
1.250"	$1.55/ft		

IN 6' OR 12' LENGTHS. 6' LENGTHS SHIP UPS. CALL FOR 3/16"AND 1/4" ROD, BAR STOCK, AND EXTRUDED TUBING.

CUSHCRAFT ANTENNAS

13B2/A148-10S	$159/89
A270-6S/A270-10S	$79/99
A3S/A4S	$439/549
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

CALL FOR MORE CUSHCRAFT ITEMS.

FORCE 12–MULTIBAND

C3	10/12/15/17/20m, 7 el	$659
C3E	10/12/15/17/20m, 8 el	$699
C3S	10/12/15/17/20m, 6 el	$579
C3SS	10/12/15/17/20m, 6 el	$599
C4	10/12/15/17/20/40m, 8 el	$799
C4S	10/12/15/17/20/40m, 7 el	$719
C4SXL	10/12/15/17/20/40m, 8 el	$1019
C4XL	10/12/15/17/20/40m, 9 el	$1189
C19XR	10/15/20m, 11 el	$999
C31XR	10/15/20m, 14 el	$1389

CALL FOR MORE FORCE 12 ANTENNAS.

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

CALL FOR MORE BENCHER/BUTTERNUT.

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	$99/209/259
25AG2/3/4	$119/119/129
45AG2/4	$229/249
AS25G/AS455G	$49/109
BPC25G/45G/55G	$89/119/129
BPL25G/45G/55G	$99/129/149
GA25GD/45/55	$79/109/139
GAR30/GAS604	$39/29
SB25G/45/55	$49/109/129
TB3/TB4	$99/119

PLEASE CALL FOR MORE ROHN PRICES.

US TOWER

MA40/MA550	$1039/1599
MA770/MA850	$2619/4049
TMM433SS/HD	$1379/1669
TMM541SS	$1799
TX438/TX455	$1289/1789
TX472/TX489MDPL	$2929/7649
HDX538/HDX555	$1539/2679
HDX572MDPL	$6999

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	$159
GP6, 2m/70cm Vertical	$149
GP9, 2m/70cm Vertical	$189
B10NMO, 2m/70cm Mobile	$39
SB14, 6m/2m/70cm Mobile	$59
SBB224NMO,2m/220/70cm	$69
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$55
SBB7NMO, 2m/70cm Mobile	$69
UHV4/UHV6	$109/149

MORE COMET ITEMS IN STOCK—CALL.

M2 ANTENNAS

50–54 MHZ

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

10/12/15/17/20M MONO

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 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
35-40'	$1569

BOLD IN PART NUMBER SHOWS WIND LOAD CAPACITY. PLEASE CALL FOR MORE UNIVERSAL MODELS. SHIPPED DIRECT TO YOU 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, Antenna Analyzer	$219
269, Antenna Analyzer	$299
941E, Antenna Tuner	$109
945E, Antenna Tuner	$99
949E, Antenna Tuner	$139
969, Antenna Tuner	$169
986, Antenna Tuner	$289
989C, Antenna Tuner	$309
1798, 80–2m Vertical	$249
1796, 40/20/15/10/6/2m Vert	$199

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	Please Call

CALL FOR MORE COAX/CONNECTORS.

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$11/12
1/2"x9"EE / EJ Turnbuckle	$18/19
1/2"x12"EE / EJ Turnbuckle	$21/22
3/16" / 1/4" Big Grips	$5/6

PLEASE CALL FOR MORE HARDWARE.

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" / 14 FT x .12"	$179/109
19 FT x .12" / 21 FT x .18"	$129/235
22 FT x .25" / 24 FT x .25"	$349/379

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 INFO.

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

HUSTLER ANTENNAS

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

HUSTLER RESONATORS IN STOCK.

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

ROTATOR CABLE

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

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 PROJECT.

WEEKDAY HOURS:
9 AM–5 PM CST

SATURDAY HOURS:
9 AM–12 NOON CST

CREDIT CARDS:
M/C, VISA, DISCOVER

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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.